Chronology of KSC and KSC Related Events for 1996

Ken Nail, Jr. and Elaine E. Liston

Technical Memorandum 112444

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Ken Nail, Jr. and Elaine E. Liston, Sherikon Space Systems, Inc.
Kennedy Space Center, FL

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FOREWORD

This 1996 Chronology is published to fulfill the requirements of KMI 2240.1 (as revised) to describe and document KSC's role in NASA's progress.

Materials for this Chronology were selected from a number of published sources. The document records KSC events of interest to historians and other researchers. Arrangement is by date of occurrence, though the source cited may be dated one or more days after the event.

Materials were researched and prepared for publication by the former Archivist Ken Nail, Jr. and the current Archivist Elaine E. Liston. For the added convenience of researchers, each entry has been headlined.

Comment on the Chronology should be directed to the John F. Kennedy Space Center, Archives, LIBRARY-E, Kennedy Space Center, Florida, 32899. The Archivist may also be reached by e-mail at Elaine.Liston-1@kmail.ksc.nasa.gov, or (407) 867-2407.

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JANUARY

January 2: **800 WORKERS CALLED BACK TO KSC**

Eight hundred of the 2,270 civil servants at Kennedy Space Center will return to work despite the federal government shutdown. "By the end of the week, there would be a problem with continuing work on all the [Shuttle] Orbiters," explained Public Affairs Director Hugh Harris. "What we have to do is cease work on the other Orbiters and put all our resources toward getting the Endeavour off" on its STS-72 mission. The countdown begins January 8 looking toward Thursday's 4:18 a.m. EDT launch. NASA was directed by the White House to call in "essential" workers in order to preserve the launch schedule during the government shutdown. Unless there is a budget settlement in Washington, NASA only has resources sufficient to continue working through the end of the week; afterward, preparations for upcoming Columbia and Atlantis launches would cease. [Halvorson, **FLORIDA TODAY**, p. 1A, Jan. 2, 1996.]

January 3: **ENDEAVOUR LAUNCH PREPARATIONS**

Preparations are underway - despite the furlough of federal workers - to launch the Space Shuttle Endeavour on its STS-72 mission January 11. The nine-day mission is planned to launch at 4:18 a.m. EDT and will include retrieval of a satellite and a pair of spacewalks to test special tools and construction techniques needed to erect the international space station. Technicians will install ordnance today and complete aft compartment closeouts January 9. A January 20 landing at Kennedy Space Center for 2:54 a.m. [Halvorson, **FLORIDA TODAY**, p. 5A, Jan. 3, 1995.]

SPACEPORT USA ATTENDANCE RECORD

"The holiday season between Christmas and New Year's is always our busiest time," said Spaceport USA spokeswoman Gwen Griffin. "I don't think any of the publicity from the Apollo 13 movie hurt us at all. It really seems to have generated interest in the space program." The holiday week produced a record attendance rate of 15,000 visitors per day. Rick Abramson, President and CEO of Delaware North Parks Service which runs the Spaceport said, "We're very pleased to see this increase in visitation over previous years. It proves that America's space program is still of huge interest to the public." [Tompkins, **FLORIDA TODAY**, p. 1A, Jan. 3, 1996.]

ARTHUR RUDOLPH DEAD AT 89

Apollo scientist Arthur Rudolph died today at his home in Hamburg, Germany. In 1982, Rudolph renounced his American citizenship in the face of accusations that he had committed war crimes involving forced labor at a Nazi V-2 rocket factory in Germany. Rudolph was among the team of 110 German rocket scientists headed by Wernher von Braun who came to the United States after the war. At the Marshall

Space Flight Center, Rudolph headed development of the Saturn V rocket which sent American astronauts to the moon. Rudolph, who had been granted U.S. citizenship in 1954. A German colleague of Rudolph, Walter Haeussermann, 81, said that it was Rudolph's highest desire to get his name cleared. Rudolph is survived by his wife Martha and a daughter who lives in Canada. ["German Who Helped U.S. Reach the Moon Dies," **FLORIDA TODAY**, p. 5A, Jan. 3, 1996; Saxon, **THE NEW YORK TIMES**, p. B11, Jan. 3, 1996.]

January 8: **STS-72 CREW ARRIVES TODAY**

The six members of Endeavour's STS-72 mission will arrive at Kennedy Space Center today for what NASA's lead Flight Director Brian Austin described as a mission that is likely to be "quite exciting. For the most part, every day is going to hold a little something different for us. All in all, we're taking on a lot with this mission." The crew of Commander Brian Duffy, Pilot Brent Jett and mission specialists Kiochi Wakata, Daniel Barry, Leroy Chiao and Winston Scott will retrieve a Japanese science satellite for return to Earth; lower the vehicle's orbit to 180 miles for the release and recapture - near the end of the mission - of a NASA experiment carrier; conduct two spacewalks to test tools and techniques for the construction of the International Space Station. Commander Duffy said, "Add it all together, and that's a dream flight for us. It's an astronaut's dream to be assigned to a flight like this." [Halvorson, "Reach for Stars, Astronaut Tells Kids: Barrier Breaker Pushes Young Blacks to Work, Succeed," **FLORIDA TODAY**, p. 1A-2A, January 7, 1996; Halvorson, **FLORIDA TODAY**, p. 1A, January 8, 1996.]

January 9: **SHUTTLE WARMED ON PAD**

The Space Shuttle Columbia has been aided in keeping warm by having ground workers blow warm air inside and pumping warm nitrogen over the devices which steer the vehicle's boosters, according to John Stealey, Test Director for NASA. Additionally, an automatic system of warming bands was wrapped around the O-rings which seal the joints of the solid rocket boosters; the devices were developed in the wake of the Challenger accident which occurred ten years ago this month. Forecasters said there was a 70 percent chance that the launch would occur as planned at 4:18 a.m. January 11; there remains the possibility of clouds moving in from the Atlantic Ocean. ["Shuttle Is Warmed Up for a 9-Day Mission," **THE NEW YORK TIMES**, p. A9, Jan. 10, 1996.]

January 10: **WELDON: FUNDING PLANNED FOR '96**

Rep. Dave Weldon [R-Melbourne] said today that funding for NASA in 1996 will be the first item of business in the U.S. House of Representatives when Congress reconvenes January 23. "That's exactly what the Speaker said," Weldon commented. The Brevard congressman said that two approaches are under consideration: a bill tied

to the appropriation for the Veterans Administration and a stand-alone NASA appropriation. Weldon stated he thought either approach would win President Bill Clinton's signature. "I don't know how he would explain to the public a NASA veto. Hopefully, he would go along with it," said the congressman. NASA's funding is routinely bundled with about $80 billion of budgets for the departments of Veterans Affairs, Housing and Urban Development and other independent agencies; President Clinton vetoed the previous bill. [Wheeler and Halvorson, **FLORIDA TODAY**, pp. 1A-2A, Jan. 11, 1996.]

January 12: **STS-72 BOOSTERS RETURN**

The solid rocket booster recovery ships Liberty and Freedom returned to Hangar AF on Cape Canaveral Air Station this morning. Nothing unusual has been observed on either booster. "Quick-look" data from the solid rocket boosters and Endeavour's three main engines shows nominal performance. Meanwhile, work continues toward the STS-75 mission; Columbia is in pre-rollover processing activity in Orbiter Processing Facility Bay 2 where the Orbiter flight controls have been tested. The mission's prime payload is the Tethered Satellite-1R/USMP-3. Today, OPF technicians are conducting Orbiter mid-body closeouts, ammonia boiler servicing, coolant loop servicing, landing gear test cycles, nose gear thermal protection system closeouts, hydraulic system testing, final testing of TSS-1R in the Operations and Checkout Building. STS-75 work scheduled for next week: changeout of hydrogen prevalve in feed line to Main Engine No. 1 and closing payload bay doors in preparation for rollover.

Atlantis, STS-76 [Mir 3]: Among the activities recently completed are the drag chute installation, potable water servicing, installation of the waste containment system, and checkout of the lights in the Orbiter Docking System. A functional test of the Orbiter Docking System is in work today and polishing of windows No. 3 and No. 4 is being performed. In the Vehicle Assembly Building, the forward center solid rocket booster segment is being mated to the left stack. [**KSC SPACE SHUTTLE STATUS REPORT**, Jan. 12, 1996.]

January 15: **COMMUNICATIONS SATELLITE LAUNCHED TO ORBIT**

"They've confirmed that the satellite is healthy and that is's functioning properly. Everyone is excited and ecstatic about the success of the launch," reported McDonnell Douglas spokeswoman Christine Nelson. The launch was a Delta 2 which lifted off from Cape Canaveral Air Station this morning at 6:10 carrying a Korean communications satellite. The spacecraft will provide telecommunications services both to business and government in South Korea and provides television programming to the public. A previous launch of a Delta 2 put a similar satellite in a lower than planned orbit which was later corrected by onboard fuel expenditures. That unplanned maneuver will shorten the usual 10-year life expectancy of the satellite. [Halvorson, **FLORIDA TODAY**, Jan. 12, 1996; Suriano, **FLORIDA TODAY**, Jan. 15, 1996.]

January 16: **THAGARD RETIRES FROM CORPS**

Space Shuttle Astronaut Dr. Norman E. Thagard has retired from NASA and returned to his alma mater, Florida State University. He leaves the space agency following five space missions, including a U.S. record four-month stay aboard Russia's Space Station Mir. Thagard accepted the position of Visiting Professor and Director of External Relations for the Florida A&M University - Florida State University College of Engineering, Tallahassee. His initial assignment - effective January 5 - is teaching electronics, an area that has been a long-time hobby. Thagard has published several articles on digital and analog electronics design.

Joining NASA as part of the astronaut class of 1978, Thagard flew on STS-7 in 1983 and STS 51-B in 1985, both aboard Challenger; STS-30 in 1989 on Atlantis; STS-42 in 1992 on Discovery; and on the Mir-18 mission on the space station last year. On that flight Thagard was launched with two cosmonauts aboard a Soyuz rocket and landed aboard Atlantis at the conclusion of the first Shuttle/Mir docking mission - STS-71. Becoming an astronaut was one of Thagard's dreams. Another was to return to his alma mater, from which he received his bachelor and master of science degrees in engineering science in 1965 and 1966, respectively. "The only thing other than being an astronaut was to come back to Florida State to teach," Thagard said. His doctor of medicine degree came in 1977 from the University of Texas Southwestern Medical School. Though born in Marianna, FL, Thagard considers Jacksonville his hometown. He is a pilot and has logged more than 2,200 hours flying tim, primarily in jet aircraft. With the completion of his fifth space mission, Thagard has spent over 140 days in space - more than any other American. [**NASA/KSC News Release No: 96-4**, Jan. 16, 1996.]

10TH CHALLENGER OBSERVANCE

The following statement by NASA Administrator Daniel S. Goldin was released today in observance of the upcoming 10th anniversary of the Challenger accident.

"The best way to honor the memories of the crew of the Challenger, and of all the men and women who have given their lives to explore the frontiers of air and space, is to continue their bold tradition of exploration and innovation. That's what the people of NASA do every day. They push the boundaries of knowledge and human endeavor to improve and enrich life on Earth today and secure a better future for all of us tomorrow. I've said many times that safety is the highest priority at today's NASA. We will not waver from that commitment. But human beings have always taken great risks to reap great rewards. Space flight is inherently dangerous and every member of the NASA team understands those risks. I'm proud of the women and men of NASA. They're blazing the trail to the future. They're building the components of the International Space Station. They're constructing spacecraft that will explore the farthest regions of our Solar System and the universe, and satellites that will monitor

the health of our own blue planet for years to come. They're conducting cutting edge research that will make airplanes faster and safer, and they've made the Space Shuttle the most capable, reliable and versatile spacecraft in the world." [**NASA News Release No: 96-2**, Jan. 16, 1996.]

LITTLES NEW DIRECTOR AT MARSHALL

Dr. J. Wayne Littles has been named the new Director of the Marshall Space Flight Center [Huntsville, AL], NASA Administrator Daniel S. Goldin announced today. Littles will assume his new post on February 3. Littles currently serves as the Associate Administrator for the Office of Space Flight. He will replace G. Porter Bridwell, who announced Jan. 11 he was retiring from NASA after 34 years of service. "Dr. Littles has the necessary managerial and technical expertise to lead Marshall into the 21st century," Goldin said. "As the Agency's Center of Excellence for space propulsion, I want Marshall to lead the world in research and development of next generation propulsion systems. Dr. Littles is uniquely qualified to provide the leadership necessary to meet that challenge." Pending selection of a replacement, Wilbur Trafton, who currently serves as the Director of the International Space Station Program, will be the acting Associate Administrator for the Office of Space Flight. As the head of the Office of Space Flight, Littles directed both the Space Shuttle and Space Station programs for NASA. During his tenure, NASA restructured the Space Station program, streamlined the management of the program by putting it under a single contractor, and led discussions with the Russian Space Agency concerning their participation and contributions to the International Space Station. Littles has led the Space Shuttle program through an extensive redefinition of requirements and put in place a restructured program which has achieved significant cost savings while maintaining safety as the highest priority. Most recently, Littles has been leading the effort to consolidate Shuttle operations under a single prime contractor to further reduce overlap, streamline operations and reduce costs. Littles will be returning as Director of the same NASA Center where he began his federal career in 1967 as an engineer in the former Propulsion and Vehicle Engineering Directorate. Littles spent 24 years at Marshall in positions of increasing responsibility, eventually becoming Deputy Director in July 1989. [**NASA/MSFC News Release No: 96-3**, Jan. 16, 1996.]

January 18:

COMMUNITY EXPO

Thirty-one community service agencies from across Brevard County will display their wide array of services at KSC, on January 19. The Community Involvement Expo begins at 10:00 a. m. with remarks from Center Director, Jay Honeycutt, and ends at 2:00 p.m. Organizers want to familiarize KSC employees with the services that are available to help them or their acquaintances in a time of need. "The Expo is an excellent opportunity to showcase the services available throughout Brevard County," said Judy McGinty, Director, Brevard Volunteer Center. "We are also hoping that

employees interested in helping will see the great opportunities for volunteering in the community," said McGinty, who is co-chairing the event with Paula Preston, Director, Brevard Retired Senior Volunteer Program. [**NASA/KSC News Releases: No. 4-96,** Jan. 18, 1996.]

TURBOPUMP BLADE CRACK

Turbopump manufacturing history has convinced STS-75 Mission Managers to order the changeout of an engine turbopump on Columbia on its launch pad. The replacement will occur because a crack was discovered in a turbine blade on a test pump with a "similar manufacturing history" to the one on Columbia. The replacement job should take about a week, according to KSC spokesman Bruce Buckingham. "There's not much lack left," he said, referring to the tight launch schedule. [Halvorson, **FLORIDA TODAY**, Jan. 19, 1996.]

January 19:

SHUTTLE FLEET UPDATE

The Space Shuttle Endeavour remains in space on the ninth day of its STS-72 mission which included the SFU Retrieval and the deployment of the OAST-Flyer. The crew members are: Commander Brian Duffy, Pilot Brent Jett, and Mission Specialists: Leroy Chiao, Daniel Barry, Winston Scott, Koichi Wakata. Weather forecasts continue to be favorable for an on-time landing at Kennedy Space Center at 2:42 a.m. on January 20. Commander Duffy has practiced both day and night landings numerous times and said of the upcoming night launch: "Any chance to land an Orbiter, day or night, is a pilot's dream. I've been training for this event. It doesn't matter to me when it happens, day or night. I can't wait." Flight Director Jeff Bantle said, "The difference between daylight and night is not all that significant. I think we probably make a little more out of that sometimes than it is."

The Space Shuttle Columbia is being readied for its next mission - STS-75- on which it will take the Tethered Satellite-1R into space along with USMP-3. Launch is planned for February 22, at 3:08 p.m. with a KSC landing targeted for March 7, at 7:38 a.m. The Orbiter is being readied for the mission in OPF Bay 2 where the Engine 1 prevalve relief valve seal is being replaced and leak checks are underway. Minor repairs are also being made to blankets in the Shuttle's payload bay. Rollover to the VAB is targeted for January 23; in the VAB, the vehicle will be mated to its mission external tank the following day. Pad rollout is scheduled for January 29; the terminal countdown demonstration test is set for February 1-2 and the flight readiness review for STS-75 will follow on February 9. Meanwhile, Atlantis is again a resident of OPF Bay 1 where it is undergoing pre-rollover processing for its STS-76 mission. The mission will be the third docking mission with the Russian Mir Space Station. Technicians in the OPF are continuing the vehicle's mid-body closeout; left forward segment stacking is complete. Right aft segment stacking is scheduled for tomorrow. The mission ODS will be delivered to OPF Bay 1 on January 22 and installed January

23. Over January 24-25, the main engines will be installed. [Borenstein, **THE ORLANDO SENTINEL**, pp. A-1 & A-4, Jan. 19, 1996; **SPACE SHUTTLE STATUS REPORT**, Jan. 19, 1996.]

January 20: **ENDEAVOUR LANDING ON TIME**

Endeavour's smooth landing at 2:42 a.m. brought a successful conclusion to its nine-day STS-74 mission. The crew of Endeavour successfully retrieved a Japanese science satellite and released and recaptured an American technology satellite. Two of the crew walked in space to test spacesuits and construction techniques. The crew also tended to the care and feeding of 60 infant rats and their six mothers. On landing, Duffy told a news conference: "We feel like we got 1996 off to a great start. We also feel that we took another step in the international cooperation in space exploration. [Borenstein, **THE ORLANDO SENTINEL**, Jan. 21, 1996.]

January 21: **BUDGET STALEMATE IMPACT ON KSC**

NASA has drawn up contingency plans in the event of another funding cutoff in Washington, the third in three months. "We have every hope a NASA budget will be passed. If it is not, we will have to move fairly quickly to begin shutting down various aspects of our programs and projects across the country," said Laurie Boeder, Associate Administrator for Public Affairs. NASA officials say they expect to be able to launch Columbia on schedule February 22 whether or not the funding bill is passed. "It is too early to say where we're going to be. It is difficult to do planning in this kind of environment; we're doing the best we can," said NASA spokesman Brian Welch. NASA Budget Specialist Beth Schmid said, "We have no out-year numbers right now. When we present our budget is anyone's guess. It might not be until mid or late March." [Halvorson, **FLORIDA TODAY**, Jan. 20, 1996; Cabbage and Halvorson, **FLORIDA TODAY**, Jan. 21, 1996; Wheeler, **FLORIDA TODAY**, Jan. 22, 1996.]

January 22: **CHALLENGER: 10TH ANNIVERSARY**

The NASA Kennedy Space Center and community organizations associated with the space program will commemorate the 10th anniversary of the Challenger accident on Sunday, January 28, and Monday, January 29. Planned events will emphasize the future and acknowledge the extraordinary efforts of the contractor and civil service teams which has safely launched 49 Shuttle missions since the accident in 1986. "It is the day-to day work and care by the men and women of NASA and its contractors which best honors the memory of the Challenger astronauts and other astronauts who have lost their lives in advancing humankind's quest to use space," KSC Director Jay F. Honeycutt said. "I don't think there has ever been a more committed and hard-working group of people anywhere. The nation is proud of them."

On Monday, January 29, Kennedy Space Center employees will have the opportunity leave their workplaces for a moment of silence outdoors. At exactly 11:38 a.m. (the time of the Challenger launch), a "missing man" formation of T-38 jets flown by members of the astronaut corps will fly over the center followed by the dropping of a wreath at sea by helicopter. A similar observance will be held simultaneously at the NASA Johnson Space Center in Houston, TX. The actual anniversary date of January 28 will be marked by observances planned by the Astronauts Memorial Foundation (AMF) and the City of Titusville.

A ceremony at the Astronauts Memorial "Space Mirror" at the Kennedy visitor center will start at 11:15 a.m. and be open to center employees, the general public and invited guests. Speakers will include: George R. Faenza, chairman of the AMF Board of Directors and Vice President and General Manger of McDonnell Douglas Space and Defense Systems at KSC; Alan Helman, who founded and was the first chairman of AMF; Bruce Jarvis, father of Challenger Payload Bay Specialist Gregory B. Jarvis; and AMF Board Member Lee D. Solid, Vice President and General Manager of Florida Operations of Rockwell International.

Former astronaut Loren J. Shriver, who is presently Launch Integration Manager for the Space Shuttle Program and chairs the NASA Mission Management Team for all Shuttle launches, will be the keynote speaker representing the astronaut corps and the families of the honored astronauts. The ceremony will conclude at 11:38 a.m. with a flyover of T-38 jets piloted by members of the Air Force's 50th Flying Training Squadron based at Columbus Air Force Base, MS, followed by 73 seconds of silence and placing of a wreath at the memorial by astronaut family members who are present. The Foundation erected the memorial on Kennedy property through revenues from Florida Challenger license plates and individual and corporate contributions. Since then it has created a living memorial in the form of a "Center for Space Education" at Spaceport USA to house NASA and AMF education programs. On Saturday, January 27, a program co-sponsored by the Young Astronaut Program, NASA, AMF, and Delaware North Park Services of Spaceport Inc. which operates the KSC visitors center, will reach out to young people to provide inspiration and motivation in pursuing the exploration and use of space. Called "Reach for the Stars" day, the program will begin at 10:00 a.m. when KSC Deputy Director Gene Thomas and Apollo 13 crew member Fred Haise welcome participants at the "Space Mirror" memorial. Children from kindergarten through the 12th grade will be encouraged to take part in a number of activities. Working in teams of several separate age groups, the young people will learn to engineer and build structures to protect raw eggs which will be dropped more than 20 feet from the top level of the gantry at the full-scale Space Shuttle Explorer.

Model rocket launches...representing Mercury, Gemini, Apollo and Shuttle, four launches are planned at the top of each hour from 12 p.m. to 3 p.m. All launches will be from the lawn on the east side of the Center for Space Education. Living in

space...On each half hour, from 10:30 a.m. to 3:30 p.m., presentations will be given on rocketry, the Space Shuttle and various aspects of living in space. The presentations will be given in Room 4000 (Exploration Station I) at the Center for Space Education. Revisiting Apollo 13...Former astronaut Fred Haise will show video footage to the participants and discuss his Apollo 13 mission in the briefing room of the Center for Space Education, at scheduled times in the morning and afternoon.

Local students' space art will be on display throughout the Center for Space Education. In the lobby, there will be an interactive demonstration of the computerized launch and landing of the Delta Clipper. It is the single stage-to-orbit launch vehicle being developed by McDonnell Douglas. At the north end of the Rocket Garden, an M-113 Crew Rescue Vehicle and a Bearcat All-Terrain Vehicle will be on display throughout the day. Student groups will also be involved in construction of a 10-foot-tall Space Shuttle out of Lego building pieces. Each year the City of Titusville, located on the northwestern boundary of KSC, has a ceremony at the Astronaut Memorial Plaza at Sand Point Park. The event will begin at 11:00 a.m. on Sunday January 28, and will be dedicated to both the 51-L crew and the Apollo 1 astronauts. Titusville Mayor Tom Mariani will make brief remarks to open the 45-minute service, which will also involve local high school students placing a carnation at each astronaut's plaque and an apple at Christa McAuliffe's plaque. All local veterans organizations will be represented at the ceremony. **[NASA/KSC News Releases No: 9-96**, Jan. 22, 1996.]

STS-75: COLUMBIA'S NEXT LAUNCH

The Space Shuttle Columbia's next mission is STS-75 and will commence February 22 with a 3:08 p.m. launch time. Landing is planned for March 7 at 7:38 a.m. The payload bay doors are being closed and landing gear retracted in preparation for the rollover to the Vehicle Assembly Building set for January 23 or 24. The STS-75 crew includes: Commander Andrew M. Allen: Pilot Scott J. Horowitz and Mission Specialists: Jeffrey A. Hoffman, Claude Nicollier, Maurizio Cheli and Payload Specialist Umberto Guidoni. In OPF Bay 1, Atlantis is being prepared for its third Mir Space Station docking mission, STS-75. The launch is currently planned for March 21; the landing is targeted for March 30 at KSC. In the OPF, technicians processing Atlantis have completed the main propulsion system blow down; moved the Orbiter Docking System into the OPF; are preparing to install the main engines and the ODS on January 24. Stacking of the SRB is expected to be complete on January 27. Meanwhile, technicians are already preparing the recently returned Endeavour for its next mission, i.e., STS-77. The mission will begin May 6 at 12:49 p.m.; landing is planned for May 26 at 8:42 a.m. Technicians in OPF Bay 3 have pulled out the STS-72 payloads [SFU and OAST Flyer] and have begun Flash Evaporator System trouble shooting. Debris inspection revealed that Endeavour sustained about 55 minor tile dings, not including the routine hits on the base heat shield. Tires and brakes were reported in good condition for landing at KSC. Tires displayed little wear. The STS-77 crew: Commander John H. Casper, Pilot Curtis L. Brown, Jr. and Mission

Specialists: Daniel W. Bursch, Mario Runco, Jr., Marc Garneau and Andrew S. W. Thomas. [**SPACE SHUTTLE STATUS REPORT**, Jan. 22, 1996.].

January 23: **STS-75: USMP HOSE FLAW**

Technicians preparing Columbia for its rollover to the VAB today are have been working to resolve a problem with a hose flaw on the USMP [United States Microgravity Payload]. Processing efforts otherwise are on track for the rollover from OPF Bay 2 and subsequent mating of the veteran Space Shuttle with its mission SRBs and external tank in the VAB. The payloads [USMP and the Tethered Satellite-1R] will be transported to Launch Complex 39B tomorrow. The STS-75 terminal countdown demonstration test is planned for February 1-2 and the flight readiness review is set for February 9. The STS-75 crew includes: Commander Andrew M. Allen: Pilot Scott J. Horowitz and Mission Specialists: Jeffrey A. Hoffman, Claude Nicollier, Maurizio Cheli and Payload Specialist Umberto Guidoni. In OPF Bay 1, work is underway in preparing Atlantis for its next Mir Docking Mission, i.e., STS-76, which will lift off March 21 at 3:34 a.m. Landing for the third mission to Mir is planned for March 30, at 12:07 a.m. Technicians processing Atlantis are installing the Tunnel Adapter today and closing out the midbody as well. Tomorrow, the STS-76 main engines and the Orbiter Docking System will be installed. In the VAB, Atlantis' solid rocket boosters have been stacked. Finally, the Space Shuttle Endeavour, recently returned from the STS-72 mission, is already being readied for its next mission, STS-77. OPF Bay 3 technicians are inspecting thrusters that failed on the mission. They are also looking into the left payload bay door that closed slower than its counterpart on the right Flash evaporator trouble shooting begins on January 24. The STS-77 crew: Commander John H. Casper, Pilot Curtis L. Brown, Jr. and Mission Specialists: Daniel W. Bursch, Mario Runco, Jr., Marc Garneau and Andrew S. W. Thomas. [**SPACE SHUTTLE STATUS REPORT**, Jan. 23, 1996; Halvorson, **FLORIDA TODAY**, Jan. 24, 1996.]

January 24: **TSS HEADS TO LC 39B**

The Tethered Satellite System - prime payload of Columbia's STS-75 mission - will be transported to Launch Complex 39B today. "It will be waiting for the Orbiter when it gets out there on Saturday [January 27]," according to KSC spokesman Bruce Buckingham. Meanwhile Columbia is being readied for flight by technicians in the Vehicle Assembly Building. The TSS includes a cargo bay reel, a 12-mile tether and a ball-shaped satellite. In the course of the mission, the crew will reel the satellite out of the cargo bay and test its ability to conduct electricity as it sweeps through space. [Halvorson, **FLORIDA TODAY**, Jan. 25, 1996..]

January 25: **CONTRACTS AWARDED**

NASA's Kennedy Space Center has awarded two payload processing contracts on

January 17 for payloads to be launched at Vandenberg Air Force Base, CA. Spaceport Systems International, based in Lompoc, CA, was awarded a firm-fixed price contract with a total potential value of $9.3 million. Astrotech Space Operations, based in Silver Spring, MD, signed a $1.7 million firm-fixed price contract. Astrotech Space Operations will provide payload processing services for the first in a series of Earth Observing System satellites. The payload is scheduled to launch atop an Atlas IIAS rocket in June 1998. Their contract performance period ends in July 1998. Spaceport Systems International will process the Landsat 7 and another Earth Observing System payload to be launched in May 1998 and December 2000, respectively. Their contract period of performance extends through June 2005 with options to process 10 additional payloads. Both contracts are part of NASA's Performance Based Contracting initiative-allowing vendors to propose their best methods to achieve the government's desired end result. [**NASA/KSC Release No: 8-96**, Jan. 25, 1996.]

January 29: **CHALLENGER TRIBUTE**

Kennedy Space Center employees held its annual remembrance of the STS 51-L Challenger crew today, pausing at 11:38 a.m., launch time of the mission in which all seven crew members lost their lives. Memorials had been held all over Brevard County over the preceding weekend, marking the 10th anniversary of the accident. Four NASA pilots flew the "Missing Man" formation over Kennedy Space Center to honor the crew. "Your day-to-day work and care, which has enabled the Space Shuttle to fly safely 49 times in the last 10 years, is the greatest tribute anyone can give," said Associate Director Al Parrish in a message broadcast to center employees. Parrish stood in for Director Jay F. Honeycutt who has been hospitalized in Concord, NC, for cardiac tests. [See Stories Below]. At the conclusion of the service, workers returned to readying Columbia for its February 22 STS-75 mission. [Cabbage, **FLORIDA TODAY**, Jan. 25, 1996; Halvorson, **FLORIDA TODAY**, Jan. 25, 1996; McAleenan, **FLORIDA TODAY**, Jan. 25, 1996; Wiggins, **FLORIDA TODAY**, Jan. 25, 1996; Halvorson, **FLORIDA TODAY**, Jan. 26, 1996; Evans, **FLORIDA TODAY**, Jan. 27, 1996; Griffin, **FLORIDA TODAY**, Jan. 27, 1996; Borenstein, **THE ORLANDO SENTINEL**, Jan. 28, 1996; "Commander. Scobee's Son Leads Flyover" **FLORIDA TODAY**, Jan. 28, 1996; "Challenger Honor At Super Bowl," **THE ORLANDO SENTINEL**, Jan. 28 1996 Holton, **THE ORLANDO SENTINEL**, pp. G-1 & G-4, Jan. 28, 1996; Reid, **FLORIDA TODAY**, Jan. 28, 1996; Suriano, **FLORIDA TODAY**, Jan. 28, 1996; Cabbage, **FLORIDA TODAY**, pp. !B-2B, Jan. 30, 1996.]

January 30: **EXTERIOR STATION MODULES COMPLETED**

With a final weld on the module that will house astronauts aboard the International Space Station, over 80,000 pounds of flight hardware have been manufactured and the exterior structures of the U.S. components are now complete. "Our manufacturing is proceeding on schedule," said Wil Trafton, Acting Associate Administrator for Space Flight. "This is what two years of stable funding and hard work will get you. Node 1

will be launched in December 1997 and we are right on track with our other modules. We'll be ready for the first U.S. launch."

McDonnell Douglas technicians are installing secondary structural subassemblies in both Node 1 and Node 2. This equipment includes braces that will support floors, equipment racks and parts of various station utility systems, life support, power, communication and other elements. Boeing completed machining on Nodes 1 and 2 last year. The nodes also have all of their hatches and common berthing mechanisms in place. Node 2 [which serves as both the structural test article and a flight article] is almost ready to begin pressure and leak testing. To that end, technicians have attached approximately 900 strain gauges to measure stresses during a series of tests which begin later this month. It will be painted after these tests are complete. Node 2 is scheduled to be launched to the Space Station in September 1999.

Node 1, which will be the first U.S.-manufactured Space Station module to fly, also has been welded and machined. It will be painted in April and will undergo pressure tests after Node 2. In June, Node 1 will begin the process of final assembly and checkout. It will be launched from Kennedy Space Center in November 1997. The U.S. lab module currently is being machined in a device called a horizontal boring mill. Technicians will begin installing mechanical systems in early February. The lab then will undergo its own pressure tests and be painted. The laboratory module will come back to a clean room for checkout before being shipped to KSC for its scheduled November 1998 launch.

The U.S. habitat module, where the astronauts will eat and sleep, will follow the lab module into the horizontal boring mill for machining, then undergo mechanical installation in May and begin pressure tests in July. The habitat module is among the last pieces to be launched to the International Space Station in 2002. The laboratory and habitat modules each are 28 feet long and 14 feet in diameter. The connecting node modules are the same diameter, but 10 feet shorter. Boeing is also building an airlock module for the Space Station. Astronauts will suit up in the airlock before venturing out during spacewalks. Welding on the airlock has begun and will be completed in June. Once the airlock is built, it will mark the completion o welding of every major structural component being built by Boeing in Huntsville.

NASA's international partners also are making progress on their hardware. The critical Russian-built Functional Cargo Block [FGB] is on schedule for launch on a Proton vehicle in November 1997. In December, 1995, the FGB experienced a pressure test failure. Khrunichev, the Russian subcontractor building the FGB, had seen this anomaly in prior modules similar to the FGB. Recently, Khrunichev completed repairs and carried out the pressure test successfully. The FGB is back on schedule. [**NASA/KSC Press Release No. 96-17**, Jan. 30, 1996; "Russian Program May Be Drifting Toward A Disaster," **FLORIDA TODAY**, Feb. 20, 1996.]

ATLAS LAUNCH ON FOR TONIGHT

Lockheed Martin plans to launch an Atlas 2AS tonight to deliver an Indonesian communications satellite - Palapa C-1 to geosynchronous orbit some 23,000 miles above Earth. Liftoff should occur between 7:30 and 9:22 p.m. This will mark the first of eight Atlas flights planned from Cape Canaveral this year; others are scheduled for April 2, April 29, May 23, July 18, August 7, September 18, and November 13. [Halvorson, **FLORIDA TODAY**, January 31, 1996.]

FEBRUARY

February 1: **STS-75 CREW GOES THROUGH PACES**

The STS-75 crew arrived at Kennedy Space Center ready to take part in the mission's terminal countdown demonstration test. Mission Commander Andrew M. Allen speaking on arrival in behalf of the crew said that the crew was anxious to get started on the flight itself. "It means we are closing in on the end of a lot of work. We're ready to go do our job...and we're excited." Referring to the fact that STS-75 would be the second time the Tethered Satellite System would be flown, Mission Specialist Jeffrey A. Hoffman said, "We sure hope we're going to be able to go all the way this time." On its previous mission in 1992, the tether got hung up on a bolt as it was being let out. The remainder of the crew includes: Franklin R. Chang-Diaz, and Europeans Claude Nicollier, Maurizio Cheli and Umberto Guidoni. [Cabbage, **FLORIDA TODAY**, Feb. 2, 1996.]

February 3: **HONEYCUTT RECUPERATING AFTER BYPASS SURGERY**

Yesterday, Kennedy Space Center Director Jay F. Honeycutt underwent a five-hour heart bypass surgery in the Cabarrus Memorial Hospital in Concord, NC. Bruce Buckingham, speaking for KSC, said, "He went through it well; he's recuperating." Honeycutt became ill January 27 while visiting North Carolina and tests revealed blockages in coronary arteries. Honeycutt is expected to recuperate in the North Carolina hospital for another week. [Halvorson, **FLORIDA TODAY**, Jan. 31, 1996; "KSC Director Slated For Heart Surgery Today," **FLORIDA TODAY**, Feb. 2, 1996; "KSC Chief Recuperating," **FLORIDA TODAY**, Feb. 3, 1996.]

February 4: **ADAMEK MADE LAUNCH SITE OPS DIRECTOR**

Ed Adamek has been named by Lockheed Martin to succeed Mike McCulley as Deputy Director of Launch Site Operations. McCulley has been promoted to be Director. A Lockheed Martin employee for the past 33 years, Adamek has previously served as Director of Safety, Reliability and Quality Assurance and has worked at Kennedy Space Center since 1985. He and his wire Kathy are residents of Cocoa Beach, FL. ["Ed Adamek Takes Over As KSC Launch Site Operation Director," **FLORIDA TODAY**, Feb. 4, 1996.]

February 5: **TURBOPUMP REPLACED; NO DELAY FORESEEN**

A turbopump on one of Columbia's three main engines has now been replaced as the June 22 launch date approaches. The pump was ordered replaced because it had a similar manufacturing history to one on which a cracked turbine blade was discovered. "The pump changeout went somewhat quicker than we had thought it would," and "that'll give us a little extra cushion in the schedule," said Bruce Buckingham, a

Kennedy Space Center spokesman. Mission Managers are meeting presently in a launch readiness review; at the conclusion of the meeting, a firm launch date for the STS-75 mission is expected to be announced. [Halvorson, **FLORIDA TODAY**, Feb. 5, 1996; Halvorson, **FLORIDA TODAY**, Feb. 6, 1996.]

SAFETY PANEL TO VISIT KSC

"We're going to be highly sensitized," said Aerospace Safety Advisory Panel member Sy Himmel of the impending visit by the safety group. Speaking of Kennedy Space Center, he said, "There has been continual change. This is another element that leads to concern and in some cases, discontent and worry." Panel member Bob Dunn speaking of the management changes, "They're trying things that are not traditional and some people are not able to live with that less-traditional approach. I'm confident that we're not going to compromise safety at all." NASA spokesman Ray Castillo said of the review, "more so than ever, NASA will keep vigilant in terms of safety." [Borenstein, **THE ORLANDO SENTINEL**, Feb. 5, 1996.]

February 6:

SHUTTLE STATUS REPORTS

Columbia [OV-102] - The Space Shuttle Columbia is being prepared for its upcoming STS-75 mission at Launch Complex 39B; launch is set for February 22. At the pad, work to secure the replaced fuel turbopump on main engine no. 1 is now complete. Hot gas and mass spectrometer leak checks are complete. Heat shield installation is complete and preparations continue for loading hypergolic fuels on February 8. The STS-75 launch readiness review is planned for today; the launch readiness review will be held February 9 along with the mission's helium signature test. Crew members are: Commander Andrew M. Allen; Pilot Scott J. Horowitz; Payload Commander Franklin R. Chang-Diaz, Mission Specialists Jeffrey A. Hoffman; Claude Nicollier, Maurizio Cheli and Payload Specialist Umberto Guidoni.

Atlantis [OV-104] - In Orbiter Processing Facility Bay 1, the Space Shuttle Atlantis is being prepared for its next Mir docking mission, STS-76, planned to commence March 21. Testing of the Orbiter Docking System [ODS] resumed after delays due to a software loading issue. Midbody configuration closeouts continue. Engine heat shield installation continues. External tank mating to the mission's solid rocket boosters is complete in the Vehicle Assembly Building. The crew equipment interface test is targeted for February 8; final payload bay door closure for February 14 and rollover to the Vehicle Assembly Building on February 20.

Endeavour [OV-105] - Endeavour's next mission - STS-77 - is targeted for launch on May 16 at 6:32 a.m.; the mission is planned to end with a Kennedy Space Center landing on May 26, at 6:49 p.m. The vehicle is being processed for rollover to the VAB in Orbiter Processing Facility Bay 3. The flash evaporator system controller functional check has been completed and preparations are ongoing for controller and

water valve removal and replacement. Orbital maneuvering system tests continue today. The main engines will be removed on February 16 and the mission engines will be installed on March 1. The STS-77 crew includes: Commander John H. Casper, Pilot Curtis L. Brown, Jr., and Mission Specialists: Daniel W. Bursch, Mario Runco, Jr., Marc Garneau [CSA] and Andrew S. W. Thomas. [**SPACE SHUTTLE STATUS REPORT**, Feb. 6, 1996.]

NEAR LAUNCH SET FOR FEB. 16

The launch of NASA's Near Earth Asteroid Rendezvous [NEAR] spacecraft aboard a McDonnell Douglas Delta II rocket is scheduled for Friday, Feb. 16 at the opening of a nominal one-minute launch window which extends from 3:53:06 p.m. to 3:54:06 p.m. EST. The launch window has the flexibility of opening one minute earlier on launch day if collision avoidance or other countdown circumstances dictate. Liftoff will occur from Launch Complex 17 Pad B on Cape Canaveral Air Station. There is a 16-day launch opportunity which extends through March 2. The NEAR spacecraft has completed processing and was mated to the solid propellant upper stage booster on Monday, February 5. It is scheduled to be mated to the Delta II rocket at Launch Complex 17 on Thursday, February 8. [**NASA/KSC Press Release: No. 15-96**, Feb. 6, 1996]

February 7: **STS-75: FLIGHT READINESS TEST COMPLETE**

The STS-75 flight readiness test has been completed while preparations continue for loading hypergolic fuel and for the helium signature test tomorrow. Columbia is targeted for launch on February 22 at 3:18 p.m. The Orbiter's mission will deploy the Tethered Satellite-1R and USMP-3. STS-75 crew: Commander Andrew W. Allen; Pilot Scott J. Horowitz; Payload Commander Franklin R. Chang-Diaz; Mission Specialists: Jeffrey A. Hoffman, Claude Nicollier, Maurizio Cheli and Payload Specialist Umberto Guidoni.

STS-76: Atlantis is scheduled to begin its third Mir Docking mission on March 21, at 3:35 a.m. The mission's orbiter docking system functional test is in progress in OPF Bay 1. Midbody configuration closeouts continue; external tank post mate closeouts are also in work. Tomorrow the crew equipment interface test will take place; Orbiter window polishing is also in progress. Final payload bay door closure is planned for February 14 with rollover to the Vehicle Assembly Building coming February 20.

STS-77: Endeavour is being readied for its next mission; the payloads include SPACEHAB-4; Spartan 207 and TEAMS. In OPF Bay 3, removal and replacement of the Orbiter's flash evaporator system water valve is scheduled for today. Preparations for the fuel cell single cell voltage test are in progress. Endeavour's Space Shuttle main engines is scheduled for February 14. Installation of the mission SSMEs is set for March 1. Crew members for the mission: Commander John H. Casper, Pilot

Curtis L. Brown, Jr.; Mission Specialists: Daniel W. Bursch, Mario Runco, Jr., Marc Garneau and Andrew S. W. Thomas. [**SPACE SHUTTLE STATUS REPORT**, Feb. 7, 1996.]

February 9: **SATURN V RESTORATION COMMENCES**

The Saturn V in front of the Vehicle Assembly Building is getting a $1.7 million makeover. "We're preserving for future generations something that this country did that was remarkable, and we think that's a valuable thing to do," said Jim Ball, who is Branch Chief at NASA's KSC Visitor Center. "But it's not just about showing what NASA did with the Apollo Program; this is about showing what America is capable of." The launch vehicle will be restored and moved to the new Banana Creek VIP launch viewing site - along with other Apollo relics - where protection can be afforded from the corrosion-causing salt air and humidity of the nearby Atlantic Ocean. "The rocket has been out in the elements for 30 years, so it's obviously suffered some deterioration. And that was the main driver initially to this project," Ball continued. "If we didn't act fairly quickly to put that rocket into a permanent home that had a roof over it and shield it from the elements, it was a valuable piece of the American space program's history that was going to literally corrode away to nothing." Restoration of the vehicle will include pressure cleaning the rocket to remove mold and mildew; spraying the rocket with a baking soda mixture to help remove rust; stripping away seven layers of an oil-based enamel that has been painted on the rocket every three years to help protect it from the environment, and repainting the vehicle to match the rocket's original color scheme. "It's a very complicated project," Ball said, "But when it's done, the rocket will look very much like it did - in fact, as close as we can possibly duplicate - to its original condition. [Halvorson, **FLORIDA TODAY**, pp. 1B-2B, Feb. 10, 1996.]

RE-BADGING FOR USA STARTS BY JUNE

In an effort to get the transition to a single prime contractor off to a running start, Lockheed Martin workers will likely be getting their new United Space Alliance [USA] badges beginning this June. Speaking to about 300 workers in the KSC Training Auditorium, USA's Chief Operating Officer James Adamson said, "You hear a lot of concern being expressed about safety as we start out on this new adventure, especially in regard to this being a private company, and profit motivation and things like that. Well, I like to refer to USA as a one-trick pony," said the former astronaut and veteran of two Shuttle missions. "We don't have a marketplace out there. If we lose this business, the whole thing goes down the drain. I mean, we're all in it together. This is one boat, and we're not about to do anything stupid." The transition to a one-contractor operation is an effort to cope with an expected budget shortfall of approximately $5 billion in the coming five years. [Halvorson, **FLORIDA TODAY**, pp. 1A-2A, Feb. 9, 1996; Halvorson, **FLORIDA TODAY**, pp. 1A & 4A, Feb. 10, 1996.]

February 12: **STS-75 UPDATE**

Columbia's storable hypergolic propellants have all been loaded onboard as the eldest Shuttle awaits its STS-75 launch from Launch Complex 39B. Prime payloads for the mission are Tethered Satellite-1R and USMP-3. At LC 39B today, workers are troubleshooting the Orbiter crew hatch microswitch system and are re-opening the payload bay doors for payload closeouts. Preparations are underway for the installation of contingency EVA spacesuits and aft main engine compartment closeouts have begun. STS-75 work scheduled: installation of contingency EVA spacesuits; ordnance installation; top-off of Tethered Satellite System cooling system consumables; TSS/USMP payload closeouts; payload bay door closure; begin launch countdown Feb. 19.

STS-76: Testing of Atlantis' flight controls was performed over the weekend and is successfully complete to date. Testing is scheduled to resume in OPF Bay 1 and be finished tomorrow. Functional tests of the inertial measurement units are being performed today and mid-body closeouts are in work. The payload bay doors of Atlantis will be closed February 14 or 15; rollover is expected late on February 19.

STS-77: Removal of the main engines is underway. The payload bay of Endeavour is being reconfigured for Spacehab and Spartan. Fuel cell testing is being performed today. A suspect flash evaporator cooling system water valve has been removed and replaced and the system is being reserviced with water today. A routine payload bay door radiator system functional test is planned for February 13. Orbital Maneuvering System pod functional tests and fuel cell electrical tests are complete. [Cabbage, **FLORIDA TODAY**, Feb. 11, 1996; **KSC SPACE SHUTTLE STATUS REPORT**, Feb. 12, 1996.]

HATCH PROBLEM MINOR

Mission Managers consider a hatch switch failure minor and plan on either repairing the switch or replace it. No delay is expected in the planned launch of Columbia on its STS-75 flight. The switch sends an electronic signal to verify that the crew hatch is closed. "I don't think it will be a scheduling issue; we still have plenty of time to look at it and replace it if necessary," said KSC spokesman George H. Diller. [Halvorson, **FLORIDA TODAY**, Feb. 13, 1996.]

February 14: **NEW PROCUREMENT DIRECTOR: HATTAWAY**

KSC ANNOUNCEMENT: Effective February 18, 1996, Mr. James E. Hattaway, Jr., is appointed to the position of Director, Procurement Office. Jim has served as Deputy Director of the Procurement Office since 1994 and assumed the duties of Acting Director of that organization in 1995. Jim joined NASA at Kennedy Space Center in 1977. In 1984, he advanced to the position of Chief, Contract Placement

Section. Prior to assuming his duties as Deputy Director, Jim served as Chief, Operations Contracts Office. Jim brings to his new position extensive and varied experience in major contract acquisitions and administration in support of aerospace operations. His commitment to customer service, and advocacy of cooperative relationships with business and industry are exemplary. I know you will join me in supporting Jim and cooperating with him in his new assignment. [James A. Thomas for Jay F. Honeycutt, Director; Feb. 14, 1996.]

February 17: **DELTA LAUNCHES NEAR SATELLITE**

The first of NASA's new Discovery Program satellites was launched today aboard a Delta rocket from Cape Canaveral Air Station. The launch came at 3:43 p.m. today and 23 minutes later its payload, the Near Earth Asteroid Rendezvous Satellite, was deployed and had communicated successfully with Earth. "It's a lot like hearing the first cry from your newborn child; it's a great relief," said Project Scientist Andrew Cheng. The Discovery Program is an effort to limit the cost of unmanned space explorations and NEAR cost about one-tenth as much as the Galileo Spacecraft which arrived at Jupiter in December. "NEAR is going to cost less than one-third the least expensive planetary mission we've ever done in this country," according to Wesley Huntress, NASA Associate Administrator for Space Science. "NEAR has proved that we can develop highly-focused, scientifically valuable planetary missions for less money." [Borenstein, **THE ORLANDO SENTINEL**, pp. A-1 & A-4, Feb. 12, 1996; Cabbage, **FLORIDA TODAY**, Feb. 16, 1996; "Delta Gets Another Minute to Try Today," **FLORIDA TODAY**, Feb. 17, 1996; Borenstein, **THE ORLANDO SENTINEL**, Feb. 17, 1996; Borenstein, **THE ORLANDO SENTINEL**, Feb. 18, 1996; Cabbage, **FLORIDA TODAY**, p. 1A, Feb. 18, 1996.]

