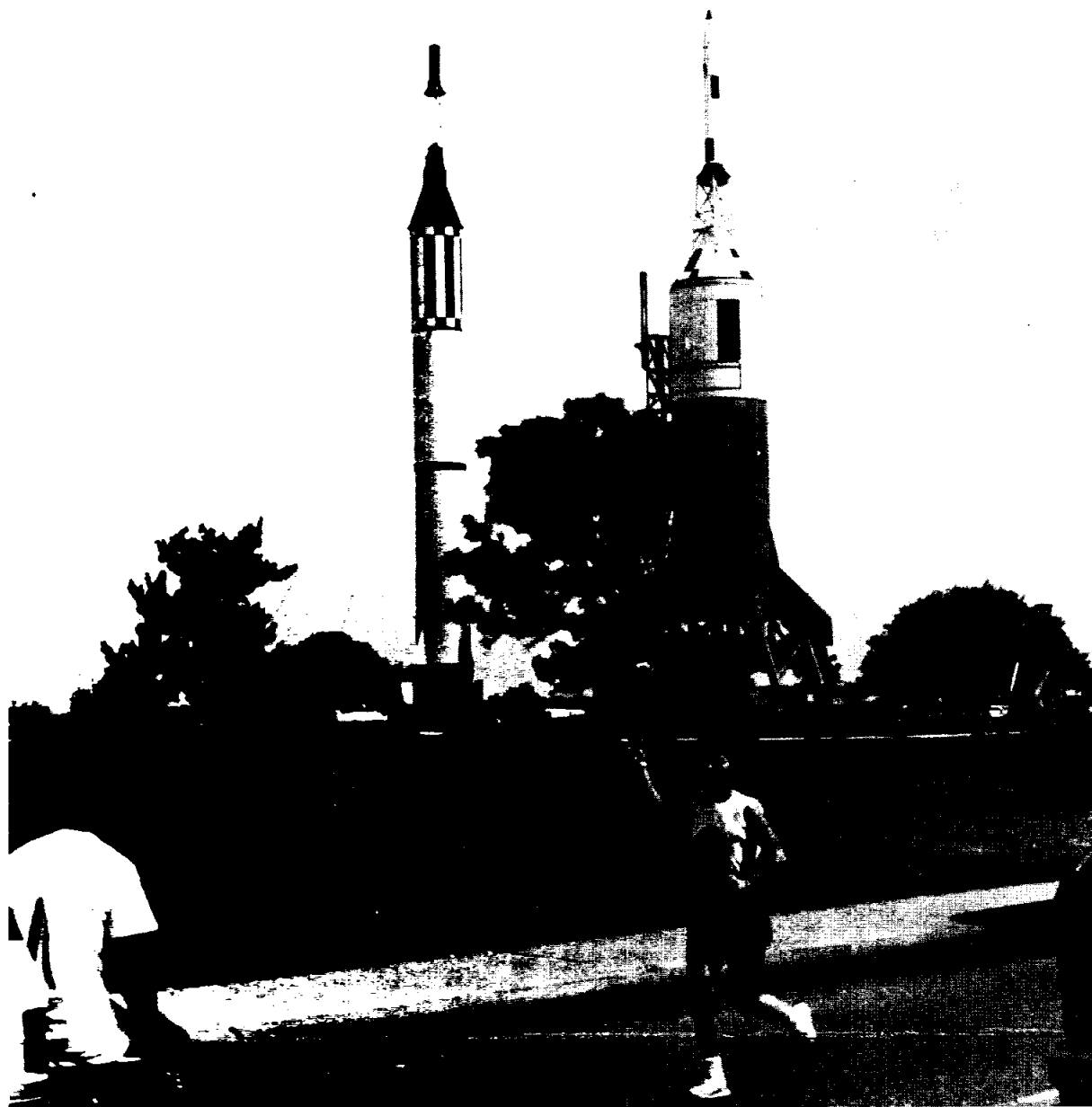


Space News Roundup

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National Aeronautics and Space Administration



Janet Ross, Public Affairs Office, carries the Olympic flame past rocket park during the torch relay through the Clear Lake area July 23. She was one of 35 JSC employees to carry the torch, which was here as part of the Olympic Festival.

NASA outlines recovery; First flight set for 1988

The first flight of the Shuttle following the *Challenger* accident is now scheduled for sometime in the first quarter of 1988, NASA reported July 14.

In a detailed report to President Reagan, NASA Administrator Dr. James Fletcher provided the Agency's responses to the nine major recommendations of the Presidential Commission on the Space Shuttle *Challenger* Accident.

Calling the Commission's findings "a road to recovery," Fletcher said the Agency has responded favorably to the report in every area.

