NASA TM-1999-208551

Chronology of KSC and KSC Related Events for 1998

Elaine E. Liston

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FOREWORD

This 1998 Chronology is published 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 Archivist Elaine E. Liston.

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@ksc.nasa.gov, or (407) 867-2407.

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JANUARY

JANUARY 2: A Brevard County congressman wants proposed layoffs at Kennedy Space Center blocked until lawmakers can investigate the impact on space shuttle safety. Rep. Dave Weldon, R-Palm Bay, is concerned about the proposal to lay off anywhere from 250 to 600 or more United space Alliance workers - up to 10 percent of the shuttle work force. He wants a congressional committee to look into the plan. A NASA spokeswoman said this week that no decision has been made to let anybody go. NASA spokeswoman Peggy Wilhide said United Space Alliance, a new company formed to privatize the shuttle program, has proposed layoffs, but she would not give specific numbers. She said United is charged with making the shuttle program more efficient but insisted NASA would not compromise safety. The controversy has drawn strong words from Weldon and Florida's two U.S. senators, Democrat Bob Graham and Republican Connie Mack. The three lawmakers wrote NASA Administrator Dan Goldin demanding answers about the proposed cutbacks. Several months ago, NASA told Congress that it could support 12 launches a year and could transfer $190 million from the shuttle budget to the budget for the proposed space station. "What factors suddenly changed that now require layoffs?" the lawmakers asked Goldin in their letter. ["Weldon: No KSC layoffs until safety is studied," **The Orlando Sentinel**, January 2, 1998, p A-5.]

◆ Shuttle launch director James F. Harrington has announced his retirement effective January 2. He will be succeeded in the launch director's position by Shuttle Processing deputy director David A. King and Process Engineering director Ralph R. Rose. As the senior member of the Shuttle launch team during the three-day countdown, the launch director makes the final determination to launch and also oversees prelaunch preparations at the space center, as well as KSC landing operations. Harrington began his space career in 1957 as a senior flight engineer for General Dynamics at Cape Canaveral on the Mercury-Atlas launch team. ["KSC's Harrington to retire," **The Brevard Technical Journal**, January 1998, p 1.]

JANUARY 4: The crew that will carry astronaut David Wolf back to Earth from Russia's Mir space station will fly in to Kennedy Space Center this week to take part in a two-day practice countdown for a planned Jan. 22 launch. Led by veteran astronaut Terrence Wilcutt, the seven-member crew will take part in emergency training starting Friday at launch pad 39B. On Saturday, the astronauts will climb aboard shuttle Endeavour for a practice countdown. Wolf, who has been conducting research aboard Mir since his arrival there in late September, is to be replaced on the outpost by astronaut Andy Thomas. Thomas will be the last of seven NASA astronauts to spend time on Mir as part of a program aimed at preparing NASA for the construction and operation of its planned $40 billion international space station. He is scheduled to return to Earth aboard shuttle Discovery in June. ["Practice countdown set for Endeavour crew," **Florida Today**, January 4, 1998, p 6E.]

JANUARY 5: NASA is poised to head for the moon tonight with the launch of its Lunar Prospector probe. The probe is destined for an intensive, yearlong mission to search for water and other resources future moon dwellers might use. It is to be carried into space on the maiden flight of Lockheed Martin's Athena rocket, which is set for launch at 8:31 p.m. from Cape Canaveral Air Station. Officials say there is a 70 percent chance of good weather

for the flight, which marks NASA's return to the moon 25 years after its manned Apollo program ended. After launch, the probe will take about 4 ½ days to reach the moon before settling into a 63-mile-high orbit above the surface. ["NASA ready for another trip to the moon," **Florida Today**, January 5, 1998, p 1A.]

JANUARY 6: A trip back to the moon for the U.S. space program will have to wait at least one more day because radar equipment maintained by the Air Force failed Monday. The radar equipment - which will track the unmanned rocket during its ascent into space - had a pressurization leak noticed by technicians as the countdown began. The launch of the Lunar Prospector mission was scrubbed about an hour before the scheduled 8:31 p.m. liftoff. "It was a range-safety issue. Without the radar, we could not have 100 percent tracking capability, and it became a public-safety issue," Lt. Col. John Martin said. Repairs would have taken several hours, so the launch was postponed until 9:28 p.m. today. There is a four-minute window of opportunity for the launch. ["Moon trip is postponed until tonight," **The Orlando Sentinel**, January 6, 1998, p A-3.]

◆ An Athena rocket lifted off from Cape Canaveral Air Station at 9:28 p.m. carrying the Lunar Prospector spacecraft. "We feel like we've taken a giant step forward to returning to the moon," said Scott Hubbard, Lunar Prospector's mission manager from NASA's Ames Research Center in Moffett Field, Calif. "I think we can look forward to getting some startling and exciting new data about the moon and about our universe." When the mission ends, controllers purposely will crash the explorer onto the surface. In doing so, the NASA spacecraft will bring to rest ashes of renowned planetary scientist Gene Shoemaker, who died in July 1997. Lunar Prospector is carrying an ounce of Shoemaker's cremated remains in a tiny cylinder embedded deep inside the spacecraft. ["Probe races to moon," **Florida Today**, January 7, 1998, p 1A & 2A.]

◆ Space Shuttle Status Report, Tuesday, January 6, 1998. STS-89: The helium signature leak test was completed yesterday and Endeavour's payload bay doors were closed by midnight. Thermal blanket installation on the left payload bay door begins Thursday and concludes on Sunday. Loading of hypergolic propellants into Endeavour's Orbiter maneuvering system pods began this morning and will continue through tomorrow. All three auxiliary power units will be hot-fired on Thursday. STS-90: Shuttle Columbia's payload bay doors were opened yesterday to accommodate Ku band antenna testing yesterday afternoon. The orbiter's nose and main landing gear tires were also installed yesterday. Orbiter maneuvering system testing and replacement of fuel cells No. 1 and 3 are in work. Window polishing efforts begin tomorrow and inspections of the forward reaction control system are scheduled for Friday. STS-91: Discovery's payload bay doors are open and Ku band antenna deploy and testing are complete. Body flap corrosion repair work has resumed. Preparations are in work for removal of the orbiter's forward reaction control system tonight. Friday, technicians will replace fuel cell No. 2. [Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, January 6].]

JANUARY 7: NASA gave shuttle Endeavour the green light for launch in two weeks, while independent safety experts voiced renewed concern Wednesday over plans to lay off 600 shuttle workers around the same time. After an all-day meeting at Kennedy Space Center, senior NASA officials cleared Endeavour and its seven-astronaut crew for a planned

Jan. 22 liftoff to Russia's space station Mir. The main goal of the mission is to pick up astronaut David Wolf, who has been on Mir for four months, and drop off his replacement, astronaut Andy Thomas. But while the NASA bosses huddled, members of the independent Aerospace Safety Advisory Panel began an investigation into plans to furlough workers from United Space Alliance, the company taking over shuttle operations. Richard Blomberg, acting chairman of the panel that oversees NASA for Congress, said he is worried the cuts could jeopardize shuttle safety by reducing the number of inspections and tests on key shuttle systems. Another concern revolves around whether the alliance can make cuts without slashing into an increasingly thin cadre of highly skilled employees who work with hazardous shuttle systems. "Ultimately, they are going to have to keep the proper skill mix within the work force," Blomberg said. In a November report prepared for the White House, the panel warned that the skills and experience mix at KSC already was being eroded as NASA began to slash its federal work force by more than 3,000 people. Further cuts, the panel said, would represent "a potential safety concern" as NASA hands over shuttle operations tot he alliance at the same time it prepares for construction of its international space station. Space station construction begins this summer.

A joint venture of Lockheed Martin and Boeing, the alliance was hired in October 1996 to gradually take over daily shuttle operations so NASA could focus on research, such as planning a human mission to the moon or Mars. NASA told alliance officials two months ago that it faced a $100 million shortfall in money to run the shuttle fleet between January and October of this year. As a result, the alliance is planning to cut as many as 600 shuttle jobs at KSC and at a nearby spare parts debot. The pink slips are expected to be sent out in late January or early February. The new safety panel investigation comes hand in hand with a separate layoff analysis being conducted by NASA's Office of Safety, Reliability and Mission Assurance at the agency's headquarters in Washington, D.C. NASA safety chief Fred Gregory, a former astronaut and veteran shuttle mission commander, is heading the study. The NASA safety study is to be delivered to agency administrator Daniel Goldin by Jan. 16. The layoffs are expected to follow. ["Panel renews concerns over shuttle safety," **Florida Today**, January 8, 1998, p 1A & 2A.]

◆ The crew of Space Shuttle mission STS-89 will arrive today at KSC for the Terminal Countdown Demonstration Test (TCDT). The TCDT is held at KSC prior to each Space Shuttle flight providing the crew of each mission opportunities to participate in simulated countdown activities. Activities will include crew participation in simulated launch day events and they will enter the orbiter Endeavour fully suited for simulated Shuttle main engine ignition and cut-off sequences. Following TCDT, the crew is scheduled to depart KSC for their homes in Houston on Saturday (Jan. 10) for final flight preparations. Endeavour is now targeted for launch on Jan. 22 at 9:43 p.m. Mission STS-89 is the eighth Mir docking mission and the seventh and final mission in which an American astronaut will live and work on the Russian outpost. Crew members for STS-89 are: Commander Terrence W. Wilcutt; Pilot Joe F. Edwards, Jr.; Mission Specialists Andrew S. W. Thomas (who will be replacing David A. Wolf as a Mir crew member), Bonnie J. Dunbar; James F. Reilly II; Michael P. Anderson; and cosmonaut Salizhan Shakirovich Sharipov of Kirghizia. [**KSC Countdown**, January 6, 1998.]

◆ Space Shuttle Status Report, Wednesday, January 7, 1998. STS-89: Loading of hypergolic propellants into Endeavour's orbiter maneuvering system pods continues

through tomorrow. The Rotating Service Structure will be retracted tomorrow at 11 a.m., pending weather, to support hot-fire tests of auxiliary power units No. 1, 2 and 3 on Thursday. Tomorrow night, technicians will gain access to the orbiter's left payload bay door to begin thermal blanket installation. Concluding on Sunday, this work will complete repair efforts on the previously dinged door. NASA managers are conducting the STS-89 Flight Readiness Review at KSC today and are expected to announce an official launch date at the meeting's conclusion this afternoon. STS-90: Functional tests of Columbia's orbiter maneuvering system continue today. Yesterday, technicians replaced fuel cell No.1 and replacement of fuel cell No. 3 is in work today. Remote manipulator system removal is slated for Friday. Window polishing efforts are under way and inspections of the forward reaction control system also begin Friday. STS-91: Removal of Discovery's forward reaction control system was completed yesterday. Technicians are working to install instrumentation that supports the new Super Lightweight External Tank scheduled to fly on this launch for the first time. Friday, technicians will replace fuel cell No. 2. Body flap corrosion repair and fuel cell monitoring modifications continue. [Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, January 7].]

JANUARY 8: Congressman David Weldon will visit the Kennedy Space Center today to meet with employees to discuss the year in Congress and other issues relating to the space program and the Space Coast. [**KSC Countdown**, January 8, 1998.]

◆ Spacehab wins NASA contract. A $42.86 million, two and one-half year contract has been awarded to Spacehab, Inc., Vienna, VA, by the Johnson Space Center. Spacehab will perform research and logistics mission support in their Payload Processing Facility at Cape Canaveral. The new contract will provide logistical support to the International Space Station, and both NASA and commercial science experiments. [**KSC Countdown**, January 8, 1998.]

◆ Kenneth Payne, a veteran leader in the field of acquisition and logistics management, has been named Director of Logistics Operations at KSC. Payne is a certified Acquisition Program Manager and Logistician who has managed major aerospace/aeronautical programs through their life cycle. He also is familiar with programs that have international involvement, having worked on such multinational efforts as the F-16 aircraft program. Payne is a member of the Senior Executive Service and currently serves as deputy director of Requirements, Headquarters Air Force Materiel Command, Wright-Patterson Air Force Base, Ohio. [**KSC Countdown**, January 8, 1998.]

◆ Joseph H. Rothenberg, Director of NASA's Goddard Space Flight Center, Greenbelt, MD, has been named to head the Agency's Office of Space Flight, NASA Administrator Daniel S. Goldin announced today. Rothenberg will lead the Human Exploration and Development of Space enterprise. As Associate Administrator for the Office of Space Flight, Rothenberg will be responsible for all NASA human space flight programs, as well as a variety of expendable launch vehicle operations and tracking and communications functions. The appointment is effective Jan. 12. [**NASA News Release #98-4**, January 8, 1998.]

◆ Former astronaut and Kennedy Space Center director Roy Bridges said Thursday he does not believe impending layoffs at the spaceport will put shuttles and their astronaut crews at risk. The remarks, made after Bridges spoke to the Leadership Brevard business group, came one day after members of an independent NASA watchdog panel expressed new concern about the agency's plan to cut 600 more jobs. Bridges said he felt the reductions could be made without jeopardizing shuttle safety because NASA plans to launch six shuttle missions this year - two less than 1997. "It's something we need to keep on top of, but our launch rate will be down this year, so we will need fewer people," Bridges said. "However, the important thing is that the people who are left are focused on their work and not worried about job security." The layoffs, which are expected to start later this month, will affect 10 percent of the work force at United Space Alliance, the private company taking over shuttle operations for NASA. The cuts will be made in addition to NASA's continuing effort to cut 3,000 civil service jobs agency-wide, including many at KSC, as part of a plan to reduce the size of the agency and turn work over to private contractors. Bridges said NASA is pushing United Space Alliance to improve morale among its employees at the center. "I would say that morale is finally turning around in the civil service sector," Bridges said. "Now, USA has to do that with their people and inspire them as part of this magnificent effort to launch shuttles and bring them back safely." ["KSC official: Job cuts won't affect shuttle safety," **Florida Today**, January 9, 1998, p 4A.]

◆ Space Shuttle Status Report, Thursday, January 8, 1998. STS-89: At the conclusion of yesterday's Flight Readiness Review, NASA managers announced Jan. 22 as the official launch date for mission STS-89. At the launch pad, loading of hypergolic propellants into Endeavour's orbiter maneuvering system pods is complete. Due to unfavorable weather conditions, retraction of the Rotating Service Structure (RSS) in support of auxiliary power unit (APU) hot-fire testing has been postponed. Should weather prohibit this evening's rescheduled APU testing, the hot-fire would be performed late Monday night with no impact to the launch date. Work to repair the thermal blanket on the left payload bay door is under way. The STS-89 crew arrived at KSC's Shuttle Landing Facility yesterday at about 7 p.m. to participate in launch familiarization activities. The crew will take part in the Terminal Countdown Demonstration Test on Friday and Saturday. STS-90: Functional tests of Columbia's orbiter maneuvering system continue and fuel cell replacement work is complete. Post-flight window inspections were completed yesterday. Preparations are in work for remote manipulator system removal slated for Friday. Window polishing efforts are under way and inspections of the forward reaction control system also begin tomorrow. STS-91: Technicians continue to install instrumentation that supports the new Super Lightweight External Tank scheduled to fly on STS-91 for the first time. Preparations are in work for fuel cell No. 2 replacement on Friday. Body flap corrosion repair and fuel cell monitoring modifications continue. [Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, January 8].]

◆ Payload Processing Status Report, Thursday, January 8, 1998. STS-89: 8th MIR Docking SPACEHAB double module; Target Launch Date: Jan. 22, 1998; Current Location: Launch Pad 39-A; Launch Vehicle: Endeavour. Operations Scheduled:* Spacehab pressure decay test (Jan. 11); * Spacehab interface verification test (IVT) Part 2 (Jan 12); * Spacehab experiment and equipment stowage/payload closeouts (Jan 16); * Payload bay door closure for flight (Jan. 16 4 p.m.) ; * Mid-deck experiment stowage (Jan.

21). STS-90: NEUROLAB; Target Launch Date: April 2, 1998; Current Location: Operations and Check-out Building (high bay); Launch Vehicle: Space Shuttle Columbia; Launch Pad: 39B. Operations currently in work: * Crew Equipment Interface Test; * Flight crew equipment stowage; * Spacelab configuration for flight. Scheduled milestones (dates are target only); * Install Neurolab in payload canister (Jan. 27) * Transfer Neurolab to OPF (Jan. 30); * Install into payload bay of Columbia (Jan. 30). International Space Station-Node 1/PMA-1/PMA-2 (STS-88). Target Launch Date: July 9, 1998; Current Location: Space Station Processing Facility (SSPF); Launch Vehicle: Space Shuttle Endeavour Launch Pad: 39B. Operations currently in work: * Installation and testing of communications systems software; * PMA-2 oxygen line installation and testing; * Powered-on electrical system testing; * Installation of space vision system targets. Scheduled milestones (dates are target only): * 4-A Integrated Equipment Assembly arrival (1/9); * Mate PMA-2 with Node 1 (late January); * Cargo element testing (1/27-2/5); * 3-A PMA-3 arrival (2/6) * First truss arrival (2/17); * End-to End Test (2/28); * Long Spacer arrival 3/27); * Node 1/PMA 1-2 Weight/Center of Gravity Determination (5/18). Bruce Buckingham. (1998). **Kennedy Space Center Payload Processing Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, January 8].]

JANUARY 9: NASA is considering bypassing Cape Canaveral and the U.S. rocket industry when it sends a probe to collection Martian rocks in 2005. A U.S. congressman thinks the plan may be illegal. And Florida space officials say it could mean a loss of tens of millions of dollars to the Space Coast economy. The National Aeronautics and Space Administration has been talking with France for the past three months about the French supplying a new Ariane V rocket for the launch from French Guyana, NASA Administrator Dan Goldin told a group of 2,000 astronomers in Washington this week. It would mark the first time Cape Canaveral was not used to launch an American planetary probe. And it would be the first mostly American spaceship to be launched outside of the United States, NASA officials said. With the latest fervor in exploring Mars, triggered by 1996's finding of a possible Martian fossil and last year's Pathfinder landing, France asked NASA to be included in its biggest mission to Mars yet. That mission - which is still in the planning stage - would gather several rocks from different places on Mars, use Mars' own atmosphere to make rocket fuel, then return the rocks to Earth for extensive examination. "If this goes on a foreign launch vehicle, it means it's not going to be launched here at the Cape. It means people are going to be not working," U. S. Rep. Dave Weldon, R-Palm Bay, said. But NASA spokesman Don Savage said that if there is foreign participation in a mission, the law allows NASA to launch on a foreign rocket. Weldon said he will seek a legal ruling on the issue. ["NASA may take French rocket to Mars, leaving Cape out," **The Orlando Sentinel**, January 9, 1998, p A-7.]

◆ Space Shuttle Status Report, Friday, January 9, 1998. STS-89: The hot-fire of all three auxiliary power units (APU) was successfully completed last night with satisfactory results. The crew of mission STS-89 continues to take part in the Terminal Countdown Demonstration Test being held at KSC this week. Tomorrow, they will go through simulated launch day activities including entering the orbiter Endeavour for a simulated main engine ignition and cut-off. They will depart for their homes in Houston tomorrow afternoon to complete their pre-mission training. Currently, the crew is scheduled to return to KSC on Jan. 19 for final launch activities. STS-90: Installation of Columbia's fuel cells is

complete and functional tests are in work. Also in work are operations to remove the remote manipulator system robotic arm, functional tests of the orbiter maneuvering system, and auxiliary power unit leak and functional checks. STS-91: Leak checks of the orbiter's freon loop are complete. Preparations are in work to remove and replace fuel cell No. 2 and to prepare the forward reaction control system to be sent to the Hypergol Maintenance Facility for routine inspections. [Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, January 9].]

◆ The first in a new class of communications satellites for the British military is orbiting Earth today after a successful ride into space Friday. The $150 million satellite, Skynet 4D, was carried into orbit on a Boeing Delta 2 rocket that was launched at 7:32 p.m. Friday from Cape Canaveral Air Station. The mission is the first of 12 Delta flights scheduled from the Cape this year. Built by the European company Matra Marconi Space, the 3,300-pound satellite is the first among a trio of spacecraft that Great Britain has ordered to augment its military communications network. ["Delta 2 rocket successfully sends satellite to new home," **Florida Today**, January 10, 1998, p 4A.]

◆ The Photovoltaic Module 1 Integrated Equipment Assembly (IEA) arrived at KSC Jan. 9 from the Boeing Company. This IEA is one of four integral units designed to generate, distribute and store power for the International Space Station. It will carry solar arrays, power storage batteries, power control units and a thermal control system. The 16-foot long, 16,850-pound unit is now undergoing preflight preparations in the Space Station Processing Facility. It is scheduled for launch on STS-97 in April 1999. [**KSC Countdown**, January 13, 1998.]

JANUARY 10: In a bid to secure Florida's future in an increasingly competitive global space launch business, state leaders will announce Monday (January 11) a task force to lure next-generation spaceships to the Space Coast. Its first job will be a tough one - winning an intense bidding war between states and nations vying to become the launch site for Lockheed Martin's proposed VentureStar Reusable Launch Vehicle, or RLV. The spaceship could dominate the 21st century launch market, and Cape Canaveral's launch pads could become vacant unless the vehicle is flown from here. "It's going to be a very, very hot competition for the RLV home base," said Ed O'Connor, executive director of Spaceport Florida Authority, a state agency created in 1989 to attract aerospace business. Expected to leap from the drawing board to launch pads during the next five years, VentureStar and other RLVs will head into orbit without dropping spent booster stages or fuel tanks back to Earth. That means they will not have to take off from coastal spaceports - such as Kennedy Space Center or Cape Canaveral Air Station - and fly over the ocean to avoid endangering the public. Instead, they will be able to take off from anywhere in the world, which raises the possibility that Florida could be shut out of the billions of dollars of business the new vehicles will bring. The battle for that business will begin Jan. 22, when Lockheed Martin hosts a VentureStar meeting to discuss launch site requirements at its Skunk Works division in Palmdale, Calif. The company is expected to make its launch site decision next year. Construction of the full-scale VentureStar, as well as launch facilities, is expected to begin in 2000. ["State aims to lure launch vehicles," **Florida Today**, January 11, 1998, p 1A & 2A.]

◆ A new generation of rockets will bring more launches to Cape Canaveral Air Station - and more hazardous materials with them. But since the Evolved Expendable Launch Vehicles would be flown from a facility already equipped to handle rocket blasts, they will have no greater effect on the environment than current rockets. That's the finding of a federal environmental impact statement on the rockets - known as EELVs. If approved, the rockets will start flying from Cape Canaveral and Vandenberg Air Force Base in California about 2002. ["Report Oks launch of new rockets," **Florida Today**, January 11, 1998, p 4B.]

JANUARY 12: Two new tour destinations opening Jan. 16 at KSC will draw visitors into the heart of Shuttle launch operations and offer a close-up look at preparations for on-orbit construction of the International Space Station. The new attractions represent the second phase of a comprehensive effort to make the American space program as accessible as possible to members of the general public visiting KSC. Located in the Launch Complex (LC) 39 area - where the Space Shuttle is prepared for flight and launched - is the 60-foot-tall LC 39 Observation Gantry. The other new tour destination is called the International Space Station Center (ISSC). It is located adjacent to the Space Station Processing Facility, in the KSC Industrial Area. "These new destinations, along with the Apollo/Saturn V Center, give the visitor unprecedented access to the U.S. space program and Kennedy Space Center," said James Ball, chief of the NASA Public Services Office at KSC. "Now, instead of a tour largely limited to driving around our facilities, the visitor can spend as much of their day as they wish in the heart of our operational sites, getting an up-close and personal view of both history and the future." [**NASA News Release #9-98**, January 12, 1998.]

◆ John Glenn, the first American to orbit the Earth in 1962, may return to space in October aboard shuttle Discovery, *Newsweek* magazine reported Monday. Glenn, 76, would serve as a payload specialist to conduct tests for the National Institutes of Health on the effect of weightlessness on aging. *Newsweek* said an announcement could be made this week, but NASA officials said no decision has been made. Glenn, the senior senator from Ohio, won support for the trip last year from President Clinton. Discovery is scheduled for an Oct. 8 liftoff from Kennedy Space Center on a 10-day scientific research mission. ["'Newsweek' reports Glenn's possible return to space," **Florida Today**, January 13, 1998, p 1A.]

JANUARY 13: United Space Alliance will start handing out pink slips to about 500 Kennedy Space Center workers Jan. 30 as it pushes ahead with deep cuts to its work force, company officials said Tuesday. The layoffs will take effect about Feb. 13. This week, the company also is asking workers to voluntarily quit their jobs. It estimates as many as 100 people might take the officer, company spokesman Jack King said. When it's all over, the company's 6,000-member work force in Florida will be reduced about 10 percent, King said. The one possible stumbling block involves a review of the situation by former astronaut Frederick Gregory, who is NASA's space shuttle safety chief in Washington. His report is expected Friday, and the layoffs cannot proceed until he approves them. However, Alliance officials said they do not think the cuts will jeopardize the shuttles and their crews, in part because NASA has only five shuttle launches set for the remainder of the fiscal year, which ends Sept. 30. The trouble has not escaped the attention of NASA's astronauts. Terry Wilcutt will command shuttle Endeavour on Jan. 22 during its planned launch to the Russian space station Mir with a crew of seven. "I have mixed feelings, because I think of

(KSC workers) as part of my extended family, and knowing how much they take care of myself and my crew members, it really bothers me to think of some of them being uncertain about their jobs," Wilcutt said Tuesday. "But I don't think any of us worry about (safety) because the people down there (at KSC) just take incredible care of us." ["500 KSC layoffs expected Jan. 30," **Florida Today**, January 14, 1998, p 1A & 2A.]

◆ Space Shuttle Status Report, Tuesday, January 13, 1998. STS-89: The Rotating Service Structure (RSS) at Pad 39A is back in place around Shuttle Endeavour following the successful completion of yesterday's auxiliary power unit hot-fire test. Stowage of flight crew systems and part 2 of the payload interface verification test were also completed yesterday. Today, technicians will work orbiter midbody umbilical unit mate and leak checks. The orbiter's aft compartment close-outs continue through Saturday. A decoder on microwave scanning beam landing system No. 3 is being replaced today and payload bay doors will be closed for flight on Friday. STS-90: Technicians completed removal of Columbia's window No. 6 yesterday and will install the new window today. replacement of floodlights No. 1 and No. 5, in the orbiter's payload bay, is in work and aft flight deck reconfiguration is under way. Fuel cell voltage tests and checks of the flash evaporator system are scheduled to begin today. STS-91: Technicians continue education work to remove any remaining fuel and oxidizer from the orbiter maneuvering system cross-feed lines. Replacement of Discovery's fuel cell No. 2 continues along with fuel cell monitoring modifications. Work to install instrumentation that supports the new Super Lightweight External Tank continues and body flap corrosion repairs proceed on schedule. [Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, January 13].]

JANUARY 14: Gov. Lawton Chiles' budget proposal includes $825,000 that will help ongoing state efforts to attract commercial, civil government and military space business to Florida's coastal spaceports. That money includes: $700,000 to help Spaceport Florida Authority build a Space Operations Support Center in a building abandoned when the Florida Solar Energy Center closed on the north side of Port Canaveral. The facility would provide commercial, university and other customers with a payload operations control center outside the gates to Cape Canaveral Air Station. Spacecraft and experiments launched from the air station or nearby Kennedy Space Center could be monitored from the center, which also will include laboratory, classroom and office space. Also: $125,000 to help Spaceport Florida Authority convert Launch Complex 20 at the air station into a facility for commercial, civil government and military missions. The complex conversion - which calls for the refurbishment of three pads and a launch control blockhouse at the site - primarily is being paid for with $2.5 million obtained by the authority from the U.S. Department of Defense. The state money would enable the authority to set up crucial communications systems at the complex, which is expected to serve rockets such as the Lockheed Martin Athena 1, the Orbital Science Taurus, the Israeli Shavit and converted Minuteman missiles, among others. "The total proposed appropriation would further our plans to bring more launch vehicles to the Cape and further our efforts in other areas, such as payload operations, work force training and support to universities," said Eddie Ellegood, the authority's director of policy and program development. ["Plan includes money to attract space business," **Florida Today**, January 15, 1998, p 2A.]

◆ Space Shuttle Status Report, Wednesday, January 14, 1998. STS-89: Orbiter midbody umbilical unit mate and leak checks are complete. Endeavour's aft compartment close-outs continue through Saturday and ordnance installation is in work today. Work to replace a decoder on microwave scanning beam landing system No. 3 is ongoing and payload bay doors will be closed for flight on Friday. Hypergolic system closeouts begin tomorrow and continue through Saturday. Shuttle engineers continue to evaluate the auxiliary power unit (APU) hydraulic lines that were serviced earlier this week. Assessments of APU No. 3 is complete. Workers today will evaluate the APU No. 1 hydraulic lines. A replacement motion control computer and air conditioning unit for Russia's Mir Space Station will be installed into the SPACEHAB module Sunday. Fit checks of the air conditioning unit are in work and delivery of the computer is expected late Friday night. STS-90: Technicians installed Columbia's window No. 6 yesterday and completed checks of the flash evaporator system. Replacement of floodlights No. 1 and No. 5, in the orbiter's payload bay, continues and aft flight deck reconfiguration proceeds on schedule. Fuel cell voltage tests are expected to conclude today. Orbiter maneuvering system functional tests and APU leak and functional checks continue. STS-91: Technicians continue work to remove residual oxidizer and fuel from the orbiter maneuvering system cross-feed lines. Replacement of Discovery's fuel cell No. 2 continues along with fuel cell monitoring modifications. Work to install instrumentation that supports the new Super Lightweight External Tank continues and body flap corrosion repairs proceed on schedule. [Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, January 14].]

JANUARY 15: International Space Station (ISS) update. The return of American astronaut Andrew Thomas in May will mark the completion of the Shuttle/Mir Phase 1 program. Phase 2 of the ISS begins in June this year with the launch of the Control Module, formerly known as the Functional Cargo Block, from Russia on a Proton rocket. On July 9th, Endeavour is scheduled for launch with the U.S.-built Node 1 which will be attached to the Control Module. In December 1998, the first living quarters and life support systems will be launched from Russia. Then in 1999 the first three-member ISS crew led by American astronaut William M. Shepherd, the expedition commander, will kick off the station's initial five month residency period. From then on, the station will be permanently inhabited. Phase 2 will be completed in August 1999, and the station will be ready for scientific research work. In Phase 3 of assembly, the ISS will progress gradually to its ultimate status with a crew of up to seven members. The membership of the ISS has also expanded to its current number of 16 participating countries. These include the original signatories which were the United States; Japan; Russia; Canada; Belguim; Denmark; France; Germany; Italy; The Netherlands; Norway; Spain; and England. To these have been added Sweden, Switzerland and Brazil. [**KSC Countdown**, January 15, 1998.]

◆ Space Shuttle Status Report, Thursday, January 15, 1998. STS-89: Testing on microwave scanning beam landing system No. 3 is complete, following a recent decoder replacement. Endeavour's aft compartment close-outs are in work through the weekend and ordnance connections began early this morning. Payload bay doors are slated for closure on Friday. Hypergolic system pressurization is in work and will continue through Saturday. Shuttle engineers continue to evaluate a small leak on a hydraulic line for auxiliary power unit No. 3. A Russian motion control computer and air conditioning unit are slated to be installed into the SPACEHAB module on Sunday, for use on the Mir space station.

To prepare for installation activities, workers Friday will conduct an exercise with a full scale mock-up of the air conditioning unit to confirm installation procedures and clearances. STS-90: Voltage tests on Columbia's fuel cells are complete and APU leak and functional checks concluded yesterday. Power reactant storage and distribution system checks are in work and are expected to conclude today. Replacement of payload bay floodlights No. 1 and No. 5 and aft flight deck reconfiguration continue. Orbiter maneuvering system functional tests are proceeding on schedule. STS-91: Technicians have completed efforts to remove residual oxidizer and fuel from the orbiter maneuvering system (OMS) cross-feed lines and will remove the right hand OMS pod tomorrow. The pod will then undergo a valve change-out in the Hypergol Maintenance Facility. Replacement of Discovery's fuel cell No. 2 is complete as fuel cell monitoring modifications continue. Work to install instrumentation that supports the new Super Lightweight External Tank continues and body flap corrosion repairs proceed on schedule. [Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, January 15].]

◆ Retired Air Force Col. Edward P. Wynne, one of the men responsible for selecting landing sites on the moon for the Apollo astronauts, died Thursday, Jan. 15, at home. He was 79. ["Space pioneer Col. Edward Wynne dies at 79," January 18, 1998, p 4B.]

JANUARY 16: NASA today named John Glenn, 76, to the crew of the Space Shuttle Discovery, scheduled to launch in October. Glenn will serve as a payload specialist on that mission. Glenn made history 35 years ago when he strapped himself into a nine-by-seven foot capsule atop an experimental rocket and became the first American to orbit the Earth. Recently he asked NASA if he could fly again to conduct space-based research on aging, but only if he met the agency's physical and mental requirements. "Not only is John Glenn a Marine test pilot, an astronaut, and the first American to orbit the Earth, he brings a unique blend of experience to NASA," said NASA Administrator Daniel S. Goldin. "He has fight, operational, and policy experience. Unlike most astronauts, he never got the opportunity for a second flight. He is part of the NASA family, an American hero, and he has the right stuff for this mission." Since aging and space flight share a number of similar physiological responses, the study of space flight may provide a model system to help scientists interested in understanding aging. Some of these similarities include bone and muscle loss, balance disorders and sleep disturbances. Senator Glenn has been a catalyst in promoting the use of space flight for the benefit of healthy and productive aging. NASA has previously flown astronauts up to 61 years old. Before NASA made the decision to fly Glenn, the senator underwent a battery of medical tests conducted by NASA physicians and by independent consultants. They all found him medically qualified for space flight. According to NASA flight surgeons, Glenn's fitness level is excellent. "We have 42 years of medical history on Senator Glenn and we were able to perform an exhaustive medical evaluation," said Dr. Denise Baisden, a NASA flight surgeon. "He is medically qualified to fly." [**NASA News Release #98-8**, January 16, 1998.]

◆ Space Shuttle Status Report, Friday, January 16, 1998. STS-89: Preparations for the launch of Space Shuttle Endeavour on mission STS-89 are proceeding on schedule, with the 43-hour countdown scheduled to begin Monday at 7 p.m. The orbiter's hypergolic system pressurization is complete. Aft compartment close-outs and ordnance connections are in work and payload bay doors are slated for closure later today. Today, Shuttle engineers will

evaluate test data gathered from a hydraulic line for auxiliary power unit No. 3. Midbody and vertical payload close-outs are in work today and late SPACEHAB stow activities are slated for Sunday. An air conditioning unit will be installed in the double module on Sunday and a Russian motion control computer will be installed in the middeck early next week. Both items are slated for use on the Mir space station. STS-90: Columbia's power reactant storage and distribution system checks are complete and a 72-hour decay check is in work. Orbiter maneuvering system functional tests are nearing completion today. With checks of the main propulsion system regulator complete, workers will need to replace two leaky valves on the system. Replacement of payload bay floodlights No. 1 and No. 5 and aft flight deck reconfiguration continue. STS-91: Work to remove Discovery's right hand orbiter maneuvering system (OMS) pod is under way. The pod will then undergo a valve change-out in the Hypergol Maintenance Facility. Electrical connections for replaced fuel cell No. 2 are complete and tests of the fuel cell monitoring modifications are in work. Work to install instrumentation that supports the new Super Lightweight External Tank continues and body flap corrosion repairs proceed on schedule. [Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, January 16].]

◆ NASA opened up shuttle missions Friday to a new class of astronauts, and the woman who served as the backup to the late Teacher-In-Space Christa McAuliffe finally is going to fly in space as a result. Barbara Morgan, who has been waiting in the wings since McAuliffe and six other were killed in the 1986 Challenger accident, will fly on an unspecified mission to the international space station. She will do so as NASA's first "educator-mission specialist." She will not be a "Civilian-In-Space," the name given in the 1980s to a now-defunct program to send teachers and journalists into orbit. "We are not reviving the Civilian-In-Space program, where we fly a civilian on the shuttle without them having a specific role. We are expanding the reach of the astronaut program," NASA Administrator Daniel Goldin said. "In the case of Barbara Morgan, she will be entering the next NASA mission specialist class. She is going to go through the full training." Morgan is expected to move to Houston later this year to begin training with NASA's 1998 astronaut class. ["Backup teacher gets OK to fly in space," **Florida Today**, January 17, 1998, p 2A.]

◆ NASA's safety chief on Friday finished a study to see if a private company could safely cut about 600 space shuttle jobs at Kennedy Space Center. But KSC workers, whose jobs are on the line, will have to wait until next week for the answer. NASA, including Administrator Dan Goldin, wouldn't say what the report concluded because it was submitted late in the day. No pink slips will be issued until NASA's safety experts clear a job-reduction plan submitted by United Space Alliance, the private company that runs the space shuttle program. The space alliance had not heard from NASA by late Friday, company spokesman Jeff Carr said. With three fewer launches expected this budget year, NASA last month asked the space alliance to trim its budget by $100 million. The alliance answered with plans to cut its KSC work force from 5,900 to between 5,250 and 5,300. About 100 people are expected to retire voluntarily so actual layoffs will be fewer than 500, Carr said. Safety chief Fred Gregory, who led the four-person review team, could not be reached for comment late Friday. ["Safety check done but no word on KSC job cuts," **The Orlando Sentinel**, January 17, 1998, p A-6.]

◆ A Brevard County school bus driver who had just completed her morning routes crashed into a Kennedy Space Center security fence Friday morning. There were no passengers on the bus. It is unclear why she drove to the Space Center. When security officers finally reached her after the crash, she was unable to communication, School District spokesman Bill Johnson said. Johnson said the bus driver will be suspended from her post pending an investigation by School District and Kennedy Space Center security officials. ["School bus driver hits KSC gate," **Florida Today**, January 17, 1998, p 2B.]

◆ Lockheed Martin will roll out the first aluminum lithium "super lightweight" Space Shuttle external tank today, bring the International Space Station another step closer to launch. Developed to give the Shuttle the performance margin needed to carry heavy U.S. Station elements to the 51.6 -degree orbital inclination required by NASA's Russian partners, the tank is about 7,500 pounds lighter than the original aluminum external tank used on all Shuttle launches to date. The new design features liquid hydrogen and liquid oxygen tanks of aluminum lithium, and the hydrogen tank has been machined into a orthogonal waffle pattern for greater strength and stability. Like its heavier predecessor, the new tank measures 154 feet long by 27 feet in diameter. Following rollout ceremonies at NASA's Michoud Assembly Facility in New Orleans, the new tank will be shipped by barge to Kennedy Space Center, Fla., for use on STS-91 in May, the last Shuttle mission to Russia's Mir orbital Station (and the first for the Shuttle Discovery). ["Lockheed Martin to roll out new lightweight Shuttle tank today," **Aerospace Daily**, January 16, 1998, p 8.]

JANUARY 17: Marking a milestone in space exploration and international cooperation, U.S. and Russian space officials Saturday unveiled the first segment of the new international space station to replace Russia's aging Mir. Paid for primarily by the United States but built in Russia, the module will be a central component of the new space station and provide a crucial link between Russian and American segments as they are added in space. ["New space station segment celebrated," **Florida Today**, January 18, 1998, p 3A.]

