DEPARTMENT OF THE NAVY
FISCAL YEAR (FY) 2000/2001 BIENNIAL BUDGET ESTIMATES

19990507 020

JUSTIFICATION OF ESTIMATES
FEBRUARY 1999

RESEARCH, DEVELOPMENT, TEST & EVALUATION, NAVY
BUDGET ACTIVITY 7

DTIC QUALITY INSPECTED 4

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Department of the Navy
FY 2000 RDT&E Program

Exhibit R-1

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

DATE: February 1999

R-1 Line Number	Program Element Number	Item Nomenclature	Budget Activity	Thousands of Dollars FY 1998	FY 1999	FY 2000	Security Classification
150	0204227N	Harpoon Modifications	7	-	1,954	-	U
151	0101221N	Strategic Sub & Weapons System Support	7	35,556	56,437	45,907	U
152	0101224N	SSBN Security/Survivability Program (R2/R3 Materials provided in Classified Budget Book)	7	23,169	30,691	33,239	U
153	0101226N	Sub Acoustic Warfare Dev	7	5,747	8,080	3,195	U
154	0204136N	F/A-18 Squadrons	7	288,698	302,033	315,714	U
155	0204152N	E-2 Squadrons	7	58,303	46,622	16,132	U
156	0204163N	Fleet Communications	7	14,495	16,112	9,947	U
157	0204229N	Tomahawk & TMPC	7	101,679	165,685	147,223	U
158	0204311N	Integrated Surveillance System	7	9,256	19,372	18,025	U
159	0204413N	Amphib Tactical Support Units	7	649	1,869	-	U
160	0204571N	Consolidated Training Systems Development	7	59,768	38,226	26,257	U
161	0204575N	Information Warfare	7	1,574	3,707	9,162	U
162	0205601N	HARM Improvement	7	38,640	30,532	23,642	U
163	0205604N	Tactical Data Links	7	40,873	49,151	46,666	U
164	0205620N	Surface ASW Combat Sys Integration	7	12,190	12,953	16,633	U
165	0205632N	MK 48 ADCAP	7	10,285	17,428	20,426	U
166	0205633N	Aviation Improvements	7	47,600	62,098	53,293	U
167	0205667N	F-14 Upgrade	7	11,116	12,834	1,390	U
168	0205675N	Operational Nuclear Power Systems (R2/R3 Materials provided in Classified Budget Book)	7	54,604	54,058	53,564	U
169	0206313M	Marine Corps Communications	7	37,828	53,015	90,293	U
170	0206623M	MC Ground Combat/Spt Arms Sys	7	12,654	18,185	39,941	U
171	0206624M	MC Combat Services Support	7	5,288	4,044	9,817	U
172	0207161N	Tactical Air Intercept	7	55,120	64,626	40,051	U
173	0207163N	AMRAAM	7	5,475	4,674	13,544	U
174	0303906N	Aquarius (Classified -- Material Not Available)	7	-	-	602	U
175	0303901N	SIRIUS (Classified -- Material Not Available)	7	28,452	30,765	32,749	U

Department of the Navy
FY 2000 RDT&E Program

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

DATE: February 1999

R-1 Line Number	Program Element Number	Item Nomenclature	Budget Activity	Thousands of Dollars FY 1998	FY 1999	FY 2000	Security Classification
176	0303109N	Satellite Communications (Space)	7	18,062	17,523	38,921	U
177	0303140N	Information Systems Security Plan	7	17,287	21,003	22,978	U
178	0303150N	Global Command and Control	7	473	468	-	U
179	0303905N	Pisces (Classified -- Material Not Available)	7	458,817	499,465	483,121	U
180	0305160N	Navy Meterological and Ocean Sensors - Space (METOC)	7	4,610	11,614	14,507	U
181	0305188N	Joint (C4ISR) Battle Center	7	-	5,337	8,125	U
182	0303907N	Capricorn (Classified -- Material Not Available)	7	2,277	2,297	2,064	U
183	0305204M	Tactical UAV (R2/R3 Not Required/Prior Year Only)	7	-	5,986	-	U
184	0305204N	Tactical UAV	7	-	51,074	69,742	U
185	0305206N	Airborne Reconnaissance Advanced Development	7	-	16,411	4,958	U
186	0305207N	Manned Recconnaissance Systems	7	327	30,140	30,958	U
187	0305208N	Distributed Common Ground Systems	7	-	4,955	5,583	U
188	0305927N	Navy Space Surv	7	387	398	712	U
189	0305972N	Space Activities	7	-	14,546	-	U
190	0308601N	Naval Modeling & Simulation	7	4,212	-	9,621	U
191	0702207N	Depot Maintenance	7	-	58,202	39,986	U
192	0708011N	Industrial Preparedness (MANTECH)	7	51,892	68,886	59,104	U
193	0708730N	Maritime Technology (MARITECH)	7	-	18,956	19,681	U
		Total Operational Systems Development		1,517,363	1,932,412	1,877,473	

Department of the Navy
FY 2000 RDT&E Program
Alphabetic Listing

Exhibit R-1

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

DATE: February 1999

R-1 Line Number	Program Element Number	Item Nomenclature	Budget Activity	Thousands of Dollars FY 1998	FY 1999	FY 2000	Security Classification
185	0305206N	Airborne Reconnaissance Advanced Development	7	-	16,411	4,958	U
159	0204413N	Amphib Tactical Support Units	7	649	1,869	-	U
173	0207163N	AMRAAM	7	5,475	4,674	13,544	U
174	0303906N	Aquarius	7	-	-	602	U
		(Classified -- Material Not Available)					
166	0205633N	Aviation Improvements	7	47,600	62,098	53,293	U
182	0303907N	Capricorn	7	2,277	2,297	2,064	U
		(Classified -- Material Not Available)					
160	0204571N	Consolidated Training Systems Development	7	59,768	38,226	26,257	U
191	0702207N	Depot Maintenance	7	-	58,202	39,986	U
187	0305208N	Distributed Common Ground Systems	7	-	4,955	5,583	U
155	0204152N	E-2 Squadrons	7	58,303	46,622	16,132	U
154	0204136N	F/A-18 Squadrons	7	288,698	302,033	315,714	U
167	0205667N	F-14 Upgrade	7	11,116	12,834	1,390	U
156	0204163N	Fleet Communications	7	14,495	16,112	9,947	U
178	0303150N	Global Command and Control	7	473	468	-	U
162	0205601N	HARM Improvement	7	38,640	30,532	23,642	U
150	0204227N	Harpoon Modifications	7	-	1,954	-	U
192	0708011N	Industrial Preparedness (MANTECH)	7	51,892	68,886	59,104	U
177	0303140N	Information Systems Security Plan	7	17,287	21,003	22,978	U
161	0204575N	Information Warfare	7	1,574	3,707	9,162	U
158	0204311N	Integrated Surveillance System	7	9,256	19,372	18,025	U
181	0305188N	Joint (C4ISR) Battle Center	7	-	5,337	8,125	U
186	0305207N	Manned Recconnaissance Systems	7	327	30,140	30,958	U
169	0206313M	Marine Corps Communications	7	37,828	53,015	90,293	U
193	0708730N	Maritime Technology (MARITECH)	7	-	18,956	19,681	U
171	0206624M	MC Combat Services Support	7	5,288	4,044	9,817	U
170	0206623M	MC Ground Combat/Spt Arms Sys	7	12,654	18,185	39,941	U
165	0205632N	MK 48 ADCAP	7	10,285	17,428	20,426	U

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190	0308601N	Naval Modeling & Simulation	7	4,212	-	9,621	U
180	0305160N	Navy Meterological and Ocean Sensors - Space (METOC)	7	4,610	11,614	14,507	U
188	0305927N	Navy Space Surv	7	387	398	712	U
168	0205675N	Operational Nuclear Power Systems	7	54,604	54,058	53,564	U
		(R2/R3 Materials provided in Classified Budget Book)					
179	0303905N	Pisces	7	458,817	499,465	483,121	U
		(Classified -- Material Not Available)					
176	0303109N	Satellite Communications (Space)	7	18,062	17,523	38,921	U
175	0303901N	SIRIUS	7	28,452	30,765	32,749	U
		(Classified -- Material Not Available)					
189	0305972N	Space Activities	7	-	14,546	-	U
152	0101224N	SSBN Security/Survivability Program	7	23,169	30,691	33,239	U
		(R2/R3 Materials provided in Classified Budget Book)					
151	0101221N	Strategic Sub & Weapons System Support	7	35,556	56,437	45,907	U
153	0101226N	Sub Acoustic Warfare Dev	7	5,747	8,080	3,195	U
164	0205620N	Surface ASW Combat Sys Integration	7	12,190	12,953	16,633	U
172	0207161N	Tactical Air Intercept	7	55,120	64,626	40,051	U
163	0205604N	Tactical Data Links	7	40,873	49,151	46,666	U
183	0305204M	Tactical UAV	7	-	5,986	-	U
		(R2/R3 Not Required/Prior Year Only)					
184	0305204N	Tactical UAV	7	-	51,074	69,742	U
157	0204229N	Tomahawk & TMPC	7	101,679	165,685	147,223	U
		Total Operational Systems Development		1,517,363	1,932,412	1,877,473	

Comparison of FY 1998 Financing as reflected in FY 1999 Budget with 1998 Financing as Shown in the FY 2000 Budget

($ In Thousands)

	Financing per FY 1999 Budget	Financing Per FY 2000 Budget	Increase (+) or Decrease (-)
Program Requirements (Service Account)	7,879,912	7,887,810	+7,898
Program Requirements (Reimbursable)	110,000	163,008	+53,008
Appropriation (Adjusted)	**7,989,912**	**8,050,818**	**+60,906**

Explanation of Changes in Financing
($ in Thousands)

The Fiscal Year 1998 program has changed since the presentation of the FY 1999 budget as noted below:

1. Program Requirements (Total). There has been a net increase to the appropriation (adjusted) of +$60,906 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 +$7,898, resulting from various changes in program requirements. These changes included recissions reflected in the FY 99 DoD Appropriations Act (-$20,500), Line Item Veto Restorals (+$6,000), and other Congressional Actions (-$8,000). A number of Internal Reprogrammings were effected which reclassified funding between DoN appropriations to more properly align them into the correct programs for execution: Medical Research Projects (-$7,278), Tactical Tomahawk (+$19,600), PMRF Sensors (-$4,852), F/A-18 (-$14,855), and ASW Combat System Integration (+$5,861). Additionally, other transfers included Overseas Contingency Operations (+$7,500) and Counterdrug Operations (+$15,613).

3. Program Requirements (Reimbursable). There has been a net increase to the appropriation of $53,008, as a result of changes in reimbursable program requirements.

Comparison of FY 1998 Program Requirements as reflected in the FY 1999 Budget with FY 1998 Program Requirements as shown in the FY 2000 Budget

Summary of Requirements ($ in Thousands)

	Total Program Requirements per FY 1999 Budget	**Total Program Requirements per FY 2000 Budget**	**Increase (+) or Decrease (-)**
01 – Basic Research	338,743	331,444	-7,299
02 – Applied Research	493,622	467,359	-26,263
03 – Advanced Technology Development	514,781	518,617	+3,836
04 – Demonstration and Validation (DEM/VAL)	2,219,002	2,222,171	+3,169
05 – Engineering and Manufacturing Development (EMD)	2,227,348	2,153,289	-74,059
06 – RDTE Management Support	551,033	677,567	+126,534
07 – Operational Systems Development	1,535,383	1,517,363	-18,020
Total Fiscal Year Program	**7,879,912**	**7,887,810**	**+7,898**

Explanation by Budget Activity
($ in Thousands)

01. Basic Research (-$7,299) - Changes to this budget activity resulted from a transfer to support the Small Business Innovative Research (SBIR) program (-$6,086) and other changes in program requirements which required minor reprogrammings (-$1,213).

02. Applied Research (-$26,263) - Changes to this budget activity resulted from a transfer to support the Small Business Innovative Research (SBIR) program (-$8,125), other changes in program requirements which required minor reprogrammings (-$21,118) and the override by Congress of a line item veto for Terfenol-D (+$3,000).

03. Advanced Technology Development (+$3,836) - Changes to this budget activity resulted from a transfer to support the Small Business Innovative Research (SBIR) program (-$3,897), other changes in program requirements which required minor reprogrammings (-$12,011), the override of a line item veto for COTS Airguns (+$3,000), and the transfer of Medical Research program funds to the Army (-$7,278).

04. Demonstration and Validation (DEM/VAL) (+$3,169) - Changes to this budget activity resulted from a transfer to support the Small Business Innovative Research (SBIR) program (-$29,846), reductions reflected on the FY 1999 DoD Appropriations Act Rescission for VECTOR (-$3,000), and other changes in program requirements which required minor reprogrammings, budget activity realignments and accounting updates (+$36,015).

05. Engineering and Manufacturing Development (EMD) (-$74,059) - Changes to this budget activity resulted from a transfer to support the Small Business Innovative Research (SBIR) program (-$56,113), transfers to support the Counterdrug Program (+$15,613), other changes in program requirements which required minor reprogrammings, budget activity realignments and accounting updates (-$26,019), a transfer to Defense Health Program and the Boy Scouts per a Congressional Supplemental (-$5,000) and Federal Technology (-$40), and a FY 1999 DoD Appropriation Act rescissions for Lightweight Torpedo (-$1,500) and Navigation/ID Systems (-$1,000).

06. RDTE Management Support (+$126,534) - Changes to this budget activity resulted from a transfer to support the Small Business Innovative Research (SBIR) program (+$120,551), other changes in program requirements which required minor reprogrammings, budget activity realignments and accounting updates (+$5,747) and a transfer for Federal Technology (+$236).

07. Operational Systems Development (-$18,020) - Changes to this budget activity resulted from a transfer to support the Small Business Innovative Research (SBIR) program (-$16,484), other changes in program requirements which required minor reprogrammings, budget activity realignments and accounting updates (-$14,697), and transfers and major reprogrammings for Overseas Contingency Operations (+$7,500), PMRF Sensors (-$4,852), Tactical Tomahawk (+$19,600), Surface ASW Combat Integration (+$5,861), F/A-18 (-$14,855), and Federal Technology Transfer (-$93).

Comparison of FY 1999 Financing as reflected in FY 1999 Budget with 1999 Financing as Shown in the FY 2000 Budget

($ In Thousands)

	Financing per FY 1999 Budget	Financing Per FY 2000 Budget	Increase (+) or Decrease (-)
Program Requirements (Service Account)	8,108,923	8,660,809	+551,886
Program Requirements (Reimbursable)	110,000	150,000	+40,000
Appropriation (Adjusted)	**8,218,923**	**8,810,809**	**+591,886**

Explanation of Changes in Financing
($ in Thousands)

The Fiscal Year 1999 program has changed since the presentation of the FY 2000 budget as noted below:

1. Program Requirements (Total). There has been a net increase to the appropriation (adjusted) of +$591,886, 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 +$551,886, resulting from changes in program requirements as a result of Congressional appropriation changes in the FY 1999 DoD Appropriations Act. These changes included: an undistributed reduction for Federally Financed Research and Development Centers (FFRDC)(-$4,264)(Section 8034), an undistributed reduction for Contract Advisory and Assistance Services (CAAS)(-$50,000)(Section 8054), a general reduction for revised economic assumptions (lower inflation rate)(-$20,000)(Section 8108), and a general undistributed reduction for civilian personnel underexecution (-$5,000). Specific FY 1999 Congressional adjustments (to start, continue, discontinue, reduce or earmark 177 specific initiatives, including transfers) resulted in a net increase of +$584,726. Also, appropriation changes include the following reprogrammings, which require Congressional prior approval: ASW & Other Helo Development (CH-60) (+$9,352); Surface and Shallow Water Mines (+$8,980); Combat Systems Integration (+$12,526); Ship Self Defense (+12,672); partially financed by a reduction to Depot Maintenance (-$11,006). Additionally, FY 1999 includes a transfer for the USACOM Joint Experiments program (+$15,900), managed by the Navy as DoD executive agent.

3. Program Requirements (Reimbursable). There has been a net increase to the appropriation of +$40,000, as a result of changes in reimbursable program requirements (+$40,000).

Comparison of FY 1999 Program Requirements as reflected in the FY 1999 Budget with FY 1999 Program Requirements as shown in the FY 2000 Budget

Summary of Requirements ($ in Thousands)

	Total Program Requirements per FY 1999 Budget	**Total Program Requirements per FY 2000 Budget**	**Increase (+) or Decrease (-)**
01 – Basic Research	362,679	361,499	-1,180
02 – Applied Research	524,723	566,801	+42,078
03 – Advanced Technology Development	460,725	593,176	+132,451
04 – Demonstration and Validation (DEM/VAL)	2,358,359	2,408,520	+50,161
05 – Engineering and Manufacturing Development (EMD)	2,063,281	2,199,737	+136,456
06 – RDTE Management Support	616,973	598,664	-18,309
07 – Operational Systems Development	1,722,183	1,932,412	+210,229
Total Fiscal Year Program	**8,108,923**	**8,660,809**	**+551,886**

Explanation by Budget Activity
($ in Thousands)

01. Basic Research (-$1,180) - Changes to this budget activity resulted from the following Congressional undistributed reductions reflected in the FY 1999 DoD Appropriations Act. These changes included: an undistributed reduction for Federally Financed Research and Development Centers (FFRDC)(-$7)(Section 8034), an undistributed reduction for civilian personnel underexecution (-$338), and a general reduction for revised economic assumptions (lower inflation rate)(-$835)(Section 8108).

02. Applied Research (+$42,078) - Changes to this budget activity resulted from the following Congressional undistributed reductions reflected in the FY 1999 DoD Appropriations Act. These changes included: an undistributed reduction for Federally Financed Research and Development Centers (FFRDC)(-$130)(Section 8034), an undistributed

reduction for Contract Advisory and Assistance Services (CAAS)(-$1,755)(Section 8054), an undistributed reduction for civilian personnel underexecution (-$724), and a general reduction for revised economic assumptions (lower inflation rate)(-$1,313)(Section 8108). Specific FY 1999 Congressional adjustments (to start, continue, discontinue, reduce or earmark 31 specific initiatives, including transfers) resulted in a net increase of +$46,000.

03. Advanced Technology Development (+$132,451) - Changes to this budget activity resulted from the following Congressional undistributed reductions reflected in the FY 1999 DoD Appropriations Act. These changes included: an undistributed reduction for Federally Financed Research and Development Centers (FFRDC)(-$146)(Section 8034), an undistributed reduction for Contract Advisory and Assistance Services (CAAS)(-$1,571)(Section 8054), an undistributed reduction for civilian personnel underexecution (-$516), and a general reduction for revised economic assumptions (lower inflation rate)(-$1,316)(Section 8108). Specific FY 1999 Congressional adjustments (to start, continue, discontinue, reduce or earmark 33 specific initiatives, including transfers) resulted in a net increase of +$113,100. Additionally, FY 1999 includes a transfer for the USACOM Joint Experiments program (+$15,900), managed by the Navy as DoD executive agent. Last, the FY 1999 program is increased by +$7,000 to fully fund the VECTOR program.

04. Demonstration and Validation (DEM/VAL) (+$50,161) - Changes to this budget activity resulted from the following Congressional undistributed reductions reflected in the FY 1999 DoD Appropriations Act. These changes included: an undistributed reduction for Federally Financed Research and Development Centers (FFRDC)(-$1,228)(Section 8034), an undistributed reduction for Contract Advisory and Assistance Services (CAAS)(-$5,650)(Section 8054), an undistributed reduction for civilian personnel underexecution (-$1,234), and a general reduction for revised economic assumptions (lower inflation rate)(-$5,550)(Section 8108). Specific FY 1999 Congressional adjustments (to start, continue, discontinue, reduce or earmark 46 specific initiatives, including transfers) resulted in a net increase of +$55,101. Also, appropriation changes include the following reprogrammings, which require Congressional prior approval: Surface and Shallow Water Mines (+$8,980); Combat Systems Integration (+$12,526); and CEC (+15,000); partially financed by a reduction to Gun Weapons Systems Technology (-$11,301) and Hardened Target Munitions (-$9,827). Additionally, changes in program requirements required minor reprogrammings (-$6,656).

05. Engineering and Manufacturing Development (EMD) (+$136,456) - Changes to this budget activity resulted from the following Congressional undistributed reductions reflected in the FY 1999 DoD Appropriations Act. These changes included: an undistributed reduction for Federally Financed Research and Development Centers (FFRDC)(-$151) (Section 8034), an undistributed reduction for Contract Advisory and Assistance Services (CAAS)(-$23,648)(Section 8054), an undistributed reduction for civilian personnel underexecution (-$878) and a general reduction for revised economic assumptions (lower inflation rate) (-$5,065)(Section 8108). Specific FY 1999 Congressional adjustments (to

start, continue, discontinue, reduce or earmark 41 specific initiatives, including transfers) resulted in a net increase of +$136,979. Also, appropriation changes include the following reprogrammings, which require Congressional prior approval: AEGIS Combat System Improvements (-$5,050); AEGIS Combat Systems Engineering (+$24,300); AV-8B Aircraft (Engineering) (-$9,615); ASW and Other Helo Developments (+$9,352); and Ship Self-Defense (+$12,672). Additionally, changes in program requirements required minor reprogrammings (-$1,440).

06. RDTE Management Support (-$18,309) - Changes to this budget activity resulted from the following Congressional undistributed reductions reflected in the FY 1999 DoD Appropriations Act. These changes included: an undistributed reduction for Federally Financed Research and Development Centers (FFRDC)(-$2,292)(Section 8034), an undistributed reduction for Contract Advisory and Assistance Services (CAAS)(-$3,338)(Section 8054), an undistributed reduction for civilian personnel underexecution (-$485) and a general reduction for revised economic assumptions (lower inflation rate)(-$1,394)(Section 8108). Specific FY 1999 Congressional adjustments (to start, continue, discontinue, reduce or earmark 10 specific initiatives, including transfers) resulted in a net decrease of -$10,800.

07. Operational Systems Development (+$210,229) - Changes to this budget activity resulted from the following Congressional undistributed reductions reflected in the FY 1999 DoD Appropriations Act. These changes included: an undistributed reduction for Federally Financed Research and Development Centers (FFRDC)(-$310)(Section 8034), an undistributed reduction for Contract Advisory and Assistance Services (CAAS)(-$14,038)(Section 8054), an undistributed reduction for civilian personnel underexecution (-$825) and a general reduction for revised economic assumptions (lower inflation rate)(-$4,527)(Section 8108). Specific FY 1999 Congressional adjustments (to start, continue, discontinue, reduce or earmark 27 specific initiatives, including transfers) resulted in a net increase of +$243,346. Also, appropriation changes include the following reprogrammings, which require Congressional prior approval: Depot Maintenance -$10,922. Additionally, changes in program requirements required minor reprogrammings (-$2,495).

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0604227N
PROGRAM ELEMENT TITLE: Harpoon Modifications

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
A1843 HARPOON		1,954							0	0
TOTAL	**0**	**1,954**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

(U) A1843/HARPOON MODIFICATIONS Description: The Harpoon Block II Weapon System program was intended to upgrade and expand the capabilities of the U.S. Navy's only anti-ship missile to improve its precision in a congested littoral environment. The Navy funding for the program was canceled during POM-00 resulting in the Navy's withdrawal from further direct participation. FY-99 RDT&E funding will be utilized to: (1) Conduct captive carry demonstration testing of the existing Block IC weapon in order to determine maximum capability of the weapon; (2) Conduct an operational cost analysis of available ship attack weaponry for application as a possible successor to Harpoon Block IC; (3) Complete testing and evaluation of the Harpoon Surface Command Launch Control System (HSCLCS) 9/10 upgrade to add World Vector Shoreline and enhanced weapon search patterns for existing launch control system.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing, operational systems.

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0604227N
PROGRAM ELEMENT TITLE: Harpoon Modifications

1. FY 1998 PLAN:
   - (U) ($ 0)

2. FY 1999 PLAN:
   - (U) ($ 500) Complete captive carry demonstrations of Harpoon Block IC sensor and missile guidance system in a littoral environment.
   - (U) ($ 953) Complete operational cost analysis of available ship attack weaponry versus upgrades to Harpoon Block IC to include non-recurring and total life cycle costs.
   - (U) ($ 500) Complete testing and evaluation of HSCLCS 9/10 for fleet introduction.
   - (U) ($ 1) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2000 PLAN:
   - (U) ($ 0)

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0604227N**
PROGRAM ELEMENT TITLE: Harpoon Modifications

(U) B. PROGRAM CHANGE SUMMARY

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	N/A	1,965	1,958
(U) Appropriated Value:		1,965	
(U) Adjustments from President's Budget:		-11	-1,958
(U) FY 2000 President's Budget Submit:	N/A	1,954	0

CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 99 decrease reflects $-11 thousand for minor program adjustments. FY00 change due to the re-evaluation of the Harpoon weapon system upgrade strategy.

(U) Schedule: N/A

(U) Technical: N/A

(U) C. OTHER PROGRAM FUNDING SUMMARY: N/A

Related RDT&E: N/A

(U) D. ACQUISITION STRATEGY: This is a non-ACAT program with no specific acquisition strategies.

(U) E. SCHEDULE PROFILE: N/A

Exhibit R-2, RDT&E Budget Item Justification	Date: FEB 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N – BA7	Program Element Name & No. PE 0101221N, Strategic Sub & Weapons System Support

cost ($ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Total PE Cost	35.6	56.5	45.9	45.3	47.0	40.7	42.3	49.3	CONT.	CONT.
J0951 TRIDENT II	8.9	10.0	9.1	9.6	9.8	1.6	1.7	1.8	CONT	CONT
S0004 TRIDENT Submarine System Improvement	4.5	7.4	2.2	0	.6	1.5	1.9	7.9	CONT	CONT
J2228 Technology Applications Program	22.2	39.1	34.6	35.7	36.6	37.6	38.7	39.6	CONT	CONT
RDT&E Articles Qty										

A. (U) Mission Description and Budget Item Justification:

The TRIDENT II (D5) Submarine Launched Ballistic Missile (SLBM) provides the U.S. a weapon system with greater accuracy and payload capability as compared to the TRIDENT I (C4) system. TRIDENT II enhances U.S. strategic deterrence providing a survivable sea-based system capable of engaging the full spectrum of potential targets with fewer submarines. This PE supports continued evaluation of the system's long range performance and capabilities as well as investigations into new technologies which would help mitigate the program impact due to component obsolescence and a rapidly decreasing manufacturing support base. Efforts also include Reentry System and Guidance System Applications efforts. The TRIDENT Submarine System Improvement Program develops and integrates command and control Improvements needed to maintain TRIDENT Submarine operational capability through the life cycle of this vital strategic asset. The program conducts efforts needed to maintain strategic connectivity, ensure platform invulnerability, and reduce lifecycle costs through Obsolete Equipment Replacement (OER) and commonality.

(U) JUSTIFICATION FOR BUDGET ACTIVITY:

This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing, operational systems.

Exhibit R-2, RDT&E Budget Item Justification	Date: FEB 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N – BA7	Program Element Name & No. PE 0101221N, Strategic Sub & Weapons System Support

B. (U) Program Change Summary:

	FY 1998	FY1999	FY 2000	
FY 1999 President's Budget	39.1	56.6	49.5	
Appropriated Value	39.1	56.6	49.5	
Adjustments to FY 1998 Appropriated/FY 1999 President's Budget	-3.5	- 0.1	-3.6	-
FY 2000/2001 President's Budget Submit	35.6	56.5	45.9	

Explanation: For all projects in FY 1998 there are SBIR assessments of -$0.7 and various taxes of –$0.5. For project J0951, $1.7 was transferred out to finance closed account billings and for Project J2228 $.6 was similarly transferred out. In FY 1999, Project J2228 was assessed a revised economic assumption of -$.1. Project J0951 increases by $0.1 for NWCF rate adjustments in FY 2000 . Project J2228 reflects affordability reductions of $3.2M in FY 2000 for the Technology Applications programs. Additionally, Projects J2228 and J0951 were assessed inflation adjustments of -$.5 in FY 2000. .

C. (U) Other Program Funding Summary: See enclosed R-2a for each individual project data.

D. (U) Acquisition Strategy: See enclosed R-2a for each individual project data.

E. (U) Schedule Profile: Not Applicable.

Exhibit R-2a, RDT&E Project Justification		Date: FEB 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N – BA7	Program Element Name & No. PE 0101221N, Strategic Sub & Weapons System Support	Project Name and Number. TRIDENT II – J0951

Cost ($ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Project Cost J0951 TRIDENT II	8.9	10.0	9.1	9.6	9.8	1.6	1.7	1.8	CONT.	CONT.
RDT&E Articles Qty										

A. (U) Mission Description and Budget Item Justification:

The TRIDENT II (D5) Submarine Launched Ballistic Missile (SLBM) provides the U.S. a weapon system with greater accuracy and payload capability as compared to the TRIDENT I (C4) system. TRIDENT II enhances U.S. strategic deterrence by providing a survivable sea-based system capable of engaging the full spectrum of potential targets with fewer submarines. This project supports continued evaluation of the system's long range performance and capabilities as well as investigations into new technologies which would help mitigate the program impact due to component obsolescence and a rapidly decreasing manufacturing support base.

Exhibit R-2a, RDT&E Project Justification		Date: FEB 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N – BA7	Program Element Name & No. PE 0101221N, Strategic Sub & Weapons System Support	Project Name and Number. TRIDENT II – J0951

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 ACCOMPLISHMENTS:
   - (U) ($8.9) SRS: Effort continued in support of phase three development of the SLBM Retargeting System. This effort is fully obligated.

2. (U) FY 1999 PLAN:
   - (U) ($9.2) SRS: Effort continues in support of phase three development of the SLBM Retargeting System. Full obligation is projected by 3rd quarter of the 1st year.
   - (U) ($ .8) This represents funding utilized to finance closed account billings. Full obligation is projected by the end of the fiscal year.

3. (U) FY 2000 PLAN:
   - (U) ($8.2) SRS:. Effort continues in support of phase three development of the SLBM Retargeting System. Full obligation is projected by 3rd quarter of the 1st year.
   - (U) ($0.9) This represents funding utilized to finance closed account billings. Full obligation is projected by the end of the fiscal year.

Exhibit R-2a, RDT&E Project Justification		Date: FEB 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N – BA7	Program Element Name & No. PE 0101221N, Strategic Sub & Weapons System Support	Project Name and Number. TRIDENT II – J0951

B. (U) Other Program Funding Summary: (Dollars in Thousands)

FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Complete	Total Programt
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

(U) Related RDT&E: N/A

C. (U) Acquisition Strategy:
Contracts will continue to be awarded to those sources who were engaged in the TRIDENT II (D5) development program and are currently engaged in the production and/or operational support of the deployed D5/C4 Strategic Weapons Systems on the basis of Other Than Full and Open Competition pursuant to the authority of 10 U.S.C. 2304 ©(1) and (3) implemented by FAR 6.302.-1, 3 4.

D. (U) Schedule Profile: Not Applicable.

Exhibit R-3, Cost Analysis		Date: FEB 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N – BA7	Program Element Name & No. PE 0101221N, Strategic Sub & Weapons System Support	Project Name and Number. TRIDENT II – J0951

Cost Categories Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	FY01 Cost	FY01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Ancillary Hardware Development	SS / CPFF	LMDS/CA.	25.4	3.8	10/98	2.7	10/99			Cont.	Cont.	Cont.
Ancillary Hardware Development	WR	NSWC/VA.	39.5	5.4	10/98	5.5	10/99			Cont.	Cont.	Cont.
Primary Hardware Development	PD	SPBH/D.C.	N/A	.8	10/98	0.9	10/99			Cont.	Cont.	Cont.
Subtotal Product Development			64.9	10.0		9.1						
Remarks:												
Total Cost			64.9	10.0		9.2		9.6		CONT.	CONT.	CONT.
Remarks:												

Exhibit R-3, Cost Analysis		Date: FEB 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N – BA7	Program Element Name & No. PE 0101221N, Strategic Sub & Weapons System Support	Project Name and Number. Technology Applications – J2228

Cost ($ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Project Cost J2228 Technology Applications Program	22.2	39.1	34.6	35.7	36.6	37.6	38.7	39.6	CONT.	CONT.
RDT&E Articles Qty										

A. (U) Mission Description and Budget Item Justification:

This supports implementation of a coordinated Air Force/Navy Reentry System Applications Program as well as the implementation of a Strategic Guidance Applications Program. Reentry Vehicle and Guidance Technology is rapidly eroding beyond the point of being capable to respond to increasing aging phenomena and future requirements. The Nuclear Posture Review examined the infrastructure which supports the nuclear force structure. It concluded that special actions were required to correct the rapidly eroding capability to maintain confidence in the existing weapon systems, and recommended that the reentry vehicle and guidance technology bases should be preserved. That recommendation resulted in the Presidential Decision Directive-30, which directed that programs be established for the reentry vehicle and guidance technology application.

- Through sustainment of the Reentry Vehicle Technology Base, confidence in the dependability and reliability of Strategic SLBM and ICBM weapon systems will be maintained over the long term when no new systems will be in development. Critical and unique attributes necessary for the design, development and in-service support of current and modernized SLBM Reentry Systems will be defined and maintained to insure a functioning readiness application technical capability in reentry is preserved. Working closely with the Air Force, Navy requirements will be integrated with the Air Force requirements into a comprehensive program. The Program will maintain close coordination with the DOD Science and Technology (S&T) Community through the Reliance process in order to: leverage S&T programs, ensure system driven technology base requirements are considered in contract awards, eliminate duplication of effort and provide an opportunity to demonstrate appropriate emerging technologies through a reentry flight test evaluation process.

- This Program provides a minimum Strategic Guidance core technology development capability consistent with the Strategic Advisory Group (SAG) recommendations to CINCSTRAT. In the SAG recommendations SSP is to establish a program which preserves this critical design and development core. It is a basic bridge program which develops critical guidance technology applicable to any of the existing Air Force/Navy Strategic Missiles. The objective is to transition from current capability to a long term readiness status required to support deployed systems. Air Force and Navy guidance technology requirements shall be integrated and needs prioritized. Efforts shall be focused on alternatives to currently utilized technologies identified as system "weak links". Current system accuracy and functionality depends upon key technologies which provide radiation hardened velocity, attitude and stellar sensing capabilities. As the underlying technologies that currently provide these capabilities age and are no longer technically supportable modern alternatives must be made available in order to allow for orderly replacement. There is no commercial market for these technologies and their viability depends on the Strategic community. This technology development activity will support the D-5 missile life extension efforts that are required to ensure that TRIDENT II weapon system life matches the recent hull life extension on the TRIDENT submarine.

Exhibit R-3, Cost Analysis		Date: FEB 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N – BA7	Program Element Name & No. PE 0101221N, Strategic Sub & Weapons System Support	Project Name and Number. Technology Applications – J2228

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 Accomplishments

- (U) ($11.9) Continued Reentry System Applications Program. Full obligation was completed by the 4th quarter of the 1st year. FY 1998 efforts included:
  - (U) Continued Ground Testing of reentry vehicle candidate materials including those available from Science & Technology (S&T).
  - (U) Focused efforts on development and ground testing of low-cost replacement materials.
  - (U) Developed program plan for testing and evaluation of reentry components exposed to operational environments beyond their design life.
  - (U) Maintained program technical plan, conduct system assessments and demonstrate replacement hardware suitability.
  - (U) Continued development of instrumentation for flight test applications.
  - (U) Focused efforts on Nosetip Recession Sensor (NRS) and Arming Fuzing & Firing (AF&F) instrumentation for flight-test applications.

- (U) ($10.3) Continued Strategic Guidance Applications Program. Full obligation was completed by 4th quarter of the 1st year. FY 1998 efforts included:
  - (U) Continued development of the current Guidance Modeling and Simulation (Integrated Engineering Environment-IEE) towards full system functionally. Primary effort in FY 1998 is the attitude gimbal control design.
  - (U) Continued the prototype/design tradeoff effort for the next generation PIGA. Continue the review of alternate accelerometer efforts/technologies. The completion of radiation testing of IFOG technology occurred in early FY 1998. Evaluation of English Electric Valve (EEV) stellar sensors for SIGHTS (Strategic Inertial Guidance Hardware Technology Synthesizer)continues. SIGHTS will be used as a proof of concept and initial hardware correlation of IEE. Initiation evaluation of design alternatives for future microprocessor functionality such as ASIC/gate array technology.

Exhibit R-3, Cost Analysis		Date: FEB 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N – BA7	Program Element Name & No. PE 0101221N, Strategic Sub & Weapons System Support	Project Name and Number. Technology Applications – J2228

2. (U) FY 1999 Plan

- (U) ($21.6) Continue Reentry System Applications Program. Full obligation is projected by the 3rd quarter of the 1st year. FY 1999 efforts include:
  - (U) Conduct ground testing of reentry vehicle candidate materials including those available from Science & Technology (S&T).
  - (U) Initiate down-select process of low-cost candidate replacement materials.
  - (U) Initiate procurement and testing of reentry hardware components exposed to operational environments beyond their design life.
  - (U) Maintain RSAP technical program plan, conduct system assessments and identify tools to conduct Vulnerability & Hardening certification in absence of Nuclear Underground Testing (UGT) facilities.
  - (U) Continue development of instrumentation for flight test applications.
  - (U) Demonstrate developed Arming, Fuzing & Firing (AF&F) instrumentation.
  - (U) Initiate feasibility of low-cost replacement candidate for aging Mk4 AF&F.

- (U) ($17.5) Continue Strategic Guidance Applications Program. Full obligation is projected by the 3rd quarter of the 1st year. FY 1999 efforts include:
  - (U) Structural (mechanical and thermal) and system performance will be added to IEE system functionality along with improved fidelity towards a "virtual" system capability in FY 2001. Continue expanding the hardware design support of SIGHTS into other subsystems such as attitude and stellar and their associated hardware correlation. One of the evaluation tools initiated in FY 1997 under SIGHTS was a set of "probes" for better diagnostic evaluation of the TRIDENT D-5 guidance system. Delivery and utilization of these probes will begin. SIGHTS will support initial full systems capability.

Exhibit R-3, Cost Analysis		Date: FEB 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N – BA7	Program Element Name & No. PE 0101221N, Strategic Sub & Weapons System Support	Project Name and Number. Technology Applications – J2228

(U) Complete the prototype alternate PIGA design studies and test towards a Critical Design Review. Initiate evaluation of IFOG architecture solutions to radiation issues found in component testing (approximately two-year effort). Procure alternate stellar sensors to TRIDENT II format. Continue the microprocessor effort. Develop attitude and stellar modules.

3. (U) FY 2000 Plan

- (U) ($19.2) Continue Reentry System Applications Program. Full obligation is projected by the 3rd quarter of the 1st year. FY 2000 efforts include:
  - (U) Continue ground testing of reentry vehicle candidate materials including those available from Science & Technology (S&T).
  - (U) Continue down-select process of low-cost candidate replacement materials.
  - (U) Initiate planning and procurement of required hardware and instrumentation for demonstration of low-cost replacement heatshield.
  - (U) Initiate build-up of heavily instrumented flight unit for aged hardware evaluation.
  - (U) Continue ground testing of reentry components exposed to operational environments beyond their design life.
  - (U) Maintain RSAP technical program plan, conduct system assessments and initiate Vulnerability & Hardening certification process in absence of Nuclear Under Ground Testing (UGT) facilities.
  - (U) Evaluate Arming, Fuzing & Firing (AF&F) flight data.

- (U) ($15.4) Continue Strategic Guidance Applications Programs (GAP). Full obligation is projected by the 3rd quarter of the 1st year. FY 2000 efforts include:

  (U) Complete and more fully utilize the IEE virtual system capability. Continue with IEE/SIGHTS towards a "real time" hardware-in-loop simulation capability targeted for completion in late FY 2001. Begin to utilize the IEE/SIGHTS capability to perform system architecture/design tradeoffs. Initiate prototype alternate PIGA fabrication and subassembly testing.

Exhibit R-3, Cost Analysis		Date: FEB 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N – BA7	Program Element Name & No. PE 0101221N, Strategic Sub & Weapons System Support	Project Name and Number. Technology Applications – J2228

(U) Continue IFOG work started in FY 1999. Initiate stellar subsystem prototype using EEV or alternate sensor technology. If schedule allows, integrate EEV or alternate stellar sensor and alternate microprocessor technology into SIGHTS. Initiate circumvention design development using available rad-hard microprocessor technology.

B. (U) Other Program Funding Summary: (Dollars in Thousands)

FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	To COMPLETE	TOTAL PROGRAM
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

(U) Related RDT&E: N/A

C. (U) Acquisition Strategy:
Contracts will continue to be awarded to those sources who were engaged in the TRIDENT II (D5) development program and are currently engaged in the production and/or operational support of the deployed D5/C4 Strategic Weapons Systems on the basis of Other Than Full and Open Competition pursuant to the authority of 10 U.S.C. 2304 (c) (1) and (3) implemented by FAR 6.302.-1, 3 4.

D (U) Schedule Profile: Not Applicable

Exhibit R-3, Cost Analysis		Date: FEB 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N – BA7	Program Element Name & No. PE 0101221N, Strategic Sub & Weapons System Support	Project Name and Number. Technology Applications – J2228

Cost Categories SUPPORT AND MANAGEMENT	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	FY01 Cost	FY01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
TECHNOLOGY APPLICATIONS	SS – CPFF	LMMS/CAL	16.4	11.0	10/98	9.7	10/99			CONT.	CONT.	CONT.
TECHNOLOGY APPLICATIONS	WR	NSWC/VA	12.2	2.5	10/98	1.8	10/99			CONT.	CONT.	CONT.
TECHNOLOGY APPLICATIONS	SS – CPFF	HITCO/CAL	.0	2.2	10/98	2.1	10/99			CONT.	CONT.	CONT.
TECHNOLOGY APPLICATIONS	SS – CPFF	INTERMAT/MAINE	.0	1.6	10/98	1.6	10/99			CONT.	CONT.	CONT.
TECHNOLOGY APPLICATIONS	SS – CPFF	SORI/ALA	.0	.8	10/98	0.9	10/99			CONT.	CONT.	CONT.
TECHNOLOGY APPLICATIONS	WR	SNL/NM	2.1	1.8	10/98	1.0	10/99			CONT.	CONT.	CONT.
TECHNOLOGY APPLICATIONS	SS – CPFF	CSDL/MA	0.2	1.2	10/98	1.5	10/99			CONT.	CONT.	CONT.
TECHNOLOGY APPLICATIONS	SS – CPFF	KAMAN/CO	1.6	0.5	10/98	0.6	10/99			CONT.	CONT.	CONT.
TECHNOLOGY APPLICATIONS	SS – CPFF	CSDL/MA	30.1	17.5	10/98	15.4	10/99			CONT.	CONT.	CONT.
Subtotal Support			62.0	39.1		34.6						

Remarks:

Exhibit R-2a, RDT&E Project Justification		Date: FEB 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N – BA7	Program Element Name & No. PE 0101221N, Strategic Sub & Weapons System Support	Project Name and Number. TRIDENT Submarine System Improvement – S0004

Cost ($ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Project Cost S0004 TRIDENT Submarine System Improvement	4.5	7.4	2.2	0.0	.6	1.5	1.9	8.0	CONT.	CONT.
RDT&E Articles Qty										

a. (U) Mission Description and Budget Item Justification:

The TRIDENT Submarine System Improvement Program develops and integrates command and control improvements needed to maintain TRIDENT submarine operations capability through the life cycle of this vital strategic asset. The program conducts efforts needed to maintain strategic connectivity, ensure platform invulnerability, and reduce life cycle costs through Obsolete Equipment Replacement (OER) and commonality.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 ACCOMPLISHMENTS:
   - (U) ($2.6) Initiated development of TRIDENT CCS MK2 Block 1C Defensive Weapons System (DWS) Program.
   - (U) ($.6) Initiated development of AN/BQQ-6 Sonar to AN/BQQ-5E sonar Translator.
   - (U) ($.8) Continued development of Acoustic Rapid Commercial-off-the-Shelf (COTS) Insertion (ARCI) Phase I/II Multipurpose Processor (MPP) Program.
   - (U) ($.5) Initiated Architecture Model Maintenance and COTS Technical Refresher.

. (U) FY 1999 PLAN
   - (U) ($3.4) Complete development of TRIDENT CCS MK2 Block 1C DWS Program.
   - (U) ($2.7) Continue development of ARCI Phase I/II MPP Program.
   - (U) ($1.1) Continue Architecture Model Maintenance and COTS Technical Refresher.
   - O (U) ($0.2) Portion of extramural program is reserved for Small Business Innovation Research assessment in accordance with 15 USC 638

Exhibit R-2a, RDT&E Project Justification		Date: FEB 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N – BA7	Program Element Name & No. PE 0101221N, Strategic Sub & Weapons System Support	Project Name and Number. TRIDENT Submarine System Improvement – S0004

3. (U) FY 2000 PLAN:
   - (U) ($.5) Complete development of ARCI Phase I/II MPP Program.
   - (U) ($1.7) Continue Architecture Model Maintenance and COTS Technical Refresher.

4. (U) FY 2001 PLAN: Not applicable.

B. (U) Program Change Summary:

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	4.6	7.4	2.2
(U) Appropriated Value:	4.7		
(U) Adjustment to FY 1998 Appropriated Value/FY 1999 President's Budget:			
a. Small Business Innovative Research (SBIR):	-.1		
b. Minor Pricing Adjustments:	-.1		
(U) FY 2000/01 PRES Budget Submit:	4.5	7.4	2.2

(U) Funding: The total decrease of $.2M in FY98 consists of a $.1M reduction for SBIR and a $.1M reduction for minor pricing adjustments.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

Exhibit R-2a, RDT&E Project Justification		Date: FEB 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N – BA7	Program Element Name & No. PE 0101221N, Strategic Sub & Weapons System Support	Project Name and Number. TRIDENT Submarine System Improvement – S0004

C. (U) Other Program Funding Summary:

	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Complete	Total Cost
267600/267606 (BA-2) Strategic Platform Support Equipment	7.2	12.4	22.2	15.9	11.7	20.8	25.7	13.0	CONT.	CONT.
535500/535506 (BA-4) Strategic Platform Support Equipment	2.2	2.9	9.5	4.7	10.6	8.7	2.3	4.8	CONT.	CONT.

(U) Related RDT&E: These PEs develop submarine software and hardware that are directly related to efforts conducted by the program element.

(U) PE 0101224N (SSBN Security Survivability Program)
(U) PE 0101402N (Navy Strategic Communications)
(U) PE 0604562N (Submarine Tactical Warfare System)
(U) PE 0604503N (Submarine System Equipment Development)

D. (U) Acquisition Strategy:

The TRIDENT operational systems development program results in improvements to the baseline TRIDENT Combat System. Current TRIDENT Combat Systems were first developed in the early 1970s and are becoming increasingly difficult to maintain and offer comparatively less performance than more recently designed systems. Previous efforts to upgrade portions of the TRIDENT Combat System include improvements via sonar and combat control hardware and software (e.g., QE2 programs), feasibility of increased countermeasure capability and a concept evaluation of an Submarine Force Mission Program Library (SFMPL) interface. Due to the sensitivity of TRIDENT programs it is assessed that international technology will not have a major impact or be a recipient of the benefits derived from this effort. Development strategies will significantly enhance the sustainability and operability of the sonar, communications and Combat Control Systems on TRIDENTs by evaluating both OER possibilities and potential improvements.

Exhibit R-2a, RDT&E Project Justification		Date: FEB 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N – BA7	Program Element Name & No. PE 0101221N, Strategic Sub & Weapons System Support	Project Name and Number. TRIDENT Submarine System Improvement – S0004

E. (U) Schedule Profile:

Successful program development will lead to the submission and approval of system and subsystem Engineering Changes for installation during SSBN 726 class submarine backfits. Specific deliverable dates for the RDT&E,N and OP,N programs are:

ARCI Phase I/II - FY97 (2nd Qtr) – Program Inception
FY00 (4th Qtr) – Install and Test Prototype
FY02 (1st Qtr) – ARCI Certification/IOC

CCS MK2 Block 1C - FY98 (2nd Qtr) – Program Inception
FY00 (4th Qtr) – Install and Test Prototype
FY02 (1st Qtr) – Certification/IOC

Architecture Model Maint. & COTS Technology Refresh - Management Processes FY98 (2nd Qtr) – Program Inception
FY00 – CONT. – COTS Supportability, Architecture Maintenance and COTS

Q6 to Q5 Translator - FY98 (2nd Qtr) – Program Inception; Installation and Test; Certification/IOC

Exhibit R-3 Cost Analysis		Date: FEB 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N – BA7	PROGRAM ELEMENT NAME AND NUMBER Strategic Submarine & Weapons System Support, PE 0101221N	PROJECT NAME AND NUMBER TRIDENT Submarine System Improvement, S0004

Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	FY01 Cost	FY01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Design/Development Engineering	SS - CPIF	Raytheon, Portsmouth RI	2.6	3.4	12/98	0	N/A		N/A	0	6.0	6.0
Software Development	WR	NUWC, Newport RI	.6	0	N/A	0	N/A		N/A	0	.6	.6
Design/Development Engineering	SS - CPFF	Lockheed Martin, Manassas VA	2.3	2.7	12/98	.5	12/99		N/A	0	5.3	5.3
Design/Development Engineering	Various	Various	11.7	0	N/A	0	N/A		N/A	0	11.7	11.7
Subtotal Product Development			17.2	6.1		.5				0	23.6	23.6
Remarks:												
Support and Management	Various	Various	.02	0	N/A	0	N/A	0	N/A	0	.02	.02
Subtotal Support			.02	0		0		0		0	.02	.02
Remarks:												

Exhibit R-3 Cost Analysis		Date: FEB 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N – BA7	PROGRAM ELEMENT NAME AND NUMBER Strategic Submarine & Weapons System Support, PE 0101221N	PROJECT NAME AND NUMBER TRIDENT Submarine System Improvement, S0004

Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	Fy00 Cost	FY00 Award Date	FY01 Cost	FY01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Test and Certification	WR	NUWC, Newport RI	.3	1.5	10/98	1.7	10-99	0	N/A	CONT.	CONT.	CONT.
Test and Certification	Various	Various	.7	0	N/A	0	N/A	0	N/A	0	.7	.7
Subtotal T&E			1.1	1.5		1.7		0		CONT.	CONT.	CONT.
Remarks: After transition to Commercial Off-The-Shelf (COTS) based systems, obsolescence becomes a major issue. To keep current, it is necessary to support the development and maintenance of a RDT&E process to maintain TRIDENT subsystems using commercial technology and parts. This model will continue the evaluation and implementation of COTS Technology.												
Subtotal Management			0	0	N/A	0	N/A	0	N/A	0	0	0
Remarks: Government Furnished Property – not applicable.												
Total Cost			18.3	7.4		2.2		0		CONT.	CONT.	CONT.
Remarks:												

Exhibit R-2, RDT&E Budget Item Justification	Date: FEB 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E / BA 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No.: Submarine Acoustic Warfare Development / 0101226N

COST ($ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Total P.E. Cost	5.7	8.1	3.2	.9	1.0	1.1	3.0	8.8	CONT.	CONT.
Submarine Defensive Warfare / V1265	5.7	8.1	3.2	.9	1.0	1.1	3.0	8.8	CONT.	CONT.
Quantity of RDT&E Articles & cost										

A. Mission Description and Budget Item Justification: This project develops a Submarine Defensive Warfare System (SDWS) to improve the effectiveness and survivability of all classes of US submarines. Project efforts consist of a new acoustic threat intercept system (AN/WLY-1) that will have threat platform sonar and torpedo recognition capability for early detection, classification, and tracking of threats. It will allow radius of curvature and multipath ranging. The system will also include a control subsystem for launch management of all onboard countermeasure devices and launchers. Next Generation Countermeasure (NGCM) including Weapons Analysis Facility (WAF) simulation analysis capability provides the US Navy with testing of hardware and software within detailed representations of acoustic environments.

1. FY 1998 ACCOMPLISHMENTS:
   - (U) ($5.747) Continued fabrication and development testing and conducted At-Sea test for the AN/WLY-1.

2. FY 1999 PLAN:
   - (U) ($7.948) Complete sensor and software development and continue Phase II design review.
   - (U) ($0.132) Portion of extramural program is reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2000 PLAN:
   - (U) ($3.195) Complete Phase II Design Review and conduct TECHEVAL/OPEVAL for the AN/WLY-1 system.

Exhibit R-2, RDT&E Budget Item Justification	Date: FEB 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E / BA 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No.: Submarine Acoustic Warfare Development / 0101226N

B. Program Change Summary:

	FY 1998	FY 1999	FY 2000
FY 1999 President's Budget:	5.800	8.328	6.535
Appropriated Value:	6.058	8.328	
Adjustment to FY 1998/99 Appropriated Value/ FY 1999 President's Budget::			
a) FY98 SBIR Transfer	-.106		
b) Federal Technology Transfer	-.001		
c) Countermeasure Adjustment			-3.300
d) Outsourcing Adjustment			-.006
e) NWCF Rates			+.007
f) Minor Pricing Adjustments	-.003	-027	+.005
g) FY1998 Update	+.054		
h) Contract Advisory & Assistance		-.221	
i) No Pay Inflation			-.046
FY 2000/01 PRES Budget Submit:	5.747	8.080	3.195

Funding: FY 1998: FY98 SBIR Transfer (-$.106), Federal Technology Transfer (-$.001), FY1998 Update (+$.054), and Minor Pricing Adjustment (-$.003)
FY 1999: Minor Pricing Adjustment (-$.027), and Contract and Advisory Assistance (-$.221)
FY 2000: Countermeasure Adjustment (-$3.300), Outsourcing Adjustment (-$.006), NWCF Rates (+$.007), Minor Pricing Adjustment (+$.005), and No Pay Inflation (-$.046)

Schedule: Not Applicable

Technical: Not Applicable

C. Other Program Funding Summary:

OPN BLI: 221000/221005
Submarine Acoustic Warfare Systems

FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Complete	Total Cost
3.539	7.296	11.202	10.448	13.691	21.247	30.513	33.296	CONT.	CONT.

D. Acquisition Strategy: Sole Source Contract to Developer for 2 units in FY00, and a one-time Competitive Contract buying out the Backfit market within the FYDP.

E. Schedule Profile: See Next Page

Exhibit R-2, RDT&E Budget Item Justification	Date: FEB 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E / BA 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No.: Submarine Acoustic Warfare Development / 0101226N

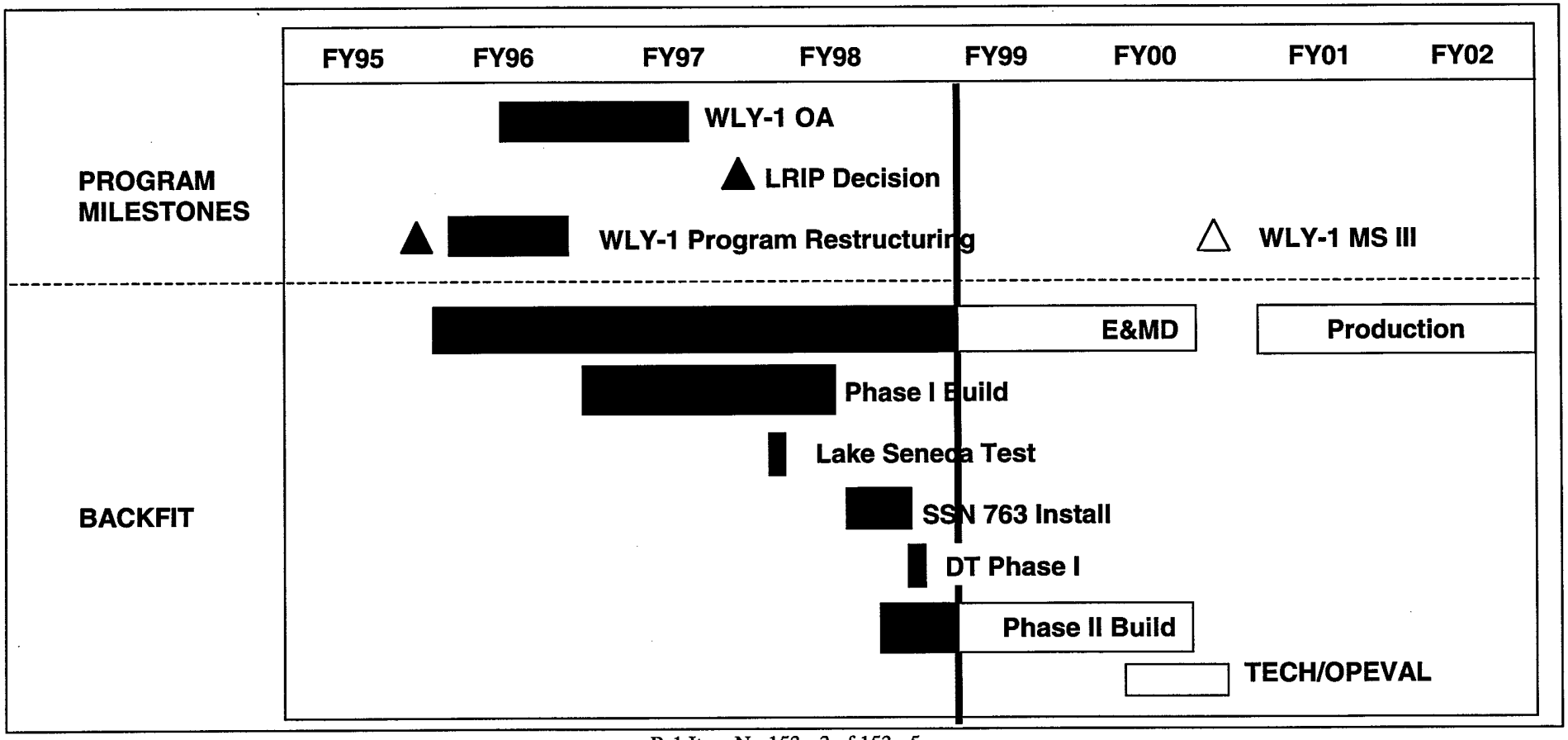


Exhibit R-3 Cost Analysis		Date: FEB 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E / BA 7	Program Element Name & No.: Submarine Acoustic Warfare Development / 0101226N	Project Name and Number: Submarine Defensive Warfare Systems / V1265

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	FY01 Cost	FY01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	C/CPAF	Northrop Grumman Norden Systems Melville, NY	31.5	3.250	12/98	.810	11/99			0	35.560	35.560
System Engineering	C/CPAF	General Dynamics Groton, CT	4.778	.939	01/99	0				0	5.717	5.717
System Engineering	WR	PNSY	.730	.100	11/98	0				0	.830	.830
System Engineering	WR	NUWCDIVNPT Newport, RI		2.245	11/98	.510	11/99			CONT.	CONT.	CONT.
Subtotal Product Development			37.008	6.534		1.320				CONT.	CONT.	CONT.
Remarks: Award Fees: (FY - Amount Budgeted - % Awarded) FY92 - $205,367 - 57% FY95 - $63,010 - 49% FY93 - $184,830 - 66% FY96 - $271,199 - 88% FY94 - $154,025 - 78% FY97 - $258,198 - 83%												
Miscellaneous	WR		0	.696	Var.	0				CONT.	CONT.	CONT.
Subtotal Support			0	.696		0				CONT.	CONT.	CONT.
Remarks:												

Exhibit R-3 Cost Analysis		Date: FEB 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E / BA 7	Program Element Name & No.: Submarine Acoustic Warfare Development / 0101226N	Project Name and Number: Submarine Defensive Warfare Systems / V1265

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total Pys Cost	FY99 Cost	FY99 Award Date	Fy00 Cost	FY00 Award Date	FY01 Cost	FY01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	OPTEVFOR Norfolk, VA	.055	0		1.175	11/99			0	1.230	1.230
Subtotal T&E			.055	0		1.175				0	1.230	1.230
Remarks:												
Program Management Support	C/CPFF	RM Vredenburg Reston, VA	.750	.750	12/98	.600	12/99			CONT.	CONT.	CONT.
Travel		PMS415	.110	.100		.100				CONT.	CONT.	CONT.
Subtotal Management			.860	.850		.700				CONT.	CONT.	CONT.
Remarks:												
Total Cost			37.923	8.080		3.195				CONT.	CONT.	CONT.
Remarks:												

EXHIBIT R-2, FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204136N
PROGRAM ELEMENT TITLE: F/A-18 SQUADRONS

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
E1662 F/A-18 Improvements	45,858	95,583	169,129	118,174	86,874	20,823	36,467	25,191	0	3,268,488
E2065 F/A-18 RADAR Upgrade	2,272	0	3,943	91,526	78,721	91,432	62,876	39,269	31,033	688,071
E2130 F/A-18 Follow-On Variant	237,751	206,450	142,642	28,550	1,512	0	0	0	0	5,598,844
E2350 F/A-18F TAC RECCE	2,817*	0	0	0	0	0	0	0	0	2,817
TOTAL	288,698	302,033	315,714	238,250	167,107	112,255	99,343	64,460	31,033	9,558,220

***F/A-18F TAC RECCE effort executed in P.E. 0305207N starting in FY 1999.**

Quantity of RDT&E Articles 10

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The F/A-18 is capable of using external equipment to perform either fighter or attack missions. The capabilities of the F/A-18 weapon system can be upgraded to accommodate and incorporate new or enhanced weapons as well as advances in technology to respond effectively to emerging future threats. Continued development capability is required to successfully optimize new F/A-18 weapon system capabilities in the Fleet. Additionally, continued improvements in reliability and maintainability are necessary to ensure maximum benefit is achieved through reduced cost of ownership and to provide enhanced availability.

F/A-18 Improvements: The F/A-18 Naval Strike Fighter program transitioned from full-scale engineering development to operational systems development during FY 1983. As F/A-18 squadrons report discrepancies and new requirements, a continuing capability is needed to perform technical evaluations, investigative flight testing, software support, and incorporate Pre-Planned Product Improvements (P^3I) (i.e., capability enhancements).

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204136N
PROGRAM ELEMENT TITLE: F/A-18 SQUADRONS

The Active Electronically Scanned Array (AESA) development program, beginning in FY 2000, is the last of three pre-planned upgrades to the F/A-18 Type/Model/Series radar. The AESA corrects operational test deficiencies noted in the AN/APG-73. It provides for multi-target tracking, Synthetic Aperture Radar (SAR) imagery, SAR Target Location Error (TLE), and improved spotlight map resolution. In addition, it provides for greater lethality than previous F/A-18 radars by allowing for full tactical support of existing and planned air-to-air (A/A) and air-to-ground (A/G) weapons significantly increases A/A and A/G detection and tracking ranges. The AESA provides greater survivability through self-protection and standoff jamming capabilities, while its greater range allows for reduced detection by enemy radar. The AESA is also more affordable than previous radars. Significant savings in operating and support costs can be realized through a five fold increase in reliability over the AN/APG-73 as well as incorporating open architecture and Higher Order Language software. Additionally, savings can be realized by avoiding parts obsolescence redesign costs that will be experienced on the AN/APG-65 and AN/APG-73.

F/A-18 Follow-On Variant: The follow-on F/A-18 (E/F version) is an airframe upgrade incorporating increased capabilities, performance, and survivability necessary to satisfy the 41% percent increase in range over the C/D in the high-low-low-high attack/interdiction mission carrying three 480 gallon drop tanks, four 1,000 pound bombs, and two AIM-9 air-to-air missiles. The E/F version will have increased internal fuel capacity, increased weapons carriage capability, increased carrier recovery payload, enhanced survivability/vulnerability, increased growth capacity, and increased engine thrust. It will retain all of the P^3I enhancements developed for the earlier night attack C/D version of the aircraft.

F/A-18F TAC RECCE: The F/A-18F Shared Advanced Reconnaissance Pod (SHARP) Program develops podded systems to provide timely, accurate imagery intelligence. This system, when installed on an F/A-18F serves as the follow-on tactical air reconnaissance system to the interim F-14 Tactical Air Reconnaissance Pod System (TARPS). This program funds development of a unique F/A-18F podded reconnaissance system. This system includes electro-optical, infrared, and provisioning for synthetic SAR sensors to provide day/night, broad area coverage and high resolution images in over flight and at short and extended ranges. Imagery data is digitally recorded and can be data linked in near real time and/or returned to base for playback, analysis, processing, and storage. This effort is now funded in P.E. 0305207N (Manned Reconnaissance Systems) starting in FY 1999.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing operational systems.

E2350 F/A-18F TAC RECCE

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS: (This effort is funded in P.E. 0305207N starting in FY 1999).

- (U) ($1,000) Solicited and evaluated industry input.
- (U) ($1,817) Developed draft ORD and program plans.

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204136N
PROGRAM ELEMENT TITLE: F/A-18 SQUADRONS

PROJECT NUMBER: E1662
PROJECT TITLE: F/A-18 IMPROVEMENTS

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
E1662 F/A-18 Improvements	**45,858**	**95,583**	**169,129**	**118,174**	**86,874**	**20,823**	**36,467**	**25,191**	**0**	**3,268,488**

Quantity of RDT&E Articles: Not Applicable

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The F/A-18 is a multi-mission strike fighter aircraft that is used in both fighter and attack roles through selected use of external equipment (fuel tanks, targeting/navigation, Forward Looking Infrared (FLIR) pods, and various bomb/missile launching racks). In order to respond effectively to emerging future threats, F/A-18 aircraft capabilities are being upgraded to incorporate new/enhanced weapons systems and avionics including the Positive Identification System (PIDS) (incorporates Congressionally mandated Combined Interrogator Transponder (CIT) Identification Friend or Foe (IFF) System), Digital Communications System (DCS), Joint Helmet Mounted Cueing System (JHMCS), Advanced Targeting Forward Looking Infrared (ATFLIR), conversion of the Operational Flight Program (OFP) to a Higher Order Language (HOL), development of the F/A-18F Advanced Crew Station, initiation of development efforts for Expand 4/5 providing high resolution maps to be displayed in the cockpit, and upgrade of the existing Global Positioning System/Inertial Navigation System in order to meet precision strike/precision approach requirements. Continued hardware/software development is required to successfully optimize fleet F/A-18 weapons systems. As F/A-18 Squadrons report system problems/requirements, a continuing capability is needed to perform technical evaluations/investigative flight testing, provide software support and integrate selected improvements.

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0204136N** **PROGRAM ELEMENT TITLE: F/A-18 SQUADRONS** **PROJECT NUMBER: E1662** **PROJECT TITLE: F/A-18 IMPROVEMENTS**

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

- (U) ($1,441) Continued to conduct engineering analysis and development improvements to existing systems and subsystems for deficiencies identified during deployment of the aircraft. Provided technical support for the integration of new weapons and systems.
- (U) ($44,417) Continued development of DCS, PIDS, ATFLIR, and JHMCS.

2. FY 1999 PLAN:

- (U) ($2,684) Continue to conduct engineering analysis and develop improvements to existing systems and subsystems for deficiencies identified during development of the aircraft. Provide technical support for the integration of new weapons and systems.
- (U) ($4,548) Continue to develop and integrate enhancements to the effectiveness, operability, and safety of the F/A-18 Weapon System (airframe, avionics, and weapons) and subsystems to include Multifunctional Information Distribution System (MIDS), AIM-9X, Embedded Global Positioning System/Inertial Navigation System (EGI), and Tactical Air Moving Map Capability (TAMMAC). Continue to investigate deficiencies and develop corrective action.
- (U) ($39,668) Continue development of DCS, PIDS, and JHMCS. Complete Phase I of BOL CHAFF wing tip certification on F/A-18 C/D.
- (U) ($47,108) Continue ATFLIR development. Commence conversion of the OFP to a HOL.
- (U) ($1,575) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 68.

3. FY 2000 PLAN:

- (U) ($1,486) Continue to conduct engineering analysis and develop improvements to existing systems and subsystems for deficiencies identified during development of the aircraft. Provide technical support for the integration of new weapons and systems.
- (U) ($16,200) Continue development and testing of DCS, JHMCS, and PIDS.
- (U) ($145,911) Continue ATFLIR development. Continue conversion of the OFP to a HOL and initiate development efforts for the F/A-18E/F Advanced Crew Station, Expand 4/5, and Precision Navigation.
- (U) ($5,532) Continue to develop and integrate enhancements to the effectiveness, operability, and safety of the F/A-18 Weapon System (airframe, avionics, and weapons) and subsystems to include MIDS, AIM-9X, and TAMMAC. Continue to investigate deficiencies and develop corrective action.

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0204136N** **PROJECT NUMBER: E1662**
PROGRAM ELEMENT TITLE: F/A-18 SQUADRONS **PROJECT TITLE: F/A-18 IMPROVEMENTS**

(U) B. PROGRAM CHANGE SUMMARY

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	45,601	97,198	130,075
(U) Appropriated Value:	47,110	97,198	
(U) Adjustments from President's Budget	+257	-1,615	+39,054
(U) FY 2000 President's Budget Submit:	45,858	95,583	169,129

CHANGE SUMMARY EXPLANATION:

(U) Funding: The net increase of $257 thousand in FY 1998 reflects an increase to the Positive Identification System (PIDS). The net decrease of $1,615 thousand in FY 1999 reflects a $1,000 thousand reprogramming to the VECTOR Program, and a decrease of $615 thousand for minor pricing adjustments. The net increase in FY 2000 of $39,054 provides funding for continued development of the Advanced Targeting Forward Looking Infrared (ATFLIR) System, initiation of conversion of the Operational Flight Program (OFP) to a Higher Order Language (HOL), development of the Aft Crew Station for the F/A-18E/F, an increase in NWCF rates, and reduced escalation rates.

(U) Schedule: Not applicable.

(U) Technical: Not applicable

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0204136N** **PROGRAM ELEMENT TITLE: F/A-18 SQUADRONS** **PROJECT NUMBER: E1662** **PROJECT TITLE: F/A-18 IMPROVEMENTS**

(U) C. OTHER PROGRAM FUNDING SUMMARY

Appn	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete
APN-1 (E/F)	224,350	416,369	382,960	618,946	743,415	842,452	891,283	982,941	3,610,694
APN-5	70,510	134,535	210,428	242,343	220,974	233,362	220,944	215,678	Cont.

Related RDT&E

(U) P.E. 0207163N Advanced Medium Range Air-to-Air Missile (AMRAAM)
(U) P.E. 0604727N Joint Stand-off Weapon (JSOW) System
(U) P.E. 0604270N EW Development
(U) P.E. 0604777N Navigation ID System, project X0921, NAVSTAR GPS equipment

(U) D. ACQUISITION STRATEGY: The F/A-18 Improvements program consists of nine separate development projects. The major programs within the F/A-18 Improvements Line are as follows:
PIDS. PIDS is a sole source cost plus fixed fee contract on an R&D Basic Ordering Agreement. Will be bought as CFE through the prime contractor.
ATFLIR. The ATFLIR development was a sole source incentive fee contract to Boeing. Boeing competed the development contract. The procurement supplier is planned to be sole source to Boeing.
Higher Order Language (HOL). The conversion of the Operational Flight Program software to HOL will be accomplished by the F/A-18 Advanced Weapons Laboratory at China Lake as the designated Software Support Activity for the F/A-18. The design of the software will be accomplished by Boeing under the sole source Technical Direction Letter contract at China Lake. As the Prime contractor for the aircraft, Boeing is the design agent for software of aircraft in production.
Advanced Crew Station. The design and development of the Advanced Crew Station modification will be sole source to Boeing as the Prime aircraft contractor.

(U) E. SCHEDULE PROFILE: (not applicable)

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204136N PROJECT NUMBER: E1662
PROJECT TITLE: F/A-18 IMPROVEMENTS

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
PIDS/DCS Development/Integration	SS/CPFF/ FFP	MDA St. Louis, MO	79,938	22,830	11/98	11,390	11/99	1,397	115,555	115,555
DCS E&MD	SS/FFP	Rockwell-Collins Cedar Rapids, IOWA	16,196	0		0		0	16,196	16,196
ATFLIR E&MD	CPIF/AF	MDA St. Louis, MO	10,079	31,900	11/98	75,200	11/99	25,945	143,124	143,124
ATFLIR AWARD FEE (Note 1)				(2,110)		(1,179)		(1,493)		
Misc. Development Efforts	Various	Other Contracts	5,284	1,200		800		1,200	8,484	8,484
JHMCS E&MD	MIPR	WPAFB Dayton, OH	5,000	2,462	11/98	788	11/99	425	8,675	8,675
Software Development Engineering	WX	NAWCWD China Lake, CA	38,766	21,414	10/98	70,475	10/99	244,203	374,858	
Misc. Product Development	WX	Other Field Activities	2,627	606	10/98	345	10/99	340	3,573	
Subtotal Product Development			**157,890**	**80,412**		**158,998**		**273,510**	**670,810**	

Remarks Note 1: Award Fees included in the total contract value (Award fees are non-add)

Subtotal Support Not Applicable			**0**	**0**		**0**		**0**	**0**	

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204136N PROJECT NUMBER: E1662
PROJECT TITLE: F/A-18 IMPROVEMENTS

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Product T&E Summary	WX	NAWCAD Patuxent River, MD	40,493	10,666	10/98	8,466	10/99	6,598	66,223	
Subtotal Test & Evaluation			**40,493**	**10,666**		**8,466**		**6,598**	**66,223**	
Contractor Support/Travel/Misc	Various	NAVAIR Patuxent River, MD	6,560	2,930	11/98	1,665	11/99	7,421	18,576	
Subtotal Management Services			**6,560**	**2,930**		**1,665**		**7,421**	**18,576**	
FY92 & Prior			**2,511,304**						**2,511,304**	
SBIR Assessment				1,575					1,575	
Total Cost			**2,716,247**	**95,583**		**169,129**		**287,529**	**3,268,488**	

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204136N
PROGRAM ELEMENT TITLE: F/A-18 SQUADRONS

PROJECT NUMBER: E2065
PROJECT TITLE: RADAR UPGRADE

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
E2065 F/A-18 Radar Upgrade	2,272	0	3,943	91,526	78,721	91,432	62,876	39,269	31,033	688,071

Quantity of RDT&E Articles: Not Applicable

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Active Electronically Scanned Array (AESA) development program, beginning in FY 2000, is the last of three pre-planned upgrades to the F/A-18 Type/Model/Series radar. The AESA corrects operational test deficiencies noted in the AN/APG-73. It provides for multi-target tracking, SAR imagery, SAR TLE, and improved spotlight map resolution. In addition, it provides for greater lethality than previous F/A-18 radars by allowing for full tactical support of existing and planned air-to-air (A/A) and air-to-ground (A/G) weapons significantly increases A/A and A/G detection and tracking ranges. The AESA provides greater survivability through self-protection and standoff jamming capabilities, while its greater range allows for reduced detection by enemy radar. The AESA is also more affordable than previous radars. Significant savings in operating and support costs can be realized through a five fold increase in reliability over the AN/APG-73 as well as incorporating open architecture and Higher Order Language software. Additionally, savings can be realized by avoiding parts obsolescence redesign costs that will be experienced on the AN/APG-65 and AN/APG-73.

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204136N
PROGRAM ELEMENT TITLE: F/A-18 SQUADRONS

PROJECT NUMBER: E2065
PROJECT TITLE: RADAR UPGRADE

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:
   - (U) ($2,272) Conducted RUG Phase II Follow-on Test and Evaluation.
2. FY 1999 PLAN: Not applicable.
3. FY 2000 PLAN:
   - (U) ($2,900) Conduct Pre E&MD AESA Radar development.
   - (U) ($643) Commence Software Development and Integration efforts.
   - (U) ($350) Commence Radar Development/Planning.
   - (U) ($50) Start Test & Evaluation planning phase.

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0204136N** **PROJECT NUMBER: E2065**
PROGRAM ELEMENT TITLE: F/A-18 SQUADRONS **PROJECT TITLE: RADAR UPGRADE**

(U) B. PROGRAM CHANGE SUMMARY

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	2,244	0	0
(U) Appropriated Value:	2,330	0	0
(U) Adjustments from 1999 President's Budget	+28	0	+3,943
(U) FY 2000 President's Budget Submit:	2,272	0	3,943

CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY1998 increase of $28 thousand properly funds RUG Phase II requirements in it's last year of development. The FY 2000 increase of $3,943 thousand consists of a beginning AESA development program.

(U) Schedule: Not applicable.

(U) Technical: Not applicable

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0204136N** **PROJECT NUMBER: E2065**
PROGRAM ELEMENT TITLE: F/A-18 SQUADRONS **PROJECT TITLE: RADAR UPGRADE**

(U) C. OTHER PROGRAM FUNDING SUMMARY

Appn	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete
APN-5*	15,112	19,546	42,211	18,946	19,899	4,284	10,275	8,851	93
APN-1C/D*	20,896								
APN-1E/F	54,204	85,671	90,509	105,164	119,815	181,149	198,268	234,547	1,162,072

Related RDT&E

(U) P.E. 0603261N Tactical Airborne Reconnaissance (TAC RECCE)
P.E. 0204136N F/A-18 Squadrons (Project E1662: F/A-18 Improvements – Higher Order Language, Aft Crew Station Upgrade)

(U) D. ACQUISITION STRATEGY: The AESA program employs a two-phase approach with sole source contracts to the airframe prime manufacturer, Boeing. Phase I will be a moderate risk reduction phase conducted in FY 1999 and FY 2000. During this phase, Boeing will conduct competitive source selection at the radar system subcontract level. A BOA order for RFP development and subcontractor selection will be made to conduct this effort. It will include an "845" agreement for prototype development, which includes commercial development/amortization provisions. Conducting the competition early in the program allows for focused risk reduction and contractor investment.

Phase II will consist of a typical E&MD program and development contract. The program transitions to Phase II with a successful Milestone II decision in FY 2001. Once the program enters production, the "845" agreement allows the contractor to amortize unreimbursed development costs into the production unit cost. This strategy fully utilizes acquisition reform initiatives such as: early partnering with industry; alpha contracting; leveraging industry investment; optimizing use of COTS and NDI; cost as an independent variable; and electronic data deliverables.

*RUG Phase I & Phase II

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0204136N** **PROJECT NUMBER: E2065**
PROGRAM ELEMENT TITLE: F/A-18 SQUADRONS **PROJECT TITLE: RADAR UPGRADE**

(U) E. SCHEDULE PROFILE:

	FY 1998	FY 1999	FY 2000	TO COMPLETE
(U) Program Milestones			1Q/PRE E&MD	3Q/06 MS-III
(U) Engineering Milestones			3Q/PDR	
(U) T&E Milestones	2Q/TECHEVAL PHASE II 3Q/FOT&E PHASE II			
(U) Contract Milestones				

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204136N PROJECT NUMBER: E2065
PROJECT TITLE: F/A-18 RUG

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
AESA Radar Contract	SS/TBD	BOEING St. Louis, MO	0	0		2,900	11/99	305,802	308,702	308,702
AESA Radar Software Development/Integration	WX	NAWCWD China Lake, CA	0	0		643	10/99	59,503	60,146	
AESA Radar Development	WX	NAWCAD Patuxent River, MD	0	0		50	10/99	4,460	4,510	
RUG PHASE I	SS/LTR(FPIF)	MDA St. Louis, MO	171,000	0		0		0	171,000	171,000
RUG PHASE II	CPIF	MDA St. Louis, MO	51,729	0		0		0	51,729	51,729
RUG PHASE II Integration	CPFF	MDA St. Louis, MO	11,000	0		0		0	11,000	11,000
Subtotal Product Development			**233,729**	**0**		**3,593**		**369,765**	**607,087**	
AESA Test & Evaluation	WX	NAWCAD Patuxent River, MD	0	0		50	10/99	4,460	4,510	
AESA Radar OPEVAL	WX	OPTEVFOR Norfolk, VA	0	0		0		10,621	10,621	

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204136N PROJECT NUMBER: E2065
PROJECT TITLE: F/A-18 RUG

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
RUG Upgrade Test & Evaluation	WX	NAWCWD China Lake, CA	48,014	0		0		0	48,014	
RUG UPGRADE OPEVAL	WX	COMOPTEVFOR	1,799	0		0		0	1,799	
RUG Upgrade Test & Evaluation	Various	Other Field Activities	4,815	0		0		0	4,815	
Subtotal Test & Evaluation			**54,628**	**0**		**50**		**15,081**	**69,759**	
AESA Contractor Support /Travel/Misc	Various	NAVAIR Patuxent River, MD	0			300	10/99	8,962	9,262	
RUG Contractor Support/Travel/Misc	Various	NAVAIR Patuxent River, MD	1,963	0		0	0	0	1,963	
Subtotal Management Services			**1,963**	**0**		**300**		**8,962**	**11,225**	
Total Cost			**290,320**			**3,943**		**393,808**	**688,071**	

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204136N
PROGRAM ELEMENT TITLE: F/A-18 SQUADRONS

PROJECT NUMBER: E2130
PROJECT TITLE: FOLLOW-ON VARIANT

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
E2130 Follow-On Variant	237,751	206,450	142,642	28,550	1,512	0	0	0	0	5,598,844

Quantity of RDT&E Articles 10

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The F/A-18 is a twin-engine, mid-wing, multi-mission, tactical aircraft employed in Navy and Marine Corps strike fighter squadrons. The F/A-18, through selected use of external equipment is designed for flexibility in fighter, attack, fleet air defense, and close air support roles. The F/A-18 E/F variant is an upgrade to the night attack "C" and "D" models. The F/A-18E/F will be the second major upgrade since the program's inception. The F/A-18 continues to adapt its strike fighter role to evolving threats into the next century. The F/A-18E/F E&MD program is under a Congressional mandated cost cap of $4.883B FY90 dollars. Pre-development efforts of $36.6M (in FY90 base year dollars), previously funded under the F/A-18 C/D program, is reflected in the RDT&E total, but is not included in the approved $4.883B development cap.

DATE: February 1999

BUDGET ACTIVITY: 7 | **PROGRAM ELEMENT: 0204136N** | **PROGRAM ELEMENT TITLE: F/A-18 SQUADRONS** | **PROJECT NUMBER: E2130** | **PROJECT TITLE: FOLLOW-ON VARIANT**

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

- (U) ($139,792) Continued engineering and manufacturing design activity in support of developmental flight test.
- (U) ($8,651) Continued to develop ground test support for integration; conducted Navy Program Review (NPR); completed engine Full Production Qualification (FPQ), and continued to procure GFE items required for developmental efforts.
- (U) ($87,308) Continued developmental flight testing; completed Developmental Test and Evaluation (DT-IIB) testing; started DT-IIC; started Operational Test & Evaluation (OT-IIA and OT-IIB).
- (U) ($2,000) Begin Test Program Set (TPS) development.

2. FY 1999 PLAN:

- (U) ($137,490) Continue engineering and manufacturing design activity in support of developmental flight test.
- (U) ($3,108) Continue to develop ground test support for integration as well as ongoing test and evaluation efforts.
- (U) ($56,106) Continue developmental flight testing, begin and complete DT-IID (TECHEVAL), and start DT-IIE and OT-IIC (OPEVAL).
- (U) ($6,000) Continue Test Program Set (TPS) development.
- (U) ($3,746) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204136N
PROGRAM ELEMENT TITLE: F/A-18 SQUADRONS

PROJECT NUMBER: E2130
PROJECT TITLE: FOLLOW-ON VARIANT

3. FY 2000 PLAN:

- (U) $87,200) Complete engineering and manufacturing design activity in support of developmental flight test and prepare for Milestone-III (MS-III) Decision Acquisition Board (DAB).
- (U) ($3,587) Continue ground testing support for integration as well as ongoing test and evaluation efforts.
- (U) ($41,855) Complete DT-IIE and OT-IIC (OPEVAL) and start OT-IIIA.
- (U) ($10,000) Continue Test Program Set (TPS) development.

DATE: February 1999

BUDGET ACTIVITY: 7 | PROGRAM ELEMENT: 0204136N | PROGRAM ELEMENT TITLE: F/A-18 SQUADRONS | PROJECT NUMBER: E2130 | PROJECT TITLE: FOLLOW-ON VARIANT

(U) B. PROGRAM CHANGE SUMMARY

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	260,068	216,607	145,214
(U) Appropriated Value:	241,536	216,607	
(U) Adjustments from 1999 President's Budget:	-22,317	-10,157	-2,572
(U) FY 2000 President's Budget Submit	237,751	206,450	142,642

CHANGE SUMMARY EXPLANATION:

(U) Funding: The net decrease of -$22,317 thousand in FY 1998 represents a reversal of anticipated reprogramming for EMD assumed in the President's Budget and -$3,683 thousand for reprogramming to other priorities. FY 1999 net decrease of -$10,157 thousand is the result of -$1,000 thousand for BTR 63105 for the VECTOR program, a -$5,000 thousand congressional adjustment, a -$498 thousand revised economic assessment and a -$3,659 balancing adjustment. The decrease in FY2000 of -$2,572 thousand is the result of an inflation adjustment of -$2,070 thousand and -$502 thousand for balancing adjustments.

(U) Schedule: FY1998 Full Production Qualification (FPQ) 4Q/98 moved to 1/Q99 to allow the test team time to fully develop the planned corrections required to address the F414 pop stall issues.

(U) FY 1999 Navy Program Review (NPR) 1Q/99 moved to 2Q/99 to allow for completion of F414 FPQ which was the last remaining exit criteria.

(U) Schedule: FY1998 1Q/OT-IIA, 3Q-4Q/OT-IIB were left off the FY 1999 President's Budget submit in error. The LRIP Contract Milestones were removed from the RDT&E Budget and are reflected in the F/A-18E/F APN budget.

(U) Technical: Not Applicable.

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204136N
PROGRAM ELEMENT TITLE: F/A-18 SQUADRONS

PROJECT NUMBER: E2130
PROJECT TITLE: FOLLOW-ON VARIANT

(U) C. OTHER PROGRAM FUNDING SUMMARY

Appn	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete
(U) A/C QTY	20	30	36	42	48	48	48	48	216
(U) APN1	2,106,362	2,870,628	2,854,229	2,890,594	3,073,708	3,105,247	3,242,645	3,344,223	14,057,797
(U) APN6	80,246	101,087	69,543	129,531	125,744	51,403	54,330	79,650	243,749

Related RDT&E

(U) PE 0207163N (AMRAAM)
(U) PE 0604727N (Joint Standoff Weapon System) (JSOW)
(U) PE 0604270N (EW Development)
(U) PE 0604777N (Navigation/ID System)
(U) PE 0305141D (Joint UAV)
(U) PE 0603261N (Tactical Airborne Reconnaissance)
(U) PE 0204163N (Fleet Communications)

DATE: February 1999

BUDGET ACTIVITY: 7 | PROGRAM ELEMENT: 0204136N | PROGRAM ELEMENT TITLE: F/A-18 SQUADRONS | PROJECT NUMBER: E2130 | PROJECT TITLE: FOLLOW-ON VARIANT

(U) D. ACQUISITION STRATEGY: The July 1992 award of the two RDT&E,N contracts to MDA (airframe) and General Electric (engine), both sole source cost plus incentive fee/award fee, effectively initiated the F/A-18E/F E&MD program. The airframe and engine contracts are incrementally funded through FY00 and FY99, respectively. In March 1997, the F/A-18E/F program received approval to enter the Low Rate Initial Production (LRIP) phase. The airframe and engine contracts for this phase are Cost Plus Incentive Fee (CPIF) for LRIP I and Fixed Price Incentive Fee (FPIF) for LRIP II and LRIP III. LRIP III is a priced option to the LRIP II contract. The LRIP II/III contract possesses a common incentive profit structure which affords contractors maximum opportunity to implement quality, reliability, and producibility improvements. Benefits of the F/A-18E/F LRIP contracts include: 1) a measurable profit incentive across the LRIP period of performance; 2) commercial-like long time relationship with contractors which tie customer (fleet) satisfaction to long term profitability; 3) progressive assumption of risk by the contractors; 4) a single negotiation for LRIP II and III.

(U) E. SCHEDULE PROFILE

	FY 1998	FY 1999	FY 2000
(U) Program Milestones	3Q/NPR	2Q/NPR	2Q/MS-III 4Q/IOC
(U) Engineering Milestones		1Q/ENG FPQ	
(U) T&E Milestones	1Q/OT-IIA 3Q-4Q/OT-IIB 3Q-4Q/DT-IIC	1Q-2Q/ DT-IID (TECHEVAL) 3Q/99 -1Q/00 OT-IIC (OPEVAL)	
(U) Contract Milestones			

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204136N PROJECT NUMBER: E2130
PROJECT TITLE: FOLLOW-ON VARIANT

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Pre-E&MD Activity	SS/CPFF	MDA St. Louis, MO	81,785	0		0		0	81,785	81,785
*Airframe E&MD	SS/CPIF/ AF	MDA St. Louis, MO	3,649,642	131,490	11/98	87,200	11/99	0	3,868,332	3,868,332
Airframe E&MD AWARD FEE (Note 1) non- add			(134,911)	(61,364)		(85,995)				
Contract OPEVAL Support	CPFF/BOA	MDA St. Louis, MO	7,910	6,000	11/98	0		0	13,910	13,910
*Pre-E&MD Activity	SS/CPFF	GE Lynn, MA	51,500	0		0		0	51,500	51,500
Engine E&MD	SS/CPIF/ AF	GE Lynn, MA	818,590	0		0		0	818,590	818,590
Engine E&MD AWARD FEE (Note 1) non-add			(49,455)							
Radar Integration	SS/CPFF	HUGHES LA, CA	6,329	0		0		0	6,329	6,329
Miscellaneous Development Efforts	Various	Other Contracts	20,619	0		0		0	20,619	20,619
Materials Development	WX	NAWCAD Warminster, PA	26,351	0		0		0	26,351	
Software Development	WX	NAWCWD China Lake, CA	52,159	2,028	10/98	2,615	10/99	2,472	59,274	
Support Equipment Development	WX	NAWCAD Lakehurst, NJ	29,584	6,000	10/98	10,000	10/99	7,200	52,784	
Maintenance Support Planning	WX	NADEP North Island, CA	10,540	0		0		0	10,540	
Avionics Support	WX	NAWCAD Indianapolis, IN	9,502	0		0		0	9,502	
Misc. Product Development/GFE	WX	Other Field Activities	113,905	0		0			113,905	
Subtotal Product Development			**4,878,416**	**145,518**		**99,815**		**9,672**	**5,133,421**	

Remarks Note 1: Award Fees included in the total contract value (Award fees are non-add)

***To date, 94% of the planned airframe award fee has been awarded and 95% of the planned engine award fee has been awarded.**

Subtotal Support Not Applicable			**0**	**0**		**0**		**0**	**0**	

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204136N PROJECT NUMBER: E2130
PROJECT TITLE: FOLLOW-ON VARIANT

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
OPEVAL	WX	OPTEVFOR Norfolk, VA	2,411	12,704	11/98	0		0	15,115	
Flying Qualities and Performance	MIPR	NASA Langley, AFB	7,156	0		0		0	7,156	
Integrated Test Team	WX	NAWCAD Patuxent River, MD	239,064	36,851	11/98	36,586	10/99	16,645	329,146	
Wind Tunnel	MIPR	Arnold Eng Development Center(AEDC) Tullahoma, TN	33,751	2,000	11/98	2,000	10/99	0	37,751	
Misc Test & Evaluation	Various	Other Field Activities	13,219	0		0		0	13,219	
Subtotal Test & Evaluation			**295,601**	**51,555**		**38,586**		**16,645**	**402,387**	
Contractor Support/Travel/Misc	Various	NAVAIR Patuxent River, MD	45,673	5,631	11/98	4,241	10/99	3,745	59,290	
Subtotal Management			**45,673**	**5,631**		**4,241**		**3,745**	**59,290**	
SBIR Assessment				3,746					3,746	
Total Cost			**5,219,690**	**206,450**		**142,642**		**30,062**	**5,598,844**	

EXHIBIT R-2, FY 2000 RDT&E,N PRESIDENT'S BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0204152N**
PROGRAM ELEMENT TITLE: E-2 SQUADRONS

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
E0463 - (E-2C Improvements)	36,985	9,783	4,048	6,544	6,570	6,805	6,999	7,174	continued	continued
E2321 – (E-2 Radar Modernization)	21,318	36,839	12,084	6,397	6,846	0	0	0	0	83,484
TOTAL	58,303	46,622	16,132	12,941	13,416	6,805	6,999	7,174	continued	continued
Quantity of RDT&E Articles	1	0	0	0	0	0	0	0	0	

(U)A. **MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: E-2C Improvements** provides pre-planned product improvements for the evolution of E-2C airborne weapon system capabilities in support of naval warfare command and control requirements. It has previously funded developments for the modification/replacement of selected weapon replaceable assemblies of current installed subsystems. This has resulted in a new baseline capability configuration referred to as Group II aircraft. The program has developed a Mission Computer Upgrade (MCU), applying on-going developments in data processing and target detection, which will relieve current bottlenecks in signal and data processing. The MCU will permit incorporation of additional functional capabilities to satisfy evolving operational requirements, e.g., Cooperative Engagement Capability (CEC), Satellite Communications (SATCOM), and permits the evolutionary growth of a Cruise Missile Defense (CMD) capability. The test article in FY98 is an MCU Engineering Manufacturing Development (EMD) Unit.

FY00-05: Technology insertion of new emergent systems and subsystems. This initiative allows for data collection and the evaluation of new technologies in the context of emerging missions and requirements including Cruise Missile Defense, Ballistic Missile Defense, littoral warfare, combat identification, and Single Integrated Air Picture as well as parts and systems obsolescence. Emphasis will be upon the following areas: participation in exercises to assess capabilities against emerging threats; identify deficiencies; identification of candidate solutions; and ground/airborne demonstrations of the identified technologies.

The Radar Modernization Program (RMP) is a Non-Acquisition Advanced Technology Transition Demonstration (ATTD). It initiates the application of new radar technologies which can be common to both seabased and landbased airborne early warning platforms, E-2C and E-3, to provide a definitive littoral Theater Air Missile Defense (TAMD) capability. Focused technologies developed in association with the RMP will be cost shared by the Navy and Air Force. Funding shown in the RMP includes the Navy cost share. Key technologies to be applied are Space-Time Adaptive Processing, an electronically scanable radar antenna with multi-channel rotary coupler, a solid state radar transmitter, and high dynamic range digital receivers. The resulting detection system will specifically provide an improved overland capability for TAMD, advanced auto detect and track, a single beam cue to a shooter, Non-Cooperative Target Recognition classification technologies, and continue to enhance E-2C CEC capabilities. These technologies and resultant equipment, demonstrated in ground environment in FY 1997, will also demonstrate in FY 1999, and be flight tested in FY 2001 and FY 2002 leading to an engineering change proposal (ECP) anticipated to start in 2003 for introduction into fleet aircraft.

(U) **JUSTIFICATION FOR BUDGET ACTIVITY**: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing operational systems.

EXHIBIT R-2a, FY 2000 RDT&E,N PRESIDENT'S BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0204152N** **PROJECT NUMBER: E0463**
PROGRAM ELEMENT TITLE: E-2 Squadrons **PROJECT TITLE: E-2C Improvements**

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
E0463 - (E-2C Improvements)	36,985	9,783	4,048	6,544	6,570	6,805	6,999	7,174	continued	continued
Quantity of RDT&E Articles	1									

(U) A. **MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:** E-2C Improvements provides pre-planned product improvements for the evolution of E-2C airborne weapon system capabilities in support of naval warfare command and control requirements. It has previously funded developments for the modification/replacement of selected weapon replaceable assemblies of current installed subsystems. This has resulted in a new baseline capability configuration referred to as Group II aircraft. The program has developed a Mission Computer Upgrade (MCU), applying on-going developments in data processing and target detection, which will relieve current bottlenecks in signal and data processing. The MCU will permit incorporation of additional functional capabilities to satisfy evolving operational requirements, e.g., Cooperative Engagement Capability (CEC), Satellite Communications (SATCOM), and permits the evolutionary growth of a Cruise Missile Defense (CMD) capability. The test article in FY98 is an MCU Engineering Manufacturing Development (EMD) Unit.

FY00-05: Technology insertion of new emergent systems and subsystems. This initiative allows for data collection and the evaluation of new technologies in the context of emerging missions and requirements including Cruise Missile Defense, Ballistic Missile Defense, littoral warfare, combat identification, and Single Integrated Air Picture as well as parts and systems obsolescence. Emphasis will be upon the following areas: participation in exercises to assess capabilities against emerging threats; identify deficiencies; identification of candidate solutions; and ground/airborne demonstrations of the identified technologies.

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0204152N** **PROGRAM ELEMENT TITLE: E-2 SQUADRONS** **PROJECT NUMBER: E0463** **PROJECT TITLE: E-2C IMPROVEMENTS**

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

1

- (U) $7,350k - Conducted DT/OT IIB
- (U) $5,192k - Completed CEC software interface
- (U) $5,568k - Completed Software System test for Build 1. Initiated Build 2.
- (U) $14,481k - Completed DT/OT-IIC Formal Qualification Testing.
- (U) $1,025k - Conducted Test Readiness Review for FY99 Technical Evaluation/Operational Evaluation (TECHEVAL/OPEVAL)
- (U) $3,369k - Completed test aircraft modifications.

2. FY 1999 PLAN:

- (U) $3,561k - Complete software system test for Build 2.
- (U) $432k - Conduct Production Readiness Review.
- (U) $5,715k - Conduct MCU TECHEVAL/OPEVAL.
- (U) $75k – Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2000 PLAN:

- (U) $4,048k – Collect sensor data. Down select technologies for demonstration. Perform demonstration of selected systems.

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204152N
PROGRAM ELEMENT TITLE: E-2 SQUADRON

PROJECT NUMBER: E0463
PROJECT TITLE: E-2C IMPROVEMENTS

(U) B. PROGRAM CHANGE SUMMARY

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	37,974	10,439	4,121
(U) Appropriated Value:	39,380	10,439	
(U) Adjustments from 1999 Pres Budget:	-989	-656	-73
(U) FY2000 PRES Budget Submit:	36,985	9,783	4,048

CHANGE SUMMARY EXPLANATION:

(U) Funding –
FY1998 decrease reflects a Small Business Innovation Research reduction of $1,589k & a Below Threshold Reprogramming increase of $600k.

FY1999 decrease reflects a $24k reduction for Revised Economic Assumption, a $15k reduction for minor pricing adjustments, and a $617k reduction for CAAS.

FY2000 decrease reflects a -$73k reduction for minor pricing adjustments.

(U) Schedule – Not Applicable.

(U) Technical – Not Applicable.

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0204152N** **PROGRAM ELEMENT TITLE: E-2C SQUADRONS** **PROJECT NUMBER: E0463** **PROJECT TITLE: E-2C IMPROVEMENTS**

(U) C. OTHER PROGRAM FUNDING SUMMARY

Appn	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete
APN 1/E-2C (LI #10 & 11)	311,569	397,278	383,016	315,917	260,991	211,730	0	0	0
APN 5/E-2C (LI #33)	44,005	83,563	28,201	26,907	14,802	2,878	65,638	65,502	0
APN 6/E-2C (LI #46)	6,017	16,978	12,497	4,968	7,617	10,114	0	0	0

Related RDT&E
(U) 0603658N (Ship Self Defense, Cooperative Engagement)

(U) C. ACQUISITION STRATEGY: Work will be led in-house. Necessary contractor support will be acquired in conjunction with already existing contracts.

(U) D. SCHEDULE PROFILE

	FY 1998	FY 1999	FY 2000	TO COMPLETE
(U) Program Milestones			1Q MCU OPEVAL 3Q MCU MSIII	
(U) Engineering Milestones				
(U) T&E Milestones	2Q/3Q MCU Qual Tests 3Q MCU DT/OT-IIB	2Q MCU DT/OT-IIB 4Q MCU DT/OT-IIC 4Q MCU TECHEVAL	Ground Demo 2Q MCU FRP	
(U) Contract Milestones				

DATE: February 1999

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

BUDGET ACTIVITY: 7 | PROGRAM ELEMENT: 0204152N | PROJECT NUMBER: E0463 | PROJECT TITLE: E-2C IMPROVEMENTS

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
PRODUCT DEVELOPMENT										
Hardware/Software Develop. – MCU	SS/CPIF	GAC, NY/FL	149,351	5,715	12/98	0		0	155,066	155,066
Hardware/Software Develop. - CEC/MCU	SS/CPFF	GAC, NY/FL	12,194	0		0		0	12,194	12,194
Hardware/Software Develop. – MCU	SS/CPFF	GAC, NY/FL	13,898	0		0		0	13,898	13,898
Hardware/Software Develop. Misc.- MCU	SS/CPFF	GAC, NY/FL	1,021	0		0		0	1,021	1,021
Hardware/Software Dev.-Prior Yr. Efforts		GAC, NY/FL	254,800	0		0		0	254,800	254,800
Subtotal Product Development			431,264	5,715		0		0	436,979	
SUPPORT										
Government Eng Support - MCU	WX/RC	NAWCAD PAX, MD	9,103	50	10/98	0		0	9,153	
Gov't Eng Support – Prior Yr. Efforts	WX/RC	NAWCAD PAX, MD	58,800	0		0		0	58,800	
Government Eng Support (Air 4.2) –MCU	WX	NAWCAD PAX, MD	247	150	10/98	0		0	397	
Subtotal Support			68,150	200		0		0	68,350	

GAC = GRUMMAN AEROSPACE CORPORATION

DATE: February 1999

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

BUDGET ACTIVITY: 7 | PROGRAM ELEMENT: 0204152N | PROJECT NUMBER: E0463 | PROJECT TITLE: E-2C IMPROVEMENTS

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
TEST & EVALUATION										
Test & Evaluation – MCU	WX/RC	NAWCAD PAX	25,343	1,528	10/98	0		0	26,871	
Test & Evaluation – MCU	WX	NAWCAD PAX	10,270	2,215	10/98	0		0	12,485	
Test & Evaluation - (Prior Yr. Effort)	WX	NAWCAD PAX	39,200	0		0		0	39,200	
Test & Evaluation – MCU	WX	PMRF, HAWAII	1,500	0		0		0	1,500	
Miscellaneous – MCU	MIPR	VARIOUS	670	0		0		0	670	
Test & Evaluation – IMPROV	WX/RC	NAWCAD PAX	0	0		684	10/99	4,373	5,057	
Test & Evaluation - IMPROV	WX	NAWCAD PAX	0	0		684	10/99	Continued	Continued	
Test & Eval. – CONTRACT /IMPROV	PD	TBD	0	0		2,680	10/99	21,716	24,396	24,396
Subtotal Test & Evaluation			76,983	3,743		4,048		Continued	Continued	
MANAGEMENT										
Management Support Services	WX/RX	NAWCAD PAX, MD	91	0	10/98	0		0	91	
TRAVEL	WX	NAWCAD PAX, MD	116	50	10/98	0		0	166	
Subtotal Management			207	50		0		0	257	
SBIR Assessment				75		0		0	75	
GRAND TOTAL			**576,604**	**9,783**		**4,048**		**Continued**	**Continued**	

DATE: February 1999

EXHIBIT R-2a, FY 2000 RDT&E,N PRESIDENT'S BUDGET PROJECT JUSTIFICATION SHEET

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204152
PROGRAM ELEMENT TITLE: E-2 SQUADRONS

PROJECT NUMBER: E2321
PROJECT TITLE: RADAR MODERNIZATION PROGRAM

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
E2321 E-2 RADAR MODERNIZATION PROGRAM	21,318	36,839	12,084	6,397	6,846	0	0	0	0	83,484
TOTAL	21,318	36,839	12,084	6,397	6,846	0	0	0	0	83,484

Quantity of RDT&E Articles: Not applicable.

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Radar Modernization Program (RMP) is a Non-Acquisition Advanced Technology Transition Demonstration (ATTD). It initiates the application of new radar technologies which can be common to both seabased and landbased airborne early warning platforms, E-2C and E-3, to provide a definitive littoral Theater Air Missile Defense (TAMD) capability. Focused technologies developed in association with the RMP will be cost shared by the Navy and Air Force. Funding shown in the RMP includes the Navy cost share. Key technologies to be applied are Space-Time Adaptive Processing, an electronically scanable radar antenna with multi-channel rotary coupler, a solid state radar transmitter, and high dynamic range digital receivers. The resulting detection system will specifically provide an improved overland capability for TAMD, advanced auto detect and track, a single beam cue to a shooter, Non-Cooperative Target Recognition classification technologies and continue to enhance E-2C CEC capabilities. These technologies and resultant equipment, demonstrated in ground environment in FY 1997, will also demonstrate in FY 1999, and be flight tested in FY 2001 and FY 2002 leading to an engineering change proposal (ECP) anticipated to start in 2003 for introduction into fleet aircraft.

DATE: February 1999

EXHIBIT R-2a, FY 2000 RDT&E,N PRESIDENT'S BUDGET PROJECT JUSTIFICATION SHEET

BUDGET ACTIVITY: 7 | **PROGRAM ELEMENT: 0204152** | **PROGRAM ELEMENT TITLE: E-2 SQUADRONS** | **PROJECT NUMBER: E2321** | **PROJECT TITLE: RADAR MODERNIZATION PROGRAM**

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:
   - (U) $5,548k - Developed the advanced common form factor modules for TAMD.
   - (U) $9,093k - Procured off the shelf flight test instrumentation.
   - (U) $3,346k - Start the integration and checkout (IACO) of flight instrumentation package for planned FY99 ground test.
   - (U) $3,331k - Completed aircraft integration concept design.
2. FY 1999 PLAN:
   - (U) $3,122k - Risk reduction, testing and data analysis of form factor modules.
   - (U) $4,421k - Complete integration and checkout of flight instrumentation package.
   - (U) $7,403k - Conduct ground testing at Pacific Missile Range Facility (PMRF).
   - (U) $5,478k - Design aircraft installation provisions for transition of flight hardware from ground tests to flight test vehicle.
   - (U) $4,187k - Conduct final design review.
   - (U) $11,337k - Initiate modification and fabrication of hardware for installation in flight vehicle C-130.
   - (U) $891k - Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

DATE: February 1999

EXHIBIT R-2a, FY 2000 RDT&E,N PRESIDENT'S BUDGET PROJECT JUSTIFICATION SHEET

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204152
PROGRAM ELEMENT TITLE: E-2 SQUADRONS

PROJECT NUMBER: E2321
PROJECT TITLE: RADAR MODERNIZATION PROGRAM

3. FY 2000 PLAN:

- (U) $4,906k - Complete modification and fabrication of hardware and installation provisions in C-130.
- (U) $7,178k - Start the IACO of full flight test system in C-130.

DATE: February 1999

EXHIBIT R-2a, FY 2000/2001 RDT&E,N PRESIDENT'S BUDGET PROJECT JUSTIFICATION SHEET

BUDGET ACTIVITY: 7 | **PROGRAM ELEMENT: 0204152** | **PROGRAM ELEMENT TITLE: E-2 SQUADRONS** | **PROJECT NUMBER: E2321** | **PROJECT TITLE: RADAR MODERNIZATION PROGRAM**

(U) B. PROGRAM CHANGE SUMMARY

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	24,556	37,358	20,659
(U) Appropriated Value:	25,472	37,358	
(U) Adjustments from 1999 Pres Budget:	-3,238	-519	-8,575
(U) FY 2000 OSD Budget Submit:	21,318	36,839	12,084

CHANGE SUMMARY EXPLANATION:

(U) Funding:
FY1998 decrease reflects a $1,038k reduction for SBIR, and a $2,200k reduction due to a BTR to assist SH-60R ALFS.

FY1999 decrease reflects an $86k reduction due to a Revised Economic Assumption, a $6k reduction for minor pricing adjustments, and a $427k reduction for CAAS.

FY2000 decrease reflects a net reduction of -$8,395k due to a rescope of RMP, as well as -$180K for minor pricing adjustments.

(U) Schedule: Program plan adjustments for FY1998 through FY2000 reflect a restructured integrated schedule.

(U) Technical: Not applicable.

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204152
PROGRAM ELEMENT TITLE: E-2 SQUADRONS

PROJECT NUMBER: E2321
PROJECT TITLE: RADAR MODERNIZATION PROGRAM

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

(U) Related RDT&E
(U) PE 0603238N (Global Surveillance Precision Strike and Advanced Technology) will fund the R&D effort to integrate existing RMP technologies at the Pacific Missile Range Facility (PMRF) for inclusion in TAMD.

(U) C. ACQUISITION STRATEGY: Not Applicable.

(U) D. SCHEDULE PROFILE: Not applicable. Non-acquisition program.

