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STUDY OF SOLID ROCKET MOTOR FOR SPACE SHUTTLE BOOSTER

VOLUME IV COST

by



prepared for

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

George C. Marshall Space Flight Center

Contract NAS 8-28430
Data Procurement Document No. 314
Data Requirement MA-02

(NASA-CR-124239) STUDY OF SOLID ROCKET

WOTOR FOR SPACE SHUTTLE BOOSTER. VOLUME

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FINAL REPORT

STUDY OF SOLID ROCKET MOTOR FOR SPACE SHUTTLE BOOSTER

VOLUME IV COST

by

THIOKOL/WASATCH DIVISION
A Division of Thiokol Chemical Corporation
P.O. Box 524, Brigham City, Utah 84302

prepared for

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

15 March 1972

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Data Procurement Document No. 314
Data Requirement MA-02

George C. Marshall Space Flight Center Marshall Space Flight Center, Alabama

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PREFACE

This report contains the results of Thiokol Chemical Corporation's Study of Solid Rocket Motors for Space Shuttle Booster. The objective of the study was to provide data to assist National Aeronautics and Space Administration in selection of the booster for the Space Shuttle system. This objective was satisfied through definition of specific Solid Rocket Motor (SRM) stage designs, development program requirements, and production and launch program requirements, as well as the development of credible cost data for each program phase. The study was performed by Thiokol's Wasatch Division, Brigham City, Utah, for the NASA George C. Marshall Space Flight Center under Contract NAS 8-28430. The study was conducted under the direction of Mr. Daniel H. Driscoll/PD-RV-MGR NASA/MSFC. Thiokol study direction was provided by Messrs. E. R. Kearney, Corporate Director, Space Shuttle Program, and J. D. Thirkill, Program Manager, Space Shuttle SRM Booster Study, Wasatch Division.

The final report was prepared in response to Data Procurement Document 314 and Data Requirement MA-02. The report is arranged in four volumes:

Volume I - Executive Summary

Volume II - Technical

Volume III - Program Planning Acquisition

Volume IV - Cost

Data Requirement MA-02 specified that the Cost report be part of the Program Acquisition and Planning report but because of its importance and size it has been bound as a separate volume in this Final Report.

Volume II, Technical, has been further subdivided into five books as follows for ease of review and handling:

Book 1

Section 1.0 - Introduction

Section 2.0 - Propulsion System Definition

Section 3.0 - SRM Stage

Book 2

Section 4.0 - SRM Parametric Data Section 5.0 - SRM Stage Recovery Section 6.0 - Environmental Effects

Section 7.0 - Reliability and Failure Modes

Section 8.0 - System Safety Analysis Section 9.0 - Ground Support Equipment

Section 10.0 - Transportation, Assembly, and Checkout

Book 3

Appendix A - Systems Requirements Analysis

Book 4

Appendix B - Mass Property Report

Appendix C - Stage and SRM CI Specifications

Appendix D - Drawings, Bill of Materials, Preliminary ICD's

Book 5

Appendix E - Recovery System Characteristics for Thiokol Chemical Corporation Solid Propellant Space Shuttle Boosters

Appendix F - Quantitative Assessment of Environmental
Effects of Rocket Engine Emissions
During Space Shuttle Operations at
Kennedy Space Center

Appendix G - Thiokol Solid Propellant Rocket Engine Noise Prediction

Appendix H - SRM Stage Recovery

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1.0 INTRODUCTION

This volume contains the cost data for solid rocket motors for a Space Shuttle Booster pursuant to the requirements outlined in NASA Contract Number NAS8-28430. The cost data are presented in the format prescribed in the attachment to Data Requirement Number MA-02 for the selected 156 inch parallel and series burn configurations as amended by NASA Letter PM-EP-MGR dated January 31, 1972. In addition, summary cost data are provided for DDT&E, production and production facilities for the 120 inch and 260 inch configurations. Probable costs are provided for all configurations. Both probable costs and ceiling costs are provided for the 156 inch booster stages as explained in Section 2.0, Cost Estimating Philosophy.

A breakdown of facilities included in the probable cost for the 156 inch parallel burn configuration is set forth in Section 6.0. Delta costs for the maximum success schedule requested in the January 31, 1972 NASA letter are set forth in Section 7.0. Section 8.0 consists of graphs depicting parametric cost estimating relationships pursuant to Table 3 of DR MA-02.

2.0 COST ESTIMATING PHILOSOPHY

The Solid Rocket Motor costs for this study were prepared utilizing the standard Thiokol/Wasatch estimating procedure. This procedure was augmented by a Space Shuttle Task Force organized and staffed by specialists from the major functional organizations: Program Management, Manufacturing, Quality Test, Engineering, Reliability, Procurement and Pricing.

The Task Force established a baseline configuration for the 156 inch SRM and subsequently prepared the program plan, program schedule and work breakdown structure. These were distributed to the estimating organizations within each of the operating departments: Operations, including Manufacturing, Quality Assurance and Test, Industrial Engineering, Safety, and Transportation; Engineering, including Reliability and Value Engineering, the Development Laboratories, Project Engineering, and Engineering Design; Program Management; Data Processing; Contracts; Publications; Financial Controls; and Procurement. Each of these organizations prepared detailed estimates to the fifth level of the work breakdown structure. These estimates were based upon standards and past experience from similar programs such as Minuteman, Poseidon and the 156 Inch SRM Booster programs. In addition, throughout the estimating period, daily meetings were held by the Space Shuttle Task Force to coordinate configuration and program changes in order to ensure the accuracy of the estimate.

In particular, the direct labor estimates for Manufacturing, Quality Assurance and Test Divisions were prepared by the Industrial Engineering Department utilizing Industrial Engineering Estimate Summaries and Manufacturing Plans prepared especially for the 156-Inch SRM Space Shuttle. The Manufacturing Plans also were used to establish tooling and facility requirements. The Estimate Summaries show the application of Industrial Engineering Time Standards to detailed elements of Manufacturing Plans. The Industrial Engineering Time Standards are based on stop watch time studies of identical operations or the use of standard data (application of time standards extrapolated from time studies). The Estimate Summary sheets include referenced to the Manufacturing Plans, operations numbers, performing cost centers, work descriptions, crew sizes, cycle time, standard manhours and performance and supervisory factors applied to determine total manhour requirements. In production new Estimate Summary sheets were made for nozzle joint fabrication and propellant preparation operations to reflect time standard reductions resulting from machining in larger lot sizes and the use of new or modified facilities or tooling when 100 or more segments are processed per year.

During the period of time which was allotted for estimating this program, Thiokol solicited quotations from reliable subcontractors for major components and material. These items include the case, nozzle, insulation, auxiliary power unit, attach structure and propellant raw materials. After a review by the Task Force, these vendor quotations were utilized in costing the program. These costs include the product cost in addition to tooling and the additional facility requirements required to meet the program schedule. Thiokol has had considerable experience with these subcontractors over the years on Minuteman, Poseidon and the 156-Inch SRM programs and has confidence in their capabilities as to product quality, timely delivery and accurate costs. The vendors have submitted written commitments to support the SRM Space Shuttle Booster Program at all peak annual launch rates.

The labor estimates from the functional organizations and the vendor quotations were consolidated by Pricing which then applied approved labor rates and burdens to arrive at the final costs to the level required by NASA in the work breakdown structure.

The Task Force reviewed the total package comprising DDT&E, Production and Site Operations in order to assure that adequate and credible costs were available in all areas. The review revealed that:
(1) adequate consideration had been given to design, engineering analysis, development tests and manufacturing procedures; (2) the projected manufacturing improvement was sound; (3) adequate staffing of all organizations was reasonable to assure the attainment of program objectives; (4) adequate quantities of components and materials were included with allowance for motor losses; and (5) site operations analysis was reviewed to assure that proper manning and equipment considerations had been made.

Upon completion of the review, the costs were adjusted as required based upon previous experience. The resulting costs reflect the inputs of the operating organizations and vendor quotations and are designated "probable costs" inasmuch as Thiokol considers them to be valid. In view of previous statistical estimates which were somewhat higher, the significant cost elements including vendor quotations were reviewed again. As a result certain cost elements and vendor quotations were increased in order to provide complete confidence. The resulting costs are designated "ceiling costs."

Detailed cost data for the various configurations and options are provided in this section including both probable and ceiling costs. The following is a selected exemplary summary for the two SRM 156 inch parallel burn booster stage for the 60 vehicle peak annual launch rate.

	Prob	oable Cost	Ceiling Cost			
	(Dollars i	in Thousands)	(Dollars in	Thousands)		
	Without	With	Without	With		
	TVC & TT	TVC & TT	TVC & TT	TVC & TT		
ED & D	\$ 39,839	\$ 51,320	\$ 44,990	\$ 57,283		
Tooling	7,553	9,702	9,798	12,332		
GTH	7,586	8,460	8,166	9,107		
FTH	33,548	38,911	38,890	44,693		
Total DDT & E	\$ 88,526	\$ 108,393	\$ 101,844	\$ 123,415		
Production	\$ 1,777,723	\$ 1,988,310	\$ 2,214,930	\$ 2,489,613		
Tooling	23,078	24,008	27,868	29,388		
Facilities	99,764	99,764	108,288	108,288		
Total Production	\$ 1,900,615	\$ 2,112,082	\$ 2,351,086	\$ 2,627,289		
Operations	\$ 15,677	\$ 15,677	\$ 17,016	\$ 17,016		
Total Program	\$ 2,004,818	\$ 2,236,152	\$ 2,469,946	\$ 2,767,720		

3.0 COST CREDIBILITY

3.1 GENERAL

The cost data presented herein for the SRM booster stage are based upon Thiokol and vendor experience. Because of the demonstrated technology and the attendant cost experience, Thiokol firmly believes that the cost data presented herein are entirely credible. The required technology exists and no major developments are required. The case is manufactured from the same type of steel now used in Minuteman Stage I SRM and the Titan IIIC SRM. Nozzle construction and materials are standard for Minuteman and Poseidon and are used in the 120-Inch Titan IIIC SRM. The flex bearing TVC system is employed on both stages of Poseidon and has been demonstrated for motors of the 156-inch size. The propellant currently is in use on the Stage I Minuteman SRM, Thiokol's Wasatch Division having processed over 125 million pounds. Consequently, its characteristics and costs are well established. The ignition and thrust termination systems also are standard.

The cost credibility of solid propellant rocket motor programs is further illustrated by summarizing Thiokol's Wasatch Division major programs since 1960. Major cost-plus and incentive contracts have included the Minuteman, Poseidon, 156-inch and 120-inch Programs. Completed contracts in this category total more than \$556 million of costs and \$39 million, or approximately 7 percent, cost underruns. Fixed price contracts for such programs as Bomarc, Genie and 156-inch have been conducted for more than \$14 million on a profitable basis. Isolating the large motor programs (156-inch and 120-inch) the cost was approximately \$12 million with a 9 percent overrun.

In arriving at the SRM stage cost for the Space Shuttle Program, Thiokol costed the program as outlined in Section 2.0, Cost Estimating Philosophy. Two cost levels are presented for the 156-inch SRM parallel and series burn configurations. The ceiling costs were developed by using a conservative approach to significant cost elements. Vendor quotations on major components such as the case and nozzle were significantly increased. Raw material costs were projected at current usage levels for programs such as Minuteman and Poseidon with no allowance for quantity buy cost reductions. Current labor efficiencies and burden rates also were used in arriving at the ceiling costs. As a result of this extremely conservative cost approach, Thiokol believes the ceiling costs presented herein represent the maximum on the high side.

The probable costs were developed using standard cost estimating procedures. In the area of the case and nozzle for example the quotations from the vendors were used as received without adjustment. The effect of increased volume on lowering the cost of ammonium perchlorate and other raw materials, as well as the influence of labor efficiencies and the effect of including the Space Shuttle SRM in the labor base thereby lowering the overhead rates, were taken into account in developing the probable cost. The probable costs represent Thiokol's best estimate of program costs.

3.2 PROBABLE COST

The probable costs presented in the cost summaries of Section IV constitute a cost position in which Thiokol has a high degree of cost confidence for reasons as outlined below:

- 1. The probable cost for propellant is based upon current experience in raw materials, mixing and casting of Minuteman propellant. Cost reductions as a result of quantity buys of raw material and increased processing efficiencies have been taken into account.
- 2. The case cost as quoted by Rohr was used. No consideration has been applied for negotiations which should result in further cost improvement.
- 3. Nozzle costs used in the probable cost base was that of the highest of three vendors and does not include any cost savings anticipated in negotiations.
- 4. The Thiokol estimate for the attach structure was used even though it was higher than vendor estimates. Thiokol realizes that the attach structure costs are considerably lower than the figures used by the vehicle contractors. However, Thiokol considers the costs used herein to be reasonable and that the structure can be obtained for the costs indicated when procured as the result of competitive procurement procedures.
- 5. In costing the probable cost, Thiokol increased the inhouse labor by 11 percent for DDT&E and 12 percent for production.

3.3 CEILING COST

The following considerations were made in arriving at the ceiling costs:

- 1. The ceiling cost for propellant is based upon an ultra-conservative approach inasmuch as no provision has been made for reductions as a result of quantity buys of raw materials, continuous mixing and casting and increased processing efficiencies.
- 2. The 156-inch case cost submitted by Rohr, a reliable subcontractor currently making 120-inch cases, was increased approximately 20 percent in order to reflect a cost equal to the cost per pound of the 120-inch Titan IIIC SRM case. No provisions were made for the cost savings resulting from larger production and learning available at the subcontractor from his 120-inch case experience.

- 3. The nozzle was quoted by three reliable subcontractors, Kaiser, Hitco and Rohr. To increase cost confidence, the cost of the highest vendor was utilized and increased approximately 25 percent in order to reflect an approximate cost per pound of the current 120-inch Titan IIIC nozzle which is a complex LITVC nozzle in comparison to our 156-inch Flex Seal nozzle.
- 4. The structure cost was estimated by Thiokol utilizing drawings available from the preliminary design. To increase confidence in our estimate Rohr and National Steel and Ship Building were solicited for estimates. Thiokol realizes that the attach structure costs are considerably lower than the figures used by the vehicle contractors. However, Thiokol considers the costs used herein to be reasonable and that the structure can be obtained for the costs indicated when procured as the result of competitive procurement procedures.
- 5. For the ceiling cost, Thiokol also chose to increase the labor inhouse by approximately 16 percent for DDT&E and 40 percent for production.

3.4 RECOVERY

Recovery costs as presented herein were costed on the basis of a conservative 90 percent recovery and assumed hardware would be discarded after ten uses. Items which have been considered for refurbishment are the case, nozzle metal parts, attach structure, auxiliary power supply and recovery system.

4.0 COST ITEM DEFINITIONS

The definitions set forth below are provided to assist in the analysis of the cost data presented in this volume.

4.1 PROGRAM MANAGEMENT

Comprises all effort associated with over-all program support consisting of the following:

- 1. Program Management
- 2. Contracts
- 3. Publications
- 4. Financial Control
- 5. Procurement
- 6. Safety

4.2 SYSTEM ENGINEERING

Consists of the following engineering support areas:

- 1. Reliability
- 2. Project Engineering
- 3. Configuration Management
- 4. Maintenance Engineering
- 5. System Engineering
- 6. Mass Properties Control

4.3 CASE

Includes: vendor cost; all direct/direct labor to process insulated case up to lining; manufacturing support; in-house and vendor tooling, and engineering design labor. This effort includes component qualification testing in ED&D.

4.4 NOZZLE, FIXED

Includes: vendor cost; all direct/direct labor to process nozzle up to assembly onto the aft closure; manufacturing support; in-house and vendor tooling; and engineering design labor. This effort includes component qualification testing in ED&D.

4.5 NOZZLE, FLEX BEARING

Includes: vendor cost; all direct/direct labor for fabricating the flex seal to process the nozzle up to assembly onto the aft closure; manufacturing support; in-house and vendor tooling; and engineering design labor. Also includes component qualification testing in ED&D. This is an option for parallel burn and is included in the baseline for series burn.

4.6 IGNITER

Includes: vendor cost; all direct/direct labor to process the igniter up to installation on the motor; manufacturing support; in-house and vendor tooling; and engineering design labor. This effort includes component qualification testing in ED&D.

4.7 PROPELLANT (TPH-1011) AND LINER

Includes: all material cost; all direct/direct labor up to X-ray; manufacturing support; in-house tooling; and engineering design labor.

4.8 POWER SUPPLY AND DISTRIBUTION

Includes: all vendor cost for components and materials; direct/direct labor up to final assembly; manufacturing support; in-house and vendor tooling, and engineering design labor. This effort includes component qualification testing in ED&D.

4.9 FINAL ASSEMBLY

Includes: all miscellaneous raw material and components not covered in the major items; all direct/direct labor associated with assembly activity and X-ray conducted at the Wasatch Division up through loading on transporters; manufacturing support; in-house and vendor tooling; and engineering design labor for motor configuration.

4.10 GROUND TEST

Includes: test area assembly; checkout, data reduction, acquisition and reporting; instrumentation for all static tests; and GTH test data reduction.

4.11 AUXILIARY POWER SUPPLY (APU)

Includes: vendor cost; all direct/direct labor to process up to assembly on the motor; manufacturing support; engineering design labor; and component qualification testing in ED&D. This is an option for parallel burn and is included in the baseline for series burn.

4.12 THRUST TERMINATION

Includes: cost from vendor; all direct/direct labor up to installing on the motor; manufacturing support; in-house and vendor tooling; engineering design labor; and component qualification in ED&D.

4.13 INSTALLATION, ASSEMBLY AND CHECK OUT

Includes: the direct effort for assembly and check out at the launch site for GTH, FTH and Production.

4.14 FACILITIES

The effort required to provide new facilities and modification and rearrangement of existing facilities at Thiokol and the major vendors including labor and material. Also includes the facility costs for GTH launch site and operational launch site requirements.

4.15 SUPPORT EQUIPMENT AND SPARES

Includes: ground support equipment required at the launch site; vendor costs; direct/direct labor up to loading on the transporter; manufacturing support; and engineering design. Cost also includes allowance for operational component spares.

4.16 FLIGHT TEST SUPPORT

That effort required to provide instrumentation data reduction and analysis of the flight test motors during DDT&E. Data reduction and analysis will be accomplished in production.

4.17 OPERATIONS SUPPORT

That effort involved with management of assembly and check out effort at the launch site.

4.18 INTERSTAGE STRUCTURES

Attach structure and fairings including: vendor cost; manufacturing support; and engineering design labor. Qualification test cost is included in ED&D.

4.19 RECOVERY SYSTEM

Includes vendor development costs during ED&D, vendor costs during production, recovery operations at the launch site and costs for disassembly of the recovered hardware at the recovery site.

4.20 TRANSPORTATION

Includes all transportation cost for shipping motor segments, spares, ground support equipment, and miscellaneous items from the Wasatch Division to the launch site. Also includes shipping cost from vendors directly to the launch site for items such as fairings and attach structure. All direct labor involved is included.

5.0 COST SUMMARIES

5.1 156 Inch Parallel Expendable Cost

156 INCH PARALLEL BURN

Presented in this section are the expendable costs for the parallel configuration, both probable and ceiling, as defined in Section 3.0. These costs are set forth on NASA Cost Tables I and II.

The recoverable costs for the DDT&E and 60 per year launch rate are presented on NASA Table I; however, the alternate launch rates of 4c, 20, and 10 are presented in total costs only by DDT&E, Production recurring and Production Facilities. The Table II time phased costs are only presented in total dollars by fiscal year for all launch rates.

For clarification it should be noted that in the 23 February presentation, it was stated that the Recovery System Development Cost was included in the recoverable cost. This was in error and on the Recoverable Cost sheets in this section the Recovery System Development Cost is included as part of the DDT&E Program Cost.

For your convenience a cost summary is included in the front of this section summarizing the cost detail which follows.

5.1.1 Summary

SUMMARY 156 INCH SRM PARALLEL BURN

(DOLLARS IN THOUSANDS)

	Production		Production			Production			Production Total 10/Year Rate				
		60/Year		Total	40/Year		Total	20/Yea		Total			Total
	DDT&E	Recurring	Facilities	Program	Recurring	Facilities	Program	Recurring	Facilities	Program	Recurring	<u>Facilities</u>	Program
Parallel Burn-Expendable													
Probable Cost		. 01/ 500	99.764	2,004,818	1, 562, 911	63, 855	1, 715, 292	972, 031	54,638	1, 115, 195	531,568	40,867	660, 961
Without TVC-TT	88,526	1, 816, 528 4, 128	99, 104	4, 004, 616	4, 440	03, 633	1, 113, 2/2	4,959	31,020	.,,	5, 263		,
Recurring Cost/Launch Peak Annual Funding	27, 612	248, 770			174, 986			117, 201			76, 485		
Peak Annual Funding	21,012	240,110			4,,,			-					
With TVC-TT	108, 393	2,027,995	99,764	2, 236, 152	1,704,279	63,855	1,876,527	1,050,142	54,638	1, 213, 173	571,945	40,867	721,205
Recurring Cost/Launch		4,609			4,842			5, 358			5, 663		
Peak Annual Funding	34, 191	276, 750			190, 835			124, 934			80,778		
Ceiling Cost				2 4/0 04/	1, 946, 925	69,608	2, 118, 077	1, 194, 875	59, 308	1, 356, 027	648, 848	44, 357	795, 049
Without TVC-TT	101,844	2, 259, 814	108, 288	2, 469, 946	1, 946, 925 5, 531	07,000	2, 110, 011	6, 096	37, 300	1, 330, 00.	6, 424	,	
Recurring Cost/Launch	22 120	5, 136 308, 015			217, 984			140, 509			89,974		
Peak Annual Funding	32, 129	308, 013			211, 701			,					
With TVC-TT	123, 415	2, 536, 017	108, 288	2, 767, 720	2, 138, 379	69,608	2, 331, 402	1, 302, 554	59,308	1, 485, 277	705, 571	44, 357	873, 343
Recurring Cost/Launch	123, 413	5, 764		4, ,	6,075			6, 646			6, 986		
Peak Annual Funding	39, 294	344, 554			239, 479			151,092			95, 822		
Parallel Burn - Recoverable													
Probable Cost Without TVC-TT	174, 427	1, 133, 566	78, 359	1, 386, 352	1,064,958	49,826	1, 289, 211	702, 114	42,686	919, 227	406, 553	30, 979	611,959
Recurring Cost/Launch	. , .,	2,576	,,	-•	3,025			3, 582			4,025		
Peak Annual Funding	19,656	166, 105			132, 181			100,415			69 ,040		
•	195, 290	1, 283, 357	78, 359	1,557,006	1, 148, 734	49, 826	1,393,850	751,506	42,686	989,482	431,500	30,979	657, 769
With TVC-TT Recurring Cost/Launch	195, 290	2,916	10, 337	1, 551, 000	3, 264	,		3, 834			4, 272		
Peak Annual Funding	22, 045	193, 282			142, 682			106, 397			73, 133		
Feak Aimidal I diiding	20, 013	2,0, 202											
Ceiling Cost								040 005	4/ 222	1 007 743	491, 262	34, 746	718,422
Without TVC-TT	192,414	1,371,302	85,053	1,648,769	1, 285, 981	54, 083	1, 532, 478	848, 995	46, 333	1,087,742	491, 262	34, 140	110, 766
Recurring Cost/Launch		3, 116			3, 653			4, 332 118, 608			82, 276		
Peak Annual Funding	23, 372	204, 921			157, 096			•				24 74/	200 (10
With TVC-TT	215, 120	1,580,551	85,053	1,880,724	1, 411, 645	54, 083	1,680,848	924, 847	46, 333	1, 186, 300	530, 753	34, 746	780, 619
Recurring Cost/Launch		3, 592			4,010			4,719			5, 255 87, 927		
Peak Annual Funding	26, 629	233, 473			172, 065			127, 253			01, 721		

5.1.2 Expendable

5.1.2.1 Probable Cost

5.1.2.1.1 W/O TVC & TT

PROBABLE COST 156 INCH SRM PARALLEL BURN W/O TVC TT (DOLLARS IN THOUSANDS)

			DDT & E			DATE _15 March 1972					
	ENGINE ERING DESIGN AND		GROUND TEST	FLIGHT TEST		PRO	60/YEAR RATE DUCTION PROGRA	/M	PRODUCTION .		TOTAL
	DEVELOPMENT (ED & D)	TOOLING	HARDWARE (GTH)	HARDWARE (FTH)	DDT & E TOTAL	PRODUCTION	TOOLING	FACILITIES	PROGRAM TOTAL	OPERATIONS	PROGRAM
SRM				'							
PROGRAM MANAGEMENT	1,705	156	42	849	2,752	11,072	1,052		12, 124	700	15, 576
SYSTEM ENGINEERING	3, 529		5	1,079	4,613	5, 005			5, 005		9, 618
SRM'S	27. 225	7.038	2, 534	25, 602	62, 399	1,451,442	21, 692		1, 473, 134		1, 535, 533
CASE	12, 378	2, 645	70	11,438	26,531	763, 806	9, 512		773, 318		799, 849
NOZZLE	4, 345	1, 254	783	4, 778_	11,160	225, 703	1,454		227, 157		238, 317
IGNITER	460	252	5	234	951	7, 799	390		8, 189		9, 140
PROPELLANT AND LINER	7, 169	1, 388	1,049	6, 902	16, 508	361, 977	2,919	<u> </u>	364, 896		381, 404
POWER SUPPLY DISTRIBUTION	210	14	103	639	966	22,749	349		23, 098		24, 064
FINAL ASSEMBLY	1, 106	675	369	1,611	3,761	66, 560	7, 068		73, 628		77, 389
GROUND TEST	1,557	810	155		2,522	2, 848			2, 848		5, 370
AUXILIARY POWER UNIT (APU)										ļ	
THRUST TERMINATION											
INSTALLATION ASSEMBLY AND CHECKOUT	207		160	440	807					6, 836	7, 643
FACILITIES	5, 344		1,946		7, 290	1, 396		99,764	101, 160		108, 450
SUPPORT EQUIPMENT AND SPARES	196		1, 399	571	2, 166	5, 227			5, 227	3, 963	11,356
FLIGHT TEST SUPPORT				473	473	7, 289			7, 289		7,762
OPERATIONS SUPPORT			124	212	336					4, 178	4, 514
STRUCTURE	1, 633	359	1,019	3, 199	6, 210	222, 631	334		222, 965		229, 175
TRANSPORTATION			357	1, 123	1,480	73,711		L	73, 711		75, 191
								L			
						<u> </u>			L		
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TOTAL PROGRAM	39, 839	7, 553	7,586	33,548	88,526	1,777,773	23, 078	99, 764	1, 900, 615	15, 677	2, 004, 818

SRM PROGRAM TIME PHASED FUNDING REQUIREMENTS

PROBABLE COST 156 INCH SRM PARALLEL BURN W/O TVC TT 60/YEAR PRODUCTION RATE

DATE

(DOLLARS IN THOUSANDS)

COST ELEMENT FY 1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 NONRECURRING TOTAL 208 9, 266 20,748 27, 236 21,582 716 208 9, 266 20,748 DDT & E 27, 236 21,582 716 9, 266 DEVELOPMENT 208 17, 595 14,576 208 DEVELOPMENT 9,266 17,595 14,576 STE DELIVERABLE HARDWARE 1,608 12, 212 20,509 DUMMY ENGINES 1,608 1,992 FLIGHT ENGINES 10,220 20,509 O & FS AND SPARES 1,545 448 1,073 716 RECURRING TOTAL 40,053 78, 364 97,520 137, 572 154, 987 INVESTMENT 29,698 77,669 96,656 136, 353 153,613 39,578 DELIVER NEW ENGINES 77,434 96, 363 135,940 153, 148 GROUND SUPPORT EQUIP. 235 120 293 413 465 PARTS OPERATIONS 355 695 864 1, 219 1,374 FLIGHT SUPPORT 168 328 408 576 649 OPERATIONS 96 188 234 330 372 179 91 222 313 353 PARTS 499 6,030 1,008 17, 222 23,978 13,740 9, 186 13,806 FACILITIES TRANSPORTATION 376 510 2,369 3,316 4,140 5,820 6,549 175, 342 TOTAL PROGRAM 707 15, 296 21, 756 27, 612 22,092 60,360 105,658 115, 380 152,578 COST ELEMENT FY 1983 1984 1989 1985 1986 1988 1990 TOTAL 1987 NONRECURRING TOTAL 79,756 79,756 DDT & E 41,645 DEVELOPMENT 41,645 DEVELOPMENT STE DELIVERABLE HARDWARE 34, 329 DUMMY ENGINES 3,600 30,729 FLIGHT ENGINES O & FS AND SPARES 3,782 RECURRING TOTAL 184, 591 229,869 228, 125 219, 418 219,418 148, 021 3,483 1,741,421 INVESTMENT 182,955 227,831 226, 105 217, 475 146, 709 1,725,991 217, 475 3,452 1,720,764 DELIVER NEW ENGINES 182, 401 227, 141 225, 420 216, 816 216,816 146, 265 3,442 GROUND SUPPORT EQUIP. 685 659 444 10 5, 227 554 690 659 PARTS OPERATIONS 1,636 2,038 2,020 1,943 1,943 1,312 31 15, 430 7,289 918 620 15 FLIGHT SUPPORT 773 962 954 918 4,178 OPERATIONS 526 355 9 547 526 443 552 7 3,963 519 499 499 337 PARTS 420 524 108,450 FACILITIES 13,795 9.186 7,805 9,715 9,647 9, 279 9,279 6, 256 150 75, 191 TRANSPORTATION

154, 277

228, 697

3,633

2,004,818

237,772

228, 697

248,770

TOTAL PROGRAM

206, 191

PROBABLE COST 156 INCH SRM PARALLEL BURN W/O TVC TT (DOLLARS IN THOUSANDS)

			DDT & E							DATE	15 March 1
	ENGINEERING DESIGN AND		GROUND TEST	FLIGHT TEST		PR	10/YEAR RATE ODUCTION PROGR	AM	PRODUCTION		
	DEVELOPMENT (ED & D)	TOOLING	HARDWARE (GTH)	HARDWARE (FTH)	DDT & E TOTAL	PRODUCTION	TOOLING	FACILITIES	PROGRAM TOTAL	OPERATIONS	TOTA PROGR
SRM											
PROGRAM MANAGEMENT	1,705	156	42	849	2, 752	11,072	1,052		12, 124	700	15,5
SYSTEM ENGINEERING	3, 529		5	1,079	4, 613	5, 005			5, 005		9,6
SRM'S	27. 225	7, 038	2,534	25, 602	62, 399	1, 264, 419	19,064		1, 283, 483		1, 345,
CASE	12, 378	2, 645	70	11,438	26, 531	693, 193	8, 277		701,470		728,
NOZZLE	4, 345	1, 254	783	4,778	11, 160	192, 573	1,358		193, 931		205,
IGNITER	460	252	5	234	951	7, 174	376	1	7,550		8,
PROPELLANT AND LINER	7, 169	1,388	1,049	6, 902	16, 508	292, 132	2, 475		294, 607		311,
POWER SUPPLY DISTRIBUTION	210	14	103	639	966	19, 587	349		19, 936		20,
FINAL ASSEMBLY	1, 106	675	369	1,611	3, 761	57, 328	6, 229		63, 557		67,
GROUND TEST	1, 557	810	155	<u> </u>	2, 522	2, 432			2, 432		4,
AUXILIARY POWER UNIT (APU)				L						L	L
THRUST TERMINATION				L		<u> </u>					
INSTALLATION ASSEMBLY AND CHECKOUT	207		160	440	807					5, 674	6,
FACILITIES	5, 344		1,946		7, 290	437		63, 855	64, 292]	71,
SUPPORT EQUIPMENT AND SPARES	196		1, 399	571	2, 166	4, 396			4, 396	3, 293	9,
FLIGHT TEST SUPPORT				473	473	5, 933			5, 933		6,
OPERATIONS SUPPORT			124	212	336					3, 675	4,
STRUCTURE	1,633	359	1,019	3, 199	6, 210	178, 722	334		179, 056		185,
TRANSPORTATION			357	1, 123	1,480	59, 135			59, 135		60,
			L								
			<u></u>	L		L					
			 			.					
					L	 -	L				
TOTAL PRINTRAM	39, 839	7, 553	7, 586	33, 548	88, 526	1, 529, 119	20,450	63, 855	1,613,424	13,342	1,715,2

SRM PROGRAM TIME PHASED FUNDING REQUIREMENTS

FROBABLE COST SRM PARALLEL W/O TVC TT 40/YEAR PRODUCTION

	T						T	T	T	1
COST ELEMENT FY	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
NONRECURRING TOTAL	208	9, 266	20,748	27, 236	21,582	716	ļ			J
DDT & E	208	9, 266	20, 748	27, 236	21,582	716	↓			
DEVELOPMENT	208	9, 266	17,595	14, 576						
DEVELOPMENT	208	9, 266	17,595	14,576			<u> </u>			1
STE										ļ
DELIVERABLE HARDWARE			1,608	12, 212	20, 509		<u> </u>			
DUMMY ENGINES			1,608	1,992			<u> </u>			
FLIGHT ENGINES				10, 220	20,509					<u> </u>
O & FS AND SPARES			1,545	448	1,073	716				
RECURRING TOTAL						42,094	84, 186	105, 233	150, 335	168, 373
INVESTMENT						41,733	83, 464	104, 331	149,044	166, 929
DELIVER NEW ENGINES						41,609	83, 218	104, 023	148, 604	166, 437
GROUND SUPPORT EQUIP.						124	246	308	440	. 492
PARTS	1					·	1			
OPERATIONS						361	722	902	1, 291	1,444
FLIGHT SUPPORT						166	333	415	593	664
OPERATIONS					· · · · · · · · · · · · · · · · · · ·	103	205	257	368	412
PARTS		_		····		92	184	230	330	368
FACILITIES	499	6,030	1,008			17, 187	23, 951	13,722	9, 185	
		0,050	1.008							
TRANSPORTATION	B			376	510	2 327	1 3.310	4.134	5.904	6.613
TRANSPORTATION TOTAL PROGRAM	707	15, 296	21.756	376 27 612	510	62, 324	3, 310	123, 089	5, 904 165, 424	6,613
TOTAL PROGRAM	707	15, 296	21,756	27, 612	22, 092	62, 324	111,447	123, 089	165, 424	174, 986
TOTAL PROGRAM COST ELEMENT FY	707 1983	15, 296 1984	21, 756				 		165, 424 TOTAL	
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL	7			27, 612	22, 092	62, 324	111,447	123, 089	165, 424 TOTAL 79, 756	
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E	7			27, 612	22, 092	62, 324	111,447	123, 089	165, 424 TOTAL 79, 756 79, 756	
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT	7			27, 612	22, 092	62, 324	111,447	123, 089	165, 424 TOTAL 79, 756 79, 756 41, 645	
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E	7			27, 612	22, 092	62, 324	111,447	123, 089	165, 424 TOTAL 79, 756 79, 756	
COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT	7			27, 612	22, 092	62, 324	111,447	123, 089	165, 424 TOTAL 79, 756 79, 756 41, 645	
COST ELEMENT FY NONRECURRING TOTAL DDT & R DEVELOPMENT DEVELOPMENT	7			27, 612	22, 092	62, 324	111,447	123, 089	165, 424 TOTAL 79, 756 79, 756 41, 645	
COST ELEMENT FY NONRECURRING TOTAL DDT & R DEVELOPMENT DEVELOPMENT STE	7			27, 612	22, 092	62, 324	111,447	123, 089	165, 424 TOTAL 79, 756 79, 756 41, 645 41, 645	
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEV ELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE	7			27, 612	22, 092	62, 324	111,447	123, 089	165, 424 TOTAL 79, 756 79, 756 41, 645 41, 645 34, 329	
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES	7			27, 612	22, 092	62, 324	111,447	123, 089	165, 424 TOTAL 79, 756 79, 756 41, 645 41, 645 34, 329 3, 600	
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES	7			27, 612	22, 092	62, 324	111,447	123, 089	165, 424 TOTAL 79, 756 79, 756 41, 645 41, 645 34, 329 3, 600 30, 729	
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES	1983	1984	1985	27, 612 1986	22, 092	62, 324 1988	111,447	123, 089	165, 424 TOTAL 79, 756 79, 756 41, 645 41, 645 34, 329 3, 600 30, 729 3, 782	
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL	1983	1984	1985	27, 612 1986	22, 092 1987	62, 324 1988	111, 447 1989	123, 089	165, 424 TOTAL 79, 756 79, 756 41, 645 41, 645 34, 329 3, 600 30, 729 3, 782 1, 503, 339	
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT	1983 165, 368 163, 949	1984 162, 361 160, 967	1985 160, 857 159, 476	27, 612 1986 159, 354 157, 986	22, 092 1987 157, 850 146, 496	62, 324 1988 142, 818 141, 592	111, 447 1989 4, 510 4, 471	123, 089	165, 424 TOTAL 79, 756 79, 756 41, 645 41, 645 34, 329 3, 600 30, 729 3, 782 1, 503, 339 1, 490, 438	
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES	1983 165, 368 163, 949 163, 465	1984 162, 361 160, 967 160, 493	1985 160, 857 159, 476 159, 006	27, 612 1986 159, 354 157, 986 157, 520	157, 850 146, 496 156, 034	62, 324 1988 142, 818 141, 592 141, 174	111, 447 1989 4, 510 4, 471 4, 459	123, 089	165, 424 TOTAL 79, 756 79, 756 41, 645 41, 645 34, 329 3, 600 30, 729 3, 782 1, 503, 339 1, 490, 438 1, 486, 042	
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP.	1983 165, 368 163, 949 163, 465	1984 162, 361 160, 967 160, 493	1985 160, 857 159, 476 159, 006	27, 612 1986 159, 354 157, 986 157, 520	157, 850 146, 496 156, 034	62, 324 1988 142, 818 141, 592 141, 174	111, 447 1989 4, 510 4, 471 4, 459	123, 089	165, 424 TOTAL 79, 756 79, 756 41, 645 41, 645 34, 329 3, 600 30, 729 3, 782 1, 503, 339 1, 490, 438 1, 486, 042	
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS	165, 368 163, 949 163, 465 484	162, 361 160, 967 160, 493 474	160, 857 159, 476 159, 006 470	27, 612 1986 159, 354 157, 986 157, 520 466	157, 850 146, 496 156, 034 462	142, 818 141, 592 141, 174 418	111,447 1989 4,510 4,471 4,459	123, 089	165, 424 TOTAL 79, 756 79, 756 41, 645 41, 645 34, 329 3, 600 30, 729 3, 782 1, 503, 339 1, 490, 438 1, 486, 042 4, 396	
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS	165, 368 163, 949 163, 465 484	162, 361 160, 967 160, 493 474	160, 857 159, 476 159, 006 470	27, 612 1986 159, 354 157, 986 157, 520 466 1, 368	157, 850 146, 496 156, 034 462	142, 818 141, 592 141, 174 418	111, 447 1989 4, 510 4, 471 4, 459 12	123, 089	165, 424 TOTAL 79, 756 79, 756 41, 645 41, 645 34, 329 3, 600 30, 729 3, 782 1, 503, 339 1, 490, 438 1, 486, 042 4, 396	
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS FLIGHT SUPPORT	165, 368 163, 949 163, 465 484 1,419 652	162, 361 160, 967 160, 493 474	160, 857 159, 476 159, 006 470	27, 612 1986 159, 354 157, 986 157, 520 466 1, 368 629	157, 850 146, 496 156, 034 462 1, 354 623	142, 818 141, 592 141, 174 418 1, 226 564	111, 447 1989 4, 510 4, 471 4, 459 12 39 18	123, 089	165, 424 TOTAL 79, 756 79, 756 41, 645 41, 645 34, 329 3, 600 30, 729 3, 782 1, 503, 339 1, 490, 438 1, 486, 042 4, 396 12, 901 5, 933	
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE BARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS PARTS	165, 368 163, 949 163, 465 484 1,419 652 405	162, 361 160, 967 160, 493 474 1, 394 641 397	160, 857 159, 476 159, 006 470 1,381 635 393	27, 612 1986 159, 354 157, 986 157, 520 466 1, 368 629 390	157, 850 146, 496 156, 034 462 1, 354 623 386	142, 818 141, 592 141, 174 418 1, 226 564 349	111,447 1989 4,510 4,471 4,459 12 39 18 10	123, 089	165, 424 TOTAL 79, 756 79, 756 41, 645 41, 645 34, 329 3, 600 30, 729 3, 782 1, 503, 339 1, 490, 438 1, 486, 042 4, 396 12, 901 5, 933 3, 675	
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS	165, 368 163, 949 163, 465 484 1,419 652 405	162, 361 160, 967 160, 493 474 1, 394 641 397	160, 857 159, 476 159, 006 470 1,381 635 393	27, 612 1986 159, 354 157, 986 157, 520 466 1, 368 629 390	157, 850 146, 496 156, 034 462 1, 354 623 386	142, 818 141, 592 141, 174 418 1, 226 564 349	111,447 1989 4,510 4,471 4,459 12 39 18 10	123, 089	165, 424 TOTAL 79, 756 79, 756 41, 645 41, 645 34, 329 3, 600 30, 729 3, 782 1, 503, 339 1, 490, 438 1, 486, 042 4, 396 12, 901 5, 933 3, 675 3, 293	

PROBABLE COST 156 INCH SRM PARALLEL BURN W/O TVC TT (DOLLARS IN THOUSANDS)

			DDT & E			7				DATE	15 March 1972
	ENGINEERING DESIGN AND DEVELOPMENT		GROUND TEST HARDWARE	FLIGHT TEST HARDWARE	DDT & E	PR	0/YEAR RATE ODUCTION PROGRA	AM.	PRODUCTION PROGRAM		TOTAL
	(ED & D)	TOOLING	(GTH)	(FTH)	TOTAL	PRODUCTION	TOOLING	FACILITIES	TOTAL	OPERATIONS	PROGRAM
SRM											
PROGRAM MANAGEMENT	1,705	156	42	849	2,752	9,411	894		10,305	700	13,757
SYSTEM ENGINEERING	3,529		5	1,079	4,613	4, 254			4, 254		8, 867
SRM'S	27, 225	7, 038	2, 534	25, 602	62, 399	762, 594	17,467		780,061		842, 460
CASE	12, 378	2, 645	70	11,438	26, 531	415,025	7, 583		422, 608		449, 139
NOZZLE	4, 345	1, 254	783	4,778	11, 160	121,850	1, 244		123, 094		134, 254
IGNITER	460	252	5	234	951	4, 885	344		5, 229		6, 180
PROPELLANT AND LINER	7, 169	1, 388	1,049	6, 902	16, 508	167, 440	2, 268		169,708		186, 216
POWER SUPPLY DISTRIBUTION	210	14	103	639	966	13, 307	320		13, 627		14, 593
FINAL ASSEMBLY	1, 106	675	369	1,611	3, 761	38, 051	5, 708		43,759		47, 520
GROUND TEST	1,557	810	155		2, 522	2,036			2, 036		4, 558
AUXILIARY POWER UNIT (APU)											
THRUST TERMINATION											
INSTALLATION ASSEMBLY AND CHECKOUT	207		160	440	807					4,710	5,517
FACILITIES	5, 344		1,946		7, 290	441		54, 638	55, 079		62, 369
SUPPORT EQUIPMENT AND SPARES	196		1, 399	571	2, 166	3, 678			3, 678	2, 755	8, 599
FLIGHT TEST SUPPORT				473	473	4, 829			4, 829		5, 302
OPERATIONS SUPPORT			124	212	336					3, 234	3, 570
STRUCTURE	1,633	359	1,019	3, 199	6, 210	117, 547	334		117, 881		124, 091
TRANSPORTATION			357	1, 123	1,480	39, 183			39, 183		40, 663
									L		
						↓					
	20.000		7.50	13.540	20.52/					11 200	1 115 105
TOTAL PROGRAM	39,839	7, 553	7,586	33, 548	88, 526	941, 937	18, 695	54,638	1, 015, 270	11,399	1, 115, 195