JANUARY 18: Former astronaut Jay Apt, now director of the Carnegie Museum of Natural History in Pittsburgh offered a 214-million-year-old Coelophysis skull to NASA for the upcoming mission, which is scheduled to take off at 9:48 p.m. Thursday. The 8-inch-long skull will not be the object of any study but is included among several light-weight items taken on each shuttle flight for the novelty of being in space, said NASA spokeswoman Audrey Rivers. The Coelophysis is one of the oldest North American dinosaurs, 6 feet long and standing nearly 3 feet at the shoulder. ["Dinosaur skull to fly on shuttle," **Florida Today**, January 18, 1998, p 1E.]

◆ Norm Thagard hated the food. Shannon Lucid and John Blaha loved the view. As for Jerry Linnenger and Michael Foale, well, they just tried to stay alive. Now it's Andy Thomas' turn to stay aboard the Russian space station Mir and, in the process, close out NASA's rewarding - and frequently dangerous - program to learn how to live and work on an orbiting outpost. Thomas is scheduled to head to Mir on Thursday night, hitching a ride from Kennedy Space Center on shuttle Endeavour. The ship is to dock at Mir two days after takeoff, pick up American astronaut David Wolf and leave Thomas behind. ["Last American to Mir ready for takeoff," **Florida Today**, January 19, 1998, p 1A & 7A.]

JANUARY 19. Space Shuttle Status Report, Monday, January 19, 1998. STS-89: Preparations continue for Thursday night's launch of Space Shuttle Endeavour on mission STS-89. The countdown remains set to begin at 7 p.m. today at the T-43-hour mark. Over the weekend, mission managers discussed the issue of the hydraulic lines on auxiliary power unit No. 3 and determined the system is prepared to fly without concerns. This topic will be discussed one final time during the standard launch minus one day review at KSC on Wednesday. Payload bay door closure was delayed Friday night due to the need to replace a portion of the door's seal. That work has been completed and the doors will be closed for flight early tomorrow morning. Aft compartment close-outs are also complete. At 2:30 p.m. today, the crew of mission STS-89 arrived at KSC's Shuttle Landing Facility. During the next three days, they will review their mission flight plans and fly in their T-38 aircraft and Shuttle training aircraft. Air Force weather forecasts are predicting a 60 percent chance of weather criteria violations on Thursday night with the main concern being thick cloud coverage in the KSC area. The 24-hour and 48-hour forecast shows a 40 percent chance of violation. [Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, January 19].]

◆ The prospect of stormy weather could keep shuttle Endeavour on the ground Thursday, but a small leak in its hydraulic system won't, NASA officials said Monday. With U.S. astronaut and soon-to-be Mir resident Andy Thomas aboard, Endeavour is scheduled to take off for Russia's space station Mir during a 10-minute launch window that will open at 9:43 p.m. Thursday. Liftoff is scheduled for 9:48 p.m. A three-day countdown began Monday at Kennedy Space Center after the shuttle's crew taxied into KSC's shuttle runway in T-38 training jets. Thomas, 46, will be the last of seven NASA astronauts to conduct research on Mir as part of a program to prepare the United States and Russia for building a $40 billion international space station. Nasty weather, however, could conspire to keep Thomas and Endeavour on the ground. Air Force Meteorologists say there is only a 40 percent chance the weather will be acceptable for flight. Forecasters say clouds associated with thunderstorms over the Gulf of Mexico might sweep into Central Florida during Thursday's launch try. Flying through such clouds could trigger dangerous bolts of lightning. NASA mission managers, meanwhile, say a small leak in one of Endeavour's three auxiliary power units isn't expected to stall launch plans. The units provide the hydraulic power needed to steer Endeavour's engines in flight and operate its landing gear, brakes and wing flaps during atmospheric re-entry and landing. But the leak is considered minor. ["Crew arrives to gloomy forecast," **Florida Today**, January 20, 1998, p 1A.]

JANUARY 20. Space Shuttle Status Report, Tuesday, January 20, 1998. STS-89: The launch countdown for mission STS-89 began yesterday at 7 p.m. at the T-43-hour mark and the STS-89 flight crew arrived at KSC at 2:30 p.m. Last night, Endeavour's payload bay doors were successfully cycled and closed for flight following replacement of a seal on the left door. The launch pad will be cleared of all personnel this afternoon to accomplish pyrotechnic initiator controller testing and loading of cryogenics into the orbiter's power reactant storage and distribution system. Current Air Force weather forecasts indicate a 60 percent chance that weather could prohibit launch on Thursday. The primary concern is for thick cloud coverage at the launch site. Also of concern are thunderstorm debris clouds resulting from a cold front in the Eastern Gulf of Mexico. Thursday's forecast calls for winds from the southeast at 12-18 knots, clouds scattered at 3,000 feet and 10,000 feet;

broken at 25,000, visibility 7 miles, temperature 64 degree F, 73 percent relative humidity, and no precipitation. [Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, January 20].]

◆ A secret Pentagon satellite launch and a French research flight to Russia's space station Mir could conspire to delay shuttle Endeavour's upcoming launch by as much as a month. If, that is, bad weather or technical problems keep Endeavour and its crew of seven - now scheduled to head to Mir at 9:48 p.m. Thursday - on the ground beyond Saturday, NASA officials say. Here's the situation: A classified Pentagon satellite thought to be an experimental spacecraft to relay data is scheduled to be launched Monday on an Air Force Atlas 2 rocket from Cape Canaveral Air Station. That means NASA will have to send Endeavour aloft by Saturday before taking a back seat to the Atlas on the Air Force's Eastern Range, which provides tracking, safety and weather forecasting services for all launches from Florida's East Coast. A Sunday launch would not be an option for Endeavour. The Air Force would be resetting range systems that day to support the Atlas mission, which also has a back-up launch chance Tuesday. Add another day after that to reset range systems for another shuttle launch attempt, and the earliest Endeavour could be launched is Jan. 29. But a Jan. 29 shuttle liftoff is an option the Russian Space Agency is not likely to approve. That same day, a French researcher and two fresh Russian cosmonauts are to be launch from Baikonur Cosmodrome in Kazakhstan to Mir. The weather forecast for Endeavour's scheduled launch, meanwhile, remains a potential problem. Forecasters say there is only a 40 percent chance weather will be acceptable for launch either Thursday or Friday because of thunderstorms. "Hopefully, we'll get lucky Thursday. If not, Friday will be tough as well," said the Air Force's shuttle weather officer, Ed Priselac. Conditions Saturday are expected to improve. The cloudy weather by that time is expected to have departed the area, and Priselac said there is an 80 percent chance of acceptable launch weather then. The situation is prompting NASA mission managers to seriously consider the possibility of three consecutive launch attempts. Endeavour's flight will be the seventh of eight planned shuttle trips to Mir. ["Shuttle delay could cause space traffic jam," **Florida Today**, January 21, 1998, p 1A & 2A.]

◆ Space-bound U.S. Sen. John Glenn returned to the nation's rocket ranch Tuesday for the up-close-and-personal look at the spaceship that will taxi him into orbit in October. And during a whirlwind tour of NASA's Kennedy Space Center, the Ohio Democrat - who at 77 will become the oldest person to fly in space - also will take in the planned launch Thursday of shuttle Endeavour on a mission to Russia's space station Mir. "I came down to see the shuttle launch - haven't been here in awhile and I wanted to start getting up to speed on everything, of course, after the announcement last week," Glenn told reporters after stepping off a NASA jet at KSC's shuttle runway. Former astronaut Steve Oswald - who now is director of space shuttle requirements at NASA headquarters in Washington, D. C. - will take Glenn on a tour of the KSC's 52-story Vehicle Assembly Building and NASA's Launch Control Center. He'll also swing by the shuttle hangar where Discovery is being readied for the October mission as well as launch pad 39A, where Endeavour is poised for flight. ["Glenn arrives at KSC for shuttle launch," **Florida Today**, January 21, 1998, p 2A.]

◆ Russia is yet again a couple of months behind schedule in building its most crucial component for the international space station, but NASA has decided not to let the

problem delay the $28.6 billion construction project. The Russian-built service module, which had been scheduled for launch this December, is now two to three months behind schedule, NASA spokesman James Hartsfield said Tuesday. In meetings this week in Moscow, Russian and U.S. officials agreed to go ahead with two other station launches slated for 1998. The first station section, the Russian-built and American-financed cargo block, is ready to launch from Russia in June. That section can be refueled in space, if necessary, and can remain in orbit without the service module for a year. Even with the expected delays, there is plenty of time to get the service module into orbit by June 1999. NASA has a makeshift station room that could replace the service module. That room could launch as early as December. The first American-made station component is set to launch in July. Last year, the Russians couldn't pay their contractor to start building the service module. That caused the entire station schedule to slip about eight months. This time, the problem was technical, not financial. The Russians needed to replace cracking electrical cables and add more thermal coating to the service module, Hartsfield said. ["Russians slipping further behind on space station," **The Orlando Sentinel**, January 21, 1998, p A-4.]

◆ NASA had modified its X-34 contract with Orbital Sciences Corp., Dulles, VA, to produce a second flight vehicle for the X-34 Program. "The purpose of a second vehicle is to reduce risk to the X-34 program," said deputy program manager Mike Allen of NASA's Marshall Space Flight Center, Huntsville, AL. In August 1996 NASA entered into a $50 million contract with Orbital Sciences Corp. to design, build and test-fly the X-34, a small reusable technology demonstrator. An additional $10 million was committed by NASA to be spent in direct support of X-34 by NASA Centers and other government agencies. Now the contract has been increased by $7.7 million to purchase long lead-time hardware, including a new wing, fuselage, avionics set, hydraulic pump and actuator system, and more. NASA has committed $2 million more for the government to provide wind tunnel testing, additional testing and analysis, and a second leading-edge Thermal Protection System. An $8.5 million option calls for purchase of shorter lead-time hardware, such as navigation systems, while a $1.8 million option has been added for assembly of piece parts into subsystems, integration and final assembly. These options should be formally exercised shortly. [**NASA News Release #98-11**, January 21, 1998.]

◆ Two pilot whales were rescued from a beach at Kennedy Space Center on Tuesday and taken to Marineland near St. Augustine. The whales, a eight-foot and an 11-foot, beached themselves and were spotted about 10:30 a.m. near Space Shuttle launch tower 39A, where the shuttle Endeavour is poised for a Thursday launch. Sea World retrieved the animals. No word on their condition was available Tuesday. ["Two pilot whales rescued at KSC beach," **Florida Today**, January 21, 1998, p 1B. "2 whales found beached by shuttle launch tower," **The Orlando Sentinel**, January 21, 1998, p A-6.]

JANUARY 21: A special NASA safety study will not prevent a private company from cutting about 600 space shuttle jobs at Kennedy Space Center, a top official said Wednesday. The safety report calls for some changes in the layoff plan by shuttle operation United Space Alliance, but the gist of it would allow cuts to proceed, NASA shuttle program manager Tommy Holloway said Wednesday. "It's a safe situation," Holloway said. NASA's safety office looked specifically at layoff plans. The study will not be released for a week while it is examined by top officials. The National Aeronautics and Space

Administration last month asked the space alliance to slash its current shuttle operating budget by $100 million, partly because fewer shuttles are set to launch this budget year. So the space alliance last week came up with a plan to reduce its 5,900-employee KSC work force to somewhere between 5,250 and 5,300. The company plans to keep layoffs, which would go into effect Feb. 13, below 500 so it doesn't have to give the 60 days notice required by federal law. It hopes at least another 100 workers will voluntarily retire. Alliance spokesman Jack King wouldn't comment on the safety study because the company hasn't seen it yet. ["Safety study won't hinder KSC layoffs, NASA says," **The Orlando Sentinel**, January 22, 1998, p A-16.]

◆ Now that he has got his flight booked on a space shuttle, U.S. Sen. John Glenn said NASA should not let more civilians into space without good scientific reasons. Glenn, 76 and one of NASA's original seven astronauts, said his October flight on Discovery is first and foremost about research and how weightlessness affects the aging process, not public relations, nostalgia or politics. Critics have called the science issue a "ruse" for Glenn to fly again. When asked about putting civilians in space after NASA said it will make teacher Barbara Morgan a full-fledged astronaut, Glenn said his flight is different. "I have never favored just opening up [space] for different professions unless there was a reason for it," Glenn said at a news conference Wednesday at Kennedy Space Center. Glenn said after reading literature about the effects of spaceflight, he noticed it was similar to that of aging so he sold NASA on the idea of a research mission. ["Glenn defends his space trek but warns NASA," **The Orlando Sentinel**, January 22, 1998, p A-16.]

◆ The director of Russia's shuttle-Mir program, a veteran cosmonaut who last flew in 1980, is joining U.S. Sen. John Glenn in the ranks of senior space travelers. Valeri Ryumin, 58, was tapped by NASA to fly aboard shuttle Discovery in late May on the eighth and final U.S. mission to the Russian space station Mir. A veteran of three flights to Russia's now-defunct Salyut 6 space station, Ryumin will become the third-oldest person to fly in space during the nine-day flight, which is scheduled for launch May 28. Only former U.S. astronauts Story Musgrave and Vance Brand flew at older ages, 61 and 59 respectively. The average age of U.S. astronauts, according to a 1993 *Florida Today* study: 43 ½ for males; 40 for females. Like Glenn, Ryumin has been tenaciously lobbying NASA - not to mention the Russian Space Agency - for a seat on a shuttle mission to Mir. He'll be following the footsteps of his wife, Russian cosmonaut Elena Kondakova, who flew aboard shuttle Atlantis on a mission to Mir in May. "I've been waiting for this day for a long time," Ryumin said. ["Veteran cosmonaut to join old pioneer Glenn in space," **Florida Today**, January 22, 1998, p 6A.]

JANUARY 22: Space Shuttle Status Report, Thursday, January 22, 1998. STS-89: The launch countdown for Space Shuttle Endeavour on mission STS-89 proceeds on schedule with no major technical issues being worked by the KSC launch team. Final preparations of the Shuttle main engines for flight were completed this morning and launch pad close-outs concluded at about 11 a.m. Loading of the external tank with 500,000 gallons of cryogenic fuel began at about 1:50 p.m. Tanking was delayed more than an hour to allow workers to adjust a gaseous nitrogen regulator valve on the Fixed Service Structure. Air Force weather forecasters briefed launch managers this afternoon that there is now a 30 percent probability that weather could prohibit launch tonight. A cold front and low pressure system in the Gulf of Mexico seem to be moving thunderstorm debris clouds and anvil

clouds north of KSC. Managers will continue to monitor the possibility of thick cloud coverage at the launch site. The 24-hour delay forecast now indicates a 70 percent chance of launch commit criteria violation with clouds and precipitation as primary concerns. The 48-hour launch delay forecast indicates a 20 percent chance that weather could prohibit launch activities. [Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, January 20].]

◆ Tonight's scheduled flight of the Space Shuttle Endeavour will mark the first use of a redesigned main engines expected to increase reliability and safety, NASA reported. All three Space Shuttle Main Engines on Endeavour carry enhancements known as the Block IIA configuration. The main Block IIA modification is the Large Throat Main Combustion Chamber, where liquid hydrogen and liquid oxygen are mixed and burned at 6,000 degrees Fahrenheit to provide thrust. The throat of the new chamber is about 10% larger than the previous design, improving the engine's reliability by reducing pressure and temperature in the chamber and throughout the rest of the engine, NASA said. This allows the turbomachinery to operate at lower turbine temperatures, pressures and speeds and extends the life of the hardware, NASA added. ["Shuttle to make first flight with redesigned main engine," **Aerospace Daily**, January 22, 1998, p 4.]

◆ Even though studies have shown that it costs up to $20 million more, NASA will again send the space shuttle Columbia to California for a tuneup instead of doing the work in Florida, a key NASA official said late Thursday. It's another blow for Kennedy Space Center, where an estimated 600 jobs will be cut next month. In 1996, National Aeronautics and Space Administration officials proposed doing much of the shuttle maintenance and modification work at KSC instead of Boeing Co.'s plant in Palmdale, Calif. But that did not happen. Shuttle renovation is big business. The work now being done on Atlantis in California costs about $70 million. The Columbia tuneup, which won't start until 1999, will probably cost less. NASA and shuttle operator United Space Alliance are not releasing the results of a joint study on where to do the work. After a news conference Thursday, NASA Launch Integration Manager Don McMonagle said Columbia's tuneup will be in California. NASA and the space alliance told Boeing officials in Palmdale to get ready to map out a plan for Columbia's work in California. But Palmdale has not formally been notified that Columbia is coming there, Boeing spokesman Alan Buis said. Because Columbia will get a complicated internal glass cockpit, Palmdale is "a logical choice," Buis said Friday. Two federal studies found that it is cheaper to do the work in Florida because of lower wages and transportation costs. That may be true, but KSC is too busy with launches to handle shuttle renovation, NASA officials have said. Only two launches are scheduled between now and Oct. 1, an unusually slow launch rate. However, nine launches - an all-time high - are scheduled for the following 12 months. Somehow work should still be done at KSC, where it is cheaper and people are losing their jobs, said Ed Ellegood, operations director of the Spaceport Florida Authority, a state-funded agency that tries to attract space business. ["California plant gets shuttle work again," **The Orlando Sentinel**, January 24, 1998, p A-4.]

JANUARY 23: Space Shuttle Status Report, Friday, January 23, 1998. STS-89: Space Shuttle Endeavour and its seven member flight crew launched on time yesterday from KSC's Launch Pad 39A at 9:48:15 p.m. After confirming that the firing room consoles were

in synch with the orbiter's general purpose computers (GPC) during a built-in 20-minute hold, launch managers worked no significant problems through the remainder of the countdown. Weather forecasts improved throughout the day as the thick clouds associated with a cold front and low pressure system in the Gulf of Mexico moved north of KSC. The solid rocket booster recovery ships are keeping station with the STS-89 boosters, but have not begun diving and retrieval operations due to unfavorable weather conditions. Preliminary inspections of the launch pad indicate no major damage. Orbiting Earth every 90 minutes and closing in on the Russian Mir space station for Saturday's planned docking, Endeavour remains in good shape. NASA flight controllers will put one of the orbiter GPCs back in use after an unintended shut down early this morning. No flight impact is expected. [Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, January 23].]

◆ The space shuttle Endeavour rocketed up the East Coast and into orbit tonight on a mission to deliver critical supplies, repair equipment and a final U.S. crew member to the Russian space station Mir. With Mercury astronaut and future shuttle flier John Glenn looking on from a VIP viewing site, Endeavour's twin solid-fuel boosters ignited with a splash of light at 9:48 p.m., kicking off a complex orbital ballet to chase down the aging Russian outpost. To catch up with Mir, which flies in an orbit that requires virtually all the shuttle's fuel and power to reach, Endeavour had to take off within about 10 minutes of the time Earth's rotation carried the Kennedy Space Center - and the shuttle - in to the plane of the station's orbit. By launching directly into that orbit, Endeavour should be able to catch up with Mir on Saturday for a docking at 3:12 p.m. The main objectives of Endeavour's mission are to pick up astronaut David Wolf after a four-month stay aboard Mir; to drop off his replacement, astronaut Andrew Thomas, for a final U.S. visit; and to deliver 4,400 pounds of equipment, supplies and fresh water. In addition, Endeavour will carry nearly 3,000 pounds of experiment samples and discarded equipment back to Earth. Joining Thomas for Endeavour's mission are the commander, Terrence Wilcutt; the pilot, Joseph Edwards; Bonnie Dunbar; Michael Anderson; James Reilly; and Russian Air Force Lt. Col. Salizhan Sharipov. Thomas is making his second flight, Wilcutt his third and Dunbar her fifth. The rest are rookies. NASA plans one final flight to Mir in late May to pick up Thomas and deliver additional supplies. [William Harwood. (1998). **The Washington Post** [Online]. Available WWW: www.washingtonpost.com/wp-srv/inatl/longterm/mir/mir.htm [1998, January 23].]

◆ A Florida task force seeking to make Brevard County home for the vehicle that will succeed the space shuttle met for the first time Thursday with Lockheed Martin officials in California. The aerospace giant's proposed VentureStar Reusable Launch Vehicle is the subject of a fierce bidding war between several states and foreign nations vying to be its launch site. Many space analysts expect the VentureStar to dominate the 21st century launch industry by offering quick, cheap access to space. During a meeting in Palmdale, Calif., state business leaders attended a launch site requirements briefing hosted by Lockheed Martin's Skunk Works division. Dubbed the Florida VentureStar Capture Team, the state's task force includes Spaceport Florida Executive Director Ed O'Connor and Lynda Weahterman, president of the Economic Development Commission of Florida's Space Coast. O'Connor said the meeting showed him that VentureStar could operate perfectly from Cape Canaveral. "If there was any surprise, it was how compatible it is to what we do," he said.

"It's very consistent to where the Cape is heading, and a good fit to NASA operations" at Kennedy Space Center. Company officials will visit Cape Canaveral launch facilities in about two months to weigh what the area has to offer, O'Connor said. VentureStar launch site bids also are expected from California, New Mexico, Virginia and several foreign countries. ["Task force meets with Lockheed," **Florida Today**, January 23, 1998, p 6A.]

◆ A top NASA official has ordered all project aimed at sending humans to Mars or back to the moon ended because there is no money to pay for the expensive missions. "I am directing the centers, effective immediately, to issue termination notices for all (programs) associated with beyond-Earth-orbit activities such as human lunar or Mars exploration," wrote Richard Wisniewski, acting associate administrator for spaceflight, in a letter dated Jan. 9. NASA spokesman Michael Braukus confirmed NASA's action Friday, but said it would be unfair to portray the agency as disinterested in a mission to the moon or Mars. "There is a budget funding problem," Braukus said. "Mr. Wisniewski is making a business decision." Word that NASA is turning its back on sending astronauts deeper into space contradicts momentum that seemed to be building for a long-range Mars mission. Despite the growing interest, Congress and the Clinton administration declined to endorse a Mars mission, which could cost hundreds of billions of dollars. NASA plans to spend about $25 million on six "advanced projects" during the current budget year, according to a list supplied by Braukus. ["NASA axing projects to send astronauts to moon, Mars," **Florida Today**, January 24, 1998, p 5A.]

◆ Boeing officials are investigating an engine problem during the successful launch of one of their Delta rockets this month, which could delay two upcoming flights. The problem did not affect the Jan. 9 launch, which placed a $150 million British military communications satellite into orbit. However, officials say they won't fly the rocket again until the problem is understood. With the investigation under way, the company is continuing preparations for two upcoming missions - a Jan. 31 liftoff from Vandenberg Air Force Base in California and a Feb. 5 flight from Cape Canaveral Air Station. Both missions are commercial flights of communications satellites. The last Delta took off from Cape Canaveral and experienced two unexplained jolts during firings of its second stage. The first occurred during the third firing of the rocket's second stage, Nelson said. A short time later, the same stage separated from the spacecraft and inexplicably was jolted again. The second jolt caused the expended stage to tumble. If the shock had caused such a tumble while the spacecraft was attached, the $150 million satellite would have been lost. Nelson said officials are examining the problem closely. ["Boeing investigates engine problem on Delta rocket," **Florida Today**, January 24, 1998, p 5A.]

JANUARY 26: An Air Force Atlas 2A rocket is poised to launch on a hush-hush military mission about lunch time today. The Lockheed Martin-built rocket is scheduled to lift off from Cape Canaveral Air Station between 12:15 and 2:15 p.m. The exact launch time is classified. Weather forecasters expect favorable conditions. Although the rocket's cargo is a Pentagon secret, military analysts say the Atlas probably is carrying a $250 million prototype for a new generation of data relay satellites. The Atlas rocket is expected to head up the Eastern seaboard to place the spacecraft into an orbit that covers two-thirds of the globe. A liquid-fueled Centaur booster then will deliver the satellite into an egg-shaped orbit that will swing the spacecraft between 200 and 24,000 miles above Earth. ["Secret satellite set for launch today at Cape," **Florida Today**, January 26, 1998, p 2A.]

◆ Space Shuttle Status Report, Monday, January 26, 1998. STS-89: Following a successful docking with the Mir space station on Saturday at 3:14 p.m., Endeavour is in the second day of joint docked operations. Working no major orbiter issues, the STS-89 flight crew is busy transferring hardware and supplies to and from Mir. Solid rocket booster recovery ship Liberty Star arrived at hangar AF with the right hand booster in tow at 8:30 a.m. today. Recovery ship Freedom arrived at Port Canaveral at about 11 a.m. today, towing the left hand booster. Workers are preparing to properly orient the left hand booster to finish the trip to hangar AF. Inspections of both boosters are planned for later this week. STS-90: Discovery's drag chute installation is complete and body flap corrosion repair work continued through the weekend. Installation of a power drive unit for the orbiter's right hand external tank umbilical door and modifications to the umbilical wiring continue. Tomorrow, the robot arm will be installed in Discovery's payload bay and fuel cell voltage testing begins on Friday. [Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, January 26].]

◆ American astronaut Andy Thomas couldn't get a good tailor in Russia for his crucial space pressure suit, but he found one on board the space station Mir on Monday. So concern about whether Thomas could stay on Mir, which surfaced Sunday when he didn't fit in his suit, evaporated. Mir commander Anatoly Solovyev loosened some sewn-in-place leg straps on Thomas' suit, fixing an overzealous alteration made in Russia in November. After the alteration, Thomas was able to slide into the white pressure suit, which is needed if he has to abandon the station in a Soyuz capsule. The suit was loosened about an inch, and straps may be covered with duct tape to keep them in space, officials said. Meanwhile, a handful of minor problems annoyed - and awoke - Endeavour's crew. A computer software glitch caused one of the shuttle's positioning jets to shut off late Sunday. Control of the shuttle-Mir complex was shifted to the Russian station. But Mir started running low on thruster fuel, so Mission Control had to awaken Endeavour's astronauts at 2:15 am. Monday to tell them to take control. NASA is installing new software to fix the problem. ["Impromptu tailoring makes Mir astronaut's spacesuit fit," **The Orlando Sentinel**, January 27, 1998, p A-3.]

◆ Launch pad processing for the Delta III, scheduled for first launch in June, will be faster than Delta II in one respect, according to a Boeing official at Cape Canaveral AFS. On Delta II, he says, the fairing is placed around the payload after it is mated to the rocket. On Delta III, the fairing will go on the payload before mating. Delta III will be able to lift 8,000 pounds to geosynchronous transfer orbit, twice as much as Delta II. ["What's Ahead: Delta III payloads will be encapsulated when they reach the pad," **Aerospace Daily**, January 26, 1998, p 3.]

JANUARY 27: The Air Force will try again today to launch an Atlas 2A rocket carrying a secret military satellite, though there is only a 20 percent chance of good weather. Poor weather caused officials to scrub Monday's liftoff attempt. The launch window runs from 12:15 to 2:15 p.m. ["Launch will be attempted again," **Florida Today**, January 27, 1998, p 1A.]

◆ Space Shuttle Status Report, Tuesday, January 27, 1998. STS-89: The solid rocket booster recovery ships delivered the left and right hand boosters to Hangar AF for post-flight inspections yesterday. Open assessments are scheduled to begin today. Initial reports revealed some water impact damage to the right hand booster including damage to the forward skirt and forward segment. Also, damage was reported to the left hand exit cone. In addition, two main parachutes (one from each booster) and a diver operated plug were lost at sea during recovery operations over the weekend. More detailed inspections of both boosters are planned to continue throughout the week. STS-90: Work to remove residual reactants from Columbia's orbital maneuvering system continue. A leak may exist on one of the manifolds and workers today will attempt to isolate that system to complete the inerting process. As a result, installation of the main engines and installation of Neurolab into the orbiter has been delayed several days. Servicing of the ammonia boilers is complete to date and mid-body close-outs continue. STS-91: Installation of the orbiter's robotic arm and fuel cell modification checks are currently in work today. Air lock checks and body flap inspections are also on going. [Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, January 27].]

◆ Shuttle Endeavour's astronauts will wrap up their delivery work at Mir today while a Russian-French crew on Earth makes final preparations for a launch to the outpost. With the U.S. shuttle and Mir linked up 248 miles above Earth, the Endeavour crew is to finish hauling 7,400 pounds of gear between the two ships. Homeward-bound NASA astronaut David Wolf, meanwhile, will give replacement Andy Thomas a few final bits of advice before Endeavour's departure from Mir at 11:52 a.m. Thursday. Endeavour is to land at Kennedy Space Center at 5:36 p.m. Saturday. NASA officials at that time will continue inspections on the two $20 million booster rockets that helped propel the shuttle into space. At least $7.2 million in damage was done to the boosters when they splashed down in 10-foot seas after a Jan. 22 launch. Two parachutes were lost and part of one of the segmented boosters was damaged beyond repair. ["Endeavour astronauts to wrap up Mir work today," **Florida Today**, January 28, 1998, p 6A.]

◆ John Glenn and the International Space Station received special mention in President Clinton's State of the Union speech. Also, the man who will sit in the commander's seat when NASA begins a new age of space exploration sat next to first lady Hillary Rodham Clinton during the speech. Astronaut Robert D. Cabana, 49, will lead a one-woman, three-man team aboard shuttle Endeavour in July on the first mission to start constructing the international space station. Hugh Harris, NASA spokesman, said Cabana's presence at the speech and the president's mention of the international space station are significant. "It shows the interest that the White House has in continuing our advancement in space technology and also in international cooperation," Harris said. "I think the space program has done as much or more than any other program to promote really positive international programs and improve relations." ["Astronaut attends speech," **Florida Today**, January 28, 1998, p 1A.]

JANUARY 28: NASA's Space Shuttle managers have reviewed the process that space flight operations contractor United Space Alliance (USA) will use to lower operating costs and have determined that safety will not be compromised. NASA's Safety and Mission Assurance Risk Assessment team concurs with the process USA used to determine

reductions in their work force. NASA asked USA to ensure that the flight rate for 1999 and beyond can be safely supported after the efficiencies are carried out. Both NASA and USA understood that work force reductions would be part of the space flight operations contract to reduce costs. The space flight operations contract was awarded to USA at the beginning of the 1996 fiscal year. [**NASA News Release #98-16**, January 28, 1998.]

◆ Taps sounded and a crowd of 200 people bowed their heads Wednesday as Space Coast residents paid tribute to the astronauts killed in the space shuttle Challenger disaster and Apollo 1 fire. "It is important we do this in Titusville, because all you have to do is turn your head a little and you can see where every manned space flight began," said former astronaut Loren Shriver, who is the deputy director for launch and payload processing at Kennedy Space Center. It was the 12th annual gathering at Astronaut Memorial Plaza in Sand Point Park. On January 27, 1967, at 1831 EST, fire broke out in the command module during a pre-launch test on Launch Complex 34. The crew was on board and the spacecraft's 100% oxygen atmosphere pressurized to 16.7 psia. The fire resulted in the deaths of astronauts Virgil I. (Gus) Grissom; Edward H. White, II; and Roger B. Chaffee. On January 28, 1986, at 11:38:00 EST, an explosion 73 seconds after liftoff claimed crew and vehicle. The crew of STS-51L included Commander Francis R. Scobee; Pilot Michael J. Smith; Mission Specialists Judith A. Resnik, Ellison S. Onizuka, Ronald E. McNair; Teach in Space Project representative Sharon Christa McAuliffe; and Payload Specialist Gregory B. Jarvis. ["Apollo 1, Challenger astronauts remembered," **Florida Today**, January 29, 1998, p 1B. **A Summary of Major NASA Launches**, July 1980, p V-17. **Space Shuttle Mission Chronology 1981-1995**, March 1996, p 9.]

◆ With NASA giving its official blessing Wednesday, the private company that runs the space shuttle program will start sending out about 400 layoff notices Friday to workers at Kennedy Space Center. The layoffs at KSC will be less than the anticipated 500 because more people than expected voluntarily left United Space Alliance, which runs the shuttle program, said company spokesman Jeff Carr. Overall, the number of alliance employees at KSC will drop from about 5,900 to roughly 5,300. The number of pink slips going out still is vague because there are two more days for people to leave voluntarily with the same severance package as those who are laid off, Carr said. By Wednesday, 170 workers had taken advantage of the severance benefits, with a few dozen other retiring or quitting without the package. The layoffs will be effective Feb. 13.

The long-anticipated layoffs had to wait until a NASA safety review approved the cuts. The report said the layoffs would not "compromise safety." Only three launches are scheduled between now and Sept. 30, the end of the budget year, the report concluded. However, NASA safety chief Fred Gregory and an independent safety panel expressed doubt over whether that same margin of safety will exist once the number of launches increases. The space alliance is scheduled to launch seven shuttles next year. There was "little apparent evidence" this could be done, said a letter by the Aerospace Safety Advisory Panel, an independent group created by Congress after the 1967 fatal Apollo 1 fire. Carr said his company, which is laying off people based on how they perform instead of on seniority, has several months to fine tune efficiencies and show how this can be done. The independent safety panel raised questions about what the cutbacks would do to an already discouraged KSC work force. ["Shuttle workers soon will receive pink slips," **The Orlando Sentinel**, January 29, 1998, p A-4.]

◆ Space Shuttle Status Report, Wednesday, January 28, 1998. STS-89: Endeavour's systems continued to perform very well as all transfer activities were completed and undocking preparations began this morning. The orbiter undocked from Mir on time at 11:56 a.m. today. At Hangar AF, solid rocket booster disassembly is in work and aft skirt removal is planned for today. Forecasters expect generally favorable weather conditions for Saturday's planned Shuttle landing at KSC. Early predictions indicate scattered clouds at 2,000 feet and broken at 25,000 feet; visibility at 7 miles; winds from the northeast at 5-6 mph; temperature 67 degrees and relative humidity 54 percent. Touchdown of Shuttle Endeavour is targeted to occur on the first of two landing opportunities at about 5:35 p.m. STS-90: Technicians began work to replace 3 thrusters last night on Columbia's orbiter maneuvering system and will continue efforts through midnight tonight. Leak checks of the OMS begin tomorrow. Gaseous nitrogen servicing of the water spray boiler is complete. Replacement of the No. 3 payload bay floodlight and installation of a Spacelab fluid line are complete. STS-91: Pressure checks of Discovery's flash evaporator system (FES), loop No. 1 and fuel cell functional checks are complete. Tests of FES loop No. 2 are in work today. Preparations for tomorrow's fuel cell voltage tests are in progress. Work on the orbiter's airlock, body flap and super lightweight tank instrumentation modification continue. [Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, January 29].]

JANUARY 29: The shuttle Endeavour streaked homeward Thursday, parting ways with space station Mir after a four-day stay to deliver tons of supplies and U.S. astronaut Andy Thomas to the Russian vessel. Endeavour began separating from Mir shortly before noon, slowly firing its steering jets and hovering about 240 feet from the space station until hitting the thrusters and making a final inspection orbit. The shuttle is scheduled to return to Kennedy Space Center at 5:36 p.m. Saturday. Forecasters say weather conditions will be excellent for the landing. Thomas, the last American scheduled to live aboard Mir, replaced astronaut Dave Wolf, who has been there since September. A research scientist and mechanical engineer, Thomas will conduct microgravity experiments. Thomas' arrival on Mir was marked by a brief foul-up over his spacesuit, which was too tight, and criticism by cosmonauts of his limited ability to speak Russian. Despite Russian requests for more U.S. missions to Mir, NASA has no plans to return after picking up Thomas in May, NASA spokesman Bruce Buckingham said. NASA's next major focus: the international space station. The first shuttle launch related to the $29 billion Russian-American project is scheduled for June. ["Endeavour heads back home," **The Orlando Sentinel**, January 30, 1998, p A-6.]

◆ The Boeing Co. expects to scoop up some of the United Space Alliance workers getting laid off at Kennedy Space Center during a job fair next month, company officials said Thursday. About 400 alliance workers are expected to lose their jobs starting Friday, but Boeing officials said they have 150 immediate job openings at KSC and NASA's Johnson Space Center in Houston. Available positions run the gamut from administrative support to engineering. At least 100 of those positions - involving work on the Delta launch vehicle program - will be at KSC, Boeing spokeswoman Ann Beach said. Beginning Monday, laid-off workers will have access to counseling, job search and resume preparation services, as well as job skills seminars. The center will remain open for about two months. ["Laid-off KSC workers given options," **Florida Today**, January 30, 1998, p 8A.]

◆ A military satellite that will likely serve as an orbiting switchboard is circling Earth today after a smooth launch Thursday aboard an Atlas rocket. Following three straight days of scrubs, the Atlas left its Cape Canaveral Air Station launch pad at 1:37 p.m. with a classified spacecraft for the Pentagon's National Reconnaissance Office. An hour and 15 minutes later, Air Force officials said the Lockheed Martin rocket had separated from its passenger, according to plan, successfully placing the spacecraft in orbit. The spacecraft is to circle Earth in a highly egg-shaped orbit that takes it 24,000 miles above the northern latitudes then dips it just 200 miles over Antarctica. From this path, it can see two-thirds of the globe. ["Atlas launches on fourth try," **Florida Today**, January 30, 1998, p 8A.]

◆ NASA Administrator Daniel S. Goldin has reversed a controversial order to cancel most agency research programs aimed at supporting future astronaut mission to the Moon and Mars early in the 21st century. Goldin's reversal voids much of a memo to NASA field centers on Jan. 9 ordering the termination of activities "uniquely directed toward human exploration beyond low-Earth orbit" by Jan. 30. The memo from Deputy Associate Administrator for Space Flight Richard J. Wisniewski said the terminations, which involved about $10 million worth of activities, were being ordered "to continue to the resolution of funding shortfalls within the agency." Cost overruns on the International Space Station program have left NASA scrambling to find savings in its Fiscal 1998 budget, which runs through Sept. 30. The termination order prompted an outcry both inside NASA and in public when it was leaked. NASA officials, acting on the direct orders of Acting Deputy Administrator John R. Dailey, initially refused any comment last week on the termination plans. It was unclear whether Goldin himself had approved the Jan. 9 memo. Goldin's chief spokeswoman confirmed the reversal on Jan. 29 after Rep. Dave Weldon (R-Fla.) revealed that the NASA chief had assured him planning for manned missions to Mars and the Moon would not be curtailed. She said NASA officials planned to detail the decision this week (Feb 2-6, 1998). ["Goldin reverses cuts to manned moon/Mars plan," **Aviation Week & Space Technology**, February 2, 1998, p 24.]

JANUARY 30: Space Shuttle Status Report, Friday, January 30, 1998. STS-89: Endeavour continues to perform very well as the STS-89 flight crew secure the items transferred from Mir and make final preparations for tomorrow's Shuttle landing in Florida. Saturday, mission managers will make a go/no go decision for deorbit burn at about 4:10 p.m., with the burn taking place at 4:28 p.m. Touch down at KSC's Shuttle Landing Facility is scheduled for 5:35 p.m. A second landing opportunity at KSC is available at 7:11 p.m. and with favorable weather conditions predicted through the weekend, Edwards Air Force Base is not being called to support tomorrow's landing operations. At Hangar AF, solid rocket booster disassembly and nozzle removal are in work and nozzle shipment to Utah is slated for Monday. Booster segment disassembly will proceed through next week. Forecasters expect favorable weather conditions for Saturday's planned Shuttle landing at KSC. Early predictions indicate few clouds at 2,000 feet and at 25,000 feet; visibility at 7 miles; winds from the north at 8-14 mph; temperature 65 degrees and relative humidity 48 percent. STS-90: Following the replacement of three thrusters on Columbia's orbiter maneuvering system yesterday, thruster leak checks are in work today. Preparations to replace a relief valve on auxiliary power unit No. 2 are under way and Spacelab water line leak checks are in work. STS-91: Pressure and leak checks on Discovery's flash evaporator system are complete. Preparations for today's fuel cell voltage tests are also complete. Work on the orbiter's

airlock, body flap and super lightweight tank instrumentation modification continue. [Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, January 30].]

