

**INSTRUCTIONS FOR COMPLETING
SPACE TEST PROGRAM FLIGHT REQUEST
(DD FORM 1721)**

General Information. This DD Form 1721, Space Test Program Flight Request, solicits substantive information needed to evaluate and select experiments proposed for spaceflight and enables STP to accomplish spaceflight planning analyses and payload integration studies prior to recommending assignments of experiments to spaceflights. Some general guidelines for completing this form are as follows:

- a. Give actual information, if available, otherwise, use an estimate and so indicate. Provide an acceptable range of performance requirements if feasible to increase the possible number of flight opportunities.
- b. Submit a change when information previously submitted changes or when actual information becomes available to replace estimates.
- c. If the available space for any item is too small, use additional pages as needed. Although conciseness is desired, considerably more room may be required for specific items in individual cases.
- d. It is important that the information on the form details all acceptable flight modes that would be considered. Clearly stating what range of flight modes would be acceptable rather than a single mode increases the flight opportunities for a specific experiment.
- e. The form is in several parts. Parts I and II should be completed for all experiments. Part III is divided into separate sections for Shuttle/ISS payloads (Part III-A) and for free-flyer payloads (Part III-B). Fill out the section appropriate to the experiment. If it is desired that the experiment be considered for either means of flight, both Part III-A and Part III-B should be completed.

Security Classification. The entire form will be marked with a security classification commensurate with the highest classification of any single entry. For a classified form, the security classification of each block must be indicated, such as (S) for SECRET. The downgrading block (Classified By:/Declassify On:) must also be completed.

Instructions for Completing Specific Items:

Part I - Request for Spaceflight

Item 1. *Experiment Title.* Select a title that describes the broad objectives of the experiment and uses one or more key words. Nicknames, acronyms, etc., will not be used. The title should be unclassified.

Item 2. *Short Title/Acronym.* Use nicknames and acronyms. The short title/acronym should be unclassified.

Item 3. *Experiment Number.* The acronym of the sponsoring organization followed by four digits consisting of the last two digits of the year and the sponsor's sequential log number in two digits. For example: the first experiment submitted by the Naval

Research Laboratory in 2000 would be NRL-0001. Once assigned, this number does not change. Coordination with Service/Agency SERB administrator is necessary.

Item 4. *Project Number.* Give the experiment project number, or the number of the overall project of which the experiment is a part. Realizing that the exact terminology for this numerical identifier varies throughout the DoD, this number reflects the most appropriate sequential sub-breakout below the DoD Program Element Number.

Item 5. *Program Element Number.* Indicate the DoD program element number of the program sponsoring the experiment.

Item 6. *Project Office.* Enter the activity to which the principal investigator responsible for the experiment is assigned.

Item 7. *Management Office.* Enter the activity having management responsibility for the experiment. The Management Office may or may not be the same as the Project Office.

Item 8. *Sponsor.* Enter the agency responsible for the program, project, or task being supported and controlling the resources to develop, fabricate and qualify the experiment.

Item 9. *Principal Investigator.* The individual responsible for the experiment. This individual will be the primary point of contact for the experiment.

Item 10. *Project Office Approval.* The individual to whom the principal investigator reports.

Item 11. *Management Office Approval.* If different from project office approval.

Item 12. *Sponsor Approval.* The individual from the agency responsible for the program, project, or task being supported and controlling the resources to develop, fabricate and qualify the experiment. Responsibilities of the sponsor are outlined in AFI 10-1202(I) paragraph 1.13.

Item 13. *Intermediate Activity.* If applicable.

Item 14. *DoD Departmental Approval.* The individual with authority to forward spaceflight requests to the Directorate of Space & Nuclear Deterrence, Office of the Assistant Secretary of the Air Force for Acquisition (SAF/AQS). See AFI 10-1202(I) paragraph 1.3.

Item 15. *Requested STP Services.* Check all that apply. If requesting launch services, complete 15b.

a. *Number of Flights Requested/Required to Meet Objective.* Indicate the total number of flights that will be requested of STP.

b. *Desired Flight Mode.* Indicate by the notation scheme shown preferred and acceptable flight modes.

Item 16. Objective. Describe what is to be accomplished. State the purpose/use of the expected results of the experiment. If there is more than one objective, treat each one separately. If the objective is classified, an unclassified version must be included, if possible.

Item 17. Relevance to Specific DoD Requirements. Explain why this experiment should be performed. Emphasize relevance to DOD as much as possible. Indicate potential improvement in military hardware or military operations. Reference current documented military requirements (i.e. document name/number, page number, paragraph title/number). Be prepared to present unclassified documents at SERB.

Item 18. Description. Identify and discuss the equipment and the technical approach or technique to be used. State how the experiment objectives are to be obtained. Include descriptive website address if applicable.

