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MANUFACTURING METHODS AND TECHNOLOGY FIVE YEAR PLAN FY 80-84 AN--ETC(U)
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FIVE YEAR PLAN FY 80-84

AND SUPPLEMENTARY LISTINGS FOR FY 79 PROJECTS

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PREPARED BY 410 713

MANUFACTURING TECHNOLOGY DIVISION
U S ARMY INDUSTRIAL BASE ENGINEERING ACTIVITY
ROCK ISLAND, ILLINOIS 61299

JUNE 1978

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DISCLAIMER

This document presents planning information for the DARCOM Manufacturing Methods and Technology Program during the period Fiscal Years 1980 - 1984. The projects and dollars are estimates and subject to change based on the state-of-the-art in technology and refinement of the scope of work for each project. The total funding for the planned projects exceeds the amount of funds projected by Department of Army for inclusion in the MM&T Program. This means that some projects will not be funded or may be slipped to later years. Also, HQ, DARCOM and the major subordinate commands have reprogramming authority which allows the funds to be transferred to new projects with higher priority.

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DARCOM's Manufacturing Methods and Technology (MM&T) Five Year Plan is a long range planning document. The Plan is an indication of where DARCOM resources will be directed in the area of MM&T. A supplementary listing of FY79 projects is also provided.

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DEPARTMENT OF THE ARMY
HEADQUARTERS US ARMY MATERIEL DEVELOPMENT AND READINESS COMMAND
5001 EISENHOWER AVE., ALEXANDRIA, VA 22333

DRCMT

22 June 1978

SUBJECT: DARCOM MM&T Five Year Plan, FY80-84

SEE DISTRIBUTION (Appendix E to Inclosure 1)

1. Reference is made to AR 700-90, C1, para 3-8a, dated 10 Mar 77.

2. This document outlines the DARCOM Manufacturing Methods and Technology Program Plan for projects and funding for the period FY80-84. The Plan is based on data prepared by the DARCOM major subordinate commands and centers, and evaluated by the Manufacturing Technology Division of the Industrial Base Engineering Activity. A supplementary listing of FY79 projects is also provided.

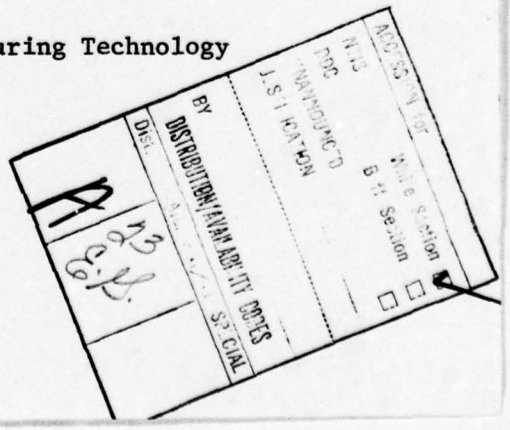
3. The planned projects support the Army goal of improving the productivity of the industrial base and assuring the ability to economically produce materiel. Individual projects within this Plan may change based on changes in future requirements and the dynamics of the materiel acquisition process; however, the main thrust of developing more efficient manufacturing processes will remain constant.

4. Additional copies of this Plan may be obtained by written request to the Defense Documentation Center, ATTN: TSR-1, Cameron Station, Alexandria, VA, 22314.

FOR THE COMMANDER:

JOHN H. TIPTON
COL, GS
Chief,
Office of Manufacturing Technology

1 Incl
FY80-84 MM&T Five Year Plan



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INDEX

		Page
I.	INTRODUCTION	1
	Objective of MM&T Program Objective of the Five Year MM&T Plan Format of the Five Year MM&T Plan Note to Industry	
II.	SUMMARY	3
III.	ANALYSIS	7
IV.	INDIVIDUAL PLANS	
	US Army Armament Materiel Readiness Command & US Army Armament Research & Development Command	15
	US Army Aviation Research & Development Command	79
	US Army Communications Research and Development Command	107
	US Army Electronics Research & Development Command	117
	US Army Materials & Mechanics Research Center	145
	US Army Missile Research & Development Command	151
	US Army Mobility Equipment Research & Development Command	193
	US Army Natick Research & Development Command	209
	US Army Tank-Automotive Research & Development Command	215
	US Army Test & Evaluation Command	235
	US Army Troop Support & Aviation Materiel Readiness Command	241

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Page

V. APPENDICES

Industry Guide ---------- A1

FY79 Project Listing ---------- B1

MM&T Points of Contact ---------- C1

IBEA Points of Contact ---------- D1

Distribution List for Five Year Plan ---------- E1

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INTRODUCTION

The MM&T Program

Within the US Army Materiel Development and Readiness Command (DARCOM), the Manufacturing Methods and Technology program can be summarized as a productivity improvement program. The MM&T program is broad in scope and supports Army's diverse production base. The basic intent of the program is to improve manufacturing efficiency by developing and applying new technology, thereby reducing the acquisition costs of future weapon systems.

The program addresses problems ranging from the loading of small caliber ammunition to the building of fifty ton tanks. Although cost reduction is the primary concern, emphasis is also placed on being able to produce, reducing the dependency on critical materials, conserving energy, meeting pollution abatement criteria, enhancing safety conditions, improving performance levels, and reducing production lead time.

The Five Year Plan

The MM&T Five Year Plan provides a single document that summarizes future MM&T efforts. The Plan is used to establish budget levels. The individual projects are an indication of where DARCOM resources will be directed; however, being included in the Plan does not guarantee funding.

Organization of the Five Year Plan

The Plan is sectioned by individual commodity commands. Each section contains a brief description of the command's mission, major problem areas, potential spin-offs to the private sector, and a summary of the planned program for each command. Following the summary, are data on the individual projects from which the summary data were extracted.

Individual project data presented includes; the last four digits of the project number, the project title, prior year funding plus projected funding by fiscal years, and a statement of the problem and proposed solution. All projects are grouped according to broad categories and sub-divided according to a component. By grouping the projects in this manner, major emphasis and possible duplication of effort can be identified.

Note to Industry

This year an Industry Guide (Appendix A) has been added to aid in the utilization of the Plan. Attention to this section will lead to a better understanding of the interrelationships between different appropriations, commands, and the personnel involved with the MM&T program. In addition, this section also contains a listing of the FY79 projects.

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SUMMARY

This Plan presents DARCOM's projected Manufacturing Methods and Technology (MM&T) Program for FY80-84. The data was prepared by the Major Subordinate Commands and assembled and analyzed by IBEA. The Plan is used to: (1) aid program managers during budget formulation procedures, (2) ensure that the efforts planned by the individual commodity commands are consistent with overall Army strategies and goals, and (3) provide other Government agencies and industry with an indication of where Army resources will be focused and what problems will be investigated.

A major objective of the US Army is to reduce system acquisition costs and still achieve mission goals. The MM&T Program is an effort to accomplish that objective. The Five Year Plan identifies a potential investment of $555 million over the planning period. New developments and technologies will not only benefit Army organizations, but are disseminated throughout DOD, other Governmental agencies and the private sector.

DARCOM's planned effort is aimed at those manufacturing areas where the greatest potential exists to generate benefits and reduce costs. Major thrust areas are listed in the summaries that preceed each individual plan. An analysis of these thrust areas identifies the major technical problems confronting the Army.

A large portion of the Plan centers around ammunition, where new methods and facilities are being developed to replace antiquated, labor intensive production lines. The replacement of these facilities requires the implementation of modular, flexible facilities capable of economically satisfying low peace time production rates and meeting high volume mobilization rates.

New technology and manufacturing methods dealing with composites, ceramics, and superalloys present a challenge to all elements of DARCOM. Higher strength, lighter weight components for aircraft structures, tracked vehicles, missiles, mobility equipment, and turbine engines are needed. Implementation of developments in these technologies will increase the mission effectiveness of weapon systems, conserve critical resources, and reduce production related costs.

Improvements in safety conditions, satisfying pollution abatement constraints, and conserving energy are areas that require major emphasis. Providing a safe working environment is even more critical when workers are exposed to highly energetic materials. Stringent pollution standards and energy shortages are problems that must be solved now. The projects planned to address these concerns will enhance DARCOM's ability to provide defense materiel with a minimum impact on the environment.

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Another major thrust is in the area of CAD/CAM (Computer-aided Design/Computer-aided Manufacturing). A total of 57 of these projects are included in the Plan. Projects ranging from evaluating software to automated flexible manufacturing systems are addressed. Planned efforts emphasize the application of computer technology and the need for improved information processing.

Problems dealing with circuit technology, electronic displays, infrared vision systems, fuel cells, power conditioners, and guidance systems are also stressed in the Plan. Work on these problems will not only lead to improved productivity, but will also increase the effectiveness of various ordnance systems by increasing functional capabilities and reliabilities.

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ANALYSIS

SUBMACOM SUBMISSION TO MM&T PROGRAM
BY COMMAND (Thousands of Dollars)

Command	Fiscal Code	Appropriation	FY80	FY81	FY82	FY83	FY84
ARRADCOM/ARRCOM	4250	Ammunition	30993	30696	29570	30141	27876
	3297	Weapons	4910	4855	5120	6076	6724
	5397	Other Support	700	313	750	500	200
AVRADCOM	1497	Aircraft	18355	17550	11410	10458	7859
CORADCOM	5297	Communications/Electronics	3791	5315	6565	3230	1140
ERADCOM	5297	Communications/Electronics	13965	19175	18820	7200	9510
AMMRC	5397	Other Support	4500	4500	4500	5000	5000
MIRADCOM	1497	Aircraft	350	718	732	890	150
	2597	Missiles	9722	13320	16322	21707	24528
	4250	Ammunition	1000	1200	500	1380	1501
	5297	Communications/Electronics	2957	1615	575	400	266
	5397	Other Support	747	787	830	880	932
MERADCOM	1497	Aircraft	176	120	0	0	0
	5397	Other Support	4469	4575	4117	3938	4039
NARADCOM	5397	Other Support	1033	1096	478	360	385
TARADCOM	3197	Tracked Combat Vehicles	8080	9510	9500	12765	14535
	5197	Tactical & Support Vehicles	2235	1770	1825	1125	1450
	5397	Other Support	300	300	400	600	600
TECOM	5397	Other Support	822	800	800	800	800
TSARCOM	1497	Aircraft	160	0	0	0	0

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SUBMACOM SUBMISSION TO MM&T PROGRAM
BY APPROPRIATION (Millions of Dollars)

Appropriation	Fiscal Code	FY80	FY81	FY82	FY83	FY84
Aircraft	1497	19.0	18.4	12.1	11.4	8.0
Missiles	2597	9.7	13.3	16.3	21.7	24.5
Tracked Combat Vehicles	3197	8.1	9.5	9.5	12.8	14.5
Weapons and Other Combat Vehicles	3297	4.9	4.9	5.1	6.1	6.7
Ammunition	4250	32.0	32.0	30.0	31.5	29.4
Tactical and Support Vehicles	5197	2.2	1.8	1.8	1.1	1.5
Communications/Electronics	5297	20.7	26.1	26.0	10.8	10.9
Other Support Equipment	5397	12.6	12.4	11.9	12.1	12.0
	TOTALS	109.2	118.4	112.7	107.5	107.5

This chart summarizes the projected DARCOM program by appropriations. It represents a composite of all the users of the Army's MM&T Program.

DARCOM'S PLANNED GUIDANCE
BY APPROPRIATION (Millions of Dollars)

Appropriation	Fiscal Code	FY80	FY81	FY82	FY83	FY84
Aircraft	1497	14.4	16.1	12.3	11.2	7.8
Missiles	2597	5.7	8.9	9.7	10.7	11.2
Tracked Combat Vehicles	3197	3.0	3.0	3.0	3.0	3.0
Weapons and Other Combat Vehicles	3297	6.0	6.0	6.0	6.0	6.0
Ammunition	4250	30.0	25.0	32.0	30.1	30.0
Tactical and Support Vehicles	5197	1.5	1.5	1.5	1.5	1.5
Communications/Electronics	5297	11.9	11.9	17.9	11.9	14.5
Other Support Equipment	5397	10.8	10.3	8.7	12.7	20.7
	TOTALS	83.3	82.7	91.1	87.1	94.7

This chart summarizes the current budget guidance by appropriation.

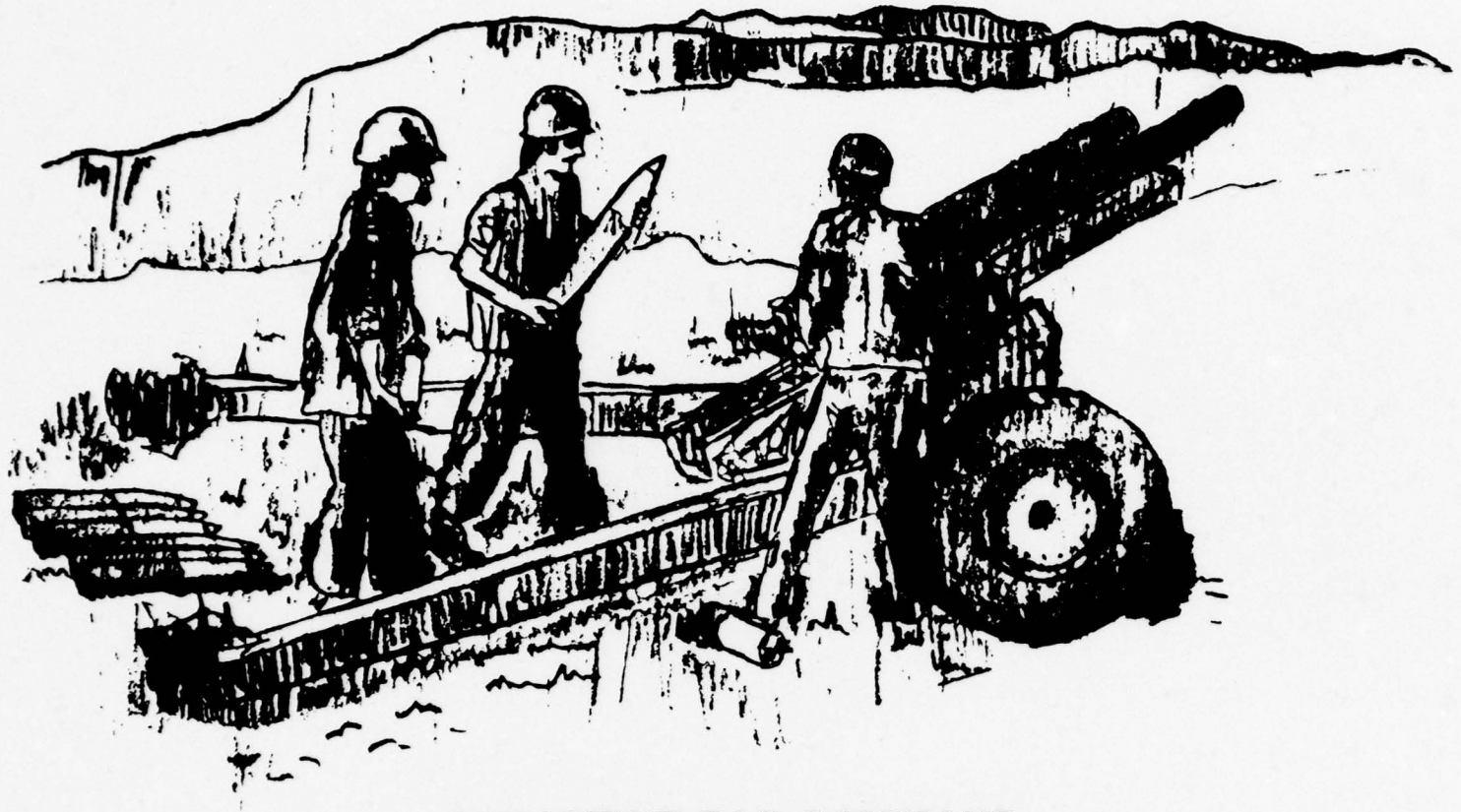
ANALYSIS OF PREVIOUS FIVE YEAR PLANNING DATA

CY of Plan	Five Year Plan	Percent of FY79 Apportionment Submissions Previously Planned
1973	FY75 - FY79	5%
1974	FY76 - FY80	14%
1975	FY77 - FY81	33%
1976	FY78 - FY82	58%
1977	FY79 - FY83	67%

This chart identifies what percentage of the current FY79 Apportionment Program was planned in previous years. As can be expected, there is a correlation between time and uncertainty.

FY80-81 INDIVIDUAL PROJECT LEVELS

Projected Funding Level (Thousands of Dollars)	Percent of Projects FY80	FY81
0 - 100	10.0	7.7
100 - 200	26.8	27.8
200 - 300	26.2	26.8
300 - 400	14.7	15.8
400 - 500	9.7	9.4
500 - 600	2.4	3.4
600 - 700	2.1	1.4
700 - 800	1.2	2.0
800 - 900	1.8	1.7
900 - 1000	2.7	2.3
Greater than 1000	2.4	1.7
TOTALS	100%	100%



ARMAMENT R&D COMMAND

(ARRADCOM)

ARMAMENT MATERIEL READINESS COMMAND

(ARRCOM)

(MUNITIONS)

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US ARMY ARMAMENT MATERIEL READINESS COMMAND (ARRCOM)

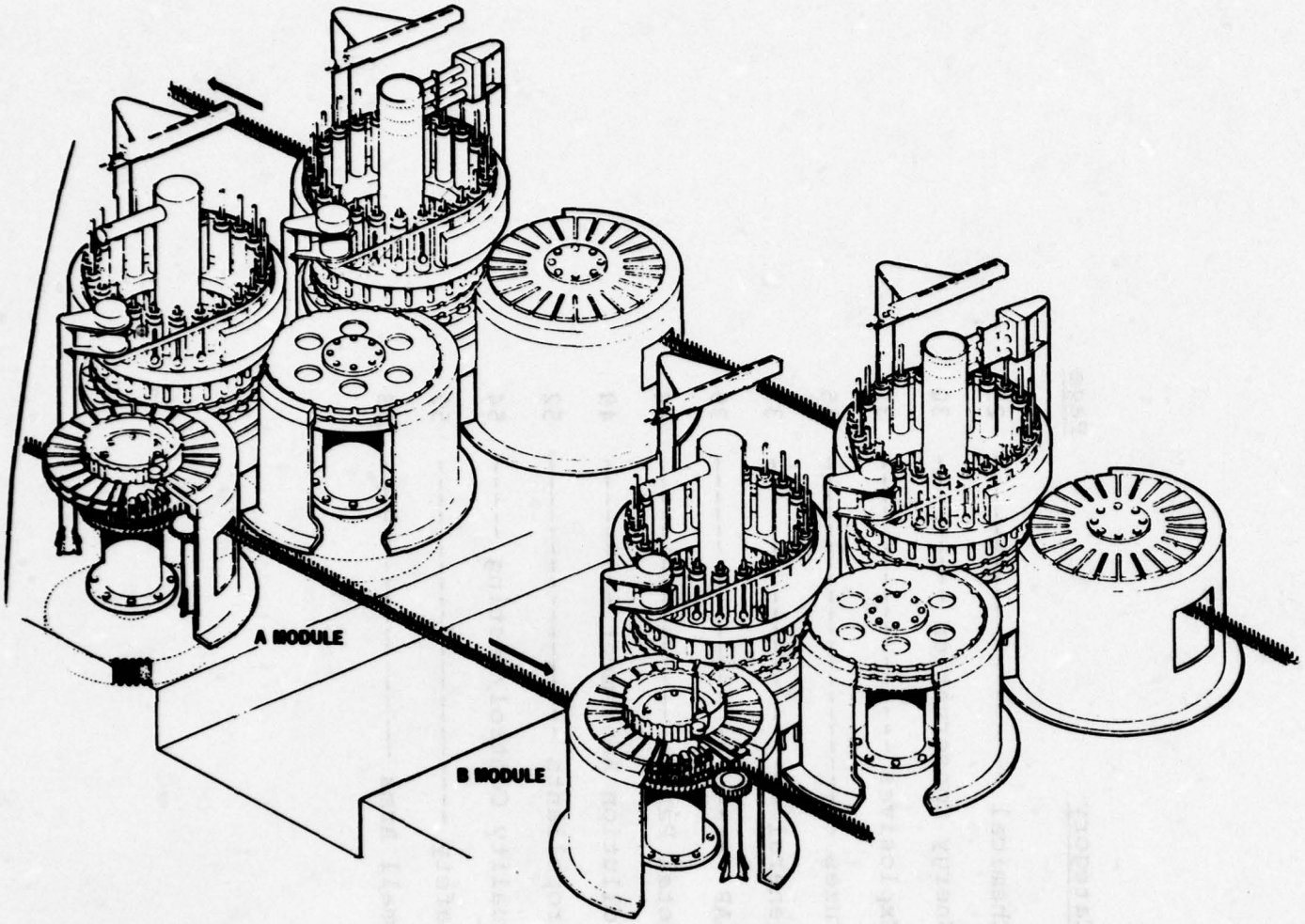
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US ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND (ARRADCOM)

ARRCOM, with headquarters at Rock Island, IL, is responsible for integrated logistics (materiel readiness) management of nuclear and non-nuclear weapons and munitions, including: Follow-on procurement; production; engineering in support of production; industrial management; product assurance; materiel management; maintenance; value and logistics engineering; international logistics; and transportation and traffic management for assigned armament systems/materiel. ARRCOM's materiel assignments include artillery, infantry, gun-type air defense, surface vehicle mounted and aircraft mounted weapons systems; rocket and missile warhead sections; demolition munitions; offensive and defensive chemical materiel; and the training equipment, tools and test equipment related thereto. ARRCOM directs the operations of four assigned arsenals (Rock Island, Watervliet, Pine Bluff, and Rocky Mountain); 28 assigned Government-owned, contractor-operated (GOCO) ammunition plants and an Army ammunition activity; the DARCOM Ammunition Center; the Central Ammunition Management Office-Pacific (CAMOPAC); and the US Army Technical Escort Unit. ARRCOM is the DOD Single Manager for Conventional Ammunition. In this capacity, it has responsibility for wholesale, common-user conventional ammunition for the Army, Navy, and Air Force.

ARRADCOM is responsible for conducting or managing all research, development, and life cycle engineering of assigned weapon systems. Its mission includes initial low-rate production for conventional systems and life cycle procurement and production for nuclear munitions. ARRADCOM also executes assigned missions in support of other DOD elements having centralized management responsibility for specific weapon systems or items. In addition to large-caliber, small-caliber, mission support and headquarters staffs at Dover, NJ, command elements include the Chemical Systems Laboratory and the Ballistics Research Laboratory at Aberdeen Proving Ground, MD.

Integrated into DARCOM's structure is the Office of the Project Manager for Munitions Production Base Modernization and Expansion (PM/PBM). The PM is responsible for project management of the Munitions Production Base Modernization and Expansion (M&E) Program. The PM exercises centralized management authority over the planning, direction, control and execution of the M&E Program at all US Army Ammunition Plants and arsenals and for Government equipment located at non-Government owned facilities that are included in the M&E Program. A significant amount of interface between the PM, ARRCOM, and ARRADCOM is necessary to assure integration of the MM&T Program into Related M&E Plans.



ARRCOM/ARRADCOM
(AMMUNITION)

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Category	Page
Chemical	25
Energy Conservation	30
Explosives	31
Fuzes	35
General	37
LAP	39
Metal Parts	44
Pollution Abatement	49
Propellants	52
Quality Control/Testing	54
Safety	55
Small Arms	58

AMMUNITION PROGRAM

Management of the MM&T effort associated with the Ammunition Program requires considerable interaction between ARRCOM, ARRADCOM, and the PM/PBM. A concerted effort by these organizations is applied to provide solutions to significant MM&T related problem areas confronting the ammunition production base. One such problem is inflation. The need to increase productivity and reduce unit cost can only be satisfied by utilizing the latest proven technology. In keeping up with this continuing need, the following projects are planned: 4179, 4187, 4194, 4208, 4210, 4236, 4251, 4257, and 6738.

Large quantity differences between the requirements for ammunition during peacetime and mobilization creates a unique problem. The establishment of an economical production base for each round responsive to both peacetime and mobilization production rates calls for a flexible facility with multi-purpose production lines. Current guidance requires production within four months in the event of mobilization. To convert from a small peacetime production rate or a cold base to mobilization in a short time span is being addressed. Effort planned in this area includes projects 4142, 4191, 4192, and 6736.

In an environment where explosives and propellants are being produced and loaded into munitions, safety becomes critical. Development of effective techniques for protecting operators and equipment from hazards utilizing the most cost-effective methods is a major goal of the ammunition related MM&T effort. Planned projects dealing with industrial safety and health conditions include: 4071, 4078, 4285, 4287, 4288, 4289, and 4291.

Meeting pollution constraints requires a continuing effort. New standards for environmental pollution will be effective in the 1985 time frame. To satisfy these requirements, a strong MM&T Program is planned. Applicable projects include: 4007, 4225, 4226, 4227, 4229, 4231, 4232, and 4235.

Energy conservation, coupled with the identification of alternate energy sources is a critical concern. An effective mobilization capability cannot be contingent upon fossil fuels without major emphasis on energy conservation and utilization of alternate resources whenever possible. Projects planned to attack this problem area include: 4184, 4224, 4246, 4258, 4281, 4474, and 4481.

Major emphasis is also being placed on improving process controls and yields in the manufacture of energetic materials. The requirements for large quantities of energetic materials along with new compositions containing ingredients that require unique processes are planned. Projects to address this area are 4027, 4036, 4037, 4048, 4061, 4161, 4199, 4212, 4213, and 4250.

The Munitions Technology Program is different from many of the other commodity technology areas since it often directly applies to a Government owned production base with little or no commercial counterpart. Much of the energetic material processing and loading technology falls in this category. There are, however, some that may have application or spin-off to the private sector.

Future standards, when imposed, will be much more stringent than present-day discharge limits for pollutants. A problem that is readily foreseen is the inability to determine the effluent discharges at these low limits with present-day monitoring instruments. R&D development on monitoring equipment to meet this requirement will serve as the basis for project 4226. This MM&T will apply instruments on-line at ammunition plants to evaluate performance in actual use. The application of the results could be applied to all munition plants and any private plants with similar pollutant problems.

Project 4221 will provide for the conducting of bench and pilot scale studies on two representative wastewater treatment sludges to evaluate methods of disposal which would allow for landfill of inert sludge and recovery of resources in a less energy intensive manner. The techniques developed could be extended to private plants where similar waste treatment sludge disposal problems exist.

In spite of protective measures, dust explosions persist. Project 4071 will provide for determining minimum concentration, minimum spark ignition, and minimum ignition temperature at different environmental conditions. This information will be used in the development of a dust detection system that can sense a hazardous dust condition and render it to a safe level. The techniques developed could be applied to private industry wherever dust hazards exist.

The application of solar energy is seriously hampered by the fact that reliable on-site solar insolation data is not available. Project 4281 will result in the acquisition of accurate on-site solar insolation and meteorological data. The information gathered will be of value not only to the Government site, but also to any potential user in the area.

Project 4164 will provide for the application of frequency analysis techniques to the high-speed small caliber equipment for the purpose of monitoring all moving parts such as gears, bearings, shaft noises, etc. This diagnostic method can readily monitor and obtain vibratory signatures from any location investigated, thus predicting, and therefore, preventing, any failure to the equipment or material. The techniques applied will be applicable wherever high-speed manufacturing equipment is employed.

Another effort that could result in spin-off technology applicable to the private sector is project 4225. This project will generate a modular optimum system design which could be utilized at both Government and private plants to treat Red Water (a dilute solution of sulfates, sulfonates, and nitrated organics).

A total of 181 projects planned for $150 million are presented in the ammunition program. Funds will be provided from the Ammunition, PA 4250, and the other Procurement, PA 5397 appropriations.

COMMAND FUNDING SUMMARY
(THOUSANDS)

CATEGORY	FY80	FY81	FY82	FY83	FY84
CHEMICAL	1908	3324	4099	2175	1635
ENERGY CONSERVATION	2035	2152	3042	2250	2250
EXPLOSIVES	1885	2568	1759	1900	1850
FUZES	1670	2420	2520	2970	4390
GENERAL	850	765	1125	1994	1717
LAP	3760	4485	3520	4892	3303
METAL PARTS	5536	6189	6304	6679	6344
POLLUTION ABATEMENT	2153	2818	3388	1720	1950
PROPELLANTS	5352	2029	1700	2264	900
QUALITY CONTROL/TESTING	1985	1888	703	1572	1602
SAFETY	3064	2371	1660	1750	1665
SMALL ARMS	1495	0	500	475	470
TOTAL	31693	31009	30320	30641	28076

****
* CATEGORY *
****
*CHEMICAL *
****

			FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- DECONTAMINATION						
(14XF) TITLE - DECONTAMINATION APPARATUS FOR VEHICLES			113			
PROBLEM - PROCESS ENGINEERING AND FABRICATION PROBLEMS WILL BE IDENTIFIED BY PEP, PROCESS DESCRIPTIONS, TOOLING, INSPECTION REQUIREMENTS AND PROTOTYPE EVALUATION MUST BE ACCOMPLISHED.						
SOLUTION - EVALUATE PROBLEM AREAS AND DETERMINE METHOD OF MANUFACTURE FABRICATION TOOLING AND PRODUCTION TYPE INSPECTION TEST AIDS DATA FOR QUALITY PRODUCTION.						
(14XI) TITLE - FIELD DECONTAMINATION SYSTEM			100			
PROBLEM - PROCESS ENGINEERING AND FABRICATION PROBLEMS WILL BE IDENTIFIED BY PEP, PROCESS DESCRIPTIONS, TOOLING, INSPECTION REQUIREMENTS AND PROTOTYPE EVALUATION MUST BE ACCOMPLISHED.						
SOLUTION - EVALUATE PROBLEM AREAS AND DETERMINE METHOD OF MANUFACTURE FABRICATION TOOLING DEVELOP INSPECTION TEST AIDS DATA FOR QUANTITY PRODUCTION.						
COMPONENT -- DETECTION/WARNING						
(1345) TITLE - FOR BIOLOGICAL WARNING SYSTEM	1018	400				
PROBLEM - THERE IS NO BIOLOGICAL AGENT DETECTOR MASS PRODUCTION CAPABILITY.						
SOLUTION - UTILIZE PEP DATA AND PROVE THE FEASIBILITY OF MASS PRODUCTION WITH A MINIMUM OF SOLE SOURCE COMPONENTS THAT MUST BE ACQUIRED ON A BROAD BASE.						
(14XC) TITLE - ADVANCED POINT SAMPLING ALARM				200	200	200
PROBLEM - PROC ENGR AND PROBLEMS WILL BE IDENTIFIED BY PEP, PROCESS DESCRIPTIONS TOOLING AND INSPECTION REQUIREMENTS PROTOTYPE PROVEOUT MUST BE ACCOMPLISHED.						
SOLUTION - EVAL PROBLEM AREAS AND DETERMINE METHOD OF MANUFACTURE FABRICATION, TOOLING AND PRODUCTION TYPE TEST AIDS DATA FOR QUALITY PRODUCTION.						
(14XD) TITLE - REMOTE SAMPLING ALARM XM21				300	300	
PROBLEM - PROCESS ENGINEERING AND FABRICATION PROBLEMS WILL BE IDENTIFIED BY PEP, PROCESS DESCRIPTIONS, TOOLING, INSPECTION REQUIREMENTS AND PROTOTYPE EVALUATION MUST BE ACCOMPLISHED.						
SOLUTION - EVALUATE PROBLEM AREAS AND DETERMINE METHOD OF MANUFACTURE, FABRICATION TOOLING AND PRODUCTION TYPE INSPECTION TEST AIDS DATA FOR QUANTITY PRODUCTION.						
(14XK) TITLE - DETECTOR KITS FOR AGENTS IN WATER			100	100		
PROBLEM - MANY CRITICAL COMPONENTS CAN BE SENSITIVE AND UNSTABLE IN STORAGE.						
SOLUTION - PRECISE PRODUCTION CONTROL IS REQUIRED TO LOWER SENSITIVITY AND INCREASE STABILITY.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT	-- FILTERS						
(1296)	TITLE - MANUFACTURING TECHNOLOGY OF CB FILTERS	1823	300				
	PROBLEM - EXISTING FILTER PRODUCTION FACILITIES ARE OBSOLETE, INEFFICIENT AND EXPENSIVE TO OPERATE.						
	SOLUTION - MODERNIZE, CONSOLIDATE ALL AREAS INTO ONE FACILITY DESIGN, NEW PROCESS EQUIPMENT.						
(14XM)	TITLE - RESIDUAL GAS LIFE INDICATOR				75		
	PROBLEM - AN IMPROVED METHOD IS REQUIRED TO ACCURATELY AND RELIABLY DETERMINE THE EFFECTIVENESS AT ANY TIME OF ON LINE FILTERS TO REMOVE TOXIC CONTAMINANTS FROM THE ENVIRONMENT.						
	SOLUTION - ADAPT KNOWN TECHNOLOGY AND PROVE OUT THE FEASIBILITY OF MORE RAPID AND ECONOMICAL METHODS FOR DETERMINING RESIDUAL GAS LIFE OF CHARCOAL FILTERS.						
COMPONENT	-- PROCESSES						
(P012)	TITLE - ADAPTATION OF SLUGGING TECHNOLOGY TO HC SMOKE AND CS RIOT MU				120	110	
	PROBLEM - COLORED SMOKE GRENADE SLUGGING CONCEPT NOT ADAPTED TO HC AND RIOT MUNITIONS. CURRENT FILL AND PRESS OPNS ARE LABOR INTENSIVE. INDUSTRIAL HYGIENE IS POOR.						
	SOLUTION - ADAPT SLUGGING TECHNOLOGY TO HC AND RIOT MIXTURES. IMPROVE INDUSTRIAL HYGIENE.						
(P017)	TITLE - OPTIMUM USE OF WASTE FROM WP WASTE TREATMENT FACILITY				150	170	
	PROBLEM - WASTE CONTAINS METALLIC PHOSPHOROUS. WASTE IS CURRENTLY INCENIRATED. WASTE MUST BE SCRUBBED.						
	SOLUTION - STUDY METHODS TO TREAT WASTE, PROVIDE PILOT RECOVERY SYSTEM. MAKE USABLE PRODUCT.						
(1318)	TITLE - ADV TECHNOLOGY OF BINARY MUNITION MFG	398	479				
	PROBLEM - AN 8 INCH LETHAL CHEMICAL PROJECTILE XM736 UTILIZING THE BINARY TECHNOLOGY IS BEING DEVELOPED FOR THE INVENTORY.						
	SOLUTION - DEVELOP OPTIMUM MASS PRODUCIBILITY METHODS FOR MANUFACTURE OF THE HARDWARE INTERMEDIATES AND FILL/LAP LINES TO ALLEVIATE PROBLEMS DEFINED BY PEP EFFORTS.						

COMPONENT -- PROCESSES (CONTINUED)	FUNDING ($000) PRIOR	80	81	82	83	84
(1344) TITLE = MOLTEN SALT DISPOSAL OF CHEMICALS			200			
PROBLEM = WASTE PRODUCTS FROM GB, VX BINARY MFR ARE CONTAMINATED AND DIFFICULT TO DISPOSE BY CONVENTIONAL METHODS. THEY CANNOT BE SOLD OR RECYCLED AND MUST BE STORED INDEFINITELY.						
SOLUTION = PROVIDE A MOLTEN SALT PROCESS WHICH WILL DECOMPOSE ORGANIC WASTES CHEAPLY AND CONSERVES ENERGY IN OPERATION.						
(1357) TITLE = DOWNLOADING FACILITY			203			
PROBLEM = NO INTERFACE FACILITY EXISTS AT PBA TO PROVIDE A DOWNLOAD CAPABILITY WHICH WOULD CONVERT MUNITIONS/MATERIALS INTO STATE WHICH IS ACCEPTABLE BY THE INCINERATOR COMPLEX.						
SOLUTION = A DOWNLOAD FACILITY WILL BE DEVELOPED TO ALLOW THE DISPOSAL OF OBSOLETE/REJECT CHEMICAL MUNITIONS IN AN ENVIRONMENTALLY ACCEPTABLE MANNER.						
(1358) TITLE = HEXACHLOROETHANE RECOVERY/REPROCESSING STUDIES			227	269		
PROBLEM = NO CURRENT DOMESTIC SUPPLIER OF HEXACHLOROETHANE, LARGE QUANTITY OF EXCESS/UNSERVICABLE MUNITIONS CONTAINING HEX.						
SOLUTION = DEVELOP TECHNOLOGY FOR RECOVERING HEXACHLOROETHANE FROM EXCESS MUN, PROVIDE DOMESTIC HEX. PRODUCTION CAPABILITY.						
(1359) TITLE = CS RECOVERY PROCESS STUDIES	239		253			
PROBLEM = COST OF CS EXCESSIVE, CS ON HAND NEEDS DEMIL.						
SOLUTION = CONVERT CSI TO CS.						
(14XO) TITLE = ESTAB PDN TECH FOR PROJ 155 MM BINARY IVA			650	250		
PROBLEM = MANUFACTURING AND FILLING PROCESSES NEED TO BE INVESTIGATED FOR REDUCED COST AND QUANTITY PRODUCTION.						
SOLUTION = STUDY PROCESSES INCLUDING WASTE AND POLLUTION ABATEMENT TECHNOLOGY.						
(14XQ) TITLE = PROCESS TECH FOR WARHEAD BINARY GSRS				175	150	
PROBLEM = MANUFACTURING AND FILLING PROCESSES NEED TO BE INVESTIGATED FOR REDUCED COST AND QUANTITY PRODUCTION.						
SOLUTION = STUDY PROCESSES INCLUDING WASTE AND POLLUTION ABATEMENT TECHNOLOGY.						
(14XU) TITLE = ESTAB PDN TECH FOR DEEP TARGET INCAP MUN				100	75	
PROBLEM = CHEMICAL AND INTERMEDIATE PROCESS PRODUCIBILITY PROBLEMS UNCOVERED BY PEP EFFORT.						
SOLUTION = ACCOMPLISH FILL CLOSE ASSEMBLY PROCESS PRODUCIBILITY STUDIES.						

		FUNDING ($000)				
		PRIOR	80	81	82	83	84
COMPONENT	-- PROCESSES (CONTINUED)						
(4159)	TITLE - EST PROCESS FOR PROD OF HEXACHLOROTHANE			365	350	400	425
	PROBLEM - THERE IS NO CONUS SUPPLIER, HEX IS CURRENTLY PROCURED IN EUROPE, THERE IS A MOB REQUIREMENT.						
	SOLUTION - PROVIDE A PROCESS TO MFG HEX IN A GOVT OWNED FACILITY.						
(4246)	TITLE - HAZARDOUS MATERIAL DRYING SURVEY		110				
	PROBLEM - LESSONS LEARNED FROM PREVIOUS DRYING EFFORTS HAS NOT BEEN FULLY UTILIZED IN ON-GOING AND PROPOSED DRYING EFFORTS.						
	SOLUTION - REVIEW ALL EXISTING REPORTS AND ON-GOING DRYING PROJECTS TO CORRELATE BOTH TECHNICAL AND ECONOMIC DATA INTO A SINGLE DOCUMENT WHICH THEN CAN BE USED AS A REFERENCE FOR FUTURE DRYING PROJECTS.						
COMPONENT	-- PROTECTIVE GEAR						
(14XG)	TITLE - ADVANCED COLLECTIVE PROTECTION FOR FIELD APPLICATIONS				75		
	PROBLEM - PROCESS ENGINEERING AND FABRICATION PROBLEMS WILL BE IDENTIFIED BY PEP, PROCESS DESCRIPTIONS, TOOLING, INSPECTION REQUIREMENTS AND PROTOTYPE EVALUATION MUST BE ACCOMPLISHED.						
	SOLUTION - EVALUATE PROBLEM AREAS AND DETERMINE METHOD OF MANUFACTURE FABRICATION TOOLING DEVELOP INSPECTION TEST AIDS DATA FOR QUANTITY PRODUCTION.						
COMPONENT	-- PYROTECHNICS						
(P007)	TITLE - SAFETY STUDY- BULK TRANSFER OF PYROTECHNIC MATERIALS			200	160		
	PROBLEM - SAFE METHODS OF TRANSFERRING PYROTECHNICS NEEDED, PRESENT MATL. HANDLING METHODS ARE UNSAFE AND LABOR INTENSIVE.						
	SOLUTION - DEVELOP PROCESS FOR SAFE AND EFFICIENT TRANSFER OF MATERIALS.						
(P011)	TITLE - DEVELOP IMPROVED MFG PROCESSES IN PRODUCTION ENGR, LABORATOR				275	250	
	PROBLEM - PROD ENGR LABORATORY PROCESSES DO NOT USE LATEST STATE-OF-THE-ART.						
	SOLUTION - UPGRADE PROCESSES BY DEVELOPING AND EXPANDING TECHNOLOGY.						
(P013)	TITLE - ADAPTATION OF SLUGGING CONCEPT TO 40MM SMOKE MARKER PRODUCTI				250	170	
	PROBLEM - SMOKE MARKER MUST BE FILLED TO CLOSE TOLERANCES, CURRENT FILL METHODS NEED IMPROVEMENTS, LABOR COSTS ARE HIGH, MATLS. HANDLING IS LABOR INTENSIVE.						
	SOLUTION - ADAPT SLUGGING TECHNOLOGY FOR AUTOMATED PRODUCTION, REPLACE MANUAL MATL. HANDLING WITH MECHANICAL SYSTEMS.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- PYROTECHNICS (CONTINUED)							
(P014)	TITLE - MFG TECHNOLOGY FOR M4-M5 SMOKE POTS				390		
	PROBLEM - ASSIGNED MOB AND CURRENT REQUIREMENTS, NEED TO UPDATE TECHNOLOGY, NEED TO INVESTIGATE NEW PRODUCTION METHODS, NEED TO UPDATE TDP.						
	SOLUTION - DEVELOP UPDATED TECHNOLOGY PILOT NEW PRODUCTION TECHNIQUES.						
(P016)	TITLE - SIMULATION OF PBA PYROTECHNIC PRODUCTION LINES				100	100	
	PROBLEM - MULTI-PURPOSE LINES, SHORT DURATION PRODUCTION RUNS.						
	SOLUTION - PROVIDE SIMULATION SOFTWARE, MONITOR PRODUCTION PROCESSES, PROVIDE STATE OF READINESS.						
(P019)	TITLE - DEVELOP MANUFACTURING TECHNOLOGY FOR 40MM SMOKE CANOPIES					250	800
	PROBLEM - MOBILIZATION REQUIREMENT, NO CURRENT PRODUCTION FACILITY, NEED PRODUCTION PROVE OUT.						
	SOLUTION - PROVIDE PILOT FACILITY TO PROVE OUT THE TDP, PROVIDE DESIGN CRITERIA AND PROCESS BASELINE.						
(P022)	TITLE - CONTINUOUS BATCH VOLUMETRIC FEEDER SYSTEM FOR PYROTECHNICS						360
	PROBLEM - PREPARATION OF PYROTECHNIC MIXTURES MUCH MANUAL MATLS. HANDLING.						
	SOLUTION - AUTOMATE MATLS. HANDLING, PROCESSING AND WEIGHING OF PYRO. MIXES.						
(P033)	TITLE - AUTO TECHNOLOGY TO LAP HAND HELD SIGNALS						450
	PROBLEM - IMPROVED TECHNOLOGY REQUIRED TO AUTOMATE LAP OF SM SIGNALS.						
	SOLUTION - DEVELOP TECHNOLOGY TO AUTOMATE LAP SIGNAL FACILITIES.						
(1353)	TITLE - SMOKE MIX PROCESS GLATT			413			
	PROBLEM - AIR POLLUTING, LABOR INTENSIVE, AND DUST LADEN ATMOSPHERE.						
	SOLUTION - REFINE PROCESS TO MIX UTILIZING THE GLATT MIXER, ELIMINATE USE OF ACETONE.						
(14XV)	TITLE - SAFE TRAINING SMOKE DEVICE				300		
	PROBLEM - A NEED EXISTS FOR SAFE TRAINING DEVICE FOR FAMILIARIZING TROOPS WITH USE OF PLANNED LARGE AREA SMOKE SCREENING SYSTEM.						
	SOLUTION - EXPLOIT PROCESS TECHNOLOGY TO PRODUCE A MORE ECONOMICAL AND BROAD BASE DEVICE.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- PYROTECHNICS (CONTINUED)						
(14XW) TITLE - PROC TECH FOR LARGE AREA SMOKE SCREEN SYSTEM				900		
PROBLEM - PRESENT ARMY SMOKE OBSCURATION CAPABILITY CONTAINS SIGNIFICANT GAPS IN PRODUCIBILITY.						
SOLUTION - UTILIZE PEP DATA AND EXPLOIT PROCESS TECHNOLOGY TO MAXIMIZE PRODUCTION OF THE LARGE AREA SMOKE SCREEN SYSTEM.						
(14XY) TITLE - PDN FILL TECH IMPRV SMK MUN 105 MM 60 MM			900			
PROBLEM - REQUIREMENT EXISTS FOR APPLYING THE IMPROVED SMOKE CONCEPT TO FILLING THE 105 MM AND 60 MM MUNITION.						
SOLUTION - CONDUCT PRODUCTION TECHNOLOGY STUDIES FOR PREMIX FILL CLOSE AND LAP IMPROVED SMOKE MUNITIONS 105 MM AND 60 MM.						
(4161) TITLE - PROC TECH FOR PDN OF 81 MM IMPRV SMOKE MUN		380				
PROBLEM - A REQUIREMENT EXISTS FOR APPLYING THE IMPROVED SMOKE CONCEPT TO FILLING THE WARHEAD FOR THE 81 MM MORTAR.						
SOLUTION - CONDUCT PROC TECH STUDIES FOR PREMIX, FILL, CLOSE AND LAP MUNITIONS PRODUCTION PROCESS DATA.						
********** CATEGORY ********** ENERGY CONSERVATION **********						
COMPONENT -- ALL						
(P009) TITLE - OPTIMIZATION OF ENERGY USE/RECOVERY AT INCINERATOR COMPLEX			225	209		
PROBLEM - OPERATION OF INCINERATOR COMPLEX REQUIRES LARGE USE OF ENERGY.						
SOLUTION - UTILIZE INCINERATOR WASTE HEAT ENERGY TO MEET OTHER ENERGY NEEDS UTILIZE ENERGY FROM WASTE PYROTECHNICS TO MEET OTHER ARSENAL NEEDS.						
(P010) TITLE - DEVELOP ALTERNATE ENERGY SYSTEM FOR WP PLANT			250	265		
PROBLEM - THE WHITE PHOSPOROUS (WP) PLANT REQUIRES LARGE AMOUNTS OF PROCESS STEAM.						
SOLUTION - DEVELOP ALTERNATE WAY TO PROVIDE HEATED PROCESS WATER, INVESTIGATE SOLAR COLLECTORS, INVESTIGATE WASTE WP.						
(4224) TITLE - ENERGY REDUCTION IN ACTIVATED SOLVENT RECOVERY SYSTEM		600	277	243	250	250
PROBLEM - CARBON BED REGENERATED USING STEAM IS ENERGY INTENSIVE AND COSTLY.						
SOLUTION - ELIMINATE USE OF STEAM IN CARBON BED REGENERATION BY USING FEED STREAM.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- ALL (CONTINUED)							
(4258)	TITLE - SOLAR PONDS HEAT PUMPS TO DELIVER HOT PROCESS WATER		215				
	PROBLEM - PLANTS USE ENERGY (FOSSILE FUEL) TO GENERATE HOT WATER.						
	SOLUTION - USE SOLAR POND AND HEAT PUMPS.						
(4281)	TITLE - CONSERVATION OF ENERGY AT AAPS	4413	1220	1000	1800	2000	2000
	PROBLEM - REDUCE ENERGY CONSUMPTION AT AMMUNITION PLANTS.						
	SOLUTION - PROCESS MODIFICATION, NEW TECHNOLOGY, ALTERNATE SOURCES OF ENERGY, AND SURVEYS.						
(4481)	TITLE - PYROLYSIS OF AAP WASTE	100		400	525		
	PROBLEM - WASTE IS DESTROYED WITHOUT RECOVERY OF ENERGY.						
	SOLUTION - RECOVER ENERGY FROM WASTE.						

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* CATEGORY *
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*EXPLOSIVES *
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COMPONENT -- PROCESS CONTROL							
(P040)	TITLE - PROCESS TECHNOLOGY FOR IMPROVED ME MORTAR					400	400
	PROBLEM - THE ARMY IS DEVELOPING AND ADAPTING NEW MORTAR ROUNDS FOR USE. CURRENT LAP SYSTEMS CANNOT BE USED FOR LOADING THESE AND MUST BE ADAPTED TO THESE ROUND.						
	SOLUTION - WE MUST PROVIDE FOR THE DEVELOPMENT AND ADAPTATION OF EXISTING SYSTEMS TO THE LOADING THE ROUNDS.						
(P041)	TITLE - PROCESS FOR CONTINUOUS MIXING AND CASTING OF PBX		139	110			
	PROBLEM - CURRENT CASTABLE PBX LOAD CAPABILITIES LIMITED TO BATCH MIXING/LOADING METHODS. INCREASING USE OF CASTABLE PBX IN CONVENTIONAL MUNITIONS WILL RESULT IN NEED FOR HIGH VOLUME PRODUCTION PROCESSING OF PBX.						
	SOLUTION - ONE PROPOSED SOLUTION WOULD BE THE PNEUMATIC MIXING OF PBX TO PROVIDE A CONTINUOUS FLOW CASTING PROCESS.						
(4037)	TITLE - PROCESS IMPROVEMENT FOR PLASTIC-BOND EXPLOSIVES			415	1259		
	PROBLEM - PRESENT PRODUCTION METHODS FOR PBX COMPOSITIONS USE FACILITIES THAT ARE REQUIRED FOR COMP B MFG DURING MOBILIZATION.						
	SOLUTION - GENERATE PROCESSES SUFFICENTLY FLEXABLE FOR MFG OF PBX PRODUCTS AT MOB LEVELS. INVESTIGATION INTO PRESENT PRODUCTION METHODS AND APPLYING NEW TECH TO COATING, DRYING, AND FINISHING PBX COMPOSITIONS WILL BE ADDRESSED.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- PROCESS CONTROL (CONTINUED)							
(4046)	TITLE - DEVELOP METHODS FOR PROC ANALYSIS OF CRUDE RDX/HMX SLURRY			193			
	PROBLEM - MANUAL ANALYTICAL METHODS ARE NOT ADEQUATE TO CONTROL THE ANHYDROUS REACTOR SLURRY FOR OPTIMIZATION OF HOLSTON'S CONTINUOUS NITROLYSIS PROCESS.						
	SOLUTION - DEVELOPMENT OF AN AUTOMATED PROCESS ANALYZER SYSTEM WITH REMOTE SAMPLING AND AUTOMATIC DATA OUTPUT WILL PROVIDE A MORE REALISTIC CONTROL FOR THE NITROLYSIS REACTION.						
(4078)	TITLE - UPGRADE SAFETY READINESS AND PRODUCTIVITY OF EXIST MELT POUR		320	215			
	PROBLEM - MELT POUR FACILITIES HAVE RECEIVE EITHER MAJOR, VERY MINOR OR NO MODERNIZATION TO DATE. ATTAINABLE SIGNIFICANT IMPROVEMENTS ARE NOT BEING REALIZED BECAUSE DESIGN APPROACHES FOR COST-EFFECTIVE INTERMEDIATE UPGRADING ARE NOT AVAILABLE.						
	SOLUTION - DEVELOP A SERIES OF PROCESS DESIGN CONCEPTS TO IMPROVE SAFETY, REDUCE EXPLOSIVE QUANTITIES, REMOVE PERSONNEL FROM HAZARDOUS AREAS AND INCREASE EFFICIENCY. PROVIDE ALTERNATIVE MODULAR DESIGN PACKAGES FOR VARIOUS PROCESS AREAS AND UPGRADING LEVELS.						
(4195)	TITLE - AUTO MEASUREMENT AND CONTROL SYSTEM FOR RDX/HMX MFG			150			
	PROBLEM - THE CURRENT ANALYTICAL METHOD USED TO DETERMINE THE HEXAMINE/ACETIC ACID SOLUTION IS UNSATISFACTORY DUE TO THE COMPLEXITY AND TIME INVOLVED IN OBTAINING DATA.						
	SOLUTION - AN AUTOMATED PROTOTYPE SAMPLING AND ANALYSIS SYSTEM WILL BE DESIGNED AND EVALUATED USING LABORATORY LIQUID CHROMOTOGRAPHY OR SPECTROSOPY TECHNIQUES.						
(4199)	TITLE - AUTO MEASUREMENT AND CONTROL OF ACETIC ACID IN RDX/HMX MFG			160			
	PROBLEM - CURRENT ANALYTICAL METHOD USED TO DETERMINE THE LEVEL OF ACETIC ACID FLOWING INTO THE FIRST SLURRY SIMMER TANK IS UNSATISFACTORY FOR CONTROLLING THE REACTOR SLURRY FOR OPTIMIZATION OF HOLSTON'S CONTINUOUS NITROLYSIS PROCESS.						
	SOLUTION - DEVELOPMENT OF AN AUTOMATED PROCESS ANALYZER SYSTEM WITH REMOTE SAMPLING AND AUTOMATIC DATA OUTPUT WILL PROVIDE A MORE REALISTIC CONTROL FOR THE NITROLYSIS REACTION.						
(4200)	TITLE - TNT CRYSTALLIZER FOR LG CAL		300	350			
	PROBLEM - TNT MELT LOADING REQUIRES AN OPTIMUM RATIO OF MOLTEN AND SOLID TNT IN THE EXPLOSIVE MIX AT THE TIME OF POUR. THE RATIO IS OBTAINED BY THE ADDITION OF FLAKE TNT TO A QUANTITY OF MOLTEN TNT BASED ON OPERATOR JUDGEMENT.						
	SOLUTION - DEV A DEVICE WHICH UTILIZES MOLTEN TNT TO GEN A SLURRY CONSISTENCY THROUGH PARTIAL CONTROLLED, STEADY-STATE CRYSTALLIZATION. BY CLOSE CONTROL OF TNT FLOW RATE AND THERMAL PARAMETERS, A CONTINUOUS FINE GRAINED SLURRY MIX OF PROPER RATIO WOULD RESULT.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- PROCESS CONTROL (CONTINUED)							
(4212)	TITLE - FALLING OR WIPED FILM DRYING OF MOLTEN EXPLOSIVES			100			
	PROBLEM - TO ACHIEVE A DEPENDABLE AND ECONOMIC DESIGN OF A HEAT TRANSFER SYSTEM WITH A HIGH HEAT TRANSFER RATE AND SUFFICIENT HEATING SURFACE TO ACCOMPLISH THE JOB.						
	SOLUTION - ADAPT AND FURTHER DEVELOP THE APPLICABILITY OF THE CONTINUOUS FALLING FILM CONCENTRATOR SYSTEM.						
(4213)	TITLE - VOLUMETRIC FEEDER FOR EXPLOSIVE SOLIDS			100			
	PROBLEM - EXPLOSIVE SOLIDS OR COMPOSITIONS HAVE THE TENDENCY OF BEING PUTTY-LIKE, PLIABLE, DAMP, FORMATIVE OR MOLDABLE, ACCURACY OF COMPOSITION OF THE EXPLOSIVE IS NECESSARY TO ACHIEVE FORMULATED REQUIREMENTS, UNIT VOLUMES OR WEIGHTED QUANTITIES IS OFTEN VERY						
	SOLUTION - A VOLUMETRIC FEEDER COULD EFFECTIVELY MOVE W/O COMPACTING, SOLIDIFYING OF DRYING, EXPLOSIVE MATERIAL THEREBY ELIMINATING WEIGHING OF MATERIAL AND MANUAL LOADING OF WET MATERIAL INTO INCORPORATION VESSELS.						
(4312)	TITLE - INJECTION MOLDING FOR PRODUCTION EXPLOSIVE LOADING	261	276				
	PROBLEM - MELT LOADING OF SMALL EXPLOSIVE ITEMS NORMALLY REQUIRES LARGE SURPLUSES OF MOLTEN EXPLOSIVE TO OBTAIN GOOD FILLING CHAR, SURPLUS RISER MATERIAL CAN BE TWICE THE AMOUNT LOADED INTO END ITEMS, VERY SMALL ITEMS CANNOT BE EFFECTIVELY MELT LOADED AT ALL.						
	SOLUTION - DEVELOP AN INJECTION MOLDING SYSTEM FOR FILLING SMALL ITEMS WITH MOLTEN EXPLOSIVE UNDER PRESSURE, DESIGN LOADING FIXTURES TO FORM EXPLOSIVE CHARGES TO FINISHED DIMENSIONS AND REDUCE SURPLUS EXPLOSIVE REQUIREMENTS TO VERY LOW LEVELS.						
(4508)	TITLE - PROCESS IMPROVEMENTS FOR PRESSABLE RDX COMPOSITIONS	657	500				
	PROBLEM - PRESENT PRODUCTION METHODS FOR PRESSABLE RDX COMPOSITIONS NECESSITATES THE USE OF FACILITIES WHICH WILL BE REQUIRED FOR COMP B MFG DURING MOBILIZATION.						
	SOLUTION - GENERATE PROCESSES SUFFICENTLY FLEXABLE FOR MFG OF PRESSABLE RDX PRODUCTS AT MOB LEVELS. INVESTIGATION INTO PRESENT PRODUCTION METHODS AND APPLYING NEW TECHNOLOGY TO COATING, DRYING, AND FINISHING WILL BE ADDRESSED.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- RAW MATERIALS						
(4086) TITLE - REPROCESSING EXPLOSIVE FINES AND DRILL SCRAP		350	200			
PROBLEM - FINELY DIVIDED EXPLOSIVE PARTICLES EMANATING FROM EXPLOSIVE PROCESSES CANNOT BE READILY REUSED IN MELT POUR EQUIP. FINE PARTICLES ARE DIFFICULT TO TRANSPORT, DO NOT MIX WELL IN MELT VESSELS AND MAY CONTAIN METAL CONTAMINANTS.						
SOLUTION - DEVELOP AN EXPLOSIVE REPROCESSING SYS THAT INSPECTS FOR METALLIC CONTAMINATION AND TRANSFORMS THE FINE PARTICLES INTO A MANAGEABLE FORM. PARTIAL REMELTING FOLLOWED BY RAPID SOLIDIFICATION ON A FLAKING BELT WOULD RESULT IN AN ACCEPTABLE FORM.						
COMPONENT -- RDX/HMX						
(P533) TITLE - GLACIAL ACETIC ACID LATENT HEAT TO PRE HEAT WEAK ACID TO STR					500	450
PROBLEM - ACID FEED IS NOT PREHEATED IN RDX MFG CAUSING INCREASED ENERGY USEAGE.						
SOLUTION - USE WASTE HEAT TO PREHEAT ACID FEED.						
(P535) TITLE - HEAT RECOVERY FROM CYCLOHEXANONE VAPOR					500	900
PROBLEM - HEAT IS NOT RECOVERED IN RDX MFG PROCESS.						
SOLUTION - RECOVER HEAT ON UNIT PROCESS BASIS.						
(4036) TITLE - IMPR NITROLYSIS OF HEXAMINE AND ALT METHODS			200	200	200	200
PROBLEM - CURRENT PROCESSES FOR MFG OF RDX AND HMX ARE INEFFICIENT IN THAT YIELDS OBTAINED ARE CONSIDERABLY LESS THAN THEORETICAL. AMOUNTS OF RAW MATERIAL REQUIRED, ESPECIALLY FOR HMX, ARE EXCESSIVE.						
SOLUTION - LAB DATA INDICATES POTENTIAL FOR IMPROVING RDX AND HMX YIELDS. METHODS WILL BE EVALUATED AND ENGR DATA GATHERED FOR IMPLEMENTING PROMISING TECHNIQUES INTO PRODUCTION.						
COMPONENT -- TNT						
(L098) TITLE - TNT HNS PROCESS MODIFICATION			250			
PROBLEM - USE OF HNS AS AN ADDITIVE TO COMP B TO IMPROVE PHYSICAL PROPERTIES, REDUCE CRACKING AND EXUDATION IS BEING DEVELOPED. THERE IS NO SUITABLE PROCESS AVAILABLE TO SYNTHESIZE THIS MATERIAL IN THE QUANTITIES REQUIRED FOR MOBILIZATION.						
SOLUTION - A PROCESS TO PRODUCE HNS IN QUANTITY WILL BE DEVELOPED. THE HE PILOT FACILITY AT ARRADCOM WILL BE UTILIZED TO DEVELOP THE PROCESS AND TO INVESTIGATE METHODS OF ADDITION OF HNS TO TNT.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84

COMPONENT -- TNT (CONTINUED)

(P120) TITLE - SUITABILITY OF TNT BY INSPECTION FOR NON CONFORMING GROUPS — 125

PROBLEM - A PROGRAM IS NEEDED TO ASSESS TNT PRODUCED BY THE CONTINUOUS PROCESS INCLUDING ESTABLISHMENT OF INSPECTION CHARACTERISTICS AND PROCESS CONTENTS REQUIRED FOR QA AND NEW SPECIFICATION FOR ACCEPTANCE OF TNT PRODUCED BY THE CONTINUOUS PROCESS.

SOLUTION - INVESTIGATE AND IDENTIFY THE SPECIFIC PRODUCT CHARACTERISTICS OF TNT WHICH AFFECT THE QUALITY OF TNT LOADED ITEMS RESULTS WILL BE UTILIZED TO PREPARE A QUALITY ASSURANCE SYSTEM FOR TNT, INSPECTION CRITERIA, SPECIFICATIONS, AND TEST METHODOLOGY.

(P544) TITLE - UTILIZATION OF HEAT GENERATED IN TNT MFG — 300 300 300

PROBLEM - HEAT IS NOT RECOVERED IN TNT MFG.

SOLUTION - RECOVER WASTE HEAT GENERATED IN TNT MFG.

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* CATEGORY *
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*FUZES *
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COMPONENT -- ASSEMBLY/PACKING

(P001) TITLE - DEV PROCESS EQUIP FOR S AND A DEVICES — 200 600 2000

PROBLEM - AUTO ASSY EQUIP DOES NOT EXIST FOR M732 AND XM587 S AND A DEVICES.

SOLUTION - PROVIDE CONCEPT FEASIBILITY AND PROTOTYPE EQUIP FOR S AND A DEVICES.

(P030) TITLE - AUTOMATION OF EQUIPMENT TO LAP THE M734 FUZE — 500 1000 500 500

PROBLEM - PROJECT 5793562 AT MILAN CONSISTS OF A HAND LINE TO LAP THE M734 FUZE. IF THE REQUIREMENTS FOR THE FUZE INCREASE, AUTOMATIC EQUIPMENT COULD PROVE TO BE ECONOMICALLY JUSTIFIABLE.

SOLUTION - TO DEVELOP AUTOMATIC EQUIPMENT TO REPLACE SOME OF THE HAND OPERATIONS PROPOSED FOR PROJECT 5793562-LAP OF MORTAR FUZES.

(P031) TITLE - PACKAGING OF FUZES FOR INTERPLANT SHIPMENT — 300 300

PROBLEM - THE EXISTING PACKAGE FOR INTERPLANT SHIPMENT REQUIRES EXTENSIVE AMOUNTS OF MANUAL LABOR AT THE METAL PARTS PLANT AS WELL AS THE LOAD PLANT.

SOLUTION - TO DEVELOP A NEW FUZE PACKAGE THAT WILL PERMIT A MACHINE TO PACK AND UNPACK THE FUZES.

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT	-- ASSEMBLY/PACKING (CONTINUED)						
(P032)	TITLE - STANDARDIZATION OF EQUIPMENT TO LAP FUZES					300	300
	PROBLEM - THE LAP OF EACH TYPE OF FUZE IS PERFORMED ON A DIFFERENT LINE ALTHOUGH THE FUNCTIONS ARE SIMILAR.						
	SOLUTION - DETERMINE THE FEASIBILITY OF DEVELOPING EQUIPMENT THAT COULD LAP ALL FUZES WITH MINOR TOOL CHANGING.						
(1003)	TITLE - LOW COST MOLDED PACKAGING FOR HYBRID ELECTRONICS	170	240	200			
	PROBLEM - FOAM OR EPOXY POTTED HYBRID CIRCUITS USED IN SMALL CALIBER ARE NOT SURVIVING HI G LEVELS. HERMETIC PACKAGES ARE NOT USED DUE TO COST CONSIDERATIONS.						
	SOLUTION - DEVELOP PROCESS TO BULK FILM PROTECTION OF THE SUBSTRATE, THEN MOLDING OF THE ELECTRONICS, THEN METAL PLATING OF THE MOLDED MODULE TO PROVIDE ELECTRICAL SHIELDING.						
COMPONENT	-- LOAD						
(4269)	TITLE - MATERIAL HANDLING ON FUZE MFG LINES		125	200			
	PROBLEM - CURRENT HIGH PRODUCTION FUZE LINES LACK SUFFICIENT INTRA-LINE HANDLING.						
	SOLUTION - DEVELOP A MATERIAL HANDLING SYSTEM CAPATABLE WITH THE CURRENT M739 FUZE LINE.						
COMPONENT	-- OTHER ELECTRONICS						
(1004)	TITLE - FUZE-ON-CHIP TECHNOLOGY FOR LOW-COST FUZES			500	400	400	400
	PROBLEM - PRESENT ELECTRONIC SUBASSEMBLIES USED IN PROXIMITY FUZES WILL BE TO COSTLY FOR SUBMUNITION SYSTEMS AND RAPID-FIRE, SMALL-CALIBER AMMO.						
	SOLUTION - DEVELOP LOW-COST, HIGH VOLUME CHIP TECHNOLOGY.						
(1005)	TITLE - CERAMIC-METAL SUBSTRATES FOR HYBRID ELECTRONICS	190	315	300	300	270	300
	PROBLEM - PRESENT CIRCUIT ENCAPSULATION IS BY POUR MOLDING AND TOXIC GASSES ARE EMITTED.						
	SOLUTION - PROVIDE AN ENCAPSULANT THAT DOES NOT EMIT TOXIC GASSES AND PROVIDE INJECTION MOLDING EQUIPMENT TO REDUCE COSTS.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT	-- POWER SUPPLIES						
(1001)	TITLE - PILOT LINE FOR FUZE FLUIDIC POWER SUPPLIES		250	250	200	200	200
	PROBLEM - FLUIDIC GENERATORS ARE COMPLEX AND COSTLY TO PRODUCE. IN PRODUCTION, CLOSE TOLERANCES AND SMALL PART ASSEMBLY ARE REFLECTED IN HIGH COST AND LOW YIELD.						
	SOLUTION - IDENTIFY AND ADOPT THE MOST ECONOMICAL MFG PROCESSES AND TECHNIQUES TO ESTABLISH A MECHANIZED PILOT LINE FOR ASSEMBLY OF FLUIDIC POWER SUPPLIES.						
COMPONENT	-- QA/TESTING						
(1000)	TITLE - S AND A PERFORMANCE MONITORING WITH ON-LINE EQUIPMENT		135				
	PROBLEM - CURRENT TESTING AND QUALITY ASSURANCE PROCEDURES ARE LABOR INTENSIVE AND THEY ONLY UTILIZE TEST DATA TO DETERMINE ACCEPTABILITY OF A DEVICE.						
	SOLUTION - PROCESS IMPROVEMENT CAN BE OBTAINED BY STORING AND PROCESSING THE TEST DATA IN REAL TIME.						
(3961)	TITLE - IMPROVED VIBRATION ACCEPT TEST FOR M732 AND XM587 FUZES	405	605	470	420	400	390
	PROBLEM - CURRENT TESTING OF S AND A MECHANISMS IS COSTLY AND TIME CONSUMING AND DOES NOT EXPOSE THE ITEM TO TRUE SERVICE ENVIRONMENTS.						
	SOLUTION - USE OF COMPUTERIZED 3-D VIBRATION/SHOCK TESTING AS ACCEPTANCE TOOL WILL SOLVE THESE DEFICIENCIES.						

CATEGORY

GENERAL

COMPONENT	-- MISCELLANEOUS						
(P005)	TITLE - AUTO INJECTION MOLDING FOR CENTERING BANDS ON SABOT 120MM AP			215	375	424	577
	PROBLEM - THE 120MM FRG APFSDS PROJECTILE CONTAINS TWO (2) PLASTIC BANDS WHICH ARE MOLDED INTO THE PROJECTILE AS AN ASSEMBLY. THE PROCESS IS CUMBERSOME, LENGTHY AND CONSUMES MUCH ENERGY.						
	SOLUTION - ELIMINATE THE PROBLEM BY MOLDING THE PLASTIC BANDS AS COMPONENTS AND ASSEMBLING THEM TO THE SABOT. VARIOUS PRIMERS WILL BE TRIED TO INSURE A TIGHT FIT ON THE SABOT.						
(P015)	TITLE - DEVELOP TECHNOLOGY FOR MFG OF DELAY AND TRAINS				250	200	
	PROBLEM - DELAY TRAIN PRODUCTION CONTRACTED OUT, DISRUPTION OF PRODUCTION, D EFECTIVE COMPONENTS.						
	SOLUTION - PROVIDE DELAY TRAIN MFG IN-HOUSE, PROVIDE INLINE CONCEPT FOR ITEMS, PROVIDE INTEGRATED FACILITY.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- MISCELLANEOUS (CONTINUED)							
(P020)	TITLE = INCENDIARY MIX STUDY					350	
	PROBLEM = TECHNOLOGY OUTDATED, FACILITIES OLD AND LABOR INTENSIVE, HEAVY POLLUTANT.						
	SOLUTION = PERFORM STUDY TO PROVIDE UPDATED EQUIPMENT, PROVIDE STATE OF ART TECHNOLOGY, LIMIT POLLUTION FROM PLANT.						
(P021)	TITLE = OPTIMIZATION OF REACTIVATION OF LAYAWAY WP PLANT					150	
	PROBLEM = COMPLEX PROCESSES AND EQUIPMENT, HAZARDOUS MATERIALS IN PRODUCTION, SHORT TIME TO REACTIVATE.						
	SOLUTION = OPTIMUM PLAN GIVES DETAILS OF PROCEDURES SEQUENCE AND METHODS, MINIMUM TIME TO REACTIVATE, ENHANCED SAFETY FOR REACTIVATION, MINIMIZE PROBLEMS DURING STARTUP OF PRODUCTION.						
(P023)	TITLE = OPTIMIZATION OF REACTIVATION OF LAYAWAY PYROTECHNIC PLANTS						175
	PROBLEM = COMPLEX PROCESSES AND EQUIPMENT, HAZARDOUS MATERIAL IN PRODUCTION, SHORT LEAD TIME TO REACTIVATE.						
	SOLUTION = OPTIMUM PLAN TO GIVE SEQUENCE DETAILS OF PROCEDURE AND METHODS, MINIMUM TIME TO REACTIVATE, ENHANCED SAFETY FOR REACTIVATION, MINIMIZE PROBLEMS DURING STARTUP OF PRODUCTION.						
(P025)	TITLE = BINARY PRODUCTION WASTE STUDY						200
	PROBLEM = NEW FACILITY FOR M687 WILL BE IN FIRST YEAR OF PLANNED PRODUCTION, ADDITIONAL FACILITIES FOR XM736 AND BIGEYE WILL BE IN DESIGN, WASTE DISPOSAL METHODS ARE EXPECTED TO BE COSTLY AND CRUDE, WASTES CONTAIN CONTAMINATED MATERIALS.						
	SOLUTION = OPTIMIZE DISPOSAL METHODS FOR THE M687 BINARY MUNITION, ENHANCE DISPOSAL METHODS FOR THE XM736 AND BIGEYE PLANNED FACILITY, IMPROVE SAFETY OF OPERATIONS, LESS RISKS TO THE ENVIRONMENT.						
(P027)	TITLE = SURVEY MATERIAL HANDLING AT NAVY FACILITIES					370	340
	PROBLEM = MATERIAL HANDLING IS AN AREA THAT HAS HISTORICLY BEEN NEGLECTED AND ONE WHICH COULD ACCOUNT FOR COST SAVINGS.						
	SOLUTION = SURVEY THE MATERIAL HANDLING TECHNIQUES AND DEVELOP PLANS FOR MODERNIZING THE AREA WHICH SHOWS THE GREATEST BENEFITS.						
(4141)	TITLE = EFFECT OF LONG PERIOD NON-OP ENVIRONMENT ON ELEC AUTO LINES	1015	475				
	PROBLEM = TO PROVIDE QUICK MOBILIZATION RESPONSE OF ELECTRONIC SYSTEMS.						
	SOLUTION = DEVELOP TECHNOLOGY TO COUNTER DEGRADATION OF ELEC SYSTEMS.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- MISCELLANEOUS (CONTINUED)						
(4166) TITLE = DEV 8M CAL LINK MFG AND INSP SYS			250	500	500	425
PROBLEM = APL OF LINK AFFECTING PACKAGING OPERATION.						
SOLUTION = IMPROVE MANUFACTURE INSP AND PACKAGING OF LINKS.						
(4190) TITLE = MOLDING REAR SEAL 120MM FRG APFSDS PROJECTILE (XM827)	375	300				
PROBLEM = PROJECTILE REQUIRES RUBBER LIKE REAR SEAL TO PREVENT PROPELLANT GAS FLOW PAST PROJECTILE BASE. TDP MANDATES THAT THE SEAL BE MOLDED IN PLACE AFTER ASSY OF COMPONENTS. PROCESS REQUIRES EXCESS MANUAL LABOR AND EXTREMELY COMPLEX MOLDING.						
SOLUTION = EXAMINE TECHNIQUES TO ATTACH SEPARATELY MOLDED REAR SEAL. INDEPENDENT MOLDER OF RUBBER PRODUCTS WITH OSHA QUALIFIED PROCESSES WILL ALEVIATE NEED TO PROCURE SPECIAL IPE IN GOVERNMENT FACILITY PACKAGE.						