◆ Gov. Lawton Chiles and the state's leading business barons called Friday on the Legislature to back a $2 million effort to lure the next generation rocket ship to Brevard County. "This is survival," Chiles said after listening to a brief presentation at the second annual Florida Economic Summit at a posh Tallahassee hotel. At stake is Florida's grip on the space industry as NASA prepares to turn the reins of the space transportation system over to private industry, supporters warned. The rocket ship, called VentureStar, would be able to launch and land anywhere when it becomes operational by 2003 threatening to make the facilities at Kennedy Space Center and Cape Canaveral obsolete in the 21st century. The ship, which will launch vertically and land like the space shuttle, is expected to spur a $40 billion space industry by radically reducing the cost of transporting satellites and other payloads into orbit. Where companies now pay $10,000 a pound to send their products in space, VentureStar promises to cut the cost to $1,000 per pound. Chiles and U.S. Rep. Dave Weldon, R-Palm Bay, agreed to head a special team to tout the benefits of launching from Florida and to convince VentureStar builder Lockheed-Martin that Brevard County is the cheapest alternative. The biggest hitch, however, is finding the $2 million, which would pay for such things as a media barrage, economic studies and environmental impact statements. Lockheed-Martin released the details of its proposal last week, and the governor's $45.1 billion budget proposal does not include money for the recruitment drive. ["Officials back spending plan to bring VentureStar to Brevard," **Florida Today**, January 31, 1998, p 2A.]

JANUARY 31: Forty years ago, a team of scientists and engineers successfully launched Explorer 1, the first U.S. satellite to orbit the Earth. This historic accomplishment marked the nation's debut in the Cold War-era space race and set the stage for the establishment of the civilian space agency that would become NASA. JPL and the Army Ballistic Missile Agency, based in Huntsville, AL, joined in firing the satellite toward space from the missile test center at Cape Canaveral, FL, on January 31, 1958. [**NASA News Release #98-15**, January 28, 1998.]

◆ Payload Processing Status Report, Saturday, January 31, 1998. NEUROLAB (STS-90): Target Launch Date: April 2, 1998 at 1:19 p.m. Current Location: Operations and Check-out Building (high bay); Launch Pad: 39B; Launch Vehicle: Space Shuttle Columbia. Operations currently in work: * Neurolab close-outs. Scheduled milestones (dates are target only): * Install Neurolab in payload canister (Feb. 4); * Transfer Neurolab to OPF (Feb. 9); * Install into payload bay of Columbia (Feb. 9); * Interface Verification Test (Feb. 11 - 12). 9th MIR docking - Spacehab single module (STS-91): Target Launch Date: May 28, 1998 at 8:05 p.m. Current Location: Launch Pad 39A; Launch Vehicle: Space Shuttle Discovery. Operations in work: * Outfitting Spacehab single module with logistics racks). International Space Station - Node 1/PMA-1/PMA-2 (STS-88): Target Launch Date: July 9, 1998. Current Location: Space Station Processing Facility (SSPF); Launch Vehicle: Space Shuttle Endeavour; Launch Pad: 39B. Operations currently in work: * Node 1 power qualification testing; * Reinstallation and testing of PMA-2 oxygen line. Scheduled milestones (dates are target only): * Combined Functional Test (2/8 - 2/13); * Softmate PMA-2 with Node 1 (2/13); * Begin cargo element test (2/ 13); * 3-A PMA-3 arrival (2/6

tentative); * First truss arrival (2/17); * End-to End Test (2/28); * Node 1leak test (3/18 - 21); * Long Spacer arrival 3/27); * Node 1/PMA 1-2 Weight/Center of Gravity Determination (5/18). [Bruce Buckingham. (1998). **Kennedy Space Center Payload Processing Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, January 31].]

◆ Space Shuttle Status Report, Saturday, January 31, 1998. STS-89: Space Shuttle Endeavour landed today on KSC's runway 15 at 5:35 p.m., successfully ending 9 days of Mir transfer and on-orbit science activities. With excellent weather conditions at KSC, flight controllers decided to bring the seven-member flight crew home on the first of two landing opportunities. Today's landing marked the 42nd KSC landing in Shuttle history and the 13th consecutive landing in Florida. The orbiter landed on orbit 139 having traveled 3.6 million statute miles. The STS-89 crew will spend the night at KSC and depart for Houston tomorrow. Endeavour is scheduled to be towed to OPF bay 3 after midnight tonight, following routine safing and SPACEHAB destow activities. [Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, January 31].]

◆ A former Kennedy Space Center worker has agreed to plead guilty to hacking into computers at several Orlando businesses, according to court records. The employee is charged with unlawfully accessing a computer at the University of Central Florida's Institute for Simulation and Training. The charge is a felony. The employee worked for Lockheed Martin, a NASA subcontractor. Attorney, Mark Blechman, said the Orlando man had no malicious or criminal intent when he broke into the companies' computers. Blechman said the employee was studying NASA's computer security when he tried to test the security of several former employers. Blechman said the investigation began after NASA computer security officials found several large data files stored in the employee's working folder. ["Ex-KSC worker pleads guilty to breaking into computers," **Florida Today**, January 31, 1998, p 3A.]

DURING JANUARY: NASA has exercised two more options from its Medium Expendable Launch Vehicle Services (MELVS) contract with Boeing. The National Aeronautics and Space Administration's options include the launch of three satellites aboard two Boeing Delta II rockets. The first launch, scheduled for the first quarter of 2000, will carry the Gravity Probe-B (GP-B) satellite. The second option, for the second quarter of 2000, includes two, dual-manifested satellites. Boeing will launch the satellites using a new, dual-payload-attach fitting designed for Delta II by Matra Marconi Space. The two spacecraft are JASON and the Thermosphere-Ionosphere-Mesosphere-Energetics and Dynamics (TIMED) satellites. ["NASA exercises two options for Boeing Launch Services," **The Brevard Technical Journal**, January 1998, p 21.]

◆ The number of launches at Cape Canaveral and the Kennedy Space Center (KSC) continues to climb back toward the busy levels characteristic of the mid-1960s, when 40-50 missions a year were launched. During the coming year up to 35 missions, using nearly $7 billion worth of boosters and payloads, are scheduled for launch from the Cape and KSC. They include 12 Delta missions, nine Atlas missions, four Titan 4s, two Athenas and one Pegasus from the Cape plus seven space shuttle flights from KSC. Twenty of the flights are commercial and seven are military missions, with the remainder being largely scientific. The

1998 schedule represents an increase of more than 30% over the 24 launches flown from the Cape and KSC in 1997. ["Back to the future," **Aviation Week & Space Technology**, January 26, 1998, p 19.]

FEBRUARY

FEBRUARY 1: Thinner and pale after four months on Mir, astronaut David Wolf found himself in a topsy-turvy world Sunday: He wobbled and his body felt at times as though it was spinning. That didn't stop him, however, from savoring Earth and all its pleasures. He gobbled down pizza and cookies and stayed up until 4 a.m. his first night back. He was up three hours later, joking about his new svelte self. Wolf, a 41-year-old doctor, returned to Earth on Saturday night aboard space shuttle Endeavour. He walked off the ship, a little shaky after 128 days of floating in weightlessness. Wolf lost 20 pounds aboard Mir. Wolf, who was the sixth and next-to-last American to live on Mir, skipped a beach party thrown by his family in his honor Saturday night, so as not to interrupt his medical tests. ["Slimmer, trimmer astronaut wolfs down pizza, cookies," **Florida Today**, February 2, 1998, p 2A.]

FEBRUARY 2: The Clinton Administration's Fiscal 1999 budget proposal calls for NASA to start setting aside money to help pay for a next-generation reusable launcher and begin building a new spacecraft to study Jupiter's moon Europa, but the space agency should expect tight budgets to continue for the foreseeable future. While NASA has contributed mightily to the reduction of the federal deficit, absorbing a budget cut of more than 20% in the last five years, the agency found little thanks when President Clinton unveiled the first balanced U. S. budget in 30 years. Clinton's budget, which must be approved by Congress, calls for NASA to receive $13.465 billion in Fiscal '99, a slight drop from this year's funding and the sixth consecutive decline proposed by the President. The White House also envisions a relatively flat NASA budget over the following three years, forcing the agency to continue to find savings from within to fund new space initiatives. By contrast, other U.S. science and technology accounts benefited handsomely from the anticipated federal budget surplus. Administrator Daniel S. Goldin shrugged off the disparities, saying NASA's efforts to operate more efficiently allowed the agency to fully fund all key areas of its strategic plan within the flat budget. "I am proud that NASA doesn't have to ask for more funds," he said, adding, "Our turn will come." But that turn may not come soon. With the White House budget forecasting a flat NASA budget through Fiscal 2002, Goldin made it clear that construction of the International Space Station will have to be completed before money is freed up for grand new endeavors, such as human mission to Mars. There was dismay that the space agency was a low priority for the White House. "The President seems to be throwing money everywhere but NASA," said Rep. Dana Rohrabacher (R-Calif.), chairman of the House space subcommittee. ["Clinton Budget Overlooks NASA," **Aviation Week & Space Technology**, February 9, 1998, p 34 & 71.]

◆ Space Shuttle Status Report, February 2, 1998. STS-90: Replacement of a relief valve on Columbia's auxiliary power unit No. 2 and water spray boiler checkout are complete. Leak checks on the Spacelab water line are also complete and work on payload bay flood light No. 3 continues. Tunnel adapter flow rate leak testing and airlock ducting reconfiguration are in work. STS-91: Voltage tests on Discovery's fuel cells were completed Friday. Installation of the power drive unit for the orbiter's right external tank umbilical door is under way. Work on the orbiter's airlock, body flap and super lightweight tank instrumentation modification continue. The new Super Lightweight External Tank is scheduled to arrive at Port Canaveral today and await transport to KSC's turn basin. With bad weather expected today and tomorrow, delivery of the tank to KSC's Vehicle Assembly

Building is expected no earlier than Wednesday. STS-88: Following Endeavour's on-time landing at KSC on Saturday evening, the orbiter was towed to Orbiter Processing Facility bay 1 early yesterday morning. SPACEHAB destow activities were complete at 2 a.m. Sunday and Endeavour arrived at the OPF door at 3:34 a.m. Draining of cryogenic reactants from the power reactant storage and distribution system is in work. Strong back installation is in work today to support payload bay door opening tomorrow and payload removal begins Thursday. Post landing inspection of Endeavour's lower surface revealed 95 total hits, of which 38 measured one-inch or greater. The fleet average is 83 total hits with 13 greater than one-inch. STS-89 booster disassembly continues with the left hand nozzle removed last Friday and right hand nozzle removal planned for today. [Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, February 2].]

◆ Work on the planned space station may grind to a halt this summer unless Congress reverses recent orders blocking the transfer of money into the cash-strapped program, NASA officials warned Monday. The threat - issued by NASA Administrator Dan Goldin - came as the White House unveiled a 1999 budget plan that would slightly shrink NASA's budget as other federal science agencies grow by leaps and bounds. Goldin effectively put a gun to Congress' head on the issue of space station cash transfers - which has grown into one of the touchiest subjects for the space agency on Capitol Hill. With the launch of the first piece of the international orbiting laboratory looming in June, the threat of a work slowdown or stoppage amounts to a game of fiscal chicken with lawmakers. Late last summer, Congress shot down NASA's request to shift $200 million into the station from the agency's science, aeronautics and overhead accounts. The money was needed to keep the program on track in the face of Russian work delays and U.S. cost overruns, NASA said. Earlier in the year, the agency had siphoned money from the shuttle program for the same purposes. But Congress refused to allow another transfer. Get the station program under control, lawmakers ordered NASA, but do so without raiding other parts of your budget. It was unclear how NASA's latest warning will play on Capitol Hill, as many lawmakers had not yet returned to Washington for the week. ["NASA in showdown about space station," **The Orlando Sentinel**, February 3, 1998, p A-4.]

◆ Canaveral National Seashore's nude sunbathing controversy managed to make it into President Clinton's 1999 budget proposal Monday. Buried in the sea of charts and mountains of federal agency requests is a single paragraph that, by now, is familiar to those in Brevard County who have been following the issue. The paragraph reads: "None of the funds made available in this or any other Act for any fiscal year may be used to designate, or to post any sign designating, any portion of Canaveral National Seashore in Brevard County, Florida, as a clothing-optional area or as an area in which public nudity is permitted, if such designation would be contrary to county ordinance." The language is the result of Rep. Dave Weldon's successful efforts last year to get such a sign-blocking provision inserted into an annual appropriations bill. The Palm Bay Republican supported the sign prohibition because he things it will clear the way for the county to enforce its anti-nude sunbathing ordinance. ["Sunbathing controversy in proposal," **Florida Today**, February 3, 1998, p 2A.]

◆ Dr. Ghassem Asrar has been selected as the new NASA Associate Administrator for Earth Science, Administrator Daniel S. Goldin announced today. [**NASA News Release #98-19**, February 2, 1998.]

FEBRUARY 3: NASA's prime shuttle contractor today will launch a bid to acquire the company that overhauls parts of the booster rockets used to help propel the agency's spaceships into orbit, officials said Monday. United Space Alliance will open talks with USBI, the company that refurbishes non-motor segments of NASA's shuttle solid rocket boosters. "We're entering into formal discussions to further explore that possibility," said alliance spokesman Jeff Carr. A joint venture of Lockheed Martin and Boeing, the alliance was hired by NASA in October 1996 to gradually take over day-to-day shuttle fleet operations from the nation's space agency. The effort involves consolidating most NASA shuttle program contracts into a single pact that is expected to save the agency about $400 million over a six-year period. The consolidation plan now calls for USBI, which is a division of United Technologies Corp.'s Pratt 7 Whitney Propulsion Operations unit, to be come a subcontractor to the alliance in July. Work done by the company, which employs about 1,100 people at Kennedy Space Center, then would be absorbed by the alliance when USBI's current NASA contract expires Sept. 30, 1999. NASA in 1996 extended USBI's $500 million shuttle booster refurbishment contract, which calls for the company to refurbish non-motor parts of the boosters, such as their nosecones and parachutes. In signing the extension, the company agreed to close facilities in Alabama and Louisiana and consolidate operations at KSC. About 175 jobs were transferred to KSC as a result. ["Alliance discusses takeover of USBI," **Florida Today**, February 3, 1998, p 9C & 10C.]

◆ Space Shuttle Status Report, Tuesday, February 3, 1998. STS-90: Polishing of Columbia's windows concluded yesterday and work on payload bay flood light No. 3 is complete. Airlock ducting reconfiguration is also complete. Tunnel adapter flow rate leak testing is in work today and preparations are under way for main engine installation beginning tomorrow. Columbia's payload premate test begins today and Neurolab will be installed in the payload canister Feb. 4. The canister is currently scheduled to arrive at OPF 3 early Feb. 9 from the Operations and Checkout Building. STS-91: Installation of the power drive unit for the orbiter's right external tank umbilical door continues. Work on Discovery's airlock, body flap and super lightweight tank instrumentation modification continue. Preparations are in work for auxiliary power unit installation slated for this week. The new super lightweight external tank, to be used on STS-91, arrived at Port Canaveral yesterday and remains docked while severe weather passes through central Florida. With high winds prohibiting tugboat operations today, managers expect the tank to arrive at KSC's turn basin no earlier than tomorrow, weather permitting. STS-88: Draining of cryogenic reactants from the power reactant storage and distribution system and aft compartment structural leak checks are complete. Technicians continue to gain access to orbiter systems and postflight inspections are under way. Flight crew equipment destow is in work. Strong back installation continues in support of payload bay door opening and SPACEHAB removal later this week. STS-89 booster disassembly continues with segment demate preparations in work. The booster nozzles have been removed and are en route to Utah. [Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, February 3].]

◆ When 170 employees of the private company that runs the space shuttle program volunteered to be laid off for no extra benefits, the state was so surprised that it wouldn't give unemployment checks to some of them. Yet those ex-workers volunteered to be laid off because their company told them they get the normal unemployment benefits, and it would save their colleagues' jobs. Now those workers will get their money, but just who is going to pay them hasn't been finalized, officials said Tuesday. It could end up costing United Space Alliance, which runs the shuttle program for NASA, an extra $1.2 million to honor its promise to those workers. The promise was that these workers would get the same unemployment benefits as those who are getting pink slips on Friday. The alliance is laying off an additional 400 workers who didn't volunteer. The workers who volunteered for layoffs will get their checks from the space alliance, not the state, firm spokesman Jack King said Tuesday. But the state today will reconsider its decision to deny benefits to the voluntarily laid off workers and may pay them, said Dianne Parcell, an operations management consultant for the state Department of Labor and Employment Security. Normally, workers are given extra money to take voluntary layoffs. That extra money disqualifies those workers for unemployment benefits or means they get reduced benefits, Parcell said. The state isn't used to a situation where workers quit for no extra money. After consulting with the state, the space alliance called the rest of its volunteers and told them to not bother applying to Florida for unemployment. They will get the equivalent of unemployment checks - up to $275 a week for up to 26 weeks - directly from the company, King said. If a worker finds a new job, the checks will stop coming from the company, just like it does with the state. But if the state decides to pay the workers, that's fine too, King said. ["Somebody will pay volunteers for layoffs," **The Orlando Sentinel**, February 4, 1998, p A-5.]

◆ Three men wearing mesh hoods robbed the Kennedy Space Center Credit Union on Tuesday morning, escaping with two drawers of cash, officials said. The men walked into the bank, which is a mile north of State Road 528 on U.S. 1, about 9:20 a.m. The three men ordered the four customers and five bank workers inside at the time onto the floor while one man stood guard at the door and at least one man waved a handgun. No one was injured. The case is being investigated by the FBI and the Sheriff's Office. ["Three men rob KSC Credit Union near Cocoa," **Florida Today**, February 4, 1998, p 2B.]

FEBRUARY 5: A Boeing Delta 2 rocket has been cleared for launch from Cape Canaveral Air Station today, but gusty winds could keep its satellite-delivery mission on the ground. The 12-story rocket and its cargo - four mobile telecommunications satellites - are scheduled to blast off between 8:22 and 9:22 a.m. Air Force meteorologists say there is a 40 percent chance that stiff ground-level winds could force a delay in the first launch for the Globalstar L.P. consortium, a partnership of 10 international telecommunications and aerospace companies. "The wind is a major concern," said Joel Tumbiolo, a weather officer with the Air Force's 45th Space Wing, which provides forecasting services for Space Coast launches. ["Gusty winds could delay Delta launch," **Florida Today**, February 5, 1998, p 7A.]

◆ Space Shuttle Status Report, Thursday, February 5, 1998. STS-90: Installation of Columbia's airlock hatch "D" is complete. The hatch provides access from the tunnel adapter to the Spacelab transfer tunnel. Today, work is under way to install new bushings on the main engine heat shields. Inspections of micrometeorite hits on an orbiter radiator

and aft compartment closeouts are also in work. Columbia's main engines are slated for installation next Thursday and tunnel adapter pressure decay checks begin tomorrow afternoon. The payload premate test is ongoing and Neurolab's installation into the orbiter's payload bay is planned for Feb. 11. STS-91: Installation of Discovery's three auxiliary power units is under way and will continue through Monday. Work on the power drive unit for the right external tank umbilical door continues. Body flap corrosion repair and super lightweight tank instrumentation modifications are also in work. The new super lightweight external tank, to be used on STS-91, remains docked on its barge at Port Canaveral. High winds have prevented tugboat operations so far this week and today managers predict the tank will arrive at KSC's turn basin no earlier than 10 a.m. tomorrow, weather permitting. STS-88: Flight crew equipment destow is complete and Endeavour's postflight inspections continue on schedule. Strong back installation and payload bay door opening were completed yesterday and SPACEHAB removal is slated for Monday. Technicians continue to install access platforms in the orbiter's aft compartment and main propulsion system inspections begin next week. [Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, February 5].]

◆ The first launch for the international space station may face another delay, NASA Administrator Dan Goldin told Congress on Thursday. NASA, meanwhile, is making plans to keep its shuttle fleet busy should the schedule be delayed, Goldin said. The space agency also is taking another look at whether hundreds of shuttle worker layoffs at Kennedy Space Center will compromise flight safety, Goldin said during his first appearance this year before the House Space subcommittee. The planned June launch of the Russian-built Functional Energy Block - a space tugboat that will serve as the foundation of the $40 billion station - might be pushed to late July or August, Goldin said. If that happens, it would postpone until September the liftoff of shuttle Endeavour, now planned for early July. The ship is to carry into orbit the first U.S. hardware to help build the outpost. Unlike last year, when NASA blamed Russian hardware delays for causing a six-month slip in the station's construction schedule, this time NASA is seeking extra time, Goldin said. One reason is a delay in the launch of the Advanced X-ray Astrophysics Facility spacecraft, which was scheduled to fly on a shuttle in August but now will not get into orbit until December or later, Goldin said. "We're trying to balance the workload," he said. "Because the Advanced X-ray Astrophysics Facility spacecraft is not going to be launched when it is supposed to, we have a big long gap. "They are looking at taking a number of flights we have and having a more uniform separation through the year." A final decision on new station launch dates is expected in a few weeks. Goldin could not rule out further changes to the station launch schedule. With that in mind, he has ordered his spaceflight managers to create an alternate plan for keeping the shuttle fleet active in the event of a major schedule shift. Of eight shuttle missions planned for the budget year beginning Oct. 1, six are dedicated to hauling station hardware into orbit. Goldin told congressional committee members the agency wants to take another look at whether it has enough workers to maintain safety margins as the launch pace quickens. "I've asked the safety experts to review exactly where they are before we start ramping up to that flight rate to establish they have everything in place, and they are ready to assume that," he said. ["Station may be delayed again," **Florida Today**, February 6, 1998, p 1A & 2A.]

FEBRUARY 6: NASA's main contractor at Kennedy Space Center handed out layoff notices to 363 employees Friday as the company began cuts to its shuttle work force. An additional 194 positions with United Space Alliance will be lost through attrition and voluntary departures, eliminating a total of 557 jobs from the company's 6,000-member work force. The notices came a day after NASA Administrator Dan Goldin assured Congress the layoffs would not jeopardize the safety of the shuttle fleet. However, members of an independent group of aerospace experts that oversees NASA for Congress said they will keep monitoring KSC to make sure the reduced work force can do its job effectively. "I am not overly concerned, but we will continue our team visits to KSC, and we are watching very closely" how the layoffs unfold, said Richard Blomberg, a member of the Aerospace Safety advisory Panel. NASA's safety chief, Federick Gregory, approved the cuts last month, even though his team expressed concern that the remaining workers might be pressed to keep up with an increased shuttle schedule during the next few years. NASA plans to launch up to eight missions annually once it begins construction of the $40 billion international space station - tentatively set to start this summer. Laid-off employees will work their last day Feb. 20. ["363 KSC workers end week with pink slips," **Florida Today**, February 7, 1998, p 1A.]

◆ NASA's international space station got an extra boost of sorts Friday with the delivery to Kennedy Space Center of a new fuel tank that will allow shuttles to carry more cargo into orbit. The 15-story fuel reservoir weighs 7,500 pounds less than the current models. As a result, it will enable the ships to carry 7,500 pounds more into space. The additional cargo capacity will be crucial to NASA as it begins this summer to raise the 480-ton outpost during a five-year series of U.S. shuttle and Russian rocket flights. The lightweight tank "is a real key item in getting the space station into orbit," said June Malone, a spokeswoman for NASA's Marshall Space Flight Center in Huntsville, Ala. "Every pound you take off of the tank is one pound more you can take into orbit." The new tanks - which are made of a lighter weight aluminum-lithium alloy - weigh 58,000 pounds and cost about $43 million each, Malone said. The aluminum-lithium alloy is said to be 30 percent stronger than the metal mix used on previous tanks. The first new tanks will be used for the May 28 launch of Discovery. That shuttle will fly NASA's ninth and final mission to Russia's Mir space station. ["Shuttle to get new lightweight fuel tank," **Florida Today**, February 7, 1998, p 2A.]

◆ Space Shuttle Status Report, Friday, February 6, 1998. STS-90: Functional tests on Columbia's airlock hatch "D" are complete. Inspections of micrometeorite hits on an orbiter radiator and checks on the orbiter's environmental control and life support system are complete. Aft compartment closeouts and payload premate testing continue. Technicians proceeded with main engine heat shield rework efforts today and no work is planned on Columbia over the weekend. Next week, the Neurolab payload is scheduled to arrive at the OPF on Wednesday for installation into the orbiter's cargo bay and Shuttle main engines will be installed on Thursday. STS-91: Tests on Discovery's power reactant storage and distribution system are complete. Installation of the orbiter's three auxiliary power units continues through Monday. Work on the power drive unit for the right external tank umbilical door continues. Body flap corrosion repair and super lightweight tank instrumentation modifications are also in work. The new super lightweight external tank, to be used on STS-91, arrived at KSC's turn basin at about 11 a.m. today. Workers transported the 154-foot-long improved tank to the Vehicle Assembly Building this

afternoon, where it will undergo processing for flight. The new tank weighs about 7,500 pounds less than the original ET. STS-88: Payload disconnects are complete and removal is slated for Monday. Shuttle main engine post flight inspections are under way and Ku antenna assembly checks are in work as well. Removal of Endeavour's tunnel adapter is scheduled for later next week. [Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, February 6].]

FEBRUARY 7: Facing a wicked weather forecast for today, the Boeing Co. now plans to wait until Sunday to make a third attempt to launch a Delta 2 rocket on a satellite-delivery mission from Cape Canaveral Air Station. The 12-story rocket and its cargo - four commercial telecommunications satellites - are scheduled to blast off during a launch window that will open at 8:22 a.m. Sunday and close at 9:47 a.m. that day. ["Rocket launch reset for Sunday," **Florida Today**, February 7, 1998, p 2A.]

◆ Brevard County once again finds itself competing with Alabama and Mississippi for a space-related facility that will generate several hundred jobs. But that's where the similarities end when comparing the current race for a laser testing facility to last year's battle for Boeing Co.'s Delta 4 rocket plant. Unlike the Boeing plant, the current competition won't come down to which state offers the most goodies, said Air Force Lt. Col. Rick Lehner, spokesman for the Pentagon" Ballistic Missile Defense Organization. "The major difference is that this is a government and not a private sector project," Lehner said. "The decision (expected in the fall) is going to be strictly based on the site guidelines." In the latest competition, Cape Canaveral Air Station and Kennedy Space Center are two of four finalists to house the testing facility for an experimental chemical laser. The Redstone Arsenal in Huntsville, Ala., and a site at Mississippi's Stennis Space Center are the other finalists. The facility is expected to employ 500 to 700 people. U.S. Rep. Dave Weldon, R-Palm Bay, said Brevard's biggest advantage will be its existing infrastructure at KSC and the air station. The laser-testing project is included in President Clinton's proposed 1999 budget. Weldon said Sen. Bob Graham and Gov. Lawton Chiles likely will head Florida's effort, especially when it comes to working on the White House. There are plenty of ways to sell the Air Force on the Brevard sites, said Ed Ellegood, director of policy and program development at Spaceport Florida Authority. "One of the requirements for this project is going to be a large, thermal vacuum chamber," Ellegood said. NASA needs a similar machine to test large, deep-space payloads for launch - providing an opportunity to share limited resources. Spaceport Florida Authority - a state agency created in 1989 to attract aerospace business - has a successful history of partnering with the federal government, to the advantage of both. As with most things centered in Washington, however, politics also will play a role. Mississippi has powerful Senate Majority Leader Trent Lott going to bat for it. "Politics will play a big role, maybe even a controlling role," Ellegood said. "We'll just have to wait and see." The program calls for the lasers to be mounted on a network of 20 to 30 satellites. The lasers would be used to destroy ballistic missiles shortly after launch. The concept is an updated version of the 1980s Strategic Defense Initiative, or "Star Wars," missile defense proposal. ["Laser, Delta plant races differ," **Florida Today**, February 7, 1998, p 14C & 13C.]

◆ Two Russian cosmonauts aboard the Mir space station, appeared live on the QVC shopping channel, set out to hawk the American-made $32.75 Fisher Space Pen, used on

NASA space flights since 1967 because it can write in the absence of gravity. But the featured attraction at the sale was the $25,000 Sokol KV-2 spacesuit. At least six callers made serious inquiries about the suits, said QVC spokeswoman Ellen Rubin. The show also sold 11 tiny pieces of Mars rock for prices ranging from $90 to $2,500. The financially shaky Russian space program gets an undisclosed donation from the proceeds. ["Mir cosmonauts try their hand as pitchmen on QVC," **The Orlando Sentinel**, February 8, 1998, p A-3.]

◆ Salty air is costing Brevard County residents millions of dollars every year - from car and homeowners to the military and NASA. Brevard's subtropical shoreline is particularly susceptible to rust and considered one of the most corrosive areas in the world. Florida has a more corrosive environment because of the combination of high temperatures, high average relative humidity, high average rainfall and - especially - a gradually slopping ocean bottom that makes waves break farther out and roll father onto the beach, said Lou MacDowell, a senior material specialist at Kennedy Space Center's corrosion labs. Consequently, more salt mist is put into the air. At Kennedy Space Center, experts have studied the effects of corrosion for the past 30 years at its Beach Corrosion Test Site about 100 feet from the Atlantic Ocean. The lab has developed many types of protective coatings that NASA uses to guard launch structures and other equipment, said MacDowell. KSC technologies also are spun off and used commercially to repair local corrosion problems. "We... hope that the coatings developed will solve many needs identified throughout the country and the world," said Karen Thompson, a KSC engineer who helped develop a corrosion-inhibiting coating that also withstands extreme heat. ["Salt air cost millions in rust," **Florida Today**, February 9, 1998, p 1A & 2A.]

FEBRUARY 9: Space Shuttle Status Report, Monday, February 9, 1998. STS-90: Leak checks of Columbia's crew module and tunnel adapter are complete. The transfer tunnel's forward extension has been installed and ammonia system servicing is complete. The payload premate test is also complete. Aft compartment closeouts and main engine heat shield rework continues. The Neurolab payload is scheduled to arrive at the OPF on Wednesday for installation into the orbiter's cargo bay and Shuttle main engines will be installed on Friday. STS-91: Discovery's three auxiliary power units have been installed. Replacement and cycling of the power drive unit for the right-hand external tank umbilical door continues. Body flap corrosion repair and super lightweight tank instrumentation modifications continue and engine heat shield attach point mold impressions are being taken today. The orbiter's external airlock is in the OPF and will be installed into the orbiter Feb. 13. The Mir docking mechanism is being mated to the airlock today. The new super lightweight external tank arrived in the Vehicle Assembly Building Friday afternoon to begin processing for launch on STS-91. Preparations are in work today to lift the tank and move it from the transfer aisle to the check out cell in high bay 2. STS-88: Endeavour's Ku band antenna assembly checks are complete. Payload disconnects are complete and SPACEHAB removal occurs today. Shuttle main engine post flight inspections are in work and removal of Endeavour's tunnel adapter is scheduled for Thursday. [Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, February 9].]

FEBRUARY 10: J. R. Dailey, acting deputy administrator, has approved buyouts for up to an additional 200 KSC civil service employees. The buyout is effective immediately, with

the separation window closing April 3. The previously approved separation date of Sep. 30 for quality assurance and safety and occupational health employees remains unchanged. According tot he buyout approval plan, this will be the last time that a buyout opportunity is offered to employees who are not eligible for retirement or those who are eligible for optional retirement to receive the full buyout. An optional retirement eligible employee who does not accept a buyout opportunity will be eligible to receive only 40 percent of the amount allowed by law should a future buyout be offered. ["Civil Service buyout extended through Apr. 3," **KSC Countdown**, February 10, 1998.]

◆ Space Shuttle Status Report, Tuesday, February 10, 1998. STS-90: Pressure decay checks of Columbia's crew module and tunnel adapter are complete. Replacement of the bushings on the main engine heat shields is in work. Preparations are under way for a pressure test of the orbiter's flash evaporator system on Friday. Aft compartment closeouts are ongoing, and main engine installation is slated for Friday. Technicians noted separated insulation on a piece of tubing in Columbia's midbody. Closeouts of midbody bay 7 will be delayed one day while workers replace the insulation. As a result, the Neurolab payload is now scheduled for installation into the orbiter on Thursday rather than tomorrow. STS-91: Replacement and cycling of the power drive unit for the right external tank umbilical door are complete. Body flap corrosion repair and super lightweight tank instrumentation modifications continue, and engine heat shield attach point assessments are in work. The Mir docking mechanism is being connected to Discovery's external airlock, and the airlock will be installed into the orbiter on Feb. 13. The super lightweight external tank will be transferred to the checkout cell in Vehicle Assembly Building high bay 2 today. Once that transfer is complete, solid rocket booster stacking will begin for mission STS-91. STS-88: Yesterday, the SPACEHAB payload was removed from Endeavour's payload bay. Orbiter power systems validation is also complete. Main propulsion system and Shuttle main engine post-flight inspections continue, and orbiter maneuvering system cross-feed lines will be drained beginning tomorrow. Tunnel adapter removal is scheduled for Thursday. [Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, February 10].]

FEBRUARY 11: Kennedy Space Center workers who have lost their jobs in recent layoffs say they are afraid the cuts will compromise shuttle safety and increase the workload and stress among those still on the job. The concerns were expressed in interviews this week following the Feb. 6 termination of 548 workers from United Space Alliance, the NASA contractor that is taking over operation of the shuttle fleet. "I think (the alliance) is going too far with these layoffs. There are going to be a lot more mistakes. My job was to try and catch those mistakes when they happened or to prevent them from happening. Where's the time to do that now?" said Wes Clark, an alliance quality control inspector and 13-year veteran of the program, who was laid off. Senior NASA and alliance officials dispute such fears and insist the cutbacks will not hurt safety. They say they will do nothing that would put the ships and their astronaut crews at risk. "If we're not able to meet the safety requirements that are demanded, we're out of business, and we know that," alliance spokesman Jack King said. "We are confident (the layoffs) are not going to affect safety in any manner. The continuing worries come as NASA Administrator Dan Goldin meets today in Washington, D. C., with the Aerospace Safety Advisory Panel, an independent group of aerospace experts that serves as a NASA watchdog for Congress. The panel has been critical of the layoffs, and recently cited its concerns in a report to former astronaut

and current NASA shuttle safety boss Frederick Gregory. The report stated: *The loss of positions will leave the KSC work force without the mix of skills needed to meet an increased shuttle launch schedule in future years. *The cuts could result in fewer inspections to key shuttle systems. *The alliance is unrealistically assuming it can rehire laid-off employees if the need arises later. *The company is overly optimistic in its estimates that the reduced work force will be able to pick up the slack by working more efficiently. Despite such reservations, Gregory approved the layoffs because of a $100 million shortfall in NASA's budget. In all, the reductions represent nearly a 10 percent cut in the alliance's 6,000-employee work force. ["Do KSC layoffs go too deep?," **Florida Today**, February 12, 1998, p 1A & 7A.]

◆ Space Shuttle Status Report, Wednesday, February 11, 1998. STS-90: Columbia's main engine heat shield attach point work continues. Preparations continue for a pressure test of the orbiter's flash evaporator system on Friday. Aft compartment closeouts are ongoing, and main engine installation is now slated for next Thursday. Replacement of the tubing insulation in Columbia's midbody is complete, and closeouts of midbody bay 7 are in work. Transfer of the Neurolab payload from the Operations and Checkout Building to the OPF begins at about 4 a.m. tomorrow. Neurolab will arrive in the payload canister at about 6 a.m. and will be installed into the orbiter after 10 a.m., weather permitting. STS-91: Body flap corrosion repair and super lightweight tank instrumentation modifications continue, and engine heat shield attach point assessments are in work. The Mir docking mechanism is being connected to Discovery's external airlock, and the airlock will be installed into the orbiter on Friday. The super lightweight external tank has been transferred to the checkout cell in Vehicle Assembly Building high bay 2. Mission STS-91 booster stacking operations have begun on the mobile launch platform in VAB high bay 1. STS-88: Main propulsion system and Shuttle main engine post-flight inspections continue. Draining of the orbiter maneuvering system cross-feed lines continues, with oxidizer line draining complete and fuel line draining in work today. Tunnel adapter removal is now scheduled for Monday. [Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, February 11].]

FEBRUARY 12: Marking the end of an era, a Spacelab module completed preflight preparations last week in the Operations and Checkout Building and was installed in the payload canister for transfer to the Orbiter Processing Facility. The STS-90 Neurolab payload was honored with a ceremony after being lowered into its payload canister for the last time. This phase of the Shuttle program is winding down as the second phase of the International Space Station (ISS) program gets under way. Microgravity and life sciences research that formerly was conducted in Spacelab modules, such as Neurolab, will eventually be conducted inside the completed ISS. Investigations during the Neurolab mission will focus on the effects of microgravity on the nervous system. STS-90 is slated for launch in April. ["Neurolab processed at KSC for last flight," **KSC Countdown**, February 12, 1998.]

◆ Space Shuttle Status Report, Thursday, February 12, 1998. STS-90: Columbia's main engine heat shield attach point work continues with match drilling in work today. Preparations for Friday's pressure test of the orbiter's flash evaporator system will wrap up today. Aft compartment close-outs are ongoing, and main engine installation is now slated for next Thursday. The Neurolab payload arrived at OPF bay 3 shortly after 6 a.m. today and is now being installed into Columbia's cargo bay. STS-91: Body flap corrosion repair

and super lightweight tank instrumentation modifications continue, and engine heat shield attach point assessments are in work. While mating the Mir docking mechanism to Discovery's external airlock, KSC technicians noticed some galling on several of the bolts that connect the two components. NASA engineers are evaluating the possibility of replacing the bolts and resuming airlock processing early next week. STS-88: Draining of hypergolic fuel from Endeavour's orbiter maneuvering system (OMS) cross-feed lines is complete. Preparations for next week's OMS pod functional testing are under way. Main propulsion system and Shuttle main engine post-flight inspections continue. Tunnel adapter removal is now scheduled for Monday. [Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, February 12].]

◆ Independent safety advisers remain concerned that layoffs of 548 workers at Kennedy Space center could jeopardize safe operation of the space shuttle fleet. But those fears did not make it into a briefing the experts gave to NASA Administrator Daniel Goldin on Thursday. "It's not like we're ducking it," said John Stewart, a consultant with the Aerospace Safety Advisory Panel, whose members presented their annual report to Goldin at NASA headquarters. "We made our views known on that. They know what we think." The Aerospace Safety Advisory Panel was created by Congress after the Apollo spacecraft fire Jan. 27, 1967. Its job is to review space agency programs and made recommendations. Ultimately, it is up to NASA's administrator whether to follow those recommendations, Stewart said. "We try to stay out of the decision-making loop," Stewart said. "But if we went to Mr. Gregory or Mr. Goldin and said, 'This activity should stop or pause,' they would give our views serious consideration." ["Shuttle safety still concerns experts," **Florida Today**, February 13, 1998, p 1A & 2A.]

