

Space Flight Operations Contract

Payload Familiarization Briefing Guidelines

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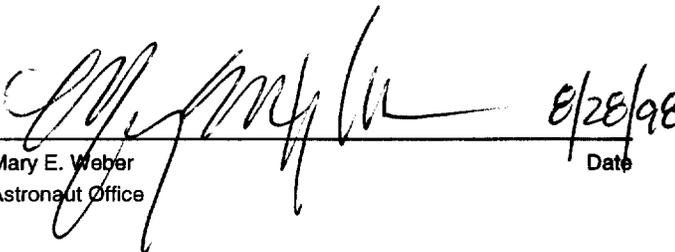
Payload Familiarization Briefing Guidelines

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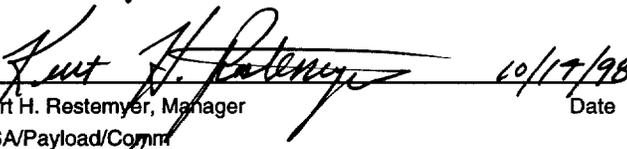


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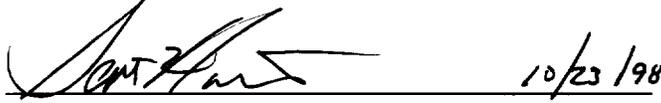
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PREFACE

The content of this document was provided by the Payloads Section, Communications and Payloads Training Branch, Space Flight Training Division, Mission Operations Directorate (MOD), Lyndon B. Johnson Space Center (JSC), National Aeronautics and Space Administration (NASA). Technical support was provided by United Space Alliance (USA), for the Space Flight Operations Contract (SFOC).

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1.0 PAYLOAD FAMILIARIZATION BRIEFING GUIDELINES

1.1 OBJECTIVE

The objective of the Payload Familiarization (FAM) Briefing is to educate flightcrew and mission operations personnel about your payload. At the conclusion of the briefing, your audience should know the following:

- Payload mission, goals, and objectives
- Payload systems and interfaces with the orbiter
- Operational aspects of the payload
- Roles and responsibilities of the flightcrew, Mission Control Center (MCC)-Houston flight controllers, and Payload Operations Control Center (POCC) operators.

1.2 AUDIENCE

Your audience will typically consist of the following people:

- Astronauts
- MCC-Houston flight controllers
- Instructors from MOD Training Division
- MOD Mission Management
- Payload Mission Management
- Payload operators

1.3 PURPOSE

The purpose of the payload FAM briefing is to bring your audience “up to speed” as efficiently as possible by presenting details that identify the “what’s, who’s, when’s, and how’s” of your payload.

Your briefing is usually your audience’s first exposure to information regarding your payload. Although these people are experts in their particular areas of mission operations support, you can assume that most have very little knowledge of and experience with your payload or experiment. They will want to know how they will interact with your payload and how their areas of expertise can best be utilized to ensure the safe and successful operation of your payload.

1.4 SCOPE OF THE BRIEFING

The attached guidelines identify generic topics that should be addressed during the payload FAM briefing. Your briefing may or may not need to address all topics. Please feel free to customize your briefing to discuss other payload- or mission-unique topics not listed here. Depending on their interaction with your payload, some of your audience may only need introductory, high-level discussions. Others, such as the flightcrew, may require significantly more detailed discussions.

For example, if the briefing is the first of many planned training sessions, it should provide only introductory, top-level material in order to develop the foundation for future training exercises. If the briefing is the only planned training session (typical with secondary or middeck payloads), then the briefing needs to provide more in-depth details on the systems engineering and operational aspects of your payload, including, if necessary, hands-on training with the flight hardware or mockups.

When developing your briefing, keep in mind that detailed discussions of the scientific, engineering, and programmatic aspects of your payload, which may be required of only a few personnel (such as the flightcrew), may best be deferred or presented at other training sessions, addressed in splinter meetings, or handled in a one-on-one situation.

Questions are inevitable. Please feel free to take the time to answer questions. However, questions that are beyond the scope of the briefing or that require extensive answers should be deferred to after the briefing or to a splinter meeting later. Since the scheduling of the crew, flight controllers, and conference room is frequently constrained, you may not have the luxury of extending beyond the time allocated for the briefing.

1.5 TIME ALLOCATION

The time allocated for your FAM briefing, for most secondary and middeck type payloads, should be about 1 hour. More time may be required for the more complex payloads. Also, more time may be allotted if this is your first flight, because there is a tendency for more questions. More time may be set aside for the briefing if you have rehearsed your presentation and are still within the FAM briefing guidelines.

1.6 SCIENCE PRESENTATION

If you expect your science presentation to be longer than suggested in the FAM briefing guidelines, then the following additional guidelines are recommended:

- A separate lesson will be scheduled for the crewmembers assigned as responsible for your payload; their attendance will be a mandatory training requirement.
- Attendance of other crewmembers will be optional or by direction of the commander.

- The crew coordinator will be asked to keep that time open for the other crewmembers so that other training activities are not scheduled that would preclude them from attending.

Experience has shown that these kinds of presentations typically last about 1 to 1½ hours. These lessons are usually scheduled to commence immediately following the FAM briefing.

1.7 PRESENTERS

We recommend that the person or persons presenting the FAM briefing (or supporting) should have, as a minimum, the ability to field questions and address issues pertaining to the science of the payload and payload operations, including interfaces with the shuttle and the shuttle environment. Although such questions and issues may be beyond the intended scope of the FAM briefing, nevertheless, they are important and you will be expected to respond as well as you can. As suggested in the briefing guidelines, you may need to suggest that such questions or issues be deferred to a separate splinter meeting to avoid running out of time.