February 19: **STS-75: COUNTDOWN COMMENCES**

The three-day countdown toward launch of STS-75 commences today; later in the day the seven-member crew will arrive to make their preparations for launch on February 22. The crew includes Commander Andrew M. Allen, Pilot Scott J. Horowitz, Mission Specialists Franklin R. Chang-Diaz and Jeffrey A. Hoffman and international crew members Maurizio Cheli and Umberto Guidoni from Italy and Jean-Jacques Favier from France. KSC spokesman Bruce Buckingham said, "There aren't any other issues [of concern] with the spacecraft or the vehicle. We've had a tight schedule at the pad, but it has gone quite well. The main mission is the deployment and retrieval of the Italian Tethered Satellite System. [Halvorson, **FLORIDA TODAY**, Feb. 18, 1996; Borenstein, **THE ORLANDO SENTINEL**, A-1 & A-14, Feb. 19, 1996; Cabbage, **FLORIDA TODAY**, Feb. 19, 1996.]

February 22: **STS-75: LAUNCH AT 3:18 P.M.**

Despite a disconcerting misreporting of a cockpit gauge, the launch of Columbia on its

STS-75 mission went smoothly today at 3:18 p.m. Just after liftoff, Commander Andrew M. Allen reported to flight controllers that a cockpit gauge showed that one of the Shuttle's main engines was operating at less than half of its thrust capacity. Another cockpit caution light came on to warn that computer commands might not be reaching the suspect engine. The report might have meant that have meant that the Shuttle was underpowered for reaching orbit. If the report had been accurate, Columbia would have had to attempt an emergency landing. Ten seconds after the initial report, flight controllers reported that all three engines were, in fact, operating properly, generating a combined 37 million horsepower. [Halvorson, **FLORIDA TODAY**, pp. 1A & 8A, Feb. 23, 1996; Borenstein, **THE ORLANDO SENTINEL**, pp. A-1 & A-6, Feb. 22, 1996; Cabbage, **FLORIDA TODAY**, pp. 1A-2A, Feb. 20, 1996.]

February 24: **BROWN NAMED ENGINEER OF YEAR**

James T. Brown, Chief of the NASA/KSC Logistics Services Branch, has been named Engineer of the Year by the Canaveral Council of Technical Societies and Florida Engineering Society. The award was presented at the council's engineering banquet today at the Cocoa Beach Holiday Inn Resort. Prior to his appointment as branch chief in 1995, Brown served as a technical staff assistant for the Logistics Directorate from 1993 to 1995; as an aerospace engineer at the Johnson Space Center Resident Office at Kennedy Space Center from 1987 to 1993; and as an electronics engineer for NASA's Mission Operations Directorate at Johnson Space Center from 1984 to 1987.

Brown has a Ph.D in industrial engineering from the University of Central Florida, a master's degree in engineering management from the Florida Institute of Technology, and a bachelor's degree in electrical engineering from Tennessee State University. He has served as an adjunct faculty member at the Florida Institute of Technology in Melbourne since 1994. Other honors Brown has received include the NASA Certificate of Commendation, the Society of Logistics Engineers Specialty Award and the NASA Special Achievement Award. Additionally, Brown and Robert Armacost of the University of Central Florida (UCF) have developed a new project scheduling algorithm for which UCF has applied for patent protection. [**NASA/KSC News Release: 27-96**, March 1, 1996.]

February 25: **$442 MILLION TSS LOST**

The $442 million Tethered Satellite System was lost in space today when a cable that attached it to the Space Shuttle Columbia snapped. NASA officials said the seven astronauts and the vehicle were not endangered by the event. The satellite - an experiment to produce electricity in space - was the primary goal of the planned 15-day mission. Mission managers said there was no plan to have Columbia's crew attempt to retrieve the satellite; "If you don't ever get your nose bloodied, you're not in the game. We got our nose bloodied this time," said Chuck Shaw, Shuttle Flight Director. The satellite's release had been delayed a day due to computer problems.

[Halvorson, **FLORIDA TODAY**, Feb. 24, 1996; Borenstein, **THE ORLANDO SENTINEL**, Feb. 24, 1996; Borenstein, **THE ORLANDO SENTINEL**, Feb. 25, 1996; Halvorson, **FLORIDA TODAY**, Feb. 25, 1996; Borenstein, **THE ORLANDO SENTINEL**, Feb. 26, 1996; Halvorson, **FLORIDA TODAY**, Feb. 26, 1996.]

February 26: **TETHER RETRIEVED**

As Columbia's astronauts retrieved the broken tether from the failed Tethered Satellite System, investigators on Earth were trying to understand the failure. The probe focused on four issues: the possibility that the tether had rubbed against metal on the satellite's boom, causing it to shred and snap at the tip of the structure; whether a surge of electrical current seared and possibly burned through the shoestring-thin cable; the chance a micrometeorite might have sliced the tether in two; or whether the age of the tether - it was manufactured between 1985 and 1987 - was a factor. [Halvorson and Cabbage, **FLORIDA TODAY**, Feb. 27, 1996; Cabbage, **FLORIDA TODAY**, Feb. 28, 1996.]

February 28: **NASA ALERT FOR SAFETY PROBLEMS**

Despite the rapid pace of change at NASA, the agency continues its safety first operational imperatives. That is the conclusion of a soon-to-be released report of the Aerospace Safety Advisory Panel. Chairman Paul Johnstone said, "We're concerned, but not to the point where you ought to shut down or go the other way." The panel is keeping a close watch on events at NASA, including the changeover to a single major contractor, United Space Alliance. Panel member Norman Parmet remarked, "nothing is constant and you've got to be wary about the entire spectrum [of changes]. You have this kind of gnawing situation. On a related issue, the panel has expressed concern that the development of software to operate the International Space Station has fallen behind schedule; "they've let it slip a little bit," said Johnstone. The panel also spoke to the issue of morale at Kennedy Space Center, saying, "There are indications that distractions are up and morale may be suffering, but the professionalism of the employees and their loyalty to the Space Shuttle Program should help ensure continued safe operations." The morale question was considered serious enough to detail several special investigation teams last year; one of these focused on Kennedy Space Center. [Wheeler, **FLORIDA TODAY**, p. 1A, March 1, 1996; Borenstein, **THE ORLANDO SENTINEL**, Feb. 29, 1996.]

MARCH

March 1: **PUERTO RICO RESOURCE CENTER ESTABLISHED**

Kennedy Space Center has accomplished a long-sought goal - the establishment of a Regional Teacher Resource Center (RTRC) in Puerto Rico. The first KSC-sponsored RTRC, in Marietta, GA, opened in 1993. "Teacher groups in Puerto Rico who can get Air National Guard transportation have been flying to KSC for years, and we send our two Spacemobile lecturers/demonstrators there as often as we can," said NASA/KSC Education Services Chief Steve Dutczak. "But Puerto Rico has a population of almost 3.5 million, and more than 2,500 schools. With numbers like those, we needed a local facility that was available to a much larger number of teachers."

All NASA centers, as well as the Jet Propulsion Laboratory and the Wallops Flight Facility, offer teacher resource centers to serve educators in their region. But where a region is large and diverse - Kennedy serves the Virgin Islands in addition to Florida, Georgia and Puerto Rico - RTRC's bring NASA educational resources closer to home. "We are delighted to have a permanent NASA presence in Puerto Rico," said Marla Schwarz, who will help operate the new facility at the University of Puerto Rico in Mayaguez. "The teachers in our local schools are very interested in the space program, but transportation costs are too high to visit the states very often. Now we can supply NASA publications, videos and slides to teachers at very little expense. We think this will create a much stronger interest in science and math in the school systems here." Plans are already under way to open a subsidiary RTRC in Jayuya, an isolated mountainous province in central Puerto Rico. Other subsidiaries are being considered for the future. "We can help open the door to good careers for the young people of Puerto Rico,' said Dutczak. "And that's what education is all about." [**NASA/KSC News Releases: 26-96**, March 1, 1996.]

KSC EMPLOYEES TO CARRY TORCH FOR OLYMPICS

Kennedy Space Center employees will be well-represented when the Olympic flame passes through Brevard County and the space center on its way to the 1996 Olympic Games in Atlanta. At least 22 KSC employees will be among those carrying the flame through Central Florida after it begins its journey in Los Angeles. The number of KSC employees selected surprised even the organizers of the event. "We had a disproportionate number selected from Brevard," said Judy McGinty, Director of Community Initiative and Fund Raising for the United Way of Brevard County. The United Way agency was used nationwide as the local coordinating group for the torch teams.

McGinty said the selection process was complicated by the fact that candidates from Brevard, Orange, Seminole and Lake counties were all chosen by a team of 24 judges at a central judging site in Orlando. Two-thirds of the more than 400 nominations

received at that location were sent in from Brevard County, McGinty said. Olympics officials told the United Way that a number of the positions would be allotted to KSC employees to carry the flame through the center. Application forms were distributed to all KSC employees, who were encouraged to nominate themselves or others for the positions. Torch bearers were selected on the basis of outstanding contributions to the community. Team members have been given T-shirts and hats with the Olympic emblem, but won't be told until a few weeks before the event where exactly they will carry the flame.

The relay begins April 27 in Los Angeles after the flame is delivered from Greece. It is scheduled to arrive in Atlanta July 19. Kennedy Space Center employees selected include: NASA employees Robert Nagy, Jr., Lee Davies, Joane Maceo, Jill Burkard, Jane Hodges and Loren Shriver; EG&G Florida Inc. employees Thomas Arceneaux, Kathleen Weaver and Marla Emmick; Lockheed Martin Space Operations Co. employees Michael Phillips, Claude Overfelt, Robin Seymour, Mike Chappell, Marty Winkel, Sara Delmonte, Tom Grimm and Michael McCulley; McDonnell Douglas Space and Defense Systems employees Donna Hoven and Thomas Anderson; Rockwell International Corp. employees Theresa Clifton and Richard Unrue; and Analysis & Technology Inc. employee Deborah Prongue. [**NASA/KSC News Release: 25-96**, March 1, 1996; **NASA/KSC Releases No. 83-96**, July 3, 1996.]

STS-76: STATUS REPORT

At Launch Complex 39B, workers have completed the installation of the Spacehab module into the payload bay of Atlantis in preparation for its upcoming STS-76 mission; the highlight of the mission will be the third docking with the Mir Space Station. Today, Atlantis undergoes main engine flight readiness testing and aerosurface test cycling; establishment of Spacehab electrical connections; installation of main propulsion system hydrogen flow control valves, and testing of the ET/SRB pyrotechnic electrical harness. STS-76 work scheduled: Spacehab tunnel connections and leak checks; helium signature leak test; terminal countdown demonstration test; installation of solid rocket booster thermal curtains; calibration of inertial measurement units; final preparations for hypergolic storable propellant loading; Spacehab interface verification test [IVT]; delivery of liquid oxygen to launch pad storage sphere. Endeavour, presently located in OPF Bay 3, is undergoing replacement of thruster R2R; replacement of R2D is complete and installation of the three main engines will begin next week. Columbia's STS-75 mission is ongoing with a landing scheduled for March 7- barring weather constraints- at 7:16 a.m. EST. [**KSC SPACE SHUTTLE STATUS REPORT**, March 1, 1996.]

March 4:

STS-75: DURATION EXTENDED A DAY

Astronauts aboard Columbia's STS-75 flight have leapt at the opportunity to stay in space for another day. "The crew offered to stay up an extra two, three or four days,"

said NASA spokeswoman Eileen Hawley. "They're already up there, and they're ready to support additional science experiments." The extra day of space granted by NASA's mission managers means that Columbia's landing is now planned for 7:13 a.m. March 8 and the managers have held out the possibility that the mission might be extended even further should the need arise. The extension of a single day was made so that astronauts can continue experiments aimed at developing advanced semiconductors, metal alloys and space station smoke detectors. [Halvorson, **FLORIDA TODAY**, March 5, 1996; Borenstein, **THE ORLANDO SENTINEL**, March 5, 1996.]

March 6: **KSC: O-RING INVESTIGATION ADVANCES**

As STS-75 heads to a conclusion with a KSC landing today, engineers at the space center are busily studying the Orbiter's SRB O-rings. They are trying to understand why hot gases singed O-rings on each of the vehicle's solid rocket boosters. Engineers are investigating whether a 1993 change to the adhesive mix used to glue thermal insulation to the inside of the rocket casing has had an impact on the O-rings. Nine of 14 cases where hot gases were found to have blemished less crucial O-rings have occurred since the change. "The trend since then shows an increase" in O-ring damage, according to Deputy Booster Project Manager Larry Caddy. Another area of investigation centers on documents generated during the assembly of the boosters for Columbia's mission. Investigators are looking for any unusual problems during the assembly process.of the rockets' "case-to-nozzle joints." [Borenstein, **THE ORLANDO SENTINEL**, March 6, 1996;Halvorson, **FLORIDA TODAY**, pp. 1A & 4A, March 6, 1996; Halvorson, **FLORIDA TODAY**, March 7, 1996.]

March 9: **COLUMBIA RETURNS TO KSC**

The Space Shuttle Columbia returned to Kennedy Space Center at the conclusion of its 15+ day STS-75 mission. The landing at KSC was delayed by one orbit this morning due to an unexpected cloud cover. The landing had already been delayed a day by bad weather and a technical problem. "It's sort of been a roller coaster of emotions for many of us as we watched it unfold," said Shuttle Program Manager Tommy Holloway. Payload Commander Franklin R. Chang-Diaz commented favorably on the mission, despite its problems, "I actually consider this mission a scientific success. Perhaps this is strange to hear. During the 15 days that we were up in orbit, we collected a tremendous amount of science data in many different disciplines. I think the rupture of the tether in itself brought with it a certain bounty of unexpected science." Commenting on the failure of the tethered satellite deployment, Italian astronaut Maurizio Cheli said, "It is as if I left some part of myself there in space." [Borenstein, **THE ORLANDO SENTINEL**, March 4, 1996; Halvorson, **FLORIDA TODAY**, March 8, 1996; Borenstein, **THE ORLANDO SENTINEL**, March 8, 1996; Borenstein, **THE ORLANDO SENTINEL**, March 9, 1996;Cabbage, **FLORIDA TODAY**, March 9, 1996; Cabbage, **FLORIDA TODAY**, March 10, 1996; Borenstein, **THE ORLANDO SENTINEL**, March 10, 1996.]

March 11: **LAUNCH FOR STS-76 SET**

Following a flight readiness review today, Space Shuttle Managers are continuing to plan on March 21 as the launch date for Space Shuttle Atlantis on Mission STS-76. The STS-76 mission is the third in a series of missions between America's Space Shuttle and Russia's Space Station, Mir. During the meeting, solid rocket motor managers discussed further their findings into the anomaly seen in O-Rings of the nozzle to case joint for the boosters used in the STS-75 launch. An additional review is planned for Friday, March 15, 1996. "We take flight issues like this very seriously and as is always the case, this problem is being aggressively investigated by both the Shuttle and safety communities," said George Abbey, Director, Johnson Space Center, who chaired the review meeting. "The teams working this issue have examined many areas including the way the boosters are processed, the thermal constraints on the system, possible failure scenarios and performance data from previous flights." The March 21 launch of Atlantis is planned for 3:35 a.m. EST from Kennedy Space Center's Launch Complex 39B. The available launch period, or "windows," to launch Atlantis is approximately seven to ten minutes each day. The STS-76 mission is scheduled to last approximately nine days. Docking with Mir will occur on flight day three. An on-time launch and nominal mission duration would have Atlantis and crew returning to Earth on March 30 with a landing at KSC's Shuttle Landing Facility at approximately 8:04 a.m. EST. The STS-76 mission will be the 16th mission and the 76th for the Space Shuttle system. [**NASA/KSC News Release No: N96-18**, March 11, 1996.]

March 12: **TSS FAILURE PROBE BEGINS**

NASA's investigation into the failure of the TSS failure begins today with the lowering of photographers into the cargo bay to take pictures of the "rod-and-reel" system that was used to deploy the Italian Tethered Satellite System. "I'm not sure the visual inspection will reveal much. I'm hoping that the very detailed laboratory examination - the microscopic examination - will start leading us down a path. The eureka comes when we conclusively prove that the fault is known," said Kenneth Szalai, Director of the Dryden Research Center at Edwards Air Force Base, CA. The tether broke during deploying of the Italian satellite on February 25 during Columbia's most recent mission. [Halvorson, **FLORIDA TODAY**, March 13, 1996; Halvorson, **FLORIDA TODAY**, p. 1A, June 5, 1996.]

March 14: **GOLDIN: NASA'S NEW STRATEGIC PLAN**

Today NASA Administrator outlined a new NASA strategic plan, saying that the agency would be "better than ever." In his summary statement to the 23-page document, Goldin wrote: "We are returning NASA to a research and development agency with a renewed focus on the development and application of new cutting-edge technologies, giving up-front consideration to the potential commercial use of our

technologies....We are moving into the next millennium in a true spirit of international cooperation." Part of the plan included the goal of "establishing a permanent human presence in space with the development of the International Space Station." Annual budget discussions with Congress begin on March 19. ["Goldin: NASA To Return To Research Roots," **FLORIDA TODAY**, March 15, 1996.]

March 16: **O-RINGS OK'D FOR LIFTOFF**

Atlantis has been cleared to fly following a NASA management decision that singed O-Rings found on Columbia's boosters do not represent a threat to the rest of the Shuttle fleet. "In any model, even beyond worst case, there's no way to (hot gases) can get past the primary O-ring," said NASA spokesman Rob Navias. NASA has determined that the singing may well have occurred as a side-effect of repair work done on the booster nozzles. "It doesn't fall into the smoking gun category, but it's certainly being looked at...as a possible contributing cause," said Marshall Space Flight Center spokeswoman June Malone. [Halvorson, **FLORIDA TODAY**, March 12, 1996; Cabbage, **FLORIDA TODAY**, March 15, 1996; Cabbage,**FLORIDA TODAY**, March 16, 1996; Cabbage, **FLORIDA TODAY**, April 17, 1996.]

March 17: **CREW ARRIVES FOR STS-74**

The six members of the STS-74 crew arrived just after midnight this morning to take part in the final preparations before launching on its flight to rendezvous with the Russian Mir Space Station. "It's been a fairly smooth flow. We haven't worked any serious problems at all," commented KSC spokesman Bruce Buckingham on pre-launch activities. The brief launch window for the mission extends from 3:33 a.m. for a maximum of ten minutes or until 3:43 a.m. "The window," said Buckingham, "should be about six minutes, depending on the time line and exactly where Mir is in orbit. If we delay a day, it could go to about ten minutes." STS-74 will be the third of nine planned Shuttle missions to the Mir and crew-member Shannon W. Lucid will remain onboard the Russian craft for nearly five months. [Cabbage, **FLORIDA TODAY**, March 17, 1996.]

March 22: **ATLANTIS LAUNCHES ON STS-76 MISSION**

Atlantis was launched from the Kennedy Space Center on time at 3:13:04 a.m. EST today to begin Shuttle mission STS-76, the third Shuttle mission to dock with the Russian Mir Space Station. The launch window as seven (7) minutes in duration. The countdown began at the T-43 hour mark at 2 a.m. Monday, March 18th, 1996. The countdown was conducted from Firing Room 1 of the Launch Control Center (LCC) and included 30 hours and 33 minutes of built-in holds. The launch countdown proceeded smoothly and launch occurred exactly on time at the start of the available window. During ascent, the only problem noted was a small leak of hydraulic fluid from the hydraulic system powered by APU #3. Post-flight inspections of the mobile

launcher platform (MLP) at Pad 39-B revealed a 63-foot-long crack on one of the MLP steel plates running from the north end of the left-hand flame hole to the north end of the MLP surface. Cracks are sometimes found and easily repaired on the MLP's following launch operations. No impact to later scheduled launches is expected. MLP-3 will next be used for Mission STS-79 in July.

Currently in a 157 by 123 nautical mile orbit, Atlantis is now trailing Mir by 13,100 nautical miles and closing in on the Russian station at 694 miles with each hour and a half-long orbit of Earth. Docking with the station remains targeted for about 8:34 p.m. CST Saturday. Atlantis' crew -- Commander Kevin Chilton, Pilot Rick Searfoss, Payload Commander Ronald M. Sega, and Mission Specialists Rich Clifford, Linda M. Godwin and Shannon W. Lucid, who will join two cosmonauts as a member of the Mir-21 crew after docking -- is now setting up the Shuttle for an extended stay in orbit. All of Atlantis' systems are currently functioning well.

Flight controllers did notice an apparent small leak of hydraulic fluid from one of three hydraulic systems aboard the Shuttle shortly after liftoff. The hydraulic systems are only used during launch and landing, and the leak from the backup system was observed only while that system was in operation during the climb to orbit. When all three hydraulic systems were shut down after reaching orbit, as is normal, no further indications of a leak were observed.

Only two hydraulic systems are actually needed for the Shuttle to land safely, although flight controllers prefer to have all three operating to ensure a backup system is available in the event of a problem. Shuttle managers believe it is unlikely that the leak in the backup system will cause any change to the planned mission, although they are continuing to evaluate the situation. The leaking hydraulic system, which is powered by Auxiliary Power Unit 3 aboard Atlantis, still has sufficient hydraulic fluid to be used during landing operations, the next time it would normally be powered up. None of the hydraulic systems are needed for Atlantis' operations in orbit, and flight controllers have ample time to analyze the leaking system and assess any impact it could have on the flight. [STS-76 Mission Control Center, Status Report #1; **http://www.ksc.nasa.gov/shuttle/missions/sts-76/news/sts-76-mcc-01.txt]**

ENDEAVOUR TUNE-UP SLATED FOR CALIFORNIA

Shuttle Program Manager Tommy Holloway wrote in a recent memo that Kennedy Space Center was so busy maintaining a seven-mission flight schedule per year that it did not have time also to do modification work at the center, even though it might well be cheaper. Other KSC officials say that the center could manage the modification work without a negative impact on the launch processing schedule. Ed Ellegood, Operations Director of Spaceport Florida, said that "I'm sure that politics entered into the decision" to send the work to California which has 54 electoral votes. [Borenstein, **THE ORLANDO SENTINEL**, March 23, 1996.]

ROBERT OVERMYER, ASTRONAUT, DEAD AT 59

Former astronaut Robert Overmyer, 59, died today in the crash of a small plane he was test flying. A daughter, Carolyn Overmyer, said: "He was doing full-flap stalls at 8,000 feet, and the plane turned over and went into a spin. He had the door open and was trying to get out and couldn't get out in time." Ms. Overmyer spoke from her parents home in Nassau Bay, Texas. Robert Overmyer commanded piloted STS-5 and commanded Challenger's 51-B mission from April 29-May 6, 1985. He is survived by his wife Katherine; daughters Carolyn Overmyer of Clear Lake, TX, and Patricia Armstrong of Woodland, TX and son Robert of Manhattan Beach, CA. ["Ex-astronaut Died Doing the Work He Loved," **FLORIDA TODAY**, March 24, 1996.]

March 26: **GAO WORRIES ABOUT NASA SAFETY**

A General Services Administration report which praises NASA's efforts to keep lines of communication open in the wake of the Challenger accident ten years ago, expresses concern, however, about Space Shuttle safety due to upcoming budget cuts. "Future funding reductions, downsizing and program restructuring will be challenging because the program also must maintain the capability to meet the demanding International Space Station launch schedule," said the report. The GAO study reported also its concerns "within the NASA rank-and-file about the effect budget cost have on issues ranging from retaining skilled employees at the agency to keeping enough database storage capacity to archive safety information." [Holton, **THE ORLANDO SENTINEL**, March 27, 1996.]

March 27: **DELTA 2 LAUNCHES AT 7:21 P.M.**

"The vehicle performed fine as far as we can tell," said Lt. Col. Doug Nowak, Commander of the First Space Launch Squadron. "I can't think of [a launch] that's gone smoother." The Delta delivered a Navstar Global Positioning System Satellite to the start of a two-week orbital journey until it reaches its permanent orbit on which it will circle the Earth every 12 hours. Meanwhile, aboard Atlantis, the crew prepared to land at KSC a day early due to rough forecasts for the planned landing day of March 31. [Cabbage, **FLORIDA TODAY**, March 28, 1996; Borenstein, **THE ORLANDO SENTINEL**, pp. A-1 & A-16, March 29, 1996; Cabbage, **FLORIDA TODAY**, March 29, 1996.]

March 29: **WELDON: JOB PICTURE TO IMPROVE**

"The [employment] situation is not as bleak as it seems," Rep. Dave Weldon [R-Palm Bay, FL] said today. "Mr. Goldin told me he thought that some of the numbers they have been working with...may have to be increased by a couple of hundred - which I thought was good news." According to current projections, civil service employment is expected to decline from its 2360 positions in fiscal 1995 to 1,135 jobs in fiscal

2001. Associate Administrator for Public Affairs Laurie Boeder confirmed that the Administrator had discussed KSC civil service employment and the possibility it may not decline to as few as 1,135. "All the numbers are under review," Boeder said. "NASA will do whatever it takes to make sure Shuttle operations are safe and we have people working at Kennedy to ensure Shuttle operations are as safe as humanly possible." A NASA document circulating on Capitol Hill suggests that civil service employment will decline to 380 by 2001. [Wheeler, **FLORIDA TODAY**, March 29, 1996; Wheeler, **FLORIDA TODAY**, March 30, 1996.]

ATLANTIS NEEDING CLEANUP

"It's definitely a mop-up type deal. It kind of gets on everything," said NASA Project Engineer Ed Mango about the leak of up to 1.6 gallons of synthetic hydraulic fluid which leaked in Atlantis' tail compartment on the STS-76 mission just concluded. Just how extensive the clean-up job will be cannot be determined until Atlantis returns from its California landing and bad weather is interfering with the ferry flight from Edwards Air Force Base, CA. Another leak problem on Atlantis involved one of 38 maneuvering thrusters which had to be shut down as the crew prepared for landing. Mission Operations Representative Bob Castle said, "It's certainly more problems than we've had the last two or three flights, but it's not more than we've ever dealt with before. I'm confident we can deal with these." [Borenstein, **THE ORLANDO SENTINEL**, March 30, 1996.]

March 31: **WEATHER PREVENTS ATLANTIS LANDING AT KSC**

With bad weather precluding a safe landing at Kennedy Space Center, Atlantis touched down in Southern California this morning at Edwards Air Force Base. Touchdown, with Commander Kevin Chilton at the controls, came at 8:29 a.m. EST. Spacecraft Communicator [Astronaut] Bill Gregory radioed the crew: "Welcome back Atlantis! Congratulations on successful delivering Shannon." Commander Chilton responded, "It sure feels good to be home, Bill; we appreciate all your help." Astronaut Shannon Lucid remained behind aboard the Mir Space Station for a 4 1/2 month visit. The stay will set a new American record for longest spaceflight at 143 days, breaking last year's 115 day record during Norman E. Thagard's stay aboard Mir. Today's California landing was the first since Endeavour's last year. [Cabbage, **FLORIDA TODAY**, April 1, 1996; Borenstein, **THE ORLANDO SENTINEL**, March 31, 1996; Cabbage, **FLORIDA TODAY**, p. A, March 31, 1996; Borenstein, **THE ORLANDO SENTINEL**, April 1, 1996.]

APRIL

April 3: **USBI WORKERS COMING TO BREVARD**

USBI will be transferring 125-150 of its Alabama and Louisiana workers to Brevard County starting in June. Spokeswoman Andrea Shea King said the company will probably hire an additional 20 to 30 workers as well. USBI refurbishes the non-motor sectors of Space Shuttle solid rocket boosters. The new workers will mean an additional $5 million-plus payroll in the county. [Reid, **FLORIDA TODAY**, April 4, 1996.]

LOCKHEED MARTIN ATLAS LAUNCHES

"We hope that this spacecraft and the following four will really make for a mobile communications system second to none. And this first satellite will be the centerpiece of this new constellation," said Nate Lindsey, Executive Vice President with Lockheed Martin Astro Space [East Windsor, NJ], which is building the set of five Inmarsat satellites. Launch of the Atlas rocket this morning came at 6:01 from Cape Canaveral Air Station. Inmarsat is a global communications consortium comprised of 79 member nations. "We're excited about dealing with the new and more dynamic customer base," said the consortium's vice president Eugene Jilg. The second Inmarsat spacecraft will be launched in the fall on a Russian Proton rocket from the Baikonur Cosmodrome in Khazakhstan. The third will come in November from Cape Canaveral. [Halvorson, Todd and Michael Cabbage, **FLORIDA TODAY**, pp. 6A & 1A, April 4, 1996.]

April 5: **BAD WEATHER DELAYS SHUTTLE FERRY FLIGHT**

NASA officials expressed concern today that rain and thunderstorms moving through the eastern United States could force a delay in the return of Atlantis to Kennedy Space Center. KSC spokesman George H. Diller said, "I think they're just going to try and get as far as they can." The last Shuttle requiring a ferry ride from California was Endeavour following its STS-67 mission in March 1995. The cost of a landing diverted to the west coast is estimated at $1 million. [Cabbage, **FLORIDA TODAY**, April 5, 1996; **Reporter's Space Flight Note Pad**, Feb. 1996; Cabbage, **FLORIDA TODAY**, April 6, 1996; Cabbage, **FLORIDA TODAY**, April 9, 1996.]

April 6: **SCA DEVELOPS ENGINE TROUBLE, LANDS**

Five minutes after takeoff, the Shuttle Carrier Aircraft bearing Atlantis developed engine trouble and was forced to return to Edwards. The SCA was piloted by former Shuttle astronaut Gordon Fullerton. "All of the times they practiced this paid off," said Cam Martin, Dryden spokesman. "They landed without incident, which is exactly what you would hope for in this situation." NASA spokesman Joel Wells said that an

investigation of the incident was underway, adding: "There appears to be internal damage to the engine, but what caused it, we don't know." The delays at Edwards will cost KSC workers about two weeks of time previously scheduled for processing Atlantis on its return.

On further examination, workers found that there had been a small fire, instead of the faulty warning light they had originally suspected, according to NASA officials. Overtime work, they speculated, could run the cost of returning Atlantis to KSC to the neighborhood of $1 million. Burned wiring was found around one of four engines on the Shuttle Carrier Aircraft. The engine will have to be refurbished and another taken from a companion carrier aircraft. "We're probably going to have to work at least six days a week, if not seven for awhile to get back on track," said Jim Hazleton, transfer scheduler at Kennedy Space Center. [Cabbage, **FLORIDA TODAY**, April 7, 1996; Borenstein, **THE ORLANDO SENTINEL**, April 9, 1996.]

April 8: **STATION SURVIVAL PLAN DETAILED**

Should Russia be unable to provide three Russian-built spacecraft to the International Space Station, NASA has a fall-back plan. The contingency plan envisions replacing the spacecraft with a single U.S. module. "We can start the backup plan any time, but it is going to take money," said Mike Hawes, NASA's senior Space Station engineer. NASA Administrator Daniel S. Goldin has imposed a May 1 deadline for the Russian government to resume paying its service module manufacturer for two units which would provide command and control functions to the Space Station. Proceeding without the Russians would cost NASA an extra $1 billion and impose a delay of up to 18 months. [Wheeler, **FLORIDA TODAY**, p. 1A, March 27, 1996; Wheeler, **FLORIDA TODAY**, April 8, 1996.]

April 10: **TALONE MADE CD ASSISTANT**

In a letter to KSC employees, Center Director Jay F. Honeycutt wrote: Effective immediately, John (Tip) Talone is reassigned reporting directly to me as the Special Assistant to the Center Director. This reassignment is done to expedite Space Station hardware testing and integration. A new office will be established in the future. [Honeycutt, April 10, 1996.]

April 11: **ATLANTIS FERRY RIDE HOME BEGINS**

The Space Shuttle Atlantis is scheduled to depart California about 9:30 a.m. on its return to Florida; the delay has been due to the replacement of an engine aboard the Shuttle Carrier Aircraft. Once the new engine is pronounced fit, the ferry ride home will proceed. An overnight stay at the Fort Worth Naval Air Station is planned before the final leg of the trip to Florida on Friday. If the new engine does not pass fitness

tests in California, Mission Managers may decide to remove Atlantis from the SCA to allow flight testing of the jet; that would delay a California departure till late Friday or Saturday. Further storms in the KSC area are anticipated and could affect the return date. [Cabbage, **FLORIDA TODAY**, p. 2A, April 11, 1996; Halvorson, **FLORIDA TODAY**, April 14, 1996.]

SHUTTLE OPERATIONS REORGANIZED

"Effective immediately, the Shuttle Operations Directorate is reorganized. This action is taken to expedite the establishment of the management structure necessary for transition to the SFOC. The directorate is renamed Director of Shuttle Processing. Two second level directorates: Director, Process Engineering and Director, Process Integration replace existing second level directorates." [Honeycutt Letter, April 11, 1996.]

TITAN LAUNCH SET FOR APRIL 24

The Department of Defense will launch a Titan 4 rocket on a classified satellite-delivery mission on April 24, officials at Cape Canaveral Air Station said today. The window for the liftoff runs from 3:15 p.m. till 8:15 p.m. The launch had been scheduled for April 9, but was delayed in order that technicians might replace suspect electronic circuits which route computer commands to explosive devices used to separate rocket stages after on ascent. A similar launch scheduled for April 26 has been delayed for similar reasons. ["Titan Rocket Launch Slated for April 24," **FLORIDA TODAY**, April 12, 1996.]

April 12:

FLORIDA ASTRONAUT, WALKER, RETIRES

David M. Walker, a native of Eustis, FL, is retiring from the ranks of America's astronauts today. Walker has been an astronaut for 18 years and has flown on the Space Shuttle four times. He's not retiring from work, however; he's becoming a part-owner and officer of a telecommunications company which is just starting up. "I wanted to do something that's exciting since I've lived an exciting life," he said. Speaking of his new career, he added, "It's a more exciting thing than just going to work. I hit 30 years in the Navy. If I'm ever going to do anything else, now is the time to do it." Walker conceded he'll miss spaceflight: "Flying in space; that's the greatest flying anyone can do." [Borenstein, **THE ORLANDO SENTINEL**, April 13, 1996.]

USA BEGINS KSC EXISTENCE

NASA and United Space Alliance today signed agreements which will lead to the takeover of the day-to-day Shuttle Operations by the newly formed company. Actually, the newest part of the company is its name since the company was formed

as a joint venture of Rockwell International and Lockheed Martin. "Nothing actually changes except for the name of the company on the contract," said NASA spokesman James Hartsfield. The agreements allow the new company time to get an early start on the transition; badging for about 3,800 Lockheed Martin at KSC and 3000 Rockwell employees at Johnson Space Center will commence next month. The consolidating of more than 85 Shuttle Program contracts will begin October 1 and will phase-in over the ensuing five years at an estimated cost savings of between $770 million and $1 billion. [Halvorson, **FLORIDA TODAY**, p. 1A, April 13, 1996; SEE BELOW.]

HONEYCUTT: NOVATION OF USA CONTRACT

On April 12, 1996, NASA will transfer the subject contract to United Space Alliance (USA). The transfer will be accomplished by execution of a novation agreement between the parties and modification of the Shuttle Processing Contract (SPC) to recognize the USA's successor interests. This arrangement will remain in effect until September 30, 1996, when the Shuttle Flight Operations Contract (SFOC) is awarded. This is the first step in transitioning Shuttle operations to USA while continuing to fly safely and meet the manifest. This approach does not change the current effort being performed, contract terms and conditions, existing day-to-da interfaces, or civil service roles and responsibilities in managing the SPC or the award fee evaluation process. As NASA takes this interim step towards awarding the SFOC, we ask for your support and cooperation in accomplishing these necessary and beneficial changes to strengthen our Nation's space program. The KSC technical and procurement support team responsible for this effort is being formed. This team will be dedicated to successful implementation of this program while ensuring that the vital interests of both KSC and the Agency are protected. The Center will keep you apprised of any new developments in this area. [Honeycutt, Letter: **Novation of the Shuttle Processing Contract**, April 10, 1996.]

ATLANTIS RETURNS HOME

Atlantis, after a six-day delay in California, is at last home in Florida where it will be prepared for its July 31 mission. "We'll be working some extra weekends, which will result in some extra overtime, but the schedule will remain essentially the same and we'll keep the same launch date," said KSC spokesman Bruce Buckingham. Atlantis will first be towed to a processing hangar for post-flight inspections, then rolled into the Vehicle Assembly Building for mating with its solid rocket boosters and external tank on June 25. On July 2, the mated vehicle will journey to Launch Complex 39A for its July 31 liftoff on a nine-day mission. Repairs will be made to a crucial hydraulic system and six of 44 thrusters will be replaced. [Halvorson, **FLORIDA TODAY**, p. 1A, April 13, 1996.]

April 14: **ENDEAVOUR ROLLS OUT THIS WEEK**

"We're still tracking May 16 for our launch date, and Endeavour's in good shape," said KSC spokesman Bruce Buckingham about this week's rollout of Endeavour to Launch Complex 39B. The 4.2 mile journey is slated to begin at 3:00 a.m. April 16. The prime payload of the STS-77 mission is the conduct of a dozen scientific experiments in the Spacehab module which will be placed in the Orbiter's cargo bay on April 18. The six-member crew is also responsible for ferrying the Spartan spacecraft into orbit. The crew is captained by John H. Casper. A firm launch date will be set May 2 at the conclusion of the mission's flight readiness review. [Halvorson, **FLORIDA TODAY**, April 15, 1996.]

April 15: **SHUTTLE INTERFACE TEST COMPLETED**

The Shuttle Interface Verification Test is complete in the Vehicle Assembly Building. In addition, the Spacehab payload was delivered to the pad over the weekend. Because of anticipated weather overnight at KSC, rollout to Pad 39B is now set for about 8 a.m. tomorrow. Based on this schedule, the vehicle is expected to be hard down on the pad at about 2 p.m. and the Rotating Service Structure moved into place around the vehicle at about 4 p.m. The Spacehab 4 and Spartan 207 are currently scheduled for installation in Endeavour's cargo bay on April 16. Meanwhile, in Orbiter Processing Facility Bay 2, replacement of one of Columbia's thrusters used for on-orbit maneuvering was completed. Preparations are now in work to install the Space Shuttle main engines starting tomorrow. In addition, payload premate testing will commence tomorrow. The Life and Microgravity Spacelab [MLS] is scheduled for installation in the transport carrier on April 22.

The Orbiter Atlantis, riding atop the modified 747 Shuttle Carrier Aircraft [SCA], departed Dyess Air Force Base (Abilene, TX), Friday morning and refueled at Eglin AFB, FL. The vehicle then proceeded to KSC, landing on Shuttle Landing Facility runway 15 at 1:41 p.m., April 12. Today, the payload bay doors will be opened and data collected on the payload bay doors latches, following-up on an in-flight anomaly that occurred prior to landing. Also today, preparations will begin to pinpoint the source of the hydraulic leak that occurred in the aft engine compartment during ascent. Tomorrow, a sharp edge inspection will be conducted in the payload bay and preparations made to remove the ferry flight main engine tailcone. On Thursday, the Spacehab payload will be removed; post-flight inspections will continue through all this week. [Oliveri, **FLORIDA TODAY**, April 16, 1996; Oliveri, **FLORIDA TODAY**, April 17, 1996; **Kennedy Space Center Space Shuttle Status Report**, April 15, 1996; Halvorson, **FLORIDA TODAY**, April 13, 1996.]

April 17: **TSS INVESTIGATION STATUS**

An investigation into the February 26 tether break during deployment of a tethered

satellite from the Space Shuttle Columbia is continuing to move forward, as it pursues an explanation for the unexpected separation and loss of the satellite. "The board is roughly on schedule," said Chairman Kenneth Szalai. "We have not closed in on a single cause, but testing has provided clues to the cause, and we have narrowed down to four or five potential single or connected scenarios." The fault-tree approach being used by the board resulted in a large number of possible contributing factors or potential "causes" for the break being defined and examined. To date, roughly half of those fault tree blocks have been eliminated from further consideration, resulting in a major narrowing of the investigation's focus. As an example of this elimination process, Szalai cited the board's assessment that neither the satellite itself, its component systems, nor operations which were being conducted with it, contributed to the separation.

Tests and analyses using a variety of sophisticated apparat and techniques have been underway at laboratories of the Marshall Space Flight Center (Huntsville, AL) in support of the board's effort. The lab activities, beginning in mid-March and continuing, have been an indispensable source of physical evidence to shed light on the tether incident, according to Szalai. Another round of tests is under way this week, with some 6,000 feet (1,800 meters) of tether which remained aboard Columbia after the break being examined in Marshall Center facilities. The board was established almost immediately after the tethered satellite loss, during the STS-75 Space Shuttle mission. The panel's charter called for submitting, within 75 days, a draft report of findings and recommendations to NASA Associate Administrator for the Office of Space Flight Wil Trafton. The target completion date, based on that schedule, is May 13. [Memo from Jerry Berg [Media Services Office, MSFC] to: smacklin; lisa.malone-1; george.diller-1; cam_martin; sandy_meske, April 17, 1996.]

NEW PERSONNEL REDUCTIONS PLANNED

Employees of the National Aeronautics and Space Administration were notified today that NASA management will develop a plan to accelerate the downsizing of the Agency's headquarters and reduce the number of headquarters workers from its current level of 1,430 positions to 650-700 by October 1997. The new plan anticipates a Reduction in Force at NASA headquarters to be completed by October 1, 1997. NASA's existing downsizing plan calls for a reduction in its headquarters staff from an October 1993 level of 2,200 positions to 1,073 positions by October 2000. The new plan increases the target reduction by approximately 400 employees and accelerates the timetable for completing the reduction.

Although the target date for the reduced staffing is still 18 months away, NASA managers decided to make the announcement today so that planning can begin immediately and employees have the information they need to make career decisions. Agency officials had previously identified 239 positions moving from the headquarters to NASA's field centers, of which 110 have already taken place or are in process.

Officials do not expect the number of jobs being transferred to NASA centers to be increased above the 239 level. The announcement today affects only the Agency's headquarters; agency officials will put the new headquarters structure in place to provide the foundation for the NASA centers to review their staffing needs, meet budget and program priorities, and set new staffing goals. [Borenstein, **THE ORLANDO SENTINEL**, April 18, 1996; Wheeler, **FLORIDA TODAY**, April 18, 1996; Wheeler, **FLORIDA TODAY**, April 26, 1996;"Wheeler, **FLORIDA TODAY**, April 19, 1996; **NASA Press Release No: 96-76**, April 17, 1996; Hagood, **FLORIDA TODAY**, April 20, 1996.]

April 18: **SATURN V MOVE TO EXHIBIT SITE**

A historic Kennedy Space Center landmark, the Saturn V located near the Vehicle Assembly Building, is being prepared for relocation to its new viewing site on the Space Center. The 363-foot-long Apollo-era rocket has been on display at KSC in an un-mated, horizontal configuration since 1976 when it was part of the U.S. Bicentennial Exposition of Science and Technology. Since that time, it has remained on display alongside the Saturn V Causeway and used as a popular tourist stop and KSC landmark. In January 1979, under the NASA-National Air and Space Museum Artifacts Agreement, NASA turned over the title of the Saturn V at KSC to the Smithsonian Institution.

In December 1995, Delaware North Park Services of Spaceport, Inc., the Kennedy Space Center Visitor Center concessioner, awarded a contract to Thomarios Painting Company (Norton, OH) to perform preservation and stabilization work on the Saturn V vehicle. These efforts have been closely coordinated with officials of the Air and Space Museum (Washington, DC). Now with construction of the new Apollo/Saturn V Center nearing completion, the rocket will be moved to its new viewing location in a way similar to how it was originally intended to deliver astronauts to the lunar surface - one stage at a time.

The first artifact to be moved to the new Apollo/Saturn V Center will be the Command Service Module (CSM). The CSM has been housed in the former Flight Crew Training Facility in KSC's industrial area, where it has been displayed with other artifacts from the Apollo era. The move of the CSM is scheduled for 9 a.m. Friday, April 19. Beginning next week, components of the Saturn V rocket that have been on display outside the VAB will be transported to the Apollo/Saturn V Center. On April 23, the upper stages (the Command Module, the Service Module, the Launch Escape System and the Spacecraft-Lunar Module Adapter) will be moved. The Saturn V second stage will be moved on April 27. Then on May 11, the Saturn V first stage, along with its attached five main engines, will be transported to the new viewing site.

The Apollo/Saturn V Center is located about 2 miles north of the Vehicle Assembly Building on the Kennedy Parkway, near the current Banana Creek VIP Shuttle launch viewing site. Final construction of the Apollo/Saturn V Center will be completed in December 1996 and open soon thereafter for visitors from the Kennedy Space Center Visitor Center. No appropriated funds are being used in connection with the Apollo/Saturn V Center or in the restoration of the vehicle. Funding for this project is provided by bus tour ticket surcharges and from state arranged funding under an interagency agreement between KSC and the Spaceport Florida Authority (SFA) and South Trust Bank of Alabama. Under the arrangement, SFA will provide the financing and own the building under a NASA-granted Use Permit until such time as the outstanding project debt is fully paid. [**NASA News Release No. 43-96,** April 18, 1996.]

April 19: **ASTRONAUTS ARRIVAL FOR TCDT SCHEDULED**

The flight readiness test of the Endeavour's main engines and flight control systems have been completed and the vehicle's payload bay doors have been closed in preparation for hypergolic loading operations. Today, crew cabin and Spacehab pressurized leak checks will be conducted along with preparations for hypergolic propellant loading operations. The helium signature leak test for STS-77 is planned for April 22 followed by the start of the terminal countdown demonstration test the following day; the test concludes April 24. The mission's flight readiness review is set for May 7.

Meanwhile, in OPF Bay 2 Columbia is being readied for the STS-78 mission. Testing of Columbia's Ku-band antenna system is being performed today. Payload bay electrical checks continue in preparation for the arrival of the Life and Microgravity Spacelab (LMS) next week. Installation of the Spacelab coolant lines is complete. Landing gear wheel and tire installation is complete. Orbiter mid-body closeouts are in process. In the Operations and Checkout Building, closeouts of LMS will conclude today. The module will be installed into the payload canister on April 22 and transported to the Orbiter Processing Facility for placement into Columbia's payload bay on April 23. In the Vehicle Assembly Building, stacking of the right aft center solid rocket booster segment was completed this morning. The Spacehab-MIR double module was removed from Atlantis yesterday and transported to the Spacehab processing facility at Port Canaveral overnight. Preparations are beginning for removal of the tunnel adapter which is to be reinstalled into Columbia's payload bay next week. Main engine heat shield removal is in work and window polishing is underway. Modification work is starting for the planned installation of Global Positioning System equipment. [**KSC Space Shuttle Status Report**, April 19, 1966.]

April 21: **EG&G PROMOTION; MCDONNELL DOUGLAS SNOOPYS**

Kenneth C. Walla [Merritt Island, FL] has been appointed Associate General Manager

of Engineering and Support Services by EG&G Florida at Kennedy Space Center. Walla has served as the acting associate general manager since September and had worked previously as the Director of Safety and Mission Assurance for EG&G since 1990.

McDonell Douglas employees Linda D'Amico and Scott Myers have recently been awarded Silver Snoopys. D'Amico was given the award for her contributions to the security aspect of Shuttle payload processing and was responsible for developing security procedures in use at KSC and at Vandenberg Air Force Base, CA. Myers, a senior systems engineer, was recognized for his quick problem-solving ability before the second U.S. Microgravity Laboratory mission in October and for his commitment to customer satisfaction. ["EG&G Promotes Acting Manager," and "McDonnell Douglas Employees Get Snoopys," **FLORIDA TODAY**, April 21, 1996.]