FEBRUARY 13: The Voyager 1 spacecraft is set to break another record and become the explorer that has traveled farthest from home. At approximately 5:10 p.m. EST on Feb. 17, 1998, Voyager 1, launched more than two decades ago, will cruise beyond the Pioneer 10 spacecraft and become the most distant human-created object in space, at 6.5 billion miles (10.4 billion kilometers) from Earth. The two are headed in almost opposite directions away from the Sun. ["Voyager 1 now most distant human-made object in space," **NASA News Release #98-30**, February 13, 1998.]

◆ Space Shuttle Status Report, Friday, February 13, 1998. STS-90: Columbia's main engine heat shield attach point work continues. The orbiter's flash evaporator system will undergo pressure tests today. Aft compartment close-outs are ongoing, and main engine installation is slated for next Thursday. With external tank and solid rocket booster close-outs nearing completion, ET/SRB mate is slated for Feb. 19. The Neurolab payload was installed into Columbia's cargo bay yesterday and payload interface verification testing is scheduled for next week. STS-91: Installation of Discovery's forward reaction control system is complete. Body flap corrosion repair and super lightweight tank instrumentation modifications continue, and engine heat shield attach point assessments are in work. NASA engineers continue to evaluate the galling noticed on about 13 out of 96 bolts that connect the Mir docking mechanism to Discovery's external airlock. Managers may opt to change-out the flawed bolts and resume airlock processing next week. STS-88: Preparations for next week's OMS pod functional testing continue. Main propulsion system and Shuttle main engine post-flight inspections continue. Tunnel adapter removal is now scheduled for

Monday and fuel cell voltage testing begins Wednesday. [Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, February 13].]

◆ Two doctors will accompany Sen. John Glenn, NASA's newest and oldest astronaut, into space in October. One of them is a heart surgeon. The other is trained in emergency medicine. "No, no, no," NASA spokeswoman Jennifer McCarter said when asked whether the doctors were assigned for the benefit of Glenn, who will be 77 at the time of the space shuttle flight. "It's coincidence." NASA announced last month that Glenn, who became the first American to orbit the Earth 36 years ago next week, will return to space aboard shuttle Discovery as part of a study on aging. The space agency on Friday named the six astronauts who will be launched with Glenn on Oct. 29. Five of the six are space veterans, including both doctors: Japanese astronaut Chiaki Mukai, the heart surgeon, and NASA astronaut Scott Parazynski, who completed a 22-month residency in emergency medicine in the early 1990s. Rounding out the crew are commander Curtis Brown, Jr., pilot Steven Lindsey, mechanical engineer Stephen Robinson and Spanish astronaut-engineer Pedro Duque. During the 10-day mission, the astronauts will release a sun-watching satellite that failed to provide data during a botched flight late last year. The satellite never received a crucial computer command before it was released from Columbia; two spacewalking astronauts had to go out and capture it. ["Glenn to fly with doctors aboard," **The Orlando Sentinel**, February 14, 1998, p A-3.]

◆ The juggling of NASA's shuttle launch schedule began in earnest Friday as officials announced a two-week delay in its next piloted spaceflight. Much of the remainder of the agency's shuttle launch schedule for the next two years, meanwhile, remains up in the air. The first ripple came as NASA pushed back the planned April 2 launch of shuttle Columbia to April 16. A crew of seven, including former Kennedy Space Center engineer-turned-astronaut Kay Hire, is to conduct a 17-day medical research mission on that flight. NASA shuttle program managers decided to move the mission back two weeks because Columbia's next flight - the planned August 26 launch of an advanced astrophysics observatory - is being delayed until at least December. Discovery's upcoming flight to Russia's space station Mir remains scheduled for launch May 28, but the delay in the astrophysics mission is prompting NASA managers to review nearly all other 1998 and 1999 missions. The launch date for that flight as well as other station construction missions in 1998 and 1999 now are under review. A new station construction schedule is expected to be ironed out in late March or early April. ["NASA juggles shuttle launches," **Florida Today**, February 14, 1998, p 5A.]

FEBRUARY 14: The first four Globalstar spacecraft were launched Feb. 14 from Cape Canaveral on board a specialized version of the Boeing Delta 2 following eight days of weather delays caused by El Nino-generated weather patterns. The new Delta 7420-10 version used only four solid rocket boosters and an advanced composite shroud. The four spacecraft were ejected in two pairs off a Boeing dispenser mounted on the Delta second stage as the vehicle flew south of Australia a little more than an hour after launch. At separation from the dispenser, one of the $13-million satellites began rotating at about 3 rpm., a rate higher than planned. A Loral/Qualcomm team at Globalstar's San Jose, Calif., control center was able to stabilize the spacecraft without difficulty, however. Each of the 979-lb. spacecraft deployed their 35-ft solar arrays during their first pass over the U.S. The

satellites were placed into an initial 1,247-km. (775-mi.) transfer orbit inclined 52 deg. But by next week, they are to be maneuvered higher into Globalstar's operational orbit at 1,414 km. The spacecraft are the first of 56 Globalstars planned. ["Globalstars finally orbited," **Aviation Week & Space Technology**, February 23, 1998, p 40.]

FEBRUARY 17: Space Shuttle Status Report, Tuesday, February 17, 1998. STS-90: Late last week, NASA managers agreed to postpone for two weeks the launch of Mission STS-90, setting the new target launch date of April 16, 1998. The delay will permit better utilization of available Shuttle resources to support orbiter processing. In the OPF, preparations continue for the installation of Columbia's main engine heat shields and for the installation of the tunnel adapter for the Neurolab module. The interface verification test of the Neurolab also continues today. STS-91: Installation of Discovery's forward reaction control system is complete. Close-outs are continuing today. Preparations to conduct the auxiliary power unit leak and functional checks are in work. The airlock is scheduled to be installed into the orbiter's payload bay this week. STS-88: Preparations continue for the orbital maneuvering system pod functional tests and for the fuel cell voltage tests. Tunnel adapter removal is underway today. [Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, February 17].]

◆ On Tuesday, Feb. 17, at about 5 p.m., the Voyager 1 spacecraft passed the Pioneer 10 spacecraft at the edge of our Solar System to become the most distant human-created object in space. Voyager 1 was launched from Cape Canaveral on Sep. 5, 1977 and has traveled 6.5 billion miles. Data received from Voyager suggests that within the next 10 years the spacecraft will enter into interstellar space for the first time. ["Did you know?" **KSC Countdown**, February 19, 1998.]

FEBRUARY 18: Dr. Wesley T. Huntress, Jr., NASA's Associate Administrator for Space Science, has announced his departure from the Agency in the near future. Huntress is responsible for NASA's programs in astrophysics, planetary exploration and space physics. ["Huntress announces his departure from NASA," **NASA News Release #98-31**, February 18, 1998.]

◆ Space Shuttle Status Report, Wednesday, February 18, 1998. STS-90: Servicing of Columbia's potable water system is complete. Work on the orbiter's main engine heat shield attach points continues and should conclude today. With successful completion of the heat shield work, main engine installation will begin early tomorrow morning. Neurolab's interface verification test is complete and transfer tunnel installation is slated for Friday. STS-91: Interface verification testing on Discovery's forward reaction control system is complete. The auxiliary power unit leak and functional checks continue and preparations for external airlock installation are complete. The airlock will be installed into the orbiter's payload bay later this week. Installation of Discovery's right-hand orbiter maneuvering system begins early next week. STS-88: Tunnel adapter removal is complete. Orbital maneuvering system pod functional tests are in work and fuel cell voltage tests are slated for tomorrow. Work on Endeavour's reaction control system is under way and technicians will replace a 4-inch disconnect on the main propulsion system today. [Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, February 18].]

FEBRUARY 19: Space Shuttle Status Report, Thursday, February 19, 1998. STS-90: Work on the orbiter's main engine heat shield attach points continues and should conclude today. Main engine installation is now scheduled to begin tomorrow. Neurolab's transfer tunnel installation is also set for Friday. STS-91: The auxiliary power unit leak and functional checks continue and preparations for external airlock installation are complete. The airlock will be installed into the orbiter's payload bay next week. Installation of Discovery's right-hand orbiter maneuvering system also begins next week. STS-88: Tunnel adapter removal is complete. Orbital maneuvering system pod functional tests are in work and fuel cell voltage tests are set for today. Work on Endeavour's reaction control system continues under way. [Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, February 19].]

FEBRURY 20: It was 36 years ago today that John Glenn made history - on Feb. 20, 1962, he became the first American to orbit the Earth, flying aboard the Friendship 7 Mercury capsule. ["Glenn takes spin through history," **The Orlando Sentinel**, February 20, 1998, p A-6.]

◆ Space Shuttle Status Report, Friday, February 20, 1998. STS-90: Work on the orbiter's main engine heat shield attach points continues. Main engine installation will begin once this work is complete. Neurolab's transfer tunnel installation has been rescheduled for Monday. STS-91: The auxiliary power unit leak and functional checks continue. The airlock will be installed into the orbiter's payload bay no earlier than late next week. Installation of Discovery's right-hand orbiter maneuvering system also begins next week. STS-88: Tunnel adapter removal is complete. Orbital maneuvering system pod functional tests and fuel cell voltage tests will continue today. A functional test of the forward reaction control system is set for Tuesday. [Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, February 20].]

◆ NASA shuttle managers are requesting a 10-week delay in starting international space station assembly flights, documents obtained by (Florida Today)Gannett News Service show. The planned July 9 launch of shuttle Endeavour to carry a pressurized docking module into orbit may be put off until Sept. 17, according to a proposal by NASA's Flight Production Schedules Working group at Feb. 10 meeting at Johnson Space Center in Houston. Though not unexpected, the schedule slip casts more doubt on the complicated and expensive venture between the United States and 15 nations to build an orbiting laboratory 220 miles above Earth's surface. A final decision hasn't been reached, said Ed Campion, a spokesman for the shuttle program at Johnson Space Center. If Endeavour's mission to deliver the module aloft is delayed, it likely will postpone a Russian launch of the Functional Cargo Block, a 43-foot-long component containing propulsion, command and control systems. The cargo block is U.S.-owned but built at Russia's Krunichev space center under contract to Boeing. The cargo block is scheduled to launch June 30 atop a Proton rocket from Russia's Baikonur Cosmodrome. "There is a desire to keep the Russian launch in close proximity to the (Endeavour) launch," Campion said. ["NASA wants to delay first flights to build station," **Florida Today**, February 21, 1998, p 1A & 2A.]

◆ Pressurized Mating Adapter-3 (PMA-3), the third PMA for the International Space Station (ISS), arrived at KSC Friday from the Boeing Company in Huntington Beach, CA. The Z1 Integrated Truss Segment, the initial framework component for the International Space Station, also began its processing at KSC in the Space Station Processing Facility last week. PMA-3 and the Z1 truss are set to fly on Space Shuttle mission STS-92, the third ISS assembly flight. While in orbit, PMA-3 will be removed from the orbiter's payload bay by the astronauts using the remote manipulator arm and mated to Node 1, a connecting passageway to the living and working areas of the International Space Station. The primary purpose of PMA-3 is to serve as a Shuttle docking port through which crew members and equipment will transfer to ISS during later assembly missions. Beginning this year with the launch of the first International Space Station element, more than 100 components will ultimately be assembled in low Earth orbit over the next five years using approximately 45 assembly flights. When complete, the station will provide access for researchers around the world to permanent, state-of-the-art laboratories in the weightless environment of space. ["New International Space Station elements arrive at KSC," **KSC Countdown**, February 24, 1998.]

FEBRUARY 23: Astronauts Jerry M. Linenger, M.D. (Capt. USN), Blaine L. Hammond (Col., USAF) and M. Rhea Seddon, M.D., have retired from NASA to pursue private interests. ["Shuttle veterans depart NASA," **NASA News Release #98-33**, February 23, 1998.]

◆ Space Shuttle Status Report, Monday, February 23, 1998. STS-90: Work continues on the orbiter's main engine heat shield attach points. Main engine installation, to follow this work, is expected to begin on Thursday. Installation of the Neurolab transfer tunnel is currently in work. On Thursday, the external tank is scheduled to be mated to the solid rocket boosters in the Vehicle Assembly Building. STS-91: Tests on the remote manipulator system began today in the OPF as modifications to the orbiter's airlock and check-outs of the orbiter's body flap continue. Installation of Discovery's right-hand orbiter maneuvering system is set for Thursday. In the Vehicle Assembly Building, stacking operations for Discovery's solid rocket boosters have begun. STS-88: Functional tests of the orbital maneuvering system and the forward reaction control system are underway today. [Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, February 23].]

FEBRUARY 24: The aerospace industry will be watching Cape Canaveral Air Station this week as officials start a three-day conference today to discuss how Florida can attract more launch business to the site. Representatives of the military, government and private companies will be part of the fourth annual Florida Space Launch Symposium at the Melbourne Airport Hilton. They will focus on what must be done to bring more commercial business to Cape Canaveral, which traditionally has served as the Air Force's launch point for secret military satellites. But the increasing demand for rockets to take private communications satellites into orbit is prompting the military to make its Cape operations more amenable to commercial customers. "We want to learn how to improve our business practices in order to meet the changing and growing needs of the commercial space industry," said Col. Ron Larivee, vice commander of the 45th Space Wing at Patrick Air Force Base, a sponsor of the symposium. Speakers will address other measures Florida

could undertake to improve its position, including: *Attracting business from other aerospace fields, such as manufacture of satellites and rockets. *Improving the Eastern Range - the tracking system the Air Force uses to monitor Florida launches - so it can support more launches. *Competing to be the launch site for next-generation rockets, called Reusable Launch Vehicles. ["Symposium explorers future of commercial launches," **Florida Today**, February 24, 1998, p 1B.]

◆ The people who build satellites for the growing commercial space market say the best place to launch their spacecraft is neither Florida nor a highly regarded European site in South America. It's Vandenberg Air Force Base in central California. That's the surprising upshot of a survey that evaluated customer satisfaction at Cape Canaveral Air Station and Kennedy Space Center as well as the European site in French Guiana and spaceports in Kazakhstan and China. The results of the $35,000 study, commissioned by the Florida Space Business Roundtable, were unveiled Tuesday at the Florida Space Launch Symposium, an aerospace industry conference in Melbourne. Officials say the findings mean more bad news for efforts to make Cape Canaveral a prime launch site for the expected $100 billion a year commercial space industry in the 21st century. "We have got to find a way to change the way we do business," said Forrest McCartney, vice president of launch operations for Lockheed Martin Corp. The company lofts Atlas and Titan rockets from Cape Canaveral. "The future of the Space Coast is certainly up for grabs at this point," McCartney said. "Vandenberg looks like the Avis of launch sites. In other words, they are clearly trying harder," said Philip Toney, president of Launch Site Engineering, which conducted the survey. Florida's coastal spaceports fared well in two categories: Satellite manufacturers found it relatively easy to ship their spacecraft to the Space coast and gave the area high marks for its amenities. But satellite manufacturers clearly thought that government red tape at Florida's spaceports presents big headaches for business executives. Commercial satellite launches now outnumber the combined total of launches each year from Florida by NASA and the Air Force, officials said. As a result, Florida will have to begin catering to commercial satellite manufacturing and launch service companies. Otherwise, officials said, satellite makers won't hesitate to take their business elsewhere. ["Survey: Brevard launch sites fail to measure up," **Florida Today**, February 25, 1998, p 1B & 2B.]

FEBRUARY 25: After an extensive review, NASA has partially terminated the Clark Earth science mission due to mission costs, launch schedule delays, and concerns over the on-orbit capabilities the mission might provide. NASA will retain launch vehicle services. The Clark mission was part of NASA's Small Satellite Technology Initiative (SSTI) program, originally scheduled for launch in mid-1996. To date, NASA has invested approximately $55 million in Clark. The Agency expects to recover some assets of the mission, such as some spacecraft payloads, components and subsystems which may be used on other NASA projects. ["NASA terminated Clark Earth Science mission," **NASA News Release #98-35**, February 25, 1998.]

◆ Space Shuttle Status Report, Wednesday, February 25, 1998. STS-90: The mission is currently baselined to last 16 days (MET of 15/21:50). The option to add the 17th day, (MET of 16/21:48) if power margins permit, will be addressed during the flight. Work on the orbiter's main engine heat shield attach points is complete and installation of the main engines is now in work. The Neurolab transfer tunnel has been installed and mechanical

mates are in work today. Tomorrow, the STS-90 crew will participate in the crew equipment and interface test (CEIT) and a sharp edge inspection of the orbiter's crew module and Neurolab. Also tomorrow, the external tank is scheduled to be mated to the solid rocket boosters in the Vehicle Assembly Building. STS-91: Modifications to the orbiter's airlock and check-outs of the orbiter's body flap continue. Installation of Discovery's right-hand orbiter maneuvering system is set for Thursday. In the Vehicle Assembly Building, stacking operations for Discovery's solid rocket boosters have begun. STS-88: Functional tests of the orbital maneuvering system and the forward reaction control system continue today. Preparations are also underway to remove auxiliary power unit No. 3. [Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, February 25].]

◆ A top NASA manager acknowledged Wednesday that agency officials doubt Russia will meet a December deadline for launch of a space station component that would give the outpost important guidance, control and living-conditions capabilities. Launch of the Service Module - the third piece of station hardware scheduled to go up this year - may be postponed to March 1999 or later, Joseph Rothenberg, NASA's new associate administrator of space flight, told a congressional subcommittee. Rothenberg did not speculate on whether difficulties with the Service Module will again prompt NASA to rewrite the entire launch sequence for the station. However, he assured skeptical members of the House Space and Aeronautics subcommittee such a change will not cost U.S. taxpayers more money. NASA expects to give Congress a more precise picture of station costs and schedules in about two weeks, Rothenberg said. ["Russians may delay station - again," **Florida Today**, February 26, 1998, p 1A.]

FEBRUARY 26: Space Shuttle Status Report, Thursday, February 26, 1998. STS-90: Work to install the orbiter's main engines is complete and Neurolab transfer tunnel mechanical mate operations continue. The tunnel interface verification test is scheduled for tomorrow. The STS-90 crew today is participating in the crew equipment and interface test (CEIT) and a sharp edge inspection of the orbiter's crew module and Neurolab. In the Vehicle Assembly Building, the external tank is being mated to the solid rocket boosters. STS-91: Modifications to the orbiter's airlock and check-outs of the orbiter's body flap continue. These items are scheduled to be installed in the orbiter next week. Installation of Discovery's right-hand orbiter maneuvering system is set for Friday. In the Vehicle Assembly Building, stacking operations for Discovery's solid rocket boosters have begun. STS-88: Functional tests of the orbital maneuvering system continue today. A similar test was successfully completed on the forward reaction control system yesterday. Preparations are also underway to remove auxiliary power unit No. 3. [Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, February 26].]

◆ The company planning to build a next-generation spaceship to replace NASA's shuttle will whittle potential launch sites down to a short list by the end of the year, and Florida's spaceports are expected to be finalists. But if it's cheaper to do business elsewhere, aerospace giant Lockheed Martin says it will homeport its VentureStar Reusable Launch Vehicle in another state or nation. "With this program, everything is going to come down to the bottom line - dollars," Stephen Black, a Lockheed Martin program manager told officials Thursday at the Florida Space Launch Symposium, an industry conference held in

Melbourne. State officials, meanwhile, said Florida intends to make a strong pitch to attract the VentureStar and other commercial space business to Cape Canaveral Air Station and Kennedy Space Center. The bidding war between potential VentureStar launch sites began in January when Lockheed Martin hosted competing spaceports at a briefing in California. Ten states, including leading contenders California, New Mexico, Florida and Virginia, sent representatives to the launch site selection briefing. There are a couple of key disadvantages to launching from Florida, Black said. One is frequent thunderstorms that trigger costly launch delays. The other is uncertainty over whether the already busy coastal spaceports will be able to accommodate as many as 40 VentureStar flights a year. ["Lockheed Martin to narrow list of launch sites by end of year," **Florida Today**, February 27, 1998, p 8A.]

FEBRUARY 27: An Atlas rocket lifted off at 7:22 p.m. Friday from Cape Canaveral Air Station. The Lockheed Martin rocket carried a commercial communications satellite to a temporary orbit 19,000 miles above the Earth. During the next few weeks, the spacecraft will fire its own engines to climb into its final orbit about 22,000 miles high. Operated by Intelsat Video Services of Washington, D.C., the 8,000 pound satellite joins a fleet of 26 Intelsat satellites already providing television, telephone and data transmission services worldwide. The $200 million mission is the second Atlas rocket launch of 1998 and the 37th successful Atlas launch from Cape Canaveral. The next rocket launch from Cape Canaveral is set for March 16, when another Atlas rocket is to take off with a Navy communications satellite. ["Atlas rocket lifts TV satellite into orbit," **Florida Today**, February 28, 1998, p 2A.]

MARCH

MARCH 1: The term "space race" will take on a new meaning this week. With the Legislature convening Tuesday (March 3), Florida Gov. Lawton Chiles and Space Coast lawmakers will be scrambling to persuade colleagues to invest taxpayer dollars in an effort to lure next-generation spaceships to the state. That same day, key state advisers will hold a public forum in Melbourne to discuss a bidding war for a spaceship that could render obsolete the rockets and shuttles that now anchor Florida's position in a booming commercial space market. If the state fails to attract the new fleet of launchers, Floridians could find themselves shut out of what promises to be a $100 billion a year business after the turn of the century. "It's going to impact their future. Are they going to have one, or not?" said Jim Bodine, chairman of the Florida Aviation Aerospace Alliance. The alliance is a key state economic development advisor. Aerospace giant Lockheed Martin in January launched a nationwide competition that will lead to the selection of a homeport for its planned VentureStar Reusable Launch Vehicle. Ten states are bidding for the spaceship, which will bolt into orbit without shedding rocket boosters or fuel tanks on its way. That means the spaceship will not have to be launched from a coastal spaceport in order to fly over uninhabited ocean areas to avoid endangering the public. In fact, the VentureStar will be able to launch from virtually anywhere in the world. States and nations competing to be VentureStar's homeport will receive formal requests for proposals from Lockheed Martin in April or May. A final decision on VentureStar's launch site is expected to be made in late 1999. ["Legislators getting their chance to weigh in on new 'space race'," **Florida Today**, March 1, 1998, p 1A & 2A.]

MARCH 2: A federal judge in Orlando, citing a lack of evidence, has thrown out a two-count indictment against a NASA engineer who was charged with making a false statement and obstructing a government proceeding. Refusing to send the case to the jury at the conclusion of the four-day trail, U.S. District Court Judge Patricia C. Fawsett ordered all charges dropped against the Merritt Island man. The engineer, a NASA employee for 26 years, was indicted on Dec. 5, 1997, on charges of making a false statement and obstructing a proceeding before a department or agency of the United States. Government attorneys said the engineer told investigators that a subcontractor suspected of overbilling NASA had been verbally directed by NASA and the prime contractor to bill the way in which it did. Subsequent investigations revealed that the subcontractor had not been directed to bill NASA in that fashion, government attorneys said. In her ruling on Feb. 25, however, Fawsett said "the government has failed to carry its burden to prove the charges...in fact, the evidence shows that it's more reasonable and probable than not that the defendant is factually innocent of the crimes charged." ["Judge clears NASA engineer, rejects two-count indictment," **Florida Today**, March 3, 1998, p 1B.]

◆ Space Shuttle Status Report, Monday, March 2, 1998. STS-90: The Neurolab transfer tunnel has been mechanically and electrically mated and the tunnel interface verification test was completed on Friday. Space Shuttle main engine close-out operations and leak checks are complete. Main engine heat shields are being installed and a landing gear functional test is scheduled for today. In the Vehicle Assembly Building, the external tank was successfully mated to the solid rocket boosters on Thursday. Close-out operations are continuing. STS-91: Discovery's right-hand orbiter maneuvering system pod was not installed last Friday as planned due to concerns with the attach points. The pod is scheduled to be installed

tomorrow. Preparations to install the orbiter's airlock and check-outs of the orbiter's body flap continue today. The airlock is scheduled to be installed later this week and the body flap will be installed early next week. In the Vehicle Assembly Building, stacking operations for Discovery's solid rocket boosters continue. STS-88: Preparations to remove the main engines are underway with heat shield removal in work today. Also, preparations are underway to remove and replace the orbiter's 4-inch liquid hydrogen external tank disconnect attach point. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, March 2].]

MARCH 5: Air Force pilot Eileen Collins will be named the first female shuttle commander today at a White House ceremony, officials said Wednesday (March 4). Collins, 41, has been in line for the job since May, when she flew her second NASA shuttle mission as a pilot. She will take the commander's seat on shuttle Columbia during a December mission to release a $2.5 billion astronomy satellite. The lieutenant colonel became NASA's first female pilot in 1995. Hillary Rodham Clinton will make the announcement at 11 a.m. today during an event emphasizing the importance of math and science studies. Later, Collins and the first lady will be joined by actor Tom Hanks at a Washington, D. C., high school. Collins flew on shuttle Discovery in 1995 and on shuttle Atlantis in May. As pilot, she served as backup to the spaceship commander, who actually flies the shuttle and oversees the mission. ["Columbia gets first woman in command," **Florida Today**, March 5, 1998, p 1A.]

MARCH 6: Space Shuttle Status Report, Friday, March 6, 1998. STS-90: Leak checks on Columbia's crew module and Ku-band testing are complete. Main engine heat shields are being installed and aft compartment close-outs are in work. Payload bay door inspections are under way and the doors are scheduled to be closed for flight this afternoon. Spacelab internal close-outs are in progress as well. STS-91: Discovery's right-hand orbiter maneuvering system pod was installed yesterday and electrical mates are complete. Preparations to install the orbiter's body flap continue and installation of auxiliary power unit No. 1 concludes today. The airlock is scheduled to be installed in the orbiter this afternoon. In the Vehicle Assembly Building, stacking operations for the STS-91 solid rocket boosters continue and will conclude next week. STS-88: Preparations for next week's removal of Endeavour's main engines continue and heat shield removal is in work today. Technicians are troubleshooting a helium isolation valve on the orbiter's reaction control system and work is also under way to replace a line that supplies gaseous nitrogen to the Spacelab. ATLANTIS (OV-104): Atlantis remains at Palmdale, CA, undergoing scheduled maintenance and orbiter modifications. The vehicle is due to be ferried back to KSC in August. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, March 6].]

MARCH 7: A wingless space lifeboat designed to bring astronauts home from the planned international space station takes its maiden free flight Monday, gliding in after being dropped 23,000 feet above the Mojave Desert. NASA's X-38 aircraft is a "lifting body," built to glide through the sky on lift generated by its aerodynamic shape before deploying a high, controllable parachute. The aircraft has no landing gear. Instead, it sets down on skids. The craft is the prototype for a "crew return vehicle" the space agency is developing

for the space station. Planners envision a six-person craft attached to the outside of the station, ready to carry crew members home if there's an emergency and a space shuttle can't be launched in time. The aircraft has flown before, but never on its own. The previous flights have been attached to a pylon under a B-52's wing. In Monday's test, the unmanned craft will make an unpowered descent, slung beneath a steerable parachute called a parafoil. When deployed, the parafoil has an area of 5,500 square feet - as much surface area as the wings of a Boeing 747. Like the first space shuttle Enterprise, the X-38 is a prototype for use in the atmosphere and will never go into space. ["NASA to test space lifeboat from air," **Florida Today**, March 8, 1998, p 3A.]

◆ An environmental research program named by former astronaut Sally Ride now is going by a new moniker. NASA's "Mission to Planet Earth" project which aims to use instruments onboard aircraft, satellites and space shuttles to do environmental research now is being referred to as the agency's "Earth Science" enterprise. The title "Mission to Planet Earth" originated 10 years ago in a report on future directions for the U.S. civilian space program by a commission led by Ride, who became the first American woman to fly in space in 1983. ["Program gets new name," **Florida Today**, March 8, 1998, p 6E.]

◆ NASA is planning to build a second X-34 spaceship so that a test-flight program can be completed event if the first craft is destroyed. Orbital Sciences Corp. is building an X-34 spaceship for NASA under a $50 million contract awarded in August 1996. The small spacecraft will be used to test advance systems that can be used on next-generation reusable ships that might replace NASA's four-orbiter space shuttle fleet. The agency, however, recently decided to build a second X-34. The primary reason: a prototype NASA spaceship known as the Delta Clipper was destroyed in a 1996 crash on the fifth flight of a similar test program. NASA plans to launch the X-34 craft on up to 50 test flights. A significant number of those might be staged from NASA's Kennedy Space Center. ["NASA signs up for second ship," **Florida Today**, March 8, 1998, p 6E.]

MARCH 8: A key Senate committee will take up a bill Thursday to fuel the booming commercial space industry by cutting government red tape that is prompting U.S. companies to take their business overseas. If the measure is enacted into law, proponents say it will make U.S. companies more competitive in what now is a $77 billion-a-year global industry. If not, U.S. businesses could continue to lose to foreign competitors that are carving healthy niches into an industry growing at 20 percent a year. "There is no denying that today the United States' preeminence in commercial space is threatened," said U.S. Sen. Bob Graham, D-Miami Lakes, the bill's co-sponsor. "While our space industry is rapidly preparing for the 21st century, federal policy in dealing with this important source of economic activity is stuck on the launch pad." Dubbed the Commercial Space Act, the bill is to be considered by the Senate Committee on Commerce, Science and Technology. The enterpiece is a provision that would give the federal government the authority to license the return to Earth of next-generation spaceships that will be operated by commercial companies. The federal government now has the authority to license commercial space launches but would be powerless to regulate the homebound trips of commercial spaceships, such as Lockheed Martin's planned VentureStar Reusable Launch Vehicle. That private sector spaceship, which Lockheed Martin plans to build within the next few years, would be launched like a rocket and return to Earth like a NASA space shuttle. Meanwhile, at least four other entrepreneurial companies are working on next-generation vehicles that

also would fly both to and from orbit. "The way the law presently exists, commercial companies can launch but cannot lad any vehicle returning from space," Graham said.

The bill also would: *Require the federal government, including the Department of Defense, to buy commercial launch services for satellite delivery and other missions rather than maintain standing armies to do the job. *Direct NASA to study the possibility of turning over its planned international space station to commercial operators once the outpost is assembled in orbit. *Require the Defense Department to conduct a study of its national spaceports, including Cape Canaveral Air Station, to see what upgrades are needed to enable a flourishing commercial launch industry. *Allow excess ballistic missiles to be converted into launch vehicles so they could carry out satellite-delivery missions. Under the 1991 Strategic Arms Reduction Treaty, the missiles no longer can be used for their intended purpose, which was to carry nuclear weapons to enemy targets around the globe. Graham said converting the missiles into space launchers for small scientific and educational payloads would save U.S. tax money that otherwise would be spent to store or destroy the missiles. Beyond that, the bill aims to clarify complex and sometimes divergent commercial space licensing requirements among various federal agencies. Some industry experts, however, say the bill, co-sponsored by U.S. Sen. Connie Mack, R-Cape Coral, takes a Band-Aid approach to mending an outdated law passed in 1984. That law was passed when the federal government had determined that NASA's space shuttle would be the nation's sole launch vehicle for civil government, military and commercial cargoes. The 1986 Challenger explosion prompted the U.S. government to swiftly reverse course and bar commercial cargoes from NASA's shuttles. The move opened the door for U.S. rocket manufacturers to begin offering commercial launch services. Staffers in the offices of both Graham and Mack say the new bill not only is adequate but is expected to win the backing of the majority of the Senate committee. If passed by the committee, the Senate bill then will be taken up by the full Senate. ["Space bill's aim: Ease regulations," **Florida Today**, March 9, 1998, p 1A & 5A.]

MARCH 9: Space Shuttle Status Report, Monday, March 9, 1998. STS-90: Columbia's main engine heat shields are installed and aft compartment close-outs continue. The payload bay doors were closed for flight Friday afternoon and strong back removal is planned for today. Orbiter maneuvering system (OMS) leak checks pick-up this afternoon and final assessments of the orbiter's elevons are in work today. STS-91: Installation of Discovery's airlock is complete and electrical connections are in work. Modifications to the external tank separation camera and the orbiter's global positioning system are under way. Auxiliary power unit installation and leak checks continue. This week, OMS pod interface verification testing and installation of the monitoring system for the docking mechanism's pyrotechnic devices are scheduled. In the Vehicle Assembly Building, stacking operations for the STS-91 solid rocket boosters continue with mating of the right forward segment planned for tonight. STS-88: Endeavour's engine heat shield removal is complete and Shuttle main engine removal is in work with engine No. 2 already pulled. Technicians are currently performing torque checks on the left wing-to-fuselage attach bolts. A payload cooling line is also being removed today. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, March 9].]

◆ The planned test Monday of a prototype spaceship that would serve as a lifeboat for international space station crews was canceled Monday because of problems with the B-52 aircraft that was to carry it aloft. The test has been reset for Thursday at Edwards Air Force Base in California, NASA officials said. The unmanned X-38, which resembles a mini-space shuttle with curved wings, is to be dropped from 23,000 feet attached to a parachute to test its aerodynamic performance. ["Spaceship's test flight reset for Thursday," **Florida Today**, March 10, 1998, p 6A.]

MARCH 10: After more than five fruitless months, NASA scientists declared the Pathfinder spacecraft officially dead Tuesday after a last-ditch attempt to communicate with the little rover and lander than made history last summer. Up to the final "time of death" at 1:21 p.m. local time, they held out hope that they could communicate once more with the comatose craft that likely had long ago succumbed to the cold and dust of the Martian winter. "This is sort of the end of the end," said Richard Cook, the mission manager. ["Scientists rule Pathfinder dead," **Florida Today**, March 11, 1998, p 2A.]

MARCH 11: NASA Administrator Daniel Goldin plans to tell a House panel today that no decisions have been made yet that would delay the planned summer launch of the international space station's first elements. The space agency chief will present a milestone-studded timeline for the coming months that will help managers decide whether the Russian Space Agency is back on track with its Interim Control Module, Goldin said Wednesday. His comments came after an event at which Vice President Al Gore and Russian prime Minister Viktor Chernomyrdin signed a new set of cooperative agreements. ["NASA sets timeline for Russia," **Florida Today**, March 12, 1998, p 1A&2A.]

MARCH 12: Space Shuttle Status Report, Thursday, March 12, 1998. STS-90: Work on Columbia's right inboard elevon is complete and both forward and aft compartment close-outs are in work. Tomorrow, technicians will complete work to install the aft doors. Aft compartment structural leak tests will follow. The orbiter is currently scheduled to roll over to the Vehicle Assembly Building at 10 a.m. on Monday, to be mated to the external tank and solid rocket booster stack in high bay 3. STS-91: Electrical connections on Discovery's airlock are complete. The orbiter's recently repaired body flap has been installed and instrumentation mates are under way. Modifications to the external tank separation camera and the orbiter's global positioning system continue. In the Vehicle Assembly Building, stacking operations for the right-hand solid rocket booster continue in high bay 1. STS-88: All three of Endeavour's main engines were removed earlier this week. Inspections of the drag chute compartment were completed yesterday in preparation for drag chute installation today. Auxiliary power unit installation is under way and technicians continue to perform torque checks on the wing-to-fuselage attach bolts. A Spacelab gaseous nitrogen line is being removed today and orbiter hydraulic system testing is in work. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, March 12].]

◆ Node 1, the first U.S. element of the International Space Station, continues with planned prelaunch preparation activities at the Space Station Processing Facility (SSPF). Node 1 is a connecting passageway to the living and working areas of the space station as well as provides for Shuttle docking ports. The midpoint has now been researched in the Cargo Element Integrated Test which will ultimately verify the node's functional readiness

for launch. Tuesday, Mar. 10, in the SSPF, the node was removed from the element rotation stand, or test stand, for an interim weight and center of gravity determination. Upon completion of this activity, the node was hoisted into the Shuttle payload transportation canister and the doors closed. There the node will be pressurized with a combination of helium and remain for a two-week leak check. At the conclusion of the test, the node will be removed from the payload canister and returned to the element rotation stand for completion of the Cargo Element Integrated Test. ["ISS Node 1 ready for leak test," **KSC Countdown**, March 12, 1998.]

◆ The Landsat-7 Earth science spacecraft will not be launched in July 1998 as planned due to necessary changes in the design of the electrical power supply hardware for the spacecraft's main instrument. A new target launch date will be set by NASA officials after completion of instrument thermal vacuum tests scheduled for this July. ["Landsat-7 Launch Delayed," **NASA News Release #98-41**, March 12, 1998.]

◆ Assembly of the world's most powerful X-ray telescope, NASA's Advanced X-ray Astrophysics Facility, was completed last week with the installation of its power-generating two solar panels. AXAF is scheduled for launch aboard Space Shuttle mission STS-93, in December 1998. ["Assembly of NASA's X-Ray Telescope Completed," **NASA News Release #98-43**, March 12, 1998.]

◆ The wingless X-38, a prototype for a space station lifeboat, was dropped from a B-52 bomber and successfully glided to a landing in the Mojave Desert on Thursday in its maiden flight, NASA said. ["Space station lifeboat makes smooth flight," **Florida Today**, March 13, 1998, p 8A.]

MARCH 13: Based on a moment of midnight inspiration, Vice President Gore today will announce his plan to make a live video image of the full, sunlit Earth - spinning on its axis against the blackness of space - continuously available to the world, via television and the Internet. The vice president's idea and, perhaps more important, his sense of urgency have triggered a scramble at NASA to make it happen inexpensively - and fast. Gore conceived the project a month ago, officials say, and he hopes to see it launched by 2000. The "all-Earth, all-the-time" images, to be transmitted from a small spacecraft stationed between Earth and the sun, would resemble the historic portrait of the fragile and isolated blue planet snapped by Apollo 17 astronauts - the last men on the moon - on Dec. 7, 1972, a picture that has become an icon. NASA Administrator Daniel S. Goldin said he hopes to keep the project's cost close to $20 million and definitely below $50 million, and will solicit commercial participation - by a cable TV company, for example - to lower the costs even further. ["The World, Live - Just a Click Away," Kathy Sawyer. (1998). **The Washington Post** [Online]. Available WWW: www.washingtonpost.com/wp-srv/digest/tech4.htm [1998, March 13].]

MARCH 14: Florida has a fighting chance to win a nationwide battle for the next-generation spaceship expected to dominate the world's launch industry in the 21st century. But several deal-busting impediments stand in the way of providing a home for Lockheed Martin's VentureStar. The low-cost launcher could drive out of business the shuttles and rockets that now fly from Florida. Among the obstacles will be the need to fly the vehicle up to 40 times a year in good weather - not into Florida's notoriously frequent

thunderstorms. Those requirements are detailed in documents obtained by *Florida Today* from Lockheed Martin. The documents provide the first public glimpse at how Kennedy Space Center and Cape Canaveral match up with the ship. "If you look at it subjectively, we don't have all the benefits they are looking for, and there are obstacles to overcome," said Warren Wiley, a NASA project director at KSC who is assisting in the state's VentureStar recruitment drive. Florida is competing for VentureStar against California, New Mexico, Virginia, Alaska, Colorado, Montana, Nevada and Oklahoma. A host of factors - not the least of which will be economic incentive packages - will be weighed by Lockheed Martin before the company decides on a short list of three or four sites in September. The final launch site is to be picked in the fall of 1999. The winner will be home to a spaceship that stands to capture an estimated $20 billion-a-year business by cutting the high cost of launching cargo on current generation rockets by a factor of 10. ["Bid for spaceship faces barriers," **Florida Today**, March 15, 1998, p 1A&2A.]