Following is an executive summary of NASA responses to each of those recommendations:

Recommendation I

Solid Rocket Motor Design: On March 24, 1986, the Marshall Space Flight Center (MSFC) was directed to form a Solid Rocket Motor (SRM) joint redesign team to include participation from MSFC and other NASA centers as well as individuals from outside NASA. The team includes personnel from Johnson Space Center, Kennedy Space Center, Langley Research Center, industry, and the Astronaut Office. To assist the redesign team, an expert advisory panel was appointed which includes 12 people with six coming from outside NASA.

The team has evaluated several design alternatives, and analysis and testing are in progress to determine the preferred approaches which minimize hardware redesign.

To ensure adequate program contingency in this effort, the redesign team will also develop, at least through concept definition, a totally new design which does not utilize existing hardware.

The design verification and certification program will be emphasized and will include tests which duplicate the actual launch loads as closely as feasible and provide for tests over the full range of operating conditions. The verification effort includes a trade study which has been under way for several weeks to determine the preferred test orientation (vertical or horizontal) of the full-scale motor firings.

The Solid Rocket Motor redesign and certification schedule is under review to fully understand and plan for the implementation of the design solutions as they are finalized and assessed. The schedule will be reassessed after the SRM Preliminary Design Review in September 1986. At this time it appears that the first launch will not occur prior to the first quarter of 1988.

Independent Oversight: In accordance with the Commission's recommendation, the National Research Council (NRC) has established an Independent Oversight Group chaired by Dr. H. Guyford Stever and reporting to the NASA Administrator. The NRC Oversight Group has been briefed on Shuttle system requirements, implementation, and control; Solid Rocket Motor background; and candidate modifications. The group has established a near-term plan that includes brief-

(Continued on page 3)

Safety office established at Headquarters

George A. Rodney will head the new Safety, Reliability and Quality Assurance Office at NASA Headquarters as Associate Administrator for SR&QA.

Rodney is presently Director of Mission Success at the Martin-Marietta Orlando Aerospace Co., Orlando, Fla. He is expected to join NASA about Aug. 1 and will report directly to Administrator James Fletcher.

In announcing the new office and position, Dr. Fletcher said establishment of the office is in response to the Presidential Commission on the Space Shuttle *Chal-*

lenger Accident which recommended that NASA establish an SR&QA office with direct authority throughout the agency. He also emphasized that objectives of the office are to ensure a NASA SR&QA program that monitors equipment status, design validation problem analysis and system acceptability in agency-wide plans and programs.

The responsibilities of the Associate Administrator will include the oversight of safety, reliability and quality assurance functions related to all NASA activities and programs. In addition, he will be responsible for the direction of reporting and

documentation of problems, problem resolution and trends associated with safety. Specific activities are to:

- Ensure that SR&QA policies, plans, procedures and standards are established, documented, maintained, communicated and implemented.
- Review safety practices and standards and their application to specific programs and projects.
- Direct the thorough, prompt and accurate investigation, and analysis of all NASA mishaps, incidents and accidents and to ensure resolution of all investi-

gation-related recommendations.

- Ensure that a fully documented trend analysis program is conducted that includes accurate reporting of anomalies.

- Ensure that SR&QA issues are fully considered during design reviews, flight readiness reviews, test readiness reviews, operational readiness reviews or equivalent formal reviews which are conducted prior to start up of operations for ground facilities, manned and unmanned launch operations, aircraft flight programs and acceptance testing of experimental facilities and hardware having significant

risk to persons or property.

Rodney has extensive experience as an experimental test pilot, the management of aircraft and missile test programs and the direction of product integration/product assurance programs for manned and unmanned space systems. Prior to his present position, where he is responsible for providing an independent assessment of the operational readiness and reliability of the company's products, Rodney served in a similar capacity at NASA's Michoud Assembly Facility, La., for the Space Shuttle external tank.

Info system RFP issued

NASA has issued a request for proposal to approximately 250 firms for a Technical and Management Information System (TMIS) to support the Space Station.

The TMIS will be used to support technical management functions of the overall Space Station Program, including the design, development and operation of the orbital facility.

The TMIS will automate the generation and interchange of documents, correspondence, schedules, engineering data, engineering drawings, budget data and other management information for the program and will connect NASA Centers supporting the effort.

TMIS will be implemented in increments. One system integration contractor will be selected to implement all increments approved during the 8-year performance period. The contract also will provide for a 2-year unpriced option extension.

The first increment of the TMIS has been approved for development. This increment would be operational less than 1 year after the contract award date.