April 22: **LEAK CHECKS COMPLETED**

Technicians at Launch Complex 39B have completed crew cabin and Spacehab pressurized leak checks in anticipation of the May 16 launch of Endeavour's STS-77 mission. Today, workers will implement the mating of the Orbiter mid-body umbilical unit, prepare for the helium signature leak test of the main propulsion system and apply booster aft skirt foam insulation. The TCDT is scheduled for April 23-24 and flushing and sampling of the potable water system and the calibration of the inertial measurement units are planned for April 24-25.

The Space Shuttle Columbia (OV-102) continues to undergo processing for its upcoming STS-78 mission, In OPF Bay 2, payload bay electrical checks will conclude today for the Life and Microgravity Spacelab (LMS). A functional test of the waste containment system is being performed today, too. Orbiter midbody avionics system testing and associated closeouts continue. In the Vehicle Assembly Building, stacking of the right forward center booster segment is underway today. Mating of the external tank to the solid rocket boosters is scheduled for April 30. In the Operations and Checkout Building, LMS is installed into the payload canister today. LMS will be transported to the Orbiter Processing Facility and installed into Columbia's payload bay on Tuesday, April 23.

In OPF Bay 1, the tunnel adapter is being removed from Atlantis for reinstallation into Columbia next week. A functional test of Atlantis' forward reaction control system is set for April 23 as is a test of the main engine turbopump system. Work to remove the three main engines for maintenance will begin on April 26. Cleaning of the aft compartment of hydraulic fluid continues. Engineering analysis has determined that the cause of the hydraulic leak was a slightly misaligned dynatube fitting which had been overtorqued to permit installation. [**KSC Space Shuttle Status Report**, April 22, 1996; **KSC Space Shuttle Status Report**, April 23, 1996.]

April 23: **SPACE CONGRESS STARTS TODAY**

The Space Congress will commence today for the 33rd consecutive year in Cocoa Beach, FL. The conference will feature leading officials from NASA, the Department of Defense and the nation's aerospace industry over the next four days. The focus will be on the impending changes in the nation's civil, commercial and military space programs. Acting Deputy Undersecretary of Defense Marc Berkowitz will open the conference with an 8:30 a.m. keynote address followed by a panel session on the future of commercial space. The panel's discussion phase will be lead by retired astronaut Rick Hauck. At the noon luncheon, Jeffrey Harris, an advisor to the Director of the CIA will speak and tonight, NASCAR driver Rusty Wallace will speak on the subject of the thermal insulation employed in his vehicle; the insulation is identical to that used in Space Shuttles. The general chairman of this year's Space Congress is former KSC Center Director Forrest S. McCartney. He emphasized the need to focus on the future in the space program, saying: "Looking back upon what we have accomplished is great to do, but let's look forward and see where we are and where we're going - and that's the theme of the congress." He added, "We are living in a time where America's space program is transitioning faster and with more activity than it ever has before." McCartney cited the commercial space program as a prime example. "It's a different ball game, and it's evolving every day," he said. As part of his Space Congress chairman's duties, McCartney went "online" as a guest of the Florida Today forum on the CompuServe online network. [Banke, **FLORIDA TODAY**, April 21, 1996; Borenstein, **THE ORLANDO SENTINEL**, April 22, 1996; Halvorson,"Military Bigwigs Talk Space," and "Missiles Turned Rockets Will Be Launched From Cape," **FLORIDA TODAY**, April 21, 1996; "Visitor's Guide to Space Congress," **FLORIDA TODAY**, April 21, 1996; "Younger Fans Can Find Lots To Do At Space Congress," **FLORIDA TODAY**, April 21, 1996; "Space Congress: Place To Find Out," **FLORIDA TODAY**, April 21, 1996; Halvorson, **FLORIDA TODAY**, April 23, 1996.]

TITAN LAUNCH READY

The Air Force is scheduled to launch one of its Titan 4 rockets today between 3:00 and 8:00 p.m., providing the weather cooperates. The payload is classified as is the exact launch time. This liftoff is set to be the first of three Titan 4 missions set for Cape Canaveral this year; the remaining two are set for July and November. At Kennedy Space Center, meanwhile, the STS-77 crew is on hand for the terminal countdown demonstration test. [Halvorson, **FLORIDA TODAY**, April 24, 1996.]

April 24: **EMERGENCY EGRESS TRAINING COMPLETED**

The crew of Endeavour's STS-77 mission has completed its emergency egress training at Launch Complex 39B. The mission's helium signature leak test has been completed as well. Workers at the pad will flush and sample the potable water system today and

conduct Orbiter mid-body closeouts and calibration of the vehicle's inertial measurement units. The terminal countdown demonstration test also commences today. Tomorrow pad workers will conduct the Spacehab/Spartan payload interface verification test [IVT], Spacehab flight crew equipment stowage and test the flash evaporator system on April 26 (Friday). Meanwhile, in OPF Bay 2, processing of Columbia for its STS-78 mission continues. The Life and Microgravity Spacelab (LMS) was installed into the payload bay of Columbia last night. Electrical connections are being established today. The tunnel adapter, recently removed from Atlantis, will be installed Friday. The interface verification test (IVT) is planned for April 29-30. Ammonia boiler servicing is scheduled for later today. Orbiter midbody avionics system testing and associated closeouts continue. In the Vehicle Assembly Building, stacking of the right forward booster segment is in work today. Mating of the external tank to the solid rocket boosters is scheduled for April 30. The functional test of the forward reaction control system of Atlantis continues today. A main propulsion system leak and functional check is also underway. Removal of the heat shields from around the three main engines continues in preparation for engine removal on Friday. Window polishing continues. [**KSC Space Shuttle Status Report**, April 24, 1996.]

WELDON HOLDS MEETING TODAY

Representative Dave Weldon [R-Palm Bay, FL] will hold a community discussion this afternoon from 4:00 p.m. till 6:00 p.m. at the Lifelong Learning Center at Brevard Community College. The event is being jointly sponsored by Brevard Community College and the Florida Space Business Roundtable. Weldon said that the meeting would discuss obstacles to commercial space enterprises. "The global marketplace is getting more and more competitive. We have to be aggressive in seeking out new business opportunities." Weldon will be joined by Kent Black, representing United Space Alliance and Air Force Gen. Joseph Ashy. ["Weldon to Host Meeting On Space Trade," **FLORIDA TODAY**, April 24, 1996.]

BUDGET: FURLOUGHS IN PROSPECT

NASA's civil service work force may be furloughed up to twelve days next year if a budget bill presently under consideration in Congress becomes law. NASA Deputy Comptroller Malcolm Peterson wrote to Congress on the issue: "To put it bluntly, the [budget] reduction is impossible to achieve without drastic action. Unless a miracle occurs, there is no way feasible to implement this reduction without resorting to furloughs." Congressman Bud Cramer [D-AL], whose district includes Marshall Space Flight Center [Huntsville, AL], said, "We're going to push NASA over the edge. If they are forced to take this out, we're not going to be able to keep NASA with its current field centers." [Wheeler, **FLORIDA TODAY**, April 25, 1996.]

USA: LAYOFFS ARE COMING

To keep the Space Shuttle flying, says Kent Black, new United Space Alliance CEO, it has to launch more often, get major upgrades, sign on new customers and lay off hundreds of workers at Kennedy Space Center. "If we don't get those costs under control, I believe we can lose the manned space program altogether," he said today. He added that NASA wants to cut a "few hundred" more jobs than does USA; negotiations on that issue and others have just begun. "I think it's inevitable somewhere in 1997 we'll have to make some reductions; we're talking in the low hundreds," Black said. NASA spokesman Ed Campion said, "There are a lot of things associated with the negotiations with USA which are very sensitive and we're not going to discuss while the negotiating process is under way." In order to increase the Shuttle's customer base, Black has called for "more Department of Defense shuttle flights" and such plans are in the works. The additional customers could bring the flight schedule up to a dozen flights a year and that could reduce operating costs and bring back some laid off workers. [Borenstein, **THE ORLANDO SENTINEL**, April 25, 1996; Halvorson, **FLORIDA TODAY**, April 25, 1996.]

April 25:

STS-77: ENDEAVOUR UPDATE

The terminal countdown demonstration test for Endeavour's May 16 STS-77 mission has been completed along with calibration of the inertial measurement units. Today, workers at Launch Complex 39B will conduct the Spacehab/Spartan payload interface verification test, Spacehab flight crew equipment stowage and Orbiter avionics bay closeouts. In addition, the potable water system will be flushed and foam insulation will be applied to the solid rocket booster aft skirts. Solid rocket booster thermal curtains will be installed as well. Scheduled STS-77 work: external tank/solid rocket booster closeouts; potable water system sampling; flash evaporator system testing and loading of storable hypergolic propellants.

Inside OPF Bay 2, establishing electrical connections between Columbia and the Life and Microgravity Spacelab in the vehicle's payload bay continues. The tunnel adapter will be installed on Friday (May 3). The interface verification test (IVT) is planned for April 29-30. Radiator coolant system servicing is in work. Orbiter avionics system testing and associated mid-body closeouts continue. In the Vehicle Assembly Building, stacking of the right forward booster segment is in process today. Mating of the external tank to the solid rocket boosters is scheduled for April 30. Meanwhile, in OPF Bay 1, the functional test of Atlantis' forward reaction control system continues today. Removal of the heat shields from around the three main engines is complete in preparation for engine removal operations which will begin tonight or tomorrow. Window No. 6 is being removed and replaced. The payload bay is being deconfigured; yesterday the Orbiter's wheels and tires were removed. [**KSC Space Shuttle Status Report**, April 25, 1996; **KSC Space Shuttle Status Report**, April 26, 1996.]

April 26: **ASIAN/PACIFIC ISLANDER MONTH**

The month of May has traditionally been observed as Asian and Pacific Islander American Heritage Month. The theme of this year's observance is "Asian Pacific Americans -- One Vision, One Mission, One Voice." The theme reflects overall awareness and pride in the contributions of Asian and Pacific Islander Americans in the Federal workforce, and reflects on the need for all cultures here at the John F. Kennedy Space Center to work together as partners to achieve the common goal of mission success....[Announcement, Honeycutt, April 26, 1996.]

CONGRESS HALTS NASA JOB CUTS

NASA has been instructed by the U.S. Congress to halt its recently announced plan to lay off nearly 800 workers at its headquarters in Washington, D.C. "The conferees are concerned by NASA's unexpected recent announcement regarding additional and accelerated personnel reductions. Such substantial staffing reductions may jeopardize NASA's ability to manage adequately programs of continuing priority to Congress and the nation," said an order which accompanied the 1996 budget bill. President Clinton finally signed a budget bill for the fiscal year which is half over. [Wheeler, **FLORIDA TODAY**, April 27, 1996; Holton, **THE ORLANDO SENTINEL**, p. A-1+, April 28, 1996.]

April 29: **PARRISH HONORED BY GEORGIA TECH**

Alan J. Parrish, a native of Adel, GA, and resident of Merritt Island, FL, will be inducted into the Georgia Institute of Technology's Academy of Distinguished Engineering Alumni on May 2 in Atlanta. Recognition by Georgia Tech is reserved for engineers who are widely respected, have attained professional and personal success, and are actively involved in engineering or management. Appointed as the associate director at NASA's John F. Kennedy Space Center on February 4, 1994, he is responsible for providing a centralized management advisory service to the center director, the deputy director, and all levels of Center management. In addition, he is an advisor on organizational matters, and on the development and implementation of management systems which are basic to the effective institutional operations of the Center. He has nearly 30 years of service at the Kennedy Space Center, and is the recipient of several awards including two NASA Exceptional Service Medals and the prestigious NASA Outstanding Leadership Medal. He graduated from Cook High School in Adel in 1952; following four years in the U.S. Navy, he received his bachelor of electrical engineering degree from the Georgia Institute of Technology in 1960. ["Georgia Tech Honors KSC Associate Director," **FLORIDA TODAY**, May 5, 1996; **NASA/KSC Release No: 44-96**, April 29, 1996.]

SPACEHAB IVT COMPLETED

STS-77: The Spacehab interface verification test for Endeavour's May 16 mission has been completed. Today and tomorrow the pad will be closed to non-essential personnel as hypergolic reactants are loaded into the Orbiter's reaction control system storage tanks. Key STS-77 operational milestones: TEAMS payload interface verification test [May 1]; Spartan payload interface verification test [May 1]; closing of payload bay doors for flight [May 3]; launch readiness review [May 3]; commencement of Orbiter aft engine compartment closeouts [May 6] and the flight readiness review for STS-77 [May 7].

STS-78: The Life and Microgravity Spacelab was installed into Columbia's payload bay last week. Electrical and mechanical mates are complete. The payload interface verification test is scheduled to begin today. The tunnel adapter is scheduled for installation April 30; final aerosurface checks and the mission's flight readiness test are planned for May 3 and rollover to the Vehicle Assembly Building is set for May 23.

STS-79: Main engines have been removed from Atlantis and testing of the Orbiter's main propulsion system continues this week. Also, a leak check of the number 3 hydraulic pump is planned for later today. The main engines for the STS-79 mission are targeted for installation May 20. [**Kennedy Space Center Space Shuttle Status Report**, April 29, 1996.]

April 30:

HOLLOWAY RESIGNS NASA POST

Harry C. Holloway, M.D., NASA's Associate Administrator for the Office of Life and Microgravity Sciences and Applications, has completed his temporary assignment at NASA and will return to the School of Medicine at the Uniformed Services University of the Health Sciences (Bethesda, MD). "Harry brought great leadership to this office," said NASA Administrator Daniel S. Goldin. "His commitment to conducting only peer reviewed science in space has reinforced NASA's reputation as a world leader in life and microgravity sciences." Holloway will leave April 30, 1996. A replacement has not been selected. Holloway had the distinction of being the first associate administrator for the Office of Life and Microgravity Sciences and Applications after the office was established by Goldin on March 8, 1993.

Holloway's accomplishments during his tenure included the establishment of programs which emphasized conducting experimental sciences on orbit and the development of technologies to support those programs. Holloway oversaw completion of an integrated strategic plan for the Human Exploration and Development of Space. During Holloway's tenure, the office also developed the plan for the scientific integration of the International Space Station and the outfitting of its science facilities to support utilization. The office initiated the integrated science and utilization plan for the Shuttle-Mir program, established an international reputation for integrity in the

selection and support of science for all office programs, and promoted an expanded cooperative relationship between NASA and the National Institutes of Health. Ten cooperative agreements were signed with the National Institutes of Health during Holloway's three-year tenure. [**NASA Press Release No: 96-80**, April 30, 1996.]

PAD CLOSED: HYPERGOLIC LOADING

STS-77: Pad 39B will remain closed today to non-essential workers as hypergolic reactants continue to be loaded into Endeavour's reaction control system storage tanks. The oxidizer loading is complete and fuel loading is now underway. Once the pad is opened to normal work tonight, operations will begin to complete the payload interface verification tests.

STS-78: The tunnel adapter for Columbia's Life and Microgravity Spacelab payload will be installed today as the payload interface verification test continues. Solid rocket booster stacking operations in the VAB are complete and the external tank will be mated with the boosters later this week. Final aerosurface checks and flight readiness testing are scheduled for May 3. Rollover to the VAB remains targeted for May 23.

STS-79: Testing of Atlantis' main propulsion system continues this week. A functional check of the orbital maneuvering system pods is scheduled for mid-week. Window no. 6 will be replaced today and the main engines are scheduled for installation May 20. [**Kennedy Space Center Space Shuttle Status Report**, April 30, 1996.]

MAY

May 1: **STS-77: IVT UNDERWAY**

STS-77: Launch Complex 39B is open today following hypergolic reactant loading into Endeavour's reaction control system storage tanks. Operations are now underway to complete the payload interface verification tests. Milestones for STS-77: TEAMS payload interface verification test; Spartan payload interface verification test; closure of payload bay doors for flight; launch readiness review; ordnance installation and hypergolic pressurization and commencement of launch countdown on May 13.

STS-78: The tunnel adapter was installed yesterday and the payload interface verification test is complete and good. The external tank will be mated with the boosters later this week in the Vehicle Assembly Building. Final aerosurface checks and flight readiness testing will occur May 3; rollover from the OPF to the VAB is scheduled for May 23.

STS-79: Testing of Atlantis' main propulsion system continues this week. A functional check of the orbital maneuvering system pods is scheduled for tomorrow. Checks of the Ku-band system are underway today. Main engines will be installed May 20.

This morning at 12:31, a Lockheed Martin Atlas rocket was launched from Cape Canaveral Air Station. The vehicle released an astronomy satellite into orbit and alls systems have appeared to be performing nominally. The satellite, called SAX, was built in Italy and i designed to study stars, supernovas and other celestial bodies. "We are very happy because (the astronomy satellite) is so complicated," commented Italian Space Agency Program Manager Roberto Ibba. ["Atlas Rocket Blasts From Pad," **FLORIDA TODAY**, p. 1A, May 1, 1996; "SAX Satellite to Study Stars," **FLORIDA TODAY**, p. 1A, May 1, 1996; **KSC Space Shuttle Status Reports**, May 1, 1996.]

KSC EMPLOYEES NAMED ASTRONAUT CANDIDATES

Two NASA/Kennedy Space Center employees have been named astronaut candidates, making a total of three candidates chosen from KSC in the past 16 months. Fernando "Frank" Caldeiro, a lead engineer in the systems assurance office, and Joan Higginbotham, a lead Orbiter project engineer, received the news April 29 in phone calls from the astronaut office at NASA's Johnson Space Center [Houston, TX]. "It is gratifying to see employees who work so diligently and successfully toward the processing and launch of the Shuttle fleet here at KSC be given the opportunity to fly," said KSC Director Jay F. Honeycutt. "Their extensive knowledge of Orbiter systems should contribute to the success of any future missions they are part of."

Caldeiro said the fact that he so thoroughly enjoys his work at KSC probably contributed to his selection. And the fact that he has always been interested in flight. His first job after receiving a mechanical engineering degree from the University of Arizona was with Rockwell International as a test engineer for the B1B bomber [Palmdale, CA]. Shortly afterward he was promoted to test director. After the 100th bomber was delivered in 1988, he was transferred to KSC as a systems specialist with Shuttle main propulsion systems. In 1991 he was hired by NASA and began working in the KSC systems assurance office. Although Caldeiro had dreamed of becoming an astronaut, he was initially a bit daunted by the educational requirements. However, after completing his master's degree at the University of Central Florida he was encouraged by Safety and Mission Assurance Director JoAnn Morgan and coworkers to apply for the astronaut corps. "I think I used up a lot of my lifetime supply of luck," he said. In his spare time Caldeiro and his wife Donna enjoy traveling in the two-seat composite airplane he built himself.

Joan Higginbotham began working for NASA in 1987 as a payload electrical engineer. Within six months she became the lead for Orbiter experiments on the Space Shuttle Columbia. Later she worked on the Shuttle payload bay reconfiguration for all Shuttle missions. "Although I felt more relaxed during the interview this time, I actually felt more confident about my chances the first time," said Higginbotham, who also interviewed for the astronaut corps in 1994. In August, she will add a master's degree in space systems to her bachelor's degree in electrical engineering and her master's in management. Higginbotham was recently promoted to the lead Orbiter project engineer position for the Shuttle Columbia after two years as an Orbiter project engineer for the Shuttle Atlantis. She holds the technical lead government engineering position in the firing room where she supports and manages the integration of vehicle testing and troubleshooting. She has also led several special assignments, including serving as executive staff assistant to the center director and working on an interactive display at Spaceport USA showing detailed Shuttle processing procedures.

In her desire to "give back" to the community, Higginbotham engages in numerous public speaking engagements, conducts tours on behalf of NASA and tutors at a local elementary school. She has received a NASA Exceptional Service Medal and the Outstanding Woman of the Year Award. She also enjoys bicycling and weight training and has received the President's Sports Award in both areas. Higginbotham and Caldeiro are expected to report to work in Houston in August. Kay Hire, formerly an engineer with Lockheed Space Operations Company, became the first KSC employee to be named a candidate when she was selected in December 1994. **[NASA/KSC News Releases: 52-96**, May 1, 1996.]

CO^2 EXPERIMENTS AT KSC

Researchers from the Smithsonian Institution hope their experiment in a local scrub oak community at the Kennedy Space Center will help them determine the effects of

increased Carbon Dioxide (CO_2) on natural vegetation. Experts forecast a doubling of the CO_2 in the Earth's atmosphere during the next century. The research team plans to simulate that increase to find out how natural ecosystems and vegetation will respond. The Smithsonian, NASA, and the Department of Energy (DOE) are cooperating to find answers to these questions. The Smithsonian will lead the investigation with on-site assistance from KSC's life science organization. The Department of Energy provided $1.3 million for the three-year project through a grant to the Smithsonian. One year has been spent preparing the site.

At first glance, the experiment site looks like a nature trail with a boardwalk that branches out to several small greenhouses. It's actually a pristine scrub community located a half mile north of KSC's Launch Complex 39. The 4-acre site is dotted with 16 open-top chambers that house the Florida scrub vegetation being studied. The chambers, constructed of PVC and covered by a clear film of polyester, are about 12 feet tall and 12 feet in diameter. They have been carefully placed over a new growth of scrub that is springing back after a planned burn of the area. Twice the normal amount of CO_2 will be blown into half of the chambers, through an electrically powered duct system. Underground cameras will monitor root growth and researchers will watch soil nutrition, the growth and physiology of the plants, and the carbon and water exchange over the next two years. Results from the eight ambient or natural chambers will be compared to those of the chambers with elevated CO_2. According to Dr. Bert Drake, the Smithsonian's principal investigator on this project, part of the experiment's focus is to determine if an increase in CO_2 will help vegetation grow in nutrient poor areas. "KSC's nutrient deficient soil is an excellent sample for this experiment," said Drake. "KSC's scrub community also provides a small, woody vegetation that fits into our chambers, but has the attributes of much larger forests. This gives us the control we need and allows a broad application of the results," explained Drake.

"The study may also show that some vegetation types are more amenable to extra CO_2 and that those will flourish and develop a competitive advantage over others," said Dr. Ross Hinkle, Biological Programs Manager for Dynamac, KSC's life sciences contractor. NASA's Biological Programs organization views the project as an opportunity to share data and expertise. "The data gathered from this study will significantly augment our knowledge base and help KSC with our environmental studies and efforts. Additionally, they are applying information we have gathered locally on a much more global scale," said Dr. Bill Knott, chief scientist, Biological Programs. Seven other co-investigators from academic and international organizations are cooperating in this investigation. The University of South Florida, Desert Research Institute, and Duke University will contribute to the study. In addition, researchers from Australia, England, the Netherlands and South Africa are supporting the study. [**NASA/KSC News Releases No. 24-96**, May 1, 1996.]

May 2: **PAYLOAD INTERFACE TESTS**

Operations continue to complete the STS-77 payload interface verification tests. The payload bay doors are scheduled to be closed for flight tomorrow. Aft engine compartment closeouts begin Monday. Milestones: Spartan payload interface verification test; closure of payload bay doors for flight; launch readiness review; commencement of Orbiter aft engine compartment closeouts; flight readiness review; ordnance installation and hypergolic pressurization; commencement of launch countdown.

STS-78: The tunnel adapter and crew module for Columbia's STS-78 mission were successfully checked for leaks yesterday. Hydraulic testing of the Orbiter's aerosurfaces will begin on Friday. The external tank will be mated with the boosters on Friday in the Vehicle Assembly Building. Milestones: mating of external tank with solid rocket boosters; final aerosurface checks and flight readiness test and rollover of the Orbiter to the Vehicle Assembly Building.

STS-79: Testing of Atlantis' main propulsion system continues this week along with a functional check of the orbital maneuvering system pods. Milestones: orbital maneuvering system functional checks and installation of the Space Shuttle main engines on May 20. [**KSC Space Shuttle Status Reports**, May 2, 1996.]

OBITUARY: CHARLES F. HENSCHEL, 61

Retired NASA Test Supervisor Charles F. Henschel, died today at his home; he was 61. His work in the space program initially was at Cape Canaveral Air Station followed by employment at Kennedy Space Center as a lead test supervisor for the first Saturn V launch from LC 39. He worked as a launch vehicle test conductor for the Apollo Program, test supervisor for the Saturn V Program and as a NASA Test Director for the Space Shuttle Program. He also served as Technical Assistant to the Chief of the Shuttle Processing Division. Henschel retired from KSC in 1994. He is survived by his wife, two sons, his mother and a sister. [Simpson, **FLORIDA TODAY**, May 4, 1996.]

May 3: **SPACE SHUTTLE UPDATES**

STS-77: The KSC Launch Readiness Review for STS-77 was held in the Mission Briefing Room this morning. There were no issues and concerns which have not already been addressed and are closed. KSC will continue to target May 16 as the launch date until the agency's Flight Readiness Review is held next week on Tuesday. Since all prelaunch activities are on schedule at this time, no work at the pad is planned for the weekend. Solid rocket booster aft skirt foam insulation has been applied; pad crews have replenished hydrogen and liquid oxygen storage tanks and the interface verification test for Spartan has been completed. Today, technicians at LC

39B are completing the TEAMS interface verification test, payload closeouts, closure of payload bay doors for flight, external tank/solid rocket booster closeouts and the KSC launch readiness review. STS-77 work scheduled for the week of May 10: ordnance work, flight readiness review, installation and checkout of the contingency EVA spacesuits, Orbiter aft main engine compartment closeouts, loading of the Orbiter mass memory units with launch and mission software and commencement of the launch countdown preparations in Firing Room 1.

STS-78: Columbia's hydraulic systems are being tested. The TACAN navigational system used during landing is also undergoing testing today. The Spacelab access tunnel will be installed on Saturday. In the Vehicle Assembly Building, the mission's external tank is being mated to the solid rocket boosters.

STS-79: Atlantis' orbital maneuvering system pod functional test and the auxiliary power unit leak and functional check are underway. The water spray boilers are also being tested. The Global Positioning System modification continues. Tile waterproofing work is scheduled for this weekend. [**KSC Space Shuttle Status Report**, May 3, 1996.]

BERNSON TO STAR IN LOCALLY PRODUCED SERIES

Former "L A Law" star Corbin Bernson is coming to Brevard County to star in a new TV movie and series called "The Cape." The series will be filmed in and around Merritt Island, Florida. Bernson is slated to play Shuttle commander and NASA veteran Barry "Bull" Eckert in the ensemble cast which will portray the personal and public lives of astronauts and astronaut candidates. The show will commence on local channel 18 in September. ["Bernson Is On His Way to 'The Cape'," **THE ORLANDO SENTINEL**, May 3, 1996.]

DELTA LAUNCH DELAYED, AGAIN

A previously delayed Delta launch may be further delayed by the expected launch of STS-77 on May 16. The McDonnell Douglas launch vehicle was supposed to have lifted off May 1, but additional tests were required. These delayed the launch till the week of May 20. McDonnell Douglas spokeswoman Christine Nelson said, "It's hard to say what would be the earliest [launch date] at this point." The Delta's payload is a Galaxy IX built by Hughes Space and Communications Inc. (El Segundo, CA). [Suriano, **FLORIDA TODAY**, May 4, 1996.]

May 5:

ENDEAVOUR LAUNCH DELAY POSSIBLE

The launch of Endeavour's STS-77 mission may slip three days because of an already scheduled British missile firing. KSC spokesman George H. Diller said, "We're still trying to keep the launch on the 16th open, at least until our flight readiness review

Tuesday [May 7]." Diller added that the next likely opportunity for launch would be May 19; with such a three-day slip, the landing target date would move from May 26 to May 29. In the meantime, senior NASA managers at KSC have told employees to press ahead for a May 16 launch date. [Halvorson, **FLORIDA TODAY**, May 6, 1996.]

May 7: **STS-77 RESCHEDULED TO MAY 19TH**

At the conclusion of a flight readiness review meeting today, NASA Managers set May 19, 1996, as the official launch readiness date for the agency's next Space Shuttle mission, designated STS-77 [see earlier story]. The original target date of May 16 was not available on the Eastern Range schedule. NASA's fourth Shuttle mission of 1996 will involve Shuttle Endeavour and a six-person crew performing microgravity research aboard the commercially owned and operated SPACEHAB Module. The crew also will deploy and retrieve a research satellite and perform rendezvous operations with a test satellite.

Launch of Endeavour on May 19 is scheduled for 6:30 a.m. EDT at the opening of a 2 1/2 hour available launch window. The STS-77 mission is forecast to last just over 10 days. Mission Control in Houston will be closely monitoring power consumption and cryogenic fuel reserves associated with the Shuttle's power system during the flight. Mission Managers will have an option of shortening the mission one day if necessary. An on-time launch and nominal mission duration would result in a landing on May 29 a little after 7:00 a.m. EDT at Kennedy Space Center's Shuttle Landing Facility [SLF].

The STS-77 crew is commanded by John H. Casper, making his fourth Shuttle flight. The pilot for the mission, Curtis L. Brown, Jr., is making his third flight. There are four mission specialists assigned to the flight. Andrew S. W. Thomas, serving as Mission Specialist-1, is making his first flight. Mission Specialist-2 is Daniel W. Bursch who is making his third flight. Mario Runco, Jr., serving as Mission Specialist-3, also is making his third flight. Mission Specialist-4 is Canadian astronaut Marc Garneau, who is flying in space for the second time. STS-77 will be the 11th flight of Endeavour and the 77th mission flown since the start of the Space Shuttle Program in 1981. [Suriano, **FLORIDA TODAY**, May 7, 1996; Suriano, **FLORIDA TODAY**, p. 3A, May 8, 1996; Borenstein, **THE ORLANDO SENTINEL**, May 8, 1996; **Kennedy Space Center Space Shuttle Status Report**, May 7, 1996; **NASA/KSC News Releases: N96-31**, May 7, 1996.]

May 8: **STS-77: PAD PREPARATIONS CONTINUE**

Today at Launch Complex 39B, work continues to closeout the aft engine compartment and a functional check of the contingency spacesuits will be performed. Part 2 of the ordnance operations and pressurization of hypergolic reactants will take place May 14. Launch countdown will commence May 16 at 4:00 a.m.; the crew is

expected to arrive at KSC by 9:00 a.m. Meanwhile, in Orbiter Processing Facility Bay 2, technicians preparing Columbia for its STS-78 mission have completed the installation of the Spacelab transfer tunnel. Aft engine compartment closeouts are underway this week as are final inspections of the main engine nozzles. The tunnel's verification test will occur May 16 and the payload bay doors will be closed the next day. Columbia will be rolled over to the VAB on May 23.

Installation of fuel cell no. 2 continues today as Atlantis is prepared for its STS-79 mission, now targeted for July 31. Also continuing are functional checks of the vehicle's orbital maneuvering system pods, leak checks and functional tests on the auxiliary power units. Managers are re-evaluating the scheduled events over the next several weeks. Main engine installation may be delayed in order to provide better times to remove and replace three reaction control system thrusters. The long term schedule will not be impacted. In the Vehicle Assembly Building, stacking of the left-hand solid rocket booster continues; main engine installation is set for May 20. [**Kennedy Space Center Space Shuttle Status Reports**, May 8, 1996.]

May 9: **STS-77: AFT ENGINE COMPARTMENT CLOSEOUT**

STS-77: Efforts continue to close-out the aft engine compartment with the aft doors scheduled for installation tomorrow. A functional check of the contingency spacesuits was conducted yesterday. Suit no. 1 passed the test, however, the second suit developed a problem and had to be removed from the Orbiter. A replacement suit is scheduled to arrive from Johnson Space Center early next week. No spacewalk is scheduled for this mission. However, spacesuits are flown on each mission for use during possible contingency situations. Part 2 of the mission's ordnance operations will be conducted May 14 along with pressurization of the hypergolic reactants. Countdown for the mission commences May 16 at 4:00 a.m.; the crew arrives at 9:00 a.m.

STS-78: The interface verification test on the Spacelab transfer tunnel in Columbia is in work today in OPF Bay 2. Aft engine compartment closeouts continue this week. Final inspections of the main engine nozzles are complete and good. The crew for STS-78 will arrive at Kennedy Space Center tonight for the crew equipment interface test tomorrow. Final payload bay closure of Columbia is scheduled for May 17 with rollover to the VAB set for May 23.

STS-79: The mechanical installation of fuel cell no. 2 into Atlantis is complete in OPF Bay 1. Electrical mates will be performed today followed by a functional test tomorrow. Also, functional checks of the orbital maneuvering system pods and the auxiliary power units continue today. Managers will continue to re-evaluate the scheduled events over the next several weeks. Main engine installation may be delayed in order to provide better times to remove and replace three reaction control system thrusters. The long-term schedule will not be impacted. In the Vehicle

Assembly Building, stacking of the left-hand solid rocket booster continues. Currently, main engine installation is set for May 20. [**KSC Space Shuttle Status Report**, May 9, 1996.]

May 12: **ENDEAVOUR'S SUNDAY LAUNCH A GO**

"Everything is in good shape;we're right on schedule," said Kennedy Space Center spokesman Bruce Buckingham today. Final preparations for the launch are underway at the space center. STS-77 will be quite a busy mission, featuring as it does the deployment of the Spartan satellite and a dozen experiments inside the Spacehab commercial laboratory module. "This mission demonstrates the tremendous versatility of the Space Shuttle vehicle in that we're able to combine a great many different kinds of experiments into one mission," said Mission Commander John H. Casper. Retired astronaut Dr. Bernard Harris be online for Florida Online May 15 to discuss the upcoming STS-77 flight. Harris has joined the company which built and maintains Spacehab. Endeavour's May 19 launch will be followed by Columbia's STS-78 mission of 16 days; then about August 1, Atlantis will make its fourth mission to the Russian Mir Space Station. One of the objectives of this docking mission will be to give American astronaut Shannon W. Lucid a ride home. ["Astronaut Doctor to Join Cyberchat," **FLORIDA TODAY**, May 12, 1996; Suriano, **FLORIDA TODAY**, May 13, 1996.]

FORCE & HOLLOWAY RESIGN

Charles Force , head of NASA's Space Communications Office, and NASA Science Chief Harry Holloway have resigned their positions with NASA. Force will pursue opportunities in business and Holloway will return to the school of medicine at the Uniformed Services University of Health Sciences in Bethesda, Maryland. Meanwhile, NASA has announced that four doctors have been chosen to train for the Neurolab mission which is to occur in 1998. The doctors are training as payload specialists and are: Jay Buckey, 39; Alexander Dunlap, 35; Chiaki Mukai, 43; and James Pawelczyk, an assistant professor of applied physiology at Penn State University. The Shuttle mission is "dedicated to studying the effects of weightlessness on the human nervous system. Only two of the six will be chosen for the flight and these will be announced about a year before the 1998 launch. ["Space Communications Chief for NASA Resigns," **FLORIDA TODAY**, May 12, 1996; "Space Science Boss Holloway Resigns," **FLORIDA TODAY**, May 12, 1996; "Trainees Picked for Neurolab Mission," **FLORIDA TODAY**, May 12, 1996.]

SATURN V MOVED FROM VAB SITE

The first stage of KSC's last remaining Saturn V has been moved from its place in front of the Vehicle Assembly Building to the site of a new KSC tourist attraction now under construction. The first stage - also called the thunder stage - was the final piece

of the huge launch vehicle to be moved to its new location, the Apollo/Saturn V Center. "We want to preserve the major artifacts of the Apollo Program so the generations who didn't get to see it firsthand have some way of experiencing the major event of this century," said Jim Ball, Branch Chief at the KSC Visitor's Center. Rick Abramson, President of the Spaceport's concessionaire, Delaware North Park Services of Spaceport Inc., said: "There's no other facility like this in the world. This is going to be quite a draw. You can say it's going to be big, it's going to be something else, but until you see it, you can't appreciate how big it actually is." [Halvorson, **FLORIDA TODAY**, April 24, 1996; Suriano, **FLORIDA TODAY**, p. 1A, May 12, 1996.]

May 16: **STS-77: COUNTDOWN COMMENCES**

The countdown for launch of Endeavour [OV-105] began on time at 4:00 a.m. today at the T-43 hour mark. No technical issues are being discussed by the management team at this time. Also, the six-member crew arrived at Kennedy Space Center's Shuttle Landing Facility this morning at approximately 9:10. Preparations are currently underway to ready the Orbiter for loading the power reactant storage and distribution system tanks with cryogenic reactants early tomorrow morning. Final stowage of experiments into the Spacehab module remains on schedule to begin at about 2:00 p.m. Friday. Weather forecasters are currently indicating only a 20 percent chance of weather violating launch constraints on Sunday morning at 6:30. Aft engine compartment closeouts have been completed and the Orbiter's contingency spacesuits have been checked out. Today, workers at Launch Complex 39B will conduct final vehicle closeouts for launch, complete stowage of flight crew equipment, start preparations for servicing fuel cell storage tanks and review flight software stored in the vehicle's mass memory units. The STS-77 crew includes Commander John H. Casper, Pilot Curtis L. Brown, Jr., and Mission Specialists Andrew S. W. Thomas, Daniel W. Bursch, Mario Runco, Jr. and Marc Garneau. [**Kennedy Space Center Space Shuttle Status Report**, May 16, 1996.]

May 17: **STS-77: L-2 DAYS**

The countdown for launch of Endeavour continues on schedule today for liftoff on Sunday [May 19]; the 2 1/2-hour window opens at 6:30 a.m.EST. This morning, Pad 39B was cleared to load the onboard cryogenic tanks with liquid hydrogen and liquid oxygen reactants. Reactant loading was completed at about 7:00 a.m. The reactants provide electricity for the Orbiter and crew while in space and drinking water as a by-product for the 10-day mission. Operations are currently in work to demate the Orbiter's mid-body umbilical unit and retract it into the Fixed Service Structure. Mid-deck closeout operations are underway and final Spacehab stowage operations will begin at about 2 p.m. and continue through the rest of the day. Final vehicle and facility closeouts have also resumed.

Tomorrow, preparations will be made to retract the Rotating Service Structure to launch position at about 12:00 p.m. Loading of the external tank with cryogenic propellants is scheduled to begin at about 9:40 p.m. Saturday. Air Force weather forecasters are currently indicating a 10 percent probability of weather prohibiting launch on Sunday. The only concern is for the slight possibility of showers in the vicinity of KSC. During Sunday's launch window, the winds at Pad B are expected to be from the east-southeast at 8 knots; temperature 74 degrees F; visibility 7 miles; humidity 82 percent; and clouds scattered at 3,500 feet. The 24-hour-delay weather forecast reveals similar conditions. [**Kennedy Space Center Space Shuttle Status Report**, May 17, 1996.]

May 18: **STS-77: COUNTDOWN UPDATE**

The countdown for the launch of Space Shuttle Endeavour on STS-77 continues on schedule this afternoon. Activities to stow the time-critical experiment samples into the Spacehab module went well overnight and work to stow the mid-deck experiments was finished late this morning. Activation of the Orbiter's communications systems is now complete. The retraction of the gantry-like rotating service structure which provides the Space Shuttle's primary access and weather protection began at 11:48 a.m. and was fully retracted at 12:20 p.m. Other activities scheduled for today include filling the pad's sound suppression system water tank, activation and calibration of the Orbiter's inertial measurement units on the flight deck, setting the switches in the cockpit for launch, activating the Orbiter's fuel cells and stowing the astronaut's personal effects onboard.

Fueling of the Space Shuttle's external tank with liquid hydrogen and liquid oxygen is scheduled to begin at 9:40 p.m. The fueling activities take about three hours to complete. The astronauts toured the launch pad this morning and the commander and pilot flew the Shuttle Training Aircraft. They will go to bed in the crew quarters at 4:30 p.m. and be awakened at 1:30 a.m. Breakfast is scheduled at 2 a.m. and after a weather briefing and donning of their launch and entry suits they will depart for Pad 39B at 3:10 a.m. They will begin boarding Endeavour at 3:40 a.m. and the crew hatch will be closed and sealed at 5 a.m. There remains only a 10 percent chance of not meeting the launch weather criteria due to the slight chance of some isolated morning showers over the Atlantic Ocean moving onshore. [Halvorson, **FLORIDA TODAY**, p. 1A, May 18, 1996; **STS-77 Space Shuttle Status Report**, May 18, 1996.]

May 19: **STS-77: ON-TIME LAUNCH**

Endeavour lifted off on its STS-77 mission this morning at 6:32 a.m., barely a second off its scheduled launch time. Astronaut Bill McArthur radioed the crew: "That was a beautiful way to start the day." That elicited Commander John H. Casper's response, "Well, it sure was from where we sat, too. Kind of woke us up." For the first time, a Space shuttle was launched with three "Block One" main engines, upgraded models

built as part of a $1 billion program to make the engines tougher and safer to fly. "They worked perfect; we were really pleased," said Patrick Louden, spokesman for United Technologies Pratt & Whitney, which built the engines. A water spray boiler failed on liftoff to cool lube oil in one of the Shuttle's three auxiliary power units. A water line within the unit apparently clogged with ice, according to former Shuttle astronaut Loren Shriver. "I'm assuming," he said, "that we'll just charge right through with our 10-day mission." Landing is scheduled for 7:07 a.m., May 29 at the Shuttle Landing Facility at Kennedy Space Center. [Halvorson, **FLORIDA TODAY**, pp. 1A & 4A, May 20, 1996; Borenstein, **THE ORLANDO SENTINEL**, pp. A-1 & A-6, .]

May 20: **STS-77: ON ORBIT UPDATE**

Endeavour is scheduled to remain in orbit for 10 days and land back at Kennedy Space Center on May 29 at about 7:07 a.m. The solid rocket boosters have been returned to Hangar AE for post-flight inspections, scheduled to begin tomorrow. The six-member crew of STS-77 includes: Commander John H. Casper, Pilot Curtis L. Brown, Jr., and Mission Specialists: Andrew S. W. Thomas, Daniel W. Bursch, Mario Runco, Jr., and Marc Garneau. Meanwhile, Columbia is being prepared in OPF Bay 2 for rollover to the Vehicle Assembly Building tomorrow. Rollover has been accelerated by several hours due to concerns for poor weather at Kennedy Space Center tomorrow morning. Once in the VAB, Columbia will be mated to the external tank and twin solid rocket boosters. Rollout to Launch Complex 39B is set for 2:00 a.m. May 30. In OPF Bay 1, Atlantis is being prepared for its next Mir Docking Mission, STS-79. Landing gear functional checks are complete and preparations are underway to remove and replace six thrusters on the Orbiter's reaction control system. The bay will be closed for thruster removal on Wednesday. In the VAB, stacking of the solid rocket boosters for the mission continues. [**Kennedy Space Center Space Shuttle Status Report**, May 20, 1996 **Kennedy Space Center Space Shuttle Status Report**, May 21, 1996.]

May 21: **GOLDIN: SPACE PROGRAM NEEDS BUDGET STABILITY**

"There is no agreement between House and Senate, Republicans and Democrats, administration and Congress on what the seven-year deficit reduction package is going to b," NASA Administrator Daniel S. Goldin told the Washington Space Business Roundtable this week. "Until that happens [budget agreement], any discussions about out-year budgets is going to be theoretical." He continued, "We expect to get $13.8 billion. While everybody is worried about what they out years are going to be, NASA needs stability in fiscal 1997. If that budget gets cut it is going to impact us and we're going to start doing dumb things." [Wheeler, **FLORIDA TODAY**, May 22, 1996.]

May 23: **COLUMBIA MATED WITH ET**

In the Vehicle Assembly Building, the Space Shuttle Columbia has been mated with

its STS-78 external tank. Tomorrow, the Shuttle's interface verification test will begin. Rollout to LC 39B has been accelerated by 24 hours and is now planned to commence at 2:00 a.m., May 29. In OPF Bay 1, Atlantis is undergoing operations to remove and replace six thrusters on the vehicle's reaction control system; the OPF will be cleared of nonessential personnel for the remainder of the week. Stacking of the STS-79 boosters continues in the VAB. [**Kennedy Space Center Space Shuttle Status Report**, May 23, 1996; **Kennedy Space Center Space Shuttle Status Report**, May 24, 1996.]

0 **DELTA 2 LAUNCHES TV SATELLITE**

A $150 million Galaxy IX television satellite was launched tonight at 9:10 p.m. from Cape Canaveral Air Station. The Hughes Communications Inc. satellite will provide television signals to homes all over the United States and parts of the Caribbean and will be one of four such satellites providing coverage for the U.S. "The Delta has been very reliable; we've launched a lot of spacecraft on them," said Jerry Farrell, President of Hughes Communications, Inc. [Long Beach, CA]. [Suriano, **FLORIDA TODAY**, May 24, 1996.]

May 28: **STS-78: IVT UNDERWAY**

Columbia's interface verification test is underway in the Vehicle Assembly Building and will continue through tomorrow. Due to adverse weather forecast for KSC May 30, rollout to Launch Complex 39B has been accelerated by several hours; it is now scheduled to begin at 11:00 p.m., Wednesday, May 29. Columbia is expected to be hard-down on the pad at about 5:30 a.m. Thursday. Once at the pad, the Rotating Service Structure will be moved around the vehicle; it should be in place by 8:30 a.m. The STS-78 terminal countdown demonstration test is set for June 4-5. In OPF Bay 1, operations to remove and replace six thrusters on Atlantis' reaction control system have been completed. Additional closed-bay work is expected to be conducted off and on through most of this week; main engines will be installed beginning May 31. [**Kennedy Space Center Space Shuttle Status Report**, May 28, 1996.]

May 29: **ENDEAVOUR LANDS TODAY AT 7:09 A.M.**

Endeavour landed today on the first opportunity on runway 33 at the center's Shuttle Landing Facility; the time was 7:09 a.m. Work is underway to destow experiments from the Orbiter's mid-deck and from the Spacehab module located in the Orbiter's payload bay. The vehicle will be towed to OPF Bay 3 beginning at about 4:00 p.m. today. Once in the OPF, post-flight deservicing will commence and preparations made for the scheduled Orbiter Maintenance Down Period (OMDP) to begin in about 60 days. Preliminary post-landing inspections of Endeavour reveal that the tires and brakes are in good condition; initial tile assessments show normal wear. Fog and clouds had worried NASA Mission Managers, but the clouds receded in time for an on-time landing at the space center. "This was a great mission, just a fantastic mission

for all of us," said Mission Commander John H. Casper after landing.

The Shuttle processing/launch schedule continues tomorrow with the rollout of Columbia to Launch Complex 39B. "We think we're all ready to go. Things are proceeding exceptionally well," said Tommy Holloway, Shuttle Program Director. The STS-78 mission of Columbia - planned for 17 days - will set a new Shuttle record and involve its seven-member crew in overseeing a variety of science and medical experiments. [Suriano, **FLORIDA TODAY**, p. 1A, May 30, 1996;"Shuttle Returns After A 10-Day Mission, **NEW YORK TIMES**, p. A-9, May 30, 1996; Borenstein, **THE ORLANDO SENTINEL**, May 29, 1996; **Kennedy Space Center Space Shuttle Status Report**, May 29, 1996.]

May 30: **OVERHAUL WORK MAY MOVE TO KSC**

If NASA gives its approval, the Orbiter modification work which had been performed in California will become part of regular Shuttle fleet maintenance operations here at Kennedy Space Center. The move would save NASA millions of dollars. KSC Director Jay F. Honeycutt said, "We're definitely ready to handle the work if that's the program's decision. Certainly, it would help stabilize the work force." A decision in favor of doing the work in Florida would bring an extra 65 jobs to the space center. U.S. Rep. Dave Weldon [R-Palm Bay, FL] said, "There is no reason we shouldn't be doing that work at KSC. It can be done well, and it can be done for less money at KSC." Florida Space Business Roundtable Chairman John Byron commented: "It is absolutely the right thing to do for the nation's space program and it does help Brevard County." [Halvorson, **FLORIDA TODAY**, pp. 1A-2A, May 30, 1996; Borenstein, **THE ORLANDO SENTINEL**, May 30, 1996.]

ORBITER UPDATES

The Space Shuttle Columbia began moving out of the Vehicle Assembly Building to Launch Complex 39B last night at 11:50 p.m. The Shuttle arrived at the pad about 5 hours later. The Rotating Service Structure has been placed around the vehicle and pad validations are underway. Also, preparations to perform the main engine flight readiness review test are in work. Meanwhile, Atlantis is in Orbiter Processing Facility Bay 1 where operations to remove and replace six thrusters on the Orbiter's reaction control system were conducted last week. Additional closed-bay work is expected to be conducted off and on through most of this week. The Space Shuttle main engines will be installed this weekend.