DATE: February 1999

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0204152** **PROJECT NUMBER: E2321**
PROJECT TITLE: RADAR MODERNIZATION PROGRAM

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
PRODUCT DEVELOPMENT										
Hardware/Software Develop.	SS/CPFF	CLASSIFIED	19,462	14,306	10/98	0		1,184	34,952	34,952
Hardware/Software Develop.	SS/CPFF	GAC, NY	0	17,942	11/98	9,684	10/99	2,559	30,185	30,185
Hardware/Software Develop.	MIPR	HANSCOMB AFB, MA	748	0		0		0	748	748
Hardware/Software Develop.	SS/CPFF	KIRKLAND AFB, TX	476	0		0		0	476	476
Subtotal Product Development			**20,686**	**32,248**		**9,684**		**3,743**	**66,361**	
SUPPORT										
Government Engineering Support	WR/WX	NAWCAD PAX, MD	332	1,465	10/98	550	10/99	1150	3,497	
Studies, Analysis, & Evaluation	CPFF	CLASSIFIED		150	10/98	165	10/99	345	660	660
Subtotal Support			**332**	**1,615**		**715**		**1,495**	**4,157**	
TEST & EVALUATION										
Test & Evaluation	WX/WR	NAWCAD PAX, MD	0	1,700	10/98	1,300	10/99	7,200	10,200	
Engineering & Tech Services	CPFF	CLASSIFIED	265	300	10/98	330	10/99	690	1,585	1,585
Subtotal Test & Evaluation			**265**	**2,000**		**1,630**		**7,890**	**11,785**	
MANAGEMENT										
Management Support Service	CPFF	CLASSIFIED	0	50	10/98	55		115	220	220
Travel	WX	NAWCAD PAX, MD	35	35	10/98	0		0	70	
Subtotal Management			**35**	**85**		**55**		**115**	**290**	
SBIR Assessment				**891**		0		0	**891**	
Total Cost			**21,318**	**36,839**		**12,084**		**13,243**	**83,484**	

BUDGET ACTIVITY: 7
PROGRAM ELEMENT: 0204163N
PROGRAM ELEMENT TITLE: FleetCommunications

COST ($ in Thousands)		FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
X0725	Communication Automation	708	1,798	1,147	1,884	1,931	1,980	2,028	2,077	CONT	CONT
X2074	Communication Support Systems	1,505	0	0	0	0	0	0	0		
X1083	Shore to Ship Communications System	11,830	13,592	8,108	7,763	6,898	7,090	7,257	7,427	CONT	CONT
X0795	Support of MEECN	452	722	692	706	719	733	750	767	CONT	CONT
Total P.E. Cost		14,495	16,112	9,947	10,353	9,548	9,803	10,035	10,271	CONT	CONT

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:
The Communications Automation Program (NAVMACS II/SMS) develops joint/combined individual and organizational message handling to US Naval ships, USMC Vans, and selected MSC and USCG platforms. NAVMACS II/SMS develops fleet interface to DMS and legacy ashore messaging systems. The Communications Support Systems (CSS) develops the architecture for an integrated Navy communication system for Ship-to-Shore and Shore-to-Ship communications defined as the Copernicus TADIXS and prototypes early operational capabilities and incremental implementation and fielding of CSS capabilities. The Shore to Ship Communications System develops communications systems elements which provide positive command and control of deployed ballistic missile submarines (SSBNs). Minimum Essential Emergency Communications Network (MEECN) is the Tri-Service transmission system which ensures delivery of Emergency Action Messages (EAM) to our strategic platforms.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing, operational systems

B. (U) PROGRAM CHANGE SUMMARY: FY 1998: Reflects a $-259K SBIR reduction, a FY98 Update -$674K, C41 RDT&E,N Ezpenditure Carryover - $70K, $-2,272K BTR reduction, and $1,809 Pending Reprogramming. FY 99-00: Reflects a $+300K increase due to reallignment of TACAMO funding to CEP, a $-698K reduction for C4I expenditure carryover, and $-174 miscellaneous reductions.

C. (U) OTHER PROGRAM FUNDING SUMMARY: See individual projects.

D. (U) ACQUISTION STRATEGY: See individual projects.

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204163N
PROGRAM ELEMENT TITLE: FleetCommunications

E. (U) SCHEDULE PROFILE: See individual projects.

Exhibit R-2a, RDT&E,N Project Justification Date: FEB 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204163N PROGRAM ELEMENT TITLE: FleetCommunications PROJECT NUMBER: (X0725) PROJECT TITLE: Communication Automation

Cost ($ in Thousands)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
X0725 Communications Automation	708	1,798	1,147	1,884	1,931	1,980	2,028	2,077	CONT	CONT

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:
This project is a continuing program that provides for automation and communications upgrades for Fleet tactical users. The Naval Modular Automated Communications System II (NAVMACS II) is the network centric Single Messaging Solution (SMS) for the processing, storage, distribution and forwarding of DMS organizational and individual messages to the user's desktop throughout the IT-21 LAN/WAN.

PROGRAM ACCOMPLISHMENTS AND PLANS:

- FY 1998 ACCOMPLISHMENTS:

($708) NAVMACS II/SMS: Continued DMS Tactical Afloat efforts. Continued accommodation to C3 technology. Integrated PC technology. Drafted SMS CONOPS. Began SMS product evaluation. Developed SMS test strategy, test plan and test schedule. Began development of design documents.

- FY 1999 PLAN:

($1,798) NAVMACS II/SMS: Continue DMS Tactical Afloat research and development efforts. Provide test and evaluation of DMS components and protocols in SMS/IT-21 network centric environment. Integrate DMS components and protocols with SMTP and other legacy protocols. Conduct intersystem integration and testing for shipboard SMS. Begin FAMIS interface testing of Smart-push/Warrior-pull with P-MUL broadcast. Continue accommodation to C3 technology including migration to WIN NT DII/COE compliant environment.

- FY 2000 PLAN:

($1,147) Continue Tactical DMS/SMS afloat migration efforts. Continue accommodation of emergent technology including Navy Virtual Internet (NVI). Conclude FAMIS interface testing of Smart-push/Warrior-pull and P-MUL broadcast. Conduct integration and evaluation of messaging High Assurance Guard (HAG). Conduct fleet developmental testing of SMS.

BUDGET ACTIVITY: 7
PROGRAM ELEMENT: 0204163N
PROGRAM ELEMENT TITLE: FleetCommunications
PROJECT NUMBER: (X0725)
PROJECT TITLE: Communication Automation

PROGRAM CHANGE SUMMARY: FY 98: Reflects a $-19K SBIR transfer, a $-836K BTR reduction, and $-37K miscellaneous reductions. FY 99-00: Reflects $-698K reduction due to C4I RDT&E Expenditure Carryover and $-10K miscellaneous reductions.

B. OTHER PROGRAM FUNDING SUMMARY:

	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Complete	Total Cost
OPN Line 3050 – Ship Comm Auto - NAVMACS	5,396	23,698	18,679						CONT	CONT
O&MN 4A6M – NAVMACS	600	600	1,491						CONT	CONT

C. Acquisition Strategy: N/A
D. Schedule Profile: N/A

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204163N PROJECT NUMBER: (X0725)

Exhibit R-3 Cost Analysis (page 1)									Date: February 1999			
APPROPRIATION/BUDGET ACTIVITY 7			PROGRAM ELEMENT Fleet Communications 0204163N						PROJECT NAME AND NUMBER: X0725 Communications Automation			
Cost Categories	Contract Method & Type	Performing Activity & Location	Total FY98 & PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	FY01 Cost	FY01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
240 Engineering Development	WX	SSC, San Diego	708	493	12/98	150	12/99			CONT	CONT	CONT
240 Engineering Development	CPFF	Lockheed Martin	0	0		100	12/99			CONT	CONT	CONT
240 Engineering Development	Various	Various Labs	0	120	12/98	0				CONT	CONT	CONT
240 Engineering Development	WX	SSC Charleston	0	950	12/98	540	12/99			CONT	CONT	CONT
240 Engineering Development	CPFF	SEMCOR	0	145	12/98	125	12/99			CONT	CONT	CONT
Subtotal Product Development			708	1,708		915						
Remarks:												
Subtotal Support												
Remarks												

Exhibit R-3, RDT&E, N Project Cost Analysis Date: FEB 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204163N PROJECT NUMBER: (X0725)

Cost Categories	Contract Method & Type	Performing Activity & Location	FY 98 and Prior	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	FY01 Cost	FY01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
400 System T&E	Various	Various	0	0	Var	150	Var			CONT	CONT	CONT
Subtotal T&E				0		150						
Remarks												
210 Project Management	WX	SSC, San Diego		90	12/99	82	12/99			CONT	CONT	CONT
Subtotal Management				90		82						
Remarks												
Total Cost			708	1,798		1,147						
Remarks												

BUDGET ACTIVITY: 7
PROGRAM ELEMENT: 0204163N
PROGRAM ELEMENT TITLE: FleetCommunications
PROJECT NUMBER: (X2074)
PROJECT TITLE: Communication Support Systems

Cost ($ in Thousands)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
X2074 Communication Support Systems	1,505	0	0	0	0	0	0	0	0	0

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION

(U) This project was an initiative to develop the Copernicus architecture and implementation concept, an integrated Navy information system architecture based on shared use of links and multimedia networks. It provides increased communication survivability, throughput and security. The Copernicus system concept further integrates the approach to research, development, acquisition, and deployment of a total Command, Control and Communications Intelligence (C3I) system supporting Navy missions. The work performed was a system engineering effort that generated engineering solutions and guidelines, prototyping and early operational capabilities, and transition plans for incremental fielding involving all current and planned Navy communication systems.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 ACCOMPLISHMENTS:

- (U) ($72K) Built, tested, demonstrated and supported fielding of JMCOMS Build 3. (Consisting of various ship and shore versions of the Automated Digital Network System (ADNS)).
- (U) ($1,433) Built, tested, demonstrated and supported fielding of ADNS Afloat Build 2.0 and Submarine Build 2.0 which is a segment of JMCOMS Build 3.

2. (U) FY 1999 PLAN: N/A

3. (U) FY 2000 PLAN: N/A

(U) CHANGE SUMMARY EXPLANATION: FY 1998: Reflects a $-40K SBIR transfer, BTR reduction -$1,081K, C41 RDT&E Expenditure Carryover -$70K, FY98 Update -$459K and a Pending Reprogramming of +$1,409K.

BUDGET ACTIVITY: 7
PROGRAM ELEMENT: 0204163N
PROGRAM ELEMENT TITLE: FleetCommunications
PROJECT NUMBER: (X2074)
PROJECT TITLE: Communication Support Systems

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

B. (U) OTHER PROGRAM FUNDING SUMMARY: N/A

(U) RELATED RDT&E,N: PE 0205604N (Tactical Data Links)
PE 0303109N (Satellite Communications)
PE 0303140N (Information Systems Security Plan)

C. (U) ACQUISITION STRATEGY: Not applicable.

D. (U) SCHEDULE PROFILE: Not applicable.

Exhibit R-2a, RDT&E,N Project Justifcation Date: FEB 1999

BUDGET ACTIVITY: 7
PROGRAM ELEMENT: 0204163N
PROGRAM ELEMENT TITLE: FleetCommunications
PROJECT NUMBER: X1083
PROJECT TITLE: Shore to Ship Communication System

Cost ($ in Thousands)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
X1083 Shore to Ship Communications System	11,830	13,592	8,108	7,763	6,898	7,090	7,257	7,427	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

This project develops communications systems elements which provide positive command and control of deployed ballistic missile submarines (SSBNs). This program provides enhancements to the shore-to-ship transmitting systems, shipboard receiver systems, and development of the Submarine Low Frequency (LF)/Very Low Frequency (VLF) Versa Module Eurocard (VME) Receiver (SLVR) System (formerly the Advanced VLF/LF VME Receiver (AVR) System). Continuing evaluation of this communications system is provided via the Strategic Communications Assessment Program (SCAP). Fixed VLF/LF develops an energy efficient, solid state, power amplifier replacement (SSPAR)for the VLF shore based transmitters of the Submarine Broadcast System, investigates improvement of the radio frequency high voltage insulators, bushings and antenna components used in these stations through the High Voltage Insulator Program (HVIP) and measures and signal propagation through the Coverage Prediction Improvement Program (CPIP).

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

FY 1998 ACCOMPLISHMENTS:

- ($350) Continued High Voltage and antenna component development and test.
- ($6,257) Completed SLVR OPEVAL, Milestone III, and continue integration and laboratory test of the KG-38 replacement and SLVR P3I.
- ($1,345) SCSS Phase II integration.
- ($3,624) Continued SCAP and continuing evaluation (CEP)
- ($254) Developed and updated Naval Command, Control, Communications, Computers, Intelligence, Sensors and Reconnaissance (C4ISR) implementation guidance.

BUDGET ACTIVITY: 7
PROGRAM ELEMENT: 0204163N
PROGRAM ELEMENT TITLE: FleetCommunications
PROJECT NUMBER: X1083
PROJECT TITLE: Shore to Ship Communication System

FY 1999 PLAN:

- ($257) Continue high voltage and antenna component development and test.
- ($6,074) Develop the ELF, Signal Processing and KOV-17 integration into SLVR.
- ($898) Complete SCSS Phase II integration.
- ($3,634) Continue SCAP and conduct continuing evaluations (CEP).
- ($2,729) Install and test SSPAR Engineering and Manufacture Development Model at NCTAMSLANT Det, La Moure, N.D.

FY 2000 PLAN:

- ($357) Continue high voltage and antenna component development and test.
- ($2,922) Continue development of the ELF and Signal Processing integration into SLVR..
- ($1,858) Begin SCSS 01.0 Phase integration and implementation.
- ($2,971) Continue SCAP and conduct continuing evaluations (CEP).

Exhibit R-2a, RDT&E,N Project Justifcation Date: FEB 1999

BUDGET ACTIVITY: 7
PROGRAM ELEMENT: 0204163N
PROGRAM ELEMENT TITLE: FleetCommunications
PROJECT NUMBER: X1083
PROJECT TITLE: Shore to Ship Communication System

(U) PROGRAM CHANGE SUMMARY: FY 1998: Reflects a $-188K SBIR reduction, a$-355K BTR reduction, and $-161K miscellaneous reductions and a Pending Reprogramming of +$400K.. FY 99-00: Reflects a $+300K increase due to reallignment of TACAMO funding to CEP , CAAS reduction -$97K and $-60K miscellaneous reductions.

B. (U) OTHER PROGRAM FUNDING SUMMARY

	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Complete	Total Cost
*OPN Line 3107 Shore LF	7,456	12,975	36,361						CONT	CONT
OPN Line 3147 Advanced VLF Receiver	7,353	17,100	0						CONT	CONT
O&MN 4A6M	21,360	16,202	18,378						CONT	CONT

***This program consolidates OPN P-1 Line Item Advanced VLF Receiver beginning in FY00.**

C. (U) ACQUISITION STRATEGY:

	FY 1998	FY 1999	FY 2000
Program Milestones	3Q SLVR MS III		
T&E Milestones	1Q SLVR OPEVAL (OT-IIB)	1Q SLVR P3I (OT-III)	

D. (U) SCHEDULE PROFILE: See paragraph C.

FY 2000 President's Budget Estimates

Exhibit R-3, RDT&E,N Project Cost Analysis Date: FEB 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204163N PROJECT NUMBER: X1083

Cost Categories	Contract Method & Type	Performing Activity & Location	FY 98 and Prior	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	FY01 Cost	FY01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
240 Engineering Support	CPIF	Rockwell, Richardson, TX	13,468	2,729	12/93	0	12/93			$21.1M		$21.1M
240 Engineering Support	CPFF	APL/JHU Baltimore, MD	16,826	3,634	10/97	2,971	10/99			CONT	CONT	CONT
240 Engineering Support	WR	NCCOSC, San Diego, CA	23,494	5,538	10/95	2,661	10/95			CONT	CONT	N/A
240 Engineering Support	WR	Miscellaneous Labs, NUWC	3,786	898	10/95	1,858	10/95			CONT	CONT	N/A
240 Engineering Support	WR	U.S. Army, Monmouth, NJ	3,172	0	2/96	0	N/A				0	N/A
240 Engineering Support	Various	Various	0	0	N/A	0	N/A				0	
Subtotal Product Development			60,746	12,799		7,490						
Remarks:												
Subtotal Support												
Remarks												

R-1 Shopping List - Item No 156-12 of 156-16

FY 2000 President's Budget Estimates

Exhibit R-3, RDT&E,N Project Cost Analysis Date: FEB 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204163N PROJECT NUMBER: X1083

Cost Categories	Contract Method & Type	Performing Activity & Location	FY 98 and Prior	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	FY01 Cost	FY01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
400 System T&E	Various	Various	400	0	N/A	0	N/A					
Subtotal T&E			400	0		0						
Remarks												
210 Program Management	Various	Various	2,241	793	N/A	618	N/A			CONT		
Subtotal Management			2,241	793		618						
Remarks												
Total Cost			63,387	13,592		8,108						
Remarks												

Exhibit R-2a, RDT&E,N Project Justification Date: FEB 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204163N PROJECT NUMBER: X0795
PROGRAM ELEMENT TITLE: FleetCommunications PROJECT TITLE: MEECN

Cost ($ in Thousands)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
X0795 MEECN	452	722	692	706	719	733	750	767	CONT	CONT

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION

Support of Minimum Essential Emergency Communications Network (MEECN). MEECN is the Tri-Service transmission system which ensures delivery of Emergency Action Messages (EAMs) to our strategic platforms. Because of substantial downsizing in the number of MEECN assets, such as the CINC Airborne Command Post (ABNCP) fleet, it is necessary to improve the range, timeliness and reliability of MEECN communications to maintain connectivity to the platforms. This project identifies, researches, and develops improvements to the MEECN primarily in the Very Low Frequency and Low Frequency (VLF/LF) ranges of MEECN. The MEECN Message Processing Mode (MMPM), which reduces transmission time while improving message delivery reliability at greater ranges, was developed under this project and is being implemented in the MEECN VLF/LF Systems. The new High Data Rate (HIDAR) mode, which greatly reduces message transmission time while providing the performance of low data rate modes, has been deployed. Potential improvements in mode design and signal processing are continually being investigated for MEECN application.

FY 1998 ACCOMPLISHMENTS:

- ($212) Completed MITB development.
- ($146) Continued Turbo Code application to MEECN Modes.
- ($50) Continued atmospheric noise data collection and analysis.
- ($20) Supported SLVR and MMRT MMPM and HIDAR certification testing in the MITB.
- ($15) Continued crypto replacement coordination.
- ($9) Developed and updated Naval Command, Control, Communications, Computers, Intelligence, Sensors and Reconnaissance (C4ISR) implementation guidance.

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204163N PROJECT NUMBER: X0795
PROGRAM ELEMENT TITLE: FleetCommunications PROJECT TITLE: MEECN

FY 1999 PLAN:

- ($291) Continue Turbo Code application to MEECN Modes.
- ($215) Initiate development of improved MEECN Mode.
- ($161) Initiate study to integrate NONAP and Signal Separator AJ algorithms.
- ($40) Investigate HIDAR/Block II compatibility.
- ($15) Continue crypto replacement coordination.

FY 2000 PLAN:

- ($306) Complete Turbo Code application to MEECN Modes.
- ($204) Continue development of improved MEECN Mode.
- ($167) Continue study to integrate NONAP and Signal Separator AJ algorithms.
- ($15) Continue crypto replacement coordination.

(U) PROGRAM CHANGE SUMMARY: FY 98: Reflects a $-12K SBIR reduction, a $-6K BTR reduction, and $-11K miscellaneous reductions. FY 99-00: Reflects $-7K miscellaneous reductions.

Exhibit R-2a, RDT&E,N Project Justification Date: FEB 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204163N PROJECT NUMBER: X0795
PROGRAM ELEMENT TITLE: FleetCommunications PROJECT TITLE: MEECN

B. (U) OTHER PROGRAM FUNDING SUMMARY

	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Complete	Total Cost
O&MN 4A6M	312	352	715						CONT	CONT

C. (U) ACQUISITION STRATEGY: Not applicable.

D. (U) SCHEDULE PROFILE: Not applicable.

EXHIBIT R-2, FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204229N
PROGRAM ELEMENT TITLE: TOMAHAWK AND THEATER MISSION PLANNING CENTER

COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
A0545 Tomahawk	$98,776	$163,123*	$145,317	$107,895	$51,598	$33,243	$10,833	$11,164	Continuing	Continuing
A1784 Theater Mission Planning Center	$2,903	$2,562	$1,906	$1,891	$22	$28	$28	$28	0	$96,816
TOTAL	**$101,679**	**$165,685**	**$147,223**	**$109,786**	**$51,620**	**$33,271**	**$10,861**	**$11,192**	**Continuing**	**Continuing**
Quantity of RDT&E Articles			6 EDM	6 EDM						

*FY99 budget reflects Congressional Realignment of $98.573M for the Tactical Tomahawk Program (A2658) and $1M Congressional Add for Alternate Turbine Engine (A2659).

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

(U) The TOMAHAWK Weapons System (TWS) provides the Tomahawk cruise missile attack capability against targets on land (Tomahawk Land Attack Missile (TLAM)). The TLAM can be fitted with either Conventional unitary warhead (TLAM/C), Nuclear warhead (TLAM/N) or submunition Dispenser (TLAM/D). This program ensures that the TWS exploits state-of-the-art technology to preserve the efficiency of this proven weapon system.

(U) The Tomahawk project includes all missile development; mission planning system development, and submarine and surface ship weapons control development.

(U) The Tomahawk TLAM Block III system upgrade (IOC March 93) incorporated the Global Positioning System (GPS) capability; provided a smaller, lighter warhead with variable fuze, extended range, Time of Arrival, and improved accuracy for low contrast matching of Digital Scene Matching Area Correlator. The Tactical Tomahawk (TT) Weapons program, beginning in FY 1998, will provide the tactical commander a quick reaction response capability as well as improved flexibility, accuracy, and lethality.

(U)The Theater Mission Planning Center (TMPC) project provides for the TMPC and the Afloat Planning System (APS), a shipboard version of TMPC. TMPC and APS provide mission planning and employment support information for both the nuclear (TMPC only) and conventional TLAM. The TMPC/APS software development decreases mission planning time and increases the quality and accuracy of each mission. TMPC provides mission planning at the theater level and is designed for high rate production responsive to national/strategic requirements. APS provides mission planning at the Battle Group level that is responsive to the needs of the tactical situation. Tomahawk Strike Planning Tools are comprised of two elements. The Mission Distribution System (MDS) is a subset of TMPC, and APS also deployed as the stand-alone TLAM employment system, that support the effective employment of TLAM by the Force Level Tomahawk Strike Coordinator (TSC). The Electronic Tomahawk Employment Planning Package (ETEPP) provides the Tomahawk user with command and control information needed to employ Tomahawk missions.

(U) These efforts provide battle-group tactical flexibility and responsiveness while maximizing TWS wartime capability.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing operational systems.

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204229N
PROGRAM ELEMENT TITLE: TOMAHAWK AND THEATER MISSION PLANNING CENTER

PROJECT NUMBER: A0545
PROJECT TITLE: TOMAHAWK

COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
A0545 Tomahawk	$98,776	$163,123*	$145,317	$107,895	$51,598	$33,243	$10,833	$11,164	Continuing	Continuing
TOTAL	**$98,776**	**$163,123***	**$145,317**	**$107,895**	**$51,598**	**$33,243**	**$10,833**	**$11,164**	**Continuing**	**Continuing**
Quantity of RDT&E Articles			6 EDM	6 EDM						

*FY99 budget reflects Congressional Realignment of $98.573M for the Tactical Tomahawk Program (A2658) and $1M Congressional Add for Alternate Turbine Engine (A2659).

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

(U) The TOMAHAWK Cruise Missile has been designed to accurately attack land targets from seaborne platforms at great distances from the launch platform (Tomahawk Land-Attack Missile (TLAM)). The TLAM can be produced with either a single conventional warhead (TLAM/C), a submunition dispenser (TLAM/D), or a nuclear warhead (TLAM/N).

(U) The Tomahawk development program (Project A0545), beginning with FY 1998, contains all costs for the Tactical Tomahawk (TT) program including the missile, weapons control systems, both surface ship and submarine, and the Tomahawk command and control systems (TC2S).

(U) The last fielded upgrade to the Tomahawk system was designated Block III. This effort added a GPS capability, a smaller, lighter warhead, a time of arrival calculation, added range, and an updated Digital Scene Matching Area Correlator for low contrast matching. The missile development covered by this budget, Tactical Tomahawk provides a comprehensive baseline upgrade to the Tomahawk Weapon System including the missile, weapons control systems, and mission planning systems. The upgrade will improve system flexibility, responsiveness, accuracy and lethality. The essential elements of the TT are upgrades to the guidance, navigation, control, and mission computer systems of the missile along with the associated Command and Control (C2) systems and weapons control systems. TT will provide a UHF Satcom data link to enable the missile to receive in-flight mission modification messages, to transfer health and status messages, and to broadcast Battle Damage Assessment/Battle Damage Indication (BDA/BDI) messages. TT also includes the development of a high anti-jam GPS receiver and antenna system for the missile.

(U) The weapons control development portion of the project is centered on the Advanced Tomahawk Weapons Control System (ATWCS), being introduced into the surface and submarine fleets. The ATWCS advancements are increase data throughput thereby reducing the time needed to execute missile preparation and launch sequences, and improving strike coordination capabilities.

DATE: February 1999

BUDGET ACTIVITY: 7 | PROGRAM ELEMENT: 0204229N | PROGRAM ELEMENT TITLE: TOMAHAWK AND THEATER MISSION PLANNING CENTER | PROJECT NUMBER: A0545 | PROJECT TITLE: TOMAHAWK

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:
   [$4,129] Continued development of Sub-ATWCS for Combat Control System MK2 Program Block 1C.
   Delivered engagement planning Interface Definition Language prototype and engineering build software of Sub-ATWCS for Block 1C.
   [$94,647] April, 1998, permission from Navy, OSD, and Congress received to transition from Tomahawk Baseline Improvement Program (TBIP) to Tactical Tomahawk Program. Continued all C2 development through Critical Design Review (CDR) and began coding software.

2. FY 1999 PLAN:
   [$4,200] Develop and deliver software for SSN 688 MK2 Block 1C Mod 0/1 and Mod 2.
   [$155,531] Continue TT Engineering and Manufacturing Development including mission planning and weapons control development.
   [$3,392] Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2000 PLAN:
   [107,214] Continue development of Tactical Tomahawk missile leading to System CDR
   Continue missile prototype fabrication and ground testing to begin Development Testing (DT-1, 2) in 2001.
   [$38,103] Continue development of common launch and track control systems for surface ship and submarine platforms for the new Tactical Tomahawk baseline. Critical Design Review leading to Development Testing of entire system in 2001.

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204229N
PROGRAM ELEMENT TITLE: TOMAHAWK AND THEATER MISSION PLANNING CENTER

PROJECT NUMBER: A0545
PROJECT TITLE: TOMAHAWK

(U) B. PROGRAM CHANGE SUMMARY

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	$85,768	$64,159	$36,514
(U) Appropriated Value:	$88,417	$163,732	
(U) Adjustments from President's Budget:	$13,008	$98,964	$108,803
(U) FY2000 President's Budget Submit:	$98,776	$163,123	$145,317

CHANGE SUMMARY EXPLANATION:

(U) Funding: FY98 net increase of +$13,008 thousand consists of an increase of +$19,600 thousand for Above Threshold Reprogramming for Tactical Tomahawk; and decreases of -$1,857 thousand for Small Business Innovative Research reduction, -$4,424 thousand for the Navy's reprioritization of requirements and -$311 thousand for canceled account adjustments. FY99 net increase of +$98,964 thousand consists of increases of +$98,573 thousand for Tactical Tomahawk Congressional Realignment, +$1,000 thousand for Alternate Turbine Engine Congressional Add; and decreases of -$ 377 for inflation adjustments, -$133 thousand for undistributed Congressional reductions, and -$99 thousand for minor programmatic adjustments. FY00 net increase of +$109,090 thousand consists of +$110,895 thousand from prior Congressional realignment action for Tactical Tomahawk and +$13 thousand for miscellaneous rate adjustments; and decreases of -$2,105 thousand for inflation adjustments.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

DATE: February 1999

BUDGET ACTIVITY: 7 | PROGRAM ELEMENT: 0204229N | PROGRAM ELEMENT TITLE: TOMAHAWK AND THEATER MISSION PLANNING CENTER | PROJECT NUMBER: A0545 | PROJECT TITLE: TOMAHAWK

(U) C. OTHER PROGRAM FUNDING SUMMARY (Dollars in Thousands)

Appn	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
WPN	$26,305	$33,001	$50,894	$59,556	$92,153	$141,480	$195,177	$294,510	Continuing	Continuing
OPN	$63,093	$101,548	$87,857	$74,701	$72,360	$63,367	$65,339	$67,100	Continuing	Continuing

Related RDT&E

Not applicable.

(U) D. ACQUISITION STRATEGY:

In 1998 the Tomahawk Baseline Improvement Program (TBIP) transitioned to the Tactical Tomahawk program. This program is outlined in the Class Justification and approval (CJ&A No AIR-22448) signed by the Under Secretary of the Navy on 29 May 1998. The acquisition strategy, in brief, is to transition the on-going Tomahawk Baseline Improvement Program (TBIP) to Tactical Tomahawk (TT). The Tactical Tomahawk development program will be a cost sharing arrangement between the Government and the Contractor to add capability to the missile. The resulting production contract incentivizes a significant reduction in price for the manufactured items. In order to be cost effective the price of the manufactured items must be significantly lower than the cost of remanufacturing a Block II or Block III missiles.

DATE: February 1999

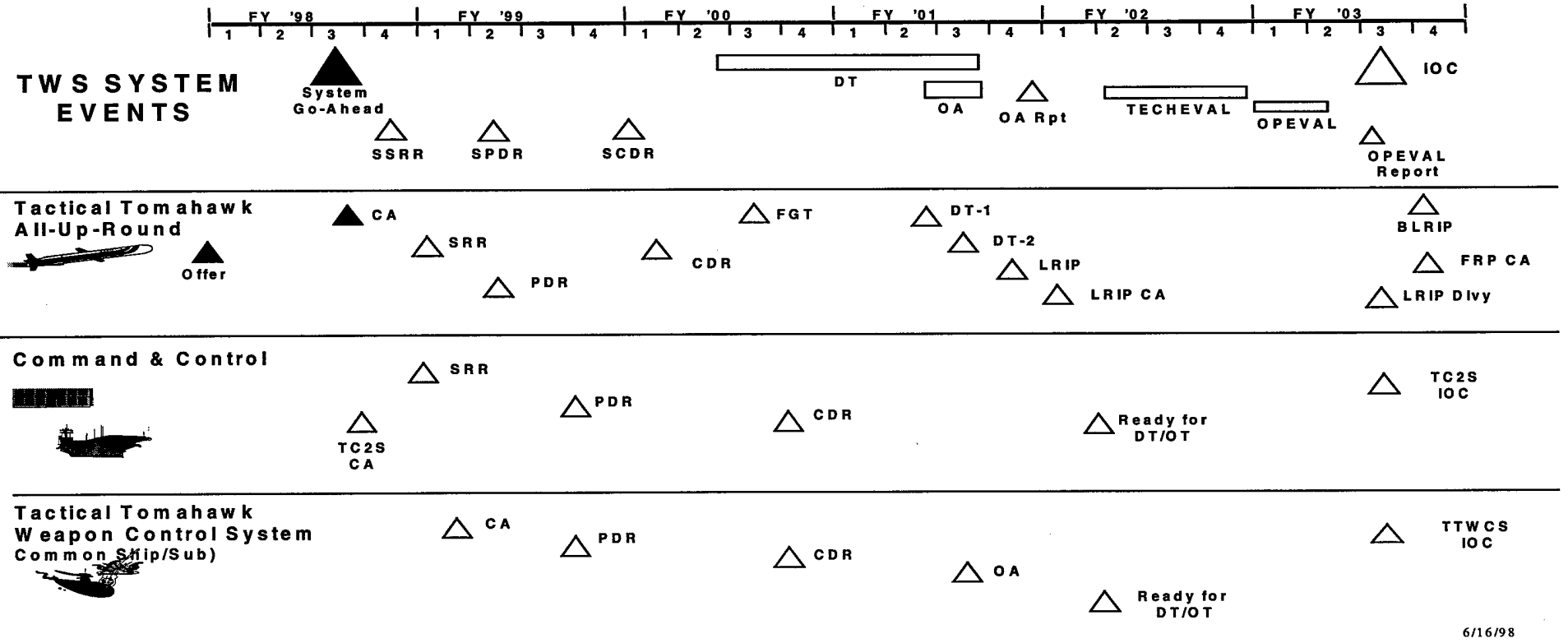
BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204229N
PROGRAM ELEMENT TITLE: TOMAHAWK AND THEATER MISSION PLANNING CENTER

PROJECT NUMBER: A0545
PROJECT TITLE: TOMAHAWK

E. Schedule Profile

TACTICAL TOMAHAWK PROGRAM MASTER SCHEDULE



DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204229N
PROGRAM ELEMENT TITLE: TOMAHAWK AND THEATER MISSION PLANNING CENTER

PROJECT NUMBER: A0545
PROJECT TITLE: TOMAHAWK

Definitions

SSRR - System Software Requirements Review
SPDR - System Preliminary Design Review
SCDR- System Critical Design Review
DT- Development Test
OT - Operational Test
IOC - Initial Operational Capability
CA - Contract Award
FRP CA - Full Rate Production Contract Award
LRIP - Low Rate Initial Production
SRR - Software Requirements Review
PDR - Preliminary Design Review
CDR- Critical Design Review
OA - Operational Assessment
CCS ECP - Submarine Combat and Control System Engineering Change Proposal
LBSIT - Land-Based System Integration Test
SBSIT - Ship-based System Integration Test
SDCT - System Design Connectivity Test
TRR - Test Readiness Review

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7 | **PROGRAM ELEMENT: 0204229N** | **PROJECT NUMBER: A0545**

PROGRAM ELEMENT TITLE: TOMAHAWK AND THEATER MISSION PLANNING CENTER | **PROJECT TITLE: TOMAHAWK**

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development										
All Product Development Costs, 1974- through TBIP Costs in FY 98			$2,176,447							
Primary Hardware Development, Tactical Tomahawk Program										
AUR	CPFF	Raytheon,Tucson,AZ	$31,510	$68,340	11/98	$53,400	11/99	$19,220	$172,470	
Launcher Integration	TBD	Lockheed,Bethesda,MD	$0	$15,000	11/98	$15,000	11/99			
Systems Engineering	FP	Raytheon, Tucson, AZ	$2,000	$2,000	10/98	$2,000	10/99	Continuing	Continuing	
	UARC	APL, Laurel, MD	$3,700	$3,500	1/99	$3,800	1/00	Continuing	Continuing	
	FP	Boeing, St Louis, MO	$3,000	$0		$0		Continuing	Continuing	
Subtotal Project Development			**$2,216,657**	**$88,840**		**$74,200**				

Remarks: None.

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204229N
PROGRAM ELEMENT TITLE: TOMAHAWK AND THEATER MISSION PLANNING CENTER

PROJECT NUMBER: A0545
PROJECT TITLE: TOMAHAWK

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Development Support	Economy Act	NSWC,Dahlgren,VA	$5,021	$814	11/98	$890	11/99	Continuing	Continuing	
	Economy Act	NAWC-WD,China Lk,CA	$2,999	$2,000	11/98	$2,444	11/99	Continuing	Continuing	
	Economy Act	NSWC,Pt Hueneme, CA	$0	$200	11/98	$400	11/99	Continuing	Continuing	
	Economy Act	NAWC-AD, Pax River, MD	$0	$400	11/98	$400	11/99	Continuing	Continuing	
	Economy Act	NWAD, Corona,CA	$0	$200	11/98	$200	11/99	Continuing	Continuing	
	Economy Act	NUWC, Newport, RI	$0	$400	11/98	$600	11/99	Continuing	Continuing	
	SS/CPFF	SAIC, Arlington, VA	$287	$1,100	12/98	$1,100	12/99	Continuing	Continuing	
	Economy Act	NOS, Indian Head, MD	$0	$510	11/98	$600	11/99	Continuing	Continuing	
	Economy Act	NAVSEA (PMS-400), VA	$200	$200	11/98	$0				
	Economy Act	SPAWAR (PMW-171), CA	$725	$800	11/98	$0				
	CPFF	Boeing, St Louis, MO	$900	$0		$0				
	CPFF	LMVF, Valley Forge, PA	$1,100	$0		$0				
	Economy Act	NAVSEA (PMS-425), VA	$200	$0		$0				
	Economy Act	NAVSEA (PMS-410), VA	$1,300	$0		$0				
	CPFF	Raytheon TI,San Jose,CA	$2,617	$0		$0				
	UARC	APL, MD	$870	$1,600	1/99	$1,400	1/00	Continuing	Continuing	
	Economy Act	NSWC, Dahlgren, VA	$4,443	$6,700	11/98	$7,600	11/99	Continuing	Continuing	
	Economy Act	NSWC, Pt Hueneme, CA	$150	$1,500	11/98	$1,500	11/99	Continuing	Continuing	
	Economy Act	NUWC, Newport, RI	$4,749	$1,264	11/98	$813	11/99	Continuing	Continuing	
Software Development										
Mission Planning Systems (TC2S)	SS/CPFF	Raytheon, Arlington, VA	$5,100	$0		$0		Continuing	Continuing	
Weapons Control Systems	Comp	TBD	$300	$35,800	10/98	$26,700	10/99	Continuing	Continuing	
ATWCS	CPFF	LMVF, Valley Forge, PA	$5,636	$0		$0		Continuing	Continuing	
Subtotal Support			**$36,597**	**$53,488**		**$44,647**				

Remarks: Software development includes costs of the entire Tomahawk development program including the missile, weapons control systems, and command and control systems.

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204229N
PROGRAM ELEMENT TITLE: TOMAHAWK AND THEATER MISSION PLANNING CENTER

PROJECT NUMBER: A0545
PROJECT TITLE: TOMAHAWK

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental, Test & Evaluation	SS/CPFF	Raytheon,Tucson,AZ	$0	$0		$12,805	10/99	Continuing	Continuing	
	Economy Act	COMOPTEVFOR,VA	$400	$400	11/98	$400	11/99	Continuing	Continuing	
	Economy Act	NAWC,Pt Mugu Tst Spt (CT),CA	$660	$1,645	11/98	$4,421	11/99	Continuing	Continuing	
	Economy Act	NAWC,China Lk Flt Tst Spt (CT), CA	$1,320	$1,258	11/98	$8,844	11/99	Continuing	Continuing	
Subtotal Test & Evaluation			**$2,380**	**$3,303**		**$26,470**				

Remarks: All testing through FY 2001 are Development Testing leading to an Operational Assessment (OA). See schedule.

Contractor Engineering Support										
Special TBIP Termination Costs	Negotiated	Raytheon,Tucson,AZ	$0	$14,100	2/99	$0				
Subtotal Management			**$0**	**$14,100**		**$0**				
SBIR Assessment				$3,392						

Remarks: None.

Total Cost			**$2,255,634**	**$163,123**		**$145,317**		**Continuing**	**Continuing**	

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0204229N** **PROJECT NUMBER: A1784**

PROGRAM ELEMENT TITLE: TOMAHAWK AND THEATER MISSION PLANNING CENTER **PROJECT TITLE: THEATER MISSION PLANNING CENTER**

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
A1784 Theater Mission Planning Center	$2,903	$2,562	$1,906	$1,891	$22	$28	$28	$28	$0	$96,816
TOTAL	**$2,903**	**$2,562**	**$1,906**	**$1,891**	**$22**	**$28**	**$28**	**$28**	**$0**	**$96,816**

Quantity of RDT&E Articles

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The TOMAHAWK Theater Mission Planning Center (TMPC) ashore and Afloat Planning System (APS) provide data base generation and processing, flight mission data, command and control information preparation, and distribution for nuclear (TMPC only) and conventional TOMAHAWK Land Attack Missiles. The TMPC project designs and develops software to decrease mission planning time in response to contingency requirements, improves the production of missile data for distribution and provides automated command and control information for employment and strike planning. APS utilizes the TMPC software on down-sized and ruggedized computer hardware for use in support of Afloat Strike Warfare Commanders. This improves battle-group tactical flexibility and responsiveness while maximizing TOMAHAWK Weapon Systems (TWS) warfare capability. The TMPC and APS systems will be compatible with the Navy Command and Control Systems and the TOMAHAWK Weapon System. TOMAHAWK Strike Planning Tools are comprised of two elements. The Mission Distribution System (MDS) allows TOMAHAWK users the capability to transmit and receive mission data updates in a tactical environment. The Electronic TOMAHAWK Employment Planning Package (ETEPP) provides the TOMAHAWK user with command and control information needed to employ TOMAHAWK missions.

DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204229N PROJECT NUMBER: A1784
PROGRAM ELEMENT TITLE: TOMAHAWK AND THEATER MISSION PLANNING CENTER PROJECT TITLE: THEATER MISSION PLANNING CENTER

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:
   [$1,698] Updated TMPC for integration of New National Sensors and Software Architectural Enhancements. Continued to explore and develop software changes to maintain parity with the commercial off the shelf world, to develop increases in throughput and processing efficiency, and to develop adaptations to interface changes mandated by other systems such as imagery systems.
   [$1,205] Supported development of enhancements to the MDS and ETEPP portion of the Tomahawk Strike Planning.

2. FY 1999 PLAN:
   [$1,465] Continue TMPC integration of New National Sensors and Software Architectural Enhancements.
   [$1,034] Support development of enhancements to the MDS and ETEPP portion of the Tomahawk Strike Planning Tools.
   [$63] Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2000 PLAN:
   [$1,906] Continue TMPC integration of New National Sensors and Software Architectural Enhancements.

DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204229N PROGRAM ELEMENT TITLE: TOMAHAWK AND THEATER MISSION PLANNING CENTER PROJECT NUMBER: A1784 PROJECT TITLE: THEATER MISSION PLANNING CENTER

(U) B. PROGRAM CHANGE SUMMARY

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	$2,992	$2,568	$1,934
(U) Appropriated Value:	$3,083	$2,568	
(U) Adjustments from Pres Budget:	($89)	($6)	($28)
(U) FY 2000 President's Budget Submit:	$2,903	$2,562	$1,906

CHANGE SUMMARY EXPLANATION:

(U) Funding: FY98 net decrease of -$89 thousand is made up of -$55 thousand for Small Business Innovative Research reductions, and -$34 thousand for the Navy's reprioritization of requirements. FY99 and FY00 decreases of -$6 thousand and $28 thousand respectively are for inflation adjustments.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

(U) C. OTHER PROGRAM FUNDING SUMMARY (Dollars in Thousands)

Appn	FY 1998 Budget	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
WPN	$2,752	$3,500	$0	$0	$6,325	$8,000	$8,200	$8,300	Continuing	Continuing
OPN	$30,659	$58,004	$37,992	$27,249	$27,578	$28,190	$28,823	$29,298	Continuing	Continuing

Related RDT&E

Not applicable.

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0204229N** **PROJECT NUMBER: A1784**
PROGRAM ELEMENT TITLE: TOMAHAWK AND THEATER MISSION PLANNING CENTER **PROJECT TITLE: THEATER MISSION PLANNING CENTER**

(U) D. ACQUISITION STRATEGY:

The acquisition strategy for this project is maintain contractual continuity to develop system updates to continue TMPC integration of New National Sensors and Software Architectural Enhancements.

(U) E. Program Milestones

	FY 1998	FY 1999	FY 2000
Program Milestones	3Q-4Q Release to Fleet TMPC 3.1	3Q-4Q Release to Fleet TMPC 4.0	Annual Fleet Release
Engineering Milestones	None	None	None
Contract Milestones	TMPC APS	TMPC APS	TMPC APS

EXHIBIT R-3, FY 2000RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0204229N** **PROJECT NUMBER: A1784**

PROGRAM ELEMENT TITLE: TOMAHAWK AND THEATER MISSION PLANNING CENTER **PROJECT TITLE: THEATER MISSION PLANNING CENTER**

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development	Comp/FP	Boeing, St Louis, MO	$36,841							
	SS/CPFF	GD/E, San Diego, CA	$11,342							
	Economy Act	NCCOSC, San Diego,CA	$4,325							
		Misc. Items 1974-1997	$34,940							
	CPFF	Lockheed,Bethesda,MD	$100	$700	11/98	$527	11/99	Continuing	Continuing	
	CPFF	MTL, Classified	$360	$400	11/98	$300	11/99	Continuing	Continuing	
	Economy Act	NSWC, Dahlgren, VA	$1,253	$0		$0		Continuing	Continuing	
Subtotal Project Development			**$89,161**	**$1,100**		**$827**				
Remarks: None.										
Development Support	CPFF	SAIC, Arlington, VA	$646	$699	11/98	$552	11/99	Continuing	Continuing	
	UARC	APL, Laurel, MD	$544	$700	1/99	$527	1/00	Continuing	Continuing	
Subtotal Support			**$1,190**	**$1,462**		**$1,079**				
Remarks: None.										
Developmental Test & Evaluation										
Subtotal Test & Evaluation			**$0**	**$0**		**$0**		**$0**	**$0**	
Remarks: None.										
Subtotal Management			**$0**	**$0**		**$0**		**$0**	**$0**	
SBIR Assessment				**$63**						
Remarks: None.										
Total Cost			**$90,351**	**$2,562**		**$1,906**		**Continuing**	**Continuing**	

EXHIBIT R-2a, FY2000 RDT&E BUDGET PROJECT JUSTIFICATION SHEET DATE: FEB 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204311N PROJECT NUMBER: X0766
PROGRAM ELEMENT TITLE: Integrated Surveillance System PROJECT TITLE: IUSS

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X0766 IUSS Detect/ Classif Syst.	8,025	15,483	11,997	12,014	22,041	21,344	18,845	13,828	CONT.	CONT.
X0758 SURTASS	1,231	3,889	6,028	6,400	5,788	6,881	7,781	7,947	CONT.	CONT.
TOTAL	9,256	19,372	18,025	18,414	27,829	28,225	26,626	21,775	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This Program Element (P.E.) comprises two projects - X0766 and X0758. Project X0766 provides for Integrated Undersea Surveillance Systems (IUSS) Research and Development Projects. Project X0758 is for the Surveillance Towed Array Sensor (SURTASS) development efforts. IUSS provides the Navy with its primary means of submarine detection both nuclear and diesel. The program has undergone a major transition from emphasis on maintaining a large dispersed surveillance force keyed to detection and tracking of soviet submarines to a much smaller force that is effective against modern diesel and nuclear submarines in regional/littoral or broad ocean areas of interest. This transition preserves the ability to continue open ocean surveillance.

(U) The IUSS Research and Development project (X0766) funds Fixed Surveillance Systems (FSS) which encompasses the Sound Surveillance System (SOSUS), the Surveillance Direction System (SDS), the Fixed Distributed System (FDS) and SURTASS Low Frequency Active (LFA) developments. The number of SOSUS processing sites has been reduced and the display equipment used at the remaining sites will be converted to SDS/SSIPS (Shore Signal and Information Processing Segment) to significantly lower life cycle costs and enable system-wide consolidation. SURTASS LFA will provide an active adjunct capability for IUSS passive and tactical sensors to assist in countering the quieter diesel and nuclear threats of the 1990s and beyond. The LFA tasks are directed at detection of slow quiet threats in harsh littoral waters.

(U) In order to continue with reductions in life cycle costs and continue with system-wide consolidation, a long-

term goal is to develop a single IUSS processor. The IUSS processor will have the capability to process and display data from future underwater systems (such as the Advanced Deployable System (ADS) and FDS-C). The IUSS processor will also have the capability to replace the legacy systems (SSIPS, SDS, and SURTASS) as they reach end of life and require upgrading.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: Budget Activity 7: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing operational systems.

B. (U) PROGRAM CHANGE SUMMARY:

Project X0766 Funding: FY98 decreased by $171K for FY98 SBIR tax reduction. FY99-00 decreased 1.5% for non pay inflation

Project X0766 Schedule/Technical: FY98, delay in completing C4ISR analysis; FY99,delay start of CLFA development.

Project X0758 Funding: FY98 decreased by $17K for FY98 SBIR tax reduction. FY00 increased $1200K for common processor.

Project X0758 Schedule/Technical: N/A

C. (U) OTHER PROGRAM FUNDING SUMMARY:

X0766:	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN# 2225	2,328	0	0	0	0	0	0	28,046	CONT.	CONT.
OMN 1C3C	27,191	29,010	28,748	30,327	30,160	31,498	33,505	40,406	CONT.	CONT.
OPN# 2237	4,571	12,659	7,267	5,594	17,456	9,464	19,721	24,656	CONT.	CONT.

X0766 RELATED RDT&E:
(U) PE 0204311N(Integrated Surveillance System)

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204311N PROJECT NUMBER: X0766
PROGRAM ELEMENT TITLE: Integrated Surveillance System PROJECT TITLE: IUSS

(U) PE 0603785N(Combat Systems Oceanographic Performance Assessment)
(U) PE 0603747N(Undersea Warfare Advanced Technology)

X0758:	FY1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN #2237	4,571	12,659	7,267	5,594	17,456	9,464	19,721	24,656	CONT.	CONT.

X0758 RELATED RDT&E:

(U) PE 0204311N(Integrated Surveillance System)
(U) PE 0603785N(Combat Systems Oceanographic Performance Assessment)
(U) PE 0603747N(Undersea Warfare Advanced Technology)

D. (U) ACQUISITION STRATEGY: See individual projects for acquisition strategy.

E. (U) SCHEDULE PROFILE: See individual projects for schedule profiles.

EXHIBIT R-2a, FY2000 RDT&E BUDGET PROJECT JUSTIFICATION SHEET DATE: FEB 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204311N PROJECT NUMBER: X0766
PROGRAM ELEMENT TITLE: Integrated Surveillance System PROJECT TITLE: IUSS

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X0766 IUSS Detect/Classif System										
TOTAL	8,025	15,483	11,997	12,014	22,041	21,344	18,845	13,828	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: LFA will provide an active adjunct capability for IUSS passive and tactical sensors to counter the quieter diesel and nuclear threats of the 1990s and beyond. The LFA tasks are directed at detection of slow quiet threats in harsh littoral waters. Functional improvements are delivered to the Fleet in software "Builds". SURTASS/LFA Build #1 (FY 97) included waveform-processing improvements, tactical processing interfaces, and signal processing enhancements. Build #2 (FY 98) includes Twin-Line/LFA integration; advanced waveforms for littoral/shallow water operations including doppler sensitive waveforms; and processing algorithms to reduce clutter and reverberation false alarms in shallow water. Also includes Adaptive Beamforming; Integration of tactical decision aids for LFA monostatic and bistatic operation; integration of SURTASS active and passive information processing systems to provide contact association and geographic tracking; and common antisubmarine warfare (ASW) OMI and environmental processing. The LFA task includes development and test of a compact LFA transmit source array for SWATH-P ships.

B. (U) PD18 is involved with the development and maintenance of various IUSS systems. These systems include FDS, FDS-C, SDS, SURTASS, and ADS. The near term objective is to obtain a common Operator Machine Interface (OMI) among currently fielded systems. The long-term goal is to develop a single IUSS processor baseline, with minor maintenance efforts continuing on fielded systems. The existing system architecture, signal processing, contact management, and reporting requirements will be evaluated as well as the requirements for future systems. The development of the IUSS processor will take advantage of automation advancement, array technology improvements, and submarine and surface system commonality.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

EXHIBIT R-2a, FY2000 RDT&E BUDGET PROJECT JUSTIFICATION SHEET DATE: FEB 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204311N PROJECT NUMBER: X0766

PROGRAM ELEMENT TITLE: Integrated Surveillance System PROJECT TITLE: IUSS

1. (U) FY 1998 ACCOMPLISHMENTS:

- (U) ($ 1,886) Transitioned SDS communications to incorporate use of Fleet standard communications equipment using NAVMACs and JMCIS. Incorporated Fleet required performance enhancements.
- (U) ($ 1,100) Investigated and corrected Year 2000 data roll over problems within SSIPS/SDS and SURTASS.
- (U) ($ 1,100) Conducted trade-off studies and analysis for CLFA source array and processing, designs and ship modification and handling system designs.
- (U) ($ 2,405) Conducted investigations and analysis to support preparation of Environmental Impact Statement (EIS) for SURTASS. Conducted three Scientific Research Program (SRP) at-sea tests to determine impact of LFA sonar on Marine Mammals.
- (U) ($ 1,534) Initiated update of IUSS to comply with revised Naval Command, Control, Communications, Computer, Intelligence, Surveillance, and Reconnaissance (C4ISR) guidance. Conduct associated IUSS C4ISR operating system, technical, and information architecture studied and analysis.

2. (U) FY 1999 PLANS:

- (U) ($ 5,054) Initiate development of a common IUSS processing architecture; to include signal, data, and display processing requirements generation, analysis, and contractual planning. Initiate incorporation of ARCI Advanced Processing Builds (APB)-1 architecture to support IUSS processing requirements.
- (U) ($ 2,500) Continue investigations and analysis to support preparation of Environmental Impact Statement (EIS) for SURTASS.
- (U) ($ 3,500) Continue LFA development and integration of signal/data processing software for littoral/shallow water operations and T-AGOS 23 initial at-sea testing and preparation for Pre-DT testing.

- (U) ($ 1,029) Upgrade SURTASS communications capabilities to comply with Naval Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) guidance. Develop capability for increased data transmissions to shore.

- (U) ($ 2,500) Prototype, define, and incorporate a common Operator Machine Interface (OMI) for SURTASS and SSIPS/SDS legacy systems.

- (U) ($ 900) Conduct Sea Test Planning for T-AGOS 23 DT/OT testing.

3. (U) FY 2000 Plans:

- (U) ($ 4,100) Continue design and development of software to transition IUSS to a common processing architecture.

- (U) ($ 1,500) Continue scientific research program to support operational deployment of LFA.

- (U) ($ 1,600) Conduct DT/OT testing of T-AGOS 23 SURTASS/LFA system.

- (U) ($ 2,600) Continue LFA development and integration in support of DT/OT testing of T-AGOS 23 SURTASS/LFA system. Correct software issues identified during conduct of DT/OT testing.

- (U) ($ 1,771) Complete transition of SURTASS and SSIPS/SDS to a common OMI. Complete Factory Acceptance Testing (FAT) at each developer facility and install into fielded legacy systems. Prototype requested fleet enhancements to common OMI baseline.

- (U) ($ 426) Continue integration of IUSS into the Fleet C4ISR architecture.

B. (U) PROGRAM CHANGE EXPLANATION:

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204311N PROJECT NUMBER: X0766
PROGRAM ELEMENT TITLE: Integrated Surveillance System PROJECT TITLE: IUSS

(U) Funding: FY98 decreased by $171K for FY98 SBIR tax reduction. FY99-00 funding decreased 1.5% for non pay inflation.

(U) Schedule/Technical: In FY98, there was a delay in completing C4ISR analysis.

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

	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN# 2225	2,328	0	0	0	0	0	0	28,046	CONT.	CONT.
OMN 1C3C	27,191	29,010	28,748	30,327	30,160	31,498	33,505	40,406	CONT.	CONT.
OPN# 2237	4,571	12,659	7,267	5,594	17,456	9,464	19,721	24,656	CONT.	CONT.

(U) RELATED RDT&E:
- (U) PE 0204311N(Integrated Surveillance System)
- (U) PE 0603785N(Combat Systems Oceanographic Performance Assessment)
- (U) PE 0603747N(Undersea Warfare Advanced Technology)

D. (U) ACQUISITION STRATEGY:

	FY 1998	FY 1999	FY 2000
Program Milestones			

EXHIBIT R-2a, FY2000 RDT&E BUDGET PROJECT JUSTIFICATION SHEET DATE: FEB 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204311N PROJECT NUMBER: X0766

PROGRAM ELEMENT TITLE: Integrated Surveillance System PROJECT TITLE: IUSS

Engineering Milestones	*Build #2 LITTORAL* IMPROV 9/98	
T&E Milestones	SDS OPEVAL 1Q/99	T-AGOS 23 DLVRY 10/99 SEA TESTS; DT-6/00,OT-8/00
Contract Milestones		

Exhibit R-3 Cost Analysis (page 1)												Date: Jan 1999
RDT&E/Budget Activity 7			PROGRAM ELEMENT: 0204311N									SURTASS x0766
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date			Cost To Complete	Total Cost	Target Value of Contract
IUSS Common Architecture	CPFF	RSC/LM	14948	4000	12/98	2415	1/00			Cont.		9,119
Environmental Research	WR	ONR	2000	2000	10/98	1500	12/99			Cont.		4,800
LFA Improvements	CPFF	RSC/LS	73238	5000	10/98	4113	12/99			Cont.		13,413
C4I Integration	CPFF	MISC	29395	1841	1/99	1100	1/00			Cont.		4,041
Various	WX	MISC	27395	1492	10/98	1056	10/99			Cont.		3,837
Subtotal Product Development			146976	14333		10184						35,210
Remarks: RSC= Raytheon Systems Co. Fullerton, CA LM= Lockheed Martin, Manassas, VA TRW=TRW Systems Div., San Diego, CA L/S= Lockheed Sanders, Nashua, NH												
IUSS Common Arch.	WX	Various	840	150	11/98	160	11/99			Cont.		480
LFA Improvements	CPFF	TRW	2099	325	12/98	395	12/99			Cont.		1115
C4ISR Integration	CPFF	TRW	1259	100	12/98	168	12/99			Cont.		429
Subtotal Support			4198	575		723						2,024

Remarks

EXHIBIT R-2a, FY2000 RDT&E BUDGET PROJECT JUSTIFICATION SHEET DATE: FEB 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204311N PROJECT NUMBER: X0758

PROGRAM ELEMENT TITLE: INTEGRATED SURVEILLANCE SYSTEM

Exhibit R-3 Cost Analysis (page 2)												Date: Jan 1999
RDT&E/Budget Activity 7			PROGRAM ELEMENT: 0204311N									SURTASS x0766
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date			Cost To Complete	Total Cost	Target Value of Contract
IUSS Common Architecture	Var/WX	MISC.	651	0	Var.	0	Var.			Cont.		245
LFA Improvement	Var/WX	MISC.	1520	475	Var.	990	Var.			Cont.		1,715
Subtotal T&E			2171	475		990				Cont.		1,960
Remarks												
LFA Improvements/C4ISR	Var/WX	MISC.	1050	100	Var.	100	Var.			Cont.		300
Subtotal Management			1050	100		100				Cont.		300
Remarks												
Total Cost			154395	15,483		11,997						39,494
Remarks												

(Exhibit R-3, page 2 of 2)

EXHIBIT R-2a, FY2000 RDT&E BUDGET PROJECT JUSTIFICATION SHEET DATE: FEB 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204311N PROJECT NUMBER: X0758
PROGRAM ELEMENT TITLE: INTEGRATED SURVEILLANCE SYSTEM

PROJECT NUMBER & TITLE	FY1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X0758 SURTASS	1,231	3,889	6,028	6,400	5,788	6,881	7,781	7,947	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The SURTASS project comprises the mobile, tactical arm of the Integrated Undersea Surveillance System, providing long range detection and cueing for tactical weapons platforms against both diesel and nuclear powered submarines. With the SOSUS Arrays being placed in a standby status (data available but not continuously monitored), SURTASS must provide the undersea surveillance necessary to support regional conflicts and sea-lane protection. SURTASS has experienced recent passive and active success against diesel submarines operating in shallow water. SURTASS is greatly reducing costs by consolidating logistics support, using Non-Developmental Items and commercial hardware, and increasing operator efficiency through computer aided detection and classification processing. SURTASS development efforts include: twin-line array processing, improved detection and classification/passive automation to counter quieter threats; additional signal processing and bi-static active capability; integrated active and passive operations; improved Battle Group support; and improved information processing. Functional improvements are delivered to the Fleet in software "Builds". Build #1 (FY 95) included source-set formulation and analysis tools, automated line trackers and nuclear source auto-detector. Build #2 (FY 96) included wideband energy trackers, wideband/narrowband feature association, and diesel Full Spectrum Processing (FSP). Build #3 (FY 97) includes automated localization and tracking, diesel automated detectors. Build #4 (FY 98) includes twin-line integration, automated classification aids that provide surface/subsurface target discrimination and subsurface target classification clues. Build #5(FY 99) includes bi-static LFA signal processing and integration of active and passive information processing subsystems to improve contact association and geographic tracking performance.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 ACCOMPLISHMENTS:

(U) ($ 1,231) Continued signal processing improvements.

2. (U) FY 1999 PLANS:

- (U) ($ 1,700) Continue software development for computer aided detection and classification including improvements to nuclear and diesel auto-detectors, integration of active and passive information processing, improved classification aids and Bi-static processing.
- (U) ($ 800) Continue array improvements and integration and expanded array interoperability
- (U) ($ 1,389) Software development to support increased data processing on shore to support tactical operations.

3. (U) FY 2000 PLANS:

- (U) ($ 1,010) Develop processing improvements to support transition to TB-29 common towed array and expand array interoperability.
- (U) ($ 1,715) Complete software development to support increased data processing on shore to support tactical operations.
- (U) ($ 1,100) Continue computer aided detection, classification and tracking to improve passive performance to support tactical operations in high clutter environments.
- (U) ($ 1,003) Continue software development to improve Bi-Static operations in littoral/shallow water regions.
- (U) ($ 1,200) Develop software to transition to Common Processor.

B. (U) PROGRAM CHANGE SUMMARY: The FY1999 President's Budget for FY 1998 was $1,265K with a subsequent reduction of $-17K for SBIR. FY00 increased $1,200K for software development to transition to Common Processor.

EXHIBIT R-2a, FY2000 RDT&E BUDGET PROJECT JUSTIFICATION SHEET DATE: FEB 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204311N PROJECT NUMBER: X0758
PROGRAM ELEMENT TITLE: INTEGRATED SURVEILLANCE SYSTEM

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

	FY1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN #2237	4,571	12,659	7,267	5,594	17,456	9,464	19,721	24,656	CONT.	CONT.

(U) RELATED RDT&E:

(U) PE 0204311N(Integrated Surveillance System)
(U) PE 0603785N(Combat Systems Oceanographic Performance Assessment)
(U) PE 0603747N(Undersea Warfare Advanced Technology)

D. (U) ACQUISITION STRATEGY:

	FY 1998	FY 1999	FY 2000
Program Milestones			
Engineering Milestones	BUILD #4 COMPUTER AIDED DET/CLASS	BUILD #5 INTEGRATED PASSIVE IP	
T&E Milestones		SEA TEST INTEGRATED TWIN-LINE	
Contract Milestones			

EXHIBIT R-3, FY2000 RDT&E COST ANALYSIS DATE: FEB 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204311N PROJECT NUMBER: x0758

Exhibit R-3 Cost Analysis (page 1)												Date: Jan 1999
RDT&E/Budget Activity 7			PROGRAM ELEMENT: 0204311N									SURTASS x0758
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date			Cost To Complete	Total Cost	Target Value of Contract
Passive Auto	CPFF	RSC/APL	21735	250	12/98	1120	12/99			Cont.		3,015
Array Improvements	CPFF/WR	RSC/APL/SSC	14696	750	3/99	800	3/00			Cont.		2,600
Processing Improvements	CPFF	RSC/APL	21531	1250	1/99	2203	1/00			Cont.		4,853
Various	Var/WX	MISC.	14490	589	10/98	650	10/99			Cont		2,289
Subtotal Product Development			72452	2,839		4,773						12,757
Remarks: APL=APL/JHU RSC= Raytheon Systems Co. SSC= SPAWAR Systems Center.												
Passive/Array improvements	Var/WX	MISC	1627	150	10/98	250	10/99			Cont.		650
Subtotal Support			1627	150		250						650
Remarks												

EXHIBIT R-3, FY2000 RDT&E COST ANALYSIS DATE: FEB 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204311N PROJECT NUMBER: x0758

Exhibit R-3 Cost Analysis (page 2)												Date: Jan 1999
RDT&E/Budget Activity 7			PROGRAM ELEMENT: 0204311N									SURTASS x0758
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date			Cost To Complete	Total Cost	Target Value of Contract
Passive/Array improvements	Var/WX	MISC.	2126	800	10/98	905	10/99			Cont.		2,610
Subtotal T&E			2126	800		905						2,610
Remarks												
Passive/Array improvements	Var/WX	MISC.	407	100	10/98	100	10/99			Cont.		300
Subtotal Management			407	100		100						300
Remarks												
Total Cost			76612	3,889		6,028						16,317
Remarks												

R-1 Shopping List - Item No 1 of 1

(Exhibit R-3, page 2 of 2)

Exhibit R-2, RDT&E Budget Item Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA7	Program Element Name & No. 0204413N/Amphibious Tactical Support Units	Project Name and Number. 21980/Amphibious Other C2

COST ($ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
21980 Amphibious Other C2	0	0	0	2.952	7.872	.983	0	0	CONT.	CONT.
22231 MCAC Weapons Development	.649	1.869	0	0	0	0	0	0	CONT.	CONT.
Total P.E. Cost	.649	1.869	0	2.952	7.872	.983	0	0	CONT.	CONT.

A. Mission Description and Budget Item Justification:

21980 – This project supports development and procurement of a technologically advanced heavy lift utility landing craft to complement the high speed, over-the-beach, ship-to-shore amphibious life of the future.

22231 – Landing Craft Air Cushion (LCAC) control enhancements initiates studies that will provide a remote control capability for LCAC and will be integrated and scheduled with developing minesweeping and shallow water mine-countermeasures systems. LCAC deep skirt will provide an improved LCAC performance in Sea State 3 and higher and improved capability near and in the surf zone for explosive lane breaching missions in support of amphibious operations.

B. Program Change Summary:

	FY 1998	FY 1999	FY 2000
FY 1999 President's Budget	.645	1.945	3.449
Appropriated Value:	.645	1.945	
Adjustment to FY 1998/1999 Appropriated Value/			
FY 1999 President's Budget:			
a. Minor adjustments	+.004	-.076	
b. MCAC			-3.449
FY 2000 PRES Budget Submit	.649	1.869	0

Exhibit R-2a, RDT&E Project Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA7	Program Element Name & No. 0204413N/Amphibious Tactical Support Units	Project Name and Number. 21980/Amphibious Other C2

COST ($ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Total P.E. Cost										
LCU Replacement	0	0	0	2.952	7.872	.983	0	0	CONT.	CONT.
Quantity of RDT&E Articles & cost										

A. Mission Description and Budget Item Justification: This project supports development and procurement of a technologically advanced heavy lift utility landing craft to complement the high speed, over-the-beach, ship-to-shore amphibious lift of the future.

FY 1998 ACCOMPLISHMENTS: Not applicable
FY 1999 PLAN: Not applicable
FY 2000 PLAN: Not applicable

B. Other Program Funding Summary

	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Complete	Total Cost
SCN Line 510000 Service Craft	0	0	0	0	0	0	59.807	59.743	CONT.	CONT.

(U) Related RDT&E: Not applicable

C. Acquisition Strategy: Feasibility studies will be conducted to determine the best design to meet Navy new requirements for heavy lift utility landing craft and to support a performance specification that will be competitively awarded.

D. Schedule Profile:	FY00	To Complete
Program Milestones	-Mission needs statement approval - Assessment of alternatives	- Evaluation of feasibility of alternatives - Enabling technology studies
Engineering Milestones		
T&E Milestones		
Contract Milestones		

Exhibit R-3, RDT&E Project Cost Analysis		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA7	Program Element Name & No. 0204413N/Amphibious Tactical Support Units	Project Name and Number. 21980/Amphibious Other C2

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date			Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	WR	NSWCBethesda, MD								4.014	4.014	
Ancillary Hardware Development	WR	NSWCBethesda,MD								2.007	2.007	
Systems Engineering	WR	NSWCBethesda,MD								2.834	2.834	
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development										8.858	8.858	
Remarks:												
Development Support Equipment												
Software Development												
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data												
GFE												
Subtotal Support			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Remarks:												
Developmental Test & Evaluation												
Operational Test & Evaluation												
Tooling												
GFE												
Subtotal T&E			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Remarks:												

Exhibit R-3, RDT&E Project Cost Analysis			Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA7	Program Element Name & No. 0204413N/Amphibious Tactical Support Units	Project Name and Number. 21980/Amphibious Other C2	

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date			Cost To Complete	Total Cost	Target Value of Contract
Contractor Engineering Support												
Government Engineering Support	WR	NSWCBethesda, MD								2.007	2.007	
Program Management Support		Various								.942	.942	
Program Management Personnel												
Travel												
Labor (Research Personnel)												
Overhead												
Subtotal Management										2.949	2.949	
Remarks:												
Total Cost										11.807	11.807	
Remarks:												

EXHIBIT R-2, FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204571N
PROGRAM ELEMENT TITLE: Consolidated Training Systems Development

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
21427 Surface Tactical Team Trainer (STTT)	10,392	11,931*	4,361	4,660	5,855	5,953	6,571	7,220	CONT.	CONT.
21823 Training and Modeling Systems (TMS)	8,217	0	0	0	0	0	0	0	0	CONT.**
W0431 Tactical Aircrew Combat Training System (TACTS)	3,267	2,934	2,747	1,714	0	0	0	0	0	57,256***
W0604 Training Range and Instrumentation Development (TRID)	4,056	2,113	1,635	3,425	4,389	3,636	3,644	3,645	CONT.	CONT.
W1998 Joint Tactical Combat Training System (JTCTS)	31,277	9,412****	7,871	7,933	6,048	5,115	5,244	5,363	CONT.	CONT.
W2124 Air Warfare Training Development (AWTD)	1,719	1,847	2,131	2,192	1,961	2,189	2,246	2,298	CONT.	CONT.
X1823 Training and Training Devices Systems (TTDS)	840	0	0	0	0	0	0	0	0	13,619*****
X1823 Training and Modeling Systems (TMS)	0	9,989	8,209	10,565	9,063	8,601	7,437	7,610	0	61,474
TOTAL	59,768	38,226	26,954	30,489	27,316	25,494	25,142	26,136	CONT.	CONT.

Quantity of RDT&E Articles

* Controls reflect a FY99 $6.0M Congressional add for Battle Force Tactical Training (BFTT) executed under 22449.

** Program transferred to SPAWAR (X1823).

*** This amount includes FY90-FY01.

**** Controls reflect a FY99 $2.5M Congressional add for Large Area Tracking Range (LATR)/Kadena Interim Training System (KITS) integration technical evaluation to be executed under project unit W2660.

***** This amount includes FY94-FY98.

EXHIBIT R-2, FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204571N
PROGRAM ELEMENT TITLE: Consolidated Training Systems Development

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The STTT will develop the Battle Force Tactical Training (BFTT) System to provide realistic joint warfare training including a means to link ships together for coordinated Combat System team training using Distributed Interactive Simulation (DIS) protocols. The TMS encompasses the requirements analysis and software development associated with the Navy's Maritime Development Agent function as part of the Joint Simulation System (JSIMS). The BFTT will develop the BFTT Electronic Warfare Trainer (BEWT) and applicable BFTT system software to provide EW operator and team training for Fleet EW Systems. TACTS provides real-time monitoring and post-exercise debrief of aircrews flying on instrumented training ranges. This system is the primary training tool used by the Naval Strike and Air Warfare Center and the Marine Aviation Weapons and Tactics Squadron. The TRID program provides development of many range systems including range electronic warfare simulator, advanced weapons training systems, laser training systems, Large Area Tracking Range (LATR), and shallow water range technology. JTCTS is planned to provide U.S. Navy fleet deployable instrumentation for at sea surface, subsurface, and air training and tactics development and fixed/transportable air range instrumentation for U.S. Navy and U.S. Air Force air training and tactics development. JTCTS incorporates the Defense Modeling and Simulation Office sponsored Distributed Interactive Simulation Protocol Data Unit for interoperability with Navy and other service live, virtual (simulators), and constructive (war games) simulations. JTCTS will initially deliver prototype hardware/software for a mobile/rangeless capability for a Carrier Air Wing 5 (CAG-5) after undergoing development/operational testing. It will further develop test and field fixed air range and fixed fleet range hardware/software in subsequent phases of the program. This summary reflects only the USN funding component of the JTCTS. The AWTD program provides development of many aviation training systems including, mission rehearsal simulation technologies and the Aviation Training Technology Integration Facility (ATTIF). TTDS provides a geographically distributed wargaming system for littoral operations training which supports objectives of Fleet Commanders, Naval War College, Joint Warfare Center, and Tactical Training Groups in wargaming, tactical decision making training, and tactics development and evaluation.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing, operational systems.

Exhibit R-2a, RDT&E Project Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA7	Program Element Name & No. 0204571N/ Consolidated Training Systems Development	Project Name and Number. Surface Tactical Team Trainer (STTT)/21427

Cost ($ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Project Cost	10.392	5.945	4.361	4.660	5.855	5.953	6.571	7.220	CONT.	CONT.
RDT&E Articles Qty	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

A. Mission Description and Budget Item Justification. The Battle Force Tactical Training (BFTT) Program provides realistic joint warfare training across the spectrum of armed conflict; realistic unit level team training in all warfare areas; a means to link ships together which are in different homeports for coordinated training; external stimulation of shipboard training systems; and simulation of non-shipboard forces. BFTT uses a distributed architecture, integrating existing training systems, and uses Distributed Interactive Simulation (DIS) protocols, with planned migration to High Level Architecture (HLA). BFTT provides ships' Commanding Officers and Battle Group/Battle Force Commanders with the ability to conduct coordinated realistic, high stress, combat system team training as an integral part of the Afloat Training Organization. BFTT provides a baseline capability/system that meets the Operational Requirements Document (ORD). The Mine Warfare Model (MW Model) will provide integration of the Minefield Environmental Server (Mine Warfare) capability into BFTT. Stimulator/Simulators (STIM/SIM) provides standardized Radio Frequency (RF), Intermediate Frequency (IF), and/or Digital injection into surface ship radars and fire control systems for training of shipboard operators/teams as part of the BFTT System. The Cryptologic Systems Trainer (CST)/BFTT Electronic Warfare Trainer (BEWT) development effort will provide embedded operator and team electronic emissions recognition training capability, integrated into BFTT.

FY 1998 ACCOMPLISHMENTS:

- ($2.859) BFTT B/L 1 - Developed software required as a result of lessons learned/additional Fleet requirements since BFTT IOC to include the rehosted AEGIS Combat Training System (ACTS), completed software development of the modifications required to incorporate amphibious/littoral functionality into BFTT software, and initiated HLA system engineering requirements/development.
- ($.328) Mine Warfare - Completed development of the software modifications required to integrate the Mine Warfare capability.
- ($1.589) STIM/SIM - Continued development of the MK 91 NATO Sea Sparrow Missile System Stimulator.
- ($.900) CST/BEWT - Continued development of the BFTT Electronic Warfare Trainer (BEWT) and software integration with BFTT.
- ($4.716) BEWT - Continued development of the BEWT capability and installed/demonstrated Engineering Development Models on Fleet directed surface ships.

FY 1999 PLANS:

- ($1.257) BFTT - Develop software required as a result of lessons learned/additional Fleet requirements since BFTT IOC to include SG&C, Display & Debrief, Entity Motioning and Modeling (EM&M) improvements and the initial interface to the Generic Navy Stimulator/Simulator (GNSS).
- ($.500) BFTT/HLA - Initiate conversion of the DIS protocol based software to the HLA mandated architecture for the Performance Monitoring portion of the BFTT software in accordance with DoD directives.
- ($1.688) STIM/SIM - Complete development of the MK 91 NATO Sea Sparrow Missile System Stimulator.
- ($2.500) - BEWT - Integrate the BEWT into BFTT.

FY 2000 PLANS:

- ($1.861) BFTT - Develop tactical link interface/simulation software and integrate Semi Automated Forces (SAF) software into BFTT. Develop stand-alone objective based training software for scenario development.

Exhibit R-2a, RDT&E Project Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA7	Program Element Name & No. 0204571N/ Consolidated Training Systems Development	Project Name and Number. Surface Tactical Team Trainer (STTT)/21427

- ($2.500) HLA - Continue conversion of the DIS protocol based software to the HLA mandated architecture for the Scenario Generation and Control portion of the BFTT software in accordance with DoD directives.

B. Program Change Summary:

	FY 1998	FY 1999	FY 2000
FY 1999 President's Budget:	10.624	5.964	1.165
Appropriated Value:	9.948		
Adjustment to FY 1998 Appropriated Value/ FY 1999 President's Budget			
(a) Undistributed Reductions	- .013		
(b) SBIR	- .219		
(c) Training Initiatives			+2.500
(d) Outsourcing Adjustment			- .006
(e) NWCF Rates			+ .049
(f) Revised Economic Assumptions		- .014	
(g) Civilian Personnel Underexecution		- .005	
(h) Civilian Pay Rates			+ .706
(i) Non Pay Inflation			- .053
FY 2000/01 PRES Budget Submit:	10.392	5.945	4.361

Funding: The FY 1998 net decrease of +$.232M is a result of undistributed reductions ($.013M) and a Small Business Innovative Research (SBIR) reduction of ($.219M). The FY 1999 net decrease of ($.019M) is a result of revised economic assumptions ($.014M) and a civilian personnel underexecution cut of ($.005M). The FY 2000 net increase of +$3.196M is a result of +$2.500M provided for Training Initiatives, a ($.006M) Outsourcing Adjustment, a +.049M NWCF Rate increase, a civilian pay rate increase of +.706M, and a non pay inflation decrease of ($.053M). Note: Training Initiatives address the conversion of the BFTT DIS software to the DoD mandated HLA.

Schedule: Not Applicable.

Technical: Not Applicable.

C. Other Program Funding Summary:

	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	To FY 2004	Total FY 2005	Complete	Cost
OPN Line 276200	20.029	24.099	31.615	17.544	38.174	24.709	25.252	25.661	CONT.	CONT.
O&MN Line 3B4K	8.057	9.809	9.083	9.969	9.590	9.463	9.704	9.952	CONT.	CONT.

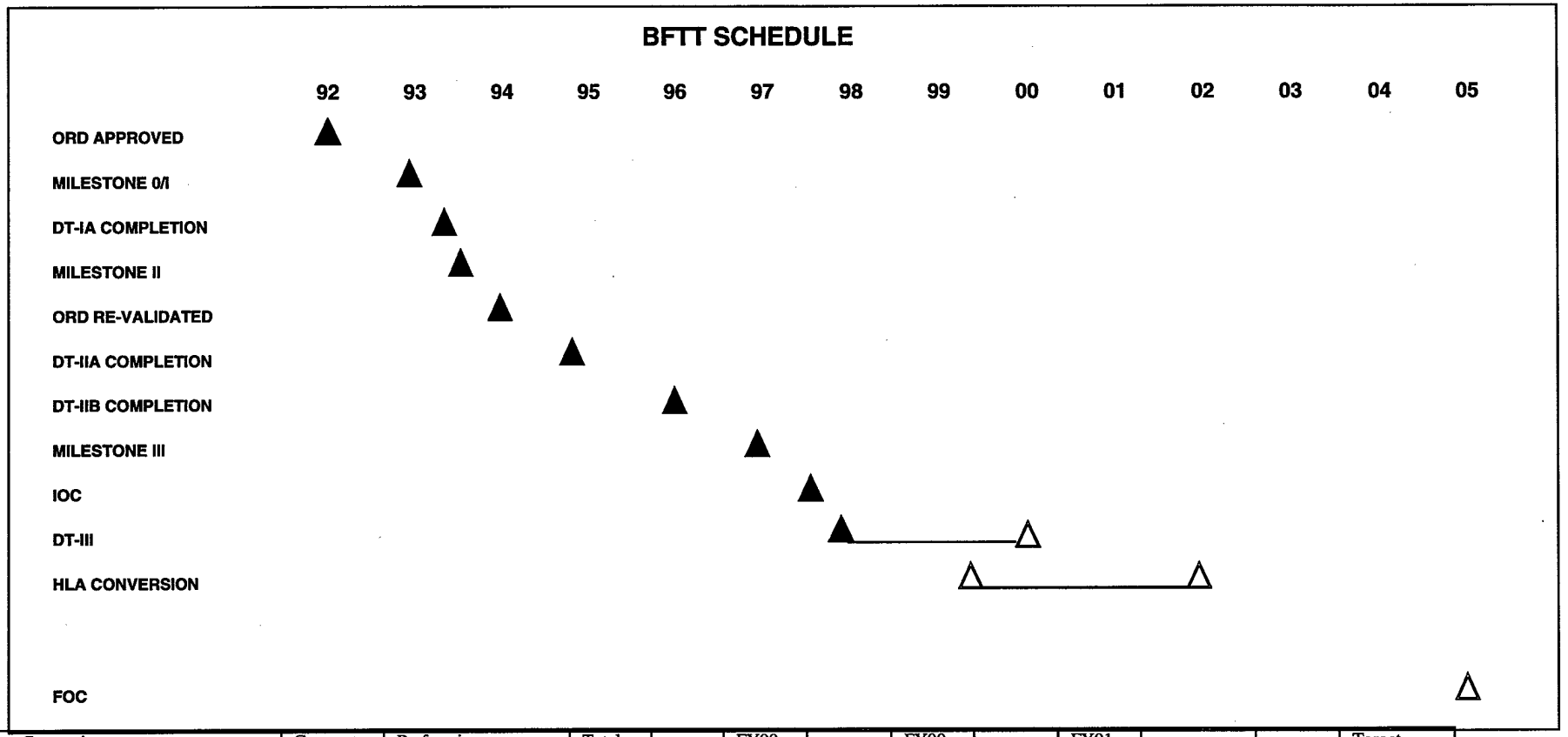
Related RDT&E: Not Applicable.

Exhibit R-2a, RDT&E Project Justification			Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA7	Program Element Name & No. 0204571N/ Consolidated Training Systems Development	Project Name and Number. Surface Tactical Team Trainer (STTT)/21427	

D. Acquisition Strategy: The BFTT Program is designated as an ACAT IV-M Program consisting of four (4) phases - Concept Exploration and Definition, Demonstration and Validation, Engineering and Manufacturing Development, and Production and Deployment.

E. Schedule Profile:

Exhibit R-2a, RDT&E Project Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA7	Program Element Name & No. 0204571N/ Consolidated Training Systems Development	Project Name and Number. Surface Tactical Team Trainer (STTT)/21427



Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	FY01 Cost	FY01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	**	AAI/MD, EWA/WV	10.024	1.490	**	0					11.514	11.514
Ancillary Hardware Development												
Systems Engineering	WR/RCP	MULTIPLE	11.101	.695		.650				CONT	CONT	N/A
Licenses	WR/RCP	MULTIPLE	1.950	.062		.025				CONT	CONT	N/A

Exhibit R-2a, RDT&E Project Justification		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA7	Program Element Name & No. 0204571N/ Consolidated Training Systems Development	Project Name and Number. Surface Tactical Team Trainer (STTT)/21427

Tooling												
GFE			2.500									
Award Fees			.197	.160							.357	.357
Subtotal Product Development			25.772	2.407		.675				CONT	CONT	N/A
Remarks: * PY total also includes NSWC PHD and NSWC DD ** AAI Contract Award 3/98 CPIF, EWA Contract Award 6/98 CPFF												
Development Support Equipment												
Software Development	Various	MULTIPLE	15.534	2.821		3.341				CONT	CONT	N/A
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data	WR/RCP	MULTIPLE	5.741	.460		.345				CONT	CONT	N/A
GFE												
Subtotal Support			21.275	3.281		3.686				CONT	CONT	N/A
Remarks:												

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	Fy00 Cost	FY00 Award Date	FY01 Cost	FY01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR/RCP	NSWC Crane/PHD	3.100	.157		0				CONT	CONT	N/A
Operational Test & Evaluation												
Tooling												
GFE												
Subtotal T&E			3.100	.157		0				CONT	CONT	N/A
Remarks:												
Contractor Engineering Support												
Government Engineering Support	WR/RCP	PHD NSWC, CA	1.583	.100		0				0	1.629	N/A
Program Management Support												

Exhibit R-2a, RDT&E Project Justification			Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA7	Program Element Name & No. 0204571N/ Consolidated Training Systems Development	Project Name and Number. Surface Tactical Team Trainer (STTT)/21427	

Program Management Personnel												
Travel												
Labor (Research Personnel)												
Overhead												
Subtotal Management			1.583	.100		0				0	1.629	N/A
Remarks:												
Total Cost			51.730	5.945		4.361				CONT	CONT	N/A
Remarks:												

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204571N
PROGRAM ELEMENT TITLE: Consolidated Training Systems Development

PROJECT NUMBER: W0431
PROJECT TITLE: Tactical Aircrew Combat Training System (TACTS)

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
W0431 Tactical Aircrew Combat Training System (TACTS)	3,267	2,934	2,747	1,714	0	0	0	0	0	57,256*
TOTAL	**3,267**	**2,934**	**2,747**	**1,714**	**0**	**0**	**0**	**0**	**0**	**57,256***

Quantity of RDT&E Articles

* This amount includes FY90-FY01.

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project develops new TACTS capabilities primarily through the integration of additional types of aircraft and weapons. This requires development of new aircraft interfaces, weapons and countermeasures simulations, and modifications to displays. Software is also developed to produce computer generated Electronic Warfare (EW) threats to enhance the system's ability to provide training in a realistic EW environment. Various other system performance improvements are also developed to make the system more effective and reliable.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

- (U) ($ 755) Weapons Integration - Completed the development of the Phoenix training capability for the F-14. Resumed development of a Joint Stand-Off Weapon (JSOW) training capability.
- (U) ($2,379) System Upgrades - Continued development of block 5.2 (formerly referred to as 6.0) software for the Control and Computation Subsystem (CCS) and A10 software for the P4A Aircraft Instrumentation Subsystem (AIS). Completed development of the Advanced Message Oriented Data Security Module (AMODSM).
- (U) ($ 133) Studies/Analysis/T&E - Developed test procedures for testing block 5.2 and A10 software.

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 | **PROGRAM ELEMENT: 0204571N** | **PROGRAM ELEMENT TITLE: Consolidated Training Systems Development** | **PROJECT NUMBER: W0431** | **PROJECT TITLE: Tactical Aircrew Combat Training System (TACTS)**

2. FY 1999 PLAN:

- (U) ($1,000) Weapons Integration - Continue development of a training capability for JSOW.
- (U) ($1,649) System Upgrades - Continue development of block 5.2 (formerly referred to as 6.0) software for CCS and A10 software for P4A AIS.
- (U) ($ 240) Studies/Analysis/T&E - Test block 5.2 CCS and A10 software.
- (U) ($ 45) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2000 PLAN:

- (U) ($ 827) Weapons Integration - Complete development of the JSOW training capability for the F/A-18. Develop a similar training capability for the Joint Direct Attack Munitions (JDAM) weapon.
- (U) ($1,645) System Upgrades- Complete the development of block 5.2 CCS software and A10 P4A AIS software. Develop software modifications to enable the system to use F/A-18 and AV-8B navigation data to improve the TACTS tracking solution in areas of marginal range coverage. Develop block 6.0 software for the CCS and Advance Display and Debriefing Subsystem (ADDS), and block A05 and K05 software for the two variants of the AIS Internal (AISI).
- (U) ($ 275) Studies/Analysis/T&E - Complete any follow-up testing of the block 5.2 CCS software and block A10 P4A AIS software. Develop test procedures for testing block 6.0 CCS/ADDS software and A05/K05.

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 | **PROGRAM ELEMENT: 0204571N** | **PROGRAM ELEMENT TITLE: Consolidated Training Systems Development** | **PROJECT NUMBER: W0431** | **PROJECT TITLE: Tactical Aircrew Combat Training System (TACTS)**

(U) B. PROGRAM CHANGE SUMMARY

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	3,367	3,069	4,934
(U) Appropriated Value:	3,512	3,069	
(U) Adjustments from President's Budget:	-100	-135	-2,187
(U) FY 2000 President's Budget Submit:	3,267	2,934	2,747

CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY98 decrease of -$100 thousand is based on a $65 thousand reduction for Small Business Innovative Research (SBIR) Assessment, a $38 thousand reduction for a Navy reprioritization of requirements and a $3 thousand increase for minor pricing adjustments. The FY99 decrease of -$135 thousand reflects Congressional undistributed reductions. The FY00 decrease of -$2,187 thousand is based on a $133 thousand reduction for Full Institutional Funding for Major Range Test Facility Base (MRTFB) indirect cost, a $2,012 thousand realignment in support of the Joint Tactical Combat Training System (JTCTS) and the Training Range and Instrumentation Development (TRID) programs and a $42 thousand reduction due to Congressional undistributed reductions.

(U) Schedule: The following milestones have been changed due to program restructure:

From	To
A10 DT-II 1Q-4Q/99	A10 DT-II 4Q99/1Q00
Blk 6.0 DT II 1Q-4Q/99	Blk 5.2 DT-II 4Q99/1Q00

"Block 6.0" has been changed to "Block 5.2" to reflect the revised version number for the next CCS software build.

The following milestones have been added: A05/K05 DT-II 2Q-3Q/01
Blk 6.0 DT-II 2Q/3Q/01

(U) Technical: Not Applicable.

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 | **PROGRAM ELEMENT: 0204571N** | **PROGRAM ELEMENT TITLE: Consolidated Training Systems Development** | **PROJECT NUMBER: W0431** | **PROJECT TITLE: Tactical Aircrew Combat Training System (TACTS)**

(U) C. OTHER PROGRAM FUNDING SUMMARY: N/A

Related RDT&E

(U) P.E. PE 0604735F (Range Improvement) - Includes funding for joint efforts with USAF.

(U) C. ACQUISITION STRATEGY: The TACTS program is a non-ACAT program. The integrated program teams that develop new TACTS capabilities include contractors whose products and services are obtained by means of competitive award, indefinite deliveries/indefinite quantity (IDIQ), and cost-type contracts. Individual delivery orders are awarded for specific development efforts.

(U) D. SCHEDULE PROFILE

	FY 1998	FY 1999	FY 2000	To Complete
(U) Program Milestones				
(U) Engineering Milestones				
(U) T&E Milestones	1Q/2Q AMODSM DT-II	4Q99/1Q00 A10 DT-II 4Q99/1Q00 Blk 5.2 DT-II		2Q/3Q-01 A05/K05 DT-II 2Q/3Q-01 Blk 6.0 DT-II
(U) Contract Milestones				

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204571N PROJECT NUMBER: W0431
PROJECT TITLE: TACTS

Cost Categories:	Contract Method & Type	Performing Activity & Location	*Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Miscellaneous	Various	Various	31,474	2,549	1Q/99	2,297	1Q/00	1,389	37,709	N/A
Subtotal Project Development			**31,474**	**2,549**	**1Q/99**	**2,297**	**1Q/00**	**1,389**	**37,709**	**N/A**
Remarks										
Miscellaneous	Various	Various	14,742	290	1Q/99	400	1Q/00	225	15,657	
Subtotal Support			**14,742**	**290**		**400**		**225**	**15,657**	
Remarks										
Miscellaneous	Various	Various	3,645	50	1Q/99	50	1Q/00	100	3,845	N/A
Subtotal Test & Evaluation			**3,645**	**50**		**50**		**100**	**3,845**	
Remarks										
Subtotal Management			**0**	**0**		**0**		**0**	**0**	
SBIR Assessment				45					45	
Remarks										
Total Cost			**49,861**	**2,934**		**2,747**		**1,714**	**57,256**	

*** This amount includes FY90-FY98.**

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204571N
PROGRAM ELEMENT TITLE: Consolidated Training Systems

PROJECT NUMBER: W0604
PROJECT TITLE: Training Range and Instrumentation Development (TRID)

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
W0604 Training Range and Instrumentation Development (TRID)	4,056	2,113	1,635	3,425	4,389	3,636	3,644	3,645	CONT.	CONT.
TOTAL	4,056	2,113	1,635	3,425	4,389	3,636	3,644	3,645	CONT.	CONT.

Quantity of RDT&E Articles

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project develops specialized instrumentation systems for fleet readiness training while minimizing life cycle costs. Tasks include development of the following: electronic warfare simulators and associated subsystems, target control systems, Large Area Tracking Range (LATR) improvements, underwater technology, ranges interoperability and information architecture, shallow water range activity which includes establishment of capability at Pacific Missile Range Facility (PMRF SWTR) (Phase I) and in the Maui basin (Phase II) at Hawaii Island Shallow Water Training Range (HI SWTR), and assorted Advanced Weapons Training Systems (AWTS), such as Imaging Weapons Training Systems (IWTS), Weapons Impact Scoring Set (WISS), Remote Strafe Scoring System (RSSS), and weapon and countermeasure simulations for use with various range training systems.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

- (U) ($ 873) Completed development and testing of RSSS Product Improvement Program (PIP). Continued development of IWTS P^3I.
- (U) ($ 248) Completed support development and testing of Next Generation Target Control System (NGTCS).
- (U) ($2,363) Continued technology development for CONUS shallow water ranges. Completed development and began installation of PMRF SWTR and continued development of HI SWTR.

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0204571N** **PROGRAM ELEMENT TITLE: Consolidated Training Systems** **PROJECT NUMBER: W0604** **PROJECT TITLE: Training Range and Instrumentation Development (TRID)**

- (U) ($572) Continued systems definitions, development of specifications, analysis of concepts, and systems engineering for developing improved interoperability among various projects. Continued systems engineering efforts for range integration using Defense Information Infrastructure standards (DIS) technology, continued development of common range architecture that meets High Level Architecture (HLA) standards, and conducted analyses of design data to ensure that Tactical Training Range (TTR) programs are logistically supportable.

2. FY 1999 PLAN:

- (U) ($800) Complete development of IWTS P^3I. Conduct testing and obtain MS III of RSSS PIP.
- (U) ($495) Continue technology development for CONUS Shallow Water Ranges. Complete test and evaluation of PMRF SWTR.
- (U) ($298) Continue systems definitions, development of specifications, analysis of concepts, and systems engineering for various projects. Continue systems engineering efforts for range integration and continue development of common range architecture that meets HLA standards. Conduct analyses of design data to ensure that TTR programs are logistically supportable.
- (U) ($500) Commence development of Block 3.0 software upgrade LATR display system and LATR hardware/software capabilities for existing training systems.
- (U) ($ 20) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2000 PLAN:

- (U) ($527) Commence development of a singular display and debrief capability for all tactical training ranges systems to provide a common operating environment (COE) for the efficient life cycle support. This singular display and debrief capability will support the real-time and post exercise capability, as well as the Information Technology of 21st Century (IT-21) initiative. The capability will be based on machine independent code that can be hosted on personal computers.
- (U) ($100) Commence development of the HLA and the Test and Training Enabling Network Architecture (TENA) for the tactical training ranges systems. The Architecture will provide for integration of the tactical training systems into a configuration which will establish the infrastructure for inter-service systems interoperability.

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204571N
PROGRAM ELEMENT TITLE: Consolidated Training Systems

PROJECT NUMBER: W0604
PROJECT TITLE: Training Range and Instrumentation Development (TRID)

- (U) ($150) Begin the development of the modeling and simulation of the training ranges systems communications systems. Collect information and input this into the model to baseline the east coast and west coast communications systems.
- (U) ($125) Conduct the operational research and systems engineering required to develop the transition plans necessary to integrate and transition legacy systems to the future systems.
- (U) ($ 75) Commence development and integration of the tactical training ranges systems with the Command, Control, Communication, Computers and Information (C4I) Global Command and Control System (GCCS). This will provide the integration of information from all services into a command and control level depiction of the exercises/operations.
- (U) ($ 75) Research integration of embedded instrumentation.
- (U) ($583) Complete development of Block 3.0 software upgrade and commence development of Block 4.0 software upgrade for the LATR display debriefing system and LATR hardware/software capabilities for existing training systems.

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0204571N**
PROGRAM ELEMENT TITLE: Consolidated Training Systems

PROJECT NUMBER: W0604
PROJECT TITLE: Training Range and Instrumentation Development (TRID)

(U) B. PROGRAM CHANGE SUMMARY

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	9,133	2,195	1,734
(U) Appropriated Value:	9,315	2,195	
(U) Adjustments from President's Budget:	-5,077	-82	-99
(U) FY 2000 President's Budget Submit:	4,056	2,113	1,635

CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY98 decrease of $5,077 thousand reflects a $5,000 thousand reduction for the PMRF Optical Sensors project that was transferred to program element 0603868C, a $15 thousand reduction for Small Business Innovative Research (SBIR) assessment, and a reduction of $62 thousand for minor program and pricing adjustments. The FY99 decrease of $82 thousand reflects Congressional undistributed reductions. The FY00 decrease of $99 thousand reflects minor pricing adjustments.

(U) Schedule: The following milestones have changed due to program restructure.

From	To
RSSS PIP MSIII 1Q/99	RSSS PIP MSIII 2Q/99
IWTS P^3I DT-II 3Q/00-4Q/00	IWTS P^3I DT-II 4Q/99-1Q/00

The following milestones have been added:

SWR Phase I IOC 1Q/99	
Block 3.0 LATR upgrade DT III 4Q/99	Block 3.0 LATR upgrade IOC 1Q/00
Block 4.0 LATR upgrade DT III 4Q/00	Block 4.0 LATR upgrade IOC 1Q/01

(U) Technical: Not Applicable.

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0204571N** **PROGRAM ELEMENT TITLE: Consolidated Training Systems** **PROJECT NUMBER: W0604** **PROJECT TITLE: Training Range and Instrumentation Development (TRID)**

(U) C. OTHER PROGRAM FUNDING SUMMARY

Appn	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete
(U) OPN/P-1 Weapons Range Support Equipment	3,348	1,227	6,319	4,519	24,023	22,965	16,563	17,365	CONT.

Related RDT&E: Not Applicable.

(U) C. ACQUISITION STRATEGY: The TRID program is a non-ACT program. The integrated program teams that develop new TRID capabilities include contractors whose products and services are obtained by means of competitive award, indefinite deliveries/indefinite quantity (IDIQ), and cost-type contracts. Individual delivery orders are awarded for specific development efforts.

(U) D. SCHEDULE PROFILE

	FY 1998	FY1999	FY 2000	To Complete
(U) Program Milestones		1Q SWR Phase I IOC		
(U) Engineering Milestones		2Q RSSS PIP MS III	1Q Block3.0 LATR Upgrade IOC	1Q-01 Block4.0 LATR Upgrade IOC
(U) T&E Milestones	1Q/98-4Q/98 RSSS PIP DT-II	4Q/99-1Q/00 P^{3}I DT-II 4Q Block 3.0 LATR Upgrade DT III	4Q Block 4.0 LATR Upgrade DT III	
(U) Contract Milestones				

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204571N PROJECT NUMBER: W0604
PROJECT TITLE: TRID

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Miscellaneous	Various	Various	78,591	1,191	1Q/99	1,285	1Q/00	CONT.	CONT.	N/A
Development of Simulations	C/CPFF	TBD	0	0		0		5,000	5,000	5,000
Subtotal Project Development			**78,591**	**1,191**		**1,285**		**CONT.**	**CONT.**	
Remarks										
Miscellaneous	Various	Various	10,288	217	1Q/99	250	1Q/00	CONT.	CONT.	N/A
Subtotal Support			**10,288**	**217**		**250**		**CONT.**	**CONT.**	
Remarks										
Miscellaneous	Various	Various	0	685	1Q/99	100	1Q/00	CONT.	CONT.	N/A
Subtotal Test & Evaluation			**0**	**685**		**100**		**CONT.**	**CONT.**	
Remarks										
Subtotal Management			**0**	**0**		**0**		**0**	**0**	
SBIR Assessment				**20**					**20**	
Remarks										
Total Cost			**88,879**	**2,113**		**1,635**		**CONT.**	**CONT.**	

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204571N
PROGRAM ELEMENT TITLE: Consolidated Training Systems

PROJECT NUMBER: W1998
PROJECT TITLE: Joint Tactical Combat Training System (JTCTS)

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
W1998 Joint Tactical Combat Training System (JTCTS)										
	31,277	9,412*	7,871	7,933	6,048	5,115	5,244	5,363	CONT.	CONT.
TOTAL	**31,277**	**9,412**	**7,871**	**7,933**	**6,048**	**5,115**	**5,244**	**5,363**	**CONT.**	**CONT.**
Quantity of RDT&E Articles	12	0	0	1	0	7	7	0	CONT.	CONT.

* Controls reflect a $2.5M Congressional add for LATR/KITS integration technical evaluation to be executed under project unit W2660.

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Joint Tactical Combat Training System (JTCTS) is planned to provide fixed, transportable, and mobile range instrumentation equipment for the USN and USAF for both shore-based and deployable applications. The fixed application provides shore-based tactical aircrew training while the mobile application will provide deployable at-sea single platform to multi-platform (surface ship, submarine and aircraft) and Naval Expeditionary Force multi-warfare training. To accomplish this, the JTCTS instrumentation is being designed to develop and transmit exercise scenarios; simulate/stimulate all exercise participants sensors/weapons with the exercise scenario, track all exercise participants and events, e.g., weapons engagements; and provide accurate, realistic, and timely exercise feedback. JTCTS is building on technology developed for existing Tactical Training Ranges Systems including the Tactical Aircrew Combat Training System, Mobile Sea Range, Large Area Tracking Range, and the capabilities developed for the in-port Battle Force Tactical Training Program. JTCTS incorporates the Defense Modeling and Simulation Office sponsored Distributed Interactive Simulation protocol data unit and the Higher Level Architecture for interoperability with Navy and other service live, virtual (simulators), and constructive (war games) simulations.

Based on the reduced funding profile that has occurred since the FY98 President's Budget, the JTCTS program has been restructured. The program schedule has been restructured to a more evolutionary approach which develops/fields a mobile, rangeless capability first; followed by the development/fielding of a fixed air range capability and finally the development/fielding of a fleet battle group capability. The first part of the approach additionally will meet an urgent fleet requirement for a mobile rangeless air combat capability delivered to Carrier Air Wing Five (CVW-5) in FY00. The CVW-5 requirement will be met by leaving in

place the JTCTS development prototype after operational testing with CVW-5, thus providing an interim training capability to CVW-5 after fully testing the system within a robust operational environment. The mobile rangeless engineering and manufacturing development (E&MD) system consists of a "core" for mission control and debrief capability and 12 participant instrumentation packages (PIPs).

The fixed range phase will begin development in FY01 and continue into FY03. The fixed range "core" will build upon the mobile "core" resulting in a greatly enhanced version that will interface with existing training range systems such as the Integrated Air Defense system. The fixed range phase will culminate in the testing and development of the E&MD core to the Naval Strike Air Warfare Center, NAS Fallon NV. The "core" and interfaces will be supplemented by 115 PIPs procured with Aircraft Procurement Navy (APN) funding. This E&MD system will be left in place to satisfy fleet requirements to replace the aging TACTS system at NSAWC Fallon.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

- (U) ($26,387) Continued contract for engineering and manufacturing development (E&MD) for the mobile rangeless capability to include, software/hardware development, site/platform integration, development testing and hardware manufacturing. Supported government testing.
- (U) ($ 4,890) Monitored contractor software development, hardware/software integration, development testing and hardware manufacturing. Began government development testing. Prepared platform site for integration development testing.

2. FY 1999 PLAN:

- (U) ($3,115) Continue the E&MD portion of the contract for the mobile rangeless capability to include software/hardware development and contractor acceptance testing.
- (U) ($2,707) Conduct system platform integration testing. Continue government development operational testing.
- (U) ($1,000) Monitor contractor progress and coordinate subsystem development/test.
- (U) ($ 96) Portion of extramural program reserved for Small Business Innovation Research Assessment in accordance with 15 USC 638.
- (U) ($2,494) Conduct a LATR/KITS integration technical evaluation (project unit W2660).

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 | **PROGRAM ELEMENT: 0204571N** | **PROGRAM ELEMENT TITLE: Consolidated Training Systems** | **PROJECT NUMBER: W1998** | **PROJECT TITLE: Joint Tactical Combat Training System (JTCTS)**

3. FY 2000 PLAN:

- (U) ($3,900) Deliver and install mobile rangeless system on CV-63/CVW-5.
- (U) ($3,971) Complete government development operational testing. Monitor contractor hardware/software development and hardware/software integration. Leave prototype JTCTS system in place for fleet use.

(U) B. PROGRAM CHANGE SUMMARY

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	32,365	6,942	7,910
(U) Appropriated Value:	33,967	9,442	
(U) Adjustments from President's Budget:	-1,088	+2,470	-39
(U) FY 2000 President's Budget Submit:	31,277	9,412	7,871

CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY98 decrease of -$1,088 thousand is based on a $720 thousand reduction for Small Business Innovative Research Assessment, a $364 thousand reduction for Navy's reprioritization of requirements and a $4 thousand reduction for a minor pricing adjustment. The FY99 increase of $2,470 thousand reflects a Congressional add of $2,500 thousand for LATR/KITS integration executed under W2660. This increase is partially offset by a -$24 thousand decrease for Congressional undistributed reductions and -$6 thousand for minor pricing adjustments under W2660. The FY00 decrease of -$39 thousand reflects pricing adjustments.

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0204571N** **PROGRAM ELEMENT TITLE: Consolidated Training Systems** **PROJECT NUMBER: W1998** **PROJECT TITLE: Joint Tactical Combat Training System (JTCTS)**

CHANGE SUMMARY EXPLANATION CONT.:

(U) Schedule:The following milestones have been changed due to program restructure.

From	To
MS III 1Q/02	MS III 4Q/00
SW PDR 3Q/98	SW PDR 4Q/98
SW CDR 4Q/98	SW CDR 1Q/99

The following milestone has been added:

FRP Contract Award 1Q/01

(U) Technical: Not Applicable.

(U) C. OTHER PROGRAM FUNDING SUMMARY

Appn	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete
(U) OPN/P-1 Weapons Range Support Equipment	0	0	0	0	4,400	2,900	3,906	2,898	CONT.
(U) APN/P-1 Other Production Charges	0	0	16,269	17,339	14,776	15,387	15,764	16,099	CONT.

Related RDT&E

(U) P.E.: Joint program with USAF Program Element 0604735F

(U) C. ACQUISITION STRATEGY: Due to the restructured acquisition program, we plan on maintaining a cost plus award fee (CPAF) contract for the E&MD and FOT&E efforts through each phase of JTCTS development. Final strategy is pending finalization of program restructure.

(U) D. SCHEDULE PROFILE: See attached milestone chart.

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204571N
PROGRAM ELEMENT TITLE: Consolidated Training Systems

PROJECT NUMBER: W1998
PROJECT TITLE: Joint Tactical Combat Training

JTCTS PROGRAM SCHEDULE

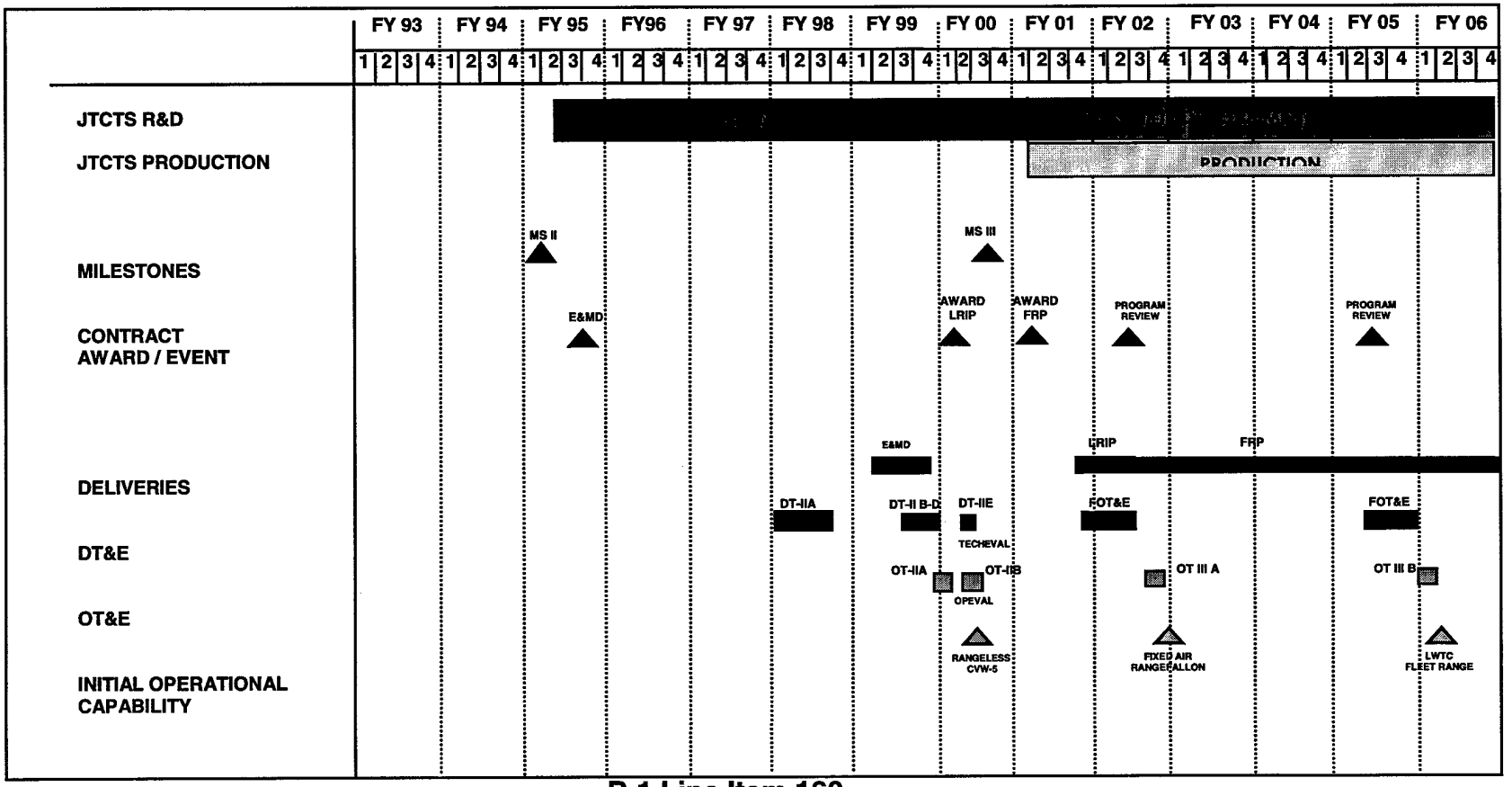


EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204571N PROJECT NUMBER: W1998
PROJECT TITLE: JTCTS

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Mobile Rangeless EDM Development	CPAF	Raytheon	78,278	3,115	1Q/99	3,500	1Q/00	0	84,893	84,893
Award Fee	CPAF	Raytheon	5,714	0	N/A	0	N/A	0	5,714	5,714
Fixed Range EDM Development	CPAF	Raytheon	0	0	0	0	N/A	CONT.	CONT.	
Award Fee	CPAF	Raytheon	0	0	0	0	N/A	CONT.	CONT.	
Miscellaneous	Various	Various	24,863	1,864	1Q/99	2,751	1Q/00	CONT.	CONT.	N/A
LATR/KITS Integration	TBD	TBD	0	2,494	TBD					
Subtotal Project Development			**108,855**	**7,473**		**6,251**		**CONT.**	**CONT.**	
Remarks Percent of award fee that was actually awarded in prior years is 54% (3.1M).										
Miscellaneous	Various	Various	8,290	1,000	1Q/99	484	1Q/00	CONT.	CONT.	N/A
Subtotal Support			**8,290**	**1,000**		**484**		**CONT.**	**CONT.**	
Remarks										
Miscellaneous	WX	NAWC AD PAX	1,361	843	1Q/99	1,136	1Q/00	CONT.	CONT.	N/A
Subtotal Test & Evaluation			**1,361**	**843**		**1,136**		**CONT.**	**CONT.**	
Remarks										
Subtotal Management			**0**	**0**		**0**		**0**	**0**	
SBIR Assessment				**96**					**96**	
Remarks										
Total Cost			**118,506**	**9,412**		**7,871**		**CONT.**	**CONT.**	

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204571N
PROGRAM ELEMENT TITLE: Consolidated Training Systems Development

PROJECT NUMBER: W2124
PROJECT TITLE: Air Warfare Training Development

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
W2124 Air Warfare Training Development	1,719	1,847	2,131	2,192	1,961	2,189	2,246	2,298	CONT.	CONT.
TOTAL	1,719	1,847	2,131	2,192	1,961	2,189	2,246	2,298	CONT.	CONT.

