FY 1983 RDT&E DESCRIPTIVE SUMMARY

Program Element: #35158F
DoD Mission Area: Strategic Communications, #333

Title: Satellite Data System
Budget Activity: Strategic Programs, #3

(U) RESOURCES (PROJECT LISTING)($ in thousands):

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Costs
N/A	TOTAL FOR PROGRAM ELEMENT	43,104	28,393	7,886	2,614		

(U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The Satellite Data System is a multi-payload, communications satellite which provides reliable communications. The Satellite Data System provides a portion of the coverage required by the Air Force Satellite Communications System for essential command and control communications to our nuclear capable forces. It also provides a high speed link between Air Force Satellite Control Facility remote tracking stations for command and control.

(U) BASIS FOR FY 1983 RDT&E REQUEST: This request includes funds for completing the multi-year design and development efforts to improve the anti-jam capabilities of the Air Force Satellite Communications System payload. Also included is the multi-year development necessary to produce a Space Shuttle optimized satellite. Sustaining engineering support and the System Program Office, required on a continuing basis, are also included. These estimates are based on contractor proposals and past experience for the sustaining engineering support.

(U) COMPARISON WITH FY 1982 DESCRIPTIVE SUMMARY:

	FY 1981	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Costs
RDT&E	43,200	29,100	15,600		Continuing	Not Applicable
Procurement (MISSILE)	95,500	43,200	161,900		Continuing	Not Applicable

(U) OTHER APPROPRIATION FUNDS:

Procurement (MISSILE)	95,300	41,770	22,518	10,200	—	—
(Quantity)	(i)					
Operation and Maintenance	9,941	11,106	11,758	12,376	Continuing	Not Applicable

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(U) DETAILED BACKGROUND AND DESCRIPTION: The Satellite Data System provides critical real-time command, control, and communications for Strategic Air Command Single Integrated Operational Plan and other nuclear capable forces. It is an integral part of the Air Force Satellite Communications System which also includes the Ultra High Frequency communications capability on the geosynchronous Fleet Satellite Communications satellites, piggy-back transponders on selected host satellites, and airborne/ground radio terminals. As such, the Satellite Data System complements the Fleet Satellite Communications coverage by providing polar coverage which the other satellites cannot provide.
Additionally, the Satellite Data System supports the Air Force Satellite Control Facility requirement for reliable, two-way high data rate communications with its remote tracking stations.

The direct benefits of the Satellite Data System are reliable and secure direct communications which will result in greatly improved command and control of our nuclear capable forces, elimination of the dependence on some of the vulnerable Air Force Satellite Control Facility communications.

(U) RELATED ACTIVITIES: The space segment of the Fleet Satellite Communications System was developed, procured, and launched under the Navy's Program Element, 33109N. The Air Force ground Ultra High Frequency radio terminals needed for operation with the Fleet Satellite Communications and Satellite Data System satellites are funded within the Air Force Satellite Communications System Program Element, 33601F. Terminals installed in aircraft were funded in the specific weapons system/aircraft Program Element. The Air Force Satellite Control Facility network is funded under Space Shuttle Program Element, 35110F.
flights for the Satellite Data System satellites are provided by the Space Launch Support Program, Program Element, 35171F. MILSTAR, a new highly jam-resistant satellite is being developed under Program Element, 33603F.

(U) WORK PERFORMED BY: Air Force Systems Command's Space Division, Los Angeles, CA, is responsible for the Satellite Data System. The prime contractor is Hughes Aircraft Company, El Segundo, CA. General Systems Engineering and Integration is performed by the Aerospace Corporation, El Segundo, CA.

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(U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

(U) 1. FY 1981 and Prior Accomplishments: The technology phase of the program was completed in FY 1971. This was followed by a contract definition phase in FY 1972 which established the system configuration. The system acquisition contractor was selected by competitive source selection and a system development contract was awarded in June 1972. The system Critical Design Review was successfully completed in March 1974 with all critical specifications being met or exceeded. The structural model satellite testing was finished in May 1975. A qualification model satellite was built and tested to fully qualify the satellite prior to production. All payloads were fully checked out on-orbit. Full operational capability was declared for all payloads after successful on-orbit checkout.