Following yesterday's successful Kennedy Space Center landing, the 30th in the history of the Shuttle Program, Endeavour was towed to OPF Bay 3 for post-mission servicing. In the OPF, work today includes removing the residual cryogenic reactants from the Orbiter's power reactant storage and distribution system tanks. Tomorrow the payload bay doors will be opened and next week work will begin to remove the

payloads and the Spacehab tunnel adapter. The tunnel adapter will be delivered to OPF Bay 1 and installed into Atlantis. Over the next 60 days, Endeavour will be prepared for its first Orbiter Maintenance Down Period [OMDP] which involves sending the Orbiter to Palmdale, CA, for about eight months of major modifications and structural inspections. Endeavour's next mission will be the first International Space Station assembly Space Shuttle flight, scheduled for launch from KSC in late 1997. [**Kennedy Space Center Space Shuttle Status Report**, May 30, 1996.]

May 31: **STS-78: LAUNCH READINESS REVIEW**

Launch pad validations continue today as does the main engine flight readiness test. The Launch Readiness Review for Columbia's mission is scheduled for June 3. Next week, the crew of mission STS-78 will arrive at Kennedy Space Center for the terminal countdown demonstration test [TCDT], a dress rehearsal for the STS-78 mission which is conducted prior to each mission. The STS-78 crew members are: Commander Terrence T. Henricks, Pilot Kevin R. Kregel; Mission Specialists: Susan J. Helms, Richard M. Linnehan, and Charles E. Brady; and Payload Specialists: Jean-Jacques Favier and Robert Brent Thirsk. Processing work continues in OPF Bay 1 on Atlantis for its scheduled July 31 STS-79 launch. The bay remains closed today for work following the replacement of six thrusters on the Orbiter's reaction control system. The Space Shuttle main engines will be installed this weekend. Endeavour, in OPF Bay 3, is being readied for OMDP work which will take place in California. [**Kennedy Space Center Space Shuttle Status Report**, May 31, 1996.]

SHUTTLE SAFETY REVIEW ORDERED

NASA has asked the Aerospace Safety Advisory Panel [ASAP] to undertake a focused review of the Space Shuttle Program, concentrating on the safety of the Shuttle in light of management changes, planned Shuttle upgrades and flight rates to build and support the International Space Station. The safety review is being conducted at the request of the White House. The ASAP was created by the Congress in 1967 following a command module fire on Apollo 204. The panel will submit their final report through NASA to the White House by the end of November. "We welcome this review," said Stephen S. Oswald, the Office of Space Flight's Deputy Associate Administrator (Shuttle). "Our number one priority in the Shuttle Program is to fly safely, and we welcome the ASAP's experienced and independent viewpoint to make sure we stay focused on that goal."

In directing the NASA Administrator to conduct the review, the President's Science Advisor Dr. John H. Gibbons stated as its goal, "to ensure that our efforts to improve and streamline the Space Shuttle Program do not inadvertently create unacceptable risk." The Shuttle Program has been at the forefront of the Agency's efforts to reshape its management and organizational structure. Changes in the Shuttle Program include plans to consolidate Shuttle operations to a single prime contractor, downsizing the

Shuttle workforce, and reducing the cost of operations and management.

"We've accomplished these changes while successfully maintaining the safety and reliability of the system," said Oswald. "What we want the Safety Panel to do is examine all the things we have done, or plan to do, and make sure we are not overlooking anything that could adversely affect safety." Oswald said NASA also will ask the Safety Panel to examine the planned Shuttle flight rage, and conduct a technical audit of the performance improvements planned for the Shuttle in preparation for constructing and supporting the International Space Station. [Halvorson, **FLORIDA TODAY**, pp. 1A-2A, June 1, 1996; Holton, **THE ORLANDO SENTINEL**, June 1, 1996; **NASA/KSC Press Releases No. 96-111**, May 31, 1996.]

COMMITTEE PASSES NASA BUDGET CUT

NASA's budget for FY 1997 would fall 3 % under a budget plan which has just passed the House Appropriations subcommittee which oversees NASA. The budget for fiscal 1997 would fall from $13.8 billion to $13.4 billion, a drop of some $400 million. The biggest loser in this reduction is NASA's Earth Observing System, a program favored by Vice President Al Gore. The subcommittee chairman, Rep. Jerry Lewis [R-CA] said that the bill would fund NASA at $14 billion, according to a press release on the subject. [Holton, **THE ORLANDO SENTINEL**, May 31, 1996.]

June 1: **NASA EMPLOYEES GET SNOOPYS**

Five of NASA's KSC employees were presented Silver Snoopy Awards by members of the STS-75 crew. The employees were Lawrence T. "Larry" Mauk of NASA Public Affairs; John J. "Tip" Talone, Shuttle Operations; James V. Thompson, Administration Office; Troy G. Turbyville, Installation Operations Directorate and John R. Lorch, Shuttle Operations Directorate. Astronauts making presentations were: Andrew M. Allen, Scott J. "Doe" Horowitz, Franklin R. Chang-Diaz, Jeffrey A. Hoffman and Maurizio Cheli. Lockheed Martin also announced that it has named Bob Granath to replace John Williams as Manager of Public Affairs. Granath is a 1985 winner of the Silver Snoopy Award and has served recently as Vice President of the Joint Industry Press Center. ["KSC Employees Get Silver Snoopy," **FLORIDA TODAY**, June 2, 1996; "Five KSC Employees Get Silver Snoopy, **FLORIDA TODAY**, June 9, 1996.]

June 4: **TSS INVESTIGATION REPORT**

NASA and the Italian Space Agency [ASI] today released the report of the investigative board appointed to determine factors which resulted in the Feb. 25 tether break and loss of the Tethered Satellite during the STS-75 Space Shuttle mission. Findings of the board, included in a 358-page document, identified primary causes which accounted for the tether break during deployment of the Tethered Satellite. "The tether failed as a result of arcing and burning of the tether, leading to a tensile failure after a significant portion of the tether had burned away," the report concludes. The arcing occurred because either external foreign object penetration [but not orbital debris or micrometeoroids]or a defect in the tether caused a breach in the layer of insulation surrounding the tether conductor. The insulation breach provided a path for the current to jump, or arc, from the copper wire in the tether to a nearby electrical ground. The board found that the arcing burned away most of the tether material at that location, leading to separation of the tether from tensile or pulling force. The break occurred when approximately 12.2 miles [19.7 km] of tether was unreeled in a period when the tether was experiencing normal stresses of approximately 15 pound [65 newtons].

In addition to the two primary causes for the tether break, the board cited, as one contributing factor, that "the degree of vulnerability of the tether insulation to damage was not fully appreciated." The board noted that the actual environment that the tether was exposed to in flight made it more vulnerable to damage than was expected. And, it noted that the high voltages under which the system was operating could, over a period of time, have reduced the ability of the tether insulation to withstand electrical breakdown due to contamination found in the tether. "The tether itself was a remarkable engineering achievement," said Ken Szalai, who chaired NASA's

investigative board, "and produced some startling scientific discoveries." Scientific papers recently presented at an American Geophysical Union conference reported that currents generated by the tether were three times higher than theoretical models had predicted prior to the flight. Constructing a tether that was strong, lightweight and electrically conducting took the project into technical and engineering areas where they had never been before," said Szalai. "now, with 20/20 hindsight, they know where the system is vulnerable and can improve the design." [Halvorson, **FLORIDA TODAY**, p. 1A, June 5, 1996; Borenstein, **THE ORLANDO SENTINEL**, June 5, 1996; **NASA/KSC Press Release No. 96-112**, June 4, 1996.]

June 5: **STS-78: TERMINAL COUNTDOWN DEMONSTRATION TEST**

The STS-78 terminal countdown demonstration test was successfully completed today at Launch Complex 39B. The test ended at about 11:30 a.m. with a simulated main engine shut down at the pad. The TCDT is a countdown rehearsal for the STS-78 crew and the KSC launch team and is conducted at the launch site prior to each flight. The STS-78 crew are: Commander Terrence T. Henricks; Pilot Kevin R. Kregel; Mission Specialists Susan J. Helms, Richard M. Linnehan and Charles E. Brady; and Payload Specialists Jean-Jacques Favier [French Space Agency] and Robert Brent Thirsk [Canadian Space Agency]. Tomorrow, mission managers will be at KSC for Flight Readiness Review. This review is held prior to each Space Shuttle launch and is designed to identify any outstanding problems or concerns surrounding the launch and mission of STS-78. Following the review, a firm launch date is expected to be announced; the current target launch date is June 20, at 10:49 a.m. EDT.

In OPF Bay 1, technicians are scheduled to install the tunnel adapter into the payload bay of Atlantis tonight. Tomorrow in the Vehicle Assembly Building, the external tank will be mated to the twin solid rocket boosters. The crew equipment interface test [CEIT] is planned for June 8. Payload bay door closure is targeted for June 19, with rollover to the VAB coming June 24. Meanwhile, Endeavour is in OPF Bay 3 where post-mission servicing is continuing. The Spacehab payload and the tunnel adapter [see above] have been removed. Endeavour, the youngest member of the four-vehicle Shuttle fleet, is being prepared for its first Orbiter Maintenance Down Period [OMDP] which involves sending the Orbiter to Palmdale, CA, for about eight months of major modifications and structural inspections. Delivery to Palmdale will occur during the first week of August. Endeavour's next mission will be the first International Space Station assembly Space Shuttle flight and is scheduled to launch from Kennedy Space Center in late 1997.

Discovery Update: The Space Shuttle Discovery, currently undergoing a series of modifications and thorough inspections in Palmdale, CA, is scheduled to be delivered back to Kennedy Space Center later this month. The vehicle is targeted to be rolled out of the Palmdale facility on June 25, begin its ferry flight on June 26 and arrive back at KSC June 27 or 28. The Orbiter Maintenance Down Period [OMDP] is a

routinely scheduled operation that periodically removes all Orbiters from flight operations. Once Discovery is back at KSC, preparations will begin for its next flight, mission STS-82, the second Hubble Space Telescope servicing mission, currently set for launch in February 1997. [Suriano, **FLORIDA TODAY**, June 6, 1996; **Kennedy Space Center Space Shuttle Status Report**, June 5, 1996.]

ASTRONAUT THORNTON RESIGNS

Veteran Space Shuttle astronaut Kathryn C. Thornton will leave NASA on August 1 to join the faculty of the University of Virginia. Thornton, 43, has logged over 950 hours in space, including more than 21 hours of extravehicular experience. Thornton joins the faculty as a professor in the School of Engineering and Applied Sciences and also will serve as director of the Center for Science Education. "We will certainly miss Kathy's experience and skills," said David C. Leestma, Director of Flight Crew Operations. "We wish her the best in her new career." [**NASA/KSC Press Release No. 96-113**, June 5, 1996. SEE: *http://www.jsc.nasa.gov/Bios/*]

AWARD WINNERS: STAMPLEY, PLOWDEN

Walter J. Stampley has been named one of two recipients of the 1996 Kennedy Space Center Equal Opportunity Award. Stampley, who has worked at the space center since 1969 has previously been awarded two NASA Exceptional Service Medals and is currently Deputy Director of Facilities Engineering and is also Program Manager for Reusable Launch Vehicle Development. John B. Plowden has been awarded the Public Service Medal at Kennedy Space Center. An employee of the space center for the past 27 years, Plowden is responsible for the overall management of Rocketdyne Programs at both KSC and Cape Canaveral Air Station, including Space Shuttle main engine processing and launch operations, Atlas/Delta field engineering support and Space Station operations. Both Stampley and Plowden are residents of Merritt Island, Florida. ["Stampley KSC Winner," **FLORIDA TODAY**, June 5, 1996; "Service Medal Awarded," **FLORIDA TODAY**, June 5, 1996.]

June 6:

STS-78: JUNE 20 LAUNCH DATE

At the conclusion of a flight readiness review meeting today, NASA managers set June 20, 1996, - a Thursday - as the official launch date for the agency's next Space Shuttle mission - designated STS-78. NASA's fifth Shuttle mission of 1996 will involve Shuttle Columbia and a seven-person crew working with the Life and Microgravity Sciences [LMS] payload being carried in the pressurized Spacelab module in the Shuttle's cargo bay. The LMS payload consists of various experiments designed to examine how human beings and other living organisms along with various materials change in a weightless environment.Launch of Columbia on June 20 is scheduled for 10:49 a.m. EDT at the opening of a 2 1/2 hour available launch window. The STS-78 mission duration is currently planned for 15 days, 22 hours, 20 minutes.

However, Mission Control will be carefully managing and monitoring Columbia's electrical power consumption with an eye towards extending the flight one day so additional science work can be performed. An on-time launch and one day mission extension would set Columbia for a landing on July 7 at 8:51 a.m. EDT at the Kennedy Space Center.The STS-78 crew will be commanded by Terrence T. Henricks. The pilot for the mission is Kevin R. Kregel. The three Mission Specialists assigned to the flight are Richard M. Linnehan, Susan J. Helms, who is also the STS-78 Payload Commander, and Charles E. Brady. There are also two Payload Specialists serving as part of the STS-78/LMS crew -- Jean-Jacques Favier from the French Atomic Energy Commission (CEA) and an astronaut of the French Space Agency [CNES], and Robert Brent Thirsk from the Canadian Space Agency [CSA]. STS-78 will be the 20th flight of Columbia and the 78th mission flown since the start of the Space Shuttle Program flights commenced April 12, 1981. [**Kennedy Space Center Space Shuttle Status Report**, June 6, 1996; **NASA/KSC Press Releases No. N96-36**, June 6, 1996.]

June 7: **SHUTTLE FLEET UPDATE**

Mission Managers concluded yesterday's Flight Readiness Review raising no issues or concerns for the launch of Columbia on June 20. At Launch Complex 39B, hypergolic reactants loading onboard the Orbiter continues. Reactant loading began yesterday and will continue through tonight. On Monday, work will begin to close out the aft engine compartment for flight. In OPF Bay 1, the Orbiter docking system [ODS] functional checks continue today. In the Vehicle Assembly Building, the external tank has been mated to the twin solid rocket boosters and closeout operations are in work today. On Saturday, the crew equipment interface test [CEIT] will be conducted by members of the STS-79 crew. They will visit the Orbiter in the OPF and inspect the configuration of the Spacehab and Orbiter docking system in the payload bay.

Endeavour: Post-mission servicing continues in the Orbiter Processing Facility. The Spacehab payload and the tunnel adapter have been removed. The payload bay doors are closed for a structural test to be conducted this weekend. On Monday, the doors will be opened again. Endeavour is being prepared for its first Orbiter Maintenance Down Period [OMDP] which involves sending the Orbiter to Palmdale, CA, for about eight months of major modifications and structural inspections. Delivery to Palmdale will occur during the first week of August. Endeavour's next mission will be the first International Space Station assembly Space Shuttle flight, scheduled for launch from KSC in late 1997.

Discovery: OV-103 is currently undergoing a series of modifications and thorough inspections in Palmdale, CA. The vehicle is supposed to be delivered back to Kennedy Space Center later this month. When Discovery returns to KSC it will be towed to OPF Bay 3. There, preparations will begin for its next flight, mission STS-

82, the second Hubble Space Telescope servicing mission, set for launch in February 1997. [Suriano, **FLORIDA TODAY**, June 8, 1996; **Kennedy Space Center Space Shuttle Status Report**, June 7, 1996.]

0 **GEMINI TEAM TO REUNITE**

From March 23, 1965 through November 1, 1966, ten successful Gemini missions were launched from Kennedy Space Center and on July 19-20, 1996, the History - making Gemini team will reunite for a dinner, reunion barbecue and groundbreaking ceremonies for a monument to the Gemini Program in Titusville, FL. The monument will be part of the U.S. Space Walk of Fame and many of the former 20,000 workers of that era will have their names commemorated on bricks in the Walk of Fame. "We are trying to do this for the children and grandchildren of the workers," said Calvin Fowler, President of the Walk of Fame foundation which is sponsoring the project. Gemini astronauts included: Gus Grissom, Neil Armstrong, Jim Lovell, John Young, Jim McDivitt, Gordon Cooper, Wally Schirra, Frank Borman, Mike Collins, Buzz Aldrin, Ed White, Pete Conrad, Tom Stafford, David Scott, Gene Cernan and Richard Gordon. [Meyer, **FLORIDA TODAY**, June 8, 1996.]

June 9: **HARLEY MOTORCYCLES AT KSC**

Almost 1,100 motorcyclists accepted Kennedy Space Center Director Jay F. Honeycutt's invitation to visit the space center. The event was part of the 30th annual Florida Harley-Davidson Dealers Association Rally. Honeycutt led 5-mile motorcade through the center and past Columbia at Launch Complex 39B. KSC spokesman Bruce Buckingham said of the event, "Everybody seemed to be having a good time. It was the first time the Space Center's seen that many motorcycles before and probably the first time some of them have seen the space center. It was a treat on both sides." [Gallop, **FLORIDA TODAY**, p. 2B, June 10, 1996.]

June 10: **X-34 CONTRACTOR CHOSEN**

NASA has selected Orbital Sciences Corp. [Dulles, VA] for final negotiations leading to the award of a contract to build a small, reusable technology demonstrator vehicle, known as the X-34 demonstrator, and begin flight testing it in late summer of 1998. The contract includes the first two X-34 flight tests and covers a program valued at approximately $60 million. The fast-track X-34 Program calls for demonstrating a vehicle that will be capable of flying up to 25 times a year at a cost of $500,000 or less per flight, attaining altitudes of at least 250,000 feet, and flying at speeds of up to eight times the speed of sound. Other specifications for the vehicle include use of advanced thermal protection systems and demonstration of the ability to fly subsonically through rain and fog. Flights of the X-34 will involve testing of new

technologies such as composite material structures, composite tanks and new, integrated avionics, as well as demonstration of safe abort and autonomous landing techniques, in high cross winds, using advanced landing systems. The selection of Orbital Sciences for negotiations follows issuance of a NASA Research Announcement in March 1996, which restructured the X-34 Program. The current program puts primary emphasis on demonstrating key technologies for a small, reusable vehicle, not tied to potential commercial applications. The X-34 effort is part of NASA's Reusable Launch Vehicle (RLV) technology program, aimed at reducing the cost of access to space, and promoting the creation and delivery of new space services and other activities that will improve U.S. economic competitiveness. ["Reusable Rocket Flight Successful," **FLORIDA TODAY**, June 8, 1996; **NASA/KSC News Releases No. 96-115**, June 10, 1996.]

June 11: **STS-78: COUNTDOWN PREPARATIONS**

Work in the aft main engine compartment of Columbia continues with closeouts for flight targeted for completion by Saturday. Countdown preparations are in work at Launch Complex 39B and the contingency space suits are being checked for flight. Tonight and most of tomorrow the pad will be closed for scheduled ordnance installation and connection and for pressurization of the hypergolic reactants system. The countdown will begin at the T-43 hour mark at 4 a.m. Monday, June 17. The crew of STS-78 is expected to arrive at about 3:30 p.m. on the 17th. Launch is scheduled presently for June 20 at 10:49 a.m.looking toward a 9:51 a.m. landing at Kennedy Space Center on July 7. [**Kennedy Space Center Space Shuttle Status Report**, June 11, 1996.]

STS-79: ATLANTIS UPDATE

The pitch actuator on Space Shuttle main engine number 1 will be replaced and the work will be done in the Vehicle Assembly Building after Atlantis is mated to the external tank. This additional work in the VAB will prompt an earlier than planned rollout from the Orbiter Processing Facility Bay 1 to provide time for the additional work in the VAB. No impact to the overall schedule of mission STS-79 is expected. The payload bay doors of Atlantis will be closed for flight on June 19 for the June 21 rollover to the VAB. Meanwhile, Endeavour continues to undergo preparations for its first Orbiter Maintenance Down Period in Palmdale, CA. The Orbiter's main engines will be removed June 18; the right hand orbital maneuvering system pod will be removed on June 26 and the left on July 2. The forward reaction control system will be removed from the vehicle on June 29. Discovery, already in California, is expected back from its OMDP later this month. Its first mission after returning will be STS-82 on which its crew will undertake the second Hubble Space Telescope servicing mission. Launch is set for February 1997. [**Kennedy Space Center Space Shuttle Status Report**, June 11, 1996.]

June 13: **STS-78: ORDNANCE CONNECTIONS**

This morning, Launch Complex 39B remains closed for scheduled ordnance connections and for pressurization of the hypergolic reactants system. Work in the aft main engine compartment will continue once the pad is re-opened. Aft closeouts are targeted for completion on Saturday [June 15]. The countdown will begin at the T-43 hour mark at 4:00 a.m. Monday, June 17. The crew of mission STS-78 will arrive at KSC at about 3:30 p.m. Monday. External tank loading for launch will begin about 2:00 a.m. June 20. Meanwhile, processing continues for Atlantis' next mission, STS-79. The pitch actuator on Space Shuttle main engine number 1 must be replaced and engineers are re-evaluating where this work should be done. Analysis will be conducted this morning to determine if the work can be completed in the OPF or if it must be done while the vehicle is vertical in the VAB. If it is necessary to perform the work in the VAB, the Orbiter will likely be rolled out to the OPF early to provide additional work time in the VAB. No impact tot he overall schedule of mission STS-79 is expected. The Orbiter's payload bay doors will be closed for flight on June 19 and the vehicle rolled over to the VAB on June 21. Endeavour is being prepared for its first Orbiter Maintenance Down Period in California and Discovery, already in Palmdale, CA, will be returned to Kennedy Space Center later in June. On its return Discovery will be towed to OPF Bay 3 where preparations will begin for Discovery's STS-82 mission, the second Hubble Space Telescope servicing mission. The mission is scheduled to launch in February 1997. [**Kennedy Space Center Space Shuttle Status Reports**, June 12, 1996; **Kennedy Space Center Space Shuttle Status Reports**, June 13, 1996.]

June 14: **HOUSE COMMITTEE PASSES NASA BUDGET**

The House Appropriations Committee has passed a $14.1 billion budget if approved by Congress and signed by the President. The bill approved by the committee provides full funding for the Shuttle Program at $3.4 billion and $2.1 billion for the Space Station. Critics asserted that certain NASA accounts would be cut, i.e., $266.8 million from science, aeronautics and technology; $220 million from Mission to Planet Earth and $93.7 million from human space flight. [Wheeler, **FLORIDA TODAY**, p. 1A, June 13, 1996; Wheeler, **FLORIDA TODAY**, p. 1A, June 14, 1996; "House OKs $14.1 Billion Budget for NASA," **FLORIDA TODAY**, p. 2A, June 28, 1996.]

June 15: **PUBLIC SERVICE MEDALS FOR EMPLOYEES**

John B. Plowden, Richard H. Jolley and Roger C. Greek have been awarded public service medals for service to NASA. Plowden, a space center veteran of 27 years, is responsible for the overall management of Rocketdyne programs at KSC and Cape Canaveral Air Station; this includes Space Shuttle main engine processing and launch operations, Atlas/Delta field engineering support and Space Station operations. Jolley is the General Manager of EG&G Florida. Greek is McDonnell Douglas's Director of

Support Services, supervising human resources, labor relations and security support for payload ground operations at the space center. ["3 KSC Employees Win Public Service Medals," **FLORIDA TODAY**, June 16, 1996.]

LOCKHEED MARTIN COMBINES ROCKET PROGRAMS

All Lockheed Martin launch vehicles are to be placed under one management umbrella, according to company officials. The organization will be known as Space Launch Systems. The new group is similar to one created by the Air Force to integrate its Atlas and Titan programs. The new operations are anticipated to provide customers with program efficiencies and cost savings. ["Titan 4 Launch Date Moves One Day to July 1," **FLORIDA TODAY**, June 15, 1996; "Rocket Programs to Be Combined," **FLORIDA TODAY**, June 16, 1996.]

FLEET UPDATE

Work in the aft engine compartment of Columbia continues today with closeouts targeted for completion late tonight. The countdown will begin at the T-43 hour mark at 4:00 a.m. EST Monday, June 17. The crew of STS-78 will arrive at Kennedy Space Center at about 3:30 p.m. Monday. External tank loading for launch commences at 2:00 a.m. on launch day, June 20. In the meantime, processing continues on Atlantis for its STS-79 mission, The actuator on the Orbiter's main engine number 1 is being replaced today in the OPF's Bay 1. Mid-body and aft compartment closeouts are also continuing. The external tank door functional checks are in work today and the landing gear will be retracted tonight. Rollover to the Vehicle Assembly Building remains scheduled for Monday, June 24 with first motion set to occur from the OPF at 4:00 a.m. Post-servicing operations for Endeavour's first OMDP are currently underway in OPF Bay 3. Helium tank purging is in process as preparations continue to remove the main engines next week. Ferrying to Palmdale, California, for the Orbiter Maintenance Down Period is targeted for early August. Discovery is being readied for a return to Kennedy Space Center at the completion of its current OMDP in California. The vehicle is expected back at KSC later in June. [Halvorson, **FLORIDA TODAY**, June 16, 1996; Suriano, **FLORIDA TODAY**, June 17, 1996; **Kennedy Space Center Space Shuttle Status Report**, June 14, 1996.]

June 18: **COLUMBIA: POWER DRIVE UNITS EXAMINATION**

Following a management decision, technicians today are preparing to re-enter the aft main engine compartment and X-Ray the power drive units (PDU) for the Orbiter's external tank doors. The units are suspected of having possible loose screws in the PDU terminal circuitry boards. X-Rays will determine if the screws are properly installed. Access platforms are being installed in the engine compartment and X-Rays will begin early this afternoon. Once the X-Rays are developed, engineering evaluations will begin and the aft compartment will be closed again for flight. Given

no additional work on the PDUs, launch remains scheduled for 10:49 a.m. Thursday, June 20.

Loading cryogenic reactants into the power reactant storage and distribution system and the extended duration Orbiter pallet was completed this morning. Payload technicians are also preparing for late stowage of experiments into the Life and Microgravity Spacelab. Mid-deck stowage will begin tomorrow. Air Force weather forecasters are currently indicating a 40 percent probability of weather prohibiting launch on Thursday. The concern is with an upper level low pressure system that may produce showers in the vicinity of the launch pad. During Thursday's launch window, the winds at Pad B are expected to be from the west-southwest at 8-13 knots; temperature 80 degrees F; visibility 7 miles; humidity 82 percent; and clouds scattered to broken at 2,000 feet and 3,500 feet; and broken at 30,000 feet. The 24-hour-delay forecast reveals similar conditions and a 30 percent chance of delay.

The STS-78 crew includes: Commander Terrence T. Henricks, Pilot Kevin R. Kregel; Mission Specialist/Payload Commander Susan J. Helms and Mission Specialists Charles E. Brady, Richard M. Linnehan, Jean-Jacques Favier (French Space Agency) and Robert Brent Thirsk (Canadian Space Agency). [**Kennedy Space Center Space Shuttle Status Report**, June 18, 1996, 1:11 P.M..]

STS-78: PDU UPDATE AND CONCERNS

Late this afternoon engineers completed X-Raying the power drive units (PDU) for the Orbiter's external tank doors and X-Rays indicate that all suspect screws are secure and properly installed on the circuit boards. Workers are now in the process of backing out of and closing the aft engine compartment. Another even that has arisen over the past few hours involves the no. 1 Master Events Controller (MEC). During routine testing today, engineers noticed incorrect byte indications from the MEC. Further analysis revealed the software errors were not critical to the mission, but managers want to insure the errors are not masking other potential problems that might come to light later in the countdown. Engineers and Managers will be working through the evening to resolve the concerns with the MEC. There are two MECs in the Orbiter's aft engine compartment. They process signals to arm and safe pyrotechnics and command and fire pyrotechnics during SRB/external tank separation and Orbiter tank separation. Mission Managers will meet again at 9 a.m. tomorrow to receive the latest update on the MEC issue and to give approval to proceed with countdown operations. Payload technicians continue to prepare for late stowage of experiments into the Life and Microgravity Spacelab tonight and mid-deck stowage begins tomorrow. [**Kennedy Space Center Space Shuttle Status Report**, June 18, 1996, 5:36 P.M.]

June 19: **KSC ENGINEERS HELP SOLVE INDUSTRY PROBLEMS**

Twenty Kennedy Space Center engineers were recently recognized by NASA and the State of Florida's Technological Research and Development Authority [TRDA] for providing technical help to hundreds of Florida businesses. Awards were presented by Florida State Senator Patsy Kurth during the NASA/TRDA 2nd Annual Technology Outreach Program Workshop on June 6. "The event focused on how KSC and the State of Florida cooperate to extend the benefits of space exploration and research to businesses across the State," said Frank Kinney, TRDA's Executive Director. TRDA is an independent state agency which provides space-related education and research grants as well as working with NASA to promote technology transfer to industry.

KSC's Technology Programs and Commercialization Office has received 434 requests for help from businesses in the southeastern United States during the past year of which 374 came from Florida companies. The requests are submitted in the form of a Technology Transfer Agreement or problem statement. Each request initiates a working relationship between NASA and the sender. "The simplicity of initiating a Technology Transfer Agreement is one of the reasons we have seen such a positive response to the program," said Chuck Griffin. KSC's Technology Outreach coordinator. "Sometimes we receive the one-page application filled out by hand."

A committee of NASA and contractor employees reviews each problem statement and then assigns it to an engineer with expertise in that area. "Companies have presented problems that range from redesigning dentistry tools to keeping sea turtles out of a nuclear power plant's intake canal," said Griffin. NASA allows the engineer to work the problem directly with a company for up to 40 hours. "If you think of the hours of free talent and expertise that small businesses can now tap into through this program, the economic impact is quite obvious," said Senator Kurth. The award recipients from NASA, EG&G Florida, Inc., Dynamac Corporation, I-Net, Inc., Lockheed Martin Space Operations and McDonnell Douglas Aerospace and Defense Systems are credited with closing 283 of the problem statements to date. "NASA's effort to accelerate the transfer of space technology to industry is right on track. This program is already proving its worth in the first year of operation at KSC," said Bill Sheehan, Chief. KSC's Technology Programs and Commercialization Office. [**NASA/KSC News Releases No. 74-96**, June 19, 1996.]

PART CHANGEOUT MAY DELAY LAUNCH

If pad technicians have to replace a vital signal relayer aboard Columbia, the changeout may delay the vehicle's launch for two or three days. "The general feeling is that we're going to be OK to fly," said KSC spokesman Bruce Buckingham. Yesterday, the signal relayer began sending garbled data during tests of the ordnance system. Troubleshooting operations began late yesterday and senior NASA Managers are expected to decide early today whether the relayer must be replaced. [Halvorson, **FLORIDA TODAY**, p. 1A, June 19, 1996.]

NASA TV OFFERS NEW VIEWS FOR STS-78

For the first time, NASA Television will offer live views of astronauts inside the crew module of the Shuttle Columbia as they are being strapped in for launch on Thursday, June 20. In addition, seconds before launch, there will be a picture-in-picture view of the Shuttle on the pad with an inset of the three main engines as they start and come up to full thrust. An inset of Columbia's main engines will appear at T-15 seconds through about T-2 seconds. NASA Television will provide the usual video feed of the vehicle as it clears the launch structure through ascent. The Kennedy Space Center also will provide the usual cadre of video feeds of different views of the STS-78 launch vehicle on several video stumps at the press site.

This mission also will be the first to attempt a live downlink of television images from the Shuttle during descent. The "Pilot Point of View" [PPOV] camera and perspective will be used for all future Columbia missions. The PPOV camera is mounted on the "dashboard" adjacent to the vertical strut separating the two forward windows in the flight deck of Columbia. This camera will provide a clear, unobstructed view out the window identical to what the Shuttle's pilot will see during reentry. Acquisition of the video S-band signal by the Merritt Island Tracking Station is expected when the Shuttle is about 300 miles from the Shuttle Landing Facility traveling at approximately Mach 10.

A second camera will be used to show live crew buckle-in activities prior to launch. The camera also will be used to record crew activity during ascent and descent. STS-78 is the second Shuttle mission to employ a color television camera mounted in the upper deck crew cabin as a Detailed Test Objective. The first Shuttle mission that used an onboard crew camera was STS-65 in June 1994. Information on STS-78 is available through several sources on the Internet. The primary source for mission information is the NASA Shuttle Web, part of the World Wide Web. This site contains information on the crew and their mission and will be regularly updated with status reports, photos and video clips throughout the flight. The NASA Shuttle Web's address: http://shuttle.nasa.gov; if that address is busy or unavailable, Shuttle information is available through the Office of Space Flight Home Page: http://www.osf.hq.nasa.gov/ **[NASA/Kenned Space Center News Releases No. V96-75**, June 19, 1996.]

L-1 ACTIVITIES: STS-78

Workers have completed work to closeout the aft engine compartment following yesterday's work to X-Ray and clear for flight the power drive units (PDU) for the Orbiter's external tank doors. Also, the No. 1 Master Events Controller (MEC) was retested overnight and no problems relating to control of the Orbiter's critical functions were identified. The MEC has been cleared for flight and no additional tests are necessary. No other vehicle issues are being addressed by the Mission Management

Team at this time and the countdown is on schedule for launch at 10:49 a.m. tomorrow. Payload technicians completed the late stowage of experiments into the Life and Microgravity Spacelab last night and mid-deck experiment stowage is now in work.

Operations to load the cryogenic reactants that service the Orbiter's fuel cells were completed yesterday and the Orbiter mid-body umbilical unit has been demated from the Orbiter. Later today, preparations will begin to retract the Rotating Service Structure (RSS) to launch position. RSS rotation is set for about 4 p.m. today. This event could be delayed several hours without impacting launch tomorrow if thunderstorms threaten KSC today. Loading the external tank with cryogenic propellants is scheduled to begin at about 2 a.m. tomorrow. Air Force weather forecasters are currently indicating a 60 percent probability of weather prohibiting launch on Tuesday. The primary concerns are for thick clouds, showers and thunderstorms. [**KENNEDY SPACE CENTER SPACE SHUTTLE STATUS REPORT**, June 19, 1996; **STS-78 LAUNCH WEATHER FORECAST**, June 19, 1996.]

June 20: **STS-78 LAUNCHES SUCCESSFULLY**

Launch of the Space Shuttle Columbia occurred on time today at 10:49 a.m. from Kennedy Space Center's Launch Complex 39B. No technical issues were worked during the final phases of the countdown. Columbia is scheduled to remain in orbit for about 17 days and land back at Kennedy Space Center on July 7 at about 8:51 a.m. If mission duration remains the same, Columbia will break the duration record for the longest Space Shuttle mission. The solid rocket booster retrieval ships have reported that all booster components have been recovered and preparations are underway to return the twin boosters to Hangar AF by tomorrow afternoon. Also, initial post-launch assessments indicate minimal damage occurred at LC 39B during launch. The crew of STS-78 are: Commander Terrence T. Henricks, Pilot Kevin R. Kregel; Mission Specialists Richard M. Linnehan, Susan J. Helms and Charles E. Brady. Payload Specialists are Jean-Jacques Favier of the French Space Agency and Robert Brent Thirsk of the Canadian Space Agency. [**Kennedy Space Center Space Shuttle Status Report**, June 20, 1996; "Columbia Crew Lifts Off for 17-Day Science Test," **USA TODAY**, p. 3A, June 21, 1996; Halvorson, **FLORIDA TODAY**, p. 1A & 7A, June 21, 1996; **Kennedy Space Center Space Shuttle Status Report**, June 22, 1996.]

June 23: **EMPLOYEE RECOGNITION, PROMOTIONS**

Dr. Irene D. Long, Director of the Biomedical Operations Office at Kennedy Space Center, has been elected second vice president of the Aerospace Medical Society of NASA Flight Engineers. The organization focuses on the human and nonhuman medical consequences of space flight. Dr. Long has worked at Kennedy Space Center since 1982 and is a past recipient of the Aerospace Medical Association's President's Award and is a member of the Crosswinds Youth Services Board of Directors.

Kenny E. Aguilar, KSC's Personnel Director, has been awarded the KSC Director's Award; his citation recognized his exceptional leadership and vision in establishing the KSC union/management partnership. Aguilar has worked at Kennedy Space Center for the past three years. Bob Granath has been named Manager of Public Affairs for Lockheed Martin Space Operations. He'll have responsibility for the contractor's internal and external communications programs; these include media relations, governmental liaison, community relations and employee communications. Granath succeeds John Williams who retired in April ["Long Chosen to Serve On Flight Engineers Board," **FLORIDA TODAY**, June 23, 1996.]

June 24: **SRBS BACK AT HANGAR**

The solid rocket booster recovery ships arrived back at Hangar AF with boosters in tow Friday at about 2:45 p.m. Preliminary inspections show no anomalies. The crew of STS-78 are: Commander Terrence T. Henricks, Pilot Kevin R. Kregel; Mission Specialists Richard M. Linnehan, Susan J. Helms, Charles E. Brady and Payload Specialists Jean-Jacques Favier and Robert Brent Thirsk. Meanwhile, in the Vehicle Assembly Building, forward and aft closeouts and preparations for mating Atlantis and its external tank are complete. The vehicle was placed on the Orbiter transporter system on Saturday and was rolled over to the VAB at about 11:00 a.m. today. The Space Shuttle Discovery has been in Palmdale, CA, undergoing its regularly scheduled Orbiter Maintenance Down Period [OMDP]; today the vehicle was loaded atop the Shuttle Carrier Aircraft in preparation for its ferry flight to Kennedy Space Center next Tuesday. The cross-country flight is expected to stop in northern Texas on its first leg of the trip to Florida. The Orbiter's next flight, mission STS-82, is the second Hubble Space Telescope servicing mission, and is scheduled for launch in February 1997. Endeavour is being readied for its first OMDP in California. Preparations for hypergolic systems drain are complete. The vehicle's orbital maneuvering system disconnects are scheduled to be complete this Wednesday. Delivery of the youngest Space Shuttle to California is expected to occur around the first of August; its next scheduled mission will be the first International Space Station assembly flight in late 1997. [**Kennedy Space Center Space Shuttle Status Report**, June 24, 1996.]

1996 OLYMPIC TORCH RELAY AT KSC

The Atlantic Committee for the Olympic Games (ACOG) is sponsoring a relay carrying the Olympic Flame over 15,000 miles throughout the United States, culminating with the opening ceremonies in Atlanta. On Sunday, July 7, around 2:00 p.m., the Olympic Torch will pass through Kennedy Space Center carried by KSC employees chosen as Torch Bearers by the ACOG. The torch will be carried from Gate 2 on State Road 3 by motorcycle to the Saturn Causeway, by bicycle to the VAB, then by runner to Pad A, up to the pad surface and back down, the by bicycle to State Road 3 and Saturn Causeway. The flame will then be transferred to motorcycle and taken to the NASA Causeway where it will again be transferred to

runners. Runners will carry the flame through the solid rocket booster display at the KSC Visitor Center, then around the parking lot perimeter road to a ceremony stage in front of the Rocket Garden. Orbiter Columbia (STS-78) is currently scheduled to land at 8:51 a.m. on July 7. If the landing occurs as planned, crew members from that mission will be positioned in the vicinity of the solid rocket boosters at the KSC Visitor Center to cheer runners on, and then take part in the ceremony at the Rocket Garden. The runners are:

Kathleen Weaver/EG & G
Mike Chappell/Lockheed-Martin
Sara Delmonte/Lockheed-Martin
Claude Overfelt/Lockheed-Martin
Michael Phillips/Lockheed-Martin
Deborah Prongue/Lockheed-Martin
Robin Seymour/Lockheed-Martin
Marty Winkel/Lockheed-Martin
Lee Harrison Davies/NASA
Jane Hodges/NASA
Joanna Maceo/NASA
Robert Nagy, Jr./NASA
Loren Shriver/NASA
Tom Anderson/McDonell-Douglas
Donna Lee Hoven/McDonnell-Douglas
Theresa Clifton/Rockwell
Richard Unrue/Rockwell

[Letter from KSC Director **Jay F. Honeycutt** to Distribution, June 24, 1996; **NASA/KSC News Release No. 83-96**, July 3, 1996.]

June 27: **ATLANTIS MATED; NOISE INVESTIGATED**

All work to mate Atlantis to the external tank is complete. The Orbiter was powered up at about 1 a.m. EDT today and the Shuttle interface test is ongoing. The Spacehab payload was placed into the payload canister yesterday. Engineers continue to evaluate a noise that was heard during the lifting of the Orbiter in the VAB. Workers who heard the sound are being interviewed and engineers will examine the Orbiter's payload bay today in search of the sound's origin. An inspection of Atlantis' aft compartment revealed no foreign objects and a review of log sheets showed all tools and equipment accounted for. The sound may have been background noise in the VAB. Milestones: transfer of Spacehab double module to Pad 39A (June 28); roll Atlantis to Pad 39A (July 1); Install Spacehab into Orbiter at the pad (July 9); STS-79 terminal countdown demonstration test (July 18-19).

Columbia remains in orbit on its STS-78 mission. The crew includes Commander Terrence T. Henricks, Pilot Kevin R. Kregel, Mission Specialists Richard M. Linnehan, Susan J. Helms and Charles E. Brady. Payload Specialists are Jean-Jacques Favier (French Space Agency) and Robert Brent Thirsk (Canadian Space Agency). The Space Shuttle Discovery is currently in Palmdale, CA, undergoing its Orbiter Maintenance Down Period and will shortly be returned to Kennedy Space Center. Meanwhile, Endeavour is being prepared for its ferry flight to California for its first OMDP. [**Kennedy Space Center Space Shuttle Status Report**, June 27, 1996.]

June 28: **STS-79 UPDATE**

Workers investigating a noise heard in the VAB while lifting the Orbiter a few days ago, may have identified the source. Using video cameras to examine the Orbiter's mid-body yesterday, engineers observed a keel latch in Atlantis' payload bay that may have swung shut during the lift. Closer observations will be made upon Atlantis' arrival at Launch Complex 39A on July 1. Meanwhile, at 10:01 a.m. Discovery departed Palmdale, CA, riding atop its Shuttle Carrier Aircraft, a modified Boeing 747. Ferry flight managers plan to travel to Oklahoma for the first refueling stop and possibly continue eastward to Warner-Robbins AFB (Macon, GA) where they may stay overnight. Depending upon weather conditions throughout the flight, Discovery may arrive at KSC as early as Saturday morning. Discovery's flight plan is also dependent upon weather conditions. ["Storms Delay Discovery's Return to KSC," **FLORIDA TODAY**, p. 2A, June 28, 1996; **Kennedy Space Center Space Shuttle Status Report**, June 28, 1996.]

JULY

July 1: **STS-78 EXTENDED A DAY**

STS-78 Mission Managers this weekend officially approved the extension day for Columbia's current mission and targeted the Orbiter's Kennedy Space Center landing for about 8:30 a.m. on July 7. A landing at this time will break by about seven hours the Shuttle mission duration record currently held by Endeavour on mission STS-67. The crew of STS-78 includes: Commander Terrence T. Henricks, Pilot Kevin R. Kregel, Mission Specialists Richard M. Linnehan, Susan J. Helms, and Charles E. Brady. Payload Specialists are Jean-Jacques Favier [French Space Agency] and Robert Brent Thirsk [Canadian Space Agency].

Space Shuttle Atlantis was rolled out to Launch Complex 39A today with first motion from the Vehicle Assembly Building occurring at 10:30 p.m. yesterday. The vehicle was hard down on the pad by 5:00 a.m. today. A hot firing of the number 3 auxiliary power unit will occur this afternoon and the Rotating Service Structure will be moved into position around the vehicle at about 8 p.m. Discovery returned to Kennedy Space Center on Saturday, June 29, after traveling two days on the Shuttle Carrier Aircraft [SCA] from Palmdale, CA, where a series of modifications and thorough inspections were conducted as part of a regularly scheduled Orbiter Maintenance Down Period [OMDP], an operation that periodically removes all Orbiters from flight operations. The vehicle, bolted atop the SCA, departed Palmdale at 10:00 a.m. EDT Friday, June 28, and stopped at Altus Air Force Base, OK, for refueling. The ferry flight then continued to Robins Air Force Base, GA, where it remained overnight. At about 9 a.m. Saturday, Discovery left Robins and landed at the Shuttle Landing Facility on runway 33 at about 9:55 a.m. By 3 a.m. Sunday, Discovery had been removed from the SCA and towed to OPF Bay 2 where preparations will begin for the Orbiter's next flight, STS-82, the second Hubble Space Telescope Servicing Mission, set for launch in February 1997. Endeavour is being readied for its first OMDP in California. [**Kennedy Space Center Space Shuttle Status Report**, July 1, 1996; **Kennedy Space Center Space Shuttle Status Report**, July 2, 1996.]

July 2: **SUCCESSFUL HOTFIRING OF APU**

A hot firing of the number 3 auxiliary power unit of Atlantis was successfully conducted yesterday afternoon and the protective Rotating Service Structure has now been moved into position around the Orbiter. Today, work includes launch pad [LC 39A] validations and the main engine flight readiness test. [**Kennedy Space Center Space Shuttle Status Report**, July 2, 1996.]

TITAN LAUNCH FACES DOUBTFUL WEATHER

The Air Force launched its Titan 4 rocket tonight, despite the possibility of inclement

weather delaying or postponing the effort. Liftoff came at 8:31 p.m. for the classified Department of Defense mission. Launch Commentator Dave Welch said that the mission was "dedicated to our fallen warriors in Saudi Arabia." Five of the 19 soldiers killed in the recent terrorist bomb attack in Dharan were based at Patrick Air Force Base, which is home to the 45th Space Wing. [Halvorson, **FLORIDA TODAY**, July 2, 1996; Halvorson, **FLORIDA TODAY**, p. 2A, July 3, 1996; "Photographer Snaps Away..." **FLORIDA TODAY**, p. 1A, July 3, 1996.]

LOCKHEED MARTIN TO BUILD X-33

Vice President Albert Gore Jr. announced today that Lockheed Martin has been selected to build the X-33 test vehicle, a one-half scale model of the Reusable Launch Vehicle [RLV] which will be used to demonstrate advanced technologies that will dramatically increase reliability and lower the costs of putting payloads into space. Lockheed Martin, build and conduct the first test flight of the X-33 test vehicle by March 1999, and conduct at least fifteen [15] flights by December 1999. NASA has budgeted $941 million for the project through 1999. Lockheed Martin will invest $200 million in its X-33 design. Called "VentureStar," the Lockheed Martin design is based on a lifting body shape with a radical new aerospike engine and a rugged metallic thermal protection system which would be launched vertically like a rocket and land horizontally like an airplane.

"The RLV program is a radical departure from the way NASA has done business in the past," NASA Administrator Daniel S. Goldin said. "Our role is to develop the high risk technologies that industry cannot afford. But we won't build the vehicle, industry will. NASA will be a user, not an operator." Goldin said the objective of the RLV technology program is simple. "We want to develop technologies that will allow industry to build a vehicle that takes days, not months, to turn-around; dozens, not thousands of people to operate; reliability ten times better than anything flying today; and launch costs that are a tenth of what they are now. Our goal is a reusable launch vehicle that will cut the cost of a pound of payload to orbit from $10,000 to $1,000."

The X-33 will integrate and demonstrate all the technologies in a scale version that would be needed for industry to build a full-size RLV. "The X-33 will be about half the size of a full-scale RLV. It will be a remotely-piloted, sub-orbital vehicle, capable of altitudes up to 50 miles and speeds of Mach 15," said RLV Director Gary Payton. The X-33 program is being conducted under a Cooperative Agreement, not a conventional customer/supplier contract. Under this agreement, NASA defined the broad objectives and industry proposed an approach to meet the objectives. "Cooperative agreements are performance-based," said Payton. "Payment is made only after the industry partner completes a pre-determined milestone. "The X-33 test vehicle is the most advanced part of a three-pronged RLV program to develop and demonstrate the kinds of technologies required by industry to build a new launch system that will provide truly affordable and reliable access to space," Payton said.

"The RLV approach is to design a little, build a little, test a little, fly a little."

*The subsonic DC-XA, or Clipper Graham vehicle which has successfully flown three times from its launch site in White Sands, New Mexico, is flight testing advanced technologies such as lightweight composite propellant tanks, fuel lines and valves.

*The Mach 8 X-34 vehicle, to be built by Orbital Sciences Corp., will demonstrate technologies necessary for a reusable vehicle.

*The Mach 15 X-33 which will integrate and test advanced components and technologies necessary for industry to build a full-scale RLV.

