# DEPARTMENT OF THE NAVY
# FY 1998/1999 BUDGET ESTIMATES

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## JUSTIFICATION OF ESTIMATES

## RESEARCH, DEVELOPMENT, TEST & EVALUATION BUDGET ACTIVITY 4

19970325 046

FEBRUARY 1997

DTIC QUALITY INSPECTED 4

Department of the Navy
FY 1998/1999 RDT&E Program

Exhibit R-1

APPROPRIATION: 1319n Research, Development, Test and Evaluation, Navy

DATE: February 1997

| R-1 Line Number | Program Element Number | Item Nomenclature | Budget Activity | Millions of Dollars FY 1996 | FY 1997 | FY 1998 | FY 1999 | Security Classification |
|---|---|---|---|---|---|---|---|---|
| 27 | 0603207N | Air/Ocean Tactical Application | 4 | 19.004 | 17.740 | 16.017 | 20.350 | U |
| 28 | 0603208N | Training System Aircraft | 4 | 2.927 | 2.292 | - | - | U |
| 29 | 0603216N | Aviation Survivability | 4 | 15.636 | 14.865 | 7.859 | 10.323 | U |
| 30 | 0603254N | ASW Systems Development | 4 | 28.860 | 20.928 | 22.869 | 24.879 | U |
| | | (R2/R3 Materials provided in Classified Budget Book) | | | | | | |
| 31 | 0603261N | Tactical Airborne Reconnaissance | 4 | 21.669 | 23.082 | 10.607 | 1.458 | U |
| 32 | 0603382N | Adv Combat System Technology | 4 | 2.657 | 3.700 | 5.232 | 8.823 | U |
| 33 | 0603451N | Tactical Space Operations | 4 | 0.911 | - | - | - | U |
| | | (Prior Year Only -- R2/R3 Not Required) | | | | | | |
| 34 | 0603502N | Surface & Shallow Water Mine Countermeasures | 4 | 54.626 | 84.851 | 58.231 | 67.922 | U |
| 35 | 0603504N | Adv Submarine Combat Systems Dev | 4 | 26.826 | 37.291 | 61.122 | 70.321 | U |
| | | (R2/R3 Materials included in Classified Budget Book) | | | | | | |
| 36 | 0603506N | Surface Ship Torpedo Defense | 4 | 9.060 | 5.491 | - | - | U |
| | | (Prior Year Only -- R2/R3 Not Required) | | | | | | |
| 37 | 0603512N | Carrier Systems Development | 4 | 12.286 | 12.210 | 98.587 | 111.273 | U |
| 38 | 0603513N | Shipboard System Component Dev | 4 | 16.636 | 17.982 | 19.194 | 30.961 | U |
| 39 | 0603514N | Ship Combat Survivability | 4 | 11.167 | 8.188 | 7.050 | 7.768 | U |
| 40 | 0603525N | PILOT FISH | 4 | 75.242 | 90.066 | 118.728 | 119.960 | U |
| | | (Classified -- Material Not Available) | | | | | | |
| 41 | 0603528N | Non-Acoustic ASW | 4 | 9.448 | - | - | - | U |
| | | (Prior Year Only -- R2/R3 Not Required) | | | | | | |
| 42 | 0603536N | RETRACT JUNIPER | 4 | 9.657 | 9.974 | 9.776 | 11.315 | U |
| | | (Classified -- Material Not Available) | | | | | | |
| 43 | 0603542N | Radiological Control | 4 | 3.084 | 2.769 | 3.030 | 3.677 | U |
| 44 | 0603553N | Surface ASW | 4 | 6.012 | 3.781 | 5.704 | 4.717 | U |
| 45 | 0603561N | Advanced Submarine System Dev | 4 | 53.378 | 63.684 | 59.067 | 65.385 | U |
| 46 | 0603562N | Submarine Tactical Warfare Sys | 4 | 8.052 | 4.342 | 4.931 | 5.739 | U |
| 47 | 0603563N | Ship Concept Advanced Design | 4 | 54.946 | 13.242 | 16.198 | 22.254 | U |
| 48 | 0603564N | Ship Prelim Design & Feasibility Studies | 4 | 10.034 | 12.377 | 38.682 | 45.075 | U |
| 49 | 0603570N | Advanced Nuclear Power Systems | 4 | 138.412 | 126.563 | 125.357 | 119.934 | U |
| | | (R2/R3 Materials included in Classified Budget Book) | | | | | | |
| 50 | 0603573N | Adv Surface Machinery Systems | 4 | 80.993 | 66.055 | 49.741 | 52.089 | U |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 51 | 0603576N | CHALK EAGLE | 4 | 109.593 | 142.946 | 137.442 | 124.734 | U |
| | | (Classified -- Material Not Available) | | | | | | |
| 52 | 0603582N | Combat System Integration | 4 | 6.078 | 3.645 | 7.739 | 9.793 | U |
| 53 | 0603609N | Conventional Munitions | 4 | 34.150 | 28.278 | 34.190 | 40.208 | U |
| 54 | 0603610N | Advanced Warhead Dev (MK-50) | 4 | 2.893 | 1.270 | 2.012 | 2.820 | U |
| 55 | 0603611M | Marine Corps Assault Vehicles | 4 | 34.039 | 61.318 | 60.134 | 106.245 | U |
| 56 | 0603612M | MC Mine Countermeasures | 4 | 1.652 | 0.529 | - | 1.985 | U |
| 57 | 0603635M | MC Ground Combat/Support System | 4 | 52.595 | 42.348 | 36.464 | 35.850 | U |
| 58 | 0603654N | Jt Serv Explosive Ordnance Dev | 4 | 8.278 | 5.844 | 10.701 | 11.758 | U |
| 59 | 0603658N | Cooperative Engagement Capability | 4 | - | - | 139.229 | 87.556 | U |
| 60 | 0603711N | Fleet Tactical Development | 4 | 4.024 | 3.261 | - | - | U |
| | | (Prior Year Only -- R2/R3 Not Required) | | | | | | |
| 61 | 0603713N | Ocean Engineering Development | 4 | 5.074 | 8.256 | 12.658 | 9.596 | U |
| 62 | 0603721N | Environmental Protection | 4 | 58.635 | 46.424 | 52.401 | 58.181 | U |
| 63 | 0603724N | Navy Energy Program | 4 | 1.914 | 2.955 | 4.159 | 4.629 | U |
| 64 | 0603725N | Facilities Improvement | 4 | 1.746 | 2.149 | 1.720 | 2.020 | U |
| 65 | 0603734N | CHALK CORAL | 4 | 68.782 | 74.448 | 94.358 | 100.154 | U |
| | | (Classified -- Material Not Available) | | | | | | |
| 66 | 0603746N | RETRACT MAPLE | 4 | 82.645 | 80.369 | 120.033 | 153.238 | U |
| | | (Classified -- Material Not Available) | | | | | | |
| 67 | 0603748N | LINK PLUMERIA | 4 | 20.695 | 34.463 | 29.433 | 16.760 | U |
| | | (Classified -- Material Not Available) | | | | | | |
| 68 | 0603751N | RETRACT ELM | 4 | 31.545 | 23.972 | 21.822 | 11.950 | U |
| | | (Classified -- Material Not Available) | | | | | | |
| 69 | 0603755N | Ship Self Defense | 4 | 309.901 | 280.381 | 9.961 | 12.501 | U |
| 70 | 0603785N | Combat Systems Oceanographic Perf Assessment | 4 | 15.219 | 13.079 | 11.706 | 17.668 | U |
| 71 | 0603787N | Special Processes | 4 | 69.793 | 88.536 | 81.439 | 83.675 | U |
| | | (Classified -- Material Not Available) | | | | | | |
| 72 | 0603790N | NATO Research and Development | 4 | - | 9.528 | 13.330 | 11.267 | U |
| 73 | 0603795N | Gun Weapons Systems Technology | 4 | 32.205 | 50.067 | 37.809 | 52.985 | U |
| 74 | 0603800N | Joint Adv Strike Technology Program | 4 | 79.981 | 246.076 | 448.855 | 443.522 | U |
| 75 | 0603851M | Non -Lethal Warfare Dem/Val | 4 | 4.590 | 9.591 | 16.807 | 23.515 | U |
| 76 | 0603852N | Arsenal Ship DEM/VAL | 4 | - | 23.977 | - | - | U |
| | | (Prior Year Only -- R2/R3 Not Required) | | | | | | |
| 77 | 0603860N | JPALS | 4 | - | - | 2.993 | - | U |
| 78 | 0604327N | Hardened Target Munitions | 4 | - | - | 4.987 | - | U |
| 79 | 0604707N | SEW Architecture/Eng Support | 4 | 5.376 | 4.960 | 4.705 | 6.677 | U |
| | | Total Demonstration and Validation (Dem/Val) | | 1,712.926 | 1,930.143 | 2,135.069 | 2,233.510 | |

Department of the Navy
FY 1998/1999 RDT&E Program
Alphabetic Listing

Exhibit R-1

APPROPRIATION: 1319n Research, Development, Test and Evaluation, Navy

DATE: February 1997

| R-1 Line Number | Program Element Number | Item Nomenclature | Budget Activity | Millions of Dollars FY 1996 | FY 1997 | FY 1998 | FY 1999 | Security Classification |
|---|---|---|---|---|---|---|---|---|
| 32 | 0603382N | Adv Combat System Technology | 4 | 2.657 | 3.700 | 5.232 | 8.823 | U |
| 35 | 0603504N | Adv Submarine Combat Systems Dev | 4 | 26.826 | 37.291 | 61.122 | 70.321 | U |
| | | (R2/R3 Materials included in Classified Budget Book) | | | | | | |
| 50 | 0603573N | Adv Surface Machinery Systems | 4 | 80.993 | 66.055 | 49.741 | 52.089 | U |
| 49 | 0603570N | Advanced Nuclear Power Systems | 4 | 138.412 | 126.563 | 125.357 | 119.934 | U |
| | | (R2/R3 Materials included in Classified Budget Book) | | | | | | |
| 45 | 0603561N | Advanced Submarine System Dev | 4 | 53.378 | 63.684 | 59.067 | 65.385 | U |
| 54 | 0603610N | Advanced Warhead Dev (MK-50) | 4 | 2.893 | 1.270 | 2.012 | 2.820 | U |
| 27 | 0603207N | Air/Ocean Tactical Application | 4 | 19.004 | 17.740 | 16.017 | 20.350 | U |
| 76 | 0603852N | Arsenal Ship DEM/VAL | 4 | - | 23.977 | - | - | U |
| | | (Prior Year Only -- R2/R3 Not Required) | | | | | | |
| 30 | 0603254N | ASW Systems Development | 4 | 28.860 | 20.928 | 22.869 | 24.879 | U |
| | | (R2/R3 Materials provided in Classified Budget Book) | | | | | | |
| 29 | 0603216N | Aviation Survivability | 4 | 15.636 | 14.865 | 7.859 | 10.323 | U |
| 37 | 0603512N | Carrier Systems Development | 4 | 12.286 | 12.210 | 98.587 | 111.273 | U |
| 65 | 0603734N | CHALK CORAL | 4 | 68.782 | 74.448 | 94.358 | 100.154 | U |
| | | (Classified -- Material Not Available) | | | | | | |
| 51 | 0603576N | CHALK EAGLE | 4 | 109.593 | 142.946 | 137.442 | 124.734 | U |
| | | (Classified -- Material Not Available) | | | | | | |
| 52 | 0603582N | Combat System Integration | 4 | 6.078 | 3.645 | 7.739 | 9.793 | U |
| 70 | 0603785N | Combat Systems Oceanographic Perf Assessment | 4 | 15.219 | 13.079 | 11.706 | 17.668 | U |
| 53 | 0603609N | Conventional Munitions | 4 | 34.150 | 28.278 | 34.190 | 40.208 | U |
| 59 | 0603658N | Cooperative Engagement Capability | 4 | - | - | 139.229 | 87.556 | U |
| 62 | 0603721N | Environmental Protection | 4 | 58.635 | 46.424 | 52.401 | 58.181 | U |
| 64 | 0603725N | Facilities Improvement | 4 | 1.746 | 2.149 | 1.720 | 2.020 | U |
| 60 | 0603711N | Fleet Tactical Development | 4 | 4.024 | 3.261 | - | - | U |
| | | (Prior Year Only -- R2/R3 Not Required) | | | | | | |
| 73 | 0603795N | Gun Weapons Systems Technology | 4 | 32.205 | 50.067 | 37.809 | 52.985 | U |
| 78 | 0604327N | Hardened Target Munitions | 4 | - | - | 4.987 | - | U |
| 74 | 0603800N | Joint Adv Strike Technology Program | 4 | 79.981 | 246.076 | 448.855 | 443.522 | U |
| 58 | 0603654N | Joint Serv Explosive Ordnance Dev | 4 | 8.278 | 5.844 | 10.701 | 11.758 | U |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 77 | 0603860N | JPALS | 4 | - | - | 2.993 | - | U |
| 67 | 0603748N | LINK PLUMERIA | 4 | 20.695 | 34.463 | 29.433 | 16.760 | U |
| | | (Classified -- Material Not Available) | | | | | | |
| 55 | 0603611M | Marine Corps Assault Vehicles | 4 | 34.039 | 61.318 | 60.134 | 106.245 | U |
| 57 | 0603635M | MC Ground Combat/Support System | 4 | 52.595 | 42.348 | 36.464 | 35.850 | U |
| 56 | 0603612M | MC Mine Countermeasures | 4 | 1.652 | 0.529 | - | 1.985 | U |
| 63 | 0603724N | Navy Energy Program | 4 | 1.914 | 2.955 | 4.159 | 4.629 | U |
| 72 | 0603790N | NATO Research and Development | 4 | - | 9.528 | 13.330 | 11.267 | U |
| 41 | 0603528N | Non-Acoustic ASW | 4 | 9.448 | - | - | - | U |
| | | (Prior Year Only -- R2/R3 Not Required) | | | | | | |
| 75 | 0603851M | Non -Lethal Warfare Dem/Val | 4 | 4.590 | 9.591 | 16.807 | 23.515 | U |
| 61 | 0603713N | Ocean Engineering Development | 4 | 5.074 | 8.256 | 12.658 | 9.596 | U |
| 40 | 0603525N | PILOT FISH | 4 | 75.242 | 90.066 | 118.728 | 119.960 | U |
| | | (Classified -- Material Not Available) | | | | | | |
| 43 | 0603542N | Radiological Control | 4 | 3.084 | 2.769 | 3.030 | 3.677 | U |
| 68 | 0603751N | RETRACT ELM | 4 | 31.545 | 23.972 | 21.822 | 11.950 | U |
| | | (Classified -- Material Not Available) | | | | | | |
| 42 | 0603536N | RETRACT JUNIPER | 4 | 9.657 | 9.974 | 9.776 | 11.315 | U |
| | | (Classified -- Material Not Available) | | | | | | |
| 66 | 0603746N | RETRACT MAPLE | 4 | 82.645 | 80.369 | 120.033 | 153.238 | U |
| | | (Classified -- Material Not Available) | | | | | | |
| 79 | 0604707N | SEW Architecture/Eng Support | 4 | 5.376 | 4.960 | 4.705 | 6.677 | U |
| 39 | 0603514N | Ship Combat Survivability | 4 | 11.167 | 8.188 | 7.050 | 7.768 | U |
| 47 | 0603563N | Ship Concept Advanced Design | 4 | 54.946 | 13.242 | 16.198 | 22.254 | U |
| 48 | 0603564N | Ship Prelim Design & Feasibility Studies | 4 | 10.034 | 12.377 | 38.682 | 45.075 | U |
| 69 | 0603755N | Ship Self Defense | 4 | 309.901 | 280.381 | 9.961 | 12.501 | U |
| 38 | 0603513N | Shipboard System Component Dev | 4 | 16.636 | 17.982 | 19.194 | 30.961 | U |
| 71 | 0603787N | Special Processes | 4 | 69.793 | 88.536 | 81.439 | 83.675 | U |
| | | (Classified -- Material Not Available) | | | | | | |
| 46 | 0603562N | Submarine Tactical Warfare Sys | 4 | 8.052 | 4.342 | 4.931 | 5.739 | U |
| 34 | 0603502N | Surface & Shallow Water Mine Countermeasures | 4 | 54.626 | 84.851 | 58.231 | 67.922 | U |
| 44 | 0603553N | Surface ASW | 4 | 6.012 | 3.781 | 5.704 | 4.717 | U |
| 36 | 0603506N | Surface Ship Torpedo Defense | 4 | 9.060 | 5.491 | - | - | U |
| | | (Prior Year Only -- R2/R3 Not Required) | | | | | | |
| 31 | 0603261N | Tactical Airborne Reconnaissance | 4 | 21.669 | 23.082 | 10.607 | 1.458 | U |
| 33 | 0603451N | Tactical Space Operations | 4 | 0.911 | - | - | - | U |
| | | (Prior Year Only -- R2/R3 Not Required) | | | | | | |
| 28 | 0603208N | Training System Aircraft | 4 | 2.927 | 2.292 | - | - | U |
| | | Total Demonstration and Validation (Dem/Val) | | 1,712.926 | 1,930.143 | 2,135.069 | 2,233.510 | |

RDT&E, Navy

Program and Financing (in Thousands of dollars) SUMMARY

| Identification code 17-1319-0-1-051 | Budget Plan (amounts for RESEARCH, DEV, TEST & EVAL actions programed) | | | |
|---|---|---|---|---|
| | 1996 actual | 1997 est. | 1998 est. | 1999 est. |
| Program by activities: | | | | |
| Direct program: | | | | |
| 00.0101 Basic research | 371,517 | 352,146 | 382,117 | 399,633 |
| 00.0201 Applied Research | 537,711 | 534,805 | 490,273 | 539,070 |
| 00.0301 Advanced technology development | 472,113 | 501,133 | 433,305 | 470,528 |
| 00.0401 Demonstration/validation | 1,712,323 | 1,930,143 | 2,135,069 | 2,233,510 |
| 00.0501 Engineering and manufacturing development | 2,347,827 | 2,143,869 | 2,085,768 | 2,032,475 |
| 00.0601 Management support | 684,815 | 538,596 | 595,265 | 613,180 |
| 00.0701 Operational system development | 2,345,195 | 1,855,062 | 1,489,225 | 1,467,918 |
| 00.9101 Total direct program | 8,471,501 | 7,855,754 | 7,611,022 | 7,756,314 |
| 01.0101 Reimbursable program | 123,806 | 121,831 | 125,000 | 125,000 |
| 10.0001 Total | 8,595,307 | 7,977,585 | 7,736,022 | 7,881,314 |
| Financing: | | | | |
| Offsetting collections from: | | | | |
| 11.0001 Federal funds(-) | -121,737 | -121,831 | -125,000 | -125,000 |
| 14.0001 Non-Federal sources(-) | -2,069 | | | |
| 17.0001 Recovery of prior year obligations | | | | |
| Unobligated balance available, start of year: | | | | |
| 21.4002 For completion of prior year budget plans | | | | |
| 21.4003 Available to finance new budget plans | -11,600 | -4,500 | | |
| 21.4009 Reprograming from/to prior year budget plans | -22,369 | 4,590 | | |
| 22.1001 Unobligated balance transferred to other accounts | 1,000 | | | |
| 22.2001 Unobligated balance transferred from other accounts (-) | -2,500 | -4,590 | | |
| Unobligated balance available, end of year: | | | | |
| 24.4002 For completion of prior year budget plans | | | | |
| 24.4003 Available to finance subsequent year budget plans | 4,500 | | | |
| 25.0001 Unobligated balance expiring | 2,915 | | | |
| 39.0001 Budget authority | 8,443,447 | 7,851,254 | 7,611,022 | 7,756,314 |
| Budget authority: | | | | |
| 40.0001 Appropriation | 8,508,970 | 8,044,767 | 7,611,022 | 7,756,314 |
| 40.3601 Appropriation rescinded (unob bal) | | -4,500 | | |
| 40.7501 Reduction pursuant to P.L. 104-208 (-), 8037(e) | | -24,834 | | |

| | | | | | |
|---|---|---|---|---|---|
| 41.0001 | Transferred to other accounts (-) | -95,788 | -164,179 | | |
| 42.0001 | Transferred from other accounts | 30,265 | | | |
| 43.0001 | Appropriation (adjusted) | 8,443,447 | 7,851,254 | 7,611,022 | 7,756,314 |

RDT&E, Navy

Program and Financing (in Thousands of dollars) SUMMARY

| Identification code 17-1319-0-1-051 | | Obligations | | | |
|---|---|---|---|---|---|
| | | 1996 actual | 1997 est. | 1998 est. | 1999 est. |
| | Program by activities: | | | | |
| | Direct program: | | | | |
| 00.0101 | Basic research | 376,671 | 338,287 | 380,319 | 398,581 |
| 00.0201 | Applied Research | 516,813 | 574,559 | 492,946 | 536,141 |
| 00.0301 | Advanced technology development | 454,795 | 547,033 | 437,377 | 468,293 |
| 00.0401 | Demonstration/validation | 1,717,965 | 1,904,811 | 2,122,576 | 2,227,616 |
| 00.0501 | Engineering and manufacturing development | 2,349,662 | 2,134,153 | 2,089,256 | 2,035,669 |
| 00.0601 | Management support | 744,549 | 528,098 | 591,864 | 612,105 |
| 00.0701 | Operational system development | 2,265,328 | 1,956,980 | 1,511,178 | 1,469,191 |
| 00.9101 | Total direct program | 8,425,783 | 7,983,921 | 7,625,516 | 7,747,596 |
| 01.0101 | Reimbursable program | 129,842 | 125,000 | 125,000 | 125,000 |
| 10.0001 | Total | 8,555,625 | 8,108,921 | 7,750,516 | 7,872,596 |
| | Financing: | | | | |
| | Offsetting collections from: | | | | |
| 11.0001 | Federal funds(-) | -122,295 | -121,831 | -125,000 | -125,000 |
| 14.0001 | Non-Federal sources(-) | -2,057 | | | |
| 17.0001 | Recovery of prior year obligations | -18,694 | | | |
| | Unobligated balance available, start of year: | | | | |
| 21.4002 | For completion of prior year budget plans | -568,848 | -605,401 | -478,655 | -464,161 |
| 21.4003 | Available to finance new budget plans | -11,600 | -4,500 | | |
| 21.4009 | Reprograming from/to prior year budget plans | | | | |
| 22.1001 | Unobligated balance transferred to other accounts | 1,000 | | | |
| 22.2001 | Unobligated balance transferred from other accounts (-) | -2,500 | -4,590 | | |
| | Unobligated balance available, end of year: | | | | |
| 24.4002 | For completion of prior year budget plans | 605,401 | 478,655 | 464,161 | 472,879 |
| 24.4003 | Available to finance subsequent year budget plans | 4,500 | | | |
| 25.0001 | Unobligated balance expiring | 2,915 | | | |
| 39.0001 | Budget authority | 8,443,447 | 7,851,254 | 7,611,022 | 7,756,314 |
| | Budget authority: | | | | |
| 40.0001 | Appropriation | 8,508,970 | 8,044,767 | 7,611,022 | 7,756,314 |
| 40.3601 | Appropriation rescinded (unob bal) | | -4,500 | | |
| 40.7501 | Reduction pursuant to P.L. 104-208 (-), 8037(e) | | -24,834 | | |

| | | | | | |
|---|---|---|---|---|---|
| 41.0001 | Transferred to other accounts (-) | -95,788 | -164,179 | | |
| 42.0001 | Transferred from other accounts | 30,265 | | | |
| 43.0001 | Appropriation (adjusted) | 8,443,447 | 7,851,254 | 7,611,022 | 7,756,314 |

RDT&E, Navy

Program and Financing (in Thousands of dollars) SUMMARY

| Identification code 17-1319-0-1-051 | Obligations | | | |
|---|---|---|---|---|
| | 1996 actual | 1997 est. | 1998 est. | 1999 est. |
| Relation of obligations to outlays: | | | | |
| 71.0001 Obligations incurred | 8,431,273 | 7,987,090 | 7,625,516 | 7,747,596 |
| 72.1001 Orders on hand, SOY | -142,908 | -161,573 | -161,573 | -161,573 |
| 72.4001 Obligated balance, start of year | 5,155,440 | 4,313,313 | 4,509,333 | 4,896,362 |
| 74.1001 Orders on hand, EOY | 161,573 | 161,573 | 161,573 | 161,573 |
| 74.4001 Obligated balance, end of year | -4,313,313 | -4,509,333 | -4,896,362 | -5,052,077 |
| 77.0001 Adjustments in expired accounts (net) | 130,748 | | | |
| 78.0001 Adjustments in unexpired accounts | -18,694 | | | |
| 90.0001 Outlays (net) | 9,404,119 | 7,791,070 | 7,238,487 | 7,591,881 |

RDT&E, Navy
Object Classification (in Thousands of dollars) SUMMARY

| Identification code 17-1319-0-1-051 | | 1996 actual | 1997 est. | 1998 est. | 1999 est. |
|---|---|---|---|---|---|
| | Direct obligations: | | | | |
| | Personnel compensation: | | | | |
| 111.101 | Full-time permanent | 43,493 | 43,735 | 42,937 | 41,311 |
| 111.301 | Other than full-time permanent | 3,501 | 2,480 | 2,390 | 2,437 |
| 111.501 | Other personnel compensation | 1,515 | 1,475 | 1,521 | 1,492 |
| 111.801 | Special personal services payments | 28 | 27 | 27 | 28 |
| 111.901 | Total personnel compensation | 48,537 | 47,717 | 46,875 | 45,268 |
| 112.101 | Personnel Benefits: Civilian personnel | 9,048 | 10,476 | 10,454 | 10,144 |
| 113.001 | Benefits for former personnel | 310 | 630 | 482 | 438 |
| 121.001 | Travel and transportation of persons | 20,199 | 20,623 | 21,056 | 21,498 |
| 122.001 | Transportation of things | 1,289 | 1,316 | 1,344 | 1,372 |
| 123.101 | Rental payments to GSA | 2,784 | 2,842 | 2,902 | 2,963 |
| 123.201 | Rental payments to others | 1,682 | 1,717 | 1,753 | 1,790 |
| 123.301 | Communications, utilities, and miscellaneous charges | 5,706 | 5,826 | 5,948 | 6,073 |
| 124.001 | Printing and reproduction | 412 | 421 | 430 | 439 |
| 125.101 | Advisory and assistance services | 246,995 | 238,054 | 224,235 | 220,989 |
| 125.201 | Other services with the private sector | 5,014,086 | 4,867,664 | 4,337,807 | 4,503,249 |
| | Purchases goods/services (inter/intra) Fed accounts | | | | |
| 125.301 | Purchase of goods/services from other Fed agencies | 660,632 | 675,166 | 690,020 | 691,000 |
| 125.303 | Purchases from revolving funds | 2,152,752 | 1,843,022 | 2,005,149 | 1,959,183 |
| 126.001 | Supplies and materials | 7,607 | 7,767 | 7,930 | 8,097 |
| 131.001 | Equipment | 8,710 | 8,893 | 9,097 | 9,270 |
| 132.001 | Land and structures | 1,604 | 1,638 | 1,673 | 1,708 |
| 141.001 | Grants, subsidies, and contributions | 243,430 | 250,149 | 258,361 | 264,115 |
| 199.001 | Total Direct obligations | 8,425,783 | 7,983,921 | 7,625,516 | 7,747,596 |
| | Reimbursable obligations: | | | | |
| | Personnel Compensation: | | | | |
| 211.101 | Full-time permanent | 33,284 | 41,446 | 35,817 | 36,545 |
| 211.301 | Other than full-time permanent | 1,237 | 2,884 | 3,125 | 3,192 |
| 211.501 | Other personnel compensation | 551 | 800 | 785 | 807 |
| 211.801 | Special personal services payments | 7 | | | |
| 211.901 | Total personnel compensation | 35,079 | 45,130 | 39,727 | 40,544 |

| | | | | | |
|---|---|---|---|---|---|
| 212.101 | Personnel Benefits: Civilian Personnel | 7,150 | 8,500 | 7,400 | 7,537 |
| 213.001 | Benefits for former personnel | 201 | | | |
| 221.001 | Travel and transportation of persons | 3,404 | 3,475 | 3,548 | 3,623 |
| 222.001 | Transportation of things | 450 | 459 | 469 | 479 |
| 223.101 | Rental payments to GSA | 77 | 79 | 80 | 82 |
| 223.201 | Rental payments to others | 691 | 706 | 720 | 735 |
| 223.301 | Communications, utilities, and miscellaneous charges | 1,317 | 1,345 | 1,373 | 1,402 |
| 224.001 | Printing and reproduction | 196 | 200 | 204 | 209 |

RDT&E, Navy
Object Classification (in Thousands of dollars) SUMMARY

| Identification code 17-1319-0-1-051 | | 1996 actual | 1997 est. | 1998 est. | 1999 est. |
|---|---|---|---|---|---|
| 225.201 | Other services with the private sector | 40,631 | 35,495 | 36,065 | 36,662 |
| | Purchases goods/services (inter/intra) Fed accounts | | | | |
| 225.303 | Purchases from revolving funds | 20,248 | 8,778 | 14,151 | 12,017 |
| 226.001 | Supplies and materials | 10,729 | 10,965 | 11,184 | 11,419 |
| 231.001 | Equipment | 5,684 | 5,803 | 5,925 | 6,050 |
| 241.001 | Grants, subsidies, and contributions | 3,985 | 4,065 | 4,154 | 4,241 |
| 299.001 | Total Reimbursable obligations | 129,842 | 125,000 | 125,000 | 125,000 |
| 999.901 | Total obligations | 8,555,625 | 8,108,921 | 7,750,516 | 7,872,596 |

Comparison of FY 1996 Financing as reflected
in FY 1997 Budget with 1996 Financing as
Shown in the FY 1998 Budget

($ in Thousands)

| | **Financing per FY 1997 Budget** | **Financing Per FY 1998 Budget** | **Increase (+) or Decrease (-)** |
|---|---|---|---|
| Program Requirements (Total) | 8,494,534 | 8,471,501 | -23,033 |
| Program Requirements (Service Account) | (8,494,534) | (8,471,501) | (-23,033) |
| Program Requirements (Reimbursable) | 110,000 | 123,806 | +13,806 |
| **Appropriation (Adjusted)** | 8,604,534 | 8,595,307 | -9,227 |

Explanation of Changes in Financing
($ in Thousands)

The Fiscal Year 1996 program has changed since the presentation of the FY 1997 budget as noted below:

1. Program Requirements (Total). There has been a net decrease to the appropriation (adjusted) of $9,227, as a result of changes in program requirements as noted below.

2. Program Requirements (Service Account). There has been a net increase to the appropriation (adjusted) of $23,033. This net change is comprised of an increase in program requirements ($23,033). These changes included a rescission to the FY 1996 program approved in the FY 1997 DoD Appropriations Act (-$4,500), a rescission for Administrative and Personal Services (-$6,739), a rescission to finance F-16 sales to Jordan (-$45,000) based on reduced inflation rates, reductions reflected on the FY 1996 DoD Omnibus Reprogramming Action to specific programs (-$10,600) and a general reduction based on lower inflation rates (-$2,506), a Supplemental Appropriation added funds to the Shallow Water MCM Demonstrations program (+$10,100), four transfers into the appropriation from a DoD central transfer account were effected to support the RDT&E Counter Drug program added funds (+$30,265), a transfer to consolidated the Non-Lethal Weapons Technology added funds (+$4,590), and the withdrawal of proposed rescissions to specific programs.

3. Program Requirements (Reimbursable). There has been a net increase to the appropriation of $13,808, as a result of changes in reimbursable program requirements ($13,806).

Comparison of FY 1996 Program Requirements as reflected in the FY 1997 Budget with FY 1996 Program Requirements as shown in the FY 1998 Budget

Summary of Requirements ($ In Thousands)

| | Total Program Requirements per FY 1997 Budget | Total Program Requirements per FY 1998 Budget | Increase (+) or Decrease (-) |
|---|---|---|---|
| 01 - Basic Research | 377,362 | 371,516 | -5,846 |
| 02 - Applied Research | 541,372 | 537,711 | -3,661 |
| 03 - Advanced Technology Development | 444,655 | 472,184 | +27,529 |
| 04 - Demonstration and Validation (DEM/VAL) | 1,718,754 | 1,712,926 | -5,828 |
| 05 - Engineering and Manufacturing Development (EMD) | 2,396,003 | 2,344,798 | -51,205 |
| 06 - RDTE Management Support | 571,115 | 684,676 | +113,561 |
| 07 - Operational Systems Development | 2,370,501 | 2,347,690 | -22,811 |
| **Total Fiscal Year Program** | **8,494,534** | **8,471,501** | **-23,033** |

## Explanation by Budget Activity

($ In Thousands)

01. Basic Research (-$5,846) - Changes to this budget activity resulted from a rescission for Administrative and Personal Services (-$1,262), a rescission to finance F-16 sales to Jordan (-$2,004) based on reduced inflation rates, a transfer to support the Small Business Innovative Research (SBIR) program (-$1,935), and other changes in program requirements which required minor reprogrammings (-$645).

02. Applied Research (-$3,661) - Changes to this budget activity resulted from a rescission for Administrative and Personal Services (-$353), a rescission to finance F-16 sales to Jordan (-$2,945) based on reduced inflation rates, a

transfer to support the Small Business Innovative Research (SBIR) program (-$8,371), and other changes in program requirements which required minor reprogrammings (+$8,008).

03. Advanced Technology Development (+$27,529) - Changes to this budget activity resulted from a rescission for Administrative and Personal Services (-$1,844), a rescission to finance F-16 sales to Jordan (-$2,528) based on reduced inflation rates, a transfer to support the Small Business Innovative Research (SBIR) program (-$5,291), two reductions reflected on the FY 1996 DoD Omnibus Reprogramming Action against the Advanced Technology Transition program (-$4,800) and a general reduction based on lower inflation rates (-$1,200), and other changes in program requirements which required minor reprogrammings (-$3,108). Additionally, a Supplemental Appropriation added funds to the Shallow Water MCM Demonstrations program (+$10,100) and a proposed rescission to the AARGM program was withdrawn (+$36,300).

04. Demonstration and Validation (DEM/VAL) (-$5,828) - Changes to this budget activity resulted from a rescission for Administrative and Personal Services (-$1,587), a rescission to finance F-16 sales to Jordan (-$9,144) based on reduced inflation rates, a transfer to support the Small Business Innovative Research (SBIR) program (-$15,807), a reduction reflected on the FY 1996 DoD Omnibus Reprogramming Action based on lower inflation rates (-$343), and other changes in program requirements which required minor reprogrammings (+$16,463). Additionally, a transfer to consolidated the Non-Lethal Weapons Technology added funds (+$4,590).

05. Engineering and Manufacturing Development (EMD) (-$51,205) - Changes to this budget activity resulted from a rescission for Administrative and Personal Services (-$517), a rescission to finance F-16 sales to Jordan (-$12,682) based on reduced inflation rates, a transfer to support the Small Business Innovative Research (SBIR) program (-$42,566), a reduction reflected on the FY 1996 DoD Omnibus Reprogramming Action against the New Design SSN Development program (-$5,800), and other changes in program requirements which required minor reprogrammings (+$10,360).

06. RDTE Management Support (+$113,561) - Changes to this budget activity resulted from a rescission for Administrative and Personal Services (-$273), a rescission to finance F-16 sales to Jordan (-$3,063) based on reduced inflation rates, a transfer to support the Small Business Innovative Research (SBIR) program (+$109,696), and other changes in program requirements which required minor reprogrammings (+$7,201).

07. Operational Systems Development (-$22,811) - Changes to this budget activity resulted from a rescission for Administrative and Personal Services (-$903), a rescission to finance F-16 sales to Jordan (-$12,634) based on reduced inflation rates, a transfer to support the Small Business Innovative Research (SBIR) program (-$32,250), and other changes in program requirements which required minor reprogrammings (-$2,789). Additionally, four transfers into the appropriation from a DoD central transfer account were effected to support the RDT&E Counter Drug program added funds (+$30,265). Additionally, a rescission was effected in the FY 1997 DoD Appropriations Act (-$4,500).

Comparison of FY 1997 Financing as reflected
in FY 1997 Budget with 1997 Financing as
Shown in the FY 1998 Budget

($ In Thousands)

| | Financing per FY 1997 Budget | Financing Per FY 1998 Budget | Increase (+) or Decrease (-) |
|---|---|---|---|
| Program Requirements (Total) | 7,334,734 | 7,855,754 | +521,020 |
| Program Requirements (Service Account) | (7,334,734) | (7,855,754) | (+521,020) |
| Program Requirements (Reimbursable) | 110,000 | 121,831 | +11,831 |
| **Appropriation (Adjusted)** | **7,444,734** | **7,977,585** | **+532,851** |

Explanation of Changes in Financing
($ in Thousands)

The Fiscal Year 1997 program has changed since the presentation of the FY 1997 budget as noted below:

1. Program Requirements (Total). There has been a net increase to the appropriation (adjusted) of $532,851, as a result of changes in program requirements as noted below.

2. Program Requirements (Service Account). There has been a net increase to the appropriation (adjusted) of $521,020, resulting from changes in program requirements as a result of Congressional appropriation changes in the FY 1997 DoD Appropriations Act. These changes included a general undistributed RDT&E reduction of 2 percent (-$164,179)(Section 8136), a general undistributed reduction of 2 percent (-$164,179) to finance Defense Business Operating Fund (DBOF) operating shortfalls (Section 8120), an undistributed reduction for Federally Financed Research and Development Centers (FFRDC)(-$3,822)(Section 8037(e)), an undistributed reduction for non-Federally Financed Research and Development Centers (non-FFRDC)(-$13,299)(Section 8037(h)), a rescission to finance force protection requirements
(-$7,713)(Section 8138), and net changes to specific program changes (+$874,212).

3. Program Requirements (Reimbursable). There has been a net increase to the appropriation of $11,831, as a result of changes in reimbursable program requirements ($11,831).

## Comparison of FY 1997 Program Requirements as reflected in the FY 1997 Budget with FY 1997 Program Requirements as shown in the FY 1998 Budget

Summary of Requirements ($ in Thousands)

| | Total Program Requirements per FY 1997 Budget | Total Program Requirements per FY 1998 Budget | Increase (+) or Decrease (-) |
|---|---|---|---|
| 01 - Basic Research | 387,213 | 352,146 | -35,067 |
| 02 - Applied Research | 463,465 | 534,805 | +71,340 |
| 03 - Advanced Technology Development | 449,342 | 501,133 | +51,791 |
| 04 - Demonstration and Validation (DEM/VAL) | 1,740,955 | 1,930,143 | +189,188 |
| 05 - Engineering and Manufacturing Development (EMD) | 2,048,657 | 2,143,869 | +95,212 |
| 06 - RDTE Management Support | 558,440 | 538,596 | -19,844 |
| 07 - Operational Systems Development | 1,686,662 | 1,855,062 | +168,400 |
| **Total Fiscal Year Program** | **7,334,734** | **7,855,754** | **+521,020** |

Explanation by Budget Activity
($ in Thousands)

01. Basic Research (-$35,067) - Changes to this budget activity resulted from the following Congressional undistributed reductions reflected in the FY 1997 DoD Appropriations Act. These changes included a general undistributed RDT&E reduction of 2 percent (-$7,344)(Section 8136), a general undistributed reduction of 2 percent (-$7,344) to finance Defense Business Operating Fund (DBOF) operating shortfalls (Section 8120), an undistributed reduction for Federally

Financed Research and Development Centers (FFRDC)(-$34)(Section 8037(e)), a rescission to finance force protection requirements (-$345)(Section 8138). Congress also specifically reduced the Defense Research Sciences program (-$20,000).

02. Applied Research (+$71,340) - Changes to this budget activity resulted from the following Congressional undistributed reductions reflected in the FY 1997 DoD Appropriations Act. These changes included a general undistributed RDT&E reduction of 2 percent (-$11,155)(Section 8136), a general undistributed reduction of 2 percent (-$11,155) to finance Defense Business Operating Fund (DBOF) operating shortfalls (Section 8120), an undistributed reduction for Federally Financed Research and Development Centers (FFRDC)(-$214)(Section 8037(e)), an undistributed reduction for non-Federally Financed Research and Development Centers (non-FFRDC)(-$212)(Section 8037(h)), a rescission to finance force protection requirements (-$524)(Section 8138). Congress also specifically added funds to start or continue 26 specific initiatives (+$94,600).

03. Advanced Technology Development (+$51,791) - Changes to this budget activity resulted from the following Congressional undistributed reductions reflected in the FY 1997 DoD Appropriations Act. These changes included a general undistributed RDT&E reduction of 2 percent (-$10,450)(Section 8136), a general undistributed reduction of 2 percent (-$10,450) to finance Defense Business Operating Fund (DBOF) operating shortfalls (Section 8120), an undistributed reduction for Federally Financed Research and Development Centers (FFRDC)(-$272)(Section 8037(e)), an undistributed reduction for non-Federally Financed Research and Development Centers (non-FFRDC)(-$348)(Section 8037(h)), a rescission to finance force protection requirements (-$491)(Section 8138). Congress also specifically added funds to start or continue 15 specific initiatives (+$106,400), while reducing one program (-$34,424). Additionally, changes in program requirements required minor reprogrammings (+$1,826).

04. Demonstration and Validation (DEM/VAL) (+$189,188) - Changes to this budget activity resulted from the following Congressional undistributed reductions reflected in the FY 1997 DoD Appropriations Act. These changes included a general undistributed RDT&E reduction of 2 percent (-$40,282)(Section 8136), a general undistributed reduction of 2 percent (-$40,282) to finance Defense Business Operating Fund (DBOF) operating shortfalls (Section 8120), an undistributed reduction for Federally Financed Research and Development Centers (FFRDC)(-$859)(Section 8037(e)), an undistributed reduction for non-Federally Financed Research and Development Centers (non-FFRDC)(-$1,546)(Section 8037(h)), a rescission to finance force protection requirements (-$1,891)(Section 8138). Congress also specifically added funds to start or continue 20 specific initiatives (+$270,551), while reducing three programs (-$6,144).

Additionally, funds were increased in support of the Near Term Mine Warfare Plan (+$6,285), as well as other changes in program requirements which required minor reprogrammings (+$3,356).

05. Engineering and Manufacturing Development (EMD) (+$95,212) - Changes to this budget activity resulted from the following Congressional undistributed reductions reflected in the FY 1997 DoD Appropriations Act. These changes included a general undistributed RDT&E reduction of 2 percent (-$44,947)(Section 8136), a general undistributed reduction of 2 percent (-$44,947) to finance Defense Business Operating Fund (DBOF) operating shortfalls (Section 8120), an undistributed reduction for Federally Financed Research and Development Centers (FFRDC)(-$282)(Section 8037(e)), an undistributed reduction for non-Federally Financed Research and Development Centers (non-FFRDC) (-$6,522)(Section 8037(h)), a rescission to finance force protection requirements (-$2,116)(Section 8138). Congress also specifically added funds to start or continue 35 specific initiatives (+$243,700), while realigning one program (-$25,000) and reducing two programs (-$11,700). Additionally, funds were decreased in support of the Near Term Mine Warfare Plan (-$6,285), as well as other changes in program requirements which required minor reprogrammings (-$6,689).

06. RDTE Management Support (-$19,844) - Changes to this budget activity resulted from the following Congressional undistributed reductions reflected in the FY 1997 DoD Appropriations Act. These changes included a general undistributed RDT&E reduction of 2 percent (-$11,274)(Section 8136), a general undistributed reduction of 2 percent (-$11,274) to finance Defense Business Operating Fund (DBOF) operating shortfalls (Section 8120), an undistributed reduction for Federally Financed Research and Development Centers (FFRDC)(-$1,956)(Section 8037(e)), an undistributed reduction for non-Federally Financed Research and Development Centers (non-FFRDC) (-$1,111)(Section 8037(h)), a rescission to finance force protection requirements (-$528)(Section 8138). Congress also specifically added funds to start or continue 3 specific initiatives (+$4,500). Additionally, changes in program requirements required minor reprogrammings (+$1,799).

07. Operational Systems Development (+$168,400) - Changes to this budget activity resulted from the following Congressional undistributed reductions reflected in the FY 1997 DoD Appropriations Act. These changes included a general undistributed RDT&E reduction of 2 percent (-$38,727)(Section 8136), a general undistributed reduction of 2 percent (-$38,727) to finance Defense Business Operating Fund (DBOF) operating shortfalls (Section 8120), an undistributed reduction for Federally Financed Research and Development Centers (FFRDC)(-$205)(Section 8037(e)), an undistributed reduction for non-Federally Financed Research and Development Centers (non-FFRDC)(-$3,560)(Section 8037(h)), a rescission to finance force protection requirements (-$1,817)(Section 8138). Congress also

specifically added funds to start or continue 19 specific initiatives (+$257,929), while reducing two programs (-$5,700). Additionally, changes in program requirements required minor reprogrammings (-$793).

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER & Title | FY 1996 Actual | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | FY 2002 Estimate | FY 2003 Estimate | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|
| R0118 Ocean Measurement Sensors | 2,748 | 3,081 | 3,150 | 4,897 | 5,005 | 5,062 | 5,170 | 5,287 | CONT. | CONT. |
| X0513 Air/Ocean Prediction | 1,469 | 1,692 | 1,644 | 2,017 | 2,022 | 2,057 | 2,101 | 2,150 | CONT. | CONT. |
| X0514 Air/Ocean Shipboard Measurements | 1,908 | 1,469 | 1,788 | 2,115 | 2,225 | 2,272 | 2,319 | 2,372 | CONT. | CONT. |
| X0523 Air/Ocean Data Assimilation | 763 | 720 | 736 | 933 | 942 | 963 | 982 | 1,005 | CONT. | CONT. |
| X0948 Precise Timing and Astrometry | 1,241 | 1,187 | 1,242 | 1,491 | 1,497 | 1,533 | 1,566 | 1,601 | CONT. | CONT. |
| X1596 Satellite Ocean Tactical Application | 3,780 | 3,700 | 3,504 | 4,257 | 4,139 | 4,360 | 4,443 | 4,506 | CONT. | CONT. |
| R1987 Mapping, Charting and Geodesy Techniques | 5,036 | 3,909 | 2,036 | 2,231 | 2,264 | 2,314 | 2,363 | 2,416 | CONT. | CONT. |
| X2008 Tactical Ocean Data Assimilation and Prediction | 2,059 | 1,982 | 1,917 | 2,409 | 2,438 | 2,490 | 2,543 | 2,601 | CONT. | CONT. |
| TOTAL | 19,004 | 17,740 | 16,017 | 20,350 | 20,532 | 21,051 | 21,487 | 21,938 | CONT. | CONT. |

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Increases capabilities of shipboard meteorology and oceanography support to tactically optimize weapon, sensor and platform performance in highly variable oceanic and atmospheric conditions. Projects in this program element develop atmospheric and oceanic data assimilation techniques, forecast models, data base management systems and associated software for use in both mainframe and tactical scale computers

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application

afloat. Also developed are algorithms to process remotely sensed satellite data for integration into other systems and tactical applications. The projects also provide for advanced development of specialized oceanographic instrumentation and techniques to measure ocean parameters, new sensors, communications, interface and precise time technologies. Mapping, Charting and Geodesy efforts address the bathymetric and gravimetric needs of the Navy.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: R0118
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Ocean Measurement Sensors

| PROJECT NUMBER & Title | FY 1996 Actual | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | FY 2002 Estimate | FY 2003 Estimate | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|
| R0118 Ocean Measurement Sensors | 2,748 | 3,081 | 3,150 | 4,897 | 5,005 | 5,062 | 5,170 | 5,287 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: R0118, Ocean Measurement Sensors: The project develops highly specialized ultra-high resolution instrumentation systems and measurement techniques in support of CNO-endorsed requirements. The objectives of this project are to develop rapid meteorology and oceanography (METOC) data collection methods for littoral and hinterland regions to 1) provide an in-situ assessment capability for combatants, 2) to provide the regional commander with continuous METOC data for operational use, 3) develop baseline data for predictive models in areas of potential interest. Climatological forecasting does not work in the littoral. The major challenges include collection and dissemination of data in highly variable meteorological and oceanographic conditions under stressful METOC situations in denied or inaccessible areas over relatively long periods of time.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

- (U) ($1,000) Initiated development of METOC sensor packages for Remotely Operated Vehicle / Autonomous Unmanned Vehicles (ROV/AUVs) to support joint littoral operations.
- (U) ($650) Continued miniature dropsonde package for Joint Navy/Army Unmanned Air Vehicle (UAV) and fleet aircraft project/integrate atmospheric E-O sensors.
- (U) ($583) Initiated hinterland clandestine system and sensors for METOC monitoring for joint operations.
- (U) ($289) Initiated Budget Activity (BA) 6.4 transition of expendable mooring system from BA 6.2 Ocean Sensors project.

- (U) ($226) Transitioned miniature Acoustic Doppler Current Profiler (ADCP) development on Covert Littoral Acoustic Mapper (CLAM) to Naval Special Warfare Command.

2. (U) FY 1997 PLAN:

- (U) ($638) Initiate Airborne Combat Data Collection (CDC) capability to support Battlespace METOC data acquisition via fleet assets.
- (U) ($779) Continue sensors developments for ROV/AUV.
- (U) ($580) Transition sensor integration and development of UAV sensors for joint littoral operations to Predator.
- (U) ($465) Continue hinterland clandestine micro system for METOC monitoring for joint operations.
- (U) ($389) Complete development of miniature ADCP for drifting buoys and bottom mount buoys.
- (U) ($170) Continue A-sized expendable mooring development.
- (U) ($60) Portion of extramural program reserved for Small Business Innovation Research assessment.

3. (U) FY 1998 PLAN:

- (U) ($1,000) Continue Airborne Combat Data Collection via fleet assets.
- (U) ($900) Continue sensor developments for ROV/AUV assume incremental vehicle size reductions requiring yearly sensor miniaturization.
- (U) ($346) Complete sensor integration and development of UAV sensors in Pioneer Vehicle.
- (U) ($600) Continue hinterland clandestine micro sensors.
- (U) ($304) Complete A-sized self mooring clandestine buoy.

4. (U) FY 1999 PLAN:

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: R0118
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Ocean Measurement Sensors

- (U) ($1,800) Continue Airborne Combat Data Collection via fleet assets.
- (U) ($1,000) Continue sensor developments for ROV/AUV assume incremental vehicle size reductions requiring yearly sensor miniaturization.
- (U) ($750) Initiate sensor integration and development of UAV sensors in Tier II Plus Vehicles.
- (U) ($900) Complete hinterland clandestine micro sensors.
- (U) ($447) Initiate development of small bottom crawling expendable littoral survey systems.

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 2,848 | 3,212 | 3,215 | 4,942 |
| (U) Adjustments from FY 1997 PRESBUDG: | -100 | -131 | -65 | -45 |
| (U) FY 1998/1999 President s Budget Submission: | 2,748 | 3,081 | 3,150 | 4,897 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1996 funding decreased due to minor pricing adjustment (-18) and SBIR assessment (-82). FY 1997 funding decreased due to undistributed Congressional reductions (-131). FY 1998 funding decreased due to inflation (-8) and Navy Working Capital Fund (NWCF) and minor adjustments (-57). FY 1999 funding decreased due to inflation (-18) and NWCF and minor adjustments (-27).

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: R0118
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Ocean Measurement Sensors

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E: PE 0604218N, Air/Ocean Equipment Engineering - AN/SMQ-11 satellite receiver/recorder system engineering to receive data from DMSP onboard selected ships and shore sites.
PE 0101224N, SSBN Security and Survivability Program.

D. (U) SCHEDULE PROFILE: Not applicable.

FY 1998 RDT&E,N PROGRAM/PROJECT ELEMENT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: R0118
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Ocean Measurement Sensors

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Primary Hardware Development | 2,720 | 2,991 | 3,120 | 4,867 |
| b. Travel | 28 | 30 | 30 | 30 |
| c. SBIR | | 60 | | |
| Total | 2,748 | 3,081 | 3,150 | 4,897 |

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | | |
| NRL | WX | N/A | CONT. | CONT. | 21,909 | 2,748 | 3,081 | 3,150 | 4,897 | CONT. | CONT. |
| Support and Management | | | | | | | | | | | |

FY 1998 RDT&E,N PROGRAM/PROJECT ELEMENT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: R0118
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Ocean Measurement Sensors

Test and Evaluation

GOVERNMENT FURNISHED PROPERTY

| Item Description | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Delivery Date | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | |
| Support and Management | | | | | | | | | | |
| Test and Evaluation | | | | | | | | | | |
| Subtotal Product Development | | | | 21,909 | 2,748 | 3,081 | 3,150 | 4,897 | CONT. | CONT. |
| Subtotal Support and Management | | | | | | | | | | |
| Subtotal Test and Evaluation | | | | | | | | | | |
| Total Project | | | | 21,909 | 2,748 | 3,081 | 3,150 | 4,897 | CONT. | CONT. |

C. (U) FUNDING PROFILE: Not Applicable.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X0513
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Air/Ocean Prediction

(U) COST (Dollars in thousands)

| PROJECT NUMBER & Title | FY 1996 Actual | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | FY 2002 Estimate | FY 2003 Estimate | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|
| X0513 Air/Ocean Prediction | 1,469 | 1,692 | 1,644 | 2,017 | 2,022 | 2,057 | 2,101 | 2,150 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project develops numerical oceanographic and atmospheric models for the Navy's Large Scale Computers at the Fleet Numerical Meteorology and Oceanography Center, Monterey, CA and the Naval Oceanographic Office, Stennis Space Center, MS. Other models under development in this project focus on sea ice, ocean thermal structure and ocean circulation prediction. In addition, the project develops expert systems/artificial intelligence applications which utilize the model output data to afford decision makers a better understanding of operational limitations imposed by the environment.

(U) PROGRAM ACCOMPLISMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

- (U) ($462) Delivered next generation NOGAPS for operational use.
- (U) ($173) Began development of advanced aerosol model.
- (U) ($350) Completed development of and transition tactical scale nested atmospheric forecast model to large scale computer.
- (U) ($484) Continued development of global coupled air-ocean-ice model.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X0513
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Air/Ocean Prediction

2. (U) FY 1997 PLAN:

- (U) ($8) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 U.S.C.638.
- (U) ($395) Begin Massively Parallel Processor (MPP) version of NOGAPS.
- (U) ($227) Continue development of advanced aerosol model.
- (U) ($589) Begin development of shipboard version of tactical scale nested model.
- (U) ($473) Deliver global coupled air-ocean-ice model for operational use.

3. (U) FY 1998 PLAN:

- (U) ($500) Continue development of MPP version of NOGAPS.
- (U) ($200) Continue development of advanced aerosol model.
- (U) ($475) Continue development of shipboard version of tactical scale nested model.
- (U) ($194) Begin development of next-generation tropical cyclone forecast system.
- (U) ($275) Begin development of Arabian Gulf/Arabian Sea ocean model.

4. (U) FY 1999 PLAN:

- (U) ($600) Deliver MPP version of NOGAPS for operational use.
- (U) ($250) Complete development of advanced aerosol model.
- (U) ($550) Deliver shipboard version of tactical scale nested model.
- (U) ($360) Continue development of next-generation tropical cyclone forecast model.
- (U) ($257) Continue development of Arabian Gulf/Arabian ocean model.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X0513
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Air/Ocean Prediction

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 1,474 | 1,764 | 1,739 | 2,034 |
| (U) Adjustments from FY 1997 PRESBUDG: | -5 | -72 | -95 | -17 |
| (U) FY 1998 President s Budget Submit: | 1,469 | 1,692 | 1,644 | 2,017 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding:

(U) FY 1996: Funding decreased due to minor pricing adjustment (-$2K) and (-$3K) for SBIR assessment.
(U) FY 1997: (-$35K) Congressional NWCF adjustment. (-$37K) Congressional undistributed general adjustments.
(U) FY 1998: Minor adjustment (-$2K). NWCF adjustment (-$89K). (-$4K) inflation adjustment.
(U) FY 1999: Minor adjustment (-$2K). NWCF adjustment (-$8K). (-$7K) inflation adjustment.

(U) Schedule: Not applicable.
(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

D. (U) SCHEDULE PROFILE: Not applicable.

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X0513
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Air/Ocean Prediction

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Software Development | 1,444 | 1,659 | 1,619 | 1,987 |
| b. Travel | 25 | 25 | 25 | 30 |
| c. SBIR | | 8 | | |
| Total | 1,469 | 1,692 | 1,644 | 2,017 |

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands): Not Applicable.

C. (U) FUNDING PROFILE: Not Applicable.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X0514
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Air/Ocean Shipboard Measurements

(U) COST (Dollars in thousands)

| PROJECT NUMBER & Title | FY 1996 Actual | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | FY 2002 Estimate | FY 2003 Estimate | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|
| X0514 Air/Ocean Shipboard Measurements | 1,908 | 1,469 | 1,788 | 2,115 | 2,225 | 2,272 | 2,319 | 2,372 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project provides for the advanced development of sensors, communication interfaces, and processing and display equipment to measure, ingest, store, distribute and display atmospheric and oceanographic parameters. Major emphasis areas include tactical workstations, data compression, connectivity, interface technology and the advanced development of new sensors such as active and passive atmospheric profilers for the Shipboard Meteorological and Oceanographic Observing System (SMOOS).

(U) PROGRAM ACCOMPLISMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

- (U) ($649) Completed data connectivity with the TAMPS, Tomahawk and other strike warfare systems. Continue development of data connectivity and interfaces with other C2 systems.
- (U) ($300) Completed development and deliver Basis Image data compression technique. Continue development of additional data compression techniques.

- (U) ($250) Established Advanced Data Visualization Laboratory (ADVL) at the Naval Research Lab (NRL). Begin development of stereoscopic, holographic and dynamic data visualization methods.
- (U) ($388) Completed advanced development of the autonomous sensor suite for small ships. Continue development of additional SMOOS sensors such as a wind profiler, an Infrared (IR) extinction sensor and a hull mounted sea surface temperature sensor.
- (U) ($321) Began Test and Evaluation of Non-development items in support of data connectivity, visualization, interfaces and C2 systems.

2. (U) FY 1997 PLAN:

- (U) ($8) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 U.S.C.638.
- (U) ($457) Complete data connectivity with the AEGIS C2 system. Continue development of data connectivity and interfaces with other C2 systems.
- (U) ($300) Continue Test and Evaluation of Non-developmental items in support of data connectivity, visualization, interfaces and C2 systems.
- (U) ($150) Complete development and deliver Fractal data compression technique. Continue development of additional data compression techniques.
- (U) ($250) Transition stereoscopic data visualization software. Continue development of holographic and dynamic data visualization methods.
- (U) ($304) Complete development of the SMOOS wind profiler. Continue development of additional SMOOS sensors.

3. (U) FY 1998 PLAN:

- (U) ($325) Complete data connectivity with the Joint Standoff Weapons System. Continue development of the

data connectivity with other C2 systems.

- (U) ($300) Continue test and evaluation of non-developmental items in support of data connectivity visualization, interfaces and C2 systems.
- (U) ($150) Complete development of wavelet data compression technique.
- (U) ($263) Complete development of holographic and dynamic data visualization methods.
- (U) ($400) Complete development of additional SMOOS sensors.
- (U) ($350) Begin development of next-generation sensors for the Small Combatant In-situ METOC sensors (SCIMS).

4. (U) FY 1999 PLAN:

- (U) ($353) Complete data connectivity with the Mine Countermeasures Mission Planning System. Continue development of data connectivity with other C2 systems.
- (U) ($375) Complete test and evaluation of non-developmental items in support of data connectivity visualization, interfaces and C2 systems.
- (U) ($350) Continue development of next-generation sensors for SCIMS.
- (U) ($662) Begin development of data connectivity with the Global Command and Control Systems (GCCS).
- (U) ($375) Begin development of advanced aerosol measurement techniques.

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 1,927 | 1,557 | 1,814 | 2,134 |
| (U) Adjustments from FY 1997 PRESBUDG: | -19 | -88 | -26 | -19 |
| (U) FY 1998 President s Budget Submission: | 1,908 | 1,469 | 1,788 | 2,115 |

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X0514
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Air/Ocean Shipboard Measurements

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding:

(U) FY 1996: (-$17K) for SBIR adjustment. (-$2K) reflects other minor Navy fiscal adjustments.
(U) FY 1997: (-$31K) NWCF adjustment. (-$57K) Congressional undistributed general adjustments.
(U) FY 1998: Minor adjustment (-$2K). NCWF adjustment (-$19K). (-$5K) Inflation adjustment.
(U) FY 1999: Minor adjustment (-$2K). NWCF adjustment (-$9K). (-$8K) Inflation adjustment.

(U) Schedule: Not applicable.
(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E: PE 0604218N (Air/Ocean Equipment Engineering). Provides for transition to engineering development.

D. (U) SCHEDULE PROFILE: Not applicable.

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X0514
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Air/Ocean Shipboard Measurements

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Sensor Development | 804 | 592 | 828 | 887 |
| b. Software Development | 689 | 454 | 545 | 763 |
| c. Contractor Engineering Support | 400 | 400 | 400 | 450 |
| d. Travel | 15 | 15 | 15 | 15 |
| e. SBIR | | 8 | | |
| Total | 1,908 | 1,469 | 1,788 | 2,115 |

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands): Not Applicable

C. (U) FUNDING PROFILE: Not Applicable.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X0523
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Air/Ocean Data Assimilation

(U) COST (Dollars in thousands)

| PROJECT NUMBER & Title | FY 1996 Actual | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | FY 2002 Estimate | FY 2003 Estimate | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|
| X0523 Air/Ocean Data Assimilation | 763 | 720 | 736 | 933 | 942 | 963 | 982 | 1,005 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project develops systems and associated software to process and manage remotely-sensed environmental data at Oceanography Centers ashore and on board ships equipped with the AN/SMQ-11 satellite receiver/recorder. The project also supports code conversion, rehosting of software from other sources and modifications to the Tactical Environmental Support System - TESS(3) - Data Base Management System (DBMS).

(U) PROGRAM ACCOMPLISMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

- (U) ($203) Completed development of capability to ingest data from Special Microwave Imagers and Synthetic Aperture Radars. Begin development of capabilities to ingest data from other new satellite sensors such as Ocean Color and Vertical Sounders.
- (U) ($270) Completed modifications to TESS(3) DBMS to accommodate increased capabilities afforded with new hardware and systems software.
- (U) ($150) Continued exploitation of new relational data base management technologies for large scale computers and TESS(3).
- (U) ($140) Began development of object-oriented DBMS.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X0523
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Air/Ocean Data Assimilation

2. (U) FY 1997 PLAN:

- (U) ($3) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 U.S.C.638.
- (U) ($212) Continue development of capabilities to ingest data from other new satellite sensors such as ocean color and altimeters.
- (U) ($205) Transition relational data base management technologies for large scale computers and TESS(3).
- (U) ($300) Continue development of object-oriented DBMS.

3. (U) FY 1998 PLAN:

- (U) ($145) Complete development of capability to ingest data from altimeters. Continue development of capabilities to ingest data from other new satellite sensors such as ocean color and vertical sounders.
- (U) ($150) Complete development of object-oriented DBMS.
- (U) ($271) Begin development of expert systems and variational techniques for DBMS.
- (U) ($170) Begin development of 4-D data assimilation techniques.

4. (U) FY 1999 PLAN:

- (U) ($200) Complete development of capability to ingest data from ocean color sensor. Continue to develop capability to ingest data from other new satellite sensors such as vertical sounders and emergent sensors.
- (U) ($370) Continue development of expert systems and variational techniques for DBMS.
- (U) ($363) Continue development of 4-D data assimilation techniques.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X0523
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Air/Ocean Data Assimilation

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 772 | 751 | 777 | 939 |
| (U) Adjustments from FY 1997 PRESBUDG: | -9 | -31 | -41 | -6 |
| (U) FY 1998 President s Budget Submission: | 763 | 720 | 736 | 933 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding:

(U) FY 1996: (-$9K) for SBIR adjustment.
(U) FY 1997: (-$15K) Congressional NWCF adjustment. (-$16K) Congressional undistributed general adjustments.
(U) FY 1998: Minor adjustment (-$1K). NWCF adjustment (-38K). (-$2K) Inflation adjustment.
(U) FY 1999: Minor adjustment (-$1K). NWCF adjustment (-$2K). (-$3K) Inflation adjustment.

(U) Schedule: Not applicable.
(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E: PE 0604218N (Air/Ocean Equipment Engineering). Provides for transition to engineering development.

D. (U) SCHEDULE PROFILE: Not applicable.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X0523
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Air/Ocean Data Assimilation

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X0523
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Air/Ocean Data Assimilation

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Software Development | 763 | 712 | 736 | 933 |
| b. SBIR | | 8 | | |
| Total | 763 | 720 | 736 | 933 |

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands): Not Applicable.

C. (U) FUNDING PROFILE: Not Applicable.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X0948
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Precise Timing & Astrometry

(U) COST (Dollars in thousands)

| PROJECT NUMBER & Title | FY 1996 Actual | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | FY 2002 Estimate | FY 2003 Estimate | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|
| X0948 Precise Timing and Astrometry | 1,241 | 1,187 | 1,242 | 1,491 | 1,497 | 1,533 | 1,566 | 1,601 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project upgrades the accuracy of the U.S. Naval Observatory's Master Clock System (MCS) for DOD surface, subsurface, air and shore communications, navigation and time dissemination systems. It also develops near-real-time Earth orientation predictions through use of satellite or fiber optics transmission of Very Long Baseline Interferometer (VLBI) data for DOD navigation and positioning systems. It also develops advanced electronic light detectors and interferometry in the optical and infrared wavelength regions for very precise determination of positions of both faint and bright star, satellite tracking, and space debris studies.

(U) PROGRAM ACCOMPLISMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

- (U) ($154) Demonstrated optimum clock stability and precision at the nanosecond level from application of more accurate environmental stability and clock model algorithms.
- (U) ($150) Completed evaluation of stored ion clock physics package.
- (U) ($347) Demonstrated the capability of optical interferometry for precise positions.
- (U) ($390) Initiated demonstration of large scale CCD arrays for electronic astrography.
- (U) ($200) Continued development of infrared capability for optical interferometer.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X0948
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Precise Timing & Astrometry

2. (U) FY 1997 PLAN:

- (U) ($100) Evaluate time transfer capabilities via fiber optic network.
- (U) ($150) Demonstrate capabilities of the Global Positioning System (GPS) for UTI/Polar Motion determination.
- (U) ($400) Complete demonstration of prototype optical interferometer for astrometry.
- (U) ($287) Complete demonstration of large scale CCD arrays for electronic astrography.
- (U) ($250) Complete development of infrared capability for optical interferometer.

3. (U) FY 1998 PLAN:

- (U) ($122) Continue evaluation of time transfer capabilities via fiber optic network.
- (U) ($150) Complete demonstration of GPS for UTI/Polar Motion.
- (U) ($350) Begin Universal Time demonstration.
- (U) ($450) Begin real time VLBI demonstrations.
- (U) ($170) Begin 2 micron measurement capability demonstration.

4. (U) FY 1999 PLAN:

- (U) ($145) Complete evaluation of time transfer capabilities via fiber optic network.
- (U) ($425) Continue Universal Time demonstration.
- (U) ($450) Continue real time VLBI demonstrations.
- (U) ($225) Complete 2 micron measurement capability demonstration.
- (U) ($246) Begin Northern Hemisphere EO/IR sky survey.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X0948
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Precise Timing & Astrometry

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 1,241 | 1,236 | 1,248 | 1,504 |
| (U) Adjustments from FY 1997 PRESBUDG: | 0 | -49 | -6 | -13 |
| (U) FY 1998 President s Budget Submission: | 1,241 | 1,187 | 1,242 | 1,491 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding:

(U) FY 1996: Jordan F-16 financing rescission (-$1K). (-$3K) reflects reduction for administrative and personal services rescission. (+$4K) reflects other minor Navy fiscal adjustments.
(U) FY 1997: (-$24K) Congressional NWCF adjustment. (-$25K) Congressional undistributed general adjustments.
(U) FY 1998: Minor POM adjustment (-$1K). NWCF adjustment (-$2K). (-$3K) Inflation adjustment.
(U) FY 1999: Minor POM adjustment (-$2K). NWCF adjustment (-$6K). (-$5K) Inflation adjustment.

(U) Schedule: Not applicable.
(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E: PE 0604218N (Air/Ocean Equipment Engineering). Provides for transition to engineering development.

D. (U) SCHEDULE PROFILE: Not applicable.

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X0948
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Precise Timing & Astrometry

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Software Development | 1,241 | 1,187 | 1,242 | 1,491 |
| Total | 1,241 | 1,187 | 1,242 | 1,491 |

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands): Not Applicable.

C. (U) FUNDING PROFILE: Not Applicable.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X1596
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Satellite Ocean Tactical Application

(U) COST (Dollars in thousands)

| PROJECT NUMBER & Title | FY 1996 Actual | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | FY 2002 Estimate | FY 2003 Estimate | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|
| X1596 Satellite Ocean Tactical Application | 3,780 | 3,700 | 3,504 | 4,257 | 4,139 | 4,360 | 4,443 | 4,506 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project develops concepts and software techniques for the integration and tactical application of significant oceanographic and atmospheric data derived from satelliteborne sensors. Included are techniques and algorithms for the processing of sensor measurements, conversion of raw signal data to geophysical information, analysis schemes encompassing Artificial Intelligence and Expert Systems, and other satellite data applications and field validation of end products. The software developed under this project is planned for use in Mainframe computers and in the Tactical Environmental Support System - TESS(3).

(U) PROGRAM ACCOMPLISMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

- (U) ($1,418) Completed transition of a cloud pattern recognition expert system. Continue development of additional expert systems for satellite oceanographic and atmospheric feature analyses.
- (U) ($1,692) Continued transition of ocean color sensor and scatterometer data operational capability. Continue development of new algorithms for SAR, altimeters, ocean color sensors and scatterometers.
- (U) ($370) Began development of advanced littoral zone analysis software.
- (U) ($300) Continued fleet exercise participation for validation of algorithms.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X1596
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Satellite Ocean Tactical Application

2. (U) FY 1997 PLAN:

- (U) ($36) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 U.S.C.638.
- (U) ($1,422) Complete Expert System for atmospheric fronts and cumulus cloud analysis. Continue development of additional expert systems for satellite oceanographic and atmospheric feature analyses.
- (U) ($1,402) Continue transition of ocean color sensor and scatterometer data operational capability. Continue development of new algorithms for SAR, Altimeters, Ocean Color sensors and scatterometers.
- (U) ($375) Continue development of advanced littoral zone analysis software.
- (U) ($165) Begin airborne vs. satellite validation of SAR ocean feature analysis.
- (U) ($300) Continue fleet exercise participation for validation of algorithms.

3. (U) FY 1998 PLAN:

- (U) ($1,088) Complete development of expert systems for satellite oceanographic and atmospheric feature analysis.
- (U) ($307) Begin development of SSM/IS atmospheric algorithms.
- (U) ($1,384) Complete transition of Ocean Color sensor and scatterometer data operational capability. Complete development and begin transition of new algorithms for SAR and altimetry data. Continue development and transition of new algorithms for Ocean Color sensors and scatterometers.
- (U) ($175) Begin evaluation of aviation impact variables satellite product.
- (U) ($225) Complete airborne vs. satellite validation of SAR ocean feature analysis.
- (U) ($325) Continue fleet exercise participation for validation of algorithms.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X1596
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Satellite Ocean Tactical Application

4. (U) FY 1999 PLAN:

- (U) ($411) Complete development of SSM/IS atmospheric algorithms.
- (U) ($1,337) Complete transition of new algorithms for SAR and altimetry data. Complete development and transition of new algorithms for Ocean Color sensors and scatterometers.
- (U) ($250) Continue evaluation of aviation impact variables satellite product.
- (U) ($725) Begin development of automated objective processing in the littoral.
- (U) ($594) Begin development of techniques for bathymetry and surf zone
- (U) ($590) Begin development of high resolution micro-topography algorithms.
- (U) ($350) Continue fleet exercise participation for validation of algorithms.

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 3,796 | 3,858 | 4,081 | 4,748 |
| (U) Adjustments from FY 1997 PRESBUDG: | -16 | -158 | -577 | -491 |
| (U) FY 1998 President s Budget Submission: | 3,780 | 3,700 | 3,504 | 4,257 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding:

(U) FY 1996: (-$14K) for SBIR assessment. (-$2K) reflects other minor Navy fiscal adjustments.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X1596
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Satellite Ocean Tactical Application

(U) FY 1997: (-$77K) Congressional NWCF adjustment. (-$81K) Congressional Undistributed General adjustments.
(U) FY 1998: Navy directed adjustment (-$454K) see explanation below. NWCF adjustment (-$114K). (-$9K) Inflation adjustment.

(U) FY 1999: Navy directed adjustment (-$455K) see explanation below. NWCF adjustment (-$20K). (-$16K) Inflation adjustment.

(U) Schedule: Navy directed termination of synthetic aperture radar algorithm development and significant reduction in efforts to exploit multi/hyper spectral sensor technology.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E: Not applicable.

D. (U) SCHEDULE PROFILE: Not applicable.

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X1596
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Satellite Ocean Tactical Application

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Software Development | 3,780 | 3,700 | 3,504 | 4,257 |
| Total | 3,780 | 3,700 | 3,504 | 4,257 |

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands): Not Applicable.

C. (U) FUNDING PROFILE: Not Applicable.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: R1987
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Mapping, Charting & Geodesy Techniques

(U) COST (Dollars in Thousands)

| PROJECT NUMBER & Title | FY 1996 Actual | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | FY 2002 Estimate | FY 2003 Estimate | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|
| R1987 Mapping, Charting and Geodesy Techniques | 5,036 | 3,909 | 2,036 | 2,231 | 2,264 | 2,314 | 2,363 | 2,416 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: R1987, Mapping, Charting & Geodesy (MC&G) Techniques: This project develops new charting and bathymetric survey techniques necessary to reduce the existing 300 ship year shortfall in coastal hydrographic survey requirements. Presently 70% of the world's coastline is not adequately charted. The requirements are originated by Fleet Commander in Chief's (CINCS) and the Commandant of the Marine Corps, and validated by the Defense Mapping Agency in support of littoral and expeditionary operations.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

- (U) ($1,167) Continued development of Airborne Laser capability, implemented tidal correction algorithm and initiated 3D Global Planning System (GPS) integration. Hardened P3 pannier to stand alone. Began software conversion for tactical application. Transitioned technology from DOD International Program to U.S. Navy use.
- (U) ($669) Continued information management and Digital Mapping, Charting & Geodesy Support Program (DMAP) functions in conjunction with Defense Mapping Agency (DMA) requirements.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: R1987
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Mapping, Charting & Geodesy Techniques

- (U) ($1,600) Initiated design and construction of dual mission Remote Minehunting System (RMS) Operational Prototype Oceanographic Remotely Controlled Automation/Remote-Mine hunting Operational Prototype (ORCA/RMOP) vehicle for joint bathymetric and mine hunting in conjunction with Naval Sea Systems Command (NAVSEA) PMS407 (Mine Countermeasures Program Office) and Naval Coastal Systems Center.
- (U) ($1,600) Continued Test and Evaluation of sensors for ORCA Remotely Operated Vehicle / Autonomous Unmanned Vehicle (ROV/AUV), add expendable sensors, automate vehicle controls, installed real time map generation, and integrate meteorology and oceanography (METOC) sensors from 6.3 Ocean Measurement Sensor (OMS) program.

2. (U) FY 1997 PLAN:

- (U) ($2,000) Complete development/acquisition of oceanographic/bathymetric (NAVSEA PMS 407/CNO(N096) dual mission RMS.
- (U) ($475) Transition ORCA demonstration and evaluations, complete automated vehicle controls, continue map generation project, and integration of OMS transitioned sensors.
- (U) ($200) Begin critical design reviews and instrumentation design for joint RMS vehicle in conjunction with Naval Coastal System Center (purchase in FY 1996 delivery in FY 1998).
- (U) ($715) Airborne Laser project, complete tide algorithm, continue multispectral scanner, and add interferometric GPS (3D position) capability.
- (U) ($519) Continue information management and continue DMAP functions. DMAP is the clearing house for reviewing Digital Mapping, Charting and Geodesy requirements.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: R1987
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Mapping, Charting & Geodesy Techniques

3. (U) FY 1998 PLAN:

- (U) ($574) Take delivery of RMS vehicle. Continue instrumentation design and begin demonstration and validation of joint RMS vehicle for remote littoral bathymetry/mine hunting.
- (U) ($815) Continue development of airborne laser bathymetry techniques from fixed wing aircraft for crisis response.
- (U) ($647) Continue information management and DMAP functions.

4. (U) FY 1999 PLAN:

- (U) ($865) Continue instrumentation demonstration and validation of joint RMS vehicle for remote littoral bathymetry/mine hunting.
- (U) ($619) Continue development of airborne laser bathymetry techniques from fixed wing aircraft for crisis response.
- (U) ($747) Continue information management and DMAP functions.

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 5,095 | 2,075 | 2,143 | 2,250 |
| (U) Adjustments from FY 1997 PRESBUDG: | -59 | +1,834 | -107 | -19 |
| (U) FY 1998/1999 President s Budget Submission: | 5,036 | 3,909 | 2,036 | 2,231 |

(U) CHANGE SUMMARY EXPLANATION:

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: R1987
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Mapping, Charting & Geodesy Techniques

(U) Funding: FY 1996 funding decreased due to Jordanian rescission (-6); an Administrative and Personal Services rescission (-16) and SBIR assessment (-37). FY 1997 funding increased due to a Congressional plus-up for Mapping, Charting, and Geodesy (+2,000) and Congressional undistributed reductions (-166). FY 1998 funding decreased due to inflation reduction (-5) and NWCF and minor adjustments (-102). FY 1999 funding decreased due to inflation reduction (-8) and NWCF and minor adjustments (-11).

(U) Schedule: Not applicable.
(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:

(U) PE 0604218N, Air/Ocean Equipment Engineering - AN/SMQ-11 satellite receiver/recorder system engineering to receive data from DMSP onboard selected ships and shore sites.

(U) PE 0101224N, SSBN Security and Survivability Program.
(U) PE 0603502N, Surf and Shallow Water Mine Countermeasures.

D. (U) SCHEDULE PROFILE: Not applicable.

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: R1987
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Mapping, Charting & Geodesy Techniques

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Primary Hardware Development | 3,953 | 2,414 | 950 | 1,071 |
| b. Development, Test & Evaluation | 400 | 600 | 353 | 390 |
| c. Software Development | 413 | 700 | 503 | 540 |
| d. Configuration Management | 150 | 75 | 50 | 50 |
| e. Program Management | 100 | 100 | 150 | 150 |
| f. Travel | 20 | 20 | 30 | 30 |
| Total | 5,036 | 3,909 | 2,036 | 2,231 |

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: R1987
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Mapping, Charting & Geodesy Techniques

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | | |
| NRL | WX | N/A | CONT. | CONT. | 12,115 | 5,036 | 3,909 | 2,036 | 2,231 | CONT. | CONT. |
| Support and Management | | | | | | | | | | | |
| Test and Evaluation | | | | | | | | | | | |

GOVERNMENT FURNISHED PROPERTY

| Item Description | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Delivery Date | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | |
| Support and Management | | | | | | | | | | |

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: R1987
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Mapping, Charting & Geodesy Techniques

Test and Evaluation

| Item Description | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Delivery Date | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|
| Subtotal Product Development | | | | 12,115 | 5,036 | 3,909 | 2,036 | 2,231 | CONT. | CONT. |
| Subtotal Support and Management | | | | | | | | | | |
| Subtotal Test and Evaluation | | | | | | | | | | |
| Total Project | | | | 12,115 | 5,036 | 3,909 | 2,036 | 2,231 | CONT. | CONT. |

C. (U) FUNDING PROFILE: Not Applicable.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X2008
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Tactical Ocean Data Assimilation & Prediction

(U) COST (Dollars in thousands)

| PROJECT NUMBER & Title | FY 1996 Actual | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | FY 2002 Estimate | FY 2003 Estimate | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|
| X2008 Tactical Ocean Data Assimilation and Prediction | | | | | | | | | | |
| | 2,059 | 1,982 | 1,917 | 2,409 | 2,438 | 2,490 | 2,543 | 2,601 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project develops new techniques for environmental data assimilation, for both conventional and satellite remotely sensed data, and includes the development of tactical models to utilize these data. Artificial Intelligence, Expert and Rule-Based systems are emphasized. The goal is to provide the Navy with a real-time, stand-alone, shipboard tactical scale atmospheric and oceanographic forecasting capability in accordance with the Pre-Planned Product Improvement (P3I) plan for the Tactical Environmental Support System - TESS(3).

(U) PROGRAM ACCOMPLISMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

- (U) ($721) Completed incorporation of Expert Systems applications in the EM model. Continue to incorporate Expert Systems' applications in the EO and VLSTrack models.

- (U) ($1,048) Continued development of coastal and enclosed basin tactical scale oceanographic models for the Sea of Okhotsk, Sea of Japan and other selected geographical locations, such as the Persian Gulf, Gulf of Oman and the Arabian Sea in response to requirements.
- (U) ($290) Continued incorporation of expert system/artificial intelligence techniques in the 4D assimilation of tactical scale data.

2. (U) FY 1997 PLAN:

- (U) ($8) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 U.S.C.638.
- (U) ($605) Complete incorporation of Expert Systems' applications in the EO and VLSTrack area.
- (U) ($235) Begin development of surface-to-air and surface-to-surface EO model.
- (U) ($844) Complete development of the Arabian Sea model. Continue development of coastal and enclosed basin tactical scale oceanographic models for the Sea of Okhotsk, Sea of Japan and other selected geographical locations such as the Persian Gulf and the Gulf of Oman in response to requirements.
- (U) ($290) Complete incorporation of expert system/artificial intelligence techniques in the 4D assimilation of tactical scale data.

3. (U) FY 1998 PLAN:

- (U) ($350) Continue development of surface to air and surface to surface EO model.
- (U) ($981) Continue development of coastal and enclosed basin tactical scale oceanographic models for selected geographical locations in response to emergent requirements.
- (U) ($361) Begin development of shipboard shallow water ocean circulation model.
- (U) ($225) Begin development of automated graphical applications for tactical data visualization.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X2008
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Tactical Ocean Data Assimilation & Prediction

4. (U) FY 1999 PLAN:

- (U) ($350) Complete development of surface to air and surface to surface EO model.
- (U) ($1,146) Continue development of coastal and enclosed basin tactical scale oceanographic models for selected geographical locations in response to emergent requirements.
- (U) ($325) Continue development of shipboard shallow water ocean circulation model.
- (U) ($225) Continue development of automated graphical applications for tactical data visualization.
- (U) ($363) Begin development of next generation tide model.

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 2,061 | 2,066 | 2,012 | 2,438 |
| (U) Adjustments from FY 1997 PRESBUDG: | -2 | -84 | -95 | -29 |
| (U) FY 1998 President s Budget Submission: | 2,059 | 1,982 | 1,917 | 2,409 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding:

(U) FY 1996: Reprogrammed to fund the Joint Service Deskbook initiative (-$1K). Jordan F-16 fiunancing rescission (-$2K). -$5K reflects reduction for administrative and personal services rescission.(-$1K) for SBIR assessment. (+$7K) reflects other minor Navy fiscal adjustments.
(U) FY 1997: (-$41K) Congressional NWCF adjustment. (-$43K) Congressional undistributed general adjustments.
(U) FY 1998: Minor POM adjustment (-$2K). NWCF adjustment (-$88K). (-$5K) Inflation adjustment.
(U) FY 1999: Minor POM adjustment (-$3K). NWCF adjustment (-$17K). (-$9K) Inflation adjustment.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X2008
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Tactical Ocean Data Assimilation & Prediction

(U) Schedule: Not applicable.
(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E: PE 0604218N (Air/Ocean Equipment Engineering). TESS 3 will incorporate data assimilation techniques and models.

D. (U) SCHEDULE PROFILE: Not applicable.

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X2008
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Tactical Ocean Data Assimilation & Prediction

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Software Development | 2,059 | 1,982 | 1,917 | 2,409 |
| Total | 2,059 | 1,982 | 1,917 | 2,409 |

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands): Not Applicable.

C. (U) FUNDING PROFILE: Not Applicable.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603208N
PROGRAM ELEMENT TITLE: Training System Aircraft

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| H1142 T-45 Improvements | 1,248 | 435 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 880,248 |
| H1150 Joint Primary Aircraft Trainer | 1,075 | 1,857 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10,252 |
| TOTAL | 2,323 | 2,292 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 890,500 |

**Note:** The JPATS program transfers to Budget Activity 5 in FY98 and out.

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

(U) The T45TS mission is to provide undergraduate jet pilot training for prospective carrier-based Navy and Marine Corps pilots, and selected international students, to meet aircrew requirements through 1990's and beyond. T45TS is a total training system concept which includes aircraft, simulators, academics and contractor logistics support. Planned RDT&E efforts include evaluation of the Cockpit-21 digital display upgrade and continued flight envelope expansion.

(U) The Joint Primary Aircraft Training System (JPATS) is an ACAT 1C, non-developmental item (NDI), commercial off-the-shelf (COTS) pilot program initiated to provide a high degree of commonality between the flight training programs of the United States Navy (USN) and United States Air Force (USAF). The JPATS is to replace the T-34 and T-37 for the USN and USAF, respectively. JPATS shall employ a common primary training system consisting of aircraft, aircrew training devices (simulators, computer-aided instruction terminals, etc.), syllabus, courseware, and logistics support. The JPATS mission will be to train entry-level USN/USAF student pilots and navigators. The U.S. Air Force is the executive service. This element funds Navy participation in the joint program and Navy unique requirements.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603208N
PROGRAM ELEMENT TITLE: Training System Aircraft

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| H1142 T-45 Improvements | 1,248 | 435 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 880,248 |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The T45TS mission is to provide undergraduate jet pilot training for prospective carrier-based Navy and Marine Corps pilot, and selected international students, to meet aircrew requirements in the 1990's and beyond. T45TS is a total training system concept which includes aircraft, simulators, academics and contractor logistics support. Planned RDT&E efforts include evaluation of the Cockpit-21 digital display upgrade and continued flight envelope expansion.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:
   - (U) ($0) Obtained Operational Test and Evaluation Force recommendation for incorporation of CP-21.
   - (U) ($830) Completed technical reviews and analysis to support Operational Assessment of CP21.
   - (U) ($238) Supported and conducted tests to expand the aircraft operating envelope (increase cruise manuverability and expanded stores carriage and release).
   - (U) ($180) Conducted study to define the design and integration of stand alone Global Positioning System (GPS) Inertial Navigation Assembly to meet congressionally mandated incorporation of GPS.

2. (U) FY 1997 PLAN:
   - (U) ($423) Complete tests to expand the aircraft operating envelope (increase cruise maneuverability and expanded stores carriage and release).
   - (U) ($12) Portion of program reserved for Small Business Innovation Research assessment in accordance with 15 U.S.C. 638.

3. (U) FY 1998 PLAN: Not Applicable

4. (U) FY 1999 PLAN: Not Applicable

DATE: February 1997

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

BUDGET ACTIVITY: 4 | PROGRAM ELEMENT: 0603208N | PROGRAM ELEMENT TITLE: Training System Aircraft | PROJECT NUMBER: H1142 | PROJECT TITLE: T-45 Improvements

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 1,278 | 453 | 3,512 | 5,336 |
| (U) Appropriated Value: | | 453 | | |
| (U) Adjustments from Pres Budget: | -30 | -18 | -3,512 | -5,336 |
| (U) FY 1998 President's Budget Submit: | 1,248 | 435 | 0 | 0 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY 1996 adjustment of -$30 thousand and FY 1997 adjustment of -$18 thousand reflects minor pricing adjustments. FY 1998 and FY 1999 reflects reductions for realignment of dollars to the Air Force as lead agency and transfer of remaining dollars to Budget Activity 5, same program element.

(U) Schedule: 4Q/96 CP21 was added due to CP21 contract definitization.
(U) Technical: Not Applicable

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

| | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| • (U)APN-3 | 304,631 | 292,481 | 250,195 | 280,377 | 287,529 | 263,786 | 256,594 | 164,238 | CONT. | CONT. |
| • (U)APN-5 | 8,690 | 5,525 | 5,442 | 19,078 | 25,082 | 25,857 | 27,151 | 27,494 | CONT. | CONT. |

DATE: February 1997

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

BUDGET ACTIVITY: 4 | PROGRAM ELEMENT: 0603208N | PROGRAM ELEMENT TITLE: Training System Aircraft | PROJECT NUMBER: H1142 | PROJECT TITLE: T-45 Improvements

(U) RELATED RDT&E:
(U) PE 0603216N (Aviation Survivability)
(U) PE 0604777N (Navigation/ID System)

D. (U) SCHEDULE PROFILE:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 | TO COMPLETE |
|---|---|---|---|---|---|
| Program Milestones | | | | | |
| Engineering Milestones | 3Q/CP21 OA | | | | |
| T&E Milestones | | | 1Q/3Q DT IIIB<br>2Q/4Q OT IIIB | | |
| Contract Milestones | 4Q/CP21 | | | | |

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603208N
PROGRAM ELEMENT TITLE: Training System Aircraft

(U) COST (Dollars in thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| H1150 Joint Primary Aircraft Trainer System | | | | | | | | | | |
| | 1,075 | 1,857 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10,252 |

**Note:** The JPATS program transfers to Budget Activity 5 in FY98 and out.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Joint Primary Aircraft Training System (JPATS) is an ACAT 1C, non-developmental item (NDI), commercial off-the-shelf (COTS) pilot program initiated to provide a high degree of commonality between the flight training programs of the United States Navy (USN) and United States Air Force (USAF). The JPATS is to replace the T-34 and T-37 for the USN and USAF, respectively. JPATS shall employ a common primary training system, consisting of aircraft, aircrew training devices (simulators, computer-aided instruction terminals, etc.), syllabus, courseware, and logistics support. The JPATS mission will be to train entry-level USN/USAF student pilots and navigators. The U.S. Air Force is the executive service. This element funds Navy participation in the joint program and Navy unique requirements.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603208N PROJECT NUMBER: H1150
PROGRAM ELEMENT TITLE: Training System Aircraft PROJECT TITLE: Joint Primary Aircraft Trainer

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

- (U) ($30) Supported joint qualification test of aircraft and maintained USN test pilot proficiency.
- (U) ($167) Provided specific engineering and logistics support in structures, crew and escape systems disciplines.
- (U) ($360) Supported engineering analysis and program risk.
- (U) ($518) Continued air vehicle technical reviews analysis, test and evaluation data analysis in support of USN requirements.

2. (U) FY 1997 PLAN:

- (U) ($265) Provide manufacturing and quality assurance analysis support.
- (U) ($316) Complete joint qualification test of aircraft and maintain USN test pilot proficiency.
- (U) ($641) Provide engineering and logistics support for Ground Based Training System (GBTS) development, review, test, data analysis, and system deployment.
- (U) ($340) Provide specific engineering and logistics support in structures, crew and escape systems.
- (U) ($139) Complete Navy specific logistics analysis for contractor logistics support.
- (U) ($135) Complete program technical reviews analysis in support of USN requirements.
- (U) ($21) Portion of program reserved for Small Business Innovation Research assessment in accordance with 15 U.S.C. 638.

3. (U) FY 1998 PLAN: NOT APPLICABLE

4. (U) FY 1999 PLAN: NOT APPLICABLE

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603208N PROJECT NUMBER: H1150
PROGRAM ELEMENT TITLE: Training System Aircraft PROJECT TITLE: Joint Primary Aircraft Trainer

B. (U) PROGRAM CHANGE SUMMARY

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 1,699 | 1,952 | 3,512 | 5,336 |
| (U) Appropriated Value: | | 1,952 | | |
| (U) Adjustments from Pres Budget: | -624 | -95 | -3,512 | -6,336 |
| (U) FY 1998 President's Budget Submit: | 1,075 | 1,857 | 0 | 0 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY 1996 adjustment of -$604 thousand reflects below threshold reprogrammings and -$20 thousand for minor pricing adjustments. FY 1997 adjustment of -$95 thousand reflects minor pricing adjustments. The FY 1998 and FY 1999 JPATS program transferred to Budget Activity 5 in FY 1998.

(U) Schedule: A/C QT&E, and CDR changed to reflect revised contractor schedule.

(U) Technical: Not Applicable

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

| FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|
| NOT APPLICABLE | | | | | | | | | |

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603208N PROGRAM ELEMENT TITLE: Training System Aircraft PROJECT NUMBER: H1150 PROJECT TITLE: Joint Primary Aircraft Trainer

(U) RELATED RDT&E:

(U) PE 0603208N (Joint Primary Aircraft Trainer-Budget Activity 5)

D. (U) SCHEDULE PROFILE:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 | TO COMPLETE |
|---|---|---|---|---|---|
| Program Milestones | | | N/A | N/A | N/A |
| Engineering Milestones | 3Q A/C PDR | 1Q A/C CDR | | | |
| T&E Milestones | 3Q A/C QT&E | | | | |
| Contract Milestones | 2Q MD AWARD<br>2Q LOT 2 AWD*<br>4Q LOT 3 AWD* | 3Q LOT 4 AWD* | | | |

* US Air Force manufacturing development contract.

DATE: February 1997

RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603216N
PROGRAM ELEMENT TITLE: Aviation Survivability

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| M0097 Aircrew Impact Injury Prevention | 2,348 | 298 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| W0584 Aircrew Protective Clothing & Devices | 8,663 | 11,059 | 3,256 | 4,301 | 4,321 | 4,416 | 4,493 | 4,605 | CONT. | CONT. |
| W0591 Aircraft Survivability, Vulnerability & Safety | 2,401 | 1,727 | 2,183 | 2,861 | 2,869 | 2,931 | 2,981 | 3,056 | CONT. | CONT. |
| W0592 Aircraft & Ordnance Safety | 1,111 | 819 | 1,290 | 1,718 | 1,722 | 1,760 | 1,790 | 1,834 | CONT. | CONT. |
| W1819 Carrier Aircraft Fire Suppression System | 1,113 | 962 | 1,130 | 1,443 | 1,461 | 1,492 | 1,518 | 1,555 | CONT. | CONT. |
| TOTAL | 15,636 | 14,865 | 7,859 | 10,323 | 10,373 | 10,599 | 10,782 | 11,050 | CONT. | CONT. |

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Aviation Survivability addresses the issues of aircrew and platform survivability, focusing on enhancing overall opportunity for aircrew and platform protection and enhanced performance. The capabilities addressed under this program element counter emerging threats of next generation operational weapons systems and enhance combat effectiveness in future operational mission scenarios.