Primary activities in FY 1981 included the continuation of design and development activities associated with improving the anti-jam capabilities of the Air Force Satellite Communications System payload on the seventh satellite (F-6), the continuation of the multi-year development of a Space Shuttle optimized design on the seventh satellite, reliability improvement efforts, and sustaining engineering support. The production of the fifth (F-5) and sixth (F-5A) satellites, to be launched on Titan/Agena, also continued in FY 81.

(U) 2. FY 1982 Program: Efforts for this year include sustaining engineering support, continuing design and development activities to improve the anti-jam capabilities of the Air Force Satellite Communications System payload on the seventh Satellite Data System satellite, and continuing the multi-year development necessary to transition that satellite to the Space Shuttle. Also included are continuing efforts to improve satellite payload reliabilities. the production of the sixth satellite continued.

(U) 3. FY 1983 Planned Program: Planned efforts include the completion of the development efforts related to the Space Shuttle optimization and the completion of the development of the Air Force Satellite Communications anti-jam improvements. Sustaining engineering support and the System Program Office will also be continued. The decrease in the current year R&D estimate from that of the previous year is the deletion of continued payload technology development. The decrease in procurement funds from last year's estimate

(U) 4. FY 1984 Planned Program: The FY 1984 plan is to continue sustaining engineering support, the System Program Office, launch support capability and on-orbit support of the SDS satellites.

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(U) 5. Program to Completion: SDS will continue to support the Air Force Satellite Communications System by providing critical communications coverage. The program will fund the launch support for three additional satellites, sustain engineering support and System Program Office and provide on-orbit support

(U) 6. Milestones:

	Date
Program Start	October 1971
System Preliminary Design Review	March 1973
System Critical Design Review	March 1974
Launch First Satellite (F-1)	
Launch Second Satellite (F-2)	
Full Operational Capability	
AFSATCOM System IOC	May 1979
Critical Design Review for Shuttle Optimized (Seventh) Satellite	June 1981

* Date presented in Fiscal Year 1982 Descriptive Summaries

(U) EXPLANATION OF MILESTONE CHANGES:

Budget Activity: Strategic Programs, #3
Program Element: #35158F, Satellite Data System

1. (U) Development Test and Evaluation: The development contractor for the Satellite Data System was Hughes Aircraft Company, El Segundo, California. The first satellite was launched
[Initial Operational Capability was established in[The first satellite (F-1) was funded entirely within the development program. The second satellite (F-2) was the first vehicle funded under the production program. The development hardware included engineering models of the communication subsystems, a structural model spacecraft (X-1) and a qualification model spacecraft (Y-1). Development tests of the communications subsystems engineering models were completed in November 1973. Structural testing was satisfactorily completed on the X-1 engineering model spacecraft in May 1975. Systems level qualification was completed in October 1975 with all critical performance specifications met or exceeded. System level qualification was designed to demonstrate design integrity and performance to specification via a series of tests including shock, acoustic, modal survey, thermal, electromagnetic interference, solar-thermal vacuum, and integrated system test. The F-1 spacecraft was acceptance tested during the [The Y-1 spacecraft was a fully configured spacecraft which has been refurbished and designated as flight vehicle (F-4).

2. (U) Operational Test and Evaluation: A portion of the Satellite Data System is to be part of the Air Force Satellite Communications space segment. Classical separate Initial Operational Test and Evaluation was not conducted on the space segments since all operational objectives and requirements were fully integrated into the Development Test and Evaluation effort and were not broken out separately. Compatibility, operational characteristics, and orbit performance of payloads supporting the Air Force Satellite Communications program are scheduled to be demonstrated during the follow-on test and evaluation which is managed by the Air Force Test and Evaluation Center. Results to date are contained in Development Test and Evaluation reports (see paragraph 1 above).

3. (U) Systems Characteristics:

Characteristics	Objectives	Demonstrated
Data Rate in words per minute	[	[
Message Bit Error Rate per ten thousand bits	[	[
Anti-Jam Protection (decibel watt)	[	[