Three industry teams competed for the X-33 vehicle. In addition to Lockheed Martin, proposals were submitted by McDonnell Douglas (Huntington Beach, CA) and Rockwell International [Downey, CA]. Due to an innovative, paperless procurement process, the X-33 evaluation and selection was completed in about one-quarter of the time it normally takes to finish procurements of this size. Proposals were submitted in April on CD-ROM media. One CD-ROM replaced approximately eight boxes worth of printed material. Proposals were read on-screen by each evaluator, and an evaluation database allowed them to enter strengths and weaknesses on-line while reading the proposal. The VentureStar team included prime contractor Lockheed Martin Skunk Works (Palmdale, CA); Rocketdyne [Canoga Park, CA]; Rohr [Chula Vista, CA]; and AlliedSignal Aerospace [Teterboro, NJ]. [Suriano, **FLORIDA TODAY**, July 1, 1996; Borenstein, **THE ORLANDO SENTINEL**, July 3, 1996; Halvorson, **FLORIDA TODAY** , pp. 1A-2A, July 3, 1996; **NASA/KSC Press Release No. 96-128,** July 2, 1996.]

July 3: **SHUTTLE FLEET UPDATES**

While disassembling the STS-78 reusable solid rocket motors [RSRM] at Kennedy Space Center on Monday, engineers observed that hot gas had seeped into the J-Joints in the motor's field joints. In some areas, the hot gas had penetrated through the J-Joint to, but not past, the capture feature O-Ring. This potential condition was anticipated during motor design and certification, and was completely tested during the redesign activity. The flight safety of the STS-78 was not compromised by this occurrence and all aspects of the motor's performance completely met design specification requirements. The STS-78 motors are the first occurrence with combustion product penetration into the J-Joint. As with all first occurrences in the RSRM program, engineers and managers are assessing this situation closely to understand the cause. At the present time, normal preparations are continuing for STS-79. The issue will be addressed at today's scheduled Mission Status Briefing.

Launch pad [39A] validations and the main engine flight readiness test are complete. Work on Atlantis for its upcoming STS-79 mission includes final hydraulic testing and

the frequency response test. Milestones: helium signature leak test [July 8]; installation of the Spacehab Double Module into the Orbiter [July 9]; STS-79 terminal countdown demonstration test [July 18-19];' closure of payload bay doors for flight [July 18]. In OPF Bay 2, preparations have begun to remove the ferry flight equipment from Discovery. The tail cone will be removed next week. access to the aft, mid-body and crew module continues. Milestones: initial power-up [July 9]; removal of the tail cone [July 9]; opening of the payload bay doors [July 16]. Meanwhile, preparations continue on Endeavour for its first Orbiter Maintenance Down Period [OMDP]. Delivery to Palmdale, CA, where Endeavour will remain for about eight months, will occur around the first of August. Once Endeavour returns to KSC, its next mission will be the first International Space Station assembly Space Shuttle flight, scheduled for launch from KSC in late 1997. Milestones: final payload bay closing [July 12]; rollout to the SLF for ferry flight to Palmdale [July 29] and departure from KSC [July 30]. [Halvorson, **FLORIDA TODAY**, July 4, 1996; **Kennedy Space Center Space Shuttle Status Report**, July 3, 1996.]

July 5: **SAFETY PANEL ISSUES REPORT**

The National Aerospace Safety Advisory Panel has issued a report advising NASA to slow its restructuring efforts to maintain safety. "It's time to call a halt and regroup. 'Hey, find out where you are before you do any more;' that's the message.," according to panel member Norman Parmet. "We're not saying it's unsafe. But we're saying that if you cut more than what you've already done, you may get to the position where you are unsafe." The panel interviewed more than 300 workers at Kennedy Space Center this past spring with more visits planned. "From the lowest of the low, so to speak, on the totem pole to the senior managers, the message that came through, although it was couched in different language, was the same at the root," according to Seymour Himmel, a panel member. "So much is going on, people don't know from day to day, what the devil is going to happen to them." [Suriano, **FLORIDA TODAY**, July 4, 1996; "Safety Experts Urge NASA to Regroup," **THE ORLANDO SENTINEL**, July 6, 1996.]

COLUMBIA TO LAND JULY 7

Columbia's landing remains scheduled for Sunday with two opportunities available at KSC at 8:37 a.m. and 10:11 a.m. EDT. Weather forecasters indicate the first opportunity at Kennedy Space Center will be the best for landing attempts on Sunday or, if necessary, on Monday. No landing will be attempted at Edwards Air Force Base [CA] on Sunday. In addition, assessments on the STS-78 booster field joints continue today. At Launch Complex 39A, where Atlantis awaits its STS-79 launch, final hydraulic testing and the mission's frequency response tests are complete. No work is scheduled for this holiday weekend. The only exception is the Rotating Service Structure will be moved away from the vehicle for about two hours Sunday afternoon as the Olympic Torch passes through KSC on its way to Atlanta. Meanwhile, in OPF

Bay 2, work continues to remove the ferry flight equipment from Discovery. The tail cone comes off next week and access to the aft, mid-body and crew module continues. Also continuing - in OPF Bay 3 - are preparations for ferrying Endeavour for California for its OMDP. [Suriano, **FLORIDA TODAY**, July 7, 1996; **Kennedy Space Center Space Shuttle Status Report**, July 5, 1996.]

July 7: **STS-78: COLUMBIA LANDS AT KSC**

Columbia landed at KSC's Shuttle Landing Facility's Runway 33 on its first opportunity today at 8:37 a.m. EDT after traveling over 7 million miles in space on the longest Space Shuttle mission to date. Columbia landed on orbit 272 marking the 31st time the Shuttle has landed at KSC and the 8th landing at KSC for Columbia. The main gear touchdown came at 16:21:47.45 or 8:36.45 a.m.; wheels stop was at 16:21:48.30 or 8:37.30 a.m. Columbia will be towed to Orbiter Processing Facility Bay 1 beginning at about 2:30 p.m. today and be spotted in the OPF at about 4 p.m. [Halvorson, **FLORIDA TODAY**, pp. 1A-2A, July 8, 1996; **Kennedy Space Center Space Shuttle Status Report**, July 7, 1996.]

ROLLBACK FOR ATLANTIS?

STS-79 Mission Managers are weighing an option to rollback Atlantis from the launch pad to initiate repairs to its solid rocket boosters. Hot gas leaks discovered in Columbia's boosters are the reason a rollback is being considered, but no final decision has been made and will not be made till after an investigation into the leaks is completed. "It would be nice to have a decision by the end of the week, but Don't want to hazard any guess right now on what that decision will be," said Senior Shuttle Manager Loren Shriver, himself a former astronaut. Columbia Commander Terrence T. Henricks added, "Until we understand it [the booster problem], the program doesn't plan on flying again." Managers expect to receive a detailed report on the gas leak by July 12. [Halvorson, **FLORIDA TODAY**, pp. 1A-2A, July 8, 1996; "Shuttles Grounded Until Gas Leaks Are Addressed," **USA TODAY**, p. 3A, July 8, 1996.]

July 8: **HURCON IV**

Due to the projected track of Hurricane Bertha, KSC has officially gone to Hurcon [Hurricane Condition] IV as of 9:30 a.m. today. Hurcon IV status indicates KSC expects to see 50 knot winds or greater within 72 hours. Initial preparations are being implemented to inform KSC workers of this status, intensify general cleanup of debris around KSC, deliver sandbags and shutters to designated locations, and discuss possible rollback options for Atlantis which is currently at pad 39A. According to the KSC Hurricane Plan, the Space Shuttle will be rolled back to the VAB if there is a possibility of sustained hurricane force winds at the pad. Rollback to the VAB must be completed before winds reach 40 knots sustained or 60 knot gusts. Work continues

to prepare Atlantis for launch with the helium signature leak check of the main propulsion system set to begin tonight and installation of the Spacehab scheduled to begin early tomorrow. If the decision to rollback to the VAB is made due to Hurricane Bertha, the payload bay doors could be closed as early as tomorrow night and rollback operations begin as early as Wednesday afternoon. [Halvorson, **FLORIDA TODAY**, July 9, 1996; **Kennedy Space Center Space Shuttle Status Report**, July 8, 1996.]

JOHNSON NAMED EO DEPUTY DIRECTOR

Ms. Evelyn Johnson has been selected as Deputy Director of the Equal Opportunity Program Office [EOPO], effective immediately. Ms. Johnson has been with the Equal Opportunity Program since January 1980; her most recent assignment was Minority University Program Manager. Prior to that assignment, she served as the Complaints Program Manager, the Manager of the Americans With Disabilities Program and the Affirmative Employment Program Manager. [Letter from **J. Albert Diggs**, EO Director, KSC, July 8, 1996.]

July 9:

HURCON III

As a precautionary measure, Kennedy Space Center has officially moved from Hurcon (Hurricane Condition) IV to Hurcon III as of 10:00 a.m. today while managers continue to monitor the projected track of Hurricane Bertha. Hurcon III status indicates KSC expects to see 50 knot winds or greater within 48 hours. KSC workers will be continuously informed of the hurricane's status, and possible rollback options for Atlantis at Launch Complex 39A will be discussed in greater detail. According to the KSC Hurricane Plan, the Space Shuttle will be rolled back to the VAB if there is a possibility of sustained hurricane force winds at the pad. Rollback to the VAB must be completed before winds reach 40 knots sustained or 60 knot gusts. [Halvorson, **FLORIDA TODAY**, July 10, 1996; **Kennedy Space Center Space Shuttle Status Report**, July 9, 1996.]

STS-79: ATLANTIS PROCESSING UPDATE

Work continues to prepare Atlantis for launch this month. Managers continue their discussions regarding the hot gas penetration [SEE ABOVE] on both of the STS-78 boosters field joints. No cause has been identified regarding the anomaly, however, managers will be looking closely at a number of possible causes including the type of adhesive used between the field joints and the pre-launch cleaning techniques of those joints. Meanwhile, the helium signature leak check of the main propulsion system was completed this morning and installation of the Spacehab began as scheduled today. If the decision is made to roll back to the VAB due to Hurricane Bertha, the payload bay doors would be closed tonight, the vehicle powered down tomorrow morning and the

rollback would begin tomorrow afternoon. This would place Atlantis out of harm's way in the VAB by midnight Wednesday night. If a rollback decision is made for weather reasons, there will be no impact to the overall launch schedule. [**Kennedy Space Center Space Shuttle Status Report**, July 9, 1996; Halvorson, **FLORIDA TODAY**, p. 2A, July 10, 1996.]

COLUMBIA: POST-FLIGHT PROCESSING

Post-mission deservicing continues on Columbia following Sunday's landing at KSC. Provided no weather concerns, the payload bay doors are scheduled to be opened tomorrow. A post landing inspection of the vehicle revealed a total of 85 debris impact hits on the thermal protection system, of which 12 had a major dimension of 1-inch or larger. By comparison, these numbers are significantly less than the average seen on previous missions. The Orbiter's tires and brakes were reported to be in average condition for a KSC landing. Also, operations to stack the solid rocket boosters for STS-80 have been accelerated. The Mobile Launcher Platform was moved into the VAB yesterday and booster stacking operations could begin as early as July 12. [**Kennedy Space Center Space Shuttle Status Report**, July 9, 1996.]

DISCOVERY & ENDEAVOUR UPDATES

Work continues to remove the ferry flight equipment from Discovery. The vehicle - in OPF Bay 2 - was powered-up this morning for the first time since its arrival at KSC following the Orbiter Maintenance Down Period. Endeavour continues to be readied for its first OMDP; if local weather dictates, the payload bay doors on the Orbiter could be closed tomorrow. Endeavour will spend eight months in Palmdale, CA, undergoing extensive inspections and modifications. When the vehicle returns home to KSC, it will be readied for the first International Space Station assembly Shuttle flight, scheduled for launch presently in late 1997. [**Kennedy Space Center Space Shuttle Status Report**, July 9, 1996.]

HURRICANE UPDATE: 3:12 P.M.

Due to possible afternoon thunderstorms at KSC tomorrow, managers have decided to move up the rollback of Atlantis to the Vehicle Assembly Building to as early as 7:00 a.m. tomorrow permitting the vehicle to be hard down in the VAB by noon tomorrow. This rollback will be to avoid having the Shuttle at the pad while Hurricane Bertha remains a threat to Kennedy Space Center. The call-to-stations for workers to report for the rollback will occur at 4:00 a.m. tomorrow. A final rollback decision will be expected from Launch Director Jim Harrington at about 5:00 a.m. His decision will be based on the latest estimates for tracking Hurricane Bertha and its potential for producing high winds at KSC. As of 2 p.m. today, KSC remains in Hurcon [Hurricane Condition] III and managers will continue to monitor the projected track of Hurricane Bertha. Hurcon III status indicates KSC expects to see 50 knot winds or

greater within 48 hours. According to the KSC Hurricane Plan, the Space Shuttle will be rolled back to the VAB if there is a possibility of sustained hurricane force winds at the pad. Rollback to the VAB must be completed before winds reach 40 knots sustained or 60 knot gusts. [**Kennedy Space Center Space Shuttle Status Report**, July 9, 1996.]

July 10: **SHUTTLE STATUS BRIEFING**

An audio-only briefing to provide an update on the status of preparations for the launch of Space Shuttle Atlantis on mission STS-79 will be held this afternoon at 5:20 p.m. EDT. Atlantis was returned from its launch pad to the Vehicle Assembly Building at the Kennedy Space Center, FL, earlier today for protection from the effects of Hurricane Bertha. Tommy Holloway, Shuttle Program Manager, and Frank Culbertson, Director, Phase One Program, will answer questions from the Johnson Space Center's briefing room. [Donnelly, **FLORIDA TODAY**, pp. 1A & 5A, July 11, 1996; Halvorson, **FLORIDA TODAY**, p. 7A, July 10, 1996; Thompson, **FLORIDA TODAY**, p. 1A, July 11, 1996; **NASA/KSC Note to Editors: N96-48**, July 10, 1996.]

July 11: **HURRICANE BERTHA UPDATE**

Kennedy Space Center employees were instructed to return to their normal work schedules today following yesterday's evacuation due to the possible threat from Hurricane Bertha. KSC went into Hurcon [Hurricane Condition] I at noon yesterday which indicated possible hurricane conditions at KSC within 12 hours. All employees were evacuated except about 200 hurricane rideout team members. Efforts are now underway to return to work schedules for processing all four Orbiters, reopening and powering-up various launch support facilities, and preparing to return Atlantis to Pad 39A, pending a final management decision expected tomorrow. [**Kennedy Space Center Space Shuttle Status Report**, July 11, 1996.]

STS-79: ATLANTIS ROLLED BACK

Atlantis was rolled back to the Vehicle Assembly Building yesterday as a precautionary measure to avoid possible high winds and rain from Hurricane Bertha, which threatened east central Florida yesterday. First motion from the pad occurred at 7:49 a.m. yesterday with the vehicle hard down in the VAB at about 1:25 p.m. Given a decision - which is expected tomorrow - Atlantis will be ready to roll back out to the pad by 11:00 p.m. Friday. This would allow the vehicle to remain on schedule for launch later this month. Meanwhile, managers continue their discussions regarding the hot gas penetration on both of the STS-78 boosters field joints. If the decision is made to roll back out to the pad, next week's activities include the Spacehab interface verification test and the Terminal Countdown Demonstration Test. [**Kennedy Space Center Space Shuttle Status Report**, July 11, 1996.]

PROCESSING UPDATES

The payload bay doors on Columbia were not opened due to possible threats from Hurricane Bertha. The doors will be opened tomorrow. Also, operations to stack the solid rocket boosters for STS-80 have been accelerated and will begin this weekend. STS-80 will deliver the Wake Shield Facility-3 and ORFEUS-SPAS-2 payloads to orbit; mission duration is for 16 days. Launch is planned for October 31 with a landing date of November 16. Preparations are also underway again today to prepare Discovery for opening the payload bay doors next week and to install the orbital maneuvering system pods later in the month. The vehicle's next mission is STS-82 and launch is planned for February 13, 1997. Mission duration is targeted for just under 10 days. Meanwhile, Endeavour continues to undergo preparations for its ferry flight to California for the Orbiter's first Maintenance Down Period. **[Kennedy Space Center Space Shuttle Status Report**, July 11, 1996.]

July 12:

STS-79: BOOSTERS TO BE REPLACED

STS-79 Mission Managers decided late today not to roll Atlantis back out to the pad in order to de-stack the vehicle from its current set of solid rocket boosters and re-stack it to another set. Atlantis has been in the Vehicle Assembly Building since Wednesday when it was taken off Launch Complex 39A due to the threat of Hurricane Bertha. This decision will delay Atlantis' launch until mid-September. Atlantis' boosters are being replaced because of hot gas seepage into the field joints of the Columbia STS-78 boosters, which was launched on June 20. An investigation found that the most probable cause of the seepage was related to the use of a new adhesive and cleaning fluid. The investigation also concluded that the risk of a field joint failure and to improve the safety margin of the field joints. **[NASA/KSC Press Releases: 96-138**, July 12, 1996; "Astronaut May Stay In Orbit 6 Weeks Longer, NASA Says," **THE NEW YORK TIMES**, p. A9, July 12, 1996; Halvorson, **FLORIDA TODAY**, July 12, 1996; Hoverstein, **USA TODAY**, p. 2A, July 12, 1996; **Kennedy Space Center Space Shuttle Status Report**, July 12, 1996.]

CAMERON TO LEAVE ASTRONAUT CORPS

Shuttle astronaut Kenneth D. Cameron [Colonel, USMC] will leave NASA on August 5 to pursue other career interests. Cameron, selected as an astronaut in 1984 and a three-time Shuttle flight veteran, will join Hughes Training, Inc., as Executive Director, Houston Operations. "Ken's contributions to the astronaut office and to NASA have been valuable," said David C. Leestma, Director of Flight Crew Operations. "He was instrumental in setting up the support system for NASA astronauts training in Russia. We wish him well in his new career." Cameron first flew as Pilot on STS-37 in 1991 and served as Commander on two subsequent missions, STS-56 in 1993 and STS-74 in 1995. **[NASA/Kennedy Press Releases: No. 96-137**, July 12, 1996; http://www.jsc.nasa.gov/Bios/]

July 13: **JAPAN TESTS SHUTTLE PROTOTYPE**

Japan used satellite and microwave systems to guide its unmanned Shuttle prototype through a successful landing test recently. Its HOPE Space Shuttle will be used to ferry cargo between Earth and the International Space Station. The prototype landed at Woomera Air Station, chosen for its remoteness, former role in space research and usually reliable weather. ["Japanese Test Shuttle Prototype," **FLORIDA TODAY**, p. 5E, July 14, 1996.]

July 15: **STS-79: MIR DOCKING MISSION**

Last Friday, NASA managers decided to replace the Space Shuttle Atlantis' reusable solid rocket boosters, delaying its July 31, 1996, launch. The decision to replace the STS-79 solid rocket motors, which also utilized the new adhesive, was made to provide an opportunity to better understand the J-Joint failure and to improve the safety margin of the joint. Atlantis will borrow the SRB set for use on mission STS-80. Launch Managers are working Atlantis' launch schedule and will recommend a target launch date later this week, for sometime in mid-September. [Halvorson, **FLORIDA TODAY**, p. 1A-2A, July 13, 1996; **Kennedy Space Center Space Shuttle Status Report,** July 15, 1996.]

SHUTTLE FLEET UPDATES

Columbia's payload bay doors are open and preparations for Spacelab removal are in work. Waterproofing of the Orbiter's thermal protection system is complete. The delay of Atlantis' launch and the booster switch may affect Columbia's launch schedule for STS-80 by one week. The receiving inspection continues on Discovery following its return from Palmdale, CA, and its Orbiter Maintenance Down Period. Removal of the vehicle's right orbital maneuvering system simulator pod is complete and preparations are underway for removal of the left simulator pod. Meanwhile, Endeavour continues to be prepared for its first OMDP. The removal of its fuel cell 3 is complete. Final payload bay closure is set for July 16; rollover to the Shuttle Landing Facility is planned for July 28. Endeavour, atop the Shuttle Carrier Aircraft, is scheduled to depart Kennedy Space Center on July 30. [**Kennedy Space Center Space Shuttle Status Report,** July 15, 1996; **Kennedy Space Center Space Shuttle Status Report,** July 16, 1996.]

FIRST MARS LANDING ANNIVERSARY

Twenty years ago, on July 20, 1976, the Viking 1 lander became the first spacecraft to land successfully on the surface of Mars. Several events this week will examine the legacy and impact of Viking on future international Mars missions and the two U.S. robotic missions scheduled for launch to Mars in November and December. The events are:

*NASA Administrator Daniel S. Goldin and Dr. Chris McKay of NASA's Ames Research Center (Mountain View, CA) will discuss the history and future of Mars exploration in a public lecture organized by The Planetary Society at 7 p.m., Thursday, July 18, at the National Academy of Sciences [NAS] in Washington, D.C.

*NASA, The Planetary Society and the Lockheed Martin Corp. are co-hosting a symposium entitled, "Mars Revisited: A Look Forward" at the NAS from 9 a.m. to 4 p.m., Friday, July 19.

*The Smithsonian Institution's National Air and Space Museum in Washington, D.C., will present "Mars Day," a day-long family program offering hands-on activities and science demonstrations from 10 a.m. to 4 p.m., Saturday, July 20. Events and activities include views of the Martian surface and Viking landing sites in 3-D, one-on-one talks with experts about the Viking landing sites and NASA's upcoming Mars Surveyor Program, an interactive computer flyover of Valles Marineris in the `Mars Virtual Exploration Control Center,' and other activities. [**NASA/Kennedy Space Center Press Releases: 96-141**, July 15, 1996.]

July 16: **DELTA 2 LAUNCH LIFTS NAVSTAR**

The Air Force launched a Delta 2 rocket tonight at 8:50 p.m.; the vehicle carried a Navstar Global Positioning Satellite which, over the next two weeks, will use its thrusters to position it in an operational location some 12,650 miles above Earth. "This is a real hype for us. This really does make us feel good," said Lila Edwards, spokeswoman for the 45th Space Wing. The Navstar satellite is one of 23 which emit radio navigation signals so accurate that U.S. troops can utilize the system to determine their exact location within 33 feet, their speed within a fraction of a mile per hour and the time within a millionth of a second. The GPS is also being used increasingly by civilian commercial interests. [Halvorson, **FLORIDA TODAY**, p. 1A, July 13, 1996; "Delta 2 Takes Satellite Skyward," **FLORIDA TODAY**, p. 1A, July 16, 1996; Halvorson, **FLORIDA TODAY**, p. 2A, July 16, 1996.]

DOD SIGNS UP FOR SHUTTLE, AGAIN

In May, 2000, the Department of Defense will turn to the Space Shuttle again for help in creating a highly accurate topographical radar map of the Earth's surface. This mission, however, does not indicate that Pentagon is reversing its policy of not flying satellites on Shuttles. "This is sort of the result of the Defense Department coming up with a unique solution to a unique requirement," said John Pike, Director of Space Policy for the Federation of American Scientists. "Its very difficult for me to see the Defense Department using the Shuttle otherwise." [Halvorson, **FLORIDA TODAY**, p. 1A-2A, July 17, 1996.]

July 17: **STS-79: SEPT. 12 LAUNCH DATE SET**

STS-79 Mission Managers have set September 12 as the date for the next launch of Atlantis. This will mark the Orbiter's fourth docking mission to Mir, the Russian Space Station. If this launch schedule is met, then astronaut Shannon W. Lucid could return to Earth September 21 having stayed in space six weeks beyond her original return date of August 9. The new launch date came in a teleconference with officials at NASA Headquarters, Kennedy Space Center and Johnson Space Center. "They believe they have a comfortable schedule, and they'll even take a gander at shaving a couple of days off the September 12 target," said JSC spokesman Rob Navias. The left forward center booster segment mate will be complete today; the left booster stack will be complete by the end of this week and work on the right booster will begin next week. The vehicle will be powered up late today or early tomorrow. Meanwhile, the remainder of the 1996 launch schedule is being revised to include the possibility of moving the October 31 launch date of Columbia to November 7 if boosters cannot be readied in time for the October effort. The next three Atlantis flights to Mir - now set for December 5, May 1 and mid-September 1997 - till between January 16 and 23 for the first mission and June and October respectively for the last two. Discovery's Hubble Space Telescope servicing mission may go on February 13 as scheduled. [**Kennedy Space Center Space Shuttle Status Report**, July 17, 1996; Halvorson, **FLORIDA TODAY**, p. 1A, July 18, 1996; "Trouble-plagued Atlantis Set for Sept. 12 Launch," **THE ORLANDO SENTINEL**, July 18, 1996.]

COLUMBIA, DISCOVERY UPDATES

Spacelab removal from Columbia's payload bay is complete. The forward reaction control system functional checkout is in process. The removal of auxiliary power unit no. 1 is targeted for July 26; main engine removal is planned for July 30. Discovery is in Orbiter Processing Facility Bay 2 where its storage checkout and transportation flanges have been removed for use during Endeavour's ferry flight to Palmdale, CA. The payload bay doors are open for work to be done in the vehicle's midbody. Discovery's right hand orbital maneuvering system pod will be installed about July 26. Discovery's sister ship, Endeavour, is in OPF Bay 3 where preparations continue for the OMDP. Work to deservice the Orbiter's ammonia boiler is complete. Installation of the left orbital maneuvering system simulator pod is scheduled for Thursday, July 25. Final payload bay closure on Endeavour will occur today. Rollover to the Shuttle Landing Facility is set for July 29 and departure for California the following day. [**Kennedy Space Center Space Shuttle Status Report**, July 17, 1996]

ATLANTIS: READY TO POWER UP

Preparations to power up Atlantis are complete. The left forward center booster segment mate is complete. Left aft joint leak checks are complete and left center leak checks are in work. The left booster stack will be complete by the end of this week

and work on the right booster will begin next week. The external tank will be mated to the solid rocket boosters on August 1; twelve days later - August 13 - Atlantis will be mated to its external tank and rolled out to Launch Complex 39A on August 20. The STS-79 terminal countdown demonstration test is set to run from August 28 through approximately 11 a.m. the following day.

In OPF Bay 1, Columbia continues to undergo processing operations for its STS-80 mission now targeted for October 31, at 2:40 p.m. EDT. Mission Managers note that there is a one week threat to the schedule. The forward reaction control system functional checkout is in work and removal of the tunnel adapter is complete. In OPF Bay 2, Discovery continues to undergo its receiving inspection which is a routine review of an Orbiter which has just returned from an Orbiter Maintenance Down Period. Installation of Discovery's radar altimeters 1 and 2 is complete. Tomorrow, Discovery's hydraulic system will be powered up for the first time since its return from California. Preparations are in process for main propulsion system tests. Work to remove and replace window 6 is complete.

Endeavour is in OPF Bay 3 where preparations continue for its transfer to Palmdale, CA, for its first OMDP. Installation of the forward reaction control system is in work. The left orbital maneuvering system simulator pod will be installed today and the right simulator pod will be installed tomorrow. Payload bay doors will be closed today. [**Kennedy Space Center Space Shuttle Status Report**, July 18, 1996; **Kennedy Space Center Space Shuttle Status Report**, July 19, 1996.]

July 19: **COLUMBIA: RCS CHECKOUT COMPLETE**

Columbia's forward reaction control system functional checkout is complete. Work continues to offload hypergolic fuel from the orbital maneuvering system. Milestones: removal of auxiliary power unit No. 1 [July 26]; begin removing Space Shuttle main engines [July 30]. Discovery, housed currently in OPF Bay 2, is undergoing installation of midbody access platforms. Main propulsion system tests continue. This morning, Discovery was powered up for the first time since its return from Palmdale, CA, where it underwent its Orbiter Maintenance Down Period. Preparations continue for Endeavour's transfer to California for its first OMDP. Installation of the forward reaction control system simulator is complete. Installation of the orbital maneuvering system simulator pods is in work. Endeavour's payload bay doors have been closed for its ferry flight to California. [**Kennedy Space Center Space Shuttle Status Report**, July 19, 1996.]

NASA HOLDING $3.6 BILLION UNSPENT

"NASA isn't yet the lean, mean fighting machine we were led to believe it is," complained Rep. James Sensenbrenner, Jr. [R-Wis], Chairman of the House Space and Aeronautics Subcommittee, which has held a hearing on a General Accounting Office

report released yesterday. The report asserts that NASA held $3.6 billion in unspent funds at the start of the fiscal year and may have as much as $2.2 billion when FY 1997 begins in October. Daniel S. Goldin, NASA Administrator, conceded that much of the report was accurate saying, "I hear your concerns. NASA is taking the necessary action which will enable us to do a better job." The GAO report "uncovered a distinct pattern of carryovers within the space agency." Sensenbrenner requested the report in March. [Wheeler, **FLORIDA TODAY**, July 19, 1996.]

July 22: **STS-79: STACKING OPERATIONS**

Atlantis will remain in the Vehicle Assembly Building while stacking operations of the replacement set of solid rocket boosters continues in the adjacent high bay. Booster stacking operations are expected to be completed early next week. The external tank will then be mated to the boosters as early as Tuesday, July 30. Rollout is planned for August 20. Operations to deservice the hypergolic system of Columbia is underway in OPF Bay 1. Today, the fuel cells will be checked and the flash evaporator system flushed. Preparations continue for the installation of the reaction control system pods in Discovery. Milestones: installation of the right=hand orbital manuevering system pod [July 31]; installation of the remote manipulator system [August 20]; installation of the forward reaction control system [about August 20.] The protective ferry flight tailcone will be installed on Endeavour tomorrow as preparations continue on schedule for the vehicle's first Orbiter Maintenance Down Period in Palmdale, CA. [**Kennedy Space Center Space Shuttle Status Report**, July 22, 1996.]

July 23: **STS-79: STACKING OPERATIONS IN VAB**

Atlantis remains in the Vehicle Assembly Building while stacking operations of the replacement set of solid rocket boosters continue in the adjacent high bay. Leak checks and joint close-out work is complete on the left booster and work to stack the right booster segments is scheduled to begin today. Booster stacking operations are expected to be complete by early next week. The external tank will then be mated to the boosters on Thursday, August 1. In Orbiter Processing Facility Bay 1, Columbia is being prepared for fuel cell voltage tests and the flushing of its flash evaporator system. Columbia is being prepared for its next mission, STS-80, on which Wake Shield Facility-3 and ORFEUS-SPAS-2 will be carried into space and deployed. In OPF Bay 2, Discovery's hydraulic testing is complete. Milestones toward its next mission - STS-82 - include: installation of the right hand orbital maneuvering system pod [July 31]; installation of the remote manipulator system [August 20]; installation of the forward reaction control system [August 28]. In Bay 3 of the OPF, Endeavour is being readied for its trip to California. Installation of the protective ferry flight tailcone is in process today. Vehicle close-outs continue as well. [**Kennedy Space Center Space Shuttle Status Report**, July 23, 1996.]

July 24: **ATLAS SET TO LAUNCH THE 25TH**

A Navy communications satellite is set to be launched from Cape Canaveral Air Station between 8:27 andt 10:27 a.m. tomorrow. "Things that would now take an hour or two to send you will be able to send in a second. It's a tremendous improvement in capability," said Capt. James Loiselle, who is in charge of the Navy's UHF - or Ultra High Frequency - satellite program. The $180 million payload is the seventh such satellite to be launched since March 1993; these new satellites are replacing aging Navy communications satellites. "From Desert Storm, there was recognized the fact that there is an increasing need for getting more information and moving it around," Loiselle said. [Suriano, **FLORIDA TODAY**, p. 1B, July 24, 1996.]

STS-79: PROCESSING CONTINUES FOR ATLANTIS

Atlantis is in the Vehicle Assembly Building while stacking operations of the replacement set of solid rocket boosters continues in the adjacent high bay. Booster stacking operations are expected to be completed this weekend and the external tank is scheduled to be mated to the new stack about August 1. Atlantis will be demated next week - about July 31 - and moved to OPF Bay 3 where some power-on operations will be conducted. Access to the mid-body will be set-up through the crew compartment and some perishable items in the Spacehab will be replaced. The payload bay doors will not be opened and limited work will be conducted in the aft engine compartment. Atlantis will remain on the Orbiter transporter until it returns to the VAB on or about August 13. Rollout is planned for August 20; a repeat of the STS-79 terminal countdown demonstration test is targeted for August 27-28.

In OPF Bay 1, Columbia is undergoing processing operations for its next mission - STS-80, scheduled currently for no earlier than October 31. Discovery is in OPF Bay 2 being prepared for the installation of its reaction control system, looking toward a February 13 launch date for its STS-82 mission. Endeavour is in OPF Bay 3; the protective ferry flight tailcone was installed yesterday as preparations proceeded on schedule for the vehicle's inital Orbiter Maintenance Down Period in Palmdale, CA. Current plans call for Endeavour's ferry flight to include a stop over Ft. Campbell, KY. The trip will continue the following day with an expected arrival at Palmdale early Wednesday afternoon, July 31. [**Kennedy Space Center Space Shuttle Status Report**, July 24, 1996.]

July 25: **STS-79: STACKING OPERATIONS CONTINUE**

Atlantis is in the Vehicle Assembly Building while stacking operations of the replacement set of solid rocket boosters continues in the adjacent high bay. Booster stacking operations are expected to be completed on Saturday and the external tank is scheduled to be mated to the new stack next Thursday. Atlantis will be demated on Wednesday and moved to OPF Bay 3 where some power-on operations will be

conducted. Access to the mid-body will be set up through the crew compartment and some perishable items in the Spacehab will be replaced. The payload bay doors will not be opened and limited work will be conducted in the aft engine compartment. Atlantis will remain on the Orbiter transporter until it returns to the VAB on or about August 13. Milestones: demate Orbiter from current SRB stack and move to OPF Bay 3 [July 31]; mate external tank to solid rocket boosters [August 1]; rollover to VAB and mate with new set of solid rocket boosters [August 13]; rollout to Launch Complex 39A [August 20]; STS-79 terminal countdown demonstration test [August 27-28]. In OPF Bay 1, preparations continue to install Columbia's auxiliary power unit no. 1 tomorrow. The Orbiter's remote manipulator system is being installed into the payload bay today. [**Kennedy Space Center Space Shuttle Status Report**, July 25, 1996; **Kennedy Space Center Space Shuttle Status Report**, July 26, 1996..]

July 29: **STS-79: FAILED LEAK CHECK**

Atlantis remains in the Vehicle Assembly Building while stacking operations of the replacement set of solid rocket boosters (SRB) continues in the adjacent high bay. Atlantis is scheduled to be destacked from the original set of SRBs early Wednesday morning and transported to OPF Bay No. 3 Wednesday evening. Atlantis will return to the VAB on August 13 to be mated to the new stack. Following a failed leak check last week of the field joint between the right aft center and right forward center segments of the replacement SRBs, the forward center segment was destacked and cleaned. During inspections of the secondary O-Rings, an applicator brush bristle was found and is believed to be the reason for the field joint leakage. New O-Rings were installed and the setment was restacked over the weekend. A leak check is being conducted today. If the leak check is successful, booster stacking will be completed this week and the external tank mated to the stack as early as Friday. [**Kennedy Space Center Space Shuttle Status Report**, July 29, 1996; Suriano, **FLORIDA TODAY**, p. 1B, July 30, 1996.]

FLEET UPDATES

The remote manipulator system was installed into Columbia's payload bay last week. Checks of the Flash Evaporator System and General Purpose Computers continue today. Columbia's main engines will be removed August 7 and mission main engines will be installed on or about August 15. Preparations to install Discovery's right hand orbital maneuvering system pod is in work this week. Complete installation of the pod will be achieved by about August 15. The remote manipulator system will be installed August 20 and the forward reaction control system on August 28. Endeavour has been transported to the Shuttle Landing Facility this morning with first motion from OPF Bay 3 at about 9:50 a.m. Due to forecast weather conditions at Fort Campbell, KY, the Orbiter/SCA will not be stopping over there as was originally planned. Instead the Orbiter/SCA plans to fly to Kelly AFB [San Antonio, TX] for refueling. Arrival at Kelly is estimated at about 10:30 a.m. EDT. Endeavour will then

proceed on to Palmdale, where it will arrive late Tuesday afternoon, weather permitting. [**Kennedy Space Center Space Shuttle Status Report**, July 30, 1996 (4:04 p.m.); **Kennedy Space Center Space Shuttle Status Report**, July 1996 (5:15 p.m.).]

CLIPPER GRAHAM SET FOR TEST 4

The "Clipper Graham" single-stage reusable rocket developed by NASA and McDonnell Douglas is scheduled to perform its fourth flight test beginning at 3:30 p.m. EDT, on Wednesday July 31, at the U.S. Army's White Sands Missile Range in New Mexico. During the test flight, scheduled to last two minutes and 20 seconds, the 43-foot-tall rocket will reach an altitude of 4,100 feet and travel laterally 2,800 feet. It will pitch its nose 60 degrees toward the horizon, right itself and pitch its nose 60 degrees in the opposite direction. This flight profile is designed tot est the Clipper Graham's flight characteristics as the maneuvers are conducted. The Clipper Graham has flown successfully three times. Its first flight was May 18, and its most recent flights came just 26 hours apart on June 7 and 8. The date of the vehicle's fifth flight test in the current series has not been determined. Tests beyond the five flights in this series are also under consideration. Longer-duration demonstrations of the new technologies aboard Clipper Graham would contribute to understanding the lifetime performance of these components.

The Clipper Graham was developed from the U.S. Air Force's DC-X rocket which flew eight times between August 1993 and July 1995. NASA and McDonnell Douglas extensively modified the DC-X by replacing existing systems with new technology components which are being tested for the development of future systems for a single-stage-to-orbit reusable launch vehicle. These include a composite liquid hydrogen tank, the first ever to fly on a rocket, and a Russian-built aluminum-lithium alloy liquid oxygen tank. The vehicle's advanced technology tanks all have performed well during its first three flights, said Dan Dumbacher, Clipper Graham Program Manager at NASA's Marshall Space Flight Center (Huntsville, AL). The Air Force's Phillips Laboratory (Kirtland Air Force Base, NM) is managing test flight operations. Clipper Graham, a subsonic vehicle, is part of NASA's Reusable Launch Vehicle Technology Program, along with the Mach-8 X-34 small technology demonstrator, scheduled for flight demonstrations in 1998, and the flagship technology demonstrator, the X-33, which is planned to test new technologies at 15 times the speed of sound in 1999. NASA and Lockheed-Martin are developing the X-33 asa one-half scale model of an operational Reusable Launch Vehicle private industry may develop and operated during the first decade of the next century. [**NASA/KSC News Releases: No. 96-150**, July 29, 1996.]

July 30:

STS-79: STACKING OPERATIONS

The right forward center segment has been mated to the booster stack in the Vehicle Assembly Building and the follow-on leak check of the stacked segments is complete

and good. The right forward segment of the replacement SRBs was scheduled to be mated to the stack today, however, damage to a vent port plug must be repaired and stacking operations are in a temporary hold. The repairs will be conducted later today. Booster stacking will be completed this weekend and the external tank is now scheduled to be mated to the stack Sunday. Atlantis remains in the VAB while stacking operations of the replacement set of solid rocket boosters (SRB) continues in the adjacent high bay. Due to the stacking schedule, Atlantis will be destacked from teh original of SRBs early Thursday morning and transported to OPF Bay No. 3 Thursday evening. Atlantis will return tot he VAB on August 13 to be mated to the new stack. [**Kennedy Space Center Space Shuttle Status Report**, July 30, 1996.]

OMDP: ENDEAVOUR ARRIVES IN CALIFORNIA

The Orbiter Endeavour, riding atop the modified 747 Shuttle Carrier Aircraft [SCA], arrived at Palmdale [CA] at 3:45 p.m. EDT today. The vehicle departed KSC at about 6:55 a.m. EDT today and landed at Kelly AFB [San Antonio, TX], at about 10:10 a.m. for refueling. The Orbiter/SCA then departed Kelly at about 11:45 a.m. and arrived ahead of schedule at Palmdale, completing the one-day ferry flight. Endeavour will be demated from the SCA early Thursday and towed into Rockwell's Orbiter Assembly Facility [Palmdale]. Endeavour will remain in California for about eight (8) months undergoing numerous modifications and structural inspections as part of its first Orbiter Maintenance Down Period. The most significant modification will be in the installation of an external air lock making Endeavour capable of docking with the International Space Station once construction begins late next year. Endeavour's first flight upon returning to flight status will be the first International Space Station assembly Space Shuttle flight, scheduled for launch in late 1997. [**Kennedy Space Center Space Shuttle Status Report**, July 30, 1996.]

AUGUST

August 1: **REPLACEMENT SRB STACKING**

Stacking of the replacement solid rocket boosters [SRBs] nears completion today as the right forward assembly is mated to the top of the booster stack in the Vehicle Assembly Building. SRB joint close-outs are continuing and the external tank is scheduled to be mated to the boosters Monday morning. Atlantis will be demated from the original set of SRBs tonight and transported to the OPF Bay No. 3. Atlantis will return to the VAB on August 13 to be mated to the new stack. Columbia is in OPF Bay 1 where a test of its master events controller will be in work today and functional tests on the orbital maneuvering system continue. Meanwhile, preparations continue in OPF Bay 2 to install the vehicle's right hand orbital maneuvering system pod and work to complete the installation of the remote manipulator system is underway as well. [**Kennedy Space Center Space Shuttle Status Report**, Aug. 1, 1996.]

ROCKWELL TAKES BOEING'S $3 BILLION BID

The Boeing Co. announced a $3 billion agreement to purchase Rockwell International's aerospace and defense businesses. Boeing will replace Rockwell in the alliance with Lockheed-Martin that will be the prime contractor for all shuttle operations. [**FLORIDA TODAY**, August 2, 1996, p 1A.]

NASA COMMENTS ON BOEING'S ROCKWELL PURCHASE AGREEMENT

Wilbur C. Trafton, NASA Associate Administrator for Space Flight, issued the following statement on today's announcement by Boeing Corp. that they have signed an agreement to acquire Rockwell's Aerospace and Defense businesses. "Today's announcement by Boeing should have no impact to the current discussions between NASA and United Space Alliance. Negotiations with Kent Black and his USA organization are continuing as planned. Finalizing the details of the Boeing/Rockwell merger will take several more months and we will of course pay close attention to areas that involve or impact NASA. It is still our hope and expectation to sign the Shuttle single-prime contract with USA in the October time frame." [**NASA/KSC News Releases No. N96-51**, Aug. 1, 1996.]

August 2: **STS-79: CLOSEOUTS CONTINUE FOR ATLANTIS**

Closeouts of the replacement solid rocket boosters [SRB] will continue through the weekend in the Vehicle Assembly Building as preparations are made to mate the external tank to the boosters yesterday. STS-79's original set of SRBs are scheduled to be used on mission STS-81 after they are destacked, cleaned, inspected and restacked. Destacking is scheduled to begin with removal of the external tank next

Thursday. Functional tests of Columbia's orbital maneuvering system is complete to date. Preparations are now in work to begin removing the Space Shuttle main engines next week. Atlantis's STS-81 mission is targeted for launch about January 16, 1997; Shuttle processing status will be issued following mission STS-79. Finally, Discovery continues to undergo preparations for its next mission - STS-82. The second Hubble Space Telescope Servicing Mission. Preparations to install the vehicle's right hand orbital maneuvering system pod and work to complete the installation of the remote manipulator system continues this week. Also, hydraulic operations and check-outs are underway today. [**Kennedy Space Center Space Shuttle Status Report**, Aug. 2, 1996; **Kennedy Space Center Space Shuttle Status Report**, Aug. 5, 1996.]

NASA'S NEW OFFICE MAY SAVE 100 KSC JOBS

A new NASA office that oversees shuttle fleet upgrades will employ more than 100 civil servants, lessening the blow of planned reductions in KSC's federal work force. The new shuttle upgrade office will be responsible for overseeing the installation of advanced navigation, flight control and cockpit systems in the shuttles. It also will oversee the replacement of the shuttle's current hydraulic systems with electromechanical actuators. [**FLORIDA TODAY**, August 2, 1996, p 4B.]

August 5: **KSC MAY BE SITE OF X-34 ROCKET TESTS**

Officials are eyeing Kennedy Space Center as a rainy and windy test site to see how an experimental rocket handles in bad weather. The X-34 rocket, under development by NASA and Orbital Sciences Corp., is scheduled to make its debut in 1998. The X-34 is a small, winged, 58-foot-long rocket that would be carried into the sky on a modified airplane, released over the ocean and soar into space. [**FLORIDA TODAY**, August 5, 1996, p 1A.]

KSC LAYS PATH OF SUPPORT

The SpaceWalk of Honor is a brick path at the Kennedy Space Center's Visitor Center to honor the thousands who have supported NASA's efforts. Anyone who has supported the space program can pay to have his or her name inscribed on a brick. The path will wrap around a pond near the Space Mirror Memorial that was built to remember the 16 astronauts who have died in space flight or training. [**FLORIDA TODAY**, August 5, 1996, p 1B.]

August 6: **SHUTTLE FLEET STATUS**

Workers in OPF Bay 3 have established access to the crew compartment of Atlantis and to the Spacehab-Mir module. In the VAB, workers have mated the STS-79 external tank to its twin solid rocket booster stack. Today, Atlantis will be powered up and tests conducted of the vehicle's microwave scanning beam landing system.

Workers will also make main engine actuator checks. Scheduled STS-79 work includes external tank/solid rocket booster interface checks. Atlantis will be rolled over to the VAB in the middle of next week. In OPF Bay 1, Columbia has had its heat shields removed in preparation for main engine removal activities later this week; the STS-80 main engines will be installed next week. Discovery is also being processed for its next mission - STS-82 - in OPF Bay 2. The vehicle's right orbital maneuvering system pod has arrived at the OPF. Preparations have begun for the installation which is scheduled to occur early next week. The remote manipulator arm is scheduled to be installed on August 20 and the Orbiter's forward reaction control system is scheduled for installation on August 30. [**KSC Space Shuttle Status Report**, Aug. 6, 1996.]

OLD METEORITE SHOWS SIGNS MARS HAD LIFE

A meteorite from the Red Planet contains organic evidence that primitive, microscopic life possibly existed on the planet about 4.5 billion years ago, NASA officials said. David McKay of the Johnson Space Center said the conclusion is drawn from more than two years of study of a rock, called Allan Hills 84001. [**FLORIDA TODAY**, August 7, 1996, p 1A.]

August 10: **STS-79: ATLANTIS UPDATE**

Atlantis will remain on the Orbiter transporter in the Orbiter Processing Facility until next week when it is scheduled to be returned to the VAB and mated with the new set of solid rocket boosters and external tank. The Spacehab destow is complete and pressure decay checks are now in work. The external tank was demated today from STS-79's original set of SRBs. Destacking of the boosters is expected to begin as early as August 12. Mating to the new set of SRBs is planned for August 13 and rollout to Launch Complex 39A is set for August 20. The STS-79 terminal countdown demonstration test is scheduled for August 27-28.

Meanwhile, in OPF Bay 1, Columbia will have its main engines removed starting tonight; installation of STS-80 main engines is scheduled to begin next Wednesday, August 14-15. Discovery is in OPF Bay 2 where auxiliary power hook-ups are scheduled to begin tonight as preparations to install the right hand orbital maneuvering system pod continue. The pod is targeted for installation early next week. [**Kennedy Space Center Space Shuttle Status Report**, Aug. 10, 1996.]

August 11: **KSC PROMOTES TWO EMPLOYEES TO WATCH OVER SAFETY ASSURANCES**

Two Kennedy Space Center officials have received new appointments. JoAnn H. Morgan has been promoted to associate director of safety and shuttle upgrades. P. Thomas Breakfield has been appointed director of safety and mission assurance.

[**FLORIDA TODAY**, August 8, 1996, p 2D.]

August 12: **STS-79: ROLLOVER IMMINENT**

Preparations continue on schedule to transport Atlantis from the Orbiter Processing Facility Bay 3 to the Vehicle Assembly Building. The move is targeted for about 10 a.m. tomorrow. Once in the VAB, Atlantis will be mated with the new set of solid rocket boosters and external tank. Engineers will conduct the Shuttle interface verification test later in the week keeping Atlantis on schedule to return to Launch Complex 39A on August 20. Main engine flight readiness test and leak checks are planned for August 21-22. The STS-79 crew will arrive August 25 for the terminal countdown demonstration test which will be conducted August 27-28. Removal of the Space Shuttle Columbia's main engines is complete. The new engines will be installed later this week; installation of the STS-80 drag chute will begin later today. Meanwhile, preparations are underway to install Discovery's right hand orbital maneuvering system pod August 14. Tests on the vehicle's 5th cryogenic tank set wiring will occur August 21. [**Kennedy Space Center Space Shuttle Status Report**, Aug. 12, 1996.]