Quantity of RDT&E Articles

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

This project develops new training system technologies for use in naval aviation training. Products from this effort directly support the Marine Corps Aviation Simulation Master Plan and will support the development and design of future naval aviation training/mission rehearsal systems. Tasks include: 1) Advanced training systems development to provide for transportable, modular, High Level Architecture (HLA) compliant, high fidelity mission rehearsal capabilities. Mission rehearsal is defined as the practice of planned tasks and functions critical to mission success using a true-to-life, interactive representation of the expected operating environment. Technologies to be developed and integrated include helmet mounted and/or flat panel displays, photographic quality image generation, advanced environmental effects models, radar/infra-red/electro-optic and acoustic sensor simulations; and 2) the Aviation Training Technology Integration Facility (ATTIF) which is a man-in-the-loop testbed for the integration of software, hardware, and networked systems. ATTIF will include a HLA node for participation in fleet exercise synthetic battlespace. This ATTIF capability provides a window to fleet aviators for critical comment, evaluation, and fine tuning of new and innovative technology before it is fielded.

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204571N
PROGRAM ELEMENT TITLE: Consolidated Training Systems Development

PROJECT NUMBER: W2124
PROJECT TITLE: Air Warfare Training Development

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

- (U) ($384) Developed initial performance level specification for Mission Rehearsal image generators.
- (U) ($568) Determined core sensor, environmental, and threat modeling performance level specifications.
- (U) ($215) Achieved preliminary integration of display, image generator, and effects modeling systems (ATTIF).
- (U) ($552) Increased operational capability of ATTIF for networking/HLA test node.

2. FY 1999 PLAN:

- (U) ($525) Develop Image Generator performance specifications for rehearsal, training, and networkable PCs.
- (U) ($320) Develop baseline night vision device (NVD) simulation performance specifications.
- (U) ($886) Reach IOC for ATTIF networkable, reconfigurable mission rehearsal device.
- (U) ($110) Determine specification-level database attributes for IR, environmental, and special effects modeling.
- (U) ($ 6) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2000 PLAN:

- (U) ($505) Develop NVD simulation performance specifications for legacy systems integration.
- (U) ($282) Demonstrate/evaluate combat special effects modeling (ATTIF).
- (U) ($120) Develop draft performance specifications for combat special effects modeling.
- (U) ($624) Demonstrate low-cost, networkable, PC-based IGs with photo-realistic databases (ATTIF).
- (U) ($600) Develop initial performance specifications for modular weapons systems simulation.

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 | PROGRAM ELEMENT: 0204571N | PROGRAM ELEMENT TITLE: Consolidated Training Systems Development | PROJECT NUMBER: W2124 | PROJECT TITLE: Air Warfare Training Development

(U) B. PROGRAM CHANGE SUMMARY

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	1,972	2,053	2,167
(U) Appropriated Value:	2,106	2,053	
(U) Adjustments from President's Budget:	-253	-206	-36
(U) FY 2000 President's Budget Submit:	1,719	1,847	2,131

CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY98 adjustment of -$253 thousand reflects a reprogramming of $222 thousand for other Navy priorities and a Small Business Innovative Research (SBIR) assessment of -$31 thousand. The FY99 adjustment of -$206 thousand reflects Congressional undistributed reductions. The FY00 adjustment of -$36 thousand reflects minor pricing adjustments.

(U) Schedule: N/A

(U) Technical: N/A

(U) C. OTHER PROGRAM FUNDING SUMMARY (Dollars in Thousands)

Appn	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete
APN Line 51									
COMMON GROUND EQUIPMENT	0	0	31,373	10,592	42,871	22,784	10,264	0	117,184
(USMC Aviation Simulation Master Plan)									

Related RDT&E

(U) P.E. 0603707N, Project # R1773, Sub-Project Title: Transportable Strike Assault Rehearsal System (T-STARS)

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204571N
PROGRAM ELEMENT TITLE: Consolidated Training Systems Development

PROJECT NUMBER: W2124
PROJECT TITLE: Air Warfare Training Development

(U) D. ACQUISITION STRATEGY:

This is a non-acquisition program with no specific acquisition strategies.

(U) E. SCHEDULE PROFILE

	FY 1998	FY 1999	FY 2000
(U) Program Milestones			1Q Implement integration plan
(U) Engineering Milestones	4Q Perf Spec Sensors & FOV	3Q PC IG Sensor Sim	2Q PC IG Perf Spec
(U) T&E Milestones	4Q Prelim ATTIF capability	4Q IOC ATTIF network PC IG demo	3Q PC IG photo-realistic Db
( ) Contract Milestones			

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204571N

PROJECT NUMBER: W2124

PROJECT TITLE: Air Warfare Training Development

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
	MIPR/WX	Miscellaneous	7186	895	11/98	1259	11/99	CONT.	CONT.	
Subtotal Product Development			**7,186**	**895**		**1,259**		**CONT**	**CONT**	
Remarks:										
	RC	GenPhysics Fairfax, VA	749	100	11/98	110	11/99	CONT.	CONT.	
Subtotal Support			**749**	**100**		**110**		**CONT.**	**CONT**	
Remarks:										
	WX	Misc/ATTIF	1,154	815	11/98	731	11/99	CONT	CONT	
Subtotal Test & Evaluation			**1,154**	**815**		**731**		**CONT**	**CONT**	
Remarks:										
	WX	NAWC-AD	710	31	11/98	31	11/99	CONT	CONT	
Subtotal Management			**710**	**31**		**31**		**CONT**	**CONT**	
Remarks:										
SBIR Assessment				6					6	
Total Cost			**9,799**	**1,847**		**2,131**		**CONT**	**CONT**	

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204571N
PROGRAM ELEMENT TITLE: Consolidated Training Systems Development Gaming Systems (ENWGS), Training, Modeling

PROJECT NUMBER: X1823
PROJECT TITLE: Enhanced Naval Warfare, Systems (TMS)

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X1823 Training and Training Devices Systems (TTDS)	840	0	0	0	0	0	0	0	0	13,619
* X1823 Training and Modeling Systems (TMS)	0	9,989	8,209	10,565	9,063	8,601	7,437	7,610		61,474

A (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The employment of naval forces in a multi-dimensional warfare environment is a complex operational problem. To counter the threat expected in hostile environments, naval officer training must be provided for all mission areas on a real-time basis at the Battle Force/Group level. This training must focus on tactical decision-making, tactics development/evaluation, and operational planning/execution. Shore-based classroom training and at-sea exercises have historically satisfied the Battle Group tactical training requirement. However, the effectiveness of this approach to training was reduced by the lack of a real-time decision-making environment during shore-based training and the reduction in number and scope of at-sea exercises. Training and Training Devices Systems is fulfilled by the Enhanced Naval Warfare Gaming System (ENWGS). Training and Modeling Systems is fulfilled by the Joint Simulation System (JSIMS), which will replace ENWGS.

ENWGS, with development ending in FY98, is a legacy modeling system for Navy Tier II and III training. It is in catastrophic maintenance mode pending replacement by JSIMS provides the decision-making environment and is a critical portion of the training that Battle Group Commanders and their supporting Warfare Commanders receive prior to deployment. ENWGS provides development of an enhanced wargaming/simulation capability to provide training to Battle Group Commanders and associated Warfare Commanders. ENWGS is a geographically distributed wargaming system that supports the needs and objectives of the Fleet Commanders. Through computer simulation, ENWGS assists tactical commanders in planning, executing, and evaluating Fleet operations and exercises. ENWGS also provides the ability to test the Battle Groups Operation Orders, providing the essential supplement to at-sea operations, prior to deployment. During FYs 95-98, ENWGS completed its conversion to an open systems architecture to provide software portability (Release 5.0).

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT:** 0204571N **PROJECT NUMBER:** X1823
PROGRAM ELEMENT TITLE: Consolidated Training Systems Development Gaming Systems (ENWGS), Training, Modeling **PROJECT TITLE:** Enhanced Naval Warfare, Systems (TMS)

* This amount include FY-94 - FY-98.

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Joint Simulation System (JSIMS) will replace ENWGS and provide expanded functionality. The mission of JSIMS is to provide a readily available, operationally valid synthetic environment for the Commanders-in-Chief (CINCs), their components, other Joint organizations and the Services to: jointly train, educate, develop doctrine and tactics, formulate and assess operational plans, assess warfighting situations, define operational requirements, and provide operational inputs to the acquisition process. In short, JSIMS will provide not only an improved certified capability for inter-Service operability but also an enhanced Joint Battle Staff training capability for the warfighting CINCs. All service Executive Agents (EAs) and Development Agents (DAs) are required to contribute to the initial population of the JSIMS architecture with facilities, services and tools, to meet an Initial Operational Capability (IOC) for Joint Task Force (JTF) training of no later than April 2001, and of Full Operational Capability (FOC) for all service applications no later than 2003. In keeping with the premise that the Services/components are best able to define their own capabilities and functionality, the JPO is working in concert with the Services to import Service-provided functionality such as land, air, naval and littoral warfare to JSIMS. The JPO will integrate these functionalities for use by Joint Army/Marine/Navy/Air Force exercise. JSIMS development is incremental. In June 1994 the Services and Director Joint Program Office signed a Memorandum Of Agreement (MOA) to establish JSIMS; a critical next-generation Modeling and Simulation (M&S) system. The long term goal of the agreement is to integrate the range of missions of the Armed Forces within a common framework. That framework provides a balanced melding of live, virtual and constructive M&S representations, with Command, Control, Communications, Computers and Intelligence (C4I) fully supported, and interfaces using real-world equipment. As the Maritime Warfare EA, OPNAV N7, on 29 Aug 1995, assigned NAVSEA as the JSIMS Maritime Development Agent (DA). The objective of the JSIMS Maritime portion of the JSIMS Program is to train at all levels of command, in all warfare areas, including joint and service specific training. JSIMS Maritime is developing the Maritime Mission Space Objects for the JSIMS Program, as well as selected portions of the core infrastructure and services to be determined when the Joint Object Model is partitioned. PROGRAM WAS TRANSITIONED FROM NAVSEA TO SPAWAR IN FY99.

1. (U) FY 1998 ACCOMPLISHMENTS:

- ($840) ENWGS completed and fielded R5.0 Build 2 (TAC-4 Workstation Game Play and Game Preparation). Completed and fielded R5.0, Build 3 (Operational Interface Design (Link 11, OTH-Gold and Post Game Analysis).

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204571N
PROGRAM ELEMENT TITLE: Consolidated Training Systems Development Gaming Systems (ENWGS), Training, Modeling

PROJECT NUMBER: X1823
PROJECT TITLE: Enhanced Naval Warfare, Systems (TMS)

2. (U) FY 1999 PLAN:

- ($8134) - Complete Build N1 Engineering & Development and T&E; complete Build N2 Engineering & Development.Build N3: Continue work on Domain Design, Domain Analysis, and Software Construction; initiate Database Development and Integration and Test. Initiate Version 1.1 Development.

- ($1855) - Model/software development required to support Joint Training Federation (JTF) HQ Staff training for electro-optic sensors, Combat DF/OUTBOARD, acoustic comms, countermeasures, tactical control devices, Command and Control Warfare, littoral representation, strike warfare ops, Theater Missile Defense Command and Control, amphibious logistics, in-port replenishment, and logistics operations.

3. (U) FY 2000 PLAN:

- ($8209) - Complete Build N1,which includes all the models and functionality required to fully meet the JSIMS ORD for IOC and conduct demonstration of functionality. Database Development, Software Construction, and Integration and Test. Continue work on Version 1.1 Development. Initiate Version 1.0 Development and Version 1.2 Development. Complete Build N1, which includes all the models and functionality required to fully meet the JSIMS-M ORD for IOC and conduct demonstration of functionality.

B. (U) PROGRAM CHANGE SUMMARY: FY-98 was decreased (-$22K) for SBIR reduction and (-$10K) for DD1002:April 1998 Update. Net decrease of (-$32K). FY-99 : Baseline Issue (+$8,167M); Additional JSIMS Development (BTR) (+$1,855M);Sec. 8108 Revised Economic Assumptions (-$19K); Civilian Personnel Underexecution (-$14K)

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

	FY98	FY99	FY2000
OPN (TMS)		0	1,011
O&MN (TMS)		0	236
OPN (TTDS)	911	1,036	0
0&MN (TTDS)	1669	1,872	1,889

D. (U) SCHEDULE PROFILE: Not Applicable

FY 2000 President's Budget Estimate

Exhibit R-3 Cost Analysis		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDTE/BA 7	PROGRAM ELEMENT NAME AND NUMBER Consolidated Training Systems Development - 0204571N	PROJECT NAME AND NUMBER Training & Modeling Systems (TMS) X1823

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	FY01 Cost	FY01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development												
Ancillary Hardware Development												
Systems Engineering	WR/RCP	Various	2,035	1,225	11/98	1,205	TBD			CONT	CONT	N/A
Licenses	WR/RCP	SSCSD, CA		408	11/98	412	TBD			CONT	CONT	N/A
Tooling												
GFE												
Award Fees												
Subtotal Product Development			2,035	1,633		1,617				CONT	CONT	N/A
Remarks: * PY Total also includes Multiple Contractors under Performing Activity												
Development Support Equipment												
Software Development	WR/RCP	SSCSD, CA	9,964	2,965	11/98	2,108	TBD			CONT	CONT	N/A
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data	WR/RCP	SSCSD, CA*		2,543	11/98	1,636	TBD			CONT	CONT	N/A
GFE												
Subtotal Support			9,964	5,508		3,744				CONT	CONT	N/A

Remarks:
*PY includes Multiple Contractorunder Performing Activity

Exhibit R-3 Cost Analysis		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDTE/BA 7	PROGRAM ELEMENT NAME AND NUMBER Consolidated Training Systems Development - 0204571N	PROJECT NAME AND NUMBER Training & Modeling Systems (TMS) X1823

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	Fy00 Cost	FY00 Award Date	FY01 Cost	FY01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR/RCP	Various	1,620	408	11/98	412	TBD			CONT	CONT	N/A
Operational Test & Evaluation												
Tooling												
GFE												
Subtotal T&E			1,620	408		412				CONT	CONT	N/A
Remarks: *PY includes NSWC PHD under Performing Activity												
Contractor Engineering Support	WR/RCP	SSCSD, CA*		1,111	11/98	1,161	TBD			CONT	CONT	N/A
Government Engineering Support	WR/RCP	SSCSD, CA		1,214	11/98	1,154	TBD			CONT	CONT	N/A
Program Management Support												
Program Management Personnel												
Travel	WR/RCP	SSCSD, CA		115	11/98	121	TBD			CONT	CONT	N/A
Labor (Research Personnel)												
Overhead												
Subtotal Management				2,440		2,436				CONT	CONT	N/A
Remarks: * PY includes Multiple Contractors under Performing Activity												
Total Cost			13,619	9,989		8,209				CONT	CONT	N/A
Remarks:												

Exhibit R-2, RDT&E Budget Item Justification									Date FEB 99	
APPROPRIATION/BUDGET ACTIVITY : RDT&E,N BA-7					R-1 ITEM NOMENCLATURE : INFORMATION WARFARE 0204575N					
COST ($ in Millions)	FY 98	FY 99	FY 00	FY 01	FY 02	FY 03	FY 04	FY 05	Cost to Complete	Total Cost
Total PE Cost	1.574	3.707	3.494	3.789	3.838	3.903	3.984	4.242	CONT.	CONT.
Project Z2263	1.574	3.707	3.494	3.789	3.838	3.903	3.984	4.242	CONT.	CONT.
Quantity of RDT&E Articles										

A. Mission Description and Budget Item Justification :
The Naval Information Warfare Activity is tasked as the Navy's principal technical agent to research, assess, develop and prototype Information Warfare (IW) capabilities.

B. Program Change Summary: Funding for FY00 through FY03 adjustments are a result of a new technology development program requirement.

Exhibit R-2a, RDT&E Project Justification									Date: FEB 99	
RDT&E,N BA-7			0204575N		INFORMATION WARFARE Z2263					
Cost ($ in Millions)	FY 98	FY 99	FY 00	FY 01	FY 02	FY 03	FY 04	FY 05	Cost to Complete	Total Cost
Project Cost	1.574	3.707	3.494	3.789	3.838	3.903	3.984	4.242	CONT.	CONT.
RDT&E Articles Qty	VAR	TBD	TBD	TBD	TBD	TBD	TBD	TBD	CONT.	CONT.

A. Mission Description and Budget Item Justification

This program supports the development of an effort encompassing all aspects of IW attack, protect and exploit. A key focus of efforts in this line will be providing tactical commanders with an IW Mission Planning, Analysis, and Command and Control Targeting System (IMPACTS) tool. An aggressive program is maintained to acquire and analyze state-of-the art technologies (software and hardware). Evaluate fleet applicability and prototype developmental capabilities. FY99 will initiate the design of next generation tactical deception (TD) systems as well as design the next generation psychological operations (PSYOP) system. These will continue through FY 01. FY 01 will initiate design to modify and incorporate second generation jammer. The project will continue upgrades through out-years. Ongoing efforts are to identify and develop new IW tools.

B. Other Program Funding Summary

	FY98	FY99	FY00	FY01	FY02	FY03	FY04	To FY05	Total Complete
Cost									
MPN Line 1B1B CONT.	11.3	11.1	11.8	12.1	12.5	12.8	12.9	12.9	CONT.
OMN Line 4B7N CONT.	1.7	1.8	1.9	1.9	2.0	2.0	2.0	2.1	CONT.
OPN 23400/6 CONT.	3.6	4.3	4.3	4.4	4.3	4.8	5.9	6.1	CONT.
RPN Line 1C1C CONT.	0.8	0.8	0.8	0.8	0.8	0.9	1.0	1.0	CONT.

C. Acquisition Strategy: This is a non-A-CAT program. No acquisition strategy exists.

Exhibit R-2a, RDT&E Project Justification	Date: FEB 99
D. Schedule Profile: N/A	

Exhibit R-3 Cost Analysis (page 1)										Date: FEB 99		
APPROPRIATION/BUDGET ACTIVITY RDT&E,N/ BA-7			PROGRAM ELEMENT 0204575N							INFORMATION WARFARE		
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	FY01 Cost	FY01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Software Development	CPFF	Various	2.921	3.601	2/00	3.394	2/01			Cont.	Cont.	Cont.
Support Cost	WR	Various	0.240	0.106	2/00	0.100	2/01			Cont.	Cont.	Cont.
Subtotal Development		Various	3.161	3.707	2/00	3.494	2/01			Cont.	Cont.	Cont.

Remarks: Information Warfare is defined as "actions taken to achieve information superiority by affecting adversary information, information-based processes, information systems, and computer-based networks while defending one's own information, information-based processes, information systems, and computer-based networks." The Information Warfare (IW) System Program funds several capabilities enabling joint and fleet commanders to conducts IW. It mans, trains, and equips naval forces to conduct IW.

Due to the rapidly developing pace of technology (turns over every 18 months) and emerging threat countries/entities, the IW program must be adaptable to ever changing requirements for capabilities.

Exhibit R-3 Cost Analysis (page 2)											Date: FEB 99	
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT								PROJECT NAME AND NUMBER	
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	CY Cost	CY Award Date	BY1 Cost	BY1 Award Date	BY2 Cost	BY2 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation												
Operational Test & Evaluation												
Tooling												
GFE												
Subtotal T&E												
Remarks												
Contractor Engineering Support												
Government Engineering Support												
Program Management Support												
Program Management Personnel												
Travel												
Labor (Research Personnel)												
Overhead												
Subtotal Management												
Remarks												
Total Cost			3.161	3.707	2/00	3.494	2/01			Cont.	Cont.	Cont.
Remarks												

EXHIBIT R-2, FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205601N
PROGRAM ELEMENT TITLE: HARM Improvement

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
E1780 HARM Improvement	4,893	7,148	11,323	9,577	5,205	4,054	2,177	2,265	0	52,038
E2185 Advanced Anti-Radiation Guided Missile (AARGM)	32,813	22,428*	10,843	7,873	0	0	0	0	0	106,596**
E2211 Joint Advanced Weapons System (JAWS) (Army Lead)	934	956	1,476	2,950	3,937	3,923	3,930	3,927	0	22,033
TOTAL	**38,640**	**30,532**	**23,642**	**20,400**	**9,142**	**7,977**	**6,107**	**6,192**	**0**	**180,667**

*FY99 estimate reflects a $12.0M Congressional Add for AARGM(W2661/E2661).
**Funding prior to FY97 for this project is under PE 0603217N. E1780, E2185,E2211 were previously executed under W1780, W2185, W2211 respectively.

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

(U) E1780/HIGH-SPEED ANTI-RADIATION (HARM) IMPROVEMENT: The HARM Improvement Program consists of two improvement efforts: a tactical software upgrade (Block V) to the missile, and the International HARM Upgrade Program (Block VI). Block VI is a tri-national cooperative program consisting of a tactical software upgrade in conjunction with a hardware upgrade which includes the installation of an Inertial Measurement Unit (IMU) closely coupled with a Global Positioning System (GPS) receiver. This will provide a much improved guidance capability for the current AGM-88B missile (in German and Italian inventories) and AGM-88C missile (in U.S. inventory). This IMU/GPS system will be retrofitted into existing missiles, as a kit, at the depot.

(U) E2185/ADVANCED ANTI-RADIATION GUIDED MISSILE (AARGM) and W2166/AARGM (Congressional Add): AARGM is a Phase III Small Business Innovative Research (SBIR) program designed to demonstrate an advanced dual-mode seeker on an existing High speed Anti-Radiation Missile (HARM) airframe. Project Unit W2166 is used to track congressional adds to the program.

(U) E2211/JOINT ADVANCED WEAPONS SYSTEM (JAWS): JAWS is a proposed joint service program which will fulfill Army and Marine Corps Mission Needs Statement requirements for the program. The Navy is participating with the Army in joint trade studies and development of Milestone 0 support documentation including a FY 2000 new start decision and joint Analysis of Alternatives (AOA).

EXHIBIT R-2, FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205601N
PROGRAM ELEMENT TITLE: HARM Improvement

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing, operational systems.

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0205601N** **PROJECT NUMBER: E1780**
PROGRAM ELEMENT TITLE: HARM Improvement **PROJECT TITLE: HARM Improvement**

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
E1780 HARM Improvement *	4,893	7,148	11,323	9,577	5,205	4,054	2,177	2,265	0	52,038
TOTAL	**4,893**	**7,148**	**11,323**	**9,577**	**5,205**	**4,054**	**2,177**	**2,265**	**0**	**52,038**

Quantity of RDT&E Articles: N/A

* Project Unit W1780 changed to Project Unit E1780 to reflect proper major claimant.

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The High-speed Anti-Radiation Missile (HARM) is a joint service program with the Air Force (NAVY lead). The program has been in full production since FY 1983. Program Element 0205601N was used until FY 1990 to develop and test one hardware and two software upgrades to the HARM as Engineering Change Proposals (ECPs). Another ECP software program (Block V) is under development that modifies HARM software in order to meet expanding requirements. This joint service upgrade is being developed with Air Force funds under Raytheon TI Systems, Inc. contract N0001993G0179. The Air Force funds cover all contractor development and contractor Test and Evaluation (T&E) cost. The Navy funds cover all government costs related to development and T&E. The tactical software upgrade will give HARM a Home-On-Jam (HOJ) capability, improved geographic specificity, and improved capability against advanced waveforms. Studies to address corrective actions for documented deficiencies will be conducted.

The Block VI HARM Upgrade Program is a tri-national (U.S., Italy, and Germany) cooperative program designed to improve the HARM's effectiveness by enhancing the missile's probability of kill and reducing the potential for fratricide while making the missile easier to employ. The Program consists of significant hardware and software modifications to the missile's control and guidance sections. The three nations involved have agreed to jointly fund the design, development, testing and production of hardware kits to be installed in the missile control section along with an improved software version to be installed in the missile guidance section.

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0205601N** **PROJECT NUMBER: E1780**
PROGRAM ELEMENT TITLE: HARM Improvement **PROJECT TITLE: HARM Improvements**

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

- (U) ($1,832) Began execution of the joint service combined Development Test/Operations Test (DT/OT) program for the Block V upgrade at the Naval Air Warfare Center - Weapons Division (NAWC-WD), China Lake. Continued government development of Electronic Intelligence (ELINT), Tactical Aircraft Mission Planning System (TAMPS), and avionics update required for the Block V Upgrade.
- (U) ($683) Developed capability to verify and test missiles while installing software developed under Block IIIA/V program.
- (U) ($153) Continued weapons system upgrade studies assessing weapon service life, missile performance, deficiencies, and logistics requirements.
- (U) ($862) Initiated Engineering and Project Management Services in support of the HARM Upgrade Program (Block VI). Contract will require incremental funding from all three co-development partners (U.S. Navy, Italy, and Germany) from FY 1998-2002.
- (U) ($403) Initiated Government engineering support including system performance definition, specification requirements and design analysis for the International HARM Upgrade Program (Block VI).
- (U) ($240) Initiated Contractor engineering support including system performance definition, specification requirements and design analysis for the International HARM Upgrade Program (Block VI).
- (U) ($24) Initiated Government test planning, including development of the Test and Evaluation Master Plan and DT/OT test plans for Block VI.
- (U) ($696) Initiated Government participation in defining HARM Upgrade Program (Block VI) aircraft integration requirements, including the HARM Mission Planning Module modifications for TAMPS; software requirements for the HARM Command Launch Computer (CLC); as well as the initial development of the interface control documents and support for the F/A-18 Operational Flight Program (OFP).

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7 | **PROGRAM ELEMENT: 205601N** | **PROGRAM ELEMENT TITLE: HARM Improvement** | **PROJECT NUMBER: E1780** | **PROJECT TITLE: HARM Improvements**

2. FY 1999 PLAN:

- (U) ($1,842) Complete the NAWCWD China Lake Block V joint service support of the combined DT/OT program. Complete government development of ELINT, TAMPS, and avionics updates required for the Block V Upgrade. Conduct the Functional Configuration Audit/Physical Configuration Audit and development of the Engineering Change Proposal to incorporate the Block V software into the HARM inventory.
- (U) ($199) Provide HARM Block V system engineering support of development and systems integration efforts. Continue weapon system upgrade studies assessing weapons service life, missile performance, deficiencies, and logistics requirements.
- (U) ($1,009) Provide logistic support by Government personnel of Block V Software Upgrade to HARM missiles at field sites.
- (U) ($500) Initiate Contractor development of Block VI USN unique software subroutines.
- (U) ($723) Continue Engineering and Project Management Services in support of the HARM Upgrade Program (Block VI) contract.
- (U) ($561) Continue Government engineering support of the HARM Upgrade Program (Block VI) including preparation for a Preliminary Design Review; support for the Interface Control Working group in defining interface requirements; supporting contractor sub-system design, analysis and testing.
- (U) ($370) Continue Government support of contractor testing including evaluation of test plans, reports, and preparation of detailed test planning documentation.
- (U) ($208) Initiate Government logistic support including logistics support analyses and evaluating contractor designs for Block VI.
- (U) ($1,708) Continue Government and contractor participation in developing the aircraft avionics updates required by the HARM Upgrade Program (Block VI) in addition to CLC/TAMPS upgrade efforts and ELINT development.
- (U) ($28) Portion of the extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7 | **PROGRAM ELEMENT: 0205601N** | **PROGRAM ELEMENT TITLE: HARM Improvement** | **PROJECT NUMBER: E1780** | **PROJECT TITLE: HARM Improvements**

3. FY 2000 PLAN:

- (U) ($1,230) Continue design/development of Inertial Measurement sub-systems and development of hardware and software associated with Block VI.
- (U) ($500) Continue development of Block VI USN unique software sub-routines.
- (U) ($1,395) Continue Engineering and Project Management Services in support of the HARM Upgrade Program (Block VI) contract.
- (U) ($1,920) Continue Government engineering support of the HARM Upgrade Program (Block VI) including preparation for Critical Design Review of Block VI software/hardware design. Effort includes further engineering studies, threat analysis, 6 Degrees of Freedom (DOF) analysis, documentation analysis, interface definition, precision navigation engineering, and software quality evaluation.
- (U) ($1,640) Continue Government support of contractor testing including evaluation of test plans, reports, and preparation of detailed test planning documentation, and captive flight testing.
- (U) ($620) Continue Government logistic support including logistics support analyses, maintenance engineering, support equipment engineering, and evaluating contractor designs.
- (U) ($4,018) Continue Government and contractor participation in integration efforts. Continue developing the aircraft avionics updates required by the HARM Upgrade Program (Block VI) in addition to Command Launch Computer (CLC)/TAMPS upgrade efforts and ELINT development. Develop HARM TAMPS/Mission Planning Module (MPM) rehost.

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0205601N** **PROJECT NUMBER: E1780**
PROGRAM ELEMENT TITLE: HARM Improvement **PROJECT TITLE: HARM Improvements**

(U) B. PROGRAM CHANGE SUMMARY

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	4,926	7,448	11,525
(U) Appropriated Value:	4,958	7,448	
(U) Adjustments from Pres Budget:	-33	-300	-202
(U) FY 2000 President's Budget Submit:	4,893	7,148	11,323

CHANGE SUMMARY EXPLANATION:

(U) Funding:
The FY 1998 decrease of $33K is due to a TAMPS reprogramming action of +$125K, a -$94K SBIR assessment, a +$1K increase due to a below threshold reprogramming action and a -$65K decrease for a 1998 update.
The FY 1999 decrease of $300K is due to a -$17K civilian personnel underexecution reduction, a -$266K assessment for contract, advisory and assistance services and a -$17K FY1998 update.
The FY 2000 decrease of $202K reflects a balancing adjustment of -$19K, an inflation adjustment of -$165K, a Working Capital Fund adjustment of -$77K and a civilian pay rate correction of +$59K.

(U) Schedule: No changes

(U) Technical: No changes

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205601N
PROGRAM ELEMENT TITLE: HARM Improvement

PROJECT NUMBER: E1780
PROJECT TITLE: HARM Improvements

(U) C. OTHER PROGRAM FUNDING SUMMARY

Appn	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete
WPN HARM MODS	0	0	0	0	0	10,699	10,964	11,193	16,192

Related RDT&E Not Applicable

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7 | **PROGRAM ELEMENT: 0205601N** | **PROGRAM ELEMENT TITLE: HARM Improvement** | **PROJECT NUMBER: E1780** | **PROJECT TITLE: HARM Improvements**

(U) D. ACQUISITION STRATEGY:

The HARM Block VI Upgrade program is an ACAT III Program and will consist of three separate phases (EMD, Production, and Technology Evaluation and Assessment). The acquisition strategy for the HARM Block VI Program is complete and is based upon a signed international Memorandum of Agreement with Germany, Italy, and the U.S. Navy; a tri-national Cooperative Operational Requirements Document (CORD) details German, Italian, and U.S. Navy common requirements; and a Cooperative Test and Evaluation Master Plan (CTEMP) summarizes all test requirements. These three documents drive the overall acquisition approach to the HARM Block VI project.

Management of the Block VI upgrade will be directed by a trilateral Steering Committee, however, the U.S. Navy Project Manager (in concert with Project Managers from Germany and Italy) is responsible for Program execution. Each partner will share one-third of "common costs," the U.S. Navy will fund Block VI unique costs, and the German and Italian participants will fund Block IIIB unique costs. Each country will pay its own aircraft integration costs.

The acquisition strategy delineates Industry and Government responsibilities. The contract strategy (i.e. hardware and software for missile, upgraded missile sections, contractor team responsibility for missile performance) assigns unique work tasks to each firm. Contract strategy is to issue contracts to Bodenseewerk Geratetechnik GmbH (BGT) (German), Alenia Difesa (Italian), and Raytheon Texas Instruments Systems (RTIS) (U.S.) firms and will maximize use of commercial-off-the-shelf (COTS)/government-off-the-shelf (GOTS)/non-development items (NDI). Each Phase I (EMD) contract type and structure is tailored to the product of each firm.

(U) E. SCHEDULE PROFILE

	FY 1998	FY 1999	FY 2000	To Complete
(U) Program Milestones		M/S II (1Q)		
(U) Engineering Milestones		PDR (4Q)	CDR(4Q)	TRR(3Q)
(U) T&E Milestones				Combined DT/OT (3Q01 - 1Q02)
(U) Contract Milestones		RTIS, BGT & ALENIA (1Q)*		

* BGT and ALENIA Contracts are not funded with U.S. funds, but are significant milestones in the Block VI contract schedule.

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205601N
PE TITLE: HARM Improvement

PROJECT NUMBER: E1780
PROJECT TITLE: HARM Improvements

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Product Development										
Block IIIA/V Development	WX	NAWC WD, China Lake	5961	1709	Oct 98	0	0	0	7670	7670
Block IIIA/V Development	WX	NAWC WD, Pt. Mugu	125	0		0		0	125	125
Block VI Development	CPIF	RTIS, Texas	0	500	Dec 98	1730	Dec 98	0	2330	2330
Block VI Eng Analyses	FFP	RTIS, Texas	240	0		0		0	240	240
Block VI Development	WX	NAWC WD, China Lake	1099	2269	Oct 98	5938	Oct 99	7430	16736	16736
Block VI ILS	WX	NAWC WD, Point Mugu	0	208	Oct 98	620	Oct 99	2550	3378	3378
Subtotal Product Development			**7425**	**4686**		**8288**		**9980**	**30379**	**30379**

Remarks: NONE

Support										
HARM Technical/Integration Studies	WX	NAWC WD, China Lake	110	23	Oct 98	0		277	410	410
Subtotal Support			**110**	**23**		**0**		**277**	**410**	**410**

Remarks: NONE

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205601N
PE Title: HARM Improvement

PROJECT NUMBER: W1780
PROJECT TITLE: HARM IMPROVEMENT

Cost Categories: Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Block IIIA/V	WX	NAWC WD, China Lake	1524	1142	Oct 98	0		0	2666	2666
Block VI	WX	NAWC WD, China Lake	24	370	Oct 98	1640	Oct 99	8186	10220	10220
Subtotal Test & Evaluation			**1548**	**1512**		**1640**		**8186**	**12886**	**12886**
Remarks: NONE										
Management										
TRAVEL	WX	NAWC AD, Patuxent MD	179	70	Oct 98	50	Oct 99	250	549	549
Technical Assessments/Mgmt Support	RX/LOE	DCS, Alex VA	1092	829	Dec 98	1345	Dec 99	4520	7786	7786
SBIR Assessment				28					28	
Subtotal Management			**1271**	**927**		**1395**		**4770**	**8363**	**8363**
Remarks: NONE										
Total Cost			**10354**	**7148**		**11323**		**23213**	**53038**	**52038**

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205601N
PROGRAM ELEMENT TITLE: HARM Improvement

PROJECT NUMBER: E2185
PROJECT TITLE: Advanced Anti-Radiation Guided Missile(AARGM)

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
E2185 Advanced Anti-Radiation Guided Missile (AARGM)*	32,813	22,428***	10,843	7,823	0	0	0	0	0	106,596**

* Project Unit changed from W2185 to E2185 to reflect proper major claimant
** Funding prior to FY97 for this project is under PE 0603217N
*** FY99 estimate reflects a $12.0M Congressional add for AARGM (W2661/E2661)

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The Advanced Anti-Radiation Guided Missile (AARGM) Project is a Phase III Small Business Innovative Research (SBIR) program to develop and demonstrate a dual-mode guidance section on a HARM airframe. The AARGM Phase III technology demonstration program is designed to demonstrate that a Dual-mode (passive Anti-Radiation Homing (ARH)/active Millimeter Wave (MMW) radar) missile can engage and destroy enemy air defenses in the event that these systems "shut-down", or employ other countermeasures.

The issue of "shut-down" has been a major shortcoming in the suppression of enemy air defenses (SEAD) element of the offensive counter air mission area for the United States Navy and Air Force. Program objectives are to demonstrate an effective and affordable lethal SEAD capability against mobile, relocatable, or fixed air defense threats even in the presence of emitter shutdown or other Anti-Radiation Missile (ARM) countermeasures. The dual-mode technology being developed in the AARGM program has very high potential to solve the problem of "shut-down" not only in the primary weapon for SEAD, the High Speed Anti-Radiation Missile (HARM), but it could be integrated with many other missile airframes.

The AARGM technology demonstration program is an outgrowth of a Phase I and II competitive SBIR program. Phase I and II SBIR efforts successfully demonstrated the feasibility of a dual-mode seeker to address radar "shut-down" issues. Science and Applied Technology (SAT), Inc. (San Diego, CA), was awarded Phase I and II contracts (FY90-93) and was subsequently selected for a Phase III demonstration in FY94. Phase III work is being performed by SAT under NAVAIR contract N00019-94-C-0078. This contractual effort will continue to be incrementally funded, under program element 0205601N, resulting in a cumulative contract value of $108.2M.

From FY93 through FY98, the AARGM program was a Congressionally mandated program which received its funding as an annual Congressional add. Starting in FY99, AARGM will receive its program funding through the standard DoD budget appropriation process. The FY99 funds added by Congress will be used to perform risk reduction tasks in preparation for a potential Milestone II Decision in FY 2001.

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0205601N**
PROGRAM ELEMENT TITLE: HARM Improvement

PROJECT NUMBER: E2185
PROJECT TITLE: Advanced Anti-Radiation Guided Missile(AARGM)

1. (U) FY 1998 ACCOMPLISHMENTS:

- (U) ($31,051) Contractor integrated brassboard seekers into the SWES and CFT configurations. Commenced Control Test Vehicle (CTV) integration and test execution, prototype seeker fabrication and assembly, prototype seeker tests, and assemble and test Guided Test Vehicles (GTVs).
- (U) ($700) Government performed technical analyses and directed project management services in support of the AARGM Advanced Technology contract.
- (U) ($1,062) Field activity monitored the engineering activities of the AARGM Advanced Technology demonstration contractor. Conducted engineering assessments of Guidance Section Design. Provide T&E planning and engineering support to include assessment, availability and acquisition of targets, acquisition of DSM-160, and use of Advanced High Speed Anti-Radiation Missile (HARM) facility to support captive flight and live fire test programs. Provided management, technical engineering, and assembly support for the design, modification, and testing of telemetry sections in support of the AARGM CTV and GTV testing. Performed all-up-round and aircraft integration technical engineering, laboratory test support, aircraft integration, Command Launch Computer (CLC) justification, flight clearance and other activity related to AARGM field testing support. Field activity to provide analysis of alternatives based on approved weapons system scenarios to include an assessment of current Suppression of Enemy Air Defense (SEAD) deficiencies and an assessment of potential weapon system alternatives to mitigate identified deficiencies.

2. (U) FY 1999 PLAN:

- (U) ($7,040) Contractor to develop software evaluation station, including hardware and software development, subsystems assembly and test, and seeker integration tests. Contractor to perform field tests of the AARGM brassboard seekers, prototype seeker tests, and GTV test execution.
- (U) ($100) Government to perform technical analyses and continue technical management, engineering support, and coordination of AARGM Program weapons system technology development program.
- (U) ($2,260) Field activity to provide AARGM system engineering support of development and systems integration efforts. Continue weapon system testing studies to assess weapons technology performance and deficiencies.
- (U) ($800) Contractor to perform program management and engineering services in support of the AARGM technology demonstration program. Provide technical management support and coordination of AARGM Program weapons system technology studies.
- (U) ($256) Portion of the extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0205601N** **PROJECT NUMBER: E2185**
PROGRAM ELEMENT TITLE: HARM Improvement **PROJECT TITLE: Advanced Anti-Radiation Guided**

- (U) ($9,800) Contractor to perform risk reduction activities in support of a FY 2001 potential Milestone II Decision to enter EMD. Activities will include ARH antenna array performance and affordability and producibility enhancements, MMW radar transceiver performance and affordability enhancements, EMI enhancements, radome material trade studies and advanced target discrimination algorithm development and validation.

- (U) ($1,876) Field activity to assist in generating required documentation in support of a FY 2001 potential Milestone II Decision to EMD, including a logistics support analysis, life cycle cost analysis, draft ORD development and aircraft integration definitions. Will also provide system engineering support for prime contractor.

- (U) ($296) Portion of the extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. (U) FY 2000 PLAN:

- (U) ($7,600) Contractor to conduct chamber tests of the software evaluation station/brassboard. Contractor to complete unique AARGM design and commence captive flight test preparation. contractor to complete control test vehicle integration, testing, and test analysis. Contractor to finalize development of AARGM prototype, to include hardware/software design upgrades, subsystems assembly and test, prototype integration and testing, and prototype captive carry test.

- (U) ($2,343) Field activity to provide AARGM system engineering support of development and systems integration efforts. Continue weapon system testing studies to assess weapons technology performance and deficiencies.

- (U) ($800) Contractor to perform program management and engineering services in support of the AARGM technology demonstration program. Provide technical management support and coordination of AARGM Program weapons system technology studies.

- (U) ($100) Continue Government technical management, engineering support, and coordination of AARGM Program weapons system technology development program.

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0205601N**
PROGRAM ELEMENT TITLE: HARM Improvement
PROJECT NUMBER: E2185
PROJECT TITLE: Advanced Anti-Radiation Guided Missile(AARGM)

(U) B. PROGRAM CHANGE SUMMARY

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	33,962	10,480	11,000
(U) Appropriated Value:	32,813	22,480	
(U) Adjustments from Pres Budget:	-1,149	+11,948	-157
(U) FY 2000 President's Budget Submit:	32,813	22,428	10,843

CHANGE SUMMARY EXPLANATION:

(U) Funding:
The FY 1998 decrease of $1,149K reflects a Small Business Innovative Research (SBIR) assessment.
The FY 1999 $11,948 thousand increase reflects a decrease of $24K for an OSD Update Adjustment, a Congressional add of $12.0M and an economic assessment reduction of $28K.
The FY 2000 decrease of $157K reflects an inflation adjustment

(U) Schedule: No changes

(U) Technical: No changes

(U) C. OTHER PROGRAM FUNDING SUMMARY

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0205601N** **PROJECT NUMBER: E2185**
PROGRAM ELEMENT TITLE: HARM Improvement **PROJECT TITLE: Advanced Anti-Radiation Guided Missile(AARGM)**

D. (U) SCHEDULE PROFILE:

The AARGM program is an Advanced Technology Program and therefore does not have a standard detailed Milestone Plan. A list of key actions appears below.

AARGM PROGRAM	FY 1998	FY 1999	FY 2000	To Complete
Software Evaluation Station/Brassboard				
Hardware/Software Development	Continue	Continue	Complete 1Q/00	
Subsystems Assembly and Test	Begin 4Q/98	Complete 3Q/99		
Seeker Integration/Test	Begin 4Q/98	Complete 3Q/99		
Chamber Tests		Begin 4Q/99	Complete 1Q/00	
Brassboard Captive Flight Tests (CFTs)				
Unique Design and CFT Preparation	Begin 1Q/98	Continue Complete 1Q/00		
Contractor Managed Testing			1Q/00	
Captive Flight Testing			Begin 2Q/00	Complete 3Q/01
Control Test Vehicles (CTVs)				
Unique Hardware/Software Development	Continue Complete 4Q/99			
Subsystems Assembly and Test	Begin 3Q/98	Complete 3Q/99		
Integration and Test		Begin 1Q/99	Complete 2Q/00	
CTV Flights Test and Analysis			2Q/00	
Prototype				
Hardware/Software Design Upgrades	Begin 2Q/98	Continue Complete 1Q/00		
Subsystems Assembly and Test	Begin 4Q/98	Complete 1Q/99		
Integration and Testing			Begin 2Q/00-Complete 2Q/00	
Captive Carry Test			4Q/00	
Guided Test Vehicles (GTVs)				
Hardware/Software Design Upgrades	Begin 2Q/98	Continue	Continue	Complete 2Q/01
Subsystems Assembly and Test	Begin 4Q/98	Continue	Continue	Complete 4Q/01
Integration and Test				Begin 1Q/01-Complete 4Q/01
GTV Live Fire Test and Analysis				1Q02
Contractor design and trade studies		2Q/99 – 4Q/00		
Milestone II Decision documentation		2Q/99 – 1Q/00		
System engineering support		2Q/99 – 4Q/00		

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205601N
PE Title: HARM Improvement

PROJECT NUMBER: E2185
PROJECT TITLE: Advanced Anti-Radiation Guided Missile (AARGM)

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Product Development										
AARGM Adv Technology Development	CPIF	SAT, Woodland Hills, CA	59327	7040	Jun 99	7600	Jun 00	4800	73767	78767
AARGM Engineering Support	WX	NAWC WD, China Lake	4505	2260	Oct 98	2343	Oct 99	2200	11308	11308
AARGM Engineering/Tech Assessment	CPIF	JHU/APL, MD	615	0		0		0	615	615
AARGM Risk Reduction	CPIF	SAT, Woodland Hills, CA		9800	Feb 99	0		0	9800	9800
AARGM Engineering Support	WX	NAWC WD		1876	Feb 99	0		0	1876	1876
Subtotal Product Development			**64447**	**20976**		**9943**		**7000**	**102366**	**102366**

Remarks:

Support

Subtotal Support			**0**	**0**		**0**		**0**	**0**	**0**

Remarks:

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 205601N
PE TITLE: HARM Improvement

PROJECT NUMBER: E2185
PROJECT TITLE: Advanced Anti-Radiation Guided Missile (AARGM)

Cost Categories: Test & Evaluation	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Subtotal Test & Evaluation			**0**	**0**		**0**		**0**	**0**	**0**
Remarks:										
Management										
Travel	WX	NAWC AD, Patuxent MD	100	100	Oct 98	100	Oct 99	100	400	400
Technical Assessment/Mgmt Support	RX/LOE	DCS, Alex VA	905	800	Dec 98	800	Dec 99	773	3278	3278
Subtotal Management			**1005**	**900**		**900**		**873**	**3678**	**3678**
Remarks:										
SBIR Assessment				552					522	522
Remarks:										
Total Cost			**65452**	**22428**		**10843**		**0**	**106596**	**106596**

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7 | **PROGRAM ELEMENT: 0205601N** | **PROGRAM ELEMENT TITLE: HARM Improvement** | **PROJECT NUMBER: E2211** | **PROJECT TITLE: JAWS**

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
E2211 Joint Advanced Weapons Systems (JAWS) *	934	956	1,476	2,950	3,937	3,923	3,930	3,927	0	22,033
TOTAL	**934**	**956**	**1,476**	**2,950**	**3,937**	**3,923**	**3,930**	**3,927**	**0**	**22,033**

Quantity of RDT&E Articles

* Project Unit W2211 changed to Project Unit E2211 to reflect proper major claimant.

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Joint Attack Weapon System (JAWS) is a proposed joint service program which will fulfill Army and Marine Corps Mission Needs Statement requirements for the post-2000 force structure. The Army (the TOW/HELLFIRE lead service) is proposed as the lead service for the program. To support an FY 2000 new start decision, the Navy is participating with the Army in joint trade studies and development of Milestone 0 support documentation, including a joint Analysis of Alternatives (AOA). The initial basis for trade studies is improvements to the Army HELLFIRE, including alternative seekers and rocket motor improvements. Proposed TOW follow-on are being evaluated including The Army Combined Arms Weapon System (TACAWS) and Advanced Missile System - Heavy (AMS-H). The Navy is participating in the Army's Battlefield Environment Weapon System Simulation (APEX) Test Bed evaluation of the Army's Future Missile Technology Integration (FMTI) advanced developments in guidance, propulsion and warheads. Application of these developments are being assessed simultaneously with the Navy's dual mode seeker technologies in the Advanced Anti-Radiation Guided Missile (AARGM) program. The JAWS Mission Needs Statement requires a state of the art technology solution which counters air and surface threats in the post-2000 battlefield.

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0205601N** **PROJECT NUMBER: E2211**
PROGRAM ELEMENT TITLE: HARM Improvement **PROJECT TITLE: JAWS**

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

- (U) ($934) Continued APEX evaluation through introduction of fixed wing, Advanced Short Takeoff and Landing (ASTOL), and lethal/non-lethal mission requirements. Continued structuring Milestone 0 acquisition program start for FY 2000 decision. Conducted mission effectiveness simulations assessments, continued selection of technology candidates, including advanced guided rockets/Hellfire upgrades, to fulfill multi-mission requirements. Completed Flight Demo of IIR Seeker for Hellfire Missile at China Lake, CA. ($660K Army and $274K Government In-House)

2. FY 1999 PLAN:

- (U) ($933) APEX Lab evaluation of fixed wing, ASTOL, lethal/non-lethal missions requirements, complete Milestone 0 documentation, complete mission effectiveness assessments, select mission technologies, transition to Pre-Planned Product Improvement or new start program. ($450K Army and $483K Government In-House).

- (U) ($23) Portion of the extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2000 PLAN:

- (U) ($1,476) Expand APEX evaluation of fixed wing, ASTOL, lethal/non-lethal missions requirements by incorporating fixed wing test bed/weapons simulator into APEX. Evaluation to include Joint Strike Fighter as Modernized Hellfire platform. Continue flight demonstrations/evaluations of advanced guided rockets/Hellfire upgrades. Prove selected technologies meet/fulfill multi-mission requirements. Continue to examine new insertions for motor, warhead, guidance, and control technologies. ($700K Army and $776K government in-house).

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0205601N** **PROJECT NUMBER: E2211**
PROGRAM ELEMENT TITLE: HARM Improvement **PROJECT TITLE: JAWS**

A. PROGRAM CHANGE SUMMARY:

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	1,025	993	0
(U) Appropriated Value:	1,080	993	
(U) Adjustment from Pres Budget Submit:	-91	-37	+1,476
(U) FY 2000 President's Budget Submit:	934	956	1,476

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY 1998 decrease reflects a $26K reduction for an SBIR and a $65K reduction for below threshold reprogrammings.
The FY 1999 decrease reflects a $37K reduction of Contractor Advisory and Assistance Services.
The FY 2000 increase of $1,476 thousand reflects an increase of $1,496 thousand for the expansion of the program to incorporate more studies in the APEX evaluation of fixed-wing aircraft, Advanced Short Take-Off and Landing (ASTOL), and lethal/non-lethal mission requirements and to continue effort for preparation to transition to planned product improvement (P3I) or new Modernized Hellfire (HF) Program as well as -$21K reduction for Inflation Adjustments.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

B. OTHER PROGRAM FUNDING SUMMARY: Not applicable.

RELATED RDT&E: U.S. Army P.E. 0603313A PROJ D263 Future Missile Technology Insertion (FMTI).

C. ACQUISITION STRATEGY: Not an ACAT program.

D. SCHEDULE PROFILE: Not applicable.

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205601N
PROGRAM ELEMENT TITLE: HARM Improvement

PROJECT NUMBER: E2211
PROJECT TITLE: JAWS

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Product Development										
APEX	MIPR	MICOM	1761	450	NOV 98	700	NOV 00	6959	9870	
Subtotal Product Development			**1761**	**450**		**700**		**6959**	**9870**	
Support										
Engineering Technical Services	C/TMM	DCS Corp	496	215	JAN 99	300	JAN 00	2400	3411	
Subtotal Support			**496**	**215**		**300**		**2400**	**3411**	
Test and Evaluation										
Testing	WX	CHINA LAKE	473	241	NOV 98	456	NOV 00	7255	8425	
Phototelesis	MIPR	FORT EUSTIS	29						29	
Subtotal Test & Evaluation			**502**	**241**		**456**		**7255**	**8454**	
Management										
Travel	WX	NAVAIR	48	27	NOV 98	20	NOV 00	180	275	
SBIR Assessment				23					23	
Subtotal Management			**48**	**50**		**20**		**180**	**298**	
Total Cost			**2807**	**956**		**1476**		**16794**	**22033**	

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205604N
PROJECT TITLE: Tactical Data Links

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
P1743 LINK-16 Improvements	2,469	4,421	4,207	4,212	9,665	8,550	8,734	8,922	CONT	CONT
P2126 ATDLS Integration	38,404	44,730	42,459	18,407	13,346	17,003	17,478	19,649	CONT	CONT
TOTAL	40,873	49,151	46,666	22,619	23,011	25,553	26,212	28,571	CONT	CONT

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program element (PE) develops and improves the Navy's tactical data link systems. It includes the LINK-16 Improvements and Advanced Tactical Data Link Systems (ATDLS) Integration programs.

(U) Link-16 Improvements extends LINK-16 technological improvements to existing and developing U.S. Navy data link systems, including LINK-11 and LINK-22. Development of the NATO Improved LINK-Eleven (NILE) project is a major element of this program. The U.S. is the lead technical nation for LINK-22 development for the NILE office. LINK-16 improvements will allow more effective employment of fleet units by increasing the timeliness, accuracy, and content of tactical data transfer.

(U) ATDLS Integration includes current efforts to develop translation tools between Tactical Digital Information Links (TADILS) and integration of the Multifunctional Information Distribution System – Low Volume Terminal (MIDS-LVT) into U.S. Navy platforms. MIDS-LVT is a multinational cooperative development program that will provide selected U.S. Navy ships and space constrained tactical fighter aircraft with LINK-16 capability through the development of a terminal that is functionally identical to the Joint Tactical Information Distribution System (JTIDS) Class II terminal, but, through the use of Very High Speed Integrated Circuit (VHSIC) and Microwave Monolithic Integrated Circuits (MMIC) technology, is one-half the weight and one-third the size of the JTIDS terminal.

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205604N
PROJECT TITLE: Tactical Data Links

(U) Translation between TADILs will isolate all tactical data link equipment, message standards and protocols from tactical information processors. This will provide a flexible capability for rapidly exchanging tactical information using a single data base for translating various link formats while remaining completely independent of communications equipment and tactical data computing systems. ATDLS will also improve existing computer-to-computer, digital radio communications in the HF and UHF radio frequency bands among Combat Direction System (CDS) equipped ships, submarines, aircraft and shore sites.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing, operational systems.

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205604N
PROGRAM ELEMENT TITLE: Tactical Data Links

PROJECT NUMBER: P1743
PROJECT TITLE: Link-16 Improvements

(U) COST (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
P1743 LINK-16 Improvements	2,469	4,421	4,207	4,212	9,665	8,550	8,734	8,922	CONT	CONT

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program includes the LINK-22 program and near term improvements to sustain existing LINK-11 systems. Near term LINK-11 improvements include: Mobile Universal Link Translator System (MULTS) upgrade, Common Shipboard Data Terminal Set (CSDTS), and LINK-11 Baseline Freeze message standard work. The LINK-22 program will improve the performance of both LINK-11 and LINK-16 through the combination of the results of the Critical Systems Demonstration (CSD) project and the NATO Improved LINK-11 (NILE) project. LINK-22 will pass TADIL-J data elements beyond the line of sight (HF) using a Time Division Multiple Access (TDMA) protocol and the improved LINK-11 waveform. These projects will allow more effective employment of fleet units by increasing timeliness, accuracy, and content of tactical data transfer.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205604N
PROGRAM ELEMENT TITLE: Tactical Data Links

PROJECT NUMBER: P1743
PROJECT TITLE: Link-16 Improvements

1. (U) FY 1998 ACCOMPLISHMENTS::

   - (U) ($1,292) Continued design and development of Subphase 2 for the NILE Reference System (NRS).
   - (U) ($1,177) Continued preparing for U.S. implementation of LINK-22 including CDLMS/CSDTS upgrades.

2. (U) FY 1999 PLAN:

   - (U) ($1,136) Continue design and development of Subphase 2 for the NILE Reference System (NRS).
   - (U) ($1,494) Continue Link-22 system development. Link-22 shall receive a NILE SNC Beta software version and shall conduct preliminary performance testing in a laboratory environment. Crypto design and message standards will be evaluated.
   - (U) (1,791) Began combined CDLMS/Link 22 program enhancements.

3. (U) FY 2000 PLAN:

   - (U) ($271) Complete design and development of Subphase 2 for the NILE Reference System (NRS).
   - (U) ($500) Commence validation of Link 22 design to ensure interoperability with NILE Reference System (NRS) under NILE In-Service Support Phase MOU.
   - (U) ($1,898) Continue Link-22 system development. Link-22 program shall perform final SNC beta software verification and performance tests. Message standards and Signal Processing Controller functions will be defined for U.S. implementation.
   - (U) ($1,538) Continue combined CDLMS/Link-22 program enhancements. CDLMS/Link-22 specifications/designs will be baselined for final system integration.

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205604N
PROGRAM ELEMENT TITLE: Tactical Data Links

PROJECT NUMBER: P1743
PROJECT TITLE: Link-16 Improvements

B. (U) PROGRAM CHANGE SUMMARY:

(U) Funding: FY 1998 decrease of $50K was due to a $42K SBIR reduction and $8K Navy reprogramming for cancelled accounts.
FY 1999 decrease of $11K was due to congressional adjustments.
FY 2000 decrease of $59K was due to pricing adjustments.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

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

NUMBER TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN Line 2614 ATDLS	14,221	32,885	19,143	16,894	21,335	23,154	33,732	33,018	CONT	CONT

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205604N
PROGRAM ELEMENT TITLE: Tactical Data Links

PROJECT NUMBER: P1743
PROJECT TITLE: Link-16 Improvements

D. (U) ACQUISITION STRATEGY:

	FY 1998	FY 1999	FY 2000	TO COMPLETE
Program Milestones				
Engineering Milestones				
T&E Milestones			NRS Test 2Q/00	Link-22 DT/OT 1Q/02
Contract Milestones				

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0205604N PROJECT NUMBER: P1743

Exhibit R-3 Cost Analysis (page 1)

Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	Cost To Complete	Total Cost	Target Value of Contract		
NATO Improved Link Eleven	Various	Various	1,022	1,136	Various	771	Various	1,000	3,929	3,929		
LINK-22	WX	SPAWARSYSCTR	1,304	3,285	Various	3,436	Various	Cont.	Cont.	Cont.		
		San Diego, CA										
C2P Improvements	Various	Various	1,576						1,576	1,576		
Subtotal Product Development			3,902	4,421		4,207		Cont.	Cont.	Cont.		

Remarks:

Support and Management	Various	Various	270	0		0		0	270	270		
Subtotal Support			270	0		0		0	270	270		

Remarks

Exhibit R-3 Cost Analysis (page 2)

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0205604N PROJECT NUMBER: P1743

Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	Cost To Complete	Total Cost	Target Value of Contract		
Test and Evaluation	Various	Various	272	0		0		0	272	272		
Subtotal T&E			272	0		0		0	272	272		
Remarks												
Subtotal Management			0	0		0		0	0	0		
Remarks												
Total Cost			4,444	4,421		4,207		Cont.	Cont.	Cont.		
Remarks												

Exhibit R-3, Project Cost Analysis

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205604N
PROGRAM ELEMENT TITLE: Tactical Data Links

PROJECT NUMBER: P2126
PROJECT TITLE: ATDLS Integration

(U) COST (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
P2126 ATDLS Integration	38,404	44,730	42,459	18,407	13,346	17,003	17,478	19,649	CONT	CONT

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The ATDLS Integration program will integrate the Multifunctional Information Distribution System – Low Volume Terminal (MIDS-LVT) LINK-16 terminal into U.S. Navy platforms. This multinational (U.S., France, Germany, Italy, and Spain) cooperative development program was established to design, develop, and deliver low-volume lightweight tactical information system terminals for U.S. and foreign fighter aircraft, helicopters, ships and ground sites. The terminals are designed as a Pre-Planned Product Improvement (P^3I) of the Joint Tactical Information Distribution System (JTIDS) Time Division Multiple Access (TDMA) Class II terminal. The goal of the MIDS-LVT program is to produce a terminal that is smaller, lighter, fully compatible with, and as capable as the JTIDS TDMA Class 2 terminals, but suitable for use in platforms that cannot accommodate the bulkier, heavier JTIDS TDMA Class II equipment. This project includes the costs to integrate and test MIDS on the Navy's F/A-18 and selected ship platforms. ATDLS Integration of the MIDS-LVT will also provide selected U.S. Navy and U.S. Marine Corps tactical aircraft, U.S. Navy ships, and U.S. Marine Corps ground units with crypto-secure, jam resistant, low-probability-of-exploitation communication of tactical data and voice at a high data rate. It will have additional capabilities of common grid navigation and automatic relay inherent in the equipment that will enable long range communication and provide jam resistance. The system will be interoperable among all services and NATO/Allied users equipped with MIDS-LVT or JTIDS Class II/IIA.

(U) ATDLS Improvement program also develops new and improved capabilities for Navy TADIL-J users. The Command and Control Processor (C2P) is a software development effort that provides an interface between the TADILs (Link 4A, 11, and 16) and major surface ship Command and Control Systems (Advanced Combat Direction System (ACDS) and AEGIS C&D). Common Data Link Management System (CDLMS) is a Pre-planned Product Improvement (P3I) of the C2P. The CDLMS will provide translation between TADILs and isolate all tactical data link equipment, message standards and protocols from tactical information processors. This will provide a flexible capability for rapidly exchanging tactical information using a single data base for translating various link formats while remaining completely independent of communications equipment and tactical data computing systems.

(U) This project also funds: (1) the development required to accommodate expanded LINK-16 operational capabilities for additional warfare areas, (2) development of automated network management aids, and (3) systems engineering and contractor support efforts.

(U) Additional terminal development costs are funded in program element 0604771D.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205604N
PROGRAM ELEMENT TITLE: Tactical Data Links

PROJECT NUMBER: P2126
PROJECT TITLE: ATDLS Integration

1. (U) FY 1998 ACCOMPLISHMENTS:

   - (U) ($24,119) Continued F/A-18 MIDS integration software and aircraft design modifications and testing.
   - (U) ($3,681) Continued TADIL-J System Engineering.
   - (U) ($3,651) Continued Performance Upgrades.
   - (U) ($4,894) Continued MIDS-LVT implementation (MIDS on Ship).
   - (U) ($2,059) Integrate Air Defense Systems Integrator with Global Command and Control System into the USS Mt. Whitney.

2. (U) FY 1999 PLAN:

   - (U) ($31,486) Continue F/A-18 MIDS integration software and aircraft design modifications and testing.
   - (U) ($3,825) Continue TADIL-J System Engineering.
   - (U) ($5,426) Continue Performance Upgrades.
   - (U) ($3,993) Continue MIDS-LVT implementation (MIDS on Ship).

3. (U) FY 2000 PLAN:

- (U) ($34,038) Continue F/A-18 MIDS integration software and aircraft design modifications and testing.
- (U) ($3,452) Continue TADIL-J System Engineering.
- (U) ($4,223) Continue Performance Upgrades.
- (U) ($746) Complete MIDS-LVT implementation (MIDS on Ship).

B. (U) PROGRAM CHANGE SUMMARY:

(U) Funding:
FY 98 increase of $989K was a result of a Navy reprogramming of $731K for Satellite TADIL-J, $2,059K for Air Defense System Integrator, a Navy programmatic adjustment of -$680K, a SBIR adjustment of -$798K and Navy reprogramming of -$323K
FY 99 decrease of $595K was for congressional adjustments.
FY 00 increase of $11,014K was due to a Navy adjustment of -$2,866K for IT-21, and $14,500 for F/A18 MIDS Integration; and pricing adjustment of -$620K.

U) Schedule: EMD terminal immaturity has delayed the start of DT-IIA-3 and OT-IIA-2 from 2Q/99 to 3Q/99. This same immaturity will delay DT-IIA-5 and OT-IIA-3 from 4Q/99 to 1Q/00.

(U) Technical: Not applicable.

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

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0205604N PROJECT NUMBER: P2126
PROGRAM ELEMENT TITLE: Tactical Data Links PROJECT TITLE: ATDLS Integration

NUMBER TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) APN LINE										
(U) # 052500	0	38,272	27,425	70,887	49,941	55,681	55,018	41,353	CONT	CONT
(U) # 054400	794	726	735	742	774	766	805	823	CONT	CONT
(U) RDT&E,DA	53,266	30,512	16,641	16,674	16,975	17,346	17,728	18,118	CONT	CONT
(U) OPN LINE 2614 ATDLS	14,221	32,885	19,143	16,894	21,335	23,154	33,732	33,018	CONT	CONT
(U) SCN	6,500	11,900	19,600	25,500	22,000	24,400	22,000	21,000	CONT	CONT

(U) RELATED RDT&E:

(U) PE (0604771D P771) – Link 16: Link 16 systems engineering support.
(U) PE (0604771D P773) - MIDS: MIDS-LVT terminal development.

D. (U) ACQUISITION STRATEGY:

FY 1998	FY 1999	FY 2000	FY 2001	TO COMPLETE

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205604N
PROGRAM ELEMENT TITLE: Tactical Data Links

PROJECT NUMBER: P2126
PROJECT TITLE: ATDLS Integration

Program Milestones			DAB MS III 3Q/00	IOC 1Q/01 Ship	IOC 2Q/03 Air
Engineering Milestones					
T&E Milestones	OT-IIID2 2/98 DT-IIIC2 6/98	F/A-18 DT-IIA-4 1Q/99 F/A-18 DT-IIA-3 3Q/99 F/A-18 OT-IIA-2 3Q/99	F/A-18 DT-IIA-5 1Q/00 F/A-18 OT-IIA-3 1Q/00	F/A-18 TECHEVAL 1Q/01 F/A-18 OPEVAL 4Q/01	F/A-18 FOT&E 2Q/03
		Ship DT/OT-IIB-1 4Q/99	Ship DT/OT-IIB-2 1Q/00	Ship FOT&E 1Q/01	
Contract Milestones					

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0205604N PROJECT NUMBER: P2126

Exhibit R-3 Cost Analysis (page 1)												
APPROPRIATION: RDT&E,N BUDGET ACTIVITY : 7		PROGRAM ELEMENT: 0205604N						Tactical Data Links				
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	Cost To Complete	Total Cost	Target Value of Contract		
F/A-18 Integration	PD	NAVAIRSYSCOM	71,430	27,000	Various	25,350	Various	18,000	141,780	141,780		
		Pax River, MD										
F/A-18 Integration	WX	NCTSI	0	850	Various	450	Various	Cont.	Cont.	Cont.		
		San Diego, CA										
TADIL-J System Engineering	WX	SPAWARSYSCTR	22,462	1,174	Various	1,872	Various	Cont.	Cont.	TBD		
		San Diego, CA										
TADIL-J System Engineering	WX	NCTSI	502	548	Various	545	Various	Cont.	Cont.	TBD		
		San Diego, CA										
MIDS on Ship	SS/CPIF	GEC Marconi	7,718	1,500	Dec 98			0	9,218	9,218		
		Wayne, NJ										
		N0003996C0094										
Performance Upgrades	WX	SPAWARSYSCOM	3,652	5,426	Various	3,649	Various	0	12,727	12,727		
		San Diego, CA										
MIDS on Ship	Various	Various	41,407	1,693	Various	246	Various	0	43,346	43,346		
Air Defense Systems Integrator	CPFF	Adv Programming	2,059									
		Concepts, TX										
Subtotal Product Development			149,230	38,191		32,112		Cont.	Cont.	Cont.		
Remarks:												

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0205604N PROJECT NUMBER: P2126

Exhibit R-3 Cost Analysis (page 2)

Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	Cost To Complete	Total Cost	Target Value of Contract		
Support and Management	Various	Various	0	957	Various	973	Various	Cont.	Cont.	Cont.		
Subtotal Support			0	957		973		Cont.	Cont.	Cont.		

Remarks

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0205604N PROJECT NUMBER: P2126

Exhibit R-3 Cost Analysis (page 3)

Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	Cost To Complete	Total Cost	Target Value of Contract		
Test and Evaluation	Various	Various	3,580	221	Various	200	Various	961	4,962	4,962		
MIDS T&E	WX	SPAWARSYSCOM	4,549	4,143	Various	8,243	Various	Cont.	Cont.	Cont.		
		San Diego, CA										
MIDS on Ship T&E	WX	SPAWARSYSCO MSan Diego, CA		800	Dec 98	500	Dec 99	0	1,300	1,300		
MIDS Test Assets	SS/CPAF/ IF	MIDSCO Fairfield, NJ	6,594	0	N/A	0	N/A	0	6,594	6,594		
Subtotal T&E			14,723	5,164		8,943		Cont.	Cont.	Cont.		
Remarks												
Project Management												
ATDLS Engineering	RCP	MITRE	606	418	Dec 98	431	Nov 99	Cont.	Cont.	Cont.		
		McLean, VA										
Subtotal Management			606	418		431		Cont.	Cont.	Cont.		
Total Cost			164,559	44,730		42,459		Cont.	Cont.	Cont.		

Exhibit R-2, RDT&E Budget Item Justification	Date: February 1999
APPROPRIATION/BUDGET ACTIVITY: RDT&E,N/ 07	R-1 ITEM NOMENCLATURE Surface ASW Combat System Integration/ 0205620N

COST ($ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Total PE Cost	12.2	13.0	16.6	19.6	18.4	15.8	7.4	6.5	CONT.	CONT.
High Dynamic Range Low Cost Towed Array Receiver/ V2662	0	4.0	0	0	0	0	0	0	0	4.0
ASW Combat Systems Integration/ V0896	0.5	2.0	2.9	3.7	2.2	2.1	0	0	CONT.	CONT.
Surf ASW System Improvements/ V1916	11.7	7.0	13.7	15.9	16.2	13.7	7.4	6.5	CONT.	CONT.
Quantity of RDT&E Articles & cost										

A. Mission Description and Budget Item Justification: The objective of this program element is to incrementally modernize existing AN/SQQ-89(V) and Surface Ship Sonar Systems. It will improve AN/SQQ-89(V) Measures of Performance (MOP) by enhancing detection, tracking, classification, data processing and display capabilities, and increasing acoustic sensor frequency bandwidth. This PE will take advantage of the AN/SQQ-89(V) open system architecture to develop and integrate the Multi-Function Towed Array (MFTA) into the AN/SQQ-89(V)15 as a backfit program. Further, this program element, under project V2662 in FY 1999, will produce a single Towed Array Acoustic Intercept Subsystem (AISS) ship set and transition the AISS technology to the surface combatant AN/SQQ-89(V)15 with MFTA baseline for integration.

B. Program Change Summary:

	FY 1998	FY 1999	FY 2000
FY 1999 President's Budget:	7.6	9.4	15.6
Appropriated Value:	8.0	9.4	
Adjustment to FY 1998 Appropriated Value/ FY 1999 President's Budget:			
a. Sonar Windows / Domes Reprogramming	+5.9		
b. SBIR Transfer	- 0.3		
c. Below Threshold Reprogramming	- 1.0		
d. Surface ASW Imp Program Realignment			+ 1.2
e. Congressional Undistributed Reductions	- 0.4		
f. Minor Pricing Adjustments		- 0.4	- 0.2
g. Congressional Add for AISS		+ 4.0	
FY 2000 PRES Budget Submit:	12.2	13.0	16.6

Funding: FY 1998 increase for fiberglass-rubber composite bow dome prototype (+5.9). FY 1998 decreases for Small Business Innovative Research (SBIR) transfer (-0.3), sponsor directed BTR (-1.0), and Congressional undistributed reductions (-0.4). FY 1999 Congressional increase for AISS development (+4.0). FY 2000 (+1.2) increase for development of a Digital Torpedo Interface. FY 1999 (-0.4) and FY 2000 (-.0.2) decreases for Minor Pricing Adjustments.

Exhibit R-2a, RDT&E Project Justification			Date: February1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N/ 07	Surface ASW Combat System Integration/ 0205620N	ASW Combat System Integration/ V0896	

Cost ($ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Project Cost	0.5	2.0	2.9	3.7	2.2	2.1	0	0	CONT.	CONT.
RDT&E Articles Qty										

A. Mission Description and Budget Item Justification: The Surface ASW Combat Systems Integration project will develop the MFTA specification, towed array and common processing subsystem. It will then integrate the active classification upgrades and torpedo alertment capabilities developed under project V1916 into the MFTA. The MFTA will improve AN/SQQ-89(V) MOP by increasing sensor acoustic bandwidth, providing bistatic capability, and making processing improvements to overcome the negative effects of shallow water. These MOPs relate directly to platform survivability and operational effectiveness in the littoral environment.

PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

- ($0.2) Purchased Navy common telemetry. Began integration and test of the ability of the Navy common telemetry and towed array hardware to function as the receiver for the mid-frequency active sonar, torpedo defense, and BroadBand Variable Depth Sonar.

- ($0.3) Began system design specification development for the MFTA array and processor. Evaluated Towed Active Receiver Subsystem (TARS) Handling System Engineering changes for MFTA. Began the requisite studies and investigations to resolve engineering issues to support Installation Control Drawings.

2. FY 1999 PLAN:

- ($0.700) Complete system design specification development for the MFTA array and processor.

- ($0.658) Begin fabrication of MFTA array parts.

- ($0.600) Begin development and integration of the MFTA processing.

- ($0.042) Portion of extramural program is reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2000 PLAN:

Exhibit R-2a, RDT&E Project Justification			Date: February1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N/ 07	Surface ASW Combat System Integration/ 0205620N	ASW Combat System Integration/ V0896	

- ($0.8) Complete fabrication of MFTA array parts.
- ($1.8) Continue development and integration of the MFTA processing system and array.
- ($0.3) Coordinate and conduct 4Q MFTA sea test and prepare analysis of results.

B. Other Program Funding Summary:

	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Complete	Total Cost
OPN P-1 Line Item 45 (BLI 213600, 213605)	17.6	23.3	31.9	27.3	29.5	37.6	62.1	64.3	CONT.	CONT.

Related RDT&E: PE 0603553N (Surface Anti-Submarine Warfare) - Advanced ASW Development

C. Acquisition Strategy: Development work in this project is performed primarily by:

- Naval Undersea Warfare Center, Newport - AN/SQQ-89(V) Technical Direction Agent
- Lockheed Martin Corporation - Incumbent AN/SQQ-89(V) Design Agent. This contract was awarded competitively and will extend through FY 2001.
- Chesapeake Sciences Corporation - SBIR Phase III Award (June 98) for common Navy Towed Array Telemetry.
- Applied Hydro Acoustics - Competitive Contract awarded by SPAWARSYSCOM.

Procurement of the MFTA array components will be from Chesapeake Sciences Corporation and array fabrication will be done by the winner of a competitive Omnibus Towed Array contract.

D. Schedule Profile:

Exhibit R-2a, RDT&E Project Justification			Date: February1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N/ 07	Surface ASW Combat System Integration/ 0205620N	ASW Combat System Integration/ V0896	

	FY 1998	FY 1999	FY 2000	FY 2001	FY2002	FY 2003	FY 2004	FY 2005
Program Milestones	1Q Begin MFTA Project					Complete MFTA Project		First (V)15+MFTA Installation (2 Systems)
Engineering Milestones		4Q Complete MFTA System Design Specification			2Q Complete Final MFTA Processing Build 5	Transition to MFTA Production		
T&E Milestones			4Q MFTA Sea Test	2Q and 4Q MFTA Sea Tests	2Q and 4Q MFTA Sea Tests		4Q Production Sea Test	
Contract Milestones	Towed Array Omnibus Contract							

Exhibit R-3 Cost Analysis		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N/ 07	Surface ASW Combat System Integration/ 0205620N	ASW Combat System Integration/ V0896

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date			Cost To Complete	Total Cost	Target Value of Contract
Primary H/W & S/W Development	Var.	Misc.	0.2	1.5	Var.	2.1	Var.			CONT.	CONT.	
Subtotal Product Development			0.2	1.5		2.1				CONT.	CONT.	
Remarks: Budgeted for Lockheed Martin award fees ($M): 0.1 in FY99 and 0.1 in FY00. There has been no award fee awarded in prior years in this project.												
Studies, Analysis, & Evaluations	Var.	Misc.	0.1	0.1	Var.	0.1	Var.			CONT.	CONT.	
Engineering & Technical Services	Var.	Misc.	0.1	0.2	Var.	0.2	Var.			CONT.	CONT.	
Subtotal Support			0.2	0.3		0.3				CONT.	CONT.	
Remarks:												

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date			Cost To Complete	Total Cost	Target Value of Contract

Exhibit R-3 Cost Analysis		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N/ 07	Surface ASW Combat System Integration/ 0205620N	ASW Combat System Integration/ V0896

Developmental & Operational T&E	Var.	Misc.	0.0	0.0		0.3	Var.			CONT.	CONT.	
Subtotal T&E			0.0	0.0		0.3				CONT.	CONT.	
Remarks:												
Program Management Support	Var.	Misc.	0.1	0.2	Var.	0.2	Var.			CONT.	CONT.	
Subtotal Management			0.1	0.2		0.2				CONT.	CONT.	
Remarks:												
Total Cost			0.5	2.0		2.9				CONT.	CONT.	
Remarks:												

Exhibit R-2a, RDT&E Project Justification			Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N/ 07	Surface ASW Combat System Integration/ 0205620N	Surface ASW System Improvements/ V1916	

Cost ($ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Project Cost	11.7	7.0	13.7	15.9	16.2	13.7	7.4	6.5	CONT.	CONT.
RDT&E Articles Qty										

A. Mission Description and Budget Item Justification: The Surface ASW Systems Improvements project will support essential performance enhancements on AN/SQQ-89(V) and Surface Ship Sonar Systems. This project will develop and refine active classification and display upgrades to support implementation in both the AN/SQQ-89(V) hull subsystem and the MFTA. This project will integrate the MFTA, completed in project V0896, with the AN/SQQ-89(V)15 for backfit on DDG51 class ships (AN/SQQ-89(V)15A). Additionally, project V1916 will develop an interplatform ASW data link, design and interface with the Light Airborne Multi-Purpose (LAMPS) Mk III Blk II system, improve torpedo recognition algorithms and provide a digital torpedo interface to the AN/SQQ-89(V) Underwater Fire Control System (UFCS).

PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

- ($1.3) Completed evaluation of the Surveillance Towed Array Sensor System (SURTASS) passive software Build 12 for incorporation into the AN/SQQ-89(V).
- ($2.3) Completed TARS mid-frequency bistatic towed array processor Advanced Development Model (ADM). Supported TARS array white ship sea test. Participated in TARS ADM gray ship demonstration. PE 0205620N provided the mid-frequency bistatic towed array processor components (dry-end).
- ($0.9) Supported transition of active classification upgrade algorithms to improve Echo Tracker Classifier (ETC) capability in active classification.
- ($0.7) Established requirements for and demonstrated feasibility of an ASW Data Link (virtual) to support multi-platform coordinated ASW.
- ($0.2) Supported Navy-wide towed array efforts.
- ($0.6) Conducted DT-IIIAN sea test assist and data analysis on an AN/SQQ-89(V) system with adjunct processing including torpedo alertment and data fusion capabilities.

Exhibit R-2a, RDT&E Project Justification			Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N/ 07	Surface ASW Combat System Integration/ 0205620N	Surface ASW System Improvements/ V1916	

- ($4.4) Contracted for completion of preliminary design, test and analysis, preparation of detail design, tooling modifications and development of room-temperature-cured composite dome prototype.

- ($1.3) Provided technical direction, configuration management, quality assurance, and preparation of engineering changes for conversion to composite dome technology. Supported composite dome sea trial.

2. FY 1999 PLAN:

- ($1.300) Complete analysis of data from TARS FY 1998 sea tests and coordinate and conduct FY 1999 TARS sea test and prepare analysis of results.

- ($0.700) Complete performance specification development for the TARS Engineering Development Model (EDM) to include active classification display upgrades and transition into the MFTA program.

- ($1.214) Continue transition of active classification upgrade algorithms for ETC to support implementation with the hull sensor and mid-frequency active MFTA.

- ($0.300) Begin development of an ASW Data Link (virtual) to support multi-platform coordinated ASW.

- ($0.200) Continue support of Navy-wide towed array commonality development efforts.

- ($0.700) Conduct developmental test, DT-IIIAO, of an AN/SQQ-89(V)6 system, and commence planning for an operational test and evaluation, OT-IIIG, on an AN/SQQ-89(V)6 system with active adjunct processing and the Sonar In-Situ Mode Assessment System (SIMAS) upgrade.

- ($0.300) Provide performance data analysis and modeling and simulation using MOP and Measures of Effectiveness (MOE) methods.

- ($0.200) Begin program planning and requirements definition for the LAMPS Mk III Blk II system, identify critical system performance items, establish new interfaces for the KuBand LAMPS Common Datalink (CDL), and explore methods of backfitting these changes to the maximum number of ships.

- ($1.200) Continue upgrades to the Torpedo Recognition Alertment Functional Segment (TRAFS) as well as develop improved torpedo detection algorithms for the AN/SQQ-89(V).

Exhibit R-2a, RDT&E Project Justification			Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N/ 07	Surface ASW Combat System Integration/ 0205620N	Surface ASW System Improvements/ V1916	

- ($0.800) Investigate AN/SQQ-89(V) display commonality issues, minimize display formats, and standardize operator-machine interfaces.
- ($0.086) Portion of extramural program is reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2000 PLAN:

- ($0.5) Continue development of an ASW Data Link (virtual) to support multi-platform coordinated ASW.
- ($0.2) Continue support of Navy-wide towed array commonality development efforts.
- ($0.6) Complete sea test analysis of FY 1999 DT-IIIAO on an AN/SQQ-89(V)6 system, and conduct operational test and evaluation, OT-IIIH, of an AN/SQQ-89(V)6 system.
- ($0.4) Continue performance data analysis and modeling and simulation using MOP and MOE methods.
- ($2.6) Write system performance specification changes, complete KuBand LAMPS CDL data definition, write shipboard and aircraft computer program design changes, and begin writing source code changes.
- ($1.3) Continue upgrades to the Torpedo Recognition Alertment Functional Segment (TRAFS) as well as develop improved torpedo detection algorithms for the AN/SQQ-89(V).
- ($0.3) Continue investigation of AN/SQQ-89(V) display commonality issues, minimize display formats, and standardize operator-machine interfaces.
- ($6.6) Begin development of mid-frequency MFTA active classification and display upgrades.
- ($1.2) Begin design specification for the Digital Torpedo Interface to the AN/SQQ-89(V) UFCS.

Exhibit R-2a, RDT&E Project Justification			Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N/ 07	Surface ASW Combat System Integration/ 0205620N	Surface ASW System Improvements/ V1916	

B. Other Program Funding Summary:

	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Complete	Total Cost
OPN P-1 Line Item 45 (BLI 213600, 213605)	17.6	23.3	31.9	27.3	29.5	37.6	62.1	64.3	CONT.	CONT.

Related RDT&E: PE 0603553N (Surface Anti-Submarine Warfare) - Advanced ASW Development

C. Acquisition Strategy: Development work in this project is performed primarily by:

- Naval Undersea Warfare Center, Newport - AN/SQQ-89(V) Technical Direction Agent
- Naval Surface Warfare Center, Dahlgren - Mk 116 Fire Control Technical Direction Agent
- Lockheed Martin Corporation - Incumbent AN/SQQ-89(V) Design Agent. This contract was awarded competitively and will extend through FY 2001.
- Naval Research Laboratory - Technical Direction Agent for Sonar Dome Rubber Windows/ and Sonar Rubber Domes (SDRW/SRD)
- B.F. Goodrich Corporation - SDRW/SRD Production Contractor

Procurement of the AN/SQQ-89(V)15 integrated with the MFTA in this project will commence in FY 2003 on a competitive contract awarded in the FY 2002 time frame.

D. Schedule Profile:

Exhibit R-2a, RDT&E Project Justification			Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N/ 07	Surface ASW Combat System Integration/ 0205620N	Surface ASW System Improvements/ V1916	

	FY 1998	FY 1999	FY 2000	FY 2001	FY2002	FY 2003	FY 2004	FY 2005
Program Milestones		Begin LAMPS Mk III Blk II Integration	Begin Digital Torpedo Interface for AN/SQQ-89(V) UCFS	Begin MFTA Integration into AN/SQQ-89(V)15		Complete MFTA Integration into AN/SQQ-89(V)15 Complete LAMPS Mk III Blk II Integration	Complete Digital Torpedo Interface for AN/SQQ-89(V) UCFS	First (V)15+MFTA Installation (2 Systems)
Engineering Milestones	4Q Complete SURTASS Passive Evaluation	4Q Complete FY98/ FY99 TARS ADM Sea Test Analysis 4Q Complete TARS EDM Performance Spec Dev						
T&E Milestones	2Q and 4Q TARS ADM Sea Tests	4Q DT-IIIAO Sea Test 2Q TARS ADM Sea Test	3Q OT-IIIH Sea Test		2Q DT-IIIAP and OT-IIIJ Sea Tests		2Q DT-IIIAQ and OT-IIIK Sea Tests	
Contract Milestones					Award new competitive AN/SQQ-89(V)15 procurement contract			

Exhibit R-3 Cost Analysis		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N/ 07	Surface ASW Combat System Integration/ 0205620N	Surface ASW System Improvement/ V1916

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date			Cost To Complete	Total Cost	Target Value of Contract
Primary H/W & S/W Development	WR	NUWC/NPT	17.5	1.4	10/98	2.6	10/99			CONT.	CONT.	
Primary H/W & S/W Development	C/CPAF	Lockheed Martin, NY	2.5	2.0	12/98	3.7	12/99			0.0	8.3	8.3
Primary H/W S/W Development	Var.	Misc.	23.6	1.1	Var.	5.0	Var.			CONT.	CONT.	
Common Systems Engineering	Var.	Misc.	0.4	0.2	Var.	0.2	Var.			CONT.	CONT.	
Subtotal Product Development			44.0	4.7		11.5				CONT.	CONT.	
Remarks: Budgeted for Lockheed Martin award fees ($M): 0.2 in FY99 and 0.2 in FY00. Lockheed Martin's performance has been excellent in prior years, earning 100% of possible award fee for the past four award fee periods.												
Studies, Analysis, & Evaluations	Var.	Misc.	0.9	0.2	Var.	0.2	Var.			CONT.	CONT.	
Engineering & Technical Services	Var.	Misc.	1.5	0.3	Var.	0.3	Var.			CONT.	CONT.	
Subtotal Support			2.4	0.5		0.5				CONT.	CONT.	
Remarks:												
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total Pys Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date			Cost To Complete	Total Cost	Target Value of Contract

Exhibit R-3 Cost Analysis		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N/ 07	Surface ASW Combat System Integration/ 0205620N	Surface ASW System Improvement/ V1916

Developmental & Operational T&E	Var.	Misc.	3.6	0.7	Var.	0.6	Var.			CONT.	CONT.	
Miscellaneous T&E	Var.	Misc.	2.3	0.3	Var.	0.4	Var.			CONT.	CONT.	
Subtotal T&E			5.9	1.0		1.0				CONT.	CONT.	
Remarks:												
Program Management Support	Var.	Misc.	3.4	0.8	Var.	0.7	Var.			CONT.	CONT.	
Subtotal Management			3.4	0.8		0.7				CONT.	CONT.	
Remarks:												
Total Cost			55.7	7.0		13.7				CONT.	CONT.	
Remarks:												

Exhibit R-2, RDT&E Budget Item Justification								Date: February 1999		
APPROPRIATION/BUDGET ACTIVITY: RDT&E,N / 7					R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. MK48 ADCAP/0205632N					
COST ($ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Total P.E. Cost	10.3	17.4	20.4	15.6	17.1	18.2	22.8	30.3	CONT.	CONT.
MK48 ADCAP / V0366	10.3	17.4	20.4	15.6	17.1	18.2	22.8	30.3	CONT.	CONT.
Quantity of RDT&E Articles & cost	26 / 2.3	3.2	3.5	5.1	1.8	0.6				

A. (U) Mission Description and Budget Item Justification:

The MK 48 ADCAP (ADvanced CAPability) torpedo R&D program focuses on two specific areas through FY05: Guidance and Control (G&C) software block upgrades and wideband sonar capability. The Chief of Naval Operations continues to stress shallow water (less than 600 feet) as a critical operating area to counter third world diesel electric submarines. Torpedo testing in shallow water has demonstrated that in-service ADCAP has less than full capability in this difficult environment. However, this testing, in conjunction with laboratory simulation efforts, has shown that significant performance improvements can be made by implementing changes to weapon tactics and software algorithms. Development, implementation and testing of these changes is being accomplished under the ADCAP G&C software block upgrade program.

(U) The focus of the MK 48 ADCAP torpedo R&D program for FY99 and out has shifted from being primarily concentrated on Software Block Upgrade efforts to a coordinated hardware/software upgrade for countering evolving threats and maintaining robust performance. Countermeasure (CM) sophistication and availability on the open market directly affects ADCAP kill proficiency and its ability to counter rapidly evolving threats. The Common Broadband Advanced Sonar System (CBASS) program will develop and field a wideband sonar capable of identifying CMs and discriminating them from the target. CBASS will procure 26 test articles (6 prototypes and 20 Engineering Development Models (EDMs)). CBASS met Milestone II requirements on 6 March 1998 and received MDA approval to proceed into EMD. Full rate production and IOC are scheduled for FY04.

(U) The introduction of phased prototyping in FY03 will provide a more rapid technology transition path for incremental torpedo improvements and upgrades (including the development and test of New Technology Concepts from the R&D community (6.2/6.3) and contractor Independent Research and Development (IR&D)). This approach will incorporate accelerated in-water testing of the new concepts allowing early Fleet input into future ADCAP upgrades and help to provide the foundation for Next Generation Torpedoes. These efforts will continue torpedo development investment at a lower cost and shorter term than traditional torpedo programs.

Exhibit R-2, RDT&E Budget Item Justification	Date: February 1999
APPROPRIATION/BUDGET ACTIVITY: RDT&E,N / 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. MK48 ADCAP/0205632N

1. (U) FY 1998 ACCOMPLISHMENTS:

- (U) ($3.5) Continued G&C Software Block Upgrade IV Improvement efforts in support of DT. Conducted validation of safety features for new build releases of software block upgrades. Developed G&C Software improvements to optimize torpedo algorithm and processor effectiveness.

- (U) ($1.3) Continued support and upgrade of the Weapon Analysis Facility (WAF) simulator to reflect the latest G&C hardware and software. Continued incremental validation of the WAF to prepare for Block IV OT in FY00.

- (U) ($1.7) Conducted DT of Software Block Upgrade IV. Supported COMSUBPAC priority FOT&E of Software Block Upgrade III.

- (U) ($0.1) Provided for COMOPTEVFOR Block Upgrade IV DT test support.

- (U) ($3.4) Continued development efforts on the CBASS wideband sonar system for the ADCAP MODs torpedo. Awarded CBASS EMD contract for the development and manufacture of prototype wideband sonar systems. Continued to perform trade-offs and comparative analysis on various wideband configurations including technologies being developed through ONR 6.2/6.3 programs.

- (U) ($0.3) Continued development, design and prototype of new propulsion concepts resulting from 6.2 R&D technology. Began the land-based testing of alternate fuels/reduced maintenance propulsion concepts.

Exhibit R-2, RDT&E Budget Item Justification	Date: February 1999
APPROPRIATION/BUDGET ACTIVITY: RDT&E,N / 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. MK48 ADCAP/0205632N

2. (U) FY 1999 PLAN:

- (U) ($6.5) Continue the development of G&C Software Block Upgrade IV in preparation for OT in FY00. G&C Software development efforts continue in order to address fleet identified priorities. Conduct validation of safety features for new build releases of software block upgrades.

- (U) ($1.6) Continue to support and upgrade the Weapon Analysis Facility simulator to reflect latest G&C hardware and software. Conduct simulation in support of Block Upgrade IV DT and other software improvements. Continue model validation efforts.

- (U) ($2.8) Complete Developmental Testing and prepare for Operational Testing in FY00 of Software Block Upgrade IV. Support FOT&E of Software Block Upgrade III.

- (U) ($0.1) Provide for COMOPTEVFOR Block Upgrade IV DT test support.

- (U) ($5.7) CBASS EMD efforts continue toward integration of prototype components. Develop advanced wideband algorithms, signal processing, and tactical software. Conduct land-based testing of prototype hardware.

- (U) ($0.6) Continue to develop, design and prototype new propulsion concepts. Continue land-based testing of alternate fuels and reduced maintenance propulsion components.

- (U) ($0.1) Portion of extramural program is reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

Exhibit R-2, RDT&E Budget Item Justification	Date: February 1999
APPROPRIATION/BUDGET ACTIVITY: RDT&E,N / 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. MK48 ADCAP/0205632N

3. (U) FY 2000 PLAN:

- (U) ($3.8) Complete the development of G&C Software Block Upgrade IV in support of OT. G&C Software development efforts continue in order to address fleet identified priorities. Conduct validation of safety features for new build releases of software block upgrades.

- (U) ($1.3) Continue to support and upgrade the Weapon Analysis Facility simulator to reflect latest G&C hardware and software. Conduct simulation in support of Block Upgrade IV OT and other software improvements. Continue model validation efforts.

- (U) ($4.4) Complete Operational Testing of Software Block Upgrade IV.

- (U) ($0.3) Provide for COMOPTEVFOR Software Block Upgrade IV test support.

- (U) ($10.4) CBASS EMD efforts continue toward integration of prototype components. Develop advanced wideband algorithms, signal processing, and tactical software. Continue land-based testing of prototypes, and begin in-water testing.

- (U) ($0.2) Continue to develop, design and prototype new propulsion concepts. Continue land-based testing of alternate fuels and reduced maintenance propulsion components.

B. (U) Program Change Summary: ($ in millions)

Exhibit R-2, RDT&E Budget Item Justification			Date: February 1999
APPROPRIATION/BUDGET ACTIVITY: RDT&E,N / 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. MK48 ADCAP/0205632N		

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	10.5	17.6	18.5
(U) Appropriated Value:	10.8	17.6	
(U) Adjustments to FY1998 Appropriated Value/FY 1999 President's Budget:	-0.5	-0.2	+1.9
(U) FY 2000/01 PRES Budget Submit:	10.3	17.4	20.4

(U) Funding:

FY98: Reduction of -$0.5M is due to Congressional Undistributed reductions (-$0.3M) and SBIR (-$0.2M).
FY99: Reduction of -$0.2M is due to Congressional Undistributed reductions.
FY00: $2.0M added to support completion of Software Block Upgrade IV and its OPEVAL and a net reduction of -$0.1M (due to Congressional Undistributed reductions -$0.2M and minor pricing adjustments $0.1M).

(U) Schedule: Not applicable.

(U) Technical: The addition of $2.0M to FY00 permits incorporation of fleet priorities into Software Block Upgrade IV in support of its operational evaluation.

C. (U) Other Program Funding Summary ($ in millions)

	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Complete	Total Cost
MK48 ADCAP MODS (WPN / PE 0204284N / BA3 / P-1 Item 322500)	53.5	49.3	52.8	38.8	46.6	60.2	59.4	71.2	CONT.	CONT.

D. (U) Acquisition Strategy: CBASS EMD contract was competitively awarded among qualified ADCAP producers.

E. Schedule Profile:

Exhibit R-2, RDT&E Budget Item Justification	Date: February 1999
APPROPRIATION/BUDGET ACTIVITY: RDT&E,N / 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. MK48 ADCAP/0205632N

MK48 ADCAP Planning Schedule

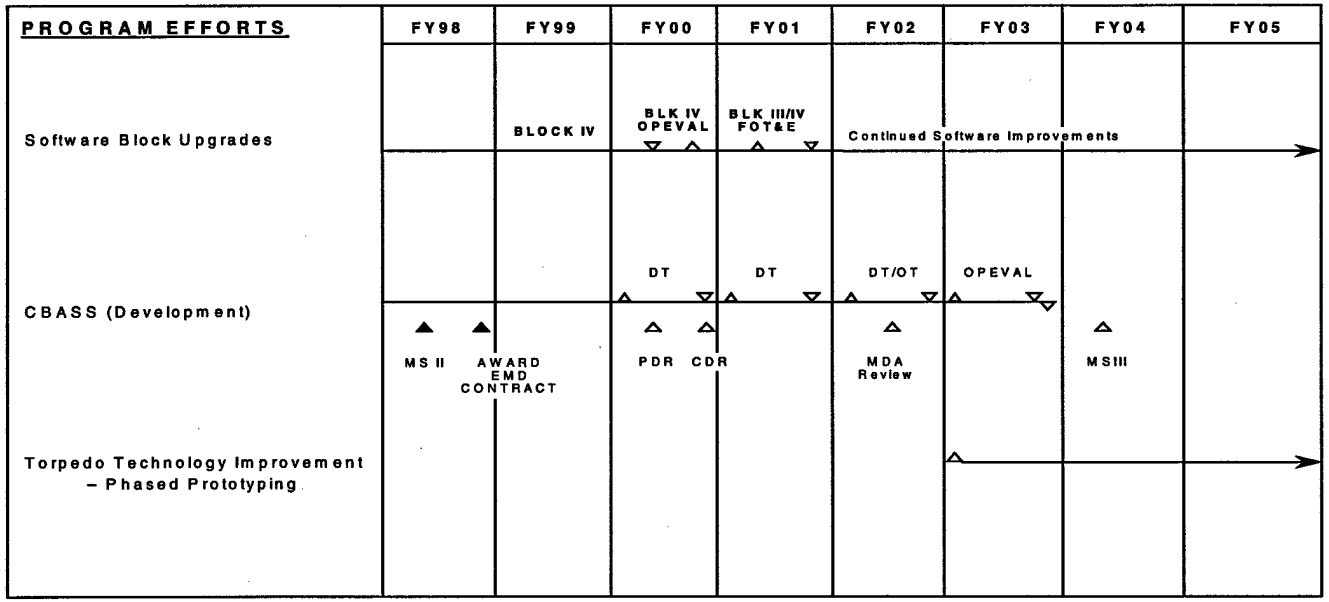


Exhibit R-3 Cost Analysis										Date: February 1999		
APPROPRIATION/BUDGET ACTIVITY: RDT&E/7		PROGRAM ELEMENT NAME AND NUMBER: MK48 ADCAP/0205632N								PROJECT NAME AND NUMBER: MK48 ADCAP/V0366		
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	FY01 Cost	FY01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	WR	NUWC Newport, RI	CONT.	1.4	11/98	1.1	10/99	0.2	10/00	CONT.	CONT.	N/A
	C,CPFF	ARL/PSU State College, PA	CONT.	0.3	01/99	0		0		CONT.	CONT.	N/A
	C,CPIF	Northrop Grumman	CONT.	3.2	10/98	3.5	10/99	5.1	10/00	2.4	16.5	16.5
Software Development	WR	NUWC Newport, RI	CONT.	3.4	11/98	2.6	10/99	1.7	10/00	CONT.	CONT.	N/A
	C,CPFF	ARL/PSU State College, PA	CONT.	0.5	01/99	0.5	10/99	0.4	10/00	CONT.	CONT.	N/A
Systems Engineering	WR	NUWC Newport, RI	CONT.	3.5	11/98	2.9	10/99	2.1	10/00	CONT.	CONT.	N/A
Subtotal Product Development			CONT.	12.3		10.6		9.5		CONT.	CONT.	
Remarks: None.												
Subtotal Support												
Remarks: None.												

Exhibit R-3 Cost Analysis												
										Date: February 1999		
APPROPRIATION/BUDGET ACTIVITY: RDT&E/7		PROGRAM ELEMENT NAME AND NUMBER: MK48 ADCAP/0205632N					PROJECT NAME AND NUMBER: MK48 ADCAP/V0366					
Cost Categories (Tailor to WBS or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY 99 Award Date	FY00 Cost	FY00 Award Date	FY01 Cost	FY01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Test and Evaluation	WR	NUWC Newport, RI	CONT.	2.7	11/98	5.1	10/99	3.9	10/00	CONT.	CONT.	N/A
	VAR	VARIOUS	CONT.	0.1	10/98	0.7	10/99	0.2	10/00	CONT.	CONT.	N/A
Modeling & Simulation	WR	NUWC Newport, RI	CONT.	2.0	11/98	3.6	10/99	1.7	10/00	CONT.	CONT.	N/A
	C,CPFF	ARL/PSU State College, PA	CONT.	0		0.1	10/99	0		CONT.	CONT.	N/A
Subtotal T&E			CONT.	4.8		9.5		5.8		CONT.	CONT.	
Remarks: None.												
Program Management Support	VAR	VARIOUS	CONT.	0.3	MISC.	0.3	MISC.	0.3	MISC.	CONT.	CONT.	N/A
Subtotal Management			CONT.	0.3		0.3		0.3		CONT.	CONT.	
Remarks: None.												
Total Cost			CONT.	17.4		20.4		15.6		CONT.	CONT.	
Remarks: None.												

EXHIBIT R-2, FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205633N
PROGRAM ELEMENT TITLE: AVIATION IMPROVEMENTS

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
W0601 Common Ground Equipment	2,790	6,141	4,110	3,969	3,587	3,690	3,799	3,902	CONT	CONT
W0852 Consolidated Automated Support System (CASS)	8,045	8,475	8,570	8,819	8,981	9,167	29,084	34,210	CONT	CONT
W1041 Aircraft Equipment Reliability/Maintainability Improvement Program (AERMIP)	1,377	1,315	899	769	672	677	700	719	CONT	CONT.
W1355 Aircraft Engine CIP	35,388	46,167*	39,714	47,526	41,628	37,373	73,135	84,162	CONT.	CONT.
TOTAL	**47,600**	**62,098**	**53,293**	**61,083**	**54,868**	**50,907**	**106,718**	**122,993**	**Cont**	**Cont**

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Common Ground Equipment is a Naval Aviation Project to apply new technology to common support equipment necessary to support all aircraft. CASS develops standardized Automated test Equipment (ATE) with computer assisted, multi-function capabilities to support the maintenance of aircraft subsystems and missiles. AERMIP is the only Navy program that provides engineering support for in-service out-of-production aircraft equipment and provides increased readiness at reduced operational and support cost. Aircraft Engine CIP develops reliability and maintainability (R&M) and safety enhancements for in-service Navy aircraft engines, transmission, propellers, starters, auxiliary power units, electrical generating systems, fuel systems, and fuels and lubricants.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing for upgrade of existing operational systems.

*FY-99 budget includes a Congressional add of $2,000K for Eddy Current Sensors executed under project W2663.

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0205633N** **PROJECT NUMBER: W0601**
PROGRAM ELEMENT TITLE: AVIATION IMPROVEMENTS **PROJECT TITLE: Common Ground Equipment**

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
W0601 COMMON GROUND EQUIPMENT										
TOTAL	**2,790**	**6,141**	**4,110**	**3,969**	**3,587**	**3,690**	**3,799**	**3,902**	**CONT**	**CONT**

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project introduces effective, efficient fleet support equipment through the application of new technology, thereby improving fleet supportability and aircraft readiness.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

- (U) ($ 290) Continued Advanced Boresight Equipment development program.
- (U) ($ 750) Completed USN involvement with USAF Joint Service Electronic Combat Tester (JSECT).
- (U) ($1054) Continued USN involvement with USAF Next Generation Munitions Handler.
- (U) ($ 150) Initiated development of Universal Aircraft Axle Jack.
- (U) ($ 95) Initiated development of an Automated Engine Turning Tool.
- (U) ($ 145) Initiated and complete development of Universal Chock Adapters.
- (U) ($ 83) Initiated development of Advanced Armament Trailer A/M 32U-13.
- (U) ($223) Initiated and completed development of Common Missile Gel Pad.

DATE: February 1999

BUDGET ACTIVITY: 7 | PROGRAM ELEMENT: 0205633N | PROGRAM ELEMENT TITLE: AVIATION IMPROVEMENTS | PROJECT NUMBER: W0601 | PROJECT TITLE: Common Ground Equipment

2. FY 1999 PLAN:

- (U) ($3886) Continue Advanced Boresight Equipment development/LRIP program.
- (U) ($ 570) Complete JSECT.
- (U) ($ 957) Continue development of USAF Next General Munitions Handler (NGMH).
- (U) ($ 155) Complete developing Automated Engine Turning Tool.
- (U) ($ 490) Initiate and complete development of the Joint Engine Test Initive (JETI).

(U) ($ 83) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2000 PLAN:

- (U) ($ 680) Complete Advanced Boresight Equipment LRIP program.
- (U) ($ 672) Continue development of USAF NGMH.
- (U) ($ 90) Continue development of Universal Aircraft Axle Jack.
- (U) ($ 320) Initiate development of Aircraft Engine Monitoring System.
- (U) ($ 44) Complete development of Advanced Armament trailer A/M 32-13
- (U) ($ 100) Initiate Joint project with US Army for Non Destructive Inspection (NDI) ultrasonic equipment.
- (U) ($ 80) Initiate development of CVN/CVX stores and pod stowage.
- (U) ($ 240) Initiate development of state of-the-art fuel system for Standard Engine Test Set (SETS).

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0205633N** **PROGRAM ELEMENT TITLE: AVIATION IMPROVEMENTS** **PROJECT NUMBER: W0601** **PROJECT TITLE: Common Ground Equipment**

- (U) ($ 265) Initiate development of Aircraft Engine Test Facility Primary Air Inlet.
- (U) ($ 220) Initiate development of Rapid Re-configurable Electronic Test Set.
- (U) ($ 111) Initiate development of Night Vision goggle/SE compatibility.
- (U) ($ 590) Initiate development of Turbo prop R&D Instrument Modernization.
- (U) ($ 140) Initiate development of Shaft Load System for small turbine engines.
- (U) ($ 235) Initiate development of Non-propelled Shipboard Weapons Loader.
- (U) ($ 168) Initiate development of Turbo Engine Test Enclosure.
- (U) ($ 55) Initiate and complete development of Expeditionary Airfield Weapons Ready Service Shelter.
- (U) ($ 100) Initiate and complete development of Graphic User Interface (GUI) interface for Test Program Set (TPS) developers.

(U) B. PROGRAM CHANGE SUMMARY

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	2,836	6,341	4,187
(U) Appropriated Value:	2,836	6,341	
(U) Adjustments from President's Budget:	(46)	(200)	(77)
(U) FY 2000 President's Budget Submit:	2,790	6,141	4,110

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0205633N** **PROJECT NUMBER: W0601**
PROGRAM ELEMENT TITLE: AVIATION IMPROVEMENTS **PROJECT TITLE: Common Ground Equipment**

CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY 1998 decrease of $46 thousand consists of decreases of $14 thousand for the Small Business Innovation Research assessment, and $32 thousand for minor program adjustments. The FY 1999 decrease of $200 thousand reflects Congressional undistributed reductions. The FY 2000 reduction of $77 thousand is due to minor pricing adjustments.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

U) C. OTHER PROGRAM FUNDING SUMMARY

Appn	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete
(U) APN-7 (47C2)	115,012	144,802	154,354	123,126	129,370	115,172	118,536	118,548	Cont
(U) O&MN	4,130	4,564	4,850	4,992	5,118	5,246	5,104	5,234	Cont

Related RDT&E:
(U) P.E.: Not Applicable

(U) D. ACQUISITION STRATEGY: This is a non-ACAT program. Field activities propose tentative RDT&E projects. Internal panel merits and selects projects. Field activities develop projects and submit results. Operational Advisory Group (OAG) process selects projects to transition to procurement (APN-7).