SRM PROGRAM TIME PHASED FUNDING REQUIREMENTS
PROBABLE COST SRM PARALLEL W/O TVC TT 20/YEAR PRODUCTION

	(DOLLARS IN THOUSANDS) DATE											
COST ELEMENT	FY	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	
NONRECURRING TOTAL		208	9, 266	20.748	27, 236	21,582	716					
DDT & E		208	9, 266	20,748	27, 236	21,582	716					
DEVELOPMENT		208	9, 266	17,595	14,576							
DEVELOPMENT		208	9, 266	17, 595	14, 576							
STE												
DELIVERABLE HARDWAI	RE			1,608	12, 212	20,509						
DUMMY ENGINES				1,608	1,992							
FLIGHT ENGINES					10, 220	20,509						
O & FS AND SPARES				1,545	448	1,073	716					
RECURRING TOTAL							44,757	89, 512	96, 970	96, 970	96, 039	
INVESTMENT							44, 237	88,473	95, 845	95, 845	94, 924	
DELIVER NEW ENGIN	ES						44,060	88, 119	95, 463	95, 463	94, 545	
GROUND SUPPORT EQ	UIP.						177	354	382	382	379	
PARTS												
OPERATIONS							520	1,039	1,125	1, 125	1, 115	
FLIGHT SUPPORT							232	464	502	502	497	
OPERATIONS							155 .	311	336	336	334	
PARTS							133	264	287	287	284	
FACILITIES		499	6, 030	1,008			16, 389	23, 936	13,709			
TRANSPORTATION					376	510	2, 546	3,753	4,070	4, 070	4,030	
TOTAL PROGRAM		707	15, 296	21,756	27, 612	22, 092	64, 408	117, 201	114, 749	101,040	100,069	

TOTAL PROGRAM	101	15, 296	21, 756	27,612 1	22, 092	01, 100	117,201	114,747	101,040
COST ELEMENT FY	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL
NONRECURRING TOTAL					-				79, 756
DDT & E									79, 756
DEVELOPMENT									41,645
DEVELOPMENT									41,645
STE									
DELIVERABLE HARDWARE									34, 329
DUMMY ENGINES									3,600
FLIGHT ENGINES									30, 729
O & FS AND SPARES									3, 782
RECURRING TOTAL	94, 172	92, 308	91, 376	89,510	88, 577	47,553	4,663		932, 407
INVESTMENT	93, 080	91, 237	90, 315	88, 472	87, 551	47,001	4,609		921,589
DELIVER NEW ENGINES	92,709	90, 873	89, 955	88, 119	87, 202	46, 813	4,590	_	917, 911_
GROUND SUPPORT EQUIP.	371	364	360	353	349	188	19		3, 678
PARTS									
OPERATIONS	1,092	1,071	1,061	1,038	1,026	552	54		10,818
FLIGHT SUPPORT	<u>4</u> 87	478	474	464	459	246	24		4, 829
OPERATIONS	327	320	317	310	307	165	16		3, 234
PARTS	278	273	270	264	260	141	14	<u> </u>	2, 755
FACILITIES	395	403							62, 369
TRANSPORTATION	3,947	3,886	3, 819	3,752	3,717	1, 992	195		40, 663
TOTAL PROGRAM	98, 514	96, 597	95, 195	93, 262	92, 294	49, 545	4, 858		1, 115, 195

PROBABLE COST 156 INCH SRM PARA LLEL BURN W/O TVC TT (DOLLARS IN THOUSANDS)

			DDT & E			7				DATE	15 March 1972
	ENGINEERING DESIGN AND DEVELOPMENT		GROUND TEST HARDWARE	FLIGHT TEST HARDWARE	DDT & E		0/YEAR RATE DUCTION PROGR	AM	PRODUCTION PROGRAM		mom. r
	(ED & D)	TOOLING	(GTH)	(FTH)	TOTAL	PRODUCTION	TOOLING	FACILITIES	TOTAL	OPERATIONS	TOTAL PROGRAM
SRM											
PROGRAM MANAGEMENT	1,705	156	42	849	2, 752	9, 411	894		10,305	700 -	13,757
SYSTEM ENGINEERING	3, 529		5	1, 079	4,613	4, 254	•		4, 254		8, 867
SRM'S	27, 225	7, 038	2, 534	25, 602	62, 399	404, 448	9,499		413,947		476, 346
CASE	12, 378	2, 645	70	11,438	26, 531	219, 320	4, 124		223, 444		249, 975
NOZZLE	4, 345	1, 254	783	4,778	11,160	65, 367	676		66,043		77, 203
IGNITER			5			2, 505	187		2, 692		3, 643
PROPELLANT AND LINER	460	252	1,049	234	951	91,214	1, 233		92, 447		108, 955
POWER SUPPLY DISTRIBUTION	7, 169	1, 388	103	6, 902	16, 508	6,670	174		6, 844		7,810
FINAL ASSEMBLY	210	14		639	966	18, 354	3, 105		21,459		25, 220
GROUND TEST			369			1,018			1,018		3, 540
AUXILIARY POWER UNIT (APU)	1, 106	675	155	1,611	3, 761						
THRUST TERMINATION	1,557	810			2, 522						
INSTALLATION ASSEMBLY AND CHECKOUT	207	•	160	440	807					3, 909	4,716
FACILITIES	5, 344		1, 946		7, 290	438		40, 867	41,305		48, 595
SUPPORT EQUIPMENT AND SPARES	196	·	1,399	571	2, 166	3, 105		· · · · · · · · · · · · · · · · · · ·	3, 105	2, 271	7, 542
FLIGHT TEST SUPPORT			 	473	473	3,912			3,912		4, 385
OPERATIONS SUPPORT			124	212	336					2,846	3, 182
STRUCTURE	1,633	359	1,019	3, 199	6, 210	64, 160	334		64, 494		70,704
TRANSPORTATION			357	1,123	1,480	21,387			21, 387		22, 867
				_				1			
			 								
TOTAL PROGRAM	39, 839	7, 553	7,586	33, 548	88_526	511, 115	10, 727	40, 867	562, 709	9,726	660, 961

SRM PROGRAM TIME PHASED FUNDING REQUIREMENTS PROBABLE COST SRM PARALLEL W/O TVC TT 10/YEAR PRODUCTION

DATE 15 March 1972

									DAI	E
COST ELEMENT FY	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
NONRECURRING TOTAL	208	9, 266	20,748	27, 236	21, 582	716				<u> </u>
DDT & E	208	9, 266	20,748	27, 236	21, 582	716				
DEVELOPMENT	208	9, 266	17, 595	14, 576		<u> </u>				
DEVELOPMENT	208	9, 266	17, 595	14, 576						ļ
STE										ļ
DELIVERABLE HARDWARE			1,608	12, 212	20,509					
DUMMY ENGINES			1,608	1,992						
FLIGHT ENGINES	ļ			10, 220	20, 509					
O & FS AND SPARES	ļ		1,545	448	1,073	716				
RECURRING TOTAL	<u> </u>					45, 368	50, 465	50, 465	49,955	49, 444
INVESTMENT						44, 664	49,571	49, 571	49,070	48, 569
DELIVER NEW ENGINES						44, 287	49, 263	49, 263	48,766	48, 268
GROUND SUPPORT EQUIP.						277	308	308	304	301
PARTS										
OPERATIONS						804	894	894	885	875
FLIGHT SUPPORT						349	387	387	383	379
OPERATIONS						253	282	282	279	276
PARTS						202	225	225	223	220
FACILITIES	499	6, 030	1,008			17, 149	23, 909			
TRANSPORTATION				376	510	2, 567	2, 111	2, 111	2, 088	2, 067
TOTAL PROGRAM	707	15, 296	21, 756	27, 612	22,092	65_800	76, 485	52, 576	52, 043	51,511
COST ELEMENT FY	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL	7
NONRECURRING TOTAL	1	1 200	1300	1200	1301	1000	1000	1000	79, 756	1
DDT & E	 						T		79, 756	1
DEVELOPMENT									41,645	
DEVELOPMENT								·	41,645	7
STE		 						-		1
DELIVERABLE HARDWARE	<u> </u>	1						 	34, 329	1
DUMMY ENGINES	 								3,600	1
FLIGHT ENGINES			_						30, 729	1
O & FS AND SPARES	 		_						3,782	1
RECURRING TOTAL	48, 936	47, 405	46 807	46 396	45 366	26, 506	3 550		509, 743	1
INVESTMENT	48, 936		46, 897	46, 386	45, 366	26, 037	2, 550		500, 714	1
DELIVER NEW ENGINES		46, 566	46,066	45, 565	44, 563					1
	47, 770	46, 278	45,780	45, 282	44, 287	25, 876	2, 489	1	497, 609	1
GROUND SUPPORT EQUIP. PARTS	298	288	286	283	276	161	15	+	3, 105	-
OPERATIONS	1				-	1/0		+	0.000	1
	868	839	831	821	803	469	46	·	9, 029	-
FLIGHT SUPPORT	376	364	360	356	348	203	20	 	3, 912	1
OPERATIONS	274	264	262	259	253	148	14		2, 846	₹
PARTS	218	211	209	206	202	118	12	+	2, 271	┨
FACILITIES	2 044	1 002	1 2/2	1,939	1,896	1, 104	106		48, 595	-
TRANSPORTATION	2,044	1,983	1,960	1, 939	1,070	1,104	100		42, 001	4
TOTAL PROGRAM	50,980	49,388	48, 857	48, 325	47, 262	27, 615	2,656		660, 961	

5.1.2.1.2 With TVC and TT

PROBABLE COST 156 INCH SRM PARALLEL BURN WITH TVC/TT (DOLLARS IN THOUSANDS)

		DDT & E						DATE _ 15 March 1973						
	ENGINEERING DESIGN AND DEVELOPMENT		GROUND TEST HARDWARE (GTH)	FLIGHT TEST ' HARDWARE (FTH)	DDT & E TOTAL	próbléfón Progr am			PRODUCTION PROGRAM		TOTAL			
	(ED & D)	TOOLING				PRODUCTION	TOOLING	FACILITIES	TOTAL	OPERATIONS	PROGRAM			
SRM			1						İ		L			
PROGRAM MANAGEMENT	1,772	156	42	858	2, 828	11,072	1,052		12, 124	700	15, 652			
SYSTEM ENGINEERING	4, 630		5	1, 274	5,909	5, 005			5,005		10,914			
SRM'S	36, 901	9,187	2, 993	30,553	79.634	1,661,979	22, 622		1,684,601		1,764,235			
CASE	12, 378	2, 645	70	11,438	26, 531	763,806	9,512		773, 318	ļ	799,849			
NOZZLE	6,039	1,953	894	5,583	14, 469	295, 728	1,516		297, 244		311,713			
IGNITER	460	252	5	234	951	7,799	390		8, 189		9,140			
PROPELLANT AND LINER	7, 169	1,388	1,049	6, 902	16, 508	361,977	2,919		364, 896	<u> </u>	381,404			
POWER SUPPLY DISTRIBUTION	226	19	134	738	1, 117	22,749	349		23, 098		24, 215			
FINAL ASSEMBLY	1,368	1, 625	449	1,932	5, 374	72,455	7, 659		80, 114	<u> </u>	85, 488			
GROUND TEST	1,606	1,011	187		2, 804	2, 848			2, 848		5, 652			
AUXILIARY POWER UNIT (APU)	7, 073	259	147	3, 495	10, 974	123, 339			123, 339		134, 313			
THRUST TERMINATION	582	35	58	231	906	11,278	277		11,555		12, 461			
INSTALLATION ASSEMBLY AND CHECKOUT	227		174	476	877					6, 836	7, 713			
FACILITIES	5, 919		1,946		7, 865	1,396		99, 764	101, 160		109, 025			
SUPPORT EQUIPMENT AND SPARES	238		1,765	577	2, 580	5, 227			5, 227	3,963	11,770			
FLIGHT TEST SUPPORT				527	527	7, 289			7, 289		7, 816			
OPERATIONS SUPPORT			124	212	336					4, 178	4,514			
STRUCTURE	1,633	359	1,019	3, 199	6, 210	222, 631	334		222, 965		229, 175			
TRANSPORTATION			392	1, 235	1,627	73,711			73,711		75, 338			
								<u> </u>			ļ			
									<u> </u>		ļ			
											 			
						1		<u> </u>						
						_	1		-		1			
TOTAL PROGRAM	51,320	9,702	8,460	38, 911	108,393	1,988,310	24,008	99,764	2, 112, 082	15,677	2, 236, 152			

SRM PROGRAM TIME PHASED FUNDING REQUIREMENTS PROBABLE COST 156 INCH SRM PARALLEL BURN WITH TVC/TT 60/YEAR PR $_{\sim}$ JCTION RATE

COST ELEMENT	FY 1973	1974	1975	1976	1977	1978	1979	1980	1981	15 March 19 1982
NONRECURRING TOTAL	273	12, 157	26, 664	33,814	25,175	818	13.0	360	1301	1362
DDT & E	273	12, 157	26, 664	33,814	25, 175	818				
DEVELOPMENT	273	12, 157	23, 085	19,123	25,115					
DEVELOPMENT	273	12, 157	23, 085	19, 123						
STE	213	12,157	23,003	19,123						
DELIVERABLE HARDWARI	r		1,814	14, 180	23,949					
DUMMY ENGINES	<u> </u>		1, 814	2, 245	23, 727					
FLIGHT ENGINES			1,014	11,935	23, 949					
O & FS AND SPARES			1,765	511	1, 226	818				
RECURRING TOTAL		<u> </u>	1,103		1, 220	44,916	87, 880	109, 362	154, 278	173,807
INVESTMENT						44, 562	87, 185	108, 498	153, 059	172, 434
DELIVER NEW ENGINES						44, 441	86,950	108, 205	152, 646	171, 969
GROUND SUPPORT EQU						121	235	293	413	465
PARTS	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,								113	40.
OPERATIONS		 				355	695	864	1,219	1,374
FLIGHT SUPPORT		-				168	328	408	576	649
OPERATIONS		-	*			96	188	234	330	37
PARTS		· · · · · · · · · · · · · · · · · · ·				91	179	222	313	35:
FACILITIES	502	6,062	1,014			17, 313	24, 105	13, 813	9, 234	13, 87
TRANSPORTATION	302	0,002	1,014	377	512	2, 373	3,322	4, 129	5, 831	6, 56
TOTAL PROGRAM	775	18, 219	27, 678	34, 191	25, 687	65, 420	115, 307	127, 304	169, 343	194, 248
										171, 210
	FY 1983	1984	1985	1986	1987	1988	1989	1990	TOTAL	
NONRECURRING TOTAL	1	I I					i		98, 901	
DDT & E									, , , , , , ,	
									98, 901	
DEVELOPMENT									98, 901 54, 638	
									98, 901	
DEVELOPMENT DEVELOPMENT STE									98, 901 54, 638	
DEVELOPMENT DEVELOPMENT	E								98, 901 54, 638	
DEVELOPMENT DEVELOPMENT STE	E								98, 901 54, 638 54, 638 39, 943 4, 059	
DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE	E								98, 901 54, 638 54, 638 39, 943 4, 059 35, 884	
DEVELOPMENT STE DELIVERABLE HARDWARN DUMMY ENGINES									98, 901 54, 638 54, 638 39, 943 4, 059 35, 884 4, 320	
DEVELOPMENT STE DELIVERABLE HARDWARD DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES	E 207, 006	257, 781	255, 828	246, 064	246, 064	165, 996	3, 906		98, 901 54, 638 54, 638 39, 943 4, 059 35, 884 4, 320 1, 952, 888	
DEVELOPMENT STE DELIVERABLE HARDWARD DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES		257, 781 255, 744	255, 828 253, 807	246, 064 244, 120	244,120	164, 683	3, 876		98, 901 54, 638 54, 638 39, 943 4, 059 35, 884 4, 320 1, 952, 888 1, 937, 458	
DEVELOPMENT STE DELIVERABLE HARDWARD DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL	207, 006 205, 370		253, 807 253, 122	244, 120 243, 461	244, 120 243, 461	164, 683 164, 240	3, 876 3, 866		98, 901 54, 638 54, 638 39, 943 4, 059 35, 884 4, 320 1, 952, 888 1, 937, 458 1, 932, 231	
DEVELOPMENT STE DELIVERABLE HARDWARF DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT	207, 006 205, 370 3 204, 816	255, 744	253, 807	244, 120	244,120	164, 683	3, 876		98, 901 54, 638 54, 638 39, 943 4, 059 35, 884 4, 320 1, 952, 888 1, 937, 458	
DEVELOPMENT STE DELIVERABLE HARDWARN DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES	207, 006 205, 370 3 204, 816	255, 744 255, 054	253, 807 253, 122	244, 120 243, 461	244, 120 243, 461	164, 683 164, 240	3, 876 3, 866		98, 901 54, 638 54, 638 39, 943 4, 059 35, 884 4, 320 1, 952, 888 1, 937, 458 1, 932, 231 5, 227	
DEVELOPMENT STE DELIVERABLE HARDWARK DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQU	207, 006 205, 370 3 204, 816	255, 744 255, 054	253, 807 253, 122	244, 120 243, 461	244, 120 243, 461	164, 683 164, 240	3, 876 3, 866		98, 901 54, 638 54, 638 39, 943 4, 059 35, 884 4, 320 1, 952, 888 1, 937, 458 1, 932, 231 5, 227	
DEVELOPMENT STE DELIVERABLE HARDWARK DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIPARTS	207, 006 205, 370 3 204, 816 IP. 554	255, 744 255, 054 690	253, 807 253, 122 685	244, 120 243, 461 659	244, 120 243, 461 659	164, 683 164, 240 443	3, 876 3, 866 10		98, 901 54, 638 54, 638 39, 943 4, 059 35, 884 4, 320 1, 952, 888 1, 937, 458 1, 932, 231 5, 227	
DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARK DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIPARTS OPERATIONS	207, 006 205, 370 3 204, 816 IP. 554	255, 744 255, 054 690 2, 038	253, 807 253, 122 685 2, 020	244, 120 243, 461 659	244, 120 243, 461 659 1, 943	164, 683 164, 240 443 1, 313 620 356	3, 876 3, 866 10 30 15 8		98, 901 54, 638 54, 638 39, 943 4, 059 35, 884 4, 320 1, 952, 888 1, 937, 458 1, 932, 231 5, 227 15, 430 7, 289 4, 178	
DEVELOPMENT STE DELIVERABLE HARDWARK DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIPARTS OPERATIONS FLIGHT SUPPORT	207, 006 205, 370 3 204, 816 IP. 554 1, 636 773	255, 744 255, 054 690 2, 038 962	253, 807 253, 122 685 2, 020 954	244, 120 243, 461 659 1, 943 918	244, 120 243, 461 659 1, 943 918	164, 683 164, 240 443 1, 313 620	3, 876 3, 866 10 30 15		98, 901 54, 638 54, 638 39, 943 4, 059 35, 884 4, 320 1, 952, 888 1, 937, 458 1, 932, 231 5, 227 15, 430 7, 289	
DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARK DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIPARTS OPERATIONS FLIGHT SUPPORT OPERATIONS	207, 006 205, 370 3 204, 816 IP. 554 1, 636 773 443	255, 744 255, 054 690 2, 038 962 552	253, 807 253, 122 685 2, 020 954 547	244, 120 243, 461 659 1, 943 918 526	244, 120 243, 461 659 1, 943 918 526	164, 683 164, 240 443 1, 313 620 356	3, 876 3, 866 10 30 15 8		98, 901 54, 638 54, 638 39, 943 4, 059 35, 884 4, 320 1, 952, 888 1, 937, 458 1, 932, 231 5, 227 15, 430 7, 289 4, 178	
DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARK DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIPARTS OPERATIONS FLIGHT SUPPORT OPERATIONS PARTS	207, 006 205, 370 3 204, 816 IP. 554 1, 636 773 443	255, 744 255, 054 690 2, 038 962 552 524	253, 807 253, 122 685 2, 020 954 547	244, 120 243, 461 659 1, 943 918 526	244, 120 243, 461 659 1, 943 918 526	164, 683 164, 240 443 1, 313 620 356	3, 876 3, 866 10 30 15 8		98, 901 54, 638 54, 638 39, 943 4, 059 35, 884 4, 320 1, 952, 888 1, 937, 458 1, 932, 231 5, 227 15, 430 7, 289 4, 178 3, 963	

PROBABLE COST 156 INCH SRM PARALLEL BURN WITH TVC/TT

(DOLLARS IN THOUSANDS)

	<u> </u>		DDT & E			DATE 15 March					
	ENGINEERING DESIGN AND DEVELOPMENT (ED & D)		GROUND TEST HARDWARE (GTH)	FLIGHT TEST HARDWARE (FTH)	DDT & E TOTAL	40/YEAR RATE PRODUCTION PROGRAM			PRODUCTION	J]
		TOOLING				PRODUCTION	TOOLING	FACILITIES	PROGRAM TOTAL	OPERATIONS	PROGRA
SRM						ł .					
PROGRAM MANAGEMENT	1,772	156	42	858_	2, 828	11,072	1,052		12, 124	700	15,6
SYSTEM ENGINEERING	4,630		5	1, 274	5, 909	5, 005			5, 005		10,9
SRM'S	36,901	9, 187	2,993	30,553	79, 634	1, 405, 094	19,757		1, 424, 851		1,504,4
CASE	12, 378	2, 645	70	11,438	26, 531	693, 193	8, 277		701,470		728,
NOZZLE	6, 039	1,953	894	5, 583	14, 469	202, 168	1,364		203,532		218,
IGNITER	460	252	5	234	951	7,174	376		7,550		8,
PROPELLANT AND LINER	7, 169	1,388	1,049	6, 902	16,508	292, 132	2, 475		294, 607		311,
POWER SUPPLY DISTRIBUTION	226	19	134	738	1, 117	19, 587	349	<u> </u>	19, 936		21,
FINAL ASSEMBLY	1, 368	1,625	449	1, 932	5, 374	61, 347	6, 673		68, 020		73,
GROUND TEST	1,606	1,011	187		2, 804	2, 432			2, 432		5,
AUXILIARY POWER UNIT (APU)	7,073	259	147	3, 495	10, 974	117, 875		L	117, 875		128,
THRUST TERMINATION	582	35	58	231	906	9, 186	243		9, 429		10,
INSTALLATION ASSEMBLY AND CHECKOUT	227		174	476	877					5, 674	6,
FACILITIES	5, 919		1,946		7, 865	437		63, 855	64, 292		72,
SUPPORT EQUIPMENT AND SPARES	238		1,765	577	2, 580	4,396			4, 396	3, 293	10,
FLIGHT TEST SUPPORT			1	527	527	5, 933			5, 933		6,
OPERATIONS SUPPORT			124	212	336					3, 675	4,
STRUCTURE	1, 633	359	1,019	3, 199	6, 210	178, 722	334		179, 056		185,
TRANSPORTATION			392	1, 235	1,627	59, 135			59, 135		60,
TOTAL PROGRAM	51,320	9,702	8, 460	38, 911	108, 393	1, 669, 794	21, 143	63,855	1,754,792	13, 342	1,876,

F	PROBABLE COST 156 INCH SRM PARALLEL BURN WITH TVC/TT 40/YEAR PRODUCTION RATE
	(DOLLARS IN THOUSANDS)

DATE 15 March 1972

COST ELEMENT	FY	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
NONRECURRING TOTAL		273	12, 157	26, 664	33, 814	25, 175	818				
DDT & E	I	273	12, 157	26, 664	33,814	25, 175	818				
DEVELOPMENT		273	12, 157	23,085	19, 123						
DEVELOPMENT		273	12, 157	23, 085	19,123						
STE											
DELIVERABLE HARDWA	RE			1,814	14, 180	23, 949					
DUMMY ENGINES				1,814	2, 245						
FLIGHT ENGINES					11,935	23, 949					
O & FS AND SPARES				1,765	511	1, 226	818				
RECURRING TOTAL							46, 052	92, 103	115, 129	164, 472	184, 206
INVESTMENT							45, 691	91,381	114, 227	163, 181	182,762
DELIVER NEW ENGIN	ES						45,567	91, 135	113,919	162, 741	182, 270
GROUND SUPPORT EQ	QUIP.						124	246	308	440	492
PARTS											
OPERATIONS							361	722	902	1, 291	1,444
FLIGHT SUPPORT							166	333	415	593	664
OPERATIONS							103	205	257	368	412
PARTS							92	184	230	330	368
FACILITIES		502	6, 062	1,014			17, 344	24, 144	13, 832	9, 259	
TRANSPORTATION					377	512	2, 331	3,318	4, 144	5,918	6, 629
TOTAL PROGRAM		775	18, 219	27, 678	34, 191	25, 687	66, 545	119,565	133, 105	179, 649	190, 835
COST ELEMENT	FY	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL	
NONRECURRING TOTAL										98, 901	
DDT & E										98, 901	
DEVELOPMENT										54, 638	
DEVELOPMENT										J T , 050	
STE			'							54,638	
DELIVERABLE HARDWAI			'								
Designation in the particular	RE		,								
DUMMY ENGINES	RE									54, 638	
DUMMY ENGINES FLIGHT ENGINES	RE									54, 638 39, 943	
FLIGHT ENGINES	RE		,							54, 638 39, 943 4, 059	
FLIGHT ENGINES O & FS AND SPARES	RE	180,918	177, 628	175, 984	174, 339	172, 694	156, 247	4,935		54, 638 39, 943 4, 059 35, 884	
FLIGHT ENGINES	RE	180,918 179,499	177, 628 176, 234	175, 984 174, 603	174, 339 172, 971	172, 694 171, 340	156, 247 155, 021	4, 935 4, 896		54, 638 39, 943 4, 059 35, 884 4, 320	
FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT										39, 943 4, 059 35, 884 4, 320 1, 644, 707	
FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINE	ES	179, 499	176, 234	174,603	172, 971	171,340	155, 021	4, 896		39, 943 4, 059 35, 884 4, 320 1, 644, 707 1, 631, 806	
FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINI GROUND SUPPORT EQ	ES	179, 499 179, 015	176, 234 175, 760	174, 603 174, 133	172, 971 172, 505	171, 340 170, 878	155, 021 154, 604	4, 896 4, 883		39, 943 4, 059 35, 884 4, 320 1, 644, 707 1, 631, 806 1, 627, 410	
FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINE	ES	179, 499 179, 015	176, 234 175, 760	174, 603 174, 133	172, 971 172, 505	171, 340 170, 878	155, 021 154, 604	4, 896 4, 883		39, 943 4, 059 35, 884 4, 320 1, 644, 707 1, 631, 806 1, 627, 410	
FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINI GROUND SUPPORT EQ PARTS OPERATIONS	ES	179, 499 179, 015 484	176, 234 175, 760 474	174, 603 174, 133 470	172, 971 172, 505 466	171, 340 170, 878 462	155, 021 154, 604 417	4, 896 4, 883		39, 943 4, 059 35, 884 4, 320 1, 644, 707 1, 631, 806 1, 627, 410 4, 396	
FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINI GROUND SUPPORT EQ PARTS	ES	179, 499 179, 015 484 1, 419	176, 234 175, 760 474 1, 394	174, 603 174, 133 470	172, 971 172, 505 466 1, 368	171, 340 170, 878 462 1, 354	155, 021 154, 604 417	4, 896 4, 883 13		39, 943 4, 059 35, 884 4, 320 1, 644, 707 1, 631, 806 1, 627, 410 4, 396	
FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINI GROUND SUPPORT EQ PARTS OPERATIONS FLIGHT SUPPORT	ES	179, 499 179, 015 484 1, 419 652	176, 234 175, 760 474 1, 394 641	174, 603 174, 133 470 1, 381 635	172, 971 172, 505 466 1, 368 629	171, 340 170, 878 462 1, 354 623	155, 021 154, 604 417 1, 226 564	4, 896 4, 883 13 39 18		39, 943 4, 059 35, 884 4, 320 1, 644, 707 1, 631, 806 1, 627, 410 4, 396 12, 901 5, 933	
FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINE GROUND SUPPORT EQ PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS	ES	179, 499 179, 015 484 1, 419 652 405	176, 234 175, 760 474 1, 394 641 397	174, 603 174, 133 470 1, 381 635 393	172, 971 172, 505 466 1, 368 629 390	171, 340 170, 878 462 1, 354 623 386	155, 021 154, 604 417 1, 226 564 349	4, 896 4, 883 13 39 18		39, 943 4, 059 35, 884 4, 320 1, 644, 707 1, 631, 806 1, 627, 410 4, 396 12, 901 5, 933 3, 675	
FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINE GROUND SUPPORT EQ PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS PARTS	ES	179, 499 179, 015 484 1, 419 652 405	176, 234 175, 760 474 1, 394 641 397	174, 603 174, 133 470 1, 381 635 393	172, 971 172, 505 466 1, 368 629 390	171, 340 170, 878 462 1, 354 623 386	155, 021 154, 604 417 1, 226 564 349	4, 896 4, 883 13 39 18		39, 943 4, 059 35, 884 4, 320 1, 644, 707 1, 631, 806 1, 627, 410 4, 396 12, 901 5, 933 3, 675 3, 293	
FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINE GROUND SUPPORT EQ PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS PARTS FACILITIES	ES	179, 499 179, 015 484 1, 419 652 405 362	176, 234 175, 760 474 1, 394 641 397 356	174, 603 174, 133 470 1, 381 635 393 353	172, 971 172, 505 466 1, 368 629 390 349	171, 340 170, 878 462 1, 354 623 386 345	155, 021 154, 604 417 1, 226 564 349 313	4, 896 4, 883 13 39 18 10		39, 943 4, 059 35, 884 4, 320 1, 644, 707 1, 631, 806 1, 627, 410 4, 396 12, 901 5, 933 3, 675 3, 293 72, 157	

PROBABLE COST 156 INCH SRM PARALLEL BURN WITH TVC/TT (DOLLARS IN THOUSANDS)

			DDT & E							DATE	_15 March 197
	ENGINEERING DESIGN AND DEVELOPMENT		GROUND TEST HARDWARE	FLIGHT TEST HARDWARE	DDT & E	PR	20/YEAR RATE ODUCTION PROGR	AM	PRODUCTION PROGRAM		TOTAL
	(ED & D)	TOOLING	(GTH)	(FTH)	TOTAL	PRODUCTION	TOOLING	FACILITIES	TOTAL	OPERATIONS	PROGRAM
SRM						I					
PROGRAM MANAGEMENT	1,772	156	42	858	2, 828	9,411	894		10, 305	700	13, 833
SYSTEM ENGINEERING	4,630		5	1, 274	5, 909	4, 254			4, 254		10, 163
SRM'S	36, 901	9, 187	2, 993	30,553	79, 634	839, 948	18, 224		858, 172		937, 806
CASE	12, 378	2, 645	70	11,438	26, 531	414,973	7, 635		422, 608		449, 139
NOZZLE	6, 039	1,953	894	5, 583	14, 469	127,509	1, 258		128, 767		143, 236
IGNITER	460	252	5	234	951	4,882	347		5, 229		6, 180
PROPELLANT AND LINER	7, 169	_1, 388	1, 049	6, 902	16, 508	167, 425	2, 283		169,708		186, 216
POWER SUPPLY DISTRIBUTION	226	19	134	738	1, 117	13, 305	322		13, 627		14, 744
FINAL ASSEMBLY	1,368	1, 625	449	1,932	5, 374	40, 564	6, 116		46,680		52, 054
GROUND TEST	1,606	1,011	187		2,804	2, 036			2, 036		4, 840
AUXILIARY POWER UNIT (APU)	7,073	259	147	3, 495	10, 974	63, 810			63, 810		74,784
THRUST TERMINATION	582	35	58	231	906	5, 444	263		5, 707		6, 613
INSTALLATION ASSEMBLY AND CHECKOUT	227		174	476	877					4,710	5, 587
FACILITIES	5,919		1,946		7, 865	441		54, 638	55, 079		62, 944
SUPPORT EQUIPMENT AND SPARES	238		1,765	577	2, 580	3, 678			3,678	2,755	9,013
FLIGHT TEST SUPPORT				527	527	4, 829			4, 829		5, 356
OPERATIONS SUPPORT			124	212	336					3, 234	3,570
STRUCTURE	1,633	359	1,019	3, 199	6, 210	117,547	334		117,881		124, 091
TRANSPORTATION			392	1, 235	1,627	39, 183			39, 183		40,810
			<u></u>			<u> </u>	ļ <u></u>				
				ļ							
TOTAL PROGRAM	51, 320	9, 702	8,460	38, 911	108, 393	1,019,291	19, 452	54, 638	1, 093, 381	11, 399	1, 213, 173

PROBABLE COST 156 INCH SRM PARALLEL BURN WITH TVC/TT 20/YEARS PRODUCTION RATE

					HOUSANDS)				DATE	
COST ELEMENT FY	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
NONRECURRING TOTAL	273	12, 157	26, 664	33,814	25, 175	818				
DDT & E	273	12, 157	26, 664	33,814	25, 175	818				
DEVELOPMENT	273	12, 157	23, 085	19, 123						
DEVELOPMENT	273	12, 157	23, 085	19, 123						
STE										
DELIVERABLE HARDWARE			1,814	14, 180	23, 949					
DUMMY ENGINES			1,814	2, 245						
FLIGHT ENGINES				11,935	23, 949					
O & FS AND SPARES			1,765	511	1,226	818				
RECURRING TOTAL						48,506	97,009	105, 093	105, 093	104,
INVESTMENT						47,986	95, 971	103,968	103,968	102,
DELIVER NEW ENGINES						47, 809	95, 618	103,586	103,586	102,
GROUND SUPPORT EQUIP.						177	353	382	382 ,	
PARTS										
OPERATIONS		'				520	1,038	1,125	1,125	1,
FLIGHT SUPPORT		· · · · · · · ·				232	464	502	502	
OPERATIONS						155	310	336	336	
PARTS						133	264	287	287	
FACILITIES	502	6, 062	1,014	" ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' '		17, 374	24, 158	13, 834		1
FACILITIES I										
	302	, , ,		377	512	2, 555	3, 767	4,085	4,085	4,
TRANSPORTATION TOTAL PROGRAM			27, 678	377 34, 191	512 25, 687	2, 555 69, 253	3, 767 124, 934	4, 085 123, 012	4, 085 109, 178	4, 108,
TRANSPORTATION TOTAL PROGRAM	775	18, 219	27, 678	34, 191	25, 687	69, 253	124, 934	123, 012	109, 178	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT FY									109, 178 TOTAL	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL	775	18, 219	27, 678	34, 191	25, 687	69, 253	124, 934	123, 012	109, 178 TOTAL 98, 901	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E	775	18, 219	27, 678	34, 191	25, 687	69, 253	124, 934	123, 012	109, 178 TOTAL 98, 901 98, 901	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT	775	18, 219	27, 678	34, 191	25, 687	69, 253	124, 934	123, 012	109, 178 TOTAL 98, 901 98, 901 54, 638	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT	775	18, 219	27, 678	34, 191	25, 687	69, 253	124, 934	123, 012	109, 178 TOTAL 98, 901 98, 901	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE	775	18, 219	27, 678	34, 191	25, 687	69, 253	124, 934	123, 012	109, 178 TOTAL 98, 901 98, 901 54, 638 54, 638	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE	775	18, 219	27, 678	34, 191	25, 687	69, 253	124, 934	123, 012	109, 178 TOTAL 98, 901 98, 901 54, 638 54, 638 39, 943	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES	775	18, 219	27, 678	34, 191	25, 687	69, 253	124, 934	123, 012	109, 178 TOTAL 98, 901 98, 901 54, 638 54, 638 39, 943 4, 059	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES	775	18, 219	27, 678	34, 191	25, 687	69, 253	124, 934	123, 012	109, 178 TOTAL 98, 901 98, 901 54, 638 54, 638 39, 943 4, 059 35, 884	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES	1983	18, 219	27,678	34, 191 1986	25, 687 1987	69, 253 1988	124, 934	123, 012	109, 178 TOTAL 98, 901 98, 901 54, 638 54, 638 39, 943 4, 059 35, 884 4, 320	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL	775 1983	18, 219	27, 678 1985	34, 191 1986 97, 009	25, 687 1987	69, 253 1988 51, 537	124, 934 1989 5, 055	123, 012	109, 178 TOTAL 98, 901 98, 901 54, 638 54, 638 39, 943 4, 059 35, 884 4, 320 1, 010, 518	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT	1983 1983 102, 061 100, 969	18, 219 1984 100, 041 98, 970	27, 678 1985 99, 032 97, 971	34, 191 1986 97, 009 95, 971	25, 687 1987 95, 999 94, 972	69, 253 1988 51, 537 50, 985	124, 934 1989 5, 055 5, 000	123, 012	109, 178 TOTAL 98, 901 98, 901 54, 638 54, 638 39, 943 4, 059 35, 884 4, 320 1, 010, 518 999, 700	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES	102, 061 100, 969 100, 598	18, 219 1984 100, 041 98, 970 98, 606	27, 678 1985 99, 032 97, 971 97, 610	97, 009 95, 971 95, 618	25, 687 1987 95, 999 94, 972 94, 622	69, 253 1988 51, 537 50, 985 50, 797	124, 934 1989 5, 055 5, 000 4, 981	123, 012	109, 178 TOTAL 98, 901 98, 901 54, 638 54, 638 39, 943 4, 059 35, 884 4, 320 1, 010, 518 999, 700 996, 021	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP.	1983 1983 102, 061 100, 969	18, 219 1984 100, 041 98, 970	27, 678 1985 99, 032 97, 971	34, 191 1986 97, 009 95, 971	25, 687 1987 95, 999 94, 972	69, 253 1988 51, 537 50, 985	124, 934 1989 5, 055 5, 000	123, 012	109, 178 TOTAL 98, 901 98, 901 54, 638 54, 638 39, 943 4, 059 35, 884 4, 320 1, 010, 518 999, 700	
TRANSPORTATION COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS	102, 061 100, 969 100, 598	18, 219 1984 100, 041 98, 970 98, 606 364	27, 678 1985 99, 032 97, 971 97, 610 361	97, 009 95, 971 95, 618	25, 687 1987 95, 999 94, 972 94, 622 350	51, 537 50, 985 50, 797 188	124, 934 1989 5, 055 5, 000 4, 981	123, 012	109, 178 TOTAL 98, 901 98, 901 54, 638 54, 638 39, 943 4, 059 35, 884 4, 320 1, 010, 518 999, 700 996, 021 3, 679	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS	102, 061 100, 969 100, 598 371	18, 219 1984 100, 041 98, 970 98, 606 364 1, 071	27, 678 1985 99, 032 97, 971 97, 610 361 1, 061	97, 009 95, 971 95, 618 353	25, 687 1987 95, 999 94, 972 94, 622 350 1, 027	51, 537 50, 985 50, 797 188	124, 934 1989 5, 055 5, 000 4, 981 19	123, 012	109, 178 TOTAL 98, 901 98, 901 54, 638 54, 638 39, 943 4, 059 35, 884 4, 320 1, 010, 518 999, 700 996, 021 3, 679	
TRANSPORTATION COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS FLIGHT SUPPORT	102, 061 100, 969 100, 598 371 1, 092 487	18, 219 1984 100, 041 98, 970 98, 606 364 1, 071 478	27, 678 1985 99, 032 97, 971 97, 610 361 1, 061 474	97, 009 95, 971 95, 618 353 1, 038 464	25, 687 1987 95, 999 94, 972 94, 622 350 1, 027 459	51, 537 50, 985 50, 797 188 552 246	124, 934 1989 5, 055 5, 000 4, 981 19 55 24	123, 012	109, 178 TOTAL 98, 901 98, 901 54, 638 54, 638 39, 943 4, 059 35, 884 4, 320 1, 010, 518 999, 700 996, 021 3, 679 10, 818 4, 829	
TRANSPORTATION COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS	102, 061 100, 969 100, 598 371 1, 092 487 327	18, 219 1984 100, 041 98, 970 98, 606 364 1, 071 478 320	27, 678 1985 99, 032 97, 971 97, 610 361 1, 061 474 317	97,009 97,009 95,971 95,618 353 1,038 464 310	25, 687 1987 95, 999 94, 972 94, 622 350 1, 027 459 307	51, 537 50, 985 50, 797 188 552 246 166	124, 934 1989 5, 055 5, 000 4, 981 19 55 24 17	123, 012	109, 178 TOTAL 98, 901 98, 901 54, 638 54, 638 39, 943 4, 059 35, 884 4, 320 1, 010, 518 999, 700 996, 021 3, 679 10, 818 4, 829 3, 234	
TRANSPORTATION COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS PARTS	102, 061 100, 969 100, 598 371 1, 092 487	18, 219 1984 100, 041 98, 970 98, 606 364 1, 071 478	27, 678 1985 99, 032 97, 971 97, 610 361 1, 061 474	97, 009 95, 971 95, 618 353 1, 038 464	25, 687 1987 95, 999 94, 972 94, 622 350 1, 027 459	51, 537 50, 985 50, 797 188 552 246	124, 934 1989 5, 055 5, 000 4, 981 19 55 24	123, 012	109, 178 TOTAL 98, 901 98, 901 54, 638 54, 638 39, 943 4, 059 35, 884 4, 320 1, 010, 518 999, 700 996, 021 3, 679 10, 818 4, 829 3, 234 2, 755	
TRANSPORTATION COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS	102, 061 100, 969 100, 598 371 1, 092 487 327	18, 219 1984 100, 041 98, 970 98, 606 364 1, 071 478 320	27, 678 1985 99, 032 97, 971 97, 610 361 1, 061 474 317	97,009 97,009 95,971 95,618 353 1,038 464 310	25, 687 1987 95, 999 94, 972 94, 622 350 1, 027 459 307	51, 537 50, 985 50, 797 188 552 246 166	124, 934 1989 5, 055 5, 000 4, 981 19 55 24 17	123, 012	109, 178 TOTAL 98, 901 98, 901 54, 638 54, 638 39, 943 4, 059 35, 884 4, 320 1, 010, 518 999, 700 996, 021 3, 679 10, 818 4, 829 3, 234	