(U) Two of the projects address aircrew requirements. Aircrew Impact Injury Prevention develops human dynamic and injury response models to impact acceleration and determines the correlation of these dynamic responses with physiological effects and injuries. Aircrew Protective Clothing and Devices develops, demonstrates and validates technology options that enhance aircrew capability to perform assigned missions. In addition, this project ensures aircrew protection against natural and induced environmental or physiological hazards encountered during routine, combat and emergency flight operations as well as during escape, survival and rescue, following loss of aircraft.

DATE: February, 1997

RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603216N
PROGRAM ELEMENT TITLE: Aviation Survivability

(U) The three remaining projects focus on platform survivability, addressing the reductions in aircraft susceptibility to enemy and non-combat threats, as well as aircraft vulnerabilities to conventional, nuclear, chemical, biological, radiological and directed energy weapons. The Aircraft Survivability, Vulnerability and Safety project expands the survivability technology base and develops prototype hardware which is required to improve the survivability of Naval aircraft. Aircraft and Ordnance Safety transitions generic insensitive munitions technology to Navy and Marine Corps air weapons, ensuring that they are insensitive to fast cook-off, slow cook-off, bullet and fragment impact and sympathetic detonation. Carrier Aircraft Fire Suppression Systems develop improved firefighting systems and fire protective measures for aircraft carriers.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION and VALIDATION because it develops and integrates hardware for experimental tests related to specific ship or aircraft applications.

DATE: February 1997

RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603216N
PROGRAM ELEMENT TITLE: Aviation Survivability

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| W0584 Aircrew Protective Clothing and Devices | | | | | | | | | | |
| | 8,663 | 11,059 | 3,256 | 4,301 | 4,321 | 4,416 | 4,493 | 4,605 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project develops, demonstrates, and validates technology options for functionally integrated aircrew emergency and life support systems designed to enhance mission effectiveness, in-flight protection and survivability. The project covers fixed and rotary wing life support and advanced helmet vision systems, and includes escape systems technology, crew centered cockpit design, and cockpit integration programs. It responds to a number of operational requirements documents, including OR# 210-05-88 for Chemical and Biological (CB) Protection, OR# 099-05-087 for Laser Eye Protection, and the joint Air Force/Navy (CAF 208-93) for an Aerospace Control Helmet Mounted Cueing System. In 1996, the various sub-projects were restructured into a combined Advanced Technology Escape System (ATES) and Advanced Integrated Life Support System (AILSS) program. This project is validated by two Non-Acquisition Program Development Documents(NAPPDs), one for an Advanced Technology Crew Station (ATCS), and the other for AILSS.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

(U) ($2,121) Continued development of environmental and combat protection components of the SMART AILSS and Air Warrior (AW) system.

(U) ($882) Designed and continued development of day targeting CRUSADER Advanced Helment Vision System (AHVS).

(U) ($795) Continued integration and evaluation of contractor ATCS designs in Dynamic Flight Simulator (DFS).

(U) ($2,625) Continued development of controllable propulsion systems for ejection seats in USN/USMC aircraft. (Fourth Generation Escape Technology Demonstration Program).

(U) ($1,575) Initiated Full Crew Accommodation (FCA) Technology Upgrade PI programs leading to development and demonstration of an advanced technology escape system.

DATE: February 1997

RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

BUDGET ACTIVITY: 4 | PROGRAM ELEMENT: 0603216N | PROGRAM ELEMENT TITLE: Aviation Survivability | PROJECT NUMBER: W0584 | PROJECT TITLE: Aircrew Protective Clothing and Devices

1. (U) FY 1996 ACCOMPLISHMENTS (CONT):
   (U) ($515) Initiated application of Russian K-36 ejection seat and automatic escape system technology in U.S. escape system programs.

   (U) ($150) Continued Joint Affordable Cockpit Integration Program (JACIP) design development.

2. (U) FY 1997 PLAN:
   (U) ($2,227) Continue Navy tasks for joint development of Helicopter AILSS (HAILSS)/AILSS and AW system.

   (U) ($926) Complete AHVS day targeting Development Testing (DT)-1 evaluation of CRUSADER AHVS.

   (U) ($109) Integrate JACIP designs in ATCS mockups.

   (U) ($950) Complete development of controllable propulsion systems for ejection seats.

   (U) ($2,160) Continue development of the Fourth Generation Escape System.

   (U) ($2,446) Continue workload and mission performance evaluation of contractor ATCS designs.

   (U) ($2,000) Develop and demonstrate 3D visualization architectures.

   (U) ($241) Portion of program reserved for Small Business Innovation Research assessment in accordance with 15 U.S.C. 638.

3. (U) FY 1998 PLAN:

   (U) ($2,319) Initiate Advance Technology Escape System using controllable propulsion.

   (U) ($ 487) Commence demonstration and validation of Russian K-36 ejection seat and automatic escape systems technologies.

   (U) ($ 450) Flight test of HAILSS/AILSS/AW system.

RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N PROGRAM ELEMENT TITLE: Aviation Survivability

PROJECT NUMBER: W0584 PROJECT TITLE: Aircrew Protective Clothing & Devices

4. (U) FY 1999 PLAN:

(U) ($3,179) Continue Advance Technology Escape System using controllable propulsion.

(U) ($672) Complete demonstration and validation of Russian K-36 ejection seat and automatic escape systems technologies.

(U) ($450) Continue flight test of HAILSS/AILSS/AW system.

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President s Budget: | 8,836 | 2,342 | 3,338 | 4,350 |
| (U) Appropriated Value | | 11,542 | | |
| (U) Adjustments from FY 1997 PRESBUDG: | -173 | 8,717 | -82 | -49 |
| (U) FY 1998/99 PRESBUDG Submit: | 8,663 | 11,059 | 3,256 | 4,301 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1996 decrease reflects $10 thousand for the F-16 Jordanian Rescission and $168 thousand for the Small Business Innovation Research assessment offset by an increase of $5 thousand for minor pricing adjustments. FY 1997 net increase reflects $9,200 thousand for a Congressional plus up in support of AILSS/ATES/ATCS. This increase is partially offset by a decrease of $483 thousand for Congressional undistributed reductions. FY 1998 reflects a decrease of $62 thousand for Navy Working Capital Fund (NWCF)carryover and rate adjustments and a reduction of $20 thousand for minor pricing adjustments. FY 1999 reflects a decrease of $29 thousand for minor pricing adjustments and $20 thousand for NWCF rate adjustments.

(U) Schedule: Congressional increase accelerated HAILSS/AILSS, AHVS and ATCS technologies. The increase also funded a one year effort to develop 3D visualization architectures.

(U) Technical: Not Applicable

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not Applicable

(U) RELATED RDT&E:

(U) PE 0602201F (Aerospace Flight Dynamics)
(U) PE 0602233N (Mission Support Equipment)
(U) PE 0604264N (Aircrew Systems Development)
(U) PE 0604706F (Life Support Systems)
(U) PE 0603231F (Crew Systems and Personal Protection Technology)

DATE: September 16, 1996

RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N
PROGRAM ELEMENT TITLE: Aviation Survivability

PROJECT NUMBER: W0584
PROJECT TITLE: Aircrew Protective Clothing & Devices

D. (U) SCHEDULE PROFILE:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 | TO COMPLETE |
|---|---|---|---|---|---|
| PROJECT MILESTONES | K36/AES: INITIATE<br>FCA/TECH UPGRADE: INITIATE 2Q | K36/AES COMPLETE 4Q<br><br>VISUALIZATION ARCHITECTURE INITIATE 2Q | ATES: INITIATE 1Q<br><br>VISUALIZATION ARCHITECTURE COMPLETE 2Q | ATES: CONTINUE | TRANS 2002 |
| ENGINEERING MILESTONES | HAILSS/AILSS/AW SYSTEM DESIGN INITIATE 4Q | HAILSS/AILSS COMPLETE 4Q<br><br>ATCS/JACIP: INTEGRATE 2Q<br><br>ESCAPE/ CONTROLLABLE PROPULSION: COMPLETE DEV 1Q | K36/AES: DEM/VAL 1Q | K-36: COMPLETE DEV 4Q | |
| T&E MILESTONES | | | HAILSS/AILSS/AW FLT TST INITIATE 1Q COMPLETE 4Q<br><br>CRUSADER DAY DT-1 COMPLETE 4Q | | |
| | | CRUSADER DAY DT-1: INITIATE 4Q | | | |
| CONTRACT MILESTONES | ESCAPE:SYSTEM/ SUBSYSTEM/AWARDS | | | | |

DATE: February 1996

RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N PROGRAM ELEMENT TITLE: Aviation Survivability PROJECT NUMBER: W0584 PROJECT TITLE: Aircrew Protective Clothing & Devices

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. System Engineering | 1,030 | 873 | 1,262 | 892 |
| b. Primary Hardware Development | 280 | 1,402 | 800 | 1,300 |
| c. Developmental Test & Evaluation | 440 | 795 | 794 | 1,559 |
| d. Contractor Engineering | 6,150 | 6,098 | 150 | 200 |
| e. Government Engineering | 713 | 1,600 | 200 | 300 |
| f. Travel | 50 | 50 | 50 | 50 |
| g. SBIR Assessment | | 241 | 0 | 0 |
| Total | 8,663 | 11,059 | 3,256 | 4,301 |

DATE: February 1996

RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

BUDGET ACTIVITY: 4 | PROGRAM ELEMENT: 0603216N | PROGRAM ELEMENT TITLE: Aviation Survivability | PROJECT NUMBER: W0584 | PROJECT TITLE: Aircrew Protective Clothing & Devices

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | FY 1996 Actual | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | |
| NAWC, AD | WX | 10/97 | TBD | TBD | 2,037 | 2,830 | 1,836 | 2,212 | CONT | CONT |
| NAWC, AD | Various Contracts | 10/97 | TBD | TBD | 2,856 | 6,148 | 735 | 1,279 | CONT | CONT |
| WPAFB | MIPR | | | | 2,625 | 950 | 0 | 0 | CONT | CONT |
| Miscellaneous | | 10/97 | TBD | TBD | 1,043 | 780 | 575 | 700 | CONT | CONT |
| Support and Management Miscellaneous | | 10/97 | | | 102 | 110 | 110 | 110 | CONT | CONT |
| Test and Evaluation: Not Applicable | | | | | 0 | 0 | 0 | 0 | 0 | 0 |

GOVERNMENT FURNISHED PROPERTY: Not Applicable

| | FY 1996 Actual | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|
| Subtotal Product Development | 8,561 | 10,708 | 3,146 | 4,191 | CONT | CONT |
| Subtotal Support and Management | 102 | 110 | 110 | 110 | CONT | CONT |
| Subtotal Test and Evaluation | 0 | 0 | 0 | 0 | 0 | 0 |
| SBIR Assessment | | 241 | 0 | 0 | 0 | 0 |
| Total Project | 8,663 | 11,059 | 3,256 | 4,301 | CONT | CONT |

DATE: February 1997

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603216N
PROGRAM ELEMENT TITLE: Aviation Survivability

(U) COST (Dollars in thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| WO591 A/C Survivability Vulnerability & Safety | 2,401 | 1,727 | 2,183 | 2,861 | 2,869 | 2,931 | 2,981 | 3,056 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Aircraft Survivability, Vulnerability and Safety. This project develops prototype hardware to improve the survivability of Navy and Marine Corps aircraft. This project addresses the likelihood of an aircraft being hit (susceptibility) and the probability of a kill if the aircraft is hit (vulnerability). Types of programs funded under this project include signature reduction efforts, subsystem and component hardening and development of fire and explosion suppression techniques for fuel systems. Beginning in fiscal year 1996 Chemical and Biological efforts were consolidated under OSD program element 0603384D (Chemical and Biological Defense (Advanced Development)).

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

(U) ($787) Completed development of the AH-1W Survivability Enhancement Program, including effectiveness testing.

(U) ($750) Initiated prototype vulnerability and susceptibility reduction design for aircraft, including power modulation and Infrared (IR) signature suppression.

(U) ($241) Completed survivability RDT&E master plan.

(U) ($394) Continued the development of the Aircraft Survivability Database.

(U) ($229) Continued the development of Survivability Analysis Methodology, including methodology to support the Live Fire Test Law.

DATE: February 1997

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

BUDGET ACTIVITY:4 PROGRAM ELEMENT: 0603216N PROGRAM ELEMENT TITLE: Aviation Survivability PROJECT NUMBER: W0591 PROJECT TITLE: Aircraft Survivability Vulnerability & Safety

2. (U) FY 1997 PLAN:
(U) ($1,152) Develop prototype survivability reduction design for aircraft, including IR signature suppression.

(U) ($224) Continue the development of RDT&E master plan update.

(U) ($329) Continue the development of Aircraft Survivability Database.

(U) ($ 22) Portion of program served for Small Business Innovation Research assessment in accordance with 15 U.S.C. 638.

3. (U) FY 1998 PLAN:
(U) ($1,643) Continue the development of prototype survivability reduction design for aircraft, including IR signature suppression.

(U) ($200) Continue the development of RDT&E master plan update.

(U) ($140) Continue the development of Aircraft Survivability Database.

(U) ($200) Continue the development of Survivability Analysis Methodology.

4. (U) FY 1999 PLAN:
(U) ($2,341) Continue the development of prototype survivability reduction design for aircraft, including IR signature suppression.

(U) ($200) Continue the development of RDT&E master plan update.

(U) ($120) Continue the development of Aircraft Survivability Database.

(U) ($200) Continue the development of Survivability Analysis Methodology.

DATE: February 1997

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N PROGRAM ELEMENT TITLE: Aviation Survivability PROJECT NUMBER: W0591 PROJECT TITLE: Aircraft Survivability Vulnerability & Safety

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 2,428 | 1,801 | 2,233 | 2,895 |
| (U) Appropriated Value | | 1,801 | | |
| (U) Adjustments from FY 1997 PRESBUDG: | -27 | -74 | -50 | -34 |
| (U) FY 1998 PRESBUDG Submit: | 2,401 | 1,727 | 2,183 | 2,861 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY 1996 decrease reflects $2 thousand for the F-16 Jordanian Rescission, $4 thousand for the Small Business Innovation Research assessment and $21 thousadn for minor pricing adjustments. The FY 1997 decrease reflects $74 thousand for Congressional undistributed reductions. The FY 1998 decrease reflects $36 thousand for Navy Working Capital Fund (NWCF) carryover and rate adjustments, and $14 thousand for minor pricing adjustments. The FY 1999 decrease reflects $14 thousand for NWCF rate adjustments and $20 thousand for minor pricing adjustments.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not Applicable

(U) Schedule: Not Applicable

(U) Technical: Not Applicable

(U) RELATED RDT&E:

(U) PE: 0605132D (Joint Technical Coordinating Group on Aircraft Survivability)
0603384D (Chemical/Biological Defense (Advanced Development))

D. (U) SCHEDULE PROFILE: Not Applicable

DATE: February 1997

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N
PROGRAM ELEMENT TITLE: Aviation Survivability
PROJECT NUMBER: W0591
PROJECT TITLE: Aircraft Survivability Vulnerability & Safety

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Primary Hardware Development | 1,818 | 1,655 | 1,933 | 2,611 |
| b. Hardware Test | 93 | 0 | 0 | 0 |
| c. Software Development | 440 | 0 | 200 | 200 |
| d. Travel | 50 | 50 | 50 | 50 |
| e. SBIR Assessment | 0 | 22 | 0 | 0 |
| Total | 2,401 | 1,727 | 2,183 | 2,861 |

DATE: February 1997

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N PROGRAM ELEMENT TITLE: Aviation Survivability

PROJECT NUMBER: W0591 PROJECT TITLE: Aircraft Survivability Vulnerability & Safety

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Actual | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | | |
| Miscelleous contracts under $2.0M: | | | | | | | | | | | |
| Bell Helicopter Fort Worth, TX | CPFF | 6/95 | 1,307 | 1,307 | 1,200 | 107 | | | | 0 | 1,307 |
| Sikorsky Corp. | C/CPIF | 10/97 | | | | | | 817 | 1,035 | 1,750 | CONT |
| Various field activities (Aggregrate Total) | | | | | 958 | 2,244 | 838 | 1,098 | 1,061 | CONT. | CONT |
| Support and Management Travel | | | | | 50 | 50 | 50 | 50 | 50 | CONT. | CONT |
| Test and Evaluation | | | | | 370 | 0 | 0 | 0 | 0 | CONT. | CONT |

DATE: February 1997

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N PROGRAM ELEMENT TITLE: Aviation Survivability PROJECT NUMBER: W0591 PROJECT TITLE: Aircraft Survivability Vulnerability & Safety

GOVERNMENT FURNISHED PROPERTY Not Applicable

| | Total FY 1995 & Prior | FY 1996 Actual | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 2,158 | 2,351 | 1,655 | 2,133 | 2,811 | CONT. | CONT |
| Subtotal Support and Management | 50 | 50 | 50 | 50 | 50 | CONT. | CONT |
| Subtotal Test and Evaluation | 370 | 0 | 0 | 0 | 0 | CONT. | CONT |
| SBIR Assessment | 0 | 0 | 22 | 0 | 0 | 0 | 22 |
| Total Project | 2,578 | 2,401 | 1,727 | 2,183 | 2,861 | CONT. | CONT |

DATE: February 1997

RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603216N
PROGRAM ELEMENT TITLE: Aviation Survivability

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| W0592 | 1,111 | 819 | 1,290 | 1,718 | 1,722 | 1,760 | 1,790 | 1,834 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project transitions Insensitive Munitions (IM) technology from IM Advanced Development (generic technology) to Air Weapon Systems to comply with Chief of Naval Operations direction that all munitions carried aboard Navy ships be insensitive to fast cook-off (FCO), slow cook-off (SCO), bullet and fragment impact (BI and FI), and sympathetic detonation (SD).

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

(U) ($131) Conducted SCO studies of Air-to-Air Missile (AMRAAM) rocket motor.

(U) ($227) Conducted demonstration of 2.75 inch rocket motor IM technology.

(U) ($105) Completed outgassing liner technology for Stand-off Land Attack Missile (SLAM) Hard Target Pentrating (HTP) warhead.

(U) ($ 61) Conducted IM risk reduction effort for Tomahawk HTP warhead.

(U) ($542) Conducted IM evaluation of Sidewinder rocket motor.

(U) ($ 45) Assessed weapons systems IM technology transition plans.

2. (U) FY 1997 PLAN:

(U) ($120) Complete SCO studies of AMRAAM rocket motor.

(U) ($388) Demonstrate IM propellant and composite rocket motor case technologies for High Performance Air-to-Air Missile (HPAAM).

(U) ($310) Investigate IM technologies for the 2.75-inch rocket motor for HYDRA XXI and demonstrate the lowest risk technology.

(U) ($1) Portion of program reserved for Small Business Innovation Research assessment in accordance with 15 U.S.C. 638.

DATE: February 1997

RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

BUDGET ACTIVITY: 4 | PROGRAM ELEMENT: 0603216N | PROGRAM ELEMENT TITLE: Aviation Survivability | PROJECT NUMBER: W0592 | PROJECT TITLE: Aircraft Ordnance and Safety

3. (U) FY 1998 PLAN:

(U) ($426) Conduct demonstration of rocket motor IM technology for HYDRA.

(U) ($456) Initiate evaluation of IM technology for AMRAAM.

(U) ($408) Conduct demonstration of IM propellant and composite motor case technology for HPAAM.

4. (U) FY 1999 PLAN:

(U)($514) Continue demonstration of rocket motor IM technology for HYDRA.

(U)($688) Continue evaluation of IM technology for AMRAAM.

(U)($516) Continue demonstration of IM propellant and composite motor case technology for HPAAM.

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 1,114 | 857 | 1,327 | 1,742 |
| (U) Appropriated Value | | 857 | | |
| (U) Adjustments from PRESBUDG: | -3 | -38 | -37 | -24 |
| (U) FY 1998/99 PRESBUDG Submit | 1,111 | 819 | 1,290 | 1,718 |

(U) Funding: FY 1996 reflects a decrease of $1 thousand for the F-16 Jordanian Rescission and $2 thousand for inor pricing adjustments. FY 1997 reflects a decrease of $38 thousand for Congressional undistributed reductions. FY 1998 reflects a decrease of $30 thousand for Navy Working Capital Fund (NWCF) carryover and rate adjustments, and $7 thousand for minor pricing adjustments. FY 1999 reflects a decrease of $12 thousand for NWCF rate adjustments and $12 thousand for minor pricing adjustments.

(U) Schedule: Not Applicable

(U) Technical: Not Applicable

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not Applicable

D. (U) SCHEDULE PROFILE: Not Applicable

DATE: February 1996

RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603216N

PROGRAM ELEMENT TITLE: Aviation Survivability

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| W1819 Carrier Aircraft Fire Suppression System | 1,113 | 962 | 1,130 | 1,443 | 1,461 | 1,492 | 1,518 | 1,555 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project develops improved firefighting systems and fire protective measures for aircraft related fires on aircraft carriers, including assessment of fire properties, the development of the P-25 shipboard firefighting vehicle, improvements to firefighting agents and delivery systems, and firefighter training improvements.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:
   (U) ($300) Continued development of ordnance cooling requirements.

   (U) ($308) Continued development of environmentally safe test and training simulator.

   (U) ($330) Began fire testing of agents, equipment, and aircraft and ordnance materials.

   (U) ($175) Continued development of flight deck imaging system.

2. (U) FY 1997 PLAN:
   (U) ($335) Continue development of ordnance cooling requirements.

   (U) ($396) Continue development of environmentally safe test and training simulator.

   (U) ($231) Continue fire testing of agents, equipment, and aircraft and ordnance materials.

3. (U) FY 1998 PLAN:
   (U) ($336) Continue development of ordnance cooling requirements.

   (U) ($390) Continue development of environmentally safe test and training simulator.

   (U) ($228) Continue fire testing of agents, equipment, and aircraft and ordnance materials.

   (U) ($176) Continue development of flight deck imaging system.

DATE: February 1996

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N PROGRAM ELEMENT TITLE: Aviation Survivability PROJECT NUMBER: W1819 PROJECT TITLE: Carrier Aircraft Fire Suppression System

4. (U) FY 1999 PLAN:

(U) ($390) Complete development of ordnance cooling requirements.

(U) ($491) Continue development of environmentally safe test and training simulator.

(U) ($317) Continue fire testing of agents, equipment, and aircraft and ordnance materials.

(U) ($245) Continue development of flight deck imaging system.

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 1,114 | 1,003 | 1,199 | 1,461 |
| (U) Appropriated Value | | 1,003 | | |
| (U) Adjustments from PRESBUDG: | -1 | -41 | -69 | -18 |
| (U) FY 1998 PRESBUDG Submit | 1,113 | 962 | 1,130 | 1,443 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1996 reflects a decrease of $1 thousand for the F-16 Jordanian Rescission. FY 1997 reflects a decrease of $41 thousand for Congressional undistributed reductions. FY 1998 reflects a decrease of $63 thousand for Navy Working Capital Fund (NWCF) rate adjustments, and $6 thousand for minor pricing adjustments. FY 1999 reflects decrease of $8 thousand for NWCF rate adjustments, and $10 thousand for minor pricing adjustments.

(U) Schedule: Not Applicable

(U) Technical: Not Applicable

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands) Not Applicable

(U) RELATED RDT&E:

(U) PE: 0603514N (Ship Combat Survivability)

DATE: September 16, 1996

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N PROGRAM ELEMENT TITLE: Aviation Survivability PROJECT NUMBER: W1819 PROJECT TITLE: Carrier Aircraft Fire Suppression System

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 | To Complete |
|---|---|---|---|---|---|
| Program Milestones | Video Trainer Mods 5 & 6 Complete 4Q<br>Initiate Fabrication of Fire Test Simulator 4Q | Video Trainer Mods for P25 Complete | Complete Video Trainer Mods 4Q | Complete Fab of Fire Test Simulator 4Q | |
| Engineering Milestones | | | | | |
| T&E Milestone | | | | | |
| Contract Milestones | | | | | |

DATE: February 1997

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N PROJECT NUMBER: W1819
PROGRAM ELEMENT TITLE: Aviation Survivability PROJECT TITLE: Carrier Aircraft Fire Suppression

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FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 04

PROGRAM ELEMENT: 0603254N
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare (ASW) Systems Development

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| H0490 Project BEARTRAP | 6,176 | 6,014 | 6,358 | 8,453 | 8,068 | 8,208 | 8,243 | 8,445 | CONT. | CONT. |
| H1292 Advanced ASW Sensors and Processors | 10,732 | 7,305 | 3,403 | 5,014 | 2,609 | 985 | 963 | 984 | CONT. | CONT. |
| V0968 Advanced ASW Target | 11,945 | 7,609 | 13,108 | 11,412 | 11,127 | 12,113 | 1,961 | 0 | 0 | 101,914 |
| TOTAL | 28,853 | 20,928 | 22,869 | 24,879 | 21,804 | 21,306 | 11,167 | 9,429 | CONT. | CONT. |

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

(U The mission of Project BEARTRAP (CNO Special Project K-416) is to provide both an airborne Maritime [classified material deleted] data collection capability and an associated high technology, rapid development project for the application of state-of-the-art collection sensors. The project is to be responsive to the need to improve Undersea Warfare systems by effectively collecting information on the newer generation diesel/electric, new construction nuclear, and all types of submarines operating in shallow and/or harsh water environments, as well as combatant and non-combatant surface ships. The program will develop and rapidly deploy new technology concepts in hardware and software to address the emerging littoral threat and improve Undersea Warfare capability in support of Joint Strike and Surveillance operations. The data collection program is to provide [classified material deleted] passive and active acoustic and non-acoustic data essential for the design of Undersea Warfare sensors, weapons, signal processing systems, and software development. BEARTRAP uses developmental and prototype hardware and software installed in specifically configured ASW aircraft to collect [classified material deleted] data, and special ground facilities to conduct post mission analysis of this data. This Project (H0490) includes [classified material deleted] data recording systems, advanced detection and tracking systems, special sensors, advanced signal processing techniques, and special operational techniques. New acoustic and non-acoustic devices and signal processing techniques developed under the Advanced Collection Technology project (H2089) are transitioned to Project BEARTRAP for evaluation and data collection.

FY 1997 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603254N
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare Systems Development

(U) Primary programs being funded during the period identified are the Shallow Water ASW Localization and Attack System (SWALAS), which is a potential replacement for the Directional Command Active Sonobuoy System in harsh water; the Air Deployed Low Frequency Projector (ADLFP) non-acquisition program which will demonstrate low frequency acoustic projector technology; the development of enhancement for Extended Echo Ranging (EER) software for P-3C platforms; the Advanced Ranging Source (ARS) non-acquisition program demonstration of potential enhancements for EER source technology, and the Advanced Multistatic Signal Processing (AMSP) non-acquisition program demonstration of processing concepts to enhance [classified material deleted]. These improvements will increase capabilities in continental shelf and bottom-limited environments typical of regional conflict scenarios.

(U) The Advanced ASW Sensors and Processors project provides improved air ASW warfare platform effectiveness through development of advanced hardware and software associated with airborne acoustic systems. This includes sensors, processing, post-processing, data recording and display capabilities to address regional threat scenarios, against conventionally powered submarines, represented by the German Type 209, and Soviet developed quiet nuclear submarines, represented by the AKULA.

(U) The Advanced ASW Target project develops the next generation fleet Anti-Submarine Warfare (ASW) training target. The MK 30 Mod 2 replaces the aging MK 30 Mod 1 ASW Target providing increased target reliability and availability to the Fleet and updates the target's electro-acoustic capabilities.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental tests related to specific ship or aircraft application.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603254N
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare Systems Development

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| H0490 Project BEARTRAP | 6,176 | 6,014 | 6,358 | 8,453 | 8,068 | 8,208 | 8,243 | 8,445 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION The mission of Project BEARTRAP (CNO Special Project K-416) is to provide both an airborne Maritime [classified material deleted] data collection capability and an associated high technology, rapid development project for the application of state-of-the-art collection sensors. The project is to be responsive to the need to improve Undersea Warfare systems by effectively collecting information on the newer generation diesel/electric, new construction nuclear, and all types of submarines operating in shallow and/or harsh water environments, as well as combatant and non-combatant surface ships. The program will develop and rapidly deploy new technology concepts in hardware and software to address the emerging littoral threat and improve Undersea Warfare capability in support of Joint Strike and Surveillance operations. The data collection program is to provide calibrated passive and active acoustic and non-acoustic data useful in the analysis and design of Undersea Warfare sensors, weapons, signal processing systems, and software development. BEARTRAP uses developmental and prototype hardware and software installed in specifically configured ASW aircrafts to collect [classified material deleted] data, and special ground facilities to conduct post mission analysis of this data. This Project (H0490) includes calibrated data recording systems, advanced detection and tracking systems, special sensors, advanced signal processing techniques, and special operational techniques. New acoustic and non-acoustic devices and signal processing techniques developed under the Advanced Collection Technology project, (PE 0603747N (H2089)) are transitioned to Project BEARTRAP for evaluation and data collection.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

- (U) ($1,008) Continued signal processing developmental efforts to include acoustics transients, active and passive acoustics and non-acoustics.

- (U) ($ 901) Continued hardware and software developmental efforts to equip BEARTRAP aircraft with advanced acoustic and non-acoustic sensor capabilities.

DATE: February 1997

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

BUDGET ACTIVITY: 4 | PROGRAM ELEMENT: 0603254N | PROGRAM ELEMENT TITLE: Anti-Submarine Warfare Systems Development | PROJECT NUMBER: H0490 | PROJECT TITLE: Project BEARTRAP

- (U) ($4,267) Continued acoustic and non-acoustic data collections for [classified material deleted] sensor development and modeling efforts.

2. (U) FY 1997 PLAN:
   - (U) ($ 770) Continue signal processing developmental efforts to include acoustic transients, active and passive acoustics and non-acoustics.
   - (U) ($ 798) Continue hardware and software developmental efforts to equip BEARTRAP aircraft with advanced acoustics and non-acoustic sensor capabilities.
   - (U) ($4,410) Continue acoustic and non-acoustic data collections for [classified material deleted] sensor development and modeling effort.
   - (U) ($ 36) Portion of program reserved for Small Business Innovation Research Assessment in accordance with 15 U.S.C. 638.

3. (U) FY 1998 PLAN:
   - (U) ($ 391) Continue signal processing developmental efforts to include acoustic transients, active and passive acoustics and non-acoustics.
   - (U) ($ 662) Continue hardware and software developmental efforts to equip BEARTRAP aircraft with advanced acoustics and non-acoustic sensor capabilities.
   - (U) ($4,601) Continue acoustic and non-acoustic data collections for [classified material deleted] sensor development and modeling effort.
   - (U) ($ 704) Install acoustic and non-acoustic data collection capability in Helicopter Anti-Submarine Squadron Light (HSL) and Anti-Submarine Squadron (VS) aircraft.

4. (U) FY 1999 PLAN:
   - (U) ($ 691) Continue signal processing developmental efforts to include acoustic transients, active and passive acoustics and non-acoustics.
   - (U) ($1,862) Continue hardware and software developmental efforts to equip BEARTRAP aircraft with advanced acoustics and non-acoustic sensor capabilities.
   - (U) ($4,750) Continue acoustic and non-acoustic data collections for [classified material deleted] sensor development and modeling effort.
   - (U) ($1,150) Install acoustic and non-acoustic data collection capability in HSL and VS aircraft.

DATE: February 1997

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603254N PROGRAM ELEMENT TITLE: Anti-Submarine Warfare Systems Development PROJECT NUMBER: H0490 PROJECT TITLE: Project BEARTRAP

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 6,218 | 6,289 | 7,252 | 8,982 |
| (U) Adjustments from Pres Budget: | -42 | -275 | -894 | -529 |
| (U) FY 1998/99 Presidents Budget Submit: | 6,176 | 6,014 | 6,358 | 8,453 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY96 reduction consists of $23 thousand for the F-16 Jordanian rescission and $19 thousand for the SBIR assessment. FY97 reduction consists of $275 thousand for Congressional undistributed reductions. FY98 reflects reductions of $600 thousand for the P-3C sensor integration; $206 thousand for Navy Working Capital Fund (NWCF) adjustments, $52 thousand for Base Realignment and Closure (BRAC) savings, and $36 thousand for minor pricing adjustments. The FY99 decrease of $529 thousand reflects reductions of $10 thousand due to minor pricing adjustments and $39 thousand for NWCF adjustments and $480 thousand for BRAC savings.

(U) Schedule: Not applicable
(U) Technical: Not Applicable

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands) Not applicable

(U) RELATED RDT&E:
(U) PE 0205620N (Surface ASW Combat System Integration)
(U) PE 0603553N (Surface Anti-Submarine Warfare)
(U) PE 0205632N (MK 48 ADCAP)
(U) PE 0604261N (Acoustic Search Sensors)
(U) PE 0604221N (P-3 Modernization Program)
(U) PE 0604212N (ASW and Other Helicopter Developments)
(U) PE 0603792N (Advanced Technology Demonstrations)
(U) PE 0603747N (Advanced Undersea Warfare Technology)

D. (U) SCHEDULE PROFILE: Not applicable

DATE: February 1997

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603254N
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare Systems Development

PROJECT NUMBER: H0490
PROJECT TITLE: Project BEARTRAP

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Research Support Equip. | 4,716 | 4,713 | 4,937 | 6,321 |
| b. Software Development | 519 | 508 | 685 | 1,162 |
| c. Systems Engineering | 906 | 722 | 701 | 935 |
| d. Travel | 35 | 35 | 35 | 35 |
| e. SBIR Assessment | 0 | 36 | 0 | 0 |
| Total | 6,176 | 6,014 | 6,358 | 8,453 |

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603254N PROJECT NUMBER: H0490
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare Systems Development PROJECT TITLE: Project BEARTRAP

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | | |
| Contracts $2M or more | | | | | | | | | | | |
| Gen Sci Corp NAWCAD(PAX) | C/CPFF | 12/93 | 11,334 | 11,334 | 2,542 | 0 | 0 | 0 | 0 | CONT. | CONT. |
| MISC, all other contracts less than $2M(Aggregate Total) | | | | | 7,509 | 1,012 | 1,185 | 723 | 724 | CONT. | CONT. |
| In-house Support $2M or more | | | | | | | | | | | |
| NAWCAD(PAX) | WX | 10/98 | | | 3,334 | 596 | 2,377 | 2,877 | 4,901 | CONT. | CONT. |
| In-house Support less than $2M (Aggregate Total) | | | | | 20,666 | 4,257 | 2,101 | 2,439 | 2,504 | CONT. | CONT. |
| SBIR Assessment | | | | | | | 36 | | | | |
| Support and Management | | | | | | | | | | | |
| MISC, all other contracts $2M or less(Aggregate Total) | | | | | 599 | 311 | 315 | 319 | 324 | CONT. | CONT. |

Test and Evaluation - Not applicable



DATE: February 1997

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603254N
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare Systems Development

PROJECT NUMBER: H0490
PROJECT TITLE: Project BEARTRAP

GOVERNMENT FURNISHED PROPERTY - Not applicable

| | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Production Development | 34,051 | 5,865 | 5,663 | 6,039 | 8,129 | CONT. | CONT. |
| Subtotal Support and Management | 599 | 311 | 315 | 319 | 324 | CONT. | CONT. |
| Subtotal Test and Evaluation | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SBIR Assessment | | | 36 | | | | 36 |
| Total Project | 34,650 | 6,176 | 6,014 | 6,358 | 8,453 | CONT. | CONT. |

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 04

PROGRAM ELEMENT: 0603254N
PROGRAM ELEMENT TITLE: ASW Systems Development

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| H1292 Advanced ASW Sensors and Processors | 10,732 | 7,305 | 3,403 | 5,014 | 2,609 | 985 | 963 | 984 | CONT | CONT |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program provides air Anti-submarine Warfare (ASW) platform effectiveness through development of advanced hardware and software associated with airborne acoustic systems. This includes sensors, processing, post-processing, data recording and display capabilities to address regional threat scenarios against conventionally powered submarines, represented by the German Type 209, Commonwealth of Independent States (CIS) export KILO, and Soviet developed quiet nuclear submarines, represented by the AKULA. Key objectives are platform accommodations of advanced active and passive sensors, improved detection, classification, localization, tracking and increased capacity and flexibility to handle multi-sensor data loads. Primary programs being funded during the period identified are the Shallow Water ASW Localization and Attack System (SWALAS), which is a potential replacement for the Directional Command Active Sonobuoy System in harsh water, the Air Deployed Low Frequency Projector (ADLFP) non-acquisition program which will demonstrate low frequency acoustic projector technology, the development of enhancement for Extended Echo Ranging (EER) software for P-3C platforms and the Advanced Multi-Static Signal Processing (AMSP) project that will demonstrate potential risk reduction technologies for the Extended Echo Ranging (EER) program which compliments the ADLFP and ARS previously approved NAPDD projects. A future NAPDD effort planned for this program is the In-Buoy Signal Processing (IBSP) project that will demonstrate in-buoy processing approaches to better utilize sonobuoy to aircraft uplink bandwidth, and reduce in-aircraft acoustic processing requirements.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

SWALAS

- (U) ($ 500) Awarded systems analysis contracts and completed Milestone I.
- (U) ($ 373) Provided engineering analysis of SWALAS critical components.
- (U) ($ 640) Provided other engineering support and contract services.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDDGET ACTIVITY: 04 PROGRAM ELEMENT: 0603254N PROJECT NUMBER: H1292
PROGRAM ELEMENT TITLE: ASW Systems Development PROJECT TITLE: Adv ASW Sensors & Processors

ADLFP
- (U) ($1,500) Completed fabrication of Demonstration Model subsystems and initiate model integration.
- (U) ($ 631) Provided engineering support to demonstration model fabrication and integration.
- (U) ($ 664) Conducted data collection during scheduled sea tests and completed data analysis.
- (U) ($ 395) Provided other engineering support and contract services.

ARS
- (U) ($ 540) Completed design and initial safety evaluation of electronic safe and arming device.
- (U) ($ 906) Completed engineering design of ARS demonstration models.
- (U) ($ 355) Conducted data collection during scheduled sea tests and completed data analysis.
- (U) ($ 650) Completed engineering design of small size mechanical safe and arm device.
- (U) ($ 858) Provided other engineering support and contract services.

AMSP
- (U) ($1,652) Conducted baseline bistatic processing performance capability data collection and analysis.
- (U) ($ 481) Conducted new bistatic processing algorithm definition development.
- (U) ($ 587) Provided other engineering support and contract services.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 04 PROGRAM ELEMENT: 0603254N PROJECT NUMBER: H1292
PROGRAM ELEMENT TITLE: ASW Systems Development PROJECT TITLE: Adv ASW Sensors & Processors

2. (U) FY 1997 PLAN:
- (U) ($ 30) Portion of program reserved for Small Business Innovation Research assessment in accordance with 15 U.S.C. 638.

SWALAS
- (U) ($1,150) Award Advanced Development Model (ADM) contracts.
- (U) ($ 550) Provided engineering support to ADM contractor and conduct critical component tests.
- (U) ($ 596) Provided other engineering support and contract services.

ADLFP/ARS
- (U) ($1,332) Complete ADLFP and ARS demonstrations and cost/performance evaluations to determine technology to transition to Advanced Extended Echo Ranging (AEER) source development.
- (U) ($2,600) Complete ADLFP and ARS component development.
- (U) ($ 649) Provided other engineering support and contract services.

AMSP
- (U) ($ 398) Complete bistatic algorithm definition and provide other engineering support and contract services.

3. (U) FY 1998 PLAN:
SWALAS
- (U) ($1,520) Complete ADM design review and subassembly tests.
- (U) ($ 692) Provided engineering support to ADM contractor and conduct critical component tests.
- (U) ($1,191) Provided other engineering support and contract services.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 04 PROGRAM ELEMENT: 0603254N PROJECT NUMBER: H1292
PROGRAM ELEMENT TITLE: ASW Systems Development PROJECT TITLE: Adv ASW Sensors & Processors

4. (U) FY 1999 PLAN:

SWALAS

- (U) ($1,320) Complete ADM over-the-side (OTS) demonstration units.
- (U) ($2,236) Provided engineering support to ADM contractor and complete component acceptance test.
- (U) ($1,458) Provided other engineering support and contract services.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 04 PROGRAM ELEMENT: 0603254N PROJECT NUMBER: H1292
PROGRAM ELEMENT TITLE: ASW Systems Development PROJECT TITLE: Adv ASW Sensors & Processors

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 10,852 | 5,168 | 7,264 | 10,669 |
| (U) Adjustments from Pres Budget: | -120 | +2,137 | -3,861 | -5,655 |
| (U) FY 1998/99 President's Budget Submit: | 10,732 | 7,305 | 3,403 | 5,014 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY 1996 net reduction of $-120 thousand includes a reduction of $-35 thousand for the Jordanian Rescission and $-18 thousand for SBIR transfer and minor program adjustments of $-67 thousand. The FY 1997 net increase of $+2,137 thousand includes a Congressional increase of $+2,500 thousand to complete ADLFP NAPDD and $-363 thousand for Navy Working Capital Fund (NWCF) and minor program adjustments. FY 1998 net reduction of $-3,861 thousand includes a transfer of $-1,489 thousand to fund Air Deployed Active Receiver (ADAR) (0604261N,H2000), $-$2,200 thousand for other sponsor priorities, $-172 thousand for NWCF and minor pricing adjustments. The FY 1999 net reduction of $-5,655 thousand includes $-1,000 for ADAR, $-4,647 thousand reduction as a result of resource sponsor reprioritization of requirements, and a $-8 thousand for NWCF and minor pricing adjustments.

(U) Schedule: SWALAS MS-I delayed from 3Q/96 to 4Q/96 for review and approval of milestone documentation. DT-I is delayed from 1Q/99 to 4Q/00 and Milestone II from 1Q/00 to 4Q/01 due to outyear funding reductions. SWALAS Design Review added 1Q/98 and acceptance test added 4Q/99 as additional program metrics since outyear funding reductions have stretched program by two years. ADLFP/ARS Demo delayed from 2Q/97 to 4Q/97 to evaluate additional projector hardware alternatives. IBSP NAPDD delayed 4Q/99 to 4Q/01, Design Review 4Q/01 to 3Q/02 and Demo Award 2Q/01 to 2Q/02 due to outyear funding reductions. A reprioritization of efforts has caused the AAR Milestones in 4Q/98 and 1Q/99 to be delayed indefinitely.

(U) Technical Not applicable.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 04 PROGRAM ELEMENT: 0603254N PROJECT NUMBER: H1292
PROGRAM ELEMENT TITLE: ASW Systems Development PROJECT TITLE: Adv ASW Sensors & Processors

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not Applicable.

(U) RELATED RDT&E:
(U) PE 0602314N (Undersea Surveillance and Weapons Technology)
(U) PE 0604261N (Acoustic Search Sensors)

D. (U) SCHEDULE PROFILE:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 | TO COMPLETE |
|---|---|---|---|---|---|
| Program Milestones | 4Q SWALAS MS-I | | | | 4Q/01 SWALAS MS-II<br>4Q/01 IBSP NAPDD |
| Engineering Milestones | | | 1Q SWALAS ADM DESIGN REV | | 3Q/02 IBSP DESIGN REVIEW |
| T&E Milestones | | 4Q ADLFP/ARS DEMO | | 4Q SWALAS ACCEPTANCE TEST | 4Q/00 SWALAS DT-I |
| Contract Milestones | 2Q SWALAS System Analysis Award | 2Q SWALAS ADM Award | | | 2Q/02 IBSP DEMO AWARD |

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 04 PROGRAM ELEMENT: 0603254N PROJECT NUMBER: H1292
PROGRAM ELEMENT TITLE: ASW Systems Development PROJECT TITLE: Adv ASW Sensors & Processors

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Hardware Development | 2,540 | 3,750 | 1,520 | 1,320 |
| b. Systems Engineering | 776 | 618 | 200 | 510 |
| c. Government Engineering Support | 2,708 | 846 | 322 | 1,026 |
| d. Development Test and Evaluation | 1,229 | 333 | 150 | 450 |
| e. Software Development | 265 | 36 | 0 | 0 |
| f. Test Support Equipment | 600 | 25 | 0 | 100 |
| g. Test Facilities | 495 | 0 | 20 | 253 |
| h. Program Management Support | 1,459 | 819 | 318 | 456 |
| i. Contractor Support Services | 660 | 848 | 873 | 899 |
| j. SBIR Assessment | | 30 | | |
| Total | 10,732 | 7,305 | 3,403 | 5,014 |

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 04 PROGRAM ELEMENT: 0603254N PROJECT NUMBER: H1292
PROGRAM ELEMENT TITLE: ASW Systems Development PROJECT TITLE: Adv ASW Sensors & Processors

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | | |
| ERAPSCO | C/CPFF | 2/95 | 4,006 | 4,006 | 2,081 | 1,500 | 425 | 0 | 0 | 0 | 4,006 |
| NAWC/AD PAX | RV WX | 10/97 | TBD | TBD | 12,827 | 3,661 | 960 | 522 | 1,536 | CONT | CONT |
| Misc | WX | 10/97 | TBD | TBD | 4,912 | 1,183 | 75 | 0 | 0 | CONT | CONT |
| Misc | C/CPFF | 2/97 | 3,185 | 3,185 | 0 | 1,040 | 2,145 | 0 | 0 | 0 | 3,185 |
| SWALAS ADM Contract | C/CPFF | 10/97 | 4,710 | 4,710 | 0 | 0 | 1,150 | 1,520 | 1,320 | 720 | 4,710 |
| Support and Management | | | | | | | | | | | |
| Misc Field and Contracts (Aggregate under $2 million) | VAR | 10/97 | TBD | TBD | 4,562 | 2,119 | 1,667 | 1,191 | 1,355 | CONT | CONT |
| Test and Evaluation | | | | | | | | | | | |
| Misc Field (Aggregate under $2 Million) | VAR | | TBD | TBD | 6,741 | 1,229 | 358 | 150 | 550 | CONT | CONT |

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 04 PROGRAM ELEMENT: 0603254N PROJECT NUMBER: H1292
PROGRAM ELEMENT TITLE: ASW Systems Development PROJECT TITLE: Adv ASW Sensors & Processors

GOVERNMENT FURNISHED PROPERTY

| Item Description | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Delivery Date | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | |
| NAWC/AD PAX | RV WX | 10/97 | 8/98 | 0 | 0 | 495 | 20 | 253 | CONT | CONT |
| Support and Management | Not applicable. | | | | | | | | | |
| Test and Evaluation | Not applicable. | | | | | | | | | |

| | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Production Development | 19,820 | 7,384 | 5,250 | 2,062 | 3,109 | CONT | CONT |
| Subtotal Support and Management | 4,562 | 2,119 | 1,667 | 1,191 | 1,355 | CONT | CONT |
| Subtotal Test and Evaluation | 6,741 | 1,229 | 358 | 150 | 550 | CONT | CONT |
| SBIR Assessment | | | 30 | | | | 30 |
| Total Project | 31,123 | 10,732 | 7,305 | 3,403 | 5,014 | CONT | CONT |

FY 1998 RDT&E,N BUDGET JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603254N
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare (ASW) Systems Devlopment

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| V0968 MK-30 Target Development | 11,945 | 7,609 | 13,108 | 11,412 | 11,127 | 12,113 | 1,961 | 0 | 0 | 101,914 |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project develops the next generation fleet Anti-Submarine Warfare (ASW) Training target. The mission of the MK 30 Mod 2 ASW Training Target System is to provide cost-effective ASW training for Navy platforms (surface ships, submarines, and aircraft) by using a highly reliable and maintainable unmanned undersea vehicle to simulate the dynamics, acoustics, and magnetic signatures of submarines and act as a target for the ASW sensors and torpedoes to detect, classify, track, and pursue in a realistic, operational training environment.

(U) The target will be capable of simulating the Russian and Rest of the World (ROW) submarine threats anticipated in the twenty-first century littoral warfare environment with the degree of simulation fidelity required for effective ASW training, especially simulation of the shallow water, slower speed and conventionally powered submarine.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:
   - (U) ($5,059) Completed D&V phase development contract, including MK 30 Mod 2 D&V prototype fabrication; complete risk mitigation and contractor testing, culminating with in-water static acoustic test.
   - (U) ($2,384) Continued program and technical management of MK 30 Mod 2 development. Prepared documentation for Program (Milestone) Review. Conducted Program Review in June.
   - (U) ($871) Continued GFE battery development.
   - (U) ($139) Travel and technical trade studies.
   - (U) ($3,492) Awarded E&MD phase development contract.

FY 1998 RDT&E,N BUDGET JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603254N PROJECT NUMBER V0968
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare (ASW) Systems Development PROJECT TITLE: MK30 Target Development

2. (U) FY 1997 PLAN:

- (U) ($4,892) Continue E&MD phase development contract. Conduct System Transition Review. Continue MK 30 Mod 2 Advanced Development Model (ADM) engineering and integration. Hold Provisioning Conference to review Logistic Support Analysis (LSA) data.
- (U) ($1,391) Continue program and technical management of MK 30 Mod 2 development.
- (U) ($525) Continue GFE (battery) development program at Government facility.
- (U) ($590) Test and Evaluation (DT-II). Continue integration and system testing of the prototype components and subsystems.
- (U) ($148) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.
- (U) ($63) Travel and other miscellaneous expenses.

3. (U) FY 1998 PLAN:

- (U) ($9,908) Continue E&MD phase development contract. Conduct subsystem and system Critical Design Reviews (CDR). Initiate manufacture of EDM hardware and support & test equipment. Continue system level testing with ADM hardware.
- (U) ($1,450) Continue program and technical management of MK 30 Mod 2 development.
- (U) ($800) Continue GFE battery development program.
- (U) ($850) Test and Evaluation (DT-II). Continue system testing of Advanced Development Model to verify support system performance.
- (U) ($100) Travel and other miscellaneous expenses.

FY 1998 RDT&E,N BUDGET JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603254N PROGRAM ELEMENT TITLE: Anti-Submarine Warfare (ASW) Systems Development PROJECT NUMBER: V0968 PROGRAM TITLE: MK30 Target Development

4. (U) FY 1999 PLAN:

- (U) ($9,587) Continue E&MD phase development contract. Update Program Environmental Analysis.
- (U) ($1,450) Continue program and technical management of MK 30 Mod 2 development.
- (U) ($275) Complete GFE battery development.
- (U) ($100) Travel and other miscellaneous expenses.

FY 1998 RDT&E,N BUDGET JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603254N PROJECT NUMBER: V0968
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare (ASW) Systems Development PROGRAM TITLE: MK30 Systems Development

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 12,146 | 8,016 | 10,938 | 15,656 |
| (U) Adjustments from FY 1997 PRESBUDG: | -201 | -407 | +2,170 | -4,244 |
| (U) FY1998/1999 PRESBUDG Submit: | 11,945 | 7,609 | 13,108 | 11,412 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1996: $201 reduction result of Jordanian recission and SBIR transfer. FY 1997: $407 reduction is result of Navy Working Capital Fund (NWCF) Carryover and General Reduction. FY 1998: The FY 1998 increase of $2,170 and the FY1999 decrease of $4,244 are the result of sponsor reprioritization.

(U) Schedule: Based on recent E&MD replanning, IOC has been rescheduled from FY 2001 to FY 2002.

(U) Technical: NA

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

| | FY 1996 ESTIMATE | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|
| (U) WPN LI 314100 | 0 | 0 | 0 | 0 | 0 | 1,241 | 12,877 | 12,572 | CONT. |

(U) The $1,241 FY 2001 provides funding to procure initial spares for EDMs.

(U) RELATED RDT&E: Not applicable

D. (U) SCHEDULE PROFILE: See attached

FY 1998 PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603254N
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare (ASW) Systems Development
PROJECT NUMBER: V0968
PROJECT TITLE: MK30 Target Development

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Primary Hardware Development | 8,551 | 4,892 | 9,908 | 9,587 |
| b. Ancillary Hardware Development (GFE, Battery) | 871 | 525 | 800 | 275 |
| c. Technical Design Agent | 1,755 | 1,210 | 1,200 | 1,200 |
| d. Developmental Test & Evaluation | 0 | 590 | 850 | 0 |
| e. Program Management Support | 629 | 181 | 250 | 250 |
| f. Miscellaneous | 139 | 211 | 100 | 100 |
| Total | 11,945 | 7,609 | 13,108 | 11,412 |

FY 1998 PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603254N PROJECT NUMBER: V0968
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare (ASW) Systems Development PROJECT TITLE: MK30 Target Development

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | | |
| Raytheon Co. Portsmouth RI | C/CPAF | 09/93 | 24,745 | 24,745 | 19,686 | 5,059 | 0 | 0 | 0 | 0 | 24,745 |
| Raytheon Co. Portsmouth RI | C/CPAF | 08/96 | TBD | 46,880 | 0 | 3,492 | 4,892 | 9,908 | 9,587 | 19,001 | 46,880 |
| NUWC/NPT* | WR | 11/96 | 15,413 | 15,413 | 6,548 | 1,755 | 1,210 | 1,200 | 1,200 | 3,500 | 15,413 |
| NUWC/NPT** | WR | 11/96 | 4,933 | 4,933 | 2,462 | 871 | 525 | 800 | 275 | 0 | 4,933 |
| Miscellaneous | various | various | 3,082 | 3,082 | 2,332 | 139 | 211 | 100 | 100 | 200 | 3,082 |
| Support and Management | | | | | | | | | | | |
| Misc | SS/CPFF | various | 3,214 | 3,214 | 1,404 | 629 | 181 | 250 | 250 | 500 | 3,214 |
| Test and Evaluation | | | | | | | | | | | |
| NUWC/NPT | WR | various | 3,647 | 3,647 | 207 | 0 | 590 | 850 | 0 | 2,000 | 3,647 |

GOVERNMENT FURNISHED PROPERTY - Not applicable

* - Contract Monitoring
** - Battery Development

FY 1998 PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603254N
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare (ASW) Systems Development
PROJECT NUMBER: V0968
PROJECT TITLE: MK30 Target Development

| | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 31,028 | 11,316 | 6,838 | 12,008 | 11,162 | 22,701 | 95,053 |
| Subtotal Support and Management | 1,404 | 629 | 181 | 250 | 250 | 500 | 3,214 |
| Subtotal Test and Evaluation | 207 | 0 | 590 | 850 | 0 | 2,000 | 3,647 |
| Total Project | 32,639 | 11,945 | 7,609 | 13,108 | 11,412 | 25,201 | 101,914 |

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603261N
PROGRAM ELEMENT TITLE: Tactical Airborne Reconnaissance

(U) Cost (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| E0534 Tactical Reconnaissance System | | | | | | | | | | |
| | 21,669 | 23,082 | 10,607 | 1,458 | 0 | 0 | 0 | 0 | 0 | 216,767 |

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Tactical Airborne Reconnaissance Program develops systems to provide timely and accurate imagery intelligence. Present systems provide such imagery from manned platforms using film based sensors, necessitating a return to base for film processing. Manned reconnaissance, with Electro-Optical, Infrared and Synthetic Aperture Radar (SAR) sensors can provide both broad coverage and high resolution imagery at extended ranges via data link in near real time. The USMC RF-4Bs were phased out in 1990. A Navy Follow-On Tactical Reconnaissance capable aircraft will replace the interim Navy F-14 Tactical Air Reconnaissance Pod System (TARPS) with a suite of sensors that will provide near real time data-linked information, Overflight and Short Range Stand-Off (O&SRS-O) sensors used for imagery processing, analysis, and storage.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603261N PROJECT NUMBER: E0534
PROGRAM ELEMENT TITLE: Tactical Airborne Reconnaissance PROJECT TITLE: Tactical Reconnaissance System

A. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

(U) ($16,172) Awarded Element III of F/A-18 ATARS development contract to complete system development and integration. Received replacement digital tape recorders. Commenced data link pod integration with ATARS and developmental flight test. Obtained Engineering Change Proposal (ECP) approval for Sensor suite and pallet production. Conducted data link minipod PDR/CDR.

(U) ($5,258) Completed sensor specific ATARS developmental flight testing. Commenced ATARS developmental flight testing with replacement digital tape recorder and data link. Commenced/completed ATARS operational analysis flight testing. Conducted limited production readiness review. Provided in-house technical support.

(U) ($239) Continued in-house engineering support.

2. (U) FY 1997 PLAN:

(U) ($20,811) Continue development of F/A-18 ATARS Tactical Reconnaissance System. Conduct software development testing for incorporation into Operational Flight Plan (OFP) 13C. Commence Tactical Reconnaissance (TAC RECCE) system unique integration efforts into Radar Upgrade (RUG) phase II. Conduct minipod flight test.

(U) ($1,018) Continue testing of ATARS and RUG II Radar with data link. Continue in-house technical support.

(U) ($813) Continue in-house engineering support.

(U) ($440) Portion of program reserved for Small Business Innovation Research and assessment in accordance with 15 USC 638.

3. (U) FY 1998 PLAN:

(U) ($6,518) Complete development and integration of F/A-18 Tactical Reconnaissance System.

(U) ($3,339) Complete ATARS and RUG II development testing with data link and Operational Flight Program (OFP) 13C. Initiate system operational evaluation. Continue in-house technical support.

(U) ($750) Continue in-house engineering support.

4. (U) FY 1999 PLAN:

(U) ($1,208) Complete system Operational Evaluation. Conduct program review for full production decision. Award full rate production contract. Achieve Initial Operational Capability with limited production systems. Conduct Follow-On Test and Evaluation. Continue in-house technical support.

(U) ($250) Continue in-house engineering support.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603261N PROJECT NUMBER: E0534
PROGRAM ELEMENT TITLE: Tactical Airborne Reconnaissance PROJECT TITLE: Tactical Reconnaissance System

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President s Budget | 20,214 | 24,085 | 10,840 | 1,477 |
| (U) Appropriated amount: | | 24,085 | | |
| (U) Adjustments from President's Budget: | +1,455 | -1,003 | -233 | -19 |
| (U) FY 1998/99 President's Budget Submit: | 21,669 | 23,082 | 10,607 | 1,458 |

(U) Funding: The net increase of +$1,455 thousand in FY96 reflects a Major Range Test Facility Base restoral, SBIR assessment, and other minor program adjustments. The net decrease of -$1,003 thousand in FY 1997 is comprised of Navy Working Capital Fund (NWCF) and minor balancing reductions. The net decreases of -$233 thousand in FY 1998 and -$19 thousand in FY 1999 are comprised of NWCF and minor balancing adjustments.

(U) Schedule: TAC RECCE was upgraded to an ACAT II Program in August 1996, changing Acquisition Approval Authority to ASN (RD&A). Based on this change new milestones are displayed on the budget exhibit. Specifically, a Program Review is now required for LRIP II (1Q98) and the associated LRIP II Contract Award is now displayed. Additionally, increased reporting requirements have caused a one quarter slip in the Program Review for LRIP I (from 4Q96 to 1Q97), LRIP I Contract Award (from 1Q97 to 2Q97), the Full Rate Production Decision (from 1Q99 to 2Q99) and the Full Rate Production Contract Award (from 2Q99 to 3Q99). Also, the Marine Corps Operational Assessment, originally scheduled for 4Q97, has been deleted based on information obtained by the Operational Test Community during Developmental Testing. Additionally, an Operational Evaluation was added in FY 1999.

(U) Technical: The original data link pod also known as the Engineering Development Model (EDM) pod was designed to house the Electro-Optic Long Range Oblique Photography System (EO-LOROPS) in addition to data link. However, EO-LOROPS was cancelled in 1994. The EDM pod housing was retained because it could still be used for Congressionally mandated data link requirement for TAC RECCE. In late summer 1995, a suitability study of the EDM pod indicated that it was unsuitable as a data link pod because of poor loading characteristics, not-carrier suitable and not jettisonable. Seven alternative designs were evaluated and in October 1995 Loral minipod was selected. This pod utilizes the same cone and tail section as the EDM pod but has a much smaller center section to house the data link Weapon Replaceable Assemblies. This commonality has also allowed continued use of the EDM pod for ground and flight risk reduc-tion testing until a minipod is built. The data link minipod completed PDR and CDR in 1996 and one R&D asset is being built and will be test flown in 1997.

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603261N PROJECT NUMBER: E0534
PROGRAM ELEMENT TITLE: Tactical Airborne Reconnaissance PROJECT TITLE: Tactical Reconnaissance System

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

(U) PROCUREMENT: Included in the F/A-18 E/F funding.

(U) RELATED RDT&E:

(U) PE 0204136N (F/A-18 Squadrons (Project E2065 F/A-18 Radar Upgrade Phase II)): Adds all weather reconnaissance capability to multi-mission aircraft; adds SAR imagery mode provisions to radar upgrade.

(U) PE 0206625M (Marine Corps Intelligence/Electronic Warfare System): Receives EO/IR/SAR imagery.

(U) SBIR: Common Aperture Multi-Spectral Sensor and Night IR and Day EO in one sensor.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603261N PROJECT NUMBER: E0534
PROGRAM ELEMENT TITLE: Tactical Airborne Reconnaissance PROJECT TITLE: Tactical Reconnaissance System

D. (U) SCHEDULE PROFILE:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 | TO COMPLETE |
|---|---|---|---|---|---|
| Program Milestones | | 1Q/PROGRAM REVIEW FOR LRIP I | 1Q/PROGRAM REVIEW FOR LRIP II | 2Q/FULL RATE PRODUCTION DECISION | |
| Engineering Milestones | 3Q/ATARS OA<br>3Q/MINI-POD PDR<br>4Q/MINI-POD CDR | 3Q/MINI-POD DELIVERY | 3Q/COMPLETE SOFTWARE ENHANCEMENTS | | |
| T&E Milestones | 1Q/CFT<br>3Q95-3Q96/ATARS DT&E | 4Q97-1Q98/MINI-POD DT | 4Q/PRODUCTION VERIFICATION FLIGHT TEST | 1Q-2Q/OPEVAL | |
| Contract Milestones | | 2Q/LRIP I CONTRACT AWARD | 1Q/LRIP II CONTRACT AWARD | 3Q/FRP CONTRACT AWARD | |

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603261N PROJECT NUMBER: E0534
PROGRAM ELEMENT TITLE: Tactical Airborne Reconnaissance PROJECT TITLE: Tactical Reconnaissance System

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Contract | 16,759 | 17,797 | 6,209 | 1,014 |
| b. Support Contract | 297 | 353 | 319 | 242 |
| c. In-House Support | 2,503 | 3,465 | 3,554 | 112 |
| d. Test and Evaluation | 2,110 | 1,027 | 525 | 90 |
| e. SBIR Assessment | | 440 | | |
| Total | 21,669 | 23,082 | 10,607 | 1,458 |

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603261N PROJECT NUMBER: E0534
PROGRAM ELEMENT TITLE: Tactical Airborne Reconnaissance PROJECT TITLE: Tactical Reconnaissance System

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | | |
| Loral Fairchild Syosset, NY | S-CPFF | Dec 92 | 20,579 | 20,579 | 20,500 | 79 | 0 | 0 | 0 | 0 | 20,579 |
| MDA St. Louis, MO | S-CPFF | Nov 95 | 49,010 | 49,010 | 7,310 | 16,680 | 17,797 | 6,209 | 1,014 | 0 | 49,010 |
| MDA St. Louis, MO | Var | Var | 26,676 | 26,676 | 26,676 | 0 | 0 | 0 | 0 | 0 | 26,676 |
| Misc Field Activities | Var | Var | 70,551 | 70,551 | 70,551 | 0 | 0 | 0 | 0 | 0 | 70,551 |
| Support and Management | | | | | | | | | | | |
| Rail | T&M | Oct 94 | TBD | 2,159 | 948 | 297 | 353 | 319 | 242 | 0 | 2,159 |
| Field Activities | Var | Oct 97 | 28,796 | 28,796 | 25,890 | 503 | 732 | 1,641 | 30 | 0 | 28,796 |
| NAWC China Lake | Var | Oct 97 | 8,528 | 8,528 | 1,800 | 2,000 | 2,733 | 1,913 | 82 | 0 | 8,528 |
| Test & Evaluation | | | | | | | | | | | |
| Field Activities | WX | Oct 97 | 5,376 | 5,376 | 5,176 | 50 | 35 | 100 | 15 | 0 | 5,376 |
| NAWC PAX River | WX | Oct 97 | 4,652 | 4,652 | 1,100 | 2,060 | 992 | 425 | 75 | 0 | 4,652 |
| SBIR Assessment | | | | | | | 440 | | | | 440 |

GOVERNMENT FURNISHED PROPERTY: Not Applicable

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603261N PROJECT NUMBER: E0534
PROGRAM ELEMENT TITLE: Tactical Airborne Reconnaissance PROJECT TITLE: Tactical Reconnaissance System

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands) (cont.)

| | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 125,037 | 16,759 | 17,797 | 6,209 | 1,014 | 0 | 166,816 |
| Subtotal Support and Management | 28,638 | 2,800 | 3,818 | 3,873 | 354 | 0 | 39,483 |
| Subtotal Test and Evaluation | 6,276 | 2,110 | 1,027 | 525 | 90 | 0 | 10,028 |
| SBIR Assessment | | | 440 | | | | 440 |
| Total Project | 159,951 | 21,669 | 23,082 | 10,607 | 1,458 | 0 | 216,767 |

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603261N
PROGRAM ELEMENT TITLE: Tactical Airborne Reconnaissance
PROJECT NUMBER: E0534
PROJECT TITLE: Tactical Reconnaissance System

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FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603382N
PROGRAM ELEMENT TITLE: Advanced Combat System Technology

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| K0324 | Advanced Combat System Technology | | | | | | | | | |
| | 2,657 | 3,700 | 5,232 | 8,823 | 8,306 | 14,889 | 15,207 | 15,558 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This Program Element is an FY 1995 new start. Studies and experiments will be conducted in distributed computer architecture, radar technology, and Tactical Informational Management Concepts to mature them to transition candidates for introduction into the AEGIS Weapon System. This program will take a disciplined systems engineering approach to find how these advances can be integrated into the AEGIS system and subsequent combat systems, and to plan combat system baseline upgrade schedules. Fully Distributed Computing Architecture is the first advanced development effort, leveraging the joint AEGIS/Defense Advanced Research Projects Agency (DARPA) High Performance Distributive Computing (Hiper-D) technology effort. It implements the results of distributed processing advances to replace the current AEGIS Combat System architecture with an open, distributed architecture. Radar studies are also being conducted to identify state-of-the-art technology options for the next generation radar. Complex Tactical Information Management of the flow and display of tactical information through the "detect-control-engage" process to better support the operator/decision maker will be a significant priority of this task. These advanced technologies are candidate systems for future baseline upgrades. Specifically, the Surface Combatant Twenty-first Century (SC-21) program will leverage the results of these studies and experiments into SC-21 combat system development. In addition, AEGIS advance computer architecture will potentially leverage into other new ship classes including CVX and LX.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship applications.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603382N PROJECT NUMBER: K0324
PROGRAM ELEMENT TITLE: Advanced Combat System Technology PROJECT TITLE: Adv Combat System Tech

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

(U) ($250) Continued system engineering to transition open system computing designs and Commercial-Off-the Shelf/Defense Advanced Research Project Agency (COTS/DARPA) computer technologies into AEGIS Combat System production baselines.

(U) ($910) Started prototyping and re-engineering activities on AEGIS Weapon System computer programs and port into the HIPER-D test bed.

(U) ($1,352) Started employing functional partitioning of the AEGIS Weapon System using multi-sensor coordination and advanced tactical information management concepts and measured system performance data to develop AEGIS Weapon System architecture and performance models using prototype modeling tools.

(U) ($145) Completed advanced technologies in the areas of radar technology and advanced display systems for application to future AEGIS baselines.

2. (U) FY 1997 PLAN:

(U) ($250) Continue system engineering to transition open system computing designs and Commercial-Off-the COTS/DARPA computer technologies into AEGIS Combat System production baselines.

(U) ($2,342) Continue prototyping and re-engineering activities of AEGIS Weapon System computer programs focusing on the Baseline 7 computer architecture.

(U)($1,108) Derive total ship computing requirements from individual requirements for shipboard information systems. Assess the state of computing technology with respect to information transfer, open system design, processing, support software, and other related areas. Review existing commercial standards for information transfer, computing, etc. Develop a standards and design guidance document.

3. (U) FY 1998 PLAN:

(U) ($250) Continue system engineering to transition open system computing designs and COTS/DARPA computer technologies into AEGIS Combat System production baselines.

(U)($2,800) Complete prototyping and re-engineering activities of AEGIS Weapon System computer programs focusing on the Baseline 7 computer architecture.

(U)($1,657) Continue to derive total ship computing requirements from individual requirements for shipboard information systems. Continue to assess the state of computing technology with respect to information transfer, open system design, processing, support software and other related areas. Develop an early engineering design for a total ship information transfer capability. Perform a proof of concept demonstration at a land base test site of an Anti-Air Warfare capability with an additional warfighting system.

(U)($525) Continue development of AEGIS Weapon System architecture and performance models using prototype modeling tools, multi-sensor coordination and advanced tactical information management concepts.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603382N PROJECT NUMBER: K0324
PROGRAM ELEMENT TITLE: Advanced Combat System Technology PROJECT TITLE: Adv Combat System Tech

4. (U) FY 1999 PLAN:

(U) ($250) Complete system engineering to transition open system computing designs and COTS/DARPA computer technologies into AEGIS Combat System production baselines.

(U) ($6,152) Develop and validate a common, total ship, information system infrastructure that will facilitate the timely exchange of data among various tactical, C4I, ship control administrative, and other shipboard information systems. Study and evaluate candidate commercial intercomputer and interprocess communication tools, protocols and support software capabilities. Evaluate these against performance and reliability criteria resulting from earlier design studies. Perform a demonstration of an initial integrated set of common engineering services for the information system infrastructure, including the addition of another warfighting or other shipboard information/control system.

(U)($2,421) Continue development of AEGIS Weapon System architecture and performance models using prototype modeling tools, multi-sensor coordination and advanced tactical information management concepts.

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 2,687 | 3,858 | 5,233 | 8,865 |
| (U) Adjustments from FY 1997 PRESBUDG: | -30 | -158 | -1 | -42 |
| (U) FY 1998/1999 PRESBUDG Submit: | 2,657 | 3,700 | 5,232 | 8,823 |

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603382N PROJECT NUMBER: K0324
PROGRAM ELEMENT TITLE: Advanced Combat System Technology PROJECT TITLE: Adv Combat System Tech

(U) PROGRAM CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1996: Jordan Rescission (-$3); FY 1996 SBIR transfer (-$27).

FY 1997: Congressionally directed NWCF adjustments (-$77); General undistributed Congressional reduction (-$77); Other minor pricing adjustments (-$4).

FY 1998: Undistributed NWCF adjustments (+$21); Inflation adjustments (-$13); Other minor pricing adjustments (-$9).

FY 1999: Undistributed NWCF adjustments (+$3); Inflation adjustments (-$33); Other minor pricing adjustments (-$12).

(U) Schedule: Not applicable.

(U) Technical: Increased emphasis will be placed on total ship information system infrastructure, including system demonstration.

C. (U) OTHER PROGRAM FUNDING SUMMARY: To be determined.

(U) RELATED RDT&E:

(U) PE 0604307N (AEGIS Combat System Engineering)

D. (U) SCHEDULE PROFILE: Not applicable.

FY 1998/1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603382N
PROGRAM ELEMENT TITLE: AEGIS Combat System Engineering
PROJECT NUMBER: K0324
PROJECT TITLE: Adv Combat Sys Tech

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. System Engineering | 250 | 350 | 600 | 1,200 |
| b. Gov. Engineering Support | 2,407 | 3,300 | 4,532 | 7,373 |
| c. Program Management Support | 0 | 50 | 100 | 250 |
| Total | 2,657 | 3,700 | 5,232 | 8,823 |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603382N PROJECT NUMBER: K0324
PROGRAM ELEMENT TITLE: AEGIS Combat System Engineering PROJECT TITLE: Adv Combat Sys Tech

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | | |
| Applied Physics Lab. (APL), Baltimore, MD | | | | | | | | | | | |
| | SS/CPFF | 02/95 | 5,798 | 5,798 | 750 | 1,000 | 1,000 | 1,000 | 2,048 | CONT. | CONT. |
| Navy Surface Warfare Center, Dahlgren, VA | | | | | | | | | | | |
| | WR | 10/94 | 12,169 | 12,169 | 1,554 | 1,407 | 2,142 | 3,291 | 3,775 | CONT. | CONT. |
| Miscellaneous | | | 4,849 | 4,849 | 500 | 250 | 508 | 841 | 2,750 | CONT. | CONT. |
| Support and Management | | | 400 | 400 | 0 | 0 | 50 | 100 | 250 | CONT. | CONT. |
| Miscellaneous | | | | | | | | | | | |

Test and Evaluation: Not applicable.

GOVERNMENT FURNISHED PROPERTY: Not applicable.

FY 1998/1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603382N PROJECT NUMBER: K0324
PROGRAM ELEMENT TITLE: AEGIS Combat System Engineering PROJECT TITLE: Adv Combat Sys Tech

| Program | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 2,804 | 2,657 | 3,650 | 5,132 | 8,573 | CONT. | CONT. |
| Subtotal Support and Management | 0 | 0 | 50 | 100 | 250 | CONT. | CONT. |
| Subtotal Test and Evaluation | 0 | 0 | 0 | 0 | 0 | CONT. | CONT. |
| Total Project | 2,804 | 2,657 | 3,700 | 5,232 | 8,823 | CONT. | CONT. |

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603502N
PROGRAM ELEMENT TITLE: Surface and Shallow Water Mine Countermeasures

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| Q0260 Remote Minehunting Systems | 11,870 | 25,188 | 6,895 | 11,495 | 21,914 | 19,056 | 19,460 | 19,910 | CONT. | CONT. |
| Q1233 Integrated Combat Weapons Systems | 6,875 | 7,411 | 5,202 | 1,931 | 845 | 894 | 596 | 596 | 0 | 198,693 |
| Q2131 Assault Breaching Systems | 16,427 | 27,525 | 25,665 | 29,486 | 18,764 | 19,426 | 17,737 | 18,147 | CONT. | CONT. |
| V2094 Unmanned Undersea Vehicle | 19,454 | 24,727 | 20,469 | 25,010 | 27,186 | 27,213 | 25,305 | 17,358 | CONT. | CONT. |
| Quantity of RDT&E Articles/NMRS | | | 1 | | | | | | | |
| TOTAL | 54,626 | 84,851 | 58,231 | 67,922 | 68,709 | 66,589 | 63,098 | 56,011 | CONT. | CONT. |

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The program provides for developments to combat the threat of known and projected foreign mines against U.S. Naval and merchant shipping in harbors, channels, choke points, sea lines of communications and amphibious and other fleet operating areas. It develops: (1) systems and support for systems which will detect, localize and classify moored, bottom, and close-tethered mines for use in Mine Countermeasure (MCM) MCM-1 Class, Mine Hunter Coastal (MHC) MHC-51 Class, and other surface ships; (2) systems for detection, neutralizing and sweeping mines from shallow water, very shallow water, surf zones, and beach landing craft zones in support of amphibious operations; (3) the integration and improvement of the combat system suite on MCM and MHC ships; (4) near-term and long-term Unmanned Undersea Vehicle (UUV) systems for clandestine mine reconnaissance.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603502N
PROGRAM ELEMENT TITLE: Surface and Shallow Water Mine Countermeasures

(U) COST (Dollars in thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| Q0260 Remote Minehunting System (RMS) | 11,870 | 25,188 | 6,895 | 11,495 | 21,914 | 19,056 | 19,460 | 19,910 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: (1) Improvements to AN/SQQ-32 variable depth minehunting sonar for MCM-1 and MHC-51 class ships; and (2) Remote Minehunting System (RMS): Program develops a new remotely operated minehunting system for surface ships based on a three-fold strategy: develop new vehicle; upgrade with state of the art minehunting sensors; and provide a supportable, incremental operational contingency to the fleet during the development process.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

(U) AN/SQQ-32:
(U) ($1,043) System hardware and software developed. Integration has begun.
(U) ($462) AT-SEA system test planned and scheduled.
(U) ($980) ILS planning completed. ILS input to design accomplished. Technical manual update began. Specifications and top-level drawings completed.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROJECT NUMBER: Q0260
PROGRAM ELEMENT TITLE: Surface and Shallow Water Mine Countermeasures PROJECT TITLE: RMS

1. (U) FY 1996 ACCOMPLISHMENTS: (Cont.)

(U) Remote Minehunting:
(U) ($200) Milestone I/II.
(U) ($250) Developed ILS plans and documentation.
(U) ($7,229) Awarded contract to develop RMS (V)3 Contingency Systems.
(U) ($1,706) Performed system engineering for RMS (V)2.

2. (U) FY 1997 PLAN:

(U) Remote Minehunting:
(U) ($431) System engineering (New Sensors).
(U) ($6,566) Continue development of RMS system (V)3 including requisite logistics support for the additional contingency systems.
(U) ($17,618) Develop and procure two (V)3 Engineering Development Models (EDMs) as contingency systems to accelerate fleet introduction per the CNO directed and approved Near Term Mine Warfare Campaign Plan.
(U) ($573) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 U.S.C. 638.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROJECT NUMBER: Q0260
PROGRAM ELEMENT TITLE: Surface and Shallow Water Mine Countermeasures PROJECT TITLE: RMS

3. (U) FY 1998 PLAN:
   (U) Remote Minehunting:
   (U)($6,895) Continue development and testing (DT/OT) of RMS system (V)3 including requisite logistics support for the additional contingency systems.

4. (U) FY 1999 PLAN:
   (U) Remote Minehunting:
   (U)($11,495) Begin development of RMS (V)4 including new sensors.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROJECT NUMBER: Q0260
PROGRAM ELEMENT TITLE: Surface and Shallow Water Mine Countermeasures PROJECT TITLE: RMS

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 8,966 | 26,308 | 7,000 | 11,583 |
| (U) Adjustments from FY 1997 PRESBUDG: | +2,904 | -1,120 | -105 | -88 |
| (U) FY 1998/99 PRESBUDG Submit: | 11,870 | 25,188 | 6,895 | 11,495 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: Remote Minehunting: FY96 +$2904K CNO directed and approved Near Term Mine Warfare Campaign Plan and minor pricing adjustments. FY97, FY98 and FY99 changes due to NWCF rate adjustments and general reductions.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603502N
PROGRAM ELEMENT TITLE: Surface and Shallow Water Mine Countermeasures

PROJECT NUMBER: Q0260
PROJECT TITLE: RMS

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

| | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| (U) (SQQ-32 P3I) OPN line item# 262200 | 0 | 9,134 | 9,148 | 11,080 | 6,814 | 0 | 0 | 0 | 0 | 36,417 |
| (U) RMS Contingency Systems OPN line items# 262200 | 0 | 0 | 0 | 18,130 | 18,769 | 19,441 | 19,489 | 20,119 | CONT. | CONT. |

(U) RELATED RDT&E:

(U) PE 0604373N (Airborne Mine Countermeasures)

D. (U) SCHEDULE PROFILE: See attached.

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROJECT NUMBER: Q0260
PROGRAM ELEMENT TITLE: Surface and Shallow Water Mine Countermeasures PROJECT TITLE: RMS

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| PROJECT COST CATEGORIES | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. System Development | 5,538 | 17,196 | 3,343 | 7,856 |
| b. System Testing | 1,930 | 1,549 | 1,929 | 910 |
| c. System Engineering Development | 1,283 | 950 | 367 | 432 |
| d. SW Support | 251 | 0 | 0 | 0 |
| e. Logistics | 1,126 | 1,137 | 329 | 1,036 |
| f. Procurement Support | 30 | 0 | 0 | 0 |
| g. Program Management | 1,683 | 4,322 | 907 | 1,231 |
| h. Travel | 29 | 34 | 20 | 30 |
| TOTAL | 11,870 | 25,188 | 6,895 | 11,495 |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROJECT NUMBER: Q0260
PROGRAM ELEMENT TITLE: Surface and Shallow Water Mine Countermeasures PROJECT TITLE: RMS

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | | |
| Lockheed Martin | C/CPAF | 08/96 | Cont. | Cont. | 0 | 3,757 | 14,717 | 2,393 | 0 | Cont. | Cont. |
| TBD | C/CPAF | TBD | Cont. | Cont. | 0 | 0 | 0 | 0 | 9,982 | Cont. | Cont. |
| Raytheon | SS/BOA | 06/92 | 2,136 | 2,136 | 2,086 | 50 | 0 | 0 | 0 | Cont. | 2,136 |
| NSWC CSS | WR | 10/96 | Cont. | Cont. | 71,738 | 4,235 | 5,739 | 1,392 | 0 | Cont. | Cont. |
| NUWC Keyport | WR | 10/96 | 505 | 505 | 0 | 505 | 0 | 0 | 0 | 0 | 505 |
| ARL UT | SS/PR | 04/96 | N/A | 2,158 | 2,128 | 30 | 0 | 0 | 0 | 0 | 2,158 |
| Support and Management | | | | | | | | | | | |
| NSWC CSS | WR | 10/96 | Cont. | Cont. | 13,375 | 1,911 | 3,845 | 950 | 0 | Cont. | Cont. |
| Misc | Various | Various | Cont. | Cont. | 13,113 | 410 | 748 | 241 | 402 | Cont. | Cont. |
| Test and Evaluation | | | | | | | | | | | |
| ARL UT | SS/PR | 04/96 | N/A | 70 | 0 | 70 | 0 | 0 | 0 | 0 | 70 |
| NSWC CSS | WR | 10/96 | Cont. | Cont. | 9,605 | 760 | 139 | 1,919 | 1,111 | Cont. | Cont. |
| Misc | Various | Various | 142 | 142 | 0 | 142 | 0 | 0 | 0 | 0 | 142 |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROJECT NUMBER: Q0260
PROGRAM ELEMENT TITLE: Surface and Shallow Water Mine Countermeasures PROJECT TITLE: RMS

GOVERNMENT FURNISHED PROPERTY

| Item Description | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Delivery Date | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | |
| Support and Management | | | | | | | | | | |
| Test and Evaluation | | | | | | | | | | |

| | FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 75,952 | 8,577 | 20,456 | 3,785 | 9,982 | Cont. | Cont |
| Subtotal Support and Management | 26,488 | 2,321 | 4,593 | 1,191 | 402 | Cont. | Cont |
| Subtotal Test and Evaluation | 9,605 | 972 | 139 | 1,919 | 1,111 | Cont. | Cont |
| Total Project | 112,045 | 11,870 | 25,188 | 6,895 | 11,495 | Cont. | Cont |

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603502N
PROGRAM ELEMENT TITLE: Surface and Shallow Water Mine Countermeasures

(U) COST (Dollars in thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| Q1233 Integrated Contract Weapons System (ICWS) | 6,875 | 7,411 | 5,202 | 1,931 | 845 | 894 | 596 | 596 | 0 | 198,693 |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: (1) AN/SSQ-94 will provide on board Combat System Training for MCM and MHC ships; (2) Closed Loop Degaussing (CLDG) to improve survivability of mine countermeasures ships; (3) Mission Package 3 (MP3) upgrade to the AN/SLQ-48 to provide destruction of moored mines in place; ICWS is a series of major, incremental block upgrades to the current combat systems. It provides the MCM/MHC Class Ships an affordable and fully integrated combat weapons system which will improve mission execution efficiency, dramatically reduce life-cycle costs, and facilitate changes to meet future mission requirements. Medal is a software application program, which will become a Mine Warfare Joint Maritime Command Information Strategy (JMCIS) segment. It will provide the MCM Commander with Automated Data Processing (ADP) support for his mission planning and evaluation.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

(U) AN/SLQ-53:
(U) ($100) Program termination costs.

(U) AN/SSQ-94:
(U) ($2,660) Installed & tested AN/SQQ-32 modules, conducted system DT-IIB.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROJECT NUMBER: Q1233
PROGRAM ELEMENT TITLE: Surface and Shallow Water Mine Countermeasures PROJECT TITLE: ICWS

1. (U) FY 1996 ACCOMPLISHMENTS: (Cont.)

(U) CLDG:
(U) ($1,248) Milestone II.
(U) ($700) EDM.
(U) ($135) Engineering Support (technical documentation and configuration mgmt).
(U) ($442) Developed engineering development model for MCM-10.

(U) MP3 for AN/SLQ-48:
(U) ($1,590) Prepared and conducted DT-IV and OT-IV testing.

2. (U) FY 1997 PLAN:

(U) CLDG:
(U) ($1,411)TECHEVAL.

(U) MP3 for AN/SLQ-48:
(U) ($0) Milestone III decision.

(U) ICWS
(U) ($1,756) Architecture definition study, life cycle cost model, and supportability study.

(U) ($4,095) Support Near Term Mine Warfare Campaign Plan.

(U) ($149) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 U.S.C. 638.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROJECT NUMBER: Q1233
PROGRAM ELEMENT TITLE: Surface and Shallow Water Mine Countermeasures PROJECT TITLE: ICWS

3. (U) FY 1998 PLAN:

(U) CLDG:
(U) ($800) Complete TECHEVAL.
(U) ($200) Conduct OPEVAL.
(U) ($339) Prepare for Milestone III.

(U) ICWS:
(U) ($1,550)Procure and test Doppler Sonar.
(U) ($1,612)Software development, drawing, and develop SHIPALT for SYQ-13/IAT.
(U) ($701) Software development Builds 8 and 9, conduct T&E, and documentation for introduction to the Fleet.

4. (U) FY 1999 PLAN:

(U) ICWS:
(U) ($1,151)T&E, training, ILS, and production approval of SYQ-13/IAT. Software development, ILS, T&E and production approval of Doppler Sonar for MHCs.
(U) ($780) Software development of Builds 10 and 11, conduct T&E, and documentation for introduction to the Fleet.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROJECT NUMBER: Q1233
PROGRAM ELEMENT TITLE: Surface and Shallow Water Mine Countermeasures PROJECT TITLE: ICWS

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 6,844 | 1,726 | 1,387 | 0 |
| (U) Adjustments from FY 1997 PRESBUDG: | +31 | +5,685 | +3,815 | +1,931 |
| (U) FY 1998/99 OSD/OMB Budget Submit: | 6,875 | 7,411 | 5,202 | 1,931 |

(U) CHANGE SUMMARY EXPLANATION:
(U) Funding: FY96 change due to minor pricing adjustments. FY 97, FY98, and FY99 changes due to increases for ICWS development and the MIW Campaign Plan, and minor pricing adjustments.
(U) Schedule: AN/SSQ-94: Deleted SYQ-13 PDR and CDR and added System DT-IIB in 4Q/96. CLDG: Milestone II from 2Q/95 to 2Q/96 due to requirements validation.
MP-3: Production award from 1Q/98 to 1Q/97 (typographic error).
(U) Technical: Not applicable.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROJECT NUMBER: Q1233
PROGRAM ELEMENT TITLE: Surface and Shallow Water Mine Countermeasures PROJECT TITLE: ICWS

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

| | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| (U) OPN (SSQ-94) Line 262200 | 1,182 | 1,065 | 565 | 971 | 0 | 0 | 0 | 0 | 0 | 10,821 |
| (U) WPN (MP-3) Line 535000 | 0 | 2,190 | 2,456 | 2,427 | 3,278 | 3,408 | 3,483 | 3,651 | CONT. | CONT. |
| (U) OPN (CLDG) Line 262200 | 0 | 0 | 0 | 4,327 | 3,165 | 5,252 | 5,785 | 5,757 | CONT. | CONT. |
| (U) OPN (ICWS) Line 262200 | 0 | 0 | 0 | 2,956 | 1,278 | 1,013 | 958 | 792 | CONT. | CONT. |

(U) RELATED RDT&E: Not Applicable.

D. (U) SCHEDULE PROFILE: See attached.

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603502N
PROGRAM ELEMENT TITLE: Surface and Shallow Water Mine Countermeasures
PROJECT NUMBER: Q1233
PROJECT TITLE: ICWS

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| PROJECT COST CATEGORIES | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. System Development | 5,435 | 5,906 | 2,985 | 702 |
| b. System Testing | 455 | 270 | 250 | 100 |
| c. SW Support | 48 | 0 | 725 | 799 |
| d. Logistics | 572 | 1000 | 650 | 200 |
| e. Program Management | 150 | 0 | 250 | 100 |
| f. Travel | 40 | 55 | 40 | 30 |
| g. Misc | 175 | 180 | 302 | 0 |
| TOTAL | 6,875 | 7,411 | 5,202 | 1,931 |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROJECT NUMBER: Q1233
PROGRAM ELEMENT TITLE: Surface and Shallow Water Mine Countermeasures PROJECT TITLE: ICWS

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | | |
| NUWC Keyport | WR | 10/95 | 882 | 882 | 0 | 554 | 328 | 0 | 0 | 0. | 882 |
| NSWC CSS | WR | 10/96 | Cont. | Cont. | 65,387 | 1,501 | 566 | 1,994 | 730 | Cont. | Cont. |
| NSWC WO | WR | 10/96 | 50,276 | 50,276 | 45,730 | 1,899 | 1,385 | 1,262 | 0 | 0 | 50,276 |
| ONR | PD | 12/96 | N/A | 3,002 | 0 | 0 | 0 | 492 | 0 | Cont. | Cont. |
| TBD | C/PR | 3/97 | Cont. | Cont. | 0 | 0 | 4,881 | 0 | 0 | Cont. | Cont. |
| Support and Management | | | | | | | | | | | |
| Misc | Various | Various | Cont. | Cont. | 4,245 | 523 | 51 | 202 | 532 | Cont. | Cont. |
| NSWC CSS | WR | 10/96 | Cont. | Cont. | 1,923 | 508 | 0 | 650 | 209 | Cont. | Cont. |
| Sherikon | C/PR | 2/93 | Cont. | Cont. | 494 | 287 | 100 | 187 | 69 | Cont. | Cont. |
| Test and Evaluation | | | | | | | | | | | |
| NSWC CSS | WR | 10/96 | Cont. | Cont. | 41,755 | 1,603 | 100 | 250 | 200 | Cont. | Cont. |
| ONR | PD | 12/96 | Cont. | Cont. | 0 | 0 | 0 | 165 | 191 | Cont. | Cont. |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROJECT NUMBER: Q1233
PROGRAM ELEMENT TITLE: Surface and Shallow Water Mine Countermeasures PROJECT TITLE: ICWS

GOVERNMENT FURNISHED PROPERTY

| Item Description | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Delivery Date | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | |
| Support and Management | | | | | | | | | | |
| Test and Evaluation | | | | | | | | | | |

| | FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 111,117 | 3,954 | 7,160 | 3,748 | 730 | Cont. | Cont. |
| Subtotal Support and Management | 6,662 | 1,318 | 151 | 1,039 | 810 | Cont. | Cont. |
| Subtotal Test and Evaluation | 41,755 | 1,603 | 100 | 415 | 391 | Cont. | Cont. |
| Total Project | 159,534 | 6,875 | 7,411 | 5,202 | 1,931 | Cont. | Cont. |

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603502N
PROGRAM ELEMENT TITLE: Surface and Shallow Water MCM Countermeasures

(U) COST (Dollars in thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| Q2131 Assault Breaching Systems (ABS) | 16,427 | 27,525 | 25,665 | 29,486 | 18,764 | 19,426 | 17,737 | 18,147 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program provides for a combination of joint US Marine Corps and US Navy projects planned to counter the threat to amphibious landing forces from known and projected foreign land and sea mines and obstacles in the shallow water, very shallow water and surf zone approaches to amphibious assault areas. It develops systems for mine sweeping and explosive mine clearance. Included are the Distributed Explosives Technology (DET), Shallow Water Assault Breach System (SABRE) and follow-on P3I efforts. Beginning FY98, includes transition of an ongoing Advanced Technology Demonstration Systems (ATDS) - Explosive Neutralization (EN) to an acquisition programs.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROJECT NUMBER: Q2131
PROGRAM ELEMENT TITLE: Surface and Shallow Water MCM PROJECT TITLE: Assault Breaching Systems

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

(U) DET:
- (U) ($863) Milestone II.
- (U) ($5,361) Began partial fabrication of DT-IIA/B hardware.
- (U) ($1,744) Conducted system deployment/Lethality tests.
- (U) ($1,900) Procured long lead detonating cord for DT-IIB/OT-II.

(U) SABRE:
- (U) ($3,601) Fabricated test hardware for DT-I.
- (U) ($734) Milestone II.
- (U) ($1,310) Deployment and DT-I test.

(U) OBS:
- (U) ($464) Preliminary design - Explosive system.
- (U) ($450) Preliminary design - Mechanical system.

2. (U) FY 1997 PLAN:

(U) DET:
- (U) ($8,282) Fabrication of DT-IIB/OT-II hardware.
- (U) ($1,900) Conduct DT-IIA and DET/SABRE LCAC interoperability tests.
- (U) ($1,450) Update documentation package.
- (U) ($1,500) Begin LCAC integration.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROJECT NUMBER: Q2131
PROGRAM ELEMENT TITLE: Surface and Shallow Water MCM PROJECT TITLE: Assault Breaching Systems

2. (U) FY 1997 PLAN: (Cont.)

(U) SABRE:
(U) ($4,700) Fabrication of DT-II hardware.
(U) ($2,448) DT-II.
(U) ($300) Procure test targets.
(U) ($990) LCAC integration test hardware.
(U) ($2,145) LCAC integration tests.
(U) ($3,510) Procure long-lead OT-II hardware.
(U) ($300) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 U.S.C. 638.

3. (U) FY 1998 PLAN:

(U) DET:
(U) ($5,349) Complete fabrication of DT-IIB/OT-II systems.
(U) ($2,513) Begin DT-IIB.
(U) ($893) Complete LCAC integration.
(U) ($4,043) Safety tests.