Item 19. Background. Provide a brief historical summary of the effort. If appropriate, include preliminary investigations in laboratories, ground facilities, aircraft, balloons, space probes, ballistic flights, and spaceflights. References to documents or publications that summarize the history or current status of these efforts are desirable. List each historical flight, the results (i.e., success, failure), and the category of flight experiment (i.e., space probes, balloons, ballistic flights, and spaceflights). How does previous work make the proposed experiment practical? All experiments, not just those of your organization, should be reflected. Update this section as necessary with new developments.

Item 20. Descriptive Graphic. Include a descriptive graphic of the experiment.

Item 21. Alternatives to Spaceflight. Discuss the need for space test as opposed to ground test and why the experiment requires spaceflight.

Item 22. Experiment Uniqueness. Explain how the proposed experiment differs from and/or is complementary to other similar efforts. Indicate if a competition is pending and when award is expected.

Item 23. Follow-on Plans. Discuss the next step if this experiment is flown and if additional spaceflights are needed/anticipated.

Part III - Program/Security Information

Item 24. Hardware Status. Self-explanatory.

Item 25. Design-Freeze Date. Indicate when the design has or will be frozen. This normally occurs when detail drawings are released for hardware fabrication.

Item 26. Delivery Date. Indicate when hardware could be delivered for integration onto the spacecraft or launch vehicle system. This can be given in terms of months after flight assignment.

Item 27. (a-e) Funding Breakdown. Indicate funds previously obtained or expended to date, funds planned for the current fiscal year, and funds needed for future fiscal years. Distinguish between funds that are needed and those that have been secured.

Total cost includes all costs supported by the experiment sponsor and all other agencies, businesses, etc., supporting this effort. Do not include the cost of STP requested services.

f. *Data Processing and Dissemination Fully Funded?* Required per AFI 10-1202(I) paragraph 1.4.

g. *On Orbit Operations Beyond First Year Fully Funded?* Self-explanatory.

h. *Remarks.* Include additional remarks concerning funding status.

Item 28. *Budget/Program Authorization Number.* Give the budget and program authorization numbers approving the expenditure of funds for the experiment by the sponsoring agency or higher authority.

Item 29. *Contractor Responsibility.* Provide the name of the primary contractors and briefly indicate their responsibilities.

Item 30. *Location of Contract Work.* Give the location of the hardware, if already fabricated, or the design/manufacturing effort.

Item 31. *Contract Number.* Self-explanatory.

Item 32. *Planned Contract Obligation Date.* Indicate when contracts were or are planned to be obligated.

Item 33. *Plan for Data Processing & Dissemination of Results.* Describe how the data will be processed and results disseminated to potential users. Specifically, what project or person will use your data?

Item 34. (a-h) *Security Information.* Designate items a through h with the highest security applicable to this experiment by U (for UNCLASSIFIED), C (for CONFIDENTIAL), S (for SECRET), or TS (for TOP SECRET).

i. *Is Raw Data Classified?* Self-explanatory. Note: A Space Shuttle or ISS flight cannot accommodate a request for classified raw data.

j. *Encryption of Raw Data Required?* Self-explanatory. Note: A Space Shuttle or ISS flight cannot accommodate a request for raw data encryption.

k. *Other Classified Items.* Identify other classified elements of the experiment and show their classification.

l. *Are Any Technologies Used in This Experiment Listed in the Military Critical Technologies List (MCTL) or the US Munitions Lists? If Yes, Are They Controlled Through the International Traffic in Arms Regulation (ITAR)?* Self-explanatory.

m. *Are Foreign Nationals Involved With This Experiment?* Self-explanatory.

Part III-A. Technical Details: Space Shuttle/ISS

Complete this section only if the experiment is to be considered for a Space Shuttle or ISS flight mode.

Item 35. *Flight Options.*

a. *Shuttle Flight Options.* Check all that apply.

b. *ISS Flight Options.* Check all that apply.

Item 36. *Standard Support Hardware Desired.* Check all that apply.

Item 37. (a-b) *Mass.* Provide the current best estimate of total experiment mass and expendable mass in kilograms. Expendables include items that will be ejected from the Shuttle and/or consumed in the conduct of the experiment.

Item 38. *Physical Dimensions.* List the actual physical dimensions of the hardware, (i.e., the compact shape not to include large or prominent voids--indicate, however, any appendages such as booms, antennas, etc.). State all dimensions in centimeters.

Item 39. *Total Volume.* Estimate the total volume of the experimental hardware in cubic centimeters.

Item 40. *Extensions Beyond Bay Envelope?* If any portion of the experiment (excluding ejectables) extends outside the dynamic envelope of the Shuttle bay when fully deployed, check yes.