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0205633N** **PROJECT NUMBER: W0601**
PROGRAM ELEMENT TITLE: AVIATION IMPROVEMENTS **PROJECT TITLE: Common Ground Equipment**

(U) E. SCHEDULE PROFILE

	FY 1998	FY 1999	FY 2000	To Complete
(U) Program Milestones				
Universal Chock		1/99 (MSIII)		
Advanced Boresight Program				12/01(MSIII)
NGMH				12/01(MSIII)
Automated Engine Turning Tool			1/00 (MSIII)	
Missile Support Pads (Gel)	10/98 (MSIII)			
Armament Maintenance Trailer			1/00(MSIII)	
Axle Jack				10/01(MSIII)
(U) Engineering Milestones				
Universal Chock	3/98 (CDR)			
Advanced Boresight Program		8/99 (CDR)		
NGMH	9/98 (CDR)			
Automated Engine Turning Tool	7/98 (CDR)			
Missile Support Pads (Gel)	7/98 (CDR)			
Armament Maintenance Trailer	7/98 (CDR)			
Axle Jack			7/00 (CDR)	
(U) T&E Milestones				
Universal Chock	7/98 (OT)			
Advanced Boresight Program				1/01(OT)
NGMH				1/01(OT)
Automated Engine Turning Tool		2/99 (OT)		
Missile Support Pads (Gel)	7/98 (OT)			
Armament Maintenance Trailer	10/98 (OT)			
Axle Jack				2/01(OT)
(U) Contract Milestones				
Advanced Boresight Program		1/99 (Contract Award)		
Automated Engine Turning Tool	7/98 (Contract Award)			
Missile Support Pads (Gel)	7/98 (Contract Award)			
Armament Maintenance Trailer	7/98 (Contract Award)			

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: Feb 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205633N

PROJECT NUMBER: W0651

PROJECT TITLE: Consolidated Automated Support System

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost Complete	Total Cost
Hardware Development	C/FP	AAI Corp Cockeysville MD	2,760	4,000	1/99	200	1/00	N/A	N/A
Miscellaneous	Various	Various	10,442	2,058	11/98	3,910	11/99	CONT	CONT
Subtotal Hardware Development			**13,202**	**6,058**		**4,110**		**CONT**	**CONT**
Remarks:									
Subtotal Support			**0**	**0**		**0**			
Remarks:									
Subtotal Test & Evaluation			**0**	**0**		**0**			
Remarks:									
Subtotal Management			**0**	**0**		**0**			
SBIR Assessment				83					
Remarks:									
Total Cost			**13,202**	**6,141**		**4,110**		**CONT**	**CONT**

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 | **PROGRAM ELEMENT: 0205633N** | **PROGRAM ELEMENT TITLE: AVIATION IMPROVEMENTS** | **PROJECT NUMBER: W0852** | **PROJECT TITLE: Consolidated Automated Support System**

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
W0852 Consolidated Automated Support System										
TOTAL	**8,045**	**8,475**	**8,570**	**8,819**	**8,981**	**9,167**	**29,084**	**34,210**	**Cont**	**Cont**

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Consolidated Automated Support System (CASS) project designs and develops modular constructed automated test equipment with computer-assisted, multi-functional capability based, standardized hardware and software elements. CASS responds to Fleet Commanders' expressed requirements to correct serious deficiencies in existing automatic test equipment. Program objectives are: (1) increase material readiness; (2) reduce life cycle costs through standardization; (3) improve tester sustainability at depot and intermediate maintenance levels; (4) reduce proliferation of unique test equipment and (5) provide test capability for existing and future avionics/electronics systems.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

- (U) ($1400) Continued development of DOD Automated Test System (ATS) standard interfaces and architectures.
- (U) ($1200) Continued development of A Board Base Environment for Test (ABBET) standards instrument control software.
- (U) ($ 612) Completed development of High Speed Digital Data Bus interfaces and commence development on Common Bus Emulater Test (CBET).
- (U) ($1808) Initiated CASS station upgrades to include tunable lasers and wide-band focal plan arrays.
- (U) ($1832) Initiated development of instrument control upgrades and virtual instruments.
- (U) ($1193) Initiated development of advanced digital/video process.

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205633N
PROGRAM ELEMENT TITLE: AVIATION IMPROVEMENTS

PROJECT NUMBER: W0852
PROJECT TITLE: Consolidated Automated Support System

2. FY 1999 PLAN:

- (U) ($1000) Continue development of DOD ATS standard interfaces and architectures.
- (U) ($ 862) Continue development of ABBET standards instrument control software.
- (U) ($2000) Continue CASS station upgrades to include tunable lasers and wide-band focal plan arrays
- (U) ($3520) Continue development of instrument control upgrades and virtal instruments.
- (U) ($1000) Continue development of advanced digital/video process.
- (U) ($ 93) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2000 PLAN:

- (U) ($1100) Continue development of DOD ATS standard interfaces and architectures.
- (U) ($1000) Continue development of ABBET standards instrument control software.
- (U) ($2500) Continue CASS station upgrades to include tunable lasers and wide-band focal plan arrays.
- (U) ($2805) Continue development of instrument control upgrades and virtual instruments.
- (U) ($1165) Continue development of advanced digital/video process.

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0205633N** **PROJECT NUMBER: W0852**
PROGRAM ELEMENT TITLE: AVIATION IMPROVEMENTS **PROJECT TITLE: Consolidated Automated Support System**

(U) B. PROGRAM CHANGE SUMMARY

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	8,563	8,862	8,780
(U) Appropriated Value:	8,563	8,862	
(U) Adjustments from President's Budget:	(518)	(387)	(210)
(U) FY 2000 President's Budget Submit:	8,045	8,475	8,570

CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY 1998 decrease of $518 thousand is due to the Small Business Innovation Research assessment of $222 thousand; and a reduction of $296 thousand for reprioritization of Navy requirements. FY1999 reduction of $387 thousand was due to Congressional undistributed reductions. The FY 2000 decrease of $210 thousand was due to pricing adjustments.

(U) Schedule: EO+ slippage due to Contractor's relocation from California to Illinois.

(U) Technical: Not Applicable

(U) C. OTHER PROGRAM FUNDING SUMMARY:

	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete
(U) APN-7 (47C2)	88,075	95,883	118,310	100,855	112,211	106,605	107,349	102,832	Cont

Related RDT&E :

(U) N/A

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205633N
PROGRAM ELEMENT TITLE: AVIATION IMPROVEMENTS

PROJECT NUMBER: W0852
PROJECT TITLE: Consolidated Automated Support System

(U) D. ACQUISITION STRATEGY: The strategy for Parts Obsolescence is a combined effort with the contractor, any changes to pre sent strategy will add additional risks to achieving a continuous production schedule and will cause technical uncertainty. For new technologies we will have competitive studies to ascertain the market technology, which will result in maximum information for minimum expenditure.

(U) E. SCHEDULE PROFILE

	FY 1998	FY 1999	FY 2000	To Complete
(U) Program Milestones	III 12/98 EO+			
(U) Engineering Milestones				
(U) T&E Milestones	EO+ FOT&E OT-IIIB 6/99			
(U) Contract Milestones				

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: Feb 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205633N

PROJECT NUMBER: W0852

PROJECT TITLE: Consolidated Automated Support System

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost
Pre-Planned Product Improvement (P3I)	FPI	TBD	835,000	225	4/99	1805	3/00	Cont	Cont
P3I	FPI	LMC	12,234	6000	1/99	4000	1/00	Cont	Cont
P3I	WX	NAWC-AD-LKE	15,539	750	12/98	1265	12/99	Cont	Cont
P3I	WX	NAWC-AD-PAX	510,200	550	12/98	750	12/99	Cont	Cont
Award Fees	N/A								
Subtotal Product Development			**1,372,973**	**7525**		**7820**		**Cont**	**Cont**
Remarks:									
Misc	MIPR	Gov		857	1/99	750	1/00	Cont	Cont
Subtotal Support				**857**		**750**		**Cont**	**Cont**
Remarks:									
Subtotal Test & Evaluation			**0**	**0**		**0**		**0**	**0**
Remarks:									
Subtotal Management			**0**	**0**		**0**		**0**	**0**
SBIR Assessment				93					
Remarks:									
Total Cost			**1,372,973**	**8475**		**8570**		**CONT**	**CONT**

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205633N
PROGRAM ELEMENT TITLE: AVIATION IMPROVMENTS

PROJECT NUMBER: W1041
PROJECT TITLE: AIRCRAFT EQUIPMENT RELIABILITY /MAINTAINABILITY IMPROVEMENT PROGRAM (AERMIP)

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
W1041 (AERMIP)	1,377	1,315	899	769	672	677	700	719	CONT	CONT
TOTAL	**1,377**	**1,315**	**899**	**769**	**672**	**677**	**700**	**719**	**CONT**	**CONT**

Quantity of RDT&E Articles

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: AERMIP is the only Navy program which provides Research, Development, Test & Evaluation (RDT&E) engineering support specifically for in-service, out-of-production aircraft equipment. AERMIP increases readiness through Reliability and Maintainability (R&M) and safety improvements to existing systems and equipments installed in Naval aircraft. It meets affordable readiness objectives by providing a cost effective solution to obsolescence problems encountered when service lives are extended, and promotes commonality and standardization across aircraft platform lines and among the services through extension of application and use of non-developmental items. AERMIP also decreases life cycle costs through reduced operational and support costs. AERMIP facilitates the Operational, Safety, and Improvement Program by applying proven low-risk solutions to current fleet problems. AERMIP also funds high priority flight testing which is not associated with any acquisition or development program under the Flight Test General (FTG) task.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

- (U) ($1377) Completed Replacement of Altitude Heading Reference System (AHRS) and S-3B SKYFLEX Evaluation. Continued multi-platform SKYFLEX evaluation, E2/C2 Cowling latch replacement, and initiated Multi-place Life Raft improvement program. Significantly improve identification, analysis, and evaluation of AERMIP candidates via use of Logistics Management Decision Support System (LMDSS).

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205633N
PROGRAM ELEMENT TITLE: AVIATION IMPROVMENTS

PROJECT NUMBER: W1041
PROJECT TITLE: AIRCRAFT EQUIPMENT RELIABILITY /MAINTAINABILITY IMPROVEMENT PROGRAM (AERMIP)

2. FY 1999 PLAN:

- (U) ($1310) Complete E2/C2 Cowling Latch. Continue SKYFLEX evaluation, Multi-Place Life Raft Improvement Program, Airborne Air Removal Device program and extend Replacement Attitude Heading Reference System (RAHRS) application to the H53E. Initiate MD-1 Gyroscope improvement program. Investigate high value payback return on investment candidates.
- (U) ($5) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2000 PLAN:

- (U) ($899) Complete multi-platform application of SKYFLEX and Airborne Air Removal Device, and Multi-Place Life Raft Improvement Program. Continue with the extension of application of the RAHRS for the H53E. Initiate AN/ARC-161 Improvement Program. Investigate high value pay back return on investment candidates.

(U) B. PROGRAM CHANGE SUMMARY

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	1,424	1,351	919
(U) Appropriated Value:	1,424	1,351	
(U) Adjustments from Pres Budget:	-47	-36	-20
(U) FY 2000 President's Budget Submit:	1,377	1,315	899

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205633N
PROGRAM ELEMENT TITLE: AVIATION IMPROVMENTS

PROJECT NUMBER: W1041
PROJECT TITLE: AIRCRAFT EQUIPMENT RELIABILITY /MAINTAINABILITY IMPROVEMENT PROGRAM (AERMIP)

CHANGE SUMMARY EXPLANATION:

(U) Funding: FY-98 reflects a net decrease of -$47 thousand which includes a -$31 thousand reduction for the SBIR assessment and -$16 thousand reduction for a minor reprogramming action. The net decrease of -$36 thousand in FY-99 represents a -$30 thousand reduction as a Congressional adjustment, -$3 thousand reduction for civilian personnel adjustment, and -$3 thousand reduction as an economic adjustment. The net decrease of -$20 thousand in FY 2000 represents a -$18 thousand reduction for rate adjustments and a -$2 thousand for a minor reprogramming action.

(U) Schedule: Not Applicable

(U) Technical: Not Applicable

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

(U) D. ACQUISITION STRATEGY: This is a non-ACAT program with no specific acquisition strategies.

(U) E. SCHEDULE PROFILE: Not applicable

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205633N
PROGRAM ELEMENT TITLE: AVIATION IMPROVEMENTS

PROJECT NUMBER: W1355
PROJECT TITLE: AIRCRAFT ENGINE CIP

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
W1355 Aircraft Engine CIP										
TOTAL	35,388	46,167*	39,714	47,526	41,628	37,373	73,135	84,162	CONT.	CONT.

Quantity of RDT&E Articles: Not applicable

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Aircraft Engine CIP provides the only source of critical design and development engineering support to resolve safety, reliability and maintainability deficiencies of in-service Navy aircraft propulsion systems. The highest priority issues CIP addresses concern safety-of-flight deficiencies which account for approximately 80% of CIP efforts. The program also corrects service-revealed deficiencies, improves Operational Readiness (OR) and Reliability and Maintainability (R&M), and reduces platform Life Cycle Cost (LCC). Budgets are allocated across platform-specific teams and multi-platform product support teams based upon long term strategies to achieve safety and affordable readiness goals; the R-3 exhibit details annual portions of those long-term plans. CIP tasks have reduced the rate of in-flight aborts, safety incidents, non-mission capable rates, scheduled and unscheduled engine removals, maintenance work hours, and overall cost of ownership. This is accomplished through the maintenance and validation of specification performance, testing to qualify engineering changes, verifying life limits, and improving the inherent reliability of the propulsion system as an integral part of Reliability Centered Maintenance (RCM) initiatives. Historically, the missions, tactics, and environmental exposure of military aircraft systems change to meet new threats or operational demands, and often result in unforeseen problems, which if not corrected, can cause critical safety/readiness degradation, such as those experienced during DESERT SHIELD/DESERT STORM operations due to sand erosion. In addition, new problems arise through actual use during deployment of the aircraft. Development programs, while geared to resolve as many problems as possible before deployment, cannot duplicate actual operations or account for the vast array of environmental and usage variables, particularly when aircraft missions vary from those the aircraft was designed to perform. Therefore, it has been found that CIP can provide an immediate engineering response to these flight-critical problems and accelerated engine testing can avoid potential problems. CIP starts after development and Navy acceptance of the first production article and addresses usage and life problems not covered by warranties. CIP addresses engines, transmissions, propellers, starters, auxiliary power units, electrical generating systems, and fuel and lubricant systems. CIP efforts continue over the system's life, gradually decreasing to a minimum level sufficient to maintain the reliability, and decrease the operating costs, of older inventory. CIP is a highly leveraged and cooperative tri-service program with Foreign Military Sales participation.

*FY-99 budget includes a Congressional add of $2,000K for Eddy Current Sensors executed under project W2663.

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7 | PROGRAM ELEMENT: 0205633N | PROGRAM ELEMENT TITLE: AVIATION IMPROVEMENTS | PROJECT NUMBER: W1355 | PROJECT TITLE: AIRCRAFT ENGINE CIP

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

- (U) ($32,095) Platform-specific efforts.
  - T56 engine (P-3, E-2, C-2, C-130) Improved the maintenance plan, qualified alternative sources of parts, completed fuel nozzle redesign, continued propeller integration efforts to reduce Non Mission Capable rates, evaluated USAF JP-8 fuel additives.
  - E-2/C-2/C-130 Identified propeller assembly fatigue failures and implemented inspection procedures in the Fleet to eliminate risk, increased electrical capacity and performance; eliminated starter failures; continued propeller redesign efforts, investigated cause of hot section damage, began generator improvement efforts.
  - S-3 Continued efforts to reduce the number of bare firewalls, completed mission analysis, continued resolution of single engine rate of climb issues, developed field hardware inspection plan.
  - F/A-18C/D Redesigned F404 flameholder configuration which will result in lower operating costs; resolved in-flight engine shut downs (a top safety concern of the F-18 Systems Safety Working Group) by designing tantalum-tantalum capacitors for circuit boards of the engine control; continued efforts to redesign aft cooling plate, low pressure turbine nozzle, and fan stage 3 shroud, conducted life management issues including the fleet leader program, engine analysis studies and improved analytical models.
  - F-14A Implemented Service Repair Development which incorporated state of the art maintenance changes which simplified tasks and reduced cost while improving safety and reliability. Addressed the top two reasons for unscheduled engine removals, sustaining engineering efforts and new problem resolution.
  - F-14B/D Continued analysis of safety of flight issues including second stage compressor failure, mission analysis/life management critical engine rotating and accessory parts; analyzed and determined cause of variable stator vane failure.
  - Mature Aircraft (EA-6B, T-2) Addressed the top four readiness degraders, the top two Aviation Depot Level Repairable (AVDLR) costs, troubleshooting procedures, and electrical system reliability and durability.
  - H-2/H-60 Analyzed flameout and rollback safety issues, analyzed life management issues affecting safety and affordability, investigated and diagnosed Hydro-mechanical Unit and Engine Control Unit rejections off-wing and power take-off shaft wear anomalies. Established Mission Profile Data Collection and Dynamic Component Life Limit efforts.
  - AV-8B Addressed top safety of flight issues including the LPC 2/3 Spacer, F402-RR-406 deficient refinery process, engine removal drivers, mission failure drivers and digital engine control unit. Redesigned LPC 2/3 spacer component, researched, tested, defined, and rectified the deficient refinery process and returned the -406 Fleet to operation and deployable status.
  - H-53/H-46/H-3 Performed life management analysis on Auxiliary Power Unit uncontained compressor wheel failures which resulted in updated life limits, rotating hardware redesigns, spin pit design validation testing and a risk mitigating implementation plan, performed Reliability Centered Maintenance analysis to baseline the material condition of engine hardware.

BUDGET ACTIVITY: 7 | PROGRAM ELEMENT: 0205633N | PROGRAM ELEMENT TITLE: AVIATION IMPROVEMENTS | PROJECT NUMBER: W1355 | PROJECT TITLE: AIRCRAFT ENGINE CIP

1. FY 1998 ACCOMPLISHMENTS: (CONT)

- H-1 Responded to and evaluated AH-1W flameout issues, Class A UH-1N mishap, Class C UH-1N mishap control purchasing issues, UH-1N tail rotor drive system, and AH-1W and UH-1N battery and starter issues. Analyzed and conducted testing on improved tail rotor drive system available on the Bell Model 412 to alleviate a "Top Ten" safety concern as ranked by the OAG and a "Top Three" safety concern as ranked by Navy UH-1N System Safety Working Group.
- T-45 Completed second year efforts on a four year engine surge recovery program. Provided inlet compatibility wind tunnel tests and conducted investigations. Addressed reliability issues including hi-pressure turbine nozzle guide vane thermal distress and high pressure compressor stator failures.

- (U) ($3,293) Multi-Platform Product Support Completed engineering improvements for F-14 and S-3 compatible Constant Speed Drive-Integrated Drive Generator. Completed several battery improvement projects and introduced Sealed Lead-Acid aircraft batteries which increased the maintenance interval of vented lead-acid technology from 30-90 days up to 30 months on F/A-18, F117, and H-46 aircraft. Implemented improved battery vents caps which double the maintenance intervals of vented nickel-cadmium batteries in the Fleet. Completed qualification and test flying of two sizes of Low Maintenance Flooded vented nickel-cadmium batteries which will increase the on-wing of nickel-cadmium batteries from 56-112 days to a minimum of one year. Improved power circuit protection, identified new circuit breakers which will identify breaks in insulation when they occur and aided in the identification of problem wiring prior to aircraft damage. This early identification will reduce wiring repair costs and realize a major safety improvement. Developed and maintained a broad qualified products list which assures product availability, maximum competition and minimum price. Evaluated numerous new corrosion inhibited turbine engine lubricants. Performed investigation on the +100 fuel additive developed by the USAF.

2. FY 1999 PLAN:

- (U) ($37,738) Platform-specific efforts.
  - T56 engine (P-3, E-2, C-2, C-130) Continue propeller integration efforts with potential propeller designs, perform engine hot section corrosion and fatigue analysis, and initiate bearing improvements.
  - E-2/C-2/C-130 Continue propeller improvement program, eliminate starter failures, continue generator improvement program to triple durability.
  - S-3 qualify lube system design improvements, conduct control system reliability and maintainability analysis, validate and implement recommended part life changes. Complete resolution of single engine rate of climb issues. Minimize number of bare firewalls.

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0205633N** **PROGRAM ELEMENT TITLE: AVIATION IMPROVEMENTS** **PROJECT NUMBER: W1355** **PROJECT TITLE: AIRCRAFT ENGINE CIP**

2. FY 1999 PLAN: (CONT)

- F/A-18C/D Continue efforts on aft cooling plate, low pressure turbine nozzle and fan stage 3 shroud redesigns. Continue life management issues including the fleet leader program, engine analysis studies, and improved analytical models, analyze engine performance data and update mission analysis.
- Mature Aircraft Address the top readiness degraders and AVDLR costs; perform an Accelerated Simulated Mission Endurance Test on the J52 engine (EA-6B), correct deficiencies in #3 hub, study "tired iron" issues and identify future obsolescence problems.
- H-2/H-60 Introduce the improved Digital Electronic Control Unit (DCU) to the H-60 fleet, develop I-level screening techniques for the DECU and Hydro-Mechanical units, continue the Advanced Helicopter Transmission Lubricant Program, extend transmission component lives, increase readiness by reducing corrosion, continue Mission Profile Data Collection and Dynamic Component Life Limit efforts.
- AV-8B Continue efforts to address safety of flight issues, engine removal drivers, and mission failure drivers. Continue efforts on digital engine control unit; resolve power lever actuator vibration problem
- H-53/H-46/H-3 Perform analysis on the top cause for engine removals; transition program to reliability-centered maintenance; create depot goals to improve compressor performance and engine power, resolve oil consumption and leakage problems, and improve on wing times.
- H-1 Continue improvements to tail rotor drive system. Investigate primary safety issues; flameouts and rollbacks.
- T-45 Implement third year of the four year engine surge recovery program, address platform safety, specification compliance, mission profile updates, and life cycle management.
- F-14A Perform minimal level of sustaining engineering.
- F-14B/D Improve propulsion system safety through an active life management program for critical rotating components, reduce the engine Non-recoverable In-Flight Shutdown Rate by 75% by 2003, reduce the propulsion system related mission abort rate by 50% by 2003.
- F/A-18E/F and V-22 Initiate CIP programs addressing propulsion systems such as electrical and fuel systems not covered by Power by the Hour programs and other support programs with the exception of fuel system, fuel pump, and engine fuel controller analysis on the F-18E/F and the Nacelle blower fan bearing, drive system chip detector, and drive shaft engine analysis on the V-22..

- (U) ($7,682) Multi-Platform Product Support Teams Initiate projects designed to provide common support to multiple platforms in the areas of improved drive systems, secondary power and mechanical systems; improved tools for performance analysis, modeling and simulation, diagnostics, engine reliability assessment, and structural integrity; improved products and processes for fuels, lubricants, and refueling equipment; improved blade and vane repair processes and life cycle support; and improved electrical system product support and battery systems. Conduct study and analysis of Eddy Current Sensors.

- (U) ($747) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0205633N** **PROGRAM ELEMENT TITLE: AVIATION IMPROVEMENTS** **PROJECT NUMBER: W1355** **PROJECT TITLE: AIRCRAFT ENGINE CIP**

3. FY 2000 PLAN:

- (U) ($35,345) Platform-specific efforts.
  - T56 engine (P-3, E-2, C-2, C-130) Maintain safety margins by investigating turbine coatings and develop new designs, continue propeller integration efforts with potential propeller designs, perform engine hot section corrosion and fatigue analysis, and continue bearing improvements.
  - E-2/C-2/C-130 Continue propeller safety improvement program, initiate pump housing improvement, perform Hub Internal Supply System development, eliminate starter failures, continue generator improvement program to triple durability.
  - S-3 Establish and implement an engineering plan to improve TF34 reliability, perform analysis to obtain better performance from existing hardware, redesign low reliability parts, conduct control system reliability and maintainability analysis, validate and implement recommended part life changes.
  - F/A-18C/D Identify obsolescence problems, continue efforts on aft cooling plate, low pressure turbine nozzle and fan stage 3 shroud redesigns. Continue life management issues including the fleet leader program, engine analysis studies, and improved analytical models, analyze engine performance data and update mission analysis.
  - Mature Aircraft Address the top readiness degraders and AVDLR costs; implement efforts on the J52 engine (EA-6B) ASMET test, correct deficiencies in #3 hub, continue to study and implement solutions to "tired iron" issues and future obsolescence problems.
  - H-2/H-60 Implement I-level screening techniques for the DECU and Hydro-Mechanical units, continue the Advanced Helicopter Transmission Lubricant Program, extend transmission component lives, increase readiness by reducing corrosion, continue Mission Profile Data Collection and Dynamic Component Life Limit efforts.
  - AV-8B Address top readiness degraders and AVDLR costs; safety of flight issues, engine removal drivers, and mission failure drivers, assess life management program issues for engine components.
  - H-53/H-46/H-3 Continue efforts on the top cause for engine removals; complete transition of program to reliability-centered maintenance; implement goals at depot level to improve compressor performance and engine power, resolve oil consumption and leakage problems, and improve on wing times.
  - H-1 Address top safety concerns as ranked by the OAG and System Safety Working Group, update Navy maintenance manuals, continue to improve time-between-overhaul and reduce impact of high-time parts, continue improvements on tail rotor drive system.
  - T-45 Complete four year engine surge recovery program, address platform safety, increase predicted part life confidence, provide mission profile updates and life cycle management.
  - F-14A Perform minimal level of sustaining engineering to address safety-of-flight issues.
  - F-14B/D Address extension of component life and the reduction of maintenance hours, improve propulsion system safety through an active life management program for critical rotating components, reduce the engine Non-recoverable In-Flight Shutdown Rate by 75% by 2003, reduce the propulsion system related mission abort rate by 50% by 2003.

BUDGET ACTIVITY: 7 | PROGRAM ELEMENT: 0205633N | PROGRAM ELEMENT TITLE: AVIATION IMPROVEMENTS | PROJECT NUMBER: W1355 | PROJECT TITLE: AIRCRAFT ENGINE CIP

3. FY 2000 PLAN: (CONT)
   - F/A-18E/F and V-22 Continue initiation of CIP programs addressing propulsion systems such as electrical and fuel systems not covered by Power by the Hour programs and other support programs. Address durability improvements identified during qualification testing, continue the life cycle management program, continue "lead the fleet" testing to identify potential deficiencies prior to manifestation in fleet.

   - (U) ($4,369) Multi-Platform Product Support Teams Continue projects designed to provide common support to multiple platforms in the areas of improved drive systems, secondary power and mechanical systems; improved tools for performance analysis, modeling and simulation, diagnostics, engine reliability assessment, and structural integrity; improved products and processes for fuels, lubricants, and refueling equipment; improved blade and vane repair processes and life cycle support; and improved electrical system product support and battery systems.

(U) B. PROGRAM CHANGE SUMMARY

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	36,484	48,402	52,439
(U) Appropriated Value:	37,607	48,402	
(U) Adjustments from President's Budget:	-1,096	-2,235	-12,725
(U) FY 2000 President's Budget:	35,388	46,167	39,714

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0205633N** **PROJECT NUMBER: W1355**
PROGRAM ELEMENT TITLE: AVIATION IMPROVEMENTS **PROJECT TITLE: AIRCRAFT ENGINE CIP**

CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1998 decrease reflects -$1,065 thousand reduction for Small Business Innovation Research assessment and a -$31 thousand reduction for minor balancing adjustments. FY 1999 decrease reflects a -$1,000 thousand reduction for VECTOR offsets, a -$3,000 thousand Congressional reduction to limit growth, a $2,000 thousand Congressional increase for Eddy Current Sensors, a -$109 thousand Congressional reduction for revised economic assumptions, and a -$126 thousand reduction for balancing and rate adjustments. FY2000 decrease reflects a -$12,000 thousand reduction to the overall Aircraft Engine CIP program, a -$627 thousand reduction for rate adjustments, and a -$98 thousand reduction for minor reprogrammings.

(U) Schedule: Postponement of ASMET test for the F-18 aircraft and deferment of Lead the Fleet efforts including analytical condition inspections, service evaluations, and threshold sampling. Reduce scope of FY99 H-1 efforts to eliminate analysis of top readiness degraders and high-time parts which support goal of improving time-between-overhaul; defer portion of tail rotor drive system improvements with completion of effort in FY02 versus FY01. F-18 E/F and V-22 CIP efforts to address propulsion system integration issues uncovered during the flight test programs and establish methodologies for core program metrics will be delayed. Impact on Reliability and Maintainability efforts such as deferment of plans for product improvements, designs to increase time on wing, reduce mean time between failure, and reduce operating and support costs.

(U) Technical: Increase aircraft flight safety risk for the F-18 E/F and V-22 during Op Eval. Increase overall production retrofit costs for needed improvements. Cannot expand evaluation and verifications of redesigns due to deferment of test and delays and elimination of R&M projects. Cannot fully explore affordable readiness or properly document lessons learned and realize reliability growth.

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

Related RDT&E
(U) P.E. 0203752A (Aircraft Engine CIP Army)
(U) P.E. 0207268F (Aircraft Engine CIP Air Force)
(U) P.E. 0603217N (Aircraft System Advance Tech. Dev.)

(U) D. ACQUISITION STRATEGY: Not applicable

(U) E. SCHEDULE PROFILE: Not Applicable

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205633N

PROJECT NUMBER: W1355

PROJECT TITLE: AIRCRAFT ENGINE CIP

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
PRODUCT DEVELOPMENT										
MAJOR EFFORTS ($1.0M OR MORE)										
F110 Engine Program										
GE F3365795C0055	SS/CPAF	Ohio	8,186	2,200	12/98	2,400	12/99	CONT.	CONT.	
Award Fees				(220)		(240)				
F402 ENGINE PROGRAM										
N0001996C0172 RR	SS/CPAF	BRISTOL ENG	6,153	2,000	1/99	1,805	12/99	CONT.	CONT.	
Award Fees				(160)		(144)				
N0001996C0134 UK	SS/CPFF	BRISTOL ENG	5,497	1,990	1/99	1,750	12/99	CONT.	CONT.	
F404//T58/T64 ENGINE PROGRAM										
N0001998C0007 GE	SS/CPFF	LYNN MA	5,333	6,500	10/98	5,640	10/99	CONT.	CONT.	
N0001998C0054 GE	SS/CPFF	LYNN MA	0	2,300	10/98	1,400	10/99	CONT.	CONT.	
J52 ENGINE PROGRAM										
N0001998C0054 P&W	SS/CPFF	FL	1,901	2,010	11/98	2,800	11/99	CONT.	CONT.	
T56 ENGINE										
NEW CONTRACT TBD ALLISON	SS/CPFF	INDIANA	0	1,670	1/99	1,905	1/00	CONT.	CONT.	
F405 ENGINE PROGRAM										
N0001997C0112 RR	SS/CPAF	BRISTOL ENG	1,900	1,440	1/99	1,204	12/99	CONT.	CONT.	
Award Fees				(115)		(96)				
F/A 18 E/F PROPULSION PROGRAM										
NEW CONTRACT TBD GE	SS/CPFF	LYNN MA	0	1,000	3/99	1,620	10/99	CONT.	CONT.	

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205633N

PROJECT NUMBER: W1355

PROJECT TITLE: AIRCRAFT ENGINE CIP

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
T700 ENGINE PROGRAM DAAJ0997C0131 GE	SS/CPFF	LYNN MA	1,092	1,000	12/98	1,000	12/99	CONT.	CONT.	
TF34 ENGINE PGROGRAM F1460895C1461 GE	SS/CPFF	LYNN MA	2,420	700	10/98	720	10/99	CONT.	CONT.	
V22 PROPULSION PROGRAM NAVAIR CONTRACT GE TBD	SS/CPFF	LYNN MA	0	1,000	3/99	1,267	12/99	CONT.	CONT.	
PROPS PROGRAM NAVAIR CONTRACT HAM STANDARD	SS/CPFF		0	2,895	11/98	1,500	10/99	CONT.	CONT.	
CONTRACTS UNDER $1.0M . AGGREGATE TOTAL	VARIOUS	VARIOUS	9,159	2,000	10/98	500	10/99	CONT.	CONT.	
LAB/FIELD ACTIVITY ($1.0M OR MORE)	WX	NAWCAD PAX	60,650	14,023	10/98	12,129	10/99	CONT.	CONT	
OTHER IN HOUSE SUPT <$1.0M	VARIOUS	VARIOUS	11,946	1,130	10/98	780	10/99	CONT.	CONT.	
GFP FUEL MD INCREMENTAL			2,885	460	10/98	350	10/99	CONT.	CONT.	
Subtotal Project Development			**117,122**	**44,318**		**38,770**		**CONT.**	**CONT.**	

Remarks
Percent of award fee that was actually awarded in PY was 97%.

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205633N

PROJECT NUMBER: W1355

PROJECT TITLE: AIRCRAFT ENGINE CIP

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
SUPPORT										
OTHER IN HOUSE SUPPORT <$1.0M			1,747	750	10/98	649	10/99	CONT.	CONT.	
Subtotal Support			**1,747**	**750**		**649**		**CONT.**	**CONT.**	
Remarks										
TEST AND EVALUATION										
OTHER IN HOUSE <$1.0M										
AGGREGATE TOTAL	VARIOUS	VARIOUS	2,144	150	10/98	100	10/99	CONT.	CONT.	
Subtotal Test & Evaluation			**2,144**	**150**		**100**		**CONT.**	**CONT.**	
Remarks										
MANAGEMENT										
OTHER IN HOUSE <$1.0M	VARIOUS	VARIOUS	0	202	10/98	195	10/99	CONT.	CONT.	
Subtotal Management			**0**	**202**		**195**		**CONT.**	**CONT.**	
Remarks										
SBIR Assessment				**747**						
Total Cost			**121,013**	**46,167**		**39,714**		**CONT.**	**CONT.**	

EXHIBIT R-2, FY 2000 PRESIDENT'S BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 07

PROGRAM ELEMENT: 0205667N
PROGRAM ELEMENT TITLE: F-14 Upgrade

PROJECT NUMBER: E1408
PROJECT TITLE: F-14 Upgrade

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
E1408 F-14 UPGRADE										
TOTAL	11,116	12,834	1,390	1,472	1,556	1,650	1,699	1,744	0	1,838,365

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program element provides for the development of improvements to the Navy F-14 squadrons in order to counter the projected threat through the year 2000 and beyond. The F-14D has increased capability in three major areas: new engine, new digital avionics, and upgraded radar. These changes yield significant improvements in capability and performance, as well as reliability and maintainability, and will facilitate the total integration and exploitation of related programs i.e., Joint Tactical Information Distribution System (JTIDS), Infrared Search and Track System (IRST), and inclusion of Airborne Self-Protection Jammer (ASPJ) in the electronic warfare (EW) suite for the F-14D operational evaluation. A Pre-deployment Update (PDU) program (primarily software) includes air-to-ground ordnance delivery capability, full Link 16 capability, and radar/Electronic Counter-Countermeasures (ECCM) improvements for the F-14D. The PDU program was created because of concurrent development of the F-14D and the above listed common avionics and weapons. It implements the capabilities inherent in systems incorporated during the full scale development (FSD) program and is a planned integral part of the evolution of the F-14D aircraft. F-14 weapons integration supports integration of EW improvements and correction of OPEVAL deficiencies. Funding is also provided for various software upgrades such as Global Positioning System, and accommodates the realignment of Aviation Depot Level Repairables (AVDLR) from Major Range and Test Facility Bases to direct project funding.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing, operational systems.

BUDGET ACTIVITY: 07

PROGRAM ELEMENT: 0205667N
PROGRAM ELEMENT TITLE: F-14 Upgrade

PROJECT NUMBER: E1408
PROJECT TITLE: F-14 Upgrade

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
E1408 F-14 UPGRADE										
TOTAL	**11,116**	**12,834**	**1,390**	**1,472**	**1,556**	**1,650**	**1,699**	**1,744**	**0**	**1,838,365**

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program element provides for the development of improvements to the Navy F-14 squadrons in order to counter the projected threat through the year 2000 and beyond. The F-14D has increased capability in three major areas: new engine, new digital avionics, and upgraded radar. These changes yield significant improvements in capability and performance, as well as reliability and maintainability, and will facilitate the total integration and exploitation of related programs i.e., Joint Tactical Information Distribution System (JTIDS), Infrared Search and Track System (IRST), and inclusion of Airborne Self-Protection Jammer (ASPJ) in the electronic warfare (EW) suite for the F-14D operational evaluation. A Pre-deployment Update (PDU) program (primarily software) includes air-to-ground ordnance delivery capability, full Link 16 capability, and radar/Electronic Counter-Countermeasures (ECCM) improvements for the F-14D. The PDU program was created because of concurrent development of the F-14D and the above listed common avionics and weapons. It implements the capabilities inherent in systems incorporated during the full scale development (FSD) program and is a planned integral part of the evolution of the F-14D aircraft. F-14 weapons integration supports integration of EW improvements and correction of OPEVAL deficiencies. Funding is also provided for various software upgrades such as Global Positioning System, and accommodates the realignment of Aviation Depot Level Repairables (AVDLR) from Major Range and Test Facility Bases to direct project funding.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing, operational systems.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 PLAN:
   - ($11,116) Continue development and test of third PDU tape.

BUDGET ACTIVITY: 07

PROGRAM ELEMENT: 0205667N
PROGRAM ELEMENT TITLE: F-14 Upgrade

PROJECT NUMBER: E1408
PROJECT TITLE: F-14 Upgrade

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

2. (U) FY 1999 PLAN:
   - (U) ($12,834) Continue development and test of third PDU tape.
   - (U) ($1) Portion of extramural program reserved for Small Business Innovation Research Assessment in accordance with 15 USC 638.

3. (U) FY 2000 PLAN:
   - (U) ($1,390) Complete development and test of third PDU tape. Conduct operational evaluation.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	11,289	12,947	1,415
(U) Appropriated Value:	11,133	12,947	
(U) Adjustments from President's Budget:	-173	-113	-23
(U) FY 2000 President's Budget Submit:	11,116	12,834	1,390

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding:
(U) The FY1998 decrease of -$173 thousand consists of -$41 thousand for a Congressional adjustment and -$132 thousand for an SBIR assessment.
(U) The FY1999 decrease of -$113 thousand consists of -$30 thousand for an economic assessment, -$37 thousand for a civilian personnel execution adjustment, and -$46 thousand for a contract advisory and assistance services adjustment.
(U) The FY 2000 decrease consists of +$11 thousand for civilian pay rate adjustment, -$20 thousand for inflation, and-$14 thousand for a working capital fund adjustment.

(U) Schedule: (U) Tape D03B is now in FY 2000.

(U) Technical: N/A

BUDGET ACTIVITY: 07

PROGRAM ELEMENT: 0205667N
PROGRAM ELEMENT TITLE: F-14 Upgrade

PROJECT NUMBER: E1408
PROJECT TITLE: F-14 Upgrade

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

APPN	FY 1998 ACTUAL	FY 1999 BUDGET	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE
APN-5	275.4	214.4	83.4	38.3	25.7	20.2	19.1	.1	0

(U) RELATED RDT&E:
(U) PE 0205604N (Tactical Data Links)
(U) PE 0604270N (EW Development)

D. (U) ACQUISITION STRATEGY: NOT APPLICABLE.

E. (U) SCHEDULE PROFILE:

	FY 1998	FY 1999	FY 2000	TO COMPLETE
Program Milestones				
Engineering Milestones				
T&E Milestones	3Q/97 - 1Q/98 OT-III(Tape 3A)		1Q/00 - 2Q/00 OT-III(Tape 3B)	
Contract Milestones				

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 07

PROGRAM ELEMENT: 0205667N

PROJECT NUMBER: E1408

PROJECT TITLE: F14 UPGRD

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
AMRAAM Int.	SS/CPFF	Northrop Grumman, Bethpage NY	9,924	0		0		0	9,924	9,924
BLK I/JDAM	SS/CPFF	Northrop Grumman Bethpage, NY	6,506	0		0		0	6,506	6,506
FSD Cont	SS/FFP	Northrop Grumman Bethpage, NY	994,378	0		0		0	994,378	994,378
PDU	WX	NAWC Pt. Mugu CA	208,241	12,328		0		0	220,569	
Miscellaneous - Contracts			3,154	0		0		0	3,154	3,154
Miscellaneous - In House			26,300	350		0		0	26,650	
Repair of Repairables	WX	Various	11,078	0		0		0	11.078	
Subtotal Product Development			**1,259,581**	**12,678**		**0**		**0**	**1,272,259**	

Remarks

Subtotal Support			**0**	**0**		**0**		**0**	**0**	**0**

Remarks

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0205667N

PROJECT NUMBER: E1408

PROJECT TITLE: F14 UPGRD

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
PDU Systems Engineering/Test and Evaluation		NAWC Pt. Mugu CA	0	0		1,390		8,121	9,511	
COMOPTEVFOR PD	PD	COMOPTEVFOR	3,760	0		0		0	3,760	
Subtotal Test & Evaluation			**3,760**	**0**		**1,390**		**8,121**	**13,271**	
Remarks										
Contractor Engineering Support	Various	wx	1,325	155		0		0	1,481	
Subtotal Management			**1,325**	**155**		**0**		**0**	**1,481**	
Other FY95 & Prior Costs			551,354						551,354	
SBIR Assessment				1						
Total Cost			**1,816,020**	**12,834**		**1,390**		**8,121**	**1,838,365**	

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206313M Marine Corps Communications Systems

COST *(In Millions)*	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	37828	53015	90293	83323	77623	64553	40462	33854	Continuing	Continuing
C2270 Command Post Systems	6027	10218	23109	23490	14966	11282	10471	10063	Continuing	Continuing
C2271 Maneuver C2 Systems	1486	2067	986	446	403	305	0	0	0	5693
C2272 Intelligence C2 Systems	2702	4348	12839	7831	8493	8264	5288	5459	Continuing	Continuing
C2273 Air Operations C2 Systems	4355	6289	16415	25747	23083	8612	6768	4094	Continuing	Continuing
C2274 C2 Warfare Systems	3384	3939	8387	3504	4374	5046	3213	3403	Continuing	Continuing
C2275 Radio Systems	3293	1733	0	0	0	0	0	0	0	5387
C2276 Communications Switching and Control System	1850	1888	1841	229	0	0	0	0	0	5808
C2277 Systems Engineering and Integration	1922	7155	6966	6762	6906	6624	6628	6466	Continuing	Continuing
C2278 Air Defense Weapons Systems	744	2001	9759	9350	9688	11537	2741	3618	Continuing	Continuing
C2315 Training Devices/Simulators	7203	9368	8850	4881	9021	12342	5093	491	Continuing	Continuing
C2500 Close Range UAV Data Links	4862	0	0	0	0	0	0	0	0	4692
C2510 MAGTF CSSE & SE	0	0	1141	1083	689	541	260	260	Continuing	Continuing
C2664 Jount Task Force Enhanced Communications	0	4009	0	0	0	0	0	0	0	0
Quantity of RDT&E Articles										

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY **7 - Operational System Development**	PE NUMBER AND TITLE **0206313M Marine Corps Communications Systems**

(U) **Mission Description and Budget Item Justification:** This program element provides funding to develop the command and control (C2) support and information infrastructures for the Fleet Marine Force and supporting establishment. Doctrinally, the C2 support system and the information infrastructure form two parts of a triad of capabilities which permits command and control systems to be transformed into a complete operating system. The third element of the triad is command and control organization and is not covered in this program element. USMC command and control is divided into six functional areas and one supporting functional area as follows: maneuver C2, intelligence C2, fire support C2, air operations C2, combat service support C2, warfare C2, and C2 support (information processing and communications). Within this program element, subprojects have been grouped by C2 functional area for more efficient planning. Air defense weapons systems have been added to facilitate planning and a separate project is used for systems assigned to the supporting establishment. Subprojects which support the commander's decision processes have been collected into the Command Post Systems project since these systems must work in close cooperation to ensure effective C2 of Marine Air Ground Task Forces. The Coastal Battlefield Reconnaissance and Analysis (COBRA) system is a passive multispectral sensor system capable of operating in a PIONEER unmanned aerial vehicle (UAV). Imagery recorded on the UAV or disseminated via data link is analyzed by the COBRA ground station. Ground station algorithm processing provides near real-time automatic minefield detection with Differential Global Positioning System (DGPS) location accuracy.

(U) **Justification for Budget Activity:** This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing, operational systems.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206313M Marine Corps Communications Systems

PROJECT: C2270

COST *(In Millions)*	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C2270 Command Post Systems	6027	10218	23109	23490	14966	11282	10471	10063	Continuing	Continuing
Quantity of RDT&E Articles										

A. (U) Mission Description and Budget Item Justification: Systems assigned to this project are to be used by commanders and their staffs to process, fuse, and tailor information to assist decision-making and enhance situational awareness. They will integrate and share information from sources both internal and external to the Marine Air-Ground Task Force (MAGTF) to provide a shared understanding of the battlespace.

1. Decision support integrates information from the seven Command and Control (C2) functional areas and the support function. The information is tailored to support the users' specific needs. As a result of the MAGTF C4I Baseline subproject, an integrated migration strategy is being incorporated into the MAGTF software baseline which will be common across and used by all MAGTF C4I programs.
2. The Tactical Command Operations (TCO) will provide systems to the command post which support Maneuver C2. Maneuver C2 is the executive layer of decision support that pulls and fuses information from other functional areas.
3. The Intelligence Analysis Systems (IAS) supports the employment of reconnaissance, surveillance, and target acquisition resources and the timely planning and processing of all-source intelligence; it ensures that tactical intelligence is tailored to meet specific mission requirements. A Marine Expeditionary Force (MEF) IAS variant will also process signals intelligence.
4. Advanced Field Artillery Tactical Data Systems (AFATDS) will consist of fire support command and control software fielded on Marine Corps common hardware. AFATDS will provide the MAGTF with an automated ability to rapidly integrate, all supporting arm assets into maneuver plans.
5. The Advanced Tactical Air Command Center (ATACC) functions as the operational command post of the MAGTF ACE. It provides automated assistance for planning and executing tactical air operations, and provides voice and data interface with joint and combined Air C2 agencies. The Phase I ATACC was fielded 1st Qtr FY96. The Improved Direct Air Support Center (IDASC) links information and systems needed to conduct Air Operations C2 with Maneuver C2 of the ground combat element of the MAGTF.
6. The Expeditionary Integrated Combat Operations Center (EICOC)/Unit Operations Center (UOC) project develops and transitions two Command and Control Imperative ATDs (the Expeditionary Integrated Combat Operations Center (EICOC) and the Joint Tactical Communications ((JT COMMs) ATDs) into various Marine Corps and Joint Engineering and Manufacturing Development (E&MD) efforts. EICOC development efforts focus on: Cognitive Task Analysis (CTA); enhanced ergonomic physical design; evaluation of advanced multimedia hardware; integration and networking with advanced development communication

systems; and advanced software development to support systems integration and advanced battlefield visualization concepts. EICOC developments are tailored to support transition of software and hardware developments as PIPs to the established MAGTF C4I baseline. EICOC is the interim name for the Unit Ops Center (UOC). The UOC name will replace the EICOC name starting with FY00. Unit Operations Center (UOC) will provide a facility and components for the integration of current and planned battlefield automation systems. It will be, in essence a "system of systems" designed to optimize the positioning, interaction, and flow of information among the various staff agencies (G-2, G-3, Operations Directorate, etc.) and their automated information systems and between the unit and higher, adjacent or subordinate units or headquarters. The Marine corps deploys Component/Joint Task Force (JTF/Marine Air Ground Task Force (MAGTF)) command elements throughout the world to fulfill operational requirements, often in joint/combined forces arenas. The UOC is designed in garrison and tactical versions. The tactical version is called the Combat Operations Center (COC) which is an outgrowth of the integrated COC (ICOC), COC-Interim (COC(I)), and the Enhanced COC (ECOC) developments over the last two years. The garrison version is called the Command Center (CC).

PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) FY 1998 Accomplishments:

- (U) $ 200 TCO: Completed Phase III ORD requirements.
- (U) $ 0 TCO: Completed Phase III ORD requirements. (This effort forwarded financed with $400 FY97 funds.)
- (U) $ 134 TCO: Initiated the integration of software and hardware changes into existing system and perform testing.
- (U) $ 517 TCO: Initiated the incorporation of Phase IV ORD requirements.
- (U) $ 70 TCO: Completed automatic relay message routing.
- (U) $ 152 IAS: Continued testing of new standard software applications.
- (U) $ 50 IAS: Continued interoperability testing with system hardware and software modifications.
- (U) $ 80 IAS: Initiated and tested prototype IAS Workstations.
- (U) $ 0 IAS: Initiated and tested prototype IAS Workstations. This effort financed with $117K of FY 97 funds.
- (U) $ 257 IDASC: Investigated hardware ECPs for the HMD DASC system for improved digital communications capabilities and for computer hardware upgrades
- (U) $ 0 IDASC: Investigated hardware ECPs for the HMD DASC system for improved digital communications capabilities and for computer hardware upgrades. This effort financed with $100K of FY 97 funds.
- (U) $ 229 IDASC: Incorporated and tested new standard software applications which will allow automated communication between the DASC and the fire support coordination center.
- (U) $ 60 IDASC: Conducted interoperability testing with system modifications to ensure that incorporated modifications will allow automated communications between USMC and joint command and control systems.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0206313M Marine Corps Communications Systems PROJECT C2270

•	(U) $	331	IAS MOD: Initiated hardware ECPs for MEF IAS and IAS suites.
•	(U) $	150	IAS MOD: Follow-on testing of ECPs and program management support.
•	(U) $	747	MAGTF C4I Baseline: Continued software development of the MSBL developed to the DII COE . Includes enhanced open system, distributed directory services, distributed file service and enhanced security.
•	(U) $	448	MAGTF C4I Baseline: Continued software integration to the MSBL.
•	(U) $	298	MAGTF C4I Baseline: Continued developmental and battle lab testing of MSBL.
•	(U) $	304	EICOC/UOC: Began investigating GOTS/COTS software/hardware to support automation of Command Post Systems.
•	(U) $	309	EICOC/UOC: Began integration efforts of GOTS/COTS software/hardware into the Command Post System.
•	(U) $	148	EICOC/UOC: Began developmental testing of Command Post System.
•	(U) $	1502	AFATDS: Continued developmental and interoperability efforts with the Army on AFATDS 98 software. This effort will include migration to the DII COE, adding additional fire support functionality, continuing work on identifying a smaller computer for the USMC, preparing test units for a Multi-Service Limited Users Test of AFATDS 98, and in obtaining a Procurement Decision. Army achieves MSIII.
•	(U) $	0	AFATDS: Continued developmental and interoperability efforts with the Army on AFATDS 98 software. This effort will include migration to the DII COE, adding additional fire support functionality, continuing work on identifying a smaller computer for the USMC, preparing test units for a Multi-Service Limited Users Test of AFATDS 98, and in obtaining a Procurement Decision. This effort financed with $612K of FY97 funds.
	(U)$	41	ATACC: Multiple Source Correlation System (MSCS) ECP 97012 for CTT3 integration
	(U)Total $	6,027	

(U) FY 1999 Planned Program:

•	(U) $	1098	TCO: Initiate Phase IV ORD requirements.
•	(U) $	230	TCO: Integrate software changes into existing systems and perform testing.
•	(U) $	155	IAS: Investigate Hardware/Software interoperability issues in regards to Marine Corps C4I and Joint intelligence and operations systems.
•	(U) $	548	IAS: Begin development of intelligence applications into the CZPC software baseline.
•	(U) $	364	IDASC: Investigate hardware ECPs for the HMD DASC system for migration towards a common USMC Aviation Comand and Control Communications System.
•	(U) $	242	IDASC: Continue testing new standard software applications. Continue interoperability testing with system modifications.
•	(U) $	231	IAS MOD: Continue investigation of hardware ECPs for MEF IAS and IAS Suites.

• (U) $	168	IAS MOD: Continue program management for testing of ECPs.
• (U) $	424	MAGTF C4I BASELINE: Continue software development of the MSBL developed to the (DIICOE). Includes enhanced open system, distributed directory services, distributed file service, and enhanced security.
• (U) $	284	MAGTF C4I BASELINE: Continue software integration to the MSBL.
• (U) $	189	MAGTF C4I BASELINE: Continue developmental and battle lab testing of the MSBL.
• (U) $	784	MAGTF C4I BASELINE: Initiate the integration (system level) of Enhanced Position Location Reporting System (EPLRS) with MAGTF C4I tactical data systems.
• (U) $	245	MAGTF C4I BASELINE: Initiate the integration (network level) and fusion of EPLRS and MAGTF C4I tactical data systems into a seamless and integrated data network that provides command, control, and situational awareness data connectivity
• (U) $	867	MAGTF C4I BASELINE: Begin software development necessary to allow the integration of the Combat Operations Center Interim (COC(I)) into the MAGTF C4I software baseline.
• (U) $	375	EICOC/UOC: Continue investigating GOTS/COTS software/hardware to support automation of Command Post Systems.
• (U) $	478	EICOC/UOC: Continue integration efforts of GOTS/COTS software/hardware into the Command Post Systems.
• (U) $	313	EICOC/UOC: Continue developmental testing of Command Post System.
• (U) $	2291	AFATDS: Continue developmental and interoperability efforts with the Army on AFATDS 98 software. This effort will include migration to the DII COE), adding additional fire support functionality, continuing work on identifying a smaller computer for the USMC, preparing test units for a Multi-Service Limited Users Test of AFATDS 98, and in obtainng a Procurement Decision.
(U) $	775	TCAC PIP: M65 Multi land family and integration of CA & TN tools. Integration iwht Joint Signet Systems, complete the Signet analysis toolkit , matches integration
(U) $	157	SBIR: 157K portion of extramural program reserved for Small Businee Innovation Reserch assessment in accordance with 15 USC 638.
(U)Total $	10,218	

(U) FY 2000 Planned Program:

• (U) $	976	TCO: Begin incorporating Phase V ORD requirements.
• (U) $	417	TCO: Complete Phase IV ORD reqt. and Integrate software changes into existing system and perform testing. Complete Phase II ORD requirements.
• (U) $	400	TCAC: Develop software to maintain compatability with Signals Intelligence systems.
• (U) $	495	TCAC: Integrate signals intelligence correlator.
• (U) $	152	IAS MOD: Investigate MEF IAS system Performance enhancement.
• (U) $	53	IAS MOD: Conduct system software enhancement

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0206313M Marine Corps Communications Systems PROJECT C2270

• (U) $	100	IAS MOD: Conduct system interoperability testing with Marine Corps and Joint systems to include: TCO,GCCS, ASAS, AFATDS,and other emerging systems as needed to ensure Marine Corps compatibility in the joint arena.
• (U) $	200	IAS MOD: Begin ECP documentation and integration.
• (U) $	249	IAS MOD: Continue C2PC Intel software development.
• (U) $	1000	MAGTF C4I BASELINE: Continue the development of improved software in order to maintain pace with the DII COE[GCCS(DISA) & GCCS-M(Navy)].
• (U) $	3283	MAGTF C4I BASELINE: Begin the migration of additional functionality segments (11) to the MSLB.
• (U) $	1802	MAGTF C4I BASELINE: Integration of new software with the systems and existing software.
• (U) $	1283	MAGTF C4I BASELINE: Continue the certification & security testing of new software to ensure interoperability (Battlelab) (GCCS-M version 3.2 & C2PC version 6.0).
• (U) $	450	MAGTF C4I BASELINE: Update/Improve the Requirements Traceability Matrix (RTM) & Revalidate the REVIC model estimates.
• (U) $	2273	AFATDS: Continue developmental and interoperability efforts with the Army on AFATDS 98 software. This effort will include migration to the DII COE), adding additional fire support functionality, continuing work on identifying a small computer for the USMC, preparing test units for a Multi-Service Limited Users Test of AFATDS 98, and in obtaining a Procurement Decision.
• (U) $	6984	UOC: Begin system engineering development, integration, and manufacture Engineering Development Models (EDMs).
• (U) $	997	UOC: Begin Tactical Data System (TDS) NT development, engineering, integration and manufacture.
• (U) $	1995	UOC: System testing and assessment.
(U)Total $	23,109	

B. (U) Project Change Summary

	FY 1998	FY 1999	FY 2000
(U) Previous President's Budget	7,067	9,778	10,430
(U) Adjustments to Previous President's Budget	-1,040	+440	+12,679
(U) Current Budget Submit	6,027	10,218	23,109

(U) Change Summary Explanation:

(U) Funding: FY98: Internal reprogramming actions; $988K, SBIR assessment in accordance with U.S.C. 638 (f) (1); $133K.
FY00: adjustments due to prioritization of program's within the Marine Corps and minor affordability adjustments.

(U) Schedule: N/A

(U) Technical: N/A

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206313M Marine Corps Communications Systems

PROJECT: C2270

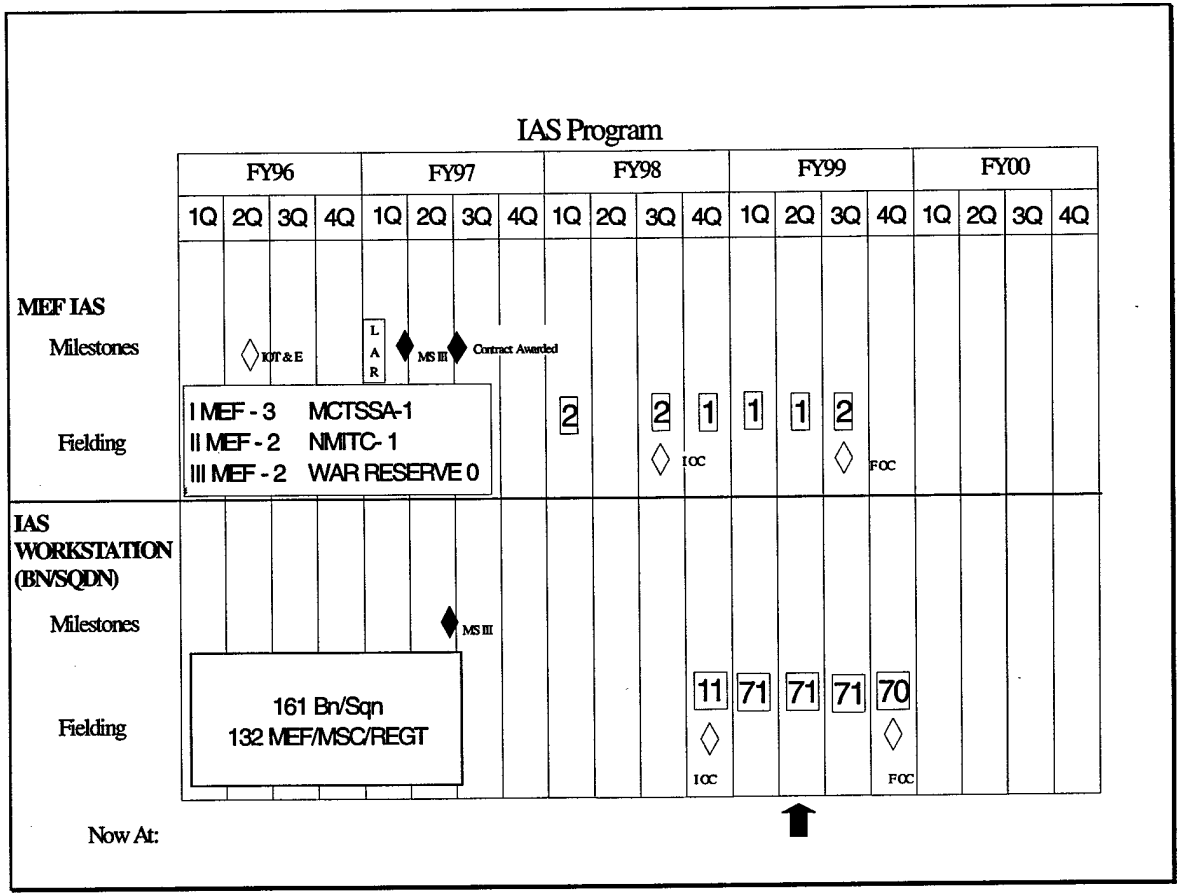
C. (U) Other Program Funding Summary (APPN, BLI #, NOMEN)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
(U) PMC BLI# 463100 TCO	9349	1560	0	0	0	0	0	0	0	10909
(U) PMC BLI# 474700 IAS	9561	10153	0	0	0	0	0	0	0	19714
(U) PMC BLI# 463600 IDASC	3008	1402	0	0	0	0	0	0	0	4410
(U) PMC BLI# 474900 IAS MOD	1383	1658	1407	1445	1369	1379	1406	1419	CONT	CONT
(U) PMC BLI# 463100 AFATDS	0	3553	3074	2958	2341	0	480	2637	0	15043
(U) PMC BLI# 463100 UOC	0	0	0	0	17529	23704	48924	77403	CONT	CONT
(U) TCO (O&MMC)	447	169	707	728	554	570	582	595	CONT	CONT
(U) MEF IAS (O&MMC)	574	1529	1848	1761	0	0	0	0	CONT	CONT
(U) IDASC (O&MMC)	187	144	148	152	155	160	164	168	CONT	CONT
(U) AFATDS (O&MMC)	0	339	428	426	406	420	429	438	CONT	CONT
(U) TCAC (O&MMC)	0	1168	1313	1302	0	0	0	0	CONT	CONT
(U) MEWSS (O&MMC)	790	820	926	930	0	0	0	0	CONT	CONT

(U) Related RDT&E

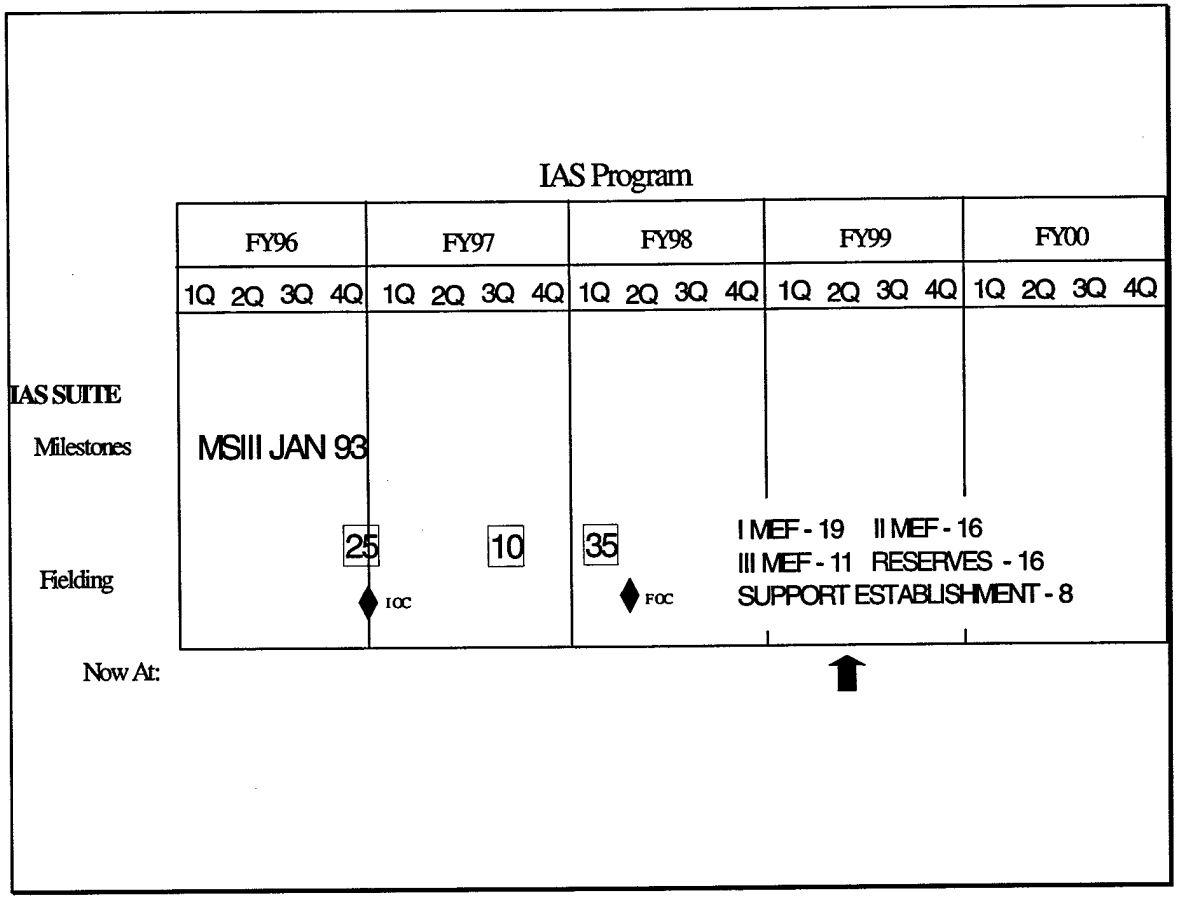
(U) PE 0301301L (Department of Defense Intelligence and Information Systems/Military Intelligence Integrated Data System/Integrated Data Base I and II) (Defense Intelligence Agency).
(U) Navy Tactical Flag Communication and Control System.

D. (U) Schedule Profile

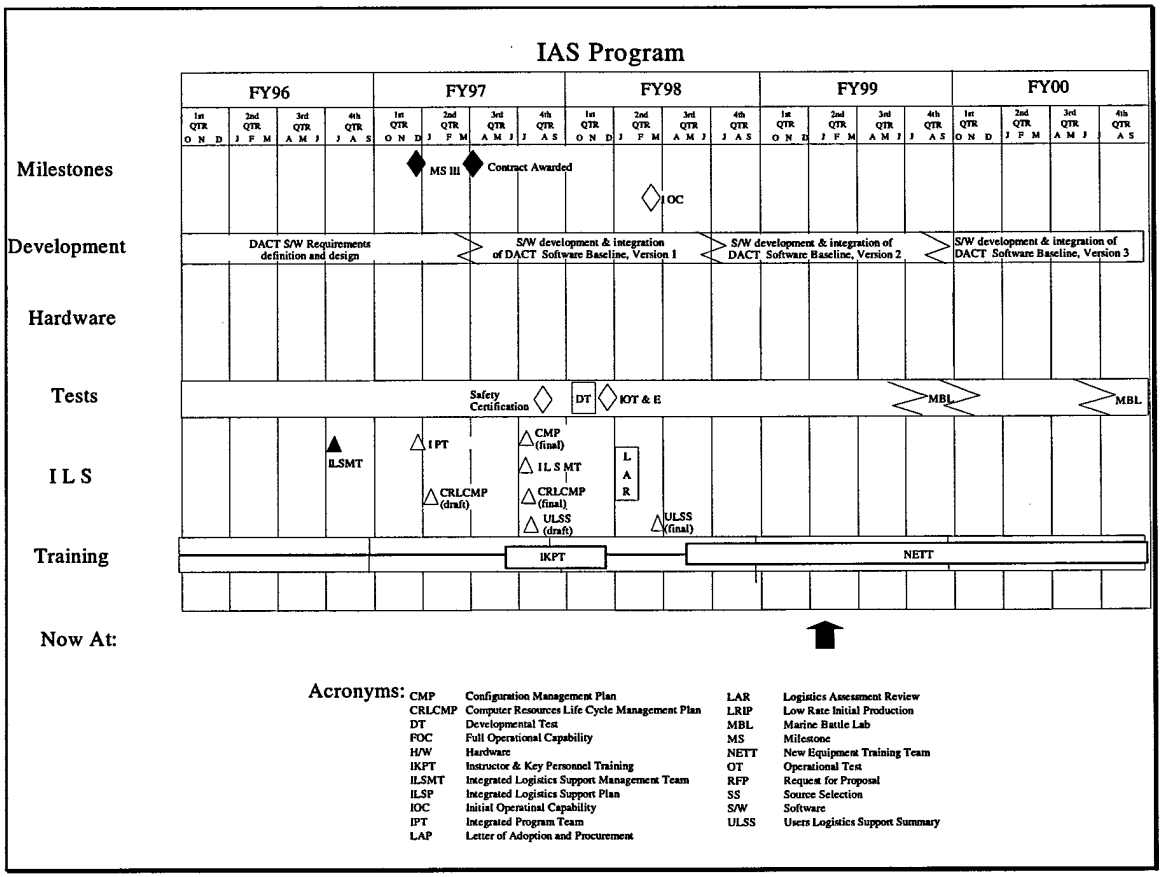
IAS MEF Schedule:



IAS SUITE Schedule:



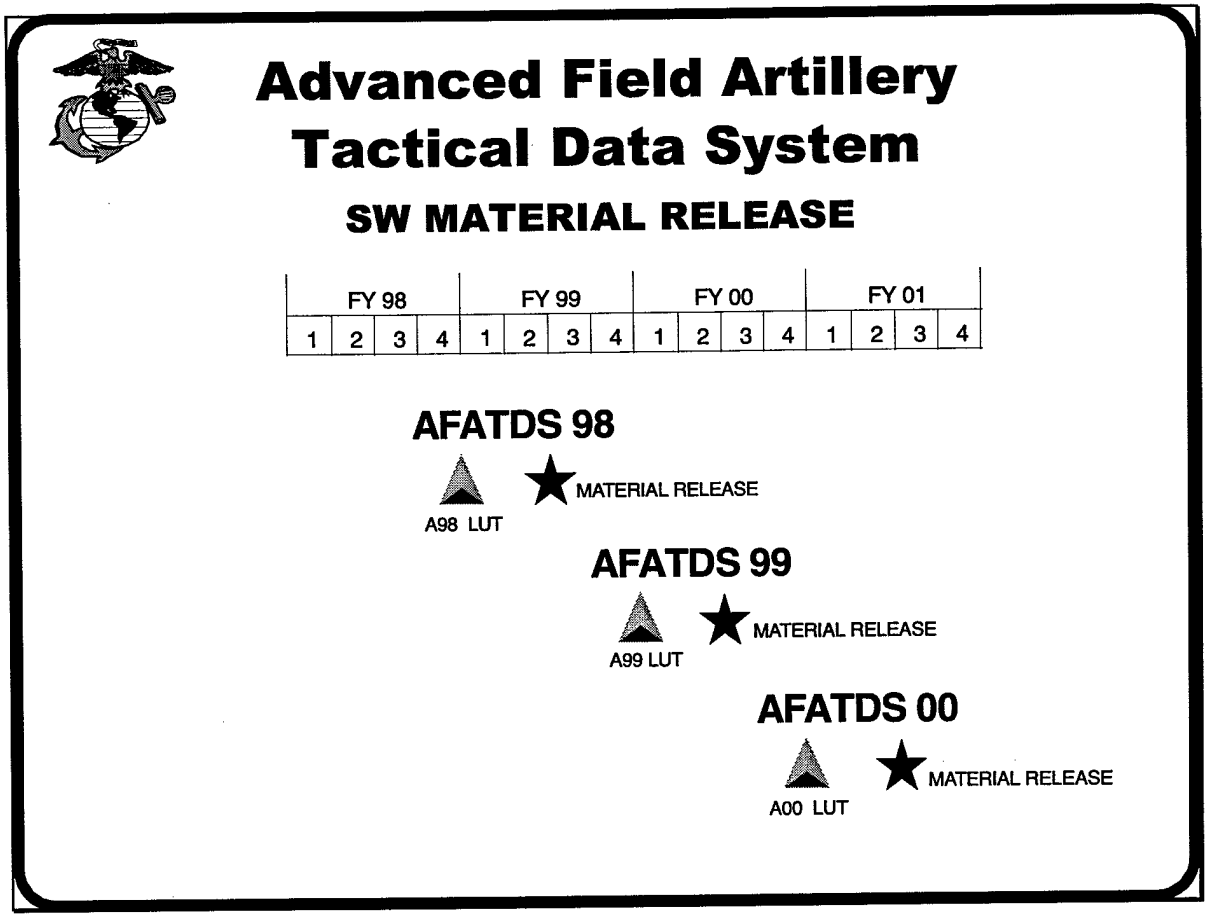
IAS Program Schedule:



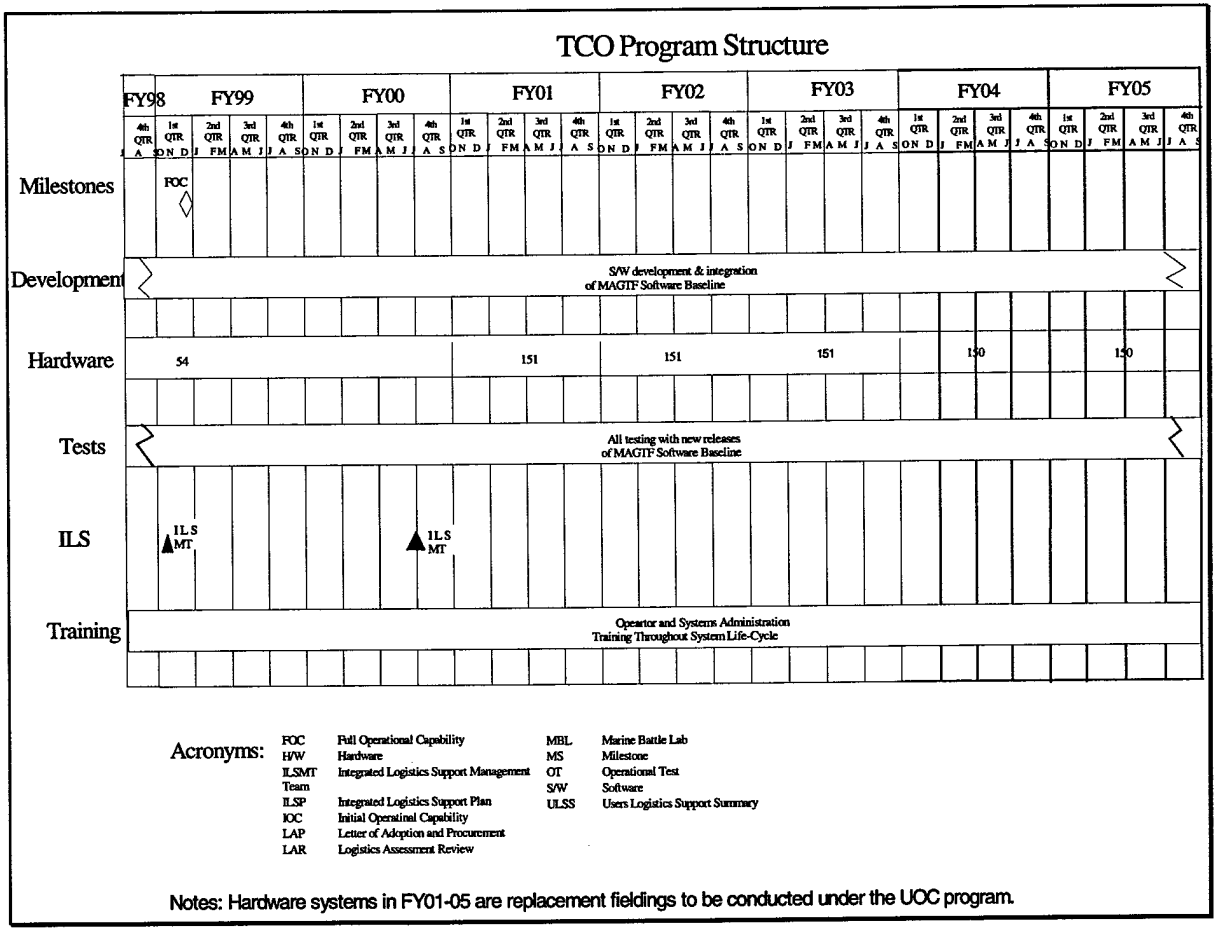
Acronyms:

CMP	Configuration Management Plan	LAR	Logistics Assessment Review
CRLCMP	Computer Resources Life Cycle Management Plan	LRIP	Low Rate Initial Production
DT	Developmental Test	MBL	Marine Battle Lab
FOC	Full Operational Capability	MS	Milestone
H/W	Hardware	NETT	New Equipment Training Team
IKPT	Instructor & Key Personnel Training	OT	Operational Test
ILSMT	Integrated Logistics Support Management Team	RFP	Request for Proposal
ILSP	Integrated Logistics Support Plan	SS	Source Selection
IOC	Initial Operational Capability	S/W	Software
IPT	Integrated Program Team	ULSS	Users Logistics Support Summary
LAP	Letter of Adoption and Procurement		

AFATDS Schedule:

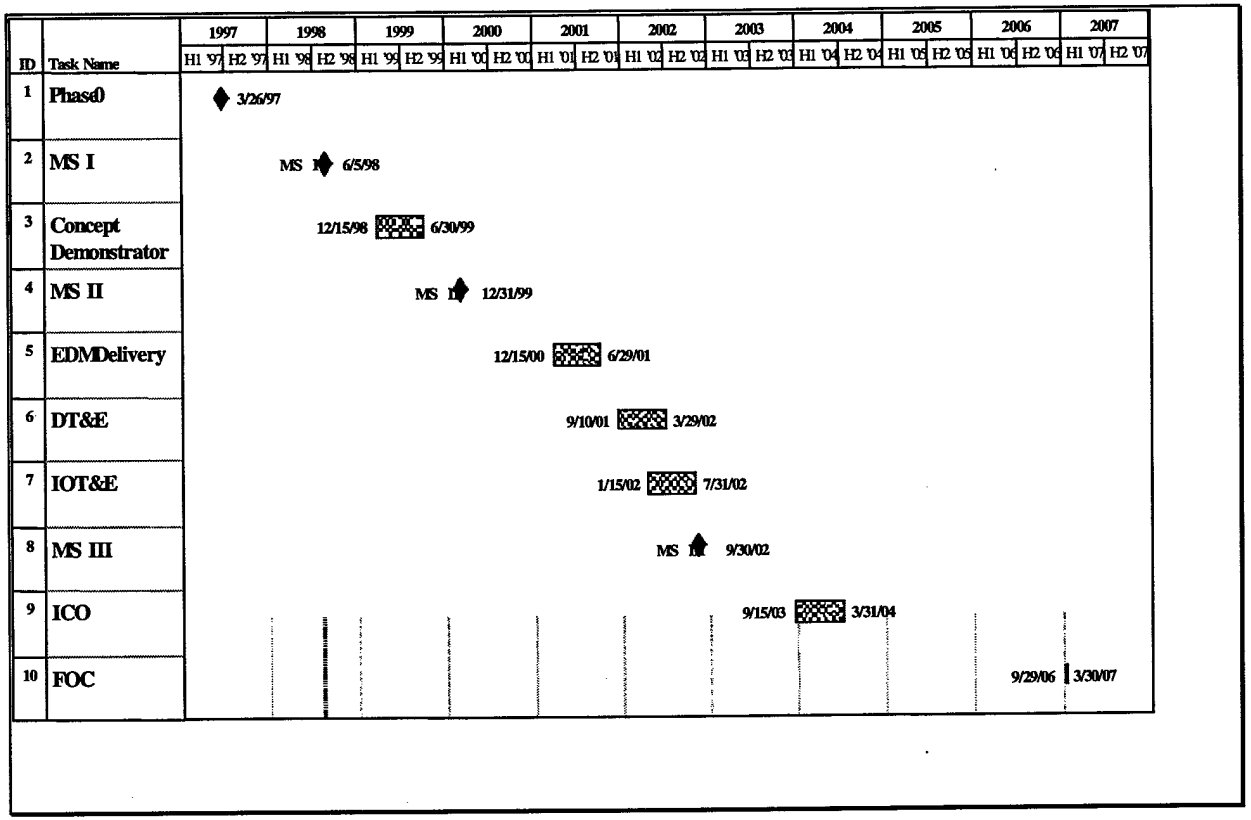


TCO Schedule



Notes: Hardware systems in FY01-05 are replacement fieldings to be conducted under the UOC program.

UOC Schedule:



RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206313M Marine Corps Communications Systems

PROJECT: C2270

A. (U) Project Cost Breakdown

	FY 1998	FY 1999	FY 2000
Primary HW/SW Development	4337	6908	19730
Development Test and Evaluation	1197	1685	1879
Program Management Support	493	1625	1500
Total	6027	10218	23109

B. Budget Acquisition History and Planning Information

Performing Organizations

Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Product Development Organizations										
EICOC:										
SSC Charleston	WR	Dec 99				0	0	8272	CONT	CONT
MCTSSA	RCP	Dec 99				0	0	520	CONT	CONT
SSC Charleston	WR	Dec 99				0	0	1080	CONT	CONT
TCO:										
MCTSSA, Camp Pendleton, CA	RCP	Jan99			0	584	1025	959	CONT	CONT
SPAWAR Charleston, SC	WR	Oct 97			0	72	102	103	CONT	CONT
IAS:										
NAWC, Pt. Mugu, CA	C/RCP	Oct 98	798	798	0	44	0	0	754	798
NSWC, Crane, IN	C/RCP	Oct 98			0	0	363	0	CONT	CONT
IAS MOD:										
NSWC, Crane, IN	C/RCP	Dec 98	1182	1182	0	481	399	202	100	1182
NAWC, Pt. Mugu, CA	C/RCP	Jan 00	717	717	0	0	0	150	567	717

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)									DATE February 1999	
BUDGET ACTIVITY 7 - Operational System Development					PE NUMBER AND TITLE 0206313M Marine Corps Communications Systems					PROJECT C2270
IDASC:										
NSWC, Crane, IN	WR	Oct 97	445	445	0	205	240	0	0	445
MCTSSA Camp Pendleton, CA	WR	Oct 97	471	471	0	229	242	0	0	471
MAGTF C4I BASELINE:										
SPAWAR, San Diego, CA	C/PFF/RCP	Jan 98			0	352	212	1638	CONT	CONT
MCTSSA, Camp Pendleton, CA (to OSEC)	RCP	Jan 99			0	0	0	1638	CONT	CONT
SPAWAR, San Diego, CA (to INRI)	RCP	Jan 99			0	827	319	3143	CONT	CONT
MARCORSYSCOM, CTQ; Quantico, VA TBD	RCP	Jan 99	1846	1846	0	0	1846	0	0	1846
AFATDS:										
USA, Ft. Sill, OK	CPFF/MIPR	Jan 97	1402	1402	0	1402	0	0	0	1402
MCSC, Quantico, VA	CPFF/RCP	Oct 98			0	100	0	0	0	100
USA, Ft Wayne, IN	CPFF/MIPR	Jan 99			0	0	0	0	CONT	CONT
USA, Ft Monmouth, NJ	CPFF/MIPR	Jan 00	2786	2786	0	0	1385	1130	271	2786
TCAP PIP:										
BTG, Fairfax, VA	RCP	Jan00	2580	2580	0	0	775	895	910	2580
ATACC:										
WR Robbins AFB, GA	RCP	Sep 98	41	41	0	41	0	0	0	41
Support and Management Organizations										
EICOC:										
Marcorsyscom	WR	Dec 99				0	0	104	CONT	CONT
TCO:										

MCTSSA, Camp Pendleton, CA	RCP	Jan99			0	97	136	137	CONT	CONT
Logicon Stafford, VA	CPFF/RCP	9/97	88	88	0	88	0	0	0	88
IAS MOD:										
SPAWAR Charleston, SC	WR	Nov 01	100	100	0	0	0	0	100	100
IDASC:										
MCSC, Quantico, VA	WR	Oct 97	236	236	0	112	124	0	0	236
MAGTF C4I										
Baseline:										
MARCORSYSCOM CTQ, Quantico, VA (Logicon Stafford, VA)	FFP/CPFF	Jan 99			0	0	100	100	CONT	CONT
MCSC Quantico, VA	WR	Nov 99			0	16	16	16	CONT	CONT
AFATDS:										
MCSC, Quantico, VA	CPFF/RCP	Jan 99	1459	1459	0	0	436	493	530	1459
MCSC, Quantico, VA	WR	Sep 99	400	400	0	0	120	120	160	400
PM AFATDS, USA Ft Monmouth, NJ	MIPR	Sep 99	1410	1410	0	0	350	530	530	1410
EICOC:										
Logicon Stafford, VA	CPFF/RCP	9/97	732	732	0	180	186	0	366	732
Test and Evaluation Organizations										
TCO:										
MCTSSA, Camp Pendleton, CA	RCP	Oct 97			0	80	65	194	CONT	CONT
IAS:										

ARL, Adelphi, MD	C/MIPR	Nov 98	125	125	0	50	75	0	0	125
MCTSSA, Camp Pendleton, CA	RCP	Oct 98	413	413	0	188	225	0	0	413
JITC, Ft. Huachuca, AZ	C/MIPR	Sep 99	40	40	0	0	40	0	0	40
IAS MOD:										
ARL, Adelphi, MD	C/MIPR	Jan 00			0	0	0	100	CONT	CONT
MCTSSA Camp Pendleton, CA	RCP	Jan 00			0	0	0	302	CONT	CONT
MAGTF C4I Baseline:										
MCTSSA, Camp Pendleton, CA	RCP	Jan 98	598	598	0	298	300	0	0	598
MCTSSA (to Contractor TBD)	RCP	Jan 00			0	0	0	1283	CONT	CONT
EICOC:										
MCTSSA, Camp Pendleton, CA	WR	Oct 97	3411	3411	0	581	980	0	1850	3411
SBIR TAX			157	157	0	0	157	0	0	157

	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Subtotal Product Development		4337	6908	19730	CONT	CONT
Subtotal Support and Management		493	1468	1500	CONT	CONT
Subtotal Test and Evaluation		1197	1842	1879	CONT	CONT
Total Project		6027	10218	23109	CONT	CONT

C. (U) **Funding Profile: Not Applicable.**

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0206313M Marine Corps Communications Systems PROJECT C2271

COST *(In Millions)*	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C2271 Maneuver C2 Systems	1486	2067	986	446	403	305	0	0	0	5693
Quantity of RDT&E Articles										

A. (U) Mission Description and Budget Item Justification:

(U) Maneuver C2 is the executive layer of decision support that retrieves and fuses information from the functional areas. It provides an integrated representation of the battlespace or a specific area of concern. The subprojects below develop systems which report unit status and location to the Tactical Combat Operations (TCO) and Advanced Tactical Air Command Central (ATACC). They also disseminate maneuver information throughout the battlespace.

1. The Joint Tactical Information Distribution System (JTIDS) provides unit location and status in near-real-time, primarily for aircraft, ships, and air defense systems.
2. The Data Automated Communications Terminal (DACT) will extend situational awareness to echelons below the battalion level within the Marine Corps. The DACT will receive, store, retrieve, create, modify, transmit, and display map overlays, operational messages/reports, and position information via tactical radios, networks, and/or wire lines. A phased approach for fielding the full functionality of the system will be used consisting of software upgrades and enhancements to allow interoperability with other C4I systems

PROGRAM ACCOMPLISHMENTS AND PLANS

(U) FY 1998 Accomplishments:

- (U) $ 791 DACT: Developed positional, navigational, and message application software (Phase I software).
- (U) $ 170 DACT: Developed DACT vehicle mount assembly.
- (U) $ 145 DACT: Developed program documentation, program plans, and operational concepts.
- (U) $ 50 JTIDS: Continued support for the Joint JTIDS Link 16 IPT.
- (U) $ 100 JTIDS: Continued JTIDS participation in DII COE working group.
- (U) $ 210 JTIDS: Initiated and developed the interface TYQ-JTIDS to other Aviation C2 Agencies..
- (U) $ 20 JTIDS: Program management support for various technical interchange meetings, demonstrations, and conferences.

(U)Total $ 1,486

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0206313M Marine Corps Communications Systems PROJECT C2271

(U) FY 1999 Planned Program:

• (U) $	185	DACT: Develop Phase II software.
• (U) $	468	DACT: Develop training package, program documentation, program plans, and operational concepts.
• (U) $	100	DACT: Perform DACT operational testing.
• (U) $	50	JTIDS: Continue engineering support for the Class 2/2H Terminals which will be used in JTIDS common processor.
• (U) $	476	JTIDS: Complete ECP to AN/TYQ JTIDS for TACC operations.
• (U) $	750	JTIDS: Commence integration of real time/non-real time data feeds to AN/TYQ JTIDS.
• (U) $	20	JTIDS: Program management support for various technical interchange meetings, demonstrations and conferences.
• (U) $	18	SBIR: Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638
(U)Total $	2,067	

(U) FY 2000 Planned Program:

• (U) $	460	DACT: Develop Phase III software.
• (U) $	150	DACT: Conduct follow-on developmental and operational testing.
• (U) $	376	DACT: Develop training package, documentation, and operational concepts for newly developed software functionality.
(U)Total $	986	

B. (U) Project Change Summary	FY 1998	FY 1999	FY 2000
(U) Previous President's Budget	1413	2090	1834
(U) Adjustments to Previous President's Budget	+73	-23	-848
(U) Current Budget Submit	1486	2067	986

(U) Change Summary Explanation:

(U) Funding: Increase in FY98 funding represents net reprogramming efforts.
FY99 Due to Revised Economic Assumption.
FY00 adjustments due to prioritization of program's within the Marine Corps, Non Pay Inflation.

(U) Schedule: N/A

(U) Technical: N/A

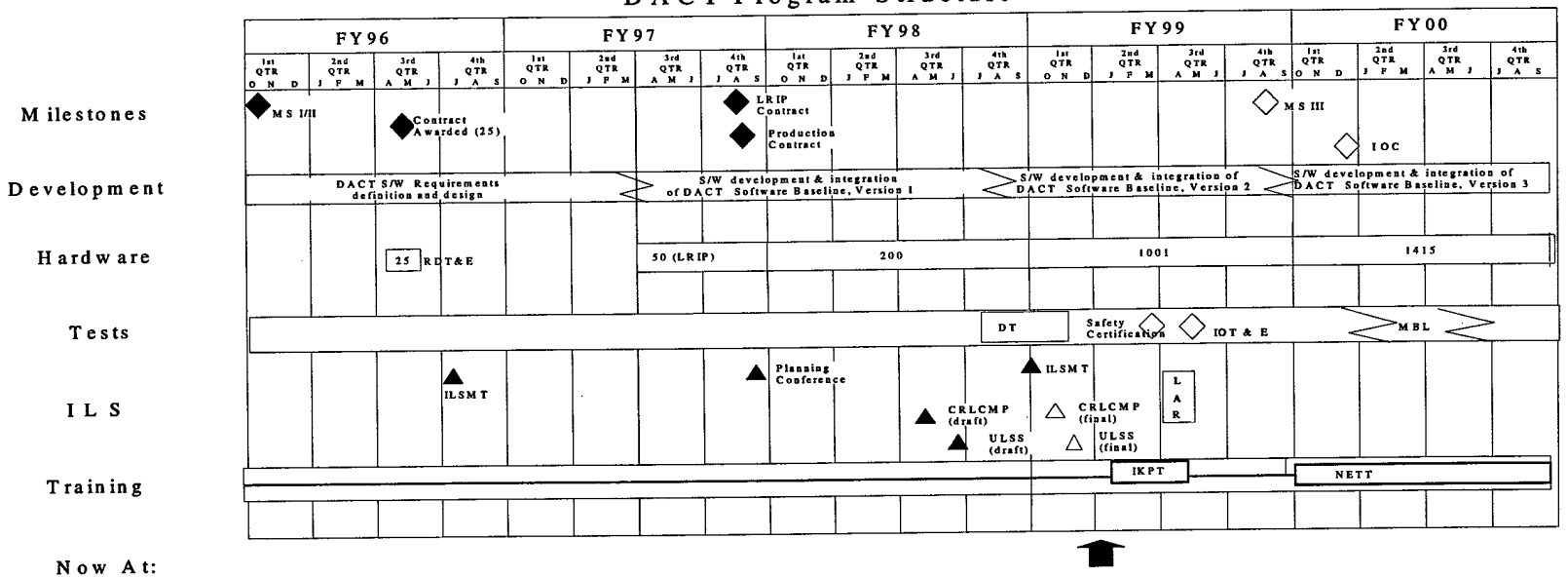
RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0206313M Marine Corps Communications Systems PROJECT C2271

C. (U) Other Program Funding Summary (APPN, BLI #, NOMEN)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
(U) PMC, BLI #463200, DACT	0	12621	6838	9873	2343	0	0	0	0	31675
(U) O&M, DACT	98	257	411	423	302	199	0	0	TBD	TBD
(U) PMC, BLI #463200, JTIDS	7216	9734	0	0	0	0	0	0	0	16950

(U) Related RDT&E
None

D. (U) Schedule Profile

DACT Program Structure

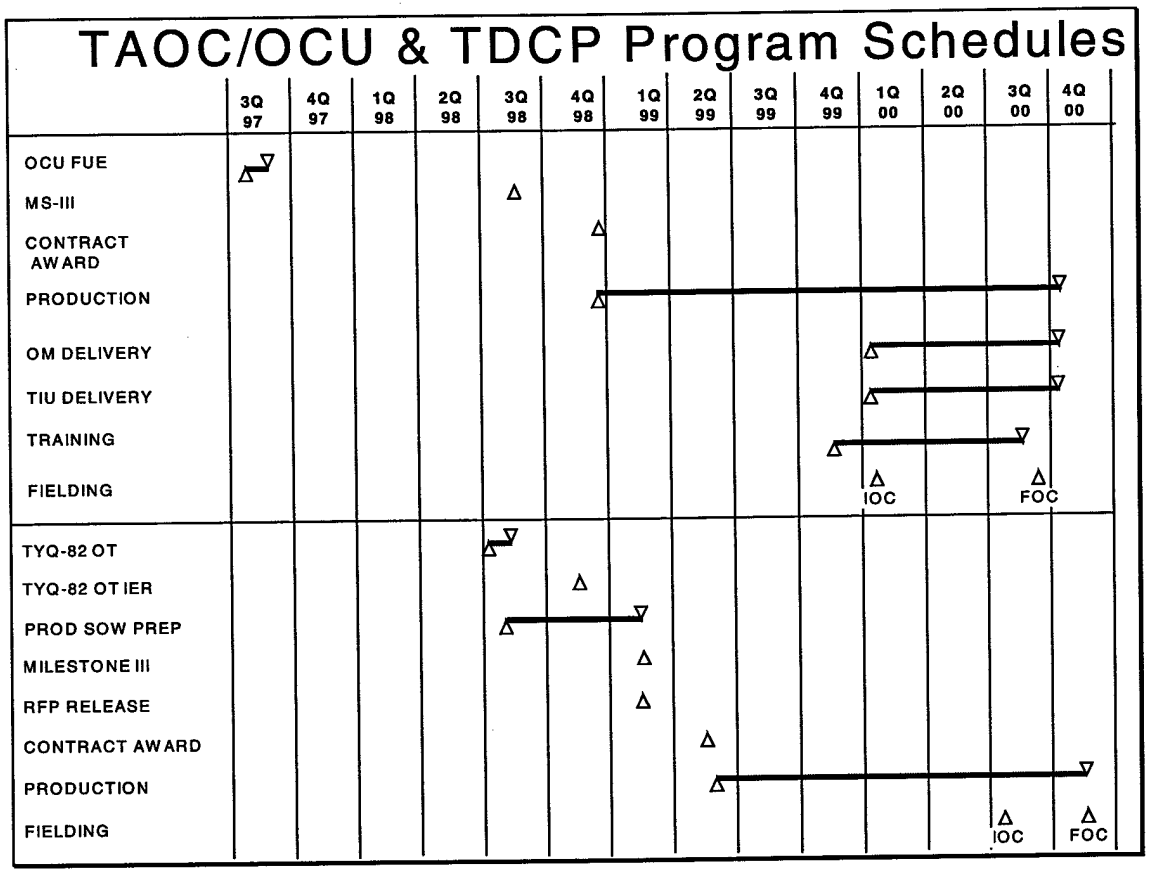


Acronyms:

CMP	Configuration Management Plan	LAR	Logistics Assessment Review
CRLCMP	Computer Resources Life Cycle Management Plan	LRIP	Low Rate Initial Production
DT	Developmental Test	MBL	Marine Battle Lab
FOC	Full Operational Capability	MS	Milestone
H/W	Hardware	NETT	New Equipment Training Team
IKPT	Instructor & Key Personnel Training	OT	Operational Test
ILSMT	Integrated Logistics Support Management Team	RFP	Request for Proposal
ILSP	Integrated Logistics Support Plan	SS	Source Selection
IOC	Initial Operatinal Capability	S/W	Software
IPT	Integrated Program Team	ULSS	Users Logistics Support Summary
LAP	Letter of Adoption and Procurement		

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE: February 1999
BUDGET ACTIVITY: 7 - Operational System Development	PE NUMBER AND TITLE: 0206313M Marine Corps Communications Systems / PROJECT: C2271

JTIDS Schedule:



RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0206313M Marine Corps Communications Systems PROJECT C2272

COST *(In Millions)*	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C2272 Intelligence C2 Systems	2702	4348	12839	7831	8493	8264	5288	5459	Continuing	Continuing
Quantity of RDT&E Articles										

A. (U) Mission Description and Budget Item Justification: Intelligence Command and Control (C2) supports the employment of reconnaissance, surveillance, and target acquisition resources and the timely planning and processing of all-source intelligence. It ensures that all-source tactical intelligence is tailored to meet specific mission requirements. The systems below collect raw intelligence data on the battlefield, convert raw intelligence data into processed information and deliver the processed products to the Intelligence Analysis Systems (IAS) for analysis.

1. The MANPACAK Secondary Imagery Distribution System (SIDS) is used to distribute processed imagery throughout the Marine Corps Communications Systems.
2. Tactical Exploitation of National Capabilities (TENCAP) is a program designed to enhance the ability of tactical Marine Corps forces to exploit the capabilities of national intelligence-gathering systems. Congressionally directed, it requires close liaison with the intelligence community and involves complex and highly-sensitive activities.
3. The Topographic Production Capability (TPC) is an advanced Geographic Information System, which employs commercial computer and software to provide the framework data for the common battlefield visualization by producing both hardcopy and digital geographic intelligence.
4. The Joint Surveillance Target Attack Radar (JSTARS) connectivity program will develop software which will allow the JSTARS Moving Target Indicator (MTI), Fixed Target Indication (FTI) and Synthetic Aperature Radar (SAR) Data to be passed from the JSTARS Common Ground Station (CGS) to lower echelons within the MAGTF. The IAS and TCO will host the JSTARS Connectivity Software. Once the Connectivity Software has developed a requirement for a JSTARS CGS software, upgrade is anticipated under Joint Program Office Pre-Planned Product Improvement (P3I) initiative.
5. The Coastal Battlefield Reconnaissance and Analysis (COBRA) system is a passive multispectral sensor system capable of operating in a PIONEER unmaned aerial vehicle (UAV). Imagery recorded on the UAV or disseminated via data link is analyzed by the COBRA ground station. Ground station algorithm processing provides near real-time automatic minefield detection with Differential Global Positioning System (DGPS) location accuracy.

PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) FY 1998 Accomplishments:

- (U) $ 49 MANPACK SIDS: Completed modification of the COTS Digital Camera.

•	(U) $	1016	TENCAP: Demonstrated the technical feasibility and tactical utility of Enhanced National-Tactical Imagery, Communications Externals Dissemination (ENTICED) into Marine Corps C4I architecture via the RADIANT MERCURY multi-level security system. ENTICED provided enhanced IMINT, ELINT, and COMINT dissemination within existing Marine Corps C4I architecture.
•	(U) $	1017	TENCAP: Initiated a concept development effort to provide nationally and tactically collected Signal Intelligence (SIGINT) data to small tactical units and teams, on a portable, lightweight device. Project RAIDER, wil focus on delivering this data to those teams conducting highly mobile, low intensity, short duration operations such as Non-combatant Evacuation Operations (NEO), and Tactical Recovery of Aircraft and Personnel (TRAP).
•	(U) $	205	TENCAP: Evaluated Tailored, Topographic Imagery Manipulation, Extraction and Dissemination (T-TIMED) project which will provide the tactical operator with the desired and required nationally derived topographic information on an as-needed basis, merged and correlated with imagery from standard workstations (i.e. IAS) and displays on laptops and DACT like devices.
•	(U) $	215	TENCAP: Continued to support TENCAP training and education efforts by providing various TENCAP simulation, scripting, and processing hardware, software and exercise support to training centers and Fleet units deployed and in garrison.
•	(U) $	200	TENCAP: Continued participation in National Intelligence Systems Data (NISI), evaluating the utility of emerging exploitation, automated and manual target recognition and detection tools, and emerging reconnaissance technologies. Formulate and submit Tactical Impact Statements (TIS) as required by Congress.
•	(U) $	0	JSTARS: Initiated the development of USMC hardware and software connectivity between the JSTARS system and the required JSTARS Connectivity sites and MAGTF C4I systems. This effort forward financed with $229 FY97 funds from this project and PE.
(U)Total $		2,702	

(U) FY 1999 Planned Program:

•	(U) $	200	MANPACK SIDS: Complete software upgrade to maintain NITFS standards and improve compression algorithms.
•	(U) $	1859	TENCAP: Conduct advance technology demonstrations and integration into the established MAGTF C4I architecture.
•	(U) $	356	TENCAP: Conduct technical assessments of emerging national data dissemination capabilities.
•	(U) $	461	TENCAP: Continue to support operational planning to enhance operating force capabilities to US national intelligence data witin the MAGTF C4I architecture.
•	(U) $	437	TENCAP: Evaluate the utility of emerging exploitation, automated and manual target recognition and detection tools.
•	(U) $	100	TENCAP: Continue TENCAP training and education efforts by providing the Fleet Marine Force with various TENCAP simulation, scripting, and processing hardware and software support.
•	(U) $	250	JSTARS: Perform tests and exercise with the JSTARS CGS and JSTARS connectivity prototype(s).
•	(U) $	626	JSTARS: Continue to develop connectivity software.
•	(U) $	59	SBIR: Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.
(U)Total $		4,348	

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0206313M Marine Corps Communications Systems PROJECT C2272

(U) FY 2000 Planned Program:

•	(U) $	332	TPC: Initiate test and evaluations.
•	(U) $	765	TPC: Initiate engineering, manufacturing and development.
•	(U) $	2300	TPC: Operational systems development.
•	(U) $	100	TPC: In-house program management.
•	(U) $	138	TPC: Contractor advisory and assistance services.
•	(U) $	1966	TENCAP: Continue advance technology demonstrations and integration into the established MAGTF C4I architecture.
•	(U) $	384	TENCAP: Continue technical assessments of emerging national data dissemination capabilities.
•	(U) $	470	TENCAP: Continue to support operational planning to enhance operating force capabilities to US national intelligence data within the MAGTF C4I architecture.
•	(U) $	445	TENCAP: Continue to evaluate the utility of emerging exploitation, automated and manual target recognition and detection tools.
•	(U) $	125	TENCAP: Continue TENCAP training and education efforts by providing the Fleet Marine Force with various TENCAP simulation, scripting, and processing hardware and software support.
•	(U) $	1900	JSTARS: Continue to develop connectivity software.
•	(U) $	366	JSTARS: Engineering and technical management support for connectivity software.
•	(U) $	148	COBRA: MarCorSysCom program contractor support activities.
•	(U) $	200	COBRA: Coastal Systems Station program engineering support.
•	(U) $	2950	COBRA: Engineering, manufacturing and development.
•	(U) $	100	COBRA: Preliminary design review.
•	(U) $	150	COBRA: Pre-Critical Design Review Documentation.
(U)Total $		12,839	

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206313M Marine Corps Communications Systems

PROJECT: C2272

B. (U) Project Change Summary	FY 1998	FY 1999	FY 2000
(U) Previous President's Budget	2975	3507	3951
(U) Adjustments to Previous President's Budget	-273	+841	+8888
(U) Current Budget Submit	2702	4348	12839

(U) Change Summary Explanation:

(U) Funding: FY 98 adjustments are due to internal reprogramming.
FY99 adjustment due to JSTARS moving from C2277, PE26313M, revised economic assumption and adjustments to CAAS.
FY 00 adjustment is due to prioritization of programs within the Marine Corps.