(U) SABRE:
(U) ($1,600) Complete fabrication of DT-IIB/OT-II systems.
(U) ($2,650) Conduct DT-IIB.
(U) ($1,900) Begin OT-II.
(U) ($685) LCAC integration.
(U) ($800) Safety tests.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROJECT NUMBER: Q2131
PROGRAM ELEMENT TITLE: Surface and Shallow Water MCM PROJECT TITLE: Assault Breaching Systems

3. (U) FY 1998 PLAN: (Cont.)

(U) EN:
- (U) ($657) Prepare for P3I Cost analysis.
- (U) ($1,589) LCAC integration tests.
- (U) ($2,986) Autonomous craft controller component procurement.

4. (U) FY 1999 PLAN:

(U) DET:
- (U) ($3,500) Complete DT-IIB.
- (U) ($2,299) Conduct OT-II.
- (U) ($1,488) MSIII.

(U) SABRE:
- (U) ($1,475) Complete OT-II.
- (U) ($1,470) MSIII.
- (U) ($525) Procurement package prep.

(U) EN:
- (U) ($300) P3I Cost Analysis.
- (U) ($8,829) Procure P3I RDT&E hardware.
- (U) ($1,000) Procure Breach Zone Array (BZA) DT-I test hardware.
- (U) ($450) BZA Cost Analysis.
- (U) ($900) BZA MSI.
- (U) ($5,041) LCAC/airframe integration.
- (U) ($2,209) Autonomous craft controller integration tests.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROJECT NUMBER: Q2131
PROGRAM ELEMENT TITLE: Surface and Shallow Water MCM PROJECT TITLE: Assault Breaching Systems

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 18,561 | 33,001 | 39,605 | 39,654 |
| (U) Adjustments from FY 1997 PRESBUG | -2,134 | -5,476 | -13,940 | -10,168 |
| (U) FY 1998/99 OSD/OMB Budget Submit: | 16,427 | 27,525 | 25,665 | 29,486 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY96 OBS -$2,004K CNO Near Term Mine Warfare Campaign plan and minor pricing adjustments -$130K. FY97, FY98 and FY99 changes reflect program restructuring in support of the Mine Warfare Campaign plan and minor pricing adjustments.
(U) Schedule: Not applicable.
(U) Technical: Not applicable.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROJECT NUMBER: Q2131
PROGRAM ELEMENT TITLE: Surface and Shallow Water MCM PROJECT TITLE: Assault Breaching Systems

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

| | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| OPN line (2624) | 834 | 942 | 0 | 14,963 | 26,298 | 31,532 | 34,302 | 35,114 | Cont. | Cont. |

(U) RELATED RDT&E:

(U) PE 0603555N (Sea Control and Littoral Warfare Technology Demonstration).
PE 0603640M and 0602131M (Advanced Countermine System (ACS); USMC M58 line charges).

D. (U) SCHEDULE PROFILE: See attached.

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603502N
PROGRAM ELEMENT TITLE: Surface and Shallow Water MCM
PROJECT NUMBER: Q2131
PROJECT TITLE: Assault Breaching Systems

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| PROJECT COST CATEGORIES | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. System Development | 8,019 | 15,595 | 6,340 | 10,860 |
| b. System Testing | 2,433 | 2,886 | 7,761 | 2,697 |
| c. System Engineering Development | 3,304 | 5,048 | 7,019 | 7,711 |
| d. Logistics Support | 897 | 915 | 789 | 1,074 |
| e. Procurement Support | 417 | 760 | 100 | 2,515 |
| f. Technical Management | 801 | 1,030 | 1,447 | 1,888 |
| g. Program Management | 486 | 906 | 2,129 | 2,651 |
| h. Travel | 70 | 85 | 80 | 90 |
| I. SBIR | 0 | 300 | 0 | 0 |
| TOTAL | 16,427 | 27,525 | 25,665 | 29,486 |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROJECT NUMBER: Q2131
PROGRAM ELEMENT TITLE: Surface and Shallow Water MCM PROJECT TITLE: Assault Breaching Systems

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

| PERFORMING ORGANIZATIONS Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | | |
| NSWC/PC | WR | 10/96 | Cont. | Cont. | 16,744 | 3,870 | 2,088 | 4,159 | 14,864 | Cont. | Cont. |
| NSWC/IH | WR' | 10/96 | Cont. | Cont. | 23,308 | 6,454 | 17,235 | 9,550 | 7,296 | Cont. | Cont. |
| Misc | Various | Various | 2,175 | 2,175 | 2,175 | 0 | 0 | 0 | 0 | 0 | 2,175 |
| Support and Management | | | | | | | | | | | |
| NCSC/PC | WR | 10/96 | Cont. | Cont. | 1,196 | 1,088 | 602 | 2,349 | 1,888 | Cont. | Cont. |
| NCWC/IH | WR | 10/96 | Cont. | Cont. | 200 | 610 | 1,268 | 100 | 0 | Cont. | Cont. |
| Misc | Various | Various | Cont. | Cont. | 2,457 | 556 | 991 | 1,307 | 2,741 | Cont. | Cont. |
| Test and Evaluation | | | | | | | | | | | |
| NCSC/PC | WR | 10/96 | Cont. | Cont. | 3,036 | 1,203 | 1,322 | 2,897 | 499 | Cont. | Cont. |
| NSWC/IH | WR | 10/96 | Cont. | Cont. | 5,573 | 2,332 | 3,829 | 4,393 | 1,862 | Cont. | Cont. |
| Misc (PMS-377) | Various | Various | 2203 | 2203 | 453 | 314 | 190 | 910 | 336 | 0 | 2,203 |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603502N
PROGRAM ELEMENT TITLE: Surface and Shallow Water MCM

PROJECT NUMBER: Q2131
PROJECT TITLE: Assault Breaching Systems

GOVERNMENT FURNISHED PROPERTY

| Item Description | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Delivery Date | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | |
| Support and Management | | | | | | | | | | |
| Test and Evaluation | | | | | | | | | | |

| | FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 42,227 | 10,324 | 19,323 | 13,709 | 22,160 | Cont. | Cont. |
| Subtotal Support and Management | 3,853 | 2,254 | 2,861 | 3,756 | 4,629 | Cont. | Cont. |
| Subtotal Test and Evaluation | 9,062 | 3,849 | 5,341 | 8,200 | 2,697 | Cont. | Cont. |
| Total Project | 55,142 | 16,427 | 27,525 | 25,665 | 29,486 | Cont. | Cont. |

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603502N
PROGRAM ELEMENT TITLE: Surface and Shallow Water Mine Countermeasures

(U) COST (Dollars in thousands)

| PROJECT NUMBER & TITLE | FY 1996 ESTIMATE | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| V2094 Unmanned Underwater Vehicle (UUV) | 19,454 | 24,727 | 20,469 | 25,010 | 27,186 | 27,213 | 25,305 | 17,358 | CONT. | CONT. |

Quantity of RDT&E Articles/NMRS 1

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTI FICATION: This project was completely restructured in FY 1994 in response to Congressional direction provided in the FY 1994 DOD Appropriations Act. Specifically, the Office of the Secretary of Defense and the Navy were directed to (1) establish priorities among various proposed UUV programs, (2) focus on near-term mine countermeasures issues, and (3) establish affordable, cost-effective programs. The Navy developed an overall UUV Program Plan, which was approved by ASN(RD&A) June 1994, endorsed by USD(A&T) and forwarded to Congress to support FY 1995 budget deliberations.

(U) The UUV Program Plan establishes a clandestine, near-term mine reconnaissance capability as the Navy's top UUV priority; a long-term mine reconnaissance system as priority two; the conduct of surveillance, intelligence and tactical oceanography missions as priority three; and exploring advanced UUV designs for the future as priority four. FY 1995 Congressional language complimented the Navy Plan and fully supported priorities one and two starting in FY 1995.

(U) The UUV project funds development of a clandestine Near-Term Mine Reconnaissance System (NMRS) and a Long-Term Mine Reconnaissance System (LMRS), the Navy's two highest UUV priorities. The NMRS will be a minehunting UUV system launched and recovered from an SSN-688 class submarine and will be capable of mine detection, classification, and localization. In accordance with the UUV Program Plan, one NMRS Operational Prototype (OP) system will be delivered to the Fleet by early 1998. No further production of the NMRS is planned. Since the NMRS is viewed as a stop-gap capability with a life expectancy of approximately 6 years, the LMRS will be developed to provide a robust, long-term, Fleet capability to conduct clandestine minefield reconnaissance. The first LMRS will replace the NMRS as the NMRS is retired and several Long Term Mine Reconnaissance Systems will be procured beginning in FY 2003.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

(U) ($16,539) Priority 1 (NMRS): Continued to execute NMRS contract. Completed design and continued fabrication of system. Commenced system integration.

(U) ($2,915) Priority 2 (LMRS): Completed LMRS Cost and Operational Effectiveness Analysis (COEA). Conducted MS I/II and developed Request For Proposal (RFP) for competitive contract awards. Conducted contracting activities and awarded three LMRS Preliminary Design contracts.

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROGRAM ELEMENT TITLE: Surface and Shallow Water Mine Countermeasures PROJECT NUMBER: V2094 PROJECT TITLE: Unmanned Underwater Vehicle

2. (U) FY 1997 PLAN:

(U) ($8,809) Priority 1 (NMRS): Complete fabrication and system integration. Conduct factory testing of NMRS and begin at-sea testing. Develop RFP for NMRS Maintenance and Support (M&S). Conduct contracting activities and award NMRS M&S contract.

- (U) ($15,324) Priority 2 (LMRS): Continue execution of and complete LMRS Preliminary Design contract(s). Conduct LMRS Preliminary Design Review (PDR). Commence preparation for award of Detailed Design Contract(s) in FY 1998.

(U) ($594) Portion of extramural program reserved for Small Business Innovation Research (SBIR) assessment in accordance with 15 U.S.C. 638.

3. (U) FY 1998 PLAN:

(U) ($5,942) Priority 1 (NMRS): Complete at-sea testing of NMRS and achieve Initial Operational Capability (IOC) Deliver NMRS to Fleet to begin operational use. Begin NMRS Maintenance and Support activities of the Operational Prototype system.

(U) ($14,527) Priority 2 (LMRS): Award and execute up to two Detailed Design Contract(s). Commence preparations for award of the LMRS Development Phase contract. Conduct product improvement risk mitigation, as required.

4. (U) FY 1999 PLAN:

(U) ($4,993) Priority 1 (NMRS): Continue Maintenance and Support of the Operational Prototype System..

(U) ($20,017) Priority 2 (LMRS): Complete LMRS Detailed Design and conduct the LMRS Critical Design Review. Award and commence execution of the LMRS Development Phase contract. Conduct product development risk mitigation, as required.

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 19,969 | 25,960 | 21,446 | 24,954 |
| (U) Adjustments from FY 1997 PRESBUDG: | -515 | -1,233 | -977 | +56 |
| (U) FY 1998/1999 OSD/OMB Budget Submit | 19,454 | 24,727 | 20,469 | 25,010 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: The reductions in FY 1996 reflect an SBIR assessment (-$419K) and other minor pricing adjustments (-$96K). The reduction of $1,233K in FY 1997 is for Congressional undistribu ted reductions. FY 1998/1999 changes due to program restructuring and minor pricing adjustments.

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROJECT NUMBER: V2094
PROGRAM ELEMENT TITLE: Surface and Shallow Water Mine Countermeasures PROJECT TITLE: Unmanned Underwater Vehicle

(U) CHANGE SUMMARY EXPLANATION: (Cont.)

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY:

| | FY 1996 ESTIMATE | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| (U) OPN PE 0204281; Line Item Number 217100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24,533 | CONT. | CONT. |

(U) The $24,533K in FY 2003 provides funding to begin LMRS production.

(U) RELATED RDT&E:

(U) PE 0602314N (ONR UUV Technology Efforts)
(U) PE 0602315N (ONR UUV Technology Efforts)

D. (U) SCHEDULE PROFILE: See Attached.

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603502N
PROGRAM ELEMENT TITLE: Surface and Shallow Water Mine Countermeasures
PROJECT NUMBER: V2094
PROJECT TITLE: Unmanned Underwater Vehicle

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Primary Hardware Development | 17,034 | 18,148 | 15,155 | 18,038 |
| b. System Maintenance and Support | 0 | 311 | 2,397 | 3,892 |
| c. Contractor Engineering Support | 576 | 885 | 640 | 600 |
| d. Government Engineering Support | 1,175 | 3,281 | 1,679 | 1,829 |
| e. Program Management Support | 547 | 848 | 443 | 441 |
| f. Govt. Developmental Test and Evaluation | 122 | 660 | 155 | 210 |
| g. SBIR Assessment | 0 | 594 | 0 | 0 |
| Total | 19,454 | 24,727 | 20,469 | 25,010 |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROJECT NUMBER: V2094
PROGRAM ELEMENT TITLE: Surface and Shallow Water Mine Countermeasures PROJECT TITLE: Unmanned Underwater Vehicle

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | | |
| NGC/NMRS | SS/CPAF | 08/94 | 39,967* | 39,967* | 15,700 | 15,624 | 6,345 | 2,298 | 0 | 0 | 39,967* |
| NGC/NMRS M&S | SS/CP | 09/97 | TBD | TBD | 0 | 0 | 311 | 2,397 | 3,892 | CONT. | CONT. |
| NGC - Northrop Grumman Corporation, Electronic Sensors and Systems Division, Annapolis MD | | | | | | | | | | | |
| LMC/LMRS | C/FFP | 08/96 | TBD | TBD | 0 | 470 | 3,933 | 0 | 0 | CONT. | CONT. |
| LMC - Lockheed Martin Corporation, Lockheed Martin Government Electronics System, Moorestown, NJ | | | | | | | | | | | |
| NGC/LMRS | C/FFP | 08/96 | TBD | TBD | 0 | 470 | 3,935 | 0 | 0 | CONT. | CONT. |
| NGC - Northrop Grumman Corporation, Electronic Sensors and Systems Division, Annapolis MD | | | | | | | | | | | |
| RIC/LMRS | C/FFP | 08/96 | TBD | TBD | 0 | 470 | 3,935 | 0 | 0 | CONT. | CONT. |
| RIC - Rockwell International Corporation, Anaheim, CA | | | | | | | | | | | |
| TBD/LMRS | C/CPAF | 11/97 | TBD | TBD | 0 | 0 | 0 | 12,857 | 18,038 | CONT. | CONT. |
| APL/ARL | SS/CPFF | 01/98 | CONT. | CONT. | 2,812 | 576 | 885 | 640 | 600 | CONT. | CONT. |
| NUWC | WR | 11/97 | CONT. | CONT. | 2,646 | 1,175 | 2,244 | 1,329 | 1,769 | CONT. | CONT. |
| Miscellaneous | WR | 11/97 | CONT. | CONT. | 0 | 0 | 1,037 | 350 | 60 | CONT. | CONT. |
| Support and Management | | | | | | | | | | | |
| Miscellaneous | various | various | | | 563 | 547 | 1,442 | 443 | 441 | CONT. | CONT. |

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N
PROGRAM ELEMENT TITLE: Surface and Shallow Water Mine Countermeasures
PROJECT NUMBER: V2094
PROJECT TITLE: Unmanned Underwater Vehicle

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands) (Cont.)

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Test and Evaluation Misc | WR | 11/97 | CONT. | CONT. | 0 | 122 | 660 | 155 | 210 | CONT. | CONT. |

GOVERNMENT FURNISHED PROPERTY - Not applicable.

*Note - $3,500K from P.E. 0603555N provided to NMRS contract in FY 94. Total contract EAC is $43,467K.

| | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 21,158 | 18,785 | 22,625 | 19,871 | 24,359 | CONT. | CONT. |
| Subtotal Support and Management | 563 | 547 | 1,442 | 443 | 441 | CONT. | CONT. |
| Subtotal Test and Evaluation | 0 | 122 | 660 | 155 | 210 | CONT. | CONT. |
| Total Project | 21,721 | 19,454 | 24,727 | 20,469 | 25,010 | CONT. | CONT. |

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603504N
PROGRAM ELEMENT TITLE: Advanced Submarine Combat Systems Development

(U) COST (Dollars in thousands)

| PROJECT NUMBER TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| V0223 Advanced Submarine Combat System Development | | | | | | | | | | |
| | 26,826 | 37,291 | 61,122 | 70,321 | 78,752 | 46,571 | 42,564 | 43,259 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This non-acquisition (Non-ACAT) program supports the advanced development and testing of improvements to present and future sonar and combat control systems. The goal is to address the technology challenges that marginalize tactical control in littoral and open ocean environments during the performance of a variety of missions including peacetime engagement, surveillance, deterrence, regional sea denial, precision strike, task group support, and ground warfare support. Prototype hardware and/or software systems are developed under this program to demonstrate technologically promising system concepts in an at-sea submarine environment. Technology areas specific to this program include transducers, hull-mounted and towed arrays, on-board sonar signal processing, target motion analysis (TMA), multiple contact processing and test and evaluation.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION AND VALIDATION because it develops and integrates hardware for experimental test related to specific ship and aircraft applications.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603504N PROGRAM ELEMENT TITLE: Advanced Submarine Combat Systems Development PROJECT NUMBER: V0223 PROJECT TITLE: Advanced Submarine Combat Systems Development

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

(U) ($2,550) Advanced Tactical Control. Completed Geographical Referenced Event Triggered Expert Program (GRETEP) development. Integrated Digital Nautical Chart from (DMA), Target Motion Analysis improvements and All Source Contact Management for at-sea evaluation. Developed common architecture for the prototype Tactical Control System (TCS).

(U) ($11,776) Advanced Sonar Systems and Processing. Continued Automated Tactical Passive Processing development with emphasis on traditional processing (TB-16, 23, 29 sphere) and non-traditional processing. Continued to define system baselines and Advanced Processing Builds (APB) to support submarine superiority initiatives. Continued to plan for at-sea testing program. Commenced comparative performance evaluation of passive processing baselines (BSY-1, BSY-2, NSSN, SURTASS). Continued fiber optic/velocity sensor conformal array development. Continued SUBPAC/SUBLANT follow-on at-sea testing and transition of prototype Advanced Fleet Towed Array Systems (AFTAS) and non-traditional processing systems. Completed TB-16 lightweight tow cable.

(U) ($5,200) High Frequency Sonar Program (HFSP). Continued planning for HFSP sea test with large sail receive array. Continued feasibility studies for algorithmic improvements for shallow water operations (vertical resolution, clutter reduction, environmental exploitation). Continued transition of HFSP software, algorithms, and specifications to BSY-1 and NSSN.

(U) ($6,900) Light-Weight Wide Aperture Array (LWAA). Continued the development and testing of fiber optic pressure sensors as an improvement for AN/BQG-5 WAA and production of the associated in-board opto-electronics. Coordinated the in-board opto-electronics efforts to also support fiber-optic flexural disk accelerometers in the Conformal Acoustic Velocity Sensor (CAVES) flank array project.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603504N PROGRAM ELEMENT TITLE: Advanced Submarine Combat Systems Development PROJECT NUMBER: V0223 PROJECT TITLE: Advanced Submarine Combat Systems Development

(U) ($400) Test and Evaluation. Completed post Rangex exercise analysis. Continued development and documenting of system level measures of effectiveness. Continued planning and support efforts for at-sea testing program (FY97). Continued requirements definition for standard at-sea sonar data-gathering program and automated real time test reconstruction system.

2. (U) FY 1997 PLAN:

(U) ($3,250) Advanced Tactical Control. Demonstrate GRETEP at sea (completed 12/96 on USS PHILADELPHIA). Develop common fusion engine for surface ship and submarine contact management. Develop system engineering and development guidelines for Tactical Control Program products. Provide contact management and data fusion products for advanced sensor products (such as AFTAS and RATTRAP) and acoustic Rapid COTS Insertion (ARCI) efforts, Develop Tactical Control MOEs/MOPs to support evaluation of DARPA Tactical Scene Operator/Associated (TSO/A). (October 1996 - July 1997).

(U) ($16,931) Advanced Sonar Systems and Processing. Continue passive processing comparative performance evaluations to establish advanced processing builds. Complete definition and commence integration of TB-16/23 related Advanced Processing Build (APB); plan APB at-sea evaluation. Conduct evaluation of BQQ-5/BSY-1 related sphere array processing improvements to support rapid COTS insertion. (October 96 - March 97)

(U) ($100) Advanced Towed Arrays. Initiate planning for high gain Multiline Towed Array (MLTA) testbed and innovative handling system. (October 96 - March 97)

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603504N PROGRAM ELEMENT TITLE: Advanced Submarine Combat Systems Development PROJECT NUMBER: V0223 PROJECT TITLE: Advanced Submarine Combat Systems Development

(U) ($7,100) High Frequency Sonar Program. Continue planning and equipment preparation for HFSP sea-tests with large sail receive array. Continue HFSP performance improvement effort. Complete transition documentation. Define HFSP conformal array options to determine system performance needs. Commence consolidation of alternative HFSP processing approaches. (October 96 - March 97)

(U) (8,800) Fiber Optics. Continue the development and testing of fiber optic pressure sensors as an improvement for AN/BQG-5 WAA and development of the associated in-board opto-electronics. (October 96 - May 97)

(U) ($500) Test and Evaluation. Continue planning for towed array APB at-sea testing. Coordinate data collection efforts to support processing algorithm development and validation. Continue development of submarine acoustic/environmental data-gathering program to include at-sea evolutions. Continue development and establishment of an automated real time test reconstruction effort. Continue support of HFSP sea-tests with large sail receive array. (October 96 - February 97)

(U) ($610) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 U.S.C.638.

3. (U) FY 1998 PLAN:

(U) ($6,142) Advanced Tactical Control. Analyze Tactical Control guidelines to Combat System upgrade for CCS MK2 Block 1C. Transition TMAI, All Source Contact Management for SSNs. Develop Weapon Employment Modules. Initiate transition and integration of own-ship vulnerability assessment module based on DARPA and SSN/SSBN Security program efforts (TSM, ISSIPS). Continue TSO/A integration and evaluation. Supply joint efforts in ASW C4I and conduct joint tactical control sea test. (October 97 - March 98)

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603504N PROGRAM ELEMENT TITLE: Advanced Submarine Combat Systems Development

PROJECT NUMBER: V0223 PROJECT TITLE: Advanced Submarine Combat Systems Development

(U) ($32,798) Advanced Sonar Systems and Processing. Continue algorithm performance evaluations for Advanced Processing Builds (APB). Complete integration of TB-16/23 related APB; assess performance and conduct at-sea evaluation. Initiate TB-16/23 related APB to Rapid COTS Insertion effort. Initiate TB-29 related APB definition and commence integration. Initiate definition of sphere array-related APB. Commence integration of [classified material deleted] approaches into passive sonar processing. Adapt surface developed active sonar processing for operation with sphere array. Initiation and development of enhanced localization approaches including passive ranging and TMA. (October 97 - July 98)

(U) ($3,600) Advanced Towed Arrays. Commence development of high gain MLTA testbed and innovative towed array handling system concepts. Deliver MLTA compatible tow cable. Initiate 3 line MLTA algorithm and processing. Evaluate improvements in array telemetry and shape estimation systems for applicability to MLTA. (October 97 - July 98)

(U) ($10,482) Advanced Hull Array. Effect transition of Conformal Acoustic Velocity Sensor (CAVES) flank array project to this line. Continue CAVES technology development. Conduct quarter scale array performance lake tests and evaluate performance as a passive receiver. Initiate planning and development of CAVES based technology WAA array equivalent. (October 97 - July 98)

(U) ($7,100) High Frequency Sonar Program. Conduct HFSP sea test and conduct performance analysis. Continue HFSP performance improvement effort. Complete consolidation of alternate HFSP processing approaches. Initiate HFSP

modifications to implement developed algorithm improvements and correct deficiencies identified in sea-tests. (October 97 - July 98)

(U) ($1,000) Test and Evaluation. Continue data collection efforts to support processing algorithm development and validation. Conduct at-sea test of TB-16/23 related APB. Validate performance of automated real time test reconstruction tools for accuracy. Define, develop and deploy follow-on high data rate recorders for sphere/hull arrays. (October 97 - June 98)

4. (U) FY 1999 PLAN:

(U) ($6,400) Advanced Tactical Control. Incorporate ARPA and 6.2 Development Products into TCS system. Conduct the Joint TCS sea test. Complete contact management improvements and deliver to SFMPL and CCS MK-2 Block 1C for implementation. Continue vulnerability assessment effort. (October 98 - June 99)

(U) ($36,448) Advanced Sonar Systems and Processing. Continue integration, conduct performance assessment and initiate transition of TB-29 related APB to Rapid COTS Insertion effort. Continue small MLTA-related and sphere array definition APB definition and commence integration and transition to Rapid COTS Insertion effort. Continue adaptation and evaluation of surface developed active processing algorithms for sphere array. Initiate follow-on towed array and hull array APBs. Continue [classified material deleted] and enhanced localization efforts. (October 98 - July 99)

(U) ($5,450) Advanced Towed Arrays Continue development and laboratory evaluation of high gain MLTA and flexible array handling system. (October 98 - March 99)

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603504N PROJECT NUMBER: V0223
PROGRAM ELEMENT TITLE: Advanced Submarine Combat Systems Development PROJECT TITLE: Advanced Submarine Combat Systems Development

(U) ($14,023) Advanced Hull Array. Continue development of CAVES technology . Conduct small aperture at-sea demonstration to validate noise estimates and assess sensor, coating materials and shipboard array installation technology. Continue CAVES/WAA array equivalent; prepare for sea test. (October 98 - July 99)

(U) ($7,000) High Frequency Sonar Program. Continue HFSP performance improvement effort. Commence HFSP conformal array development activity. Investigate the incorporation of Advanced Acoustic Communications capabilities within HFSP. Commence detailed advanced visualization feasibility study. Commence HFSP/weapons sensor interaction study. (October 98 - March 99)

(U) ($1,000) Test And Evaluation. Conduct CAVES at-sea demonstration and Joint TCS sea test. Conduct evaluation to TA-APB. Continue towed array data-gathering program. Commence sphere array data collection gathering program. (October 98 - March 99)

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 27,207 | 19,149 | 19,746 | 24,188 |
| (U) Adjustments from FY 1997 PRESBUDG: | -381 | +18,142 | +41,376 | +46,133 |
| (U) FY 1998/99 PRESBUDG Submit: | 26,826 | 37,291 | 61,122 | 70,321 |

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603504N PROGRAM ELEMENT TITLE: Advanced Submarine Combat Systems Development PROJECT NUMBER: V0223 PROJECT TITLE: Advanced Submarine Combat Systems Development

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY1996 decrease due to Jordanian rescission (-$31K), SBIR (-$250K) and below threshold reprogramming (-$100K). FY1997 plus up to fund Fiber Optics (+$10,800K) and Submarine Technology (+$9,200K). FY 1997 decrease due to undistributed congressional reductions (-$294K) and Navy Working Capital Funds (-$1,564K). FY1998 plus up to fund AN/BSY-1, ECP-1000 (Acoustic Rapid COTS insert) (+$18,374); increase due to transfer of CAVES effort from PE 0603751N (+$10,482); and funds increased to support increased effort in Submarine Technology based on the Secretary of Defense Report on Nuclear Attack Submarine Procurement and Submarine Technology. (+$39,000) and increase for NWCF rate restoration totaling (+$72K). FY1998 decrease due to programmatic reductions (-$6,000); decrease for submarine acoustics (-$5,000K), decrease for submarine technology (-$14,000K), and other minor adjustments and undistributed adjustments for Navy Wide Capital Funds (-$1,552). FY1999 plus up to fund AN/BSY-1, ECP-1000 (Acoustic Rapid COTS insert) (+$22,412); increase to fund CAVES effort (+$12,523) and an increase for submarine technology (+$25,000K). FY1999 decrease: due to programmatic reductions (-$7,500K), submarine acoustics (-$5,000), other minor adjustments and Navy Wide Capital Funds (-$1,302K).

(U) Schedule: Not applicable.

(U) Technical: Proceed with category 2 and CORE technologies as identified in SECDEF report on Nuclear Attack Submarines.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:
(U) PE0603562N (Submarine Tactical Warfare System)
(U) PE0604524N (Submarine Combat System)
(U) PE0604503N (Submarine System Equipment Development)

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603504N PROGRAM ELEMENT TITLE: Advanced Submarine Combat Systems Development

PROJECT NUMBER: V0223 PROJECT TITLE: Advanced Submarine Combat Systems Development

D. (U) SCHEDULE PROFILE:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| Program Milestones | 3Q-Algorithm Descrp Document Update | | 1Q Transition of CAVES Program to Program Office | |
| Engineering Milestones | 2Q-AFTAS Deployables(2) Delivery<br>4Q-HFSP Sail Array Delivery<br>4Q-AMDS Performance Analysis | 1Q- Sonar Sys. Level Evaluations Complete<br>2Q-AFTAS Source Code Delivery<br>4Q-AFTAS Deployables (2) Delivery | 3Q-HFSP Performance Analysis | 2Q-Transition of TA/SA APBs<br>2Q-CAVES Sea Test Performance Analysis |
| T&E Milestones | 1Q-4Q AFTAS Sea Tests | 1Q-GRETEP at-sea Demonstration<br>3Q-HFSP System Level Lake Test<br>3Q-AFTAS Sea Tests | 1Q-HFSP sea-test<br>2Q-CAVES Lake Tests<br>3Q-TA-APB Sea Tests<br>3Q-HFSP Sea Test | 3Q Joint Tactical Control Sea Test |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603504N
PROGRAM ELEMENT TITLE: Advanced Submarine Combat Systems Development
PROJECT NUMBER: V0223
PROJECT TITLE: Advanced Submarine Combat Systems Development

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Product Development | 26,106 | 36,471 | 59,522 | 68,821 |
| b. Support & Management | 320 | 320 | 600 | 500 |
| c. Test & Evaluation | 400 | 500 | 1,000 | 1,000 |
| Total | 26,826 | 37,291 | 61,122 | 70,321 |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603504N PROGRAM ELEMENT TITLE: Advanced Submarine Combat Systems Development

PROJECT NUMBER: V0223 PROJECT TITLE: Advanced Submarine Combat Systems Development

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | | |
| NUWC/NL | WR | 10/97 | Cont. | Cont. | 69,484 | 15,411 | 14,761 | 23,156 | 27,562 | Cont. | Cont. |
| NUWC/NL | RCP | Var. | Cont. | Cont. | 3,276 | 6,900 | 3,700 | 1,255 | 1,345 | Cont. | Cont. |
| NRL/WASH | WR | 10/97 | Cont. | Cont. | 0 | 858 | 350 | 1,025 | 1,025 | Cont. | Cont. |
| NRL/WASH | RCP | Var. | Cont. | Cont. | 0 | 186 | 210 | 225 | 235 | Cont. | Cont. |
| Miscellaneous | Var. | Var. | Cont. | Cont. | 0 | 1,050 | 7,488 | 12,378 | 19,861 | Cont. | Cont. |
| APL/JHU | PD | Var. | Cont. | Cont. | 0 | 155 | 854 | 1,342 | 1,560 | Cont. | Cont. |
| Contractor(s) | C/CPFF | Var. | Cont. | Cont. | 0 | 0 | 2,000 | 5,500 | 6,200 | Cont. | Cont. |
| Mitre | MIPR | Var. | Cont. | Cont. | 0 | 826 | 1,530 | 1,690 | 1,690 | Cont. | Cont. |
| GTRI | PD | Var. | Cont. | Cont. | 0 | 0 | 0 | 5,450 | 3,150 | Cont. | Cont. |
| NSWC/CD | WR | 10/97 | Cont. | Cont. | 0 | 75 | 0 | 3,450 | 3,450 | Cont. | Cont. |
| NRAD | WR | 10/97 | Cont. | Cont. | 0 | 0 | 2,300 | 300 | 320 | Cont. | Cont. |
| ARPA | MIPR | 10/97 | Cont. | Cont. | 0 | 0 | 1,125 | 1,576 | 0 | Cont. | Cont. |
| ARL/UT | PD | Var. | Cont. | Cont. | 0 | 645 | 2,153 | 2,175 | 2,423 | Cont. | Cont. |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603504N
PROGRAM ELEMENT TITLE: Advanced Submarine Combat Systems Development
PROJECT NUMBER: V0223
PROJECT TITLE: Advanced Submarine Combat Systems Development

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Support and Management | | | | | | | | | | | |
| Miscellaneous | Var | Var. | Cont. | Cont. | 1,777 | 320 | 320 | 600 | 500 | Cont. | Cont. |
| Test and Evaluation | | | | | | | | | | | |
| NUWC/NL | WR | 10/97 | Cont. | Cont. | 1,846 | 400 | 400 | 600 | 600 | Cont. | Cont. |
| Miscellaneous | Var. | Var. | Cont. | Cont. | 1,230 | 0 | 0 | 0 | 0 | Cont. | Cont. |
| APL/JHU | PD | Var. | Cont. | Cont. | 0 | 0 | 100 | 400 | 400 | Cont. | Cont. |

GOVERNMENT FURNISHED PROPERTY: Not Applicable.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: Feb 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603512N
PROGRAM ELEMENT TITLE: Carrier Systems Development

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| S1722 | CV Weapons Elevator Improvements | | | | | | | | | |
| | 1,003 | 486 | 877 | 1,036 | 1,035 | 1,061 | 1,080 | 1,107 | CONT. | CONT. |
| W1723 | CV Launch and Recovery Systems | | | | | | | | | |
| | 3,068 | 2,124 | 3,255 | 2,612 | 1,801 | 4,619 | 1,253 | 4,300 | CONT. | CONT. |
| S2208 | Future CV R&D | | | | | | | | | |
| | 8,215 | 5,771 | 90,246 | 104,952 | 151,171 | 130,982 | 109,699 | 64,547 | CONT. | CONT. |
| W2269 | EAF Matting | | | | | | | | | |
| | 0 | 3,829 | 4,209 | 2,673 | 4,502 | 0 | 0 | 0 | 0 | 15,213 |
| TOTAL | 12,286 | 12,210 | 98,587 | 111,273 | 158,509 | 136,662 | 112,032 | 69,954 | CONT. | CONT. |

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This Navy unique program addresses all technology areas associated with Navy/Marine Corps aircraft operations aboard ships. The program includes:

(U) (S1722) Development of standardized, supportable and maintainable aircraft carrier (CV/CVN) weapons elevators components.

(U) (W1723) Development of all systems required to provide approach and landing guidance and control, recovery, service, support and launch aircraft operating onto or from ships. Payoffs include increased safety, greater sortie generation rates, enhanced aircraft boarding rates, reduced manning, increased aircraft service life and fleet modernization.

(U) (S2208) Development of ship hull, mechanical, electrical, aviation and combat support systems, subsystems and components to significantly improve aircraft carrier affordability, survivability and operational capabilities and to meet the requirements of existing and pending regulations and statutes critical to the operation of future aircraft carriers.

(U) (W2269) Development of lightweight mat and expeditionary arresting gear for use at Marine Corps Expeditionary Airfields (EAF).

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603512N PROJECT NUMBER: S1722
PROGRAM ELEMENT TITLE: Carrier Systems Development PROJECT TITLE: CV Weapons Elevator Improvements

(U) COST ($ in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ACTUAL | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| S1722 CV Weapons Elevator Improvements | 1,003 | 486 | 877 | 1,036 | 1,035 | 1,061 | 1,080 | 1,107 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project provides for the advanced development, fabrication, test, evaluation and documentation of standardized aircraft carrier weapons elevators components such as control systems, hoist machinery, doors and hatches. Emphasis is placed on the improvement of safety, reliability, maintainability, watertight integrity and weight reduction.

(U) PROGRAM ACCOMPLISHMENT AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

- (U) ($413) Procured and installed prototype variable speed AC drive system.
- (U) ($175) Identified and procured advanced platform position sensor.
- (U) ($27.5) Completed evaluation and testing of epoxy wire rope sockets.
- (U) ($ 40) Completed testing of new aircraft wire rope designs.
- (U) ($ 50) Completed testing of alternative wire rope greases.
- (U) ($ 42.5) Tested new S-Flex gasket for watertight doors.
- (U) ($255) Developed concepts for PLC troubleshooting panel.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603512N PROJECT NUMBER: S1722

PROGRAM ELEMENT TITLE: Carrier Systems Development PROJECT TITLE: CV Weapons Elevator Improvements

2. (U) FY 1997 PLAN:

- (U) ($430) Conduct variable speed AC drive and platform position sensor tests on LBES. (2/97)
- (U) ($40.7) Identify and procure linear actuating sys for use on weapons elevator doors and hatches (2/97-6/97)
- (U) ($15.3) Watertight door gasket testing (12/96-9/97)

3. (U) FY 1998 PLAN:

- (U) ($350) Develop imbedded sensors for monitoring elevator equipment condition. (11/97-6/98)
- (U) ($350) Install and test linear actuating system for elevator doors at LBES. (11/97-6/98)
- (U) ($77) Conduct investigation of alternative elevator overspeed governor designs (11/97-6/98)
- (U) ($100) Test wire rope coatings to prevent internal corrosion at termination (11/97-6/98

4. (U) FY 1999 PLAN:

- (U) ($400) Conduct investigation and engr analysis for integration of multiple elevator PLCs. (11/98-6/99)
- (U) ($400) Continue development and procurement of alternative elevator overspeed governors. (11/98-6/99)
- (U) ($236) Complete development and testing of imbedded sensors in conjunction with PLC. (11/98-6/99)

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603512N PROJECT NUMBER: S1722
PROGRAM ELEMENT TITLE: Carrier Systems Development PROJECT TITLE: CV Weapons Elevator Improvements

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 97 President s Budget: | 1,003 | 506 | 883 | 1,036 |
| (U) Adjustments from FY 97 PRESBUDG: | 0 | -20 | -6 | 0 |
| (U) FY 98/99 PRESBUDG Submission: | 1,003 | 486 | 877 | 1,036 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY96-FY99 - Congressional undistributed general and inflation reductions.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E: Not applicable.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: Feb 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603512N
PROGRAM ELEMENT TITLE: Carrier Systems Development

D. (U) SCHEDULE PROFILE:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| Program Milestones | 2Q Install AC Drive | | | |
| Engineering Milestones | 3Q Develop Sensor | | 3Q Complete Overspeed Governor Investigation<br>4Q Complete Imbedded | 2Q Complete Multiple PLC Investigations<br>Sensor Research |
| T&E Milestones | 3Q Begin AC Drive Test | 2Q Complete AC Drive Test | 4Q Complete Linear Drive Test | 3Q Complete Imbedded Sensor Test |
| Contract Milestones | 2Q Procure AC Drive | 4Q Procure Linear Drive System | | 2Q Procure Overspeed Governor |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: Feb 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603512N PROJECT NUMBER:W1723
PROGRAM ELEMENT TITLE: Carrier Systems PROJECT TITLE: CV launch & Recovery Systems

(U) COST (Dollars in thousands)

| PROJECT NUMBER & TITLE' | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| W1723 CV Launch and Recovery Systems | 3,068 | 2,124 | 3,255 | 2,612 | 1,801 | 4,619 | 1,253 | 4,300 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project addresses the Demonstration and Validation (DEMVAL) of advanced systems to meet Navy unique shipboard operational requirements for:

(U) DEMVAL of critical components of the Electromagnetic Aircraft Launch System (EMALS) including the launch engine and its associated power generation, storage and distribution system.

(U) DEMVAL of advanced optical, electro-optical and laser tracking, approach and landing control and guidance systems, and air operations reporting systems for pilots, Landing Signal Officers (LSO) and ship's crew. The Improved Carrier Optical Landing System (ICOLS), which includes the Improved Fresnel Lens Optical Landing System (IFLOLS) and the Long Range Line-up System (LRLS), will provide optical displays so that the pilot can take early corrective actions in order to prevent landing accidents and increase the aircraft boarding rate. The Integrated Shipboard Information System (ISIS) will provide automated air operations information to decision makers via electronic status boards, replacing the current manpower intensive, hand-written status boards in all of the air operations work areas. ISIS also includes supporting systems which will optimize the flow and processing of situational management information. The Virtual Imaging System for Approach and Landing (VISUAL) will provide the ship's company and pilots with enhanced images of the aircraft and ship, respectively, in low visibility and night conditions. The Shipboard Optical Landing System (SOLS) will provide advanced visual landing aids (VLA) for fixed wing, rotary wing and Vertical/Short Take-Off and Landing (VSTOL) aircraft, so that pilots can fly safer and more accurate approaches to all classes of ships.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

   - (U) ( $284) Continued engineering support for the EMALS ADM.

- (U) ($2,784) Completed development of ISIS ADM supporting situational management systems and completed documentation to proceed to a Milestone II decision to proceed to Engineering and Manufacturing Development (E&MD).

(U) FY 1997 PLAN:

- (U) ( $165) Conclude engineering support for the EMALS ADM. EMALS support will be continued under the Advanced Technology Launcher program in Project S2208. (11/96-6/97)

- (U) ($1,959) Initiate development of the VISUAL ADM. (11/96-6/97)

(U) FY 1998 PLAN:

- (U) ($3,255) Conduct critical component demonstrations of the VISUAL ADM components. (11/97-6/98)

(U) FY 1999 PLAN:

- (U) ($2,612) Complete development of the VISUAL ADM and conduct Milestone II decision to proceed to Engineering and Manufacturing Development (E&MD). (11/98-6/99)

B. (U) PROGRAM CHANGE SUMMARY: (Dollars in thousands)

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 97 President s Budget: | 3,095 | 2,231 | 3,352 | 4,148 |
| (U) Adjustments from FY 97 PRESBUDG: | -27 | -107 | -97 | -1,536 |
| (U) FY 98/99 PRESBUDG Submit: | 3,068 | 2,124 | 3,255 | 2,612 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY96 (-27) Revised DOD inflation rates and minor pricing adjustments, FY97 (-107) General undistributed reductions, FY98 (-97) General undistributed reductions. FY99 - (-$1,500) Cancellation of Shipboard Wind Measure System (SWMS), (-$36) General undistributed reductions.

(U) Technical: Not applicable.

(U) Schedule: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:

(U) PE 0602122N (Aircraft Technology)

(U) PE 0604512N (Shipboard Aviation Systems)

D. (U) SCHEDULE PROFILE:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| Program Milestones | ISIS: 4Q MS II | VISUAL: 2Q MSI | | VISUAL: 2Q MSII |
| Engineering Milestones | | | VISUAL: 4Q PDR | |
| T&E Milestones | ISIS: 2Q DT | | VISUAL: 4Q DT | |
| Contract Milestones | | | | |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: Feb 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603512N PROJECT NUMBER:W1723
PROGRAM ELEMENT TITLE: Carrier Systems PROJECT TITLE: CV launch & Recovery Systems

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Primary Hardware Development | 1,823 | 1,282 | 1,717 | 1,340 |
| b. Software Development | 664 | 446 | 984 | 772 |
| c. Integrated Logistics Support | 277 | 150 | 227 | 258 |
| d. Development Test & Evaluation | 304 | 246 | 327 | 242 |
| Total | 3,068 | 2,124 | 3,255 | 2,612 |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: Feb 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603512N PROJECT NUMBER: W1723
PROGRAM ELEMENT TITLE: Carrier Systems PROJECT TITLE: CV Launch & Recovery Systems

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | | |
| Naval Air Warfare Center Aircraft Division, Lakehurst, NJ | | | | | | | | | | | |
| NAWCAS-LKE | WX | 9/95 | N/A | N/A | 11,062 | 2,668 | 2,124 | 3,255 | 2,612 | Cont. | Cont. |
| Kaman Electromagnetics, Hudson, MA | | | | | | | | | | | |
| Kaman EM | CPFF | 12/92 | 4,900 | 4,900 | 1,840 | 0 | 0 | 0 | 0 | 4,900 | 4,900 |
| Miscellaneous, Navy | | | | | | | | | | | |
| Misc. | WX | 9/95 | 32,432 | 32,432 | 900 | 400 | 0 | 0 | 0 | 32,432 | 32,432 |
| Support and Management: | | | | | 200 | 0 | 0 | 0 | 0 | 0 | 200 |

Test and Evaluation: Not applicable

GOVERNMENT FURNISHED PROPERTY

| Item Description | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Delivery Date | FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|
| Product Development: | Not Applicable | | | | | | | | | |
| Support and Management: | Not Applicable | | | | | | | | | |
| Test and Evaluation: | Not Applicable | | | | | | | | | |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: Feb 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603512N
PROGRAM ELEMENT TITLE: Carrier Systems

PROJECT NUMBER: W1723
PROJECT TITLE: CV Launch & Recovery Systems

| | FY 1995 Budget | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Production Development | 13,802 | 3,068 | 2,124 | 3,255 | 2,612 | Cont. | Cont. |
| Subtotal Support and Management | 200 | 0 | 0 | 0 | 0 | 0 | 200 |
| Subtotal Test and Evaluation | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Project | 14,002 | 3,068 | 2,124 | 3,255 | 2,612 | Cont. | Cont. |

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603512N PROJECT NUMBER: S2208
PROGRAM ELEMENT TITLE: Carrier Systems Development PROJECT TITLE: Future CV R&D

(U) COST (Dollars in thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| S2208 Future CV R&D | 8,215 | 5,771 | 90,246 | 104,952 | 151,171 | 130,982 | 109,699 | 64,547 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project provides for the development of aircraft carrier (CV/CVN) specific technologies, the infusion of the surface ship technology base into future aircraft carriers and the potential realization of subsystem design capabilities not currently feasible. This project transitions the most promising technologies from the Navy technology base, other government laboratories, and the private sector into specific advanced development efforts. All systems developed in this project have the potential to support emerging requirements and other promising systems technologies for insertion into new aircraft carrier designs. The emphasis is directed toward developing ship hull, mechanical, electrical, aviation and combat support systems, sub-systems and components to significantly improve aircraft carrier affordability, survivability, and operational capabilities and to meet the requirements of existing and pending regulations and statutes critical to the operation of future aircraft carriers.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

- (U) ($4,677) Carrier Technology Assessment and Affordability: Continued engineering assessment of alternative ship design concepts, improved aircraft carrier design tools and assesssed aircraft carrier design criteria. Evaluated cost and capabilities of design concepts. Continued development of a comprehensive roadmap for future sea-based tactical aviation platforms. Continued assessment of design concepts of simplified systems for selected candidates from the electrical system, structural system, auxiliary and fluid systems and design concepts for selected standard, modular-packaged subsystems and components.

- (U) ($1,538) Initiated development of an Aviation Weapons Information Management System (AWIMS).

- (U) ($2,000) Initiated development of an advanced Zonal Electric Distribution System for aircraft carrier

2. (U) FY 1997 PLAN:

- ($5,670) Carrier Technology Assessment and Affordability: Continue engineering assessment of alternative ship design concepts, improve aircraft carrier design tools and assess aircraft carrier design criteria. Evaluate cost and capabilities of design concepts. Complete development of a comprehensive roadmap for future sea-based tactical aviation platforms. Continue assessment of design concepts of simplified systems for selected candidates from the structural system, auxiliary and fluid systems and design concepts for selected standard, modular-packaged subsystems and components. Continue engineering assessment of candidate subsystems and components that could be made common with other surface and submarine subsystems and components to reduce total Navy logistic support costs and simplify ship installation. Continue assessment of alternative propulsion system configurations. Continue development of selected auxiliary machinery modules to complement simplified distributive system architectures for improved affordability.

- (U) ($ 101) Portion of extramural program reserved for Small Business Innovative Research assessment in accordance with 15 U.S.C.

3. (U) FY 1998 PLAN:

- (U) ($ 4,746) Continue improvement of aircraft carrier design tools and assess aircraft carrier design criteria. (11/97-6/98)

- (U) ($23,000) Commence development of advanced aircraft launch alternatives including an Advanced Technology Launcher (ATL) and possible integration with ski-jumps. (11/97-6/98)

- (U) ($ 3,000) Commence development of an integrated rapid aircraft turnaround capability to reduce manpower on the flight deck. (11/97-6/98)

- (U) ($34,000) Commence propulsion plant alternatives assessments including nuclear and conventional power generation, integrated machinery controls, and integrated electric power systems. (11/97-6/98)

- (U) ($10,000) Commence development of advanced passive survivability concepts including armor, underbottom, side protection systems and carrier-suitable, pro-active, tactical and damage response systems. (11/97-6/98)

- (U) ($ 3,000) Assess alternatives for carrier-suitable integrated information management resources such as a common shipwide computing plant architecture and functional applications. (11/97-6/98)

- (U) ($ 4,500) Assess emerging technologies to enable development of advanced carrier topside systems and designs including adjunct multi-function sensor concepts to perform aircraft control and landing guidance functions and design concepts to address RF emission and signature. (11/97-6/98)

- (U) ($ 7,000) Assess emerging technologies to enable significant reductions in manpower requirements. (11/97-6/98)

- (U) ($ 1,000) Restart development of an Aviation Weapons Information Management System. (11/97-6/98)

4. (U) FY 1999 PLAN:

- (U) ($ 2,452) Continue improvement of aircraft carrier design tools and assess aircraft carrier design criteria. (11/98-6/99)
- (U) ($26,000) Continue development of advanced aircraft launch alternatives including an Advanced Technology Launcher (ATL) and possible integration with ski-jumps. (1/98-6/99)
- (U) ($ 3,000) Continue development of an integrated rapid aircraft turnaround capability to reduce manpower on the flight deck. (11/98-6/99)
- (U) ($49,000) Continue propulsion plant alternatives assessments including nuclear and conventional power generation, integrated machinery controls, and integrated electric power systems. (1/98-6/99)
- (U) ($10,000) Continue development of advanced passive survivability concepts including armor, underbottom, side protection systems and carrier-suitable, pro-active, tactical and damage response systems. (11/98-6/99)
- (U) ($ 3,000) Continue assessment of alternatives for carrier-suitable integrated information management resources such as a common shipwide computing plant architecture and functional applications. (11/98-6/99)
- (U) ($ 4,000) Continue assessment of emerging technologies to enable development of advanced carrier topside systems and designs including adjunct multi-function sensor concepts to perform aircraft control and landing guidance functions and design concepts to address RF emission and signature. (11/98-6/99)
- (U) ($ 7,000) Continue to assess emerging technologies to enable significant reductions in manpower. (11/98-6/99)
- (U) ($ 500) Continue development of an Aviation Weapons Information Management System. (11/98-6/99)

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 97 President s Budget: | 8,272 | 6,017 | 1,800 | 1,774 |
| (U) Adjustments from FY 97 PRESBUDG: | -57 | -246 | +88,446 | +103,178 |
| (U) FY 98/99 PRESBUDG Submit: | 8,215 | 5,771 | 90,246 | 104,952 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY96 - (-57) Minor pricing adjustments. FY97 - (-246) General undistributed reductions . FY98 - (+89,559) CVX78 Recapitalization, (-797) General undistributed reductions, (-316) Revised DOD inflation rates and minor pricing adjustments. FY99 - (+103,819) CVX78 Recapitalization, (-45) General undistributed reductions, (-596) Revised DOD inflation rates and minor pricing adjustments.

(U) Schedule: Completion of Aviation Weapons Information Management System slipped one year. FY98 and FY99 increase support technology efforts associated with design and development of systems for potential use on CVX-78.

(U) Technical: Increased risk to achievement of technical goals.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603512N PROJECT NUMBER: S2208
PROGRAM ELEMENT TITLE: Carrier Systems Development PROJECT TITLE: Future CV R&D

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:
(U) PE 0603564N Ship Preliminary Design & Feasibility Studies
(U) PE 0604567N Ship Contract Design and Live Fire Test and Evaluation

D. (U) SCHEDULE PROFILE:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| Program Milestones | CVX: 2Q MS 0 | CVX: 4Q COEA PART I | | CVX: 1Q COEA PART II |
| Engineering Milestones | | | | ATL: 2Q PDR<br>ARMOR: 3Q PDR |
| T&E Milestones | | | | |
| Contract Milestones | | | ATL: 1Q DEMVAL AWARD | |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: Feb 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603512N PROJECT NUMBER: S2208
PROGRAM ELEMENT TITLE: Carrier Systems Development PROJECT TITLE: Future CV R&D

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Systems Engineering | 7,194 | 4,886 | 87,146 | 85,777 |
| b. Software Development | 538 | 500 | 2,500 | 2,500 |
| c. Primary Hardware | 0 | 0 | 0 | 16,000 |
| d. Travel | 30 | 60 | 100 | 125 |
| e. Miscellaneous | 453 | 224 | 500 | 550 |
| f. SBIR | 0 | 101 | 0 | 0 |
| Total | 8,215 | 5,771 | 90,246 | 104,952 |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: Feb 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603512N PROJECT NUMBER: S2208
PROGRAM ELEMENT TITLE: Carrier Systems Development PROJECT TITLE: Future CV R&D

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | | |
| Naval Surface Warfare Center, Carderock Division, Bethesda, MD | | | | | | | | | | | |
| NSWC/CD | WR | Mar 96 | Cont. | Cont. | 13 | 2,492 | 905 | 10,267 | 11,000 | Cont. | Cont. |
| Naval Sea Systems Command Detachment, (PERA CV) | | | | | | | | | | | |
| PERA CV | WR | Feb 97 | Cont. | Cont. | 0 | 25 | 101 | 500 | 500 | Cont. | Cont. |
| Naval Surface Warfare Center, Ship Systems Engineering Station, Philadelphia, PA | | | | | | | | | | | |
| NAVSSES | WR | Feb 96 | Cont. | Cont. | 35 | 260 | 521 | 500 | 500 | Cont. | Cont. |
| Naval Surface Warfare Center, Dahlgren Division, Dahlgren, VA | | | | | | | | | | | |
| NSWC/DD | WR | Apr 96 | Cont. | Cont. | 0 | 515 | 284 | 9,416 | 10,500 | Cont. | Cont. |
| Naval Surface Warfare Center, Port Hueneme Division, Port Hueneme, CA | | | | | | | | | | | |
| NSWC/PHD | WR | Apr 96 | Cont. | Cont. | 0 | 25 | 5 | 200 | 200 | Cont. | Cont. |
| Naval Air Warfare Center, Aircraft Division, Lakehurst, NJ | | | | | | | | | | | |
| NAWC AD LKE | WR | Feb 96 | Cont. | Cont. | 0 | 1,780 | 205 | 32,405 | 35,934 | Cont. | Cont. |
| Naval Air Warfare Center, Aircraft Division, Patuxant River, MD | | | | | | | | | | | |
| NAWC AD PAX | WR | Feb 97 | Cont. | Cont. | 0 | 15 | 25 | 500 | 500 | Cont. | Cont |
| NCCOSC Research and Development Division, San Diego, CA | | | | | | | | | | | |
| NRaD | WR | Mar 96 | Cont. | Cont. | 20 | 200 | 0 | 3,000 | 3,500 | Cont. | Cont. |
| Naval Research Laboratory, Washington, DC | | | | | | | | | | | |
| NRL | WR | Feb 96 | Cont. | Cont. | 50 | 280 | 50 | 2,000 | 2,500 | Cont. | Cont. |
| Supervisor of Shipbuilding, Conversion and Repair, Newport News, VA | | | | | | | | | | | |
| SOSNN | WR | Jun 96 | Cont. | Cont. | 0 | 245 | 0 | 0 | 0 | Cont. | Cont. |
| John J. McMullen Associates, Arlington, VA | | | | | | | | | | | |
| JJMA | Contr. | Feb 96 | Cont. | Cont. | 121 | 1,379 | 1,356 | 1,500 | 1,500 | Cont. | Cont. |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: Feb 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603512N PROJECT NUMBER: S2208
PROGRAM ELEMENT TITLE: Carrier Systems Development PROJECT TITLE: Future CV R&D

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development (cont d) | | | | | | | | | | | |
| Advanced Marine Enterprises, Inc., Arlington, VA | | | | | | | | | | | |
| AME | Contr. | Apr 96 | Cont. | Cont. | 24 | 277 | 490 | 500 | 500 | Cont. | Cont. |
| George G. Sharp, Inc., Arlington, VA | | | | | | | | | | | |
| GGS | Contr. | Apr 96 | Cont. | Cont. | 0 | 20 | 0 | 250 | 250 | Cont. | Cont. |
| M. Rosenblatt & Son, Inc., Arlington, VA | | | | | | | | | | | |
| MRS | Contr. | Apr 96 | Cont. | Cont. | 0 | 245 | 65 | 250 | 250 | Cont. | Cont. |
| American Systems Corporation, Reston, VA | | | | | | | | | | | |
| ASC | Contr. | Feb 96 | Cont. | Cont. | 30 | 210 | 90 | 300 | 300 | Cont. | Cont. |
| ROH, Inc., Arlington, VA | | | | | | | | | | | |
| ROH | Contr. | Mar 96 | Cont. | Cont. | 30 | 75 | 155 | 300 | 300 | Cont. | Cont. |
| Newport News Shipbuilding, Newport News, VA | | | | | | | | | | | |
| NNS | Contr. | Jun 96 | Cont. | Cont. | 30 | 170 | 0 | 0 | 0 | Cont. | Cont. |
| Naval Nuclear propulsion Program | | | | | | | | | | | |
| SEA 08 | Misc. | Oct 97 | Cont. | Cont. | 0 | 0 | 0 | 20,000 | 35,000 | Cont. | Cont. |
| Contractors | | | | | | | | | | | |
| (TBD) | Misc. | Oct 96 | Cont. | Cont. | 0 | 0 | 1,185 | 7,565 | 968 | Cont. | Cont. |
| Miscellaneous | | | | | | | | | | | |
| Misc. | Misc. | Aug 95 | Cont. | Cont. | 147 | 2 | 334 | 793 | 750 | Cont. | Cont. |

Support and Management: Not Applicable

Test and Evaluation: Not Applicable

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: Feb 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603512N PROJECT NUMBER: S2208
PROGRAM ELEMENT TITLE: Carrier Systems Development PROJECT TITLE: Future CV R&D

GOVERNMENT FURNISHED PROPERTY

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | Not Applicable | | | | | | | | | |
| Support and Management | | Not Applicable | | | | | | | | | |
| Test and Evaluation | | Not Applicable | | | | | | | | | |

Total

| | FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 500 | 8,215 | 5,771 | 90,246 | 104,952 | Cont. | Cont. |
| Subtotal Support and Management | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Test and Evaluation | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Project | 500 | 8,215 | 5,771 | 90,246 | 104,952 | Cont. | Cont. |

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603512N
PROGRAM ELEMENT TITLE: Carrier Systems Development

(U) COST (Dollars in thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| W2269 EAF Matting | 0 | 3,829 | 4,209 | 2,673 | 4,502 | 0 | 0 | 0 | 0 | 15,213 |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project addresses the Demonstration and Validation (DEMVAL) of lightweight airfield mat and expeditionary arresting gear to meet naval aviation unique Expeditionary Airfield (EAF) operational requirements including transportability requirements on Maritime Prepositioning Ships (MPS).

(U) The EAF mat presently available (AM-2) was developed for heavy fighter aircraft operations, such as the F-4, and is heavy and cumbersome to deploy. Potentially lightweight (1/2 the weight of AM-2) and less voluminous (1/2 the volume of AM-2) mat material may be technically feasible and commercially available, but the potential materials must be evaluated for use with current type/model/series naval and Air Mobility Command (AMC) aircraft at Vertical and Short Take-Off and Landing (VSTOL) airfields ashore. Current aluminum matting requires approximately 15 days to install a complete airfield. Potential material will meet Marine Corps requirements to install complete airfield in five days or less. Candidate mat materials under consideration for continuation of this on-going evaluation program include reinforced synthetic composite materials and polyvinyl fiberglass. These mat materials will be configured and evaluated for the Marine Corps operational scenarios.

(U) The expeditionary arresting gear program will provide the Marine Corps with the capability to conduct short span arrestments of all Navy and Marine Corps tail hook aircraft in the expeditionary environment. The current M-21 arresting gear cannot be adapted to operate on short span (less than 100 feet) surfaces and is incapable of arresting the full inventory of aircraft under casualty (no flaps or half flap) conditions. Installation of the M-21 requires 24 hours, extensive excavation and heavy support equipment. The M-21 has inadequate reliability and several replacement components are no longer produced. The replacement gear will provide transportability, rapid setup, full inventory operational capability under all arrestment conditions, and adequate operational reliability.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS: Not applicable

2. (U) FY 1997 PLAN:

   • (U) ($ 54) Procure limited amounts of candidate mat, test materials for EAF landing sites. (11/96-6/97)

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603512N PROGRAM ELEMENT TITLE: Carrier Systems Development PROJECT NUMBER: W2269 PROJECT Title: EAF Matting

- ($3,775) Validate absorber, tape and cross deck pendant design and performance. Develop system requirements for mobility, auxiliary and anchoring subsystems prior to integration and demonstration of full system capability. (11/96-6/97)

(U) FY 1998 PLAN:

- (U) ($ 67) Evaluate candidate materials to determine heat resistant and load bearing properties. (11/97-6/98)
- (U) ($4,142) Validate mobility, auxiliary and anchoring subsystem alternatives. Conduct system integration studies and develop prototype designs. (11/97-6/98)

(U) FY 1999 PLAN:

- (U) ($ 101) Validate compatibility of mat panels with AM-2 mat and aircraft operations. (11/98-6/99)
- (U) ($2,572) Fabricate full scale system demonstration units suitable for validation of concepts in a test and controlled operational environment. (11/98-6/99)

B. (U) PROGRAM CHANGE SUMMARY: (Dollars in thousands)

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 97 President s Budget: | 0 | 3,991 | 4,302 | 2,711 |
| (U) Adjustments from FY 97 PRESBUDG: | 0 | -162 | -93 | -38 |
| (U) FY 98/99 PRESBUDG Submit: | 0 | 3,829 | 4,209 | 2,673 |

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603512N PROJECT NUMBER: W2269
PROGRAM ELEMENT TITLE: Carrier Systems Development PROJECT Title: EAF Matting

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY97-99 - Congressional undistributed general and inflation reductions.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY:

| | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| (U) EAF OPN (PE 0206139M, Expeditionary Airfields) | 0 | 0 | 0 | 0 | 0 | 5,555 | 4,577 | 4,715 | Cont. | Cont. |

(U) RELATED RDT&E: Not applicable.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: Feb 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603512N
PROGRAM ELEMENT TITLE: Carrier Systems Development

PROJECT NUMBER: W2269
PROJECT Title: EAF Matting

D. (U) SCHEDULE PROFILE:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| Program Milestones | | A/G: 2Q MS I<br>Mat: 2Q MS I | | |
| Engineering Milestones | | | | |
| T&E Milestones | | Mat:4Q DT<br>A/G: 4Q Subsys Test | | |
| Contract Milestones | | A/G: 2Q Contract Award<br>Mat: 2Q Contract Award | | |

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: Feb 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603512N
PROGRAM ELEMENT TITLE: Carrier Systems Development

PROJECT NUMBER: W2269
PROJECT Title: EAF Matting

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Primary Hardware Development | 0 | 3,561 | 3,928 | 2,496 |
| b. Software Development | 0 | 0 | 0 | 0 |
| c. Integrated Logistics Support | 0 | 268 | 281 | 177 |
| d. Development Test & Evaluation | 0 | 0 | 0 | 0 |
| Total | 0 | 3,829 | 4,209 | 2,673 |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: Feb 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 063512N PROJECT NUMBER: W2269
PROGRAM ELEMENT TITLE: Carrier Systems Development PROJECT TITLE: EAF Matting

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | | |
| Naval Air Warfare Center Aircraft Division, Lakehurst, NJ | | | | | | | | | | | |
| NAWCAD-LKE | WX | 9/30/96 | 2,591 | 2,591 | 0 | 0 | 1,474 | 118 | 118 | 881 | 2,591 |
| TBD | CPFF | 6/31/97 | 12,622 | 12,622 | 0 | 0 | 2,355 | 4,091 | 2,555 | 3,621 | 12,622 |

Support and Management: Not applicable.

Test and Evaluation: Not applicable.

GOVERNMENT FURNISHED PROPERTY: Not applicable

| Item Description | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Delivery Date | FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | Not Applicable | | | | | | | | | |
| Support and Management | Not Applicable | | | | | | | | | |
| Test and Evaluation | Not Applicable | | | | | | | | | |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: Feb 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603512N
PROGRAM ELEMENT TITLE: Carrier Systems Development

PROJECT NUMBER: W2269
PROJECT TITLE: EAF Matting

| | FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Production Development | 0 | 0 | 3,829 | 4,209 | 2,673 | 4,502 | 15,213 |
| Subtotal Support and Management | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Test and Evaluation | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Project | 0 | 0 | 3,829 | 4,209 | 2,673 | 4,502 | 15,213 |

FY 1998/1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603513N

PROGRAM ELEMENT TITLE: Shipboard Systems Component Development

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY2001 ESTIMATE | FY2002 ESTIMATE | FY2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| S0382 - Shipboard Auxiliary Systems Development | 14,742 | 16,393 | 7,227 | 16,135 | 11,400 | 6,705 | 11,034 | 11,400 | CONT. | CONT. |
| S1712 - Hull, Mechanical & Electrical Improvement | 1,894 | 1,589 | 11,967 | 14,826 | 14,031 | 17,552 | 19,549 | 15,412 | CONT. | CONT. |
| TOTAL | 16,636 | 17,982 | 19,194 | 30,961 | 25,431 | 24,257 | 30,583 | 26,812 | CONT. | CONT. |

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program develops affordable non-propulsion machinery systems, components, and improvements for current and future surface fleet Hull, Mechanical and Electrical (HM&E) systems. It includes auxiliary machinery, hull and deck machinery, Fiber Optic (FO) systems, shipboard corrosion control, HM&E materials, Underway Replenishment (UNREP), and ship salvage systems. The integrated topside design portion of this program element develops and integrates the necessary technologies to achieve a total integrated topside architecture focused on future surface combatant ships. Technology areas including topside signature control, sensor and antenna integration, weapon system integration, HM&E integration, related decision making tools, and composite materials will be addressed. Other stand alone technology programs will be synergistically integrated with the topside design integration effort to assure total ship systems integration for future ship design efforts. Surface combatants will need an added (stealth) layer of defense to support hardkill and softkill systems in defeating future threats. Composite materials will be considered for their corrosion control and reduced maintenance attributes. Fiber optics development includes the distributed combat systems under the Integrated Interior Communication and Control ((IC)2) total shipwide network engineering, Fiber Optic Data Multiplexing System (FODMS (1) & (2)), fiber optic shipboard cable topology, analog and digital optoelectronic interfaces, passive optical sensors, and local area network installation projects.

(U) The program is closely coordinated with Advanced Surface Machinery Program (ASMP), formerly Integrated Electric Drive. The program does not duplicate any efforts and is independent of ASMP.

FY 1998/1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603513N

PROGRAM ELEMENT TITLE: Shipboard Systems Component Development

(U) System developments in the Shipboard Auxiliary Systems Development Project (S0382) are usually ACAT IVT or IVM. The HM&E Improvement Project (S1712) is non-ACAT, resulting primarily in new specifications, standards, and operating procedures. The program uses technology from industry and Navy exploratory development programs, evaluates breadboard units in the laboratory, and develops prototype equipment for technical and operational evaluation in Navy platforms and facilities. Thrusts are directed towards improved affordability, performance, producibility, service life, reliability and maintainability, signature reduction, safety, commonality, and standardization, and towards reduced life cycle and acquisition costs, and reductions in weight, volume, and manning. Systems generally apply to all ships and many components may be backfitted during overhauls or equipment replacements, or implemented relatively late in a new ship design cycle. This presents many windows of opportunity to transition technology to the current and future fleet.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under demonstration and validation because it develops and integrates hardware for experimental test related to specific ship or aircraft applications

FY 1998/1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603513N PROGRAM ELEMENT TITLE: Shipboard Systems Component Development

PROJECT NUMBER: S0382 PROJECT TITLE: Shipboard Auxiliary Systems Development

(U) COST (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY2001 ESTIMATE | FY2002 ESTIMATE | FY2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| S0382 - Shipboard Auxiliary Systems Development | 14,742 | 16,393 | 7,227 | 16,135 | 11,400 | 6,705 | 11,034 | 11,400 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project primarily supports ACAT IV projects that develop shipboard fiber optics and auxiliary machinery components and systems to improve affordability, performance, reliability, and maintainability and result in size, weight, and/or acquisition and life cycle cost savings. The auxiliary machinery HM&E developments include standard commercial based components applying new technology which provide the existing and future fleet affordability through reductions in logistics piece part proliferation including low and high pressure air systems, pumps, and advanced water systems to make and disinfect potable water. The project addresses development of machinery and systems architectures to reduce future ship acquisition and operating costs with advanced machinery, advanced degaussing, controllers, solid state power electronics, new underway replenishment concepts and salvage systems. Fiber Optic Topology provides the criteria and specifications for the design, implementation and installation of the physical cable plant on board ship to support data transmission requirements. Fiber optic sensors measure parameters such as pressure, temperature, speed (revolutions per minute) and physical separation (limit switches). This program area also provides performance specifications for shipboard use. (IC)$^2$ will coordinate and integrate the development of hardware and software to provide total-shipwide communications for combat systems networking based on standard open architecture networks.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

- (U) ($8,911) Continued development of advanced affordable HM&E auxiliary machinery systems, components and shipboard salvage systems. Initiated Techeval of standard family composite centrifugal pumps. Continued development of advanced auxiliary machinery and systems to reduce operational costs and manning and improve responsiveness of future surface combatants including new equipment designs, system behavior and control models,

diagnostic and prognostic methodologies, advanced controllers, sensors, software and maintenance methods including fuel cells, ship service generator sets, polymer current limiter, and advanced degaussing systems. Initiated manning functional analysis; development of current system automation baseline, autonomic hardware, current and advanced system enhancements and concepts for reduced maintenance and manning. Completed evaluation of amphibious ship physical magnetic model and determine effectiveness of advanced degaussing system. Continued development of Power Electronic Building Block (PEBB) module, and initiated simulated based design of in-theater replenishment concepts. Awarded contracts for prototype polymer current limiters (PCL), PEBB brassboard, and initiated HP membrane dehydrator demonstration. Commenced Shipeval/Techeval of Electrolytic Disinfectant Generator (EDG) on CVN-71.

- (U) ($5,350) Verified and documented (IC)2 interfaces for combat system components, machinery control system components and Joint Maritime Command Information System (JMCIS). Continued implementing the (IC)2 total ship systems integration process on the LPD-17 baseline design. Maintained and upgraded distributed (IC)2 engineering and integration developmental facility to Asynchronous Transfer Mode (ATM) backbone/network technology. Supported potential user system development with advanced network multimedia technologies. Developed Life Cycle Management Plan and Configuration Management Plan for shipboard fiber optic networks. Continued development of design guidelines for generic fiber optic topology including high capacity single mode cable and components and cable plant design for new construction ships and selected backfit ships. Continued qualification of new fiber optic network components. Completed development of passive optical sensors.

- (U) ($481) Terminated the project for the development of a Remotely Operated Vehicle (ROV) umbilical Splicing System, continued the development of the Underwater Inspection Sensors; completed the development of the ROV Power System Study; and continued development of the Towline Extreme Tension Model for Programs of Ship Salvage Engineering (POSSE) and USN Tow Manual.

2. (U) FY 1997 PLAN:

- (U) ($7,724) Continue development of advanced machinery for HM&E systems to reduce operational, manning, and maintenance costs. Continue development of manning analysis, current and advanced system enhancements and initiate simulation and evaluation of advanced hardware control and concepts maintenance to reduce shipboard manning and maintenance. Begin development of advanced machinery/system integration software. Labeval/Shipeval prototype high pressure membrane dehydrator. Continue development of PEBB modules, PCL, fuel cells, and packaged

commercial equipment for military use. Complete standard family composite centrifugal pumps and EDG Techeval and obtain MS III approval. Transition magnetic silencing technology for steel hull surface ships; including closed loop degaussing. Contract for full scale ships service molten carbonate fuel cell design and 500kw demonstrator.

(U) ($1,482) Complete engineering and development of the Total Ship Integration Management (TSIM) process documentation for the integration of combat system, HM&E, engineering, logistics, and administrative networks for LPD-17. Complete development of PRIDE database and documentation to support new, upgrade, and SHIPALT design efforts. Maintain/upgrade and complete distributed (IC)2 engineering and integration developmental facility. Complete design of potential user systems utilizing the developmental ATM (IC)2 network/backbone. Complete shipboard application of ATM technology. Execute Air Blown Fiber evaluation plan for Navy shipboard fiber optic cable plant installations. Complete conversion of Mil-Specs/Stds to performance/industry standards in accordance with acquisition reform strategy. (915K used to forward finance FY98 program due to termination of Fiber Optics.)

- (U) ($400) Complete development of the Underwater Inspection Sensors; complete development of the Towline Extreme Tension Model for POSSE and USN Tow Manual; initiate development of the Under Water Closed Circuit Blasting System; and initiate development of the Transient Analysis Model for POSSE.

- (U) ($6,503) Support development of prototype/demonstration ship control and monitoring systems, including hardware and software concepts, to minimize manning on surface combatants.

- (U) ($284) Portion of extramural program reserved for Small Business Innovative Research (SBIR) assessment in accordance with 15 U.S.C. 638.

3. (U) FY 1998 PLAN:

(U) ($6,827) Continue development of advanced HM&E machinery and systems to reduce manning and eliminate at-sea maintenance. Conduct laboratory evaluations and demonstrate proof of concept for reduced manning of auxiliary machinery and system architectures. Continue development of PEBB modules, PCL, fuel cells, HP membrane dehydrator, and complete latent defect testing of EDG and composite pumps. Start development of a magnetic on-board self monitoring and control system (Closed Loop Degaussing) for surface combatants. Concentrate initial

efforts in area of on-board sensors and control algorithms. Conduct molten carbonate fuel cell hardware demonstration. (915k used to forward finance FY98 program due to the termination of Fiber Optics.)

- (U) ($400) Complete development of the Transient Analysis Model for POSSE; continue development of the Under Water Closed Circuit Blasting System; and initiate development of the ROV Power System.

4. (U) FY 1999 PLAN:

- (U) ($15,685) Continue development of advanced HM&E machinery and systems architectures to reduce manning and eliminate at-sea maintenance. Initiate full scale demonstration of autonomics machinery zone. Continue development of PCL, PEBB modules, fuel cells, and HP membrane dehydrators. Procure on-board sensor suite, data acquisition and controller equipment, and continue development of control algorithm for Closed Loop Degaussing.

- (U) ($450) Complete development of the Under Water Closed Circuit Blasting System; complete development of the ROV Power System and initiate development of the improved shaft coating system.

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 14,378 | 8,291 | 12,148 | 20,227 |
| (U) Adjustments from FY 1997 PRESBUDG: | +364 | +8,102 | -4,921 | -4,092 |
| (U) FY 1998/99 PRESBUDG Submit: | 14,742 | 16,393 | 7,227 | 16,135 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: The $364K increase in FY 96 is due to minor pricing adjustments. The $8,102K increase in FY97 is due to a $1.9M increase for molten carbonate fuel cell technology, a $6.9M increase for smart ship demonstration and a $698K decrease for Congressional undistributed reductions. Of the $4,921 decrease in FY98, $4,000 is a reduction of shipboard auxiliary systems, $915 for termination of Fiber Optics, and a decrease of $6K due to

minor pricing adjustments. Of the $4,092K decrease in FY99, $4,000K is for reduction of shipboard auxiliary systems and a decrease of $92K due to minor pricing adjustments.

(U) Schedule Changes: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not Applicable.

(U) RELATED RDT&E: Not Applicable.

(U) RELATED RDT&E:

(U) PE0602121N, Surface Ship Technology
(U) PE0603555N, Undersea Superiority Technical Demonstration
(U) PE0603573N, Advanced Surface Machinery Program (ASMP)

FY 1998/1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

February 1997

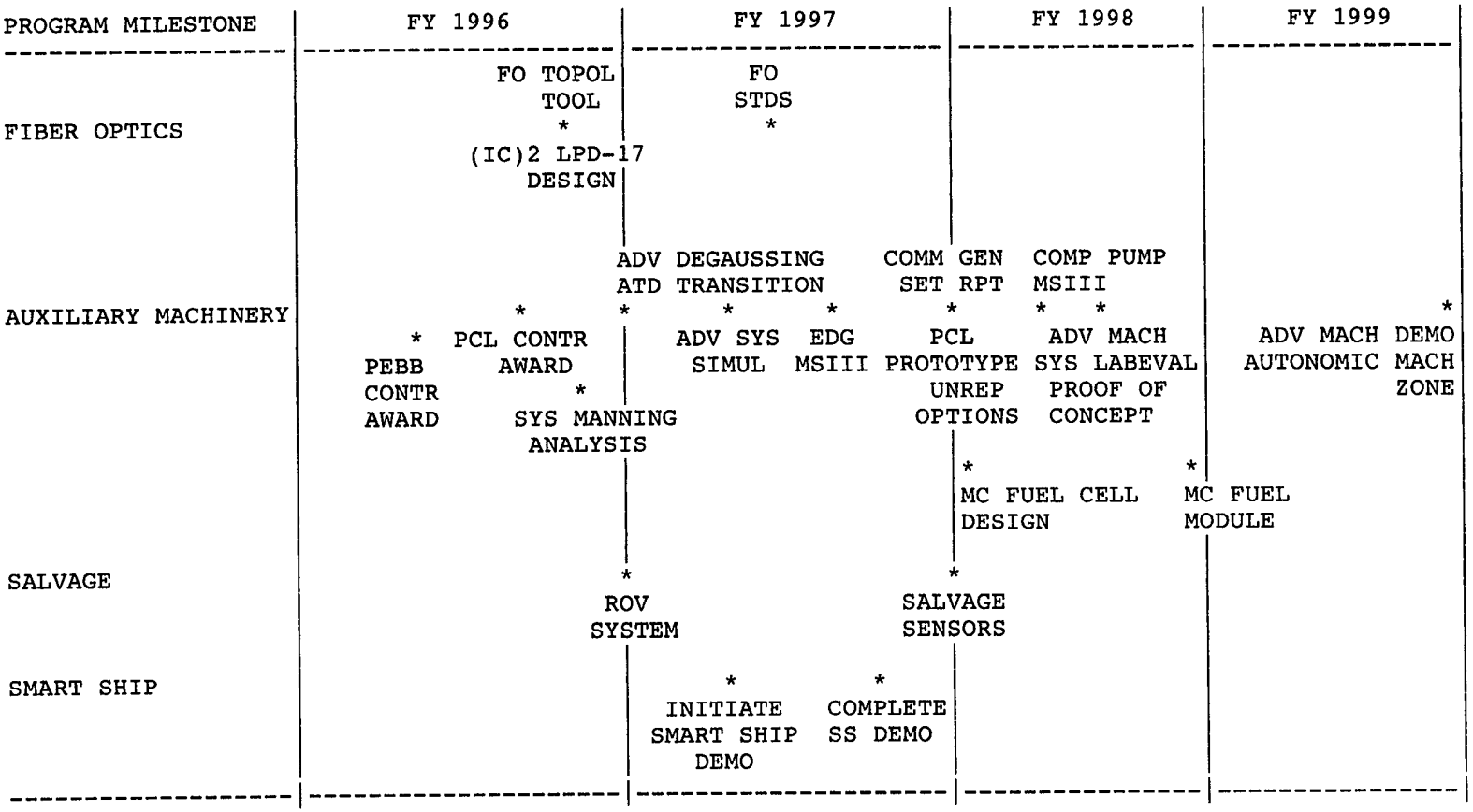
BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603513N
PROGRAM ELEMENT TITLE: Shipboard Systems Component Development

PROJECT NUMBER: S0382
PROJECT TITLE: Shipboard Auxiliary Systems Development

D. (U) SCHEDULE PROFILE:

SCHEDULE PROFILE
0603513N, SHIPBOARD AUXILIARY SYSTEMS DEVELOPMENT, S0382



FY 1998/1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603513N
PROGRAM ELEMENT TITLE: Shipboard Systems Component Development

PROJECT NUMBER: S0382
PROJECT TITLE: Shipboard Auxiliary Systems Development

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| PROJECT COST CATEGORIES | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Auxiliary Machinery | 8,911 | 7,724 | 6,827 | 15,685 |
| b. Fiber Optic | 5,350 | 1,482 | 0 | 0 |
| c. Salvage | 481 | 400 | 400 | 450 |
| d. Smart Ship | -- | 6,503 | -- | -- |
| e. SBIR | -- | 284 | -- | -- |
| TOTAL | 14,742 | 16,393 | 7,227 | 16,135 |

FY 1998/1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603513N PROGRAM ELEMENT TITLE: Shipboard Systems Component Development

PROJECT NUMBER: S0382 PROJECT TITLE: Shipboard Auxiliary Systems Development

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

| PERFORMING ORGANIZATIONS Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development: | | | | | | | | | | | |
| Ingersoll-Dresser Pump Philips./NJ | C/CPFF | 3/92 | | | 5,175 | 725 | 200 | 0 | 0 | 0 | 6,100 |
| ElTech International Clevelnd,OH | C/CPFF | 12/88 | | | 3,470 | 340 | 125 | 0 | 0 | 0 | 3,935 |
| TBD | C/CPFF | Various | | | 1,423 | 2,530 | 1,000 | 1,000 | 3,000 | Cont | Cont |
| Misc Contr. | Various | Various | | | 7,636 | 4,157 | 8,701 | 1,000 | 2,226 | Cont | Cont |
| NSWC/Dahl. | WR | Various | | | 6,191 | 0 | 0 | 0 | 0 | 0 | 6,191 |
| NSWC/Annap. | WR | Various | | | 8,168 | 4,318 | 3,300 | 4,455 | 10,062 | Cont | Cont |
| NAVSSES/Ph | WR | Various | | | 0 | 0 | 700 | 0 | 0 | 0 | 700 |
| NCCOSC, SD | WR | Various | | | 0 | 1,067 | 700 | 0 | 0 | Cont | Cont |
| MiscGovtLab | WR | Various | | | 25,463 | 1,605 | 1,667 | 772 | 847 | Cont | Cont |
| Support and Management: | | | | | | | | | | | |
| Misc. | C/CPFF | Various | | | 159 | 0 | 0 | 0 | 0 | 0 | 159 |

Test and Evaluation: N/A

FY 1998/1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603513N

PROGRAM ELEMENT TITLE: Shipboard Systems Component Development

PROJECT NUMBER: S0382

PROJECT TITLE: Shipboard Auxiliary Systems Development

GOVERNMENT FURNISHED PROPERTY: N/A

| | FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 57,526 | 14,742 | 16,393 | 7,227 | 16,135 | Cont | Cont |
| Subtotal Support and Management | 159 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Test and Evaluation | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Project | 57,685 | 14,742 | 16,393 | 7,227 | 16,135 | Cont | Cont |

FY 1998/1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603513N PROGRAM ELEMENT TITLE: Shipboard Systems Component Development PROJECT NUMBER: S1712 PROJECT TITLE: HM&E Improvement

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY2001 ESTIMATE | FY2002 ESTIMATE | FY2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| S1712 - Hull, Mechanical & Electrical Improvement | 1,894 | 1,589 | 11,967 | 14,826 | 14,031 | 17,552 | 19,549 | 15,412 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project is non-ACAT and develops improved equipments which are small but critical components of non-propulsion HM&E systems. The program is directed toward improved affordability, performance, reduced life cycle cost, reliability and maintainability, signature reduction, standardization, and weight and manning reductions for the existing and future fleet. The integrated topside design portion of this program element develops and integrates the necessary technologies to achieve a total integrated topside architecture focused on future surface combatant ships. Technology areas including topside signature control, sensor and antenna integration, weapon system integration, HM&E integration, related decision making tools, and composite materials will be addressed. Other stand alone technology programs will be synergistically integrated with this topside design integration effort to assure total ship systems integration for future ship design efforts. Surface combatants will need an added (stealth) layer of defense to support hardkill and softkill systems in defeating future threats. Composite materials will also be considered for their corrosion control and reduced maintenance attributes.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

- (U) ($1,360) Continued development of advanced affordable, mechanical, electrical, and hull and deck auxiliary machinery including variable capacity motors & controls, and components including alternative piping and valve specs and standards and new affordable efficient ships service power generation. Completed demonstration of alternative propulsion diesel engine starting system. Qualified Glass Reinforced Plastic (GRP) valve for seawater, freshwater, oily waste, waste water and plumbing drain, and continued Labeval and Shipeval of prototype standard GRP ball valves. Completed low pressure membrane dehydrator evaluations, design and specifications. Completed evaluation of commercial variable speed drives.

- (U) ($534) Established initial approach to reduce signatures of all topside systems. Assess the significance of signature components (combat, communications, and HM&E) access the most critical improvements needed. Continued

topside design requirement definition, technology assessments, and composites implementation plan to address mission needs. Completed evaluation of integrated composite structure/sensor task and assembled initial systems engineering approach required for topside systems signature reduction.

2. (U) FY 1997 PLAN:

- (U) ($711) Continue development of affordable mechanical, electrical and hull and deck machinery. Complete development of Navy Standard GRP Ball Valves. Award contract and conduct trade off analysis ship impact study of affordable efficient ships service power generation. Complete Labeval of alternate diesel starting systems.

- (U) ($867) Complete long-term project plan that defines design tools, signature data, subcomponents, components, and full scale prototypes necessary to demonstrate topside design integration concepts, including composite materials for future surface combatants. Establish the total signature budget for the next generation surface combatant systems and subsystems that distributes the signature over the platform. Evaluate composite materials for their corrosion control and reduced maintenance attributes. Draft and formalize a long term Signature Management Plan (SMP) for implementation of reduced signature technology within the ship acquisition cycle and produce definitive component signature goals for topside equipments anticipated on future ship designs. Begin scale model development work to refine computer assessments on ship signatures predictions and goals with emphasis on major hullform and superstructure arrangements.

- (U) ($11) Portion of extramural program reserved for Small Business Innovation Research (SBIR) assessment in accordance with 15 U.S.C. 638.

3. (U) FY 1998 PLAN:

- (U) ($981) Continue development of affordable mechanical electrical machinery including feasibility study of commercial ship service genset.

- (U) ($10,986) Define multi-function radar-communication antenna system. Identify common platform for integrated topside design toolset implementation. Initiate development of integrated topside design toolset. Develop preliminary design concepts for integrated topside design prototype components. Develop and initiate validation of composite design procedures. Evaluate composite materials for their corrosion control and reduced maintenance attributes. Transition signature requirements and goals into concept formulation for HM&E elements, aviation

systems, etc. Continue computer, testing, and scale modeling signature assessments. Assess major signature component tradeoffs and begin formulation of detailed specifications for topside components.

4. (U) FY 1999 PLAN:

- (U) ($941) Continue development of improved HM&E auxiliary components for improved maintenance and reliability. Complete ship service genset feasibility study.

- (U) ($13,885) Continue development of integrated topside design toolset. Initiate fabrication concepts of integrated topside surface ship prototype components. Continue development and validation of composite design procedures. Consider composite materials for their corrosion control and reduced maintenance attributes. Conduct advanced engineering analysis and article testing for reduced signature topside features and components. Produce advanced computer and scale modeling predictions for detailed components and basic ship arrangements. Produce specifications and drawings for reduced signature topside components.

FY 1998/1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603513N PROGRAM ELEMENT TITLE: Shipboard Systems Component Development PROJECT NUMBER: S1712 PROJECT TITLE: HM&E Improvement

PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 1,902 | 1,657 | 5,094 | 4,733 |
| (U) Adjustments from FY 1997 PRESBUDG: | -8 | -68 | +6,873 | +10,093 |
| (U) FY 1998/1999 PRESBUDG Submit: | 1,894 | 1,589 | 11,967 | 14,826 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: The $8K decrease in FY96 reflects minor pricing adjustments. The FY97 decrease of $68K reflects Congressional undistributed reductions. The $6,873K increase in FY98 is for Integrated Surface Ship Topside Design and other minor pricing adjustments. The $9,553K increase in FY99 is for Integrated Surface Ship Topside Design and other minor pricing adjustments.

(U) Schedule Changes: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:

(U) PE0602121N, Surface Ship Technology
(U) PE0603573N, Advanced Surface Machinery Program (ASMP)

D. (U) SCHEDULE PROFILE: SEE ATTACHED.

FY 1998/1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603513N
PROGRAM ELEMENT TITLE: Shipboard Systems Component Development

PROJECT NUMBER: S1712
PROJECT TITLE: HM&E Improvement

SCHEDULED PROFILE
0603513N, HULL, MECHANICAL, & ELECTRICAL IMPROVEMENT, S1712

| PROGRAM MILESTONE | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| AUXILIARY MACHINERY | LPMD COMPL * GRP VALVE SHIPEVAL * * DIESEL STARTING DEMO | * DIESEL STARTING COMPL | | *GEN SET COMPL |
| ADVANCED COMPOSITES | * DESIGN EVAL | * SIGNATURE MANAGEMENT PLAN | * SIGNATURES TRADEOFF ANALYSIS | * REDUCED SIG TOPSIDE DES SPECS & DWGS |

FY 1998/1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603513N PROJECT NUMBER: S1712
PROGRAM ELEMENT TITLE: Shipboard Systems Component Development PROJECT TITLE: HM&E Improvement

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| PROJECT COST CATEGORIES | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. HM&E | 1,360 | 711 | 981 | 941 |
| b. Integr. Topside Design | 534 | 867 | 10,986 | 13,885 |
| c. SBIR | -- | 11 | -- | -- |
| TOTAL | 1,894 | 1,589 | 11,967 | 14,826 |

FY 1998/1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603513N PROGRAM ELEMENT TITLE: Shipboard Systems Component Development

PROJECT NUMBER: S1712 PROJECT TITLE: HM&E Improvement

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

| PERFORMING ORGANIZATIONS Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development: | | | | | | | | | | | |
| Misc Contr. | Various | Various | | | 355 | 245 | 404 | 717 | 1,342 | Cont | 3,063 |
| JJMA | C/CPFF | Various | | | 0 | 0 | 0 | 1,500 | 2,000 | Cont | 3,500 |
| Rockwell | C/CPFF | Various | | | 0 | 0 | 0 | 1,500 | 2,000 | Cont | 3,500 |
| Lockheed/ Martin | C/CPFF | Various | | | 0 | 0 | 0 | 1,500 | 2,000 | Cont | 3,500 |
| NSWCCD | WR | Various | | | 2,801 | 1,599 | 1,075 | 2,000 | 2,520 | Cont | Cont |
| NSWCDD | WR | Various | | | 1,480 | 0 | 0 | 900 | 1,000 | Cont | Cont |
| NRL | WR | Various | | | 181 | 50 | 80 | 900 | 1,000 | Cont | Cont |
| NSWCCD/Phil | WR | Various | | | 275 | 0 | 0 | 600 | 600 | Cont | 1,475 |
| NRaD | WR | Various | | | 0 | 0 | 0 | 1,850 | 1,864 | Cont | Cont |
| NAWC | WR | Various | | | 0 | 0 | 30 | 500 | 500 | Cont | Cont |

Support and Management: N/A

Test and Evaluation: N/A

GOVERNMENT FURNISHED PROPERTY: N/A

FY 1998/1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603513N

PROGRAM ELEMENT TITLE: Shipboard Systems Component Development

PROJECT NUMBER: S1712

PROJECT TITLE: HM&E Improvement

| | FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 5,092 | 1,894 | 1,589 | 11,967 | 14,826 | Cont | Cont |
| Subtotal Support and Management | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Test and Evaluation | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Project | 5,092 | 1,894 | 1,589 | 11,967 | 14,826 | Cont | Cont |

FY 1998/1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603513N
PROGRAM ELEMENT TITLE: Shipboard Systems Component Development

PROJECT NUMBER: S1712
PROJECT TITLE: HM&E Improvement

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FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603514N
PROGRAM ELEMENT TITLE: Ship Combat Survivability

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| S0384 Combat Survivability Design | 2,887 | 2,195 | 2,062 | 2,116 | 2,110 | 2,155 | 2,199 | 2,251 | CONT. | CONT. |
| S1121 Personnel Protection | 2,394 | 1,818 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 48,245 |
| S1565 Fire Protection/Damage Control Systems | 5,886 | 4,175 | 4,988 | 5,652 | 5,686 | 5,812 | 5,933 | 6,070 | CONT. | CONT. |
| TOTAL | 11,167 | 8,188 | 7,050 | 7,768 | 7,796 | 7,967 | 8,132 | 8,321 | CONT. | CONT. |

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The advanced development of equipment/systems/engineering data and full scale weapons effects simulation will provide protection of ships and their personnel from conventional weapon effects, and enable the ship to continue performing assigned missions at an effective level. This program is also concerned with the effects of fire, smoke, and lethal environments created by peacetime accidents and the development of fire protection and damage control capabilities necessary to limit, control, and correct wartime and peacetime casualty situations.

(U) Starting in FY 1998, P.E. 0603514N/S1121 efforts transition to P.E. 0604516N/S2054, Integrated Fire Protection/ Damage Control. This zero-sum realignment is required since future work in this area will be primarily engineering/ manufacturing development and T&E, vice demonstration and validation.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental tests related to specific ship or aircraft applications.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N PROJECT NUMBER: S0384
PROGRAM ELEMENT TITLE: Ship Combat Survivability PROJECT TITLE: Combat Survivability Design

(U) COST (Dollars in thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| S0384 Combat Survivability Design | 2,887 | 2,195 | 2,062 | 2,116 | 2,110 | 2,155 | 2,199 | 2,251 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project supports the development of protection concepts, specifications, and standards to meet objectives of OPNAVINST 9070.1, "Survivability Policy for Surface Ships of the U.S. Navy", dtd 23 Sep 1988. Specifically, combatants must be able to deal with the degrading effects of damage from anti-ship missiles (ASMs), torpedoes, and mines. Additionally, the lessons learned from the Persian Gulf experience demonstrated the need to: (1) improve the resistance of the hull girder and equipment/ systems against underwater explosion (UNDEX) shock and whipping effects, and (2) provide uninterruptible shipboard power to ensure continuous combat capability.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

- (U) ($800) Completed dynamic verification testing of UNDEX resistant hull girder designs. Developed preliminary design guidance manual.

- (U) ($1,315) Designed and fabricated a prototype Advanced Ship Shock Isolation Systems Technology (ASSIST) mount capable of supporting 3000 lbs (3 KIPS) of electronic equipment. Initiated full scale UNDEX shock testing to demonstrate the ability to protect a suite of commercial electronic equipment installed on a floating raft ; designed and constructed raft. Initiated total-ship systems integration and producibility studies to define outfitting and structural construction procedures.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N PROJECT NUMBER: S0384
PROGRAM ELEMENT TITLE: Ship Combat Survivability PROJECT TITLE: Combat Survivability Design

1. (U) FY 1996 ACCOMPLISHMENTS: (Cont.)