Item 41. (a-c) *Power.* Indicate stand-by, nominal and maximum power in watts. All entries should denote only the power that is to be provided to the experiment by the support equipment.

Item 42. (a-c) *Typical Duty Cycle.* Enter the typical or nominal percentage of one day's operation for each of the power levels in Item 41.

Item 43. (a-c) *Maximum Duty Cycle.* Consider also a realistic maximum (most stressing) duty cycle.

Item 44. (a-c) *Mission Duration.* Express the mission duration requirements in days. Exclude from consideration time for ascent, descent, or deployment of host payload. Minimum refers to the shortest time that could successfully meet the stated objectives. Nominal denotes a typical mission. Maximum may be dictated by battery life or other considerations; if there is no maximum, leave this item blank.

Item 45. (a-c) *Flight Date.* Indicate the quarter and fiscal year of the earliest, preferred and latest desired/required date for flight. If no latest date can be provided at this time, write open. The earliest date should be estimated based on the experiment delivery date, allowing a reasonable length of time for experiment integration.

d. *Rationale.* Explain the rationale for the dates given in a-c.

Item 46. *Orbital Parameters.*

- a. *Nominal Shuttle Parameters Acceptable?*** Self-explanatory.
- b. *Nominal ISS Parameters Acceptable?*** Self-explanatory.
- c. *Desired Apogee.*** Indicate the apogee in kilometers, including tolerances, required to meet the stated objectives.
- d. *Desired Perigee.*** Indicate the perigee in kilometers, including tolerances, required to meet the stated objectives.
- e. *Desired Inclination.*** Indicate the inclination in degrees, including tolerances, required to meet the stated objectives.
- f. *Alternate Orbits.*** Indicate acceptable alternative orbits if the orbits indicated in c-e are not available.
- g. *Remarks.*** Indicate additional orbital requirements.

Item 47. *Orientation Requirements.*

- a. *ISS Nominal Acceptable?*** Self-explanatory.
- b. *X-Axis.*** Indicate X-Axis orientation requirements.
- c. *Y-Axis.*** Indicate Y-Axis orientation requirements.
- d. *Z-Axis.*** Indicate Z-Axis orientation requirements.
- e. *Other Requirements.*** Indicate any additional orientation requirements necessary to perform the experiment.
- f. *Viewing Requirements.*** Self-explanatory.
- g. *Remarks.*** Indicate any additional orientation requirements or concerns.

Item 48. *Stabilization Requirements.*

- a. *ISS Nominal Acceptable?*** Self-explanatory.
- b. *Line-of-Site.*** Provide experiment pointing accuracy and pointing knowledge requirements for line-of-sight.
- c. *Roll About Line-of-Site.*** Provide experiment pointing accuracy and pointing knowledge requirements for roll about line-of-sight.
- d. *Jitter or Drift Control.*** Indicate jitter or drift control requirements, if applicable.

e. *Experiment Provided Pointer.* If the experiment is to be mounted on an experiment-provided pointer, specifications on pointing, jitter or drift are not to be provided.

Item 49. (a-d) *Major Movements.* Discuss track or slew requirements. Include under "other motions" requirements for instrumented booms, masts, RMS, or special field-of-view envelopes.

Item 50. *Astronaut Participation.*

a. *Required?* Self-explanatory.

b. *Function.* Check the functions an astronaut will be expected to perform.

c. *Non US Astronaut Participation Acceptable?* Self-explanatory.

d. *Description of Astronaut Duties.* Summarize briefly the major tasks for the astronaut noting essential and desired functions.

Item 51. *Ground Support Requirements During Flight.* Describe any coordinated ground support activities that will occur during the flight.

Item 52. *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. Indicate if the requirement is for real-time knowledge or post-flight data.

Item 53. (a-e) *Telemetry And Data Handling.* Make a best estimate of telemetry requirements. Acceptable delay times for ground reception should be indicated. Real-time downlink should be minimized to the extent possible.

Item 54. (a-h) *Experiment Complement/Package Data.* Provide a breakdown of the experiment into subassemblies based on packaging or modules, and/or in terms of separate experiments constituting the total experiment. Provide stowed and deployed (as applicable) dimensions in centimeters. The mass is to be provided in kilograms, and total mass for all items must agree with Item 37. Indicate the status of the final design drawings. Note the timetable of any critical specifications that are not presently determined.

Item 55. *Contamination Control Requirements.* Self-explanatory.

Item 56. (a-c) *Space Shuttle/ISS Safety.* Indicate any radioactive or hazardous materials and other safety considerations. Describe the status of any safety coordination activities already undertaken with NASA. Note desirable correlative experiments (specific experiments or experiment classes) and unique temperature or thermal load requirements. Also, indicate any special requirements such as keeping the instrument in a clean-room facility and of what class. Additionally, indicate any special requirements during integration and testing, e.g., instrument purging and health monitoring, removal of instrument after integration testing for preflight calibration.