August 14: **STS-79: ATLANTIS ROLLED TO VAB**

Workers have completed the rollover of Atlnatis from OPF Bay 3 to the Vehicle Assembly Building and the Orbiter has been mated to its external tank and solid rocket booster stack in preparation for its STS-79 mission. Today, VAB technicians will establish electrical connections between the Orbiter and the external tank/SRB stack. The mission's Shuttle interface test will take place August 16 and the STS-79 crew will arrive for safety training and the terminal countdown demonstration test on August 25 at 5:30 p.m. The test will occur August 27-28. Launch for STS-79 is now targeted for September 12 at 6:26 a.m.; landing is planned to occur nine days later at Kennedy Space Center. In OPF Bay 1, Columbia is being prepared for its next mission, i.e., STS-80, on which it will deploy both ORFEUS-SPAS-2 and Wake Shield Facility-3. Drag chute installation is in work today. Preparations continue for installing the remote manipulator system and the Orbiter main engines on August 16. Work is also underway for the planned purge and flush of the flash evaporator system this week. Payload bay reconfiguration continues. Polishing of windows 3 and 4 is complete. Discovery, in OPF Bay 2, is having its right orbital maneuvering system pod installed today. The vehicle's radiator functional test is complete. The main propulsion system functional test is scheduled to begin tonight and orbiter electrical system testing will resume. The Orbiter's forward reaction control sysem is scheduled for installation on August 30. [**Kennedy Space Center Space Shuttle Status Report**, August 14, 1996; **Kennedy Space Center Space Shuttle Status Report**, August 15, 1996.]

PROBES ARRIVE AT KSC FOR MARTIAN JOURNEY

The 2,315-lb. Mars Global Surveyor, built by Lockheed Martin Astronautics in Denver, was unloaded from a U.S. Air Force C-17 on August 14 and taken to the Payload Hazardous Servicing Facility in the Kennedy Space Center industrial area. Most elements of Mars Pathfinder which NASA built in-house at the Jet Propulsion Laboratory arrived the day before in a van from California. The cruise stage, aeroshell and lander were driven to the Spacecraft Assembly and Encapsulation Facility at KSC. The fourth element, the rover, is due to arrive by air this week.

The Global Surveyor will be taken to Launch Complex 17 on October 23 and prepared for launch on a Delta 2 during a 20-day period the following month. A launch at the opening of the launch window on the first day would put the liftoff at 12:11 p.m. EST on November 6. The spacecraft would reach Mars in September 1997. Pathfinder is due to undergo a three-month integration process before being taken to Pad 17-B on November 21. The launch of Pathfinder, about 570 kg. fully fueled, is scheduled December 2 at 2:09 a.m. EST, with other opportunities running through December 25. An on-time launch would lead to a landing on Mars on July 4, 1997. [**AVIATION WEEK & SPACE TECHNOLOGY**, August 19, 1996, p 27.]

August 20: **LAYOFFS MAY CUT KSC STAFF IN HALF IN 1999**

NASA doesn't have a detailed plan of how it will achieve a dramatically smaller work force by 2000 and could resort to layoffs by 1999 to meet its goals, a General Accounting Office report says. Kennedy Space Center is scheduled to take the largest hit among 11 NASA centers, including headquarters. [**FLORIDA TODAY**, August 20, 1996, p 1A]

ATLANTIS CRAWLS TO PAD

Shuttle Atlantis was moved to its launch pad for a mission to the Russian space station Mir. The shuttle and its crew are set for liftoff Sept. 12 to pick up astronaut Shannon Lucid. Originally scheduled for a July 31 launch, Atlantis was taken off the pad at KSC on July 10 when Hurricane Bertha threatened Florida's coastline. NASA officials then decided to change the boosters because they were assembled with a new adhesive that may be to blame for hot gas leaks in the boosters of shuttle Columbia during a flight in June. When Lucid is picked up by Atlantis, she will be replaced by astronaut John Blaha, who will spend about 130 days aboard Mir. [**FLORIDA TODAY**, August 21, 1996, p 1A.]

August 21: **NASA: CUTS WON'T BE AS DEEP AS REPORTED**

Federal job cuts at Kennedy Space Center will not be as deep as a congressional report indicated earlier this week, NASA officials said. The changes in the work force projections are the result of less work being picked up by United Space Alliance and the opening of two new offices at KSC. [**FLORIDA TODAY**, August 21, 1996, p 2A.]

August 22: **NEW ADHESIVE, CLEANING SOLUTION BLAMED FOR BOOSTER LEAKS**

NASA Officials have concluded a new adhesive and cleaning solution are to blame for allowing hot gases to leak into the booster rockets of shuttle Columbia during a June launch. While the leaks did not threaten Columbia or its crew, NASA will continue using an old adhesive and solution while more tests are done on the problem-causing materials. The booster problems forced NASA to delay the upcoming launch of shuttle Atlantis to the Russian space station Mir until Sept. 12 so the ship could be outfitted with new boosters. [**FLORIDA TODAY**, August 22, 1996, p 7A.]

MARS ROVER DUE AT KSC

The Sojourner Truth, a 10-kilogram rover that will ride NASA's Mars Pathfinder is scheduled for delivery at its Kennedy Space Center launch site August 23. Sojourner will take simple chemical readings on rocks in a large outflow channel selected because it is likely to contain a variety of material washed there when liquid water existed on the surface of Mars. [**AEROSPACE DAILY**, August 16, 1996, p 246.]

KSC WORKERS WIN SILVER SNOOPY

Two NASA employees at Kennedy Space Center have been awarded the "Silver Snoopy Award" for their service to space shuttle astronauts. Shawn M. Greenwell and C. Philip Benardo were presented the award August 22 by astronaut Andy Thomas, who flew on a 17-day research flight of shuttle Columbia. [**FLORIDA TODAY**, October 13, 1996, p 5E.]

August 23: **SPACE SHUTTLE FINALLY GET ROLE AS 'SPACE TRUCK' ON STS-79**

The space shuttle Atlantis will finally get to play the "space truck" role originally assigned NASA's fleet of reusable space planes next month on the STS-79 mission, when it will deliver fresh crew and supplies to Russia's Mir space station. Targeted for launch on September 12, Atlantis will carry 7,096 pounds of food, water, scientific gear and other supplies to Mir in the first double Spacehab module to fly. Also on board will be U.S. Astronaut John Blaha, who will trade places on Mir with Astronaut Shannon Lucid as the U.S. begins what will be an almost continuous presence in space going into the International Space Station era. [**AEROSPACE DAILY**, August 23, 1996, p 282.]

August 27: **CUTBACKS COULD GUT NASA'S PROGRAMS**

A smaller work force at Kennedy Space Center will lead to hundreds of layoffs in two years and leave the center unable to do everything NASA expects of it, KSC's director is warning his bosses. In his letter, Honeycutt noted that the cuts would come just as

KSC is taking on responsibility for overseeing massive upgrades to the space shuttle and getting pieces of NASA's space station ready for launch. Honeycutt said the 1,445-employee figure that NASA wants to impose on KSC was based on the center's becoming a government-owned, contractor-run facility - an approach that has been heavily changed by NASA officials since it was announced in May 1995. [**THE ORLANDO SENTINEL**, August 27, 1996, p A-1.]

August 28: **ASTRONAUTS PREPARE FOR ATLANTIS FLIGHT**

Shuttle Atlantis astronauts were at the Kennedy Space Center training for the launch Sept. 12. The crew performed a practice countdown for the mission to retrieve astronaut Shannon Lucid from space station Mir. [**FLORIDA TODAY**, August 28, 1996, p 5A.]

SPACEHAB SERVICE SHUTTLE/MIR

Set for launch in mid-September, STS-79 will take some 7,100 pounds of food, scientific gear and other supplies up to Mir in special foam-lined lockers and fabric bags ranged along the walls and bulkheads of the double Spacehab. Once the shuttle docks with the Russian station, astronauts and cosmonauts will wrestle the supplies along a tunnel to the Shuttle docking system and then "up" into Mir.

On the return trip Atlantis will ferry more than 3,000 pounds of "down cargo" to Earth, including spent batteries and broken gyrodynes from Mir, again using the logistics gear in the Spacehab module. When it lands at Kennedy Space Center, most of the gear stowed in the Spacehab module will be offloaded at the company's Payload Processing Facility just outside Gate 1, after the module is hauled there on a rented flatbed truck. [**AEROSPACE DAILY**, August 28, 1996, p 311.]

NASA MAY ROLL ATLANTIS OFF ITS PAD

The severe tropical weather in the Atlantic might be churning up NASA's latest plan to launch shuttle Atlantis on a mission to pick up astronaut Shannon Lucid from the Russian Space station MIR. NASA officials are keeping close tabs on Edwouard as well as Fran and a tropical depression behind it. NASA is still targeting the 12th, but may have to wait two days because a Delta rocket has already laid claim to that date for liftoff from Cape Canaveral Air Station. [**FLORIDA TODAY**, August 29, 1996, p]

August 29: **ASTRONAUT MUST WAIT EVEN LONGER FOR RIDE HOME**

NASA on Thursday moved back the scheduled launch of the space shuttle Atlantis from Sept. 12 to Sept. 14 at 5:39 a.m. The main reason Atlantis' launch was delayed two days is because it has to wait its turn to launch from the Brevard County coast. Kennedy Space Center and Cape Canaveral Air Station use the same safety equipment

to control their liftoffs, and launch dates are set on a first-come, first-go basis. [**THE ORLANDO SENTINEL**, August 30, 1996, p A-1.]

During August: **ENDEAVOUR UNDERGOES MODIFICATIONS**

The space shuttle Endeavour is set to undergo eight months of modification and refurbishment at Rockwell International's orbiter assembly facility in Palmdale, CA. Performing the work at Rockwell has generated controversy because many shuttle managers believe it could be done just as effectively and more inexpensively at the Kennedy Space Center. About 100 modifications will be added to Endeavour, with about 10 of them directly related to operations to assemble the international space station. A large external airlock to facilitate station dockings will be added, as well as a new power supply and computer upgrades. Endeavour has flown 11 missions since its first launch in May, 1992. Its first mission following refurbishment is scheduled to be the initial station assembly flight in December, 1997. [**AVIATION WEEK & SPACE TECHNOLOGY**, August 5, 1996, p 55.]

GET-AWAY SPECIAL PROGRAM BACKLOGGED

NASA's Get-Away Special (GAS) program remains backlogged with dozens of small self-contained payloads awaiting eventual launch on the space shuttle. Nearly 550 potential payload sponsors have booked reservations with NASA for "GAS can" payloads, although many of the sponsors will not follow through with actual payload development. Twenty-seven GAS payloads are currently being built under NASA specifications, with two ready to fly on upcoming shuttle missions. [**AVIATION WEEK & SPACE TECHNOLOGY**, August 5, 1996, p 55.]

ASTRONAUTS BEGIN TRAINING

Thirty-five new astronauts, the largest class selected by NASA since the original shuttle group was chosen in 1978, is beginning training this month at the Johnson Space Center. Eleven of the new U.S. astronauts selected were already employed at NASA centers, including five from Johnson, two each from the Kennedy and Goddard centers and one each from the Jet Propulsion Laboratory and Langley Research Center. Seven were selected from the Navy, while two each were selected from the Marine Corps and U.S. Army. The U.S. Air Force provided five of the new astronauts. Two researchers each were selected from the Georgia Institute of Technology and Los Alamos National Laboratories. [**AVIATION WEEK & SPACE TECHNOLOGY**, August 26, 1996, p 62.]

NASA NAMES FLIGHT CREWS

NASA's chief astronaut has been named to command the space shuttle mission slated to carry the first U.S. hardware for the international space station into orbit. U.S.

Marine Corps Col. Robert D. Cabana has been picked to command Mission 88, in which the shuttle Endeavour is scheduled to orbit the Boeing-built Node-1 connector and two McDonnell Douglas-built pressurized mating adapters. The highlights of the December, 1997, mission are to be the mating of Node-1 to the Russian-built Functional Energy Block space tug and two spacewalks to connect power and data transmission cables between the node and the FGB. The FGB, the first piece of station hardware to be orbited, is slated for launch on a Russian booster in November 1997. Joining Cabana is Nancy Currie, Jerry Ross, Jim Newman and Frederick "Rick" Sturckow. [**AVIATION WEEK & SPACE TECHNOLOGY**, August 26, 1996, p 26.]

SEPTEMBER

September 3: **KSC TO OFFER 1-DAY TOUR OF AREAS OFF LIMITS**

On October 19 NASA will open the restricted gates of Kennedy Space Center for an unprecedented Community Appreciation Day. Normally off limits to all but badged employees and those on tour buses, KSC will be open to local residents between 8 a.m. and 3 p.m. that day. The open house, the first in 33 years at KSC, is a way of thanking the public, KSC Director Jay Honeycutt said. "We've been in this community for 30-plus years and haven't really taken the opportunity to express to the community how much we appreciate the support that they've given us," Honeycutt said. KSC Community Appreciation Day booklets and vehicle placards will be available at any Brevard County Public Library. [**FLORIDA TODAY**, September 3, 1996, p 1B; **THE ORLANDO SENTINEL**, September 4, 1996, p C3.]

September 4: **MIR CREW, FRENCH COSMONAUT LAND SAFELY; FRAN THREATENS STS-79**

The "two Yuris" who served five months on Russia's Mir space station with Astronaut Shannon Lucid returned to Earth safely on Monday along with the French cosmonaut who traveled to Mir two weeks ago with a Russian replacement crew, but Hurricane Fran threatened to delay Lucid's return to Earth again. Crews at Kennedy Space Center maintained Atlantis in a "rollback posture" through the holiday weekend after setting a September 14 flight date last week. If the storm heads for KSC the umbilical linking the Shuttle and the launch pad would be detached and Atlantis rolled to safety. [**AEROSPACE DAILY**, September 4, 1996, p 336.]

ATLANTIS MOVED TO VAB; STS-79 LAUNCH DELAYED

NASA managers early this morning decided to move Space Shuttle Atlantis off of Launch pad 39-A as a precautionary move due to the approach of Hurricane Fran to the southeast coast of the United States. Rollback of Atlantis will mean a slip in the launch date of Shuttle Mission STS-79 which had been set for September 14, 1996. The decision to move Atlantis was made around midnight and first motion of the vehicle off the launch pad occurred at 5:21 a.m. EDT. Atlantis was back in the Vehicle Assembly Building (VAB) by about noon EDT. The VAB provides better protection for the Orbiter systems against severe weather which may pass through the Kennedy Space Center area. For planning purposes, NASA managers are using September 16 or 17 as a target launch date. [**NASA Press Release** #96-181, September 4, 1996.]

September 6: **SENATE REJECTS MOVE TO KILL INTERNATIONAL SPACE STATION**

The Senate has again thwarted an attempt by Sen. Dale Bumpers (D-Ark.) to kill the fiscal year 1997 funding for the International Space Station. During debate late Wednesday on the FY '97 VA, HUD and Independent Agencies appropriations bill, senators voted 60-37 to table Bumpers' amendment terminating the orbiting laboratory project. When an amendment is tabled it becomes a dead issue. [**AEROSPACE DAILY**, September 6, 1996, p 455.]

ATLANTIS RETURNS TO PAD; LAUNCH SET FOR SEPT. 16

For the third time in as many months, shuttle Atlantis is back on its launch pad while another tropical depression strengthens in the Atlantic and moves toward the Caribbean. The ship's flight to the Russian space station Mir is set for Sept. 16. But a tropical depression far out in the Atlantic, which soon could become Tropical Storm Hortense, has NASA keeping a careful watch. Although it's too early to predict the system's path, NASA officials decided Thursday to keep some of their preparations for Hurricane Fran intact a few more days. That means sandbags and plywood will be left in place until forecasters confidently can predict what will happen with the disturbance, KSC spokesman Bruce Buckingham said.

For the record, Atlantis first was placed on the launch pad July 1, and rolled back to the Vehicle Assembly Building on July 10 because of a threat from Hurricane Bertha. After replacing a set of solid rocket boosters that may have been prone to leak, Atlantis made another trip to the pad Aug. 20 aiming for a Sept. 14 launch. [**FLORIDA TODAY**, September 6, 1996, p 5A.]

September 7: **LUCID FLIES INTO THE RECORD BOOK**

Today U.S. astronaut Shannon Lucid will break the world record for the longest spaceflight by a woman, 169 days and counting. "As long as Atlantis is in good shape, then I'm in good shape," she said. Cosmonaut Elena Kondakova held the woman's space endurance title until today. She set it aboard the Mir space station while a member of the Mir 17 crew in March 1995. Currently Kondakova is training at the Johnson Space Center in Houston for a shuttle mission in 1997. Barring any more troubles, Lucid should be back on the ground at Kennedy Space Center in fewer than three weeks, providing Atlantis' new Sept. 16 liftoff date holds firm. [**THE ORLANDO SENTINEL**, September 8, 1996, p A3; **FLORIDA TODAY**, September 7, 1996, p 2A; **FLORIDA TODAY**, September 8, 1996, p 1A; **KSC Countdown**, September 10, 1996.]

September 8: **NASA ADDS TO SPACEPORT**

NASA is upping its ante into a pair of Spaceport Florida Authority conversion projects at Cape Canaveral Air Station, bringing the agency's total investment in the efforts to $831,250. NASA last month agreed to provide $500,000 to the authority to enclose a portion of a mobile service tower now being erected at Launch Complex 46, a pad that will be used by small rockets for commercial launch operations. Some of that money also is being used to help build a Customer Service Center for commercial launch companies staging missions out of the launch complex. [**FLORIDA TODAY**, September 8, 1996, p 1E.]

September 9: **ATLAS LIFTS OFF WITH NEW BREED OF SATELLITE**

A U.S.-made communications satellite originally intended for launch on a European booster was launched into space from Cape Canaveral Air Station aboard a Lockheed Martin Atlas 2A rocket. The commercial mission was launched on time at 5:49 p.m., marking the 25th consecutive success for Atlas. With fewer parts, more broad-casting power and an expected 15-year lifetime in space, officials say the GE-1 spacecraft represents a new breed of Earth-orbiting satellites. Now that the Atlas has cleared the Eastern Range schedule, all attention turns to Thursday's scheduled Delta 2 launch of a Navstar Global Positioning System satellite. [**FLORIDA TODAY**, September 9, 1996, p 1-2A.]

ATLANTIS FLIGHT RESCHEDULED

At the Kennedy Space Center, launch of the space shuttle Atlantis on its mission to Mir was rescheduled for 4:54 a.m. EDT September 16. The launch was delayed from September 14 when Hurricane Fran forced Atlantis to be rolled back to the Kennedy Vehicle Assembly Building September 4. The shuttle was rolled back to Pad 39A on September 5. [**AVIATION WEEK & SPACE TECHNOLOGY**, September 9, 1996, p 17.]

September 10: **STS-79 WORK PROCEEDS**

Work is proceeding at Launch Pad 39A towards a 4:54 a.m. launch of the STS-79 mission on Sept. 16. The six-member mission crew is scheduled to arrive at KSC at midnight Thursday (Sept. 12), and the countdown clock for the 10-day space flight will start at the same time. Atlantis is scheduled to dock with the Mir Space Station on the evening of Sept. 18. [**KSC Countdown**, September 10, 1996.]

KSC WILL HOST CREW MAKING MOVIE OF SAGAN'S CONTACT

A Warner Bros. movie based on Carl Sagan's best seller Contact, about extraterrestrial life, will spend two weeks filming at Kennedy Space Center in February. Production

personnel have been negotiating with NASA since April and have scouted locations here several times. [**THE ORLANDO SENTINEL**, September 10, 1996, p A-2.]

September 11: **WAKE SHIELD FACILITY**

The Wake Shield Facility has been delivered to Kennedy Space Center for an October 31 reflight aboard the Space Shuttle Columbia. The vacuum epitaxy experiment, which creates an ultra-pure vacuum in the "wake" of a stainless steel disk dropped off in orbit from the Shuttle's robot arm, set a "world record" in semiconductor wafer purity on its last flight. It has since been upgraded by Space Industries of league City, Texas, to include more battery power and better shielding from Earth-based electromagnetic signals that have fouled the vehicle's attitude control system in the past. [**AEROSPACE DAILY**, September 11, 1996, p 394.]

BETHUNE-COOKMAN AWARDED KSC SPACE EDUCATION GRANT

NASA has awarded a grant to Bethune-Cookman College to operate the Educators Resource Center and the Exploration Stations in the Center for Space Education at Kennedy Space Center. Awarded Sept. 11, the grant gives Bethune-Cookman a key role in helping NASA expose students and educators to real-world science through space-related teaching resources and hands-on, minds-on learning experiences. KSC's Education Services Branch in the Public Affairs Office manages the program, which is designed to help teachers and inspire students to choose careers in mathematics, science and technology. [**KSC Countdown**, September 26, 1996.]

September 12: **HURRICANE HORTENSE EXPECTED TO BYPASS FLORIDA**

Hurricane Hortense is expected to follow a northerly course over the Atlantic Ocean and present no threat to Florida. KSC hurricane preparedness crews will begin removing window coverings and sandbags today. The weather is expected to improve over the weekend and provide favorable conditions for the launch of the STS-79 mission. [**KSC Countdown**, September 12, 1996.]

NASA WON'T ROLL ATLANTIS OFF PAD

With Hurricane Hortense turning north away from Florida, NASA officials decided Wednesday not to move the ship off its launch pad for safe keeping. That means the countdown for Atlantis' 10-day mission to the Russian space station Mir is set to start at midnight. [**FLORIDA TODAY**, September 12, 1996, p 2A.]

September 13: **PREMIERE OF "THE CAPE" TO AIR SEPT. 13**

"The Cape" premiere is scheduled for Friday, September 13, on WKCF-TV (Channel

18) at 8 p.m. Since this two-hour pilot was filmed at KSC and in the Merritt Island area, viewers will see a lot of familiar scenes and faces, including the KSC Shuttle Launch Team. During the pilot episode, the Shuttle Atlantis is launched to retrieve a malfunctioning nuclear-powered Russian satellite that threatens the U. S. East Coast. The hour-long, nationally syndicated show will continue in this time slot throughout the season, with production currently underway at the center and in Brevard County for several more episodes. [**KSC Countdown**, September 10, 1996.]

ATLANTIS COUNTS DOWN -- AGAIN

The clocks started ticking at Kennedy Space Center early this morning after two months of delays caused by everything from booster rocket problems to hurricanes threatening off the Florida coast. Atlantis is scheduled for a pre-dawn liftoff Monday (Sept. 16) between 4:45 a.m. and 5:01 a.m. A 70 percent chance of good weather exists. [**FLORIDA TODAY**, September 13, 1996, p 1A.]

September 14: **SLEEPLESS OVER SEATTLE?**

The shuttle Atlantis is to carry John Blaha to the Russian space station Mir on Monday (Sept. 16) for a 128-day stay. An on-time return to Earth will keep Blaha in space during Christmas, giving him a record of his own in the shadow of Shannon Lucid's mission endurance title. Blaha will be the first American in orbit on Christmas Day since 1973, when the three-man crew of Skylab 4 fashioned a makeshift tree out of cans and decked the halls from their orbiting laboratory. The only other Americans to be in orbit during Christmas were the crew of Apollo 8, who looped around the moon for the first time during their historic mission on Dec. 25, 1968. [**FLORIDA TODAY**, September 14, 1996, p 2A.]

SPACE SHUTTLE STATUS REPORT

The preparations for the launch of Space Shuttle Atlantis continued on schedule at Pad 39A. The L-2 day review was held this afternoon in the Mission Briefing Room and there are no open issues remaining to be resolved by the Mission Management Team before tanking begins tomorrow night. The countdown clock in Firing Room 1 of the Launch Control Center entered a planned built-in hold at 4 p.m. today and will resume counting down at 1:03 p.m. on Sunday. Launch remains scheduled to occur at 4:54 a.m. on Monday, Sept. 16, which will begin a 10-day mission planned to end with a landing at the Kennedy Space Center on Thursday, Sept. 26 at approximately 8:12 a.m. [**Space Shuttle Status Report**, September 14, 1996.]

September 15: **BUZZ ALDRIN AT KSC VISITORS CENTER**

Apollo 11 pilot Buzz Aldrin will be at the KSC Visitor Center Sept. 15 to conduct a public briefing from 1:30 to 2 p.m. about his new book "Encounter with Tiber." He

will also sign copies of the book from 2 to 4 p.m. in the Space Shop. [**KSC Countdown**, September 12, 1996.]

September 16: **ATLANTIS, MIR ADVANCE SPACE OPERATIONS**

The demonstration of new technology and capabilities applicable to future station and shuttle operations continues to be a focal point of the Atlantis mission to Mir, in parallel with the completion of station resupply and the first changeout of a U. S. long-duration crew in orbit. Atlantis lifted off from Pad 39A at Kennedy Space Center at 4:54 a.m. EDT Sept. 16 and docked with the Mir station 242 stat. mi. over Moldova approaching southwest Russia at 10:13 p.m. EDT Sept. 18. The two spacecraft were to remain docked until late Sept. 23, when pilots William Readdy and Terrence Wilcutt are to back Atlantis 600 ft. away from Mir. Wilcutt is to then fly Atlantis around the station twice for a photo documentation before final separation of the two spacecraft. Shuttle mission 79 astronaut John Blaha will watch that departure from Mir, where he is to remain until mid-January with Russian cosmonauts Valery Korzun and Alexander Kaleri. Astronaut Shannon Lucid will watch the separation from Atlantis after having spent six months aloft. [**AVIATION WEEK & SPACE TECHNOLOGY**, September 23, 1996, p 22.]

MARS EXPLORATION

Tom Stafford, who headed the Bush Administration's "Synthesis Group" study of long-term U.S. space exploration strategy, says "senior members" of that panel still believe that human exploration of Mars will require development of a Saturn V-class heavy lift launch capacity and a nuclear thermal rocket. Stafford, a retired Air Force three-star and Apollo astronaut, tells a House Science space and aeronautics subcommittee that the "incremental" architectures his group formulated in 1990-91 are still valid as a way to fund pay-as-you-go Mars exploration. [**AEROSPACE DAILY**, September 16, 1996, p 410.]

September 17: **ATLANTIS DEPARTS TO MIR ON TIME, BUT MAY HAVE TO RETURN EARLY**

NASA's Space Shuttle Atlantis launched for its fourth rendezvous and docking with Russia's Mir space station yesterday, hitting a narrow launch window after six weeks of technical and weather delays, but a problem that developed during ascent may force controllers to truncate the flight.

The No. 2 auxiliary power unit shut down prematurely after the 4:54 a.m. EDT liftoff, which came at the beginning of the roughly five-minute launch window. Controllers at first thought they might have to send Atlantis to a quick docking with Mir so record-setting U.S. Astronaut Shannon Lucid could be relieved, and then bring the space plane home. The three APUs aboard Atlantis are not used in orbit, but at least

one of them must be operational to activate the flight control surfaces during landing. [**AEROSPACE DAILY**, September 17, 1996, p 421.]

THE CAPE' CAPTURES LAUNCH SHOT IN 1 TAKE

Actor Corbin Bernsen, star of the television series "The Cape," had but one chance to get his lines right during a scene being filmed at Kennedy Space Center's Launch Complex 39 Press Site. With the live launch of Atlantis serving as a backdrop, the producers of the show couldn't exactly call the thundering shuttle back to the ground for a second take. "That was a one-time deal, and I haven't been that nervous since I was on stage," said Bernsen, who plays veteran astronaut Henry "Bull" Eckert on the show. For the record, the sheer spectacle of a nighttime shuttle launch did, in fact, cause Bernsen to botch a line. [**FLORIDA TODAY**, September 17, 1996, p 4A.]

COUNCILWOMAN IN COURT

Cocoa Councilwoman Phyllis Churchill attended a hearing in her DUI trial Tuesday at the Moore Justice Center. The judge declared a mistrial, and a new trial is being scheduled. Churchill was arrested in December 12, 1995 on KSC property. [**FLORIDA TODAY**, September 18, 1996, p 1A.]

ASTRONAUT GETS A NEW ROLE

Two-time astronaut and United Space Alliance shuttle engineering chief Bruce E. Melnick took over Tuesday as boss of McDonnell Aerospace, Space and Defense Systems at Kennedy Space Center, the company announced. Melnick is vice president and general manager of the conglomerate's KSC division, which processes experiments and satellites for the space shuttle. [**THE ORLANDO SENTINEL**, September 18, 1996, p 1B.]

September 18:

TESTING ON ALUMINUM LITHIUM SHUTTLE TANK COMPLETED

NASA and Lockheed Martin have completed tests designed to show that the new aluminum lithium lightweight external tank for the U.S. Space Shuttle can withstand the rigors of launch. Testing at Marshall Space Flight Center demonstrated that the tank, built to enhance Shuttle performance to the 51.6-degree International Space Station inclination, can bear up under loads "greater than flight certification requirements," NASA said. The test series, which ended September 5, included both capability and certification tests. The new tank weighs 7,500 pounds less than the original version. [**AEROSPACE DAILY**, September 18, 1996, p 432.]

September 18: **ATLANTIS DOCKS WITH MIR; CARGO TRANSFER UNDERWAY**

NASA's Space Shuttle Atlantis docked with Russia's Mir space station at 11:13 p.m. Wednesday and then gently connected for the fourth time in 15 months. By 7 a.m. EDT yesterday U.S. Astronaut Shannon Lucid had ended her six-month stint as a Mir crew member. The two spacecraft will remain docked for a total of five days before separating for a landing at Kennedy Space Center targeted for 8:12 a.m. EDT September 26. [**AEROSPACE DAILY**, September 20, 1996, p 446; **THE ORLANDO SENTINEL**, September 19, 1996, p A1.]

September 20: **BOOSTER HAD STOWAWAY: WRENCH**

NASA officials said they have formed an investigative panel to find out how a 5-inch wrench could have been left in an electronics compartment for one of the booster rockets. The 8-ounce wrench was discovered inside the compartment of the top right booster after the booster was recovered from the ocean and returned to KSC. Engineers found no immediate sign of damage in the compartment, which houses crucial electronic components. The rockets performed as expected in Monday's predawn blastoff. [**FLORIDA TODAY**, September 20, 1996, p 1-2A; **THE ORLANDO SENTINEL**, September 20, 1996, p'A-14.]

APOLLO HAD BOMB CALL, LIGHTNING HIT

Report of a bomb threat shortly before Apollo 12 lifted off from Kennedy Space Center has never been printed before, according to the NASA officials who ran security and directed the launch. It occurred Nov. 14, 1969, only four months after America put the first human on the moon. "It was just prior to the Apollo 12 mission, after the astronauts were put in the capsule 90 minutes before launch," says Charles Buckley. He headed up security on Mercury, Gemini and Apollo programs. "...I talked to Walter Kapryan (Apollo launch director) in the Launch Control Center...I recommended he go ahead with the launch." [**FLORIDA TODAY**, Salamon, September 20, 1996, p 10A.]

VIEWS OF MARS SPACECRAFT PROCESSING AVAILABLE

Internet users can view NASA's preparations of two spacecraft that soon will be bound for Mars. Still images of processing of the Mars Global Surveyor and Mars Pathfinder are available from Kennedy Space Center, FL. The pictures, which are "frame grabs" from television cameras, are updated every 90 seconds. The internet address for images of Mars Global Surveyor and the Delta launch vehicle at Complex 17 is: http://www.ksc.nasa.gov/payloads/missions/mgs/video.html. The internet address for Mars Pathfinder images is: http://www.ksc.nasa.gov/payloads/missions/ pathfinder/video.html. Mars Global Surveyor is scheduled to be launched November 6 and Mars Pathfinder on December 2. Both spacecraft will be launched from Cape

Canaveral, FL. [**NASA Press Release**, Internet Advisory #I96-8, September 20, 1996.]

September 22: **SHUTTLE SHELL ORBITS AMUSEMENT PARK**

The Buran space shuttle, once a symbol of the Soviet Union's determination to compete with the United States in the cosmos, has opened at Gorky Park as a flight simulator complete with space food, space stewardesses and simulated space emergencies. Otherwise known as vessel No. 011, it is anchored on the banks of the Moscow River. It is one of several spaceships built solely for ground testing. Only one Buran vehicle flew in space. On Nov. 15, 1988, it orbited Earth twice and landed eight miles from its launch pad at the Baikonur Cosmodrome in a three-hour, 25-minute unmanned flight. [**FLORIDA TODAY**, September 22, 1996, p 1&5E.]

KSC WINS AWARD FOR IMPROVEMENTS

Kennedy Space Center this summer received the Quality Achievement Award at the President's Quality Award Program ceremony during the National Conference on Federal Quality in Washington, D.C. KSC was recognized for these improvements: Reducing the cost for each space shuttle flight in the past five years by $55 million; Reducing shuttle processing time; Reducing consumption of chlorofluorocarbons, or CFCs, by 58.9 percent, resulting in a cost savings of nearly $1 million. [**FLORIDA TODAY**, September 22, 1966, p 5E.]

MCDONNELL DOUGLAS WORKERS WIN AWARD FOR SHUTTLE HELP

Six McDonnell Douglas employees from the Space and Defense Systems - Kennedy Space Center division have received the Space Flight Awareness Honoree Award for work on STS-79, shuttle Atlantis' mission to Mir. Recipients are: Kathy Egan, Mark Jager, Sam Rivera, Doug Thom, Ron Tyson, Russ Walker. [**FLORIDA TODAY**, September 22, 1996, p 5E.]

September 23: **ATLANTIS RETURNING WITH WEAK LANDING GEAR**

When the space shuttle Atlantis glides to the ground this week, the hydraulic system that controls landing gear, brakes and wing flaps will be at its weakest. But NASA officials are confident Atlantis will safely bring Shannon Lucid back to Kennedy Space Center at 8:12 a.m. Thursday, despite a shutdown in a crucial landing system. One of three auxiliary power units, television-sized pumps that control the hydraulic system that make landing maneuvers, mysteriously shut down shortly after launch this week. Atlantis Commander Bill Readdy and Briscoe said the shuttle can land on two power units and maybe even one if necessary. "The shuttle's got tremendous redundancy built into it," Readdy said in a Sunday television interview. [**THE ORLANDO SENTINEL**, September 23, 1996, p A5.]

LUCID BIDS FAREWELL TO MIR

Astronaut Shannon Lucid and five other astronauts aboard shuttle Atlantis left Mir at 9:33 p.m. Monday and flew twice around the outpost before pulling away and setting course for Earth. Astronaut John Blaha, who will remain on the station for four months, bid his NASA colleagues goodbye as Atlantis and Mir parted company more than 200 miles over the Ural Mountains of Russia. The shuttle is scheduled to land at 8:12 a.m. Thursday at Kennedy Space Center, where Lucid will be greeted by family, doctors and curious observers worldwide who have been hearing about the 53-year-old biochemist's 188 days in space. [**FLORIDA TODAY**, September 24, 1996, p 1-2A.]

NASA OFFICIALS: WRENCH DIDN'T DAMAGE BOOSTER EQUIPMENT

A wrench left inside one of shuttle Atlantis' solid rocket boosters did not damage the black boxes that contain its electronic control system, NASA officials said Monday. A five-inch wrench was found inside the right-hand booster last week after it was recovered from the ocean and returned to Kennedy Space Center. The booster had been used on Atlantis' Sept. 16 liftoff to Mir. A NASA official said the wrench, which weighs less than an ounce, did not cause any apparent damage to the boxes that enclose the electronic brains of the boosters. [**FLORIDA TODAY**, September 24, 1996, p 2A.]

NEXT SHUTTLE MISSION DELAYED

NASA's next shuttle mission is being delayed more than a week because the threat of Hurricane Fran forced the agency to delay assembly of a set of solid rocket boosters for flight. Shuttle Columbia and a crew of five astronauts had been slated to take off Oct. 31 on a 16-day space science mission. The new target launch date is Nov. 8. [**FLORIDA TODAY**, September 24, 1996, p 2A.]

September 24:

BOOSTER PROBLEM WORRIES NASA

NASA officials said Tuesday it is too early to tell if the latest discovery will delay the next shuttle launch in November. Hot gas burned about 60 grooves through the insulation in the bottom part of a booster used when Atlantis launched last week. That insulation keeps superheated gas from burning through the side of the booster. The problem occurred at the bottom of the booster at the hourglass shaped nozzle, where the flames escape and propel the shuttle. The 60 grooves were found only in the right booster. There is a layer of carbon insulation 1.5 to 3 inches thick inside the nozzle. The grooves varied in depth from one-tenth of an inch to half an inch, and were between 6 inches and 2 feet long. Some of the grooves were up to 3 inches wide. Despite the problem, there was 1.5 inches of insulation remaining in Atlantis' booster. [**THE ORLANDO SENTINEL**, September 25, 1996, p A6.]

KSC'S RENE PAQUETTE TO BE AWARDED EXCEPTIONAL SERVICE MEDAL

Rene Paquette of KSC's Procurement Office has been announced as one of only three NASA employees to receive the Agency's Exceptional Service Medal from Administrator Goldin at the NASA Minority Business and Advocates Awards Ceremony to be held at NASA Headquarters. [**KSC Countdown**, September 19, 1996.]

September 25: **POST FLIGHT INSPECTION OF ATLANTIS**

Postflight inspection of the Reusable Solid Rocket Motors (RSRMs) that boosted the Space Shuttle Atlantis to its successful docking with Russia's Mir space station last week revealed unusual erosion in the nozzle on the right-hand motor, leading NASA to set up a team to find out why. Atlantis STS-79 mission was delayed six weeks while new RSRMs were installed as a safety precaution following discovery of hot gas penetrations in the field joints, but it was unclear yesterday what effect the latest problem would have on the planned Nov. 8 launch of the Shuttle Columbia with the Wake Shield Facility. NASA found "several" unusual troughs eroded in the nozzle's ablative insulation. [**AEROSPACE DAILY**, September 25, 1996, p 467.]

KSC'S FOOD: OUT OF THIS WORLD

The Kennedy Space Center Visitors Center's new management company, Delaware North Park Services of Spaceport Inc., has upgraded the munchies and meals, as well as expanding the displays. Delaware North, which took over the contract in 1995 from TW Recreational Services, is making $70 million of upgrades to the center, which drew more than 2.15 million visitors last year. The center's upgrades would help bring more tourists to the center, said Rob Varley, executive director of the Brevard County Tourist Development Council. Because visitors to Central Florida are accustomed to the high quality food and exhibits of Disney World, Universal Studios, Sea World and the like, it's especially important that the KSC Visitors Center offer the same level of quality. [**FLORIDA TODAY**, September 25, 1996, p 12-11C.]

September 26: **ATLANTIS RETURNS TO KSC**

The Space Shuttle Atlantis landed safely at Kennedy Space Center today, returning Astronaut Shannon Lucid to Earth after a U.S.-record 188 days in space, most of it aboard Russia's Mir space station. Atlantis touched down at 8:13 a.m.EDT after a reentry and approach unhampered by auxiliary power unit problems that earlier threatened to truncate the STS-79 mission. Lucid, who was forced by safety concerns about Atlantis' original solid rocket boosters to spend an extra six weeks on Mir, rode to the landing in a special supine couch but walked off the Shuttle. She was initially pronounced fit, although facing two or three weeks of rehabilitation as she readjusts to gravity. [**AEROSPACE DAILY**, September 17, 1996, p 482.]

NASA SWITCH: U.S. TO SHARE SPACE-STATION COMMAND

America designed the international space station and is paying half its construction costs, but when U.S. astronauts arrive there, they won't always be in charge. Sometimes they'll have to take orders from a Russian cosmonaut or an astronaut from Japan, Canada or the European Space Agency. In a major reversal of policy, NASA this week agreed to allow space travelers from other countries to command the station at times. Ground control will remain in the hands of the Johnson Space Center in Houston. [**THE ORLANDO SENTINEL**, September 28, 1996, p A1&8.]

September 27: **'SPACE SUPERWOMAN' FLIES HOME**

Back home at last, astronaut Shannon Lucid stood Friday before the cheering crowd that applauded her return to Earth after a six-month tour of the heavens. NASA's space endurance record-holder left Kennedy Space Center earlier Friday, one day after the crew of Atlantis delivered her safely to Florida. Lucid spent 188 days in space, mostly on the Russian space station Mir. Her stay was extended seven weeks because of mechanical problems and bad weather back on Earth. [**FLORIDA TODAY**, September 28, 1996, p 1A.]

INTERNATIONAL ULTRAVIOLET EXPLORER RECEIVES FINAL COMMAND

After nearly 19 years of operation, NASA's International Ultraviolet Explorer (IUE) spacecraft will receive its final "shutdown," marking the end of one of the longest and most productive missions in the history of space science. The IUE spacecraft was launch on January 26, 1978 aboard Delta-138 launch vehicle from Complex 17A. [**NASA Press Release**, #96-194, September 30, 1996; **A Summary of Major NASA Launches**, KHR-1, July 1980, p I-14.]

September 30: **SHUTTLE CONTRACT CONSOLIDATION BEGINS NEW ERA OF EFFICIENCY**

NASA has begun a new era in the Space Shuttle Program this week by consolidating much of the ground processing and in-flight operations of the Shuttle under a simplified contract signed with a single company, United Space Alliance (USA). The six-year, $7 billion base contract includes two, two-year extension options that could bring the total estimated contract value to about $12 billion over ten years. While maintaining safety as the top priority and keeping the current annual flight rate intact, the new contract is expected to reduce the cost of flying the Space Shuttle. The contract assigns greater responsibility to the contractor, reducing the government's role in overseeing day-to-day, routine shuttle operations.

The new single prime contract, called the Space Flight Operations Contract (SFOC),

NAS 9-20000, replaces 12 previous individual contracts, the largest two of which had covered shuttle ground processing work at the Kennedy Space Center, performed by Lockheed-Martin Space Operations and shuttle operations work performed by Rockwell Space Operations Co. at the Johnson Space Center. USA is a joint venture announced last year by Rockwell and Lockheed-Martin in preparation to compete for NASA's request for a single shuttle operations contract. [**NASA Press Release** #96-195, September 30, 1996.]

During September: **NEW SPACE POLICY**

The Clinton Administration has produced a broad new National Space Policy. The White House is billing it as the first post-Cold War assessment of U. S. military, commercial and civil space activities and goals. For NASA, the policy renews the commitment to completing the international space station and putting a robotic rover on Mars surface by 2000. Other mandates include a long-term effort to obtain in-situ measurements and sample returns from bodies in the solar system, and the privatization of NASA's space communications operations by 2005. [**AVIATION WEEK & SPACE TECHNOLOGY**, September 23, 1996, p 19.]

SHUTTLE RESCUE EYED FOR CHINESE SATELLITE

Some U. S. space officials are beginning an informal and preliminary assessment on the possibility of using the space shuttle to retrieve and return to Earth a 1.5-ton Chinese communications satellite stranded in useless orbit by a failure of its Long March booster Aug. 18. The White House is cool to the idea at best and NASA reviews and management have also taken a conservative view of such flight concepts since the last commercial retrieval in 1992. But some NASA and other space officials have begun to consider the potential for a ChinaSat rescue. Possible space station assembly delays could allow openings in the shuttle schedule for such a mission. If approved, it could take place by late 1997. [**AVIATION WEEK & SPACE TECHNOLOGY**, September 23, 1996, p 21.]

OCTOBER

October 1:

PRIVATE SECTOR TAKES HELM OF SPACE SHUTTLE PROGRAM

NASA hands the keys to its space shuttles to a private company today, hoping the private sector can run the multi-billion-dollar program cheaper than the government. In a $7 billion, six-year contract, NASA is turning over daily shuttle operations to united Space Alliance in phases. The first phase begins today with the consolidation of 12 existing contracts worth $1.2 billion. The space alliance, a joint venture of shuttle-builder Rockwell International and shuttle-processor Lockheed martin, said it plans to cut its portion of shuttle costs by at least $400 million over the life of the contract. After cost savings reach $400 million, the alliance will get 35 cents for every additional $1 it saves NASA and will share cost over-runs in a similar manner. A clause in the contract allows NASA to withhold the profits if agency inspectors say safety is less than "very good."

Now one of the largest employers in Brevard County, the alliance's local work force is about 6,200. That includes 5,600 former Lockheed Martin shuttle program workers. Another 800 Rockwell workers in Brevard, including about 700 who work at the shuttle logistics depot in Cape Canaveral and 100 who perform work on the shuttle at KSC, officially became USA employees today. [**THE ORLANDO SENTINEL**, October 1, 1996, p A1; **FLORIDA TODAY**, October 1, 1996, p 1A.]

SPACE CENTER VISITORS PASSES ON A FAST COUNTDOWN TO ZERO

People are lining up at Brevard County libraries to get an information booklet with a car pass that allows entrance into Kennedy Space Center for the first public open house in its 33-year history. The open house isn't until Oct. 19, but the 8,000 free passes became available Tuesday (October 1). At the North Brevard branch in Titusville, someone camped overnight and greeted the janitor at 6 a.m. When the doors opened at 9 a.m., a line had already formed. By Tuesday evening, only 70 of 700 passes remained. At the central library in Cocoa, 200 passes were given out in five hours. [**THE ORLANDO SENTINEL**, October 2, 1996, p A16.]

NASA FY97 APPROPRIATION BILL APPROVED INCLUDES BUYOUT PROVISION

On Thursday, Sept. 26, 1996, President Clinton signed NASA's fiscal year 1997 appropriation bill. The bill also includes a buyout provision of up to $25,000 per eligible employee that is contingent upon approval of the Center's plan by NASA Headquarters. NASA Headquarters anticipates approval of KSC's plan by Nov. 1, 1996. [**KSC Countdown**, October 1, 1996.]

MARS PATHFINDER PROCESSING MILESTONE TO BE SHOWN LIVE ON NASA TELEVISION

The Mars Pathfinder spacecraft which is undergoing final preparations and checkout for launch at the Kennedy Space Center will reach a major prelaunch processing milestone today and will be shown live on NASA Television. The "Sojourner," the small rover to venture away from the Mars Pathfinder lander will be seen for the final time as the last of three "petals" on which the rover is mounted will be closed tomorrow. The petal containing the rover will not open again until the landing on Mars scheduled for July 4, 1997. [**NASA Press Release** #116-96, October 1, 1996.]

October 2: **2ND MISPLACED WRENCH FOUND ABOARD ATLANTIS**

Workers somehow left not one, but two, wrenches aboard the space shuttle Atlantis when it launched from Kennedy Space Center last month. The second wrench was found Saturday (September 28) on the floor of the shuttle's left rear engine compartment when technicians opened that area, KSC spokesman Bruce Buckingham said. The first wrench was found late last month in one of Atlantis' solid-fuel rocket boosters after it was retrieved from the ocean after liftoff. The second wrench, a 2-inch-by-1/2-inch L-shaped Allen wrench, may have flown into space several times undetected aboard Atlantis, Buckingham said. [**THE ORLANDO SENTINEL**, October 2, 1996, p A16.]

October 3: **KSC WORKERS SET MARROW DONOR RECORD**

Almost 900 Kennedy Space Center employees registered as potential bone marrow donors last month, surpassing any one day drive conducted by the Leukemia Society of America in Florida, Georgia and Alabama. The record-setting 888 employees gave a small sample of blood that is now being tested for further screening. KSC's Biomedical Office and volunteers helped generate interest in the event. With minority numbers low in the bone marrow registry, an emphasis was placed on registering minority employees. "An astounding 22 percent of those registered were from KSC's minority population," said Dr. George Martin from KSC's Biomedical Office. [**FLORIDA TODAY**, October 3, 1996, p 1B.]

CONGRATULATIONS TO KSC'S SEVEN NEW SENIOR EXECUTIVES

Pending final approval by NASA Headquarters, the following KSC employees have been selected for appointment to Senior Executive Service positions; Larry C. Ellis, director, Process Integration; John C. Fairey, director, Quality Assurance; Stephen M. Francois, director, International Space Station Launch Site Support; David A. King, deputy director of Shuttle Processing; Joel R. Reynolds, director, Safety and Reliability; Ralph R. Roe, Jr., director, Process Engineering; and John J. (Tip) Talone, Jr., director, Space Station Hardware Integration Office. [**KSC Countdown**, October 3,

1996.]