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* CATEGORY *
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*LAP *
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COMPONENT -- ASSEMBLY						
(4182) TITLE = PROCESS IMPROVEMENTS AND AUTO TEST FOR M70/73 XM75 BLU91B	438	164	125	200	225	
PROBLEM = PRESENT ASSEMBLY PROCEDURES ARE BY HAND WHICH IS SLOW AND COSTLY. THEY ARE, POTTING OPERATIONS MCD ASSEMBLY, MCD TO LENS ASSEMBLY, WAVE SOLDER CAN WARP ELECTRONIC LENS, MAGNETOMETER TESTING IS SLOW, NO DIAGNOSTIC LENS TESTER IS AVAILABLE.						
SOLUTION = ELIMINATE HAND POTTING, AUTOMATE MCD AND MCD TO LENS ASSEMBLY OPERATIONS. IMPROVE PROCESS TO ELIMINATE WARPING. DEVELOP HIGH SPEED MAGNETOMETER AND DIAGNOSTIC TESTERS.						
(4238) TITLE = PROPELLANT CHARGE ASSEMBLY SYSTEM, 155MM XM211			480			
PROBLEM = THIS IS A NEW CHARGE WHICH BECAUSE OF RSI REQUIREMENTS HAS THE POTENTIAL OF PRESENTING SOME UNIQUE ASSEMBLY OPERATIONS.						
SOLUTION = DEVELOP A PROTOTYPE UNIT TO ASSEMBLE THE CHARGE AUTOMATICALLY.						
COMPONENT -- GENERAL						
(P028) TITLE = AUTOMATE MANUFACTURE OF M3 8 IN FLASH REDUCER BAG					175	110
PROBLEM = BAG MANUFACTURE AT THE PRESENT TIME IS A HAND OPERATION.						
SOLUTION = POSSIBLE SOLUTIONS INVESTIGATE USE OF NONSEWN, NONWOVEN MATERIAL UTILIZING ULTRASONICS OR ADAPT 105MM BAG MAKER TO PRODUCE THE M3 BAG.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- GENERAL (CONTINUED)							
(P034)	TITLE = TECHNOLOGY TO LAP IMPROVED ILLUM 4.2 IN MORTAR				390		
	PROBLEM = NO TECHNOLOGY EXISTS TO LAP THE NEW IMPROVED 4.2 MORTARS.						
	SOLUTION = DEVELOP TECHNOLOGY TO LAP 4.2 IN IMPROVED ILLUM MORTARS.						
(P035)	TITLE = TECHNOLOGY TO LAP IMPROVED ILLUM 60MM 81MM MORTARS			354			
	PROBLEM = NO TECHNOLOGY EXISTS TO LOAD ASSEMBLE AND PACK NEW LIGHT WEIGHT MORTARS.						
	SOLUTION = DEVELOP TECHNOLOGY TO LAP 60-81MM ILLUM MORTARS.						
(P036)	TITLE = TECHNOLOGY TO LAP IMPROVED SMOKE 4.2 IN MORTARS					410	
	PROBLEM = NO TECHNOLOGY EXISTS TO LAP IMPROVED 4.2 IN MORTARS.						
	SOLUTION = DEVELOP TECHNOLOGY TO LAP 4.2 IN IMPROVED SMOKE MORTARS.						
(P037)	TITLE = LAP MOPMS				1000	1000	500
	PROBLEM = NEW METHOD OF DISPERSING SCATTERABLE MINES IS BEING DEVELOPED FOR INVENTORY.						
	SOLUTION = DEVELOP OPTIMUM METHODS FOR LAP OF THE SCATTERABLE MINES.						
(P043)	TITLE = DEV EQUIPMENT TO LAP STICK AND STACKED PROP CHGS					480	360
	PROBLEM = NEW PROPELLING CHARGES IN DEVELOPMENT ARE USING STICK PROPELLANT AND STACKING BUNDLES OF THESE. THIS PROVES TO BE A LABOR INTENSIVE OPERATION AND AN EXTREMELY COSTLY ONE.						
	SOLUTION = DEVELOP TECHNIQUES AND EQUIPMENT TO MECHANIZE THESE OPERATIONS.						
(4251)	TITLE = AUTO MANU OF DELAY FOR M549 AND XM650 PROJECTILES			350			
	PROBLEM = CURRENT OPERATION ARE LABOR INTENSIVE, COST OF ITEM IS HIGH.						
	SOLUTION = DEV AUTO LAP EQUIP.						
(4313)	TITLE = DEV LAP TECH FOR OPER REQ BY GER 120MM DES CART		280				
	PROBLEM = THE GERMAN DESIGNED 120MM TANK AMMUNITION HAS SEVERAL LABOR INTENSIVE, SLOW RATE OPERATIONS INVOLVING THE CARTRIDGE CASE LOADING AND ASSEMBLY.						
	SOLUTION = IDENTIFY THESE OPERATIONS AND DETERMINE ECONOMICS AND ALTERNATIVES FOR DESIGNING PROTOTYPES.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- GENERAL (CONTINUED)							
(4320)	TITLE - COMBUSTIBLE CARTRIDGE CASE PROCESS 120MM		350				
	PROBLEM - PRESENT GERMAN PROCESS FOR PRODUCING THE COMBUSTIBLE CASE IS BOTH HAZARDOUS AND WILL REQUIRE A COSTLY SOLVENT RECOVERY SYSTEM FOR FACILIZATION.						
	SOLUTION - DETERMINE IF THE PRESENT U.S. PROCESS CAN BE USED.						
COMPONENT -- LOAD							
(P018)	TITLE - DEVELOP IMPROVED FILLING METHOD FOR M74 ROCKET					250	
	PROBLEM - TPA FILLING METHOD IS SLOW AND CAUSES INEFFICIENT OPERATION.						
	SOLUTION - EVALUATE AND SELECT OPTIMUM FILL EQUIPMENT TO REDUCE FILLING TIME.						
(P029)	TITLE - NONWOVEN NONSEWN PROPELLANT BAGS			110	175	150	100
	PROBLEM - THREAD BREAKAGE WHEN SEWING PROPELLANT BAGS CAUSES CONSIDERABLE PRODUCTION DOWNTIME.						
	SOLUTION - ULTRASONIC SEALING IS A PROVEN METHOD OF JOINING NONWOVEN MATERIAL. THIS PROJECT WILL INVESTIGATE THE USE OF NONWOVEN INSTEAD OF CLOTH.						
(P042)	TITLE - 5 INCH HI-FRAG LAP			400			
	PROBLEM - 5 INCH HI-FRAG IS A TWO PIECE ROUND UTILIZING PBX BILLET LOAD. CURRENTLY, NO LOAD TECHNOLOGY EXISTS.						
	SOLUTION - DEVELOP A MFG. METHOD TO LAP THE PROJECTILE FOR HIGH VOLUME PRODUCTION.						
(1367)	TITLE - DEVELOP MFG TECHNOLOGY FOR XM96 CS ROCKET					350	
	PROBLEM - NEVER PRODUCED AT PBA, MOBILIZATION REQUIREMENT.						
	SOLUTION - PROVIDE MFG TECHNOLOGY, PROVIDE DESIGN CRITERIA FOR IPF.						
(4137)	TITLE - AUTO LOADING OF CENTER CORE IGNITERS	205	957				
	PROBLEM - LOADING OF THE LONG SLENDER CLOTH BAG IS AN AREA WHICH REQUIRES HIGH LABOR COSTS AND SUBJECTS A LARGE NUMBER OF PERSONNEL TO HAZARDOUS OPERATIONS.						
	SOLUTION - DEVELOP EQUIP TO AUTOMATICALLY LOAD THESE IGNITERS.						
(4194)	TITLE - IMPROVED PROCESS FOR PRESSING LX-14 EXPL CHGS.		300				
	PROBLEM - PRESENT PROCESS FOR PRESSING LX-14 IS SLOW AND REQUIRES NUMEROUS OPERATIONS WHICH ARE COSTLY.						
	SOLUTION - DEVELOP A NEW SIMPLIFIED PROCESS FOR PRESS LOADING LX-14.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- LOAD	(CONTINUED)						
(4208)	TITLE - IMPROVED COOLING PROCESS FOR MORTARS MUNITIONS			250	200	100	125
	PROBLEM - AT THE PRESENT TIME THE MINUTE MELTOR EXPLOSIVE MELTING AND POURING SYSTEM IS A VERY COMPLEX SYSTEM.						
	SOLUTION - AN EFFORT IS PROPOSED TO DEVELOP AN IMPROVED MTR COOLING SYSTEM TO ELIMINATE THE COMPLEX SYSTEM NOW IN USE.						
(4236)	TITLE - AUTO LACE JACKETS FOR CENTER CORE CHARGES		605				
	PROBLEM - THE MANUAL THREADING AND TIGHTENING OF THE LACING IS EXTREMELY TIME CONSUMING AND REQUIRES LABORIOUS HIGH COST OPERATIONS WHILE PROVIDING POOR QUALITY PRODUCT.						
	SOLUTION - DEVELOP AN AUTOMATED/MECHANIZED SYSTEM FOR THE LACING OPERATION.						
(4244)	TITLE - DEV AUTO LOADING EQUIP FOR ELEC PRIMER IGNITERS			260	236	250	275
	PROBLEM - NEW MIX BEING DEV TO LOAD INTO ELECT PRIMER IGNITERS, SAFETY IS A FACTOR.						
	SOLUTION - DEV AUTO LAP EQUIP, REDUCE NUMBER OF OPERATORS.						
(4257)	TITLE - LOADING OF 155MM ZONE 2 PROP CHARGE			1175			
	PROBLEM - THE ZONE 2 PROPELLANT CHARGE PLANNED FOR DEVELOPMENT PROMISES TO PRESENT SOME UNIQUE LOADING PROBLEMS WHICH WILL REQUIRE A LARGE NUMBER OF OPERATORS.						
	SOLUTION - DEVELOP AUTOMATIC EQUIPMENT WHICH WILL LOAD THIS CHARGE WITH A MINIMUM OF OPERATOR INTERFACE.						
(4272)	TITLE - AUTO HEAT SEAL OF IGNITER AND FLASH REDUCER BAGS	75		282	199	175	150
	PROBLEM - THREAD BREAKAGE IN SEWING BAG CLOSED CAUSES CONSIDERABLE PRODUCTION DOWNTIME.						
	SOLUTION - VARIOUS METHODS SUCH AS ULTRASONIC ADHESIVE OFFER A POSSIBLE SOLUTION. PROCESS EQUIPMENT WILL BE DESIGNED AND A PROTOTYPE WILL BE BUILT.						
(4472)	TITLE - DEV OF EQUIPMENT FOR AUTO FAB OF CENTER CORE PROP BAGS	764	830				
	PROBLEM - MANUFACTURING OF CENTER CORE PROP BAGS IS A LONG, TIME CONSUMING, PIECEMEAL PROCESS WHICH IS VERY COSTLY.						
	SOLUTION - DEVELOP EQUIPMENT TO MECHANIZE OR AUTOMATE THE BAG MFG PROCESS.						

MMT FIVE YEAR PLAN
RCS DRCMT 126

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- PROCESS CONTROL						
(4179) TITLE = OPTIMUM LOADING OF COMP A5 INTO M42/M46 GRENADE BODIES			250			
PROBLEM = CURRENT METHOD FOR CONSOLIDATING A5 INTO GRENADE BODIES REQUIRES ASSEMBLY, DISASSEMBLY AND CLEANING OF THE NESTS. THIS MMT WILL ELIMINATE NEST AND LOWER AVERAGE LAP PRODUCTION COSTS.						
SOLUTION = USE OF PREFORMED CHARGES SHOULD ELIMINATE THE NEED FOR NESTS.						
COMPONENT -- SUPPORT						
(P008) TITLE = ADVANCE TECHNOLOGY FOR PRODUCTION OF IGNITION SLEEVE			110	95		
PROBLEM = PRODUCTION OF CLOTH IMPREGNATED IGNITION SLEEVE IS INEFFICIENT. HIGH REJECT RATE. MUNITION ASSEMBLY DIFFICULT.						
SOLUTION = DEVELOP IMPROVED MANUFACTURING TECHNOLOGY.						
(P039) TITLE = IMPROVE LAP OF INIATING DEVICES TO SUPPORT FYDP				850	850	850
PROBLEM = HIGH COSTS. INSUFFICIENT CAPACITY. SAFETY.						
SOLUTION = PROCESS IMPROVEMENT. DEVELOPMENT OF AUTOMATIC LAP EQUIPMENT.						
(1368) TITLE = DEVELOP MANUF TECH FOR CARTRIDGE 40MM CS M651					202	
PROBLEM = THE M651 CARTRIDGE HAS BEEN ADDED TO PBA MOBILIZATION REQUIREMENTS. THERE IS CURRENTLY NO PRODUCTION FACILITY TO PRODUCE THE ITEM.						
SOLUTION = THIS PROJECT PROVIDES ALL THE TECHNOLOGY NEEDED TO CONVERT THE EXISTING 40MM COLORED SMOKE FACILITY FOR PRODUCTION OF THE M651 CARTRIDGE.						
(1369) TITLE = DEVELOP MANUF TECH FOR M4 INCENDIARY BURSTER						308
PROBLEM = THE M4 INCENDIARY BURSTER HAS BEEN ADDED ON PBA MOBILIZATION SCHEDULE. THE MUNITION HAS NOT PREVIOUSLY BEEN PRODUCED AT PBA.						
SOLUTION = CONDUCT STUDY TO DEVELOP THE TECHNOLOGY NEEDED FOR PRODUCTION OF THE M4 BURSTER.						
(4191) TITLE = OPTIMIZATION OF REACTIVATION TIME VS MECHANIZATION			300	250	300	300
PROBLEM = ACTIVATION OF THE AMMUNITION PRODUCTION BASE TO ESTABLISH INITIAL PRODUCTION CAPABILITY IN THREE MONTHS AND FULL MOBILIZATION RATE CAPABILITY IN FOUR MONTHS.						
SOLUTION = DEVELOP GUIDELINES FOR OPTIMUM LEVELS OF MECHANIZATION TO ACHIEVE REQUIRED MOBILIZATION RESPONSE TIMES.						

CATEGORY

METAL PARTS

	PRIOR	FUNDING ($000) 80	81	82	83	84
COMPONENT -- CARTRIDGES CASES						
(P004) TITLE - FORMING OF STUB BASE CARTRIDGE CASE			350	300	275	350
PROBLEM - CURRENTLY THE STUB IS MADE FROM A FORGED CUP WHICH REQUIRES EXTENSIVE MACHINING OF A 4140 TYPE OF STEEL.						
SOLUTION - FORGE CUP TO CLOSER NET SHAPE BY DIE DESIGN AND LOWER FORGING TEMPERATURE, INVESTIGATE OTHER GRADES OF STEEL WITH LOWER ALLOY CONTENT, EXPLORE DIE DESIGN MATERIAL SUBSTITUTIONS AND FORGING PARAMETERS AND MANUFACTURE 500 ITEMS FOR EVALUATION.						
COMPONENT -- FORMING						
(P002) TITLE - FABRICATION OF ADVANCED SHAPED CHARGE LINERS			200	200	250	250
PROBLEM - NEW SPECIAL ARMOR CONFIGURATIONS HAVE BEEN DEVELOPED THAT ARE EFFECTIVE IN DEFEATING HIGH EXPLOSIVE ANTITANK AMMUNITION USING COPPER LINER CONES, NEW METALS AND ALLOYS UNDER CONSIDERATION ARE NOT ECONOMICALLY PRODUCEABLE FOR QUANTITY PRODUCTION.						
SOLUTION - ADVANCED SHAPED CHARGE LINER STUDIES HAVE SHOWN THAT NEW METALS ARE REQUIRED TO DEFEAT NEW ARMOR, PDN TYPE PROCESSES COMPATABLE WITH METAL CANDIDATES UNDER CONSIDERATION WILL BE EXPLORED, IDENTIFICATION OF SPECIFIC METALS UNDER CONSIDERATION IS CLASS						
(1903) TITLE - DIECAST TAIL CONE FOR BLU-96B	1178	900	250	350	350	
PROBLEM - PERMANENT MOULD CASTING NOW USED ON BLU-95B TOO EXPENSIVE AND OF QUESTIONABLE QUALITY.						
SOLUTION - DIECAST ALUMINUM TAIL CONE WILL MEET REQUIRED PRODUCTION RATE WITH SATISFACTORY QUALITY AND DIE WILL MAKE PRODUCTION QUANTITY OF 100,000 PIECES.						
(1904) TITLE - ONE PIECE SKIN FOR BLU-96B	431	80				
PROBLEM - THREE PIECE SKIN REQUIRES TOO MUCH EXPENSIVE SEAM WELDING THAT CAN CAUSE REWORK AND MORE POSSIBILITY OF LEAKS WHEN LOADED FOR DEPLOYMENT.						
SOLUTION - ONE PIECE SKIN WILL PROVIDE FEWER INCHES OF SEAM WELDING THAT COULD LEAK.						
(4184) TITLE - FORM SABOT SEG TO NET SHAPE ON APFSDS AMMO	425	275				
PROBLEM - CURRENT METHOD WASTES MATERIAL AND MACHINING TIME RESULTING IN HIGH COST, CURRENT METHOD IS TO EXTRUDE BAR SEGMENTS, FACE SIDES 120 DEG, CLAMP AND MACHINE 2/3 OF STARTING MATERIAL.						
SOLUTION - FORGE TO NEAR SHAPE, SOLUTION HEAT TREAT COIN ROUGH TURN AGE ASSEMBLY, FINISH MACHINE.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT	-- FORMING (CONTINUED)						
(4187)	TITLE - FORMING ROOM OF HEAT AMMO BY UPSET FORGING (XM830)		325	290			
	PROBLEM - HUB ON ONE END IS CONSIDERABLY LARGER THAN REMAINING PORTION. REQUIRES MACHINING FROM BAR STOCK AT CONSIDERABLE MATERIAL LOSS.						
	SOLUTION - FORM HUB END BY UPSET FORGING AND FINISH MACHINING.						
(4188)	TITLE - FORMING TAIL FIN FOR APFSDS PROJECTILE (M735/M774)		200	175			
	PROBLEM - CURRENT METHOD IS TO COMPLETELY MACHINE CONTINUOUS EXTRUSIONS OF THE FIN GEOMETRY TO THE FINAL CONFIGURATION. 66 PERCENT MATERIAL SCRAP IS GENERATED.						
	SOLUTION - PRECISION FORGING METHOD WILL BE DEVELOPED TO FORM TO NET SHAPE FOLLOWED BY THREAD TAPPING AND SHAVING OF FIN EDGES.						
(6716)	TITLE - DEV COMP-AID MODEL OF FORMING OPERATIONS FOR ARTILLERY MPTS	851	357	367	350	400	400
	PROBLEM - TRIAL AND ERROR METHODS AND THE ABSENCE OF PROVEN AUTOMATED DESIGN TECHNIQUES FOR TOOLING CAUSE UNEXPECTED FAILURES IN FORMING OPERATIONS AND DELAYS IN STARTUP OF AMMUNITION PRODUCTION LINES.						
	SOLUTION - DEVELOP ANALYTICAL MODELS AND AUTOMATED TOOL DESIGN METHODS OF CRITICAL METAL FORMING OPERATIONS. TOOL DESIGNS THUS GENERATED WILL BE TESTED IN A PRODUCTION SETTING TO VERIFY THE COMPUTER MODELS. PROVEN MODELS ARE APPLICABLE TO CURRENT AND FUTURE ITE						
COMPONENT	-- MACHINING						
(P003)	TITLE - HIGH SPEED MACHINING OF ADVANCED SHAPED CHARGE LINERS			175	225	325	300
	PROBLEM - NEW SPECIAL ARMOR CONFIGURATIONS HAVE BEEN DEVELOPED THAT ARE EFFECTIVE IN DEFEATING CURRENT COPPER TYPE SHAPED CHARGES. ADVANCED SHAPED CHARGES UTILIZING NEW METALS ARE NOT ECONOMICALLY MACHINEABLE USING STANDARD SPEED AND FEEDS.						
	SOLUTION - HIGH SPEED MACHINING WILL BE INVESTIGATED IN THIN WALLED CONICAL CONF TO PRECISE TOLERANCE LEVELS. EFFORT WILL NOT INVOLVE OR DUPLICATE AL MACH STUDY PROJ5794093 OR STEEL PROJ5796738. SPECIFIC ALLOY CANDIDATES UNDER CONSIDERATION ARE CLASSIFIED.						
(4093)	TITLE - HIGH SPEED MACHINING OF ALUMINUM TO IMPROVE PRODUCTIVITY			200	395	463	511
	PROBLEM - CONVENTIONAL MACHINING METHODS ARE SLOW COMPARED TO THE POTENTIAL METAL REMOVAL OBTAINABLE BY HIGH SPEED MACHINING.						
	SOLUTION - INVESTIGATE THE MACHINING OF ALUMINUM BY INCREASING THE CUTTING VELOCITY OVER THE CONVENTIONAL PLASTIC DEFORMED-TYPE MACHINE CHIP TO A BRITTLE FRACTURE TYPE MACHINE CHIP.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT	-- MACHINING (CONTINUED)						
(6736)	TITLE - TECH READINESS ACCEL THRU COMPUTE INTEGRATED MFG (TRACIM)	396	267	267	282	290	300
	PROBLEM - LEAD TIME TO BRING MUNITION PRODUCTION LINES TO MOBILIZATION LEVELS IS EXCESSIVE, NON-AVAILABILITY OF TECHNICAL SKILLS (TOOL MAKERS AND MACHINISTS) AND UP-TO-DATE ON ITEM DESCRIPTION, MANUFACTURING PROCESS, TOOL DESIGNS, GAGES, FIXTURES, AND FACILITI	O					
	SOLUTION - IMPLEMENTATION OF A COMPUTER INTEGRATED MFG (CIM) SYSTEM USING INTERACTIVE GRAPHICS AND NUMERICAL CONTROL MACHINE TOOLS WILL REDUCE REQUIREMENTS AND TIME TO MAKE TOOLS. THE DESIGNS AND OPERATION PROCEDURES WOULD BE UP DATED AND STORED BY A COMPUTER.						
COMPONENT	-- MORTAR						
(14XX)	TITLE - PROC TECH PDN COMP 81 MM IMPRV SMOKE MUN			275			
	PROBLEM - METAL PARTS AND COMPONENTS MUST BE INVESTIGATED FOR EASE OF MANUFACTURE, REDUCED COSTS AND RELIABILITY.						
	SOLUTION - CONDUCT PRODUCTION PROCESS STUDIES FOR COMPONENTS OF 81 MM IMPROVED SMOKE MUNITION.						
(14XZ)	TITLE - MFG IMPROVED SMOKE MUN COMPONENTS 105 MM 60 MM			300			
	PROBLEM - METAL PARTS AND COMPONENTS MUST BE INVESTIGATED FOR EASE OF MANUFACTURE, REDUCED COSTS AND RELIABILITY.						
	SOLUTION - INVESTIGATE METHODS OF FABRICATING INTERNAL COMPONENTS FOR MASS PRODUCIBILITY.						
COMPONENT	-- PROJECTILES						
(L139)	TITLE - COLD SHEARING OF ALUMINUM SLUGS FOR FORGING			200	327	511	473
	PROBLEM - CURRENTLY ALUMINUM BILLETS ARE SAWED TO PROVIDE SLUGS FOR FORGING. THE KERF LOSS IS APPROXIMATELY 0.243 POUNDS PER SLUG.						
	SOLUTION - ADVANCES IN THE STATE-OF-THE-ART OF COLD SHEARING AND POTENTIAL COST SAVINGS WARRANTS INVESTIGATION OF COLD SHEARING ALUMINUM SLUGS FOR FORGING.						
(P006)	TITLE - VIBRATORY STRESS RELIEF OF MUNITION METAL PARTS				500	750	820
	PROBLEM - THE COST OF STRESS RELIEF WILL INCREASE AS THE COST OF ENERGY INCREASES.						
	SOLUTION - VIBRATORY STRESS RELIEF WOULD REDUCE THE REQUIREMENTS FOR ENERGY. THIS PROCESS MAY ALSO LEAD TO A MORE ECONOMIC PROCESSING SEQUENCE.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- PROJECTILES (CONTINUED)							
(4189)	TITLE - HIGH FRAGMENTATION STEEL PRODUCTION PROCESS		1490	1060	825	790	750
	PROBLEM - NEED FOR INVESTIGATION OF HIGH FRAGMENTATION STEEL PRODUCTION PROCESSES.						
	SOLUTION - PROCESS WILL REDUCE UNIT COST ALSO WILL OPTIMIZE TOOLING DESIGNS AND MACHINING TECHNIQUES.						
(4192)	TITLE - MULTI-PURPOSE PRODUCTION LINE				400	475	390
	PROBLEM - THE REQUIREMENTS FOR PROJECTILE MPTS PART CHANGE FREQUENTLY. CURRENTLY THERE IS NO PRODUCTION BASE CAPABLE OF RESPONDING TO RAPIDLY CHANGING PRODUCTION REQUIREMENTS.						
	SOLUTION - THIS PROJECT WILL DETERMINE THE METHODS AND COST OF A METALS PARTS FACILITY WHICH IS BOTH RESPONSIVE TO CHANGES IN DEMAND OF METAL PARTS AND COST EFFECTIVE TO OPERATE.						
(6682)	TITLE - SIMULATION OF AMMUNITION PRODUCTION LINES	170	413		450	400	450
	PROBLEM - METHODS ARE NEEDED FOR DESIGNING PRODUCTION LINES OPERATING IN A REAL ENVIRONMENT AND SUBJECT TO THE UNCERTAINTIES ASSOCIATED WITH MACHINE BREAKDOWNS AND SCHEDULED MAINTENANCE.						
	SOLUTION - MODEL LINES DEVELOPED BY KAISER ENGINEERS WILL BE SIMULATED TAKING INTO ACCOUNT STATISTICAL DISTRIBUTION OF MACHINE FAILURE, DEFECTIVE PARTS, BUFFER EFFECTS, SCHEDULED MAINTENANCE, OPERATING EXPERIENCE AND OTHER PERTINENT VARIABLES.						
(6738)	TITLE - ULTRA-HIGH SPEED METAL REMOVAL, ARTILLERY SHELL	181	350	290			
	PROBLEM - DUE TO THE LOW METAL REMOVAL RATES OF THE CURRENT CONVENTIONAL MACHINING OPERATIONS, A GREATER NUMBER OF MACHINES ARE REQUIRED TO PRODUCE ARTILLERY PROJECTILES.						
	SOLUTION - TO ACHIEVE INCREASED METAL REMOVAL RATES ALSO TO REDUCE THE NUMBER OF MACHINES CURRENTLY USED TO PRODUCE PROJECTILES.						
(6742)	TITLE - EVALUATION OF BORON STEELS FOR MUNITIONS APPLICATIONS				500	540	500
	PROBLEM - USE OF 4140 SERIES, GRADE ALLOY STEEL IS USED TO ACHIEVE THE MECHANICAL PROPERTY REQUIREMENTS. CHROMIUM ALLOY IS USED IN THIS GRADE OF STEEL WHICH MAY BECOME A SHORT SUPPLY AT TIME OF NATIONAL EMERGENCY.						
	SOLUTION - BORON STEELS 15B41H OR 15B48H GRADES INDICATE THAT THEY ARE CAPABLE OF BEING HEAT TREATED TO MECHANICAL PROPERTIES COMPARABLE TO 4140 GRADE STEEL.						

		FUNDING ($000)				
		PRIOR	80	81	82	83	84
COMPONENT -- PROJECTILES (CONTINUED)							
(6781)	TITLE - SOFT IRON TUBING FOR ROTATING BAND			400	500	485	500
	PROBLEM - COPPER, A HIGH COST AND POTENTIALLY CRITICAL MATERIAL, IS THE PRIMARY ELEMENT USED IN BANDING VIRTUALLY ALL 105MM,155MM,AND 8 INCH PROJECTILES. RECENT TESTS HAVE INDICATED "SOFT IRON" BANDS ARE A VIABLE ALTERNATIVE.						
	SOLUTION - METALLURGICAL AND BALLISTIC TESTS OF SOFT IRON ROTATING BANDS. DEVELOP A PRODUCTION PROCESS FOR SOFT IRON TUBING. ENROUTE THE VIABILITY OF INERTIA WELDING BANDS OF SOFT IRON TUBING TO ICM AND HE PROJECTILES WILL BE EVALUATED.						
COMPONENT -- ROCKETS							
(14XN)	TITLE - MFG TECH COMP FOR WARHEAD BINARY GSRS				200	125	
	PROBLEM - MATERIALS FASTENING DEVICES SEALS AND WELDING REQUIREMENTS WERE DEVELOPMENT EXPEDIENTS.						
	SOLUTION - INVESTIGATE THESE AREAS TO REDUCE COSTS LEAD TIMES AND IMPROVE RELIABILITY.						
COMPONENT -- TOOLING							
(14XL)	TITLE - MFG TECH COMP FOR PROJ 155 MM BINARY IVA			290	100		
	PROBLEM - METHODS OF EXPULSION CUP ATTACHMENT CANISTER FABRICATION AND MATERIALS OF CONSTRUCTION FOR OGIVE AND BASE ADAPTER RING REQUIRE IMPROVEMENT.						
	SOLUTION - INERTIA WELDING FOR CUP ATTACHMENT FURGED CANISTERS IN LIEU OF FABRICATION AND CHEAPER MORE READILY AVAILABLE MATERIALS WILL BE INVESTIGATED.						
(14XR)	TITLE - MFG TECH COMP FOR PROJECTILE 155 MM INCAP				250	125	
	PROBLEM - THE PROPOSED DESIGN IS COSTLY TO PRODUCE AND FIRING SAFETY SHOULD BE IMPROVED.						
	SOLUTION - MANUFACTURING METHODS WILL BE INVESTIGATED TO SIMPLIFY FABRICATION AND REDUCE COST.						
(14XT)	TITLE - MFG TECH COMP FOR DEEP TARGET INCAP MUN				250	125	
	PROBLEM - PRODUCIBILITY PROBLEMS UNCOVERED BY PEP EFFORT.						
	SOLUTION - INVESTIGATE HARDWARE CRITICAL COMPONENTS AND OPERATIONS.						
(4164)	TITLE - VIBRAT ANALYSIS FOR PRED TOOL FAILURES		80	95			
	PROBLEM - TOOL FAILURES WITHOUT WARNING.						
	SOLUTION - DET VIB SIGNATURES TO FORECAST TOOL FAILURES.						

CATEGORY	FUNDING ($000) PRIOR	80	81	82	83	84
POLLUTION ABATEMENT						
COMPONENT -- ACID						
(4007) TITLE - EVALUATION OF ACETIC ANHYDRIDE RECYCLE	316	93				
PROBLEM - IN THE ACETIC ANHYDRIDE MFG PROCESS AT HOLSTON AAP A MAJOR SOURCE OF AIR AND WATER POLLUTION IS THE BAROMETRIC CONDENSORS AND STEAM EJECTORS IN THE "E" SCRUBBER EFFLUENT LINE. THE PROCESS ALSO USES LARGE QUANTITIES OF STEAM AND COOLING WATER.						
SOLUTION - REPLACE THE WATER SCRUBBER, STEAM JET EJECTOR, BAROMETRIC SEAL, AND DRAIN SUMP WITH A LIQUID SEAL VACUUM PUMP USING SURFACE HEAT EXCHANGERS FOR COOLING. IT IS NECESSARY TO EVALUATE A FULL-SCALE PROTOTYPE UNIT AT HAAP BEFORE COMPLETE IMPLEMENTATION.						
COMPONENT -- CHEMICAL						
(14XS) TITLE - ESTAB PDN TECH FOR PROJECTILE 155 MM INCAP				200	120	
PROBLEM - MANUFACTURING AND FILLING PROCESSES AND WASTE DISPOSAL/POLLUTION ABATEMENT NEED TO BE INVESTIGATED FOR REDUCED COST AND QUANTITY PRODUCTION.						
SOLUTION - STUDY PROCESSES INCLUDING WASTE TREATMENT AND POLLUTION ABATEMENT TECHNOLOGY.						
(4298) TITLE - EVALUATION OF HEXAMINE RECYCLE OF HOLSTON AAP		450	382			
PROBLEM - HAAP'S AMMONIA COLUMN (B-LINE) EFFLUENT CONTAINS HEXAMINE WHICH IS NOT READILY BIODEGRADABLE NOR CHEMICAL DECOMPOSABLE. HEXAMINE IS ALSO CARCINOBENIC USE OF WET OXIDATION IN HAAP'S NEW LWTF WOULD BE QUITE EXPENSIVE TO BUILD AND OPERATE.						
SOLUTION - RECYCLE OF THE AMMONIA COLUMN EFFLUENT WOULD CONCENTRATE THE DILUTE HEXAMINE UP TO 30 PERCENT AT WHICH POINT IT CAN BE EITHER REVISED OR INCINERATED.						
COMPONENT -- EXPLOSIVES						
(4033) TITLE - CAUSTIC RECOVERY FROM SODIUM NITRATE SLUDGE		151	140	125		
PROBLEM - SODIUM NITRATE SLUDGE IS A BY-PRODUCT IN THE PRODUCTION OF RDX/HMX. UNDER PRESENT CONDITIONS SODIUM NITRATE COST $97/TON AND IS SOLD FOR $17/TON. REMAINING SODIUM NITRATE IS TRANSFERRED TO LAGOONS FOR SOLAR EVAPORATION WHICH CAUSES A POTENTIAL POLLUT						
SOLUTION - THERMAL CONVERSION OF ALL THE SODIUM NITRATE SLUDGE TO AN OXIDE UPON WHICH HYDROLYSIS FORMS THE HYDROXIDE THAT CAN BE REUSED TO CAUSTICIZE EXCESS NITRIC ACID WILL RESULT IN AN OVERALL SAVINGS OF $63/TON AND ELIMINATE A POTENTIAL POLLUTION PROBLEM.						
(4225) TITLE - RED WATER POLLUTION ABATEMENT SYSTEM		500	300	400		
PROBLEM - TOXIC EFFLUENT FROM TNT MFG PURIFICATION PROCESS. APPLICATION AND TECHNICAL SUPPORT TO OTHER EXPLOSIVE MFG PLANTS.						
SOLUTION - ADAPT SUNOCO SULFITE RECOVERY PROCESS.						

MMT FIVE YEAR PLAN
RCS DRCMT 126

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- GENERAL						
(1354) TITLE - SLUDGE VOLUME REDUCTION [illegible] DISPOSAL PROCESS STUDY	122	253				
PROBLEM - SLUDGE BUILDUP NEEDS TO BE DISPOSED.						
SOLUTION - IMPROVED TREATMENT METHODS AND SLUDGE COLLECTION.						
(1355) TITLE - MANUFACTURING PLANTS TOXIC EFFLUENT/EMISSION PRETREATMENT	104	196				
PROBLEM - TOXIC SUBSTANCES IN EFFLUENT NEED PRETREATMENT. DIRECT SUPPORT OF MCA PROTECT.						
SOLUTION - CHARACTERIZATION AND ESTABLISH DESIGN PARAMETERS FOR TREATMENT SEDIMENTATION, OXIDATION, EXTRACTION, ABSORPTION.						
(4084) TITLE - OPACITY/MASS EMISSION CORRELATION	121	110				
PROBLEM - SMOKE EMISSION MONITORING REQUIRED BY EPA. EQUIPMENT AND INSTRUMENTS ARE COSTLY AND NOT TESTED OR OPTIMIZED.						
SOLUTION - USE OF INEXPENSIVE OPACITY MONITOR TO MEASURE MASS AND OPACITY.						
(4226) TITLE - ON-LINE MONITORS FOR WATER POLLUTANTS		400	350	400	300	300
PROBLEM - INADEQUATE ON-LINE MONITORS. ALL POLLUTANTS MUST BE MONITORED BY REGULATION. INVESTIGATE COST-EFFECTIVE MONITORING TECHNIQUES.						
SOLUTION - CONTINUATION OF R AND D EFFORT INTO ACTUAL APPLICATION AT PLANTS.						
(4227) TITLE - DISPOSAL OF WASTE WATER TREATMENT SLUDGE			342	360	300	300
PROBLEM - CURRENT TREATMENTS YIELD SLUDGES CONTAINING EXPLOSIVES, METALS, ETC. INVESTIGATE OTHER SLUDGES AS PRODUCTS OF POLLUTION ABATEMENT TASKS.						
SOLUTION - PHYSICAL/CHEMICAL TREATMENTS, RECOVERY BY CALCINATION AND THERMAL DESTRUCTION, RECLAMATION AND REUSE, CHEMFIXATION.						
(4229) TITLE - ADVANCED PINK WATER TREATMENT			233	278		
PROBLEM - MORE STRINGENT STANDARDS DUE TO CARCINOGENIC NATURE OF POLLUTANTS, HIGH COSTS OF CURRENT TECHNOLOGY.						
SOLUTION - DESTRUCTIVE TECHNOLOGIES BY OXIDATION AND UV-OZONOLYSIS, FIXATION BY SURFACTANT OR EXTRACTION BY WHITE OIL, MICROFILTRATION.						
(4231) TITLE - IN-PLANT REUSE OF POLLUTION ABATED WATERS			352	429	500	500
PROBLEM - MORE STRINGENT STANDARDS FOR MILITARY UNIQUE POLLUTANTS, 1985 GOAL OF ZERO DISCHARGE, EXPENSE OF TREATING POLLUTION, CONTINUE THIS REUSE OF TREATED WATER IN OTHER PROCESSES.						
SOLUTION - RECYCLE AND REUSE OF DISCHARGES FROM TREATMENT PLANTS.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- GENERAL (CONTINUED)						
(4232) TITLE = RECYCLE OF METALLIC ILLUMINANTS			120	170		
PROBLEM = HIGH COSTS OF DISPOSAL OF ILLUMINANT WASTES AND CRITICAL SUPPLY OF MAGNESIUM.						
SOLUTION = EXTRACTION PROCESS FOR RECOVERING MG AND SODIUM NITRATES.						
(4260) TITLE = TREATMENT OF ELECTROCHEMICAL MACHINING WASTE			140			
PROBLEM = SLUDGE CONTAINING FERRIC OXIDE CHROM SODIUM NITRATE.						
SOLUTION = CONCENTRATE CHEMICAL TREAT AND LANDFILL.						
COMPONENT -- LAP						
(1363) TITLE = ADV TECH FOR PRODUCTION OF M8, M14 AND M7A3 GRENADES			238	259		
PROBLEM = THE CURRENT M8(HC) SMOKE GRENADE PRODUCTION FACILITY AT PBA IS IN VIOLATION OF EPA AND OSHA STANDARDS.						
SOLUTION = THIS PROJECT WILL DEVELOP THE TECHNOLOGY TO COMPLY WITH BOTH LAWS. THIS PROJECT INVOLVES TWO YEARS EFFORT.						
(4296) TITLE = MOD OF HC CANISTER FILL AND PRESS LINE				589		
PROBLEM = THE EXISTING 105MM AND 155MM HC CANISTER FILL AND PRESS FACILITY IS MARGINALLY EFFECTIVE IN MEETING OSHA AND ENVIRONMENTAL STANDARDS.						
SOLUTION = THIS PROJECT WILL DEVELOP A FACILITY THAT WILL QUALIFY UNDER ALL OSHA AND ENVIRONMENTAL CRITERIA.						
COMPONENT -- RECYCLE						
(P024) TITLE = RESOURCE RECOVERY OF SOLID WASTE AT PBA						350
PROBLEM = WASTE GENERATED IS INCENIRATED, NO REUSE OF CHEMICALS AND COMPONENTS.						
SOLUTION = STUDY METHODS TO RECOVER SOLID WASTE, PROVIDE PILOT METHODS.						
(4235) TITLE = SNR UNIT WATER POLLUTION ABATEMENT			201	178	500	500
PROBLEM = HIGH COSTS OF TREATING EFFLUENTS FROM SODIUM NITRATE RECOVERY, LOSS OF ENERGY AND WATER, CONTINUE THIS WATER MANAGEMENT STUDIES FOR OTHER PLANTS.						
SOLUTION = COMPLETE WATER RECYCLE STUDIES TO ATTAIN ZERO DISCHARGE FOR SNR.						

CATEGORY

PROPELLANTS

		FUNDING ($000)				
	PRIOR	80	81	82	83	84

COMPONENT -- BALL

(4775) TITLE - SYNTHETIC COLLOIDS FOR BALL PROPELLANT — 300

PROBLEM - COLLOID, A NATURAL PRODUCT OF AN ANIMAL RENDERING, USED IN BALL PROPELLANT MFG AS A SURFACE PROTECTIVE AGENT VARIES IN EFFECTIVENESS FROM BATCH TO BATCH AND IS SUPPLIED BY ONLY ONE SOURCE WHO AT TIMES HAS BEEN UNABLE TO SUPPLY EFFECTIVE COLLOID.

SOLUTION - DETERMINE IF ONE OR MORE OF CURRENTLY AVAILABLE SYNTHETIC COLLOIDS CAN BE USED IN THE MANUFACTURE OF BALL PROPELLANT.

COMPONENT -- GENERAL

(4027) TITLE - COMBINED SOLVENT RECOVERY DRYING OF PROPELLANTS — 304 — 270

PROBLEM - CONVENTIONAL METHOD FOR BATCH DRYING USES SEPERATE SOLVENT RECOVERY, WATER DRY AND AIR DRY, USES MUCH TIME AND LABOR TO LOAD AND UNLOAD THE SINGLE BASE PROPELLANT.

SOLUTION - AN EXISTING RECOVERY TANK WILL BE MODIFIED FOR THE COMBINED SOLVENT RECOVERY, WATER DRYING AND AIR DRYING OPERATIONS.

(4210) TITLE - DRY CUTTING OF ENERGETIC MATERIALS — 491 —

PROBLEM - UNDULY HIGH COST OF CUTTING BENITE PROPELLANT USING MILLING MACHINE WITH TWO CIRCULAR SAWS SPACED ON COMMON ARBOR.

SOLUTION - PROCUREMENT INSTALLATION OF FLUID JET CUTTER PROTOTYPE EQUIPMENT WHICH WILL SIGNIFICANTLY REDUCE COST AND IMPROVE SAFETY OF OPERATION.

(4274) TITLE - RECOV AND REGEN MFG SOLVENTS BY REMOTE CONTROL — 250

PROBLEM - THERE IS NO WAY OF KNOWING WHEN CHARCOAL REQUIRES REACTIVATION HENCE IT REQUIRES DOING SOLELY ON A PERIODIC BASIS THUS US IG GREATER ENERGY THAN REQUIRED.

SOLUTION - USE SOLVENT DETECTION INSTRUMENTATION TO DETERMINE WHEN THE ACTIVATED CHARCOAL IS SATURATED ON THE ABSORPTION CYCLE AND WHEN IT IS FREE OF SOLVENT ON THE REGENERATION CYCLE.

(4289) TITLE - MATHEMATICAL MODELING FOR HAZARDS CLASSIFICATION — 210 — 200 — 200

PROBLEM - TESTING IN-PROCESS MATERIALS FOR THE NUMEROUS PROCESS OPERATIONS USED IN THE VARIOUS STAGES CAN BE TIME CONSUMING AND COSTLY.

SOLUTION - COORDINATE FRAGMENTED DATA OF FRAGMENTED DATA OF ENERGETIC MATERIALS DERIVED BY MANY INVESTIGATIONS INTO A COMPREHENSIVE MODEL THAT INCLUDES BOTH SENSITIVITY AND EFFECTS CHARACTERISTICS.

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT	-- GENERAL (CONTINUED)						
(4309)	TITLE - PROPELLANT PROCESS DEVELOPMENT FOR 120MM TANK AMMUNITION	531	1340				
	PROBLEM - THE ARMY HAS SELECTED THE GERMAN 120MM GUN FOR THE XM-1 TANK. THE PROPELLANT UTILIZED IS A GERMAN FORMULATION NOT MANUFACTURED IN THE US.						
	SOLUTION - TRANSPOSE GERMAN INFORMATION INTO US MASS PRODUCTION FACILITIES AND PRACTICE INCLUDING EQUIPMENT DESIGN AND MODIFICATION, HAZARDS ANALYSIS, POLLUTION ABATEMENT, PROCESS EVALUATION, AND PRODUCT QUALIFICATION.						
COMPON	-- MULTI BASE						
(4250)	TITLE - NO ROLL SOLVENT PROCESS FOR ARTILLERY PROPELLANT			350	500	1200	700
	PROBLEM - PRESENT MANUFACTURING PROCESSES FOR MULTI-BASE PROPELLANTS ARE COSTLY TO BUILD AND ARE EITHER LABOR INTENSIVE OR DEPENDENT UPON COMPLEX CONTROL SYSTEM TO OPERATE.						
	SOLUTION - DEVELOP THE NO ROLL PROCESS FOR USE AT ARMY OWED SITES, THROUGH ITS SIMPLICITY OF DESIGN IT SHOULD BE LESS COSTLY TO FACILITATE AND STARTUP FROM LAYAWAY.						
COMPONENT	-- NITROCELLULOSE						
(4341)	TITLE - IMPROVED NITROCELLULOSE PURIFICATION	1436	894				
	PROBLEM - THE BATCH PROCESS REQUIRES LENGTHY BOILING AND POACHING CYCLES AND UTILIZES LARGE QUANTITIES OF STEAM, WATER, AND ELECTRICITY.						
	SOLUTION - APPLY THE CONICELL PROCESS TO THE PURIFICATION OF NITROCELLULOSE.						
COMPONENT	-- NITROGUANIDINE						
(4059)	TITLE - OPTIMIZATION OF NITROGUANIDINE IN M30 PROPELLANT		901	519			
	PROBLEM - QUALIFY SAAP NQ IN CAMBL PROCESS.						
	SOLUTION - USE SAAP NQ TO MAKE PROPELLANT ON CAMBL PILOT LINE.						
(4061)	TITLE - NITROGUANIDINE PROCESS OPTIMIZATION		467	590	990	864	
	PROBLEM - SUNFLOWER NQ PLANT IS FIRST SUCH FACILITY WITHIN US, IT CONTAINS MANY RECIRCULATION LOOPS NOT INCLUDED IN PRIOR INDEPENDENT EXPERIMENTAL FACILITIES WHICH ARE STRONGLY INTERDEPENDENT AND REQUIRE OPTIMIZATION.						
	SOLUTION - CONDUCT PROCESS IMPROVEMENT STUDIES USING NITROGUANIDINE SUPPORT EQUIPMENT INSTALLED UNDER PROJECT 5752632 AND APPLY EVOLUTIONARY OPERATION TO THE NQ FACILITY BEING CONSTRUCTED AT SUNFLOWER.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- SINGLE BASE						
(4474) TITLE - DEHUMIDIFIED AIR FOR DRYING SINGLE BASE PROPELLANT	350	200				
PROBLEM - HUMID AIR REQUIRES MORE ENERGY TO DRY SINGLE BASE PROPELLANT.						
SOLUTION - USE DEHUMIDIFIED AIR-SAVE ENERGY.						
COMPONENT -- SOLVENTLESS						
(P026) TITLE - DEV OF A CONTINUOUS PROCESS TO MANUF 120MM PROPELLANT			300			
PROBLEM - BATCH GERMAN TECH WILL BE ADAPTED TO BATCH US PRODUCTION TECHNOLOGY, HOWEVER, THE CONTINUOUS PROCESS AT SAAP DIFFERS AND REQUIRES SPECIAL CONSIDERATION FOR THE PRODUCTION OF SOLVENTLESS PROPELLANT. HIGH VOLUME PRODUCTION IS REQUIRED AT MOB LEVELS.						
SOLUTION - DEM THE MFG OF GERMAN PROPELLANT ON THE EXISTING PORTION OF THE CONTINUOUS FACILITY AT SAAP. CARPET ROLL WILL BE PRODUCED. OPERATIONAL REQUIREMENTS AND PROBLEM AREAS WILL BE IDENTIFIED, CHANGES MADE AS REQUIRED AND PROC DESIGN CRITERIA ESTABLISHED.						
(4414) TITLE - AUTOMATIC PROCESS CONTROL OF SOLVENTLESS PASTE COMPOSITION		205				
PROBLEM - RAPID ON-LINE CHEMICAL ANALYSIS OF THE CONSTITUENTS OF SOLVENTLESS PROPELLANTS IS REQUIRED TO OPERATE THE CONTINUOUS PROCESS AT SAAP. PROPELLANTS OTHER THEN N5 SUCH AS XM37, JA2 AND DIGL-RP WILL BE MFG AND ADEQUATE QUALITY CONTROL IS REQUIRED.						
SOLUTION - EQUIPMENT HAS BEEN PURCHASED UNDER A FACILITY PROJECT ($73238) FOR ANALYSIS OF N5 PROPELLANT. THIS EQUIPMENT WILL BE LOANED TO RAAP WHERE TECHNIQUES AND EQUIPMENT MODIFICATIONS WILL BE DEVELOPED FOR THE NEW PROPELLANT CONSTITUENTS.						

CATEGORY

QUALITY CONTROL/TESTING

COMPONENT -- INSPECTION						
(4131) TITLE - SHELL HOLOGRAPHIC INSPECTION AND EXAMINATION LINE DEVICE		550	544	163	275	325
PROBLEM - METAL PART ARTILLERY PROJECTILE DEFECTS COULD BE DETECTED BY STD NDT WITH GREAT DIFFICULTY AND EXPENSE.						
SOLUTION - DOUBLE EXPOSURE HOLOGRAPHIC INSPECTION SYSTEM WILL PROVIDE RELIABLE AND COST EFFECTIVE INSPECTION TECHNIQUE.						

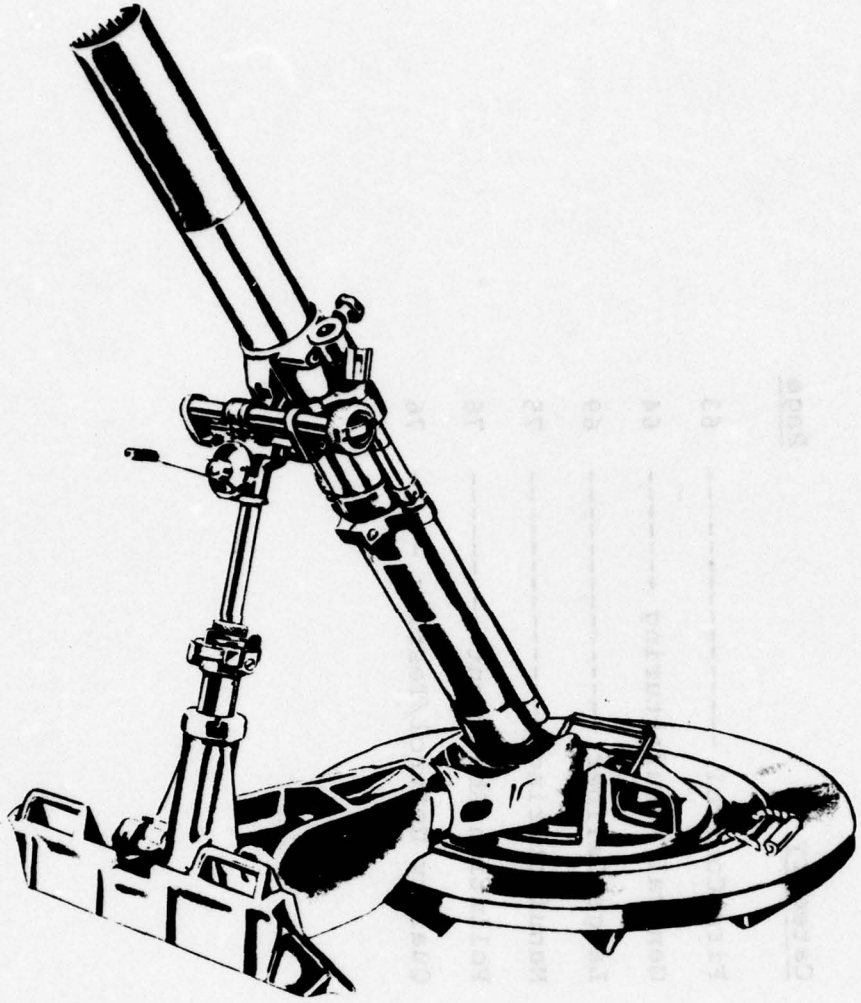
		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- INSPECTION (CONTINUED)							
(4175)	TITLE - PROCESS CONTROL IMPR FOR SM CAL AMMO			120	240	570	482
	PROBLEM - PROD RATES EXCEED INSPECTION RATES.						
	SOLUTION - DEV NEW HARDNESS AND XRAY DEVICES FOR 100 PERCENT CASES AND CARTRIDGE INSP.						
(4276)	TITLE - PRODUCTION OPTICAL INSP SYSTEM 155MM KNURL		152				
	PROBLEM - INADEQUATE KNURL BETWEEN THE ROCKET MOTOR BODY AND WARHEAD BASE CAUSES FLIGHT FAILURE.						
	SOLUTION - PRODUCTION OPTICAL INSP SYSTEM WILL PROVIDE FAIL-SAFE TECHNIQUES AND AUTOMATIC SEGREGATION OF REJECTED PARTS THIS SYSTEM PREVENTS RELATIVE MOTION BETWEEN THE TWO COMPONENTS DURING FIRING.						
(4294)	TITLE - AUTOMATIC X-RAY INSPECTION OF MUNITIONS			534	100	400	395
	PROBLEM - THE MOD PROGRAM INCLUDES HIGH RATES OF X-RAY INSPECTION OF MORTAR AMMUNITION TO DETECT EXPLOS CAST DEFECTS. SAMPLING INSPECTION IS ACCOMPLISHED WITH COSTLY PERSONNEL AND FILM REQUIREMENTS PLUS IS CONTINGENT UPON HUMAN X-RAY INTREPRETATION.						
	SOLUTION - AN AUTOMATED X-RAY IMAGE INTERPRETATION OF EXPLOSIVE CASTS IN 81MM AND 4.2 INCH MORTAR SHELL WITHOUT THE USE OF FILM.						
(4315)	TITLE - RADIOGRAPHIC INSPECTION OF LAA1 GRENADE			340			
	PROBLEM - NO VERIFICATION OF MISSING COMPONENTS.						
	SOLUTION - 100 PERCENT INSPECTION OF ASSEMBLED GRENADE.						
(4454)	TITLE - AUTOMATIC INSPECTION DEVICE EXPLOSIVE CAST IN SHELL	1666	1283	350	200	327	400
	PROBLEM - CURRENTLY CONVENTIONAL FILM RADIOGRAPHY CHARACTERIZED BY HIGH COST OF FILM AND HIGH PERSONNEL COSTS IS USED FOR DETECTION OF DEFECTS IN EXPLOS CASTS. THIS IS NOT ONLY COSTLY BUT INVOLVES THE QUESTIONABLE RELIABILITY OF HUMAN INTERPRETATION.						
	SOLUTION - A FILMLESS REAL TIME AUTOMATED SYSTEM WILL BE DEVELOPED FOR EXPLOSIVE CAST IN THE 155MM, XM795, 8 IN, XM650 AND OTHER HE ROUNDS.						

CATEGORY
SAFETY

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT	-- BROAD APPLICATIONS						
(4291)	TITLE - BLAST EFFECTS IN THE MUNITIONS PLANT ENVIRONMENT	1650	400	200	200	325	350
	PROBLEM - MOST OF THE DESIGN EFFORT IS IN THE AREA OF LACE REINFORCED STRUCTURES FOR CLOSED IN AREAS TO AN EXPLOSION. WE MUST ATTEMPT TO UTILIZE COM CONSTRUCTION MATERIAL.						
	SOLUTION - TO STUDY CHARACTERISTICS OF THE BLAST ENVIRONMENT AND DETERMINE THE RESPONSE OF THE VARIOUS STRUCTURAL MATERIALS AND ELEMENTS SUBJECTED TO THESE LOADING.						
(4492)	TITLE - WATER DELUGE SYSTEM APPLICATION IN MUNITION PLANTS	300	270				
	PROBLEM - PRESENTLY INFORMATION IS NOT AVAILABLE ON HOW TO EXTINGUISH FIRES OF VARIOUS PROPELLANTS AND EXPLOSIVES PRIOR TO A TRANSITION TO DETONATION.						
	SOLUTION - A WATER DELUGE SYSTEM WILL BE DEVELOPED TO EXTINGUISH COMP A5, CYCLOTOL M30, M26E1 AND M10 FIRE BEFORE A TRANSITION TO DETONATION CAN OCCUR.						
COMPONENT	-- ENGINEERING						
(4493)	TITLE - DESIGN PARAMETERS FOR LARGE SCALE PROCESS VESSELS	410	410				
	PROBLEM - INFORMATION IS REQUIRED TO DEVELOP HOPPERS FOR ENERGETIC MATERIAL SO THAT IF FIRE OCCURS DETONATIONS CAN BE PREVENTED.						
	SOLUTION - PRESSURE RISES FOR DIFFERENT VENT RATIOS WILL BE OBTAINED. FROM THIS A DESIGN WILL BE DEVELOPED AND FULL SCALE TESTS CONDUCTED FROM THE DATA. THE VENT RATIO WILL BE DETERMINED FOR ANY SIZE VESSELS.						
COMPONENT	-- LAP						
(P038)	TITLE - ULTRASONIC SEAL PROCESS FOR M55 DETONATORS			300	350	350	325
	PROBLEM - FIBERS ARE STICKING TO THE LACQUER SEALS ON M55 DETONATORS CAUSING BLOWS AT USER INSTALLATIONS.						
	SOLUTION - DEVELOP AN HERMETIC SEAL PROCESS BY THE USE OF ULTRASONIC WELDING.						
COMPONENT	-- PROPELLANTS/EXPLOSIVES						
(1902)	TITLE - MFG METHODS OF GEL FUEL FOR FAE BOMBS BLU-95/B AND BLU-96/B		263	371			
	PROBLEM - PROPYLENE OXIDE IS VOLATILE AND FLAMMABLE. IT IS DESIRABLE TO MINIMIZE FIRE HAZARD IN THE EVENT OF FUEL SPILLAGE.						
	SOLUTION - TO REDUCE THE FLOW PROPERTIES OF PROPYLENE OXIDE BY DEVELOPING A METHOD OF MIXING AND LOADING OF GELLED FUEL. THE END PRODUCT OF PROPYLENE OXIDE MIXED WITH A GELLING AGENT.						

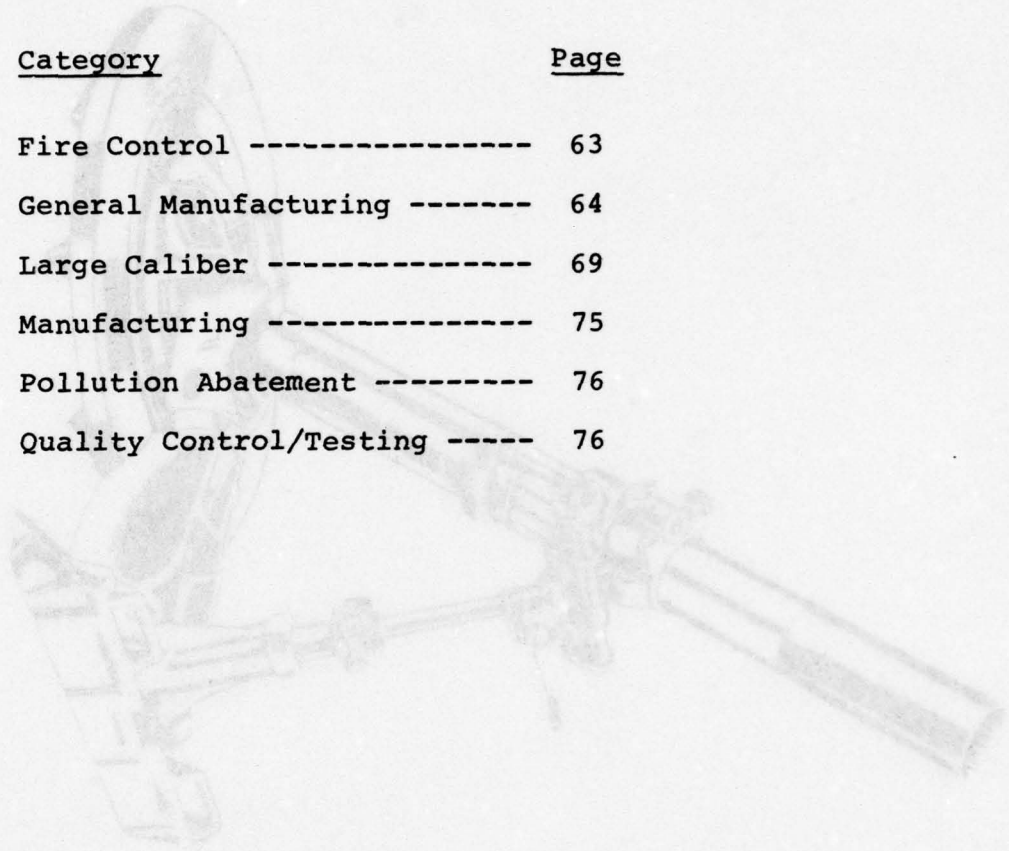
		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- PROPELLANTS/EXPLOSIVES (CONTINUED)							
(4071)	TITLE - EXPL DUST HAZARDS		250	275			
	PROBLEM - DRY EXPLOSIVE DUST COLLECTION SYSTEMS EXHIBIT THE POTENTIAL FOR EXPLOSIONS BECAUSE ELECTROSTATIC CHARGES ACCUMULATE DUE TO FRICTIONAL FORCES ON MATERIALS BEING TRANSPORTED OR THE COLLISION OF PARTICLES. EXPLOSIONS CONTINUE TO OCCUR DESPITE ELECTRICAL						
	SOLUTION - EVALUATE ALL FACTORS WHICH COULD CAUSE OR SUSTAIN AN EXPLOSION WITHIN A DRY DUST COLLECTION SYSTEM, ESTABLISH THRESHOLD VALUES FOR ALL KEY PARAMETERS NECESSARY FOR SAFE OPERATION, DEVELOP A TOP FOR AN EXPLOSION-PROOF SYSTEM.						
(4135)	TITLE - CHARACTERISTICS OF MOVING BULK ENERGETIC MATERIALS				310	300	300
	PROBLEM - DUE TO A LACK OF INFORMATION ON THE WAY THESE MATERIALS BEHAVE WHEN TRANSPORTED NONE OF THE NEW MATERIAL HANDLING METHODS ARE USED.						
	SOLUTION - CONDUCT NUMEROUS TESTS ON THE VARIOUS MATERIALS IN ORDER TO CHARACTERIZE THEIR BEHAVIOR AND ESTABLISH A HANDBOOK FOR DESIGNING MATERIAL HANDLING SYSTEMS.						
(4285)	TITLE - TNT EQUIV TESTING FOR SAFETY ENGINEERING	1606	400	375	200	275	190
	PROBLEM - PRESENT CRITERIA FOR BLAST RESISTANT STRUCTURES IS IN TERMS OF SURFACE BURST OF HEMISPHERICAL TNT. IN STRUCTURAL DESIGN, TO PROTECT FROM THE OUTPUT OF OTHER ENEGETICS, THE DESIGNERS MUST HAVE DATA PERTINENT TO THE MATERIAL IN QUESTION.						
	SOLUTION - BY TESTING TO GENERATE PEAK PRESSURE AND POS IMPULSE DATA FROM BLAST MEASUREMENTS OF HIGH ENERGY MATERIALS IS GENERATED. THESE RESULTS ARE COMPARED WITH THE BLAST OUTPUT OF HEMISPHERICAL TNT TO DETERMINE THE TNT EQUIVALENCY OF THE MATERIAL.						
(4287)	TITLE - DEV OF DETONATION TRAPS FOR IMPROVED SAFETY		371	250			
	PROBLEM - NO EFFECTIVE MEANS IS AVAILABLE FOR PREVENTING PROPAGATION IN A PIPELINE CONTAINING AN EXPLOSIVE FLUID.						
	SOLUTION - DEVELOP A PDN-SCALE DETONATION TRAP FOR DIRECT APPLICATION TO EXPLOSIVE PROCESSING FACILITIES, THEREBY, QUANTITIES OF EXPLOSIVES IN PROCESS CAN BE ISOLATED FROM THE EFFECTS OF AN EXPLOSIVE INCIDENT AND THE INHERENT SAFETY OF THE OPERATIONS INCREASED.						
(4288)	TITLE - EXPLOSIVE SAFE SEPARATION AND SENSITIVITY CRITERIA	2819	700	600	600	500	500
	PROBLEM - INFORMATION IS REQUIRED TO UPGRADE PROCESSES AND FACILITIES TO PROVIDE MAX SAFETY BY THE DEVELOPMENT ON SAFE SEP DISTANCES BETWEEN EXPLOSIVE AND END ITEM TO DETERMINE SAFE DEPTH OF EXPLOSIVES AND TO DETERMINE SENSITIVITY CRITERIA.						
	SOLUTION - TESTS WILL BE DESIGNED AND CONDUCTED FOR EXPLOSIVES AND END ITEMS TO DETERMINE THE SAFE SEPARATION DISTANCE AND THE EXPLOSIVE DEPTH ON CONVEYORS.						

CATEGORY	MMT FIVE YEAR PLAN RCS DRCMT 126	FUNDING ($000)				
SMALL ARMS		PRIOR	80	81	82	83	84
COMPONENT -- 5.56MM & .30 CAL							
(4142)	TITLE - DETERMINATION OF LAYAWAY AND STANDBY PROCED FOR SCAMP	1015	475				
	PROBLEM - READINESS POSTURE UNDETERMINED OF COMPUTER-AIDED MFG SYS.						
	SOLUTION - INVESTIGATE LAYAWAY AND START UP PROCEDURES.						
(4150)	TITLE - NEW MFG PROCEDURE FOR SAWS AMMO	785	220				
	PROBLEM - NO ECON METHOD FOR PROD SAWS AMMO.						
	SOLUTION - ENG STUDY LEADING TO CONVERSION OF SCAMP TO SAWS AND DEVELOP MFG PROCESS FOR DETONATOR.						
(4177)	TITLE - NEW METH OF SM CAL TRACER CHARGE	1000	800		500	475	470
	PROBLEM - SCAMP HAS NO CAPABILITY FOR TRACER CHARGE.						
	SOLUTION - DEV HI SPEED METH FOR CHARGING TRACER.						



ARRCOM/ARRADCOM
(WEAPONS)

Category	Page
Fire Control	63
General Manufacturing	64
Large Caliber	69
Manufacturing	75
Pollution Abatement	76
Quality Control/Testing	76



WEAPONS PROGRAM

The Weapons MM&T Program is managed by ARRCOM. Various projects are submitted by the weapon arsenals to include Rock Island Arsenal and Watervliet Arsenal.

Major emphasis is being placed on general manufacturing and large caliber weapons in line with the overall on-going modernization efforts. The arsenals produce components ranging from small caliber barrels to cannon tubes 30 feet long. Many of the current manufacturing processes are in jeopardy of being shut down due to changes that have been made in environmental and health regulations. Problems dealing with cyanide wastes, cadmium toxicants, and air emissions will be investigated.

Other manufacturing problems dealing with induction brazing (project 8035), automation (projects 7615, 7730, and 8104), production control (projects 7709 and 8034), and cutting fluids and coolants (projects 8214, 7933, 7948, 8026, and 8126) will be investigated.

Successful completion of project 8044 will provide an alternative to cadmium plating. Removal of this toxicant from the manufacturing environment will benefit both Government and private industry. Another potential spin-off to the private sector from project 7926 could materialize. This project will look at hot isostatic pressing of gun steel. The ability to produce basic parts with desired structure characteristics to nearly final shape will reduce machining costs.

The MM&T Five Year Plan submitted by ARRCOM was developed based upon budget guidance that has since increased over 200%. A late effort resulted in the identification of additional projects bringing the submission in line with the current budget guidance for FY's 81-84. The actual FY80 budget submission will take care of the difference for FY80.

Funds will be provided from the PA 3297, Weapons appropriation.

COMMAND FUNDING SUMMARY
(THOUSANDS)

CATEGORY	FY80	FY81	FY82	FY83	FY84
FIRE CONTROL	0	0	300	680	1000
GENERAL MANUFACTURING	1070	692	1945	3344	3586
LARGE CALIBER	3289	2955	2257	1371	1638
MANUFACTURING	114	177	200	0	0
POLLUTION ABATEMENT	182	75	75	100	0
QUALITY CONTROL/TESTING	125	550	190	125	0
SMALL CALIBER	130	406	153	456	500
TOTAL	4910	4855	5120	6076	6724

CATEGORY

FIRE CONTROL

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- ASSEMBLIES						
(8321) TITLE - EXPANDED APPLICATION OF ADHESIVE BONDING TO F.C. ASSEMBLY					200	100
PROBLEM - CURRENT ASSEMBLY METHODS DO NOT TAKE FULL ADVANTAGE OF THE MANY ADVANCED ADHESIVE SYSTEMS AVAILABLE, MANY OPERATIONS COULD BE CONVERTED WITH SIGNIFICANT SAVINGS IN BOTH TIME AND MONEY AND WITH INCREASED RELIABILITY.						
SOLUTION - SELECT A SERIES OF ASSEMBLY OPERATIONS AS CANDIDATES FOR ADHESIVE BONDING, DESIGN BONDING SYSTEMS, APPLY, TEST AND EVALUATE, PREPARE PROCESS SPECIFICATIONS FOR THE SUCCESSFUL SYSTEMS.						
COMPONENT -- GENERAL						
(7439) TITLE - APPLICATION OF COMPUTERIZED AUTO GAGING NC MACHINES SYS OPER					100	100
PROBLEM - PRESENT METHODS OF INSP MATERIAL PRODUCED ON NUMERICAL CONTROL EQUIP REQUIRE OFF MACHINE MEASUREMENT OF THE FIRST PIECE AND PERIODIC (APPROX, 2%) OFF MACHINE INSP THEREAFTER, SUBSTANTIAL NC PRODUCTION TIME IS THUS LOST.						
SOLUTION - ADAPT AUTO GAGING TECHNIQUES TO NC PRODUCTION OF FIRE CONTROL COMPONENTS, MEASUREMENT WOULD THEN BE MADE AN INTEGRAL PART OF THE MACHINE OPER AND DRIFT COULD BE CORRECTED IN PROCESS BY A FEEDBACK SIGNAL, A TWO YEAR EFFORT IS PLANNED.						
(8210) TITLE - APPLICATION PROGRAMMABLE CONTROLLERS TO INSTRUMENT MANUFACTU			100	80	100	
PROBLEM - MANUAL SETTING AND CONTROL OF PRODUCTION EQUIPMENT REQUIRES USE OF SKILLED LABOR THAT IS INCREASINGLY EXPENSIVE AND LESS AVAILABLE.						
SOLUTION - SELECT A UNIT OF EQUIPMENT, ADAPT IT FOR PROGRAM CONTROL AND OPERATE IT FOR EVALUATION DATA, COMPLETE A SIMILAR TASK FOR A PROCESS.						
(8320) TITLE - PRODUCTION TECHNOLOGY FOR GRAPHIC INSTRUMENT DISPLAYS						300
PROBLEM - A TREND IN FIRE CONTROL INSTRUMENTATION TOWARDS INCREASED USE OF REAL TIME GRAPHICS AND OTHER VISUAL DISPLAYS, COST REDUCTION PROBLEMS ASSOCIATED WITH SUCH DISPLAYS ARE ANTICIPATED.						
SOLUTION - MONITOR THE DEVELOPMENT OF GRAPHIC DISPLAY SYSTEMS, AND EVALUATE PROBLEMS, IF WARRANTED, UNDERTAKE AN MMT PROJECT (TO BE DEFINED) IN THE FY82-83 PERIOD.						
COMPONENT -- OPTICS						
(8110) TITLE - ON-LINE LASER MEASUREMENT OF LENS SPHERICITY			100			100
PROBLEM - CONTROL DURING PRODUCTION REQUIRES REAL TIME CONTINUOUS MEASUREMENT AND FEED BACK, CURRENT METHODS FOR SUCH MEASUREMENT ALL HAVE SERIOUS DRAWBACKS.						
SOLUTION - ADAPT TECHNIQUES NOW BEING DEVELOPED TO USE LASERS FOR DYNAMIC MEASUREMENT TO OPTICAL MANUFACTURE, PROTOTYPE EQUIPMENT WILL BE ASSEMBLED AND PILOT OPERATED.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- OPTICS (CONTINUED)						
(8209) TITLE - PILOT PRODUCTION OF GRADIENT INDEX OPTICS				100	200	200
PROBLEM - GRADIENT OPTICS, WHERE IN THE INDEX OF THE GLASS IS SEQUENTIALLY VARIED TO OBTAIN DESIGNED OPTICAL CHARACTERISTICS IS FAR MORE DESIRABLE THAN CURRENT USED, I.E., FORMING A CURVE ON THE GLASS SURFACE.						
SOLUTION - ESTABLISH, SUBSEQUENT TO THE INTRODUCTION AND DEVELOPMENT OF GRADIENT OPTICS TO MILITARY USE, A PILOT PRODUCTION FACILITY TO MANUFACTURE GRADIENT OPTICS AT A REQUIRED RATE.						
(8211) TITLE - NET SHAPE OPTICAL PROCESSING					100	100
PROBLEM - CONSIDERABLE TIME AND EFFORT IS REQUIRED TO PROCESS AN OPTIC FROM A RAW PRESSING TO ITS FINAL SHAPE.						
SOLUTION - IMPROVE OPTICAL PRESSING TECHNIQUE TO ACHIEVE NEAR NET SHAPES IN THE INPUT BLANK.						
********** CATEGORY ********** GENERAL MANUFACTURING **********						
COMPONENT -- EQUIPMENT						
(7417) TITLE - LASER WELDING TECHNOLOGY FOR WEAPON COMPONENTS		75	75	200	200	200
PROBLEM - CONVENTIONAL WELDING AND OTHER JOINING METHODS YIELD JOINTS WHICH ARE UNSUITABLE IN CERTAIN HIGH STRESS APPLICATIONS.						
SOLUTION - LASER WELDING CAN PRODUCE ACCEPTABLE JOINTS.						
(7615) TITLE - AUTOMATED FORGING OF WEAPON COMPONENTS (CAM RELATED)					541	808
PROBLEM - PRESENT FORGING METHODS ARE COMPARATIVELY SLOW AND COSTLY DUE TO CONVENTIONAL EQUIPMENT SPEED LIMITATIONS AND DEPENDENCY ON THE SKILL AND SPEED LEVELS OF THE OPERATOR. WORKING CONDITIONS AROUND DROP HAMMERS ARE HOT, DIRTY AND NOISY.						
SOLUTION - ESTABLISH A HIGH SPEED AUTOMATED FORGING CENTER INCLUDING A PROGRAMABLE FORGING HAMMER, ELECTRIC BILLET-HEATING SYSTEM, PROGRAMABLE ROBOT MATERIAL HANDLING DEVICE, RELATED CONVEYORS AND OPERATION PARAMETERS.						
(7811) TITLE - ELECTROMAGNETIC FORMING OF WEAPON COMPONENTS	200	150	150			
PROBLEM - CURRENT METHODS OF FABRICATION ARE NOT VERY EFFICIENT.						
SOLUTION - ELECTROMAGNETIC FORMING WILL PRODUCE CONSISTENT PRODUCT QUALITY.						

MMT FIVE YEAR PLAN
RCS DRCMT 126

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- INFORMATION SYSTEMS						
(7709) TITLE - MANAGEMENT INFORMATION SYSTEM FOR NC EQUIPMENT (CAM)					343	200
PROBLEM - LACK OF 'MACHINE LEVEL' MANAGEMENT INFORMATION SYSTEM FOR COSTLY NC MACHINES PREVENTS FULL PRODUCTIVITY.						
SOLUTION - INSTALL AND TEST A PILOT NC 'MACHINE LEVEL' MANAGEMENT INFORMATION SYSTEM AT ROCK ISLAND ARSENAL.						
(7806) TITLE - ENGTRAN				1000	1000	1000
PROBLEM - NO UNDERSTANDABLE LANGUAGE FOR AVERAGE ENGINEER.						
SOLUTION - COMPILE DATA.						
(8034) TITLE - MANUFACTURING SHOP FLOOR FEEDBACK SYSTEM (CAM)		84				
PROBLEM - ROCK ISLAND ARSENAL'S CURRENT METHOD OF COLLECTING SHOP FLOOR DATA IS COSTLY, UNRELIABLE AND DOES NOT PROVIDE ENOUGH DATA FOR PROPER CONTROL OF PRODUCTION.						
SOLUTION - DESIGN AND INSTALL A MANUFACTURING SHOP FLOOR FEEDBACK SYSTEM UTILIZING THE LATEST ADVANCEMENTS IN COMPUTER HARDWARE AND PRODUCTION MANAGEMENT CONCEPTS.						
COMPONENT -- MISCELLANEOUS						
(7933) TITLE - CENTRAL COOLANT SYSTEM		58				
PROBLEM - MACHINES ARE USED INTERMITTENTLY, LACK OF AGITATION ALLOWS STAGNATION AND CONSEQUENTLY, A BACTERIA BUILD UP, AT INDIVIDUAL MACHINE SITES, PROPER MAINTENANCE IS DIFFICULT.						
SOLUTION - CENTRAL COOLANT SYSTEM WILL REDUCE COOLANT CONSUMPTION BY MAINTAINING PROPER CONCETRATIONS, BACTERIA AND PH CONTROL, A SINGLE SITE REDUCES THE COST AND IMPROVES THE LIKELIHOOD OF PROPER COOLANT MAINTENANCE.						
(8030) TITLE - MANUFACTURING GUIDE FOR ELASTOMERIC SEALS		100	85			
PROBLEM - CONSTANT PROBLEMS IN THE PROCUREMENT OF SATISFACTORY SEALS FOR WEAPONS SYSTEMS, I.E., M140, M127, ETC., ARE EXPERIENCED WITH RESULTANT SOLE SOURCE PURCHASES.						
SOLUTION - ELIMINATE SOLE SOURCE PROCUREMENT BY DOCUMENTING PROCESSING TECHNIQUES AND FORMULA VARIATIONS FOR A VARIETY OF MILITARY SEALS FOR PUBLICATION IN A GUIDE FOR USE BY INDUSTRY.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT	-- MISCELLANEOUS (CONTINUED)						
(8049)	TITLE - MFG FACILITIES AND PROCESSES ENERGY CONVERSATION/RECOVERY		95				
	PROBLEM - AS THE PRICE OF UTILITIES AND FUELS CONTINUE TO INCREASE THE POSSIBILITY OF CURTAILMENT IN UTILITIES DURING THE WINTER MONTHS INCREASES. CONSCIENTIOUS ENERGY CONSERVATION EFFORTS ARE REQUIRED.						
	SOLUTION - A PROJECT TO ANALYZE PRESENT ENERGY CONSUMPTION AND DESIGN A COMPLETE ENERGY RECOVERY SYSTEM FOR MFG FACILITIES AND PROCESSES IS THE ONLY SOLUTION TO THE PROBLEM.						
(8208)	TITLE - MATERIAL HANDLING		85	118			200
	PROBLEM - A STUDY MADE ON THE 105MM M68 GUN TUBE PRODUCTION LINE REVEALED 12% OF TIME TO PRODUCE THE TUBE WAS 'CONSUMED IN MOVING THE TUBE ABOUT' ANOTHER 20% OF THE MFG TIME SPENT IN MAKING THE TUBE READY AND TAKING THE TUBE DOWN FROM THE MACHINES.						
	SOLUTION - ONE METHOD TO REDUCE THE HANDLING TIME AND TERMINAL (POSITIONING AND REMOVING) TIME WOULD BE TO DEVELOP NEW EQUIPMENT FOR POSITIONING LIFTING AND TRANSFERING OF GUN TUBES AND COMPONENTS.						
COMPONENT	-- PROCESSES						
(7583)	TITLE - APPLICATION OF ELECTROMECHANICAL MACHINING						80
	PROBLEM - CUTTING FORCES AND TOOL WEAR LIMIT MACHINE TOOL EFFICIENCY AND MACHINING RATES. MACHINING TIME AND COSTS ARE UNNECESSARILY HIGH BECAUSE OF NORMALLY INHERENT WORK MATERIAL STRENGTH AND TOOL WEAR.						
	SOLUTION - ADAPT ELECTROMECHANICAL MACHINING TO REDUCE MAJOR FORCE OF CHIP FORMATION IN CUTTING AND TOOL WEAR. CONVERT REDUCED CUTTING FORCES AND TOOL WEAR TO FASTER CUTTING FOR HIGHER PRODUCTIVITY.						
(7605)	TITLE - CHEMICALLY BONDED SAND FOR CLOSE TOLERANCE CASTINGS	130	130				
	PROBLEM - PRESENT METHODS OF MOLDING AND CORE MAKING ARE COSTLY, ENERGY WASTEFUL, AND UNSUITABLE FOR HOLDING CLOSE TOLERANCES.						
	SOLUTION - INSTALL CHEMICALLY BONDED SAND CORE MAKING AND MOLDING SYSTEM AT ROCK ISLAND ARSENAL WHICH WILL REDUCE LABOR COST, ELIMINATE BAKING CORES, AND CREATE MORE RIGID MOLDS.						
(7948)	TITLE - ESTABLISH CUTTING FLUID CONTROL SYSTEM	150	158	164			
	PROBLEM - THE LACK OF A CONTROLLED PROGRAM FOR THE USE OF CUTTING FLUIDS RESULTS IN HIGH MACHINING COSTS AND STOCKING OF MANY FLUIDS.						
	SOLUTION - ESTABLISH A PROGRAM TO CONTROL SHOP FLOOR TESTING AND DEFINE METHODS TO CONTROL USE OF CUTTING FLUIDS DURING MANUFACTURING OPERATIONS.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- PROCESSES (CONTINUED)							
(8008)	TITLE = 'MANUAL' ADAPTIVE CONTROL (CAM)				120		
	PROBLEM = APPLICATION AND ADJUSTMENT OF MACHINING RATES AND OTHER PARAMETERS IS UNCERTAIN, SLOW AND COSTLY.						
	SOLUTION = APPLY MANUAL-COMPUTER PROGRAMS ON SHOP FLOOR TO OPTIMIZE AND CONTROL MACHINING OPERATIONS.						
(8044)	TITLE = ALTERNATIVES TO CADMIUM PLATING		85	100			
	PROBLEM = CADIUM IS A DANGEROUS CUMULATIVE TOXICANT AND IS PRESENTLY USED IN PLATING, ACCORDING TO THE FEDERAL FOOD AND DRUG ADMINISTRATOR, DIETARY LEVELS OF CADIUM ARE APPROACHING 90 PERCENT OF THE RECOMMENDED LEVEL.						
	SOLUTION = A COMPARATIVE EVALUATION OF CANDIDATE COATINGS WITH RESPECT TO THE REQUIREMENTS OF ALL COMPONENTS PRESENTLY BEING CADMIUM PLATED WILL BE REQUIRED. A CADIUM FREE METAL FINISHING SYSTEM WITH A DECREASE IN A DANGEROUS TOXICANT WILL RESULT.						
(8204)	TITLE = ADAPTIVE CONTROL OF N/C MACHINE TOOLS					225	225
	PROBLEM = MACHINING CAPABILITIES ARE LIMITED BY INACCURACIES OF NC MACHINE TOOLS AND THE INABILITY TO HANDLE NEW WEAPON COMPONENTS OF CLOSE TOLERANCES AND COMPLEX CONTOURS. MACHINING RATES FOR CLOSE-TOLERANCE COMPONENTS ARE EXCESSIVELY SLOW.						
	SOLUTION = APPLY ADAPTIVE CONTROLS IN NC MACHINING FOR CLOSER TOLERANCES AT OPTIMIZED FASTER RATES.						
(8205)	TITLE = SURFACE PREPARATION OF METALS BY PRESSURE BLASTING				60		
	PROBLEM = METAL SURFACES ARE CLEANED FOR FINISHING BY USING CHEMICALS THAT REQUIRE POLLUTION ABATEMENT PROCEDURES.						
	SOLUTION = DEVELOP PARAMETERS FOR THE USE OF HIGH PRESSURE WATER-INERT MEDIA BLASTING METHODS TO REMOVE DRY FILM LUBRICANTS, AND TO USE FOR DERUSTING, DESCALING AND PAINT STRIPPING OPERATIONS.						
(8206)	TITLE = APPLICATION OF HIGH-RATE ABRASIVE MACHINING				75	200	
	PROBLEM = CONVENTIONAL GRINDING IS SLOW AND COSTLY. LONG, MULTIPLE PASSES AND INFEEDS ARE REQUIRED TO SIZE AND FINISH WEAPON COMPONENTS.						
	SOLUTION = APPLY HIGH-SPEED ABRASIVE-BELT MACHINING.						
(8214)	TITLE = LESS CRITICAL MATERIALS FOR USE AS CUTTING FLUIDS				150	150	
	PROBLEM = THE SHORTAGE OF PETROLEUM WILL BECOME MORE ACUTE AND CUTTING FLUIDS WILL BECOME MORE EXPENSIVE AND DIFFICULT TO OBTAIN.						
	SOLUTION = EVALUATE VARIOUS SYNTHETIC MATERIALS FOR USE IN MACHINING OPERATIONS IN LIEU OF THE PRESENT PETROLEUM BASE FLUIDS TO CONSERVE CRITICAL PETROLEUM MATERIALS AND STILL MEET PRODUCTION SCHEDULES.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT	-- PROCESSES (CONTINUED)						
(8215)	TITLE - RHEOLOGICAL CONTROL OF RUBBER-PLASTIC MOLDED ITEMS				90	85	
	PROBLEM - CURRENT IN-PROCESS CONTROL MEASURES FOR MIXING AND MOLDING RUBBER AND PLASTICS DO NOT ADEQUATELY CONTROL MATERIAL SCORCH OR CURE CYCLE TIMES.						
	SOLUTION - EMPLOY IN-PROCESS RHEOLOGICAL (MATERIAL FLOW) CONTROL OF NON-METALLIC MOLDING MATERIALS TO ASSURE DIMENSIONAL STABILITY AND TO ELIMINATE DEFECTS.						
(8301)	TITLE - RHEO(THIXOTROPIC)STEEL CASTING						198
	PROBLEM - CURRENT PRODUCTION PROCESSES OF FORGING, POWDER METAL FORGING, INVESTMENT CASTING, AND SUBSEQUENT MACHINING ARE COSTLY WHEN COMPARED TO RHEOCASTING AND THIXOCASTING.						
	SOLUTION - REPLACE THESE PROCESSES WITH RHEOCASTING AND THIXOCASTING WHICH WILL ELIMINATE MUCH MACHINING NOW REQUIRED IN FINISHING PARTS. THIS CASTING PROCESS MAKES POSSIBLE THE ECONOMICAL PRECISION CASTING OF VERY THIN CROSS SECTIONS.						
(8322)	TITLE - LASER ASSISTED MFG METHODS					600	250
	PROBLEM - THERE ARE MANY DIFFICULTIES ASSOCIATED WITH CONVENTIONAL HEAT TREATING AND WELDING TECHNIQUES.						
	SOLUTION - APPLY LASER TECHNOLOGY TO THESE MFG PROCESSES.						
(8401)	TITLE - IMPROVED MELTING PRACTICES FOR LOW ALLOY STEEL						125
	PROBLEM - ACHIEVING LOW POROSITY IN CASTINGS IS DIFFICULT.						
	SOLUTION - INVESTIGATE DEGASSING TREATMENTS.						
COMPONENT	-- TOOLING						
(7702)	TITLE - UNIVERSAL FIXTURES FOR MACHINING WEAPON COMPONENTS				100		100
	PROBLEM - FIXTURES ARE EXPENSIVE AND INCREASE THE COST OF MANUFACTURING.						
	SOLUTION - DEVELOP UNIVERSAL FIXTURES FOR WEAPON COMPONENTS.						
(8402)	TITLE - COMPUTERIZED RUBBER-PLASTIC MOLD DESIGN (CAM)						200
	PROBLEM - MOLD CHANGES ARE TIME CONSUMING AND EXPENSIVE.						
	SOLUTION - DEVELOP COMPUTER AIDED TECHNIQUES TO REDUCE THE COST OF MOLD DESIGN.						