PROBABLE COST 156 INCH SRM PARALLEL BURN WITH TVC/TT

(DOLLARS IN THOUSANDS)

			DDT & E			7				DATE	15 March 197
	ENGINEERING DESIGN AND DEVELOPMENT		GROUND TEST HARDWARE	FLIGHT TEST HARDWARE	DDT & E	PR	10/YEAR RATE ODUCTION PROGR.	АМ	PRODUCTION		
	(ED & D)	TOOLING	(GTH)	(FTH)	TOTAL	PRODUCTION	TOOLING	FACILITIES	PROGRAM TOTAL	OPERATIONS	TOTAL PROGRAM
SRM									Ī		_
PROGRAM MANAGEMENT	1,772	156	42	858	2, 828	9,411	894		10, 305	700	13, 833
SYSTEM ENGINEERING	4,630		5	1,274	5, 909	4, 254			4, 254		10, 163
SRM'S	36,901	9, 187	2, 993	30, 553	79, 634	444, 403	9,921		454, 324		533, 958
CASE	12, 378	2, 645	70	11,438	26, 531	219, 288	4, 156		223, 444		249,975
NOZZLE	6,039	1,953	894	5, 583	14, 469	68, 422	685		69, 107		83, 576
IGNITER	460	252	5	234	951	2, 503	189		2,692		3, 643
PROPELLANT AND LINER	7, 169	1,388	1,049	6, 902	16, 508	91, 204	1, 243		92, 447	I	108, 955
POWER SUPPLY DISTRIBUTION	226	19	134	738	1, 117	6, 669	175		6, 844		7, 961
FINAL ASSEMBLY	1,368	1,625	449	1,932	5, 374	19, 263	3, 330		22, 593		27, 967
GROUND TEST	1,606	1,011	187		2, 804	1,018			1,018		3, 822
AUXILIARY POWER UNIT (APU)	7,073	259	147	3, 495	10,974	33, 110			33,110		44, 084
THRUST TERMINATION	582	35	58	231	906	2, 926	143		3, 069		3, 975
INSTALLATION ASSEMBLY											
AND CHECKOUT	227		174	476	877					3,909	4,786
FACILITIES	5,919		1,946		7, 865	438		40, 867	41,305		49,170
SUPPORT EQUIPMENT AND SPARES	238		1,765	577	2, 580	3, 105			3, 105	2, 271	7,956
FLIGHT TEST SUPPORT				527	527	3, 912			3,912		4, 439
OPERATIONS SUPPORT			124	121	336					2,846	3, 182
STRUCTURE	1,633	359	1,019	3, 199	6, 210	64, 160	334		64, 494		70,704
TRANSPORTATION			392	1, 235	1,627	21, 387			21, 387		23, 014
TOTAL PROGRAM	51,320	9,702	8, 460	38,911	108, 393	551,070	11, 149	40, 867	603, 086	9,726	721, 205

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PROBABLE COST 156 INCH SRM PARALLEL BURN WITH TVC/TT 10/YEAR PRODUCTION RATE

(DOLLARS IN THOUSANDS) DATE 15 March 1972 1978 1979 1980 1981 1982 COST ELEMENT FY 1973 1974 1975 1976 1977 818 NONRECURRING TOTAL 26,664 33,814 25, 175 273 12, 157 818 DDT & E 273 12.157 26,664 33, 814 25, 175 DEVELOPMENT 273 12, 157 23, 085 19, 123 DEVELOPMENT 19, 123 12, 157 23,085 273 STE DELIVERABLE HARDWARE 23,949 1,814 14, 180 DUMMY ENGINES 2, 245 1,814 23, 949 FLIGHT ENGINES 11,935 O & FS AND SPARES 1, 226 818 511 1,765 53, 361 48,962 54, 463 54, 463 53,912 RECURRING TOTAL 53, 569 53,027 52, 486 48, 158 53, 569 INVESTMENT 52, 185 52,723 53, 261 47,881 53, 261 DELIVER NEW ENGINES 304 301 308 308 277 GROUND SUPPORT EQUIP. PARTS 875 894 894 885 804 OPERATIONS 387 383 379 349 387 FLIGHT SUPPORT 276 282 279 253 282 OPERATIONS 220 225 223 202 225 PARTS 17,40T 24, 191 FACILITIES 1,014 502 6,062 2, 101 2,080 2,124 2, 124 2,586 377 512 TRANSPORTATION 34, 191 80,778 56, 587 56,013 55, 441 TOTAL PROGRAM 25,687 69,767 18, 219 27, 678 775

TOTAL PROGRAM	(1)	10, 217		<u> </u>	25,007	07,101			<u> </u>
COST ELEMENT FY	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL
NONRECURRING TOTAL									98, 901
DDT & E									98, 901
DEVELOPMENT									54, 638
DEVELOPMENT									54, 638
STE			j						
DELIVERABLE HARDWARE									39,943
DUMMY ENGINES									4,059
FLIGHT ENGINES									35,884
O & FS AND SPARES									4, 320
RECURRING TOTAL	52, 813	51,160	50,612	50, 061	48,960	28, 605	2,748		550, 120
INVESTMENT	51,945	50, 321	49, 781	49, 240	48, 157	28, 136	2, 702		541,091
DELIVER NEW ENGINES	51,647	50,033	49, 495	48, 957	47,881	27, 975	2, 687		537, 986
GROUND SUPPORT EQUIP.	298	288	286	283	276	161	15		3, 105
PARTS									
OPERATIONS	868	839	831	821	803	469	46		9, 029
FLIGHT SUPPORT	376	364	360	356	348	203	20		3, 912
OPERATIONS	274	264	262	259	253	143	14		2, 846
PARTS	218	211	209	206	202	118	12		2, 271
FACILITIES									49, 170
TRANSPORTATION	2,057	1,995	1,972	1,952	1, 908	1, 117	109		23, 014
TOTAL PROGRAM	54, 870	53, 155	52, 584	52,013	50,868	29,722	2, 857		721, 205

5.1.2.2 Ceiling Cost

5.1.2.2.1 W/O TVC and TT

CEILING COST 156 INCH SRM PARALLEL BURN W/O TVC TT (DOLLARS IN THOUSANDS)

			DDT & E			1				DATE	15 March 197
	ENGINEERING DESIGN AND DEVELOPMENT		GROUND TEST HARDWARE	FLIGHT TEST HARDWARE	DDT & E	60/YEAR RATE PRODUCTION PROGRAM		PRODUCTION PROGRAM		TOTAL	
	(ED & D)	TOOLING	(GTH)	(FTH)	TOTAL	PRODUCTION	TOOLING	FACILITIES	TOTAL	OPERATIONS	PROGRAM
SRM										_	
PROGRAM MANAGEMENT	1,778	163	44	885	د. 870	12,017	1,142		13, 159	760	16, 789
SYSTEM ENGINEERING	3, 680		5	1,125	+, 810	5, 432			5, 432		10, 242
SRM'S	31, 837	9, 261	2, 899	30,605	74,602	1,860,723	26, 366		1, 887, 089		1, 961, 691
CASE	14, 956	3,692	73	14, 226	32, 947	1,012,557	12, 298		1, 024, 855		1,057,802
NOZZLE	5, 251	1,501	1,008	6, 009	13,769	244, 975	1,586		246, 561		260, 330
IGNITER	480	274	5	244	1,003	8, 465	423		8, 888		9, 891
PROPELLANT AND LINER	7, 985	1,929	1, 144	7,597	18, 655	494, 696	4,009		498,705		517, 360
POWER SUPPLY DISTRIBUTION	219	20	107	666	1,012	24, 693	378		25, 071		26, 083
FINAL ASSEMBLY	1,323	810	400	1,863	4, 396	72, 246	7,672		79,918		84, 314
GROUND TEST	1,623	1,035	162		2, 820	3, 091			3, 091		5,911
AUXILIARY POWER UNIT (APU)									l		
THRUST TERMINATION											
INSTALLATION ASSEMBLY AND CHECKOUT	216		167	459	842				:	7,420	8, 262
FACILITIES	5,572		2, 029		7, 601	1,513		108, 288	109, 801		117, 402
SUPPORT EQUIPMENT AND SPARES	204		1,459	595	2, 258	5, 674			5, 674	4, 301	12, 233
FLIGHT TEST SUPPORT				493	493	7,912			7,912		8, 405
OPERATIONS SUPPORT			129	221	350			1		4,535	4,885
STRUCTURE	1,703	374	1,062	3, 336	6, 475	241,651	360		242, 011		248, 486
TRANSPORTATION			372	1,171	1,543	80,008			80,008		81,551
TOTAL PROGRAM	44, 990	9, 798	8, 166	38, 890	101, 844	2, 214, 930	27, 868	108, 288	2, 351, 086	17, 016	2, 469, 94

CEILING COST 156 INCH SRM PARALLEL BURN W/O TVC & TT 60/YEAR PRODUCTION RATE

	· · · ·		T	(DOLLARS IN T						15 March 1972
COST ELEMENT FY	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
NONRECURRING TOTAL	244	10, 857	24, 019	31,721	25, 113	746				
DDT & E	244	10,857	24,019	31,721	25, 113	746				
DEVELOPMENT	244	10,857	20,616	17, 079						
DEVELOPMENT	244	10,857	20,616	17,079						
STE								· · · · · - · · · · · ·		
DELIVERABLE HARDWARE			1,792	14, 175	23, 994			·		
DUMMY ENGINES			1,792	2, 218						
FLIGHT ENGINES				11,957	23,994					
O & FS AND SPARES			1,611	467	1,119	746				
RECURRING TOTAL						50, 101	98,023	121,984	172, 085	193, 869
INVESTMENT						49,716	97, 269	121,047	170, 762	192, 378
DELIVER NEW ENGINES						49, 585	97,014	120, 729	170, 314	191,873
GROUND SUPPORT EQUIP.						131	255	318	448	50 5
PARTS										
OPERATIONS						385	754	938	1, 323	1,491
FLIGHT SUPPORT						182	356	443	625	704
OPERATIONS						104	204	254	358	404
PARTS						99	194	241	340	383
FACILITIES	540	6, 528	1,092			18, 643	25, 958	14, 875	9, 944	14, 945
TRANSPORTATION				408	555	2,569	3, 596	4, 469	6, 312	7, 103
TOTAL PROGRAM	784	17, 385	25, 111	32, 129	25, 668	72,059	127, 577	141,329	188, 341	215,917
COST ELEMENT FY	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL	ì
NONRECURRING TOTAL	1	7004	1300		1381	1500	2000	7000		1
DDT & E										1
	<u> </u>	· · · · · · · · · · · · · · · · · · ·							92,700	
									92,700	
DEVELOPMENT										
DEVELOPMENT DEVELOPMENT									92,700 48,796	
DEVELOPMENT DEVELOPMENT STE									92,700 48,796	
DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE									92,700 48,796 48,796 39,961	
DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES									92,700 48,796 48,796 39,961 4,010	
DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES									92,700 48,796 48,796 39,961 4,010 35,951	
DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES						loc lee	4 357		92,700 48,796 48,796 39,961 4,010 35,951 3,943	
DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL	230, 899	287, 535	285, 355	274, 465	274, 465	185, 155	4, 357		92,700 48,796 48,796 39,961 4,010 35,951 3,943 2,178,293	
DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT	229, 123	285, 324	283, 162	272, 355	272, 355	183,731	4, 323		92,700 48,796 48,796 39,961 4,010 35,951 3,943 2,178,293 2,161,545	
DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES	229, 123 228, 522	285, 324 284, 575	283, 162 282, 419	272, 355 271, 640	272, 355 271, 640	183, 731 183, 249	4, 323 4, 311		92,700 48,796 48,796 39,961 4,010 35,951 3,943 2,178,293 2,161,545 2,155,871	
DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP.	229, 123	285, 324	283, 162	272, 355	272, 355	183,731	4, 323		92,700 48,796 48,796 39,961 4,010 35,951 3,943 2,178,293 2,161,545	
DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS	229, 123 228, 522 601	285, 324 284, 575 749	283, 162 282, 419 743	272, 355 271, 640 715	272, 355 271, 640 715	183, 731 183, 249 482	4, 323 4, 311 12		92,700 48,796 48,796 39,961 4,010 35,951 3,943 2,178,293 2,161,545 2,155,871 5,674	
DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS	229, 123 228, 522 601	285, 324 284, 575 749 2, 211	283, 162 282, 419 743 2, 193	272, 355 271, 640 715 2, 110	272, 355 271, 640 715 2, 110	183, 731 183, 249 482 1, 424	4, 323 4, 311 12		92,700 48,796 48,796 39,961 4,010 35,951 3,943 2,178,293 2,161,545 2,155,871 5,674	
DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS FLIGHT SUPPORT	229, 123 228, 522 601 1, 776 839	285, 324 284, 575 749 2, 211 1, 044	283, 162 282, 419 743 2, 193 1, 036	272, 355 271, 640 715 2, 110 997	272, 355 271, 640 715 2, 110 997	183, 731 183, 249 482 1, 424 673	4, 323 4, 311 12 33 16		92,700 48,796 48,796 39,961 4,010 35,951 3,943 2,178,293 2,161,545 2,155,871 5,674 16,748 7,912	
DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS	229, 123 228, 522 601 1, 776 839 481	285, 324 284, 575 749 2, 211 1, 044 599	283, 162 282, 419 743 2, 193 1, 036 594	272, 355 271, 640 715 2, 110 997 571	272, 355 271, 640 715 2, 110 997 571	183, 731 183, 249 482 1, 424 673 385	4, 323 4, 311 12 33 16		92,700 48,796 48,796 39,961 4,010 35,951 3,943 2,178,293 2,161,545 2,155,871 5,674 16,748 7,912 4,535	
DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS PARTS	229, 123 228, 522 601 1, 776 839 481 456	285, 324 284, 575 749 2, 211 1, 044 599 568	283, 162 282, 419 743 2, 193 1, 036	272, 355 271, 640 715 2, 110 997	272, 355 271, 640 715 2, 110 997	183, 731 183, 249 482 1, 424 673	4, 323 4, 311 12 33 16		92,700 48,796 48,796 39,961 4,010 35,951 3,943 2,178,293 2,161,545 2,155,871 5,674 16,748 7,912 4,535 4,301	
DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS	229, 123 228, 522 601 1, 776 839 481	285, 324 284, 575 749 2, 211 1, 044 599	283, 162 282, 419 743 2, 193 1, 036 594	272, 355 271, 640 715 2, 110 997 571	272, 355 271, 640 715 2, 110 997 571	183, 731 183, 249 482 1, 424 673 385	4, 323 4, 311 12 33 16		92,700 48,796 48,796 39,961 4,010 35,951 3,943 2,178,293 2,161,545 2,155,871 5,674 16,748 7,912 4,535	

2, 469, 946

TOTAL PROGRAM

254, 298

308, 015

295, 818

284, 528

284,528

191,940

4,519

CEILING COST 156 INCH SRM PARALLEL BURN W/O TVC TT (DOLLARS IN THOUSANDS)

			DDT & E			٦				DATE	15 March 19
	ENGINEERING DESIGN AND DEVELOPMENT		GROUND TEST HARDWARE	FLIGHT TEST HARDWARE	DDT & E		10/YEAR RATE DDUCTION PROGR	АМ	PRODUCTION PROGRAM		TOTAL
	(ED & D)	TOOLING	(GTH)	(FTH)	TOTAL	PRODUCTION	TOOLING	FACILITIES	TOTAL	OPERATIONS	PROGRAM
SRM											
PROGRAM MANAGEMENT	1,778	163	44	885	2, 870	12,017	1,142		13, 159	760	16, 789
SYSTEM ENGINEERING	3, 680		5	1,125	4,810	5, 432			5, 432		10, 242
SRM'S	31,837	9, 261	2, 899	30, 605	74, 602	1,620,134	23, 492	.	1, 643, 626		1,718,228
CASE	14,956	3, 692	73	14, 226	32, 947	901, 178	10,945	<u> </u>	912, 123	<u></u>	945, 070
NOZZLE	5, 251	1,501	1,008	6, 009	13, 769	209, 024	1,473		210, 497		224, 266
IGNITER	480	274	5	244	1,003	7,787	408	L	8, 195		9, 198
PROPELLANT AND LINER	7,985	1,929	1, 144	7, 597	18, 655	416,019	3,527		419, 546		438, 201
POWER SUPPLY DISTRIBUTION	219	20	107	666	1,012	21, 261	378		21,639		22, 651
FINAL ASSEMBLY	1, 323	810	400	1,863	4, 396	62, 225	6, 761		68, 986		71, 182
GROUND TEST	1,623	1,035	162		2, 820	2, 640			2, 640		5, 460
AUXILIARY POWER UNIT (APU)											L
THRUST TERMINATION								<u> </u>			
INSTALIATION ASSEMBLY AND CHECKOUT	216		167	459	842					6, 159	7,001
FACILITIES	5, 572		2, 029		7, 601	476		69, 308	69,784		77, 385
SUPPORT EQUIPMENT AND SPARES	204		1,459	595	2, 258	4,771			4, 771	3, 575	10,604
FLIGHT TEST SUPPORT				493	493	6, 440			6, 440	l	6, 933
OPERATIONS SUPPORT			129	221	350					3, 989	4, 339
STRUCTURE	1,703	374	1,062	3, 336	6, 475	193,992	360		194, 352		200, 827
TRANSPORTATION			372	1, 171	1,543	64, 186			64, 186		65, 729
						<u> </u>					
			<u> </u>	<u> </u>		<u> </u>			<u> </u>		L
				ļ		-		<u> </u>			
TOTAL PROGRAM	44, 990	9, 798	8, 166	38, 890	101,844	1,907,448	24, 994	69, 308	2, 001, 750	14, 483	2, 118, 077

SRM PROGRAM TIME PHASED FUNDING REQUIREMENTS
CEILING COST 156 INCH SRM PARALLEL BURN W/O TVC & TT 40 /YEAR PRODUCTION RATE

(DOLLARS IN THOUSANDS)		DATE 15 March 1972

COST ELEMENT FY	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
NONRECURRING TOTAL	244	10,857	24,019	31,721	25, 113	746	1010	1.000	1301	1304
DDT & E	244	10,857	24,019	31,721	25, 113	746				
DEVELOPMENT	244	10, 857	20,616	17, 079	23, 113	740		-		
DEVELOPMENT	244	10, 857	20,616	17,079						
STE	244	10, 837	20,616	17,079					· · · · · · · · · · · · · · · · · · ·	
DELIVERABLE HARDWARE			1,792	14, 175	23, 994					
DUMMY ENGINES			1,792	2, 218	23, 774					<u>.</u>
FLIGHT ENGINES			1,172	11,957	23, 994					
O & FS AND SPARES			1,611	467	1,119	746		-		
RECURRING TOTAL			1,011		1,117	52, 704	105, 406	131,758	188, 227	210, 813
INVESTMENT						52, 312	104, 622	130,778	186, 826	209, 245
DELIVER NEW ENGINES		·- /-				52, 178	104, 355	130,444	186, 349	208,711
GROUND SUPPORT EQUIP.						134	267	334	477	534
PARTS										
OPERATIONS						392	784	980	1, 401	1,568
FLIGHT SUPPORT						180	361	451	644	721
OPERATIONS						112	223	279	399	447
PARTS						100	200	250	358	400
FACILITIES	540	6, 528	1,092			18, 569	25, 893	14, 835	9, 928	
TRANSPORTATION				408	555	2, 521	3, 589	4, 483	6, 402	7, 171
	784	17, 385	25, 111	32, 129	25, 668	74,540	134, 888	151,076	204, 557	217, 984
TOTAL PROGRAM	784	17, 385	25, 111	32, 129	25, 668	74, 540				217,984
TOTAL PROGRAM COST ELEMENT FY	784 1983	17, 385 1984	25, 111 1985	32, 129 1986	25, 668 1987	74, 540 1988	134, 888	151,076	TOTAL	217,984
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL									TOTAL 92,700	217,984
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E									TOTAL 92,700 92,700	217, 984
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT									TOTAL 92, 700 92, 700 48, 796	217,984
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT									TOTAL 92,700 92,700	217,984
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE									707AL 92, 700 92, 700 48, 796 48, 796	217,984
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE									707AL 92, 700 92, 700 48, 796 48, 796	217,984
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES									92, 700 92, 700 92, 700 48, 796 48, 796 39, 961 4, 010	217,984
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES									707AL 92, 700 92, 700 48, 796 48, 796 39, 961 4, 010 35, 951	217,984
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES	1983	1984	1985	1986	1987	1988	1989		707AL 92, 700 92, 700 48, 796 48, 796 39, 961 4, 010 35, 951 3, 943	217,984
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL	207, 049	203, 285	201,402	1986	1987	1988	1989 5, 646		707AL 92, 700 92, 700 48, 796 48, 796 39, 961 4, 010 35, 951 3, 943 1, 882, 263	217,984
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT	207, 049 205, 509	203, 285 201, 772	201, 402 199, 903	1986 199, 521 198, 036	1987 197, 637 196, 167	1988 178, 815 177, 484	1989 5, 646 5, 605		707AL 92, 700 92, 700 48, 796 48, 796 39, 961 4, 010 35, 951 3, 943 1, 882, 263 1, 868, 259	217,984
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES	207, 049 205, 509 204, 984	203, 285 201, 772 201, 257	201,402 199,903 199,393	1986 199, 521 198, 036 197, 530	1987 197, 637 196, 167 195, 666	1988 178, 815 177, 484 177, 031	1989 5, 646		707AL 92, 700 92, 700 48, 796 48, 796 39, 961 4, 010 35, 951 3, 943 1, 882, 263 1, 868, 259 1, 863, 488	217, 984
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP.	207, 049 205, 509	203, 285 201, 772	201, 402 199, 903	1986 199, 521 198, 036	1987 197, 637 196, 167	1988 178, 815 177, 484	5, 646 5, 605 5, 590		707AL 92, 700 92, 700 48, 796 48, 796 39, 961 4, 010 35, 951 3, 943 1, 882, 263 1, 868, 259	217, 984
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES	207, 049 205, 509 204, 984 525	203, 285 201, 772 201, 257 515	201,402 199,903 199,393 510	199, 521 199, 521 198, 036 197, 530 506	1987 197, 637 196, 167 195, 666	1988 178, 815 177, 484 177, 031	5, 646 5, 605 5, 590		707AL 92, 700 92, 700 48, 796 48, 796 39, 961 4, 010 35, 951 3, 943 1, 882, 263 1, 868, 259 1, 863, 488	217, 984
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS	207, 049 205, 509 204, 984 525	203, 285 201, 772 201, 257 515	201,402 199,903 199,393 510	1986 199, 521 198, 036 197, 530	1987 197, 637 196, 167 195, 666 501	178, 815 177, 484 177, 031 453	5, 646 5, 605 5, 590		707AL 92, 700 92, 700 48, 796 48, 796 39, 961 4, 010 35, 951 3, 943 1, 882, 263 1, 868, 259 1, 863, 488 4, 771	217, 984
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS	207, 049 205, 509 204, 984 525 1, 540 708	203, 285 201, 772 201, 257 515 1, 513 696	201,402 199,903 199,393 510	199, 521 198, 036 197, 530 506	1987 197, 637 196, 167 195, 666 501	178, 815 177, 484 177, 031 453	5, 646 5, 605 5, 590 15		707AL 92, 700 92, 700 48, 796 48, 796 39, 961 4, 010 35, 951 3, 943 1, 882, 263 1, 868, 259 1, 863, 488 4, 771	217, 984
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS	207, 049 205, 509 204, 984 525 1, 540 708 439	203, 285 201, 772 201, 257 515	201,402 199,903 199,393 510 1,499 689	199, 521 199, 521 198, 036 197, 530 506 1, 485 683	1987 197, 637 196, 167 195, 666 501 1, 470 676	178, 815 177, 484 177, 031 453	5, 646 5, 605 5, 590 15 41		707AL 92, 700 92, 700 48, 796 48, 796 39, 961 4, 010 35, 951 3, 943 1, 882, 263 1, 868, 259 1, 863, 488 4, 771 14, 004 6, 440	217, 984
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS FLIGHT SUPPORT	207, 049 205, 509 204, 984 525 1, 540 708	203, 285 201, 772 201, 257 515 1, 513 696 431	201,402 199,903 199,393 510 1,499 689 427	199, 521 198, 036 197, 530 506 1, 485 683 423	1987 197, 637 196, 167 195, 666 501 1, 470 676 419	178, 815 177, 484 177, 031 453 1, 331 612 379	5, 646 5, 605 5, 590 15 41 19		707AL 92, 700 92, 700 48, 796 48, 796 39, 961 4, 010 35, 951 3, 943 1, 882, 263 1, 868, 259 1, 863, 488 4, 771 14, 004 6, 440 3, 989	217, 984
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS PARTS	207, 049 205, 509 204, 984 525 1, 540 708 439	203, 285 201, 772 201, 257 515 1, 513 696 431	201,402 199,903 199,393 510 1,499 689 427	199, 521 198, 036 197, 530 506 1, 485 683 423	1987 197, 637 196, 167 195, 666 501 1, 470 676 419	178, 815 177, 484 177, 031 453 1, 331 612 379	5, 646 5, 605 5, 590 15 41 19		707AL 92, 700 92, 700 48, 796 48, 796 39, 961 4, 010 35, 951 3, 943 1, 882, 263 1, 868, 259 1, 863, 488 4, 771 14, 004 6, 440 3, 989 3, 575	217,984

CEILING COST 156 INCH SRM PARALLEL BURN W/O TVC TT (DOLLARS IN THOUSANDS)

	}		DDT & E			1				DATE	15 March 197
	ENGINEERING DESIGN AND DEVELOPMENT		GROUND TEST HARDWARE	FLIGHT TEST HARDWARE	DDT & E		20/YEAR RATE ODUCTION PROGR	AM	PRODUCTION PROGRAM		TOTAL
	(ED & D)	TOOLING	(GTH)	(FTH)	TOTAL	PRODUCTION	TOOLING	FACILITIES	TOTAL	OPERATIONS	PROGRAM
SRM											
PROGRAM MANAGEMENT	1,778	163	44	885	2, 870	10, 214	971		11, 185	760	14,815
SYSTEM ENGINEERING	3, 680		5	1,125	4,810	4,617			4,617		9, 427
SRM'S	31,837	9, 261	2, 899	30,605	74, 602	964, 991	21,519		986, 510		1,061,112
CASE	14, 956	3, 692	73	14, 226	32, 947	536, 353	10,118		546, 471		579, 418
NOZZLE	5, 251	1,501	1,008	6,009	13,769	132, 249	1,360		133,609		147, 378
IGNITER	480	274	5	244	1,003	5, 298	378	<u></u>	5, 676		6, 679
PROPELLANT AND LINER	7, 985	1,929	1, 144	7,597	18, 655	233, 185	3,071		236, 256		254, 911
POWER SUPPLY DISTRIBUTION	219	20	107	666	1,012	14, 434	357		14, 791		15, 803
FINAL ASSEMBLY	1,323	810	400	1,863	4, 396	41, 262	6, 235		47, 497		51,89
GROUND TEST	1, 623	1,035	162		2, 820	2, 210			2, 210		5, 03
AUXILIARY POWER UNIT (APU)											
THRUST TERMINATION											
INSTALLATION ASSEMBLY AND CHECKOUT	216		167	459	842					5, 112	5, 954
FACILITIES	5,572		2, 029		7, 601	476		59, 308	59,784		67, 385
SUPPORT EQUIPMENT AND SPARES	204		1,459	595	2, 258	4,012		T	4,012	2,970	9, 240
FLIGHT TEST SUPPORT				493	493	5, 242			5, 242		5, 735
OPERATIONS SUPPORT			129	221	350				1	3,510	3,860
STRUCTURE	1,703	374	1,062	3, 336	6, 475	127, 591	360		127,951		134, 426
TRANSPORTATION			372	1,171	1,543	42, 530			42, 530		44,073
			 			<u> </u>		ļ			
TOTAL PROGRAM	44, 990	9, 798	8, 166	38, 890	101,844	1, 159, 673	22, 850	59, 308	1, 241, 831	12, 352	1,356,02

SRM PROGRAM TIME PHASED FUNDING REQUIREMENTS CEILING COST 156 INCH SRM PARALLEL BURN W/O TVC & TT 20/YEAR PRODUCTION RATE

					(DOLLARS IN T	HOUSANDS)				DATE_	15 March 1972
COST ELEMENT	FY	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
NONRECURRING TOTAL		244	10,857	24, 019	31,721	25, 113	746				
DDT & E		244	10, 857	24, 019	31,721	25, 113	746				
DEVELOPMENT		244	10,857	20,616	17,079						
DEVELOPMENT		244	10,857	20,616	17,079						
STE											
DELIVERABLE HARD	WARE			1,792	14, 175	23,994					
DUMMY ENGINES				1,792	2, 218						
FLIGHT ENGINES					11,957	23, 994					
O & FS AND SPARES				1,611	467	1,119	746				
RECURRING TOTAL							55, 290	110,579	119,794	119, 794	118, 643
INVESTMENT							54,727	109, 454	118, 575	118, 575	117,435
DELIVER NEW ENG	INES						54, 534	109,069	118, 158	118, 158	117,022
GROUND SUPPORT	EQUIP.						193	385	417	417	413
PARTS											
OPERATIONS							563	1,125	1,219	1, 219	1, 208
FLIGHT SUPPORT			,				252	503	545	545	540
OPERATIONS							168	337	365	365	362
PARTS							143	285	309	309	306
FACILITIES		540	6, 528	1,092			18, 552	25, 862	14,811		
TRANSPORTATION					408	555	2, 756	4,068	4,412	4,412	4, 368
TOTAL PROGRAM		784	17, 385	25,111	32, 129	25, 668	77, 344	140,509	139,017	124, 206	123, 011
COST ELEMENT	FY	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL	
NONRECURRING TOTAL										92, 700	
DDT & E										92, 700	
DEVELOPMENT										48,796	
DEVELOPMENT										48, 796	
STE											
DELIVERABLE HARD	WARE									39, 961	
DUMMY ENGINES										4,010	
FLIGHT ENGINES										35, 951	
O & FS AND SPARES										3, 943	
RECURRING TOTAL		116, 339	114,034	112,883	110, 579	109,427	58, 745	5, 762		1,151,869	
INVESTMENT		115, 155	112,874	111,734	109, 454	108,314	58, 148	5, 702		1,140,147	
DELIVER NEW ENG	INES	114,750	112,477	111,341	109,069	107,933	57,943	5, 681		1, 136, 135	

DELIVERABLE HARDWARE								39, 961
DUMMY ENGINES								4,010
FLIGHT ENGINES								35, 951
O & FS AND SPARES								3, 943
RECURRING TOTAL	116, 339	114,034	112,883	110,579	109,427	58, 745	5, 762	1,151,869
INVESTMENT	115, 155	112,874	111,734	109,454	108, 314	58, 148	5, 702	1,140,147
DELIVER NEW ENGINES	114,750	112,477	111,341	109, 069	107,933	57, 943	5, 681	1, 136, 135
GROUND SUPPORT EQUIP.	405	397	393	385	381	205	21	4,012
PARTS								
OPERATIONS	1,184	1,160	1,149	1, 125	1,113	597	60	11,722
FLIGHT SUPPORT	529	519	514	503	498	267	27	5, 242
OPERATIONS	355	347	344	337	333	179	18	3,510
PARTS	300	294	291	285	282	151	15	2, 970
FACILITIES								67, 385
TRANSPORTATION	4, 279	4, 196	4,152	4,068	4, 028	2, 160	211	44, 073
TOTAL PROGRAM	120, 618	118, 230	117,035	114, 647	113, 455	60,905	5,973	1, 356, 027

CEILING COST 156 INCH SRM PARALLEL BURN W/O TVC TT (DOLLARS IN THOUSANDS)

DDT & E GROUND TEST HARDWARE (GTH) 44 5 2,899 73 1,008	FLIGHT TEST HARDWARE (FTH) 885 1, 125 30, 605 14, 226	DDT & E TOTAL 2,870 4,810 74,602 32,947	PRODUCTION 10, 214 4, 617	O/YEAR RATE DUCTION PROGRA TOOLING	FACILITIES	PRODUCTION PROGRAM TOTAL	OPERATIONS	TOTAL PROGRAM
HARDWARE (GTH) 44 5 2,899 73 1,008 5	885 1, 125 30, 605 14, 226	2, 870 4, 810 74, 602	PRODUCTION 10, 214 4, 617	TOOLING		PROGRAM TOTAL		
(GTH) 44 5 2,899 73 1,008 5	(FTH) 885 1, 125 30, 605 14, 226	2, 870 4, 810 74, 602	10, 214 4, 617		FACILITIES	TOTAL		
5 2,899 73 1,008	1, 125 30, 605 14, 226	4, 810 74, 602	4, 617	971		11, 185	740	
5 2,899 73 1,008	1, 125 30, 605 14, 226	4, 810 74, 602	4, 617	971		11, 185	740	
2,899 73 1,008 5	30, 605 14, 226	74, 602					00	14,815
73 1,008 5	14, 226				L	4,617		9, 427
1,008		22 047	509, 399	11,781		521, 180		595, 782
5		36, 771	285, 049	5,519		290, 568		323, 515
	6, 009	13, 769	70, 934	751		71,685		85, 454
	244	1,003	2,742	180		2,922		3, 925
1,144	7, 597	18, 655	122, 509	1,670		124, 179		142, 834
107	666	1,012	7, 227	202		7,429		8, 441
400	1,863	4, 396	19, 833	3,459		23, 292		27,688
162		2, 820	1,105			1,105		3, 925
167	459	842					4, 243	5, 085
2, 029		7,601	476		44, 357	44, 833		52, 434
1,459	595	2, 258	3, 370			3, 370	2, 465	8, 093
	493	493	4, 246			4, 246		4,739
129	221	350					3, 089	3, 439
1,062	3, 336	6, 475	69, 643	360		70,003		76, 478
372	1,171	1,543	23, 214			23, 214		24, 757
	10,000	101 044	625 170	12 112	44.352	402 449	10 557	795, 049
		372 1,171	372 1,171 1,543	372 1,171 1,543 23,214	372 1,171 1,543 23,214	372 1,171 1,543 23,214	372 1,171 1,543 23,214 23,214	372 1,171 1,543 23,214 23,214

CEILING COST 156 INCH SRM PARALLEL BURN W/O TVC & TT 10/YEAR PRODUCTION RATE (DOLLARS IN THOUSANDS)

DATE 15 March 1972

						· · · · · · · · · · · · · · · · · · ·			DATE	
COST ELEMENT FY	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
NONRECURRING TOTAL	244	10, 857	24, 019	31,721	25, 113	746				
DDT & E	244	10, 857	24,019	31,721	25, 113	746				
DEVELOPMENT	244	10, 857	20,616	17, 079						
DEVELOPMENT	244	10, 857	20, 616	17, 079				1,72		
STE										
DELIVERABLE HARDWARE			1,792	14, 175	23, 994					
DUMMY ENGINES		Ò	1,792	2, 218						
FLIGHT ENGINES				11,957	23, 994					
O & FS AND SPARES			1,611	467	1,119	746				
RECURRING TOTAL						55, 639	61,891	61,891	61,266	60, 641
INVESTMENT						54, 767	60,921	60, 921	60,305	59, 690
DELIVER NEW ENGINES						54, 467	60, 587	60, 587	59,975	59, 363
GROUND SUPPORT EQUIP.						300	334	334	330	327
PARTS										
OPERATIONS						872	970	970	961	951
FLIGHT SUPPORT						378	420	420	416	412
OPERATIONS						275	306	306	303	300
PARTS						219	244	244	242	239
FACILITIES	540	6, 528	1,092			18, 476	25, 798			
TRANSPORTATION				408	555	2, 776	2, 285	2, 285	2, 260	2, 238
TOTAL PROGRAM	784	17, 385	25, 111	32, 129	25, 668	77, 637	89,974	64, 176	63, 526	62, 879
COST ELEMENT FY	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL	
NONRECURRING TOTAL				2000	2001				92,700	
DDT & E			·····						92,700	ľ
DEVELOPMENT									48,796	
DEVELOPMENT		771							48, 796	
STE										
DELIVERABLE HARDWARE									39, 961	
DUMMY ENGINES									4,010	
FLIGHT ENGINES									35, 951	
O & FS AND SPARES									3, 943	
RECURRING TOTAL	60,017	58, 139	57, 515	56, 889	55, 639	32, 508	3, 123		625, 158	
INVESTMENT	59,075	57, 228	56, 613	55, 998	54, 767	31, 998	3,075		615, 358	
DELIVER NEW ENGINES	58, 751	56, 915	56, 303	55, 691	54, 467	31,823	3, 059		611, 988	
GROUND SUPPORT EQUIP.	324	313	310	307	300	175	16		3, 370	
PARTS										
OPERATIONS	942	911	902	891	872	510	48		9, 800	
FLIGHT SUPPORT							21	· · · · - · · - 		
	408	395	391	386	378	221	21		4, 440	
	408 297	395 287	391 284	386 281	378 275	161	14		4, 246 3, 089	
OPERATIONS	297	287								
OPERATIONS PARTS			284	281	275	161	14		3, 089 2, 4 65	
OPERATIONS PARTS FACILITIES	297 237	287 229	284 227	281 224	275 219	161	14		3, 089 2, 465 52, 434	
OPERATIONS PARTS	297	287	284	281	275	161 128	14 13		3, 089 2, 4 65	

5.1.2.2.2 With TVC and TT

CEILING COST 156 INCH SRM PARALLEL BURN WITH TVC/TT

			DDT & E							DATE	15 March 1972
	ENGINEERING DESIGN AND DEVELOPMENT		GROUND TEST HARDWARE	FLIGHT TEST HARDWARE	DDT & E		60/YEAR RATE ODUCTION PROGR	АМ	PRODUCTION PROGRAM		TOTAL
	(ED & D)	TOOLING	(GTH)	(FTH)	TOTAL	PRODUCTION	TOOLING	FACILITIES	TOTAL	OPERATIONS	PROGRAM
SRM						1					
PROGRAM MANAGEMENT	1,848	163	44	895	2, 950	12,017	1,142		13, 159	760	16, 869
SYSTEM ENGINEERING	4, 828		5	1,328	6, 161	5, 432			5, 432		11,593
SRM'S	42, 247	11,795	3, 408	35,978	93, 428	2, 135, 406	27, 886		2, 163, 292		2, 256, 720
CASE	14,956	3, 692	73	14, 226	32, 947	1,012,279	12, 576		1,024,855		1,057,802
NOZZLE	7, 297	2, 336	1,152	7, 021	17, 806	367, 425	1,882		369, 307		387, 113
IGNITER	480	274	5	244	1,003	8, 465	423		8, 888		9, 891
PROPELLANT AND LINER	7,985	1, 929	1, 144	7, 597	18, 655	494, 696	4,009		498, 705		517,360
POWER SUPPLY DISTRIBUTION	236	26	140	770	1, 172	24, 693	378		25, 071		26, 243
FINAL ASSEMBLY	1,636	1,940	486	2, 235	6, 297	78, 641	8, 317		86, 958		93, 255
GROUND TEST	1,675	1, 291	195		3, 161	3, 091			3,091	<u> </u>	6, 252
AUXILIARY POWER UNIT (APU)	7, 375	270	153	3,644	11,442	133, 875	I		133, 875		145, 317
THRUST TERMINATION	607	37	60	241	945	12, 241	301		12, 542		13, 487
INSTALLATION ASSEMBLY AND CHECKOUT	237		181	496	914					7,420	8, 334
FACILITIES	6, 172		2, 029		8, 201	1,513		108, 288	109, 801		118,002
SUPPORT EQUIPMENT AND SPARES	248		1,840	602	2, 690	5, 674	T		5, 674	4, 301	12,665
FLIGHT TEST SUPPORT				549	549	7,912			7,912		8, 461
OPERATIONS SUPPORT			129	221	350					4,535	4, 885
STRUCTURE	1,703	374	1,062	3,336	6, 475	241, 651	360		242, 011		248, 486
TRANSPORTATION			409	1, 288	1, 697	80,008			80,008		81,705
			 								
										<u> </u>	
TOTAL PROGRAM	57, 283	12, 332	9, 107	44,693	123, 415	2, 489, 613	29. 388	108, 288	2, 627, 289	17, 016	2, 767, 720

CEILING COST 156 INCH SRM PARALLEL BURN WITH TVC & TT 60/YEAR PRODUCTION RATE (DOLLARS IN THOUSANDS)