◆ Minnie, The last surviving "astro-chimp" from the early days of the space program, has died at 41. Once an understudy for the space-going chimpanzees Ham and Enos, Minnie died March 14 of old age, Coulston Foundation spokesman Don McKinney said. Minnie was the only female chimp trained for the Mercury Project in the early 1960s, but never flew. ["Last surviving 'astro-chimp' dies," **Florida Today**, March 28, 1998, p 2A.]

MARCH 15: The Navy's Vanguard 1 satellite lost the space race two generations ago, first to the dreaded Soviets and then to the almost as equally dreaded U.S. Army. But Vanguard 1 has done what its competitors couldn't: survive. It is the oldest man-made object in space. The 3-pound sphere, nicknamed "the grapefruit satellite" by the Russians, turns 40 on Tuesday (March 17) and could have hundreds more birthdays after that. Vanguard 1 has left the three satellites that beat it into orbit in ashes. Sputnik 1, the first satellite launched, lasted four months and burned up as it returned to Earth. Sputnik 2, which carried the dog Laika, made it to five months. After the Navy had two failures with the Vanguard program, the Army took the lead in the United States' space efforts and launched Explorer 1 in 1958. Explorer 1 fell to Earth in 1967. But the 6.5-inch Vanguard 1 has circled Earth more than 158,000 times and keeps going around and around. It should last a few hundred years more, engineers calculate. Vanguard 1's team at Cape Canaveral 40 years ago was disappointed when the Army took over and the press labeled Vanguard's failures "Kaputnik." That disappointment has turned to pride. "We've got one up there a lot longer than anything else," Vanguard launch director Bob Gray said. Vanguard 1 has flown for nearly 5.28 billion miles. That's the same as 28 round trips between Earth and the sun, 152 round trips to the moon and 15 times around the world - combined. Since Vanguard 1 was launched, 2,469 space objects have fallen back to Earth. Vanguard 1 remains in orbit because it is so high. Vanguard 1 changed the way we look at Earth, correcting theories about the world's size, shape and air density. Geophysicists used Vanguard's data and determined the Earth wasn't round, but somewhat pear-shaped. Vanguard 1 was launched on March 17, 1958 from Launch Complex 18A at 0725 EST. It was the second U.S. satellite. ["Energizer Bunny of space," **The Orlando Sentinel**, March 16, 1998, p A-10. **A Summary of Major NASA Launches**, July 1980, p A-3.]

MARCH 16: Space Shuttle Status Report, Monday, March 16, 1998. STS-90: Columbia's forward and aft compartment closed-outs were completed last week. Weight and center of gravity testing was completed on Friday and Columbia was placed on the orbiter transport

system Saturday to support rollover to the Vehicle Assembly Building. Technicians began preparing for orbiter rollover activities at about 8 a.m. today and first motion started at 10:50 a.m. Columbia arrived in the VAB at 11:33 a.m. This afternoon, workers will connect the sling and lift the orbiter to a vertical position and mate it to the external tank and solid rocket boosters already stacked in VAB high bay 3. Early tomorrow morning, orbiter/external tank hardmate will be complete and umbilical connections begin Tuesday night. STS-91: Technicians completed leak checks on a section of flex hose recently replaced on Discovery's tunnel adapter, and airlock water and fluid line leak tests are complete as well. Modifications to the external tank separation camera continue. Today, technicians are preparing to replace power control assembly No. 3 on the orbiter docking system because the current unit has an incompatible configuration. Rework of the main engine heat shield attach points will conclude this week and preparation for the payload premate test is under way. In the Vehicle Assembly Building, STS-91 booster stacking operations will resume after Shuttle Columbia is mated to the STS-90 external tank. The right forward assembly is the final booster segment left to be stacked. STS-88: Endeavour's orbiter docking system floodlight is being replaced and removal is complete. Removal of the Spacelab gaseous nitrogen line is also complete. The manipulator positioning mechanism, a device that supports the remote manipulator system, or robot arm, is being installed in the orbiter's midbody. Torque checks of the wing-to-fuselage attach bolts continue and installation of auxiliary power unit No. 3 is slated for today. Leak checks of the main propulsion system's gaseous hydrogen line start today and preparations for orbiter maneuvering system (OMS) pod removal are in work. Hypergolic deservicing and cross-feed line disconnects begin Wednesday and right hand OMS pod removal begins next Monday. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, March 16].]

◆ Lockheed Martin Atlas Rocket successfully lifts off from Cape Canaveral Air Station at 4:32 p.m. Monday. The rocket, carrying a Navy communications satellite, was delayed 10 minutes because of a problem with a ground control computer. The $190 million Navy satellite is the first of three spacecraft that will enable the Pentagon to instantaneously beam spy satellite photos, intelligence reports, missile warning alerts and strike order to soldiers worldwide. The 7,000-pound satellite was dropped off in an orbit with a high point of about 14,000 miles. Thruster firings will be carried out over the next nine days to lift the satellite into an orbit 22,300 miles above Earth. The next two satellites, which are slated to blast off from Cape Canaveral this fall and next spring, will operate above the Atlantic and Indian oceans, respectively. ["Atlas rocket boosts satellite into orbit," **Florida Today**, March 17, 1998, p 2A. "Bound for space," **Florida Today**, March 17, 1998, p 1A.]

MARCH 17: First motion of Columbia's rollover from Orbiter Processing Facility Bay 3 to the Vehicle Assembly Building, began yesterday morning at 10:50 a.m. The orbiter is scheduled to rollout to the Pad 39B on Mar. 23. Columbia, and her seven-person crew is currently scheduled for launch on STS-90, on April 16. The mission is expected to last just under 17 days, with a KSC landing projected on May 3. ["Columbia rolled-over to the VAB," **KSC Countdown**, March 17, 1998.]

◆ Responding to U.S. criticism of Russian construction delays, Russia's space agency chief claimed Tuesday the United States was facing similar difficulties on parts it is building for

the international space station. Agency director Yuri Koptev, trying to turn the tables on the United States, said NASA was trying to "concentrate attention entirely on Russia's difficulties" even though it was "three months behind" in constructing a laboratory module. Earlier this month, NASA's Gretchen McClain, deputy associate administrator for the space station, said the agency was 1 ½ months behind on the module, which is supposed to fly next year. The work was two months behind until recently, so the manufacturer has made up some time. NASA officials also recently acknowledged that initial assembly flights this summer - scheduled to start with a Russian rocket launch in June followed by shuttle Endeavour in July - likely will be delayed again by two months. The agency is expected to make a decision on Endeavour's launch date in May, officials said. ["Top Russian space official criticizes U.S. for delays," **Florida Today**, March 18, 1998, p 7A.]

◆ Despite some last-minute scrambling, Brevard County lawmakers were confident Tuesday that House and Senate leaders would approve a $1.6 million plan for Florida to try to capture the next generation space shuttle. Gov. Lawton Chiles proposed spending that amount earlier this month, and House budget writers included the item in a $44 billion spending plan that faces a floor vote Friday. While the item was not included in a Senate spending plan that was circulating Tuesday, a powerful chairman pledged it would be when the full Senate debates it Friday. Spaceport Florida Authority will use the money to help a task force promote Cape Canaveral as the base for VentureStar, which is expected to dominate the 21st century launch market for commercial satellites. ["Budget plan marks $1.6 million for Florida to woo VentureStar," **Florida Today**, March 18, 1998, p 1A.]

◆ For the second time in four months, heavy equipment has smacked a space shuttle being readied for launch. Late Tuesday, a huge steel sling hit shuttle Columbia after technicians had positioned the orbiter inside the Vehicle Assembly Building at Kennedy Space Center, officials said. There was no serious damage. "Just a scuff on a blanket (providing insulation), that's all," said KSC shuttle operations chief Bob Sieck. A bolt that helps keep the sling attached to the shuttle was sticking, and when workers got it free, the sling swung back and brushed against Columbia, Sieck said. There are no delicate thermal tiles in that part of the shuttle, just thermal blankets. The scuffed blanket still can be used, Sieck said. The accident happened a month after the space alliance laid off 347 workers at KSC, but King said the reductions did not have any effect on what happened. "It does not appear to be an operator error," King said. NASA still will study the accident because "somewhere there's a lesson learned," Sieck said. In December, a cargo bay door on shuttle Endeavour was banged when a weld on a large brace broke and the brace slammed against Endeavour. Shuttle insulation was damaged and replaced. Columbia still will make its April 16 launch on a flight to study the effect of zero gravity on the nervous system, officials said. ["Shuttle gets scraped - but not damaged," **The Orlando Sentinel**, March 19, 1998, p A-9.]

MARCH 18: Space Shuttle Status Report, Wednesday, March 18, 1998. STS-90: The orbiter Columbia is hardmated to the external tank (ET) in VAB high bay 3 and umbilical connections are in work. During removal of the orbiter sling yesterday evening, the aft sling contacted the orbiter near the left aft ET attach point and damaged the thermal protection system (TPS) in that area. Today, technicians will cut away the impacted thermal protection system tiles and inspect the surface area beneath it to ensure that no structural damage to the orbiter exists. Shuttle interface testing resumes this afternoon and managers do not expect the additional work to significantly impact the overall schedule. Columbia remains

scheduled to roll out to Pad 39B on Monday morning. STS-91: Preparations are under way for replacement of power control assembly No. 3 on Discovery's orbiter docking system this weekend. Modifications to the external tank separation camera continue. Rework of the main engine heat shield attach points will conclude this week. The payload premate test is in work today. In the Vehicle Assembly Building, STS-91 booster stacking operations have resumed with mating of the right forward assembly segment. STS-88: Endeavour's main propulsion system leak and functional testing began yesterday and continues through Monday. Installation of auxiliary power unit No. 3 begins tomorrow and concludes Friday. Torque checks of the wing-to-fuselage attach bolts continue. Hypergolic deservicing and cross-feed line disconnects are now slated to begin tomorrow and right hand OMS pod removal is planned for next Thursday. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, March 18].]

◆ Payload Processing Status Report, Wednesday, March 18, 1998. NEUROLAB (STS-90): Simulator training for Neurolab experiment installation at the launch pad. 9th MIR docking Spacehab double module Alphamagnetic Spectrometer (AMS) (STS-91): Transfer AMS from Multipurpose Payload Processing Facility (MPPF) to Space Station Processing Facility (SSPF). International Space Station-Node 1/PMA-1/ PMA-2 (STS-88): Pressurized leak test of Node-1. Bruce Buckingham. (1998). **Kennedy Space Center Payload Processing Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, March 18].]

MARCH 19: The international space station may have to be put on hold and re-evaluated because of more problems with the project's Russian partners, a senior NASA official said Thursday. Joseph Rothenberg, NASA's associate administrator for space flight, told Congress the decision on whether to press ahead would come May 15. That is when NASA will know whether it wants to continue delays from the Russian Space Agency - or admit to Congress the station cannot be completed as planned. Rothenberg's public acknowledgment was the first from a NASA manager that the Russians' participation has become so integral the station can't be built without them - unless Congress is willing to spend much more money and time. His comments came during a Capitol Hill hearing in which some of the project's staunchest supporters said they were shaken by NASA's recent admission of another cost overrun, this one nearly $4 billion. ["Space station project in peril," **Florida Today**, March 20, 1998, p 1A.]

◆ Space Shuttle Status Report, Thursday, March 19, 1998. STS-90: Technicians completed inspections of the orbiter surface beneath a scuffed thermal blanket on Columbia's left aft sidewall. Inspections revealed no structural damage. Workers are completing efforts today to put the original blanket back in place. The incident occurred Tuesday evening when the orbiter's aft sling contacted a thermal blanket following orbiter/external tank mating activities in the VAB. KSC managers expect no schedule delays due to the additional work. No thermal tiles were damaged and KSC managers expect no schedule delays due to the additional work. The Shuttle Interface Test is in work and will conclude tomorrow. Preparations for Columbia's rollout to Pad 39B started this afternoon and the Shuttle is expected to begin first motion at 7 a.m. on Monday. Atop the giant crawler transporter, the Shuttle is slated to arrive at the pad by 1 p.m. Monday and the Rotating Service Structure will be pulled around the Shuttle at about 4 p.m. STS-91:

Preparations continue for replacement of power control assembly (PCA) No. 3 on Discovery's orbiter docking system this weekend. The PCA is incompatible with a new Adrogynis Peripheral Docking System (APDS) that will fly for the first time on STS-91. The new APDS mechanism is intended for use on the International Space Station. Auxiliary power unit installation is complete and leak checks are in work. The payload premate test is scheduled through next week. In the Vehicle Assembly Building, stacking of the right forward assembly segment concluded yesterday completing the STS-91solid rocket booster stack. STS-88: Endeavour's main propulsion system leak and functional testing began yesterday and continues through Monday. Torque checks of the wing-to-fuselage attach bolts continue. Hypergolic deservicing and cross-feed line disconnects are under way and right hand OMS pod removal preparations begin next week. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, March 19].]

MARCH 20: Sen. Patsy Kurth, D-Malabar, passed a last-minute, $1.6 million budget amendment Friday that supporters say will rescue the future of Florida's commercial space industry. Kurth's amendment, adopted during a marathon floor session, brought the Senate version in line with the House. That means it stands a much greater chance of surviving final House and Senate budget negotiations, which begin after next week's vote. ["Senate Oks space money," **Florida Today**, March 21, 1998, p 1B.]

MARCH 21: NASA's Cassini probe is headed for its first big maneuver since leaving Earth. The craft, launched Oct. 15, is hurtling toward Venus for a planetary shove next month in the direction of its eventual target - Saturn. If all goes as planned, Cassini is to ship around Venus on April 26 and use the planet's gravity to gain speed for its 2-billion-mile journey to the Saturn system. The Venus maneuver will be followed in the next few years by three more planetary flybys. The craft is to loop around Venus again in June 1999, Earth in August 1999 and Jupiter in December 2000. Cassini is to reach Saturn in 2004. ["Cassini on course for Venus flyby," **Florida Today**, March 22, 1998, p 1A.]

MARCH 22: After a costly delay in construction, NASA's $1.3 billion Advanced X-ray Astrophysics Facility is finally finished and should be ready for shipment to Kennedy Space Center this summer. That would put the telescope on track for a December launch aboard shuttle Columbia on a mission to give scientists unprecedented views of the unseen X-ray universe - and a better idea of the engines driving the cosmos. Columbia is scheduled to carry the telescope into space Dec. 3. The X-ray telescope is the third of NASA's four "great observatories" that experts are using to rewrite our understanding of the universe. The final instrument in the group - the Space Infrared Telescope Facility - is scheduled for launch in 2001. ["X-ray probe will zoom on cosmos," **Florida Today**, March 23, 1998, p 1A&2A.]

MARCH 23: Space Shuttle Status Report, Monday, March 23, 1998. STS-90: Columbia's Shuttle Interface Test was successfully concluded Friday. At about 7:30 a.m. today the Shuttle began its 4.2 mile trip to launch Pad 39B atop the crawler transporter. It is expected to be hard down on the pad surface at about 1:30 p.m. today. The Rotating Service Structure will be moved to the park position around the Shuttle at about 4:30 p.m. today. STS-91: Over the weekend, workers completed auxiliary power unit connections and orbiter maneuvering system (OMS) cross-feed connections. OMS leak checks are under way.

Replacement of power control assembly (PCA) No. 3 on Discovery's orbiter docking system is complete and functional tests are planned throughout this week. In the Vehicle Assembly Building, solid rocket booster stacking operations are complete and close-outs are in work. Preparations are under way to mate the new super lightweight external tank to the boosters on Thursday. Workers will perform a final weighing of the tank just prior to mating activities. STS-88: Replacement of a liquid hydrogen 4-inch disconnect is complete. Technicians will disconnect Endeavour's OMS cross-feed lines today and begin hypergolic deservicing tonight. Torque checks of the orbiter's left wing-to-fuselage attach bolts continue. The manipulator positioning mechanism that supports the robot arm is being installed in the orbiter's midbody. Right hand OMS pod removal is slated to begin Wednesday and checks of the forward reaction control system thrusters are in work. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, March 23].]

◆ Building the international space station will take two years longer and cost nearly $3 billion more than NASA just said 12 days ago, an independent team of experts will report this week. NASA Administrator Dan Goldin told lawmakers March 12 that the space station price was rising from $17.4 billion to $21.3 billion. But the latest cost estimate is overly optimistic, said Jay Chabrow, head of a seven-member review team that Goldin appointed last fall to provide an outside analysis of station accounting. The price tag likely will be $24 billion, Chabrow said. The station will cost more because it will take longer to build - as much as 38 months - Chabrow, a former executive with aerospace giant TRW, said in a interview Monday. NASA thinks the station will be completed by December 2003. NASA officials have not seen Chabrow's report, which will be submitted to the agency Friday, and would not comment. It will be forwarded to Congress by Monday. ["Billions more for space station?" **The Orlando Sentinel**, March 24, 1998, p A-1&A-5.]

MARCH 24: Space Shuttle Status Report, Tuesday, March 24, 1998. STS-90: Shuttle Columbia arrived at Pad 39B yesterday at about 3:20 p.m. At about 7 p.m., the Rotating Service Structure was extended around the Shuttle. Launch pad validations began yesterday and will continue through this evening. Preparations are in work for the Shuttle main engine Flight Readiness Test tonight and the helium signature leak test on Friday. Workers will perform a routine freon flush of a gaseous nitrogen line on the Mobil Launch Platform today. The orbiter midbody umbilical unit is slated for standard leak checks today and orbiter hydraulic connections are scheduled for tonight. STS-91: Rework on a connector for Discovery's orbiter docking system and the new androgynous peripheral docking system is complete. Potable water servicing is in work today and modifications of the orbiter's external tank (ET) separation camera continue. Cycling tests on the right hand ET umbilical door are under way and power redundancy tests on the orbiter's airlock are in work. Tunnel adapter hatch "D" is being installed in Discovery's midbody today and functional tests on hatch "C" and "D" will precede tunnel adapter installation set for next Tuesday. Preparations are in work for main engine installation late next week. In the Vehicle Assembly Building, preparations continue for orbiter/ET mate on Thursday. STS-88: Technicians completed deservicing Endeavour's oxidizer lines last night and fuel line draining will resume on Thursday. Torque checks of the orbiter's left wing-to-fuselage attach bolts continue. The manipulator positioning mechanism that supports the robot arm is being installed in the orbiter's midbody. Bruce Buckingham. (1998). **Kennedy Space**

Center Space Shuttle Status Report [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, March 24].]

MARCH 25: Looking as regal and svelte as his famous father did 37 years ago, John F. Kennedy Jr. on Wednesday night visited the place where the moon race began. Helping to celebrate the premiere of HBO's celebrated Apollo docudrama series, he mingled with an estimated 900 guests at the Saturn V Center at Kennedy Space Center. Actor/director Tom Hanks and HBO hope the "From the Earth to the Moon" series will do for television audiences what "Titanic" is doing at movie box offices across the nation - revisit an epic milestone with dramatic and personal narrative. Kennedy was making only his second visit to KSC, which is named after his father. His first trip was eight years ago. Real life moon walker Buzz Aldrin paused to discuss his futuristic ideas on space tourism with bystanders, but the reporters and photographers held behind a velvet restraining ropes bolted for Kennedy the moment he arrived. Kennedy gave them his reasons for attending the affair: "(HBO) found the entertainment potential in American history. The space program was really the blending of political will, technological innovation and popular imagination. And I think they have found a way to really dramatize that, and we're happy to participate." As for you JFK's futuristic vision of space: "this space station is the next logical step. I look forward to learning a little bit more about it and understanding what it's about." During his presentation Kennedy said that when his dad first started talking about going to the moon, a Gallup poll found only one third of the public supported the effort. Most non-NASA scientists were against the effort, he said. He expressed awe of the Saturn V rocket, noting it was six stories higher than the Statue of Liberty and burned fuel at the same rate as three million automobiles.

The 12-part docudrama, which Hanks produced, co-directed and co-wrote, was filmed partially on location at Kennedy Space Center last year. Tracing the beginning of the moon campaign from Alan Shepard's 1961 suborbital flight through the final Apollo mission in 1972, "From the Earth to the Moon" will debut on April 5 and air new installment for six successive Sundays. Hanks, a two-time Academy Award Best Actor winner, had other filming obligations and was unable to attend the KSC premiere. Hanks became a space buff during the filming of "Apollo 13," which chronicled the saga of the ill-fated 1970 mission. He and Disney-MGM Studios were instrumental in salvaging the so-called White Room, the launch gantry boarding platform, from NASA's rusting "boneyard" and employing the refurbished version for the production. ["JFK Jr. joins stars at HBO premiere," **Florida Today**, March 26, 1998, p 1A&2A.]

◆ Space Shuttle Status Report, Wednesday, March 25, 1998. STS-90: Launch pad validations continue and Columbia's main engine Flight Readiness Test is complete. Orbiter hydraulic connections began last night and will conclude later today. Preparations for Friday's helium signature leak test are under way. Purging of the gaseous nitrogen (GN2) lines on the mobile launch platform continues and cleaning of a GN2 panel is in work. Minor hydrocarbon buildup from previous launch activities requires cleaning of the GN2 equipment. STS-91: Tests on Discovery's right hand external tank umbilical door and airlock power redundancy tests are complete. Verification of the orbiter docking system (ODS) and androgynous peripheral docking system is complete. Potable water servicing and modifications of the orbiter's external tank (ET) separation camera continue. Tunnel adapter hatch "D" installation continues in Discovery's midbody and the tunnel adapter will

be installed next Tuesday. Payload premate testing begins tomorrow and continues through Saturday. Preparations are in work for main engine installation late next week. In the Vehicle Assembly Building, preparations continue for orbiter/ET mate tomorrow. STS-88: Tonight technicians will begin efforts to drain Endeavour's orbiter reaction control system cross-feed lines and complete hypergolic deservicing. Engineers are evaluating a leaky thruster on the forward reaction control system (FRCS) and may opt to replace the thruster after FRCS removal. Torque checks of the orbiter's left wing-to-fuselage attach bolts continue. The manipulator positioning mechanism that supports the robot arm is being installed in the orbiter's midbody. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, March 25].]

MARCH 26: The launch of NASA's Transition Region and Coronal Explorer (TRACE) spacecraft aboard on Orbital Sciences Pegasus XL vehicle is scheduled for Wednesday, Apr. 1, during a window which extends from 9:38:32 - 9:45:40 p.m., EST. The drop of the Pegasus from the L-1011 aircraft is targeted to occur inside the launch window at 9:40 p.m. at a location over the Pacific Ocean approximately 100 miles from Vandenberg Air Force Base, CA. ["TRACE spacecraft to be launched aboard Pegasus XL Apr. 1," **KSC Countdown**, March 26, 1998.]

◆ Space Shuttle Status Report, Thursday, March 26, 1998. STS-90: Launch pad validations continue and Columbia's hydraulic connections are complete. Main engine ball seal leak checks are in work and preparations are under way for the helium signature leak test set for tomorrow. Purging of the gaseous nitrogen (GN2) lines on the mobile launch platform and cleaning of a GN2 panel continues through next week. Auxiliary power unit interface leak checks are under way and preparations for hypergolic system loading are in work. Prelaunch propellant load is slated for the middle of next week. On Monday, the orbiter's payload bay doors will be opened to give technicians access to two bolts on a getaway special canister. Workers will add a washer to each bolt to ensure proper torque and the doors will be closed again on Tuesday. The minor unplanned work will not impact the launch date. STS-91: Discovery's body flap shaft installation is complete and body flap rub panel modification is in work. External tank (ET) separation camera modifications continue and the super lightweight tank instrumentation work is underway. Auxiliary power unit lubrication servicing is in progress. Preparations continue for tunnel adapter installation Tuesday. Payload premate testing begins tomorrow and continues through Saturday. Preparations are also in work for main engine installation late next week. In the Vehicle Assembly Building, preparations continue for orbiter/ET mate. STS-88: Leak checks of the replaced liquid hydrogen four-inch disconnect are complete and good. Change-out of a leaky liquid oxygen prevalve on Endeavour's main propulsion system is complete and checks are in work. Draining of the right hand orbiter maneuvering system fuel cross-feed lines has been rescheduled to next week. Next week, technicians will also remove the forward reaction control system (FRCS) to replace a leaky thruster. Torque checks of the orbiter's left wing-to-fuselage attach bolts continue. Installation of the manipulator positioning mechanism that supports the robot arm continues. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, March 26].]

◆ If NASA sold tickets on the space shuttle and squeezed 50 passengers aboard, it would have to charge $10 million per ticket just to break even, a study shows. The study, done jointly by NASA and private industry, concludes the space-vacation business is feasible, potentially lucrative, and not that far in the future. But it said the price would have to come down to about $100,000 to make civilian travel feasible. "It's got to get 100 times more reliable and 100 times more regular," said Jack Mansfield, a former NASA associate administrator. "There are technical, operational, regulatory and other problems, but the study concluded that these problems are no longer intractable," said Thomas Rogers, president of the Space Transportation Association. "We can begin to open up space to the general public." The report said the space-ride business should be done by private enterprises separate from NASA, but the government would be needed to help such enterprises get off the ground. Rogers said he envisioned private rocketeers providing suborbital flights on demand in less than 10 years. ["Civilian space travel feasible, but costly," **Florida Today**, March 27, 1998, p 1D.]

MARCH 27: Kennedy Space Center's first full-fledged astronaut is coming back to her former home port next week to take part in a dress rehearsal for a planned April 16 launch aboard shuttle Columbia. Former shuttle engineer Kay Hire, who was selected as an astronaut in December 1994, will fly in to the space center's air field Sunday with the rest of the crew for Columbia's flight, a 17-day medical research mission. Led by veteran astronaut Richard Searfoss, the seven-member crew will go through emergency training at launch pad 39B on Monday. The next day, the astronauts will suit up and board Columbia for the last three hours of a two-day practice countdown. "We're excited that Kay is coming home, and we're looking forward to providing her the first class support that we give all the astronauts," KSC spokesman Joel Wells said Friday. "But she is very special to us." Hire, 38, worked as a shuttle engineer at KSC from May 1989 until March 1995, when she moved to Houston to begin astronaut training at Johnson Space Center. She will serve as a mission specialist on Columbia's flight, which will be the 90th for NASA's shuttle program. Preparations for Columbia's launch remain on schedule for a planned launch at 2:19 p.m. April 16. Senior NASA managers, meanwhile, will hold a formal flight readiness review at KSC on Thursday. ["KSC's first astronaut, six others arrive Sunday for launch rehearsal," **Florida Today**, March 28, 1998, p 2A.]

◆ Payload Processing Status Report, Friday, March 27, 1998. NEUROLAB (STS-90): Mid-deck experiment hardware interface verification testing. Preparations for Neurolab and mid-deck experiment stowage. 9th MIR docking Spacehab module Alphamagnetic Spectrometer (AMS) (STS-91): AMS stand-alone testing. International Space Station-Node 1/PMA-1/PMA-2 (STS-88): PMA-2 electrical harness installation. Digital analysis and documentation of Node-1 port interfaces. Resumption of common berthing mechanism testing. Bruce Buckingham. (1998). **Kennedy Space Center Space Payload Processing Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, March 27].]

◆ Space Shuttle Status Report, Friday, March 27, 1998. STS-90: Launch pad validations are essentially complete less orbiter midbody umbilical mating activities, currently slated for the first week in April. Main engine ball seal leak checks were completed yesterday and helium signature leak testing occurs today. Purging of the gaseous nitrogen (GN2) lines on the mobile launch platform and cleaning of a GN2 panel continues through this weekend.

Preparations for next week's prelaunch propellant load are in work. NASA managers may opt to open Columbia's payload bay doors on Monday to give technicians access to two bolts on a getaway special canister. If the work is needed, technicians will add a washer to each bolt to ensure that the bolts are properly secured. The doors will be closed again on Tuesday. The minor unplanned work will not impact the launch date. STS-91: Discovery's body flap shaft installation and auxiliary power unit lubrication servicing are complete. Thermal protection system work near the nose landing gear is complete and will pickup on the body flap rub panel Monday. Body flap rub panel modifications continue through next week. Auxiliary power unit electrical checkouts are in work today. Orbiter docking system electrical and mechanical system checks are slated for Saturday and payload premate testing begins Monday. Preparations are also in work for main engine installation late next week. STS-88: Draining of the right hand orbiter maneuvering system fuel cross-feed lines has been rescheduled to next week. Next week, technicians will also remove the forward reaction control system (FRCS) to replace a leaky thruster. Torque checks of the orbiter's left wing-to-fuselage attach bolts continue. Installation of the manipulator positioning mechanism that supports the robot arm continues. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, March 27].]

MARCH 29: The most difficult project ever planned in space passes through here first. Inside a building that could hold 180 average-size homes, workers at Kennedy Space Center are hustling around the first U.S. piece of the international space station. Dressed in white coveralls and plastic gloves, they are meticulously checking every inch of the 22-foot component, which will be used as a docking port for space shuttles and a hallway leading to other station rooms. It is the first of 22 large station pieces that are to be prepared at KSC for flight in an effort so complex that it rivals the epic work done at the spaceport to send men to the moon. "We've never done anything quite like this before," said Steve Francois, one of KSC's top space station officials. The work is going on day in and day out, despite new and serious funding and political problems in Washington, D.C., facing the embattled, 14-year-old project. Despite the avalanche of bad news, KSC technicians are quietly combining the patience and skill of a surgeon with the brawn of massive machinery to prepare millions of pounds of station hardware for flight. The men and women say their work is a critical link in a complex chain that starts at the drawing board and ends when the station's lights finally are turned on in orbit.

At KSC, it could take workers as little as six weeks or as long as a year to get individual parts ready for launch. Each piece must be problem-free because officials don't know what to expect when it all gets into space. "In orbit, there's not a question in anyone's mind that we're going to find a lot of peculiar things," said John Talone, director of the Space Station Integration Office at KSC. KSC workers have one thing in their favor: years of experience gingerly shuffling equipment and experiments into rockets and shuttles and lofting them above the Earth. NASA first orbiting space station, called Skylab, was prepared and launched from KSC in the 1970s aboard Saturn rockets. This decade, KSC experts also have prepared such delicate payloads at the Hubble Space Telescope, the Galileo probe to Jupiter and the Cassini spacecraft to Saturn. "The strong point of Kennedy is its ability to take complex payload elements and integrate them into a single shuttle flight or a combination of flights, like we have coming up with space station," Kinslow said. "I feel like we have the best experts working on this." Their skill will be tested this summer, when

plans call for different station pieces to be assembled to see how they work together. "Obviously, there's a lot of stuff you can't do when you're building a station one piece at a time in orbit," Talone said. "But we believe the testing and verification we've evolved to is complete. Everything that can be done here is being done in spades." ["KSC skills pull station together," **Florida Today**, March 30, 1998, p 1A&2A.]

MARCH 30: Space Shuttle Status Report, Monday, March 30, 1998. STS-90: Engineers completed efforts to load test configuration software to support Columbia's upcoming prelaunch tests. Helium signature leak testing concluded last week. Over the weekend, workers continued efforts to flush the gaseous nitrogen system lines and expect to complete their efforts today. Loading of prelaunch propellants into Columbia's on-board storage tanks begins Wednesday. The STS-90 flight crew arrived at KSC yesterday and are involved with mission familiarization activities today. On Tuesday they will participate in the Terminal Coundown Demonstration Test with a full dress, simulated main engine shutoff at 11 a.m. tomorrow. Having reviewed available payload data, NASA managers are confident that the two bolts on a getaway special canister (GASCAN) in Columbia's payload bay are properly secured and ready for flight. Opening the orbiter's payload bay doors to access the GASCAN will not be necessary. STS-91: Installation of pyrotechnic devices that support Discovery's remote manipulator system, landing gear, Ku Band antenna and Firex system is Complete. Body flap rub panel modifications continue. through next week. Auxiliary power unit lubrication servicing and orbiter docking system electrical and mechanical system checks are in work. Payload premate testing is slated for today and main engine installation begins later this week. In the Vehicle Assembly Building, ET/SRB mate was postponed last Thursday while workers conducted inspections of the STS-91 solid rocket booster stack. An extensive search for a magnet location marker missing from the right forward center segment is under way. The magnet is used by VAB workers as a visual reference during segment mating operations only and removed after stacking is complete. Managers have viewed video that shows the black, 3/4" wide x 2" long magnet properly affixed before the right forward center segment was mated to the right aft center segment. However, no video is available of that portion of the booster after mating activities were complete. NASA managers are evaluating the unlikely possibility that during stacking operations the small magnet fell into the center joint that connects the forward segment with the aft segment. Extensive inspections conducted during mating activities give no indication that the magnet fell into the center segment. Pending successful completion of this evaluation, ET/SRB mate is scheduled to resume Wednesday and managers would then expect no impact to the STS-91 launch date. STS-88: Torque checks of Endeavour's left wing-to-fuselage attach bolts are complete. Draining of the right hand orbiter maneuvering system fuel cross-feed lines begins today in preparation for right hand orbiter maneuvering system pod removal next week. Technicians will complete forward reaction control system (FRCS) removal on Wednesday and then begin work to replace a leaky thruster. With installation of the manipulator positioning mechanism complete this week, technicians will install the robot arm next Thursday. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, March 30].]

◆ A missing magnet that may have been sealed inside one of shuttle Discovery's boosters could delay the ship's May launch, NASA officials said Monday. The tiny magnet, which is used to mark locations on the outside of the booster during assembly, was discovered

missing last week. It had not been recovered by late Monday, prompting concerns that the magnetic strip may have been sealed inside the 14-story booster while it was being assembled. If the magnet is not found, NASA officials will have to decide if they need to take the booster apart and examine it for the missing object, said Joel Wells, a spokesman at Kennedy Space Center. However, they also could decide that the tiny magnet poses no danger to the booster's performance - even if it is inside - and continue with preparations for Discovery's May 28 launch. Wells said NASA wants to make a decision by Wednesday. If the agency decides to take the booster apart, the extra work would delay Discovery's flight by about a week, he said. The spaceship currently is set to make NASA's final flight to the Russian space station Mir, where NASA astronaut Andy Thomas is serving a four-month tour of duty. The magnet, which is three-fourths of an inch wide and 2 inches long, is among 36 small magnets used to mark the outside of a booster segment while technicians are stacking it with adjoining sections. Technicians use the magnets as visual markers to align the segments correctly. Just because it is missing, NASA officials say, does not mean that the magnet is inside its booster. Some observers worry that the job cuts with United Space Alliance could cause the remaining NASA workers to be overburdened, prompting mistakes. "There is no reason to believe that this is any way related to workmanship, the cutbacks or morale," Wells said. ["Shuttle faces delayed launch," **Florida Today**, March 31, 1998, p 4A.]

◆ It's the one place Kay Hire has never been in at Kennedy Space Center - strapped inside a shuttle ready for launch. Hire will become the first KSC engineer to attempt the leap from Earth to space during a 16- to 17-day mission of shuttle Columbia in April. In town to practice for the April 16 launch, KSC's first astronaut said Monday that the upcoming flight gives her a new perspective on the spaceport where she worked for six years. "It's a much different feeling seeing that vehicle sit there on the pad because that's the one I'm going to fly this time," said Hire, an engineer and commander in the Navy Reserve. "It's a great feeling of anticipation and excitement." On her debut spaceflight, Hire and her crewmates are to run a science-packed mission devoted to the study of the nervous system. As the crew's flight engineer, Hire's main job will be helping oversee the spaceship's systems while four of her flying partners carry out experiments designed to uncover the intricacies of the brain and nervous system. "She's carrying the hopes and aspirations of a lot of great workers down here at the Cape into space with her," said Columbia's Commander Richard Searfoss. "My experience here at the Kennedy Space Center has given me even greater confidence as a crew member because I know the hard work that goes in here," Hire said. "The folks that work here really, truly put their lives into this job. They truly understand the importance of it." Hire will be making her first spaceflight with a crew that includes pilot Scott Altman and astronauts Rick Linnehan, Dave Williams, Jay Buckey Jr. and Jim Pawelczyk. ["Astronaut prepares for debut," **Florida Today**, March 31, 1998, p 1A & 2A.]

MARCH 31: Space Shuttle Status Report, Tuesday, March 31, 1998. STS-90: Launch preparations for STS-90 continue on schedule. Flushing of the gaseous nitrogen system lines on the mobile launch platform at Pad 39B concludes today. Loading of prelaunch propellants into Columbia's on-board storage tanks begins tomorrow. Early next week, orbiter aft compartment close-outs and ordnance installation will begin. The STS-90 flight crew will conclude their mission familiarization activities at KSC today following a dress rehearsal of a simulated main engine cut-off at the launch pad. They are slated to return to

their homes in Houston, TX later this afternoon. STS-91: Auxiliary power unit lubrication servicing and orbiter docking system passive docking checks are complete. Payload premate testing is in work through tomorrow and preparations for main engine installation on Thursday are in work. Tunnel adapter installation is in work today. External tank and solid rocket booster mating activities will resume tomorrow with no impact expected to Discovery's target launch date. Yesterday, NASA managers discussed the issue of a location marker magnet that was reported missing from the right forward center segment of the STS-91 booster stack last week. Based on thorough inspections and monitoring during stacking operations, KSC officials are confident that the 3/4" wide x 2" long magnet did not fall into the center joint that connects the booster's forward and aft segments. STS-88: Torque checks of Endeavour's right wing-to-fuselage attach bolts are in work. Draining of the right hand orbiter maneuvering system fuel cross-feed lines is in work. Technicians will complete forward reaction control system (FRCS) removal on Wednesday and then begin work to replace a leaky thruster in the Hypergol Maintenance Facility. With installation of the manipulator positioning mechanism complete this week, technicians will install the robot arm next Thursday. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, March 31].]

◆ NASA decided Tuesday that shuttle Discovery's boosters are safe for the ship's May launch to the Russian station Mir, ending a search for a missing magnet feared to be inside one of the twin rockets. The small magnet still is lost, but officials said it was highly unlikely it accidentally was sealed inside a booster during assembly. Used as a marker on the outside of the booster, the magnet more likely was knocked off by accident and lost in the Kennedy Space Center's Vehicle Assembly Building, officials said. "There have been times when we've caught human hairs and brush bristles," KSC spokesman Joel Wells said. "The thought of them missing a 2-inch magnet is almost impossible." By picking up booster work, NASA will be on track for Discovery's planned May 28 launch to the Russian space station Mir to pick up American astronaut Andy Thomas. Officials said even if the magnet - three quarters of an inch wide and 2 inches long - were inside the booster, it would not affect the safety of the flight. Engineers at Marshall Spaceflight Center in Huntsville, Ala., conducted an exhaustive analysis of that possibility using computer simulations, and they found no safety threat, said June Malone, a Marshall spokeswoman. Members of a NASA watchdog group expressed confidence Tuesday in NASA's decision. They also doubted the mishap was linked to recent job cuts at KSC that have left fewer workers to prepare the shuttles for launch. ["Missing magnet won't delay flight," **Florida Today**, April 1, 1998, p 1A.]

