Army Regulation 70–43
AFR 80-2
OPNAVINST 3913.1

Research and Development

Space Test Program (STP) Management

Headquarters
Departments of the Army,
the Air Force, and the Navy
Washington, DC
30 November 1984

UNCLASSIFIED

SUMMARY of CHANGE

AR 70–43/AFR 80–2/OPNAVINST 3913.1
Space Test Program (STP) Management

This revision updates terminology, defines new procedures, and prescribes DD Forms 1721 (Oct 82) and 1721-1 (May 84). Highlights of the changes include--

- The incorporation of a new objective “to use the manned Shuttle as a laboratory in space for DOD experiments” (para 1-1) as directed by USDR&E;

- The delineation of experiment funding restrictions (para 2-2f);

- The delineation of actions in the event of program cost changes (para 2-11e);

- And the addition of the distinction of types of space flights-- sortie and free-flyer.

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Effective 30 November 1984

Research and Development

Space Test Program (STP) Management

BY ORDER OF THE SECRETARIES OF THE AIR FORCE, THE ARMY, AND THE NAVY

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JAMES H. DELANEY *Colonel, USAF* *Director of Administration*	**ROBERT M. JOYCE** *Major General, United States Army* *The Adjutant General*	

History. This publication has been organized to make it compatible with the Army electronic publishing database. No content has been changed.

Summary. The Space Test Program (STP) is a Department of Defense (DOD) activity under executive management of the Air Force, created to provide spaceflights for DOD experiments not authorized their own means of spaceflight. This regulation prescribes the policies, procedures, and responsibilities for STP management. It provides potential sponsors, experimenters, and spacecraft designers with the information needed to prepare and submit spaceflight requests, and defines the relationship between sponsors, experimenters, and the STP management. It also describes the procedures followed in ranking STP experiments, selecting experiments to be included in a space mission, developing payloads, and managing payloads once they are defined.

Applicability. This regulation applies to the STP Office, to all DOD organizations supported by STP, and to DOD organizations supporting STP. Federal government agencies outside DOD desiring spaceflight support from STP will be required to follow procedures in this regulation.

Proponent and exception authority. The Directorate of Space Systems and Command, Control, Communications (C^3), HQ USAF/RDS, is the executive office for the DOD STP, and is the approving authority for requests for spaceflight and spaceflight plans. Disputes on priorities, experiment selection, or duplication among departments or agencies are resolved by the Office of the Secretary of Defense (OSD). The Air Force Space Division (SD), Air Force Systems Command (AFSC), maintains a separate organizational element known as the STP Office to manage the planning, engineering, and operational functions necessary to execute the approved program. Since the Air Force STP Office is a tri-Service organization, the Army, Navy, and DOD agencies are strongly encouraged to provide qualified personnel for assignment to, or onsite liaison with, the Air Force STP Office.

Army management control process. This regulation contains management control provisions but does not identify key management controls that must be evaluated.

Supplementation. Participating DOD and other agencies are responsible for issuing directives for STP procedures within their respective organizations. These directives will be consistent with the contents of this regulation.

Suggested Improvements. Requests for additional information on this regulation may be submitted to HQ USAF/RDS, Wash DC 20330-5040.

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*Supercedes AFM 80-2, AR 70-43, and OPNAV 76P-2, 8 April 1970.

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Chapter 1
INTRODUCTION

1–1. Program Authority.

A memorandum for the Assistant Secretary of the Air Force (R&D) from the Director of Defense Research and Engineering (DDR&E), dated 15 July 1966, designated the Space Experiments Support Program, later renamed the Space Test Program (STP), as the central spaceflight-support agency for all DOD research and development payloads not authorized their own means of spaceflight. A second memorandum, dated 15 August 1968, from the DDR&E to the Assistant Secretary for R&D for each of the three military departments announced the approval of "The Air Force Plan for Managing and Conducting the DOD Space Experiments Support Program (SESP)." A third memorandum, dated 3 October 1978, from the Under Secretary of Defense for Research and Engineering (USDR&E), set forth, as an objective of STP, "to use the manned Shuttle as a laboratory in space for DOD experiments," and limits STP support for highly sophisticated, expensive spacecraft for a single experiment.

1–2. Program Objective.

The STP mission is to provide spaceflight of DOD research and development (R&D) experiments not authorized their own means of spaceflight. The program includes both sortie spacecraft, which are Shuttle captive, and free-flyer spacecraft, which are launched by either the Space Shuttle or expendable launch vehicles (ELVs). In addition, the STP uses the Space Shuttle as a manned laboratory when possible.

1–3. Program Description.

STP provides:

a. Equal opportunities for all DOD R&D experimenters to have their experiments considered for spaceflight.

b. Procedures for reviewing and selecting DOD R&D payloads for spaceflight.

c. Rapid response to experimenters' needs in the Shuttle era using man's capabilities as a payload specialist to expedite the process.

d. Spaceflight for experiments expected to provide data or demonstrate concepts that will contribute to new or improved DOD systems, or to define the space environment and its effects on military systems.

e. Centralized management of launch vehicle, spacecraft, and support equipment procurement; payload integration; launch scheduling; launch services; orbital support; and data handling.

f. Centralized management of payload spaceflight assignment, including the use of space available on launch vehicles and spacecraft of other space programs.

g. Training for manned spaceflight engineers, payload specialists, and mission specialists for STP payload operations.

h. Advice to all potential experimenters regarding free-flyer and Shuttle capabilities, Shuttlebased testing, and the capability and availability of manned spaceflight engineers, payload specialists, and mission specialists.

1–4. Organization and Responsibilities.

The Directorate of Space Systems and Command, Control, Communications (C^3), HQ USAF/RDS, is the executive office for the DOD STP, and is the approving authority for requests for spaceflight and spaceflight plans. Disputes on priorities, experiment selection, or duplication among departments or agencies are resolved by the Office of the Secretary of Defense (OSD). The Air Force Space Division (SD), Air Force Systems Command (AFSC), maintains a separate organizational element known as the STP Office to manage the planning, engineering, and operational functions necessary to execute the approved program. Since the Air Force STP Office is a triService organization, the Army, Navy, and DOD agencies are strongly encouraged to provide qualified personnel for assignment to, or onsite liaison with, the Air Force STP Office.

1–5. The STP Office.

The STP Office is responsible for:

a. Planning for spaceflight, including experiment selection, programming, budgeting, system analyses, performance analyses, trade-off studies, cost analyses, preparation of spaceflight plans, and special studies.

b. Implementing spaceflight plans after approval by HQ USAF/RDS.

(1) For each spaceflight using a launch vehicle provided by STP, the STP Office has DOD management responsibility, which includes authority to plan, organize, control, and direct the progress of the space mission.

(2) For STP payloads assigned as secondary payloads on a host vehicle of another office, the STP Office provides the interface between the experimenter and the host-vehicle office.

c. Acquiring advanced spaceflight hardware to improve future spaceflight support capabilities.

d. Procuring spacecraft and payload integration services, mission data acquisition, ephemeris, spacecraft health data, and hardware, either by separate contract or, in case of urgency, by using existing contracts of other agencies:

e. Providing payload or mission-specialist training for:

(1) STP sortie payloads requiring participation by a Shuttle crew member for on-orbit operations.

(2) STP free-flyer payloads requiring predeployment checkout and deployment from the Shuttle.

Chapter 2
POLICIES

2–1. Authority for Submission of Spaceflight Requests:

a. Any military department or other DOD agency can submit experiments for STP support. Submission by DOD agencies must be based on a DOD need to obtain the information to be derived from the experiment through spaceflight.

(1) Within the Air Force, AFSC approves and submits all Air Force requests for STP support.

(2) Within the Army, the Office of the Deputy Chief of Staff for Research, Development, and Acquisition approves and submits all Army requests for STP support.

(3) Within the Navy, the Office of the Chief of Naval Operations (OP-098) approves and submits all Navy requests for STP support.

(4) Other DOD agencies may submit requests for STP support.

b. Federal agencies other than DOD also may submit spaceflight requests, provided the experiments' benefits to DOD warrant the submission.

c. Any DOD agency may submit spaceflight requests for experiments from foreign countries, provided the experiments' benefits to DOD warrant the submission.

2–2. Experiment Eligibility.

To be eligible for support under STP, an experiment must meet these criteria:

a. The experiment is relevant to DOD requirements.

b. Spaceflight is necessary for effective and efficient attainment of program objectives.

c. The experiment is part of a DOD research, development, test, and evaluation activity, or is sponsored by another federal agency.

d. The experiment is not authorized its own means for spaceflight.

e. Current and projected funding is sufficient to support experiment development, integration, any unique on-orbit support, and data analysis and distribution.

f. Total experiment spaceflight costs to STP as determined by preliminary review do not impact accomplishment of the overall STP mission. Specifically, no experiment will be supported whose estimated costs for spaceflight are more than 25 percent of the STP budget in a given fiscal year, or extend beyond 5 years, unless specifically exempted by HQ USAF/RDS in the best interests of the DOD. (Study definition phase, on-orbit operations, and postflight data reduction are not included in those 5 years.)

2–3. Experiment Sponsorship.

The responsibilities of the sponsor are defined in attachment 1.

a. Any DOD organization may sponsor experiments for spaceflight under STP. DOD sponsors must submit DD Forms 1721 and 1721-1, Space Test Program Flight Request and Space Test Program Flight Request (Executive Summary), through their departmental approval authority to the Director of Space Systems and C, HQ USAF/RDS.

b. Non-DOD federal agencies may sponsor experiments for spaceflight under STP. They must submit DD Forms 1721 and 1721-1 to the USDR&E.

2–4. Spaceflight Planning.

The STP Office prepares spaceflight plans based on a list or lists of approved and ranked experiments and program guidance issued by HQ USAF/RDS. Separate lists may be developed for different classes of experiments as required. The guiding principles in developing spaceflight plans are to ensure:

a. The experiments are flown in a timely manner, adequate to meet experiment requirements.

b. The most cost-effective use of available launch vehicle capability and standard hardware.

2–5. Use of Secondary Payload Space.

Maximum use is made of secondary payload space available on DOD, NASA, or other space program launches.

a. Each DOD space system and launch vehicle program office provides the STP Office with timely information to enable the STP Office to make maximum use of, and to maintain a list of, the secondary payload space excess to those offices.

b. The STP Office is authorized direct communications with DOD space system and launch vehicle program offices to arrange accommodations for STP payloads.

c. The STP Office is authorized direct communications with NASA space system and launch vehicle program offices to make arrangements for the use of secondary payload space on NASA spaceflights. Requests for primary and secondary payload space on NASA Space Shuttle flights are sent by the STP Office through the established channels for manifesting payloads on the Space Transportation System (STS).

2–6. Launch Vehicles.

The STP Office selects launch vehicles (either the Space Shuttle or existing ELVs) to place the approved experiments into the desired orbits. Experiments may be launched on dedicated launch vehicles or as secondary payloads on launch vehicles of other DOD or NASA space programs. Of major interest is the use of available and compatible secondary-payload space aboard launch vehicles of other space programs because of the economic effectiveness of such flights. The development of new rocket motors or vehicles dictated by requirements unique to a particular experiment may be justified in some instances for cost-effective reasons. Approval by HQ USAF/RDS of such development depends on need, cost, risk factors, and other considerations relative to attainment of overall DOD objectives.

2–7. Standard Hardware and Services.

The STP Office uses existing free-flying spacecraft and orbital-transfer stages when possible. Standard experiment-support equipment, such as Shuttle-attached cradles and astronaut interface equipment, which can support a variety of experiments, normally are used for sortie flights. If an experiment requires support beyond that provided by the standard hardware, this additional support is funded by the experiment sponsors. The STP Office may obtain spacecraft that are surplus to other space programs. Spacecraft provided by STP are equipped with standard subsystems, such as command and control, power, data storage, and data transmission. Unique spacecraft subsystem requirements are funded by the experiment sponsors. To improve standard services STP, with approval of HQ USAF/RDS, may initiate development or acquisition programs to increase support capabilities. Services provided by the STP Office include advice and assistance to the experimenter, planning and management of the integration of the experiment with spacecraft or support equipment, and a continuing interface between sponsors or experimenters and launch vehicle managers. The STP Office maintains documentation that identifies for experimenters or users a standard set of hardware, capabilities, and services for both Shuttle sortie and free-flyer missions. Further details of standard services may be obtained from the STP Office.