DATE 15 March 1972

COST ELEMENT FY	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
NONRECURRING TOTAL	314	14, 009	30, 459	38, 885	28, 998	852				
DDT & E	314	14,009	30, 459	38, 885	28, 998	852				
DEVELOPMENT	314	14,009	26,600	22, 035						
DEVELOPMENT	314	14, 009	26, 600	22, 035						
STE										
DELIVERABLE HARDWARE			2,019	16, 317	27, 720					
DUMMY ENGINES			2,019	2,500						
FLIGHT ENGINES				13,817	27,720					
O & FS AND SPARES			1,840	533	1, 278	852				
RECURRING TOTAL						56, 454	110, 452	137,452	193, 905	218, 451
INVESTMENT						56,069	109, 698	136, 514	192, 582	216, 960
DELIVER NEW ENGINES						55, 938	109,443	136, 196	192, 134	216, 455
GROUND SUPPORT EQUIP						131	255	318	448 `	505
PARTS										
OPERATIONS						385	754	938	1,323	1,491
FLIGHT SUPPORT						182	356	443	625	704
OPERATIONS						104	204	254	358	404
PARTS						99	194	241	340	383
FACILITIES	541	6,561	1.099			18, 741	26, 092	14, 951	10,000	15,017
TRANSPORTATION				409	553	2, 575	3,601	4,480	6, 321	7, 120
TOTAL PROGRAM	855	20,570	31,558	39, 294	29, 551	78, 622	140, 145	156, 883	210, 226	240, 588
COST ELEMENT F	Y 1983	1984	1985	1986	1987	1988	1989	1990	TOTAL	
NONRECURRING TOTAL									113, 517	
DDT & E									113, 517	
DEVELOPMENT									62, 958	
DEVELOPMENT				1						
STE									62, 958	
DELIVERABLE HARDWARE									62, 958	
									62, 958 46, 056	
DUMMY ENGINES									46, 056	
DUMMY ENGINES									46, 056 4, 519	
DUMMY ENGINES FLIGHT ENGINES	260, 177	323,994	321,538	309, 266	309, 266	208, 632	4,909		46, 056 4, 519 41, 537	
DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES	260, 177 258, 401	323,994 321,783	321, 538 319, 345	309, 266 307, 156	309, 266 307, 156	208, 632 207, 208	4, 909 4, 876		46, 056 4, 519 41, 537 4, 503	
DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL									46, 056 4, 519 41, 537 4, 503 2, 454, 496	
DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT	258, 401 257, 800	321,783	319, 345	307, 156	307, 156	207, 208	4, 876		46, 056 4, 519 41, 537 4, 503 2, 454, 496 2, 437, 748	
DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES	258, 401 257, 800	321,783 321,034	319, 345 318, 602	307, 156 306, 441	307, 156 306, 441	207, 208 206, 726	4, 876 4, 864		46, 056 4, 519 41, 537 4, 503 2, 454, 496 2, 437, 748 2, 432, 074	
DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP	258, 401 257, 800	321,783 321,034	319, 345 318, 602	307, 156 306, 441	307, 156 306, 441	207, 208 206, 726	4, 876 4, 864		46, 056 4, 519 41, 537 4, 503 2, 454, 496 2, 437, 748 2, 432, 074	
DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP PARTS	258, 401 257, 800 . 601	321,783 321,034 749	319, 345 318, 602 743	307, 156 306, 441 715	307, 156 306, 441 715	207, 208 206, 726 482	4, 876 4, 864 12		46, 056 4, 519 41, 537 4, 503 2, 454, 496 2, 437, 748 2, 432, 074 5, 674	
DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP PARTS OPERATIONS	258, 401 257, 800 . 601	321,783 321,034 749 2,211	319, 345 318, 602 743 2, 193	307, 156 306, 441 715 2, 110	307, 156 306, 441 715 2, 110	207, 208 206, 726 482 1, 424	4, 876 4, 864 12		46, 056 4, 519 41, 537 4, 503 2, 454, 496 2, 437, 748 2, 432, 074 5, 674	
DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP PARTS OPERATIONS FLIGHT SUPPORT	258, 401 257, 800 601 1, 776 839	321,783 321,034 749 2,211 1,044	319, 345 318, 602 743 2, 193 1, 036	307, 156 306, 441 715 2, 110 997	307, 156 306, 441 715 2, 110 997	207, 208 206, 726 482 1, 424 673	4,876 4,864 12 33 16		46, 056 4, 519 41, 537 4, 503 2, 454, 496 2, 437, 748 2, 432, 074 5, 674 16, 748 7, 912	
DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS	258, 401 257, 800 . 601 . 1, 776 839 481	321,783 321,034 749 2,211 1,044 599 568 10,000	319, 345 318, 602 743 2, 193 1, 036 594 563	307, 156 306, 441 715 2, 110 997 571	307, 156 306, 441 715 2, 110 997 571	207, 208 206, 726 482 1, 424 673 385	4,876 4,864 12 33 16		46, 056 4, 519 41, 537 4, 503 2, 454, 496 2, 437, 748 2, 432, 074 5, 674 16, 748 7, 912 4, 535	
DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS PARTS	258, 401 257, 800 . 601 . 1, 776 839 481 456	321,783 321,034 749 2,211 1,044 599 568	319, 345 318, 602 743 2, 193 1, 036 594	307, 156 306, 441 715 2, 110 997 571	307, 156 306, 441 715 2, 110 997 571	207, 208 206, 726 482 1, 424 673 385	4,876 4,864 12 33 16		46, 056 4, 519 41, 537 4, 503 2, 454, 496 2, 437, 748 2, 432, 074 5, 674 16, 748 7, 912 4, 535 4, 301	

CEILING COST 156 INCH SRM PARALLEL BURN WITH TVC/TT

			DDT & E			1				DATE	15 March 1972
	ENGINEERING DESIGN AND	,	GROUND TEST	FLIGHT TEST		PR ⁴	0/YEAR RATE DUCTION PROGRA	AM	PRODUCTION		, , , , , , , , , , , , , , , , , , ,
	DEVELOPMENT (ED & D)	TOOLING	HARDWARE (GTH)	HARDWARE (FTH)	DDT & E TOTAL	PRODUCTION	TOOLING	FACILITIES	PROGRAM TOTAL	OPERATIONS	TOTAL PROGRAM
SRM											
PROGRAM MANAGEMENT	1,848	163	44	895	2, 950	12,017	1,142		13, 159	760	16, 869
SYSTEM ENGINEERING	4, 828		5	1,328	6, 161	5, 432			5, 432		11,593
SRM'S	42, 247	11,795	3, 408	35, 978	93, 428	1,811,018	24, 362		1,835,380		1,928,808
CASE	14, 956	3, 692	73	14, 226	32, 947	901,331	10,792		912, 123		945,070
NOZZLE	7, 297	2, 336	1,152	7,021	17, 806	257, 481	1,748		259, 229		277, 035
IGNITER	480	274	5	244	1,003	7,787	408		8, 195		9, 198
PROPELLANT AND LINER	7,985	1,929	ì, 144	7, 597	18, 655	416,019	3, 527		419, 546		438, 201
POWER SUPPLY DISTRIBUTION	236	26	140	770	1, 172	21, 261	378		21,639		22, 811
FINAL ASSEMBLY	1,636	1,940	486	2, 235	6, 297	66, 585	7, 245		73, 830		80, 127
GROUND TEST	1,675	1, 291	195		3, 161	2, 640		ľ	2, 640		5, 801
AUXILIARY POWER UNIT (APU)	7, 375	270	153	3, 644	11,442	127,944			127, 944		139, 386
THRUST TERMINATION	607	37	60	241	945	9,970	264		10, 234		11, 179
INSTALLATION ASSEMBLY AND CHECKOUT	237		181	496	914					6, 159	7, 073
FACILITIES	6, 172		2,029		8, 201	476		69, 308	69, 784		77, 985
SUPPORT EQUIPMENT AND SPARES	248		1,840	602	2, 690	4, 771			4,771	3,575	11,036
FLIGHT TEST SUPPORT				549	549	6, 440			6, 440		6, 989
OPERATIONS SUPPORT			1 29	221	350					3, 989	4,339
STRUCTURE	1,703	374	1,062	3, 336	6, 475	193, 992	360		194, 352		200, 827
TRANSPORTATION			409	1,288	1,697	64, 186			64, 186		65, 883
TOTAL PROGRAM	57, 283	12, 332	9,107	44, 693	123, 415	2, 098, 332	25, 864	69, 308	2, 193, 504	14, 483	2, 331, 402

DATE __15 March 1972

CEILING COST 156 INCH SRM PARALLEL BURN WITH TVC & TT 40/YEAR PRODUCTION RATE (DOLLARS IN THOUSANDS)

COST ELEMENT	FY	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
NONRECURRING TOTAL		314	14,009	30, 459	38,885	28, 998	852				
DDT & E		314	14,009	30, 459	38,885	28, 998	852				
DEVELOPMENT		314	14,009	26,600	22, 035						
DEVELOPMENT		314	14,009	26, 600	22, 035						
STE											
DELIVERABLE HARD	VARE	-		2,019	16,317	27,720			_		
DUMMY ENGINES				2,019	2,500						
FLIGHT ENGINES					13,817	27,720					
O & FS AND SPARES				1,840	533	1,278	852				
RECURRING TOTAL							58,073	116, 145	145, 181	207, 402	232, 289
INVESTMENT							57, 681	115, 361	144, 201	206, 001	230,721
DELIVER NEW ENG	INES						57, 547	115,094	143, 867	205, 524	230, 187
GROUND SUPPORT							134	267	334	477	534
PARTS											
OPERATIONS							392	784	980	1,401	1,568
FLIGHT SUPPORT							180	361	451	644	721
OPERATIONS						```	112	223	279	399	447
PARTS							100	200	250	358	400
			, .,.	1,099			18, 741	26, 092	14, 951	10,000	
FACILITIES		541									
FACILITIES TRANSPORTATION		541	6, 561	1, 17, 17	409	553	2,532	3, 594	4, 493	6.419	7 190
		541 855	20, 570	31,558	409 39 , 294	553 29,551	2, 532 80, 198	3, 594 145, 831	4, 493 164, 625	6. 419 223, 821	7, 190 239, 479
TRANSPORTATION TOTAL PROGRAM	FY	855	20,570	31,558	39, 294	29, 551	80, 198	145, 831	164,625	223, 821	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT	FY									223, 821 TOTAL	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT NONRECURRING TOTAL	FY	855	20,570	31,558	39, 294	29, 551	80, 198	145, 831	164,625	223, 821 TOTAL 113, 517	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT NONRECURRING TOTAL DDT & E	FY	855	20,570	31,558	39, 294	29, 551	80, 198	145, 831	164,625	223, 821 TOTAL 113, 517 113, 517	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT NONRECURRING TOTAL DDT & E DEVELOPMENT	FY	855	20,570	31,558	39, 294	29, 551	80, 198	145, 831	164,625	223, 821 TOTAL 113, 517	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT	FY	855	20,570	31,558	39, 294	29, 551	80, 198	145, 831	164,625	223, 821 TOTAL 113, 517 113, 517 62, 958	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE		855	20,570	31,558	39, 294	29, 551	80, 198	145, 831	164,625	223, 821 TOTAL 113, 517 113, 517 62, 958	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARD		855	20,570	31,558	39, 294	29, 551	80, 198	145, 831	164,625	223, 821 TOTAL 113, 517 113, 517 62, 958 62, 958 46, 056	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDO DUMMY ENGINES		855	20,570	31,558	39, 294	29, 551	80, 198	145, 831	164,625	223, 821 TOTAL 113, 517 113, 517 62, 958 62, 958 46, 056 4, 519	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDO DUMMY ENGINES FLIGHT ENGINES		855	20,570	31,558	39, 294	29, 551	80, 198	145, 831	164,625	223, 821 TOTAL 113, 517 113, 517 62, 958 62, 958 46, 056	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDO DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES		855 1983	20,570	31,558	39, 294 1986	29,551	80, 198 1988	145, 831	164,625	223, 821 TOTAL 113, 517 113, 517 62, 958 62, 958 46, 056 4, 519 41, 537 4, 503	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDO DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL		855 1983 228, 142	20,570	31,558 1985 221,920	39, 294 1986 219, 847	29,551 1987 217,771	197,032	145, 831 1989 6, 221	164,625	223, 821 TOTAL 113, 517 113, 517 62, 958 62, 958 46, 056 4, 519 41, 537 4, 503 2, 074, 017	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDO DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT	VARE	228, 142 226, 602	20, 570 1984 223, 994 222, 481	31,558 1985 221,920 220,421	39, 294 1986 219, 847 218, 362	29,551 1987 217,771 216,301	197, 032 195, 701	145, 831 1989 6, 221 6, 180	164,625	223, 821 TOTAL 113, 517 113, 517 62, 958 62, 958 46, 056 4, 519 41, 537 4, 503 2, 074, 017 2, 060, 013	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDV DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENC	VARE	228, 142 226, 602 226, 077	20, 570 1984 223, 994 222, 481 221, 966	221, 920 220, 421 219, 911	219,847 218,362 217,856	29,551 1987 217,771 216,301 215,800	197, 032 195, 701	6, 221 6, 180 6, 165	164,625	223, 821 TOTAL 113, 517 113, 517 62, 958 62, 958 46, 056 4, 519 41, 537 4, 503 2, 074, 017 2, 060, 013 2, 055, 242	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDV DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENG GROUND SUPPORT	VARE	228, 142 226, 602	20, 570 1984 223, 994 222, 481	31,558 1985 221,920 220,421	39, 294 1986 219, 847 218, 362	29,551 1987 217,771 216,301	197, 032 195, 701	145, 831 1989 6, 221 6, 180	164,625	223, 821 TOTAL 113, 517 113, 517 62, 958 62, 958 46, 056 4, 519 41, 537 4, 503 2, 074, 017 2, 060, 013	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDV DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENC	VARE	228, 142 226, 602 226, 077 525	20,570 1984 223,994 222,481 221,966 515	221, 920 220, 421 219, 911 510	219,847 218,362 217,856 506	29,551 1987 217,771 216,301 215,800 501	197, 032 195, 701 195, 248 453	6, 221 6, 180 6, 165	164,625	223, 821 TOTAL 113, 517 113, 517 62, 958 62, 958 46, 056 4, 519 41, 537 4, 503 2, 074, 017 2, 060, 013 2, 055, 242 4, 771	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDV DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENG GROUND SUPPORT PARTS	VARE	228, 142 226, 602 226, 077 525	20,570 1984 223,994 222,481 221,966 515	221, 920 220, 421 219, 911 510	219,847 218,362 217,856 506	29,551 1987 217,771 216,301 215,800	197, 032 195, 701	6, 221 6, 180 6, 165	164,625	223, 821 TOTAL 113, 517 113, 517 62, 958 62, 958 46, 056 4, 519 41, 537 4, 503 2, 074, 017 2, 060, 013 2, 055, 242 4, 771	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDY DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENG GROUND SUPPORT PARTS OPERATIONS	VARE	228, 142 226, 602 226, 077 525 1, 540 708	20,570 1984 223,994 222,481 221,966 515 1,513 696	221, 920 220, 421 219, 911 510 1, 499 689	219,847 218,362 217,856 506	29,551 1987 217,771 216,301 215,800 501 1,470 676	197, 032 195, 701 195, 248 453 1, 331 612	145, 831 1989 6, 221 6, 180 6, 165 15	164,625	223, 821 TOTAL 113, 517 113, 517 62, 958 62, 958 46, 056 4, 519 41, 537 4, 503 2, 074, 017 2, 060, 013 2, 055, 242 4, 771 14, 004	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDY DUMMY ENGINES FLIGHT ENGINES Q & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENG GROUND SUPPORT PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS	VARE	228, 142 226, 602 226, 077 525 1, 540 708 439	20,570 1984 223,994 222,481 221,966 515 1,513 696 431	221, 920 220, 421 219, 911 510 1, 499 689 427	219,847 218,362 217,856 506 1,485 683 423	29,551 1987 217,771 216,301 215,800 501 1,470 676 419	197, 032 195, 701 195, 248 453 1, 331 612 379	6, 221 6, 180 6, 165 15	164,625	223, 821 TOTAL 113, 517 113, 517 62, 958 62, 958 46, 056 4, 519 41, 537 4, 503 2, 074, 017 2, 060, 013 2, 055, 242 4, 771 14, 004 6, 440	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDY DUMMY ENGINES FLIGHT ENGINES Q & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENC GROUND SUPPORT PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS PARTS	VARE	228, 142 226, 602 226, 077 525 1, 540 708	20,570 1984 223,994 222,481 221,966 515 1,513 696	221, 920 220, 421 219, 911 510 1, 499 689	219,847 218,362 217,856 506	29,551 1987 217,771 216,301 215,800 501 1,470 676	197, 032 195, 701 195, 248 453 1, 331 612	6, 221 6, 180 6, 165 15 41 19	164,625	223, 821 TOTAL 113, 517 113, 517 62, 958 62, 958 46, 056 4, 519 41, 537 4, 503 2, 074, 017 2, 060, 013 2, 055, 242 4, 771 14, 004 6, 440 3, 989	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDY DUMMY ENGINES FLIGHT ENGINES Q & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENG GROUND SUPPORT PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS	VARE	228, 142 226, 602 226, 077 525 1, 540 708 439	20,570 1984 223,994 222,481 221,966 515 1,513 696 431	221, 920 220, 421 219, 911 510 1, 499 689 427	219,847 218,362 217,856 506 1,485 683 423	29,551 1987 217,771 216,301 215,800 501 1,470 676 419	197, 032 195, 701 195, 248 453 1, 331 612 379	6, 221 6, 180 6, 165 15 41 19	164,625	223, 821 TOTAL 113, 517 113, 517 62, 958 62, 958 46, 056 4, 519 41, 537 4, 503 2, 074, 017 2, 060, 013 2, 055, 242 4, 771 14, 004 6, 440 3, 989 3, 575	

CEILING COST 156 INCH SRM PARALLEL BURN WITH TVC/TT (DOLLARS IN THOUSANDS)

	<u></u>		DDT & E			٦				DATE	_15 March 1972
	ENGINEERING DESIGN AND DEVELOPMENT		GROUND TEST HARDWARE	FLIGHT TEST HARDWARE	DDT & E	PI	20/YEAR RATE RODUCTION PROGR	AM	PRODUCTION PROGRAM		
	(ED & D)	TOOLING	(GTH)	(FTH)	TOTAL	PRODUCTION	TOOLING	FACILITIES	TOTAL	OPERATIONS	TOTAL PROGRAM
SRM							ŀ				
PROGRAM MANAGEMENT	1,848	163	44	895	2, 950	10, 214	971		11, 185	760	14, 895
SYSTEM ENGINEERING	4,828		5	1,328	6, 161	4, 617			4,617		10,778
SRM'S	42, 247	11, 795	3, 408	35, 978	93, 428	1,071,725	22, 464		1, 094, 189		1, 187, 617
CASE	14,956	3, 692	73	14, 226	32, 947	536, 353	10,118		546, 471		579, 418
NOZZLE	7. 297	2, 336	1, 152	7, 021	17, 806	161,048	1,614		162, 662		180, 468
IGNITER	480	274	5	244	1,003	5, 298	378		5, 676		6, 679
PROPELLANT AND LINER	7,985	1,929	1, 144	7, 597	18, 655	233, 185	3,071		236, 256		254, 911
POWER SUPPLY DISTRIBUTION	236	26	140	770	1, 172	14, 434	357	1	14,791		15, 963
FINAL ASSEMBLY	1, 636	1,940	486	2, 235	6, 297	43, 986	6, 681		50, 667		56, 964
GROUND TEST	1,675	1, 291	195		3, 161	2, 210			2, 210		5, 371
AUXILIARY POWER UNIT (APU)	7,375	270	153	3, 644	11,442	69, 261			69, 261		80, 703
THRUST TERMINATION	_607	37	60	241	945	5, 950	245		6, 195		7, 140
INSTALLATION ASSEMBLY AND CHECKOUT	237		181	496	914					5, 112	6, 026
FACILITIES	6, 172		2, 029		8, 201	476		59, 308	59,784		67, 985
SUPPORT EQUIPMENT AND SPARES	248		1,840	602	2, 690	4,012			4, 012	2,970	9, 672
FLIGHT TEST SUPPORT				549	549	5, 242			5, 242		5, 791
OPERATIONS SUPPORT			129	221	350					3,510	3, 860
STRUCTURE	1,703	374	1,062	3, 336	6, 475	127, 591	360		127, 951	-	134, 426
TRANSPORTATION			409	1, 288	1, 697	42,530			42,530		44, 227
TOTAL PROGRAM	57, 283	12, 332	9, 107	44, 693	123, 415	1, 266, 407	23, 795	59, 308	1, 349, 510	12, 352	1, 485, 277

CEILING COST 156 INCH SRM PARALLEL BURN WITH TVC & TT 20/YEAR PRODUCTION RATE

DATE 15 March 1972 (DOLLARS IN THOUSANDS) COST ELEMENT FY 1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 NONRECURRING TOTAL 30,459 38,885 28,998 852 314 14,009 DDT & E 852 314 14,009 30, 459 38,885 28,998 DEVELOPMENT 14,009 26,600 22,035 314 DEVELOPMENT 14,009 26,600 22,035 314 STE DELIVERABLE HARDWARE 2,019 16,317 27,720 2,019 2,500 DUMMY ENGINES FLIGHT ENGINES 13,817 27,720 533 1,278 852 O & FS AND SPARES 1,840 60, 459 120,918 130,993 130,993 129,732 RECURRING TOTAL 128, 526 INVESTMENT 59,896 119,791 129,774 129,774 119,406 129,357 129, 357 128, 113 59,703 DELIVER NEW ENGINES 413 193 385 417 417 GROUND SUPPORT EQUIP. PARTS 563 1,125 1,219 1,219 1,208 **OPERATIONS** 545 540 252 503 545 FLIGHT SUPPORT 365 365 362 337 168 OPERATIONS 306 143 285 309 309 PARTS 14,951 18,741 26, 092 FACILITIES 541 6,561 1.099 4,423 4, 423 4,380 4,084 TRANSPORTATION 409 553 2,775 29,551 82, 827 151,092 150, 367 135, 416 134, 114 31,558 39, 294 TOTAL PROGRAM 20,570 855 COST ELEMENT FY 1983 1984 1985 1986 1987 1988 1989 1990 TOTAL NONRECURRING TOTAL 113, 517 113,517 DDT & E 62, 958 DEVELOPMENT 62, 958 DEVELOPMENT DELIVERABLE HARDWARE 46,056 4,519 DUMMY ENGINES 41,537 FLIGHT ENGINES 4,503 O & FS AND SPARES 120,916 119,656 64, 237 6, 299 1, 259, 548 127, 214 124,695 123,436 RECURRING TOTAL 1, 247, 826 6, 239 118,543 63,640 126,030 123,535 122, 287 119,791 INVESTMENT 1,243,814 118, 162 63, 435 6,218 119,406 125, 625 123, 138 121,894 DELIVER NEW ENGINES 4,012 21 385 381 205 397 393 GROUND SUPPORT EQUIP. 405 PARTS 11,722 1,113 597 60 1,125 1,160 1,149 OPERATIONS 1,184 27 5, 242 498 267 519 514 503 529 FLIGHT SUPPORT 3,510 179 18 347 344 337 333 OPERATIONS 355 15 2,970 151 282 294 291 285 PARTS 300 67, 985 FACILITIES 4, 167 4,084 4,042 2, 169 212 44, 227 4, 296 4,210

125,000

123,698

66, 406

6,511

1,485,277

128,905

131,510

127,603

TRANSPORTATION

TOTAL PROGRAM

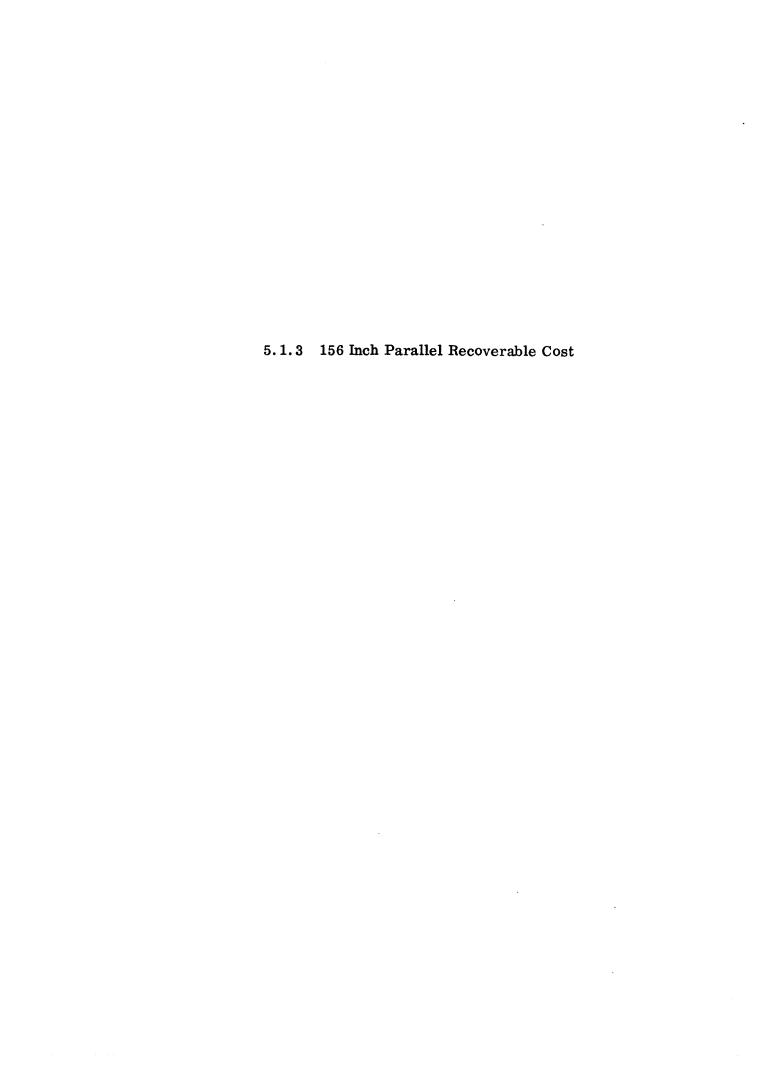
CEILING COST 156 INCH SRM PARALLEL BURN WITH TVC/TT

			DDT & E		······································					DATE	15 March 197
	ENGINEERING DESIGN AND DEVELOPMENT		GROUND TEST HARDWARE	FLIGHT TEST HARDWARE	DDT & E	PRO	0/YEAR RATE ODUCTION PROGR	AM	PRODUCTION PROGRAM		TOTAL
	(ED & D)	TOOLING	(GTH)	(FTH)	TOTAL	PRODUCTION	TOOLING	FACILITIES	TOTAL	OPERATIONS	PROGRAM
SRM											
PROGRAM MANAGEMENT	1,848	163	44	895	2, 950	10, 214	971		11, 185	760	14, 895
SYSTEM ENGINEERING	4,828		5	1,328	6, 161	4,617			4, 617	<u> </u>	10,778
SRM'S	42, 247	11,795	3,408	35, 978	93, 428	565,600	12, 303		577, 903		671, 331
CASE	14,956	3, 692	73	14, 226	32, 947	285, 049	5,519		290, 568		323, 515
NOZZLE	7, 297	2, 336	1, 152	7, 021	17, 806	87, 017	891		87,908		105,714
IGNITER	480	274	5	244	1,003	2,742	180		2, 922		3,925
PROPELLANT AND LINER	7, 985	1,929	1, 144	7, 597	18, 655	122, 509	1,670		124, 179		142, 834
POWER SUPPLY DISTRIBUTION	236	26	140	770	1,172	7, 227	202		7, 429		8, 601
FINAL ASSEMBLY	1,636	1,940	486	2, 235	6, 297	20, 816	3,707		24, 523		30, 820
GROUND TEST	1,675	1, 291	195		3, 161	1, 105			1, 105		4, 266
AUXILIARY POWER UNIT (APU)	7,375	270	153	3, 644	11, 442	35, 938			35, 938		47, 380
THRUST TERMINATION	607	37	60	241	945	3, 197	134		3, 331		4, 276
INSTALLATION ASSEMBLY AND CHECKOUT	237		181	496	914					4, 243	5, 157
FACILITIES	6, 172		2, 029		8, 201	476		44, 357	44, 833		53, 034
SUPPORT EQUIPMENT AND SPARES	248		1,840	602	2, 690	3, 370			3, 370	2, 465	8, 525
FLIGHT TEST SUPPORT				549	549	4, 246			4, 246		4,795
OPERATIONS SUPPORT			129	221	350					3,089	3, 439
STRUCTURE	1,703	374	1,062	3, 336	6, 475	69, 643	360		70,003		76, 478
TRANSPORTATION			409	1,288	1,697	23, 214			23, 214		24, 911
						ļ		ļ			
			ļ			_		ļ			
	_					 		<u> </u>	ļ		
TOTAL PROGRAM	57, 283	12, 332	9, 107	44, 693	123,415	681, 380	13, 634	44, 357	739, 371	10, 557	873, 343

SRM PROGRAM TIME PHASED FUNDING REQUIREMENTS CEILING COST 156 INCH SRM PARALLEL BURN WITH TVC & TT 10/YEAR PRODUCTION RATE

DATE 15 March 1972

COST ELEMENT FY	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
NONRECURRING TOTAL	314	14, 009	30, 459	38, 885	28, 998	852	1313	1500	1901	1302
DDT & E	314	14,009	30, 459	38, 885	28,998	852				
DEVELOPMENT	314	14,009	26,600	22,035	20,778	832				
DEVELOPMENT	314	14,009	26, 600	22, 035						
STE		14,007	20,000		· †	 -				
DELIVERABLE HARDWARE			2,019	16, 317	27, 720					
DUMMY ENGINES			2,019	2, 500	27, 120					
FLIGHT ENGINES	<u> </u>		2,017	13, 817	27,720					
O & FS AND SPARES			1,840	533	1,278	852		i - †		
RECURRING TOTAL			- 3,0.0			60,620	67, 431	67, 431	66, 750	66, 069
INVESTMENT						59,748	66, 461	66, 461	65,789	65, 118
DELIVER NEW ENGINES						59,448	66, 127	66, 127	65, 459	64, 791
GROUND SUPPORT EQUIP.		· · · · · · ·				300	334	334	330	327
PARTS										
OPERATIONS						872	970	970	961	951
FLIGHT SUPPORT						378	420	420	416	412
OPERATIONS	l					275	306	306	303	300
PARTS						219	244	244	242	239
FACILITIES	541	6, 561	1,099			18,741	26, 092			
TRANSPORTATION	311	0, 501		409	553	2, 801	2, 299	2, 299	2, 274	2, 251
TOTAL PROGRAM	855	20,570	31,558	39, 294	29, 551	83, 014	95, 822	69, 730	69,024	68, 320
										
COST ELEMENT FY	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL	
NONRECURRING TOTAL									113, 517	
DDT & E									113, 517	
DEVELOPMENT	 								62, 958	
DEVELOPMENT							t		62, 958	
STE	ļ								46,056	
DELIVERABLE HARDWARE	ļ									
DUMMY ENGINES	 								4, 519	
FLIGHT ENGINES		<u> </u>							41,537	
O & FS AND SPARES									4, 503	
RECURRING TOTAL	65, 389	63, 343	62,663	61,982	60,620	35, 418	3, 405		681, 121	
INVESTMENT	64, 447	62, 432	61,761	61.091	59.748	34, 908	3, 357		671, 321	
DELIVER NEW ENGINES						34, 733	3,341		667, 951	
	64, 123	62, 119	61,451	60,784	59,448					
GROUND SUPPORT EQUIP.	64, 123	62, 119	61,451	60,784	59, 448	175	16		3, 370	
PARTS	324	313	310	307	300	175	16			
PARTS OPERATIONS	324	911	310 902	307 891	300 872	510	16		9, 800	
PARTS OPERATIONS FLIGHT SUPPORT	324 942 408	911 395	902 391	307 891 386	300 872 378	510 221	16 48 21		9, 800 4, 246	
PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS	324 942 408 297	911 395 287	902 391 284	307 891 386 281	300 872 378 275	510 221 161	16 48 21 14		9, 800 4, 246 3, 089	
PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS PARTS	324 942 408	911 395	902 391	307 891 386	300 872 378	510 221	16 48 21		9, 800 4, 246 3, 089 2, 465	
PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS PARTS FACILITIES	942 408 297 237	313 911 395 287 229	310 902 391 284 227	307 891 386 281 	300 872 378 275 219	175 510 221 161 128	16 48 21 14		9, 800 4, 246 3, 089 2, 465 53, 034	
PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS PARTS	324 942 408 297	911 395 287	902 391 284	307 891 386 281	300 872 378 275	510 221 161	16 48 21 14		9, 800 4, 246 3, 089 2, 465	



5.1.3.1 Probable Cost

5.1.3.1.1 W/O TVC and TT

PROBABLE COST 156 INCH SRM WITH REFURBISHMENT AND RECOVERY PARALLEL BURN W/O TVC & TT

(DOLLARS IN THOUSANDS)

DATE 15 March 1972

					•	•					DATE	_15 March 1972
	DDT & E TOTAL	DDT & E REFURBISH AND RECOVERY DELTA	DDT & E WITH REFURBISH AND RECOVERY TOTAL (1)	PRODUCTION PROGRAM TOTAL	REFU PRODUCTION DELTA	60/YR RATE RBISH AND RECOV TOOLING DELTA	FACILITIES DELTA	PROD PROGRAM WITH REFURBISH AND RECOVERY TOTAL (2)	OPERATIONS TOTAL	REFURBISH AND RECOVERY OPERATIONS DELTA	OPERATIONS WITH REFURBISH AND RECOVERY TOTAL (3)	TOTAL PROGRAM
SRM												
PROGRAM MANAGEMENT	2,752	ļ	2,752	12, 124		,		12,124	700		700	15,576
SYSTEM ENGINEERING	4, 613	230	4,843	5,005				5,005				9,848
SRM'S	62, 399	(3, 670)	58, 729	1, 473, 134	(583, 988)	(2, 453)		886, 693				945, 422
CASE	26,531	(4, 390)	22, 141	773,318	(554, 067)	(2, 355)		216, 896				239,037
NOZZLE	11,160	593	11, 753	227, 157	(27, 207)	(98)		199,852	· · · · · · · · · · · · · · · · · · ·			211, 605
IGNITER	951		951	8, 189				8, 189				9,140
PROPELLANT AND LINER	16,508		16, 508	364, 896				364, 896				381,404
POWER SUPPLY DISTRIBUTION	966	(29)	937	23, 098	(2, 714)		<u> </u>	20,384				21, 321
FINAL ASSEMBLY	3,761		3,761	73,628				73,628				77,389
GROUND TEST	2,522	156	2,678	2, 848				2,848				5,526
AUXILIARY POWER UNIT (APU)												
THRUST TERMINATION												
INSTALLATION ASSEMBLY AND CHECKOUT	807		807						6, 836		6, 836	7,643
FACILITIES	7,290		7,290	101, 160			(41, 796)	59, 364		18,995	18, 995	85, 649
SUPPORT EQUIPMENT AND SPARES	2,166		2,166	5, 227				5,227	3,963		3,963	11, 356
FLIGHT TEST SUPPORT	473	95	568	7,289				7.289				7,857
OPERATIONS SUPPORT	336		336						4,178		4, 178	4, 514
STRUCTURE	6,210	(1, 640)	4,570	222, 965	(187, 993)			34,972				39, 542
RECOVERY SYSTEM		90,844	90, 844				<u> </u>			86, 361	86, 361	177,205
TRANSPORTATION	1,480	42	1,522	73, 711	6,507			80,218				81,740
TOTAL PROGRAMS	88,526	85, 901	174, 427	1,900,615	(765, 474)	(2, 453)	(41, 796)	1,090,892	15,677	105,356	121,033	1,386,352

NOTE: TOTAL PROGRAM IS SUM OF COLUMN 1, 2, AND 3

PROBABLE COST 156 INCH SRM WITH REFURBISHMENT & RECOVERY PARALLEL BURN W/O TVC & TT

60/YEAR PRODUCTION RATE

(DOLLARS IN THOUSANDS)

FUNDING REQUIREMENTS

Total \$11,088 \$17,082 \$19,656 \$14,811 \$39,311 \$70,041 \$78,484 \$105,200 \$120,287 \$141,881 \$172,334 \$166,105 \$159,737 \$159,737 \$107,691 \$2,492 \$1,386,352 \$415

PROBABLE COST 156 INCH SRM WITH REFURBISHMENT & RECOVERY PARALLEL BURN W/O TVC & TT

40/YEAR PRODUCTION RATE

(DOLLARS IN THOUSANDS)

			DDT&E			PRODUCTION RECURRING				PRODUCTION FACILITIES				TOTAL PROGRAM					
			\$174,427			\$1,064,9	58			\$49,826				\$1, 289, 21	1				
FUNDING	G REQUIREM	MENTS																	
1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	Total		
\$415	\$11,088	\$17,082	\$19,656	\$14,811	\$44, 275	\$86, 978	\$90,867	\$123,558	\$132, 181	\$129,865	\$127,548	\$126, 261	\$125,103	\$123,944	\$112,103	\$3,476	\$1,289,211		

PROBABLE COST 156 INCH SRM WITH REFURBISHMENT & RECOVERY PARALLEL BURN W/O TVC & TT

20/YEAR PRODUCTION RATE

			DDT&E			PRODUCTION RECURRING				PRODUC'				TOTAL PROGRA				
			\$174, 427			\$702, 114				\$42,686				\$919, 227	,			
FUNDING	G REQUIRE	MENTS																
1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	Total	
¢415	¢11 000	\$17 NB2	¢19 656	\$14 811	\$51 173	\$100.415	\$99.956	\$ 83 638	\$82 812	\$81 162	\$79 603	\$78 777	\$77 218	\$76 393	\$40 QQ3	\$4 035	¢919 227	

PARALLEL COST 156 INCH SRM WITH REFURBISHMENT & RECOVERY PARALLEL BURN W/O TVC & TT

10/YEAR PRODUCTION RATE

			DDT&E			PRODUCTION RECURRING				PRODUCTION				TOTAL PROGRAM				
										FACILIT	IES_			PROGRAM				
			\$174,427			\$406,553				\$30,979				\$611,959				
FUNDING	G REQUIRE	MENTS																
1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	Total	
\$415	\$11,088	\$17, 082	\$19,656	\$14, 811	\$57, 993	\$69,040	\$60.867	\$ 58, 236	\$47, 748	\$47, 260	\$45, 797	\$45, 309	\$44, 821	\$43, 785	\$25, 612	\$2, 439	\$611.959	

5.1.3.1.2 With TVC and TT

PROBABLE COST 156 INCH SRM WITH REFURBISHMENT AND RECOVERY PARALLEL BURN WITH TVC & TT

(DOLLARS IN THOUSANDS)

DATE 15 March 1972

		DDT & E	DDT & E		nead.	60/YR RATE RBISH AND RECOV	FDV	PROD PROGRAM		REFURBISH	OPERATIONS	TOTAL PROGRAM	
	DDT & E TOTAL		WITH REFURBISH AND RECOVERY TOTAL (1)	PRODUCTION PROGRAM TOTAL	PRODUCTION DELTA	TOOLING DELTA	FACILITIES DELTA	WITH REFURBISH AND RECOVERY TOTAL (2)	OPERATIONS TOTAL	AND RECOVERY OPERATIONS DELTA	WITH REFURBISH AND RECOVERY TOTAL (3)		
SRM													
PROGRAM MANAGEMENT	2,828		2,828	12, 124				12, 124	700		700	15, 652	
SYSTEM ENGINEERING	5,909	291	6, 200	5,005				5,005		, , , , , , , , , , , , , , , , , , , ,		11, 205	
SRM'S	79,634	(2, 735)	76, 899	1, 684, 601	(645, 635)	(2, 482)		1,036,484				1,113,383	
CASE	26,531	(4, 390)	22,141	773,318	(554, 067)	(2, 355)		216, 896				239, 037	
NOZZLE	14, 469	767	15, 236	297,244	(30, 813)	(127)	<u> </u>	266, 304				281,540	
IGNITER	951		951	8,189				8, 189				9, 140	
PROPELLANT AND LINER	16,508		16,508	364, 896				364, 896				381, 404	
POWER SUPPLY DISTRIBUTION	1,117	(29)	1,088	23,098	(2,714)			20, 384				21, 472	
FINAL ASSEMBLY	5,374		5,374	80,114				80,114				85, 488	
GROUND TEST	2,804	156	2,960	2,848				2,848				5, 808	
AUXILIARY POWER UNIT (APU)	10,974	761	11,735	123, 339	(58, 041)			65, 298				77, 033	
THRUST TERMINATION	906		906	11,555				11,555				12, 461	
INSTALLATION ASSEMBLY AND CHECKOUT	877		877						6,836		6,836	7, 713	
FACILITIES	7,865		7,865	101,160			(41, 796)	59, 364		18, 995	18,995	86, 224	
SUPPORT EQUIPMENT AND SPARES	2,580		2,580	5,227				5,227	3,963		3,963	11,770	
FLIGHT TEST SUPPORT	527	95	622	7,289				7,289				7,911	
OPERATIONS SUPPORT	336	1	336						4,178		4,178	4,514	
STRUCTURE	6,210	(1, 640)	4,570	222,965	(187, 993)			34, 972				39,542	
RECOVERY SYSTEM		90, 844	90, 844							86, 361	86, 361	177,205	
TRANSPORTATION	1,627	42	1,669	73, 711	6,507			80, 218				81,887	
TOTAL PROGRAMS	108,393	86, 897	195, 290	2,112,082	(827, 121)	(2, 482)	(41, 796)	1,240,683	15,677	105,356	121,033	1,557,006	

NOTE: TOTAL PROGRAM IS SUM OF COLUMN 1, 2, AND 3

PROBABLE COST 156 INCH SRM WITH REFURBISHMENT & RECOVERY PARALLEL BURN WITH TVC & TT

60/YEAR PRODUCTION RATE

(DOLLARS IN THOUSANDS)

FUNDING REQUIREMENTS

1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	Total
\$466	\$13,278	\$20,450	\$22,045	\$16,611	\$44,090	\$78,555	\$88,025	\$117.987	\$134,909	\$159,128	\$193, 282	\$186, 296	\$179,154	\$179, 154	\$120,782	\$2, 794	\$1,557,006

PROBABLE COST 156 INCH SRM WITH REFURBISHMENT & RECOVERY PARALLEL BURN WITH TVC & TT

40/YEAR PRODUCTION RATE

(DOLLARS IN THOUSANDS)

DDT&E	PRODUCTION RECURRING	PRODUCTION FACILITIES	TOTA L PROGRAM	
\$195, 290	\$1, 148, 734	\$49, 826	\$1,393,850	

FUNDING REQUIREMENTS

<u>1973</u>	1974	1975	1976	1977	1978	1979	1980	1981 1982	1983	1984	1985	1986	1987	1988	1989	Total	
\$4 66	\$13, 278	\$20,450	\$22,045	\$16,611	\$47,792	\$91,324	\$98,085	\$133,374 \$142,68	2 \$140,181	\$137,680	\$136, 291	\$135,041	\$133,790	\$121,009	\$3,751	\$1,393,850	

20/YEAR PRODUCTION RATE

(DOLLARS IN THOUSANDS)

			DDT&E			PRODUCT	NOI			PRODUC	TION			TOTAL			
						RECURRI	NG			FACILIT	ES			PROGRA	<u>M</u> _		•
			\$195, 29	0		\$751,506	i			\$42,686				\$989,48	2		
FUNDIN	G REQUIRE	MENTS		\$195, 290										,			
1973	1974	1975	<u>197</u> 6	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	Total
\$466	\$13, 278	\$20,450	\$22,045	\$16,611	\$54,960	\$106, 397	\$105, 904	\$89,827	\$88,940	\$87, 167	\$85, 493	\$84,606	\$82,932	\$82,046	\$44,027	\$4, 333	\$989,482

10/YEAR PRODUCTION RATE

(DOLLARS IN THOUSANDS)

DDT&E	PRODUCTION RECURRING	PRODUCTION FACILITIES	TOTAL PROGRAM
\$195, 290	\$431,500	\$30,979	\$657,769

FUNDING REQUIREMENTS

1973	1974	1975	<u>1976</u>	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	Total
\$46 6	\$13, 278	\$20,450	\$22,045	\$16,611	\$62,122	\$73,133	\$63,666	\$61,670	\$51,148	\$50,625	\$49,057	\$48,535	\$48,012	\$46,902	\$27,436	\$2,613	\$657,769

5.1.3.2 Ceiling Cost

5.1.3.2.1 W/O TVC and TT

(DOLLARS IN THOUSANDS)