- (U) ( $772) Initiated development of Integrated Magazine Protection Systems (IMPS) to reduce the vulnerability of a magazine to mass detonation by integrating anti-fratricide shielding to prevent sympathetic detonation, explosion suppression systems to contain any munitions reaction within the magazine boundary, and blast and fragment tolerant magazine boundaries. Defined IMPS options to support identification of ship/ magazine interface requirements.

2. (U) FY 1997 PLAN:

- (U) ($ 150) Finalize UNDEX resistant hull girder design manual.
- (U) ($1,159) Complete UNDEX shock testing of 3 KIP ASSIST mount; prepare design drawings and ship design procedures. Complete systems integration and producibility studies. Initiate development of prototype ASSIST mount for protecting commercial machinery.
- (U) ($ 868) Conduct scaled weapon effects tests of IMPS concepts to evaluate the effectiveness of water to suppress detonation effects. Conduct ship producibility studies to identify cost effective integration approaches.
- (U) ($ 18) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 U.S.C.638.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N PROJECT NUMBER: S0384
PROGRAM ELEMENT TITLE: Ship Combat Survivability PROJECT TITLE: Combat Survivability Design

3. (U) FY 1998 PLAN:

- (U) ($1,059) Fabricate a prototype ASSIST machinery mount; develop design drawings and ship design procedures. Initiate full scale UNDEX shock demonstration tests employing ASSIST mounts, raft, and commercial machinery.

- (U) ($1,003) Initiate full scale proof-of-concept IMPS demonstration tests employing multiple missiles, magazine and ship structure, threat stimuli, anti-fratricide shielding, and explosion suppression system; construct full scale structural models.

4. (U) FY 1999 PLAN:

- (U) ($1,099) Conduct full scale UNDEX shock demonstration tests of ASSIST machinery mounts, raft, and commercial machinery.

- (U) ($1,017) Conduct full scale IMPS demonstration tests employing a shaped charge jet as the threat stimuli, initiating multiple warhead detonations. Develop preliminary ship installation design standards and drawing.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N PROJECT NUMBER: S0384
PROGRAM ELEMENT TITLE: Ship Combat Survivability PROJECT TITLE: Combat Survivability Design

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 2,972 | 1,502 | 2,059 | 2,120 |
| (U) Adjustments from FY 1997 PRESBUDG: | -85 | +693 | +3 | -4 |
| (U) FY 1998/99 PRESBUDG Submit: | 2,887 | 2,195 | 2,062 | 2,116 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1996 change due to minor pricing adjustments. FY 1997 change due to (+785K) Near Term Mine Warfare reprogramming and (-92K) Congressional Undistributed General Reductions. FY 1998 and FY 1999 changes due to revised Navy Working Capital Fund (NWCF) rates.

(U) Schedule: Not Applicable.
(U) Technical: Not Applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Specification changes included in new construction ships (SCN funding). Procurement information not available at this level of detail.

(U) RELATED RDT&E:

(U) PE 0604516N, Project S1828 (Combat Readiness & Sustainability).

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N PROGRAM ELEMENT TITLE: Ship Combat Survivability PROJECT NUMBER: S0384 PROJECT TITLE: Combat Survivability Design

| D. (U) SCHEDULE PROFILE: | FY 1996 | FY 1997 | FY 1998 | FY 1999 | TO COMPLETE |
|---|---|---|---|---|---|
| PROGRAM MILESTONES | | | | | |
| Engineering Milestones | 4Q UNDEX Hull Girder Design Manual (Preliminary) | 3Q UNDEX Hull Girder Design Manual (Final) | | | |
| | 4Q ASSIST Electronics Mounts | 4Q ASSIST Electronics Mount /Design Drawings and Procedures | 4Q ASSIST Machinery Mount/Design Drawings and Procedures | | |
| | 4Q IMPS Integration Options | 4Q IMPS Producibility Studies | | 4Q IMPS Design Standards and Drawings | |
| T&E Milestones | | 2Q ASSIST UNDEX Electronics Mount Shocks Tests | | 2Q ASSIST UNDEX Machinery Mount Shock Tests | |
| | | 4Q IMPS Scaled | | 4Q IMPS Full | |

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N PROJECT NUMBER: S0384
PROGRAM ELEMENT TITLE: Ship Combat Survivability PROJECT TITLE: Combat Survivability Design

Test Scale Test

FY 1998/FY 1999 PROGRAM ELEMENT PROJECT COST BREAKDOWN DATE: Feb 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N PROJECT NUMBER: S0384
PROGRAM ELEMENT TITLE: Ship Combat Survivability PROJECT TITLE: Combat Survivability Design

Contract
Milestones: None

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| PROJECT COST CATEGORIES | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Engineering Assessment/ Design Studies | 1,122 | 285 | 250 | 200 |
| b. Test and Evaluation | 1,205 | 1,450 | 1,266 | 1,606 |
| c. Specification/Design Standard Preparation | 150 | 200 | 50 | 100 |
| d. Hardware Development | 400 | 250 | 486 | 200 |
| e. Travel | 10 | 10 | 10 | 10 |
| TOTAL | 2,887 | 2,195 | 2,062 | 2,116 |

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands) (Not applicable)

FY 1998/FY 1999 RDT&E,NBUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N PROGRAM ELEMENT TITLE: Ship Combat Survivability PROJECT NUMBER: S1565 PROJECT TITLE: Fire Protection/Damage Control Systems

(U) COST (Dollars in thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| S1565 Fire Protection/Damage Control Systems | 5,886 | 4,175 | 4,988 | 5,652 | 5,686 | 5,812 | 5,933 | 6,070 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Persian Gulf war lessons-learned highlighted the threat to ship s mission caused by fire, smoke, and flooding following an attack, and the need to execute more organized and effective DC actions. Additionally, the inability to rapidly restore vital hull, mechanical, and electrical (HM&E) systems following damage was also addressed.

(U) In that context, including peacetime lessons-learned, this project supports the development and evaluation of systems to enable the ship and crew under reduced manning to contain damage to the primary damage zone, and rapidly restore vital HM&E systems, providing for recovery of mission capability. System development areas include: 1) computerized information management (IM) to collect, analyze, and display, in real-time, key data on ship status and recommended DC actions for restoring vital HM&E services, 2) active and passive fire protection systems, and 3) advanced DC training systems which account for all aspects of combat induced damage, decision making in high stress environments, and recovery/ restoration.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

- (U) ( $290) Completed full scale fire tests of selected shipboard compartments and prepared material performance specification.

FY 1998/FY 1999 RDT&E,NBUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N
PROGRAM ELEMENT TITLE: Ship Combat Survivability
PROJECT NUMBER: S1565
PROJECT TITLE: Fire Protection/Damage Control Systems

1. (U) FY 1996 ACCOMPLISHMENTS (Cont d)

- (U) ( $705) Prepared final specification for fixed fine water mist fire extinguishing system.
- (U) ( $590) Continued development of the time-dependent Ship Vulnerability Model (SVM) dynamic electrical model.
- (U) ( $440) Completed ship-based evaluation of preliminary Real-Time Stability Status (RTSS) software module.
- (U) ( $415) Continued structural assessment software module development for the computer-based Damage Control System (DCS).
- (U) ( $190) Updated ship vulnerability assessment software which identifies inactivated equipment as a function of threat to allow for more rapid and efficient program execution.
- (U) ( $799) Completed full scale single repair party damage control tests aboard the ex-USS SHADWELL.
- (U) ( $595) Completed development of interactive training system for the Repair Locker Leader (RLL).
- (U) ( $555) Provided technical and logistic support assessments for existing damage control/firefighting equipment and systems.
- (U) ( $115) Developed a survivable damage control sensor architecture design that identifies the primary damage zone and tracks fire and smoke progression in real-time. Initiated integration into DCS to display sensor data.

FY 1998/FY 1999 RDT&E,NBUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N PROJECT NUMBER: S1565
PROGRAM ELEMENT TITLE: Ship Combat Survivability PROJECT TITLE: Fire Protection/Damage Control Systems

1. (U) FY 1996 ACCOMPLISHMENTS: (Cont.)

- (U) ( $443) Initiated development of a DCS firemain reconfiguration management module that supports rapid isolation and restoration following a rupture. Evaluated system options including sensors that identify the location of a rupture, and software that provides valve isolation sequencing logic.

- (U) ( $473) Initiated development of a DCS systems reconfiguration management software module that provides recommended actions (decision aid) for rapid restoration of combat system auxiliary support (HM&E) services (e.g., electrical, chilled water, electronic cooling water, and seawater cooling). Prepared software development plan. Identified HM&E/CS integration options for the effective exchange of equipment status data between HM&E and combat systems (CS) computers.

- (U) ( $276) Initiated assessment of current magazine sprinkler systems to provide sufficient cooling to prevent deflagration under combat threat conditions. Specifically, investigated external fire threats raising the magazine air temperature above a critical level, and penetrating threats that initiate propellant burning.

2. (U) FY 1997 PLAN:

- (U) ( $410) Conduct shipboard T&E of final RTSS software module integrated with flooding sensors and tank level indicators.

- (U) ( $350) Complete prototype structural assessment module; conduct fleet evaluation.

FY 1998/FY 1999 RDT&E,NBUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N PROJECT NUMBER: S1565
PROGRAM ELEMENT TITLE: Ship Combat Survivability PROJECT TITLE: Fire Protection/Damage Control Systems

2. (U) FY 1997 PLAN (Cont d):

- (U) ( $250) Complete integration of fire and smoke sensor data into DCS. Conduct full scale fire testing aboard ex-USS SHADWELL to demonstrate the ability to track fire in real-time.
- (U) ( $350) Continue development of a DCS firemain reconfiguration management module. Conduct land-based T&E of sensor option; develop specification.
- (U) ( $475) Continue development of DCS systems reconfiguration management software. Select HM&E/CS integration approach; develop software requirements and initiate coding for a chilled water system reconfiguration decision aid.
- (U) ($1,000) Conduct fleet evaluations aboard the ex-USS SHADWELL to evaluate the effectiveness of DCS in reducing the number of personnel devoted to communications and plotting; and develop shipboard procedures for the on-scene leader in support of rapid battle damage assessment and prioritization.
- (U) ( $550) Complete development of SVM dynamic electrical model. Initiate development of fire and smoke spread model.
- (U) ( $571) Initiate development of an interactive training system for improving interdepartmental coordination between RLL and the Damage Control Assistant (DCA).
- (U) ( $200) Complete assessment of current magazine sprinkler systems. Develop performance-based specification.
- (U) ( $19) Portion of extramural program reserved for Small Business Innovation Research assessment in a ordance with 15 U.S.C.638.

FY 1998/FY 1999 RDT&E,NBUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N PROGRAM ELEMENT TITLE: Ship Combat Survivability PROJECT NUMBER: S1565 PROJECT TITLE: Fire Protection/Damage Control Systems

3. (U) FY 1998 PLAN:

- (U) ( $400) Integrate RTSS software module with DCS to allow stability data to be presented from the DCS console.
- (U) ( $400) Develop training curriculum for the DCS structural assessment module and finalize software based on fleet lessons learned.
- (U) ( $400) Initiate development of firemain valve isolation sequencing logic software that will recommend valves to close to isolate a break; develop software specification.
- (U) ( $900) Complete chilled water system reconfiguration decision aid and initiate electrical system reconfiguration decision aid. Initiate land-based tests to demonstrate the transfer of combat system equipment status data to DCS for use in prioritizing HM&E restoration actions.
- (U) ($1,188) Conduct fleet evaluations aboard the ex-USS SHADWELL to demonstrate the effectiveness of active reduced manning damage control concepts in responding to a major casualty; develop shipboard procedures.
- (U) ( $600) Complete interactive training system for the RLL and DCA. Initiate development of a DC Command Team Trainer for improving total-ship coordination between the DCA, Engineering Officer of the Watch (EOOW), and the Combat Systems Officer of the Watch (CSOOW) in support of rapid mission restoration.
- (U) ( $600) Complete development of SVM fire and smoke model.
- (U) ( $500) Initiate development of an intelligent ventilation and fixed fire suppression system control capability for containing fire and smoke remotely from the Damage Control Central (DCC) DCS computer console.

FY 1998/FY 1999 RDT&E,NBUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N
PROGRAM ELEMENT TITLE: Ship Combat Survivability
PROJECT NUMBER: S1565
PROJECT TITLE: Fire Protection/Damage Control Systems

4. (U) FY 1999 PLAN:

- (U) ( $750) Complete development of the firemain valve isolation sequencing logic software and initiate demonstration aboard the ex-USS SHADWELL, employing a fully operational firemain, sensors, remotely actuated valves, and simulated ruptures.

- (U) ($1,150) Complete electrical system reconfiguration decision aid software coding. Complete land-based demonstration tests of combat system equipment status data transfer to DCS; develop DCS/ CS interface standard.

- (U) ( $600) Develop a crew casualty/ damage control model for the SVM that supports ship designs by predicting crew casualties as a result of initial damage and the capability of personnel to take necessary actions to contain damage/ restore mission capability.

- (U) ($1,227) Conduct fleet evaluations aboard the ex-USS SHADWELL in support of developing shipboard procedures for firefighting in a chemical, biological, and radiological (CBR) environment.

- (U) ( $900) Continue development of the interactive DC Command Team Trainer.

- (U) ($1,025) Continue development of a remote firefighting capability from DCC. Evaluate sensor and architecture options aboard the ex-USS SHADWELL; develop system requirements.

FY 1998/FY 1999 RDT&E,NBUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N PROGRAM ELEMENT TITLE: Ship Combat Survivability PROJECT NUMBER: S1565 PROJECT TITLE: Fire Protection/Damage Control Systems

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 5,894 | 2,353 | 5,048 | 5,683 |
| (U) Adjustments from FY 1997 PRESBUDG: | -8 | +1,822 | -60 | -31 |
| (U) FY 1998/99 PRESBUDG Submit: | 5,886 | 4,175 | 4,988 | 5,652 |

B. (U) PROGRAM CHANGE SUMMARY: (Cont.)

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1996 change due to minor pricing adjustments. FY 1997 increase due to (+2,000K) for Near Term Mine Warfare reprogramming and (-178K) for Congressional Undistributed General Reductions. FY 1998 and FY 1999 changes reflect revised NWCF rates.

(U) Schedule: Not Applicable.
(U) Technical: Not Applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Specification changes included in new construction ships (SCN funding). Procurement information not available at this level of detail.

(U) RELATED RDT&E:

(U) PE 0604516N, Project S2054 (Integrated Fire Protection/ Damage Control).

FY 1998/FY 1999 RDT&E,NBUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N PROGRAM ELEMENT TITLE: Ship Combat Survivability PROJECT NUMBER: S1565 PROJECT TITLE: Fire Protection/Damage Control Systems

D. (U) SCHEDULE PROFILE:

| Program Milestones | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| Engineering Milestones | 4Q Fire/ Smoke Sensor Design | | | |
| | | 2Q SVM Dynamic Electrical Model | | |
| | 4Q RTSS Software Module (Preliminary) | 4Q RTSS Software Module (Final) | | |
| | 4Q DCS Structural Assessment Software Module (Preliminary) | | | |

FY 1998/FY 1999 RDT&E,NBUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N PROGRAM ELEMENT TITLE: Ship Combat Survivability PROJECT NUMBER: S1565 PROJECT TITLE: Fire Protection/Damage Control Systems

| | | | |
|---|---|---|---|
| | 4Q Interactive DC Training System Module for RLL | | 4Q Interactive System Module for RLL and DCA |
| Engineering Milestones (Continued) | 4Q Magazine Combat Threat Assessment | 4Q Magazine Sprinkler System Vulnerability Assessment and Specification | |
| | 4Q Material Performance Specification | | |
| | 4Q Firemain Reconfiguration Options | 2Q Firemain Test Plan | |
| | 4Q Systems Reconfiguration Management Integration Options | 4Q Systems Reconfiguration Management Software Requirements | 4Q Chilled Water Decision Aid Software |

FY 1998/FY 1999 RDT&E,NBUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N PROJECT NUMBER: S1565
PROGRAM ELEMENT TITLE: Ship Combat Survivability PROJECT TITLE: Fire Protection/Damage Control Systems

FY 1998/FY 1999 RDT&E,NBUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N PROJECT NUMBER: S1565
PROGRAM ELEMENT TITLE: Ship Combat Survivability PROJECT TITLE: Fire Protection/Damage Control Systems

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| T&E Milestones | 4Q RTSS Shipboard T&E (Preliminary) | 4Q RTSS Shipboard T&E (Final) | | |
| | 3Q Single Repair Party Full Scale DC Evaluations | 3Q DCS Fleet Evaluations | 4Q Reduced Manning Evaluations | 4Q CBR Environment Firefighting Evaluations |
| | | 4Q Fire/Smoke Sensor Demonstration | | |
| | | 4Q Firemain Reconfiguration Sensor Evaluations | | 4Q DCS\CS Integration Demonstration |
| Contract Milestones (Not applicable) | | | | |

FY 1998/FY 1999 RDT&E,NBUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N
PROGRAM ELEMENT TITLE: Ship Combat Survivability
PROJECT NUMBER: S1565
PROJECT TITLE: Fire Protection/Damage Control Systems

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| PROJECT COST CATEGORIES | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Engineering Assessment /Design Studies | 1,084 | 400 | 300 | 283 |
| b. Test and Evaluation | 1,833 | 1,420 | 1,627 | 1,838 |
| c. Specifications/Design Standard Preparation | 350 | 100 | 200 | 200 |
| d. Training Development | 645 | 625 | 650 | 1,000 |
| e. Software Development | 1,929 | 1,605 | 2,186 | 2,306 |
| f. Travel | 25 | 25 | 25 | 25 |
| TOTAL | 5,886 | 4,175 | 4,988 | 5,652 |

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands) Not applicable.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603542N
PROGRAM ELEMENT TITLE: Radiological Control

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| S1830 RADIAC Development | 3,084 | 2,769 | 3,030 | 3,677 | 3,685 | 3,758 | 3,761 | 3,745 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Project S1830 coordinates all Navy efforts for the development of nuclear radiation detection devices in direct support of the Navy Nuclear Propulsion Program and other users by providing accurate, reliable Health Physics instrumentation at the lowest possible life-cycle cost. Reliable radiation monitoring instruments are needed to ensure the radiological safety of Navy personnel. This includes hand-held RADIAC meters, personnel dose measurement devices, and area monitors used to measure radiation fields. The Laser Heated Thermoluminescent Dosimetry (LHTLD) System will be able to meet new NRC regulations and will provide sensitive measurements down to the levels required to meet all new and imminent health and safety requirements. The Multifunction RADIAC will cut calibration costs by up to 75% and reduce the requirements for spare parts by 85% by replacing over 60 different models of obsolete equipment. This project has a 5 to 1 payback ratio. New requirements for the measurement of lower neutron levels necessitate the development of modernized instrumentation. The program is critical to joint-service radiation safety initiatives within DOD and has been coordinated with Army, Air Force, and Defense Nuclear Agency personnel to achieve the maximum cross-service applicability. All OR's issued 25 Aug 1987.

Multifunction RADIAC (MFR), OR #176-04-86
Laser Heated Thermoluminescent Dosimetry (LHTLD) System, OR #180-04-87
Neutron Dosimetry System, OR #179-04-87
Automated RADIAC Calibration and Diagnostics System, OR #175-04-86

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603542N PROJECT NUMBER: S1830
PROGRAM ELEMENT TITLE: Radiological Control PROJECT TITLE: RADIAC Development

Underwater RADIAC System, OR #178-04-88
Wide Range Survey Meter, OR #177-04-87
Tritium Monitors, OR #182-04-89
EOD Personal Dosimeter, OR #181-04-87 (Updated 09 MAR 95 as 392-04-95)

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

(U) ($2,306) Completed Engineering and Manufacturing Development (EMD) Phase III for LHTLD System. Continued development of Copper-doped Lithium dosimeter. Began development of proton recoil neutron dosimeter and beta dosimeter.

(U) ($693) Continued development of plastic scintillation gamma probe and universal neutron/gamma probe. Began development of miniature beta interface. Completed alpha interface and small gamma probe.

(U) ($85) Continued development of Casualty Dosimeter.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603542N PROJECT NUMBER: S1830
PROGRAM ELEMENT TITLE: Radiological Control PROJECT TITLE: RADIAC Development

2. (U) FY 1997 PLAN:

(U) ($2,156) Begin enhancements to LHTLD System. Continue development of LHTLD Dosimeters.

(U) ($396) Continue development of MFR universal probe. Complete plastic scintillation and beta probes. Begin development of extendable gamma probe and flexible gamma probe.

(U) ($60) Complete development of Casualty Dosimeter.

(U) ($120) Resume development of Tritium Monitor and complete development of Underwater RADIAC.

(U) ($37) Portion of extramural program reserved for Small Business Innovative Research assessment in accordance with 15 U.S.C. 638.

3. (U) FY 1998 PLAN:

(U) ($1,675) Continue enhancements to LHTLD System. Continue development of LHTLD Dosimeters.

(U) ($1,061) Complete development of MFR universal probe, flexible probe, and extendable probe. Begin development of remote detectors and MFR Large Scale Integrated (LSI) circuit boards.

(U) ($294) Complete development of Tritium Monitor and begin development of Neutron Dosimetry System.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603542N PROGRAM ELEMENT TITLE: Radiological Control PROJECT NUMBER: S1830 PROJECT TITLE: RADIAC Development

4. (U) FY 1999 PLAN:

(U) ($1,572) Continue enhancements to LHTLD System. Continue development of LHTLD Dosimeters.

(U) ($1,626) Begin MFR improvements. Continue development of remote detectors and MFR LSI boards.

(U) ($479) Continue development of Neutron Dosimetry System.

B. PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| FY 1997 President's Budget: | 3,104 | 2,886 | 2,971 | 3,610 |
| Adjustments from FY 1997 PRESBUDG: | -$20 | -117 | +59 | +67 |
| FY 1998/1999 PRESBUDG Submit: | 3,084 | 2,769 | 3,030 | 3,677 |

CHANGE SUMMARY EXPLANATION:

Funding: FY 1996: Minor pricing adjustments.
FY 1997: Congressional undistributed reductions.
FY 1998: Minor pricing adjustments.
FY 1999: Minor pricing adjustments.
Schedule: Not applicable.
Technical: Not applicable.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603542N PROJECT NUMBER: S1830
PROGRAM ELEMENT TITLE: Radiological Control PROJECT TITLE: RADIAC Development

C. OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

| | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| OPN Line 292000 (Portion) | | | | | | | | | | |
| | 4,793 | 3,419 | 6,093 | 6,921 | 6,810 | 6,915 | 6,971 | 5,885 | 8,078 | 55,885 |

(U) RELATED RDT&E: Work on the Underwater RADIAC is being funded ($500K for FY 96) separately by the Ordnance Environmental Support Office.

D. (U) SCHEDULE PROFILE: See Attachment(A).

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603542N PROJECT NUMBER: S1830
PROGRAM ELEMENT TITLE: Radiological Control PROJECT TITLE: RADIAC Development

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Primary Hardware Development (contractor) | 1,265 | 1,590 | 1,067 | 1,179 |
| b. Government Engineering Support | 1,150 | 742 | 1,362 | 2,038 |
| c. Developmental Test and Evaluation | 342 | 188 | 377 | 260 |
| d. Configuration Management | 138 | 64 | 69 | 75 |
| e. Travel | 10 | 10 | 10 | 10 |
| f. Integrated Logistics Support | 69 | 75 | 75 | 55 |
| g. Software Development | 60 | 60 | 40 | 30 |
| h. Program Management Support | 50 | 40 | 30 | 30 |
| Total | 3,084 | 2,769 | 3,030 | 3,677 |

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)
Not applicable.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603553N
PROGRAM ELEMENT TITLE: Surface Anti-Submarine Warfare

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| S0229 Surface Ship Silencing | 780 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | CONT. | CONT. |
| V1704 ASW Advanced Development | 5,232 | 3,781 | 5,704 | 4,717 | 4,030 | 3,810 | 3,413 | 3,432 | CONT. | CONT. |
| TOTAL | 6,012 | 3,781 | 5,704 | 4,717 | 4,030 | 3,810 | 3,413 | 3,432 | CONT. | CONT. |

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program develops surface anti-submarine warfare (ASW) combat system and acoustic silencing technology. The ASW Advanced Development Project provides the advanced development demonstration and validation of technology for potential surface sonar and combat system application. Efforts focus on resolution of technical issues associated with providing capability against the year 2000 and beyond threat with emphasis on shallow water/littoral area ASW. The surface ship acoustic quieting develops surface countermine acoustic silencing technology. In light of the sea mine threat, the surface ship acoustic quieting provides for the development and at-sea demonstration of quieting techniques to reduce surface ship active and passive sonar self-noise, ship radiated noise, and shipboard machine-generated airborne noise. Subprojects are directed toward increasing own ship survivability against a variety of acoustic threats, including acoustic quieting as a mine countermeasure and improving sensor performance by reducing the interference impact on our own force's sensors.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603553N PROGRAM ELEMENT TITLE: Surface Anti-Submarine Warfare PROJECT NUMBER: V1704 PROJECT TITLE: ASW Advanced Development

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| V1704 ASW Advanced Development | 5,232 | 3,781 | 5,704 | 4,717 | 4,030 | 3,810 | 3,413 | 3,432 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project provides the advanced development demonstration and validation of technology for potential surface sonar and combat system applications. Efforts focus on resolution of technical issues associated with providing capability against the year 2000 and beyond submarine threat with emphasis on shallow water/littoral area ASW. Key technology areas being investigated include active sonar transmissions, signal and information processing, active sonar classification, towed arrays and transducer technology, multi-static sonar, and multi-sensor data fusion. The major near-term effort is development of a mid-frequency Towed Active Receive Subsystem (TARS) prototype which will function as a deep receiver adjunct for the SQS-53 transmitter, thereby providing significantly enhanced submarine detection performance against deep submarine targets.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

(U) ($4,412) TARS. Continued TARS towed array development, including validation of the telemetry design, and tow cable. Conducted the TARS towed array Critical Design Review (CDR) and completed TARS Critical Item Test (CIT). Conducted TARS telemetry down selection to build 200 channel telemetry kits.

(U) ($500) Tactical Control. Migrated contact management activities to joint tactical control architecture and conducted laboratory performance evaluation. Performed warfare payoff, performance modeling, and operational evaluations.

(U) ($320) Forward financing FY 1997 TARS requirements due to low execution rates.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603553N PROJECT NUMBER: V1704
PROGRAM ELEMENT TITLE: Surface Anti-Submarine Warfare PROJECT TITLE: ASW Advanced Development

2. (U) FY 1997 PLAN:

(U) ($3,458) TARS. Complete development of TARS array components (array, towing system, receiver) and begin TARS integration. Conduct and evaluate results of initial at-sea demonstration on research vessel. Perform performance and operational modeling and analysis to derive top level USW measures of effectiveness (MOE) required to support SC-21 COEA mission definition. (1 October 1996 - 30 April 1997)

(U) ($320) Forward financing FY 1998 TARS requirements due to low execution rates.

(U)($3) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 U.S.C.638.

3. (U) FY 1998 PLAN:

(U) ($4,048) TARS. Complete TARS integration. Complete array installation and conduct at-sea tactical system demonstration. Perform post sea test data analysis and provide support for transition to production under PMS411. (1 October 1997 - 30 April 1998)

(U) ($672) Tactical Control. Update Tactical Control architecture and functional capabilities to account for surface ship requirements. Initiate development of contact management functionality to support TARS and SQQ-89. (1 October 1997 - 31 December 1997)

(U) ($584) Passive Processing. Initiate adaptation of passive processing approaches developed under Advanced Submarine Combat Systems Development (P.E. 603504N, V0223) for use with surface towed arrays. Develop approaches for commonizing surface and submarine processing architectures. (1 October 1997 - 31 December 1997)

(U) ($400) Requirements Engineering. Based on FY97 SC-21 top level USW MOE requirements, perform functional decomposition for LBVDS, Passive, Hull and other USW systems. Perform technology assessment and bottoms up verification of LBVDS and Hull Array technologies in support of functional decomposition. Begin incorporation of PEO(USW) and DON Modeling and Simulation (M&S) infrastructure. (1 October 1997 - 31 December 1997)

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603553N PROJECT NUMBER: V1704
PROGRAM ELEMENT TITLE: Surface Anti-Submarine Warfare PROJECT TITLE: ASW Advanced Development

4. (U) FY 1999 PLAN:

(U) ($1,000) Towed Systems (TARS). Complete post-test analysis and transition to production. (1 October 1998 - 31 December 1998)

(U) ($1,551) Tactical Control. Continue development of Contact Management Enhancements to support TARS and AN/SQQ-89, Block III Upgrade. Incorporate 6.2 Development Products into TCS Common Architecture. Conduct Joint TCS sea test. Transition complete Contact Management Enhancements to TDSS. (1 October 1998 - 31February 1999)

(U) ($1,616) Signal Processing. Continue adaptation of passive processing approaches from Advanced Submarine Combat Systems Development (P.E. 0603504N, V0223) for use with surface towed arrays. Continue commonization of surface and submarine processing architectures. (1 October 1998 - 28 February 1999)

(U) ($550) Requirements Engineering. Formulate Tactical Control systems engineering analysis model. Incorporate Surface Ship Torpedo Defense and ASW systems engineering analysis model in SC21 systems engineering baseline. Initiate SC-21 analyses for Hull and Towed Systems. Formalize and finalize Analytic baseline for systems engineering models. Continue incorporation of PEO(USW) and DON M&S infrastructure. (1 October 1998 - 31 December 1998)

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY1998 | FY1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 5,660 | 3,964 | 6,016 | 7,443 |
| (U) Adjustments from FY 1997 PRESBUDG: | -428 | -183 | -312 | -2,726 |
| (U) FY 1998/1999 PRESBUDG Submit: | 5,232 | 3,781 | 5,704 | 4,717 |

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603553N PROJECT NUMBER: V1704
PROGRAM ELEMENT TITLE: Surface Anti-Submarine Warfare PROJECT TITLE: ASW Advanced Development

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1996 reduced due to general reductions and Omnibus reprogramming. FY 1997 reduced due to general reductions. FY 1998 change due to low expenditure rate in FY 1996 and NWCF adjustments. FY 1999 reduced due to program restructuring and general reductions.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E
(U) PE 0602121N (Surface Ship & Submarine HM&E Technology)
(U) PE 0603561N (Advanced Submarine System Development)
(U) PE 0603504N (Advanced Submarine Combat System Development)
(U) PE 0205620N (Surface ASW Combat Systems Integration)

D. (U) SCHEDULE PROFILE: See attached

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603553N PROJECT NUMBER: V1704
PROGRAM ELEMENT TITLE: Surface Anti-Submarine Warfare PROJECT TITLE: ASW Advanced Development

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Product Development | 5,057 | 3,236 | 4,754 | 4,467 |
| b. Support and Management | 175 | 145 | 200 | 200 |
| c. Test and Evaluation | 0 | 400 | 750 | 50 |
| Total | 5,232 | 3,781 | 5,704 | 4,717 |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603553N PROJECT NUMBER: V1704
PROGRAM ELEMENT TITLE: Surface Anti-Submarine Warfare PROJECT TITLE: ASW Advanced Development

B.(U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | | |
| NAVUNSEAWARCEN DET New London, CT | WR | 6/96 | CONT. | CONT. | 31,478 | 1,535 | 1,375 | 1,834 | 2,641 | CONT. | CONT. |
| NAVSURFWARCENDIV Dahlgren, VA | WR | 10/95 | CONT. | CONT. | 6,294 | 700 | 0 | 872 | 1,826 | CONT. | CONT. |
| Misc Contractors | C/CPFF | 4/95 | TBD | CONT. | 2,963 | 1,622 | 1,361 | 2,048 | 0 | CONT. | CONT. |
| Miscellaneous | WR | | | | 4,821 | | | | | | |
| Support and Management | | | | | | | | | | | |
| Misc Contractors | C/CPFF | 3/95 | TBD | CONT. | 478 | 175 | 145 | 200 | 200 | CONT. | CONT. |
| Test and Evaluation | | | | | | | | | | | |
| NAVUNSEAWARCEN DET New London, CT | WR | 10/95 | CONT. | CONT. | 0 | 0 | 400 | 750 | 50 | CONT. | CONT. |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603553N PROJECT NUMBER: V1704
PROGRAM ELEMENT TITLE: Surface Anti-Submarine Warfare PROJECT TITLE: ASW Advanced Development

GOVERNMENT FURNISHED PROPERTY

| Item Description | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Delivery Date | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | |
| Towed Array Telemetry | C/FP | 4/95 | 12/96 | 1,240 | 705 | 400 | 0 | 0 | CONT. | CONT. |
| Towed Array Receiver/ Test Set | C/FP | 4/95 | 2/96 | 520 | 495 | 100 | 0 | 0 | CONT. | CONT. |
| Support and Management | | | | | | | | | | |
| Test and Evaluation | | | | | | | | | | |

| | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 47,316 | 5,057 | 3,236 | 4,754 | 4,467 | CONT. | CONT. |
| Subtotal Support and Management | 478 | 175 | 145 | 200 | 200 | CONT. | CONT. |
| Subtotal Test and Evaluation | 0 | 0 | 400 | 750 | 50 | CONT. | CONT. |
| Total Project | 47,794 | 5,232 | 3,781 | 5,704 | 4,717 | CONT. | CONT. |

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603561N
PROGRAM ELEMENT TITLE: Advanced Submarine System Development

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ACTUAL | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| S2033 Advanced Submarine Systems Development | 47,371 | 61,620 | 59,067 | 65,385 | 64,721 | 29,239 | 29,856 | 30,549 | CONT. | CONT. |
| S2034 R&D Submarine | 3,637 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 104,599 |
| F2177 New Design HM&E | 2,370 | 2,064 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 144,268 |
| TOTAL | 53,378 | 63,684 | 59,067 | 65,385 | 64,721 | 29,239 | 29,856 | 30,549 | CONT. | CONT. |

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program supports innovative research and development in submarine technologies and the subsequent evaluation, demonstration, and validation for submarine platforms. It will increase the submarine technology base and provide subsystem design options not currently feasible.

(U) Project S2033 identifies the most promising and emerging technologies and transitions them into specific demonstration/validation efforts. The project transitions technologies developed by Navy technology bases, the private sector, and the Defense Advanced Research Projects Agency (DARPA) Tactical Technology Office. Advanced systems developed under this program have potential for backfit into existing classes of submarines, supporting emerging requirements, and systems technology insertion into future submarine designs. Research and development (R&D) investment factors used to select these technologies include: economic environment and return on investment; mission enhancement; and safety and survivability The project also conducts an SSN Security Program (SSP) to develop techniques and devices that decrease the detection vulnerability of attack submarines, specifically operating in littoral environments; supports two Information Exchange Programs with the United Kingdom (UK), one on submarine electromagnetic silencing and the second on submarine platform equipment, systems and hull technology; operates the Large Scale Vehicle (LSV) to provide at-sea test capability for propulsor, acoustic and non-acoustic signature reduction, remote vehicle R&D, and large scale hydrodynamic experimentation; operates the Integrated Measurement System (ISMS) in support of structural acoustics technology development; operates the

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603561N
PROGRAM ELEMENT TITLE: Advanced Submarine System Development

Hydrodynamic/Hydroacoustic Technology Center (H/HTC) to enhance our ability to accurately, computationally predict hydrodynamic and hydroacoustic performance of submerged bodies; and provides life cycle support for the R&D Submarine modifications.

(U) Project S2034 provides resources to convert an attack submarine to a dedicated R&D platform without loss of mission capability. This project provides a dedicated at-sea platform for testing and evaluating advanced systems technologies applicable to existing and the next generation SSN.

(U) Project F2177 is dedicated to the New Attack Submarine (New SSN). The primary goal of the project is to develop affordable yet capable submarine platform specific systems by evaluating a broad range of system technology alternatives and examining cost reduction, producibility improvement, and technical risk reduction.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental tests related to specific ship or aircraft applications.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1996

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603561N
PROGRAM ELEMENT TITLE: Advanced Submarine System Development

(U) COST (Dollars in thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ACTUAL | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| S2033 Advanced Submarine Systems Development | 47,371 | 61,620 | 59,067 | 65,385 | 64,721 | 29,239 | 29,856 | 30,549 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Project S2033 identifies the most promising and emerging technologies and transitions them into specific demonstration/validation efforts. The project transitions technologies developed by Navy technology bases, the private sector, and the DARPA Tactical Technology Office. Advanced systems developed under this program have potential for backfit into existing classes of submarines, supporting emerging requirements, and systems technology insertion into future submarine designs. R&D investment factors used to select these technologies include economic environment and return on investment; mission enhancement; and safety and survivability. The project also conducts the SSP to develop techniques and devices that decrease the detection vulnerability of attack submarines specifically operating in littoral environments; supports two Information Exchange Programs with the UK, one on submarine electromagnetic silencing and the second on submarine platform equipment, systems and hull technology; operates the LSV to provide at-sea test capability for propulsor, acoustic and non-acoustic signature reduction, remote vehicle R&D, and large scale hydrodynamic experimentation; operates the ISMS in support of structural acoustics technology development; operates the H/HTC to enhance our ability to accurately, computationally predict hydrodynamic and hydroacoustic performance of submerged bodies; and provides life cycle support for the R&D Submarine modifications.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

(U) ($3,621) Continued concept integration studies (e.g. composite most aggressive feature, support for the Science and Technology/R&D working group, impact studies on the ship system perspective for stealth and affordability issues, HM&E Master Plan, and support for the strategic plan/working group).

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603561N PROJECT NUMBER: S2033
PROGRAM ELEMENT TITLE: Advanced Submarine System Development PROJECT TITLE: Advanced Submarine Systems Development

(U) ($8,456) Infrastructure: Continued operations and support for the LSV (testing candidate propulsors for New SSN, large scale hydrodynamic studies, and propulsor advanced technology demonstration). Continued operations and support for the H/HTC including hardware/software maintenance and hardware upgrades.

(U) ($23,814) Continued development of modeling and simulation procedures to address hydrodynamic issues integral to operational submarines and future ship designs (e.g., code certifications and design tool integration). Continued identification and feasibility assessments for integrated stern/main propulsion electric drive concepts and configuration. Initiated technology development plans for technology gaps and shortfalls detected during feasibility assessment. Continued development, fabrication, and testing of prototype composite main propulsion shaft. Continued ONR-NAVSEA jointly funded AVR program with completion of land based testing. Continued development of the arc fault prevention program. Continue development and testing of shock and acoustic isolation devices. Accomplished at-sea proof of concept test of DARPA radiated noise project F. Continued demonstration/validation phase of the electromagnetic silencing program and with the UK, commissioned the mobile deep range. Transitioned these programs to PE 0604558N. Commenced advanced sail concept exploration. Continued to refine elastomeric disk design and fabricated and tested additional disks.

(U) ($889) $2866 FY95 forward funded for FY96: Continued development of Situational Awareness System (SAS) sensors for, and characterization and operational assessment of, SSN operations in littorals. Conducted SAS Sea Test I.

(U) ($9,341) Funded implementation of submarine superiority initiatives for towed and sphere array related advanced processing build, development and evaluation. Established data gathering and librarian function in support of developing comparative performance assessment capability based on availability of common at-sea data base.

(U) ($50) Funded enhanced fiber optically guided missile (EFOG-M) cost benefit study. This project leveraged off the Army's EFOG-M program with the intent to provide submarines with the capability to destroy helicopters, small patrol craft, and slow moving aircraft at tactically significant ranges.

(U) ($1,200) N875 SSBN Security effort.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603561N PROJECT NUMBER: S2033
PROGRAM ELEMENT TITLE: Advanced Submarine System Development PROJECT TITLE: Advanced Submarine Systems Development

2. (U) FY 1997 ACCOMPLISHMENTS:

(U) ($1,692) Continue concept integration studies (e.g., active control systems interaction/integration study; stealth histories; Secretary of Defense Report on Nuclear Attack Submarine Procurement and Submarine Technology selected Appendix C technologies cost benefit studies).

(U) ($12,682) Continue operations and support for the LSV. Complete support for test and demonstration of the advanced hybrid advanced technology demonstration. Complete support for test and demonstration of the non-acoustic detection and signature reduction program called Standard Crimson. Conduct unmanned undersea vehicle support experiments, continue large scale hydrodynamic studies. Continue operation and support for the H/HTC including hardware/software maintenance and hardware upgrades. Iniate operation of the ISMS. Commence life cycle support for the R&D Submarine modifications (transitioned from PE 0603561N/S2034).

(U) ($20,687) Continue development of modeling and simulation procedures to address hydrodynamic issues integral to operational submarines and future ship designs (e.g., code certifications and design tool integration). Continue identification and feasibility assessments of HM&E component technologies related to main propulsion electric drive. Commence proof of concept hardware demonstration for scaled models of HM&E components for the development of electric drive technology. Commence demonstration and validation efforts for critical assessment tools using scale models. Complete demonstration/validation phase of the arc fault prevention program. Transition programs to PE 0604558N. Complete fabrication of the composite shaft. Install AVR system on USS BOISE (SSN 764) and conduct at-sea system evaluation thereby completing the ONR-NAVSEA jointly funded program. Complete Project F. Complete development and testing of shock and acoustic isolation devices and integrate into the specifications and design of the New SSN. Commence development and design of a rim driven main seawater pump. Complete concept downselect and design.

(U) ($3,304) Conduct SAS and Tactical Decision Aids for Submarine Security (TDASS) modeling and investigations, assess tactical utility of environmental sensors, develop littoral area operations and environment characteristics, tactics and countermeasures. Initiate planning for SAS Sea Test II. Program management responsibility continues under PEO-USW.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603561N PROJECT NUMBER: S2033
PROGRAM ELEMENT TITLE: Advanced Submarine System Development PROJECT TITLE: Advanced Submarine Systems Development

(U) ($3,150) Provide funding for at-sea technical and tactical evaluation of the Total Ship Monitoring SSN Advanced Development Model System. Continue development of system enhancements/refinements based on ongoing test results. PEO USW has program management responsibility.

(U) ($4,618) Continue demonstration and validation of the elastomeric ejection system. Continue elastomeric disk design. Fabricate additional disks and test. Continue the previously ONR funded Advanced Hybrid Propulsor project developing a new concept propulsor which provides improved affordability and maintainability over current advanced propulsor configurations, while maintaining or improving acoustic and hydrodynamic performance. Small scale model testing will be used to evaluate powering, maneuvering, cavitation and acoustics performance.

(U) ($13,200) Initiate development of an advanced sail concept to exploit shaping and materials to improve ship hydrodynamics, add aditional volume for mission capability enhancements, and reduce the ship s acoustic and non-acoustic signatures. Initiate development and demonstration of improved acoustic isolation using active or hybrid (active/passive) isolation systems. Initiate development and demonstration of innovative submarine internal structural designs to increase isolation of acoustic enery to/from machinery, electronics, and habitability spaces. Pursue evaluation and development of mission and future design. Initiate development of technologies that influence hydrodynamic performance - specific areas include hull and appendage flow dynamics and visualization techniques, maneuvering control, stability and recovery, and self-noise.

(U) ($1,000) Fund, at Congressional direction, Doppler Sonar Velocity Log.

(U) ($1,287) Portion of extramural program reserved for Small Business Innovation Research (SBIR) assessment in accordance with 15 U.S.C.638.

3. (U) FY 1998 PLAN:

(U) ($2,067) Continue concept integration studies (e.g., Secretary of Defense Report on Nuclear Attack Submarine Procurement and Submarine Technology selected Appendix C technologies cost benefit studies).

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603561N PROJECT NUMBER: S2033
PROGRAM ELEMENT TITLE: Advanced Submarine System Development PROJECT TITLE: Advanced Submarine Systems Development

(U) ($13,200) Continue operations and support of the H/HTC including hardware/software maintenance and hardware upgrades. Continue life cycle support for the R&D Submarine modifications (transitioned from 0603561N/S2034). Continue operations and support for the LSV. Conduct restricted availability to modify the vehicle to replicate the New SSN. Upgrade the radiated noise range and analysis equipment, and install new battery charger. Conduct first New SSN propulsor performance validation trials. Continue large scale hydrodynamic studies. Continue operations of the ISMS.

(U) ($20,300) Continue development of modeling and simulation procedures to address hydrodynamic issues integral to operational submarines and future ship designs (e.g., code certification and design tool integration). Continue identification and feasibility assessments of HM&E component technologies related to main propulsion electric drive. Continue proof of concept hardware demonstration for scaled models of the main propulsion electtric drive component technologies. Continue scale model and tool development, demonstration and validation. Identify larger scales required to provide proof of concept. Begin design, build and test of critical components such as the motor, motor controller, and advanced materials. Begin manufacture of rim driven main seawater pump hardware.

(U) ($4,000) Continue development of SAS sensors, TDASS modules, characterization of operations and environment, tactics and countermeasures for littoral areas. Conduct SAS Sea Test II.

(U) ($7,000) Continue EES demonstration and validation and EES second generation elastomer disk life cycle test. Continue developing a new concept propulsor which provides improved affordability and maintainability over current advanced propulsor configurations, while maintaining or improving acoustic and hydrodynamic performance. Small scale model testing will be used to evaluate powering, maneuvering, cavitation and acoustics performance. Fabricate 1/4 scale candidate configurations.

(U) ($11,500) Continue development of an advanced sail concept to exploit shaping and materials to improve ship hydrodynamics, add aditional volume for mission capability enhancements, and reduce the ship s acoustic and non-acoustic signatures. Continue development and demonstration of improved acoustic isolation using active or hybrid (active/passive) isolation systems. Continue development and demonstration of innovative submarine internal structural designs to increase isolation of acoustic enery to/from machinery, electronics, and habitability spaces.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603561N PROJECT NUMBER: S2033
PROGRAM ELEMENT TITLE: Advanced Submarine System Development PROJECT TITLE: Advanced Submarine Systems Development

(U) ($1,000) Initiate identification, development, and demonstration of alternate means of silencing electromagnetic signatures as well as enhancing the performance of existing systems on New SSN. The program continues the IEP with the UK.

4. (U) FY 1999 PLAN:

(U) ($2,085) Continue concept integration studies (e.g., Secretary of Defense Report on Nuclear Attack Submarine Procurement and Submarine Technology selected Appendix C technologies cost benefit studies).

(U) ($25,400) Continue development of modeling and simulation procedures to address hydrodynamic issues integral to operational submarines and future ship designs (e.g., code certification and design tool integration. Continue identification and feasibility assessments of HM&E component technologies related to main propulsion electric drive. Continue proof of concept hardware demonstration for scaled models of the main propulsion electric drive component technologies. Continue large scale model build and develop plans for the demonstration and validation of tools. Begin downselect process for next phase of the program. Complete manufacture of rim driven main seawater pump test hardware and commence test and evaluation.

(U) ($4,000) Continue SAS sensors and TDASS modules development, characterization of operations and environment, tactics and countermeasures for littoral areas. Commence development of architecture for operational integration. Analyze the results of SAS Sea Test II.

(U) ($12,900) Continue operations and support for the LSV and H/HTC including hardware/software maintenance and hardware upgrades. Continue life cycle support for the R&D Submarine. Continue operations of the ISMS.

(U) ($11,000) Complete development of the elastomeric ejection system. Complete developing a new concept propulsor which provides improved affordability and maintainability over current advanced propulsor configurations, while maintaining or improving acoustic and hydrodynamic performance. Evaluate the 1/4 scale candidate configurations on the LSV.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603561N PROJECT NUMBER: S2033
PROGRAM ELEMENT TITLE: Advanced Submarine System Development PROJECT TITLE: Advanced Submarine Systems Development

(U) ($8,000) Continue development of an advanced sail concept to exploit shaping and materials to improve ship hydrodynamics, add aditional volume for mission capability enhancements, and reduce the ship s acoustic and non-acoustic signatures. Continue development and demonstration of improved acoustic isolation using active or hybrid (active/passive) isolation systems. Continue development and demonstration of innovative submarine internal structural designs to increase isolation of acoustic enery to/from machinery, electronics, and habitability spaces.

(U) ($2,000) Continue identification, development, and demonstration of alternate means of silencing electromagnetic signatures as well as enhancing the performance of existing systems on New SSN. The program continues the IEP with the UK.

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 49,125 | 24,248 | 24,350 | 30,908 |
| (U) Adjustments from FY 1997 PRESBUDG: | -1,754 | +37,372 | +34,717 | +34,477 |
| (U) FY 1998/1999 PRESBUDG Submit: | 47,371 | 61,620 | 59,067 | 65,385 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: SBIR and miscellaneous smaller reductions account for the change in FY96. FYs 97-99 were increased in order to pursue Category II and Core Technologies as identified in Secretary of Defense Report on Nuclear Attack Submarine Procurement and Submarine Technology.

(U) Schedule: Not applicable.

(U) Technical: Proceed with the Category II and Core Technologies as identified in Secretary of Defense Report on Nuclear Attack Submarine Procurement and Submarine Technology.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603561N PROJECT NUMBER: S2033
PROGRAM ELEMENT TITLE: Advanced Submarine System Development PROJECT TITLE: Advanced Submarine Systems Development

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:
(U) PE 0101224N (SSBN Security & Survivability Program)
(U) PE 0603569E (DARPA Advanced Submarine Technology Program)
(U) PE 0603792N (Advanced Technology Transition)
(U) PE 0604558N (New Design SSN Development)

D. (U) SCHEDULE PROFILE:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| Program Milestones | Transition projects to New SSN | 1Q Transition of R&D Sub Life Cycle Support from F2034 | Transition projects to New SSN | Continue hydrodynamics testing for scaling effects on LSV |
| | Continue LSV support for New SSN propulsor dev. program | Transition projects to New SSN | Complete LSV support for New SSN propulsor development program | |
| | Complete WATTS trials on LSV | Continue LSV support for New SSN propulsor development program | Continue hydrodynamics testing for scaling effects on LSV | |
| | Commence LSV support for the test & demo of the advanced hybrid advanced tech demo | Commence Hydrodynamics testing for scaling effects on LSV | Continue EES dem/val | |

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603561N PROJECT NUMBER: S2033
PROGRAM ELEMENT TITLE: Advanced Submarine System Development PROJECT TITLE: Advanced Submarine Systems Development

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| | | Complete AVR dem/val<br><br>Transition ISMS facility from ONR<br><br>Complete LSV support for the test & demo of the advanced hybrid advanced tech demo<br><br>US/UK commission mobile deep array (NOULD 96)<br><br>Began advanced sail concept exploration | | |
| Engineering Milestones | Complete dev & fab. of portable LIDAR early warning device<br><br>Complete AVR land based test | Complete sea trial with arc fault wide band optic sensor<br><br>Deliver composite shaft joint | Complete EES 2nd generation elastomer disk life cycle test<br><br>Design & fab LSV adv sail | Deliver LSV advanced sail<br><br>Install LSV sail and instrumentation/ sensor suite |

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603561N PROGRAM ELEMENT TITLE: Advanced Submarine System Development PROJECT NUMBER: S2033 PROJECT TITLE: Advanced Submarine Systems Development

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| | based test of thermal ionization detector for arc fault system | Complete land of LIDAR, early warning, TDASS module | Complete development Dev instrumentation/ sensor suite for LSV test | |
| Complete | Initiate dev feasibility study of external electric drive concept & dev draft tech dev | Continue dev of enabling component and analytical techniques needed for main propulsion electric drive | Continue dev of enabling component and analytical techniques needed for main propulsion electric drive | of enabling component and analytical techniques needed for main propulsion electric drive |
| | | Install AVR system on USS BOISE (SSN 764) | Rip out AVR System from USS BOISE | |
| | | Field test periscope mounted LIDAR early warning device | Deliver full length composite shaft | |
| | Complete EES 1st generation elastomer disk life cycle test | Design & manufacture EES 2nd generation elastomer disk | | |

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603561N PROJECT NUMBER: S2033
PROGRAM ELEMENT TITLE: Advanced Submarine System Development PROJECT TITLE: Advanced Submarine Systems Development

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| | Conduct wind & water tunnel experiments on sail shapes | Complete sail shape assessment - select sail shape | | |
| T&E Milestones | Conducted at-sea testing for hull dynamic strength program facilities<br><br>Demo aspects of EM silencing system (NOULD 95)<br><br>US test of the mobile deep array<br><br>Conduct full-scale acoustic and shock testing of isolated deck modules | Conduct AVR at-sea system eval. | Conduct SAS Sea Test II | |

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603561N PROJECT NUMBER: S2033
PROGRAM ELEMENT TITLE: Advanced Submarine System Development PROJECT TITLE: Advanced Submarine Systems Development

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| | Completed SAS Sea Test I<br><br>Accomplish proof of concept demo of nonintrusive means to measure and compensate for fluid & structure borne noise in sea connected systems | | | |
| Contract Milestones | | | | |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603561N PROJECT NUMBER: S2033
PROGRAM ELEMENT TITLE: Advanced Submarine System Development PROJECT TITLE: Advanced Submarine Systems Development

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| PROJECT COST CATEGORIES | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Hardware Development | 28,342 | 39,970 | 37,932 | 43,868 |
| b. Developmental T&E | 16,224 | 13,255 | 11,935 | 12,317 |
| c. Countermeasures Dev | 889 | 3,304 | 4,000 | 4,000 |
| d. R&D Facilities Mgmt | 1,916 | 3,804 | 5,200 | 5,200 |
| e. SBIR | 0 | 1,287 | 0 | 0 |
| TOTAL | 47,371 | 61,620 | 59,067 | 65,385 |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603561N PROJECT NUMBER: S2033
PROGRAM ELEMENT TITLE: Advanced Submarine System Development PROJECT TITLE: Advanced Submarine Systems Development

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | | |
| TRACOR | C/CPFF | 12/87 | CONT. | CONT. | 6,957 | 1,800 | 1,854 | 1,910 | 1,967 | CONT. | CONT. |
| Austin, Texas | | | | | | | | | | | |
| NNS | S/CPFF | 03/90 | 15,054 | 15,054 | 15,054 | 0 | 0 | 0 | 0 | 0 | 15,054 |
| Norfolk, Virginia | | | | | | | | | | | |
| NNS | S/CPFF | 01/95 | CONT. | CONT. | 3,018 | 1,830 | 10,543 | 10,337 | 11,442 | CONT. | CONT. |
| Norfolk, Virginia | | | | | | | | | | | |
| GD/EBDiv | S/CPFF | 03/92 | 19,231 | 19,231 | 19,231 | 0 | 0 | 0 | 0 | 0 | 19,231 |
| Groton, Connecticut | | | | | | | | | | | |
| GD/EBDiv | S/CPFF | 01/95 | CONT. | CONT. | 10,310 | 1,127 | 6,715 | 6,527 | 7,069 | CONT. | CONT. |
| Groton, Connecticut | | | | | | | | | | | |
| JHU/APL | S/CPFF | 10/89 | CONT. | CONT. | 21,246 | 1,914 | 3,050 | 3,931 | 3,185 | CONT. | CONT. |
| Laurel, Maryland | | | | | | | | | | | |
| AT&T | S/CPFF | 10/94 | 3,627 | 3,627 | 3,627 | 0 | 0 | 0 | 0 | 0 | 3,627 |
| Whippany, New Jersey | | | | | | | | | | | |
| NSWC | WR | Var | CONT. | CONT. | 71,522 | 12,278 | 15,221 | 14,590 | 16,150 | CONT. | CONT. |
| Bethesda & Annapolis, Maryland; Bayview, Idaho; Portsmouth, Virginia | | | | | | | | | | | |
| NUWC | WR | Var | CONT. | CONT. | 9,742 | 4,840 | 3,150 | 3,012 | 3,335 | CONT. | CONT. |
| New London, Connecticut; Newport, Rhode Island | | | | | | | | | | | |
| Misc | Var | Var | CONT. | CONT. | 48,301 | 6,515 | 7,219 | 7,645 | 9,740 | CONT. | CONT. |
| Support and Management | | | | | | | | | | | |
| Misc | Var | Var | CONT. | CONT. | 3,208 | 843 | 613 | 180 | 180 | CONT. | CONT. |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603561N PROJECT NUMBER: S2033
PROGRAM ELEMENT TITLE: Advanced Submarine System Development PROJECT TITLE: Advanced Submarine Systems Development

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Test and Evaluation | | | | | | | | | | | |
| NSWC Bethesda & Annapolis, Maryland; Bayview, Idaho | WR | Var | CONT. | CONT. | 7,764 | 5,570 | 1,262 | 2,215 | 1,000 | CONT. | CONT. |
| AT&T Whippany, New Jersey | C/CPFF | 10/94 | 5,746 | 5,746 | 0 | 2,904 | 2,842 | 0 | 0 | 0 | 5,746 |
| GD/EBDiv Groton, Connecticut | | | CONT. | CONT. | 4,812 | 4,311 | 3,310 | 3,700 | 3,531 | CONT. | CONT. |
| JHU/APL Laurel, Maryland | | | 1,997 | 1,997 | 0 | 1,397 | 600 | 0 | 0 | 0 | 1,997 |
| Misc | Var | Var | 10,024 | 10,024 | 7,609 | 2,042 | 5,241 | 5,020 | 7,786 | 0 | 10,024 |

GOVERNMENT FURNISHED PROPERTY: Not applicable.

| | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 209,008 | 30,304 | 47,752 | 47,952 | 52,888 | CONT. | CONT |
| Subtotal Support and Management | 3,208 | 843 | 613 | 180 | 180 | CONT. | CONT |
| Subtotal Test and Evaluation | 20,185 | 16,224 | 13,255 | 10,935 | 12,317 | CONT. | CONT |
| Total Project | 232,401 | 47,371 | 61,620 | 59,067 | 65,385 | CONT. | CONT |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603561N
PROGRAM ELEMENT TITLE: Advanced Submarine System Development

PROJECT NUMBER: S2033
PROJECT TITLE: Advanced Submarine Systems Development

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FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603562N
PROGRAM ELEMENT TITLE: Submarine Tactical Warfare Systems

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| F0770 Advanced Submarine Support Equipment Program (ASSEP) | 2,177 | 2,324 | 2,612 | 3,475 | 4,277 | 4,315 | 4,408 | 4,514 | CONT. | CONT. |
| V1739 Submarine Special Operations Support Development | 5,875 | 2,018 | 2,319 | 2,264 | 2,477 | 2,041 | 2,288 | 2,377 | CONT. | CONT. |
| TOTAL | 8,052 | 4,342 | 4,931 | 5,739 | 6,754 | 6,356 | 6,696 | 6,891 | CONT. | CONT. |

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Submarine Tactical Warfare Systems program element is comprised of the Advanced Submarine Support Equipment Program and the Submarine Special Operations Support Development Program. The overall goal of the program is to improve submarine operational effectiveness through the development of advanced Research and Development (R&D) and Electronic Support Measures (ESM) technologies. The goal of the Advanced Submarine Support Equipment Program (ASSEP) is to increase submarine operational effectiveness through improvements in electronic warfare (i.e., threat warning, over-the-horizon targeting, and expanded tactical reconnaissance). A continuing need exists to improve submarine capabilities in the increasingly dense and sophisticated electromagnetic environment caused by the proliferation of complex radar, communications, and navigation equipment of potential adversaries.The Submarine Special Operations Support Development program responds to the increased threat of Naval activity in the Littorals and the continuing threat of submarine and surface ship activity in regions of the world through the development of advanced submarine R&D technology to provide improved operational capability in shallow water regions. Particular emphasis is placed in the areas of sonar operability and maintainability, Littoral operations, mine warfare, tactical surveillance, and other submarine support missions. Efforts include assessment of combat system effectiveness, development of Arctic shallow water specific improvements for existing sonars, development of class specific Arctic operational guidelines and the testing of ice-capable submarine support structures. This program also provides the framework for various R&D programs to conduct Test and Evaluation in shallow water and Arctic regions.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603562N PROGRAM ELEMENT TITLE: Submarine Tactical Warfare Systems PROJECT NUMBER: F0770 PROJECT TITLE:Advanced Support Equipment Program

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| F0770 Advanced Submarine Support Equipment Program | 2,177 | 2,324 | 2,612 | 3,475 | 4,277 | 4,315 | 4,408 | 4,514 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program develops submarine ESM equipment technology. A continuing need exists to improve submarine capabilities in these areas to enhance operational effectiveness in the increasingly dense and sophisticated electromagnetic environment caused by the proliferation of complex radar, communications, and navigation equipment of potential adversaries. Improvements are necessary for submarine ESM to be effective in conducting the following mission areas: Joint Littoral Warfare, Joint Surveillance, Space and Electronic Warfare, Intelligence Collection, Maritime Protection and Joint Strike. Specific efforts include development of: Radar Cross Section Reduction (RCSR) Techniques, Periscope Monopulse Direction Finding (MDF) System, Sensor Technology Insertion Program (STIP), and ESM Technology Insertion Program (ESMTIP). The RCSR evaluates the vulnerability of submarine masts, periscopes and sensors to radar and infrared threats and evaluates the state of the art in radar absorbent material, resulting in potential periscope/mast engineering improvements to reduce the counter-detection threat. The MDF system is an improvement to the Type 18 Periscope which will allow the ESM system to discriminate and identify complex radar signals using direction of arrival as a primary sorting parameter. The STIP and ESMTIP programs develop submarine unique improvements to mast, periscope and hull mounted ESM electromagnetic and electro-optic sensors based on emerging technologies that are available from DOD Exploratory Development Programs, industry Independent Research and Development, and other sources. Feasibility demonstration models (FDMs) are developed to provide a realistic method of evaluating the improvements , including deployment on submarines for testing. STIP projects include: Laser detection and warning; radio frequency (RF) extensions; RF bandwith improvements; passive localization; upgrades to the Photonics Mast sensors and software; and advanced antenna arrays for beam steering and high resolution direction finding enhancements.
A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: ESMTIP projects include: improvements to signal sorting and recognition methods to support classification and identification of ESM contacts encountered during Littoral operations;

signal processing improvements for processing of low probability of intercept signals; voice/language recognition and human/machine interface (HMI)enhancements. Starting in FY 95 all programs funded in this project are non-acquisition category programs in accordance with NAPDD # 428-87.

1. (U) 1996 ACCOMPLISHMENTS:

(U) ($220) Continued RCSR techniques and materials investigation. Funds were obligated 10/95.

(U) ($497) Completed Periscope MDF FDM development. Funds were obligated 11/95.

(U) ($1,460) Continued STIP. Initiated development of Laser Warning Receiver FDM. Funds were obligated between 10/95 and 9/96.

2. (U) FY 1997 PLAN:

(U) ($45) Continue RCSR techniques and materials investigation. Funds were obligated 10/96.

(U) ($2,239) Continue STIP. Continue development of Laser Warning Receiver FDM. Initiate development of a shock hardened radome for the ESM antenna. Update simulation tools. Funds will be obligated between 10/96 and 9/97.

(U) ($40) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 U.S.C. 638.

3. (U) FY 1998 PLAN:

(U) ($110) Continue RCSR techniques and materials investigation. Funds will be obligated between 10/97 and 11/97.

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603562N
PROGRAM ELEMENT TITLE: Submarine Tactical Warfare Systems
PROJECT NUMBER: F0770
PROJECT TITLE:Advanced Support Equipment Program

(U) ($2,502) Continue STIP. Complete at sea testing of Laser Warning Receiver FDM. Complete development of a shock hardened radome for the ESM antenna . Complete updating simulation tools. Funds will be obligated between 10/97 and 12/97.

4. (U) FY 1999 PLAN:

(U) ($233) Continue RCSR techniques and materials investigation. Funds will be obligated between 10/98 and 11/98.

(U) ($2,335) Continue STIP. Complete development of Laser Warning Receiver FDM. Begin development of Passive Localization FDM. Begin development of Photonics Mast Auto Target Recognition and Tracking algorithms. Funds will be obligated between 10/98 and 12/98

(U) ($ 907) Initiate ESMTIP. Begin development of Low Probability of Intercept (LPI) processing algorithms and HMI design enhancements. Funds will be obligated between 10/98 and 12/98

| B. (U) PROGRAM CHANGE SUMMARY: | FY 1996 | FY 1997 | FY1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 2,311 | 2,440 | 3,728 | 4,538 |
| (U) Adjustments from FY 1997 PRESBUDG: | -134 | -116 | -1,116 | -1,063 |
| (U) FY 1998/99 PRESBUDG Submit: | 2,177 | 2,324 | 2,612 | 3,475 |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603562N PROGRAM ELEMENT TITLE: Submarine Tactical Warfare Systems PROJECT NUMBER: F0770 PROJECT TITLE:Advanced Support Equipment Program

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: The $134K decrease in FY 1996 is due to Below Threshold Reprogrammings ($-101K), Jordanian Recission ($-2K), and SBIR assessment ($-31K). The $116K decrease in FY 1997 is due to undistributed Congressional reductions. The $1.1M decrease in FY 1998 and $1.1M decrease in FY 1999 is a result of NWCF rate/carryover adjustments, an Acquisition Center of Excellence assessment, funding for the Acquisition Desk Book, Inflation, and NWCF R&D Actuals.

(U) Schedule: Initiation of STIP Photonics Mast Auto Target Recognition and Tracking algorithms and the ESMTIP LPI signal processing algorithms and HMI design enhancements is deferred.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands): Not applicable.

(U) RELATED RDT&E:
(U) PE 0604503N (Submarine System Equipment Development)
(U) PE 0604558N (New Design SSN Development)
(U) PE 0604777N (Navigation /ID Systems)

D. (U) SCHEDULE PROFILE: Not applicable.

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603562N
PROGRAM ELEMENT TITLE: Submarine Tactical Warfare Systems
PROJECT NUMBER: F0770
PROJECT TITLE:Advanced Support Equipment Program

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Advance Development Models | 1,906 | 2,214 | 2,411 | 3,198 |
| b. Requirements Development | 220 | 45 | 110 | 233 |
| c. Miscellaneous | 51 | 25 | 91 | 44 |
| d. SBIR | 0 | 40 | 0 | 0 |
| Total | 2,177 | 2,324 | 2,612 | 3,475 |

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION: ($ in thousands)

PERFORMING ORGANIZATIONS

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603562N
PROGRAM ELEMENT TITLE: Submarine Tactical Warfare Systems
PROJECT NUMBER: F0770
PROJECT TITLE:Advanced Support Equipment Program

| Contractor/ Method/ Performing Activity | Contract Award/ Fund Type Vehicle | Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | | |
| Type 18 Periscope MDF FDM Contract | | | | | | | | | | | |
| Condor | C/CPIF | 12/93 | 1,890 | 1,890 | 1,890 | 0 | 0 | 0 | 0 | 0 | 1,890 |
| Sensor Technology Insertion FDM contracts | | | | | | | | | | | |
| JHU/APL | C/CPIF | 12/95 | 3,366 | 3,366 | 0 | 935 | 1,151 | 1,280 | 0 | 0 | 3,366 |
| TBD | C/CPIF | 12/98 | CONT. | CONT. | 0 | 0 | 0 | 0 | 1,450 | CONT. | CONT. |
| ESM Technology Insertion FDM contracts | | | | | | | | | | | |
| TBD | C/CPIF | 12/98 | CONT. | CONT. | 0 | 0 | 0 | 0 | 600 | CONT. | CONT. |
| NUWC Newport | WR/RCP | 11/96 | CONT. | CONT. | 13,754 | 1,127 | 1,118 | 1,167 | 1,225 | CONT. | CONT. |
| Support and Management | | | | | | | | | | | |
| Miscellaneous | | | | | 2,257 | 115 | 55 | 165 | 200 | CONT. | CONT. |
| Test and Evaluation | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

GOVERMENT FURNISHED PROPERTY: Not Applicable.

| | FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 15,644 | 2,062 | 2,269 | 2,447 | 3,275 | CONT. | CONT. |
| Subtotal Support and Management | 2,257 | 115 | 55 | 165 | 200 | CONT. | CONT. |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603562N
PROGRAM ELEMENT TITLE: Submarine Tactical Warfare Systems
PROJECT NUMBER: F0770
PROJECT TITLE:Advanced Support Equipment Program

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Subtotal Test and Evaluation | 0 | 0 | 0 | 0 | 0 | CONT. | CONT. |
| Total Project | 17,901 | 2,177 | 2,324 | 2,612 | 3,475 | CONT. | CONT. |

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603562N PROGRAM ELEMENT TITLE: Submarine Tactical Warfare Systems PROJECT NUMBER: V1739 PROJECT TITLE: Submarine Special Operations Support Development

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| V1739 Submarine Special Operations Support Development | 5,875 | 2,018 | 2,319 | 2,264 | 2,477 | 2,041 | 2,288 | 2,377 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program responds to the increased threat of Naval activity in the Littoral and the continuing threat of submarine and surface ship activity in all regions of the world through the development of advanced submarine operational concepts. It places particular emphasis on submarine operability and mission support in unique environments. Efforts include assessment of combat system effectiveness, use of high frequency sonars in Arctic regions, testing of ice-capable submarine structures, and development of class specific Arctic shallow water operational guidelines. This program also provides the framework for various Research and Development (R&D) programs to conduct Test and Evaluation in the shallow water and Arctic regions.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

(U) ($3,256) Continued development of the Passive Subsurface Topographical Defense and Navigation System Submarine Tactical Navigation System.

(U) ($2,554) Conducted/supported an Arctic Science Exercise, ICEX 1-96 and ICEX 2-96.

(U) ($65) Provided updates to the Naval Warfare Publications concerning routine and emergency under-ice surfacing operations

2. (U) FY 1997 PLAN:

(U) ($2,018) Conduct/support an Arctic Science Exercise and plan for ICEX 1-98.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603562N
PROGRAM ELEMENT TITLE: Submarine Tactical Warfare Systems
PROJECT NUMBER: V1739
PROJECT TITLE: Submarine Special Operations Support Development

3. (U) FY 1998 PLAN:

(U) ($2,319 Conduct/support an Arctic Science Exercise and ICEX 1-98.

4. (U) FY 1999 PLAN:

(U) ($2,264) Conduct/support an Arctic Science Exercise and plan for ICEX 1-00.

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 2,483 | 2,138 | 2,061 | 2,445 |
| (U) Adjustments from FY 1997 PRESBUDG: | +3,392 | -120 | +258 | -181 |
| (U) FY 1998/1999 PRESBUDG Submit: | 5,875 | 2,018 | 2,319 | 2,264 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1996: Congressional increase for the Passive Subsurface topographical Defense and Navigation System Submarine Tactical Navigation System ($3,500K), Jordanian rescission ($-21K), FY 1996 SBIR transfer ($-87K).

FY 1997: Undistributed Congressional reductions ($-120K).

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603562N PROGRAM ELEMENT TITLE: Submarine Tactical Warfare Systems PROJECT NUMBER: V1739 PROJECT TITLE: Submarine Special Operations Support Development

FY 1998: Plus up for Submarine Special Operations ($400K); undistributed adjustments for NWCF carryover and rates ($-119K); funding for the Acquisition Desk Book ($-1K), Inflation ($-6K), NWCF R&D Activities ($-9K), Carryover adjustment ($-4K), other minor adjustments ($-3K).

FY 1999: Submarine Special Operations reduction ($-100K); Undistributed adjustments for NWCF carryover and rates ($-100K), fund Acquisition Desk Book ($-1K), Inflation ($-8K), NWCF R&D Activities ($30K), other minor adjustments ($-2K).

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:
(U) PE 0602323N Submarine Technology-provides technologies for advanced development efforts.
(U) PE 0602435N Ocean and Atmospheric Technology-provides technologies for advanced development efforts.
(U) PE 0603504N Advanced Submarine Combat Systems Development-conducts advanced development of submarine acoustic sensors and combat control technologies.
(U) PE 0604524N Submarine Combat System-incorporates Arctic-specific improvements.

D. (U) SCHEDULE PROFILE: See attached.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603562N
PROGRAM ELEMENT TITLE: Submarine Tactical Warfare Systems

PROJECT NUMBER: V1739
PROJECT TITLE: Submarine Special Operations Support Development

Program Element: 0603
Project Number:
Title: Submarine Special Operations Support Development

# Schedule Prof

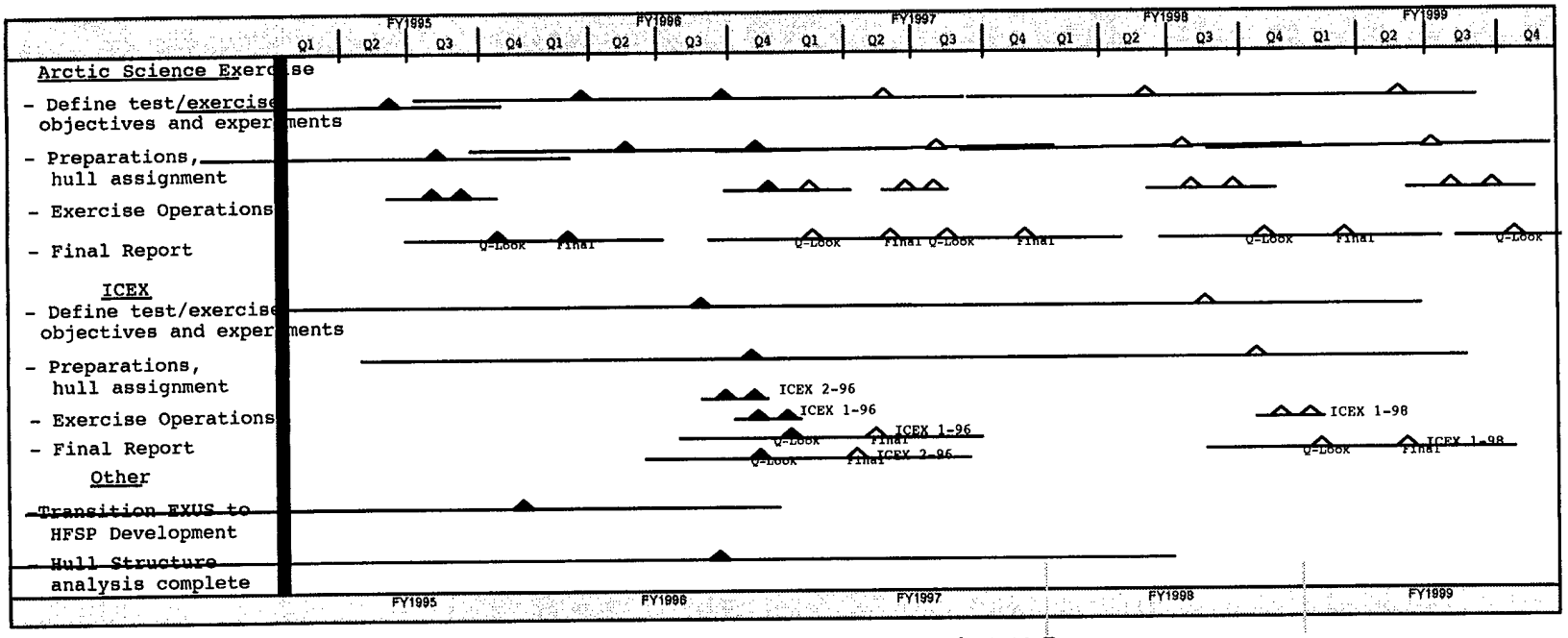




EXHIBIT R-2



1739POAM.PPT

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603562N
PROGRAM ELEMENT TITLE: Submarine Tactical Warfare Systems
PROJECT NUMBER: V1739
PROJECT TITLE: Submarine Special Operations Support Development

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Systems Engineering | 65 | 0 | 0 | 0 |
| b. Developmental Test & Evaluation | 5,223 | 1,443 | 1,739 | 1,684 |
| c. Contractor Engineering Support | 400 | 400 | 400 | 400 |
| d. Program Management Support | 166 | 160 | 160 | 160 |
| e. Travel | 21 | 15 | 20 | 20 |
| Total | 5,875 | 2,018 | 2,319 | 2,264 |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603562N PROGRAM ELEMENT TITLE: Submarine Tactical Warfare Systems PROJECT NUMBER: V1739 PROJECT TITLE: Submarine Special Operations Support Development

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands):

| PERFORMING ORGANIZATIONS Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total* FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | | |
| Advanced Research Projects Agency | MIPR | N/A | CONT. | CONT. | 0 | 2,906 | 0 | 0 | 0 | CONT. | CONT. |
| NUWC Division Newport, RI | WR | 3/93 | CONT. | CONT. | 1,117 | 445 | 0 | 0 | 0 | CONT. | CONT. |
| David Taylor Research Carderock, MD | WR | 3/93 | CONT. | CONT. | 945 | 65 | 0 | 0 | 0 | CONT. | CONT. |
| ARL/UT University of Texas | PD | 3/93 | CONT. | CONT. | 1,483 | 0 | 0 | 0 | 0 | CONT. | CONT. |
| Miscellaneous | N/A | N/A | CONT. | CONT. | 96 | 0 | 0 | 0 | 0 | CONT. | CONT. |
| Support and Management | | | | | | | | | | | |
| Miscellaneous | N/A | N/A | CONT. | CONT. | 570 | 587 | 575 | 580 | 580 | CONT. | CONT. |

| PERFORMING ORGANIZATIONS Contractor/ Government Performing | Contract Method/ Fund Type | Award/ Oblig | Perform Activity | Project Office | Total* FY 1995 | FY 1996 | FY 1997 | FY 1998 | FY 1999 | To | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603562N PROGRAM ELEMENT TITLE: Submarine Tactical Warfare Systems PROJECT NUMBER: V1739 PROJECT TITLE: Submarine Special Operations Support Development

| Activity | Vehicle | Date | EAC | EAC | & Prior | Budget | Budget | Budget | Budget | Complete | Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Test and Evaluation | | | | | | | | | | | |
| NUWC Division Keyport, WA | WR | 5/93 | CONT. | CONT. | 1,964 | 1,704 | 1,393 | 1,739 | 1,684 | CONT. | CONT. |
| Sippican, Incorporated | N/A | 3/96 | CONT. | CONT. | 0 | 168 | 0 | 0 | 0 | CONT. | CONT. |
| NFSEC Port Hueneme, CA | WR | 3/97 | CONT. | CONT. | 0 | 0 | 50 | 0 | 0 | CONT. | CONT. |
| Miscellaneous | N/A | N/A | CONT. | CONT. | 126 | 0 | 0 | 0 | 0 | CONT. | CONT. |

GOVERNMENT FURNISHED PROPERTY: Not applicable.
*V1739 is a continuing program. Only FY95 dollars are shown.

| | Total* FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 3,641 | 3,416 | 0 | 0 | 0 | CONT. | CONT. |
| Subtotal Support and Management | 570 | 587 | 575 | 580 | 580 | CONT. | CONT. |
| Subtotal Test and Evaluation | 2,090 | 1,872 | 1,443 | 1,739 | 1,684 | CONT. | CONT. |
| Total Project | 6,301 | 5,875 | 2,018 | 2,319 | 2,264 | CONT. | CONT. |

*V1739 is a continuing program. Only FY95 dollars are shown.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603563N
PROGRAM ELEMENT TITLE: Ship Concept Advanced Design

(U) COST (Dollars in thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| S2196 Design Tools, Plans and Concepts | 54,946 | 13,242 | 16,198 | 22,254 | 20,324 | 17,709 | 15,908 | 13,561 | Continuing | Continuing |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The efforts within this PE directly support the Navy's ability to design more affordable ships with reduced manning, increased producibility, and greater utilization of the latest technology. The program directly supports the Navy Shipbuilding Plan with state-of-the-art design tools and methods for ship studies, and the actual conduct of design concept studies for the ships in that plan. The program provides the foundation for affordable surface ship design, construction, and life cycle support and is a required first step in the integration of total ship systems, including combat systems and hull, mechanical and electrical (HM&E) systems. Inadequate early planning and ship concept formulation can result in down-stream design/construction and operational problems. A more subtle and severely negative impact of neglecting this early effort is that the "best" concepts may never even be considered and our greatest potential ship design advances never realized. Designs and technologies must meet the threat. This project supports this requirement. While these efforts support all surface ship acquisition programs, they are not in direct support of specific authorized shipbuilding programs. Computer modeling and simulation developments will permit virtual operation and evaluation of the ship and enable reduction of ship production and support cost by allowing fleet representatives, shipbuilders and maintenance staffs to build, test, operate or repair the ship "in the computer" at a design stage where the design is flexible and where feedback and suggested changes can be incorporated relatively easily. A key affordability concept of future designs is a use of common modules, comprised of standard components and/or standard interfaces. These modules will be used across ship types and will be integral with equipment standardization and distributed system architectures that support generic build strategies. Increased commonality will reduce the total cost of ownership and is the cornerstone of an affordable fleet. Efforts under Project S2196 transfer directly to early stage ship design in PE 0603564N, Ship Preliminary Design and Feasibility Studies. This project is the only R&D effort (Government or commercial) that supports this country s naval ship design and engineering capabilities in the area of early stage (Feasibility through Contract Design) design tools, criteria, and methods.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY:4 PROGRAM ELEMENT: 0603563N PROJECT NUMBER: S2196
PROGRAM ELEMENT TITLE: Ship Concept Advanced Design PROJECT TITLE: Design Tools, Plans & Concepts

(U) This project accomplishes the following: (1) identifies future surface ship requirements and characteristics necessary to meet future threats and support mission needs; (2) investigates new affordable ship concepts and evaluates technologies necessary to support these concepts; (3) provides design methods and automated design tools to develop and evaluate ship concepts, support early ship design, and solve pressing fleet engineering problems; (4) develops design criteria and common standards to improve affordability; (5) improves the quality of the product in the design phases, to reduce or eliminate the costs of fixing problems after ships reach the fleet; (6) develops investment strategies for new concepts and technologies; (7) and supports development of Mission Need Statements (MNS) for future ships.

(U) In FY 1996, funding was re-programmed into this PE/Project for Large Cruise Missile Carrier (LCMC) / Arsenal Ship demonstrator concept efforts. The Arsenal Ship project has two major phases: (1) development of a Demonstrator Ship using R&D funds and (2) a subsequent SCN-funded program of multiple fleet ships commencing as soon as FY 01. The Demonstrator Ship is a prototype used to establish the proof-of-principle for high fire-power, low manning strike mission ships. The Chief of Naval Operations has directed that the Demonstrator Ship start at-sea testing prior to award of the first SCN ship. The schedule requires a Functional Design phase in FY 97 detail design, construction starting in FY 98, and at-sea tests and trials starting in FY 00. FY 97 efforts are funded under PE 0603582N. FY 98-00 efforts are funded under PE 0604310N.

(U) In FY 1996, Congress added funding for Landing Craft, Air Cushion (LCAC) Service Life Extension Program (SLEP), to this PE/Project, for advance planning and engineering efforts. Modifications are to be incorporated into craft 91 in production.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

- (U) ($785) Integrated new technologies in total ship concepts. Developed ship concepts for potential ships 5-10 years out in the SCN plan, including ship size, configuration, capabilities and rough order of magnitude (ROM) ship costs. Conducted pre-Milestone 0 ship concept studies for combat logistics force, amphibious assault, mine countermeasure support, and large cruise missile carrier surface combatant ships. Analyzed the cost/benefit of new concepts and technologies.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY:4 PROGRAM ELEMENT: 0603563N PROJECT NUMBER: S2196
PROGRAM ELEMENT TITLE: Ship Concept Advanced Design PROJECT TITLE: Design Tools, Plans & Concepts

- (U) ($1,563) Continued development and improvement of design methods, criteria, standards and data bases. Continued improvements to surface ship synthesis/assessment models. Added capability to address reduced construction cost, and increased capabilities to determine ship size impacts of new technologies. Included the lessons learned from ship modularity, production, and commonality of H,M&E systems studies done in previous FYs. Continue improvements to ship cost estimating models. Continued supporting development of advanced computer aided design methods and tools for early stage ship design, including simulation based design techniques. Identified, characterized and assessed new and emergent technologies and update the HM&E technology database.

- (U) ($1,563) Continued obtaining long-term data collection of full-scale seaway hydrodynamic loads. Initiated development of slam pressure algorithms and associated strength considerations. Finalized stiffener strength variable and distribution development to augment reliability assessments. Continued component fatigue strength evaluations and initiate fracture toughness assessment formulation. Began validation studies of analytical based loads predictions. Finalized ship fabrication and material strength variable definition and development of probability distributions. Completed stiffener local instability tests. Developed hull girder bending (part I) of the reliability-based load and resistance factor design (LRFD) structural rules for naval surface ships. Supported Ship Structure Committe (SSC) Research.

- (U) ($1,683) Developed additional elements of the EM Engineering Baseline II system. Released EM Engineering interim Baseline I+. Completed microwave EM environment predictive techniques, and continue transition frequency prediction development. Developed and installed modules to address composite and frequency selective surfaces. Continued Baseline II electro-optics and millimeter wave analysis development. Brought on-line a prototype Baseline II high frequency (HF) EM environment workstation that operates in parallel with scaled "brass model" tests. Finalized the architectural design for the Baseline II version of the EM Engineering system.

- (U) ($10,244) Continued to identify and develop areas/methods for increased commonality for naval ships and ship systems to improved life cycle affordability. Continued development of common ship architectures for hull, mechanical and electrical (HM&E) systems, and related command, control, communications, computers and information (C4I) systems, and combat systems (C/S) as well as development of associated common module prototypes and designs to demonstrate more cost-effective design, fabrication, shipbuilding processes and operational utility. Emphasis was on development of ship configurations and systems architectures that can utilize commercial processes and/or commercial-off-the-shelf (COTS) equipment and materials. Developed total ship concepts for modular surface combat ships and combat logistics support ships. Continued development of common berthing modules, damage control locker modules, food service (galley) module, rolling airframe missile (RAM) modules, and radio communication system equipment modules. Continued development of module concepts identified as architectural building blocks efforts, including ship auxiliary system modules, and ship self defense combat systems modules. Prepared for shock test of the modular 5-inch gun system in conjunction with DoD Foreign Comparative Test (FCT) program. Continued work on modular track/hold down systems and in compartment support systems (i.e. modular electrical connections) for use in mounting standardized and modular equipment aboard ships in C4I and other types of spaces to reduce the future costs of ship equipment/ system modernization. Supported prototype installations on fleet ships to demonstrate these track hold down systems and common/standard foundation connections. Continued development of specifications, standards, and practices for implementing use of common modules, standard components and standard interfaces. Continued development and definition of common module standard interfaces. Continued efforts on more cost effective methods and practices to standardize shipboard equipment for life cycle cost savings. Completed first phase of engineering efforts on across program / fleet common equipment. Completed systems engineering analysis (including cost analysis) to identify/develop the families of modules as the building blocks of the future surface Navy, including configuration control requirements. Continued development of alternative distributed systems architectures for HVAC, air systems and fluid transfer systems that foster improved ship production and total life cycle ship affordability. Completed the first phase of development for the PODAC cost model using a Navy / shipbuilder team. Continued development of generic and engineered build strategies for naval ships that foster product-oriented ship design and construction, and incorporate common system architectures and modules. Completed module and equipment standardization efforts for inclusion into the final LPD 17 design package. Efforts were focused on application of commonality to combat logistics force (CLF) ships, the 21st century surface combatant (SC 21), and other ships in the SCN plan.

- (U) ($3,999) Developed five large cruise missile carrier (LCMC) / Arsenal Ship initial concept development of demonstrator ship. Project plans and documentation for managing the next phases of this effort.

- (U) ($35,109) Initiated engineering of Landing Craft, Air Cushion (LCAC) Service Life Extension Program (SLEP) improvements and initiated integrated logistics planning. Initiated engineering for engine upgrades and qualification testing. Modified delivered craft for testing. Developed the Engineering Change Proposal (ECP) for incorporation of modifications on the last craft during production. Technical support and analysis. Craft operations and test support.

2. (U) FY 1997 PLAN:

- (U) ($598) Integrate new technologies in total ship concepts. Develop ship concepts for potential ships 5-10 years out in the SCN plan, including ship size, configuration, capabilities and rough order of magnitude (ROM) ship costs. Conduct pre-Milestone 0 ship concept studies for combat logistics force, amphibious assault ships, and other potential ship concepts / configurations in support of SCN planning. Analyze the cost/benefit of new concepts and technologies. Develop R&D investment strategies which provide cost/benefit comparisons for new concepts and technologies. Obligations begin upon receipt of funding.

- (U) ($1,433) Continue development and improvement of design methods, criteria, standards and data bases. Continue improvements to surface ship synthesis/assessment models. Enhance capability to address minimum required shipboard manning, reduced total cost of ownership, and determine ship size impacts of new technologies. Include the lessons learned from ship modularity, production, and commonality of HM&E systems studies done in previous FYs. Continue improvements to ship cost estimating models. Continue supporting development of advanced computer aided design methods and tools for early stage ship design. Identify, characterize and assess new and emergent technologies and update the HM&E technology database.

- (U) ($211) Conduct initial hands-on evaluation of state-of-the-art visualization and simulation techniques for application to ship design and engineering. Accomplish initial exploratory application of techniques having multi-disciplinary applicability.

- (U) ($1,078) Continue collection of long-term hydrodynamic loads data and update algorithms for longitudinal and transverse bending as well as torsion loads. Continue grillage strength tests and assessments developing ultimate strength relationships. Complete fracture assessment formulation. Update reliability inputs and assessment techniques; continue validation of processes and utilize technologies/improved design methods on existing ships. Develop unstiffened panels (part II) of the reliability-based load and resistance factor design (LRFD) structural rules for naval surface ships. Support SSC Research.

- (U) ($444) Support user base in execution of EM Engineering interim Baseline I+ installations and integration. Develop integration plan for EM Engineering Baseline II evolution into the Surface Ship Integrated Topside Design Project.

- (U) ($9,249) Continue to identify and develop areas/methods for increased commonality for naval ships and ship systems to improved life cycle affordability. Continue development of common ship architectures for HM&E systems, related C4I systems, and combat systems including interface standards for modular ship systems. Continue development of ship configurations and systems architectures that can utilize commercial processes and/or commercial-off-the-shelf (COTS) equipment and materials. Continue development of total ship concepts for modular surface combat ships and combat logistics support ships. Continue development of food service (galley) module(s), ventilation and chilled water HVAC modules, ship auxiliary systems, and various ship's self defense system modules. Commence development of concept level designs and requirements for modules identified as architectural building blocks, including combat systems modules and shipboard auxiliary system modules. Continue to develop, and maintain specifications and standards for implementing use of common modules, standard components and standard interfaces including use of commercial standards. Continue efforts on more cost effective methods and practices to standardize shipboard equipment for life cycle cost savings. Continue developmental and testing work on modular track/hold down systems and in compartment support systems (i.e. modular electrical connections) for use in mounting standardized and modular equipment aboard ships in C4I and other types of spaces to reduce the future costs of ship equipment/ system modernization. Support SC 21 systems engineering on modularity requirements and flexible mission systems. Validate the prototype PODAC cost model for one type of naval ship. Revise the PODAC cost model based on results of ship production and equipment manufacturing cost data analysis and the validation of the model for naval ship types. Continue development of alternative zonal distributed systems architectures that foster improved ship production and total life cycle ship affordability. With focus on surface combatants continue development of generic and engineered build strategies for naval ships that foster product-oriented ship design and construction, and incorporate common system architectures and modules. Efforts are focused on application of commonality to the 21st century surface combatant (SC 21),

future carrier (CV(X), combat logistics force (CLF) ships, and other ships in the SCN plan. Primary emphasis is on ship and ship systems modularity for and affordability of the SC 21.

- (U) ($229) Portion of extramural program reserved for Small Business Innovative Research assessment in accordance with 15 U.S.C. 638.

3. (U) FY 1998 PLAN:

- (U) ($760) Integrate new technologies in total ship concepts. Develop ship concepts for potential ships 5-10 years out in the SCN plan, including ship size, configuration, capabilities and rough order of magnitude (ROM) ship costs. Conduct pre-Milestone 0 ship concept studies for combat logistics force, amphibious assault ships, and other potential ship concepts / configurations in support of SCN planning. Analyze the cost/benefit of new concepts and technologies. Develop R&D investment strategies which provide cost/benefit comparisons for new concepts and technologies.

- (U) ($1,653) Continue development and improvement of design methods, criteria, standards and data bases. Continue improvements to surface ship synthesis/assessment models. Enhance capability to address minimum required shipboard manning, reduced life cycle cost, and determine ship size impacts of new technologies. Add capability to handle new ship configurations, hull form alternatives, and signature reduction features. Include the lessons learned from ship modularity, production, and commonality of HM&E systems studies done in previous FYs. Continue improvements to ship cost estimating models. Continue supporting development of advanced computer aided design methods and tools for early stage ship design. Identify, characterize and assess new and emergent technologies and update the HM&E technology database.

- (U) ($1,500) Begin broad-based implementation of state-of-the-art visualization and simulation techniques for ship design and engineering applications. Acquire, validate, adapt, and implement visualization and simulation tools from all sources, including DARPA, ONR, and other government activities for areas such as ship motions, maneuvering, powering, personnel flow, stores flow, structural response, command and communications systems, electric power systems, piping systems, HVAC systems, and combat systems. Develop custom visualization and simulation tools where no alternate source exists. Develop standard wrapper program to integrate visualization and simulation tools with legacy computer aided design and physics-based analysis tools. Integrate ship feasibility tools and new cost algorithms develop by the PODAC effort. Provide capability for realistic, physics-based simulation of ship performance, behavior, and response.

Improve accuracy of survivability, damage tolerance, and damaged mission capability simulation. Provide efficient, reliable, progressively improving set of tools for designers, engineers, builders, operators, and maintainers of Navy ships.

- (U) ($985) Continue collection of long-term hydrodynamic loads data. Continue development and validation of seaway loads prediction method. Complete updating of compressive strength of plating stiffeners study. Continue grillage strength tests and assessments. Complete fracture assessment formulation. Update reliability inputs and assessment techniques. Develop stiffened panels (part III) of the reliability-based load and resistance factor design (LRFD) structural rules for naval surface ships. Continue validation of processes and utilize technologies/improved design methods on existing ships. Support SSC Research.