****
*** C A T E G O R Y ***
****
***LARGE CALIBER ***
****

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- BARRELS							
(7621)	TITLE - IMPROVE CHROMIUM PRODUCTION PLATING EFFICIENCY			69	69		
	PROBLEM - CHROMIUM PLATING IS INEFFICIENT BECAUSE CATHODE EFFICIENCY IS LOW.						
	SOLUTION - ESTABLISH OPTIMUM PARAMETERS TO RAISE PLATING EFFICIENCY.						
COMPONENT -- BREECH MECHANISMS							
(7246)	TITLE - SIMPLIFICATION OF BREECH RING MFG. AND HANDLING	135	117		378		
	PROBLEM - A PRIOR YEAR STUDY HAS IDENTIFIED MANY AREAS WHERE COST REDUCTIONS ARE POSSIBLE IN THE MFG OF THE 105MM M68 BREECH RING.						
	SOLUTION - SELECTED OPERATIONS WILL BE COMBINED, EQUIPMENT WILL BE MODIFIED RESULTING IN REDUCED TIME AND COST.						
(7730)	TITLE - MANUFACTURE OF SPLIT RING BREECH SEALS	137	395				
	PROBLEM - SPLIT RINGS REQUIRE PRECISE MFG, PRESENT METHODS ARE OUTDATED AND COSTLY REQUIRING MUCH HAND FINISHING BY HIGHLY SKILLED WORKERS, REJECTION RATE HIGH WITH MUCH REWORK.						
	SOLUTION - AUTOMATED AND IMPROVED PROCEDURES WILL BE ADOPTED, NEW METHOD OF SLITTING RING REQUIRING LESS STOCK REMOVAL, SPECIAL EQUIPMENT WILL BE DESIGNED AND PURCHASED TO MINIMIZE HAND FINISHING BY HIGH SKILL OPERATORS.						
(7926)	TITLE - HOT ISOSTATIC PRESSING (HIP) OF LARGE COMPONENTS		205	242	95		
	PROBLEM - MANY HOURS ARE REQUIRED TO MACHINE THE BREECH BLOCK FORGING TO THE FINISHED PART, MORE THAN 25% OF FORGING BECOMES CHIPS, WITH HIGH COST OF ALLOY STEEL, THIS BECOMES A VERY COSTLY WASTE OF MATERIAL.						
	SOLUTION - HOT ISOSTATIC PRESSING (HIP) WILL FORM BREECH BLOCKS TO NEARLY FINAL SHAPE, GREATLY REDUCING MACHINING COSTS.						
(7927)	TITLE - GENERATION OF BASE MACHINING SURFACES		85	135			
	PROBLEM - TO OBTAIN A DISTR OF STOCK ON A ROUGH CAST COMPONENT, IT IS CURRENTLY NECESSARY TO 'DRAW' THE FINISHED COMPONENT ON THE MATERIAL USING HT GAGE AND LAYOUT TEMPLATES, THIS IS DONE ON A TABLE FROM WHICH THE PART MOVES TO A MACHINE FOR SIMILAR SET-UP.						
	SOLUTION - USING PRESENT LAYOUT TECHNIQUES SUCH AS OPTICAL SHADOW LAYOUT TEMPLATES, THE COMPONENT CAN BE POSITIONED DIRECTLY ON THE MACHINE TO ESTABLISH THE FIRST CUT ELIMINATING THE INITIAL LAYOUT OPERATION.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT	-- BREECH MECHANISMS (CONTINUED)						
(8102)	TITLE - APPL OF POWDER METALLURGY TO THE PROD OF WEAPONS COMPONENTS			92	96	133	200
	PROBLEM - MANY COMPONENTS REQUIRE A NUMBER OF MACHIN. OPERATIONS WHICH MAKE THEM HIGH COST ITEMS.						
	SOLUTION - POWDER METALLURGY TECHNIQUES HAVE IMPROVED GREATLY IN RECENT YRS. AND IT IS NOW FEASIBLE TO PRODUCE COMPONENTS BY COMPRESSING POWDERED METALS UNDER HEAT AND PRESSURE THUS REDUCING OR ELIMINATING MUCH OF THE MACHINING.						
(8104)	TITLE - BREECH BLOCK MFG BY AUTOMATION			130		317	200
	PROBLEM - IT CAN BE CONCLUDED BASED ON A SURVEY AND REPORT OF BREECH RING PRODUCTION PROCEDURES THAT OUR CURRENT APPROACH TO BREECH BLOCK PRODUCTION COULD BE IMPROVED BY AN ENCOMPASSING ENGINEERING REVIEW.						
	SOLUTION - ORTAIN AN ENGINEERING REVIEW OF THE MFG PROCEDURES INCLUDING SPECIFICATION OF THE REQUIRED EQUIPMENT AND NEW OR IMPROVED TECHNIQUES.						
(8105)	TITLE - ESTABLISH ROUGH THREAD BLANKS		87	303			
	PROBLEM - A SINGLE POINT TOOL IS NOW USED TO PRODUCE THE ROUGH FORMED BLANK FOR STEP THREADS ON STEP BLOCKS, CURRENT TIME VALUE IS 13.9 HOURS.						
	SOLUTION - POSSIBLE APPLICATIONS OF MULTIPLE SLOTTING TOOLS AND MILLING OFFER A FAR MORE EFFICIENT METAL REMOVAL PROCESS AIMED AT TIME/COST REDUCTION.						
(8107)	TITLE - CREEP FEED CRUSH FORM GRINDING		87	363	76		
	PROBLEM - THE BRACKET SLOT ON THE 105MM M68 BREECH RING IS A HIGH COST OPERATION. IT IS CURRENTLY MILLED WITH FORM TOOLS IN TWO OPERATIONS-ROUGH AND FINISH.						
	SOLUTION - A NEW PROCESS IS BEING DEVELOPED THAT RESEMBLIES THE CRUSH FORM ABRASIVE MACHINE FOR CYLINDRICAL PARTS EXCEPT THAT THE PROCESS IS USED TO PRODUCE FLAT CONTOURED SURFACES. IT IS PROPOSED THIS PROCESS BE ADAPTED TO PRODUCTION OF THE BRACKET SLOT.						
COMPONENT	-- GENERAL						
(8207)	TITLE - HIGH TOUGHNESS CAST ARMOR STEELS				150	150	
	PROBLEM - PRODUCTION OF ARMOR CASTINGS MEETING THE MATERIAL TOUGHNESS REQUIREMENT OF MIL-S-11356 IS VERY DIFFICULT AND COSTLY.						
	SOLUTION - CONTROL OF SLAG COMPOSITIONS CAN REDUCE SULFUR AND PHOSPHORUS LEVELS, THUS IMPROVING MATERIAL TOUGHNESS.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT	-- GENERAL (CONTINUED)						
(8340)	TITLE - IMPROVED MACHINING PROCEDURES FOR DOVETAILS					133	200
	PROBLEM - TO IMPROVE QUALITY OUTPUT AND REDUCE TIME REQUIRED TO PERFORM THE OPERATION.						
	SOLUTION - DEVELOP MACHINING AND TOOLING IN LIEU OF PRESENT MILLING TECHNIQUES.						
COMPONENT	-- GUN MOUNTS						
(7201)	TITLE - ADAPT FIRING TEST SIMULATOR TO SOFT RECOIL WEAPONS	1610		80	80		
	PROBLEM - SOFT RECOIL TYPE WEAPONS ACCELERATE THE RECOILING PARTS FORWARD BEFORE THE PROPELLANT IS IGNITED. TO TEST SUCH WEAPONS, THE SIMULATOR RAM MUST IMPACT THE GUN TUBE MUZZLE WHEN THE MUZZLE HAS MOVED FORWARD THE PROPER DISTANCE.						
	SOLUTION - PROVIDE A CONTROL SYSTEM TO PHASE THE TRIGGERING OF THE SIMULATOR WITH THAT OF THE WEAPON SO IMPACT OCCURS AT THE PROPER POINT.						
(7717)	TITLE - ISOSTATIC PRESSING OF METAL PARTS				325		200
	PROBLEM - CONVENTIONAL METHODS OF COMPACTING POWDERS FOR SHORT RUN COMPLEX PARTS IS EXPENSIVE.						
	SOLUTION - USE A FLEXIBLE CONTAINER OF METAL POWDERS AND EVACUATE THE AIR FROM IT AFTER IT IS PLACED IN A HIGH PRESSURE VESSEL, THEN APPLY HYDRAULIC PRESSURE TO COMPACT THE POWDER.						
(8035)	TITLE - COATING TUBE SUPPORT SLEEVES WITH BEARING MATERIALS		140	100			
	PROBLEM - METALLIZED COATINGS ON SUPPORT SLEEVES FOR GUN MOUNTS ARE BRITTLE AND LACK BOND STRENGTH.						
	SOLUTION - USE INDUCTION/ARC-INERT GAS METHODS TO COAT SLEEVES WITH BEARING MATERIALS.						
COMPONENT	-- TUBES						
(7162)	TITLE - APPLICATION OF HYDROSTATIC EXTRUSION	100			188	133	138
	PROBLEM - MORTAR TUBES MADE FROM FORGINGS WHICH REQUIRE EXTENSIVE MACHINING TIME AND RESULT IN EXCESSIVE MATERIAL LOSS.						
	SOLUTION - HYDROSTATIC EXTRUSION WAS DONE IN PRIOR YEAR FUNDING ON A HIGH TEMPERATURE MATERIAL. ITS USE WITH LOW ALLOY STEEL CAN REDUCE RAW MATERIAL REQUIREMENTS AND PRODUCE A PRODUCT CLOSE TO FINISHED DIMENSIONS.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- TUBES (CONTINUED)							
(7309)	TITLE - REPLACEABLE STEEL LINERS FOR CANNON TUBES						250
	PROBLEM - TUBE LIFE IN SEVERAL HIGH PERFORMANCE CANNONS SUCH AS THE 155MM HOW M199 AND OTHERS IS LIMITED BY EROSION AND LOSS OF ACCURACY IN A RELATIVELY FEW ROUNDS AT MAXIMUM CHARGE.						
	SOLUTION - DEVELOP MFG. PROCESS FOR FABRICATION OF THIN LINERS AND PROCESS FOR PLACING THESE LINERS IN CANNON TUBES, THEREBY EXTENDING CANNON LIFE.						
(7725)	TITLE - FORGED AUTOFRETTAGED ARTILLERY BARRELS PRODUCED BY RF		192		254		
	PROBLEM - AUTOFRETTAGE PROCESS REQUIRES A NUMBER OF DISTINCT OPERATIONS INVOLVING UNIQUE EQUIPMENT. AS USE OF THIS EQUIP INCREASES, ANNUAL OPER AND MAINT COSTS INCREASES. IT IS DESIRABLE TO REDUCE THESE COSTS WHILE RETAINING BENEFITS OF AUTOFRETTAGING.						
	SOLUTION - COMBINE AUTOFRETTAGE PROCESS INTO COLD ROTARY FORGING. DESIGN TOOLING THAT WILL INDUCE EQUIV RESIDUAL STRESS PATTERN NOW OBTAINED BY CONV AUTOFRETTAGE.						
(7917)	TITLE - APPLICATION OF BORE BROACHING TO MID CALIBER CANNON	100	171	295			
	PROBLEM - FINISHING THE BORE IS PRESENTLY DONE BY HONING, A HIGH COST PROCESS.						
	SOLUTION - IN BORE BROACHING THE BORE IS FINISHED TO SIZE AND RIFLED IN THE SAME MACHINE. THIS ELIMINATES A SET UP, HANDLING AND RESULTS IN REDUCED TIME AND COST.						
(7920)	TITLE - CONSERVATION OF CRITICAL MATERIALS FOR GUN TUBES		208				
	PROBLEM - GUN STEEL REQUIRES ALLOY SUCH AS CHROMIUM WHICH IS BECOMING IN SHORT SUPPLY AND WHICH MUST BE OBTAINED FROM OUT OF COUNTRY AND FROM A RELATIVELY FEW NATIONS. THERE IS A NEED FOR MATERIALS AND PROCESSES WHICH USE LESS OF CRITICAL ELM SUCH AS CHROMIUM.						
	SOLUTION - ALLOY STEEL VARIATIONS WHICH REPLACE CHROMIUM WITH BORON AND MOLYBDENUM HAVE BEEN DEVELOPED BUT HAVE PROCESSING PROBLEMS. THIS PROJECT WILL GENERATE PROCESS MODIFICATIONS TO ALLOW USE OF STEELS WITH LESS CRITICAL ALLOYS.						
(7925)	TITLE - BORE EVACUATOR BORING		98	245			
	PROBLEM - BOTH ENDS OF THE BORE EVACUATOR HAVE SIMILAR DIAMETER BORES AND REQUIRE ALMOST EQUAL MACHINING WITH HIGH COST OF MACHINING TIME. REDUCTION OF MACHINING TIME IS IMPERATIVE. ORIENTATION OF THE BORES IS IN RELATION TO EACH OTHER.						
	SOLUTION - A SPECIAL PURPOSE MACHINE AND TOOLING PKG PROVIDING A HEAD FOR EACH END OF THE EVAC CHAMBER CAN BE DEVELOPED TO PRODUCE BOTH BORES SIMULTANEOUSLY. IF BOTH SURFACES WERE PRODUCED FROM THE SAME SET UP, ORIENTATION OF CENTERLINES WOULD BE AUTO ASSURED.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- TUBES (CONTINUED)						
(8024) TITLE - HIGH SPEED ABRASIVE BELT GRINDING		321	121		100	
PROBLEM - SLIDE SURFACE DIAMETER AND FINISH IS PRESENTLY PRODUCED ON CYLINDRICAL GRINDING MACHINES USING ABRASIVE WHEELS. THE TIME IT TAKES FOR THIS OPERATION CAN BE SIGNIFICANTLY REDUCED.						
SOLUTION - ABRASIVE BELT GRINDING DEPENDING ON ITS APPLICATION HAS METAL REMOVAL RATES WHICH CAN EXCEED MILLING OR GRINDING AT THE SAME TIME PRODUCING EXCELLENT TOLERANCES AND SURFACE FINISH.						
(8025) TITLE - ELECTRONIC PROFILE READOUT GAGE FOR POWDER CHAMBERS		112		142	95	
PROBLEM - POWDER CHAMBER SIZE IS CHECKED BY 4-6 PLUSH PIN GAGES EACH WEIGHING ABOUT 35 LBS. FROM EACH CHECK, MACHINE ADJUSTMENTS MUST BE MADE TO MACHINE CHAMBER TO REQUIRED SPEC.						
SOLUTION - USING NEW PROXIMITY SENSING DEVICES 1 LT WEIGHT GAGE WOULD REPLACE THE 4-6 PRESENT GAGES. IT WOULD PROVIDE A SIGNAL FOR DIGITAL READOUT AND FOR TOOL CONTROL IN LATTER PHASE OF PROJECT.						
(8026) TITLE - APPL OF SYN QUENCHANTS GUN TUBES AND HEAVY WPN COMPONENTS		118				
PROBLEM - QUENCHANTS ARE NOT SATISFACTORY FROM BOTH THE THERMAL AND SAFETY STANDPOINT.						
SOLUTION - USE OF POLYMERIC MATERIALS TO ALTER QUENCH POWER OF BATH AND ALLOW HEAT TRANSFER TO OBTAIN RANGE OF COLLING RATES WHILE ELIMINATING HAZARDS ASSOCIATED WITH OIL QUENCHING.						
(8043) TITLE - IMPROVE MACHINING PROCEDURES FOR DOVETAILS		133	300			
PROBLEM - CLOSE TOLERANCE DOVETAILS ARE REQUIRED TO ASSEMBLY RECOIL RAILS ON LARGE CALIBER WEAPONS. EXTREME CARE IS REQUIRED WHEN MILLING TO AVOID CUTTING OVERSIZE.						
SOLUTION - DEVELOP MACHINING AND TOOLING FOR MACHIN. DOVETAILS IN LIEU OF MILLING PRESENTLY USED BECAUSE OF EXTREMELY CLOSE TOLERANCES. BROACHING, ONCE DEVELOPED SHOULD IMPROVE QUALITY OUTPUT AND REDUCE TIME SIZE CONTROL WOULD BE BUILT INTO THE TOOLING.						
(8045) TITLE - IMPROVED TUBE STRAIGHTENING		125				
PROBLEM - TURE STRAIGHTENING IS AN ART WHICH REQUIRES YRS OF EXPERIENCE FOR DEVELOPMENT OF PROFICIENT OPERATORS, OPERATORS ARE LIMITED BY DIFFICULTY IN MONITORING AND CONTROLLING OF STRAIGHTENING OPERATIONS REGARDLESS OF EXPERIENCE.						
SOLUTION - PRESSES WILL BE MODIFIED BY ADDITION OF GUAGES AND CONTROL DEVICES, RESULTING IN IMPROVED EFFICIENCY, REDUCED TIME AND IMPROVED PRODUCT QUALITY. THIS CAPABILITY WILL DECREASE OPERATOR EXPERIENCE REQUIRED.						

		FUNDING ($000)				
		PRIOR	80	81	82	83	84
COMPONENT -- TUBES (CONTINUED)							
(8047)	TITLE - PASS THRU STEADY RESTS FOR TUBE TURNING		80		150		
	PROBLEM - ROLLER RESTS PROVIDE NECESSARY SUPPORT FOR GUN TUBE TURNING BUT IT WILL NOT ALLOW TURNING FULL LENGTH IN 1 SET UP. PRESENT METHOD IS TO USE 2 LATHES WITH 2 SET UPS OR LATHE MUST HAVE 2 CARRIAGES.						
	SOLUTION - A PASS THRU REST WILL ALLOW THE CARRIAGE TO MOVE FROM ONE SUPPORTED AREA OF THE TUBE TO THE OTHER WITHOUT DISTURBING THE SETUP. THE DESIGN WILL BE APPLICABLE TO CURRENTLY AVAILABLE EQUIP BUT WILL HAVE EVEN GREATER IMPACT ON NEW EQUIP ACQUISITIONS.						
(8048)	TITLE - IMPROVED INSP TECHNIQUES FOR INGOTS AND PREFORMS FOR RF		100	100			
	PROBLEM - CURRENT TECHNIQUE OF INSPECTION OF INGOTS IS TIME CONSUMING AND PRONE TO ERROR. EACH INGOT OR PREFORM MUST SATISFY AN INTERNAL SOUNDNESS REQUIREMENT. ULTRASONIC INSPECTION IS NECESSARY.						
	SOLUTION - AUTOMATIC ULTRASONIC TECHNIQUES WILL BE DEVELOPED TO ALLOW MORE RAPID AND ACCURATE INSPECTION.						
(8050)	TITLE - RECYCLING SPENT GUN TUBES BY ESR		150				
	PROBLEM - BECAUSE OF ANTICIPATED SHORTAGES IN THE AVAILABILITY OF CRITICAL ALLOYS, IT IS ADVANTAGEOUS TO UTILIZE SPENT GUN TUBES.						
	SOLUTION - TUBES WHICH CANNOT BE DIRECTLY ROTARY FORGED MIGHT BE REMELTED DIRECTLY BY ESR INTO INGOTS FOR USE ON THE ROTARY FORGE.						
(8103)	TITLE - HIGH VELOCITY MACHINING			61	191	200	200
	PROBLEM - SPEED OF MACHINING IS ALWAYS A PROBLEM IN DEALING WITH CANNON TUBES WHICH ARE LARGE, LONG (20-30 FT LONG) AND REQUIRE TIGHT TOLERANCE MACHINE WORK.						
	SOLUTION - THERE ARE METHODS CURRENTLY BEING DEVELOPED AND SOME ALREADY IN USE FOR REMOVING METAL AT HIGH SPEEDS. IT IS THE EXPLOITATION AND ADAPTION OF THESE METHODS FOR CANNON TUBES WHICH OFFER A SOLUTION TO THE NEED FOR HIGH SPEED METAL REMOVAL.						
(8106)	TITLE - LARGE CALIBER POWDER CHAMBER BORING		58	157	63		
	PROBLEM - POWDER CHAMBERS PRODUCTION ON LARGE BORE CANNON 8"M201 CURRENTLY REQUIRES 14 HRS TO ACCOMPLISH BOTH ROUGH AND FINISH OPERATIONS.						
	SOLUTION - PERFORM THE FINISHING OPERATION IN THE SAME SETUP AS THE ROUGHING OPERATION BUT USING AS A CUTTING MEDIA DIAMOND FINISHING TOOLS WHICH AT VERY HIGH SPEEDS PRODUCE EXCELLENT SURFACE FINISH. THIS PROCESS WOULD ELIMINATE ONE GRINDING OPERATION.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- TUBES (CONTINUED)						
(8339) TITLE - LASER SURFACE HARDENING					110	250
PROBLEM - SOME COMPONENTS PRODUCED BY WVA REQUIRE KEYWAYS OR BEARING SURFACES TO BE INDUCTION HARDENED, THIS REQUIRES THE USE OF INTRICATE COILS AND OFTEN RESULTS IN A HARDNESS PATTERN WHICH IS LESS THAN IDEAL.						
SOLUTION - LASERS ARE AVAILABLE WHICH WILL ALLOW CONTROLLED LOCAL HEATING, RAPID HEATING RATES WOULD ALLOW SURFACE HARDENING AT A RAPID RATE.						
(8341) TITLE - HOLLOW CYLINDER CUT OFF MACHINE		68	162			
PROBLEM - ESTAB, CYL LENGTH IS DONE 1 OF 2 WAYS, PARTED OFF IN A LATHE AND FACED TO LENGTH OR SAWED OFF AND THEN SET UP IN A LATHE FOR FACING TO FINAL LENGTH DIMENSIONS, IN EITHER CASE, THE OPERATION REQUIRES DOUBLE HANDLING OR SLOW OPERATING PROCEDURES.						
SOLUTION - NEW TECHNOLOGY IS BEING DEVELOPED WHEREBY A SET OF ROTATING CUTTERS MILLS THE CYLINDER TO LENGTH PRODUCING A FACE SURFACE TO SATISFY OUR TUBE LENGTH REQUIREMENTS CURRENT MACH, DESIGN WILL NOT PERFORM THIS FUNCTION BUT THE TECHNOLOGY IS APPLICABLE.						
(8342) TITLE - KEYWAY MILLING MACHINE		239				
PROBLEM - 155MM M185 REQUIRES 3 KEYWAYS BE MILLED ON C/L TO CLOSE DIMENSIONS AND TOLERANCES, PRESENTLY MILLED IN 3 DIFFERENT MACHINES REQUIRING 3 SET UPS AND 3 MOVES.						
SOLUTION - A SPECIAL PURPOSE KEYWAY MILLING MACHINE WILL BE DEVELOPED TO HOLD THE TUBE ON LOCATION AND MILL ALL 3 KEYWAYS SIMULTANEOUSLY. ALLIGNMENT OF ALL KEYWAYS TO C/L WOULD BE ASSURED.						

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* CATEGORY *
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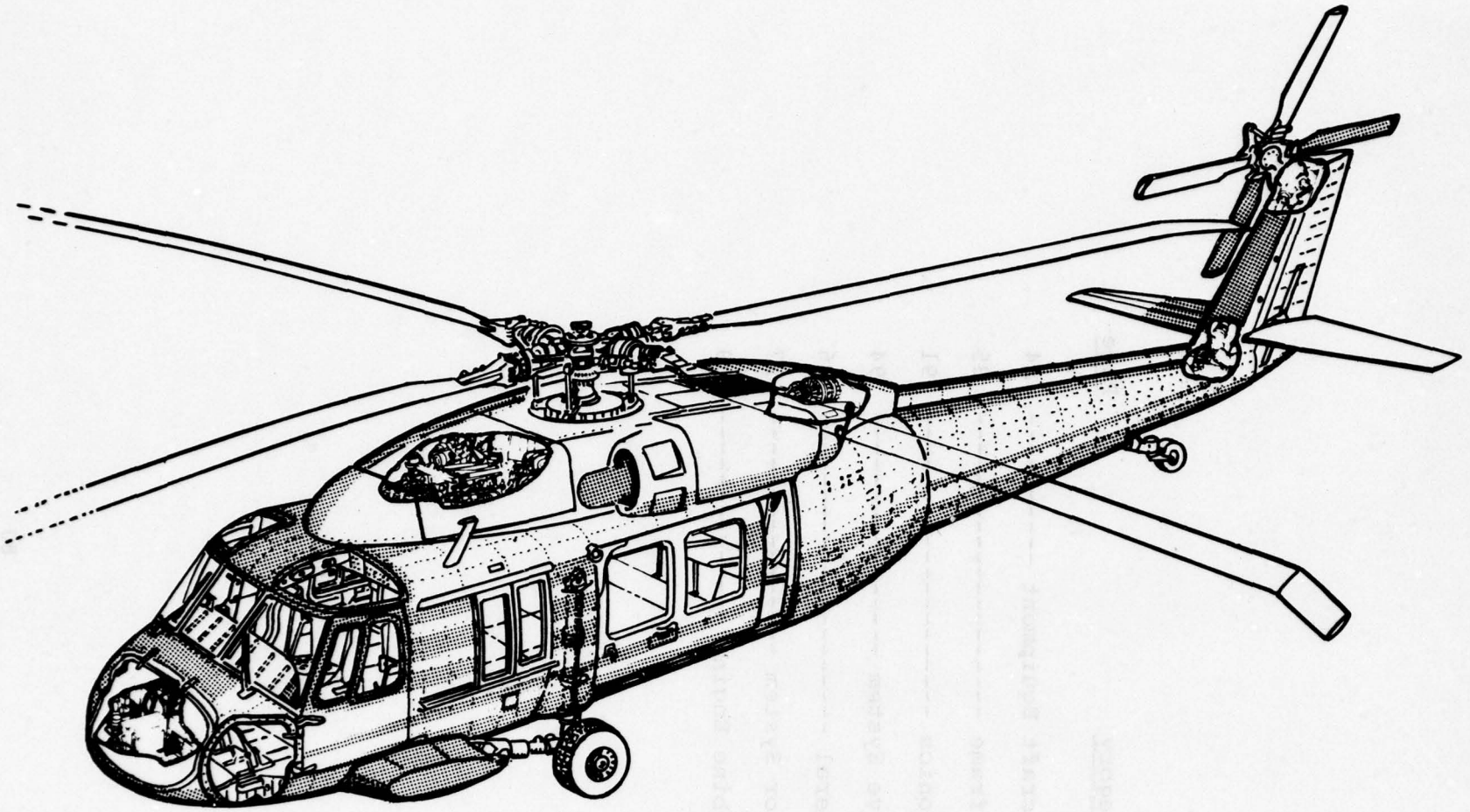
COMPONENT -- PROCESSES						
(7707) TITLE - AUTOMATED PROCESS CONTROL FOR MACHINING (CAM)	95	114				
PROBLEM - MACHINING OPERATIONS ARE SELECTED, PARAMETERS ARE SET, AND STANDARDS ARE ESTABLISHED EMPIRICALLY WITH LITTLE OR NO ENGINEERING ANALYSES, CONTROL OR FEEDBACK.						
SOLUTION - APPLY COMPUTERIZED CONTROLS FOR OVERALL SELECTION OF PROCESSES, OPERATIONS, PARAMETERS, FEEDBACK AND OPTIMATION, WITH AUTOMATED ESTIMATING AND DETERMINATION OF REAL TIME AND COSTS.						

FUNDING ($000)

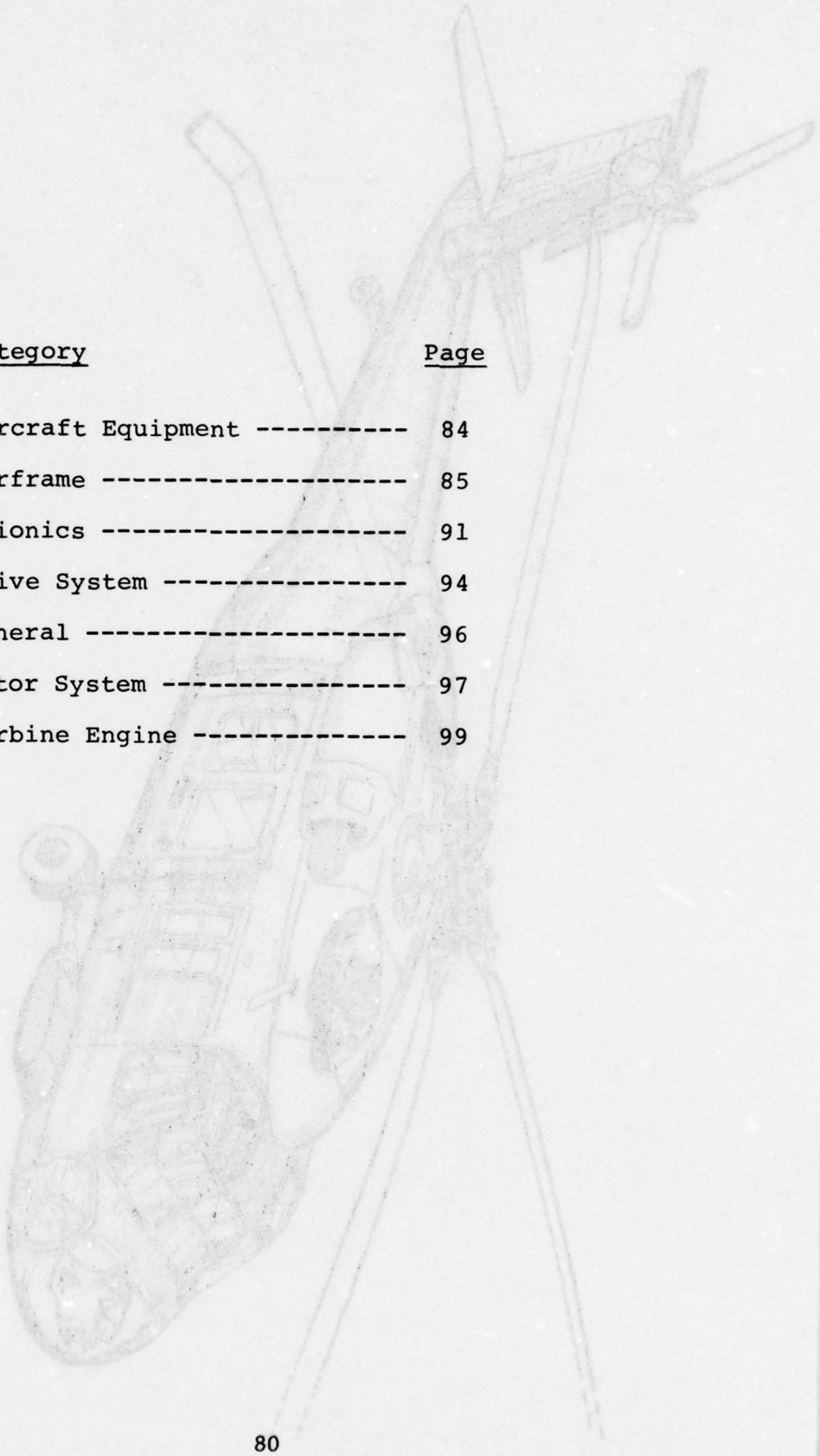
	PRIOR	80	81	82	83	84
COMPONENT -- PROCESSES (CONTINUED)						
(7949) TITLE - APPLICATION OF GROUP TECHNOLOGY MANUFACTURING (CAM)			177	200		
PROBLEM - PRESENT PLANNING, SCHEDULING, AND MANUFACTURE OF WEAPON ASSEMBLIES AND COMPONENTS ARE BY SEPARATE LOTS AND PARTS WHICH REQUIRE MULTIPLE, MACHINING OPERATIONS, SET-UPS AND CHANGES OF TOOLING, AND CAUSE LOSS OF TIME AND MONEY.						
SOLUTION - APPLY GROUP TECHNOLOGY TO CLASSIFY, CODE AND MANUFACTURE WEAPON ASSEMBLIES AND COMPONENTS AS FAMILIES-OF-PARTS, MATCH PARTS BY CONTOUR AND SIZE FOR SIMULTANEOUS MACHINING- AND, SUB-GROUP FOR MORE EFFICIENT MACHINING AND ASSEMBLY.						
********** CATEGORY ********** POLLUTION ABATEMENT						
COMPONENT -- GENERAL						
(8017) TITLE - POLLUTION ABATEMENT PROGRAM	124	182				
PROBLEM - MORE STRINGENT ENVIRONMENTAL REQUIREMENTS ARE BEING ESTABLISHED FOR AIR AND WASTE WATER DISCHARGE.						
SOLUTION - NEW NON-POLLUTING MANUFACTURING PROCESSES WILL BE EVALUATED AS SUBSTITUTES FOR PRESENT AIR AND WATER POLLUTING PROCESSES IN THE AREAS OF PLATING, MACHINING AND RUBBER COMPOUNDING.						
(8126) TITLE - SEPARATION OF OILS AND CUTTING FLUIDS FROM WASTE WATER			75	75		
PROBLEM - REMOVAL OF OILS AND CUTTING FLUIDS FROM WASTE WATER IS NECESSARY TO MEET EPA REQUIREMENTS.						
SOLUTION - EVALUATE CHEMICAL AND MECHANICAL METHODS FOR OIL AND CUTTING FLUID REMOVAL FROM WASTE WATER.						
(8302) TITLE - WASTE SLUDE DISPOSAL					100	
PROBLEM - SLUDGE DISPOSAL FROM PLATING SHOP EFFLUENTS IS NOT EASILY ACCOMPLISHED.						
SOLUTION - EVALUATE AND IMPLEMENT METHODS FOR THE EFFICIENT DISPOSAL OF WASTE SLUDGE.						
********** CATEGORY ********** QUALITY CONTROL/TESTING						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- GUN SYSTEMS						
(8036) TITLE - WEAPON AIMING SYSTEM FOR THE 6-DOF SIMULATOR		125				
PROBLEM - THE EXISTING PHYSICAL SIMULATION FACILITY FOR EVALUATION AND TESTING OF WEAPONS, STABILIZATION AND FIRE CONTROL SYSTEMS IS NOT CAPABLE OF FULLY TESTING THESE SYSTEMS BECAUSE THE PRESENT AIMING SYSTEM IS INADEQUATE FOR LARGE AMPLITUDE MOTIONS.						
SOLUTION - DEVELOP A WEAPON AIMING SYSTEM IN WHICH THE GUNNERS LINE OF SIGHT IS INDEPENDENT OF HULL MOTIONS INDUCED BY THE SIMULATOR, AND WHICH PROVIDES A REMOTE CONTROL AND DISPLAY CAPABILITY TO THE GUNNER.						
(8124) TITLE - MODERN DATA ACQUISITION AND REDUCTION SYSTEM			350			
PROBLEM - THE DATA ACQUISITION AND REDUCTION SYSTEM AT THE WARE SIMULATION CENTER USED TO SUPPORT PRODUCTION TESTING OF WEAPON SYSTEMS WAS PURCHASED IN FY68. TECHNOLOGICAL ADVANCES IN PHYSICAL SIMULATION CAPABILITY HAVE OUTGROWN THE DATA SYSTEM CAPABILITY.						
SOLUTION - OBTAIN A DATA ACQUISITION AND REDUCTION SYSTEM COMPATIBLE WITH PHYSICAL SIMULATION TESTING OF WEAPON SYSTEMS. SUCH A SYSTEM WILL IMPROVE THE CAPABILITY TO QUICKLY AND ACCURATELY ACQUIRE TEST DATA ON WEAPON SYS, STABILIZATION SYS AND FIRE CONTROL SYS.						
(8125) TITLE - TORQUE AND VIBRATION TESTING OF WEAPON SYSTEMS			200			
PROBLEM - FIELD FAILURES OF WEAPON SYSTEMS, STABILIZATION SYSTEMS AND FIRE CONTROL SYSTEMS DUE TO SHOCK AND VIBRATION SIGNIFICANTLY REDUCE THE EFFECTIVENESS OF COMBAT FORCES. IN ADDITION, SOME SYSTEMS PERFORM ONLY AT REDUCED LEVELS IN THE FIELD ENVIRONMENT.						
SOLUTION - PROVIDE EQUIPMENT FOR MORE REALISTICALLY SIMULATING THE SEVERE ENVIRONMENTAL VIBRATIONS AND DISTURBANCE TORQUE TO WHICH WEAPON SYSTEMS AND SUBSYSTEMS ARE SUBJECTED. THESE TEST EQUIPMENTS WILL BE INTEGRATED WITH EXISTING PHYSICAL SIM FACILITIES.						
(8212) TITLE - IMPROVED CAPABILITY FOR SIMULATION TESTING				140		
PROBLEM - THE 6-DEGREE-OF-FREEDOM SIMULATOR USED TO TEST WEAPON SYSTEMS BY IMPARTING MOTIONS TO A MOUNTED SYSTEM SUCH AS A HELICOPTER FUSELAGE CANNOT BE OPERATED AT FULL CAPACITY.						
SOLUTION - THE PRESENT HYD SUPPLY SYSTEM WILL BE AUGMENTED WITH TWO 250 H/P ELECTRIC MOTORS DRIVING 200 GPM HYD PUMPS. THIS INCREASED CAPACITY WILL ALLOW MAXIMUM CAPABILITY TO IMPART MOTIONS AND VIBRATIONS WHILE FIRING WEAPON SYSTEMS MOUNTED ON THE SIMULATOR.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- GUN SYSTEMS (CONTINUED)						
(8213) TITLE - TAILBOOM SIMULATOR TO TEST HELICOPTER WEAPON SYSTEMS				50	125	
PROBLEM - VARIOUS AUTOMATIC CANNONS AND WEAPON STABILIZATION SYSTEMS MOUNTED TO HELICOPTER FUSELAGES UNDERGO TESTING FROM THE 6-DEGREE-OF-FREEDOM SIMULATOR, HOWEVER, THE TAILBOOM IS REMOVED FROM THE HELICOPTER BEFORE THE FUSELAGE IS SUSPENDED.						
SOLUTION - A DEVICE TO REPRODUCE TAILBOOM FORCES ON THE HELICOPTER FUSELAGE WHILE WEAPONS ARE FIRING WILL BE DEVELOPED TO ENHANCE THE SIMULATION OF THE FIELD ENVIRONMENT.						
********** CATEGORY ********** SMALL CALIBER **********						
COMPONENT -- BARRELS						
(7520) TITLE - ULTRASONIC STRAIGHTENING			175		150	200
PROBLEM - BARREL STRAIGHTENING IS AN ART DEPENDENT UPON THE OPERATOR.						
SOLUTION - EMPLOY ULTRASONIC STRAIGHTENING METHODS.						
(8121) TITLE - FLOW-THROUGH CHROME PLATING OF SMALL ARMS BARRELS			65		150	200
PROBLEM - LARGE TANKS AND FLOOR SPACE REQUIRED.						
SOLUTION - SPECIAL FIXTURING WHICH WILL ELIMINATE 90 PERCENT OF SPACE REQUIRED.						
COMPONENT -- SPRINGS						
(7610) TITLE - ESTABLISH PROCEDURES FOR MFG SPRINGS WITH NON-METALLIC CORES				60	60	
PROBLEM - THERE ARE NO COILING STANDARDS OR PROCEDURES FOR MULTI-WIRE STRANDS WITH NON-METALLIC CORES.						
SOLUTION - DESIGN AND FABRICATE NECESSARY TOOLING AND ESTABLISH PROCEDURES.						
COMPONENT -- STOCK/RECEIVER						
(7654) TITLE - BLOW MOLDING WEAPONS COMPONENTS FOR SMALL ARMS	130	166	93	96	100	
PROBLEM - SOME SMALL ARMS COMPONENTS ARE COSTLY AND HAVE POOR SOUND ABSORBING CHARACTERISTICS.						
SOLUTION - MANUFACTURE SMALL ARMS PARTS FROM PLASTIC UTILIZING THE BLOW MOLDING PROCESS.						



AVIATION R&D COMMAND
(AVRADCOM)



Category	Page
Aircraft Equipment	84
Airframe	85
Avionics	91
Drive System	94
General	96
Rotor System	97
Turbine Engine	99

US ARMY AVIATION RESEARCH

AND DEVELOPMENT COMMAND

(AVRADCOM)

AVRADCOM, with headquarters at St. Louis, MO, is responsible for Army aviation research; development; product improvement; acquisition with respect to assigned materiel and research projects; initial procurement; and production. The Command directs the US Army Air Mobility Research and Development Laboratory with headquarters at NASA - Ames Research Center, Moffet Field, CA; US Army Avionics Agency and Laboratory, Fort Monmouth, NJ; US Army Aviation Engineering Flight Activity, Philadelphia, PA; US Army Bell Plant Activity, Fort Worth, TX; US Army Hughes Plant Activity, Culver City, CA; and three project managers: Aircraft Survivability Equipment; CH-47 Modernization Program; and Navigation/Control Systems. PM Advanced Attack Helicopter (AAH) and PM Utility Tactical Transport Aircraft System (UTTAS) are collocated with AVRADCOM, but are under the direct control of HQ, DARCOM.

In November of 1977, AVRADCOM conducted the first Army Aviation Manufacturing Technology Conference. The objective of the Conference was to develop a five year manufacturing technology investment plan by identifying major cost drivers and problem areas, obtaining proposed projects and defining investment priorities. The outcome of this Conference is reflected in the projected five year plan.

Projects listed in the Plan attack various MM&T problem areas. Heavy emphasis is placed on those areas where potential benefits will have a major impact. Aircraft structures is one such area. Conventional metallic aircraft structures require an excessive amount of machining, are expensive, and propose design/weight problems. A major thrust of AVRADCOM is to obtain low cost, composite fabrication techniques to produce these structures. Projects in the five year plan that attack this area are: 7051, 7113, 7157, 7166, 7177, 7178, 7192, 7214, and 8139.

Implementation of composite structures in Army aircraft is dependent upon the ability to detect and evaluate defects. Projects in the five year plan to develop applicable technology include: 7288, 7175, 7119, and 7172.

Expensive alloys with exotic elements are currently required to extend the operating temperature of metallic engine components. Emphasis on ceramic technology will develop techniques resulting in lower costs and improved performance of high temperature engine components. Projects in the plan devoted to this problem include 7268, 7190, and 7085. These projects are listed under the category, Turbine Engine.

Another problem area confronting AVRADCOM is gear technology. Current production methods for gears do not take advantage of advanced technological process available. Projects aimed at improving the quality, reliability, and cost of gears by improving process techniques are: 7155, 7267, and 7187.

Some of AVRADCOM's projects will have spin-offs to the private sector. Composite technology developing low cost composite fabrication techniques, and production oriented processing techniques for the manufacture of high performance, low cost titanium impeller castings are potential candidates. Other potential projects where spin-offs are likely include projects 7115 and 7299. Project 7115 will optimize quality, reliability, and costs for helicopter gears by developing ausrolling and improving process inspection techniques. Project 7299 will investigate the manufacturing technology to produce low cost fiber reinforced thermoplastic prepreg in sufficient quantity for mechanical property and prototype evaluation.

Projects totaling $66M have been identified by AVRADCOM and included in the five year plan. Funding will be provided from the Aircraft, PA 1497 appropriation. The overall MM&T effort is steadily increasing. This increase, from $3M in FY75 to a projected $18M in FY80, is contributed to DOD's increased emphasis on Manufacturing Technology and on awareness of the benefits (reducing future system acquisition costs) that can be achieved in the aviation environment.

Due to the uncertainties involved with long range planning, AVRADCOM plans five general projects that are used to provide budget support. These projects are listed in the plan as projects 7001 through 7005.

AVRADCOM

COMMAND FUNDING SUMMARY
(THOUSANDS)

CATEGORY	FY80	FY81	FY82	FY83	FY84
AIRCRAFT EQUIPMENT	1280	1480	470	320	1150
AIRFRAME	3660	3065	3245	6035	2860
AVIONICS	335	835	735	425	0
DRIVE SYSTEM	2580	2460	1075	400	1000
GENERAL	600	165	125	125	0
ROTOR SYSTEM	3100	1850	1000	550	1000
TURBINE ENGINE	6800	7695	4760	2603	1849
TOTAL	18355	17550	11410	10458	7859

CATEGORY	FUNDING ($000)					
	PRIOR	80	81	82	83	84
AIRCRAFT EQUIPMENT						
COMPONENT -- FUEL TANKS						
(7043) TITLE - PRODUCTION OF INERT FOAM FOR EXPLOSION PROOF FUEL TANKS	250	100				
PROBLEM - THE USE OF INTERNAL FUEL TANK FOAM TO MINIMIZE EXPLOSIONS UPON BALLISTIC IMPACT IS LIMITED DUE TO THE HYDROLYTIC INSTABILITY, BIODEGRADABILITY AND UNSATIFACTORY FUEL RESISTANT OF POLYURETHANE BASED FOAMS.						
SOLUTION - DEVELOP TECHNIQUES FOR THE MANUFACTURE OF PHOLYPHOSPHAZENE FOAMS TO BE USED FOR FIRE PREVENTION IN FUEL TANKS FOR ARMY AIRCRAFT.						
COMPONENT -- HYDRAULIC SYSTEM						
(7022) TITLE - PDN OF POLYPHOSPHAZENE FIRE RESIST HYDRAULIC FLUIDS		225	200	200		
PROBLEM - CURRENT HYDRAULIC FLUIDS THAT MEET REQUIRED PERFORMANCE SPECIFICATIONS ARE FLAMMABLE.						
SOLUTION - THE DEVELOPMENT OF PHOSPHAZENE FLUIDS DEMONSTRATE THERMAL STABILITY, VISCO-ELASTIC PROPERTIES, AND FIRE RESISTANCE. THIS WOULD INCREASE THE FIRE SAFETY OF ARMY AIRCRAFT.						
COMPONENT -- OTHER						
(7005) TITLE - MANUFACTURING TECHNOLOGY FOR HELICOPTER EQUIPMENT		440	330	70	70	1000
PROBLEM - MANUFACTURING PROBLEMS ARISING FROM INSUFFICIENTLY DEVELOPED STATE-OF-THE-ART TECHNOLOGY ARE RESPONSIBLE FOR VARIOUS FAILURES IN PRODUCTION BUY ITEMS.						
SOLUTION - DEVELOP TECHNOLOGY TO MANUFACTURE HELICOPTER EQUIPMENT FROM EXISTING OR NEW MATERIALS.						
(7080) TITLE - MFG. STRUCTURAL FOAMS WHICH DISPERSE HI-INTENSITY LIGHT			300	200		
PROBLEM - LASER RADIATION, RADAR AND FIRE PRESENT THREATS FOR WHICH PROTECTION MUST BE ESTABLISHED.						
SOLUTION - DEVELOP TECHNIQUES FOR THE COMMERCIAL PRODUCTION OF A HIGH SPECIFIC STRENGTH FOAM MATERIAL WHICH IS RADAR ABSORBANT FIRE RETARDANT AND RESISTANT TO LASER RADIATION.						
(7303) TITLE - ELECTRICAL WIRE HARNESS FABRICATION		215	450			
PROBLEM - PRESENTLY, ALL THE REQUIRED WIRE HAS BEEN NUMBERED AND IS THEN PULLED FROM STOCK, HAND FORMED AND TIED ON THE HARNESS LAYOUT BOARDS.						
SOLUTION - DEVELOP THE MANUFACTURING TECHNOLOGY FOR AUTOMATING THE FABRICATION, NUMBERING AND FORMING THAT WOULD PERFORM ALL PREREQUISITE WORK OF A PRODUCTION PROCESS.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- TRANSPARENT ARMOR						
(7078) TITLE - ARC PLASMA DEPOSITION PLTZ PROTECT FROM LASER RADIATION					250	150
PROBLEM - CURRENT HELICOPTER WINDSHIELDS ARE INADEQUATE IN THAT THEY DO NOT PROVIDE PROTECTION FOR AIRCREW AGAINST FLASH BLINDNESS AND THERMAL BURN ARISING FROM LASERS.						
SOLUTION - ADAPT LOW COST ARC PLASMA METHOD FOR DEPOSITING THIN FILM LEAD LANTHANUM ZIRCONATE TITNATE (PLZT) MATERIAGS OVER LARGE CONTOURED SURFACE AREAS.						
(7279) TITLE - LASER RESISTANT ARMOR WINDSHIELDS		300	200			
PROBLEM - CURRENT WINDSHIELDS ARE NOT LASER-RESISTANT WHICH COULD RESULT IN FLASH BLINDNESS OF THE PILOT, CRACKING AND CRAZING OF THE SURFACE, AS WELL AS PENETRATION OF THE COCKPIT.						
SOLUTION - DEVELOP MANUFACTURING TECHNOLOGY FOR TRANSPARENT, LASER-RESISTANT WINDSHIELDS WHICH WILL REDUCE HELICOPTER AND CREW LOSSES.						

CATEGORY: AIRFRAME

COMPONENT -- CUTOUTS						
(7277) TITLE - INTEGRATED LASER MACHINING/MEASUREMENT SYSTEM		250	250			
PROBLEM - CURRENT TECHNOLOGIES PROVIDE SUPERIOR METHODS OF CUTTING METALS AND SUBSEQUENT MEASUREMENTS TO DETERMINE IF WORK MEETS SPECIFICATIONS, HOWEVER THIS INVOLVES REPETITIVE OPERATIONS.						
SOLUTION - THIS PROJECT WILL PROVIDE THE MANUFACTURING TECHNOLOGY FOR DEVELOPING AN INTEGRATED LASER MEASURING SYSTEM FOR METAL MACHINING OPERATIONS.						
COMPONENT -- FUSELAGE STRUCTURES						
(7051) TITLE - FILAMENT WOUND ADVANCED COMPOSITE FUSELAGE	175	125				
PROBLEM - TO FULLY EXPLOIT POTENTIAL COST SAVINGS FOR COMPOSITE STRUCTURES, CURRENT PROTOTYPE FABRICATION TECHNIQUES MUST BE EXPANDED TO PRODUCTION PROCESSES.						
SOLUTION - ESTABLISH PRODUCTION TECHNIQUES FOR WET IMPREGNATED FILAMENT WINDING OF FUSELAGE COMPONENTS.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT	-- FUSELAGE STRUCTURES (CONTINUED)						
(7113)	TITLE - LOW COST COMPOSITE FUSELAGE PRIMARY STRUCTURES	500	1000	500			
	PROBLEM - CONVENTIONAL METALLIC FUSELAGE STRUCTURES ARE EXCESSIVE IN WEIGHT AND COMPOSITE FUSELAGE STRUCTURES ARE EXPENSIVE TO FABRICATE.						
	SOLUTION - DEVELOP TECHNOLOGY TO MANUFACTURE A COMPOSITE BELLY PAN AND AFT FUSELAGE USING LOW COST COMPOSITE FABRICATION TECHNIQUES.						
(7168)	TITLE - TWO STEP MOLDED RPV FUSELAGE					200	100
	PROBLEM - REMOTELY PILOTED VEHICLES MUST BE AS LOW IN COST AS POSSIBLE DUE TO MISSION REQUIREMENTS. PRESENT MANUFACTURING METHODS PREVENT THIS.						
	SOLUTION - MANUFACTURE RPV FUSELAGES IN 2 SECTIONS FROM FIBER REINFORCED THERMOPLASTICS, INSERT THE REQUIRED EQUIPMENT AND JOINS THE SECTION BY APPLYING LOCALIZED HEAT AND PRESSURE.						
(7178)	TITLE - ONE-STEP, LOW COST MANUFACTURE OF AIRCRAFT COMP STRUCTS				100	300	100
	PROBLEM - MANUFACTURING COST OF HELICOPTERS ARE HIGH DUE TO EXPENSIVE MATERIALS USED (METALS) AND HIGH COST OF COMPONENTS FABRICATION AND ASSEMBLY.						
	SOLUTION - CHANGE MATERIAL USED, REDUCE THE NUMBER OF PARTS REQUIRED, ELIMINATE PRODUCTION OPERATIONS, AND SIMPLIFY ASSEMBLY.						
(7179)	TITLE - LTWT, NON-STRUCT SKIN COVER FOR IMPROVED BLSTIC SRVIBLTY				125	225	
	PROBLEM - SURVIVABILITY OF HELICOPTER STRUCTURES TO 57MM HEL EXPLODING PROJECTILES IS NON-EXISTANT.						
	SOLUTION - DEVELOP THE TECHNOLOGY TO PRODUCE MOLDED REDUNDANT STRUCTURES WITH LIGHT WEIGHT SKIN COVERS.						
(7183)	TITLE - SEMI-AUTOMATED COMPOSITE MFG SYST, FOR FUSELAGE STRUCTURE	420		355			
	PROBLEM - HELICOPTER FUSELAGE STRUCTURES HAVE HIGH MFG COST DUE TO HIGH PART COUNT AND HIGH ASSEMBLY COSTS. METHODS OF COMPOSITE FABRICATION HAVE BEEN INVESTIGATED BUT HAND OPERATIONS RESULT IN HIGH LABOR COSTS.						
	SOLUTION - FABRICATE AND DEMONSTRATE A SEMI-AUTOMATED COMPOSITE MANUFACTURING SYSTEM FOR THE PRODUCTION OF COMPOSITE HELICOPTER FUSELAGE STRUCTURAL PARTS.						
(7208)	TITLE - BALLISTIC TOLERANT TAIL CONES				315	545	
	PROBLEM - BALLISTIC TOLERANCE OF CONVENTIONALLY CONSTRUCTED (SKIN-STRINGER) TAIL CONES IS CONSIDERED MARGINAL.						
	SOLUTION - DEVELOP MOLDED TAIL CONE STIFFENED WITH COMPOSITE GEODESIC STRUCTURES AND COVERED WITH FIBER REINFORCED COMPOSITE SKING AS A MEANS OF DECREASING RESISTANCE TO FRACTURE GROWTH DURING AND AFTER BALLISTIC IMPACT.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT	-- FUSELAGE STRUCTURES (CONTINUED)						
(7214)	TITLE - SIMULTANEOUS MOLDING AND FORMING OF STIFF PRIMARY STRUCTURES					575	
	PROBLEM - CONVENTIONAL METALLIC FUSELAGE STRUCTURES ARE EXCESSIVE IN WT, COMPOSITE STRUCTURES ARE EXPENSIVE TO FABRICATE WITH HAND LAYUP.						
	SOLUTION - DEVELOP LOWER COST MANUFACTURING TECHNIQUES FOR SIMULTANEOUSLY MOLDING AND FORMING STIFFENED PRIMARY STRUCTURES. USE AUTOMATED LAYUP TECHNIQUES WHERE APPROPRIATE. USE FOAM OR NOMEX FILLERS WHERE STIFFNESS IS REQUIRED.						
(7306)	TITLE - HIGH STRENGTH ALUMINUM STRUCTURAL CASTINGS USING HIP				125	125	
	PROBLEM - ALUMINUM CASTINGS ARE NOT GENERALLY USED IN AIRCRAFT PRIMARY STRUCTURE DUE TO THE LOWER STRENGTH, DUCTILITY AND FRACTURE TOUGHNESS AND POOR MICROSTRUCTURE OF CONVENTIONAL CASTINGS.						
	SOLUTION - DEVELOP HIGH STRENGTH ALUMINUM CASTINGS WITH MATERIAL PROPERTIES APPROCHING THOSE OF 7075-T73.						
COMPONENT	-- GENERAL						
(7001)	TITLE - *MFG TECHNOLOGY FOR AIRFRAME AND SECONDARY STRUCTURES*		1100	760	170	170	1000
	PROBLEM - MANUFACTURING PROBLEMS ARISING FROM INSUFFICIENTLY DEVELOPED STATE-OF-THE-ART TECHNOLOGY ARE RESPONSIBLE FOR VARIOUS FAILURES IN PRODUCTION BUY ITEMS.						
	SOLUTION - DEVELOP TECHNOLOGY TO MANUFACTURE AIRFRAME AND SECONDARY STRUCTURES FROM EXISTING NEW METALLIC OR NONMETALLIC MATERIALS AT SUBSTANTIALLY LOWER COSTS.						
COMPONENT	-- MISC COMPONENTS						
(7192)	TITLE - DRAWING OF METAL MATRIX COMPOSITES		165				
	PROBLEM - THERE IS A CONTINUING NEED FOR TOTAL SYSTEMS WEIGHT REDUCTION ATTAINABLE AT REASONABLE COSTS.						
	SOLUTION - DEVELOP STREAMLINED DRAW DIES TO PRODUCE METAL MATRIX COMPOSITES INTO DESIRED STRUCTURAL SHAPES.						
(7243)	TITLE - EFFICIENT MACHING METHODS FOR KEVLAR COMPOSITE STRUCTURES	150	125				
	PROBLEM - PRESENT TOOLING AND METHODS TEND TO CAUSE DELAMINATION AND EXCESSIVE FUZZING/FRAYING OF KEVLAR LAMINATES.						
	SOLUTION - DEVELOP TOOLING AND METHODS TO ACHIEVE BASIC MACHINING OPERATIONS ON KEVLAR LAMINATES.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- MISC COMPONENTS (CONTINUED)							
(7244)	TITLE - LASER CUTTING AND WELDING OF METAL			300	300	300	
	PROBLEM - TECHNIQUES ARE NEEDED THAT WILL REDUCE CUTTING AND WELDING TIMES ON AIRCRAFT PARTS.						
	SOLUTION - DEVELOP LASER WELDING TO PERMIT RAPID, PRECISE AND STRUCTURALLY SOUND WELDS. DEVELOP LASER CUTTING METHODS TO CUT COMPLEX CORNERS AT HIGH SPEED.						
(7307)	TITLE - ALUMINA FIBER REINFORCED AL AND MAGNESIUM COMPOSITES				230	510	660
	PROBLEM - THERE IS A NEED FOR LIGHTER WEIGHT MATERIALS WITH GREATER STRENGTH, STIFFNESS AND RETENTION OF PROPER TIES AT ELEVATED TEMPERATURES OR IMPROVED CORROSION RESISTANCE.						
	SOLUTION - DEVELOP METAL MATRIX COMPOSITES.						
COMPONENT -- OTHER							
(7148)	TITLE - COST/DESIGN GUIDE FOR DESIGNING A/C TO UNIT PROD COST				280	300	500
	PROBLEM - MANUFACTURING COSTS ARE REQUIRED CRITERIA IN AVIATION DESIGN/PRODUCIBILITY. RELEVANT, CONCISE AND ACCURATE DESIGN/PRODUCTION COST TRADEOFFS IS A FUNCTION OF MANUFACTURING TECHNOLOGY.						
	SOLUTION - DEVELOP AND USE A MANUFACTURING UNIT COST DESIGN GUIDE TO SUPPLY THIS CRITERIA.						
(7284)	TITLE - SUPERPLASTIC FORM OF TITANIUM FOR HELICOPTER COMPONENTS	520	400				
	PROBLEM - CURRENT ENGINE COMPARTMENT STRUCTURES EMPLOY EITHER STEEL OR TITANIUM TO MEET THE HIGH TEMPERATURE REQUIREMENTS. AS SHEET METAL STRUCTURAL COMPONENTS, THESE ALLOYS ARE EXPENSIVE TO FABRICATE AND ASSEMBLE.						
	SOLUTION - DEVELOP A MANUFACTURING PROCESS THAT USES THE SUPERPLASTIC FORMING AND DIFFUSION BONDING (SPF/DB) PROPERTIES OF TITANIUM TO PRODUCE ENGINE COMPARTMENT STRUCTURES AND AIRFRAME PARTS.						
(7299)	TITLE - PRODUCTION OF LOW COST THERMOPLASTIC PREPREG	300	200				
	PROBLEM - THERMOPLASTIC PREPREGS CURRENTLY PRODUCED ARE COSTLY DUE TO EXPENSIVE PROCESSING EQPT AND ARE OF POOR QUALITY BECAUSE RESIN IS OFTEN APPLIED BY SOLVENT SOLUTION TECHNIQUES.						
	SOLUTION - DEVELOP THE MANUFACTURING TECHNOLOGY TO PRODUCE LOW COST FIBER REINFORCED THERMOPLASTIC PREPREG IN SUFFICIENT QUANITY FOR MECHANICAL PROPERTY AND PROTOTYPE EVALUATION.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- OTHER (CONTINUED)						
(7302) TITLE - PRODUCTION OF TIB2 COATED LONG LIFE TOOLS		200				
PROBLEM - AIRFRAME FORGINGS REQUIRE EXTENSIVE MACHINING WHICH IS EXPENSIVE IN TERMS OF LABOR HOURS REQUIRED AND TOOL COSTS. COMPOSITES AND ABRASIVE MATERIALS ARE DIFFICULT TO MACHINE WITH CONVENTIONAL TOOLING.						
SOLUTION - DEVELOP AN ELECTRODEPOSITED TIB2 ON STEEL DRILLS THAT WILL INCREASE THE LIFE OF CONVENTIONAL TOOLS WHEN USED FOR DRILLING FIBERGLASS.						
(8157) TITLE - PRODUCTION OF GRAPHITE FILM				200	275	
PROBLEM - CUTOUTS AND HOLES CAUSE A LOSS OF STRENGTH IN FILAMENT REINFORCED COMPOSITE MATERIALS SINCE THE STRENGTH OF THESE MATERIALS IS DEPENDENT ON THE ORIENTATION OF THE REINFORCING FIBERS.						
SOLUTION - ESTABLISH TECHNOLOGY TO PRODUCE INPLANE ISOTROPIC MATERIAL WHICH CAN REPLACE THE FIBERS WHOLLY OR PARTIALLY AT BOLT HOLE AND CUTOUT AREAS.						
COMPONENT -- SECONDARY STRUCTURES						
(7157) TITLE - STRUCTURAL FOAM FOR SECONDARD STRUCTURES			200			
PROBLEM - PRESENT METHODS OF FABRICATING SECONDARY STRUCTURES SUCH AS FAIRINGS AND ACCESS DOORS INVOLVE SIGNIFICIANT RECURRING LABOR AND PREMIUM MATERIALS.						
SOLUTION - ESTABLISH A MANUFACTURING PROCESS USING PRESENTLY DEVELOPED HIGH AND LOW PRESSURE STRUCTURAL FOAM MOLDING TECHNIQUES.						
(7166) TITLE - TRANSFORMING/BLOW MOLDING OF FRP COMPONENTS			250	100		
PROBLEM - THE RISING USE OF COMPOSITE MATERIALS FOR STRUCTURAL APPLICATIONS HAS BROUGHT ABOUT A NEED FOR NEW MANUFACTURING METHODS TO REDUCE COST AND INCREASE QUALITY.						
SOLUTION - DEVELOP TECHNOLOGY FOR COMBINING THE THERMOFORMING AND BLOW MOLDING PROCESSES TO FABRICATE THERMOPLASTIC SHEET MATERIALS INTO COMPOSITES STRUCTURES.						
(7167) TITLE - FOAM RESERVOIR OF COMPOSITE STRUCTURES			250	100		
PROBLEM - USING TRADITIONAL LAMINATE MOLDING TECHNIQUES, THE PRIMARY WAY OF INCREASING STIFFNESS IS TO INCREASE PART THICKNESS, RESULTING IN GREATER COST AND ADDED WEIGHT.						
SOLUTION - UTILIZE OPEN CELL FOAM CORE AS A RESERVOIR FOR RESIN PLACED BETWEEN 2 LAYERS OF DRY REINFORCEMENT AND CURED IN A MOLD TO BRING ABOUT LESS COSTLY PARTS WITH REDUCED THICKNESS.						

		FUNDING ($000)				
		PRIOR	80	81	82	83	84
COMPONENT -- SECONDARY STRUCTURES (CONTINUED)							
(7177)	TITLE - ELASTIC RESERVOIR MOLDING OF RPV STRUCTURES			200	250		
	PROBLEM - METAL COMPONENTS ON REMOTELY PILOTED VEHICLES (RPV) RESULT IN EXCESS WEIGHT AND COST.						
	SOLUTION - FABRICATE STRONG, STIFF, LIGHTWEIGHT STRUCTURES USING RELATIVE INEXPENSIVE MATERIALS, AND ELASTIC RESERVOIR MOLDINGS (USING FIBER MAT AS THE REINFORCING MATERIALS, IN THE POLYMER COMPOSITE RATHER THAN CONTINUOUS FIBER).						
(7215)	TITLE - EDGE MEMBERS FOR HELICOPTER FUSELAGES.				200	550	
	PROBLEM - SANDWICH PANELS FOR HELICOPTER FUSELAGES CURRENTLY REQUIRE HIGH-COST, CLOSE-FIT EDGE MEMBERS WHICH ARE SENSITIVE TO TOLERANCE REQUIRED FOR EFFICIENT ADHESIVE-BONDED JOINTS, POSING MOISTURE, MIGRATION AND DELAMINATION PROBLEMS.						
	SOLUTION - DESIGN LOW COST EDGE-MEMBER WHICH AVOID CORE MACHINING AND ALLEVIATE TOLERANCE PROBLEMS. THE NEWER COMPOSITE FABRICATION PROCESSES NEED TO BE FOCUSED ON NEW SANDWICH EDGE-MEMBERS OR CLOSE-OUT CONFIGURATIONS FOR SANDWICH PANELS.						
(7216)	TITLE - TECHNIQUE FOR APPLYING TEMPERED GLASS TO HELICOPTER WINDOW					490	200
	PROBLEM - WINDOWS OF HELICOPTERS BECOME DULLED BY WINDBLOWN ABRASIVES, AND SOMETIME CRACKED BY PROJECTILES. THERE IS A GROWING SHORTAGE OF PLEXIGLASS, THE PATCHES MADE ARE NOT TRANSPARENT, AND TOO MANY PATCHES CAUSE REPLACEMENTS.						
	SOLUTION - DEVELOP TECHNIQUES FOR APPLYING TEMPERED GLASS TO EXTERIOR OF WINDOWS (PLEXIGLAS INNER LAYER).						
(7217)	TITLE - EVALUATION OF BI-MODAL RESIN SYSTEMS					300	300
	PROBLEM - EPOXY BINDER USED IN FIBER REINFORCED STRUCTURES STILL REQUIRE IMPROVEMENT FROM THE STANDPOINT OF OPTIMIZING RESISTANCE TO CRACK GROTH.						
	SOLUTION - EVALUATE "BI-MODAL" RESIN SYSTEMS CONTAIN RUBBER-LIKE ADDITIVES WHICH PRECIPATE AND SPHERODIZE DURING THE CURE CYCLE TO PROVIDE ADDED RESISTANCE TO FATIGUE CRACK BROTH DURING SERVICE.						
(7219)	TITLE - MOLDED ONE PIECE SECONDARY SHAPES					490	
	PROBLEM - MOST SECONDARY STRUCTURES ARE CURRENTLY MADE WITH SKIN-STRINGER CONSTRUCTION INVOLVING SEVERAL PARTS AND NUMEROUS FASTENERS WHICH, IN TURN, REQUIRES A HIGH LABOR CONTENT.						
	SOLUTION - DEVELOP MANUFACTURING METHODS FOR MOLDING ONE PIECE SECONDARY SHAPES FROM STRUCTURAL FRAMES INTEGRALLY STIFFENED WHERE NECESSARY.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- SECONDARY STRUCTURES (CONTINUED)							
(7220)	TITLE - COMPRESSION, INJECTION, AND TRANSFER MOLDING				550	480	
	PROBLEM - RELIABILITY AND MAINTAIN ABILITY PROBLEMS OCCUR IN METAL PARTS BECAUSE OF VIBRATION, CORROSION, ENVIRONMENTAL EFFECTS, AND NEED FOR REPAINTING; PARTS MADE FROM FIBER CLASS CLOTH ARE HIGH IN COST.						
	SOLUTION - DOOR, HATCHES AND ACESS PANELS WILL BE PRODUCED FROM CHOPPED FIBER-REINFORCED THERMO-PLASTICS BY COMPRESSION, INJECTION AND TRANSFER MOLDING PROCEDURES.						
(7301)	TITLE - DEVELOP A MACHINE FOR WET FILAMENT WINDING/TUBULAR ELE		95				
	PROBLEM - THERE ARE A NUMBER OF POTENTIAL CANDIDATES FOR WET FILAMENT WOUND COMPONENTS FOR AIRFRAME STRUCTURES THAT ARE BENT TO SOME DEGREES, A CONFIGURATION THAT CANNOT BE HANDLED READILY WITH CURRENT WINDING MACHINES.						
	SOLUTION - DEVELOP A MACHING WITH THE CAPABILITY FOR PROGRAMMING FOR ADJUSTABLE WINDING ANGLES AND WALL THICKNESS, USING ANY OF THE COMMONLY AVAILABLE FILAMENT MATERIALS, EITHER INDIVIDUALLY OR IN SELECTED MIXES TO ACHIEVE OPTIMUM STRENGTH/STIFFNESS CHAR.						
COMPONENT -- STRUCTURAL MEMBERS							
(7063)	TITLE - PRODUCTION OF METAL MATRIX COMPOSITE CROWN FRAME				200	200	
	PROBLEM - CROWN FRAMES ON PRESENT HELICOPTERS ARE LIMITED IN FATIGUE LIFE AND ARE EXCESSIVE IN WEIGHT.						
	SOLUTION - REPLACE STEEL STIFFENING CAPS ON THE CROWN FRAME WITH BORON/ALUMINUM OR ALUMINUM/GRAPHITE BONDED TO ALUMINUM ANGLES.						

CATEGORY

AVIONICS

COMPONENT -- DETECTORS							
(7317)	TITLE - SEALING CASTINGS FOR FLIR COMMON MODULE COOLERS			55			
	PROBLEM - IT IS DIFFICULT TO CONTAIN THE PRESSURIZED HELIUM USED AS THE REFRIGERANT IN THE FLIR COMMON MODULE COOLERS.						
	SOLUTION - DEVELOP LEAK-PROOF CASTINGS.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- DISPLAYS							
(7312)	TITLE = DEVELOPMENT OF MULTIPLEX SYSTEM FOR CDU LAMP DISPLAYS				185		
	PROBLEM = PRESENT CDU USES CABLES WITH 160 WIRES TO DRIVE LAMPS, TWO CIRCUIT CARDS ARE REQUIRED, MANUFACTURING AND MAINTENANCE COSTS OF THIS APPROACH ARE HIGH.						
	SOLUTION = INCORPORATE A MULTIPLEX LAMP DRIVER APPROACH WHICH WOULD REDUCE THE NUMBER OF CARDS FROM 2 TO 1 AND ELIMINATE APPROXIMATELY 130 WIRES IN THE DISPLAY CABLE.						
(7316)	TITLE = IMPROVED MANAGEMENT SYSTEM FOR HELICOPTER COCKPITS				125	125	
	PROBLEM = INCREASED USE OF AVIONICS UNITS AND MONITORING FUNCTIONS FOR COMMUNICATIONS, FIRE CONTROL, AND AIRCRAFT OPERATION HAS RESULTED IN AN EVER INCREASING NUMBER OF CONTROL PANELS AND DISPLAYS IN A HELICOPTER COCKPIT.						
	SOLUTION = A COMBINATION OF A MULTIPURPOSE DISPLAY, MICROPROCESSOR AND MINIMAL KEYBOARD WILL BE DESIGNED AS A MULTISYSTEM CONTROL UNIT AND/OR MULTIPURPOSE INDICATOR UNIT TO SET UP AND MONITOR HELICOPTERS AVIONIC UNITS AND AIRCRAFT OPERATION.						
COMPONENT -- GENERAL							
(7292)	TITLE = FAULT DETECTION/ISOLATION TESTING OF MICROPROCESSORS	115	115				
	PROBLEM = TESTING OF CPU CARDS AND OR INTERMITTENT MICROPROCESSOR PART FAILURES ARE MOST DIFFICULT PROBLEM TO SOLVE. STD AUTOMATIC TEST EQPT BECOMES INEFFICIENT, OR UNPROGRAMABLE, WHEN COMPLEX INTEGRATED CRTS ARE PORTIONS OF THE PRINTED CRT CARD TESTED.						
	SOLUTION = DEVELOP METHODS OF ISOLATING LARGE NUMBER OF LEADS ON SAME BUSS FOR TEST PURPOSES, USE PLUGGABLE CPU (REPLACING IT WITH A SIMULATOR WHENEVER THE PCB FAILS), AND DEVELOP PROGRAMING TECHNIQUES.						
(7310)	TITLE = TADS/PNVS LENS HOLDER AND GIMBAL PRODUCIBILITY		60				
	PROBLEM = LENS HOLDER AND GIMBAL PARTS ARE DIFFICULT TO MACHINE RESULTING IN COST AND WEIGHT PENALTIES.						
	SOLUTION = DEVELOP NECESSARY TOOLS TO PRODUCE COMPLEX SHAPED PARTS FOR THE TADS/PNVS SYSTEMS.						
(7313)	TITLE = INTERACTIVE ANALOG CIRCUIT FAULT ISOLATION					300	
	PROBLEM = AUTOMATIC FAULT ISOLATION TECHNIQUES FOR DENSELY PACKAGED ANALOG AND HYBRID CIRCUIT BOARDS ARE NOT AVAILABLE IN THE MANUFACTURING ENVIRONMENT.						
	SOLUTION = COMBINE THE PRIMARY CAPABILITY OF THE ATE TO RAPIDLY COLLECT MANY MEASUREMENTS WITH THE UNEQUALLED REASONING CAPABILITY OF AN EXPERIENCED HUMAN TROUBLESHOOTER.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- GENERAL (CONTINUED)						
(7315) TITLE - POISE GIMBLA PRODUCIBILITY		90	90			
PROBLEM - THE PRESENT APPROACH TO FABRICATION OF THE SEVERAL GIMBALS AND BASE PLATE IS CASTING AND MACHINING MAGNESIUM, MAGNESIUM GIMBLAS ARE EXPENSIVE AND HAVE A RATHER LOW STIFFNESS.						
SOLUTION - CONSIDER NEW MATERIALS (GRAPHITE-EPOXY OR KEVLAR-EPOXY) THAT OFFER THE PROBABILITY OF SUBSTANTIALLY HIGHER STIFFNESS AND LOWER PRODUCTION COST.						
(7319) TITLE - MULTI-LEGEND DISPLAY SWITCH (MLD/S)			600			
PROBLEM - EXPERIMENTAL VERSIONS ARE EXPENSIVE AND DIFFICULT TO MANF BECAUSE THE MOUNTING OF THE COMMERCIALLY AVAILABLE ELECTRONICS DISPLAY CHIPS AND SWITCHES MUST BE DONE BY HAND IN ORDER TO OBTAIN PROPER RUGGEDNESS AND OPERATION OF THE STRUCTURE.						
SOLUTION - MAKE THE MLD/S A MANUFACTURABLE ITEM SO IT CAN BE MADE ROUTINELY AVAILABLE FOR INCORPORATION IN AVIONIC SYSTEMS. ESTABLISH THE MANUF TECHNIQUES TO PROPERLY MOUNT, ALIGN, AND FABRICATE MILITARIZED DISPLAYS AND SWITCHES INTO RUGGEDIZED, RELIABLE MLD/S.						
COMPONENT -- GUIDANCE SYSTEMS						
(7311) TITLE - AUTOMATED FABRICATION TECHNIQUES FOR WOUND INERTIAL EQPT		70	90			
PROBLEM - ALMOST ALL OF THE WOUND COMPONENTS USED IN INERTIAL GUIDANCE SYSTEMS ARE RELATIVELY COMPLICATED, HAND-WOUND DEVICES WHICH REQUIRE THE UTMOST IN ASSEMBLER DEXTERITY TO ACHIEVE THE DESIRED RESULTS.						
SOLUTION - DEVELOP AUTOMATED FABRICATION TECHNIQUES FOR WOUND COMPONENTS IN ORDER TO REDUCE THE COST OF MILITARY INERTIAL GUIDANCE SYSTEMS.						
COMPONENT -- GYROS						
(7309) TITLE - LOW TEMPERATURE LUBRICANT FOR INERTIAL GYROSCOPES				75		
PROBLEM - SOME APPLICATIONS OF GYROS PRESENTLY CONTAIN COSTLY HEATERS AND THERMOSTATS IN ORDER TO OPERATE IN THEIR VISCOUS LUBRICANT.						
SOLUTION - EVALUATE A NEW CLASS OF LUBRICANT BLENDED BY SINGER-KEARFOTT IN ACTUAL GYRO MOTORS AND GYROS IN ORDER TO VERIFY PERFORMANCE CHARACTERISTICS SUCH AS POWER GAG, NOISE LEVELS AND LIFE.						
(7314) TITLE - PRODUCTION OF IMPROVED MIRRORS FOR RING LASER GYROS				350		
PROBLEM - THE KEY PARAMETERS IN RING LASER GYRO MIRRORS ARE LOW SCATTERING, LOW ABSORPTION AND DURABILITY IN THE HELIUM/NEON PLASMA.						
SOLUTION - IMPROVE MIRRORS FOR RING LASER GYROS BY PROVIDING THE OXYGEN NECESSARY FOR PROPER STOICHIOMETRY WHILE MAINTAINING A HIGH VACUUM IN THE CHAMBER.						