October 4: **SHUTTLE WOES MOUNT AS AGE, WATER TAKE TOLL**

NASA officials on Friday decided to replace two older shuttle cockpit windows because of potential deterioration. That will likely delay by about a week the scheduled Nov. 8 launch of Columbia. Shuttle windows consist of three panes of shatterproof glass. NASA is worried that the outer pane might weaken, fracture and become nearly impossible to see through. The outer panes usually become slightly hazy during flight because they are covered with microscopic debris when the boosters separate from the shuttle. NASA has not considered this a problem because the haze can be wiped off after the shuttle lands. But a new NASA study is finding that windows that go through this process several times tend to deteriorate, said Johnson Space Center spokesman James Hartsfield. Engineers taking molds of heavily used windows found three small slivers of glass falling out of the outside pane. That was enough to make NASA rethink flying with older windows, Hartsfield said. Windows are usually replaced every few flights, so there aren't many old windows. But Columbia's two front windows are the oldest in the fleet, with one that had gone through 8 launches. [Orlando Sentinel, October 5, 1996, p A1&6.]

INVESTIGATION CLOSED

NASA contractor USBI closed it investigation into a 5-inch wrench that was left inside one of the solid rocket boosters used to launch shuttle Atlantis on Sept. 16. The contractor was not able to determine which employee left the wrench behind. However, a company official said new safeguards will be added to prevent any future slip-ups. ["Replacing 2 windows may delay shuttle," **FLORIDA TODAY**, October 5, 1996, p 1A.]

INVESTIGATION OPENED

NASA officials opened an investigation to find out how a sprinkler system was activated inside one of its facilities Thursday (October 3), drenching a critical piece of shuttle equipment. Water damaged some of the thermal blankets on the orbiter maneuvering system pod that encloses jets used to guide the shuttle during flight. The accident occurred in a Space Alliance hangar in which technicians were doing maintenance work on the sprinkler system. The sprinklers, which spray about 3,000 gallons of water a minute, remained on for about 3 1/2 minutes, spokesman Bruce Buckingham said. ["Replacing 2 windows may delay shuttle," **FLORIDA TODAY**, October 5, 1996, p 1A; "Shuttle woes mount as age, water take toll," **THE ORLANDO SENTINEL**, October 5, 1996, p A1&6.]

October 6: **APOLLO 14 CONVOY HITS SNAG WHILE ENTERING MINNESOTA**

The Apollo 14 command module that carried U.S. astronauts into space hit a snag on the final leg of its journey to St. Paul. The convoy carrying the 12,000 pound spacecraft was stopped at the state line because the truck company's permit didn't allow the oversize load to travel on Minnesota highways until after 4 a.m. The module is part of a Smithsonian Institution traveling exhibit. [**THE ORLANDO SENTINEL**, October 6, 1996, p A16.]

October 8: **COLUMBIA WINDOWS REPLACED; ROLLOVER SET**

Work is underway in Orbiter Processing Facility 1 to install thermal barriers around windows No. 3 and 4 on the orbiter Columbia after they were replaced this weekend. The replacement stemmed from a preliminary engineering analysis which suggested that windows flown a high number of times could tend to fracture more easily. Columbia's rollover to the Vehicle Assembly Building for mating to the STS-80 external tank and solid rocket boosters is now scheduled for tomorrow afternoon. Launch remains targeted for Nov. 8. [**KSC Countdown**, October 8, 1996.]

NASA BIOLOGIST DR. RICHARD S. YOUNG DIES

Dr. Richard S. Young died Sunday, Oct. 6, at home. He was 69. He came to Brevard County in 1987 from McLean, Va. Since 1988, he has participated as a senior scientist consultant to NASA Life Science Division at the Kennedy Space Center. [**FLORIDA TODAY**, October 8, 1996, p 2A.]

October 9: **STS-80 UPDATE**

Columbia was rolled over to the Vehicle Assembly Building. Work to replace windows No. 3 and 4 and tile rework are complete. Key STS-80 operational milestones yet to be completed include payload delivery to Pad 39B (targeted for Oct. 10), roll-out to Pad 39B (Oct. 16) and Terminal Countdown Demonstration Test (Oct. 22-23). Columbia is targeted for a Nov. 8 launch. [**KSC Countdown**, October 10, 1996.]

COCOA COUNCILWOMAN JAILED

Within minutes of being found guilty of drunken driving, Cocoa City Councilwoman Phyllis Churchill was headed for the Brevard County Jail to begin serving a 10-day jail term. Churchill had claimed she was drugged by political opponents and dumped at the Kennedy Space Center. [**THE ORLANDO SENTINEL**, October 10, 1996, p 1B.]

HBO SERIES ON APOLLO SLIPS AWAY

Orlando film industry officials confirmed Wednesday that the $47 million HBO project, *From Earth to the Moon*, will be produced in Los Angeles instead of Central Florida. Despite an aggressive campaign and locations that would have given producers more realism, the area's toughest hurdle in landing the production turned out to be actor Tom Hanks' responsibilities in Los Angeles. Hanks, star of *Apollo 13*, is executive producer of the project. The series, including 13 one-hour dramas with will likely go into production the first of the year for about nine months. They are still expected to do some filming, though without actors, at Kennedy Space Center. [**THE ORLANDO SENTINEL**, October 10, 1996, p 1A.]

October 10: **SCHOOLS TO GET TECHNICAL HELP**

Wyck Hofler and Walter Murphy have been involved for decades with NASA's space operations. Now they are embarking on a program that bridges new technology and lessons in Brevard County classrooms. As members of a pilot program that retains retiring NASA employees to be school technology consultants, these men are learning to help schools use computer software, networks and the Internet. The program is one of several ways the federal space agency is dealing with looming cutbacks in its civil work force. By 2000, NASA's staff at Kennedy Space Center will be reduced from 2,215 to 1,443. Murphy and others are being taught the eight-week program at the Astronaut Memorial Foundation's Educational Technology Institute. After the program is over, the School District may hire the NASA retirees if positions are available. [**FLORIDA TODAY**, October 10, 1996, p 1-2B.]

October 12: **NEW 3D IMAX MOVIE AT VISITOR CENTER OPENS OCT. 12**

The showing of L5: First City in Space, a new 42-minute IMAX 3D film, will begin Oct. 12 in the Galaxy Center of the KSC Visitor Center. The movie tells the story of a fictional space colony orbiting between the Earth and the moon through the eyes of a seven-year-old girl who lives in the space city with her parents. The movie includes a computer-generated high-resolution 3D tour of the self-contained world, the impact of Comet Shoemaker-Levy on Jupiter, the landing on the surface of a comet, footage of the Russian Mir space station and planetary imagery from NASA's Jet Propulsion Laboratory. [**KSC Countdown**, October 8, 1996.]

KSC WORK LEADS TO SHUTTLE INSULATION SPINOFF

The same material used in Space Shuttle Thermal Protection System (TPS) insulation blankets will soon be manufactured for use on race cars. An agreement between Rockwell Space Systems at KSC and BSR Products, Inc. of Mooresville, NC, will be signed today that will allow the racing products company to use TPS technology in add-on insulation kits. The kits will reduce the buildup of excessive heat in driver

cockpits, where it can reach up to 160 degrees. A Rockwell TPS team designed the first prototype kit and installed it on NASCAR drive Rusty Wallace's car in the Thermal Protection System Facility at KSC last year. Tests at Daytona International Speedway this April showed the material reduced cockpit temperatures by 30 to 50 degrees. Further work by KSC employees led to the agreement. This spinoff is the first commercial application of TPS material, and the kits are the first product to bear the Mission HOME seal, a certification that informs the public that a product was developed by U.S. space program technology. [**KSC Countdown**, October 8, 1996.]

October 14: **BOOSTERS DELAY CARGO SHIP TO MIR**

A Russian cargo spaceship carrying food, fuel and Christmas presents for the two Russians and one American aboard the Mir space station will not be launched today. The Progress M-33 will be sent into space some time in early November because of a lack of booster rockets, the Interfax news agency reported Monday. [**FLORIDA TODAY**, October 15, 1996, p 2A.]

October 16: **NASA HUNTS FOR CAUSE OF BOOSTER SNAG**

Shuttle Columbia was to arrive this morning at its launch pad, but it won't be cleared for a Nov. 8 mission until NASA resolves lingering booster rocket questions. After recovering the solid rocket boosters from shuttle Atlantis, which was launched Sept. 16, engineers discovered hot gases had eaten about 60 small trenches in the insulation within the nozzle of one booster. Similar but fewer trenches have been noted on five previous shuttle flights. NASA officials still haven't found the cause. They will meet today to discuss the issue, said Jerry Berg, a spokesman with Marshall Space Flight Center in Huntsville, Al. Berg said experts hope to learn the cause by the time top NASA managers meet Oct. 25 to review Columbia's launch date. [**FLORIDA TODAY**, October 16, 1996, p 4A.]

NASA WEIGHS CHANGING SITE TO FIX SHUTTLES

NASA is quietly considering a multimillion-dollar plan to land shuttles at a new California site when the space planes are scheduled for tune-ups or major upgrades. The plan would reverse an earlier NASA pledge to move the refurbishing work to the Kennedy Space Center. Last spring, NASA budgeted the shift of work to KSC, a move that the U.S. General Accounting Office estimates would save the space agency up to $20 million a year. The plan is being developed with United Space Alliance, the private company that recently took over the shuttle operation. Rockwell International, which is co-owner of United Space Alliance, owns the Palmdale, Calif., plant where the refurbishing work is done. The study, which should be finished this month, involves landing shuttles at Palmdale each time they require tune-ups. The Palmdale plant has a landing strip but needs millions of dollars worth of special equipment for navigation, communication and handling of toxic fuel before a shuttle

can land there, NASA spokesman Ed Campion said. The big positive is that Palmdale has the time and space to do the work more than Kennedy, Campion said. There are four shuttles and only three shuttle hangars at Kennedy. Even with the need for extra space at KSC, it would be cheaper to convert part of the Vehicle Assembly Building into a fourth shuttle hangar than it would be to prepare Palmdale for shuttle landings, said Bob Sieck, KSC shuttle operations director. Campion said no decision has been made about where the tuneups will be conducted. [**THE ORLANDO SENTINEL**, October 16, 1996, p A1&11.]

October 18: **28,000 AWAIT A SNEAK PEEK INSIDE NASA**

It's a sold-out show. More than 28,000 people are expected at Kennedy Space Center on Saturday (October 19) for the first-ever Community Appreciation Day when the public can get an insider's view of KSC's buildings and launch pads. Eight thousand placards that give admittance to the event were scooped up quickly from Brevard County public libraries early this week. The placards will let people take a 30-mile drive around KSC, stopping at points to look inside the buildings were shuttles and spacecraft are prepared for rides into space. This is the first time KSC has opened the gates to the public. [**FLORIDA TODAY**, October 18, 1996, p 2B.]

NASA PLANS ADDITIONAL BUYOUTS

In NASA's latest effort to reduce its workforce nationwide, the space agency in November will offer some employees up to $25,000 to leave NASA next year. About 150 people at Kennedy Space Center are expected to accept the offer, said Ken Aguilar, KSC director of personnel. By extending the buyouts to people nearing retirement age, NASA can trim its civil service workforce and reduce the number of workers it might have to lay off to meet federal budget cuts. Congress, in late September, offered another buyout plan for federal employees with the same $25,000 offer used in 1994 and 1995. Under those two buyout offers, more than 320 KSC employees left NASA. Some 2,660 workers left agency wide. [**FLORIDA TODAY**, October 18, 1996, p 5A.]

October 20: **32,000 GET BEHIND-THE-SCENES LOOK AT KSC**

More than 32,000 visitors walked and drove to areas normally off limits to the public as part of KSC's first Community Appreciation Day. The event originated as an annual open house for Space Center personnel and their families, but Kennedy Space Center Director Jay Honeycutt expanded the program as a gesture of thanks to the public. Cars inched along Phillips Parkway on the way to behind-the-scenes tours of pad 39B, where space shuttle Columbia is being prepared for launch Nov. 8. Long lines of enthusiasts crammed other NASA sites to see demonstration, feel protective clothing and play with the robots. They toted maps and guide books specially printed for the day and were assisted by hundreds of orange-hatted Kennedy Space Center

personnel turned tour guides for the day. [**FLORIDA TODAY**, October 20, 1996, p 2B.]

NASA TO MOVE SHUTTLE ENGINE SHOP

NASA's space shuttle main engine shop will be moved to a new hangar in 1998 after construction of a new facility for the power plants is completed. The liquid-fueled engines now are overhauled in an engine shop within the 52-story Vehicle Assembly Building. NASA, however, has decided to build a 34,600-square-foot addition to hangar No. 3 of the Orbiter Processing Facility, where the engine work will be done in the future. Iveys Construction Inc. of Merritt Island recently was awarded a $5.3 million contract to construct the hangar addition. The work will include installation of heating, ventilation, air conditioning and plumbing systems as well as high-pressure gas lines, power and communications lines. The company has 450 days from Oct. 15 to complete the work. Engine operations are expected to begin in the new facility around July 30, 1998. [**FLORIDA TODAY**, October 20, 1996, p 1E.]

SHUTTLE CREW ARRIVES AT KSC

Shuttle Columbia's five-member crew arrived at Kennedy Space Center on Sunday and will spend the next few days practicing for the Nov. 8 liftoff on a 16-day research mission. The practice ends Wednesday morning when the astronauts, strapped in Columbia's crew cabin, simulate a main-engine cutoff just seconds before liftoff. Columbia's crew includes Cmdr. Ken Cockrell, pilot Kent Rominger and mission specialists Tammy Jernigan, Tom Jones and Story Musgrave. During the mission, the astronauts will release and retrieve two satellites. One satellite is equipped with a furnace to grow superconductors and the other has a telescope used to study stars. [**FLORIDA TODAY**, October 21, 1996, p 1A.]

October 22: **CENTER DIRECTOR JAY HONEYCUTT ANNOUNCES 1997 RETIREMENT**

Following Tuesday's (October 22) announcement of his decision to retire from the federal service in 1997, Center Director Jay Honeycutt talked to members of the press, touching on a wide variety of topics ranging from NASA's future to his personal reasons for retirement. He made it clear that he is not leaving due to discontent or concern over NASA's future directions. He explained that after 37 years of federal service, he had concluded that it is time to move on to something else. He stated that being the KSC Center Director is "the best job in the world," and he will miss all of the great people he has had the opportunity to work with. Honeycutt did not mention a specific retirement date, stating only that he would leave sometime between January and July. [**KSC Countdown**, October 24, 1996.]

KSC LOSES 3 TOP LEADERS

NASA's top three directors at Kennedy Space Center will leave the agency early next year, creating a senior executive exodus amid widespread uncertainty and tumultuous change at the nation's spaceport. Those departing include: Center Director Jay Honeycutt, an agency veteran credited with guiding the shuttle program through a difficult period during which its budget and contractor work force were slashed 30 percent. Deputy Director Gene Thomas, a longtime NASA veteran who served as a special assistant to three center directors and also logged time as KSC safety chief and director of launch and landing operations. Associate Director Alan Parrish, a chief adviser at KSC who also has held a number of other high-level management posts at the spaceport. Senior officials at NASA headquarters in Washington D. C., say successors have yet to be picked for the three posts. [**FLORIDA TODAY**, October 23, 1996, p 1A.]

October 23: **SHUTTLE CREW WRAPS UP KSC PREPARATIONS**

Shuttle Columbia's astronauts wrapped up a practice countdown Wednesday, clearing the way for officials next week to review plans for the planned Nov. 8 liftoff. Led by veteran astronaut Ken Cockrell, the Columbia crew climbed onboard the shuttle for the last few hours of the mock countdown, which serves as launch day dress rehearsal. Columbia's crew is scheduled to take off at 2:47 p.m. Nov. 8 on a 16-day space science mission. [**FLORIDA TODAY**, October 24, 1996, p 4A.]

October 25: **NASA PLANS TO BUILD RESCUE VEHICLES FOR EMERGENCY USE ON SPACE STATION**

In a $500 million project, NASA is planning to build another new spaceship for the year 2001: an emergency vehicle for the International Space Station that could possibly double as a small space taxi. After two years of quiet testing and study at Johnson Space Center in Houston, the space agency revealed its plan in an advertisement looking for aerospace companies to help develop the spaceship, dubbed X-38. The ship is designed to be an emergency crew-return vehicle for the soon-to-be-built space station, NASA spokesman James Hartsfield said. A crew transporter would only carry people, instead of people and cargo as the space shuttle does. The ship will not compete with VentureStar, which is being built to replace the 15-year-old space shuttle fleet and is expected to fly in about 10 years. As a rescue vehicle, the X-38 would take the place of the Russian Soyuz capsules, which will serve as the station's emergency vehicle until 2001. The ship is designed to land in the desert, which would rule out Kennedy Space Center, the primary landing site for shuttles. [**THE ORLANDO SENTINEL**, October 26, 1996, p A-1&12.]

October 26: **SHUTTLE MISHAP RULED HUMAN ERROR**

An Oct. 3 accident in which a multimillion dollar shuttle maneuvering system pod was doused with water has been chalked up to human error, NASA officials said Friday. NASA contractor technicians working with the pod, which houses a shuttle maneuvering engine and orbital steering thrusters, activated a sprinkler system in the building where the system is readied for flight, officials said. "It turns out the technicians accidentally turned the sprinkler system on," said Bruce Buckingham. No dollar estimate for the damage was available, but Buckingham said the incident could be lumped into a category of accidents causing less than $25,000 damage. [**FLORIDA TODAY**, October 26, 1996, p 2A.]

October 28: **STS-80 UPDATE**

During the Monday, Oct. 28, Flight Readiness Review (FRR), managers decided to conduct a follow-up FRR on Monday, Nov. 4. The review will focus on additional analysis being conducted on one Redesigned Solid Rocket Motor (RSRM) that experienced unusual nozzle insulation erosion during mission STS-79. The KSC launch team will continue to prepare Columbia for launch as early as Nov. 8. Meanwhile, STS-80 crew is scheduled to arrive at KSC Monday evening. Pending Monday's FRR decision, launch countdown will begin at 1 p.m. on Tuesday, Nov. 5. [**KSC Countdown**, October 31, 1996.]

October 29: **GLOBAL SURVEYOR PROGRAM MANAGER MARY KAYE OLSEN DIES**

NASA's Mars Global Surveyor program manager Mary Kaye Olsen, 36, died October 29 in Pasadena, California, nine days before the Global Surveyor spacecraft was launched aboard a Delta 2 rocket from Cape Canaveral Air Station. [**FLORIDA TODAY**, November 17, 1996, p 5E.]

NASA MANAGERS DEFER SETTING STS-80 LAUNCH DATE PENDING RESOLUTION OF ROCKET MOTOR NOZZLE ISSUE

NASA managers decided late Monday to defer setting a launch date for the next Shuttle mission in order to allow time for additional analysis of nozzle erosion seen on one Reusable Solid Rocket Motor (RSRM) used on the STS-79 launch in September. Managers will meet again Nov. 4 to set a launch date for STS-80. The analysis being conducted concerns insulation material located in the nozzle of the RSRM. During the STS-79 post-flight inspection, technicians found the insulation in the nozzle throat area had experienced greater than normal erosion in one of the two RSRM nozzles. The erosion presented no safety of flight issue with the STS-79 launch, but managers want to better understand the situation before committing to the next launch. [**NASA Press Release** #N96-72, October 29, 1996.]

October 30: **NASA BEGINS PREPARATIONS FOR NEXT LAUNCH**

NASA will plunge ahead with routine preparations for shuttle Columbia's upcoming launch today while engineers continue an investigation into a booster problem that could delay its planned Nov. 8 flight. With just six days remaining before NASA starts a three-day launch countdown, contractor technicians today will finish fueling Columbia's orbital maneuvering system at launch pad 39B. NASA engineers, meanwhile, will continue lab tests aimed at figuring out why some 60 trenchlike grooves were carved into booster nozzle insulation on Atlantis' flight in September. [**FLORIDA TODAY**, October 30, 1996, p 4A.]

NOVEMBER

November 1: **NEXT-GENERATION ROCKETS ADD POWER TO BUSY LAUNCH LINEUP**

A new, beefed-up version of America's most powerful unmanned launcher is to take off early next year, starting a string of Titan rocket missions from Cape Canaveral over the next two years. First up will be the maiden launch of Titan 4B, a more-powerful version of a rocket used primarily to haul heavy spy satellites into orbit. Manufactured by Alliant Techsystems Inc. of Hopkins, Minn., the new boosters are made of a lightweight composite rather than steel. That dramatically increases the amount of cargo the Titan can carry into orbit. The upgraded Titan will be capable of carting cargoes weighing up to 47,800 pounds into low Earth orbit, and payloads weighing 12,700 pounds into orbits 22, 300 miles above the planet. [**FLORIDA TODAY**, November 1,1996, p 1A.]

November 2: **BOOSTERS MAY STALL SHUTTLE LAUNCH**

NASA has put in place an independent team to oversee an investigation into a space shuttle booster rocket problem, a move that could prompt a postponement in next week's planned launch of Columbia. Headed by Max Faget, a former NASA engineer who played a key role in designing the shuttle, the team is reviewing results from more than 1,000 tests that have yet to pinpoint the cause of unusual booster damage on Atlantis' Sept. 16 flight. Post-flight inspections on one of two boosters used to launch Atlantis showed hot gases had carved 60 trench-like channels in insulation lining the inside of the bell-shaped nozzle of the rocket. Engineers since have determined how the damage was done: small divot-like pockets in the insulation allowed hot gases to dig the troughs. [**FLORIDA TODAY**, November 2, 1996, p 5A.]

November 3: **AXAF OBSERVATORY MIRROR READY**

NASA contractors recently finished building a complicated mirror assembly that is the heart of the agency's Advanced X-ray Astrophysics Facility, or AXAF, which is to be launched from Kennedy Space Center aboard a space shuttle in August 1998. Designed and built by Eastman Kodak Co. of Rochester, N.Y., the High-Resolution Mirror Assembly is the central component of a 10-meter telescope that will scan the cosmos for X-rays being emitted from black holes, quasars and other celestial objects. [**FLORIDA TODAY**, November 3, 1996, p 1E.]

ORBITER UPDATE

Columbia is on launch pad 39B, where a countdown might be under way this week for a Friday launch for a 16-day research mission. NASA officials are to meet Monday to determine whether to launch the shuttle. Technicians this week will close the payload

bay doors for flight and complete rear-engine compartment work.

Atlantis is in hangar No. 3 of the Orbiter Processing Facility, where technicians this week will install the space shuttle's main engines and conduct crew equipment interface tests. The shuttle is being prepared for a January flight to the Russian space station Mir.

Discovery is in hangar No. 2, where it is being readied for a Feb. 13 launch on a mission to service the Hubble Space Telescope. Technicians this week will install the left-hand maneuvering system pod.

Endeavour is at a Rockwell International shuttle assembly plant in Palmdale, Calif., where it is undergoing an eight-month, $47 million overhaul. The shuttle is to be returned to KSC in April for preparations for a December 1997 mission to carry the first piece of the future international space station into orbit from the United States. [**FLORIDA TODAY**, November 3, 1996, p 1E.]

MARS BY MODEM

The Mars Pathfinder and Global Surveyor spacecraft will give Internet users a near real-time look at what the probes are sending back to Earth from Mars when they get there next year. Address: http://mpfwww.jpl.nasa.gov/ and http://mgs-www.jpl.nasa.gov/ [**FLORIDA TODAY**, November 3, 1996, p 9A.]

November 4: STS-80 LAUNCH TARGETED ONE WEEK LATER TO ALLOW COMPLETION OF SOLID ROCKET NOZZLE EROSION ANALYSIS

NASA managers today decided to change the target date for Columbia's launch on STS-80 to no earlier than Nov. 15, pending availability of the Eastern Test Range. The new target date allows engineers additional time to complete their analysis and evaluation of nozzle erosion that was found on one Reusable Solid Rocket Motor from Atlantis' September flight on STS-79. Shuttle managers plan to reconvene a Flight Readiness Review panel during the week of Nov. 11 to hear the findings from the solid rocket motor analysis. [**NASA Press Release** #96-225, November 4, 1996.]

PEGASUS LAUNCH ANOMALY UNDER INVESTIGATION

Preliminary analysis of today's launch of the SAC-B and HETE spacecraft indicates that the Orbital Sciences Corporation's Pegasus XL third stage failed to separate properly. Both spacecraft are still attached to the third stage in low Earth orbit. Project officials believe up to four of the five scientific instruments aboard SAC-B may still be able to return scientific data. The HETE spacecraft was unable to deploy its solar arrays and battery failure is expected today. The Pegasus launch occurred at approximately 12:09 p.m. EST offshore from NASA's Wallops Flight Facility in

Virginia. The Pegasus vehicle achieved the desired orbit of 265 nautical miles by 297 nautical miles at an inclination of 38 degrees. [**NASA Press Release** #96-227, November 4, 1996.]

November 5: **TITUSVILLE HIGH STUDENTS' BRINE SHRIMP WILL FLY ON SHUTTLE**

Titusville High School students are preparing for a science experiment aboard shuttle Columbia. The 29 research students are studying whether microscopic brine shrimp can reproduce and grow in zero gravity, with the idea that eventually the organisms could be used as a high-quality source of animal protein. The students learned in mid-September that they were one of a dozen student groups that would have an experiment aboard the bread-box sized payload prepared by Instrumentation Technology Associates. Instrumentation Technology Associates conducts experiments for itself, other commercial space companies and NASA. And, when possible, the company donates space for schools to run small experiments. [**FLORIDA TODAY**, November 5, 1996, p 1-2B.]

ARTISTS FROM LOS ANGELES, CA PRESENT MURAL

In a ceremony at 12:30 p.m. today in Spaceport Central at the KSC Visitor Center, student artists from Los Angeles, CA, area high schools will present a mural that depicts the Roman god Mars and the Mars Global Surveyor spacecraft to NASA Jet Propulsion Laboratory (JPL) Director Dr. Edward C. Stone and JPL Mars Exploration Program managers. The 12-by-20-foot painting, entitled "Mars: Leading Students of the New Millennium," will be on display at the Visitor Center through December before it is returned home to JPL. [**KSC Countdown**, November 5, 1996.]

November 6: **RAIN SCRUBS MARS LAUNCH**

Light rain and a last-minute burst of strong winds forced NASA to postpone today's launch of a Delta II rocket carrying the first of 11 probes heading toward Mars during the next decade. NASA has two chances tomorrow, noon and 1:05 p.m., to get the $155 million Mars Global Surveyor on its way to the Red Planet. There is an 80 percent change of good weather for tomorrow's launch attempts. Those sound like good odds, but they are the same ones NASA had today when unexpected weather forced the launch to be scrubbed before the 12:11 p.m. attempt and again before a 1:15 launch try. During the first try, light rain and clouds over the launch pad at Cape Canaveral Air Station kept the rocket grounded. The weather cleared shortly before the second attempt, but then heavy winds suddenly kicked up, forcing the launch to be scrubbed. [**THE ORLANDO SENTINEL**, November 7, 1996, p A5.]

November 7: **RALLY WANTS CLOSER LOOK AT MARTIAN SURFACE**

Buoyed by a huge turnout at a kickoff lecture earlier in the week, organizers for Wednesday's "NASA About Face" rally outside Kennedy Space Center had hoped for big numbers. But the dozen or so people who brought their homemade signs and slogans to Gate 3 on the NASA Causeway felt they'd made their point. With Mars Global Surveyor poised for launch at nearby Cape Canaveral Air Force Station, activists greeted motorists with signs reading "Mars Face Images: High Priority, High Resolution, Fast Release" and "Secrets Cost Taxpayers Millions." A similar protest was held by 50 people at NASA's Jet Propulsion Laboratory in Pasadena, Calif., which is running the Global Surveyor mission. [**FLORIDA TODAY**, November 7, 1996, p 10A.]

PICTURE-PERFECT LAUNCH SENDS PROBE TO MARS

A Delta II rocket sent NASA's Mars Global Surveyor on a 435-million-mile mission Thursday. NASA Associate Administrator Wesley Huntress called the launch from Cape Canaveral Air Station "the beginning of the adventure," which will continue with up to 11 probes from three nations during the next decade. Mars Global Surveyor will conduct extensive surveillance of Mars. It will take pictures, monitor the weather and chart a topographical map. One instrument on board will analyze infrared radiation on the Martian surface, and another will look at the planet's magnetic field. NASA will also use a laser to measure the exact elevation of the Martian surface by firing pulses of light 10 times a second. That laser system is so advanced that it is better than anything circling Earth, said Donna Shirley, manager of the Mars Exploration Program for NASA's Jet Propulsion Lab. [**THE ORLANDO SENTINEL**, November 8, 1996, p A5.]

November 8: **SALUTE TO SATURN 5 ROCKETS TAKES OFF**

On Saturday (November 9), the 29th anniversary of the first launch of a Saturn 5, Titusville will celebrate its link with the space program with a day long Spacefest '96 in old downtown. The windows won't rattle like they did when full-scale Saturns flew, but the Space Coast Rocketry Association hopes to capture some of that former excitement when it launches a scale model rocket at 1:30p.m. Among the events planned: Hands-on demonstrations by NASA's Center for Space Education, including building kites guaranteed to fly, and building and launching small rockets. Robot demonstrations by Steve VanMeter of NASA's advanced systems analysis division. One of the big draws will be a 4 p.m. talk and autograph-signing session by astronaut Loren Shriver, who piloted three shuttle missions. [**FLORIDA TODAY**, November 8, 1996, p 2B.]

November 9: **SURVEYOR'S PANEL STILL CRAMPED**

NASA's Mars Global Surveyor is wobbling through interplanetary space today as experts try to figure out why one if its power-producing solar panels failed to fully unfurl after launch. NASA engineers say the problem is minor, however, and that the spacecraft can be righted in time for a crucial Nov. 22 thruster firing, the first of four that will fine-tune its flight path to the Red Planet. NASA managers initially thought a solar panel froze up when the spacecraft was launched into an orbit on the cold, dark side of Earth. That still might be the case, and the panel could swing into position after the hinge is exposed to sunlight for a few days. Engineers, however, are looking at other potential causes, including the possibility of an error in the computer software. [**FLORIDA TODAY**, November 9, 1996, p 1A.]

PANEL: BOOSTER ROCKETS OK

A group of NASA experts has concluded that shuttle Columbia's booster rockets are safe to fly, which might clear the spaceship for launch late next week. The engineers from NASA's Marshall Space Flight Center in Huntsville, Ala., will present their findings Monday (November 11) to top agency managers, who then will decide whether to allow Columbia to lift off. The shuttle's flight was set for a Nov. 8 launch, but it was postponed to give NASA officials more time to review reams of data from weeks of booster testing. [**FLORIDA TODAY**, November 9, 1996, p 5A.]

FUEL CELL MAY KEEP COLUMBIA ON GROUND

Just as NASA solved a problem that delayed the launch of the space shuttle Columbia, a new glitch may keep it grounded. Engineers were worried about a potentially faulty part in one of Columbia's three fuel cells, said NASA spokesman Bruce Buckingham. NASA discovered that a shipment of internal regulators for the fuel cells may not work properly. One of Columbia's fuel cells has a regulator from that supply. But test have shown that all three cells are working, Buckingham said. The worry is that "under certain circumstances, maybe they wouldn't work," Buckingham said. If the fuel cell has to be replaced, NASA may not have enough time to change cells before Nov. 15, he said. NASA managers will meet Monday (November 11) and decide whether to continue with tentative plans to launch Columbia on Nov. 15. [**THE ORLANDO SENTINEL**, November 9, 1996, p A8.]

November 10: **'HOOT' GIBSON TO LEAVE NASA**

Five-time shuttle flier and former chief astronaut Robert "Hoot" Gibson announced last week that he will leave NASA in mid-November to pursue private business interests. Selected as a astronaut in 1978, Gibson, 50, is a veteran commander of four shuttle missions, including the first shuttle-Mir docking flight in July 1995. [**FLORIDA TODAY**, November 10, 1996, p 5E.]

WANTED: 1 SPACE CENTER DIRECTOR

The job opening of NASA's Kennedy Space Center director was created by the impending retirement next year of current KSC Director Jay Honeycutt. Salary range: $98,718 to $124,478. Job description: Manage and operate the nation's shuttle spaceport as well as NASA activities at Cape Canaveral Air Station and Vandenberg Air Force Base in California, the sites from which most U.S. space missions are launched. NASA's worldwide network of emergency shuttle landing sites falls within the purview of the KSC director, who also is responsible for providing preflight processing and launch operations for NASA's $40 billion international space station. The NASA job vacancy announcement calls for a senior executive with shuttle program experience and the strategic vision needed to lead KSC in a new millennium of launch operations. Candidates must have a proven track record in "the management of a major aerospace or aircraft operation" and be well-versed in "the application of human space flight safety and operational requirements," the announcement says. Renee Green, an employee services official at NASA Headquarters in Washington, D.C., said Honeycutt's successor, who will be only the seventh KSC director since NASA established the spaceport in 1962, will be chosen by Wil Trafton, NASA's Associate Administrator for Space Flight. [**FLORIDA TODAY**, November 10, 1996, p 2A.]

November 12: **NASA CLEARS COLUMBIA FOR LAUNCH ON FRIDAY**

Engineers resolved three technical problems for the space shuttle Columbia, allowing NASA to finally set a Friday (November 15) launch date. But there's a new threat that those engineers can't fix: the weather. In a special meeting Monday, engineers decided that three technical problems discovered recently are not a threat to the ship. So managers set the launch for 2:50 p.m. Friday. The shuttle's five astronauts arrived at Kennedy Space Center on Monday (November 11) night, and countdown starts today at 1 p.m.

NASA engineers reached the following conclusions on the three problems: Unusual burns in the insulation in a rocket booster used to launch Atlantis in September were caused by the way the insulation was installed in the booster. Even if the burns occur again, they should never get deep enough to cause a problem. A shipment of bad fuel cell parts, including one used in one of Columbia's three fuel cells, should not cause the fuel cell to shut down. Columbia's suspect fuel cell was tested and worked fine. The failure of a power unit that controls landing hydraulics on Atlantis was because of bad wiring and should not be a problem for Columbia. [**THE ORLANDO SENTINEL**, November 12, 1966, p A6.]

KSC CONTRACTORS OF THE YEAR HONORED

Seven Kennedy Space Center contractors received honors at the fiscal year 1996

Contractor Awards Ceremony, hosted by the KSC Small and Disadvantaged Business Council on November 12 at the KSC Visitors Center. McDonnell Douglas Space & Defense Systems (MDS&DS) was recognized as the large business contractor of the year while the following small business contractors were also recognized for their outstanding contract performance: Small business contractor - Dynamac Corporation; Small disadvantaged business subcontractor - Oneida Construction, inc.; Woman-owned small business subcontractor - Wiltech of Florida Corporation. Ann Watson, deputy director, KSC Procurement Office, underlined the important contributions made by these members of the KSC team by pointing out that "more than $220 million in prime contracts and subcontracts were awarded by KSC to the small business community during fiscal year 1996. [**KSC Countdown**, November 14, 1996.]

November 13: **BAD WEATHER MAY DELAY TWO LAUNCHES**

Nasty weather could conspire to delay today's planned launch of an Atlas rocket and NASA's attempt to fly shuttle Columbia on Friday. The Atlas and its payload, a European television satellite, are to blast off from Cape Canaveral Air Station between 3:44 p.m. and 5:18 p.m. today. Shuttle Columbia and a crew of five astronauts are scheduled to take off from nearby Kennedy Space Center between 2:50 p.m. and 5:20 p.m. Friday. Strong winds, however, are expected to sweep into Central Florida today as the area gets sandwiched between a high pressure system to the north of Florida and a low pressure system in the Caribbean. Complicating matters will be an upper level disturbance drifting eastward from Mexico and Texas. Air Force meteorologists, as a result, say there is only a 20 percent chance that the weather will be acceptable for on-schedule launches for either the Atlas or the shuttle. Should the Atlas launch be scrubbed today, it will be rescheduled for liftoff between 3:44 p.m. and 5:18 p.m. Thursday. An Atlas delay would automatically bump the shuttle launch back to Saturday during a launch window that will open at 2:51 p.m. and close at 5:21 p.m. The reason: the Air Force requires about 48 hours to prepare range safety and tracking equipment for launches of different space vehicles. [**FLORIDA TODAY**, November 13, 1996, p 6A.]

KSC BUSINESS OPPORTUNITIES EXPO

The 7th annual KSC Business Opportunities Expo will be held at Port Canaveral Cruise Terminal 10. More than 200 large and small businesses that provide supplies and services to governmental agencies will feature exhibits of everything from latest computer technology to employment services. [**KSC Countdown**, November 7, 1996.]

November 14: **SHUTTLE LAUNCH DELAYED**

NASA officials may be in charge of launching space shuttles, but Mother Nature gets to decide when. And she's telling the space agency to wait until Tuesday to launch Columbia on a 16-day research mission. NASA officials gave up on their first chance

to launch the ship this weekend, opting instead to wait for better weather next week. The shuttle will be set to go between 2:53 and 5:23 p.m. Tuesday, (November 19). NASA stopped countdown clocks at 11 hours before liftoff, and Columbia's crew members will get some free time this weekend as they wait for their mission to begin. [**FLORIDA TODAY**, November 14 , 1996, p 1B.]

KSC RECEIVES ENERGY CONSERVATION AWARD

KSC was one of 177 nominees for the Federal Energy and Water management Award. On Nov. 14, EG&G of Florida, Inc., was presented with the prestigious award for outstanding performance in energy management. KSC's aggressive approach to energy conservation responds to a 1994 executive order that mandated a 30 percent reduction in energy consumption by 2005. The reduction is based on KSC's energy consumption in 1985. The award recognized KSC's milestone reduction of 10 percent by 1995. In 1994 alone, KSC avoided $1,051,153 in energy costs and through Energy Management office efforts obtained $85,369 in rebates from Florida Power and Light. [**KSC Countdown**, November 26, 1996.]

November 16: **HIGH WINDS FORCE DELAY IN ATLAS LAUNCH**

An Atlas rocket launch is being postponed until late this week because of predicted high winds on the space coast and already scheduled launch attempts for NASA's shuttle Columbia earlier in the week. The satellite-delivery mission now is scheduled for launch Friday during a window that will open at 3:48 p.m. and close at 5:14 p.m. [**FLORIDA TODAY**, November 17, 1996, p 7A.]

CAPE MAY LOSE DELTA LAUNCHES

Delta rocket maker McDonnell Douglas might launch commercial satellites from South America, a move that could siphon at least $30 million a year from the local economy, officials said Friday. McDonnell Douglas and Arianespace, a French company that controls about 60 percent of the world's commercial launch business, are discussing the possibility of launching Delta rockets from Kourou Space Center in French Guiana. McDonnell Douglas officials say the talks are exploratory, but local economic development officials are worried. They say moving some of all of McDonnell Douglas' commercial launch business away from Cape Canaveral would be a serious blow to the Brevard County economy. McDonnell Douglas has been lofting Delta rockets from Cape Canaveral since May 1960 and maintains a local launch team of about 200 managers, engineers and technicians. Kourou Space Center is attractive as a commercial launch site because its location allows for satellite launches to both equatorial and polar orbits. Another advantage over Cape Canaveral is that the South American launch site is closer to the equator, so rockets launched from there can carry heavier satellites into orbit. [**FLORIDA TODAY**, November 16, 1996, p 1-2A.]

November 17: RUSSIA'S MARS MISSION ENDS IN FAILURE, SETBACK

Russia's celebrated mission to Mars failed early today shortly after the rocket blasted off into space, the military space forces said. Space force officials refused immediate explanation of what went wrong after the four-stage Proton booster lifted off at 3:48 p.m. Saturday from the Baikonur Cosmodrome in Kazakstran. In the end, the craft smashed harmlessly into the atmosphere at 17,000 mph over the southern Pacific Ocean west of Chile. [**FLORIDA TODAY**, November 17, 1996, p 17A; **FLORIDA TODAY**, November 18, 1996, p 1A.]

SPACEWALKERS READY TO TEST TOOLS THAT WILL BUILD ORBITING STATION

Building a space station that weighs 440 tons and covers an area bigger than a football field will be no stroll through the park. So astronauts Tammy Jernigan and Tom Jones will be talking a walk on the wild side during shuttle Columbia's 16-day space science mission. With Columbia whizzing around the world at 17,500 miles per hour, the astronauts will don bulky spacesuits and them climb out into the shuttle's cargo bay for a pair of 6 1/2 hour spacewalks. The spacewalks on Columbia's flight will involve tests with: A boomlike crane that can stretch out as much as 18 feet, helping astronauts install items such as batteries in hard-to-reach places. A small metal work platform that will help keep station construction workers anchored in the weightless space environment. Jernigan and Jones also will be testing power tools, such as ratchet and socket wrenches. And they'll try out special tethers design to keep tools from floating away from station construction sites. [**FLORIDA TODAY**, November 17, 1996, p 1E.]

ASTRONAUT TESTS WINGS IN BUSINESS

Former astronaut Bruce Melnick has a new title, vice president of Space & Defense Systems-Kennedy Space Center at McDonnell Douglas. He is responsible for all operations involved in processing a wide range of complex payloads, including satellites, experiments and space station elements the shuttle will transport. In short, he's overseeing the same payloads he helped deploy as a mission specialist while logging more than 300 hours of spaceflight between 1988 and 1992. [**FLORIDA TODAY**, November 17, 1996, p 1E.]

November 18: COUNTDOWN UNDER WAY FOR SHUTTLE

NASA will try to launch shuttle Columbia on Tuesday after waiting out a weekend of gusty winds. Countdown clocks started ticking again at 1 this morning, leading up to the planned launch between 2:53 and 5:23 p.m. Tuesday, when forecasters say there is an 80 percent chance that weather will cooperate. [**FLORIDA TODAY**, November 18, 1996, p 4A.]

November 19: **SHUTTLE LAUNCH INFORMATION**

STS-80, Columbia is scheduled to launch from Kennedy Space Center's Pad 39-B on a 15 day mission to release two satellites. One will study the life and death of stars, and the other will try to grow semiconductors. Crewmembers include commander Ken Cockrell, pilot Kent Rominger, Tammy Jernigan, Tom Jones and Story Musgrave. [**THE ORLANDO SENTINEL**, November 19, 1996, p 1A.]

COLUMBIA SET FOR FIRST LAUNCH UNDER PRIVATE CONTRACT DEAL

A space shuttle will try to launch today, the first liftoff since NASA started turning over daily shuttle operations to a private company. Columbia's launch today will be no different from usual because the switch to the private company is going at a deliberate pace. On Oct. 1, NASA began to turn over daily shuttle operations to the United Space Alliance to save hundreds of millions of dollars. "This is the first launch under the new shuttle processing contract, but rest assured, it's the same people, same performance," NASA Shuttle Operations Director Bob Sieck said at a Monday press conference. Sieck's office will be transferring 400 different NASA duties to the space alliance, a joint venture between shuttle-maker Rockwell International and shuttle-processor Lockheed Martin. About 100 of the changes are complete, but they are relatively minor, Sieck said. "The launch decision will always have NASA fingerprints," he said. [**THE ORLANDO SENTINEL**, November 19, 1996, p A-8.]

ANTI-NUKE PROTESTERS AT KSC TODAY

Anti-nuclear activists today will protest the planned launch next year of a NASA plutonium-powered spacecraft. Riding atop an Air Force Titan 4 rocket, NASA's Cassini spacecraft is to be launched in October from Cape Canaveral Air Station on a 6 1/2-year voyage to Saturn. Plutonium-powered generators are being used on Cassini because conventional solar arrays won't generate electricity as far away as Saturn. The Florida Coalition for Peace and Justice will demonstrate at 11 a.m. today at Kennedy Space Center off State Road 3. [**FLORIDA TODAY**, November 19, 1996, p 1A.]

November 20: **NEW SHUTTLE ENGINE FACILITY GROUNDBREAKING**

A ceremony to commemorate the beginning of construction work on the 34,600-square-foot Space Shuttle Main Engine Processing Facility (SSMEPF) was held, November 20, next to the Orbiter Processing Facility (OPF) 3. Space Shuttle Main Engine operations now housed in the Vehicle Assembly Building (VAB) at KSC will be moved into the new facility on about July 30, 1998. Ivey's Construction of Merritt Island, FL, was awarded a $5,328,400 contract to complete the structure. [**KSC Countdown**, November 21, 1996.]

SHUTTLE MISSION TO STUDY UNIVERSE'S OLDEST ELEMENT

The nation's oldest space shuttle climbed into orbit Tuesday, carrying the world's oldest space traveler, and looking for the universe's oldest element: hydrogen. About eight hours after the space shuttle Columbia's 2:55 p.m. launch through a partly cloudy sky, astronauts pitched into orbit a German-built satellite carrying an $80 million telescope. That telescope will look for hydrogen in the ultraviolet light wavelength. Hydrogen also was responsible for delaying Columbia's launch by more than two minutes. Ever since a series of hydrogen leaks delayed shuttle launch by several months in 1990, NASA set a limit on how much of the volatile element is allowed to leak from the external fuel tank. A half a minute before launch, sensors indicated that hydrogen levels near the shuttle's main engines were at or over the threshold. NASA decided to launch because the average reading was just below the limit. Minutes after launch, NASA had to order an early shutdown of one of three auxiliary power units that control hydraulic systems crucial for landing. The power unit got too hot and a water sprayer that was supposed to cool it down had frozen. STS-80 was the seventh and final shuttle launch of 1996. [**THE ORLANDO SENTINEL**, November 20, 1996, p A-8.]

MUSGRAVE FLIES ONE LAST TIME

Celebrated astronaut Story Musgrave will make his last trip into space aboard Columbia. It will be his sixth trip into the heavens, matching the spaceflight record of only one other U.S. astronaut and setting a record of his own as the oldest person ever to leave the planet. During Columbia's 16-day jaunt, the astronauts are to release two satellites and later retrieve them to bring back to Earth. Two of Musgrave's fellow astronauts also will conduct a pair of spacewalks. Musgrave, who has taken four strolls in space, will assist the spacewalkers from inside Columbia and keep track of one satellite.

Story Musgrave was selected by NASA to become a nonpilot scientist astronaut in 1967. His initial flight came in 1983 on the maiden voyage of shuttle Challenger, where he and astronaut Donald Peterson took the first spacewalk from a shuttle. Three more shuttle trips followed. After the Columbia mission, Musgrave will go into the books with astronaut John Young as the most experienced space travelers of their time. Young, 66, flew six times during NASA's Gemini, Apollo and shuttle programs. Musgrave will be the fist to have flown on six shuttle missions. [**FLORIDA TODAY**, November 19, 1996, p 1A and 7A.]

COLUMBIA REACHING OUT FOR BETTER TECHNOLOGIES

The Wake Shield satellite tucked into Columbia's cargo bay could lead to the development of more efficient electronics in the decades ahead - superfast computers, high-definition television and other futuristic devices. For three days the Wake Shield

will fly on its own, with its 12-foot diameter dish creating a wake that is nearly free of matter. Inside that wake a special furnace attached to the spacecraft is expected to produce much more efficient semiconductors, which will be evaluated after Columbia's crew picks up the Wake Shield and returns it to Earth. [**FLORIDA TODAY**, November 20, 1996, 12A.]

COLUMBIA SOARS FOR SCIENCE

The astronomy satellite, called ORFEUS-SPAS, will remain outside the ship for two weeks while collecting data on about 300 different targets. Guiding the shuttle's 50-foot robot arm, astronauts Tammy Jernigan and Tom Jones hoisted the 8,000 pound satellite out of Columbia's cargo bay and released it into orbit at 11:11 p.m. 217 miles over the coast of Peru. After adjusting the instruments for five hours, the German-made spacecraft was to begin collecting information early this morning. This is the second trip into orbit for the telescope, a joint project between NASA and the German Space Agency. [**FLORIDA TODAY**, November 20, 1966, p 1A.]