(U) Schedule: N/A

(U) Technical: N/A

C. (U) Other Program Funding Summary (APPN, BLI #, NOMEN)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
PMC BLI 474700 Intelligence Support Equipment MANPACK SIDS	3903	0	0	0	0	0	0	0	0	3791
PMC BLI 474700 Intelligence Support Equipment TPC	0	0	0	7264	6737	3999	1610	583	Cont	Cont
PMC BLI #474900 JSTARS	0	1017	982	0	973	0	973	0	Cont	Cont

(U) Related RDT&E

(U) PE 0301301L (Department of Defense Intelligence and Information Systems/Military Intelligence Integrated Data System/Integrated Data Base I and II) (DefenseIntelligence Agency)

(U) PE 0604270A (Intelligence and Electronic Warfare Common Sensor (IEWCS), TACJAM-A)

(U) PE 0305885G (Tactical Cryptologic Program)

(U) PE 0603730A (Tactical Surveillance System - Advanced Development), Army TENCAP, Project D560(U)PE 0603766A (Tactical Electronic Surveillance System - Advance Development), Army TENCAP, Project D907

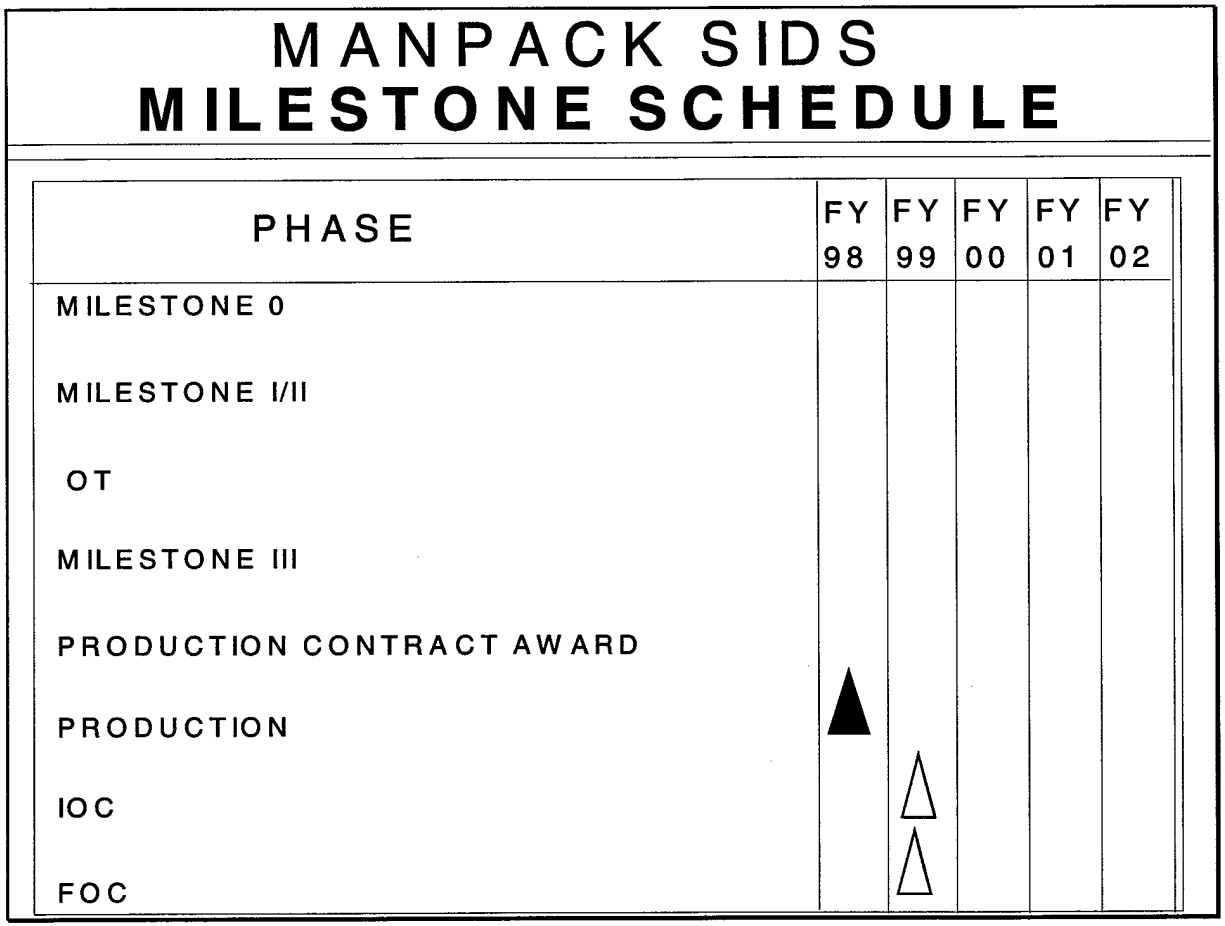
(U) PE 0604740A (Tactical Surveillance System - Engineering Development), OSD TENCAP, Project D662

(U) PE 0902398M (United States Special Operations Command), Chariot Program

(U) PE 0605867N (SEW Surveillance/Reconnaissance Support), Project Z1034

(U) **Schedule Profile:**

SIDS Schedule

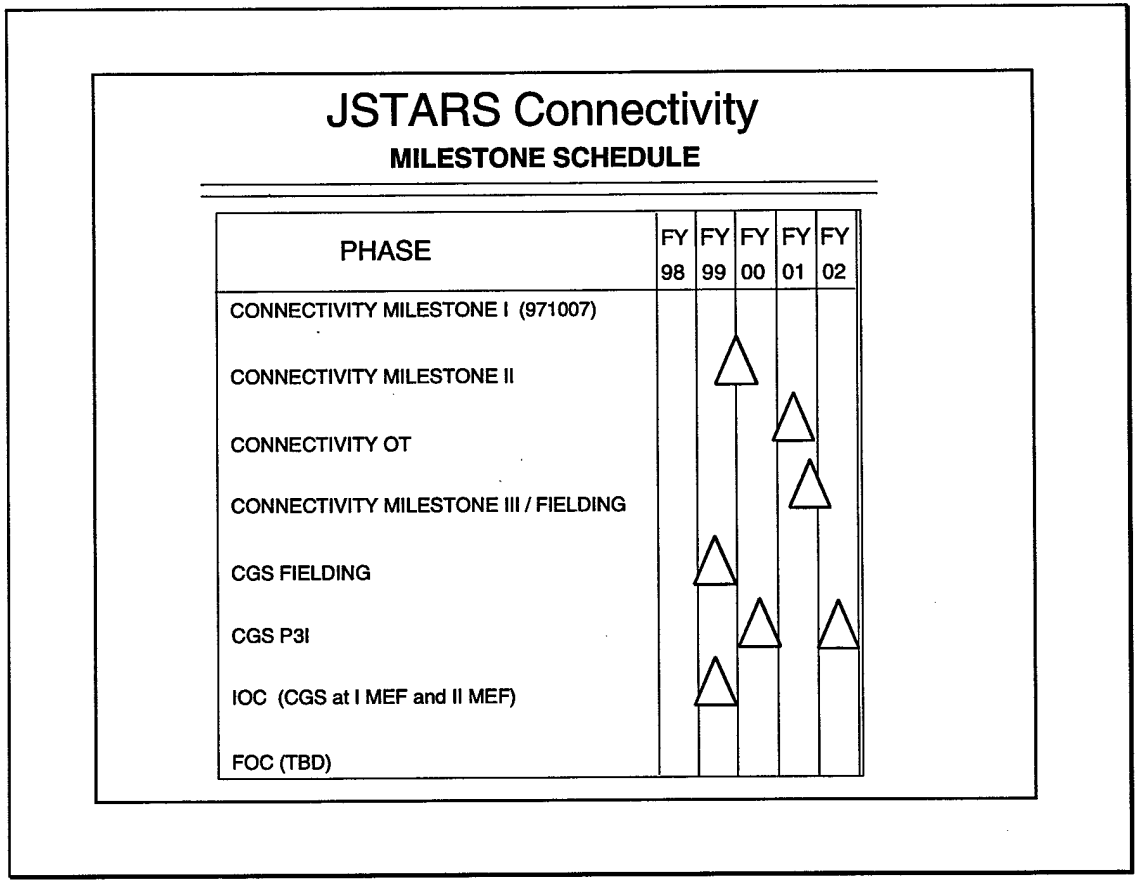


TPC Schedule

Topographic Production Capability
MILESTONE SCHEDULE

PHASE	FY 98	FY 99	FY 00	FY 01	FY 02	FY 03	FY 04	FY 05
MILESTONE 0		2nd Qtr						
MILESTONE I	▲	3rd Qtr						
MILESTONE II		▲	4th Qtr					
OT			●	3rd Qtr				
MILESTONE III				▲	1st Qtr			
PRODUCTION CONTRACT AWARD				●	1st Qtr			
IOC					▲	2nd Qtr		
FOC						▲	3rd Qtr	
P3I,Phase 1							▲	4th Qtr
P3I,Phase 2								▲ 4th Qtr

JSTARS Schedule:



RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206313M Marine Corps Communications Systems

PROJECT: C2272

A. (U) Project Cost Breakdown	FY 1998	FY 1999	FY 2000
a. Program Management Support	0	0	295
b. Engineering Support	0	126	412
c. TENCAP Concept Development/Feasibility Demonstration	1474	1859	2589
d. TENCAP Training/Exercise Support to FMF	100	100	126
e. System Design/Integration/Development	102	356	6747
f. Management Support Services	518	461	645
g. Software Development	508	1446	2025
h. Primary Hardware Development			0
Total	2702	4348	12839

B. Budget Acquisition History and Planning Information

Performing Organizations

Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Product Development Organizations										
TENCAP:										
Booz-Allen & Hamilton	RCP	Jan 97			2392	2035	2819	2814	CONT	CONT
JSTARS:										
TBD	MIPR	Mar 00	2266	2266	0	0	0	2266	0	2266
JSTARS:										
TBD	MIPR	Mar 01	394	394	0	0	0	0	0	394
JSTARS:										
TBD	MIPR	Mar 99	876	876	0	0	876	0	0	876
COBRA:										
TBD	RCP	Feb 00			0	0	0	2950	CONT	CONT
TPC:										

MRJ Inc.	RCP	Mar 00	3065	3065	0	0	0	3065	0	3065
Support and Management Organizations										
TENCAP:										
Booz, Allen & Hamilton	Various	Jan 97			435	618	453	576	CONT	CONT
COBRA:										
CSS	WR	Mar 00			0	0	0	450	CONT	CONT
BRTJRC	RCP	Mar 00			0	0	0	148	CONT	CONT
TPC:										
TBD	RCP	Mar 00			0	0	0	238	CONT	CONT
Test and Evaluation Organizations										
SIDS:										
NAWC, PT Mugu	WR	Dec 96	249	249	0	49	200	0	0	249
TPC:										
TBD	WR	Mar 00						332	CONT	CONT

	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Subtotal Product Development	2392	2035	3695	11095	CONT	CONT
Subtotal Support and Management	435	618	453	1412	CONT	CONT
Subtotal Test and Evaluation		49	200	332	CONT	CONT
Total Project	2827	2702	4348	12839	CONT	CONT

C. (U) Funding Profile: Not Applicable.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206313M Marine Corps Communications Systems

PROJECT: C2273

COST *(In Millions)*	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C2273 Air Operations C2 Systems	4355	6289	16415	25747	23083	8612	6768	4094	Continuing	Continuing
Quantity of RDT&E Articles										

A. (U) Mission Description and Budget Item Justification: Air Operations C2 coordinates and plans Navy and Marine air combat operations and interfaces with joint and combined forces air operations. It also interfaces with fire support C2. The systems in this project are used to detect aircraft and missiles, process the detected information, deliver the processed information to the Advanced Tactical Air Command Central (ATACC), and conduct the air battle.

1. The Tactical Air Operations Module (TAOM) improves the current system; the TAOM is the center for directing aircraft and anti-air systems in real time as part of the joint air battle.
2. The Air Defense Communications Platform (ADCP) provides an interface between the AN/TPS-59 (V)3 radar and for tactical ballistic missile defense as a JTIDS network user, the ADCP provides a direct interface between the AN/TPS-59 (v)3 and the joint services.
3. Aviation radars (AV RDR) are used to detect the location and identity of aircraft and missiles in the battle area.
4. Theater Battle Management Core Systems (TBMCS) provides the commander the automated tools necessary to generate, dissemenate and execute the Air Tasking Order (ATO), as mandated by the Chairman, Joint Chiefs of Staff in July 1993. It is an evolutionary acquisition, allowing for the rapid development/fielding of hardware and software to meet todays rapidly advancing technology. It is fielded to all four Marine Tactical Air Command Squadrons (MTACS) and the supporting establishment with Marine Aviation Weapons and Tactics School (MAWTS) and the Battlestaff Training Facility (BSTF) sharing a system. Beginning FY00, CTAPS is migrating to the Theater Battle Management Core Systems (TBMCS) program within the USAF, and will change names from CTAPS to TBMCS.
5. The Common Aviation Command and Control System (CAC2S) will provide a common baseline of equipment, computer hardware, and software required to perform the mission of the Marine Air Command and Control System (MACCS). CAC2S will provide a complete and coordinated modernization effort for the equipment of the Marine Air Command and Control System (MACCS) to support its employment in an Operational Maneuver From The Sea (OMFTS) environment. The CAC2S will eliminate the current dissimilar aviation Command & Control systems, and will add the capability for aviation combat direction and air defense functions. CAC2S will be comprised of standardized tactical facilities, hardware, software and will significantly reduce the physical size and logistical footprint of existing MACCS equipment suite. Utilizing common hardware, the CAC2S will be an open architecture system that will migrate to the DII COE. Furthermore, CAC2S will execute real time functions of controlling aircraft and missiles, and employing weapons systems against time critical targets. CAC2S will provide a capability that allows operators to integrate Marine aviation into joint and combined air/ground operations. CAC2S will provide the tools that perform aviation C2 planning and execution functions in a positive control environment. CAC2S will assimilate the missions and fiscal resources of the Tactical Air Operations Center (TAOM), Tactical Air Command Center and the Direct Air Support Center (DASC) and the Air Defense Communications Platform (ADCP).

PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) FY 1998 Accomplishments:

•	(U) $	193	ADCP: Executed a comprehensive plan to prepare and test the ADCP for JTIDS joint certification.
•	(U) $	180	TAOM: Completed development of DII COE TADIL J Common Segment in preparation for MS III award during 1st qtr FY98.
•	(U) $	292	TAOM: Continued closed system (AYK-14) to open system migration.
•	(U) $	384	TAOM: Conduct Theater Ballistic Missile Defense (TBMD) implementation into the TAOM.
•	(U) $	350	TAOM: Program support, which consists of contractor support to provide documentation, hardware/software engineering, and logistics analysis to the program office; support of developmental testing, IPR, and contract management.
•	(U) $	2529	AV RDR: Analyzed and developed ECP's to increase AN/TPS-59 radar detection and targeting capability within the Antenna Array Transmitters and Receivers.
•	(U) $	427	AV RDR: Program in Process Review (IPR), and contract management.
•	(U) $	0	AV RDR: Analyzed and developed ECP-s to increase AN/TPS-59 radar detection and targeting capability within the Antenna Arry Transmiters and Receivers. This effort forward finance with $229K FY97 funds from this PE and Project.
(U)Total $		4,355	

(U) FY 1999 Planned Program:

•	(U) $	209	ADCP: Continue software enhancements concentrating on testing for JTIDS joint certification and a complete VMF development/meshnet upgrades.
•	(U) $	766	TAOM: Continue closed system (AYK-14) to open system migration.
•	(U) $	460	TAOM: Continue TMD implementation into the TAOC.
•	(U) $	128	TAOM: Program support, which consists of contractor support to provide documentation, hardware/software engineering, and logistics analysis to the program office; support of operational testing, IPR, and contract management.
•	(U) $	63	AV RDR: Continue MCTSSA software support.
•	(U) $	410	AV RDR: Program contractor support
•	(U) $	247	AV RDR: ECP development in support of MCCES radar trainers.
•	(U) $	97	CTAPS: Initiate USMC'S management of Theater Battle Management Core System (TBMCS) 1.0 development
•	(U) $	500	CAC2S: Program Management Support.
•	(U) $	2431	CAC2S: Initiate the migration of existing equipment to a technology, demonstration laboratory (TDL).
•	(U) $	911	CAC2S: Conduct exercises with TDL equipment to determine optimum equipment mix and organization.
•	(U) $	67	SBIR : Portion of of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC638.
(U)Total $		6,289	

(U) FY 2000 Planned Program:

•	(U) $	200	ADCP: Complete VMF development/meshnet upgrades.
•	(U) $	81	ADCP: Continue software modifications.
•	(U) $	7462	AV RDR: Initiate Safety ECP's developing a replacement IFF Interrogator, maintenance lift, False Alarm Adaptation (FAA) software, and begin development of special TBM modes software for increased range and enhanced operation.
•	(U) $	300	AV RDR: Program in Process Review (IPR), and contact management.
•	(U) $	593	AV RDR: Perform studies and analysis to determine the best approach for upgrading the 59 radar Electronic Protection capability during a POM-02 initiative in compliance with phase II of the ORD.
•	(U) $	319	TBMCS: Continue USMC's TBMCS development.
•	(U) $	25	TBMCS: Continue MCTSSA TBMCS software support.
•	(U) $	284	TBMCS: Program support to provide documentation, and support of TBMCS development and testing.
•	(U) $	2659	CAC2S: Initiate Phase II system engineering, software design and development efforts.
•	(U) $	2120	CAC2S: Initiate Processing and Display Suite (PDS) efforts.
•	(U) $	985	CAC2S: Conduct initial sensor interface/integration and interoperability testing.
•	(U) $	690	CAC2S: Initiate communication package effort.
•	(U) $	690	CAC2S: Initiate integration of Engineering Deveopment Model (EDM) hardware with existing assets and development of shelter configurations.
•	(U) $	600	CAC2S: Program Management Support
(U)Total $		16,415	

B. (U) Project Change Summary

	FY 1998	FY 1999	FY 2000
(U) Previous President's Budget	5135	6366	6277
(U) Adjustments to Previous President's Budget	-780	-77	+10138
(U) Current Budget Submit	4355	6,289	16415

(U) Change Summary Explanation:

(U) Funding: FY 1998 changes due to minor affordability adjustments.
Fy 1999 Due to Revised Economic Assumption.
FY 00 adjustment is due to prioritization of programs within the Marine Corps and due to Congressional adjustments to AN/TPS-59 in the amount of $5.5M for aviation radars (AV RDR) which provide a direct interface between the AN/TPS-59(V)3 and the Joint Services and to detect the location and identity of aircraft and missiles in the battle area.

(U) Schedule: Not Applicable

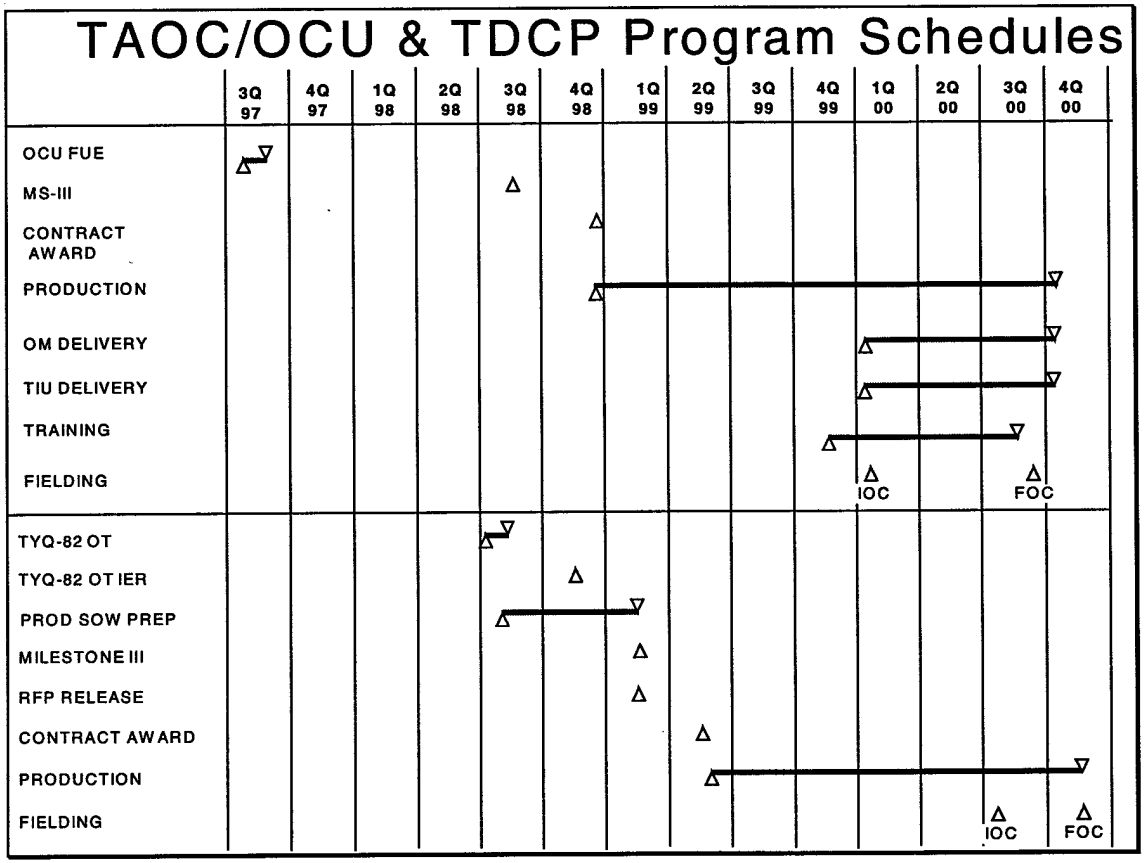
(U) Technical: Not applicable

C. (U) Other Program Funding Summary (APPN, BLI #, NOMEN)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
(U) PMC, BLI#464000, TAOM	10,671	6,706	0	0	0	0	0	0	0	17,377
(U) PMC, BLI#464000,TBMCS	400	1,462	4152	3197	3421	2510	6743	3583	CONT	CONT
(U) PMC, BLI#463700, ADCP	0	2,096	0	0	0	0	0	0	0	2,096
(U) PMC, BLI#463600, TPS-59 ECPS	5,476	8,322	1,314	1,368	3,847	20,815	17,954	10,739	0	69,835
(U) PMC, BLI#463600, AN/TPS-59	0	0	1,066	0	0	0	0	0	0	1,066
(U) PMC BLI #464000 Air Ops Systems CAC2S	0	0	0	0	0	19,753	43,895	45,980	CONT	CONT
(U) O&M, TAOM	0	0	0	0	0	0			0	0
(U) O&M, ADCP	375	361	0	0	0	0			0	736
(U) O&M, AN/TPS-59	0	0	0	0	0	0			0	0
(U) O&M, CTAPS	0	200	266	347	0	0	0	0	0	813

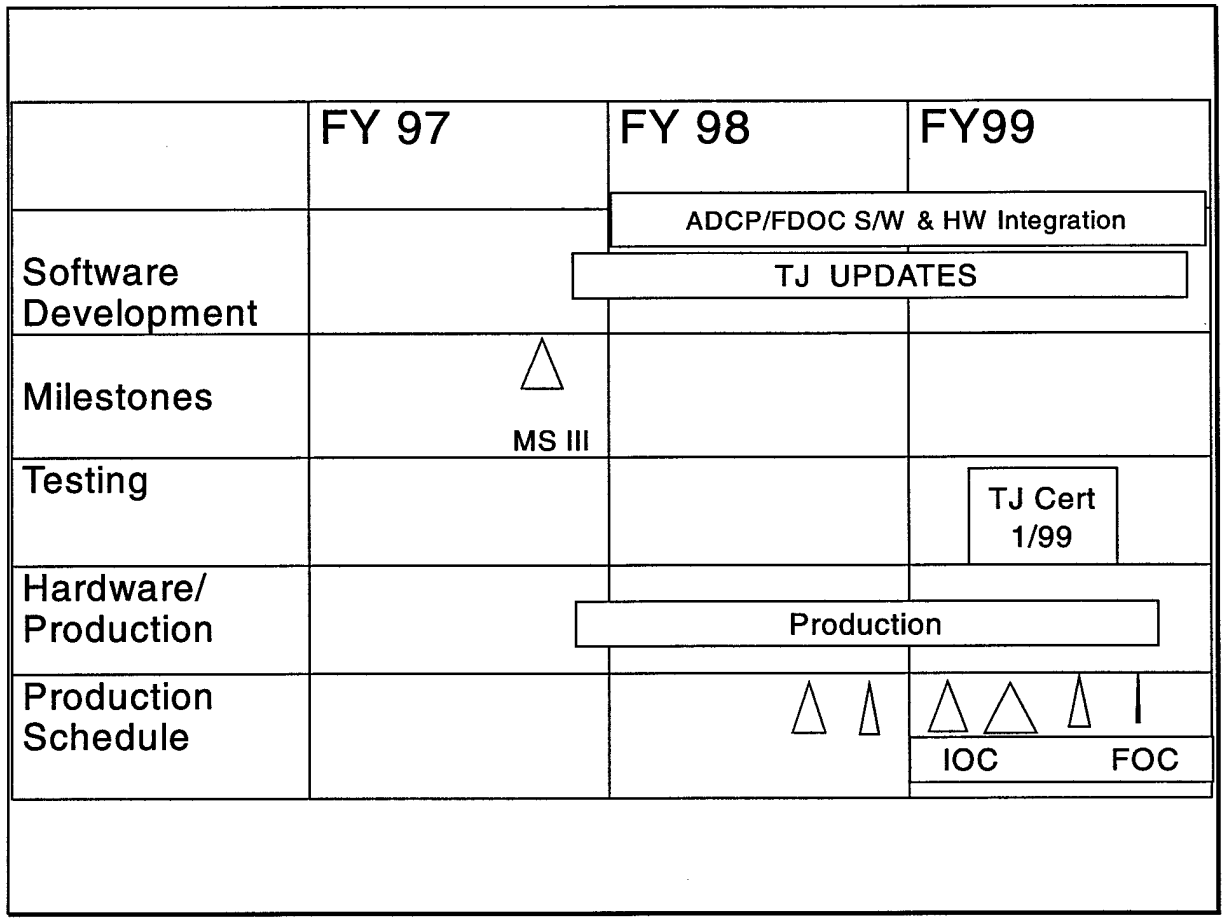
(U) **Related RDT&E**
PE 0603216C (Ballistic Missile Defense Organization, Theater Missile Defense)

D. (U) TAOM Milestone Schedule Profile

TAOM Schedule:



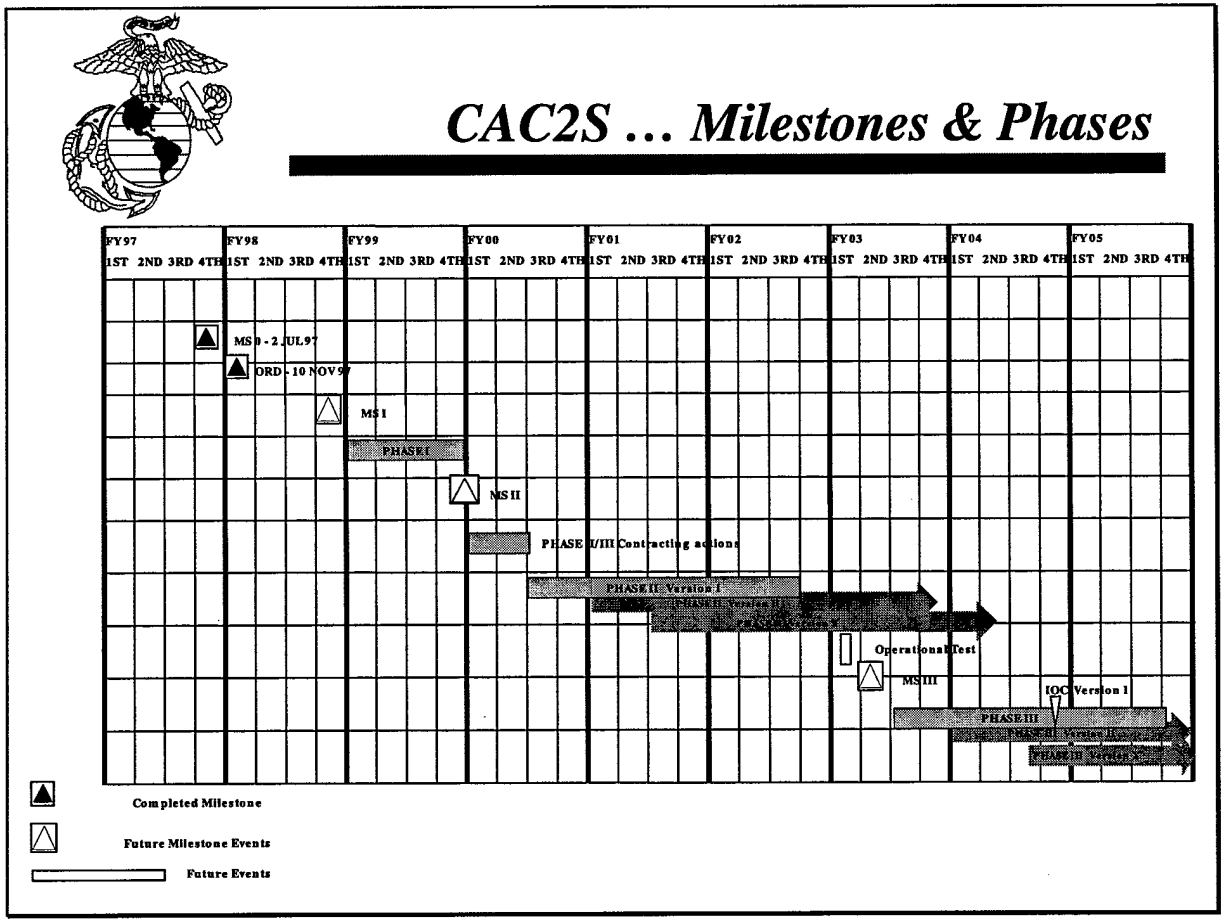
ADCP Schedule



TPS-59 RADAR SCHEDULE:

(V)3 Fielding Schedule:	3rd Qtr 98 thru 3rd Qtr 99
IOC:	Sep 98
FOC:	Aug 99
CEC Integration:	1st Qtr 99 thru 4th Qtr 00
Develop:	1st Qtr 99 thru 3rd Qtr 00
IV&V:	3rd Qtr 99 thru 4th Qtr 00
Antenna Upgrades:	1st Qtr 99 thru 3rd Qtr 04
Procure (Various):	1st Qtr 99 thru 4th Qtr 03
IOC:	2nd Qtr 01
FOC:	3rd Qtr 04

CAC2S Schedule:



RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0206313M Marine Corps Communications Systems PROJECT C2273

A. (U) Project Cost Breakdown

	FY 1998	FY 1999	FY 2000
Software Development	1,113	1,357	5859
Configuration Management	0	0	344
Development Support Equipment Acquisition	0	0	1645
Systems Engineering	2389	1,087	4862
Developmental Test and Evaluation	0	968	271
Prototype Hardware Development	0	2,500	951
Program Management Support	853	377	2483
Total	4355	6289	16415

B. Budget Acquisition History and Planning Information

Performing Organizations

Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Product Development Organizations										
CAC2S:										
Center Charleston, SC	MIPR	Oct 98	6502	6502	0	0	2931	2285	1286	6502
TBD	TBD	TBD	15728	15728	0	0	111	4359	11258	15728
TAOM:										
Litton Data Systems Augora Hills, CA	SS/CPAF/ RCP	Mar 97			0	1,016	1093		CONT	CONT
AV RADAR:										
Lockheed Martin, Syracuse NY	C/CPFF	Oct 96			0	2956	367	5389	CONT	CONT
TBD	TBD	Jan 00			0	0	0	1580	CONT	CONT
TBD	RCP	Nov 98			0	0	276	0	CONT	CONT

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)							DATE February 1999	
BUDGET ACTIVITY 7 - Operational System Development			PE NUMBER AND TITLE 0206313M Marine Corps Communications Systems					PROJECT C2273
TBMCS:								
3rd MAW	WR	Oct98	0	0	10	0	CONT	CONT
MARCORSYSCOM	WR	Oct 98	0	0	67	0	CONT	CONT
ESC Hanscom AFB, MA	MIPR	Dec 99	0	0	0	319	CONT	CONT
Support and Management Organizations								
CAC2S:								
MARCORSYSCOM	WR	Oct 98	0	0	100	100	100	300
Logicon	IDIQ	Oct 98	0	0	500	600	832	1932
MITRE, Bedford, MA	MIPR	Oct 98	0	0	200	200	200	600
MCTSSA, Camp Pendleton, CA	WR	Oct 98	0	0	0	200	200	400
ADCP:								
NSWC Crane IN	WR	Oct 96	0	193	100	150	CONT	CONT
MCTSSA, Camp Pendleton, CA	WR	Oct 98	0	0	85	100	180	365
MARCORSYSCOM	WR	Oct 98	0	0	24	31	CONT	CONT
TAOM:								
Logicon Stafford VA	FFP	Oct 99	0	178	236	0	CONT	CONT
MCSC Quantico, VA	WR	Oct 97	0	12	25	0	CONT	CONT
AV RADAR:								
MCSC, Quantico, VA	WR	Oct 99	0	0	25	38	CONT	CONT
MCSC, Quantico , VA	RCP	Oct 99	0	0	52	208	CONT	CONT
Logicon, Stafford, VA	CPFF	Oct 99	0	0	0	547	CONT	CONT

TBMCS:								
MCTSSA, Camp Pendelton, CA	WR	Oct 99	0	0	0	106	CONT	CONT
3D Maw. El Toro, CA	WR	Oct 99	0	0	20	47	CONT	CONT
Logicon, Stafford, VA	CPFF	Oct 99	0	0	0	156	CONT	CONT
SBIR TAX			0	0	67	0	0	67

Test and Evaluation Organizations

	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Subtotal Product Development		3972	4855	13932	CONT	CONT
Subtotal Support and Management		383	1434	2483	CONT	CONT
Subtotal Test and Evaluation						
Total Project		4355	6289	16415	CONT	CONT

C. (U) Funding Profile: Not Applicable.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206313M Marine Corps Communications Systems

PROJECT: C2274

COST *(In Millions)*	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C2274 C2 Warfare Systems	3384	3939	8387	3504	4374	5046	3213	3403	Continuing	Continuing
Quantity of RDT&E Articles										

A. (U) Mission Description and Budget Item Justification: Command and Control (C2) Warfare Project includes the following tactical electronic intercept, direction finding, and electronic attack systems:

1. The Tactical Electronic Reconnaissance Processing and Evaluation System (TERPES) is used to process, sort, analyze, display and correlate ES and EA data collected by EA-6B aircraft and maintain the Tactical Electronic Orders of Battle.
2. The Mobile Electronic Warfare Support System (MEWSS) will be used to collect and process electronic intelligence and provide electronic attack capability from a mobile ground platform.
3. Team Portable collection System (TPCS) upgrade is a semi-automated, manpackable/team transportable signals intelligence system that provides communications intercept, radio direction finding analysis and reporting to the Marine Air Ground Task Force (MAGTF) Commander.
4. The Radio Reconnaissance Equipment Program (RREP) provides the FMF Radio Battalions, Radio Reconnaissance Platoons (RRP) with mission unique Signals Intelligence/Ground Electronic Warfare SIGINT/EW) Euipment suites. Continuing with an evolutionary acquisition approach, the second suite RREP-SS-2 will provide the RRPs with the capability to conduct SIGINT/EW operations in support of Marine Air Ground Task Force (MAGTF) Commanders during advance force special operations, and other special purpose missions where the use of conventional Radio Battalion assets are not feasible. RREP-SS-2 is a ruggerized, modular, man packable system specifically designed utilizing emerging NDI/COTS/GOTS technology for RRP operations, particularty those conducted under the most austere conditions. The RREP-SS-2 module configuration has an "open systems" architecture that will permit future upgrades by simply installing cutting edge NDI/COTS/GOTS technology into the standard modules. The third suite, RREP-SS-3, to be fielded in FY04, will have the added capability to intercept those emerging target sets as identified by the NSA, be operated from remoted positions, and incorporate polymer battery technologies.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0206313M Marine Corps Communications Systems PROJECT C2274

PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) FY 1998 Accomplishments:

•	(U) $	572	MEWSS: Successfully conducted IOT&E.
•	(U) $	258	MEWSS: Continued USMC unique subsystem development for direction finding and communications emitters.
•	(U) $	214	MEWSS: Upgrade task and reporting capability.
•	(U) $	290	TPCS Upgrade: Initiated TPCS Upgrade software development to control and exploit special signal receivers and analysis tools.
•	(U) $	164	TPCS Upgrade: Systems Engineering and Technical Assistance (SETA).
•	(U) $	1000	TERPES: Continuing upgrades to TERPES mission planning software to maintain compatibility with the EA-6B aircraft software changes.
•	(U) $	460	TERPES: Continuing development of Tactical Automation Sanitation capability or similar Multi-Level Security (MLS) device or procedure.
•	(U) $	426	TERPES: Beginning software development of Link l6 TADIL J to be incorporated into fusion processor.
(U)Total $		3,384	

(U) FY 1999 Planned Program:

•	(U) $	335	MEWSS: Development of performance enhancing ECP for Electronic Attack integration.
•	(U) $	100	MEWSS: Development of performance enhancing ECP for SATCOM radio integration.
•	(U) $	295	TPCS Upgrade: Transition TPCS Upgrade 2.0 Software to Defense Information Infrastructure (DII) Common Operating Environment (COE).
•	(U) $	217	TPCS Upgrade: Fund Phase II IOT&E of TPCS Upgrade.
•	(U) $	285	TPCS Upgrade: Software revisions to TPCS Upgrade 2.0 software.
•	(U) $	290	TPCS Upgrade: Hardware revisions to TPCS Upgrade. Achieve MSIII.
•	(U) $	178	TPCS Upgrade: Systems Engineering and Technical Assistance (SETA).
•	(U) $	900	TERPES: Continue development of TERPES mission planning software to maintain compatibility with the EA-6B aircraft software changes.
•	(U) $	142	TERPES: Continue development of Tactical Automation Sanitation capability or similar Multi-Level Security (MLS) device or procedure.
•	(U) $	400	TERPES: Begin software development of Link 16 TADIL J (IBS) to be incorporated into fusion processor.
•	(U) $	133	TERPES: Begin development of advanced communication suite upgrade for Joint interoperability software changes.
•	(U) $	480	TERPES: Begin DII/COE compliance.
•	(U) $	117	TERPES: Begin Sensitive Secret Compartmented Information (SCI) accreditation.
(U) $		67	SBIR: 67K portion of extramural program reserved for Small Business Innovation Research assessment in accordance with USX 638
(U)Total $		3,939	

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0206313M Marine Corps Communications Systems PROJECT C2274

(U) FY 2000 Planned Program:

•	(U) $	510	MEWSS: Conduct Phase II IOT&E for Electronic Attack module.
•	(U) $	4000	MEWSS: Developmental and Operational Testing.
•	(U) $	822	TPCS Upgrade: In keeping with the evolutionary acquisition strategy, these funds will be used to develop software to enhance the baseline
•	(U) $		Including enchancements to improve the systems interoperability with other systems.
•	(U) $	195	TPCS Upgrade: Systems Engineering and Technical Assistance (SETA).
•	(U) $	500	TERPES: Continue development of TERPES mission planning software to maintain compatibility with the EA-6B aircraft software changes.
•	(U) $	200	TERPES: Continue development of Tactical Automation Sanitation capability or similar Multi-Level Security (MLS) device or procedure.
•	(U) $	100	TERPES: Begin software and hardware integration for Joint Tactical Terminal (JTT).
•	(U) $	582	TERPES: Continue DII/COE compliance to reach level 6.
•	(U) $	397	TERPES: Continue development of advanced communications suite for Joint interoperability software changes.
•	(U) $	500	TERPES: Enhance TERPES Fusion Correlator.
•	(U) $	581	RREP: Integrate GOTS/COTS electronic attack (EA) capability (SS-2).
	(U)Total $	8,387	

B. (U) Project Change Summary	FY 1998	FY 1999	FY 2000
(U) Previous President's Budget	3275	4007	3865
(U) Adjustments to Previous President's Budget	+109	-68	+4522
(U) Current Budget Submit	3384	3939	8387

(U) Change Summary Explanation:

(U) Funding: FY 98 adjustments are due to minor internal reprogramming.
FY 00 adjustments due to prioritization of program's within the Marine Corps.

(U) Schedule: N/A

(U) Technical: N/A

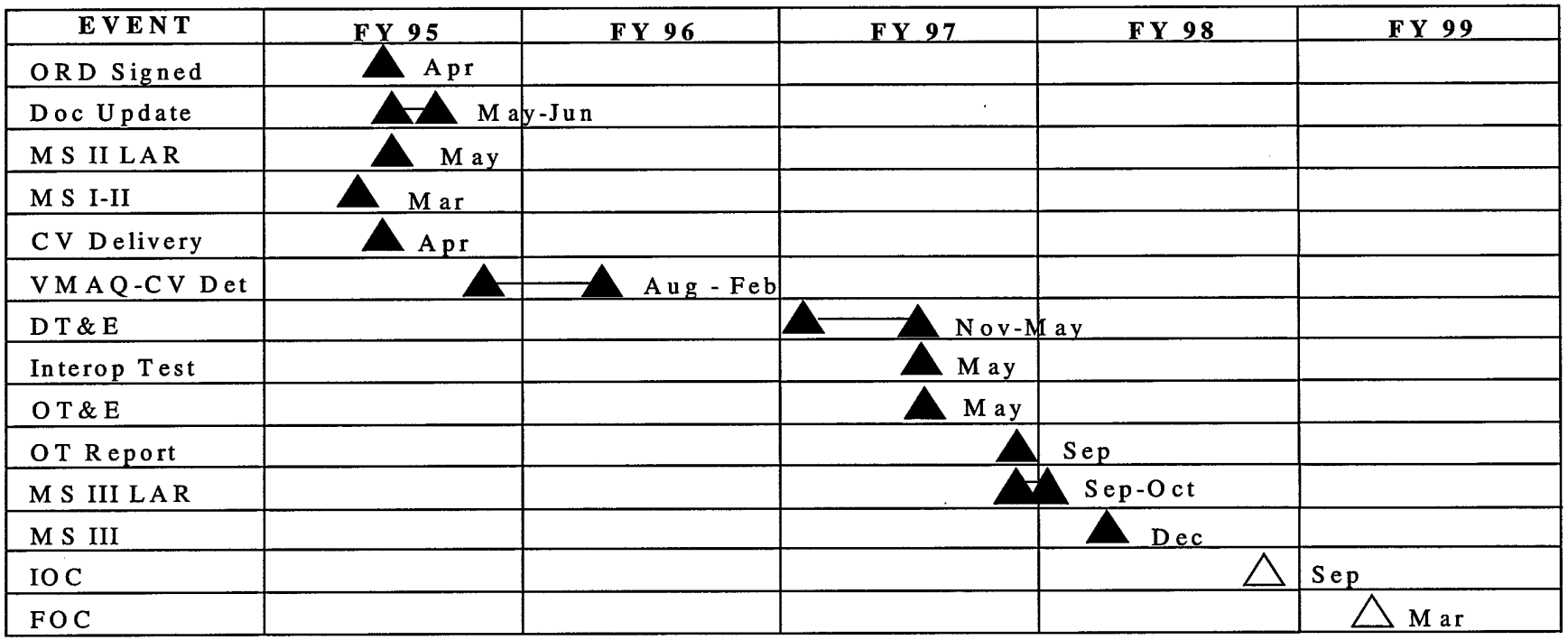
C. (U) Other Program Funding Summary (APPN, BLI #, NOMEN)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
(U) PMC BLI 474900 Modification Kits INTEL TERPES	4231	0	3695	0	2741	0	2715	0	0	13611
(U) PMC BLI 463600 Modification Kits MEWSS	14300	21291	4965	28010	33800	10346	4363	3220	Cont	Cont
(U) PMC BLI 474900 Modification Kits INTEL TPCS	0	3119	11358	2873	0	0	2500	2105	0	21955
(U) PMC BLI 474700 Intelligence Support EQUIPMENT RREP	0	0	2916	0	0	4041	0	0	0	6957
(U) O&M			2861			3969				6830
TERPES	2146	2325	2397	2472	2540	2629	0	0	Cont	Cont
TPCS	867	1203	1453	1246	1243	1270	1615	0	1415	10312

(U) Related RDT&E

(U) (U) PE 0305885G (Tactical Cryptologic Program)

D. (U) Schedule Profile

TERPES UPGRADE



MEWSS Schedule

MEWSS-PIP
MILESTONE SCHEDULE

PHASE	FY 98	FY 99	FY 00	FY 01	FY 02
MILESTONE 0		TIME NOW			
MILESTONE I/II					
PHASE I OT	X				
PHASE II OT			X		
MILESTONE III				X	
PRODUCTION CONTRACT AWARD				X	
PRODUCTION				X-------	
IOC				X	
FOC					

TPCS Schedule

TPCS UPGRADE
MILESTONE SCHEDULE

PHASE	FY 98	FY 99	FY 00	FY 01	FY 02
MILESTONE 0		TIME NOW →			
MILESTONE I/II					
OT		X			
MILESTONE III		X			
PRODUCTION CONTRACT AWARD			X		
PRODUCTION			X		
IOC				X	
FOC					X

Last Updated: 980515

RREP Schedule

RREP
MILESTONE SCHEDULE

PHASE	FY 98	FY 99	FY 00	FY 01	FY 02
MS II (SS-2)	1Q				
MS III (SS-2)		4Q			
ELECTRONIC ATTACK (EA) MODULE			3Q		
MS 0/I (SS-3)			4Q		
REMOTE EA CAPABILITY				2Q	
IOC/FOC (SS-2)				3Q	
MS II (SS-3)				3Q	
MS III (SS-3)					4Q

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	DATE February 1999
BUDGET ACTIVITY **7 - Operational System Development**	PE NUMBER AND TITLE **0206313M Marine Corps Communications Systems** PROJECT **C2274**

A. (U) Project Cost Breakdown	FY 1998	FY 1999	FY 2000
a. System Design/Integration/Development	1384	1331	2925
b. Development Testing/Operational Testing	397	434	4370
c. Management Support Services	1037	1029	215
d. Software Development	236	580	877
e. Primary Hardware Development	330	565	0
Total	3384	3939	8387

B. Budget Acquisition History and Planning Information

Performing Organizations

Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Product Development Organizations										
MEWSS:										
Lockheed Martin Fed Sys, Owego	CPFF	Jul97	1044	1044	0	1044	0	0	0	1044
Lockheed Martin Fed Sys, Owego	CPFF	Nov98			0	0	435	510	CONT	CONT
TPCS Upgrade:										
DAC/BTG	CPFF	Jan98			0	290	1069	802	CONT	CONT
TERPES:										
NAWCWPNS,	WR	Jan 99			0	1000	500	500	CONT	CONT
Pt Mugu, CA	RCP	Jan 99			0	297	1728	1777	CONT	CONT
RREP:	CPFF	Oct00			0	0	0	581	CONT	CONT
SPAWAR										
Support and Management Organizations										
TPCS Upgrade:										

CSC	CPFF	Oct 97	548	548	0	164	187	197	0	548
TERPES:										
NAWCWPNS, Pt Mugu, CA	WR	Oct 96			0	32	20	20	CONT	CONT
Test and Evaluation Organizations										
MEWSS:										
Lockheed Martin Fed Sys, Owego	CPFF	OCT 00	4000	4000	0	0	0	4000	0	4000
TPCS Upgrade:										
TERPES:										
NAWCWPNS Pt Mugu, CA	RCP	Oct 96	557	557	0	557	0	0	0	557

	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Subtotal Product Development		2631	3732	4170	CONT	CONT
Subtotal Support and Management		196	207	217	CONT	CONT
Subtotal Test and Evaluation		557	0	4000	CONT	CONT
Total Project		3384	3939	8387	CONT	CONT

C. (U) **Funding Profile: Not Applicable.**

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206313M Marine Corps Communications Systems

PROJECT: C2276

COST *(In Millions)*	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C2276 Communications Switching and Control System	1850	1888	1841	229	0	0	0	0	0	5808
Quantity of RDT&E Articles										

A. (U) Mission Description and Budget Item Justification: This program consists of four interrelated projects: Unit Level Circuit Switch Product Improvement Program (ULCS PIP), Digital Technical Control (DTC), Tactical Data Network (TDN), and Defense Message System (DMS). Together, these systems form an integrated, digital communications backbone for a deployed Marine Air Ground Task Force (MAGTF) which has the capability to manage, control, switch, and multiplex networks providing voice, data, message, imagery, facsimile, and video services to subscribers.

(U) The ULCS PIP will upgrade the ULCS circuit switches (AN/TTC-42 Central Office Telephone radio and switchboard SB-3865). The ULCS PIP is a competitive reprocurement of special purpose circuit card assemblies (CCAs) produced from a government-owned technical data package. The additional CCAs will provide improved access to fixed plant analog and trunk connections. Additional enhancements provide STU-III secure telephone interfaces in the AN/TTC-42 and SB-3865. The ULCS PIP requires low risk/medium technology engineering and development prior to build-to-print production.

(U) The TDN augments existing MAGTF communications infrastructure to provide the commander an integrated data network forming the communication backbone for MAGTF tactical data systems and Defense Message System. The TDN consists of a network of Gateways and Servers interconnected with one another and their subscribers via a combination of common user long-haul transmission systems, local area networks, single channel radios, and the switched telephone system. The network provides its subscribers with basic data transfer and switching services; access to strategic, supporting establishment, joint, and other service component tactical data networks; network management capabilities; and value-added services such as message handling, directory services, file sharing, facsimile handling, and terminal emulation support. Required functionality was separated into three blocks of capabilities due to the leading edge technology required in the Operational Requirement Document (ORD). This evolutionary acquisition strategy and funding provide for development of additional capabilities which compose the Block II upgrade of the system.

(U) The DTC facilitates the installation, operation, restoration, and management of individual circuits and digital links consisting of many multiplexed circuits. It provides the primary interface between subscriber systems/networks within a local area and long-haul multichannel transmissions systems to transport voice, message, data, and imagery traffic. It can add, drop and insert digital circuits into multiplexed groups; provide a source of stable timing to connected equipment; condition circuits; and perform analog/digital, 2-wire/4-wire, and signaling conversions. It contains the monitoring, testing, and patching equipment required by technical controllers to troubleshoot and restore faulty circuits and links. This funding provides for the development of interfaces to new technology transmission systems.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0206313M Marine Corps Communications Systems PROJECT C2276

(U) DMS is an OSD-mandated program to integrate Automatic Digital Network (AUTODIN) and E-Mail into a single, secure, DoD message communications system. DMS will expand writer-to-reader connectivity, support, and message security services. Organizations and individuals will be able to create, edit, send, receive, read, and process organizational and individual messages, secured with end-to-end protection, direct from desktop terminals/personal computers in their workspaces. DMS will do everything our current Banyan E-Mail and AUTODIN systems do with the following additional capabilities: connectivity to all users in DoD.

PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) FY 1998 Accomplishments:

• (U)$	379	DTC: Development and Engineering system technology upgrades. Achieve MS III decision.
• (U)$	318	DMS: Support software and hardware integration/testing. Incorporate evolutionary security products into the unclassified DMS architecture within a Marine Corps-unique network infrastructure.
• (U)$	1153	TDN: Begin developing TDN on Block II. Achieve MS III decision block I.
(U)Total $	1,850	

(U) FY 1999 Planned Program:

• (U)$	387	DTC: Engineering/testing system technology upgrades..
• (U)$	325	DMS: Support software and hardware integration/testing. Incorporate evolutionary security products into the unclassified DMS architecture within a Marine Corps-unique network infrastructure.
• (U)$	1144	TDN: Continue development TDN of Block II and software/hardware integration/testing.
• (U) $	32	SBIR: Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.
(U)Total $	1,888	

(U) FY 2000 Planned Program:

• (U) $	549	DTC: Developmental/Interoperability testing of ATM upgrade, obtain approval for ATM upgrade
• (U) $	198	DMS: Support software and hardware integration/testing. Incorporate evolutionary security products into the unclassified DMS architecture within a Marine Corps-unique network infrastructure.
• (U) $	1094	TDN: Continue TDN BLK II development and S/W and H/W Intergration testing. Achieve milestone III Decision for Block II
(U)Total $	1,841	

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206313M Marine Corps Communications Systems

PROJECT: C2276

B. (U) Project Change Summary

	FY 1998	FY 1999	FY 2000
(U)Previous President's Budget	1959	2106	1746
(U)Adjustments to Previous President's Budget	-109	-218	+95
(U)Current Budget Submit	1850	1888	1841

(U) Change Summary Explanation:

(U) Funding: FY 98/99 changes are due to minor affordability adjustments, revised economic assumption, CASS reductions. FY 00 adjustment is due to prioritization of programs within the Marine Corps, minor affordability adjustments, and non pay inflation adjustment.

(U) Schedule: N/A

(U) Technical: N/A

C. (U) Other Program Funding Summary

	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	FY 2004	FY 2005	To Complete	Total Cost
(U)PMC BLI 463400 Communications Switching and Control Systems										
DTC	11293	18330	33704	0	0	0	0	0	0	68603
TDN	24707	49606	24063	11040	204	253	313	386	0	115246
ULCS	0	2943	0	0	0	0	0	0	0	29527
DMS	7120	4475	7358	3197	0	0	0	0	0	26394
(U) O&M										
DTC	0	0	208	0	219	0	0	0	0	427
TDN	47	0	141	141	0	0	0	0	0	329
DMS	211	367	216	220	299	242	0	0	0	1555

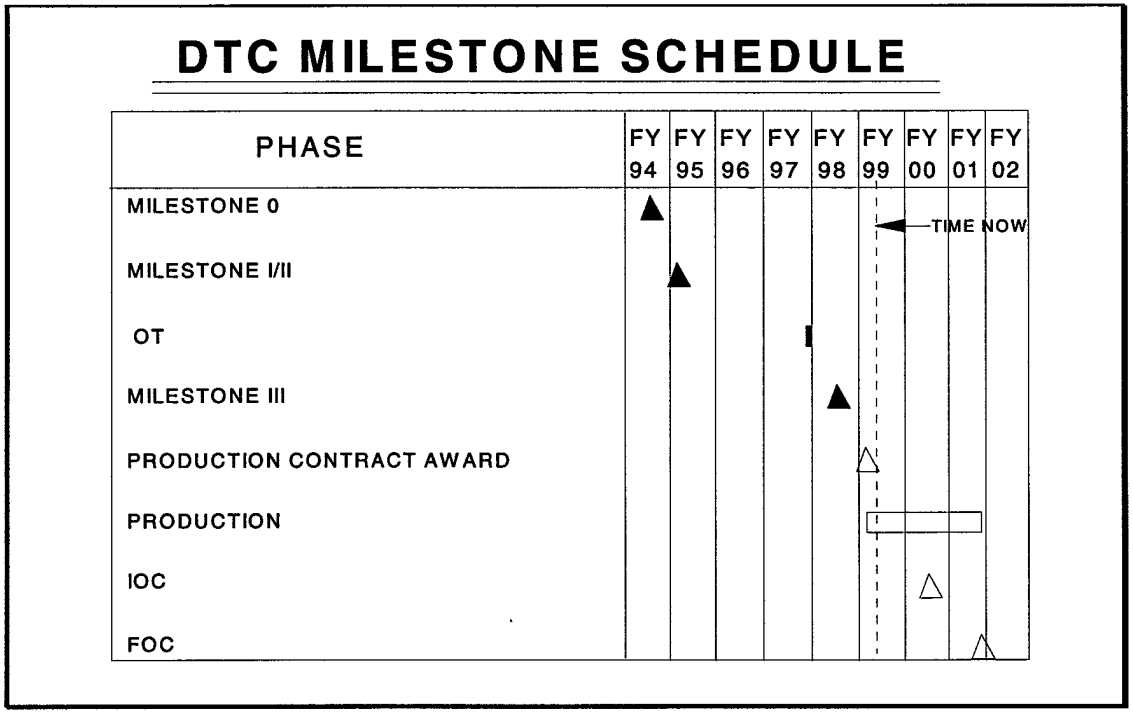
(U) Related RDT&E : N/A

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1999

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
7 - Operational System Development	0206313M Marine Corps Communications Systems	C2276

(U) **Schedule Profile:**

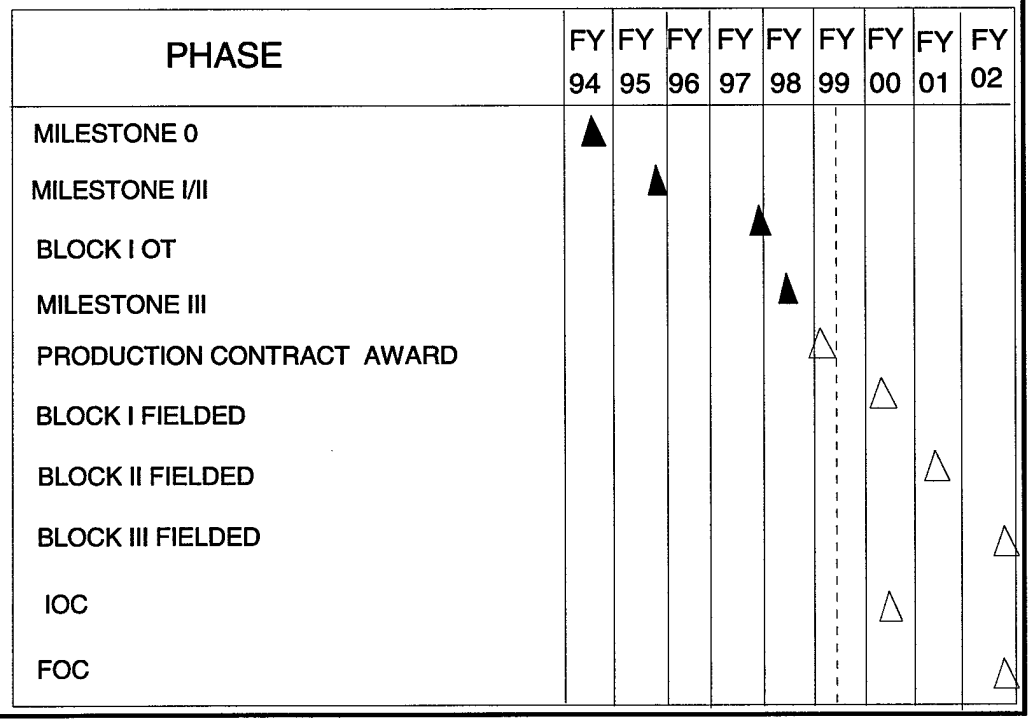
DTC Schedule



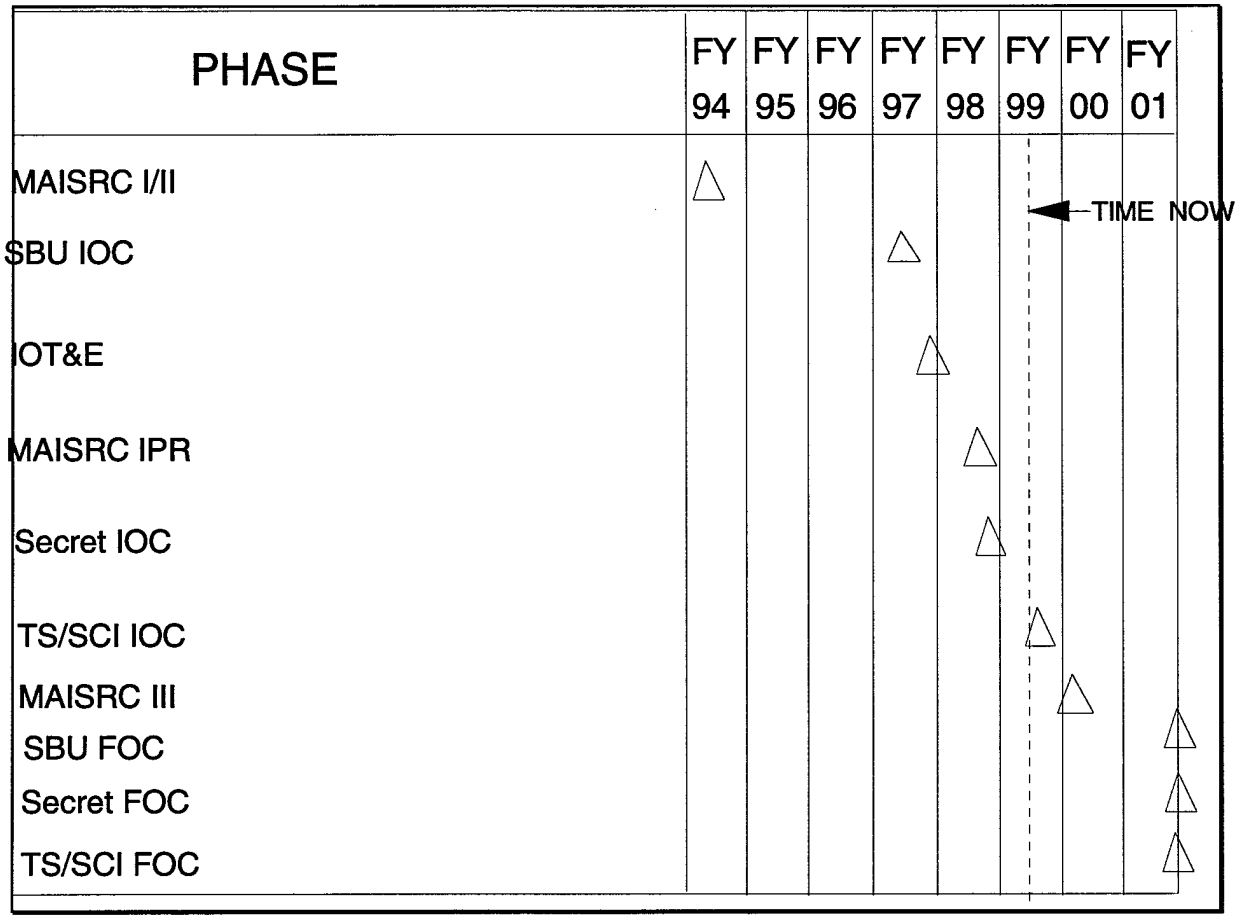
TDN Schedule

Tactical Data Network (TDN)

TDN MILESTONE SCHEDULE



DMS Schedule



A. (U) Project Cost Breakdown

	FY 1998	FY 1999	FY 2000
Contractor Engineering Support	1238	317	320
Development Test Evaluation	335	325	412
Program Management Support	277	1246	1109
Total	1850	1888	1841

B. Budget Acquisition History and Planning Information

Performing Organizations

Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Product Development Organizations										
TDN:										
CSC Dumfries, VA	C/CPFF	Oct 97	10160	10160	9215	945	0	0	0	10160
DTC:										
ESC, USAF Hanscom AFB, MA	C/FFP/MIP	Oct 97	1159	1159	866	293	0	0	0	1159
MITRE	CPFF/MIPR	Oct 98	637	637	0	0	317	320	0	637
Support and Management Organizations										
TDN:										
MCTSSA, Camp Pendleton, CA	WR	Oct 97	785	785	249	210	300	26	0	785
MITRE	CPFF/MIPR	Oct 98	1852	1852	0	0	814	1038	0	1852
MCSC, Quantico, VA	WR	Oct 98	120	120	0	0	30	30	60	120
SBIR	UNKNOWN	TBD	32	32	0	0	32	0	0	32
DTC:										

MCTSSA, Camp Pendleton, CA	WR	Oct 98	234	234	35	59	60	10	70	234
MCCDC Quantico, VA	WR	Oct 98	59	59	31	8	10	5	5	59
Test and Evaluation Organizations										
DTC:										
TBD	MIPR	Oct 99	427	427	0	0	0	214	213	427
DMS:										
MCTSSA, Camp Pendleton, CA	WR	Oct 98	1087	1087	0	335	325	198	229	1087

	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Subtotal Product Development	10374	1238	317	320	0	12249
Subtotal Support and Management	315	277	1246	1109	135	3082
Subtotal Test and Evaluation	0	335	325	412	442	1514
Total Project	10689	1850	1888	1841	577	16845

C. (U) Funding Profile: Not Applicable

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206313M Marine Corps Communications Systems

PROJECT: C2277

COST (*In Millions*)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C2277 Systems Engineering and Integration	1922	7155	6966	6762	6906	6624	6628	6466	Continuing	Continuing
Quantity of RDT&E Articles										

A. (U) Mission Description and Budget Item Justification:

This project provides funds for engineering, test, and evaluation activity which ensures that the systems being developed within the Program Element (PE) employ consistent standards for interoperability and, to the maximum extent feasible, use hardware and software which is uniform across programs.

1. The Marine Air-Ground Task Force Command, Control, Communications, Computers, and Intelligence Systems Engineering and Integration, Coordination. (MAGTF C4I SE&IC) subproject is a non-acquisition effort which provides centralized planning and execution of MAGTF C4I Systems; it is also used to develop and test common hardware and software for use in MAGTF C4I Systems; MAGTF C4I SE&I also funds USMC participation in joint planning and technical standards development. MAGTF SE&IC changes name to MAGTF SEI&c in FY00.
2. Joint Warrior Interoperability Demos (JWID) is a JCS-mandated program to demonstrate new C4I interoperability concepts for the warrior. JWID offers the opportunity for demonstrations of evolving technologies in interoperability, information dissemination, fusing and digital communications.
3. The Joint Interoperability of Tactical Command and Control Systems (JINTACCS) is a Joint Chiefs-of-Staff (JCS)-mandated program for joint development, implementation, and testing of data links under the direction of the Joint Interoperability Engineering Organization (JIEO).
4. All Service Combat Identification Evaluation Team (ASCIET) conducts multi-service tactical air-to-air and surface-to-air evaluations, examines air-to-surface and surface-to-surface combat identification capabilities and provides an environment to exercise and examine developmental combat identification systems. USMC participation in ASCIET is mandated by an existing all service MOA (940914).
5. Common Computer Resources mission – Central and standardized management and acquisition of all common computer hardware and infrastructure adopting the Joint Defense Information Infrastructure (DII) Common Operating Environment (COE) with consolidated Integrated Logistics Support. Ensure the environment remains in synchronization with computer hardware technology hardware improvements. The mission supports the Commandant's Planning Guidance and input to the Marine Corps Master Plan.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0206313M Marine Corps Communications Systems PROJECT C2277

PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) FY 1998 Accomplishments:

•	(U) $	110	JWID: Participated in JWID, a JCS-mandated program, to demonstrate new C4I interoperability concepts. JWID-98 offers the opportunity for demonstrations of evolving technologies in interoperability, information dissemination, fusing and digital communications.
•	(U) $	0	JWID: This effort forward financed with $257 FY97 funds from this project and PE.
•	(U) $	0	MAGTF SE&I: Continued DII COE migration to include enhanced open system, capabilities, distributed directory service, distributed file service with data replication, enhanced security, and modern desktop manger to include user configured icon and toolbars. This effort forward financed with $322 FY97 funds from this project and PE.
•	(U) $	1783	MAGTF SEI&C: Continued to provide systems engineering to centralize management, ensure proper testing, and provide integrated support planning of hardware.
•	(U) $	0	MAGTF SEI&C: Continued to provide engineering and technical support in support of the configuration management of the MAGTF C4I system and its igration to the DII COE. Provide analyses, studies, and reviews in the development of an integrated migration strategy. Continue to provide systems engineering efforts to implement the emerging Joint Technical Architecture. Provide interoperability testing/certification of MAGTF C4I systems. This effort forward financed with $1322 FY97 funds from this project.
•	(U) $	0	JINTACCS: Support the JINTACCS program with $1450, by providing system engineering efforts to implement emerging standard and provide interoperability testing/certification of MAGTF C4I systems.
•	(U) $	29	JINTACCS OPNET Software for modeling of USMC systems
(U)Total	$	1,922	

(U) FY 1999 Planned Program:

•	(U) $	720	JWID: Participate in JWID, a JCS-mandated program, to demonstrate new C4I interoperability concepts. JWID-99 offers the opportunity for demonstrations of evolving technologies in interoperability, information dissemination, fusing and digital communications.
•	(U) $	2289	MAGTF SEI&C: Initiate Independent Verification and Validation (IV&V) to certify that all MAGTF C4I systems are Year 2000 complaint.
•	(U) $	1287	MAGTF SEI&C: Continue to provide engineering and technical support in the support of configuration management of the MAGTF C4I system and its migration to the DII COE. Provide analyses, studies, and reviews in the development and implementation of an integrated migration strategy. Continue to provide systems engineering efforts to implement the emerging Joint Architecture. Provide interoperability testing/certification of MAGTF C4I systems.
•	(U) $	1354	JINTACCS: Support the JINTACCS program by providing system engineering efforts to implement emerging standard and provide interoperability testing/certification of MAGTF C4I systems.
•	(U) $	51	ASCIET: Support and management to monitor and participate in the development of the Joint Program.
•	(U) $	1151	ASCIET: Direct support to conduct yearly combat identification evaluations.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0206313M Marine Corps Communications Systems PROJECT C2277

• (U) $	303	SBIR: Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638
(U)Total $	7,155	

(U) FY 2000 Planned Program:

• (U) $	1380	JWID: Provide management, engineering and technical support in preparation for JWID-00, a JCS-mandated program. USMC will support fielding of "GOLDEN NUGGET" from JWID-99 during JWID-00 exercise. JWID offers the opportunity to demonstrate and evaluate emerging technologies.
• (U) $	1345	JINTACCS: Participate in JINTACCS, a JCS-mandated program aimed at ensuring interoperability of tactical systems. Provide analysis, engineering and technical support in developing joint standards. Provides interoperability testing/certification in support of C4I systems. Provide technical support in varuois joint programs and ACTD's.
• (U) $	2497	MAGTF SEI&C: Provide engineering and technical support for configuration management of MAGTF C4I systems and its migration to the DII COE. Provide analysis, studies and reviews in the development and implementation of the COE migration strategy. Provide engineering support for remaining Y2K problems within MAGTF C4I systems.
• (U) $	1685	CCR MCHS: Provide for research, evaluation, test and selection of computer hardware products for the Marine Corps Common Hardware Suite (MCHS). Develop MCHS system specifications and baselines; research and analyze computer technoligies and hardware; conduct performance, compatibility and environment testing; support commercial product selection and application.
• (U) $	59	ASCIET: USMC fair share of ASCIET exercise per estabilished MOA.
(U)Total $	6,966	

B. (U) Project Change Summary

	FY 1998	FY 1999	FY 2000
(U) PreviousPresident's Budget	189	6500	5716
(U) Adjustments to Previous President's Budget	+1733	+655	+1250
(U) Current Budget Submit	1922	7155	6966

(U) Change Summary Explanation:

(U) Funding: FY98 reprogramming for consolidation of support contract.
FY99/00 changes due to realignment of programs within MarCorSysCom, and Non Pay Inflation adjustments.

(U) Schedule: N/A

(U) Technical: N/A

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0206313M Marine Corps Communications Systems PROJECT C2277

C. (U) Other Program Funding Summary

(APPN, BLI #, NOMEN)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Complete	Total Cost
(U) CCR PMC (BLI#463000)	0	0	102814	88001	68380	63066	62153	68542	CONT	CONT

(U) Related RDT&E
(U) PE 0604817A
(U) PE 0206623M, Marine Corps Ground Combat/Supporting Arms Systems

D. (U) Schedule Profile:
Not Applicable

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206313M Marine Corps Communications Systems

PROJECT: C2277

A. (U) Project Cost Breakdown

	FY 1998	FY 1999	FY 2000
Software Development/Integration Testing	139	200	375
Civilian Salaries	416	426	435
Program Management Support	628	1933	1357
Systems Engineering PM Support	0	2144	2525
Development Support Equipment Acquisition	739	806	1065
Test/Certification	0	1646	1209
Total	1922	7155	6966

B. Budget Acquisition History and Planning Information

Performing Organizations

Contractor or Government Performing Activity	Contract Method/ Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Product Development Organizations										
JWID:										
MCTSSA, Camp Pendleton, CA	WR	Oct97			0	110	200	300	CONT	CONT
HQMC Arlington, VA	WR	Oct 99			0	0	0	580	CONT	CONT
CCR:										
TBD	TBD	Jan 00			0	0	0	133	CONT	CONT
TBD	TBD	Jan 00			0	0	0	152	CONT	CONT
JINTACCS										
CECOM FT MONMOUTH, NJ	SS	Oct 98	29	29	0	29	0	0	0	29
Support and Management Organizations										
JWID:										

Logicon, Stafford, VA	C/FFP	Oct98				0	294	300	CONT	CONT
TBD	TBD	TBD				0	226	200	CONT	CONT
MAGTF SE&I:										
CECOM, Fort Monmouth N.J.	WR	Oct 98	700	700	0	0	175	175	350	700
CCR:										
Logicon, Stafford VA	C/FFP	Oct 99			0	0	0	1048	CONT	CONT
MCSC, Quantico, VA	WR	Oct 99			0	0	0	38	CONT	CONT
ASCIET:										
Eglin AFB	MIPR	Oct 98				0	1202	59	CONT	CONT
Test andEvaluation Organizations										
MAGTF SEIC:										
Logicon, Stafford, VA	CFFP	Oct 99	8509	8509		1783	3401	2322	1003	8509
JINTACCS:										
Logicon, Stafford, VA	C/CPFF	Oct 98			649	0	1319	1310	CONT	CONT
MCTSSA, Camp Pendleton, CA	WR	Oct 97			0	0	35	35	CONT	CONT
CCR:										
TBD	TBD	Jan 00			0	0	0	314	CONT	CONT
SBIR			303	303	0	0	303	0	0	303

	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Subtotal Product Development		139	200	1165	CONT	CONT
Subtotal Support and Management	649	0	1897	1820	CONT	CONT
Subtotal Test and Evaluation		1783	5058	3981	CONT	CONT
Total Project	649	1922	7155	6966	CONT	CONT

C. (U) Funding Profile: Not Applicable.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0206313M Marine Corps Communications Systems PROJECT C2278

COST *(In Millions)*	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C2278 Air Defense Weapons Systems	744	2001	9759	9350	9688	11537	2741	3618	Continuing	Continuing
Quantity of RDT&E Articles										

A. (U) Mission Description and Budget Item Justification:

This project encompasses two sub-element programs which are part of the Integrated Air Defense System for the Marine Corps.

1. The Expeditionary Air Defense System (EADS) is the Marine Corps' low altitude ground based air defense system. Upgrades include mobility enhancements and expeditionary air defense improvements. Primarily, the Continuous Wave Acquisition Radar (CWAR) is the only sensor organic to the Marine Corps capable of providing low altitude target acquisition in a high clutter environment.
2. Combat ID (CID) will provide the ability to distinguish friends, foes, and neutrals on the battlefield through the use of situation awareness and target identification.
3. The Cooperative Engagement Capability (CEC) enables all ECE-equipped, Anti-Air Warfare (AAW) weapons systems in a battle force to operate as a single, distributed AAW weapon system. This is accomplished providing timely sharing of fire control quality sensor data, correlatred identificatrion data, and AAW weapon system management status via a Data Distribution System (DDS). The data is processed Independently the Cooperative Engagement Processor (CEP) on-board each Cooperating Unit (CU) to construct a detailed tract and status database in real time to provide required remote data to and from the local AAW weapon system elements (hardware and software modified for CEC). In this manner, each CU of a battle force can operatecooperatively with the other CUs, taking advantage of diverse locations and aspect angles, various AAW system capabilities, and degrees of availability by sharing sensor data, and coordinating engagements, fire control illuminatore, and AAW missiles.

PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) FY 1998 Accomplishments:

• (U) $	744	EADS: Continued pursuing ECPs for correcting hardware and software deficiencies thereby maintaining CWAR system viability.
(U)Total $	744	

(U) FY 1999 Planned Program:

•	(U) $	1,964	EADS: Identification Friend or Foe (IFF) continuous wave acquistion radar integration.
•	(U) $	37	Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.
(U)Total $		2,001	

(U) FY 2000 Planned Program:

•	(U) $	3,600	CEC: Initiate development of a land based CEC Engineering Design Model.
•	(U) $	1,000	CEC: Initiate design and development of a land based CEC antenna.
•	(U) $	197	CEC: Certify AN/TPS-59(V)3 adaptive layer software.
•	(U) $	500	CEC: Continue UPX-27(IFF) adaptive layer software development.
•	(U) $	500	CEC: Initiate design of combat system adaptive layer interface.
•	(U) $	700	CEC: Conduct Developmental Testing.
•	(U) $	200	CEC: Program support of provide program documentation for MS II.
•	(U) $	400	CEC: Program Management Support.
•	(U) $	400	CID: Test and evaluate systems currently available COTS for applicability.
•	(U) $	1,400	CID: Demonstration & Validation of systems.
•	(U) $	500	CID: Conduct Studies to investigate feasibility of using various fielded systems to fulfill some CID requirements.
•	(U) $	312	CID: Contractor Management.
•	(U) $	50	CID: TAD.
(U)Total $		9,759	

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206313M Marine Corps Communications Systems

PROJECT: C2278

B. (U) Project Change Summary

	FY 1998	FY 1999	FY 2000
(U) Previous President's Budget	793	2006	847
(U) Adjustments to Previous President's Budget	-49	-5	+8912
(U) Current Budget Submit	744	2001	9759

(U) Change Summary Explanation:

(U) Funding: FY98 Due to minor affordability adjustments.
FY99 Due to Revised Economic Assumption.
FY00 adjustment is due to prioritization of programs within the Marine Corps, due to Congressional adjustments to: (Combat ID) in the amount of $2.2 to test and evaluate available COTS to distinguish friends, foes and neutrals on the battlefield; and (CEC) in the amount of $6.7 to develop a land based system to enable all ECE-equipped, Anti-Air Warfare weapon systems in a battle force to operate as a single.

(U) Schedule: N/A

(U) Technical: N/A

C. (U) Other Program Funding Summary

	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Complete	Total Cost
(U) PMC LINE BLI 300600 EADS MOD	1490	976	0	0	0	0	0	0	4376	4376
(U) PMC LINE BLI 464000										
CID	0	0	0	0	0	0	16014	23168	CONT.	CONT.
CEC	0	0	0	0	14135	19624	21849	28698	CONT.	CONT.

(U) Related RDT&E

PE 0603216C (Ballistic Missile Defense Organization, Theater Missile Defense)

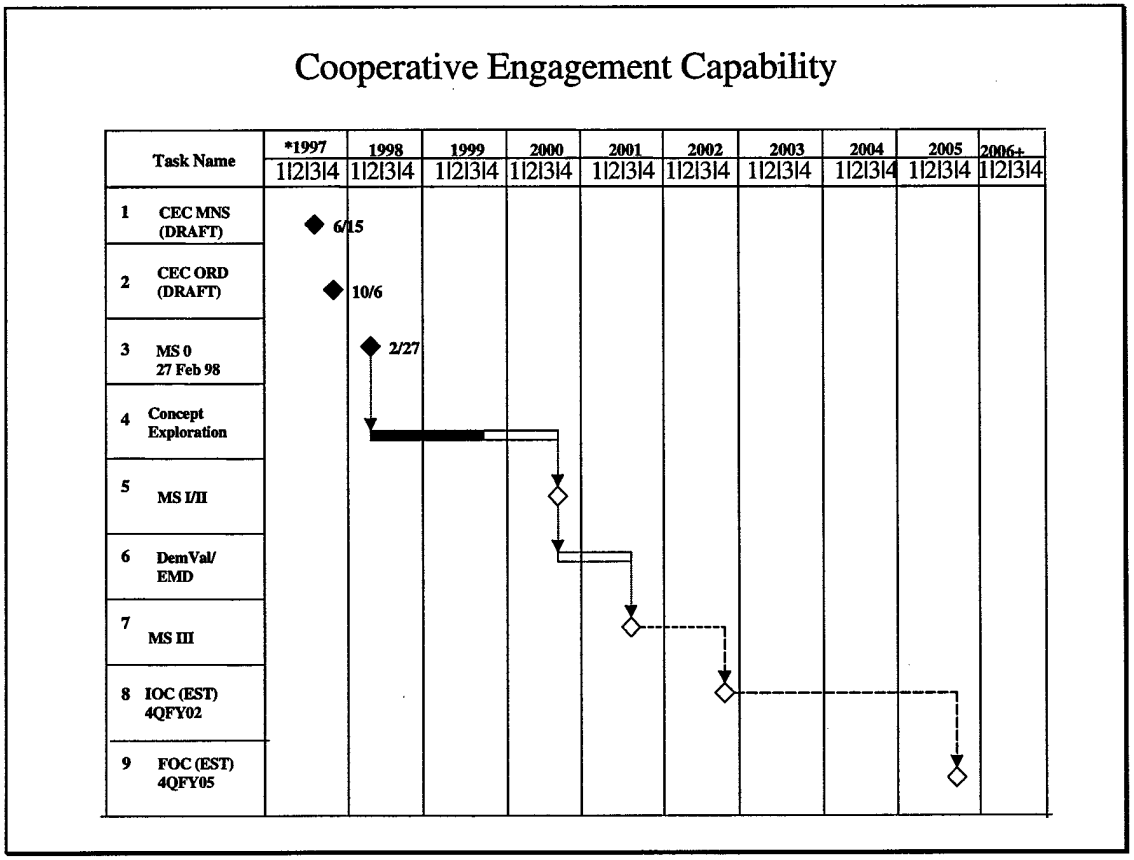
D. (U) Schedule Profile

CID Schedule:

Combat Identification Schedule

Task Name	*1992	1998	1999	2000	2001	2002	2003	2004	2005	2006+
	1|2|3|4	1|2|3|4	1|2|3|4	1|2|3|4	1|2|3|4	1|2|3|4	1|2|3|4	1|2|3|4	1|2|3|4	1|2|3|4
1 CID JMNS	◆3/26									
2 CID Master Plan		◆10/1								
3 MS 0 10/14/97										
4 CID ORD (EST)			◆7/1							
5 MS I 2QFY00										
6 MS II 2QFY02										
7 MS III 2QFY04										
8 IOC (EST) 1QFY05								◆		

CEC Schedule:



RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206313M Marine Corps Communications Systems

PROJECT: C2278

A. (U) Project Cost Breakdown

	FY 1998	FY 1999	FY 2000
a. Program Management/Travel	103	10	400
b. System Design	0	0	750
c. Program Management Support Services	60	0	200
d. Primary Hardware Development	0	0	4600
e. Software Development	0	0	800
f. CEC Training Exercise Support to FMF	0	0	347
g. Systems Engineering	581	1991	2662
Total	744	2001	9759

B. Budget Acquisition History and Planning Information

Performing Organizations

Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Product Development Organizations										
EADS:										
MCSC, Quantico, VA	WR	OCT 97	84	84	0	84	0	0	0	84
MICOM, Redstone Arsenal, AL	MIPR	MAR 98	2536	2536	0	545	1991	0	0	2536
MCTSSA, Camp Pendleton, CA	WR	OCT 97	29	29	0	19	10	0	0	29
MICOM, Redstone Arsenal, AL	MIPR	OCT 97	15	15	0	15	0	0	0	15
CID:										
TBD	TBD	TBD	5418	5418	0	0	0	2662	2756	5418
CEC:										

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE February 1999	
BUDGET ACTIVITY 7 - Operational System Development					PE NUMBER AND TITLE 0206313M Marine Corps Communications Systems						PROJECT C2278
TBD	CPFF	OCT 99			0	0	0	1000	CONT.	CONT.	
TBD	CPFF	OCT 99			0	0	0	4000	CONT.	CONT.	
TBD	CPFF	OCT 99			0	0		200	CONT.	CONT.	
TBD	CPFF	OCT 99			0	0	0	497	CONT.	CONT.	
Support and Management Organizations											
EADS:											
MCSC, Quantico, VA	RCP	JAN 98	60	60	0	60	0	0	0	60	
CECOM, Ft. Monmouth, NJ	MIPR	DEC 97	21	21	0	21	0	0	0	21	
CEC:											
MCTSSA	WR	OCT 99			0	0	0	250	CONT.	CONT.	
NSWC, Crane, IN	WR	OCT 99			0	0	0	850	CONT.	CONT.	
NSWC, Dahlgren, VA	WR	OCT 99			0	0	0	100	CONT.	CONT.	
TBD	FFP	OCT 99			0	0	0	200	CONT.	CONT.	
Test and Evaluation Organizations											
Government Furnished Property											
Item Description	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date		Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program	
Product Development Property											
Support and Management Property											
Test and Evaluation Property											

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0206313M Marine Corps Communications Systems PROJECT C2278

	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Subtotal Product Development		663	2001	8359	CONT.	CONT.
Subtotal Support and Management		81	0	1400	CONT.	CONT.
Subtotal Test and Evaluation		0	0	0	0	0
Total Project		744	2001	9759	CONT.	CONT.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0206313M Marine Corps Communications Systems PROJECT C2315

COST *(In Millions)*	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C2315 Training Devices/Simulators	7203	9368	8850	4881	9021	12342	5093	491	Continuing	Continuing
Quantity of RDT&E Articles										

A. (U) Mission Description and Budget Item Justification:

(U) Training simulators supported by this program element include Joint Simulation System (JSIMS), Range Instrumentation Systems (RIS), and Combat Vehicle Appended Trainer (CVAT). These training systems provide tactical weapons and decision-making skill training from entity level through Marine Air-Ground Task Force (MGTF) staff level. Together these systems will be interoperable and will allow for mission planning, mission rehearsal and concept evaluation in a valid synthetic environment with objective, timely feedback. Through live, virtual and constructive simulation, the Marine Corps will have the means to train jointly, educate, develop doctrine and tactics; formulate and assess operational plans, assess warfighting situations and define operational requirements.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) FY 1998 Accomplishments:

- (U) $ 5001 JSIMS: Provided technical expertise to the US Army, US Navy and US Air Force in the development of the Marine Corps unique simulation requirements. Completed development of software Build 0 products within Maritime Domain, and completed program system level specification and detailed software requirements.
- (U) $ 1,323 JSIMS: Completed development of unit level Conceptual Models for software build 0 and build 1 and continue to develop Conceptual Models for software builds 2 and 3. Completed candidate list of USMC simulations to interface.
- (U) $ 170 JSIMS: Completed USMC input to Joint Level Test and Evaluation Master Plan and provided technical expertise to the Test Planning Group to provide input for USMC unique system test requirements.
- (U) $ 430 JSIMS: Completed development of platform level Conceptual models for software builds 0 and build 1. Continued development of platform level conceptual models for software builds 2 and 3.
- (U) $ 279 RIS: Completed After Action Report (AAR) software capabilities.

(U)Total $ 7,203

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0206313M Marine Corps Communications Systems PROJECT C2315

(U) FY 1999 Planned Program:

• (U) $	298	JSIMS: Provide Marine Corps funding to CECOM for the development of the USMC specific Test and Evaluation master plan and provide technical expertise to the JSIMS test planning group for the Build 1 demonstration.
• (U) $	6881	JSIMS: Continue to provide technical expertise to the US Army, US Navy and US Air Force in the development of USMC specific requirements. Complete development of USMC requirements for software build 1. Procure Test hardware for Camp Lejeune in preparation for Collaborative Event.
• (U) $	400	JSIMS: Provide USMC Funding to Naval Air Warfare Center to continue development of JSIMS Build 2 and Build 3 conceptual models for USMC.
• (U) $	1000	JSIMS: Provide USMC Funding to US Army STRICOM to begin development of USMC Tactical Intelligence Systems.
• (U) $	528	JSIMS: Support development of USMC notional hardware configurations and participate in the Enterprise development of USMC C4I interface requirements.
• (U) $	261	SBIR: Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.
(U)Total $	9,368	

(U) FY 2000 Planned Program:

• (U) $	4622	JSIMS: Continue to provide technical expertise to the US Army, US Navy and US Air Force in the development of USMC specific requirements. Participate in Collaborative Event 1. Procure testing hardware for Quantico site to support developmental testing and Verification, Validation and Accreditation of USMC requirements.
• (U) $	200	JSIMS: Continue technical expertise to test planning group for build 1 demonstration. Participate in Collaborative Event and provide Verification, Validation, and Accreditation of USMC requirements.
• (U) $	528	JSIMS: Continue support in the development of USMC notional hardware configurations and participates in the Enterprise development of USMC C4I interface requirements.
• (U) $	1,900	CVAT: Develop appended trainer M1A1 prototype.
• (U) $	350	CVAT: Develop/Modify visual database.
• (U) $	1,250	CVAT: Independent verification and validation/testing of prototype functionality and interfaces.
(U)Total $	8,850	

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206313M Marine Corps Communications Systems

PROJECT: C2315

B. (U) Project Change Summary	FY 1998	FY 1999	FY 2000
(U) Previous President's Budget	8,233	9,933	10,180
(U) Adjustments to Previous President's Budget	-1,030	-565	-1,330
(U) Current Budget Submit	7,203	9,368	8,850

(U) Change Summary Explanation:

(U) Funding: FY 98 decrease of $1,030K due to minor affordability adjustments for net reprogramming $766K, SBIR $261K and $3K reprogrammed from JSIMS to CA. Decrease of $565K in FY99 is due to below threshhold reprogramming action. FY00 decrease is due to a delay in development and procurement of RIS and a scope reduction of affordable unique Marine Corps requirements in JSIMS.

(U) Schedule: N/A

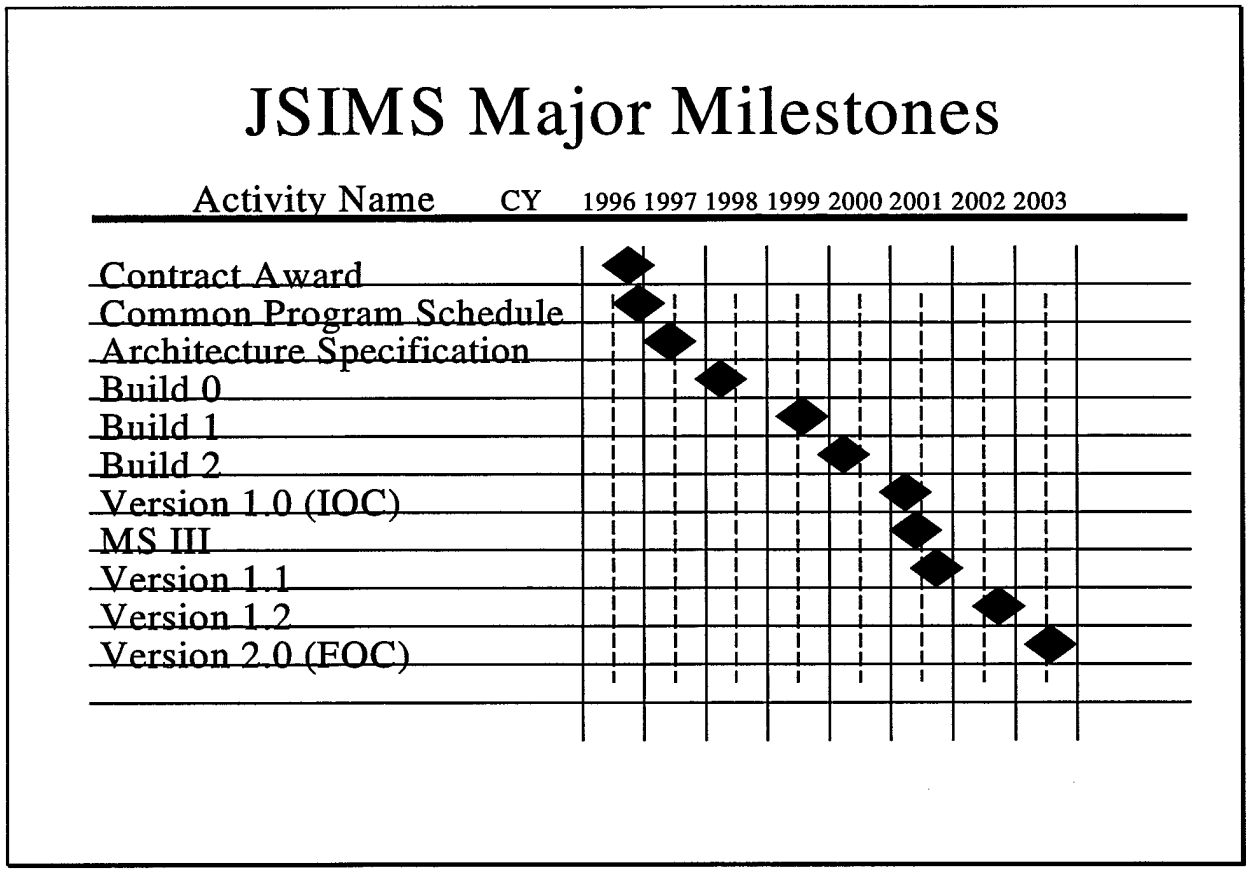
(U) Technical: N/A

C. (U) Other Program Funding Summary (APPN, BLI #, NOMEN)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
(U) PMC, 653200, Training Devices/Simulators	6,501	3297	13848	32165	22339	18302	25466	25320	CONT	CONT

(U) **Related RDT&E:** PE 0603832D, Joint Simulation Management

D. (U) Schedule Profile

JSIMS Schedule



CVAT Schedule:

CVAT MAJOR MILESTONES

	1998	1999	2000	2001	2002	2003
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Acquisition Strategy						
Finalize Procurement Package		♦				
Proposal Evaluation			♦			
MS I Contract Award			♦			
Developmental Testing				♦		
Operational Capability Demo				♦		
Mileston II/III Decision				♦		
MS III Contract Award				♦		
First Article Test					♦	
First Article Delivery					♦	
IOC					♦	
FOC						♦

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0206313M Marine Corps Communications Systems PROJECT C2315

A. (U) Project Cost Breakdown

	FY 1998	FY 1999	FY 2000
Subtotal Product Development	6915	8901	8531
Subtotal Support and Management	288	169	119
Subtotal Test and Evaluation	0	298	200
Total	7203	9368	8850

B. Budget Acquisition History and Planning Information

Performing Organizations

Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Product Development Organizations										
VISICOM, Labs Inc. San Diego, CA	RCP	NOV 97				3447	4373	2984	CONT	CONT
STRICOM Orlando, FL	RCP	NOV 98	1000	1000		0	1000	0	0	1000
TBD, MARCOR SYSCOM	RCP	DEC 99				0	0	3500	0	2700
NRaD, San Diego, CA	WR	DEC 97				1196	600	400	CONT	CONT
CECOM, Ft. Monmouth, NJ	MIPR	NOV 97				1375	528	528	CONT	CONT
Naval Air Warfare Center, Orlando, FL	RCP	DEC 97	680	680		279	401	0	0	1029
Naval Air Warfare Center Orlando FL	RCP	NOV 97	760	760		380	380	0	0	760

MCIA Quantico, VA	WR	NOV 97				238	119	119	CONT	CONT
CCR Quantico, VA	RCP	JAN 99	2500	2500		0	1500	1000	0	2500
Support and Management Organizations										
Naval Air Warfare Center, Orlando, FL	WR	NOV 97	100	100		50	50	0	0	100
Naval Surface Warfare Center Indian Head, MD	RCP	NOV 97				238	119	119	CONT	CONT
Test and Evaluation Organizations										
MCOTEA Quantico, VA	RCP	NOV 98				0	298	200	CONT	CONT

Government Furnished Property

Item Description	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Product Development Property									
Support and Management Property									
Test and Evaluation Property									

	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Subtotal Product Development		6915	8901	8531	CONT	CONT
Subtotal Support and Management		288	169	119	CONT	CONT
Subtotal Test and Evaluation		0	298	200	CONT	CONT
Total Project		7203	9368	8850	CONT	CONT

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0206313M Marine Corps Communications Systems PROJECT C2510

COST *(In Millions)*	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C2510 MAGTF CSSE & SE	0	0	1141	1083	689	541	260	260	Continuing	Continuing
Quantity of RDT&E Articles										

A. (U) Mission Description and Budget Item Justification:

(U) The MAGTF Combat Service Support Element & Supporting Establishment (CSSE & SE) consists of mutually supporting Logistics Information Technology (IT) programs that support force deployment, planning, and execution; sustainment and distribution; and contribute to the CINC's Common Operating Picture (COP) to support rapid accurate decision making.

1. The ATLASS capability represents a deployable capability that will be used in the tactical deployed areas of the Marine Corps, as well as in garrison. The ATLASS PIP program funds the improvement of the fielded ATLASS II+ system as well as the migration of base and station (non-deployable) USMC intermediate and consumer level supply and maintenance systems from a mainframe environment into a personal computer application using a networked client server architecture. The ATLASS PIP consolidated the total force intermediate and consumer level supply and maintenance information management functions into a single material management system. ATLASS PIP enhances ATLASS II+, retires existing mainframe legacy applications in use by the bases and stations, and expands the client-server based supply maintenance and material readiness Automated Information System (AIS) ATLASS II+ to them. ATLASS PIP retains the flexibility to exploit existing commercial and government off-the-shelf software. This system remains compliant with the MAGTF C4I concept, GCCS COE, and published DOD standards for open systems architecture.
2. TC-AIMS II is a Joint transportation and deployment Automated Information System (AIS) supporting the DOD mission areas of mobility and sustainment. It will replace two of our MAGTF LOG AIS applications over a parallel transitin starting in FY00. TC-AIMS II will be used by Command Elements, Traffic Management Offices (TMO), and all operating forces deploying units to automate the processes of planning, organizing, corrdinating, and controlling deployment, redeployment, and sustainment activities worlwide, in peace as well as during contingencies. It provides a modernized, scaleable, integrated, and easily deployable AIS that supports reengineered deployment and business processes throughout DOD. TC-AIMS II is the key enabler towards Force Deployment Planning and Execution. It is the source system for In-Transit-Visibility (ITV) data, which procides CINCs and Components with critical visibility of items in the transportation pipeline. TC-AIMS II links all DOD Component unit movement and Installation Transportraion Office/Traffic Management Office (ITO/TMO) functionality into s single transportation mangagement system. It is a Joint ACAT 1A(M) program, with the USMC portion being handled as an ACAT III.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0206313M Marine Corps Communications Systems PROJECT C2510

(U) FY 1998 Accomplishments:

• (U) $	0	N/A
(U)Total $	0	

(U) FY 1999 Planned Program:

• (U) $	0	N/A
(U)Total $	0	

(U) FY 2000 Planned Program:

• (U) $	792	ATLASS PIP: Commence design and development activity of ATLASS PIPs
• (U) $	205	ATLASS PIP: Evaluate and Integrate existing software and hardware modules and technology
• (U) $	50	ATLASS PIP: Commence development of implementation and support plans
• (U) $	50	TC-AIMS II: Exploration and development of Integration Plans with Air/Ship/Rail Load Planning and Joint Planning & Execution Tools, leveraging data warehousing and operational data stores initiatives.
• (U) $	44	TC-AIMS II: Evaluate existing software modules, technology, and AIT enablers related to Sea Based Logistics and MPT-E requirements.
(U)Total $	1,141	

B. (U) Project Change Summary

	FY 1998	FY 1999	FY 2000
(U) Previous President's Budget	0	0	0
(U) Adjustments to Previous President's Budget	0	0	1141
(U) Current Budget Submit	0	0	1141

(U) Change Summary Explanation:

(U) Funding: FY00 adjustment is due to prioritization of programs within the Marine Corps.

(U) Schedule: N/A

(U) Technical: N/A

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206313M Marine Corps Communications Systems

PROJECT: C2510

C. (U) Other Program Funding Summary (APPN, BLI #, NOMEN)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
(U) PMC Line (BLI#463500) ATLASS II+	3745	10552	3489	7228	0	0	0	0	CONT	CONT
(U) PMC Line (BLI#464100) ATLASS II+	0	0	0	0	2568	1181	390	485	CONT	CONT
(U) PMC Line (BLI#464100) TC-AIMS II	0	0	4518	4609	4066	0	0	0	CONT	CONT

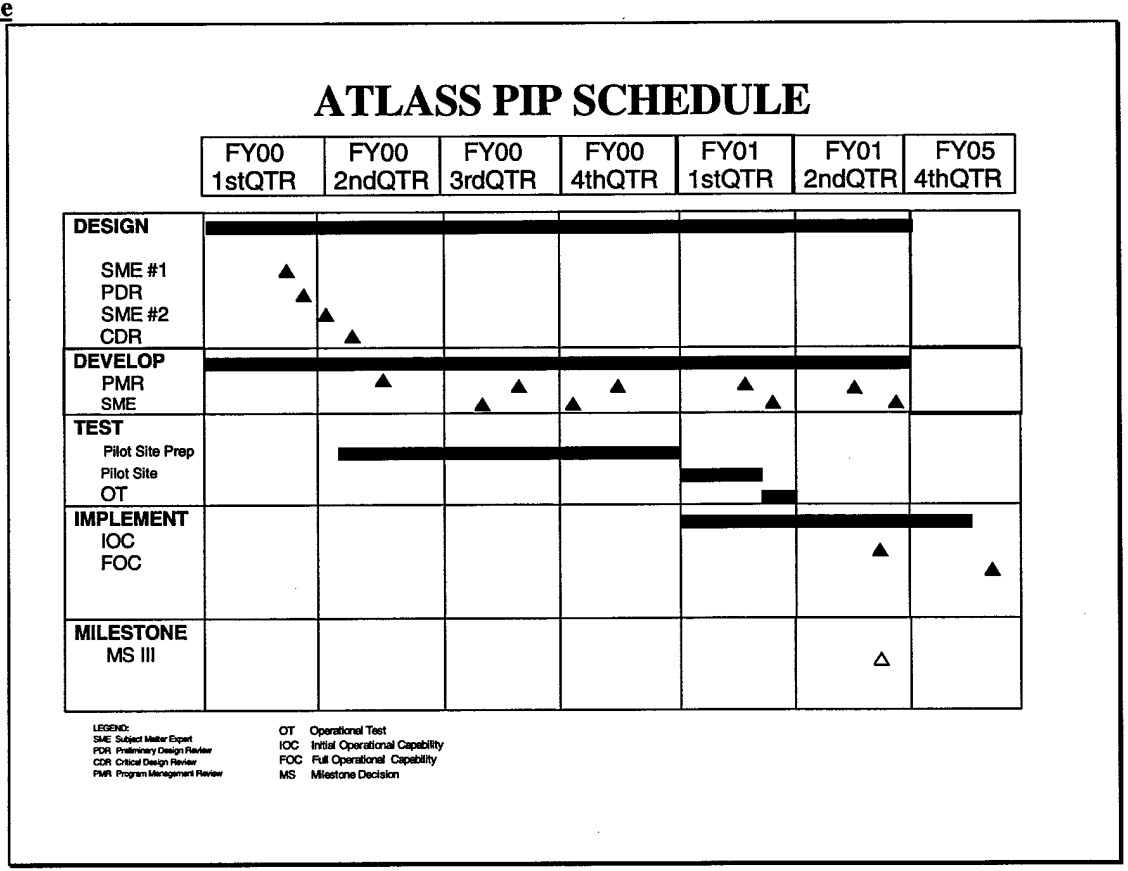
(U) Related RDT&E

None

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0206313M Marine Corps Communications Systems PROJECT C2510

D. (U) **Schedule Profile**

Atlass PIP Schedule:

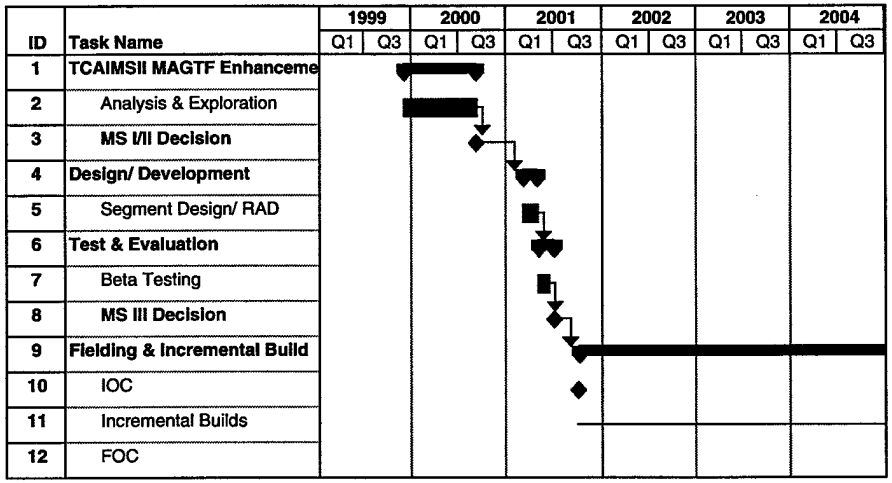


RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0206313M Marine Corps Communications Systems PROJECT C2510

TC-AIMS II Schedule:

TC-AIMS II

MAGTF R&D Enhancements



ID	Task Name	1999 Q1	1999 Q3	2000 Q1	2000 Q3	2001 Q1	2001 Q3	2002 Q1	2002 Q3	2003 Q1	2003 Q3	2004 Q1	2004 Q3
1	**TCAIMSII MAGTF Enhanceme**												
2	Analysis & Exploration												
3	**MS I/II Decision**												
4	**Design/ Development**												
5	Segment Design/ RAD												
6	**Test & Evaluation**												
7	Beta Testing												
8	**MS III Decision**												
9	**Fielding & Incremental Build**												
10	IOC												
11	Incremental Builds												
12	FOC												

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206313M Marine Corps Communications Systems

PROJECT: C2510

A. (U) Project Cost Breakdown

	FY 1998	FY 1999	FY 2000
Product Development	0	0	779
Support and Management	0	0	101
Test and Evaluation	0	0	261
Total	0	0	1141

B. Budget Acquisition History and Planning Information

Performing Organizations

Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Product Development Organizations										
ATLASS PIP:										
SSC Chesapeake	MIPR	Jan 00	1665	1665	0	0	0	685	970	1665
TC-AIMS II:										
US Army (PEOSTAMIS) (GTE, BBN)	FFP/O	Jan 00						94	CONT	CONT
Support and Management Organizations										
ATLASS PIP:										
Logicon	Spt/Svcs	Jan 00	151	151	0	0	0	101	50	151
TC-AIMS II:										
US Army, PEOSTAMIS (GTE, BBN)	FFP/O	Jan 00	50	50	0	0	0	0	50	50
Test and Evaluation Organizations										
ATLASS PIP:										
SSC Charleston	MIPR	Jan 00	383	383	0	0	0	261	122	383

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206313M Marine Corps Communications Systems

PROJECT: C2510

TC-AIMS II:
MarCorSysCom, Quantico, VA (Logicon, MITRE) FFP/O Jan 00 — CONT CONT

	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Subtotal Product Development				779	CONT	CONT
Subtotal Support and Management				101	0	201
Subtotal Test and Evaluation				261	CONT	CONT
Total Project				1141	CONT	CONT

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE: February 1999

BUDGET ACTIVITY: **7 - Operational System Development**

PE NUMBER AND TITLE: **0206623M Marine Corps Ground Combat/Supporting Arms Systems**

COST *(In Millions)*	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	12744	18185	39941	35487	20911	10647	9764	10030	Continuing	Continuing
C0021 Assault Amphibious Vehicle 7A1 (AAV7A1)	297	216	398	409	361	372	382	394	Continuing	Continuing
C1555 Light Armored Vehicle (LAV) PIP	1744	1548	11706	12556	6286	1342	1373	1411	Continuing	Continuing
C1901 Marine Corps Ground Weaponry PIP	6251	7462	24488	18695	9579	4507	3142	3290	Continuing	Continuing
C2086 Marine Enhancement Program	1684	3009	1484	1672	2639	2564	2906	2946	Continuing	Continuing
C2237 Amphibious Vehicle Test Branch	1524	1960	643	723	731	746	821	826	Continuing	Continuing
C2317 ASCIET	1154	0	0	0	0	0	0	0	0	0
C2503 Initial Issue	0	0	1222	1432	1315	1116	1140	1163	Continuing	Continuing
C2666 Automatic Target Tracker (ATT)	0	1995	0	0	0	0	0	0	0	1995
C2667 Shortstop Electronic Protection System (SEPS)	0	1995	0	0	0	0	0	0	0	1995
Quantity of RDT&E Articles										

(U) **Mission Description and Budget Item Justification:** This PE provides modification to Marine Corps Expeditionary Ground Force Weapon Systems to increase lethality, range survivability and operational effectiveness. It also provides for the development of AAV7A1 reliability, maintainability, operational and safety modifications , improvements in command and control in the ADMS, product improvements to the family of LAV's and the development effort for the LAV-AD variant. 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 OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing and manufacturing development for upgrade of existing operational systems.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206623M Marine Corps Ground Combat/Supporting Arms Systems

PROJECT: C0021

COST *(In Millions)*	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C0021 Assault Amphibious Vehicle 7A1 (AAV7A1)	297	216	398	409	361	372	382	394	Continuing	Continuing
Quantity of RDT&E Articles										

A. (U) Mission Description and Budget Item Justification:

(U) The AAV7A1 RDT&E program provides for the development, test and preparation of Engineering Change Proposals (ECPs) to improve the performance, reliability, maintainability and safety of the AAV7A1 Family of Vehicles (FOV). This program also allows for the development of installation kits for the integration of communications and navigation equipment developed for integration into the AAV7A1 FOV.

(U) FY 1998 Accomplishments:

- (U) $ 140 Engineering Support for various ECP developments to include integration of communications and navigation improvements to AAV7A1
- (U) $ 157 Travel in support of RAM/RS

(U)Total $ 297

(U) FY 1999 Planned Program:

- (U) $ 214 Continuing providing engineering support for integration of communications and navigation improvements to AAV7A1.
- (U) $ 2 Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

(U)Total $ 216

(U) FY 2000 Planned Program:

- (U) $ 398 Complete providing engineering support for integration of communications and navigation improvements to AAV7A1

(U)Total $ 398

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206623M Marine Corps Ground Combat/Supporting Arms Systems

PROJECT: C0021

B. (U) Project Change Summary

	FY 1998	FY 1999	FY 2000
(U) Previous President's Budget	331	273	396
(U) Adjustments to Previous President's Budget	-34	-57	+2
(U) Current Budget Submit	297	216	398

(U) Change Summary Explanation:

(U) Funding: Decrease of 34K in FY98 due to 9K SBIR tax and 25K transfer to MCOTEA to support AAV RAM/RS testing. Adjustments in FY99, and FY00 are due to revised economic and general adjustments.

(U) Schedule: N/A

(U) Technical: N/A

C. (U) Other Program Funding Summary (APPN, BLI #, NOMEN)

	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
(U) PMC, 202100, AAV PIP	13,684	89,553	80,714	78,439	68,487	1,555	1,499	1,566	Cont.	Cont.

(U) Related RDT&E: PE 0603611M (Marine Corps Assault Vehicles)

D. (U) Schedule Profile: N/A

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206623M Marine Corps Ground Combat/Supporting Arms Systems

PROJECT: C1555

COST *(In Millions)*	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C1555 Light Armored Vehicle (LAV) PIP	1744	1548	11706	12556	6286	1342	1373	1411	Continuing	Continuing
Quantity of RDT&E Articles			17							

(U) **Mission Description and Budget Item Justification:** The Light Armored Vehicle Family of Vehicles (LAV FOV) consists of seven fielded LAV configurations, and one communications/intelligence-configured asset on an LAV chassis (Mobile Electronic Warfare Support System). Collectively, the LAV FOV provides a logistically self-contained, highly mobile, and lethal combined arms combat system to the Marine Air-Ground Task Force (MAGTF). These efforts will include, but not be limited to: a Service Life Extension Program (SLEP) which will ensure the LAV FOV will be capable of conducting its assigned missions by enhancing lethality and survivability, minimizing LAV operations and support costs, maximizing reliability, availability, maintainability, and durability; and ensuring high levels of fleet readiness; an Enhanced Fire Support Platform (EFSP) which will address current LAV FOV deficiencies by enhancing the capabilities of the existing LAV Mortar variant by investing in a new mortar system capable of extended range, greater lethality, and reduced call-for-fire response time; as well as improvements to the LAV Command and Control (C2) capabilities which will enhance overall Light Armored Reconnaisance (LAR) Battalion and MAGTF command and control capabilities by investing in C4I systems that will enhance communications, interoperability, and interconnectivity with the LAR Battalions and within other USMC C4I systems.

(U) FY 1998 Accomplishments:

- (U) $ 513 Continued development, testing, and evaluation of urgent LAV reliability, availability, maintainability, durability (RAM-D), and readiness enhancements.
- (U) $ 1231 Continued study and development of LAV Service Life Extension Program, including analysis of alternative modifications and upgrades.

(U)Total $ 1744

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0206623M Marine Corps Ground Combat/Supporting Arms Systems PROJECT C1555

(U) FY 1999 Planned Program:

• (U) $	460	Complete development, testing and evaluation of urgent LAV RAM-D and readiness enhancements.
• (U) $	1076	Continued study, development, and analysis of existing and other technological solutions; commence developmental and operational test planning for the LAV Service Life Extension Program.
• (U) $	12	Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.
(U)Total $	1548	

(U) FY 2000 Planned Program:

• (U) $	4287	Development of 9 LAV SLEP operational system prototypes for developmental & operational test and evaluation of SLEP modifications.
• (U) $	2080	Continue study, analysis, and development of existing and other alternative technological solutions for the LAV Service Life Extension Program.
• (U) $	508	Continue and complete developmental and operational test planning for the LAV Service Life Extension Program Test Planning
• (U) $	1500	Conduct research and development of command and control technology and possible upgrades under the PIP concept.
• (U) $	2949	Conduct design and engineering addressing use of current 120 technology as it would apply to fire control enhancement under the PIP concept.
• (U) $	382	Incorporate elements of fire control enhancements into LAV PIP masterplan.
(U)Total $	11706	

B. (U) Project Change Summary

	FY 1998	FY 1999	FY 2000
(U) Previous President's Budget	1768	1626	2687
(U) Adjustments to Previous President's Budget	-24	-78	9019
(U) Current Budget Submit	1744	1548	11706

(U) Change Summary Explanation:

(U) Funding: FY 98 and FY 99 changes are due to revised economic and general adjustments. FY 2000 increase reflects upgrades such as the LAV Service Life Extension Program.

(U) Schedule: Not Applicable.