- (U) ($11,300) Identify and develop areas/methods for increased commonality for naval ships and ship systems to improved life cycle affordability. Develop common ship architectures for HM&E systems, related C4I systems, and combat systems including interface standards for modular ship systems. Develop ship configurations and systems architectures that can utilize commercial processes and/or commercial-off-the-shelf (COTS) equipment and materials. Examine commercial technologies to provide more affordable solutions to ship board functional requirements and/or reduced maintenance costs. Evaluate aboard fleet ships suitable commercial technologies to meet shipboard functions. Develop commonality / modular total ship architecture detailed concepts, and requirements for surface combatants. Perform operational, survivability, and cost analysis of this ship architecture. Develop family of commonality based ships for surface combatants and combat logistics force ships. Support SC 21 systems engineering on modularity requirements and meeting flexible mission systems requirements. Continue development of zonal distributed systems architectures for HVAC and other auxiliary support systems that foster improved ship production and total life cycle ship affordability. Refine zonal distributed systems architectures for HVAC, firemain, and other auxiliary/support systems that are scaleable to all classes/sizes of ship types and apply to SC 21 ships. Detailed studies/analysis of alternative distributed systems (i.e. replacements for current means for providing support to main systems and compartments). Survivability and operational evaluations for these systems on surface combatants. Develop detailed requirements for dedicated serviceways for zonal distributed and other support systems. Define Weapons / Topside / Electronic Zones definition & interface standards for combat systems and C4I. Develop module to ship, module to module, and intra-module interface standards for hull, mechanical & electrical systems. Systems engineering analysis (including life cycle cost analysis) to identify/develop the families of modules as the building blocks of the future surface navy, including configuration control requirements with emphasis on combat systems. Complete the HM&E families of common modules fleet level functional sizing and concepts efforts. Develop prototype common modules identified as architectural building blocks during previous FY efforts to demonstrate design, fabrication, shipbuilding process and operational utility, and to support zonal distributed systems

architecture. Commence development of production level designs for modules identified as architectural building blocks of the SC 21, including combat systems modules and shipboard auxiliary system modules. Hull & human support systems module designs & prototypes. Continue development of galley of the future module including evaluation of commercial equipment on existing fleet ships. Support prototype evaluations for ships under construction (such as DDG 51 class) and modernization (CVN 68 class) for habitability common modules, and commercial furniture for offices and berthing. Evaluate commercial technologies to meet hull outfitting equipment functions including assessment at sea. Evaluate results of LPD 17 detailed design experience with modular sanitary spaces to evolve this design for SC 21 ships, CLF (combat logistics force) ships and CV(X). Machinery & auxiliary systems module designs & prototypes. Begin detail design of modules for zonal distributed systems: chill water, ventilation, and fuel & lub oil transfer. Define performance based requirements for family of steering gears, based on commercial rotary value technology, for use on SC 21 ships, CLF ships, and CV(X). Revise LPD 17 shipbuilder developed package units, and construction modules as needed to make them common modules for use on SC 21 ships, CLF ships and CV(X). Targeted candidates are AFFF stations, fire hose stations, CPS fan rooms, LP air, and water mist fire suppression system. Evaluate results of LPD 17 detailed design experience with previously developed ATC auxiliary systems modules to evolve these design for SC 21 ships, CLF ships and CV(X). Combat systems and C4I module designs & prototypes. Identify legacy combat systems for packaging and/or modularization for SC 21 ships. Support modularization of the high ship integration and testing cost items identified to fit with the modular architecture of SC 21 ships. Support design of advanced electronics module that would be used across different systems/spaces that have rapidly changing equipment especially electronics. Support detailed requirements definition for flexible mission bays / spaces. Work with next generation combat systems and C4I developers to provide modularization engineering support so that these systems are supported by zonal distributed systems, and the weapons / topside / sensor zone and interfaces are not violated. Support C4I modularity especially use of standard commercial racks and interfaces for radio communications equipment. Complete development of level II definition and performance requirements for ship self defense system modules. Support integration of distributed computing plant schematic architecture into the physical architecture of modular ship architecture. Continue efforts on more cost effective methods and practices to standardize shipboard equipment for life cycle cost savings. Continue development of the requirements and systems engineering, including logistics support methods, to achieve more cost effective equipment standardization for naval ships. Continue to develop, maintain and update as needed based on lessons learned, specifications and standards for implementing use of common modules, standard components and standard interfaces including use of commercial standards. Work to have these standards and specifications reviewed by industry standard committees and bodies. Prepare ILS and other processes, requirements in specifications that foster use of standard equipment. Analyze potential across acquisition program common buy equipment and support resolution of common buy issues. Develop equipment standardization processes including use of COTS equipment. Definition of families standard equipment / components especially using

COTS equipment. Equipment standardization support to on-going ship design / acquisition programs. Continue to look for, develop, evaluate, and test modularity enabling technologies. Continue developmental and testing work on SMART Deck / C4I Modularity system (modular track/hold down systems) and in compartment support systems (i.e. modular electrical connections) for use in mounting standardized and modular equipment aboard ships in C4I and other types of spaces to reduce the future costs of ship equipment/ system modernization. Complete detailed design of internal to a module/space support systems (electric, cooling, lighting, air, etc.), and from commercial applications (especially electronics). Complete initial development of the product-oriented design and construction (PODAC) cost model for naval ships and ship systems. Collection and analysis of cost data by shipbuilders for use with the model in developing activity cost factors. Revise the PODAC cost model based on results of ship production and equipment manufacturing cost data analysis and the validation of the model for naval ship types. Begin PODAC cost model extensions for combat systems, and C4I. Prototype use and evaluation of the PODAC cost model for analysis zonal architectures and common modules concepts. Operating & support cost analysis methodology development and begin tie in with product work break down of PODAC cost model. Continue identification of changes to naval ship configurations, ship systems, and equipment designs to enable the use of commercial shipbuilding processes for the construction of future naval ships. With focus on surface combatants continue development of generic build strategies (GBS) for naval ships that foster product-oriented ship design and construction, and incorporate common system architectures, alternative distributed ship systems architectures and modules. Include results of the commonality architecture and zonal distributed systems and analyze their impact on ship production costs, scheduling, fabrication, erection, outfitting, and testing. Perform early stage design for production analysis of concepts and technologies for on-going ship acquisition programs primarily SC 21. Support NAVSEA Professor of Ship Production research grant. Efforts are focused on application of commonality to the 21st century surface combatant (SC 21), combat logistics force (CLF) ships, future carrier CV(X), and other ships in the SCN plan. Primary emphasis is on ship and ship systems commonality and modularity for and affordability of the SC 21.

4. (U) FY 1999 PLAN:

- (U) ($600) Integrate new technologies in total ship concepts. Develop ship concepts for potential ships 5-10 years out in the SCN plan, including ship size, configuration, capabilities and rough order of magnitude (ROM) ship costs. Conduct pre-Milestone 0 ship concept studies for combat logistics force, amphibious assault ships, and other potential ship concepts / configurations in support of SCN planning. Analyze the cost/benefit of new concepts and technologies. Develop R&D investment strategies which provide cost/benefit comparisons for new concepts and technologies.

- (U) ($2,009) Continue development and improvement of design methods, criteria, standards and data bases. Continue improvements to surface ship synthesis/assessment models. Enhance the capabilities to address minimum required shipboard manning, reduced construction cost, and increased capabilities to determine ship size impacts of new technologies. Continue to add capability to handle new ship configurations, hull form alternatives, and signature reduction features. Include the lessons learned from ship modularity, production, and commonality of HM&E systems studies done in previous FYs. Begin efforts to improve linkage between ship synthesis/assessment models with operational effectiveness models. Continue improvements to ship cost estimating models. Continue supporting development of advanced computer aided design methods and tools for early stage ship design. Identify, characterize and assess new and emergent technologies and update the HM&E technology database.

- (U) ($2,440) Continue broad-based implementation of state-of-the-art visualization and simulation techniques for ship design and engineering applications. Acquire, validate, adapt, and implement visualization and simulation tools from all sources, including DARPA, ONR, and other government activities for areas such as ship motions, maneuvering, powering, personnel flow, stores flow, structural response, command and communications systems, electric power systems, piping systems, HVAC systems, and combat systems. Develop custom visualization and simulation tools where no alternate source exists. Integrate visualization and simulation tools with computer aided design and physics-based analysis tools. Provide capability for realistic, physics-based simulation of ship performance, behavior, and response. Improve accuracy of survivability, damage tolerance, and damaged mission capability simulation. Provide efficient, reliable, progressively improving set of tools for designers, engineers, builders, operators, and maintainers of Navy ships.

- (U) ($1,105) Continue development and validation of seaway loads prediction method. Continue to collection and analysis of long-term hydrodynamic loads data. Continue grillage strength tests and assessments. Continue overall strength analysis of surface ships. Continue updating reliability inputs and assessment techniques. Develop structural fatigue (part IV) of the reliability-based load and resistance factor design (LRFD) structural rules for naval surface ships. Continue validation of analysis processes and utilize technologies/improved design methods on existing and new design ships. Support SSC Research.

- (U) ($16,100) Identify and develop areas/methods for increased commonality for naval ships and ship systems to improved life cycle affordability. Develop common ship architectures for HM&E systems, related C4I systems, and combat systems including interface standards for modular ship systems. Develop ship configurations and systems architectures that can utilize commercial processes and/or commercial-off-the-shelf (COTS) equipment and materials. Examine commercial technologies to provide more affordable solutions to ship board functional requirements and/or reduced maintenance costs. Evaluate aboard fleet ships suitable commercial technologies to meet shipboard functions. Develop commonality / modular total ship architecture detailed concept, and requirements for surface combatants. Perform operational, survivability, and cost analysis of this ship architecture. Develop of family of commonality based ships for surface combatants and combat logistics force ships. Start development of total ship concepts for future aircraft carriers. Support SC 21 systems engineering on modularity requirements and meeting flexible mission systems requirements. Continue development of zonal distributed systems architectures for HVAC and other auxiliary support systems that foster improved ship production and total life cycle ship affordability. Detailed design of zonal distributed systems architectures for HVAC, firemain, and other auxiliary/support systems , that are scaleable to all classes/sizes of ship types, for SC 21 ships. Complete detailed studies/analysis of alternative distributed systems (i.e. replacements for current means for providing support to main systems and compartments). Detailed survivability and operations evaluations for these systems on surface combatants. Develop detailed requirements for dedicated serviceways for zonal distributed and other support systems. Detailed definition of Weapons / Topside / Electronic Zones definition & interface standards for combat systems and C4I. Development detailed module to ship, module to module, and intra-module interface standards for hull, mechanical & electrical systems. Complete systems engineering analysis (including life cycle cost analysis) to identify/develop the combat systems families of modules as the building blocks of the future surface Navy, including configuration control requirements. Develop prototype common modules identified as architectural building blocks during previous FY efforts to demonstrate design, fabrication, shipbuilding process and operational utility, and to support zonal distributed systems architecture. Continue development of production level designs for modules identified as architectural building blocks of the SC 21, including combat systems modules and shipboard auxiliary system modules. Produce performance requirements and level II design definition common modules with standard interfaces and/or components. Hull & human support systems module designs & prototypes. Continue development of galley of the future module including evaluation of commercial equipment on existing fleet ships. Support prototype evaluations for ships under construction (such as DDG 51 class) and modernization (CVN 68 class) for habitability common modules, and commercial furniture for offices and berthing. Evaluate commercial technologies to meet hull outfitting equipment functions including assessment at sea. Integrate LPD 17 update modular sanitary spaces into SC 21 ships, CLF ships, and CV(X). Begin efforts with CV(X) team on common modules for aircraft maintenance and supply support that be cross decked with the aircraft and not require ship modifications for

aircraft system changes. Machinery & auxiliary systems module designs & prototypes. Continue detail design of modules for zonal distributed systems: chill water, ventilation, and fuel & lub oil transfer. Build a prototype steering gear module, with commercial rotary value technology, based on performance based requirements for family of steering gears for use on SC 21 ships, CLF ships, and CV(X). Incorporate the revised LPD 17 shipbuilder developed package units, and construction modules that are now common modules into SC 21 ships, CLF ships, and CV(X). Targeted candidates are AFFF stations, fire hose stations, CPS fan rooms, LP air, and water mist fire suppression system. Integrate LPD 17 detailed design experience updated ATC auxiliary systems modules into SC 21 ships, CLF ships, and CV(X). Combat systems and C4I module designs & prototypes. Identify legacy combat systems for packaging and/or modularization for SC 21 ships. Support modularization of the high ship integration and testing cost items identified to fit with the modular architecture of SC 21 ships. Support design of advanced electronics module that would be used across different systems/spaces that have rapidly changing equipment especially electronics. Support detailed requirements definition for flexible mission bays / spaces. Work with next generation combat systems and C4I developers to provide modularization engineering support so that these systems are supported by zonal distributed systems, and the weapons / topside / sensor zone and interfaces are not violated. Support C4I modularity especially use of standard commercial racks and interfaces for radio communications equipment. Work to use these on ships under construction and in modernization. Support modifications of AA size modular 5 inch gun system to accommodate advanced 5 inch gun. Support integration of distributed computing plant schematic architecture into the physical architecture of modular ship architecture. Continue efforts on more cost effective methods and practices to standardize shipboard equipment for life cycle cost savings. Continue development of the requirements and systems engineering, including logistics support methods, to achieve more cost effective equipment standardization for naval ships. Continue to develop, maintain and update as needed based on lessons learned, specifications and standards for implementing use of common modules, standard components and standard interfaces including use of commercial standards. Work to have these standards and specifications reviewed by industry standard committees and bodies. Prepare ILS and other processes, requirements in specifications that foster use of standard equipment. Develop equipment standardization processes including use of COTS equipment. Definition of families standard equipment / components especially using COTS equipment. Equipment standardization support to on-going ship design / acquisition programs. Continue to look for, develop, evaluate, and test modularity enabling technologies. Complete develop and testing work on SMART Deck / C4I Modularity system (modular track/hold down systems) and in compartment support systems (i.e. modular electrical connections) for use in mounting standardized and modular equipment aboard ships in C4I and other types of spaces to reduce the future costs of ship equipment/ system modernization. Complete detailed design of internal to a module/space support systems (electric, cooling, lighting, air, etc.), and from commercial applications (especially electronics). Continue Product Oriented Design & Construction (PODAC) cost model extensions for combat systems, and C4I. Continue collection and analysis of cost data by shipbuilders for use with the model in developing activity

cost factors. Use PODAC cost model to analyze new technologies to validate the models capabilities to correct reflect cost impacts. Continue to work on tying in operating & support cost analysis methodology with product work break down of PODAC cost model. Continue identification of changes to naval ship configurations, ship systems, and equipment designs to enable the use of commercial shipbuilding processes for the construction of future naval ships. With focus on surface combatants continue development of generic build strategies (GBS) for naval ships that foster product-oriented ship design and construction, and incorporate common system architectures, alternative distributed ship systems architectures and modules. Include results of the commonality architecture and zonal distributed systems and analyze their impact on ship production costs, scheduling, fabrication, erection, outfitting, and testing. Perform early stage design for production analysis of concepts and technologies for on-going ship acquisition programs primarily SC 21. Support NAVSEA Professor of Ship Production research grant. Efforts are focused on application of commonality to the 21st century surface combatant (SC 21), combat logistics force (CLF) ships, future carrier CV(X), and other ships in the SCN plan. Primary emphasis is on ship and ship systems commonality and modularity for and affordability of the SC 21. The increased FY 99 funding is for building and evaluating prototype modules that were designed in FY 98, detailed definition of standard interfaces, and reflects the increase in engineering efforts on modular architectures and zonal ship distributed systems applied to surface combatants in support of the SC 21 contract design phase. The majority of this increase goes towards the building of modular food service (galley of the future), modular steering gear, advanced electronics module prototypes, and some smaller modularity enabling technologies demonstrators. The three prototype modules represent one member of each family of common modules for these three shipboard functions that will be used on SC 21 ships, CV(X), LH(X), combat logistics force ships (AOE(X) and ADC(X)), and other future ships.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship and fleet wide applications.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY:4 PROGRAM ELEMENT: 0603563N PROJECT NUMBER: S2196
PROGRAM ELEMENT TITLE: Ship Concept Advanced Design PROJECT TITLE: Design Tools, Plans & Concepts

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 52,044 | 13,807 | 25,279 | 28,330 |
| (U) Adjustments from FY 1997 PRESBUDG: | +2,902 | -565 | -9,081 | -6,076 |
| (U) FY 1998/99 PRESBUDG Submit: | 54,946 | 13,242 | 16,198 | 22,254 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1996 net increase is due addition of funding for LCMC / Arsenal Ship Demonstrator concept studies and reduction from Small Business Inovative Research (SBIR) assessment. FY 1997 changes are due to NWCF surcharge and general reductions. FY 1998 and FY 1999 decreases are due to restructured program requirements.
(U) Schedule: Change of combat logistics force ships AOE(X)/ADC(X) lead ship award from FY 00 to FY 04 has shifted related and supporting work in this PE/Project to later FYs. This is reflected in the FY 1998/1999 reduction in funding.
(U) Technical: none

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:
(U) PE 0602121N (Surface Ship Technology)
(U) PE 0603513N (Shipboard System Component Development)
(U) PE 0603514N (Ship Combat Survivability)
(U) PE 0603564N (Ship Preliminary Design and Feasibility Studies)
(U) PE 0603573N (Advanced Surface Machinery Systems)
(U) PE 0603582N (Arsenal Ship - Dem/Val)
(U) PE 0604310N (Arsenal Ship)
(U) PE 0604567N (Ship Contract Design/Live Fire T&E)
(U) PE 0605130D (Foreign Comparative Test Program)

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1997

BUDGET ACTIVITY:4 PROGRAM ELEMENT: 0603563N PROJECT NUMBER: S2196
PROGRAM ELEMENT TITLE: Ship Concept Advanced Design PROJECT TITLE: Design Tools, Plans & Concepts

D. (U) SCHEDULE PROFILE:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| Program Milestones | (Not applicable - Non-Acquisition Program) | | | |
| Engineering Milestones | LHD 1 Full Scale Trials Analysis Complete 4Q | Unstiffened Panels LRFD structural rules 4Q | Stiffened Panel LRFD structural rules 4Q | Structural Fatigue LRFD structural rules 4Q |
| | Hull Girder Bending LRFD structural rules 4Q | Fracture & Grillage Tests of Shipyard Fabrication Specimens Complete 4Q | Cost Tool Integration w/SBD 4Q | Visualization/Simulation of Discrete Electrical Control Systems 4Q |
| | Crew Sanitary Module Prototype Complete 2Q | EMENG Transition Frequency Model Complete 4Q | Stereoscopic walk-through for SBD 4Q | Synthetic Space Arrangement 4Q |
| | Stateroom Module Level II Design Complete 4Q | Visualization Virtual Mockup for SBD 4Q | Feasibility Tool (ASSET) Integration w/SBD 4Q | Visualization of Weapon/Cargo/Vehicle Flow 4Q |
| | HVAC Module Level I Design Complete 3Q | HVAC Module Level II Design and Zonal Arch. Definition 4Q | Standard Wrapper Program for Physics Based Analysis 4Q | Dynamic Fluid System behavior 4Q |
| | 13M standard boat tech. design Complete 2Q | Prototype Stateroom Module Complete 3Q | Early Stage Design for Production Guidance Production 4Q | Zonal HVAC Design & Distr. System Level III Design 4Q |
| | Modular RAM Install Design Complete 4Q | HM&E Module Interface Standards Industry Review 4Q | Module Design Handbook Complete 4Q | HM&E Module Interface Standards Complete 4Q |
| | PODAC Cost Model Generic PWBS Complete 3Q | Assessment of Impact of Zonal Distributed Syst. Arch. on Ship 4Q | Combat Systems Zone & Interface Standards Industry Review 3Q | Modular Food Service Level II Design 4Q |
| | | PODAC Cost Model Prototype Version 0 2Q | PODAC Cost Model Validation Complete 2Q | PODAC Cost Model Version 1 Complete 4Q |

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| Engineering Milestones (continued) | | C4I Modularity Prototype Complete 3Q | Radio Communication Modular Equipment Stds. 2Q | C4I Modularity Distributed Systems Prototype 3Q |
| | | Surface Combatant GBS Phase I 4Q | Dedicated Distributed Systems Serviceways Level II Design 4Q | Surface Combatant GBS Phase II 4Q |
| | LCAC SLEP Design Review 4Q | | | |
| Testing Milestones | R.O. Module Operational, Shock & Other Testing Complete 2Q | 5 inch Modular Gun System FCT Complete 3Q | | |
| | Fire Pump Module Operational, Shock & Other Testing Complete 1Q | LCAC SLEP Advanced Skirt Tests 3Q | | |
| | Commercial Lighting Shipboard testing 4Q | LCAC SLEP Component Tests 2Q | | |
| Contract Milestones | (Not applicable) | | | |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY:4 PROGRAM ELEMENT: 0603563N PROJECT NUMBER: S2196
PROGRAM ELEMENT TITLE: Ship Concept Advanced Design PROJECT TITLE: Design Tools, Plans & Concepts

(U) COST (Dollars in thousands)

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| PROJECT COST CATEGORIES | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Pre-MS0 Ship Concepts | 785 | 598 | 760 | 600 |
| b. Ship Design Methods, Tools, & Criteria | 1,563 | 1,433 | 1,653 | 2,009 |
| c. Simulation Based Design | -- | 211 | 1,500 | 2,440 |
| d. Reliability Based Structures | 1,563 | 1,078 | 985 | 1,105 |
| e. EM Engineering | 1,683 | 444 | -- | -- |
| f. Affordability Through Commonality | 10,244 | 9,249 | 11,300 | 16,100 |
| g. Arsenal Ship Concept Studies | 3,999 | -- | -- | -- |
| h. LCAC Service Life Extension | | | | |
| i. Prime Contract Engr/ILS | 31,360 | -- | -- | -- |
| ii. Government Engineering Support | 1,630 | -- | -- | -- |
| iii. Government Test Support | 1,050 | -- | -- | -- |
| iv. Contractor Test Support | 344 | -- | -- | -- |
| v. Program Management Support | 650 | -- | -- | -- |
| vi. Travel | 75 | -- | -- | -- |
| i. SBIR | | 229 | | |
| TOTAL | 54,946 | 13,242 | 16,198 | 22,254 |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY:4 PROGRAM ELEMENT: 0603563N PROJECT NUMBER: S2196
PROGRAM ELEMENT TITLE: Ship Concept Advanced Design PROJECT TITLE: Design Tools, Plans & Concepts

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | | |
| Advanced Marine Enterprises (AME) Arlington, VA | C/CPFF | 4-95 | CONT. | CONT. | 188 | 2,441 | 1,527 | 2,165 | 2,260 | CONT. | CONT. |
| John J. McMullen Assoc. (JJMA) Arlington, VA | C/CPFF | 4-95 | CONT. | CONT. | 0 | 1,314 | 430 | 2,155 | 2,260 | CONT. | CONT. |
| Gibbs&Cox, Inc. Arlington, VA & New York, NY (This contract is a team contract supporting the Affordability Through Commonality Task. Other contract team members are: Advanced Engineering & Research Associates, Arlington, VA; AME, Arlington, VA; Avondale Industries, New Orleans, LA; Bath Irons Works, Bath, ME; Dayton T. Brown, Islip, NY; Hopeman Brothers, Waynesboro, VA; Ingalls Shipbuilding, Pascagoula, MS; M. Rosenblatt & Son, Arlington, VA; NKF Engin., Arlington, VA; PDI Corp., Annapolis, MD; Thomas Enterprises, Alexandria, VA; United Defense LP (FMC), Minneapolis, MN; and Lockheed-Martin, Arlington, VA.) | C/CPFF | 9-94 | CONT. | CONT. | 8,501 | 1,995 | 1,565 | 2,000 | 2,000 | CONT. | CONT. |
| Textron Marine and Land Systems New Orleans, LA | TBD | TBD | 31,360 | 31,360 | 0 | 31,360 | -- | -- | -- | 0 | 31,360 |
| Other Contractors | Various | Various | N/A | N/A | 13,592 | 9,309 | 3,917 | 4,315 | 9,088 | CONT. | CONT. |
| NSWC/Carderock Division | WR | Various | N/A | N/A | 7,037 | 4,569 | 4,296 | 4,210 | 5,025 | CONT. | CONT. |
| Other Govt. Activities | WR | Various | N/A | N/A | 3,007 | 1,839 | 1,278 | 1,353 | 1,621 | CONT. | CONT. |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY:4 PROGRAM ELEMENT: 0603563N PROJECT NUMBER: S2196
PROGRAM ELEMENT TITLE: Ship Concept Advanced Design PROJECT TITLE: Design Tools, Plans & Concepts

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Support and Management | | | | | | | | | | | |
| TRW | CPAF | 7/96 | N/A | 590 | -- | 590 | -- | -- | -- | 0 | 590 |
| Various Govt. Activities | Various | Various | N/A | N/A | -- | 135 | -- | -- | -- | 0 | 135 |
| Test and Evaluation | | | | | | | | | | | |
| Various Contractors | Various | Various | N/A | N/A | -- | 344 | -- | -- | -- | 0 | 344 |
| Various Govt. Activities | Various | Various | N/A | N/A | -- | 1,050 | -- | -- | -- | 0 | 1,050 |

GOVERNMENT FURNISHED PROPERTY - Not applicable.

| | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 32,325 | 52,827 | 13,013 | 16,198 | 22,254 | CONT. | CONT. |
| Subtotal Support and Management | 0 | 725 | 0 | 0 | 0 | 0 | 725 |
| Subtotal Test and Evaluation | 0 | 1,394 | 0 | 0 | 0 | 0 | 1,394 |
| SBIR assessment | | | 229 | | | | |
| Total Project | 32,325 | 54,946 | 13,242 | 16,198 | 22,254 | CONT. | CONT. |

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603564N
PROGRAM ELEMENT TITLE: Ship Preliminary Design and Feasibility Studies

(U) COST (Dollars in thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| S0408 Ship Feasibility Studies | 10,034 | 12,377 | 3,848 | 2,062 | 10,555 | 5,702 | 4,214 | 5,528 | CONT. | CONT. |
| S2300 CV Feasibility Studies | 0 | 0 | 34,834 | 43,013 | 15,612 | 0 | 0 | 0 | 0 | 93,459 |
| TOTAL | 10,034 | 12,377 | 38,682 | 45,075 | 26,167 | 5,702 | 4,214 | 5,528 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The primary objective of Ship Preliminary Design and Feasibility Studies is to design more capable warships at reduced cost, with reduced manning and increased producibility, utilizing the latest technologies. Modern day ship design and acquisition processes do not separate Preliminary and Contract Design. These are seamless design actions conducted between MS I and II. Therefore after FY 1996, design activities formerly conducted in this Program Element (P.E.) as Preliminary Design are combined under P.E. 0604567N, Ship Contract Design/Live Fire Test and Evaluation. After FY 1996, the program will be renamed "Ship Feasibility Studies". This program directly supports the Navy Shipbuilding Plan by performing ship Feasibility Studies and developing Preliminary Designs for new ships in the SCN Plan.

(U) Project S0408 - Ship Development (Advanced), supports post Milestone 0 ship Feasibility Studies that provide the technical definition and initial cost estimates for various ship alternatives being considered in the Cost and Operational Effectiveness Analysis (COEA). This project develops the primary supporting documentation for Milestone I decisions.

(U) Project S2300 - CV Feasibility Studies support post Milestone 0 ship Feasibility Studies that provide the technical definition and initial cost estimates for various ship alternatives being considered in the Cost and OperationaEffectiveness Analysis (COEA). This project supports interim Operational Requirements Document (ORD) preparation and develops the primary supporting documentation for Milestone I decisions.

(U) JUSTIFICATION FOR BUDGET ACTIVITY. This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603564N PROJECT NUMBER: S0408
PROGRAM ELEMENT TITLE: Ship Preliminary Design and Feasibility Studies PROJECT TITLE: Ship Feasibility Studies

(U) COST (Dollars in thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| S0408 Ship Development (Advanced) | 10,034 | 12,377 | 3,848 | 2,062 | 10,555 | 5,702 | 4,214 | 5,528 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Ship concepts, identified in PE 0603563N (Ship Concept Advanced Design) are transitioned to and further developed by this project after an approved Milestone 0 (MS 0) decision. This project performs the ship Feasibility Studies required after MS 0 to address a specific Mission Needs Statement (MNS) and supports the Cost and Operational Effectiveness Analysis (COEA) for new surface ships in the Navy Shipbuilding Plan; performs impact studies of warfare, hull, machinery and electrical subsystems on advanced ship designs; develops the initial documentation and the design methodology required by government for the design of surface ships in the Shipbuilding Program in accordance with the requirements of the DoD 5000 directives/instructions; supports the development of the Operational Requirements Document (ORD) and other documentation required at Milestone I; develops and evaluates conventional and unconventional hull form alternatives suitable for future acquisition in support of a Milestone I decision. Completion of this phase allows review and approval, at Milestone I, to transfer a ship program to the Contract Design Program Element 0604567N. Ship Feasibility Study products include a description of the alternative ships' principal characteristics and mission critical subsystems, weight estimates, general arrangement sketches, technical risk assessments, and Class F cost estimates. The objective is to provide the decision makers with feasible, affordable alternatives.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

- (U) ($10,034) Conducted Ship Feasibility Studies and COEA studies and supported ORD preparation for ships in the SCN plan which reached MS 0. Feasibility Studies for the Future Surface Combatant (SC-21) continued. $661K of forward funded FY 1995 funds also supported the SC-21 Feasibility Studies effort. ADC(X) received MS 0 approval in the first quarter. ADC(X) Feasibility Studies and COEA support began.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603564N PROGRAM ELEMENT TITLE: Ship Preliminary Design and Feasibility Studies PROJECT NUMBER: S0408 PROJECT TITLE: Ship Feasibility Studies

2. (U) FY 1997 PLAN:

- (U) ($12,173) Conduct Ship Feasibility Studies, COEA analysis and support ORD preparation for ships in the SCN plan which reach MS 0. Feasibility Studies, COEA analysis and documentation preparation for the 21st Century Surface Combatant (SC-21) will complete in the fourth quarter to support a planned FY 97 Milestone I Decision. Expand ADC(X) Feasibility Studies and COEA support to include the Fleet Oiler AOE(X). Rename the ADC(X)/AOE(X) effort as the AOE(X).
- (U) ($204) Portion of Extramural Program reserved for Small Business Innovation Research assessment in accordance with 15 U.S.C. 638

3. (U)FY 1998 PLAN:

(U) ($3,848) Complete AOE(X) Ship Feasibility Studies, COEA support and preparation of documentation required for the planned FY 98 Milestone I decision.

4. (U)FY 1999 PLAN:

- (U) ($2,062) Feasibility Studies and COEA support will begin for a new class of helicopter carrier, LH(X) following a Milestone 0 decision.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603564N PROJECT NUMBER: S0408
PROGRAM ELEMENT TITLE: Ship Preliminary Design and Feasibility Studies PROJECT TITLE: Ship Feasibility Studies

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 9,210 | 12,942 | 5,422 | 6,618 |
| (U) Adjustments from FY 1997 PRESBUDG: | 824 | -565 | -1,574 | -4,556 |
| (U) FY 1998/99 PRESBUDG Budget Submit | 10,034 | 12,377 | 3,848 | 2,062 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1996 increase due to SC-21 COEA. FY 1997 decrease due to undistributed general reductions. FY 1998 and FY 1999 decreases due to program restructuring and NWCF rate adjustments.

(U) Schedule: Schedules have changed to reflect the latest shipbuilding schedule.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:

(U) PE 0603563N (Ship Concept Advanced Design)
(U) PE 0604567N (Ship Contract Design/Live Fire T&E)
(U) PE 0603508N (Ship Propulsion System)
(U) PE 0603513N (Shipboard Systems Component Development)
(U) PE 0602121N (Surface Ship Technology)
(U) PE 0603573N (Advanced Surface Mac hinery Systems)

D. (U) SCHEDULE PROFILE:

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603564N PROJECT NUMBER: S0408
PROGRAM ELEMENT TITLE: Ship Preliminary Design and Feasibility Studies PROJECT TITLE: Ship Feasibility Studies

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| Program Milestones | 1Q ADC(X) MS O | 4Q SC-21 MS I | 4Q AOE(X)MS I | 1Q LH(X) MS 0 |
| Engineering Milestones | TBD - Milestone schedule is established at MS I. | | | |
| T&E Milestones | See individual ship acquisition program documentation. | | | |
| Contract milestones | See individual ship acquisition program documentation. | | | |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603564N PROJECT NUMBER: S0408
PROGRAM ELEMENT TITLE: Ship Preliminary Design and Feasibility Studies PROJECT TITLE: Ship Feasibility Studies

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| PROJECT COST CATEGORIES | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a.Ship Design Feasibility Studies | 9,993 | 12,262 | 3,818 | 2,032 |
| b.Travel | 41 | 115 | 30 | 30 |
| c. | | | | |
| d. | | | | |
| TOTAL | 10,034 | 12,377 | 3,848 | 2,062 |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603564N PROGRAM ELEMENT TITLE: Ship Preliminary Design and Feasibility Studies PROJECT NUMBER: S0408 PROJECT TITLE: Ship Feasibility Studies

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | | |
| Naval Surface Warfare Center Dahlgren Dahlgren VA | WR | Various | CONT. | CONT. | 2,028 | 3,182 | 3,318 | 500 | 350 | CONT. | CONT. |
| Other Government | WR/Reqn | Various | CONT. | CONT. | 2,546 | 1,801 | 2,314 | 1,337 | 700 | CONT. | CONT. |
| Aplied Physics Laboratory Laurel, MD | Comp | Various | CONT. | CONT. | 1,720 | 1,915 | 3,304 | 0 | 0 | CONT. | CONT. |
| Other Contractor | Comp | Various | CONT. | CONT. | 3,139 | 3,016 | 3,291 | 2,011 | 1,012 | CONT. | CONT. |
| Support and Management | | | | | | | | | | | |
| Various | Comp | Various | CONT. | CONT. | 55 | 120 | 150 | 0 | 0 | CONT. | CONT. |
| Test and Evaluation | | | | | | | | | | | |

GOVERNMENT FURNISHED PROPERTY: (Not applicable)

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603564N PROJECT NUMBER: S0408
PROGRAM ELEMENT TITLE: Ship Preliminary Design and Feasibility Studies PROJECT TITLE: Ship Feasibility Studies

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands) Continued

| | FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 9,433 | 9,914 | 12,227 | 3,848 | 2,062 | CONT. | CONT. |
| Subtotal Support and Management | 55 | 120 | 150 | 0 | 0 | CONT. | CONT. |
| Subtotal Test and Evaluation | | | | | | | |
| Total Project | 9,488 | 10,034 | 12,377 | 3,848 | 2,062 | CONT. | CONT. |

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603564N PROJECT NUMBER: S2300
PROGRAM ELEMENT TITLE: Ship Preliminary Design and Feasibility Studies PROJECT TITLE: CV Feasibility Studies

(U) COST (Dollars in thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| S2300 CV Feasibility Studies | 0 | 0 | 34,834 | 43,013 | 15,612 | 0 | 0 | 0 | 0 | 93,459 |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project performs the ship Feasibility Studies required after Milestone 0 (MS 0) to address a specific Mission Needs Statement (MNS) and supports the Cost and Operational Effectiveness Analysis (COEA) for the Future Carrier (CVX) Program; performs impact studies of aircraft/air wing composition, propulsion, hull alternatives, combat systems, machinery and electrical subsystems, and cost on CVX designs; supports the development of the Operational Requirements Document (ORD) and other documentation required at Milestone I. Completion of this phase allows review and approval, at Milestone I, to transfer a ship program to the Contract Design Program Element 0604567N. Ship Feasibility Study products include a description of the alternative ships' principal characteristics and mission critical subsystems, weight estimates, general arrangement sketches, technical risk assessments, and Class F cost estimates. The objective is to provide the decision makers with feasible, affordable alternatives.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS: Not applicable.
2. (U) FY 1997 PLAN: Not applicable.
3. (U) FY 1998 PLAN:

- (U) ($26,000) Commence ship feasibility studies and support ORD preparation for the CVX. (11/97-6/98)
- (U) ($3,834) Utilize existing and developmental commercial and government hardware and software, and develop interfaces where required, to enable rapid visualization and analysis of future carrier systems and ship concepts through development of virtual prototypes. ((11/97-6/98)

- (U) ($5,000) Provide CVX COEA engineering support. (11/97-6/98)

4. (U) FY 1999 PLAN:

- (U) ($32,000) Continue Ship Feasibility Studies and ORD preparation for CVX. (11/97-6/98)

- (U) ($ 6,013) Utilize existing and developmental commercial and government hardware and software, and develop interfaces where required, to enable rapid visualization and analysis of future carrier systems and ship concepts through development of virtual prototypes. (11/97-6/98)

- (U) ($ 5,000) Continue COEA engineering support for CVX. (11/97-6/98)

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603564N PROJECT NUMBER: S2300
PROGRAM ELEMENT TITLE: Ship Preliminary Design and Feasibility Studies PROJECT TITLE: CV Feasibility Studies

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 0 | 0 | 0 | 0 |
| (U) Adjustments from FY 1997 PRESBUDG: | 0 | 0 | +34,834 | +43,013 |
| (U) FY 1998/99 PRESBUDG Submit: | 0 | 0 | 34,834 | 43,013 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1998 and FY 1999 changes due to CV(X) efforts.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:

(U) PE 0604567N (Ship Contract Design/Live Fire T&E)

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603564N
PROGRAM ELEMENT TITLE: Ship Preliminary Design and Feasibility Studies

PROJECT NUMBER: S2300
PROJECT TITLE: CV Feasibility Studies

D. (U) SCHEDULE PROFILE:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| Program Milestones | 2Q CVX JROC<br>2Q CVX MS0 | | | |
| Engineering Milestones | TBD - Milestone schedule is established at MS I | | | |
| T&E Milestones | See Individual ship acquistion program documentation. | | | |
| Contract Milestones | See individual ship acquistion program documentation. | | | |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603564N PROJECT NUMBER: S2300
PROGRAM ELEMENT TITLE: Ship Preliminary Design and Feasibility Studies PROJECT TITLE: CV Feasibility Studies

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| PROJECT COST CATEGORIES | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. System Engineering | | | 34,334 | 42,438 |
| b. Travel | | | 50 | 75 |
| c. Miscellaneous | | | 450 | 500 |
| d. | | | | |
| TOTAL | | | 34,834 | 43,013 |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603564N PROJECT NUMBER: S2300
PROGRAM ELEMENT TITLE: Ship Preliminary Design and Feasibility Studies PROJECT TITLE: CV Feasibility Studies

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

| PERFORMING ORGANIZATIONS Contractor / Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | | |
| NAVSURFWARCEN, Carderock Division, Bethesda, MD | WR | Oct 97 | CONT. | CONT. | 0 | 0 | 0 | 2,000 | 3,000 | CONT. | CONT. |
| NAVSURFWARCEN, Ship Systems Engineering Station, Philadelphia, PA | WR | Oct 97 | CONT. | CONT. | 0 | 0 | 0 | 500 | 500 | CONT. | CONT. |
| NAVSURFWARCEN, Dahlgren Division, Dahlgren, VA | WR | Oct 97 | CONT. | CONT. | 0 | 0 | 0 | 1,000 | 2,000 | CONT. | CONT. |
| NAVSURFWARCEN, Port Hueneme Division, Port Hueneme, CA | WR | Oct 97 | CONT. | CONT. | 0 | 0 | 0 | 100 | 100 | CONT. | CONT. |
| NAVAIRWARCEN, Aircraft Division, Lakehurst, NJ | WR | Oct 97 | CONT. | CONT. | 0 | 0 | 0 | 1,000 | 2,000 | CONT. | CONT. |
| NCCOSC Research and Development Division, San Diego, CA | WR | Oct 97 | CONT. | CONT. | 0 | 0 | 0 | 2,000 | 3,000 | CONT. | CONT. |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603564N PROJECT NUMBER: S2300
PROGRAM ELEMENT TITLE: Ship Preliminary Design and Feasibility Studies PROJECT TITLE: CV Feasibility Studies

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| NAVAL Research Laboratory, Washington, DC WR | | Oct 97 | CONT. | CONT. | 0 | 0 | 0 | 2,000 | 3,000 | CONT. | CONT. |
| John J Mcmullen Assoc., Arlington, VA | Contr | Oct 97 | CONT. | CONT. | 0 | 0 | 0 | 2,000 | 2,000 | CONT. | CONT. |
| Advanced Marine Enterprises, Inc., Arlington, VA | Contr | Oct 97 | CONT. | CONT. | 0 | 0 | 0 | 2,000 | 2,000 | CONT. | CONT. |
| George G. Sharp, Inc., Arlington, VA | Contr | Oct 97 | CONT. | CONT. | 0 | 0 | 0 | 1,000 | 1,000 | CONT. | CONT. |
| M. Rosenblatt & Son, Inc., Arlington, VA | | Oct 97 | CONT. | CONT. | 0 | 0 | 0 | 1,000 | 1,000 | CONT. | CONT. |
| | Contr | Oct 97 | CONT. | CONT. | 0 | 0 | 0 | 19,234 | 22,413 | CONT. | CONT. |
| Contractors | Contr | Oct 97 | CONT. | CONT. | 0 | 0 | 0 | 1,000 | 1,000 | CONT. | CONT. |
| Miscellaneous Support and Management | Misc. | | | | | | | | | | |
| Test and Evaluation | | | | | | | | | | | |

GOVERNMENT FURNISHED PROPERTY: (Not applicable).

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603564N PROJECT NUMBER: S2300
PROGRAM ELEMENT TITLE: Ship Preliminary Design and Feasibility Studies PROJECT TITLE: CV Feasibility Studies

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands) Continued

| | FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 0 | 0 | 0 | 34,834 | 43,013 | | |
| Subtotal Support and Management | | | | | | | |
| Subtotal Test and Evaluation | | | | | | | |
| Total Project | 0 | 0 | 0 | 34,834 | 43,013 | | |

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603570N
PROGRAM ELEMENT TITLE: Advanced Nuclear Power Systems

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| S1258 Nuclear Technology Development | 44,996 | 38,848 | 39,965 | 38,065 | 39,140 | 39,917 | 40,787 | 41,722 | CONT. | CONT. |
| S2158 S9G Nuclear Propulsion Plant Development | 93,416 | 87,715 | 85,392 | 81,869 | 40,031 | 31,053 | 29,741 | 24,890 | 15,105 | 631,779 |
| TOTAL | 138,412 | 126,563 | 125,357 | 119,934 | 79,171 | 70,970 | 70,528 | 66,612 | CONT. | CONT. |

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Work is directed toward the design, development and test of new and improved components and their related systems for use in nuclear propulsion plants. The intent is to develop safe, reliable, high-performance, long-life nuclear propulsion plants, systems, and components. Work includes development of propulsion plant arrangements, components, and materials, plant analysis and [classified material deleted] for future fleet application, as well as development of a nuclear propulsion plant for a New Attack Submarine.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603570N
PROGRAM ELEMENT TITLE: Advanced Nuclear Power Systems

(U) COST (Dollars in thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| S1258 Nuclear Technology Development | 44,996 | 38,848 | 39,965 | 38,065 | 39,140 | 39,917 | 40,787 | 41,722 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The purpose is to develop safe, reliable, high-performance, long-life nuclear propulsion plant systems and components. Work is directed towards developing and applying the technology, methods, and materials necessary for designing, developing and testing new and improved components, systems and controls for use in nuclear propulsion plants.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

(U) ($16,875) Developed designs for [classified material deleted] instrumentation and control equipment to reduce replacement/upgrade costs and improve reliability. Began designing and testing new, less complicated instrumentation and control displays to improve operator response times. Developed engineering models for improved [classified material deleted].

(U) ($6,471) Developed conceptual and detailed designs of advanced technology electrical distribution components. Developed and tested designs for power electronic conversion, conditioning and control equipment. Developed the design for a [classified material deleted].

(U) ($4,250) Developed advanced analysis methods for evaluating the effectiveness of new propulsion plant component and system designs, and applicable materials. Tested and evaluated component designs to determine their susceptibility to the adverse effects of vibration, high temperature, pressure, and irradiation. Developed methods for shock-testing new plant arrangements and mounting techniques, and evaluating subsequent data.

(U) ($6,400) Continued to develop more reliable and higher performing propulsion plant fluid system and component designs. Developed and tested applications for [classified material deleted]. [classified material deleted].

(U) ($11,000) Continued developing new [heat exchanger] designs and technology required for more compact [classified material deleted]. Conducted long-term thermal/hydraulic and corrosion testing to confirm [classified material deleted]. Evaluated materials through stress-corrosion, corrosion-fatigue and fracture toughness tests to validate required properties.

2. (U) FY 1997 PLAN:

(U) ($17,348) Develop advanced technology [classified material deleted] instrumentation and control equipment and system designs. Develop and compatibility test [classified material deleted] instrumentation and control [classified material deleted]. Continue developing and testing new, less complicated designs for data displays to improve operator response times. Develop and test propulsion plant [classified material deleted] systems and an [classified material deleted]. Continue development of [classified material deleted] to improve propulsion plant [classified material deleted].

(U) ($3,800) Continue to develop and test advanced technology [classified material deleted] designs. Test [classified material deleted].

(U) ($3,700) Continue to develop and test advanced analysis methods for propulsion plant component and system designs, and applicable materials. Continue to test and evaluate the susceptibility of component designs to the adverse effects of shock, vibration, high temperature, pressure and irradiation [classified material deleted]. Evaluate structural materials which enable development of more optimal, lighter, and less costly propulsion plant designs.

(U) ($4,900) Develop improved propulsion plant fluid system and component designs. Test and qualify designs of fluid system components constructed from [classified material deleted].

(U) ($9,100) Continue to develop more efficient [classified material deleted] technology. Perform structural analysis of [classified material deleted]. Conduct long-term thermal/hydraulic and corrosion testing to confirm [classified material deleted]. Subject [classified material deleted] materials to stress-corrosion, corrosion-fatigue and fracture-toughness tests to demonstrate structural material properties. [classified material deleted]

3. FY 1998 Plan:

(U) ($18,717) Conduct compatibility testing of [classified material deleted] instrumentation and control equipment, [classified material deleted] Continue to develop and qualify [classified material deleted] Examine multi-media technologies to coordinate text and graphics in propulsion plant displays. Initiate [classified material deleted] propulsion plant [classified material deleted] development using [classified material deleted] Continue testing [classified material deleted]

(U) ($4,500) Test and qualify an [classified material deleted] Continue to develop and qualify [classified material deleted] Develop an [classified material deleted] Fabricate and test electric plant control system hardware. Initiate development and testing of an [classified material deleted]

(U) ($3,548) Continue testing of [classified material deleted] analysis and computer modelling methods to [classified material deleted] Apply [classified material deleted] concepts to developing and evaluating [classified material deleted] Conduct [classified material deleted] testing to determine the effects of corrosion, embrittlement, environmentally assisted cracking and irradiation on component materials.

(U) ($5,800) [classified material deleted] Develop [classified material deleted] Qualify [classified material deleted] Continue to develop [classified material deleted] Fabricate a [classified material deleted]

(U) ($7,400) Continue to develop [classified material deleted] lower life-cycle costs. Perform fundamental performance and structural analysis of a manufacturing demonstration unit. Inspect and evaluate [classified material deleted] test specimens undergoing [classified material deleted] to qualify [classified material deleted] Perform [classified material deleted] fracture-toughness, stress corrosion cracking and baseline testing. [classified material deleted] Develop advanced [classified material deleted]

4. FY 1999 Plan:

(U) ($16,994) Develop engineering model of a [classified material deleted] Continue [classified material deleted] testing of [classified material deleted] design. Conduct [classified material deleted] qualification testing. Continue exploring multi-media technologies to coordinate text and graphics displays. Continue [classified material deleted] development. Qualify [classified material deleted] Continue [classified material deleted]

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603570N PROGRAM ELEMENT TITLE: Advanced Nuclear Power Systems PROJECT NUMBER: S1258 PROJECT TITLE: Nuclear Technology Development

(U) ($5,471) Continue to develop [classified material deleted] [classified material deleted] design of [classified material deleted] Finalize [classified material deleted] and fabricate and begin testing engineering model. Continue testing [classified material deleted] hardware and incorporate resulting design changes. Continue to develop and test [classified material deleted] Develop and conduct breadboard testing of [classified material deleted] Begin developing [classified material deleted]

(U) ($3,300) Qualify and [classified material deleted] to propulsion plant [classified material deleted] Continue to design, develop and evaluate [classified material deleted] Continue [classified material deleted] testing to determine the effects of corrosion, embrittlement, environmentally assisted cracking and irradiation on component materials.

(U) ($6,200) Develop [classified material deleted] to [classified material deleted] in propulsion plant [classified material deleted] Perform qualification testing of [classified material deleted] Utilize improved [classified material deleted] and incorporate [classified material deleted] into propulsion plant [classified material deleted] Continue to [classified material deleted] Conduct [classified material deleted] testing of [classified material deleted]

(U) ($6,100) Continue to [classified material deleted] Evaluate and improve [classified material deleted] inspection and process techniques, and fabricate mockups and demonstration hardware for [classified material deleted] Continue to develop and test [classified material deleted] for [classified material deleted] Continue to develop [classified material deleted ]

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603570N PROGRAM ELEMENT TITLE: Advanced Nuclear Power Systems PROJECT NUMBER: S1258 PROJECT TITLE: Nuclear Technology Development

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 44,647 | 40,506 | 39,297 | 37,733 |
| (U) Adjustments from FY 1997 PRESBUDG | +349 | -1,658 | +668 | +332 |
| (U) FY 1998/1999 PRESBUDG Submit: | 44,996 | 38,848 | 39,965 | 38,065 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1996 adjustment reflects a below threshhold reprogramming and a respread of the Jordanian F-16 rescission. FY 1997 adjustment reflects undistributed Congressional budget reductions. FY 1998 adjustment reflects minor revisions to cost estimates, the respread of various issues, and revised inflation rate estimates. FY 1999 adjustments reflect minor revisions to cost estimates, the respread of various issues, and revised inflation rate estimates.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:
(U) PE 0205675N (Operational Nuclear Power Systems)

D. (U) SCHEDULE PROFILE: Not applicable.

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603570N
PROGRAM ELEMENT TITLE: Advanced Nuclear Power Systems

PROJECT NUMBER: S1258
PROJECT TITLE: Nuclear Technology Development

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Instrumentation and Control Technology | 16,875 | 17,348 | 18,717 | 16,994 |
| b. Power Distribution Technology | 6,471 | 3,800 | 4,500 | 5,471 |
| c. Component/System Performance Measurement, Analysis, and Advancement | 4,250 | 3,700 | 3,548 | 3,300 |
| d. Fluid Systems Technology/Noise Reduction | 6,400 | 4,900 | 5,800 | 6,200 |
| e. Heat Transfer Technology | 11,000 | 9,100 | 7,400 | 6,100 |
| Total | 44,996 | 38,848 | 39,965 | 38,065 |

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION: Not applicable.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603570N
PROGRAM ELEMENT TITLE: Advanced Nuclear Power Systems

(U) COST (Dollars in thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| S2158 S9G Nuclear Propulsion Plant Development | 93,416 | 87,715 | 85,392 | 81,869 | 40,031 | 31,053 | 29,741 | 24,890 | 15,105 | 631,779 |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This effort develops the components and systems applicable to the nuclear propulsion plant for a new design SSN. Work is directed toward design, development, and testing of plant arrangements, heat transfer equipment, fluid systems, instrumentation and control equipment, and power distribution systems, with emphasis on simplifying and exploiting existing technology.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

(U) ($13,105) Continued developing plant arrangements and foundations, [classified material deleted] Built mock-ups of plant configurations to ensure feasibility of overall plant arrangement.

(U) ($13,840) Conducted testing to ensure design meets goals for [classified material deleted] Conducted shielding design analyses. Began development of [classified material deleted]

(U) ($15,482) Conducted [classified material deleted] Commenced [classified material deleted] and began long-term performance, structural, and [classified material deleted] testing necessary to confirm design performance, evaluate [classified material deleted] and qualify component designs.

(U) ($26,667) Continued fluid transfer and control equipment development and qualification resulting in simplified fluid systems and components such as an advanced main coolant pump, coolant loops, main seawater pump, main condenser, and valves; conducted design efforts for simplified propulsion plant fluid and steam systems and components. [classified material deleted] Fabricated test units and began qualification testing.

(U) ($14,682) Continued design of plant specific instrumentation and control equipment such as control panels, rod control instrumentation, and nuclear instrumentation [classified material deleted] Conducted qualification testing of instrumentation and control engineering models.

(U) ($9,640) Further developed power generation/distribution components and systems. Continued equipment qualification testing. Incorporated test results into design efforts as appropriate. Conducted system compatibility testing.

2. (U) FY 1997 PLAN:

(U) ($13,821) Continue plant arrangement efforts for [classified material deleted] Construct a full-sized plant configuration mock-up to verify feasibility of overall plant arrangement. Assess major equipment arrangement in relation to the overall propulsion plant arrangement.

(U) ($17,120) Test individual systems and subassemblies [classified material deleted] Continue development of an integrated propulsion plant test program and begin development of test systems. Begin to develop test program performance predictions.

(U) ($11,515) Carry out [classified material deleted] development and associated performance, structural, shock, and [classified material deleted] testing necessary to provide design confirmation, [classified material deleted] and verify component design performance. Continue [classified material deleted] and conduct structural analyses [classified material deleted]

(U) ($17,481) Continue to design and qualify fluid transfer and control equipment, resulting in simplified fluid systems and components. Test engineering models to verify performance predictions. Identify needed improvements, determine necessary design changes, and resolve testing deficiencies. Develop detailed system drawings. Develop operating procedures and plant manuals.

(U) ($13,256) Complete qualification testing of engineering models for rod control system, rod position indication system and protection instrumentation system. Begin fabrication of instrumentation and control preproduction units. Conduct qualification testing of primary plant control panel, valve and heater control cabinet, and [classified material deleted] [classified material deleted] Identify necessary changes to production equipment designs.

(U) ($14,522) Continue qualification and compatibility testing for power generation/distribution components and systems [classified material deleted] Conduct shock, vibration, and high power electrical tests. Incorporate test findings into designs. Begin fabricating preproduction components. Develop electrical distribution control panel.

3. (U) FY 1998 PLAN:

(U) ($15,092) Conduct [classified material deleted] analyses to confirm adequacy of plant arrangement, piping, deck structures, and aft bulkhead. Continue full-sized plant configuration mockup construction including [classified material deleted] The propulsion plant arrangement will [classified material deleted]

(U) ($22,600) Continue [classified material deleted] testing of systems [classified material deleted] Continue to develop integrated propulsion plant test systems which will be used to confirm acceptability of plant design. Complete development of test program performance predictions. Complete developing test procedures which precede core loading and begin developing test procedures which follow core loading.

(U) ($7,600) Confirm [classified material deleted] efforts and evaluate [classified material deleted] through [classified material deleted] testing. Complete [classified material deleted]

(U) ($12,600) Continue fluid transfer and control system design effort. Identify needed improvements, determine necessary system design changes, and resolve testing deficiencies. Develop detailed drawings for those systems which have been finalized in full-scale mockups. Continue operating procedure and plant manual development.

(U) ($13,100) Complete fabrication of instrumentation and control preproduction units and commence testing. Conduct compatibility testing to validate integrated system performance and electrical interface between [classified material deleted] Identify necessary changes to production equipment designs. Develop instrumentation and control technical manuals.

(U) ($14,400) Conduct power generation/distribution system compatibility testing to validate electrical interfaces between power generation/distribution components. Complete [classified material deleted] Complete fabrication and commence testing of [classified material deleted] control panel. Incorporate test results into production designs.

4. (U) FY 1999 PLAN:

(U) ($16,610) Continue [classified material deleted] analyses to confirm adequacy of [classified material deleted] Complete initial construction of a full-size plant configuration mockup to verify feasibility of overall plant arrangement. Incorporate changes needed to equipment and system designs identified during construction of the full-sized propulsion plant mockup. Update plant arrangement and systems designs as necessary to reflect changes made during ship construction.

(U) ($26,659) Continue testing systems [classified material deleted] to ensure plant design meets goals. Complete development of integrated propulsion plant test systems which will be used to confirm the acceptability of the plant design. Complete development of test procedures which follow core loading and start development of all criticality and sea-trial test procedures. Conduct [classified material deleted]

(U) ($6,700) Continue [classified material deleted] performance and [classified material deleted] testing and [classified material deleted] evaluations. Complete [classified material deleted] testing. Continue [classified material deleted]

(U) ($11,700) Analyze fluid systems test results, determine necessary systems design changes, and resolve testing deficiencies. Prepare final detailed system designs. Complete detailed system drawings. Continue operating procedure and plant manual development.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603570N PROGRAM ELEMENT TITLE: Advanced Nuclear Power Systems PROJECT NUMBER: S2158 PROJECT TITLE: S9G Nuclear Propulsion Plant Development

(U) ($12,700) Continue testing instrumentation and control preproduction units and incorporate test results into production designs. Continue compatibility testing to validate integrated system performance and electrical interface between major instrumentation and control systems. Continue instrumentation and control technical manual development.

(U) ($7,500) Continue power generation/distribution system compatibility testing to validate electrical interface between power generation/distribution components. Develop technical manuals for electrical distribution control console [classified material deleted]

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 92,723 | 91,459 | 83,985 | 81,091 |
| (U) Adjustments from FY 1997 PRESBUDG | +693 | -3,744 | +1,407 | +778 |
| (U) FY 1998/1999 PRESBUDG Submit: | 93,416 | 87,715 | 85,392 | 81,869 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1996 adjustment reflects a below threshhold reprogramming and the respread of the Jordanian F-16 rescission. FY 1997 adjustment reflects undistributed Congressional budget reductions. FY 1998 adjustment reflects minor revisions to cost estimates, the respread of various issues, and revised inflation rate estimates. FY 1999 adjustments reflect minor revisions to cost estimates, the respread of various issues, and revised inflation rate estimates.

(U) Schedule: Not applicable.
(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:
(U) PE 0205675N (Operational Nuclear Power Systems)

D. (U) SCHEDULE PROFILE: Not applicable.

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603570N
PROGRAM ELEMENT TITLE: Advanced Nuclear Power Systems
PROJECT NUMBER: S2158
PROJECT TITLE: S9G Nuclear Propulsion Plant Development

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Plant Arrangements | 13,105 | 13,821 | 15,092 | 16,610 |
| b. Plant Integration | 13,840 | 17,120 | 22,600 | 26,659 |
| c. Advanced Steam Generator | 15,482 | 11,515 | 7,600 | 6,700 |
| d. Fluid Systems and Components | 26,667 | 17,481 | 12,600 | 11,700 |
| e. Instrumentation and Control | 14,682 | 13,256 | 13,100 | 12,700 |
| f. Power Generation Equipment | 9,640 | 14,522 | 14,400 | 7,500 |
| Total | 93,416 | 87,715 | 85,392 | 81,869 |

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION: Not applicable.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603573N
PROGRAM ELEMENT TITLE: Advanced Surface Machinery Programs

(U) COST: (Dollars in thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| S1314 Advanced Surface Machinery (ASM) Programs | 80,993 | 66,055 | 49,741 | 52,089 | 72,792 | 57,530 | 52,959 | 42,033 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: ASM Programs develop affordable advanced machinery and subsystems for surface ship propulsion, electric and auxiliary requirements. These programs are in various phases of development ranging from concept formulation to full scale development. The goals of the ASM Programs are to: reduce acquisition and operating costs of naval ships; provide military advantages; contribute to American industrial competitiveness; and, lead to environmental compliance. These goals are to be accomplished by leveraging investments in technologies that will be usable by both the military and commercial sectors. Some technologies being developed for military application will have significant commercial viability upon completion of development, while other technologies being developed commercially have significant military applications and will be demonstrated and adapted for military use.

(U) ASM places primary emphasis on a system architecture and a systems engineering approach which maintains flexibility and minimizes investment until technologies are demonstrated, affordability is assessed, trade off decisions are made, and subsystems evaluated and brought together for optimal total ship cost effectiveness. The products of ASM include: InterCooled Recuperated (ICR) Gas Turbine Engine; Standard Monitoring and Control System (SMCS); Integrated Power System (IPS); and, Systems Engineering & Modular Architecture.

(U) ICR Gas Turbine Engine. The ICR Gas Turbine Engine is a next generation marine propulsion gas turbine. ICR will significantly reduce life cycle fuel cost and provide a minimum impact alternative to increase range.

(U) A contract for ICR Advanced Development (AD) with an option for Full Scale Development was awarded to Westinghouse Electric Corporation in December 1991. The ICR is derived from the Rolls-Royce RB211 aircraft engine and through the introduction of an intercooler, recuperator, and variable area nozzles achieves approximately a 30% propulsion fuel savings when compared to the LM2500. The RB211 is a modern commercial aircraft engine with over 2000 engines delivered to date and production projected well into the next century.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603573N
PROGRAM ELEMENT TITLE: Advanced Surface Machinery Programs

PROJECT NUMBER: S1314
PROJECT TITLE: Advanced Surface Machinery Programs

(U) ICR developmental full scale system testing began in July 1994 and is continuing at Pyestock, UK. Recuperator recovery efforts are continuing following the failure in January 1995 of the initial recuperator. A second generation recuperator, which is the exhaust heat recovery unit that provides most of the fuel efficiency gains, was delivered to the test site in December 1995. To date a series of five engine test series have been completed with over 550 hours of successful testing including over 240 hours with the redesigned recuperator which performed satisfactorily. Tests to date have confirmed engine design predictions and fuel savings benefits of recuperation.

(U) Planned Fleet introduction is targeted in FY 03 SC21 class ships. A Cooperative Agreement between the United Kingdom and United States governments was signed by USD(A&T) on 21 June 94 for in-kind and cash contributions to the ICR program. A Cooperative Agreement between the French and United States governments was signed by ASN(RD&A) on 30 August 95 for in-kind and cash contributions to the ICR program. In Feb 94, the Under Secretary of Defense for Acquisition and Technology, USD(A&T) approved an engine Pre-Planned Product Improvement (P3I) for incorporating engine improvements to the DDG51 class to improve fuel efficiency and ensure environmental compliance. Other ship classes are being reviewed for possible ICR installation.

(U) Standard Monitoring and Control System (SMCS). The SMCS integrates the sensing, transmission, interpretation and display of Hull Mechanical and Electrical (HM&E) parameters necessary for machinery control, condition monitoring/ assessment, signature control and damage control management. It is a fully digital, open architecture system based upon commercial specifications and standards. The system design is consistent with the total ship Integrated Communications and Control ($IC^2$) architecture while supporting and implementing the proposed Integrated Condition Assessment System (ICAS) and Damage Control System (DCS). SMCS offers potential to reduce machinery space manning and introduce a standard control system across multiple ship platform classes, taking maximum advantage of open system architecture and industry standards. Based on the results of life cycle cost studies, SMCS is expected to reduce machinery control system procurement costs and total cost of ownership. SMCS supports reduced watchstanding through the use of an embedded Onboard Training System (OBTS).

(U) A contract for SMCS hardware and software necessary for an Advanced Development Model (ADM) was awarded to CAE Corporation in Binghamton, New York in May 1993. SMCS ADM equipment completed testing at the DDG-51 Land Based Engineering Site (LBES) at NSWC-SSES Phila. All core system hardware to software components have successfully controlled the DDG-51 LBES. Integration of Supplemental Systems (DCS, ICAS, and OBTS) is completed. OPTEVFOR completed an operational assessment of SMCS in FY-97 with satisfactory results. SMCS-NT is currently being evaluated as part of the Smartship project.

(U) Zonal Electrical Distribution System (ZEDS). The Zonal Electrical Distribution System is a standard architecture for electrical distribution designed to improve ship producibility and reduce ship acquisition and

construction costs. Initial installations of ZEDS incorporated a zonal electrical distribution architecture in order to achieve major enhancements to producibility by reducing the number of watertight compartment penetrations and facilitate testing by ship construction zones. Initial ship installation was FY 94 DDG 51 class ships. This project has been combined with IPS for future systems concepts utilizing dc distribution with rapid reconfiguration and automated control and forms an integral part of the IPS architecture.

(U) Integrated Power System (IPS). The IPS provides complete ship power management by generating power for all load requirements from any combination of prime movers. IPS employs ICR, SMCS, and ZEDS, plus large scale high power density motors, power electronics, and cost saving power distribution architectures. IPS components and technologies are defined through system effectiveness analyses, which include cost and performance factors. IPS addresses ASM Program goals through: reduced ship acquisition cost through integration of propulsion and ship's service prime movers; lower ship operational costs resulting from more flexible operating characteristics and more efficient components; reduced ship construction costs by allowing more extensive modular construction of power generation, distribution, and loads if desired; improved survivability and vulnerability through increased arrangement flexibility; reduced manning through improved monitoring and control systems and reduced on-board maintenance requirements; improved ship signature characteristics if required; improved design flexibility to meet future requirements of multiple ship types or missions; integrating power control and protection by fully utilizing the power electronics in the system to perform fault protection as well as power conversion and load control functions; and, reduced machinery system acquisition costs through utilization of commercially shared technologies and components. The target application for IPS is the twenty-first century surface combatant. Elements of IPS such as solid state power electronics and variable speed drives on auxiliaries will be integrated in near-term ship acquisition targets.

(U) A contract for IPS Full Scale Advanced Development (FSAD) was awarded to Lockheed-Martin (then Martin Marietta) Ocean, Radar and Sensor Systems, Syracuse, New York in February 1995. IPS FSAD incorporates a commercial marine approach to shipboard power generation, propulsion, and electrical power distribution, employing a commercial industrial-derivative generator and propulsion motor, a developmental propulsion power converter and a zonal direct current (DC) ship service electrical distribution system. The focus of the FSAD effort is on system integration, with maximum use of commercial technology adapted as necessary to satisfy military requirements. The IPS architecture will allow the Navy to incorporate developing technologies such as next generation power electronics such as Power Electronic Building Blocks (PEBB s), fuel cells, permanent magnet electric machines and pulse power systems into future ship designs as programmed, pre-planned replacements or additions for the first generation of IPS modules, with minimum impact on a more efficient and streamlined ship design and construction process.

(U) IPS has the potential to revolutionize the design, construction and operation of U.S. naval ships by using electricity as the primary energy medium aboard ship. IPS reduces the number of installed prime movers to a minimum, as

any power generating unit can supply either propulsion or ship service power to support ship operational priorities at any given time. The flexibility of electric power transmission allows power generating modules with various ower ratings to be connected to propulsion loades and service power converters in whatever arrangement support the ship's mission at lowest overall cost. The ability to independently position the minimum amount of machinery components in small, unmanned modules avoids the need for large engine rooms which in turn will permit greater separation and compartmentation in the ship, with significant benefits in manning, safety and ship survivability over conventional arrangements designs. Additionally, the use of small, unmanned machinery spaces will permit the use of non-CFC based fire extinguishing agents (such as CO2) to be installed as integral fire suppression systems similar to those currently used in fleet propulsion gas turbine enclosures.

(U) Systems Engineering & Modular Architecture. Systems Engineering & Modular Architecture in the ASM Programs are focused on increasing the commonality of components used across ship types and in developing modules which will be integral with standardization, zonal system architectures, and generic shipbuilding strategies. The purpose of increased commonality is to reduce the total cost of ship ownership by using common modules composed of standard components and/or standard interfaces.

(U) ASM modules are being designed to support anticipated ship construction requirements. These modules include Power Generation Modules, Propulsion Motor Modules, Electric Power Transmission/Distribution/Conversion Modules, and Control Modules. Each of these major items consists of numerous sub-modules which, through computer aided design techniques, are integrated as necessary to fulfill unique ship requirements.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

- (U) ($27,154) IPS: Continued development of IPS FSAD including the following efforts: completed design of generator subsystem and propulsion motor subsystem; continued design of the ship service distribution system and its modules; completed design of FSAD software for IPS Supervisory Control and Zonal Control and began to code and test software; conducted FSAD software requiremens review, FSAD software design review, and FSAD software interface req ts review; took delivery of SMCS GFE hardware; and, began design and preparation of IPS FSAD pre-LBES and LBES. Awarded contract for design and fabrication of axial full scale PM propulsion motor.

- (U) ($44,328) ICR: Continued recuperator recovery plan including the design and build of the developmental recuperator which enabled engine testing with a recuperator to continue. Stripped and inspected A/2 and B/2 engines. Started A/3 engine strip and inspection Completed Design Review Number 3 (DR3) using redesigned recuperator. DR3 provided preliminary performance data for the full ICR power range in all modes of operation. Continued ICR system development testing at the Pyestock test facility using B/2 and A/3 engines, tests included airborne noise trials, air system and control system tests, performance demonstration, strain gauge and thermal paint tests and 50 hour endurance test. Continued site preparation and initiated activation of the North American Land-Based Engineering Site at NSWC.

- (U) ($ 3,770) SMCS: Completed propulsion testing on DDG51 LBES. Initiated logistic support development.

- (U) ($ 4,100) Smart Ship: Supported the Smart Ship initiative aboard the USS Yorktown (CG-48) including the following efforts: supported design, manufacture, and test of the Damage Control System (DCS) and Machinery Control System (MCS); provided overall management and coordination between members supplying the DCS, MCS, Integrated Condition Assessment System (ICAS), and shipwide LAN.

- (U) ($ 1,641) Systems Engineering: Performed life cycle costing, producibility studies, manning studies, module development, systems integration, and architecture design in support of ASMP efforts. Provided support to naval architecture and costing teams for SC-21 COEA.

2. (U) FY 1997 PLAN:

- (U) ($41,629) ICR: Complete A/3 strip and inspect, testing of B/3, and B/3 strip and inspect. Build A/4. Complete the first 500hr endurance test using A/4 engine. Complete A/4 strip and inspect. Finalize design of the EDM recuperator. Commence fabrication of EDM recuperator.

- (U) ($21,222) IPS: Continue development of IPS including: Complete manufacturing design and begin manufacture of generator, propulsion motor(s), and propulsion distribution subsystems; complete system design and start detail design of Ship Service Distribution System (SSDS) functional equivalent modules which include the DC power supply and Ship Service Inverter Modules (SSIM) and Ship Service Converter Modules (SSCM); complete IPS

supervisory control and zonal control code and test; complete IPS system and distribution module design reviews; complete FSAD SIM/STIM; and, continue FSAD pre-LBES and LBES site preparation and equipment delivery.

- (U) ($ 1,732) Systems Engineering: Perform life cycle costing, producibility studies, manning studies, module development, systems integration, and architecture design, and other IPS FSED system design/analysis efforts as needed to support development of FSED module specifications. Continue support for SC-21 COEA, CV(X), CVN77, and other possible IPS ship candidates.

- (U) ($ 1,472) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 U.S.C. 638.

3. (U) FY 1998 PLAN:

- (U) ($15,694) IPS: Continue development of IPS including: Complete generator subsystem, propulsion motor(s), and propulsion distribution subsystems fabrication and factory acceptance testing (FAT); complete FSAD SSDS equipment fabrication and factory testing including ship service power supply and SSIM/SSCM; take delivery of SSDS equipment; take delivery of generator, propulsion motor and propulsion distribution subsystems; complete FSAD LBES site preparation; complete INCO of all FSAD equipment; and, begin preparation of FSED procurement documents. Commence FSAD system testing at LBES.

- (U) ($32,297) ICR: Take delivery of EDM recuperator. Modify the exhaust collector, perform testing on B/4 engine, install the EDM recuperator, and perform testing on the A/5 engine. Testing will include high pressure turbine metal temperature measurements on B/4, and functional and performance testing on A/5. Complete strip and inspection of the B/4 engine.

- (U) ($ 1,750) Systems Engineering: Perform life cycle costing, producibility studies, manning studies, module development, systems integration, and architecture design and other IPS FSED system design/analysis efforts as needed to support development of FSED module specifications. Continue support for SC-21 design efforts.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603573N
PROGRAM ELEMENT TITLE: Advanced Surface Machinery Programs
PROJECT NUMBER: S1314
PROJECT TITLE: Advanced Surface Machinery Programs

4. (U) FY 1999 PLAN:

- (U) ($23,297) IPS: Continue development of IPS including: complete FSAD system testing; complete preparation of FSED procurements documents and evaluate proposals for development of IPS FSED ship system modules; award contracts for manufacture; and, begin design/fabrication of FSED modules.

- (U) ($23,892) ICR: Finish the A/5 engine testing began last FY, conduct A/6 engine testing, and perform most of the 500-hour endurance test on engine B/6.

- (U) ($ 1,900) Systems Engineering: Perform life cycle costing, producibility studies, manning studies, module development, systems integration, and architecture design and other IPS FSED system design/analysis efforts as needed to support development of FSED module designs. Continue support for SC-21 design efforts.

- (U) ($3,000) Power Electronic Building Block (PEBB) Demonstration: Initiate detailed design and fabrication of PEBB based IPS power conversion modules (PCM s).

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President s Budget: | 80,256 | 59,773 | 47,292 | 49,813 |
| (U) Adjustments from FY 1997 PRESBUDG: | +737 | +6,282 | +2,449 | +2,276 |
| (U) FY 1998/99 PRESBUDG Submit: | 80,993 | 66,055 | 49,741 | 52,089 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY1996 plus up for DD 1002 (+$2,400K). Reduced by $1,663K for Congressional Undistributed general reductions and minor pricing adjustments. FY 1997 plus up for ICR Land Based Engineering Site ($10,000K); Congressional Undistributed general reductions (-$2,818); and, transfer of SMCS (-$900K). FY 1998 plus up for Ship Design and HM&E (+$4,208) and ICR program adjustment (-$1,400); Congressional and general undistributed adjustments (-$454); NWCF rate adjustment (+$95). FY 1999 plus up for Ship Design and HM&E ($2,900); Undistributed adjustments due to minor pricing and NWCF adjustments (-624K).

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603573N
PROGRAM ELEMENT TITLE: Advanced Surface Machinery Programs
PROJECT NUMBER: S1314
PROJECT TITLE: Advanced Surface Machinery Programs

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

| | FY1996 ACTUAL | FY1997 ESTIMATE | FY1998 ESTIMATE | FY1999 ESTIMATE | FY2000 ESTIMATE | FY2001 ESTIMATE | FY2002 ESTIMATE | FY2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| SCN Line (ICR) - TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | TBD | TBD | TBD |

(U) RELATED RDT&E:
(U) PE 0602121N (Surface Ship Technology)
(U) PE 0603721N (Environmental Protection)
(U) PE 0603508N (Ship Propulsion System)

D. (U) SCHEDULE PROFILE: See Attached

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603573N
PROGRAM ELEMENT TITLE: Advanced Surface Machinery Programs
PROJECT NUMBER: S1314
PROJECT TITLE: Advanced Surface Machinery Programs

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| PROJECT COST CATEGORIES | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. PRIMARY HARDWARE DEVELOPMENT | 74,779 | 60,048 | 45,391 | 49,589 |
| b. SYSTEMS ENGINEERING | 1,641 | 1,732 | 1,750 | 1,900 |
| c. DEVELOPMENTAL T&E | 4,495 | 4,175 | 2,500 | 500 |
| d. TRAVEL | 78 | 100 | 100 | 100 |
| TOTAL | 80,993 | 66,055 | 49,741 | 52,089 |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603573N PROGRAM ELEMENT TITLE: Advanced Surface Machinery Programs

PROJECT NUMBER: S1314 PROJECT TITLE: Advanced Surface Machinery Programs

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | | |
| N0002492C4166 NORTHROP GRUMMAN, SUNNYVALE CA (ICR) | | | | | | | | | | | |
| | C/CPAF | 12/91 | CONT. | CONT. | 192,733 | 42,199 | 40,629 | 31,297 | 22,892 | CONT. | CONT. |
| N0002493C4010 CAE-LINK, BINGHAMPTON NY (SMCS) | | | | | | | | | | | |
| | C/CPAF | 5/95 | 27,247 | 27,247 | 23,432 | 4,711 | 0 | 0 | 0 | 0 | 27,247 |
| N0002492C4207 NEWPORT NEWS, NEWPOT NEWS VA (IPS RSAD) | | | | | | | | | | | |
| | SS/CPFF | 5/92 | 8,319 | 8,319 | 8,319 | 0 | 0 | 0 | 0 | 0 | 8,319 |
| N0002495C4109 LOCKHEED MARTIN, SYRACUSE NY (INTEGRATED POWER SYSTEMS FSAD) | | | | | | | | | | | |
| | C/CPAF | 2/95 | CONT. | CONT. | 6,475 | 20,058 | 14,071 | 10,980 | 2,600 | CONT. | CONT. |
| N0002496C4004 NEWPORT NEWS SHIPBUILDING, NEWPORT NEWS VA (PM MOTORS - AXIAL) | | | | | | | | | | | |
| | C/CPAF | 5/96 | 2,400 | 2,400 | 0 | 2,483 | 0 | 0 | 0 | 0 | 2,400 |
| TBD (INTEGRATED POWER SYSTEMS FSED) | | | | | | | | | | | |
| | C/CPAF | 1Q/99 | TBD | TBD | 0 | 0 | 0 | 0 | 18,100 | CONT. | CONT. |
| TBD (POWER ELECTRONIC BUILDING BLOCK (PEBB) DEMO) | | | | | | | | | | | |
| | C/CPAF | 1Q/99 | TBD | TBD | 0 | 0 | 0 | 0 | 2,700 | CONT. | CONT. |
| NAVSURFWARCEN ANNAPOLIS MD | | | | | | | | | | | |
| | WR | 1Q/96 | CONT. | CONT. | 36,468 | 2,925 | 3,332 | 3,662 | 3,364 | CONT. | CONT. |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603573N
PROGRAM ELEMENT TITLE: Advanced Surface Machinery Programs
PROJECT NUMBER: S1314
PROJECT TITLE: Advanced Surface Machinery Programs

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MISC CONTRACTS (LESS THAN $1M) TOTAL: | | | | | 20,448 | 3,975 | 1,943 | 997 | 1,080 | CONT. | CONT. |
| MISC GOV T ACTIVITIES (LESS THAN $1M) TOTAL: | | | | | 1,164 | 147 | 100 | 0 | 0 | TBD | TBD |
| SMALL BUSINESS INNOVATION RESEARCH IAW 15 U.S.C. 638 | | | | | 0 | 0 | 1,472 | 0 | 0 | | |
| TOTAL PRODUCT DEVELOPMENT: | | | | | 289,039 | 76,498 | 61,547 | 46,936 | 50,736 | CONT. | CONT. |
| Support and Management | Not applicable. | | | | | | | | | | |
| Test and Evaluation | | | | | | | | | | | |
| NAVSURFWARCEN SHIPSYSENGSTA PHILADELPHIA PA | | | | | | | | | | | |
| | WR | 1Q/96 | CONT. | CONT. | 16,791 | 4,495 | 4,508 | 2,805 | 1,353 | CONT. | CONT. |

GOVERNMENT FURNISHED PROPERTY

| Item Description | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Delivery Date | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | Not applicable. | | | | | | | | | |
| Support and Management | Not applicable. | | | | | | | | | |
| Test and Evaluation | Not applicable. | | | | | | | | | |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603573N
PROGRAM ELEMENT TITLE: Advanced Surface Machinery Programs

PROJECT NUMBER: S1314
PROJECT TITLE: Advanced Surface Machinery Programs

| | FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 289,039 | 76,498 | 61,548 | 46,936 | 50,736 | CONT. | CONT. |
| Subtotal Support and Management | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Test and Evaluation | 16,791 | 4,495 | 4,508 | 2,805 | 1,353 | CONT. | CONT. |
| Total Project | 305,830 | 80,993 | 66,055 | 49,741 | 52,089 | CONT. | CONT. |

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603582N PROGRAM ELEMENT TITLE: Combat System Integration PROJECT NUMBER: S0164 PROJECT TITLE: Combat System Integration

(U) COST (Dollars in thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| S0164 Combat System Integration | 6,078 | 3,645 | 7,739 | 9,793 | 9,486 | 9,711 | 9,873 | 10,057 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project provides shore based testing of integrated combat direction, weapon, sensor and computing systems prior to their installation in operational fleet units. The operational computer programs are assembled and tested to assure proper configuration and interoperability in a test environment similar to their ultimate shipboard operational environment. Included is operational assessment testing of the integrated suite of computer programs. This is the only opportunity for this range of testing of individually developed and tested combat system subsystem programs prior to shipboard delivery for operational use. Combat system level configuration control is maintained by updates to the Surface Ship Combat System Master Plan (SSCSMP).

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

- (U) ($3,914) Conducted integration testing of: Advanced Combat Direction System (ACDS) Block 1; ACDS Block 0 improvements and Cooperative Engagement Capability for CV/CVN and LHD 1 classes; AN/SQQ-89 Surface Warfare System upgrades, Rolling Airframe Missile System and Rapid Anti-Ship Missile Integrated Defense System in DD 963 class; and, Command Direction System upgrades in FFG 7 Class.

- (U) ($1,864) Initate design and development of test beds for LPD-17 Class. Continued planning and preparations for out-year testing including simulation system, test bed and test procedures design and development.

- (U) ($300) Continued SSCSMP updates.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603582N PROGRAM ELEMENT TITLE: Combat System Integration PROJECT NUMBER: S0164 PROJECT TITLE: Combat System Integration

2. (U) FY 1997 PLAN:

- (U) ($2,603) Conduct integration testing of: Advanced Combat Direction System (ACDS) Block 1 upgrades and Shipboard Self Defense System in CV/CVN and LHD 1 classes; and, ACDS Block 0 upgrades in LHA 1 class.
- (U) ($754) Initiate design and development of test beds for CVN 68 and CVN 76 Classes and continue for LPD17 Class. Continue planning and preparations for out-year testing including simulation system, test bed and test procedures design and development.
- (U) ($220) Continue SSCSMP updates.
- (U) ($68) Portion of extramural program reserved for Small Business Innovation Research Assessment in accordance with 15 U.S.C. 638.

3. (U) FY 1998 PLAN:

- (U) ($5,645) Conduct integration testing of Advanced Combat Direction System (ACDS) Block 1 upgrades and Integrated Ships Defense System in CV/CVN and LHD 1 classes.
- (U) ($1,819) Continue design and development of test beds for CVN 68, CVN 76 and LPD 17 classes. Continue planning and preparations for out-year testing including simulation system, test bed and test procedures design and development.
- (U) ($275) Continue SSCSMP updates.

4. (U) FY 1999 PLAN:

- (U) ($7,317) Conduct integration testing of Advanced Combat Direction System (ACDS) Block 1 upgrades and Integrated Ships Defense System in CV/CVN, LHD 1 and LHA 1 classes.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603582N PROGRAM ELEMENT TITLE: Combat System Integration PROJECT NUMBER: S0164 PROJECT TITLE: Combat System Integration

- (U) ($2,201) Continue development of test bed for LPD 17 class. Continue planning and preparations for out-year testing including simulation system, test bed and test procedures design and development.
- (U) ($275) Continue SSCSMP updates.

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 5,246 | 3,879 | 5,961 | 7,455 |
| (U) Adjustments from FY 1997 PRESBUDG: | +832 | -234 | +1,778 | +2,338 |
| (U) FY 1998/99 PRESBUDG Submit: | 6,078 | 3,645 | 7,739 | 9,793 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1996: Increase for Integrated Combat System Test Facility(ICSTF): OPNAV BTR for LPD-17 Class ($900) and other minor pricing adjustments (-$68).
FY 1997: Decrease reflects Congressional Undistributed reductions (-$234).
FY 1998: Increase for ICSTF: Critical Non-Aegis Combat System Integration will fully fund scheduled testing. Prior funding levels covered only minimal levels of testing ($1,800) and other minor pricing adjustments (-$22).
FY 1999: Increase for ICSTF: Critical Non-Aegis Combat System Integration will fully fund schedule testing. Prior funding levels covered only minimal levels of testing ($2400) and other minor pricing adjustments (-$62).

(U) Schedule: Weekly testing will be expanded to provide the additional test hours necessary to fulfill the requirements of the increased scope of testing and meet the established fleet delivery schedules.

(U) Technical: Fleet delivery of combat system computer programs which have undergone full interoperability testing.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603582N PROGRAM ELEMENT TITLE: Combat System Integration PROJECT NUMBER: S0164 PROJECT TITLE: Combat System Integration

(U) RELATED RDT&E: Computer programs developed under these programs are tested in their integrated configuration:
- (U) PE 0204571N (Consolidated Training Systems Development)
- (U) PE 0205620N (Surface ASW Combat Systems Integration)
- (U) PE 0603382N (Advanced Combat System Technology)
- (U) PE 0603755N (Ship Self Defense)
- (U) PE 0604301N (MK 92 Fire Control System Upgrade)
- (U) PE 0604372N (New Threat Upgrade)
- (U) PE 0604518N (CIC Conversion)
- (U) PE 0604755N (Ship Self Defense)

D. (U) SCHEDULE PROFILE: Not applicable.

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603582N PROJECT NUMBER: S0164
PROGRAM ELEMENT TITLE: Combat System Integration PROJECT TITLE: Combat System Integration

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| PROJECT COST CATEGORIES | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Integration Testing Test Bed & Simulation | | | | |
| Development | 680 | 305 | 602 | 533 |
| Planning | 656 | 288 | 516 | 428 |
| Procedures | 650 | 342 | 408 | 397 |
| Development | 500 | 301 | 582 | 508 |
| Conduct | 1,646 | 930 | 3,642 | 5,552 |
| Reporting | 310 | 236 | 375 | 457 |
| Configuration Management | 425 | 330 | 422 | 485 |
| Technical Support | 662 | 401 | 621 | 764 |
| b. SSCSMP | 300 | 220 | 275 | 275 |
| c. Travel | 40 | 40 | 40 | 40 |
| d. Miscellaneous | 209 | 252 | 256 | 354 |
| TOTAL | 6,078 | 3,645 | 7,739 | 9,793 |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603582N
PROGRAM ELEMENT TITLE: Combat System Integration
PROJECT NUMBER: S0164
PROJECT TITLE: Combat System Integration

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Progra |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | | |
| N/A | | | | | | | | | | | |
| Support and Management | | | | | | | | | | | |
| N/A | | | | | | | | | | | |
| Test and Evaluation | | | | | | | | | | | |
| Integrated Combat System Test Facility San Diego, Ca. (See Note) | WR | Various | | | 43,258 | 0 | 0 | 0 | 0 | 0 | 0 |
| Naval Surface Warfare Center, Port Hueneme Division Port Hueneme, Ca. | WR | Various | CONT. | CONT. | 51,361 | 4,471 | 2,355 | 6,449 | 8,503 | CONT. | CONT. |
| Applied Physics Laboratory Laurel, MD | SS/FP | 07/95 | 1,075 | 1,075 | 1,075 | 0 | 0 | 0 | 0 | 0 | 1,075 |
| Miscellaneous | Various | Various | CONT. | CONT. | 40,638 | 1,607 | 1,290 | 1,290 | 1,290 | CONT. | CONT. |

Note: In FY 94 Navy reorganizations, Integrated Combat System Test Facility, San Diego Ca. became a division of Naval Surface Warfare Center (NSWC), Port Hueneme Division (PHD), Port Hueneme, Ca. Work Request (WR) funds above include Request for Contractual Procurement (RC) effort at NSWC PHD. Miscellaneous includes contractor support and Program Headquarters Travel.

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603582N PROGRAM ELEMENT TITLE: Combat System Integration PROJECT NUMBER: S0164 PROJECT TITLE: Combat System Integration

GOVERNMENT FURNISHED PROPERTY: Not applicable.

| | FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Tota Progr |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 0 | 0 | 0 | 0 | 0 | | |
| Subtotal Support and Management | 0 | 0 | 0 | 0 | 0 | | |
| Subtotal Test and Evaluation | 136,332 | 6,078 | 3,645 | 7,739 | 9,793 | CONT. | CONT |
| Total Project | 136,332 | 6,078 | 3,645 | 7,739 | 9,793 | CONT. | CONT |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603582N
PROGRAM ELEMENT TITLE: Combat System Integration

PROJECT NUMBER: S0164
PROJECT TITLE: Combat System Integration

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FY 1998 / FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603609N
PROGRAM ELEMENT TITLE: Conventional Munitions

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| S0363 Insensitive Munitions Advanced Development | 7,619 | 9,884 | 10,145 | 12,715 | 15,809 | 16,308 | 16,633 | 17,017 | CONT. | CONT. |
| S2299 Non-Nuclear Expendable Ordnance (NNEO) | 0 | 0 | 1,863 | 2,327 | 1,390 | 924 | 993 | 1,016 | CONT. | CONT. |
| U1821 Conventional Fuze/Warhead Package | 26,531 | 18,394 | 22,182 | 25,166 | 33,071 | 24,517 | 18,885 | 19,320 | CONT. | CONT. |
| TOTAL | 34,150 | 28,278 | 34,190 | 40,208 | 50,270 | 41,749 | 36,511 | 37,353 | CONT. | CONT. |

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: **INSENSITIVE MUNITIONS ADVANCED DEVELOPMENT (IMAD) (Project S0363):** Most Navy munitions react violently when exposed to unplanned stimuli such as fire, shock and bullet impact, thus presenting a great hazard to ships, aircraft, and personnel. This IMAD program will provide, validate and transition technology for explosives, propellants and ordnance to enable production of munitions insensitive to unplanned stimuli with no reduction to combat performance.

**NON-NUCLEAR EXPENDABLE ORDNANCE (NNEO) (Project S2299):** This item addresses improvements to Navy surface launched (2T) non-nuclear expendable ordnance. It supports transition of the Multi-Function Fuze from Engineering and Manufacturing Development (E&MD) to production.

**CONVENTIONAL FUZE/WARHEAD PACKAGE (Project U1821):** The Navy requires improved lethality of air and surface launched ordnance to defeat advanced threats. Current specific requirements and initiatives to address them include: the ability to defeat anti-ship missiles attacking at extremely low altitudes by improving SPARROW Missile through the Missile Homing Improvement Program (MHIP) to counter deceptive countermeasures; demonstrate advance missile fuzing systems to defeat extremely low-altitude and low observable targets with the Advance Threat Fuze; develop advanced integrated guidance/fuzing and warhead mass-focusing systems to increase lethality against current and emerging threats. This project will, in future years, also provide the vehicle to address emergent requirements by transitioning mature fuze and warhead technology from conceptual developments to engineering development with minimum technical and financial risk.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

FY 1998 / FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603609N
PROGRAM ELEMENT TITLE: Conventional Munitions

(U) COST (Dollars in thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| S0363 Insensitive Munitions Advanced Development | 7,619 | 9,884 | 10,145 | 12,715 | 15,809 | 16,308 | 16,633 | 17,017 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

Most Navy munitions react violently when exposed to unplanned stimuli such as fire, shock and bullet impact, thus presenting a great hazard to ships, aircraft and personnel. This program will provide, validate and transition technology to all new weapon developments and priority weapon systems and enable production of munitions insensitive to these stimuli with no reduction in combat performance. The Insensitive Munitions (IM) Advanced Development Program is the Navy's focused effort on propellants, propulsion units, explosives, warheads, fuzes and pyrotechnics to reduce the severity of cook-off and bullet/fragment impact reactions, minimizing the probability for sympathetic detonation, both in normal storage and in use, increasing ship survivability and satisfying performance and readiness requirements. Each technology area is divided into subtasks addressing specific munition/munition class IM deficiencies. Energetic materials producibility is demonstrated to assure national capability to produce and load munitions systems. The program is being closely coordinated with other Military Departments, NATO and allied countries to eliminate redundant efforts and maximize efficiency. A joint service IM requirement has been developed. Insensitive munitions are identified as a DoD critical technology requirement and considered as part of a weapon design per DoD 5000.2R.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

- (U) ($568) Validated and analyzed weapon systems POA&Ms for IM compliance. Analyzed the availability of critical chemicals.
- (U) ($2,608) Demonstrated high explosives which showed improved IM characteristics while maintaining or improving operational performance. Continued scale-up, performance and vulnerability testing of a castable CL-20 based explosive. Completed downselect for two candidate improved underwater explosives for qualification.

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603609N
PROGRAM ELEMENT TITLE: Conventional Munitions
PROJECT NUMBER: S0363
PROJECT TITLE: Insensitive Munitions Advanced Development

1. (U) FY 1996 ACCOMPLISHMENTS (CON T):

- (U) ($1,193) Continued evaluation of IM ordnance concepts. Conducted system demonstrations of new high explosives combined with improved warhead and booster designed to support technology transitions. Continued modeling and data base improvements and application that reduce and enhance IM warhead design and test efforts.

- (U) ($2,960) Evaluated and demonstrated IM propellants and propulsion systems which provide improved or comparable performance to in-service systems and better IM characteristics. Combined candidate IM propellants and case concepts to demonstrate compliance with IM and performance requirements. Continued demonstration and evaluation of prototype IM dual thrust rocket motor for surface missile systems (SMS).

- (U) ($290) Forward financing FY97 requirements for low execution rate.

2. (U) FY 1997 PLAN:

- (U) ($935) Continue validation and analysis of weapon systems POA&Ms for IM compliance. Analyze the availability of critical chemicals.

- (U) ($2,267) Demonstrate high explosives which show improved IM characteristics while maintaining or improving operational performance. Demonstrate an energy-managed IM compliant booster explosive for VLS missiles. Complete scale-up, performance and vulnerability testing of a castable CL-20 based explosive and qualify if warranted. Complete qualification of improved underwater explosives.

- (U) ($1,086) Evaluate IM ordnance concepts. Conduct system demonstrations of new high explosives combined with improved warhead and booster designed to support technology transitions. Continue data base applications that reduce and enhance IM warhead design and test efforts.

- (U) ($5,237) Evaluate and demonstrate IM propellants and propulsion systems which provide improved or comparable performance to in-service systems and better IM characteristics. Combine candidate IM propellants and case concepts to demonstrate compliance with IM and performance requirements. Initiate formulation evaluation of ADN based propellant. Demonstrate high stiffness composite and injection molded motor cases. Complete demonstration and evaluation of prototype IM advanced booster propulsion systems for large diameter, 13-inch or greater, rocket motors for surface missile systems (SMS).

2. (U) FY 1997 PLAN (CON T):

- (U) ($290) Forward financing FY98 requirements for low execution rate.
- (U) ($69) Portion of extramural program reserved for Small Business Innovation Research (SBIR) assessment in accordance with 15 U.S.C. 638.