The contract is cost-plus-award-fee level of effort. Competing firms are required to submit a detailed design for the first increment, along with a total systems architecture including future increment conceptual designs. Also required is submission of a continuing level of effort for strategic planning, increment design and implementation, maintenance and operations, and information management.

Proposals must be submitted by Oct. 10, 1986. The contract award is expected in April 1987.



JSC Director Jesse Moore chats with reporters following a press conference last week. Moore outlined the Space Station reorganization plan and how that might affect JSC.

Space News Briefs

Challenger tapes analyzed

Preliminary analysis of restored tapes containing intercom and voice channels indicates the *Challenger* crew was unaware of the events associated with the tragedy, and the internal communications were being maintained as would be expected during a normal ascent. Engineers at JSC have begun efforts to playback tape from *Challenger's* onboard operational recorder 2. The tape was severely damaged by exposure to seawater and resultant chemical by-products. Engineers at IBM developed a process for neutralizing the caustic chemicals and restoring the tape to the point where it can be analyzed. Data and voice channels are intermixed on the digital bit stream, and the tape must be decoded using flight-type equipment in a lab at JSC.

Ariane accident board submits findings

The board of inquiry set up by the European Space Agency to determine the cause of the failure of an Ariane 3 on May 30 found no manufacturing fault in any item in the third-stage engine which failed to start. The board, in a preliminary report, found that a partial ignition in the third stage of the Ariane V18 vehicle occurred, but propagation of combustion did not take place. A second ignition 0.12 seconds later occurred at an abnormally high pressure level which caused a high-pressure peak and the extinction of the engine. Because of this, the board submitted 14 recommendations aimed at improving the engine. The recommendations included developing a more powerful ignitor for the engine. Arianespace, the marketing arm for the expendable Ariane vehicle, stated it will analyze the report and determine possible effects on the Ariane launch schedule.

KSC Director Smith retires

Richard G. Smith, Director of the Kennedy Space Center, has announced his retirement, effective July 31. Smith will end 35 years of service to the nation's space program, and over 25 years of service with NASA, to become president and chief executive officer of General Space Corp., Pittsburgh. Deputy Director Thomas E. Utsman will serve as Acting Director of the Center until NASA Administrator James Fletcher appoints a new director. Smith began his career in 1951 at Redstone Arsenal and was transferred to NASA when the Development Operation Division of the Army Ballistic Missile Agency became the nucleus for the Marshall Space Flight Center. Smith's positions became increasingly responsible as he became manager of the Saturn rocket program and later Deputy Director of Marshall in 1974. Smith moved on to become KSC Director in September 1979 and he served in that position until his recent retirement.

Topex/Poseidon RFP issued

NASA's Jet Propulsion Laboratory has issued a request for proposals (RFP) to three firms to determine a single satellite contractor for the proposed U.S.-French Topex/Poseidon oceanographic mission. The satellite would map the circulation of the world's oceans using a precise radar altimeter to measure height variations on the sea surface. Such information will help lead to a better understanding of the role of the oceans in climate change. Fairchild Industries, RCA Astro-Electronics and Rockwell International were given the RFP after these companies completed Phase B definition studies for the satellite. A single winner among these companies will be announced in December 1986, with a contract award date of May 1987 pending Congressional approval of the project in the 1987 budget. The satellite is scheduled for a 1991 launch aboard a European Ariane 4 launcher. The payload consists of five U.S. and two French sensors.

Bulletin Board

Engineering Expo set for July 30-31

Spacesuits, laser docking systems and proposed solid rocket motor O-ring redesigns will be featured at the third annual Engineering Exposition which is slated for July 30-31 at the Gilruth Center. The expo is free and open to JSC employees, contractors and their families and is slated for 10 a.m. to 4 p.m., July 30, and 10 a.m. to 5 p.m. and 6 p.m. to 8 p.m. July 31. "JSC Engineering: 25 Years of Excellence" is the theme of the expo and features displays from the Engineering Directorate's divisions.

JSC EAA plans trip to Las Vegas

The JSC Employees Activities Association is planning a trip to Las Vegas to coincide with the October 13 celebration of Columbus Day. The trip begins with a Transtar Airlines flight from Hobby airport on October 10 and ends with return flights to Hobby on October 13. The package is priced at \$288 per person, double occupancy, and includes round trip airfare, three nights at the Imperial Palace Hotel and round trip airport transfers. The Exchange Store will accept reservations beginning August 4, and a \$100 deposit is due by August 22. Final payment for the package is due September 5.