CATEGORY

DRIVE SYSTEM

	FUNDING ($000)					
	PRIOR	80	81	82	83	84

COMPONENT -- GEARS

(7155) TITLE - COST EFFECTIVE MFG METHODS FOR IMPROVED HELICOPTER GEARS — 596 | 375

PROBLEM - DEMAND IN HELICOPTER OPERATION OF GREATER RELIABILITY OF HIGH PERFORMANCE GEARS AT LOWER COST HAS REQUIRED THAT IMPROVED PROCESSING AND EVALUATION TECHNIQUES BE INSTITUTED.

SOLUTION - OPTIMIZE QUALITY, RELIABILITY AND COST BY DEVELOPING AUSROLLING AND IMPROVING IN PROCESS INSPECTION TECHNIQUES.

(7187) TITLE - POWDER METALLURGY GEARS FOR GAS TURBINE COMPONENTS — 200 | 250

PROBLEM - PRODUCE GEARS FOR GAS TURBINE COMPRESSORS AT A LOWER COST.

SOLUTION - DEVELOP THE MANUFACTURING AND QUALIFICATION FOR THE PRODUCTION OF LIGHTLY STRESSED, LOW TEMPERATURE POWER METALLURGY GEARS FOR SELECTED NON-CRITICAL APPLICATIONS.

(7267) TITLE - LOW COST GEARS FOR TURBINE ENGINES AND ACCESSORY GEARBOX — 250 | 375 | 125

PROBLEM - CURRENT PRODUCTION METHODS FOR GEARS DO NOT TAKE FULL ADVANTAGE OF ADVANCED TECHNOLOGICAL PROCESSES AVAILABLE.

SOLUTION - DEMONSTRATE THE ECONOMY OF USING ADVANCED TECHNOLOGICAL PROCESSES SUCH AS ORBITAL PRECISION FORGING, LASER OR ELECTRON BEAM HARDENING, ROLL-FORMED GEAR TEETH AND POT BROACHING IN THE MANUFACTURE OF AIRCRAFT GEARS.

(7273) TITLE - ONE PIECE DOUBLE HELICAL GEARS — 125

PROBLEM - CURRENTLY DOUBLE HELICAL GEARS ARE MADE IN TWO PIECES AND ELECTRON BEAM WELDED TOGETHER. THIS RESULTS IN LARGE GAPS BETWEEN WELDS AND IN TURN MORE WEIGHT.

SOLUTION - THIS PROJECT WOULD ELIMINATE THE WELDING GAP WHICH WOULD ALLOW THE GEAR TO BE LIGHTER IN WEIGHT FOR A GIVEN LOAD.

(7274) TITLE - FORM WHEEL GROUND DOUBLE HELICAL GEARS — 110

PROBLEM - PRESENTLY DOUBLE HELICAL GEARS ARE PRODUCED BY MACHINING AND FINISH GRINDING EACH ROW OF HELICAL TEETH SEPARATELY AND BY ELECTRON BEAM WELDING THE TWO ROWS TOGETHER. THIS REQUIRES A FINISH GRINDING OPERATION WHICH IS VERY TIME CONSUMING.

SOLUTION - THIS PROJECT WILL PROVIDE THE MANUFACTURING TECHNOLOGY FOR FINISH GRINDING DOUBLE HELICAL GEARS BY FORM WHEEL GRINDING. THIS ELIMINATES TWO MACHINING OPERATIONS.

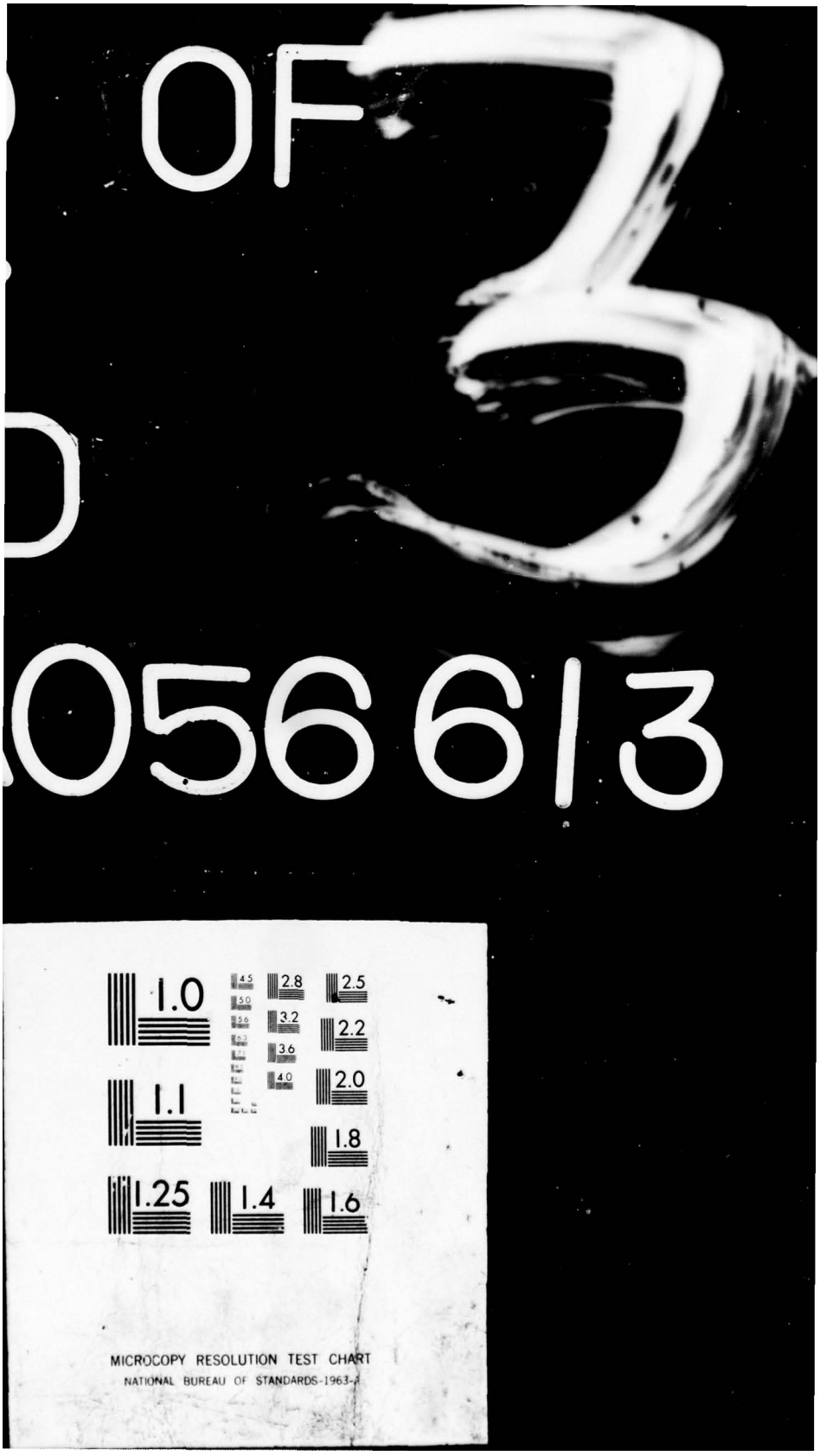
		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- GEARS (CONTINUED)							
(7298)	TITLE - EVALUATION OF HIGH TEMPERATURE CARBURIZING	150	150	250			
	PROBLEM - PRESENT GEAR CARBURIZING IS PERFORMED AT 1700 DEG F (PER MIL-S-6090) WHICH REQUIRES PROCESSING TIMES OF 8-10 HOURS.						
	SOLUTION - REDUCE PROCESSING TIME BY INCREASING THE OPERATING CAPACITY, ALSO INVESTIGATE VACUUM CARBURIZING AND HARDING OF VARIOUS GEAR CONFIGURATIONS IN ORDER TO PRODUCE A MORE UNIFORM CARBON PROFILE OF GEAR TEETH.						
COMPONENT -- OTHER							
(7003)	TITLE - MANUFACTURING TECHNOLOGY FOR DRIVE PARTS AND COMPONENTS		970	660	150	190	1000
	PROBLEM - MANUFACTURING PROBLEMS ARISING FROM INSUFFICIENTLY DEVELOPED STATE-OF-THE-ART TECHNOLOGY ARE RESPONSIBLE FOR FAILURE IN PRODUCTION BUY ITEMS.						
	SOLUTION - DEVELOP TECHNOLOGY TO MANUFACTURE METALLIC AND NON-METALLIC FROM EXISTING OR NEW MATERIALS TO INCREASE RELIABILITY AND DECREASE LIFE CYCLE COSTS.						
(7271)	TITLE - REGENERATIVE TEST STANDS FOR HELICOPTER TRANSMISSIONS		225	575			
	PROBLEM - REGENERATIVE TEST STANDS ARE CURRENTLY NON-EXISTENT.						
	SOLUTION - THIS PROJECT WILL PROVIDE THE TECHNOLOGY AND EQUIPMENT FOR A UNIVERSAL LOAD SIMULATION SYSTEM CAPABLE OF TESTING A WIDE VARIETY OF HIGH SPEED, HIGH POWER TRANSMISSION AND GEARBOX CONFIGURATIONS HAVING RADICAL SHAFT ANGULATIONS.						
(7308)	TITLE - OIL SEAL DEVELOPMENT AND TEST				100	100	
	PROBLEM - CARBON FACE TYPE SEALS ARE EXPENSIVE, PRONE TO DAMAGE AND NOT TOTALLY RELIABLE IN A TRANSMISSION SERVICE ENVIRONMENT.						
	SOLUTION - DEVELOP LIP SEAL TECHNOLOGY THAT WOULD DEAL WITH GEOMETRY, MATERIAL MODULUS, DAMPING, LIP PRESSURE, FINISH AND OTHER PARAMETERS PERTINENT TO RELIABLE OPERATION.						
COMPONENT -- SHAFTS							
(7186)	TITLE - HELICOPTER FREE FLOATING ROTOR SHAFT(S) SYSTEM		250	300	250		
	PROBLEM - FAILURE OF LOAD CARRYING BEARINGS REPRESENTS A CATASTROPHIC SITUATION.						
	SOLUTION - ESTABLISH MANUFACTURING TECHNOLOGY FOR THE PRODUCTION OF HELICOPTER TRANSMISSION SYSTEMS WHICH ELIMINATE ALL OR A MAJORITY OF THE LOAD CARRYING BEARINGS BY THE ELIMINATION OF THE METAL TO METAL CONTACT OF THE ROTOR SHAFT(S) WITH BEARINGS.						

AD-A056 613 ARMY INDUSTRIAL BASE ENGINEERING ACTIVITY ROCK ISLAND IL F/G 5/1
MANUFACTURING METHODS AND TECHNOLOGY FIVE YEAR PLAN FY 80-84 AN--ETC(U)
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NATIONAL BUREAU OF STANDARDS-1963-A

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- SHAFTS (CONTINUED)						
(8075) TITLE - COMPOSITE DRIVE SHAFT FABRICATION			100	200	150	
PROBLEM - THE FABRICATION OF COMPOSITE DRIVE SHAFT HARDWARE IS COSTLY AND TIME CONSUMING UTILIZING PRESENTLY AVAILABLE HAND FABRICATION AND SEMI-AUTOMATED METHODS.						
SOLUTION - DEVELOP AN AUTOMATED PROCESS TO MECHANICALLY PRODUCE LARGE COMPOSITE DRIVE SHAFT COMPONENTS.						
COMPONENT -- TRANSMISSION HOUSING						
(7272) TITLE - FABRICATION METHODS FOR HELICOPTER TRANSMISSION HOUSING		125				
PROBLEM - ALTERNATE PROCESSES ARE NEEDED TO DEVELOP HOUSINGS FABRICATED BY JOINING SEGMENTS.						
SOLUTION - DEVELOP THE MANUFACTURING TECHNOLOGY, METHODS, PROCESSES AND PROCESS PARAMETERS AND TOOLING FOR JOINING OF TRANSMISSION HOUSING COMPONENTS OF SIMILAR OR DISSIMILAR MATERIALS INTO A SOLID HOUSING.						
********** CATEGORY ********** GENERAL **********						
COMPONENT -- ALL						
(7266) TITLE - IMPROVED HIGH TEMPERATURE THREADED FASTENER LUBRICANTS		250	165			
PROBLEM - CURRENTLY USED FASTENER LUBRICANTS CONTAIN THERMALLY UNSTABLE COMPOUNDS, POTENTIALLY CORROSIVE COMPOUNDS, OR INCLUSION OF METAL POWDERS WHICH ARE KNOWN TO JAM LOCKNUTS.						
SOLUTION - DEVELOP THE TECHNOLOGY TO PROVIDE IMPROVED THREADED FASTENER LUBRICANTS.						
(7293) TITLE - MOLDED WAVEGUIDE PARTS FOR MANUFACTURE OF ARRAY ANTENNAS	125	250				
PROBLEM - MAJOR COST AND WEIGHT CONTRIBUTORS IN ELECTRONICALLY STEERER ANTENNAS IS THE WAVEGUIDE FEED AND COUPLING SECTIONS.						
SOLUTION - DEVELOP A LIGHTWEIGHT WAVEGUIDE FEED STRUCTURE FOR PHASED ARRAY ANTENNAS, USING MOLDED EPOXY FIBERGLASS WITH METAL COATING.						
(7294) TITLE - COMPOSITE APEX FITTINGS FOR ARMY A/C SLING APPLICATIONS	100	100				
PROBLEM - CURRENT APEX FITTINGS ARE FORGED METAL (STEEL OR ALUMINUM) ITEMS WHICH REQUIRE CONSIDERABLE TIME AND LABOR FOR FINISHING AND ASSEMBLY.						
SOLUTION - ESTABLISH MANUFACTURING TECHNOLOGY FOR PRODUCTION FABRICATION OF COMPOSITE APEX FITTINGS. THIS PROCESS/PRODUCT WILL INCLUDE BOTH MATERIALS AND LABOR COSTS FOR THIS TYPE ITEM.						

FUNDING ($000)

	PRIOR	80	81	82	83	84
COMPONENT -- ALL (CONTINUED)						
(7295) TITLE - IMPROVED METHODS FOR MFG GYRO MOTOR BEARING RETAINERS				125	125	
PROBLEM - GYROS USED IN MILITARY INERTIAL GUIDANCE SYSTEMS HAVE INHERENT COLD START AND "WHIRL" PROBLEMS.						
SOLUTION - DEVELOP UNIQUE RETAINER DESIGNS AND IMPROVE METHODS FOR MANUFACTURING GYRO MOTOR BEARING RETAINERS.						
CATEGORY: ROTOR SYSTEM						
COMPONENT -- BLADE CORE						
(7171) TITLE - THERMOFORMING OF STRUCTURAL HONEYCOMB			100	100		
PROBLEM - THE COSTS ASSOCIATED WITH MATERIAL AND FABRICATION OF CONTOUR MACHINED HONEYCORE IS EXCESSIVE.						
SOLUTION - ESTABLISH MANUFACTURING PROCEDURES TO THERMOFORM CORE FROM SELECTED SHEET PLASTIC MATERIALS.						
COMPONENT -- BLADES						
(7150) TITLE - ECONOMIC CURE OF URETHANE COATING FOR ARMY AIRCRAFT				100	100	
PROBLEM - LOWER COST, MORE SERVICEABLE AND TOUGHER THAN THE PRESENTLY USED LACQUER TYPES ARE NEEDED FOR ROTOR BLADES.						
SOLUTION - DEVELOP THE ELECTRON BEAM TECHNOLOGY FOR CURING POLYURETHANE COATING FOR THIS APPLICATION.						
(7172) TITLE - FABRICATION OF INSPECTIBLE COMPOSITE LAMINATES				300		
PROBLEM - PRESSURE-DIFFERENTIAL SYSTEMS PRESENTLY USED TO DETECT INCIPIENT FAILURE DUE TO FATIGUE CRACKS ARE EXPENSIVE AND NOT AMENDABLE TO USE ON ALL MAJOR LOAD PATHES.						
SOLUTION - ESTABLISH THE MANUFACTURING TECHNOLOGY AND ASSOCIATED IN-PROCESS INSPECTION TECHNIQUES TO LAY DOWN OPTICAL FIBERS/TAPES AS AN INTEGRAL PART OF THE BLADE, DAMAGED PORTORTION WOULD FAIL TO TRANSMIT LIGHT.						
(7175) TITLE - AUTOMATED ROTOR BLADES CONTOUR/COMPUTER-AIDED INSPECTION	275	275				
PROBLEM - CONTOUR INSPECTION OF PRODUCTION ROTOR BLADES IS TIME CONSUMING AND IS SUBJECT TO HUMAN ERROR.						
SOLUTION - DESIGN AND DEVELOP A COMPUTER AIDED GAUGING SYSTEM TO AUTOMATICALLY INSPECT CONTOURS OF SPARS AND AIRFOILS OF HELICOPTER ROTOR BLADES.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- BLADES (CONTINUED)							
(7201)	TITLE - HIGH PERFORMANCE COMPOSITE ROTOR BLADES	300	500				
	PROBLEM - CURRENT COMPOSITE BLADE PROGRAMS CONCENTRATE ON DEVELOPMENT OF A SINGLE DESIREABLE PERFORMANCE OR PRODUCTION ATTRIBUTE FOR A GIVEN COMPOSITE BLADE.						
	SOLUTION - DEVELOP THE BLADE MANUFACTURING TECHNOLOGY FOR AN ADVANCE COMPOSITE MAIN ROTOR BLADE THAT COMBINES INTO ONE PROGRAM EACH OF THE DESIRABLE ATTRIBUTES OF OTHER BLADE PROGRAMS.						
(7242)	TITLE - ADVANCED PRECISSION FORMING OF AIRFOILS		300	355			
	PROBLEM - AIR FOIL CONFIGURATION TECHNIQUES WERE DEVELOPED FOR PROTOTYPE AIRCRAFT, THIS IS NOT SUITABLE FOR PRODUCTION.						
	SOLUTION - DEVELOP AN ECONOMICAL METHOD TO PRECISELY FORM HIGH STRENGTH SHEET MATERIAL TO NEAR IDEAL AIR FOIL SHAPES FOR MAXIMUM AERODYNAMIC EFFICIENCY REQUIRED ON THE LEADING EDGE OF THE YAH-6H AND OTHER ROTOR BLADES.						
(7296)	TITLE - ELECTRONIC SYSTEM FOR ROTOR BLADE BALANCING	130	60				
	PROBLEM - STATIC ROTOR BLADE BALANCE SYS ARE PRESENTLY ACCOMP BY TRIAL AND ERROR METHODS TO DETERMINE THE AMOUNT AND DISTR OF HOBED BALANCE WEIGHTS. THE PROCESS IS SLOW, BEING SUBJECT TO THE PRODUCTIVITY AND ARTISTRY OF THE BALANCE TECHNICIAN.						
	SOLUTION - DEVELOP A UNIVERSAL BALANCE MACHINE CAPABLE OF USING EITHER FORCE OR DISPLACEMENT MEASURING TRANSDUCERS COUPLED TO A MINI-COMPUTER OR MICROPROCESSOR. THE MICROPROCESSOR THEN CALCULATES WT ROMTS TO SATISFY BOTH SPAN AND CHORD BALANCE.						
(8060)	TITLE - HINGELESS FLEXBEAM HELICOPTER MAIN ROTOR BLADE			350	350	300	
	PROBLEM - STRAIGHT SCALE-UP OF EXISTING HUB AND ROTOR BLADE DESIGN WILL NOT SATIFY FUTURE REQUIREMENTS.						
	SOLUTION - DEVELOP FABRICATION TECHNIUGES FOR THE BEARINGLESS ROTOR SYSTEM DESIGN.						
COMPONENT -- HUBS							
(7241)	TITLE - HOT ISOSTATICALLY PRESSED TITANIUM CASTINGS	446	320				
	PROBLEM - THE CURRENT METHOD OF MANUFACTURING ROTOR HUBS RESULTS IN EXCESSIVE USE OF MATERIALS AND MACHINING.						
	SOLUTION - DEVELOP A PROCESS FOR HOT ISOSTATIC PRESSING OF A CAST TITANIUM ROTOR HUB.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- HUBS (CONTINUED)							
(8139)	TITLE - COMPOSITE ROTOR HUB	150	350	220			
	PROBLEM - UNACCEPTABLE SIZE AND WEIGHT PENALTIES ARE INCURRED WHEN CONVENTIONAL METALLIC MATERIALS ARE USED FOR ADVANCED HUB DESIGNS.						
	SOLUTION - DEVELOP THE FABRICATION TECHNOLOGY, TOOLING AND AUTOMATED TECHNIQUES NECESSARY TO MANUFACTURE COMPOSITE ROTOR HUBS.						
COMPONENT -- MISC COMPONENTS							
(7004)	TITLE - MFG TECHNOLOGY FOR ROTOR ITEMS AND ASSOCIATED COMPONENTS		970	300	150	150	1000
	PROBLEM - MANUFACTURING PROBLEMS ARISING FROM INSUFFICIENTLY DEVELOPED STATE-OF-THE-ART TECHNOLOGY ARE RESPONSIBLE FOR VARIOUS FAILURES IN PRODUCTION BUY ITEMS.						
	SOLUTION - DEVELOP TECHNOLOGY TO MFG. ROTOR ITEMS AND ASSOCIATED COMPONENTS FROM EXISTING OR NEW MATERIALS THAT WILL INCREASE AND RELIABILITY AND REDUCE LIFE CYCLE COSTS.						
(7119)	TITLE - NON-DESTRUCTIVE EVALUATION TECHNIQUE FOR COMPOSITES	496		400			
	PROBLEM - IMPLEMENTATION OF COMPOSITE STRUCTURES IN ARMY AIRCRAFT IS DEPENDANT UPON THE ABILITY TO DETECT AND EVALUATE DEFECTS.						
	SOLUTION - ESTABLISH A VIABLE AND COMPREHENSIVE INPROCESS INSPECTION PROGRAM FOR NON-DESTRUCTIVE INSPECTION OF COMPOSITE STRUCTURES.						
(7288)	TITLE - DETERMINATION OF OPTIMAL CURING CONDITIONS	125	325	125			
	PROBLEM - SMALL CHANGES IN CURE CONDITIONS DURING MANUFACTURE CAN REDUCE THE DURABILITY OF FIBER-REINFORCED COMPOSITES IN THE FIELD AND THEREBY INCREASE LIFE CYCLE COSTS.						
	SOLUTION - DEVELOP PROCEDURES AND TECHNIQUES TO DETERMINE PARAMETERS FOR CURE CONTITIONS DURING PROCESSING OF FIBER-REINFORCED COMPOSITES.						

CATEGORY
TURBINE ENGINE

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT	-- COMPRESSOR BLADES						
(7275)	TITLE - HOLOGRAPHIC VIBRATION ANALYSIS OF BASIC BLADE SHAPES		200				
	PROBLEM - PRESENT METHODS OF ANALYZING BLADES USING COMPUTERS ARE NON-EXISTANT.						
	SOLUTION - THIS PROJECT WILL DEVELOP THE TECHNOLOGY FOR ANALYZING COMPRESSOR AND TURBINE BLADE SHAPES, PARTICULARLY HOLLOW BLADES, USING HOLOGRAPHIC VIBRATION.						
COMPONENT	-- COMPRESSOR BLADES/IMPELLERS						
(7285)	TITLE - CAST TITANIUM IMPELLER FOR TURBINE ENGINE	450	250				
	PROBLEM - LARGE AMOUNTS OF MATERIAL WASTAGE AND EXTENSIVE MACHINING TIMES ARE REQUIRED WHEN TITANIUM IMPELLERS ARE MACHINED FROM OVERSIZED FORGINGS.						
	SOLUTION - PRODUCTIONIZE THE PROCESSING TECHNIQUES REQUIRED FOR THE MANUFACTURE OF HIGH PERFORMANCE LOW COST IMPELLER CASTINGS.						
COMPONENT	-- GENERAL						
(7002)	TITLE - MFG TECHNOLOGY FOR HI-PERFORMANCE ENGINES AND COMPONENTS			920	210	1360	1000
	PROBLEM - MANUFACTURING PROBLEMS ARISING FROM INSUFFICIENTLY DEVELOPED STATE-OF-THE-ART TECHNOLOGY ARE RESPONSIBLE FOR FAILURES IN PRODUCTION BUY ITEMS.						
	SOLUTION - DEVELOP TECHNOLOGY TO MANUFACTURE EXISTING OR ANTICIPATED HI-PERFORMANCE ENGINE AND ASSOCIATED COMPONENTS USING CURRENT OR NEW MATERIALS.						
(7198)	TITLE - COMPOSITE MATERIALS FOR ENGINE ASSESSORY GEARBOX HOUSING	200	400				
	PROBLEM - ENGINE GEARBOXES ARE MANUFACTURED FROM ALUMINUM SAND CASTINGS WHICH RESULT IN NUMEROUS FINISH MACHINING OPERATIONS AND A WEIGHT PENALTY.						
	SOLUTION - ESTABLISH MANUFACTURING PROCEDURES FOR PRODUCING GEARBOXES AND COVERS UTILIZING COMPOSITE TECHNOLOGY TO AVOID COST AND WEIGHT PENALTIES.						
(7200)	TITLE - COMPOSITE ENGINE INLET PARTICLE SEPARATOR	200	250				
	PROBLEM - THE INLET PARTICLE SEPARATOR STRUCTURE IS COSTLY AND HEAVY.						
	SOLUTION - DEVELOP AND DEMONSTRATE A COMPOSITE INLET PARTICLE SEPARATOR SWIRL FRAME WHICH SATISFACTORILY REPLACES THE MORE COSTLY AND THE HEAVER CONVENTIONALLY FABRICATED THIN SHEET METAL PRODUCTION DESIGN.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- GENERAL (CONTINUED)							
(7248)	TITLE - CLOSED LOOP MACHINING, MID-FRAME	716	245				
	PROBLEM - THE ENGINE MID-FRAME HAS 22 DIAMETERS WITH TOLERANCES RANGING FROM .001 INCHES. THESE TOLERANCES RESULT IN HIGH MACHINING, REWORK AND INSPECTIONS COSTS.						
	SOLUTION - DEVELOP CLOSED LOOP MACHINING THAT WILL AUTOMATICALLY COMPENSATE FOR ANY DEVIATION IN NUMERICAL CONTROLLED PROGRAMMED PLAN THEREBY REDUCING PRODUCTION COSTS.						
(7262)	TITLE - HIGH CAPABILITY CASTINGS		425	550			
	PROBLEM - THERE IS SCATTER IN THE MECHANICAL PROPERTIES OF CASTINGS THAT CONTRIBUTE TO UNRELIABLE PRODUCTS AND STRENGTHEN TENSILE FATIGUE.						
	SOLUTION - DEVELOP HOT ISOSTATIC PROCESSING PARAMETERS TO APPLY TO CAST COMPONENTS PRODUCED BY CONVENTIONAL METHODS.						
(7286)	TITLE - HIGH QLTY SUPERALLOY POWDER PRODUCTION FOR TURBINE COMPONENT	350	130				
	PROBLEM - VENDORS HAVE EXPERIENCED DIFFICULTY IN CLEANLINESS OF SUPERALLOY POWDERS.						
	SOLUTION - REDUCE THE COST OF SUPERALLOY AND IMPROVE THE PERFORMANCE OF ASHIP MATERIALS BY IMPROVING THE POWER CLEANLINESS LEVEL.						
(7291)	TITLE - TITANIUM POWDER METAL COMPRESSOR IMPELLER	240	240				
	PROBLEM - WHEN COMPLEX CONFIGURATIONS, SUCH AS CENTRIFUGAL IMPELLERS AND COMPRESSOR ROTORS ARE UTILIZED IN GAS TURBINE ENGINES, TYPICALLY HIGH MANUFACTURING COSTS ARE ENCOUNTERED.						
	SOLUTION - DEVELOP OVERALL PROCESS CONTROLS CAPABLE OF REPRODUCIBLY PRODUCING 100 PERCENT DENSE PARTS WITH TENSILE AND FATIGUE STRENGTHS EQUAL TO THOSE OF HIGH QUALITY TITANIUM FORGINGS.						
COMPONENT -- ROTOR							
(7085)	TITLE - ESTAR, MFG. PROCEDURES FOR CERAMIC RADIAL TURBINE ROTOR.					300	300
	PROBLEM - ADVANCED GAS TURBINE ENGINES WILL REQUIRE HIGHER TEMPERATURE MATERIALS IN THE TURBINE SECTION.						
	SOLUTION - ESTABLISH TECHNIQUES TO MANUFACTURE EITHER A ONE PIECE OR A TWO PIECE SILICON CARBIDE CERAMIC RADIAL TURBINE ROTOR.						
(7109)	TITLE - EVALUATION TECHNOLOGY FOR CERAMIC COMPONENTS					300	200
	PROBLEM - TECHNOLOGY FOR INSPECTING ENGINE COMPONENTS WHILE IN PRODUCTION PROCESS DOES NOT EXIST.						
	SOLUTION - DEVELOP NON-DESTRUCTIVE EVALUATION TECHNIQUES FOR THE IN-PROCESS INSPECTION OF CERAMIC COMPONENTS.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT	-- SEAL RINGS/STATOR BANDS						
(7269)	TITLE - GENASEAL SHROUD FABRICATION METHODS		240	400			
	PROBLEM - ADAPTATION OF GENASEAL TO SHROUD DESIGNS IS LIMITED BY MANUFACTURING TECHNOLOGY, AND BY INSUFFICIENT UNDERSTANDING OF THE RELATIONSHIP BETWEEN FABRICATION PROCEDURE AND ENGINE PERFORMANCE.						
	SOLUTION - DEVELOP MANUFACTURING TECHNOLOGY FOR GENASEAL SHROUDS AND ESTABLISH A FABRICATION PROCEDURE FOR SMALL TURBINES.						
(7270)	TITLE - DEVELOPMENT OF ALTERNATE ENGINE SEAL MATERIAL		300	125			
	PROBLEM - PRESENT SEAL MATERIAL IS EXPENSIVE AND DOES NOT EXHIBIT ADEQUATE OXIDATION OR CORROSION RESISTANCE ABOVE 800 DEGREES F.						
	SOLUTION - DEVELOP ALTERNATE SEAL MATERIALS THAT HAVE GOOD OXIDATION AND CORROSION RESISTANCE TO 900 DEGREES F AND ABOVE AND THAT HAVE GOOD SEALING CHARACTERISTICS.						
(7304)	TITLE - VACUUM PLASMA SPRAY DEPOSITION OF SEAL MATERIALS					250	250
	PROBLEM - INCONSISTENCE IN COATING HOMEGENEITY OFTEN RESULT IN THE THERMAL SPRAY PROCESS.						
	SOLUTION - COUPLE ADVANCED CONTROL SYSTEMS WITH THE VACUUM PLASMA SPRAY PROCESS TO IMPROVE THE QUALITY AND PERFORMANCE OF EXISTING ABRADABLE CLEANANCE CONTROL COATINGS.						
(7305)	TITLE - PRODUCTION OF ENERGY EFFICIENT SEALS			200	225		
	PROBLEM - THERE IS A NEED FOR IMPROVED HYDRODYNAMIC SEAL OPERATIONAL RELIABILITY.						
	SOLUTION - DEVELOP THE ENERGY EFFICIENT GAS FILM DYNAMIC SEAL TO ACHIEVE THE SAME INITIAL PERFORMANCE BUT AT LOWER PROCESSING AND MATERIAL COSTS THAN THAT OF THE INITIAL DESIGN.						
COMPONENT	-- TURBINE BLADES						
(7071)	TITLE - PRESSURE DIE CASTING SUPERALLOY TURBINE BLADES/VANES			1000	1500		
	PROBLEM - THE INVESTMENT CAST PROCESS USED TO PRODUCE ALL COBALT AND NICKEL BASE SUPERALLOY BLADES REQUIRES MACHINING AWAY EXCESS MATERIAL WHICH BECOMES SCRAP.						
	SOLUTION - PRESSURE DIE CASTING OF SUPERALLOY BLADES AND VANES TO NEAR NET SHAPES WILL BE DEVELOPED AS A COMMERCIAL PROCESS.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- TURBINE BLADES (CONTINUED)						
(7190) TITLE - PRODUCTION OF DIRECTIONALLY SOLIDIFIED ALLOY TURBINE BLADES		360	540			
PROBLEM - A HIGH PERFORMANCE ALLOY FOR THE FIRST AND SECOND STAGE HP TURBINE IS REQUIRED FOR GROWTH OF THE T-700 ENGINE.						
SOLUTION - DEVELOP AND DEMONSTRATE THE PRODUCTION PROCESS OF PRODUCING THE FIRST AND SECOND STAGE TURBINE BLADES FOR THE T-700 ENGINE (GROWTH VERSIONS) FROM DIRECTIONALLY SOLIDIFIED NI76XB ALLOY.						
(7233) TITLE - CHANDLEY-LAMB VACUUM PROCESS FOR POWER TURBINE BLADES			275	250		
PROBLEM - THE CONVENTIONAL PROCESS FOR MANUFACTURE OF STAGE 2 AND 3 TURBINE BLADES INVOLVES EXCESSIVE SCRAP OF METAL AND IMPROVED MECHANICAL PROPERTIES CAN BE OBTAINED.						
SOLUTION - INCREASED METAL YIELDS AND INCREASED NUMBERS OF PARTS PER MOLD CAN BE ACHIEVED USING THE CHANDLEY-LAMB VACUUM PROCESS FOR THE STAGE 2 AND 3 TURBINE BLADES.						
(8129) TITLE - COLUMBIUM ALLOY DYNAMIC TURBINE ENGINE COMPONENTS		300	250			
PROBLEM - SINCE THE EFFICIENCY OF A TURBINE ENGINE IS A DIRECT FUNCTION OF THE OPERATING TEMPERATURE, HIGHER TEMPERATURE ALLOYS ARE REQUIRED.						
SOLUTION - DEMONSTRATE THE FEASIBILITY OF A CAST AND COATED TURBINE ENGINE NOZZLE, SUITABLE FOR SUSTAINED OPERATION AT TEMPERATURES ABOVE 2000 DEGREES F.						
COMPONENT -- TURBINE DISKS						
(7265) TITLE - DIE CAST TURBINE DISK		320	800	800		
PROBLEM - MACHINING COSTS ASSOCIATED WITH THE BROACHING OF DOVETAILS AND THE LABOR REQUIRED FOR ASSEMBLY AND BALANCING OF FINISHED ENGINE COMPONENTS ARE HIGH DUE TO THE PRECISION TOLERANCES THAT ARE REQUIRED TO MEET FINAL PERFORMANCE REQUIREMENTS.						
SOLUTION - DEVELOP THE TECHNOLOGY TO PROVIDE TOOLING AND TO PRODUCE TURBINE DISKS USING MODIFICATIONS OF THE RHEOCASTING PROCESS.						
COMPONENT -- TURBINE ROTOR						
(7191) TITLE - COST EFFECTIVE PRODUCTION OF COOLED TURBINE ROTORS		400	500			
PROBLEM - PRODUCTION PROCESSES AND QUALITY CONTROL PROCEDURES DO NOT CURRENTLY EXIST FOR AIR-COOLED TURBINE ROTORS.						
SOLUTION - DEVELOP A COST EFFECTIVE PROCEDURE FOR PRODUCING AND ASSURING THE QUALITY OF SINGLE AIR-COOLED ROTORS WHICH CAN DO THE WORK OF TWO STAGES UNDER PRESENT TECHNOLOGY.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- TURBINE ROTOR (CONTINUED)						
(7197) TITLE - FABRICATION OF INTEGRAL TURBINE ROTOR BY JOINING	250	300				
PROBLEM - CURRENT GAS TURBINE ROTOR FABRICATION IS LIMITED TO EITHER INTEGRALLY CAST ROTORS OR SEPARATE BLADE AND DISK ATTACHMENT. THIS PROCESS RESULTS IN EXPENSIVE MACHINING AND CREATES A POTENTIAL LIFE PROBLEM.						
SOLUTION - DEVELOP THE MANUFACTURING TECHNOLOGY FOR FABRICATION OF INTEGRAL TURBINE ROTORS BY JOINING THE BLADES AND DISKS BY DIFFUSION BONDING.						
(7264) TITLE - FABRICATED POWER TURBINE ROTOR		200	300			
PROBLEM - DOVETAIL FASTENERS BETWEEN TURBINE BLADES AND DISKS ADD WEIGHT AND COST TO THE ASSEMBLY OF POWER TURBINES THAT USE SOLID UNCOOLED TURBINE BLADING.						
SOLUTION - DEVELOP THE MANUFACTURING TECHNOLOGY TO FABRICATE THE POWER TURBINE ROTOR FROM A 360 DEGREE BLADED RING AND A WROUGHT DISK BY INERTIA WELDING THE RING TO THE DISK.						
(7300) TITLE - IMPROVED LOW CYCLE FATIGUE COST SUPERALLOY ROTORS		250	300	306		
PROBLEM - SERVICE LIFE OF CAST WHEELS IS FREQUENTLY LIMITED BY LOW-CYCLE FATIGUE. AS A RESULT, A PROGRAM IS REQUIRED TO IMPROVE THE LOW-CYCLE FATIGUE PROPERTIES OF THESE CAST COMPONENTS IN ORDER TO EXTEND THEIR OPERATIONAL LIFE.						
SOLUTION - CAST MACRO AND MICROSTRUCTURES CAN AFFECT THE PROPERTIES. THIS HAS BEEN FOUND TO BE A FUNCTION OF MATERIAL PROPERTIES, CAST GRAIN SIZE, INCLUSIONS AND/OR POST-CASTING PROCESSING.						
COMPONENT -- TURBINE/COMPRESSOR COMPONENTS						
(7143) TITLE - MANUFACTURE OF SPRAY ABRADABLE GAS PATH SEAL SYSTEM		580				
PROBLEM - MANUFACTURING AND REPLACEMENT COSTS OF ABRADABLE SHROUD MATERIALS ARE EXCESSIVE.						
SOLUTION - DEVELOP RELIABLE SPRAY TECHNIQUES, EQUIPMENT AND CONTROL THAT WILL PRODUCE A CONSISTENT AND COST EFFECTIVE ABRADABLE SEAL.						
(7235) TITLE - REPAIR PROCEDURE FOR REPLACING DAMAGED BLADES				225	393	99
PROBLEM - BLISKS USED IN THE T700 ENGINE COMPRESSOR STAGES 1 THRU 5 ARE INTEGRAL BLADES AND DISKS. DAMAGE TO ANY ONE BLADE DURING MANUFACTURING OR OPERATION RESULTS IN SCRAPPING THE WHOLE BLISK.						
SOLUTION - DEVELOP AN ECONOMICAL REPAIR PROCEDURE TO SALVAGE THE BLISKS UTILIZING A JOINING PROCESS THAT PROVIDES PROPERTIES EQUAL TO THE PARENT MATERIAL.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- TURBINE/COMPRESSOR COMPONENTS (CONTINUED)						
(7268) TITLE - CERAMIC TURBINE STATOR PARTS		1250	1375	1250		

PROBLEM - EXPENSIVE ALLOYS WITH EXOTIC ELEMENTS ARE CURRENTLY REQUIRED TO EXTEND THE OPERATING TEMPERATURE OF METALLIC ENGINE COMPONENTS TO 2500 DEGREES F.

SOLUTION - DEVELOP AND DEMONSTRATE THE ECONOMICAL OPERATION OF CERAMIC COMPONENTS FOR HIGH TURBINE TEMPERATURE APPLICATION.

(8116) TITLE - EROSION RESISTANT COATINGS FOR TITANIUM COMPRESSOR PARTS		160	160			

PROBLEM - HELICOPTER ENGINES OPERATING IN SAND/DUST ENVIRONMENTS HAVE ENCOUNTERED SERIOUS EROSION PROBLEMS DUE TO SAND/DUST INGESTION RESULTING IN SIGNIFICANT INCREASES IN UNSCHEDULED ENGINE REMOVAL.

SOLUTION - A PROTECTIVE COATING OF ELECTROLESS NICKEL AND TITANIUM CARBONITRIDE HAS BEEN DEVELOPED AND EVALUATED IN THE LABORATORY. MANUFACTURING METHODS TO MINIMIZE COATING VARIATIONS OVER CLOSE TOLERANCE COMPONENT PROFILES WILL BE DEVELOPED.



COMMUNICATIONS R&D COMMAND

(CORADCOM)

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Category	Page
Displays	112
Integrated Electronics	112
Materials/Processes	113
Solid State	115

US ARMY COMMUNICATIONS RESEARCH AND DEVELOPMENT COMMAND (CORADCOM)

CORADCOM, with headquarters at Fort Monmouth, New Jersey, was recently formed from resources of the US Army Electronics Command. CORADCOM is responsible for research, development, and acquisition, to include first production and initial fielding of communications, tactical data, and command and control systems. CORADCOM consists of resources of ECOM's Communications/ADP Laboratory and a segment of the R&D Technical Support Activity plus Project Managers of Multi-Service Communications System (MSCS), Army Tactical Communications System (ATACS), Single Channel Ground and Airborne Radio Subsystem (SINCGARS), Automatic Test Support System (ATSS), and project managed elements of Army Tactical Data Systems (ARTADS), i.e., Tactical Fire Control System (TACFIRE), Missile Minder (AN/TSQ-73), Tactical Operations System (TOS), and Position Location Reporting System (PLRS).

On 28 February through 4 March 1977, the Electronics Systems Manufacturing Technology Conference was held. This conference represented a major effort by the Army and the electronics industry to develop the Army's long range investment plan in electronics system manufacturing technology. Selected proposed concepts and projects are included in CORADCOM's portion of the five year plan.

Projects listed in the Plan attack a range of problems with emphasis placed on computer applications and circuit technology. The manufacture of specialized integrated circuits (memory, synthesizer, microprocessor) is one area of concern. Project 3036 is intended to address this need, while project 3024 proposes to approach the problem of efficient and economical production methods for a compact solid state circuit protection device.

The video disc information storage technology is seen as a possible first step in an evolution toward dissemination of Army maintenance, training and doctrinal data by electronic means. The high cost of mastering and duplication of video discs is a problem of production which can restrict the adaptation of a promising technology to such use. MM&T project 3042 seeks to address this problem through achievement of lower cost methods.

Effective exploitation of computer techniques for the generation, storage, assessment, revision, dissemination, and utilization of production-related control, technical and cost data, and documentation is a continuing goal. Several proposed MM&T projects will attack facets of the problem:

- Project 3005 proposes to evaluate the capability of about ten existing software systems to produce NC tapes and part geometries for a wide range of items, using past MM&T studies of programming for milled and turned parts as background.

- Project 3043 would provide computer-aided methods, for the preparation and production of NC, Integrated Technical Documentation and Training (ITDT) and related data, which would be compatible with existing programs, facilities and equipments.

- Project 3045 would provide automated methods for alignment and quality validation of film deposition pattern masks.

Included in CORADCOM's Plan are a few projects that offer potential technology spin-offs to the private sector. Project 3024 can yield technology applicable to commercial projection of electromagnet pulse (EMP) circuit protection devices while it is possible that project 3034 will provide testing technology adaptable to the production of complex industrial equipment.

CORADCOM has projected a total of 16 projects over the period covered at an estimated cost of $20.1M. Funding will be provided from the Other Procurement, Communications/Electronics, PA 5197 Appropriation.

CORADCOM

COMMAND FUNDING SUMMARY
(THOUSANDS)

CATEGORY	FY80	FY81	FY82	FY83	FY84
DISPLAYS	1000	500	0	0	0
INTEGRATED ELECTRONICS	631	2755	2695	1000	0
MATERIALS/PROCESSES	1960	2060	3870	2230	1140
SOLID STATE	200	0	0	0	0
TOTAL	3791	5315	6565	3230	1140

CATEGORY
DISPLAYS

	PRIOR	FUNDING ($000) 80	81	82	83	84
COMPONENT -- OTHER						
(3040) TITLE - OWENS-ILLINOIS (O-I) COMPATIBLE AC GAS DISCHARGE DISPLAY	1000	500				

PROBLEM - ONLY DOMESTIC SOURCE FOR GAS DISCHARGE DISPLAY PANELS USED IN EW AND TACTICAL COMPUTER SYSTEMS HAS TERMINATED ITS MANUFACTURING OPERATION. ONLY REMAINING SOURCE FOR SIMILAR PANELS IS LOCATED IN JAPAN. NEW DOMESTIC SOURCE IS URGENTLY REQUIRED.

SOLUTION - PREVIOUS DOMESTIC SOURCE IS OFFERING TO SELL LICENSING AGREEMENTS. THIS PROJECT WOULD PROVIDE INCENTIVE FOR INTERESTED COMPANIES TO PURCHASE THE NECESSARY RIGHTS AND SET UP THEIR OWN PRODUCTION FACILITIES FOR MANUFACTURE OF THE REQUIRED PANELS.

CATEGORY
INTEGRATED ELECTRONICS

COMPONENT -- AMPLIFIERS						
(3037) TITLE - 250 WATT BAND 3 UHF AMPLIFIER	631	2005	1445			

PROBLEM - 250 WATT AMPLIFIER REQUIRED IN PATRIOT COMMUNICATIONS SYSTEMS IS SUSCEPTIBLE TO PRODUCTION COST REDUCTION THROUGH IMPROVED MANUFACTURING TECHNOLOGY.

SOLUTION - REDUCE COST OF AMPLIFIER THROUGH PROVISION OF TECHNOLOGY FOR LESS COSTLY MANUFACTURE.

COMPONENT -- CIRCUITS						
(3036) TITLE - SPECIAL COMPONENTS MFG TECHNIQUES FOR SINGLE CHANNEL RADIOS		500	1000	500		

PROBLEM - FUTURE SINGLE CHANNEL RADIOS WILL BE PROCURED IN VERY LARGE QUANTITIES. SPECIAL COMPONENTS FOR THESE RADIOS WILL BE VERY HIGH COST ITEMS UNLESS LOWER COST MANUFACTURING PROCEDURES ARE DEVELOPED.

SOLUTION - PROVIDE MANUFACTURING TECHNIQUES WHICH WILL REDUCE COST OF SPECIALIZED COMPONENTS AND IMPROVE RELIABILITY.

(3044) TITLE - MONOLITHIC DISPLAY, PROCESSOR, AND MEMORY UNITS		250	250	500		

PROBLEM - THE PRODUCIBILITY OF MONOLITHIC INTELLIGENT TERMINALS IS LIMITED BY CURRENT PRODUCTION METHODS.

SOLUTION - THIS PROJECT WILL PROVIDE METHODS AND PROCEDURES TO IMPROVE PRODUCIBILITY AND YIELD OF MONOLITHIC INTELLIGENT TERMINALS.

CATEGORY
MATERIALS/PROCESSES

FUNDING ($000)

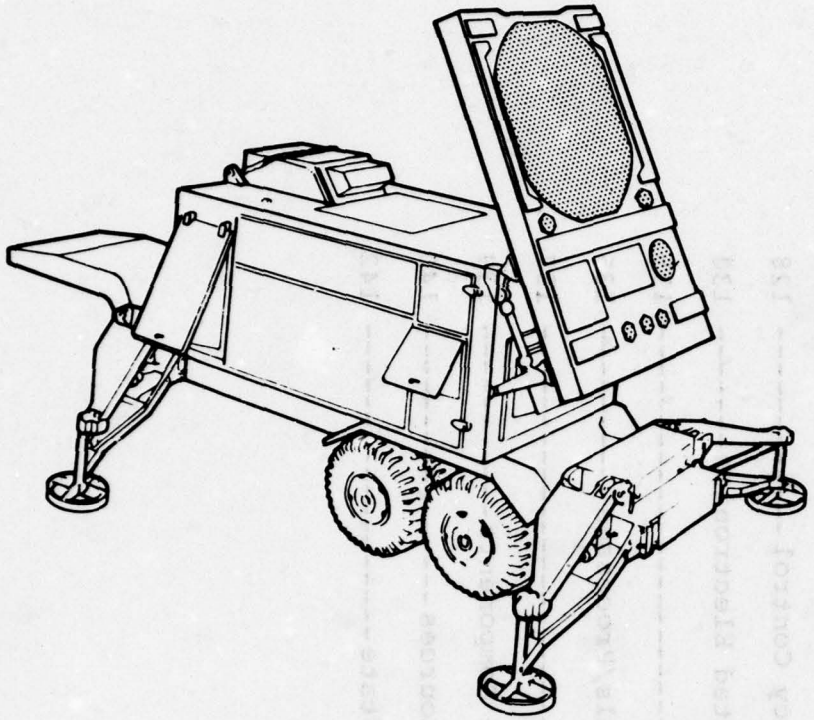
	PRIOR	80	81	82	83	84
COMPONENT -- CIRCUITRY						
(3004) TITLE - COMPUTER ANALYSIS OF ELECTRONICS FABRICATION AND ASSEMBLY	490					
PROBLEM - SYSTEMATIZED DATA ON COMMUNICATIONS/ELECTRONICS EQUIPMENT MANUFACTURING PROCEDURES, EVALUATION, SELECTION, LAYOUT, LABOR USAGE, AND COSTS AND ON CIRCUIT INTERCONNECTION SCHEMES IS NEEDED TO PERMIT RELIABLE ASSESSMENT OF PRODUCTION METHODS.						
SOLUTION - IMPLEMENT COMPUTER AIDED TOOL TO BE USED FOR THE EVALUATION OF P-ODUCTION COSTS AND PROCESSES ASSOCIATED WITH THE ELECTRICAL AND ELECTRONIC ASSEMBLY OF COMMUNICATIONS EQUIPMENT.						
COMPONENT -- GENERAL						
(3005) TITLE - GRAPHICAL PART PROGRAMMING EVALUATION	195					
PROBLEM - POTENTIAL EXISTS TO EXTEND THE EXISTING COMPUTER-AIDED INTERACTIVE DESIGN SYSTEMS FOR THE CREATION OF NUMERICAL CONTROL TAPES AND THREE-DIMENSIONAL PARTS GEOMETRIES TO A BROAD RANGE OF DOD EQUIPMENT REQUIREMENTS.						
SOLUTION - THIS PROJECT WILL EVALUATE THE CAPABILITY OF EXISTING COMPUTER AIDED INTERACTIVE DESIGN SYSTEMS TO PRODUCE NUMERICAL CONTROL PART PROGRAMS AND PART GEOMETRIES FOR DOD PRODUCTION REQUIREMENTS.						
(3006) TITLE - EVAL OF PLASMA PROCESS FOR PWB AND THIN FILM PANEL CLEANING	250					
PROBLEM - A POTENTIAL EXISTS FOR THE USE OF PLASMA TECHNOLOGY FOR ACHIEVEMENT OF A CONTAMINANT-FREE SUBSTRATE PRIOR TO PLATING, BETWEEN THIN FILM DEPOSITION STEPS AND PRIOR TO CONFORMAL COATING IN PRODUCTION OF THIN FILM DISPLAY PANELS AND PRINTED WIRING BOARD						
SOLUTION - ESTABLISH THE METHODS AND TECHNIQUES TO ACHIEVE MAXIMUM CLEANING AT APPROPRIATE POWER AND DURATION LEVELS FOR THE VARIOUS CLASSES OF PRINTED WIRING BOARDS AND THIN FILM PANEL ASSEMBLIES.						
(3034) TITLE - VOICE-RESPONSIVE PRODUCTION TEST TECHNIQUES	80	150	200	200		
PROBLEM - PRODUCTION-LINE TESTING AND REBUILD OF DEFECTIVE COMPLEX EQUIPMENT IS TIME-CONSUMING, TEDIOUS, AND CORRESPONDINGLY VERY COSTLY USING CONVENTIONAL TECHNICIAN-TEST EQUIPMENT INTERFACES.						
SOLUTION - PROVIDE VOICE-RESPONSIVE TECHNIQUES INTERFACE WITH TEST TECHNICIAN. COMPUTER-GENERATED VOICE WILL PROVIDE TESTING INTELLIGENCE TO OPERATOR WHILE VOICE RECOGNITION TECHNIQUES WILL RESPOND TO VERBAL REQUESTS FOR STIMULI/MEASUREMENT CAPABILITIES.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- GENERAL (CONTINUED)						
(3035) TITLE = BUILT-IN-TEST (BIT) EVALUATOR	250	350	350			
PROBLEM = ADEQUATE BIT PERFORMANCE RARELY ACHIEVED DUE TO LACK OF BIT EVALUATION TECHNIQUES AND COST OF TEST VALIDATION. PAYOFFS FOR LOWER-COST SYSTEM PRODUCTION TESTING/REDUCTION OF FIELD TEST EQUIPMENT NEVER ACHIEVED.						
SOLUTION = PROVIDE SIM/MODELING TECHNIQUES TO EVALUATE FAULT-DETECTION PERFORMANCE OF BIT DESIGNS AND PERMIT TRANSFER OF BIT TEST TECH THRU PRODUCTION SELL-OFF TO FIELD UTILIZATION. FIGURE-OF-MERIT FACTOR WILL BE DEFINED TO PERMIT RANKING OF BIT DESIGNS.						
(3038) TITLE = MCF/ITF MULTIPLE SOURCE ENHANCEMENT		600	1500	800	500	
PROBLEM = TO ENABLE AN EFFECTIVE MULTIPLE SOURCE COST COMPETITIVE CAPABILITY OVER THE ENTIRE SYSTEM LIFE CYCLE AS WELL AS ENABLING PERIODIC TECHNOLOGY INSERTION FOR PRODUCT ENHANCEMENT.						
SOLUTION = A SOLUTION TO THE PROBLEM WILL RESULT IN A SIGNIFICANT REDUCTION IN OVERALL LIFE CYCLE COSTS AS WELL AS AN ENHANCED CAPABILITY FOR THE TIMELY FIELDING OF FUTURE COMMAND COMMUNICATIONS AND CONTROL SYSTEMS.						
(3039) TITLE = MCF/ITF LIFE CYCLE SUPPORT (HARDWARE/SOFTWARE)		500	800	600	500	
PROBLEM = TO ENABLE AN EFFECTIVE SYSTEM LIFE CYCLE SUPPORT (HARDWARE/SOFTWARE) METHODOLOGY TO MINIMIZE COSTS ASSOCIATED WITH LOGISTICS, TRAINING AND MAINTENANCE OF COMPUTER EMBEDDED SYSTEMS.						
SOLUTION = A SOLUTION TO THE PROBLEM WILL RESULT IN A SIGNIFICANT REDUCTION IN OVERALL LIFE CYCLE COSTS AS WELL AS SUBSTANTIALLY INCREASE THE READINESS POSTURE OF THE ARMY.						
(3041) TITLE = ELIMINATION OF HARD COPY DOCUMENTATION	100	110	120	130	140	
PROBLEM = TO ELIMINATE NEED FOR HARD COPY DOCUMENTATION IN COMMAND COMMUNICATIONS AND CONTROL, COMBAT SERVICE SUPPORT AND TRAINING ENVIRONMENTS.						
SOLUTION = PROVIDE AN ALL ELECTRONIC PREPARATION-DISTRIBUTION-PRESENTATION SYSTEM FOR DISSEMINATION OF INTEGRATED TECHNICAL DOCUMENTATION AND TRAINING (ITDT), DOCTRINAL, AND TECHNICAL INFORMATION.						
(3042) TITLE = MASTERING AND DUPLICATION OF VIDEO DISCS	450		500			
PROBLEM = THE HIGH COST OF MASTERING AND DUPLICATING OF VIDEO DISCS HAS RESTRICTED THE USE OF THE TECHNOLOGY IN HIGH PAYOFF TRAINING AND MAINTENANCE OPERATIONS.						
SOLUTION = THIS PROJECT WILL PROVIDE METHODS AND TECHNIQUES FOR LOW-COST MASTERING AND DUPLICATION OF VIDEO DISCS.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- GENERAL (CONTINUED)							
(3043)	TITLE = TRANSPORTABILITY OF END ITEM ADP INFORMATION	620	145	350			
	PROBLEM = COMPUTER AIDED METHODS FOR THE PREPARATION AND PRODUCTION OF NC, ITDT AND RELATED DATA ARE NOT COMPATIBLE WITH EXISTING PROGRAMS, FACILITIES AND EQUIPMENTS.						
	SOLUTION = PROJECT WILL PROVIDE INTERFACE CRITERIA TO INSURE ORDERLY TRANSITION OF DATA BETWEEN CONTRACTORS AND USERS.						
(3045)	TITLE = AUTOMATED ARTWORK ALIGNMENT AND INSPECTION				400	500	
	PROBLEM = THE ALIGNMENT AND CLEANLINESS OF ARTWORK AND MASKS USED FOR PRODUCTION OF THIN FILM DISPLAY DEVICES MUST BE AUTOMATED TO IMPROVE YIELD.						
	SOLUTION = THIS PROJECT WILL PROVIDE AUTOMATED METHODS AND PROCEDURES TO VALIDATE CORRECT ALIGNMENT AND CLEANLINESS OF PATTERN MASKS PRIOR TO DEPOSITION OF FILMS.						

CATEGORY
SOLID STATE

COMPONENT -- SWITCHES							
(3024)	TITLE = METAL OXIDE THRESHOLD SWITCHES (MOTS) FOR NEMP PROTECTION		200				
	PROBLEM = TECHNOLOGY IS NEEDED FOR MANUFACTURE OF MOTS DEVICE TO SUPPLANT PRESENTLY AVAILABLE DEVICES WHICH SUFFER SLOW RESPONSE AND HIGH INSERTION LOSS IN PROTECTION OF EQUIPMENT AGAINST NUCLEAR ELECTROMAGNETIC PULSE AND LIGHTNING DAMAGE.						
	SOLUTION = PROVIDE MANUFACTURING TECHNIQUES FOR MOTS DEVICES AND ADAPTORS FOR INCORPORATION OR RETROFIT INTO CABLES, CONNECTORS, AT ANTENNA FOOTPRINTS AND IN CRITICAL CIRCUITS.						



ELECTRONICS R&D COMMAND
(ERADCOM)

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Category	Page
Detectors	122
Displays	124
Electron Tubes	126
Frequency Control	128
Integrated Electronics	130
Laser	135
Materials/Processes	135
Optics	137
Passive Components	139
Power Sources	140
Solid State	142

US ARMY ELECTRONICS RESEARCH AND DEVELOPMENT COMMAND (ERADCOM)

The recent formation of the US Army Electronics Research and Development Command (ERADCOM) with headquarters at Adelphi, MD, consolidated and integrated activities of the Harry Diamond Laboratories (HDL), R&D portions of the US Army Intelligence and Security Command (INSCOM), and the research, development and acquisition portion of the US Army Electronics Command (ECOM) exclusive of communications and automatic data processing. With this realignment, ERADCOM is the Army's focal point for electronics research and the development and acquisition of electronic materiel.

ERADCOM performs a full spectrum of research, development and acquisition (RDA) activities: primarily research, development, engineering and initial procurement. As the principal electronics research, development and acquisition center of the Army, ERADCOM will accomplish programs in such areas as electronics signal intelligence; electronic warfare; atmospheric sciences; target acquisition and combat surveillance; electronic fuzing; radars; sensors; night vision; radar frequency and optical devices; nuclear weapons effects; instrumentation and simulation; and fluidics.

Each of the Research and Development Commands has one or several laboratories integrated into its structure. At ERADCOM, seven such laboratories exist. These laboratories, in part, identify and manage a large portion of the MM&T effort performed by ERADCOM. Being product related, these laboratories can identify major problem areas where applied MM&T effort will realize maximum benefits. The majority of the work accomplished to attack these problems is contracted out to non-Government companies.

One such major problem area is obtaining legible tactical displays with sufficient reliability, availability, and maintainability (RAM). Conventional displays are not suitable for tactical operations due to operational limitations (legibility, power, weight) and poor RAM characteristics. Newer display technologies (flat panel displays and ruggedization techniques) can satisfy these requirements and are now in various stages of development. Techniques used to fabricate these displays are unconventional and manufacturing methods must be developed to reduce costs. To address this problem, projects 3023, 5007, 5008, 5020, and 5036 are included in the plan. These projects are listed under the category, Displays.

Efficient means to produce third generation image intensifier devices (for night vision aids) is another major area of emphasis. Significant improvements in high volume, competitive, production capabilities to replace hand methods will be addressed in projects 9588, 3501, 3502, 3503, 9593, and 9858.

The military departments are expending a major effort to develop an all-weather and smoke fighting capability. Technology applying millimeter waves and far infrared laser systems to establish this capability will be utilized. This requires the development of new surveillance, target-designation, rangefinding, fire control, and beamrider systems generating the requirement for a new class of nanosecond components and pulser subsystems. Production techniques to insure adequate and timely availability of these components and pulsers will be established via projects 5009, 5031, and 5032.

Emphasis is also being placed on high energy pulser systems. Future weapons system for defense against missiles, aircraft, and ARM's require high energy pulsers. Pulsers using state-of-the-art components are excessively large, costly, and are not usable for mobile field applications. Recent research and development has led to an order of magnitude decrease in size providing the potential for fielding mobile systems. Since the applications are exclusively military oriented, production techniques have to be established for components and subsystems to provide the military with the quanitites required and to reduce the cost to an affordable level for the number of systems being considered. Applicable projects include projects 3018, 3019, 5037, and 5038.

Projects 3008, 3504, 5000, 5002, 5012, 5014, and 9845 deal with thermal electro-optical systems. These systems include the present generation Common Modules and future second generation systems such as the ATAC and HISTAF FLIRS (Forward Looking Infrared Systems) and the Thermal Weapon Sight (TWS). MM&T effort for present generation devices will address methods and tooling required to manufacture critical components and parts for modular FLIRS, emphasizing increased performance and reduced cost. Projected MM&T effort for the new second generation devices will address the development of techniques for low-yield processes associated with focal planes, displays, and processing electronics.

Potential spinoff benefits to the private sector could materialize through successful completion of projects on electroluminescent numeric module, electroluminescent displays, and high contrast CRT's. As mentioned above, improved manufacturing methods for the devices will be developed under projects 3023, 3505, 5007, 5008, 5020, and 5036.

ERADCOM submitted a total of 103 projects for inclusion in the Five Year Plan. These projects total $68.7M. Projected funding will be provided from the Other Procurement, Communications/Electronics, PA 5297 Appropriation.

ERADCOM

COMMAND FUNDING SUMMARY
(THOUSANDS)

CATEGORY	FY80	FY81	FY82	FY83	FY84
DETECTORS	2750	850	3300	900	800
DISPLAYS	1300	790	630	500	710
ELECTRON TUBES	1220	1750	1400	400	0
FREQUENCY CONTROL	300	3160	1260	400	1000
INTEGRATED ELECTRONICS	2250	6450	2030	1800	2550
LASER	0	500	0	0	0
MATERIALS/PROCESSES	900	1500	4700	0	0
OPTICS	1150	400	4200	0	450
PASSIVE COMPONENTS	360	700	0	0	0
POWER SOURCES	285	1825	1300	650	4000
SOLID STATE	3450	1000	0	2550	0
TOTAL	13965	18925	18820	7200	9510

****
* CATEGORY *
****
*DETECTORS *
****

FUNDING ($000)

	PRIOR	80	81	82	83	84
COMPONENT -- ARRAYS						
(3008) TITLE - MONOLITHIC FOCAL PLANE SIGNAL PROCESSING ELECTRONICS		850				
(5012) TITLE - 3-5 MICRON HYBRID TE COOLED FOCAL PLANES				1100		
(5014) TITLE - VACUUM DEWARS FOR MOSAIC ARRAYS FOR 2ND GEN. FLIRS				750		
(5025) TITLE - TWO DIMENSIONAL STARTING ARRAYS					900	
(5033) TITLE - MAGNETIC ARRAYS (SQUID)						800

PROBLEM - FUTURE THERMAL IMAGING EQUIP REQUIRE THE USE OF A HIGH DENSITY MATRIX DETECTOR ARRAY IN THE ORDER OF 1000 ELEMENTS. THIS EQUIP CANNOT BE BUILT IN PDN WITH TODAY'S THERMAL IMAGING OFF-FOCAL PLANE TECH BECAUSE OF SIZE, POWER AND WEIGHT PROBLEMS.

SOLUTION - ESTABLISH PRODUCTION TECHNOLOGY TO ALLOW THE SIGNAL PROCESSING ELECTRONICS TO BE LOCATED ON THE FOCAL PLANE.

PROBLEM - BECAUSE OF THEIR HIGH DENSITY, THE 3-5 MICRON FOCAL PLANE DETECTOR ARRAYS AND THE SILICON CCD ELECTRONICS HAVE A LOW YIELD, RESULTING IN A HIGH UNIT COST.

SULUTION - DEVELOP PRODUCTION PROCESSES FOR HIGH DENSITY 3-5 MICRON DETECTOR ARRAYS AND SILICON CCD ELECTRONICS TO INCREASE YIELD.

PROBLEM - NEW DEWAR CONCEPTS MUST BE ESTABLISHED TO HOUSE THE NEW GENERATION FOCAL PLANE ARRAYS SUCH THAT VACUUM INTEGRITY AND MECHANICAL STABILITY ARE MAINTAINED.

SOLUTION - DEVELOP PRODUCTION TECHNIQUES FOR LOW OUT-GASSING DEWAR COMPONENTS.

PROBLEM - POOR UNIFORMITY BETWEEN DETECTORS RESULT IN LOSS OF PERFORMANCE OF IR SYSTEMS.

SOLUTION - DEVELOP MANUFACTURING TECHNIQUES TO REDUCE DETECTOR NON-UNIFORMITY.

PROBLEM - THE METHOD OF FABRICATING THE R AND D ARRAYS RESULTS IN MULTIPLE TARGET PROBLEMS WHICH REDUCE THE LEVEL OF SENSITIVITY. ALSO, DETECTOR YIELD INCREASES UNIT COST EXCESSIVELY.

SOLUTION - DEVELOP TECHNIQUES TO FABRICATE PRODUCTION ARRAYS WITH THE MULTIPLE TARGET PROBLEMS REDUCED TO A MORE TOLERABLE LEVEL. DETERMINE PRODUCTION TECHNIQUES TO INCREASE DETECTOR YIELD.

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- INFRARED/UV						
(3501) TITLE - THIRD GENERATION PHOTOCATHODE ON FIBER OPTICS		900				
PROBLEM - FORM, FIT AND FUNCTION REPLACEMENT OF 2ND GEN, 18 MM AND 25 MM DEVICES WITH 3RD GEN, PRODUCE IMPROVEMENT WILL REQUIRE THAT A PRODUCTION TECHNIQUE BE AVAILABLE FOR FABRICATING GA-AS PHOTOCATHODES ON FIBER OPTIC FACEPLATES.						
SOLUTION - PROVIDE A PRODUCTION PROCESS FOR 25 MM FIBER OPTICS FACEPLATES WITH PROPER COEFFICIENT OF EXPANSION TO MATCH GA-AS, SEAL GA-AS TO THE FIBER OPTIC AND ACTIVATE PHOTOCATHODE TO HIGH SENSITIVITY USING HIGH RATE OF PRODUCTION TECHNIQUES						
(3502) TITLE - IMPROVED FIBER OPTIC INVERTER FOR 3RD GEN, IMAGE INTENSIFIER		300				
PROBLEM - AVIATION GOGGLES REQUIRE 3RD GEN, WAFER TUBES WITH HIGH PERFORMANCE AND LIGHTWEIGHT DESIGN, IMPROVEMENT IN THE RESOLUTION OF MICROCHANNEL PLATES REQUIRES ATTENDANT HIGH RESOLUTION IN THE INVERTER ALONG WITH REDUCED FIXED PATTERN NOISE AND MIN LGTH.						
SOLUTION - PROVIDE A PDN PROCESS FOR SIX MICRON SIZE FIBER OPTIC INVERTERS HAVING VERY LOW BLEMISH COUNT AND FIXED PATTERN NOISE, AND HAVING A MINIMUM LENGTH, APPLY LEARNING FROM MCP FABR. TO FIBER OPTIC TWIST TO REDUCE FIXED PATTERN NOISE AND BLEMISHES.						
(5002) TITLE - ADVANCED MECHANICAL COOLERS FOR 2ND GEN, FLIR'S.			850			
PROBLEM - SECOND GENERATION IR SENSORS ARE NOW VERY SUSCEPTIBLE TO VIBRATIONS AND THERMAL FLUCTUATIONS TO A LARGER DEGREE THAN CONVENTIAL 1ST GEN SYSTEMS.						
SOLUTION - DEVELOP MANUFACTURING TECHNIQUES FOR REDUCING THERMAL FLUCTUATIONS AND VIBRATIONS.						
(9588) TITLE - THIRD GENERATION LOW COST GOGGLE TUBE		700				
PROBLEM - TYPICAL MANUFACTURING METHODS REQUIRE THE USE OF AN EXCESSIVE AMOUNT OF HAND LABOR WHICH CONTRIBUTES TO HIGH UNIT COSTS FOR THE INTENSIFIER TUBE.						
SOLUTION - DETERMINE THE MOST ECONOMICAL METHOD FOR PRODUCING A LOW COST 3RD GEN, IMAGE INTENSIFIER TUBE - METHOD TO BE PROVED BY PRODUCING A SAMPLE TUBE LOT.						
(9948) TITLE - SUB-MILLIMETER DETECTOR/ARRAY				600		
PROBLEM - APPLICATION OF INTEGRATED ELECTRONICS TECHNIQUES TO THE FABRICATION OF SMALL SCHOTTKY BARRIER DIODE DETECTORS HAS RESULTED IN SUPERIOR DETECTORS FOR THE 10MM TO 1000MM RANGE. THIS HAS ONLY BEEN DONE IN LABORATORY BY HIGHLY QUALIFIED PERSONNEL.						
SOLUTION - ESTABLISH PRODUCTION METHODS TO FABRICATE SCHOTTKY BARRIER DETECTORS AND DETECTOR ARRAYS AT REDUCED COST.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84

COMPONENT -- NUCLEAR

(5021) TITLE - NUCLEAR REMBAS SENSOR — 82: 850

PROBLEM - REMOTE MONITORING OF THE ENEMY AREA NUCLEAR ENVIRONMENT REQUIRES A SENSOR THAT CAN WITHSTAND EMPLACEMENT BY AN ARTILLERY ROUND AND YET BE INEXPENSIVE, RELIABLE AND LONG-LIVED.

SOLUTION - USE AN EXSISTING GEIGER-MUELLER TUBE COUPLED WITH AN LSI RADIAC CIRCUIT, THE RESULTING PACKAGE WOULD MEET MILITARY NEEDS AT A PRICE WHICH WOULD MAKE SATURATION OF THE ENEMY AREA PRACTICABLE.

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* CATEGORY *
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*DISPLAYS *
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COMPONENT -- CRT

(3505) TITLE - HIGH CONTRAST CRT — PRIOR: 450

PROBLEM - HIGH CONTRAST CRT AVIONIC DISPLAYS FOR DAY-NIGHT-NIGHT VISION GOGGLES ARE CURRENTLY UNAVAILABLE, OPTICAL FILTERS ARE ENVIRONMENTALLY LIMITED FOR THIS APPLICATION, PHOSPHOR TECHNIQUES ARE AVAILABLE BUT OPTIMIZATION NOR ECONOMICS HAVE BEEN DEMONSTATED.

SOLUTION - USE OF OPTIMIZED BILAYER TRANSPARENT PHOSPHERS WITH A BLACK ABSORBENT LAYER PROVIDES THE HIGH CONTRAST DISPLAY FOR THE SEVERAL MODES. OPTIMIZATION OF PHOSPHER TECHNIQUES FOR 5 IN AND LARGER CRTS WILL BE ECONOMICALLY JUSTIFIED.

(9838) TITLE - MINIATURE CATHODE RAY TUBES — PRIOR: 300

PROBLEM - PRESENT MINIATURE CRT'S ARE TOO EXPENSIVE AND DO NOT HAVE IMAGE QUALITY TO ALLOW FOR MISSION REQUIREMENTS, THERE ARE NO SOURCES FOR THE REQUIRED TUBES IN DESIRED QUANTITIES.

SOLUTION - ESTABLISH A SOURCE AND MANUFACTURING PROCESS TOWARD BETTER CONTROL AND SIMPLIER PROCEDURES TO ELIMINATE PRODUCTIUN VARIABLES AND HAND MANUFACTURING STEPS.

COMPONENT -- LED

(5026) TITLE - DISPLAY FOR SECOND GENERATION FLIR'S — 84: 900

PROBLEM - PRESENT METHODS OF FLIR DISPLAYS ARE TOO LARGE AND HEAVY TO MEET THE SYSTEM CONSTRAINTS OF THE 2ND GEN, (TWS) CLASS.

SOLUTION - ESTABLISH THE MANUFACTURING METHODS ON THE ADVANCED DISPLAYS WHICH WILL BE COMPLETING R AND D IN FY-82.

FUNDING ($000)

	PRIOR	80	81	82	83	84
COMPONENT -- OTHER						
(3023) TITLE - TUBULAR PLASMA PANEL		550				
PROBLEM - PRESENT DISPLAY DEVICE FOR TACFIRE AND TOS [illegible] SMALL AN ACTIVE AREA, INSUFFICIENT INTERACTIVE AND MAP CAPABILITY. [illegible] PLASMA PANEL CAN BE USED BUT IS HIGH IN COST DUE TO EXTENSIVE LABOR [illegible], INSP, ASSEMBLY, AND FINAL INSPECTION.						
SOLUTION - HIGH LABOR COSTS WILL BE REDUCED BY DECREASING MANUAL LABOR AND USING A MAXIMUM OF FULLY AUTOMATED PROCESSING AND INSPECTION TECHNIQUES AND EQUIPMENT.						
(5007) TITLE - ELECTROLUMINESCENT DISPLAYS			440			
PROBLEM - TACTICAL EQUIP REQUIRE RUGGED HIGH CONTRAST DISPLAY DEVICES WITH HIGH INFORMATION DENSITY CAPABILITIES. ELECTROLUMINESCENT DISPLAYS NEEDED TO PERFORM THIS FUNCTION REQUIRE DEPOSITION OF HIGH INTEGRETY THIN FILMS OVER HUNDREDS OF SQUARE CENTIMETERS.						
SOLUTION - VOLUME MANU PROCESSES TO FABRICATE UNIFORM ELECTROLUMINESCENT THIN FILM STRUCTURES WILL BE DEVELOPED. REQUIREMENTS WILL BE ESTABLISHED FOR MATERIALS PURITY AND PROCESS CONTROL TO OBTAIN HIGH YIELD THEREBY LOWERING COST AND INSURING AVAILABILITY.						
(5008) TITLE - ELECTROLUMINESCENT NUMERIC MODULE			350			
PROBLEM - HIGH CONTRAST NUMERIC READOUTS ARE REQUIRED FOR SUNLIGHT LEGIBILITY AND FULL ENVIRONMENTAL OPERATION IN TACTICAL EQUIP. ELECTROLUMINESCENT MODULES NEEDED TO FULFILL THIS REQUIREMENT ARE AVAILABLE ONLY AS SMALL QTY, HIGH COST, LAB BUILT SAMPLES.						
SOLUTION - THIN FILM CIRCUITRY TECHNIQUES AND HYBRID ASSEMBLY PROCEDURES WILL BE USED TO ACHIEVE AN EFFICIENT HIGH YIELD MFG TECHNOLOGY CAPABLE OF PRODUCING RELIABLE FULLY MILITARIZED NUMERIC DISPLAY DEVICES AT REASONABLE COST FOR LARGE VOLUME USAGE.						
(5020) TITLE - TACTICAL GRAPHICS DISPLAY PANEL				630		
PROBLEM - TACTICAL MANPACK COMMUNICATIONS TERMINALS REQUIRE A LIGHTWEIGHT LOW POWER DISPLAY WHICH IS CAPABLE OF GRAPHICS AND IS LEGIBLE IN DIRECT SUNLIGHT. SUCH DISPLAYS ARE PRESENTLY AVAILABLE ONLY AS LABORATORY EVALUATION MODELS AT PROHIBITIVE EXPENSE.						
SOLUTION - A MANUFACTURING METHODS PROGRAM MUST BE CONDUCTED SO THAT THESE DISPLAYS CAN BE MANUFACTURED IN LARGE QUANTITIES AT A PRICE WHICH WILL MAKE THEM FEASIBLE FOR TACTICAL USE WHERE THEY ARE BADLY NEEDED.						