3. (U) FY 1998 PLAN:

- (U) ($1,078) Continue validation and analysis of weapon systems POA&Ms for IM compliance. Analyze the availability of critical chemicals.
- (U) ($3,253) Demonstrate high explosives which show improved IM characteristics while maintaining or improving operational performance. Demonstrate deformable high explosives for new Anti-Air-Warfare Warheads. Demonstrate internal blast explosive, high performance pressed metal accelerating explosive and deformable explosive. Qualify an insensitive high bubble energy underwater explosive. Complete qualification of a castable CL-20 based explosive.
- (U) ($1,345) Evaluate IM ordnance concepts. Conduct system demonstrations of new high explosives combined with improved warhead and booster designed to support technology transitions. Continue data base applications that reduce and enhance IM warhead design and test efforts.
- (U) ($4,469) Evaluate and demonstrate IM propellants and propulsion systems which provide improved or comparable performance to in-service systems and better IM characteristics. Combine candidate IM propellants and case concepts to demonstrate compliance with IM and performance requirements. Continue scale-up, performance and vulnerability testing of ADN based propellant. Demonstrate performance of super high pressure composite case motor. Demonstrate insensitive high energy booster propellants and motors.

4. (U) FY 1999 PLAN:

- (U) ($1,200) Continue validation and analysis of weapon systems POA&Ms for IM compliance. Analyze the availability of critical chemicals.
- (U) ($4,141) Demonstrate high explosives which show improved IM characteristics while maintaining or improving operational performance. Demonstrate high performance cast explosive. Qualify internal blast explosive, high performance pressed metal accelerating explosive and deformable explosive.
- ((U) ($1,705) Evaluate IM ordnance concepts. Conduct system demonstrations of new high explosives combined with improved warhead and booster designed to support technology transitions. Continue data base applications that reduce and enhance IM warhead design and test efforts.
- (U) ($5,669) Evaluate and demonstrate IM propellants and propulsion systems which provide improved or comparable performance to in-service systems and better IM characteristics. Combine candidate IM propellants and case concepts to demonstrate compliance with IM and performance requirements. Complete scale-up, performance and vulnerability testing of ADN based propellant. Demonstrate an insensitive, multi-mission, high performance rocket motor.

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 7,628 | 7,306 | 12,578 | 15,586 |
| (U) Adjustments from FY 1997 PRESBUDG: | -9 | +2,578 | -2,433 | -2.871 |
| (U) FY 1998 / FY 1999 PRESBUDG Submit: | 7,619 | 9,884 | 10,145 | 12,715 |

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603609N
PROGRAM ELEMENT TITLE: Conventional Munitions

PROJECT NUMBER: S0363
PROJECT TITLE: Insensitive Munitions Advanced Development

B. (U) PROGRAM CHANGE SUMMARY (CON T):

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1996 decrease due to minor pricing adjustments; FY 1997 adjustments due to $3M Congressional plus up and undistributed reductions of $422K; FY 1998 decrease due to low execution rate in FY 1996 and program restructuring;
FY 1999 decrease due to program restructuring.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands) Not applicable.

(U) RELATED RDT&E:

(U) PE 0601153N (Defense Research Sciences)
(U) PE 0602111N (Surface/Aerospace Surveillance and Weapons Technology)
(U) PE 0602314N (Undersea Surveillance and Weapons Technology)
(U) PE 0602315N (MCM, Mining and Special Warfare Technology)
(U) PE 0603216N (Aviation Survivability)
(U) PE 0604603N (Unguided Conventional Air-launched Weapons)
(U) Cooperative technology transfer efforts with all weapons project offices are in progress. Close liaison is maintained with PE 0603514N (Ship Combat Survivability).

D. (U) SCHEDULE PROFILE: Not applicable.

FY 1998 / FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603609N
PROGRAM ELEMENT TITLE: Conventional Munitions

PROJECT NUMBER: S0363
PROJECT TITLE: Insensitive Munitions Advanced Development

A. ( U ) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Technology Optimization & Characterization | 2,335 | 2,276 | 2,780 | 3,435 |
| b. Technology Development & Demonstration | 2,895 | 5,163 | 4,840 | 6,395 |
| c. Technology Transition | 700 | 670 | 740 | 950 |
| d. Technical Coordination | 1,000 | 1,050 | 1,050 | 1,175 |
| e. Program Management | 659 | 690 | 700 | 725 |
| f. Travel | 30 | 35 | 35 | 35 |
| TOTAL | 7,619 | 9,884 | 10,145 | 12,715 |

FY 1998 / FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOW N DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603609N
PROGRAM ELEMENT TITLE: Conventional Munitions

PROJECT NUMBER: S0363
PROJECT TITLE: Insensitive Munitions Advanced Development

B. ( U ) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ FundType Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY1995 &Prior | FY1996 Budget | FY1997 Budget | FY1998 Budget | FY1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | | |
| NAWCWPNDIV China Lake | WR | 11/95 | CONT. | CONT. | 73,690 | 3,544 | 6,023 | 4,768 | 5,667 | CONT. | CONT. |
| NSWCDD | WR | 11/95 | CONT. | CONT. | 66,181 | 500 | 494 | 850 | 1,170 | CONT. | CONT. |
| NSWCIHDIV | WR | 11/95 | CONT. | CONT. | 13,397 | 3,451 | 3,287 | 4,392 | 5,703 | CONT. | CONT. |
| Misc | WR | 11/95 | CONT. | CONT. | 13,923 | 124 | 80 | 135 | 175 | CONT. | CONT. |

| | |
|---|---|
| Support and Management | Not Applicable |
| Test and Evaluation | Not Applicable |

FY 1998 / FY 1 999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603609N
PROGRAM ELEMENT TITLE: Conventional Munitions

PROJECT NUMBER: S0363
PROJECT TITLE: Insensitive Munitions Advanced Development

GOVERNMENT FURNISHED PROPERTY Not Applicable

| | FY1995 &Prior | FY1996 Budget | FY1997 Budget | FY1998 Budget | FY1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| **Subtotal Product Development** | 167,191 | 7,619 | 9,884 | 10,145 | 12,715 | CONT. | CONT. |
| **Subtotal Support and Management** | 0 | 0 | 0 | 0 | 0 | CONT. | CONT. |
| **Subtotal Test and Evaluation** | 0 | 0 | 0 | 0 | 0 | CONT. | CONT. |
| **Total Project** | 167,191 | 7,619 | 9,884 | 10,145 | 12,715 | CONT. | CONT. |

FY 1998 / FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603609N PROGRAM ELEMENT TITLE: Conventional Munitions PROJECT NUMBER: S2299 PROJECT TITLE: Non-Nuclear Expendable Ordnance (NNEO)

(U) COST (Dollars in thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| S2299 Non-Nuclear Expendable Ordnance (NNEO) | | | | | | | | | | |
| | 0 | 0 | 1,863 | 2,327 | 1,390 | 924 | 993 | 1,016 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Navy requires improved lethality of air and surface launched ordnance to defeat advanced threats. This budget item addresses improvements to Navy surface launched (2T) non-nuclear expendable ordnance (NNEO) outside existing operational requirements. The commodities comprising 2T NNEO are: major and medium caliber gun ammunition, small arms ammunition, other ship gun ammunition, pyrotechnics and demolition items. There are no other R&D budget items supporting the 2T NNEO program. Currently, this project is supporting transition of the Multi-Function Fuze (MFF) from E&MD to production. The MFF will be used on 76mm and 5 /54 gun ammunition and will replace many existing configurations by providing multi-mode functioning (AAW, ASuW, KGFS) in one fuze.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS: Not applicable.

2. (U) FY 1997 PLAN: Not applicable.

3. (U) FY 1998 PLAN:
   - (U) ($1,863) MULTI-FUNCTION FUZE: Incorporate pre-planned product improvement programs to reduce fuze cost and increase producibility.

4. (U) FY 1999 PLAN:
   - (U) ($2,327) MULTI-FUNCTION FUZE: Continue incorporation of product improvement programs into Multi-Function Fuze to reduce cost and increase producibility.

FY 1998 / FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603609N PROJECT NUMBER: S2299
PROGRAM ELEMENT TITLE: Conventional Munitions PROJECT TITLE: Non-Nuclear Expendable Ordnance (NNEO)

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 0 | 0 | 0 | 0 |
| (U) Adjustments from FY 1997 PRESBUDG: | 0 | 0 | +1,863 | +2,327 |
| (U) FY 1998 / FY 1999 PRESBUDG Submit: | 0 | 0 | 1,863 | 2,327 |

(U) CHANGE SUMMARY EXPLANATION:
(U) Funding: Change in FY 1998 and FY 1999 due to transfer of funding from Project U1821.
(U) Schedule: A five month slip in IOC has occurred as a result of technical difficulties with Monolithic Microwave Integrated Circuit (MMIC) technology.
(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E: PE 0603795N (Naval Surface Fire Support). The 5 /54 Improved Conventional Munition projectile will be qualified with the MFF. MS III scheduled for FY 1998.

D. (U) SCHEDULE PROFILE:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| PROGRAM MILESTONES | | | 3Q IOC | |
| ENGINEERING MILESTONES | | | | |
| T&E MILESTONES | | | | 1Q TECHEVAL P3I<br>1Q OPEVAL P3I |
| CONTRACT | | | 1Q PRODUCTION | 2Q PRODUCTION P3I |
| MILESTONES | | | 2Q P3I | |

FY 1998 / FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603609N
PROGRAM ELEMENT TITLE:Conventional Munitions

PROJECT NUMBER: S2299
PROJECT TITLE: Non-Nuclear Expendable Ordnance (NNEO)

A. ( U ) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Design and Analysis | 0 | 0 | 763 | 929 |
| b. Hardware Fabrication and Procurement | 0 | 0 | 375 | 600 |
| c. Demonstration Test and Evaluation | 0 | 0 | 300 | 375 |
| d. Operational Test and Evaluation | 0 | 0 | 125 | 123 |
| e. Engineering Support | 0 | 0 | 200 | 200 |
| f. Program Management Support | 0 | 0 | 80 | 80 |
| g. Travel | 0 | 0 | 10 | 10 |
| h. Other/Miscellaneous | 0 | 0 | 10 | 10 |
| Total | 0 | 0 | 1,863 | 2,327 |

FY 1998 / FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603609N PROJECT NUMBER: S2299
PROGRAM ELEMENT TITLE:Conventional Munitions PROJECT TITLE: Non-Nuclear Expendable Ordnance (NNEO)

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ FundType Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY1995 &Prior | FY1996 Budget | FY1997 Budget | FY1998 Budget | FY1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Product Development** | | | | | | | | | | | |
| NAVSURFWARCEN Dahlgren, VA | WR | Various | CONT. | CONT. | 0 | 0 | 0 | 713 | 1,127 | CONT. | CONT. |
| Motorola | CPFF | Various | 952 | 952 | 0 | 0 | 0 | 425 | 527 | 0 | 952 |
| Hittite | CPFF | Various | 948 | 948 | 0 | 0 | 0 | 0 | 0 | 0 | 948 |
| **Support and Management** | | | | | | | | | | | |
| NAVSURFWARCEN Dahlgren, VA | WR | Various | CONT. | CONT. | 0 | 0 | 0 | 300 | 300 | CONT. | CONT. |
| **Test and Evaluation** | | | | | | | | | | | |
| NAVSURFWARCEN Dahlgren, VA | WR | Various | CONT. | CONT. | 0 | 0 | 0 | 150 | 150 | CONT. | CONT. |
| NAVAIRWARCEN / WD China Lake, CA | WR | Various | CONT. | CONT. | 0 | 0 | 0 | 150 | 100 | CONT. | CONT. |
| COMOPTEVFOR Norfolk, VA | WR | Various | CONT. | CONT. | 0 | 0 | 0 | 125 | 123 | CONT. | CONT. |

FY 1998 / FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603609N
PROGRAM ELEMENT TITLE: Conventional Munitions

PROJECT NUMBER: S2299
PROJECT TITLE: Non-Nuclear Expendable Ordnance (NNEO)

GOVERNMENT FURNISHED PROPERTY : Not applicable.

| | FY1995 &Prior | FY1996 Budget | FY1997 Budget | FY1998 Budget | FY1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| **Subtotal Product Development** | 0 | 0 | 0 | 1,138 | 1,654 | CONT. | CONT. |
| **Subtotal Support and Management** | 0 | 0 | 0 | 300 | 300 | CONT. | CONT. |
| **Subtotal Test and Evaluation** | 0 | 0 | 0 | 425 | 373 | CONT. | CONT. |
| **Total Project** | 0 | 0 | 0 | 1,863 | 2,327 | CONT. | CONT. |

FY 1998 / FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603609N PROJECT NUMBER: U1821

PROGRAM ELEMENT TITLE: Conventional Munitions PROJECT TITLE: Convention al Fuze / Warhead Package (U) COST (Dollars in thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| U1821 Conventional Fuze and Warhead Package | 26,531 | 18,394 | 22,182 | 25,166 | 33,071 | 24,517 | 18,885 | 19,320 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Navy requires improved lethality of air and surface launched ordnance to defeat advanced threats. This is the only Navy 6.3B RDT&E program that addresses improvements in warhead and fuze technology and provides a vehicle for orderly planning and transition of Navy 6.2 and 6.3A investments into E&MD for Navy missile systems. This project improves SPARROW missile capability to defeat existing and near term deceptive counter measures with the Missile Homing Improvement Program (MHIP). This project also addresses increased lethality against current and emerging threats with the development of a mass focusing warhead system, and Land Attack Cruise Missile Defense (LACMD)/Direct Hit and Multi-Mode Strike Ordnance Systems. The project supports the full spectrum of missile advanced development including guidance technology improvements. This project will, in future years, also provide the vehicle to address emergent requirements by transitioning mature development efforts into weapon systems with minimum technical and financial risk.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

- (U) ($5,629) DIRECTIONAL ORDNANCE SYSTEM: Completed system design and integration tests and defined system demonstration configuration; continued with system analysis and risk assessments.
- (U) ($853) ADVANCED STRIKE WARHEAD IMPROVEMENT: Continued system analysis and design; initiated system integration tests.
- (U) ($6,836) LAND ATTACK CRUISE MISSILE DEFENSE (LACMD)/ DIRECT-HIT FUZE AND WARHEAD: Selected concept and initiated prototype design and development. Completed warhead concept study contracts and preliminary downselect to 6-8 concepts/variants. Conducted trade studies, top level end game effectiveness analysis and critical experiments. Designed, fabricated, and evaluated S&A concept models. Conducted advanced fuze efforts.
- (U) ($520) ORDNANCE COMPONENT TECHNOLOGY: Completed effort on universal Safe and Arming (S-A) chipset; continued with efforts on initiation systems and customized S-A Components; initiated effort on high G fiber-optic accelerometer.

- (U) ($5,881) MULTI-FUNCTION FUZE: Engineering, manufacturing, producibility enhancement for OPEVAL/TECHEVAL. Evaluated 1000 fuzes and update technical data package.
- (U) ($5,499) MHIP DT/OT.
- (U) ($1,313) Forward financing of FY 1997 requirements due to low execution rates.

2. (U) FY 1997 PLAN:

- (U) ($4,839) DIRECTIONAL ORDNANCE SYSTEM: Conduct system level testing. Refine fragmentation method. Optimize ESAD and initiation system.
- (U) ($2,517) ADVANCED STRIKE WARHEAD IMPROVEMENT: Conduct precursor warhead and penetration tests and validate concept.
- (U) ($500) ORDNANCE COMPONENT TECHNOLOGY: Complete effort on initiation system; continue with very high energy density capacitors and high G fiber-optic accelerometer efforts.
- (U) ($2,759) MULTI-FUNCTION FUZE: Perform certification of OPEVAL/TECHEVAL and laboratory testing.
- (U) ($6,258) LAND ATTACK CRUISER MISSILE DEFENSE/ DIRECT HIT FUZE WARHEAD: Continue with warhead concept optimization end game effectiveness analysis, critical experiments and fabrication studies. Fabricate, test and evaluate S-A breadboard design. Integrate fuze community inputs.
- (U) ($1,313) Forward financing of FY 1998 requirements due to low execution rates in FY 1996.
- (U) ($208) Portion of extramural program reserved for Small Business Innovation Research (SBIR) assessment in accordance with 15 U.S.C. 638.

3. (U) FY 1998 PLAN:

- (U) ($3,887) DIRECTIONAL ORDNANCE SYSTEM: Assemble demonstration hardware. Conduct system demonstration. Develop specifications, drawings, and design and test data reports. Prepare system demonstration report.
- (U) ($2,384) ADVANCED STRIKE WARHEAD IMPROVEMENT: Conduct follow through warhead and fuze/ESAD tests. Conduct system effectiveness assessments and tradeoffs.
- (U) ($500) ORDNANCE COMPONENT TECHNOLOGY: Continue effort with customized S-A components. Continue with very high energy density capacitors and high G fiber optic accelerometer efforts.

- (U) ($8,411) LAND ATTACK CRUISE MISSILE DEFENSE (LACMD)/DIRECT HIT FUZE WARHEAD: Downselect 1-2 total concepts, and conduct component and system tests.
- (U) ($7,000) Advanced Seeker Technology: Initiate advanced seeker technology development effort.

4. (U) FY 1999 PLAN:
   - (U) ($5,153) DIRECTIONAL ORDNANCE SYSTEM: Conduct quick look scaling design/test. Customize DOS for specific target application.
   - (U) ($2,936) ADVANCED STRIKE WARHEAD IMPROVEMENT: System design/development. Conduct precursor/follow through warhead system integration tests.
   - (U) ($552) ORDNANCE COMPONENT TECHNOLOGY: Complete efforts on high energy density capacitors and high G fiber optic accelerometer. Initiate efforts on near field contact sensors and enhanced low energy exploding foil initiator.
   - (U) ($9,525) LAND ATTACK CRUISE MISSILE DEFENSE (LACMD)/DIRECT HIT FUZE WARHEAD: Initiate concept definition. Conduct component tests and synthesis studies.
   - (U) ($7,000) Advanced Seeker Technology: Continue with advanced seeker technology development effort.

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 26,801 | 19,184 | 18,803 | 20,624 |
| (U) Adjustments from FY 1997 PRESBUDG: | -270 | -790 | +3,379 | +4,542 |
| (U) FY 1998/1999 PRESBUDG Submit: | 26,531 | 18,394 | 22,182 | 25,166 |

FY 1998 / FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603609N
PROGRAM ELEMENT TITLE: Conventional Munitions

PROJECT NUMBER: U1821
PROJECT TITLE: Conventional Fuze / Warhead Package

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: Decrease in FY 1996 is due to minor pricing adjustments. Decrease in FY 1997 is due to Congressional Undistributed General reductions. Change in FY 1998 is due to increase for Land Attack Cruise Missile Defense (LACMD) (+7,000), Forward Financing of FY 1998 requirements due to low execution rates (-1,313) and NWCF rate adjustments. Increase in FY 1999 is due to increase for LACMD (+7,000), program pricing adjustments (-2,347) and NWCF rate adjustments (-111).

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

| | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| WPN Line 18 SPARROW Mods | 1,319 | 2,478 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 238,564 |

(U) RELATED RDT&E:

(U) PE 0603755N (SHIP SELF DEFENSE)

(U) PE 0604366N (STANDARD Missile Improvements) Block IIIB fully describes the common milestones for joint program that adds a common seeker to both STANDARD Missile and SPARROW Missile.

D. (U) SCHEDULE PROFILE: Not applicable.

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603609N
PROGRAM ELEMENT TITLE:Conventional Munitions

PROJECT NUMBER: U1821
PROJECT TITLE: Conventional Fuze / Warhead Package

A. ( U ) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Design and Analysis | 11,594 | 7,458 | 9,148 | 12,366 |
| b. Hardware Fabrication and Procurement | 5,335 | 2,400 | 4,600 | 4,800 |
| c.Demonstration Test and Evaluation | 5,353 | 5,508 | 8,234 | 7,800 |
| d.Operational Test and Evaluation | 3,999 | 2,878 | 0 | 0 |
| e. Program Management Support | 200 | 100 | 150 | 150 |
| f. Travel | 50 | 50 | 50 | 50 |
| Total | 26,531 | 18,394 | 22,182 | 25,166 |

FY 1998 / FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603609N
PROGRAM ELEMENT TITLE:Conventional Munitions

PROJECT NUMBER: U1821
PROJECT TITLE: Conventional Fuze / Warhead Package

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ FundType Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY1995 &Prior | FY1996 Budget | FY1997 Budget | FY1998 Budget | FY1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Product Development** | | | | | | | | | | | |
| NAVSURFWARCENDIV Dahlgren, VA | WR | Various | CONT. | CONT. | 18,467 | 6,651 | 5,735 | 1,739 | 4,466 | CONT. | CONT. |
| IRISS Bedford, MA / Tuscon, AZ | CPAF | 12/89 | 82,531 | 82,531 | 82,237 | 294 | 0 | 0 | 0 | 0 | 82,531 |
| Motorola Scottsdale, AZ | CPAF | Various | CONT. | CONT. | 400 | 1,000 | 1,800 | 2,500 | 3,500 | CONT. | CONT. |
| NAVSUP Washington, DC | PD | 05/96 | 650 | 650 | 0 | 650 | 0 | 0 | 0 | 0 | 650 |
| NAVAIRWARCEN / WD China Lake, CA | WR | Various | CONT. | CONT. | 48,233 | 5,972 | 4,173 | 2,009 | 1,400 | CONT. | CONT. |
| Miscellaneous | Various | Various | CONT. | CONT. | 0 | 0 | 0 | 6,000 | 6,000 | CONT. | CONT. |

FY 1998 / FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603609N
PROGRAM ELEMENT TITLE:Conventional Munitions
PROJECT NUMBER: U1821
PROJECT TITLE: Conventional Fuze / Warhead Package

| Contractor/ Government Performing Activity | Contract Method/ FundType Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY1995 &Prior | FY1996 Budget | FY1997 Budget | FY1998 Budget | FY1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Support and Management** | | | | | | | | | | | |
| NAVAIRWARCEN / WD China Lake, CA | WR | Various | CONT. | CONT. | 2,385 | 500 | 500 | 500 | 450 | CONT. | CONT. |
| NAVSURFWARCENDIV Dahlgren, VA | WR | Various | CONT. | CONT. | 1,149 | 500 | 500 | 500 | 450 | CONT. | CONT. |
| **Test and Evaluation** | | | | | | | | | | | |
| NAVAIRWARCEN / WD China Lake, CA | WR | Various | CONT. | CONT. | 5,582 | 1,900 | 1,500 | 3,473 | 4,200 | CONT. | CONT. |
| NAVSURFWARCENDIV Dahlgren, VA | WR | Various | CONT. | CONT. | 1,573 | 5,874 | 2,103 | 3,961 | 3,200 | CONT. | CONT. |
| COMOPTEVFOR Norfolk, VA | WR | Various | CONT. | CONT. | 3,950 | 2,990 | 2,083 | 0 | 0 | CONT. | CONT. |
| JHU/APL Laurel, MD | PD | Various | CONT. | CONT. | 500 | 200 | 0 | 0 | 0 | CONT. | CONT. |
| Motorola | CPAF | Various | CONT. | CONT. | 0 | 0 | 0 | 500 | 500 | CONT. | CONT. |
| Miscellaneous | Various | Various | CONT. | CONT. | 0 | 0 | 0 | 1,000 | 1,000 | CONT. | CONT. |

FY 1998 / FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603609N
PROGRAM ELEMENT TITLE:Conventional Munitions

PROJECT NUMBER: U1821
PROJECT TITLE: Conventional Fuze / Warhead Package

GOVERNMENT FURNISHED PROPERTY : Not applicable.

| | FY1995 &Prior | FY1996 Budget | FY1997 Budget | FY1998 Budget | FY1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| **Subtotal Product Development** | 149,337 | 14,567 | 11,708 | 12,248 | 15,366 | CONT. | CONT. |
| **Subtotal Support and Management** | 3,534 | 1,000 | 1,000 | 1,000 | 900 | CONT. | CONT. |
| **Subtotal Test and Evaluation** | 11,605 | 10,964 | 5,686 | 8,934 | 8,900 | CONT. | CONT. |
| **Total Project** | 164,476 | 26,531 | 18,394 | 22,182 | 25,166 | CONT. | CONT. |

FY 1998/1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603610N PROJECT NUMBER: V1873
PROGRAM ELEMENT TITLE: MK-50 SHALLOW WATER PERFORMANCE PROJECT TITLE: LTWT TORPEDO

(U) COST (Dollars in thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| V1873 LTWT TORPEDO | 2,893 | 1,270 | 2,012 | 2,820 | 0 | 0 | 0 | 0 | 0 | 24,816 |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The funding is to continue an ongoing MK-50 Torpedo Improvement program to maintain the technological edge in US Navy torpedoes. The program addresses improvements in shallow water, near surface performance, zero doppler target detection, and bottom target recognition necessary to counter the high-tech diesel submarines encountered in the littoral warfare arena.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates software/hardware for experimental test related to specific ship or aircraft applications.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

- (U)($1,111) Began development, modeling and testing of tactical software to refine shallow water search patterns/ tactics, addressed multi-bounce propagation, refined bottom avoidance algorithms, and addressed near surface targets.
- (U)($1,118) Began development, modeling and testing of improved tactical software for counter-countermeasure performance, long range acquisition, and slow low doppler (loitering) target detection.
- (U)($664) Will forward fund FY 1997 software tasks due to low execution rates in FY 1996.

FY 1998/1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603610N PROJECT NUMBER: V1873
PROGRAM ELEMENT TITLE: MK-50 SHALLOW WATER PERFORMANCE PROJECT TITLE: LTWT TORPEDO

2. (U) FY 1997 PLAN:

- (U)($301) Continue development, modeling and testing of tactical software to refine shallow water search patterns/ tactics, address multi-bounce propagation, and refine bottom avoidance algorithms.
- (U)($300) Continue development, modeling and testing of improved tactical software for counter-countermeasure performance, long range acquisition, and slow low doppler (loitering) target detection.
- (U)($664) Will forward fund FY 1998 software tasks due to low execution rates in FY 1996. Obligation 10/97
- (U)($5) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 U.S.C. 638.

3. (U) FY 1998 PLAN:

- (U)($1,046) Continue development, modeling and testing of tactical software to refine shallow water search patterns/ tactics, address multi-bounce propagation, and refine bottom avoidance algorithms.
- (U)($966) Continue development, modeling and testing of improved tactical software for counter-countermeasure performance, long range aquisition, and slow low doppler (loitering) target detection.

(U) ($0) Continue development, modeling and testing of software tasks.

4. (U) FY 1999 PLAN:

- (U)($1,466) Complete development, modeling and testing of tactical software to refine shallow water search patterns/ tactics, address multi-bounce propagation, and refine bottom avoidance algorithms.
- (U)($1,354) Complete development, modeling and testing of improved tactical software for counter-countermeasure performance, long range acquisition, and slow low doppler (loitering) target dectection.

FY 1998/1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603610N PROJECT NUMBER: V1873
PROGRAM ELEMENT TITLE: MK-50 SHALLOW WATER PERFORMANCE PROJECT TITLE: LTWT TORPEDO

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 2,900 | 1,329 | 2,804 | 2,909 |
| (U) Adjustments from FY 1997 PRESBUDG: | -7 | -59 | -792 | -89 |
| (U) FY 1998/1999 PRESBUDG Submit: | 2,893 | 1,270 | 2,012 | 2,820 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding:

FY 96: Minor pricing adjustments (-$7).

FY 97: Congressional undistributed reductions (-$59).

FY 98: Minor pricing adjustments (-$128) and program adjustment for low FY 1996 execution(-$664).

FY 99: Minor pricing ajustments (-$89).

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: ($ in thousands) Not applicable.

(U) RELATED RDT&E:

(U) PE 0205632N (MK 48 ADCAP)

(U) PE 0604610N (LIGHTWEIGHT TORPEDO DEVELOPMENT)

D. (U) SCHEDULE PROFILE: See attached.

FY 1998/1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603610N
PROGRAM ELEMENT TITLE: MK-50 SHALLOW WATER PERFORMANCE

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY1998 | FY 1999 |
|---|---|---|---|---|
| a. Software Development | 615 | 394 | 624 | 874 |
| b. Program Management Support | 50 | 33 | 33 | 33 |
| c. Systems Engineering | 538 | 180 | 282 | 395 |
| d. Developmental Test & Evaluation | 1,690 | 663 | 1,073 | 1,518 |
| Total | 2,893 | 1,270 | 2,012 | 2,820 |

FY 1998/1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603610N PROJECT NUMBER: V1873
PROGRAM ELEMENT TITLE: MK-50 SHALLOW WATER PERFORMANCE PROJECT TITLE: LTWT TORPEDO

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING ($ in thousands):

PERFORMING ORGANIZATIONS:

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Actual | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | | |
| NAVUNSEAWARCEN | | | | | | | | | | | |
| Newport, RI | WR | JAN 97 | 20,127 | 20,127 | 11,311 | 2,813 | 1,237 | 1,979 | 2,787 | 0 | 20,127 |
| Miscellaneous | WR | | 830 | 830 | 800 | 30 | 0 | 0 | 0 | 0 | 830 |
| Support and Management | | | | | | | | | | | |
| ARL/PSU | C/CPFF | DEC 95 | 3,710 | 3,710 | 3,710 | 0 | 0 | 0 | 0 | 0 | 3,710 |
| Miscellaneous | VAR | VAR | 149 | 149 | 0 | 50 | 33 | 33 | 33 | 0 | 149 |

Test and Evaluation: Not applicable.

GOVERNMENT FURNISHED PROPERTY: Not applicable.

FY 1998/1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603610N PROJECT NUMBER: V1873
PROGRAM ELEMENT TITLE: MK-50 SHALLOW WATER PERFORMANCE PROJECT TITLE: LTWT TORPEDO

B. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| | FY 1995 & Prior | FY 1996 Actual | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 12,111 | 2,843 | 1,237 | 1,979 | 2,787 | 0 | 20,957 |
| Subtotal Support and Management | 3,710 | 50 | 33 | 33 | 33 | 0 | 3,859 |
| Subtotal Test and Evaluation | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Project | 15,821 | 2,893 | 1,270 | 2,012 | 2,820 | 0 | 24,816 |

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603611M
PROGRAM ELEMENT TITLE: Marine Corps Assault Amphibious Vehicles

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| B0020 Advanced Amphibious Assault Vehicle (AAAV) | 32,223 | 61,318 | 60,134 | 106,245 | 94,782 | 113,679 | 134,732 | 157,048 | CONT. | CONT. |
| C2237 Amphibious Vehicle Test Branch (AVTB)[1] | 1,816 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3,273 |
| TOTAL | 34,039 | 61,318 | 60,134 | 106,245 | 94,782 | 113,679 | 134,732 | 157,048 | CONT. | CONT. |

1. FY 1997 and beyond AVTB funding and discussion are contained in Program Element (PE) 0206623M, Marine Corps Ground Combat/Supporting Arms Systems, Project C2237, AVTB.

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The AAAV program will field a successor to the Marine Corps' current Amphibious vehicle, the AAV7A1. The AAAV will provide the principal means of tactical surface mobility for the Marine Air-Ground Task Force (MAGTF) during both ship-to-objective maneuver and subsequent combat operations ashore. The AVTB provides facilities and personnel which perform a broad range of testing, repair and technical services to Amphibious vehicles.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under PROGRAM DEFINITION AND RISK REDUCTION (DEMONSTRATION & VALIDATION) because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603611M
PROGRAM ELEMENT TITLE: Marine Corps Assault Amphibious Vehicles

(U) COST (Dollars in thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| B0020 Advanced Amphibious Assault Vehicle (AAAV) | 32,223 | 61,318 | 60,134 | 106,245 | 94,782 | 113,679 | 134,732 | 157,048 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The AAAV program will field a successor to the Marine Corps' current Amphibious vehicle, the Advanced Amphibious Vehicle 7A1 (AAV7A1). The AAAV will provide the principal means of tactical surface mobility for the Marine Air-Ground Task Force (MAGTF) during both ship-to-objective maneuver and subsequent combat operations ashore.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

- (U) ($17,046) Awarded the Demonstration and Validation (Dem/Val) phase contract without protest.
- (U) ($1,671) Completed design, fabrication and testing of operational mock-ups of the VC/WS.
- (U) ($1,483) Conducted detail design of remaining peripherals of MTU Version B engine development, as directed in accordance with Congressional direction.
- (U) ($3,258) Completed re-design, modification and 400 hour FMIT of the 2,600 Hp MTU (Version A) diesel engine.
- (U) ($516) Completed re-design, fabrication and component laboratory tests of the two-stage, single axis turbocharger for the advanced version (Version B) of the 2,600 Hp MTU diesel engine.
- (U) ($3,449) Continued to provide in-house support.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603611M PROGRAM ELEMENT TITLE: Marine Corps Assault Amphibious Vehicles PROJECT NUMBER: B0020 PROJECT TITLE: Advanced Amphibious Assault Vehicle (AAAV)

- (U) ($1,908) Continued to enlist program support to coordinate and update program planning.
- (U) ($578) Completed test and evaluation of operational mock-up weapon stations.
- (U) ($2,314) Established and equipped AAAV Warfighting Lab; Design, Development, and Maintenance of the AAAV Modeling and Simulation (M&S) Implementation plan; Development of suitable scenarios of operations for AAAV. Modify/enhance operational M&S tools to support system/subsystem/cost effectiveness analysis/assessment.

3. (U) FY 1997 PLAN:

- (U) ($53,887) Continue Program Definition and Risk Reduction (PDRR) (formerly Dem/Val)phase which includes, contractor design, modeling, and simulation of the AAAV Personnel (P) and Command (C) prototypes.
- (U) ($1,371) Continue to provide in-house support.
- (U) ($1,700) Provide for Program Office Personnel costs
- (U) ($2,811) Continue to enlist program support to coordinate and update program planning.
- (U) ($71) Initiate Ballistic Armor validation testing.
- (U) ($1,478) SBIR: Portion of program reserved for Small Business Innovation Research assessment in accordance with 15 U.S.C. 638(f)(1).

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603611M PROGRAM ELEMENT TITLE: Marine Corps Assault Amphibious Vehicles PROJECT NUMBER: B0020 PROJECT TITLE: Advanced Amphibious Assault Vehicle (AAAV)

4. (U) FY 1998 PLAN:

- (U) ($54,417) Continue PDRR phase, contractor design, Modeling and Simulation of the AAAV Personnel (P) and Command (C) prototypes.

- (U) ($2,367) Continue to provide in-house support.
- (U) ($1,750) Continue to enlist program support to coordinate and update program planning.
- (U) ($1,600) Conduct test on AAAV weapon system, Continue Ballistic Armor Validation testing.

5. (U) FY 1999 PLAN:

- (U) ($96,752) Continue PDRR phase, complete Detail Design Review and fabrication of prototype.

- (U) ($2,136) Continue to provide in-house support.

- (U) ($3,642) Continue to enlist program support, and software Independent Verification and Validation.

- (U) ($3,715) Complete Armor Verification and Validation tests.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603611M PROGRAM ELEMENT TITLE: Marine Corps Assault Amphibious Vehicles PROJECT NUMBER: B0020 PROJECT TITLE: Advanced Amphibious Assault Vehicle (AAAV)

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 37,010 | 40,106 | 60,239 | 104,146 |
| (U) Adjustments from FY 1997 PRESBUD: | -4,787 | +21,212 | - 105 | +2,099 |
| (U) FY 1998 President's Budget: | 32,223 | 61,318 | 60,134 | 106,245 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1996 reflects below threshold reprogramming of $4.0 million. The $4 million is replaced in FY 1997. The Congressional increase of $20.0 million in FY 1997 (not requested in the budget) is to procure an additional Prototype for testing and evaluation, to accelerate testing activities now scheduled for FY 1999 and 2000, and to preserve the option to enter production a year earlier than currently planned. FY 1997 funding was decreased by $2,788, Congressional marks, various undistributed $129; non-FFRDC $34, FIRDC $1,282, DBOF surcharge, $1,282. General Reduction, $60. Budgetary Resou, and $1 BTR. FY 1998 and 1999 adjustments reflect program cost estimates.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:

(U) PE 0206623M (Marine Corps Ground Combat/Supporting Arms Systems), Project C0021, AAV7A1

D. (U) SCHEDULE PROFILE: See attached.

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603611M
PROGRAM ELEMENT TITLE: Marine Corps Assault Amphibious Vehicles
PROJECT NUMBER: B0020
PROJECT TITLE: Advanced Amphibious Assault Vehicle (AAAV)

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Product Development (AAAV) | 23,974 | 55,365 | 54,417 | 96,752 |
| b. Support and Management (AAAV) | 7,671 | 5,882 | 4,117 | 5,778 |
| c. Test and Evaluation (AAAV) | 578 | 71 | 1,600 | 3,715 |
| Total | 32,223 | 61318 | 60,134 | 106,245 |

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603611M PROJECT NUMBER: B0020
PROGRAM ELEMENT TITLE: Marine Corps Assault Amphibious Vehicles PROJECT TITLE: Advanced Amphibious Assault Vehicle (AAAV)

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | | |
| (The following performing organizations are in support of the AAAV program). | | | | | | | | | | | |
| GDLS(DEM/VAL) | CPAF | JUN 96 | 0 | 0 | 0 | 17,046 | 53,887 | 54,417 | 96,752 | CONT. | CONT. |
| GDLS (Turret), Warren, MI | CPFF | JAN 95 | 7,359 | 7,359 | 7,169 | 190 | 0 | 0 | 0 | 0 | 7,359 |
| UDLP (Turret), San Jose, CA | CPFF | DEC 94 | 6,227 | 6,227 | 5,439 | 788 | 0 | 0 | 0 | 0 | 6,227 |
| MTU (Engine B), Friedrichshafen, Germany (#9071) | CPFF | APR 94 | 3,783 | 3,783 | 2,300 | 1,483 | 0 | 0 | 0 | 0 | 3,783 |
| GDLS (ATR), Warren, MI | CPFF | SEP 93 | 16,642 | 16,642 | 16,497 | 145 | 0 | 0 | 0 | 0 | 16,642 |
| FMC/UDLP (ATR), San Jose, CA | CPFF | SEP 93 | 16,180 | 16,180 | 15,955 | 225 | 0 | 0 | 0 | 0 | 16,180 |
| MTU (Engine A II), Friedrichshafen, Germany (#9189) | CPFF | APR 93 | 6,170 | 6,170 | 5,849 | 321 | 0 | 0 | 0 | 0 | 6,170 |
| MTU (Engine B/Version B), Friedrichshafen, Germany (#9061) | CPFF | APR 95 | 2,650 | 2,650 | 2,134 | 516 | 0 | 0 | 0 | 0 | 2,650 |
| MTU (Engine Re-build/Version B 400 Hr Test), Friedrichshafen, Germany (#9102) | CPFF | JUN 95 | 4,603 | 4,603 | 1,345 | 3,258 | 0 | 0 | 0 | 0 | 4,603 |
| MISCELLANEOUS | VARIOUS (SBIR) | | 2,635 | 2,635 | 1,155 | 2 | 1,478 | 0 | 0 | 0 | 2,635 |
| Total Product Development | | | | | 57,843 | 23,974 | 55,365 | 54,417 | 96,752 | CONT. | CONT. |

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603611M PROGRAM ELEMENT TITLE: Marine Corps Assault Amphibious Vehicles PROJECT NUMBER: B0020 PROJECT TITLE: Advanced Amphibious Assault Vehicle (AAAV)

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Support and Management | | | | | | | | | | | |
| (The following performing organizations are in support of the AAAV program). | | | | | | | | | | | |
| TMA, Arlington, VA | CPFF | DEC 93 | | | 1,520 | 755 | 742 | 1,000 | 1,100 | CONT. | CONT. |
| MISCELLANEOUS (Contracts) | CPFF | VARIOUS | | | 1,419 | 1,153 | 576 | 750 | 2,542 | CONT. | CONT. |
| MISCELLANEOUS (Government Laboratories) | WR | | | | 2,793 | 3,449 | 1,371 | 2,367 | 2,136 | CONT. | CONT. |
| PROGRAM OFFICE PERSONNEL COSTS | | | | | 0 | 0 | 1,700 | 0 | 0 | CONT. | CONT. |
| MODELING and SIMULATION | WR | | | | 0 | 2,314 | 1,493 | 0 | 0 | CONT. | CONT. |
| Total Support and Management | | | | | 5,732 | 7,671 | 5,882 | 4,117 | 5,778 | CONT. | CONT. |
| Test and Evaluation | | | | | | | | | | | |
| (The following performing organizations are in support of the AAAV program). | | | | | | | | | | | |
| MISCELLANEOUS VARIOUS | VARIOUS | | | | 587 | 578 | 71 | 1,600 | 3,715 | CONT. | CONT. |
| Total Test and Evaluation | | | | | 587 | 578 | 71 | 1,600 | 3,715 | CONT. | CONT. |

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603611M PROJECT NUMBER: B0020
PROGRAM ELEMENT TITLE: Marine Corps Assault Amphibious Vehicles PROJECT TITLE: Advanced Amphibious Assault Vehicle (AAAV)

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| GOVERNMENT FURNISHED PROPERTY: | | | | | | | | | | | |
| Product Development: | AAAV Misc | | 27 | 27 | 27 | 0 | 0 | 0 | 0 | 0 | 27 |
| | In-house laboratories | | | | | | | | | | |

Support and Management: Not applicable.

Test and Evaluation: Not applicable.

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603611M
PROGRAM ELEMENT TITLE: Marine Corps Assault Amphibious Vehicles
PROJECT NUMBER: B0020
PROJECT TITLE: Advanced Amphibious Assault Vehicle (AAAV)

| | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 57,843 | 23,974 | 55,365 | 54,417 | 96,752 | CONT. | CONT. |
| Subtotal Support and Management | 5,732 | 7,671 | 5,882 | 4,117 | 5,778 | CONT. | CONT. |
| Subtotal Test and Evaluation | 587 | 578 | 71 | 1,600 | 3,715 | CONT. | CONT. |
| Total Project | 64,162 | 32,223 | 61,318 | 60,134 | 106,245 | CONT. | CONT. |

C. (U) FUNDING PROFILE: Not applicable.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603612M
PROGRAM ELEMENT TITLE: Marine Corps Mine Countermeasures

(U) COST (Dollars in thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| C2106 Advanced Mine Countermeasures System (AMCS) | 1,652 | 0 | 0 | 1,985 | 2,489 | 1,791 | 0 | 0 | 0 | 8,224 |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project was formerly titled Distributed Explosive Mine Neutralization System (DEMNS). The AMCS program centers on neutralization of blast-hardened and complex-fuzed mines, and unexploded munitions (current and future threat) that defeat the effectiveness of current minefield breaching systems. Primary goals are: neutralization in-stride from a standoff position; very high neutralization percentages against all types of mines; and joint applicability for use with primary assault platforms to include land and amphibious assaults.

(U) The AMCS program researches and develops assault minefield breaching capabilities that will neutralize current and future blast-hardened and complex-fuzed mines from a standoff position. AMCS will alleviate a critical deficiency in breaching minefields during amphibious operations. Current breaching assets are 1950s technology that do not meet breaching mission requirements.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

- (U) ($1,607) Completed standoff minefield breacher DEM/VAL and development and testing of system components.
- (U) ($45) Completed program documentation and contract progress analysis. Program transitions to PE 0604612M, Marine Corps Mine Countermeasures, for engineering and manufacturing development.

2. (U) FY 1997 PLAN: Efforts funded under Program Element 0604612M, Project C2106.

3. (U) FY 1998 PLAN: Efforts funded under Program Element 0604612M, Project C2106.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 Countermeasures

PROGRAM ELEMENT: 0603612M
PROGRAM ELEMENT TITLE: Marine Corps Mine Systems (ACS)

PROJECT NUMBER: C2106
PROJECT TITLE: Advanced Countermeasures

4. (U) FY 1999 PLAN:

- (U) ($150) Prepare milestone documentation for Coastal Battlefield Reconnaissance and Analysis (COBRA).
- (U) ($150) Award COBRA Advanced Development Model (ADM) contract.
- (U) ($1,000) Design COBRA Advanced Development Model. Start Fabrication.
- (U) ($685) Conduct testing of COBRA advanced technology tunable camera.

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 1,722 | 0 | 0 | 0 |
| (U) Adjustments from FY 1997 PRESBUD: | -70 | 0 | 0 | +1,985 |
| (U) FY 1998 President's Budget: | 1,652 | 0 | 0 | 1,985 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY 1996 decrease is due to below threshold internal reprogramming. The FY 1999 increase is due to the transition of the COBRA program to this Program Element from advanced technology demonstration.

(U) Schedule: N/A

(U) Technical: N/A

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603612M PROGRAM ELEMENT TITLE: Marine Corps Mine Countermeasures Systems (ACS) PROJECT NUMBER: C2106 PROJECT TITLE: Advanced Countermeasures

C. (U) OTHER PROGRAM FUNDING SUMMARY:

(U) RELATED RDT&E:
(U) PE 0603606A (Landmine Warfare and Barrier Advanced Technology)
(U) Negotiations are underway to join Army programs and the SMB/ORSMC projects into joint programs at the appropriate milestone.
(U) PE 0603619A (Landmine Warfare and Barrier Advanced Demonstrations)
(U) PE 0604808A (Landmine Warfare and Barrier Engineering Development)
(U) PE 0602131M (Marine Corps Landing Force Technology)
(U) PE 0603612M (Marine Corps Mine Countermeasures Systems)
(U) PE 0603640M (Marine Corps Advanced Technology Demonstrations)
(U) PE 0604612M (Marine Corps Mine/Countermeasures Systems (Engineering))
(U) PE 0602315N (Mine Countermeasures, Mining and Special Warfare Technology)
(U) PE 0603555N (Sea Control and Littoral Warfare Technology Demonstration)
(U) PE 0603782N (Shallow Water Mine Countermeasures Demonstrations)
(U) PE 0603635M (Marine Corps Combat/Supporting Arms Systems)
(U) This program is in compliance with Tri-Service Reliance Agreements.

D. (U) SCHEDULE PROFILE: N/A

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4

Countermeasures

PROGRAM ELEMENT: 0603612M
PROGRAM ELEMENT TITLE: Marine Corps Mine Systems (ACS)

PROJECT NUMBER: C2106
PROJECT TITLE: Advanced Countermeasures

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FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603635M
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms Systems

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| C1964 Anti-Armor Weapons Systems | 338 | 436 | 431 | 447 | 503 | 582 | 640 | 748 | CONT. | CONT. |
| C2112 Lightweight 155 millimeter Howitzer (LW155) | 14,392 | 13,269 | 35,303 | 33,915 | 8,624 | 0 | 0 | 0 | 0 | 124,300 |
| C2113 Short Range Anti-Armor Weapon (SRAW)/Predator | 33,542 | 27,716 | 730 | 0 | 0 | 0 | 0 | 0 | 0 | 118,422 |
| C2247 Coastal Battlefield Reconnaissance and Analysis (COBRA) | 4,323 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4,153 |
| C2250 Team Target Engagement Simulator (TTES) | 0 | 927 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 966 |
| C2251 JT ADV AMPHIBIOUS LOGISTICS/COMBAT SERVICE SUPPORT (JT AAL/CSS )TECHNOLOGY | 0 | 0 | 0 | 744 | 1,245 | 1,492 | 1,740 | 1,990 | CONT. | CONT. |
| C2255 OBJ INDIVIDUAL COMBAT WEAPON | 0 | 0 | 0 | 0 | 622 | 796 | 746 | 0 | CONT. | CONT. |
| C2256 21ST CENTURY LAND WARRIOR | 0 | 0 | 0 | 744 | 871 | 746 | 0 | 0 | CONT. | CONT. |
| TOTAL | 52,595 | 42,348 | 36,464 | 35,850 | 11,865 | 3,616 | 3,126 | 2,738 | CONT. | CONT. |

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This PE supports the demonstration and validation of Marine Corps Ground/Supporting Arms Systems for utilization in Marine Air-Ground Expeditionary Force amphibious operations.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603635M
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms Systems

(U) COST (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| C1964 ANTI-ARMOR WEAPON SYSTEM | 338 | 436 | 431 | 447 | 503 | 582 | 640 | 748 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project provides for the Marine Corps, participation in the Joint Anti-Armor program entitled Javelin (Advanced Anti-Tank Weapon System - medium (AAWS-M)) and the AntiArmor Weapon System - Heavy (AAWS-H). The Javelin weapon system will provide the Marine Corps and Army with a state-of-the-art capability to destroy sophisticated and future armored threats. No such medium anti-armor system is currently available to the infantryman. The AAWS-H is a long range, antitank weapon system that will replace the TOW Missile system. It will satisfy an operational requirement to provide increased range (4000 meters), increased lethality against all armored threats, to include explosive reactive armor, active protection, increased probability of hit and kill and increased gunner survivability. Additional possible applications include LAV-AT and AAAV usage, thus promoting commonality between Marine Corps' systems.

1. (U) FY 1996 ACCOMPLISHMENTS:

- (U) ($78) Continued to monitor the joint Javelin program and participate in follow-on testing.
- (U) ($22) Updated Javelin Milestone III documentation and prepared Marine Corps Acquisition Decision Memorandum (MCADM) documentation.
- (U) ($232) Monitored and participated in Javelin Production Qualification Test (PQT) and engineering changes to include warhead improvements.
- (U) ($6) Monitored necessary logistics aspects of the joint Javelin program.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms System Systems

PROJECT NUMBER: C1964 PROJECT TITLE: Anti-Armor Weapon

2. (U) FY 1997 PLAN:

- (U) ($127) Continue to monitor and participate in PQT for Javelin.
- (U) ($73) Continue to conduct preparations necessary to perform as an ISEA for Javelin.
- (U) ($111) Continue to monitor and participate in the Javelin P3I program.
- (U) ($95) Participate in development and integration of Javelin software upgrades.
- (U) ($30) Complete Javelin Milestone III documentation and integration of software upgrades.

3. (U) FY 1998 PLAN:

- (U) ($166) Continue to monitor and participate in Javelin PQT.
- (U) ($25) Participate in development and integration of Javelin software upgrades.
- (U) ($170) Engineering/Technical Support to monitor and participate in technical developments in the Joint AAWS-H program.
- (U) ($40) Monitor the Joint AAWS-H Program and participate in evaluation.
- (U) ($30) Prepare necessary Marine Corps documentation for AAWS-H Milestone II.

4. (U) FY 1999 PLAN:

- (U) ($174) Continue to monitor and participate in the Javelin P3I program.
- (U) ($27) Participate in development and integration of Javelin software upgrades.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M PROJECT NUMBER: C1964
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ PROJECT TITLE: Anti-Armor Weapon
Supporting Arms System Systems

- (U) ($156) Engineering/Technical Support to monitor and participate in developmental testing and technical developments in the Joint AAWS-H Program.

- (U) ($40) Monitor Joint Program and prepare necessary Marine Corps documentation for the AAWS-H program.

- (U) ($50) Participate in AAWS-H user evaluation.

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget | 485 | 463 | 473 | 471 |
| (U) Adjustments from FY 1997 PRESBUDG: | -147 | - 27 | - 42 | - 24 |
| (U) FY 1998 President's Budget: | 338 | 436 | 431 | 447 |

(U) CHANGE SUMMARY EXPLANATION:

(U) The FY 1996 decrease of $147 was SBIR and a minor below threshold reprogramming. The FY 1997 decrease of $27 was due to FFRDC DBOF and other General Reductions.

(U) The FY 1998 decrease is due to a decrease of $282 in the Javelin program due to the expected maturity of the system and the addition of $240 for the AAWS-H program. The FY 1999 decrease due to expected maturity of the Javelin system (-$270) and the addition of the AAWS-H program (+$246).

(U) Schedule: Not Applicable.

(U) Technical: Not Applicable.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M PROJECT NUMBER: C1964
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ PROJECT TITLE: Anti-Armor Weapon
Supporting Arms System Systems

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

| | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| (U) PMC Line 29 (BLI# 301100) Javelin | 0 | 38,151 | 42,146 | 83,379 | 81,667 | 28,754 | 0 | 0 | 0 | 274,097 |

(U) RELATED RDT&E:

(U) PE 0604611A

D. (U) SCHEDULE PROFILE: (SEE ATTACHED)

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M

PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms Systems

(U) COST (Dollars in thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| C2112 Lightweight 155 Millimeter (MM) Howitzer (LW155) | 14,392 | 13,269 | 35,303 | 33,915 | 8,624 | 0 | 0 | 0 | 0 | 124,300 |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The LW155 is the replacement for the aging, operationally deficient M198 155mm Howitzer for both the Marine Corps and the Army. The LW155 will weigh 9,000 pounds, (approximately one-half the weight of its predecessor) and will offer significant strategic and tactical mobility improvements. The LW155 program is a cooperative joint program. The Joint Operational Requirements Document (JORD) was approved by the Assistant Commandant of the Marine Corps on 27 June 1995. The document was validated and approved by the Army on 29 September 1995. A MS I/II MCPDM was approved on 23 January 1996. A "shoot-off" in 1996 leads to source selection in March 1997 of a single contractor for EMD.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

- (U) ($4,030) Conducted component technology and prototype evaluation/testing.
- (U) ($5,797) Conducted system development.
- (U) ($800) Conducted Source Selection Board of prototype test participants.
- (U) ($1,100) Provided government Project Management Office support
- (U) ($2,665) Provide Matrix Development Engineering to System, Logistics, Testing, Safety, Quality Assurrance (QA)

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Supporting Arms Systems PROJECT NUMBER: C2112 PROJECT TITLE: Lightweight 155 Millimeter Howitzer (LW155)

2. (U) FY 1997 PLAN:

- (U) ($1,085) Provide government Project Management Office support
- (U) ($3,083) Provide Matrix Development Engineering to System, Logistics, Testing, Safety, Quality Assurrance(QA).
- (U) ($ 510) Complete Shoot Off and Finalize Test Data.
- (U) ($8,000) Award contract to initiate development and prototype manufacture of selected system.
- (U) ($ 520) Complete Source Selection Evaluation Board.
- (U) ($ 71) SBIR: Portion of program reserved for Small Business Innovation Research assessment in accordance with 15 U.S.C. 638(f)(1).

3. (U) FY 1998 PLAN:

- (U) ($22,480) Continue Contractor Development Engineering and Prototype Manufacturing.
- (U) ($5,713) Provide Matrix Development Engineering to System, Logistics, Testing, Safety, Quality Assurrance (QA).
- (U) ($2,602) Conduct Engineering support for Tech Data Analysis and Validation
- (U) ($1,200) Provide Program Management Office Support
- (U) ($3,308) Conduct System Development Test and Evaluation (fatigue, recoil, safety, hot/cold, firing table)

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Supporting Arms Systems PROJECT NUMBER: C2112 PROJECT TITLE: Lightweight 155 Millimeter Howitzer (LW155)

4. (U) FY 1999 PLAN:

- (U) ($20,050) Continue Contractor Development Engineering and Prototype Manufacturing
- (U) ($1,200) Provide Program Management Office Support
- (U) ($6,675) Provide Matrix Development Engineering to System, Logistics, Testing, Safety, Quality Assurrance (QA)
- (U) ($2,386) Continue Engineering support for Technical Data Analysis and Validation
- (U) ($3,604) Conduct and Conclude System DT and Initiate OA (airlift, arctic, desert, hot/humid, safety,log demo)

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 14,607 | 11,205 | 30,227 | 29,877 |
| (U) Adjustments from FY 1997 PRESBUD: | -215 | +2,064 | +5,076 | +4,038 |
| (U) FY 1998 President's Budget: | 14,392 | 13,269 | 35,303 | 33,915 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1996 decrease is due to an SBIR transfer and other miscellanous adjustments. FY 1997, 1998 and 1999 increases are based on a revised Life Cycle Cost Estimate validated by the Navy Center for Cost Analysis and approved at a MS II Decision on 23 January 1996.

(U) Schedule: Unchanged. See attached Program Schedule.

(U) Technical:

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Supporting Arms Systems PROJECT NUMBER: C2112 PROJECT TITLE: Lightweight 155 Millimeter Howitzer (LW155)

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

| | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| (U) PMC (BLI# 218500) 155mm Lightweight Towed Howitzer | 0 | 0 | 0 | 7,590 | 106,359 | 148,435 | 142,081 | 142,034 | CONT. | CONT. |

(U) RELATED RDT&E: PE 0603004A (Weapons and Munitions Advanced Technology)

D. (U) SCHEDULE PROFILE: (See Attached)

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M PROJECT NUMBER: C2112
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Supporting Arms Systems PROJECT TITLE: Lightweight 155 Millimeter Howitzer (LW155)

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Primary Hardware Development | 5,797 | 8,000 | 22,480 | 20,050 |
| b. Development Test and Evaluation | 4,030 | 0 | 3,308 | 2,604 |
| c. Operational Test and Evaluation | 0 | 510 | | 1,000 |
| d. Miscellaneous Test and Evaluation | 800 | 520 | | |
| e. Government Developmental Engineering | 2,665 | 3,154 | 5,713 | 6,675 |
| f. Engineering Tech Data Analysis | | | 2,602 | 2,386 |
| g. Program Management Support | 1,100 | 1,085 | 1,200 | 1,200 |
| Total | 14,392 | 13,269 | 35,303 | 33,915 |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M PROJECT NUMBER: C2112
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Supporting Arms Systems PROJECT TITLE: Lightweight 155 Millimeter Howitzer (LW155)

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | | |
| TBD (Shoot Off) | C/FPIF | MAY 96 | | | 0 | 1,500 | 8,000 | 22,480 | 20,050 | CONT | CONT. |
| ARDEC, Picatinny, NJ | MIPR | OCT 96 | | | 0 | 1,200 | 1,650 | 1,700 | 1,700 | CONT. | CONT. |
| MISC Government Accounts | MIPR | VARIOUS | | | 0 | 4,992 | 1,504 | 4,013 | 4,975 | CONT. | CONT. |
| MISC Tech Data Analysis Accounts | MIPR | VARIOUS | | | | | | 2,602 | 2,386 | CONT. | CONT. |
| TOTAL PRODUCT AND DEVELOPMENT | | | | | | 7,692 | 11,154 | 30,795 | 29,111 | CONT. | CONT. |
| Support and Management | | | | | | | | | | | |
| PMO LW155, Picatinny, NJ | MIPR | OCT 96 | | | 4,720 | 1,000 | 1,085 | 1,200 | 1,200 | CONT. | CONT. |
| Total Support and Management | | | | | 4,720 | 1,000 | 1,085 | 1,200 | 1,200 | CONT. | CONT. |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M PROJECT NUMBER: C2112
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ PROJECT TITLE: Lightweight 155 Millimeter
Supporting Arms Systems Howitzer (LW155)

B.(U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Test and Evaluation | | | | | | | | | | | |
| ARDEC, Picatinny, NJ | | | | | | | | | | | |
| (SSEB) | MIPR | OCT 96 | 3,825 | 3,825 | 3,124 | 701 | 0 | 0 | 0 | 0 | 3,825 |
| Misc Government Activities | | | | | | | | | | | |
| | MIPR | VARIOUS | | | 0 | 3,219 | 520 | 0 | 1,000 | CONT. | CONT. |
| ARL, Aberdeen, MD | | | | | | | | | | | |
| | | APR 94/JUL 95 | | | 5,347 | 0 | 0 | 0 | CONT. | CONT. | CONT. |
| Yuma Proving Ground, Yuma AZ | | | | | | | | | | | |
| (Shoot Off) | MIPR | FEB 96 | 2,040 | 2,040 | 0 | 1,530 | 510 | 0 | 0 | 0 | 2,040 |
| Yuma Proving Ground, Yuma AZ | | | | | | | | | | | |
| | MIPR | | | | 0 | 250 | 0 | 3,308 | 2,604 | CONT. | CONT. |
| Total Test and Evaluation | | | | | 8,471 | 5,700 | 1,030 | 3,308 | 3,604 | CONT. | CONT. |

GOVERNMENT FURNISHED PROPERTY: Not applicable.

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M PROJECT NUMBER: C2112
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Supporting Arms Systems PROJECT TITLE: Lightweight 155 Millimeter Howitzer (LW155)

| | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 0 | 7,692 | 11,154 | 30,795 | 29,111 | CONT. | CONT. |
| Subtotal Support and Management | 4,720 | 1,000 | 1,085 | 1,200 | 1,200 | CONT. | CONT. |
| Subtotal Test and Evaluation | 8,471 | 5,700 | 1,030 | 3,308 | 3,604 | CONT. | CONT. |
| Total Project | 13,191 | 14,392 | 13,269 | 35,303 | 33,915 | CONT. | CONT. |

FY 1998 RDT&E, N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Supporting Arms Systems PROJECT NUMBER: C2113 PROJECT TITLE: Predator/Short Range Assault Weapon (SRAW)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| C2113 Predator Short Range Assault Weapon (SRAW) | 33,542 | 27,716 | 730 | 0 | 0 | 0 | 0 | 0 | 0 | 118,422 |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Predator (SRAW) will provide the Marine Corps with a lethal, disposable, fire and forget, top-attack, soft launch for firing from enclosed spaces, proliferable, accurate, night vision capable, lightweight, main battle tank killer. Modularity of the system will allow development of optimal warheads (flame, bunker-busting, multi-purpose) to fit on the flight module.

1. (U) FY 1996 ACCOMPLISHMENTS:

- (U) ($28,542) Continued Engineering and Manufacturing Development (EMD) phase of program and conducted Critical Design Review (CDR).

- (U) ($1,500) Began Developmental Testing (DT).
- (U) ($3,500) Built test models.

2. (U) FY 1997 PLAN:

- (U) ($17,465) Continue EMD phase of program.

- (U) ($2,700) Complete DT.

- (U) ($2,700) Begin Operational Test (OT).

- (U) ($4,296) Forward finances efforts in FY 1998 within this project.

- (U) ($555) SBIR: Portion of program reserved for Small Business Innovation Research assessment in accordance with 15 U.S.C. 638 (f)(1).

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Supporting Arms Systems PROJECT NUMBER: C2113 PROJECT TITLE: Predator/Short Range Assault Weapon (SRAW)

3. (U) FY 1998 PLAN:

- (U) ($200) Complete OT. This effort partially financed with $300 of FY 1997 funds for this project.

- (U) ($ 50) Complete EMD phase of program. This effort partially financed with $3,996 of FY 1997 funds from this project.

- (U) ($480) Achieve Milestone III Approval for Service Use.

- (U) This program completes in FY 1998.

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 30,545 | 32,257 | 457 | 0 |
| (U) Adjustments from FY 1997 PRESBUDG: | +2,997 | -4,541 | +273 | 0 |
| (U) FY 1998 President's Budget: | 33,542 | 27,716 | 730 | 0 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY96 funding increase due to cost growth and rate changes on the prime contract. FY 1996 partially out of phase with work planned resulting in a shortfall in FY 1996 and an overage in FY 1997. FY98 R&D required to finish the EMD phase, achieve Milestone III decision, and to conduct contracting activities associated with awarding a production contract.

NOTES: Additional reductions due to DBOF, NON-FFRDC, General Reduction, Budget Resolution, and SBIR

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET Date: February 1997

BUDGET ACTIVITY: Supporting Arms Systems

PROGRAM ELEMENT: 0603635M
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Assault Weapon (SRAW)

PROJECT NUMBER: C2113
PROJECT TITLE: Predator/Short Range

(U) Schedule: Critical Design Review (CDR) delayed to 4th Qtr FY 1996 from 2nd Qtr FY96 due to minor delays in Engineering Model test flights resulting in MS III delay to 3rd Qtr FY 1998 from 1st Qtr FY-98.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

| | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| (U) PMC Line | (BLI#308900) | | | | | | | | | |
| | 0 | 0 | 0 | 18,238 | 29,789 | 28,308 | 27,966 | 28,895 | 223,104 | 356,300 |

(U) RELATED RDT&E: Not Applicable

D (U) SCHEDULE PROFILE: (See attached)

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M PROJECT NUMBER: C2113
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ PROJECT TITLE: Predator/Short Range
Supporting Arms Systems Assault Weapon (SRAW) A.(U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Primary Hardware Development | 5,681 | 276 | 0 | 0 |
| Airframe & Launcher | 1,400 | 156 | | |
| Electronics | 1,600 | 120 | | |
| Propulsion & Ordnance | 1,245 | 0 | | |
| System Integration | 1,436 | 0 | | |
| b. Materials and Subcontracting | 7,660 | 5,546 | 0 | 0 |
| c. Test Evaluation and Equipment in Support of Product Development | 4,617 | 3,800 | 0 | 0 |
| Support Equipment | 800 | 455 | | |
| Development Tests | 597 | 0 | | |
| Qualification Tests | 3,220 | 2,776 | | |
| Government Support | 0 | 569 | | |
| d. Production Support | 6,670 | 5,815 | 0 | 0 |
| Engineering Support | 120 | 100 | | |
| First Article Inspection and Test | 2,410 | 2,015 | | |
| Manufacturing and Process engineering | 4,140 | 3,700 | | |
| e. Program Support | 2,814 | 2,125 | 0 | 0 |
| Quality Assurance | 1,150 | 1,000 | | |
| Procurement | 924 | 550 | | |
| ILS | 740 | 575 | | |
| f. System Engineering | 1,100 | 1,100 | 0 | 0 |
| g. Project/Technical Management | 2,340 | 2,000 | 50 | |
| h. PM/Inhouse Support | 2,660 | 4,054 | 480 | |
| i. OT Testing | 0 | 3,000 | 200 | |
| Total | 33,542 | 27,716 | 730 | 0 |

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M PROJECT NUMBER: C2113
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ PROJECT TITLE: Predator/Short Range
Supporting Arms Systems Assault Weapon (SRAW)

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development : Basic Technology Initiative (BTI) Funds covered Prime (Lockheed Martin) through FY-92. | | | | | | | | | | | |
| Lockheed Martin Electronics and Missiles, Orlando, FL | | | | | | | | | | | |
| | SS/CPIF | 2 Jun 94 | 97,253 | 97,253 | 45,623 | 30,918 | 20,662 | 50 | 0 | 0 | 97,253 |
| Total Product Development | | | 97,253 | 97,253 | 45,623 | 30,918 | 20,662 | 50 | 0 | 0 | 97,253 |
| Support and Management | | | | | | | | | | | |
| NSWC, Dahlgren, VA | | | | | | | | | | | |
| | WR | 1 Oct 96 | 15,746 | 15,746 | 9,002 | 2,500 | 3,794 | 450 | 0 | 0 | 15,746 |
| Miscellaneous | | | | | | | | | | | |
| | VARIOUS | VARIOUS | 2,223 | 2,223 | 1,809 | 124 | 260 | 30 | 0 | 0 | 2,223 |
| Total Support and Management | | | 17,969 | 17,969 | 10,811 | 2,624 | 4,054 | 480 | 0 | 0 | 17,969 |
| Test and Evaluation | | | | | | | | | | | |
| Marine Corps Oper. Test Activity | | | 3,200 | 3,200 | 0 | 0 | 3,000 | 200 | 0 | 0 | 3,200 |
| Total Test and Evaluation | | | 3,200 | 3,200 | 0 | 0 | 3,000 | 200 | 0 | 0 | 3,200 |

GOVERNMENT FURNISHED PROPERTY: NOT APPLICABLE

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN Date: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M PROJECT NUMBER: C2113
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ PROJECT TITLE: Predator/Short Range
Supporting Arms Systems Assault Weapon (SRAW)

| | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 45,623 | 30,918 | 20,662 | 50 | 0 | 0 | 97,253 |
| Subtotal Support and Management | 10,811 | 2,624 | 4,054 | 480 | 0 | 0 | 17,969 |
| Subtotal Test and Evaluation | 0 | 0 | 3,000 | 200 | 0 | 0 | 3,200 |
| Total Project | 56,434 | 33,542 | 27,716 | 730 | 0 | 0 | 118,422 |

C. (U) FUNDING PROFILE: Not applicable.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms Systems

(U) COST (Dollars in thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| C2251 JT ADV AMPHIBIOUS LOGISTICS/COMBAT SERVICE SUPPORT (JT AAL/CSS)TECHNOLOGY | 0 | 0 | 0 | 744 | 1245 | 1492 | 1740 | 1990 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program develops, demonstrates and validates key advanced equipment and enabling technologies for Logistics/Combat Service Support of future amphibious and expeditionary missions across the crisis/operational spectrum encompassing Other Expenditionary Operations (OEO), Operations Maneuver from the Sea (OMFTS), and Sustained Operation Ashore (SOA). Multiple transitions from 6.3 technology development and demonstration are planned. Equipment development is focused on Marine Corps Combat Service Support Command and Control (MCSSC2) with integrated recording and tracking technologies for Total Asset Visibility (TAV), expeditionary container transporter concepts for fielding of an Improved Tactical Container Handler (ITCH), enabling concepts for sea-basing logistics that improve both sea-surface (Logistics Container Transporter-LCT) and aerial resupply transport mechanisms. Enhanced capabilities for execution of amphibious/naval expeditionary logistics/CSS are vital to the readiness of the Marine Corps as our nations forward deployed contingency force.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 Accomplishments: FY 1996 funding is contained in PE 0603640M, Marine Corps Advanced Technology Demonstrations.

2. (U) FY 1997 Plan: FY 1997 funding is contained in PE 0603640M.

3. (U) FY 1998 Plan: FY 1998 funding is contained in PE 0603640M.

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M PROJECT 4UMBER: C2251
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Supporting Arms Systems PROJECT TITLE: Jt Adv Amphibious Logistics/Combat Service Support (JT AAL/CSS) Technology

4. (U) FY 1999 PLAN: Funding is split between PE 0603640M, Project C2223, (3,510); and ($750) in this PE. The following efforts are funded in this PE:

- (U) ($197) Transition mature joint program concepts for aerial resupply from a sea-based platform to advanced development, at MS-I.

- (U) ($25) Establish baseline performance specification for LCT and ITCH for LCT and ECT concepts.

- (U) ($75) Prepare for MCPDM MS-I for LCT and ITCH Concepts.

- (U) ($447) Award Advanced Development Model (ADM) contract.

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 0 | 0 | 0 | 0 |
| (U) Adjustments from FY 1997 PRESBUD: | 0 | 0 | 0 | +744 |
| (U) FY 1998 President's Budget: | 0 | 0 | 0 | 744 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: Initiate program funding in FY 1999 due to anticipated maturity of emerging technologies and criticality of warfighting deficiency.

(U) Schedule: Not applicable.

(U) Technical: Not Applicable.

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M PROJECT NUMBER: C2251
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Supporting Arms Systems PROJECT TITLE: Jt Adv Amphibious Logistics/Combat Service Support (JT AAL/CSS) Technology

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not Applicable.

(U) RELATED RDT&E:

(U) PE 0602131M (Marine Corps Landing Force Technology)
(U) PE 0603640M (Marine Corps Advanced Technology Demonstrations)

D. (U) SCHEDULE PROFILE: Not Applicable.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms Systems

(U) COST (Dollars in thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| C2256 21ST CENTURY LAND WARRIOR (21CLW) | 0 | 0 | 0 | 744 | 871 | | 746 | 0 | 0 | 0 2,361 |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Funded Marine Corps commitment to joint service program led by the Army. This effort was undertaken to significantly enhance combat effectiveness and survivability of the dismounted combatant through evolution in materials, command and control, computers, electro-optics, firepower, navigation, and situational awareness.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 Accomplishments: FY 1996 funding is contained in PE 0603640M, Marine Corps Advanced Technology Demonstrations.

2. (U) FY 1997 Plan: Fy 1997 funding is contained in PE 0603640M.

3. (U) FY 1998 Plan: Fy 1998 funding is contained in PE 0603640M.

4. (U) FY 1999 PLAN:

- (U) ($494) Transition from the Technology Demonstration Phase to the Dem/Val phase. Participate fully in the Joint Army/Marine Corps program. Develop Marine unique sub-systems and aspects.

- (U) ($250) Begin test and evaluation.

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M PROJECT NUMBER: C2256
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Supporting Arms Systems PROJECT TITLE: 21st Century Land Warrior

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 0 | 0 | 0 | 0 |
| (U) Adjustments from FY 1997 PRESBUD: | 0 | 0 | 0 | +744 |
| (U) FY 1998 President's Budget: | 0 | 0 | 0 | 744 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: Initiate program funding in FY 1999 due to anticipated maturity of emerging technologies and criticality of warfighting deficiency.

(U) Schedule: Not Applicable.

(U) Technical: Not Applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not Applicable.

(U) RELATED RDT&E:
(U) PE 0602131M (Marine Corps Landing Force Technology)
(U) PE 0603640M (Marine Corps Advanced Technology Demonstrations)

D. (U) SCHEDULE PROFILE: Not Applicable.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603654N
PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Disposal Development

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| Q0377 Joint Service Explosive Ordnance Disposal System | 4,585 | 3,683 | 4,720 | 6,152 | 6,180 | 6,322 | 6,458 | 6,606 | CONT. | CONT. |
| Q1317 Explosive Ordnance Disposal Diving Systems | 3,693 | 2,161 | 5,981 | 5,606 | 5,196 | 4,875 | 3,067 | 2,817 | CONT. | CONT. |
| TOTAL | 8,278 | 5,844 | 10,701 | 11,758 | 11,376 | 11,197 | 9,525 | 9,423 | CONT. | CONT. |

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This is a Joint Service Program. This program provides for the development of Explosive Ordnance Disposal tools and equipment for use by all military services. The responsibility is assigned to the Navy as single service manager, by Department of Defense Directive 5160.62 of 26 April 1989, for management o the Joint Service Explosive Ordnance Disposal Research and Development Program. Increasing types of foreign and domestic weapons necessitate a continuing development program to provide Explosive Ordnance Disposal personnel of all military services with the special equipment and tools required to support this mission. This program also provides life support related equipment necessary to support the performance of Navy Explosive Ordnance Disposal tasks underwater. This equipment must have inherently low acoustic and magnetic signatures in order to allow the Explosive Ordnance Disposal technician to safely approach, render safe and dispose of sea mines and other underwater ordnance.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603654N
PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Disposal Development

(U) COST (Dollars in thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| Q0377 Joint Service Explosive Ordnance Disposal System | 4,585 | 3,683 | 4,720 | 6,152 | 6,180 | 6,322 | 6,458 | 6,606 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Provides Explosive Ordnance personnel of all military services with the specialized equipment and tools required to support their mission of detection, location, identification, rendering safe, recovery, field and laboratory evaluation, and final disposal of nuclear, conventional, chemical, and biological munitions, including improvised explosive devices.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

- (U) ($800) Initiated Main Charge Disrupter (MCD), formerly Remote Firing Device.
- (U) ($106) Completed critical design review on MODS project.
- (U) ($1,594) Obtained Milestone II for Remote Ordnance Neutralization System (RONS) project and initiated the Classified Project. ($457) Forward financing FY 97 requirements due to low expenditures in FY 95 and FY 96.
- (U) ($2,085) Obtained Milestone I decision for (Lightweight Disposable Disrupter (LIDD) and Milestone I/II decision for Advanced Radiographic System (ARS) project. ($210) Forward financing FY 97 requirements due to low expenditures in FY 96.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603654N PROJECT NUMBER: Q0377
PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Disposal Development PROJECT TITLE: Joint Service Explosive Ordnance Disposal System

2. (U) FY 1997 PLAN:

- (U) ($1,388) Continue development of RONS and Classified Project I. ($363) Forward finance for FY 98 requirements due to low execution rates.
- (U) ($1,086) Initiate DT-II on ARS project.
- (U) ($1,184) Initiate DT-IB on LIDD and DT-II on MCD projects.
- (U) ($25) Improved Ordnance Locator (IOL) project.

3. (U) FY 1998 PLAN:

- (U) ($1,460) Obtain Milestone III decision for ARS project and Classified Project I and Milestone II decision for LIDD.
- (U) ($2,570) Continue development of the RONS and MCD projects.
- (U) ($690) Initiate the Classified Project II project.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603654N PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Disposal Development PROJECT NUMBER: Q0377 PROJECT TITLE: Joint Service Explosive Ordnance Disposal System

4. (U) FY 1999 PLAN:

- (U) ($1,830) Obtain Milestone III decision for RONS and MCD projects.
- (U) ($2,340) Continue development of the Classified Project II and LIDD projects.
- (U) ($1,982) Initiate the Explosive Safe/Arm Monitor, Improvised Explosive Device (IED) Fuze Detector and Standoff Disrupter projects.

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 4,654 | 2,370 | 5,109 | 6,208 |
| (U) Adjustments from FY 1997 PRESBUDG: | -69 | +1,313 | -389 | -56 |
| (U) FY 1998/1999 PRESBUDG Submit: | 4,585 | 3,683 | 4,720 | 6,152 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: Decrease in FY 96 due SBIR adjustments. Increase in FY 97 due to Near Term Mine Warfare Plan. FY 98 decrease due to minor NWCF adjustments and -$363 for low expenditures in FY 96. FY 99 decrease due to minor NWCF adjustments.

(U) Schedule: Not applicable.

(U) Technical: Not applicable

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603654N PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Disposal Development PROJECT NUMBER: Q0377 PROJECT TITLE: Joint Service Explosive Ordnance Disposal System

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

| | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| (U) OPN Line 550900 (portion) | 0 | 0 | 200 | 1,600 | 1,520 | 1,992 | 0 | 0 | CONT. | CONT. |

(U) RELATED RDT&E:

(U) PE 0602315N (MCM, Mining & Special Warfare Technology) Provides for the development of new technologies which show promise and the transition to advanced development.
(U) PE 0604654N (Joint Service Explosive Ordnance Disposal Development) Provides for the integration of specialized tools and equipment into specified procedures required for individual weapons and ordnance items.

D. (U) SCHEDULE PROFILE: See Attached.

FY 1998/FY 1999 PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603654N PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Disposal Development PROJECT NUMBER: Q0377 PROJECT TITLE: Joint Service Explosive Ordnance Disposal System

A. (U) PROJECT COST BREAKDOWN: ($in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Primary Hardware Development | 2,239 | 1,126 | 1,587 | 2,487 |
| b. Software Development | 0 | 0 | 150 | 200 |
| c. ILS | 780 | 690 | 780 | 840 |
| d. Developmental T&E | 500 | 995 | 1,135 | 1,250 |
| e. Operational T&E | 0 | 0 | 0 | 75 |
| f. Program Management Support | 300 | 230 | 300 | 340 |
| g. Program Management Personnel | 220 | 200 | 200 | 220 |
| h. Miscellaneous | 546 | 442 | 568 | 740 |
| Total | 4,585 | 3,683 | 4,720 | 6,152 |

FY 1998/FY 1999 PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603654N PROJECT NUMBER: Q0377
PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Disposal Development PROJECT TITLE: Joint Service Explosive Ordnance Disposal System

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | | |
| NAVEODTD IH | WR | 10/96 | CONT. | CONT. | 154,512 | 3,601 | 3,453 | 4,420 | 5,812 | CONT. | CONT. |
| ARL, MD | MIPR | 1/96 | 684 | 684 | 0 | 684 | 0 | 0 | 0 | 0 | 684 |
| Support and Management | | | | | | | | | | | |
| Dynamic Sys | CPFF | 1/93 | 1,757 | 1,757 | 1,227 | 300 | 230 | 0 | 0 | 0 | 1,757 |
| TBD | CPFF | 1/98 | CONT. | CONT. | 0 | 0 | 0 | 300 | 340 | CONT. | CONT. |
| Test and Evaluation | Not applicable. | | | | | | | | | | |

GOVERNMENT FURNISHED PROPERTY

| Item Description | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Delivery Date | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | Not applicable. | | | | | | | | | |

Support and Management Not applicable.

Test and Evaluation Not applicable

FY 1998/FY 1999 PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603654N
PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Disposal Development

PROJECT NUMBER: Q0377
PROJECT TITLE: Joint Service Explosive Ordnance Disposal System

| | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 154,512 | 4,285 | 3,453 | 4,420 | 5,812 | CONT. | CONT. |
| Subtotal Support and Management | 1,227 | 300 | 230 | 300 | 340 | CONT. | CONT. |
| Subtotal Test and Evaluation | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Project | 155,739 | 4,585 | 3,683 | 4,720 | 6,152 | CONT. | CONT. |

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603654N
PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Disposal Development

(U) COST (Dollars in thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| Q1317 Explosive Ordnance Disposal Diving Systems | 3,693 | 2,161 | 5,981 | 5,606 | 5,196 | 4,875 | 3,067 | 2,817 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Provides for development of diving equipment and explosive charges to support Explosive Ordnance Disposal (EOD) underwater operation. The equipment must have inherently low acoustic and magnetic signatures in order to allow the EOD technician to safely approach, render safe, and dispose of sea mines and other underwater ordnance. Provides support for the Navy s high priority mission of Very Shallow Water Mine Countermeasures, including clandestine reconnaissance, in support of amphibious operations.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:
   - (U) ($1,374) Continued development of equipment which improves diver capability and endurance.
   - (U) ($504) Continued development of a non-magnetic underwater lift system.
   - (U) ($515) Continued development of a non-magnetic acoustic firing device.
   - (U) ($1,300) Support procurement, testing and maintenance of commercial, prototypical equipment for the VSW MCM Test Detachment.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603654N PROJECT NUMBER: Q1317
PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Disposal Development PROJECT TITLE: Explosive Ordnance Disposal Diving Systems

2. (U) FY 1997 PLAN:
   - (U) ($1,596) Continue developing equipment which improves diver capability and endurance.
   - (U) ($565) Continue developing a non-magnetic acoustic firing device.

3. (U) FY 1998 PLAN:
   - (U) ($845) Continue developing equipment which improves diver capability and endurance.
   - (U) ($604) Continue developing a non-magnetic acoustic firing device.
   - (U) ($560) Develop non-magnetic diver held underwater equipment to detect objects in the water column.
   - (U) ($270) Develop non-magnetic diver underwater navigation system compatible with Global Positioning System (GPS).
   - (U) ($3,702) Develop, test and gain approval for fleet use of specialized equipment to support the Very Shallow Water Mine Countermeasures unit.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603654N PROJECT NUMBER: Q1317
PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Disposal Development PROJECT TITLE: Explosive Ordnance Disposal Diving Systems

4. (U) FY 1999 PLAN:

- (U) ($323) Continue developing equipment which improves diver capability and endurance.
- (U) ($400) Continue developing a non-magnetic acoustic firing device.
- (U) ($839) Continue developing non-magnetic diver held underwater equipment to detect objects in the water column.
- (U) ($300) Continue developing non-magnetic diver underwater navigation system compatible with GPS.
- (U) ($309) Develop low influence underwater diver mounted display which will provide video interface with other EOD systems (Underwater Imaging System, Underwater Navigation System and MK 16 UBA).
- (U) ($468) Develop non-magnetic underwater vehicle to transport EOD diver and assocated equipment in support of EOD operations.
- (U) ($2,967) Continue to develop, test and gain approval for fleet use of specialized equipment to support the Very Shallow Water Mine Countermeasures unit.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603654N PROJECT NUMBER: Q1317
PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Disposal Development PROJECT TITLE: Explosive Ordnance Disposal

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 2,418 | 2,269 | 2,304 | 2,669 |
| (U) Adjustments from FY 1997 PRESBUDG: | +1,275 | -108 | +3,677 | +2,937 |
| (U) FY 1998/1999 PRESBUDG SUBMIT: | 3,693 | 2,161 | 5,981 | 5,606 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1996 increase due to Near Term Mine Warfare Plan, +$1,300K and SBIR adjustment, -$25K. Decreases in FY 97 are due to NWCF and General Reduction adjustments. Increases in FY 1998 and FY 1999 due to development of equipment for Very Shallow Water Mine Countermeasures unit.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603654N PROJECT NUMBER: Q1317
PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Disposal Development PROJECT TITLE: Explosive Ordnance Disposal Diving Systems

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

| FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|
| (U) OPN Line 114000 (portion) | | | | | | | | | |
| 1,117 | 722 | 4,977 | 6,075 | 5,933 | 3,134 | 4,827 | 4,152 | CONT. | CONT. |

(U) RELATED RDT&E: Not applicable.

D. (U) SCHEDULE PROFILE: See Attached.

FY 1998/FY 1999 PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603654N

PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Disposal Development

PROJECT NUMBER: Q1317

PROJECT TITLE: Explosive Ordnance Disposal Diving Systems

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Primary Hardware Development | 1,153 | 200 | 3,470 | 2,650 |
| b. Software Development | 0 | 0 | 80 | 133 |
| c. Systems Engineering | 546 | 311 | 456 | 441 |
| d. ILS | 298 | 326 | 284 | 540 |
| e. Developmental T&E | 831 | 311 | 585 | 720 |
| f. Operational T&E | 133 | 326 | 96 | 150 |
| g. Program Management Support | 212 | 255 | 361 | 428 |
| h. Program Management Personnel | 374 | 334 | 480 | 467 |
| i. Miscellaneous | 146 | 98 | 169 | 77 |
| Total | 3,693 | 2,161 | 5,981 | 5,606 |

FY 1998/FY 1999 PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603654N PROJECT NUMBER: Q1317
PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Disposal Development PROJECT TITLE: Explosive Ordnance Disposal Diving Systems

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION:

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | | |
| NAVEODTD IH | WR | 1/98 | 9,694 | 9,694 | 0 | 660 | 0 | 3,000 | 1,998 | 4,696 | 9,694 |
| MISC | Various | 1/96 | CONT. | CONT. | 26,660 | 2,821 | 1,956 | 2,620 | 3,180 | CONT. | CONT. |
| Support and Management | | | | | | | | | | | |
| Dynamic Sys | CPFF | 1/93 | 1,057 | 1,057 | 640 | 212 | 205 | 0 | 0 | | 1,057 |
| TBD | CPFF | 1/98 | 2,000 | 2,000 | 0 | 0 | 0 | 361 | 428 | CONT. | CONT. |
| Test and Evaluation | Not applicable. | | | | | | | | | | |

GOVERNMENT FURNISHED PROPERTY

| Item Description | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Delivery Date | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | Not applicable. | | | | | | | | | |

Support and Management Not applicable.

Test and Evaluation Not applicable

FY 1998/FY 1999 PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603654N

PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Disposal Development

PROJECT NUMBER: Q1317

PROJECT TITLE: Explosive Ordnance Disposal Diving System

| | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 | FY 1999 Budget | To Budget | Total Complete | Program |
|---|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 26,660 | 3,481 | 1,956 | 5,620 | 5,178 | CONT. | CONT. | |
| Subtotal Support and Management | 640 | 212 | 205 | 361 | 428 | CONT. | CONT. | |
| Subtotal Test and Evaluation | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Total Project | 27,300 | 3,693 | 2,161 | 5,981 | 5,606 | CONT. | CONT. | |

FY 1998 / FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603658N
PROGRAM ELEMENT TITLE: Cooperative Engagement Capability

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| U2039 Cooperative Engagement Capability (CEC) | 0 | 0 | 139,229 | 87,556 | 46,188 | 48,775 | 49,824 | 50,922 | | CONT. |
| CONT. | | | | | | | | | | |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Cooperative Engagement Capability (CEC) significantly improves Battle Force Anti-Air Warfare (AAW) capability by coordinating all Battle Force AAW sensors into a single, real-time, composite track picture having fire control quality. CEC distributes sensor data from each ship and aircraft, or cooperating unit (CU), to all other CUs in the battle force through a real-time, line of sight, high data rate sensor and engagement data distribution network. CEC is highly resistant to jamming and provides accurate gridlocking between CUs. Each CU independently employs high capacity, parallel processing and advanced algorithms to combine all distributed sensor data into a fire control quality track picture which is the same for all CUs. CEC data is presented as a superset of the best AAW sensor capabilities from each CU, all of which are integrated into a single input to each CU's combat weapons system. CEC will significantly improve our Battle Force defense in depth, including both local area and ship defense capabilities against current and future AAW threats. Moreover, CEC will provide critical connectivity and integration of over-land air defense systems capable of countering emerging air threats, including land attack cruise missiles, in a complex littoral environment.

(U) CEC consists of the Data Distribution System (DDS), the Cooperative Engagement Processor (CEP), and Combat System Modifications. The DDS encodes and distributes ownship sensor and engagement data, is a high capacity, jam resistant, directive system providing a precision gridlocking and high throughput of data. The CEP is a high capacity distributed processor which is able to process force levels of data in a timely manner that allows its output to be considered real-time fire control data. This data is passed to the ship's combat system as fire control quality data for which the ship can cue its onboard sensors or use the data to engage targets without actually tracking them.

(U) Project U2039 transferred from Program Element 0603755N beginning in FY 1998.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under ENGINEERING AND MANUFACTURING DEVELOPMENT because it encompasses engineering and manufacturing development of new end-items prior to production approval decision.

FY 1998 / FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603658N
PROGRAM ELEMENT TITLE: Cooperative Engagement Capability

PROJECT NUMBER: U2039
PROJECT TITLE: Cooperative Engagement Capability (CEC)

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS: Not applicable.

2. (U) FY 1997 PLAN: Not applicable.

3. (U) FY 1998 PLAN:

- (U) ($51,360) Complete development of shipboard Common Equipment Set (CES).
- (U) ($49,700) Continue development of airborne integration.
- (U) ($28,169) Continue integration with AEGIS, Advanced Combat direction System (ACDS), and AN/UYQ-70s.
- (U) ($10,000) Continue field support.

4. (U) FY 1999 PLAN:

- (U) ($51,519) Continue development of shipboard CES.
- (U) ($10,700) Continue development of airborne integration.
- (U) ($13,247) Continue integration with AEGIS, ACDS, and AN/UYQ-70s.
- (U) ($12,100) Continue field support.

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 | |
|---|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 0 | 0 | 0 | | 0 |
| (U) Adjustments from FY 1997 PRESBUDG: | 0 | 0 | +139,229 | +87,556 | |
| (U) FY 1998 / FY 1999 PRESBUDG Submit: | 0 | 0 | +139,229 | +87,556 | |

FY 1998 / FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603658N PROJECT NUMBER: U2039
PROGRAM ELEMENT TITLE: Cooperative Engagement Capability (CEC) PROJECT TITLE: Cooperative Engagement Capability

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: Changes in funding for FY 1998 and FY 1999 due to transfer of Project U2039 from Program Element 0603755N beginning in FY 1998.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in Thousands)

| | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| OPN 260600 | 0 | 0 | 0 | 57,522 | 107,905 | 104,780 | 113,540 | 111,748 | 333,305 | 828,800 |
| SCN Various | 0 | 0 | 0 | 7,157 | 29,443 | 33,070 | 38,133 | 25,048 | 120,149 | 253,000 |
| O&M 1D4D | 0 | 0 | 15,488 | 22,437 | 25,265 | 31,495 | 32,104 | 32,322 | CONT. | CONT. |
| APN (BA-5) 330000 | 0 | 0 | 5,400 | 11,000 | 16,500 | 8,100 | 49,800 | 44,100 | 112,161 | 247,061 |
| APN-1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 101,152 | 101,152 |
| R&D (0204152N) | 0 | 0 | 5,100 | 0 | 0 | 0 | 0 | 0 | 9,900 | 15,000 |

NOTE: Program Element 0603755N (Project U2039) contains CEC program for FY 1997 and prior .

FY 1998 / FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603658N
PROGRAM ELEMENT TIT LE: Cooperative Engagement Capability (CEC)

PROJECT NUMBER: U2039
PROJECT TITLE: Cooperative Engagement Capability

(U) RELATED RDT&E:

(U) PE 0205604N (Tactical Data Links)

(U) PE 0604307N (AEGIS Combat System Engineering)

(U) PE 0604366N (Standard Missile Improvements)

(U) PE 0604518N (Combat Information Center Conversion)

(U) PE 0204152N (E-2C Improvements)

D. (U) SCHEDULE PROFILE: See attached.

FY 1998 / FY 1999 RDT&E,N PROGRAM ELEMENT/PROJEC T COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT:0603658N
PROGRAM ELEMENT TITLE:Cooperative Engagement Capability

PROJECT NUMBER: U2039
PROJECT TITLE: Cooperative Engagement Capability

A. ( U ) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996* | FY 1997* | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Program Management | 0 | 0 | 5,560 | 5,274 |
| b. Systems Engineering | 0 | 0 | 24,830 | 19,900 |
| c. Equipment Assembly | 0 | 0 | 19,880 | 15,800 |
| d. Software Development | 0 | 0 | 18,725 | 15,213 |
| e. Integration | 0 | 0 | 44,176 | 19,669 |
| f. Installation | 0 | 0 | 5,455 | 3,200 |
| g. Test | 0 | 0 | 6,585 | 4,000 |
| h. Technical Data | 0 | 0 | 2,205 | 1,500 |
| i. Integrated Logistics Support | 0 | 0 | 11,813 | 3,000 |
| Total | 0 | 0 | 139,229 | 87,556 |

* Note: Project U2039 transferred from PE 0603755N beginning in FY 1998.