2–8. Payload-Integration Management.

A payload-integration manager is designated in the program management plan (PMP) for each approved spaceflight plan. The specific assignment of responsibilities for each launch on which STP has a payload also must be documented in the PMP.

a. The STP Office is responsible for managing payload integration for launches on which STP has provided the means of spaceflight.

b. Management responsibilities for payload integration are delineated in required Memorandums of Agreement (MOAs) between STP and the DOD or NASA program that will carry STP secondary payloads.

c. STP payloads flown on NASA spaceflights must have a DOD official designated as the point of contact for NASA.

2–9. Payload Accommodation.

An STP payload assigned to fly on a space vehicle of another program is accommodated on the basis that the objectives of the other program are not jeopardized. The sponsor of the other program normally has final authority in questions of conflicting payload accommodations. The sponsor of an STP payload on another program should have available a flightworthy mass simulator to fly if the payload is unacceptable for flight or is unavailable for other reasons.

2–10. Launch and Orbital Support.

The STP Office normally procures or arranges for the flight support necessary to meet the objectives of the experiment, including arrangements for support services and equipment onboard the launch vehicle, launch services, prelaunch system checkout, and payload test and storage facilities.

a. Although STP is the central flight-support agency for all DOD R&D payloads not authorized their own means of spaceflight, orbital support for an experiment can be arranged by the experiment sponsor by mutual consent with the STP Office and the activity providing the orbital support. The responsibility for orbital support is specified in the PMP and the MOA for the spaceflight concerned. In any case where the sponsor is arranging for the orbital support of the experiment, the STP Office must be kept informed of the status of such action.

b. Launch or orbital support procured or arranged for by the STP Office includes the training of payload specialists and delivery of raw digital data to the experimenter or sponsor. Raw digital data, ephemeris, and spacecraft attitude are provided by STP for up to 1 year of space operation. The cost of providing data, ephemeris, and attitude beyond I year is the responsibility of the experimenter or sponsor. The experimenter or sponsor is responsible for data reduction, analysis, interpretation, and dissemination.

c. STP arranges for frequency allocation and authorization for spacecraft command-data handling. The experimenter supports arrangements for the frequency allocation and authorization that may be required for the experiment. The experimenter supports, as required, maintenance of the experiment at the launch site during pre- and postflight operations.

NOTE: Any exception to a through c above must be mutually agreed to by the STP Office, the activity providing support to the STP Office, and the experimenter or sponsor on a case-by-case basis.

d. The STP Office, experimenters, and sponsors meet after each launch to exchange data and experience gained, document lessons learned during the course of the program, and offer recommendations.

2–11. Program Funding.

STP, within its annual budget, funds for the integration, launch, and orbital support of those experiments that HQ USAF/RDS has approved for spaceflight. MOAs between STP and the experiment sponsors will specify exceptions or special funding procedures. The following are examples of representative funding procedures:

a. STP funds for the procurement of an orbit transfer stage when justified for reasons of costeffectiveness and mission considerations. STP normally funds for the procurement of a spacecraft to accommodate several experiments. Funding for a unique spacecraft to meet the needs of a single experiment is the responsibility of the sponsor. Normally, STP will not provide integration and mission support for major missions that accommodate a single experiment. Modification of standard hardware and services provided by the STP Office that are dictated by requirements unique to a particular experiment, or development of new payload components to accommodate a single experiment, is the funding responsibility of the sponsor.

b. Support provided to agencies outside the DOD by the STP is reimbursed in accordance with the MOA for the support provided. Reimbursement is negotiated on the basis of the benefits to DOD derived from the experiment. A DOD activity assuming sponsorship for such an experiment automatically assumes responsibility for reimbursing STP in accordance with the requirements defined in this regulation.

c. The sponsor is required to reimburse STP for any increase in cost incurred as a result of changed requirements, damage to support hardware, or delays caused by the experiment.

d. The sponsor is required to reimburse STP for costs incurred due to withdrawing from a spaceflight after an experiment has been assigned to a mission by an approved spaceflight plan. For primary experiments, these include any mission termination costs.

e. Program cost changes greater than 10 percent in a given fiscal year are reported immediately by the STP Office through AFSC to HQ USAF/RDS. In the event of a projected overrun of 15 percent or more in a given fiscal year over the approved spaceflight plan estimate, the STP Office reevaluates program cost to completion. The STP Office reports the results of this reevaluation, along with program options, through AFSC to HQ USAF/RDS. The sponsor may be requested to provide additional funding support for the spaceflight, or the spaceflight may be terminated.

f. STP may not be able to support all experiments immediately because of varying launch capabilities, varying orbit requirements of experiments, and funding limitations. The STP Office may attempt to arrange for flight and orbital support of experiments that cannot be funded by STP. In this instance the total cost of the spaceflight is divided among the sponsors who agree to participate in such a flight.

g. A sponsor's funds for a spaceflight, as previously arranged for between HQ USAF/RDS and the sponsor, must be made available to the STP Office in a timely manner. The failure of a sponsor to provide funds to STP in a timely manner as dictated by the mission MOA will be grounds for removal from the mission. Any decision on experiment removal is made by HQ USAF/RDS.

h. Funding for STP is to be used to provide spaceflight for all DOD military departments and agencies. Because STP is a DOD-wide support program for which the Air Force is the executive agency, changes to approved funding cannot be made below HQ USAF level.

2–12. Program Security.

STP functions as an unclassified program, and does not publish an overall security guide. STP, however, publishes a security guide for each flight in which classified data or payloads are included.

a. When STP is using secondary payload space, security controls must be carried out in consonance with the primary space program concerned.

b. Security controls must be implemented to protect classified payload or launch vehicle information, including the application of the STS Security Classification Guide (available from HQ Space Division, Directorate of Security, Security Management Office (SD/SPI) when payloads are flown on the Shuttle.

c. Proper security classification of experiment documentation, hardware, and gathered data is the responsibility of the sponsor or experimenter.

d. The STP Office must classify program documents based on classification requirements expressed in the experiment spaceflight request and in security classification guides relating to the experiments and programs being supported.

2–13. Safety Considerations.

Experimenters should be aware that their experiments must be designed so that they can be safely handled, integrated, maintained, and launched. STP has overall management responsibility for safety, and ensures that the payload meets safety requirements of the launch vehicle and the range commander. Sponsors or experimenters should consult applicable Air Force and NASA safety regulations early in the experiment design phase with assistance from the STP Office. The sponsor or experimenter is responsible for providing all technical documentation required to evaluate and confirm that the experiment meets all applicable safety criteria.

a. Launch of Nuclear Material. The launch of nuclear material, such as is contained in radioactive calibration devices, heat sources, and radioisotope thermoelectric generators, may require special approval procedures. Depending on the type and amount of nuclear material and its categorization, a safety analysis summary that describes the material, its application, and its effect on operating personnel and the general public is prepared and sent to the Director of Nuclear Surety, Kirtland AFB, NM, and HQ AFSC/IGF for review and approval at least 6 months before the first anticipated launch date, as prescribed byAFR 122-16. The sponsor or experimenter is responsible for preparing this analysis for the STP Office. The sponsor or experimenter also is responsible for providing any additional nuclear device design information and certification required by the STP Office to support the request for clearance for spaceflight.

b. Nuclear Regulatory Commission (NRC) License. The experiment sponsor is required to obtain the necessary NRC byproduct, source, or special nuclear material license. A valid NRC license does not, however, constitute approval for space applications of radionuclides, even when the proposed use is included in the license application.

c. Special Requirements for Nuclear Devices Transported in the Space Shuttle. In addition to safety requirements prescribed in a and b above, nuclear devices transported in the Shuttle cargo bay must not interfere with or contaminate other payloads in the Shuttle. All pertinent NASA regulations regarding flight of nuclear devices in the Space Shuttle must be met.

2–14. Information Release.

Policies and procedures for release of public information concerning STP launches are in the HQ USAF Space Test Program (STP) Information Plan, 75-4 (available from HQ Space Division, Office of Public Affairs, [SD/PA]). Information release procedures regarding STP payloads aboard the STS are mission specific, and are published on a case-by-case basis by the Secretary of the Air Force, Office of Public Affairs (SAF/PA). Releases on the subjects of experiments, the program being supported, and spacecraft, launch vehicles, and combinations of these are made only according to the STP Information Plan, 75-4. The release of public information by experimenters, sponsors, support program offices, or launch vehicles offices is made according to the applicable MOA with the STP Office.

2–15. Spaceflight Priorities.

The STP spaceflight of any experiment that has a high DOD importance category and precedence rating assumes that category and precedence rating.

Chapter 3
PROCEDURES

3–1. Submission of Spaceflight Requests.

A spaceflight request can be submitted by a departmental approval authority at any time. Submitting a request as far in advance as possible of the desired launch date increases the probability of the experiment being assigned to a spaceflight that meets all its requirements. Experiment hardware need not be available when the request is submitted; however, experiments should be sufficiently well defined so that payload integration and launch can be completed within the time requested.

3–2. Space Test Program (STP) Flight Request Documentation (RCS: HAF-RDS(AR)8401).

Request for a spaceflight of a proposed experiment is documented on DD Forms 1721 and 1721-1 and required supporting documents. Sample DD Forms 1721 and 1721-1 and instructions for completing them are in attachments 2 through 5. For Army users, DD Forms 1721 and 1721-1 will be locally reproduced on 81/2 x 11-inch paper. Copies for local reproduction are at attachments 6 and 7. For other users, blank DD Forms 1721 and 1721-1 are available from HQ USAF/RDSL, Wash DC 20330-5040.

a. For those cases in which the sponsor proposes a single spaceflight of two or more experiments, the request is submitted under covering DD Forms 1721 and 1721-1, describing the spaceflight. To these covering DD Forms 1721 and 1721-1 the sponsor attaches a separate 1721 and 1721-1 for each experiment proposed for the spaceflight.

b. A spaceflight request may ask for more than one spaceflight of a particular experiment.

3–3. Experiment Coordination.

The objective of experiment coordination is to ensure that unwarranted duplication with other experiments and investigations will not occur. The departmental approval authority is responsible for coordinating an experiment within the agency before requesting spaceflight support from STP. Departments or agencies submitting similar experiments will be requested by HQ USAF/RDS to coordinate their proposals and consider the possibilities of cosponsored experiments. Departmental approval authorities should send an information copy of proposed requests for spaceflight to the STP Office for comment early in the conceptual stage. This function can be delegated within a department or agency.

3–4. Channels for Spaceflight Requests:

a. DOD departmental approval authorities send their requests for spaceflights in triplicate to the Director of Space Systems and C^3, HQ USAF/RDS, Wash DC 20330-5040. Send an information copy to HQ Space Division/Space Test Program Office, Post Office Box 92960, Worldway Postal Center, Los Angeles CA 90009-2960.

b. All requests for STP spaceflights by sponsors outside the DOD are addressed to the Under Secretary of Defense for Research and Engineering, Wash DC 20301-3090.

3–5. Experiment Approval for Spaceflight:

a. HQ USAF/RDS conducts a preliminary screening of each spaceflight request, normally before the yearly DOD Experiment Review Panel meeting. A spaceflight request which requires an excessive amount of STP personnel or funding resources may be rejected and returned to the sponsor. Specifically, a spaceflight request which requires more than an estimated 25 percent of the STP budget in a given fiscal year, or that extends beyond 5 years, normally is rejected unless specifically exempted by HQ USAF/RDS in the best interests of the DOD. (Study definition phase, onorbit operations, and postflight data reduction are not included in those 5 years.) If time does not permit an adequate preliminary screening, a spaceflight request may be conditionally accepted for ranking pending the outcome of a detailed cost evaluation.

b. HQ USAF/RDS convenes a DOD Experiment Review Panel yearly, normally in May, to:

(1) Review and evaluate all requests for spaceflight.

(2) Determine an experiment priority list.

c. In support of the DOD Experiment Review Panel meeting, departmental approval authorities submit not later than 1 April of each year:

(1) A consolidation of requests submitted since the last DOD panel meeting, revised as necessary.

(2) Additional requests.

(3) Validation, revision, or withdrawal of experiments that have not yet been assigned to a specific spaceflight.