FUNDING ($000)

	PRIOR	80	81	82	83	84
COMPONENT -- OTHER (CONTINUED)						
(5036) TITLE - MULTICOLOR GRAPHICS DISPLAY						710

PROBLEM - TACTICAL MANPACK COMM TERMINALS REQUIRE A LIGHTWEIGHT LOW POWER MULTICOLOR DISPLAY WHICH IS CAPABLE OF GRAPHICS AND IS LEGIBLE IN DIRECT SUNLIGHT. SUCH DISPLAYS ARE PRESENTLY AVAILABLE ONLY AS LABORATORY EVALUATION MODELS AT PROHIBITIVE EXPENSE.

SOLUTION - A MANUFACTURING METHODS PROGRAM MUST BE CONDUCTED SO THAT THESE DISPLAYS CAN BE MANUFACTURED IN LARGE QUANTITIES AT A PRICE WHICH WILL MAKE THEM FEASIBLE FOR TACTICAL USE WHERE THEY ARE BADLY NEEDED.

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* CATEGORY *
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*ELECTRON TUBES *
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COMPONENT -- BEAM

(5006) TITLE - STD CAVITY FOR WIDEBAND TWT — 450

PROBLEM - HAND MACHINING AND CLOSE TOLERANCES PREVENT COST REDUCTION. EXCESSIVE PARTS HANDLING AND CIRCUIT READJUSTMENT RESULT IN HIGH COST, LOW YIELD TRAVELING WAVE TUBE. EW SYSTEMS REQUIRE RELIABLE LOW COST WIDE BAND JAMMER TUBES FOR AIRCRAFT SURVIVABILITY.

SOLUTION - NUMERICAL CONTROLLED MACHINING MAINTAIN DESIRED TOLERANCES FOR ONE TIME STACKING AND HIGH YIELD PRIOR TO FINAL ASSEMBLY. LOW COST CAVITY PROVIDES COST EFFECTIVE WIDEBAND JAMMER TUBE FOR EW PROTECTION OF ARMY AIRCRAFT.

(5010) TITLE - BONDED GRID ELECTRON GUN — 500

PROBLEM - PRESENT TECHNOLOGY CAN NOT BE USED TO BUILD GRIDED MILLIMETER WAVE TUBES. MUST USE HIGH VOLTAGE MODULATOR FOR PULSED OPERATION.

SOLUTION - DEVELOP TECHNIQUES FOR MANUFACTURING LINEAR BEAM TUBES USING BONDED GRID ELECTRON GUNS.

(5011) TITLE - ELECTRON BEAM SEMICONDUCTOR AMPLIFIER FOR JAMMERS — 500

PROBLEM - BROAD BANDWIDTH TRANSISTOR AMPLIFIERS LIMITED IN POWER. MUST COMBINE MANY TRANSISTORS TO ACHIEVE HIGH POWER. RESULTING AMPLIFIER IS INEFFICIENT, LARGE AND COSTLY.

SOLUTION - DEVELOP MANUFACTURING PROCESS TO BUILD HIGH POWER ELECTRON BEAM AMPLIFIER TO REDUCE SIZE AND COST BY FACTOR OF TWO AND ACHIEVE AND IMPROVE EFFICIENCY.

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- BEAM (CONTINUED)							
(5019)	TITLE - LASER-CUT SUBSTRATES FOR MICROWAVE TUBES				600		
	PROBLEM - PRESENT CFA JAMMER TUBES EMPLOY HIGH COST, PRECISION ANODE CIRCUITS LIMITING UTILIZATION IN OPTIMIZED EW SYSTEMS. HIGH PERFORMANCE AND LOW WEIGHT AT MINIMUM COST IS REQUIRED TO FIELD DESIRED EW SYSTEMS.						
	SOLUTION - UTILIZE LASER-CUT ANODE CIRCUIT SUBSTRATES TO ACHIEVE DESIRED RF PERFORMANCE AND MINIMIZE PARTS AND OVERALL DEVICE COST. ALSO EMPLOY PHOTOLITHOGRAPHIC TECHNIQUES TO FORM MEANDERLINE CIRCUIT, USE BERYLLIA SUBSTRATE MATERIAL FOR DIELECTRIC SUPPORTS.						
(5029)	TITLE - FERRULESS CAVITY FOR MILLIMETER-WAVE AMP					400	
	PROBLEM - MILLIMETER RADARS REQUIRE LIGHT WEIGHT LOW COST TRANSMITTER TUBES TO PROVIDE SYSTEMS TO PENETRATE SMOKE AND FOG. PRESENT HAND MACHINING IS EXPENSIVE AND POOR TOLERANCE CONTROL AT MM DIMENSIONS RESULT IN HIGH COST TRANSMITTER TUBES EVEN IN LARGE QTY.						
	SOLUTION - COMPUTER CONTROLLED ZERO BLANK COINING AND LAPPING METHODS WOULD ELIMINATE COSTLY HAND MACH AND HAND STACKING OF CAVITIES SUITABLE FOR MILLIMETER WAVE TUBES, ADAPTING PRESENT TECH AND ASSEMBLY PROC TO ACHIEVE HIGH YIELD WILL PROVIDE A LOW COST TUBE.						
(9970)	TITLE - LIGHTWEIGHT LOW COST JAMMER PACKAGE		600				
	PROBLEM - MANUAL ASSEMBLY OF LARGE NUMBER OF PIECE PARTS MAKES TUBES EXPENSIVE. A LARGE AMOUNT OF HIGHLY SKILLED LABOR IS REQUIRED TO PERFORM ROUTINE REPETITIVE TESTS.						
	SOLUTION - USE AUTOMATIC CONTROL FOR TEMPERATURE AND VACUUM PROCESSING. FABRICATION OF HELIX CURCUIT AND SUPPORT RODS, AND DEPOSITION OF ATTENUIATOR PATTERN ON THE SUPPORT RODS, USE AUTOMATIC TESTING.						
COMPONENT -- CATHODE							
(3018)	TITLE - ONE MEGANATT HELS SWITCH		620				
	PROBLEM - HIGH PEAK AND AVERAGE POWER THYRATRONS NOT COMMERCIALLY AVAILABLE. LOW YIELD ON R AND D DEVICES DUE TO INCREASED SIZE AND POWER REQUIREMENTS.						
	SOLUTION - ESTABLISH PRODUCTION TECHNIQUES FOR IMPROVING YIELD. DEVELOP LEARNING CURVE FOR LARGE AREA OXIDE COATED CATHODES AND MULTIPLE GRID DEVICE.						
(3027)	TITLE - PLASMA CATHODE THYRATRON				800		
	PROBLEM - STANDBY FILAMENT AND RESERVOIR POWER REQUIRED BY CONVENTIONAL PLASMA SWITCHES MAKE THEM UNSUITABLE FOR MILITARY APPLICATIONS REQUIRING LOW POWER DRAIN AND INSTANTANEOUS START.						
	SOLUTION - ESTABLISH PRODUCTION FACILITIES FOR FABRICATING PLASMA CATHODE HYDROGEN THYRATRONS THAT WILL NOT REQUIRE STANDBY POWER.						

FUNDING ($000)

	PRIOR	80	81	82	83	84
COMPONENT -- CATHODE (CONTINUED)						
(9879) TITLE - HIGH CURRENT DENSITY CATHODE			300			
PROBLEM - CURRENT DENSITY REQUIRED FOR MILLIMETER WAVE TUBES RESULTS IN VERY SHORT LIFE AND POOR RELIABILITY WITH ANY PRESENTLY AVAILABLE CATHODE.						
SOLUTION - PROVIDE MANUFACTURING PROCESS FOR TUNSTATE CATHODE WHICH AT THE REQUIRED CURRENT DENSITY HAS OVER TEN TIMES THE LIFE PRESENTLY AVAILABLE CATHODES.						

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* CATEGORY *
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*FREQUENCY CONTROL *
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COMPONENT -- CRYSTALS						
(9451) TITLE - HIGH RELIABILITY GENERAL PURPOSE CRYSTALS			400			
PROBLEM - CRYSTALS USED IN HIGH RELIABILITY TACTICAL RADIOS HAVE A HIGH FAILURE RATE AND VARY WITH AGE, TEMPERATURE, AND ENVIRONMENT.						
SOLUTION - PRODUCTION ENGINEERING WILL CLOSELY CONTROL CRYSTAL AXES ORIENTATION, SHAPING, PLATING, AND SEALING IN CLEAN-ROOM CONDITIONS.						
(9545) TITLE - ACCELERATION RESISTANT QUARTZ CRYSTAL UNITS				400		
PROBLEM - CRYSTAL UNITS FAIL UNDER STATIC AND DYNAMIC ACCELERATION STRESSES.						
SOLUTION - IMPROVE AND CLOSELY CONTROL CRYSTAL BLANK GEOMETRY, PROCESSING, BONDING, MOUNTING, AND LEAD ATTACHMENT.						
(9549) TITLE - SHOCK RESISTANT CRYSTAL					400	
PROBLEM - CRYSTALS FOR FUZES ARE INOPERATIVE AFTER EXPOSURE TO HIGH SHOCK (25,000G'S).						
SOLUTION - CLOSELY CONTROL CRYSTAL GEOMETRY, SHAPING, BONDING, MOUNTING, AND LEAD ATTACHMENT TO SUSTAIN 100,000 G'S FOR 3 MILLISECONDS.						
(9720) TITLE - FABRICATION OF OVERTONE MINIATURE PRECISION QUARTZ CRYSTALS				360		
PROBLEM - MINIATURIZED PRECISION QUARTZ CRYSTALS IN MICROCIRCUIT PACKAGES ARE VERY FRAGILE AND DIFFICULT TO FABRICATE.						
SOLUTION - IMPROVE PRODUCTION TECHNIQUES TO FABRICATE, HANDLE, AND ASSEMBLE THE CRYSTAL BLANKS TO OVERCOME THE BREAKAGE. MAINTAIN TIGHT CONTROL ON GEOMETRY AND ESTABLISH LOW LOSS BONDING TECHNIQUES IN MINIATURE ENCLOSURES.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- CRYSTALS (CONTINUED)							
(9754)	TITLE - CONT CYCLE PROC OF SHOCK RESIS (15000G) QUARTZ CRYSTAL UNITS	1500		500			
	PROBLEM - CRYSTALS CAPABLE OF WITHSTANDING 15,000G SHOCK CANNOT BE PRODUCED USING STANDARD PRODUCTION PROCESSES.						
	SOLUTION - ESTABLISH A CONTINUOUS PROCESSING VACUUM STATION FOR PRODUCING HI-G SHOCK CRYSTALS IN QUANTITY.						
(9807)	TITLE - PROCESSING HIGH STABILITY QUARTZ CRYSTAL UNITS	400		760			
	PROBLEM - STRESSES DUE TO CRYSTAL MOUNTING, BONDING, AND ELECTRODING, PLUS MASS TRANSFER OF CONTAMINANTS WITHIN THE ENCLOSURE CAUSE REDUCTION IN CRYSTAL STABILITY.						
	SOLUTION - DEVELOP THREE PRODUCTION TECHNIQUES, X-RAY OR LASER ORIENTATION OFTHE CRYSTAL BLANK, STRESS AND CONTAMINATION-FREE BONDING OF THE CRYSTAL TO THE CLIP, AND IN-LINE FINAL PROCESSING IN A HIGH VACUUM FACILITY.						
COMPONENT -- FILTERS							
(9914)	TITLE - MULTIMODE PIEZOELECTRIC FILTERS				300		
	PROBLEM - FILTERS WITH MORE PRECISE FREQUENCY DISCRIMINATION CHARACTERISTICS ARE REQUIRED TO COMPLY WITH NARROWER GUARD BAND REQUIREMENTS OF NEWER MILITARY COMMUNICATIONS EQUIPMENT.						
	SOLUTION - ESTABLISH PRODUCTION TECHNIQUES AND PROCESS CONTROLS TO PROVIDE PRECISE LAYER THICKNESSES, STIFFNESSES AND DENSITIES OF ELECTRODES AND SUBSTRATES USED IN MULTIMODE FILTERS.						
COMPONENT -- OSCILLATORS							
(9647)	TITLE - I.C. VOLTAGE CONTROLLED OSCILLATOR ASSEMBLY			450			
	PROBLEM - CRYSTALS REQUIRE OVENS FOR FREQUENCY STABILITY, ARE LARGE, AND REQUIRE CONSIDERABLE POWER.						
	SOLUTION - PACKAGE A VOLTAGE CONTROLLABLE I.C. FOR PRECIAION FREQUENCY CONTROL. PRODUCTION ENGINEER QUARTZ CRYSTAL FINISHING METHODS.						
(9767)	TITLE - DEP OF HIGH DENSITY THICK FILM CIRCUITS FOR XTAL OSCILLATORS	550			200		
	PROBLEM - PRECISE CONTROL OF THICK FILM CIRCUITRY IS NECESSARY TO INSURE THE REQUIRED CRYSTAL OSCILLATOR STABILITY.						
	SOLUTION - ESTABLISH PROCESS CONTROLS OF THICK FILM DEPOSITION AND MOLD TOLERANCES TO PLUS OR MINUS 2 MILS.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT	-- OSCILLATORS (CONTINUED)						
(9851)	TITLE - TACTICAL MINIATURE PRECISION CRYSTAL OSCILLATOR	200		650			
	PROBLEM - MINIATURE TACTICAL RADIOS NEED MINIATURE CRYSTAL OSCILLATORS WITH A 10 X IMPROVEMENT IN STABILITY. VACUUM BRAZING, SEALING, AND CLEANLINESS ARE IMPORTANT. MICROELECTRONICS MUST BE PACKAGED INSIDE A VACUUM ENCLOSURE.						
	SOLUTION - PDN ENG WILL ESTABLISH ASSEMBLY TECHNIQUES FOR CRYSTAL UNITS AND HYBRID MICROCIRCUIT OSCILLATOR CIRCUITS UNDER CLOSE CONTROL OF MECHANICAL AND THERMAL PROPERTIES. HIGH VACUUM COMPATIBLE ASSEMBLY TECHNIQUES OF COMPLETED UNITS WILL BE ESTABLISHED.						
(9900)	TITLE - MULTIPLE CHANNEL VHF/UHF SOURCE			400			
	PROBLEM - PRODUCTION TECHNIQUES FOR A LOW COST, SMALL SIZE, MULTIPLE CHANNEL VHF/UHF FREQUENCY SOURCE USING ADVANCED I.C. SYNTHESIS TECHNIQUES ARE NOT AVAILABLE.						
	SOLUTION - ESTABLISH PRODUCTION METHODS FOR A VHF/UHF FREQUENCY SYNTHESIZER HAVING INTEGRATED CRYSTAL UNITS AND MICROELECTRONIC CIRCUITRY.						
COMPONENT	-- SAW						
(9897)	TITLE - SURFACE ACOUSTIC WAVE RESONATOR AND REFLECTIVE ARRAY DEVICES		300				
	PROBLEM - PRODUCTION TECHNIQUES FOR ACHIEVING DEVICE REPRODUCIBILITY, FREQUENCY TUNABILITY AND LOW COST FOR SAW RESONATORS AND REFLECTIVE ARRAY DEVICES ARE NOT AVAILABLE.						
	SOLUTION - ESTABLISH PRODUCTION TECHNIQUES AND PROCESS CONTROLS TO PROVIDE SAW RESONATORS AND REFLECTIVE ARRAY DEVICES AT PRECISE FREQUENCIES.						
COMPONENT	-- STANDARDS						
(9721)	TITLE - FABRICATION METHODS AND CONTROLS FOR MIN MOLECULAR FREQ STDS						1000
	PROBLEM - AVAILABLE ATOMIC OR MOLECULAR FREQUENCY STANDARDS REQUIRED AS MASTER CLOCKS ARE TOO LARGE FOR TACTICAL NAVIGATION AND POSITION LOCATIONS AND COMMUNICATIONS SYSTEMS.						
	SOLUTION - AN MMT PROGRAM IS REQUIRED TO DEVELOP PRODUCTION METHODS TO MANUFACTURE THE CARBON DIOXIDE LASER AND ASSOCIATED FREQUENCY MULTIPLIERS.						

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* CATEGORY *
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*INTEGRATED ELECTRONICS *
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		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- AMPLIFIERS							
(9543)	TITLE - LOW NOISE BROADBAND MICROWAVE IC AMPLIFIER	143		400			
	PROBLEM - TRAVELING WAVE TUBES (TWT) ARE BULKY AND HEAVY, PRESENT IC'S ARE NOT COMMERCIALLY AVAILABLE FOR OPERATION AT THE FREQUENCY BANDWIDTH AND LOW NOISE FIGURE REQUIRED.						
	SOLUTION - PERFORM PRODUCTION ENGINEERING TO PRODUCE HIGH FREQUENCY IC'S AND TRANSISTORS, CONTROL GEOMETRY, PHOTOMASKING, ION IMPLANTATION, ELECTRON BEAM TECHNIQUES, AND DIFFUSION.						
(9676)	TITLE - LOW NOISE MILLIMETER WAVE PREAMPLIFIERS				680		
	PROBLEM - PRODUCTION CAPABILITY FOR SOLID STATE PUMP SOURCES AND HIGH CUTOFF VARACTORS ARE NOT AVAILABLE, THEY ARE NEEDED FOR COMMUNICATIONS AND AVIONICS.						
	SOLUTION - DEVELOP PRODUCTION CAPABILITY FOR SOLID STATE PUMP SOURCES AND HIGH CUTOFF VARACTORS.						
(9711)	TITLE - OPTIMIZATION OF PROCESS CONTROLS-FABR OF MW SOLID STATE DVCS			900			
	PROBLEM - CAPABILITY OF MICROWAVE DEVICES IS LIMITED BY INADEQUATE PRODUCTION PROCESSING.						
	SOLUTION - ESTABLISH CLOSE CONTROL OF THE DOPING GRADIENT, THE DEVICE CONFIGURATION, AND PREVENT EPITAXIAL AUTODOPING.						
(9749)	TITLE - THICK FILM PROCESSING OF MICROWAVE INTEGRATED CIRCUITS	500			500		
	PROBLEM - PRESENT FABRICATION PROCESSES EMPLOYING THIN FILM TECHNOLOGY ARE VERY COSTLY AND TIME CONSUMING FOR MICROWAVE INTEGRATED CIRCUITS.						
	SOLUTION - REPLACE THIN FILM PROCESS WITH INEXPENSIVE THICK FILM PROCESS.						
COMPONENT -- CIRCUITS							
(3014)	TITLE - ECONOMICAL PDN OF HIGH PERFORMANCE ELECTRONIC SUBSYSTEMS		750				
	PROBLEM - SIZE, WEIGHT AND POWER REDUCTIONS ARE ESSENTIAL TO FUTURE ARMY SYSTEMS, SUBSYSTEM DESIGN BY COMPUTER TECHNIQUES INVOLVES MINIMIZING INITIAL DESIGN ERRORS AND INCREASING TESTABILITY TO CORRECT ERRORS.						
	SOLUTION - ESTABLISH FOR PDN APPLICATION A COMPLETE SELF-CONTAINED COMPUTER AIDED DESIGN AND DESIGN AUTOMATED (CADDA) CAPABILITY TO FACILITATE COST EFFECTIVE PRODUCTION OF HIGH PERFORMANCE COMPLEX SYSTEMS AND SUBSYSTEMS INCLUDING DESIGN FOR TESTABILITY.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- CIRCUITS (CONTINUED)							
(3026)	TITLE - HIGH PRESSURE OXIDE INTEGRATED CIRCUIT PROCESS		500				
	PROBLEM - CONVENTIONAL OXIDATION OF THICK SILICON DIOXIDE LAYERS REQUIRES EXCESSIVE TIME OR TEMPERATURE. FOR OXIDE-ISOLATED BIPOLAR CIRCUITS, 1200 DEGREES FOR OVER 12 HOURS IS REQUIRED. FOR MOS/SOS, THE TEMPERATURES ARE EXCESSIVE.						
	SOLUTION - ESTABLISH PRODUCTION TECHNIQUES FOR HIGH PRESSURE OXIDATION OF SILICON LAYERS. RAPID OXIDATION RATES OBTAINABLE PERMIT EITHER REDUCTION OF TIME REQUIRED TO ONE-FOURTH OR A TEMPERATURE DECREASE TO LESS THAN 900 DEGREES.						
(3028)	TITLE - HIGH POWER X-RAY SOURCE FOR FINE LINE LITHOGRAPHY		500				
	PROBLEM - HIGHER SPEED REQUIRED FOR MILITARY INTEGRATED CIRCUITS REQUIRES FINE LINE FABRICATION TECHNOLOGY OF BELOW TWO MICROMETER PATTERN SIZE. X-RAY LITHOGRAPHY CAN MEET THIS REQUIREMENT IF HIGHER POWER SOURCES ARE USED.						
	SOLUTION - ESTABLISH PRODUCTION METHODS FOR UTILIZING HIGHER POWER X-RAY SOURCES THAN CURRENTLY USED TO PROVIDE NECESSARY FINE LINE CAPABILITY, AND ADAPT HIGH POWER X-RAY SOURCES TO PROVIDE POWER REQUIRED IN PRODUCTION ENVIRONMENT.						
(5001)	TITLE - 3-D INTERCONNECTION TECH. FOR HIGH DENSITY MICRO-ELECTRONICS			1500			
	PROBLEM - HIGH PERFORMANCE AIRBORNE FLIR'S WITH REMOTE DISPLAYS REQUIRE SOLID STATE SCAN CONVERTERS FOR SIGNAL PROCESSING. THESE ELECTRONICS MUST BE LOCATED ON-GIMBAL. CURRENT PRINTED CIRCUIT BOARD TECHNOLOGY PREVENTS IMPLEMENTATION OF THESE ELECTRONICS.						
	SOLUTION - UTILIZE A 3 DIMENSIONAL MICROELECTRONIC INTERCONNECTION TECHNOLOGY AIMED AT HIGH PRODUCTION VOLUME WHERE LOW UNIT COST, HIGH DEVICE DENSITY, GOOD POWER DISSIPATION, HIGH LOGIC SPEED AND LOW EMI SUSCEPTIBILITY ARE DRIVING REQUIREMENTS.						
(5003)	TITLE - 200 MHZ MICROPROCESSOR			900			
	PROBLEM - PRESENT COMMERCIALLY AVAILABLE MICROPROCESSORS ARE MUCH TOO SLOW TO COPE WITH FUTURE SIGINT OR SURVEILLANCE REQUIREMENTS OF ARMY ISTA SYSTEMS.						
	SOLUTION - ESTABLISH PRODUCTION TECHNIQUES TO CONVERT THE HIGH SPEED TECHNOLOGY NOW UNDER DEVELOPMENT INTO A MANUFACTURING CAPABILITY FOR MICROPROCESSORS TEN TIMES FASTER THAN THE BEST CURRENTLY AVAILABLE.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- CIRCUITS (CONTINUED)						
(5005) TITLE - SEALED CHIP TAPE CARRIER FOR HYBRID MICROCIRCUITS			500			
PROBLEM - RUGGEDIZATION OF HYBRID MICROCIRCUITS IS REQUIRED FOR ARTILLERY AND AIRCRAFT DELIVERED SENSORS AND TRANSMITTERS. FOR LONGTERM RELIABILITY. HERMETIC ENCLOSURES ARE REQUIRED. THESE PACKAGES ARE DIFFICULT AND COSTLY TO RUGGEDIZE.						
SOLUTION - ESTABLISH PDN TECHNIQUES AND PAC FOR LOW COST, HIGH RELIABILITY PACKAGING OF ALL INTEGRATED CIRCUIT CHIPS USED IN MILITARY HYBRID MICROCIRCUITS. SEALED CHIP TAPE ASSEMBLED DEVICES PROVIDE CHIP PACKAGES TO BE USED IN NON-HERMETIC PACKAGES.						
(5018) TITLE - GHZ SIGNAL PROCESSOR				850		
PROBLEM - PRESENT AND PLANNED GENERAL PURPOSE HIGH SPEED MICROPROCESSORS LACK THE SPEED REQUIRED FOR NON-COOPERATIVE IFF AND SOME ELINT SYSTEM REQUIREMENTS.						
SOLUTION - ESTABLISH PRODUCTION TECHNIQUES TO TRANSFER OPTIMUM SIGNAL PROCESSING ALGORITHMS AND HIGH SPEED TECHNOLOGY NOW UNDER DEVELOPMENT INTO MANUFACTURABLE SPECIFIC CIRCUITS SUCH AS FAST FOURIER TRANSFORM CIRCUITS CAPABLE OF OPERATING AT GHZ DATA RATES.						
(5027) TITLE - LOW COST HYBRID MICROCIRUCIT MODULES					1000	
PROBLEM - THE PRODUCIBILITY OF HIGH DENSITY LARGE AREA HYBRID MICROCIRCUITS MUST BE IMPROVED TO MAKE THEM AFFORDABLE FOR MILITARY ELECTRONICS.						
SOLUTION - ESTABLISH PRODUCTION METHODS FOR DESIGN AND ASSEMBLY OF LARGE AREA (OVER FIVE SQUARE INCHES) FOR USE AT THE MODULE LEVEL IN PLACE OF PRINTED CIRUCIT BOARDS.						
(5034) TITLE - CCD SIGNAL PROCESSORS						700
PROBLEM - EXTENSIVE ENGINEERING WORK IS REQUIRED TO INCORPORATE ANY CCD PROCESSING DEVICE INTO A SYSTEM. ALL INTERFACE CIRCUITRY MUST BE ESPECIALLY DESIGNED AND ASSEMBLED. THERE ALSO EXISTS A VERY LIMITED SELECTION OF COMMERCIAL CCD DEVICES.						
SOLUTION - ESTABLISH PRODUCTION TECHNIQUES FOR DESIGN AND FABRICATION OF INTEGRATED CIRCUITS CONTAINING IN ONE CHIP CCD DEVICES, ANALOG CIRCUITRY, AND DIGITAL CIRCUITRY TO PERFORM ALL UNIQUE INTERFACE FUNCTIONS.						
(5035) TITLE - HIGH SPEED DIGITAL HYBRID MICROCIRCUITS						1000
PROBLEM - HIGH SPEED LSI AND VLSI CHIPS WILL BE AVAILABLE, HOWEVER, PRESENT HYBRID INTERCONNECTING FILMS CANNOT BE DEPOSITED TO THE DIMENSIONS REQUIRED AND WITH THE MANUFACTURABILITY AND CONTROL REQUIRED FOR HIGH SPEED LOGIC.						
SOLUTION - ESTABLISH PRODUCTION METHODS FOR DESIGN, FABRICATION AND ASSEMBLY OF DIGITAL HYBRID MICROCIRCUITS TO RETAIN THE GHZ SPEED CAPABILITY OF INDIVIDUAL LSI/VLSI CHIPS.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- CIRCUITS (CONTINUED)							
(9631)	TITLE - I.C. FABRICATION USING ELECTRON BEAM TECHNOLOGY	1117					850
	PROBLEM - EXTREMELY HIGH SPEED REAL-TIME SIGNAL PROCESSING INTEGRATED CIRCUITS REQUIRE SUBMICRON LINE WIDTHS AND SPACING. CURRENT ELECTRON BEAM PROCESSING CAN PROVIDE DIMENSIONAL RESOLUTION AT THE ONE TO TWO MICRON (MICROMETER) RANGE.						
	SOLUTION - ESTABLISH PRODUCTION PROCESSES FOR APPLICATION OF HIGHER RESOLUTION RESIST MATERIALS AND ELECTRON BEAM CONTROL TO YIELD SUBMICRON RESOLUTION.						
(9905)	TITLE - LOW COST MONOLITHIC GALLIUM ARSENIDE MW INTEGRATED CIRCUITS			1000			
	PROBLEM - THE PHYSICAL SIZE OF THE CIRCUIT COMPONENTS USED AT MICROWAVE FREQUENCIES, THE PACKAGING DENSITY AND THE FREQUENCY DEMAND THAT MONOLITHIC CONSTRUCTION BE USED.						
	SOLUTION - ESTABLISH THE TECHNIQUES FOR MONOLITHIC DESIGN IN GALLIUM ARSENIDE.						
(9909)	TITLE - RED OF THERMAL RES OF PKGS USED FOR MICROWAVE INT CKTS (MIC'			500			
	PROBLEM - AS THE CONCENTRATION OF INTEGRATED CIRCUITS INCREASES THE HEAT DENSITY IS REACHING THE POINT WHERE IT WILL DESTROY THE SEMICONDUCTOR DEVICES.						
	SOLUTION - REPLACE THE PRESENT PACKAGING DEVICES WITH UNITS HAVING A HIGH PERCENTAGE OF DIAMOND MATERIAL SO AS TO ACHIEVE A GREATER THERMAL TRANSMISSION.						
(9968)	TITLE - LARGE AREA HYBRID MICROCIRCUITS		500				
	PROBLEM - REQUIREMENTS EXIST FOR INCREASED PACKING DENSITY OF MICROELECTRONIC DEVICES ON HYBRID SUBSTRATES. PRESENT STATE-OF-THE-ART REQUIRES MOUNTING LARGE HYBRID SUBSTRATES IN LARGE PACKAGES WHICH ARE COSTLY AND DIFFICULT TO HERMETICALLY SEAL.						
	SOLUTION - ESTABLISH PRODUCTION CAPABILITY FOR SEALING METAL COVERS OVER SMALL AREAS OF THE LARGER SUBSTRATE TO PROVIDE HERMETIC ENCLOSURES FOR SENSITIVE COMPONENTS. PRODUCTION TESTING OF HERMETICITY OF THESE ENCLOSURES MUST ALSO BE ESTABLISHED.						
COMPONENT -- MEMORIES							
(5004)	TITLE - MILITARY MEMORY MODULES			750			
	PROBLEM - COMMERCIAL LSI MEMORIES OF 16K BIT COMPLEXITY OR GREATER USE LOW COST DYNAMIC DESIGNS THAT CANNOT OPERATE ABOVE 70DEG CELSIUS. STATIC CELLS THAT CAN TOLERATE FULL MILITARY TEMP RANGE HAVE NOT BEEN USED COMMERCIALLY DUE TO HIGH COST AND LOW YIELD.						
	SOLUTION - ESTABLISH PRODUCTION TECHNIQUES AND PROCESS CONTROLS TO ACHIEVE FULL TEMPERATURE OPERATION IN 16K BIT RAMS BY REDUCTION IN CELL LEAKAGE AT HIGH TEMPERATURE OR BY USING HIGH DENSITY STATIC CELL DESIGNS.						

	FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- MEMORIES (CONTINUED)						
(5028) TITLE - COST EFFECTIVE MILITARY MEMORIES						800

PROBLEM - COST OF TESTING COMMERCIAL LSI MEMORY CIRCUITS IS APPROACHING THEIR FABRICATION COST AS MORE ELABORATE TESTING AND SCREENING ARE REQUIRED FOR MILITARY USE.

SOLUTION - ESTABLISH PRODUCTION TECHNIQUES TO REDUCE COST OF TESTING BY (1) ACCESSING STRATEGIC TEST POINTS, (2) UTILIZE UNIQUE TEST SIGNATURES, OR (3) USE FAULT TOLERANT DESIGNS.

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* CATEGORY *
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*LASER *
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COMPONENT -- GENERAL

(5009) TITLE - MINIATURE HIGH VOLTAGE PULSED POWER SUPPLY FOR GAS LASERS — 500

PROBLEM - POWER SUPPLY WITH PULSE FORMING NETWORK HAS TO DELIVER HIGH VOLTAGE PULSES, PACKAGE MUST BE SMALL AND ELECTRODES CURRENT BE EXPOSED TO AIR.

SOLUTION - APPLY TECHNOLOGY AS DEVELOPED FOR HIGH VOLTAGE GAS TO THE PRODUCTION OF COMPACT POWER SUPPLY.

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* CATEGORY *
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*MATERIALS/PROCESSES *
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COMPONENT -- CIRCUITRY

(3029) TITLE - HIGH DENSITY PRINTED CIRCUIT BOARDS — 600

PROBLEM - THERE IS A GROWING NEED FOR MILITARY QUALITY HIGH DENSITY BOARDS OF THE TYPES BEING UTILIZED COMMERCIALLY, SMALLER CIRCUIT ELEMENT DIMINSIONS DO NOT MEET REQUIREMENTS OF MILSTD 275, CAPABILITY OF PRODUCTION TO MEET MIL REQUIREMENTS IS NOT KNOWN.

SOLUTION - DETERMINE PERFORMANCE CAPABILITIES, PRODUCTION CONTROLS, AND POTENTIAL YIELDS OF CURRENT COMMERCIAL PRODUCTION LOTS BY ENVIRONMENTAL TESTING AND QC INSPECTIONS. MODIFY MILSTD 275 TO ALLOW HIGHER DENSITY BOARDS IF APPROPRIATE.

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- CIRCUITRY →	(CONTINUED)						
(5017)	TITLE - NON-HERMETIC HYBRID MICROCIRCUITS				1000		
	PROBLEM - SEALED CHIP TAPE CARRIER TECHNIQUES OFFER LOW COST ASSEMBLY AND ENVIRONMENTAL PROTECTION OF INTEGRATED CIRCUIT CHIPS ON HYBRID MICROCIRCUITS, SIMILAR TREATMENT OF DISCRETE TRANSISTOR AND DIODE CHIPS IS NOT ECONOMICALLY FEASIBLE.						
	SOLUTION - ESTABLISH PRODUCTION TECHNIQUES FOR SEALING AND HANDLING DISCRETE SEMICONDUCTOR DEVICE CHIPS INCLUDING TESTING AND BONDING OF CHIPS TO HYBRID MICROCIRUCITS.						
(9795)	TITLE - PRINTED WIRING ASSEMBLY CONTAMINATION CONTROL PROCESS		300				
	PROBLEM - ACTIVATED FLUXES PROVIDE MORE RELIABLE SOLDER JOINTS AND ELIMINATE NEED TO PRE-CLEAN SOLDER TERMINALS, RESIDUAL FLUX CONTAMINANTS CAN CAUSE CORROSION AND CONDUCTIVE PATHS RESULTING IN PRINTED WIRING ASSEMBLY FAILURE, IF THEY ARE NOT REMOVED.						
	SOLUTION - LABORATORY STUDIES HAVE DEVELOPED TEST PROCEDURES AND PASS-FAIL CRITERIA FOR CLEAN PRINTED WIRING ASSEMBLIES. ACCEPTABLE YIELDS, LOWER COST AND HIGHER RELIABILITY WILL BE ASSURED BY ESTABLISHING SUITABLE CONTROLS ON AN ACTUAL PRODUCTION LINE.						
(9810)	TITLE - ELIMINATION OF MECHANICAL DRILLING OF PRINTED CIRCUIT BOARDS				400		
	PROBLEM - MECHANICAL DRILLING OF PRINTED CIRCUIT BOARDS PRODUCES EPOXY SMEAR DUE TO OVERHEATING OF DULL DRILLS. THIS CAUSES OPEN CIRCUIT FAILURES IN MULTILAYER PLATED THROUGH HOLES.						
	SOLUTION - ESTABLISH PRODUCTION TECHNIQUES FOR THE USE OF LASER BEAM DRILLING WHICH AVOIDS DULL DRILL PROBLEM OF OVERHEATING AND PRODUCES HOLES WITH NO EPOXY SMEAR, BETTER TOLERANCES AND MORE RAPIDLY.						
(9846)	TITLE - ULTRA HIGH THERMAL CONDUCTIVITY SUBSTRATE			250			
	PROBLEM - ALUMINA AND BERYLLIA SUBSTRATES DO NOT HAVE ADEQUATE HEAT DISSIPATING CAPACITY FOR HIGH POWER DEVICES.						
	SOLUTION - DEVELOP PROCESSES FOR PRODUCING POLYCRYSTALLINE DIAMOND SUBSTRATES OR SINGLE CRYSTAL DIAMOND SUBSTRATES.						
(9849)	TITLE - PROCESS CONTROL OF CONFORMAL COATING FOR PRINTED CIRCUIT BDS				2000		
	PROBLEM - TWO-PART CONFORMAL COATING SYSTEMS CURRENTLY IN USE REQUIRE PRECISION MIXING AND CURING, VARIATIONS IN PRODUCTION CONTROLS WILL RESULT IN UNCURED MATERIAL WITH POTENTIAL FOR BREAKDOWN.						
	SOLUTION - ESTABLISH PRODUCTION TECHNIQUES FOR USE OF ONE-PART MONOMERS WHICH CAN BE CURED QUICKLY WITH ULTRAVIOLET LIGHT. THIS WILL RESULT IN MORE HOMOGENEOUS HARDENING, AND THE ENTIRE PROCESS CAN BE AUTOMATIC.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- GENERAL							
(5015)	TITLE - 1-2 MICRON PHOTOCATHODE MATERIALS FOR IMAGE INTENSIFIERS				500		
	PROBLEM - THE PHOTOCATHODE MATERIAL WHICH TAKES ADVANTAGE OF THE RADIATION IN THE 1-2 MICRON REGION CANNOT BE PRODUCED IN REQUIRED QUANTITY OR QUALITY ON A PRODUCTION BASIS.						
	SOLUTION - PROVIDE A PRODUCTION PROCESS FOR FABRICATION OF PHOTOCATHODE MATERIALS WHICH ARE SENSITIVE IN THE 1-2 MICRON REGION.						
(9441)	TITLE - ARC PLASMA SPRAYED PHASE SHIFT ELEMENTS	190		450			
	PROBLEM - MATERIAL FOR CIRCULATORS HAS VARYING ELECTRICAL PROPERTIES, CLOSE CONTROL IS DIFFICULT BY PRESENT METHODS.						
	SOLUTION - EMPLOY THE ARC PLASMA TECHNIQUE TO PRODUCE HIGHER AND CONSTANT QUALITY CIRCULATOR MATERIAL, MAINTAIN UNIFORM PLASMA FLOW, ESTABLISH BEST TEMPERATURE AND VOLTAGE CONDITIONS FOR THE ARC, REGULATE FEED RATE.						
(9865)	TITLE - HIGH QUALITY SEMI-INSULATING GA-AS SUBSTRATES				800		
	PROBLEM - IMPURITIES IN GA-AS CAUSE PARAMETER CHANGES WITH TEMPERATURES.						
	SOLUTION - PROCESS GA-AS INTO A PURER CRYSTALLINE STRUCTURE.						
(9865)	TITLE - HIGH QUALITY SEMI-INSULATING GA-AS SUBSTRATES			800			
	PROBLEM - IMPURITIES IN GA-AS CAUSE PARAMETER CHANGES WITH TEMPERATURES.						
	SOLUTION - PROCESS GA-AS INTO A PURER CRYSTALLINE STRUCTURE.						

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* CATEGORY *
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*OPTICS *
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COMPONENT -- OTHER							
(5024)	TITLE - BROADBAND MID IR SOURCE						450
	PROBLEM - THERE IS INSUFFICIENT COMMERCIAL NEED FOR A MID IR SOURCE, PRESENT MILITARY HARDWARE FOR A BROADBAND SOURCE CANNOT PROVIDE THE SYSTEM OUTPUT AT A REASONABLE EFFICIENCY.						
	SOLUTION - PRODUCE GASEOUS DISCHARGE LAMPS THAT WILL SELECTIVELY EMIT MID IR RADIATION UTILIZING THE TECHNOLOGY GAINED IN PRODUCING ALKALI VAPOR STREET LAMPS.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- OTHER (CONTINUED)							
(9858)	TITLE = ADVANCED METHODS FOR FABRICATING MCP'S FOR 3RD GEN. IM. INT.				600		
	PROBLEM = MICROCHANNEL PLATES ARE NOW MADE BY FUZING TOGETHER THOUSANDS OF COATED GLASS FIBERS, THEN ETCHING OUT THE GLASS, CRACKING OCCURS FROM FIBER REDRAWING.						
	SOLUTION = DEVELOP A SYSTEM THAT USES A LASER BEAM TO DRILL THOUSANDS OF HOLES IN A THIN GLASS, CERAMIC OR SEMI-CONDUCTOR DISC, THEN FILL THE HOLES WITH ELECTRON MULTIPLICATION MATERIAL.						
COMPONENT -- WINDOWS/LENSES							
(3503)	TITLE = HOLOGRAPHIC OPTICS FOR NIGHT VISION GOGGLES		800				
	PROBLEM = CURRENT METHODS OF MANUFACTURING HOLOGRAPHIC OPTICS UTILIZE LABORATORY TECHNIQUES WHICH ARE INEFFICIENT AND COSTLY.						
	SOLUTION = DEVELOP PRODUCTION TECHNIQUES TO PRODUCE INEXPENSIVE HOLOGRAPHIC OPTICS.						
(3504)	TITLE = INFRARED COLOR CORRECTING GLASS		350				
	PROBLEM = PRESENT COMMON MODULE IR IMAGERS USED WITH THE ARMY FIRE CONTROL SYSTEM REQUIRE ABERRATION CORRECTING LENS ELEMENTS, THERE IS NO SUBSTITUTE FOR TEXAS INSTR. PROPRIETARY 1173 IR GLASS EXCEPT FOR THE NEWLY DEVELOPED AMTIR-1.						
	SOLUTION = ESTABLISH THE PROCESSES AND METHODS FOR MANUFACTURING THIS NEW GLASS IN SUFFICIENT QUANTITY TO SATISFY THE ARMY'S PRODUCTION DEMANDS.						
(5000)	TITLE = FORGING TO FIGURE OF FAR INFRARED LENSES			400			
	PROBLEM = THE COST OF GERMANIUM OPTICS USED IN FIR SYSTEMS IS EXPENSIVE. UNDER DARPA SPONSORSHIP IN FY 79 AND FY80, FIR LENSES WILL BE FABRICATED IN THE LAB BY FORGING TO FIGURE OF SALTS, THIS FORGING PROCESS MUST BE TRANSFERRED TO A PDN LINE OPERATION.						
	SOLUTION = DEVELOP PRODUCTION TECHNIQUES TO FORGE THESE LENSES IN A PRODUCTION ATMOSPHERE BY NON-PROFESSIONAL PERSONNEL.						
(5013)	TITLE = FABRICATION OF COMPOSITE LENS BENCHES				3000		
	PROBLEM = MOVE FROM A BRASSBOARD PROTOTYPE INTO A PRODUCTION ENVIRONMENT.						
	SOLUTION = DEVELOP PROCESSES TO FABRICATE AND MACHINE COMPLEX COMPOSITE MATERIAL STRUCTURES HAVING EXTREMELY CLOSE TOLERANCES AND TOLERANCES WHICH HAVE TO BE MATCHED FOR ENVIRONMENTAL RESPONSE.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT	-- WINDOWS/LENSES (CONTINUED)						
(9845)	TITLE - NUMERICALLY CONTROLLED OPTICAL FABRICATION	300			600		
	PROBLEM - GERMANIUM AND OTHER CRYSTALINE LENSES USED IN INFRARED NIGHT VISION DEVICES ARE HARD TO MACHINE AND POLISH, PARTICULARLY IF THEY ARE NOT SPHERICAL.						
	SOLUTION - DEVELOP A NUMERICALLY CONTROLLED GRINDING MACHINE TO ROUGH FORM THE ELEMENT AND AN NC POLISHING MACHINE TO FINISH THE COMPLEX LENS SURFACE.						

CATEGORY

PASSIVE COMPONENTS

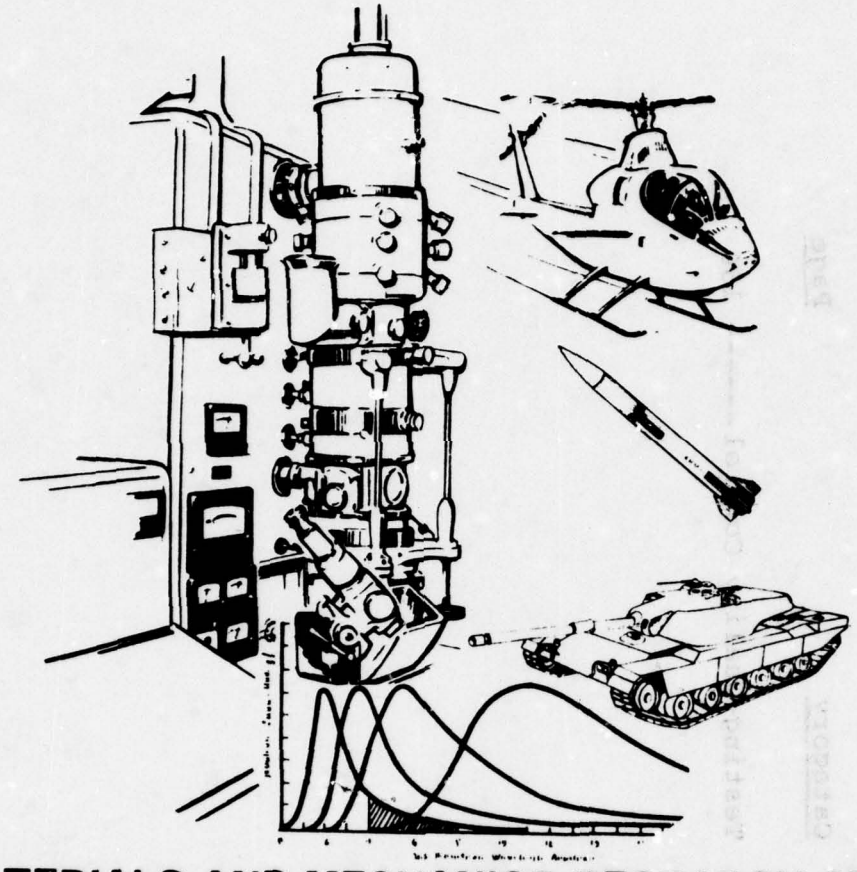
COMPONENT	-- CAPACITORS						
(3019)	TITLE - PROD TECH FOR HIGH ENERGY DENSITY PULSE FORMING NETWORKS		360				
	PROBLEM - LOW WEIGHT, HIGH ENERGY DENSITY PULSE FORMING NETWORKS SUITABLE FOR WEAPON SYSTEMS NOT COMMERCIALLY AVAILABLE.						
	SOLUTION - ESTABLISH MANUFACTURING TECHNIQUES FOR PRODUCING WRINKLE FREE CAPACITOR PADS. ESTABLISH FABRICATION TECHNIQUES TO INCORPORATE PADS INTO LOW WEIGHT HIGH ENERGY DENSITY PULSE FORMING NETWORKS.						
COMPONENT	-- CONDUCTORS						
(9552)	TITLE - THICK FILM CONDUCTIVE NETWORKS	350		500			
	PROBLEM - THICK FILM CONDUCTIVE NETWORKS USED IN HYBRID MICROCIRCUITS UTILIZE GOLD OR PALLADIUM. THESE NOBLE METALS ARE EXPENSIVE AND CONTRIBUTE SIGNIFICANTLY TO THE PRICE OF THE NETWORK.						
	SOLUTION - ESTABLISH PRODUCTION TECHNIQUES FOR PREPARING, HANDLING AND PROCESSING OF A NON-NOBLE METAL CONDUCTIVE COMPOSITION FOR FABRICATING HYBRID MICROCIRCUITS.						
COMPONENT	-- INSULATORS						
(9766)	TITLE - HIGH VOLTAGE INSULATING LAYER DEPOSITION FOR THICK FILM CIRC			200			
	PROBLEM - THE PRESENT PROCESS FOR DEPOSITING AN INSULATING LAYER ON THE THICK FILM CIRCUITS TO SEPARATE HIGH VOLTAGES WITHIN THE CIRCUIT IS IN ADEQUATE AND COSTLY.						
	SOLUTION - ESTABLISH A MECHANIZED PROCESS TO PASSIVATE THE VARIOUS CIRCUIT COMPONENTS.						

CATEGORY	FUNDING ($000)					
	PRIOR	80	81	82	83	84
POWER SOURCES						
COMPONENT -- BATTERIES						
(3016) TITLE - SMALL SIZE LITHIUM CELLS / BATTERIES			800			
PROBLEM - SMALL LITHIUM CELLS 1.5 A.H. OR LESS ARE PRESENTLY HANDMADE WITH LIMITED MECHANIZATION AND THEREFORE ARE EXPENSIVE. PRESENT FABRICATION METHODS ARE NOT ADAPTABLE.						
SOLUTION - NEW TECHNIQUES MUST BE MADE AVAILABLE TO AUTOMATE PRODUCTION OF THE SMALL CELLS TO REDUCE COST AND IMPROVE RELIABILITY.						
(3017) TITLE - ELECTRODE MATERIALS FOR NICKEL ZINC BATTERIES			175			
PROBLEM - WEIGHT AND COST OF PRESENT NICKEL ELECTRODES ARE HIGH. PRIMARY FAILURE MODE OF HIGH ENERGY NICKEL ZINC BATTERIES IS ZINC PENETRATION.						
SOLUTION - DEVELOP LIGHTWEIGHT, INEXPENSIVE NICKEL CATHODE AND INEXPENSIVE SEPERATOR, ZINC STOPPER SYSTEM.						
COMPONENT -- INFRARED						
(3012) TITLE - IR SOURCES FOR AN/ALQ-144		285				
PROBLEM - PRESENT INFRARED SOURCE FOR THE AN/ALQ-144 DOES NOT EMIT ENOUGH RADIATION IN BAND NO. 4.						
SOLUTION - ESTABLISH PDN TECHNIQUES FOR FABRICATING BORON NITRIDE HEATED SOURCES AND PROCESSING, SEALING SOURCES IN INFRARED TRANSMISSIVE ENVELOPES RESULTING IN A SOURCE OF RADIATION CAPABILE OF SATISFYING ALL FOUR BANDS WITH NO INCREASE IN ELECTRICAL POWER.						
(5023) TITLE - POWER CONSERVATION IR SOURCE ENVELOPE				400		
PROBLEM - PRESENT MILITARY IR SYSTEMS USE IR SOURCES WITH ENVELOPES THAT TRANSMIT BROADBAND RADIATION WHICH LIMITS SYSTEM EFFICIENCY.						
SOLUTION - ESTABLISH PRODUCTION MEASURES FOR FABRICATING DIELECTRIC COATED IR SOURCE ENVELOPES WHICH WILL REFLECT UNWANTED RADIATION BACK INTO THE SOURCE. THIS WILL REDUCE ELECTRICAL POWER REQUIREMENTS.						
COMPONENT -- OTHER						
(5016) TITLE - PRODUCTION CAPABILITY FOR LOW COST THERMOCOUPLE MODULES				350		
PROBLEM - THE HIGH COST OF THERMOCOUPLE MODULES IS DUE TO THE EXPENSIVE MANUAL PROCESSES THAT RESULT IN LOW YIELD COMPONENTS.						
SOLUTION - ESTABLISH EFFICIENT MANUFACTURING PROCESSES WHICH MAKE POSSIBLE THE ECONOMIC MASS PRODUCTION AND INCREASE RELIABILITY OF THE THERMOCOUPLE MODULE.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- OTHER (CONTINUED)							
(5022)	TITLE = LONG LIFE XRAY MODULATOR FOR CATSCANNING EQUIPMENT				550		
	PROBLEM = PRESENT CATSCANNING SYSTEMS CANNOT BE UTILIZED FOR BOMB DISPOSAL OR NON-DISTRUCTIVE TESTING BECAUSE EXISTING XRAY TUBES HAVE SHORT LIVES. A LONG-LIFE PULSED XRAY MODULATOR WOULD BE THE CRITICAL ITEM NEEDED TO EXPLOIT THIS NEW TECHNOLOGY FOR MILIT.						
	SOLUTION = A LONG-LIFE PULSED XRAY MODULATOR WOULD BE THE CRITICAL ITEM NEEDED TO EXPLOIT THIS NEW TECHNOLOGY FOR MILITARY PURPOSES.						
(5032)	TITLE = RADAR MODULATOR FOR MINI RPV AND TANKS					650	
	PROBLEM = MM RADAR MOD CAPABLE OF SURVIVING A RUGGED ENVIRONMENT WITH HIGH RELIABILITY REQUIRES COMPONENTS OF NO COMM INT. NEW SWITCH DEVELOPMENTS, PULSE SHARPENING TECHNIQUES, PULSE CHARGING, AND NANOSECOND PULSE TRANSFORMER MUST BE COMBINED INTO ONE UNIT.						
	SOLUTION = FABRICATE IN QUANTITY MM RADAR MODULATOR UTILIZING RECENT COMPONENT IMPROVEMENTS TO MEET MILITARY REQUIREMENTS WITH THE BEST EFFICIENCY, RELIABILITY, COST, WEIGHT POSSIBLE.						
(5037)	TITLE = TWO MEGAWATT MELS MODULE						1500
	PROBLEM = PROPOSED MILITARY DIRECTED BEAM WEAPONS WILL REQUIRE MULTIMEGAWATT AVERAGE PULSED POWER TO OPERATE DELIVERY SYSTEM.						
	SOLUTION = PRODUCE TWO MEGAWATT PULSE MODULES WHICH WILL CONVERT THE INCOMING MEGAWATTS OF DC POWER INTO HIGH ENERGY PULSES. MODULES COULD BE STACKED TO MEET THE PARTICULAR SYSTEM NEEDS.						
(5038)	TITLE = INDUCTIVE ENERGY STORAGE PULSER						2500
	PROBLEM = COMPACT PULSE POWER SUPPLIES FOR DIRECTED BEAM WEAPONS AND JAMMERS NECESSITATES INDUCTIVE ENERGY STORAGE. A MODULE IS NOT AVAILABLE WHICH WILL CONVERT THE STORED ENERGY INTO HIGH PEAK POWER PULSES AT A KILOHERIZ RATE.						
	SOLUTION = PRODUCE AN INDUCTIVE STORAGE PULSE MODULE IS A COMBINED STORAGE AND SWITCH UNIT WHICH WOULD BE STACKABLE TO PROVIDE THE REQUIRED PULSE POWER.						
COMPONENT -- TRANSFORMER							
(9563)	TITLE = MINIATURE HIGH VOLTAGE POWER SUPPLY FOR IMAGE INTENSIFIERS			850			
	PROBLEM = PRESENT IMAGE INTENSIFIER POWER SUPPLIES DO NOT MEET 3RD GEN. SHAPE AND SIZE REQUIREMENTS.						
	SOLUTION = DEVELOP NEW PROCESSES AND TECHNIQUES FOUND ON R AND D CONTRACTS.						

CATEGORY	PRIOR	FUNDING ($000) 80	81	82	83	84
SOLID STATE						
COMPONENT -- DIODES/RECTIFIERS						
(3010) TITLE - MILLIMETER-WAVE SOURCES FOR 60 AND 94 GHZ		1000				
PROBLEM - TO ESTABLISH A MANUFACTURING CAPABILITY FOR PRODUCTION OF IMPATT DIODES WHICH ARE UNIFORM ENOUGH TO BE FIELD REPLACEABLE IN ARMY SYSTEMS.						
SOLUTION - ESTABLISH COMPUTER CONTROLLED EPITAXIAL OR IMPLANTATION FACILITIES FOR FABRICATION OF IMPATT DIODES. CANDIDATE APPROACHES ARE MOLECULAR BEAM EPITAXY, VAPOR PHASE EPITAXY, AND ION IMPLANTATION.						
(3011) TITLE - MILLIMETER-WAVE IDIUM PHOSPHIDE GUNN DEVICES		900				
PROBLEM - INADEQUATE CONTROL OF EPI MATERIAL AND DEVICE PROCESSING STEPS REQUIRING CLOSE TOLERANCES FOR EFFICIENT MM OPERATION RESULTS IN LOW YIELD POOR UNIFORMITY AND HIGH UNIT COST FOR MILLIMETER-WAVE INDIUM PHOSPHIDE GUNN DEVICES.						
SOLUTION - ENG IN EPITAXIAL MATERIAL PREPARATION, INJECTION-LIMITED CONTACT FORMATION, INTEGRAL HEAT SINK TECHNOLOGY AND PACKAGING WILL BE PERFORMED TO ESTABLISH MANF TECHNIQUES AND CONTROLS RESULTING IN A DEVICE COST REDUCTION OF MORE THAN TEN TO ONE.						
(3021) TITLE - LOW LOSS, HIGH POWER TUNING VARACTOR FOR USE IN MM XMTRS		300				
PROBLEM - THE INTERNAL SERIES RESISTANCE AND THE THERMAL RESISTANCE ARE TOO HIGH AND CONSEQUENTLY THE EFFICIENCY AND POWER HANDLING CAPABILITIES ARE INADEQUATE FOR HIGH POWER APPLICATIONS.						
SOLUTION - DEVELOP GALLIUM ARSENIDE VARACTORS WITH HYPER ABRUPT JUNCTIONS AND INTEGRAL PLATED HEAT SINKS BY ADAPTING PRESENT IMPATT DIODE TECHNIQUES TO VARACTORS.						
COMPONENT -- OTHER						
(9908) TITLE - REDUCTION OF COST FOR GALLIUM ARSENIDE EPITAXIAL MATERIAL			1000			
PROBLEM - DUE TO THE PRESENTLY EMPLOYED MANUAL METHOD OF GROWING GALLIUM ARSENIDE MATERIAL AND SUBSEQUENT FORMATION OF THE EPITAXIAL LAYER, THE YIELD IS LOW AND THE COST IS HIGH.						
SOLUTION - CONTROL THE GROWTH OF GALLIUM ARSENIDE MATERIAL AUTOMATICALLY SO AS TO ORTAIN UNIFORMITY AND HIGH YIELD AND REDUCE THE LABOR CONTENT.						
COMPONENT -- SWITCHES						
(3020) TITLE - FAST RISETIME SCR SWITCH		250				
PROBLEM - AVALIABLE SCR COMMERCIAL SWITCHES ARE UNSATISFACTORY FOR MICROWAVE AND LASER SYSTEMS DUE TO SLOW RISE TIME.						
SOLUTION - ESTABLISH A PRODUCTION SOURCE FOR A FAST RISE TIME SCR TO COVER A WIDE RANGE OF MILITARY REQUIREMENTS.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- SWITCHES (CONTINUED)							
(5030)	TITLE - REPETITIVE SERIES INTERRUPTER FOR PHASED ARRAY SYSTEMS					650	
	PROBLEM - WHEN A FAULT OCCURS IN PRESENT PHASED ARRAY RADARS THE ENTIRE SYSTEM MUST BE SHUT DOWN FOR CRITICAL SECONDS, IF SHUT DOWN OCCURS WHILE MONITORING AN INCOMING MISSLE THE RESULT COULD BE DISASTROUS.						
	SOLUTION - PRODUCTION AND INSTALLATION OF REPETITIVE SERIES INTERRUPTER IN THE RADAR TRANSMITTER HIGH VOLTAGE LINE WOULD PREVENT DAMAGE DURING FAULTED PULSE, SYSTEM WOULD IMMEDIATELY RECOVER WITH NO LOSS IN INFORMATION.						
(5031)	TITLE - LIGHT ACTIVATED SILICON SWITCH					1200	
	PROBLEM - MM AND OPTICAL RADARS NEED A SUB-NANOSECOND SWITCH, NO SWITCH EXISTS TODAY WHICH WILL MEET MILITARY REQUIREMENTS NOR IS THERE SUFFICIENT OUTSIDE INTEREST TO SPUR COMMERCIAL PRODUCTION.						
	SOLUTION - ESTABLISH PRODUCTION TECHNIQUES TO MANUFACTURE LASS DEVICES FOR MM AND OPTICAL RADARS.						
COMPONENT -- TRANSISTORS							
(3022)	TITLE - LOW THERMAL RESISTANCE MICROWAVE TRANSISTORS		500				
	PROBLEM - TO REDUCE THE PRESENT LEVELS OF THERMAL RESISTANCE IN MICROWAVE POWER TRANSISTORS BY FIFTY PERCENT IN ORDER TO MEET MILITARY GOALS OF OPERATIONAL LIFE AND ELECTRICAL PERFORMANCE.						
	SOLUTION - TO DEVELOP PRODUCTION TECHNIQUES WHICH WILL DECREASE THE THERMAL RESISTANCE OF SILICON TRANSISTORS BY MEANS OF WAFER THINNING AND BACK METAL PLATING.						
(3025)	TITLE - LOW COST MICROWAVE POWER TRANSISTOR		500				
	PROBLEM - TO ESTABLISH MANUFACTURING CAPABILITY FOR LOW COST HIGH POWER MICROWAVE TRANSISTORS.						
	SOLUTION - TO ESTABLISH AUTOMATED PROCEDURES TO REPLACE MANUAL INTRA-PACKAGE LEAD BONDING OF HUNDREDS OF LEADS PER TRANSISTOR.						
(9811)	TITLE - REDUCTION OF MFG COSTS FOR NW POWER XISTORS + IN-PROC TUNING	600				700	
	PROBLEM - POWER TRANSISTORS REQUIRE SCORES OF INTERNAL INTERCONNECTIONS, NOW BEING APPLIED BY HAND.						
	SOLUTION - DEVELOP EQUIPMENT AND PROCEDURES FOR AUTOMATIC ATTACHMENT OF INTERNAL LEADS AND POWER BALANCING COMPONENTS.						



MATERIALS AND MECHANICS RESEARCH CENTER
(AMMRC)

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Category	Page
Testing-Quality Control	150

US ARMY MATERIALS AND

MECHANICS RESEARCH CENTER

(AMMRC)

AMMRC, located at Watertown, Massachusetts, manages the DARCOM research and development structural materials and mechanics program as lead laboratory for materials, solid mechanics and testing technology; conducts technological programs in materials and mechanics used in Army materiel, and executes the program in its own facilities by assignment and fund transfer to other DARCOM laboratories and contractors.

AMMRC's Materials Testing Technology (MTT) Program has shown a steady growth over the last several years, from 2.5 million dollars in FY73 to 4.5 million dollars in FY78. This growth has been largely due to the increased participation in the Program by DARCOM Project Managers, as well as increased attention to the Program by DARCOM Quality Assurance managers.

The most recent five-year planning for the MTT Program illustrated a leveling off of the Program at 4.5 million dollars. A decrement in the funding level of the Materials Testing Technology Program will force the curtailment of support of DARCOM Project Managers, R&D and Readiness Commands, and disrupt the proper transitioning of testing technology into the life cycle of Army materiel. Specific areas of effort that will be adversely affected are as follows:

A. Automated Testing

One of the primary needs in NDT, and in inspection in general, is to remove the decision-making from the inspector, where possible. In FY78 and beyond, efforts will be intensively directed toward providing engineering prototype systems utilizing automated decision-making. These include automated radiographic and ultrasonic techniques, optical/laser techniques, and computerized chemical analysis. The ultimate goal in all automated testing systems is the essential feedback to the total system for automated process control.

B. Predictive Failure

The need for diagnostic measurement techniques for anticipation of catastrophic failure and for the measurement of remaining life, both in operating equipment and in units being overhauled and rebuilt, presents an opportunity for cost savings and reliability improvement. In essence, the field of diagnostics and in-situ measurements adjunct to nondestructive testing and represents the real time use of NDT techniques with analysis and decision elements built in.

C. Materials

As the newer materials are utilized in major weapon systems, it is imperative that new and/or improved inspection techniques be available to measure those characteristics or parameters to assure adequate and reliable performance. Of particular interest in the next five years are composites, elastomers, plastics, and ceramics, with continuing interest in metals and consumables (explosives, pyrotechnics, and propellants).

D. Techniques

Specifically covered in the objectives of the MTT Program is the investigation of specific physical principles which can potentially offer significant improvement in sensitivity, cost, portability, or speed and combinations of these. The development and application of techniques, such as ultrasonics, infrared, holography, spectroscopy, chromatography, etc., can offer substantial improvement in process control and result in significantly improved DARCOM materiel.

MM&T funding is provided to AMMRC in the form of one "parent program" utilizing the Other Procurement, Appropriation. Branching off from this "parent program" are three areas: documentation, resource conservation and improvement of test capability, under which individual tasks are performed.

AMMRC

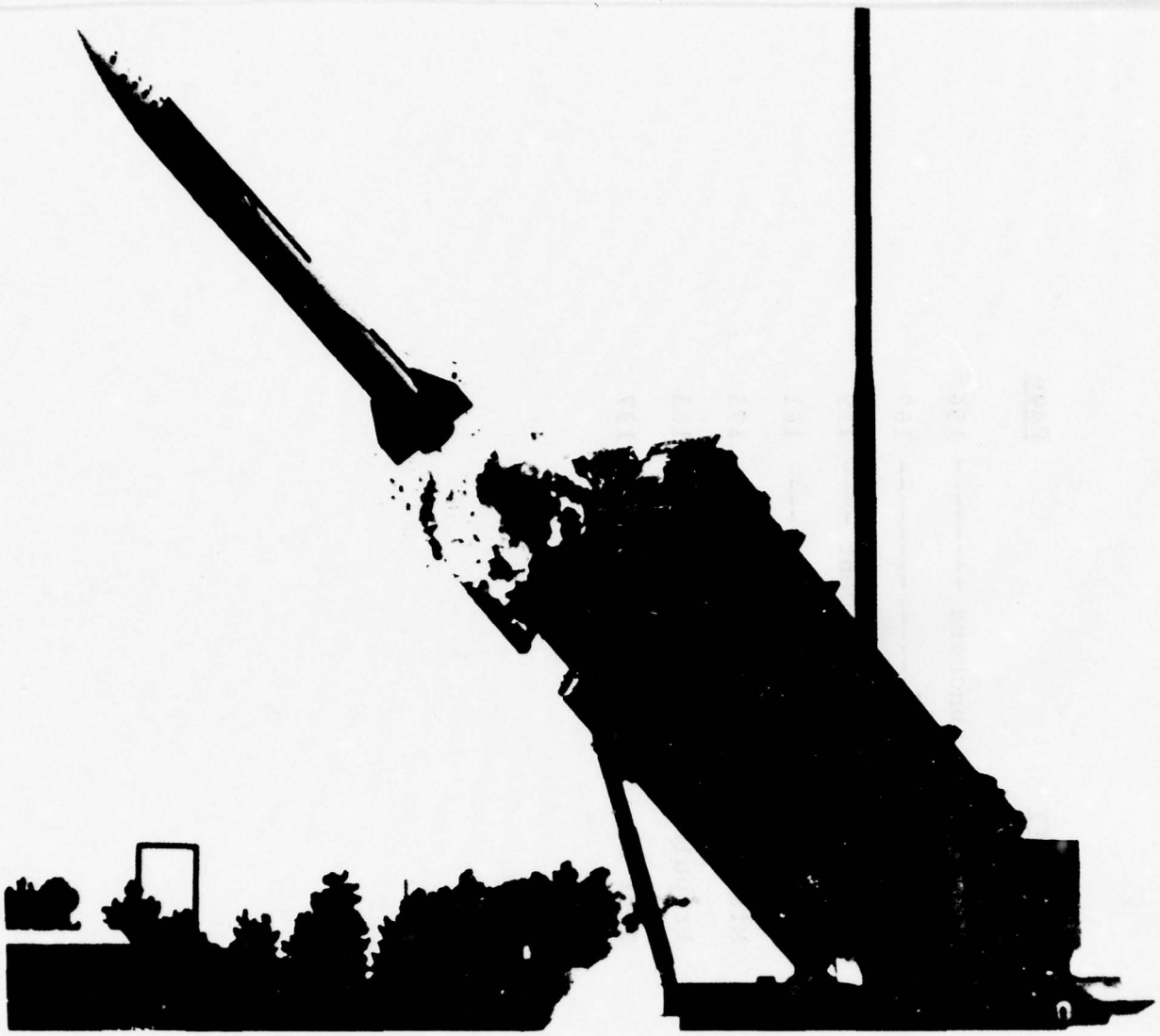
COMMAND FUNDING SUMMARY
(THOUSANDS)

CATEGORY	FY80	FY81	FY82	FY83	FY84
TESTING-QUALITY CONTROL	4500	4500	4500	5000	5000
TOTAL	4500	4500	4500	5000	5000

CATEGORY

TESTING-QUALITY CONTROL

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- CHEMICAL TESTING						
(6350) TITLE - MATERIALS TESTING TECHNOLOGY		950	950	950	1050	1050
PROBLEM - CURRENT LABORATORY METHODS FOR CHEMICAL TESTING ARE SPECIALIZED AND EXPENSIVE. REAL TIME TESTING TECHNIQUES ARE NEEDED TO CONTROL CHEMICAL PROCESSING.						
SOLUTION - ADAPT QUICK RESPONSE CHEMICAL TESTING EQUIPMENT TO AUTOMATE THE CONTROL OF CHEMICAL PROCESSES.						
COMPONENT -- MECHANICAL TESTING						
(6350) TITLE - MATERIALS TESTING TECHNOLOGY		950	950	950	1050	1050
PROBLEM - METHODS OF MECHANICAL TESTING ARE BASICALLY TIME CONSUMING, LABORATORY TYPE OPERATIONS, THE TESTING IS OFTEN ULTIMATE AND THEREFORE DISTRUCTIVE OR IT TENDS TO INTRODUCE RESIDUAL STRESS/STRAIN IN THE TESTED ITEMS.						
SOLUTION - ESTABLISH IMPROVED REAL-TIME INSPECTION TECHNIQUES TO REDUCE PRODUCTION BOTTLENECKS ASSOCIATED WITH MECHANICAL TESTING, ALSO, THE OPTIMUM TESTING CRITERIA WILL BE ESTABLISHED WHEN NECESSARY.						
COMPONENT -- NON-DESTRUCTIVE TESTING						
(6350) TITLE - MATERIALS TESTING TECHNOLOGY	13002	2600	2600	2600	2900	2900
PROBLEM - DESTRUCTIVE AND CERTAIN CONVENTIONAL NON-DESTRUCTIVE TESTING TECHNIQUES ARE RESPECTIVELY UNSUITED AND INADEQUATE OR HARD TO BE ADAPTED TO ON-LINE PRODUCTION TESTING USAGE.						
SOLUTION - DETERMINE FEASIBILITY OF ADAPTING LAB-PROVEN NDT METHODS OR MODIFO THE EXISTING TEST PROCEDURES FOR ON-LINE PRODUCTION QUALITY ASSURANCE TESTING.						



MISSILE R&D COMMAND
(MIRADCOM)

Category	Page
Containers/Launchers	156
Control System	157
Ground Support Equipment	159
Guidance System	161
Missile Structure	173
Propulsion System	183
Test Equipment	187

US ARMY MISSILE

RESEARCH AND DEVELOPMENT COMMAND

(MIRADCOM)

The US Army Missile Research and Development Command (MIRADCOM), based at Redstone Arsenal, has the mission for managing missile systems acquisition. "Acquisition," in this sense, means research, development and initial purchase of the system for issue to soldiers.

MIRADCOM's facilities include missile flight test ranges and modern laboratories. Recently, a $40 million simulation center was completed.

The command annually manages a program of several hundred million dollars to fund basic and applied research and development new weapons.

Major systems managed by special project offices within MIRADCOM include: the Stinger shoulder-fired air defense guided missile; US Roland, a mobile, all-weather air defense missile system; GSRS, a general support rocket system; Viper, a short-range anti-tank weapon; Hellfire, a helicopter-carried air-to-ground missile; Pershing, the Army's 400-mile-range surface-to-surface weapon; and the 2.75-inch air-to-ground rocket.

MIRADCOM is also the Army's center of laser research, and manages efforts to apply lasers in missile guidance and as weapons.

A major thrust of MIRADCOM's program is in guidance systems. Approximately 35% of their entire five year effort is planned in this area. A large amount of this effort is planned for work on gyros, printed circuits, and seekers. Improvements in the gyro area can be made by addressing proposals in new machining methods and assembly techniques. Efforts in the electronics area includes projects on plated-through holes, thin foils, wave soldering, and cleanliness criteria. The seeker area includes work on infra-red optics, radio frequency, and laser optics. Other work planned on guidance systems includes projects concerned with windoms and radomes, optics, and hybrids circuits.

Another major thrust area is concentrated around missile structures. Projects in this area include work on air frames-metal, plastic, and composite. A proposal for new steel technology should provide a more cost-effective material. Efforts for composite air frames will address filament winding, inner shell forming, and missile substructures. New joining, machining, and forming technologies will be investigated and applied.

Proposals in the area of test equipment include work on electrical, X-ray, N-ray, and hydraulic equipment. Calibration efforts including infra-red testing of PC boards, digital fault isolation, and automatic circuit tuning and alignment are planned.

MIRADCOM's projected five year effort is for $104M. Funds are programmed under five appropriations, to include PA 1497, 2597, 4250, 5297, and 5397. Dollar breakouts for these individual accounts are provided in the analysis section.

MIRADCOM

COMMAND FUNDING SUMMARY
(THOUSANDS)

CATEGORY	FY80	FY81	FY82	FY83	FY84
CONTAINERS/LAUNCHERS	560	350	390	1465	600
CONTROL SYSTEM	0	568	1208	340	3453
GROUND SUPPORT EQUIPMENT	875	1495	1120	650	2605
GUIDANCE SYSTEM	6955	6035	6921	8553	8465
MISSILE STRUCTURE	3218	4632	5423	7095	5428
PROPULSION SYSTEM	500	803	1379	3609	3534
TEST EQUIPMENT	2668	3757	2318	3545	3292
TOTAL	14776	17640	18959	25257	27377

CATEGORY	FUNDING ($000) PRIOR	80	81	82	83	84
CONTAINERS/LAUNCHERS						
COMPONENT -- LAUNCHERS						
(3159) TITLE - QUALITY PROD. OF LIGHT WT. MULTIPLE TUBE ROCKET LAUNCHERS		250	350	200		
PROBLEM - MULTIPLE TUBE ROCKET LAUNCHERS ARE HEAVY AND EXPENSIVE.						
SOLUTION - ESTABLISH PRODUCTION TECHNIQUES FOR IMPROVED QUALITY, LIGHT WEIGHT LAUNCHERS.						
(3378) TITLE - PLASTIC STRUCTURES FOR LAUNCHERS					275	275
PROBLEM - METAL COMPONENTS OF MISSILES REQUIRE HIGH COST MACHINING.						
SOLUTION - SELECT COMPOUNDS FOR MOLDED PLASTIC COMPONENTS WHICH MEET PERFORMANCE REQUIREMENTS IN ORDER TO WEIGHT AND COSTS.						
(3401) TITLE - CAMOUFLAGE SCREENING SYSTEM					1000	
PROBLEM - PRESENT CAMOUFLAGE SCREEN HAS FINE FOR RADAR SCREENING, BUT WIRE BREAKS IN FIELD USE.						
SOLUTION - DEVELOP MORE DURABLE SCREEN FOR FIELD USE.						
COMPONENT -- SHIPPING CONTAINERS						
(3200) TITLE - WIRE BOUND SHIPPING CONTAINERS		190				
PROBLEM - CONTAINERS FOR LARGE MISSILE SYSTEMS ARE BULKY, HEAVY, AND EXPENSIVE.						
SOLUTION - INVESTIGATE ADAPTATION AND PRODUCTION OF WOODEN WIRE BOUND MISSILE CONTAINERS.						
(3326) TITLE - NON METALLIC WEAPON CONTAINER		120				
PROBLEM - METAL WEAPON CONTAINERS ARE CONSIDERABLY MORE EXPENSIVE TO BUILD THAN NON METALLIC.						
SOLUTION - ESTABLISH MANUFACTURING TECHNOLOGY FOR NON METALLIC CONTAINERS.						
(3347) TITLE - OPTIMUM EXPENDABLE SHIPPING CONTAINERS				190		
PROBLEM - PRESENT CONTAINERS ARE COSTLY DUE TO EXCESSIVE WEIGHT AND CUBIC DISPLACEMENT.						
SOLUTION - CONSIDER CONTAINER SIMILAR TO TOW TO REDUCE TARE WEIGHT AND CUBIC DISPLACEMENT.						
(3348) TITLE - COMBINATION SHIPPING LAUNCHER CONTAINER FABRICATION					190	190
PROBLEM - SHIPPING LAUNCH CONTAINER IS A MAJOR COST DRIVER, DIFFICULT TO ASSES COST AND FUNCTIONAL COMPATIBILITY.						
SOLUTION - CONDUCT STUDIES AND ESTABLISH TESTS TO SELECT OPTIMUM MATERIAL AND FORMULATE MANUFACTURING PROCESSES FOR PRODUCTION.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- SHIPPING CONTAINERS (CONTINUED)						
(3388) TITLE - MANUFACTURING PROCESSES FOR NON METALLIC COMPOSITE CONTAINER						135
PROBLEM - DRAWN AND FABRICATED METAL CONTAINERS HAVE LOW POTENTIAL FOR SIGNIFICANT COST SAVINGS.						
SOLUTION - DEVELOP A NON METALLIC COMPOSITE CONTAINER TO MEET DESIGN REQUIREMENTS.						
********** CATEGORY ********** *CONTROL SYSTEM * **********						
COMPONENT -- ACTUATORS						
(3213) TITLE - ALUMINUM AND STEEL DIE CASTING			200	200		
PROBLEM - MANIFOLDS MACHINED FROM BAR STOCK REQUIRE ONE MAN MONTH OF MACHINE TIME FOR SMALL QUANTITIES.						
SOLUTION - DEVELOP LOW COST TECHNIQUES FOR DIE CASTING.						
(3293) TITLE - ELECTRO FORMING						702
PROBLEM - EFFECTIVE SHAPED CHARGE WARHEAD REQUIRES PRECISION MACHINED LINER, BOTH LABOR AND RAW MATERIAL ARE COST EXCESSIVE.						
SOLUTION - ADAPT A UNIQUE ELECTRO FORMING PROCESS FOR FABRICATION TO REDUCE COST, LABOR AND CONSERVE MATERIALS.						
(3349) TITLE - CONTROL ACTUATION SYTEM FABRICATION				646		
PROBLEM - PROJECTILE SYSTEM DEMANDS HIGH VOLUME LOW COST CONTROL ACTUATION SYSTEM FOR MANEUVERABILITY.						
SOLUTION - REFINE SYSTEM DESIGN TO ENHANCE PRODUCIBILITY BY UTILIZING HIGH VOLUME PRODUCTION TECHNIQUES.						
(3350) TITLE - DEVELOP LOW COST SERVOVALVES				190	190	190
PROBLEM - THREE OR FOUR VALVES ARE EMPLOYED IN EACH MISSILE STAGE WHICH REPRESENT A SIGNIFICANT PERCENTAGE OF TOTAL COST.						
SOLUTION - DEVELOP A SUITABLE SINGLE STAGE VALVE FOR MISSILE CONTROL SYSTEM.						
(3351) TITLE - LOW COST AIR VANE FABRICATION PROCESS						375
PROBLEM - DESIGN AND MANUFACTURING PROCESS FOR AIR VANES REQUIRE APPLICATION OF LIBERAL SAFETY FACTORS.						
SOLUTION - DEVELOP PROCESS FOR FABRICATION AND APPLICATION OF HEAT SHIELD TO PASSIVELY COOLED AIR VANES.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- ACTUATORS (CONTINUED)							
(3352)	TITLE - MANUFACTURING TECH, FOR LOW COST PNEUMATIC CONTROL SUPPORT						835
	PROBLEM - ACTUATION HARDWARE FOR THRUST VECTOR CONTROL COMPRISES 25 TO 50 % OF CONTROL SYSTEM COST.						
	SOLUTION - INITIATE SYSTEM ENGINEERING TO FORMULATE DETAILED CONTROL SYSTEM REQUIREMENTS.						
(3360)	TITLE - FABRICATION TECH, FOR MOLDED COMPOSITES IN ACTUATORS						1000
	PROBLEM - ACTUATOR CONTROL SYSTEMS ARE MAJOR COST DRIVERS DUE TO EXCESSIVE MATERIAL AND FABRICATION COSTS.						
	SOLUTION - INVESTIGATE AND DEVELOP MANUFACTURING TECHNOLOGY FOR USING PLASTICS, FIBERGLASS, AND COMPOSITES FOR HIGH PRESSURE HYDRAULIC AND PNEUMATIC SYSTEMS.						
(3368)	TITLE - PRODUCTION TECH, FOR HOT GAS THRUST VECTOR CONTROL						300
	PROBLEM - MORE EFFICIENT CONTROLS ARE NEEDED TO REPLACE LIQUID IVC SYSTEMS FOR HIGH PERFORMANCE MISSILES.						
	SOLUTION - ESTABLISH TECHNOLOGY FOR HOT GAS TVC/JIC TO UTILIZE THE SIMPLICITY OF FEWER COMPONENTS.						
(3379)	TITLE - ELECTROSTATIC POWDER COATING TECHNIQUES					150	
	PROBLEM - HIGH PAINT LOSS IN SUCESSIVE SPRAYING AND FINISH DAMAGE DURING SUBSEQUENT ASSEMBLY.						
	SOLUTION - INVESTIGATE AND APPLY ELECTROSTATIC POWDER COATING USING SPRAY METHODS.						
COMPONENT -- ELECTRICAL							
(3108)	TITLE - MISSILE/ROCKET DISPENSING SYSTEM			368			
	PROBLEM - DISPENSING UNITS ARE FABRICATED, ASSEMBLED, AND TESTED BY HAND.						
	SOLUTION - ESTABLISHED AUTOMATED AND SEMI AUTOMATED SYSTEM FOR PRODUCING THE SWITCHING DEVICE.						
(3260)	TITLE - CONDUCTIVE EPOXY FOR BRAIDED ELECTRICAL CONNECTORS						425
	PROBLEM - DIFFICULTY IN CONTROLLING THE FLOW OF SOLDER IN A PRODUCTION ENVIRONMENT FOR CONNECTIONS IN HIGH DENSITY PACKAGES.						
	SOLUTION - INVESTIGATE AND EVALUATE CONDUCTIVE EPOXY MATERIALS AND APPLICATIONS FOR USE IN THE FABRICATION OF HYBRID CIRCUITS.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- ELECTRICAL (CONTINUED)						
(3270) TITLE - TRANSITION SOLID TO STRANDED WIRE						91
PROBLEM - CONNECTORS REQUIRE TRANSITION FROM SOLID TO STRANDED WIRE FOR FLEXIBILITY, COMMERCIAL CONNECTORS HAVE NOT BEEN EVALUATED FOR MILITARY USE.						
SOLUTION - SURVEY COMMERCIAL ITEMS AVAILABLE FOR USE IN PRODUCTION ASSEMBLIES, EVALUATE AND DEVELOP PROTOTYPE EQUIPMENT.						
(3271) TITLE - IMPROVED TECHNIQUE FOR ELECTRICAL INTERCONNECTION						139
PROBLEM - WIRE HARNESSES AND CONNECTORS ARE A SIGNIFICANT COST BUT MULTIPLEX CIRCUITRY LIMIT USE.						
SOLUTION - EXPLORE ALTERNATIVE INTERCONNECTION TECHNIQUES WITH ATTENTION TO MULTIPLEX SYSTEMS FOR LARGE SCALE CIRCUITRY.						
(3273) TITLE - SHRINKING OF IRRADATED TUBING				172		
PROBLEM - PRESENT METHODS OF SHRINKING INSULATING TUBING ONTO WIRE BUNDLES RESULT IN NON UNIFORM HEAT FLUXES AND INFERIOR QUALITY.						
SOLUTION - FABRICATE A HEATING DEVICE TO PROVIDE A UNIFORM HEAT FLUX TO THE TUBING SURFACE.						