DATE _15 March 1972

		DDT & E REFURBISH	DDT & E WITH REFURBISH	PRODUCTION		60/YR RATE RBISH AND RECOV	ERY	PROD PROGRAM WITH REFURBISH		REFURBISH AND RECOVERY	OPERATIONS WITH REFURBISH	
	DDT & E TOTAL	AND RECOVERY DELTA	AND RECOVERY TOTAL (1)	PROGRAM TOTAL	PRODUCTION DELTA	TOOLING DELTA	FACILITIES DELTA	AND RECOVERY TOTAL (2)	OPERATIONS TOTAL	OPERATIONS DELTA	AND RECOVERY TOTAL (3)	TOTAL PROGRAM
SRM												
PROGRAM MANAGEMENT	2,870		2,870	13,159			<u> </u>	13, 159	760		760	16,789
SYSTEM ENGINEERING	4,810	241	5,051	5, 432				5, 432				10,483
SRM'S	74,602	(4, 232)	70,370	1,887,089	(780, 009)	(3, 739)		1, 103, 341				1, 173, 711
CASE	32,947	(5, 031	27,916	1,024,855	(741, 425)	(3, 544)		279,886				307, 802
NOZZLE	13,769	665	14, 434	246, 561	(35, 638)	(195)		210,728				225, 162
IGNIT ER	1,003		1,003	8,888				8,888				9,891
PROPELLANT AND LINER	18, 655		18,655	498,705				498, 705				517,360
POWER SUPPLY DISTRIBUTION	1,012	(31)	981	25,071	(2,946)			22, 125				23, 106
FINAL ASSEMBLY	4,396	<u> </u>	4,396	79,918				79,918				84, 314
GROUND TEST	2,820	165	2,985	3,091				3, 091				6,076
AUXILIARY POWER UNIT (APU)												
THRUST TERMINATION												
INSTALLATION ASSEMBLY AND CHECKOUT	842		842						7,420		7,420	8, 262
FACILITIES	7,601		7,601	109, 801			(45, 366)	64, 435		20,618	20, 618	92,654
SUPPORT EQUIPMENT AND SPARES	2,258		2,258	5,674				5, 674	4, 301		4,301	12,233
FLIGHT TEST SUPPORT	493	100	593	7,912				7,912				8,505
OPERATIONS SUPPORT	350		350		l				4,535		4,535	4, 885
STRUCTURE	6, 475	(1, 714)	4,761	242,011	(204, 052)			37, 959				42,720
RECOVERY SYSTEM		96, 131	96, 131							93,737	93,737	189, 868
TRANSPORTATION	1,543	44	1,587	80,008	7,064			87,072				88, 659
TOTAL PROGRAMS	101, 844	90,570	192,414	2,351,086	(976, 997)	(3, 739)	(45, 366)	1,324,984	17,016	114, 355	131,371	1,648,769

NOTE: TOTAL PROGRAM IS SUM OF COLUMN 1, 2, AND 3

60/YEAR PRODUCTION RATE

(DOLLARS IN THOUSANDS)

FUNDING REQUIREMENTS

1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	Total	
\$494	\$13,290	\$20, 473	\$23.372	\$17,612	\$46,745	\$83, 285	\$93,325	\$125.092	\$143,033	\$168,710	\$204, 921	\$197.514	\$189,943	\$189, 943	\$128,055	\$2, 962	\$1 648 769	

40/YEAR PRODUCTION RATE

(DOLLARS IN THOUSANDS)

DDT&E	PRODUCTION RECURRING	PRODUCTION FACILITIES	TOTAL PROGRAM
\$192, 414	\$1, 285, 981	\$54, 083	\$1,532,478

FUNDING REQUIREMENTS

1973	1974	<u> 1975 </u>	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	<u>Total</u>
\$494	\$13 290	\$20 473 \$23	3. 372	\$17, 612	\$52, 620	\$103, 336	\$107,994	\$146,847	\$157,096	\$154, 343	\$151, 589	\$150,060	\$148, 683	\$147.306	\$133, 233	\$4, 130	\$1,532,478

20/YEAR PRODUCTION RATE

(DOLLARS IN THOUSANDS)

			DDT&E			PRODUCT RECURRI				PRODUC FACILIT				TOTAL PROGRA	.		
						112001111				THOILIT				FROORA	101		•
			\$192,414		\$848,995	5			\$46,333				\$1,087,	742			
FUNDING	G REQUIRE	MENTS															
1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	<u>Total</u>
\$494	\$13,290	\$20,473	\$23,372	\$17,612	\$60,539	\$118,608	\$118,064	\$98,945	\$97,969	\$96,016	\$94, 171	\$93,195	\$91,351	\$90,374	\$48, 496	\$ 4, 773	\$1,087,742

10/YEAR PRODUCTION RATE

(DOLLARS IN THOUSANDS)

			DDT&£			PRODUCT RECURRI				PRODUC FACILIT				TOTAL PROGRAI	M		
						KECOKKI	.IVG			THOILET	120			IKOMA	<u> </u>		
			\$192,414			\$491, 267	2			\$34,746				\$718,422			
FUNDIN	G REQUIRE	MENTS															
1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	Total
\$494	\$13, 290	\$20,473	\$23,372	\$17,612	\$68,054	\$ 82, 276	\$70,951	\$66,604	\$56,032	\$55, 459	\$53,742	\$53, 169	\$52,597	\$51,380	\$30,055	\$2,862	\$718,422

5.1.3.2.2 With TVC and TT

(DOLLARS IN THOUSANDS)

DATE _15 March 1972_

						60/YR RATE				1		15 March 1972
	DDT & E TOTAL	DDT & E REFURBISH AND RECOVERY DELTA	DDT & E WITH REFURBISH AND RECOVERY TOTAL (1)	PRODUCTION PROGRAM TOTAL	REFU PRODUCTION DELTA	RBISH AND RECOV TOOLING DELTA	FACILITIES DELTA	PROD PROGRAM WITH REFURBISH AND RECOVERY TOTAL (2)	OPERATIONS TOTAL	REFURBISH AND RECOVERY OPERATIONS DELTA	OPERATIONS WITH REFURBISH AND RECOVERY TOTAL (3)	TOTAL PROGRAM
SRM							1					
PROGRAM MANAGEMENT	2,950		2,950	13, 159				13, 159	760		760	16, 869
SYSTEM ENGINEERING	6,161	308	6, 469	5,432				5, 432				11, 901
SRM'S	93, 428	(3, 164)	90,264	2,163,292	(846, 920)	(3, 782)		1,312,590				1,402,854
CASE	32,947	(5, 031)	27,916	1,024,855	(741, 425)	(3, 544)		279, 886				307, 802
NOZZLE	17, 806	937	18,743	369,307	(39, 550)	(238)	ļ <u></u> .	329, 519		<u> </u>		348, 262
IGNITER	1,003		1,003	8,888			<u></u>	8,888				9, 891
PROPELLANT AND LINER	18,655		18, 655	498, 705				498, 705				517,360
POWER SUPPLY DISTRIBUTION	1,172	(31)	1,141	25,071	(2, 946)			22, 125				23,266
FINAL ASSEMBLY	6.297		6,297	86,958				86, 958				93, 255
GROUND TEST	3, 161	165	3, 326	3,091				3,091				6,417
AUXILIARY POWER UNIT (APU)	11, 442	796	12,238	133,875	(62, 999)		 	70,876		ļ		83, 114
THRUST TERMINATION	945		945	12,542			ļ	12,542				13, 487
INSTALLATION ASSEMBLY AND CHECKOUT	914		914						7,420		7,420	8, 334
FACILITIES	8,201		8,201	109,801			(45, 366)	64, 435		20,618	20,618	93, 254
SUPPORT EQUIPMENT AND SPARES	2,690		2,690	5,674				5, 674	4, 301		4,301	12,665
FLIGHT TEST SUPPORT	549	100	649	7,912				7, 912				8, 561
OPERATIONS SUPPORT	350		350						4,535		4,535	4, 885
STRUCTURE	6,475	(1, 714)	4,761	242,011	(204, 052)			37,959				42,720
RECOVERY SYSTEM	I	96, 131	96, 131				<u> </u>	L		93, 737	93,737	189, 868
TRANSPORTATION	1,697	44	1.741	80,008	7,064			87, 072				88, 813
							ļ. <u>.</u>					
												<u>-</u>
TOTAL PROGRAMS	123, 415	91, 705	215, 120	2,627,289	(1,043,908)	(3, 782)	(45, 366)	1,534,233	17,016	114, 355	131, 371	1,880,724

NOTE: TOTAL PROGRAM IS SUM OF COLUMN 1, 2, AND 3

60/YEAR PRODUCTION RATE

(DOLLARS IN THOUSANDS)

FUNDING REQUIREMENTS

1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	<u> 1986</u>	1987	1988	1989	Total
\$563	\$16,017	\$24, 675	\$26,629	\$20,066	\$53, 258	\$94,890	\$106, 329	\$142,522	\$162,962	\$192, 217	\$233,473	\$225,034	\$216,408	\$216,408	\$145,897	\$3,376	\$1,880,724

40/YEAR PRODUCTION RATE

(DOLLARS IN THOUSANDS)

			DDT&E			PRODUCT RECURRI					FACILITI					TOTAL PROGRA	<u>M</u>
			\$215,120			\$1,411,64	:5				\$54,083					\$1,680,8	48
FUNDING	REQUIREMENTS																
1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	Total
\$563	\$16,017	\$24,675	\$26,629	\$20,066	\$57,634	\$109,992	\$118, 284	\$160,839	\$172,065	\$169,049	\$166,033	\$164,358	\$162,850	\$161,342	\$145,928	\$4,524	\$1,680,848

20/YEAR PRODUCTION RATE

(DOLLARS IN THOUSANDS)

DDT&E	PRODUCTION	PRODUCTION	TOTAL
	RECURRING	FACILITIES	PROGRAM
\$215,120	\$924,847	\$46, 333	\$1,186,300

FUNDING REQUIREMENTS

1973	1974	<u>1975</u> <u>1976</u>	<u> 1977</u>	1978	<u>1979</u>	1980	1981	1982	1983	1984	1985	<u>1986</u>	1987	1988	1989	Total
¢563	\$16,017	\$24,675 \$26,629	\$20,066	\$65,892	\$127, 253	\$126,662	\$107,695	\$106,632	\$104,506	\$102,499	\$101,436	\$99,429	\$98,366	\$52,785	\$5, 195	\$1,186,300

10/YEAR PRODUCTION RATE

(DOLLARS IN THOUSANDS)

			aDDT&E				PRODUC RECURR				PRODUC FACILIT				TOTAL PROGRAM	м_	
			\$215, 120	1			\$530,75	3			\$34,746				\$780,619)	`
FUNDIN	G R EQUIR E	MENTS															
1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	Total
\$563	\$16,017	\$24,675	\$26,629	\$20,066	\$73,720	\$87,927	\$74, 827	\$71,317	\$60,697	\$60,077	\$58, 216	\$57,596	\$56,976	\$55,658	\$32,558	\$3,100	\$780,619

5.2 156 Inch Series Expendable Cost

156 INCH SERIES BURN

Presented in this section are the expendable costs for the Series Configuration, both probable and ceiling, as defined in Section 3.0. These costs are set forth on NASA Cost Tables I and II.

The recoverable costs for the DDT&E and 60 per year launch rate are presented on NASA Cost Table I; however, the alternate launch rates of 40, 20 and 10 are presented in total costs only by DDT&E, Production recurring and Production facilities. The Table II time phased cost are only presented in total dollars by fiscal year for all launch rates.

In the 23 February presentation it was stated that the Recovery System Development Cost was included in the recurring cost per launch for the recoverable cost. This was correct but for consistency with the 156-inch parallel configuration we have included the Recovery System Development Cost in the DDT&E and excluded it from the recurring production cost.

For your convenience a cost summary is included in the front of this section summarizing the cost detail which follows. 5.2.1 Summary

SUMMARY 156 INCH SRM SERIES BURN

(DOLLARS IN THOUSANDS)

	DDT&E	Produc 60/Year Recurring		Total Program	Produc 40/Year Recurring		Total Program	Produ 20/Yea Recurring		Total Program	Produc 10/Year Recurring		Total Program
Series Burn-Expendable Probable Cost With TVC/W/O TT Recurring Cost/Launch Peak Annual Funding	151, 902 48, 906	3, 428, 120 7, 791 464, 484	134, 639	3, 714, 661	2, 893, 476 8, 220 323, 845	118, 612	3, 163, 990	1, 809, 511 9, 232 206, 087	72, 532	2, 033, 945	978, 138 9, 685 130, 459	58, 983	1, 189, 023
Ceiling Cost With TVC/W/O TT Recurring Cost/Launch Peak Annual Funding	171, 486 55, 583	4, 400, 293 10, 001 593, 784	146, 092	4, 717, 871	3, 733, 535 10, 607 417, 797	128, 702	4, 033, 723	2, 306, 164 11, 766 259, 176	78, 702	2, 556, 352	1, 246, 399 12, 341 159, 693	64,000	1, 481, 885
With TVC-TT Recurring Cost/Launch Peak Annual Funding	172, 550 55, 968	4, 419, 049 10, 043 596, 259	146, 092	4, 737, 691	3, 749, 652 10, 652 419, 705	128, 702	4, 050, 904	2, 316, 021 11, 816 260, 201	78,702	2, 567, 273	1, 251, 748 12, 394 160, 224	64,000	1,488,298
ries Burn - Recoverable Probable Cost With TVC W/O TT Recurring Cost/Launch Peak Annual Funding	256, 902 34, 714	2, 074, 705 4, 715 304, 358	119, 190	2, 450, 797	1, 825, 696 5, 187 224, 036	105, 024	2, 187, 622	1, 182, 435 6, 033 159, 972	64, 713	1,504,050	692, 620 6, 858 125, 095	52, 861	1, 002, 383
Ceiling Cost With TVC W/O TT Recurring Cost/Launch Peak Annual Funding	280, 574 42, 635	2, 599, 688 5, 908 373, 811	129, 330	3, 009, 592	2, 287, 386 6, 498 274, 704	113, 958	2,681,918	1, 480, 926 7, 556 194, 319	70, 218	1, 831, 718	869, 823 8, 612 149, 524	57, 357	1, 207, 754
With TVC-TT Recurring Cost/Launch Peak Annual Funding	281, 638 42, 917	2, 618, 444 5, 951 376, 278	129, 330	3,029,412	2, 304, 282 6, 546 276, 549	113, 958	2, 699, 878	1,491,706 7,611 195,572	70, 218	1, 843, 562	876, 287 8, 676 150, 438	57, 357	1, 215, 282

5.2.2 Expendable

5.2.2.1 Probable Cost With TVC and W/O TT

PROBABLE COST 156 INCH SRM SERIES BURN WITH TVC W/O TT (DOLLARS IN THOUSANDS)

						_					
			DDT & E			7				DATE	15 March 1972
,	ENGINEERING DESIGN AND DEVELOPMENT		GROUND TEST HARDWARE	FLIGHT TEST HARDWARE	DDT & E	PR	60/YEAR RATE ODUCTION PROGR	AM	PRODUCTION PROGRAM		TOTAL
	(ED & D)	TOOLING	(GTH)	(FTH)	TOTAL	PRODUCTION	TOOLING	FACILITIES	TOTAL	OPERATIONS	PROGRAM
SRM	1										
PROGRAM MANAGEMENT	1,772	156	42	880	2, 850	12, 149	1,052		13, 201	700	16,751
SYSTEM ENGINEERING	4,630		5	I,416	6, 051	6, 625			6, 625		12, 676
SRM'S	40,543	10, 359	3, 842	55, 916	110, 660	2, 759, 498	30, 867		2, 790, 365		2,901,025
CASE	15, 188	3, 434	147	23, 969	42, 738	1,313,407	12, 249		1, 325, 656		1, 368, 394
NOZZLE	6, 145	1,953	1,007	8, 426	17,531	397,480	1,464		398, 944		416, 475
IGNITER	563	266	11	450	1, 290	10, 431	430		10, 861		12, 151
PROPELLANT AND LINER	8, 276	1, 698	1,656	13, 843	25, 473	659, 760	4, 497		664, 257		689, 730
POWER SUPPLY DISTRIBUTION	226	19	151	1, 223	1, 619	56, 516	392		56, 908		58, 527
FINAL ASSEMBLY	1,466	1,719	499	3, 014	6, 698	132, 834	11,835		144, 669		151, 367
GROUND TEST	1,606	1,011	208		2, 825	4, 273			4, 273		7,098
AUXILIARY POWER UNIT (APU)	7,073	259	163	4, 991	12, 486	184, 797	}		184, 797		197, 283
THRUST TERMINATION							<u> </u>				
INSTALLATION ASSEMBLY]						
AND CHECKOUT	239		193	528	960					8, 232	9, 192
FACILITIES	6, 294		1,946		8, 240	1,610		134, 639	136, 249		144, 489
SUPPORT EQUIPMENT AND SPARES	238		2, 752	592	3, 582	5, 915			5, 915	5, 242	14, 739
FLIGHT TEST SUPPORT				617	617	9, 459			9, 459		10,076
OPERATIONS SUPPORT			124	212	336					4, 179	4, 515
STRUCTURE	5, 481	1,562	2, 180	6, 732	15, 955	440, 301	282		440, 583		456, 538
TRANSPORTATION			639	2,012	2, 651	142, 009			142, 009		144, 660
										l	
										<u> </u>	
TOTAL PROGRAM	59, 197	12,077	11,723	68, 905	151,902	3, 377, 566	32, 201	134, 639	3, 544, 406	18,353	3, 714, 661

SRM PROGRAM TIME PHASED FUNDING REQUIREMEN .'S (DOLLARS IN THOUSANDS)

PROBABLE COST 156 INCH SRM SERIES BURN WITH TVC W/O TT 60/YEAR PRODUCTION

DATE 15 March 1972

COST ELEMENT											
COST ELEMENT	FY	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
NONRECURRING TOTAL		323	14, 352	32, 210	48, 183	44,903	1,040				
DDT & E		323	14, 352	32, 210	48, 183	44,903	1,040				
DEVELOPMENT		323	14,352	27, 253	22, 575		<u>[</u>				
DEVELOPMENT		323	14, 352	27, 253	22, 575						
STE									L		
DELIVERABLE HARDY	VARE			2,712	24, 957	43, 344				<u> </u>	
DUMMY ENGINES			<u> </u>	2,712	3,357						
FLIGHT ENGINES					21,600	43, 344					
O & FS AND SPARES				2, 245	651	1,559	1,040				
RECURRING TOTAL							75, 545	147,803	183,933	259, 476	292, 321
INVESTMENT							75, 110	146,953	182, 875	257, 984	290, 640
DELIVER NEW ENG	INES						74,973	146, 687	182, 544	257, 517	290, 114
GROUND SUPPORT	EQUIP.						137	266	331	467	526
PARTS											
OPERATIONS							435	850	1,058	1,492	1,681
FLIGHT SUPPORT							218	426	530	747	842
OPERATIONS							96	188	234	330	372
PARTS							121	236	294	415	467
FACILITIES		665	8,034	1,344			22, 945	31,947	18, 307	12, 238	18, 393
TRANSPORTATION					723	984	4,557	6, 380	7,927	11, 197	12,600
TOTAL PROGRAM		988	22, 386	33,554	48, 906	45,887	104,087	186, 130	210, 167	282, 911	323, 314
COST ELEMENT	FY	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL	1
NONRECURRING TOTAL										141,011	7
DDT & E			1						1	141, 011	1
			1	i	1						1
DEVELOPMENT										64, 503	1
DEVELOPMENT DEVELOPMENT											
										64, 503	
DEVELOPMENT	VARE									64, 503	
DEVELOPMENT STE DELIVERABLE HARDW	VARE									64, 503 64, 503	
DEVELOPMENT STE DELIVERABLE HARDW DUMMY ENGINES	VARE									64, 503 64, 503 71, 013 6, 069	
DEVELOPMENT STE DELIVERABLE HARDW	VARE									64, 503 64, 503 71, 013	
DEVELOPMENT STE DELIVERABLE HARDW DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES	VARE	348 158	433 555	430, 267	413.846	413.846	279.183	6.568		64, 503 64, 503 71, 013 6, 069 64, 944	
DEVELOPMENT STE DELIVERABLE HARDW DUMMY ENGINES FLIGHT ENGINES	WARE	348, 158 346, 156	433, 555 431, 062	430, 267	413,846	413,846 411,468	279, 183 277, 577	6, 568 6, 532		64, 503 64, 503 71, 013 6, 069 64, 944 5, 495 3, 284, 501	
DEVELOPMENT STE DELIVERABLE HARDW DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT		346, 156	431,062	427, 796	411,468	411,468	277, 577	6, 532		64, 503 64, 503 71, 013 6, 069 64, 944 5, 495 3, 284, 501 3, 265, 621	
DEVELOPMENT STE DELIVERABLE HARDW DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENG	INES	346, 156 345, 529	431,062 430, 281	427, 796 427, 021	411,468	411, 468 410, 723	277, 577 277, 075	7		64, 503 64, 503 71, 013 6, 069 64, 944 5, 495 3, 284, 501 3, 265, 621 3, 259, 706	
DEVELOPMENT STE DELIVERABLE HARDW DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENG GROUND SUPPORT	INES	346, 156	431,062	427, 796	411,468	411,468	277, 577	6, 532 6, 519		64, 503 64, 503 71, 013 6, 069 64, 944 5, 495 3, 284, 501 3, 265, 621	
DEVELOPMENT STE DELIVERABLE HARDW DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENG	INES	346, 156 345, 529 627	431, 062 430, 281 781	427, 796 427, 021 775	411,468 410,723 745	411,468 410,723 745	277, 577 277, 075	6, 532 6, 519		64, 503 64, 503 71, 013 6, 069 64, 944 5, 495 3, 284, 501 3, 265, 621 3, 259, 706	
DEVELOPMENT STE DELIVERABLE HARDW DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENG GROUND SUPPORT PARTS OPERATIONS	INES	346, 156 345, 529 627 2, 002	431, 062 430, 281 781 2, 493	427, 796 427, 021 775 2, 471	411,468 410,723 745 2,378	411, 468 410, 723 745 2, 378	277, 577 277, 075 502	6,532 6,519		64, 503 64, 503 71, 013 6, 069 64, 944 5, 495 3, 284, 501 3, 265, 621 3, 259, 706 5, 915	
DEVELOPMENT STE DELIVERABLE HARDW DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENG GROUND SUPPORT PARTS	INES	346, 156 345, 529 627 2, 002 1, 003	431, 062 430, 281 781	427, 796 427, 021 775	411,468 410,723 745 2,378 1,192	411,468 410,723 745	277, 577 277, 075 502	6, 532 6, 519 13		64, 503 64, 503 71, 013 6, 069 64, 944 5, 495 3, 284, 501 3, 265, 621 3, 259, 706 5, 915	
DEVELOPMENT STE DELIVERABLE HARDW DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENG GROUND SUPPORT PARTS OPERATIONS FLIGHT SUPPORT	INES	346, 156 345, 529 627 2, 002	431, 062 430, 281 781 2, 493 1, 249	427, 796 427, 021 775 2, 471 1, 238	411,468 410,723 745 2,378	411, 468 410, 723 745 2, 378 1, 192	277, 577 277, 075 502 1, 606 805	6, 532 6, 519 13 36 17		64, 503 64, 503 71, 013 6, 069 64, 944 5, 495 3, 284, 501 3, 265, 621 3, 259, 706 5, 915 18, 880 9, 459	
DEVELOPMENT STE DELIVERABLE HARDW DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENG GROUND SUPPORT PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS	INES	346, 156 345, 529 627 2, 002 1, 003 443	431, 062 430, 281 781 2, 493 1, 249 552	427, 796 427, 021 775 2, 471 1, 238 547	411,468 410,723 745 2,378 1,192 526	411, 468 410, 723 745 2, 378 1, 192 526	277, 577 277, 075 502 1, 606 805 355	6,532 6,519 13 36 17		64, 503 64, 503 71, 013 6, 069 64, 944 5, 495 3, 284, 501 3, 265, 621 3, 259, 706 5, 915 18, 880 9, 459 4, 179	
DEVELOPMENT STE DELIVERABLE HARDW DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENG GROUND SUPPORT PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS PARTS	INES	346, 156 345, 529 627 2, 002 1, 003 443 556	431, 062 430, 281 781 2, 493 1, 249 552 692	427, 796 427, 021 775 2, 471 1, 238 547	411,468 410,723 745 2,378 1,192 526	411, 468 410, 723 745 2, 378 1, 192 526	277, 577 277, 075 502 1, 606 805 355	6,532 6,519 13 36 17		64, 503 64, 503 71, 013 6, 069 64, 944 5, 495 3, 284, 501 3, 265, 621 3, 259, 706 5, 915 18, 880 9, 459 4, 179 5, 242	

PROBABLE COST 156 INCH SRM SERIES BURN WITH TVC W/O TT (DOLLARS IN THOUSANDS)

			DDT & E			٦				DATE	15 March 1972
	ENGINEERING DESIGN AND		GROUND TEST	FLIGHT TEST		PRO	40/YEAR RATE DUCTION PROGR	AM	PRODUCTION		
	DEVELOPMENT (ED & D)	TOOLING	HARDWARE (GTH)	HARDWARE (FTH)	DDT & E TOTAL	PRODUCTION	TOOLING	FACILITIES	PROGRAM TOTAL	OPERATIONS	TOTAL PROGRAM
SRM											
PROGRAM MANAGEMENT	1,772	156	42	880	∠, 850	12, 149	1,053		13, 202	699	16, 751
SYSTEM ENGINEERING	4,630		5	1,416	6,051	6, 625			6, 625		12,676
SRM'S	40, 543	10, 359	3,842	55, 916	110, 660	2, 341, 772	26, 583		2, 368, 355		2, 479, 015
CASE	15, 188	3, 434	147	23, 969	42,738	1, 135, 031	10,840		1,145,871		1,188,609
NOZZLE	6,145	1,953	1,007	8, 426	17, 531	340, 978	1,428		342, 406		359, 937
IGNITER	563	266	11	450	1, 290	9, 157	395	<u> </u>	9, 552	L	10,842
PROPELLANT AND LINER	8, 276	1,698	1, 656	13, 843	25, 473	532, 510	3, 630		536, 140		561,613
POWER SUPPLY DISTRIBUTION	226	19	151	1, 223	1,619	49, 065	372		49, 437		51,056
FINAL ASSEMBLY	1,466	1, 719	499	3,014	6, 698	113, 400	9,918	<u> </u>	123, 318		130, 016
GROUND TEST	1,606	1,011	208		2, 825	2, 886			2, 886		5,711
AUXILIARY POWER UNIT (APU)	7,073	259	163	4, 991	12, 486	158, 745			158, 745		171, 231
THRUST TERMINATION						I					
INSTALLATION ASSEMBLY AND CHECKOUT	239		193	528	960					7, 590	8, 550
FACILITIES	6, 294		1, 946	T	8, 240	1,443		118, 612	120, 055	Γ	128, 295
SUPPORT EQUIPMENT AND SPARES	238		2,752	592	3, 582	4, 907			4,907	4,654	13, 143
FLIGHT TEST SUPPORT				617	617	8,077			8, 077		8, 694
OPERATIONS SUPPORT			124	212	336					4, 179	4,515
STRUCTURE	5,481	1, 562	2. 180	6.734	15, 955	352, 240	282		352, 522		368, 477
TRANSPORTATION			639	2, 012	2, 651	121, 223			121, 223		123, 874
					L		ļ				
				L							
						 					
TOTAL PROGRAM	59, 197	12,077	11,723	68, 905	151,902	2,848,436	27, 918	118,612	2, 994, 966	17, 122	3, 163, 990

SRM PROGRAM TIME PHASED FUNDING REQUIREMENTS PROBABLE COST SERIES WITH TVC W/O TT 40/YEAR PRODUCTION

										15 March 1972
COST ELEMENT FY	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
NONRECURRING TOTAL	323	14, 352	32, 210	48, 183	44, 903	1,040				
DDT & E	323	14, 352	32, 210	48, 183	44,903	1,040			<u> </u>	
DEVELOPMENT	323	14, 352	27, 253	22,575						
DEVELOPMENT	323	14, 352	27, 253	22, 575	L				I	
STE						, }				
DELIVERABLE HARDWARE			2,712	24, 957	43, 344				Ι	T
DUMMY ENGINES			2,712	3, 357					Ι]
FLIGHT ENGINES				21,600	43, 344					
O & FS AND SPARES	L		2, 245	651	1,559	1,040			Γ	1
RECURRING TOTAL	1					77, 583	155, 166	193, 955	277, 082	310, 330
INVESTMENT					1	77,110	154, 219	192,773	275, 390	308, 436
DELIVER NEW ENGINES						76,972	153, 944	192, 430	274, 899	307,887
GROUND SUPPORT EQUIP.					·	138	275	343	491	549
PARTS										
OPERATIONS						473	947	1,182	1, 692	1,894
FLIGHT SUPPORT						226	453	565	808	905
OPERATIONS						117	234	. 292	418	468
PARTS				1	I	130	260	325	466	521
FACILITIES	665	8, 034	1, 344			34, 270	42, 928	24, 594	16, 460	
	T			723	984	4, 859	6, 764	8, 448	12, 065	13,515
TRANSPORTATION	1	i l		1 123	1 70-1	4,009	0, 104	0,320	1 -, -, -	10,000
TRANSPORTATION TOTAL PROGRAM	988	22, 386	33, 554	48,906	45, 887	117.752	204, 858	226, 997	305, 607	323, 845
				48,906	45, 887	117. 752	204,858	226, 997	305, 607	
TOTAL PROGRAM	988	22, 386	33, 554 1985		 				305, 607 TOTAL	
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL				48,906	45, 887	117. 752	204,858	226, 997	305, 607 TOTAL 141, 011	
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E				48,906	45, 887	117. 752	204,858	226, 997	305, 607 TOTAL 141, 011 141, 011	·
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT				48,906	45, 887	117. 752	204,858	226, 997	305, 607 TOTAL 141, 011 141, 011 64, 503	
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT				48,906	45, 887	117. 752	204,858	226, 997	305, 607 TOTAL 141, 011 141, 011	
COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE				48,906	45, 887	117. 752	204,858	226, 997	305, 607 TOTAL 141, 011 141, 011 64, 503 64, 503	
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE				48,906	45, 887	117. 752	204,858	226, 997	305, 607 TOTAL 141, 011 141, 011 64, 503 64, 503 71, 013	·
COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES				48,906	45, 887	117. 752	204,858	226, 997	305, 607 TOTAL 141, 011 141, 011 64, 503 64, 503 71, 013 6, 069	·
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES				48,906	45, 887	117. 752	204,858	226, 997	305, 607 TOTAL 141, 011 141, 011 64, 503 64, 503 71, 013 6, 069 64, 944	
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES	1983	1984	1985	48, 906 1986	1987	117. 752	204, 858	226, 997	305, 607 TOTAL 141, 011 141, 011 64, 503 64, 503 71, 013 6, 069 64, 944 5, 495	
COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL	1983	1984	1985 296, 476	48, 906 1986 293, 707	45, 887 1987 290, 934	117. 752 1988 263, 227	204, 858 1989 	226, 997	305, 607 TOTAL 141, 011 141, 011 64, 503 64, 503 71, 013 6, 069 64, 944 5, 495 2, 770, 810	·
COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT	1983 304, 787 304, 929	1984 299, 247 297, 420	296, 476 294, 667	293,707 291,914	45, 887 1987 290, 934 289, 159	263, 227 261, 620	204, 858 1989 8, 316 8, 265	226, 997	305, 607 TOTAL 141, 011 141, 011 64, 503 64, 503 71, 013 6, 069 64, 944 5, 495 2, 770, 810 2, 753, 900	·
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES	304, 787 304, 929 302, 389	299, 247 297, 420 296, 891	296, 476 294, 667 294, 142	293, 707 291, 914 291, 393	290, 934 289, 159 288, 644	263, 227 261, 620 261, 154	8, 316 8, 265 8, 248	226, 997	305, 607 TOTAL 141, 011 141, 011 64, 503 64, 503 71, 013 6, 069 64, 944 5, 495 2, 770, 810 2, 753, 900 2, 748, 993	
COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP.	1983 304, 787 304, 929	1984 299, 247 297, 420	296, 476 294, 667	293,707 291,914	45, 887 1987 290, 934 289, 159	263, 227 261, 620	204, 858 1989 8, 316 8, 265	226, 997	305, 607 TOTAL 141, 011 141, 011 64, 503 64, 503 71, 013 6, 069 64, 944 5, 495 2, 770, 810 2, 753, 900	
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS	304, 787 304, 929 302, 389 540	299, 247 297, 420 296, 891 529	296, 476 294, 667 294, 142 525	293,707 291,914 291,393 521	290, 934 289, 159 288, 644 515	263, 227 261, 620 261, 154 466	8, 316 8, 263 8, 248	226, 997	305, 607 TOTAL 141, 011 141, 011 64, 503 64, 503 71, 013 6, 069 64, 944 5, 495 2, 770, 810 2, 753, 900 2, 748, 993 4, 907	
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS	304, 787 304, 929 302, 389 540	299, 247 297, 420 296, 891 529	296, 476 294, 667 294, 142 525	293, 707 291, 914 291, 393 521	290, 934 289, 159 288, 644 515	263, 227 261, 620 261, 154 466	8, 316 8, 265 8, 248 15	226, 997	305, 607 TOTAL 141, 011 141, 011 64, 503 64, 503 71, 013 6, 069 64, 944 5, 495 2, 770, 810 2, 753, 900 2, 748, 993 4, 907	·
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS FLIGHT SUPPORT	304, 787 302, 929 302, 389 540 1, 858 886	299, 247 299, 420 296, 891 529 1, 827 873	296, 476 294, 667 294, 142 525 1, 809 864	293, 707 291, 914 291, 393 521 1, 7 13 857	290, 934 289, 159 288, 644 515	263, 227 261, 620 261, 154 466 1, 607	8, 316 8, 263 8, 248 15	226, 997	305, 607 TOTAL 141, 011 141, 011 64, 503 64, 503 71, 013 6, 069 64, 944 5, 495 2, 770, 810 2, 753, 900 2, 748, 993 4, 907	·
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS	304, 787 302, 929 302, 389 540 1, 858 886 461	299, 247 299, 247 297, 420 296, 891 529 1, 827 873 451	296, 476 294, 667 294, 142 525 1, 809 864 447	293,707 291,914 291,393 521 1,-33 857 443	290, 934 289, 159 288, 644 515 1, 77- 848 139	263, 227 261, 620 261, 154 466 1, 607 67	8, 316 8, 265 8, 248 15	226, 997	305, 607 TOTAL 141, 011 141, 011 64, 503 64, 503 71, 013 6, 069 64, 944 5, 495 2, 770, 810 2, 753, 900 2, 748, 993 4, 907 15, 910 8, 077 4, 179	
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS PARTS	304, 787 302, 929 302, 389 540 1, 858 886	299, 247 299, 420 296, 891 529 1, 827 873	296, 476 294, 667 294, 142 525 1, 809 864	293, 707 291, 914 291, 393 521 1, 7 13 857	290, 934 289, 159 288, 644 515	263, 227 261, 620 261, 154 466 1, 607	8, 316 8, 263 8, 248 15	226, 997	305, 607 TOTAL 141, 011 141, 011 64, 503 64, 503 71, 013 6, 069 64, 944 5, 495 2, 770, 810 2, 753, 900 2, 748, 993 4, 907 15, 910 8, 077 4, 179 4, 654	
TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS	304, 787 302, 929 302, 389 540 1, 858 886 461	299, 247 299, 247 297, 420 296, 891 529 1, 827 873 451	296, 476 294, 667 294, 142 525 1, 809 864 447	293,707 291,914 291,393 521 1,-33 857 443	290, 934 289, 159 288, 644 515 1, 77- 848 139	263, 227 261, 620 261, 154 466 1, 607 67	8, 316 8, 265 8, 248 15	226, 997	305, 607 TOTAL 141, 011 141, 011 64, 503 64, 503 71, 013 6, 069 64, 944 5, 495 2, 770, 810 2, 753, 900 2, 748, 993 4, 907 15, 910 8, 077 4, 179	

PROBABLE COST 156 INCH SRM SERIES BURN WITH TVC W/O TT (DOLLARS IN THOUSANDS)

						_					
			DDT & E			1				DATE	15 March 1972
	DESIGN AND DEVELOPMENT		GROUND TEST HARDWARE	FLIGHT TEST HARDWARE	DDT & E	PRO	20/YEAR RATE DUCTION PROGR	АМ	PRODUCTION PROGRAM		TOTAL
	(ED & D)	TOOLING	(GTH)	(FTH)	TOTAL	PRODUCTION	TOOLING	FACILITIES	TOTAL	OPERATIONS	PROGRAM
SRM										-	
PROGRAM MANAGEMENT	1,772	156	42	880	2, 850	10, 327	895		11,222	699	14, 771
SYSTEM ENGINEERING	4, 630		5	1,416	6, 051	5, 632			5, 632		11,683
SRM'S	40, 543	10, 359	3,842	55,916	110,660	1,440,625	24, 507		1,465,132		1, 575, 792
CASE	15, 188	3, 434	147	23,969	42, 738	696, 819	10,287	1	707, 106		749, 844
NOZZLE	6, 145	1,953	1,007	8, 426	17, 531	207, 192	1,324		208, 516		226, 047
IGNITER	563	266	- 11	450	1,290	5, 118	349		5, 467		6,757
PROPELLANT AND LINER	8, 276	1,698	1, 656	13,843	25, 473	305, 352	3, 250		308, 602		334,075
POWER SUPPLY DISTRIBUTION	226	19	151	1,223	1,619	33, 989	340		34, 329		35,948
FINAL ASSEMBLY	1,466	1,719	499	3,014	6, 698	80, 473	8,957		89,430		96, 128
GROUND TEST	1,606	1,011	208		2, 825	1,994		1	1,994		4,819
AUXILIARY POWER UNIT (APU)	7,073	259	163	4,991	12, 486	109,688	L		109, 688		122, 174
THRUST TERMINATION											
INSTALLATION ASSEMBLY AND CHECKOUT	239		193	528	960					6, 300	7, 260
FACILITIES	6, 294		1,946		8, 240	1, 443		72, 532	73, 975		82, 215
SUPPORT EQUIPMENT AND SPARES	238		2, 752	592	3, 582	4,121			4, 121	3,870	11,573
FLIGHT TEST SUPPORT				617	617	6,542			6, 542		7, 159
OPERATIONS SUPPORT			124	212	336					3, 678	4, 014
STRUCTURE	5, 481	1,562	2, 180	6, 732	15, 955	227, 191	280		227, 471		243, 426
TRANSPORTATION			639	2,012	2,651	73, 401			73, 401		76, 052
									L		
					L						
								4			
			<u> </u>	<u> </u>	<u> </u>	<u> </u>		<u> </u>			
TOTAL PROGRAM	_59, 197	12.077	11,723	68, 905	151, 902	1,769,282	25, 682	72, 532	1,867,496	14, 547	2, 033, 945

SRM PROGRAM TIME PHASED FUNDING REQUIREMENTS PROBABLE COSTS SERIES WITH TVC W/O TT 20/YEAR PRODUCTION (DOLLARS IN THOUSANDS)

DATE 15 March 1972

									DATE	_13 Watch 1772
COST ELEMENT FY	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
NONRECURRING TOTAL	323	14,352	32, 210	48, 183	44,903	1,040				
DDT & E	323	14, 352	32, 210	48, 183	44,903	1,040_				
DEVELOPMENT	323	14, 352	27, 253	22, 575						
DEVELOPMENT	323	14,352	27, 253	22, 575						
STE										
DELIVERABLE HARDWARE			2,712	24,957	43, 344					
DUMMY ENGINES			2,712	3, 357						
FLIGHT ENGINES				21,600	43, 344					
O & FS AND SPARES			2, 245	651	1,559	1,040				
RECURRING TOTAL						83, 265	166, 529	180, 404	180, 404	178, 671
INVESTMENT						82,588	165, 176	178, 939	178, 939	177, 219
DELIVER NEW ENGINES						82, 390	164,780	178, 511	178, 511	176, 795
GROUND SUPPORT EQUIP.						198	396	428	428	424
PARTS										
OPERATIONS						677	1,353	1, 465	1,465	1,452
FLIGHT SUPPORT						315	628	680	680	674
OPERATIONS						176	353	383	383	379
PARTS						186	372	402	402	399
FACILITIES	665	8, 034	1, 344			22, 548	31,554	18,070		
TRANSPORTATION				723	984	4,712	7,020	7,613	7, 613	7,537
TOTAL PROGRAM	988	22, 386	33, 554	48, 906	45, 887	111,565	205, 103	206, 087	188, 017	186, 208
COST ELEMENT FY	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL	1
NONRECURRING TOTAL	1000	1001			130.	1000		1	141,011	1
DDT & E									141,011	1
DEVELOPMENT									64, 503	1
DEVELOPMENT									64, 503	1
STE										1
DELIVERABLE HARDWARE							· · ·		71,013	1
DUMMY ENGINES									6, 069	1
FLIGHT ENGINES									64, 944	1
O & FS AND SPARES									5, 495	1
RECURRING TOTAL	175, 201	171,732	169, 998	166, 529	164,792	88, 468	8, 674		1,734,667	1
INVESTMENT	173, 778	170, 337	168, 617	165, 176	163, 454	87,750	8,604		1,720,577	1
DELIVER NEW ENGINES	173, 362	169, 929	168, 213	164,780	163, 063	87,539	8,583		1, 716, 456	1
GROUND SUPPORT EQUIP.	416	408	404	396	391	211	21		4, 121	1
PARTS		- 100								1
OPERATIONS	1,423	1, 395	1,381	1,353	1,338	718	70		14, 090	
FLIGHT SUPPORT	660	648	642	628	621	333	33		6, 542	}
OPERATIONS	372	364	360	353	349	188	18		3, 678	
PARTS	391	383	379	372	368	197	19		3, 870]
FACILITIES								1		1
								L	82, 215	1
TRANSPORTATION	7, 385	7, 240	7, 164	7,020	6, 951	3,727	363		82, 215 76, 052	
	7, 385 182, 586	7, 240 178, 972	7, 164 177, 162	7,020 173,549	6,951 171.743	3,727 92.195	363			