FY 1998 / FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT:0603658N PROGRAM ELEMENT TITLE:Coopera tive Engagement Capability PROJECT NUMBER: U2039 PROJECT TITLE: Cooperative Engagement Capability

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ FundType Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY1995 &Prior | FY1996 Budget | FY1997 Budget | FY1998 Budget | FY1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Product Development** | | | | | | | | | | | |
| E-Systems St. Petersburg, FL | SS/CPFF | 10/97 | CONT. | CONT. | 0 | 0 | 0 | 37,394 | 30,134 | CONT. | CONT. |
| JHU/APL Laurel, MD | SS/CPFF | 02/98 | CONT. | CONT. | 0 | 0 | 0 | 19,900 | 15,000 | CONT. | CONT. |
| NAVSURFWARCENDIV Crane, IN | WR | Various | CONT. | CONT. | 0 | 0 | 0 | 4,398 | 3,518 | CONT. | CONT. |
| NAVSURFWARCENDIV Dahlgren, VA | WR | Various | CONT. | CONT. | 0 | 0 | 0 | 7,000 | 4,527 | CONT. | CONT. |
| NAVSURFWARCENDIV Port Hueneme, CA | WR | Various | CONT. | CONT. | 0 | 0 | 0 | 4,663 | 2,555 | CONT. | CONT. |
| DRPM, AEGIS Washington, DC | PD | Various | 60,900 | 60,900 | 0 | 0 | 0 | 22,300 | 13,247 | 25,353 | 60,900 |
| NAVAIR PMA-231 Washington, DC | PD | Various | 127,700 | 127,700 | 0 | 0 | 0 | 22,000 | 7,700 | 98,000 | 127,700 |
| LOCKHEED AERO SYS CO Marietta, GA | C/FFP | 10/97 | 8,500 | 8,500 | 0 | 0 | 0 | 8,500 | 0 | 0 | 8,500 |
| Miscellaneous | Various | Various | CONT. | CONT. | 0 | 0 | 0 | 7,000 | 7,000 | CONT. | CONT. |

FY 1998 / FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT:0603658N PROJECT NUMBER: U2039
PROGRAM ELEMENT TITLE:Cooperative Engagement Capability PROJECT TITLE: Cooperative Engagement Capability

| Contractor/ Government Performing Activity | Contract Method/ FundType Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY1995 &Prior | FY1996 Budget | FY1997 Budget | FY1998 Budget | FY1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Support and Management** | | | | | | | | | | | |
| Miscellaneous | Various | Various | CONT. | CONT. | 0 | 0 | 0 | 5,875 | 3,875 | CONT. | CONT. |
| **Test and Evaluation** | | | | | | | | | | | |
| Miscellaneous | Various | Various | 17,272 | 17,272 | 0 | 0 | 0 | 199 | 0 | 17,073 | 17,272 |

GOVERNMENT FURNISHED PROPERTY - Not applicable.

| | FY1995 &Prior | FY1996 Budget | FY1997 Budget | FY1998 Budget | FY1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| **Subtotal Product Development** | 0 | 0 | 0 | 133,155 | 83,681 | CONT. | CONT. |
| **Subtotal Support and Management** | 0 | 0 | 0 | 5,875 | 3,875 | CONT. | CONT. |
| **Subtotal Test and Evaluation** | 0 | 0 | 0 | 199 | 0 | 17,073 | 17,272 |
| **Total Project** | 0 | 0 | 0 | 139,229 | 87,556 | CONT. | CONT. |

FY 1998 / FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT:0603658N PROJECT NUMBER: U2039
PROGRAM ELEMENT TITLE:Cooperative Engagement Capability PROJECT TITLE: Cooperative Engagement Capability

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FY 1998/1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603721N
PROGRAM ELEMENT TITLE: Environmental Protection

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| S0400 Ordnance Reclamation | 1,027 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 26,703 |
| S0401 Shipboard Waste Management | 50,307 | 38,828 | 42,281 | 44,844 | 69,707 | 49,515 | 27,839 | 25,923 | CONT | CONT |
| W2210 Environmental Compliance | 1,754 | 1,418 | 2,594 | 4,225 | 4,494 | 4,723 | 5,040 | 5,333 | CONT | CONT |
| Y0817 Pollution Abatement Ashore | 5,547 | 6,178 | 7,526 | 9,112 | 9,534 | 10,147 | 10,767 | 11,380 | CONT | CONT |
| TOTAL | 58,635 | 46,424 | 52,401 | 58,181 | 83,735 | 64,385 | 43,646 | 42,636 | CONT | CONT |

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program develops processes, prototype hardware, systems and operational procedures that will allow the Navy to operate in the U.S., foreign and international waters, air, space, and land areas while complying with U.S. statutes and international agreements. The program also includes efforts to improve the Navy's response to salvage-related pollution incidents. Projects support the Navy's requirement to meet environmental standards outlined by Environmental Protection Agency Executive Order 12088 of October 1978, The Act to Prevent Pollution from Ships, 1993 Amendment and DoD Directive 6050.4 of 16 March 1982, DoD Directive 4210.15 of 27 July 1989, DoD Directive 6050.15 of 14 June 1985, and DoD Directive 6050.9 of 13 February 1989. Project S0401 supports RDT&E efforts that allow the Navy to be in compliance with existing and anticipated laws with regard to four major areas: 1) ozone depleting substances, 2) solid waste, 3) liquid waste, and 4) hazardous and other ship wastes. Project W2210 supports development of environmental systems for naval aviation operations to enable compliance with environmental laws and regulations and minimize the cost associated with environmental compliance. Project Y0817 supports and validates development of technologies to enable facilties to comply with environmental laws and regulations in a cost effective manner.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

FY 1998/1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603721N PROGRAM ELEMENT TITLE: Environmental Protection

DATE: February 1997
PROJECT NUMBER: S0401
PROJECT TITLE: Shipboard Waste Management

(U) COST (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| S0401 Shipboard Waste Management | 50,307 | 38,828 | 42,281 | 44,844 | 69,707 | 49,515 | 27,839 | 25,923 | CONT | CONT |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Project develops equipment and procedures for managing shipboard waste. Emphasis is on developing shipboard systems to enable compliance with national, state, and international regulations and on achieving an affordable pollution-free profile for future ships and submarines. This program also develops conservation technologies and ozone-safe replacement chemical technologies for Navy solvents and shipboard refrigeration and firefighting systems.

1. (U) FY 1996 ACCOMPLISHMENTS:

- (U) ($14,880) Ozone Depleting Substances(ODS) - Continued development of backfit modification kits for two surface ship 200-ton CFC-114 air conditioning plant designs. Continued development of backfit modification kits for surface ship 300-ton CFC-114 air conditioning plant designs. Continued development of backfit modifications for other surface ship CFC-114 air conditioning systems. Continued development of future fleet non-chlorofluorocarbon 125-ton twin screw air conditioning plant prototype. Continued development of a future fleet non-chlorofluorocarbon 200-ton centrifugal air conditioning plant and 1.5-ton refrigeration plant. Continued development of Alternative Fire Fighting Agent Delivery Systems (AFFADS) for new ship construction. Evaluated promising alternative non-ozone depleting firefighting technologies from science and technology programs. Continued development of alternative solvents and processes for oxygen systems cleaning applications.

- (U) ($20,840) Integrated Liquid Wastes - Initiated support of rulemaking process with the Environmental Protection Agency (EPA) in the development of Uniform National Discharge Standards (UNDS) for liquid waste discharges from naval vessels. Continued development of shipboard integrated liquid waste treatment system including the following: completed shipboard test and evaluation of a breadboard membrane oily waste polishing system and initiate and completed development of advanced development model and initiate shipboard testing,

initiated evaluation of alternative Sorbent Based Oily Waste Polishing System (SBOWPS); continued test and evaluation of breadboard graywater treatment system; upgraded shipboard vortex incinerator system modified to process graywater and oily waste concentrate in addition to sewage, and initiated development of advanced development model graywater treatment system for shipboard testing. Continued evaluation of low flow water minimization appliances, devices and marine sanitation devices. Initiated development of an advanced Oil Content Monitor (OCM). Continued investigation of fixes for Compensated Fuel Ballast Systems (CFBS) primarily through development of a computational fluid dynamics model and scale model testing. Initiated investigation of improved bilge detergents.

- (U) ($7,000) Solid Wastes - Performed studies supporting 1996 and 1997 Reports to Congress on plan to comply with special area provisions of the International Convention for the Prevention of Pollution from Ships (MARPOL), Annex V, and the associated Environmental Impact Statement (EIS) for Navy Solid Waste Management Plan. Continued test and evaluation of prototype solid waste processing equipment for surface ships.

- (U) ($7,587) Hazardous and Other Major Ship Wastes - Continued shipboard hazardous waste substitution and elimination program. Initiated investigations and evaluations of shipboard Pollution Prevention (P2) equipment to identify their high potential for Fleet hazardous material and cost reduction. Initiated investigation, test and evaluation of non-asbestos (Non-Asb) substitute gaskets, packing and brake/clutch faces used in shipboard machinery. Initiated laboratory testing on compliant commercial paints to ensure that environmental regulatory limits for Volatile Organic Compound (VOC) content, Hazardous Air Pollutants (HAP) as well as heavy metal and toxic contaminants are met. Continued development of Recovered Oil Logistic System (ROLS); continued development of a Computer Based Contingency Planning System (CBCPS); continued development of In-Situ Oil Burning Techniques (ISOBS); and initiated development of the Oil Outflow and Salvage Response Analysis Program (OOSRAP).

2. (U) FY 1997 PLAN:

- ($11,715) Ozone Depleting Substances - Convert first submarine CFC-12 refrigeration plant to HFC-134a and related equipment modifications for at-sea testing and evaluation. Complete development of backfit modification kits for two surface ship 200-ton CFC-114 air conditioning plant designs. Continue development of backfit modification kits for a 300-ton surface ship CFC-114 air conditioning plant designs. Initiate development of backfit modification kit for a third surface ship 200-ton CFC-114 air conditioning plant design. Continue development of the backfit modification kit for the surface ship 125-ton CFC-114 air conditioning plant design. Continue

development of backfit modifications for other surface ship air conditioning systems. Begin efforts to perform one-year at-sea ship test of HFC-236fa backfit modifications on shipboard 200-ton CFC-114 plants. Continue development of future fleet non-chlorofluorocarbon 125-ton twin screw air conditioning plant prototype. Continue development of future fleet non-chlorofluorocarbon 200-ton centrifugal air conditioning plant and 1.5-ton refrigeration plant; begin laboratory evaluations of prototype hardware. Continue development of alternate solvents and processes for oxygen systems cleaning applications. Continue development of AFFADS for new ship construction. Evaluate promising alternative non-ozone depleting substances firefighting technologies from science and technology community.

- (U) ($18,639) Integrated Liquid Wastes - Continue support of rulemaking process with the Environmental Protection Agency (EPA) in the development of Uniform National Discharge Standards (UNDS) for liquid waste discharges for Navy vessels. Continue development of shipboard integrated liquid waste treatment system including the following: continue development of membrane oily waste polishing systems; continue development of improved bilge cleaning detergents and advanced oil content monitor; continue test and evaluation of breadboard graywater treatment system and development of an advanced development model graywater treatment system; continue testing upgraded vortex incinerator system; continue investigating design fixes for shipboard compensated fuel ballast systems and initiate development of sectional full scale model system. Initiate testing of Non-Seeping Grease Seal (NSGS) on submarine dive and steering gear.

- (U) ($4,636) Solid Wastes - Complete effort supporting Reports to Congress on plan to comply with special area provisions of the International Convention for the Prevention of Pollution from Ships (MARPOL), AnnexV. Initiate development of management practices and systems for plastics for submarine application. Complete support for Environmental Impact Statement (EIS) for Navy Solid Waste Management Plan for surface ships. Initiate and complete Environmental Assessment (EA) for Navy Solid Waste Management plan for submarines. Continue test and evaluation of prototype solid waste processing equipment for surface ships.

- (U) ($3,600) Hazardous and Other Major Ship Wastes - Continue shipboard hazardous waste substitution and elimination task and continue T&E of pollution prevention equipment aboard ship. Continue investigation of non-asbestos substitutes and initiate preparation of a final report and substitute specifications. Continue quality assurance testing on reformulated commercial paints. Continue development of Recovered Oil Logistics System; continue development of Computer Based Contingency Planning System; continue development of In-Situ Oil Burning System; and continue development of the Oil Outflow and Salvage Response Analysis program.

- (U) ($238) Portion of extramural program reserved for Small Business Innovation Research (SBIR) assessment in accordance with 15 U.S.C.638.

3. (U) FY 1998 PLAN:

- (U) ($9,405) Ozone Depleting Substances - Complete development of a backfit modification kit for surface ships 300-ton CFC-114 air conditioning plant designs. Continue development of backfit modification kit for a third surface ship 200-ton CFC-114 air conditioning plant design. Continue development of backfit modification kit for the surface ship 125-ton CFC-114 air conditioning plant design. Continue development of backfit modification kit for surface ship 150-ton CFC-114 air conditioning plant design. Continue development of backfit modifications for other surface ship air conditioning plant designs. Modify shipboard 200-ton CFC-114 air conditioning plants onboard one ship to HFC-236fa for one-year at-sea ship test. Complete development of future fleet non-chlorofluorocarbon 125-ton twin screw air conditioning plant, 200-ton centrifugal air conditioning plant and 1.5-ton refrigeration plant prototypes. Continue development of alternative solvents and process for oxygen systems cleaning applications. Complete development of AFFADS for new ship construction. Evaluate next-generation non-ozone depleting fire suppression technologies.

- (U) ($18,328) Integrated Liquid Wastes - Continue support of rulemaking process with the Environmental Protection Agency (EPA) in the development of Uniform National Discharge Standards (UNDS) for liquid waste discharges from Navy vessels. Continue development of integrated liquid waste treatment system including: complete development of Membrane Oily Waste Polishing Systems (MOWPS), initiate shipboard evaluation of advanced development model graywater treatment system, continue test and evaluation of upgraded shipboard vortex incinerator with emphasis on evaporation/incineration of all concentrated ship liquid wastes (multifunctional) and continue development of design fixes for compensated fuel ballast systems. Complete testing of Non-Seeping Grease Seal (NSGS) on submarine dive and steering gear.

- (U) ($6,432) Solid Wastes - Continue development of management processes and systems for plastics for submarine application. Complete evaluation of prototype solid waste processing equipment on surface ships. Initiate development of a pulper for submarine application.

FY 1998/1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603721N PROGRAM ELEMENT TITLE: Environmental Protection

DATE: February 1997
PROJECT NUMBER: S0401
PROJECT TITLE: Shipboard Waste Management

- (U) ($8,116) Hazardous and Other Major Ship Wastes - Continue shipboard hazardous waste substitution and elimination task and continue T&E of pollution prevention equipment aboard ship. Complete investigation of Non-Asbestos Substitutes (NAS) and issue final report. Continue quality assurance testing on reformulated commercial paints. Continue development of Recovered Oil Logistics System; continue development of Computer Based Contingency Planning System; complete development of In-Situ Oil Burning System (ISOBS); complete development of the Oil Outflow and Salvage Response Analysis Program (OOSRAP); initiate development of Remotely Operated Under Water Tank Access System (HotTap); and initiate development of the Oil and Skimmer Tracking System; initiate development of technology necessary to reduce nitrous oxide emissions from Navy gas turbine engines.

4. (U) FY 1999 PLAN:

- (U) ($8,713) Ozone Depleting Substances - Complete development of backfit modification kit for a third surface ship 200-ton CFC-114 air conditioning plant design. Complete development backfit modification kit for the surface ship 125-ton CFC-114 air conditioning plant design. Complete development of backfit modification kit for surface ship 150-ton CFC-114 air conditioning plant design. Continue development of backfit modification kits for surface ship 250-ton and 363-ton CFC-114 air conditioning plant designs. Continue development of backfit modifications for remaining surface ship 200-ton and 250-ton CFC-114 air conditioning plants designs. Complete one-year at-sea ship test of HFC-236fa backfit modifications in 200-ton CFC-114 air conditioning plants. Complete development of alternative solvents and processes for oxygen systems cleaning applications. Continue evaluating next-generation non-ozone depleting fire suppression technologies.

- (U) ($19,915) Integrated Liquid Wastes - Continue support of rulemaking process with the Environmental Protection Agency (EPA) in the development of Uniform National Discharge Standards (UNDS) for liquid waste discharges from navy vessels. Continue development of integrated liquid waste treatment system including: complete shipboard evaluation of advanced development model graywater treatment system and continue development of prototype graywater/sewage treatment system; continue development of multifunctional shipboard evaporation/incineration for all concentrated ship liquid wastes and continue development of design fixes for compensated fuel ballast systems.

- (U) ($6,136) Solid Wastes - Continue development of management processes and systems for plastics for submarine application. Continue development of a pulper for submarine application.

FY 1998/1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1997

BUDGET ACTIVITY: 4 | PROGRAM ELEMENT: 0603721N | PROGRAM ELEMENT TITLE: Environmental Protection | PROJECT NUMBER: S0401 | PROJECT TITLE: Shipboard Waste Management

- (U) ($10,080) Hazardous and Other Major Ship Wastes - Continue shipboard Hazardous Waste substitution and elimination task and continue T&E of Pollution Prevention equipment aboard ship. Continue quality assurance testing on reformulated commercial paints. Continue development of Recovered Oil Logistics System; complete development of Computer Based Contingency Planning System; continue development of Remotely Operated Under Water Tank Access System (HotTap); and continue development of the Oil and Skimmer Tracking System. Continue development of technology necessary to reduce nitrous oxide emissions from Navy gas turbine ships.

FY 1998/1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603721N PROGRAM ELEMENT TITLE: Environmental Protection

DATE: February 1997
PROJECT NUMBER: S0401
PROJECT TITLE: Shipboard Waste Management

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 55,457 | 40,484 | 43,573 | 50,047 |
| (U) Adjustments from FY 1997 PRESBUDG: | -5,150 | -1,656 | -1,292 | -5,203 |
| (U) FY98/99 PRESBUDG Submit: | 50,307 | 38,828 | 42,281 | 44,844 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1996: Reduction for reprogramming (-$3,499), reduction for SBIR (-$503)and other minor pricing adjustments (-$1,148).

FY 1997: Changes reflect Congressional undistributed reductions (-$1656).

FY 1998: Increase for Ozone Depleting Substances, liquid, and other ship wastes requirements (+$7,517). Reductions are due to requirements being reduced (-$6,580) and Navy Working Capital Fund (NWCF) and other minor pricing adjustments (-$2,229).

FY 1999: Increase for liquid and other ship wastes (+$6,710). Reductions are due to requirements being reduced (-$11,825) and NWCF and other minor pricing adjustments (-$88).

(U) Schedule Changes: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not Applicable.

(U) RELATED RDT&E: Not Applicable.

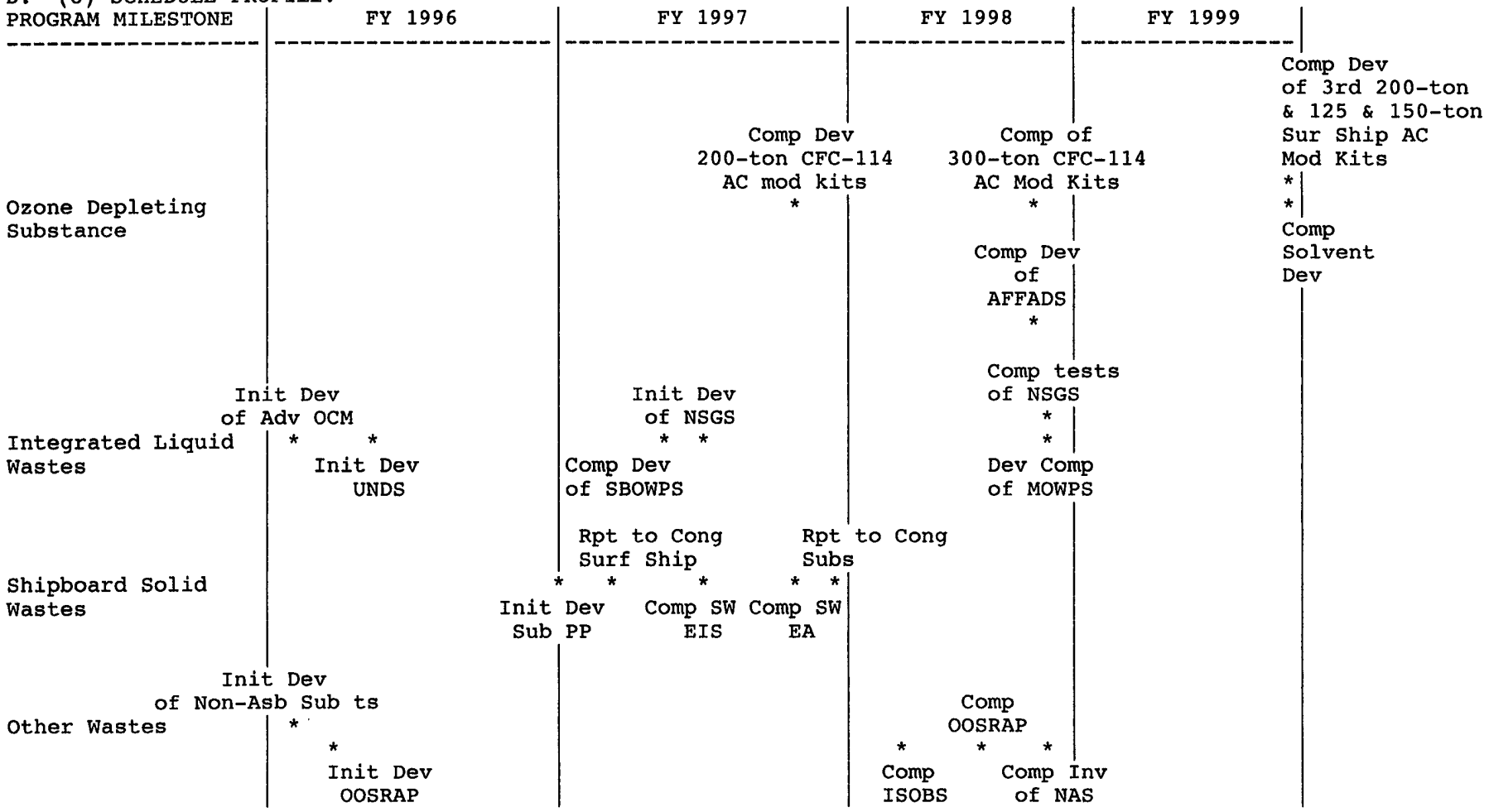
FY 1998/1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603721N PROJECT NUMBER: S0401

PROGRAM ELEMENT TITLE: Environmental Protection PROJECT TITLE: Shipboard Waste Management

D. (U) SCHEDULE PROFILE:



FY 1998/1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1997

BUDGET ACTIVITY: 4 | PROGRAM ELEMENT: 0603721N | PROGRAM ELEMENT TITLE: Environmental Protection | PROJECT NUMBER: S0401 | PROJECT TITLE: Shipboard Waste Management

FY 1998/1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603721N PROJECT NUMBER: S0401
PROGRAM ELEMENT TITLE: Environmental Protection PROJECT TITLE: Shipboard Waste Management

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| PROJECT COST CATEGORIES | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Ozone Depleting Subst | 14,880 | 11,715 | 9,405 | 8,713 |
| b. Integr Liquid Waste | 20,840 | 18,639 | 18,328 | 19,915 |
| c. Solid Wastes | 7,000 | 4,636 | 6,432 | 6,136 |
| d. Other Major Ship Wastes | 7,587 | 3,600 | 8,116 | 10,080 |
| e. SBIR | 0 | 238 | 0 | 0 |
| TOTAL | 50,307 | 38,828 | 42,281 | 44,844 |

FY 1998/1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603721N PROJECT NUMBER: S0401
PROGRAM ELEMENT TITLE: Environmental Protection PROJECT TITLE: Shipboard Waste Management

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development: | | | | | | | | | | | |
| Westinghouse, Machinery Technology Division | | | | | | | | | | | |
| Pitts., PA | C/CPFF | 8/86 | 20,000 | 20,000 | 14,580 | 30 | 0 | 0 | 0 | 0 | 14,610 |
| Geo-Centers, Inc. | | | | | | | | | | | |
| Boston, MA | C/CPFF | 1/96 | 20,000 | 20,000 | 0 | 5,983 | 3,000 | 3,000 | 3,000 | 5,017 | 20,000 |
| York International Corporation | | | | | | | | | | | |
| York, PA | SS/CPFF | 12/92 | 7,300 | 7,300 | 2,700 | 2,000 | 0 | 1,300 | 0 | 0 | 6,000 |
| Northern Research and Engineering Corporation, Inc. | | | | | | | | | | | |
| Pitts., PA | C/CPFF | 3/94 | 2,200 | 2,200 | 1,200 | 1,000 | 0 | 0 | 0 | 0 | 2,200 |
| John J. McMullen & Associates | | | | | | | | | | | |
| | C/CPFF | 11/95 | 10,000 | 10,000 | 0 | 2,000 | 1,000 | 2,000 | 2,000 | 3,000 | 10,000 |
| Rosenblatt & Son | | | | | | | | | | | |
| NewYork,NY | C/CPFF | 10/95 | 10,000 | 10,000 | 0 | 1,330 | 1,000 | 2,000 | 2,000 | 3,670 | 10,000 |
| Misc. Contr | Various | N/A | N/A | N/A | 12,510 | 5,000 | 2,000 | 3,000 | 3,000 | N/A | N/A |
| Support & Management: | | N/A | N/A | N/A | 70 | 0 | 0 | 0 | 0 | 70 | 70 |
| Test and Evaluation: | | | | | | | | | | | |
| NAVSURFWARCEN CARDEROCK DIV | | | | | | | | | | | |
| Bethes.,MD | WR | N/A | N/A | N/A | 31,289 | 15,971 | 18,844 | 14,693 | 16,004 | Cont | Cont |
| Naval Research Lab | | | | | | | | | | | |
| Wash., DC | WR | N/A | N/A | N/A | 8,805 | 7,995 | 7,500 | 5,500 | 5,000 | Cont | Cont |
| NCCOSC | | | | | | | | | | | |
| SanDiego,CA | WR | N/A | N/A | N/A | 2,050 | 1,200 | 2,000 | 2,000 | 2,000 | Cont | Cont |

FY 1998/1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603721N PROJECT NUMBER: S0401
PROGRAM ELEMENT TITLE: Environmental Protection PROJECT TITLE: Shipboard Waste Management

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NNSY Norfolk,VA | WR | N/A | N/A | N/A | 3,658 | 0 | 0 | 1,000 | 1,000 | Cont | Cont |
| Misc. Government Labs | WR | N/A | N/A | N/A | 14,325 | 1,500 | 1,000 | 1,000 | 2,000 | Cont | Cont |
| York International Corporation York, PA | C/CPFF | Various | 22,000 | 22,000 | 10,975 | 2,300 | 0 | 0 | 0 | 5,725 | 22,000 |
| Geo-Centers, Inc. Boston, MA | C/CPFF | 1/96 | 15,000 | 15,000 | 4,875 | 2,245 | 2,000 | 2,000 | 2,000 | 1,880 | 15,000 |
| Misc. Contr | C/CPFF | Various | Various | Various | 3,394 | 1,753 | 484 | 4,788 | 6,840 | Cont | Cont |

GOVERNMENT FURNISHED PROPERTY: Not applicable.

| Item Description | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 30,990 | 17,343 | 7,000 | 11,300 | 10,000 | Cont | Cont |
| Subtotal Support and Management | 70 | 0 | 0 | 0 | 0 | 70 | 70 |
| Subtotal Test and Evaluation | 79,371 | 32,964 | 31,828 | 30,981 | 34,844 | Cont | Cont |
| Total Program | 110,431 | 50,307 | 38,828 | 42,281 | 44,844 | Cont | Cont |

FY 1998/1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

ACTIVITY: 4 | PROGRAM ELEMENT: 0603721N | PROGRAM ELEMENT TITLE: Environmental Protection | PROJECT NUMBER: W2210 | PROJECT TITLE: Environmental Compliance | DATE: February 1997

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| W2210 Environmental Compliance | 1,754 | 1,418 | 2,594 | 4,225 | 4,494 | 4,723 | 5,040 | 5,333 | CONT | CONT |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project supports development and implementation of technologies which will lead to environmentally safe naval aviation operations and support; compliance with international, federal, state, and local regulations and policies; reduction of increasing compliance costs and personal liability; and enhancement of naval aviation mission effectiveness. Naval aviation pollution prevention efforts were previously supported by Project Y0817, Pollution Abatement Ashore. This project will support that part of project Y0817 that addressed aviation pollution prevention technologies as well as additional operational and shipboard aviation requirements previously unsupported.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

- (U) ($1,443) Developed and tested: Alternatives for cadmium, chromium, and cyanide plating; nonchromate aluminum pretreatment; non-hazardous chemical paint stripping processes; compliant solvents and cleaners; blast media treatment processes; molten salt bath plating process; zinc-nickel and tin-zinc alternates to cadmium plating; and nonchromated sealants.
- (U) ($161) Optimized low volatility diluents and non-toxic corrosion control pigments.
- (U)($150) Demonstrated performance of water-borne topcoat.

FY 1998/1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1997

ACTIVITY: 4 PROGRAM ELEMENT: 0603721N PROJECT NUMBER: W2210
PROGRAM ELEMENT TITLE: Environmental Protection PROJECT TITLE: Environmental Compliance

2. (U) FY 1997 PLAN:

- (U) ($1,202) Continue to develop and test: Alternatives for cadmium, chromium, and cyanide plating, nonchromate coatings, surface pretreatments, non-hazardous aircraft paint stripping processes; compliant solvents and cleaners; blast media treatment processes; and nonchromated sealants.

- (U) ($121) Evaluate alternative aircraft materials and processes to eliminate or reduce the emission of hazardous materials.

- (U) ($80) Continue to demonstrate performance of water-borne topcoat. Develop and test hazardous operational chemical and material alternatives.

- (U) ($15) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 U.S.C. 638.

3. (U) FY 1998 PLAN:

- (U) ($1,715) Continue to develop and test: Alternatives for cadmium, chromium, and cyanide plating nonchromate aluminum pretreatments, and sealants; non-hazardous chemical paint stripping processes; alternative non-hazardous solvents and cleaners. Develop and test low/non-volatile organic compound coatings; and non-hazardous corrosion control materials and processes.

- (U) ($355) Continue to evaluate alternative aircraft materials, processes, and systems to eliminate or reduce the emission of hazardous materials.

- (U) ($524) Continue to demonstrate performance of water-borne topcoats. Develop and test hazardous operational chemical and material alternatives.

FY 1998/1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1997

ACTIVITY: 4 PROGRAM ELEMENT: 0603721N PROJECT NUMBER: W2210
PROGRAM ELEMENT TITLE: Environmental Protection PROJECT TITLE: Environmental Compliance

4. (U) FY 1999 PLAN:

- (U) ($2,426) Continue to develop and test: Alternatives for cadmium, chromium, and cyanide plating nonchromate aluminum pretreatments, and sealants; non-hazardous chemical paint stripping processes; alternative non-hazardous solvents and cleaners; low/non-volatile organic compound coatings; and non-hazardous corrosion control materials and processes.

- (U) ($869) Continue to evaluate alternative aircraft systems to eliminate or reduce the emission of hazardous materials.

- (U) ($930) Continue to demonstrate performance of water-borne topcoats. Develop and test hazardous operational chemical and material alternatives. Develop and demonstrate technologies for control of ordnance and composite material emissions.

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 1,756 | 1,477 | 2,058 | 2,500 |
| (U) Adjustment from FY 1997 PRESBUDG: | -2 | -59 | +536 | +1,725 |
| (U) FY98/99 PRESBUDG Submit: | 1,754 | 1,418 | 2,594 | 4,225 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY 1996 decrease of $2K reflects a minor pricing adjustment. The FY97 decrease of $59K reflects Congressional undistributed reductions. The FY 1998 increase of $536K consists of: an increase of $13K for Navy Working Captial Fund (NWCF) rate restored and an increase of $523K for other minor pricing adjustments. The FY 1999 increase of $1,725K consists of: an increase of $1,767K for Shore Environmental Quality and an increase of $53K for NWCF rate restoral partially offset by decreases of $95K for other minor pricing adjustments.

FY 1998/1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1997

ACTIVITY: 4 PROGRAM ELEMENT: 0603721N PROJECT NUMBER: W2210
PROGRAM ELEMENT TITLE: Environmental Protection PROJECT TITLE: Environmental Compliance

(U) Schedule Changes: The increase of funds will allow for the development and test of low/non-volatile organic compound coatings; and non-hazardous corrosion control materials and processes.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:
(U) PE 0602233N (Readiness/Training/Environmental Quality)
(U) PE 0603716D (Strategic Environmental R&D Program)

D. (U) SCHEDULE PROFILE: Not applicable.

FY 1998/1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1997

ACTIVITY: 4

PROGRAM ELEMENT: 0603721N

PROGRAM ELEMENT TITLE: Environmental Protection

PROJECT NUMBER: W2210

PROJECT TITLE: Environmental Compliance

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| PROJECT COST CATEGORIES | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a.Pollution Prev Tech | 1,753 | 1,403 | 2,594 | 4,225 |
| b.Travel | 1 | 0 | 0 | 0 |
| c. SBIR | 0 | 15 | 0 | 0 |
| TOTAL | 1,754 | 1,418 | 2,594 | 4,225 |

FY 1998/1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1997

ACTIVITY: 4 PROGRAM ELEMENT: 0603721N PROJECT NUMBER: W2210
PROGRAM ELEMENT TITLE: Environmental Protection PROJECT TITLE: Environmental Compliance

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

| PERFORMING ORGANIZATIONS Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development: | | | | | | | | | | | |
| MISC (IN-HOUSE) | | | | | 0 | 1,754 | 1,418 | 2,594 | 4,225 | CONT | CONT |

Support and Management: Not applicable.

Test & Evaluation: Not applicable.

FY 1998/1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1997

ACTIVITY: 4

PROGRAM ELEMENT: 0603721N
PROGRAM ELEMENT TITLE: Environmental Protection

PROJECT NUMBER: W2210
PROJECT TITLE: Environmental Compliance

GOVERNMENT FURNISHED PROPERTY: Not applicable.

| | FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 0 | 1,754 | 1,418 | 2,594 | 4,225 | CONT | CONT |
| Subtotal Support and Management | 0 | 0 | 0 | 0 | 0 | CONT | CONT |
| Subtotal Test and Evaluation | 0 | 0 | 0 | 0 | 0 | CONT | CONT |
| Total Project | 0 | 1,754 | 1,418 | 2,594 | 4,225 | CONT | CONT |

FY 1998/1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1997

ACTIVITY: 4 PROGRAM ELEMENT: 0603721N PROJECT NUMBER: Y0817
PROGRAM ELEMENT TITLE: Environmental Protection PROJECT TITLE: Pollution Abatement Ashore

(U) COST (Dollars in thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| Y0817 Pollution Abatement Ashore | 5,547 | 6,178 | 7,526 | 9,112 | 9,534 | 10,147 | 10,767 | 11,380 | CONT | CONT |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project develops and validates new technologies needed to address pervasive Navy shoreside environmental requirements imposed on Naval shore activities by the need to comply with environmental laws, regulations, orders, and policies. The goal of the program is to minimize personnel liabilities, operational costs, and regulatory oversight while preserving or enhancing the ability of Naval shore activities to accomplish their required missions and functions. Each project task addresses one or more of the requirements from the Navy Environmental Quality RDT&E Strategic Plan dated October 1994.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

- (U) ($1,350) Ship Repair/Deactivation Operations - Completed development of a treatment system for sodium nitrite wastewater generated during marine steam boiler maintenance operations. Continued development of the Ultra High Pressure Waterjet System. Began: a) effort to quantify hexavalent chromium emissions from shipyard welding operations needed to identify commercial off the shelf (COTS) alternatives to reducing emission levels, b) development of system to recycle the mixture of concentrated citric acid and triethonalamine that is used to derust ship bilges and tanks; and c) identification of candidate technologies to reduce the cost for the removal and disposal of materials contaminated with polychlorinatedbiphenyls (PCBs) from deactivated Navy submarines.

- (U) ($0) Ordnance Manufacture/Testing Operations - During the FY 1997 budget development process, a decision was made to consolidate oversight and execution management of ordnance related environmental protection technologies under this project. FY 1996 was the year of transition and both Y0817 and S0400 ordnance tasks were funded by the

final year of funding for Project S0400. Completed validations previously funded under this project: a) use of the Catalyzed Electrochemical Oxidation (CEO) process to dispose of the OTTO fuel used in torpedoes, and b) a joint project with the Army demonstrating the use of a bioreactor to treat Propylene Glycol Dinitrate contaminated wastewater. Continued development of a Rocket Motor Exhaust Gas Scrubber for small rocket motor test firings. Began development of a Confined Burn Facility that will provide an environmentally compliant alternative to the Open Burn/Open Detonation (OB/OD) disposal of ordnance.

- (U) ($1,862) Other Industrial Operations - Completed validation of: a) a system to reduce Nitrous Oxide emissions from diesel generators in the Navy's Mobile Utilities Support Equipment (MUSE) inventory by allowing them to use natural gas as an alternative fuel. Began development of a ceramic crossflow ultrafiltration (CCF) system to recycle contaminated aqueous degreasing agents.

- (U) ($1,780) Non-Industrial Processes - Began development of a) sound propagation algorithms for Navy-unique scenarios needed to adapt existing Tri-Service noise models for Navy use in assessing and reducing the noise impacts of Navy operations in coastal areas on nearby communities; b) a modified QWIKLITE rapid marine bioassay system for use with contaminated marine sediments that uses the natural bioluminescence of marine organisms as the indicator; and c) systems to reduce the volume and the disposal costs of Aqueous Film Forming Foam (AFFF) wastes generated by the testing of firefighting equipment.

- (U) ($555) Hazardous Waste Minimization/Disposal - Began project to accelerate validation of emerging lower-cost hazardous waste disposal technology to reduce Navy disposal costs by 50% by gathering technical, economic, and regulatory performance data for characteristic Navy wastes from a range of ongoing and planned demonstrations by other agencies and industry. Efforts included treatability tests to determine if the Molten Salt Oxidation process is a viable alternative for shoreside hazardous waste destruction and participating in the Environmental Security Technology Certification Program (ESTCP) project to validate the use of Plasma Arc technology to destroy shoreside hazardous wastes.

FY 1998/1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1997

ACTIVITY: 4 PROGRAM ELEMENT: 0603721N PROJECT NUMBER: Y0817
PROGRAM ELEMENT TITLE: Environmental Protection PROJECT TITLE: Pollution Abatement Ashore

2. (U) FY 1997 PLAN:

- (U) ($1,803) Ship Repair/Deactivation Operations - Complete validation of a closed cycle Ultra High Pressure Waterjet System for ship paint removal and surface preparation with on-demand garnet abrasive injection and recovery. Conduct evaluation testing of alternative technologies for the cost effective removal and disposal of polychlorinatedbiphenyl (PCB) contaminated materials from deactivated Navy submarines. Begin a broader analysis to determine best removal processes and disposal technologies for hazardous materials removed during ship deactivations. Materials include lead and chrome in paints, asbestos, and a variety of fluids used in shipboard machinery.

- (U) ($1,150) Ordnance Manufacture/Testing Operations - Complete validation of a 5 pound/second capacity Rocket Motor Exhaust Gas Scrubber prototype. Continue development of the Confined Burn Facility.

- (U) ($1,195) Other Industrial Operations - Complete validation of: a) leak detection system for the 12 million gallon capacity underground fuel storage tanks at the Fleet and Industrial Supply Center (FISC) Red Hill facility; b) leak detection and locating (LDL) systems for underground high capacity fuel distribution pipelines; c) new low Volatile Organic Compound (VOC) lining systems for use in concrete and steel POL tanks.

- (U) ($1,277) Non-Industrial Processes - Complete validation of: a) alternative affordable capping methods for coastal landfills in high precipitation areas where contaminated leachate production is a problem; b) DOD noise model enhancements for Navy-unique operational scenarios; c) the use of X-Ray Fluorescence for the on-site measurement of metal contaminated sediments; d) a system for the direct in-situ measurement of contaminant transport between marine sediments and the overlying water mass; and e) Aqueous Film Forming Foam (AFFF) control and disposal system for wastes generated by firefighting equipment testing. Begin development of: a) a sensor and analysis program for the Site Characterization and Analysis Probe System (SCAPS) that will enable the system to be used to assess the subsurface transport characteristics of a contaminated site; and b) a concept from the Navy Exploratory Development R&D program for a premixing combustion technique that will minimize air emissions from Fire Fighter Training Facilities without sacrificing training realism.

- (U) ($720) Hazardous Waste Minimization/Disposal - Complete: a) shoreside hazardous waste destruction analysis that will identify the characteristics of Navy hazardous waste streams, capabilities of emerging technologies,

and the suitability of alternative acquisition plans; b) validation of the process of using physical separation techniques to reduce the volume of contaminated dredge spoil; and c) treatability testing of the Molten Salt Oxidation process. Continued participation in the Environmental Security Technology Certification Program s shoreside Plasma Arc project.

- (U) ($33) Portion of extramural program reserved for Small Business Innovation Research in accordance with 15 U.S.C. 638.

3. (U) FY 1998 PLAN:

- (U) ($1,925) Ship Repair/Deactivation Operations - Complete validation of: a) alternative technologies for the cost effective removal and disposal of polychlorinatedbiphenyl (PCB) contaminated materials from deactivated Navy submarines; and b) system to recycle derusting chemicals used for ship bilges and tanks. Conduct evaluation testing of alternative hazardous material removal processes and disposal technologies for ship deactivations.

- (U) ($1,513) Ordnance Manufacture/Testing Operations - Complete validation of a 10 pound capacity Confined Burn Facility prototype. Continue development of the Rocket Motor Exhaust Gas Scrubber.

- (U) ($1,710) Other Industrial Operations - Complete validation of a ceramic crossflow ultrafiltration (CCF) system for contaminated aqueous degreasing agents. Continue development of a low air emission fire simulator for Fire Fighter Training Facilities.

- (U) ($1,338) Non-Industrial Processes - Completed validation of: a) rapid cost effective assessment approach for marine contaminants by measuring sublethal cellular level indicators of contaminant exposure; b) a monitoring system to rapidly detect pierside oil spills; and c) the use of constructed coastal wetlands to control nonpoint source pollution control for Naval activities. Begin development of: a) non-polluting method for the cleaning of electrical switchgear while still energized; and b) an integrated approach to the contamination assessment and treatability characterization of coastal and harbor sediments.
- (U) ($1,040) Hazardous Waste Minimization/Disposal - Completed participation in the Environmental Security Technology Certification Program s shoreside Plasma Arc project. Begin: a) effort to provide an economical and transportable asbestos vitrification system having a unit acquisition cost below $450K; and b) containment and

cleaning approaches to minimize the hazardous wastes generated cleaning fuel and oil from airfield pavements. Army participation will be sought for the first project and Air Force participation will be sought for the second.

4. (U) FY 1999 PLAN:

- (U) ($2,385) Ship Repair/Deactivation Operations - Complete validation of alternative hazardous material removal processes and disposal technologies for ship deactivations that can be provided based on commercial off the shelf (COTS) alternatives. Continue development of removal processes and disposal technologies that cannot be provided based on (COTS) alternatives.

- (U) ($2,506) Ordnance Manufacture/Testing Operations - Complete validation of a 80 pound/second capacity Rocket Motor Exhaust Gas Scrubber prototype and a 100 pound capacity Confined Burn Facility prototype.

- (U) ($1,777) Other Industrial Operations - Complete development of non-polluting method for the cleaning of energized electrical switchgear. Complete development of a low air emission fire simulator for Fire Fighter Training Facilities.

- ($1,400) Non-Industrial Processes - Complete validation of: a) a modified QWIKLITE rapid marine bioassay system for marine sediments; and b) the subsurface transport sensor and analysis program for the SCAPS. Continue development of integrated contamination assessment and treatability characterization approaches for marine sediments.

- ($1,044) Hazardous Waste Minimization/Disposal - Complete development of: a) a transportable asbestos vitrification system; and b) containment and cleaning approaches for airfield pavements b) aircraft fuel and oil

  leak containment systems and airfield. Funding of additional shoreside general hazardous waste destruction technology validations is dependent on the outcome of the FY 1997 hazardous waste disposal analysis.

FY 1998/1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1997

ACTIVITY: 4 PROGRAM ELEMENT: 0603721N PROJECT NUMBER: Y0817
PROGRAM ELEMENT TITLE: Environmental Protection PROJECT TITLE: Pollution Abatement Ashore

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 5,553 | 6,440 | 7,310 | 7,948 |
| (U) Adjustments from FY 1997 PRESBUDG: | -6 | -262 | +216 | +1,164 |
| (U) FY 98/99 PRESBUDG Submit: | 5,547 | 6,178 | 7,526 | 9,112 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY 1996 decrease of $6K reflects a minor pricing adjustment. FY 1997 decrease of $262K reflects Congressional undistributed reductions. FY 1998 funding is increased $216K. The FY 1999 increase of $1,217K is for minor pricing adjustments.

(U) Schedule Changes: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E: This project transitions shoreside pollution abatement technologies from two Navy Science and Technology programs and the Strategic Environmental Research and Development Program (SERDP). Project funding is leveraged by transitioning technologies to the Environmental Security Technology Certification Program (ESTCP) for final certification and by providing funding for Navy participation in ESTCP projects. Execution of this project is coordinated with related Army and Air Force programs by the Tri-Service Environmental Quality R&D Strategic Plan developed under the leadership of the Joint Engineers Management Panel (JEMP).

FY 1998/1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1997

ACTIVITY: 4 PROGRAM ELEMENT: 0603721N PROJECT NUMBER: Y0817
PROGRAM ELEMENT TITLE: Environmental Protection PROJECT TITLE: Pollution Abatement Ashore

(U) PE 0602233N, Readiness, Training, and Environmental Quality Technology Development
(U) PE 0603712N, Environmental Quality, Logistics Advanced Technology Demonstrations
(U) PE 0603716D, Strategic Environmental Research & Development Program (SERDP)
(U) PE 0603851D, Environmental Security Technology Certification Program (ESTCP)

D. (U) SCHEDULE PROFILE: Not applicable.

FY 1998/1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

ACTIVITY: 4

PROGRAM ELEMENT: 0603721N
PROGRAM ELEMENT TITLE: Environmental Protection

PROJECT NUMBER: Y0817
PROJECT TITLE: Pollution Abatement Ashore

DATE: February 1997

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| PROJECT COST CATEGORIES | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. System Engineering | 1,696 | 938 | 1,204 | 1,458 |
| b. Prototype Development/Acquisition | 1,146 | 1,050 | 1,279 | 1,549 |
| c. Testing & Evaluation | 1,730 | 2,954 | 3,463 | 4,191 |
| d. Technical Doc. | 975 | 1,236 | 1,580 | 1,914 |
| TOTAL | 5,547 | 6,178 | 7,526 | 9,112 |

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development: | | | | | | | | | | | |
| NFESC | | | | | | | | | | | |
| PrtHuen.,CA | WR | 11/95 | N/A | N/A | 20,730 | 2,462 | 2,097 | 2,650 | 2,861 | CONT | CONT |
| NAVAIRWARCENACDIV | | | | | | | | | | | |
| Warmin.,PA | WR | 10/94 | N/A | N/A | 1,870 | 0 | 0 | 0 | 0 | CONT | CONT |
| NAVSURFWARCEN DET | | | | | | | | | | | |
| Annap., MD | WR | 1/96 | N/A | N/A | 2,282 | 350 | 625 | 1,402 | 1,791 | CONT | CONT |
| NAVSURFWARCENDIV | | | | | | | | | | | |
| Ind Hd, MD | WR | 3/96 | N/A | N/A | 3,231 | 135 | 935 | 1,256 | 1,632 | CONT | CONT |
| NCCOSC | | | | | | | | | | | |
| SanDiego,CA | WR | 11/95 | N/A | N/A | 13,060 | 1,745 | 1,413 | 1,446 | 1,847 | CONT | CONT |
| NRL | | | | | | | | | | | |
| Wash., DC | WR | 12/95 | N/A | N/A | 1,165 | 425 | 566 | 307 | 339 | CONT | CONT |

FY 1998/1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1997

ACTIVITY: 4 PROGRAM ELEMENT: 0603721N PROJECT NUMBER: Y0817

PROGRAM ELEMENT TITLE: Environmental Protection PROJECT TITLE: Pollution Abatement Ashore

Var Activ. 9,692 430 542 465 642

GOVERNMENT FURNISHED PROPERTY: Not applicable.

| | FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 52,030 | 5,547 | 6,178 | 7,526 | 9,112 | CONT | CONT |
| Subtotal Support and Management | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Test and Evaluation | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Project | 52,030 | 5,547 | 6,178 | 7,526 | 9,112 | CONT | CONT |

FY 1998/1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603724N
PROGRAM ELEMENT TITLE: Navy Energy Program (ADV)

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| R0829 | Energy Conservation (ADV) | | | | | | | | | |
| | 1,914 | 1,726 | 2,202 | 2,543 | 2,725 | 2,691 | 2,824 | 2,884 | CONT. | CONT. |
| R0838 | Mobility Fuels (ADV) | | | | | | | | | |
| | 0 | 1,229 | 1,957 | 2,086 | 2,180 | 2,170 | 2,204 | 2,242 | CONT. | CONT. |
| TOTAL | 1,914 | 2,955 | 4,159 | 4,629 | 4,905 | 4,861 | 5,028 | 5,126 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program supports projects to evaluate, adapt, and develop energy related technologies for ship, aircraft, and land-based operations to: (a) increase fuel-related weapons systems capabilities such as range and time on station; (b) conserve energy and reduce energy costs; (c) reduce Navy shore facilities dependence on petroleum fuels and apply energy technologies that improve environmental compliance; (d) relax unnecessarily restrictive fuel specification requirements to reduce cost and increase availability worldwide; (e) provide guidance to fleet operators for the safe use of commercial grade or off-specification fuels when military specification fuels are unavailable or in short supply; and (f) make needed periodic changes to fuel specifications to ensure fuel quality and avoid fleet operating problems. Through 1995, the Navy Energy R&D Program, of which this program element is a part, had produced energy cost avoidance estimated at $130M per year (compared to 1985 consumption rates). As currently funded, additional savings of $25M per year are projected to be achieved by FY 2000.

(U) This program, and the companion PE 0604710N, Navy Energy Program (ENG), support the achievement of Executive Department, DOD, and Navy Energy Management Goals; and also the Office of the Secretary of Defense, the Secretary of the Navy and the Chief of Naval Operations direction to make up-front investment in technologies that reduce future cost of operation and ownership of the fleet.

FY 1998/1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603724N
PROGRAM ELEMENT TITLE: Navy Energy Program (ADV)

(U) Joint Mission Areas/Warfare Areas (JMA/WA): This program directly supports the following JMA's: Forward Engagement/Deterrence, Maritime Support of Land Forces, and Strike; and Warfare Areas: Air Superiority, Strike, and Forward Deployed Combat Capable Forces.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental tests related to specific ship or aircraft applications.

FY 1998/1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603724N
PROGRAM ELEMENT TITLE: Navy Energy Program (ADV)

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| R0829 Energy Conservation (ADV) | 1,914 | 1,726 | 2,202 | 2,543 | 2,725 | 2,691 | 2,824 | 2,884 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project improves the energy efficiency of Navy ships, aircraft, and shore facilities and thereby contributes to reduced operating costs and improved fleet sustainability and performance. Major efforts include work to increase the efficiency of aircraft engines; develop improved hull coatings and auxiliary equipment for ships; and develop energy conservation technologies, and energy use management strategies for Navy shore facilities.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:
   - (U) ($592) Aircraft: Continued advanced control modes demonstrations for F414 engine and F/A-18 E/F airframe. Demonstrated (ground tests) advanced control logic effects on full authority digital engine control (FADEC) operation and resulting engine responses. Evaluated energy efficiency retrofit options for F/A-18 C/D. Initiated design of new high pressure turbine (HPT) for F414 growth engine (joint effort with General Electric).

- (U) ($831) Ships: Completed design and drawings for stern flap for DD-963/CG-47 hulls to reduce powering requirements. Selected bow bulb and aft hull/propeller interaction hydrodynamic mods for TAO-187 model test to reduced powering requirements. Evaluated hull cleaning procedures for easy release silicone anti-fouling (AF) coatings. Monitored self cleaning performance of "easy release" coatings and biofilm formation resistance of ablative copper coatings "boosted" with organic cobiocides in small scale tests. Validated impeller optimization software for design of high efficiency new construction airconditioning plants which will use ozone-safe HFC-134a refrigerant.
- (U) ($491) Facilities: Completed development of clean steam and metered electrical power for pierside support of ships.

2. (U) FY 1997 PLAN:

- (U) ($625) Aircraft: Complete altitude testing phase of F414 advanced control modes demonstration and develop flight test plans to demonstrate inlet distortion accommodation. Cost/benefit studies F/A-18 C/D energy efficiency options: affordable FADEC with inlet distortion model; extend flap/aileron scheduled droop to interdiction mission; and enhanced fidelity of flight path optimization system. Complete conceptual design of increased airflow/efficiency HPT for F414 growth engine. Support re-starting GE-23a Demo Engine program to develop F414 growth technologies.
- (U) ($1,050) Ships: Model test bow bulb and stern/propeller hydrodynamic enhancements for a TAO-187 class oiler to demonstrate reduced powering requirements. Model test stern flap retrofit for early DDG-51 s (28 ships). Continue screening tests of advanced AF materials/coating systems (expand testing of ablative copper/cobiocide paints). Develop unified Navy approach to fuel cell power generation of ship service electrical power, (ensure optimization of F76 diesel fuel, desulfurization and marinization requirements). Support design optimization of HFC 134a air conditioning plants for new construction. Support compressor design for new 125 ton HFC-236fa plant in support of R114 replacement program.
- (U) ($51) Portion of extramural program reserved for Small Business Innovation Research Assessment in accordance with 15 USC 638.

FY 1998/1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603724N PROJECT NUMBER: R0829
PROGRAM ELEMENT TITLE: Navy Energy Program (ADV) PROJECT TITLE: Energy Conservation (ADV)

3. (U) FY 1998 PLAN:
   - (U) ($850) Aircraft: Flight test F414 advanced control modes system to demonstrate inlet distortion accommodation, transition to F414 engine and F/A-18 E/F airframe development programs. Support GE-23a demonstrator engine program; participate in conceptual design of advanced fan for F414 growth engine to ensure efficiency gains.
   - (U) ($1,352) Ships: Detailed design and drawings for DDG-51 retrofit stern flap (first 28 ships), and multiple TAO-187 modifications. Model tests of simple hydro mods for additional ships. Continue laboratory to bilge-keel panel tests of emerging AF coatings. Optimize tool designs for hull inspection remotely operated vehicle (ROV) for fouling assessment and spot cleaning. Support fuel cell technology demonstration for ship service power generation.

4. (U) FY 1999 PLAN:
   - (U) ($940) Aircraft: Support GE-23a demonstrator engine program; participate in low pressure turbine conceptual design for F414 growth engine to ensure efficiency improvement; continue advanced fan development. Evaluate benefits for F414 of advanced control modes technology.
   - (U) ($1,603) Ships: Select ablative copper/cobiocide paint for full hull application. Assist fleet introduction of Hull Inspection/Cleaning ROV. Continue model tests of hydrodynamic refinements to reduce powering requirements of existing/future ships. Continue fuel cell technology demonstration involvement, emphasizing fuel reformation and efficiency issues.

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President s Budget: | 1,917 | 1,800 | 1,756 | 2,095 |
| (U) Adjustments from FY 1997 PRESBUDG: | -3 | -74 | +446 | +448 |

FY 1998/1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603724N PROGRAM ELEMENT TITLE: Navy Energy Program (ADV) PROJECT NUMBER: R0829 PROJECT TITLE: Energy Conservation (ADV)

| | | | | |
|---|---|---|---|---|
| (U) FY 1998/1999 PRESBUDG Submission: | 1,914 | 1,726 | 2,202 | 2,543 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1996 adjustment is due to Jordanian rescission (-3). FY 1997 adjustment is due to Congressional Undistributed Reductions (-74). FY 1998 adjustment is due to NWCF and minor adjustments (+452), and inflation (-6). FY 1999 adjustment is due to NWCF and minor adjustments (+457), and inflation (-9).

(U) Schedule: Facilities energy conservation thrust area discontinued in FY 1997 because of fueling constraints.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:
(U) PE 0601153N (Defense Research Sciences)
(U) PE 0602121N (Surface Ship and Submarine HM&E Technology)
(U) PE 0602122N (Aircraft Technology)
(U) PE 0602234N (Materials, Electronics, and Computer Technology)
(U) PE 0603217N (Air Systems and Weapons Advanced Technology)
(U) PE 0603712N (Environmental Quality and Logistics Advanced Technology)
(U) PE 0604710N (Navy Energy Program (ENG))

D. (U) SCHEDULE PROFILE: Not applicable.

FY 1998/1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603724N PROGRAM ELEMENT TITLE: Navy Energy Program (ADV)

PROJECT NUMBER: R0829 PROJECT TITLE: Energy Conservation (ADV)

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. System Development and Integration | 1,914 | 1,726 | 2,202 | 2,543 |

FY 1998/1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603724N PROJECT NUMBER: R0829
PROGRAM ELEMENT TITLE: Navy Energy Program (ADV) PROJECT TITLE: Energy Conservation (ADV)

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION: ($ in thousands)

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | | |
| NSWC/CD Annapolis | | | | | 38,808 | 831 | 1,050 | 1,352 | 1,603 | CONT. | CONT. |
| NAWC/AD, Patuxent | | | | | 7,198 | 592 | 625 | 850 | 940 | CONT. | CONT. |
| Miscellaneous | | | | | 51,711 | 491 | 51 | 0 | 0 | 0 | 52,205 |

Support and Management: Not applicable.

Test and Evaluation: Not applicable.

GOVERNMENT FURNISHED PROPERTY: Not applicable.

FY 1998/1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603724N
PROGRAM ELEMENT TITLE: Navy Energy Program (ADV)
PROJECT NUMBER: R0829
PROJECT TITLE: Energy Conservation (ADV)

| | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 97,717 | 1,914 | 1,726 | 2,202 | 2,543 | CONT. | CONT. |
| Subtotal Support and Management | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Test and Evaluation | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Project | 97,717 | 1,914 | 1,726 | 2,202 | 2,543 | CONT. | CONT. |

C. (U) FUNDING PROFILE: Not applicable.

FY 1998/1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603724N
PROGRAM ELEMENT TITLE: Navy Energy Program (ADV)

(U) COST: (Dollars in thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| R0838 Mobility Fuels (ADV) | 0 | 1,229 | 1,957 | 2,086 | 2,180 | 2,170 | 2,204 | 2,242 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project provides data through engine and fuel system tests which relate the effects of changes in Navy fuel procurement specification properties to the performance and reliability of Naval ship and aircraft engines and fuel systems. This information is required to: (a) determine the extent to which unnecessarily restrictive specification features can be relaxed to reduce cost and increase availability worldwide; (b) provide guidance to fleet operators for the safe use of off-specification or commercial grade fuels when military specification fuels are unavailable or in short supply; and (c) make needed periodic changes to fuel specifications to ensure fuel quality and avoid fleet operating problems while accommodating evolutionary changes in the fuel supply industry. Recent problems with fuel quality have adversely affected ship and aircraft system performance and reliability and resulted in degradation of fuel in storage. The resulting readiness impacts, additional maintenance costs, and the cost of lost equipment, although difficult to quantify, are many times the cost of this project. Over the next decade, the potential for fuel quality related problems will increase because of changing industry practices required to comply with new environmental regulations. This project represents the only investment designed to maintain the Navy's ability to operate as a "smart" customer for fuels that costs over $2B per year to procure, transport, store and consume and are essential to fleet operations.

FY 1998/1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603724N PROJECT NUMBER: R0838
PROGRAM ELEMENT TITLE: Navy Energy Program (ADV) PROJECT TITLE: Mobility Fuels (ADV)

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS: Not applicable.

2. (U) FY 1997 PLAN:
   - (U) ($650) Ships: Complete sample collection and characterization of commercial marine gas oils worldwide to determine quality, availability and cost. Complete analysis of Allison 501-K17/34 ship gas turbine engine (GTE) ignition, flame stability and thermal performance tests with broadened specification fuels. Initiate atmospheric burner rig tests for GTE corrosion scaling factor development. Initiate experiments to determine Navy ship fuel (F-76) lubricity characteristics using new Navy test procedures.
   - (U) ($579) Aircraft: Initiate evaluation of +100 thermal stability improving additive containing fuels at a T-45 air station. Complete full scale testing of non-toxic, environmentally friendly fuel system icing inhibitors (FSII). Develop full scale prototype of fuel copper contamination removal system. Continue development of +100 additive compatible fuel/water separation system.

3. (U) FY 1998 PLAN:
   - (U) ($890) Ships: Complete phase I of the atmospheric burner rig tests for GTE corrosion scaling factor development. Complete bench-scale diesel fuel lubricity experiments and initiate high-speed diesel engine (HDSE) validation. Initiate fuel injector experiments to quantify HSDE response to fuel thermal stability characteristics.
   - (U) ($1,067) Aircraft: Complete evaluation of +100 fuel additives on S-3 and C-130 engine systems. Field test environmentally friendly FSII. Field test fuel copper contamination removal system. Initiate test and evaluation of prototype +100 additives fuel/water separators.

4. (U) FY 1999 PLAN:

- (U) ($950) Ships: Initiate GTE fuel pump test to validate fuel lubricity specification recommendations Complete HSDE fuel injector test and initiate GTE fuel nozzle fouling thermal stability experiments. Complete tests to evaluate the impact of fleet use of red-dyed diesel fuels.
- (U) ($1,136) Aircraft: Complete evaluation of effects of +100 fuel additives on SH-60 helicopter and AV-8B aircraft engine systems. Complete development of fuel copper contamination removal system. Complete test and evaluation and select +100 additive fuel/water separator for field evaluation.

B. (U) PROGRAM CHANGE SUMMARY

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President s Budget: | 0 | 1,280 | 1,612 | 1,698 |
| (U) Adjustments from FY 1997 PRESBUDG: | 0 | -51 | +345 | +388 |
| (U) FY 1998/1999 PRESBUDG Submission: | 0 | 1,229 | 1,957 | 2,086 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1997 adjustment is due to Congressional Undistributed Reductions (-51). FY 1998 adjustment is due to NWCF and minor adjustments (+350) and inflation (-5). FY 1999 adjustment is due to NWCF and minor adjustments (+396) and inflation (-8).

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

FY 1998/1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603724N PROJECT NUMBER: R0838
PROGRAM ELEMENT TITLE: Navy Energy Program (ADV) PROJECT TITLE: Mobility Fuels (ADV)

(U) RELATED RDT&E:
(U) PE 0601152N (In-House Lab Independent Research)
(U) PE 0602234N (Materials, Electronics, and Computer Technology)

D. (U) SCHEDULE PROFILE: Not applicable.

FY 1998/1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603724N PROJECT NUMBER: R0838
PROGRAM ELEMENT TITLE: Navy Energy Program (ADV) PROJECT TITLE: Mobility Fuels (ADV)

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Reliability, Maintainability, and Availability | 0 | 1,229 | 1,957 | 2,086 |

(U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | | |
| NSWC/CD Annapolis | | | | | 39,117 | 0 | 650 | 890 | 950 | CONT. | CONT. |
| NAWC/AD Trenton | | | | | 47,484 | 0 | 579 | 1,067 | 1,136 | CONT. | CONT. |
| Miscellaneous | | | | | 32,609 | 0 | 0 | 0 | 0 | 0 | 32,609 |

Support and Management: Not applicable.

FY 1998/1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603724N
PROGRAM ELEMENT TITLE: Navy Energy Program (ADV)
PROJECT NUMBER: R0838
PROJECT TITLE: Mobility Fuels (ADV)

Test and Evaluation: Not applicable.

GOVERNMENT FURNISHED PROPERTY: Not applicable.

| | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 119,210 | 0 | 1,229 | 1,957 | 2,086 | CONT. | CONT. |
| Subtotal Support and Management | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Test and Evaluation | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Project | 119,210 | 0 | 1,229 | 1,957 | 2,086 | CONT. | CONT. |

C. (U) FUNDING PROFILE: Not applicable.

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWNDATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603725N PROGRAM ELEMENT TITLE: Facilities Improvement PROJECT NUMBER: Y0995 PROJECT TITLE: Navy Facilities Systems

(U) COST (Dollars in thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| Y0995 Naval Facilities Systems | 1,746 | 2,149 | 1,720 | 2,020 | 2,025 | 1,963 | 1,779 | 1,804 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program provides the Navy with new civil engineering capabilities that are required to overcome specific performance limitations of Naval shore facilities while reducing the cost of sustaining the Naval shore infrastructure. The program focuses available resources on satisfying facility requirements where the Navy is a major stakeholder, there are no test validated Commercial of the Shelf (COTS) solutions available, and a timely solution will not emerge without a Navy sponsored demonstration and validation. The program completes the development and validation of facilities technologies originating in Navy Science and Technology programs plus a variety of other sources including the National Science Foundation (NSF) and the National Institute of Science and Technology (NIST). Validated technologies are implemented in the Navy s Military Construction (MILCON)and Real Property Maintenance (RPM) Programs. This program is addressing three Navy facility requirements during the years FY 1996 through FY 1999:

- (U) THE HIGH PERFORMANCE (HP) MAGAZINE. Based on current magazine technologies, substantial land areas within Naval activities cannot be used for inhabited buildings in order to satisfy Explosives Safety Quantify Distance (ESQD) arcs. The converse is also true, the Navy is not able to construct new magazines where they are needed because of the presence of inhabited buildings. This effort enables a quantification of the specific hazard scenarios capable of causing ordnance detonation, an improved capability to model an ordnance explosion in a magazine, and the innovative use of energy absorbing construction materials to provide the Navy with a new magazine concept in which the ESQD arcs are based on a Maximum Credible Event (MCE) that is not the detonation of the entire magazine but rather the detonation of the contents of one, much smaller, storage cell within the magazine. For a typical magazines with Net Explosive Weight (NEW) capacities of 250,000 pounds, the allowable ordnance storage density is increased from 370 pounds/acre to 2,222 pounds/acre. In addition, the number of incompatible classes of ordnance that can be stored in the same magazine is increased from none to eight. This will lead to lower operational costs for the Receipt, Segregation, Storage, and Issue (RSSI) of ordnance and, for some activities, a reduction in the number of magazines required to accomplish their mission.

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWNDATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603725N PROGRAM ELEMENT TITLE: Facilities Improvement PROJECT NUMBER: Y0995 PROJECT TITLE: Navy Facilities Systems

- (U) WATERFRONT FACILITIES REPAIR AND UPGRADE. Over 75% of the Navy s waterfront facilities are over 45 years old. They were designed for a service life of no more than 25 years and to satisfy the mission requirements existing at that time of construction. The reinforced concrete used to construct nearly all of them requires costly and repetitive repairs. In addition, they are unable to satisfy new mission requirements, such as the increase in pier deck capacity required to accomplish more extensive pier-side ship maintenance and repair tasks using truck-mounted cranes that have concentrated outrigger loads of up to 120 tons on a pier originally designed for no concentrated deck loading. This effort integrates new advanced structural diagnostic and modeling capabilities with the innovative application of high performance materials and corrosion arrestment techniques to provide new methods to extend the service life of existing waterfront facilities by an additional 15 to 30 years, and to cost-effectively upgrade them to satisfy new mission requirements. Specific benefits include increasing the durability of spalled marine concrete repairs from 3 to 15 years, new longer-lasting low-maintenance fendering systems that eliminate the need for the frequent replacement of timber piles, and providing new pier upgrade alternatives costing about $5M for a typical pier instead of the now required demolish then replace approach costing about $30M.

- (U) FACILITY TECHNOLOGIES TO REDUCE THE REAL PROPERTY MAINTENANCE (RPM) BACKLOG. The Real Property Maintenance(RPM) costs to correct critical facility deficiencies is over $2.0B as reported in the FY 1995 Annual Inspection Summary (AIS). Current Navy RPM funding levels are insufficient to prevent the continued growth of the critical backlog of maintenance and repairs. This effort will validate and accelerate the wide-spread implementation of a broad range of advanced facility technologies needed to overcome design and construction practices that are conservative and remain costly because of the high risk the private sector associates with the utilization of new facility technologies. The effort will accelerate the validation, commercialization, and wide-spread implementation of the facility technologies urgently required to reduce the cost of deficiencies in the Navy s RPM backlog by reducing initial construction costs up to 20% and facility component service lives that are up to 25 years longer.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it completes development of technologies and verifies their application to specific ship, aircraft, or facility requirements.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWNDATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603725N PROGRAM ELEMENT TITLE: Facilities Improvement PROJECT NUMBER: Y0995 PROJECT TITLE: Navy Facilities Systems

1. (U) FY 1996 ACCOMPLISHMENTS:

- (U) ($1,746) Awarded contract and started construction of the HP Magazine prototype for the full scale explosive test to certify explosives safety performance. Developed test plans for the FY 1997 certification tests of HP Magazine prototype. Conducted arena test to evaluate the fragment hazard mitigation effectiveness of prototype pit cover cross sections.
- Funds were provided to performing activity during 1st and 2nd quarters and were obligated during the same timeframe.

2. (U) FY 1997 PLAN:

- (U) ($956) Complete construction and quality assurance of the HP Magazine prototype. Conduct operational and certification tests. Compile and analyze test data, and complete technical documentation required to obtain DOD Explosive Safety Board approval. Apply for DOD Explosive Safety Board approval.

- (U) ($1,193) Begin demonstration and validation of advanced technologies to reduce the life-cycle costs of Navy waterfront facilities. First efforts include: a) validating a new ship berthing force analysis procedure; b) working cooperatively with manufacturers to develop hybrid fender piles using recycled plastics that can serve as the principle impact resisting component in fendering systems for Naval combatant berthing; and c) validating the use of a falling weight deflectometer to rapidly assess pier deck capacity.

  Obligation of funds at 90% occurred in 1st quarter. 5% will be obligated during the 2nd quarter. 100% obligation will occur by the end of the fiscal year.

3. (U) FY 1998 PLAN:

- (U) ($1,628) Complete design, component testing, and fabrication of prototypes for advanced fender pile and camel concepts using recycled plastic piles. Award contract for the installation of the prototypes for validation testing. Continue validation of the use of falling weight deflectometer system for load safety certification of piers and wharves.

Exhibit R-2

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWNDATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603725N PROGRAM ELEMENT TITLE: Facilities Improvement PROJECT NUMBER: Y0995 PROJECT TITLE: Navy Facilities Systems

- (U) ($92) Conduct an analysis of the planned FY 1999 RPM projects to determine best candidates for the FY 1999 validation testing of advanced facility technologies to reduce the RPM backlog. Coordinate with Navy RPM project managers and the Civil Engineering Research Foundation (CERF) to determine the specific objectives and schedule for the FY 1999 validation tests. Technologies to be tested include high strength lightweight concretes for severe and corrosive environments, and early-flaw detection methods and systems used in conjunction with longer-lasting roofing materials and designs.

  Obligation of funds will begin as soon as they are received with all but 10% being obligated by the beginning of the 2nd quarter. 100% obligation will occur by the end of fiscal year.

4. (U) FY 1999 PLAN:

- (U) ($1,000) Complete installation of prototype advanced fender pile and camel concepts, and begin validation testing. Complete validation testing of the falling weight deflectometer for load safety certification. Begin constructability improvement and validation of methods for the structural upgrade of piers and wharves using composite materials.

- (U) ($1,020) Conduct RPM advanced facility technology validation tests planned in FY 1998. Conduct an analysis of the planned FY 2000 RPM projects to determine best candidates for the FY 2000 validation testing. Coordinate with Navy RPM project managers and CERF to determine the specific objectives and schedule for the FY 2000 tests. Technologies to be tested include techniques for improved surface preparation that enhances coating system adhesion used in conjunction with longer-life coating systems, and use of composite materials as a substitute for traditional materials in facility components subject to high maintenance and replacement costs.

  Obligation of funds will begin as soon as they are received with all but 10% being obligated by the beginning of the 2nd quarter. 100% obligation will occur by end of the fiscal year.

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWNDATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603725N PROGRAM ELEMENT TITLE: Facilities Improvement PROJECT NUMBER: Y0995 PROJECT TITLE: Navy Facilities Systems

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 1,748 | 2,239 | 1,861 | 902 |
| (U) Adjustments from FY 1997 PRESBUDG: | -2 | -90 | -141 | +1,118 |
| (U) FY 1998/FY 1999 PRESBUDG Submit: | 1,746 | 2,149 | 1,720 | 2,020 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1996 funding reduced by $2 thousand as part of the Jordanian F-16 financing rescission. FY 1997 funding is decreased by $90 thousand for NWCF adjustments and general reductions. FY 1998 funding is decreased by $205 thoudand for NWCF carryover, rate adjustments, and general reductions; increases of $64 thousand in FY 1998 for NWCF adjustments and restoration of partial offset of prior reduction. FY 1999 funding is decreased by $18 thousand for general program reductions and NWCF adjustments; increases of $1136 thousand for partial offset of prior general reduction, NWCF adjustment, and to validate and accelerate the implementation of advanced facility technologies for the reduction of the Navy s Real Property Maintenance (RPM) backlog.

(U) Schedule: Not applicable
(U) Technical: Not applicable

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands) Not applicable.

(U) RELATED RDT&E: A DOD Laboratory Infrastructure Capability Study conducted in FY 1994 by the Director of Defense Research and Engineering (DDR&E) identified civil engineering as a Technology area where DOD could not depend on the private sector for satisfaction of its research requirements. However, this program does utilize the capabilities of the private sector to the maximum extent possible. The execution of this program is consistent with the findings and recommendations of two National Academy of Sciences Reports: The Role of Federal Agencies in Fostering New technology and Innovation in Building and Federal Policies to Foster Innovation and Improvement in Constructed Facilities. To ensure that this program focuses on Navy requirements not already being addressed by other programs and uses the results of other programs when it will contribute to the satisfaction of a Navy requirement, the planning and execution of this

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWNDATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603725N PROGRAM ELEMENT TITLE: Facilities Improvement

PROJECT NUMBER: Y0995
PROJECT TITLE: Navy Facilities Systems

project is coordinated with other RDT&E programs in a variety of ways: a) with related Army and Air Force programs by contacts made under the leadership of the Tri-Service Joint Engineers; b) with other Federal agencies through the Federal Facilities Council of the National Academy of Sciences; c) with the private sector through the Civil Engineering Research Foundation (CERF), and a Cooperative Research and Development Agreement (CRADA) with the Composites Institute of the Society of Plastics Industry. This project includes transitions of facility technologies from four Navy Science and Technology programs:

(U) PE 0602233N, Readiness, Training, and Environmental Quality Technology Development
(U) PE 0602234N, Materials, Electronics and Computer Technology Development
(U) PE 0603792N, Advanced Technology Transition
(U) PE 0603712N, Environmental Quality and Logistics Advanced Technology Demonstrations

D. (U) SCHEDULE PROFILE: Not applicable.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603725N
PROGRAM ELEMENT TITLE: Facilities Improvement

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Systems Engineering | 0 | 494 | 395 | 465 |
| b. Prototype Development | 0 | 495 | 396 | 464 |
| c. Prototype Fabrication | 1,591 | 0 | 0 | 0 |
| d. Test and Evaluation | 0 | 1,075 | 843 | 990 |
| e. Technical Documentation | 155 | 85 | 86 | 101 |
| Total | 1,746 | 2,149 | 1,720 | 2,020 |

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS
NFESC, Port Hueneme, CA

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | 61,935 | | | | | | |
| NFESC | WX | | N/A | N/A | | 1,146 | 1,218 | 525 | 1,620 | CONT. | CONT. |
| Const. Contractor | FP | | N/A | N/A | | 600 | 931 | 1,195 | 400 | | |
| Support and Management | | | | | | | | | | | |
| Test and Evaluation | | | | | | | | | | | |

GOVERNMENT FURNISHED PROPERTY: Not applicable

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603725N
PROGRAM ELEMENT TITLE: Facilities Improvement

| | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 61,935 | 1,746 | 2,149 | 1,720 | 2,020 | CONT. | CONT. |
| Subtotal Support and Management | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Test and Evaluation | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Project | 61,935 | 1,746 | 2,149 | 1,720 | 2,020 | | |

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603785N
PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA)

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| R0120 Advanced Environmental Acoustic Support (AEAS) | 7,331 | 4,508 | 3,607 | 6,852 | 7,105 | 7,316 | 7,550 | 7,726 | CONT. | CONT. |
| R2017 Advanced Underwater Acoustic Modeling Project (AUAMP) | 1,534 | 1,295 | 1,509 | 1,969 | 1,990 | 1,999 | 2,041 | 2,088 | CONT. | CONT. |
| V0823 Sensor Performance Prediction (SPP) | 6,354 | 7,276 | 6,590 | 8,847 | 8,884 | 9,209 | 9,720 | 10,053 | CONT. | CONT. |
| TOTAL | 15,219 | 13,079 | 11,706 | 17,668 | 17,979 | 18,524 | 19,311 | 19,867 | CONT. | CONT. |

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Combat Systems Oceanographic Performance Assessment (CSOPA) Program Element provides oceanographic/atmospheric research and development for expanded knowledge and improved understanding of the environment and its impact on combat systems performance. Its purpose is to assess, predict and enhance the performance of current and proposed undersea surveillance, tactical and mine warfare and weapons systems. This effort is accomplished through at-sea experimentation, numerical model and data base development, development and evaluation of stand-alone and Command, Control, Communications, Computers, and Intelligence (C4I)-system-embedded prediction/tactical decision aid products, fleet technical support, and system and area technical assessments. Emphasis is placed on shallow water and other harsh environments, and regional conflict and crisis response scenarios. The Advanced Environmental Acoustic Support (AEAS) Project conducts complex oceanographic and acoustic measurements, develops computer prediction products, models and simulations, data bases, and conducts analyses in support of undersea warfare and mine warfare systems. The Advanced Underwater Acoustic Modeling Project (AUAMP) is focused on the development of a family of acoustic system performance prediction products beginning with active system models and data bases in the low-, mid-, and high-frequency regimes and culminating with high fidelity simulation products. The Sensor Performance Prediction Project develops computer-based, on-board capabilities to provide system performance predictions, operating mode selection guidance and tactical decision aids for tactical platforms based on AEAS and AUAMP-developed models and historical data bases usingin situ measurements and synoptic data. These guidance products are essential to maximize the effective employment of combat

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603785N
PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA)

systems and weapons in highly complex regional conflict littoral warfare areas. The CSOPA Program products are being tailored for, and assimilated into, the onboard Combat Systems and the Joint Maritime Command Information System to operationally provide accurate system performance predictions and into fleet trainers to provide realistic ocean environments in support of warfare simulations. Direct support to existing fleet systems is provided in the Combatant Data Collection thrust which focuses on in situ measurements through operational weapon systems and provides direct, real-time feedback to optimize system performance in tactical situations. The CSOPA Program supports the Joint Mission Areas of Joint Littoral Warfare and Joint Surveillance.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware and software for experimental test related to specific ship or aircraft applications.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603785N PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA) PROJECT NUMBER: R0120 PROJECT TITLE: Advanced Environmental Acoustic Support (AEAS)

(U) COST: (Dollars in thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| R0120 Advanced Environmental Acoustic Support (AEAS) | 7,331 | 4,508 | 3,607 | 6,852 | 7,105 | 7,316 | 7,550 | 7,726 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Department of Defense has turned its focus from the global threat of the Soviet Union to the future regional conflict scenarios outlined in the Defense Planning Guidance (DPG). Most of the DPG scenarios require operating naval forces in the earth's littoral waters which are shallow, have highly variable (in space and time) oceanographic conditions and confined maneuvering space. Of key concern to the U.S. Navy is the dual threat posed by very quiet diesel submarines capable of opposing U.S. naval forces and sea mines which will dramatically restrict force mobility and hamper or curtail amphibious operations. To counter these threats, there is an urgent and continuing need for the Navy to fully understand the ocean areas in which they will operate in the future. This project provides the necessary research and development to: a) rapidly and automatically acquire a broad array of meteorological and oceanographic (METOC) data in littoral areas using organic sensors on fleet platforms and use these data to optimize system performance; b) accurately predict the performance of warfighting systems under development or employed in those areas; c) develop new capabilities in environmental acoustic models and data bases to support assessments of regional conflict ocean areas; d) develop a synthetic environment module which will drive future simulations, and e) provide real-time and remote METOC data collection modeling and analysis capabilities.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

- (U) ($2,650) Began advanced development of Extended Echo Range Sonobuoys (SSQ-110) and Active Distributed Systems. Completed Gulf of Mexico experiment to use the SSQ-110 to measure low angle bottom scattering in shallow water. Began integration and transition of simulations and modeling capabilities to the Navy trainer and simulation communities. Developed an enhanced interface between the user and environmental modules for Generic Acoustic Stimulator System, for use with trainers and simulations.

- (U) ($1,700) Completed Build 5 of the Mine warfare Environmental Decision Aids Library (MEDAL) program, designed to provide a planning tool for the Mine Warfare community. Build 5 includes interfaces to the environmental modules, e.g. bathymetry, sediment type, and BT profiles. Evaluated MEDAL during fleet exercises. Began transition to Joint Maritime Command Information System (JMCIS) segments.

- (U) ($2,981) Began development and conducted at-sea demonstrations of rapid airborne area oceanographic and acoustic characterization techniques, and transitioned this capability to other Fleet applications. Began development of a METOC Denied Area Measurement Processing System (DAMPS), used to permit real-time characterization of the battlespace environment. Demonstrated similarity between incoherent and coherent bottom scattering at two sites (thus demonstrating applicability of world wide SUS (explosive charge) measurements to Fleet systems such as Low Frequency (LFA)). Developed tactical applications for in-situ measurement of low angle bottom scattering by both Fleet Combatants and Oceanographic measurement vessels. Developed critical environmental factors atlases for surface, Mine Warfare (MIW) and air platforms for potential regional conflict areas. Began development of the required interfaces with the Army Integrated Weather Effects Decision Aid (IWEDA) Project and the incorporation of the Navy/Marine Surf Manual Requirements. Provided advanced graphic development capabilities for METOC models and databases on workstations.

2. (U) FY 1997 PLAN:

- (U) ($1,070) Continue integration of ocean and atmosphere representation, including effects on platforms, weapons and sensor systems into DOD simulation systems for mission rehearsal, training

and analysis. Evaluate Navy systems performance in surrogate environment and extrapolate to foreign sites of interest.

- (U) ($2,500) Complete verification and validation of rapid real-time data acquisition capabilities in two littoral environments. Continue development of DAMPS, used to permit real-time characterization of the battlespace environment. Begin development of airborne-remote METOC data acquisition, data base and modeling capabilities in direct support of crisis response, regional conflicts and peace-time scenarios.

- (U) ($865) Conduct technical feasibility evaluations in data assimilation techniques for real-time and shore-based processing/applications. Conduct technical assessment on the existing data assimilation techniques. Conduct technical feasibility evaluations in data inversion techniques applied to the ocean environment for Navy applications and the identification of the realistic operational applications. Conduct technical assessment on the existing data inversion techniques.

- (U) ($73) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 U.S.C.638.

3. (U) FY 1998 PLAN:

- (U) ($1,707) Continue integration of ocean and atmosphere environmental effects on battlespace platforms, weapons and sensor systems, including simulation for mission rehearsal, training and analysis. Continue assessment of Navy system performance in surrogate environment. Develop data inversion measurement and test plans and identify fleet assets required for test conduct.

- (U) ($1,900) Perform assessment of temporal/spatial variability of littoral environments, and assess various inversion and assimilation techniques to obtain ocean/atmosphere temporal/spatial variability of littoral

environments. Integration of DAMPS into airborne unmanned vehicles (UAV s). Develop Battlespace characterization techniques to measure environmental data in-situ and transmit to Fleet assets.

4. (U) FY 1999 PLAN:

- (U) ($3,852) Continue modeling and simulation of atmosphere and ocean environmental effects on Navy systems. Conduct data inversion at-sea proof-of-concept experiment with fleet assets with focus on surface scatter, bottom back scatter, and advanced reverberation algorithm development. Also continue performance studies in surrogate environments.

- (U) ($3,000) Continue assessments of temporal/ spatial variability of littoral environments, and perform verification and validation of algorithms and databases developed for Fleet use. Continue development of ocean data assimilation systems for characterization of littoral environments.

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President s Budget: | 7,501 | 4,700 | 4,228 | 7,379 |
| (U) Adjustments from FY 1997 PRESBUDG: | -170 | -192 | -621 | -527 |
| (U) FY 1998/1999 PRESUBDG Sumbit: | 7,331 | 4,508 | 3,607 | 6,852 |

(U) CHANGE SUMMARY EXPLANATION:

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603785N PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA) PROJECT NUMBER: R0120 PROJECT TITLE: Advanced Environmental Acoustic Support (AEAS)

(U) Funding: FY 1996 adjustments include (-$136) due to SBIR transfer and (-$34) due to minor adjustments. FY 1997 decrease of (-$192) due to Congressional Undistributed Reductions. FY 1998 adjustments include (-$621) for NWCF and minor adjustments. FY 1999 adjustments include (-$527) due to NWCF and minor adjustments.

(U) Schedule: Not applicable.

(U) Technical: Reduced participation in demonstration and validation of field exercises and testing real time data acquisition and processing. Reduced partcipation in at sea proof-of-concept experiments demonstrating advanced data acquisition and processing.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:

(U) PE 0205620N (Surface ASW Combat System Integration) - Transition of surface ship CDC efforts.
(U) PE 0602702E (Tactical Technology) - Advanced Research Projects Agency simulation development program.
(U) PE 0603254N (Anti-Submarine Warfare Systems Development) - Environmental support to the Extended Echo Range sonobuoy.
(U) PE 0603502N (Surface and Shallow Water MCM) - Integration of MEDAL into combat systems.

D. (U) SCHEDULE PROFILE: Not applicable.

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603785N
PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA)
PROJECT NUMBER: R0120
PROJECT TITLE: Advanced Environmental Acoustic Support (AEAS)

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Software Development | 6,331 | 3,635 | 2,907 | 5,952 |
| b. Ancillary Hardware Development | 0 | 0 | 0 | 0 |
| c. Development Support Equipment | 0 | 0 | 0 | 0 |
| d. Miscellaneous | 1,000 | 800 | 700 | 900 |
| e. SBIR | 0 | 73 | 0 | 0 |
| Total | 7,331 | 4,508 | 3,607 | 6,852 |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603785N PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA) PROJECT NUMBER: R0120 PROJECT TITLE: Advanced Environmental Acoustic Support (AEAS)

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands):

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development: | | | | | | | | | | | |
| NRL, Wash, DC | WR | 11/02/93 | N/A | N/A | 150 | 100 | 1,801 | 1,400 | 2,000 | Cont | Cont |
| PSI, McLean, VA | C/CPFF | 05/03/93 | N/A | N/A | 350 | 1,865 | 1,718 | 1,200 | 1,500 | Cont | Cont |
| SAIC, McLean, VA | C/CPFF | 11/02/94 | N/A | N/A | 0 | 600 | 100 | 200 | 300 | Cont | Cont |
| Loral, Manassass and Reston, VA | C/CPFF | 12/24/92 | N/A | 6,736 | 6,736 | 1,690 | 0 | 0 | 0 | 8,426 | 8,426 |
| NAWC, Warminister, VA | WR | 11/02/95 | N/A | N/A | 300 | 544 | 350 | 200 | 300 | Cont | Cont |

| Contractor/ Government Performing | Contract Method/ Fund Type | Award/ Oblig | Perform Activity | Project Office | Total FY 1995 | FY 1996 | FY 1997 | FY 1998 | FY 1999 | To | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603785N
PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA)
PROJECT NUMBER: R0120
PROJECT TITLE: Advanced Environmental Acoustic Support (AEAS)

| Activity | Vehicle | Date | EAC | EAC | & Prior | Budget | Budget | Budget | Budget | Complete | Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NUWC, Newport, RI | WR | 11/02/93 | N/A | N/A | 110 | 0 | 24 | 0 | 0 | Cont | Cont |
| CSS, Panama City, FL | WR | 11/15/95 | N/A | N/A | 0 | 150 | 0 | 100 | 200 | 450 | 450 |
| Miscellaneous: | | | | | 5,108 | 2,382 | 515 | 507 | 2,552 | Cont | Cont |

Support and Management: Not Applicable

Test and Evaluation: Not Applicable

GOVERNMENT FURNISHED PROPERTY: Not Applicable

| | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 12,754 | 7,331 | 4,508 | 3,607 | 6,852 | Cont | Cont |
| Subtotal Support and Management | 0 | 0 | 0 | 0 | 0 | Cont | Cont |
| Subtotal Test and Evaluation | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Project | 12,754 | 7,331 | 4,508 | 3,607 | 6,852 | Cont | Cont |

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603785N
PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA)

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| R2017 Advanced Underwater Acoustic Modeling Project (AUAMP) | 1,534 | 1,295 | 1,509 | 1,969 | 1,990 | 1,999 | 2,041 | 2,088 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: As Navy sonar systems become more sophisticated and their use in shallow water is increasing, there is an urgent and continuing need to understand underwater sound boundary interactions and propagation through the oceanic medium. The shallower waters of the earth's littoral regions are characterized by extreme variability in time as well as space. This project is focused on the development of a family of acoustic models which will predict the performance of existing and future Navy sonar systems. Initial efforts have concentrated upon the development of a multi-source, multi-receiver, Anti-Submarine Warfare (ASW) system performance prediction capability in support of active ASW systems currently being planned and developed for use in the 1990's. Further efforts are directed toward the stochastic prediction of performance of mid- and high-frequency tactical and mine warfare sonars, with an eventual goal of high fidelity simulation.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

- (U) ($630) Started development of bottom scattering models for surface Combatant Ships and Mine Underwater Warfare (MUW) sonars and incorporate into high frequency system performance model. Developed high resolution version of Acoustic Sonar Propagation Model to Naval Air Warfare Center (NAWC) to support evaluation of SSQ-110 source.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603785N
PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA)

- (U) ($190) Verified the range dependent active sonar performance model against data acquired in support of Extended Echo Range sonobuoy and surface ship sonars. Prepared a version of ASPM to be delivered to the Ocean Acoustics Master Library Software Review Board, for acceptance as a Navy Standard Model.

- (U) ($714) Completed phase one of HFBL databases for shallow waters and developed algorithms for addressing bottom reverberation through advanced algorithm and data processing techniques. Developed an improved bottom scattering model which includes basement scattering (Delivered to Oceanographic Atmospheric Master Library (OAML) FY 96).Developed and delivered shallow water bottom loss upgrade to OAML in FY 96, completed study of effect of time spread in thick sediments on performance of mid-frequency active systems and developed technique to process shallow water reverberation data. This will be applied to development of a model to account for clutter in system performance prediction.

2. (U) FY 1997 PLAN:

- (U) ($365) Complete upgrade of existing Navy Standard Low Frequency Bottom Loss model/database to 5Khz, complete interim shallow water clutter prediction models.

- (U) ($337) Transition the Acoustic Sonar Propagation Model to the Oceanographic and Atmospheric Master Library as a Navy Standard model/database, develop a broadband propagation model for Fleet use, begin development of shallow water geo-acoustic inversion technique that make use of time spread functions.

- (U) ($415) Complete development of bottom scattering model upgrade for low frequencies (less than 500 Hz) and begin initial development of bottom scattering model valid to frequencies of 20 Khz, consistent with existing LFBL.

- (U) ($147) Verification and validation of high to mid-frequency models for Surface Ship Combatants, and provide upgrades for model deficiencies.

- (U) ($31) Portion of extramural program reserved for Small Business Innovative Research assessment in accordance with 15 U.S.C.638.

3. (U) FY 1998 PLAN:

- (U) ($1,150) Complete development of clutter prediction model, continue development of high frequency bottom/loss scatter model/database, continue development of shallow water geoacoustic inversion algorithms using real-time data, continue development of broadband prediction model for Fleet use, begin development of an Operational Sensitivity model to predict the sensitivity of system performance to environmental factors, and develop improvements to mine warfare acoustic models.

- (U) ($100) Begin extending LFBL from the 50 M contour water depth to very shallow water.

- (U) ($259) Perform independent verification and validation of models being developed and upgraded.

4. (U) FY 1999 PLAN:

- (U) ($1,300) Complete development of high frequency bottom model and integration into LFBL, continue development of operational model to predict sensitivity of system performance to the environmental and continue development of shallow water geoacoustic inversion model.

- (U) ($427) Continue development of extension of bottom loss/bottom scattering databases into very shallow water, and upgrade of MIW acoustic models.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603785N
PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA)

- (U) ($242) Continue validation and verification of models/databases of products developed for Fleet use.

(U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President s Budget: | 1,573 | 1,348 | 1,550 | 1,989 |
| (U) Adjustments from 1997 PRESBUDG: | -39 | - 53 | -41 | -20 |
| (U) FY 1998/1999 PRESBUDG Submit: | 1,534 | 1,295 | 1,509 | 1,969 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1996 adjustments include (-$34) due to SBIR transfer and (-$5) for minor adjustments. FY 1997 decrease of (-$53) due to Congressional Undistributed Reductions. FY 1998 decrease of (-$41) due to NWCF and minor adjustments. FY 1999 decrease of (-$20) due to NWCF and minor adjustments.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603785N
PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA)

(U) RELATED RDT&E:

(U) PE 0602435N (Oceanographic and Atmospheric Technology) - Joint efforts in boundary interaction physics.
(U) PE 0603747N (Undersea Warfare Advanced Technology) - Evaluation of ASPM during Critical Sea Tests.

D. (U) SCHEDULE PROFILE: Not applicable.

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| | Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|---|
| a. | Software Development | 1,171 | 914 | 1,130 | 1,469 |
| b. | Ancillary Hardware Development | 0 | 0 | 0 | 0 |
| c. | Developemnt Support Equipment | 363 | 350 | 379 | 500 |
| d. | Miscellaneous | 0 | 0 | 0 | 0 |
| e. | SBIR | 0 | 31 | 0 | 0 |

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603785N
PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA)

| | | | | |
|---|---|---|---|---|
| Total | 1,534 | 1,295 | 1,509 | 1,969 |

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603785N
PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA)

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands):

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development: | | | | | | | | | | | |
| NRL, Wash,DC | WR | 11/02/93 | N/A | N/A | 150 | 40 | 250 | 50 | 55 | Cont | Cont |
| PSI, McLean, VA | C/CPFF | 05/03/93 | N/A | N/A | 350 | 250 | 250 | 250 | 250 | Cont | Cont |
| SAIC, McLean, VA | C/CPFF | 11/02/94 | N/A | N/A | 898 | 700 | 550 | 650 | 650 | Cont | Cont |
| NAWC, Warminister, PA | WR | 11/02/95 | N/A | N/A | 65 | 50 | 0 | 50 | 50 | Cont | Cont |
| NUWC,Newport RI | WR | 11/02/93 | N/A | N/A | 110 | 0 | 0 | 0 | 0 | Cont | Cont |
| Miscellaneous: | | | | | 837 | 494 | 245 | 509 | 964 | Cont | Cont |

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603785N
PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA)

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Support and Management: | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Test and Evaluation: Not Applicable | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

GOVERNMENT FURNISHED PROPERTY: Not Applicable

| | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 2,410 | 1,534 | 1,295 | 1,509 | 1,969 | Cont | Cont |
| Subtotal Support and Management | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Test and Evaluation | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Project | 2,410 | 1,534 | 1,295 | 1,509 | 1,969 | Cont | Cont |

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603785N
PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA)

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| V0823 Sensor Performance Prediction (SPP) | 6,354 | 7,276 | 6,590 | 8,847 | 8,884 | 9,209 | 9,720 | 10,053 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The SPP program develops on-board software capabilities that provide sensor performance predictions and Tactical Decision Aids (TDA) for all tactical platforms using in-situ measurements, synoptic data and new/high resolution environmental data bases. SPP maximizes the full performance potential of complex sensor systems by increasing their detection/tracking performance. The program is focused on the development of new combat system and mine warfare performance prediction and tactical decision aid capabilities for highly complex littoral environments to support regional conflict scenarios. It addresses the multi-warfare areas, particularly Mine Warfare, shallow water ASW and missile and air defense/strike capabilities that are critical to operate in the littoral and hinterland and includes all platforms (i.e. surface, submarine and air).