DURING MARCH: Bruce H. S. Anderson has become the chief counsel of Kennedy Space Center. Anderson most recently served as chief counsel for the U.S. Army Corps of Engineers TransAtlantic Programs Center in Winchester, VA, providing legal oversight and support for the Corps' construction, operations, and maintenance projects in Europe, the former Soviet Union, the Middle East, and Africa. Anderson has a bachelor of science degree in civil engineering from the University of Alabama. He earned his law degree from the same institution in 1975. Between engineering and law school, he was employed as a structural design engineer with Newport News Shipbuilding and Drydock Co., Newport News, VA. ["New chief counsel named at Kennedy Space Center," **The Brevard Technical Journal**, March 98, p 7.]

◆ NASA's Kennedy Space Center (KSC) is slated to receive more than $270 million in new funding next year, U.S. Representative Dave Weldon (R-Palm Bay) has announced. NASA's fiscal year 1999 budget request, as well as the President's total federal budget proposal, was submitted to Capitol Hill. KSC funding would rise from $583 million this year to nearly $855 million text year under the NASA plan and is one of only three NASA field centers to receive a funding increase. Spending on the Space Shuttle program would increase to $3.06 billion, up $136 million from $2.92 billion this year. NASA's overall budget request of $13.5 billion is only slightly lower than this year's $13.6 billion allocation and is a significant improvement over earlier White House plans to cut NASA's funding by up to a billion dollars. That proposal was reversed when Weldon, working with Representatives Dennis Kucinich (D-OH) and Nick Lampson (D-TX), led a bipartisan effort to demonstrate support for NASA on Capitol Hill. Their effort to stabilize NASA's funding garnered the support of more than 200 of their House colleagues, including House Speaker Newt Gingrich, and is widely credited with holding off the Administration's original plans for deep cuts. ["KSC, Shuttle to receive budget increases," **The Brevard Technical Journal**, March 98, p 28.]

APRIL

APRIL 1: Space Shuttle Status Report, Wednesday, April 1, 1998. STS-90: The STS-90 launch countdown will begin at 2 a.m. on 4/13/98. Yesterday, the Terminal Countdown Demonstration Test was completed successfully. Loading of prelaunch propellants into Columbia's on-board storage tanks begins today and continues through Friday. Drying of the gaseous nitrogen (GN2) lines on the mobile launch platform is in progress as GN2 system cleaning efforts conclude. Technicians will resume external tank ordnance canister modifications in Columbia's aft compartment after hypergolic loading is complete. Early next week, orbiter aft compartment close-outs and ordnance installation will begin. STS-91: Functional tests of Discovery's external tank umbilical doors and ammonia system servicing are complete. Technicians have also completed installation of the payload bay camera. Heat shield and body flap work continues in the orbiter's aft compartment as preparations for main engine installation are in work. Payload premate testing will conclude today and preparations for tunnel adapter installation continue. In the Vehicle Assembly Building high bay 1, external tank and solid rocket booster mating activities resume today following super lightweight tank weighing operations. STS-88: Draining of Endeavour's right-hand orbiter maneuvering system fuel cross-feed lines is complete and removal of any residual fuel is in work. Torque checks of the right wing-to-fuselage attach bolts continue. Removal of the orbiter's forward reaction control system (FRCS) is in work and the FRCS will be delivered to the Hypergol Maintenance Facility tomorrow to undergo thruster replacement. Main propulsion system gaseous hydrogen leak checks are slated to occur this week. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, April 01].]

◆ Journalists will no longer be allowed to listen in on conversations between Russian Mission Control and cosmonauts on the Mir space station, officials said Thursday. The shift in policy came after a seven-hour spacewalk Wednesday failed to accomplish repairs to the outside of Mir. When asked why the sound system was turned off, officials said it reflected a recent decision to prevent reporters from listening in. Pressed further, Deputy Mission Control chief Viktor Blagov cited problems with "unconscientious" journalists who allegedly exaggerated some of Mir's past problems. ["Media can't eavesdrop on Mir," **Florida Today**, April 3, 1998, p 9A.]

APRIL 2: Space Shuttle Program managers today affirmed April 16 as the launch date for NASA's second Shuttle mission of 1998 - a two week plus life sciences research flight that will focus on the most complex and least understood part of the human body, the nervous system. The Flight Readiness Review held at the Kennedy Space Center earlier today is the final major review by all of the Shuttle project offices to evaluate the readiness of the flight crew, vehicle, along with launch and mission control flight teams to support the launch of Space Shuttle Columbia on the STS-90 Neurolab mission. Columbia is scheduled for launch on April 16, 1998 from Launch Complex 39B. The 2 ½ hour available launch window opens at 2:19 p.m. Eastern. The STS-90 mission is scheduled to last 15 days, 21 hours, 50 minutes. However, mission managers are reserving an option of extending the flight one additional day for science operations if Shuttle electrical power margins permit. A launch on April 16 and a 16 or 17 day nominal mission being flown would have Columbia landing back at Kennedy Space Center on May 2 or May 3. The STS-90 Mission Commander is Richard A. Searfoss. Pilot for the flight is Scott D. Altman. There are three

mission specialists assigned to this mission - Richard M. Linnehan, who is also serving as the Payload Commander, Kathryn P. (Kay) Hire and Dafydd (Dave) Rhys Williams from the Canadian Space Agency. Two payload specialists - Jay Clark Buckey, Jr. and James A. (Jim) Pawelczyk - round out the seven member STS-90 crew. STS-90 will be the 25th flight of Columbia and the 90th mission flown since the start of the Space Shuttle program in April 1981. ["Neurolab Shuttle Mission to launch April 16," **NASA News Release #45-98**, April 2, 1998.]

◆ Space Shuttle Status Report, Thursday, April 2, 1998. STS-90: At Pad 39B, launch preparations continue on schedule. Prelaunch oxidizer loading is complete and loading of fuel into Columbia's on-board storage tanks is in work. Cleaning of the gaseous nitrogen lines on the mobile launch platform continues through tomorrow. Today, workers will run cycling tests on the circuit breaker controller that supports Columbia's main engine No. 2. Technicians will resume external tank ordnance canister modifications in Columbia's aft compartment after hypergolic loading is complete. Early next week, orbiter aft compartment close-outs and ordnance installation will begin. The STS-90 Flight Readiness Review is under way and NASA managers are expected to announce April 16 as Columbia's official launch date at the conclusion of the meeting. STS-91: Workers are removing access platforms used for Discovery's body flap work to make way for Shuttle main engine installation efforts. Engine installation is slated to begin late tonight and body flap rub panel work will resume next week. Payload premate testing has resumed today following successful troubleshooting of a failed signal during yesterday's testing. Tunnel adapter installation is slated to begin early next week. In Vehicle Assembly Building high bay 1, mating of the first super lightweight external tank and STS-91 solid rocket boosters is complete. STS-88: Removal of Endeavour's forward reaction control system (FRCS) was completed yesterday, and the FRCS will be moved to the Hypergol Maintenance Facility today for about one month of work to replace a leaky thruster. Removal of residual fuel from the orbiter's right-hand OMS cross-feed lines continues in preparation for next week's removal of the right-hand OMS pod. Torque checks of the right wing-to-fuselage attach bolts continue. Main propulsion system gaseous hydrogen leak checks are slated for this week. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, April 2].]

APRIL 3: Payload Processing Status Report, Friday, April 3, 1998. NEUROLAB (STS-90): Preparations in pad payload changeout room for Neurolab initial experiment stowage. 9th Mir docking Spacehab module Alphamagnetic Spectrometer (AMS) (STS-91): AMS stand-alone testing. International Space Station-Node 1/PMA-1 /PMA-2 (STS-88): Rotation of node to zenith down. Resumption of testing for node common berthing mechanism. Preparation of PMA-3 for oxygen and nitrogen line installation. KSC arrival activities for ISS-3/4A Long Spacer (STS-97). Bruce Buckingham. (1998). **Kennedy Space Center Space Payload Processing Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, April 3].]

◆ Expendable Launch Vehicle Payload Processing Status, Friday, April 3, 1998. ELV spacecraft arrival status at KSC: Deep Space 1: May 9. Mars Orbiter: Sept. 4. Mars Lander: October 15. Stardust: Nov. 12. Space Shuttle: AXAF (STS-93): August 14. Bruce Buckingham. (1998). **Kennedy Space Center Space Payload Processing Status Report**

[Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, April 3].]

◆ Space Shuttle Status Report, Friday, April 3, 1998. STS-90: At Pad 39B, prelaunch propellant load is complete. Columbia is currently powered down to allow workers to replace an electrical circuit breaker that supports main engine No. 2. The breaker failed during tests yesterday. Ordnance canister modifications in Columbia's aft compartment have resumed following successful hypergol loading efforts. Early next week, orbiter aft compartment close-outs and ordnance installation activities begin. The STS-90 Flight Readiness Review concluded yesterday afternoon and NASA managers affirmed April 16 as Columbia's official launch date. STS-91: Installation of Discovery's main engines began last night with engine No. 1. Main engines No. 2 and No. 3 will be installed today. Body flap rub panel work will resume next week. In the orbiter's midbody, functional testing of the orbiter docking system's upper hatch is complete and payload premate testing continues. The assembly power controller units that support the AMS payload arrived in the OPF this week and are being installed today. Preparations continue for tunnel adapter installation early next week. STS-88: Removal of residual propellants from Endeavour's right-hand orbiter maneuvering system cross-feed lines is complete and removal of the right-hand OMS pod is slated for next week. Torque checks of the right wing-to-fuselage attach bolts continue. Main propulsion system gaseous helium leak checks are slated for next week. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, April 3].]

APRIL 4: Millions of Africans could be threatened by debris from failed Cape Canaveral rocket launches unless the Air Force quickly fixes problems in systems that allow officials to destroy wayward vehicles during flight, Air Force documents show. If the problems are not solved, some in the Air Force say part of a network that tracks the rockets might have to be temporarily shut down Sept. 30 - a move that could ground 70 percent of all missions flown from Cape Canaveral Air Station and Kennedy Space Center. The Air Force Eastern Range, which extends more than 10,000 miles from Cape Canaveral to the South Atlantic Ocean and into the Indian Ocean, is a network of stations that relies heavily on 1950s technology to monitor rocket flights. Most of the stations have antiquated systems that allow safety officers to beam coded radio signals to stray rockets so they can be deliberately blown up over the sea before threatening populated areas. The Air Force is spending $2 billion to modernize the network, but the work is three years behind schedule and will not be completed until 2006. Air Force officials say the most immediate problems will be solved in a $4.6 million program scheduled to be completed by September. "We would not in any way ever jeopardize the public at the expense of getting a satellite on orbit," said Col. Ronald Larivee, vice commander of the Air Force's 45th Space Wing, which operates the Eastern Range. Air Force officials note that 3,500 launches have been conducted on the Eastern Range since 1950 without an injury or death in the general public. Documents reveal how the problems could come to head this fall. That is when NASA plans to shut down a tracking station in Bermuda. The shuttle missions to build NASA's planned international space station would not be impacted. Flight paths will take those orbiters farther north and within range of tracking stations that have less severe equipment problems. ["Rocket range woes may pose threat," **Florida Today**, April 5, 1998, p 1A & 2A.]

APRIL 6: Space Shuttle Status Report, Monday, April 6, 1998. STS-90: Over the weekend, workers completed efforts to replace a failed electrical circuit breaker that supports Columbia's main engine No. 2. Late last Friday, managers decided to replace an integrated electronic assembly (IEA) in the aft of the left-hand solid rocket booster. The replaced IEA had transistors from the same manufacturing lot as those that had recently failed tests at KSC's SRB Assembly and Refurbishment Facility. The IEA replacement work was completed over the weekend and retests are slated for today. Technicians will complete efforts to reassemble the gaseous nitrogen panel on the mobile launch platform today and panel hydrocarbon sampling is in work. Orbiter aft compartment close-outs are in work and will conclude Saturday. STS-91: Installation of Discovery's main engines is complete and main propulsion system assembly leak checks are in work. The assembly power controller units that support the AMS payload have been installed in the orbiter's midbody, and SPACEHAB fluid line installation is complete. Payload premate testing will conclude early this week. The tunnel adapter installation begins today and the SPACEHAB tunnel will be installed Saturday. Body flap rub panel work resumes this week. STS-88: Preparations for the removal of Endeavour's right-hand OMS pod are in work today and removal is slated for Wednesday. Main propulsion system helium leak and functional tests begin Thursday, and liquid oxygen testing begins next week. Torque checks of the right wing-to-fuselage attach bolts continue. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, April 6].]

APRIL 7: A looming delay in construction of NASA's international space station may prompt the agency to fly a shuttle medical research mission twice within the next three months, officials said Tuesday. "We'd be very delighted at the prospect," said mission Commander Richard Searfoss. "If we had a vote in the matter, which we don't, we would certainly vote to go do it again in a few months." The first flight of the Neurolab mission will be carried out aboard shuttle Columbia next week. The shuttle is to launch April 16 from Kennedy Space Center. A joint effort of researchers in the United States, Canada, France and Germany, the 16-day mission will allow the crew to perform detailed studies of the human brain and nervous system. Seven astronauts will carry out 11 investigations in areas such as cardiovascular and blood pressure regulation, motor skills, insomnia and the adaptation of the balance system in weightlessness. But an anticipated delay in the construction of the $40 billion international station is prompting NASA managers to consider flying the mission a second time this summer. The first station construction flight - launch of a Russian-built space tug from Baikonur Cosmodrome in Kazakhstan - is scheduled for June 30. The first U.S. station construction mission is to be carried out after the planned July 9 launch of shuttle Endeavour. The launch dates for both those missions, however, are expected to be pushed back until Aug. 25 and Sept. 3, respectively, because of delays with Russian and American station equipment. That slip would open a slot this summer for a reflight of the Columbia Neurolab mission, NASA officials say. A decision on the station schedule and the possibility of a second Neurolab mission is expected by mid-May. ["Neurolab mission may fly twice," **Florida Today**, April 8, 1998, p 1A.]

◆ Space Shuttle Status Report, Tuesday, April 7, 1998. STS-90: Retests of the replaced integrated electronic assembly in the aft of the left-hand booster are complete and good. In Columbia's aft compartment, the external tank attach point ordnance canister modifications

are complete. Orbiter midbody umbilical unit mate and leak checks are also complete. Efforts to clean and reassemble the gaseous nitrogen system on the mobile launch platform are complete. Orbiter aft compartment closeouts continue through Saturday. Preparations to pickup the launch countdown on Monday are under way. Payload early stow activities are in work. STS-91: Electrical connections of the assembly power controller units that support the AMS payload are complete and interface verification testing is in work. Orbiter docking system voltage checks and lighting functional tests are complete. Discovery's main engine and main propulsion system integrated testing is in work. Payload premate testing concludes this week. Preparations for tunnel adapter installation are in work and the SPACEHAB tunnel will be installed Saturday. Body flap closeouts are under way. STS-88: Preparations for the removal of Endeavour's right-hand OMS pod continue and removal begins tomorrow. Transfer of the OMS pod to the Hypergol Maintenance Facility is slated for Friday. Main propulsion system leak checks continue with hydrogen system tests in work. Helium system testing begins Thursday and liquid oxygen system testing will follow next week. Torque checks of the right wing-to-fuselage attach bolts continue. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, April 7].]

APRIL 8: Space Shuttle Status Report, Wednesday, April 8, 1998. STS-90: Columbia's prelaunch preparations continue on schedule with the launch countdown slated to begin early Monday morning. Orbiter aft compartment closeouts are proceeding very well and will conclude Saturday. Payload early stow activities are nearing completion today in the orbiter's cargo bay. Ordnance installation begins later today following final inspections of the right forward booster integrated electronic assembly. STS-91: Interface verification testing of the assembly power controller units that support the AMS payload is complete. Discovery's main engine and main propulsion system integrated testing continues and inspection of the ground support equipment used during leak checks is in work. Payload premate testing concludes this week. Preparations for tunnel adapter installation are in work and the SPACEHAB tunnel will be installed Saturday. Body flap closeouts continue. Preparations for Friday's Crew Equipment Interface Test are under way. STS-88: Preparations for the removal of Endeavour's right-hand OMS pod are complete and pod removal efforts begin later today. Main propulsion system leak checks continue with helium system tests in work. Liquid oxygen system testing will follow next week. Torque checks of the right wing-to-fuselage attach bolts continue. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, April 8].]

APRIL 9: Space Shuttle Status Report, Thursday, April 9, 1998. STS-90: At Pad 39B, ordnance installation was completed last night and pyrotechnic initiator controller testing is in work. Payload early stow efforts are also complete. Columbia's prelaunch preparations continue on schedule with the launch countdown slated to begin early Monday morning. Orbiter aft compartment closeouts continue through Saturday. STS-91: Discovery's main landing gear wheel and tire assembly installation is complete. Nose wheel steering and break system hydraulic tests are also complete. Payload cooling kit line leak checks concluded yesterday. Orbiter midbody and aft compartment closeouts are in work and tunnel adapter installation begins later today. SPACEHAB tunnel installation is slated for early next week. Following inspection of the ground support equipment used during Space Shuttle main engine (SSME) leak checks, SSME/main propulsion system integrated testing will resume.

Preparations for Friday's Crew Equipment Interface Test continue. STS-88: Removal of Endeavour's right-hand orbiter maneuvering system pod is complete and inspection of the helium isolation valve is in work. Main propulsion system leak checks continue in the orbiter's aft compartment. In the orbiter's midbody, alignment of the androgynous peripheral docking system base is complete and replacement of an orbiter docking system floodlight is scheduled for this week. Torque checks of the right wing-to-fuselage attach bolts continue. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, April 9].]

APRIL 10: The traditional high season for the tourism industry has left area hotelers and others in the industry feeling a little low this year. A warmer-than-normal winter up North, combined with Florida's heavy rainfall, persuaded many would-be tourists to pass on Sunshine State vacations this winter. Many days during the season there was as little as a 10-degree difference in temperatures between here and up there. Attendance at Kennedy Space Center Visitor Complex, as might be expected, also was off during the season. "We didn't see growth in the first quarter. Attendance was pretty flat," spokeswoman Melissa Tomasso said. "We are seeing attendance pick up as we are heading toward Easter," Tomasso said. ["Officials lament tourism lag," **Florida Today**, April 11, 1998, p 1A & 2A.]

◆ Space Shuttle Status Report, Friday, April 10, 1998. STS-90: At Pad 39B, preparations for launch are on schedule. Hypergolic system pressurization is complete and launch countdown preparations are in work. The 43-hour countdown is slated to begin at 2 a.m. on Monday. Vertical stowage of the flight crew's systems is in work and orbiter aft compartment closeouts continue through Saturday. The STS-90 flight crew arrives at KSC Monday afternoon. STS-91: Discovery's midbody and aft compartment closeouts continue. The Crew Equipment Interface Test began today and tunnel adapter installation begins tonight. SPACEHAB tunnel installation is slated for early next week. Shuttle main engine and main propulsion system integrated testing resumes Monday. Main Engine heat shield installation is in work. STS-88: Inspection of Endeavour's right-hand orbiter maneuvering system pod isolation valves is complete and good. Technicians will reset two recessed pins found on the OMS pod and reinstall the pod next week. Main propulsion system leak checks continue in the orbiter's aft compartment. Torque checks of the right wing-to-fuselage attach bolts continue. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, April 10].]

APRIL 11: A plan for the future of Patrick Air Force Base, written by its commander, could leave the installation vulnerable to closure as Pentagon officials push to shut down more bases, experts say. The 45th Space Wing, which calls Patrick home, is moving ahead with the plan, written in September by Brig. Gen. Randall Starbuck, that made several unprecedented recommendations for reducing the size of the base, officials say. They include reducing the Air Force's role in launching military rockets from Cape Canaveral Air Station and turning over the job to private contractors, converting Patrick into an Air Force Reserve base and cutting the Space Wing's manpower and moving it to the air station. The changes - scheduled to be in place by 2002 - are under review by the U.S. Air Force Space Command, which is incorporating them into its plan for the future, said Capt. Lewonnie

Belcher, a Space Command spokeswoman in Colorado Springs, Colo. ["Patrick cuts could make base target for closure," **Florida Today**, April 12, 1998, p 1A & 7A.]

APRIL 12: NASA's most detailed orbital study of the human brain and nervous system is ready to get under way this week as seven astronauts take off on the second space shuttle flight of the year. Shuttle Columbia and its crew, which includes former Kennedy Space Center engineer Kay Hire, are to blast off between 2:19 and 4:49 p.m. Thursday (April 16). A three-day launch countdown will start early Monday. Later in the day, the astronauts are to arrive at KSC from their home base at Johnson Space Center in Houston. NASA officials say the 17-day mission, called Neurolab, will help researchers gauge the ill effects of weightlessness on astronauts during long stays in space. Columbia's crew will carry out their research in a cargo bay laboratory the size of a small school bus. Flying along as test subjects will be mice, rats, snail eggs, crickets and swordfish. Many of the animals will be dissected during or after the flight so scientists can determine how their nervous systems were affected by the lack of gravity in space. Former shuttle engineer Hire will become the first KSC worker to fly in orbit. ["Neurolab shuttle flight set Thursday," **Florida Today**, April 12, 1998, p 1A.]

APRIL 13: For more than three decades, the tens of thousands of people who worked on America's spaceships here knew their place: They could get capsules and space shuttles ready for launch, but someone else got to fly in them. An engineer who rose through the ranks at Kennedy Space Center, Kay Hire, will make a familiar trek to launch pad 39B on Thursday. But she won't be examining the movable arm that connects the launch tower to the space shuttle or make last-minute spacesuit inspections, as she has done before. This time she'll climb aboard. Columbia commander Rick Searfoss said Hire has "an intensity and desire that is really overwhelming." Hire, a 38-year-old former Merritt Island resident, is used to blazing trails. As a commander in the Naval Reserve, she was the first American woman assigned to a combat aircrew. But the biggest breakthrough will come during Columbia's launch, scheduled for 2:19 p.m. Thursday (April 16). Hire will shatter what some call "a caste system" between Kennedy and its National Aeronautics and Space Administration sister/rival, Johnson Space Center in Houston. Kennedy prepares shuttles in the blue-collar, dirt-under-your-fingernails tradition. The white-collar Johnson engineers take over just seconds after liftoff. They also choose who gets to fly. In nearly six years at KSC, Hire monitored a console at the Launch Control Center, headed the checkout of spacesuits and docking systems and supervised the connecting arm between the shuttle and launch tower. Like other KSC workers, Hire wanted to fly in the shuttle, not just help prepare it. Hire was selected as an astronaut in 1994. That broke down any barrier, real or perceived, between the two space centers and paved the way for others at KSC. Two more Kennedy workers were chosen for the astronaut corps last year. ["Engineer's dreams break stratosphere," **The Orlando Sentinel**, April 13, 1998, p A-1 & A-4.]

◆ Space Shuttle Status Report, Monday, April 13, 1998. STS-90: The launch countdown for mission STS-90 began on time today at 2 a.m. KSC managers are working no major issues at this time and launch preparations continue on schedule for lift-of on Thursday. Columbia's aft compartment closeouts are complete and replacement/reload of mass memory unit No. 1 concluded over the weekend. Vertical stowage of the flight crew systems is in work and the first of three Neurolab late stow waves begin this afternoon. The STS-90 flight crew is slated to arrive at KSC's Shuttle Landing Facility at 3:30 p.m.

today. They will participate in crew equipment fit checks, routine medical examinations and fly in the Shuttle Training Aircraft in the days leading up to launch. Air Force weather forecasters are currently indicating only a 20 percent chance that weather conditions could prohibit launch activities on Thursday. The forecast calls for scattered clouds at 3,500 and 25,000 feet; visibility of at least 7 miles; winds from the southwest at 12-17 knots; a temperature of 81 degrees F and relative humidity of 60 percent. There is a slight chance for showers in Thursday's forecast. The 24-hour and 48-hour delay forecasts both indicate a 40 percent chance that weather could violate launch commit criteria. CREW FOR MISSION STS-90: Commander (CDR): Richard Searfoss; Pilot (PLT): Scott Altman; Mission Specialist (MS1): Rick Linnehan; Mission Specialist (MS2): Kay Hire; Mission Specialist (MS3): Dave Williams; Payload Specialist (PS1): Jay Buckey; Payload Specialist (PS2): James Pawelczyk. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, April 13].]

APRIL 14: NASA plans to give shuttle Columbia a little extra boost in orbit Thursday (April 16). For only the second time ever, the agency plans to fire the ship's two small maneuvering engines during launch in a test that could help shuttles carry hefty pieces of the planned international space station into orbit. The engines typically are used for just two jobs: to maneuver the vehicles while they are in orbit and to slow them down at the end of the flight so they can begin their drop through Earth's atmosphere. However, NASA officials want to fire them during Thursday's launch to see whether they can provide extra power for space station work. Officials think the engines could enable the shuttle to hoist an extra 500 pounds. The engine firing should be imperceptible to the crew, who instead will feel the push of the spaceship's much larger and far more powerful three main engines. While this is the first time NASA is doing the maneuver as a test, it was done once before out of necessity. In July 1985, shuttle Challenger lost one of its main engines about five minutes into launch. The crew fired the ship's maneuvering engines in an emergency move that helped the craft limp into orbit. Here's how the test will work on Columbia: The engine firing is scheduled to occur 2 minutes and 14 seconds into flight, just after the shuttle's twin solid rocket boosters are jettisoned into the Atlantic Ocean. The firing is to last 1 minute and 42 seconds. During that time, the engines will burn about 4,500 pounds of fuel, which gives a shuttle the ability to carry an extra 250 pounds into space. ["Shuttle to get extra power at launch," **Florida Today**, April 14, 1998, p 2A.]

◆ Astronauts who will rocket into orbit this week aboard the shuttle Columbia to study the nervous system got an early bon voyage Tuesday from President Clinton. "I hope you find out a lot of things about the human neurological system to help me because I'm moving into those years where I'm getting dizzy and I'm having all these problems and I expect you to come back with all the answers," Clinton told the seven astronauts. "We'll take that on board as one of the challenges that we'll try to meet," Columbia commander Richard Searfoss replied with a laugh. Columbia's astronauts were at Kennedy Space Center, preparing for Thursday's liftoff. Clinton spoke with them by video hookup from the Johnson Space Center in Houston, where he was joined by NASA's newest and oldest astronaut, Sen. John Glenn. The launch countdown continues without disruption Tuesday. Perfect weather was forecast for Thursday's 2:19 p.m. liftoff. ["Astronauts get early bon voyage," Marcia Dunn. (1998). **The Washington Post** [Online]. Available WWW:

www.washingtonpost.com/wp-srv/WAPO/19980414/V000563-041498-idx.html [1998, April 14].]

◆ Space Shuttle Status Report, Tuesday, April 14, 1998. STS-90: Launch preparations are proceeding on schedule. Yesterday, the pyrotechnic controllers on Columbia's external tank and solid rocket boosters were successfully tested. Earlier this morning, cryogenic reactants were successfully loaded into the orbiter's power reactant storage and distribution system. Orbiter midbody umbilical unit securing is in work and final preparations of the Shuttle main engines begin this afternoon. Neurolab late stow activities are also scheduled to resume this afternoon. Launch managers are working no major technical issues at this time. The STS-90 flight crew arrived at KSC's Shuttle Landing Facility yesterday at about 4 p.m. Today they will undergo routine medical checks and finalize their mission flight plans. Air Force weather officials have improved the launch day forecast, indicating a zero percent chance that weather conditions could prohibit launch activities on Thursday. The forecast calls for few clouds at 3,500 and scattered clouds at 25,000 feet; visibility of at least 7 miles; winds from the south at 12-18 knots; a temperature of 82 degrees F and relative humidity of 58 percent. Forecasters predict no chance of showers at launch time on Thursday. The 24-hour and 48-hour delay forecasts both indicate a 40 percent chance that weather could violate launch commit criteria. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, April 14].]

APRIL 15: Thousands of tourists are in town for shuttle Columbia's liftoff Thursday. "We expect it to be highly attended and highly viewed, as well it should be," KSC spokeswoman Joel Wells said. The crowds are packing hotels and restaurants in Brevard County, which had seen a slowdown in tourism this winter and spring because of warmer weather than usual up north and cool, rainy weather here. Shuttle launches always draw a crowd, but officials say a combination of factors is causing the upswell for the start of Columbia's 17-day flight to study the human brain and nervous system. The factors include: *People already are visiting Florida for the Easter holiday or spring break, and may have decided to stay longer to see the launch. *The weather, with sunny days in the high 70s, is beautiful. NASA says the same perfect forecast should hold Thursday, giving Columbia an excellent chance of flying on time. *Columbia's daytime launch, liftoff is set for 2:19 p.m., is more attractive to people than evening or middle-of-the-night liftoffs. "There are lots of people wanting to see this launch," said Melissa Tomasso, a spokeswoman for Kennedy Space Center's Visitor Complex. "It's a very popular mission." Five days before every shuttle launch, the Visitor Complex starts selling tickets to its special viewing site for the liftoff. All 1,500 tickets for Columbia's launch sold within two hours Saturday. ["Huge crowds to view launch," **Florida Today**, April 15, 1998, p 1A.]

◆ Gov. Lawton Chiles and his Cabinet members proudly passed a resolution Tuesday recognizing the Lunar Prospector, the first spacecraft to blast off from the state's launch pad at Cape Canaveral. "Florida is intent on being a long-term player as space moves from federal projects into reliable, commercial transportation systems," Comptroller Bob Milligan said. He pointed out that the unmanned craft, designed to map the moon and study its geology and magnetic properties, already has relayed evidence of water - a key to colonization - in the form of ice at the lunar poles. "This gives us an added incentive to go back to the moon," said Insurance Commissioner Bill Nelson, who flew aboard a space

shuttle when he serviced in Congress. The Spaceport Flight Authority, the state's space agency, operates Launch Complex 46 in partnership with the Navy, Air Force and NASA. ["Fla. Cabinet lauds launch from state pad," **Florida Today**, April 15, 1998, p 8A.]

◆ When NASA tries to launch Columbia on Thursday, the space agency will be using the fewest Kennedy Space Center workers ever for a shuttle flight - 661 fewer than last launch. That has some people concerned about safety and others proud about cost-savings. This will be the first launch since United Space Alliance, the private company that runs the daily operations of the shuttle, cut 549 people from its payroll in February. The cutbacks were a response to a NASA request for a $100 million reduction in spending. The company has 5,300 workers left here. In addition to those cuts, 112 NASA employees have taken special bonuses to retire since late January. KSC has 1,900 civil servants. Some workers and safety experts say the job cuts have hurt morale at KSC, but NASA and space-alliance officials say everything is fine. "This is a reflection on the incredible efficiency where we can continue to launch shuttles and save money at the same time," NASA spokesman Bruce Buckingham said. Because of technical problems and schedule-shifting, NASA is flying only five shuttles in the budget year that ends Sept. 30. Normally, NASA flies seven or eight annually. Because of the reduction in launches, the number of labor hours spent preparing each shuttle has increased 20 percent despite the layoffs, making the space alliance feel "very confident," company spokesman Jeff Carr said. NASA is able to create the savings because it is ending two long-time shuttle programs: Spacelab and shuttle-Mir. ["Can pared-down KSC staff get Columbia into orbit?" **The Orlando Sentinel**, April 15, 1998, p A-4.]

◆ A subcontractor making products for the international space station has pleaded guilty to giving more than $32,000 in kickback payments, NASA said Wednesday. Dynasty Performance Inc., a subcontractor to Lockheed Martin Services of Melbourne, pleaded guilty to one kickback charge. The plea was entered by the company's president, Traci Marie Maceroni, in U.S. District Court in Orlando on Friday. A federal investigation revealed that Maceroni, acting on behalf of the company, paid more than $32,000 in kickbacks to a Lockheed procurement manager involved with space station project at Kennedy Space Center. The manager awarded Dynasty subcontracts in return for the kickbacks, said Richard Triplett, NASA's assistant inspector general for investigations. The company could face fines or be ordered to pay restitution, Triplett said. Triplett would not disclose the Lockheed procurement manager's name or whether he has been charged. The NASA official said the investigation is continuing. ["Space station subcontractor pleads guilty to kickbacks," **Florida Today**, April 16, 1998, p 10A.]

◆ An astronaut caused a $10 million solar satellite to malfunction after it was released by the space shuttle Columbia last fall, a top NASA manager said Wednesday. An investigation found that astronaut Kalpana Chawla didn't send the satellite, called Spartan, a key signal to turn itself on, shuttle program manager Tommy Holloway said in a Kennedy Space Center news conference. Holloway said there were other factors behind the satellite failure, including communication, training and procedural glitches. He also said the entire crew should have done a better job overseeing the satellite deployment. ["Astronaut gets blame," **The Orlando Sentinel**, April 16, 1998, p A-4.]

◆ Space Shuttle Status Report, Wednesday, April 15, 1998. STS-90: Operations to launch the Shuttle Columbia on Mission STS-90 are continuing without problem today. Launch

remains set for 2:19 p.m. tomorrow from KSC's Pad 39B. Neurolab late stow activities were completed earlier this morning and closeouts of the spacelab and the airlock were conducted soon afterwards. Activation of Columbia's communications systems also began on time this afternoon. Operations have commenced to prepare for the movement of the Rotating Service Structure to launch position. The RSS is set to be rolled back at about 8 p.m. today. Tomorrow, efforts to load the external tank with 500,000 gallons of liquid oxygen and liquid hydrogen will begin at about 5:30 a.m. During this three-hour operation, the crew will be awakened and begin final preparations for launch. They are scheduled to depart for the pad at about 11 a.m. Air Force weather officials continue to forecast a zero percent chance that weather will prohibit launch activities tomorrow afternoon. The forecast calls for few clouds at 3,500 and scattered clouds at 25,000 feet; visibility of at least 7 miles; winds from the south at 12-18 knots; a temperature of 82 degrees F and relative humidity of 55 percent. The 24-hour delay forecast also indicates a zero percent chance that weather could violate launch criteria. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, April 15].]

APRIL 16: NASA is searching for a new name for the Advanced X-ray Astrophysics Facility (AXAF), currently scheduled for launch Dec. 3, 1998, from the Space Shuttle Columbia. AXAF is the third of NASA's Great Observatories, after the Hubble Space Telescope and the Compton Gamma Ray Observatory. Once in orbit around Earth, it will explore hot, turbulent regions in the universe where X-rays are produced. Dr. Alan Bunner, director of NASA's Structure and Evolution of the Universe science program, will announce April 18 at the National Science Teacher's Association meeting in Las Vegas, NV, the start of a contest, open to people worldwide, to find a new name for the observatory. Entries should contain the name of a person (not living), place, or thing from history, mythology, or fiction. Contestants should describe in a few sentences why this choice would be a good name for AXAF. The name must not have been used before on space missions by NASA or other organizations or countries. The grand prize will be a trip to NASA's Kennedy Space Center in Cape Canaveral, FL, to see the launch of the satellite aboard the Space Shuttle. Ten runner-up prizes will be awarded and all entrants will receive an AXAF poster. [**NASA News Release #98-63**, April 16, 1998.]

◆ Ken Aguilar has been named Chief, Equal Opportunity Program Office, effective Monday, April 20. Aguilar succeeds J. Albert "Jay" Diggs Jr., who retired on April 3. Aguilar formerly was KSC's personnel director, involved with the management of personnel programs, employment, student programs, employee development and training, union management relations, insurance, retirement, compensation and policy development. Pat Simpkins will succeed Aguilar as acting directory of personnel. [**KSC Countdown**, April 16, 1998.]

◆ Space Shuttle Status Report, Thursday, April 16, 1998. STS-90: The launch of Space Shuttle Columbia on mission STS-90 with Neurolab was postponed 24 hours earlier today due to difficulties with one of two network signal processors (NSP) on the orbiter. Mission managers first noticed the problem at about 3 a.m. today during normal communications systems activation prior to tanking operations. As a result, work to load the external tank with the cryogenic propellants did not begin and launch postponement was made official at about 8:15 a.m. The NSPs, which are located in the orbiter's middeck, format data and

voice communications between the ground and the Space Shuttle. Both processors are required for launch and landing and are also highly desirable for on-orbit mission operations. The unit which failed, NSP No. 2, has at this time been removed and replaced. Testing of the new unit is scheduled to be completed this evening. The RSS will remain in the open launch configuration. The countdown clock has been reset to the T-11 hour hold position and will remain there until 11:59 p.m. Tomorrow, the external tank will be loaded with 500,000 gallons of liquid oxygen and liquid hydrogen beginning at about 5:30 a.m. During this three-hour operation, the crew will be awakened and begin final preparations for launch. They are scheduled to depart for the pad at about 11 a.m. Air Force weather officials continue to forecast a zero percent chance that weather will prohibit launch activities tomorrow afternoon. The forecast calls for few clouds at 3,500 and scattered clouds at 25,000 feet; visibility of at least 7 miles; winds from the south at 12-20 knots; a temperature of 83 degrees F and relative humidity of 55 percent. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, April 16].]

◆ Space Shuttle Status Report, Thursday, April 16, 1998, UPDATE. STS-90: The launch of Columbia on mission STS-90 has been rescheduled for Friday, April 17 following the successful replacement and retest of a failed network signal processor on the orbiter. The launch of Columbia with the Neurolab spacelab onboard was postponed 24 hours earlier today due to difficulties with one of two network signal processors (NSP) on the orbiter. Mission managers first noticed the problem at about 3 a.m. today during normal communications systems activation prior to tanking operations. As a result, work to load the external tank with the cryogenic propellants did not begin and launch postponement was made official at about 8:15 a.m. The NSPs, which are located in the orbiter's middeck, format data and voice communications between the ground and the Space Shuttle. Both processors are required for launch and landing and are also highly desirable for on-orbit mission operations. The RSS will remain in the open launch configuration and the countdown clock has been reset to the T-11 hour hold position where it will remain until 11:59 p.m. Tomorrow, the external tank will be loaded with 500,000 gallons of liquid oxygen and liquid hydrogen beginning at about 5:30 a.m. During this three-hour operation, the crew will be awakened and begin final preparations for launch. They are scheduled to depart for the pad at about 11 a.m. Air Force weather officials continue to forecast a zero percent chance that weather will prohibit launch activities tomorrow afternoon. The forecast calls for few clouds at 3,500 and scattered clouds at 25,000 feet; visibility of at least 7 miles; winds from the south at 12-20 knots; a temperature of 83 degrees F and relative humidity of 55 percent. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, April 16].]

APRIL 17: The planned July 1998 launch of NASA's Deep Space 1 technology validation mission from Cape Canaveral, FL, has been rescheduled for October. The delay is due to a combination of late delivery of the spacecraft's power electronics system and an ambitious flight software development schedule, which together leave insufficient time to test the spacecraft thoroughly for a July launch. Deep Space 1 is the first launch in NASA's New Millennium program, a series of missions designed to test new technologies so that they can be confidently used on science missions of the 21st century. The New Millennium Program

and Deep Space 1 are managed by JPL for NASA's Office of Space Science, Washington, DC. [**NASA News Release #98-64**, April 17, 1998.]

