

GAO

Fact Sheet for the Chairman,  
Subcommittee on HUD and Independent  
Agencies, Committee on Appropriations,  
U.S. Senate

September 1987

# NASA ADP SYSTEMS

## Information on the Automated Mission and Payload Tracking System



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Information Management and  
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The Honorable William Proxmire  
Chairman, Subcommittee on HUD and  
Independent Agencies  
Committee on Appropriations  
United States Senate

Dear Mr. Chairman:

This report responds to your May 18, 1987, request for information on the National Aeronautics and Space Administration's (NASA) Automated Mission and Payload Tracking System. The system is being developed to support the National Space Transportation System Program Office at the Lyndon B. Johnson Space Center.

The Program Office's Integration and Operations Office is developing the Automated Mission and Payload Tracking System to provide improved automated systems support to its Space Shuttle activities. The system is planned to eliminate data duplication among five existing systems, increase data accuracy, improve data accessibility within the Integration and Operations Office and other NASA offices, and provide enhanced capability not available on existing systems. As of January 1987, NASA had authorized about \$1.1 million in contract task orders to develop the system. Appendix I provides background information on the National Space Transportation System Program Office at Johnson Space Center; appendix II describes the existing automated information systems which will be incorporated into the Automated Mission and Payload Tracking System; appendix III discusses the new capabilities of the Automated Mission and Payload Tracking System; and appendix IV describes the automated environment in which the Automated Mission and Payload Tracking System will operate.

To obtain this information, we interviewed NASA's National Space Transportation System Program Office officials at the Johnson Center and reviewed documentation on the basic activities of the Program Office and the automated information systems discussed in this fact sheet. We did not perform analyses of the information or attempt to draw any conclusions on the adequacy of NASA's management, activities, or systems described in this report.

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We discussed the contents of this fact sheet with National Space Transportation System Program Office officials at the Johnson Center. They agreed that the information presented is correct.

As arranged with your office, unless you publicly announce the contents of this document earlier, we plan no further distribution of this fact sheet until 5 days from its issue date. At that time, we will make copies available to NASA and other interested parties.

Sincerely yours.



Howard G. Rhile, Jr.  
Associate Director



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## Abbreviations

IBM	International Business Machines Corporation
NASA	National Aeronautics and Space Administration



# Background

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The National Space Transportation System Program Office at the Johnson Center provides mission planning, engineering, and integration support to the Space Shuttle program. The Program Office's Integration and Operations Office works with payload requirements and details of each mission to ensure the achievement of mission and payload objectives.

The Integration and Operations Office provides information about NASA that customers request; obtains payload information and requirements such as launch dates, altitudes, and special service needs from customers; negotiates payload requirements with customers; assembles missions to accommodate payload requirements; and provides engineering support between the payloads and spacecraft. The Office also develops and manages the flight production schedules, which show the Program Office's activities and milestones needed to plan and assemble missions.



# Existing Automated Information Systems

Five automated information systems will be incorporated into the Automated Mission and Payload Tracking System. In general, these systems keep track of Space Shuttle payload and flight data as follows:

- **Mission Integration Management System.** This system supports activities that control the flight requirements for Space Shuttle and payload configurations and operates on a Masscomp minicomputer. The system tracks the status of changes requested by customers or NASA that affect any payload documents or interfaces among payloads and the orbiter as the requested changes are evaluated and decided upon; provides documentation status; produces distribution lists for documents and data packages; and captures the Mission Integration Control Board's (a Program Office management panel) agendas and decisions on change requests.
- **Customer Service Center Systems.** These systems support customer services activities and operate on an Alpha Microcomputer. The systems contain various data on customers such as their requests for information and the actions to satisfy the requests; track payload and experiment information and documentation; produce customer distribution lists; and analyze customer service data, which is manually translated into graphs to determine responsiveness to customers.
- **Flight Definition Requirements Document System.** This system maintains the working copy of the Flight Definition Requirements Document, a key document that shows flight details such as launch date, payloads, and orbiter used to accomplish the mission. The system operates on an IBM-3084 computer.
- **Flight Requirements Document System.** This system operates on a word-processing system supported by an IBM-4341 computer. It maintains the Flight Requirements Document, which shows the requirements of a flight in greater detail than the Flight Definition Requirements Document. For example, the document not only shows launch date, but multiple launch windows and launch periods. Each time a change request is approved, staff must search through the Flight Requirements Document and make the necessary changes. A NASA official told us that, on average, there are about 40 to 50 changes requested for each payload.
- **Flight Production Schedule System.** This system operates on an IBM-3084 computer and tracks payload and mission milestones for flight production scheduling. The system must be updated each time a date or milestone changes.

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**Appendix II**  
**Existing Automated Information Systems**

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The systems described above have user access limitations because they operate on different computers; have separate data bases, which results in data duplication and inaccuracies; do not provide flight production schedule and analysis capabilities; and have limited report generation, graphics, and data sorting and selecting capabilities.

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# New System Will Integrate Existing Systems and Provide Additional Capabilities

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The Automated Mission and Payload Tracking System will integrate existing information systems and provide additional capabilities. These new capabilities include integration of existing data bases, better user access, and enhanced automated features as follows:

- a user-friendly information system with an integrated data base which is automatically updated to support all users in the National Space Transportation System Program Office;
- a single authoritative source of up-to-date information accessible by other Johnson Center offices, contractors, and other NASA organizations;
- Flight Requirements Documents will be maintained in data base form and linked to Flight Definition Requirements Documents;
- an on-line display of change requests documents (vs. status information only on where the request stands);
- increased payload and mission personnel assignment information, tracking of management directed actions (action items), and data sorting and selecting capabilities;
- automated flight production scheduling using critical path techniques and capability to perform "what if" analysis on schedules;
- on-line responses to flight manifest inquiries;
- trend analysis with automatic reporting and graphics;
- historical data base trend analysis; and
- a correspondence control log for the Program Office.

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# Johnson Center Computer Will Operate the New System and Other Information Systems

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The Program Office's Integrated Management Information Computer will operate the Automated Mission and Payload Tracking System and two other systems—the Problem Reporting and Corrective Action system and the Program Compliance and Assurance Status System—to support the Space Shuttle program. This computer system is a part of the Johnson Center Information Network, which is widely accessible by its staff, contractors, and other NASA offices.

The Problem Reporting and Corrective Action system is being developed to provide more capability for National Space Transportation System's management to oversee the reporting, analysis, trends, and resolution of problems affecting flight hardware and ground support equipment. The Program Compliance and Assurance Status System is being developed to help National Space Transportation System's management to oversee safety and reliability of flight and ground support systems by providing critical program information such as requirements, problems, hazards, trend information, risk decisions, and critical item histories.

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