Part III-B - Technical Details: Free-Flyer Mode

Complete this section only if the experiment is to be considered for flight on a free-flying satellite.

Item 57. Experiment Class. Check one of the following categories as follows:

Experiment Only - the experiment consists of one or more items requiring support from a spacecraft not provided as a part of the experiment.

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

Piggyback Payload - the experiment is specifically designed as a piggyback payload for a specific spacecraft host.

Item 58. (a-c) Mass. Provide the current best estimate of the total experiment mass and expendable mass in kilograms. "Expendables" include items that will be ejected from the spacecraft and/or consumed in the conduct of the experiment.

Item 59. Physical Dimensions. List the actual physical dimensions of the hardware (i.e., the compact shape not to include large or prominent voids--indicate, however, any appendages such as booms, antennas, etc.). State all dimensions in centimeters.

Item 60. Total Volume. Estimate the total volume of the experimental hardware in cubic centimeters.

Item 61. (a-c) Power. Indicate stand-by, nominal and maximum power in watts. All entries should denote only the power that is to be provided to the experiment by the support equipment.

Item 62. (a-c) Typical Duty Cycle. Enter the typical or nominal percentage of one day's operation for each of the power levels in Item 61.

Item 63. (a-c) Maximum Duty Cycle. Consider also a realistic maximum (most stressing) duty cycle.

Item 64. (a-c) Mission Duration. Express the mission duration requirements in months. "Nominal" denotes a typical mission. "Minimum" refers to the shortest time that could yield a successful experiment. "Maximum" might be dictated by battery life or other considerations. If there is no maximum, leave this item blank.

Item 65. (a-d) Flight Date. Indicate the quarter and fiscal year of the preferred and latest desired/required date for flight. If no latest date can be provided at this time, write, "open." The earliest date should be estimated based on the experiment delivery date, allowing a reasonable length of time for experiment integration.

Item 66. Orbital Parameters.

a. Apogee. Indicate the apogee in kilometers, including tolerances, required to meet the stated objectives.

b. Perigee. Indicate the perigee in kilometers, including tolerances, required to meet the stated objectives.

c. Inclination. Indicate the inclination in degrees, including tolerances, required to meet the stated objectives.

d. Rationale. Indicate the rationale for the parameters given in a-c.

e. Alternate Orbits. Indicate acceptable alternative orbits if the orbit indicated in a-c is not available.

f. Axis/Orbit Plane Restrictions. Indicate additional orbital requirement/restrictions, if applicable.

Item 67. (a-g) Stabilization Requirements. Indicate type of vehicle stabilization required, if any. Provide experiment pointing accuracy and pointing knowledge. If special jitter or drift requirements are given, control duration should also be provided. If the experiment is to be mounted on an experiment-provided pointer, specifications on pointing, jitter or drift are not to be provided.

Item 68. (a-d) Major Movements. Discuss track or slew requirements. Include under "other motions" requirements for instrumented booms, masts, or special field-of-view envelopes.

Item 69. Ground Support Requirements During Flight. Describe any coordinated ground support activities that will occur during the flight.

Item 70. 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.

Item 71. (a-e) Telemetry and Data Handling. Estimate the maximum amount of data to be taken on a typical orbit. Estimate the rates at which the spacecraft will be required to record the data. Make a best estimate of telemetry requirements. Acceptable delay times for ground reception should be indicated. Real-time downlink should be minimized to the extent possible.

Item 72. (a-f) Commands. Estimate requirements for the different types of commands. "Power on" and "Power off" for an item are considered separate commands. If it is determined that command storage is required, so indicate.

Item 73. Possible Hazards. Indicate any radioactive, hazardous materials or other safety considerations.

Item 74. Contamination Control Requirements? Self-explanatory.

Item 75. (a-g) Experiment Complement/Package Data. Provide a breakdown of the experiment into subassemblies, based on packaging or modules, and/or in terms of separate experiments constituting the total experiment. Provide stowed and deployed (as applicable) dimensions in centimeters. Provide mass in kilograms; the total mass for all items must agree with Item 58. Indicate the status of the final design drawings.

Item 76. *Other Requirements.* Provide any other information necessary to allow STP to meet the experiment requirements. Indicate here items not considered earlier. Note desirable correlative experiments (specific experiments or experiment classes) and unique temperature or thermal load requirements. Indicate specific launch-window requirements, if any. Also, indicate any special requirements such as keeping the instrument in a clean-room facility and of what class. Additionally, indicate any special requirements during integration and testing, e.g., instrument purging and health monitoring, removal of instrument after integration and testing for preflight calibration, etc.