AFCEA meeting set for July 30

Retired Air Force Lt. Col. and aviation historian Dr. John F. Guilmartin Jr., will speak at the Armed Forces Communications and Electronics Association luncheon. The luncheon is scheduled at 11:30 a.m., July 30, at the Holiday Inn located on NASA Road One. "High Technology, Communications and the Shuttle: The Limits of Engineering," is the title of Guilmartin's speech. Admission is \$8, and reservations must be made as soon as possible through Sharon Carr, 280-6018, or Jerri Huff, 280-6019.

ABWA announces new officers

The American Business Women's Association, Clear Lake chapter, announced the following new officers: president, Lupita Armendariz; vice-president, Nancy Byrd; recording secretary Marjorie Jacobson; corresponding secretary Inge Stuehrk. The new officers will serve from August, 1986 to July, 1987. Persons interested in joining the organization should call Lupita Armendariz at x4831.

Discount theater tickets available

The University of Houston-Clear Lake in conjunction with the JSC Employees Activities Association is offering discount tickets to the eighth annual Houston Shaw Festival. The festival features the works of George Bernard Shaw at the Satellite Theater at UH-CL. NASA employees can receive \$6 tickets for \$4 by showing their badge at the UH-CL box office. Featured plays are "Arms and the Man," July 10, 11, 19, 20, 24, 25, August 2, 3, "Don Juan in Hell," July 12, 13, 17, 18, 26, 27, 31, August 1 and for the children, "Mingling and the Magic Tree," July 21, 22, 23, 24, 25, 28, 29, 30, 31, August 1. Showtime is 8 p.m. for the Thursday, Friday and Saturday shows, 5 p.m. for the Sunday matinees and 10:30 a.m. for the children's shows. For reservations call the UH-CL box office at 488-9334.

OV 104 bound for Pad B

The Orbiter *Atlantis* will be rolled out to Launch Pad 39-B in August to support verification testing of newly installed weather protection structures at the Kennedy Space Center.

Currently stacked on Mobile Launcher Platform 1 in the Vehicle Assembly Building, *Atlantis* is slated to be transported no earlier than August 12.

In the past, Shuttle Orbiters have been partially shielded by the Rotating Service Structure (RSS) that closes in around the Space Shuttle at the launch pad.

The new \$3.3 million system of sliding and folding doors and seals

will cover previously exposed, lower portions of the Orbiters to greatly reduce the risk of damage to their fragile heat protection tiles. The metal doors will slide between an Orbiter's belly and its external tank.

Other weather protection structures to provide a roof seal and enclose the space between the RSS and the external tank were checked earlier this year.

Without the shielding, the tiles are susceptible to damage from hail and wind-blown debris, and heavy rains can erode tile waterproofing.

By moving *Atlantis* to the pad, engineers will be able to check

structural clearances, verify seal integrity and validate deployment procedures and timelines.

Operations managers and facility engineers scheduled the Pad B weather protection checkout to take advantage of having a fully assembled Shuttle available. *Atlantis* originally had been assembled to support planned testing of Shuttle/Centaur hardware at Pad A this summer.

Existing weather protection systems at Pad 39-A are slated to be upgraded to the Pad B configuration next year.

Atlantis is expected to remain on the launch pad until early September.

Umpires strive for quality

Crack! The impact of the softball and the bat makes one think the game was misnamed as the ball goes sailing over to left field. The hitter can easily make a stand-up double, but he decides to go for a triple. The runner, the ball, the third baseman and the homeplate umpire all converge upon third base simultaneously. Everyone knows it's going to be a close call as the umpire at the scene glances to the other umpire, pauses a moment and then pumps the runner out with a thumb and voice that says "OUT!"

Such a situation can sometimes lead to very real, heated arguments at the Gilruth Center's softball fields during games. But Ron Buckley of the NASA/Bay Area Softball Umpires Association said he and the other 19 members of the association work hard to provide professional umpiring that ensures good calls and a minimum of arguments.

Buckley and the other umpires in the association have already faced a lot of situations like the one above as they umpire from May to November for the nearly 90 softball teams that use NASA facilities. But most umpires have seen these situations before because the members average over ten years of softball umpiring each. Buckley, who works for Northrop in Bldg. 33, said the least experienced member has three years experience, while many have over 20 years experience in making close calls. Buckley himself has been umpiring for 21 years.

Although softball participants may think their games are physically demanding, most of them don't have to take the heat from disgruntled players and the Houston summer for five games per night. The umpires don't put out this effort for nothing; Buckley said umpires get paid from \$9 to \$14 per game. Because they are being paid to make close calls, Buckley said

they try to provide professional umpiring.

"We try to do a good job at every game and every level of play. We know we're being paid, and we try to call a good game because of this. But I don't think any of us would be out there if we didn't love doing it," Buckley said. As evidence of their dedication, Buckley said most of the members judge softball for other organizations and some members referee other sports like basketball and soccer.