(U) Technical: Not Applicable.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE: February 1999

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
7 - Operational System Development	0206623M Marine Corps Ground Combat/Supporting Arms Systems	C1555

C. (U) **Other Program Funding Summary** (APPN, BLI #, NOMEN)

	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
(U) PMC, 203800, LAV PIP	586	1380	1706	1734	75007	107406	122011	119604	CONT	CONT
(U) PMC, 203900, LAV (LAV AIR DEFENSE)	6541	0	0	0	0	0	0	0	0	6541

(U) **Related RDT&E:** Not applicable

D. (U) **Schedule Profile**

LAV SLEP

Milestone 0:	1st Qtr, FY 1998	Milestone III:	2nd Qtr, FY 2002
Milestone I:	2nd Qtr, FY 1999	Contract Award:	2nd Qtr, FY 2002
Milestone II:	1st Qtr, FY 2000	IOC:	4th Qtr, FY 2003
DT / OT:	1st Qtr, FY 2001	FOC:	1st Qtr, FY 2007

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206623M Marine Corps Ground Combat/Supporting Arms Systems

PROJECT: C1555

A. (U) Project Cost Breakdown

	FY 1998	FY 1999	FY 2000
Product Development	1115	779	9749
Support Costs and Management	524	555	1167
Test and Evaluation	105	214	790
Total	1744	1548	11706

B. Budget Acquisition History and Planning Information

Performing Organizations

Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Product Development Organizations										
Dies Div, GM	C/FF	Dec 97	915	915	312	303	300	0	0	915
In-house Product Development	WR	1st Qtr			0	512	448	1252	Continue	Continue
Other	Various	Various			9380	300	31	7947	Continue	Continue
Support and Management Organizations										
In-house Support	WR	1st Qtr			22722	524	555	1167	Continue	Continue
Test and Evaluation Organizations										
Other (LAV Test Dir/YumaPrvGrd)	WR	Various			4337	105	214	790	Continue	Continue

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206623M Marine Corps Ground Combat/Supporting Arms Systems

PROJECT: C1555

Government Furnished Property

Item Description	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Product Development Property									
Not Applicable									
Support and Management Property									
Not Applicable									
Test and Evaluation Property									
Not Applicable									

	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Subtotal Product Development	9692	1115	779	9749	Continue	Continue
Subtotal Support and Management	22722	524	555	1167	Continue	Continue
Subtotal Test and Evaluation	4337	105	214	790	Continue	Continue
Total Project	36751	1744	1548	11706	Continue	Continue

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE: February 1999

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
7 - Operational System Development	0206623M Marine Corps Ground Combat/Supporting Arms Systems	C1901

COST *(In Millions)*	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C1901 Marine Corps Ground Weaponry PIP	6251	7462	24488	18695	9579	4507	3142	3290	Continuing	Continuing
Quantity of RDT&E Articles										

A. (U) Mission Description and Budget Item Justification:

(U) This Project develops joint and Marine Corps unique improvements to infantry weapons and artillery technology, USMC unique Amphibious Armor Systems (AAS), improvements for the M1A1 Main Battle Tank and support systems, USMC Family of Small Craft, Night Vision Equipment and monitors national and international weapons developments.

(U) FY 1998 Accomplishments:

- (U) $ 229 Armored Vehicle Driver's Viewer Enhancer (AVDVE): Continued integrated logistics documentation and testing for the Light Armored Vehicle (LAV) /Assault Amphibious Vehicle (AAV) procurement of the AVDVE for all Marine Corps vehicles.
- (U) $ 160 M1A1 Armor Mods: Continued joint evaluation of modifications of amphibious armor including Component Enhancements, Advanced Fire Control Systems, survivability systems, M88 Tank Retriever and AVLB upgrades, combat identification and others.
- (U) $ 1795 Target Location Designator Hand-off System (TLDHS): Continued participation in Joint-Service, U.S. Army-led EMD development of the Lightweight Laser Designator Rangefinder (LLDR) to include system design, subsystem fabrication and integration and user evaluations. Continued to define, design and develop TLDHS-specific software application and integration with the Marine Corps Data Automated Communication Terminal (DACT) and Rugged Hand-held Computer (RHC).
- (U) $ 469 Fire Support Mods: Continued joint participation in artillery and fire support improvement projects. Specifically, continued joint sustainment of the M198 Howitzer, to include research, development and field user evaluations of the Hydraulic Assist Kit Package and Elimination of Radioactive Light Sources (ERLS) collimeter. Continued unilateral development of USMC-unique ballistics software for the Mortar Ballistic Computer (MBC) to include initial software definition and design. Initiated Marine Corps participation in Joint-Service, U.S. Army-led development of Firefinder Radar Position Analysis System software. Monitored U.S. Army development and executed USMC-unique cost analyses of the Gun Laying and Positioning System (GLPS) and Family of Artillery Munitions.
- (U) $ 352 Mortar Ballistic Computer (MBC): Continued unilateral development of USMC-unique ballistics software for the Mortar Ballistic Computer.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0206623M Marine Corps Ground Combat/Supporting Arms Systems
	PROJECT C1901

•	(U) $	595	Infantry Mods: Continued joint participation and Marine Corps unique activities for evaluation of safety, lethality, and technology improvements for Marine Corps infantry/reconnaissance individual weapons, crew served weapons, and night vision devices. Pursue improvements in accuracy, reliability, and maintainability of the current service rifle, special operations weapons, and crew served weapons.
•	(U) $	268	Thermal Weapons Sight (TWS)[AN/PAS-13]: Continued joint participation and Marine Corps unique activities for the testing and evaluation of TWS.
•	(U) $	78	Family of Small Craft: Provided Fault Analysis and Fault Isolation (FAFI) for the Riverine Assault Craft (RAC) and the Rigid Raiding Craft (RRC) and associated equipment at Marine Corps Programs Department (MCPD), Fallbrook, CA.
•	(U) $	2105	AN/VVR-1 Laser Warning Receiver: Developed an installation kit for the AN/VVR-1 laser warning receiver and an integrated target Identification capability for the M1A1 tank.
•	(U) $	200	Marine Corps Portion of Joint Ammunition Management Standard System.
	(U)Total $	6,251	

(U) FY 1999 Planned Program:

•	(U) $	236	Armored Vehicle Driver's Viewer Enhancer (AVDVE): Complete integrated logistics documentation and testing for the LAV/AAV procurement of the Armored Vehicle Driver's Viewer Enhancer for all USMC vehicles.
•	(U) $	253	M1A1 Armor Mods: Continue joint evaluation of modifications of amphibious armor including Component Enhancements, Advanced Fire Control Systems, survivability systems, M88 and AVLB upgrades, combat identification and others.
•	(U) $	3531	Target Location Designator Hand-off System (TLDHS): Continue participation in the joint-Service, U.S. Army-led EMD development of the LLDR hardware and software, and continue to develop TLDHS-specific software application. Continue integration of LLDR with the DACT, C2PC, and the Marine Air-Ground Task Force (MAGTF) C4I architecture. Participate in the LLDR IOT&E and demonstrate limited interoperability with artillery agencies (AFATDS) and close-air-support platforms (F-18 and AV-8B).
•	(U) $	861	Fire Support Mods: Continue joint participation in artillery and fire support improvement projects. Specifically, continue joint sustainment of the M198 Howitzer, to include development of an improved Suspension Kit and user evaluations of the Elimination of Radioactive Light Sources (ERLS) collimeter. Continue joint software modeling, design and field user evaluations of the Firefinder Radar Position Analysis System. Conduct technical, operational and cost analysis of Family of Artillery Munitions. Provide support to the Marine Corps Warfighting Lab for the development, evaluation and rapid transition of fire support initiatives.
•	(U) $	75	Mortar Ballistic Computer (MBC): Continue unilateral development of USMC-unique ballistics software for the Mortar Ballistic Computer.
•	(U) $	600	Mortar Ballistic Computer (MBC): Forward Financed efforts within this project for FY00 to continue EMD phase.
•	(U) $	1141	Infantry Wpns Mods: Continued joint participation and Marine Corps unique activities for evaluation of safety, lethality, and technology improvements for Marine Corps infantry/reconnaissance individual and crew served weapons. Pursue solutions to integrate weapons systems with existing and planned night vision and sighting technologies including revisions of mounts and interfaces. Begin weapon system ingetration into the Integrated Infantry Combat System (IICS) to enhance the efficiency, effectiveness and safety of the Combat System.

• (U) $	613	Thermal Weapons Sight (TWS)[AN/PAS-13]: Joint participation and Marine Corps unique activities for the testing and evaluation of TWS.
• (U) $	91	Family of Small Craft: Provide Fault Analysis and Fault Isolation (FAFI) for the Riverine Assault Craft (RAC) and the Rigid Raiding Craft (RRC) and associated equipment at MCPD, Fallbrook. Engineering support for the Raw Water Cooling System (RWCS) for the RAC.
• (U) $	61	Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.
(U)Total $	7,462	

(U) FY 2000 Planned Program:

• (U) $	261	M1A1 Armor Mods: Continue joint evaluation of modifications of amphibious armor including Component Enhancements, Advanced Fire Control Systems, survivability systems, M88 and AVLB upgrades, combat identification and others.
• (U) $	1903	Target Location Designator Hand-off System (TLDHS): Complete Joint-service, U.S. Army-led EMD development and IOT&E of the LLDR. Complete initial systems integration between the LLDR and the DACT/Command & Control Personal Computer. Continue incremental refinement, coding, evaluation and Independent Verification & Validation (IV&V) of the TLDHS-specific software application to ensure interoperability with emerging Marine Corps tactical C4I architecture and with other fire support platforms and agencies. Conduct FOT&E of artillery (Variable Message Format/Package 11) fire support functionality.
• (U) $	1053	Fire Support Mods: Continue joint participation in artillery and fire support improvement projects. Specifically, continue joint sustainment of the M198 Howitzer. Conduct prelimnary technical, operational and cost analyses of alternative technologies to replace the AN/GVS-5 Laser Infared Observation Set. Provide support to the Marine Corps Warfighting Lab for the development, evaluation and rapid transition of fire support initiatives.
• (U) $	1271	Infantry Wpns Mods: Continued joint participation and Marine Corps unique activities for evaluation of safety, lethality, and technology improvements for Marine Corps infantry/reconnaissance individual and crew served weapons. Pursue solutions to integrate weapons systems with existing and planned night vision and sighting technologies including revisions of mounts and interfaces. Begin weapon system integration into the Integrated Infantry Combat System (IICS) to enhance the efficiency, effectiveness and safety of the Combat System.
• (U) $	112	Thermal Weapons Sight (TWS)[AN/PAS-13]: Continued joint participation and Marine Corps unique activities for testing of the TWS.
• (U) $	623	Family of Small Craft: Provide Fault Analysis and Fault Isolation (FAFI) for the Riverine Assault Craft (RAC) and the Rigid Raiding Craft (RRC) and associated equipment at MCPD, Fallbrook, CA. Engineering support for the Raw Water Cooling System (RWCS) for the RAC.
• (U) $	450	Night Vision Mod Line: Continue joint participation and Marine Corps unique activities for evaluation of safety, lethality and technology improvements for Marine Corps Night Vision Devices. Provides for In Service Engineering Activity (ISEA) at NSWC, Crane, IN. Participate with ARMY PM-Night Vision at Ft Belvoir, VA on new enhancements for I2. Travel/TAD to support enhanced systems development and review of tests.
• (U) $	265	Begin in-depth requirements analysis to establish the types and amounts of future ammunition required by the USMC. Establish active monitoring of US Army artillery ammunition development programs in order to leverage off and influence Army munitions R&D effort. Allow Marine Corps Operational Test and Evaluation Activity participation in all tests to collect/analyze data to support a procurement decision.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206623M Marine Corps Ground Combat/Supporting Arms Systems

PROJECT: C1901

- (U) $ 6000 AVLB Upgrade: Develop NDI integration design for mobility and hydraulic improvements to Armored Vehicle Launched Bridge. Begin fabrication of two upgraded Engineering Development Models (EDMs).
- (U) $ 7200 Improved Recovery Vehicle: Initiate preliminary design of powertrain and weight improvements to M-88 Recovery Vehicle to include NDI alternatives.
- (U) $ 5150 M1A1 Firepower Enhancements: Conduct trade studies to determine most cost effective upgrades to the tank fire control system. Initiate preliminary design of integrated NDI package to include improved thermal sight, automatic target tracker and north-finding/far target location capability. Begin fabrication/testing of prototype integrated system.
- (U) $ 200 Family of Improved Lightweight Mortars: In conjunction with Program manager for Mortars, conduct concept exploration initiatives to determine the feasibility of alternative concepts for the Pointing Device (PD) for the Mortar Fire Control System (Light) (MFCS). The PD provides precise deflection, elevation, and Global Positioning System interface for the MFCS. Will down-select to no more than two alternatives for further development.

(U)Total $ 24488

B. (U) Project Change Summary

	FY 1998	FY 1999	FY 2000
(U) Previous President's Budget	6313	7661	5228
(U) Adjustments to Previous President's Budget	- 62	-199	+19260
(U) Current Budget Submit	6251	7462	24488

(U) Change Summary Explanation:

(U) Funding: Decreases in FY 1998 and FY 1999 are due to revised economic and general adjustments. Increase in FY 2000 is due to the addition of the Family of Small Craft Line, Night Vision Mod Line, Family of Artillery Munition, Armored Vehicle Launched Bridge, Improved Recovery Vehicle, M1A1 Firepower Enhancements, Family of Improved Mortars and revised economic and general adjustments.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206623M Marine Corps Ground Combat/Supporting Arms Systems

PROJECT: C1901

C. (U) Other Program Funding Summary (APPN, BLI #, NOMEN)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
(U) PMC (BLI#206300) Modifications Kits (Tracked Vehicles)	4484	7708	22853	19301	16261	35032	65585	59391	Cont.	Cont.
(U) PMC (BLI#210500) Items Less Than $5 Million (Tracked Vehicles)	1943	97	0	0	0	0	0	0	0	2040
(U) PMC (BLI#220900) Modifications Kits (Arty & Other)	3712	2803	3288	3947	1489	8335	9986	7352	Cont.	Cont.
(U) PMC (BLI#221000) Items Less Than $5 Million (Other)	1653	105	0	0	0	0	0	0	0	1758
(U) PMC (BLI#468300) AN/TPQ-36 Firefinder Radar Upgrades	160	155	0	0	0	0	0	0	0	34355
(U) PMC (BLI#493000) Night Vision Equipment	6842	33586	9032	17761	24948	27888	40078	2267	Cont.	Cont.
(U) PMC (BLI#473300) Fire Support Systems	0	0	0	12519	21678	20388	17319	0	0	71904
(U) PMC (BLI#643400) Amphibious Raid Equipment	0	3714	0	0	0	0	0	0	0	3714
(U) PMC (BLI#233400) Modular Weapon System	0	0	0	16146	0	0	0	0	0	16146
(U) PMC (BLI#222000) Weapons and Combat Vehicles	0	0	323	421	256	308	319	326	Cont.	Cont.
(U) PMC (BLI#462000) Items Less Than $5M (Communications and Electronics)	0	0	10303	8439	6932	10390	9500	5577	Cont.	Cont.
(U) PMC (BLI#667000) Items Less Than $5M	0	0	9102	5671	9003	8220	8431	6351	Cont.	Cont.

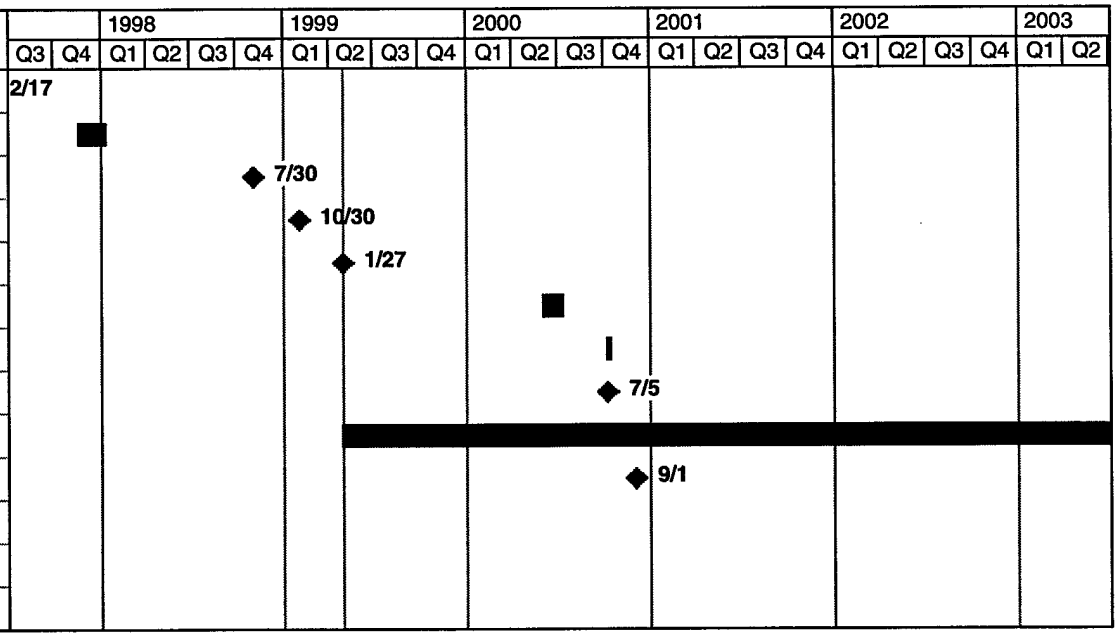
(U) Related RDT&E

(U) All Ground Weapons and Ground Ammunition Systems: Army, Navy, Air Force, Coast Guard, and Special Operations Command.

D. (U) Schedule Profile:

AVDVE

ID	Task Name
1	MS-III
2	USMC IOT&E
3	PRODUCTION CONTRACT AWARD (CECOM)
4	USMC LIMITED PROCUREMENT MCPDM
5	OBLIGATE USMC FY-99 BUY (236)
6	USMC FOT&E
7	OT REPORT
8	USMC FULL PROCUREMENT MCPDM
9	PRODUCTION/FIELDING
10	IOC
11	FOC



RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE: February 1999

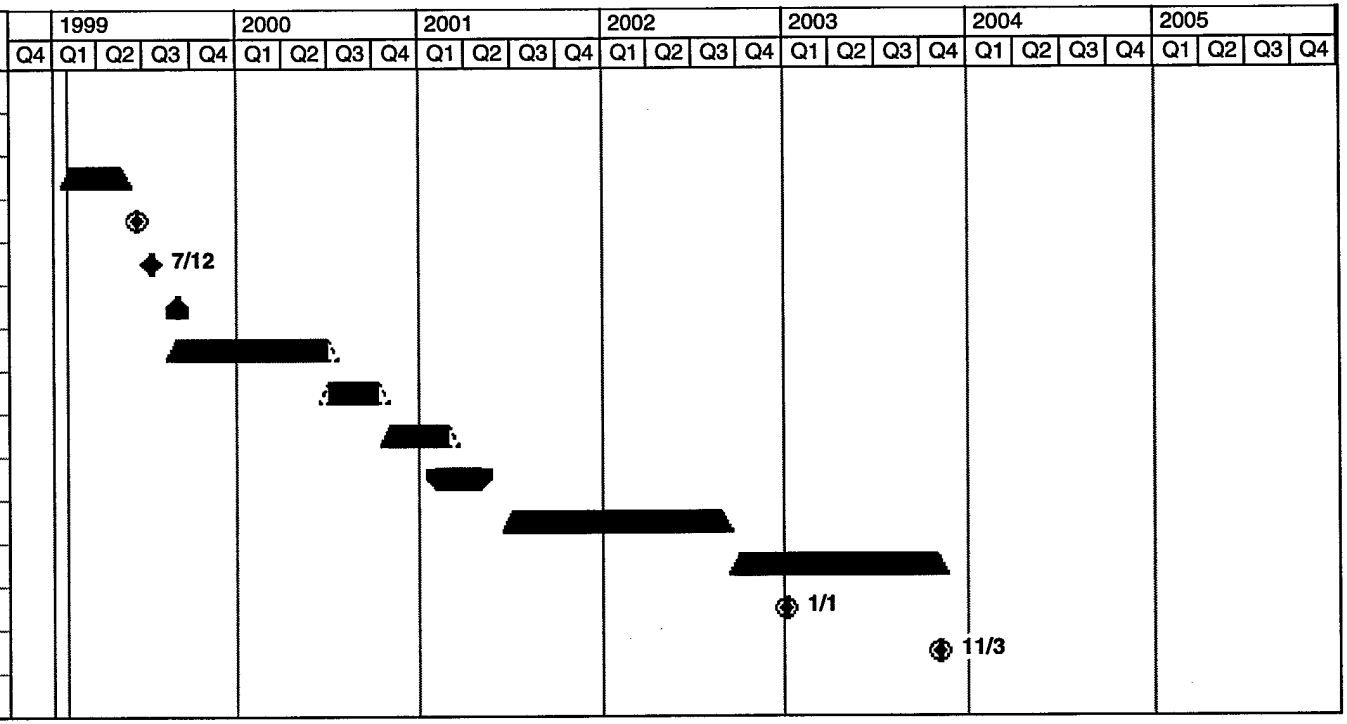
BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206623M Marine Corps Ground Combat/Supporting Arms Systems

PROJECT: C1901

MORTAR BALLISTIC COMPUTER (MBC)

Task Name	Finish
MNS	Tue 10/5/93
MS 0	Mon 5/23/94
RAA Study	Fri 5/14/99
ORD CH 1	Tue 6/15/99
MS I/III	Mon 7/12/99
Contract Award	Wed 9/1/99
S/W Conversion	Fri 6/30/00
DT	Fri 10/13/00
H/W Porting	Thu 3/1/01
OT	Tue 5/1/01
S/W - H/W INTEGRATION	Fri 8/30/02
PRODUCTION	Fri 10/31/03
IOC	Wed 1/1/03
FOC	Mon 11/3/03



RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

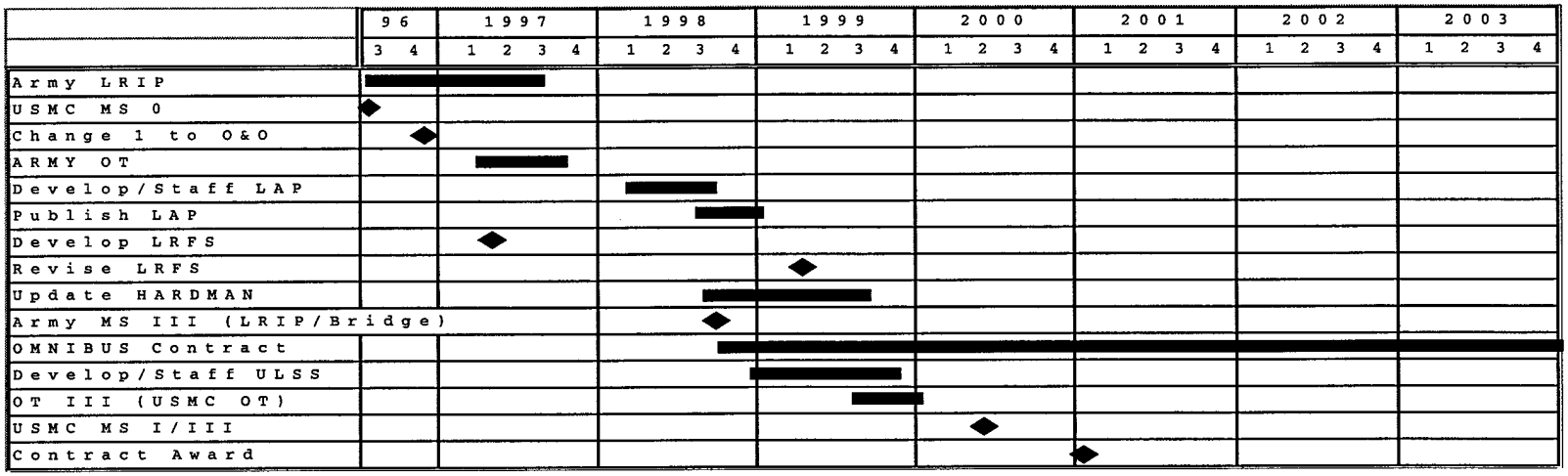
DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206623M Marine Corps Ground Combat/Supporting Arms Systems

PROJECT: C1901

THERMAL WEAPONS SIGHT



RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

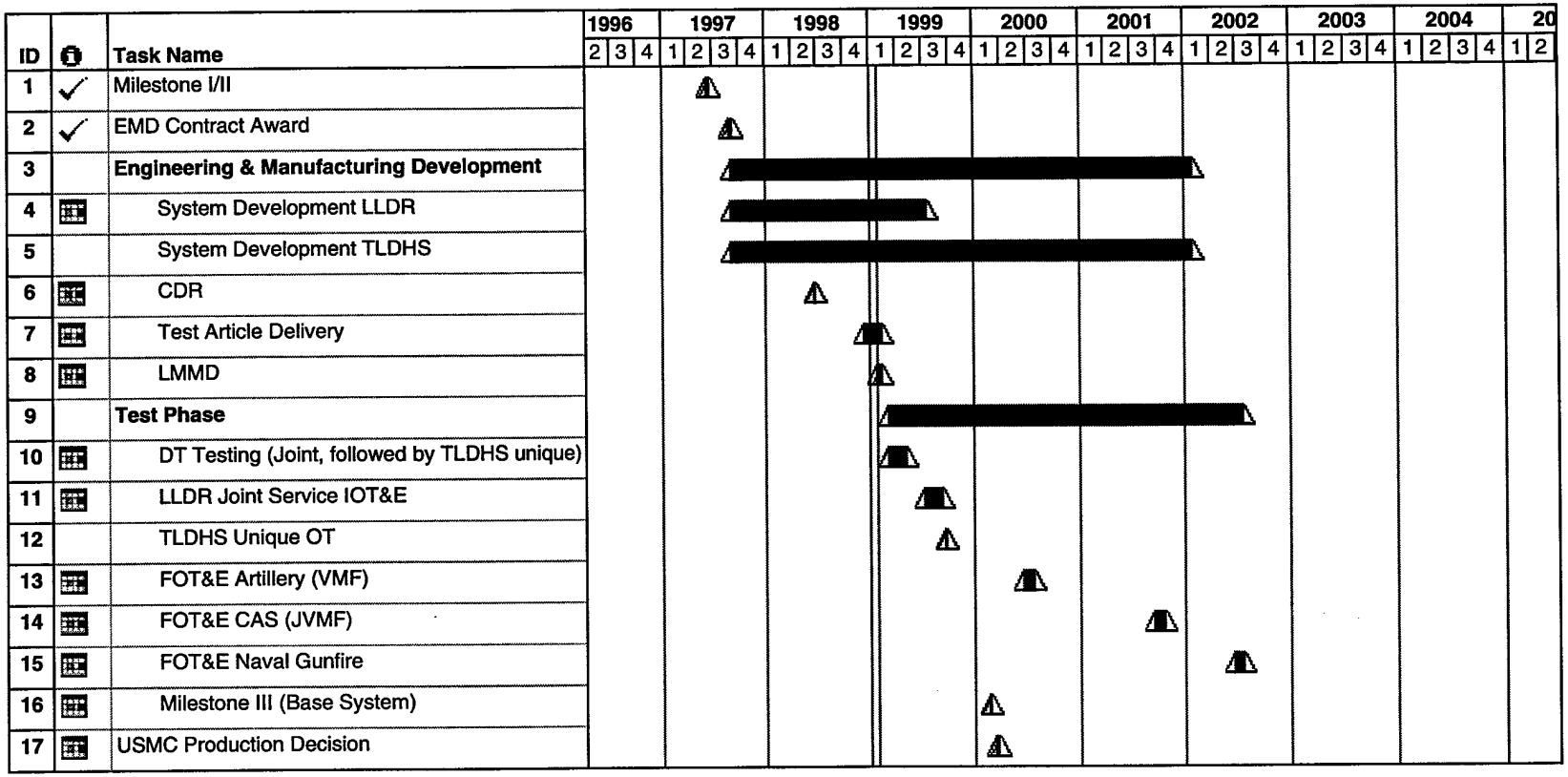
DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206623M Marine Corps Ground Combat/Supporting Arms Systems

PROJECT: C1901

TLDHS



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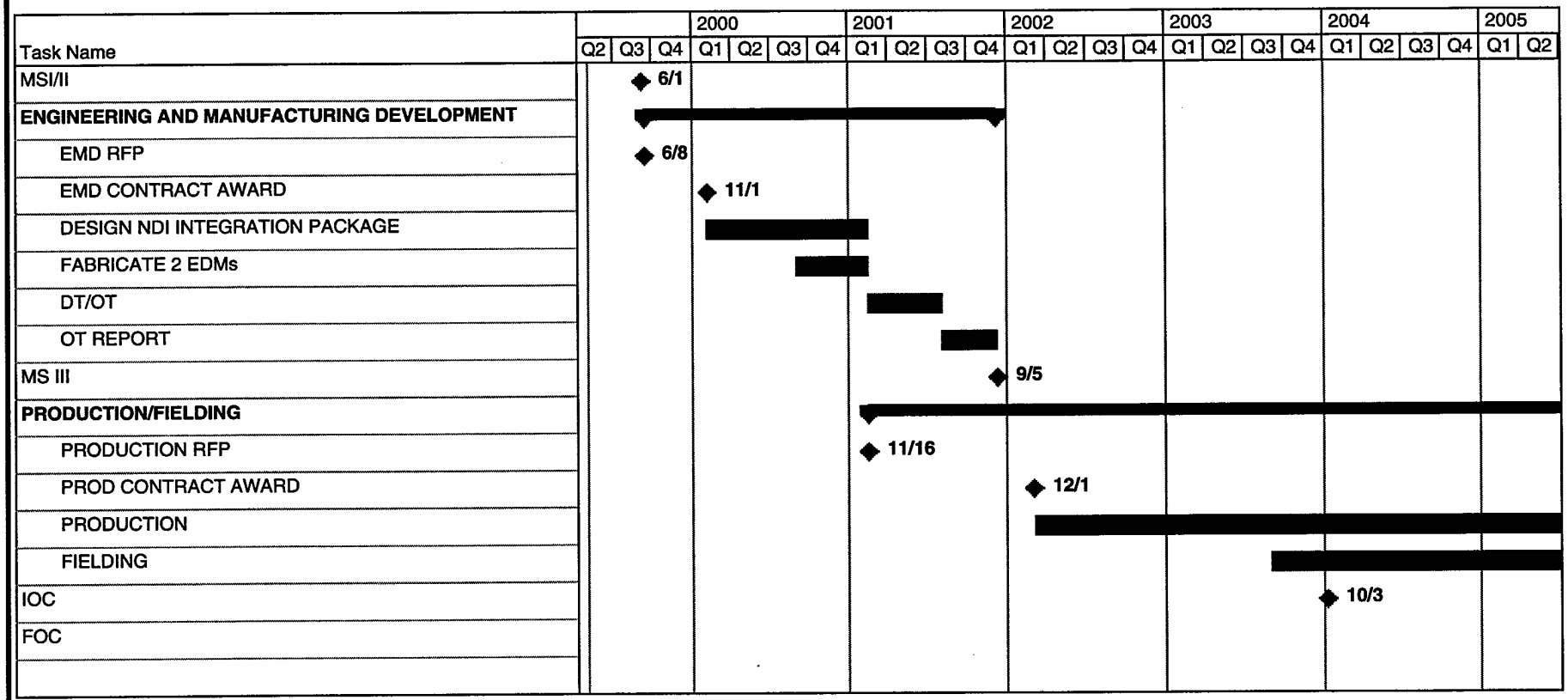
BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206623M Marine Corps Ground Combat/Supporting Arms Systems

PROJECT: C1901

AVLB



RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE: February 1999

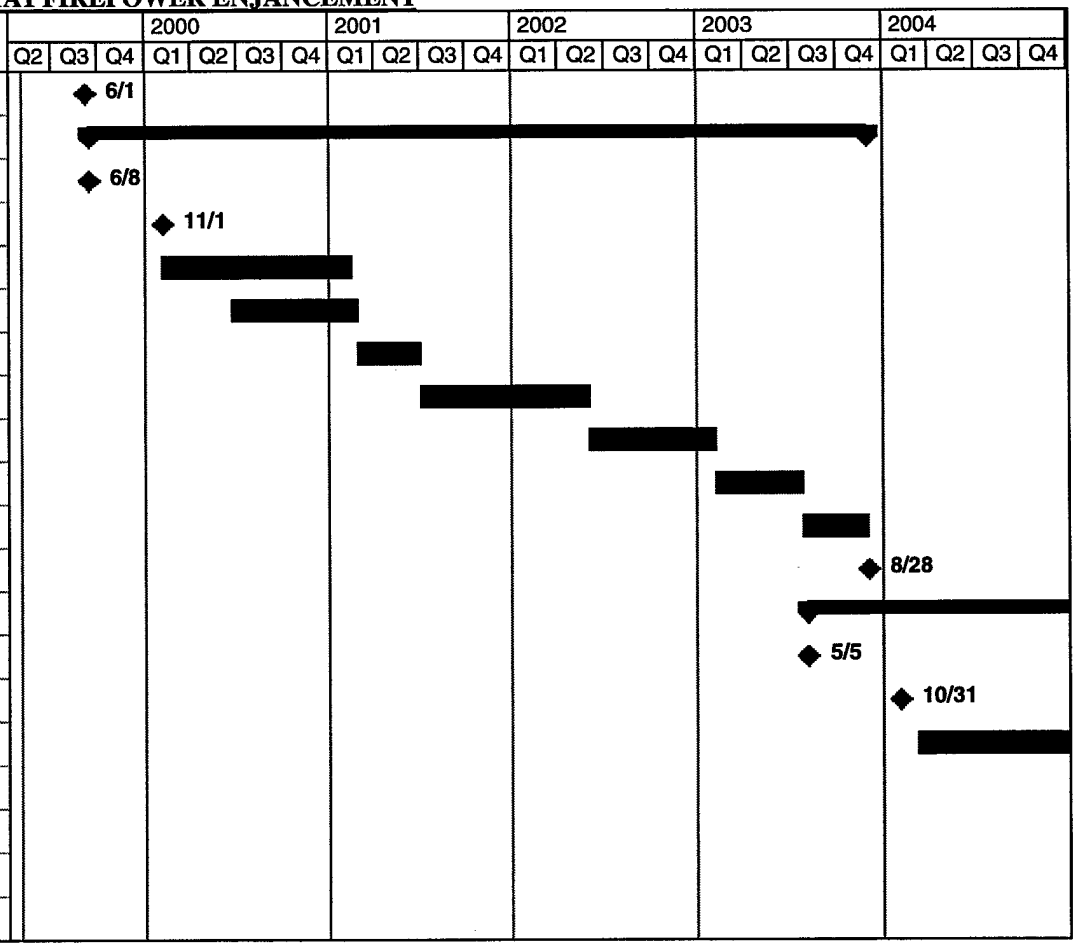
BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206623M Marine Corps Ground Combat/Supporting Arms Systems

PROJECT: C1901

M1A1 FIREPOWER ENJANCEMENT

ID	Task Name
1	MSI/II
2	**ENGINEERING AND MANUFACTURING DEVELOPMENT**
3	EMD RFP
4	EMD CONTRACT AWARD
5	PRELIMINARY DESIGN
6	FABRICATE PROTOTYPES
7	PROTOTYPE TESTING
8	FINAL DESIGN
9	FABRICATE EDMs
10	DT/OT
11	OT REPORT
12	MS III
13	**PRODUCTION/FIELDING**
14	PRODUCTION RFP
15	PROD CONTRACT AWARD
16	PRODUCTION
17	FIELDING
18	IOC
19	FOC



RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

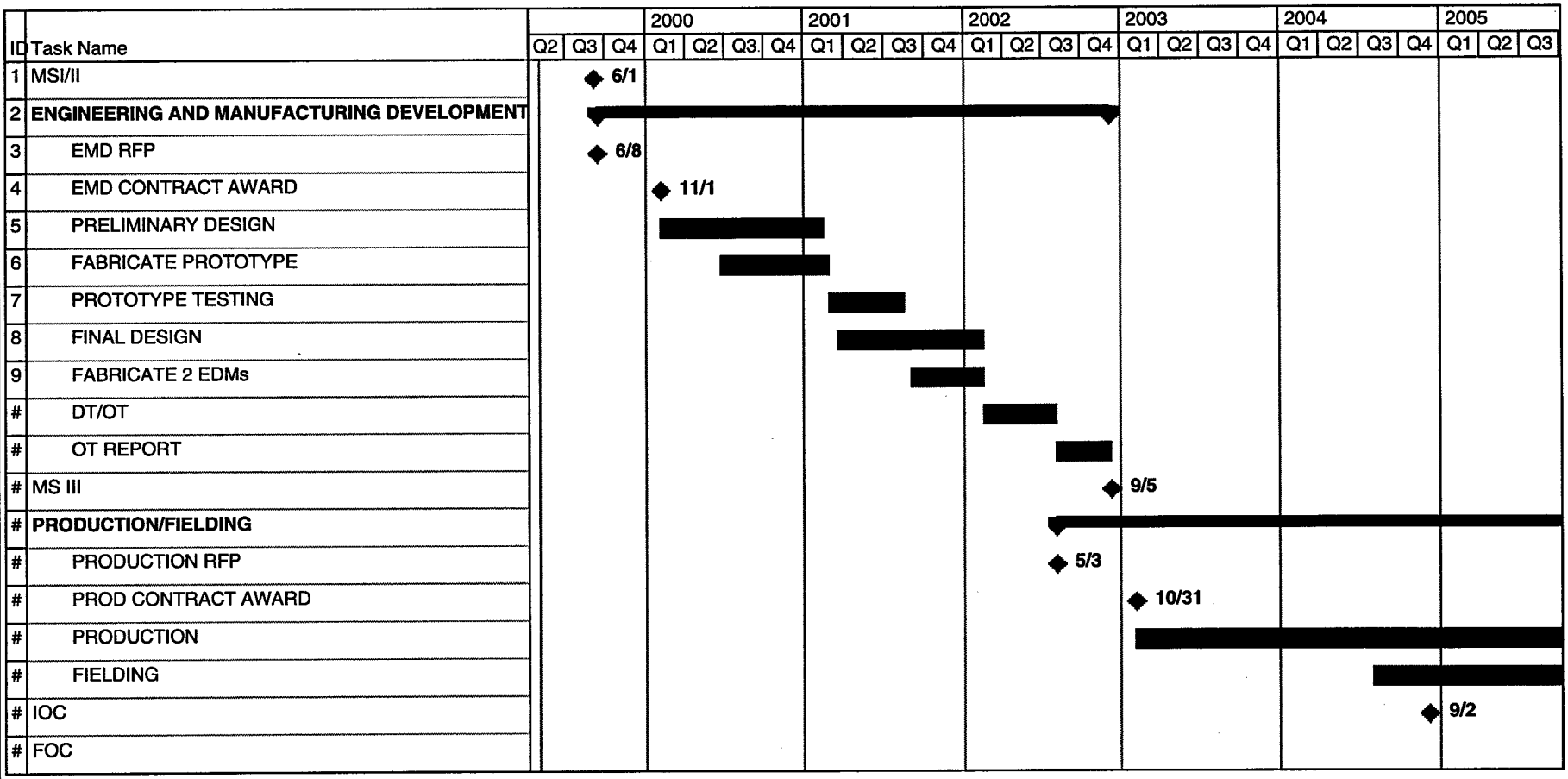
DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206623M Marine Corps Ground Combat/Supporting Arms Systems

PROJECT: C1901

IMPROVED RECOVERY VEHICLE (IRV)



A. (U) Project Cost Breakdown

	FY 1998	FY 1999	FY 2000
Systems Engineering & Development	5288	5890	23030
Program Management and Support	550	580	830
Test and Evaluation	413	992	628
Total	6251	7462	24488

B. Budget Acquisition History and Planning Information

Performing Organizations

Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Product Development Organizations										
Acquisition Logistics Support, Dumfries, VA	WR/RCP	1st Qtr			3763	225	240	310	CONT.	CONT.
NSWC, Crane, IN	WR/RCP	1st Qtr			1144	255	270	190	CONT.	CONT.
AMCOM, Huntsville, AL	MIPR	1st Qtr			3441	410	425	340	CONT.	CONT.
NSWC, Dahlgren, VA	WR/RCP	1st Qtr			3300	275	300	300	CONT.	CONT.
MCPD, Fall Brook, CA	WR/RCP	1st Qtr			228	375	380	580	CONT.	CONT.
NSWC, Indian Head, MD	WR/RCP	1st Qtr			0	425	475	410	CONT.	CONT.
BENET LABS, Albany NY	MIPR	1st Qtr			37	148	170	120	CONT.	CONT.
PM NVRSTA, Ft Belvoir, VA	MIPR	1st Qtr			0	1190	1100	490	CONT.	CONT.

U.S. Army CECOM, NJ	MIPR	1st Qtr			0	290	750	310	CONT.	CONT.
Rock Island Arsenal, IL	MIPR	1st Qtr			0	125	115	120	CONT.	CONT.
MCTSSA, Camp Pendleton, CA	WR/RCP	1st Qtr			0	1018	1255	953	CONT.	CONT.
MCCDC, Quantico, VA	WR	1st Qtr			3693	275	290	325	CONT.	CONT.
ARDEC	MIPR	1st Qtr			0	0	0	125	CONT.	CONT.
TBD (AVLB)	Comp/CPAF	Nov 99	6925	6925	0	0	0	5925	1000	6925
Benet Labs Albany, NY (AVLB)	MIPR	Various	100	100	0	0	0	50	50	100
TBD (IRV)	Comp/CPAF	Nov 99	15200	15200	0	0	0	7100	8100	15200
Benet Labs Albany, NY (IRV)	MIPR	Various	150	150	0	0	0	50	100	150
General Dynamics Land Systems, Warren MI (M1A1 Firepower)	Comp/CPAF	Nov 99	10745	10745	0	0	0	4075	6670	10745
Benet Labs Albany, NY (M1A1 Firepower)	MIPR	Various	2450	2450	0	0	0	1000	1450	2450
PM Mortars (Ktr TBD)	FFP	TBD	580	580	0	0	0	190	390	580
Misc	Various	Various			2865	277	120	67	CONT.	CONT.
Total Product Development					18471	5288	5890	23030		

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206623M Marine Corps Ground Combat/Supporting Arms Systems

PROJECT: C1901

Support and Management Organizations										
Aquisition Logistics Support, Dumfries, VA	WR/RCP	Various			19486	550	580	640	CONT.	CONT.
MCCDC	WR	1st Qtr			0	0	0	30	CONT.	CONT.
Acquisition Logistics Support, Dumfries, VA (AVLB)	RCP	Various	50	50	0	0	0	25	25	50
Acquisition Logistics Support, Dumfries, VA (IRV)	RCP	Various	150	150	0	0	0	50	100	150
Acquisition Logistics Support, Dumfries, VA (M1A1 Firepower)	RCP	Various	300	300	0	0	0	75	225	300
ALS (Mortars)	RCP	TBD	20	20	0	0	0	10	10	20
Total Support and Management					19486	550	580	830	CONT.	CONT.
Test and Evaluation Organizations										
AMCOM, Huntsville, AL	MIPR	1st Qtr			5160	150	0	0	CONT.	CONT.
CECOM, New Jersey	MIPR	1st Qtr			0	150	0	0	CONT.	CONT.
MCCDC, Quantico, VA	WR/RCP	1st Qtr			5540	20	700	280	CONT.	CONT.

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206623M Marine Corps Ground Combat/Supporting Arms Systems

PROJECT: C1901

MCPD, Fallbrook, CA	WR/RCP	1st Qtr			341	0	0	18	CONT.	CONT.
NSWC , Dahlgren, VA	WR/RCP	1st Qtr			4950	35	150	155	CONT.	CONT.
NSWC, Crane, IN	WR/RCP	1st Qtr			1717	50	75	125	CONT.	CONT.
PM NVRSTA, Ft Belvoir, VA	MIPR	1st Qtr			0	0	50	0	CONT.	CONT.
MCOTEA, Quantico, VA					0	0	0	50	CONT.	CONT.
MCOTEA, Quantico, VA (AVLB)	WR		1075	1075	0	0	0	0	1075	1075
Misc	Various	Various			4598	8	17	0	CONT.	CONT.
Total Test & Eval					22306	413	992	628	CONT.	CONT.

Government Furnished Property N/A

Item Description	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Product Development Property									
Support and Management Property									
Test and Evaluation Property									

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1999

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
7 - Operational System Development	0206623M Marine Corps Ground Combat/Supporting Arms Systems	C1901

	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Subtotal Product Development	18471	5288	5890	23030	Con't	Con't
Subtotal Support and Management	19486	550	580	830	Con't	Con't
Subtotal Test and Evaluation	22306	413	992	628	Con't	Con't
Total Project	60263	6251	7462	24488	Con't	Con't

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206623M Marine Corps Ground Combat/Supporting Arms Systems

PROJECT: C2086

COST *(In Millions)*	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C2086 Marine Enhancement Program	1684	3009	1484	1672	2639	2564	2906	2946	Continuing	Continuing
Quantity of RDT&E Articles										

A. (U) Mission Description and Budget Item Justification:

(U) This program was formerly titled Soldier/Marine Enhancement. MEP provides Research, Development, Test and Evaluation funding for low visibility, low cost items. It focuses on items of equipment which will benefit the individual Marine by reducing the load, increasing survivability, enhancing safety and improving combat effectiveness. The emphasis of the program is on non-developmental/commercially available items which can be quickly evaluated and fielded. This program is coordinated with the Army's Soldier Enhancement Program and the Special Operations Command.

(U) FY 1998 Accomplishments:

- (U) $ 472 Continued to explore Non-Developmental Item (NDI) equipment that will improve the combat effectiveness and enhance safety and survivability of the Individual Marine.
- (U) $ 450 Continued to explore clothing and individual equipment NDI categories.
- (U) $ 355 Continued to explore ground weapons, communications and command and control equipment NDI categories.
- (U) $ 427 Explored initial issue clothing and individual equipment categories.

(U)Total $ 1,684

(U) FY 1999 Planned Program:

- (U) $ 510 Continue to explore NDI equipment that will improve the combat effectiveness and enhance safety and survivability of the Individual Marine.
- (U) $ 518 Continue to explore clothing and individual equipment NDI categories.
- (U) $ 509 Continue to explore ground weapons, communications and command and control equipment NDI categories.
- (U) $ 1437 Explore initial issue clothing and individual equipment categories.
- (U) $ 35 Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

(U)Total $ 3,009

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE: February 1999

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
7 - Operational System Development	0206623M Marine Corps Ground Combat/Supporting Arms Systems	C2086

(U) FY 2000 Planned Program:

- (U) $ 505 Continue to explore NDI equipment that will improve the combat effectiveness and enhance safety and survivability of the Individual Marine.
- (U) $ 468 Continue to explore clothing and individual equipment NDI categories.
- (U) $ 511 Continue to explore ground weapons, communications and command and control equipment NDI categories.

(U)Total $ 1,484

B. (U) Project Change Summary

	FY 1998	FY 1999	FY 2000
(U) Previous President's Budget	1766	2399	3174
(U) Adjustments to Previous President's Budget	-82	+610	-1690
(U) Current Budget Submit	1684	3009	1484

(U) Change Summary Explanation:

(U) Funding: FY 1998 decrease of $82K is due to revised economic and general adjustments. FY 1999 increase of $610 is due to an internal realignment within this PE. Decrease in FY 00 is due to the split of Initial Issue funding to its own project and revised economic and general adjustments.

(U) Schedule: N/A

(U) Technical: N/A

C. (U) Other Program Funding Summary (APPN, BLI #, NOMEN)

	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
(U) PMC (BLI #221100) MEP	869	2070	2956	6505	2251	4231	4131	4200	Cont.	Cont.
(U) O&M Initial Issue	24959	25659	26376	27114	27872	28655			Cont.	Cont.

(U) Related RDT&E: PE 0604713A (Combat Feeding, Clothing and Equipment)

D. (U) Schedule Profile: N/A

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1999

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
7 - Operational System Development	0206623M Marine Corps Ground Combat/Supporting Arms Systems	C2086

A. (U) Project Cost Breakdown

	FY 1998	FY 1999	FY 2000
Systems Engineering	118	318	137
Development Test and Evaluation	346	526	278
Program Management and Support	287	453	296
Integrated Logistics Support	357	519	303
Test/Evaluations	155	452	142
Government Engineering Support	272	504	214
Miscellaneous	149	237	114
Total	1684	3009	1484

B. Budget Acquisition History and Planning Information

Performing Organizations

Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Product Development Organizations										
Lexington – Bluegrass Lexington, KY	WR	1st Qtr			2316	41	35	42	Con't	Cont.
NOC PacDiv Fallbrook, CA	WR	1st Qtr			132	41	86	30	Con't	Con't
MCTSSA CamPen, CA	WR/RCP	1st Qtr			598	6	22	4	Con't	Con't
NCTRF, Aberdeen, MD	WR/RCP	1st Qtr			276	23	25	21	Con't	Con't
NATICK, Natick, MA	MIPR	2nd Qtr			1216	82	215	61	Con't	Con't

ARL/APG Aberdeen, MD	MIPR	1st Qtr	238	9	25	7	Con't	Con't
PM, Mortar, Ft. Monmouth, NJ	MIPR	1st Qtr	544	0	0	0	Con't	Con't
PPSC, Philadelphia, PA	MIPR	3rd Qtr	13	0	0	0	Con't	Con't
MCAGCC, Twenty-Nine Palms, CA	WR/RCP	1st Qtr	104	0	0	0	Con't	Con't
NSMA Washington, DC	MIPR	1st Qtr	157	18	10	14	Con't	Con't
TACOM, Warran, MI	MIPR	1st Qtr	55	12	118	10	Con't	Con't
NHRC, Crane, IN	MIPR	2nd Qtr	365	24	33	18	Con't	Con't
2nd MARDIV CamLej, NC	WR	1st Qtr	64	2	5	2	Con't	Con't
NCCOSC, San Diego, CA	WR	1st Qtr	193	24	39	16	Con't	Con't
NCSS, Pamama City, FL	WR	1st Qtr	1866	14	10	8	Con't	Con't
NSWC, Crane, IN	WR	1st Qtr	1919	81	273	59	Con't	Con't
NAWC Air Div Patuxent River, MD	WR	1st Qtr	199	57	56	42	Con't	Con't
II MEF, CamLej, NC	WR	1st Qtr	75	5	0	5	Con't	Con't
NFESC, San Diego, CA	MIPR	2nd Qtr	344	0	0	0	Con't	Con't
NSWC IHD, Indian Head, MD	WR	4th Qtr	164	0	0	0	Con't	Con't

Support and Management Organizations

MCCDC, Quantico, VA	WR	1st Qtr	1991	48	192	37	Con't	Con't
MISC	Various	Various	4379	55	60	41	Con't	Con't
Test and Evaluation Organizations								
MCTSSA, CamPen, CA	WR/RCP	1st Qtr	1774	44	47	24	Conb't	Con't
NCTRF, Aberdeen, MD	WR/RCP	1st Qtr	846	5	3	5	Con't	Con't
NATICK, Natick, MA	MIPR	2nd Qtr	2243	227	550	127	Con't	Con't
ARL/APG, Aberdeen, MD	MIPR	1st Qtr	787	14	19	12	Con't	Con't
PM, Mortors, Ft. Monmouth, NJ	MIPR	1st Qtr	1803	0	0	0	Con't	Con't
PPSC, Philadelphia, PA	MIPR	3rd Qtr	42	4	0	4	Con't	Con't
MCAGCC Twenty-Nine Palms, CA	WR/RCP	1st Qtr	340	11	18	8	Con't	Con't
NSMA, Washington, DC	MIPR	1st Qtr	507	32	43	21	Con't	Con't
TEXCOM, Warran, MI	MIPR	1st Qtr	178	21	25	21	Con't	Con't
NHRC, Crane, IN	MIPR	2nd Qtr	1257	216	380	152	Con't	Con't
2nd MarDiv, CamLej, NC	WR	1st Qtr	212	12	10	12	Con't	Con't
NCCOSC, San Diego, CA	WR	1st Qtr	638	36	31	36	Con't	Con't
NCSS, Panama City, FL	WR	1st Qtr	6177	15	15	15	Con't	Con't

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206623M Marine Corps Ground Combat/Supporting Arms Systems

PROJECT: C2086

NSWC, Crane, IN	WR	1st Qtr		6299	261	410	261	Con't	Con't
NAWC Air Div, Patuxent River, MD	WR	1st Qtr		625	163	154	163	Con't	Con't
II MEF CamLej, NC	WR	1st Qtr		5506	0	0	0	Con't	Con't
NFESC, San Diego CA	MIPR	2nd Qtr		1139	0	0	0	Con't	Con't
NSWC IHD, Indian Head, MD	WR	4th Qtr		546	10	10	10	Con't	Con't
MISC	Various	Various		8780	71	90	196	Con't	Con't

Government Furnished Property

Item Description	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Product Development Property									
Not Applicable									
Support and Management Property									
Test and Evaluation Property									

	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Subtotal Product Development	10838	439	952	339	Con't	Con't
Subtotal Support and Management	6370	103	252	78	Con't	Con't
Subtotal Test and Evaluation	39699	1142	1805	1067	Con't	Con't
Total Project	56907	1684	3009	1484	Con't	Con't

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE: February 1999

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
7 - Operational System Development	0206623M Marine Corps Ground Combat/Supporting Arms Systems	C2237

COST *(In Millions)*	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C2237 Amphibious Vehicle Test Branch	1524	1960	643	723	731	746	821	826	Continuing	Continuing
Quantity of RDT&E Articles										

A. (U) Mission Description and Budget Item Justification:

(U) The Amphibious Vehicle Test Branch (AVTB) is a one-of-a-kind Department of Defense test facility for amphibious vehicles and supports the requirements of all Services. The AVTB conducts developmental, combined developmental/operational, and follow-on testing and evaluation of production hardware. It also conducts Product Assurance Testing and Substitute or alternative parts and material testing for amphibious vehicles and associated equipment. Because of its year-round temperate climate, diverse terrain, and 17 miles of coastline, the AVTB is ideal for amphibious vehicle, as well as ship related testing. The AVTB is in close proximity to San Clemente island which is used frequently for live fire sea-to-shore testing and high-speed water testing. The AVTB is committed to testing product improvement programs, engineering change proposal design changes, and field change requests.

U) FY 1998 Accomplishments:

- (U) $ 174 Program support, supplies, and services at AVTB test site to support scheduled Assault Amphibious Vehicle 7A1 (AAV7A1) "rebuild to standard" testing, Advanced Amphibious Assault Vehicle (AAAV) Developmental Testing as well as other Marine Corps mobility and mine warfare programs. Program on-site support, supplies, and services to support Naval Sea Systems Command and Naval Mine Warfare Command for development testing of Navy mine countermeasures system. Provided services and support to the Department of Defense Common Test and Training Range Architecture workshops. These funds provided organic supply support including management operations, general accounting, and a maintenance float of equipment. Provided intermediate maintenance (third echelon) of organic non-developmental communication electronic and ordnance equipment.
- (U) $ 99 Provided funding for necessary services provided by Marine Corps Base, Camp Pendleton (MCB CAMPEN), California and off-station units for electricity, heating and other power charges; long distance telephone support; and calibration of laboratory test equipment and maintenance.

- (U) $ 1251 Provided AVTB personnel civilian salaries to support scheduled AAV7A1 and AAAV Developmental Testing. Planned and conducted Developmental Tests and report results, identifying any unresolved test issues in accordance with approved test plans and procedures. Supported Marine Corps Operational Test and Evaluation Activity (MCOTEA) in AAV, Reliability, Availability, Maintainability/Rebuild to Standards (RAM/RS), Initial Operational Test & Evaluation (IOT&E). Prepared analysis of field-reported problems as received. Provided recommendations pertaining to design requirements which affect both operational effectiveness and operation suitability. Performed all echelons of maintenance on developmental items, including all on-hand assets of assault amphibious vehicles, within the capabilities of on-hand personnel, tools, test, and measuring equipment and facilities. Provided technical assistance and recommendations in the test of substitute or alternate parts and materials. Prepared technical analysis of proposed product improvements as requested. Prepared analysis of proposed engineering changes. Conducted hardware testing and evaluation of design changes, including verification of both the design and the technical data in accordance with approved test plans and procedures. Provided technical assistance in writing and revision of Technical Manuals. Provided technical reviews and recommendations regarding proposed Modification, Technical, Retrofit Instructions, and Retrofit Kit Hardware. Provided Testing expertise to Program Managers to assist in program acquisition strategy development. Provided Technical reviews and recommendation on Test and Evaluation Master Plans (TEMP's) and Detailed Test Plans for Program Managers. Provided technical input as the Marine Corps Developmental Testing representative to the Department of Defense Common Test and Training Range Architecture workshops. Conducted study to improve business processes to increase efficiencies and service.

(U)Total $ 1,524

(U) FY 1999 Planned Programs:

- (U) $ 483 Maintenance, refurbishment, upgrade, and replacement of test equipment and instrumentation needed to provide program support, supplies, and services at AVTB test site to support scheduled Assault Amphibious Vehicle 7A1 (AAV7A1) "rebuild to standard": testing, Advanced Amphibious Assault Vehicle (AAAV) Development Testing as well as other Marine Corps mobility and mine warfare programs. Program on-site support, supplies, and services to support Naval Sea System Command and naval Mine Warfare Command for development testing of Navy mine countermeasures system. Provide services and support to the Department of Defense Common test and Training Range Architecture workshops. These funds provide organic supply support including management operations, general accounting, and a maintenance float of equipment. Provide intermediate maintenance (third echelon) of organic non-developmental communication electronic and ordnance equipment.
- (U) $ 151 Provide funding for necessary services provided by Marine Corps Base, Camp Pendleton (MCB CAMPEN), California for electricity, heating, and other power charges; and long distance telephone support. Provided funding for calibration of laboratory test equipment and maintenance services provided by Marine Corps Logistics Base (MCLB) Barstow and 1 Force Service Support Group (FSSG).

• (U) $	1319	Provide AVTB personnel civilian salaries to support scheduled AAV7A1 and AAAV Developmental Testing. Plan and conduct Developmental Tests and report results, identifying any unresolved test issues in accordance with approved test plans and procedures. Prepare analysis of field-reported problems as received. Provide recommendations pertaining to design requirements which affect both operational effectiveness and operation suitability. Perform all echelons of maintenance on developmental items, including all on-hand assets of assault amphibious vehicles, within the capabilities of on-hand personnel, tools, test, and measuring equipment and facilities. Provided technical assistance and recommendations in the test of substitute or alternate parts and materials. Prepare technical analysis of proposed product improvements as required. Prepared analysis of proposed engineering changes. Conduct hardware testing and evaluation of design changes, including verification of both the design and the technical data in accordance with approved test plans and procedures. Provide technical assistance in writing and revision of Technical Manuals. Provide technical reviews and recommendations regarding proposed Modification, Technical, Retrofit Instructions, and Retrofit Kit Hardware. Provide Testing expertise to Program Managers to assist in program acquisition strategy development. Provide Technical reviews and recommendation on Test and Evaluation Master Plans (TEMP'S) and Detailed Test Plans for Program Managers. Provide technical input as the Marine Corps Developmental Testing representative to the Department of Defense Common Test and Training Range Architecture workshops.
• (U) $	7	Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.
(U)Total $	1,960	

(U) FY 2000 Planned Program:

• (U) $	490	Maintenance, refurbishment, upgrade, and replacement of test equipment and instrumentation needed to provide program support, supplies, and services at AVTB test site to support scheduled Assault Amphibious Vehicle 7A1 (AAV7A1) "rebuild to standard" testing, Advanced Assault Amphibious Vehicle (AAAV) Development Testing as well as other Marine Corps mobility and mine warfare programs. Program on-site support, supplies, and services to support Naval Sea System Command and Naval Mine Warfare Command for development testing of Navy mine countermeasures system. Provide services and support to the Department of Defense Common Test and Training Range Architecture workshops. These funds provide organic supply support including management operations, general accounting, and a maintenance float of equipment. Provide intermediate maintenance (third echelon) of organic non-developmental communication electronic and ordnance equipment.
• (U) $	153	Provide funding for necessary services provided by Marine Corps Base, Camp Pendleton (MCB CAMPEN), California for electricity, heating, and other power charges; and long distance telephone support. Provide funding for calibration of laboratory test equipment and maintenance services provided by MCLB Barstow and 1FSSG.
•		
(U)Total $	643	

B. (U) Project Change Summary

	FY 1998	FY 1999	FY 2000
(U) Previous President's Budget	1596	1965	2015
(U) Adjustments to Previous President's Budget	-72	-5	-1372
(U) Current Budget Submit	1524	1960	643

(U) Change Summary Explanation:

(U) Funding: FY 1998 decrease of $72K reflects minor program changes. FY 1999 decrease is due to revised economic and general adjustments. Decreasein FY00 is due to transfer of AVTB civilian salaries to the O&M, MC appropriation and revised economic and general adjustments.

(U) Schedule: N/A

(U) Technical: N/A

C. (U) Other Program Funding Summary (APPN, BLI #, NOMEN)

FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost

(U) Not Applicable

(U) Related RDT&E: PE 0603611M (Marine Corps Assault Vehicles)

D. (U) Schedule Profile

Testing conducted at AVTB includes all aspects of Marine Corps Assault Amphibious Vehicles. Testing planned for FY 98 and beyond includes MK 155 Minefield Breaching System, NBC overpressure system, RAM/RS (Reliability, Availability and Maintainability/Rebuild to Standard) Proof of Principle Developmental Testing, Operational Testing Support and Production Assurance testing; Engineering Change Proposals (ECP) as required; combined Recoil Booster (CRB) for adoption of Multiple Integrated Laser Engagement System (MILES) for AAV use; support for Extended Littoral Battlefield Advanced Concept Technology Demonstration; C4I integration support for AAVCommunications 7 RAM/RS. AVTB will also support the testing of the Advanced Amphibious Assault Vehicle (AAAV) as directed, by DRPM AAAV, during the Program Definition & Risk Reduction phase of the AAAV Program Development.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206623M Marine Corps Ground Combat/Supporting Arms Systems

PROJECT: C2503

COST *(In Millions)*	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C2503 Initial Issue	0	0	1222	1432	1315	1116	1140	1163	Continuing	Continuing
Quantity of RDT&E Articles										

A. (U) **Mission Description and Budget Item Justification:** This program was formerly reported under C2086, Marine Enhancement Program. The Initial Issue program provides Research, Development, Test and Evaluation of low visibility, low cost items with emphasis on non-developmental/commercial available items. Items approved for procurement will transition into the O&M Initial Issue program. Focus is on clothing and equipment items (i.e. improved Jungle and Desert Boots, Light Weight Helmet, combat boots, sleeping bags) which will benefit the individual Marine by reducing the load with less bulky, lightweight, comfortable equipment, increasing survivability and improving combat effectiveness. Initial Issue continues to explore the spectrum of technologies commercially available that can provide enhancement in individual protection, tactical mobility and application of state-of-the-art technologies through studies and testing.

(U) FY 1998 Accomplishments: This program is contained in Project C2086 in this PE.

(U) FY 1999 Planned Program: This program is contained in Project C2086 in this PE.

(U) FY 2000 Planned Program:

- (U) $ 1022 Explore and evaluate across a broad spectrum of commercially available technologies that can be incorporated into existing or new designs of individual clothing and equipment in an effort to reduce weight, increase survivability, increase lethality, improve safety, increase mobility, and improve combat performance of the individual Marine. (Marine load system product improvement, redesign, conduct testing and evaluation; improve jungle and desert boot; conduct boot outsole traction study to optimize performance of boot soles for traction, durability, and resole-ability; Body armor and light weight helmet ballistic testing to include cadaver testing and analysis of ballistic effects of shock forces of the torso, neck and spine; Review uniform sizing integration (less sizes covering same population with potential cost savings associated with stock and storage). Provide recommendation to uniform board on Marine uniform product improvements in an effort to reduce cost, utilize commercial manufacturing techniques, improve durability, and retain sharp appearance.

(U) $ 200 Develop prototype for Multipurpose Health Service Facility for surgery, dental, pharmacy functions, etc.

(U)Total $ 1,222

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206623M Marine Corps Ground Combat/Supporting Arms Systems

PROJECT: C2503

B. (U) Project Change Summary

	FY 1998	FY 1999	FY 2000
(U) Previous President's Budget	0	0	0
(U) Adjustments to Previous President's Budget	0	0	1222
(U) Current Budget Submit	0	0	1222

(U) Change Summary Explanation:

(U) Funding: FY98 and FY99 program funding contained in Project C2086 in this PE. Increase in FY00 is due to the split of Initial Issue funding from Project C2086 into this Project and revised economic and general adjustments.

(U) Schedule: N/A

(U) Technical: N/A

C. (U) Other Program Funding Summary

(APPN, BLI #, NOMEN)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
(U) PMC Line (BLI # 652200) Field Med Equip					2765	9202	6022			
(U) O&M Initial Issue	44279	65593	26693	32173	27662	28188	28808	29442	Cont	Cont

(U) Related RDT&E

D. (U) Schedule Profile: N/A

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206623M Marine Corps Ground Combat/Supporting Arms Systems

PROJECT: C2503

A. (U) Project Cost Breakdown

	FY 1998	FY 1999	FY 2000
Product Development	0	0	927
Product Test	0	0	295
Total	0	0	1222

B. Budget Acquisition History and Planning Information

Performing Organizations

Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Product Development Organizations										
NATICK	MIPR	Oct 99			0	0	0	727	CONT	CONT
USAMRA	MIPR	Oct 99						200	CONT	CONT
Support and Management Organizations										
Test and Evaluation Organizations										
NATICK	MIPR	Oct 99			0	0	0	295	CONT	CONT
AMED	MIPR	Oct 99			0	0	0	0	CONT	CONT

Government Furnished Property

Item Description	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Product Development Property									
Support and Management Property									
Test and Evaluation Property									

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206623M Marine Corps Ground Combat/Supporting Arms Systems

PROJECT: C2503

	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Subtotal Product Development	0	0	0	927	CONT	CONT
Subtotal Support and Management	0	0	0	0	0	0
Subtotal Test and Evaluation	0	0	0	295	CONT	CONT
Total Project	0	0	0	1222	CONT	CONT

DATE: February 1999

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206624M Marine Corps Combat Services Support

COST *(In Thousands)*	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	5288	4044	9817	4450	15568	5191	1377	273	Continuing	Continuing
C0076 Medium Tactical Vehicle Replacement (MTVR)	4376	1925	6814	1543	1535	0	0	0	0	31156
C0200 Light Tactical Vehicle Replacement (LTVR)	185	400	0	0	0	0	0	0	0	1329
C0201 Logistical Vehicle System Replacement (LVSR)	0	883	1055	1075	13025	4770	1111	2	0	22287
C2316 Combat Service Support Engineering Equipment	727	836	1702	1581	752	160	0	0	0	5758
C2509 Motor Transport Modification	0	0	246	251	256	261	266	271	Continuing	Continuing
Quantity of RDT&E Articles										

(U) **Mission Description and Budget Item Justification:** This program element (PE) provides funding for Marine Air-Ground Task Force requirements for Combat Service Support equipment improvements. It will enhance combat breaching capabilities of the ground combat elements, provide potable water from any available raw water source, logistics, maintenance and transportation requirements. It will also determine the reconfiguration of the current Twin Agent Unit firefighting apparatus and provide a portable, highly mobile general purpose automatic tester designed for use by technicians in the garrison and at the forward edge of the battlefield. The PE also provides improvements in all areas of Combat Service Support Equipment Vehicles by determining the replacement for the heavy, medium and light fleet vehicles.

(U) **Justification for Budget Activity:** This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing, operational systems.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206624M Marine Corps Combat Services Support

PROJECT: C0076

COST *(In Thousands)*	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C0076 Medium Tactical Vehicle Replacement (MTVR)	4376	1925	6814	1543	1535	0	0	0	0	31156
Quantity of RDT&E Articles			8							

A. (U) Mission Description and Budget Item Justification: The Medium Tactical Vehicle Replacement (MTVR) Program will determine the replacement vehicle for the Medium 5-ton fleet. This project will increase mobility, maintainability, and reliability for the medium fleet.

(U) FY 1998 Accomplishments:

- (U) $ 3144 Completed testing prototype vehicles provided by contractors. Durability testing, Reliability, Availability and Maintainability (RAM) testing.
- (U) $ 1139 Program documentation and management support for the MTVR program.
- (U) $ 93 Travel in support of the MTVR program.

(U)Total $ 4,376

(U) FY 1999 Planned Program:

- (U) $ 1,700 Begin variant prototype development.
- (U) $ 50 Travel in support of the MTVR program.
- (U) $ 135 Program documentation and management support for the MTVR program.
- (U) $ 40 Engineering Study.

(U)Total $ 1,925

(U) FY 2000 Planned Program:

- (U) $ 6500 Complete MTVR variant prototype development.
- (U) $ 120 Travel in support of the MTVR program.
- (U) $ 194 Program documentation and management support for the MTVR program.

(U)Total $ 6,814

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0206624M Marine Corps Combat Services Support PROJECT C0076

B. (U) Project Change Summary	FY 1998	FY 1999	FY 2000
(U) Previous President's Budget	3836	1,968	8379
(U) Adjustments to Previous President's Budget	+540	-43	-1565
(U) Current Budget Submit	4,376	1,925	6814

(U) Change Summary Explanation:

(U) Funding: FY 1998 funding increase of $540 thousand reflects cost increase for MTVR prototype testing. FY 1999 decrease of $43 thousand reflects revised economic and general adjustments. FY 2000 decrease reflects program restructuring within the Marine Corps and revised economic and general adjustments.

(U) Schedule: N/A

(U) Technical: N/A

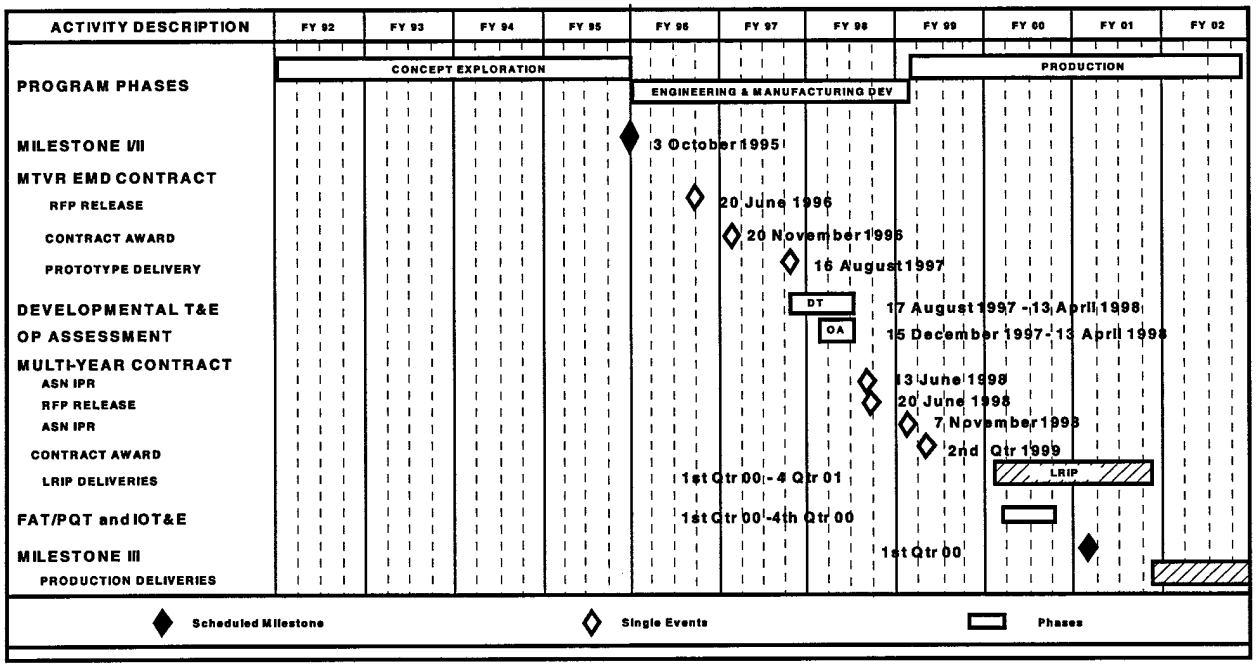
C. (U) Other Program Funding Summary (APPN, BLI #, NOMEN)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
(U) PMC Line (BLI# 508800) MTVR	0	69522	138268	325824	312128	380690	5880	530	0	1234842

(U) Related RDT&E

(U) PE 0206623M Marine Corps Ground Combat Supporting Arms Systems
(U) PE 0603640M Marine Corps Advanced Technology Demonstration
(U) PE 0604804A Logistics and Engineering Equip/Engr Development
(U) PE 0206313M Marine Corps Communications

D. (U) Schedule Profile:

MEDIUM TACTICAL VEHICLE REPLACEMENT SCHEDULE



RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206624M Marine Corps Combat Services Support

PROJECT: C0076

A. (U) Project Cost Breakdown

	FY 1998	FY 1999	FY 2000
Product Development	0	1700	6500
Support and Management	1232	225	314
Test and Evaluation	3144	0	0
Total	4376	1925	6814

B. Budget Acquisition History and Planning Information

Performing Organizations

Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Product Development Organizations										
TACOM	MIPR				10578	0	1700	6500	0	18778
Support and Management Organizations										
TACOM	MIPR				2070	709	135	194	342	3450
MKI	RCP				72	430	0	0	0	502
MCSC	WR				189	93	50	120	200	652
CLNC	RCP				0	0	40	0	0	40
Test and Evaluation Organizations										
TACOM	MIPR				2054	3144	0	0	2536	7734

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	DATE February 1999

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
7 - Operational System Development	0206624M Marine Corps Combat Services Support	C0076

Government Furnished Property

Item Description	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	FY 2001	Budget to Complete	Total Program
Product Development Property: N/A										
Support and Management Property: N/A										
Test and Evaluation Property: N/A										

	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Subtotal Product Development	10578	0	1700	6500	0	18778
Subtotal Support and Management	2331	1232	225	314	542	4644
Subtotal Test and Evaluation	2054	3144	0	0	2536	7734
Total Project	14963	4376	1925	6814	3078	31156

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206624M Marine Corps Combat Services Support

PROJECT: C0201

COST *(In Thousands)*	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C0201 Logistical Vehicle System Replacement (LVSR)	0	883	1055	1075	13025	4770	1111	2	0	22287
Quantity of RDT&E Articles					12					

A. (U) Mission Description and Budget Item Justification: The Logistics Vehicle System Replacement (LVSR) will provide a replacement vehicle system for the current fleet of LVS's, which are quickly approaching the end of their service life. The current LVS, procured in 1985, has a twenty year service life based on a mid-life rebuild begining in FY95. That rebuild never occurred making the procurement of a replacement system essential. The LVSR is the Marine Corps heavy fleet vehicle system for transporting heavy bulk and break bulk cargo, bulk liquids (fuel and water), and ammunition. The LVSR will be comprised of a dual axle front power unit coupled to one of five interchangable rear body units. These rear body units will allow the LVSR to fulfill various missions: transport standardized containers up to 20 ft., wrecker/vehicle recovery, 5th wheel semitrailer adapter, and self-loading ribbon bridge/container hauler/flatrack transport. The LVSR will address current heavy fleet deficiencies, including off-road mobility, ride quality, corrosion, stability, and braking. The increased speed, mobility, and fuel consumption of mechanized forces magnifies the inability of our current LVS to maintain the tempo needed to support the Marine Air Ground Task Force (MAGTF) in combat operations. Maneuver Warfare, Operational Maneuvers from the Sea (OMFTS), and Ship-to-Objective Maneuver (STOM) doctrines dictate that the LVSR, the Marine Corps primary bulk fuel and ammunition transport, be able to support high tempo operations over an enlarged battlespace and keep pace with rapidly moving and widely dispersed maneuver forces.

(U) FY 1998 Accomplishments:

- (U) $ 0 N/A

(U)Total $ 0

(U) FY 1999 Planned Program:

- (U) $ 500 Perform fabrication on LVSR technology demonstrator.
- (U) $ 367 Program management, travel, analysis of alternatives/technology studies in support for LVSR program.
- (U) $ 16 Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

(U)Total $ 883

(U) FY 2000 Planned Program:

- (U) $ 332 Program management, travel, continue analysis of alternatives/technology studies in support for LVSR program.
- (U) $ 723 Begin test and evaluation on technology demonstrator.

(U)Total $ 1,055

B. (U) Project Change Summary

	FY 1998	FY 1999	FY 2000
(U) Previous President's Budget	0	910	1031
(U) Adjustments to Previous President's Budget	0	-27	+24
(U) Current Budget Submit	0	883	1055

(U) Change Summary Explanation:

(U) Funding: FY99 decrease of $27K economic adjustment.
FY00 increase of $24K reflect program restructuring within the Marine Corps

(U) Schedule: N/A

(U) Technical: N/A

C. (U) Other Program Funding Summary (APPN, BLI #, NOMEN)

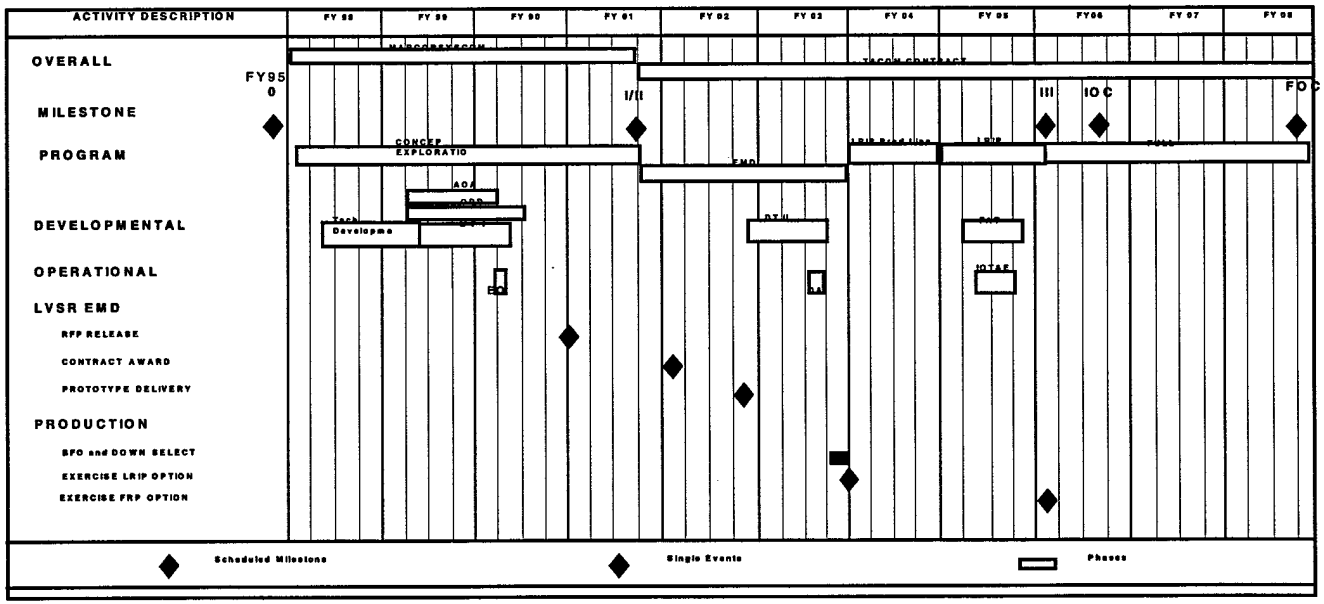
	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
(U) PMC Line (BLI #509300) LVSR	0	0	0	0	0	0	60079	89775	CONT.	CONT.

(U) Related RDT&E

(U) PE 0206623M Marine Corps Ground Combat Supporting Arms Systems

D. (U) **Schedule Profile:**

Logistics Vehicle System Replacement (LVSR)



RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0206624M Marine Corps Combat Services Support PROJECT C0201

A. (U) Project Cost Breakdown

	FY 1998	FY 1999	FY 2000
Product Development		516	0
Support and Management		367	332
Test		0	723
Total		883	1055

B. Budget Acquisition History and Planning Information

Performing Organizations

Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Product Development Organizations										
VARIOUS					0	0	516	0	12865	13381
Support and Management Organizations										
MCCDC	WR				0	0	206	28	0	234
MSCS	WR				0	0	50	95	249	394
MKI	RCP				0	0	106	204	695	1005
TACOM	MIPR				0	0	0	0	1593	1593
NATC	MIPR				0	0	0	0	104	104
MCLB, Albany	WR				0	0	5	5	15	25
Test and Evaluation Organizations										
NATC	MIPR				0	0	0	723	134	857
VARIOUS					0	0	0	0	4328	4328

Government Furnished Property

Item Description	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Product Development Property									
Support and Management Property									
Test and Evaluation Property									

	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Subtotal Product Development			516	0	12865	13381
Subtotal Support and Management			367	332	2656	3355
Subtotal Test and Evaluation			0	723	4462	5185
Total Project			883	1055	19993	21921

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206624M Marine Corps Combat Services Support

PROJECT: C2316

COST *(In Thousands)*	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C2316 Combat Service Support Engineering Equipment	727	836	1702	1581	752	160	0	0	0	5758
Quantity of RDT&E Articles										

A. (U) **Mission Description and Budget Item Justification:** This project includes improvements in all areas of Combat Service Support Equipment. The Army developed Combat Breacher Vehicle (CBV) will be a fully tracked, armored vehicle capable of keeping pace with the maneuver force. It will breach minefields with a full width mine plow, (14 feet wide), equipped with automatic depth control while maintaining speeds of 4 to 5 miles per hour. The CBV, also referred to as the Grizzly, is a full-tracked, heavy-protection level combat system being developed by the Army to enhance the combat breaching capabilities of the ground combat elements. The overall system is integrated on the M1 chassis to provide commonality with the tank fleet while providing the latest technology in direct fire armor protection and will provide capabilities to breach minefields, neutralize obstacles, demolish berms, and fill in auto-tank ditches. Major subsystems of the CBV include an automatic depth control system, a weapon systems station, a commander's control station, and a power driven arm. The Marine Corps is coordinating with the Army to establish a joint program. The 1500 Reverse Osmosis Water Purification Unit (1500ROWPU) is capable of providing potable water from any available raw water source. The 1500ROWPU is "state-of-the-art" technology producing 1,200/1,500 gallons per hour (GPH). This system will replace the aging 600 GPH ROWPUs at a 2 old systems to 1 enhanced system ratio. The 1500ROWPU will reduce logistics, maintenance, and transportation requirements allowing significant potential cost avoidance in out year support costs. The 1500ROWPU is a joint Marine Corps program with the Army as the lead service. The current Twin Agent Unit (TAU) firefighting apparatus is mounted on a modified Commercial Utility, Cargo Vehicle (CUCV). The CUCV has reached its service life and was phased out of the Marine Corps' inventory by FY 1997. Funds will be used to determine the reconfiguration of the current TAU and the Truck, Utility, Cargo, D1180, into a compatible mobile extinguisher. The Third Echelon Test Set (TETS) is a portable, highly mobile general purpose automatic tester designed for use by technicians both in garrison and at the forward edge of the battlefield.

FY 1998 Accomplishments:

- (U) $ 419 1500ROWPU: Designed/fabricated working 1500ROWPU prototype to confirm the design decisions based on componentry testing.
- (U) $ 104 TETS: Initiated research of Electro-Optic (EO) Test Requirements and capabilities of Commercial and other Services EO Tester. Developed new technology testing applications in support of emerging Weapon System by Automatic Test Support Unit (ATSU), Albany, GA.
- (U) $ 72 COMPRESSED AIR FOAM SYSTEM MOBILE: Procured two (2) prototypes from General Services Administration (GSA) Schedule.
- (U) $ 85 COMPRESSED AIR FOAM SYSTEM MOBILE: Begin Developmental testing.
- (U) $ 47 COMPRESSED AIR FOAM SYSTEM MOBILE: Technical and Logistical Support

(U)Total $ 727

(U) FY 1999 Planned Program:

- (U) $ 704 1500 ROWPU: Prototype changes to componentry to optimize the design hardware.
- (U) $ 110 TETS: Develop new technology testing applications in support of emerging weapon systems.
- (U) $ 22 SBIR: Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638

(U)Total $ 836

(U) FY 2000 Planned Program:

- (U) $ 1592 CBV: Design and develop mechanically deployed CBV blade. Test amphibious shipboard compatibility.
- (U) $ 110 TETS: Continue development of new technology testing applications in support of emerging weapon systems.

(U)Total $ 1,702

B. (U) Project Change Summary

	FY 1998	FY 1999	FY 2000
(U) Previous President's Budget	836	1756	1586
(U) Adjustments to Previous President's Budget	-109	-920	+116
(U) Current Budget Submit	727	836	1702

(U) Change Summary Explanation:

(U) Funding: FY98 decreased to support higher priority requirements. FY99 decreased to delay CBV blade mechanical deployment. FY00 increases reflects program restructuring within the Marine Corps.

(U) Schedule: N/A

(U) Technical: N/A

C. (U) Other Program Funding Summary (APPN, BLI #, NOMEN)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
(U) PMC Line (BLI# 613300) CBV	0	0	0	0	0	28631	150186	226743	Cont	Cont
(U) PMC Line (BLI# 627400) 1500ROWPU	0	0	0	0	12762	13277	11670	8316	Cont	Cont
(U) PMC Line (BLI# 666900) CAFMS	0	1137	0	0	0	0			0	1137
(U) PMC Line (BLI# 440200) TETS	12445	29245	29068	4781	0	0	0	0	0	75539
(U) PMC Line (BLI# 667000) ILT $5Million(CAFMS)	0	0	3443	0	0	0			0	3443

(U) Related RDT&E

(U) PE 0206623M Marine Corps Ground Combat Supporting Arms Systems
(U) PE 0603640M Marine Corps Advanced Technology Demonstration
(U) PE 0604804A Logistics and Engineering Equip/Engr Development
(U) PE 0206313M Marine Corps Communications

D. (U) Schedule Profile: N/A

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206624M Marine Corps Combat Services Support

PROJECT: C2316

A. (U) Project Cost Breakdown

	FY 1998	FY 1999	FY 2000
Production Development	595	816	1223
Support and Management	47	20	60
Test and Evaluation	85	0	419
Total	727	836	1702

B. Budget Acquisition History and Planning Information

Performing Organizations

Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Product Development Organizations										
Miscellaneous	Various				201	177	110	573	1301	2362
TACOM	MIPR				0	418	706	650	770	2544
Support and Management Organizations										
MKI	RCP				18	40	10	60	0	128
MCSC					350	7	10		0	367
Test and Evaluation Organizations										
TACOM	MIPR				510	85	0	419	422	1436

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	DATE February 1999
BUDGET ACTIVITY 7 - Operational System Development	PE NUMBER AND TITLE 0206624M Marine Corps Combat Services Support PROJECT C2316

Government Furnished Property

Item Description	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Product Development Property: Not Applicable									
Support and Management Property: Not Applicable									
Test and Evaluation Property: Not Applicable									

	Total Prior to FY 1998	FY 1998	FY 1999	FY 2000	Budget to Complete	Total Program
Subtotal Product Development	201	595	816	1223	2071	4906
Subtotal Support and Management	368	47	20	60	0	495
Subtotal Test and Evaluation	510	85	0	419	422	1436
Total Project	1079	727	836	1702	2493	6837

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206624M Marine Corps Combat Services Support

PROJECT: C2509

COST *(In Thousands)*	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C2509 Motor Transport Modification	0	0	246	251	256	261	266	271	Continuing	Continuing
Quantity of RDT&E Articles										

A. (U) Mission Description and Budget Item Justification: This project develops joint service and Marine Corps unique improvements to motor transport systems, monitors the commercial automotive industrial base for technology insertions to increase Reliability Availablity and Maintainability, Durability (RAM-D), reduce ownership costs, and resolve unplanned safety hazards. This also includes the monitoring and implementation of state and federal requirements if required. This will be a "level of effort" program to quickly analyze and field items that address safety modifications and product improvements to current systems that increase combat readiness and capability. Funding will focus on streamlined acquisitions of Commercial-Off-the-Shelf/Non-Developmental Item (COTS/NDI) items that can be identified, integrated, and tested in a short amount of time. Successful modifications will be later procured and fielded to the Fleet Marine Force (FMF).

(U) FY 1998 Accomplishments: Not Applicable.
(V)
(U) FY 1999 Planned Program: Not Applicable.

(U) FY 2000 Planned Program:

- (U) $ 39 Program Management and travel in support of Motor Transport modifications.
- (U) $ 108 Develop kits for Motor Transport modifications utilizing COTS/NDI.
- (U) $ 99 Begin testing, integration and evaluation on Motor Transport modifications which utilize COTS/NDI.

(U)Total $ 246

B. (U) Project Change Summary FY 1998 FY 1999 FY 2000

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE: February 1999

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0206624M Marine Corps Combat Services Support

PROJECT: C2509

B. (U) Project Change Summary

	FY 1998	FY 1999	FY 2000
(U) Previous President's Budget			0
(U) Adjustments to Previous President's Budget			+246
(U) Current Budget Submit	0	0	246

(U) Change Summary Explanation:

(U) Funding: FY 2000: Program funded in POM-00. Portions previously funded in multiple principle end item RDT&E lines.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) Other Program Funding Summary (APPN, BLI #, NOMEN)

	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
(U) PMC Line (BLI#523000) ILT $5Million (MotTranMod)			7525	9396	1229	1254	1274	1299	Cont.	Cont.

(U) Related RDT&E

D. (U) Schedule Profile: Not applicable.

EXHIBIT R-2, FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0207161N
PROGRAM ELEMENT TITLE: TACTICAL AIR INTERCEPT

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
E0457 AIM-9X	55,120	64,626	40,051	17,503	5,699	1,927	799	1,531	0	260,396
TOTAL	**55,120**	**64,626**	**40,051**	**17,503**	**5,699**	**1,927**	**799**	**1,531**	**0**	**260,396**

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The AIM-9X Sidewinder program is a joint USN/USAF effort to continue the evolutionary development of the AIM-9 missile. The AIM-9X is the long-term evolution of the AIM-9 that will provide a series of modifications to the AIM-9 improving seeker/guidance and kinematic performance and will be fielded in the post-2000 timeframe. Funding for AIM-9X activities beyond FY 1994 is provided equally by the USN and USAF. The test articles are engineering developmental assets for proving missile performance in support of the LRIP DAB decision.

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET **DATE: February 1999**

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0207161N
PROGRAM ELEMENT TITLE: TACTICAL AIR INTERCEPT

PROJECT NUMBER: E0457
PROJECT TITLE: AIM-9X

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1998 BUDGET	FY 1999 BUDGET	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
E0457 AIM-9X	55,120	64,626	40,051	17,503	5,699	1,927	799	1,531	0	260,396
RDT&E,N Articles		9	15	2						26

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The AIM-9X Sidewinder program is a joint USN/USAF effort to continue the evolutionary development of the AIM-9 missile. The AIM-9X is the long term evolution of the AIM-9 that will provide a series of modifications to the AIM-9 improving seeker/guidance and kinematic performance which will be fielded in the post-2000 timeframe. Funding for AIM-9X activities beyond FY 1994 is provided equally by the USN and USAF. The test articles are engineering developmental assets for proving missile performance in support of the LRIP DAB decision.

(U) B. JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering
and manufacturing development for modifying existing, operational systems.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 ACCOMPLISHMENTS: (Navy Share Only)

- (U) ($34,216) Continued engineering manufacturing development (EMD), conducted Design Review II (DR II), flew Captive Test Units, and started delivery of safe separation vehicles for Developmental Test-IIB (DT-IIB).
- (U) ($7,590) Continued to provide aircraft interface information to EMD contractor to include available wind tunnel data.

- (U) ($9,552) Continued monitoring EMD contract, continued DT-IIA flight testing, complete DT-IIA within the fourth quarter, began preparations for DT-IIB, initiated DT-IIB, and provided consulting services support.
- (U) ($1,980) Headquarters/field travel.
- (U) ($1,782) Began digital upgrade modification to LAU-7 launcher.

2. FY 1999 PLAN: (Navy Share Only)

- (U) ($31,505) Continue EMD efforts.
- (U) ($9,110) Continue providing aircraft interface to the EMD contractor. Relate results of wind tunnel testing to missile/platform interface and compatibility efforts.
- (U) ($18,763) Continuation of EMD contractor monitoring, complete DT-IIB, start DT-IIC, begin Operational Test-IIA (OT-IIA), and provide consulting services support.
- (U) ($1,917) Headquarters/field travel.
- (U) ($2,770) Continue digital upgrade to LAU-7 launcher.
- (U) ($561) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2000 PLAN: (Navy Share Only)

- (U) ($19,635) Continue EMD efforts.
- (U) ($1,320) Continue providing aircraft interface to the EMD contractor in support of OT-IIA, DT-IID and Operational Flight Program (OFP 15C).

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0207161N PROGRAM ELEMENT TITLE: TACTICAL AIR INTERCEPT PROJECT NUMBER: E0457 PROJECT TITLE: AIM-9X

- (U) ($17,346) Continue providing Government flight test support through implementation of OT-IIA and DT-IID and Government engineering support to the EMD activities and provide consulting services support.
- (U) ($1,750) Headquarters/field travel.

(U) B. PROGRAM CHANGE SUMMARY:

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	57,946	65,855	42,711
(U) Appropriated Value:	57,946	65,855	
(U) Adjustments from PRESBUDG:	-2,826	-1,229	-2,660
(U) FY 2000/2001 President's Budget Submit:	55,120	64,626	40,051

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 7 | **PROGRAM ELEMENT: 0207161N** | **PROGRAM ELEMENT TITLE: TACTICAL AIR INTERCEPT** | **PROJECT NUMBER: E0457** | **PROJECT TITLE: AIM-9X**

CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY 1998 reduction of -$2,826 thousand is the result of $2,174 thousand for reprogramming actions and $652 thousand for SBIR transfer. The FY 1999 reduction of -$1,229 thousand reflects a $152 reduction for economic assessments, Contract Advisory and Assistance reduction of $1011 and a -$66 reduction for Civilian Personnel under execution. The FY 2000 net reduction of -$2,660 thousand includes; -$75 for minor pricing adjustments, -$1,954 to transfer RDT&E for LAU-7 and F/A-18 Digital Wingtip modifications to the appropriate APN line, -$582 inflation, -$195 working capital fund reductions of -$195 thousand and civilian pay rate increase of $146.

(U) Schedule: Test article delivery schedule revised to reflect EMD schedule changes. LRIP DAB revised to 3rd Qtr of FY 00 based on revised test schedule.

(U) Technical: Not applicable.

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

APPN	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	TO COMPLETE
Qty	75	125	300	300	300	300	3,600
WPN	29,387	32,493	56,759	62,192	63,691	65,089	957,482

(U) RELATED RDT&E:

(U) DA PE 0603715D (AIM-9 CONSOLIDATED PROGRAM)

(U) AF PE 0207161F (TACTICAL AIM MISSILE)

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 7 | **PROGRAM ELEMENT: 0207161N** | **PROGRAM ELEMENT TITLE: TACTICAL AIR INTERCEPT** | **PROJECT NUMBER: E0457** | **PROJECT TITLE: AIM-9X**

(U) D. ACQUISITION STRATEGY: The Acquisition Decision Memorandum (ADM) dated December 3, 1996 approved program entry into Engineering and Manufacturing Development (E&MD). A contract with Hughes Aircraft Company for E&MD was awarded December 13, 1996. Retrofitting of components will extend the operational effectiveness of existing inventories at an affordable cost while continuing evolution of the AIM-9 series. The E&MD contract is a Cost Plus Incentive Fee/Award Fee. In December 1997, Hughes Missile Systems Company became Raytheon Missile Systems Company as a result of Raytheon's acquisition of Hughes.

(U) E. SCHEDULE PROFILE:

	FY 1998	FY 1999	FY 2000	TO COMPLETE
(U)Program Milestones			3Q/00 LRIP DAB	2Q/02 MSIII
(U)Engineering Milestones	2Q DR II		2Q/00 TRR TECHEVAL	1Q/01 TRR for OPEVAL
(U)T&E Milestones	4Q/98-1Q/00 DT-IIB/C	4Q/99-1Q/00 OT-IIA	1Q/00-4Q/00 DT-IID	2Q/01-4Q/01 OT-IIB
(U)Contract Milestones			2Q/00 LRIP	

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0207161N

PROJECT NUMBER: E0457
PROJECT TITLE: AIM-9X

Cost Categories:	Contract Method & Type	Performing Activity & Location	*Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	**Target Value of Contract
DEM/VAL		Hughes								
	C/CPIF	Tucson AZ	6,685	0		0		0	6,685	22,600
	C/CPIF	Raytheon Bedford MA	8,587	0		0		0	8,587	24,900
EMD	C/CPIF/AF	Hughes Tucson, AZ	56,509	27,949	OCT 98	16,313	OCT 99	10,281	111,052	193,500
EMD Award Fee			5,250	3,556	NOV 99	3,322	NOV 00	1,768	13,896	27,792
Aircraft Integration	C/CPFF	McDonnell-Douglas St. Louis, Mo St. Louis, Mo	13,967	9,110	OCT 98	1,320	OCT 99		24,397	
Engineering Services	WX	NAWCWD, CL	26,237	17,393	NOV 98	17,373	NOV 99	10,684	72,916	
Miscellaneous I/H (Efforts <$1.0M)	Various	Various	4,780	1,648	NOV 98	777	NOV 99	1,611	8,816	
LAU-7 Launcher		McDonnell-Douglas St. Louis,Mo	1,782	2,770					4,552	
Contract (P^3I)	TBD	TBD						2,404	2,404	2,404
Subtotal Product Development			123,797	63,655		39,105		26,748	253,305	
Remarks: Target Value of Contract for DEM/VAL, EMD and Award Fee includes Air Force Funding										
Support Costs included in Management										
Subtotal Support			0	0		0		0	0	

Remarks:

Award Fee is 12% of the Target Cost and is broken into four increments. The first award fee period was applied in July 1998.
*FY95 and prior funded under P.E. 0603715D. FY96-98 funded under P.E. 0207161N. **Target Value includes both Navy and Air Force Funding.

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0207161N

PROJECT NUMBER: E0457
PROJECT TITLE: AIM-9X

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
All costs for test and evaluation are included in product development										
Subtotal Test & Evaluation			**0**	**0**		**0**		**0**	**0**	
Remarks:										
Contract Engineering Support	ID/IQ, T&M	Endmark Arlington, VA	2,750	1,000	Dec 98	500	Dec 99	0	4,250	4,250
	TBD	TBD				250	Dec 99	493	743	
Program Management Support	ID/IQ, T&M	NSM	1,088	383	Dec 98				1,471	1,471
Travel		PMA 259 IPT	625	256		196		218	1,295	
Subtotal Management			**4,463**	**1,639**		**946**		**711**	**7,759**	
SBIR Assessment				561					561	
Remarks:										
Total Cost			**128,260**	**64,626**		**40,051**		**27,459**	**260,396**	

EXHIBIT R-2, FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0207163N
PROGRAM ELEMENT TITLE: AMRAAM

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
E0981 AMRAAM	5,475	4,674	13,544	12,311	11,035	8,405	9,877	10,175	Cont.	Cont.
TOTAL	5,475	4,674	13,544	12,311	11,035	8,405	9,877	10,175	Cont.	Cont.

Quantity of RDT&E Articles

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This joint Navy/Air Force program is structured in response to the Joint Service Operational Requirement and Mission Element Need Statement to develop an air superiority air-to-air missile with significant improvements in operational utility and combat effectiveness. This program supports the integration of the AMRAAM into Navy aircraft with analysis of Navy unique applications, simulation capability development, aircraft missile integration tasks, pre-planned product improvement (P3I) efforts, and procurement of hardware to support Navy test and evaluation tasks. This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing, operational systems.

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0207163N
PROGRAM ELEMENT TITLE: AMRAAM

PROJECT NUMBER: E0981
PROJECT TITLE: AMRAAM

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
TOTAL	5,475	4,674	13,544	12,311	11,035	8,405	9,877	10,175	Cont.	Cont.
Quantity of RDT&E Articles										

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This joint Navy/Air Force program is structured in response to the Joint Service Operational Requirement and Mission Element Need Statement to develop an air superiority air-to-air missile with significant improvements in operational utility and combat effectiveness. This program supports the integration of the AMRAAM into Navy aircraft with analysis of Navy unique applications, simulation capability development, aircraft missile integration tasks, pre-planned product improvement (P3I) efforts, and procurement of hardware to support Navy test and evaluation tasks.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

- (U) ($5,475) Continued systems engineering and participation in AMRAAM P3I Phase 2 EMD and Phase 3 risk reduction program (incorporating additional Air Force funding of ($39,181) with emphasis on Navy unique requirements and aircraft integration compatibility requirements. Participate in Joint Tactical Air-to-Air Missile Office (JTAAMO) Air-to-Air Joint Assessment Roadmap activities.

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0207163N** **PROGRAM ELEMENT TITLE: AMRAAM** **PROJECT NUMBER: E0981** **PROJECT TITLE: AMRAAM**

2. FY 1999 PLAN:

- (U) ($4,575) Initiate systems engineering and participation in AMRAAM P3I Phase 3 EMD program (incorporating additional Air Force funding of $34,613) with emphasis on Navy unique compatibility requirements and aircraft integration compatibility requirements. Conduct P3I Phase 3 System Design Review. Continue JTAAMO Air-to-Air Roadmap activities.
- (U) ($99) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2000 PLAN:

- (U) ($13,544) Continue systems engineering/aircraft integration activities in AMRAAM P3I Phase 3 EMD program (incorporating additional Air Force funding of $49,783) conducting proof of design (POD) testing of Phase 3 components with emphasis on Navy unique compatibility requirements and aircraft integration compatibility requirements. Conduct Phase 3 Preliminary Design Reviews. Continue JTAAMO Air-to-Air Roadmap activities including technology studies.

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0207163N** **PROGRAM ELEMENT TITLE: AMRAAM** **PROJECT NUMBER: E0981** **PROJECT TITLE: AMRAAM**

(U) B. PROGRAM CHANGE SUMMARY

	FY 1998	FY 1999	FY 2000
(U) FY1999 President's Budget:	5,479	4,862	4,647
(U) Appropriated Value:	5,700	4,862	
(U) Adjustments from President's Budget:	-4	-188	8,897
(U) FY2000 President's Budget Submit:	5,475	4,674	13,544

CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY 1998 reduction of -$4 thousand was for Small Business Innovative Research. The FY1999 decrease of -$188 thousand was for various minor pricing adjustments. The FY2000 increase is to fund the Navy's share of Pre-planned Product Improvement (P3I) Phase 3 efforts.

(U) Schedule: The revised schedule is consistent with a one-stage P3I Phase 3 program vice the schedule estimate when a two stage P3I Phase 3 was envisioned.

(U) Technical: None.

(U) C. OTHER PROGRAM FUNDING SUMMARY

Appn	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete
WPN/P1#6 Qty	120	100	100	100	100	100	100	100	436
$	54,088	51,135	46,261	46,385	54,804	54,989	52,845	53,996	234,646

Related RDT&E

(U) PE 0207130F F-15
(U) PE 0204136N F/A-18 Squadrons
(U) PE 0207163F AMRAAM P3I
(U) PE 0207133F F-16
(U) PE 0604239F F-22
(U) PE 0207134F F-15E

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0207163N** **PROGRAM ELEMENT TITLE: AMRAAM** **PROJECT NUMBER: E0981** **PROJECT TITLE: AMRAAM**

(U) D. ACQUISITION STRATEGY: With the December 1997 merger of Raytheon and Hughes into the Raytheon Systems Company, the government implemented a new acquisition strategy labeled AMRAAM Vision 2000. The Vision 2000 strategy capitalizes on the hardware pricing agreement between Raytheon and the government under the auspices of the Department of Justice, and supported the Raytheon/Hughes merger and a shift in government business practices toward a more "commercial" business arrangement. The procurement lot 12 contract award includes an overarching price control strategy and the transfer of Total System Performance Responsibility (TSPR) to the Raytheon Defense Systems Segment in Tucson, Arizona. The purchase includes missiles, warranties, spares, missile performance tracking and assessments, and reliability tests. Raytheon assumes control and responsibility for all specifications below missile performance. Also included in this contract are pre-priced options for lots 13-15, awarded in FY99

(U) E. SCHEDULE PROFILE

	FY 1998	FY 1999	FY 2000	To Complete
(U) Program Milestones		1Q P3I-3 EMD CTK AWD		
(U) Engineering Milestones		3Q P3I-3 SDR	3Q P3I-3 PDR	P3I-3 CDR
(U) T&E Milestones	4Q P3I-2 FLT TEST			
(U) Contract Milestones				

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0207163N

PROJECT NUMBER: E0981
PROJECT TITLE: AMRAAM

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Product Development	SS/CPAF	ASC EGLIN AFB, FL		1671	1/99	9386	11/99	8263	Cont.	TBD
Award Fee		ASC EGLIN AFB, FL		312	1/99	1656	11/99	1458	Cont.	TBD
Product Development	WX	NAWC-WD Pt. Mugu, CA		175	11/98	179	11/99	183	Cont.	TBD
Subtotal Product Development				**2158**		**11221**		**9904**	**Cont.**	

Remarks:

Support	SS/CPAF	ASC EGLIN AFB, FL		72	1/99	75	11/99	77	Cont.	TBD
Award Fee		ASC EGLIN AFB, FL		13	1/99	13	11/99	14	Cont	TBD'
Support	SS/FFP	JHU/APL LAUREL MD		510	4/99	366	4/00	370	Cont.	TBD
Support	RX	NSMA VA		1292	1/99	1325	12/99	1288	Cont.	TBD
Support	WX	NAWC-WD Pt. Mugu, CA		120	10/98	120	10/99	128	Cont.	TBD
Subtotal Support				**2007**		**1899**		**1877**	**Cont.**	

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0207163N

PROJECT NUMBER: E0981
PROJECT TITLE: AMRAAM

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Test and Evaluation	TBD	TBD		150	1/99	154	10/99	250	Cont.	TBD
Subtotal Test & Evaluation				**150**		**154**		**250**	**Cont.**	
Remarks:										
Management	Travel Orders	PMA268 EGLIN AFB FL		260		270		280	Cont.	TBD
Subtotal Management				**260**		**270**		**280**	**Cont.**	
SBIR Assessment				**99**						
Remarks:										
Total Cost				**4674**		**13544**		**12311**	**Cont.**	**TBD**

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0303109N**
PROGRAM ELEMENT TITLE: Satellite Communications

(U) Cost ($ in Thousands)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Total PE Cost	18,062	17,523	38,921	12,946	11,819	15,824	7,978	8,158	CONT.	CONT.
X0728 EHF SATCOM Terminals	14,789	15,523	8,491	7,415	6,686	7,803	7,978	8,158	CONT.	CONT.
X0731 Fleet Satellite Communications	3,273	2,000	2,829	1,514	1,025	0	0	0	CONT.	CONT.
P2472 Mobile User Segment	0	0	27,601	4,017	4,108	8,021	0	0	0	43,747

A. Mission Description and Budget Item Justification:

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Navy Extremely High Frequency (EHF) Satellite Communications (SATCOM) Program (NESP) provides for the development and production of terminals to provide anti-jam, low probability of intercept/detection communications capability for Command and Control of the fleet. NESP operates with FLTSAT EHF packages and UFO EHF Satellite packages and is the Navy's portion of Milstar. The Milstar program is comprised of satellites, control stations, and aircraft, ship, and ground terminals to provide assured worldwide, secure, anti-jam, survivable communications for the National Command Authority, CINCs, and operational commanders.

(U) Fleet Satellite Communications includes Sensitive Compartmented Information (SCI) Automated Digital Network System (ADNS)/Tactical Intelligence Information Exchange Subsystem II Plus (TACINTEL II+) which provides real time indications and warning support and enhanced SCI interoperability with other services, agencies, and allies permitting a level of integration not available with current systems.

U) The Mobile User Segment program develops the next generation DoD narrowband communications satellite constellation. The current UHF Follow-On (UFO) constellation is expected to degrade below acceptable availability parameters and will require replacement by FY07. In addition, new user requirements have been identified and validated as improvements in warfighter tactics, and strategies have been modified to incorporate new concepts and technologies. The joint Mobile User Objective System (MUOS) Integrated Product Team (IPT) has developed an acquisition strategy based on the exponential growth of narrowband communications demands, which has resulted in identifying the need to explore new approaches to acquiring satellite based communications capabilities. This program builds on state of the art technologies and commercial practices to develop a totally responsive joint warfighter system.

(U) An eleventh UFO satellite is being procured as a gapfiller to maintain the current UFO constellation until the MUOS can be put in place. The UFO receiver used on all previous UFOs is obsolete and no longer available. The contractor will develop and test a replacement UHF receiver for the UFO gapfiller satellite.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing, operational system.

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0303109N
PROGRAM ELEMENT TITLE: Satellite Communications

PROJECT NUMBER: X0728
PROJECT TITLE: EHF SATCOM Terminals

Cost ($ in Thousands)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
X0728 EHF SATCOM Terminals Quantity of RDT&E Articles & cost	14,789	15,523	8,491	7,415	6,686	7,803	7,978	8,158	CONT.	CONT.