◆ Space Shuttle Status Report, Friday, April 17, 1998. STS-90: Space Shuttle Columbia lifted off from KSC's Launch Pad 39B on time today at 2:19 p.m. EDT. Following yesterday's scrubbed launch attempt, workers replaced a faulty network signal processor located in the orbiter's middeck last night. Once retests were complete, KSC launch managers worked no significant technical issues throughout the remainder of the launch countdown. STS-90 is the first Shuttle mission to focus completely on the study of the human nervous system. Researches expect to glean information that will help overcome the physiological challenges encountered during space flight and assist in the treatment of diseases here on Earth. The solid rocket booster recovery ships were deployed Wednesday and are expected to be on-station with the boosters in the Atlantis Ocean by 4 p.m. today. Recovery operations will begin this evening. The ships are expected to arrive at Port Canaveral with the boosters in-tow at about 3 p.m. tomorrow. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, April 17].]

◆ With Friday's teeth-shaking, picture-perfect launch of the space shuttle Columbia over, the specimens in the flying zoo are just now adjusting to zero gravity. "The first day is crucial for our experiments," said David Liskowsky, a NASA special projects scientist. "The initial exposure to microgravity, that's what you're seeking." The test subjects include NASA's most diverse group of scientific guinea pigs: 1,514 crickets, 233 fish, 152 rats, 135 snails, 18 pregnant mice, five professional astronauts and two nonastronaut scientists. One last-minute animal hitchhiker, a 3-inch common brown bat, attached itself to the shuttle's cool external tank before launch and fell asleep. It probably didn't survive liftoff and wouldn't have been a good test subject, NASA scientists said. ["1st day is critical for critters on Columbia," **The Orlando Sentinel**, April 18, 1998, p A-15.]

APRIL 18: Except for some minor fish-tank problems, the first day of experiments on space shuttle Columbia's brain-research flight went swimmingly Saturday. Columbia's crew members spent their time trying to capture, for the sake of science, how 2,052 animals and seven humans adjusted to their new lack of gravity. "The biggest challenge, I think, is controlling your body position, because it tends to move around, even when you try very hard to stay still," said Astronaut Kay Hire. But the crew had to stay still sometimes to do its work. Astronauts squeezed, sliced and shook their way through a series of experiments. They also dissected animals in space on Saturday, just the start of a series of surgeries scheduled for the 17-day mission. Astronauts also shook four fish tanks to see what it would do to the sense of balance of the fish. The fish have wiring connected to their brains, but it hasn't been sending all the data to scientists at Kennedy Space Center. Hire, the first KSC worker to fly in space, said sleep was no problem. "I had imagined I would have to be peeled off of one of these windows just from the excitement of watching the Earth go by below us," she said. "But I was pretty exhausted at the end of the day, and it was very easy for me to go ahead and fall asleep." ["Guinea pigs in space tested," **The Orlando Sentinel**, April 19, 1998, p A-4.]

APRIL 20: Space Shuttle Status Report, Monday, April 20, 1998. STS-90: The solid rocket boosters from Columbia's launch Friday were returned to Hangar AF Saturday afternoon.

Initial indications revealed no problems with recovery operations. Open assessments of the boosters will begin today. Also, minimal damage was reported to Pad 39B following launch. Mission managers have indicated the mission may be extend a day if cryogenic margins and consumable permit. The decision will come mid-way through the flight. STS-91: Discovery's midbody and aft compartment closeouts continue. Hydraulic operations and checks of the main propulsion system are complete. SPACEHAB tunnel installation is slated to begin tonight. Rollover to the VAB is currently targeted for no earlier than Friday, April 24. STS-88: Preparations for the installation of the right-hand orbital maneuvering system pod are currently in work. The pod is scheduled to be installed tonight. Docking base wire harness installation for the International Space Station is also in work this week. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, April 20].]

◆ Two manatees, found in a Cocoa Beach drainpipe in February, were checked over by SeaWorld Orlando veterinary specialists before their release into the Banana River at KARS Park. A third manatee was also released. The release site is on the southern boundary of a "no motor" zone for boats and includes 10,500 acres of the Banana River, said Kathy Whaley, spokeswoman for the Merritt Island National Wildlife Refuge. "It's a perfect location for them, if they choose to stay here," Whaley said. "We've counted up to 400 manatee in this area in the springtime." ["3 misguided manatees go back to river," **The Orlando Sentinel**, April 21, 1998, p A-4.]

APRIL 21: JoAnn Morgan, KSC associate director for Advanced Development and Shuttle Upgrades, has been named this year's recipient of the Kurt H. Debus Award by the National Space Club. The Debus Award is one of the most prestigious honors bestowed by the Florida aerospace community upon those whose leadership and contributions have advanced America's space program. The official presentation is scheduled for May 15. Named after KSC's first director, the Debus Award previously has been bestowed on former Center Director Forrest McCartney, former KSC Deputy Director George Page and former contractor executive George Faenza of McDonnell Douglas. Morgan's tenure with the U.S. space program began in 1958. ["JoAnn Morgan receives Debus Award," **KSC Countdown**, April 21, 1998.]

APRIL 23: Payload Processing Status Report, Thursday, April 23, 1998. STS-91: 9th MIR Docking SPACEHAB Module Alphamagnetic Spectrometer (AMS); Target Launch Date: May 28, 1998; Current Locations: Spacehab Processing Facility/Space Station Processing Facility; Launch Vehicle: Space Shuttle Discovery; Launch Pad: 39A. Operations Scheduled: * Spacehab module arrives at SSPF from Spacehab Processing Facility (4/27); * Install Spacehab/AMS into payload canister (4/28); * Rotate payload canister from horizontal position to vertical position (4/29); * Transport Spacehab/AMS to Pad 39-A (4/30); * Install Spacehab/AMS into Discovery (5/4); * Spacehab Interface Verification Test (IVT) (5/10-5/11); * AMS Interface Verification Test (IVT) (5/12); * AMS end-to-end test (5/17); * Payload bay door closure (5/20). STS-88: International Space Station - Node 1/PMA-1/PMA-2; Target Launch Date: July 9, 1998 NET; Current Location: Space Station Processing Facility (SSPF); Launch Vehicle: Space Shuttle Endeavour; Launch Pad: 39B. Operations currently in work: * Forward and starboard hatch leak tests; * Testing of node common berthing mechanisms; * Internal smoke detector tests; * Configuration work for

PMA-2 installation. STS-90: NEUROLAB; Launched: April 17, 1998 2:19 p.m.; Current Location: On-orbit Launch Vehicle: Space Shuttle Columbia. Expendable Launch Vehicle Payload Processing Status: ELV spacecraft arrival status at KSC: Deep Space 1: July 19; Mars Orbiter: Sept. 4; Mars Lander: Oct. 15; Stardust: Nov. 12; Space Shuttle: AXAF (STS-93): Aug. 14. Bruce Buckingham. (1998). **Kennedy Space Center Payload Processing Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, April 23].]

◆ Instead of saving time and money as first predicted, Russian participation in the international space station is having just the opposite effect on the 16-nation construction project, a NASA advisory panel found. The program is over budget and behind schedule, and a great deal of the blame goes to Russia, the Cost Assessment and Validation Task Force concluded in a report released by NASA Thursday. Although members of Congress have been saying the same thing for years, the Clinton administration and NASA officials have been reluctant to acknowledge the 4-year-old partnership with Russia is a prime factor in cost overruns and delays. The Clinton administration originally invited the Russian Space Agency to become a space station partner in 1993, enlisting top officials at NASA to sell the deal to Congress partly on the belief it would save an estimated $2 billion, expand the station's capabilities and enable the research station to be completed sooner. Those assumptions were faulty, concluded the panel chaired by Jay Chabrow, an aerospace industry consultant who led the seven-member team of private and government analysts during its five-month investigation of station costs and schedules. The outlook isn't getting any better. "With continuing funding shortfalls carrying into 1998, the absence of any hard indicators that adequate Russian funding will be provided soon, and the recent Cabinet shake-up in Moscow, it is likely Russian Space Agency elements will experience further delays," the panel concluded. The report findings are sure to muddy the waters this spring as Congress prepares to act on NASA space station funding requests for the coming fiscal year. ["Russia's role in station has project overbudget, behind schedule," **Florida Today**, April 24, 1998, p 2A.]

APRIL 24: Space Shuttle Status Report, Friday, April 24, 1998. STS-90: NASA managers have indicated the mission may be extended a day if cryogenic margins and consumables permit. The decision is expected to be announced early next week. STS-91: Discovery's midbody and aft compartment closeouts continue. SPACEHAB tunnel installation is complete and the payload bay doors are closed. Rollover to the VAB is currently targeted for the morning of Monday, April 27. Rollout to Pad 39A is set for no earlier than Saturday, May 2. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, April 24].]

◆ A Boeing Delta 2 rocket carried four satellites into orbit Friday to bring cellular telephone service to remote areas of the globe. The 6:38 p.m. liftoff from Cape Canaveral Air Station marked the second lot of an eventual constellation of 48 satellites to be launched during the next 16 months by Globalstar, an international telecommunications partnership. The $2.6 billion system will lead to service in some of the most remote areas on Earth as the company tries to grab a big share of an exploding market. Currently, more than half of the world's population has never used a telephone. ["Delta lobs satellites into orbit," **Florida Today**, April 25, 1998, p 1B.]

APRIL 26: Bound for Saturn, NASA's Cassini spacecraft is headed for its first interplanetary turn Sunday by flying near Venus and using the planet's gravity to gain speed for its 2-billion-mile journey. It's the first of four planned planetary flybys for Cassini, which will use the maneuvers to reach Saturn in 2004. Once there, it will begin a four-year study of the planet's rings, moons and atmosphere. The trek near Venus is the most crucial milestone to date for the probe, which was launched from Cape Canaveral in October. ["Cassini to zip past Venus," **Florida Today**, April 25, 1998, p 1A & 6A.]

◆ The United States and Russia likely will delay the start-up of construction of NASA's international space station until late October -- a four-month delay, U.S. space agency officials said Sunday. The reason: A crucial Russian command and control center and a U.S. lab have fallen behind schedule, all but scuttling plans to begin station construction with the planned launch of a Russian space tug from Kazakstan on June 30. The delay, which is expected to be agreed upon this week, would push back the first U.S. station construction mission aboard shuttle Endeavour from July 9 until mid-November. The first research crew on the new station, as a result, wouldn't open the outpost for business until mid-1999 -- a six-month delay. In any case, NASA officials say they are anxious to begin launching the station construction project, which is considered by some the most complex engineering effort in history. "We really need to get started before the end of the year," NASA space station project director Randy Brinkley said. A joint project of space agencies in the United States, Russia, Europe, Japan and Canada, the $40 billion space station is envisioned as a 480-ton cluster of laboratories that will span an area larger than an American football field 250 miles above Earth. ["Station likely delayed," **Florida Today**, April 27, 1998, p 1A.]

APRIL 27: Space Shuttle Status Report, Monday, April 27, 1998. STS-90: Over the weekend, the flight crew completed efforts to bypass a leaky valve in Columbia's carbon dioxide removal system that threatened to shorten the mission. With retests of the repaired system successfully completed and all of Columbia's systems performing very well, mission managers are still entertaining the option of extending the mission by one day. Managers are expected to make an extension decision on Wednesday. STS-91: Discovery's midbody and aft compartment closeouts were completed over the weekend. The orbiter is expected to begin its move from Orbiter Processing Facility bay 2 to the Vehicle Assembly Building this afternoon. Discovery will be mated to the super lightweight tank in high bay 1 tonight and the entire Shuttle stack is scheduled for transport to Pad 39A later this week. STS-88: Endeavour's power reactant storage and distribution checks are in work. Preparations for right-hand orbiter maneuvering system pod functional checks are under way. Technicians are replacing window No. 1 today. Preparations for remote manipulator system installation continue. Functional tests of the orbiter/external tank umbilical doors are scheduled to occur this week. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, April 27].]

◆ After 33 baby rats on their ship died over the weekend, shuttle Columbia's astronauts did everything they could to save the ones that remained. They hand-fed them water, stayed up late and treated them with all the kindness you'd give a kitten. In the end, it paid off. NASA officials said Monday that the crew saved 56 of the baby rats – enough to make

a small cadre of research animals for the crew's experiments on the brain and nervous system. As a result, researchers on the ground still can accomplish "the vast majority" of their science work by sharing tissues from the remaining animals, said Dr. Joseph Bielitzki, NASA's chief veterinarian. ["Columbia crew nurses rats after 33 die," **Florida Today**, April 28, 1998, p 8A.]

◆ The Spacehab Single Module arrived at the Space Station Processing Facility (SSPF) from the Spacehab Processing Facility at Port Canaveral. The pressurized mini-laboratory arrived at the SSPF for installation into the payload canister/transporter, together with the AMS-01 payload. The canister will be rotated vertically on Wednesday and then taken Thursday to Launch Pad 39A. ["Spacehab moved to the SSPF," **KSC Countdown**, April 28, 1998.]

APRIL 28: Space Shuttle Status Report, Tuesday, April 28, 1998. STS-90: Columbia continues to provide a stable platform for neurological science research and all systems on board are operating very well. The Space Shuttle orbits Earth every 90 minutes traveling 17,500 miles per hour. To date, Columbia has completed more than 175 orbits of the Earth. Tomorrow mission managers are expected to make a decision on extending the mission by one day. STS-91: Yesterday, Discovery was transferred from Orbiter Processing Facility bay 2 to the Vehicle Assembly Building. The orbiter arrived in the VAB just after 5 p.m. yesterday. Efforts to mate Discovery to the new super lightweight external tank in high bay 1 will conclude this afternoon. The entire Shuttle stack is scheduled for transport to Pad 39A later this week. NASA managers decided today to move the STS-91 target launch date to June 2. The additional time will accommodate orbiter processing requirements and launch preparations at Pad 39A. STS-88: Endeavour's power reactant storage and distribution checks continue. Right-hand orbiter maneuvering system pod interface testing is under way. Technicians continue efforts to replace window No. 1. Preparations for remote manipulator system installation are complete. Functional tests of the orbiter/external tank umbilical doors are scheduled to occur this week. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, April 28].]

◆ NASA's international space station is plagued with more launch delays and cost overruns. There are no guarantees the successor to the space shuttle will be based in Brevard County. And competition for the lucrative commercial launch business threatens to leave Florida with an ever-slimmer share of the world market. To those who suggest this puts a cloud over this week's 35th Space Congress in Cocoa Beach, Bruce Melnick disagrees. "It's those kind of stories that are going to make this Space Congress more exciting than the ones in the past," said Melnick, a Boeing vice president at Kennedy Space Center and two-time shuttle astronaut who is chairing this year's event. Four days of seminars and exhibits begin Tuesday and end Friday. ["Challenges await Space Congress," **Florida Today**, April 26, 1998, p 1E & 6E.]

◆ Russia's space station Mir is finally headed for the trash heap. In a first step toward bidding farewell to their battered outpost, Russian officials said Tuesday they gradually will begin to lower Mir's orbit next month to prepare to discard it in 1999. Mir could stay in orbit longer, however, if the new international space station continues to face delays, Yuri Semyonov, head of the state-run RKK Energia, told the *ITAR*-Tass new agency. His

company built Mir and has been running it since it was put in orbit in 1986. A cargo ship that is scheduled to dock with Mir on May 17 will use its engines to begin dragging the 120-ton station's orbit closer to Earth, Semyonov said. "Every future spacecraft docking with Mir will bring the station down," Semyonov said. ["Russians prepare to discard workhorse space station Mir," **Florida Today**, April 29, 1998, p 8A.]

◆ Delays and political turmoil are plaguing NASA's international space station. And some in Congress, upset by mounting costs, are calling for the program's head. But veteran astronaut John Young dismisses the headlines as so much deja vu. "We've gone through the same growing pains with every program we've ever had," Young said during Tuesday's keynote speech to open the 35th Space Congress. "Gemini, Apollo, Skylab. The shuttle was supposed to start in '78 and it launched in '81. When you've never done something, and you're doing it for the first time, you can't estimate when you're going to finish it." John David Bartoe, NASA's station project manager, said the space station will offer the opportunity for groundbreaking orbital research. "Research into the effects on humans and cell tissues and protein crystals will touch more people than any other research," he said. While describing Russia as the Achilles' heel in the project, the panel expressed confidence the Russians would meet their obligations. ["Patience wears thin on station delays," **Florida Today**, April 29, 1998, p 8A.]

◆ It worked for Apollo 13 in the 1970s. Now a Los Angeles aerospace company is hoping a slingshot trip around the moon can save a communications satellite that is stuck in the wrong orbit around Earth. "The mission is a good gamble," Ronald Swanson of Hughes global Services said Wednesday. No one has ever sent a commercial satellite around the moon. If it works, it could mean a new way of rescuing wayward satellites without having to haul them back to Earth on a NASA space shuttle. Hughes is spending less than $1 million on the attempt. The 3.8-ton, 18-foot-high satellite has 3,700 pounds of fuel on board. That's more than enough to escape Earth's gravity and go to the moon but not enough for it to orient itself into the proper alignment 23,000 miles above the Earth. So Hughes engineers next month will order the satellite to fire its motors for a nine-day trip to the moon and back. They hope lunar gravity will steer the satellite to where it can be captured by Earth's gravity in an orbit high enough to be useful. ["Wayward satellite will be swung around moon," **USA Today**, April 30, 1998, p 5A.]

APRIL 30: Space Shuttle Status Report, Thursday, April 30, 1998. STS-90: Space Shuttle Columbia's onboard systems continue to perform well on orbit as the flight crew wraps up their neurological research activities. NASA managers decided today that Columbia will return to Earth as scheduled on Sunday, May 3. With preliminary weather forecasts indicating favorable conditions to support a Shuttle landing at KSC on Sunday, mission managers are not calling on Edwards Air Force Base, CA, to support Sunday's landing activities. The first Sunday landing opportunity at KSC is at 12:09 p.m. EDT with a second opportunity at 1:43 p.m. EDT. STS-91: Discovery has been hard-mated to the new Super Lightweight External Tank in VAB high bay 1 and umbilical interface connections continue on schedule. The Shuttle Interface Test began yesterday and will conclude tomorrow. Discovery is scheduled to begin its roll out to Pad 39A on Saturday, May 2 at about 3 a.m., atop the mobile launch platform and crawler transporter. STS-88: Testing of Endeavour's power reactant storage and distribution system is complete. Installation of the remote manipulator arm is slated to begin today. Right-hand orbiter maneuvering system pod

interface testing continues. Functional tests of the orbiter/external tank umbilical doors are scheduled for this week. The main propulsion system liquid hydrogen and liquid oxygen systems are slated for leak and functional tests this week as well. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, April 30].]

◆ KSC has more than 150 natural gas vehicles, the largest fleet of these vehicles in NASA. Benefits include significantly less air pollution than gasoline or diesel, longer-life engines and less maintenance due to clean burning and less dependence on foreign oil (natural gas is a domestic fuel). ["Did you know?" **KSC Countdown**, April 30, 1998.]

DURING APRIL: NASA managers are considering returning the Hubble Space Telescope to Earth for study – and eventual display in the Smithsonian National Air & Space Museum – once the telescope's mission is completed around 2010. A possible future space shuttle mission to return the historic observatory was reviewed last week at the 35th Annual Space Congress at Cape Canaveral. Examination of the telescope after what would be about 20 years in space would provide valuable data on the effects to aerospace materials of long-term space exposure. ["NASA managers are considering..." **Aviation Week & Space Technology**, May 4, 1998, p 19.]

◆ NASA wants proposals by May 1 for a smallsat to be launched to the Lagrangian point as part of a $50 million mission proposed by Vice President Gore to provide a high-resolution image of the sunlit Earth for free distribution on the Internet. Dubbed "Triana" by Gore, the "Earth Observing Post" would consist of a satellite weighing 330 pounds or less, with a 2,048-pixel CCD camera able to produce 7-kilometer resolution of Earth's surface for educational outreach. The satellite will be positioned at the L-1 point, roughly 1 million miles from Earth, where the gravitational pulls of the earth and the sun will allow the spacecraft to maintain a constant view of Earth. Plans call for launching the satellite on an expendable launch vehicle or from the U.S. space shuttle, with a upper stage to get it to L-1. ["NASA seeking proposals on L-1 satellite," **Aerospace Daily**, April 7, 1998, p 5-6.]

◆ Given that the shuttle's Neurolab mission studied the human brain, some NASA managers might want to have their own heads examined. Why? For allowing too much tacky show biz to intrude on the flight. First, at the Kennedy Space Center, the Power Rangers – dressed in Grade-B Halloween-type "space" costumes – were allowed to film a king-fu routine atop the 400-ft.-tall Vehicle Assembly Building as Columbia roared off in the background. Meanwhile, at ground level, NASA admitted to the press site a Bulgarian folk singer who plugged her new CD. Then, after launch, controllers patched in a phone call to Columbia from Vanna White of "Wheel of Fortune" fame. ["I Dream of Jeannie," **Aviation Week & Space Technology**, May 4, 1998, p 17.]

MAY

MAY 1: Space Shuttle Status Report, Friday, May 1, 1998. STS-90: Orbiter Columbia and the STS-90 flight crew began their third week of nervous system research as the Neurolab mission approaches an end. The Shuttle is expected to touch down at KSC's Shuttle Landing Facility Sunday May 3 at 12:09 p.m. EDT. The deorbit burn is scheduled to occur about one hour before touchdown at 11:02 a.m. There is a backup landing opportunity at KSC on Sunday at 1:43 p.m. EDT. NASA managers have not called for Edwards Air Force Base, CA, to support Sunday's landing activities. Preliminary weather forecasts indicate favorable conditions to support a Shuttle landing at KSC on Sunday. STS-91: Mating operations for Discovery and the new super lightweight external tank, and umbilical connection leak checks are complete. Technicians have complete efforts to shave off a thin layer of thermal protective foam from a small area on the external tank's outer surface. Shaving efforts will minimize the chance of TPS foam debris contacting the orbiter during ascent. The Shuttle is expected to begin its transfer to Pad 39A at about 3 a.m. Saturday morning. STS-88: Endeavour's remote manipulator system has been installed in the orbiter's payload bay. The right-hand orbiter maneuvering system's helium system is undergoing verification tests today. Leak and functional tests of the main propulsion system are in work. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, May 1].]

MAY 3: Twin sonic booms should be heard thundering across the Space Coast around lunch time today as shuttle Columbia swoops in for a scheduled landing at Kennedy Space Center. The landing will be slightly different than expected for the astronauts. Columbia's crew uncovered a minor problem Saturday in tests of systems needed during the fiery plunge through the atmosphere and landing. During the tests, a problem seen during Columbia's launch resurfaced. The cooling system on one of the shuttle's three hydraulic systems – used during launch and landing – failed. The hydraulic systems control the ship's wing flaps, rudder and landing gear. The cooling systems spray water onto the hydraulics and prevent them from overheating. The cooling system has been troublesome to NASA engineers in recent years, with water repeatedly turning to ice and shutting down the system. This time engineers think a valve that controls the water flow probably failed, said NASA flight director John Shannon. During the launch, and again Saturday, the hydraulic unit functioned properly for about 10 minutes before it automatically shut down after becoming too hot. Although the shuttle is able to land safely with only one hydraulic unit working, and previously has returned under the power of two units, officials would like to have the third system available as a backup. So today, controllers will call on the plan used in 1991, when a similar problem occurred on shuttle Atlantis. Instead of starting the hydraulic unit as planned about 45 minutes before landing, the crew will leave the troubled unit off until the critical last 6 ½ minutes before touchdown. Engineers expect the unit to work for 10 minutes before it overheats. ["Hydraulic unit fails, but shuttle set to land," **Florida Today**, May 3, 1998, p 1A.]

◆ Space Shuttle Status Report, Sunday, May 3, 1998. STS-90: The Space Shuttle Columbia glided to a successful landing on runway 33 at KSC's Shuttle Landing Facility today at 12:09 p.m. EDT. Neurolab scientists and their research teams gathered at KSC to begin preliminary ground processing of the valuable data gleaned from STS-90's nervous

system experiments. With excellent weather conditions at KSC, flight controllers opted to bring Columbia and her seven-member flight crew home on the first of two landing opportunities, executing the deorbit burn at about 11:11 a.m. today. At the flight's conclusion, the orbiter and crew had traveled 6.375 million statute miles and completed 256 orbits of the Earth. Columbia's 13th KSC landing marked the 43rd KSC landing in Shuttle program history. Following routine orbiter safing, servicing and payload destow activities, Columbia will begin its transfer from the SLF to Orbiter Processing Facility bay 3 at about 10:15 p.m. and will arrive in the OPF at about 11:30 p.m. MET EDT: Main Gear Touchdown 15:21:49:59; 12:08:59 p.m. -- Nose Gear Touchdown 15:21:50:13; 12:09:13 p.m. – Wheels Stop 15:21:50:58; 12:09:58 p.m. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, May 3].]

◆ Astronaut Kay Hire returned Sunday to the place where her NASA career began: Kennedy Space Center. The former KSC engineer and first astronaut chosen from Florida's spaceport arrived on shuttle Columbia in the lunch time landing of its 16-day mission studying the brain and nervous system. The work is to help NASA learn how spaceflight affects astronauts' nervous systems as well as uncovering solutions to common Earth ailments such as insomnia or motion sickness. Now researchers will spend months studying information on things such as the nervous system's control of blood pressure, sleep and balance. ["Scientists eager to test shuttle data," **Florida Today**, May 4, 1998, p 1B & 2B.]

◆ Shuttle Columbia returned home Sunday to crystal-blue skies but a hazy future for its next flight as NASA officials struggle to nail down a launch schedule for the remainder of 1998. Two questions remain. One is whether to fly Columbia in late summer on the same neurological research mission that ended Sunday. The second is when NASA and Russia can start building the international space station. Until these questions are settled, the launch schedule at Kennedy Space Center will be muddled. "I don't recall a period when we had as many flights in question as we do right now," said Tommy Holloway, chief of the shuttle program, during a news conference after Columbia's lunch time landing at KSC. Two flights of shuttle Discovery are the only missions set for the rest of the year. One will be NASA's last flight to the Russian station Mir in June; the other will be a research mission with returning astronaut John Glenn aboard in October. Holloway said NASA will decide this week whether to repeat Columbia's mission, a 16-day excursion to study the intricate workings of the brain and nervous system. NASA and Russia were to start building the station this summer, but delays have pushed the first shuttle construction flight back into September at the earliest, Holloway said. It's possible that flight – a mission aboard shuttle Endeavour – won't be launched until December or even January, Holloway acknowledged. Building the station – a $40 billion international effort – will require 45 shuttle launches, 15 Russian rocket launches and about 1,200 hours of spacewalks during six years of construction. ["Shuttle lands to sketchy plans," **Florida Today**, May 4, 1998, p 1A.]

MAY 4: Space Shuttle Status Report, Monday, May 4, 1998. STS-91: Space Shuttle Discovery rolled out of the Vehicle Assembly Building Saturday May 2 at 3:26 a.m. and arrived at Pad 39A at about 9:30 a.m. Once at the pad, hotfire testing of Discovery's three auxiliary power units was completed and launch pad validations began. Yesterday, the payload was installed into the payload changeout room. The Rotating Service Structure has

been extended to the vehicle and the orbiter's payload bay doors are slated to be opened later today. Pad validations continue and payload installation is scheduled for tomorrow. The STS-91 flight crew is scheduled to arrive at KSC at 3:30 p.m. today for the Terminal Countdown Demonstration Test set for Wednesday and Thursday. STS-88: Leak and functional tests on Endeavour's main propulsion system are complete. Following last week's installation of the remote manipulator system, verification testing of the system is under way. Endeavour's window No. 1 is scheduled for installation today and replacement of window No. 3 occurs this week. The right-hand orbiter maneuvering system's helium system continues to undergo verification tests. STS-90: Following Columbia's on-time landing at KSC's Shuttle Landing Facility yesterday and after payload deservicing was completed at the SLF, Columbia was towed to OPF bay 3 arriving at about midnight. Post flight draining of cryogenic reactants from the orbiter's power reactant storage and distribution system is under way. Preliminary inspections of Columbia's lower surface revealed no significant damage with only 73 total "debris hits" of which 11 measured 1 inch or greater. The STS-90 flight crew departed from Florida at about 9 a.m. today, headed back to their homes in Houston, TX. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, May 4].]

◆ They're the last NASA crew scheduled to fly onto humanity's most remote outpost. Shuttle Discovery's astronauts are at Kennedy Space Center for a week of practice leading to their planned June 2 launch to the Russian space station Mir. Their mission: Travel, one last time, to the station to pick up NASA astronaut Andy Thomas and end the productive – and sometimes highly dangerous – shuttle-Mir program. "It will bring to a close a very successful and educational phase in our process to build the international space station," KSC spokesman Joel Wells said. Discovery's crew for the nine-day flight includes two astronauts who have made short visits to Mir and a Russian cosmonaut who helped design the station. The crew will run through a launch day countdown rehearsal Thursday. Other work this week will include emergency escape training and reviewing their mission plan. ["Discovery crew practices for mission to Mir," **Florida Today**, May 5, 1998, p 4A.]

MAY 5: Shuttle Columbia's recently completed mission to study the brain and nervous system won't be repeated this fall, NASA officials decided Tuesday. Managers had considered a second flight to keep their calendar open for NASA's biggest challenge – starting to build the international space station. "Our top priorities are to launch the first elements of the international space station as soon as possible," said Ed Campion, a NASA spokesman at Johnson Space Center in Houston. "By not flying it, we have the maximum flexibility." NASA would like to launch its first station construction flight later this year. Officials are considering dates ranging from early September to January 1999. The uncertainty has been caused by NASA and Russian delays. ["NASA won't repeat Neurolab mission," **Florida Today**, May 6, 1998, p 8A.]

◆ Kennedy Space Center has landed the premiere of *Armageddon* on June 29. Cast members expected to attend: Bruce Willis, which may mean wife Demi Moore, Billy Bob Thornton, Liv Tyler, Ben Affleck, Will Patton and Steve Buscemi. The guest list of 500 is already drawn up and can't grow. That's all the temporary theater that the studio is building beside the Apollo/Saturn V Center will hold. The movie was filmed in part at KSC. ["Movie to launch at KSC," **The Orlando Sentinel**, May 6, 1998.]

MAY 6: Space Shuttle Status Report, Wednesday, May 6, 1998. STS-91: Preparations for the Terminal Countdown Demonstration Test continue on schedule. The STS-91 flight crew arrived at KSC Monday evening and are participating in mission familiarization activities this week before their launch day dress rehearsal set for Thursday. Discovery's master event controller (MEC) No. 1 failed tests on Monday and technicians completed MEC removal efforts yesterday. A new MEC will be installed tomorrow afternoon. Orbiter midbody umbilical mates are complete and vertical payload installation concluded yesterday. The helium signature test continues through this afternoon. Routine forward and aft compartment cleaning is in work through the weekend and external tank umbilical close-outs conclude tonight. STS-88: Verification of Endeavour's right hand orbiter maneuvering system helium system continues. Technicians are checking a valve on the reaction control system. Installation of a strut in bay 3 of the midbody is in work. Drag chute installation is in work and hydraulic checks of Endeavour's main landing gear begin tonight. Window No. 1 is scheduled for installation Friday. STS-93: Following NASA's decision yesterday not to refly the Neurolab mission, KSC workers will focus efforts to process Columbia for the AXAF mission on STS-93. Draining of the orbiter's power reactant storage and distribution system is complete and technicians now have access to Columbia's aft compartment. Fuel cell and water spray boiler evaluations are in work. The payload bay doors will be opened today and technicians will begin Neurolab deconfiguration on Friday. Removal of the Spacelab payload from the cargo bay occurs Monday. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, May 6].]

◆ NASA Administrator Daniel Goldin acknowledged Wednesday that Russia's participation in the international space station is not working, leaving U.S. taxpayers to pay more and wait longer to get the outpost built. The frank admission before a House panel was a major reversal for Goldin, who has previously defended the partnership and expressed "cautious optimism" that NASA and the Russians could solve their problems. "We were too naïve in expecting them to act like we act," Goldin said of the Russian government's repeated failure to provide adequate money for their portion of the 15-nation project. "The Russians have been welcomed into the largest science project of the 20th century. They are going to have to decide do they want to be a partner or do they want to have some other relationship with us." Goldin's testimony may mark a turning point in the stormy relations between Congress, NASA and the White House over Russia's involvement in the space station. No longer was he asking for "one more chance," as he and his top managers have done so many times in the past. Instead, he promised that on June 15 he would deliver to Congress a new assessment of station costs and assembly schedules – one that would include estimates of moving forward without key Russian hardware. Despite the delay, Goldin's words seemed to mollify Rep. James Sensenbrenner Jr., R-Wis., who as chairman of the House Science Committee has been a persistent station taskmaster. He has repeatedly criticized Russia, the Clinton administration and NASA for frequent broken promises, missed timelines and hidden costs. ["NASA: Russia has let us down," **Florida Today**, May 7, 1998, p 1A & 7A.]

MAY 7: Space Shuttle Status Report, Thursday, May 7, 1998. STS-91: The Terminal Countdown Demonstration Test concluded at about 11 a.m. today with a simulated main engine cut-off at the pad. Following the test, the flight crew was set to return to Houston,

TX later this afternoon. On the Shuttle Discovery, helium signature testing is complete. Cleaning of the gaseous nitrogen (GN2) system on the mobile launch platform and reassembly of the Shuttle main engine GN2 purge panel concluded yesterday. Technicians will replace multiplexer demultiplexer (MDM) No. 4 this week because of an internal card failure. MDM No. 4 is one of 23 MDMs on board the orbiter that convert and format data from the vehicle for transfer to the Shuttle's general purpose computers. STS-88: Verification of Endeavour's right hand orbiter maneuvering system helium system is complete. Replacement of window No. 3 is complete and windows No. 1 and No. 4 are slated for replacement later this week. Drag chute installation and hydraulic checks of Endeavour's main landing gear continue. STS-93: Post flight inspections of Columbia's main engines are under way. Work to destow the flight crew equipment is in work. Fuel cell and water spray boiler evaluations continue. Tomorrow workers begin efforts to deconfigure the Neurolab payload and Spacelab removal is slated for Monday. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, May 7].]

MAY 8: Payload Processing Status Report, Friday, May 8, 1998. Operations currently in work: STS-91 9th MIR docking Spacehab Module Alpha Magnetic Spectrometer (AMS): Spacehab electrical/water system connections. AMS stand-alone testing within orbiter payload bay. STS-88 International Space Station-Node 1/PMA-1/PMA-2: Leak check of PMA-2 interface. Cargo Element Integrated Test. Future Payload Processing Status: ELV spacecraft arrival status at KSC: Deep Space 1: July 19 (Launch Oct. 15); Mars Orbiter: Sept. 4 (Launch Dec. 10); Mars Lander: Oct. 15 (Launch Jan. 3, '99); Stardust: Nov. 12 (Launch Feb. 6, '99). Space Shuttle payload arrivals: AXAF/STS-93: Aug. 14 (Launch Dec. 3)(no earlier than). Payload Special Note: In OPF Bay 3, Columbia's payload bay doors have been opened. With the decision not to refly Neurolab, work will begin to mechanically and electrically disconnect the Spacelab payload. Its removal from Columbia's payload bay is scheduled for Monday, May 11. It will be returned to the Operations and Checkout Building for deconfiguration. Bruce Buckingham. (1998). **Kennedy Space Center Payload Processing Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, May 8].]

◆ An Air Force Titan 4 rocket carried a spy satellite into orbit Friday that experts think will be used to eavesdrop on communications in the world's hotspots. The 9:38 p.m. launch from Cape Canaveral Air Station marked the third mission of the Air Force's latest version of the Titan, the most powerful unmanned American booster in use today. ["Titan rocket sends spy satellite into orbit," **Florida Today**, May 9, 1998, p 6A.]

MAY 11: Space Shuttle Status Report, Monday, May 11, 1998. STS-91: Replacement of Discovery's master event controller No. 1 and the change-out of multiplexer demultiplexer No. 4 are complete. Over the weekend, technicians completed work on the mobile launch platform's gaseous nitrogen system. The payload bay doors are closed and crew module/SPACEHAB pressure leak checks are complete. Loading of hypergolic propellant into Discovery's onboard storage tanks is under way, with oxidizer loading in work today and fuel loading slated for tomorrow. Preparations for next Monday's tanking test of the new super lightweight external tank are ongoing this week. STS-88: Replacement of the yaw actuator on Endeavour's main engine No. 2 is complete. Window No. 4 has been removed and replacement occurs this week. Drag chute installation is in work and

preparations for radiator deployment and inspection begin today. STS-93: Post-flight inspections of Columbia's main engines are complete. Main landing gear wheel and tire removal begins today. Orbiter power system validations are complete and forward reaction control system functional tests pick up tomorrow. The payload bay doors are open and workers have demated Neurolab's electrical connections. Payload removal is slated for tomorrow. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, May 11].]

◆ Gordon Cooper hadn't seen the place since Faith 7 lifted him into orbit 35 years ago. But on Sunday when the control center, or blockhouse, at the historic Space Launch Complex 14 was reclaimed from nature and opened to the public for the day, Cooper was among those reminding visitors of the nationwide fascination with space travel. The site was where John Glenn took Friendship 7 on the first manned orbital mission in February 1962. That mission was followed by Scott Carpenter's Aurora 7 flight in May 1962 and Wally Schirra's Sigma 7 flight in October 1962. Cooper became the sixth and final astronaut to fly in NASA's Mercury program 35 years ago this week. Project Mercury was initiated in 1958 and ended in 1963. It was this nation's first man-in-space program. And while it may not have been a labor of love for members of the 45th Operations Support Squadron to refurbish the blockhouse, it was done with a deep respect for the history of the place. Members of the squadron donated thousands of hours over the past two years cleaning off mildew, replacing old plumbing, painting and polishing the blockhouse. The blockhouse will serve as a conference center at Cape Canaveral. Brig. Gen. Randall Starbuck, commander of the 45th Space Wing, allocated $60,000 for the refurbishing effort. The blockhouse served as the launch control station only 100 yards from the launch site. Sealed beneath 8 feet of sand and locked behind a foot-thick vault door, technicians and engineers monitored and launched Atlas rockets. ["Launching space history," **Florida Today**, May 11, 1998, p 1B & 2B.]

MAY 12: Space Shuttle Status Report, Tuesday, May 12, 1998. STS-91: Loading of hypergolic propellant into Discovery's onboard storage tanks continues. Oxidizer loading is complete and fuel loading begins today. Preparations for next Monday's tanking test of the new super lightweight external tank continue. Tomorrow, the payload bay doors will be reopened and SPACEHAB testing will begin. On Friday, the AMS payload will undergo orbiter interface verification tests. STS-88: Endeavour's radiator deployment is complete and inspections of the radiator's lower surface are in work today. This week technicians will conduct leak and functional testing of the gaseous oxygen system on the orbiter's main propulsion system. Preparations to install window No. 4 are in work. STS-93: Removal of Columbia's main landing gear wheels and tires is complete. Brake assembly removal is slated for today. Functional checks of the orbiter's forward reaction control system (FRCS) are also complete and FRCS disconnection begins later today. Neurolab removal efforts began this morning. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, May 7].]