PROBABLE COST 156 INCH SRM SERIES BURN WITH TVC W/O TT (DOLLARS IN THOUSANDS)

	r					٦				DATE	15 March 1972
	ENGINEERING DESIGN AND		DDT & E GROUND TEST	FLIGHT TEST		PRO	10/YEAR RATE DDUCTION PROGR	AM	PRODUCTION	DATE	
	DEVELOPMENT (ED & D)	TOOLING	HARDWARE (GTH)	HARDWARE (FTH)	DDT & E TOTAL	PRODUCTION	TOOLING	FACILITIES	PROGRAM TOTAL	OPERATIONS	TOTAL PROGRAM
SRM											
PROGRAM MANAGEMENT	_1,772	156	42	880	2, 850	10, 327	895		11, 222	699	14, 771
SYSTEM ENGINEERING	4,630		5	1,416	6, 051	5-632			5, 632		11,683
SRM'S	40, 543	10, 359	3, 842	55, 916	110,660	-764, 221	13.544		777.765		888, 425
CASE	15, 188	3, 434	147	23,969	42, 738	375, 169	5, 436		380,605		423, 343
NOZZLE	6, 145	1,953	1,007	8,426	17, 531	110, 332	759		111,091		128, 622
IGNITER	563	266	11	450	1, 290	3, 108	197		3, 305		4,595
PROPELLANT AND LINER	8, 276	1,698	1,656	13,843	25, 473	165, 910	1,867		167, 777		193, 250
POWER SUPPLY DISTRIBUTION	226	19	151	1,223	1, 619	16, 054	197		16, 251		17,870
FINAL ASSEMBLY	1,466	1,719	499	3,014	6, 698	41, 339	5, 088		46, 427		53, 125
GROUND TEST	1, 606	1,011	208		2, 825	935			935		3, 760
AUXILIARY POWER UNIT (APU)	7,073	259	163	4, 991	12, 486	51, 374			51, 374		63, 860
THRUST TERMINATION											
INSTALLATION ASSEMBLY AND CHECKOUT	239		193	528	960					5, 229	6, 189
FACILITIES	6, 294		1,946		8, 240	1, 443		58, 983	60, 426		68, 666
SUPPORT EQUIPMENT AND SPARES	238		2, 752	592	3, 582	3, 461			3, 461	3, 212	10, 255
FLIGHT TEST SUPPORT				617	617	5, 299			5, 299		5, 916
OPERATIONS SUPPORT			124	212	336				<u> </u>	3, 237.	3, 573
STRUCTURE	5, 481	1,562	2, 180	6,732	15, 955	121,428	280		121,708		137, 663
TRANSPORTATION			639	2,012	2, 651	39, 231			39, 231		41,882
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				<u> </u>		 			ļ		
TOTAL PROGRAM	59, 197	12,077	11,723	68,905	151,902	951, 042	14,719	58, 983	1.024.744	12, 377	1, 189, 023

SRM PROGRAM TIME PHASED FUNDING REQUIREMENTS PROBABLE COSTS SERIES WITH TVC W/O TT 10/YEAR PRODUCTION

				(DOLLARS	IN THOUSANDS)				DATE	1 <u>15 March 1972</u>
COST ELEMENT FY	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
NONRECURRING TOTAL	323	14, 352	32, 210	48, 183	44, 903	1,040				
DDT & E	323	14, 352	32, 210	48, 183	44,903	1,040				
DEVELOPMENT	323_	14, 352	27, 253	22, 575						
DEVELOPMENT	323	14, 352	27, 253	22, 575				İ		
STE										
DELIVERABLE HARDWARE			2,712	24, 957	43, 344					
DUMMY ENGINES			2,712	3, 357						
FLIGHT ENGINES				21,600	43, 344					
O & FS AND SPARES			2, 245	651	1, 559	1,040				
RECURRING TOTAL						83, 436	92, 809	92,809	91,871	90,935
INVESTMENT						82, 390	91,646	91,646	90,720	89,795
DELIVER NEW ENGINES						82, 081	91,303	91,303	90, 382	89,459
GROUND SUPPORT EQUIP.						309	343	343	338	336
PARTS										
OPERATIONS						1,046	1,163	1, 163	1,151	1,140
FLIGHT SUPPORT						473	524	524	519	514
OPERATIONS						288	321	321	317	314
PARTS						285	318	318	315	312
FACILITIES	665	8, 034	1,344			24, 839	33,784		T	
TRANSPORTATION				723	984	4,618	3,866	3, 866	3,823	3,786
TOTAL PROGRAM	988	22, 386	33, 554	48,906	45, 887	113, 933	130, 459	96, 675	95, 694	94,721
COST ELEMENT FY	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL]
NONRECURRING TOTAL	į.							}	141,011	i
									·	1
DDT & E									141,011	-
									141, 011 64, 503	
DDT & E DEVELOPMENT DEVELOPMENT									141,011	
DDT & E DEVELOPMENT									141, 011 64, 503	
DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE									141, 011 64, 503 64, 503 71, 013	
DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES									141, 011 64, 503 64, 503 71, 013 6, 069	
DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES									141, 011 64, 503 64, 503 71, 013 6, 069 64, 944	
DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES	99 998	97 193	86 246	85 309	R3, 434		4.685		141, 011 64, 503 64, 503 71, 013 6, 069 64, 944 5, 495	
DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL	89, 998	87, 183	86, 246	85, 309 84, 240	83, 434	48,749	4, 685		141, 011 64, 503 64, 503 71, 013 6, 069 64, 944 5, 495 937, 464	
DDT & E DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT	88, 869	86.092	85, 165	84, 240	82, 389	48,749 48,137	4, 627		141, 011 64, 503 64, 503 71, 013 6, 069 64, 944 5, 495 937, 464 925, 716	
DDT & E DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES	88, 869 88, 536	86, 092 85, 770	85, 165 84, 847	84, 240 83, 925	82, 389 82, 081	48,749 48,137 47,957	4, 627 4, 611		141, 011 64, 503 64, 503 71, 013 6, 069 64, 944 5, 495 937, 464 925, 716 922, 255	
DDT & E DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP.	88, 869	86.092	85, 165	84, 240	82, 389	48,749 48,137	4, 627		141, 011 64, 503 64, 503 71, 013 6, 069 64, 944 5, 495 937, 464 925, 716	
DDT & E DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS	88, 869 88, 536 333	86, 092 85, 770 322	85, 165 84, 847 318	84, 240 83, 925 315	82, 389 82, 081 308	48,749 48,137 47,957 180	4, 627 4, 611 16		141, 011 64, 503 64, 503 71, 013 6, 069 64, 944 5, 495 937, 464 925, 716 922, 255 3, 461	
DDT & E DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS	88, 869 88, 536 333 1, 129	86, 092 85, 770 322 1, 091	85, 165 84, 847 318	84, 240 83, 925 315	82, 389 82, 081 308	48,749 48,137 47,957 180	4, 627 4, 611		141, 011 64, 503 64, 503 71, 013 6, 069 64, 944 5, 495 937, 464 925, 716 922, 255 3, 461	
DDT & E DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS FLIGHT SUPPORT	88, 869 88, 536 333 1, 129 509	86, 092 85, 770 322 1, 091 492	85, 165 84, 847 318 1, 081 488	84, 240 83, 925 315	82, 389 82, 081 308	48,749 48,137 47,957 180	4, 627 4, 611 16		141, 011 64, 503 64, 503 71, 013 6, 069 64, 944 5, 495 937, 464 925, 716 922, 255 3, 461	
DDT & E DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS	88, 869 88, 536 333 1, 129 509 311	86, 092 85, 770 322 1, 091 492 301	85, 165 84, 847 318 1, 081 488 297	84, 240 83, 925 315 1, 069 482	82, 389 82, 081 308 1, 045 472	48,749 48,137 47,957 180 612 276	4, 627 4, 611 16 58 26		141, 011 64, 503 64, 503 71, 013 6, 069 64, 944 5, 495 937, 464 925, 716 922, 255 3, 461 11, 748 5, 299	
DDT & E DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS PARTS	88, 869 88, 536 333 1, 129 509	86, 092 85, 770 322 1, 091 492	85, 165 84, 847 318 1, 081 488	84, 240 83, 925 315 1, 069 482 295	82, 389 82, 081 308 1, 045 472 288	48,749 48,137 47,957 180 612 276 169	4,627 4,611 16 58 26		141, 011 64, 503 64, 503 71, 013 6, 069 64, 944 5, 495 937, 464 925, 716 922, 255 3, 461 11, 748 5, 299 3, 237 3, 212	
DDT & E DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS	88, 869 88, 536 333 1, 129 509 311	86, 092 85, 770 322 1, 091 492 301	85, 165 84, 847 318 1, 081 488 297	84, 240 83, 925 315 1, 069 482 295	82, 389 82, 081 308 1, 045 472 288	48,749 48,137 47,957 180 612 276 169	4,627 4,611 16 58 26		141, 011 64, 503 64, 503 71, 013 6, 069 64, 944 5, 495 937, 464 925, 716 922, 255 3, 461 11, 748 5, 299 3, 237	

5.2.2.2 Ceiling Cost

5.2.2.1 Ceiling Cost with TVC and W/O TT

CEILING COST 156 INCH SRM SERIES BURN WITH TVC/WO TT (DOLLARS IN THOUSANDS)

		· · · · · · · · · · · · · · · · · · ·									
						DATE	15 March 19				
	ENGINEERING DESIGN AND		GROUND TEST	FLIGHT TEST		PRO	OVEAR RATE DUCTION PROGR	A.M.	PRODUCTION		
	DEVELOPMENT (ED & D)	TOOLING	HARDWARE (GTH)	HARDWARE (FTH)	DDT & E TOTAL	PRODUCTION	TOOLING	FACILITIES	PROGRAM TOTAL	OPERATIONS	TOTAL PROGRAM
SRM								ļ			
PROGRAM MANAGEMENT	1,848	163	44	918	2, 973	13, 183	1,142		14, 325	759	18, 057
SYSTEM ENGINEERING	4, 828		5	1,476	6, 309	7, 189			7, 189		13, 498
SRM'S	46, 605	13,305	4, 375	64, 198	128, 483	3, 669, 372	38,910		3, 708, 282		3, 836, 765
CASE	18, 237	4,731	153	28, 997	52, 118	1, 866, 426	17, 398		1, 883, 824		1,935,942
NOZZLE	7,457	2,336	1, 280	10, 596	21,669	518, 560	1,905		520, 465		542, 134
IGNITER	587	289	11	469	1, 356	11,318	467		11,785		13, 141
PROPELLANT AND LINER	9, 279	2, 320	1,847	14, 174	27,620	862, 455	5, 873		868, 328		895, 948
POWER SUPPLY DISTRIBUTION	236	26	157	1,275	1,694	61, 324	425		61,749		63, 443
FINAL ASSEMBLY	1,759	2,042	540	3, 483	7, 824	144, 134	12,842		156, 976		164, 800
GROUND TEST	1, 675	1, 291	217		3, 183	4, 637			4, 637		7, 820
AUXILIARY POWER UNIT (APU)	7, 375	270	170	5, 204	13,019	200, 518	-		200, 518		213,537
THRUST TERMINATION											L
INSTALLATION ASSEMBLY AND CHECKOUT	249		201	551	1,001					8, 932	9,933
FACILITIES	6, 564		2,029		8, 593	1,748		146, 092	147, 840	·	156, 433
SUPPORT EQUIPMENT AND SPARES	248		2,869	617	3, 734	6, 418			6, 418	5, 688	15, 840
FLIGHT TEST SUPPORT				643	643	10, 264			10, 264		10,907
OPERATIONS SUPPORT			129	221	350					4,535	4, 885
STRUCTURE	5,715	1,629	2, 273	7, 019	16, 636	477,760	303		478, 063		494, 699
TRANSPORTATION			666	2, 098	2,764	154, 090			154,090		156, 854
									1		
									1	<u> </u>	<u> </u>
TOTAL PROGRAM	66, 057	15, 097	12, 591	77, 741	171, 486	4, 340, 024	40, 355	146, 092	4, 526, 471	19,914	4.717.871

SRM PROGRAM TIME PHASED FUNDING REQUIREMENTS

CEILING COST 156 INCH SRM SERIES BURN WITH TVC W/O TT 60/YEAR PRODUCTION RATE

(DOLLARS IN THOUSANDS) DATE _15_March 1972. COST ELEMENT 1973 1974 FY 1975 1976 1977 1978 1979 1980 1981 1982 NONRECURRING TOTAL 370 36,636 16,486 54, 799 50,754 1,084 DDT & E 16,486 36,636 54,799 1,084 370 50, 754 DEVELOPMENT 31,304 370 16,486 25,933 DEVELOPMENT 370 16,486 31,304 25,933 STE DELIVERABLE HARDWARE 2,992 28, 188 49,128 DUMMY ENGINES 2,992 3,705 FLIGHT ENGINES 24, 483 49,128 O & FS AND SPARES 2,340 678 1,626 1,084 RECURRING TOTAL 97,623 191,001 237,690 335, 312 377,756 97, 152 190,078 236, 542 333, 693 375,933 INVESTMENT 97,004 189,790 236, 183 333, 186 375, 362 DELIVER NEW ENGINES GROUND SUPPORT EQUIP. 148 288 359 507 571 PARTS 47 I 923 1,148 1,619 1,823 OPERATIONS 236 FLIGHT SUPPORT 462 575 811 913 104 OPERATIONS 204 254 358 404 131 257 319 450 506 PARTS 24,842 34, 587 19,820 19,914 FACILITIES 720 8,698 1,455 13, 250 784 1,067 4,941 6,917 8,596 12, 140 13,662 TRANSPORTATION

232,505

266, 106

360,702

411,332

TOTAL PROGRAM	1,070	23, 101	30, 071	33,303	31,051	100, 170	254,505	200, 100	500,102
COST ELEMENT FY	1983	1984	1985	1986	1987	1988	1989_	1990	TOTAL
NONRECURRING TOTAL									160, 129
DDT & E									160, 129
DEVELOPMENT									74,093
DEVELOPMENT									74, 093
STE									
DELIVERABLE HARDWARE									80, 308
DUMMY ENGINES									6,697
FLIGHT ENGINES									73, 611
O & FS AND SPARES									5, 728
RECURRING TOTAL	449, 912	560, 268	556, 022	534, 801	534, 801	360, 779	8,490		4, 244, 455
INVESTMENT	447,740	557, 564	553, 340	532, 220	532, 220	359,037	8, 449		4, 223, 968
DELIVER NEW ENGINES	447,060	556, 717	552, 499	531,411	531,411	358, 492	8, 435		4,217,550
GROUND SUPPORT EQUIP.	680	847	841	809	809	545	14		6, 418
PARTS									
OPERATIONS	2, 172	2, 704	2, 682	2,581	2,581	1,742	41		20, 487
FLIGHT SUPPORT	1,088	1,355	1,344	1,293	1, 293	873	21		10, 264
OPERATIONS	481	599	594	571	571	385	10		4,535
PARTS	603	750	744	717	717	484	10		5, 688
FACILITIES	19,897	13, 250							156, 433
TRANSPORTATION	16, 281	20, 266	20, 124	19, 356	19, 356	13,050	314		156, 854
TOTAL PROGRAM	486, 090	593, 784	576, 146	554, 157	554, 157	373, 829	8, 804		4,717,871

55, 583

51,821

128, 490

TOTAL PROGRAM

1,090

25, 184

38,091

CEILING COST 156 INCH SRM SERIES BURN WITH TVC/WO TT (DOLLARS IN THOUSANDS)

			DDT & E			Ⴂ			DATE 15 March 197		
	ENGINEERING DESIGN AND DEVELOPMENT		GROUND TEST HARDWARE	FLIGHT TEST HARDWARE	DDT & E	PR	40/YEAR RATE ODUCTION PROGE	АМ	PRODUCTION PROGRAM TOTAL		TOTAL
	(ED & D)	TOOLING	(GTH)	(FTH)	TOTAL	PRODUCTION	TOOLING	FACILITIES		OPERATIONS	PROGRAM
SRM											
PROGRAM MANAGEMENT	1,848	163	44	918	2, 973	13, 183	1, 142		14, 325	759	18, 057
SYSTEM ENGINEERING	4, 828		5	1,476	6, 309	7, 189			7,189		13, 498
SRM'S	46,605	13, 305	4,375	64, 198	128, 483	3, 130, 105	33,636		3, 163, 741		3, 292, 224
CASE	18, 237	4,731	153	28, 997	52, 118	1,590,948	15, 180		1, 606, 128		1, 658, 246
NOZZLE	7,457	2, 336	1, 280	10,596	21,669	441,582	1,848		443, 430		465,099
IGNITER	587	289	11	469	1, 356	9,936	429		10, 365		11,721
PROPELLANT AND LINER	9, 279	2, 320	1,847	14, 174	27,620	735, 970	5,015	<u> </u>	740, 985		768, 605
POWER SUPPLY DISTRIBUTION	236	26	157	1, 275	1,694	53, 240	403		53, 643		55, 337
FINAL ASSEMBLY	1,759	2,042	540	3, 483	7, 824	123, 048	10,761		133, 809		141,633
GROUND TEST	1,675	1, 291	217		3, 183	3, 132			3, 132		6, 315
AUXILIARY POWER UNIT (APU)	7, 375	270	170	5, 204	13, 019	172, 249			172, 249		185, 268
THRUST TERMINATION									<u> </u>	<u> </u>	<u> </u>
INSTALLATION ASSEMBLY AND CHECKOUT	249		201	551	1,001					8, 236	9, 237
FACILITIES	6, 564		2, 029		8, 593	1, 566		128,702	130, 268		138, 861
SUPPORT EQUIPMENT AND SPARES	248		2,869	617	3, 734	5, 324			5, 324	5, 050	14, 108
FLIGHT TEST SUPPORT				643	643	8,764	·		8,764		9,407
OPERATIONS SUPPORT			129	221	350					4, 535	4,885
STRUCTURE	5, 715	1,629	2, 273	7,019	16, 636	382, 208	303		382, 511		399, 147
TRANSPORTATION			666	2, 098	2, 764	131, 535			131,535		134, 299
											
TOTAL PROGRAM	66,057	15,097	12,591	77, 741	171, 486	3, 679, 874	35,081	128, 702	3, 843, 657	18, 580	4, 033, 723

SRM PROGRAM TIME PHASED FUNDING REQUIREMEN 18 CEILING COST 156 INCH SRM SERIES BURN WITH TVC W/O TT 40/YEAR PRODUCTION RATE (DOLLARS IN THOUSANDS)

DATE 15 March 1972

COST ELEMENT FY	1973	1974	1975	1976	1977	1978	1979	±98∪	1981	1982
NONRECURRING TOTAL	370	16, 486	36, 636	54, 799	50, 754	1, 084				
DDT & E	370	16, 486	36, 636	54, 799	50,754	1,084				
DEVELOPMENT	370	16, 486	31, 304	25, 933						
DEVELOPMENT	370	16, 486	31, 304	25,933						
STE										
DELIVERABLE HARDWARE			2, 992	28, 188	49, 128					
DUMMY ENGINES			2, 992	3,705			·			
FLIGHT ENGINES				24, 483	49,128					
O & FS AND SPARES			2, 340	678	1,626	1,084				
RECURRING TOTAL						100, 789	201,575	251, 966	359, 948	403, 145
INVESTMENT						100, 299	200, 597	250,746	358, 208	401, 193
DELIVER NEW ENGINES						100, 149	200, 299	250, 373	357, 676	400, 597
GROUND SUPPORT EQUIP.		****	.,			150	298	373	532	596
PARTS									1	1
OPERATIONS						490	978	1,220	1,740	1,952
FLIGHT SUPPORT						245	492	613	876	983
OPERATIONS						104	204	254	358	404
PARTS						141	282	353	506	565
FACILITIES	720	8, 698	1, 455			37, 089	46, 463	26, 620	17,816	
TRANSPORTATION				784	1, 067	5, 267	7,333	9, 159	13, 081	14, 652
TOTAL PROGRAM	1,090	25, 184	38, 091	55, 583	51, 821	144, 229	255, 371	287, 745	390, 845	417, 797
							•			
COST FLEMENT EV	1983	1984	1005	1006	1007	1088	1989	1090	TOTAL]
COST ELEMENT FY NONRECURRING TOTAL	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL 160, 129	
NONRECURRING TOTAL	1983	1984	1985	1986	1987	1988	1989	1990	160, 129	
NONRECURRING TOTAL DDT & E	1983	1984	1985	1986	1987	1988	1989	1990	160, 129 160, 129	
NONRECURRING TOTAL DDT & E DEVELOPMENT	1983	1984	1985	1986	1987	1988	1989	1990	160, 129 160, 129 74, 093	
NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT	1983	1984	1985	1986	1987	1988	1989	1990	160, 129 160, 129	
NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE	1983	1984	1985	1986	1987	1988	1989	1990	160, 129 160, 129 74, 093 74, 093	
NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE	1983	1984	1985	1986	1987	1988	1989	1990	160, 129 160, 129 74, 093 74, 093	
NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES	1983	1984	1985	1986	1987	1988	1989	1990	160, 129 160, 129 74, 093 74, 093 80, 308 6, 697	
NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES	1983	1984	1985	1986	1987	1988	1989	1990	160, 129 160, 129 74, 093 74, 093 80, 308 6, 697 73, 611	·
NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES								1990	160, 129 160, 129 74, 093 74, 093 80, 308 6, 697 73, 611 5, 728	·
NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL	396, 027	388, 956	385, 355	381,738	378, 140	341,996	10,799	1990	160, 129 160, 129 74, 093 74, 093 80, 308 6, 697 73, 611 5, 728 3, 600, 434	·
NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT	396, 027 394, 030	388, 956 386, 864	385, 355 383, 282	381,738 379,702	378, 140 376, 119	341, 996 340, 298	10,799	1990	160, 129 160, 129 74, 093 74, 093 80, 308 6, 697 73, 611 5, 728 3, 600, 434 3, 582, 085	·
NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES	396, 027 394, 030 393, 444	388, 956 386, 864 386, 290	385, 355 383, 282 382, 713	381,738 379,702 379,137	378, 140 376, 119 375, 560	341, 996 340, 298 339, 792	10,799 10,747 10,731	1990	160, 129 160, 129 74, 093 74, 093 80, 308 6, 697 73, 611 5, 728 3, 600, 434 3, 582, 085 3, 576, 761	·
NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP.	396, 027 394, 030	388, 956 386, 864	385, 355 383, 282	381,738 379,702	378, 140 376, 119	341, 996 340, 298	10,799	1990	160, 129 160, 129 74, 093 74, 093 80, 308 6, 697 73, 611 5, 728 3, 600, 434 3, 582, 085	·
NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS	396, 027 394, 030 393, 444 586	388, 956 386, 864 386, 290 574	385, 355 383, 282 382, 713 569	381,738 379,702 379,137 565	378, 140 376, 119 375, 560 559	341, 996 340, 298 339, 792 506	10, 799 10, 747 10, 731 16	1990	160, 129 160, 129 74, 093 74, 093 80, 308 6, 697 73, 611 5, 728 3, 600, 434 3, 582, 085 3, 576, 761 5, 324	·
NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS	396, 027 394, 030 393, 444 586	388, 956 386, 864 386, 290 574 2, 092	385, 355 383, 282 382, 713 569	381,738 379,702 379,137 565	378, 140 376, 119 375, 560 559 2, 021	341, 996 340, 298 339, 792 506	10, 799 10, 747 10, 731 16	1990	160, 129 160, 129 74, 093 74, 093 80, 308 6, 697 73, 611 5, 728 3, 600, 434 3, 582, 085 3, 576, 761 5, 324 18, 349	·
NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS FLIGHT SUPPORT	396, 027 394, 030 393, 444 586 1, 997 961	388, 956 386, 864 386, 290 574 2, 092 947	385, 355 383, 282 382, 713 569 2, 073 938	381,738 379,702 379,137 565 2,036 930	378, 140 376, 119 375, 560 559 2, 021 920	341, 996 340, 298 339, 792 506 1, 698 833	10, 799 10, 747 10, 731 16 52 26	1990	160, 129 160, 129 74, 093 74, 093 80, 308 6, 697 73, 611 5, 728 3, 600, 434 3, 582, 085 3, 576, 761 5, 324 18, 349 8, 764	·
NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS	396, 027 394, 030 393, 444 586 1, 997 961 481	388, 956 386, 864 386, 290 574 2, 092 947 599	385, 355 383, 282 382, 713 569 2, 073 938 594	381,738 379,702 379,137 565 2,036 930 571	378, 140 376, 119 375, 560 559 2, 021 920 571	341, 996 340, 298 339, 792 506 1, 698 833 385	10, 799 10, 747 10, 731 16 52 26 10	1990	160, 129 160, 129 74, 093 74, 093 80, 308 6, 697 73, 611 5, 728 3, 600, 434 3, 582, 085 3, 576, 761 5, 324 18, 349 8, 764 4, 535	·
NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS PARTS	396, 027 394, 030 393, 444 586 1, 997 961	388, 956 386, 864 386, 290 574 2, 092 947	385, 355 383, 282 382, 713 569 2, 073 938	381,738 379,702 379,137 565 2,036 930	378, 140 376, 119 375, 560 559 2, 021 920	341, 996 340, 298 339, 792 506 1, 698 833	10, 799 10, 747 10, 731 16 52 26	1990	160, 129 160, 129 74, 093 74, 093 80, 308 6, 697 73, 611 5, 728 3, 600, 434 3, 582, 085 3, 576, 761 5, 324 18, 349 8, 764 4, 535 5, 050	
NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS	396, 027 394, 030 393, 444 586 1, 997 961 481	388, 956 386, 864 386, 290 574 2, 092 947 599	385, 355 383, 282 382, 713 569 2, 073 938 594	381,738 379,702 379,137 565 2,036 930 571	378, 140 376, 119 375, 560 559 2, 021 920 571	341, 996 340, 298 339, 792 506 1, 698 833 385	10, 799 10, 747 10, 731 16 52 26 10	1990	160, 129 160, 129 74, 093 74, 093 80, 308 6, 697 73, 611 5, 728 3, 600, 434 3, 582, 085 3, 576, 761 5, 324 18, 349 8, 764 4, 535	·

CEILING COST 156 INCH SRM SERIES BURN WITH TVC/WO TT (DOLLARS IN THOUSANDS)

				(D IIV THOUSINGEDS)	_					
			DDT & E			1				DATE	E <u>15 March 1972</u>
	ENGINEERING DESIGN AND DEVELOPMENT	1	GROUND TEST HARDWARE	FLIGHT TEST HARDWARE	DDT & E		20/YEAR RATE RODUCTION PROGR		PRODUCTION PROGRAM		TOTAL
	(ED & D)	TOOLING	(GTH)	(FTH)	TOTAL	PRODUCTION	TOOLING	FACILITIES	TOTAL	OPERATIONS	PROGRAM
SRM				<u> </u>	1						
PROGRAM MANAGEMENT	1,848	163	44	918	2, 973	11, 205	971		12, 176	759	15,908
SYSTEM ENGINEERING	4, 828		5	1,476	6,309	6, 111			6, 111		12, 420
SRM'S	46.605	13,305	4, 375	64, 198	128, 483	1,901,490	30,998		1, 932, 488		2, 060, 971
CASE	18, 237	4,731	153	28,997	52, 118	964,510	13,990	Τ	978, 500		1, 030, 618
NOZZLE	7.457	2, 336	1, 280	10, 596	21, 669	267, 523	1,703		269, 226		290, 895
IGNITER	587	289	11	469	1, 356	5, 537	395		5, 932		7, 288
PROPELIANT AND LINER	9, 279	2, 320	1,847	14, 174	27,620	418,738	4,622		423, 360		450,980
POWER SUPPLY DISTRIBUTION	236	26	157	1, 275	1,694	36, 878	371		37, 249		38, 943
FINAL ASSEMBLY	1,759	2,042	540	3, 483	7, 824	87, 121	9, 917		97, 038		104, 862
GROUND TEST	1,675	1,291	217		3, 183	2, 164			2, 164		5, 347
AUXILIARY POWER UNIT (APU)	7, 375	270	170	5, 204	13, 019	119, 019			119,019		132, 038
THRUST TERMINATION											
INSTALLATION ASSEMBLY AND CHECKOUT	249		201	551	1,001					6, 836	7,837
FACILITIES	6,564		2,029		8, 593	1,566		78, 702	80, 268		88, 861
SUPPORT EQUIPMENT AND SPARES	248		2,869	617	3,734	4, 472			4, 472	4, 199	12, 405
FLIGHT TEST SUPPORT				643	643	7, 099			7, 099		7, 742
OPERATIONS SUPPORT			129	221	350					3, 991	4, 341
STRUCTURE	5,715	1,629	2, 273	7,019	16, 636	246, 519	303		246, 822 -		263, 458
TRANSPORTATION			666	2, 098	2, 764	79, 645			79, 645		82, 409
	T										
	T										
		1							<u> </u>		
	'	<u> </u>		⊥′	1						
TOTAL PROGRAM	66, 057	15, 097	12,591	77,741	171,486	2, 258, 107	32, 272	78, 702	2, 369, 081	15, 785	2, 556, 352

SRM PROGRAM TIME PHASED FUNDING REQUIREMENTS

CEILING COST 156 INCH SRM SERIES BURN WITH TVC W/O TT 20/YEAR PRODUCTION RATE

(DOLLARS IN THOUSANDS) DATE 15 March 1972 COST ELEMENT 1973 1974 1975 1976 1977 1978 1981 1982 NONRECURRING TOTAL 370 16, 486 36,636 54, 799 50,754 1,084 DDT & E 370 50,754 1,084 16,486 36,636 54,799 DEVELOPMENT 370 16,486 31,304 25,933 DEVELOPMENT 370 16,486 31,304 25,933 49,128 DELIVERABLE HARDWARE 2,992 28, 188 3,705 DUMMY ENGINES 2.992 FLIGHT ENGINES 24, 483 49, 128 2,340 678 1,626 1,084 O & FS AND SPARES 106,798 213.595 231, 395 231, 395 229, 171 RECURRING TOTAL 106,064 212, 127 229,805 229, 805 227,595 INVESTMENT 105,849 211,698 229, 340 229, 340 227, 135 DELIVER NEW ENGINES 215 429 465 465 GROUND SUPPORT EQUIP. PARTS 734 1,468 1,590 1,590 1,576 OPERATIONS 341 682 738 738 732 FLIGHT SUPPORT 191 383 415 415 412 OPERATIONS 202 403 437 437 432 PARTS 34, 104 19, 532 720 8.698 1,455 24, 352 **FACILITIES** 7,606 8, 249 8, 249 8, 168 TRANSPORTATION . 784 1,067 5, 104 255, 305 259, 176 239, 644 237, 339 TOTAL PROGRAM 1,090 25, 184 38, 091 55, 583 51, 821 _137, 338

COST ELEMENT	FY	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL
NONRECURRING TOTAL			,					-		160, 129
DDT & E				_						160, 129
DEVELOPMENT										74, 093
DEVELOPMENT										74, 093
STE										
DELIVERABLE HARDWAI	RE		,							80, 308
DUMMY ENGINES										6, 697
FLIGHT ENGINES										73, 611
O & FS AND SPARES										5, 728
RECURRING TOTAL		224, 719	220, 270	218, 046	213, 595	211,369	113,473	11, 127		2, 224, 953
INVESTMENT		223, 175	218,756	216, 547	212, 127	209, 918	112, 695	11,050		2, 209, 664
DELIVER NEW ENGIN	ES	222, 724	218, 314	216, 109	211,698	209, 493	112, 465	11,027		2, 205, 192
GROUND SUPPORT EQ	UIP.	451	442	438	429	425	230	23		4, 472
PARTS										
OPERATIONS		1,544	1,514	1,499	1,468	1,451	778	77		15, 289
FLIGHT SUPPORT		717	703	696	682	674	361	35		7,099
OPERATIONS		403	395	391	383	379	204	20		3, 991
PARTS	·	424	416	412	403_	398	213	22		4, 199
FACILITIES										88, 861
TRANSPORTATION		8,003	7,845	7,762	7,606	7,532	4,038	396		82, 409
TOTAL PROGRAM		232, 722	228, 115	225,808	221, 201	218, 901	117,511	11,523		2,556,352

CEILING COST 156 INCH SRM SERIES BURN WITH TVC/WO TT

(DOLLARS IN THOUSANDS)

	L		DDT & E			<u> </u>				DATE	15 March
	ENGINE ERING DESIGN AND		GROUND TEST HARDWARE	FLIGHT TEST		PR	10/YEAR RATE ODUCTION PROGR	AM	PRODUCTION		
	DEVELOPMENT (ED & D)	TOOLING	(GTH)	HARDWARE (FTH)	DDT & E TOTAL	PRODUCTION	TOOLING	FACILITIES	PROGRAM TOTAL	OPERATIONS	TOTA PROGR
SRM											
PROGRAM MANAGEMENT	1,848	163	44	918	2, 973	11, 205	971		12, 176	759	15, 908
SYSTEM ENGINEERING	4,828		5	1,476	6, 309	6, 111			6, 111		12,420
SRM'S	46,605	13,305	4, 375	64, 198	128, 483	1,011,758	17, 222		1,028,980		1. 157. 463
CASE	18, 237	4,731	153	28, 997	52, 118	520, 848	7,773		528, 621		580, 73
NOZZLE	7, 457	2, 336	1,280	10, 596	21,669	143,810	946		144, 756	<u> </u>	166, 42
IGNITER	587	289	11	469	1,356	3, 367	219		3,586		4,94
PROPELLANT AND LINER	9, 279	2, 320	1,847	14, 174	27, 620	224, 682	2, 568	L	227, 250		254, 87
POWER SUPPLY DISTRIBUTION	236	26	157	1, 275	1, 694	17,427	206	<u> </u>	17,633		19, 32
Final Assembly	1,759	2, 042	540	3, 483	7, 824	44, 866	5, 510		50, 376		58, 20
GROUND TEST	1,675	1, 291	217		3, 183	1,014			1,014		4, 19
AUXILIARY POWER UNIT (APU)	7,375	270	170	5, 204	13, 019	55,744	L		55, 744	L	68,76
THRUST TERMINATION			<u> </u>		l	ļ					
INSTALLATION ASSEMBLY AND CHECKOUT	249		201	551	1,001				<u> </u>	5, 674	6, 67
FACILITIES	6, 564		2,029		8, 593	1,566		64,000	65, 566		74, 15
SUPPORT EQUIPMENT AND SPARES	248		2, 869	617	3, 734	3, 756			3, 756	3, 485	10, 97
FLIGHT TEST SUPPORT				643	643	5, 750			5, 750		6, 39
OPERATIONS SUPPORT	-		129	221	350					3,512	3, 86
STRUCTURE	5,715	1,629	2, 273	7,019	16, 636	131, 759	303		132, 062		148, 69
TRANSPORTATION			666	2, 098	2, 764	42, 568			42, 568		45, 33
TOTAL PROGRAM	66, 057	15, 097	12, 591	77, 741	171, 486	1, 214, 473	18, 496	64, 000	1, 296, 969	13, 430	1, 481, 88

SRM PROGRAM TIME PHASED FUNDING REQUIREMENTS CEILING COST 156 INCH SRM SERIES BURN WITH TVC W/O TT 10/YEAR PRODUCTION RATE (DOLLARS IN THOUSANDS)

DATE 15 March 1972

COST ELEMENT FY	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
NONRECURRING TOTAL	370	16, 486	36, 636	54,799	50,754_	1,084				
DDT & E	370	16, 486	36, 636	54,799	50,754	1,084				
DEVELOPMENT	370	16, 486	31, 304	25, 933						
DEVELOPMENT	370	16,486	31, 304	25, 933						
STE										
DELIVERABLE HARDWARE			2, 992	28, 188	49,128					
DUMMY ENGINES			2, 992	3,705						
FLIGHT ENGINES				24, 483	49,128					
O & FS AND SPARES			2,340	678	1,626	1,084				
RECURRING TOTAL						107,003	119,022	119,022	117, 824	116, 620
INVESTMENT						105, 868	117, 762	117,762	116, 573	115, 383
DELIVER NEW ENGINES						105, 533	117,390	117, 390	116, 205	115,019
GROUND SUPPORT EQUIP.						335	372	372	368	364
PARTS										
OPERATIONS						1,135	1,260	1,260	1,251	1, 237
FLIGHT SUPPORT						513	568	568	563	558
OPERATIONS						313	347	347	345	341
PARTS						309	345	345	343	338
FACILITIES	720	8, 698	1,455			26, 799	36, 487			
TRANSPORTATION				784	1,067	4, 993	4, 184	4, 184	4, 140	4,098
TOTAL PROGRAM	1, 090	25, 184	38, 091	55, 583	51,821	139, 879	159, 693	123, 206	121,964	120, 718
									والمراجع المراجع	
COST ELEMENT FY	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL	1
COST ELEMENT FY NONRECURRING TOTAL	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL 160, 129	
NONRECURRING TOTAL	1983	1984	1985	1986	1987	1988	1989	1990		
NONRECURRING TOTAL DDT & E	1983	1984	1985	1986	1987	1988	1989	1990	160, 129	
NONRECURRING TOTAL DDT & E DEVELOPMENT		1984	1985	1986	1987	1988	1989	1990	160, 129 160, 129	
NONRECURRING TOTAL DDT & E		1984	1985	1986	1987	1988	1989	1990	160, 129 160, 129 74, 093	
NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT		1984	1985	1986	1987	1988	1989	1990	160, 129 160, 129 74, 093	
NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE	1983	1984	1985	1986	1997	1988	1989	1990	160, 129 160, 129 74, 093 74, 093	
NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES	1983	1984	1985	1986	1987	1988	1989	1990	160, 129 160, 129 74, 093 74, 093 80, 308	
NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES	1983	1984	1985	1986	1987	1988	1989	1990	160, 129 160, 129 74, 093 74, 093 80, 308 6, 697	
NONRECURING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES		111,810	1985	1986	1987	62,518	6,009	1990	160, 129 160, 129 74, 093 74, 093 80, 308 6, 697 73, 611	
NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL	115, 420	111,810						1990	160, 129 160, 129 74, 093 74, 093 80, 308 6, 697 73, 611 5, 728	
NONRECURING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT	115, 420	111, 810 110, 625	110, 610	109, 406	107,001	62, 518	6, 009	1990	160, 129 160, 129 74, 093 74, 093 80, 308 6, 697 73, 611 5, 728 1, 202, 265	
NONRECURING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES	115, 420 114, 194 113, 833	111,810	110, 610	109, 406 108, 246	107,001	62, 518 61, 855	6, 009 5, 947	1990	160, 129 160, 129 160, 129 74, 093 74, 093 80, 308 6, 697 73, 611 5, 728 1, 202, 265 1, 189, 518	
NONRECURING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP.	115, 420	111, 810 110, 625 110, 276	110, 610 109, 436 109, 090	109, 406 108, 246 107, 904	107, 001 105, 867 105, 533	62, 518 61, 855 61, 660	6,009 5,947 5,929	1990	160, 129 160, 129 74, 093 74, 093 80, 308 6, 697 73, 611 5, 728 1, 202, 265 1, 189, 518 1, 185, 762	
NONRECURING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES	115, 420 114, 194 113, 833 361	111, 810 110, 625 110, 276	110, 610 109, 436 109, 090	109, 406 108, 246 107, 904	107, 001 105, 867 105, 533	62, 518 61, 855 61, 660	6,009 5,947 5,929	1990	160, 129 160, 129 74, 093 74, 093 80, 308 6, 697 73, 611 5, 728 1, 202, 265 1, 189, 518 1, 185, 762	
NONRECURING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS	115, 420 114, 194 113, 833	111, 810 110, 625 110, 276 349	110, 610 109, 436 109, 090 346	109, 406 108, 246 107, 904 342	107, 001 105, 867 105, 533 334	62,518 61,855 61,660 195	6,009 5,947 5,929 18	1990	160, 129 160, 129 74, 093 74, 093 80, 308 6, 697 73, 611 5, 728 1, 202, 265 1, 189, 518 1, 185, 762 3, 756	
NONRECURING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS	115, 420 114, 194 113, 833 361 1, 226 553	111, 810 110, 625 110, 276 349	110, 610 109, 436 109, 090 346	109, 406 108, 246 107, 904 342	107, 001 105, 867 105, 533 334	62,518 61,855 61,660 195	6,009 5,947 5,929 18	1990	160, 129 160, 129 74, 093 74, 093 80, 308 6, 697 73, 611 5, 728 1, 202, 265 1, 189, 518 1, 185, 762 3, 756	
NONRECURING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS	115, 420 114, 194 113, 833 361	111,810 110,625 110,276 349 1,185 535	110, 610 109, 436 109, 090 346 1, 174 530	109, 406 108, 246 107, 904 342 1, 160 523	107, 001 105, 867 105, 533 334 1, 134 512	62,518 61,855 61,660 195 663 299	6,009 5,947 5,929 18 62 28	1990	160, 129 160, 129 74, 093 74, 093 80, 308 6, 697 73, 611 5, 728 1, 202, 265 1, 189, 518 1, 185, 762 3, 756	
NONRECURING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS FLIGHT SUPPORT	115, 420 114, 194 113, 833 361 1, 226 553 338	111,810 110,625 110,276 349 1,185 535 326	110, 610 109, 436 109, 090 346 1, 174 530 323	109, 406 108, 246 107, 904 342 1, 160 523 320	107, 001 105, 867 105, 533 334 1, 134 512 313	62, 518 61, 855 61, 660 195 663 299 183	6,009 5,947 5,929 18 62 28 16	1990	160, 129 160, 129 74, 093 74, 093 74, 093 80, 308 6, 697 73, 611 5, 728 1, 202, 265 1, 189, 518 1, 185, 762 3, 756 12, 747 5, 750 3, 512	
NONRECURING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS PARTS	115, 420 114, 194 113, 833 361 1, 226 553 338	111,810 110,625 110,276 349 1,185 535 326	110, 610 109, 436 109, 090 346 1, 174 530 323	109, 406 108, 246 107, 904 342 1, 160 523 320	107, 001 105, 867 105, 533 334 1, 134 512 313	62, 518 61, 855 61, 660 195 663 299 183	6,009 5,947 5,929 18 62 28 16	1990	160, 129 160, 129 74, 093 74, 093 80, 308 6, 697 73, 611 5, 728 1, 202, 265 1, 189, 518 1, 185, 762 3, 756 12, 747 5, 750 3, 512 3, 485	

5.2.2.2 With TVC and TT

CEILING COST 156 INCH SRM SERIES BURN WITH TVC & TT

(DOLLARS IN THOUSANDS)