(4) A list of the recommended order of priority for all experiments proposed for review.

d. A spaceflight request submitted between DOD panel meetings is listed at the bottom of the appropriate master list of approved experiments until evaluated at the, next DOD Experiment Review Panel meeting, unless dictated by exceptional circumstances and approved by HQ USAF/RDS.

e. Separate review procedures and priority lists may be developed for different classes of experiments. Additional experiment review panel meetings may be convened to address different classes of experiments as required. Publication of these lists in the STP Program Management Directive (PMD) constitutes HQ USAF/RDS approval of the experiments for spaceflight by the STP. However, any experiment whose preliminary cost estimate for spaceflight is more than 25 percent of the STP budget in a given fiscal year, or that extends beyond 5 years, as explained in paragraph 3-5a, is to be considered conditionally approved and ranked pending favorable results from a HQ USAF/RDS evaluation of detailed cost estimates or a HQ USAF/RDS exemption in the best interests of the DOD. Otherwise, the experiment spaceflight request is rejected. The priority lists are published subsequently by the STP Office in periodic program status reports.

3–6. Preparing Spaceflight Plans.

The planning effort consists of one or more spaceflight plans with suitable options, tailored to the STP budget.

a. Contents of a Spaceflight Plan. A spaceflight plan, as a minimum, contains:

(1) Launch vehicle and launch date identification.

(2) Experiment complement identification.

(3) Experiment individual weights and complement weight.

(4) Launch window, orbital inclination, and altitude data.

(5) Spacecraft and support equipment identification.

(6) Payload-specialist or mission-specialist participation data, if any.

(7) MOA regarding obligations for each experiment.

(8) Cost per fiscal year for spacecraft development, payload integration, launch vehicle, launch support, and orbital support.

(9) STP budget by fiscal year, indicating that portion allocated to each program, including the funding for the program proposed in the spaceflight plan.

b. Experiment Selection. Spaceflight plans normally are formed around certain key experiments, based on the approved STP experiment priority list and guidance to the STP Office by HQ USAF/RDS. DD Form 1721 is the governing document that defines the instruments to be flown on a given experiment. Any modification to the instrument complement described in the DD Form 1721 must be coordinated with the sponsor. Other experiments on the approved list may be added to complete a payload. The procedure is to consider the experiments in the order in which they appear on the experiment priority list, and to determine their spaceflight compatibility. Spaceflight compatibility can be affected by such factors as orbital parameters; power and telemetry requirements; interference of an electronic, magnetic, or mechanical nature; and experiment hardware delivery schedules. The overall DOD R&D goals may be better served in some cases by having a payload of several lower-ranked experiments rather than one or two high-ranked experiments. Overall DOD goals other than R&D also can influence the formulation of a spaceflight plan.

c. Spaceflight Plan Approval and Direction. HQ USAF/RDS approves those spaceflight plans that best meet the needs of the DOD and are acceptable within the constraints of funds available. The STP Office begins implementing a spaceflight plan on notification from HQ USAF/RDS of approval of the plan. Approved spaceflights are reflected in the STP PMD.

3–7. Spaceflight Plan Revisions.

A change of experiments on an approved spaceflight plan can be made only with the approval of HQ USAF/RDS. HQ USAF/RDS and the STP Office coordinate such changes with the sponsors concerned.

3–8. Updating Accepted Experiment Documentation.

The DD Form 1721 of an accepted experiment must be kept current for the purpose of selecting experiments for spaceflights and for payload integration. If the sponsor or experimenter wants to significantly change the scope of the experiment or the support to be provided through STP, then the revision is forwarded through the departmental approval authority to HQ USAF/ RDS with an information copy to the STP Office. Minor and routine updating of spaceflight requests may be forwarded by the sponsor directly to the STP Office, with an information copy for HQ USAF/RDS.

3–9. Documentation of Detailed Experiment Requirements.

After approval of the spaceflight plan, information of a more detailed nature than that in DD Form 1721 may be required. As necessary, the STP Office sends to sponsors or experimenter's a questionnaire that must be completed and returned to the STP Office before the master schedule meeting.

3–10. Master Schedule Meetings.

The STP Office convenes a meeting with the experimenters, sponsors, and representatives of other concerned activities for each approved spaceflight plan during the payload-definition study phase, and before publishing the PMP, to establish the master schedule. The master schedule must detail required actions, milestones, objectives, and experiment delivery dates consistent with payload integration and launch dates. The STP Office provides a copy of the master schedule to all participants. In the case of a secondary payload to be carried by another space program, the launch schedule and major milestone dates are determined by that space program office.

3–11. Program Management Plan (PMP).

The STP Office publishes a PMP for each approved spaceflight plan. The plan contains the responsibilities and functions of all participants, master schedules with milestones, interfaces and event sequences, data-transmittal schedules, and other information. Portions of the plan containing mission and experiment operations, data analysis, and reports are coordinated with sponsoring agencies.

3–12. Payload-Integration Meetings.

During the development of the experiments, spacecraft, and spaceborne support equipment that constitute the payload for each spaceflight, the STP Office conyenes meetings periodically to ensure that critical activities (such as design, fabrication, testing, spaceflight qualification, safety, and integration of the payload) are proceeding on schedule, and to help resolve problems. Each participant in a scheduled spaceflight must act with full awareness of the interrelationships of responsibilities, functions, and actions among all participants. The STP Office requires timely, detailed status information from all participants. The experimenters support the STP contractor's design reviews. STP supports the primary-experiment contractor's design reviews, and also supports secondary-experiment contractor's design reviews as required.

3–13. Interface Design Freeze.

The STP Office establishes an interface-design freeze date that must be recognized by all agencies contributing

elements to the spaceflight. Every reasonable effort is made to allow for experiment changes that offer better experiment performance during the implementation phases. However, agencies that cannot meet an interface-design freeze date established by an interface-control document are responsible for any additional costs incurred by STP as a result of the delay or spacecraft-design modifications necessary to support experiment changes.

Chapter 4
MANAGEMENT REPORTS

4–1. STP Management Documentation.
The STP Office is required to prepare a four-part management report to inform HQ USAF/RDS of the status of STP activities. Each part of this Space Test Program (STP) Management Documentation (RCS: HAF-RDS (AR)8402) is described below briefly and in more detail in the STP PMD.

4–2. Program Status.
The STP Office prepares STP status reports as specified by the current PMD.

4–3. Launch Activity.
The STP Office notifies HQ USAF/RDS immediately of any change in launch dates as specified in the PMD. In addition, the STP Office provides launch reports to HQ USAF/RDS as specified in the PMD.

4–4. Funding Status.
The STP Office provides to HQ USAF/RDS status reports on funds authorized and obligated for each mission. The format of this report and its publication dates are specified by the STP PMD.

4–5. History File.
The STP Office maintains an STP history file. Contents include copies of all approved DD Forms 1721 and 1721-1, list of experiments flown, launch history, costs, spacecraft pictures, and additional information outlined in the STP PMD.

Appendix ATTACHMENT 1
Refer to Glossary.

Appendix ATTACHMENT 2
INSTRUCTIONS FOR COMPLETING DD FORM 1721-1

1. General Information.

DD Form 1721-1 requests information required by management for a "quick look" understanding and evaluation of a proposed flight experiment. This form describes the objective(s) of the experiment and its military value or relevance. It also provides a summary of flight requirements, funding, and hardware status.

a. Give actual information, if available; otherwise, use an estimate and so indicate. Show dates (YYMMDD), indicating year-month-day. If a particular block is not applicable for the experiment, enter N/A. Do not leave spaces blank.

b. Submit a change when information previously submitted changes or when actual information becomes available to replace estimates. Fill in only those blocks necessary to identify the experiment and to note the change. In the block titled "Objective" insert "Revision to previous form dated (YYMMDD) by the sponsor."

2. Security Classification.

Mark the form with a security classification commensurate with the highest classification of any single entry. For a classified form, indicate the security classification of each block, such as (C) for CONFIDENTIAL. Include the downgrading block.

3. Completing Specific Items:

a. Items 1-5. Self-explanatory.

b. Item 6. Objective. Describe (in 50 words or less) what is to be accomplished. State the purpose or use of the expected results of the experiment. If there is more than one objective, treat each one separately.

c. Item 7. Relevance to Specific DOD Requirements. Explain (in 50 words or less) why this experiment should be performed. Emphasize relevance to DOD as much as possible. Indicate potential improvement in military hardware or military operations.

d. Item 8. Requirements Summary. Indicate by a check whether the experiment is to be considered for sortie only, for free-flyer only, or for another means of accommodation. If the experiment can be accommodated on the Shuttle aft- or mid-flight deck or as a payload of opportunity, indicate and explain under "Other." If the experiment can be accommodated by more than one flight mode, indicate order of preference by numbers. If technical requirements have not been fully determined, provide best estimates. Indicate any requirement for a payload specialist, including the use of a payload specialist for free-flyer checkout before release.

e. Item 9. Program Summary. Indicate funds expended in previous fiscal years (FYs), funds planned for the current FY, and funds included in approved planning documents for future FYs. In total cost include all costs supported by the experiment sponsor. Hardware delivery date (year-month-day) is the date on which the experiment could be delivered for integration with spacecraft or support equipment. Provide contractor name and geographical location.

f. Item 10. Approving Official. Indicate person authorized to transmit spaceflight requests to the Director of Space Systems and C^3, HQ USAF/RDS; include signature of authorized individual.

SPACE TEST PROGRAM FLIGHT REQUEST EXECUTIVE SUMMARY	**CLASSIFIED BY:** N/A **DECLASSIFY ON:** N/A

1. EXPERIMENT TITLE		2. SHORT TITLE
Space EHF Crosslink Experiment		SECLE
3. EXPERIMENT NO.	4. DATE OF SUBMISSION *(YYMMDD)*	5. DATE OF REVISION *(YYMMDD)*
XXX-301	83/07/10	N/A

6. OBJECTIVE

To measure the attenuation of EHF crosslinks when the signal is propagating through the upper atmosphere.

7. RELEVANCE TO SPECIFIC DOD REQUIREMENTS

There exists a need to maintain connectivity and signal covertness between DMSP and other low Earth-orbiting satellites and geosynchronous communication satellites. Experiment should demonstrate and determine the atmospheric limitations on satellite-to-satellite communication, which potentially is a critical piece of our force-wide communication capability.

8. REQUIREMENTS SUMMARY

a. FLIGHT MODE ☐ 1 FREE-FLYER ☒ 2 SORTIE ☐ GAS ☐ LDEF
☐ OTHER *(Specify)*

b. PAYLOAD SPECIALIST	c. WEIGHT *(kg)*
☒ YES ☐ NO in sortie mode	Free-Flyer (FF): 55 Sortie (S): 70

d. LENGTH *(cm)*	e. MAX. DIAMETER *(cm)*	f. POWER *(w)*
FF: 100 S: 120	FF: 90 S: 90	FF: 60 S: 100

g. ORBIT *(km)*	h. INCLINATION
APOGEE 240-3704 PERIGEE 240-1020	70°-110°

i. OTHER N/A

9. PROGRAM SUMMARY

a. FUNDING STATUS PRIOR FY's $2.0 million CURRENT FY $1.0 million FUTURE FY's $1.0 million

b. TOTAL COST	c. HARDWARE DELIVERY DATE *(YYMMDD)*
$4.0 million	85/01/15

d. CONTRACTOR
Space Research Hardware, Inc.; Cleveland, Ohio 44111

10. APPROVING OFFICIAL

a. NAME *(Last, first, MI)*	b. ACTIVITY	
Smith, Joseph M.	HQ AFSC	
c. POSITION	d. TELEPHONE NO.	e. DATE *(YYMMDD)*
Director of Laboratories	(719)277-2170/AV 250-2170	83/06/30

f. SIGNATURE Joseph M. Smith

DD Form 1721-1, 84 MAY

Figure ATTACHMENT 3. COMPLETED SAMPLE DD FORM 1721-1

Appendix ATTACHMENT 4
INSTRUCTIONS FOR COMPLETING DD FORM 1721

1. General Information.

DD Form 1721 requests information needed to evaluate and select experiments proposed for spaceflight, and to enable STP to accomplish spaceflight planning analyses and payload integration studies before recommending assignments of experiments to space-flights.

a. Give actual information, if available; otherwise, use an estimate and so indicate. Show dates (YYMMDD), which indicates year-month-day. If a particular block is not applicable for the experiment, enter N/A. Do not leave spaces blank.

b. Submit a change when information previously submitted changes or when actual information becomes available to replace estimates. Fill in only those blocks necessary to identify the experiment and to note the change. In the block titled "Objective" insert "Revision to previous form dated (YYMMDD) by the sponsor."

c. If the available space is too small, use either the other side of DD Form 1721 or additional pages. Although conciseness is desired, considerably more room may be required for specific items in individual cases.