1.8 AUDIO-VISUAL AIDS

An overhead projector that accommodates 8½ by 11 inch transparencies will be provided. If you require other aids, such as a slide projector or videotape player, please advise us in advance so that we can make the necessary arrangements.

Vu-Graph diagrams, charts, and illustrations should be legible, simplistic, and easy to read. Text should be concise, with large-size type. Define all payload-unique or unfamiliar acronyms. Supporting details should be available in your handouts or be verbally addressed. Illustrations should clearly show the relative sizes of all flight hardware.

1.9 HANDOUTS

Copies of your presentation should be given to your audience before the beginning of the briefing. The presentation package may include additional reference material not covered during the presentation. Typically, a minimum of 15 copies is required. If your payload is a complex primary payload, a minimum of 40 copies may be more appropriate. To save paper, we do not require that your handouts be one-to-one copies of your Vu-Graphs. Double-sided pages are acceptable. However, you should provide at least one single-sided copy to be a master for additional copies.

1.10 HARDWARE

Demonstrating or exhibiting your payload using flight, flight-similar, or mockup hardware is encouraged. Please advise us if you require temporary storage of any hardware during your stay at JSC.

1.11 VIDEOTAPING

Your FAM briefing will be videotaped for future review training. If any portion of your briefing is proprietary or uniquely sensitive, please advise us and we will ensure that viewing of the videotape is strictly controlled.

2.0 FAMILIARIZATION BRIEFING OUTLINE

The following guidelines suggest an outline format and generic topics that should be addressed during the payload FAM briefing. Your briefing may or may not need to address all topics. Please feel free to deviate from this outline as needed for discussion of other payload- or mission-unique topics not listed here.

a. Payload

1. Mission

- Outline payload goals and objectives.
- Name benefactors and how they benefit from mission success.
- Summarize the underlying scientific or engineering principles of the payload.
- Explain how the experiment works—briefly.

2. Science

- Summarize the underlying scientific or engineering principles of the payload.
- Give a basic science review (5 to 10 minutes only).
- Explain why you are using the space shuttle.
- Describe results from previous space shuttle missions.
- Explain how this mission reinforces or adds to the knowledge gained from previous shuttle missions.

3. Organization

- Name the organizations sponsoring and manufacturing the payload.
- Show a basic organization chart.
- Name payload points of contact and NASA flight operations counterparts.

b. Payload Systems

Provide a general and basic description of the major payload systems: electrical, mechanical, avionics, communications, control and display, and thermal. Simplified “black-box” functional schematics are recommended.

c. Payload Interfaces With the Orbiter

1. Mechanical and structural interfaces

- Illustrate payload as it would be configured in middeck or payload bay.
- Describe middeck stowage requirements.

2. Power sources

- Identify orbiter and payload power sources.
- Show power usage (power profile charts are useful).
- Describe power cabling between payload and orbiter.

3. Communications interfaces

- Describe telemetry and command interfaces between the orbiter payload interrogator, payload signal processor, payload data interleaver, Ku-band, payload recorder, and General Purpose Computer (GPC).
- Summarize usage of the payload general and support computer or the autonomous payload controller.

4. Control and display

- Describe orbiter control panels used to operate the payload.
- Summarize payload data presented on an orbiter GPC display.

5. Data recording

- Describe photographic, video, and audio recording requirements.
- Describe data recording devices and note any unique requirements.

d. MCC Interfaces With the Payload

1. Show MCC interfaces with your payload control center.

2. Describe command and telemetry interfaces utilizing the MCC, NASA, and payload communications networks.

3. Diagram voice interfaces.

e. Operations

1. Nominal

- Summarize payload activation procedures, including unstowing, assembly, and setup.
- Note any unique or unusual handling procedures.
- List any special cabin or payload bay configuration required, such as orbiter attitude or cabin lights.
- List payload status checks, visual inspections, monitoring, photography, and camcorder information logging requirements.
- Summarize payload deactivation procedures, including disassembling and restowing.

2. Contingency

- Show how payload malfunctions are identified and analyzed.
- Summarize payload malfunctions from which the crew can and cannot recover.
- Describe techniques available to the crew for recovering from payload malfunctions.

3. Constraints

- List restrictions to orbiter operations such as water dumps, attitude maneuvers, jet firings, or Remote Manipulator System (RMS) operations.
- Summarize the negative impacts that other types of experiments, payloads, or crew activity may have on your payload, such as vibrational perturbations, radio frequency transmissions, or lighting.

4. Previous flight experience

Summarize lessons learned from past flights and how these lessons are being applied.

f. Flight and Mission Rules

1. Summarize payload priorities.
2. Compare payload priorities to mission objectives.
3. Summarize flight rules and rationale.

g. Crew Training

1. Summarize your requirements for crew training sessions beyond the FAM briefing.
2. Note the hours required for each session, type of session, and session objectives.
3. Emphasize what requirements are mandatory, “highly desirable,” and “nice-to-do.”
4. Explain how the crew can obtain preflight exposure or experience with actual flight hardware.

Note: These requirements should summarize the training plan to which we agreed during the training requirements definition phase of the payload integration plan baseline process.

**APPENDIX A
ABBREVIATIONS AND ACRONYMS**

FAM	Familiarization
GPC	General Purpose Computer
JSC	Lyndon B. Johnson Space Center
MCC	Mission Control Center
MOD	Mission Operations Directorate
NASA	National Aeronautics and Space Administration
POCC	Payload Operations Control Center
RMS	Remote Manipulator System
SFOC	Space Flight Operations Contract
USA	United Space Alliance