CATEGORY

GROUND SUPPORT EQUIPMENT

COMPONENT -- ELECTRICAL						
(3084) TITLE - SUPER CONDUCTING POWER CABLES						150
PROBLEM - CURRENTLY AVAILABLE POWER CABLES ARE BULKY AND HEAVY.						
SOLUTION - DEVELOP MANUFACTURING TECHNIQUES FOR SUPER CONDUCTING POWER CABLES.						
(3113) TITLE - STD. OF COMPUTER BASED DESIGN FOR PCB AND ELECTRONIC EQUIP.			250	200	200	
PROBLEM - THE GOVERNMENT IS PRESENTLY UNABLE TO UTILIZE CONTRACTOR DESIGN DATA FOR FABRICATION, QUICK TURN AROUND, AND RELIABILITY.						
SOLUTION - DEVELOP A STANDARD SYSTEM LANGUAGE FOR PROCESSING DESIGN DATA TO BE USED BY A SECOND SOURCE OR BREAKOUT CONTRACTORS.						
(3161) TITLE - POWER CONDITIONING EQUIPMENT					300	
PROBLEM - POWER CONDITIONING SUB ASSEMBLIES ARE SUSCEPTIBLE TO FAILURES CAUSED BY ARCING OF HIGH VOLTAGE COMPONENTS.						
SOLUTION - ESTABLISH TECHNIQUES AND PROCESSES TO ELIMINATE PROBLEMS ASSOCIATED WITH HIGH VOLTAGE SUBASSEMBLIES.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- ELECTRICAL (CONTINUED)							
(3172)	TITLE - CLINCHED LEAD ELIMINATION			175			
	PROBLEM - LEAD CLINCHING IS DISADVANTAGEOUS, DIFFICULTY EXISTS IN REPAIRING ASSEMBLIES.						
	SOLUTION - DEVELOP TECHNOLOGY TO UTILIZE COMPONENT CHIPS AND PARTS FOR USE ON AUTOMATIC INSERTION MACHINERY HANDLING MULTIPLE LEADS.						
(3173)	TITLE - DEVELOPMENT OF FLUX TO ELIMINATE CLEANING PCB'S						250
	PROBLEM - APPLICATION OF FLUX AND ASSOCIATED CLEANING IS COSTLY AND TIME CONSUMING.						
	SOLUTION - DEVELOP METHODS AND EQUIPMENT FOR PCB SOLDERING WHICH DOES NOT REQUIRES FLUX IN THE TRADITIONAL SENSE.						
(3233)	TITLE - COMPUTERIZED INTEGRATED MANUFACTURING SUPPORT		700	700	700		
	PROBLEM - MANUFACTURING SYSTEMS MUST BECOME MORE PRODUCTIVE, FLEXIBLE AND PRECISE AND BETTER ABLE TO COPE WITH VARYING REQUIREMENTS.						
	SOLUTION - ESTABLISH A SYSTEM DESIGN RELATING INPUT, OUTPUTS, FORMATS, AND DATA TO MEET REQUIREMENTS OF THE TOTAL DESIGN TO USE PROGRESSION.						
(3274)	TITLE - HIGH STRESS COAXIAL CABLES					150	200
	PROBLEM - OPERATING CONDITIONS MAKE CABLE REQUIREMENTS VERY STRINGENT.						
	SOLUTION - DEVELOP TECHNIQUES FOR PRODUCING SMALL, LIGHT, AND RELIABLE HIGH PERFORMANCE CABLE.						
COMPONENT -- GENERAL							
(3235)	TITLE - ENERGY CONSERVATION AND REDUCED OPERATING COST IN A FACILITY			220	220		
	PROBLEM - OVERHEAD IS A MAJOR COST FACTOR IN OPERATING A PRODUCTION FACILITY, ESPECIALLY ENERGY COSTS.						
	SOLUTION - SELECT AUTOMATIC PROCESSES AND COMPUTER SYSTEM TO CONTROL AND REDUCE ELECTRICITY DEMANDS.						
(3236)	TITLE - MANUFACTURING COST ANALYSIS (CAM)		175	150			
	PROBLEM - THERE IS A NEED TO DEFINE AND CONTROL AQUISTION PROGRAM COST DURING CONTRACT DEFINITION AND DEVELOPMENTAL PHASES.						
	SOLUTION - STRUCTURE COMPUTER MODEL TO CALCULATE THE LABOR CONTENT OF A DESIGN CONCEPT IN STANDARD SETUP AND RUN TIME.						

		FUNDING ($000)				
		PRIOR	80	81	82	83	84
COMPONENT -- GENERAL (CONTINUED)							
(3249)	TITLE - AUTOMATIC READING AND RECORDING OF PART AND SERIAL NUMBERS						290
	PROBLEM - PRESENT METHODS OF SUPPLYING PART NUMBERS TO CONTROLLING COMPUTER ARE RELATIVELY SLOW AND SUBJECT TO HIGH ERROR.						
	SOLUTION - INVESTIGATE AUTOMATED METHODS FOR TRANSFERRING PART AND SERIAL NUMBER INFORMATION.						
(3259)	TITLE - CONTROL OF CHEMICAL PROC FOR PRINTED CIRCUIT BOARDS (CAM)						215
	PROBLEM - CONTROL OF CHEMICAL PLATING AND ETCHING PROCESSES ARE MARGINAL UNDER MANUAL CONTROL. SCRAP AND REWORK ARE EXCESSIVE.						
	SOLUTION - ESTABLISH COMPUTER PROGRAMMING TO REGULATE CLOSED LOOP MONITORING SYSTEM OF CRITICAL PROCESS PARAMETERS.						
(3402)	TITLE - MANUFACTURING PROCESS GUIDE FOR WEAPONS SYSTEMS						1500
	PROBLEM - MISSILE DESIGNER IS UNABLE TO MAKE RELATED COMPARISONS OF MANUFACTURING PROCESSES DUE TO ABSENCE OF GUIDE.						
	SOLUTION - ESTABLISH DATA REQUIREMENTS INCLUDING COST DRIVERS FORMAT, MODEL AND IMPLEMENTATION PLANS FOR PROCESS GUIDE TO ACHIEVE DESIGN CONFIDENCE.						

CATEGORY

GUIDANCE SYSTEM

COMPONENT -- ACCELEROMETERS							
(3276)	TITLE - MANUFACTURING TECHNOLOGY FOR AUTOMATIC COIL WINDING		265				
	PROBLEM - FABRICATION ASSEMBLY AND TESTING OF LEAD COIL ASSEMBLY IS COSTLY.						
	SOLUTION - DEVELOP TECHNIQUES TO AUTOMATICALLY WIND AND TEST COILS.						
COMPONENT -- BATTERIES							
(3279)	TITLE - THERMAL BATTERY MATERIALS AND ALTERNATES				630	630	630
	PROBLEM - THE EFFECTS OF PHYSICAL AND CHEMICAL PROPERTIES AND PROCESSING VARIABLES FOR THERMAL BATTERIES HAVE NOT BEEN ADEQUATELY STUDIED.						
	SOLUTION - DETERMINE EFFECT OF PROCESSING VARIABLES AND TYPES OF RAW MATERIALS TO PRODUCE OPTIMUM BATTERIES. ESTABLISH PILOT PLANT FOR THE MANUFACTURE OF CRITICAL RAW MATERIALS.						

		FUNDING ($000)				
		PRIOR	80	81	82	83	84
COMPONENT -- BATTERIES (CONTINUED)							
(3281)	TITLE - SILVER ZINC GUIDANCE BATTERIES (CAM)		250	250	250		
	PROBLEM - ANODE AND CATHODE MANUFACTURING FOR SILVER ZINC BATTERIES IS BASED ON TWENTY YEAR OLD TECHNIQUES, REQUIREMENTS CALL FOR IN LINE PRODUCTION AND ACCEPTANCE TESTS.						
	SOLUTION - DEVELOP TECHNIQUES FOR CONTINUOUS PLATE MANUFACTURING AND AUTOMATIC PLATE SETTING.						
(3314)	TITLE - ZIRCONIUM PROCESSING FOR BATTERIES						405
	PROBLEM - ZIRCONIUM METAL POWDER IS UTILIZED AS A FUEL SOURCE FOR THERMAL BATTERIES, INCOMPLETE INFORMATION EXISTS ON PROCESS PARAMETERS.						
	SOLUTION - INVESTIGATE ZIRCONIUM MANUFACTURE AND EFFECTS ON THERMAL BATTERY PERFORMANCE.						
(3338)	TITLE - MISSILE BATTERY TECHNOLOGY (CAM)					135	
	PROBLEM - THE POSITIVE NEGATIVE SILVER ZINC BATTERY MANUFACTURING PROCESSES WERE DEVELOPED TWENTY YEARS AGO.						
	SOLUTION - DEVELOP TECHNIQUES FOR CONTINUOUS PLATE MANUFACTURE AND AUTOMATIC PLATE SETTING USING COMPUTERIZED MONITORING AND PROCESS CONTROL SYSTEM.						
COMPONENT -- CRYOSTATS							
(3261)	TITLE - LOW COST CRYOSTAT ASSEMBLY						171
	PROBLEM - CRYOSTATS ARE LARGELY ASSEMBLED BY HAND AND THUS ARE MORE COSTLY THAN NECESSARY.						
	SOLUTION - ESTABLISH VOLUME PRODUCTION METHODS FOR SUBASSEMBLY AND FINAL ASSEMBLY AND TEST OF COOLER UNITS.						
COMPONENT -- GYROS							
(3275)	TITLE - OPTIMIZE ASSEMBLY OF SUBMINATURE GYROS AND ACCELEROMETERS						500
	PROBLEM - AUTOMATED ASSEMBLY PROCESSES HAVE NOT BEEN EVALUATED ON PRODUCTION SCALE.						
	SOLUTION - DESIGN AND FABRICATE TOOLS AND FIXTURES FOR ADAPTING ASSEMBLY PROCCESS TO PRODUCTION LINE REQUIREMENTS.						
(3278)	TITLE - IMPROVED MANUFACTURING PROCESS FOR LOW COST LASER GYRO					700	200
	PROBLEM - COST OF FABRICATING SMALL QUANTITY OF LASER GYROS IS EXPENSIVE.						
	SOLUTION - ESTABLISH AUTOMATIC PROCESSING OF OPTICAL PARTS, USING DIAMOND DRILL AND MILL MACHINE FOR LASER GYRO BLOCK.						

		FUNDING ($000)				
		PRIOR	80	81	82	83	84
COMPONENT -- GYROS (CONTINUED)							
(3353)	TITLE - GYRO ASSEMBLY AND FABRICATION PROCESSES						30
	PROBLEM - GYRO ELEMENTS ARE COSTLY BECAUSE OF PRECISION AND RELIABILITY REQUIREMENTS.						
	SOLUTION - REASSESS GYRO DESIGN ELEMENTS TO DETERMINE OPTIMIZATION FOR AUTOMATIC MANUFACTURE AND ASSEMBLY.						
(3356)	TITLE - PRECISION ROTATING PLASTIC PARTS FOR SEEKER GYRO				350	350	
	PROBLEM - FABRICATION OF SEEKER GYRO IS CRITICAL TO PROTECT ITS ELEMENTS FROM LAUNCH LOADS.						
	SOLUTION - CONDUCT AN INVESTIGATION TO DETERMINE THE STABILITY OF PLASTIC MATERIAL UNDER HIGH-G ENVIRONMENTS.						
(3363)	TITLE - IMPROVED TECHNIQUE IN GYRO PICK OFF WIRING SYSTEM						750
	PROBLEM - HANDWIRING OF GYROS REQUIRES SKILLED PERSONNEL FOLLOWING TIME CONSUMING PROCEDURES, RESULTING IN MANY ERRORS.						
	SOLUTION - REPLACE PRESENT HANDWIRING BY PRINTED CIRCUIT CABLE.						
(3364)	TITLE - OPTIMIZED FABRICATION OF GYRO ROTOR HOUSING						750
	PROBLEM - THE ROTOR HOUSING AND STIFFENING END PLATE ARE FABRICATED FROM BAR STOCK MATERIAL REQUIRING MACHINING AND ASSEMBLY.						
	SOLUTION - INVESTIGATE GYRO HOUSING AS A CAST STRUCTURE TO REDUCE MACHINING.						
(3365)	TITLE - LOW COST HERMETIC SEALING OF INERTIAL INSTRUMENTS					750	750
	PROBLEM - RELIABLE PERFORMANCE OF INERTIAL INSTRUMENTS INVOLVES HERMETIC SEALING IN BONDING OPERATIONS.						
	SOLUTION - INVESTIGATE METHODS AND TECHNIQUES FOR USING HERMETIC SEALS IN LOW COST HIGH PRODUCTION, AUTOMATED MANUFACTURING PROCESS.						
(3366)	TITLE - LOW COST GAS STORAGE BOTTLES						95
	PROBLEM - MATERIAL COST FOR WELDED VESSELS ARE HIGH AND OTHER COST FACTORS ARE SIGNIFICANTLY HIGHER.						
	SOLUTION - INVESTIGATE COMPOSITE PRESSURE VESSEL TO DECREASE BOTTLE WEIGHT AT SIGNIFICANT COST REDUCTIONS.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- HYBRIDS							
(3110)	TITLE - HYBRID CIRCUIT ASSEMBLY UTILIZING AUTOMATED TECHNIQUES		250				
	PROBLEM - FILM HYBRID CIRCUITS ARE PRESENTLY MANUFACTURED IN A LABORATORY ATMOSPHERE BY ONLY A FEW PRODUCERS.						
	SOLUTION - CONVERT LABATORY TECHNIQUES INTO PRODUCTION METHODS UTILIZING AUTOMATED COMMERCIAL EQUIPMENT.						
(3383)	TITLE - METHODS FOR MEASURING MEDIUM RANGE LEAK RATES						165
	PROBLEM - CONVENTIONAL TEST EQUIPMENT PRESENTS DIFFICULTY IN MEASURING LEAK RATES UNDER HIGH RATE PRODUCTION CONDITIONS.						
	SOLUTION - INVESTIGATE AND DETERMINE THE OPTIMUM METHOD OF TESTING FOR LEAKS OF THE MEDIUM RANGE MAGNITUDE.						
(3405)	TITLE - THICK FILM MICROELECTRONIC PROC. EQUIP. FOR BASE METAL COND.					300	150
	PROBLEM - THE USE OF GOLD ON HYBRID MICROCIRCUITS IS EXPENSIVE.						
	SOLUTION - CONSTRUCT EQUIPMENT AND OPTIMIZE PROCESSING TECHNIQUE FOR APPLYING, DRYING, FIRING BOTH ALUMINUM CONDUCTOR PASTES AND DIFFUSION BARRIER PASTES.						
(3406)	TITLE - LOW COST PRODUCTION FOR MULTILAYER HYBRIDS					170	90
	PROBLEM - FIRING OF EACH LAYER SEPARATELY IN MULTILAYER MICROCIRCUIT FABRICATION IS TIME CONSUMING AND COSTLY.						
	SOLUTION - DEVELOP PRODUCTION TECHNIQUES BASED ON SINGLE FIRING METHOD OF MICROCIRCUIT FABRICATION.						
(3408)	TITLE - PLASTIC ENCAPSULATION OF MICROELECTRONIC CIRCUITS						250
	PROBLEM - HERMETICALLY SEALING MICROELECTRONIC CIRCUITS IS EXPENSIVE.						
	SOLUTION - DEVELOP MATERIALS AND TECHNOLOGY NECESSARY TO PRODUCE ECONOMICAL AND RELIABLE ENCAPSULATED CIRCUITS.						
COMPONENT -- MEMORIES							
(3097)	TITLE - MINIMIZATION OF HARD BUBBLE FORMATION IN MISSILE DOMAINS						500
	PROBLEM - CURRENT MEMORY DEVICES SUFFER FROM ONE OR MORE DEFICIENCIES COST, RELIABILITY, VULNERABILITY OF NUCLEAR RADIATION, SIZE, WEIGHT, POWER REQUIREMENTS.						
	SOLUTION - ESTABLISH MANUFACTURING TECHNOLOGY FOR THE SUPPRESSION OF HARD MAGNETIC BUBBLE IN MAGNETIC FILMS FOR USE IN GUIDED MISSILE DOMAIN DEVICES.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- MEMORIES (CONTINUED)						
(3128) TITLE - PROCESSING TECH, FOR LOGIC IN MISSILE DOMAIN DEVICES					500	
PROBLEM - DOMAIN DEVICES ARE HIGH IN COST AND MUST BE HAND TAILORED TO APPLICATION.						
SOLUTION - ESTABLISH PRODUCTION TECHNIQUES FOR MASS PRODUCTION OF LOGIC AND MEMORY DEVICES AT LOWER COSTS.						
(3130) TITLE - PRODUCTION TECH, FOR GUIDED MISSILE DOMAIN DEVICES					500	
PROBLEM - PRESENT MANUFACTURING TECHNIQUES ARE ADAPTED ONLY TO COMMERCIAL APPLICATION.						
SOLUTION - DEVELOP PRODUCTION TECHNIQUE FOR MISSILE DOMAIN DEVICES TO MILITARY MISSILE APPLICATION.						
COMPONENT -- OPTICS						
(3152) TITLE - PRODUCTION OF OPTICAL ELEMENTS (CAM)		200	200			
PROBLEM - HIGH GRADE OPTICS IN MODERATE QUANTITY CANNOT BE PRODUCED AT LOW COST WITH REPEATABILITY.						
SOLUTION - APPLY COMPUTER CONTROL TO PROCESS OPERATIONS WITH SENSOR CONTROL AND PROCESS FEEDBACK TO ASSURE HIGH YIELD.						
(3189) TITLE - IMPROVED PROCESS FOR ZOOM OPTICS BEAM RIDER TRANSMITTER			375	400		
PROBLEM - THE TRANSMITTER IS PRODUCED USING PROTOTYPE TECHNOLOGY IN SMALL QUANTITIES AT HIGH COST.						
SOLUTION - ESTABLISH NEW PRODUCTION TECHNIQUES TO PRODUCE THE TRANSMITTER IN LARGE QUANTITIES.						
(3324) TITLE - OPTIC SURFACE FINISHING			210	210		
PROBLEM - PREPARING LARGE QUANTITIES OF SILICON WAFERS REQUIRE SAWING AND POLISHING BY EQUIPMENT.						
SOLUTION - EXPLORE TECHNIQUES FOR DOUBLE FACE POLISHING, SLICING, AND EVALUATION OF SURFACE QUALITY.						
(3325) TITLE - LASER OPTICAL DEVICE FABRICATION				475	470	
PROBLEM - FABRICATION OF LASER OPTICAL DEVICE REQUIRES ACCURATE MACHINING, MULTIPLE POLISHING OPERATIONS, AND HIGH COST MIRROR ELEMENTS.						
SOLUTION - REDUCE MACHINING COST, REFINE POLISHING TOOLING, AND ESTABLISH IMPROVED PROCESS CONTROLS FOR MIRROR FABRICATION.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- OPTICS (CONTINUED)							
(3354)	TITLE - PROCESSING TECHNIQUES FOR FIBER OPTICS					250	200
	PROBLEM - MATERIALS USED IN OPTICAL SYSTEMS HAVE HIGH LOSSES, ARE FRAGILE AND EXPENSIVE.						
	SOLUTION - INVESTIGATE IMPROVED PROCESSING TECHNIQUES FOR FIBER OPTICS.						
(3370)	TITLE - OPTICALLY POLARIZED GYROLESS SYSTEM			275	950		
	PROBLEM - GUIDANCE GYRO IS LARGE COST DRIVER, MECHANICALLY MOVING PART IS LESS RELIABLE THAN SOLID STATE ELECTRONICS.						
	SOLUTION - INVESTIGATE OPTICALLY POLARIZED LIGHT EMITTING DIODE AND RECEIVER TO REPLACE MECHANICAL DRIVE GYRO ASSEMBLY.						
COMPONENT -- PRINTED CIRCUITS							
(3149)	TITLE - ELIMINATION OF COSMETIC EFFECTS ON PRINTED CIRCUIT BOARDS						266
	PROBLEM - COSTLY MANUFACTURING TECHNIQUES ARE REQUIRED TO ATTAIN COSMETIC ATTRIBUTES FOR PRINTED CIRCUIT INSPECTION CRITERIA.						
	SOLUTION - DEVELOP PRODUCTION CRITERIA FOR ACCEPTANCE OR REJECTION OF PRINTED CIRCUITS BY FUNCTIONAL CHARACTERISTICS ONLY.						
(3164)	TITLE - COMPONENT SIDE PRINTED CIRCUIT BOARD SOLDERING		325				
	PROBLEM - THERE IS NO KNOWN METHOD FOR HOLDING COMPONENTS IN ALIGNMENT FOR MOUNTING.						
	SOLUTION - REFINE PROCESS FOR FOIL SIDE MOUNTING OF COMPONENTS TO ACCOMODATE FLEXIBLE CIRCUITS.						
(3166)	TITLE - TIN-LEAD PLATING AND FUZING CONTROL FOR PRINTED CIRCUITS				254	454	
	PROBLEM - LACK OF CONTROLS ON REFLOW PROCESS CONTRIBUTE TO CORROSION, BARE COPPER EDGES, AND POOR ADHESION.						
	SOLUTION - PROVIDE CONTROLS ON PROCESS THAT WILL MAINTAIN PARAMETERS REQUIRED TO PRODUCE GOOD ADHESION.						
(3184)	TITLE - SCREEN PRINTING PROCESSES FOR PTH ON PLASTIC PCB'S		250	250			
	PROBLEM - SET UP AND RUN TIME FOR ELECTROLESS COPPER PLATED THRU HOLES (PTH) IS APPROXIMATELY 3.75 MIN PER BOARD WITHOUT INSPECTION OR MAINTENANCE.						
	SOLUTION - SCREEN PRINTING COULD ACCOMPLISH THE SAME JOB IN APPROXIMATELY .48 MIN PER BOARD, INVESTIGATE CURING CYCLE, SCREEN PREPARATION TIME, AND PASTE THEOLOGY FOR OPTINUM FLOW THRU HOLES.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- PRINTED CIRCUITS (CONTINUED)							
(3237)	TITLE = RELATE DESIGN TO COST OF PRINTED CIRCUIT BOARDS		270				
	PROBLEM = OVERCROWDING OF PRINTED CIRCUIT BOARDS RESULTS IN UNACCEPTABLE SCRAP RATES.						
	SOLUTION = DEVELOP A SET OF DESIGN TRADEOFFS FOR MINIMIZING COSTS BY CALCULATING COST PENALTIES OF VIOLATIONS.						
(3262)	TITLE = PROD. METHOD FOR AUTOMATIC PLACE AND SOLDER OF FLATPACK		330				
	PROBLEM = WAVE SOLDERING LEAVES EXCESSIVE AND UNCONTROLLED AMOUNTS OF SOLDER ON THE CIRCUIT BOARDS.						
	SOLUTION = ESTABLISH MANUFACTURING METHODS FOR CONTROLLING SOLDERING OF CIRCUIT BOARDS.						
(3263)	TITLE = MANF. TECH. FOR PWB UTILIZING LEADLESS COMPONENTS		250	250			
	PROBLEM = THE VOLUME, WEIGHT, QUANTITY, RELIABILITY AND COST OF PCB USING WIRE LEADS CAN BE SUBSTANIALLY IMPROVED.						
	SOLUTION = ESTABLISH MANUFACTURING TECHNOLOGY TO FABRICATE, TEST, AND INSPECT PRINTED WIRE ASSEMBLIES THAT USE LEADLESS COMPONENTS.						
(3264)	TITLE = UTILIZE THIN FOIL COPPER CLAD PCB'S				150		
	PROBLEM = THIN FOIL IS NOT UTILIZED BECAUSE THICK CLADDING IS REQUIRED PER MILITARY SPECIFICATION.						
	SOLUTION = OPTIMIZE TECHNIQUES FOR PROCESSING PRINTED CIRCUIT BOARD FROM THIN FOIL LAMINATES.						
(3265)	TITLE = ELIMINATE GOLD ON PRINTED CIRCUIT BOARD CONTACTS				135		
	PROBLEM = THE USE OF GOLD ON MILITARY PRINTED CIRCUIT BOARD CONTACTS IS AN IMPORTANT FACTOR IN THE COST OF A BOARD.						
	SOLUTION = DEVELOP LIST OF METAL ALLOY AS CANDIDATES TO REPLACE GOLD ON CONTACTS.						
(3267)	TITLE = PRODUCTION PROCESSES FOR REMOVING EPOXY SMEAR IN PTH	200	200				
	PROBLEM = REMOVAL OF EPOXY SMEAR TO PLATING THRU HOLES IS COSTLY.						
	SOLUTION = INCREASE EFFICIENCY OF HONING MACHINES.						
(3269)	TITLE = REDUCE ELECTRO-STATIC FAILURES IN COMPONENT PCB'S						168
	PROBLEM = STATIC VOLTAGES CAN DEGRADE OR DESTROY SENSITIVE ELECTRONIC DEVICES DURING PRODUCTION, TESTING, AND AFTER PACKAGING.						
	SOLUTION = INTRODUCE A SERIES OF ANTISTATIC PREVENTATIVE MEASURES INTO THE MANUFACTURING PROCESS.						

		FUNDING ($000)				
		PRIOR	80	81	82	83	84
COMPONENT -- PRINTED CIRCUITS (CONTINUED)							
(3411)	TITLE = MANUFACTURE OF NON PLANAR PRINTED CIRCUIT BOARDS		350	350	350		
	PROBLEM = USE OF FLAT CIRCUIT BOARDS RESULTS IN COMPLEX AND EXPENSIVE INTERCONNECTIONS WITH LOWERED RELIABILITY.						
	SOLUTION = PRODUCE NON PLANAR PCB'S SHAPED TO FIT THE AVAILABLE COMPARTMENTS.						
COMPONENT -- SEEKERS							
(3118)	TITLE = PASSIVE RADIO FREQUENCY HOMING SEEKER					250	250
	PROBLEM = PRESENT METHODS FOR FABRICATION OF PASSIVE RF HOMING SEEKER INVOLVES THE USE OF EXPENSIVE MULTI-COMPONENT CONSTRUCTION AND HAND ASSEMBLY.						
	SOLUTION = ESTABLISH SIMPLIFIED CONSTRUCTION OF MAJOR COMPONENTS AND AUTOMATE ASSEMBLY OF SEEKER.						
(3139)	TITLE = MILLIMETER RADIOMETRIC SEEKERS FOR SUBMISSILE APPLICATION		350	250			
	PROBLEM = LOW QUANTITY PRODUCTION IS TOO COSTLY FOR THE SYSTEM REQUIREMENTS.						
	SOLUTION = ESTABLISH AUTOMATED FABRICATION/ASSEMBLY TECHNOLOGY FOR HIGH PRODUCTION CAPABILITY AND IMPROVE PRODUCTION TEST METHODS.						
(3178)	TITLE = IMPROVED MANUFACTURING PROCESSES FOR LASER IR/OPTICAL SEEKER						225
	PROBLEM = FIBER OPTICS FIXTURE ARE DIFFICULT AND EXPENSIVE TO MAKE.						
	SOLUTION = REDUCE FIBER OPTICS FIXTURE DIFFICULTIES BY DEVISING METHODS TO REDUCE HANDLING OF FIBER FIXTURE AND DETECTOR ARRAY.						
(3186)	TITLE = IMPROVED MANUFACTURE OF INFRARED SUBMISSILE SEEKERS		500	450			
	PROBLEM = LOW YIELD OF SEEKER COMPONENTS IS DUE TO HANDLING AND CHECKOUT OF GYRO OPTICS.						
	SOLUTION = ESTABLISH PROCEDURES FOR AUTOMATED HANDLING AND CHECKOUT OF GYRO OPTICS.						
(3427)	TITLE = IMPROVED MANF. TECH. FOR THE MULTI-ENVIRONMENT ACTIVE SEEKER		380	380			
	PROBLEM = DIODE ARRAY TRANSMITTER, POLARIZATION ANTENNA, AND ACOUSTIC WAVE DEVICES USED IN THIS SEEKER ARE PRESENTLY BUILT BY PROTOTYPE SHOP METHODS.						
	SOLUTION = ESTABLISH METHODS FOR PRODUCING THESE CRITICAL COMPONENTS SO THAT PERFORMANCE PARAMETERS CAN BE CLOSELY CONTROLLED.						

		FUNDING ($000)				
		PRIOR	80	81	82	83	84
COMPONENT -- SEEKERS (CONTINUED)							
(3428)	TITLE - IMPROVED TECHNIQUES FOR COMMON APERTURE MULTISPECTRUM SEEKER		320	350			
	PROBLEM - PRESENT METHODS FOR MAKING WIDE BAND ON A ONE AT A TIME BASIS, DOES NOT PERMIT GOOD CONTROL OF PERFORMANCE.						
	SOLUTION - MANUFACTURING TECHNIQUES ARE REQUIRED TO PRODUCE THESE COMPONENTS IN MODERATE QUANTITIES WITH CLOSER TOLERANCES.						
(3451)	TITLE - IMPROVED MFG PROCESSES FOR ACTIVE RF SEEKERS					250	250
	PROBLEM - PRESENT SEEKER ELEMENTS ARE HAND MADE IN R+D PROTOTYPE SHOP.						
	SOLUTION - ESTABLISH IMPROVED MANUFACTURING METHODS TO INCREASE YIELD AND LOWER COST.						
COMPONENT -- SEMI-CONDUCTORS							
(3258)	TITLE - E-BEAM PATTERN GENERATION ON SEMICONDUCTOR WAFERS (CAM)				500	500	
	PROBLEM - PREPARING A LARGE SCALE INTEGRATED CIRCUIT (LSI) IS SLOW AND COSTLY.						
	SOLUTION - DEVELOP TECHNIQUES TO PRODUCE SMALL TO MEDIUM LOTS OF LSI DEVICES USING ELECTRON BEAM MICROSCOPE TO GENERATE MASK PATTERNS.						
(3369)	TITLE - UTILIZATION OF LARGE SCALE INTEGRATION (LSI) TECHNIQUES		400	400			
	PROBLEM - THE DESIGN AND UTILIZATION OF LSI ELECTRONICS IN AN ADVANCED DEVELOPMENT PROGRAM IS NOT FEASIBLE BECAUSE OF THE INABILITY TO MAKE QUICK CHANGES.						
	SOLUTION - CONDUCT PROJECT FOR LSI DEVELOPMENT, QUALIFICATION, PRODUCTION ENGINEERING AND PILOT RUN FOR THE STINGER ALTERNATE MISSILE GUIDANCE ELECTRONICS.						
(3377)	TITLE - CUTTING AND POLISHING OF SILICON WAFERS					400	
	PROBLEM - THE PREPARATION OF SILICON WAFERS ARE EQUIPMENT INTENSIVE, PROBLEMS ARE PREVALENT IN YIELD AND DAMAGE.						
	SOLUTION - INVESTIGATE DOUBLE FACE POLISHING, MINIMIZE MACHINE TIME POLISHING, INCREASE SURFACE QUALITY AND YIELD.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- SENSORS						
(3080) TITLE = PROD. OF SANDWICH DETECTORS FOR MULTI. WAVE LENGTH SENSORS		200	150	150		
PROBLEM = IN PRESENT SENSORS AND SEEKERS, ONLY ONE MODE OF DETECTION AND SEEKER HOMING CAN BE ACCOMPLISHED WITHIN THE CONSTRAINTS OF SMALL DIAMETER SYSTEMS.						
SOLUTION = ESTABLISH TECHNIQUES FOR SANDWICHING THE DETECTORS ON A COMMON SUBSTRATE, THIS WILL ALLOW TWO DETECTION MODES.						
(3175) TITLE = MANUFACTURING PROCESSES FOR SOLID STATE IMAGING SENSORS		250	280			
PROBLEM = EXISTING PROCESSES ARE LOW YIELD AND NON-UNIFORM, MECHANICAL VAPOR DEPOSITION MUST BE OPTIMIZED.						
SOLUTION = ESTABLISH THE PROCESSES CIRCUMVENTING PRESENT PROBLEMS ON WIRE BONDING, TWEAKING, TESTING, ETC.						
(3177) TITLE = IMPROVED MANF. PROCESS FOR SUBMISSILE ELECTRONIC SUBSYSTEM		250	175			
PROBLEM = PRESENT MANUFACTURING PROCESSES SUBSTANTIALLY INCREASE THE COST OF HOMING SUBSYSTEMS.						
SOLUTION = INVESTIGATE VOLUME METHODS FOR PRODUCING ELECTRONIC HOMING SUBSYSTEMS.						
(3221) TITLE = FLUIDIC RATE SENSOR		165	165	165		
PROBLEM = PRESENT MASS PRODUCED RATE SENSORS ARE COSTLY FOR USE IN A MANPORTABLE AIR DEFENSE SYSTEM.						
SOLUTION = CONDUCT PROJECT TO DO QUALIFICATION, PRODUCTION ENGINEERING, TOOLING, AND PILOT RUN FOR RATE SENSOR.						
(3277) TITLE = AUTOMATIC INERTIAL SENSOR FABRICATION			375	350		
PROBLEM = INERTIAL SENSOR FABRICATION REQUIRES PRECISION MACHINING AND ASSEMBLY METHODS WITH SEVERAL ITERATIONS, ALL OF WHICH INCREASE COST.						
SOLUTION = ESTABLISH AUTOMATIC FLUID FILL STATION AND SET UP PILOT STATION FOR AUTOMATIC BALANCING OF GYRO ROTORS.						
(3367) TITLE = ECONOMICAL PRODUCTION OF HEATERS FOR PHOTO DETECTORS				110		
PROBLEM = HEATER INTEGRATED WITH LASER PHOTO DETECTORS HAVE VERY LOW YIELD.						
SOLUTION = SELECT RELIABLE HEATER DESIGN AND CONDUCT PRODUCTION OPTIMIZATION STUDIES FOR THE MOST COST EFFECTIVE MANUFACTURING METHOD.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- STRIPLINE						
(3163) TITLE - MANUFACTURING PROCESS FOR STRIPLINE DEVICES				200		
PROBLEM - STRIPLINE CIRCUITS NEEDING PLATED THRU HOLES HAVE A TENDENCY TO CRAZE AROUND THE HOLE.						
SOLUTION - ESTABLISH METHOD FOR PREVENTING CRAZING. INVESTIGATE ACIDITY OF SOLUTIONS AND EFFECT ON CRAZING.						
COMPONENT -- THICK FILM						
(3257) TITLE - STAR VALUE ADJUSTMENT BY THICK FILM TRIMMING TECHNIQUES				253		
PROBLEM - TRIMMING OR BALANCING RESISTORS FOR CLOSE TOLERANCE IS A MAJOR COST FACTOR.						
SOLUTION - DEVELOP MANUFACTURING TECHNOLOGY TO TRIM THICK FILM RESISTORS BY A COST EFFECTIVE METHOD.						
(3415) TITLE - AUTOMATIC PHOTOGRAPHIC PRODUCTION OF THICK FILM MICROCIRCUIT		200	200			
PROBLEM - SCREEN PRINTING OF FINE LINES DOES NOT ALLOW HIGH DENSITY DUE TO RHEOLOGY OF ZINC SYSTEMS.						
SOLUTION - DEVELOP THICK FILM HYBRID PROCESSING CAPABILITY INCLUDING PHOTOLITHOGRAPHIC PATTERNING.						
COMPONENT -- THIN FILM						
(3255) TITLE - IN-SITU MASKING TECHNIQUE FOR THIN FILM VAPOR DEPOSITION					125	
PROBLEM - TEMPLATE MASKING TECHNIQUES REQUIRE TIME CONSUMING PROCEDURES FOR EACH NEW DEPOSITION.						
SOLUTION - ACCOMPLISH THE REMASKING FOR MULTI DEPOSITION PROCESSES WITHIN THE VACUUM FOR EITHER SINGLE OR MULTI-MEMBER MASKS.						
(3256) TITLE - PROCESS DEVELOPMENT FOR COMPOSITE THIN FILMS		210				
PROBLEM - CONSTRUCTION OF FILMS ARE SUCH THAT INDIVIDUAL LAYERS OF A MULTILAYER STRUCTURE PERFORM A SINGLE FUNCTION.						
SOLUTION - IDENTIFY POTENTIALLY EXPLOITABLE COMPOSITE THIN FILM PHENOMENA AND SELECT FOR DEVELOPMENT IN A MANUFACTURING PROCESS.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- WARHEADS						
(3346) TITLE - RELAXED TOLERANCES IN WARHEADS						276
PROBLEM - CURRENT WARHEAD SHAPED CHARGE DESIGN EMPLOY PRECISION MACHINED LINER, NO RELAXATION OF COSTLY TOLERANCES IS CONSIDERED.						
SOLUTION - CONDUCT TECHNICAL INVESTIGATION TO VERIFY AMOUNT OF TOLERANCE RELAXATION ALLOWABLE IN BODY DIMENSIONS.						
COMPONENT -- WINDOWS/RADOMES						
(3176) TITLE - MANUFACTURE OF SILICON NITRIDE RADOMES		390	350			
PROBLEM - THERE IS NO EXISTING ECONOMICAL MANUFACTURING PROCESSES FOR LARGE RADOMES FROM CURRENT MATERIALS.						
SOLUTION - SLIPCAST SILICON POWDER AND FIRE THE RADOME IN A NITROGEN ATMOSPHERE.						
(3215) TITLE - PRODUCTION OF SPINEL FOR IR RADOMES					250	250
PROBLEM - MAGNESIUM FLOURIDE DOES NOT PROVIDE EROSION RESISTANCE, THERMAL SHOCK CAPACITY, AND FORMABILITY REQUIREMENTS FOR NEW GENERATION MISSILES.						
SOLUTION - INVESTIGATE MANUFACTURING PROCESSES FOR MAGNESIUM ALUMINATE (SPINEL) WHICH OFFERS HIGH POTENTIAL AS IR DOME MATERIALS.						
(3323) TITLE - IR DOME MATERIALS PROCESSING				327	327	327
PROBLEM - MAGNESIUM FLOURIDE WILL NOT MEET THE REQUIREMENTS FOR NEXT GENERATION OF MISSILES.						
SOLUTION - ESTABLISH MANUFACTURING PROCESSES TO UTILIZE IR DOME MATERIALS THAT OFFER HIGH POTENTIAL.						
(3426) TITLE - IMPROVED PROCESSES FOR MIRRORS AND WINDOWS FOR HE LASERS		250	350			
PROBLEM - MIRRORS AND WINDOWS FOR HIGH ENERGY LASER APPLICATION ARE EXPENSIVE TO FABRICATE AND ARE REPRODUCIBILITY POOR.						
SOLUTION - ESTABLISH METHODS FOR PRODUCING MODERATE QUANTITIES OF MIRRORS AND WINDOWS AT LOWER COST AND GREATER UNIFORMITY.						
(3429) TITLE - IMPROVED MANF. METHODS FOR ZONED DIELECTRIC MICROWAVE LENS				320	450	
PROBLEM - PRODUCTION OF ZONED DIELECTRIC MICROWAVE LENS IS EXTREMELY COMPLEX AND EXPENSIVE.						
SOLUTION - ESTABLISH TECHNIQUES TO PRODUCE ZONED DIELECTRIC MICROWAVE LENS AT LOWER COST AND MORE ACCURATE CONTROL PARAMETERS.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- WINDOWS/RADOMES (CONTINUED)						
(3432) TITLE - IMPROVED IR DOME MATERIALS		150				
PROBLEM - MACHINING COSTS FOR REFRACTORY OXIDES ARE HIGH.						
SOLUTION - ESTABLISH PRODUCTION PROCESS USING AMMRG GRADIENT FURNANCE TECHNIQUE.						
COMPONENT -- WIRE						
(3311) TITLE - DOMESTIC SOURCE FOR CONTROL WIRE				392	392	392
PROBLEM - THERE IS NO DOMESTIC SOURCE FOR THE SPECIAL HIGH PURITY STEEL REQUIRED TO MAKE CONTROL WIRES FOR WIRE GUIDED MISSILES.						
SOLUTION - DEVELOP DOMESTIC SOURCE FOR HIGH PURITY DEFECT-FREE OR POTENTIAL ALTERNATIVES.						
(3390) TITLE - AUTOMATIC WINDING OF BOBBINS					400	425
PROBLEM - THE WINDING OF CABLE TO CREATE BOBBINS REQUIRE OPERATOR CONTROL. EFFORTS TO AUTOMATE THE OPERATION HAVE BEEN UNSUCCESSFUL.						
SOLUTION - DEVELOP MANUFACTURING CAPABILITY TO PERMIT AUTOMATED WINDING OF BOBBINS USING CABLE MADE FROM FINE WIRE.						

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* CATEGORY *
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*MISSILE STRUCTURE *
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COMPONENT -- AIRFRAMES-COMPOSITES						
(3266) TITLE - LAMINATING SURFACE ADHESION					273	
PROBLEM - MAJOR STRUCTUAL COMPONENTS REQUIRE EXTENSIVE MACHING OPERATIONS, A MAJOR COST DRIVER.						
SOLUTION - ESTABLISH ADHESIVE-BOND COMPONENTS IN ALUMINUM, STEEL AND TITANIUM.						
(3329) TITLE - FABRICATION AND PROCESSING COMPOSITE MATERIALS				532	532	
PROBLEM - NEW PRODUCTION METHODS ARE NEEDED TO REDUCE COST OF COMPONENTS CURRENTLY PRODUCED IN COMPOSITES.						
SOLUTION - USE TECHNIQUES SUCH AS BRAIDING, FILAMENT WINDING, PULTRUSION TO ELIMINATE COSTLY MACHINING.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- AIRFRAMES-COMPOSITES (CONTINUED)						
(3331) TITLE - MANUFACTURING PROCESS FOR FILAMENT WINDING		270	270			
PROBLEM - METAL MOTOR CASES ARE HIGH IN COST AND PROCUREMENT LEAD TIMES ARE LONG.						
SOLUTION - ESTABLISH FILAMENT WINDING EQUIPMENT AND TOOLS TO ACCOMPLISH HIGH VOLUME PRODUCTION.						
(3332) TITLE - CURING PROCEDURES FOR COMPOSITE MATERIALS			174			
PROBLEM - TIME, TEMPERATURE, AND PRESSURE CYCLES ARE DIFFICULT TO CONTROL DURING CURING.						
SOLUTION - ESTABLISH DEVICE TO ACCURATELY MEASURE VISCOSITY DURING A CURE CYCLE.						
(3333) TITLE - MACHINING OF COMPOSITE MATERIALS						342
PROBLEM - MACHINING COMPOSITES CAUSES SURFACE DELAMINATION, INTRODUCES FOREIGN OBJECTS TO THE LAMINATE AND WEAKENS THE COMPOSITE STRUCTURE.						
SOLUTION - ESTABLISH TECHNIQUES MINIMIZING OR ELIMINATING INTRODUCTION OF CONTAMINANTS AND/OR DELAMINATION DURING THE MACHINING OF LAMINATES.						
(3334) TITLE - NEW COMPOSITE MATERIAL FORMULATIONS					325	325
PROBLEM - ACCELERATION FORCES, VIBRATION LEVELS, AND EXTREME TEMPERATURES REQUIRE USE OF HIGH STRENGTH LIGHTWEIGHT MATERIALS.						
SOLUTION - ESTABLISH COMPOSITE MATERIALS TO ACCOMMODATE REQUIREMENTS.						
(3335) TITLE - ADVANCED COMPOSITE SUBSTRUCTURES FOR MISSILES		300	300			
PROBLEM - THE CONVENTIONAL APPROACH FOR BUILDING UP STRUCTURE FROM DETAILED PARTS RESULT IN HIGH COST.						
SOLUTION - USE ADVANCED COMPOSITE STRUCTURE TO ELIMINATE PRACTICALLY ALL MACHINING.						
(3358) TITLE - INNER SHELL ADVANCED COMPOSITE STRUCTURE					425	
PROBLEM - CURRENT DESIGN OF THE INNER SHELL IS OF AN ALUMINUM CASTING WHICH IS EXPENSIVE, HEAVY, OF MEDIUM STRENGTH AND STIFFNESS AND POSSESSES LOW STRUCTURAL DAMPING.						
SOLUTION - ESTABLISH A METHOD ACHIEVING LOWER FABRICATION COSTS OF THE INNER SHELL USING ADVANCED COMPOSITE MATERIALS.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- AIRFRAMES-COMPOSITES (CONTINUED)						
(3382) TITLE - FOR BRAIDED COMPOSITE STRUCTURE			500	525		
PROBLEM - CURRENT LOW COST TECHNIQUES RESULT IN CONFIGURATION LIMITATIONS WHEREAS TECHNIQUES THAT MINIMIZE THESE LIMITATIONS ARE COSTLY.						
SOLUTION - ESTABLISH TECHNOLOGY OF BRAIDING COMPOSITE STRUCTURES WHICH ARE COST COMPETATIVE AND PROVIDE ADVANTAGES.						
(3385) TITLE - UTILIZATION OF COMMERCIAL GRADE KEVLAR 49		100				
PROBLEM - COMMERCIAL GRADE KEVLAR 49 DIFFERS FROM AEROSPACE GRADE IN THAT THE COMMERCIAL ROVING IS LARGER IN DIAMETER AND DOES NOT ACCEPT THE EXISTING RESIN SYSTEM.						
SOLUTION - ESTABLISH RESIN THAT IS MORE COMPATABLE WITH COMMERCIAL GRADE/WINDING PROCESS THAT IMPROVES PROPERTIES OF TUBES MADE OF COMMERCIAL GRADE.						
(3386) TITLE - OPTIMIZATION AND CONTROL OF COMPOSITE FABRICATION PROCESS						175
PROBLEM - DISCREPANCIES IN TIMING, TEMPERATURE, ETC. CAN RESULT IN PROCESS FAILURES.						
SOLUTION - ESTABLISH NECESSARY INSTRUMENTATION TO DYNAMICALLY MEASURE ABSOLUTE DIELECTRIC PROPERTIES SIMULTANEOUSLY WITH FABRICATION.						
(3417) TITLE - GRAPHITE COMPOSITES FOR LIGHTWEIGHT MISSILE STRUCTURES						250
PROBLEM - AIRFRAMES AND WARHEADS IN VARIOUS SYSTEMS ARE OVERWEIGHT.						
SOLUTION - ESTABLISH TECHNOLOGY TO SUPPLY LIGHTWEIGHT MISSILE HARDWARE USING GRAPHITE COMPOSITES.						
(3420) TITLE - ADV. COMPOSITE MATERIAL FOR GUID. INNER SHELL SPT. STRUCTURE		225	225			
PROBLEM - ELECTRONIC PACKAGE SUPPORT STRUCTURES ARE EXPENSIVE TO FABRICATE.						
SOLUTION - INVESTIGATE AND OPTIMIZE LOW COST FABRICATION OF ADVANCED COMPOSITE MATERIALS FOR INNER SHELL SUPPORT STRUCTURE.						
(3421) TITLE - LOW COST LIGHTWEIGHT MISSILE STRUCTURE					250	
PROBLEM - MATERIALS FOR AIRFRAME AND CONTROL SURFACES ARE EXPENSIVE AND DIFFICULT TO MACHINE AND JOIN.						
SOLUTION - ESTABLISH TECHNOLOGY FOR THE USE OF FIBERS MADE OF ORGANIC MATERIALS TO REINFORCE PLASTIC POLYMERS.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- AIRFRAMES-METAL/PLASTIC							
(3131)	TITLE - PRODUCTION METHODS FOR PLASTIC MOLDED MISSILE AIRFRAMES.			350			
	PROBLEM - PRESENT METHODS OF FABRICATION ARE EXPENSIVE.						
	SOLUTION - IMPROVE METHODS FOR AIRFRAME FABRICATOR.						
(3153)	TITLE - TOOLING FOR MOLDS FOR PLASTIC PARTS				150		
	PROBLEM - DUE TO DESIGN CHANGES, METAL MOLDS ARE OFTEN CHANGED AND RESULT IN HIGH TOOLING COSTS.						
	SOLUTION - DEVELOP METAL MOLDS BY USE OF POWDER METALLURGICAL TECHNIQUES SUPPORTED BY INEXPENSIVE SUPPORT MEMBERS.						
(3156)	TITLE - PASSIVATION TECHNIQUE FOR CRES				200	200	
	PROBLEM - HEAT TREATED MACHINED ITEMS ARE CURRENTLY PASSIVATED.						
	SOLUTION - REFINE PROCESS FOR INVESTMENT TO REMOVE IRON-RICH SLAG AND SUPERFICIAL MICRO-CRACKS. THIS WILL ALLOW CHEMICAL PASSIVATION.						
(3179)	TITLE - *IMPROVED* MANUFACTURING PROCESS FOR SUBMISSILE AIRFRAMES		200	260			
	PROBLEM - CURRENT TECHNIQUES OF MANUFACTURING TERMINALLY GUIDED SUBMISSILE AIRFRAMES REQUIRE ADEQUATE PROCESS CONTROL AND DESIGN RELIABILITY.						
	SOLUTION - DEVELOP METHODS TO INCREASE YIELD AND REDUCE COST OF TERMINALLY GUIDED SUBMISSILE AIRFRAMES						
(3181)	TITLE - STUDY OF REQUIREMENTS			100	150		
	PROBLEM - THERE IS A NEED TO IDENTIFY AND SELECT THE BEST POSSIBLE MANUFACTURING TECHNOLOGY PROGRAM.						
	SOLUTION - DEVELOP METHODS OF ANALYZING COST INFORMATION AND CONDUCTING MINI-CONFERENCES TO IDENTIFY PROJECT AREAS.						
(3239)	TITLE - UTILIZATION OF ROBOTS				425	400	
	PROBLEM - ASSEMBLY WORK ON MISSILES HAS A HIGH LABOR CONTENT AND IN MANY CASES REQUIRES HIGHLY SKILLED PEOPLE.						
	SOLUTION - DESIGN AND BUILD A SYSTEM USING ROBOTS TO ASSEMBLE TYPICAL MISSILE COMPONENTS.						
(3312)	TITLE - DEVELOPMENT OF NEW STEEL						267
	PROBLEM - HIGH MACHINING COSTS OF CANNON LAUNCHED GUIDED PROJECTILE COMPONENTS.						
	SOLUTION - DEVELOP ISOTHERMAL-FORGING TECHNOLOGY FOR NEW HIGH STRENGTH, LOW ALLOY STEEL.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- AIRFRAMES-METAL/PLASTIC (CONTINUED)						
(3315) TITLE - SURFACE FINISHES-NON PAINT						130
PROBLEM - PAINT LOSS FROM SPRAYING IS CLOSE TO 80 PERCENT, THE RESULTANT FINISH IS ALSO UNACCEPTABLE.						
SOLUTION - USE ELECTROSTATIC POWDER COATING TECHNIQUES TO ELIMINATE PAINT LOSS AND YIELD ACCEPTABLE FINISHES.						
(3337) TITLE - DETERMINATION OF WEIGHT-CENTER OF GRAVITY					121	
PROBLEM - DETERMINE THE CENTER OF GRAVITY INVOLVES LARGE TEST TIMES AND POSSIBLE TESTER ERROR.						
SOLUTION - DEVELOP TWO AXIS SYSTEM WHICH SIMULTANEOUSLY WEIGHS AND DETERMINES THE CENTER OF GRAVITY.						
(3391) TITLE - MFG. PROCESSES FOR ANODIZED ALUMINUM STRUCTURE						65
PROBLEM - APPROXIMATELY 10-15 PERCENT OF CONTAINER COST IS ASSOCIATED WITH PAINTING IN ACCORDANCE WITH MILITARY REQUIREMENTS.						
SOLUTION - EVALUATE FEASIBILITY OF THE ANODIZE FINISH APPROACH TO FIELD CONTAINTERS AND NON-FIELD CONTAINERS.						
(3392) TITLE - MFG EVALUATION OF NON-CHROMATED ALUMINUM DEOXIDIZERS						125
PROBLEM - CHROMATED DEOXIDIZERS ARE THE CHIEF SOURCE OF CHROMIUM COMPOUNDS IN RINSE WATERS WHICH POLLUTE STREAMS, LAKES, ETC.						
SOLUTION - EVALUATE THE MORE PROMISING NON-CHROMATED DEOXIDIZERS TO REPLACE THE CHROMATED TYPE.						
(3398) TITLE - MANUFACTURING PROCESS FOR PAINT PIGMENTS					500	500
PROBLEM - PIGMENT IS PRESENTLY AVAILABLE ONLY AS AN ALKYOL.						
SOLUTION - DEVELOP PIGMENT FOR OTHER TYPES OF PAINT AS AN ALKYOL IS NOT SUITABLE FOR ALL APPLICATIONS.						
(3431) TITLE - AN ECONOMICAL PROCESS FOR ELECTROPLATING ALUMINUM ON STEEL			250	250		
PROBLEM - HYDROGEN EMBRITTLEMENT IS A SERIOUS PROBLEM OF HIGH STRENGTH STEELS.						
SOLUTION - DEVELOP PROCESS ELECTROPLATING ALUMINUM ON STEEL IN WHICH NO HYDROGEN GAS IS PRODUCED.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- COMPONENTS						
(3154) TITLE = POWDER COATINGS				250	250	
PROBLEM = METAL PARTS FABRICATION IS MORE EXPENSIVE THAN POWDER METALLURGY EQUIVALENT PARTS.						
SOLUTION = ANALYZE METAL PARTS FOR POTENTIAL FABRICATION BY POWDER METALLURGY AND FURNISH DATA TO DESIGNERS.						
(3198) TITLE = HIGH STRENGTH GRAPHITE FIBERS			250	200		
PROBLEM = FIBROUS GRAPHITE HAS BEEN PRODUCED ONLY IN LABORATORIES WITH LIMITED BILLET SIZE.						
SOLUTION = SCALE UP THE FIBROUS GRAPHITE PROCESS TO MAKE FULL SCALE NOZZLE COMPONENTS.						
(3288) TITLE = MANUFACTURING TECHNOLOGY FOR DIE CASTING		450	450			
PROBLEM = WEIGHT AND SPACE CONSTRAINTS HAVE RESULTED IN COMPLEX AND HIGH DENSITY CONFIGURATIONS OF METAL PARTS WHICH ARE MACHINED.						
SOLUTION = ESTABLISH AND PROVE-OUT DIE CASTING TECHNIQUES FOR THESE COMPLEX CONFIGURATION.						
(3289) TITLE = PROCESSES FOR INVESTMENT CASTING		158	158	158		
PROBLEM = MANUFACTURING IRREGULAR SHAPES IS TRADITIONALLY DIFFICULT AND CREATES EXPENSIVE SECONDARY OPERATIONS.						
SOLUTION = ESTABLISH CONFIGURATION FAMILIES TO DETERMINE THE EXTENT THAT THIN WALL-MAXIMUM AREAS MAY BE FABRICATED BY INVESTMENT CASTING.						
(3290) TITLE = PRODUCTING CASTING TECHNOLOGY					110	105
PROBLEM = PROCESS CONTROL OF CASTING IS DIFFICULT FROM THE SPORADIC NATURE OF MOLTEN METAL AND ITS SOLIDIFICATION CYCLE.						
SOLUTION = ESTABLISH A HEAT EXCHANGER SYSTEM FOR CONTROL OF THE SOLIDIFICATION PROCESS.						
COMPONENT -- FORMING						
(3208) TITLE = NUMERICALLY CONTROLLED TUBE BENDING						175
PROBLEM = MANUAL METHODS REQUIRE NUMEROUS SET UPS, AND UNIFORMITY OF PRODUCTS ARE ONLY APPROXIMATE.						
SOLUTION = APPLY NUMERICALLY CONTROLLED AUTOMATIC TUBE CUTTING AND BENDING TECHNIQUE TO TUBULAR DETAILS.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT	-- FORMING (CONTINUED)						
(3282)	TITLE - CONFORM EXTRUSION PROCESS		375	375	375		
	PROBLEM - CONSIDERABLE COSTS ARE INCURRED IN TRANSPORTATION, DAMAGE AND LOSS OF SEMI-FINISHED PARTS.						
	SOLUTION - REVIEW MISSILE PARTS AND DETERMINE IF THEY CAN BE PRODUCED BY CONFORM PROCESS.						
(3292)	TITLE - HIGH PRESSURE FORMING				553	553	553
	PROBLEM - FABRICATION OF STRUCTURAL COMPONENTS FREQUENTLY REQUIRES USE OF RELATIVELY HIGH COST MANUFACTURING PROCESSES.						
	SOLUTION - REPLACE COMPONENTS WITH COMPLEX, HEAVY GAGE FORMED PARTS (STAMPINGS).						
(3297)	TITLE - SIZING OF METAL PARTS						123
	PROBLEM - MILLING OF LAUNCHER RAILS REQUIRES EXPENSIVE SPECIAL CUTTERS.						
	SOLUTION - USE A BROACH ON THIS OPERATION WITH AN ADJUSTABLE TOOL HOLDER FOR DIFFERENT DIMENSION RAILS.						
COMPONENT	-- GENERAL						
(3313)	TITLE - SPRAY POWDERED METALS						355
	PROBLEM - PRESENT METHODS OF PAINTING INVOLVE SPRAYING COATS OF SOLVENTS. PAINT LOSS IS CLOSE TO 80 PERCENT.						
	SOLUTION - USE ELECTROSTATIC POWDER COATING TECHNIQUES TO ELIMINATE PAINT LOSSES AND YIELD ACCEPTABLE FINISHES.						
(3380)	TITLE - HEAT SHRINKABLE SILICONE FOR HEAT SHIELDS				400		
	PROBLEM - HEAT SHIELDS FORMED BY FABRIC TAPE WRAPPING AND MACHINING ARE EXPENSIVE PROCESSES.						
	SOLUTION - ESTABLISH SHRINKABLE SILICONE SHIELD AS ALTERATIVE TO TAPE WRAP METHOD ELIMINATING BOTH WRAPPING AND MACHINING.						
COMPONENT	-- JOINING						
(3144)	TITLE - USE OF INFRARED DETECTION FOR AUTO. CONTROL WELD PENETRATION	150	100				
	PROBLEM - THERE IS NO ACCEPTABLE MEANS OF CONTROLING WELD PENETRATION ON COMPONENTS FABRICATED FROM THIN SHEETS OF HIGH STRENGTH STEEL ALLOYS.						
	SOLUTION - ESTABLISH FEEDBACK SYSTEM FOR WELDING.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT	-- JOINING (CONTINUED)						
(3162)	TITLE - WELDING 7000 SERIES ALUMINUM					225	
	PROBLEM - SERIES 7000 ALUMINUM IS VERY DIFFICULT TO WELD BECAUSE OF HIGH LEVEL ALLOYING ELEMENTS.						
	SOLUTION - ESTABLISH WELDING PROCEDURES FOR LIMITING THE HEAT AFFECTED ZONE.						
(3206)	TITLE - INSTALLING BLIND RIVETS					150	150
	PROBLEM - VARIOUS FASTENERS REQUIRE METHODS INVOLVING HANDLING, SETUP, AND MOVING COSTS FOR COMPLETION OF A SINGLE ASSEMBLY.						
	SOLUTION - ESTABLISH NUMERICALLY CONTROLLED MACHINES CAPABLE OF DRILLING, COUNTERSINKING, AND SETTING RIVETS.						
(3209)	TITLE - WELD BOND CHASSIS PANEL ASSEMBLY					250	
	PROBLEM - PRESENT METHODS REQUIRE THOUSANDS OF RIVETS AND MANY HOURS OF DRILLING AND RIVETING.						
	SOLUTION - UTILIZE WELD BONDING TECHNIQUES IN ASSEMBLING LAUNCHER PANELS AND CHASSIS.						
(3212)	TITLE - AUTOMATIC BONDING TECHNIQUE					250	
	PROBLEM - THERE IS A WIDE VARIETY OF ADHESIVE MATERIALS WITH EACH TYPE OF MATERIAL HAVING SPECIFIC PARAMETERS THAT MUST BE ADHERED TO FOR MAXIMUM EFFECTIVENESS.						
	SOLUTION - ESTABLISH A REDUCED NUMBER OF STANDARD ADHESIVES AND INVESTIGATE THE USE OF AUTOMATED EQUIPMENT FOR HANDLING AND DISPENSING ADHESIVE.						
(3285)	TITLE - AUTOMATIC FEED FOR HAND RIVET GUN					97	
	PROBLEM - PRESENT BLIND RIVETER REQUIRES LOST TIME IN HANDLING RIVETS AND LOCATING STEM IN NOSE OF GUN.						
	SOLUTION - ESTABLISH AUTOMATIC FEED SYSTEM TO LOCATE RIVETS IN NOSE OF GUN READY FOR INSTALLATION.						
(3286)	TITLE - AUTOMATIC RIVET SHAVING					151	
	PROBLEM - PRESENT METHOD OF SHAVING RIVETS IS SEVERELY FATIGUING.						
	SOLUTION - ESTABLISH EQUIPMENT TO SHAVE RIVETS USING SAME NUMERICALLY CONTROLLED PROGRAM AS RIVETING MACHINE WITH SIMILAR POSITIONING DEVICE.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT	-- JOINING (CONTINUED)						
(3304)	TITLE = ESTABLISH INERTIAL WELDING		400				
	PROBLEM = CRITICAL HIGH STRENGTH MISSILE AND LAUNCHER FORGING DETAIL REQUIRE LONG LEAD TIMES AND ARE EXPENSIVE.						
	SOLUTION = ADAPT TO AEROSPACE USE MANUFACTURING PROCESS FOR JOINING DETAILS AND PROVIDE HIGH STRENGTH STRUCTUAL COMPONENTS.						
(3306)	TITLE = WELD BONDING METALLIC STRUCTURES				368	368	368
	PROBLEM = PRESENT MANUFACTURING METHODS ARE LABOR INTENSIVE AND REQUIRE MUCH HANDLING AND EQUIPMENT.						
	SOLUTION = ESTABLISH TECHNIQUES OF WELD BONDING.						
(3307)	TITLE = PLASMA ARC WELDING FOR MISSILE STRUCTURES					250	230
	PROBLEM = DISTORTION AND THE HAZE EFFECT ON WELD JOINT INTEGRITY.						
	SOLUTION = OPTIMIZE PROCESS TECHNIQUES NEEDED TO PRODUCE PLASMA ARC WELDS.						
(3308)	TITLE = FUSION WELDING PARAMETERS					200	100
	PROBLEM = WELD PARAMETERS, CHIEFLY WELD SPEED AND PARTS RESTRAINT, HAVE A LARGE INFLUENCE ON CRACKING IN ALUMINUM WELDS.						
	SOLUTION = DETERMINE PROPER TECHNIQUE FOR REVEALING THE STRESSES AND STRAINS AND ESTABLISH AN OPTIMIZED SCHEDULE WITH RESPECT TO WELDING STRESSES.						
(3309)	TITLE = ULTRASONIC WELDING TECHNIQUES					300	265
	PROBLEM = IMPROVEMENT OF THE FABRICATION PROCEDURE OF MISSILE COMPONENTS BY REDUCING COST, MATERIAL REQUIREMENTS AND FABRICATION TIME IS NEEDED.						
	SOLUTION = ADAPT THE ULTRASONIC JOINING PROCESS TO THE FABRICATION OF MISSILE COMPONENTS.						
(3287)	TITLE = PROFILING TECHNIQUES FOR MECHANICAL FASTENERS						425
	PROBLEM = CERTAIN PROBLEMS WITH SURFACE DELAMINATION, CORROSION, AND HIGH FAILURE RATES ENCOUNTERED IN THE FABRICATION OF COMPOSITE STRUCTURES.						
	SOLUTION = ESTABLISH PRODUCTION METHODS FOR COMPOSITE STRUCTURES INCLUDING DRILLING, ROUTING, AND MATERIAL REQUIREMENTS.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT	-- MACHINING						
(3203)	TITLE - TRUE POSITION PROFILE MACHINING					250	250
	PROBLEM - NUMERICALLY CONTROLLED PROFILE MILLING MACHINE COSTS ARE HIGH.						
	SOLUTION - ESTABLISH SYSTEM USING LASER INTERFEROMETER TO VIRTUALLY ELIMINATE SCRAP AND INCREASE MACHINING ACCURACY.						
(3295)	TITLE - MECHANICAL MILLING (CAM)				220	220	
	PROBLEM - MACHINING OPERATIONS ARE MAJOR COST DRIVERS IN MISSILE PRODUCTION.						
	SOLUTION - ANALYZE MACHINING OPERATIONS AND OPTIMIZE, COMPUTERIZE, AND USE NUMERICAL CONTROL ON MILLING OPERATIONS.						
(3296)	TITLE - ELECTROCHEMICAL MILLING			240	250		
	PROBLEM - CONVENTIONAL METAL REMOVAL METHODS ARE SLOW. MACHINE SET UP TIMES ADD SIGNIFICANTLY TO THE COST.						
	SOLUTION - ESTABLISH THE USE OF ELECTROCHEMICAL MILLING PROCESS.						
(3298)	TITLE - AUTOMATIC GANTRY ROUTER					320	
	PROBLEM - PRESENT MANUFACTURING METHODS ARE COSTLY DUE TO MANUAL ROUTING AND EXPENSIVE TOOLING.						
	SOLUTION - ESTABLISH A MULTISPINDLE GANTRY ROUTING MACHINE WITH AUTOMATIC OPERATION.						
(3299)	TITLE - LASER AND MECHANICAL CUTTING			90	97		
	PROBLEM - USE OF HIGH STRENGTH MATERIALS REQUIRE ESTABLISHING PERFORMANCE EFFECTIVE CUTTING METHODS WHILE REDUCING COST.						
	SOLUTION - ESTABLISH TECHNIQUES FOR CUTTING HIGH STRENGTH METALS AND COMPOSITES WITH LASER ENERGY.						
(3300)	TITLE - DRILLING OF METAL PARTS						150
	PROBLEM - WITH INCREASING NEED FOR SPECIALIZED OPERATIONAL SPECIFICATIONS BEING MET BY COMPLEX METALS DICTATES IMPROVEMENT OF MACHINING METHODS.						
	SOLUTION - ESTABLISH AND APPLY ELECTRO-MECHANICAL MACHINING, SPECIFICALLY TO DRILLING OF HIGH STRENGTH ALUMINUM AND TITANIUM ALLOYS.						
(3301)	TITLE - OPTIMIZED MACHINING PROCEDURES		320	320			
	PROBLEM - MISSILE PARTS REQUIRING MACHINING BEAR EXCESSIVE COSTS.						
	SOLUTION - ESTABLISH IN PROCESS QUALITY CONTROL SYSTEM.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- MACHINING (CONTINUED)						
(3302) TITLE - ELECTRO DISCHARGE MACHINING PROCEDURE		320	320	320		
PROBLEM - THERE ARE MANY FABRICATION PROBLEMS DUE TO TIGHT TOLERANCE REQUIREMENTS IN FABRICATING MOUNTING HOLES FOR ARRAY ELEMENTS OF THE RADAR ANTENNA FOR THE PATRIOT SYSTEM.						
SOLUTION - ESTABLISH TOOLING AND TECHNIQUES FOR FORMING HOLES IN FULL-SIZE ARRAY ELEMENT SUPPORT PLATES BY ELECTRO DISCHARGE MACHINING.						
(3374) TITLE - LOW CAST PRECISION CASTING					165	
PROBLEM - PRESENT CASTINGS REQUIRE EXCESSIVE MACHINING WITH LONG SET UP AND LOAD TIMES.						
SOLUTION - INVESTIGATE AND APPLY TECHNIQUES SUCH AS PERMANENT MOLD, CERAMIC MOLD, INVESTMENT CASTING, ETC.						

CATEGORY

PROPULSION SYSTEM

COMPONENT -- MOTOR CASES						
(3197) TITLE - MOTOR CASE DIMENSIONAL STABILITY					115	
PROBLEM - TECHNICAL DIFFICULTIES ASSOCIATED WITH THE L/D RATIO AND WALL THICKNESS OF MOTOR CASES HAVE HAMPERED COST REDUCTION.						
SOLUTION - AN EVALUATION OF MANUFACTURING COST REDUCTION AND DIMENSIONAL REPRODUCIBILITY SHOULD BE PERFORMED.						
(3284) TITLE - PRODUCTION OF MOTOR CASES BY DEEP DRAW PROCESS						160
PROBLEM - CONVENTIONAL METHODS OF MACHINING LAUNCH MOTOR CASES ARE COSTLY.						
SOLUTION - APPLY DEEP DRAW TECHNOLOGY TO LAUNCH MOTOR CASES TO MINIMIZE REQUIRED FINISH MACHINING.						
(3343) TITLE - FABRICATION OF INTEGRATED CASE AND GRAIN		500	500			
PROBLEM - CONSIDERABLE LABOR IS REQUIRED TO MANUFACTURE ASSEMBLE AND FINISH PROPULSION SYSTEMS.						
SOLUTION - DEVELOP STRIP WOUND INTEGRATED CASE AND GRAIN PROCESS TO INTEGRATE MANUFACTURE ASSEMBLY AND FINISHING IN LOW COST AUTOMATIC PRODUCTION LINE.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- MOTOR CASES (CONTINUED)							
(3359)	TITLE - PRODUCTION OF ASBESTOS PHENOLIC CASE ISULATION				175		
	PROBLEM - PRODUCTION CAPACITY PROBLEMS AND SAFETY CRITERIA PREDICT COST INCREASES, AVAILABILITY FOR PRODUCTION IS A CONCERN.						
	SOLUTION - REVIEW AVAILABILE MATERIALS AND EVALUATE FOR MANUFACTURING TECHNIQUE AND PERFORMANCE.						
(3362)	TITLE - DEVELOP LOW COST INSULATION MATERIAL						190
	PROBLEM - PROPULSION SYSTEMS REQUIRE SEPARATE INSULATORS INSTALLED AND BONDED TO CASE WALL PRIOR TO LINER APPLICATION.						
	SOLUTION - DEVELOP PROCESSES FOR APPLYING FOR A FLUID HIGH VISCOSITY MATERIAL TO CHAMBER WALLS TO PROVIDE INSULATION.						
(3384)	TITLE - UMVA FOR COMPOSITE CASES						375
	PROBLEM - COMPOSITE MOTOR CASES BECAUSE OF THEIR LACK OF INSPECTABILITY BY TRADITIONAL METHODS HAVE LOW RELIABILITY.						
	SOLUTION - APPLY ADVANCED SIGNAL PROCESSING TECHNOLOGY USED IN MFEC ANALYSIS TO DETECT DEFECTS.						
(3419)	TITLE - THERMOMECHANICAL METHODS FOR HIGH STRENGTH STL RKT MTR CASES				250	250	
	PROBLEM - HIGH STRENGTH ROCKET MOTOR CASE MANUFACTURING PROCESSES ARE COSTLY.						
	SOLUTION - DEVELOP AUTOMATED PROCEDURES TO PERFORM THERMOMECHANICAL FABRICATION PROCESS FOR HIGH STRENGTH MOTOR CASES AND TEST.						
COMPONENT -- MOTOR COMPONENTS							
(3123)	TITLE - PRODUCTION OF CERAMIC DRONE TURBINE ENGINE					300	325
	PROBLEM - DRONES USED FOR TESTING MISSILE EFFECTIVENESS ARE COSTLY AND ARE DESTROYED BY DIRECT HITS, THE ENGINE MUST BE ECONOMICALLY BUILT.						
	SOLUTION - DEVELOP METHODS FOR CASTING CURING FIRING AND FINISH GRINDING ENGINE COMPONENTS.						
(3135)	TITLE - CERAMIC COMPONENTS				200	150	
	PROBLEM - HIGH TEMPERATURE ENGINE COMPONENTS ARE COSTLY TO MACHINE AND MIGHT BE BUILT CHEAPER IF MOLDED OF CERAMIC.						
	SOLUTION - ESTABLISH PRODUCTION METHODS FOR MOLDING COMPLEX MISSILE COMPONENTS OF HIGH TEMPERATURE CERAMICS.						