Buckley said that in an effort to provide professional umpiring, the association, which became a chartered chapter of the Amateur Softball Association in 1982, certifies its own officials. This ensures the umpires know the rules from the moment they first step behind the plate, and monthly clinics keep the members up to date with any rule changes. Buckley also said they try to look sharp and be on time for the games they umpire. "We've fined and ejected people from the association who had a habit of showing up late and looking unprofessional for games," Buckley said.

Buckley said the monthly clinics provide tips to help members make good calls and control the game. He said members are instructed to hustle to the scene of a close call so they can be on top of the action. When two umpires are used to officiate a game, Buckley said the umpires often signal to one another the way they would call the play so that two viewpoints go into the decision and one umpire's call doesn't conflict with the other's.

Members are also told to pause a moment before making a call. "If you know a throw will beat out the runner, and you call the runner out in anticipation of the baseman catching and holding onto the ball, you can get an embarrassing situation if the baseman drops the ball," Buckley said. He also said umpires

are told to "sell their call. If it's a close call, and you know exactly how it went, you need to tell everybody else that you knew what happened." But what happens when the umpires, who are human after all, make an error? When two umpires officiate a game, a team can appeal a call to the other umpire. "I often make calls because I'm on top of the play, but I hope the call will be appealed because the other umpire may have a better angle to see what happened. I don't have to accept their appeal and ask the other umpire, but I never take an appeal as a criticism of a call. I think they just want a fair call," Buckley said.

When only a single umpire officiates a game and he or she makes a bad call, "You have to live with it," Buckley said. Decisions on rules can be appealed to the chief umpire, but decisions on whether a player is safe or out can't. "When you make a bad call you just live with it, but you can't try to make up for a bad call by compensating for it later with a bad call that goes the other way," Buckley said.

But with the time spent in clinics and on the fields, Buckley and the other members of the NASA/Bay Area Softball Umpires Association try to minimize the number of bad calls they make. Their efforts appear to be paying off because the association has been chosen to officiate high-caliber tournaments like the Air National Guard national tournament, and the association also officiates for other leagues like the IBM, Ford-Philco and the Bendix leagues.

So the next time you find yourself getting into an argument with an umpire out at the Gilruth Center, remember the experience and training that went into the decision. And if that doesn't end the argument, remember the umpire's only human.

Risch to leave Det. 2

Lt. Col. Gotthard Janson III will assume command of Detachment 2, Space Division from Col. Gregory M. Risch at a ceremony here on August 6. Janson will be the third commander of the unit since its inception in 1979.

Janson will be responsible for developing and implementing plans and strategy for management of Detachment 2's Space Transportation System (STS) payload integration, small experiments, secure systems and future STS plans and developments.

No stranger to NASA, Janson has been the Director of Development and Operations and Security Engineering for the Detachment over the past two years. Prior to that he was at NASA Headquarters, working in the Office of Space Transportation Operations, where he assisted in the planning of headquarters and field center manifesting activities for Department of Defense payloads and coordinated STS integration of all NASA planetary spacecraft. The Inertial Upper Stage and the Tracking and Data Relay Satellite System.

"I feel very fortunate to be named the commander of this small yet

vital organization. The NASA and Air Force people I have worked with at JSC are the best and I am elated that I will be able to continue these relationships. Having worked in positions for both agencies, I have always felt the bond between the Air Force and NASA is strong and I am confident that continued cooperation between the two will help us overcome the challenges we are facing," Janson said.

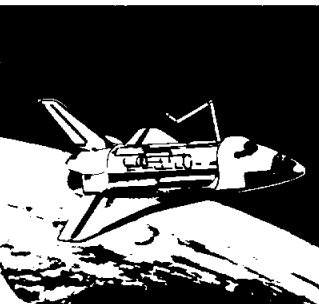
A 21 year veteran, Janson has a Bachelor of Science degree in Mechanical Engineering from Cali-

fornia State Polytechnic University and a Master of Science degree in Engineering Sciences from U.C.L.A.

Col. Risch has been commander of Detachment 2 since March 1982. He is moving to Eglin Air Force Base, Fla. where he will be Director of Plans and Requirements for the 3246th Test Wing. This will be Colonel Risch's second assignment to Eglin. He was a munitions test engineer during an assignment beginning in 1971 and later was named Chief, Program Control Division, Guided Bombs Program Office.

NASA
Lyndon B. Johnson Space Center

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Editor

Brian Welch

NASA responds to Rogers Commission report

(Continued from page 1)

ings and visits to review inflight loads; assembly processing; redesign status; and other solid rocket motor designs, including the Titan. Longer term plans are being formulated by the group including participation in the Solid Rocket Motor preliminary design review in September 1986.