2. Security Classification.

Mark the entire form with a security classification commensurate with the highest classification of any single entry. For a classified form, indicate the security classification of each block, such as (C) for CONFIDENTIAL. The downgrading block will be included on the first page of each DD Form 1721 submitted.

3. Part I—Request for Spaceflight:

a. Item 1. Experiment Title. Describe the broad objectives of the experiment and use one or more key words. Do not use equipment nomenclatures, nicknames, acronyms, and so forth. The title should be unclassified if possible.

b. Item 2. Short Title. Use nomenclature, nicknames, or acronyms (unclassified if possible).

c. Item 3. Experiment Number. Use up to five letters followed by a hyphen to identify the activity, then three numbers consisting of the fiscal year ("2" for FY 82), and the sponsor's log number in two digits. For example: the first experiment submitted by the Air Force Geophysics Laboratory for FY 84 would be AFGL-401. Once assigned, this number does not change.

d. Item 4. Project Number. Give the experiment project number or the number of the overall project of which the experiment is a part.

e. Item 5. Task Number. Give the task number that the experiment is supporting; a subelement of the project.

f. Item 6. Program Element Number. Indicate the DOD program element number of the program sponsoring the experiment.

g. Item 7. Project Office. Enter the activity to which the experimenter responsible for the experiment is assigned.

h. Item 8. Management Office. Enter the activity having management responsibility for the experiment.

i. Item 9. Sponsor. Indicate the agency responsible for the program, project, or task being supported and controlling the resources to develop, fabricate, and qualify the experiment—for example, the Naval Research Laboratory (NRL).

j. Items 10-15. Approval. As a minimum, include principal experimenter, sponsor, and office having authority to forward request to HQ USAF/RDS.

k. Item 16. Objective. Describe what is to be accomplished. State the purpose or use of expected results of the experiment. If there is more than one objective, treat each one separately in descending order of importance. Do not include justification or description in this section. Note here possible modifications in the objectives and scope resulting from alternative flight options (for example, sortie versus free-flyer, or primary orbit versus alternate orbit).

l. Item 17. Relevance to Specific DOD Requirements. Explain why this experiment should be performed. Emphasize relevance to DOD as much as possible. Multiagency relevance is particularly desirable. Consider the following questions as a guide in developing your narrative:

(1) What is the relation to exploratory development or operational systems development programs?

(2) For hardware developments and demonstrations, forecast results accruing through successfully completing this

effort, including potential operational applications or improvements in present operational systems performance. What is the need for this hardware development? What will it do better? Why do it?

(3) For exploratory development efforts, forecast the improvement in technology that is anticipated. Discuss how the proposed technology will be better than existing technology.

(4) What is our present knowledge or capability in this area? What is the current state of the art?

(5) What are the technological alternatives? Why should this effort be made at this time?

m. Item 18. Background. Provide a brief historical sketch of the effort. Include preliminary investigations in laboratories, ground facilities, aircraft, balloons, space probes, ballistic flights, and spaceflights; each of these may be lumped with inclusive dates. It is desirable to indicate documents or publications summarizing history or current status of efforts. List space probes, ballistic flights, and spaceflights individually for each flight, and indicate results, that is, success, failure, and so forth. Explain how previous work makes the proposed experiment practical (reflect all experiments, not just those of your organization). Update this section as necessary with new developments.

n. Item 19. Alternatives to Spaceflight. Explain why this experiment should be performed in space. Consider the following questions:

(1) Why are ground, balloon, airplane, or space probe tests inadequate?

(2) Why are existing data inadequate?

(3) Explain how this proposal differs from NASA investigations, and comment on the following:

(a) Why this DOD and similar or overlapping NASA or other experiments should both be flown.

(b) How either this DOD or the NASA experiment could be modified to suit the needs of the other.

(c) What efforts have been made to accomplish (b) above, and with what results?

o. Item 20. Follow-on Plans. Indicate the next step if this experiment is flown. Identify additional spaceflights anticipated. State whether the present experiment requires more than one flight. If so, indicate if the DD Form 1721 is to be used for justification for such flights.

p. Item 21. Description. Tell how the experiment objectives are to be attained. Use the following as a guide, but include other relevant material:

(1) Identify and discuss the technical approach or technique to be used.

(2) State why the proposed approach or technique is better than others. Discuss in quantitative terms. What are the alternatives? What are the comparative advantages and disadvantages?

(3) Identify and discuss the equipment to be used.

(4) Discuss the risks involved.

q. Item 22. Pictorial. Include a descriptive picture of the experiment.

4. Part IIA—Technical Details (Sortie):

a. Item 23. Orbiter Sortie Mode. Check item that indicates if experiment is to be considered for sortie only, for sortie as first choice, or as a second choice (that is, free-flyer as a first choice). Do not complete Part IIA if this experiment must be on a free-flyer. Accordingly, check the "Required" category on item 52 of page 8 for free-flyer. The other two categories of item 23, page 5 must also be consistent with item 52, page 8.

b. Item 24. Experiment Class. Check items that represent acceptable ways in which the experiment objectives may be satisfied. Several items may be checked; for example, Standard STP Support Hardware with a 1 beside it and Get-Away Special (GAS) with a 2 beside it indicates that Standard STP Support Hardware is preferred, but that acceptable support could be provided by GAS. Indicate whether the experiment can be accommodated on Shuttle aft- or mid-flight deck or as a payload of opportunity, and explain under "Other." Describe briefly under "Other" any nonstandard support required.

c. Item 25. Weight. Provide the current best estimate of total experiment weight and expendable weight. "Expendables" include items that will be ejected from the Shuttle or consumed in the conduct of the experiment.

d. Item 26. Size. Self-explanatory.

e. Item 27. Extensions Beyond Bay Envelope. Check yes only if any portion of the experiment (excluding ejectables) extends outside the dynamic envelope of the Shuttle bay when fully deployed.

f. Items 28-29. Electric Power. Self-explanatory.

g. Item 30. Energy. Provide the total energy requirement of the experiment under worst-case conditions. Do not include special processing undertaken in the support of the experiment by the Standard STP Support Hardware.

h. Item 31. Duty Cycle. Consider typical or nominal percentage of l day's operation. Consider also a realistic maximum. Duty cycle for standby refers to experiments that must have warmup time.

i. Item 32. Mission Duration. Express the mission duration requirements in days. Exclude from consideration time for ascent, descent, or deployment of host payload.

j. Item 33. Flight Date. Indicate the quarter and calendar year of the preferred and latest date for flight; write "open" if no latest date can be provided. Indicate best available information or subsequent flights required.

k. Item 34. Orbital Parameters. Consider the experiment requirements for orbit apogee, perigee, and inclination. If

none, so state in "Rationale." Include any other special requirements, such as circularity, sun-synchronous orbits, and so forth.

l. Item 35. Alternate Orbits. Consider these orbits as alternatives to the primary orbit. If none are indicated, no consideration, will be given to sortie flights for which the orbital parameters of item 34 are not satisfied.

m. Item 36. Orbiter Orientation. Use standard notation as much as possible to indicate any orbiter-orientation requirements. For example, orbiter x, y, and z axes are standard right-handed coordinate axes with origin at the center of mass, x axis forward, y axis out of the right wing, and z axis out of the bottom of the fuselage. LV denotes local vertical or nadir. For example, + z LV denotes bottom of the fuselage nadir oriented or payload bay zenith oriented.

n. Item 37. Stabilization Requirements. Provide experiment-pointing accuracy and pointing knowledge requirements for "Line of Sight" (LOS) and "Roll about LOS." If special jitter or drift requirements are given, also provide control duration. Indicate if the experiment is to be mounted on an experiment-provided pointer.

o. Item 38. Major Movements. Discuss track or slew requirements. Indicate nature of targets and expected angular rates for pointing system, if known. Include under "Other Motions" requirements for instrumented booms, masts, remote manipulator system (RMS), or special field-of-view envelopes.

p. Item 39. Astronaut Participation. Indicate by a check the functions an astronaut will be expected to perform.

q. Item 40. Astronaut Estimated Duty Cycle. Provide estimate of duty cycle.

r. Item 41. Description of Astronaut Duties. Briefly summarize the major tasks for the astronaut, noting essential and desired functions.

s. Item 42. Ephemeris Requirements. Provide accuracy requirements in terms of a root-sum-square error, or crosstrack, in-track, and radial errors. Also indicate update requirements, if known.

t. Item 43. Telemetry. Make best estimate of telemetry requirements. Indicate acceptable delay times for ground reception. Minimize real-time downlink to the extent possible. Consider astronaut monitoring and processing.

u. Item 44. On-Board Processing (Display/Control). Note special requirements, such as high-speed processing or timeline-critical items.

v. Item 45. Commands. Estimate requirements for the different types of commands. Refer to "Guide to Standard Services." "Power on" and "Power off" for an item are considered separate commands. If command storage is required, write "yes" in item 45e.

w. Item 46. Plan for Data Processing and Dissemination of Results. Describe how the data will be processed and results disseminated to potential users.

x. Item 47. Radioactive Devices. Indicate material and strength for any radioactive materials used.

y. Item 48. Experiment Complement/Package Data. Provide a breakdown of the experiment into subassemblies based on packages or modules, or in terms of separate experiments constituting the total experiment. Provide stowed and deployed (as applicable) dimensions in cm. Provide weight in kg. The total weight for all items must agree with item 25. Note any ejected items, such as subsatellite, or targets. Any difference in the total weight of "ejected" items here and the "expendables" in item 25 are due to items consumed in the experiment operations (for example, cryogen).

z. Item 49. Security Information. Designate appropriate items by C (for CONFIDENTIAL), 5 (for SECRET), or TS (for TOP SECRET). Military relevance in item 49a refers to the experiment's application to other DOD programs, especially operational ones. This information is in item 17 or in an attachment to the DD Form 1721. Under "Other" identify other classified elements of the experiment and show classification.

aa. Item 50. Design Drawing/Specification Status. Indicate the status of final design drawings. Note timetable of any critical specifications that are not presently determined.

ab. Item 51. Special Requirements. Indicate here items not considered earlier, such as special contamination-control requirements on the orbiter operations, experiment-support equipment, or other experiments. Note desirable correlative experiments (specific experiments or experiment classes) and unique temperature or thermal load requirements.

5. Part IIB—Technical Details (Free-Flyer):

a. Item 52. Free-Flyer Mode. Check item that indicates if experiment is to be considered for free flyer only, for free-flyer as a first choice, or as a second choice (that is, sortie as first choice). Do not complete Part IIB if this experiment must be flown as a sortie. Accordingly, check the "Required" category in item 23 of page 5 for sortie. The other

categories of item 52, page 8 also must be compatible with item 23, page 5. Note that compatibility with the Long Duration Exposure Facility (LDEF) may be checked in addition to any of the other items.

b. Item 53. Experiment Class. Check one of the categories as follows:

(1) Experiment Only—the experiment consists of one or more items requiring support from spacecraft.