		FUNDING ($000)				
		PRIOR	80	81	82	83	84
COMPONENT -- MOTOR COMPONENTS (CONTINUED)							
(3174)	TITLE - ROCKET MOTOR THRUSTER UNITS				350	250	
	PROBLEM - PRODUCTION OF THRUSTER UNITS BY CURRENT AUTOMATED METHODS IS PROHIBITED BY SAFETY STANDARDS, FABRICATION AND ASSEMBLY BY HAND LIMIT QUANTITIES PRODUCED.						
	SOLUTION - DEVELOP SAFE AUTOMATED PROCEDURES TO LOWER COST AND INCREASE YIELD FOR PRODUCTION OF THRUSTER UNITS.						
(3393)	TITLE - LOW COST METHODS OF INCORPORATING END CLOSURES						225
	PROBLEM - ADAPTING ROCKET MOTOR DESIGN TO UTILIZE COMMERCIAL MILL PRODUCTS IS MORE EXPENSIVE BECAUSE OF THE PROBLEM ENCOUNTERED IN INCORPORATING HEAD CLOSURES.						
	SOLUTION - DEVELOP LOW COST METHOD OF INCORPORATING HEAD CLOSURES TO OBTAIN BENEFITS OF COMMERCIAL PRODUCTS.						
(3425)	TITLE - IMPROVED PRODUCTION MENTODS FOR TARGETS					315	400
	PROBLEM - ENGINES FOR TARGETS ARE FAR TOO EXPENSIVE AS A RESULT OF THE EXPENSIVE PROCESS OF FABRICATION.						
	SOLUTION - DEVELOP METHODS TO REDUCE THE NEED FOR EXPENSIVE METAL REMOVAL PROCESS OF FABRICATION.						
COMPONENT -- NOZZLES							
(3341)	TITLE - NOZZLELESS NOZZLE FABRICATION PROCEDURES					260	260
	PROBLEM - BECAUSE OF THE LARGE QUANTITIES TO BE PURCHASED, PROPULSION FOR THE GBS AND VSTT SYSTEMS MUST EMPHASIZE LOW COST.						
	SOLUTION - DEVELOP PROCESS TO DELETE MOTOR ASSEMBLY AND USE NOZZLELESS MOTORS.						
(3361)	TITLE - MANUFACTURE TECHNIQUE FOR CASTABLE ABLATIVES.						285
	PROBLEM - CURRENT ABLATIVE LINERS FOR THRUST CHAMBERS REQUIRE HI-COST MATERIAL AND LENGTHY FABRICATION AND INSPECTION TIME.						
	SOLUTION - INSUFFICIENT DATA EXISTS FOR PRESENT USE OF CASTABLE ABLATIVE MATERIAL.						
(3395)	TITLE - PROCESSING OF ASBESTOS FIBERS					800	600
	PROBLEM - FOREIGN EQUIPMENT FOR PRODUCTION AVAILABLE FROM ONLY ONE DOMESTIC SOURCE.						
	SOLUTION - DEVELOP DOMESTIC PRODUCTION EQUIPMENT TO ELIMINATE DEPENDENCE.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- NOZZLES (CONTINUED)						
(3418) TITLE - ONE-PIECE INJECTION MOLDED NOZZLES					200	
PROBLEM - TIME REQUIRED TO PERFORM THE ONE-AT-A-TIME MOLDING OPERATION SIGNIFICANTLY ADDS TO COST AS WELL AS REDUCES PRODUCTION RATE.						
SOLUTION - APPLY INJECTION OR TRANSFER MOLDING OF REINFORCED THERMOSET PLASTICS TO MOLDING OF SINGLE OR MULTIPLE CAVITIES.						
COMPONENT -- PROPELLANTS						
(3137) TITLE - PRODUCTION OF MOAN PROPELLANT IN QUANTITY					100	
PROBLEM - THE PRESENT METHOD OF MANUFACTURE IS TOO COSTLY.						
SOLUTION - PROVIDE MASS PRODUCTION TECHNIQUES FOR VOLUME PRODUCTION OF THIS PROPELLANT.						
(3317) TITLE - CASTING OF PROPELLANTS			138			
PROBLEM - THE END BURNING SUSTAINER GRAIN FOR STINGER IS PRESENTLY CAST AND CURED, MACHINED, INHIBITED WITH BOOT WHICH IS BONDED TO EXTERIOR OF GRAIN.						
SOLUTION - DEVELOP COST-IN-BOOT PROCESS TO CAST GRAIN DIRECTLY INTO INHIBITOR BOOT.						
(3318) TITLE - IGNITER MANUFACTURING AND ASSEMBLY						110
PROBLEM - FABRICATION OF IGNITERS REQUIRES, (1) SEPERATE COMBUSTION CHAMBER AND PROPELLANT CHARGE (2) COMPLEX MANUFACTURING PROCESSES AND TOOLING.						
SOLUTION - EXAMINE PROPELLANT GRAIN FABRICATION METHODS TO FORM REQUIRED CONFIGURATION, AND INCORPORATE STAR GRAIN CONFIGURATION WHICH SERVES AS PYROGEN SYSTEM TO IGNITE MAIN CHARGE.						
(3319) TITLE - ENGINEERING FOR LOSS PREVENTION-SAFETY					265	
PROBLEM - PREVIOUS METHODS OF ANALYZING HAZARDS HAVE BEEN QUALITATIVE BASED ON EXPERIENCE, AND THE RESULTS CAN BE UNCERTAIN, DANGEROUS, AND COSTLY.						
SOLUTION - PERFORM PRELIMINARY HAZARD, ENGINEERING, MATERIAL RESPONSE, AND RISK ANALYSIS WHICH WILL RESULT IN AN EFFICIENT AND COST EFFECTIVE APPROACH TO SYSTEM DESIGN.						
(3320) TITLE - NON-DESTRUCTIVE TESTING (NDT) OF PROPELLANTS			165			
PROBLEM - THE FULL COMPLEMENT ON NDT TEST BY CURRENT METHODS IS TOO EXPENSIVE TO BE USED.						
SOLUTION - DEVELOP A COMPUTERIZED SYSTEM FOR THE ASSESSMENT OF NDT DATA.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- PROPELLANTS (CONTINUED)							
(3321)	TITLE - QUICK CURE PROPELLANTS PROCESSING				604	604	604
	PROBLEM - TEMPERATURE TIME CURING IS EXPENSIVE, TIME CONSUMING AND IF NOT RIGIDLY CONTROLLED INTRODUCES PROPERTY VARIATIONS.						
	SOLUTION - INVESTIGATE AND SHOW FEASIBILITY OF CURING PROPELLANT BY MEANS OTHER THAN A TIME-TEMPERATURE ENVIRONMENT.						

CATEGORY

TEST EQUIPMENT

COMPONENT -- ELECTRICAL TEST EQUIPMENT							
(3115)	TITLE - ENGINEERING FOR CALIBRATION EQUIPMENT	700	747	787	830	880	932
	PROBLEM - MEASUREMENT SCIENCES OR METROLOGY MUST BE CONTINUALLY ADVANCED IN RELEVANT TECHNOLOGY AREAS TO KEEP PACE WITH MANY ARMY PROGRAMS.						
	SOLUTION - ADVANCEMENTS MUST BE MADE BY DERIVING NEW TYPES OF STANDARDS.						
(3234)	TITLE - CONTINUOUS MONITORING SYSTEM (CAM)					340	
	PROBLEM - CONTINUOUS MONITORING OF A MANUFACTURING PROCESS GENERATES A VAST AMOUNT OF DATA.						
	SOLUTION - ESTABLISH USE OF HIGH DENSITY RECORDER FOR CONTINUOUS MONITOR SYSTEM.						
(3240)	TITLE - TESTING ELECTRICAL PARTS AT TEMPERATURE EXTREMES			225			
	PROBLEM - A COST EFFECTIVE HIGH RATE ENVIRONMENTAL TEST SYSTEM FOR ELECTRONIC COMPONENTS DOES NOT EXIST.						
	SOLUTION - ESTABLISH ECONOMICAL TEST SYSTEM TO OPERATE UNDER HIGH RATE CONDITIONS AND IS CAPABLE OF TESTING ELECTRONIC COMPONENTS AT TEMPERATURE EXTREMES.						
(3243)	TITLE - ANALOG FAULT ISOLATION OF PRINTED CIRCUIT BOARDS		425	425			
	PROBLEM - MANUAL FAULT ISOLATION AND TROUBLE SHOOTING METHODS ARE SLOW.						
	SOLUTION - ESTABLISH AUTOMATIC FAULT ISOLATION AND TROUBLE SHOOTING METHODS FOR ANALOG CIRCUIT ASSEMBLIES.						
(3245)	TITLE - ECONOMICAL AUTOMATED ELECTRONICS ALIGNMENT AND TEST			375	375		
	PROBLEM - ELECTRONICS ALIGNMENT AND TEST EQUIPMENT DEVELOPMENT REPRESENT A LARGE COST.						
	SOLUTION - DEVELOP AUTOMATED ALIGNMENT AND TEST EQUIPMENT GENERALLY APPLICABLE TO LASER SEEKER SYSTEM ELECTRONICS.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- ELECTRICAL TEST EQUIPMENT (CONTINUED)						
(3247) TITLE - TEST ADAPTER FOR MULTILAYER PRINTED CIRCUIT BOARDS					85	
PROBLEM - TESTING PCB PRIOR TO ASSEMBLY REQUIRES DESIGN AND FABRICATION OF A SPECIAL TEST ADAPTER FOR EACH BOARD CONFIGURATION.						
SOLUTION - FABRICATE A UNIVERSAL ADAPTER THAT COULD BE ADAPTED TO FIT ANY BOARD CONFIGURATION WITH MINIMUM TIME AND EFFORT.						
(3248) TITLE - DEFECT PREVENTION THROUGH ADVANCE INSPECTION TECHNIQUES				175	175	
PROBLEM - THE NEED FOR DESIGN TO COST COUPLED WITH HIGH RELIABILITY AND LOW FAILURE RATE WILL INCREASE END ITEM COST.						
SOLUTION - ESTABLISH DEFECT PREVENTION INSPECTION PROCEDURES USING LATEST QUANTITATIVE INVESTIGATIVE TECHNIQUES.						
(3250) TITLE - EVALUATION OF CABLE TESTING				43		
PROBLEM - THE LIMITS OF TESTING AND THE RESULTS OF OVERTESTING NEED TO BE DELINEATED.						
SOLUTION - SUMMARIZE CURRENT STATE OF THE ART IN CABLE TESTING AND RECOMMEND IMPROVED METHODS.						
(3251) TITLE - HIGH TEMPERATURE OPERATING TESTS FOR MICROCIRCUITS		490	490			
PROBLEM - LIFE TESTS ON SEMICONDUCTOR DEVICES ARE IMPRACTICAL DUE TO THE HUNDREDS OF THOUSANDS OF TEST HOURS REQUIRED.						
SOLUTION - IMPLEMENT HIGH TEMPERATURE OPERATING TESTS AS EARLY IN THE MANUFACTURING CYCLE AS FEASIBLE.						
(3322) TITLE - INFRARED ELEMENT TESTING		125	125	125		
PROBLEM - IR SYSTEM OPTICAL ELEMENTS ARE SPECIFIED IN TERMS OF MIL-O-13830 WHICH REQUIRES SUBJECTIVE JUDGEMENT.						
SOLUTION - ESTABLISH A SUPPLEMENT TO MIL-O-13830, OPTICAL DESIGN GUIDANCE FOR FUNCTION TESTING, STANDARD TESTS AND EQUIPMENT.						
(3340) TITLE - ELECTROMAGNETIC PULSE SHIELDING TEST TECHNIQUES						175
PROBLEM - MEETING EMP HARDNESS REQUIREMENTS INVOLVES EXTENSIVE TESTING AND EVALUATION AT AN EMP TEST SITE.						
SOLUTION - ESTABLISH FIELD IMMERSION OR CURRENT INJECTION TECHNIQUES TO EVALUATE EMP SHIELDING EFFECTIVENESSS OF COMPONENTS.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- ELECTRICAL TEST EQUIPMENT (CONTINUED)						
(3342) TITLE - STANDARD TEST EQUIPMENT SOFTWARE			190	200		
PROBLEM - TEST PROGRAMS ARE UNIQUE TO THE TESTED ITEMS AND THE PREPARATION IS A SIGNIFICANT NON RECURRING COST.						
SOLUTION - PROVIDE HIGH QUALITY SUPPORT AT LOWER COST, BY PERFORMING TESTS UNDER STEP BY STEP CONTROL OF A PREPARED PROGRAM.						
(3344) TITLE - INCORPORATE MICROPROCESSOR IN AUTOMATIC TEST EQUIPMENT			310	300		
PROBLEM - IMPLEMENTING TEST EQUIPMENT FOR MISSILE PRODUCTION HAS INDICATED A NEED FOR COST EFFECTIVE AUTOMATION.						
SOLUTION - ESTABLISH A TEST ORIENTED, MICROPROCESSOR, MODULAR CONTROLLER WHICH CAN BE INTEGRATED INTO THE TEST SYSTEM.						
(3371) TITLE - SPIRAPHASED ARRAY MANUFACTURING TECHNOLOGY					1000	1000
PROBLEM - PHASED ARRAY ANTENNA REQUIRE THOUSANDS OF ELEMENTS WHICH ARE HIGH IN COST.						
SOLUTION - FABRICATE SPIRAPHASE PHASED ARRAY ANTENNA TO REDUCE OVERALL COST.						
(3409) TITLE - AUTOMATIC HANDLING AND TESTING OF CHIPS						150
PROBLEM - MANUAL HANDLING AND TESTING OF MICROELECTRONIC CHIP COMPONENTS RESULTS IN LARGE NUMBERS OF DAMAGED COMPONENTS.						
SOLUTION - ESTABLISH COST EFFECTIVE MANUFACTURING METHOD FOR AUTOMATIC HANDLING AND TESTING HYBRID MICROELECTRONIC CHIPS.						
COMPONENT -- GENERAL						
(3310) TITLE - WELD TESTING PROCEDURES					225	220
PROBLEM - CURRENT INSPECTION PRACTICES USUALLY INVOLVE NDE AFTER ALL OF THE WELDS ARE COMPLETED, REPAIRING DEFECT IS COSTLY AND TIME CONSUMING.						
SOLUTION - ESTABLISH ACOUSTIC EMISSION MONITORING AND EXPANSION MONITORING OF RESISTANCE WELDS.						
(3327) TITLE - RUBBER O-RING STORAGE AND TESTING					240	240
PROBLEM - HYDRAULIC AND PNEUMATIC SYSTEM LEAKS CONSTITUTE A LARGE PORTION OF FAILURES AFTER MISSILE IS ASSEMBLED AND PREPARED FOR FLIGHT.						
SOLUTION - IMPLEMENT IN HOUSE CONTROLS TO ENSURE 100 PERCENT INSPECTION OF ALL SEALS.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT	-- GENERAL (CONTINUED)						
(3330)	TITLE - TEST PROCEDURE FOR COMPOSITE MATERIALS			270	270		
	PROBLEM - LACK OF PROPER ACCEPTANCE TESTS IS A MAJOR BARRIER TO THE USE OF COMPOSITE MATERIALS.						
	SOLUTION - ESTABLISH CRITERIA, EVALUATED BY NONDESTRUCTIVE INSPECTION METHODS AND TESTED TO DESTRUCTION.						
(3345)	TITLE - DEVELOP DYNAMIC BALANCING TECHNIQUE						275
	PROBLEM - THE PRESENT METHOD OF BALANCING IN TWO PLANES IS VERY EXPENSIVE AND TIME CONSUMING.						
	SOLUTION - ESTABLISH AN AUTOMATED, CONTAMINATION FREE, AND COST EFFECTIVE LASER MATERIAL REMOVAL BALANCING SYSTEM.						
(3389)	TITLE - NON DESTRUCTIVE TEST IN OPERA EVALUATION OF SPOT WELDS						300
	PROBLEM - NON INSPECTABILITY OF SPOT WELDS DECREASES RELIABILITY.						
	SOLUTION - DEVELOP USE OF WELD SIZE AS RELATED TO EXPANSION IN A NON DESTRUCTIVE TEST.						
(3394)	TITLE - NON DESTRUCTIVE TEST OF LINE PIPE ROCKET MOTORS		254				
	PROBLEM - ROCKETS ARE NOT COST COMPETITIVE TO TUBE ARTILLERY IN SUCH APPLICATIONS AS AREA FIRE SATURATION.						
	SOLUTION - OPTIMIZE MILL FABRICATION PROCEDURES FOR API LINE PIPE.						
(3403)	TITLE - HIGH SPEED HANDLING EQUIPMENT FOR AUTOMATIC TUBE INSPECTION					350	
	PROBLEM - PRODUCTION PROCESS TIME IS INCREASED BECAUSE MANUAL LOADING-UNLOADING OF EQUIPMENT IS REQUIRED.						
	SOLUTION - FABRICATE AUTOMATIC LOADING-UNLOADING EQUIPMENT TO HANDLE FIVE FOOT LENGTHS OF MOTOR CASE TUBES.						
COMPONENT	-- HYDRAULIC						
(3246)	TITLE - COMPONENT TEST SYSTEM, ELECTROHYDRAULIC (CAM)					250	
	PROBLEM - CUMULATIVE COSTS OF COMPREHENSIVE TESTING, DATA REDUCTION, AND QUALITY ASSURANCE VERIFICATION REPRESENT A SIGNIFICANT PORTION OF THE TOTAL UNIT COST.						
	SOLUTION - ESTABLISH A COMPUTER CONTROLLED TEST SYSTEM TO REDUCE COST OF PRE-FINAL, FINAL TESTS AND DATA REDUCTION.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- X-RAY AND N-RAY						
(3241) TITLE - AUTOMATIC X-RAY READER TEST EQUIPMENT FOR 3D X-RAYS		350	560			
PROBLEM - X-RAY IS LIMITED TO A TWO DIMENSIONAL FORMAT AND IS DEPENDENT ON THE TRAINING AND JUDGEMENT OF THE INSPECTOR.						
SOLUTION - AUTOMATE THE ANALYSIS OF X-RAY RESULTS, AND PROVIDE DEPTH PERSPECTIVE BY PARALLELS OR HOLOGRAPHIC TECHNIQUES.						
(3244) TITLE - NEUTRON BOMBARDMENT NONDESTRUCTIVE TESTING		277				
PROBLEM - ORGANIC CONTAMINATION DOES NOT LEND ITSELF TO X-RAY INSPECTION.						
SOLUTION - ESTABLISH TESTING PROCEDURE FOR NONORGANIC COMPONENTS WITH ORGANIC CONTAMINATION.						



MOBILITY EQUIPMENT R&D COMMAND
(MERADCOM)

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Category	Page
Bridging	199
Camouflage	199
Field Fortifications	200
General	201
Land Mines	203
Power Sources	204

US ARMY MOBILITY EQUIPMENT

RESEARCH AND DEVELOPMENT COMMAND

(MERADCOM)

MERADCOM, located at Fort Belvoir, VA, is conducting a widely diversified program to improve the Army's combat readiness in four major areas: barrier and counterbarrier systems; countersurveillance systems; energy and environmental systems; and supply distribution and construction equipment systems.

Activities in these areas involve research, development, engineering, and initial production buys in mine detection; mine neutralization; camouflage; barriers; tactical and physical security sensors; fuels and lubricants; fuels handling; tactical bridging; construction equipment; marine and rail transportation; electrical power generation and distribution; tactical environmental control; materials handling; and waste water management. The command also does engineering on topographic systems.

Practically speaking, all procurements for items under MERADCOM's cognizance (and TSARCOM's, after the item transition from R&D to the readiness side) are placed with the private sector. In light of the privately owned production base, a lot of MERADCOM's MM&T efforts are accomplished by the private sector.

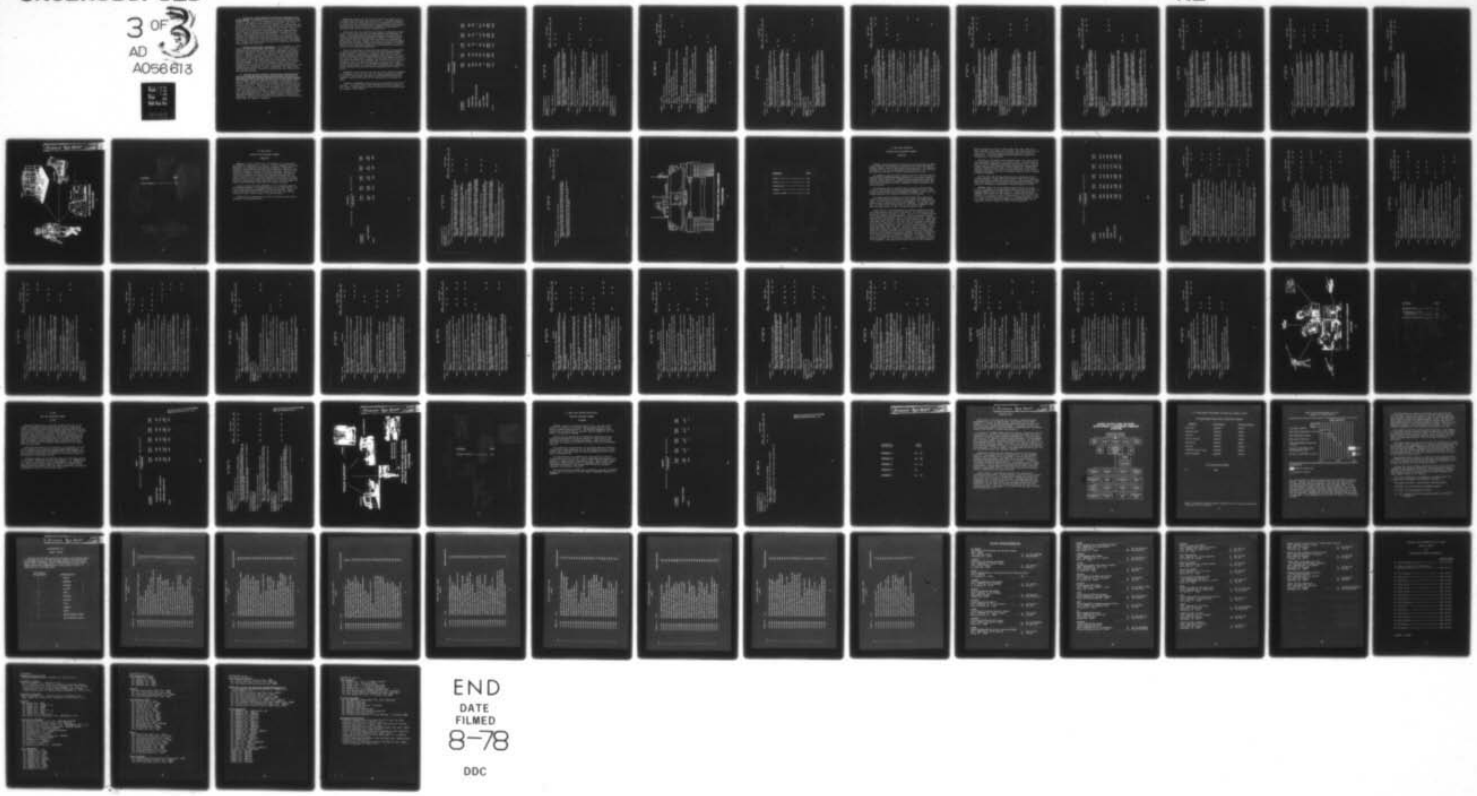
To attack the overall problem of increasing system acquisition costs, MERADCOM has identified major problem areas where improved manufacturing technology is needed. Finding solutions to these problems will enhance MERADCOM's goal of providing cost effective mission items. Major problem areas confronting MERADCOM include:

a. Obtaining Fuel Stacks that Exhibit Required Performance and Life with Minimum Manufacturing and Noble Metal Catalyst Cost. Manufacturing methods and technology have been developed for producing fuel cells up to 0.4 ft^2 in area with catalyst loadings of nominally two grams per square foot of electrode area. Extending this technology to larger area fuel cells, (1 ft^2 or more) and incorporating Kocite^R catalyst technology is veiwed as an important step towards satisfying the Army requirements for Tactical Utility Power Plants. The Kocite^R catalyst is a recent development funded by MERADCOM and the US Department of Energy. Kocite^R has the potential for reducing noble metal catalyst loadings by 85 percent. The primary solution of the problem lies in developing efficient manufacturing methods and technology for all fuel cell components that will enable large area cell stacks to be built at a lower cost per KW. A major thrust of this Command is to obtain high quality fuel cell stacks at a reasonable price. Projects in the five year plan attacking this area are 3716 and 3733.

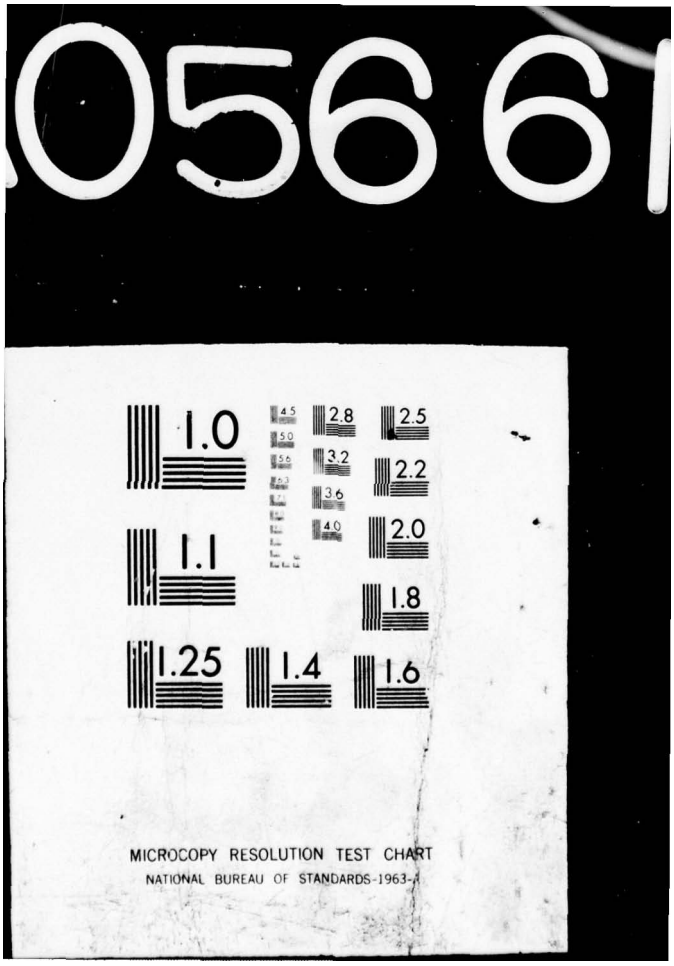
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MANUFACTURING METHODS AND TECHNOLOGY FIVE YEAR PLAN FY 80-84 AN--ETC(U)
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MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

b. Limitations of High Temperature Super Alloy Components of Gas Turbine Engines. A limiting factor in the life and performance of gas turbines is the ability of the components to withstand the abrasive and corrosive environment at peak operating temperatures. Super alloy metals utilize strategic materials, are limited to 1750°F operating temperature and are subject to catastrophic failure when subjected to high dust concentrations or corrosive atmosphere such as salt. Thermal efficiency can be improved by increasing peak cycle temperature currently limited by maximum operating temperature of materials of the burner, turbine inlet nozzle and turbine wheel. The most critical component for damage due to wear and corrosion is the turbine nozzle. Materials are needed which have increased operating temperature limits and improved resistance to corrosion and abrasive wear at a reasonable cost. Projects in the Five Year Plan which are addressing this problem area are 3608, 3717, and 3719.

c. Military Quality Power Conditioners. The development of lightweight, military quality power conditioners is, to a large extent, dependent upon the availability of reliable, lightweight, and compact electronic components. The power stages of these power conditioners employ an important class of these components - power semiconducting devices. Currently available versions of these power semiconducting devices in the required ratings often are too heavy and bulky to be conveniently used in the power stages of military power conditioners under development. Also, in some instances, reliability of currently available devices is not adequate for military power conditioners. Recognizing the limitations of today's power semiconducting devices, the command has been developing reliable, lightweight, and compact power semiconducting devices. Projects in the Five Year Plan attacking this area are 3605 and 3710.

d. Providing Military Bridges at Moderate Cost, Which Have High Mobility and High Emplacement Speeds While Retaining the Ability to Withstand the Abusive Treatment Inherent in the Battlefield Environment. High strength, low density composite materials in both organic and/or metallic matrix appear to offer great promise for solutions to this problem. Increased production of high strength fiber materials has reduced materials cost. Techniques for the fabrication and installation of these materials into usable bridge components is the area in which large cost reductions are possible. The reduction of presently used labor intensive methods, through the application of automated processes, will reduce component costs. Initial design in these materials offer improved performance due to the flexibility possible in material configuration. Projects in the Five Year Plan directed at this problem are listed under the category - Bridging.

MERADCOM's efforts over the next five years could result in new technology that will impact the private sector. Successful completion of project 3605 will bring down the prize of transcalent transistors. By lowering the cost of these devices, potential users in both the military and private sector will be able to discover the advantages of transcalent devices for a variety of applications.

Hydrocarbon fuel cell electric power plants are beginning to penetrate the civilian sector under the sponsorship of the Department of Energy. These power plants utilize fuel conditioners based upon the technology developed by the petrochemical industry. Planned efforts under project 3764 will establish more economical fuel conditioning designs using the latest ceramic, heat pipe, and catalyst technologies. The resultant conditioner subsystem, which will be cheaper to produce, smaller in size, and have a longer life, will probably be adopted and utilized by the civilian energy market.

Fuel cell technology in other areas have potential for utilization by private industry. Projects 3733 and 3716 will establish manufacturing methods for production of economical large fuel cell stacks having a minimum of noble subsystem designs for all size indirect methanol fuel cell power plants. Indications are that methanol is one of the leading alternate fuel contenders, and that fuel cell utilization of methanol is one of the more efficient ways to use this fuel. Since it is apparent that fuel cells are beginning to penetrate the civilian electric power market, it is likely that Army methanol fuel conditioner design resulting from this study will be utilized by the civilian sector.

MERADCOM's projections over the next five years include 39 projects at a estimated cost of $21.4M. Money is planned utilizing the Other Procurement, Other Support Equipment, PA 5397 Appropriation with one exception, where the Aircraft, PA 1497 Appropriation is planned for $296K.

A summary of MERADCOM's planned projects is provided on the following chart. The major problem areas mentioned previously relating to fuel cells, turbine engines, and power conditioners are addressed under the category - Power Sources.

MERADCOM

COMMAND FUNDING SUMMARY
(THOUSANDS)

CATEGORY	FY80	FY81	FY82	FY83	FY84
BRIDGING	1231	329	250	300	250
CAMOUFLAGE	225	150	85	110	125
FIELD FORTIFICATIONS	748	662	0	0	0
GENERAL	456	520	484	1143	2014
LAND MINES	0	200	700	650	400
POWER SOURCES	1985	2834	2598	1735	1250
TOTAL	4645	4695	4117	3938	4039

CATEGORY

BRIDGING

		PRIOR	FUNDING ($000) 80	81	82	83	84
COMPONENT == REINFORCEMENT							
(3551)	TITLE = DEV PDN CAPABILITY FOR MFG THIN FILM COMPOS REINFORCEMENTS	252	471	120			
	PROBLEM = HIGH MODULUS REINFORCEMENTS FOR COMPOSITES HAVE POOR IMPACT STRENGTH DUE TO THE FACT THAT THEIR TENSILE STRENGTH HAVE NOT INCREASED COMMENSURATELY WITH THEIR MODULUS.						
	SOLUTION = DEVELOP A FILM REINFORCEMENT MADE BY ELECTRON BEAM DEPOSITION WHICH IS KNOWN TO DEPOSIT ULTRA HIGH STRENGTH FILMS, BY DEPOSITING ALTERNATE LAYERS OF TWO MATERIALS OF DIFFERENT STRUCTURE A STABLE FILM OF HIGH STRENGTH WILL BE FORMED.						
(3592)	TITLE = IMPROVED GRAPHITE REINFORCEMENT	471	285	209			
	PROBLEM = LOW IMPACT STRENGTH OF GRAPHITE FIBERS IS DUE TO THE COMBINATION OF THEIR HIGH MODULUS AND AVERAGE TENSILE STRENGTH.						
	SOLUTION = DEVFLOP A GRAPHITE FIBER WITH A VERY HIGH TENSILE STRENGTH.						
COMPONENT == STRUCTURAL MEMBERS							
(3746)	TITLE = METAL MATRIX COMPOSITE MATERIAL				250	300	250
	PROBLEM = CONNECTION OF COMPOSITE MATERIAL IS DIFFICULT IN LINEAR PLAINER COMPONENTS. MECHANICAL CONNECTORS ARE EXPENSIVE IN BOTH DESIGN AND MATERIAL.						
	SOLUTION = IMBED HIGH MODULUS FIBER MATERIALIN DUCTILE METAL WHICH CAN BE WORKED AND CONNECTED WITH STANDARD METHODS.						
(3756)	TITLE = COMPOSITE MATERIAL GIRDER MODULES FOR BRIDGES	300	297				
	PROBLEM = REDUCE WEIGHT AND COST OF BRIDGE WHILE INCREASING FATIGUE LIFE. INCREASE BRIDGE SPAN AND LOAD CLASS WITHOUT A WEIGHT INCREASE.						
	SOLUTION = SELECTIVELY PLACE COMPOSITE MATERIAL TO ACHIEVE BALANCE AND COMPATIBLE STIFFNESS.						
(3761)	TITLE = DIMPLE PLATE		178				
	PROBLEM = HOW TO STABILIZE THIN SHEETS OF ALUMINUM TO CARRY HIGH SHEAR STRESSES WITHOUT BUCKLING.						
	SOLUTION = CONTROLLED SPACING OF DRAWN DIMPLES OF PLATES AND SPOT WELDED TO FORM A SANDWICH PLATE.						

CATEGORY

CAMOUFLAGE

		PRIOR	FUNDING (8000) 80	81	82	83	84
COMPONENT -- COVERS							
(3721)	TITLE - WOVEN RADAR CLOTH		150	150			
	PROBLEM - RADAR CHARACTERISTICS DEGRADE WITH FIELD USE.						
	SOLUTION - ALTERNATE METAL FIBERS WITH SYNTHETIC FILAMENTS DURING WEAVING.						
(3725)	TITLE - GLARE COVERS FOR HELICOPTERS						125
	PROBLEM - HELICOPTERS PRODUCE EXCESSIVE GLARE.						
	SOLUTION - DEVELOP REUSABLE COVERS FOR REDUCING GLARE FROM HELICOPTERS.						
COMPONENT -- GENERAL							
(3724)	TITLE - SHAPE DISRUPTERS				85	110	
	PROBLEM - MASS PRODUCTION PROCEDURES FOR UNIVERSAL DISRUPTERS.						
	SOLUTION - IDENTIFY MANUFACTURING PROCESSES WHICH CAN BE USED TO MASS PRODUCE DISRUPTERS.						
(3726)	TITLE - CAMOUFLAGE SYSTEM FOR M109A1 HOWITZER		75				
	PROBLEM - THE FORCE OF THE BACK-BLAST DAMAGES THE CAMOUFLAGE SCREEN.						
	SOLUTION - DEVELOP A SCREEN SUPPORT SYSTEM TO REDUCE CAMOUFLAGE SCREEN DAMAGE.						

CATEGORY

FIELD FORTIFICATIONS

COMPONENT -- FUEL TANKS							
(3708)	TITLE - COATED FABRIC COLLAPSIBLE FUEL TANK-CIRCULAR SEAMLESS WEAVIN	97	75				
	PROBLEM - TO IMPROVE THE RELIABILITY AND ENDURANCE OF FABRIC PILLOW TANKS BY ELIMINATING THE LONGITUDINAL SEAMS WHICH ARE VULCANIZED TOGETHER. THESE SEAMS ARE THE MOST LIKELY CAUSE OF CATASTROPHIC FAILURE.						
	SOLUTION - DEVELOP A MANUFACTURING METHOD OF WEAVING A CIRCULAR SEAMLESS TUBE.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- HOSES						
(3704) TITLE - LIGHT WEIGHT POTABLE WATER HOSE		280	512			
PROBLEM - CURRENT FIELD POTABLE WATER HOSE IS SUBJECT TO ABRASION, AND DETERIORATION WHEN MOISTURE IS PRESENT DUE TO MOLD AND MILDEW. THIS CAUSES UNNECESSARY COST AND EXCESS CARE AND HANDLING.						
SOLUTION - DEVELOP MATERIALS AND MANUFACTURING TECHNOLOGY NECESSARY TO PRODUCE LIGHTWEIGHT COLLAPSIBLE SYNTHETIC POTABLE WATER HOSE.						
(3709) TITLE - CONTINUOUS LENGTH FUEL HOSE	245	293				
PROBLEM - A LARGE PORTION OF THE COST OF CONTINUOUS LENGTH FUEL HOSE IS ATTRIBUTED TO SPLICING THE HOSE EVERY 50 FEET, 100 GRAINS SIZE, PYROPHORIC MATERIAL MUST BE BONDED TO STEEL FRAGMENTS AND PRODUCED IN GREAT NUMBERS FOR THE SYS.						
SOLUTION - IMPART A PARTIAL CORE ON THE EXTRUDED TUBE WITH A RF OR OTHER MECHANISM TO IMPROVE THE GREEN STRENGTH OF THE TUBE SO IT MAY BE HANDLED AND PROCESSED WITHOUT BREAKING.						
COMPONENT -- OTHER						
(3769) TITLE - LIGHTWEIGHT METAL PROTECTIVE STRUCTURES		100	150			
PROBLEM - LOGISTICAL BURDEN, ERECTION TIME AND COSTS ARE TOO HIGH.						
SOLUTION - OPTIMIZE PHYSICAL CHARACTERISTICS THUS REDUCING LOGISTICS THRU UNIQUE DESIGN EFFORTS.						

CATEGORY
GENERAL

COMPONENT -- OTHER						
(3718) TITLE - DETERMINE PRODUCTION METHODS -AIR CYCLE COMPRESSOR- EXPANDER					350	350
PROBLEM - A TECHNICAL INNOVATION HAS PRODUCED AN AIR CYCLE COMPRESSOR-EXPANDER, BUT THE FABRICATION TECHNIQUES AND MATERIALS OF CONSTRUCTION USED TO PRODUCE PROOF OF CONCEPT HARDWARE WILL BE UNECONOMICAL FOR FULL SCALE PRODUCTION.						
SOLUTION - CHANGE DESIGN TO CONFORM TO CONVENTIONAL MANUFACTURING METHODS OR DEVELOP NEW METHODS AS REQUIRED TO MACHINE ELLIPTICAL CAM TRACKS INTO END PLATES OF COMPRESSOR-EXPANDER.						

		FUNDING ($000)				
		PRIOR	80	81	82	83	84
COMPONENT -- OTHER (CONTINUED)							
(3720)	TITLE - IMPROVED MANUFACTURING METHODS FOR TECS-18 CONTROL ENCLOSURE					225	225
	PROBLEM - THE PRESENT ELECTRONIC CONTROL SYSTEMS FOR THE TECS-18 PROGRAM HAVE HEAT EXCHANGERS/ENCLOSURES WHICH ARE EXPENSIVE TO MANUFACTURE. THE PRESENT PACKAGING METHODS AND MACHINING PROCESSES ARE COSTLY.						
	SOLUTION - CHANGE PACKAGING TECHNIQUES TO USE STANDARD MATERIAL SIZES AND LESS EXPENSIVE MACHINING AND OTHER COSTLY MANUFACTURING METHODS.						
(3730)	TITLE - SMALL SIZED PARTICLES OF TNT			250	200	100	100
	PROBLEM - TO DEVELOP MANUFACTURING METHODS FOR MASS PRODUCTION OF VERY SMALL PRECISION SIZED PARTICLES OF EXPLOSIVES (I.E., TNT, RDX, PETN, ETC.).						
	SOLUTION - TO IDENTIFY AND DEFINE THE REQUIRED MANUFACTURING TECHNIQUES AND TOOLING TO PERMIT LOW COST PRODUCTION OF LARGE QUANTITIES OF PRECISION SMALL SIZED PARTICLES OF EXPLOSIVES.						
(3747)	TITLE - LIGHTER, AIR CUSHION VEHICLE SKIRT AND FINGER COMPONENTS		176	120			
	PROBLEM - FABRICATION OF SKIRT, FINGERS AND CONES IS CURRENTLY HIGHLY LABOR INTENSIVE, LEADING TO HIGH COMPONENT REPLACEMENT COSTS.						
	SOLUTION - DEVELOP MECHANIZED/AUTOMATED FABRICATION TECHNIQUES TO REDUCE MANUFACTURING COSTS.						
(3762)	TITLE - WASTE HEAT ENVIRONMENTAL CONTROL UNIT						275
	PROBLEM - MOBILE ABSORPTION ECU WILL REQUIRE CRITICAL COMPONENTS PRODUCED BY TOOLS AND PROCESSES PRESENTLY NONEXISTENT.						
	SOLUTION - DEVELOP FABRICATION TOOLS AND TECHNIQUES REQUIRED TO PRODUCE THE ABSORPTION ECU THERMAL GENERATOR AND EVAPORATOR.						
(3763)	TITLE - HIGH CONDUCTIVITY GRAPHITE INTERCALATION COMPOUNDS						1000
	PROBLEM - CONVERT R+D INTERCALATION TECHNIQUES INTO PRODUCTION PROCESSES TO FABRICATE LIGHTWEIGHT ELECTRICAL CONDUCTORS SUITABLE FOR REPLACING CURRENTLY AVAILABLE ELECTRICAL CONDUCTORS.						
	SOLUTION - DEVELOP MANUFACTURING PROCESSES FOR FABRICATING GRAPHITE INTERCALATION COMPOUNDS INTO WIRES AND CABLES. THESE CONDUCTORS WILL HAVE A TYPICAL DENSITY WHICH IS HALF THAT OF COPPER, AND ELEC CONDUCTIVITY AT LEAST THAT OF COPPER.						
(3767)	TITLE - DEVELOPMENT OF LOW COST MICRO MARKER LABELS					300	
	PROBLEM - A LARGE PORTION OF THE LABEL COST IS ASSOCIATED WITH THE MATERIAL USED AND THE PRESCRIBED FABRICATION METHODS ASSOCIATED WITH THIS MATERIAL.						
	SOLUTION - DEVELOP THE USE OF NEW MATERIALS AND ASSOCIATED FABRICATION TECHNIQUES THAT WILL HAVE A HIGH IMPACT ON THE END ITEM COST.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- OTHER (CONTINUED)						
(3768) TITLE - GENERAL PURPOSE BARBED TAPE OBSTACLE				284	168	64
PROBLEM - DEVELOP PRODUCTION TECHNIQUES FOR MANUFACTURE OF GPBTO ALSO DEVELOP NECESSARY PRODUCTION QA TECHNIQUES FOR REPRODUCIBILITY OF END ITEM IE HARDNESS TEMPER ETC.						
SOLUTION - ORTAIN NECESSARY ENGINEERING DESIGN AND PILOT PLANT FOR FABRICATION OF GPBTO WITH REPRODUCIBILITY THE DEVELOPED TECHNIQUE WILL ASSURE COMPETITION PRESENTLY SOLE PRODUCER.						
(3770) TITLE - DEVELOPMENT OF PAPER TEXTILE FABRIC TECHNOLOGY FOR SANDBAGES		280	150			
PROBLEM - A MAJOR PORTION OF THE FABRICATION COST OF PAPER TEXTILE SANDBAGS IS DUE TO THE LACK OF HIGH SPEED EFFICIENT MANUFACTURING FACILITIES.						
SOLUTION - UTILIZE NEW TECHNOLOGY AND COMPUTER AIDED MANUFACTURING CAPABILITY TO FABRICATE TEXTILE PAPER SANDBAGS THAT WILL BE COMPETITIVE IN PRICE TO THE ALTERNATE ACRYLIC SANDBAGS.						
********** CATEGORY ********** LAND MINES						
COMPONENT -- DETECTORS						
(3702) TITLE - STANDARDIZED MICROCOMPUTER SENSOR MODULES			200	200	200	
PROBLEM - CURRENTLY SENSORS ARE COMPLEX ELECTRONICALLY WITH LITTLE IN COMPONENT COMMONALITY. END RESULT IS A GREAT DUPLICATION OF COMPONENT FUNCTIONS WITHOUT STANDARDIZATION OF DESIGN AND FABRICATION SPECIFICATIONS.						
SOLUTION - MANF A SENSOR COMPONENT USING MICROPROCESSOR TECH OF A SINGLE STAND HARDWARE DESIGN THAT REQUIRES ONLY A SOFTWARE PACKAGE CHANGE TO PROVIDE VARIOUS MISSION PROFILES OF SENSOR CHANGES RESULTING IN A HIGHLY COST EFFECTIVE ITEM WITH VERSITAL USES.						
COMPONENT -- NEUTRALIZERS						
(3729) TITLE - ROCKET MOTOR FOR PORTABLE PROPELLED LINE CHARGE				200	200	200
PROBLEM - THE MAN PORTABLE LINE CHARGE IS A STANDARD PIECE OF EQUIPMENT OF THE ISRAELI ARMY PROPULSION FOR THIS DEVICE IS PROVIDED BY ROCKET MOTORS WHICH ARE MANUFACTURED IN USSR.						
SOLUTION - IF ROCKET MOTORS ARE WELL EVALUATED REVERSE ENGINEERING WILL BE ACCOMPLISHED. THIS EFFORT WILL PROVIDE FOR ESTABLISHMENT OF MANUFACTURING TECHNIQUES FROM REVERSE ENGINEERED DESIGNS.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- NEUTRALIZERS (CONTINUED)						
(3738) TITLE - DEVELOPMENT OF PYROPHORIC BONDING TO STEEL FRAGMENTS				300	250	200

PROBLEM - THE PYROPHORIC MINE NEUTRALIZATION SYS EMPLOYS THE DISPERSEMENT OF FRAG OVER AN AREA, THE FRAG ARE PYROPHORIC/STEEL OF APPROXIMATELY 100 GRAINS SIZE, PYROPHORIC MATERIAL MUST BE BONDED TO STEEL FRAGMENTS AND PRODUCED IN GREAT NUMBERS FOR THE SYS.

SOLUTION - DEVELOP MANUFACTURING METHODS FOR BONDING PYROPHORIC MATERIALS TO STEEL OR METAL IN LARGE QUANTITIES AND LOW COST.

****
* CATEGORY *
****
*POWER SOURCES *
****

COMPONENT -- CELLS						
(3714) TITLE - LIGHTWEIGHT MILITARY SOLAR CELL POWER MODULE, 100W				200	600	300

PROBLEM - MILITARY NEEDS FOR LIGHTWEIGHT SMALL SIZE SOLAR CELL MODULES NOT DEVELOPED AT PRESENT; SOLAR CELL SHAPING FOR HIGH AREA DENSITY; AND EXTRACTION OF PEAK POWER FROM MODULE FOLDING INTO COMPACT PACKAGE FOR MOBILITY AND STOARGE.

SOLUTION - DEVELOP METHODS TO SHAPE SOLAR CELLS AND TO FOLD MODULE AS A MEANS TO PRODUCE LIGHTWEIGHT AND SMALL SIZE POWER SYSTEMS AT A LOWER COST. MODIFY EXISTING PEAK POWER TRACKER.

(3716) TITLE - KOCITE ELECTRODES		238	124			

PROBLEM - SIGNIFICANT REDUCTION IN FUEL CELL COST CAN BE REALIZED THROUGH REDUCTION IN NOBLE METAL CATALYSTS LOADINGS. ELECTRODES UTILIZING MINIMUM CATALYST LOADINGS ARE CURRENTLY PRODUCED IN SMALL BATCHES, SUBJECT TO VARIABILITY IN CHAR AND ARE EXP TO PROD.

SOLUTION - KOCITE CATALYST HAS THE POTENTIAL FOR REDUCING FUEL CELL NOBLE METAL COSTS BY 65 PERCENT. DEVELOPMENT OF METHODS FOR PRODUCTION OF ELECTRODES INCORPORATING THIS CATALYST IS NECESSARY. EFFICIENT PRODUCTION OF THESE ELECTRODES REQUIRES STRICT QC.

(3728) TITLE - METHANOL REFORMER MODULES		379	320			

PROBLEM - PRESENT FUEL CONDITIONER DESIGN REQUIRES LABOR INTENSIVE MANUFACTURING PROCESSES. REDESIGN TAILORED FOR AUTOMATIC PRODUCTION MACHINES WILL GREATLY REDUCE MANUFACTURING COST.

SOLUTION - REDESIGN OF FUEL CONDITIONER BASED UPON AVAILABLE AUTOMATED MACHINE PRODUCTION CAPABILITIES.

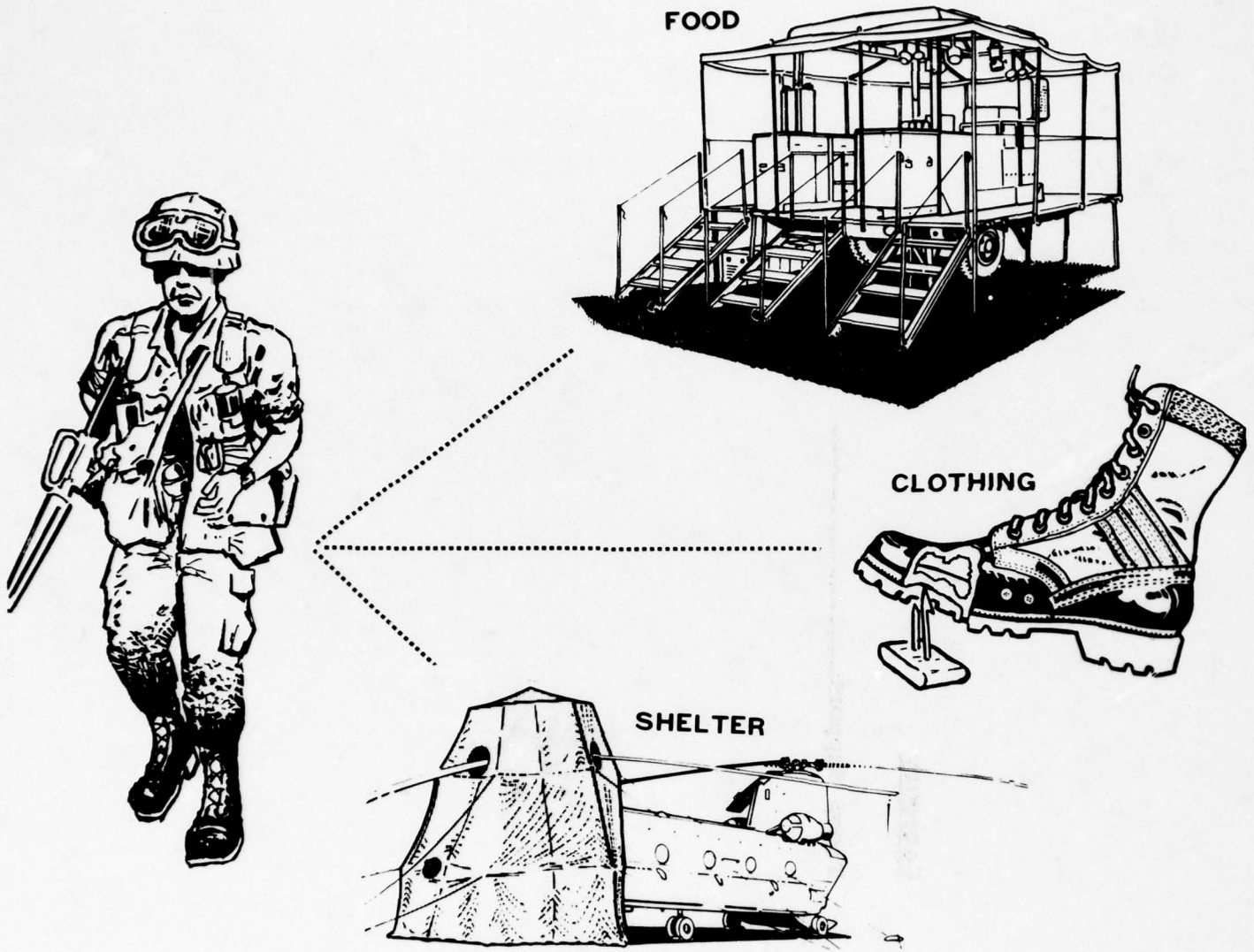
		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- CELLS (CONTINUED)							
(3733)	TITLE = PRODUCTION OF LARGE AREA FUEL CELL STACKS				200	150	
	PROBLEM = PRODUCTION METHODS FOR LARGE AREA FUEL CELLS ARE CURRENTLY INADEQUATE IN TERMS OF PRODUCTION YIELD, COMPONENT REJECTION RATE AND PERFORMANCE, UNIFORMITY MUST BE IMPROVED TO ENABLE ECONOMICAL PRODUCTION TO BE ACHIEVED.						
	SOLUTION = DEVELOP MANUFACTURING METHODS AND TECHNOLOGY FOR PRODUCTION OF FUEL CELL COMPONENTS AND FUEL CELL STACKS, EFFORT WILL CONCENTRATE ON COMPONENT UNIFORMITY AND STACK ASSEMBLY TECHNIQUES.						
(3764)	TITLE = LOGISTIC HYDROCARBON FUEL CONDITIONER				350	300	250
	PROBLEM = PREDICTED FUEL CONDITIONER DESIGN USES EXPENSIVE HIGH TEMPERATURE ALLOYS, AND LABOR INTENSIVE WELDING AND ASSEMBLY TECHNIQUES.						
	SOLUTION = REDESIGN OF FUEL CONDITIONER EMPLOYING LATEST CERAMIC, HEAT PIPE AND CATALYST TECHNOLOGIES WILL YIELD LOWER COST UNITS CAPABLE OF AUTOMATIC ASSEMBLY TECHNIQUES.						
COMPONENT -- GENERATOR/ALTERNATOR							
(3723)	TITLE = GEN THERMAL SIGNATURE ALTERNATOR KIT		318				
	PROBLEM = MASS PRODUCTION PROCEDURES FOR FABRICATION OF THE GENERATOR EXHAUST SUPPRESSION SYSTEM ARE NEEDED.						
	SOLUTION = IDENTIFY THE SPECIAL MANUFACTURING PROCESSES AND ASSEMBLY TECHNIQUES TO MASS PRODUCE THE ITEM.						
COMPONENT -- OTHER							
(3605)	TITLE = TRANSCALENT (HIGH POWER) TRANSISTOR	450	50				
	PROBLEM = CURRENTLY AVAILABLE SOLID STATE POWER DEVICES OF REQUIRED RATINGS AND THEIR HEAT SINKS OFTEN ARE TOO HEAVY AND BULKY TO BE CONVENIENTLY USED IN COMPACT, LIGHTWEIGHT POWER CONDITIONERS.						
	SOLUTION = DEVELOP MANUFACTURING PROCESSES FROM R+D DESIGNS FOR COMPACT LIGHTWEIGHT TRANSCALENT DEVICES, THESE DEVICES WITH INTEGRAL HEAT PIPES DO NOT REQUIRE EXTERNALLY MOUNTED HEAT SINKS.						
(3710)	TITLE = DUAL EPOXY SCR			490	250		
	PROBLEM = DUAL EPOXY IS A HIGH POWER DUAL ANTIPARALL SCR CONFIGURATION WITH ELECTRICAL ISOLATED FLAT PLATE HEAT SINK IDEALLY SUITED FOR MILITARY POWER CONDITIONER, THESE DEVICES ARE ONLY AVAILABLE ON A LABORATORY PROCESSED BASIS.						
	SOLUTION = ESTABLISH THE BEST STATE OF THE ART METHODS OF WAFER PURIFICATION, EPOXY AND EPOXY CASTING TECHNIQUES AND CONVERT LABORATORY PROCESS TO PRODUCTION METHODS.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- OTHER (CONTINUED)							
(3735)	TITLE - 3KW MILITARY POWER QUALITY INVERTER			700	500		
	PROBLEM - ALL MANUFACTURING AND ASSEMBLY WORK IS ACCOMPLISHED BY HAND IN LABORATORY ENVIRONMENT RESULTING IN HIGH PRODUCTION COSTS.						
	SOLUTION - INITIATE NEW STATE OF THE ART MANUFACTURING PROCESSES COUPLED WITH PRODUCTION LINE TECHNOLOGY BEST SUITED FOR MASS PRODUCTION.						
(3752)	TITLE - 1.5KW MILITARY POWER QUALITY INVERTER		600	500	90		
	PROBLEM - ALL MANUFACTURING AND ASSEMBLY WORK IS ACCOMPLISHED BY HAND IN LABORATORY ENVIRONMENT RESULTING IN HIGH PRODUCTION COSTS.						
	SOLUTION - INITIATE NEW STATE OF THE ART MANUFACTURING PROCESSES COUPLED WITHPRODUCTION LINE TECHNOLOGY BEST SUITED FOR MASS PRODUCTION.						
(3772)	TITLE - INTEGRATED POWER SWITCH			300	275	75	
	PROBLEM - PRESENT USE OF DISCRETE CONTROL AND POWER COMPONENTS AND THEIR REQUIRED HEAT SINKS REQUIRES SELECTIVE ATTENTION IN A LABORATORY ENVIRONMENT BY HIGHLY SKILLED PERSONNEL RESULTING IN HIGH MANUFACTURING COSTS.						
	SOLUTION - COMBINE LATEST MICROELECTRONIC MICROPROCESSOR AND HEAT TRANSFER TECHNIQUES BEST SUITED FOR MANUFACTURING PROCESSES AND MASS PRODUCTION.						
COMPONENT -- TURBINES							
(3608)	TITLE - IMPROVED METHOD OF MFG CERAMIC GAS ENGINE COMPONENTS				408	225	350
	PROBLEM - MOST OF HIGH COST OF COMPONENTS IS DUE TO LONG TREATMENT PERIODS OF PARTS AT HIGH TEMPERATURES AND PRESSURES OR OTHER EQUALLY EXPENSIVE METHODS. PARTS MADE BY THESE METHODS ARE POROUS RESULTING IN POOR STRENGTH AND LOW CHEMICAL RESISTANCE.						
	SOLUTION - DEVELOP A METHOD OF CASTING BY MELTING PART IN HIGH TEMPERATURE ATMOSPHERICALLY CONTROLLED FURNACE IN WHICH ATMOSPHERE CONSISTS OF GASEOUS DECOMPOSITION PRODUCTS OF CERAMIC UNDER PRESSURE.						
(3717)	TITLE - HIGH TEMPERATURE TURBINE NOZZLE FOR 10KW POWER UNIT	343	400	400			
	PROBLEM - SUPER ALLOY METALS USED IN HOT COMPONENTS OF GAS TURBINES ARE LIMITED IN OPERATING TEMPERATURE AND ARE SUBJECT TO PREMATURE FAILURE IN DUSTY OR CORROSIVE ATMOSPHERE. ALLOY METALS ARE STRATEGIC MATERIALS AND ARE COSTLY TO MANUFACTURE.						
	SOLUTION - DETERMINE METHODS AND TECHNIQUES TO REDUCE THE COST OF MANUFACTURING HIGH TEMPERATURE CERAMIC MATERIALS WHICH HAVE BEEN FOUND TO POSSESS HIGH TEMPERATURE RESISTANCE TO DUST ABRASION AND SALT CORROSION. MATERIALS CONTAIN NO STRATEGIC ELEMENTS.						

	FUNDING ($000)					
	PRIOR	80	81	82	83	84
COMPONENT -- TURBINES (CONTINUED)						
(3719) TITLE = HEAT EXCHANGER FOR SMALL 10-30KW REGEN CYCLE GAS TURBINES				325	385	350

PROBLEM = GAS TURBINE REGENERATORS AND RECUPERATORS SIGNIFICANTLY INCREASE UNIT COST SIZE AND WEIGHT WHICH OFFSETS BENEFIT OF SIGNIFICANTLY REDUCED FUEL CONSUMPTION.

SOLUTION = DETERMINE METHODS AND TECHNIQUES TO REDUCE FABRICATION COSTS FOR ADVANCED HEAT EXCHANGER CORE AND HEADER MATERIALS SUITABLE FOR OPERATING IN ADVANCED GAS TURBINE HIGH TEMPERATURE ENVIRONMENT.



NATICK R&D COMMAND
(NARADCOM)

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Category	Page
Troop Support----------	213

US ARMY NATICK

RESEARCH AND DEVELOPMENT COMMAND

(NARADCOM)

NARADCOM, located at Natick, MA, is responsible for research and development of items/systems to include: air drop equipment (platforms, parachutes and packaging); organizational equipment; refrigeration equipment; non-powered heaters; DOD tactical shelters; individual field sanitation equipment; biological materials (germicides, insecticides); tentage and equipage; clothing and personnel equipment; DOD food and food service equipment; containers and packaging (excluding MHE containers); physical security (safes and padlocks); materials (textiles, rubber, leather, plastic, paper and chemicals); field support equipment (printing, composing and duplicating); hand tools; office equipment and supplies and furnishings; appliances; and cleaning equipment.

A major problem confronting NARADCOM is one of providing adequate clothing and equipment to the field soldier in an economic matter. The five projects submitted by NARADCOM all address this area. Manufacturing technology associated with protective outerwear and nonwoven fabrics will have a direct impact on the private sector.

Funding will be provided from the Other Procurement, Other Support Equipment, PA 5397 Appropriation.

NARADCOM

COMMAND FUNDING SUMMARY
(THOUSANDS)

CATEGORY	FY80	FY81	FY82	FY83	FY84
TROOP SUPPORT	1033	1096	478	360	385
TOTAL	1033	1096	478	360	385

CATEGORY

TROOP SUPPORT

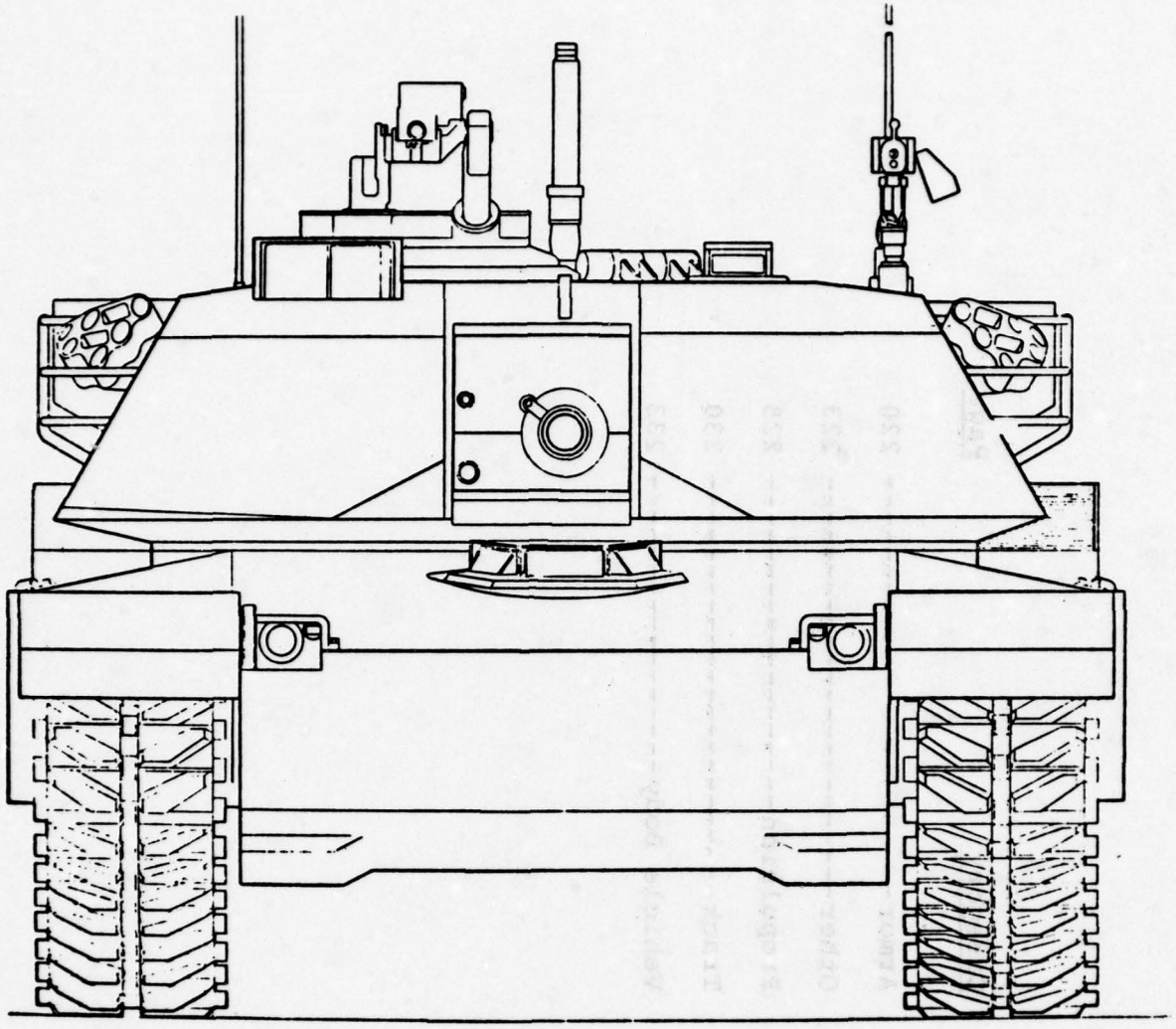
FUNDING ($000)

	PRIOR	80	81	82	83	84
COMPONENT -- PROTECTIVE GEAR						
(8063) TITLE - IMPROVED METHODS OF MANUFACTURE OF BUTYL RUBBER HANDWEAR		113	196	151		
PROBLEM - THE PRESENT METHOD OF STANDARD BUTYL RUBBER GLOVE FOR CW PROTECTION IS BY A SOLE SOURCE DIPPING PROCESS WHICH REQUIRES CLOSE QUALITY AND ENVIRONMENTAL SUPERVISION INCREASED COST AND LIMITED DURABILITY AND PROTECTION.						
SOLUTION - EVALUATE SEVERAL METHODS OF MANUFACTURE THAT WILL INCREASE PRODUCTION LESS HAZARDOUS CONDITIONS THAT WILL MANUFACTURE A MORE DENSE BUTYL GLOVE OFFERING GREATER PROTECTION AND DURABILITY.						
(8064) TITLE - IMPROVED METHODS OF MANUFACTURE OF BUTYL RUBBER FOOTWEAR		170	200	177		
PROBLEM - THE PRESENT METHOD OF MANF. CW FOOTWEAR IS BY CALENDERING BUTYL SHEET, CUTTING UPPER PATTERNS AND CEMENTING THE SEAMS AND BOTTOM OUTSOLE. THE CW OVERBOOT IS MADE IN ONE SIZE ONLY, RESULTING IN AN AWKWARD BULKY DESIGN SUBJECT TO SNAGGING						
SOLUTION - EVALUATE VARIOUS MANUFACTURING METHODS AND SELECT THE MOST FEASIBLE TECHNIQUE AND COME UP WITH A SPECIFICATION/TECHNICAL DATA PACKAGE RESULTING IN INCREASED DURABILITY, REDUCED LOGISTIC EXPOSURE, AND INCREASED CONFIDENCE OF THE USER.						
(8065) TITLE - KEVLAR/NYLON ORTHO FABRICS IN PASGT HELMET AND VEST		250	200	150		
PROBLEM - THE UNIT COST OF THE PASGT HELMET AND VEST IS THE SINGLE MOST LIMITING FACTOR IN ITS ACCEPTANCE. THE UNIT COST IS MOSTLY AFFECTED BY THE COST OF THE BASIC MATERIAL KEVLAR. A LOWER COST BASIC MATERIAL WILL RESULT IN A MORE ACCEPTABLE PASGT.						
SOLUTION - A SERIES OF FABRICS WILL BE DESIGNED, MANUFACTURED AND EVALUATED. THIS SERIES WILL CONSIST OF ORTHOGONAL BLENDED KEVLAR AND NYLON FILAMENT YARNS. STANDARD MANF TECHNIQUES WILL BE USED AND RECOGNIZED TEST PROCEDURES WILL BE EMPLOYED TO LOWER COST.						
(8066) TITLE - CONTINUOUS FILAMENT PRODUCTION METHOD		500	500			
PROBLEM - CONVENTIONAL MODE OF MOLDING THE PASGT HELMENT I.E. WEAVING KEVLAR YARNS INTO FABRIC CUTTING PREFORM AND LAYING UP, IS VERY WASTEFUL.						
SOLUTION - LAYUP PREFORM BY CONTINUOUS YARN AND WETTING WITH RESIN THUS REDUCING WASTE SAVING 30 TO 40 DOLLARS PER HELMET.						

	FUNDING ($000)					
	PRIOR	80	81	82	83	84
COMPONENT -- SHELTER						
(8043) TITLE = NONWOVEN SHEET MATERIALS FOR SHELTERS					360	385

PROBLEM = THE US TEXTILE INDUSTRY UNDER MAJOR MOBILIZATION FOR FULFILLING REQUIREMENTS OF FINISHED COTTON DUCK FOR SHELTERS AND TARPAULINS CANNOT BE MET AS VERIFIED BY AMC STEERING COMMITTEE IN NARADCOM TR 73-50-CE DECEMBER 1975.

SOLUTION = THE BREAKTHROUGHS IN NONWOVEN FABRIC TECHNOLOGY WILL REQUIRE DETAIL MANUFACTURING METHODS AND TESTS TO PROVIDE MATERIAL THAT WILL BE MANUFACTURED AT RAPID PRODUCTION AND LOWER COSTS.



TANK-AUTOMOTIVE R&D COMMAND

(TARADCOM)

Category	Page
Armor	220
Other	223
Propulsion	225
Track	230
Vehicle Body	233

US ARMY TANK-AUTOMOTIVE

RESEARCH AND DEVELOPMENT COMMAND

(TARADCOM)

TARADCOM, with headquarters in Warren, MI, has the mission of developing, acquiring, and fielding the world's finest tracked and wheeled military combat, tactical, and general purpose vehicles. The mission is worldwide in scope and includes among its customers all of the US military services, and those of friendly foreign nations as well.

The TARADCOM responsibilities include operation of in-house R&D laboratories and providing management direction to a contractor-operated Advanced Concept Laboratory. TARADCOM also performs quality assurance functions and manages the integrated logistics support activities associated with the vehicles and their subsystems through development and early deployment.

The production base for mission items is made up of both private facilities and contractor operated-government owned facilities. MM&T efforts to enhance this base are managed by TARADCOM. These efforts are accomplished partially in-house and partially out-of-house.

The Combat Vehicle Conference, held in October 1976, resulted in industry representatives submitting a large number of program suggestions. The Five Year Plan reflects the results of this conference and emphasis major problem areas confronting TARADCOM. A concerted commitment to solving these problems will not only enhance TARADCOM's readiness, but will result in a more efficient production base.

Combat vehicle system development has changed extensively through the incorporation of new types of components. The Turbine Engine has become the propulsion system for tanks. Because of its growth potential for future systems, advanced materials, such as ceramics and complex shaped parts of super-alloy, will be more extensively used. Projects in the Five Year Plan which are directed toward solutions are: 6020, 6019, 4295, 5005, 5080, and 5081. New armor forms are becoming standardized. These are not monolithic and thus, will require extensive use of assembly and joining techniques. Planned efforts include projects: 6007, 6018, 6009, 6017, 5091, and 5072. Increased vehicle performance standards have dictated the usage of materials at higher strength levels which will increase the difficulty of producing parts by traditional methods of metal removal and material forming. The thrust program will be to utilize advances in automated fabrication techniques to reduce costs and improve the efficiency of production. The usage of hard-to-produce materials will require new techniques for providing the essential components. Thirteen projects in the Five Year Plan (planned at

$12M) attacking this area are: 6007, 6018, 5003, 6008, 6009, 6017, 5091, 5072,6010, 4574, 5050, 5024, and 5082. The future situation will tend to call for greater usage of materials which are declining in availability. The work presented in this program will support the conservation of these materials.

Solutions to the problem areas mentioned above, will create potential advancements applicable to the private sector. Projects 6018 and 6019 will provide funding to demonstrate the practicality of producing ceramic parts for high temperature engine application. Higher engine operating temperature will result in fuel economy and increased performance. Results of this project will be beneficial to the civilian transportation system, which is increasingly required to meet stringent performance standards.

Friction rings and reaction plates are used extensively in the civilian industry. Project 5081 will provide a less costly method of fabricating friction rings and reaction plates. The process will demonstrate the feasibility of fabricating these components utilizing strip materials, resulting in approximately a 50-60% reduction of waste.

TARADCOM budgets for two procurement appropriations to include PA 3197, Procurement of Tracked Combat Vehicles, and PA 5397, Other Procurement appropriations for MM&T projects. During previous years, TARADCOM's MM&T effort has been funded at a relatively low amount in comparison to the dollar volume of items procured. This year the Five Year Plan is approximately three times over the budget guidance. This is a result of their increased emphasis on the MM&T program and the suggestions submitted during the Combat Vehicle Conference.

TARADCOM

COMMAND FUNDING SUMMARY
(THOUSANDS)

CATEGORY	FY80	FY81	FY82	FY83	FY84
ARMOR	3050	3155	4110	4775	5910
OTHER	1720	2570	1600	1400	1700
PROPULSION	2725	3150	3325	6100	6250
TRACK	1355	1260	1040	1115	1275
VEHICLE BODY	1465	1145	1250	500	850
TOTAL	10315	11280	11325	13890	15985

CATEGORY	MMT FIVE YEAR PLAN RCS DRCMT 126	FUNDING ($000)				
ARMOR		PRIOR	80	81	82	83	84
COMPONENT -- GENERAL							
(4557)	TITLE - HIGH EFFICIENCY JOINING OF ESR ARMOR	300			200	200	
	PROBLEM - ESR STEEL ARMOR UTILIZED FOR VEHICLE CONSTRUCTION AND BALLISTIC APPLIQUES MUST HAVE HIGH JOINT EFFICIENCIES TO TAKE ADVANTAGE OF THE INCREASED PROTECTION.						
	SOLUTION - IMPROVE JOINING PROCESSES TO INCREASE PROTECTION TO THE LEVEL OF A PARENT MATERIAL, WORK ON EDGE PREPARATION AND PRE- AND POST-HEAT TREATMENT.						
(4575)	TITLE - LASER WELDING TECHNIQUES FOR MILITARY VEHICLES	525			250	250	
	PROBLEM - NO MANUFACTURING BASELINE EXISTS FOR WELDING HIGH STRENGTH MATERIAL BY ADVANCED HIGH-SPEED WELDING TECHNIQUES.						
	SOLUTION - STUDY THE USE OF LASER WELDING TO ESTABLISH A PRODUCTION BASELINE.						
(4577)	TITLE - ATTACHMENT OF COMBINATION ARMOR TO COMBAT VEHICLES		200	100	100	100	
	PROBLEM - COMBINATION ARMOR SYSTEMS PROVIDE LARGE BALLISTIC IMPROVEMENT BUT REQUIRE COMPLEX ATTACHMENT METHODS.						
	SOLUTION - IDENTIFY COST EFFECTIVE METHODS FOR PRODUCTION APPLICATION.						
(4578)	TITLE - ELECTRON BEAM WELDING FOR FERROUS COMPONENTS			150	250	250	150
	PROBLEM - ELECTRON BEAM WELDING FOR FERROUS MATERIALS REQUIRES MODIFICATION TO ASSURE WELD QUALITY.						
	SOLUTION - IDENTIFY LOW COST AUTOMATED TECHNIQUES FOR APPLICATION OF ELECTRON BEAM WELDING OF FERROUS MATERIALS.						
(4586)	TITLE - IMPROVED SOLIDIFICATION AND SOUNDESS THICK ARMOR CASTING	375	550	300			
	PROBLEM - PRESENT CASTING TECHNIQUES NEED UPDATING IN ORDER TO EXPLOIT THE ADVANTAGE OF CASTING PROCESS.						
	SOLUTION - ESTABLISH IN PRODUCTION TECHNIQUES FOR CONTROLLING SOLIDIFICATION RATES IN MOLDS TO IMPROVE PROPERTIES AND REDUCE COSTS.						
(5009)	TITLE - FORGING ARMOR COMPONENTS FROM FORGED AND CAST PREFORMS	525	250	150	150		
	PROBLEM - IMPROVED AVAILABILITY OF PREFORMS IS NEEDED.						
	SOLUTION - ESTABLISH PRODUCTION TECHNIQUES TO FORGE AND CAST THE PREFORM AS A MILL INGOT.						
(5016)	TITLE - IMPROVED HIGH STRENGTH ALUMINUM COMPONENTS BY MECH TREATMENT			350	200	250	250
	PROBLEM - COMMERCIALLY AVAILABLE HIGH STRENGTH ALUMINUM ALLOYS NEED IMPROVEMENT IN DUCTILITY AND FRACTURE TOUGHNESS.						
	SOLUTION - ESTABLISH PRODUCTION PROCESSES UTILIZING ADVANCES IN BOTH METAL SOLIDIFICATION AND THERMAL MECHANICAL WORKING OF ALUMINUM ALLOYS.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- GENERAL (CONTINUED)							
(5040)	TITLE - FABRICATION TECHNIQUES FOR MANUFACTURING PLASTIC TANK DECOYS				250	300	350
	PROBLEM - FABRICATE AN INEXPENSIVE VEHICLE DECOY WHICH WOULD BE EXPENDABLE.						
	SOLUTION - ESTABLISH MANUFACTURING PROCESS UTILIZING PLASTIC COMPONENTS FOR BUILDING FULL SCALE PLASTIC COMBAT VEHICLE DECOYS.						
(5045)	TITLE - SPALL SUPPRESSIVE FOR COMBAT VEHICLES	150	190	225	500	300	510
	PROBLEM - CURRENT METALLIC ARMOR DOES NOT SUPPRESS FLYING SHRAPNEL WITHIN THE VEHICLE CREW COMPARTMENT.						
	SOLUTION - ESTABLISH METHODS OF APPLYING SPALL SUPPRESIVE ARMOR TO THE INTERIOR WALLS OF COMBAT VEHICLES.						
(5047)	TITLE - ENVIRONMENTAL COLOR ADAPTING COATINGS FOR COMBAT VEHICLES				300	300	250
	PROBLEM - ARMY VEHICLE COLORS DO NOT BLEND WITH EVERY TERRAIN AND/OR ENVIRONMENTAL CONDITION.						
	SOLUTION - ESTABLISH PROCESS FOR APPLICATION OF COATINGS WHICH WILL CHANGE COLOR TO BLEND INTO ANY ENVIRONMENT.						
(5049)	TITLE - LASER ENERG ABSORBING COATINGS	200	200	200			250
	PROBLEM - THE INCREASED USE OF LASER BEAM FOR RANGE FINDERS AND MISSILE GUIDANCE INCREASES THE PROBABILITY OF HIT.						
	SOLUTION - ESTABLISH FEASIBILITY OF APPLYING LASER ABSORRING COATINGS ON COMBAT VEHICLES.						
(5050)	TITLE - AUTOMATED DISSIMILAR METAL JOINING	255	200	150	100		
	PROBLEM - COMPLEXITIES IN THE FABRICATION BY UTILIZING DISSIMILAR METALS FOR SPECIFIC THREAT DEFEAT DOES NOT ENHANCE ITSELF TO PRODUCTION TECHNIQUES.						
	SOLUTION - ESTABLISH MANUFACTURING TECHNIQUES AUTOMATING THE WELDING AND POSITIONING FOR JOINING DISSIMILAR METALS.						
(5051)	TITLE - TECHNIQUES FOR JOINING ARMOR MATERIALS BY ULTRA SONIC METHOD				200	150	150
	PROBLEM - CONVENTIONAL JOINING PROCESSES INDUCE HEAT AFFECTED ZONES ADJACENT TO JOINT METALS WHICH HAVE ADVERSE AFFECTS ON BALLISTIC PROPERTIES.						
	SOLUTION - ESTABLISH MANUFACTURING PROCESSES WHICH WILL JOIN METALS WITH A MINIMUM AMOUNT OF HEAT PRODUCTION COUPLING WITH ULTRASONIC WELDING.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT	-- GENERAL (CONTINUED)						
(5061)	TITLE - HIGH STRENGTH ALUMINUM FOR ARMOR	150	200	200	200	200	
	PROBLEM - RESPONSE TO A PROCESS AND FABRICATION TECHNIQUES ARE UNRELIABLE IN NEWLY DEVELOPED ALLOYS.						
	SOLUTION - DEVELOP PROCESSING TECHNIQUES AND QUALITY ASSURANCE AND PROVISIONS TO ASSURE CONSISTENT QUALITY COMPONENTS.						
(5065)	TITLE - ADVANCED TECHNOLOGY SURVEILLANCE COUNTERMEASURES MATERIALS	190	90		110	325	350
	PROBLEM - USE OF MATERIALS WHICH WILL DEFEAT SURVEILLANCE MEASURES HAS NOT BEEN EXPLOITED IN PRODUCTION.						
	SOLUTION - PRODUCTION TECHNIQUES ARE NEEDED TO ASSURE SUFFICIENT QUALITY TO PERFORM SATISFACTORILY.						
(5088)	TITLE - HIGH-POWER ELECTRON BEAM WELDING IN AIR	450	200	250	200		
	PROBLEM - USE OF ELECTRON BEAM HAS NOT BEEN EXPLOITED.						
	SOLUTION - ESTABLISH PROCEDURES UTILIZING THIS NEW PROCESS FOR RAPID ECONOMICAL JOINING OF ARMOR MATERIALS.						
(5091)	TITLE - HEAVY ALUMINUM PLATE FABRICATION		420	180	100		
	PROBLEM - FABRICATION OF HEAVY ALUMINUM PLATE NEEDS TO BE IMPROVED.						
	SOLUTION - ESTABLISH PROCESSES AND TECHNIQUES TO UTILIZE LATEST METHOD IN THE FABRICATION PROCESS.						
(5094)	TITLE - ALLOY AND ARMOR STEELS TREATED WITH RARE EARTH ADDITIVES	225	150				
	PROBLEM - ARMOR STEELS UTILIZED CONVENTIONAL DEOXIDIZING AND SCAVENGING PROCESSES IN STEEL MAKING.						
	SOLUTION - ESTABLISH TECHNIQUES TO TREAT STEELS WITH RARE EARTH ADDITIONS.						
(5096)	TITLE - WELD REPAIR OF ARMOR CASTINGS		400	200	100	100	
	PROBLEM - FOUNDRY WELD REPAIR OF ARMOR CASTINGS IS A DISTASTEFUL HIGHLY LABOR INTENSE OPERATION.						
	SOLUTION - ESTABLISH A PROCESS WHICH WILL EXPEDITE AND REDUCE LABOR INTENSITY.						
COMPONENT	-- HULL/BODY						
(5017)	TITLE - AUTOMATED WELDING OF ALUMINUM COMBAT VEHICLES	250			200	250	
	PROBLEM - MANUAL WELDING IS TIME CONSUMING AND FATIGING.						
	SOLUTION - DEVELOP IMPROVED AUTOMATED PROCESS TO WELD ALUMINUM HULLS.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- HULL/BODY (CONTINUED)						
(5046) TITLE - RADAR DISPERSING AND ABSORBING AUTOMOTIVE COATINGS			200	250	300	300
PROBLEM - COMBAT VEHICLES WILL REFLECT RADAR ENERGIES, THUS ALLOWING ITSELF TO BE DETECTED.						
SOLUTION - ESTABLISH PRODUCTION METHODS FOR COATINGS WHICH WILL DISPERSE AND ABSORB RADAR WAVE LENGTHS.						
(5072) TITLE - PRODUCTION OF HULL/TURRETS FOR COMBAT VEHICLES					1000	3000
PROBLEM - CASTING FACILITIES LACK ADVANCED METHODS, TECHNIQUES AND CONTROLS WHICH CONTRIBUTE TO LOWER DENSITY, LOWER PERFORMANCE, AND HIGHER COSTS OF THE CAST STEEL ARMORS.						
SOLUTION - NEW FOUNDRY TECHNIQUES WILL BE UTILIZED WHICH WILL RESULT IN AN IMPROVED ARMOR CONFIGURATION.						
(6007) TITLE - WELDING WITH POWDERED METAL FOR RAPID DEPOSITION.			200	200	200	
PROBLEM - WELD JOINT PROPERTIES ARE DEGRADED BY EXCESSIVE HEAT AFFECTED ZONE WHICH ARE INHERENT IN THE SUBMERGED ARC WELDING PROCESS.						
SOLUTION - USE OF POWDERED METALS WILL INCREASE THE DEPOSITION RATE THEREBY REDUCE HEAT TRANSFER INTO THE PLATE THUS DECREASE THE HEAT AFFECTED ZONE.						
COMPONENT -- TURRETS						
(4574) TITLE - COMPUTER SIMULATION OF WELDING PROCESSES			300	250		
PROBLEM - INCORPORATION OF ADVANCED MATERIALS DEVELOPED IN R AND D PROGRAMS ARE INHIBITED BECAUSE OF FABRICATION PROBLEMS.						
SOLUTION - ESTABLISH A METHODOLOGY WHICH PERMITS A STUDY OF ALL PRODUCTION VARIABLES ON AN ANALYTICAL BASIS TO ESTABLISH A PRACTICAL PROCEDURE.						
(6010) TITLE - IMPROVE POWER SUPPLIES USED WITH AUTOMATED COMPUTIZED WELD					300	350
PROBLEM - PRESENT POWER DO NOT HAVE THE ADAPTABILITY TO RESPOND TO ALL COMPUTER COMMANDS.						
SOLUTION - WELD POWER SUPPLIES WILL BE IMPROVED TO MEET DEMANDS IMPOSED WITH COMPUTER CONTROLLED AUTOMATED WELDING.						