A. Mission Description and Budget Item Justification:

(U) Navy Extremely High Frequency (EHF) Satellite Communications (SATCOM) Program provides for the development and production of terminals to provide anti-jam, low probability of intercept/detection communications capability for Command and Control of the fleet. The terminals will provide physical and electromagnetically survivable, worldwide communications in the current and projected electromagnetic and nuclear threat environments. Navy EHF terminals are interoperable with Army and Air Force terminals and will operate with Milstar as well as EHF packages on-board Ultra High Frequency (UHF) Follow-On (UFO) Satellites 4 through 10 and FLTSATCOM Satellites 7 and 8. The increased capability provided by EHF terminals is accomplished by use of the wider bandwidths available at extremely high frequencies, narrow antenna beamwidths, spread spectrum techniques, on-board satellite processing, and advanced signal processing technology.

(U) A Medium Data Rate (MDR) capability is currently under development to utilize the capabilities on Milstar satellites DFS-3 through DFS-6. MDR will provide the only protected (jam resistant and low probability of intercept/detection) MDR data rates from 4.8 kilobits per second (Kbps) to 1.544 megabits per second (Mbps) to the majority of the fleet.

(U) The Navy EHF Communications Controller (NECC) provides automated, netted tactical data Information Exchange Subsystems (IXS) over jam resistant EHF satellite links. The NECC will provide for load and channel sharing, resource management, communications management and planning, network control and monitoring, and services including circuit switching, packet switching, and backward compatibility to UHF SATCOM.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 ACCOMPLISHMENTS:

- (U) ($ 8,462) Delivered additional EDM MDR modem and modification kits; continue MDR ILS development; complete MDR software development; continue MDR SATSIM development; and perform system integration testing to meet MST testing schedule.
- (U) ($ 1,504) Performed developmental and interoperability testing (MST-6000) with Navy MDR terminal, Army MDR terminal, and the on-ground flight model Milstar MDR satellite to verify compatibility prior to launch of first Milstar satellite in FY 99.
- (U) ($ 1,031) Continued development of NECC interface with MDR.

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0303109N
PROGRAM ELEMENT TITLE: Satellite Communications

PROJECT NUMBER: X0728
PROJECT TITLE: EHF SATCOM Terminals

- (U) ($ 1,039) Commenced development of Submarine Reportback Compression/Encryption capability to provide transmit and receive message processing for reportback messages to support tactical brevity coding, reportback message compression, and KGV-11 time of day encryption.
- (U) ($ 294) Developed and updated Naval Command, Control, Communications, Computers, Intelligence, Sensors and Reconnaissance (C4ISR) implementation guidance.
- (U) ($ 2,459) Continued Milstar terminal and MDR development engineering analysis and management.

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0303109N
PROGRAM ELEMENT TITLE: Satellite Communications

PROJECT NUMBER: X0728
PROJECT TITLE: EHF SATCOM Terminals

2. (U) FY 1999 PLAN:

- (U) ($ 6,504) Perform MDR software corrections resulting from MST-6000 testing with flight model MDR satellite. Continue MDR ILS development; prepare MDR software documentation; perform software configuration management; perform system testing; support installation, checkout, and integration of EDM antenna/pedestals on operational platforms, EDM MDR modems, and field change kits in support of MST testing; and complete MDR SATSIM development and modifications.
- (U) ($ 600) Perform ship and shore integration for MDR upgrade.
- (U) ($ 1,600) Perform MST-8000 development testing with initial AN/USC-38(V) with MDR, Army MDR terminal, and on-orbit Milstar satellite with MDR to verify compatibility.
- (U) ($ 2,809) Perform TECHEVALs/OPEVALs for Navy MDR and participate in Milstar MDR IOT&E.
- (U) ($ 1,500) Continue development of NECC modifications. Conduct developmental and operational testing of MDR capable NECC units.
- (U) ($ 1,500) Develop modifications required to maintain compatibility with future EHF satellite constellations (i.e., Advanced EHF). Investigate antenna technology advancements including phased array and flat plate antennas. Begin investigation of Radar Cross Section (RCS) vulnerability reduction measures.
- (U) ($ 1,010) Continue Milstar terminal and MDR development engineering analysis and management.

3. (U) FY 2000 PLAN:

- (U) ($ 2,408) Complete MDR Satellite Simulator (SATSIM) development and support EDM MDR modems.
- (U) ($ 1,062) Continue testing for Navy MDR and participate in Milstar MDR IOT&E for multiple MDR constellations.
- (U) ($ 1,610) Continue development of TIP/NECC modifications.
- (U) ($ 2,400) Continue Advanced EHF system engineering analysis and specification generations.
- (U) ($ 1,011) Continue Milstar terminal and MDR development engineering analysis and management.

BUDGET ACTIVITY: 7 | **PROGRAM ELEMENT: 0303109N** | **PROGRAM ELEMENT TITLE: Satellite Communications** | **PROJECT NUMBER: X0728** | **PROJECT TITLE: EHF SATCOM Terminals**

B. (U) PROGRAM CHANGE SUMMARY:

	1998	1999	2000
(U) FY 99 President's Budget	$15,464	$16,068	$8,595
(U) Appropriated Value			
(U) Adjust. from FY 99 PRESBUDG	($675)	($545)	($104)
(U) FY 00 President's Budget Submit	$14,789	$15,523	$8,491

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding:

FY 1998 reflects a $1k FY1998 Update
FY 1998 Congressional undistributed general adjustment since the President's Budget.
FY 1999 reflects the following ($-545K) issues: **64128:** Sec. 8108 Revised Economic Assumptions, **64231:** Civilian Personnel Underexecution, **64440:** Sec.8054 Contract Advisory and Assistance Service, **65606:** Sec.8034 FFRDC Distribution.
FY 2000 reflects the following ($117K) issues: **66212:** PBD 606 Civilian Pay Rates, **66547:** PBD 604 Non Pay Inflation.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

B. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in Thousands)

	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	TO COMPLETE	TOTAL PROGRAM
OPN SHIP* 321000	39,579	56,910	89,900							
OPN SHORE*	2,195	14,793	32,215							

*Includes EHF terminal installation costs.

(U) Related RDT&E:

(U) PE 0303603F, Milstar

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0303109N**
PROGRAM ELEMENT TITLE: Satellite Communications

PROJECT NUMBER: X0728
PROJECT TITLE: EHF SATCOM Terminals

(U) PE 0303601F, Air Force Satellite Communications
(U) PE 0303142A, Army Extremely High Frequency Communications Terminal

C. (U) ACQUISITION STATEGY:

	FY 1998	FY 1999	FY 2000
Program Milestones	N/A	MS IV (MDR Full Rate Prod) 6/99	Milstar II Launch (Flight 4) 1/00
Engineering Milestones	N/A	N/A	N/A
T&E Milestones	MDR MST6000 7/98	MDR MST8000 3/99 MDR OT 5/99	N/A
Contract Milestones	MDR Initial Prod Award 1/98	N/A	N/A

D. SCHEDULE PROFILE: See paragraph C.

DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0303109N PROJECT NUMBER: X0728

Cost Categories	Contract Method & Type	Performing Activity & Location	Total Pys Cost	FY 99 Cost	FY 99 Award Date	FY 00 Cost	FY 00 Award Date	FY01 Cost	FY 01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Product Development												
Prime Mission Equipment	SS/CPFF	Raytheon Marlborough, MA	29,501	8,578	12/98	5,228	12/99			CONT	CONT	
Prime Mission Equipment	WR	SSC SD	10,194	2,594	11/98	493	11/99			CONT	CONT	
Prime Mission Equipment	Various	Other	4,641	938	12/98	99	12/99			CONT	CONT	
Subtotal Product Development			44,336	12,110		5820				CONT	CONT	
Remarks:												
Support Cost/Management Services												
	WR	SSC SD	5,532	840	12/98	446	12/99			CONT	CONT	
	WR	NUWC	4,712	417	12/98	365	12/99			CONT	CONT	
	Various	Other	3,676	325	12/98	309	12/99			CONT	CONT	
Subtotal Support			13,920	1,582		1,120				CONT	CONT	
Remarks:												

DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0303109N PROJECT NUMBER: X0728

Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 99 Cost	FY 99 Award Date	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Test & Evaluation												
Test & Evaluation	Various	Various	3,566	1,831	12/98	1,551	12/99			CONT	CONT	
Subtotal T&E			3,566	1,831		1,551				CONT	CONT	
Remarks												
Management Services												
Subtotal Management												
Remarks												
Total Cost			61,822	15,523		8,491				CONT	CONT	
Remarks												

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0303109N** **PROJECT NUMBER: X0731**

Cost ($ in Thousands)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
X0731 Fleet Satellite Communications	3,273	2,000	2,829	1,514	1,025				CONT.	CONT.

A. Mission Description and Budget Item Justification:

(U) The Sensitive Compartmented Information (SCI) Automated Digital Network System (ADNS)/Tactical Intelligence Information Exchange Subsystem II Plus (TACINTEL II+) implements the Integrated Special Intelligence Communications portion of the Copernicus Joint Maritime Communications System (JMCOMS)/ADNS architecture, to provide services for transfer of Special Intelligence (SI) information between ships, aircraft, and shore activities in support of joint and combined operations. SCI ADNS/TACINTEL II+ will provide real time indications and warning support to joint and component commanders through reliable high speed transfer of sensor data and intelligence information. Enhanced interoperability with other services, agencies, and allies will permit a level of integration of SI operations not achievable with current systems. The Joint ultra high frequency (UHF) Military Satellite Communications Network Integrated Control System (JMINI) Control system will provide dynamic centralized control of joint 5-kHz and 25kHz UHF military satellite communications (MILSATCOM) voice and data resources (channels and Time Division Multiple Access (TDMA) time slots via a globally integrated system of four control stations to be located at each of the three Naval Computer and Telecommunications Area Master Station (NCTAMS) sites plus Naval Computer and Telecommunications Station (NCTS) Guam.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 ACCOMPLISHMENTS:

- (U) ($2940) Implemented advanced SCI ADNS/TACINTEL II+ into ADNS. Begin design, implementation, system/software test documentation support on the Network Management Systems (NMS) to support the JMINI Control System.
- (U ($333) Developed and updated Naval Command, Control, Communications, Computers, Intelligence, Sensors and Reconnaissance (C4ISR) implementation guidance.

2. (U) FY 1999 PLAN:

DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0303109N PROJECT NUMBER: X0731

- (U) ($ 2,000) Continue implementation of SCI ADNS/TACINTEL II+.

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0303109N** **PROJECT NUMBER: X0731**

3. (U) FY 2000 PLAN:

- (U) ($ 2,829) Transition SCI ADNS/TACINTEL II+ functionality to Windows NT/IT 21 compliant architecture to include re-hosting to Cryptologic Workstation environment. Integrate and implement SCI ADNS Build II. Continue development of voice, data and video integration into SCI ADNS environment. Preparation for SCI Defense Messaging System integration. Developmental Testing (DT) and Follow on Operational Testing and Evaluation (FOT&E) of SCI ADNS/TACINTEL II+.

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding:

FY98: Joint Staff decision- JWCA issue: N6 plus-up $2,491K and FY 1998 Update -$10K.
FY 99: Reflects a net -$120K for issues: 64128, 64231, 64440
FY 00 Reflects a net +$31K for issues: 66212, 66547

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0303109N** **PROJECT NUMBER: X0731**

B. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in Thousands)

	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY2004	FY2005	TO COMPLETE	TOTAL PROGRAM
OPN SHIP* 321000	1972	2,649	4,892						CONT.	CONT.
OPN SHORE* 322000	1,261	626	493						CONT.	CONT.

*Includes terminal installation costs.
(U) Related RDT&E: N/A

C. (U) ACQUISITION STRATEGY:

	FY 1998	FY 1999	FY 2000
Program Milestones	N/A	N/A	SCI ADNS 2 IOC 6/00
Engineering Milestones	N/A	N/A	SCI ADNS 2 PCA 3/00
T&E Milestones	SCI ADNS 1 DT 9/98	SCI ADNS 1 OT1 7/99	SCI ADNS DT 7/00 OT 9/00
Contract Milestones	N/A	N/A	N/A

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0303109N** **PROJECT NUMBER: X0731**

D. SCHEDULE PROFILE: See paragraph C.

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 99 Cost	FY 99 Award Date	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
1.1.1 Prime Mission Product	FPI	Titan	6,309	0		0		0		0	6,309	
1.1.1 Prime Mission Product	FFP	SRC	18,505	0		0		0		0	18,505	
1.1.1 Prime Mission Product	PD	NAVSUP/SRC	3,946	1,395	Dec 98	2,194	Dec 99			1,597	9,132	
1.1.1 Prime Mission Product	VAR	VAR	9,654	125	Dec 98	100	Dec 99			200	10,079	
Subtotal Product Development			38,414	1,520		2,294				1,797	44,025	

Remarks:

1.1.1 Prime Mission Product	CPFF	CSC	3,588	0		0		0		0	3,588	
1.1.1 Prime Mission Product	PD	NAVAIR/ISC	1,176	0		0		0		0	1,176	
1.1.1 Prime Mission Product	VAR	VAR	9,343	0		0		0		0	9,343	
GFE												
Subtotal Support			14,107	0		0		0		0	14,107	

Remarks

DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0303109N PROJECT NUMBER: X0731

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 99 Cost	FY 99 Award Date	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
1.2.5 System T&E	N/A	SSC SD	0	267	Dec 98	322	Dec 99		Dec 00	448	1,037	
1.2.5 System T&E	N/A	OPTEVFOR	0	80	Dec 98	80	Dec 99		Dec 00	160	320	
1.2.5 System T&E	VAR	VAR	9,296	0		0		0		0	9,296	
Subtotal T&E			9,296	347		402				608	10,653	
Remarks												
1.1.3 Program Management	CPFF	CSC	3,588								3,588	
1.1.3 Program Management	PD	NAVAIR/ISC	1,176								1,176	
1.1.3 Program Management	N/A	ACS	410	133	Dec 98	133	Dec 99		Dec 00	134	810	
1.1.3 Program Management	VAR	VAR	9,343								9,343	
Subtotal Management			14,517	133		133				134	14,917	
Remarks												
Total Cost			76,334	2,000		2,829				2,539	83,702	
Remarks												

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0303109N
PROGRAM ELEMENT TITLE: Satellite Communications

PROJECT NUMBER: P2472
PROJECT TITLE: Mobile User Segment

Cost ($ in Thousands)

PROJECT NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
P2472 Mobile User Segment	0	0	27,601	4,017	4,108	8,021	0	0	0	43,747

A. Mission Description and Budget Item Justification:

(U) This program provides for: (1) the development of the digital receiver for the UHF Follow-On (UFO) F11 gapfiller satellite and (2) the development of the next generation DoD narrowband communications satellite constellation.

(U) The RDT&E effort for the UFO F11 gapfiller satellite is to develop and test a digital receiver to replace the obsolete analog receiver used on UFO F1-F10. The F11 is being procured to maintain the health of the UFO constellation until the Mobile User Objective System (MUOS) system can be put in place. The analog receiver used earlier is no longer available since the parts for the analog receiver were bought early in the UFO program.

(U) The current UFO constellation is expected to degrade below acceptable availability parameters and will require replacement by FY07. In addition, new user requirements have been identified and validated as improvements in warfighter tactics, and strategies have been modified to incorporate new concepts and technologies. The joint MUOS Integrated Product Team (IPT) has developed an acquisition strategy based on the exponential growth of narrowband communications demands, which has resulted in identifying the need to explore new approaches to acquiring satellite based communications capabilities. This program builds on state of the art technologies and commercial practices to develop a totally responsive joint warfighter system.

(U) This RDT&E effort supports the program objectives by assisting in identifying the cheapest, fastest, most effective way to field a new system by FY07. A draft over-arching communication satellite system Technical Requirements Document (TRD) has been developed by the MUOS IPT as the basic planning document. The TRD incorporates the latest understanding of the joint user needs and transposes these to high level technical performance requirements. From the TRD, in its final form, the prime system contractor will generate the SATCOM system specification from which will flow the technical development and production specifications. It is planned to use industry teams to conduct early evaluation of the TRD, and to identify risk management areas and candidate systems approaches.

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0303109N
PROGRAM ELEMENT TITLE: Satellite Communications

PROJECT NUMBER: P2472
PROJECT TITLE: Mobile User Segment

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY98 ACCOMPLISHMENTS:
   - (U) ($0) N/A
2. (U) FY99 PLAN:
   - (U) ($0) N/A

3. (U) FY00 PLAN:
   - (U) ($4,000) Prepare a final draft TRD for government review and approval. Begin development of draft SATCOM System Specifications.
   - (U) ($23,601) Design and test a digital receiver for UFO F11 gapfiller.

B. (U) PROGRAM CHANGE SUMMARY:

(U) Funding: N/A This project starts in FY00.
(U) Schedule: N/A
(U) Technical: N/A

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

NUMBER / TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) WPN Line 243300										
Fleet Satellite Communication Follow-On	0	0	9,789	167,711	1,961	1,932	50,020	61,109	CONT.	CONT.

(U) RELATED RDT&E: None

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0303109N
PROGRAM ELEMENT TITLE: Satellite Communications

PROJECT NUMBER: P2472
PROJECT TITLE: Mobile User Segment

D. (U) SCHEDULE PROFILE:

	FY 1998	FY 1999	FY 2000
Program Milestones		4Q-PDM/AP	1Q-MS 0
Engineering Milestones			4Q-Final TRD 4Q-Draft Spec
T&E Milestones			
Contract Milestones			1Q-Multiple contracts Award

UFO GAPFILLER

Program Milestone			
Engineering Milestone			
T&E Milestone			
Contract Milestone			SS/FFP 1Q-Mod for F11

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0303109N** **PROJECT NUMBER: P2472**

Exhibit R-3 Cost Analysis (page 1)												Date: January 1999
APPROPRIATION: RDT&E,N BUDGET ACTIVITY : 7		PROGRAM ELEMENT: 0303109N										Mobile User Segment P2472
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	FY01 Cost	FY01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
MUS 2007 Specification Preparation	COM/FP	Various	0	0	N/A	4,000	Oct 99			16,146	20,146	20,146
UFO Gapfiller – Digital Receiver	SS/FP	Hughes, El Segundo	0	0	N/A	21,701	Oct 99			0	21,701	22,100
Subtotal Product Development			0	0		25,701				16,146	41,847	41,847
Remarks:												
Support Cost												
Program Support	Var	Program Support	0	0	N/A	1,900	Oct 99				1,900	1,900
Subtotal Support Cost			0	0		1,900				0	1,900	1,900
Remarks:												
Total Cost			0	0		27,601				16,146	43,747	43,747

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0303140N
PROGRAM ELEMENT TITLE: Information Systems Security Program

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	TO COMPLETE	TOTAL PROGRAM
X0734 Information Systems Security										
	17,287	21,003	22,978	23,712	24,436	24,962	27,151	27,951	CONT.	CONT.
TOTAL	17,287	21,003	22,978	23,712	24,436	24,962	27,151	27,951	CONT.	CONT.

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The goal of the Navy Information Systems Security (INFOSEC) Program (ISSP) is to ensure the continued protection of Navy and Joint information and information systems from hostile exploitation and attack. With the advent of the information age, the network environment, and the evolving reliance on distributed information systems that communicate via computer networks, protecting these networks, the data flowing on the networks, and the attached information systems has become critical to the effective performance of the Navy mission. The fundamental nature of these distributed systems in modern Naval and Joint war fighting means that attacks against the systems are increasingly likely. An adversary has a much broader selection of attack types from which to chose than in the past. In addition to the traditional attacks that involve the theft or eavesdropping of information, attacks involving malicious changes to critical information, changes to the functioning of critical systems, or the destruction of systems and networks have become much more feasible. Since many Navy information systems are based on commercially available technologies, an adversary often has access to the very technologies that are targeted for exploitation.

(U) Owing to the attack variety, the complexity of Navy distributed systems, and the rapid rate of change of the underlying commercial and government technologies; the provision of security is an increasingly complex and ever changing problem. Technologies involved with providing security are a mix of computer security, network security, and cryptographic security technologies which must be carefully developed and integrated into many parts of the Navy information infrastructure. The placement of technologies and the mix of technologies required must evolve quickly to meet the rapidly evolving threats and vulnerabilities. This is a departure from years past when protections were mostly associated with the eavesdropping threat and were primarily provided by cryptographic devices. In order to gain the requisite levels of protection, the various security technologies must be applied in a carefully architected manner. Information Assurance (IA) is the comprehensive management of both the information and the information system security disciplines. At the same time the IA problem is becoming more complex, demands to move information between security levels and to and from coalition partners are increasing.

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0303140N
PROGRAM ELEMENT TITLE: Information Systems Security Program

(U) The Navy ISSP RDT&E program is structured to stay abreast of the exploding information system security problem in Navy and ensure that Navy systems possess the requisite level of protection. To model the way DOD information systems are evolving (rather than being one-time developments), the ISSP RDT&E program is structured to continuously evaluate technical directions/options. The program develops frameworks and architectures based on mission threats, exploitation risks, and integrated Joint information system efforts, etc. The program provides the efforts and resources to determine the proper security functions and placement of the functions; uses the frameworks and architectures to coordinate Navy work with DoD and National Security Agency (NSA) IA efforts. The program also examines commercial technologies to determine their fit with the architectures; provides feedback to vendors and standards bodies about what Navy requires in commercial products. It develops or tailors technologies, standards, and processes to Navy requirements if necessary; prototypes systems or portions of systems and examines their operational utility in operational Navy settings, and provides IA expertise and engineering to Navy and Joint information system developments. All technology development efforts are aimed at specific Navy and Joint IA problems and are aimed to transition to procurement as soon as ready.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing, operational systems.

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0303140N
PROGRAM ELEMENT TITLE: Information Systems Security Program

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	TO COMPLETE	TOTAL PROGRAM
X0734 Information Systems Security	17,287	21,003	22,978	23,712	24,436	24,962	27,151	27,951	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Navy RDT&E program analyzes existing information assurance products and solutions, and develops improved, interoperable communications security equipment and methods, computer security technology and other high assurance techniques/solutions to protect voice, video and data communications from exploitation and provide IA for critical Navy information systems. This program element is a continuing effort to modernize obsolete computer security and cryptographic equipment and ancillaries with state-of-the-art replacements in order to meet the evolving threat. Communication Security (COMSEC) replacements, in most cases, will use embedded modules (using NSA approved crypto engines) and programmable cryptographic technology. The technical strategy and framework efforts are focused on the use of IA technology (e.g., COMSEC and COMPUSEC technology) to counter a wide variety of INFOSEC threats in a Navy environment. Processes and tools are being evaluated, developed and/or tested to design and evaluate the security of systems that integrate information assurance products. Technology base efforts are: developing new secure voice algorithms and prototypes; developing technology for a new family of programmable COMSEC modules; development of network security products, which are designed to interconnect networks of dissimilar classification, and address the Multi-level Security (MLS) technology requirements for the DON, and assessing a variety of potentially high pay-off NSA and industry products. The resulting expertise is applied to a wide variety of Navy development programs that must integrate IA technology.

(U) The expertise in the DON RDT&E program is applied to the development of Navy INFOSEC products and systems, computer and other high assurance technology, development of missing technology (e.g., network security technology and certification methods), and the development of standards, processes and tools, etc). Specific emphasis is being placed on evaluation, integration and test of Contractor off-the-shelf (COTS)/Non-developmental Item (NDI) IA security products into prototype capabilities such as firewalls, guards and monitoring systems to provide for monitoring, detecting, isolating and reacting MDIR to network intrusions throughout the DON. With the Navy now making profound changes in the way it approaches communications and computer security, the current operating environment has virtually eliminated the traditional distinction between telecommunications and information systems. The Navy RDT&E program analyzes existing INFOSEC and high assurance equipment and solutions, and develops improved, interoperable communications security equipment and methods to protect information from exploitation and provide IA for

critical Navy systems. The project provides a continuing effort to modernize obsolete cryptographic and network security equipment and ancillaries with state-of-the-art replacements in order to meet the evolving threat on Navy communication networks. Because INFOSEC is a cradle-to-grave discipline, this program develops the technology and methodology to systems in development, production and operation, and develops the infra-structure needed to support and evaluate the security of deployed systems. These objectives are pursued by using equipment/systems focusing on information assurance technology and their use and impact on distributed information systems.

(U) Under the Navy Secure Voice program, technology to provide high grade, secure tactical and strategic voice connectivity shall be developed and assessed. Additional efforts shall focus on architectures, designing, demonstrating and integrating a secure voice capability for IT-21 and other Command, Control, Communications and Computers (C4I) programs and initiatives. Gateway technology to address Navy unique point-to-multipoint communications shall be developed in support of IT-21 and the Naval Virtual Intranet (NVI). This technology will comprise the secure voice communications suite of equipment for shipboard applications, as well as shore-based sites. Under the Navy Security Management Infrastructure (SMI) program, new emerging technology and enhanced capabilities shall be developed, evaluated and applied to the Electronic Key Management System (EKMS) and other Navy Information Systems. Additional efforts shall focus on the architecture, design, and development of systems to manage the security parameters (for example, encryption keys) necessary to the operation of the systems developed by the Secure Data and Secure Voice portions of the ISSP. This includes the application of Public Key Infrastructure and Certificate Management Infrastructure (PKI/CMI) technology, and the development of a Single Point Command, Control and Keying (SPC^2K) solution to support emerging, embedded cryptographic technology. Under the Secure Data program, efforts focus on architectures, designing, acquiring, demonstrating and integrating the IA technologies into Navy distributed information systems (IT-21, NVI). It involves the injection of security technologies and solutions in Navy C^4I systems to maintain pace with the evolving infrastructure of the internet and expanding network capabilities of ashore and afloat users. Secure data RDT&E, focuses primarily on designing and proving IA solutions for IT-21 and the NVI. This portion of the ISSP supports delivery of network security engineering expertise needed to stand-up the NVI and securely deploy IT-21 constituent systems such as Joint Maritime Communications (JMCOMS), Joint Martime Command Information System (JMCIS), and Base Level information Infrastructure (BLII). It also provides solutions to the coalition operations problem and to the Navy cryptographic equipment obsolescence problem.

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0303140N
PROGRAM ELEMENT TITLE: Information Systems Security Program

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 ACCOMPLISHMENT:

- (U) ($300) Complete development of the Embeddable INFOSEC Product (EIP).
- (U) ($250) Continue development of PEIP prototype.
- (U) ($6,671) Perform development demonstrations, software design reviews, and development, integration and system testing for Tier 1 Phase 1.
- (U) ($1,117) Continue development and begin testing of Tiers 2 and 3 components.
- (U) ($1,810) Provide developmental systems security engineering, Certification, and Accreditation (C&A) support to Navy information systems such as Defense Messaging System (DMS) and Multi-Level Information System Security Initiative (MISSI). This will include systems security engineering support to Navy tactical and non-tactical systems, that are required to incorporate DMS and MISSI evolving technology. Particular emphasis will be directed to system engineering associated with implementation of DMS and MISSI technology into tactical systems, including those associated with Top Secret and Secure Compartmented Information (SCI) systems.
- (U) ($1,030) Develop and test network security solutions for Navy information systems. This will include the high assurance components associated with Top Secret and SCI system solutions.
- (U) ($1,033) Continue development of integrated security architectures for Naval INFOSEC systems, both for C4I systems and non-C4I systems. This will include refinements of interim, incremental security architectures that display how MISSI, Electronic Key Management System (EKMS), and Secure Terminal Equipment (STE) security technology will be integrated into Navy systems. The architectures will include analysis of all technical issues and related concepts of operations associated with the architectures. Develop requirements for mid-term INFOSEC products that may be required. Continue to analyze achieved INFOSEC performance in operational systems. Include latest operational requirements, technical opportunities and new threat information.
- (U) ($405) Continue to participate in revising/refining INFOSEC standards to reflect evolving capabilities. Refine INFOSEC engineering guideline documents as directed by the CNO/Marine Corps co-chaired INFOSEC Steering Group. In coordination with NSA, continue refinements to automated tools to accomplish systems C&A.

- (U) ($879) Develop secure voice integrated shipboard architecture incorporating NSA STE products and integrating COTS assessments of the latest NSA and industry INFOSEC technology and demonstrations of prototype voice systems. Continue research into new INFOSEC voice technology.

- (U) ($386) Develop and update Naval Command, Control, Communications and Computers Information Surveillance and Reconnaissance (C4ISR) implementation guidance. Develop and update Naval C4ISR mission to incorporate an overarching systems, technical and information architectures. Conduct associated C4ISR analysis and studies.

- (U) ($906) Reflects realignment of Navy Vulnerability Assessment and Countermeasures (NVACM) under the INFOSEC Program. Continue vulnerability assessments and information warfare threat assessments in support of critical developing information systems. Continue development, evaluation, integration and prototype of COTS/NDI network countermeasures capabilities to MDIR unwanted intrusions into Navy information systems.

2. (U) FY 1999 PLAN:

- (U) ($2,110) Continue development of the programmable embedded COMSEC prototype and begin integration and system testing. The first targeted application is the Submarine LF/VLF VME Bus Receiver (SLVR) system for replacement of the KG-3X family of cryptos. Initiate efforts to address the use of programmable embedded COMSEC solutions and other cryptographic technology for replacement of aging and obsolete cryptos in Navy systems (e.g., Advanced Narrow-Band Digital Voice Terminal (ANDVT), VINSON, KG-84, KG-40 in support of Link-11, and the Thornton family in support of Link- 16). Identify applications and technology for new ship construction and other platforms, as well as for new emerging communications backbones/circuits in support of Navy initiatives such as IT-21/NVI.

- (U) ($1,249) Continue development of EKMS Tier 1.

- (U) ($842) Complete development, integration and testing of the Tier 1 system with Tiers 0, 2 and 3 components and software.

- (U) ($4,802) Begin the development of EKMS Phase IV. This includes support for the support for the incorporation of the DMS in EKMS, development of requirements for Data Transfer Device (DTD) 2000, and for addressing incorporation of key management solutions for IT-21/NVI. Address the development and inclusion of web-based technology, integration of PKI/CMI technology, integration of key management and net planning capabilities and functions, and support for the incorporation of the Key Systems Operation

(KSO) exchange. Additional efforts focus on the development of the Navy Single Point Command, Control and Keying ($NSPC^2K$) design and solution for Navy platforms and support for embedded cryptographic technology and the Navy's crypto replacement efforts. Continue the development, evaluation and application assessment of high assurance products, and provide system security and C&A engineering and testing for key management components and systems.

- (U) ($475) Begin the design, development, application and evaluation of PKI/CMI techniques (e.g., benign key), netted re-key technology, application of COTS key management technology, key/net management integration, key and certificate workstation integration, key fill device and delivery technology, new cryptographic algorithm developments, and new approaches to cryptographic technology (e.g., software, quantum cryptography, and chaos theory based). Provide the design, development, application and evaluation of new key generation and distribution techniques and technology. Conduct laboratory assessments of the latest NSA and industry COTS key management technology and products, and demonstrations of prototype key management systems.

- (U) ($900) Begin development of the Navy Security Management Infrastructure (NSMI) architecture and design. This includes the development of the concept, architecture, and requirements for the integration of PKI/CMI components and technology for Navy applications and sites. Evaluate and assess the use and application of medium (and other) assurance commercial products for PKI/CMI applications. Assess the feasibility of integrated PKI/CMI technology with key management products and initiatives. Additional NSMI efforts shall focus on incorporating technology and techniques in support of the IT-21/NVI initiatives.

- (U) ($2,576) Continue the design, development and assessment of security solutions/capabilities for next generation voice systems. Continue research into new secure voice technology, developing technology and techniques for secure voice over government and COTS communications backbones, specifically addressing wireline and wireless telephony applications and strategic and tactical communications. Support the integration of secure voice services in support of IT-21/ NVI. Develop/assess the requirements for integrated secure voice/data, and provide system security and C&A engineering and testing for secure voice components and systems. Continue the development of voice algorithms and security techniques, and conduct laboratory assessments of the latest NSA and industry COTS secure voice technology and products, and demonstrations of prototype secure voice systems. This includes development of secure voice technology to support Navy unique requirements/applications (e.g., point-to-multipoint) for new ship construction, existing ship platforms, and for shore sites.

- (U) ($200) Continue to research secure voice and biometric access consortia. Continued laboratory assessments of the latest NSA and industry INFOSEC technology and demonstrations of prototype voice systems. Continue research into new high assurance secure voice technology.

- (U) ($620) Develop a security architecture for IA that includes virtually all Navy distributed information system development programs. Ensure the architecture evolves to provide proper protection as technology, DOD missions, and the threat all evolve. Provide inputs to the major Navy and joint initiatives that are defining and building distributed systems including IT-21, NVI, the Navy CIO Technology Infrastructure project, the Joint Technical Architecture, and large development programs including (Global Command and Control System, Maritime (GCCS-M), Global Command and Control System (GCCS), DMS, JMCOMS and others. Include both defensive protections as well as intrusion monitoring in the architecture.

- (U) ($2,692) Evaluate, test and if necessary, develop distributed information system security technology solutions for Navy information systems. This includes the examination and selection of various components, such as firewalls, intrusion detection systems, virtual private networking systems, public key based secure e-mail and web systems, and others as well as high assurance components for connection of Top Secret and SCI systems to lower level systems. Prototype some of the components at operational sites. Begin examining alternatives for high speed network encryption (IP packet encryption at speeds of at least 100 Mbps).

- (U) ($1,950) Provide developmental systems security engineering, C&A support to Navy information system developments such as GCCS-M, GCCS, DMS, JMCOMS, IT-21, NVI, NSSN, LPD-17, SC-21, and others. Focus on integration of the proper functions to ensure adherence to the common security architectures. Ensure that the security and performance of the tactical systems, including those operating at Top Secret and at SCI are consistent with Navy and DOD requirements.

- (U) ($705) Continue developing and updating INFOSEC standards and engineering guidance documents to ensure they are consistent with the security architecture, the rapidly changing technology, and the evolving threat. Include guidance for proper operational procedures for the use of the security protections at various levels in the command hierarchy.

- (U) ($550) Develop, prototype, and test solutions to the coalition interoperability problem. Base the solutions on available multilevel security technologies as well as emerging architectural methods of providing interoperability across different security levels.

- (U) ($1332) Continue vulnerability/threat assessments and development and systems integration of network countermeasures tools (NVACM) efforts.

3. (U) FY 2000 PLAN:

- (U) ($2,000) Continue development of programmable embedded COMSEC solutions for the remainder of the KG-3X family of cryptos, addressing specifically the ground based transmitter sites and TACAMO aircraft. Begin the development and implementation of benign keying technology for all crypto replacement efforts. Continue efforts to address the use of other cryptographic technology for replacement of aging and obsolete cryptos in existing and new Navy communications systems/circuits (e.g., ANDVT, VINSON, KG-84, KG-40 in support of Link-11, and the Thornton family in support of Link-16). Continue to identify and target applications for cryptographic replacement technology for new ship construction and other platforms, as well as for new emerging communications backbones/circuits in support of Navy initiatives such as IT-21/NVI. Begin prototyping candidate cryptographic replacement solutions for evaluation and assessment in Navy representative circuits and platforms. These efforts will be coordinated with the NSA.

- (U) ($825) Complete development of EKMS, and ensure compatibility with the Tier 0, Tier 2, and Tier 3 components and software.

- (U) ($2,675) Continue the development of EKMS Phase IV for Tier 1, Tier 2 and Tier 3. This includes support for the incorporation of the DMS into EKMS, and for addressing incorporation of enhanced key management capabilities/solutions for IT-21/NVI. Address the development and inclusion of web-based technology and support for the incorporation of the KSO exchange. Begin the requirements definition for integration of certificate management and key management. Additional efforts focus on the development and prototyping of the NSPC^{2}K design and solution for Navy platforms, development and prototyping of the DTD 2000, and key management support for embedded cryptographic technology and the Navy's crypto replacement efforts. Provide system security and C&A engineering and testing for key management components and systems.

- (U) ($1,260) Continue the design, development, application and evaluation of key management technology, key management techniques (e.g., benign key), netted re-key technology, application of COTS key management technology, key/net management integration, key and certificate workstation integration, key fill device and delivery technology, new cryptographic algorithm developments, and new approaches to cryptographic technology (e.g., software, quantum cryptography, and chaos theory based). Initiate

prototyping and demonstration of technology. Provide the design, development, application and evaluation of new key generation and distribution techniques and technology. Conduct laboratory assessments of the latest NSA and industry COTS key management technology and products, and demonstrations of prototype key management systems.

- (U) ($1,125) Continue development of the NSMI architecture and design. Based on the Navy's architecture/concept and requirements, begin the evaluation, development and integration of PKI/CMI components and technology for Navy applications and sites. Additional NSMI efforts shall focus on incorporating SMI technology and techniques in support of the IT-21/NVI initiatives. Evaluate and assess the use and application of medium (and other) assurance commercial products for PKI/CMI applications. Continue assessing the feasibility of integrated PKI/CMI technology with key management products and initiatives. Work closely with the commercial developers and vendors, infuse technology and requirements into the commercial products, as required.

- (U) ($2,110) Continue the design, development and assessment of security solutions/capabilities for next generation voice systems. Continue research into new secure voice technology, developing technology and techniques for secure voice over government and COTS communications backbones, specifically addressing wireline and wireless telephony applications and strategic and tactical communications. Support the integration of secure voice services in support of IT-21/NVI. Continue to develop and assess the technology for integrated secure voice/data, low data rate algorithms, voice compression technology in conjunction with cryptographic algorithm technology, and voice/speaker recognition. Continue the development of voice algorithms and security techniques, and conduct laboratory assessments of the latest NSA and industry COTS secure voice technology and products, and demonstrations of prototype secure voice systems. This includes development of secure voice technology to support Navy unique requirements/applications (e.g., point-to-multipoint) for new ship construction, existing ship platforms, and for shore sites, and for providing system security and C&A engineering and testing for secure voice components and systems.

- (U) ($2,773) Initiate the design, development and assessment of the Secure Voice-21 (SV-21). This includes the development and integration of the crypto gateways (i.e., network interface card, crypto interface card, and the voice processing card), the crypto replacement technology based on PEIP, the SPC^{2}K technology to support the embedded crypto replacements, and new voice algorithms (e.g., Mixed Excitation Linear Prediction (MELP). This suite of equipment/solutions is targeted to support the LPD-17 class, the DDG-51 class, NSSN, and CVX class of ships by providing a secure voice solution for telephonic, tactical and secure voice problems, specifically addressing the IT-21 initiatives.

- (U) ($250) Continue to support secure voice and biometric access consortia. Continued laboratory assessments of the latest NSA and industry INFOSEC technology and demonstrations of prototype voice systems. Continued research into new high assurance secure voice technology.

- (U) ($650) Continue the evolutionary development of security architectures for IA that include virtually all Navy distributed information system development programs. Ensure the architecture evolves to provide proper protection as technology, DOD missions, and the threat all evolve. Provide inputs to the major Navy and joint initiatives that are defining and building distributed systems including IT-21, NVI, the Navy CIO Technology Infrastructure project, the Joint Technical Architecture, and large development programs including GCCS-M, GCCS, DMS, JMCOMS and others. Include both defensive protections as well as intrusion monitoring in the architecture.

- (U) ($3,860) Continue developing and testing distributed information system security solutions for Navy information systems. This includes the examination and selection of various components required by the architectures that may include firewalls, intrusion detection systems, virtual private networking systems, public key based secure e-mail and web systems, and others as well as high assurance components for connection of Top Secret and SCI systems to lower level systems. Prototype some of the components at operational sites.

- (U) ($2,100) Provide systems security engineering, C&A support to Navy information system developments such as GCCS-M, GCCS, DMS, JMCOMS, IT-21, NVI, NSSN, LPD-17, SC-21, and others. Focus on integration of the proper functions to ensure adherence to the common security architectures. Ensure that the security and performance of the tactical systems, including those operating at Top Secret and at SCI are consistent with Navy and DOD requirements.

- (U) ($825) Continue developing and updating INFOSEC standards and engineering guidance documents to ensure they are consistent with the security architecture, the rapidly changing technology, and the evolving threat.

- (U) ($1,265) Develop, prototype, and test solutions to the coalition interoperability problem. Base the solutions on available multilevel security technologies as well as emerging architectural methods of providing interoperability across different security levels.

- (U) ($1,260) Continue vulnerability/threat assessments and development and systems integration of network countermeasures tools (NVACM) efforts.

B. (U) CHANGE SUMMARY EXPLANATION:

(U) Funding:

(U) FY 1998: -$361K SBIR, $2,120K is for pending below threshold reprogrammings, and -$1,245K for DD1002: April 98 Update.

(U) FY 1999: -$51K Revised Economic Assumption, -$30K for Civilian Personnel Underexecution, and -$1,040K CAAS adjustments and -$77K for FFRDC Distribution.

(U) FY 2000: -$1,660 reduction to finance other higher priority programs, $300K for NWCF rates, -$332K for Non-Pay Inflation, and $92K for Civilian Pay Rates.

(U) Schedule: The schedule impact is directly related to the contractor's late start in portions of the software development effort and the additions of new requirements on the Tier 1 baseline contract.

(U) Technical: Tier 1 development contractor experienced unexpected delays in completing detail design or certain Tier 1 functions. New requirements were added to the present baseline Tier 1 Contract to maintain compatibility with NSA's Tier 0 design. These new requirements had a direct affect on the present software development resulting in re-work of current design and some new design work.

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

	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	TO COMPLETE	TOTAL PROGRAM
(U) OPN 3415 Information Systems Security Program (ISSP)	25,492	45,800	64,139	52,338	66,912	56,747	74,703	78,524	CONT.	CONT.
(U) O&MN 4A6M										

13,213	14,767	14,247	14,847	15,356	15,862	18,362	18,862	CONT.	CONT.

(U) RELATED RDT&E:
(U) PE 0303140G (Cryptographic Equipments)

D. ACQUISITION STRATEGY

	FY 1998	FY 1999	FY 2000	To Complete
EKMS				
Program Milestones			1Q-Tier 1 IOC	
Engineering Milestones	2Q-Build Review 1 3Q-Build Rev 2 3Q-Initial Phase IV Development	1Q-Build Rev 3		
T&E Milestones		3Q-Tier 1 Test	1Q-Tier 1 Government Acceptance Test (GAT)	
Contract Milestones				
EIP				
Program Milestones				
Engineering Milestones				
T&E Milestones				

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0303140N
PROGRAM ELEMENT TITLE: Information Systems Security Program

Contract
Milestones

FY 2000 President's Budget Estimates

EXHIBIT R-2, RDT&E,N Budget Item Justification

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0303150N
PROGRAM ELEMENT TITLE: Global Command and Control System

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X2304 Global Command and Control System (GCCS)	473	468	0	0	0	0	0	0	0	941
TOTAL	473	468	0	0	0	0	0	0	0	941

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Global Command and Control System (GCCS) is the DoD's conventional command and control (C2) system that supports the National Command Authority and the Joint Staff in the mission areas of force employment, sustainment, surveillance, reconnaissance and intelligence. Additionally, GCCS supports decision support systems at the Area Air Defense Coordinator (AADC) and Commander, Joint Task Force (CJTF) facilities.

The Defense Information Systems Agency (DISA) is the lead agency for GCCS, however, each Service is responsible for designing and developing essential Service-unique segments in support of their GCCS users. These segments must be interoperable with the GCCS architecture.

The Navy supported GCCS sites are USACOM, USPACOM, CINCLANTFLT, CINCPACFLT, CINCUSNAVEUR, CNO, and COMNAVCENT Bahrain (in FY00) and COMUSJAPAN, as well as associated remote and afloat users. The GCCS funding will transfer to the GCCS-M program beginning in FY2000.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT (BA 7) because it encompasses engineering and manufacturing development for upgrade of existing operational systems.

FY 2000 President's Budget Estimates

EXHIBIT R-2a, RDT&E,N Project Justification

DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0303150N PROJECT NUMBER: X2304
PROGRAM ELEMENT TITLE: Global Command and Control System

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X2304 Global Command and Control System (GCCS)	473	468	0	0	0	0	0	0	0	941

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Global Command and Control System (GCCS) is the DoD's conventional command and control (C2) system that supports the National Command Authority and the Joint Staff in the mission areas of force employment, sustainment, surveillance, reconnaissance and intelligence. Additionally, GCCS supports decision support systems at the Area Air Defense Coordinator (AADC) and Commander, Joint Task Force (CJTF) facilities.

The Defense Information Systems Agency (DISA) is the lead agency for GCCS, however, each Service is responsible for designing and developing essential Service-unique segments in support of their GCCS users. These segments must be interoperable with the GCCS architecture.

The Navy supported GCCS sites are USACOM, USPACOM, CINCLANTFLT, CINCPACFLT, CINCUSNAVEUR, CNO, and COMNAVCENT Bahrain (in FY00) and COMUSJAPAN, as well as associated remote and afloat users. The GCCS funding will transfer to the GCCS-M program beginning in FY2000.

FY 2000 President's Budget Estimates

EXHIBIT R-2a, RDT&E,N Project Justification

DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0303150N PROJECT NUMBER: X2304

PROGRAM ELEMENT TITLE: Global Command and Control System

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 ACTUAL:

- (U) ($465) Develop a Web based interface to the GCCS segments which will allow the use of standard Navy hardware instead of the non-standard hardware prescribed by DISA and migrate Navy site unique GCCS applications to GCCS DII version 4.0. Efforts will include initial development and required upgrades to accommodate changes between GCCS DII COE versions 3 and 4. The Navy site unique application, Reserve Data Unit Data Resource System version 4.0 (RUDRS), will also require updating to accommodate GCCS CDII version 4.0, developing new code to support emergent user requirements and migration to Oracle database.

- (U) ($8) Develop and update Naval Command, Control, Communications, Computers, Intelligence, Sensors and Reconnaissance (C4ISR) implementation guidance. Develop and update Naval C4ISR mission to incorporate an overarching operational, systems, technical and information architectures. Conduct associated C4ISR analyses and studies.

2. (U) FY 1999 ESTIMATE:

- (U) ($468) Continue to develop and migrate the Web based interfaces and Navy site unique GCCS applications to GCCS DII version 5.0. Efforts will include initial development and required upgrades to Navy segments to accommodate changes between GCCS DII COE versions 4 and 5. Develop RUDRS 5.0 and integrate with GCCS DII version 5.0.

3. (U) FY 2000 ESTIMATE: Not Applicable

4. (U) FY 2001 ESTIMATE: Not Applicable

FY 2000 President's Budget Estimates

EXHIBIT R-2a, RDT&E,N Project Justification

DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0303150N PROJECT NUMBER: X2304
PROGRAM ELEMENT TITLE: Global Command and Control System

B. (U) PROGRAM CHANGE SUMMARY:

(U) CHANGE SUMMARY EXPLANATION:

FY 1998 reflects a $6K decrease from DD1002: April 1998 update, and reflects a $5K decrease for FY98 update.

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

	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN 3350	1,781	2,932	0	0	0	0	0	0	0	4,713
(U) OMN	3,964	4,930	2,908	3,002	3,094	3,568	3,964	3,605	CONT.	CONT.

(U) RELATED RDT&E: Not applicable

D. (U) SCHEDULE PROFILE: Not Applicable

FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305160N
PROGRAM ELEMENT TITLE: Navy Meteorological and Oceanographic Sensors-Space (METOC)

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0524 Navy METOC Support (Space)	4,266	10,378	12,770	17,396	16,666	13,035	20,397	6,767	CONT.	CONT.
X1452 GEOSAT	344	1,236	1,737	1,731	967	953	973	993	CONT.	CONT.
TOTAL	4,610	11,614	14,507	19,127	17,633	13,988	21,370	7,760	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program element supports Navy interests in meteorological and oceanographic (METOC) remote sensors. These interests include commitments to satellite, sensor, and operational development activities associated with three satellite programs: 1)the Joint Service Defense Meteorological Satellite Program (DMSP), 2) The National Polar-Orbiting Operational Environmental Satellite System (NPOESS) and 3) the Navy Geodetic/geophysical Satellite (GEOSAT), funded entirely by Navy. The passive microwave instruments carried on DMSP and future NPOESS provide global oceanic and atmospheric data of direct operational relevance, including sea surface wind, sea ice, precipitation; GEOSAT altimeter data are used to produce significant wave height, ocean circulation, and ocean topography. The Navy (METOC) Support Space provides for Navy participation in Navy/Air Force cooperative efforts leading to current and future DMSP sensor development, including calibration and validation of instruments and delivery of satellite products to the Fleet. A new initiative in 1997, Windsat, on the Coriolis spacecraft, is a partnered program to meet multiple Naval remote Sensing requirements and provide risk reduction effort for the Department of Commerce/National Oceanic and Atmospheric Administration /Department of Defense converged satellite program, National Polar-Orbiting Operational Environmental Satellite System (NPOESS). The Navy METOC Support (Space) project supports the Navy contribution to Windsat, which is fully funded via a formalized inter-agency agreement. The NPOESS Integrated Program Office is providing a portion of the funds for the Windsat sensor. The Air Force Space Test Program (STP) will pay for the satellite bus and the launch vehicle. The GEOSAT provided ocean

FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305160N
PROGRAM ELEMENT TITLE: Navy Meteorological and Oceanographic Sensors-Space (METOC)

topography information from 1985-1990. In 1991, the Navy began the development of a follow-on capability to continue providing this required ocean topography information via the GEOSAT follow-on satellite, launched on 10 February 1998. Both of these projects fulfill Navy's obligation to develop Navy-unique, or mission critical technology.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing, operational systems.

B. (U) PROGRAM CHANGE SUMMARY FOR TOTAL PE:

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	4,753	11,671	13,739
(U) Appropriated Value:		11,671	-
(U) Adjustments from FY 1999 Presbudg:	-143	-57	+768
(U) FY 2000 President's Submission:	4,610	11,614	14,507

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1998 adjustment is due to Small Business Innovation Research reduction (-130) and FY 1998 update (-13). FY 1999 adjustments due to revised economic assumptions (-27) and civilian personnel underexecution (-30). FY 2000 adjustments due to Navy METOC-SPACE realignment (+567), Navy Working Capital Fund (NWCF) (+315) and non pay inflation (-210).

FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305160N
PROGRAM ELEMENT TITLE: Navy Meteorological and Oceanographic Sensors-Space (METOC)

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0524 Navy (METOC) Support (Space)	4,266	10,378	12,770	17,396	16,666	13,035	20,397	6,767	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Navy Meteorological and Oceanographic Sensor-Space (METOC)-Navy (METOC) Support (Space) project provides for Navy participation in current Defense Meteorological Satellite (DMSP) Special Sensor Microwave/Imager and Special Sensor Microwave Imager/Sounder, and future Navy unique sensor development efforts (Windsat) in support of the Fleet operational requirements. The project ensures Navy operational requirements are satisfied primarily through demonstration of technologies for inclusion on operational constellations such as DMSP and National Polar Orbiting Operational Environmental Satellite System (NPOESS). These reflect Navy unique efforts that are not funded within the Air Force DMSP/NPOESS program, and are in accordance with current inter-agency agreements. The project acquires information necessary to keep Navy ground receiving equipment compatible with future satellite data formats and data transfer rates. The project also provides for studies leading to operational improvements of satellite derived products and implemented via Navy participation as a voting member of the DMSP Configuration Control Board (CCB). Future funding plans respond to emerging Chief of Naval Office requirements for Navy METOC data. Plans for FY 2002 and beyond address the requirement for high-resolution

FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305160N PROJECT NUMBER: R0524
PROGRAM ELEMENT TITLE: Navy Meteorological and Oceanographic Sensors-Space (METOC) PROJECT TITLE: Navy METOC Support (Space)

METOC imagery to ships, in particular, in the data denied Indian Ocean area.

(U) PROGRAM ACCOMPLISMENTS AND PLANS:

1. (U) FY 1998 ACOMPLISHMENTS:
   - (U) ($68) Participated in DMSP Special Sensor Microwave/Imager (SSM/I) Calibration/Validation. Continued data quality assurance activities in support of operational products.
   - (U) ($924) Conducted GEOSAT /follow-on launch and early orbit calibration/validation activities. Developed and updated Naval C4ISR mission to incorporate an overarching operational, systems, technical and information architecture. Conducted associated C4ISR analyses and studies.
   - (U) ($3,274) Completed preliminary design and analysis for Windsat and breadboard sensor and subsystems leading to a prototype instrument.

2. (U) FY 1999 PLAN:
   - (U) ($500) Conduct SSM/I calibration and validation. Prepare for validation effort associated with the expected launch of the first DMSP Special Sensor Microwave Imager/Sounder (SSMI/S).
   - (U) ($1,401) Design and fabricate Airborne Polarimetric Microwave Imaging Radiometer (APMIR) to use for calibration/validation of DMSP SSM/I, and SSM/IS, and Windsat development, calibration, and validation.
   - (U) ($8,477) Continue Windsat sensor design and initiate fabrication of flight hardware. Support spacecraft design effort.

3. (U) FY 2000 PLAN:
   - (U) ($815) Continue to monitor SSM/I performance and prepare for validation effort associated with the expected launch of the first DMSP SSM/IS.
   - (U) ($612) Conduct field experiments with APMIR to use for calibration/validation of DMSP SSM/I and

FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305160N PROJECT NUMBER: R0524
PROGRAM ELEMENT TITLE: Navy Meteorological and Oceanographic Sensors-Space (METOC) PROJECT TITLE: Navy METOC Support (Space)

SSM/IS sensors, and Windsat development, calibration, and validation.

- (U) ($11,343) Complete final Windsat sensor design and continue fabrication of flight hardware. Prepare for Windsat calibration and validation.

B. (U) PROGRAM CHANGE SUMMARY: See total program change summary for P. E.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.
(U) RELATED RDT&E:
(U) PE 0305160F, Air Force DMSP
(U) PE 0604218N, Air/Ocean Equipment Engineering

D. (U) SCHEDULE PROFILE: Not applicable.
A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1998	FY 1999	FY 2000
a. Satellite Development	0	1,000	3,911
b. Payload Development	3,274	7,477	7,432
c. Science and Calibration/Validation	68	500	815
d. Airborne Testbed	0	1,401	612
e. Support GFO	924	0	0
Total	4,266	10,378	12,770

FY 2000 RDT&E,N BUDGET PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305160N PROJECT NUMBER: R0524
PROGRAM ELEMENT TITLE: Defense Meteorological Satellite PROJECT TITLE: DMSP-Navy Support

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

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method Fund Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1997 & Prior	FY 1998 Budget	FY 1999 Budget	FY 2000 Budget	To Complete	Total Program
Product Development										
Misc.	Misc.	N/A	CONT.	CONT.	727	3,274	8,477	11,343	CONT.	CONT.
Support and Management:										
Misc.	Misc.	N/A	CONT.	CONT.	0	924	0	0	924	924
Test and Evaluation:										
Misc.	Misc.	N/A	CONT.	CONT.	0	68	1,901	1,427	CONT.	CONT.

FY 2000 RDT&E,N BUDGET PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305160N PROJECT NUMBER: R0524
PROGRAM ELEMENT TITLE: Defense Meteorological Satellite PROJECT TITLE: DMSP-Navy Support

TOTAL:	727	4,266	10,378	12,770	CONT.	CONT.

GOVERNMENT FURNISHED PROPERTY: Not Applicable

	FY 1997 & Prior	FY 1998 Budget	FY 1999 Budget	FY 2000 Budget	To Complete	Total Program
Subtotal Product Development	727	4,266	10,378	12,770	CONT.	CONT.
Subtotal Support and Management:	0	0	0	0	0	0
Subtotal Test and Evaluation:	0	0	0	0	0	0
Total Project	727	4,266	10,378	12,770	CONT.	CONT.

FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305160N
PROGRAM ELEMENT TITLE: Navy Meteorological And Ocean Sensors-Space (METOC)

(U) COST (Dollars in thousands)

PROJECT NUMBER & Title	FY 1998 ACTUAL	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 ESTIMATE	To Complete	Total Program
X1452 GEOSAT	344	1,236	1,737	1,731	967	953	973	993	CONT.	Cont.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project provides a satellite-borne radar altimeter sensor to obtain ocean topography measurements from which tactically significant features such as oceanfronts, eddies, and sea-ice edges are derived. Topography provides a unique and important data source in support of a number of Naval warfare areas such as anti-submarine and undersea warfare, as well as providing other agencies such as National Oceanic and Atmospheric Administration and National Aeronautics and Space Administration with valuable inputs to studies involving El Nino, global warming and climate change. Data was previously provided by GEOSAT from 1985 until the satellite failed in January 1990. The GEOSAT Follow-On (GFO) satellite is intended to provide interim altimetry data until altimetry data becomes available on a future environmental satellite.

FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305160N PROJECT NUMBER: X1452
PROGRAM ELEMENT TITLE: Navy Meteorological and Ocean Sensors-Space (METOC) PROJECT TITLE: GEOSAT

(U) PROGRAM ACCOMPLISMENTS AND PLANS:

1. (U) FY 1998 ACCOMPLISHMENTS:
   - (U) ($337) Monitored launch operations, satellite performance and acceptance.
   - (U) ($7) Developed and updated Naval Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) implementation guidance. Developed and updated Naval C4ISR mission to incorporate an overarching operational, systems, technical and information architecture. Conducted associated C4ISR analyses and studies.

2. (U) FY 1999 PLAN:
   - (U) ($800) Fund on-orbit performance incentive.
   - (U) ($436) Continue to monitor satellite performance. Conduct altimeter calibration/validation activities.

3. (U) FY 2000 PLAN:
   - (U) ($800) Fund on-orbit performance incentive.
   - (U) ($937) Continue to assess on-orbit system performance and conduct payload calibration and validation. Maintain ground segment hardware and software.

B. (U) Program Change Summary: See total program change summary for P.E.

(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)

FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305160N
PROGRAM ELEMENT TITLE: Navy Meteorological and Ocean Sensors-Space (METOC)

PROJECT NUMBER: X1452
PROJECT TITLE: GEOSAT

D. (U) SCHEDULE PROFILE:

	FY 1997	FY 1998	FY 1999	FY 2000
Program Milestones		Launch Sat #1		
Engineering Milestones	FRR 3Q			
T&E Milestones		On Orbit Tests		
Contract Milestones	Not Applicable			

FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305160N

PROGRAM ELEMENT TITLE: Navy Meteorological and Ocean Sensors-Space (METOC)

PROJECT NUMBER: X1452

PROJECT TITLE: GEOSAT

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

Project Cost Categories	FY 1998	FY 1999	FY 2000
a. Satellite Development	344	1,236	1,737
b. Sensor Development	0	0	0
c. Contractor Engineering Support	0	0	0
Total	344	1,236	1,737

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

PERFORMING ORGANIZATIONS

Contractor/ Contract

FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305160N PROJECT NUMBER: X1452
PROGRAM ELEMENT TITLE: Navy Meteorological and Ocean Sensors-Space (METOC) PROJECT TITLE: GEOSAT

Government Performing Activity	Method Fund Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1997 & Prior	FY 1998 Budget	FY 1999 Budget	FY 2000 Budget	To Complete	Total Program
Product Development										
Ball Aerospace w/Options	CPIF	8/92	85,213	85,213	82,458	344	800	800	CONT.	CONT.
Various	Various	N/A	CONT.	CONT.	6,361	0	436	937	CONT.	CONT.
Support and Management: Not Applicable										
Contractor/ Government Performing Activity	Contract Method Fund Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1997 & Prior	FY 1998 Budget	FY 1999 Budget	FY 2000 Budget	To Complete	Total Program
Various					2,881	0	0	0	CONT.	CONT.
Test and Evaluation: Not Applicable										
GOVERNMENT FURNISHED PROPERTY Not Applicable										

	FY 1997 & Prior	FY 1998 Budget	FY 1999 Budget	FY 2000 Budget	To Complete	Total Program
Subtotal Product Development	82,458	344	1,236	1,737	CONT.	CONT.

FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305160N PROJECT NUMBER: X1452
PROGRAM ELEMENT TITLE: Navy Meteorological and Ocean Sensors-Space (METOC) PROJECT TITLE: GEOSAT

Subtotal Support and Management	2,881	0	0	0	CONT.	CONT.
Subtotal Test and Evaluation Not Applicable						
Total Project	85,339	344	1,236	1,737	CONT.	CONT.

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305188N
PROGRAM ELEMENT TITLE: Joint (C4ISR) Battle Center

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ACTUAL	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X2456 Joint (C4ISR) Battle Center	*	5,337	8,125	8,303	8,497	8,704	8,897	9,095	CONT.	CONT.
TOTAL	*	5,337	8,125	8,303	8,497	8,704	8,897	9,095	CONT.	CONT.

Note: *Funds for this program were transferred from the Joint Staff to the Department of Navy, IAW Defense Reform Initiative, which moved JBC from CJCS to CINCUSACOM beginning in FY99. In addition, funds for this program were previously included in PE 0303149J-C4I for the Warrior.

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Joint Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) Battle Center (JBC) is the Commander In Chief, United States Atlantic Command (CINCUSACOM) and Chairman, Joint Chiefs of Staff (CJCS) facility for warfighter exploration and assessment of C4ISR capabilities. The Center provides the combatant commands, at the Joint Task Force (JTF) level, with a near term joint assessment and experimental environment for the warfighter and technologist in support of Joint Vision 2010 (JV2010). It serves as the technical analysis and assessment agency for the Joint Requirement Operating Council (JROC) in determining C4ISR system "value-added" PRIOR to introduction to the CINCs and in advance of system fielding in operational environments. The intent is for the JBC to be a forcing function for joint synchronization and a means to foster rapid, near-term insertion of C4ISR technology. The mission of the JBC is to provide rapid assessment of required C4ISR interoperability and warfighter utility, join emerging C4ISR technology with new operational doctrine, and result in fielding C4ISR capabilities that meet the joint warfighter's needs.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it provides rapid assessment of required C4ISR interoperability, as well as rapid insertion of emerging technology, with new operational doctrine that will result in fielding C4ISR capabilities that meet the joint warfighter's need.

Program Budget Decision (PBD) 710, Defense Reform Initiative, moved the JBC from the Joint Staff to CINCUSACOM with funding moved to the Department of Navy, as Executive Agent for CINCUSACOM, effective FY 99. FY 97 and FY 98 funds are reflected in the Joint Staff RDT&E,DW budget submission.

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305188N
PROGRAM ELEMENT TITLE: Joint (C4ISR) Battle Center

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 PLAN:

- (U) FY 98 funds are reflected in the Joint Staff RDT&E,DW budget submission.
- (U) Funds were transferred from PE 0303149J-C4I for the Warrior to PE 0305188-Joint C4ISR Battle Center beginning in FY 99

2. (U) FY 1999 PLAN:

- ($705K) Host Joint Warfighter Interoperability Demonstration (JWID). The theme year JWID permits scenarios for warfighting commanders and acquisition decision makers which are relevant to new interoperability technology and the utility of evolving systems for operational use pertinent to each annual theme. The JBC has the infrastructure in place to support these demonstrations and the assessment methodology in place to support evaluations.
- (U) ($1,450K) Follow-on JWID. Upon completion and evaluation of each theme year JWID the CINC's and CJTF's involved identify systems which demonstrated warfighting utility but which require further refinement and follow-on assessment. These technologies are forwarded to the JBC for inclusion in the exploitation fiscal year plan. Enhancements and follow-on assessments are conducted by JBC and programmatic recommendations are prepared.
- (U) ($1,100K) Asynchronous Transfer Mode (ATM) Operational Demonstration. ATM will take advantage of significant advances in switching technology to ensure CJTF seamless communications across all forces. Bandwidth restrictions severely limit successful JTF operations. ATM offers a potential solution but there is currently no DOD or Industry standard. This effort addresses a lack of commonality among the services in their communications approaches and addresses synchronization disconnects relating to fielding schedules which affect the required CINC/JTF capability. Each service is currently selecting their "vendor of choice" which will likely lead to non-interoperability as well as increased cost and complexity in implementation. JBC will document/validate interoperability problems, assess ability to support tactical JTF down to actual ground forces and perform an operational demonstration.
- (U) ($1,187K) Link 16 Operational Demonstration. Demonstrate Link-16/VMF Digitized Battle Space interoperability through proof of concept prototype development to permit portable exchange

of tactical information to/from Link-16 and VMF networks. This is an advanced concept technology demonstration (ACTD).

- (U) ($895K) Federated Battle Lab (FBL). The FBL is a consortium of Joint and Service battle centers/laboratories formed to promote solutions to operational problems in CJTF environments. The JBC is recognized as the joint FBL hub by CINC's, services, agencies and CJTF's. The JBC, as chairman of the consortium, will coordinate efforts to capitalize on lessons learned in order to continue these effective and successful collaborative experiments in future years.

3. (U) FY 2000 PLAN:

- (U) ($730K) Host Joint Warfighter Interoperability Demonstration (JWID). The theme year JWID permits scenarios for warfighting commanders and acquisition decision makers which are relevant to new interoperability technology and the utility of evolving systems for operational use pertinent to each annual theme. The JBC has the infrastructure in place to support these demonstrations and the assessment methodology in place to support evaluations.

- (U) ($1,505K) Follow-on JWID. Upon completion and evaluation of each theme year JWID the CINC's and CJTF's involved identify systems which demonstrated warfighting utility but which require further refinement and follow-on assessment. These technologies are forwarded to the JBC for inclusion in the exploitation fiscal year plan. Enhancements and follow-on assessments are conducted by JBC and programmatic recommendations are prepared.

- (U) ($1,112K) Federated Battle Lab (FBL). The FBL is a consortium of Joint and Service battle centers/laboratories formed to promote solutions to operational problems in CJTF environments. The JBC is recognized as the joint FBL hub by CINC's, services, agencies and CJTF's. The JBC, as chairman of the consortium, will coordinate efforts to capitalize on lessons learned in order to continue these effective and successful collaborative experiments in future years.

- (U) ($1,390K) Intelligence, Surveillance and Reconnaisance (ISR). The JBC, as written into the Joint Intelligence Interoperability Board (JIIB), will perform system integration and functional assessments of the identified intelligence systems, including shared segments, as appropriate. JBC will establish and maintain a JTF Integration Facility (JTFIF) to include current and BETA baselines of all the major Service ISR systems to support on-going maturity, operational utility, and jointness assessments of ISR systems.

- (U) ($1,251K) Information Assurance (IA). JBC will continue to be a key player in IA Tools integration with network management and for emerging network IA technologies. JBC will incorporate red-teaming into Joint exercises and FBL efforts in order to facilitate JBC assessments of new C4ISR IA technologies. JBC will also be looking at Information Operations Planning Tools that provide analysis, correlation, and fusion capabilities as well as greater visualization, rehearsal, and wargaming/situational analysis capabilities.

- (U) ($681K) MILSATCOM. JBC will be a host site for the Global Broadcast System (GBS) Test Bed/GBS Receive Suite. Included in this effort will be the installation of a GBS receive suite at the JBC and the associated program plan to move the Phase I GBS Test Bed equipment to the JBC from the Pentagon. The JBC will be involved in joint evaluation of system applications for various MILSATCOM initiatives as they are developed, thereby assuring that they will be "born joint.

- (U) ($1,456K) Joint C4ISR Operational Architectures. The focus of Joint Operational Architectures is on C4ISR support to the warfighter across the "Range of military operations." The objective is to describe the doctrinally based tasks and activities, operational elements, and the time phased information flows required to accomplish Joint military operations. The architectures will be used to assess and analyze doctrine, TTPs, system and procedural interoperability, processes, and synchronization issues that impact Joint Forces. These Operational Architectures will provide the baseline to identify warfighter requirements, design and structure assessments, and generate functional metrics. They will be developed and documented in close coordination with OSD, Joint staff, CINCs, and Services.

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305188N
PROGRAM ELEMENT TITLE: Joint (C4ISR) Battle Center

B. (U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1999: Economic Assumption (-$12K), Civilian Personnel (-$3K).
FY 2000: NWCF Rates (+$32K), Civilian Pay Rates (+10K), and Non-Pay Inflation (-$117K).

(U) Schedule: No change.

(U) Technical: No change.

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

	FY 1998 ACTUAL	FY 1999 ACTUAL	FY 2000 ESTIMATE
(U) OPN 3368	*	2,677	0
(U) OMN 1C6C	*	10,071	12,456

Note: *Funds for this program were transferred from DISA to the Joint Staff in FY 97. Funds were further transferred from the Joint Staff to the Department of Navy, IAW Defense Reform Initiative, that moved JBC from CJCS to CINCUSACOM beginning in FY99. In addition, funds for this program were previously included in PE 0303149J-C4I for the Warrior.

(U) RELATED RDT&E: Not applicable

D. (U) ACQUISITION STRATEGY

- FY 1998-01. The JBC does not have a major contract for its RDT&E efforts. Equipments that are required to support our various projects are either bought from other service contracts and/or from the GSA schedule. Services are provided by other services and/or various vendors with expertise on a specific assessment we are accomplishing.

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305188N
PROGRAM ELEMENT TITLE: Joint (C4ISR) Battle Center

Exhibit R-3 Cost Analysis (page 1)										Date: February 1999		
APPROPRIATION/BUDGET ACTIVITY 1319/BA 7			PROGRAM ELEMENT: 0305188							PROJECT NAME AND NUMBER: JBC/x2456		
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY-99 Cost	FY-99 Award Date	FY-00 Cost	FY-00 Award Date	FY-01 Cost	FY-01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Dev Support Equip Acquisition	MIPR	GSA Schedule		289	Var	405	Var			Cont	Cont	Cont
Systems Engineering	C-CPFF	ODU		40	12/98	56	10/99			Cont	Cont	Cont
Development T&E	MIPR	MITRE/ODU		167	12/98	235	10/99			Cont	Cont	Cont
Government Engineering Supt	WR	SPAWARENGC		39	3/99	57	10/99			Cont	Cont	Cont
Subtotal Product Development				535		753						
Remarks:												
Systems Engineering	C-CPFF	ODU		102	12/98	168	10/99			Cont	Cont	Cont
Contractor Engineering Supt	C-CPFF	GTE		432	12/98	630	10/99			Cont	Cont	Cont
Government Engineering Supt	WR	SPAWARENGC		829	3/99	1108	10/99			Cont	Cont	Cont
Misc	MIPR	Various		228	Var	346	Var			Cont	Cont	Cont
Subtotal Support				1591		2252				Cont	Cont	Cont
Remarks												

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305188N
PROGRAM ELEMENT TITLE: Joint (C4ISR) Battle Center

Exhibit R-3 Cost Analysis (page 2)										Date: February 1999		
APPROPRIATION/BUDGET ACTIVITY: 1319/BA 7			PROGRAM ELEMENT: 0305188							PROJECT NAME AND NUMBER: JBC/x2456		
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY-99 Cost	FY-99 Award Date	FY-00 Cost	FY-00 Award Date	FY-01 Cost	FY-01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Dev Support Equipment Acq	MIPR	GSA Schedule		427	Var	802	Var			Cont	Cont	Cont
Systems Engineering	C-CPFF	ODU		239	12/98	436	10/99			Cont	Cont	Cont
Developmental T&E	MIPR	MITRE/IDA		704	12/98	1091	10/99			Cont	Cont	Cont
Contractor Engineering Support	C-CPFF	GTE		143	4/99	298	10/99			Cont	Cont	Cont
Gov Engineering Support	MIPR(s)	FBL Participants		1698	2/99	2493	10/99			Cont	Cont	Cont
Subtotal T&E				3211		5120						
Remarks												
Subtotal Management												
Remarks												
Total Cost				5337		8125				Cont	Cont	Cont
Remarks												

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305204N
PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
A2467 VTOL UAV	*	0	38,489	43,407	49,129	19,731	0	0	0	150,756
A2478 Tactical Control Station	**	32,070***	24,553	15,724	9,481	9,441	9,641	9,848	CONT.	CONT.
A2479 Common Systems Development	**	9,027***	6,700	7,927	7,380	7,942	8,112	8,283	CONT.	CONT.
A2671 Multiple Participant Competitive Demonstration	*	9,977	0	0	0	0	0	0	0	9,977
TOTAL		51,074	69,742	67,058	65,990	337,114	17,753	18,131	CONT.	CONT.

* FY97 & FY98 funding received as a Congressional add; Program Element 0305204D (RDT&E, Defensewide)
** Funding included in Program Element 0305204D (RDT&E, Defensewide)
*** The FY99 Tactical Control Station (A2478) funding includes a Congressional Add of $32,144 K for the Tactical Control Station (TCS) which is being executed under A2669. The FY99 Common Systems Development (A2479) funding includes a Congressional transfer from the Defense Airborne Reconnaissance Office (DARO) of $5,048K executed under A2668 and a Congressional plus up of $4,000K for the multi-function self aligned gate array technology which is being executed in project unit A2670.

(A) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program provides for the development of tactical unmanned aerial vehicle (UAV) systems for DoD that provide warfighters with a dedicated capability for day/night aerial reconnaissance, surveillance and target acquisition (RSTA); intelligence, communications/data dissemination; electronic warfare; weather data collection to support combat operations; minefield detection; and nuclear, biological and chemical reconnaissance in limited adverse weather. Specifically:

- VTOL UAV: The Vertical Takeoff and Landing (VTOL) Unmanned Aerial Vehicle will provide users real-time and near-real-time data required to support intelligence surveillance and reconnaissance (ISR) efforts without the use of manned aircraft or reliance on limited joint theater or national assets. Missions supported under ISR and accomplished by a VTOL UAV include over-the-horizon classification and targeting, mine countermeasures, battle management chemical/biological agent reconnaissance and signals intelligence. The VTOL UAV would be an organic asset of the ship to which it is attached or deployed. The forte of the VTOL UAV is that it launches and recovers vertically and it can operate from any/all air capable ships as well as confined land based areas.

- Other capabilities of the VTOL UAV include: autonomous waypoint navigation; automatic launch and recovery of the vehicle both ashore and afloat; incorporation of a heavy fuel engine and the ability to incorporate modular mission payloads. The data from the VTOL UAV System would be provided to the user through standard DoD Command, Control, Communications, Computers and Intelligence (C4I) systems, architectures and protocols.

- TCS: Efforts are underway to develop a Tactical Control System to provide an interoperable capability for the Medium Altitude Endurance (MAE) and the spectrum of present and future Tactical UAVs and their payloads utilized by the military for RSTA and combat assessment. TCS has the objective requirement to interface with the High Altitude Endurance (HAE) UAV systems and provide connectivity to service designated C4I systems. TCS is being developed in concert with the development of UAV concepts of operations so as to ensure system functionality satisfies operational requirements. TCS development and testing is being accomplished via a Government/Industry Team. Software integration/development is initially the responsibility of Naval Surface Warfare Center (NSWC), Dahlgren Division, while systems integration and hardware in the loop testing is being accomplished at the Joint Technology Center/System Integration Laboratory (JTC/SIL), Redstone Arsenal. The JTC/SIL allows the integration and simulation of air vehicles, payloads and system upgrades prior to actual flight. Integration of software and hardware within this controlled laboratory environment reduces the cost of test and evaluation and the risks associated with actual flight test. System Integration responsibility will migrate to industry in FY99 with the award of a system design, test and integration contract.

- CSD: Common Systems Development (CSD) provides for system interoperability and commonality among UAVs. Efforts such as payload development, joint logistics, simulation and modeling, UAV command and control antenna, and small UAV projects continue to ensure reduced life cycle costs, improved supportability, and the exploitation of technological advancement having UAV application.

- Multiple-Participant Competitive Demonstration: The Multiple-Participant Competitive Demonstration, known also as the VTOL Demonstration, provides the opportunity to assess the maturity of VTOL UAV technologies, evaluate air vehicle performance, minimize risks in development of VTOL UAVs in the Naval environment and gather lessons learned for future acquisition.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is categorized as Budget Activity 7 because it provides for development of technologies and capabilities in support of operational system development.

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305204N
PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles

PROJECT NUMBER: A2467
PROJECT TITLE: VTOL UAV

U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
A2467 VTOL UAV	*	0	38,489	43,407	49,129	19,731	0	0	0	150,736
TOTAL	*	**0**	**38,489**	**43,407**	**49,129**	**19,731**	**0**	**0**	**0**	**150,736**

* FY97 & FY98 funding received as a Congressional add; Program Element 0305204D (RDT&E, Defensewide)

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The VTOL UAV will provide users real-time and near-real-time data required to support ISR efforts without the use of manned aircraft or reliance on limited joint theater or national assets. Missions supported under ISR and accomplished by a VTOL UAV include over-the-horizon classification and targeting, mine countermeasures, battle management chemical/biological agent reconnaissance and signals intelligence. The VTOL UAV would be an organic asset of the ship to which it is attached or deployed. The forte of the VTOL UAV is that it launches and recovers vertically and it can operate from any/all air capable ships as well as confined land based areas. Other capabilities of the VTOL UAV include: autonomous waypoint navigation; automatic launch and recovery of the vehicle both ashore and afloat; incorporation of a heavy fuel engine and the ability to incorporate modular mission payloads. The data from the VTOL UAV System would be provided to the user through standard DoD Command, Control, Communications, Computers and Intelligence (C4I) systems, architectures and protocols. This program is categorized as Budget Activity 7 because it provides for development of technologies and capabilities in support of operational system development.

DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305204N PROJECT NUMBER: A2467
PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles PROJECT TITLE: VTOL UAV

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

Previous Accomplishments under Program Element 0305204D: FY97 and FY98 Congressional plus-up funds were provided to execute a VTOL UAV demonstration program with three contractors. The purpose of the demonstration program was to evaluate current VTOL UAV air vehicles which demonstrate the potential to meet or exceed defined performance objectives and to evaluate air vehicle technology risks associated with a VTOL UAV system operating in the Naval environment. The contracts for the demonstration program included 50 hours of flight test at a Government range, payload integration and demonstration and a life cycle cost estimate from the contractors. All three contractors concluded the initial phase of the demonstration. The demonstration program continues in FY99 with the integration of the UAV Common Automatic Recovery System (UCARS) in the VTOL UAV, shipboard demonstrations and integration with the Tactical Control System (TCS). FY99 efforts are described under Project Number A2671. Because of the success demonstrated by these three contractors at the government test site, it was determined that the technology was mature enough to proceed in acquiring a VTOL UAV platform.

1. FY 2000 Plan:

- (U) ($27,180) Initiate system design efforts.
- (U) ($ 7,944) Government support of TUAV proposal evaluations leading up to MSII decision and competitive design evaluation.
- (U) ($ 3,365) Funds miscellaneous efforts including technical management support and initial test efforts.

DATE: February 1999

BUDGET ACTIVITY: 7 | PROGRAM ELEMENT: 0305204N | PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles | PROJECT NUMBER: A2467 | PROJECT TITLE: VTOL UAV

(U) B. PROGRAM CHANGE SUMMARY

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	0	0	0
(U) Appropriated Value:			
(U) Adjustments from President's Budget:			+38,489
(U) FY2000/2001 President's Budget Submit			38,489

CHANGE SUMMARY EXPLANATION:

(U) Funding: The Navy funded the VTOL UAV program in POM 00 (FY00-$15,343). PDM1 transferred funds from DARO (OSD) to the Navy (FY00-$23,702). These increases were partially offset by a pricing adjustment of -$556 thousand.

(U) Schedule: N/A

(U) Technical: N/A

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

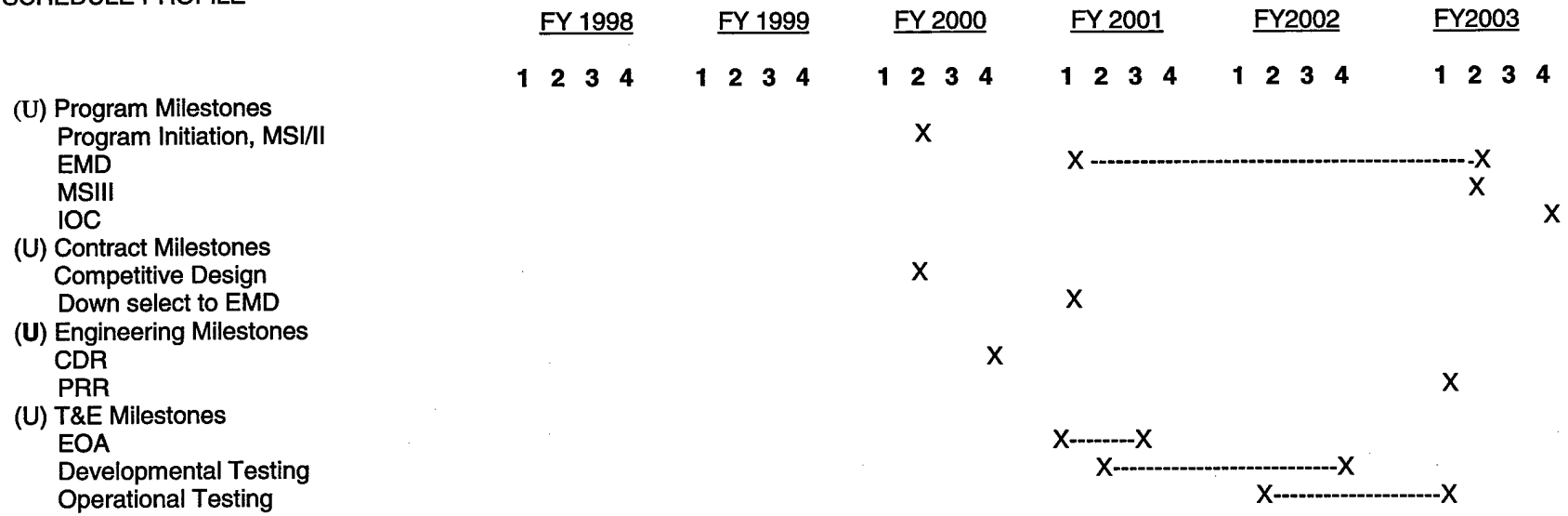
Appn WPN	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
						$40,256	$57,061	$63,904	Continuing	Continuing

DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305204N PROJECT NUMBER: A2467
PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles PROJECT TITLE: VTOL UAV

(U) D. ACQUISITION STRATEGY: The VTOL UAV program will have a combined Milestone I/Milestone II decision in 2Q FY2000. Development, fabrication and developmental test of the VTOL UAV system is scheduled to begin in FY 2000 and continue through FY 2001/2002. A low rate initial production decision is planned for FY 2002 with operational testing being conducted in FY 2002. A Milestone III decision is planned for 2Q FY 2003 and the initial operational capability (IOC) would occur during 4Q FY 2003. Initial planning has a VTOL UAV system defined as: air vehicles (A/Vs), ground control stations (GCSs), modular mission payloads, remote data terminals, and spares. Connectivity into the DOD C4I architecture would be provided by the GCS, which is to be TCS compatible. Although not currently designated as a joint program, the VTOL UAV program can accommodate Joint Services (Army, Navy and Marine Corps) as well as U.S. Coast Guard requirements into the acquisition planning process. A key objective of the VTOL UAV program would be to minimize the Total Ownership Cost (TOC) of the system while providing the maximum utility to the user.

(U) E. SCHEDULE PROFILE



FY 2000 President's Budget

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305204N

PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles

PROJECT NUMBER: A2467

PROJECT TITLE: VTOL UAV

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Project Development Organizations										
Design/Hardware Development	TBD	TBD				27,180	02/00	0	27,180	27,180
Hardware Development	TBD	TBD				1,100	07/00	CONT.	CONT.	CONT.
Development Support	WR	NAWC-AD Patuxent River,MD				7,944	11/99	CONT.	CONT.	CONT.
Other						380		CONT.	CONT.	CONT.
Subtotal Project Development						**36,604**		**CONT.**	**CONT.**	**CONT.**

Remarks:

Support Organizations

Subtotal Support

Remarks:

FY 2000 President's Budget

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305204N

PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles

PROJECT NUMBER: A2467

PROJECT TITLE: VTOL UAV

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Test & Evaluation Organizations										
Developmental Testing	WR	NAWC-AD Patuxent River MD						CONT.	CONT.	CONT.
Operational Testing	WR	OPTEVFOR Norfolk,VA				111	11/99	CONT.	CONT.	CONT.
Subtotal Test & Evaluation						**111**		**CONT.**	**CONT.**	**CONT.**
Remarks:										
Management Organizations										
Technical and Management Support	FFP	H. J. FORD				1,100	10/99	CONT.	CONT.	CONT.
MISC.	VARIOUS	VARIOUS				674	10/99	CONT.	CONT.	CONT.
Subtotal Management						**1,774**		**CONT.**	**CONT.**	**CONT.**
Remarks:										
Total Cost						**38,489**			**CONT.**	**CONT.** **CONT.**

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305204N
PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles

PROJECT NUMBER: A2478
PROJECT TITLE: Tactical Control System

(U) COST: (Dollars in thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
A2478 Tactical Control System	*	32,070**	24,553	15,724	9,481	9,441	9,641	9,848	CONT.	CONT.
TOTAL	*	**32,070****	**24,553**	**15,724**	**9,481**	**9,441**	**9,641**	**9,848**	**CONT.**	**CONT.**

- * FY98 funding included in Program Element 0305204D (RDT&E Defense Wide)
- **FY99 funding includes $32,144K as the result of a Congressional realignment from DARO. This funding is being executed in Project Unit A2669.

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:
The Tactical Control System (TCS) provides interoperability and commonality for mission planning, command, control, communications, and data dissemination for the current and future family of Tactical and the Medium Altitude Endurance (MAE) Unmanned Aerial Vehicles (UAVs). It provides a full range of scaleable UAV capability from passive receipt of air vehicle and payload data to full air vehicle command and control. TCS functionality supports the joint warfighter with a common core operating environment to receive, process, and disseminate UAV air vehicle and payload data from two or more different UAV types for reconnaissance, surveillance, and combat assessment. TCS also has an objective requirement to receive and disseminate payload information from the Global Hawk and Dark Star endurance UAVs. TCS supports seamless integration into the existing Command, Control, Communications Computers and Intelligence (C4I) architecture and interfaces with other manned and unmanned reconnaissance platforms and intelligence systems thereby providing information superiority through cross cueing. TCS maximizes the use of Commercial and Government off-the-shelf (COTs and GOTs) hardware and software whenever possible. TCS software will be interoperable and operate on existing standard service computer platforms and compliant with the Assistant Secretary of Defense for Command, Control, Communications and Intelligence (ASD(C3I)) Joint Technical Architecture, Distributed Common Ground System (DCGS), Common Imagery Ground/Surface Station (CIGSS), and the United States Imagery Standards, and Defense Information Infrastructure/Common Operating Environment (DII/COE). The UAV Joint Technology Center and Systems Integration Laboratory (JTC/SIL) supports the assessment of system integration readiness prior to actual flight testing. The JTC/SIL provides for hardware-in-the-loop tests of payloads, air vehicles (A/V), ground system components, and joint interoperable interface and UAV Concept of Operations (CONOPS) evaluations using the Multiple UAV Simulation Environment (MUSE) in Advanced Warfighting Exercises (AWEs). The NATO Naval Armaments Group, Project 35, has undertaken studies/technical demonstrations to define a common interoperable NATO UAV ground control system architecture. Current plans include a TCS demonstration with a German UAV.

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 | PROGRAM ELEMENT: 0305204N | PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles | PROJECT NUMBER: A2478 | PROJECT TITLE: Tactical Control System

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. *FY 1998 ACCOMPLISHMENTS:

- (U) ($8,373) Continued prototype demonstrations of land and sea-based TCS including mission planning, air vehicle, and payload control of MAE and TUAV.
- (U) ($14,276) Continued TCS evolutionary development, engineering and integration efforts to include demonstration of scalability, portability, mission planning and C4I integration , and select a System Design, Test and Integration (SDTI) contractor.
- (U) ($2,120) Continued documentation of system requirements.
- (U) ($6,000) Continued JTC/SIL rapid prototyping simulation and modeling, systems integration and test including establishment of a development baseline.
- (U) ($0,000) Continued participation in joint warfighting experiments and Service exercises for refinement of CONOPS. (Contingent on funding from Services).
- (U) ($8,000) Acquired Predator AV and additional supporting assets for TCS integration and testing.
- (U) ($ 900) Conducted flight route and payload planning system integration into TCS.
- (U) ($1,000) Awarded SDTI contract.

* FY98 funding included in Program Element 0305204D (RDT&E Defense Wide)

2. **FY 1999 PLAN:

- (U) ($12,459) Mature and refine system design. Conduct critical design review and continue block 0 configuration development. Conduct Initial Operational Assessment.
- (U) ($10,110) Transition system engineering responsibility to SDTI contractor. Perform validation of system manufacturing and production; complete documentation and logistics efforts. Deliver Engineering Development Units (EDUs).
- (U) ($3,709) Continue route and payload planning systems integration, continue integration of CARS into TCS; and support interoperability tests (i.e. VTOL Technical Demonstration Phase II).
- (U) ($5,000) Initiate Multiple UAV Simulation Environment (MUSE) efforts in support of TCS multi-UAV development.
- (U) ($ 792) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

**FY99 funding includes $32,144M as the result of a Congressional realignment from DARO. This funding is being executed in Project Unit A2669.

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0305204N** **PROJECT NUMBER: A2478**
PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles **PROJECT TITLE: Tactical Control System**

3. FY 2000 PLAN:
   - (U) ($6,100) Continue System Engineering and Configuration Management in support of service capable UAV ground control stations.
   - (U) ($4,700) Initiate TCS software pre-planned product improvements (P3I) to the C4I interfaces and re-programmable Data Control Modules.
   - (U) ($13,753) Continue Integration, Test and Certification of required C4I interfaces.

DATE: February 1999

BUDGET ACTIVITY: 7 | PROGRAM ELEMENT: 0305204N | PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles | PROJECT NUMBER: A2478 | PROJECT TITLE: Tactical Control System

(U) B. PROGRAM CHANGE SUMMARY

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	0	0	0
(U) Appropriated Value:		32,144	
(U) Adjustments from President's Budget:		+32,070	+24,553
(U) FY 2000/2001 President's Budget Submit:	0	32,070	24,553

FY 1998 funding ($40.7M) included in Program Element 0305204D (RDT&E, Defensewide)

CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1999 funding includes ($32.1M) as the result of a Congressional realignment from DARO which was partially offset by a decrease of $74 thousand for Congressional undistributed reductions. FY 00 funding includes $24,553 which was transferred by PDM1 from DARO to the Navy. This increase was offset by a decrease of $355 thousand for a pricing adjustment.

(U) Schedule: N/A

(U) Technical: N/A

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

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0305204N** **PROJECT NUMBER: A2478**
PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles **PROJECT TITLE: Tactical Control System**

(U) D. ACQUISITION STRATEGY:
The TCS initial design and development effort will be completed at the end of Program Definition and Risk Reduction phase (Phase I) in the 3Q of FY99; Engineering and Manufacturing Development (EMD) phase (Phase II) begins in 3Q FY99. A major effort during the EMD phase will be the integration of government furnished TCS hardware and software components by a Systems Design, Test and Integration (SDTI) contractor for four Engineering Development Units (EDUs). The SDTI contract was awarded to Raytheon Systems Company 1Q FY99. Options for Full Rate Production (Phase III) of additional TCS systems will be included in the basic SDTI contract. The TCS scheduled Initial Operational Capability (IOC) with the Air Force's Predator, MAE is 2Q FY01; Full Operational Capability (FOC) with the Air Force's Predator, MAE is 2Q FY02. IOC will be achieved after each service has fielded one TCS capable ground control system with interim Integrated Logistics Support (ILS) (training, spares, technical publications, support equipment) in place and testing (developmental and operational) completed. FOC will be achieved when full attainment of capability is provided by in-place maintenance and repair support, software support, test equipment and spares and systems are effectively employed and operated by the services' hosting unit or force.

(U) E. SCHEDULE PROFILE

	FY 1998				FY 1999				FY 2000				FY 2001			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
(U) Program Milestones																
MS II							X									
EMD Start							X									
EDU Delivery						X										
MS III (Air Force, Predator MAE)											X					
(U) Engineering Milestones																
SIL (System Integration / Test)	———	———	———	———	———	———	———	———	———	———	———	———	———	———	———	——→
MAE/TUAV Interoperability	———	———	———	———	———	———	———	———	———	———	———	———	———	———	———	——→

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0305204N** **PROJECT NUMBER: A2478**
PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles **PROJECT TITLE:** **Tactical Control System**

(U) E. SCHEDULE PROFILE Cont.

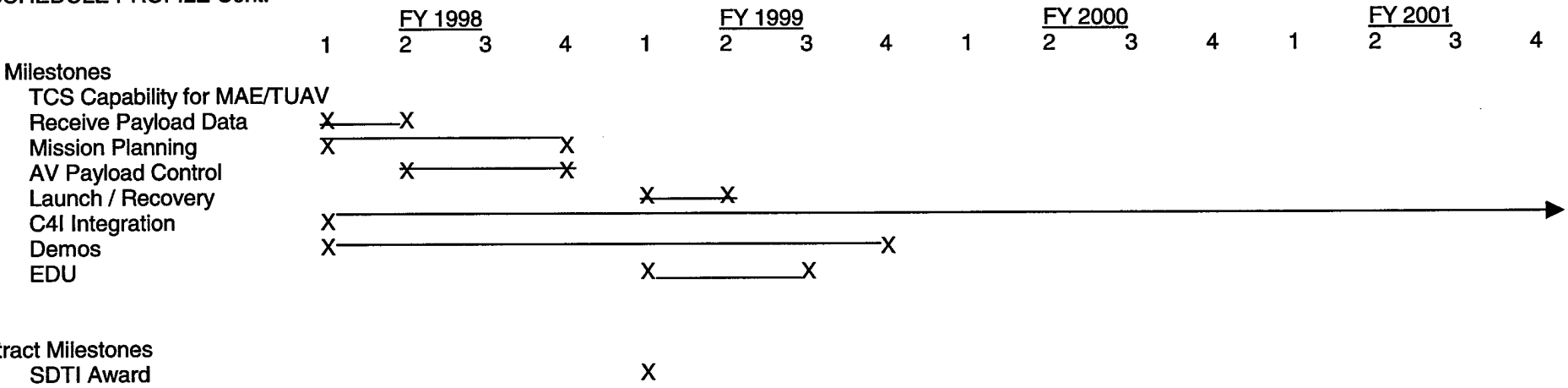


EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305204N

PROGRAM ELEMENT TITLE: TACTICAL UNMANNED AERIAL VEHICLES

PROJECT NUMBER: A2478

PROJECT TITLE: Tactical Control System

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost		FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Software/Hardware Development	WR	NSWC-DD Dahlgren, VA	*	9,940	10/98	5,302	10/99	CONT.	CONT.	
Primary hardware Development	MIPR	JTC/SIL, Huntsville, AL	*	1,000	10/98			CONT.	CONT.	
Development of the Predator Data Control Module	CPFF	GA-ASI, San Diego, CA	*	1,730	12/98					
Development of the Outrider Data Control Module	CPFF	Alliant Techsystems, Hopkins MN	*	536	12/98					
Systems Integration	CPAF	Raytheon, Falls Church, VA	*	5,000	12/98	8,540	12/99	CONT.	CONT.	
Human Computer Interface Development	WR	NAWC-AD, Patuxent River, MD	*	240	10/98					
Subtotal Project Development				**18,446**		**13,842**		**CONT.**	**CONT.**	
Remarks: Prior Years funded under PE 0305204D										
Support Organizations										
Configuration Management	WX,RC MIPR	NSWC-DD, Dahlgren, VA	*	813	10/98	630	10/99	CONT.	CONT.	
Training/Logistics	WX,RC	Various	*	2,669	10/98	1,612	10/99	CONT.	CONT.	
Other	MIPR	JTC/SIL Huntsville, AL	**	4,700	10/98					
Subtotal Support			*	**8,182**		**2,242**		**CONT.**	**CONT.**	

Remarks:

* Prior years funded under PE 0305204D
** Congressional Adjustment for Multiple UAV Simulation Environment (MUSE) support.

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305204N PROJECT NUMBER: A2478

PROGRAM ELEMENT TITLE: TACTICAL UNMANNED AERIAL VEHICLES PROJECT TITLE: Tactical Control System

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost		FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Test and Evaluation											
Test Support	WX,RC	NSWC-DD, Dahlgren, VA		*	1,700	10/98	1,900	10/99	CONT.	CONT.	
Test Support	WX	NPS, Monterey, CA		*	1,362	10/98	1,250	10/99	CONT.	CONT.	
Miscellaneous	WR,RX, MIPR	Various		*			4,019	10/99	CONT.	CONT.	
Subtotal Test & Evaluation:				*	**3,062**		**7,169**		**CONT.**	**CONT.**	
Remarks: * Prior year funding under PE 0305204D											
Management Support											
Miscellaneous	WX,RX MIPR	Various		*	1,588	10/98	1,300	10/99	CONT.	CONT.	
Subtotal Management				*	**1,588**		**1,300**		**CONT.**	**CONT.**	
SBIR Assessment					792						
Remarks:. * Prior year funding under PE 0305204D											
Total Cost				*	**32,070**		**24,553**		**CONT.**	**CONT.**	

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305204N
PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles

PROJECT NUMBER: A2479
PROJECT TITLE: Common Systems Development

U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
A2479 Common Systems Development	*	**9,027	6,700	7,927	7,380	7,942	8,112	8,283	CONT.	CONT.
TOTAL	*	**9,027	6,700	7,927	7,380	7,942	8,112	8,283	CONT.	CONT.

- * FY98 funding included in Program Element 0305204D (RDT&E, Defensewide)
- ** FY99 funding includes $5,048K as the result of a Congressional realignment from DARO. This is being executed in project unit A2668. In addition, FY99 includes a Congressional plus up of $4,000K which will be executed in project unit A2670.

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Common Systems Development (CSD) pursues the RDT&E and production of systems common to the tactical family of Unmanned Aerial Vehicles (UAVs) (Pioneer, Outrider, Predator), including growth payloads and subsystems; performs user demonstrations of emerging UAV technologies; manages UAV joint international programs; and provides cross-functional support in the areas of logistics, simulation, test, and operations research. CSD supports testing, common system integration, and subsystems development for UAVs, including the UAV Common Automatic Recovery System (UCARS) and Modular Integrated Avionics Group (MIAG) and supports initiatives to reduce life cycle costs, improve supportability, and exploit commercial and Non Developmental Item (NDI) technology having UAV applications. CSD also provides user demonstration, integration, test, and qualification of Joint Requirements Oversight Council (JROC) -prioritized growth payloads such as communication/data relay, electronic warfare, laser designator, and chemical/biological reconnaissance; demonstrates alternative UAV technologies and concepts, including Vertical Take Off and Landing (VTOL) and Multifunction Self-Aligned Gate (MSAG) active array antennas; and provides small UAV capabilities in response to unique warfighter requirements. CSD's International program efforts include cooperative R&D arrangements with major NATO and non-NATO allies and providing day-to-day management and policy oversight regarding UAV export control and foreign military sales.

DATE: Februasy 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305204N
PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles

PROJECT NUMBER: A2479
PROJECT TITLE: Common Systems Development

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

Previous Accomplishments under Program Element 0305204D: The previous CSD FY98 budget was used to conduct Congressionally-directed research of Multifunction Self-Aligned Gate (MSAG) active array antenna and to continue Congressionally directed flight demonstration of UAV VTOL technology, including initiation of Congressionally directed Stopped-Rotor/Reaction Drive/High Speed VTOL UAV Concept Technology Demonstrations.

1. FY 1999 Plan:

- (U) ($1,752) Initiate and support integration, demonstration, and test of growth payloads
- (U) ($200) Continue international initiatives to improve UAV integration into NATO Task Force Operations
- (U) ($200) Continue exchange with allies to expand US markets and work cost-effective solutions to US requirements
- (U) ($600) Improve/validate UCARS and MIAG upgrades to expand user base and enhance common applications
- (U) ($200) Investigate alternative UAV automatic launch/recovery technologies
- (U) ($500) Support small-drone demonstrations and special payload integration in response to user community requirements
- (U) ($1,460) Continue common integration, test, logistics and international support efforts
- (U) ($3,892) Conduct Congressionally-directed research of Multifunction Self-Aligned Gate (MSAG) active array antenna
- (U) ($223) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638

2. FY 2000 Plan:

- (U) ($2,900) Initiate and support integration, demonstration, and test of growth payloads
- (U) ($1,200) Corrections of UCARS/MIAG deficiencies identified during initial fielding and user base expansion
- (U) ($2,000) Support small UAV development and special payload integration in response to user community requirements
- (U) ($600) Continue international initiatives to improve UAV integration into NATO Task Force Operations and common international support efforts

EXHIBIT R-2a, FY 2000 PRESIDENT'S RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305204N
PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles

PROJECT NUMBER: A2479
PROJECT TITLE: Common Systems Development

(U) B. PROGRAM CHANGE SUMMARY

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	0	0	0
(U) Appropriated Value:		9,048	
(U) Adjustments from President's Budget:		+9,027	+6,700
(U) FY 2000 President's Budget Submit:	0	9,027	6,700

CHANGE SUMMARY EXPLANATION:

FY 1998 funding ($12.0M) included in Program Element 0305204D(RDT&E, Defensewide)

(U) Funding: FY 1999 funding includes $5,048K as the result of the Congressional realignment from DARO and a Congressional increase of $4,000K for MSAG. These increases were partially offset by a decrease of $21K for Congressional undistributed reductions. FY00 funding transferred from DARO in the amount of $6,797 as the result of PDM1. Pricing adjustments reduced funding in FY00 by $97 thousand.

(U) Schedule: N/A

(U) Technical: N/A

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

BUDGET ACTIVITY: 7
PROGRAM ELEMENT: 0305204N
PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles
PROJECT NUMBER: A2479
PROJECT TITLE: Common Systems Development

(U) D. ACQUISITION STRATEGY: The key objectives of this program element are to: maximize the potential for interoperability of UAVs among the services and among our international allies; minimize the growth payload impacts into multiple platforms; support the small UAV user; and continue international UAV initiatives. To maximize the interoperability of all UAVs, the UAV Common Automated Recovery System (UCARS) provides a recovery system for all operational platforms. CSD will field UCARS for the Pioneer UAV in FY 1999. FY 2000 and FY 2001 will require UCARS logistics support and Engineering Change Proposal (ECP) modifications. The Modular Integrated Avionics Group (MIAG), which provides a common avionics package across all operational platforms, will enter production in FY99. After initial MIAG fielding and user base expansion, the MIAG system must undergo a product improvement based on enhanced computer capabilities and future platform integration in both FY 2000 and FY 2001. Starting in FY 1999, CSD will support the development of a laser designator. In FY 2000, the laser designator will be integrated into a common payload for all tactical UAV use, to include VTOL. The laser designator technical demonstration will occur in FY 2001. If successful, the demonstration will allow an Initial Operational Capability (IOC) of the Laser designator in FY 2002/3. As in the past, CSD will continue to integrate, demonstrate and test advanced payload technologies as they emerge. New missions and operator requirements will be incorporated into all future payloads. For a potential fleet of small UAVs, CSD is identifying multi-service, small UAV requirements. In FY99, these requirements will be integrated into an Acquisition Strategy. In FY 2000 and FY 2001, CSD will execute this Acquisition Strategy. The CSD International Program Office (IPO) will continue initiatives to improve UAV integration into NATO Task Force Operations, including international VTOL and fixed wing UAV demonstrations. CSD IPO will pursue international sales of American UAV products. Foreign exchange of UAV technologies and developments are also continuing efforts.

(U) E. SCHEDULE PROFILE (CONT.)

	FY1998				FY1999				FY2000			
	1	2	3	4	1	2	3	4	1	2	3	4
T&E Milestones												
Demo small-drone night vision sensor						X						
NATO International VTOL Technology Demo											X	
Contract Milestones												
UCARS/MIAG Upgrade Award											X	
MIAG Aircraft Integration Award											X	
SMALL UAV Development Award										X		

EXHIBIT R-3, FY 2000 PRESIDENT'S RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305204N

PROGRAM ELEMENT TITLE: TACTICAL UNMANNED AERIAL VEHICLES

PROJECT NUMBER: A2479

PROJECT TITLE: COMMON SYSTEMS DEVELOPMENT

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development	CPFF	TBD(LASER)		700	4/99	1,200	12/99	Cont.	Cont.	
	TBD	TBD(PAYLOAD		288	4/99	750	3/00	Cont.	Cont.	
	TBD	TBD(SMALL UAV)		700	2/99	1,400	2/00	Cont.	Cont.	
	TBD	Other		800	2/98	800	4/00	Cont.	Cont.	
	TBD	ITT GILFALLON		3715	2/99					
Subtotal Product Development			**0**	**6203**		**4,150**		**Cont.**	**Cont.**	
Remarks:										
Development Support	IQ/T&M(8A COMP)	H.J. FORD		974	12/98	1,050	12/99	Cont.	Cont.	
		OTHER		627	12/98	500	12/99	Cont.	Cont.	
Subtotal Support				**1,601**		**1,550**		**Cont.**	**Cont.**	
Remarks:										

EXHIBIT R-3, FY 2000 PRESIDENT'S RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305204N

PROGRAM ELEMENT TITLE: TACTICAL UNMANNED AERIAL VEHICLES

PROJECT NUMBER: A2479

PROJECT TITLE: COMMON SYSTEMS DEVELOPMENT

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Test and Evaluation		Misc.		1,000	1/99	1,000	12/99	Cont.	Cont.	
Subtotal Test & Evaluation			**0**	**1,000**		**1,000**		**Cont.**	**Cont.**	
Remarks:										
Subtotal Management			**0**	**0**		**0**		**0**	**0**	
SBIR Assessment				223						
Remarks:										
Total Cost			**0**	**9,027**		**6,700**		**Cont.**	**Cont.**	

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0305204N** **PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles** **PROJECT NUMBER: A2671** **PROJECT TITLE: Multiple-Participant Competitive Demonstration**

U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
A2671 Multiple-Participant Competitive Demonstration	*	9,977	0	0	0	0	0	0	0	9,977
TOTAL	*	**9,977**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**9,977**

* FY97 & FY98 funding received as a Congressional add; Program Element 0305204D (RDT&E, Defensewide)

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Multiple-Participant Competitive Demonstration, known also as the VTOL Demonstration, provides the opportunity to assess the maturity of VTOL UAV technologies, evaluate air vehicle performance, minimize risks in development of VTOL UAVs in the Naval environment and gather lessons learned for future acquisition. This program is categorized as Budget Activity 7 because it provides for development of technologies and capabilities in support of operational system development.

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305204N
PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles

PROJECT NUMBER: A2671
PROJECT TITLE: Multiple-Participant Competitive Demonstration

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

Previous Accomplishments under Program Element 0305204D: FY97 and FY98 Congressional plus-up funds were provided to execute a VTOL UAV demonstration program with three contractors. The purpose of the demonstration program was to evaluate current VTOL UAV air vehicles which demonstrate the potential to meet or exceed defined performance objectives and to evaluate air vehicle technology risks associated with a VTOL UAV system operating in the Naval environment. The contracts for the demonstration program included 50 hours of flight test at a Government range, payload integration and demonstration and a life cycle cost estimate from the contractors. All three contractors concluded the initial phase of the demonstration. The demonstration program continues in FY99 with the integration of the UAV Common Automatic Recovery System (UCARS) in the VTOL UAV, shipboard demonstrations and integration with the Tactical Control System (TCS).

1. FY 1999 Plan:

- (U) ($3,400) Conduct land based UAV Common Automatic Recovery System (UCARS) efforts.
- (U) ($6,331) Conduct shipboard demonstration efforts to include TCS integration efforts.
- (U) ($246) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305204N
PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles

PROJECT NUMBER: A2671
PROJECT TITLE: Multiple-Participant Competitive Demonstration

(U) B. PROGRAM CHANGE SUMMARY

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	0	0	0
(U) Appropriated Value:		10,000	
(U) Adjustments from President's Budget:		$9,977	
(U) FY2000 President's Budget Submit		$9,977	

CHANGE SUMMARY EXPLANATION:

(U) Funding: FY99 funding includes $10,000K as a result of a Congressional increase. This increase was partially offset by a decrease of $23K for Congressional undistributed reductions.

(U) Schedule: N/A

(U) Technical: N/A

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

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305204N
PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles

PROJECT NUMBER: A2467
PROJECT TITLE: Multiple Participant Competitive Demonstration

(U) D. ACQUISITION STRATEGY: The Multiple Participant Competitive Demonstration (VTOL UAV Demonstration) was designed as a program to evaluate current VTOL UAV air vehicles which demonstrate the potential to meet or exceed defined performance objectives and to evaluate air vehicle technology risks associated with a system operating in the Naval environment. This demonstration was congressionally directed and congressional plus-up funds were made available. A production representative VTOL UAV System would not be down-selected from the VTOL Demonstration contractors. Any acquisition program for a production VTOL UAV System would be the result of a free and open competition.