			DDT & E	*		7				DATE	15, March 1972
	ENGINEERING DESIGN AND DEVELOPMENT		GROUND TEST HARDWARE	FLIGHT TEST HARDWARE	DDT & E	PRO	0/YEAR RATE DUCTION PROGR	AM	PRODUCTION PROGRAM		TOTAL
	(ED & D)	TOOLING	(GTH)	(FTH)	TOTAL	PRODUCTION	TOOLING	FACILITIES	TOTAL	OPERATIONS	PROGRAM
SRM											
PROGRAM MANAGEMENT	1,848	163	44	918	2, 973	13, 183	1,142		14, 325	759	18,057
SYSTEM ENGINEERING	4, 828		5	1,476	6, 309	7, 189			7, 189		13, 498
SRM'S	47, 212	13, 342	4, 465	64,528	129, 547	3, 687, 712	39, 326	ļ	3, 727, 038		3, 856, 585
CASE	. 18, 237	4,731	153	28,997	52, 118	1, 866, 426	17,398		1, 883, 824		1,935,942
NOZZLE	7, 457	2, 336	1,280	10,596	21, 669	518, 560	1,905	<u></u>	520,465		542, 134
IGNIT ER	587	289	11	469	1,356	11, 318	467		11,785		13, 141
PROPELLANT AND LINER	9, 279	2, 320	1,847	14, 174	27, 620	862, 455	5, 873		868, 328		895, 948
POWER SUPPLY DISTRIBUTION	236	26	157	1, 275	1, 694	61, 324	425		61,749		63, 443
FINAL ASSEMBLY	1,759	2,042	540	3, 483	7, 824	144, 134	12, 842		156, 976		164, 800
GROUND TEST	1, 675	1, 291	217		3, 183	4, 637			4, 637		7, 820
AUXILIARY POWER UNIT (APU)	7, 375	270	170	5, 204	13,019	200, 518			200, 518		213, 537
THRUST TERMINATION	607	37	90	330	1,064	18, 340	416		18, 756		19, 820
INSTALLATION ASSEMBLY AND CHECKOUT	249		201	551	1,001					8, 932	9, 933
FACILITIES	6, 564		2, 029		8, 593	1,748		146, 092	147, 840		156, 433
SUPPORT EQUIPMENT AND SPARES	248		2, 869	617	3, 734	6,418			6, 418	5, 688	15,840
FLIGHT TEST SUPPORT				643	643	10, 264			10, 264		10,907
OPERATIONS SUPPORT			129	221	350					4, 535	4, 885
STRUCTURE	5, 715	1, 629	2, 273	7,019	16, 636	477, 760	303		478, 063		494, 699
TRANSPORTATION			666	2, 098	2, 764	154,090			154,090		156, 854
TOTAL PROGRAM	66, 664	15,134	12, 681	78, 071	172,550	4, 358, 364	40,771	146, 092	4, 545, 227	19, 914	4, 737, 691

DATE 15 March 1972

COST ELEMENT FY	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
NONRECURRING TOTAL	374	16, 629	36, 948	55,184	50,974	1,084				
DDT & E	374	16,629	36, 948	55, 184	50,974	1,084				
DEVELOPMENT	374	16, 629	31,576	26, 158						
DEVELOPMENT	374	16, 629	31,576	26, 158						
STE										
DELIVERABLE HARDWARE			3, 032	28, 348	49, 348					
DUMMY ENGINES			3, 032	3, 755						
FLIGHT ENGINES				24, 593	49, 348					
O & FS AND SPARES			2, 340	678	1,626	1,084				
RECURRING TOTAL						98,053	191,845	238,740	336, 794	379, 425
INVESTMENT						97,583	190, 922	237, 592	335, 175	377,602
DELIVER NEW ENGINES						97,435	190, 634	237, 233	334, 668	377, 031
GROUND SUPPORT EQUIP.						148	288	359	507	571
PARTS										
OPERATIONS						470	923	1,148	1,619	1,823
FLIGHT SUPPORT						236	462	575	811	913
OPERATIONS						104	204	254	358	404
PARTS						130	257	319	450	506
FACILITIES	720	8, 698	1,455			24, 842	34, 587	19,820	13, 250	19,913
						4, 941	6 012	8, 596	12, 140	13, 662
TRANSPORTATION				784	1,067	4,741	6,917	0, 370	,	,
	1,094	25, 327	38, 403	784 55, 968	1,067 52,041	128, 920	233, 349	267, 156	362, 184	413,000
TRANSPORTATION TOTAL PROGRAM				55,968	52,041	128,920	233, 349	267, 156	362, 184	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT FY	1,094_	25, 327	38, 403						362, 184 TOTAL	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL				55,968	52,041	128,920	233, 349	267, 156	362, 184 TOTAL 161, 193	·
TRANSPORTATION TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E				55,968	52,041	128,920	233, 349	267, 156	362, 184 TOTAL 161, 193 161, 193	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT				55,968	52,041	128,920	233, 349	267, 156	362, 184 TOTAL 161, 193 161, 193 74, 737	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT				55,968	52,041	128,920	233, 349	267, 156	362, 184 TOTAL 161, 193 161, 193	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE				55,968	52,041	128,920	233, 349	267, 156	362, 184 TOTAL 161, 193 161, 193 74, 737 74, 737	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE				55,968	52,041	128,920	233, 349	267, 156	362, 184 TOTAL 161, 193 161, 193 74, 737 74, 737 80, 728	·
TRANSPORTATION TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES				55,968	52,041	128,920	233, 349	267, 156	362, 184 TOTAL 161, 193 161, 193 74, 737 74, 737 80, 728 6, 787	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES				55,968	52,041	128,920	233, 349	267, 156	362, 184 TOTAL 161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES	1983	1984	1985	55, 968	1987	128, 920	233, 349	267, 156	362, 184 TOTAL 161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL	1983 451, 900	1984	1985 558, 481	55, 968 1986 537, 165	52, 041 1987 537, 165	128, 920 1988 362, 373	233, 349 1989 8, 527	267, 156	362, 184 TOTAL 161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728 4, 263, 211	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT	1983 451, 900 449, 728	1984 562,743 560,039	1985 558,481 555,798	55, 968 1986 537, 165 534, 584	52, 041 1987 537, 165 534, 584	128, 920 1988 362, 373 360, 631	233, 349 1989 	267, 156	362, 184 TOTAL 161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728 4, 263, 211 4, 242, 724	·
TRANSPORTATION TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES	1983 451, 900 449, 728 449, 048	1984 562,743 560,039 559,192	1985 558,481 555,798 554,956	55, 968 1986 537, 165 534, 584 533, 775	52, 041 1987 537, 165 534, 584 533, 775	128, 920 1988 362, 373 360, 631 360, 086	233, 349 1989 8, 527 8, 486 8, 473	267, 156	362, 184 TOTAL 161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728 4, 263, 211 4, 242, 724 4, 236, 306	·
TRANSPORTATION TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP.	1983 451, 900 449, 728	1984 562,743 560,039	1985 558,481 555,798	55, 968 1986 537, 165 534, 584	52, 041 1987 537, 165 534, 584	128, 920 1988 362, 373 360, 631	233, 349 1989 	267, 156	362, 184 TOTAL 161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728 4, 263, 211 4, 242, 724	·
TRANSPORTATION TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS	451,900 449,728 449,048 680	1984 562, 743 560, 039 559, 192 847	1985 558, 481 555, 798 554, 956 842	55, 968 1986 537, 165 534, 584 533, 775 809	52, 041 1987 537, 165 534, 584 533, 775 809	128, 920 1988 362, 373 360, 631 360, 086 545	233, 349 1989 8, 527 8, 486 8, 473 13	267, 156	362, 184 TOTAL 161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728 4, 263, 211 4, 242, 724 4, 236, 306 6, 418	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS	451,900 449,728 449,048 680	1984 562, 743 560, 039 559, 192 847 2, 704	1985 558, 481 555, 798 554, 956 842 2, 683	55, 968 1986 537, 165 534, 584 533, 775 809 2, 581	52, 041 1987 537, 165 534, 584 533, 775 809 2, 581	362, 373 360, 631 360, 086 545	233, 349 1989 8, 527 8, 486 8, 473 13	267, 156	362, 184 TOTAL 161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728 4, 263, 211 4, 242, 724 4, 236, 306 6, 418 20, 487	·
TRANSPORTATION TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS FLIGHT SUPPORT	451, 900 449, 728 449, 048 680 2, 172 1, 088	562, 743 560, 039 559, 192 847 2, 704 1, 355	558, 481 555, 798 554, 956 842 2, 683 1, 344	55, 968 1986 537, 165 534, 584 533, 775 809 2, 581 1, 293	52, 041 1987 537, 165 534, 584 533, 775 809 2, 581 1, 293	362, 373 362, 373 360, 631 360, 086 545	233, 349 1989 8, 527 8, 486 8, 473 13	267, 156	362, 184 TOTAL 161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728 4, 263, 211 4, 242, 724 4, 236, 306 6, 418 20, 487 10, 264	·
TRANSPORTATION TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS	451, 900 449, 728 449, 048 680 2, 172 1, 088 481	562, 743 560, 039 559, 192 847 2, 704 1, 355 599	558, 481 555, 798 554, 956 842 2, 683 1, 344 594	55, 968 1986 537, 165 534, 584 533, 775 809 2, 581 1, 293 571	52, 041 1987 537, 165 534, 584 533, 775 809 2, 581 1, 293 571	128, 920 1988 362, 373 360, 631 360, 086 545 1,742 873 385	233, 349 1989 8, 527 8, 486 8, 473 13 41 21 10	267, 156	362, 184 TOTAL 161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728 4, 263, 211 4, 242, 724 4, 236, 306 6, 418 20, 487 10, 264 4, 535	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS PARTS	451, 900 449, 728 449, 048 680 2, 172 1, 088 481 603	562, 743 560, 039 559, 192 847 2, 704 1, 355 599 750	558, 481 555, 798 554, 956 842 2, 683 1, 344	55, 968 1986 537, 165 534, 584 533, 775 809 2, 581 1, 293	52, 041 1987 537, 165 534, 584 533, 775 809 2, 581 1, 293	362, 373 362, 373 360, 631 360, 086 545	233, 349 1989 8, 527 8, 486 8, 473 13	267, 156	362, 184 TOTAL 161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728 4, 263, 211 4, 242, 724 4, 236, 306 6, 418 20, 487 10, 264 4, 535 5, 688	
TRANSPORTATION TOTAL PROGRAM COST ELEMENT FY NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWARE DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINES GROUND SUPPORT EQUIP. PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS	451, 900 449, 728 449, 048 680 2, 172 1, 088 481	562, 743 560, 039 559, 192 847 2, 704 1, 355 599	558, 481 555, 798 554, 956 842 2, 683 1, 344 594	55, 968 1986 537, 165 534, 584 533, 775 809 2, 581 1, 293 571	52, 041 1987 537, 165 534, 584 533, 775 809 2, 581 1, 293 571	128, 920 1988 362, 373 360, 631 360, 086 545 1,742 873 385	233, 349 1989 8, 527 8, 486 8, 473 13 41 21 10	267, 156	362, 184 TOTAL 161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728 4, 263, 211 4, 242, 724 4, 236, 306 6, 418 20, 487 10, 264 4, 535	·

CEILING COST 156 INCH SRM SERIES BURN WITH TVC & TT (DOLLARS IN THOUSANDS)

				(202222	o in Thousands,						
			DDT & E							DATE	15 March 197
	ENGINEERING DESIGN AND DEVELOPMENT		GROUND TEST HARDWARE	FLIGHT TEST HARDWARE	DDT & E	PRO	40/YEAR RATE ODUCTION PROGR	АМ	PRODUCTION PROGRAM		TOTAL
	(ED & D)	TOOLING	(GTH)	(FTH)	TOTAL	PRODUCTION	TOOLING	FACILITIES	TOTAL	OPERATIONS	PROGRAM
SRM									1	1	
PROGRAM MANAGEMENT	1,848	163	44	918	2, 973	13, 183	1,142		14, 325	759	18, 057
SYSTEM ENGINEERING	4, 828		5	1, 476	6, 309	7, 189	•		7, 189		13, 498
SRM'S	47, 212	13, 342	4, 465	64, 528	129, 547	3, 145, 859	33, 999		3, 179, 858		3, 309, 405
CASE	18, 237	4,731	153	28,997	52, 118	1,590,948	15, 180		1, 606, 128	1	1, 658, 246
NOZZLE	7, 457	2, 336	1,280	10, 596	21,669	441, 582	1,848		443, 430		465, 099
IGNIT ER	587	289	11	469	1,356	9, 936	429		10, 365		11,721
PROPELLANT AND LINER	9, 279	2, 320	1,847	14, 174	27, 620	735, 970	5,015		740, 985		768, 605
POWER SUPPLY DISTRIBUTION	236	26	157	1,275	1,694	53, 240	403		53, 643		55, 337
FINAL ASSEMBLY	1,759	2,042	540	3, 483	7, 824	123, 048	10,761		133, 809		141,633
GROUND TEST	1,675	1, 291	217		3, 183	3, 132			3, 132		6, 315
AUXILIARY POWER UNIT (APU)	7, 375	270	170	5, 204	13,019	172, 249			172, 249		185, 268
THRUST TERMINATION	607	37	90	330	1,064	15, 754	363		16, 117		17, 181
INSTALLATION ASSEMBLY AND CHECKOUT	249		201	551	1, 001					8, 236	9, 237
FACILITIES	6, 564		2,029		8, 593	1,566		128, 702	130, 268		138, 861
SUPPORT EQUIPMENT AND SPARES	248		2, 869	617	3, 734	5, 324			5, 324	5, 050	14, 108
FLIGHT TEST SUPPORT				643	643	8, 764		 	8,764		9, 407
OPERATIONS SUPPORT			129	221	350	1			1	4, 535	4, 885
STRUCTURE	5, 715	1, 629	2, 273	7,019	16, 636	382, 208	303		382, 511		399, 147
TRANSPORTATION			666	2,098	2, 764	131,535			131,535		134, 299
			† 			1		1			
			,								
						- 1	, , , , , , ,	1			
TOTAL PROGRAM	66, 664	15, 134	12,681	78, 071	172, 550	3, 695, 628	35, 444	128,702	3, 859, 774	18,580	4, 050, 904

CEILING COST SERIES WITH TVC & TT 40/YEAR PRODUCTION (DOLLARS IN THOUSANDS)

COST ELEMENT	FY	1973	1974	1975	1976	1977	1978	1979	1980	1981	15 March 1
NONRECURRING TOTAL		374	16, 629	36, 948	55, 184	50,974	1,084				
DDT & E		374	16,629	36,948	55, 184	50,974	1,084				
DEVELOPMENT		374	16,629	31,576	26, 158						
DEVELOPMENT		374	16,629	31,576	26, 158						
STE											
DELIVERABLE HARDW	VARE			3,032	28, 348	49, 348					
DUMMY ENGINES				3,032	3,755	, ,					
FLIGHT ENGINES					24, 593	49, 348					
O & FS AND SPARES				2, 340	678	1,626	1,084				
RECURRING TOTAL							101, 264	202, 527	253, 157	361, 656	405, 053
INVESTMENT							100,751	201, 499	251, 874	359, 820	402, 998
DELIVER NEW ENG	INES			·			100,601	201, 201	251,501	359, 288	402, 402
GROUND SUPPORT	EQUIP.						150	298	373	532	596
PARTS											
OPERATIONS							513	1,028	1, 283	1, 836	2,055
FLIGHT SUPPORT							245	492	613	876	982
OPERATIONS							127	254	317	454	508
PARTS							141	282	353	506	56!
FACILITIES		720	8, 698	1,455			37, 089	46, 477	26, 620	17, 802	
TRANSPORTATION					784	1, 067	5, 267	7, 333	9, 159	13,081	14,652
TOTAL PROGRAM		1.094	25, 327	38, 403	55, 968	52, 041	144, 704	256, 337	288, 936	392, 539	419,705
COOR DI DICTIO											
COST ELEMENT	FY	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL	1
NONRECURRING TOTAL	FY	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL 161, 193	i
	FY	1983	1984	1985	1986	1987	1988	1989	1990		
NONRECURRING TOTAL	FY	1983	1984	1985	1986	1987	1988	1989	1990	161, 193 161, 193	
NONRECURRING TOTAL DDT & E	FY	1983	1984	1985	1986	1987	1988	1989	1990	161, 193 161, 193 74, 737	
NONRECURRING TOTAL DDT & E DEVELOPMENT	FY	1983	1984	1985	1986	1987	1988	1989	1990	161, 193 161, 193	
NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT		1983	1984	1985	1986	1987	1988	1989	1990	161, 193 161, 193 74, 737	
NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE		1983	1984	1985	1986	1987	1988	1989	1990	161, 193 161, 193 74, 737 74, 737	
NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDW DUMMY ENGINES		1983	1984	1985	1986	1987	1988	1989	1990	161, 193 161, 193 74, 737 74, 737 80, 728 6, 787	
NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDW		1983	1984	1985	1986	1987	1988	1989	1990	161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941	
NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDW DUMMY ENGINES FLIGHT ENGINES		1983 397, 819	1984 390, 588	1985 386, 971	1986	379,737	343,572	1989	1990	161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728	
NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDW DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES								10, 851	1990	161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728 3, 616, 551	
NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDW DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL	VARE	397, 819 395, 803	390, 588 388, 605	386, 971 385, 006	383, 356 381, 410	379,737 377,811	343, 572 341, 829	10, 851 10, 796	1990	161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728 3, 616, 551 3, 598, 202	
NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDW DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT	VARE	397, 819	390, 588	386, 971	383, 356	379,737	343, 572	10, 851	1990	161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728 3, 616, 551 3, 598, 202 3, 592, 878	
NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDW DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENG	VARE	397, 819 395, 803 395, 217	390, 588 388, 605 388, 031	386, 971 385, 006 384, 438	383, 356 381, 410 380, 845	379,737 377,811 377,252	343, 572 341, 829 341, 323	10, 851 10, 796 10, 779	1990	161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728 3, 616, 551 3, 598, 202	
NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDW DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENG-	VARE	397, 819 395, 803 395, 217	390, 588 388, 605 388, 031	386, 971 385, 006 384, 438	383, 356 381, 410 380, 845	379,737 377,811 377,252	343, 572 341, 829 341, 323	10, 851 10, 796 10, 779	1990	161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728 3, 616, 551 3, 598, 202 3, 592, 878	
NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDW DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENG- GROUND SUPPORT PARTS	VARE	397, 819 395, 803 395, 217 586	390,588 388,605 388,031 574	386, 971 385, 006 384, 438 568	383, 356 381, 410 380, 845 565	379, 737 377, 811 377, 252 559	343, 572 341, 829 341, 323 506	10, 851 10, 796 10, 779 17	1990	161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728 3, 616, 551 3, 598, 202 3, 592, 878 5, 324	
NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDW DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENG GROUND SUPPORT PARTS OPERATIONS	VARE	397, 819 395, 803 395, 217 586	390,588 388,605 388,031 574 1,983 947	386, 971 385, 006 384, 438 568 1, 965 939	383, 356 381, 410 380, 845 565 1, 946 930	379,737 377,811 377,252 559 1,926 920	343, 572 341, 829 341, 323 506	10, 851 10, 796 10, 779 17	1990	161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728 3, 616, 551 3, 598, 202 3, 592, 878 5, 324 18, 349 8, 764	
NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDW DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENG. GROUND SUPPORT PARTS OPERATIONS	VARE	397, 819 395, 803 395, 217 586 2, 016 961 500	390,588 388,605 388,031 574 1,983 947 490	386, 971 385, 006 384, 438 568 1, 965 939 485	383, 356 381, 410 380, 845 565 1, 946 930 481	379,737 377,811 377,252 559 1,926 920 476	343, 572 341, 829 341, 323 506 1, 743 833 430	10, 851 10, 796 10, 779 17 55 26	1990	161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728 3, 616, 551 3, 598, 202 3, 592, 878 5, 324 18, 349 8, 764 4, 535	
NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDW DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENG. GROUND SUPPORT PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS PARTS	VARE	397, 819 395, 803 395, 217 586 2, 016 961	390,588 388,605 388,031 574 1,983 947	386, 971 385, 006 384, 438 568 1, 965 939	383, 356 381, 410 380, 845 565 1, 946 930	379,737 377,811 377,252 559 1,926 920	343, 572 341, 829 341, 323 506 1, 743 833	10, 851 10, 796 10, 779 17 55 26	1990	161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728 3, 616, 551 3, 598, 202 3, 592, 878 5, 324 18, 349 8, 764 4, 535 5, 050	
NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDW DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENG. GROUND SUPPORT PARTS OPERATIONS	VARE	397, 819 395, 803 395, 217 586 2, 016 961 500	390,588 388,605 388,031 574 1,983 947 490	386, 971 385, 006 384, 438 568 1, 965 939 485	383, 356 381, 410 380, 845 565 1, 946 930 481	379,737 377,811 377,252 559 1,926 920 476	343, 572 341, 829 341, 323 506 1, 743 833 430	10, 851 10, 796 10, 779 17 55 26	1990	161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728 3, 616, 551 3, 598, 202 3, 592, 878 5, 324 18, 349 8, 764 4, 535	

CEILING COST 156 INCH SRM SERIES BURN WITH TVC & TT (DOLLARS IN THOUSANDS)

DATE 15 March 1972 DDT & E 20/YEAR RATE PRODUCTION PROGRAM ENGINEERING PRODUCTION GROUND TEST FLIGHT TEST DESIGN AND DEVELOPMENT HARDWARE HARDWARE DDT & E PROGRAM TOTAL OPERATIONS (FTH) TOTAL PRODUCTION TOOLING **FACILITIES** TOTAL PROGRAM (ED & D) TOOLING (GTH) SRM 12, 176 759 15,908 2, 973 971 PROGRAM MANAGEMENT 1,848 163 44 918 11,205 12,420 6, 111 SYSTEM ENGINEERING 4,828 1,476 6, 309 6, 111 1,942,345 071,892 31,334 SRM'S 47, 212 13,342 4, 465 64,528 129, 547 1,911,011 978, 500 1,030,618 28,997 52, 118 964,510 13,990 CASE 18, 237 4,731 153 21,669 1,703 269, 226 290, 895 10,596 267, 523 NOZZLE 7,457 2,336 1,280 7, 288 1,356 5, 537 395 5,932 IGNITER 587 289 11 469 1,847 14, 174 27, 620 418,738 4,622 423, 360 450, 980 9, 279 2, 320 PROPELLANT AND LINER 37, 249 38,943 371 26 157 1,275 1,694 36,878 POWER SUPPLY DISTRIBUTION 236 104,862 3,483 7, 824 87, 121 9,917 97,038 1,759 2,042 540 FINAL ASSEMBLY 2, 164 5,347 2, 164 3, 183 GROUND TEST 1,675 1,291 217 5, 204 13,019 119,019 119,019 132,038 170 AUXILIARY POWER UNIT (APU) 7, 375 270 10,921 1,064 9, 521 336 9,857 37 330 THRUST TERMINATION 607 90 INSTALLATION ASSEMBLY 6,836 7,837 201 551 1,001 AND CHECKOUT 249 78,702 80, 268 88, 861 8, 593 1,566 6, 564 2,029 FACILITIES 4, 199 12,405 SUPPORT EQUIPMENT AND SPARES 4, 472 4, 472 2,869 617 3, 734 248 7, 099 7,742 643 643 7,099 FLIGHT TEST SUPPORT 3,991 4,341 OPERATIONS SUPPORT 129 221 350 246, 822 263,458 7,019 16,636 246, 519 303 STRUCTURE 5,715 1,629 2, 273 79, 645 82, 409 TRANSPORTATION 666 2,098 2,764 79,645 2, 567, 273 2, 267, 628 32,608 78,702 2, 378, 938 TOTAL PROGRAM 66,664 15, 134 12,681 78,071 172,550

1982

230,185 228,610 228,150 460

8,168 238,353

2, 567, 273

COST ELEMENT	FY	1973	1974	1975	1976	1977	1978	1979	1 ,	1981	
NONRECURRING TOTAL		374	16,629	36, 948	55, 184	50,974	1,084				
DDT & E		374	16,629	36, 948	55, 184	50,974	1,084				
DEVELOPMENT		374	16,629	31,576	26, 158						<u> </u>
DEVELOPMENT		374	16, 629	31,576	26, 158						ļ
STE											
DELIVERABLE HARDWAF	RE			3,032	_28, 348	49, 348					<u> </u>
DUMMY ENGINES				3,032	3,755						
FLIGHT ENGINES					24, 593	49, 348			· · · · · · · · · · · · · · · · · · ·	<u> </u>	<u> </u>
O & FS AND SPARES				2,340	678	1,626	1,084				<u> </u>
RECURRING TOTAL							107, 272	214,542	232, 420	232, 420	
INVESTMENT							106, 537	213,074	230, 830	230,830	<u> </u>
DELIVER NEW ENGINE	ES						106, 322	212, 645	230, 365	230, 365	_
GROUND SUPPORT EQ	UIP.						215	429	465	465 '	<u> </u>
PARTS											
OPERATIONS							735	1,468	1,590	1,590	<u> </u>
FLIGHT SUPPORT							341	682	738	738	L
OPERATIONS							192	383	415	415	
PARTS							202	403	437	437	<u> </u>
FACILITIES		. 720	8, 698	1,455			24, 352	34, 104	19,532		
TRANSPORTATION					784	1,067	5, 104	7,606	8, 249	8, 249	L
TOTAL PROGRAM		1, 094	25, 327	38, 403	55, 968	52, 041	137, 812	256, 252	260, 201	240,669	L
COST ELEMENT	FY	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL]
COST ELEMENT NONRECURRING TOTAL	FY	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL 161, 193	}
	FY	1983	1984	1985	1986	1987	1988	1989	1990		
NONRECURRING TOTAL	FY	1983	1984	1985	1986	1987	1988	1989	1990	161, 193	
NONRECURRING TOTAL DDT & E	FY	1983	1984	1985	1986	1987	1988	1989	1990	161, 193 161, 193	
NONRECURRING TOTAL DDT & E DEVELOPMENT	FY	1983	1984	1985	1986	1987	1988	1989	1990	161, 193 161, 193 74, 737	
NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT		1983	1984	1985	1986	1987	1988	1989	1990	161, 193 161, 193 74, 737	
NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE		1983	1984	1985	1986	1987	1988	1989	1990	161, 193 161, 193 74, 737 74, 737	
NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWAI		1983	1984	1985	1986		1988	1989	1990	161, 193 161, 193 74, 737 74, 737	
NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWAI DUMMY ENGINES		1983	1984	1985	1986		1988	1989	1990	161, 193 161, 193 74, 737 74, 737 80, 728 6, 787	
NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDWAI DUMMY ENGINES FLIGHT ENGINES			1984 221, 247	219, 012	214,542		1988	1989	1990	161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941	
NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDWAI DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES		225, 714 224, 171							1990	161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728	
NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDWAI DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL	RE	225, 714	221, 247	219, 012	214, 542	212, 306	113, 975	11,175	1990	161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728 2, 234, 810	
NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDWAI DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT	RE	225, 714 224, 171	221, 247 219, 733	219, 012 217, 513	214, 542 213, 074	212, 306 210, 855	113, 975 113, 196	11,175 11,098	1990	161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728 2, 234, 810 2, 219, 521	
NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDWAI DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINI	RE	225, 714 224, 171 223, 720	221, 247 219, 733 219, 290	219, 012 217, 513 217, 075	214, 542 213, 074 212, 645	212, 306 210, 855 210, 430	113, 975 113, 196 112, 967	11,175 11,098 11,075	1990	161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728 2, 234, 810 2, 219, 521 2, 215, 049	
NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDWAI DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINI GROUND SUPPORT EQ	RE	225, 714 224, 171 223, 720	221, 247 219, 733 219, 290	219, 012 217, 513 217, 075	214, 542 213, 074 212, 645	212, 306 210, 855 210, 430	113, 975 113, 196 112, 967	11,175 11,098 11,075	1990	161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728 2, 234, 810 2, 219, 521 2, 215, 049	
NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDWAI DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINE GROUND SUPPORT EQ PARTS	RE	225, 714 224, 171 223, 720 451	221, 247 219, 733 219, 290 443	219, 012 217, 513 217, 075 438	214, 542 213, 074 212, 645 429	212, 306 210, 855 210, 430 425	113, 975 113, 196 112, 967 229	11, 175 11, 098 11, 075 23	1990	161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728 2, 234, 810 2, 219, 521 2, 215, 049 4, 472	
NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDWAY DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINE GROUND SUPPORT EQ PARTS OPERATIONS	RE	225, 714 224, 171 223, 720 451	221, 247 219, 733 219, 290 443	219, 012 217, 513 217, 075 438	214, 542 213, 074 212, 645 429	212, 306 210, 855 210, 430 425	113, 975 113, 196 112, 967 229	11, 175 11, 098 11, 075 23	1990	161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728 2, 234, 810 2, 219, 521 2, 215, 049 4, 472	
NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDWAI DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINE GROUND SUPPORT EQ PARTS OPERATIONS FLIGHT SUPPORT	RE	225, 714 224, 171 223, 720 451 1, 543 716 403	221, 247 219, 733 219, 290 443 1, 514 703	219, 012 217, 513 217, 075 438 1,499 696	214, 542 213, 074 212, 645 429 1, 468 682	212, 306 210, 855 210, 430 425 1, 451 674	113, 975 113, 196 112, 967 229 779 362	11, 175 11, 098 11, 075 23 77 35	1990	161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728 2, 234, 810 2, 219, 521 2, 215, 049 4, 472 15, 289 7, 099	
NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDWAY DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINE GROUND SUPPORT EQ PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS	RE	225, 714 224, 171 223, 720 451 1, 543 716	221, 247 219, 733 219, 290 443 1,514 703 395	219, 012 217, 513 217, 075 438 1,499 696 391	214, 542 213, 074 212, 645 429 1, 468 682 383	212, 306 210, 855 210, 430 425 1, 451 674 379	113, 975 113, 196 112, 967 229 779 362 204	11, 175 11, 098 11, 075 23 77 35 20	1990	161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728 2, 234, 810 2, 219, 521 2, 215, 049 4, 472 15, 289 7, 099 3, 991	
NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDWAY DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENGINE GROUND SUPPORT EQ PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS PARTS	RE	225, 714 224, 171 223, 720 451 1, 543 716 403	221, 247 219, 733 219, 290 443 1,514 703 395	219, 012 217, 513 217, 075 438 1,499 696 391	214, 542 213, 074 212, 645 429 1, 468 682 383	212, 306 210, 855 210, 430 425 1, 451 674 379	113, 975 113, 196 112, 967 229 779 362 204	11, 175 11, 098 11, 075 23 77 35 20	1990	161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728 2, 234, 810 2, 219, 521 2, 215, 049 4, 472 15, 289 7, 099 3, 991 4, 199	

222, 148

219,838

118,013

11,571

TOTAL PROGRAM

233, 716

229,092

226,775

CEILING COST 156 INCH SRM SERIES BURN WITH TVE & TT (DOLLARS IN THOUSANDS)

			DDT & E			7				DATE	15 March 1972
	ENGINEERING DESIGN AND DEVELOPMENT		GROUND TEST HARDWARE	FLIGHT TEST HARDWARE	DDT & E	PRO	10/YEAR RATE ODUCTION PROGR.	AM	PRODUCTION PROGRAM		TOTAL
	(ED & D)	TOOLING	(GTH)	(FTH)	TOTAL	PRODUCTION	TOOLING	FACILITIES	TOTAL	OPERATIONS	PROGRAM
SRM									<u> </u>	<u> </u>	
PROGRAM MANAGEMENT	1,848	163	44	918	2, 973	11, 205	971		12, 176	759	15, 908
SYSTEM ENGINEERING	4, 828		5	1,476	6,3 09	6, 111			6, 111		12,420
SRM'S	47, 212	13, 342	4, 465	64, 528	129, 547	1, 016, 919	17, 410		1,034,329		1, 163, 876
CASE	18, 237	4,731	153	28, 997	52, 118	520,848	7, 773		528, 621	<u> </u>	580,739
NOZZLE	7,457	2, 336	1,280	10,596	21, 669	143, 810	946		144,756		166, 425
IGNITER	587	289	11	469	1,356	3, 367	219		3,586		4, 942
PROPELLANT AND LINER	9, 279	2, 320	1,847	14, 174	27,620	224, 682	2,568		227, 250		254, 870
POWER SUPPLY DISTRIBUTION	236	26	157	1, 275	1,694	17, 427	206	L	17,633		19, 327
FINAL ASSEMBLY	1,759	2,042	540	3, 483	7, 824	44, 866	5, 510		50, 376		58, 200
GROUND TEST	1, 675	1,291	217		3, 183	1,014			1,014		4, 197
AUXILIARY POWER UNIT (APU)	7, 375	270	170	5, 204	13,019	55, 744			55, 744		68, 76 3
THRUST TERMINATION	607	37	90	330	1,064	5, 161	188		5, 349		6,413
INSTALLATION ASSEMBLY AND CHECKOUT	249		201	551	1,001					5,674	6, 675
FACILITIES	6, 564		2, 029		8, 593	1, 566		64,000	65, 566		74, 159
SUPPORT EQUIPMENT AND SPARES	248		2, 869	617	3, 734	3, 756			3, 756	3, 485	10, 975
FLIGHT TEST SUPPORT				643	643	5, 750	1]	5, 750		6, 393
OPERATIONS SUPPORT			129	221	350				I	3,512	3, 862
STRUCTURE	5,715	1, 629	2, 273	7,019	16, 636	131, 759	303		132, 062		148, 698
TRANSPORTATION			666	2, 098	2, 764	42, 568			42,568		45, 332
									<u> </u>		
							<u> </u>				ļ <u> </u>
						↓		ļ	ļ		ļ <u>.</u>
						-					
TOTAL PROGRAM	66, 664	15, 134	12, 681	78, 071	172, 550	1, 219, 634	18,684	64, 000	1, 302, 318	13, 430	1, 488, 298

	FY_	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
NONRECURRING TOTAL		374	16, 629	36,948	55, 184	50,974	1,084				
DDT & E		374	16, 629	36, 948	55, 184	50,974	1,084				
DEVELOPMENT		374	16,629	31,576	26, 158						
DEVELOPMENT		374	16,629	31,576							
STE											
DELIVERABLE HARDY	WARE			3, 032	28, 348	49, 348					
DUMMY ENGINES				3,032	3,755						
FLIGHT ENGINES					24,593	49, 348					
O & FS AND SPARES				2, 340	678	1,626	1,084				
RECURRING TOTAL							107,479	119,553	119,553	118, 346	117,138
INVESTMENT							106, 344	118, 292	118, 292	117,096	115,902
DELIVER NEW ENG	INES						106, 009	117,920	117,920	116, 728	115,538
GROUND SUPPORT	EQUIP.					· -	335	372	372	368 .	364
PARTS											1
OPERATIONS							1,135	1,261	1, 261	1,250	1,236
FLIGHT SUPPORT							513	568	568	564	558
OPERATIONS							313	348	348	344	340
PARTS							309	345	345	342	338
FACILITIES		720	8, 698	1,455			26, 799	36, 487			
TRANSPORTATION					784	1, 067	4, 993	4, 184	4, 184	4, 139	4,098
TOTAL PROGRAM		1.094	25, 327	38, 403	5 5, 968	52, 041	140, 355	160, 224	123,737	122, 485	121, 236
		r	T						· · · · · · · · · · · · · · · · · · ·		1
COST ELEMENT	FY	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL	
COST ELEMENT NONRECURRING TOTAL		1983	1984	1985	1986	1987	1988	1989	1990	161, 193	
		1983	1984	1985	1986	1987	1988	1989	1990		
NONRECURRING TOTAL		1983	1984	1985	1986	1987	1988	1989	1990	161, 193	
NONRECURRING TOTAL DDT & E		1983	1984	1985	1986	1987	1988	1989	1990	161, 193 161, 193	
NONRECURRING TOTAL DDT & E DEVELOPMENT		1983	1984	1985	1986	1987	1988	1989	1990	161, 193 161, 193 74, 737	
NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT		1983	1984	1985	1986	1987	1988	1989	1990	161, 193 161, 193 74, 737	
NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARD		1983	1984	1985	1986	1987	1988	1989	1990	161, 193 161, 193 74, 737 74, 737	
NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE		1983	1984	1985	1986	1987	1988	1989	1990	161, 193 161, 193 74, 737 74, 737	
NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARD DUMMY ENGINES		1983	1984	1985	1986	1987	1988	1989	1990	161, 193 161, 193 74, 737 74, 737 80, 728 6, 787	
NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARD DUMMY ENGINES FLIGHT ENGINES			112, 307	1985	1986	1987	62,796	6, 036	1990	161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941	
NONRECURRING TOTAL DDT & E DEVELOPMENT DEVELOPMENT STE DELIVERABLE HARDV DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES		115, 934							1990	161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728	
NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDY DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL	WARE	115, 934 114, 708	112, 307	111, 102 109, 928	109, 893 108, 733	107, 477	62, 796	6, 036	1990	161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728 1, 207, 614	·
NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDY DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT	WARE	115, 934	112, 307	111,102	109, 893	107, 477	62, 796 62, 133	6, 036 5, 974	1990	161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728 1, 207, 614 1, 194, 867	·
NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDY DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENG	WARE	115, 934 114, 708 114, 347	112, 307 111, 122 110, 773	111, 102 109, 928 109, 582	109, 893 108, 733 108, 391	107, 477 106, 343 106, 009	62, 796 62, 133 61, 938	6, 036 5, 974 5, 956	1990	161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728 1, 207, 614 1, 194, 867 1, 191, 111	·
NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDY DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENG GROUND SUPPORT	WARE	115, 934 114, 708 114, 347	112, 307 111, 122 110, 773	111, 102 109, 928 109, 582	109, 893 108, 733 108, 391	107, 477 106, 343 106, 009	62, 796 62, 133 61, 938	6, 036 5, 974 5, 956	1990	161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728 1, 207, 614 1, 194, 867 1, 191, 111	·
NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDY DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENG GROUND SUPPORT PARTS	WARE	115, 934 114, 708 114, 347 361	112, 307 111, 122 110, 773 349	111, 102 109, 928 109, 582 346	109, 893 108, 733 108, 391 342	107, 477 106, 343 106, 009 334	62, 796 62, 133 61, 938 195	6, 036 5, 974 5, 956 18	1990	161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728 1, 207, 614 1, 194, 867 1, 191, 111 3, 756	·
NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDY DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENG GROUND SUPPORT PARTS OPERATIONS	WARE	115, 934 114, 708 114, 347 361	112,307 111,122 110,773 349	111,102 109,928 109,582 346	109, 893 108, 733 108, 391 342	107, 477 106, 343 106, 009 334	62, 796 62, 133 61, 938 195	6, 036 5, 974 5, 956 18	1990	161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728 1, 207, 614 1, 194, 867 1, 191, 111 3, 756	·
NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDY DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENG GROUND SUPPORT PARTS OPERATIONS FLIGHT SUPPORT	WARE	115, 934 114, 708 114, 347 361 1, 226 553	112,307 111,122 110,773 349 1,185 535	111,102 109,928 109,582 346 1,174 530	109, 893 108, 733 108, 391 342 1, 160 523	107, 477 106, 343 106, 009 334 1, 134 512	62, 796 62, 133 61, 938 195 663 298	6, 036 5, 974 5, 956 18	1990	161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728 1, 207, 614 1, 194, 867 1, 191, 111 3, 756	·
NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDY DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENG GROUND SUPPORT PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS	WARE	115, 934 114, 708 114, 347 361 1, 226 553 338	112, 307 111, 122 110, 773 349 1, 185 535 326	111, 102 109, 928 109, 582 346 1, 174 530 323	109, 893 108, 733 108, 391 342 1, 160 523 320	107, 477 106, 343 106, 009 334 1, 134 512 313	62, 796 62, 133 61, 938 195 663 298 183	6, 036 5, 974 5, 956 18 62 28 16	1990	161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728 1, 207, 614 1, 194, 867 1, 191, 111 3, 756 1:, 747 2, 750 3, 485 74, 159	·
NONRECURRING TOTAL DDT & E DEVELOPMENT STE DELIVERABLE HARDY DUMMY ENGINES FLIGHT ENGINES O & FS AND SPARES RECURRING TOTAL INVESTMENT DELIVER NEW ENG GROUND SUPPORT PARTS OPERATIONS FLIGHT SUPPORT OPERATIONS PARTS	WARE	115, 934 114, 708 114, 347 361 1, 226 553 338	112, 307 111, 122 110, 773 349 1, 185 535 326	111, 102 109, 928 109, 582 346 1, 174 530 323	109, 893 108, 733 108, 391 342 1, 160 523 320	107, 477 106, 343 106, 009 334 1, 134 512 313	62, 796 62, 133 61, 938 195 663 298 183	6, 036 5, 974 5, 956 18 62 28 16	1990	161, 193 161, 193 74, 737 74, 737 80, 728 6, 787 73, 941 5, 728 1, 207, 614 1, 194, 867 1, 191, 111 3, 756 1, 747 2, 750 3, 512 3, 485	·

5.2.3 156 Inch Series Recoverable Cost

5.2.3.1 Probable Cost With TVC and W/O TT

(DOLLARS IN THOUSANDS)

DATE 15 March 1972

		DDT & E REFURBISH	DDT & E WITH REFURBISH	PRODUCTION	REFU	60/YR RATE RBISH AND RECOV	ERY	PROD PROGRAM WITH REFURBISH		REFURBISH AND RECOVERY	OPERATIONS WITH REFURBISH	
	DDT & E TOTAL		AND RECOVERY TOTAL (1)	PROGRAM TOTAL	PRODUCTION DELTA	TOOLING DELTA	FACILITIES DELTA	AND RECOVERY TOTAL (2)	OPERATIONS TOTAL	OPERATIONS DELTA	AND RECOVERY TOTAL (3)	TOTAL PROGRAM
SRM												ļ
PROGRAM MANAGEMENT	2,850		2,850	13,201				13,201	700		700	16,751
SYSTEM ENGINEERING	6,051	302	6, 353	6,625			<u> </u>	6,625				12,978
SRM'S	110,660	(8, 655)	102,005	2,790,365	(1, 102, 741)	(956)		1,686,668				1,788,673
CASE	42,738	(9, 515)	33,223	1,325,656	(979, 577)	(1, 049)		345,030				-378,253
NOZZLE	17,531	630	18, 161	398, 944	(43, 084)	93		355, 953				374,114
IGNITER	1,290		1,290	10,861				10,861				12, 151
PROPELLANT AND LINER	25, 473		25, 473	664, 257				664, 257				689,730
POWER SUPPLY DISTRIBUTION	1,619	(43)	1,576	56,908	(4, 098)			52, 810	.,			54,386
FINAL ASSEMBLY	6, 698		6,698	144,669				144, 669				151, 367
GROUND TEST	2,825	156	2,981	4,273				4,273				7,254
AUXILIARY POWER UNIT (APU)	12,486	117	12,603	184,797	(75, 982)			108,815				121, 418
THRUST TERMINATION												ļ
INSTALLATION ASSEMBLY AND CHECKOUT	960		960						8,232		8,232	9,192
FACILITIES	8,240		8,240	136, 249			(41, 809)	94, 440		24, 750	24,750	127,430
SUPPORT EQUIPMENT AND SPARES	3,582		3,582	5,915				5, 915	5,242		5,242	14, 739
FLIGHT TEST SUPPORT	617	118	735	9,459				9,459				10, 194
OPERATIONS SUPPORT	336		336						4,179		4,179	4,515
STRUCTURE	15, 955	(1, 561)	14, 394	440, 583	(371, 490)			69, 093				83, 487
RECOVERY SYSTEM		114, 718	114,718	-						112,362	112,362	227.080
TRANSPORTATION	2, 651	78	2,729	142,009	11,020			153, 029				155, 758
TOTAL PROGRAMS	151,902	105,000	256, 902	3,544,406	(1, 463, 211)	(956)	(41, 809)	2,038,430	18, 353	137, 112	155, 465	2,450,797

NOTE: TOTAL PROGRAM IS SUM OF COLUMN 1, 2, AND 3

60/YR PRODUCTION RATE

(DOLLARS IN THOUSANDS)