CATEGORY
OTHER

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- ALL						
(5068) TITLE = NEW ANTI-CORROSIVE MATERIALS AND TECHNIQUES		300	250			
PROBLEM = METALLIC COMPONENTS ARE DETERIORATED BY THE ENVIRONMENT.						
SOLUTION = ESTABLISH TECHNIQUES OF ECONOMICALLY APPLYING ANTI-CORROSIVE MATERIAL COATINGS TO THE COMPONENTS OF THE TACTICAL VEHICLE FLEET.						
(5082) TITLE = FLEXIBLE MACHINING SYSTEM PILOT LINE FOR TCV COMPONENT	440	880	880			
PROBLEM = MACHINING RELATIVELY SMALL QUANTITIES BY ON-LINE METHOD IS INEFFICIENT AND UNECONOMICAL.						
SOLUTION = ESTABLISH A MACHINE CENTER WHICH WILL HANDLE SMALL BATCH-TYPE PARTS WITH MINIMUM UTILIZATION OF MANPOWER.						
(5090) TITLE = IMPROVED AND COST EFFECTIVE MACHINING TECHNOLOGY	315	290	290	100	100	
PROBLEM = MACHINE DATA ON NEWER MATERIALS AND NEW REMOVAL RATES ARE NOT ESTABLISHED.						
SOLUTION = ESTABLISH DATA WHEREAS THE NEW MACHINING EQUIPMENT MAY BE UTILIZED WITH MAXIMUM EFFICIENCY.						
(5093) TITLE = MANUFACTURING METHODS FOR HIGH SPEED MACHINING FERROUS ALLOY			950	1500	500	1000
PROBLEM = FAST CHIP REMOVAL FOR FERROUS ALLOYS HAVE NOT BEEN ESTABLISHED FOR PRODUCTION.						
SOLUTION = ESTABLISH FAST CHIP REMOVAL FOR PRODUCTION CONDITIONS.						
(6014) TITLE = AUTOMATED PRODUCTION OF MULTIPLEXING NETWORKS FOR COMBAT VEH					400	400
PROBLEM = ADVANCED TECHNIQUES FOR ELECTRICAL POWER DISTRIBUTION AND VEHICLE CONTROL WILL USE ADVANCED MICROPRESSURES AND MULTIPLEXING AND INTRODUCE NEED FOR NEW ASSEMBLY TECHNIQUE.						
SOLUTION = COMPUTER AIDED DESIGN AND MANUFACTURING WILL BE APPLIED TO ASSEMBLY OF THE COMPLEX ELECTRONIC SYSTEMS.						
(6017) TITLE = CHEMICAL JOINING TECHNIQUE FOR METALLIC COMPONENTS					400	300
PROBLEM = CURRENT TECHNIQUES FOR JOINING MATERIAL REQUIRE EXPENDITURE OF ENERGY AND JOINING MATERIALS.						
SOLUTION = INVESTIGATE A PROCESS WHICH WILL BARE ADJOINING SURFACES AND LEAVE THEM IN A HIGHLY REACTIVE STATE WHICH WILL PROMOTE IMMEDIATE JOINING.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- ALL	(CONTINUED)						
(6021)	TITLE - COMPUTER SIMULATION OF PRODUCTION LINES		250	200			
	PROBLEM - FACILITIZATION PLANNING FOR PRODUCING NEW VEHICLES IS COSTLY AND DOES NOT PROVIDE MEANS FOR SELECTING OPTIMUM FABRICATION PROCESSES.						
	SOLUTION - A COMPUTER SIMULATION OF THE PRODUCTION LINE WILL LAYOUT A COMPLETE FACTORY AND PERMIT SELECTION OF THE MOST EFFECTIVE PROCESSES EARLY IN PREPRODUCTION PHASE.						
********** CATEGORY **********							
*PROPULSION *							
COMPONENT -- ENGINE							
(5071)	TITLE - PRODUCTION ENGINE SYSTEMS FOR COMBAT VEHICLES					1000	1900
	PROBLEM - THE LACK OF AN AUTOMATED TECHNOLOGY BASE CONTRIBUTES TO HIGH COSTS AND LOWERED PERFORMANCE.						
	SOLUTION - INCORPORATE THE NEW TECHNOLOGY BASE ADAPTABLE TO THIS CLASS OF ARMY MATERIEL AND THE MAJOR COST DRIVER ELEMENTS.						
(5084)	TITLE - FABRICATION TECHNIQUES FOR PRODUCTION OF INTERGRAL CAST COMP	500	200				
	PROBLEM - ROTORS FOR COMBAT TURBINE ENGINES ARE EXPENSIVE, HIGH TEMPERATURE ALLOYS.						
	SOLUTION - ESTABLISH FABRICATION TECHNIQUES TO PRODUCE AN INTEGRAL METALLIC AND CERAMIC ROTOR.						
(5095)	TITLE - SEAM LOCATOR AND FOLLOWER FOR EB WELDED CYLINDER ASSEMBLIES		160	50	50		
	PROBLEM - WELDING OF THE STEEL AND ALUMINUM PARTS FOR ENGINE CYLINDER ASSEMBLY IS PERFORMED MANUALLY.						
	SOLUTION - DEVELOP A SEAM LOCATOR AND FOLLOWER FOR AUTOMATED WELDING.						
(6008)	TITLE - AUTOMATED COMPUTER CONTROL LASER MACHINING						800
	PROBLEM - CONVENTIONAL MEANS OF MACHINING HIGH ALLOY MATERIALS TO PRECISE DIMENSIONS IS TIME CONSUMING.						
	SOLUTION - LASER MACHINING WITH COMPUTER CONTROL WILL ALLOW RAPID REMOVAL OF DIFFICULT TO MACHINE MATERIALS WHILE MAINTAINING PRECISION.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- ENGINE (CONTINUED)							
(6018)	TITLE - JOINING OF ATTACHMENTS ON CERAMICS				300	300	
	PROBLEM - CURRENT METHOD OF JOINING METALS TO CERAMIC JOINTS ARE NOT RELIABLE AND HAVE POOR LIFE.						
	SOLUTION - INVESTIGATE USE OF JOINTS THAT ARE COMPLIANT OR USE INTERMEDIATE CONNECTING PHASE.						
(6019)	TITLE - GRAIN BOUNDARY IMPROVEMENT PROCESSING FOR CERAMICS				200	300	400
	PROBLEM - EFFECT OF HIGH TEMPERATURE ON CERAMICS GRAIN BOUNDARIES LIMIT THEIR APPLICATION.						
	SOLUTION - UPSCALE DEVELOPED TECHNIQUES FOR DEVELOPING A NONGLASS BOUNDARY OR ELIMINATE THE GRAIN BOUNDARY PHASE.						
(6020)	TITLE - PRODUCTION OF REINFORCED CERAMIC COMBUSTORS			400	300		
	PROBLEM - TECHNIQUE FOR LARGE SCALE PRODUCTION OF COMBUSTORS NOT AVAILABLE. THESE COMBUSTORS IMPROVE ENGINE PERFORMANCE GREATLY.						
	SOLUTION - UPSCALE LABORATORY PROVEN TECHNIQUE FOR FABRICATING COMBUSTOR FOR PRODUCTION.						
COMPONENT -- FRAME							
(4259)	TITLE - NON STICK UNDERCOATING FOR TACTICAL VEHICLES		250	175	100	150	
	PROBLEM - NO MANUFACTURING BASE LINE EXISTS FOR APPLYING MUD-REPELLING COATINGS TO TACTICAL VEHICLES.						
	SOLUTION - ESTABLISH MANUFACTURING PROCESSES TO PROVIDE MUD-REPELLING COATINGS.						
(4579)	TITLE - INDUSTRIAL PRACTICES FOR WELDING CONSTRUCTIONAL ALLOY STEELS			250	200	200	
	PROBLEM - A WIDE VARIETY OF HIGH STRENGTH CONSTRUCTIONAL ALLOYS STILL WILL BE USED IN GREATER QUANTITIES TO MEET WEIGHT REQUIREMENTS.						
	SOLUTION - DOCUMENT RECOMMENDED WELDING PRACTICES AND PROCEDURES TO IDENTIFY SIGNIFICANT FACTORS AFFECTING PRODUCTION QUALITY FOR THE VARIOUS MATERIALS AND EQUIPMENT.						
(5003)	TITLE - MFG TECH OF STRONG WIRE WRAPPING TO MAKE COMPLEX COMPONENTS				500	225	225
	PROBLEM - COMPLEX HIGH STRENGTH ITEM CONFIGURATIONS ARE DIFFICULT TO PRODUCE.						
	SOLUTION - UTILIZE MULTI-AXIS WRAPPING MACHINES TO PRODUCE COMPLEX ITEMS IN THE ULTRA HIGH STRENGTH AREA.						

		FUNDING ($000)				
		PRIOR	80	81	82	83	84
COMPONENT -- SUSPENSION							
(4295)	TITLE - COMPONENTS FABRICATION USING ULTRA HIGH STRENGTH STEELS		270	170		200	
	PROBLEM - THE USE OF ULTRA HIGH STRENGTH STEELS HAS NOT BEEN PROPERLY EXPLORED.						
	SOLUTION - STUDY SEVERAL ULTRA HIGH STRENGTH STEELS TO DETERMINE THE MOST ADVANTAGEOUS AND ECONOMICAL FOR FABRICATION.						
(4345)	TITLE - METALLIC COMPOSITES IN VEHICULAR STRUCTURED APPLICATIONS		250	180		200	150
	PROBLEM - SOLID MEMBERS IMPOSE PENALTIES ON MOBILITY AND LOAD CARRYING CAPACITY.						
	SOLUTION - PROCESS TECHNIQUES IN THE USE OF COMPOSITES WILL BE INVESTIGATED.						
(4556)	TITLE - TITANIUM TORSION SPRING FABRICATION		250	200		200	175
	PROBLEM - THE USE OF TITANIUM ALLOYS IN SUSPENSION TORSION BARS HAS NOT BEEN PROPERLY EXPLORED.						
	SOLUTION - ESTABLISH PROCESSING TECHNIQUES TO ASSURE PRODUCABILITY OF DURABLE COMPONENTS ON AN ECONOMICAL AND CONSISTENT BASIS.						
(5002)	TITLE - FABRICATING TORSION BAR SPRINGS FROM HIGH STRENGTH STEEL	150	150				
	PROBLEM - ENGINEERING ALLOY STEELS CAN BE HEAT TREATED TO A MAXIMUM WORKING HARDNESS WHICH REQUIRES LARGE DIAMETER BARS THEREBY INTERFERING WITH DESIGN FITS AND INCREASING WEIGHT.						
	SOLUTION - ESTABLISH METHODS OF FABRICATING TORSION BARS UTILIZING 300000 MINIMUM YIELD MATERIALS.						
(5074)	TITLE - PRODUCTION TECHNIQUES FOR COMBAT VEHICLE SUSPENSION SYSTEMS					500	850
	PROBLEM - SUSPENSION SYSTEMS OF COMBAT VEHICLES ARE UNDERGOING A LARGE DESIGN CHANGE TO PROVIDE INCREASED MOBILITY PERFORMANCE BY UTILIZING NEWLY DEVELOPED COMPONENTS. APPLICATION OF THE ADVANCED SYSTEMS WILL INCREASE ACQUISITION COSTS.						
	SOLUTION - APPLY ADVANCED MANUFACTURING TECHNIQUES TO REDUCE OR PREVENT INCREASES IN THE ACQUISITION COSTS.						
(6009)	TITLE - FRICTION WELDING OF COMBAT VEHICLE COMPONENTS					250	250
	PROBLEM - CURRENT METHODS OF WELDING PRODUCE EXCESS HEAT AFFECTED ZONES THAT MUST BE ELIMINATED BY HEAT TREATMENT WHICH IS EXPENSIVE AND TIME CONSUMING.						
	SOLUTION - FRICTION WELDING WILL ELIMINATE THE NEED FOR HEAT TREATMENT AND ALSO ACCELERATE WELDING TIME IN PRODUCTION.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT	-- SUSPENSION (CONTINUED)						
(6011)	TITLE - SPRINGS FROM CARBON-FIBER PLASTIC-COMPOSITES			250	250		250
	PROBLEM - STEEL SPRINGS FOR TACTICAL VEHICLES ARE HEAVY AND SUBJECT TO FAILURE FROM FATIGUE. CARBON FIBER COMPOSITES ARE LIGHTER AND HAVE EXCELLENT FATIGUE RESISTANCE.						
	SOLUTION - THE TECHNOLOGY IS KNOWN TO MANUFACTURE LEAF SPRINGS FROM CARBON-FIBER-PLASTIC COMPOSITES- HOWEVER THE TECHNIQUES FOR MASS PRODUCTION NEED TO BE DEVELOPED.						
COMPONENT	-- TRANSMISSION						
(4319)	TITLE - FORGE POWDERED METAL PREFORMS	375		150	150	200	
	PROBLEM - HIGH COST RESULTS FROM MACHINING GEARS FROM FORGED GEAR BLANKS. METAL REMOVAL CAN ACCOUNT FOR AS MUCH AS 60 PER CENT OF THE COST OF THE FINISHED ITEM.						
	SOLUTION - ESTABLISH POWDER METAL FORGING TECHNIQUES WHICH WILL RESULT IN A GEAR MADE TO FINAL DIMENSIONS.						
(4573)	TITLE - HOT FORGED GEARS			225	150	150	
	PROBLEM - HIGH COST RESULTS FROM MACHINING GEARS FROM FORGED GEAR BLANKS. METAL REMOVAL CAN ACCOUNT FOR AS MUCH AS 60 PER CENT OF THE COST OF THE FINISHED ITEM.						
	SOLUTION - ESTABLISH MANUFACTURING PROCESSES WHICH WOULD RESULT IN A FINISHED GEAR TO DRAWING TOLERANCES FROM BAR STOCK AT ELEVATED TEMPERATURES.						
(4583)	TITLE - ESR PROCESS FOR GEAR BLANK FORGINGS	150	200	200			
	PROBLEM - SERVICE LIFE OF HIGH STRESSED GEARS NEEDS TO BE IMPROVED FOR LOWER MAINTENANCE AND HIGHER PRODUCT ASSURANCE.						
	SOLUTION - DEVELOP FURTHER AND APPLY THE ELECTROSLAG REMELT PROCESS TO CRITICAL GEAR BLANKS.						
(5005)	TITLE - COLD FORGED GEARS TO DRAWING TOLERANCES				250	200	200
	PROBLEM - MACHINING AND OTHER PROCESSES ADD COST TO THE FINISHED COMPONENT.						
	SOLUTION - ESTABLISH A MFG PROCESS TO RESULT IN A FINISHED GEAR TO DRAWING TOLERANCES FROM BAR STOCK AT AMBIENT TEMPERATURES.						
(5024)	TITLE - GEAR DIE DESIGN AND MFG UTILIZING COMPUTER TECHNOLOGY (CAM)	405			150	150	
	PROBLEM - PROPER TOOTH PATTERN ON BEVEL GEARS MUST BE MADE BY TRIAL AND ERROR.						
	SOLUTION - USE CAM METHOD TO DECREASE NEED FOR REWORKING PRECISION GEAR FORGING DIES.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- TRANSMISSION (CONTINUED)							
(5073)	TITLE = PRODUCTION OF TRANSMISSIONS FOR COMBAT VEHICLES					1000	1250
	PROBLEM = MANUFACTURING PROCESSES USED ARE LABOR INTENSIVE AND REFLECT ON HIGH MANUFACTURING COSTS.						
	SOLUTION = APPLY NEWLY AVAILABLE NET SHAPING PROCESSES.						
(5080)	TITLE = FAB METH FOR HIGH STRENGTH NEAR NET SHAPE AL TRANS CASES	325	150			100	200
	PROBLEM = TRANS CASES ARE BULKY AND NEED COMPLEX FABRICATION AND MACHINING.						
	SOLUTION = EST PROCESSES TO FAB CASES TO NET SHAPE USING HIGH STRENGTH LIGHT WEIGHT ALLOYS.						
(5081)	TITLE = FABRICATE FRICTION RIGHS AND REACTION PLATES	215	200				
	PROBLEM = FAB OF FRICTION RINGS AND REACTION PLATES RESULTS IN LARGE AMOUNTS OF SCRAP MATERIAL THUS CONTRIBUTING TO HIGH COST.						
	SOLUTION = ESTABLISH TECHNIQUES TO REDUCE SCRAP BY FABRICATING METHODS USING SPIRAL PROCESS TECHNIQUES.						
(5083)	TITLE = UPSCALING OF ADVANCED POWDER METALLURGY PROCESSES	715					
	PROBLEM = POWDER METALS PROCESSES HAVE NOT BEEN UTILIZED IN LARGE COMPONENTS						
	SOLUTION = EST PROCESSES WHICH PRODUCE HIGH DENSITY HIGH STRENGTH LARGE COMPLEX SHAPES.						
(5086)	TITLE = SURFACE HARDENING AND ALLOYING OF TRANS SYSTEMS WITH LASERS			225	200	100	
	PROBLEM = TRANS COMP HEAT TREATED BY CARB AND OR INDUCTION TAKES LONG TIME AND HIGH ENERGY DIFFICULT TO CONTROL PARAMETERS.						
	SOLUTION = ESTABLISH TECH USING LASER BEAM OR PRECISE CONTROL OF HEAT TREAT PARAMETERS.						
(5092)	TITLE = RHEOCAST PRESSURE-CASTING FOR COMBAT VEHICLE PARTS		225	225		150	150
	PROBLEM = PRESSURE CASTING UTILIZING INTERNAL REINFORCEMENTS HAVE NOT BEEN DEVELOPED.						
	SOLUTION = PRODUCTION TECHNIQUES WILL BE DEVELOPED TO PRODUCE CASTINGS OF NEAR NET SHAPE WITH REINFORCEMENTS.						

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- WHEELS						
(4559) TITLE - PRESSURE CASTING TECHNIQUES FOR ALUMINUM COMPONENTS				200	200	150
PROBLEM - ALUMINUM CASTINGS REQUIRE GATINGS AND RISERS WHICH UTILIZE LARGE AMOUNTS OF MATERIAL WHICH HAVE TO BE REMOVED FROM THE CASTINGS AND USED AS SCRAP REMELT. THIS CONTRIBUTES TO INCREASED COSTS OF COST ITEMS.						
SOLUTION - ESTABLISH MANUFACTURING PROCESSES UTILIZING LOW PRESSURE CASTING TECHNIQUES, THEREBY ELIMINATING THE NEED FOR EXCESS GATING AND TOTALLY ELIMINATING RISERS.						
(5037) TITLE - FAB TECH FOR FIBER REINF LAMINATED PLASTIC ROADWHEELS		200	250	150	150	
PROBLEM - METALLIC WHEELS ARE SUBJECT TO CORROSION HAVE DIFFICULTY IN FORMING AND ARE HEAVY.						
SOLUTION - DEVELOP PROCESSING TECHNIQUES FOR FABRICATED HIGH STRENGTH LIGHTWEIGHT REINFORCED PLASTIC WHEELS.						
(5038) TITLE - NON-PNEUMATIC COMBAT TIRE FABRICATION TECHNIQUES		220	200	175	175	100
PROBLEM - PNEUMATIC TIRES ON TACTICAL VEHICLES ARE SUBJECT TO COMBAT DAMAGE.						
SOLUTION - ESTABLISH PROCESSING TECHNIQUES TO ASSURE RELIABLE HIGH MOBILITY, NON-PNEUMATIC TIRES.						

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* CATEGORY *
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*TRACK *
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COMPONENT -- GENERAL						
(5043) TITLE - FABRICATION TECHNIQUES FOR NON METALLIC TRACK			250	250	200	
PROBLEM - CURRENT METALLIC TRACK CONTRIBUTES A LARGE PERCENTAGE OF TOTAL VEHICLE WEIGHT.						
SOLUTION - INVESTIGATE FABRICATION FEASIBILITY TO BUILD AN ALL PLASTIC COMBAT VEHICLE TRACK.						
(5075) TITLE - RUBBER FOR MILITARY TRACK	200		200			
PROBLEM - TRACK LIFE IS HELD AT ITS PRESENT LEVEL BY FAILURE OF RUBBER COMPONENTS SUCH AS BUSHINGS, PADS AND BLOCKS.						
SOLUTION - ESTABLISH PRODUCTION PROCESSES FOR NEWLY DEVELOPED ELASTOMER COMPOUNDS FOR TRACKS.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- GENERAL (CONTINUED)							
(5089)	TITLE = INJECTION MOULTING RUBBER FOR IMPROVED TRACK BUSHINGS	200	150	150	100	100	
	PROBLEM = TRACK BUSHINGS ARE SUBJECTED TO HIGH LOADS AND STRESSES WHOSE FAILURE RESULTS IN TRACK FAILURE.						
	SOLUTION = ESTABLISH PROCESS TO ASSURE BUSHING RUBBER WITH THE CORRECT PHYSICAL CONSISTENCIES TO PERFORM SATISFACTORILY.						
(6013)	TITLE = FILAMENT WOUND TRACK AND DRIVE					225	550
	PROBLEM = PRESENT TRACK AND DRIVE SYSTEMS ARE LIMITED IN LIFE DUE TO FATIGUE OR WEAR CAUSED BY MASS INERTIA OF COMPONENT PARTS.						
	SOLUTION = DEVELOP PROCESSING TECHNIQUES TO FABRICATE COMPLEX TRACK AND DRIVE COMPONENTS FROM FILAMENT ORIENTED FIBERS TO REDUCE WEIGHT AND IMPROVE WEAR.						
(6016)	TITLE = FABRICATION TECHNIQUES FOR REINFORCED METAL MATRIX COMPONENT					400	400
	PROBLEM = METAL MATRIX FABRICATION TECHNIQUES ARE REQUIRED WHICH WILL PROVIDE THE OPTIMUM METAL AND REINFORCEMENT RELATIONSHIPS.						
	SOLUTION = UPSCALE LABORATORY TECHNIQUE FOR MIXING ORIENTING AND INTEGRATING REINFORCING MATERIAL FOR LARGE COMPLEX PARTS.						
COMPONENT -- RUBBER PADS							
(4264)	TITLE = INSERTS AND FRICTION FILLERS FOR TRACK RUBBER PADS		150				
	PROBLEM = TRACK PADS CUT AND CHUNK IN ROCKY OR FROZEN GROUND RESULTING IN REDUCED PAD LIFE AND INCREASED COSTS AND MAINTENANCE.						
	SOLUTION = ESTABLISH PROCESS TO INCORPORATE FILLER FRICTION MATERIALS IN EXISTING FORMULATIONS WHICH WILL REDUCE CUTTING AND CHUNCKING.						
(4270)	TITLE = CAST IN PLACE TRACK SHOE BACKING INSERTS		125	125			
	PROBLEM = TRACK COSTS ARE ESCALATED BY EXCESSIVE METAL SHIPPING HANDLING AND CAPITAL EQUIPMENT FOR MOLDING RUBBER.						
	SOLUTION = ESTABLISH PROCESSES AND RECIPE MODIFICATIONS REQUIRED TO PROVIDE A REMOTE RUBBERIZING SYSTEM.						
(4371)	TITLE = FABRICATION TECHNIQUES FOR TRACK ELASTROMERIC COMPOUNDS		225	225			
	PROBLEM = TRACK FAILURES ARE CAUSED, TO A LARGE DEGREE, BY DEGRADATION OF ITS RUBBER COMPONENTS.						
	SOLUTION = INVESTIGATE NEWLY DEVELOPED MATERIALS AND PROCESSING FOR APPLICATION TO PRODUCTION TRACKS.						

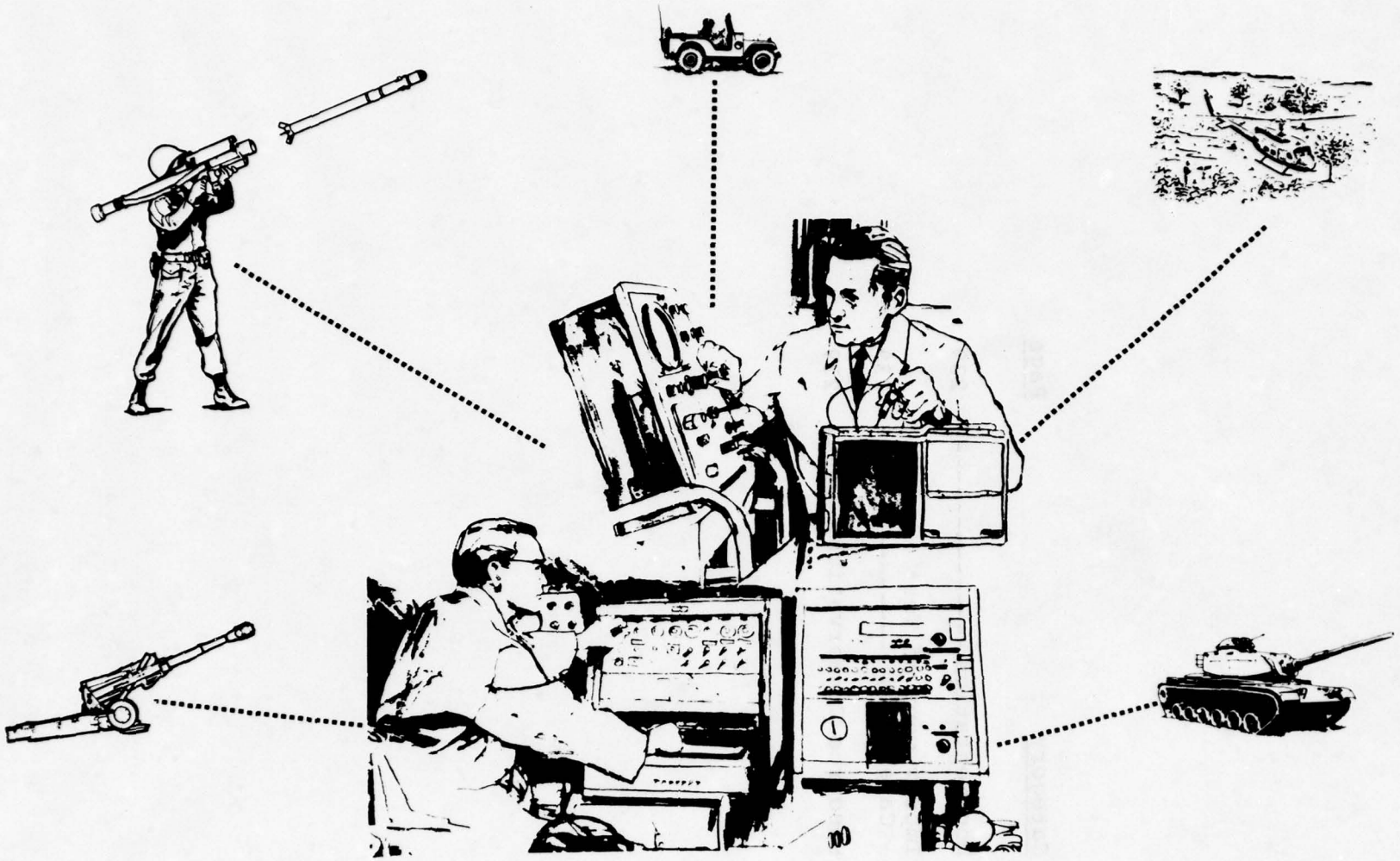
		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT	-- RUBBER PADS (CONTINUED)						
(5041)	TITLE - MFR TECH FOR LONG LIFE PLASTIC TRACK SHOE PADS		200	250	150	150	
	PROBLEM - CURRENT RUBBER PADS HAVE RELATIVELY SHORT LIFE.						
	SOLUTION - ESTABLISH A PROCESS FOR A LAMINATED FIBER REINFORCED PLASTIC TRACK SHOE PAD.						
(5087)	TITLE - IMPR PROD TECH FOR MOLDING IMPROVED RUBBER PADS	250	180	60	40	40	
	PROBLEM - RUBBER PARTS REPRESENT HIGH COST ITEM WHICH REQUIRE UTILIZING A NEW FORMULATION TO INCREASE LIFE.						
	SOLUTION - ESTABLISH PROCESSING TECHNIQUES FOR NEW RUBBER COMPOUNDS.						
COMPONENT	-- SHOES						
(5006)	TITLE - PRODUCTION OF LIGHTWEIGHT STEEL CAST TRACK SHOES	200	150				
	PROBLEM - THE MOST COSTLY ITEM TO MAINTAIN PER MILE OF TRACKED VEHICLE OPERATION IS THE TRACK.						
	SOLUTION - PRODUCT CAST TRACK SHOES WHICH WILL INCREASE LIFE OVER PRESENT SHOES.						
COMPONENT	-- TREADS						
(4514)	TITLE - PRODUCTION OF HARD FACE COATINGS				200		150
	PROBLEM - PRESENT HARD FACE COATINGS DO NOT HAVE ADEQUATE BOND STRENGTH.						
	SOLUTION - INVESTIGATE APPLICATION OF DIFFUSION BONDING TECHNIQUE.						
(5054)	TITLE - LASER SURFACE HARDENING COMBAT VEHICLE COMPONENTS	175	175				
	PROBLEM - PRESENT METHODS OF SURFACE HARDENING INPUTS HEAT OVER LARGE SURFACE AREA.						
	SOLUTION - ESTABLISH LASER BEAM HARDENING PROCEDURES WITH ITS ATTENDANT FINE BEAM SMALL AREAS RAPID HEATING.						
COMPONENT	-- WEDGES						
(4513)	TITLE - HIGH DENSITY POWDER METAL PARTS FOR COMBAT VEHICLES				300		175
	PROBLEM - TRACK WEDGES WEAR EXCESSIVELY REQUIRING THE TRACK TO BE ADJUSTED AND/OR THE WEDGES REPLACED FREQUENTLY.						
	SOLUTION - FABRICATE THE WEDGE BY COMPACTING A HIGH MANGANESE WORK HARDENABLE POWDER.						

*** CATEGORY ***

***VEHICLE BODY ***

		FUNDING ($000)				
	PRIOR	80	81	82	83	84
COMPONENT -- ALL						
(5039) TITLE - INSULATED PLASTIC ENVIRONMENTAL TRAILER MODULES (ERM)		300	300	350		
PROBLEM - MINIMUM EFFORT WAS EXERTED TO DEVELOP TECHNIQUES TO UTILIZE ALL PLASTIC, NON-STRUCTURAL VEHICLE BODIES.						
SOLUTION - ESTABLISH THE FEASIBILITY OF USING ELASTIC RESERVOIR MOLDING REINFORCED BODIES FOR TRAILER MODULES.						
(5044) TITLE - ESTABLISH RAPID CURING OF AUTOMOTIVE PROTECTIVE COATINGS-UVR		200	200	150		
PROBLEM - PROTECTIVE COATINGS REQUIRE TEDIOUS, TIGHTLY CONTROLLED APPLICATION WITH LONG CURE TIMES.						
SOLUTION - PRODUCE PROTECTIVE COATINGS WITH SHORT CURE TIMES USING ULTRA VIOLET RADTATION.						
(6012) TITLE - PRODUCTION TECHNIQUES FOR THE APPLICATION NEW NONTOXIC PAINT						350
PROBLEM - THE OLD PAINT WITH METAL ANTI-FUNGICIDES HAVE BEEN DISAPPROVED BY THE FDA.						
SOLUTION - DEVELOP NEW METHODS FOR APPLYING THE NEWLY DEVELOPED PAINTS.						
(6015) TITLE - APPLICATION OF ADHESIVE FOR LAYERED METALLIC STRUCTURES			250	250		
PROBLEM - USE OF ADHESIVES FOR JOINING METALLIC PLATE REQUIRES EXTENSIVE USE OF MANUAL OPERATION.						
SOLUTION - DEVELOP AUTOMATED AND COMPUTER CONTROLLED PROCESSES FOR JOINING MATERIALS.						
COMPONENT -- CAB TOPS						
(4389) TITLE - PRODUCTION OF REMOVEABLE PLASTIC TOPS FOR SOFT TOP TRUCK CAB	225	175				
PROBLEM - CANVAS TOPS AND BACKS AFFORD MINIMUM COMFORT AND ENVIRONMENTAL PROTECTION. REPLACEMENT IS OFTEN NECESSARY.						
SOLUTION - FABRICATE RIDIG PLASTIC COMPONENTS WITHOUT MAJOR CHANGES TO VEHICLES IN SERVICE.						
COMPONENT -- NON-STRUCTURAL						
(5019) TITLE - TACTICAL VEHICLE STORAGE BATTERY	220	200	170			
PROBLEM - THE MAJOR CAUSE OF TACTICAL VEHICLE BATTERY FAILURE IS BATTERY CONTAINER BREAKAGE.						
SOLUTION - PROVIDE NEW HIGH IMPACT PLASTIC CONTAINER TO INCREASE FIELD PERFORMANCE REQUIREMENTS AND TO ACCOMODATE THE MAINTENANCE FREE CONCEPT ALREADY RELEASED IN LARGER MILITARY BATTERY SIZES.						

		FUNDING ($000)					
		PRIOR	80	81	82	83	84
COMPONENT -- NON-STRUCTURAL (CONTINUED)							
(5042)	TITLE - MANUFACTURING TECHNIQUES FOR NON-METALLIC TOTAL VEHICLES				500	500	500
	PROBLEM - CURRENT NON-STRUCTURAL VEHICLE BODIES MADE FROM METALS ARE EXCESSIVE IN WEIGHT AND TEND TO CORRODE.						
	SOLUTION - ESTABLISH FEASIBILITY OF MOLDING A VEHICLE BODY USING A MINIMUM OF PARTS.						
(5067)	TITLE - PLASTIC BATTERY BOX	90	120				
	PROBLEM - METALLIC BATTERY BOXES ARE SUBJECT TO CORROSION, THEREBY, DAMAGING THE VEHICLE.						
	SOLUTION - ESTABLISH PRODUCTION TECHNIQUES TO USE NON-CORROSIVE NON-METALS.						
(6000)	TITLE - LIGHTWEIGHT TILT-UP HOOD/FENDER ASSEMBLY	200	350	225			
	PROBLEM - CURRENT HOOD/FENDER ASSEMBLY MADE FROM STEEL STAMPINGS ARE TOO HEAVY FOR ONE MAN TO LIFT.						
	SOLUTION - *REDUCE WEIGHT BY MANUFACTURING ITEMS FROM LIGHTWEIGHT FORMABLE* PLASTIC.						
COMPONENT -- SEATING							
(5066)	TITLE - COMPOSITE WOOD SLATS FOR TRUCK CARGO RACKS	100	120				
	PROBLEM - HARDWOODS ARE BECOMING INCREASINGLY UNAVAILABLE.						
	SOLUTION - ESTABLISH TECHNIQUES TO UTILIZE WOOD SUBSTITUTES IN TACTICAL VEHICLE APPLICATIONS.						



TEST AND EVALUATION COMMAND

(TECOM)

Category	Page
Documentation	239
Improvement of Test Capability	239
Resource Conservation	239

US ARMY

TEST AND EVALUATION COMMAND

(TECOM)

TECOM, with headquarters at Aberdeen Proving Ground, MD, is the primary developmental testing agency for the US Army. TECOM plans, conducts, and reports results on development tests performed during the life cycle of Army materiel, and evaluates foreign materiel for possible US acquisition. Additional testing is performed as a service to the commodity commands upon their request. The testing organization consists of the aircraft development test activity, three environmental testing activities, five proving grounds, one of which serves as the third environmental testing activity; and a national missile range. These are located in the Continental United States and in the Panama Canal Zone and Alaska.

Individual investigations into production test procedures and evaluation techniques are accomplished through TECOM's MM&T program. In view of TECOM's mission and the intended results of their MM&T efforts (to improve test procedures), the majority of the work done under the MM&T program is accomplished in-house.

Procurement funds from the Other Procurement, PA 5397 Appropriation, are provided to TECOM under three general headings: (1) documentation, (2) resource conservation, and (3) improvement of test capability. From these "parent programs" individual efforts are funded. Current budget guidance constrains TECOM to an annual program that only supports approximately one-half of their planned efforts.

TECOM

COMMAND FUNDING SUMMARY
(THOUSANDS)

CATEGORY	FY80	FY81	FY82	FY83	FY84
DOCUMENTATION	325	250	250	250	250
IMPRO OF TEST CAPABILITY	305	400	400	400	400
RESOURCE CONSERVATION	192	150	150	150	150
TOTAL	822	800	800	800	800

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********** CATEGORY **********		FUNDING ($000)					
		PRIOR	80	81	82	83	84
DOCUMENTATION							
COMPONENT -- TEST OPNS/ACCEPTANCE TEST PRO							
(5071)	TITLE - TECOM PRODUCTION TEST METHODOLOGY ENGINEERING MEASURES	200	325	250	250	250	250
	PROBLEM - STANDARD TEST PROCEDURES ARE REQUIRED TO INSURE THAT TEST ACTIVITIES COLLECT DATA AND CONDUCT TESTS IN A UNIFORM MANNER TO SUPPORT THE DT EVALUATION PROCESS. ACCEPTANCE TEST PROCEDURES ARE REQUIRED TO VERIFY PRN HARDWARE SPECIFICATION COMPLIANCE.						
	SOLUTION - MAINTAIN TEST OPERATIONS PROCEDURES AND ACCEPTANCE TEST PROCEDURES TO TEST SYSTEMS FOR SPECIFICATION COMPLIANCE.						
********** CATEGORY **********							
IMPRO OF TEST CAPABILITY							
COMPONENT -- ARTILLERY,VEHICLES AND ELECTRONICS							
(5071)	TITLE - TECOM PRODUCTION TEST METHODOLOGY ENGINEERING MEASURES	524	305	400	400	400	400
	PROBLEM - ARTILLERY,VEHICLE AND ELECTRONIC CONVENTIONAL TEST CAPABILITIES NEED TO BE UPGRADED TO PROVIDE MORE TIMELY ACCURATE TEST DATA FOR THE TEST AND EVALUATION PROCESS.						
	SOLUTION - DEVELOP A PROGRAM TO UPGRADE CONVENTIAL TEST CAPABILITIES AT THE TEST ACTIVITIES.						
********** CATEGORY **********							
RESOURCE CONSERVATION							
COMPONENT -- SIMULATION AND AUTOMATION							
(5071)	TITLE - TECOM PRODUCTION TEST METHODOLOGY ENGINEERING MEASURES	35	192	150	150	150	150
	PROBLEM - FIELD TESTING COMPLEX WEAPON SYSTEMS IS COST PROHIBITIVE. SIM TECHNIQUES MUST BE DEVELOPED TO REDUCE THE COST AND MANPOWER REQUIRED TO PERFORM GOVT TESTS ROUTINE. PDN TEST PROCESSES MUST BE AUTOMATED BECAUSE OF PERSONNEL REDUCTIONS AT TEST ACTIVITIES						
	SOLUTION - DEVELOP SIMULATION TECHNIQUES TO TEST COMPLEX WEAPON SYSTEMS AND AUTOMATE PRODUCTION TEST PROCESSES.						

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TROOP SUPPORT

POWER



BRIDGING

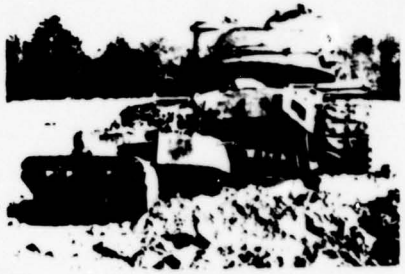


ENVIRONMENTAL





MINE DETECTION/
NEUTRALIZATION



TROOP SUPPORT AND AVIATION MATERIEL READINESS COMMAND (TSARCOM)

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Category	Page
Turbine Engine ----------	245

US ARMY TROOP SUPPORT AND AVIATION

MATERIEL READINESS COMMAND

(TSARCOM)

TSARCOM, located at the Federal Center in St. Louis, MO, is the product of a merger of the Aviation Systems Command and Army Troop Support Command readiness missions. The logistic management responsibility for the ground and air equipment formerly managed by two commands is now handled by TSARCOM.

Field activities supporting the headquarters operations include aeronautical maintenance and supply missions at Corpus Christi, New Cumberland, Red River, and Sharpe Army Depots. Army Aviation Plant activities are located at Fort Worth, TX; Culver City, CA; and Philadelphia, PA.

Three additional sub-activities are the General Materiel and Petroleum Activity at New Cumberland, PA, the Army Support Activity in Philadelphia, and a Government-owned contractor-operated facility for watercraft at Charleston, SC.

The diverse mission of TSARCOM ranges from fixed wing, vertical take-off and rotary aircraft to a fleet of amphibians and watercraft and hundreds of large and small field support items. Typical items include generators; bridges; water purifiers; camouflage; mine detectors; air conditioners and heaters; fuel storage and distribution equipment; compasses; and surveying instruments.

With few exceptions, the MM&T effort performed in support of TSARCOM's mission items is performed by the R&D commands (AVRADCOM, NARADCOM, and MERADCOM).

TSARCOM

COMMAND FUNDING SUMMARY
(THOUSANDS)

CATEGORY	FY80	FY81	FY82	FY83	FY84
TURBINE ENGINE	160	0	0	0	0
TOTAL	160	0	0	0	0

CATEGORY
TURBINE ENGINE

	PRIOR	FUNDING ($000) 80	81	82	83	84
COMPONENT -- GENERAL						
(8187) TITLE = IMPROVED STRENGTH CAST INCO718 STRUCTURES	750	160				

PROBLEM = LARGE AMOUNTS OF MATERIAL AND LABOR ARE SPENT IN MACHINING SUPERALLOY FORGINGS.

SOLUTION = REDUCE THE INPUT MATERIAL COSTS AND MACHINING COSTS ASSOCIATED WITH THE T=700 ENGINE.

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APPENDICES	PAGES
APPENDIX A	A1 - A5
APPENDIX B	B1 - B9
APPENDIX C	C1 - C4
APPENDIX D	D1
APPENDIX E	E1 - E4

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INDUSTRY GUIDE

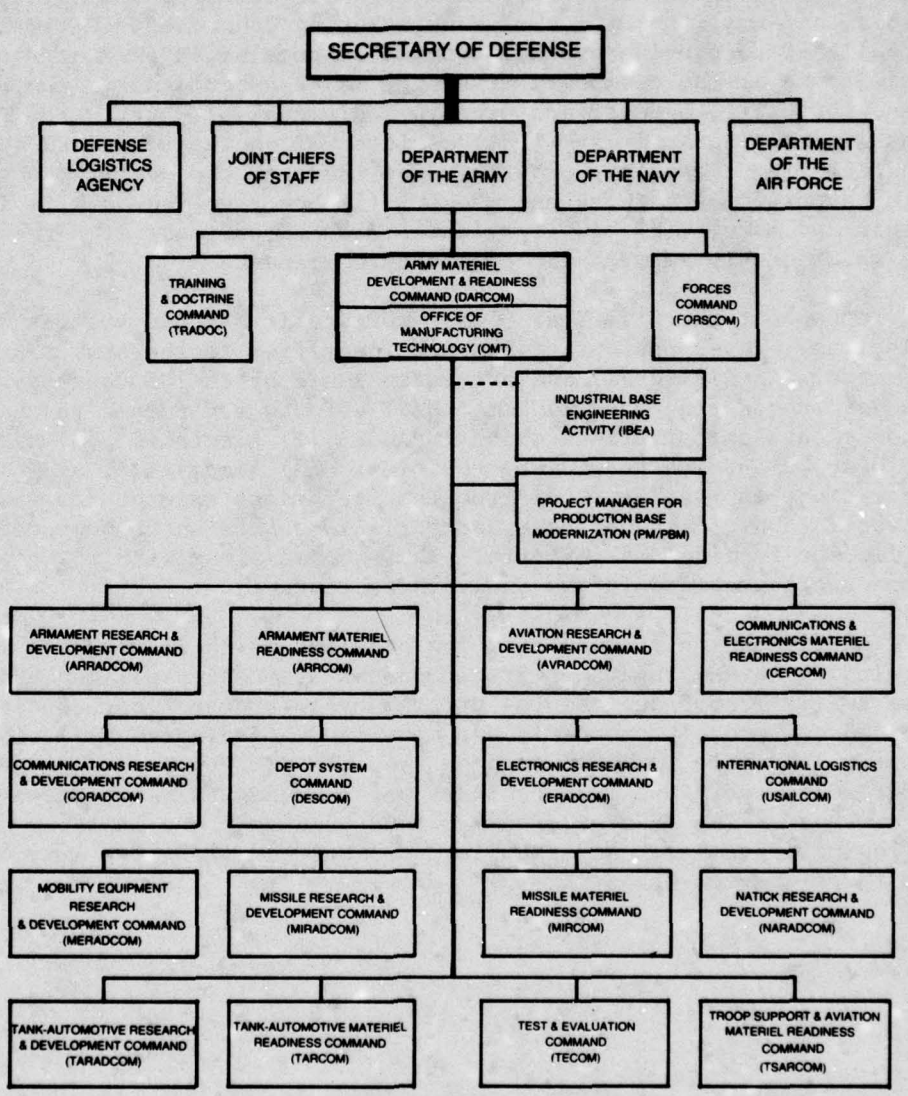
This section of the Five Year Plan was added to explain the Army programming cycle for the MM&T Program. The objective of the MM&T Program is to develop new manufacturing methods and processes that will reduce the cost of producing weapon systems. The program is made up of over 300 projects annually that concentrate on improving and/or developing manufacturing methods, techniques and processes.

The scope of the MM&T Program covers all three of the military services. Within the Army, the Office of Manufacturing Technology (OMT), has been established to provide overall program responsibility. Functional responsibility is at the commodity oriented, Major Subcommands. The Subcommands plan, formulate, budget, and execute individual projects. The Industrial Base Engineering Activity (IBEA) assists OMT on the technical aspects of the manufacturing technology program. The chart on the next two pages depicts this supporting framework and shows; (1) how the framework is interrelated within the Army, (2) how it relates to the Department of Defense, and (3) the relationship between the commodity commands.

Throughout the Five Year Plan reference is made to various appropriations. These appropriations are identified in the Army Management Structure (AR 37-100-FY) and are established by the US Congress as a standard accounting system. Most MM&T efforts are funded through the Procurement Appropriations which include (1) Aircraft, (2) Missile, (3) Weapons and Tracked Combat Vehicles, (4) Ammunition, and (5) Other. A few projects receive funds from the Operations Maintenance Army (OMA) appropriation. Each of these appropriations have an unique code identified for funding MM&T efforts. These codes along with the projected funds are summarized in the analysis section.

Identification of manufacturing problems is the first step in developing an MMT Program. Problem areas are conceptualized and compiled into a Five Year Plan. As the program cycle proceeds the concepts are refined and project proposals are developed. A diagram depicting this programming cycle is shown on page A-4. To fully understand the entire programming cycle one must realize that DOD budgets funds based upon a Fiscal Year. The FY starts on 1 October and ends the last day of the following September. For example, on 1 October 1978, the Army will begin the first quarter of FY79.

UNITED STATES ARMY MATERIEL DEVELOPMENT & READINESS COMMAND (DARCOM)



U.S. ARMY MATERIEL DEVELOPMENT AND READINESS COMMAND (DARCOM)

Interelationships Between Major Subordinate Commands

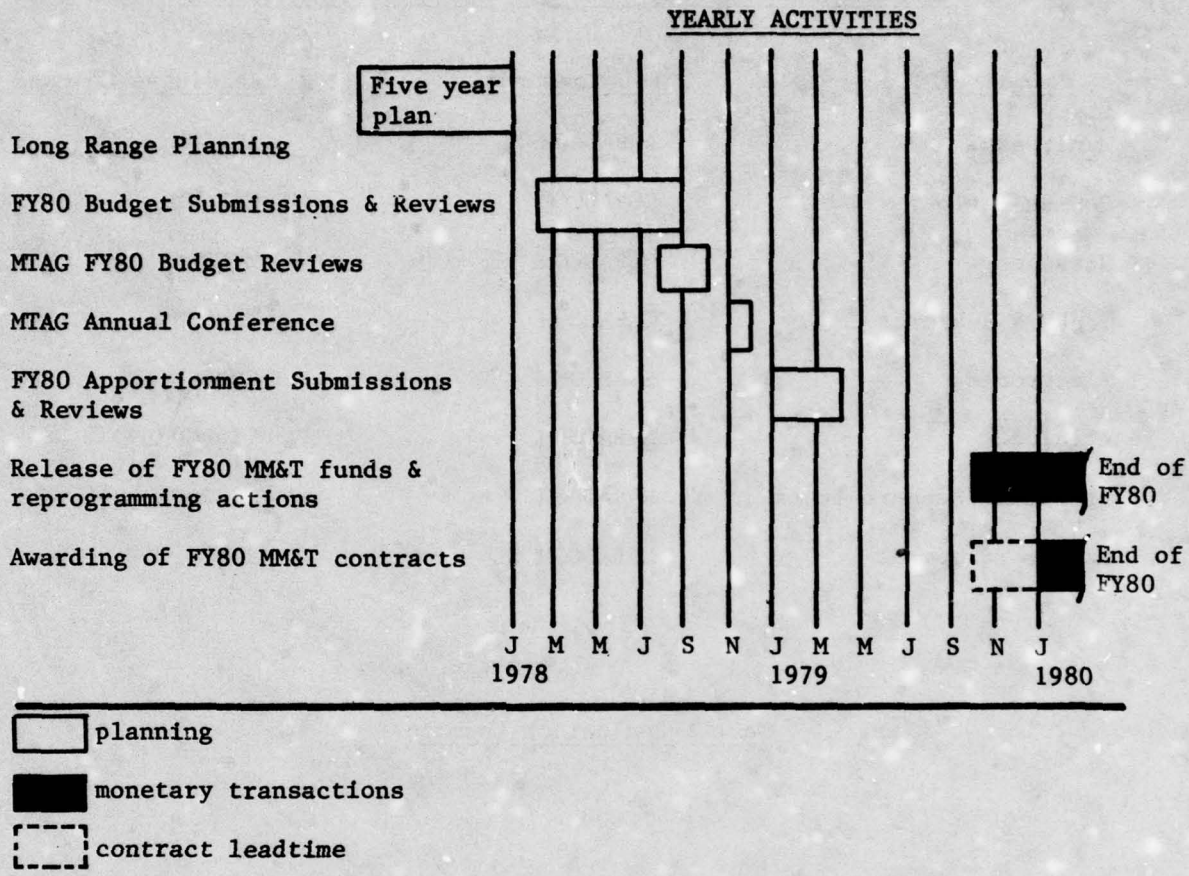
Commodity	R&D Command*	Readiness Command
Munitions	ARRADCOM	ARRCOM
Communications	CORADCOM	CERCOM
Missiles	MIRADCOM	MIRCOM
Tanks & Vehicles	TARADCOM	TARCOM
Electronics	ERADCOM	CERCOM
Aviation	AVRADCOM	TSARCOM
Personnel Support Items	NARADCOM	TSARCOM
Mobile Equipment	MERADCOM	TSARCOM

Test & Evaluation Command

All	TECOM

*Each of the Research and Developments Commands has one or several laboratories integrated into its structure.

MM&T Planning/Budgeting/Review Cycle
(Example for a FY80 Project)



This chart depicts the various activities and stages that MM&T projects go through. Concepts are first identified in the five year plan according to the projected year funding is expected. Each year these concepts are reevaluated and move forward until they reach the budget phase. At that time the concept is further refined and a project prepared. Industry has the opportunity to participate during the annual MTAG conference. At this gathering the current program, the latest budget program and the five year plan are discussed. Approximately one year later the Apportionment reviews are completed. Actual funding starts in October 1979 which is the beginning of FY80.

The programming cycle shown on the previous page starts with the Five Year Plan. The Five Year Plan is a long range planning document that consolidates individual submissions from the Major Subcommands and makes up what is known as the planned program. Because long range Army budget guidance provides "ceilings", potential projects must be prioritized which results in some being excluded or slipped. Inclusion in the Plan does not guarantee that the project will be funded. The level of funding is dependent upon what Congress will appropriate each year.

As projects in the Five Year Plan approach the start of the funding cycle specific objectives and work scopes are developed. These projects are documented in what is known as a P-16. A P-16 is simply the format that is utilized to document data elements such as estimated cost, economics, and description of work. (The P-16 format is described in AR 700-90).

The budget submission represents the first P-16 submitted for inclusion in the program. This submission is followed about nine months later by the more definite apportionment submission. Projects are then funded when the new fiscal year begins. Although this is the normal planning cycle, a project can enter the planning cycle at any point in time. Such a project would be known as a late start submission and funding is usually at the expense of another project.

Representatives from industry can submit unsolicited proposals when the results are directly beneficial to the Army. The submission of a proposal is no assurance that the concern who submitted the proposal will be given the contract to actually perform the work.

Criteria for actually funding individual projects include technical, operational, and economical feasibility. The potential for technical success, the means by which the results will be implemented, the potential payback or return on investment and the interrelationships that exist between factors are all evaluated.

For a more comprehensive understanding of the MM&T program, the following list of documents are provided for reference:

DOD Instruction 4200.15, Manufacturing Technology Program

AR 700-90, The Army Industrial Preparedness Program

AR 37-100, The Army Management Structure

AR 11-28, Economic Analysis and Program Evaluation for Resources Management

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SUPPLEMENTARY FY79

PROJECT LISTING

A special list of FY79 projects are provided on the following pages. At this point in time, the FY79 list only includes those projects for which funding is expected. Data provided includes the project number, project title, and estimated costs. The first digit of the project number indicates what Command/Activity will manage the efforts. A conversion list is provided below.

First Digit of Project Number	Command/Activity
D	DARCOM
E	MERADCOM
F	CORADCOM
H	ERADCOM
M	AMMRC
R	MIRADCOM
T	TARADCOM
0	TECOM
1	AVRADCOM
2	CERCOM
5	ARRCOM/ARRADCOM (AMMO)
6	ARRCOM/ARRADCOM (WPNS)

FISCAL YEAR 79 PROJECT LISTING

06/22/78

	PROJECT NO.	TITLE	PROJECTED FUNDING($000)
***			
*	D 79 5052	ARMY ENGINEERING DESIGN HANDBOOK FOR PRODUCTION SUPPORT	500
*	E 79 3532	MOLTEN SALT LI/CL BATTERY	295
*	E 79 3604	SOLID STATE POWER SWITCH	85
*	E 79 3605	TRANSCALENT-HIGH POWER-TRANSISTOR	453
*	E 79 3606	250 AMP TRANSCALENT HIGH POWER RECTIFIER	85
*	E 79 3613	VEHICLE-MOUNTED ROAD MINE DETECTOR SYSTEM ANTENNAS	165
*	E 79 3708	COATED FABRIC COLLAPSIBLE FUEL TANK- CIRCULAR SEAMLS WEAVING	97
*	E 79 3709	CONTINUOUS LENGTH FUEL HOSE	245
*	E 79 3743	COMPOSITE SPUN MATERIAL LAUNCHING BEAM FOR BRIDGES	420
*	E 79 3745	ALUMINUM-GRAPHITE EPOXY SANDWICHED BRIDGE REINFORCEMENT	383
*	E 79 3756	COMPOSITE MATERIAL GIRDER MODULES FOR BRIDGES	300
*	E 79 3759	KEVLAR CABLE REINFORCEMENT FOR MILITARY BRIDGES	175
*	F 79 9784	RUGGEDIZED TACTICAL FIBER OPTIC CABLE ASSEMBLIES	600
*	F 79 9891	ARCTIC (-55 C) ELECTRICAL CABLE JACKET	400
*	F 79 9938	THREE COLOR LIGHT EMITTING DIODE DISPLAY UNIT	510
*	H 79 9805	QUARTZ CRYSTAL PARAMETER TESTING	400
*	H 79 9807	MMT FOR PROCESSING HIGH STABILITY QUARTZ CRYSTAL UNIT	760
*	H 79 9844	CMOS CIRCUITS USING SILICON ON SAPPHIRE -SOS-TECHNOLOGY	700
*	H 79 9853	LEAD TIN TELLURIDE DETECTOR/DEWAR MODULES	1000
*	H 79 9869	RAPID REMOVAL OF PLASTIC ENCAPSULANTS	242
*	H 79 9877	MMT FOR LIGHT EMITTING DIODE ARRAY COMMON MODULE	550
*	H 79 9893	ADVANCED METHODS FOR FABRICATING MICROCHANNEL PLATES	623
*	H 79 9963	LOW COST E-BEAM EQUIPMENT	1050

FISCAL YEAR 79 PROJECT LISTING

06/22/78

	PROJECT NO.	TITLE	PROJECTED FUNDING($000)
***			
*	M 79 6350	MATERIALS TESTING TECHNOLOGY (77-)	4500
*	R 79 3116	IMPROVED PDN METHOD FOR ROSETTE AD SEEKER OPTICS + DETECTOR	750
*	R 79 3136	IMPROVED MFR PROCESSES FOR COMPLIANT BEARING GYROS	350
*	R 79 3142	PRODUCTION METHODS FOR LOW COST PAPER MOTOR COMPONENTS	275
*	R 79 3146	HIGH DENSITY MULTILAYER THICK FILM HYBRID MICRO CIRCUITS	350
*	R 79 3160	CLEANLINESS + PROCESS CRITERIA FOR CIRCUIT BOARDS	150
*	R 79 3217	AUTOMATED PRODUCTION METHODS FOR TRAVELING WAVE TUBES	760
*	R 79 3219	AUTOMATIC POLYMER ATTACHMENT PRODUCTION METHODS	200
*	R 79 3242	DIGITAL FAULT ISOLATION OF PRINTED CIRCUIT BOARD	425
*	R 79 3253	HIGH CURRENT DENSITY CATHODES	175
*	R 79 3267	PDN PROC FOR REMOVING EPOXY SMEAR IN PLATED-THROUGH HOLES	200
*	R 79 3268	AUTOMATIC CONTROL OF PLATING (CAM)	450
*	R 79 3272	FLEX PRINTED CIRCUITS WITH INTEGRAL MOLDED CONNECTORS	500
*	R 79 3280	ENGR ANALYSIS OF MFG PARAMETERS FOR THERMAL BATTERIES	145
*	R 79 3372	DEV + EVAL OF MFR METHODS FOR MAGNETIC MATERIALS	610
*	R 79 3381	LOW COST, IMPROVED 2-D HEAT SHIELDS	500
*	R 79 3410	PRODUCTION METHOD FOR HEAT PIPES FOR HYBRID/LSI	350
*	R 79 3438	DEL1ODING, PARALLEL SEAM SEALED HYBRID MICROELECT PACKAGES	200
*	R 79 3441	APPLICATION OF HIGH ENERGY LASER MANUFACTURING PROCESSES	400
*	R 79 3448	FULLY ADDITIVE MANUFACTURING FOR PRINTED WIRING BOARDS	200
*	R 79 3445	PRECISION MACHINING OF OPTICAL COMPONENT	300
*	T 79 4389	PDN OF FOLDABLE PLASTIC TOPS FOR SOFT TOP TRUCK CABS-PH 1	225
*	T 79 4575	LASER WELDING TECHNIQUES FOR MILITARY VEHICLES	375

FISCAL YEAR 79 PROJECT LISTING

06/22/78

	PROJECT NO.	TITLE	PROJECTED FUNDING($000)
***			
*	T 79 4586	IMPROVED LARGE ARMOR STEEL CASTINGS- PHASE 1	500
*	T 79 5002	FABRICATING TORSION SPRINGS FROM HIGH STRENGTH STEELS	150
*	T 79 5006	PRODUCTION OF LIGHTWEIGHT STEEL CAST TRACK SHOES	200
*	T 79 5007	ADVANCED TECHNOLOGY BRAKE LINING MATERIALS-PHASE 2	190
*	T 79 5024	GEAR DESIGN + MFR UTILIZING COMPUTER TECHNOLOGY, CAM-PH 2	205
*	T 79 5045	SPALL SUPPRESSIVE ARMOR FOR COMBAT VEHICLES-PHASE 1	150
*	T 79 5049	PRODUCTION OF LASER ENERGY ABSORBING COATINGS	85
*	T 79 5054	LASER SURFACE HARDENED COMBAT VEHICLE COMPONENTS-PHASE 1	175
*	T 79 5061	NEW HIGH STRENGTH ALUMINUM FOR ARMOR	460
*	T 79 5064	LIGHT WEIGHT SADDLE TANK-PHASE 2	140
*	T 79 5065	ADV TECH SURVEILLANCE COUNTERMEASURE MATERIALS-PH 1	190
*	T 79 5067	PLASTIC BATTERY BOX	60
*	T 79 5080	HIGH STRENGTH NEAR NET SHAPE ALUMINUM TRANSMISSION CASES	325
*	T 79 5081	FABRICATION OF FRICTION RINGS AND REACTION PLATES- PHASE 2	215
*	T 79 5082	FLEXIBLE MACHINING SYSTEMS PILOT LINE FOR TCV COMPONENTS	440
*	T 79 5083	UPSCALING OF ADVANCED POWDERED METALLURGY PROCESSES-PH 3	175
*	T 79 5086	HIGH POWER ELECTRON BEAM WELDING IN AIR PHASE 1	250
*	T 79 5090	IMPROVED AND COST EFFECTIVE MACHINING TECHNOLOGY	315
*	T 79 5094	ARMOR STEEL TREATED WITH RARE EARTH ADDITIONS	480
*	T 79 6000	LIGHT WEIGHT TILT-UP HOOD FENDER ASSEMBLY-PHASE1	200
*	0 79 5071	TECOM TEST METHODOLOGY ENGINEERING MEASURES	861
*	1 79 7036	ISOTHERMAL ROLL-FORGING COMPRESSOR BLADES	275
*	1 79 7052	ULTRASONICALLY-ASSISTED COLD FORMING OF TITANIUM	250

FISCAL YEAR 79 PROJECT LISTING

06/22/78

	PROJECT NO.	TITLE	PROJECTED FUNDING($000)
***			
*	1 79 7086	ABRADABLE SEALS FOR COMPRESSOR BLADE TIP APPLICATION	100
*	1 79 7113	COMPOSITE FUSELAGE MANUFACTURING TECHNOLOGY	500
*	1 79 7119	NDE TECHNIQUES FOR COMPOSITE STRUCTURES	400
*	1 79 7155	MFG METHODS FOR IMPROVED HIGH PERFORMANCE HELICOP. GEARS	125
*	1 79 7175	AUTOMATED BLADE CONTOUR INSPECTION	275
*	1 79 7183	SEMI-AUTO COMPOSITE MFR SYS FOR HELICOPTER STRUCTURES	300
*	1 79 7197	FABRICATION OF INTEGRAL ROTORS BY JOINING	250
*	1 79 7198	COMPOSITE MATERIAL ENGINE ACCESSORY GEARBOX HOUSING	200
*	1 79 7199	SURFACE HARDENING OF GEARS, BEARINGS AND SEALS BY LASERS	400
*	1 79 7200	COMPOSITE ENGINE INLET PARTICLE SEPARATOR	200
*	1 79 7202	APPLICATION OF THERMOPLASTICS	450
*	1 79 7238	PRECISION FORGED ALUMINUM POWDER MTL HELICOPTER COMP	443
*	1 79 7240	MACHINING METH FOR ESR 4340 STEEL FOR HELICOPTER APPL	75
*	1 79 7241	HOT ISOSTATIC PRESSED TITATINIUM CASTINGS	320
*	1 79 7243	MACHINING OPERATIONS ON KEVLAR LAMINATED CONSTRUCTIONS	150
*	1 79 7248	CLOSED LOOP MACHINING T700 MID FRAME	284
*	1 79 7258	THIN WALL MFG TECH FOR RPV SENSOR DOMES	200
*	1 79 7284	SUPERPLASTIC FORMING/DIFFUSION BONDING OF TITANIUM	400
*	1 79 7285	CAST TITANIUM COMPRESSOR IMPELLER	300
*	1 79 7286	HIGH QUALITY SUPERALLOY POWDER PRODUCTION FOR TURBINE COMP	358
*	1 79 7287	PRODUCTION METHODS FOR MULTI-ELEMENT MODULES FOR ARRAY ANTEN	275
*	1 79 7288	OPTIMAL CURING COND. FOR PROCESS FIBER-REINFORCED COMPOSITES	125
*	1 79 7291	TITANIUM POWDER METAL COMPRESSOR IMPELLER	240

FISCAL YEAR 79 PROJECT LISTING

06/22/78

	PROJECT NO.	TITLE	PROJECTED FUNDING($000)
***			
*	1 79 7292	IMPROVED PROD PROC TO REDUCE COST OF TESTING MICROPROCESSOR	260
*	1 79 7294	COMPOSITE APEX FITTING FOR ARMY AC SLING APPLICATION	100
*	1 79 7297	PROD-INSTALL OF URETHANE EDGE GUARDS ON ROTOR BLADES	98
*	1 79 7298	HIGH TEMPERATURE VACUUM CARBURIZING	150
*	1 79 7315	LOW COST MANUFACTURE OF POISE GIMBAL	267
*	3 79 3115	ENGINEERING FOR METROLOGY AND CALIBRATION	700
*	5 79 1295	MODERNIZATION OF CHARCOAL FILTER TEST EQUIPMENT	987
*	5 79 1296	MT FOR CB FILTERS	819
*	5 79 1335	MAN TECH FOR NEW PROTECTIVE MASK	618
*	5 79 1339	ESTABLISH PRODUCTION AND DISPOSAL PROCESSES FOR XM9 LAD	857
*	5 79 1345	BIOLOGICAL WARNING SYSTEM	538
*	5 79 1347	ADVANCED TECH FOR MANUFACTURE OF RED PHOSPHORUS	526
*	5 79 1354	SLUDGE VOLUME REDUCTION AND DISPOSAL PROCESS STUDY	122
*	5 79 1355	MANUFACTURING PLANT TOXIC EFFLUENT/EMISSION PRETREATMENT	104
*	5 79 3913	MECHANICAL JOINING OF MINIATURIZED ELECTRONIC COMPONENTS	89
*	5 79 3960	PROTOTYPE PDN EQUIP FOR PRINTED CIRCUIT BOARDS	405
*	5 79 3961	IMPROVED 3-D VIBRATION ACCEPTANCE TEST FOR ART FUZES	282
*	5 79 4000	AUTOMATED M55 DETONATOR PDN EQUIPMENT	1600
*	5 79 4007	EVALUATION - ACETIC ANHYDRIDE RECYCLE	316
*	5 79 4024	DSN DEV BLD PROT COMP AND AUTO ASSY MACH M223 FZ	1132
*	5 79 4046	QUANTITATIVE ANAL. OF BLENDED EXPLOS. SAMPLES	307
*	5 79 4051	IMPROVED INSTR CONTROL FOR ACID PLANTS	157
*	5 79 4062	AUTO MFG SYSTEM FOR MORTAR INCREMENT CONTAINERS	507

FISCAL YEAR 79 PROJECT LISTING

06/22/78

	PROJECT NO.	TITLE	PROJECTED FUNDING($000)
***			
*	5 79 4064	AUTO LAP OPERATIONS FOR 105MM TANK CARTRIDGES	1262
*	5 79 4084	OPACITY/MASS EMISSION CORRELATION	121
*	5 79 4124	FABRICATION OF CONTROL ACTUATION SYSTEM HOUSINGS	1785
*	5 79 4133	AUTO INSPECTION FOR CRITICAL DEFECTS IN THE M55 DETONATOR	283
*	5 79 4137	AUTOMATED LOADING OF CENTER CORE IGNITERS	295
*	5 79 4214	POLLUTION ENGINEERING FOR 1983-85 REQUIREMENTS	1269
*	5 79 4281	CONSERVATION OF ENERGY AT ARMY AMMUNITION PLANTS	1285
*	5 79 4285	TNT EQUIVALENCY TESTING FOR SAFETY ENGINEERING	420
*	5 79 4288	EXPLOSIVE SAFE SEPARATION AND SENSITIVITY CRITERIA	643
*	5 79 4291	BLAST EFFECTS IN THE MUNITIONS PLANT ENVIRONMENT	600
*	5 79 4310	DMSO RECRYSTALLIZATION OF HMX/RDX	483
*	5 79 4312	INJECTION MOLDING FOR PRODUCTION EXPLOSIVE LOADING	261
*	5 79 4341	IMPROVED NITROCELLULOSE PURIFICATION PROCESS	742
*	5 79 4414	AUTO PROC CONTROL OF SOLVENTLESS PASTE COMP	183
*	5 79 4444	MMT-BODY FOR M42/ M46 GRENADE	1063
*	5 79 4454	AUTO INSPECTION DEVICE OF EXPLOSIVE CHARGE IN SHELL	628
*	5 79 4460	CONT MIXER-ILLUMINANT COMP ANAL + CONTROL SYSTEM	236
*	5 79 4462	MODERNIZED FAD FOR MULTI-BASE PROPELLANTS	928
*	5 79 4466	EVAL TNT, CYCLOTOL, OCTOL IN MELT-POUR FACILITY	461
*	5 79 4469	AUTO INSERTION OF GRENADE LAYERS	1392
*	5 79 4472	DEV OF EQUIP/PROC F/AUTO/MECH FAB OF CTR CORE PROP BAGS	549
*	5 79 4474	DEHUMIDIFIED AIR FOR DRYING SINGLE- BASE PROPELLANT	350
*	5 79 4481	PYROLYSIS OF ARMY AMMUNITION PLANT SOLID WASTE	425

FISCAL YEAR 79 PROJECT LISTING

06/22/78

	PROJECT NO.	TITLE	PROJECTED FUNDING($000)
***			
*	5 79 4492	WATER DELUGE SYSTEM APPLICATION IN MUNITION PLANTS	300
*	5 79 4493	DESIGN PARAMETERS FOR LARGE-SCALE PROCESS VESSELS	410
*	5 79 4498	DEV METH FOR CONSOL + AUTO ASSY OF SMALL MINES	1147
*	5 79 4508	PROCESS IMPROVEMENT OF PRESSABLE RDX COMPOSITIONS	357
*	5 79 6634	MFG PROC FOR DU ALLOYS-LARGE CALIBER ARMOR DEFEATING PROJ	306
*	5 79 6681	PROCESS PARAMETERS FOR PRODUCTION FORMING OF PROJECTILES	1018
*	5 79 6682	SIMULATION OF AMMUNITION PRODUCTION LINES	170
*	5 79 6683	PDN OF TUNGSTEN BASE HV ALLOY PENETRATORS FOR AP MUNIT	186
*	5 79 6693	BALL PROPELLANT DETERRENT COATING-CAM RELATED	171
*	5 79 6716	DEV OF COMPT-AIDED MODELING OF FORMING OPN F/ARTY MPTS DSGN	306
*	5 79 6725	AUTOMATED INERTIA BANDING MACHINE FOR ARTILLERY MUNITION	186
*	5 79 6736	TECH READINESS ACCEL THRU COMPUTER INTEGRATED MFG-TRACIM	256
*	5 79 6738	USE OF ULTRA-HI SURFACE SPEEDS F/METAL REMOVAL, ARTY SHELL	181
*	5 79 6748	SCAMP POLLUTION ABATEMENT	77
*	5 79 6753	INVESTIGATION OF MFR SYSTEMS FOR 7.62MM AMMUNITION	461
*	5 79 6760	DRYING OF LOW DENSITY BALL PROPELLANT	181
*	5 79 6774	MANUFACTURING METHODS FOR APDS PROJECTILE-25MM-MICV	805
*	6 79 7213	HIGH SPEED CHROMIUM PLATING TECHNIQUE	109
*	6 79 7246	SIMPLIFICATION OF BREECH RING MFR AND HANDLING	60
*	6 79 7317	OPTIMIZATION OF STEP THREAD TOOLING	75
*	6 79 7482	MODIFIED RIBBON RIFLING GENERATING MACHINE	136
*	6 79 7555	DYNAMIC PRESSURIZATION STAND, SLIDE BLOCK BREECH MECH	121
*	6 79 7605	CHEMICALLY BONDED SAND FOR CLOSE TOLERANCE CASTING	127

FISCAL YEAR 79 PROJECT LISTING

06/22/78

	PROJECT NO.	TITLE	PROJECTED FUNDING($000)
***			
*	6 79 7724	GROUP TECHNOLOGY OF WEAPON SYSTEMS	85
*	6 79 7726	APPLICATION OF COLD AND WARM ROTARY FORGING	462
*	6 79 7727	RECYCLING OF SCRAP GUN TUBES BY ROTARY FORGING	248
*	6 79 7730	MANUFACTURE OF SPLIT RING BREECH SEALS	137
*	6 79 7802	ESTABLISH MACHINE TOOL PERFORMANCE SPECIFICATIONS	205
*	6 79 7807	PROGRAMMED OPTICAL SURFACING EQUIPMENT AND METHODOLOGY	138
*	6 79 7948	ESTABLISH CUTTING FLUID CONTROL SYSTEM	150
*	6 79 7949	APPLICATION OF GROUP TECHNOLOGY TO RIA MFR-CAM-1ST INCR	127
*	6 79 7963	GROUP TECH + CELLULAR MFR FOR FC COMPONENTS + ASSEMBLIES	188
*	6 79 7965	DIFFERENTIAL SCATTEROMETRY FOR MICROFINISH SURFACES	100
*	6 79 8004	CO-DEPOSITION OF SOLID LUBRICANTS DURING ANODIZING	120
*	6 79 8005	ESTABLISHMENT OF THE SPACE MECHANICAL PLATING PROCESS	150
*	6 79 8010	PRODUCTION OF ACOUSTIC MICROWAVE FILTERS	233
*	6 79 8017	POLLUTION ABATEMENT PROGRAM	41
*	6 79 8025	ELECTRONIC PROFILE READOUT GAGE FOR POWDER CHAMBER CONTROLS	106
*	6 79 8107	CREEP FEED CRUSH FORM GRINDING	82

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