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EXPANDED GREB PROGRAM PROPOSAL

BYE-057424-99

Launch Vehicle and Related SubjectsVehicle Selection

The THOR ABLESTAR Space booster has been selected as the optimum launch vehicle to support an expanded GREB program. This vehicle has been selected because of its ready availability; suitability from payload handling and environment point-of-view; adaptability to multiple payload operations; launch reliability; payload field crew familiarity; and relatively moderate cost. An additional reason for its selection, although not primary, involves the TRANSIT program selection of the THOR ABLESTAR as the interim operational launch vehicle.

This higher quantity production and vehicle utilization rate will not only reduce costs but will tend to improve vehicle reliability.

Vehicle Procurement

Launch vehicles are procured by the Space Systems Division of the Air Force Systems Command upon receipt of funds and authorization from the Bureau of Naval Weapons. Depending upon THOR booster availability, seven months leadtime is required from the time procurement initiation until the launch is accomplished. An expanded program with continuing launches, however, will provide sufficient program stability through increased numbers of operations to overcome current problems resulting from starting and stopping production.

Vehicle Launch Operation

Launch operations are conducted by civilian launch crews under the direction of the 65 55th Aerospace Test Wing of the Air Force Systems Command. Launch complex 17 at Atlantic Missile Range is configured for the THOR ABLESTAR and will be utilized for this program pending availability of suitable facilities

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in the PMR. Should the launch operation move to the PMR, the launch operation would be directed by the 6595th A. T.W. of the AFSC. Continuation of the operation from the AMR is [redacted] aded because of facilities availability; proximity to payload assembly; proven launch operation; thoroughly trained launch crew; and lower costs. The problem of overflight of inhabited land masses has been studied exhaustively and impact probabilities are sufficiently remote to singly not justify moving the operation. To achieve the required orbital inclination out of PMR without sacrificing significant amounts of payload capability may require overflight of southern California. This problem is currently under study by SSD.

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Launch Operations Costs

Recent estimates prepared by the Space Systems Division of the AFSC for the Navy's TRANSIT Program indicate a cost of 2.5 million per launch operation in quantities of six per year. This figure is believed to be optimistic by from .75 to 1.0 million per launch. However, by programming for five THOR ABLESTAR operations yearly, it is estimated that a total of at least four successful launch operations can be conducted on an annual basis. Launch operations are planned to occur at three month intervals. Launch failures will be backed up by following operations. Costs are estimated as follows:

	<u>FY 63</u>	<u>FY 64</u>
1st Stage THOR and DAC Launch	5.275	5.275
2nd Stage ABLE STAR & A/J Launch	7.500	7.500
BTL Guidance	1.250	1.250
Technical Assistance	.800	.800
Propellants, Transportation	.800	.800
Communications, Admin. Etc.		
	<u>15.625</u>	<u>15.625</u>

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[redacted] 3.25/launch

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Possible Additional Costs

It is anticipated that an improvement in the ABLESTAR stage of the launch vehicle will be required ly in the program. The least complex improvement that promises significant increase in orbital weight capability involves merely a change in propellants. The vehicle currently utilizes unsymmetrical Dimethyl Hydrazine with Inhibited Red Fuming Nitric Acid as an oxidizer. The proposed improvement will use Mono-Methyl Hydrazine and Nitric Tetroxide as an oxidizer. The new fuel will provide relatively large improvements in specific impulse and since optimum mixture ratios are the same for both fuel combinations there is no change in tankage required. Costs for this improvement are estimated at approximately 1.2 million dollars and will require an estimated ten months to accomplish. Program share of a PMR THOR ABLESTAR capability is estimated at approximately 1.0 million.

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