(U) E. SCHEDULE PROFILE

	FY 1998	FY 1999	FY 2000	FY 2001	FY2002	FY2003
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
(U) Program Milestones						
Landbased UCARS		X----------X				
Ship Demo		X----------X				
(U) Contract Milestones						
Option Exercise		X				
(U) Engineering Milestones						
Landing System Data		X----X				
Ship Install Data		X--X				
(U) T&E Milestones						
Test Readiness Review (TRR)		X---X				
TCS Demo		X				

FY 2000 PRESIDENT'S BUDGET DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305204N PROJECT NUMBER: A2671

PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles PROJECT TITLE: Mult. Part. Comp. Demo

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Project Development Organizations										
Project Integration	CPFF	Bell Helicopter	3788	3,302					3,302	7090
	CPFF	Bombardier	3740	2,952					2,952	6692
DEMO Support	WX	NAWC-AD Patuxent River,MD		1,320					1,320	
Ship Integration	PD	NAVSEA		1,000					1,000	
Subtotal Project Development				**8,574**					**8,574**	
Support Organizations										
Subtotal Support										

Remarks:

FY 2000 PRESIDENT'S BUDGET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305204N

PROGRAM ELEMENT TITLE: Tactical Unmanned Aerial Vehicles

PROJECT NUMBER: A671

PROJECT TITLE: Mult. Part. Comp. Demo

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Test & Evaluation Organizations										
Subtotal Test & Evaluation										
Remarks:										
Management Organizations										
Technical and Management Support	FFP	H. J. FORD	236	205					205	441
MISC.	VARIOUS	VARIOUS		952					1,198	
Subtotal Management				**1,157**					**1,403**	
SBIR Assessment				246						
Remarks:										
Total Cost				**9,977**					**9,977**	

EXHIBIT R-2, FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305206N
PROGRAM ELEMENT TITLE: Airborne Reconnaissance Advanced Development (ARAD)

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
H2694 Advanced Digital Sensors	9,802*	3,048	2,986	6,921	7,920	8,848	18,165	22,994	CONT	CONT
R2476 Framing Reconnaissance Camera	9,278*	13,363	1,972	1,968	0	2,949	0	0	CONT	CONT
TOTAL	**19,080***	**16,411****	**4,958**	**8,889**	**7,920**	**11,797**	**18,165**	**22,994**	**CONT**	**CONT**

Quantity of RDT&E Articles

*Previously executed under Defense Airborne Reconnaissance Office (DARO) PE 0305206D8Z.
**FY 1999 funds executed under NAVAIR Project Unit H2675, ONR Project Unit R2676 and an ONR Project Unit yet to be determined for Framing Reconnaissance Camera effort. $7,982 is to be executed through ONR and $5,381 is to be executed through DARO

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program funds and coordinates the development of advanced defense airborne reconnaissance technologies to ensure systems satisfy strategies and architectures to assure U.S. ability to support warfighter intelligence needs in the face of rapidly developing threat technology, proliferation of advanced weaponry, and uncertain political alignments. This program funds the development of the technologies that respond to evolving threats by emphasizing multi-service utility, interoperability among existing and planned complementary systems (i.e., sensors, ground systems, data links, and manned and unmanned platforms), and timely dissemination of intelligence information to operational forces. It also funds the architecture and master planning activities that will provide the overall guidance for airborne reconnaissance Signals Intelligence and Imagery Intelligence, and manned/unmanned airborne reconnaissance systems.

(U) JUSTIFICATION OF BUDGET ACTIVITY: This program is categorized as Budget Activity 7 because it provides for the development of technologies and capabilities in support of Operational Systems Development.

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305206N
PROGRAM ELEMENT TITLE: Airborne Reconnaissance Advanced Development (ARAD)

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
H2694 Advanced Digital Sensors	0*	3,048	2,986	6,921	7,920	8,848	18,165	22,994	CONT	CONT
Quantity of RDT&E Articles										

*Previously executed under Defense Airborne Reconnaissance Office (DARO).
FY 1999 funds executed under NAVAIR Project Unit H2675.

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Provides funds for the development of sensor systems to improve present airborne reconnaissance capabilities. The developments are driven by evolving collection requirements and modern technology advances. The developments allow for the necessary changes required to meet an integrated, objective airborne reconnaissance architecture as defined in the Integrated Airborne Reconnaissance Strategy (IARS) and amplified in the Airborne Reconnaissance Information Technical Architecture (ARITA). The advanced sensor program includes technical analyses, systems engineering assessments, planning, and development for advanced airborne sensor systems. This effort focuses on developments which support sensor system interoperability and standardization of multi-Service and multi-platform applications. The advanced sensor developments will provide the technology transition modules for operational use necessary for the overall migration of the airborne fleet (manned and unmanned) to a Joint Airborne SIGINT Architecture (JASA) (i.e., sensors, ground systems, data links, and platforms), and provide the mechanism required for timely dissemination of intelligence information to operational forces. The development and modification of the lead integration aircraft (EP-3E) for the initial JASA modules will provide a mechanism to begin development and operational assessment of the Joint SIGINT Avionics Family (JSAF) components.

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305206N
PROGRAM ELEMENT TITLE: Airborne Reconnaissance Advanced Development (ARAD)

PROJECT NUMBER: H2694
PROJECT TITLE: Advanced Digital Sensors

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

   (U) Previously executed under Defense Airborne Reconnaissance Office (DARO) PE 0305206D8Z.

2. FY 1999 PLAN:

   (U) ($2,973) Continue Story Series Development

   - Complete joint Phase III Common Processor Core (CPC) development
   - Procure Story Book software integration lab/aircraft Tadpole replacement cards
   - Complete Story Finder software development
   - Complete Story Finder development unit
   - Begin requirements analysis for fusion integration
   - Continue Fusion Engine Software development

   (U) ($ 75) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0305206N** **PROJECT NUMBER: H2694**
PROGRAM ELEMENT TITLE: Airborne Reconnaissance Advanced Development (ARAD) **PROJECT TITLE: Advanced Digital Sensors**

3. FY 2000 PLAN:

(U) ($2,986) Continue Story Series Development

- Begin joint Common Processor Core (CPC) Phase IV Development
- Begin Story Finder Precision Direction Finding (DF) Array engineering development
- Complete requirements analysis for fusion integration
- Continue Fusion Engine Software development
- Begin Story Finder Integration within EP-3E aircraft
- Begin production of Story Finder Development Unit

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305206N
PROGRAM ELEMENT TITLE: Airborne Reconnaissance Advanced Development (ARAD)

PROJECT NUMBER: H2694
PROJECT TITLE: Advanced Digital Sensors

(U) B. PROGRAM CHANGE SUMMARY

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	0*	0	0
(U) Appropriated Value:	0*	3,055	0
(U) Adjustments from Pres Budget:	0*	3,048	2,986
(U) FY 2000 President's Budget Submit:	0*	3,048	2,986

*Previously executed under Defense Airborne Reconnaissance Office (DARO) PE 0305206D8Z.
FY 1999 funds executed under NAVAIR Project Unit H2675.

CHANGE SUMMARY EXPLANATION:

(U) Funding: The net increase of $3,048 in FY 1999 reflects a DARO transfer of $3,055 thousand from PE 0305206D8Z and a Revised Economic Assumption adjustment of -$7 thousand. The net increase of $2,986 thousand in FY 2000 reflects a DARO transfer of $3,000 thousand from PE 0305206D8Z and a Non Pay Inflation/Correction adjustment of -$14 thousand.

(U) Schedule: Not Applicable.

(U) Technical: Not Applicable

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305206N
PROGRAM ELEMENT TITLE: Airborne Reconnaissance Advanced Development (ARAD)

PROJECT NUMBER: H2694
PROJECT TITLE: Advanced Digital Sensors

(U) C. OTHER PROGRAM FUNDING SUMMARY

APPN	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete
APN5 EP-3E OSIP 01-01				25,649	27,810	34,618	35,032	36,946	200,077

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305206N
PROGRAM ELEMENT TITLE: Airborne Reconnaissance Advanced Development (ARAD)

PROJECT NUMBER: H2694
PROJECT TITLE: Advanced Digital Sensors

Related RDT&E (Not applicable)

(U) D. ACQUISITION STRATEGY: Leverages/complements Air Force , Naval Research Laboratory, Office of Naval Research RDT&E efforts for techology insertions into EP-3E/ES-3/VPU productions programs.

(U) E. SCHEDULE PROFILE

	FY 1998	FY 1999	FY 2000	TO COMPLETE
(U) Program Milestones				2Q01/MSIII for StoryBook & Story Finder
(U) Engineering Milestones		2Q/Story Finder Review 4Q/Story Book CPC Review		1Q01/Begin megapixel microsensor dev
(U) T&E Milestones			2Q/DT/OA	3Q01/DT/OT
(U) Contract Milestones				

FY98 Efforts accomplished under DARO PE 0305206D8Z

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305206N PROJECT NUMBER: H2694
PROJECT TITLE: Advanced Digital Sensors

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Story Finder	CPFF	BTG, Vienna, VA; Sub-Melborne, FL		1050	1Q/99	900	1Q/00	CONT	CONT	CONT
CPC Development	CPFF	Raytheon, Greenville		856	1Q/99	650	1Q/00	CONT	CONT	CONT
Fusion Software Development		Various		245	1Q/99	325	1Q/00	CONT	CONT	CONT
Production Engineering (NRL)	Various	NRL						CONT	CONT	CONT
Subtotal Product Development				**2,151**		**1,875**		**CONT**	**CONT**	**CONT**

Remarks:

System Engineering	WX	NAWC AD, Pax River, MD		247	1Q/99	316	1Q/00	CONT	CONT	CONT
System Engineering	CPFF	VARIOUS		275	1Q/99	292	1Q/00			
Systems Engineering	WX	NAWC WD, China Lake, CA		0		145				
Subtotal Support				**522**		**753**		**CONT**	**CONT**	**CONT**

Remarks:

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305206N PROJECT NUMBER: H2694
PROJECT TITLE: Advanced Digital Sensors

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Test and Evaluation	WX	NAWC AD, Pax River, MD				50	1Q/00			
Subtotal Test & Evaluation						**50**		**CONT**	**CONT**	**CONT**
Remarks:										
Technical Support	CPFF	China Lake, CA		300	1Q/99	308	1Q/00	CONT	CONT	CONT
Subtotal Management			**0**	**300**		**308**		**CONT**	**CONT**	**CONT**
Remarks:										
FY 1999 SBIR Assessment				75					75	
Total Cost			**0***	**3,048**		**2,986**		**CONT**	**CONT**	**CONT**

* PY funds executed under DARO PE#0305206D8Z

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305206N
PROGRAM ELEMENT TITLE: Airborne Reconnaissance Advanced Development (ARAD)

PROJECT NUMBER: R2476
PROJECT TITLE: Framing Reconnaissance Camera

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
R2476 Framing Reconnaissance Camera	9,278*	13,363	1,972	1,968	0	2,949	0	0	CONT	CONT
TOTAL	**9,278***	**13,363**	**1,972**	**1,968**	**0**	**2,949**	**0**	**0**	**CONT**	**CONT**

Quantity of RDT&E Articles

*Previously executed under Defense Airborne Reconnaissance Office (DARO) PE 0305206D8Z.
FY 1999 funds executed under ONR Project Unit R2676 (Electro Optical Congressional Add).

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: There are two primary objectives for the Advanced Technology funding: (1) to evaluate the utility and maturity of technology for airborne reconnaissance applications; and (2) to reduce the risk of employing emerging technologies in system upgrades, new system acquisitions, or Advanced Concept Technology Demonstrations (ACTDs), by integrating and exercising them in developmental and operational tests. These technologies help satisfy the requirements of the objective architecture set forth in the Integrated Airborne Reconnaissance Srategy (IARS). These technology investments are also identified in the Airborne Reconnaissance Technology Program Plan (ARTPP), published in November 1994. They were carefully selected from a broad range of technologies to provide utility to the warfighter at acceptable levels of cost and risk. This project continues technology transition programs in the critical areas identified in the ARTPP. This program leverages the commercial base at every opportunity while investing in carefully selected DoD-unique areas. Additionally, it defines near-term demonstrations in specific areas, followed by ones in which the most promising technology is chosen from a pool of possibilities currently under investigation within government and commercial sectors.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS:

(U) ($3,000) Developed, tested and flown IR framing camera with FMC.
(U) ($5,000) Developed, tested and flown 100 Megapixel EO camera.
(U) ($1,000) Developed improved image data compression boards and initiated contract for next generation compression boards.
(U) ($ 278) Test flew fastest compression boards to date.

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305206N
PROGRAM ELEMENT TITLE: Airborne Reconnaissance Advanced Development (ARAD)

PROJECT NUMBER: R2476
PROJECT TITLE: Framing Reconnaissance Camera

2. FY 1999 PLAN:

(U) ($ 2,300) Continue development of 25-Megapixel/second IR framing camera.
(U) ($ 2,948) Begin multi-spectral medium altitude sensor development and transition MSI algorithms.
(U) ($ 7,785) Begin Electro-Optical development.
(U) ($ 330) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2000 PLAN:

(U) ($ 1,400) Continue multi-spectral medium altitude sensor development and development of IR framing camera.
(U) ($ 572) Develop and test precision strike capable camera.

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305206N
PROGRAM ELEMENT TITLE: Airborne Reconnaissance Advanced Development (ARAD)

PROJECT NUMBER: R2476
PROJECT TITLE: Framing Reconnaissance Camera

(U) B. PROGRAM CHANGE SUMMARY

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	0*	0	0
(U) Appropriated Value:	0*	13,393**	0
(U) Adjustments from Pres Budget:	9,278*	13,363**	1,972
(U) FY 2000/2001 President's Budget Submit:	9.728*	13,363**	1,972

* Previously executed under Defense Airborne Reconnaissance Office (DARO) PE 0305206D8Z.
** $7,982 FY 1999 funds to be executed under ONR Project Unit R2676 and $5,381 to be executed through DARO.

CHANGE SUMMARY EXPLANATION:

(U) Funding: The net increase of $13,363 thousand includes $5,381 thousand executed by DARO and +$7,982 thousand executed by ONR. The $7,982 increase reflects a +$8,000 thousand Congressional Add for Electro Optical effort and a reduction of -$18 thousand for a Revised Economic Assumption. The net increase of $1,972 thousand in FY 2000 reflects a DARO transfer of $2,000 thousand and a reduction of -$28 thousand for Non pay inflation.

(U) Schedule: Not Applicable.

(U) Technical: Not Applicable.

(U) C. OTHER PROGRAM FUNDING SUMMARY

Appn	FY 1998 Budget	FY 1999 **Budget**	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete

Related RDT&E
(U) F/A-18 SHARP (U) HISTAR

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305206N
PROGRAM ELEMENT TITLE: Airborne Reconnaissance Advanced Development (ARAD)

PROJECT NUMBER: R2476
PROJECT TITLE: Framing Reconnaissance Camera

(U) D. ACQUISITION STRATEGY: Leverages in-house (Navy RDT&E) efforts with commercial sources in the areas of advanced digital and sensor technology development.

(U) E. SCHEDULE PROFILE

	FY 1998	FY 1999	FY 2000	TO COMPLETE
(U) Program Milestones				
(U) Engineering Milestones		1Q/Begin Multi-Spec IR Sensor Dev	3Q/Begin Precision Strike Dev	
(U) T&E Milestones				2Q01/Precision Strike Flight Demo 3Q01/IR Camera Flight Test
(U) Contract Milestones				

FY98 and prior effort were budgeted and executed under DARO PE 0305206D8Z

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305206N PROJECT NUMBER: R2476
PROJECT TITLE: Framing Reconnaissance Camera

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Production Engineering	CPFF	TBD Contractors	*	3,953	1Q/99	1,400	1Q/00	Cont	Cont	Cont
Technical Support	CPFF	TBD Contractors	*	1,277	1Q/99	572	1Q/00	Cont	Cont	Cont
Production Engineering	CPFF	TBD Contractors	0	7,803	2Q/99	0		Cont	Cont	Cont
Subtotal Product Development			**0***	**13,259**		**1,972**		**Cont**	**Cont**	**Cont**

Remarks: * Funds executed as part of DARO PE# 0305206D8Z

Subtotal Support	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Remarks:

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305206N PROJECT NUMBER: R2476
PROJECT TITLE: Framing Reconnaissance Camera

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
								0	0	0
Subtotal Test & Evaluation			**0**	**0**		**0**		**0**	**0**	**0**
Remarks:										
			0	0		0		0	0	0
Subtotal Management			**0**	**0**		**0**		**0**	**0**	**0**
Remarks:										
FY 1999 SBIR Assessment				330					330	
Total Cost			**0***	**13,363**		**1,972**		**Cont**	**Cont**	**Cont**

FY98 and prior effort executed under DARO PE 0305206D8Z

FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305207N
PROGRAM ELEMENT TITLE: Manned Reconnaissance Systems

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
*R0117 Reef Point	327	295	400	2,261	2,313	2,365	2,420	2,475	CONT.	CONT.
R2673 FA 18F Tactical Reconnaissance (SHARP)	**2,817	29,845	30,558	25,588	22,632	1,966	0	0	0	113,406
Total	3,144	30,140	30,958	27,849	24,945	4,331	2,420	2,475	CONT.	CONT.

*Executed at a higher level of classification–no project R2.
** Was executed under P.E. 0204136N in FY 1998.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Provides funds for the development of a podded dual-spectral-band reconnaissance camera system capable of being deployed on several tactical aircraft. The camera will have simultaneous visible and infrared imaging capability and provide digital images in national standard formats. The system will be capable of collecting imagery, recording on-board, and transmitting simultaneously to a ground receiving station. Cameras operating in multiple spactral bands will be introduced as the technology evolves. The target aircraft are the F/A-18E/F, Joint Strike Fighter (JSF), S-3, P-3, F-14, and F-16. A prototype system will be flight demonstrated by June 2001. Provision will be made to accommodate transmission of Search and Rescue (SAR) data. The system will operate autonomously from the aircraft operating software in order to be compatible with multiple aircraft. Emphasis will be placed on using commercially available subsystems and components in an open architecture so that evolutionary designs in cameras, processors, transmitters, and recorders can be introduced seamlessy via competitive procurement procedures. An aggressive development schedule will be embraced driving toward an operational capability by May 2003. The purpose of the aggressive development schedule is to have an operational capability ready to replace the F-14 Tactical Air Reccce System (TARPS) due to retire beginning in 2003.

FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305207N
PROGRAM ELEMENT TITLE: Manned Reconnaissance Systems

(U) This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing, operational systems.

(U) Program Change Summary for total P.E.

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	*3,245	342	405
(U) Appropriated Value:	-	30,342	-
(U) Adjustments from FY 1999 PRESBUDG:	-101	+29,798	+30,553
(U) FY 2000 PRESBUDG Submission:	*3,144	30,140	30,958

*$2,817 was executed under P.E. 0204136N in FY 1998.

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1998 adjustment is due to SBIR assessment (-101). FY 1999 adjustments due to Congressional Undistributed Reductions (-202), and FY99 Congressional realignment of funds from F-18 (PE 0204136N) for Shared Reconnaissance Pod (+30,000). FY 2000 adjustments due to Civilian Pay Rates (+1), Non Pay Inflation (-448), and additional funds to continue development of SHARP (+31,000).

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305207N
PROGRAM ELEMENT TITLE: Manned Reconnaissance Systems

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R2637 F/A 18E/F Tactical Reconnaissance (SHARP)										
	*2,817	29,845	30,558	25,588	22,632	1,966	0	0	0.	113,406

* Was executed under P.E. 0204136N in FY 1998.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Provides funds for the development of a podded dual-spectral-band reconnaissance camera system capable of being deployed on several tactical aircraft. The camera will have simultaneous visible and infrared imaging capability and provide digital images in national standard formats. The system will be capable of collecting imagery, recording on-board, and transmitting simultaneously to a ground receiving station. Cameras operating in multiple spectral bands will be introduced as the technology evolves. The target aircraft are the F/A-18E/F, Joint Strike Fighter (JSF), S-3, P-3, F-14, and F-16. A prototype system will be flight demonstrated by June 2001. Provision will be made to accommodate transmission of Search and Rescue (SAR) data. The system will operate autonomously from the aircraft operating software in order to be compatible with multiple aircraft. Emphasis will be placed on using commercially available subsystems and components in an open architecture so that evolutionary designs in cameras, processors, transmitters, and recorders can be introduced seamlessly via competitive procurement procedures. An aggressive development schedule will be embraced driving toward an operational capability by May 2003.

FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305207N PROGRAM ELEMENT TITLE: Manned Reconnaissance Systems PROJECT NUMBER: R2673 PROJECT TITLE: F/A 18E/F Tactical Reconnaissance

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 ACCOMPLISHMENTS:
   - (U) ($1,000) Solicit and evaluate industry input.
   - (U) ($1,817) Develop draft ORD and program plans.

2. (U) FY 1999 PLAN:
   - (U) ($14,000) Begin development of pod structure for multiple aircraft use.
   - (U) ($3,000) Risk reduction camera assessment, airborne vibration tests, dual band window development.
   - (U) ($4,500) Dual band camera development.
   - (U) ($4,000) Reconnaissance Management Systems (RMS) development.
   - (U) ($1,700) Begin systems software development.
   - (U) ($1,900) Begin subsystem and component procurement.
   - (U) ($745) Begin integration and testing.

3. (U) FY 2000 PLAN:
   - (U) ($600) Complete risk reduction efforts.
   - (U) ($2,500) Complete prototype integration and testing.
   - (U) ($900) Begin preparation for flight demonstration.
   - (U) ($3,000) Begin Integrated Logistics Support (ILS) program.
   - (U) ($4,200) Continue Software operational flight program.
   - (U) ($5,558) Procure Engineering, Development and Manufacturing (EDM) pods.
   - (U) ($8,800) Procure payloads.
   - (U) ($5,000) Continue Software development.

B. (U) PROGRAM CHANGE SUMMARY: See total program change summary for P.E.

FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305207N
PROGRAM ELEMENT TITLE: Manned Reconnaissance Systems

PROJECT NUMBER: R2673
PROJECT TITLE: F/A 18E/F Tactical Reconnaissance

C. (U) OTHER PROGRAM FUNDING SUMMARY:
(U) PROCUREMENT FUNDING: APN F-18E/F starting in FY 2001

(U) RELATED RDT&E:
(U) PE 0305206N (Airborne Reconnaissance Advance Development)
(U) PE 0204136N F/A-18
(U) PE 0305208N JSIPS

D. (U) SCHEDULE PROFILE:

(U) Program Milestones	FY 1998	FY 1999	FY 2000
			MS II EMD development
(U) Engineering Milestones		Pod structure CDR Vibration Tests Window Tests	
			Reconnaissance management system delivery
(U) T&E Milestones		Camera flight tests	First system flight tests

FY 2000 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305207N
PROGRAM ELEMENT TITLE: Manned Reconnaissance Systems

PROJECT NUMBER: R2673
PROJECT TITLE: F/A 18 Tactical Reconnaissance

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

Project Cost Categories	FY 1998	FY 1999	FY 2000
a. Preliminary Design Review/Concept Review	2,817	0	0
b. SHARP pod structure	0	14,000	5,558
c. Dual band cameras	0	4,500	8,800
d. Subsystems components FFP	0	1,900	0
e. Risk reduction WX	0	3,000	600
f. Reconnaissance management	0	4,000	0
g. Software development	0	1,700	9,200
h. Integration and testing	0	745	3,400
i. Integrated Logistics Support	0	0	3,000
Total	2,817	29,845	30,558

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

PERFORMING ORGANIZATIONS

FY 2000 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305207N
PROGRAM ELEMENT TITLE: Manned Reconnaissance Systems

PROJECT NUMBER: R2673
PROJECT TITLE: F/A 18 Tactical Reconnaissance

Contractor/ Government Performing Activity	Contract Method Fund Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1998 & Prior	FY 1999 Budget	FY 2000 Budget	To Complete	Total Program
Product Development									
Raytheon	IDIQ	Mar 99	14,000	14,000	0	14,000	5,558	12,986	32,544
TBD	CPFF	Mar 99	4,500	4,500	0	4,500	8,800	18,188	31,488
TBD	FFP	Jun 99	1,900	1,900	0	1,900	0	2,000	3,900
Miscellaneous	WX	Various	N/A	N/A	2,074	8,700	12,800	9,400	32,974
Various	Various	Various	Various	Various	743	0	0	0	743
Support and Management:	Not Applicable								
Test and Evaluation:									
Miscellaneous	WX	Oct 99	N/A	N/A	0	745	3,400	7,612	11,757
TOTAL:					*2,817	29,845	30,558	50,186	113,406

GOVERNMENT FURNISHED PROPERTY: Not Applicable

	FY 1998 & Prior	FY 1999 Budget	FY 2000 Budget	To Complete	Total Program
Subtotal Product Development	*2,817	29,100	27,158	42,574	101,649

FY 2000 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305207N
PROGRAM ELEMENT TITLE: Manned Reconnaissance Systems

PROJECT NUMBER: R2673
PROJECT TITLE: F/A 18 Tactical Reconnaissance

Subtotal Support and Management:	0	0	0	0	0
Subtotal Test and Evaluation:	0	745	3,400	7,612	11,757
Total Project	0	29,845	30,558	50,186	113,406

*Was executed under P.E. 0204136N in FY 1998.

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 2

PROGRAM ELEMENT: 0305208N
PROGRAM ELEMENT TITLE: DISTRIBUTED COMMON GROUND SYSTEMS (DCGS)

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
A2174 JSIPS-N	*	$4,955**	$5,583	$6,042	$6,049	$6,608	$6,694	$6,794	Continuing	Continuing
TOTAL	*	$4,955**	$5,583	$6,042	$6,049	$6,608	$6,694	$6,794	Continuing	Continuing

*** FY 1998 funded under RDT&E Defense Wide, P.E. 0305208D8Z, Project P813, Common Imagery Ground/Surface Systems (CIGSS)**
**** FY 1999 budget reflects a transfer of funds from defense-wide account to Navy of $4,966 for Common Imagery Ground/Surface Systems (A2677)**

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The Joint Services Imagery Processing System – The DCGS is a cooperative effort between the services, agencies, and DoD to provide systems capable of receiving, processing, exploiting, and disseminating data from airborne and national reconnaissance platforms. DCGS is further subdivided into systems which process, exploit, and disseminate Measurements Analysis and Signatures Intelligence (MASINT) data, Signals Intelligence (SIGINT) data, Multi-Intelligence Reconnaissance data, and Imagery data. Cooperative imagery processing systems are collected under the general heading Common Imagery Ground/Surface Systems (CIGSS). JSIPS-N is the Navy CIGSS component.

JSIPS-N has the capability to receive, process, exploit, store and disseminate imagery, imagery-derived products and imagery intelligence (IMINT) reports based on multi-source from multiple inputs. The primary mission of JSIPS-N is to assist strike planners, tactical aviators, and Marine Corps amphibious planners in the delivery of precision ordnance (including Tomahawk Cruise Missiles) on target.

JSIPS-N includes three major components, the Softcopy Exploitation Segment (SES) consisting of the Digital Imagery Workstation Suite Afloat (DIWSA) and the Precision Targeting Workstation (PTW), the National Input Segment (NIS) and the Tactical Input Segment (TIS). JSIPS-N is being installed onboard aircraft carriers (CV/CVN), amphibious assault ships (LHA/LHD), select fleet flag ships (AGF/LCC) and shore sites.

Secondary missions of the system are to provide near-real-time imagery and support to fleet intelligence assets, Special Operations Forces, and to support primary exploitation and dissemination of tactical organic and theater IMINT products.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing operational systems

DATE: February 1999

BUDGET ACTIVITY: 2 PROGRAM ELEMENT: 0305208N PROGRAM ELEMENT TITLE: DISTRIBUTED COMMON GROUND SYSTEMS (DCGS) PROJECT NUMBER: A2174 PROJECT TITLE: JOINT SERVICE IMAGERY PROCESSING SYSTEMS

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
A2174 JSIPS-N	*	$4,955**	$5,583	$6,042	$6,049	$6,608	$6,694	$6,794	Continuing	Continuing
TOTAL	*	$4,955**	$5,583	$6,042	$6,049	$6,608	$6,694	$6,794	Continuing	Continuing

*** FY 1998 funded under RDT&E Defense Wide, P.E. 0305208D8Z, Project P813, Common Imagery Ground/Surface Systems (CIGSS)**
**** FY 1999 budget reflects a Congressional Add of $4,966 for Common Imagery Ground/Surface Systems (A2677)**

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The Joint Services Imagery Processing System – Navy (JSIPS-N) is the Navy's portion of the Distributed Common Ground System (DCGS) which is a cooperative effort between the services, agencies, and DoD to provide systems capable of receiving, processing, exploiting, and disseminating data from airborne and national reconnaissance platforms. DCGS is further subdivided into systems which process, exploit, and disseminate Measurements Analysis and Signatures Intelligence (MASINT) data, Signals Intelligence (SIGINT) data, Multi-Intelligence Reconnaissance data, and Imagery data. Cooperative imagery processing systems are collected under the general heading Common Imagery Ground/Surface Systems (CIGSS). JSIPS-N is the Navy CIGSS component.

JSIPS-N has the capability to receive, process, exploit, store and disseminate imagery, imagery-derived products and imagery intelligence (IMINT) reports based on multi-source from multiple inputs. The primary mission of JSIPS-N is to assist strike planners, tactical aviators, and Marine Corps amphibious planners in the delivery of precision ordnance (including Tomahawk Cruise Missiles) on target.

JSIPS-N includes three major components, the Softcopy Exploitation Segment (SES) consisting of the Digital Imagery Workstation Suite Afloat (DIWSA) and the Precision Targeting Workstation (PTW), the National Input Segment (NIS) and the Tactical Input Segment (TIS). JSIPS-N is being installed onboard aircraft carriers (CV/CVN), amphibious assault ships (LHA/LHD), select fleet flag ships (AGF/LCC) and shore sites.

Secondary missions of the system are to provide near-real-time imagery and support to fleet intelligence assets, Special Operations Forces, and to support primary exploitation and dissemination of tactical organic and theater IMINT products.

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 2 | **PROGRAM ELEMENT: 0305208N** | **PROGRAM ELEMENT TITLE: DISTRIBUTED COMMON GROUND SYSTEMS (DCGS)** | **PROJECT NUMBER: A2174** | **PROJECT TITLE: JOINT SERVICE IMAGERY PROCESSING SYSTEMS**

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 ACCOMPLISHMENTS:
   FY 1998 was funded as part of the RDT&E Defense-Wide Program, Distributed Common Ground Systems (DCGS), PE 0305208D8Z.

2. (U) FY 1999 PLAN:
   ($4,232) JSIPS-N System Engineering including Precision Targeting Workstation, Classified Communications, JSIPS-N Concentrator Architecture and Imagery Exploitation Software Segment.
   ($500) Perform Collaborative Contingency Targeting and Precision Guided Missile/Support Activity efforts.
   ($100) Test and Evaluation Support.
   ($123) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. (U) FY 2000 PLAN:
   ($3,800) JSIPS-N System Engineering including Precision Targeting Workstation, Classified Communications, JSIPS-N Concentrator Architecture and Imagery Exploitation Software Segment.
   ($919) Shared Reconnaissance Pod (SHARP)/Tactical Input Segment (TIS) Systems Engineering and Integration.
   ($764) Perform Collaborative Contingency Targeting and Precision Guided Missile/Support Activity efforts.
   ($100) Test and Evaluation Support.

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 2 **PROGRAM ELEMENT: 0305208N** **PROGRAM ELEMENT TITLE: DISTRIBUTED COMMON GROUND SYSTEMS (DCGS)** **PROJECT NUMBER: A2174** **PROJECT TITLE: JOINT SERVICE IMAGERY PROCESSING SYSTEMS**

(U) B. PROGRAM CHANGE SUMMARY

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	0*	0	0
(U) Appropriated Value:		$4,966	
(U) Adjustments from President's Budget:	0*	+$4,955	+$5,583
(U) FY2000 President's Budget Submit:	0*	$4,955	$5,583

*FY 1998 budget for this item was submitted as part of the RDT&E Defense-Wide Program, Distributed Common Ground Systems (DCGS), PE 0305208D8Z. OSD Program Decision Memorandum, of 18 August 1998, transferred FY00-05 funding for this program to the services.

CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1999 net increase of +$4,955 thousand reflects a transfer from defense-side account to Navy of +$4,966 thousand for Common Imagery Ground/Surface System and a decrease of -$11 thousand for Congressional undistributed reductions. FY 2000 net increase of +$5,583 thousand consists of an increase of +$4,664 thousand DARO funding transfer and +$1,000 thousand for IPDM reduction; and a decrease of -$81 thousand for non pay inflation.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 2 **PROGRAM ELEMENT: 0305208N** **PROGRAM ELEMENT TITLE: DISTRIBUTED COMMON GROUND SYSTEMS (DCGS)** **PROJECT NUMBER: A2174** **PROJECT TITLE: JOINT SERVICE IMAGERY PROCESSING SYSTEMS**

(U) C. OTHER PROGRAM FUNDING SUMMARY (Dollars in Thousands)

Appn	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
OPN	*	$65,556	$41,255	$47,791	$46,556	$45,404	$73,975	75,079	Continuing	Continuing

* FY 1998 procurement budget for this item was submitted in the Procurement, Defense-Wide appropriation as Distributed Common Ground Systems (DCGS), PE 0305208D8Z. OSD Program Decision Memorandum, of 18 August 1998, transferred FY00-05 funding for this program to the services.

Related RDT&E

Not applicable.

(U) D. ACQUISITION STRATEGY:

The production system consists of three elements, the Softcopy Exploitation System (SES) consisting of the Digital Imagery Workstation Suite Afloat (DIWSA) and the Precision Targeting Workstation (PTW), the National Input Segment (NIS) and Tactical Input Segment (TIS). The DIWSA is already in full rate co-production with other programs, most notably Tomahawk's mission planning systems. The NIS is also in full rate production and supplied as Government Furnished Equipment (GFE) by the National Imagery and Mapping Agency (NIMA SDD). The TIS is acquired from the Air Force Electronic Systems Center (ESC) at Hanscom AFB and is supplied as GFE to the integrating contractor. The system integrator for the Navy system is the Space and Naval Warfare Systems Command.

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 2

PROGRAM ELEMENT: 0305208N
PROGRAM ELEMENT TITLE: DISTRIBUTED COMMON GROUND SYSTEMS (DCGS)

PROJECT NUMBER: A2174
PROJECT TITLE: JOINT SERVICE IMAGERY PROCESSING SYSTEMS

E. SCHEDULE PROFILE

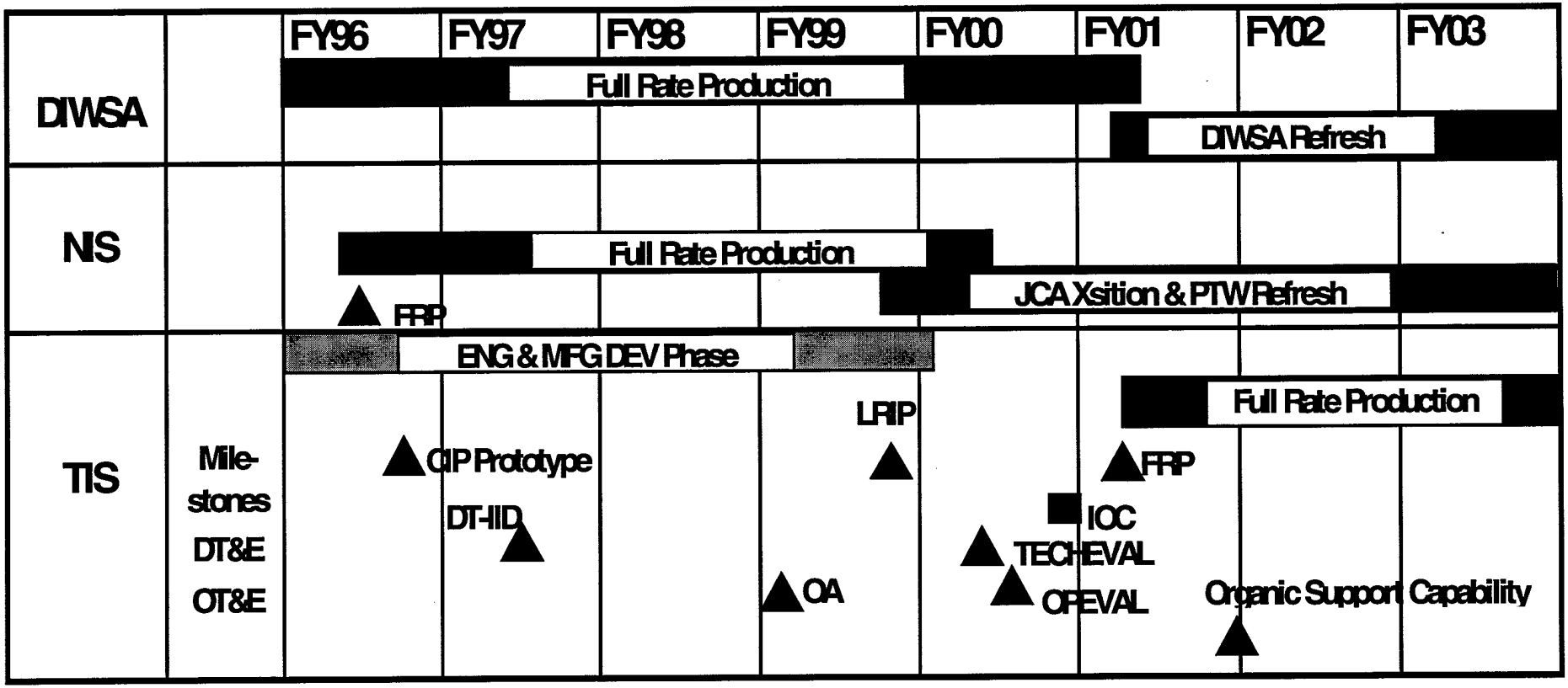


EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 2 | **PROGRAM ELEMENT: 0305208N** | **PROGRAM ELEMENT TITLE: DISTRIBUTED COMMON GROUND SYSTEMS (DCGS)** | **PROJECT NUMBER: A2174** | **PROJECT TITLE: JOINT SERVICE IMAGERY PROCESSING SYSTEMS**

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development			*See Note below*							
Hardware Development						$0				
Systems Engineering	Project Directive	SPAWAR, San Diego, CA		$1,525	5/99	$2,314	5/00	Continuing	Continuing	
	Economy Act	NRL, Washington DC		$877	5/99	$1,919	5/00	Continuing	Continuing	
	SS/CPFF	Mitre, Vienna VA		$500	2/99	$250	2/00			
	MIPR	NRO/OSO, Wash DC		$750	3/99	$800	3/00	Continuing	Continuing	
	MIPR	Rome Lab, NY		$1,080	6/99	$200	6/00	Continuing	Continuing	
Subtotal Project Development				**$4,732**		**$5,483**				

Remarks: None.

Note: FY 1998 budget for this item was submitted as part of the RDT&E Defense-Wide Program, Distributed Common Ground Systems (DCGS), PE 0305208D8Z. OSD Program Decision Memorandum, of 18 August 1998, transferred FY00-05 funding for this program to the services.

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 2 **PROGRAM ELEMENT: 0305208N** **PROGRAM ELEMENT TITLE: DISTRIBUTED COMMON GROUND SYSTEMS (DCGS)** **PROJECT NUMBER: A2174** **PROJECT TITLE: JOINT SERVICE IMAGERY PROCESSING SYSTEMS**

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation										
Test and Evaluation	WX	COMOPTEVFOR, Norfolk, VA		$100	6/99	$100	6/00	Continuing	Continuing	
Subtotal Test & Evaluation				**$100**		**$100**				
Subtotal Management										
SBIR Assessment				$123						
Total Cost			**See Note Below**	**$4,955**		**$5,583**		**Continuing**	**Continuing**	

Remarks: None.

Note: FY 1998 budget for this item was submitted as part of the RDT&E Defense-Wide Program, Distributed Common Ground Systems (DCGS), PE 0305208D8Z. OSD Program Decision Memorandum, of 18 August 1998, transferred FY00-05 funding for this program to the services.

FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0305927N
PROGRAM ELEMENT TITLE: Naval Space Surveillance

(U) COST: (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0125 Naval Space Surveillance	387	398	712	724	737	749	765	781	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Naval Space Surveillance Fence is an integral component of the U. S. Space Command Space Surveillance Network. This system provides continuous surveillance and unalerted detection of space objects crossing the Continental United States. The fence is also the only space surveillance system which provides satellite vulnerability and space control data to the fleet. It is a multistatic continuous wave radar fence consisting of three transmitter sites, six receiver sites, and a computation/communication center. The Alternate Space Control role assigned by U.S. Commander in Chief Space (USCINCSPACE), requires that the Naval Space Command Mission System maintain functional equivalence with the USCINCSPACE Space Control Center and receive, process, and distribute data from 26 surveillance sites. The increase in funding FY00 and out supports this role and the research and development of high-powered transmitters and other system component parts for the next generation fence system to reduce risk in the implementation phase.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrading existing operational systems.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

FY 2000/2001 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305927N PROJECT NUMBER: R0125
PROGRAM ELEMENT TITLE: Naval Space Surveillance PROJECT TITLE: Naval Space Surveillance

1. (U) FY 1998 ACCOMPLISHMENTS:
   - (U) ($192) Improved accuracy and consistency of chip processing techniques.
   - (U) ($175) Studied and analyzed the geodetic positional alignment of the space surveillance radar system and determined the effect on system performance.
   - (U) ($ 20) Traveled in support of Naval Space Surveillance Fence.

2. (U) FY 1999 PLAN:
   - (U) ($190) Evaluate tradeoffs in prototype S band feed assembly as part of a large antenna array.
   - (U) ($100) Evaluate impacts to current system of S band implementation.
   - (U) ($ 99) Demonstrate impact of high volume (10-100X) processing on multiple site integration.
   - (U) ($ 9) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. (U) FY 2000 PLAN:
   - (U) ($190) Assess impact of chirp processing to S-band operations.
   - (U) ($150) Study system designing trades for S-band operations.
   - (U) ($100) Evaluate multi-frequency detection processing.
   - (U) ($150) Verify high volume processing algorithms.
   - (U) ($122) Study improved drag processing for low orbits.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	387	399	722
(U) Appropriated Value:		399	-

FY 2000/2001 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305927N PROJECT NUMBER: R0125
PROGRAM ELEMENT TITLE: Naval Space Surveillance PROJECT TITLE: Naval Space Surveillance

(U) Adjustments from FY 1999 PRESBUDG:	0	**-1**	-10
(U) FY 2000 President's Submission:	387	398	712

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY99 adjustments are due to Revised Economic Assumption (-1K). FY00 adjustment is due to Non Pay Inflation (-10).
(U) Schedule: Not applicable.
(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 2000 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305927N PROGRAM ELEMENT TITLE: Naval Space Surveillance PROJECT NUMBER: R0125 PROJECT TITLE: Naval Space Surveillance

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

Project Cost Categories	FY 1998	FY 1999	FY 2000
a. Project Management	20	15	20
b. Product Development	367	384	692
Total	387	398	712

Exhibit R-2, RDT&E Budget Item Justification									Date: February 1999	
APPROPRIATION/BUDGET ACTIVITY RDT&E,N Budbet Activity 4					R-1 ITEM NOMENCLATURE Program Element: 0305972 Program Element Title: Integrated Broadcast Service					
COST ($ in Millions)	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	FY2004	FY2005	Cost to Complete	Total Cost
Total PE Cost	0	14,546	0	0	0	0	0	0	CONT	CONT
4778 Integrated Broadcast Service	0	14,546	0	0	0	0	0	0	CONT	CONT
Project B Name/No. & subtotal cost										
Project C Name/No. & subtotal cost										
Quantity of RDT&E Articles	0	2	0	0	0	0	0	0		

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Integrated Broadcast Service (IBS) provides warfighters with critical and highly perishable intelligence and information in a single, correlated picture via a near-real-time, integrated dissemination architecture. IBS consolidates existing intelligence broadcast systems into a common-format, common-terminal, theater-tailored architecture. The IBS design incorporates new functionality in broadcast and information management, a new message format, and a new receiver. It fields four Information Management Elements to geographic CINCs that perform requirements as set forth in the Joint Operational Requirements Document.

- Accept data from dissimilar, geographically-dispersed data sources including airborne, space-based, shipborne and ground SIGINT, radar and infrared sensors.
- Transmit intelligence and information to end users equipped with JTT or terminals which incorporate the CIBS-M.
- Disseminate theater oriented, based, and focused intelligence and information, based on user generated and CINC validated dissemination priorities.
- Disseminate intelligence and information over various communications paths, based on the communications available to the end user.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) FY 1999 ACCOMPLISHMENTS

- (U) ($1,366) Maintain a Program Management Office, including program supervision, finance and acquisition strategy development
- (U) ($3,650) Perform System Engineering, including design of message format, maintenance of architectures, and system configuration control
- (U) ($8,416) Design, build and field the initial Information Management Element (IME) (Spiral #1)
- (U)($ 800) Test initial IME in CUBE and CANX before fielding in Pacific Command (PACOM)
- (U) ($ 314) AMB Development

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is in budget activity 4 because it includes demonstrating and validating the use of technologies to create an operational integrated broadcast service.

Exhibit R-2, RDT&E Budget Item Justification	Date: February 1999

B. Program Change Summary:
(U) Funding: FY1999 adjustments due to Economic Assumptions (-34).
C. Other Program Funding Summary

	FY 1998	FY 1999	FY 2000	FY 2001	TotalCost
(U) Previous President's Budget (FY 1999 PB)	0		0	0	TBD
(U) Appropriated Value		14,580			TBD
(U) Adjustments to Appropriated Value					
a. Cong Reductions		-34			
b. SBIR					
c. Omnibus or Other Above Threshold Reprogram					
d. Below Threshold Reprogramming					
(U) Adjustments to Budget Years Since FY 1999 PB					
a. IPDM					
b. PBD 602/604 (Inflation)					
(U) Current Budget Submit/ FY 2000 PB		14,546			

(U) Significant Program Changes:
USN received $24.9M in a Congressional transfer of IBS and IBS legacy funds in the FY 1999 budget: $14.580M in RDT&E, $10.271M in OPN. FY1999 adjustments (-34) Economic Assumptions.

D. Other Program Funding Summary ($ in Thousands)

	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	TotalCost
(U) OPN/PE0305972N	0	10,271	0	0	0	0	0	0	10,271

(U) E. Acquisition Strategy
IBS will use a spiral development program to create a common dissemination architecture. Systems and technology will be contracted for under a competitive Request for Proposal (RFP) process.

Exhibit R-2, RDT&E Budget Item Justification | Date: February 1999

(U) F. Schedule Profile

	FY 1998				FY 1999				FY 2000				FY 2001			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
(U) Master Acquisition Plan			*													
(U) Spiral 1																
(U) - Design					*											
(U) - Development					*											
(U) - Accreditation Efforts Begin					*											
(U) - CANX/CUBE Activities Begin						*										
(U) - Product Build						X										
(U) - PACOM Preparations						X										
(U) - PACOM Delivery							X									
(U) Spiral 2																
(U) - Concept						X										
(U) - Develop RFP							X									
(U) - Award Contract						X										
(U) - Delivery													X			
(U) Spiral 3																
(U) - Concept									X							
(U) - Develop RFP									X							
(U) - Award Contract										X						
(U) - Delivery (1QFY02)																

* - Denotes completed event
X - Denotes planned event

DATE: FEBRUARY 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0308601N
PROGRAM ELEMENT TITLE: Modeling and Simulation Program

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X2222 Naval Modeling & Simulation										
	4,212	0*	9621	9677	8922	9195	11,663	12,294	Cont	Cont

* Note: In 1999, the program was funded and executed in P.E. 0605853N

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Funds the efforts of Navy Modeling and Simulation (M&S) Management Office and the Department of the Navy Technical Support Group (TSG). Supports technical and management initiatives directed by Congress, DoD and SECNAV with the aim of bringing organization and focus to the development and use of M&S tools throughout Navy and DoD. It provides a central agency for the formulation and implementation of policy and guidance in M&S; represents Navy interests in Joint/other Agency. Funds efforts to define and coordinate execution of a Navy M&S program to evolve an interoperable and reusable core M&S capability consistent with the M&S technical framework prescribed by DoD. Efforts are organized around 4 product areas: (1) Engineering Studies and Analysis, to define the feasibility and applicability of proposed standards to Navy and to investigate service unique requirements for standards or guidance; (2) Products and Services, to develop the policy, standards, and common tools and services necessary to guide more efficient development and use of M&S across Navy; this includes development and management of the Navy M&S Information System (NMSIS), Navy counterpart to the DOD M&S Resource Repository, to provide a central M&S information resource to reduce stovepiped development, promote tool reuse and support informed M&S investment decisions; (3) M&S Quality Assurance Program, to establish and manage a disciplined process of model verification, validation and accreditation (VV&A) required by current directives; (4) Simulation Experiments, to test distributive simulation technology in fleet exercises, experiments, and pilot efforts which demonstrate and examine the value and limitations of proposed standards (such as HLA and JMASS) to mission and program requirements.
Note: In FY 2000 a Technical Change moves the Naval Modeling and Simulation X2222 Project from Program Element 0605853N to Program Element 0308601N in order to more accurately describe the Naval Modeling and Simulation Project.

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0308601N
PROGRAM ELEMENT TITLE: Modeling and Simulation Program

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 ACCOMPLISHMENTS:

- (U) ($ 762) Engineering Studies and Analysis: Developed Navy strategy for the transition of Navy M&S to the OSD-mandated M&S interoperability standard, High Level Architecture (HLA). Led Navy HLA implementation planning, reported Navy compliance intentions to DoD and participated in the DoD HLA transition working group. Briefed Navy flags, intra and inter service forums on the issues and technical implications of Navy M&S compliance with HLA. Completed Phase I of Maritime Virtual Environmental Data Specification (MARVEDS), initial analysis and feasibility of approach to developing an information model, data format, data dictionary, algorithms, techniques, and database management system that can define and mediate the environmental data required to enable a virtual prototype. This type of standard for simulation environments is critical to enabling Simulation Based Acquisition (SBA). Developed a roadmap for migrating existing standalone logistics modeling capability into a more integrated, interoperable core suite of capability to support both operational logistics and long term logistics wargaming and assessment. Logistic study was directly applicable to the development of the M&S Investment Plan.
- (U) ($2,271) Products and Services: Developed an initial prototype of the web-based Navy Modeling and Simulation Information System (NMSIS), the Naval component of the DoD M&S resource repository (part of the DoD M&S Framework). Updated and provided user assistance and support on the Naval M&S Catalog; added HLA compliance information for Navy systems. Supported planning and technical coordination of efforts across Navy M&S Functional Areas, other Services, OSD, Joint Staff, and other agencies to develop policies and procedures for M&S standardization. Coordinated and chaired Navy's M&S Working Group and Navy Flag M&S Steering Group; participated in the Defense M&S Office's M&S working group and the DoD M&S Executive Council, including separate forums for training, assessments & acquisition; and coordination of technical reviews of joint programs and initiatives (JSIMS, JWARS, JMASS and NETWARS). Developed draft of DoD and SECNAV-required Navy M&S Investment Plan and developed and coordinated draft/final review and approval of SECNAV Instruction for Navy M&S VV&A. Provided M&S education and information services to the full spectrum of M&S developers and users via production and dissemination of a Navy M&S information video; home page maintenance and distribution of informational brochures; established Navy Postgraduate School curriculum on M&S development and application; and participation in select OSD and industry sponsored symposia. Initiated effort to define a common technical framework to support consistent evaluation and measurement of C4I return on investment and provided Navy requirements in the Joint development of a Network Warfare Simulation (NETWARS), a key element in the establishment of a common technical framework for consistent C4I analysis across DoD.

- (U) ($ 555) M&S Quality Assurance Program: Developed Navy process and guidelines for Verification, Validation, and Accreditation (VV&A) of M&S and a process of Verification, Validation, and Certification (VV&C) for data. Provided technical review on M&S VV&A plans and reports and provided subject matter expertise and advice on how to meet Navy policy requirements within existing fiscal and programmatic constraints. Developed the Naval M&S VV&A/VV&C repository. Developed and implemented a prototype web-based distributed interactive VV&A/VV&C training capability for M&S developers and accreditors.
- (U) ($ 624) Simulation Experiments: Provided Navy share of Services' contribution to maintenance of the simulation protocol needed to use Joint Training Confederation simulations in Joint Task Force Exercises. Ensured simulation of Naval forces supported Navy participation in Joint exercises; supported Ulchi Focus Lens, Synthetic Theater of War, and United Endeavor. Identified initial suite of existing M&S tools to offer near term relevance and application to the goals of the Maritime Battle Center (MBC) and the ongoing evaluation of systems and technologies in reoccurring Fleet Battle Experiments (FBE). Participated in OSD effort to develop a definition, functional description, and implementation plan for simulation-based acquisition.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

2. (U) FY 1999 Plan: Program was funded and executed in PE0605853N

3. (U) FY 2000 PLAN:

- (U) ($1,713) Engineering Studies and Analysis: Conduct engineering studies and analysis aimed at determining the feasibility and applicability of proposed standards or technical approaches to Navy and at investigating service unique requirements for standards or guidance. Individual study thrusts will focus on developing or evaluating approaches to optimize training, assessments and acquisition functional/mission objectives through more efficient development and use of M&S. Develop standards for modeling communication networks and information systems with the overarching objective of facilitating the development of a core, reusable, communications M&S capability which supports the full range of architecture and engineering design and analysis requirements across Navy. Support the Naval Postgraduate School Modeling and Simulation degree program, Modeling, Virtual Environments and Simulation (MOVES) curriculum.
- (U) ($3,698) Products and Services: Continue development of common services, tools, and data bases. Develop the Navy Modeling and Simulation Information System (NMSIS), through an evolutionary process, integrating standards, standard models, standard data and connectivity to support all Naval assessments, training, acquisition and operational communities. Manage and maintain the Navy Modeling and Simulation Information System (NMSIS), as a central M&S information resource to reduce stovepiped development, promote standardization and reuse and

support informed M&S investment decision making across Navy. Provide the necessary planning and coordination of M&S efforts across the Navy M&S Functional Areas, other Services, OSD, Joint Staff, and other agencies to develop policies and procedures necessary for M&S standardization within the Navy. Provide annual updates to the Naval M&S Catalog, Master Plan, and Investment Strategy.

- (U) ($790) M&S Quality Assurance Program: Continue to implement and manage the M&S Quality Assurance development of the Verification, Validation, and Accreditation (VV&A) process and guidelines for modeling and simulation and the Verification, Validation, and Certification (VV&C) process and guidelines for data. Continue implementation of the VV&A/VV&C process and review on both new and legacy M&S plans and reports. Develop and maintain the Naval M&S VV&A/VV&C repository. Establish and implement a VV&A/VV&C training curriculum for developers and accreditors. Provide annual VV&A/VV&C assessment to the CNO.
- (U) ($3,420) Simulation Experiments: Support Fleet Exercise simulation experiments and the application of distributed simulation to a wide variety of operational, research and development, training, test and evaluation exercises. Develop a series of simulation projects to test and evolve the standards for models, interfaces, data, and tools necessary to enable the seamless access and use of operationally relevant M&S to support the range of Navy training, warfare assessments and acquisition requirements.

B. (U) PROGRAM CHANGE SUMMARY: In FY 2000, Funds were decreased -$105K for Budget Submitting Office realignment, -139K for Non Pay Inflation, and -7K for Working Capital-NAWC. It was increased +50K for NCWF rate adjustments and +22K for Civilian Pay Rates.

(U) OTHER PROGRAM FUNDING SUMMARY:

	FY1998	FY1999	FY2000
O&M,N PE0204662N/1C1C (Partial) (SEE PE 0605853N)			877

(U) RELATED RDT&E: Not applicable.

D. (U) SCHEDULE PROFILE: Not applicable.

Exhibit R-3 Cost Analysis (page 1)									Date FEBRUARY 1999			
APPROPRIATION/BUDGET ACTIVITY: 7			PROGRAM ELEMENT: 0308601N						PROJECT NAME AND NUMBER: Modeling & Simulation, X2222			
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY-99 Cost	FY-99 Award Date	FY-00 Cost	FY-00 Award Date	FY-01 Cost	FY-01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Navy M&S Info Syst Developmt	Various	Various	-	-	-	1825	TBD		TBD	Cont.	Cont.	Cont.
Quality Assurance	Various	Various	555	-	-	790	TBD		TBD	Cont.	Cont.	Cont.
Subtotal Product Development			555			2615				Cont.	Cont.	Cont.
Remarks:												
M&S Services	Various	Various	2373	-	-	1873	TBD		TBD	Cont.	Cont.	Cont.
Subtotal Support			2373			1873				Cont.	Cont.	Cont.
Remarks												

Exhibit R-3, Project Cost Analysis

Exhibit R-3 Cost Analysis (page 2)									Date: FEBRUARY 1998			
APPROPRIATION/BUDGET ACTIVITY: 7			PROGRAM ELEMENT: 0308601N						PROJECT NAME AND NUMBER: Modeling & Simulation, X2222			
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY-99 Cost	FY-99 Award Date	FY-00 Cost	FY-00 Award Date	FY-01 Cost	FY-01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Simulation Experiments	Various	Various	627	-	-	3420	TBD		TBD	Cont.	Cont.	Cont.
Subtotal T&E			627			3420				Cont.	Cont.	Cont.
Remarks												
Engineering Studies/Analyses	Various	Various	592	-	-	1713	TBD		TBD	Cont.	Cont.	Cont.
Program Management			65									
											Cont.	Cont.
Subtotal Management			657			1713				Cont.	Cont.	Cont.
Remarks												
Total Cost			4212	0		9621						

EXHIBIT R-2, FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0702207N
PROGRAM ELEMENT TITLE: Depot Maintenance (Non-IF)

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
H2451 P-3C SLAP	0	28,123	24,023	19,295	0	0	0	0	0	71,441
H2452 S-3 SLAP	0	23,634	14,230	4,691	0	0	0	0	0	42,555
W2454 AN/ARC-210-RT-1794(C)*	0	6,445	1,733	576	766	0	0	0	0	9,520
TOTAL	**0**	**58,202**	**39,986**	**24,562**	**766**	**0**	**0**	**0**	**0**	**123,516**

Quantity of RDT&E Articles

* W2454 was previously funded as H2454.

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Service Life Assessment Program (SLAP) on the P-3C (H2451) and S-3B (H2452) began in FY 1999. These efforts are required to be conducted for these airframes to ascertain what actions must be taken to safely operate each system until the targeted end of service life. The results of the SLAP also provide justification for funding a Service Life Extension Program (SLEP) for fatigue limiting components with APN-5 funding if necessary. The AN/ARC-210 - RT-1794(C) (W2454) will provide for the development of radio software modifications required for upgrades to the evolving standards.

EXHIBIT R-2a, FY 2000 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7 | PROGRAM ELEMENT: 0702207N | PROGRAM ELEMENT TITLE: Depot Maintenance | PROJECT NUMBER: H2451 | PROJECT TITLE: P-3 SLAP

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
H2451 P-3 SLAP	0	28,123	24,023	19,295	0	0	0	0	0	71,441
TOTAL	**0**	**28,123**	**24,023**	**19,295**	**0**	**0**	**0**	**0**	**0**	**71,441**

Quantity of RDT&E Articles

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The P-3C Service Life Assessment Program (SLAP) will perform Non-Recurring Engineering (NRE) for the P-3C Service Life Extension Program (SLEP) (OSIP 02-99). SLAP includes a fatigue article destructive test of a full scale P-3C, associated pre-test and post-test analyses, NRE for designing SLEP kits, and post-test disposal. SLEP is a fatigue life extension program that will extend operational service life by replacing fatigue limiting airframe components. Present fatigue life estimates (from 20,000 to 24,000 flight hours) are based on analysis alone. SLAP will identify specific components that require replacement or modification in order to extend the aircraft model's service life beyond its original design parameters by approximately 6,000 flight hours. This SLAP effort was previously budgeted under APN-5 (BLI 538) funding within OSIP 02-99.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS: Not Applicable.

DATE: February 1999

BUDGET ACTIVITY: 7 | PROGRAM ELEMENT: 0702207N | PROGRAM ELEMENT TITLE: Depot Maintenance | PROJECT NUMBER: H2451 | PROJECT TITLE: P-3 SLAP

2. FY 1999 PLAN:

(U) ($25,222) Reaction frame buildup, pre-analysis, aircraft preparation.

(U) ($ 257) Data: Preliminary engineering reports, quality assurance reports, preliminary SLEP drawings, cost schedule status reporting.

(U) ($ 522) Contract Support Services.

(U) ($ 1,429) Naval Air Warfare Center (NAWC) field support.

(U) ($ 693) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2000 PLAN:

(U) ($21,292) Fatigue article test.

(U) ($ 550) Data: Preliminary

(U) ($ 1,157) Contract support services.

(U) ($ 1,024) Naval Air Warfare Center (NAWC) field support.

DATE: February 1999

BUDGET ACTIVITY: 7 | PROGRAM ELEMENT: 0702207N | PROGRAM ELEMENT TITLE: Depot Maintenance | PROJECT NUMBER: H2451 | PROJECT TITLE: P-3 SLAP

(U) B. PROGRAM CHANGE SUMMARY

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	0	28,694	24,376
(U) Appropriated Value:	0	28,694	
(U) Adjustments from Pres Budget:	0	-571	-353
(U) FY 2000 President's Budget Submit:	0	28,123	24,023

CHANGE SUMMARY EXPLANATION:

(U) Funding: The net decrease of (-$571 thousand) in FY 1999 includes a Revised Economic Assessment of -$66 thousand and a Contract Advisory and Assistance Services adjustment of -$505 thousand. The net decrease of (-$353 thousand) in FY 2000 includes a Non Pay Inflation adjustment of -$347 thousand and -$6 thousand for minor pricing adjustments.

(U) Schedule: The Fatigue Test milestone was moved from FY 2001 to FY 2000 to correct a typographical error from the last budget submit. The SLEP Kit Data Package milestone also moved from FY 2001 to FY 2000 to correct a typographical error.

(U) Technical: Not Applicable.

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

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0702207N** **PROJECT NUMBER: H2451**
PROGRAM ELEMENT TITLE: Depot Maintenance **PROJECT TITLE: P-3 SLAP**

(U) D. ACQUISITION STRATEGY: SLAP is a full and open competition for a fatigue article test. The contract will be a cost plus incentive fee (CPFF), therefore, providing an incentive to the contractor to effectively manage program cost and schedule. This program is in the source selection process. Anticipate contract award by December 1998. SLAP supports the Secretary of the Navy's Maritime Patrol Aircraft Ten Year Plan.

(U) E. SCHEDULE PROFILE

	FY 1998	FY 1999	FY 2000	TO COMPLETE
(U) Program Milestones				
(U) Engineering Milestones		Prelim. Design Review (2Q) Critical Design Review (3Q)	1Q/00 Conduct Fatigue Test 4Q/00 SLEP Kit Data Package	
(U) T&E Milestones				
(U) Contract Milestones		Contract Award (1Q)		

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0702207N PROJECT NUMBER: H2451
PROJECT TITLE: P-3 SLAP

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Contracts	CPIF	TBD	0	25,479	Mar 99	21,842	Nov 99	16,833	64,154	64,154
Award Fees			0	0		0				
Subtotal Product Development			**0**	**25,479**		**21,842**		**16,833**	**64,154**	**64,154**
Remarks:										
Field Activity Support	WX	NAWCAD	0	1,429	Nov 98	1,024	Nov 99	1,370	3,823	3,823
Award Fees		Pax River, MD	0	0		0				
Subtotal Support			**0**	**1,429**		**1,024**		**1,370**	**3,823**	**3,823**
Remarks:										
Subtotal Test & Evaluation			**0**	**0**		**0**		**0**	**0**	
Remarks:										
Contracts	CPIF	TBD	0	522	Nov 98	1,157	Nov 99	1,092	2,771	2,771
Award Fees			0	0		0				
Subtotal Management			**0**	**522**		**1,157**		**1,092**	**2,771**	**2,771**
Remarks:										
FY 1999 SBIR Assessment				693				0	693	
Total Cost			**0**	**28,123**		**24,023**		**19,295**	**71,441**	**70,748**

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0702207N** **PROJECT NUMBER: H 2452**
PROGRAM ELEMENT TITLE: Depot Maintenance **PROJECT TITLE: S-3 SLAP**

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
H2452 S-3 SLAP	0	23,634	14,230	4,691	0	0	0	0	0	42,555
TOTAL	**0**	**23,634**	**14,230**	**4,691**	**0**	**0**	**0**	**0**	**0**	**42,555**

Quantity of RDT&E Articles

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The S-3 Service Life Assessment Program (SLAP) (H2452) will determine the present S-3B fatigue for 113 aircraft which were all procured from 1972 to 1976. The intent is to determine the magnitude of the Service Life Extension Program (SLEP) necessary to extend the aircraft service life through 2015. The SLAP will certify an increase of the aircraft fatigue life from 13,000 flight hours to approximately 17,500 flight hours and from 3,000 to 4,300 catapults/arrested landings. This SLAP effort was previously budgeted under APN-5 (BLI 541) funding within OSIP 12-95.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS: Not Applicable.

DATE: February 1999

BUDGET ACTIVITY: 7 | PROGRAM ELEMENT: 0702207N | PROGRAM ELEMENT TITLE: Depot Maintenance | PROJECT NUMBER: H2452 | PROJECT TITLE: S-3 SLAP

2. FY 1999 PLAN:

(U) ($22,350) Award Service Life Assessment Program (SLAP)/Full Scale Fatigue Test (FSFT) contract option.

(U) ($ 570) Establish field activity support for SLAP/FSFT efforts.

(U) ($ 139) Contract support services.

(U) ($ 575) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2000 PLAN:

(U) ($13,545) Continuing SLAP/FSFT.

(U) ($ 495) Continuing field activity support for SLAP/FSFT efforts.

(U) ($ 190) Contract support services.

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0702207N** **PROJECT NUMBER: H2452**
PROGRAM ELEMENT TITLE: Depot Maintenance **PROJECT TITLE: S-3 SLAP**

(U) B. PROGRAM CHANGE SUMMARY

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	0	23,781	14,489
(U) Appropriated Value:	0	23,781	
(U) Adjustments from Pres Budget:	0	-147	-259
(U) FY 2000 President's Budget Submit:	0	23,634	14,230

CHANGE SUMMARY EXPLANATION:

(U) Funding: The net decrease of (-$147 thousand) in FY 1999 includes -$56 thousand for minor pricing adjustments and a Contract Advisory and Assistance Services adjustment of -$91 thousand. The net decrease of (-$259 thousand) in FY 2000 includes a Non Pay Inflation adjustment of -$206 thousand and -$53 thousand for minor pricing adjustments.

(U) Schedule: Not Applicable.

(U) Technical: Not Applicable.

(U) C. OTHER PROGRAM FUNDING SUMMARY

Appn	FY 1998 Budget	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete
APN S-3 (OSIP 12-95)	10,941	10,160	8,836	12,462	9,814	6,674	4,229	2,569	0
APN ES-3 (OSIP 33-95)	1,521	0	0	0	0	0	0	0	0

NOTE: Both critical structure OSIPs contain all S-3B/ES-3A structural degraders, not just those associated with SLAP.

Related RDT&E

None.

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0702207N** **PROJECT NUMBER: H2452**
PROGRAM ELEMENT TITLE: Depot Maintenance **PROJECT TITLE: S-3 SLAP**

(U) D. ACQUISITION STRATEGY: The S-3Service Life Assessment Program will be a sole source procurement to the Original Equipment Manufacturer, Lockheed Martin of Marietta, GA. This program will utilize a cost plus incentive type contract.

(U) E. SCHEDULE PROFILE

	FY 1998	FY 1999	FY 2000	TO COMPLETE
(U) Program Milestones				
(U) Engineering Milestones		Test Fixture Design Analysis(3Q) Test Spectrum Development (1Q-4Q)	Test Fixture Design and Assembly (1Q-3Q)	
(U) T&E Milestones			Full Scale Test (4Q)	Full Scale Test (1Q-4Q)
(U) Contract Milestones		Contract Award (1Q)		

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0702207N PROJECT NUMBER: H2452
PROJECT TITLE: S-3 SLAP

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Contracts	SS/CPIF	LMAS/Marietta, GA	0	20,136	Nov 98	13,545	Nov 99	4,226	37,907	37,907
Award Fees			0	0		0				
Subtotal Product Development			**0**	**20,136**		**13,545**		**4,226**	**37,907**	**37,907**

Remarks:

Contracts	C/FFP	TBD	0	250	Nov 98	190	Nov 99	120	560	560
Award Fees			0	0		0				
Subtotal Support			**0**	**250**		**190**		**120**	**560**	**560**

Remarks:

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0702207N PROJECT NUMBER: H2452
PROJECT TITLE: S-3 SLAP

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Test & Evaluation	WX	NAWC/AD	0	2,273	Nov 98	20	Nov 99	20	2,313	
		Pax River, MD	0	0		0				
Award Fees										
Subtotal Test & Evaluation			**0**	**2,273**		**20**		**20**	**2,313**	
Remarks:										
Management		NADEP North Island, CA	0	400	Nov 98	475	Nov 99	325	1,200	
Award Fees			0	0		0				
Subtotal Management			**0**	**400**		**475**		**325**	**1,200**	
Remarks:										
FY 1999 SBIR Assessment				575					575	
Total Cost			**0**	**23,634**		**14,230**		**4,691**	**42,555**	**38,467**

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0702207N** **PROJECT NUMBER: W2454**
PROGRAM ELEMENT TITLE: DEPOT MAINTENANCE **PROJECT TITLE: AN/ARC-210 RT-1794(C)**

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
W2454 AN/ARC-210 RT-1794(C)*	0	6,445	1,733	576	766	0	0	0	0	9,520
TOTAL	**0**	**6,445**	**1,733**	**576**	**766**	**0**	**0**	**0**	**0**	**9,520**

Quantity of RDT&E Articles

*The project unit designator was changed from H2454 to W2454

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Project W2454, AN/ARC-210 RT-1794(C): This project provides for the development of radio software modifications required for upgrades to the evolving standards. Annual engineering change proposals to accomplish implementation of additional advanced waveforms, have been planned to maintain interoperability/connectivity with other services, FAA and ICAO (commercial air traffic data links). Implementation of these waveforms is essential and will be accomplished in the Fleet by organizational units via the Memory Loader Verifier System (MLVS). These changes are the responsibility of the radio program for funding, management, and execution.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1998 ACCOMPLISHMENTS: Not Applicable

DATE: February 1999

BUDGET ACTIVITY: 7 | PROGRAM ELEMENT: 0702207N | PROGRAM ELEMENT TITLE: DEPOT MAINTENANCE | PROJECT NUMBER: W2454 | PROJECT TITLE: AN/ARC-210 RT-1794(C)

2. FY 1999 PLAN:

(U) ($6,295) Develop upgrades and initiate Engineering Change Order (ECO) to meet requirements for DAMA SATCOM waveform standards upgrade; digital battlefield interoperability/connectivity communications; and commercial air traffic management data links.

(U) ($ 150) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. FY 2000 PLAN:

(U) ($1,733) Develop upgrades and initiate Engineering Change Order (ECO) to meet requirements for upgrades to MIL STD 188-220, variable message formatting, and communications security.

DATE: February 1999

BUDGET ACTIVITY: 7 **PROGRAM ELEMENT: 0702207N** **PROJECT NUMBER: W2454**
PROGRAM ELEMENT TITLE: DEPOT MAINTENANCE **PROJECT TITLE: AN/ARC-210 RT-1794(C)**

(U) B. PROGRAM CHANGE SUMMARY

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	0	6,486	1,762
(U) Appropriated Value:	0	6,486	
(U) Adjustments from Pres Budget:	0	-41	-29
(U) FY 2000 President's Budget Submit:	0	6,445	1,733

CHANGE SUMMARY EXPLANATION:

(U) Funding: The decrease of -$41 thousand in FY 1999 reflects congressional undistributed reductions. The decrease of -$29 thousand in FY 2000 reflects minor pricing adjustments.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

(U) C. OTHER PROGRAM FUNDING SUMMARY

Appn	FY 1998 Budget	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete
APN L.I. 0577	127,552	100,881	81,599	82,132	65,014	63,592	61,903	62,585	Cont'd

Related RDT&E

None.

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0702207N
PROGRAM ELEMENT TITLE: DEPOT MAINTENANCE

PROJECT NUMBER: W2454
PROJECT TITLE: ARC-210 1794 (C)

(U) D. ACQUISITION STRATEGY: Sole source to Rockwell Collins, Inc. for the production and enhancement of the AN/ARC-210(V) Electronic Radio Protection radios. Contract for production buys is firm fixed price with yearly priced options. Development and enhancement tasks are funded under a Basic Ordering Agreement (BOA).

(U) E. SCHEDULE PROFILE: Not Applicable

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS | DATE: February 1999

BUDGET ACTIVITY: 7 | PROGRAM ELEMENT: 0702207N | PROJECT NUMBER: W2454 | PROJECT TITLE: AN/ARC-210 RT-1794 (C)

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Prime Eqpmt/E&MD Prime Contract	SS/ BOA	Rockwell Collins Cedar Rapids, IA	0	5,809	2/99	1,427	12/99	852	8,088	8,088
Systems Engineering	Misc	Misc	0	200	2/99	52	11/99	30	282	
Subtotal Project Development			**0**	**6,009**		**1,479**		**882**	**8,370**	**8,088**

Remarks:

Contractor Support Systems Engineering	Misc	Misc	0	85	2/99	33	11/99	30	148	
Subtotal Support			**0**	**85**		**33**		**30**	**148**	

Remarks

EXHIBIT R-3, FY 2000 RDT&E,N COST ANALYSIS

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0702207N

PROJECT NUMBER: W2454

PROJECT TITLE: AN/ARC-210 RT-1794 (C)

Cost Categories:	Contract Method & Type	Performing Activity & Location	Total Prior Yrs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Systems T&E	Various	Various	0	75	2/99	200	11/99	400	675	
Subtotal Test & Evaluation			**0**	**75**		**200**		**400**	**675**	
Remarks										
Travel	WX	NAWCAD Pax River, MD	0	36	11/98	5	11/99	10	51	
Misc Management Support	Misc	Misc	0	90	11/98	16	11/99	20	126	
Subtotal Management			**0**	**126**		**21**		**30**	**177**	
Remarks										
SBIR Assessment				150					150	
Total Cost			**0**	**6,445**		**1,733**		**1,342**	**9,520**	**8,008**

FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0708011N
PROGRAM ELEMENT TITLE: Manufacturing Technology Development

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R1050 Manufacturing Technology	51,892	58,909	59,104	60,179	61,406	62,190	62,931	65,472	CONT.	CONT.
R2674 Manufacturing Technology	0	9,977	0	0	0	0	0	0	0	9,977
Total	51,892	68,886	59,104	60,179	61,406	62,190	62,931	65,472	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Manufacturing Technology (MANTECH) Program is intended to improve the productivity and responsiveness of the U.S. defense industrial base by funding the development of manufacturing technologies. The MANTECH program, by providing seed funding for the development of moderate to high risk process and equipment technology, permits contractors to upgrade their manufacturing capabilities. Ultimately, the program aims to produce high-quality weapon systems with shorter lead times and reduced acquisition costs. Major areas of endeavor both underway and planned include: advanced manufacturing technology for electronics assembly, laser metalworking, flexible computer manufacturing, composites, metal working and welding technology. The MANTECH program is being integrated into the Joint Mission Area/Support Area and Joint Warfare Operational Capability process and will utilize the results of these initiatives as appropriate in the program planning process. The MANTECH program is aimed at achieving affordability in the acquisition of weapons systems by inserting manufacturing process solutions early into the design phase to reduce lifecycle costs, improve schedules and ensure quality.

FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0708011N
PROGRAM ELEMENT TITLE: Manufacturing Technology Development

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing, operational systems.

(U) PROGRAM CHANGE FOR TOTAL P.E.:

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	53,369	59,060	59,867
(U) Appropriated Value:	-	69,060	-
(U) Adjustments from FY 1999 PRESBUDG:	-1,477	+9,826	-763
(U) FY 2000 President's Budget Submission:	51,892*	68,886	59,104

* $22,676 thousand of FY 1997 carryover funding being utilized in addition to the control amount of $51,892 thousand.

(U) Funding: FY 1998 adjustment is due to Small Business Innovation Research assessment (-1,473) and update to reflect actual execution (-4). FY 1999 adjustment is due to congressional undistributed reductions (-174) and a congressional plus-up to fund MANTECH shortfall (+10,000). FY 2000 adjustment is due to Navy Working Capital Fund rate adjustment (+46), Civilian Pay Rates (+46), and non pay inflation (-855).

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0708011N
PROGRAM ELEMENT TITLE: Manufacturing Technology Development

PROJECT NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R1050 Manufacturing Technology	51,892	58,909	59,104	60,179	61,406	62,190	62,931	65,472	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Manufacturing Technology (MANTECH) Program is intended to improve the productivity and responsiveness of the U.S. defense industrial base by funding the development of manufacturing technologies. The MANTECH program, by providing seed funding for the development of moderate to high risk process and equipment technology, permits contractors to upgrade their manufacturing capabilities. Ultimately, the program aims to produce high-quality weapon systems with shorter lead times and reduced acquisition costs. Major areas of endeavor both underway and planned include: advanced manufacturing technology for electronics assembly, laser metalworking, flexible computer manufacturing, composites, metal working and welding technology. The MANTECH program is being integrated into the Joint Mission Area/Support Area and Joint Warfare Operational Capability process and will utilize the results of these initiatives as appropriate in the program planning process. The MANTECH program is aimed at achieving affordability in the acquisition of weapons systems by inserting manufacturing process solutions early into the design phase to reduce lifecycle costs, improve schedules and ensure quality.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 PLAN: (While the control amount for FY 1998 is $51,892, the actual execution amount is $74,568 thousand. This reflects $22,676 thousand of FY 1997 carryover to FY 1998.)

FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0708011N PROJECT NUMBER: R1050
PROGRAM ELEMENT TITLE: Manufacturing Technology Development PROJECT TITLE: Manufacturing Technology

- (U) The Navy MANTECH program executes a significant amount of its projects through the Centers of Excellence. The technical efforts performed are reflected throughout the following taxonomy:

  -- (U) ($15,087) Composites and Processing Fabrication - Continued the Composites Affordability Initiative, and initiated a Composites Topside Structure project. Continued work on the Fiber Inlet Duct, Gearbox Housing, Composites Shipboard Electronic Cabinets, Rapid Response, Teaching Factories and Korex Phase II. Terminated Fiber Steering for Lightweight Affordable Composite Structures, Z-Direction Reinforcement for Composite Laminates, Insitu Fiber Placement, C-Section Composites, and Injection Molded Thermoplastic Bearing Cages.

  -- (U) ($9,000) Electronics Processing and Fabrication - Continued the AEGIS electronics demonstration, continued Flexible manufacturing of microwave vacuum electronic devices, continued Diamond Film Packaging for Transmit Receive Modules, continued Sapphire Dome Coatings, continued Diode Pump Erbium Glass Laser Range Finders, continued Low Cost Manufacture of Infrared Focal Plane Arrays, and continued Manufacture Automation of Monolithic Ring Gyros.

  -- (U) ($25,500) Metals Processing and Fabrication - Completed Programmable Automated Welding System; Weld Fumes; Gas Tungsten Arc Welding Flux for Increased Penetration; Netshape Finishing of Gears by Ausforming; and LaserARC Rapid Response. Cancelled Process Development of Advanced Gear Steels; Condition Based Maintenance; and Manufacturing Improvements for F/A-18 Cockpit Displays. Continued Spray Forming in support of Joint Strike Fighter; Centrifugal Cast Titanium Carbide Bronze Implements; Commercialization of Advanced Welding Consumables; Titanium Welding; Weld Residual Stress and Distortion; Modeling of Clamping Distortions and Prediction of Gear Accuracy; laser Processing of Nickel Aluminum Bronze; Non-Contact Highspeed Gear Inspection; Adhesive Bondline Integrity, and Underwater Wet Welding. Initiated Distortion and Accuracy Control in Welding. Restarted Laser Pipe Welding.

  -- (U) ($8,750) Advanced Manufacturing Enterprise - Continued efforts in identifying best commercial practices to be incorporated into the Acquisition Reform regime. Initiated efforts to establish a stronger linkage between the Best Manufacturing Practices program and the Acquisition Center of Excellence. Initiate efforts to support the Naval Sea Systems Command Maritime Technology Advanced Shipbuilding Enterprise program. Continued Shipbuilding Supplier Chain Integration in support of the Lean Shipbuilding initiative.

Recompeted the Gulf Coast Region Maritime Technology Center in order to continue shipbuilding efforts such as Non-Toxic Pigment Substitute for Chromium in Primer for Aluminum Substrates, continued Simulation Based Design initiatives, continued Environmental Resource Information Center, continued Research in Shipboard Sensors and continued Effective Aluminum Catamaran Structure Extrusions.

-- (U) ($16,231) Other - Continued projects in the repair technology arena that support the depots and shipyards such as Supercritical CO2 Parts Cleaning, Ball Valve Repair Process Improvement, Shearography System Development, and Reverse and Re-Engineering Technical Data Generation System. Continued the Ammonium Dinitramide; Low Cost Shaped Charge Munitions Manufacturing; and Improved Technology for Line Charge Manufacturing. Completed the Composite Propellants project in support of energetic materials. Completed technology transfer efforts at the Manufacturing Technology Transfer Center. Continued Phase III of the F414 Engine Demonstration Device with General Electric. Continued Production Tooling for Concept 1 Payload in support of Surface Ship Torpedo Defense. Initiated research efforts in support of the Advanced Shipbuilding Enterprise. Continued efforts in Propulsor Encapsulation. Funded technical engineering work at Navy labs and field activities to support Center projects.

2. (U) FY 1999 PLAN:

- (U) The Navy MANTECH program executes a significant amount of its projects through the Centers of Excellence. The technical efforts performed are reflected throughout the following taxonomy:

-- (U) ($14,000) Composites Processing and Fabrication - Continue work on the Composites Affordability Initiative, the Composites Topside Structures, KOREX II; Enhanced Production Techniques for Low Observable Structures and Materials; Gearbox Housing; Teaching Factory and Rapid Response projects, and Restart Z-Direction Reinforcement for Composite Laminates. Initiate new effort in Ceramic Matrix Composites and Resin Transfer Molding.

-- (U) ($10,000) Electronics Processing and Fabrication - Continue AEGIS Electronic Demonstration, Flexible Manufacturing of Microwave Power Module Manufacturing, Learning Center and Demonstration Factory, and the Power Electronic Building Blocks Manufacturing plan. Continue electro-optics efforts in Sapphire Domes,

Manufacturing Automation of Monolithic Ring Gyros; and initiate efforts for Fiber Optic Velocity Sensors, Remote Source Lighting Technology, Conformal Acoustic Velocity Sensor Accelerometer Manufacturing, Radio Frequency Photonics for Multi-Function Phased Array Antennas, and Affordable Array Technology Tooling.

-- (U) ($22,850) Metals Processing and Fabrication - Continue the following metalworking projects: Centrifugally Cast Titanium/Chromium Bronze Components, Neodymium Ribbon Development, Optimized Atomization of Magnesium Powder, Titanium Alloy Hearth Melting Processing Technology, Optimized High Strength Lightweight Alloy Welding, and Thin Wall Superalloy Structural Castings. Complete Powder Metallurgy and Materials Initiative. Continue the following joining projects: Weld Residual Stress and Distortion, Titanium Welding, Adhesive Bonding Integrity, Knowledge Based Ultrasonic Testing of Welds, and continue rapid response actions. Continue the following materials processing initiatives: Laser Processing of Nickel Aluminum Bronze, Non-Contact High Speed Gear Inspection, Repair/Refurbishment of Fatigue/Wear Limited Navy Structures, Advanced Manufacturing Processes for the Advanced Amphibious Assault Vehicle, and Manufacturing of High Performance of Transmission Housing. Initiate Femto 2nd Laser project to support the Joint Strike Fighter Office. Initiate project in Propulsor Improvements; Smart Sensors/Actuators; Adaptive Control for Mechanized Welding; Amphibious Assault Vehicle (AAV) Enhanced Armor Kit; Nd:YAG Laser Repair of Catapult Troughs; and Improved Through Thickness Properties of Heavy Gauge Steel.

-- (U) ($6,550) Advanced Manufacturing Enterprise- Continue leveraging the Best Manufacturing Practices and the Acquisition Center of Excellence Acquisition Reform Initiatives. Continue documenting environmental manufacturing and business practices. Continue efforts in shipbuilding and simulation based design. Continue efforts in Shipboard Sensors; Effective Aluminum Catamaran Structures; Chromium Primer for Aluminum Substrates; and the Environmental Resource Information Center. Continue ongoing and initiate new research efforts in support of the Maritime Technology Advanced Shipbuilding Enterprise. Initiate project for Heavy Equipment Repair; Automated Paint Application Containment; Crew Compartment Heater; and AAV Manufacturing Enhancement.

-- (U) ($4,240) Other - Continue projects in the repair technology arena that support the depots and shipyards. Continue the Ammonium Dinitramide; Low Cost and Improved Line Charge Munitions Manufacturing projects in support of energetic materials. Continue Phase III of the F414 Engine Demonstration Device with General

Electric. Continue Production Tooling for Concept 1 Payload in support of Surface Ship Torpedo Defense. Fund technical engineering work at Navy labs and field activities to support Center projects.

-- (U) ($1,269) Portion of extramural program reserved for Small Business Innovation Research Assessment in accordance with 15 U.S.C. 638.

3. (U) FY 2000 PLAN:

- (U) The Navy MANTECH program executes a significant amount of its projects through the Centers of Excellence. The technical efforts performed are reflected throughout the following taxonomy:

-- (U) ($12,750) Composites Processing and Fabrication - Continue work on the Composites Affordability Initiative; the Composites Topside Structures; Enhanced Production Techniques for Low Observable Structures and Materials; Teaching Factory; Rapid Response; Z-Direction Reinforcement for Composite Laminates; Ceramic Matrix Composites; and Resin Transfer Molding. Complete Korex Phase II.

-- (U) ($8,500) Electronics Processing and Fabrication - Continue AEGIS Electronic Demonstration, Flexible Manufacturing of Microwave Power Module Manufacturing, Learning Center and Demonstration Factory, and the Power Electronic Building Blocks Manufacturing plan. Continue electro-optics efforts in Sapphire Domes, Manufacturing Automation of Monolithic Ring Gyros; and initiate efforts for Fiber Optic Velocity Sensors, Remote Source Lighting Technology, Conformal Acoustic Velocity Sensor Accelerometer Manufacturing, Radio Frequency Photonics for Multi-Function Phased Array Antennas, and Affordable Array Technology Tooling.

-- (U) ($18,000) Metals Processing and Fabrication - Continue the following metalworking projects: Centrifugally Cast Titanium/Chromium Bronze Components, Neodymium Ribbon Development, Optimized Atomization of Magnesium Powder, Titanium Alloy Hearth Melting Processing Technology, Optimized High Strength Lightweight Alloy Welding, and Thin Wall Superalloy Structural Castings. Complete Powder Metallurgy and Materials Initiative; Femto 2nd Laser. Continue the following joining projects: Weld Residual Stress and Distortion, Titanium Welding, Adhesive Bonding Integrity, Knowledge Based Ultrasonic Testing of Welds, and continue rapid response actions. Continue the following materials processing initiatives: Laser Processing of Nickel Aluminum Bronze, Non-Contact High Speed Gear Inspection, Repair/Refurbishment of Fatigue/Wear

FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0708011N PROGRAM ELEMENT TITLE: Manufacturing Technology Development PROJECT NUMBER: R1050 PROJECT TITLE: Manufacturing Technology

Limited Navy Structures, Advanced Manufacturing Processes for the Advanced Amphibious Assault Vehicle, and Manufacturing of High Performance of Transmission Housing. Initiate a new joint effort with the Air Force in Metals Affordability.

-- (U) ($6,750) Advanced Manufacturing Enterprise - Continue leveraging the Best Manufacturing Practices and the Acquisition Center of Excellence Acquisition Reform Initiatives. Continue documenting environmental manufacturing and business practices. Continue efforts in shipbuilding and simulation based design. Continue efforts in Shipboard Sensors; Effective Aluminum Catamaran Structures; Chromium Primer for Aluminum Substrates; and the Environmental Resource Information Center. Continue ongoing and initiate new research efforts in support of the Maritime Technology Advanced Shipbuilding Enterprise. Continue efforts in Propulsor Encapsulation.

-- (U) ($10,104) Other - Continue projects in the repair technology arena that support the depots and shipyards such as Supercritical CO2 Parts Cleaning, Ball Valve Repair Process Improvement, Shearography System Development, and Reverse and Re-Engineering Technical Data Generation System. Continue the Ammonium Dinitramide and Composite Propellants projects in support of energetic materials. Continue Phase III of the F414 Engine Demonstration Device with General Electric.

-- (U) ($3,000) Initiate efforts based on the prioritization submitted by the MANTECH Executive Steering Committee. Initiatives will be focused on composites, metals and electronics.

B. (U) PROGRAM CHANGE SUMMARY: See total program change summary for P.E.

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

(U) RELATED RDT&E: Not applicable.

D. (U) SCHEDULE PROFILE: Not applicable.

FY 2000 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1999

BUDGET ACTIVITY: 7
PROGRAM ELEMENT: 0708011N
PROGRAM ELEMENT TITLE: Manufacturing Technology Development
PROJECT NUMBER: R1050
PROJECT TITLE: Manufacturing Technology

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

Project Cost Categories	FY 1998	FY 1999	FY 2000
a. Process Development	65,300	55,000	53,617
b. Program Management Support	9,268	3,909	5,487
Total	74,568*	58,909	59,104

*Reflects actual execution. This includes $$22,676 thousand of FY 1997 carryover and $51,892 thousand in FY 1998 funds.

FY 2000 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0708011N
PROGRAM ELEMENT TITLE: Manufacturing Technology Development
PROJECT NUMBER: R1050
PROJECT TITLE: Manufacturing Technology

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 1997 & Prior	FY 1998 Budget	FY 1999 Budget	FY 2000 Budget	To Complete	Total Program
Product Development										
GLCC	C/BAA	1995	CONT.	CONT.	86,928	14,000	14,000	12,000	CONT.	CONT.
CTC	SS/CPFF	1988	CONT.	CONT.	161,495	20,000	15,000	15,000	CONT.	CONT.
EWI	C/BAA	1996	CONT.	CONT.	8,100	3,000	3,000	3,000	CONT.	CONT.
ACI	C/BAA	1995	CONT.	CONT.	9,500	6,000	6,000	6,000	CONT.	CONT.
UNO	C/BAA	1998	CONT.	CONT.	2,000	3,875	4,000	4,000	CONT.	CONT.
PSU	C/CPFF	1997	CONT.	CONT.	3,450	7,000	3,000	3,000	CONT.	CONT.
BFTC	C/CA	1994	CONT.	CONT.	11,881	0	0	0	0	11,881
PTI	C/CPFF	1997	CONT.	CONT.	5,000	5,000	4,500	4,000	CONT.	CONT.
TBD	C/CA	1999	UNK	25,000	0	1,000	4,000	2,500	CONT	CONT.
NSWC-CD	WX	1998	UNK	UNK	1,350	1,398	1,300	1,000	CONT	OCNT
NSWC-IN	WX	1996	UNK	UNK	UNK	3,000	2,000	2,000	CONT.	CONT.
TBD	TBD	TBD	TBD	TBD	0	0	0	3,000	0	0
IPI	C/CPFF	1995	UNK	UNK	4,274	2,700	0	0	0	9,542
Miscellaneous	WX/RC/WR	Various	Various	Various		7,595	2,109	3,604	CONT.	CONT.

Support and Management: Not applicable.

Test and Evaluation: Not applicable.

GOVERNMENT FURNISHED PROPERTY: Not applicable.

FY 2000 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1999

BUDGET ACTIVITY: 7
PROGRAM ELEMENT: 0708011N
PROGRAM ELEMENT TITLE: Manufacturing Technology Development
PROJECT NUMBER: R1050
PROJECT TITLE: Manufacturing Technology

	Total FY 1997 & Prior	FY 1998 Budget	FY 1999 Budget	FY 2000 Budget	To Complete	Total Program
Subtotal Product Development	293,978	74,568	58,909	59,104	CONT.	CONT.
Subtotal Support and Management	0	0	0	0	0	0
Subtotal Test and Evaluation	0	0	0	0	0	0
Total Project	293,978	74,568	58,909	59,104	CONT.	CONT.

Exhibit R-2, RDT&E Budget Item Justification	Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA-7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. MARITIME TECHNOLOGY/P.E. 0708730N

COST ($ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Total P.E. Cost	0	19.0	19.7	19.4	19.6	19.5	0	0	0	97.2
MARITECH/S2466	0	19.0	19.7	19.4	19.6	19.5	0	0	0	97.2
Quantity of RDT&E Articles & cost	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

A. Mission Description and Budget Item Justification

MARITECH was initiated by DARPA in 1994 as part of the President's National Shipbuilding Initiative to enhance the commercial viability of the U.S shipbuilding industry and preserve that section of the defense industrial base. The MARITECH Advanced Shipbuilding Enterprise (ASE) is a Navy program that will build on the progress made by the original DARPA MARITECH. The mission of the program is to manage and focus national research funding on technologies that will reduce the cost of naval ships and will establish U.S. commercial shipbuilding competitiveness. MARITECH ASE will integrate DARPA's MARITECH, the Navy's National Shipbuilding Research Program (NSRP) and Manufacturing Technology efforts. Industry has expanded on the long standing collaborative network of the NSRP to form an organizational structure to execute the research projects to be accomplished under MARITECH ASE.

The industry has developed a landmark long range Strategic Investment Plan which will guide MARITECH ASE investments. This Strategic Investment Plan provides a framework to guide collaborative research and development among all segments of the U.S. ship construction and repair industry, educational and research institutions, and Government. The objective is assist the industry in achieving significant reduction in the cost and time required for both commercial and Navy ship construction, conversion, and repair. The recommended investment portfolio includes major initiatives that tie the strategic vision to proposed industry research through collaborative R&D. The major initiatives include: Shipyard Production Process Technologies, Product Design and Material Technologies, Facilities and Tooling, Business Process Technologies and Systems Technologies. Additionally, several critical success factors were found to cut across all of the major initiatives. These "Crosscut Initiatives" include Education and Training, Technology Transfer, Organizational Change, Environmental Protection and Human Resources.

MARITECH ASE will have a number of distinguishing features. It will: a) be led by an industry collaboration; b) be guided by a Strategic Investment Plan; c) use a structured analytical process for cost/benefit decisions; d) maintain market led benchmarking and metrics to track industry progress; e) promote collaboration with the research and acquisition communities; f) foster cooperation with ship owners, designers, regulators, suppliers and other industry stakeholders; and g) leverage work accomplished by other industries/countries.

The initial collaboration of major shipyards that will lead the program are: Electric Boat Corporation, Bath Iron Works, Newport News Shipbuilding, Atlantic Marine, Ingalls Shipbuilding, Halter Marine Group, Avondale Industries, Inc., NASSCO and Todd Pacific.

FY 1998 ACCOMPLISHMENTS: During FY1998, the industry collaboration brought together experts who represented the broad maritime industry to prepare the five-year Strategic Investment Plan for MARITECH ASE. The industry also developed the organizational structure and operational procedures which will enable them to select, award and manage research projects. This effort was jointly funded by DARPA and industry partners.

FY 1999 PLAN:

- (U) (490K) Establish and staff a co-located multi-agency MARITECH ASE support office (NAVSEA, MARAD, ONR).
- (U) (452K) Establish, develop and execute a Joint Funding Agreement with the shipbuilding industry collaboration using other transactions authority.

Exhibit R-2, RDT&E Budget Item Justification	Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA-7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. MARITIME TECHNOLOGY/P.E. 0708730N

• (U) (13,952) Work with the industry collaboration to award cost-shared technology development projects in accordance with the Strategic Investment Plan (SIP) covering the areas of Shipyard Production Processes, Product Design and Material Technologies, Facilities and Tooling, Business Processes, Systems Technologies, and the cross-cut initiatives which include Education and Training, Technology Transfer, Organizational Change, Environmental Protection and Human Resource Optimization.
• (U) (275K) Support Government and university participation on the industry-led major initiative teams. Participants will promote technology transfer between the industry and the R&D community and will act as technology scouts for the industry.
• (U) (503K) Transfer ongoing research projects from DARPA MARITECH and the National Shipbuilding Research Program to the MARITECH ASE program in order to consolidate management resources. Support existing Cooperative Agreements including agents such as MARAD, ONR, NSWC, and NRL to continue and close out the remaining DARPA projects.
• (U) (250K) Perform an annual review and update of the Strategic Investment Plan.
• (U) (200K) Establish a Government team to work with industry on developing a benchmarking study to assess the competitive position of the industry.
• (U) (2,400) As directed by Congress, provide funds to develop advanced concepts to mitigate marine oil spills caused by tanker casualties.
• (U) (478K) Portion of extramural program is reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

FY 2000 PLAN:
• (U) (18,150) Solicit new proposals and continue to fund technology development projects in accordance with the Strategic Investment Plan.
• (U) (500K) Operate multi-agency support office to facilitate technology transfer between Government and industry.
• (U) (300K) Support Government and university participation on the industry-led major initiative teams. Participants will promote technology transfer between the industry and the R&D community and will act as technology scouts for the industry.
• (U) (300K) Close out DARPA MARITECH and NSRP projects that transferred to MARITECH ASE.
• (U) (250K) Perform annual review of Strategic Investment Plan.
• (U) (200K) Update benchmark study and assess progress being made by industry to achieve competitive levels.

B. Program Change Summary:

	FY 1998	FY 1999	FY 2000
FY 1999 President's Budget:	0	0	0
Appropriated Value:	0	0	0
Adjustment to FY 1998 Appropriated Value/			
FY 1999 President's Budget:	0	0	+19.7
FY 2000 PRES Budget Submit:	0	+19.0	0

Funding: Transferred from DARPA (MARITIME TECHNOLOGY, PE 0603746E)

Schedule: 2nd qtr FY1999: Execute Joint Funding Agreement, Release Research Announcement, Receive first research proposals. 3rd Quarter FY 1999: Award Research Agreements for research projects, Update SIP and Program Plan, Update benchmarking study. 4th Quarter FY 1999: Initiate 2nd solicitation for technology developed projects.

Exhibit R-2, RDT&E Budget Item Justification	Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA-7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. MARITIME TECHNOLOGY/P.E. 0708730N

Technical: Not applicable.

C. Other Program Funding Summary (Related RDT&E): DARPA P.E. 0603746E (MARITECH) - MARITECH ASE follows the original DARPA MARITECH program . Work remaining under the original DARPA program will transition to the MARITECH ASE program.

D. Acquisition Strategy: R&D projects will be solicited and awarded by an industry collaboration represented by the Executive Control Board (ECB) of the National Shipbuilding Research Program (NSRP). The Navy will enter into an agreement with the industry collaboration using "other transaction" authority pursuant to 10 U.S.C. 2371.

E. Schedule Profile:

	FY 98	FY 99	FY 00
Engineering Milestones: N/A			
T&E Milestones: N/A			
Contract Milestones:	N/A	2Q Sign "Other Transactions" Agreement w/Industry 2Q Solicit Proposals for Technology Developed Projects 3Q Evaluate Proposals 4Q Initiate 2nd Solicitation for Technology Developed Projects	
Other Program Events:	N/A	2Q Staff Multi-Agency Program Office 3Q Initiate New Technology Development Projects 3Q Begin Update of Benchmarking Study/SIP	1Q Initiate 2nd Set of Technology Developed Projects

Exhibit R-3 Cost Analysis		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA-7	PROGRAM ELEMENT NAME AND NUMBER MARITIME TECHNOLOGY-P.E. 0708730N	PROJECT NAME AND NUMBER MARITECH/S2466

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total Pys Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	FY01 Cost	FY01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Technology Development	SS OT*	ECB NSRP**	0	15.5M	2Q99	17.8M	2Q 00			52.8M	86.1M	86.1M
Subtotal Technology Development			0	15.5M		17.8M				52.8M	86.1M	86.1M
Remarks: * Other Transaction IAW 10 USC 2371 ** Executive Control Board of the National Shipbuilding Research Program												
Government Support Services Other Agencies	MIPR/ WR	Various	0	2.4M	2Q99	.4M	1Q 00			1.2M	4.0M	4.0M
Support Services Revolving Accounts	MIPR/ WR	Various	0	.3M	2Q99	.3M	1Q 00			.9M	1.5M	1.5M
Subtotal Support			0	2.7M	NA	.7M				2.1M	5.5M	5.5M
Remarks:												

Exhibit R-3 Cost Analysis		Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA-7	PROGRAM ELEMENT NAME AND NUMBER MARITIME TECHNOLOGY-P.E. 0708730N	PROJECT NAME AND NUMBER MARITECH/S2466

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total Pys Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	FY01 Cost	FY01 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Subtotal T&E (Not applicable)												
Remarks:												
Contract Support Services	Reqn *	TBD	0	.8M	2Q99	1.2M	1Q 00			3.6M	5.6M	5.6M
Subtotal Management			0	.8M	NA	1.2M				3.6M	5.6M	5.6M
Remarks: * Procure Under GSA Schedule												
Total Cost			0	19.0M	NA	19.7M				58.5M	97.2M	97.2M

Program Funding ($M) Tracking
'94 through '97

Navy		1994	1995	1996	1997	Total
Naval Aerospace Medical Research Lab						
	Technical Reports		4	1	12	17
	Funding	6.24	7.096	4.145	2.912	20.393
Naval Air Warfare Center						
	Technical Reports	214	245	220	271	950
	Funding	1.475	1393.5	1284.487	1264.038	3943.5
Naval Biodynamics Laboratory						
	Technical Reports	3	9	7	0	19
	Funding	5.17	7.789	1.208	0	14.167
Navy Clothing and Textile Rsch Facility						
	Technical Reports	6	8	2	0	16
	Funding	1.848	2.83	2.723	1.691	9.092
Naval Comd. Control & Ocean Surveillance						
	Technical Reports	298	225	247	555	1325
	Funding	455.011	568.71	497.877	546.295	2067.893
Naval Dental Research Institute						
	Technical Reports	5	12	1	0	18
	Funding	1.901	1.842	1.414	1.392	6.549
Naval Facilities Engineering Svcs. Ctr.						
	Technical Reports	17	34	43	55	149
	Funding	41.471	32.892	27.972	34.992	137.327
Naval Health Research Ctr. San Diago, CA						
	Technical Reports	50	66	58	63	237
	Funding	8.033	13.032	10.355	11.15	42.57
Naval Medical Research Ins. Bethesda, MD						
	Technical Reports	117	194	131	39	481
	Funding	51.261	50.507	49.363	16.871	168.002
Naval Medical Research Ins. Unit #2						
	Technical Reports	0	0	0	0	0
	Funding	3.562	3.602	4.331	3.539	15.034
Naval Medical Research Ins. Unit # 3						
	Technical Reports	0	9	6	5	20
	Funding	5.491	5.865	4.9	5.821	22.077
Naval Personnel R&D Ctr.						
	Technical Reports	38	20	68	21	147
	Funding	18.64	18.252	14.686	13.79	65.368
Naval Research Laboratory						
	Technical Reports	396	572	366	421	1755
	Funding	623.638	585.7	614.1	658.936	2482.374
Naval Submarine Medical Rsch						
	Technical Reports	7	10	6	13	36
	Funding	0	2.475	3.664	3.656	9.795
Naval Surface Warfare Ctr.						
	Technical Reports	499	467	418	441	1825
	Funding	959.312	961.2	974.6	954.914	3850.026

Program Funding ($M) Tracking
'94 through '97

Naval Undersea Warfare Ctr.						
	Technical Reports	285	148	236	149	818
	Funding	346.9	348.4	315	289.8	1300.1
	Total Technical Reports	1935	2023	1810	2045	7813
	Total Funding	2529.95	4003.692	3810.825	3809.797	14154.267
Air Force		**1994**	**1995**	**1996**	**1997**	**Total**
Armstrong Lab.						
	Technical Reports	36	8	10	22	76
	Funding	166.1	162.3	180.5	191.312	700.212
Arnold Eng. Development Lab.						
	Technical Reports					0
	Funding	251.038	241.737	289.358	277.515	1059.648
Development Test Ctr.						
	Technical Reports	46	70	21	28	165
	Funding	263.7	584.053	554.214	249.87	1651.837
Flight Test Ctr.						
	Technical Reports	8	13	19	20	60
	Funding	257.718	584.053	554.214	575.717	1971.702
Phillips Lab.						
	Technical Reports	32	65	48	41	186
	Funding	444.229	399.3	452.56	463.632	1759.721
Rome Lab.						
	Technical Reports	75	58	35	29	197
	Funding	284.888	324.452	368.69	368.938	1346.968
Wright Lab.						
	Technical Reports	247	239	214	154	854
	Funding	1029.4	1016.5	1043.7	1031.9	4121.5
46th Test Group						
	Technical Reports					0
	Funding		56.646			
	Total Technical Reports					
	Total Funding					
Army		**1994**	**1995**	**1996**	**1997**	**Total**
Aberdeen Test Center						
	Technical Reports	140	109	104	158	511
	Funding	46.4	70.4	65.5	58	240.3
Aeromedical Research Lab						
	Technical Reports	0	1	0	0	1
	Funding	5.8	5	4.9	4.7	20.4
Armament Rsch. Dev., Picatinny, NJ						
	Technical Reports	156	158	201	131	646
	Funding	309.6	344.1	305.6	292.6	1251.9
Army Research Lab, Adelphi, MD						
	Technical Reports	319	436	420	391	1566
	Funding	408.4	399.2	284.4	324	1416

Program Funding ($M) Tracking
'94 through '97

Aviation Rsch, Dev., & Eng., Lab, St. Louis						
	Technical Reports	0	0	0	0	0
	Funding	98	117.5	114.4	129.9	459.8
Aviation Technical Test Center, Ft. Rucker						
	Technical Reports	23	21	32	102	178
	Funding	22.2	14.2	14.8	9.8	61
Biomedical Rsch & Dev Lab, Ft. Detrick						
	Technical Reports	15	9	2	1	27
	Funding		6.1			6.1
CECOM - Ft. Monmouth						
	Technical Reports	28	25	65	61	179
	Funding	286.5	304.9	304.1	308	1203.5
Cold Regions Rsch & Eng Lab - Hanover						
	Technical Reports	54	76	47	52	229
	Funding	23.3	23	19.6	17.1	83
Construction Eng Rsch Labs - Champaign						
	Technical Reports	122	134	101	123	480
	Funding	50.6	55.4	42.7	41.3	190
Dugway Proving Ground - Dugway						
	Technical Reports	42	56	33	159	290
	Funding	56.2	57.8	46	40.9	200.9
Edgewood RD&E Ctr., - APG						
	Technical Reports	159	152	118	124	553
	Funding	180.5	151.3	199.8	174.2	705.8
Institute of Surgical Research - Ft. Sam H.						
	Technical Reports	13	0	0	0	13
	Funding	9.6	7.8	7.5	5.9	30.8
Materiel Systems Analysis Act. - APG						
	Technical Reports	6	7	11	28	52
	Funding	32	29.2			61.2
Medical Rsch Institute Chemical - APG						
	Technical Reports	28	44	49	40	161
	Funding	16	36.6	32.2	27.8	112.6
Med., Rsch Institute Environ., - Natick						
	Technical Reports	46	52	47	64	209
	Funding	8.4	8.4	9.9	9.7	36.4
Med., Rsch Institute Infectious - Natick						
	Technical Reports	39	75	77	47	238
	Funding	27.2	25.4	22.8	23.7	99.1
Missile RD&E Center - Redstone						
	Technical Reports	155	175	99	57	486
	Funding	217.7	292.4	358.6	326.5	1195.2
Natick RD&E Center - Natick						
	Technical Reports	28	49	38	11	126
	Funding	114.3	60.2	82	94.2	350.7
OPTEC Test & Exper., Ft. Hood						
	Technical Reports	60	49	42	290	441
	Funding	78.6	76.1	59.5	48.4	262.6

Program Funding ($M) Tracking
'94 through '97

Redstone Technical Test Ctr., - Redstone						
	Technical Reports	19	13	1	6	39
	Funding	32.6	27.5	25	26.6	111.7
Research Institute Behavorial Science, VA						
	Technical Reports	34	38	35	48	155
	Funding	34.3	27.7	23.8	25.6	111.4
Tank-Automotive RD&E Ctr - Warren, MI						
	Technical Reports	4	28	12	14	58
	Funding	156.2	158.6	129	108.6	552.4
Topographic Eng., Center - Alexandria, VA						
	Technical Reports	47	4	10	4	65
	Funding	27.3	33.5	58.8	45.5	165.1
Walter Reed Army Institute of Rsch., DC						
	Technical Reports	132	178	92	80	482
	Funding	60	61.9	59.5	54.6	236
Waterways Experiment Station - Vicksburg						
	Technical Reports	255	392	235	183	1065
	Funding		272.7	237.7	228.8	739.2
White Sands Missile Range - NM						
	Technical Reports	11	9	7	121	148
	Funding	181.7	268	285.3	276.2	1011.2
Yuma Proving Ground - Yuma, AZ						
	Technical Reports	34	44	29	122	229
	Funding	74.8	93.8	96.8	96.7	362.1
Cumulative Total						
Army - Total Technical Reports		2305	2662	2239	2645	8681
Army - Total RDT&E Funding		2592.5	3056.4	2914	2824.9	11387.8
	Project Grand Total	4240	4685	4049	4690	16494
			10.5%	-4.5%	10.6%	
	Funding Grand Total	5122.45	7060.092	6724.825	6634.697	25542.067
			37.8%	31.3%	29.5%	

Average '98 CBD project cost $ 5.251

445	-191	450
1937.64	1602.372	1512.244