Recommendation II

Shuttle Management Structure: The Administrator has appointed General Sam Phillips, who served as Apollo Program Director, to study every aspect of how NASA manages its programs, including relationships between various field centers and NASA Headquarters. General Phillips has broad authority from the Administrator to explore every aspect of NASA organization, management and procedures. His activities will include a review of the Space Shuttle management structure.

On June 25, 1986, Astronaut Robert Crippen was directed to form a fact-finding group to assess the Space Shuttle management structure. The group will report recommendations to the Associate Administrator for Space Flight by August 15, 1986. Specifically, this group will address the roles and responsibilities of the Space Shuttle Program Manager to assure that the position has the authority commensurate with its responsibilities. In addition, roles and responsibilities at all levels of program management will be reviewed to specify the relationship between the program organization and the field center organizations.

The results of this study will be reviewed with General Phillips and the Administrator with a decision on implementation of the recommendations by October 1, 1986.

Astronauts in Management: Rear Admiral Richard Truly, a former astronaut, has been appointed as Associate Administrator for the Office of Space Flight. Several active astronauts are currently serving in management positions in the agency. The Crippen group will address means to stimulate the transition of astronauts into other management positions. It will also determine the appropriate position for the Flight Crew Operations Directorate within the NASA organizational structure.

Shuttle Safety Panel: A Shuttle Safety Panel will be established by the Associate Administrator for Space Flight not later than September 1, 1986, with direct access to the Space Shuttle Program Manager. This date allows time to determine the structure and function of this panel, including an assessment of its relationship to the newly formed Office of Safety, Reliability, and Quality Assurance, and to the existing Aerospace Safety Advisory Panel.

Recommendation III

Critical Item Review and Hazard Analysis: On March 13, 1986, NASA initiated a complete review of all Space Shuttle program failure modes and effects analyses (FMEA's) and associated critical item lists (CIL's). Each Space Shuttle project element and associated prime contractor is conducting separate comprehensive reviews which will culminate in a program-wide review with the Space Shuttle Program Manager at Johnson Space Center later this year.

Technical specialists from outside the Space Shuttle program have been assigned as formal members of each of these review teams. All Criticality 1 and 1R critical item waivers have been cancelled.

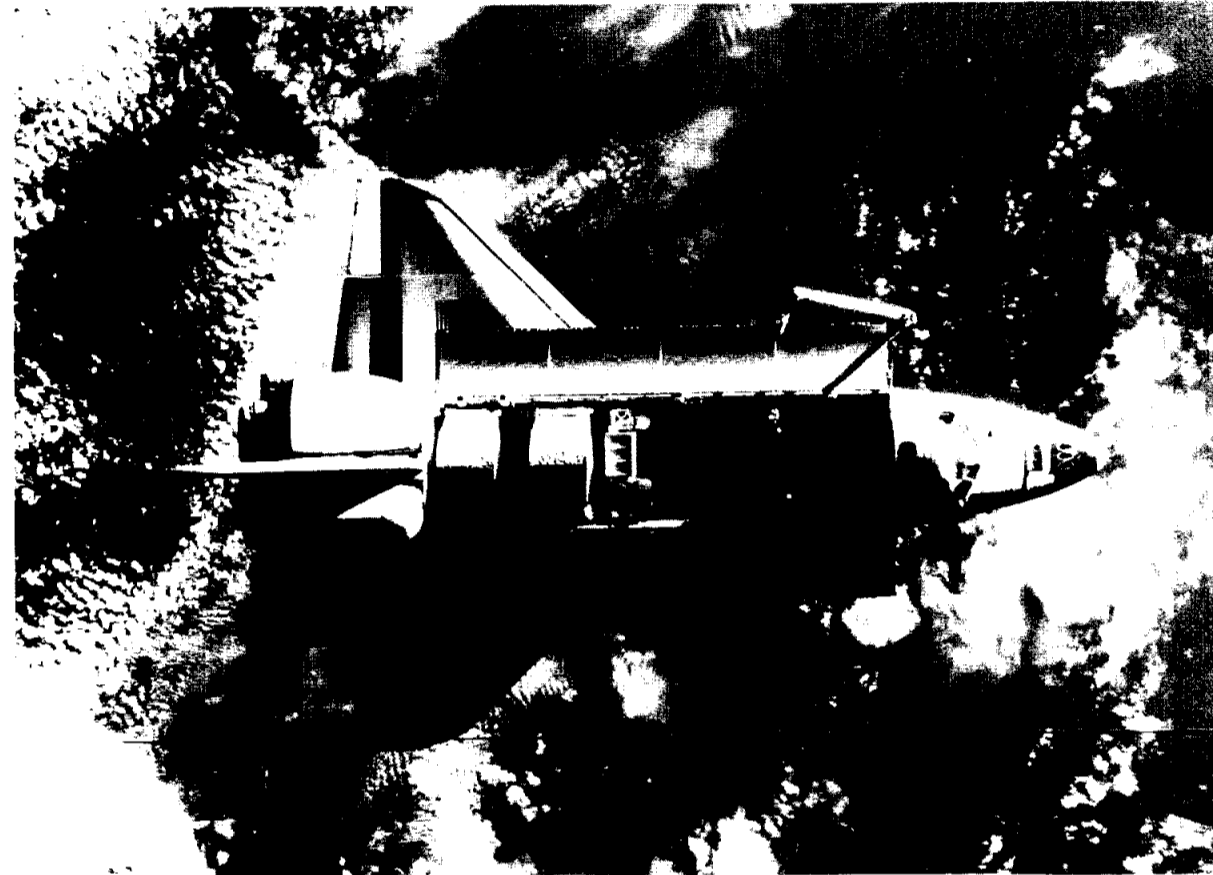
The teams are required to reassess and resubmit waivers in categories recommended for continued program applicability. Items which cannot be revalidated will be redesigned, qualified, and certified for flight. All Criticality 2 and 3