(2) Complete Spacecraft—the experiment is to be supplied to STP as a self-contained spacecraft.

c. Item 54. Weight. Provide the current best estimate of total experiment weight.

d. Item 55. Size. Provide length, maximum diameter, and the current best estimate of total volume (stowed).

e. Item 56. Power. Include nominal operating power and peak operating power.

f. Item 57. Duty Cycle. Enter typical or nominal percentage of mission duration and a realistic maximum.

g. Item 58. Mission Duration. Express in months the mission-duration requirements. Include a nominal mission duration and the minimum acceptable.

h. Item 59. Launch Date. Indicate the quarter and calendar year of the preferred and latest date for launch. Write "open" if no latest date can be provided at this time.

i. Item 60. Orbital Parameters. Enter the experiment requirements for orbit apogee, perigee, and inclination. If none, so state in "Rationale." Include any other special requirements such as circularity, sun-synchronous orbits, and so forth.

j. Item 61. Alternate Orbits. Indicate apogee, perigee, and inclination. These orbits are to be considered alternatives to the primary orbit. If none are indicated, no consideration will be given to free-flyer flights for which the orbital parameters of item 60 are not satisfied.

k. Item 62. Stabilization Type. Indicate any type of vehicle stabilization required. For the spin-stabilized case, additional information is required on the spin rate and spin vector.

l. Item 63. Axis/Orbit Plane. Indicate relationship of spacecraft major axis to orbital plane.

m. Item 64. Stablization Requirements. Provide experiment-pointing accuracy and pointing knowledge requirement. If special jitter requirements are given, also provide control duration. If the experiment is to be mounted on an STP-provided gimbal, so state.

n. Item 65. Major Movements. Discuss track or slew requirements. Indicate nature of targets and expected angular rates for pointing system, if known. Include under "Other Motions" requirements for instrumented booms or probes.

o. Item 66. Ephemeris Requirements. Provide accuracy requirements in terms of a root-sum-square error, or crosstrack, in-track, and radial errors. Also indicate update requirements, if known.

p. Item 67. Telemetry. Provide best estimate of amount and type of telemetry required. Indicate acceptable delay times for ground reception. Minimize real-time (or near-real-time) downlink requirements to the extent practical. Note alternatives in the "Remarks."

q. Item 68. Commands. Estimate requirements for the different types of commands. "Power on" and "Power off" for an item are considered separate commands. If command storage is required, write "yes" in item 68e.

r. Item 69. Plan for Data Processing and Dissemination of Results. Describe how data will be processed and disseminated to potential users.

s. Item 70. Radioactive Devices. Indicate material and strength for any radioactive materials used.

t. Item 71. Experiment Complement/Package Data. Provide a breakdown of the experiment into subassemblies, based on packages or modules, or in terms of separate experiments constituting the total experiment. Provide stowed and deployed (as applicable) dimensions in cm. Provide weight in kg. The total weight for all items must agree with item 54.

u. Item 72. Security Information. Designate appropriate items by C (for CONFIDENTIAL), 5 (for SECRET), or TS (for TOP SECRET). Military relevance in item 72a refers to the experiment's application to other DOD programs, especially operational ones. This information is in item 17 or in an attachment to the DD Form 1721. Under "Other" identify other classified elements of the experiment and show classification.

v. Item 73. Design Drawing/Specification Status. Indicate the status of final design drawings. Note timetable of any critical specifications that are not presently determined.

w. Item 74. Special Requirements. Indicate here items not considered earlier, such as special contamination-control requirements on the spacecraft or other experiments. Note desirable correlative experiments (specific experiments or experiment classes) and unique temperature or thermal load requirements. Indicate requirement for payload specialist for checkout of payload before deployment. State any launch-window requirements.

6. Part III—Program Information:

a. Item 75. Funding Status. Self-explanatory.

b. Item 76. Hardware Status. Self-explanatory.

c. Item 77. Design Freeze Date. Indicate when the design has or will be "frozen." This normally occurs when detail drawings are released for hardware fabrication.

d. Item 78. Delivery Date. Indicate date when hardware could be delivered for integration into spacecraft or launch

vehicle system. This can be given in "months after flight assignment." Show as year, month, day when exact delivery date given.

e. Item 79. Funding Breakdown. In total cost include all costs supported by the experiment sponsor. Indicate funds expended in previous fiscal years (FYs), funds planned for the current FY, and funds included in approved planning documents for future FYs.

f. Item 80. Budget/Program Authorization No. Give the budget and program authorization numbers approving the expenditure of funds for the experiment by the sponsoring agency or higher authority.

g. Item 81. Contractor. Provide name of contractor.

h. Item 82. Location of Contractor Work. Give geographical location of the hardware if already fabricated; or if not, of the design or manufacturing effort.

i. Item 83. Contract No. Self-explanatory.

j. Item 84. Planned Contract Obligation Date. State when contracts were or will be let to design, build, or support the experiment or spacecraft.

k. Item 85. Coordination. Summarize the coordination and concurrence obtained from other DOD agencies and NASA. Give names, offices, and the phone numbers. Indicate result of coordination. Give special consideration to the issue of similar and duplicative experiments in terms of objectives or techniques. Report significant changes resulting from continuing coordination. Attach additional pages if necessary with tne new preparation dates.

l. Item 86. Coordination Summary. Discuss similarities with other experiments, plans for consolidation, data exchange, and so forth.

UNCLASSIFIED

Security Classification *(when data entered)*

SPACE TEST PROGRAM FLIGHT REQUEST	Preparation Date: *(YYMMDD)*: 83/06/10 CLASSIFIED BY: N/A DECLASSIFY ON: N/A

PART I - REQUEST FOR SPACEFLIGHT

1. EXPERIMENT TITLE			2. SHORT TITLE
Space EHF Crosslink Experiment			SECLE
3. EXPERIMENT NUMBER	**4. PROJECT NUMBER**	**5. TASK NUMBER**	**6. PROGRAM ELEMENT NUMBER**
XXX-301	671J	671J05	63402F
7. PROJECT OFFICE	**8. MANAGEMENT OFFICE**	**9. SPONSOR**	
EHF Communications Lab	AF Communications Lab	HQ AFSC	

10. PRINCIPAL EXPERIMENTER		
a. NAME *(Last, first, MI)*	b. ACTIVITY	c. POSITION
Miller, Steven S.	EHF Communications Lab	Space EHF Scientist
d. SIGNATURE Steven S. Miller	e. TELEPHONE NUMBER 780- (663)372-4133/AV 4133	f. DATE *(YYMMDD)* 83/06/10

11. STAFF APPROVAL		
a. NAME *(Last, first, MI)*	b. ACTIVITY	c. POSITION
Pennington, Charles E.	AF Communications Lab	Associate Lab Director
d. SIGNATURE Charles E. Pennington	e. TELEPHONE NUMBER 780- (663)372-4100/AV 4100	f. DATE *(YYMMDD)* 83/06/17

12. SPONSOR		
a. NAME *(Last, first, MI)*	b. ACTIVITY	c. POSITION
Smith, Joseph M.	HQ AFSC	Director of Laboratories
d. SIGNATURE Joseph M. Smith	e. TELEPHONE NUMBER 250- (719)277-2170/AV 2170	f. DATE *(YYMMDD)* 83/06/30

13. PROJECT MANAGEMENT OFFICE		
a. NAME *(Last, first, MI)*	b. ACTIVITY	c. POSITION
N/A		
d. SIGNATURE	e. TELEPHONE NUMBER	f. DATE *(YYMMDD)*

14. INTERMEDIATE ACTIVITY		
a. NAME *(Last, first, MI)*	b. ACTIVITY	c. POSITION
N/A		
d. SIGNATURE	e. TELEPHONE NUMBER	f. DATE *(YYMMDD)*

15. DEPARTMENT APPROVAL		
a. NAME *(Last, first, MI)*	b. ACTIVITY	c. POSITION
N/A		
d. SIGNATURE	e. TELEPHONE NUMBER	f. DATE *(YYMMDD)*

DD FORM 1721 82 OCT — EDITION OF 1 OCT 69 IS OBSOLETE — PAGE 1 OF 11

Figure ATTACHMENT 5. COMPLETED SAMPLE DD FORM 1721—Page 1 of 11

UNCLASSIFIED
Security Classification *(when data entered)*

Experiment Number XXX-301 Preparation Date *(YYMMDD)* 83/06/10

16. OBJECTIVE

This experiment's primary objective is to measure the attenuation of EHF crosslinks when the signal propagates through the upper atmosphere.

Secondary objectives include: testing of a new EHF antenna concept, measuring the ability to intercept EHF crosslink signals in the atmosphere, verifying the pointing requirements for low-altitude satellite antennas when attempting to crosslink with geosynchronous satellites, and measuring the attenuation-causing H_2O (vapor) and O_2 densities in the upper atmosphere.

A single sortie-mode flight may not include sufficient experimentation time to satisfy all the above objectives.

17. RELEVANCE TO SPECIFIC DOD REQUIREMENTS

There exists a need to maintain connectivity and signal covertness between DMSP and other low Earth-orbiting satellites and geosynchronous communication satellites. Experiment should demonstrate and determine the atmospheric limitations on satellite-to-satellite communication that potentially is a critical piece of our force-wide communication capability. Each Service has identified operational needs for secure EHF satellite-to-satellite communication. This experiment should answer the few remaining questions that exist concerning EHF hardware and use for satellite crosslinks.

18. BACKGROUND

In tests as part of the LES 8/9 Program, the feasibility of using EHF for satellite crosslinks and downlinks to air,sea, and land was demonstrated. But increasingly capable electronic warfare threats make it more critical to determine the limits of EHF communication capabilities. One of these limits that this experiment should help define is the propagation of EHF through the upper atmosphere. This capability is important to measure and maximize in order to maximize satellite connectivity while maintaining link security. Major causes of uncertainty in EHF propagation are due to the uncertainties in H_2O (vapor) and O_2 densities and knowledge of the resonant absorption nature of these atmospheric components. By making atmospheric composition density measurements and linking them with actual EHF link performance, a better model of EHF propagation through the atmosphere should be obtained.

A list of references is included on the next page.

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Figure ATTACHMENT 5. COMPLETED SAMPLE DD FORM 1721—Page 2 of 11

REFERENCES

Bedrosian, E., J. R. Clark, L. N. Rowell, and W. Sollfrey, *An Evaluation of Millimeter Waves for Military Satellite Communications*, The Rand Corporation, R-2597-DCA, February 1980.

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Mundie, L. G., and N. E. Feldman, *The Feasibility of Employing Frequencies between 20 and 30 GHz for Earth-Satellite Communication Links*, The Rand Corporation, R-2275-DCA, May 1978.

Reiffen, B., *SPACE COMMUNICATIONS - Quarterly Technical Summary Report to the AFSC (U)*, Lincoln Laboratory, May 1982 (SECRET).

Seay, T. S., and D. R. McElroy, Jr., *The LES-8/9 Program (U)*, Lincoln Laboratory Draft Report, November 15, 1978 (SECRET).

Von Glahn, Capt P. G., USAF, et al., *LES 8/9 Joint Test Program Final Report: Volume II - System Performance (U)*, Electronic Systems Division, AFSC, ESD-TR-78-120, Vol II, March 1, 1978 (SECRET).

Figure ATTACHMENT 5. References

UNCLASSIFIED
Security Classification *(when data entered)*

Experiment Number XXX-301 Preparation Date *(YYMMDD)* 83/06/10

19. ALTERNATIVES TO SPACEFLIGHT

Because the overall communications capability relies on both ground-to-space and space-to-space links, each of these must be tested. Because of the great uncertainties and both spatial and temporal variations in EHF attenuation in the atmosphere, it is impossible to merely subtract irrelevant portions from the overall measurements. Therefore, it is impossible to accurately test space-to-space EHF links through the upper atmosphere from the ground or air; these measurements must be made in situ. And because of the variety of tests required, sounding rockets do not offer sufficient observation time to be considered a viable alternative to spaceflight.

20. FOLLOW-ON PLANS

Based on the results of this experiment, two satellites with prototype EHF transponders and antennas will be placed into geosynchronous orbit. The designs for this hardware and eventual operational hardware will be determined largely by SECLE experimental results. In addition, overall communication system concepts will be influenced by the success of this experiment; for example, the overall reliance upon low Earth-orbit to geosynchronous satellite crosslinks.

This SECLE experiment itself is the only one requiring STP support in this program. The two prototype geosynchronous satellites are already planned and funded with operational program funds.

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Figure ATTACHMENT 5. COMPLETED SAMPLE DD FORM 1721—Page 3 of 11

Experiment Number XXX-301 Preparation Date *(YYMMDD)* 83/06/10

21. DESCRIPTION

This experiment consists of EHF crosslink tests and associated environmental measurements. Used in tandem with an EHF transponder on a planned geosynchronous satellite, this experiment will both send and receive EHF signals through space and the upper atmosphere. During these communication experiments, attempts will be made using ground- and air-based transponders to both intercept and jam the experimental link. Also, the RMS will be used to deploy beyond the Shuttle bay an instrument package measuring relevant near-environment parameters concerning the electric field, magnetic field, and plasma. Finally, a small pallet-carried sensor will measure upper atmosphere H_2O (vapor) and O_2 densities.