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

- (U) ($2,668) Initiated development of a Joint Littoral/Multi-Mission TDA for submarine, air and surface ships that provides an integrated acoustic and non-acoustic combat system performance prediction capability using in-situ and synoptic Meteorological and Oceanographic (METOC) data for the multi-threat, multi-warfare scenario.

- (U) ($2,097) Continued the development of the initial Electro-Magnetic/Electro-Optic Performance Prediction/Decision Support System for Anti-Submarine, Anti-Missile and Air Defense/Strike Warfare. Tested at-sea.

- (U) ($1,589) Incorporated the prototype Electro-Magnetic and Electro-Optic capabilities into the current surface ship, air and submarine performance prediction system ADM to maximize Expeditionary Warfare decision support in the littoral areas. Tested at-sea.

2. (U) FY 1997 PLAN:

- (U) ($2,061) Complete initial development of the Joint Littoral/Multi-Mission TDA capability for use in shallow water against diesel submarines/low flying missiles. Fully integrate the best available METOC Battlespace Analysis including in-situ, remotely sensed, synoptic and climatological data into the Joint Littoral/Multi-Mission TDA. Evaluate at-sea during Fleet Regional Conflict/Littoral exercises.

- (U) ($1,455) Complete development of MCM tactics and optimization algorithms initiated by the AEAS Program (R0120). Incorporate more robust environmental analysis capability. Begin minefield planning module. Incorporate Mine Warfare capabilities in the Joint Littoral/Multi-Mission TDA. Evaluate at-sea.

- (U) ($1,657) Develop new functionality and corrections for the Electro-Magnetic/Electro-Optic Performance Prediction/Decision Support System based on initial at-sea use and Fleet feedback. Develop required combat system connectivity to measure systems performance. Test at-sea.

- (U) ($2,032) Develop new functionality for the submarine, air and surface ship ADM to further address the requirements for Tactical Control in the multi-threat, multi-warfare scenarios. This new functionality will include predictions for advanced combat systems, greater use of highly variable in-situ/remotely sensed and synoptic METOC data, increased connectivity/integration with the shipboard tactical decision process and "greater automation/event triggering" to reduce manning requirements. Test at-sea.

- (U) ($71) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 U.S.C.638.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603785N PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA) PROJECT NUMBER: V0823 PROJECT TITLE: Sensor Performance Prediction (SPP)

3. (U) FY 1998 PLAN:

- (U) ($2,043) Develop performance prediction capability for additional Electro-Magnetic/Electro-Optic sensors. Address new sensor suites scheduled for incorporation on New Attack Submarine (NSSN), SQQ-89 Block III Ships and LAMPS helicopter upgrades (SH-60R). Incorporate new capability based on Shipboard Tactical Atmospheric Forecast Capability (STAFC) developments and in-situ/remote measurement techniques. Evaluate at-sea.

- (U) ($2,109) Initiate development of sensor performance prediction and employment TDAs which address new generation undersea warfare systems (Airborne Low Frequency Sonar (ALFS), Towed Active Receive Subsystem (TARS), High Frequency Sonar Program (HFSP)). Maximize use of in-situ collected environmental data fused with synoptic data. Ensure connectivity to both organic combat system and remote sites in support of Joint Littoral Operations. Integrate into platform ADM s and evaluate at-sea.

- (U) ($1,120) Based on submarine security and survivability developments, initiate development of automated vulnerability assessment tactical decision aid capabilities and integrate them with emerging COTS combat systems. Update automatic event triggering capabilities based on evaluation of previous years efforts. Integrate into platform ADM s and evaluate at-sea.

- (U) ($1,318) Develop atmospheric and oceanographic data acquisition and application capabilities. Provide real time capability to utilize environmental parameters and distribute these to other Fleet combatants and shore sites. Support Oceanographer of the Navy s Battlespace METOC Data Acquisition, Assimilation and Application strategy. Test initial implementation at-sea.

4. (U) FY 1999 PLAN:

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603785N PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA) PROJECT NUMBER: V0823 PROJECT TITLE: Sensor Performance Prediction (SPP)

- (U) ($2,123) Incorporate prototype Mine Warfare tactical decision aids in baseline surface ship, air and submarine performance prediction systems. Maximize littoral operation support by ensuring interoperability of system via existing Fleet communication mechanisms.

- (U) ($3,362) Complete development of initial sensor prediction capabilities for acoustic and non-acoustic sensors scheduled to be installed on Fleet combatants. Apply advanced COTS visualization techniques to facilitate operator understanding of complex littoral environmental effects on sensor performance. Integrate into appropriate platform ADM s. Perform at sea evaluation of new capabilities.

- (U) ($1,858) Integrate platform vulnerability assessment TDA into surface ship, submarine and air ADM s to perform vulnerability assessment for acoustic and non-acoustic sensors and weapons. Evaluate functionality during at-sea tests.

- (U) ($1,504) Incorporate additional environmental sensor interface capabilities to allow for real time monitoring and measurement of key environmental parameters in support of the Oceanographer of the Navy s Battlespace METOC Data Acquisition, Assimilation and Application strategy. Implement in the platform ADM s and evaluate at-sea.

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 6,437 | 7,602 | 7,899 | 10,366 |
| (U) Adjustments from FY 1997 PRESBUDG: | -83 | -326 | -1,309 | -1,519 |
| (U) FY 1998/1999 PRESBUDG Submit: | 6,354 | 7,276 | 6,590 | 8,847 |

(U) CHANGE SUMMARY EXPLANATION:

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603785N PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA) PROJECT NUMBER: V0823 PROJECT TITLE: Sensor Performance Prediction (SPP)

(U) Funding: FY 1996 adjustments include (-$75) due to SBIR Transfer and (-$8) for minor pricing adjustments.

FY 1997 adjustment include (-$326) due to Congressional Undistributed Reductions.

FY 1998 decrease of (-$986) for minor repricing adjustments and (-$323) for NWCF reductions.

FY 1999 decrease of (-$167) for NWCF reductions and (-$1,352) for minor pricing adjustments.

(U) Schedule: Multi-Warfare/Amphibious Warfare TDA development and improvements will be delayed.

(U) Technical: Availability of all TDA functionality will be delayed.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:

(U) PE 0603207N (Air/Ocean Tactical Applications)
(U) PE 0603504N (Advanced Submarine Combat Systems Development)
(U) PE 0603553N (Surface ASW)
(U) PE 0604218N (Air/Ocean Equipment Engineering)
(U) PE 0101224N (SSBN Security/Survivability Program)
(U) PE 0603561N (Advanced Submarine Systems Development)

D. (U) SCHEDULE PROFILE: See Attached.

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603785N
PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA)
PROJECT NUMBER: V0823
PROJECT TITLE: Sensor Performance Prediction (SPP)

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Development Support Equipment Acquisition | 75 | 100 | 100 | 100 |
| b. Software Development | 3,459 | 4,105 | 3,690 | 5,172 |
| c. Systems Engineering | 1,050 | 1,125 | 1,100 | 1,300 |
| d. Configuration Management | 150 | 150 | 150 | 150 |
| e. Development Test & Evaluation | 900 | 1,100 | 1,025 | 1,500 |
| f. Contractor Engineering Support | 100 | 100 | 100 | 100 |
| g. Government Engineering Support | 445 | 350 | 250 | 350 |
| h. Program Management Support | 150 | 150 | 150 | 150 |
| i. Travel | 25 | 25 | 25 | 25 |
| j. SBIR | 0 | 71 | 0 | 0 |
| Total | 6,354 | 7,276 | 6,590 | 8,847 |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603785N PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA) PROJECT NUMBER: V0823 PROJECT TITLE: Sensor Performance Prediction (SPP)

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands):

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total* FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | | |
| NUWC Division Newport, RI | WR | 11/95 | CONT. | CONT. | 950 | 1,052 | 900 | 925 | 1,100 | CONT. | CONT. |
| Integrated Performance Decisions, Inc., Middletown, RI | CPFF | 3/96 | CONT. | CONT. | 0 | 2,017 | 4,076 | 3,595 | 4,937 | CONT. | CONT. |
| Analysis & Tech. Inc., Middletown, RI | CPFF | 11/93 | CONT. | CONT. | 2,193 | 0 | 0 | 0 | 0 | CONT. | CONT. |
| Sonalysts Inc., Waterford, CT | CPFF | 11/89 | CONT. | CONT. | 2,526 | 1,200 | 0 | 0 | 0 | CONT. | CONT. |
| Miscellaneous | N/A | N/A | CONT. | CONT. | 808 | 465 | 575 | 520 | 685 | CONT. | CONT. |
| Support and Management | | | | | | | | | | | |
| Contractor/ Government Performing | Contract Method/ Fund Type | Award/ Oblig | Perform Activity | Project Office | Total* FY 1995 | FY 1996 | FY 1997 | FY 1998 | FY 1999 | To | Total |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603785N
PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA)
PROJECT NUMBER: V0823
PROJECT TITLE: Sensor Performance Prediction (SPP)

| Activity | Vehicle | Date | EAC | EAC | & Prior | Budget | Budget | Budget | Budget | Complete | Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Miscellaneous | N/A | N/A | CONT. | CONT. | 662 | 720 | 625 | 525 | 625 | CONT. | CONT. |
| Test and Evaluation | | | | | | | | | | | |
| Miscellaneous | N/A | N/A | CONT. | CONT. | 996 | 900 | 1,100 | 1,025 | 1,500 | CONT. | CONT. |

*V0823 is a continuing program. Only FY 1995 dollars are shown.

GOVERNMENT FURNISHED PROPERTY: Not Applicable

| | Total* FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 6,477 | 4,734 | 5,551 | 5,040 | 6,722 | CONT. | CONT. |
| Subtotal Support and Management | 662 | 720 | 625 | 525 | 625 | CONT. | CONT. |
| Subtotal Test and Evaluation | 996 | 900 | 1,100 | 1,025 | 1,500 | CONT. | CONT. |
| Total Project | 8,135 | 6,354 | 7,276 | 6,590 | 8,847 | CONT. | CONT. |

*V0823 is a continuing program. Only FY 1995 dollars are shown

FY 1998/1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603790N
PROGRAM ELEMENT TITLE: NATO Research and Development

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| R2293 NATO Cooperative Research and Development (R&D) | 0 | 9,528 | 13,330 | 11,267 | 11,179 | 11,825 | 12,033 | 12,228 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project provides funding for the continuation of on-going research and development projects that were initiated between the U.S. Navy and allies under the Office of the Secretary of Defense (OSD) NATO Cooperative Research and Development (R&D) program (Program Element (P.E.) 0603790D) in prior years. Each year OSD will provide seed money to initiate worthy R&D projects for which the Navy will provide continuation funding from this P.E.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental tests related to specific ship or aircraft applications.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS: Not applicable

FY 1998/1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603790N PROJECT NUMBER: R2293
PROGRAM ELEMENT TITLE: NATO Research and Development PROJECT TITLE: NATO Cooperative R&D

2. (U) FY 1997 PLAN:

- (U) ($2,717) Support on-going work related to the U.S./United Kingdom development of the Intercooled Recuperated (ICR) Gas Turbine Engine.
- (U) ($2,730) Support on-going Navy efforts on the U.S./Japanese Cooperative Material Project for Advanced Steel.
- (U) ($1,150) Support on-going Navy efforts on the U.S./German joint project on Computer Codes for Predicting Underwater Explosion Effects initiated with OSD funding in FY96.
- (U) ($700) Support on-going work on the U.S./Norway joint project on Composite Hull Embedded Sensor System initiated with OSD funding in FY96.
- (U) ($700) Support on-going work on the U.S./France High-Performance Protocol Project initiated with OSD funding.
- (U) ($350) Support on-going work on the U.S./France Software Engineering Tools Project initiated with OSD funding.
- (U) ($750) Support on-going work on the U.S./U.K. Trimaran Demonstrator Project initiated with OSD funding.
- (U) ($300) Support on-going work on the U.S./France Unmanned Underwater Vehicle Non-Traditional Navigation, Guidance and Control Project initiated with OSD funding.
- (U) ($131) Portion of the extramural program reserved for Small Business Innovation Research Assessment in accordance with 15 U.S.C. 638.

3. (U) FY 1998 PLAN:

- (U) ($3,319) Support on-going Navy efforts on the U.S./Japanese Cooperative Material Project for Advanced Steel initiated with OSD funding.
- (U) ($2,960) Support on-going work on the High-Speed Protocol Project with France initiated with OSD funding.
- (U) ($140) Support on-going work on the U.S./Norway joint project on Composite Hull Embedded Sensor System initiated with OSD funding.
- (U) ($3,091) Support on-going Navy work related to the U.S./United Kingdom development of the ICR Gas Turbine Engine.
- (U) ($1,100) Support work on the Unmanned Undersea Vehicle cooperative R&D project between the U.S. and France initiated with OSD funding.

- (U) ($520) Support on-going Navy efforts on the U.S./German joint project on Computer Codes for Predicting Underwater Explosion Effects.
- (U) ($200) Support on-going work on the U.S./France Software Engineering Tools Project initiated with OSD funding.
- (U) ($2,000) Support on-going work on the U.S./U.K. Trimaran Demonstrator Project initiated with OSD funding.

4. (U) FY 1999 PLAN:

- (U) ($3,000) Support on-going work related to the U.S./Australian Anti-Torpedo Torpedo cooperative R&D project.
- (U) ($1,369) Support on-going work related to the cooperative R&D program between the U.S. and U.K. for Trimaran Hull initiated with OSD funding.
- (U) ($831) Support on-going Navy efforts on the U.S./Japan Cooperative Material Project for Advanced Steel initiated with OSD funding.
- (U) ($400) Support on-going Navy work on the U.S./U.K. development of the ICR Gas Turbine Engine initiated with OSD funding.
- (U) ($2,500) Support on-going work on the multilateral Interoperable Secure Networks Project initiated with OSD funding.
- (U) ($1,300)Support on-going work on the U.S./U.K. Bottom Mounted Sensor System Project initiated with OSD funding.
- (U) ($1,867) Support work on the multilateral Naval Gun Fire Support Computer Codes Development Project initiated with OSD funding.

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President s Budget: | 0 | 9,933 | 10,172 | 7,421 |

FY 1998/1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603790N PROGRAM ELEMENT TITLE: NATO Research and Development PROJECT NUMBER: R2293 PROJECT TITLE: NATO Cooperative R&D

| | | | | |
|---|---|---|---|---|
| (U) Adjustments from FY 1997 PRESBUDG: | 0 | -405 | +3,158 | +3,846 |
| (U) FY 1998/1999 PRESBUDG Submission: | 0 | 9,528 | 13,330 | 11,267 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1997 adjustment is due to Congressional Undistributed Reductions (-405). FY 1998 adjustment is due to NWCF and other DON adjustments (-2,308), NATO Cooperative R&D increase (+5,500), and inflation (-34). FY 1999 adjustment is due to NWCF and other DON adjustments (+188), NATO Cooperative R&D distribution (+3,700) and inflation (-42).

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:
(U) PE 0603790D (NATO Cooperative Research and Development)
(U) PE 0605853N (Management, Technical and International Support)
(U) PE 0605130D (Foreign Comparative Testing)

D. (U) SCHEDULE PROFILE: Not applicable.

FY 1998/1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603790N PROJECT NUMBER: R2293
PROGRAM ELEMENT TITLE: NATO Research and Development PROJECT TITLE: NATO Cooperative R&D

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Cooperative Research and Development | 0 | 9,528 | 13,330 | 11,267 |

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION: Not applicable.

C. (U) FUNDING PROFILE: Not applicable.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603795N
PROGRAM ELEMENT TITLE: Gun Weapons Systems Technology

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| S2156 Naval Surface Fire Support | 32,205 | 50,067 | 37,809 | 52,985 | 39,328 | 31,284 | 31,921 | 32,667 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Naval Surface Fire Support (NSFS) Mission will be met near term by gun, missile and C4I weapons systems. The NSFS Program Office will acquire all gun related systems in order to meet the range, accuracy, and lethality requirements of the Mission Needs Statement dated 11 May 1992. Gun related systems are to include: a 5" MK 45 modification, a 5" extended range guided munitions with an internal Global Positioning System (GPS) receiver and Inertial Navigation System (INS) coupled guidance system delivering a submunition payload to targets at ranges exceeding 41 NM to be known as the EX-171 Hammer (formerly Precision Guided Munition (PGM)), a gun fire control system and some ballistic ammunition improvements. Missile related systems include a ship launched strike missile reaching out to 150 NM. Both gun and missile weapons will require a C4I system of commensurate capability. These combined weapon systems will provide the required standoff capability to safely destroy shore targets. Technologies which have been developed and funded by other agencies are being leveraged, not only as a means to determine near term benefits to surface combatants, but with the goal of ensuring that all existing and emerging technologies are maximally exploited. The program will provide critical NSFS capabilities necessary to support all phases of amphibious operations. The Acquisition Decision Memorandum (November 1992) approved initiation of program Phase 0.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603795N PROJECT NUMBER: S2156
PROGRAM ELEMENT TITLE: Gun Weapons PROJECT TITLE: Naval Surface Fire Support

Systems Technology

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:
   - (U) ($9,702) Awarded Contract for EX-171 EDMs and in-house EX-171 support.
   - (U) ($12,122) Completed Milestone II for the 5" MK 45 Modification. Awarded contract for 5" MK 45 Modification and in-house support.
   - (U) ($2,020) Continued EX-171 Advanced Solid Propellant (ASP) charge. Test and evaluation of alternative explosives for the Army XM80 submunition to meet Navy Insensitive Munition requirements.
   - (U) ($3,000) Conducted EX-171 Risk Mitigation efforts.
   - (U) ($5,361) Forward financing FY 1997 requirements for low execution rates.

2. (U) FY 1997 PLAN:
   - (U) ($15,000) Continue development of EX-171 EDMs.
   - (U) ($2,500) Develop EX-171 Advanced Solid Propellant Charge.
   - (U) ($500) Preparation of EX-171 preliminary technical documentation and planning, including logistics documentation.
     - (U) ($2,000) Perform EX-171 component testing (Government-In-house support).
   - (U) ($500) Complete EX-171 Preliminary Design Review and Critical Design Review.
   - (U) ($3,000) Continue Risk Reduction efforts for GPS/INS.
   - (U) ($10,000) Exercise Contract Option for 5" MK 45 Modification and GFP preparation.
   - (U) ($2,000) Continue ballistic projectile qualification for 5" MK 45 Modification.
   - (U) ($1,500) Continue 5" MK 45 Modification Conventional propellant charge qualification.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603795N PROJECT NUMBER: S2156
PROGRAM ELEMENT TITLE: Gun Weapons PROJECT TITLE: Naval Surface Fire Support Systems Technology

- (U) ($1,241) Conduct 5" MK 45 Modification system interface (Fire Control and Ammunition).
- (U) ($600) Develop 5" MK 45 Modification Gun Fire Control.
- (U) ($3,000) Concept development and engineering analysis of the Army ATACM missile integration onto naval platforms to meet Marine Corps requirements.
- (U) ($1,863) Develop Warfare Mission Planning System to allow effective use of NSFS capability with a FY 2001 IOC.
- (U) ($1,002) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 U.S.C. 638.
- (U) ($5,361) Forward financing FY 1998 requirements for low execution rates in FY 1996.

3 (U) FY 1998 PLAN:
- (U) ($21,500) Continue development of EX-171 EDMs and in-house support.
- (U) ($2,520) Procure Long Lead Material for 90 LRIP ERGMs in support of OPEVAL.
- (U) ($13,789) Exercise Contract Option for 5" MK 45 Modification and GFP Preparation.

4. (U) FY 1999 PLAN:
- (U) ($24,500) Continue development of EX-171 EDMs and in-house support.
- (U) ($4,410) Procure 90 LRIP ERGMs in support of OPEVAL.
- (U) ($4,847) Perform EX-171 Land Based Testing and In-House support.
- (U) ($10,000) Conduct EX-171 TECHEVAL and OPEVAL and In-House support.
- (U) ($9,228) Exercise Contract Option for 5" MK 45 Modification and GFP Preparation.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603795N PROJECT NUMBER: S2156
PROGRAM ELEMENT TITLE: Gun Weapons PROJECT TITLE: Naval Surface Fire Support

Systems Technology

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 32,958 | 42,204 | 48,190 | 44,252 |
| (U) Adjustments from FY 1997 PRESBUDG: | - 753 | +7,863 | -10,381 | +8,733 |
| (U) FY 1998/99 PRESBUDG Submit | 32,205 | 50,067 | 37,809 | 52,985 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: Decrease of $753K in FY 1996 due to minor pricing adjustments and SBIR assessment. In FY 1997 increase provided for concept development of the Army ATACM missile; development of warfare mission planning and continuation of ERGM risk reduction. FY 1998 change due to program restructure and low execution rates in FY 1996. FY 1999 change due to revised testing program and increase for ERGM LRIP.

(U) Schedule: IOC delayed to FY 2002.
(U) Technical: Not Applicable

C. (U) OTHER PROGRAM FUNDING SUMMARY:

| APPN/LI/BLI | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| PANMC/11/0250 5" | 0 | 0 | 0 | 28,000 | 15,900 | 15,900 | 47,800 | 47,800 | CONT. | CONT. |

(U) RELATED RDT&E: Not applicable.

D. (U) SCHEDULE PROFILE: See Attachments "A" and "B".

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603795N PROJECT NUMBER: S2156
PROGRAM ELEMENT TITLE: Gun Weapons Systems Technology PROJECT TITLE: Naval Surface Fire Support

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Primary Hardware Development | 20,105 | 34,809 | 23,458 | 39,819 |
| b. Ancillary Hardware Development | 1,318 | 7,239 | 3,827 | 3,511 |
| c. Government Engineering | 6,262 | 5,909 | 8,132 | 7,461 |
| d. Systems Engineering | 3,839 | 1,058 | 1,904 | 1,755 |
| e. Miscellaneous | 681 | 1,052 | 488 | 439 |
| Total | 32,205 | 50,067 | 37,809 | 52,985 |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603795N PROJECT NUMBER: S2156
PROGRAM ELEMENT TITLE: Gun Weapons Systems Technology PROJECT TITLE: Naval Surface Fire Support

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | | |
| NSWC DAHLGREN, VA | WR | VAR | CONT. | CONT. | 9,661 | 7,408 | 7,800 | 1,761 | 17,686 | CONT. | CONT. |
| NSWC CRANE, IN | WR | VAR | CONT. | CONT. | 7,181 | 1,875 | 2,000 | 0 | 200 | CONT. | CONT. |
| NSWC CRANE, IN | RC | VAR | CONT. | CONT. | 9,263 | 0 | 0 | 0 | 0 | CONT. | CONT. |
| NSWC ANNAPOLIS,MD | WR | VAR | CONT. | CONT. | 2,200 | 0 | 0 | 0 | 0 | CONT. | CONT. |
| NSWC INDIAN HD, MD | WR | VAR | CONT. | CONT. | 3,891 | 1,833 | 2,300 | 0 | 3,000 | CONT. | CONT. |
| NSWC PORT HUE, CA | WR | VAR | CONT. | CONT. | 250 | 64 | 300 | 0 | 2,100 | CONT. | CONT. |
| UNITED DEFENSE, MINNEAPOLIS, MN | CP | VAR | CONT. | CONT. | 4,000 | 9,720 | 10,000 | 12,028 | 7,900 | CONT. | CONT. |
| TEXAS INSTRUMENTS, LEWISVILLE, TX | CP | VAR | CONT. | CONT. | 0 | 4,200 | 9,000 | 24,020 | 19,410 | CONT. | CONT. |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603795N PROJECT NUMBER: S2156
PROGRAM ELEMENT TITLE: Gun Weapons Systems Technology PROJECT TITLE: Naval Surface Fire Support

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SSPO/DRAPER LABS BOSTON, MA | PD | VAR | CONT. | CONT. | 5,537 | 3,100 | 3,000 | 0 | 0 | CONT. | CONT. |
| SPW/JOHNS HOPKINS LAUREL, MD | PD | VAR | CONT. | CONT. | 1,800 | 200 | 0 | 0 | 0 | CONT. | CONT. |
| MISCELLANEOUS | VAR | VAR | CONT. | CONT. | 12,855 | 3,805 | 15,667 | 0 | 2,689 | CONT. | |
| Support and Management | | | | | 0 | 0 | 0 | 0 | 0 | CONT. | CONT. |
| Test and Evaluation | | | | | 0 | 0 | 0 | 0 | 0 | CONT. | CONT. |
| GOVERNMENT FURNISHED PROPERTY - Not applicable. | | | | | | | | | | | |
| Subtotal Product Development | | | | | 56,638 | 32,205 | 50,067 | 37,809 | 52,985 | CONT. | CONT. |
| Subtotal Support and Management | | | | | 0 | 0 | 0 | 0 | 0 | CONT. | CONT. |
| Subtotal Test and Evaluation | | | | | 0 | 0 | 0 | 0 | 0 | CONT. | CONT. |
| Total Project | | | | | 56,638 | 32,205 | 50,067 | 37,809 | 52,985 | CONT. | CONT. |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603795N
PROGRAM ELEMENT TITLE: Gun Weapons Systems Technology

PROJECT NUMBER: S2156
PROJECT TITLE: Naval Surface Fire Support

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FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603800N PROJECT NUMBER: D2209
PROGRAM ELEMENT TITLE: JOINT ADVANCED STRIKE TECHNOLOGY (JAST) PROGRAM PROJECT TITLE: JASTP

(U) COST (Dollars in thousands)

| PROJECT NUMBER TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| D2209 JASTP | 79,981 | 246,076 | 448,855 | 443,522 | 249,429 | 25,448 | 0 | 0 | 0 | 1,621,099 |

RDT&E 4
Articles (Unit cost of RDT&E articles not separately priced)

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Joint Strike Fighter (JSF) Program (formally JAST) will develop and field an affordable, highly common family of next generation strike aircraft for the USN, USMC, USAF and allies. Current program emphasis is on facilitating the evolution of fully validated and affordable joint operational requirements, and demonstrating cost leveraging technologies and concepts to lower risk prior to entering Engineering and Manufacturing Demonstration (E&MD) in FY 2001. This is a joint program with no executive service. Navy and Air Force each provide approximately equal shares of annual funding for the program effective in FY 1995. The Defense Advanced Research Projects Agency (DARPA) and the United Kingdom (UK) contribute funding effective in FY 1996. The Netherlands, Norway and Denmark will contribute funding effective in FY 1997 under a Multi-Lateral Agreement.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it integrates hardware for test related to specific ship or aircraft applications.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS: (Breakout reflects Navy, Air Force, DARPA and UK funding)

(U) ($ 60,768) Completed concept definition and design research for weapon system concepts for a tri-service family of aircraft; received contractors preferred weapon system concepts and recommended development and demonstration plans; and continued affordability analyses.

(U) ($ 7,000) Conducted Phase I of the Alternate Engine Program including study efforts and preliminary design risk reduction activities.

(U) ($111,587) Completed technology maturation concept definition and design research; continued demonstrations and assessments in the areas of airframe, flight systems, manufacturing and producibility, propulsion, mission systems and supportability.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603800N PROJECT NUMBER: D2209
PROGRAM ELEMENT TITLE: JOINT ADVANCED STRIKE TECHNOLOGY (JAST) PROGRAM PROJECT TITLE: JASTP

(U) ($ 7,101) Continued strategy-to-task analysis and strike warfare demonstrations and assessments to facilitate the Services joint requirements definition.

(U) ($ 5,065) Continued modeling and simulation activities to support strike warfare mission area analysis.

(U) ($ 5,502) Completed Advanced Short Takeoff and Vertical Landing (ASTOVL) risk mitigation efforts, integrated with JAST Program Concept Development tasks.

(U) ($ 7,152) Supported program operations, including program office functions.

(U) ($204,175) Total

2. (U) FY 1997 PLAN: (Breakout reflects Navy, Air Force, DARPA, UK and Multi-Lateral funding)

(U) ($411,620) Competitively awarded contracts to Boeing and Lockheed Martin for ground and flight demonstrations and continued concept refinement for a tri-service family of aircraft that meets the Services needs and optimizes commonality among the variants to minimize life cycles costs (LCC); award contract to Pratt & Whitney for supporting propulsion efforts.

(U) ($ 25,000) Commence Phase II of the Alternate Engine Program, which continues detailed design and begins hardware testing.

(a) Within this amount, $10M has been included for early risk reduction on critical technologies for the alternative engine.

(b) The Department is evaluating acceleration of the alternative engine to meet a Lot 4 production introduction.

(U) ($ 6,308) Continue requirements analysis efforts including Cost & Operational Trades (COPT) to facilitate the Services joint requirements definition.

(U) ($ 10,292) Continue modeling and simulation activities to support strike warfare mission area analysis.

(U) ($172,695) Continue technology maturation demonstrations and assessments in the areas of airframe, flight systems, manufacturing and producibility, propulsion, mission systems, and supportability. Commence systems engineering support for the Concept Demonstration Phase in the areas of system test, air vehicle analysis and integration, advanced cost estimating, survivability, integrated flight and propulsion control and carrier suitability.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603800N PROGRAM ELEMENT TITLE: JOINT ADVANCED STRIKE TECHNOLOGY (JAST) PROGRAM PROJECT NUMBER: D2209 PROJECT TITLE: JASTP

(U) ($ 9,525) Support program operations, including program office functions; Congressionally directed OSD Force Structure Analysis.

(U) ($ 6,035) USN portion of program reduced for transfer to Small Business Innovative Research assessment in accordance with 15 U.S.C. 638.

(U) ($ 12,809) Anticipated USAF and DARPA general reductions.

(U) ($654,284) Total

3. (U) FY 1998 PLAN: (Breakout reflects Navy, Air Force, DARPA, UK and Multi-Lateral funding)

(U) ($718,261) Continue Concept Demonstration efforts by Boeing, Lockheed Martin and Pratt & Whitney for ground and flight demonstrations and continued concept refinement for a tri-service family of aircraft.

(U) ($ 20,000) Continue the Alternate Engine Program.

(U) ($ 7,287) Continue requirements analysis efforts including Cost & Operational Trades (COPT) to facilitate the Services joint requirements definition.

(U) ($ 11,913) Continue modeling and simulation activities to support strike warfare mission area analysis.

(U) ($231,591) Continue technology maturation demonstrations and assessments in the areas of airframe, flight systems, manufacturing and producibility, propulsion, mission systems, and supportability. Continue systems engineering support for the Concept Demonstration Phase in the areas of system test, air vehicle analysis and integration, advanced cost estimating, survivability, integrated flight and propulsion control and carrier suitability.

(U) ($ 6,355) Support program operations, including program office functions.

(U) ($995,407) Total

4. (U) FY 1999 PLAN: (Breakout reflects Navy, Air Force, DARPA, UK and Multi-Lateral funding)

(U) ($702,484) Continue Concept Demonstration efforts by Boeing, Lockheed Martin and Pratt & Whitney for ground and flight demonstrations and continued concept refinement for a tri-service family of aircraft.

(U) ($ 23,000) Continue the Alternate Engine Program.

(U) ($ 5,776) Continue requirements analysis efforts including Cost & Operational Trades (COPT) to facilitate the Services joint requirements definition; receive Joint Operational Requirements Document (JORD) from the Services.

(U) ($ 9,424) Continue modeling and simulation activities to support strike warfare mission area analysis.

(U) ($203,749) Continue technology maturation demonstrations and assessments in the areas of airframe, flight systems, manufacturing and producibility, propulsion, mission systems, and supportability. Continue systems engineering support for the Concept Demonstration Phase in the areas of system test, air vehicle analysis and integration, advanced cost estimating, survivability, integrated flight and propulsion control and carrier suitability.

(U) ($ 6,300) Support program operations, including program office functions.

(U) ($950,733) Total

B. (U) PROGRAM CHANGE SUMMARY: (Dollars in thousands)

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 | Total Cost |
|---|---|---|---|---|---|
| (U) FY 1997 President's Budget: | $81,215 | $246,833 | $421,848 | $457,300 | $1,592,855 |
| (U) Adjustments from Pres Budget: | -1,234 | -757 | +27,007 | -13,778 | + 28,244 |
| (U) FY 1998 President s Budget: | $79,981 | $246,076 | $448,855 | $443,522 | $1,621,099 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1996 decrease reflects CNO PA&E (-$18), Jordanian Rescission (-$430), SBIR Transfer (-$1,123)and Reversed to Increase (+$337) adjustments. FY 1997 has been decreased by a net of $757 reflecting the increase of $10,000 for alternate engine efforts offset by decreases for Non-FFRDC reduction ($-244), Navy Working Capital Fund (NWCF) Savings (-$5,136), General Reductions (-$5,136) and Budgetary Resolution (-$241). FY 1998 increase reflects the replacement of funding formerly provided by DARPA (+$32,612) and decreases attributed to Balance adjustments (-$1,046), NRL BRAC Savings (-$15), Respread (-$488), Carryover (-$165), Acquisition Internship Program (-$223), Acquisition Center for Excellence (-$255), AN-SSQ-53 (-$1,800), Desk Book (-$115) and Inflation savings (-$1,432) adjustments. FY 1999 net decrease reflects the replacement of funding formerly provided by DARPA (+$18,226) and the decreases attributed to Balance Adjustments (-$983), NRL BRAC Savings (-$95), Respread (-$496), NWCF Savings

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603800N PROJECT NUMBER: D2209
PROGRAM ELEMENT TITLE: JOINT ADVANCED STRIKE TECHNOLOGY (JAST) PROGRAM PROJECT TITLE: JASTP

(-$1,959), Acquisition Internship Program (-$689), Acquisition Center for Excellence (-$245), Inflation Savings (-$2,398), CVN-77 reduction (-$25,000), Desk Book (-$139) adjustments.

(U) Schedule: No Change. Program schedule is consistent with recent Concept Demonstration Phase contract awards.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands) This is a joint program with no executive service. The United Kingdom is a full collaborative partner in the program in accordance with a Memorandum of Understanding (MOU) signed in December 1995. The Netherlands, Norway and Denmark will become associate partners in the program in accordance with a Multi-Lateral Memorandum of Agreement (MOA) to be signed in the second quarter of FY 1997.

| | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| (U)RDT&E 0603800F | 81,277 | 252,043 | 458,052 | 465,611 | 245,439 | 23,641 | 0 | 0 | 0 | 1,609,843 |
| (U)RDT&E 0603800E | 28,917 | 76,865 | 23,900 | 0 | 0 | 0 | 0 | 0 | 0 | 129,682 |
| (U)United Kingdom | 14,000 | 71,000 | 55,000 | 34,000 | 26,000 | 0 | 0 | 0 | 0 | 200,000 |
| (U)Multi-Lateral | 0 | 8,300 | 9,600 | 7,600 | 5,000 | 1,700 | 0 | 0 | 0 | 32,200 |

(U) RELATED RDT&E:
Milestone II for E&MD of the Joint Strike Fighter (JSF) is planned in FY 2001.

| | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| (U)RDT&E 0604800F: | 0 | 0 | 0 | 0 | 0 | 560,234 | 1,399,882 | 1,915,720 | TBD* | TBD* |
| (U)RDT&E 0604800N: | 0 | 0 | 0 | 0 | 0 | 558,184 | 1,398,026 | 1,913,742 | TBD* | TBD* |

* Pending initial SAR approval, 3QTR FY97

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603800N PROJECT NUMBER: D2209
PROGRAM ELEMENT TITLE: JOINT ADVANCED STRIKE TECHNOLOGY (JAST) PROGRAM PROJECT TITLE: JASTP

D. (U) SCHEDULE PROFILE:

Dec 94 Commenced Concept Development Phase
Mar 96 Released RFP for Concept Demonstration Phase
May 96 Designated a joint, DOD, Acquisition Category ID Program by USD(A&T)
Nov 96 Competitively Awarded Concept Demonstration Contracts to Boeing and Lockheed Martin
Mar 01 Milestone II for JSF E&MD

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1997

| | | | |
|---|---|---|---|
| BUDGET ACTIVITY: 4 | PROGRAM ELEMENT: 0603800N | USN | PROJECT NUMBER: D2209 |
| BUDGET ACTIVITY: 4 | PROGRAM ELEMENT: 0603800F | USAF | PROJECT NUMBER: 2025 |
| BUDGET ACTIVITY: 3 | PROGRAM ELEMENT: 0603800E | ARPA | PROJECT NUMBER: JA-01 |
| BUDGET ACTIVITY: N/A | PROGRAM ELEMENT: N/A | UNITED KINGDOM | PROJECT NUMBER: UK |
| BUDGET ACTIVITY: N/A | PROGRAM ELEMENT: N/A | MULTI-LATERAL | PROJECT NUMBER: ML |
| | PROGRAM ELEMENT TIT | JOINT ADVANCED STRIKE TECHNOLOGY (JAST) PROGRAM | PROJECT TITLE: JASTP |

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| | Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|---|
| a. | Strike Warfare Systems Design Development | 60,768 | | | |
| b. | Weapon System Concept Demonstrations Contracts (including flying demonstrations) | | 411,620 | 718,261 | 702,484 |
| c. | Alternate Engine Program | 7,000 | 25,000 | 20,000 | 23,000 |
| d. | ASTOVL | 5,502 | | | |
| e. | Technology Maturation and Systems Engineering Support Total | 111,587 | 172,695 | 231,591 | 203,749 |
| | Breakout: | | | | |
| | Technology Maturation | | | | |
| | Airframe | 10,417 | 13,083 | 24,900 | 21,200 |
| | Flight Systems | 31,363 | 38,736 | 32,200 | 24,800 |
| | Manufacturing & Producibility | 5,475 | 4,597 | 5,400 | 8,950 |
| | Propulsion | 35,654 | 33,304 | 38,523 | 9,200 |
| | Mission Systems | 24,237 | 36,874 | 63,197 | 77,580 |
| | Supportability | 3,554 | 6,800 | 8,480 | 20,850 |
| | Core Team Support | 887 | 0 | 0 | 0 |
| | Subtotal Technology Maturation | 111,587 | 133,394 | 172,700 | 162,580 |
| | Plus: Systems Engineering Support | 0 | 39,301 | 58,891 | 41,169 |
| | Subtotal | 111,587 | 172,695 | 231,591 | 203,749 |

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

| | | |
|---|---|---|
| BUDGET ACTIVITY: 4 | PROGRAM ELEMENT: 0603800N USN | PROJECT NUMBER: D2209 |
| BUDGET ACTIVITY: 4 | PROGRAM ELEMENT: 0603800F USAF | PROJECT NUMBER: 2025 |
| BUDGET ACTIVITY: 3 | PROGRAM ELEMENT: 0603800E ARPA | PROJECT NUMBER: JA-01 |
| BUDGET ACTIVITY: N/A | PROGRAM ELEMENT: N/A UNITED KINGDOM | PROJECT NUMBER: UK |
| BUDGET ACTIVITY: N/A | PROGRAM ELEMENT: N/A MULTI-LATERAL | PROJECT NUMBER: ML |
| | PROGRAM ELEMENT T JOINT ADVANCED STRIKE TECHNOLOGY (JAST) PROGRAM | PROJECT TITLE: JASTP |

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| | Project Cost Categories (Cont) | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|---|
| f. | Requirements Analysis Total | 12,166 | 16,600 | 19,200 | 15,200 |
| | Breakout: | | | | |
| | Requirements Analysis (Analysis, Threat/ Intelligence, Cost & Operational Performance Trades and Core Team Support) | 7,101 | 6,308 | 7,287 | 5,776 |
| | Modeling and Simulation | 5,065 | 10,292 | 11,913 | 9,424 |
| g. | Program Operations | 7,152 | 9,525 | 6,355 | 6,300 |
| h. | USN SBIR | | 6,035 | | |
| i. | USAF/DARPA General Reductions | | 12,809 | | |
| | Total | 204,175 | 654,284 | 995,407 | 950,733 |
| | Funding Resources: | | | | |
| | 0603800N | 79,981 | 246,076 | 448,855 | 443,522 |
| | 0603800F | 81,277 | 252,043 | 458,052 | 465,611 |
| | 0603800E | 28,917 | 76,865 | 23,900 | 0 |
| | United Kingdom | 14,000 | 71,000 | 55,000 | 34,000 |
| | Multi-Lateral | | 8,300 | 9,600 | 7,600 |
| | Total | 204,175 | 654,284 | 995,407 | 950,733 |

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1997

BUDGET ACTIVITY: 4
BUDGET ACTIVITY: 4
BUDGET ACTIVITY: 3
BUDGET ACTIVITY: NA
BUDGET ACTIVITY: NA

PROGRAM ELEMENT: 0603800N USN
PROGRAM ELEMENT: 0603800F USAF
PROGRAM ELEMENT: 0603800E DARPA
PROGRAM ELEMENT: N/A UNITED KINGDOM
PROGRAM ELEMENT: N/A MULTI-LATERAL
PROGRAM ELEMENT TITLE: JOINT ADVANCED STRIKE TECHNOLOGY (JAST) PROGRAM

PROJECT NUMBER: D2209
PROJECT NUMBER: 2025
PROJECT NUMBER: JA-01
PROJECT NUMBER: UK
PROJECT NUMBER: ML
PROJECT TITLE: JASTP

B. (U) BUDGET ACQUISTION HISTORY AND PLANNING INFORMATION ($ in thousands) No budget in FY 1993 and Prior.

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PRODUCT DEVELOPMENT | | | | | | | | | | | |
| Strike Warfare Concept Studies (Total Prior to FY 1996) | | | | | | | | | | | |
| Miscellaneous | Various | Oct93-Sep 94 | 11,467 | 11,467 | 11,467 | | | | | | 11,467 |
| Technology Maturation Concept Exploration Phase (Total Prior to FY 1996) | | | | | | | | | | | |
| Fld. Act. | Various | Oct93-Sep 94 | 3,432 | 3,432 | 3,432 | | | | | | 3,432 |
| Strike Warfare Systems Design Development | | | | | | | | | | | |
| Boeing Seattle WA | C/CPFF | Oct 95 | 32,770 | 32,770 | 14,140 | 18,630 | | | | | 32,770 |
| McAir St. Louis MO | C/CPFF | Oct 95 | 23,708 | 23,708 | 14,393 | 9,315 | | | | | 23,708 |
| Northrop Pico Rivera CA | C/CPFF | Oct 95 | 21,358 | 21,358 | 12,043 | 9,315 | | | | | 21,358 |
| Lockheed Ft. Worth TX | C/CPFF | Oct 95 | 28,311 | 28,311 | 9,950 | 18,361 | | | | | 28,311 |
| Miscellaneous | Various | Various | 1,121 | 1,121 | 821 | 300 | | | | | 1,121 |
| Fld. Activ. | Various | Oct95-Sep96 | 8,322 | 8,322 | 3,475 | 4,847 | | | | | 8,322 |
| SUBTOTAL | | | | | 54,822 | 60,768 | | | | | 115,590 |

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

PROGRAM ELEMENT TITLE: JOINT ADVANCED STRIKE TECHNOLOGY (JAST) PROGRAM PROJECT TITLE: JASTP

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Weapon System Concept Demonstrations (including flying demonstrators and supporting propulsion efforts) | | | | | | | | | | | |
| Boeing | C/CPFF | Nov 96 | 661,802 | 661,802 * | | | 67,208 | 199,827 | 238,684 | 156,083 | 661,802 |
| Lockheed | C/CPFF | Nov 96 | 718,800 | 718,800 * | | | 105,900 | 215,200 | 246,900 | 150,800 | 718,800 |
| Pratt & Whit | SS/CPAF | Nov 96 | 832,046 | 832,046 | | | 238.512 | 303.234 | 216.900 | 73.400 | 832.046 |
| West Palm Beach FL | | | | | | | | | | | |
| SUBTOTAL | | | 2,212,648 | 2,212,648 | | | 411,620 | 718,261 | 702,484 | 380,283 | 2,212,648 |
| *includes government managed equipment | | | | | | | | | | | |
| Alternate Engine Program | | | | | | | | | | | |
| GE | SS/CPFF | Oct 97 | 105,000 | 105,000 | | 7,000 | 25,000 | 20,000 | 23,000 | 30,000 | 105,000 |
| ASTOVL | | | | | | | | | | | |
| Lockheed | SS/CPFF | Oct 95 | 16,416 | 16,416 | 14,067 | 2,349 | | | | | 16,416 |
| Boeing | SS/CPFF | Oct 95 | 11,200 | 11,200 | 8,047 | 3,153 | | | | | 11,200 |
| Miscellaneo | Various | Various | 15,539 | 15,539 | 15.539 | 0 | | | | | 15.539 |
| SUBTOTAL | | | | | 37,653 | 5,502 | | | | | 43,155 |
| Technology Maturation and Systems Engineering Support | | | | | | | | | | | |
| Airframe | | | | | | | | | | | |
| McAir | SS/CPFF | Oct 97 | 70,800 | 70,800 | 3,300 | 8,800 | 11,800 | 23,300 | 19,600 | 4,000 | 70,800 |
| Miscellaneo | Various | Various | 2,661 | 2,661 | 1,007 | 854 | | 400 | 400 | | 2,661 |
| Fld. Activ. | Various | Oct97-Sep9 | 6,128 | 6,128 | 1.276 | 512 | 1.110 | 1.130 | 1.120 | 980 | 6.128 |
| SUBTOTAL | | | | | 5,583 | 10,166 | 12,910 | 24,830 | 21,120 | 4,980 | 79,589 |
| Flight Systems | | | | | | | | | | | |
| Lockheed | C/CPFF | Oct 97 | 47,992 | 47,992 | 740 | 14,556 | 15,793 | 9,600 | 5,800 | 1,503 | 47,992 |
| McAir | C/CPFF | Oct 97 | 64,821 | 64,821 | 1,186 | 13,515 | 16,600 | 18,000 | 14,400 | 1,120 | 64,821 |
| Contracts Less Than $1.0M | | | | | | | | | | | |
| Various | CPFF | Various | 9,229 | 9,229 | 6,397 | 501 | 1,131 | 400 | 400 | 400 | 9,229 |
| Fld. Activ. | Various | Oct97-Sep9 | 22,453 | 22,453 | 3.175 | 2.751 | 5.112 | 4.090 | 4.080 | 3.245 | 22.453 |
| SUBTOTAL | | | | | 11,498 | 31,323 | 38,636 | 32,090 | 24,680 | 6,268 | 144,495 |

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

PROGRAM ELEMENT TITLE: JOINT ADVANCED STRIKE TECHNOLOGY (JAST) PROGRAM PROJECT TITLE: JASTP

| Contractor/ Government Performing Activity | Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Manufacturing & Producibility | | | | | | | | | | | |
| Hughes Los Angeles CA | C/CPFF | Oct 97 | 18,400 | 18,400 | 1,397 | 1,638 | 2,030 | 635 | 2,800 | 9,900 | 18,400 |
| Lockheed | C/CPFF | Oct 97 | 11,193 | 11,193 | 1,581 | 1,316 | 1,836 | 2,770 | 2,890 | 800 | 11,193 |
| General Res. Corp. Huntsville AL | C/CPFF | Oct 95 | 1,945 | 1,945 | 465 | 1,480 | | | | | 1,945 |
| New Contra | C/CPFF | Oct 97 | 4,600 | 4,600 | | | | 1,100 | 2,200 | 1,300 | 4,600 |
| Miscellaneo | Various | Various | 6,101 | 6,101 | 1,724 | 1,031 | 731 | 685 | 845 | 1,085 | 6,101 |
| SUBTOTAL | | | | | 5,167 | 5,465 | 4,597 | 5,190 | 8,735 | 13,085 | 42,239 |
| Propulsion | | | | | | | | | | | |
| Pratt/Whitne | C/CPFF | Oct 95 | 5,448 | 5,448 | 4,212 | 1,236 | | | | | 5,448 |
| GE Cincinnati OH | SS/CPFF | Oct 95 | 5,681 | 5,681 | 4,331 | 1,350 | | | | | 5,681 |
| Pratt/Whitne | SS/CPFF | Nov 95 | 30,000 | 30,000 | | 30,000 | | | | | 30,000 |
| Pratt/Whitne | SS/CPFF | Nov 97 | 60,854 | 60,854 | | | 22,681 | 33,173 | 5,000 | | 60,854 |
| GE | SS/CPFF | Nov 97 | 8,000 | 8,000 | | | 3,000 | 3,000 | 2,000 | | 8,000 |
| New Contra | SS/CPFF | Feb 97 | 5,000 | 5,000 | | | 5,000 | | | | 5,000 |
| Contracts Less Than $1.0M | | | | | | | | | | | |
| Various | CPFF | Various | 13,195 | 13,195 | 11,263 | 1,632 | 300 | | | | 13,195 |
| Fld. Activ. | Various | Oct97-Sep9 | 8,967 | 8,967 | 803 | 1,411 | 2,293 | 2,310 | 2,150 | | 8,967 |
| SUBTOTAL | | | | | 20,609 | 35,629 | 33,274 | 38,483 | 9,150 | | 137,145 |
| Mission Systems | | | | | | | | | | | |
| TI Plano TX | C/CPFF | Dec 95 | 2,464 | 2,464 | 1,413 | 1,051 | | | | | 2,464 |
| Lockheed | SS/CPFF | Oct 97 | 7,506 | 7,506 | 740 | 2,266 | 2,250 | 2,250 | | | 7,506 |
| McAir | SS/CPFF | Oct 97 | 7,174 | 7,174 | 740 | 1,934 | 2,250 | 2,250 | | | 7,174 |
| Hughes | C/CPFF | Oct 97 | 54,637 | 54,637 | | 4,653 | 8,619 | 14,002 | 23,832 | 3,531 | 54,637 |
| Westinghou Baltimore MD | C/CPFF | Oct 97 | 49,998 | 49,998 | | 4,288 | 7,660 | 13,998 | 20,522 | 3,530 | 49,998 |

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

PROGRAM ELEMENT TITLE: JOINT ADVANCED STRIKE TECHNOLOGY (JAST) PROGRAM PROJECT TITLE: JASTP

| Contractor/ Government Performing Activity | Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mission Systems (Cont) | | | | | | | | | | | |
| Boeing | C/CPFF | Oct 97 | 26,848 | 26,848 | | 300 | 3,883 | 11,000 | 10,515 | 1,150 | 26,848 |
| Lockheed | C/CPFF | Oct 97 | 26,791 | 26,791 | | 300 | 3,826 | 11,000 | 10,515 | 1,150 | 26,791 |
| New Contra | C/CPFF | Dec 97 | 25,150 | 25,150 | | | | 2,900 | 5,000 | 17,250 | 25,150 |
| Hughes | C/CPFF | Oct 98 | 3,681 | 3,681 | 1,019 | 1,609 | 1,053 | | | | 3,681 |
| Miscellaneo | Various | Various | 19,698 | 19,698 | 15,656 | 3,197 | 45 | 200 | 200 | 400 | 19,698 |
| Fld. Activ. | Various | Oct97-Sep9 | 35,364 | 35,364 | 6,573 | 4,409 | 6,797 | 5,517 | 6,906 | 5,162 | 35,364 |
| SUBTOTAL | | | | | 26,141 | 24,007 | 36,383 | 63,117 | 77,490 | 32,173 | 259,311 |
| Supportability | | | | | | | | | | | |
| Classified | | | | | | | | | | | |
| Project 3 | C/CPFF | Jan 98 | 15,262 | 15,262 | 770 | 1,492 | 3,000 | 4,000 | 1,000 | 5,000 | 15,262 |
| Project 4 | C/CPFF | Jan 98 | 7,418 | 7,418 | 800 | 238 | 2,000 | 1,480 | 1,000 | 1,900 | 7,418 |
| New Contra | C/CPFF | Jan 98 | 26,900 | 26,900 | | | | 1,800 | 8,000 | 17,100 | 26,900 |
| New Contra | C/CPFF | Jan 99 | 20,841 | 20,841 | | | | | 7,800 | 13,041 | 20,841 |
| Miscellaneo | Various | Various | 2,227 | 2,227 | 1,914 | 213 | 100 | | | | 2,227 |
| Fld. Activ. | Various | Oct97-Sep9 | 12,780 | 12,780 | 1,523 | 1,521 | 1,586 | 1,200 | 3,050 | 3,900 | 12,780 |
| SUBTOTAL | | | | | 5,007 | 3,464 | 6,686 | 8,480 | 20,850 | 40,941 | 85,428 |
| Core Team Support | | | | | | | | | | | |
| Fld. Activ. | Various | Oct95-Sep9 | 2,522 | 2,522 | 1,635 | 887 | | | | | 2,522 |
| Systems Engineering Support | | | | | | | | | | | |
| Contracts Less Than $1.0M | | | | | | | | | | | |
| Various | CPFF | Various | 7,042 | 7,042 | | | 1,539 | 2,356 | 1,647 | 1,500 | 7,042 |
| Fld. Activ. | Various | Oct97-Sep9 | 180,299 | 180,299 | | | 37,762 | 56,535 | 39,522 | 46,480 | 180,299 |
| SUBTOTAL | | | | | | | 39,301 | 58,891 | 41,169 | 47,980 | 187,341 |
| Requirements Analysis | | | | | | | | | | | |
| Contracts Less Than $1.0M | | | | | | | | | | | |
| Various | CPFF | Various | 20,342 | 20,342 | 3,293 | 4,005 | 3,366 | 3,919 | 3,042 | 2,717 | 20,342 |
| Fld. Activ. | Various | Oct97-Sep9 | 19,351 | 19,351 | 5,809 | 2,985 | 2,712 | 3,138 | 2,484 | 2,223 | 19,351 |
| SUBTOTAL | | | | | 9,102 | 6,990 | 6,078 | 7,057 | 5,526 | 4,940 | 39,693 |

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1997

PROGRAM ELEMENT TITLE: JOINT ADVANCED STRIKE TECHNOLOGY (JAST) PROGRAM

PROJECT TITLE: JASTP

| Contractor/ Government Performing Activity | Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Modeling and Simulation | | | | | | | | | | | |
| Contracts Less Than $1.0M | | | | | | | | | | | |
| Various | CPFF | Various | 31,539 | 31,539 | 1,223 | 3,118 | 6,907 | 8,208 | 6,441 | 5,642 | 31,539 |
| Fld. Activ. | Various | Oct97-Sep98 | 13,398 | 13,398 | 249 | 1,558 | 2,985 | 3,455 | 2,733 | 2,418 | 13,398 |
| SUBTOTAL | | | | | 1,472 | 4,676 | 9,892 | 11,663 | 9,174 | 8,060 | 44,937 |
| Program Operations | | | | | | | | | | | |
| Institute for Defense Anal | Grant | Jan 97 | 2,500 | 2,500 | | | 2,500 | | | | 2,500 |
| Fld. Activ. | Various | Oct97-Sep98 | 16,829 | 16,829 | 5,409 | 3,052 | 3,028 | 1,655 | 1,520 | 2,165 | 16,829 |
| SUBTOTAL | | | | | 5,409 | 3,052 | 5,528 | 1,655 | 1,520 | 2,165 | 19,329 |
| SUPPORT AND MANAGEMENT ORGANIZATIONS (CS) | | | | | | | | | | | |
| ANSER Arlington VA | SS/CPFF | Jan 97 | 12,253 | 12,253 | 6,192 | 3,601 | 2,460 | | | | 12,253 |
| New Contract | C/CPFF | Jan 98 | 12,745 | 12,745 | | | | 4,160 | 4,250 | 4,335 | 12,745 |
| Contracts Less Than $1.0M | | | | | | | | | | | |
| Various | CPFF | Oct97-Sep98 | 15,661 | 15,661 | 6,379 | 1,645 | 3,075 | 1,530 | 1,585 | 1,447 | 15,661 |
| SUBTOTAL | | | | | 12,571 | 5,246 | 5,535 | 5,690 | 5,835 | 5,782 | 40,659 |

TEST AND EVALUATION: (included above)

GOVERNMENT FURNISHED PROPERTY: N/A

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603800N
PROGRAM ELEMENT TITLE: JOINT ADVANCED STRIKE TECHNOLOGY (JAST) PROGRAM
PROJECT NUMBER: D2209
PROJECT TITLE: JASTP

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FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: FEB 1997

BUDGET ACTIVITY: 4/5 PROGRAM ELEMENT: 0603852N/0604310N PROJECT NUMBER: S2294
PROGRAM ELEMENT TITLE: Arsenal Ship PROJECT TITLE: Arsenal Ship Development

(U) COST (Dollars in thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| S2294 Arsenal Ship Development | 0 | 23,977 | 102,994 | 139,499 | 79,680 | 11,287 | 0 | 0 | 0 | 357,437 |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:The Arsenal Ship project has two major phases: (1) development of a Demonstrator Ship using R&D funds and (2) a subsequent SCN-funded program. The Demonstrator Ship is a prototype used to establish the proof-of-principle for high fire-power, low manning strike mission ships. The Chief of Naval Operations has directed that the Demonstrator Ship start at-sea testing prior to award of the first SCN ship. The schedule requires a Functional Design phase in FY 1997. Detail Design and Construction starting in FY 1998, and at-sea tests and trials starting in FY 2000. Initial concept development was funded in PE 0603563N, S2196 in FY 96 Congress appropriated the FY 97 funding under BA 4, PE 0603852N. Funding for FY98 and later are designated BA 5, PE 0604310N.

(U) JUSTIFICATION FOR BUDGET ACTIVITY. This program is funded under DEMONSTRATION & VALIDATION because it will demonstrate via detailed designs the concepts established by the proof-of-principle. The program will test the ship s readiness for transition to full production.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1995 ACCOMPLISHMENTS:
   - (U) Not Applicable

2. (U) FY 1996 ACCOMPLISHMENTS:
   - (U) Not Applicable

3. (U) FY 1997 PLAN:
   - (U) ($23,347) Perform proposal evaluation of Concept Designs/source selection for Functional Designs. Perform Functional Designs. Develop detailed test plan. Products that will be produced include: source selection results for concept evaluations; three extensive Demonstrator Ship Contract Design drawing packages, study reports, plans and specifications suitable for a ship procurement; management plans for technology developments; Test Plan for post-delivery testing; Navy/independent cost estimates to compare with industry costs; project plans and documentation for managing the design and construction phases; detailed proposal evaluation/source selection plan. Funds to begin obligating on 1 Nov 96 and be fully obligated by 15 July 97.
   - (U) ($630) Portion of extremutral program reserved for Small Business Innovative Research assessment in accordance with 15 U.S.C. 638.

4. (U) FY 1998 PLAN:
   - (U) ($102,994) Perform proposal evaluation of Functional Designs, leading to selection of a single industry team to build the Arsenal Ship Demonstrator. Develop the design details suitable for ship production, order materials and equipments, negotiate purchase agreements for combat systems equipment with vendors, and initiate construction. Products that will be produced include: source selection results for functional design; Detailed Design drawing packages, study reports, plans and specifications suitable a ship production; management plans for the ship production and test phases. Funds to begin obligating on 1 Nov 97 and be fully obligated by 1 July 98.

5. (U) FY 1999 PLAN:
   - (U) ($139,499) Continue construction of the Arsenal Ship Demonstrator. Lay the keel and start fabrication of structural steel, piping, machinery and information systems components. Pre-test combat and information systems at shore-based facilities. Funds to begin obligating on 1 Nov 98 and be fully obligated by 1 Nov 98.

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: FEB 1997

BUDGET ACTIVITY: 4/5 PROGRAM ELEMENT: 0603852N/0604310N PROJECT NUMBER: S2294
PROGRAM ELEMENT TITLE: Arsenal Ship PROJECT TITLE: Arsenal Ship Development

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1995 | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 0 | 0 | 25,000 | 0 | 0 |
| (U) Adjustments from FY 1997 PRESBUDG: | 0 | 0 | -1,023 | +102,994 | +139,499 |
| (U) FY 1998/99 PRESBUDG Submission: | 0 | 0 | 23,977 | 102,994 | 139,499 |

(U) CHANGE SUMMARY EXPLANATION:
(U) Funding: FY97 reflects undistributed general reductions. FY98 and out is the required program funding.
(U) Schedule: Not applicable.
(U) Technical: Not applicable

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not Applicable.

D. (U) SCHEDULE PROFILE:

| | FY 1995 | FY 1996 | FY 1997 | FY 1998 | FY1999 |
|---|---|---|---|---|---|
| Program Milestones | (Not Applicable - Non-Acquisition Program) | | | | |
| Engineering Milestones | | | Compl Concept Studies - 1Q | Compl Func Designs - 1Q | |
| T&E Milestones | | | TBD | TBD | TBD |
| Contract Milestones | | | Award Functional Design Contracts - 2Q | Award Detail Design and Ship Construction - 2Q | Keel Laying - 2Q |

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: FEB 1997

BUDGET ACTIVITY: 4/5 PROGRAM ELEMENT: 0603852N/0604310N PROJECT NUMBER: S2294
PROGRAM ELEMENT TITLE: Arsenal Ship PROJECT TITLE: Arsenal Ship Development

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Primary Hardware Development | 0 | 0 | 60,000 | 130,499 |
| b. Systems Engineering | 0 | 22,970 | 41,994 | 8,000 |
| c. Government Engineering Support | 0 | 377 | 1,000 | 1,000 |
| d. SBIR | 0 | 630 | 0 | 0 |
| Total | 0 | 23,977 | 102,994 | 139,499 |

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: FEB 1997

BUDGET ACTIVITY: 4/5 PROGRAM ELEMENT: 0603852N/0604310N PROJECT NUMBER: S2294
PROGRAM ELEMENT TITLE: Arsenal Ship PROJECT TITLE: Arsenal Ship Development

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATION

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Actual | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | | |
| TBD | C/FFP | 1/97 | 22,970 | 22,970 | 0 | 0 | 22,970 | 0 | 0 | 0 | 22,970 |
| TBD | WR | 1/97 | 3,000 | 3,000 | 0 | 0 | 0 | 1,000 | 1,000 | 1,000 | 3,000 |
| TBD | C/CPIF | 1/98 | TBD | 317,173 | 0 | 0 | 0 | 100,994 | 137,499 | 78,680 | 317,173 |
| Support and Management | | | | | | | | | | | |
| TBD | WR | TBD | TBD | 3,377 | 0 | 0 | 377 | 1,000 | 1,000 | 1,000 | 3,377 |
| Test and Evaluation | | | | | | | | | | | |
| TBD | SS/CPIF | 11/00 | TBD | 10,287 | 0 | 0 | 0 | 0 | 0 | 10,287 | 10,287 |
| SBIR | | | TBD | 630 | 0 | 0 | 630 | 0 | 0 | 0 | 630 |

GOVERNMENT FURNISHED PROPERTY - Not Applicable

FY 1998/FY 1999 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: FEB 1997

BUDGET ACTIVITY: 4/5 PROGRAM ELEMENT: 0603852N/0604310N PROJECT NUMBER: S2294
PROGRAM ELEMENT TITLE: Arsenal Ship PROJECT TITLE: Arsenal Ship Development

| Subtotals ($ in thousands) | Total FY 1995 & Prior | FY 1996 Actual | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 0 | 0 | 22,970 | 101,994 | 138,499 | 79,680 | 343,143 |
| Subtotal Support and Management | 0 | 0 | 377 | 1,000 | 1,000 | 1,000 | 3,377 |
| Subtotal Test and Evaluation | 0 | 0 | 0 | 0 | 0 | 10,287 | 10,287 |
| Subtotal SBIR | 0 | 0 | 630 | 0 | 0 | 0 | 630 |
| Total Program | 0 | 0 | 23,977 | 102,994 | 139,499 | 90,967 | 357,437 |

DATE: February 1997

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603860N
PROGRAM ELEMENT TITLE: Joint Precision Approach Landing System

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| W2329 Joint Precision Approach Landing System | 0 | 0 | 2,993 | 0 | 0 | 0 | 0 | 0 | Cont. | Cont. |
| TOTAL | 0 | 0 | 2,993 | 0 | 0 | 0 | 0 | 0 | Cont. | Cont. |

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program element provides for the engineering, development, integration, adaptation, and testing of new and/or modernized precision air traffic control and landing aids. Joint Precision Approach and Landing System (JPALS) hardware and software are required to provide improved flight safety and more reliable all-weather landing capabilities ashore and afloat. Funded programs are required to upgrade or replace aging landing equipment on aircraft, aircraft carriers, amphibious ships, Naval Air Stations, and Navy/Marine Corps tactical/expeditionary airfields and remote landing sites. Development of the JPALS hardware is required for Navy unique ship, shore and avionics applications.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under ENGINEERING & MANUFACTURING DEVELOPMENT because it encompasses engineering and manufacturing development of new end-items prior to production approval decision.

DATE: February 1997

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603860N
PROGRAM ELEMENT TITLE: Joint Precision Approach Landing System

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| W2329 Joint Precision Approach Landing System | 0 | 0 | 2,993 | 0 | 0 | 0 | 0 | 0 | Cont. | Cont. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Joint Precision Approach Landing System project provides for the engineering, development, integration, adaptation, and testing of new and/or modernized precision air traffic control and landing aids. Joint Precision Approach and Landing System (JPALS) hardware and software are required to provide improved flight safety and more reliable all-weather landing capabilities ashore and afloat. Funded programs are required to upgrade or replace aging landing equipment on aircraft, aircraft carriers, amphibious ships, Naval Air Stations, and Navy/Marine Corps tactical/expeditionary airfields and remote landing sites. Development of the JPALS hardware is required for Navy unique ship, shore and avionics applications.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS: Not Applicable.

2. (U) FY 1997 PLAN: Not Applicable.

3. (U) FY 1998 PLAN:

   - (U) ($2,500) Provide engineering support, system development, and test and evaluation for JPALS.
   - (U) ($493) Provide JPALS aircraft integration/A-kit development.

4. (U) FY 1999 PLAN: Not Applicable.

DATE: February 1997

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603860N
PROGRAM ELEMENT TITLE: JPALS

PROJECT NUMBER: W2329
PROJECT TITLE: JPALS

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President s budget: | 0 | 0 | 0 | 0 |
| (U) Adjustments from PRESBUDG: | 0 | 0 | +2,993 | 0 |
| (U) FY 1998/99 President s budget submit: | 0 | 0 | 2,993 | 0 |

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1998 funding was provided to develop a kit for JPALS aircraft integration.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:

(U) PE 0305114A (Joint Precision Approach Landing System)
(U) PE 0305114F (Joint Precision Approach Landing System)
(U) PE 0305114N (Joint Precision Approach Landing System)
(U) PE 0603512N (Carrier Systems Development)
(U) PE 0604504N (Air Control)
(U) PE 0604512N (Shipboard Aviation Systems )

DATE: February 1997

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

BUDGET ACTIVITY: 4 | PROGRAM ELEMENT: 0603860N | PROGRAM ELEMENT TITLE: JPALS | PROJECT NUMBER: W2329 | PROJECT TITLE: JPALS

D. (U) SCHEDULE PROFILE:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 | TO COMPLETE |
|---|---|---|---|---|---|
| Program Milestones | | | 1Q-4Q DEMVAL/ EMD | | |
| Engineering Milestones | | | | | |
| T&E Milestones | | | 1Q-4Q Testing Preparation | | |
| Contract Milestones | | | | | |

DATE: February 1997

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603860N
PROGRAM ELEMENT TITLE: JPALS

PROJECT NUMBER: W2329
PROJECT TITLE: JPALS

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Primary Hardware Dev | 0 | 0 | 1200 | 0 |
| b. Systems Engineering Sup | 0 | 0 | 993 | 0 |
| c. T & E Support | 0 | 0 | 500 | 0 |
| d. Project Management Sup | 0 | 0 | 260 | 0 |
| e. Travel | 0 | 0 | 40 | 0 |
| Total | 0 | 0 | 2,993 | 0 |

DATE: February 1997

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

BUDGET ACTIVITY: 4 | PROGRAM ELEMENT: 0603860N | PROGRAM ELEMENT TITLE: JPALS | PROJECT NUMBER: W2329 | PROJECT TITLE: JPALS

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Actual | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Miscellaneous | Various | - | - | | 0 | 0 | 0 | 2,193 | 0 | Cont. | Cont. |
| Support and Management Miscellaneous | Various | - | - | | 0 | 0 | 0 | 300 | 0 | Cont. | Cont. |
| Test and Evaluation Miscellaneous | Various | - | - | | 0 | 0 | 0 | 500 | 0 | Cont. | Cont. |

GOVERNMENT FURNISHED PROPERTY : Not applicable.

| | Total FY 1995 & Prior | FY 1996 Actual | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Production Development | 0 | 0 | 0 | 2,193 | 0 | Cont. | Cont. |
| Subtotal Support and Management | 0 | 0 | 0 | 300 | 0 | Cont. | Cont. |
| Subtotal Test and Evaluation | 0 | 0 | 0 | 500 | 0 | Cont. | Cont. |
| Total Project | 0 | 0 | 0 | 2,993 | 0 | Cont. | Cont. |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

Date: Feb 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0604327N
PROGRAM ELEMENT TITLE: Hardened Target Munitions

(U) COST (Dollars in thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL TITLE PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| | N/A | N/A | 4,987 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| J2331 Hardened Target Munitions | | | | | | | | | | |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Advanced Penetrator Definition Program will develop an advanced conventional earth penetrating warhead for use on conventional ballistic missiles.

(U) PROGRAM ACCOMPLISHMENT AND PLANS:

1. (U) FY 1996 PLAN: N/A

2. (U) FY 1997 PLAN: N/A

3. (U) FY 1998 PLAN:

(U) ($4,987) Initiate Advanced Penetrator Definition program. Full obligation is projected by the 3rd quarter of FY 1998. FY 1998 efforts include:

(U) Initiate evaluation of reactive materials for penetrator warhead loading.

(U) Define penetrator design options for increased penetration.

(U) Initial definition of missile functional interfaces in support of providing missile guidance from the warhead.

FY 1999 PLAN: N/A

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

1997 Date: Feb

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0604327N
PROGRAM ELEMENT TITLE: Hardened Target Munitions

B. (U) PROGRAM CHANGE SUMMARY:

(U) CHANGE SUMMARY EXPLANATION:

| | FY 1995 | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|---|
| (U) FY 1997 President"s Budget: | 0 | 0 | 0 | 0 | 0 |
| (U) Adjustment from 1997 PRESBUDG: | 0 | 0 | 0 | 4,987 | 0 |
| (U) FY 1998/99 President"s budget | 0 | 0 | 0 | 4,987 | 0 |

(U) CHANGE SUMMARY EXPLANATION:

(U) FY 1998 increase represents initiation of Advanced Penetrator Definition Program.

(U) Schedule: N/A

(U) Technical: N/A

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

| FY 1995 ACTUAL | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TOTAL PROGRAM | TO COMPLETE/ TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | N/A |

(U) RELATED RDT&E: N/A

D. (U) SCHEDULE PROFILE: N/A

(U) COST (Dollars in thousands)

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

1997 Date: Feb

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0604327N
PROGRAM ELEMENT TITLE: Hardened Target Munitions

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Hardened Target Munitions | 0 | 0 | 4,987 | 0 |

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | | |
| LMMS | SS/CPFF | 10/97 | 3,491 | 3,491 | | | 3,491 | | | 3,491 |

GOVERNMENT FURNISHED PROPERTY

| Item Description | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Delivery Date | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|
| Product Development | | | | | | | | | |
| NSWC | WR | 10/97 | | | | 1,496 | | | 1,496 |

FY 1998/FY 1999 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

Date: Feb 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0604327N
PROGRAM ELEMENT TITLE: Hardened Target Munitions

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FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0604707N
PROGRAM ELEMENT TITLE: SEW Architecture/Eng Support

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| X0798 OTH Targeting | 1,815 | 1,377 | 1,617 | 1,837 | 1,821 | 1,862 | 1,903 | 1,948 | Cont. | Cont. |
| X2144 SEW Engineering | 3,561 | 3,583 | 3,088 | 4,840 | 4,752 | 4,861 | 4,571 | 4,180 | Cont. | Cont. |
| TOTAL | 5,376 | 4,960 | 4,705 | 6,677 | 6,573 | 6,723 | 6,474 | 6,128 | Cont. | Cont. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This Program Element (PE) contains two projects: Over-the-Horizon (OTH) Targeting and Space and Electronic Warfare (SEW) Engineering. Both projects are systems engineering non-acquisition programs with the objectives of developing, testing and validating Naval Command, Control, Communications, Computers, Intelligence, and Reconnaissance (C4ISR) architectures to support naval missions in Joint and Coalition Theater. The mission of this program element is carried out by multiple tasks that are used to ensure Naval Command, Control, Communications, Computers and Intelligence ($C^4I$), Surveillance, and Command and Control Warfare ($C^2W$) components of SEW are effectively integrated into the C4ISR architectures. The Program additionally ensures that (1) the composite operational capabilities of SEW systems (not the individual component systems) conform to the Naval C4ISR architecture as related to the objectives of National Defense Strategy and evolving joint visions and direction, such as COPERNICUS...Forward , "Forward...From the Sea" and $C^4I$ For the Warrior, the Defense Science Board Summer Study Task Force on Information Architecture for the Battlefield and are guided by CINC requirements; and (2) that SEW systems and systems integration effort involves leading-edge technology transfer of information processing technologies primarily through integration of government and commercial off-the-shelf (COTS/GOTS) products to enhance the Navy s operational capability, interoperability, flexible reconfiguration, as well as reduce costs.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0604707N
PROGRAM ELEMENT TITLE: SEW Architecture/Eng Support

(U) COST: (Dollars in thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| X0798 OTH Targeting | 1,815 | 1,377 | 1,617 | 1,837 | 1,821 | 1,862 | 1,903 | 1,948 | Cont. | Cont. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Over-the-Horizon Targeting (OTH-T) project supports prototyping and engineering activities critical to the development of operational capabilities to target TOMAHAWK and HARPOON cruise missiles beyond the sensor range of the launch platforms. Specifically, to: Demonstrate enhanced capability to integrate sensor data using prototype sensor interface systems, and provide that information via satellite communications to: (1) the Force Over-the-Horizon Track Coordinator (FOTC) for input into the common tactical/operational picture, and (2) to TOMAHAWK and HARPOON cruise missile targeting systems. This line supports the promulgation of composite OTH-T system specifications; Certifies the interoperability of, and exercises configuration control over any system that operates on the Officer-in-Tactical Command Information Exchange System (OTCIXS) net. This ensures the integrity of the net for transmission of OTH-T messages as new systems come onto the net, or as existing systems undergo substantive software revisions/upgrades. This line also provides technical expertise afloat and ashore via a cadre of highly-trained Fleet Systems Engineers who ensure smooth integration of new capabilities to enhance OTH-T during major Fleet exercises and demonstrations which are used to validate and evaluate developed portions of Navy Battle Force Information Architecture.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0604707N PROJECT NUMBER: X0798
PROGRAM ELEMENT TITLE: SEW Architecture/Eng Support PROJECT TITLE: OTH Targeting

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

- ($906) Provided Fleet Engineering Support to Fleet Commanders in Chiefs (CINCs) to perform the following: monitored technical performance of Officer in Tactical Command Information Exchange System (OTCIXS) during introduction and demonstration of new capabilities, and provided end-to-end system engineering expertise to ensure smooth integration of Naval Tactical Command and Control System (NTCCS) into the Joint Maritime Command Information Strategy (JMCIS, GCCS, and coalition interfaces).

- ($909) OTH Targeting Interoperability Certification - Utilized Reconfigurable Land Based Test Site (RLBTS) to test evolutionary software enhancements of NTCCS to verify compliance with interoperability requirements before placing any system on the operational OTCIXS network.

2. (U) FY 1997 PLAN:

- (U) ($225) Conduct prototyping and demonstrations of OUTLAW HAWKEYE, an initiative to field advanced communications information management and real time intelligence package for the E-2C Aircraft. Evaluate potential packages and E-2C architecture.

- (U) ($585) Provide Fleet Engineering Support to Fleet CINCs to perform the following: monitor technical performance of OTCIXS during testing of interoperability of Advanced Tomahawk Weapon Control System (ATWCS), advanced submarine combat system (AN/BSY-2), migration of systems into JMCIS, and provide end-to-end system engineering expertise to ensure smooth integration of these same systems into the Fleet. Efforts have been reduced by $174K as a result of low expenditures in the accounting system for FY 1995.

- ($4) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 U.S.C.638.

- (U) ($563) OTH Targeting Interoperability Certification - Utilize RLBTS to test evolutionary software enhancements, i.e., systems migration into JMCIS, ATWCS, and BSY-2, to verify compliance with interoperability requirements. Efforts have been reduced by $157K as a result of low expenditures in the accounting system for FY 1995.

3. (U) FY 1998 PLAN:

- ($276) Develop hardware/software packages for Command and Control (C2) aircraft on a cooperative basis with industry and the Air Force.

- ($693) Provide Fleet Engineering Support to Fleet CINCs to perform the following: monitor technical performance of OTCIXS during testing of interoperability of prototype systems into JMCIS, provide end to end system engineering expertise to ensure smooth integration of these same systems into the Fleet, and provide the testing environment which will aid in the integration of such systems for Fleet use.

- ($648) OTH Targeting Interoperability Certification - Utilize RLBTS to test evolutionary software enhancements, i.e., systems migration into JMCIS or GCCS, to verify compliance with interoperability requirements.

4. (U) FY 1999 PLAN:

- ($311) Demonstrate and evaluate OUTLAW HAWKEYE package.

- ($803) Provide Fleet Engineering Support to Fleet CINCs to perform the following: monitor technical performance of OTCIXS during testing of interoperability of prototype systems into JMCIS, provide end-to-end system engineering expertise to ensure smooth integration of these systems into the Fleet, and provide the testing environment which will aid in the integration of such systems for Fleet use.

- ($723) OTH Targeting Interoperability Certification - Utilize RLBTS to test evolutionary software enhancements, i.e., systems migration into JMCIS or GCCS, to verify compliance with interoperability requirements.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0604707N PROJECT NUMBER: X0798
PROGRAM ELEMENT TITLE: SEW Architecture/Eng Support PROJECT TITLE: OTH Targeting

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 President's Budget: | 1,844 | 1,444 | 1,671 | 1,876 |
| (U) Adjustments from FY 1997 PRESBUDG: | -29 | -67 | -54 | -39 |
| (U) FY 1998 President s Budget Submit: | 1,815 | 1,377 | 1,617 | 1,837 |

(U) CHANGE SUMMARY EXPLANATION:

FY 1996: Change reflects a decrease of $2K for the Jordan Rescission; $5K reduction for Administrative and Personal Services Rescission; and decrease of $22K for SBIR.

FY 1997: Change reflects a decrease of $67K for Congressional undistributed general adjustments.

FY 1998: Change reflects a Navy POM decision decrease of $2K; decrease of $48K for NWCF adjustments; and decrease of $4K for inflation.

FY 1999: Change reflects a Navy POM decision decrease of $2K; decrease of $30K for NWCF adjustments; and decrease of $7K for inflation.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E: (SEW) Architecture/Engineering Support program element encompasses all Naval CI related efforts.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0604707N PROJECT NUMBER: X0798
PROGRAM ELEMENT TITLE: SEW Architecture/Eng Support PROJECT TITLE: OTH Targeting

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. Program Management | 82 | 37 | 35 | 45 |
| b. System Test and Evaluation | 870 | 700 | 791 | 895 |
| c. Prototyping and Demonstration | | 225 | 276 | 311 |
| d. Engineering | 507 | 195 | 235 | 290 |
| e. Fleet Support | 356 | 220 | 280 | 296 |
| Total | 1,815 | 1,377 | 1,617 | 1,837 |

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION: N/A

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0604707N
PROGRAM ELEMENT TITLE: SEW Architecture/Eng Support

(U) COST: (Dollars in Thousands)

| PROJECT NUMBER & TITLE | FY 1996 ACTUAL | FY 1997 ESTIMATE | FY 1998 ESTIMATE | FY 1999 ESTIMATE | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|---|---|---|---|---|---|---|---|---|---|---|
| X2144 SEW Engineering | 3,561 | 3,583 | 3,088 | 4,840 | 4,752 | 4,861 | 4,571 | 4,180 | Cont. | Cont. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Space and Electronic Warfare (SEW) Engineering is a non-acquisition systems engineering effort and has the objectives of developing, testing and validating a Naval Command, Control, Communications, Computers, Intelligence, and Reconnaissance (C4ISR) architecture to support naval missions in Joint and Coalition Theater. The mission is carried out by multiple tasks that are used to ensure Naval Command, Control, Communications, Computers and Intelligence (C4I), Surveillance, and Information Warfare components are effectively integrated into the C4ISR architecture. The Project additionally ensures that (1) the composite operational capabilities of the individual component systems conform to the C4ISR as related to the objectives of National Defense Strategy and evolving joint visions and direction, such as COPERNICUS...Forward , "Forward...From the Sea" and C4I For the Warrior, the Defense Science Board Summer Study Task Force on Information Architecture for the Battlefield. This effort is guided by CINC requirements; and (2) the need to integrate leading-edge information processing technologies primarily through the use of government and commercial off-the-shelf (COTS/GOTS) products to enhance the Navy s operational capability, interoperability, flexible reconfiguration, as well as reduce costs. C4ISR architectures support the following activities in achieving a fully integrated, interoperable Naval C4I system: identify technology developments that can be brought to bear to meet and validate C4ISR operational objectives, address prioritized CINC issues; integrate Naval C4I system developments, including developments from other services and commercially developed products in support of Joint Warfare Interoperability Demonstrations (JWID); develop interface and connectivity standards based architectures to support the enhanced operational capabilities in support of the C4ISR architectures; extract lessons learned for feedback from research, development, and acquisition programs to support further C4ISR architecture development efforts or more extensive implementation. This effort also performs high-level systems architecture/engineering to support long-range planning for COPERNICUS...Forward , C4I For the Warrior, Theater Battle Management (in conjunction with the Air Force), Digitization of the Battlefield (in conjunction with the Army), Theater Ballistic Missile Defense, Mine Warfare, Amphibious Warfare integration into C4ISR, the Defense Information infrastructure (DII) and coalition force architectures; as well as technical architecture/engineering to support C4I Office of the Secretary of Defense (OSD) joint technical architecture initiatives.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0604707N PROJECT NUMBER: X2144
PROGRAM ELEMENT TITLE: SEW Architecture/Eng Support PROJECT TITLE: SEW Engineering

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1996 ACCOMPLISHMENTS:

- (U) ($966) Developed plans for the integration of maturing system developments, and military and commercial technologies that support Copernicus...Forward concept into the annual Joint Warrior Interoperability Demonstration (JWID). Plans incorporate the use of enhanced operational capabilities in key CINC priority areas and Joint Mission Area (JMA) Assessment Thrust Areas including high capacity communications, improved Command and Control Warfare ($C^2W$), integrated land fight architecture, trusted systems/multi-level security, improved sensors/strike planning, common tactical/operational picture, theater air defense/force protection, and combat identification.

- (U) ($1,825) Developed a Mine Warfare Operational and Systems Architecture based on the multi-tier architecture framework of Operational, System and Technical, to support Naval missions in a Joint and Coalition Theater. Architectural development consisted of (1) assisting OPNAV, Navy Doctrine Command, and Fleet Commanders in the development of Operational Architectures and maintain documentation describing these Operational Architectures; (2) defining System Architecture parameters, attributes, and characteristics necessary to ensure that Program Executives and Managers acquire systems that achieve the desired operational objectives; and (3) defining the appropriate Technical Architectural standards and interfaces to achieve fully interoperable systems. An additional $250K is available due to low expenditures to forward finance FY 1997 requirements.

- (U) ($770) Developed a high-level systems architecture/engineering process to support long range planning for COPERNICUS...Forward , $C^4I$ for the Warrior, Joint Air Operations Functional Process Improvement, Theater Battle Management (in conjunction with the Air Force), Digitization of the Battlefield (with the Army), Theater Ballistic Missile Defense, Mine Warfare, Amphibious Warfare and integration into the DII. Extracted lessons learned for feedback to research, development, and acquisition programs to support further architectural developments. Participated in Office of the Secretary of Defense (OSD) and joint architectural working groups and panels.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0604707N PROJECT NUMBER: X2144
PROGRAM ELEMENT TITLE: SEW Architecture/Eng Support PROJECT TITLE: SEW Engineering

2. (U) FY 1997 PLAN:

- (U) ($941) The U.S. Navy is the lead service for planning, coordination and execution of FY-97 s Joint Warrior Interoperability Demonstration (JWID). As lead service, coordinate all participation and develop plans for the integration of maturing system developments, military and commercial technologies that support enhanced operational capability in key Department of Defense (DOD) priority areas and Joint Mission Area (JMA) Assessment Thrust Areas. These include high capacity communications, improved Command and Control Warfare ($C^2W$), integrated landfight architecture, trusted systems/multi-level security, improved sensors/strike planning, common tactical/operational picture, theater air defense/force protection, and combat identification.

- (U) ($1,817) Continue to develop and validate a Naval $C^4ISR$ Architecture based the multi-tier architecture framework of Operational, System and Technical, to support Naval missions in a Joint and Coalition Theater. Architectural development will consist of (1) assisting OPNAV, Navy Doctrine Command, and Fleet Commanders in the development of Operation Architectures for Amphibious and Strike Warfare, and maintain documentation describing these Operational Architectures; (2) defining System Architecture parameters, attributes, and characteristics necessary to ensure that Program Executives and Managers acquire systems that achieve the desired operational objectives; and (3) defining the appropriate Technical Architectural standards and interfaces to achieve fully interoperable systems. Participate with the Joint Battle Center and Naval Battle Laboratories to verify and validate operational and system architectures. The Amphibious Warfare and Strike Warfare operational and systems architectures will be completed. Theater Air Defense architectures will be updated. Develop joint technical architecture in cooperation with other services. An additional $250K from FY-96 is available due to low expenditures to forward finance FY 1998 requirements.

- (U) ($778) Develop high-level systems and operational architecture processes to support long range planning for COPERNICUS...Forward , $C^4I$ for the Warrior, Joint Air Operations Functional Process Improvement, Theater Battle Management (in conjunction with the Air Force), Digitization of the Battlefield (with the Army), Theater Ballistic Missile Defense, Amphibious Warfare, Strike Warfare and integration into the DII. Extract lessons learned for feedback to research, development, and acquisition programs to support further architecture development efforts. An integrated $C^4ISR$ systems architecture, integrated node list, and hierarchical data dictionary will be completed. Participate in OSD and joint architectural working groups and panels.

- (U) ($47K) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 U.S.C.638.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0604707N PROJECT NUMBER: X2144
PROGRAM ELEMENT TITLE: SEW Architecture/Eng Support PROJECT TITLE: SEW Engineering

3. (U) FY 1998 PLAN:

- (U) ($1,000) Develop plans for the integration of maturing system developments, military and commercial technologies that support enhanced operational capabilities in key CINC priority areas and Joint Mission Area (JMA) Assessment Thrust Areas into the annual Joint Warrior Interoperability Demonstration (JWID). Integration plans will include high capacity communications, improved Command and Control Warfare ($C^2W$), integrated landfight architecture, trusted systems/multi-level security, improved sensors/strike planning, common operational picture, collaborative planning, knowledge based systems, smart push-warrior pull data flow, theater air defense/force protection, and combat identification.

- (U) ($1,738) Continue to develop and validate a Naval $C^4ISR$ Architecture based the multi-tier architecture framework of Operational, System and Technical, to support Naval missions in a Joint and Coalition Theater. Architectural development will consist of (1) assisting OPNAV, Navy Doctrine Command, and Fleet Commanders in the continuing upgrade of Operation Architectures and maintain documentation describing the Operational Architectures; (2) provide system architecture parameters, attributes, and characteristics necessary to ensure that Program Executives and Managers acquire systems that achieve the desired operational objectives. Participate with the Joint Battle Center and Naval Battle Laboratories to verify and validate operational and system architectures. The Amphibious systems architecture will be completed. Previously delivered operational architectures will be updated. This program was reduced $250K as a result of low FY 1996 expenditures.

- (U) ($350) Develop the high-level systems and operational architecture processes to include long range planning for COPERNICUS...Forward , $C^4I$ for the Warrior, Joint Air Operations Functional Process Improvement, Theater Battle Management (in conjunction with the Air Force), Digitization of the Battlefield (with the Army), Marine Air Ground Task Force (MAGTF) C4I and integration into the DII. An updated integrated $C^4ISR$ systems architecture, integrated node list, information exchange requirements and hierarchical data dictionary will be provided. Participate in OSD and joint architectural working groups and panels.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0604707N PROJECT NUMBER: X2144
PROGRAM ELEMENT TITLE: SEW Architecture/Eng Support PROJECT TITLE: SEW Engineering

4. (U) FY 1999 PLAN:

- (U) ($1,000) Develop plans for the integration of maturing system developments, military and commercial technologies that support enhanced operational capabilities in key CINC priority areas and Joint Mission Area (JMA) Assessment Thrust Areas into the annual Joint Warrior Interoperability Demonstration (JWID). Integration plans will include high capacity communications, improved Command and Control Warfare ($C^2W$), integrated landfight architecture, trusted systems/multi-level security, improved sensors/strike planning, common operational picture, collaborative planning, knowledge based systems, smart push-warrior pull data flow, theater air defense/force protection, and combat identification.

- (U) ($3,100) Continue to develop and validate a Naval $C^4ISR$ Architecture based the multi-tier architecture framework of Operational, System and Technical, to support Naval missions in a Joint and Coalition Theater. Architectural development will consist of (1) assisting OPNAV, Navy Doctrine Command, and Fleet Commanders in the development of operation and overarching architectures and maintain documentation describing the Operational Architectures; (2) provide system architecture parameters, attributes, and characteristics necessary to ensure that Program Executives and Managers acquire systems that achieve the desired operational objectives. Participate with the Joint Battle Center and Naval Battle Laboratories to verify and validate operational and system architectures. Three additional systems architectures will be completed. Amphibious Warfare operational architecture will be updated.

(U) ($740) Update the high-level systems and operational architecture processes to support long range planning for COPERNICUS...Forward , $C^4I$ for the Warrior, Joint Air Operations Functional Process Improvement, Theater Battle Management (in conjunction with the Air Force), Digitization of the Battlefield (with the Army), Marine Air Ground Task Force (MAGTF) C4I architectures. An updated information exchange requirement list, integrated node list, and hierarchical data dictionary will be completed. Participate in OSD and joint architectural working groups and panels.

FY 1998 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1997

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0604707N PROJECT NUMBER: X2144
PROGRAM ELEMENT TITLE: SEW Architecture/Eng Support PROJECT TITLE: SEW Engineering

B. (U) PROGRAM CHANGE SUMMARY:

| | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| (U) FY 1997 PRESIDENT S BUDGET: | 3,623 | 3,768 | 3,904 | 4,911 |
| (U) ADJUSTMENTS FROM FY 1997 PRESBUDG: | -62 | -185 | -816 | -71 |
| (U) FY 1998 PRESIDENT S BUDGET SUBMIT: | 3,561 | 3,583 | 3,088 | 4,840 |

(U) CHANGE SUMMARY EXPLANATION:

FY 1996: Change reflects decreases of $4K for the Jordan Rescission; $9K decrease for Administrative and Personal Services rescission; and $49K decrease for SBIR.

FY 1997: Change reflects a decrease of $185K for Congressional undistributed general adjustments.

FY 1998: Change reflects a decrease of $56K for NWCF adjustments; decrease of $2K for minor Navy POM decision; $250K decrease for poor expenditure performance in FY96; $500K decrease for C4I program reduction; and $8K decrease for inflation.

FY 1999: Change reflects a decrease of $43K for NWCF adjustments; $11K decrease for a minor Navy POM decision; and $17K decrease for inflation.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E: (SEW) Architecture/Engineering Support program element relates to all Naval C4I related efforts.

D. (U) SCHEDULE PROFILE: Not applicable.

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0604707N
PROGRAM ELEMENT TITLE: SEW Architecture/Eng Support

PROJECT NUMBER: X2144
PROJECT TITLE: SEW ENGINEERING

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

| Project Cost Categories | FY 1996 | FY 1997 | FY 1998 | FY 1999 |
|---|---|---|---|---|
| a. SEW/C4I Technology Integration | 770 | 778 | 350 | 740 |
| b. Systems Architecture and Engineering | 1,825 | 1,852 | 1,738 | 3,100 |
| c. Joint Warrior Interoperability Demonstrations | 966 | 953 | 1,000 | 1,000 |
| Total | 3,561 | 3,583 | 3,088 | 4,840 |

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION: ($ in thousands)

PERFORMING ORGANIZATIONS

| Contractor/ Government Performing Activity | Contract Method/ Fund Type Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete |
|---|---|---|---|---|---|---|---|---|---|---|
| Product Development: | | | | | | | | | | |
| Various | | N/A | Cont. | Cont. | 6,962 | 3,561 | 3,583 | 3,088 | 4,840 | Cont. |
| Support and Management: | | N/A | N/A | N/A | 0 | 0 | 0 | 0 | 0 | 0 |
| Test and Evaluation: | | N/A | N/A | N/A | 0 | 0 | 0 | 0 | 0 | 0 |

GOVERNMENT FURNISHED PROPERTY: None

FY 1998 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1997

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0604707N
PROGRAM ELEMENT TITLE: SEW Architecture/Eng Support

PROJECT NUMBER: X2144
PROJECT TITLE: SEW ENGINEERING

| | FY 1995 & Prior | FY 1996 Budget | FY 1997 Budget | FY 1998 Budget | FY 1999 Budget | To Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 6,962 | 3,561 | 3,583 | 3,088 | 4,840 | Cont. | Cont. |
| Subtotal Support and Management | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Test and Evaluation | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Project: | 6,962 | 3,561 | 3,583 | 3,088 | 4,840 | Cont. | Cont. |