CIL's being reviewed for reacceptance and proper categorization. This activity will culminate in a comprehensive final review with NASA Headquarters beginning in March 1987.

As recommended by the Commission, the National Research Council has agreed to form an Independent Audit Panel, reporting to the NASA Administrator, to verify the adequacy of this effort.

Recommendation IV

Safety Organization: The NASA Administrator announced the appointment of Mr. George A. Rodney to the position of Associate Administrator for Safety, Reliability, and Quality Assurance on July 8, 1986. The responsibilities of this office will include the oversight of safety, reliability, and quality assurance functions related to all NASA activi-



ties and programs and the implementation of a system for anomaly documentation and resolution to include a trend analysis program.

One of the first activities to be undertaken by the new Associate Administrator will be an assessment of the resources including workforce required to ensure adequate execution of the safety organization functions. In addition, the new Associate Administrator will assure appropriate interfaces between the functions of the new safety organization and the Shuttle Safety Panel which will be established in response to the Commission Recommendation II.

Recommendation V

Improved Communications: On June 25, 1986, Astronaut Robert Crippen was directed to form a team to develop plans and recommended policies for the following:

- Implementation of effective management communications at all levels.
- Standardization of the imposition and removal of STS launch constraints and other operational constraints.
- Conduct of Flight Readiness Review and Mission Management Team meetings, including requirements for documentation and flight crew participation.

Since this recommendation is closely linked with the recommendation on Shuttle management structure, the study team will incorporate the plan for improved communications with that for management restructure.

This review of effective communications will consider the activities and information flow at NASA Headquarters and the field centers which support the Shuttle program. The study team will

present findings and recommendations to the Associate Administrator for Space Flight by August 15, 1986.

Recommendation VI

Landing Safety: A Landing Safety Team has been established to review and implement the Commission's findings and recommendations on landing safety. All Shuttle hardware and systems are undergoing design reviews to insure compliance with the specifications and safety concerns.

The tires, brakes, and nose wheel steering system are included in this activity, and funding for a new carbon brakes system has been approved. Runway surface tests and landing aid requirement reviews had been under way for some time prior to the accident and are continuing.

Landing aid implementation will be complete by July 1987. The interim brake system will be delivered by August 1987. Improved methods of local weather forecasting and weather-related support are being developed.

Until the Shuttle program has demonstrated satisfactory safety margins through high fidelity testing and during actual landings at Edwards Air Force Base, the Kennedy Space Center landing site will not be used for nominal end-of-mission landings. Dual Orbiter ferry capability has been an issue for some time and will be thoroughly considered during the upcoming months.

Recommendation VII

Launch Abort and Crew Escape: On April 7, 1986, NASA initiated a Shuttle Crew Egress and Escape review. The scope of this analysis includes egress and escape capabilities from launch through landing and will provide analyses, concepts, feasibility assessments, cost, and schedules for pad abort, bailout, ejection systems, water landings, and powered flight separation.

This review will specifically assess options for crew escape during controlled gliding flight and options for extending the intact abort flight envelope to include failure of 2 or 3 main engines during the early ascent phase.