GROUNDBREAKING SET FOR NEW SHUTTLE ENGINE FACILITY ON NOV. 20

A ceremony to commemorate the beginning of construction work on the 34,600-square-foot Space Shuttle Main Engine Processing Facility (SSMEPF) will be held on November 20th, next to the Orbiter Processing Facility (OPF) 3 in Launch Complex 39 area. Participating in the ceremony will be KSC Deputy Director Gene Thomas; Robert Sieck, director of Shuttle Processing; Marvin Jones, director of Installation Operations; and Walt Stampley, associate director of Facilities Design Engineering. Also in attendance will be Michael McCulley, associate program manager for Ground Operations, United Space Alliance, and Wade Ivey, president of Ivey's Construction, Inc. Space Shuttle Main Engine operations now housed in the Vehicle Assembly Building (VAB) at KSC will be moved into the new facility on about July 30, 1998. Ivey's Construction of Merritt Island, FL, was awarded a $5,328,400 contract to complete the structure. [**NASA News Release**, #139-96, November 19, 1996.]

November 21: **TELESCOPE OK DESPITE EARLY JITTERS**

A special telescope released by the space shuttle Columbia overcame early trouble finding its first star Wednesday, and now its aim is true. The $80 million telescope, attached to a German satellite carrier, was sent into orbit late Tuesday night. When scientists started calibrating instruments Wednesday, they had difficulty aligning them with their first star, said Konrad Moritz, the NASA project manager. The problem probably was caused by the jostling that occurred during launch or when the satellite was released, he said. Scientists anticipated the problem and corrected it by aiming the telescope a little farther until it located the star. [**THE ORLANDO SENTINEL**, November 21, 1996, p A-1.]

HOT BIRD 2 LAUNCH TODAY

A third attempt to launch the Hot Bird 2 payload aboard an Atlas Centaur rocket will be made this afternoon from Launch Pad 36-B at the Cape Canaveral Air Station. Lift-off is scheduled for 3:47 p.m. with a 69 minute window extending through 4:56 p.m. Weather is not expected to be a problem, with only a 20 percent probability of unfavorable conditions at launch time. [**KSC Countdown**, November 21, 1996]

November 24: **MAN ON MISSION TO HONOR 1ST BLACK ASTRONAUT**

Jim Oberg, a Houston space engineer and noted authority on the Russian space program, is attempting to sway the Astronauts Memorial Foundation's board of directors to include Air Force Maj. Robert H. Lawrence on the Space Mirror at Kennedy Space Center. Maj. Lawrence died when his F-104 Starfighter crashed and burned on a California runway. The board, which originally rejected Lawrence when the memorial was designed in the wake of the 1986 shuttle Challenger disaster, agreed unanimously last week to stand firm. "We've looked at this three times," said board member Chuck Hollinshead, who recently retired as director of public affairs at KSC. "Oberg's quarrel is really not with us. It's with the Air Force." A recent investigation ordered by Air Force Secretary Sheila Widnall concluded Lawrence never met the Air Force's strict definition of astronaut as it was written in 1961. Maj. Lawrence was selected by the Air Force for the Manned Orbital Laboratory program, but never attained astronaut status prior to his death. [**FLORIDA TODAY**, November 24, 1996, p 1-2A.]

BRAVE NEW DISNEY WORLDS?

On September 30, NASA awarded the United Space Alliance a $7 billion contract to manage the space shuttle and "streamline" their costs without compromising safety. The alliance's two corporate owners (space shuttle-builder Rockwell and the Lockheed Martin Corp., the builder of the shuttle's huge, orange external tanks) would do handsprings if the alliance ran the shuttle profitably. And odd as it seems, Disney, Universal Studios or even Carnival Cruises could help them do just that while doubling the local space industry's work force. These startling possibilities involve two equally startling concepts: space tourism and the 20-year-old idea of building palatial, commercially operated, 300-person space stations from NASA's space trash. Twenty years ago, aerospace engineers realized that a dozen empty external tanks left in orbit could be joined into a rigid, 3-deck, slowly rotating ring capable of holding 300 tourists under conditions much like that of cruise ships. The concept (now referred to as "space islands") has been refined since then. Aerospace engineers believe the first habitable external tank could be carried up by shuttles within 18 months and the first space island could be under construction two years later. An international space island interior design competition for architectural students will be announced in December. In recent weeks, NASA managers have publicly suggested

that space islands should be patterned after the cruise-line industry. [**THE ORLANDO SENTINEL**, November 24, 1996, p G1&4.]

November 25: **SATELLITE'S RETRIEVAL SET TONIGHT**

Shuttle Columbia's astronauts are to snatch a satellite from orbit tonight, using their ship's robot arm to retrieve it three hours earlier than planned because a space telescope is looming ever closer. NASA officials originally planned to grab the satellite, called Wake Shield, shortly after midnight Tuesday but moved up the retrieval when they saw that another satellite - an ultraviolet telescope released earlier in the mission - was gaining on it. "The tracking assessments that they've been doing shows that (the telescope) will be about (13) miles from the Wake Shield by retrieval tomorrow," NASA spokesman Kyle Herring said. The Wake Shield is in the middle of a three-craft formation orbiting Earth, marking the first time that a shuttle is flying with two satellites. Columbia is leading the way, with more than 20 miles between it and the Wake Shield as of late Sunday. The Wake Shield was flying about 24 miles from the telescope - and closing at a varying rate. NASA officials estimate the telescope will be about 13 miles from the Wake Shield by the time the shuttle moves between the two late today. [Florida Today, November 25, 1996, p 1-2A.]

SPACE DEBRIS BARELY DINGS SHUTTLE COLUMBIA'S WINDOW

Two tiny dings have been discovered on the orbiting space shuttle Columbia, according to NASA video transmissions Sunday. Shuttle astronauts beamed down video showing two marks in a crew cabin window that are similar to the kinds of damage caused in the past by micrometeorites. Crewman Thomas Jones said the larger pit was about half a millimeter in width. He described the other as pinpoint-sized. [**FLORIDA TODAY**, November 25, 1996, p 2A.]

FRY HAMMOND BARR PLANS 'RIVETING' KSC CAMPAIGN

Delaware North Parks Services of Spaceport Inc. last week enlisted Fry Hammond Barr as its partner in marketing a new and improved Kennedy Space Center Visitor Center. The agency won a $1.6 million account over two other local finalists. Pete Barr Sr., president and chief executive of the agency, said he was as pleased to have the challenges of the account as its size, which is substantial by Central Florida standards. The center, which opens a $37 million, 100,000-square-foot Apollo/Saturn V Center in December , is looking for a higher profile in the tourism marketplace. [**THE ORLANDO SENTINEL**, Central Florida Business, November 25-December 1, 1966, p 10.]

NEW METHOD CLEANS WATER BELOW GROUND

Scientists think they have developed an underground method for cleaning subsurface

water polluted by chemicals at a Kennedy Space Center launch pad. The technique to be field-tested over the next two years at KSC Launch Complex 34 by University of Central Florida scientists relies on iron filings placed in a permeable underground wall. NASA officials have determined the Complex 34 site is not an immediate threat to the nearby Indian River Lagoon marine life or humans. This year, KSC will spend about $7.5 million in remediation efforts. [**FLORIDA TODAY**, November 25, 1996, p 1B.]

November 26: **SHUTTLE'S PURSUIT OF SATELLITE IS RISKY**

In a risky maneuver requiring precision flying, space shuttle Columbia's astronauts went after one satellite Monday (November 25) while trying to avoid being rear-ended by another. The crew slowly closed in on the speeding, saucer-shaped satellite in preparation for retrieving it. The rendezvous was moved up three hours because a telescope in orbit was gaining on the satellite faster than expected. As of late Monday afternoon, the satellites were trailing Columbia 220 miles above the Earth. It was a 25-mile-long procession and shrinking: Columbia, followed 8 miles behind by the saucer, followed 17 miles behind by the telescope. The satellites were expected to be 16 miles apart at the time of retrieval. The plan called for Columbia to leap-frog backward over the saucer to a point 9 miles behind the craft and 7 miles ahead of the telescope. Then commander Kenneth Cockrell was to guide the shuttle in for the capture. This was the first mission in which a shuttle flew in formation with two satellites. [**THE ORLANDO SENTINEL**, November 26, 1996, p A3.]

November 27: **MARS GLOBAL SURVEYOR SOLAR PANEL WILL NOT HINDER MISSION GOALS**

Mission engineers studying a solar array on NASA's Mars Global Surveyor that did not fully deploy during the spacecraft's first day in space have concluded that the situation will not significantly impair Surveyor's ability to aerobrake into its mapping orbit, or affect its performance during the cruise and science portions of the mission. [**NASA Press Release**, #96-250, November 27, 1996.]

November 28: **ASTRONAUTS TO TEST NEW TOOLS FOR CONSTRUCTING SPACE STATION**

Starting tonight at 9:16 p.m. two of Columbia's astronauts will work off an unusual Thanksgiving dinner (dried turkey, stuffing, cranberry sauce and orange snowball cupcakes) by going out in space for a strenuous stroll. Tammy Jernigan and Tom Jones will walk in space for six hours to test 18 new tools and train for the massive construction of the international space station. The biggest tool is a new crane, a series of five nested tubes that extend 17 1/2 feet. The crane will be used to do work from the shuttle, when a shuttle is too close to the space station to use the robot arm. Another new tool they'll test will multiply by a factor of five the torque astronauts produce using tools. That will make it easier for astronauts to do harder jobs. The

station will be the largest structure ever to circle the Earth. [**THE ORLANDO SENTINEL**, November 28, 1996, p A14.]

STUBBORN HATCH HANDLE SPOILS SPACEWALK

Dressed and ready for a spacewalk, two of shuttle Columbia's astronauts instead were stuck inside their ship late today when the door leading outside would not budge. After two hours of attempts to spring the hatch, the astronauts were told shortly before 11:30 p.m. to take off their bulky spacesuits and give up the excursion for the night. At one point, Tom Jones even used his legs to put as much force as possible to turn the stubborn door handle. The door remained firmly shut. It was unclear late today whether the astronauts still would get to do both walks. [**FLORIDA TODAY**, November 29, 1996, p 1A.]

November 29: **ASTRONAUTS TO TRY AGAIN FOR SPACEWALK**

NASA pored over documents and photos Friday to see whether Columbia's astronauts could do anything more to open a stuck hatch and proceed with a spacewalk considered crucial practice for space station construction. The earliest Tamara Jernigan and Thomas Jones could attempt a spacewalk is tonight. That's when they should have been floating out for spacewalk No. 2. Jernigan and Jones pushed as hard as they could Thursday night, upside down, right-side up, with their hands and with their feet, but could not rotate the handle on the hatch leading out into the open cargo bay. The handle barely moved, the hatch remained sealed, and the spacewalk was canceled. It is the first time a hatch has jammed in 15 years of space shuttle flight. [**THE ORLANDO SENTINEL**, November 30, 1996, p A3.]

During November: **LOW TROPHY AWARDED TO MCDONNELL DOUGLAS**

The McDonnell Douglas Delta Launch Team has been named the recipient of the George M. Low Space Transportation Award. [**THE BREVARD TECHNICAL JOURNAL**, November 1996, p 18.]

NASA AND RED PEPPER MAKE A SPICY TEAM

An advanced NASA software technology that schedules prelaunch work for the entire Space Shuttle fleet was spiced up recently by the Red Pepper Software Company of San Mateo, CA to help America's corporate giants respond to customer demands and maximize their profits. NASA's Ground Processing Support System (FPSS) is a computer-based scheduling tool that helps planners manage the thousands of overlapping activities that prepare each Shuttle for launch. Now, companies like Texas Instruments, Bausch & Lomb, Coors, and Hewlett Packard have begun to apply this technology to their diverse industries using Red Pepper's Response-Agents, commercial software systems inspired by GPSS which help production and distribution

centers satisfy customer demands by optimizing materials, capacity, and labor in real time. [**THE BREVARD TECHNICAL JOURNAL**, November 1996, p 9.]

KSC SPECIAL RESPONSE TEAM COMPETES

The KSC Special Response Team placed sixth out of 59 competing teams from the United States and Germany at the 14th Annual SWAT Roundup held this month at the Orange County, FL, Firearms Range. The competition consisted of five events that called for the five-member KSC team to use shooting skills, physical ability and mental preparation in stressful conditions. In addition to placing sixth overall, the KSC team placed third in the state and third in one of the events. [**KSC Countdown**, November 19, 1996.]

DECEMBER

December 1: **SPACEWALK NO-GO FOR SHUTTLE ASTRONAUTS**

Two of shuttle Columbia's astronauts learned Saturday that they won't get to step among the stars on a spacewalk because NASA officials still don't know why the door to the outside is stuck. Astronauts Tammy Jernigan and Tom Jones won't get to test equipment that is to be used for building and maintaining the future international space station, leaving unanswered questions about the tools' performance in space. NASA officials say they can't risk damaging the hatch with repair efforts. [**FLORIDA TODAY**, December 1, 1996, p 1A.]

COLD FONT THREATENS MARS LAUNCH

NASA's Mars Pathfinder spacecraft is ready to rocket off on an interplanetary journey to the Red Planet, but nasty weather in Central Florida stands to keep its flight grounded at least a day. Mounted atop a McDonnell Douglas Delta 2 rocket, the $155 million spacecraft is scheduled to blast off from Cape Canaveral Air Station during a night owl launch window that will open at 2:08 a.m. Monday. There is a 90% probability of not meeting the launch weather criteria due to wind, thick low clouds and showers of thunderstorms. On Tuesday the probability decreases to only a 10% chance of weather criteria violation. The launch time on Tuesday, December 3 is 2:03:07 a.m. [**NASA News Release**, Launch Advisory, December 1, 1996; **FLORIDA TODAY**, December 1, 1996, p 1B.]

December 2: **COLUMBIA TO STAY ALOFT UNTIL FRIDAY**

NASA officials decided today to keep shuttle Columbia in space an extra day so an astronomy satellite that it carried into orbit can observe more stars, galaxies and planets. The satellite, equipped with a telescope that detects ultraviolet light, was released from the shuttle Nov. 19 and is due to be brought back to Earth aboard Columbia on Thursday (December 5). However, NASA managers extended the mission until Friday because the spacecraft lost a day of observing time earlier in the flight when it was moving too close to another satellite that the shuttle had released. [**FLORIDA TODAY**, December 12, 1996, p 5A; **USA TODAY**, December 3, 1996, p 3A.]

SHUTTLE HATCH BAFFLES NASA BUT PROBLEMS COULD HAVE BEEN WORSE

Would-be spacewalkers Tammy Jernigan and Tom Jones on Monday showed NASA video of a stuck hatch on Columbia that remained jammed despite a change in air pressure that they had hoped would free the stubborn door. But for Jones and Jernigan, who said Monday they were disappointed that their weekend spacewalks

were cancelled because they couldn't completely turn the handle to the outer door, the outcome could have been worse. Much worse. The shuttle Columbia's hatch could have jammed open after their spacewalk rather than having failed to open in the first place. Then they would have had a dangerous, bumpy and untried emergency ride home, space experts said. If the outer door could not have been closed, the astronauts would not have been allowed to open an inner hatch that leads to Columbia's crew compartment. To do so would create an instantaneous and deadly vacuum throughout the ship, said Bryan O'Connor, a former NASA shuttle director. The spacewalkers would have had to remain in their spacesuits inside the empty air lock between the two hatches while Columbia made an emergency landing. Despite the concern, Jones and NASA flight director John Shannon said it would have been unlikely that the hatch would have failed to close and seal because of the tremendous pressure within the air lock. NASA sent two astronauts to Kennedy Space Center over the weekend to test Atlantis and Discovery for similar problems that might help engineers figure out just what went wrong. [**THE ORLANDO SENTINEL**, December 3, 1996, p A1 and A4.]

December 3: **LUCID HONORED**

Shannon Lucid, the astronaut who spent a record 188 days in space this year, became the first woman to be awarded the Congressional Space Medal of Honor. Lucid is the 10th astronaut awarded the medal, which was created in 1969. [**USA TODAY**, December 3, 1996, p 3A.]

CANAVERAL SEASHORE TO CHARGE ADMISSION

Starting sometime this spring, entrance fees will be charged at Playalinda Beach and the rest of Canaveral National Seashore. Fees will be $1 a person or $5 a vehicle for each visit. An annual pass will cost $20. Eighty percent of the money collected will remain here, said Bill DeHart, chief ranger at Canaveral National Seashore. [**FLORIDA TODAY**, December 3, 1996, p 1-2A.]

DELTA/MARS PATHFINDER LAUNCH ADVISORY

The launch of Mars Pathfinder aboard a McDonnell Douglas Delta II rocket was postponed today one minute thirty three seconds before launch. A propulsion console in the blockhouse lost synchronization with a launch-mandatory alarm system. The alarm system assures that no launch parameters are out of limit during the final four minutes of the countdown. Pending resolution of the problem, the launch has been rescheduled for Wednesday, Dec. 4 at 1:58:07 a.m. A meeting will be held early Tuesday to determine launch readiness. There is a 90% chance of acceptable launch weather conditions on Wednesday morning. [**NASA News Release**, Launch Advisory, December 3, 1996.]

December 4: **'SIMPLE CRUISE' TO MARS UNDER WAY**

A Delta rocket carrying the Mars Pathfinder lifted off at 1:58 a.m. Wednesday from Launch Pad 17B at Cape Canaveral Air Station. Outfitted with an instrumented lander and NASA's first planetary rover, the $196 million robotics scout is on a seven-month, 310 million-mile voyage that will take it to the surface of Mars. Its planned touchdown on an ancient flood plain known as Ares Vallis will mark America's first return to Mars since NASA's $1 billion Viking spacecraft visited the planet more than 20 years ago. Internet surfers can keep track of the Mars Pathfinder spacecraft, on its way to the Red Planet, through the NASA Jet Propulsion Laboratory's Mars Pathfinder Home Page at http://mpfwww.jpl.nasa.gov/. [**FLORIDA TODAY**, December 5, 1996, p 1-2A; **THE ORLANDO SENTINEL**, December 5, 1996, p A-4; **KSC Countdown**, December 10, 1996.]

ECOLOGIST TRACKS MANATEE MOVEMENTS

The world knows the eyes of nearly everyone at Kennedy Space Center are on the skies. The people at Kennedy Space Center know the eyes of Jane Provancha are on the area's earth-bound natural habitat. And well they should be. Consider: One of Florida's most ambitious and careful projects to preserve the natural habitat takes place at KSC. Much of the information collected about native species, particularly those of the endangered variety, comes from scientists at KSC. Between 2,500 and 2,600 manatee now live in Florida at peak times of the year, which scientists never would have known except for the aforementioned scientists at KSC. Thus it falls to Provancha and her fellow ecologists at Dynamac Corp. to keep track of most of the above and in which KSC has been involved well before that. According to Provancha, KSC administrators long have recognized the importance of preserving the ground from whence men rocket into space. Before such matters were law, rocket scientists determined they should regularly check the health of the surrounding habitat. After all, a good chunk of the 140,000 acres of land and water that is the world's most prominent launch area is also part of a major wildlife refuge. [**FLORIDA TODAY**, **COCOA TRIBUNE**, December 4, 1996, p 1-2A.]

December 5: **WEATHER FORCES NASA TO DELAY SHUTTLE LANDING**

Space Shuttle Columbia was supposed to land a day early on Thursday, because NASA was worried about bad weather for a landing today. But the bad weather came earlier than expected, forcing NASA to cancel the landing and try again Friday (December 6, 1996). Less than an hour before astronauts were supposed to start the plunge toward Earth, clouds moved in at Kennedy Space Center. Columbia's landing was rescheduled for 8:01 .m. Friday. If the weather is bad at that time, NASA will try again at 9:38 a.m. [**THE ORLANDO SENTINEL**, December 6, 1996, p A-9.]

BAD NEWS FROM RUSSIA THROWS OFF SPACE STATION COUNTDOWN

A shortage of cash in Russia's space program has wrecked NASA's intricate plans for building the first phase of the international space station, officials said Thursday. At best, the setback means the launch of the first space-station crew will be delayed by up to eight months. At worst, it could add hundreds of millions of dollars in costs to American taxpayers and threaten the United States-Russian partnership that has kept the program alive since 1993. A critical Russian component that would provide flight control for the space station and living quarters for its crew was supposed to be ready for launch in April 1998. But Randy Brinkley, the NASA official who manages the station program, said the slowdown in work by cash-starved Russian contractors building the module will push that date back as far as December 1998. The "service module" that the Russians are building was to have been sent up on the third launch. [**THE ORLANDO SENTINEL**, December 6, 1996, p A-1&A-9.]

ROCKWELL TO LEAVE KSC

Boeing Co. and Rockwell International Inc. are set to sign a $3.2 billion deal in which Boeing will acquire Rockwell's space and defense divisions. Rockwell stockholders voted Wednesday (December 4) to approve the purchase, which was announced in August. About 500 Rockwell Aerospace division employees at Cape Canaveral and Kennedy Space Center will become Boeing North American employees today. Those employees will continue working on contracts that include maintaining the Rocketdyne engines used on the shuttle and in Delta and Atlas rockets. They join 300 Boeing Aerospace Operations division employees in Cocoa Beach and KSC. That division assembles and maintains a special booster attached to satellites. Brevard County's Rockwell Aerospace employees and their heritage were honored Thursday at the Radisson Convention Center in Cape Canaveral. KSC Director Jay Honeycutt, U.S. Rep. Dave Weldon, R-Palm Bay, and other officials praised the company for its four decades of participation in the space program. [**FLORIDA TODAY**, December 6, 1996, p 10C-9C.]

COMPANY SETTLES SUIT

The Boeing Co. has agreed to restrict its space-launch business and to give up work on an unmanned high-altitude aircraft to settle federal antitrust charges, the Federal Trade Commission announced Thursday. The FTC had charged that Boeing's $3 billion acquisition of Rockwell International's aerospace and defense businesses could violate antitrust law by reducing competition in the two types of business. Boeing and Lockheed Martin are partners in a project to build a high-altitude, endurance, unmanned aircraft for the Defense Department. Competing with them is a project by Teledyne Ryan, which includes Rockwell as manufacturer of the craft's wings. The settlement forbids Boeing from making any information obtained as a propulsion supplier available to its launch-vehicle division. [**FLORIDA TODAY**, December 6,

1996, p 9C.]

December 7: **SPACE SHUTTLE MISSION ENDS**

Space Shuttle Columbia landed smoothly through mottled clouds after a twice-extended record 7,043,950-mile mission, which lasted 17 days, 15 hours and 54 minutes. Columbia's landing also ended the flying part of the 30-year career of record-setting astronaut Story Musgrave, who at 61 was the oldest person in space. He flew in a record six space shuttle trips. [**THE ORLANDO SENTINEL**, December 8, 1996, p A-6.]

December 8: **TITUSVILLE RESIDENTS WIN SILVER SNOOPYS**

Three NASA/KSC employees from Titusville recently were presented with NASA's Silver Snoopy Award for service to the space shuttle astronauts. Sharon M. Carlson, space station hardware integration office; Danny R. Culbertson, engineering development directorate; Elizbeth S. Gruhler, chairwoman of the space station ground operations and logistics working group; Carl B. Mattson, engineer with I-Net, Inc. [**FLORIDA TODAY**, December 8, 1996, p 5E.]

December 9: **ROAR INTO NASA'S APOLLO PAST**

Several hundred employees took an advance tour of a new Apollo-era attraction Monday night at Kennedy Space Center. Inside a $37 million facility is the 363-foot rocket that was built to launch men to the moon. The Saturn V looks bigger than ever lying on its side and perched overhead in the shiny, 100,000 square-foot building that was built around it. The rest of the saga is told with exhibits, other Apollo relics, including a spiderlike lunar module and a tiny command module, and two shows that meld video of historic scenes with current interviews of the gray-haired men who once walked on the moon. One of three remaining Saturn Vs, the rocket was brought to KSC in 1975 and placed outside the VAB, where the salt air and rain took its toll. Portions of the rocket were built to fly on Apollo 18, which was cancelled, and other portions were designed a backup or test components. With the expertise of the Smithsonian leading the restoration efforts, the rocket was moved to its new home and painstakingly returned to its Apollo-era appearance. The Apollo/Saturn V Center opens to the public Dec. 17. The recently completed Apollo/Saturn V Center will be a stop on the regular tours that are run daily from the Visitor Center. [**FLORIDA TODAY**, December 10, 1996, p 1A-2A.]

A 'STITCH IN TIME' SAVES PATHFINDER

A critical element of the Pathfinder lander's Mars surface weather station was seriously damaged just as JPL technicians were about to fold the spacecraft into its launch configuration. But an "electronic seamstress" rushed here was able to repair the

instrument, saving one of the lander's most important science instruments. A JPL technician working on the spacecraft in its Kennedy Space Center checkout building accidentally severed the lander wire mechanism designed to obtain wind direction. The sensor employs six "hot wire" elements that provide wind speed and direction by detecting temperature changes. "Our hearts sank," said Tony Spear, JPL Pathfinder project manager. "We were emotionally crushed. We did not find the damage until just 2 hr. before we were to fold the lander shut." No one knows when the accident occurred. The damage was discovered so late that technicians believed they might have to launch the mission with the broken instrument. "It looked hopeless, when Regina A. Alleruzzo at JPL asked for an opportunity to fix it," Spear said. Alleruzzo, an expert in threading and soldering delicate wiring, was flown here overnight from Los Angeles and was able to rethread and resolder the wire to fix the spacecraft. [**AVIATION WEEK & SPACE TECHNOLOGY**, December 9, 1996, p 26.]

U.S., JAPANESE MOON MISSIONS TO SEEK WATER, LUNAR CORE

New evidence that a large region of subsurface water ice exists on the Moon will increase the importance of two new U.S. and Japanese unmanned lunar missions set for launch by early 1998. The NASA Lunar Prospector set for liftoff next Sept. 24 is specifically designed to look for evidence of water on the Moon. The $63-million Lockheed Martin spacecraft will search for regions with subsurface permafrost composed of water ice that could provide hydrogen and oxygen resources for use by manned flights to the Moon and Mars in the 21st century. The Ames Research Center spacecraft is set for launch from Cape Canaveral on board the first flight of the three stage LMLV-2 booster. [**AVIATION WEEK & SPACE TECHNOLOGY**, December 9, 1996, p 64.]

December 10: **ATLANTIS ROLLS OUT TO PAD TODAY FOR STS-81**

The Space Shuttle Atlantis was scheduled to roll out to Launch pad 39B from the Vehicle Assembly Building at 11 a.m. today, with the vehicle expected to be hard down at the pad at about 5 p.m. Atlantis' primary payload, a Spacehab double module, is already in the Payload Changeout Room at the pad and will be installed in the orbiter's payload by on Thursday. The STS-81 Terminal Countdown Demonstration Test (TCDT) is planned for Dec. 16-17. The six-member STS-81 crew is expected to arrive at KSC to participate in the final launch sequence simulation on Dec. 15. Highlights of the 10-day space flight include the fifth Shuttle docking with the Russian Mir space station, the transfer of Mission Specialist Jerry Linenger from Atlantis to take astronaut John Blaha's place on the Mir 22 crew and the return of Blaha to Earth via the orbiter. [**KSC Countdown**, December, 10, 1996.]

COLUMBIA READIED FOR STS-83

Columbia is in Orbiter Processing Facility 1 undergoing deservicing and preparation

for the STS-83 mission after its record-setting space flight that concluded with a touchdown at KSC's Shuttle Landing Facility at 6:49 a.m. Dec. 7. At 17 days, 15 hours and 54 minutes, the STS-80 mission is now in the history books as the longest Shuttle mission to date. While in orbit, Columbia circled the Earth more than 278 times and traveled approximately more than 7 million miles. [**KSC Countdown**, December 10, 1996.]

KSC'S ENERGY SAVINGS EFFORTS REWARDED WITH NATIONAL HONOR

Kennedy Space Center is the only NASA center to receive the 1996 Federal Energy and Water Management Award. The prestigious award recognizes KSC's efforts to promote a cleaner environment and save taxpayer dollars by conserving energy. A total of 117 nominees representing 19 federal agencies competed for the award, presented by the Federal Interagency Energy Policy Committee and the Department of Energy. KSC won because of its aggressive response to a 1994 Executive Order that mandated energy conservation goals and called for innovative ways to reduce energy consumption. Using KSC's energy consumption in 1985 as a baseline, the order requires an ambitious 330 percent reduction by 2005. In fiscal year 1995 alone, KSC avoided more than $1 million in energy costs. Kennedy's Base Operations Contractor (BOC), EG&G Florida, Inc., contributed to that savings by implementing more than 13 energy conservation projects through their Energy Management Office. [**NASA News Release**, #142-96, December 10, 1996.]

December 11:

IT'S OFFICIAL: LOOSE SCREW MADE SHUTTLE HATCH STICK

NASA confirmed that a missing screw was responsible for a stuck hatch on the space shuttle Columbia. The screw had been a prime suspect on Tuesday (December 10) as NASA technicians tried to determine what caused a critical hatch gearbox to jam during Columbia's flight. The screw was found lodged "where the teeth of the gears run together," Kennedy Space Center spokesman Bruce Buckingham said. The jammed hatch cause the cancellation of two important spacewalks late last month. The screw lodged in the thermos-sized gearbox, a collection of a dozen interlocking gears called an actuator. That actuator, behind the hatch handle, increases the torque applied by astronauts and unlocks latches along the hatch. The quarter-inch screw is one of two that hold a brake in place in the gearbox. Officials figure the screw became loose over time and slipped out during the jostling of Columbia's launch. [**THE ORLANDO SENTINEL**, December 12, 1996, p A-6.]

LOOSE SCREW ON COLUMBIA'S HATCH MAY PROMPT ATLANTIS INSPECTION

A loose screw on shuttle Columbia might prompt a launch pad inspection of six

hatches on sister ship Atlantis, but the extra work probably wouldn't delay the planned Jan. 12 launch of the latter, officials said Wednesday. NASA officials were mulling the possibility of more inspections to Atlantis after discovering a loose screw jammed Columbia's airlock hatch, forcing the agency to cancel two spacewalks on its recent space science mission. Identical hatches on Atlantis will have to be open and shut properly in order to pick up astronaut John Blaha at Russia's Mir space station and conduct science experiments in a cargo bay laboratory. Engineers are debating whether to X-ray the Atlantis hatches or disassemble their gearboxes to make certain all screws are in place and tightened properly. [**FLORIDA TODAY**, December 12, 1996, p 4A.]

December 12: **CLANCY TO COVER SHUTTLE LAUNCH ONLINE**

Microsoft mogul Bill Gates and techno-thriller king Tom Clancy will team together next month to take arm-chair Internet adventurers to NASA's next shuttle launch at Kennedy Space Center. The cyberspace foray is part of a different sort of launch, that of "Mungo Park," an interactive online travel adventure magazine from Microsoft. Named after an 18th-century Scottish explorer, the "web-zine" already has taken Internet cruisers on two African expeditions as part of test runs. Its official start will come Jan. 7 at KSC as NASA gears up for Atlantis' liftoff five days later. The shuttle expedition will take cyber-surfers to NASA's KSC launch site, the Mission Control Center in Houston and an orbit 250 miles above the Earth. Atlantis astronaut John Grunsfeld will file daily dispatches during the shuttle's 10-day journey. Other crew mates will try to beam back "surround video" that would give Mungo Park readers a 360-degree digital look at the inside of the shuttle. A live Internet chat from space also will be attempted. [**FLORIDA TODAY**, December 12, 1996, p 1A.]

December 13: **PANEL: SHUTTLES SAFE UNDER NEW PLAN**

NASA's ambitious plan to cut costs by turning over daily operations of its shuttle fleet to a private contractor poses no unacceptable safety risks at the present time, an independent safety panel concluded in a report Friday. However, the panel raised red flags about potential problems that could crop up and endanger future shuttle crews. "Efforts to streamline the space shuttle program have not inadvertently created unacceptable flight or ground risks," wrote Paul Johnston, chairman of the Aerospace Safety Advisory Panel in a letter to NASA Administrator Daniel Goldin. But Johnston also pointed out the report's emphasis on the need for NASA "to take steps to ensure the availability of a skilled and experienced civil service work force." NASA is facing severe budget pressure just as it is about to begin assembling the $40 billion international space station, its most ambitious engineering project ever. The space agency's civil service work force is expected to decline significantly through 2001, and many policymakers, including those in the White House who requested the safety report, are concerned the dramatic changes could contribute to another shuttle catastrophe. The panel also advised NASA not to increase the shuttle launch schedule

without first making sure its work force safely could sustain the faster tempo. [**FLORIDA TODAY**, December 14, 1996, p 1-2A.]

THE CAPE COMPLETES SEASON FILMING AT KSC

Early Dec. 13, the film crew of The Cape will shoot the final footage at KSC for its initial 22-episode television season. This will bring to a close a busy schedule of nearly seven months of filming at several locations at KSC and throughout Brevard County. A company representative stated that they will not know until the end of January 1997 whether the space-oriented drama will continue into a second season. If it is, filming is expected to begin again next March. [**KSC Countdown**, December 12, 1996.]

December 15: **AVIATION GIANTS TO MERGE**

Boeing Co. jolted the aerospace world Sunday with a $13.3 billion deal to buy McDonnell Douglas Corp., reducing the number of major commercial-aircraft makers in the world from three to two. [**THE ORLANDO SENTINEL**, December 16, 1996, p A-1.]

HOW WILL DEAL AFFECT LOCKHEED, AND NASA?

NASA used to have a whole sea of suppliers to choose from when it went into space. Soon there may be just two. It's either Boeing or Lockheed Martin. Practically no other U. S. competition remains. Boeing Co. announced Sunday that it was buying the ailing McDonnell Douglas Corp. for $13.3 billion, the seventh megamerger in the aerospace industry in the past three years. The purchase, which is subject to government review, came 10 days after Boeing, which is the No. 2 supplier to NASA, finished buying Rockwell International's defense and space divisions, NASA's third-biggest supplier. McDonnell Douglas is NASA's No. 4 supplier. Now Boeing will catapult past No. 1 NASA supplier Lockheed Martin, which until now had been the biggest aerospace company in America. Boeing and Lockheed Martin, which have teamed up to run the $3 billion space shuttle program for NASA, together get about half of every dollar that the National Aeronautics and Space Administration spends. Boeing acquired Rockwell's half-interest in the United Space Alliance, which runs daily shuttle operations. It now gets McDonnell Douglas' payload processing contract. And it already was the prime contractor to build the $29 billion international space station. [**THE ORLANDO SENTINEL**, December 16, 1996, p A-1& A-8.]

December 16: **SPACE COAST, NASA GEAR UP FOR BUSY WEEK**

A nighttime rocket launch, a space shuttle practice countdown and the opening of a new space tourism center are scheduled on the Space Coast this week. If that's not enough, NASA's Galileo spacecraft also is to swing by the Jovian moon Europa on

Thursday. Kicking off the busy week today will be a two-day practice countdown for NASA's next shuttle mission, the Jan. 12 launch of Atlantis from Kennedy Space Center. Also today, Gemini and Apollo astronaut Eugene Cernan, the last human to walk on the moon, will be at the opening ceremony for the new facility that houses a Saturn 5 moon rocket. Tuesday (December 17) night Lockheed Martin Atlas rocket blasts off from Cape Canaveral Air Station on a satellite delivery mission. [**FLORIDA TODAY**, December 16, 1996, p 2A.]

CONCEPTS PRESENTED FOR FUTURE MILITARY SPACEPLANE

Seventeen U.S. contractors presented their concepts for a future military spaceplane to a panel of U.S. Air Force Space Command and Materiel Command reviewers last week. The three-day spaceplane conference, which focused on technology assessments, showed another prominent indication of the USAF's growing interest in a reusable vehicle that can maneuver in the atmosphere and space. [**AVIATION WEEK & SPACE TECHNOLOGY**, December 16, 1996, p 17.]

December 17: **ATLAS LIFTS OFF WITH SATELLITE**

An Atlas 2A blasted off Tuesday night from Cape Canaveral Air Station carrying a mobile communications satellite. It was the Cape's seventh and last Atlas launch of 1996. [**FLORIDA TODAY**, December 18, 1996, p 1A.]

CHALLENGER DEBRIS SURFACES

A barnacle-encrusted wedge of aluminum found Tuesday on Cocoa Beach was a piece of the shuttle Challenger that had washed ashore almost 11 years after the accident that killed seven astronauts. Covered with sea urchins and green slime, the 14-foot-long piece of wreckage later was identified by NASA officials as a flap from Challenger's left wing. Discovered near Minutemen Causeway, it was one of two Challenger pieces that washed ashore. The other was a 5-foot-long piece that appears to be part of the wing flap's skin. The space shuttle Challenger accident occurred on January 28, 1986. [**FLORIDA TODAY**, December 18, 1996, p 1A & 11A.]

APOLLO/SATURN V RIBBON-CUTTING CEREMONY DEC. 17

The long-awaited official opening of the Apollo/Saturn V Center on Tuesday, Dec. 17, will be preceded by a ribbon-cutting ceremony to be held at the facility at 11:30 a.m. The ceremony will include Apollo astronaut Gene Cernan, Deputy Center Direction Gene Thomas and other dignitaries. Special presentations will be made to those organizations that contributed to the successful completion of the project. Following the ceremony, the facility will officially open to the public at 12:30 p.m. From Dec. 18 throught 22, operating hours will be 10:30 a.m. to 5:45 p.m. and change to 9:30 a.m. to 8 p.m. from Dec. 23 - Jan. 3. The massive 100,000 square foot, $37 million facility

is the largest single expansion ever made to the KSC Visitor's Center. [**KSC Countdown**, Decemer 12, 1996.]

December 18: **THIRD PIECE OF CHALLENGER DEBRIS WASHES ASHORE**

A third piece of shuttle Challenger's left wing washed up Wednesday in Cocoa Beach as NASA and local police combed the shoreline for wreckage. The debris was taken to the Cocoa Beach Police Department and retrieved by NASA officials. It was then taken to Kennedy Space Center, where Challenger was launched on its 10th and final flight Jan. 28, 1986. All the pieces found the past two days will join other Challenger wreckage in two abandoned Minuteman missile silos and four underground rooms at nearby Cape Canaveral Air Station. [**FLORIDA TODAY**, December 19, 1996, p 1-2B.]

KSC EXTENDS MCDONNELL DOUGLAS PAYLOAD CONTRACT

NASA's Kennedy Space Center, has awarded McDonnell Douglas Aerospace, Space and Defense Systems, Huntington Beach, CA, a two-year extension to its existing contract for payload ground operations services. The value of this option is $245.7 million. This two-year extension is effective Jan. 1, 1997 and ends Dec. 31, 1998. This contract features options that will carry the contract period of performance through Dec. 31, 2001, and will bring the total contract value to $1.9 billion. This is the fourth extension of the payload ground operations contract awarded to McDonnell Douglas since the original contract was initiated in January 1987. Under the cost-plus-award-fee/incentive-fee performance based contract, McDonnell Douglas will continue to provide ground support, test and integration for payload operations at Kennedy Space Center. [**NASA News Release**, #96-264, December 18, 1996.]

December 20: **ASTRONAUT PLANS MIRRY CHRISTMAS ON SPACE STATION**

Gifts wrapped and mail sent, astronaut John Blaha will be celebrating Christmas next week unlike any American since 1973 as he orbit Earth aboard the Russian space station Mir. Blaha will be the first American in orbit on Christmas Day since 1973, when the three-man crew of Skylab 4 fashioned a makeshift tree out of cans and decked the halls from their orbiting laboratory. The only other NASA astronauts to be in space during Christmas were the crew members of Apollo 8, who looped around the moon for the first time during their historic mission on Dec. 25, 1968. [**FLORIDA TODAY**, December 20, 1996, p 1A.]

ASTRONOMER CARL SAGAN DIES

'Everybody starts out as a scientist. Every child has the scientist's sense of wonder

and awe. Too often we beat it out of the kid. The job of a science popularizer is to penetrate through the teachings that tell people they're too stupid to understand science." -Carl Sagan, in explaining the role that made him one of the nation's best-known scientists. He enthusiastically conveyed the wonders of the universe to millions of people on television and in books. Sagan also played a big role in putting messages from Earth on the Pioneer and Voyager spacecraft that were sent to Jupiter, Saturn and beyond during the 1970s. In Brevard (August 1977) for the launch of Voyager II, Carl Sagan stated, "Many scientists just don't have the guts to stick out their neck and say there is a possibility of finding life on Mars like I do. We can't prove there is life, but equally important, we can't prove there is not life. That is my point." Sagan, 62, died of pneumonia on Friday. [**THE ORLANDO SENTINEL**, December 21, 1996, p A-1; **FLORIDA TODAY**, December 21, 1996, p 1-2A.]

U.S. LAUNCHES SPY SATELLITE

A rocket hurled a U.S. spy satellite into orbit Friday in the first such launch ever acknowledged in advance by the government. There were no official details on the satellite itself, but trade publications indicated it is part of the lacrosse series of radar imagery satellites that "see" through cloud cover and darkness. The first of these was launched in 1988. Launch occurred from the Vandenberg Air Force Base, Calif. [**FLORIDA TODAY**, December 21, 1996, p 5A.]

CRCA RIBBON-CUTTING

A ribbon-cutting ceremony for phase one of KSC's new Component Refurbishment and Chemical Analysis (CRCA) Facility will be held tomorrow (December 20) outside the new facility at 9 a.m. The CRCA, located in the LC 39 area, will replace and modernize the existing Wiltech Facility and be used to precision clean and refurbish numerous types of propellant and other fluid systems components. The new facility will include approximately 37,000 square feet of floor space including a class 100 clean room, a rough clean area, a hydraulic laboratory and office spaces. Also included is a gas tank farm, de-mineralized water production plant and a waste water treatment plant. [**KSC Countdown**, December 19, 1996.]

December 21: **CONTEST DOWN TO 2: LOCKHEED, MCDONNELL**

Called on to make a new rocket, two old presences on the Space Coast emerged as victors Friday in the first round of competition to build the next generation of American rockets. Aerospace giants Lockheed Martin and McDonnell Douglas were chosen by the Air Force to compete for a $1.6 billion contract to manufacture a new rocket that is being hailed as the saving grace of America's commercial launch industry. The three rockets currently launched from Cape Canaveral Air Station are manufactured by the two companies. McDonnell Douglas builds the Delta, and the Atlas and Titan rockets are made by Lockheed Martin. The Air Force expects the new

rocket eventually to replace all those vehicles by incorporating the best technologies and cutting launch costs 25 percent. One company will be chosen in mid-1998 to build the rocket, with test flights set for 2001. [**FLORIDA TODAY**, December 21, 1996, p 1A.]

December 23: **KSC PREPARES TO SHUT DOWN FOR HOLIDAYS**

Preparations for shuttle Atlantis' launch next month to the Russian space station Mir will stop Tuesday for almost two weeks as NASA closes for the holidays. Instead, workers will make sure Kennedy Space Center buildings are in shape to support the eight shuttle missions planned for 1997, including a February flight to service the Hubble Space Telescope. The new year will also feature the first shuttle mission to start assembly of NASA's $40 billion international space station. That flight is tagged for liftoff next December. Workers will resume Atlantis' launch preparations Jan. 2, preparing the ship for a Jan. 12 liftoff to Mir. [**FLORIDA TODAY**, December 23, 1996, p 1A.]

December 24: **BOMB THREAT SHUTS KSC CENTER**

A bomb threat forced Kennedy Space Center security to close the Visitor Center for about four hours early on Christmas Eve, sending thousands of people away. The threat was phoned in to the center Monday and again Tuesday morning by a female caller, according to Jim Ball, chief of the Visitor Center public affairs branch for NASA. A search by employees and KSC security uncovered nothing suspicious, Ball said. The center, open every day of the year except Christmas, was packed with holiday visitors hoping to get a glimpse of shuttle launch pads and a newly opened Apollo-era center. [**FLORIDA TODAY**, December 25, 1996, p 1B.]

December 27: **KSC EXPECTS NEAR-RECORD CROWDS**

An estimated 13,000 people toured Kennedy Space Center's Visitor Center on Thursday, but even larger crowds are expected today and Saturday. The tourist attraction's biggest days of the year traditionally start after the Christmas holiday, when Brevard County residents are off work and visitors pour into the area, said Dan LeBlanc, Visitor Center director of marketing. The most-attended days of 1995 tourist season fell on Dec. 27 and Dec. 28, when almost 17,000 people passed through the Visitor Center. [**FLORIDA TODAY**, December 27, 1996, p 1A.]

December 29: **UNITED SPACE ALLIANCE NAMES NEW PRESIDENT**

A longtime Boeing Co. executive has been tapped to take on the newly created position of president of United Space Alliance, the joint venture partnership which is taking over day-to-day shuttle operations from NASA. Denton Hanford, vice president and general manager of the helicopter division of Boeing Defense and Space Group,

will join USA on Jan. 6. Kent Black will remain as chief executive officer of USA and former astronaut James Adamson will continue as chief operating officer of the alliance, a joint venture of Lockheed Martin and Boeing. [**FLORIDA TODAY**, December 29, 1996, p 5E.]

December 30: **COMPUTER CHAOS LOOMS IN 2000**

Some survivalists think we have only three good years left. When the century turns, they think numerous computer systems using two-digit year dates will fail, creating a global crisis followed by a depression. Even computer gurus are worried that government and business are not moving quickly enough to fix their computer systems' year 2000 problems. When 2000 rolls around, computers not equipped to handle calculations based on dates in the new century will crash or spit out bad data. NASA and its contractors have organized teams to work on assessing, making and testing needed changes. Getting ready for 2000 at Kennedy Space Center alone is expected to cost at least $6 million, said Vanessa Stromer, shuttle processing chief information officer for NASA and leader of NASA's year 2000 integration team. "We're hoping to be finished making changes by Jan. 1, 1999, so we can have a year to test to make absolutely sure all the problems are solved." Stromer's counterpart at the United Space Alliance is launch-processing system project engineer Ellen Prince. Prince estimates the year 2000 changes within the alliance at KSC alone will cost about $3 million. "We can't just wait around until funding is approved, we've got to go ahead with this thing," Prince said. "No one knows whether the money will ever be appropriated. That's one of the biggest concerns everyone has about the year 2000 problem. Who's going to pay for making it go away?" [**FLORIDA TODAY**, December 30, 1996, p 1-2A.]

During December: **KSC RECEIVES EMPLOYEE DISABILITY HIGH-TECH TRAINING AWARD**

The Business Advisory Council of the Center for High-Tech Training for Individuals With Disabilities has awarded KSC the Dale Wallbrown Memorial Corporate Sponsor of the year Award. This annual award, presented by Valencia Community College, represents outstanding contributions to disabled students who have received special training in the field of computer programming or in computer assisted drafting and design. KSC has had five interns, all of which have performed successfully and now have productive jobs in local businesses. [**KSC Countdown**, December 17, 1996.]

KSC RECEIVES COMPETITION ADVOCACY AWARD

KSC's efforts to enhance competition for federal contracts by easing the bidding process for all businesses have once again been recognized nationally with the prestigious Competition Advocacy Award from NASA Headquarters. The award, which KSC has won for three of the last four years, recognizes several steps KSC has

taken to open up the procurement process, specifically to small and small disadvantaged businesses that may have had difficulty obtaining bidding information in the past. KSC's efforts have helped NASA to find suppliers that might never have applied for contracts in the past, said Ann Watson, deputy director of the Procurement Office. [**KSC Countdown**, December 19, 1996.]

LAUNCH OPERATIONS BUSY IN 1997

Launch operations at the Kennedy Space Center and Cape Canaveral Air Station will remain at an extremely busy pace into 1997. A Lockheed Martin/International Launch Services Atlas Centaur is scheduled to loft a European Inmarsat spacecraft here Dec. 17, a mission worth about $150 million. And the 1997 schedule here will involve more than 30 major launches. They include: Eight space shuttle flights each valued at about $400 million. Nine Atlas missions each worth $150-175 million, including their payloads. Ten McDonnell Douglas Delta missions, each worth $80-100 million, including payload. At least three USAF/Lockheed Martin Titan 4 missions worth $300-400 million each, including payload. The first Lockheed Martin LV-2 mission worth $63 million, including its Lunar Prospector payload. ["EVA Hatch Problems Blamed on Loose Screws." **AVIATION WEEK & SPACE TECHNOLOGY**, December 16, 1996, p 24.]

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Elaine E. Liston

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