FUNDING REQUIREMENTS

Total \$20,514 \$31,594 \$34,714 \$26,158 \$69,428 \$123,699 \$138,611 \$185,793 \$212,439 \$250,575 \$304,358 \$293,357 \$282,111 \$282,111 \$190,193 \$4,409 \$2,450,797 \$733

40/YR PRODUCTION RATE

(DOLLARS IN THOUSANDS)

<u>DDT &E</u> <u>PRODUCTION RECURRING</u> <u>PRODUCTION FACILITIES</u> <u>TOTAL PROGRAM</u>

\$256,902 \$1,825,696 \$105,024 \$2,187,622

FUNDING REQUIREMENTS

Total \$20,514 \$31,594 \$34,714 \$26,158 \$75,042 \$143,097 \$154,011 \$209,421 \$224,036 \$220,110 \$216,183 \$214,002 \$212,038 \$210,075 \$190,006 \$5,888 \$2,187,622

20/YR PRODUCTION RATE (DOLLARS IN THOUSANDS)

 DDT &E
 PRODUCTION RECURRING
 PRODUCTION FACILITIES
 TOTAL PROGRAM

 \$256,902
 \$1,182,435
 \$64,713
 \$1,504,050

FUNDING REQUIREMENTS

 1973
 1974
 1975
 1976
 1977
 1978
 1979
 1980
 1981
 1982
 1983
 1984
 1985
 1986
 1987
 1988
 1989
 Total

 \$733
 \$20,514
 \$31,594
 \$34,714
 \$26,158
 \$83,582
 \$159,972
 \$159,223
 \$136,608
 \$135,260
 \$132,563
 \$130,017
 \$128,669
 \$126,123
 \$124,774
 \$66,956
 \$6,590
 \$1,504,050

10/YR PRODUCTION RATE

(DOLLARS IN THOUSANDS)

DDT &E	PRODUCTION RECURRING	PRODUCTION FACILITIES	TOTAL PROGRAM	
\$256,902	\$692,620	\$52,861	\$1, 002, 383	

FUNDING REQUIREMENTS

 1973
 1974
 1975
 1976
 1977
 1978
 1979
 1980
 1981
 1982
 1983
 1984
 1985
 1986
 1987
 1988
 1989
 Total

 \$733
 \$20,514
 \$31,594
 \$34,714
 \$26,158
 \$94,741
 \$125,095
 \$95,406
 \$78,801
 \$78,004
 \$77,207
 \$74,816
 \$74,020
 \$73,223
 \$71,529
 \$41,841
 \$3,987
 \$1,002,383

5.2.3.2 Ceiling Cost

5.2.3.2.1 With TVC and W/O TT

(DOLLARS IN THOUSANDS) DATE 15 March 1972

		DDT & E	DDT & E		REFU	60/YR RATE RBISH AND RECOV	/ERY	PROD PROGRAM		REFURBISH	OPERATIONS	15 March 1972
	DDT & E TOTAL	REFURBISH AND RECOVERY DELTA			PRODUCTION DELTA	TOOLING DELTA	FACILITIES DELTA	WITH REFURBISH AND RECOVERY TOTAL (2)	OPERATIONS TOTAL	AND RECOVERY OPERATIONS DELTA	WITH REFURBISH AND RECOVERY TOTAL (3)	TOTAL PROGRAM
SRM												
PROGRAM MANAGEMENT	2,973		2,973	14, 325				14, 325	759		759	18, 057
SYSTEM ENGINEERING	6, 309	315	6, 624	7,189				7, 189			1	13, 813
SRM'S	128, 483	(11, 179)	117, 304	3, 708, 282	(1, 528, 074)	(1, 571)		2,178,637				2,295,941
CASE	52,118	(12, 190)	39,928	1, 883, 824	(1, 385, 032)	(1, 654)		497, 138				537,066
NOZZLE	21,669	768	22,437	520, 465	(56, 149)	83		464, 399				486, 836
IGNITER	1,356		1,356	11,785				11, 785				13, 141
PROPELLANT AND LINER	27,620		27,620	868, 328				868, 328				895, 948
POWER SUPPLY DISTRIBUTION	1,694	(46)	1,648	61,749	(4, 447)			57, 302				58,950
FINAL ASSEMBLY	7,824		7,824	156, 976				156, 976				164,800
GROUND TEST	3,183	165	3,348	4,637				4, 637				7,985
AUXILIARY POWER UNIT (APU)	13,019	124	13,143	200,518	(82, 446)			118,072				131, 215
THRUST TERMINATION												ADA, 240
INSTALLATION ASSEMBLY AND CHECKOUT	1,001		1,001						8,932		8, 932	9, 933
FACILITIES	8, 593		8,593	147, 840			(45, 366)	102,474		26, 856	26,856	137, 923
SUPPORT EQUIPMENT AND SPARES	3,734		3,734	6,418			 `	6, 418	5, 688		5,688	15, 840
FLIGHT TEST SUPPORT	643	125	768	10,264			· · · · · · · · · · · · · · · · · · ·	10,264			- 0,000	11, 032
OPERATIONS SUPPORT	350		350						4,535		4,535	4,885
STRUCTURE	16,636	(1, 651)	14,985	478,063	(403, 089)			74, 974	1,000		4,000	89, 959
RECOVERY SYSTEM		121,395	121,395		1					121,920	121,920	243, 315
TRANSPORTATION	2,764	83	2,847	154,090	11,957			166,047		223,020		168, 894
								250,011				100,004
										,		
TOTAL PROGRAMS	171,486	109,088	280,574	4, 526, 471	(1, 919, 206)	(1, 571)	(45, 366)	2,560,328	19,914	148,776	168, 690	3,009,592

NOTE: TOTAL PROGRAM IS SUM OF COLUMN 1, 2, AND 3

60/YEAR PRODUCTION RATE

(DOLLARS IN THOUSANDS)

FUNDING REQUIREMENTS

Total \$901 \$25,011 \$38,532 \$42,635 \$32,127 \$85,271 \$151,926 \$170,241 \$228,190 \$270,917 \$307,756 \$373,811 \$360,299 \$346,488 \$346,488 \$233,594 \$5,405 \$3,009,592

40/YEAR PRODUCTION RATE

(DOLLARS IN THOUSANDS)

DDT&E	PRODUCTION	PRODUCTION	TOTA L
	RECURRING	FACILITIES	PROGRAM
\$280,574	\$2, 287, 386	\$113,958	\$2,681,918

FUNDING REQUIREMENTS

1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	<u>1985</u>	1986	1987	1988	1989	Total
\$901	\$25,011	\$38, 532	\$42,635	\$32, 127	\$92,014	\$175, 227	\$188,842	\$256,783	\$274,704	\$269,889	\$265,075	\$262,400	\$259,993	\$257, 585	\$232,977	\$7, 223	\$2,681,918

20/YEAR PRODUCTION RATE

(DOLLARS IN THOUSANDS)

			DDT&E			RECURE:					FACILITI					TOTAL PROGRA	<u>M</u> v
			\$280,574	:		\$1,480,9	26				\$70,218					\$1,831,7	18
FUNDIN	G REQUIRE	MENTS															
1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	Total
\$901	\$25,011	\$38, 532	\$42,635	\$32,127	\$101,814	\$194, 319	\$193,407	\$166,405	\$164,763	\$161,479	\$158,377	\$156, 735	\$153,633	\$151,991	\$81,561	\$8,028	\$1,831,718

10/YEAR PRODUCTION RATE

(DOLLARS IN THOUSANDS)

			DDT&E			PRODUCT RECURRI					PRODUC FACILIT					TOTAL PROGRA	M
			\$280,574			\$869,823					\$57, 357					\$1,207,7	54
FUNDING	G REQUIRE	MENTS															
1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	Total
\$901	\$25,011	\$38,532	\$42,635	\$32, 127	\$114, 182	\$149,524	\$113,744	\$94,972	\$94,011	\$93,051	\$90, 169	\$89, 209	\$88, 248	\$86, 207	\$50, 428	\$4,803	\$1,207,754

5.2.3.2.2 With TVC and TT

CEILING COST 156 INCH SRM WITH REFURBISHMENT AND RECOVERY SERIES BURN WITH TVC & TT (DOLLARS IN THOUSANDS)

DATE 15 March 1972

			DDT & E WITH REFURBISH	PRODUCTION		60/YR RATE RBISH AND RECOV		PROD PROGRAM WITH REFURBISH	i			
	DDT & E TOTAL	AND RECOVERY DELTA	AND RECOVERY TOTAL (1)	PROGRAM TOTAL	PRODUCTION DELTA	TOOLING DELTA	FACILITIES DELTA	AND RECOVERY TOTAL (2)	OPERATIONS TOTAL	OPERATIONS DELTA	AND RECOVERY TOTAL (3)	TOTAL PROGRAM
SRM												
PROGRAM MANAGEMENT	2,973		2,973	14, 325				14, 325	759		759	18, 057
SYSTEM ENGINEERING	6,309	315	6, 624	7,189				7,189				13, 813
SRM'S	129, 547	(11, 179)	118, 368	3,727,038	(1,528,074)	(1, 571)		2,197,393				2,315,761
CASE	52,118	(12, 190)	39,928	1, 883, 824	(1, 385, 032)	(1, 654)		497,138				. 537,066
NOZZLE	21,669	768	22,437	520, 465	(56, 149)	83		464, 399				486, 836
IGNITER	1,356		1,356	11,785				11, 785				13, 141
PROPELLANT AND LINER	27,620		27,620	868, 328				868, 328				895, 948
POWER SUPPLY DISTRIBUTION	1,694	(46)	1,648	61,749	(4, 447)			57, 302				58, 950
FINAL ASSEMBLY	7.824		7,824	156,976				156,976		<u></u> _		164, 800
GROUND TEST	3,183	165	3,348	4, 637				4, 637				7,98
AUXILIARY POWER UNIT (APU)	13,019	124	13, 143	200,518	(82, 446)			118,072				131, 215
THRUST TERMINATION	1,064		1,064	18,756				18, 756				19, 820
INSTALLATION ASSEMBLY AND CHECKOUT	1,001		1,001						8,932		8, 932	9, 93
FACILITIES	8,593		8,593	147,840			(45, 366)	102,474		26, 856	26, 856	137, 923
SUPPORT EQUIPMENT AND SPARES	3,734		3,734	6,418				6,418	5,688		5,688	15,840
FLIGHT TEST SUPPORT	643	125	768	10,264				10, 264				11,032
OPERATIONS SUPPORT	350		350						4,535		4,535	4,885
STRUCTURE	16,636	(1, 651)	14, 985	478,063	(403, 089)		· · · · · · · · · · · · · · · · · · ·	74,974				89, 959
RECOVERY SYSTEM		121, 395	121, 395							121,920	121,920	243, 315
TRANSPORTATION	2,764	83	2,847	154,090	11,957			166, 047				168, 894
	 											
TOTAL PROGRAMS	172,550	109,088	281,638	4, 545, 227	(1, 919, 206)	(1, 571)	(45, 366)	2,579,084	19,914	148, 776	168, 690	3,029,41

NOTE: TOTAL PROGRAM IS SUM OF COLUMN 1, 2, AND 3

CEILING COST 156 INCH SRM WITH REFURBISHMENT & RECOVERY SERIES BURN WITH TVC & TT 60/YEAR PRODUCTION RATE

FUNDING REQUIREMENTS

1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 Total
\$ 907 \$ 25, 158 \$ 38, 758 \$ 42, 917 \$ 32, 339 \$ 85, 834 \$152, 929 \$171, 365 \$229, 696 \$262, 639 \$309, 787 \$376, 278 \$362, 678 \$348, 775 \$348, 775 \$235, 136 \$ 5, 441 \$3, 029, 412

40/YEAR PRODUCTION RATE

(DOLLARS IN THOUSANDS)

DDT&E	PRODUCTION RECURRING	PRODUCTION FACILITIES	TOTAL PROGRAM
\$281,638	\$2, 304, 282	\$113,958	\$2, 699, 878
FUNCING REQUIREMENTS			

\$25,158 \$28,758 \$42,917 \$32,339 \$92,632 \$176,418 \$190,110 \$258,507 \$276,549 \$271,702 \$266,855 \$264,162 \$261,738 \$259,315 \$234,541 \$7,270 \$2,699,878

Total

\$907

20/YEAR PRODUCTION RATE

(DOLLARS IN THOUSANDS)

DDT&E	. PRODUCTION	PRODUCTION	TOTAL
	RECURRING	FACILITIES	PROGRAM
\$281,638	\$1,491,706	\$70, 218	\$1,843,562

FUNDING REQUIREMENTS

1973	1974	1975	<u> 1976</u>	1977	1978	1979	1980	1981	1982	1983	1984	1985	<u>1986</u>	1987	1988	1989	<u>Total</u>
\$907	\$25, 158	\$38,758	\$42,917	\$32, 339	\$102,475	\$195, 572	\$194,654	\$167,486	\$165,833	\$162,527	\$159,405	\$157,752	\$154,630	\$152,978	\$82,090	\$8, 081	\$1.843.562

10/YEAR PRODUCTION RATE

(DOLLARS IN THOUSANDS)

DDT&E	PRODUCTION	PRODUCTION	TOTAL
	RECURRING	FACILITIES	PROGRAM
\$281,638	\$876, 287	\$57,357	\$1, 215, 282

FUNDING REQUIREMENTS

1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	Total
\$907	\$25, 158	\$38,758	\$42,917	\$32, 339	\$114,898	\$150,438	\$114,434	\$95,567	\$94,601	\$93,634	\$90,735	\$89,768	\$88,802	\$86.748	\$50.744	\$4, 834	\$1, 215, 282

5.3 260 Inch Series Expendable Cost

260 INCH SERIES BURN

Presented in this section are the probable costs for the expendable and recoverable 260-inch Series Configuration. Since these costs were extrapolated from statistical data, they are presented in total cost only for DDT&E, Production recurring and Production Facilities for the 60, 40, 20 and 10 launch rates.

For your convenience a cost summary is included in the front of this section summarizing the cost detail which follows.

5.3.1 Summary

SUMMARY 260 INCH SRM SERIES BURN

(DOLLARS IN THOUSANDS)

		Producti	on		Produc	tion		Produc	tion		Production		
		60/Year H	Rate	Total	40/Year		Total	20/Yea		Total	10/Year I	Rate	Total
	DDT&E	Recurring	Facilities	Program	Recurring	Facilities	Program	Recurring	<u>Facilities</u>	Program	Recurring	Facilities	Program
Series Burn-Expendable													
Probable Cost													
With TVC	230, 473	3, 181, 766	148,000	3, 560, 239	2,709,818	130,000	3,070,291	1, 698, 066	80,000	2,008,539	940,996	66,000	1, 237, 469
Recurring Cost/Launch		7, 231			7,698			8,663			9,317		
Peak Annual Funding	50, 555	443, 250			315, 319			212,317			135,750		
Series Burn-Recoverable													
Probable Cost													
With TVC	376, 178	1,908,720	129,000	2, 413, 898	1,725,504	114,000	2, 215, 682	1, 124, 060	70,000	1,570,238	671, 953	58,000	1, 106, 131
Recurring Cost/Launch		4,338			4, 902			5,735			6, 653		
Peak Annual Funding	35,920	299,882			227,001			170, 282			124, 504		

5.3.2 260 Inch Series Expendable Probable Cost

60/YEAR PRODUCTION RATE

(DOLLARS IN THOUSANDS)

DDT&E	PRODUCTION	PRODUCTION FACILITIES	TOTAL PROGRAM
		THOTELTIES	1110011111
\$230, 473	\$3, 181, 766	\$148,000	\$3,560,239

FUNDING REQUIREMENTS

1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	Total	
\$1.068	\$26 346	\$40, 587	\$50, 555	\$38, 095	\$101,111	\$180, 148	\$201.866	\$270,578	\$309, 385	\$364.924	\$443, 250	\$427, 229	\$410,852	\$410,852	\$276,987	\$6,406	\$3,560,239	

40/YEAR PRODUCTION RATE

(DOLLARS IN THOUSANDS)

PRODUCTION

TOTAL

						<u>F</u>				FACILITIES				PROGRAM				
		-	\$230, 473			\$2, 709, 8	818			\$130,000)			\$3,070,29	91			
FUNDING	REQUIRE	MENTS																
1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	Total	
\$1,068	\$26,346	\$40,587	\$50,555	\$38,095	\$105,618	\$196, 126	\$21 6, 763	\$294,748	\$315, 319	\$309,792	\$304,266	\$301,196	\$298,432	\$295,669	\$267,421	\$8, 290	\$3,070,291	

PRODUCTION

DDT&E

20/YEAR PRODUCTION RATE

(DOLLARS IN THOUSANDS)

aDDT&E	PRODUCTION	PRODUCTION FACILITIES	TOTAL PROGRAM
\$230, 473	\$1,698,066	\$80,000	\$2,008,539

FUNDING REQUIREMENTS

1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 Total
\$1,068 \$26,346 \$40,587 \$50,555 \$38,095 \$112,076 \$212,317 \$203,264 \$183,179 \$181,371 \$177,756 \$174,341 \$172,534 \$169,119 \$167,311 \$89,782 \$8,838 \$2,008,539

10/YEAR PRODUCTION RATE

			DDT&E							PR ODUCTION FACILITIES				TOTAL PROGRAM				
										FACILIT	125			IKOGKA	***			
			\$230, 473			\$940, 996	5			\$66,000				\$1,237,4	69			
FUNDING	G REQUIRE	MENTS																
1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	Total	
\$1,068	\$26, 346	\$40,587	\$50,555	\$38,095	\$117,683	\$135,750	\$106,985	\$105,995	\$96, 894	\$95, 904	\$92,934	\$91,944	\$90, 954	\$88,850	\$51,974	\$4,951	\$1,237,469	

5.3.3 260 Inch Series Recoverable Probable Cost

60/YEAR PRODUCTION RATE

(DOLLARS IN THOUSANDS)

DDT&E	PRODUCTION	PRODUCTION FACILITIES	TOTAL PROGRAM
-	 	FACILITIES	PROGRAM
\$376, 178	\$1, 908, 720	\$129,000	\$2,529,608

FUNDING REQUIREMENTS

1973	1974	1975	1976	1977	1978	1979	<u>1980</u>	1981	1982	1983	1984	1985	1986	1987	1988	1989	Total
\$759	\$18.719	\$28, 838	\$35, 920	\$27, 067	\$68, 407	\$121, 880	\$136, 573	\$183.060	\$209.315	\$246, 891	\$299,882	\$289.043	\$277, 963	\$277, 963	\$187, 397	\$4, 221	\$2, 413, 898

40/YEAR PRODUCTION RATE

(DOLLARS IN THOUSANDS)

DDT&E	PRODUCTION	PRODUCTION FACILITIES	TOTAL PROGRAM
\$376. 178	\$1,725,504	\$114.000	\$2,215,682

FUNDING REQUIREMENTS

1973	1974	1975	1976	1977	1978	<u>1979</u>	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	Total
\$ 750	¢18 719	¢28 838	¢35 920	\$27 067	\$76, 035	\$147, 951	\$156, 049	\$212, 192	\$227,001	\$223,022	\$219.044	\$216.834	\$214.844	\$212.855	\$192,520	\$6,032	\$2,215,682

20/YEAR PRODUCTION RATE

DDT&E	PRODUCTION	PRODUCTION FACILITIES	TOTAL PROGRAM	
\$376, 178	\$1,124 <u>,</u> 060	\$70,000	\$1,570,238	

FUNDING	REQUIREMENTS

1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	Total	
\$759	\$18,719	\$28, 838	\$35,920	\$27,067	\$87, 329	\$170, 282	\$169, 498	\$142,731	\$141,322	\$138,505	\$135,845	\$134,436	\$131,775	\$130,368	\$69,957	\$6,887	\$1,570,238	3

10/YEAR PRODUCTION RATE

			DDT&E			PRODUCTION					PRODUCTION FACILITIES				TOTA L PROGRAM				
			\$376, 17	8		\$671,95	3			\$58,000)			\$1,106,1	31				
FUNDING	G REQUIRE	MENTS																	
1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	Total		
\$759	\$18,719	\$28,838	\$35,920	\$27,067	\$104,734	\$124,504	\$121,685	\$97,112	\$86, 231	\$85,350	\$82,707	\$81,826	\$80,945	\$79,073	\$46,254	\$4,40 7	\$1,106,131		

5.4 120 Inch Parallel Expendable Probable Cost

120 INCH PARALLEL BURN

Presented in this section are the expendable probable costs only for the 120-inch parallel configuration. Since these costs were extrapolated from statistical data, they are presented in total cost only for the DDT&E, Production recurring and Production Facilities for the 60, 40, 20 and 10 launch rates.

For your convenience a cost summary is included in the front of this section summarizing the cost detail which follows.

5.4.1 Summary

SUMMARY 120 INCH SRM PARALLEL BURN

	DDT&E	Production 60/Year I		Total Program	Production 40/Year Recurring		Total Program	Producti 20/Year Recurring		Total Program	Producti 10/Year i Recurring		Total Program
Parallel Burn - Expendable													
Probable Cost Without TVC 7 TT Recurring Cost/Launch Peak Annual Funding	97, 395 37, 063	2, 312, 279 5, 255 324, 954	200, 398	2, 610, 072	1, 995, 999 5, 670 229, 708	143, 295	2, 236, 689	1, 207, 468 6, 161 143, 665	107,768	1, 412, 631	655, 355 6, 489 93, 095	95, 884	848, 634

5.4.2	120 Inch Parallel Expendable Probable Cost

60/YEAR PRODUCTION RATE

(DOLLARS IN THOUSANDS)

PRODUCTION

TOTAL

			·			RECURRI	NG			FACILITI	ES			PROGRAI	<u>vi</u>			
	\$97, 395			\$2, 312, 279				\$200, 398	3			\$2,610,0	72					
FUNDING	G REQUIRE	MENTS																
1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	Total	
\$783	\$19,315	\$29,755	\$37,063	\$27,928	\$74,126	\$132,070	\$147,991	\$198,365	\$226,815	\$267,532	\$324,954	\$313, 209	\$301,202	\$301,202	\$203,064	\$4,698	\$2,610,072	

PRODUCTION

DDT&E

40/YEAR PRODUCTION RATE

(DOLLARS IN THOUSANDS)

DDT&E	PRODUCTION	PRODUCTION	TOTAL
	RECURRING	FACILITIES	PROGRAM
\$97, 395	\$1,995,999	\$143, 295	\$2, 236, 689

FUNDING REQUIREMENTS

1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	Total
\$783	\$19, 315	\$29,755	\$37,063	\$27,928	\$76,942	\$142, 152	\$157,910	\$214,722	\$229,708	\$225,682	\$221,656	\$219,419	\$217,406	\$215,393	\$194,816	\$6,039	\$2,236,689

20/YEAR PRODUCTION RATE

			DDT&E			PRODUCT RECURRI				PRODUCT FACILITI				TOTAL PROGRAM	4			
														A1 412 (2	_			
			\$97,395			\$1, 207, 46	58			\$107,768	!			\$1,412,63	1			
FUND																		
FUNDING	G REQUIRE	MENTS																
1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	Tota1	
\$783	\$19,315	\$29,755	\$37,063	\$27,928	\$78,825	\$144,657	\$142,958	\$128,832	\$127,561	\$125,018	\$122,616	\$121,345	\$118,944	\$117,672	\$63, 145	\$6, 214	\$1,412,631	

10/YEAR PRODUCTION RATE

	DDT&E						PRODUCTION FACILITIES				TOTAL PROGRAM						
			\$97,395	i		\$655, 35	5			\$95,884				\$848,63	4		
FUNDIN	G REQUIRE	MENTS															
1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	<u>Total</u>
\$783	\$19,315	\$29,755	\$37,063	\$27,928	\$80,705	\$93,095	\$71,518	\$67,127	\$66, 448	\$65,769	\$63,732	\$63,054	\$62,375	\$60,932	\$35,643	\$3,392	\$848,634

6.0 FACILITIES - PARALLEL BURN

Identified below are the Thiokol and vendor facilities required for use on the 156 inch SRM Booster DDT&E and 60 peak annual production rate programs. It has been determined that of the total facility cost identified by the case subcontractor thirty thousand dollars of tooling was inadvertently included. This was discovered too late to change the cost in order to reflect the proper dollar allocation between tooling and facilities.

Facility Use	Facility *Cost	Tooling *Cost	Total *Cost
Thiokol	\$13,931	\$ -	\$ 13,931
Case	30,024	32,910	62,934
Nozzle	10,045	-	10,045
Insulation	6,658	-	6,658
Ammonium Perchlorate	13, 164	•	13, 164
Operation Site	1,718		1,718
Total	\$75,540	\$32,910	\$108,450

 $^{^*}$ (Dollars in Thousands)

7.0 MAXIMUM SUCCESS SCHEDULE

7.1 COST IMPACT TO DDT&E PROGRAM

If the maximum success schedule is considered it will have a cost savings effect to the program which was costed to the baseline schedule. This savings results from reduction in time-related costs since the maximum schedule reduces the DDT&E program by six months. The cost reductions are made in level-of-effort type cost in Program Management, System Engineering, Manufacturing Support, Installation Assembly and Checkout, and Operations Site Support.

These savings, stated in thousands of dollars, are as follows:

Parallel Configuration - DDT&E

Probable Cost

(\$1, 273)

Ceiling Cost

(\$1,333)

Series Configuration - DDT&E

Probable Cost

(\$1,371)

Ceiling Cost

(\$1,436)

8.0 PARAMETRIC COST DATA

The CER's requested by NASA are included in this section and the costs shown do not include facility cost. CER's are presented as follows:

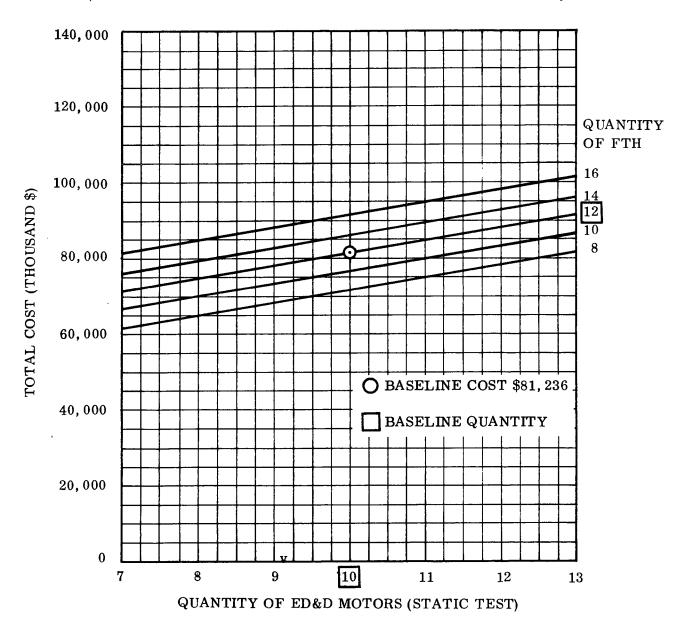
- SCHEDULE I DDT & E Cost = Function of Static Test or FTH Motor Quantity
 - Schedule IA Probable Cost 156 Inch SRM
 Parallel Burn without TVC/TT
 - Schedule IB Probable Cost 156 Inch SRM
 Parallel Burn with TVC/TT
 - Schedule IC Ceiling Cost 156 Inch SRM
 Parallel Burn without TVC/TT
- SCHEDULE II DDT & E Cost = Function of Gross Weight
 - Schedule IIA Probable Cost 156 Inch SRM
 Parallel Burn without TVC/TT
 - Schedule IIB Probable Cost 156 Inch SRM
 Parallel Burn with TVC/TT
 - Schedule IIC Ceiling Cost 156 Inch SRM
 Parallel Burn without TVC/TT
- SCHEDULE III Production Cost = Function of Motor Quantity and/or Weight Variance
 - Schedule III A Probable Cost 156 Inch SRM
 Parallel Burn without TVC/TT
 - Schedule III B Probable Cost 156 Inch SRM
 Parallel Burn with TVC/TT
 - Schedule III C Probable Cost 156 Inch SRM
 Parallel Burn without TVC/TT

Schedule I shows the cost variance to the DDT & E Program by changing ED & D motors (static test motors) or FTH motors within the quantity restraints as shown. Due to Fix Cost a total of four motors change is the limit of variance which can be permitted within this CER. To interpolate from this graph, if you choose to select a cost impact by changing from ten to twelve ED & D motors, read the grid across the bottom to twelve, then move up the grid until you intersect with the baseline quantity of twelve FTH motors; move across the grid to the left for the total program cost.

Schedule II can be interpolated by determining the gross weight required, then moving up the grid to the intersecting line, then moving to the left grid for total DDT & E cost.

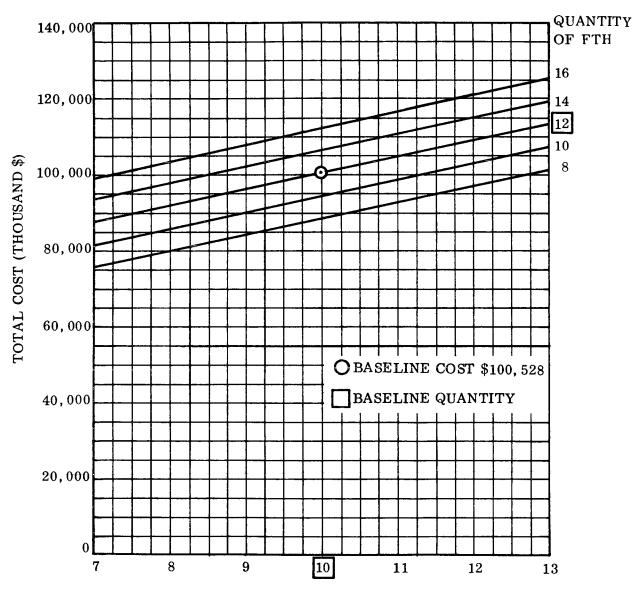
Schedule III can be interpolated for production cost for the baseline weight by selecting the quantity from the bottom grid and moving up until you intersect the solid line, then moving to the left grid for total cost. If you choose to change the gross weight the two lines on each side of the baseline (solid line) represent cost effect of ten and twenty percent weight variances. These weight variances can be interpolated the same as the baseline above.

DDT & E COST = FUNCTION OF FTH OR STATIC TEST MOTOR QUANTITY



PROBABLE COST 156 IN. SRM PARALLEL BURN WITHOUT TVC/TT (SCHEDULE IA)

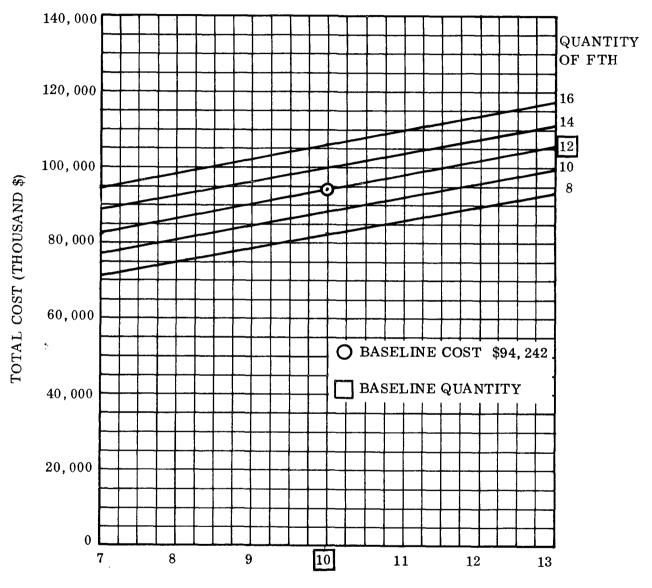
DDT & E COST = FUNCTION OF FTH OR STATIC TEST MOTOR QUANTITY



QUANTITY OF ED & D MOTORS (STATIC TEST)

PROBABLE COST 156 IN. SRM PARALLEL BURN WITH TVC/TT (SCHEDULE I B)

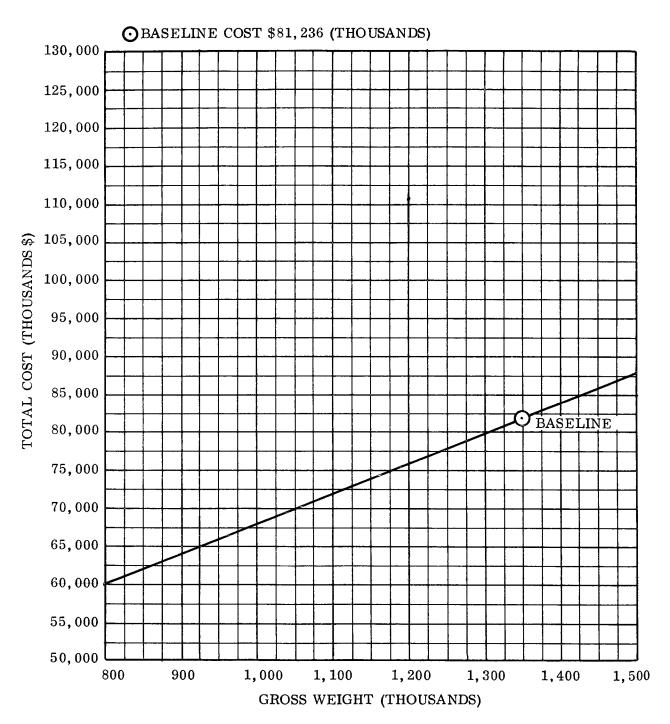
DDT & E COST = FUNCTION OF FTH OR STATIC TEST MOTOR QUANTITY



QUANTITY OF ED & D MOTOR (STATIC TEST)

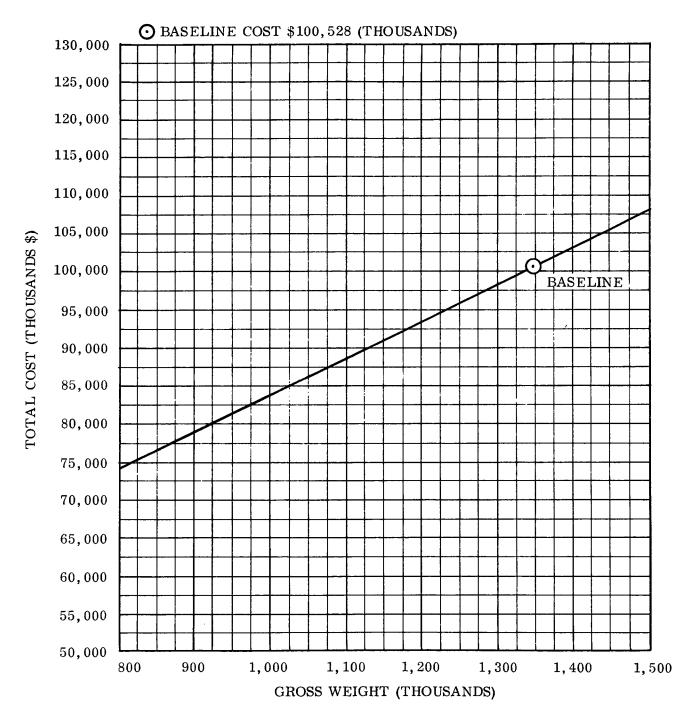
CEILING COST 156 IN. SRM PARALLEL BURN WITHOUT TVC/TT (SCHEDULE I C)

DDT & E COST = FUNCTION OF GROSS WEIGHT



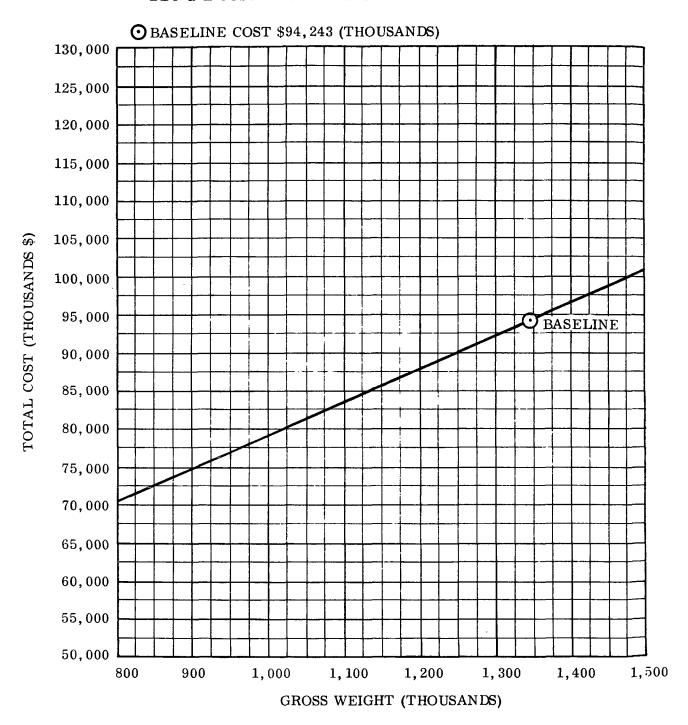
Probable Cost 156 Inch SRM Parallel Burn Without TVC/TT (Schedule II A)

DDT & E COST = FUNCTION OF GROSS WEIGHT

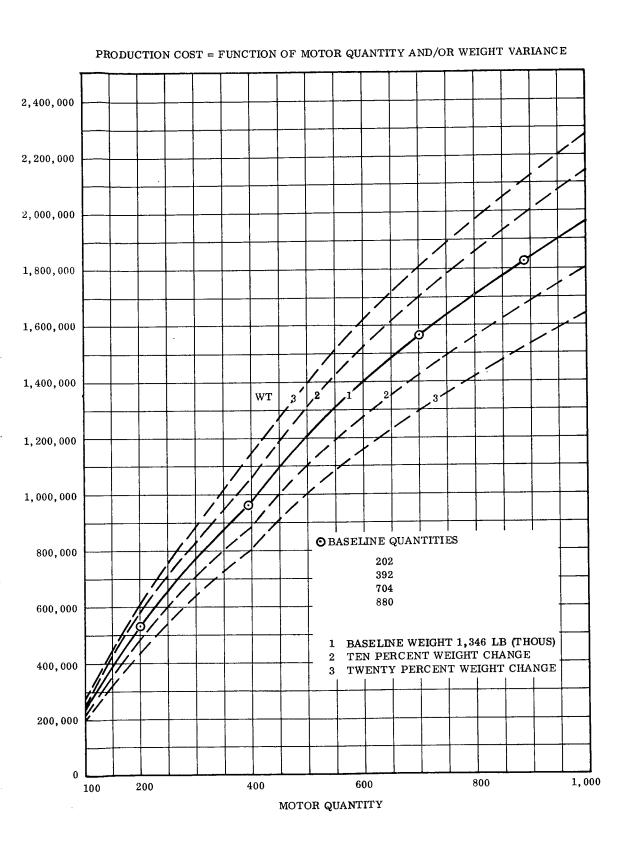


Probable Cost 156 Inch SRM Parallel Burn With TVC/TT (Schedule II B)

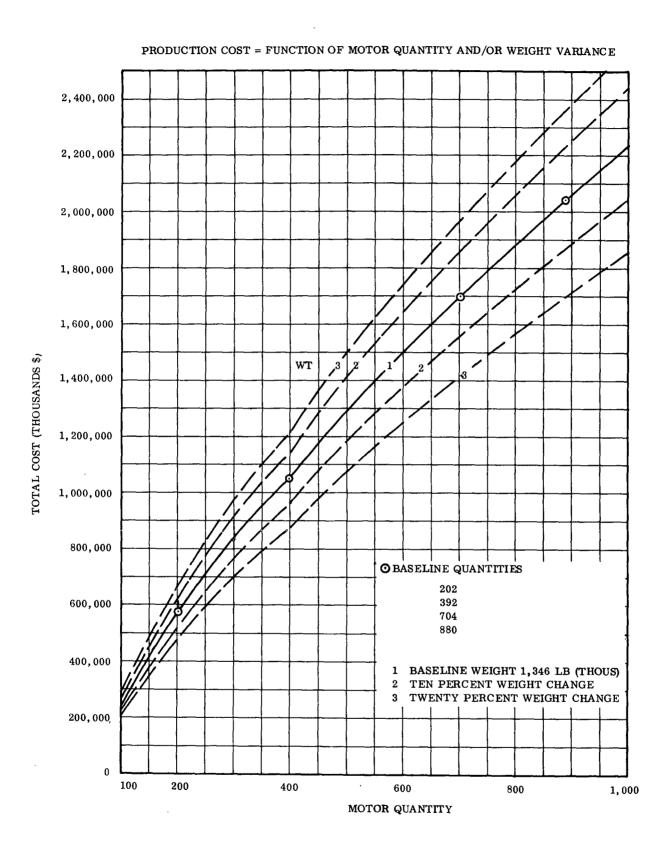
DDT & E COST = FUNCTION OF GROSS WEIGHT



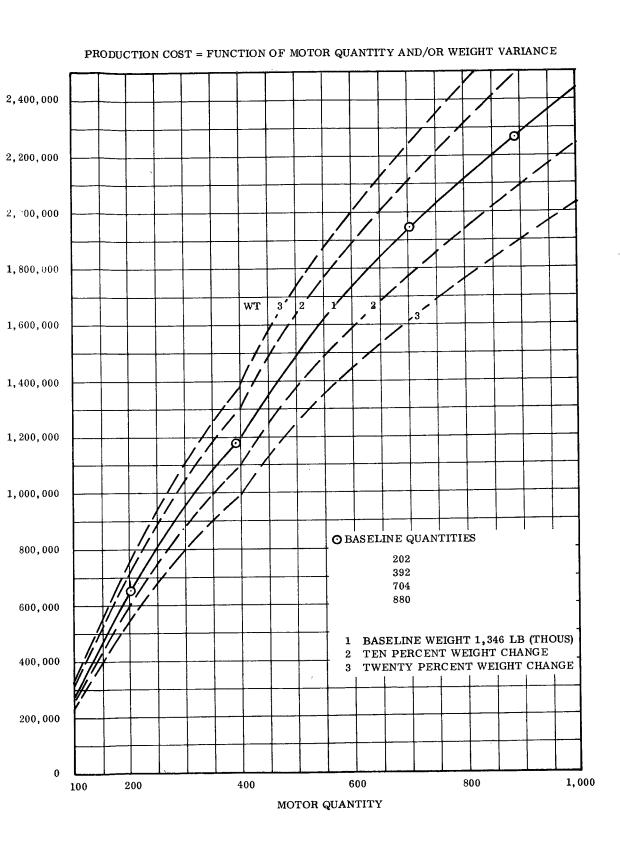
Ceiling Cost 156 Inch SRM Parallel Burn Without TVC/TT (Schedule II C)



Probable Cost 156 Inch SRM Parallel Burn Without TVC/TT (Schedule III A)



Probable Cost 156 Inch SRM Parallel Burn With TVC/TT (Schedule III B)



Ceiling Cost 156 Inch SRM Parallel Burn Without TVC/TT (Schedule III C)