Experiment hardware consists of: steerable EHF antenna, EHF transponder, deployable environmental package (electric and magnetic field detectors, pulsed plasma probe), pallet-carried environmental package (solar occultation-based composition detector), and associated support electronics.

22. PICTORIAL

EHF Crosslink Antenna System

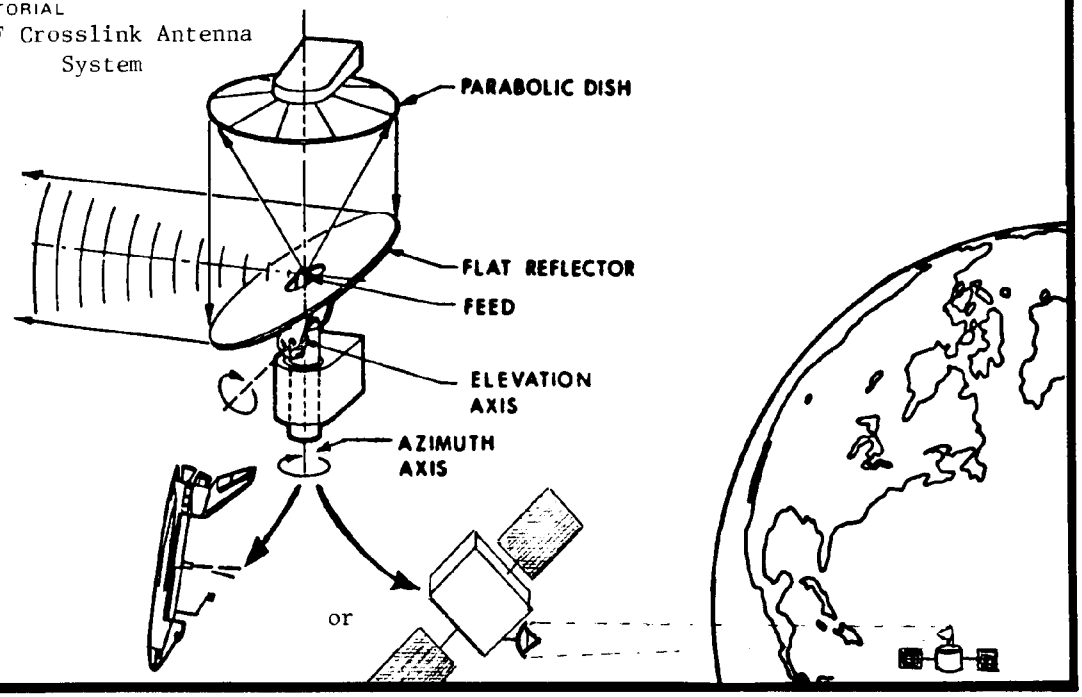

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Figure ATTACHMENT 5. COMPLETED SAMPLE DD FORM 1721—Page 4 of 11

Experiment Number XXX-301 Preparation Data *(YYMMDD)* 83/06/10

PART IIA - TECHNICAL DETAILS: SORTIE

23. ORBITER SORTIE MODE	24. EXPERIMENT CLASS	
☐ REQUIRED ☐ PREFERRED ☒ AS SECOND CHOICE	a. STANDARD STP SUPPORT HARDWARE: Compatible with STP Experiment Support System Pallet	b. GET-AWAY SPECIAL: Not applicable
	c. OTHER: Requires use of remote manipulator system (RMS)	

25. WEIGHT *(KG)*		26. SIZE	
a. TOTAL PAYLOAD	b. EXPENDABLES	a. LENGTH *(cm)*	b. MAX. DIA. *(cm)*
70	0	120	90

27. EXTENSIONS BEYOND BAY ENVELOPE	28. NOMINAL POWER *(W)*	29. PEAK POWER *(W)*	30. ENERGY *(WH)*
☒ YES ☐ NO	100	150	5,200

31. DUTY CYCLE *(% of one day's operation)*			32. MISSION DURATION *(DAYS)*		
a. TYPICAL	b. MAXIMUM	c. STANDBY	a. NOMINAL	b. MINIMUM	c. MAXIMUM
25%	42%	8%	5	3	None

33. FLIGHT DATE *(quarter, calendar year)*		
a. PREFERRED	b. LATEST	c. SUBSEQUENT FLIGHTS
2Q, 1986	3Q, 1987	Depending on data, other flights could be required.

d. RATIONALE: Dates driven by hardware availability (preferred) and operational program requirement (latest).

34. ORBITAL PARAMETERS *(KM, degrees)*			
		+ *(plus)*	− *(minus)*
a. APOGEE	296	Any	56
b. PERIGEE	296	Any	56
c. INCLINATION	90°	20°	20°

d. RATIONALE: Need to test in future operational orbit (low Earth, polar)

35. ALTERNATE ORBITS *(Acceptable if primary orbit is unavailable)*: None

36. ORBITER ORIENTATION *(check/comment as applicable)*	
a. ☐ +, − X AXIS	N/A
b. ☐ +, − Y AXIS	N/A
c. ☒ +, − Z AXIS	Cargo bay oriented toward local vertical for at least 4 hours during the mission
d. ☐ OTHER	N/A

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Figure ATTACHMENT 5. COMPLETED SAMPLE DD FORM 1721—Page 5 of 11

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Security Classification *(when data entered)*

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37. STABILIZATION REQUIREMENTS *(pointing accuracy (degrees)/pointing knowledge (arc sec))*

a. LOS

N/A / N/A

b. ROLL ABOUT LOS

N/A / N/A

c. JITTER OR DRIFT

N/A

d. EXPERIMENT PROVIDED POINTER

Antenna will provide own pointing (under payload specialist control)

38. MAJOR MOVEMENTS *(explain and provide rates)*

a. TRACK

Antenna must track geosynchronous satellite.

b. SLEW

Antenna must slew at rates from 0.0° to 0.3° per second.

c. OTHER MOTIONS

RMS will lift payload out of bay and sweep out series of arcs.

d. REMARKS

N/A

39. ASTRONAUT PARTICIPATION ☒ MONITORING ☐ ANALYSIS

☒ MISSION SPECIALIST ☒ PAYLOAD SPECIALIST

☒ COMMAND CONTROL

40. ASTRONAUT ESTIMATED DUTY CYCLE *(Hr/day)*

Mission specialist: 2 hr/day for 2 days; Payload specialist: 3 hr/day for 5days.

41. DESCRIPTION OF ASTRONAUT DUTIES

Mission specialist must use RMS to lift a small environmental monitoring package out of the cargo bay for measurements.

Payload specialist must command payload, initiate antenna pointing procedures, and monitor experiment operation.

42. EPHEMERIS REQUIREMENTS

Position (crosstrack and in-track) < 2 km; Velocity (crosstrack and in-track) < 10 m/sec. Updates required every 6 hours at a minimum.

43. TELEMETRY

a. REALTIME DATA RATE *(BPS)* 1000 bps rate to recorders

b. MAXIMUM STORAGE *(Bits)* 3.67×10^7 bits

c. DATA DUMP *(BPS)* 3.6×10^4 bps

d. SPECIAL REQUIREMENTS Need analog data storage of the antenna current waveform for short periods tagged with Universal Time.

e. REMARKS

At a minimum data should be dumped every 24 hours. Prefer every 6 hours.

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Figure ATTACHMENT 5. COMPLETED SAMPLE DD FORM 1721—Page 6 of 11

Experiment Number XXX-301 Preparation Date *(YYMMDD)* 83/06/10

44. ONBOARD PROCESSING *(display/control)*

a. NO. OF STANDARD DISPLAY FORMATS	b. TYPES OF FORMATS
Three	☒ ALPHANUMERIC STATUS ONLY ☒ KEYBOARD ☒ HAND CONTROLLER ☐ OTHER *(specify)*

45. COMMANDS

a. NO. OF POWER COMMANDS	b. NO. OF DISCRETE COMMANDS		
Two	Six		
c. NO. OF SERIAL/DIGITAL COMMANDS	d. MAGNITUDE COMMAND-WORD SIZE *(Bits)*	e. COMMAND STORAGE	
Three	Eight	No	

46. PLAN FOR DATA PROCESSING AND DISSEMINATION OF RESULTS

Will process data within 2 weeks of final data reception at experimenter facility. Results to be published in both restricted Air Force laboratory reports and established, open scientific journals.

47. RADIOACTIVE DEVICES *(If yes, complete b and c)*

a. ☒ YES ☐ NO	b. MATERIAL	c. STRENGTH
	Americium	$< 2 \times 10^{-5}$ millicuries

48. EXPERIMENT COMPLEMENT/PACKAGE DATA

a. ITEM	b. DIMENSIONS STOWED *(cm)*	c. DIMENSIONS DEPLOYED *(cm)*	d. WEIGHT *(kg)*	e. EJECTED?	f. RECOVERY?
EHF Antenna	50x50x50	120x50x50	25	No	Yes
EHF Transponder	20x20x10	20x20x10	20	No	Yes
Deployable Environment Pkg.	30x30x10	30x30x10	10	No	Yes
Pallet Environment Package	40x30x10	40x30x10	6	No	Yes
Support Electronics	30x20x5	30x20x5	9	No	Yes

49. SECURITY INFORMATION *(State highest levels)*

a. MILITARY RELEVANCE	b. TIMELINE	c. EXTERNAL VIEW
UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
d. DATA	**e. INTERNAL FEATURE**	
UNCLASSIFIED	UNCLASSIFIED	

f. OTHER CLASSIFIED ITEMS

N/A

50. DESIGN DRAWING/SPECIFICATION STATUS

All drawings/specifications complete except for pallet and RMS interface.

51. SPECIAL REQUIREMENTS

Requires Time Code Generator. Contamination Class 100,000.

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Figure ATTACHMENT 5. COMPLETED SAMPLE DD FORM 1721—Page 7 of 11

Experiment Number: XXX-301 Preparation Date *(YYMMDD)*: 83/06/10

PART IIB - TECHNICAL DETAILS *(Free-Flyer)*

52. FREE-FLYER MODE	53. EXPERIMENT CLASS
☐ REQUIRED ☒ PREFERRED ☐ 2ND CHOICE ☐ LDEF COMPATIBLE	☒ EXPERIMENT ONLY ☐ COMPLETE SPACECRAFT

54. WEIGHT *(kg)*	55. SIZE		
	a. LENGTH *(cm)*	b. MAX DIAMETER *(cm)*	c. VOLUME *(cm³)*
55	100	90	144,000

56. POWER *(w)*		57. DUTY CYCLE *(% of mission duration)*	
a. NOMINAL	b. PEAK	a. TYPICAL	b. MAXIMUM
60	100	25%	42%

58. MISSION DURATION *(months)*

a. NOMINAL	b. MINIMUM
12	6

c. RATIONALE
Need sufficient time for a variety of tests in all seasons.

59. LAUNCH DATE *(quarter, calendar year)*

a. PREFERRED	b. LATEST
2Q, 1986	3Q, 1987

c. RATIONALE
Dates driven by hardware availability (preferred) and operational program requirement (latest).

60. ORBITAL PARAMETERS *(km, degrees)*

		+ *(plus)*	− *(minus)*
a. APOGEE	296	3408	56
b. PERIGEE	296	724	56
c. INCLINATION	90°	20°	20°

d. RATIONALE
Need to test in future operational orbit (low Earth, polar)

61. ALTERNATE ORBITS *(Acceptable if primary orbit is unavailable)*
None

62. STABILIZATION TYPE
☒ 3-AXIS ☐ ANY RATE *(RPM)* _____
☐ SPIN ☐ OTHER *(Specify)* _____

63. AXIS/ORBIT PLANE
☐ PARALLEL ☒ PERPENDICULAR

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Figure ATTACHMENT 5. COMPLETED SAMPLE DD FORM 1721—Page 8 of 11

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Security Classification *(when data entered)*

Experiment Number XXX-301 Preparation Date *(YYMMDD)* 83/06/10

64. STABILIZATION REQUIREMENTS *(pointing accuracy (degrees)/pointing knowledge (arc sec))*

a. ROLL: 0.5 degree / 20 arc seconds

b. PITCH: 0.5 degree / 20 arc seconds

c. YAW: 0.5 degree / 20 arc seconds

d. JITTER OR DRIFT: Jitter $\leq \pm$ 20 arc seconds (2-minute duration)

65. MAJOR MOVEMENTS *(explain and provide rates)*

a. TRACK: Antenna must track geosynchronous satellite.

b. SLEW: Antenna must slew at rates from 0.0° to 0.3° per second.

c. OTHER MOTIONS: N/A

d. REMARKS: N/A

66. EPHEMERIS REQUIREMENTS

a. REQUIREMENTS

Position (crosstrack and in-track) <2 km.
Velocity (crosstrack and in-track) <10 m/sec.
Updates required every 12 hours at a minimum.

b. RATIONALE

Position and velocity must be known to above accuracies at time of command in order to determine position and length of link propagation path to desired accuracy.