In conjunction with this activity, a Launch Abort Reassessment Team was established to review all launch and launch abort rules to ensure that launch commit criteria, flight rules, range safety systems and procedures, landing aids, runway configurations and lengths, performance versus abort exposure, abort and end-of-mission landing weights, runway surfaces, and other landing-related capabilities provide the proper margin of safety to the vehicle and crew.

Crew escape and launch abort studies will be complete on October 1, 1986, with an implementation decision in December 1986.

Recommendation VIII

Flight Rate: In March 1986 NASA established a Flight Rate Capability Working Group. Two flight rate capability studies are under way: (1) a study of capabilities and constraints which govern the Shuttle processing flows at the Kennedy Space Center and (2) a study by the Johnson Space Center to assess the impact of flight specific crew training and software delivery/certification on flight rates.

The working group will present flight rate recommendations to the Office of Space Flight by August 15, 1986. Other collateral studies are still in progress which address Presidential Commission recom-

mendations related to spares provisioning, maintenance, and structural inspection.

This effort will also consider the National Research Council independent review of flight rate which is under way as a result of a Congressional Subcommittee request.

NASA strongly supports a mixed fleet to satisfy launch requirements and actions to revitalize the United States expendable launch vehicle capabilities.

Additionally, a new cargo manifest policy is being formulated by NASA Headquarters which will establish manifest ground rules and impose constraints to late changes. Manifest control policy recommendations will be completed in November 1986.

Recommendation IX

Maintenance Safeguards: A Maintenance Safeguards Team has been established to develop a comprehensive plan for defining and implementing actions to comply with the Commission recommendations concerning maintenance activities.

A Maintenance Plan is being prepared to ensure that uniform maintenance requirements are imposed on all elements of the Space Shuttle program. This plan will define the structure that will be used to document (1) hardware inspections and schedules, (2) planned maintenance activities, (3) maintenance procedures configuration control, and (4) maintenance logistics.

The plan will also define organizational responsibilities, reporting, and control requirements for Space Shuttle maintenance activities. The maintenance plan will be completed by September 30, 1986.

A number of other activities are underway which will contribute to

a return to safe flight and strengthening the NASA organization. A Space Shuttle Design Requirements Review Team headed by the Space Shuttle Systems Integration Office at Johnson Space Center has been assigned to review all Shuttle design requirements and associated technical verification.

The team will focus on each Shuttle project element and on total Space Shuttle system design requirements. This activity will culminate in a Space Shuttle Incremental Design Certification Review approximately 3 months prior to the next Space Shuttle launch.

In consideration of the number, complexity, and interrelationships between the many activities leading to the next flight, the Space Shuttle Program Manager at Johnson Space Center has initiated a series of formal Program Management Reviews for the Space Shuttle program.

These reviews are structured to be regular face-to-face discussions involving the managers of all major Space Shuttle program activities. Specific subjects to be discussed at each meeting will focus on progress, schedules, and actions associated with each of the major program review activities and will be tailored directly to current program activity for the time period involved.

The first of these meetings was held at Marshall Space Flight Center on May 5-6, 1986, with the second at Kennedy Space Center on June 25, 1986. Follow-on reviews will be held approximately every 6 weeks. Results of these reviews will be reported to the Associate Administrator for Space Flight and to the NASA Administrator.

On June 19, 1986, the NASA Administrator announced termination of the development of the Centaur upper stage for use aboard the Space Shuttle. Use of the Centaur upper stage was planned for NASA planetary spacecraft launches as well as for certain national security satellite launches.

Major safety reviews of the Centaur system were under way at the time of the *Challenger* accident, and these reviews were intensified in recent months to determine if the program should be continued. The final decision to terminate the Centaur stage for use with the Shuttle was made on the basis that even following certain modifications identified by the ongoing reviews, the resultant stage would not meet safety criteria being applied to other cargo or elements of the Space Shuttle system.

NASA has initiated efforts to examine other launch vehicle alternatives for the major NASA planetary and scientific payloads which were scheduled to utilize the Centaur upper stage. NASA is providing assistance to the Department of Defense as it examines alternatives for those national security missions which had planned to use the Shuttle/Centaur.

The NASA Administrator has announced a number of Space Station organizational and management structural actions designed to strengthen technical and management capabilities in preparation for moving into the development phase of the Space Station program.

The decision to create the new structure is the result of recommendations made to the Administrator by a committee, headed by General Phillips, which is conducting a long range assessment of NASA's overall capabilities and requirements.

Finally, NASA is developing plans for increased staffing in critical areas and is working closely with the Office of Personnel Management to develop a NASA specific proposal which would provide for needed changes to the NASA personnel management system to strengthen our ability to attract, retain, and motivate the quality work force required to conduct the NASA mission.