67. TELEMETRY

a. REAL TIME DATA RATE *(BPS)*: 1000 bps rate to recorders

b. MAXIMUM STORAGE *(Bits)*: 3.67×10^7 bits

c. DATA DUMP *(BPS)*: 3.6×10^4 bps

d. SPECIAL REQUIREMENTS: Need short periods of analog data dump of the antenna current waveform tagged with Universal Time.

e. REMARKS: At a minimum data should be dumped every 24 hours. Prefer dumps every 6 hours.

68. COMMANDS

a. NO. OF POWER COMMANDS	b. NO. OF DISCRETE COMMANDS	
Four	Eight	
c. NO. OF SERIAL/DIGITAL COMMANDS	d. MAGNITUDE COMMAND WORD SIZE *(Bits)*	e. COMMAND STORAGE
Seven	Eight	Yes

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Figure ATTACHMENT 5. COMPLETED SAMPLE DD FORM 1721—Page 9 of 11

UNCLASSIFIED

Security Classification *(when data entered)*

Experiment Number XXX-301 Preparation Date *(YYMMDD)* 83/06/10

69. PLAN FOR DATA PROCESSING AND DISSEMINATION OF RESULTS

Will process data on own computer facilities within 2 weeks after provided data tapes. Analysis software already designed. Experimental results to be published promptly in both restricted Air Force laboratory reports and established, open scientific journals.

70. RADIOACTIVE DEVICES *(If yes, complete b and c)*

a.	b. MATERIAL	c. STRENGTH
☒ YES ☐ NO	Americium	$<2 \times 10^{-5}$ millicuries

71. EXPERIMENT COMPLEMENT/PACKAGE DATA

a. ITEM	b. DIMENSIONS STOWED *(cm)*	c. DIMENSIONS DEPLOYED *(cm)*	d. WEIGHT *(kg)*
EHF Antenna	50x50x50	120x50x50	23
EHF Transponder	20x20x10	20x20x10	18
Environmental Packages	40x30x10	40x30x10	8
Support Electronics	30x20x5	30x20x5	6

72. SECURITY INFORMATION *(state highest levels)*

a. MILITARY RELEVANCE	b. TIME LINE	c. EXTERNAL VIEW
UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED

d. DATA	e. INTERNAL FEATURE
UNCLASSIFIED	UNCLASSIFIED

f. OTHER CLASSIFIED ITEMS: N/A

73. DESIGN DRAWING/SPECIFICATION STATUS

All drawings/specifications complete except for spacecraft interface.

74. SPECIAL REQUIREMENTS

Requires Time Code Generator. Antenna must have clear Field of View (FOV). Contamination Class 100,000.

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Figure ATTACHMENT 5. COMPLETED SAMPLE DD FORM 1721—Page 10 of 11

UNCLASSIFIED

Security Classification *(when data entered)*

Experiment Number XXX-301 Preparation Date *(YYMMDD)* 83/06/10

PART III - PROGRAM INFORMATION

75. FUNDING STATUS	76. HARDWARE STATUS
☒ TOTAL ☐ PARTIAL ☐ UNFUNDED	☐ BREADBOARD ☒ UNDER CONSTR. ☐ UNFUNDED
77. DESIGN FREEZE DATE *(YYMMDD)* 84/01/15	78. DELIVERY DATE *(YYMMDD)* 85/01/15

79. FUNDING BREAKDOWN

a. ITEM	b. TOTAL COST	c. PRIOR FY FUNDS	d. CURRENT FY FUNDS	e. FUTURE FY FUNDS
PROTOTYPE	N/A	N/A	N/A	N/A
HARDWARE	$3.5 million	$2.0 million	$1.0 million	$0.5 million
MAN-YEARS	40	20	10	10
DATA REDUCTION AND DISSEMINATION	$0.5 million	$0	$0	$0.5 million

80. BUDGET/PROGRAM AUTHORIZATION NO.	81. CONTRACTOR	
P671J	Space Research Hardware, Inc.	
82. LOCATION OF CONTRACT WORK	83. CONTRACT NO.	84. PLANNED CONTRACT OBLIGATION DATE *(YYMMDD)*
Cleveland, Ohio 44111	F04801-0090-C-0083	Continuing

85. COORDINATION

a. NAME *(Last, first, MI)*	b. OFFICE	c. TELEPHONE NO.
Fritz, George M.	NASA Advanced Communications	(202) 733-1520

d. COORDINATION RESULTS
NASA is planning no experiments at the same frequency as SECLE and no satellite crosslink experiments.

e. NAME *(Last, first, MI)*	f. OFFICE	g. TELEPHONE NO.
Doe, John N.	NRL Space Communications	AV872-1920

h. COORDINATION RESULTS
The Navy is planning no experiments of a scope similar to SECLE. They recognize the value of SECLE and are very supportive of the experiment.

i. NAME *(Last, first, MI)*	j. OFFICE	k. TELEPHONE NO.
Jones, James E.	DARPA Communications Office	AV916-1270

l. COORDINATION RESULTS
DARPA strongly supports SECLE and is eager to be involved in applying the results to their own program.

86. COORDINATION SUMMARY

No other organization is performing any experiment or has any program to duplicate SECLE's results. The Navy and DARPA both have acknowledged the high military relevance of this experiment and are interested in the experiment's results.

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Figure ATTACHMENT 5. COMPLETED SAMPLE DD FORM 1721—Page 11 of 11

Glossary
(Formerly Attachment 1)

Section I
Abbreviations
This section contains no entries.

Section II
Terms

Departmental Approval Authority.
The command or agency authorized to submit requests for space-flight to the Directorate of Space Systems and C^3, HQ USAF/RDS, Wash DC 20330-5040. Refer to paragraph 2-1 for a listing of departmental approval authorities.

Experiment.
An investigation or test of a scientific, technological, or developmental nature. An experiment proposed for spaceflight in STP is defined in DD Forms 1721 and 1721-1. An experiment may include several instrument packages from the same or different sponsoring agencies. On a given payload there may be several experiments from the same or different sponsoring agencies. They may be either a primary or a secondary experiment.

Experiment Support Equipment.
Services and equipment onboard the Shuttle orbiter that support an STP experiment. This includes structural, mechanical, electrical, thermal, and payload interface equipment. Also included are the Shuttle and payload interface equipment used by a payload specialist.

Experimenter.
The person designated "experimenter" on the DD Form 1721. The experimenter conceives and designs the experiment.

Free-Flyer Spacecraft.
A spacecraft that is deployed into its mission orbit from the Space Shuttle or is launched into its mission orbit by an ELV.

Investigator.
The person responsible for design, test, and fabrication of an instrument that is a part of a multi-instrument experiment. In cases where there is only one instrument package, the experimenter and the investigator are the same.

Launch Support.
All logistics and support functions associated with a launch operation through orbital injection, such as prelaunch installation and checkout, range tests, countdown, and launch vehicle guidance.

Launch Vehicle.
The vehicle that places payloads in space. A launch vehicle can be expendable (for example, Titan or Atlas) or reusable (for example, Space Shuttle).

Manned Spaceflight Engineer (MSE).
A development engineer who is a specialist in the Space Shuttle, space payloads, and manned spaceflight operations.

Mission Specialist.
That member of the Shuttle crew who is the interface between the orbiter systems and the payload.

Orbital Transfer Stage.
A propulsive system used to transfer a free-flying spacecraft from the orbit of the launch vehicle to the desired orbit.

Payload.
The ensemble of experiment(s), spacecraft, and supporting equipment to be placed into space by a launch vehicle.

Payload Integration.
For the purposes of this regulation only, the process of integrating instrument packages and support equipment into a payload, and the integration of the payload into a launch system. The process of systems management, definition,

engineering, analysis, design, manufacturing, qualification, test, installation, and checkout that combines experiment(s), spacecraft, launch vehicle, facilities, telemetry, data acquisition, and personnel into a compatible entity capable of achieving the stated objectives of each experiment.

Payload of Opportunity.
A secondary payload of generally simple experiments assembled to fill unused capacity in the orbiter or to replace a withdrawn payload.

Payload Specialist.
That member of the Shuttle crew whose primary function is the operation of payloads.

Primary Experiment.
That part of the total mission experiment complement that represents the primary objective of the mission and has the highest priority for data acquisition.

Primary Payload.
That part of the total launch vehicle payload that represents the primary objective of a launch, and usually drives the mission requirements.

Secondary Experiment.
That part of the total mission experiment complement that is flown with the primary experiment but has lower priority for data acquisition.

Secondary Payload.
That part of the total launch vehicle payload not associated with the primary mission.

Shuttle Aft- or Mid-Flight Deck Experiment.
An experiment, usually simple and portable, that is carried or installed in the Shuttle aft- or mid-flight deck and operated by a crewmember or payload specialist.

Sortie Spacecraft.
A spacecraft designed to be operated within the Shuttle cargo bay or attached to the Shuttle.

Spacecraft.
A vehicle that provides structure, control, and other services to support operations of experiments in space. May be either a free-flyer or sortie spacecraft.

Spaceflight.
The flight of a payload into or through space. The payload in a spaceflight may be captive (for example, mounted in the Shuttle), tethered, or free-flying.

Spaceflight Compatibility.
The state or condition of being easily and cost-effectively integrated with launch vehicle systems, facilities, and other experiments.

Spaceflight Plan.
An overall plan for an STP space mission of one or more experiments. As a minimum the spaceflight plan includes launch date, launch vehicle, experiment data, support equipment data, mission parameters, MOAs between participants, and estimated costs.

Spaceflight Request.
A request for spaceflight of a single experiment (DD Forms 1721 and 1721-1).

Sponsor.
The agency responsible for the program, project, or task being supported and for the funding, development, fabrication, and qualification of the spaceflight hardware for an approved experiment, as described in DD Forms 1721 and 1721-1.

STP Payload.
The part of the total launch vehicle payload that is the responsibility of STP. May be either a primary or secondary payload.

Section III
Special Abbreviations and Terms

This section contains no entries.

RESERVED

Security Classification *(when data entered)*

SPACE TEST PROGRAM FLIGHT REQUEST EXECUTIVE SUMMARY	**CLASSIFIED BY:** **DECLASSIFY ON:**

1. EXPERIMENT TITLE		2. SHORT TITLE
3. EXPERIMENT NO	4. DATE OF SUBMISSION *(YYMMDD)*	5. DATE OF REVISION *(YYMMDD)*
6. OBJECTIVE		
7. RELEVANCE TO SPECIFIC DOD REQUIREMENTS		

8. REQUIREMENTS SUMMARY				
a. FLIGHT MODE ☐ FREE-FLYER	☐ SORTIE	☐ GAS	☐ LDEF	
☐ OTHER *(Specify)* _____				
b. PAYLOAD SPECIALIST ☐ YES ☐ NO		c. WEIGHT *(kg)*		
d. LENGTH *(cm)*	e. MAX. DIAMETER *(cm)*		f. POWER *(w)*	
g. ORBIT *(km)* APOGEE _____ PERIGEE _____			h. INCLINATION	
i. OTHER				
9. PROGRAM SUMMARY				
a. FUNDING STATUS PRIOR FY's _____ CURRENT FY _____ FUTURE FY's _____				
b. TOTAL COST		c. HARDWARE DELIVERY DATE *(YYMMDD)*		
d. CONTRACTOR				
10. APPROVING OFFICIAL				
a. NAME *(Last, first, MI)*		b. ACTIVITY		
c. POSITION	d. TELEPHONE NO.		e. DATE *(YYMMDD)*	
f. SIGNATURE				

DD Form 1721-1, 84 MAY EDITION OF OCT 82 IS OBSOLETE.

Security Classification *(when data entered)*

SPACE TEST PROGRAM FLIGHT REQUEST	Preparation Date: *(YYMMDD)*: CLASSIFIED BY: DECLASSIFY ON:

PART I - REQUEST FOR SPACEFLIGHT

1. EXPERIMENT TITLE			2. SHORT TITLE
3. EXPERIMENT NUMBER	4. PROJECT NUMBER	5. TASK NUMBER	6. PROGRAM ELEMENT NUMBER
7. PROJECT OFFICE	8. MANAGEMENT OFFICE	9. SPONSOR	

10. PRINCIPAL EXPERIMENTER		
a. NAME *(Last, first, MI)*	b. ACTIVITY	c. POSITION
d. SIGNATURE	e. TELEPHONE NUMBER	f. DATE *(YYMMDD)*

11. STAFF APPROVAL		
a. NAME *(Last, first, MI)*	b. ACTIVITY	c. POSITION
d. SIGNATURE	e. TELEPHONE NUMBER	f. DATE *(YYMMDD)*

12. SPONSOR		
a. NAME *(Last, first, MI)*	b. ACTIVITY	c. POSITION
d. SIGNATURE	e. TELEPHONE NUMBER	f. DATE *(YYMMDD)*

13. PROJECT MANAGEMENT OFFICE		
a. NAME *(Last, first, MI)*	b. ACTIVITY	c. POSITION
d. SIGNATURE	e. TELEPHONE NUMBER	f. DATE *(YYMMDD)*

14. INTERMEDIATE ACTIVITY		
a. NAME *(Last, first, MI)*	b. ACTIVITY	c. POSITION
d. SIGNATURE	e. TELEPHONE NUMBER	f. DATE *(YYMMDD)*

15. DEPARTMENT APPROVAL		
a. NAME *(Last, first, MI)*	b. ACTIVITY	c. POSITION
d. SIGNATURE	e. TELEPHONE NUMBER	f. DATE *(YYMMDD)*

Experiment Number _____ **Preparation Date** *(YYMMDD)* _____

16. OBJECTIVE

17. RELEVANCE TO SPECIFIC DOD REQUIREMENTS

18. BACKGROUND

Experiment Number _____ **Preparation Date** *(YYMMDD)* _____

19. ALTERNATIVES TO SPACEFLIGHT

20. FOLLOW-ON PLANS

Experiment Number _____ **Preparation Date** *(YYMMDD)* _____

21. DESCRIPTION

22. PICTORIAL

Experiment Number _____ **Preparation Date** *(YYMMDD)* _____

PART IIA - TECHNICAL DETAILS: SORTIE

23. ORBITER SORTIE MODE	24. EXPERIMENT CLASS	
☐ REQUIRED ☐ PREFERRED ☐ AS SECOND CHOICE	a. STANDARD STP SUPPORT HARDWARE	b. GET-AWAY SPECIAL
	c. OTHER	

25. WEIGHT *(KG)*		26 SIZE	
a. TOTAL PAYLOAD	b. EXPENDABLES	a. LENGTH *(cm)*	b. MAX DIA *(cm)*

27. EXTENSIONS BEYOND BAY ENVELOPE ☐ YES ☐ NO	28. NOMINAL POWER *(W)*	29 PEAK POWER *(W)*	30 ENERGY *(WH)*

31. DUTY CYCLE *(% of one day's operation)*			32. MISSION DURATION *(DAYS)*		
a. TYPICAL	b. MAXIMUM	c. STANDBY	a. NOMINAL	b. MINIMUM	c. MAXIMUM

33. FLIGHT DATE *(quarter, calendar year)*		
a. PREFERRED	b. LATEST	c. SUBSEQUENT FLIGHTS

d. RATIONALE

34. ORBITAL PARAMETERS *(KM, degrees)*		
a. APOGEE	*+(plus)*	*-(minus)*
b. PERIGEE	*+(plus)*	*-(minus)*
c. INCLINATION	*+(plus)*	*-(minus)*

d. RATIONALE

35. ALTERNATE ORBITS *(Acceptable if primary orbit is unavailable)*

36. ORBITER ORIENTATION *(check/comment as applicable)*

a. ☐ +,-X AXIS

b. ☐ +,-Y AXIS

c. ☐ +,-Z AXIS

d. ☐ OTHER

Experiment Number _____ **Preparation Date** *(YYMMDD)* _____

37. STABILIZATION REQUIREMENTS *(pointing accuracy (degrees)/pointing knowledge (arc sec))*

a. LOS /

b. ROLL ABOUT LOS /

c. JITTER OR DRIFT

d. EXPERIMENT PROVIDED POINTER

38. MAJOR MOVEMENTS *(explain and provide rates)*

a. TRACK

b. SLEW

c. OTHER MOTIONS

d. REMARKS

39. ASTRONAUT PARTICIPATION ☐ MONITORING ☐ ANALYSIS ☐ MISSION SPECIALIST ☐ PAYLOAD SPECIALIST ☐ COMMAND CONTROL

40 ASTRONAUT ESTIMATED DUTY CYCLE *(Hr/day)*

41. DESCRIPTION OF ASTRONAUT DUTIES

42. EPHEMERIS REQUIREMENTS

43. TELEMETRY

a. REALTIME DATA RATE *(BPS)*

b. MAXIMUM STORAGE *(Bits)*

c. DATA DUMP *(BPS)*

d. SPECIAL REQUIREMENTS

e. REMARKS

Experiment Number _____ **Preparation Date** _____

44. ONBOARD PROCESSING *(display/control)*

a. NO. OF STANDARD DISPLAY FORMATS	b. TYPES OF FORMATS ☐ ALPHANUMERIC STATUS ONLY ☐ KEYBOARD ☐ HAND CONTROLLER ☐ OTHER *(specify)* _____

45. COMMANDS

a. NO. OF POWER COMMANDS	b. NO. OF DISCRETE COMMANDS	
c. NO. OF SERIAL/DIGITAL COMMANDS	d. MAGNITUDE COMMAND-WORD SIZE *(Bits)*	e. COMMAND STORAGE

46 PLAN FOR DATA PROCESSING AND DISSEMINATION OF RESULTS

47. RADIOACTIVE DEVICES *(If yes, complete b and c)*

a. ☐ YES ☐ NO	b. MATERIAL	c. STRENGTH

48. EXPERIMENT COMPLEMENT/PACKAGE DATA

a. ITEM	b. DIMENSIONS STOWED *(cm)*	c. DIMENSIONS DEPLOYED *(cm)*	d. WEIGHT *(kg)*	e. EJECTED?	f. RECOVERY?

49. SECURITY INFORMATION *(State highest levels)*

a. CLASSIFIED DD FORM 1721	b. TIMELINE	c. EXTERNAL VIEW
d. DATA	e. INTERNAL FEATURE	

f. OTHER CLASSIFIED ITEMS

50. DESIGN DRAWING/SPECIFICATION STATUS

51. SPECIAL REQUIREMENTS

Experiment Number _____ **Preparation Date** _____

PART IIB - TECHNICAL DETAILS *(Free-Flyer)*

52. FREE-FLYER MODE	53. EXPERIMENT CLASS
☐ REQUIRED ☐ PREFERRED ☐ 2ND CHOICE ☐ LDEF COMPATIBLE	☐ EXPERIMENT ONLY ☐ COMPLETE SPACECRAFT

54. WEIGHT *(kg)*	55. SIZE		
	a. LENGTH *(cm)*	b. MAX DIAMETER *(cm)*	c. VOLUME *(cm^3)*

56. POWER *(w)*		57. DUTY CYCLE *(% of mission duration)*	
a. NOMINAL	b. PEAK	a. TYPICAL	b. MAXIMUM

58. MISSION DURATION *(months)*

a. NOMINAL	b. MINIMUM

c. RATIONALE

59. LAUNCH DATE *(quarter, calendar year)*

a. PREFERRED	b. LATEST

c. RATIONALE

60. ORBITAL PARAMETERS *(km, degrees)*

a. APOGEE	*+(plus)*	*-(minus)*
b. PERIGEE	*+(plus)*	*-(minus)*
c. INCLINATION	*+(plus)*	*-(minus)*

d. RATIONALE

61. ALTERNATE ORBITS *(Acceptable if primary orbit is unavailable)*

62. STABLIZATION TYPE

☐ 3-AXIS ☐ ANY RATE *(RPM)* _____

☐ SPIN ☐ OTHER *(Specify)* _____

63. AXIS/ORBIT PLANE

☐ PARALLEL ☐ PERPENDICULAR

Experiment Number _____ **Preparation Date** *(YYMMDD)* _____

64. STABILIZATION REQUIREMENTS *(pointing accuracy (degrees)/pointing knowledge (arc sec))*

a. ROLL /

b. PITCH /

c. YAW /

d. JITTER OR DRIFT

65. MAJOR MOVEMENTS *(explain and provide rates)*

a. TRACK

b. SLEW

c. OTHER MOTIONS

d. REMARKS

66. EPHEMERIS REQUIREMENTS

a. REQUIREMENTS

b. RATIONALE

67. TELEMETRY

a. REAL TIME DATA RATE *(BPS)*

b. MAXIMUM STORAGE *(Bits)*

c. DATA DUMP *(BPS)*

d. SPECIAL REQUIREMENTS

e. REMARKS

68. COMMANDS

a. NO. OF POWER COMMANDS	b. NO. OF DISCRETE COMMANDS	
c. NO. OF SERIAL/DIGITAL COMMANDS	d. MAGNITUDE COMMAND-WORD SIZE *(Bits)*	e. COMMAND STORAGE

Experiment Number _____ **Preparation Date** *(YYMMDD)* _____

69. PLAN FOR DATA PROCESSING AND DISSEMINATION OF RESULTS

70. RADIOACTIVE DEVICES *(If yes, complete b and c)*

a. ☐ YES ☐ NO	b. MATERIAL	c. STRENGTH

71. EXPERIMENT COMPLEMENT/PACKAGE DATA

a. ITEM	b. DIMENSIONS STOWED *(cm)*	c. DIMENSIONS DEPLOYED *(cm)*	d. WEIGHT *(kg)*

72. SECURITY INFORMATION *(state highest levels)*

a. CLASSIFIED DD FORM 1721	b. TIME LINE	c. EXTERNAL VIEW

d. DATA	e. INTERNAL FEATURE

f. OTHER CLASSIFIED ITEMS

73. DESIGN DRAWING/SPECIFICATION STATUS

74. SPECIAL REQUIREMENTS

Experiment Number _____ **Preparation Date** *(YYMMDD)* _____

PART III - PROGRAM INFORMATION

75. FUNDING STATUS	76. HARDWARE STATUS
☐ TOTAL ☐ PARTIAL ☐ UNFUNDED	☐ BREADBOARD ☐ UNDER CONSTR. ☐ UNFUNDED
77. DESIGN FREEZE DATE *(YYMMDD)*	78. DELIVERY DATE *(YYMMDD)*

79. FUNDING BREAKDOWN

a. ITEM	b. TOTAL COST	c. PRIOR FY FUNDS	d. CURRENT FY FUNDS	e. FUTURE FY FUNDS
PROTOTYPE				
HARDWARE				
MAN-YEARS				
DATA REDUCTION AND DISSEMINATION				

80. BUDGET/PROGRAM AUTHORIZATION NO.	81. CONTRACTOR
82. LOCATION OF CONTRACT WORK / 83. CONTRACT NO.	84. PLANNED CONTRACT OBLIGATION DATE *(YYMMDD)*

85 COORDINATION

a. NAME *(Last, first, MI)*	b. OFFICE	c. TELEPHONE NO.
d. COORDINATION RESULTS		
e. NAME *(Last, first, MI)*	f. OFFICE	g. TELEPHONE NO.
h. COORDINATION RESULTS		
i. NAME *(Last, first, MI)*	j. OFFICE	k. TELEPHONE NO.
l. COORDINATION RESULTS		

86. COORDINATION SUMMARY