MAY 13: Space Shuttle Status Report, Wednesday, May 13, 1998, STS-91: Loading of hypergolic propellant into Discovery's onboard storage tanks is complete. Today, technicians will begin close-outs of the orbiter's aft compartment in preparation for

Monday's tanking test of the first super lightweight external tank. Shuttle integrated voltage tests are scheduled for today. Opening of the orbiter's payload bay doors is under way and SPACEHAB interface verification testing (IVT) begins this morning. The AMS payload will undergo its IVT on Friday. STS-88: Leak and functional testing of the gaseous oxygen system on Endeavour's main propulsion system is complete. Radiator lower surface inspections and window No. 4 installation are also complete. Hydraulic pressurization tests of the main engine thrust vector control and elevons are in work. STS-93: Removal of Columbia's main landing gear brake assembly is complete. Down loading of the orbiter's experiment recorder data to the ground support equipment is also complete. Yesterday, workers removed Neurolab and the Spacelab transfer tunnel from Columbia's payload bay. Today, preparations for hypergolic deservicing are in work. Nose landing gear wheel and tire inspections and GAS canister removal efforts begin today. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, May 13].]

MAY 14: Space Shuttle Status Report, Thursday, May 14, 1998. STS-91: Close-outs of Discovery's aft compartment continue in preparation for Monday's tanking test of the first super lightweight external tank. Shuttle integrated voltage tests begin today. Yesterday, technicians opened the orbiter's payload bay doors and completed SPACEHAB tunnel leak checks. SPACEHAB interface verification testing (IVT) is under way and the AMS IVT is set for Friday. STS-88: Hydraulic pressurization tests of Endeavour's main engine thrust vector control and elevons are complete. Leak checks on the orbiter maneuvering system oxidizer valves are also complete. Hydraulic leak checks of the main landing gear struts are scheduled to begin today. Endeavour's radiators will be stowed in the orbiter's midbody today. STS-93: Columbia's nose landing gear wheel and tire inspections are complete. Removal of the GAS canisters from the orbiter's middeck was completed yesterday. Today, preparations for hypergolic deservicing are in work. Workers will also remove the forward extension of the Spacelab transfer tunnel later today. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, May 14].]

MAY 15: On the final NASA mission to the Russian space station Mir next month, shuttle Discovery's launch will be fed by a new, lighter fuel tank that never has flown. The new tank weighs about 7,500 pounds less than its predecessor, allowing the shuttle haul heavier cargoes into orbit. The extra carrying room will be critical once NASA's shuttle fleet starts hoisting big pieces of the international space station off the planet. Before it takes its first leap off the launch pad, however, the tank will get once last test Monday. Kennedy Space Center workers will fill the new model with more than 500,000 gallons of super-cold liquid oxygen and liquid hydrogen. Then they will see how the tank holds up and will check for leaks before draining it. If all goes well, the tank will be cleared for its debut launch. If there are problems, NASA has a potentially serious dilemma. Depending on the problem, the tank work could delay the mission by days or much longer if the shuttle has to be moved off the launch pad for extensive work. However, NASA officials say they expect no surprises Monday, only confirmation that the tank is ready to go. The new tank is the third model that has been designed for NASA's space shuttles. The first model flew on only six missions before a new version of the tank was launched in 1983. Called the lightweight tank, that model weighed 10,000 pounds less than the original version – considered quite an accomplishment for the time. It's been used on every shuttle launch since. But with the

international space station project looming, NASA began looking for new ways to lighten its spaceships. Enter aluminum lithium, a tough material that weighs much less but is stronger than the aluminum alloy now used for the tanks. NASA calls it the "super-lightweight tank." ["New lightweight shuttle tank gets final test Monday," **Florida Today**, May 16, 1998, p 1A & 2A.]

◆ Space Shuttle Status Report, Friday, May 15, 1998. STS-91: Retests of Discovery's replaced master event controller and multiplexer/demultiplexer were successfully completed yesterday. Aft compartment close-outs continue in preparation for testing of the first super lightweight external tank. Liquid hydrogen loading is slated to begin Monday at about 7 a.m. and liquid oxygen loading follows at 10:20 a.m. SPACEHAB interface verification testing is complete and the AMS IVT is scheduled to begin this afternoon. Following the AMS IVT, Discovery's payload bay doors will be closed. The Rotating Service Structure will be retracted on Sunday in preparation for the tanking test. STS-88: Endeavour's radiators are stowed in the orbiter's midbody and the payload bay doors have been closed to support inspections. Hydraulic leak checks of the main landing gear struts are in work. STS-93: Preparations for Columbia's hypergolic deservicing are complete. Removal of the Spacelab tunnel forward extension is also complete. Draining of the orbiter maneuvering system propellant tanks is under way. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, May 15].]

◆ Payload Processing Status Report, Friday, May 15, 1998. Operations currently in work: 9th MIR DOCKING SPACEHAB MODULE ALPHA MAGNETIC SPECTROMETER (AMS) (STS-91): Target Launch Date: June 2, 1998 6:10 p.m. EDT. Current Location: Space Shuttle Discovery payload bay; Launch Pad: 39 A. PAYLOAD OPERATIONS IN WORK: * AMS stand-alone testing in payload bay; * Establish AMS electrical connections with Discovery;* AMS Interface Verification Test (IVT). INTERNATIONAL SPACE STATION (STS-88) Node 1 (Unity): Target Launch Date: Sept. 3, 1998 NET (under review); Current Location: Space Station Processing Facility (SSPF);Launch Vehicle: Space Shuttle Endeavour; Launch Pad: 39B. SPACE STATION OPERATIONS CURRENTLY IN WORK: * Cargo Element Integrated Test;* Integrated Compatibility Test; * Ventilation control system flow balance checks. FUTURE PAYLOAD PROCESSING STATUS: ELV spacecraft arrival status at KSC: Deep Space 1: July 19 (Launch Oct. 15); Mars Orbiter: Sept. 4 (Launch Dec. 10); Mars Lander: Oct. 15 (Launch Jan. 3, '99); Stardust: Nov. 12 (Launch Feb. 6, '99); Space Shuttle payload arrivals: AXAF/STS-93: Aug. 14 (Launch Dec. 3)(no earlier than). Payload Special Note: In the Operations and Checkout Building, the Neurolab Spacelab module has been removed from the payload canister and was installed into the workstand on Thursday. Deintegration of the laboratory experiment racks is now beginning. Bruce Buckingham. (1998). **Kennedy Space Center Space Payload Processing Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, May 15].]

MAY 16: Months ahead of John Glenn's return to space, motels and trailer parks are booked for 100 miles around. High school bands all over Brevard County are thumping out the Marine hymn. "Go, Glenn, Go" T-shirts are being rushed to Florida from cutting boards in Hong Kong and Honduras. John Herschel Glenn Jr., middle-named for the 18th century astronomer who discovered Uranus, is coming back to the beach resort where he

blasted off into history Feb. 20, 1962. Glenn was the first American to orbit Earth. He's due to lift off again Oct. 29. At the Econo Lodge in Cocoa Beach, which Glenn and his fellow astronauts owned when it was the Cape Colony Inn, the receptionist answers the phone: "Home of the original seven astronauts... Sorry, we sold out for that week when the flight was announced." Tens of thousands of campers are expected to line the beaches of Cape Canaveral and the banks of Banana River. Thousands more are expected to watch from powerboats and cruise ships in the Atlantic, where Russians used to trawl for minnows of Cold War intelligence. The Atlas missile that carried Glenn aloft was a mere firecracker compared with the monstrous rockets that will power his next trip. Johnnie Johnson, a former deputy commander of Kennedy Space Center, stood at Pad 14, just off ICBM Road, where John Glenn blasted off into glory. "The gantry was sold for scrap years ago, a victim of Florida cancer: rust." An armadillo grazed near the bunker that once stored liquid oxygen, the fuel that boosted the missile aloft. The entrance to the complex is marked by a monument to the Mercury Seven, fashioned from some exotic missile metal. Buried beneath it is a time capsule, to be opened in 2462, containing photos, movies, blueprints of the capsule and Glenn's Marine Corps pilot's wings. Johnson pointed to the 5-foot-high bank of Burroughs computers along the wall that controlled every phase of Glenn's flight from launch to recovery. "Combined, they had 30,000 bytes," Johnson said, "about what's needed to turn out an expensive wristwatch these days." Hangar S is where the Mercury astronauts lived just before launch, undergoing final medical tests and donning their spacesuits before boarding a van to the pad. And where they constantly complained about the smell from the cages housing the chimpanzees that preceded them into the heavens. The hangar now is what Johnson described as a "cleansing area for retrievable space scrap." One room stores row upon row of helmeted silver spacesuits, like a display in Madame Tussaud's wax works. The ghost town setting of old hangars and decaying gantries is a reminder that the carnival atmosphere of the pioneer space days all but disappeared when flight training and Mission Control, with its highly sophisticated computer complex, moved to the Johnson Space Center in Houston. The training is just as rigorous, but the new breed of astronaut is more sedate. Yesteryear's bawdy, barracks behavior would be frowned on nowadays. The actual launch still takes place at Kennedy Space Center. Glenn's shuttle, about the size of a DC-9 passenger jet, will depart from Pad 39B, rocketed off by 7.2 million pounds of thrust, compared with the 360,000 pounds of thrust from the Atlas popgun that lofted his phone-booth sized Mercury capsule 3 ½ decades ago. ["Once and future Glenn to rise again," **Florida Today**, May 17, 1998, p 1B & 5B.]

MAY 18: NASA is expected to clear shuttle Discovery today for its June 2 launch to the Russian space station Mir after successfully finishing tests Monday on the ship's new fuel tank. Top NASA managers will meet at Kennedy Space Center starting this morning for a final review of the shuttle. "We expect to be ready for a June 2 launch date," said KSC spokesman Joel Wells. During the nine-day mission, Discovery and its crew are to pick up astronaut Andy Thomas, who has been living on Mir since January. The flight will clear the way for the planned start of construction later this year on the new international space station. Discovery passed a major hurdle Monday when its external fuel tank was filled with more than 500,000 gallons liquid oxygen and liquid hydrogen in an important check of the tank's new design. The tank, which feeds the shuttle's three main engines during launch, looks the same as its predecessors but weighs 7,500 pounds less. The lost weight means the spaceships will be able to carry heavier cargoes into orbit. The increased capacity will be needed once the shuttle fleet starts hauling pieces of the international station into orbit.

["Light space shuttle fuel tank ready for launch, NASA says." **Florida Today**, May 19, 1998, p 5A.]

◆ Space Shuttle Status Report, Monday, May 18, 1998. STS-91: Today, Shuttle engineers successfully completed the tanking test of the new super lightweight external tank (SLWT) set to fly for the first time with Shuttle Discovery on mission STS-91. From Firing Room No. 1, the test team subjected the external tank and orbiter to a simulated launch countdown scenario. The simulated countdown clock started Saturday night at 9 p.m. with reactant loading of Discovery's power reactant storage and distribution system and culminated with a planned ground launch sequencer (GLS) cut-off at T-31 seconds today at 4:50 p.m. Cryogenic loading of the SLWT liquid hydrogen tank began at about 7:20 a.m. today and loading of the liquid oxygen tank began at about 10 a.m. A SLWT data evaluation team with members from KSC, Johnson Space Center and Marshall Space Flight Center were primarily interested in the tension loads that would be placed on the new tank during fuel loading. The extremely cold cryogenic fuels can cause the external tank to shrink up to 1-inch in diameter and several inches in length. This shrinkage places a tension or "pinch" load on the external tank/solid rocket booster strut attach points located near the tank's aft dome. The data evaluation team began gathering "pinch" load data at the 7 percent full mark during liquid hydrogen tanking. Throughout the entire liquid hydrogen tanking process, the tension loads were well within the acceptable limits. The SLWT data evaluation team completed their test objectives earlier than expected so the test team chose to move GLS cut-off up by about two hours. An orbiter data evaluation team also used the test scenario as an opportunity to check-out various orbiter systems. The KSC ice/debris inspection team conducted remote inspections of the external tank from firing room No. 1 throughout the test and performed an onsite inspection after the SLWT was 100 percent full and halfway through stable replenish. Though additional hands-on inspections will follow this week, preliminary reports show the external tank in excellent condition. Draining of the external tank concludes at about 7 p.m. tonight and boil-off should be complete tomorrow afternoon. Preliminary results from the data evaluation teams will be presented at tomorrow's STS-91 Flight Readiness Review, where the official launch date and time is expected to be announced. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, May 18].]

MAY 19: The Flight Readiness Review for the STS-91 mission is being held today in the Mission Briefing Room of the Operations and Checkout (O&C) Building. Mission managers are expected to announce the go-ahead to launch the Space Shuttle Discovery from Launch Pad 39A on June 2 at about 6:10 p.m. The FRR follows the successful completion of the Launch Readiness Review (LRR) last Friday and the pre-launch cryogenic test of the Shuttle's first super lightweight external tank (SLWT) on Monday. The SLWT will be used for the first time on STS-91. ["STS-91 Flight Readiness Review today; launch target is June 2," **KSC Countdown**, May 19, 1998.]

◆ The street in front of 45th Space Wing Headquarters at Patrick Air Force Base will be dedicated in honor of astronaut Edward White II during a Memorial Day ceremony. The event will be held at the Memorial Plaza on base, May 22 at 10 a.m., with the dedication made by Space Wing Commander General Randall Starbuck. Several current and former

astronauts are expected to attend the ceremony. [**KSC Countdown,** May 19, 1998 and May 21, 1998.]

MAY 20: Space Shuttle Status Report, Wednesday, May 20, 1998. STS-91: Following yesterday's Flight Readiness Review, NASA Shuttle managers announced June 2 as the official launch date for Shuttle Discovery on mission STS-91. As the launch team proceeds with standard prelaunch preparations, Shuttle engineers are evaluating a minor overboard water leak from the orbiter's fuel cell No. 3 relief valve to determine its acceptability for flight. The leak was first noticed Monday afternoon during the tanking test of the new super lightweight external tank. With the super lightweight tank (SLWT) test complete, the Rotating Service Structure at Pad 39A has been moved back in place around the orbiter. Today, the ice/debris inspection team will evaluate data taken from a hands-on inspection of the external tank thermal protection system as part of the SLWT test data evaluation process. With the payload bay doors open, technicians are completing electrical connections that support the AMS payload. STS-88: Technicians are preparing to make auxiliary power unit drain line connections tomorrow. Rework on the main engine heat shield attach points is underway. Standard inspections of the payload bay doors are in work. STS-93: Removal of Columbia's main engine heatshields is complete. Shuttle main engine No. 2 has been removed and removal of the two remaining engines is in work. Replacement of multiplexer demultiplexer No. 2 is slated to occur today and removal of fuel cell No. 2 is scheduled for this week. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, May 20].]

MAY 21: Space Shuttle Status Report, Thursday, May 21, 1998. STS-91: KSC workers have gained access to Discovery's aft compartment and will conduct standard main engine hydraulic testing today. Following yesterday's final inspection of the super lightweight external tank, the ice/debris inspection team noted no significant thermal protection system damage resulting from the recent tanking test. Engineering evaluations of the leaky fuel cell No. 3 relief valve are expected to conclude tomorrow. Though repairs on the valve are not expected to be necessary, as a precaution KSC engineers are developing a plan to reach the over board valve from Discovery's midbody should access be required. Electrical connections supporting the AMS payload are complete. The payload bay doors remain open as AMS end-to-end testing begins today and continues through Saturday. Payload bay camera testing is slated for this week and installation of the external tank separation camera is in work. The payload bay doors are scheduled to be closed on Tuesday. STS-88: Technicians are making auxiliary power unit drain line connections today. Rework on the main engine heat shield attach points continues. Standard inspections of the payload bay doors also continue today. STS-93: Columbia's main engine removal is complete. Technicians have also removed fuel cell No. 2 and a replacement fuel cell is being installed today. Preparations are under way to install multiplexer demultiplexer No. 2 today. Efforts to remove the extended duration orbiter (EDO) pallet are in work through next week. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, May 21].]

MAY 22: Another delay in the construction of the international space station has left NASA with nothing to launch this summer, officials said Friday. The station's first two

launches – originally set for late 1997 – on Friday were rescheduled for Nov. 20 in Kazakhstan and Dec. 3 at Kennedy Space Center. NASA recommended the launch delays – the third in the past year – agency spokesman Ed Campion said. The 15 countries that run the $46 billion project will vote on NASA's recommendation in a May 30 meeting at KSC. Russia once again is being blamed for the delay. The Russians are late with their Service Module, which provides the station's living quarters, life support, flight control and propulsion. The module is 95 percent complete but won't be ready for launch until early April 1999. The Service Module is the third part to be launched, but it needs to be in orbit within six months of the first two sections to keep them from going out of control, the Russians say. NASA contends the first two station parts technically can last 18 months without the Service Module but decided there was no reason to launch them early. This means the shuttle-launching scheduled will come to a stand still after the launch of Discovery, set for June 2. The next launch is Oct. 29 with U.S. Sen. John Glenn's return to space. ["NASA launchers get summer break," **The Orlando Sentinel**, May 23, 1998, p A-13.]

◆ Payload Processing Status Report, Friday, May 22, 1998. 9th MIR DOCKING SPACEHAB MODULE ALPHA MAGNETIC SPECTROMETER (AMS) (STS-91): Target Launch Date: June 2, 1998 6:10 p.m. EDT; Current Location: Space Shuttle Discovery payload bay; Launch Pad: 39 A. PAYLOAD OPERATIONS IN WORK: * AMS end- to-end communications test. INTERNATIONAL SPACE STATION (STS-88) Unity (Node 1); Target Launch Date: Sept. 3, 1998 NET (under review); Current Location: Space Station Processing Facility (SSPF); Launch Vehicle: Space Shuttle Endeavour; Launch Pad: 39B. SPACE STATION OPERATIONS CURRENTLY IN WORK: * Work to remove and replace Node 1 cold plates. FUTURE PAYLOAD PROCESSING STATUS: ELV spacecraft arrival status at KSC: Deep Space 1: July 19 (Launch Oct. 15); Mars Orbiter: Sept. 4 (Launch Dec. 10); Mars Lander: Oct. 15 (Launch Jan. 3, '99); Stardust: Nov. 12 (Launch Feb. 6, '99); Space Shuttle payload arrivals: AXAF/STS-93: Aug. 14 (Launch Dec. 3 NET). Bruce Buckingham. (1998). **Kennedy Space Center Space Payload Processing Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, May 22].]

◆ Space Shuttle Status Report, Friday, May 22, 1998. STS-91: With evaluations of the leaky fuel cell No. 3 relief valve complete, Shuttle engineers are recommending that no additional work or testing be performed on the valve preflight. The minor leak is well within acceptable limits and engineers are confident that in-flight water production will not be seriously impacted. AMS end-to-end testing began early this morning and continues through Saturday. Payload bay camera testing is slated for this week and installation of the external tank separation camera is in work. The payload bay doors are scheduled to be closed on Tuesday. STS-88: Technicians have completed auxiliary power unit drain line connections. Flushing of the ammonia boiler system is scheduled for today. In the Vehicle Assembly Building , solid rocket booster joint close-outs are in work and external tank/solid rocket booster mate is slated for the first week in June. STS-93: Technicians have completed electrical connections on Columbia's replaced fuel cell No. 2 and mechanical mating is in work today. Replacement of multiplexer demultiplexer No. 2 is also complete. Yesterday, workers removed the orbiter's payload recorder. Efforts to remove the extended duration orbiter (EDO) pallet continue through next week. Preparations for orbiter maneuvering system functional tests are in work. Bruce Buckingham. (1998). **Kennedy**

Space Center Space Shuttle Status Report [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, May 22].]

MAY 23: Walter Koenig, better known as Pavell Chekov from the original "Star Trek" series, reached out Saturday to shake the hand of a 30-something fan at the Kennedy Space Center Visitor Complex. According to officials at the Kennedy Space Center complex, thousands visited the center duirng the second day of Space Week 98, which featured actors from three generations of Gene Roddenberry's "Star Trek" series, as well as astronauts Capt. Alan Bean, who served with the Apollo XII mission, and Dr. Ed Gibson, who spent 84 days in space on a Skylab mission. Area residents and visitors will get the opportunity to meet more astronauts during Space Week, which continues through Monday at the Kennedy Space Center Visitor Complex. ["Stars of space and screen touch down at KSC," **Florida Today**, May 24, 1998, p D-1.]

MAY 26: The entrance to the Kennedy Space Center Visitor Complex will be revamped as part of a $10 million project that includes two new attractions. Opening in 1999 near the renovated entrance building are a 300-seat theater with a film exploring the possibilities of life on other planets and a display that looks at the future of robotic explorers. The new exhibits are part of a bigger, $90 million project that has added attractions off the visitor center's main campus, including an observation deck overlooking the space shuttle launch pad and a behind-the-scenes look at construction of the international space station. "Over the past two years, we've concentrated on real exhibits and showing people what happens at the space center," said Rick Abramson, president and chief operating officer of Delaware North Parks Services, which operates the center through a leasing agreement with NASA. "Now it's time to bring the main campus up to date." Abramson announced the project at Pow Wow, the massive international travel trade show under way in Chicago. The visitor center's entrance building will close June 15 for refurbishing, and visitors will enter through a temporary site, Abramson said. The new entrance will open in December and will include video screens that show the off-site attractions. The 11-minute, $1 million movie will be housed in the former Spaceport Theater. The robot display, which features Marie, twin sister of Sojourner rover that recently explored Mars, will replace "Satellites and You." The automated exhibit will tout robots as the unsung heroes of space exploration. ["$10 million will give a lift to space center entrance," **The Orlando Sentinel**, May 27, 1998, p B-5.]

◆ Space Shuttle Status Report, Tuesday, May 26, 1998. STS-91: Discovery's main engine leak checks are complete and orbiter aft compartment close-outs are in work. Installation of the external tank separation camera is also complete. End-to-end testing of the AMS payload concluded Saturday and payload bay door closure is slated to occur today. At pad 39A, preparations are under way for ordnance installation early tomorrow morning. Tomorrow afternoon, technicians will partially drain and then refill the orbiter maneuvering system oxidizer tank to ensure proper loading and pressurization. Launch countdown preparations begin this week with the 43-hour countdown clock scheduled to start Saturday at 9 p.m. The STS-91 flight crew arrives at KSC Saturday at 12:30 p.m. STS-88: Flushing of Endeavour's ammonia boiler system was completed Friday. Preparations are in work today to support forward reaction control system installation on Wednesday. Auxiliary power unit leak and functional testing is under way. In the VAB, solid rocket booster joint close-outs continue and external tank/solid rocket booster mate is slated for the first week in June. STS-93: Mechanical connections of Columbia's replaced fuel cell No. 2 are

complete. Efforts to remove the extended duration orbiter (EDO) pallet continue through next week. Orbiter maneuvering system functional testing is in work. Main propulsion system inspections are under way and water spray boiler No. 3 off-load is in progress. This week technicians will replace the nose landing gear wheels and tires. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, May 26].]

MAY 27: Final preparations are hitting full stride at Kennedy Space Center today as NASA gets ready for next week's planned launch of shuttle Discovery on an orbital taxi mission. Agency managers say nothing is standing in the way of sending the spaceship and its crew to the Russian space station Mir at 6:10 p.m. Tuesday. The countdown is scheduled to begin Saturday (May 30). During the nine-day mission, Discovery is to make NASA's last flight to Mir and pick up astronaut Andy Thomas, who has been living on the outpost since January. When Thomas returns to Florida, it will mark the end of a partnership that began in March 1995 when former astronaut Norm Thagard became the first American to take up residence on Mir. Seven NASA guests have made Mir their home, gathering information about running a space station so the United States can lead construction of a new international station beginning in November. Discovery has cleared one potential problem that could have delayed its flight. Engineers have decided the ship can fly with a leaking water valve. The valve, which vents water into space, does not need to be repaired before the flight. The water is a byproduct of the way the shuttle produces electricity in its fuel cells and is left behind for Mir's residents to use for drinking and cooking. Engineers concluded the leak would not keep the shuttle from producing an adequate amount of water for Mir's crew, nor would the released water endanger Mir by contaminating its outside surfaces. ["Preparations under way for Discovery launch," **Florida Today**, May 28, 1998, p 11A.]

◆ Space Shuttle Status Report, Wednesday, May 27, 1998. STS-91: Preparations to begin the launch countdown for mission STS-91 on Saturday continue on schedule. Discovery's payload bay doors were closed for flight yesterday afternoon. Ordnance connections on the solid rocket boosters are complete and pyrotechnic initiator controller (PIC) checks are in work today. Drain and refill of the orbiter maneuvering system oxidizer tank follow PIC checks this afternoon. Discovery's aft main engine compartment close-outs are on a scheduled hold today due to planned launch pad clears and will resume tomorrow. The STS-91 flight crew arrives at KSC Saturday at 12:30 p.m. STS-88: Technicians have completed inspections and measurements of Endeavour's payload bay door seals. The forward reaction control system was delivered to Orbiter Processing Facility bay 1 yesterday and will be installed into the orbiter tonight. Auxiliary power unit leak and functional testing is in work this week. In the Vehicle Assembly Bay, solid rocket booster joint close-outs continue. STS-93: Efforts to remove Columbia's extended duration orbiter (EDO) pallet are in work. Orbiter maneuvering system functional testing continues. Main propulsion system and water spray boiler No. 3 inspections also continue. Removal and replacement of the nose landing gear wheels and tires is in work. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, May 27].]

MAY 28: Space Shuttle Status Report, Thursday, May 28, 1998. STS-91: Preparations to begin the launch countdown for mission STS-91 on Saturday are proceeding on schedule. Installation and checkout of the ordnance on the solid rocket boosters are complete.

Refilling of Discovery's orbiter maneuvering system oxidizer tank concluded yesterday and pressurization of the hypergolic system began this morning. Aft main engine compartment close-outs have resumed today and will conclude Saturday with aft door installation. The STS-91 flight crew arrives at KSC Saturday at 12:30 p.m. STS-88: Installation of Endeavour's forward reaction control system is in work and interface checks are scheduled for tomorrow. Auxiliary power unit leak and functional testing continues this week. In the Vehicle Assembly Building, solid rocket booster joint close-outs continue. STS-93: Replacement of Columbia's nose landing gear wheels and tires is complete. Technicians continue preparations for tomorrow's planned removal of the extended duration orbiter (EDO) pallet. Orbiter maneuvering system functional testing also continues. Main propulsion system inspections are under way and water spray boiler No. 3 core off-load continues. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, May 28].]

MAY 29: Labor strife at Cape Canaveral Air Station will not affect Tuesday's scheduled launch of shuttle Discovery to Russia's space station Mir, NASA officials and labor leaders said Friday. Ed Hill, president of the 2,000-member Transport workers Union Local 525, said the union likely would not call a strike on Monday or Tuesday. A strike may have forced NASA to delay Discovery's launch. Discovery is scheduled to liftoff at 6:10 p.m. Tuesday on NASA's final trip to Mir to pick up American astronaut Andy Thomas, who has spent five months aboard the station. The local is protesting Sverdrup Technology Corp.'s decision not to recognize the union when the company takes over the $200 million Launch Operations and Support Contract at the air station Monday. Hill said the union first will seek legal and political remedies to the dispute. He said he personally assured U.S. Rep. Dave Weldon, R-Palm Bay, the union would take no action that would jeopardize the launch. The contract change has resulted in about 200 layoffs including 139 union workers. Despite the Air force's critical role in coordinating shuttle operations, NASA spokesman Bruce Buckingham said there was little concern about a strike affecting the launch. "This is an Air Force issue, not a NASA issue." Buckingham said. ["Labor woes won't affect launch of Discovery, official says," **Florida Today**, May 30, 1998, p 6A.]

◆ Space Shuttle Status Report, Friday, May 29, 1998. STS-91: The STS-91 launch countdown begins tomorrow at 9 p.m. and all prelaunch preparations continue on schedule. The contingency space suits are installed in the orbiter's airlock. Aft main engine compartment close-outs continue with installation of the aft doors slated for tomorrow morning. Preliminary weather forecasts indicate a 40 percent chance that weather could prohibit launch activities on Tuesday. The primary concern is for seabreeze thunderstorms with associated showers and anvil clouds. The forecast calls for scattered clouds at 4,000 feet and broken clouds at 30,000 feet; visibility of 7 miles (in thunderstorms possibly 2 miles); winds from the southeast at 12 knots peaking to 18 knots; a temperature of 83 degrees F and relative humidity of 63 percent. STS-88: Installation of Endeavour's forward reaction control system is complete and interface checks are planned for today. Auxiliary power unit leak and functional testing continues and main engine heat shield attach point work is under way. Technicians will install hydraulic pump No. 3 today. Endeavour's payload bay doors will be opened today and later the Ku-band antenna will be deployed. In the Vehicle Assembly Building, solid rocket booster joint close-outs continue. STS-93: Columbia's orbiter maneuvering system leak and functional testing is complete. Ammonia

off load from water spray boiler No. 3 concluded yesterday and electrical checks are in work today. Technicians are preparing to remove Columbia's extended duration orbiter (EDO) pallet today. Main propulsion system leak and functional testing begins today. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, May 29].]

◆ Payload Processing Status Report, Friday, May 29, 1998. 9th MIR DOCKING SPACEHAB MODULE ALPHA MAGNETIC SPECTROMETER (AMS) (STS-91): Target Launch Date: June 2, 1998 6:10 p.m. EDT; Current Location: Space Shuttle Discovery payload bay; Launch Pad: 39 A. PAYLOAD OPERATIONS IN WORK: * Payload preparations to begin launch countdown. INTERNATIONAL SPACE STATION (STS-88) Unity (Node 1): Target Launch Date: Dec, 1998 NET; Current Location: Space Station Processing Facility (SSPF); Launch Vehicle: Space Shuttle Endeavour; Launch Pad: 39B. SPACE STATION OPERATIONS CURRENTLY IN WORK: * Reinstallation of Node 1 cold plates. FUTURE PAYLOAD PROCESSING STATUS: ELV spacecraft arrival status at KSC: Deep Space 1: July 19 (Launch Oct. 15); Mars Orbiter: Sept. 4 (Launch Dec. 10); Mars Lander: Oct. 15 (Launch Jan. 3, '99); Stardust: Nov. 12 (Launch Feb. 6, '99); Space Shuttle payload arrivals: AXAF/STS-93: Aug. 14 (Launch Jan. wk 4 NET). Bruce Buckingham. (1998). **Kennedy Space Center Space Payload Processing Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, May 29].]

◆ NASA and its worldwide partners will try to set a new schedule for building the international space station during meetings this weekend at Kennedy Space Center. The top space officials are expected to bless a new plan NASA unveiled last week, which calls for the first two construction flights to be launched in November and December. Work on the station was to begin in June but has been pushed back because of Russian delays in completing key early pieces of the outpost. The new launch schedule will lay out the 33 space shuttle missions and 15 Russian rocket launches that will be needed to build the station during six years of construction. ["Meetings will try to revise station-building schedule," **Florida Today**, May 30, 1998, p 6A.]

◆ An independent auditor said Friday that NASA did a good job evaluating all the risks before rocketing 72 pounds of nuclear materials into space. The Cassini probe, which will arrive at Saturn in 2004, was the subject of protests and criticism when launched in October. But the General Accounting Office, a government arm that has been critical of the National Aeronautics and Space Administration in the past, praised the agency's system of evaluating risks. Protesters said a mishap during launch could have caused serious health risks because of the plutonium on board, which will be used as fuel for the spacecraft. They also worry what will happen as the probe slingshots past Earth next year. "NASA did a good job in trying to ensure the risks were addressed," said Alan Li, associate director at GAO for the division that handles NASA audits. "We're not talking about a handful, but many experts in many areas were consulted." In addition to the unmanned plutonium missions already planned, plutonium is considered by some as a necessary part of any human mission to Mars. ["Cassini handling praised," **The Orlando Sentinel**, May 30, 1998, p A-8.]

MAY 30: To spark interest in space exploration and finance a $10 million prize for the best three-person spacecraft, a not-for-profit foundation has announced a sweepstakes in which

the grand prize is a free suborbital trip into the great beyond. Of course, to cash in your prize, you'll have to wait until the new spacecraft is designed, built and working. The St. Louis-based X PRIZE Foundation, with the support of the New Spirit of St. Louis Organization, is offering the $10 million to the first private team of entrepreneurs and aerospace experts to build a three-person craft capable of going 62 miles into space twice within 14 days. ["$10 million prize offered to send tourists to space," **Florida Today**, May 31, 1998.]

◆ Space Shuttle Status Report, Saturday, May 30, 1998. STS-91: The countdown for launch of mission STS-91 remains on schedule to begin tonight at 9 p.m. at the T-43 hour mark. All pre-launch activities continue on schedule. The contingency space suits have been installed into the orbiter's airlock and check-out of those suits will be completed today. Flight crew equipment stowage in the orbiter's mid-deck continues today and aft main engine compartment close-outs are complete. Final main propulsion system checks are underway. The crew for mission STS-91 arrived at KSC's Shuttle Landing Facility at about 12:50 p.m. EDT today. They will spend the days prior to launch at KSC reviewing their flight plans, undergoing final medical examinations and flying in the Shuttle Training Aircraft. The STS-91 crew are: Commander Charles Precourt; Pilot Dominic Gorie; and Mission Specialists Franklin Chang-Diaz, Wendy Lawrence, Janet Kavandi and Valery Ryumin. Mission Specialist Andrew Thomas, currently on the Mir space station, will be returning with the rest of the crew following Shuttle/Mir docking operations. Given an on time launch June 2, Discovery is scheduled to land at KSC on June 12. Air Force weather forecasts are currently indicating a 40 percent chance that weather could prohibit launch activities Tuesday. The primary concern is for thunderstorms with associated showers and anvil clouds. The forecast calls for scattered clouds at 4,000 feet and broken clouds at 30,000 feet; visibility of 7 miles (in thunderstorms possibly 2 miles); winds from the southeast at 12 knots peaking to 18 knots; temperature 83 degrees F and relative humidity 63 percent. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, May 30].]

MAY 31: Space Shuttle Status Report, Sunday, May 31, 1998. STS-91: The countdown for launch of mission STS-91 began as scheduled at 9 p.m. yesterday at the T-43 hour mark. All pre-launch activities at Kennedy Space Center continue without problem toward a target lift-off time of 6:10 p.m. on Tuesday, June 2, from Launch Pad 39A. Today at KSC, engineers are preparing the Shuttle Discovery for the loading of cryogenic reactants into the onboard power reactant and storage distribution tanks. Loading is set to begin at about 5 p.m. Prior to this operation, a standard orbiter and solid rocket booster pyrotechnic initiator controller test will be performed. Cryogenic loading operations are expected to conclude by midnight tonight. The crew for mission STS-91 arrived at KSC yesterday afternoon and will spend their time before launch reviewing their flight plans, undergoing final medical examinations and flying in the Shuttle Training Aircraft. The STS-91 crew are: Commander Charles Precourt; Pilot Dominic Gorie; and Mission Specialists Franklin Chang-Diaz, Wendy Lawrence, Janet Kavandi and Valery Ryumin. Mission Specialist Andrew Thomas, currently on the Mir space station, will be returning with the rest of the crew following Shuttle/Mir docking operations. Air Force weather forecasts have today updated their forecast and are now indicating a zero percent chance that weather could prohibit launch activities Tuesday. The forecast calls for scattered clouds at 4,000 feet and

broken clouds at 30,000 feet; visibility of 7 miles; winds from the northeast at 10 - 12 knots; temperature 83 degrees F and relative humidity 63 percent. The 24-hour scrub turnaround forecast reveals similar conditions with a zero percent chance of launch commit criteria violation. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, May 31].]

◆ NASA and its partners approved a new schedule for building the international space station Sunday. U.S. officials also said the Russians have agreed to end operations aboard the Mir station in July 1999. The new schedule, which delays the start of construction from June to November, was negotiated to give cash-strapped Russia time to finish paying for work on a critical piece of the future outpost. Ending operations on Mir is crucial, NASA officials say, because Russia can't afford to run the 12-year-old outpost and build the new station. Russia had hoped to keep Mir operating through the end of 1999. "The longer they keep it up there, the more they are spending money to maintain it," said Joe Rothenberg, NASA's chief of manned spaceflight. "We would like it de-orbited as early as possible, and July 1999 is a practical date. Many (Russians) at this meeting for the first time have agreed it's a date" they will work toward. In the meantime, work on the new station would begin with the first launch from Russia of the Control Module named Zarya (Russian word for sunrise) on Nov. 20, followed by shuttle Endeavour's launch Dec. 3 with the initial U.S. component Unity. The third segment, which has been delayed, should be ready for launch from Russia in April 1999, officials say. It will serve as living quarters for the early three member crews, which will begin inhabiting the station in July 1999. The rest of the schedule lays out 33 shuttle missions and nine Russian rocket launches to complete the station by January 2004. By the time it's finished, the station will be home to crews of six for half-year missions. ["New schedule set for space station," **Florida Today**, June 1, 1998, p 2A. "International Space Station partners adjust target dates for first launches, revise other station assembly launches," **NASA News Release #98-93**, June 1, 1998.]

JUNE

JUNE 1: Sverdrup Technology Corp., a $1 billion engineering firm, was awarded the $200 million Launch Operations and Support Contract at Cape Canaveral Air Station in April. It has made job offers to about 410 of the 445 workers it will need when the contract takes effect June 1. ["Space contract could be union-buster," **Florida Today**, May 28, 1998, p 1A.]

◆ A computer problem on the Russian space station Mir could delay NASA's planned launch Tuesday of shuttle Discovery to pick up the final American astronaut living aboard the outpost. NASA managers will meet this morning to decide whether they should halt launch preparations if it seems the computer glitch will not be fixed in time for Discovery's arrival at Mir on Thursday. The system is needed to keep Mir steady while the spaceship docks at the station. "It's enough of a concern right now that it will be the red hot topic tomorrow morning," said Bruce Buckingham, Kennedy Space Center spokesman on Sunday. The problem surfaced Saturday, when Mir's automatic steering system failed, apparently due to a problem with the computer that runs it. The crew replaced the suspect computer with a spare on Sunday, but the system still wasn't working, NASA officials said late Sunday. Now ground controllers are struggling to figure out whether something else could be to blame. "They just don't know at this point," Buckingham said. ["Mir's woes may delay shuttle," **Florida Today**, June 1, 1998, p 1A.]

◆ James M. Guinn, United Space Alliance, received the Cape Canaveral Chapter of the American Society of Safety Engineers award Safety Professional of the Year for 1997. ["KSC safety engineer wins honor," **Florida Today**, June 1, 1998, p 2E.]

◆ John Glenn, continuing training for his upcoming space mission, donned rappelling gear and his orange flight suit Monday to practice exiting the space shuttle in the event of emergency. Glenn and his six fellow crew members took turns popping out of the hatch of a life-size shuttle mockup and lowering themselves down the side of the spacecraft. The exercise simulates how the astronauts would exit the shuttle if there was an emergency while the vehicle was on the ground, either before takeoff or after landing. Glenn completed the exercise without a hitch. The Ohio Democrat will become the oldest man in space when he flies on the nine-day mission to help NASA learn more about aging in space. Glenn will be 77 when he blasts off on Oct. 29 aboard the space shuttle Discovery, which is planned to lift off today for NASA's final rendezvous with the Mir space station. ["Glenn readies for ride," **Florida Today**, June 2, 1998, p 5A.]

JUNE 2: A NASA shuttle is chasing down the Russian space station Mir today on a final mission to pick up an American guest and end a unique – and sometimes turbulent – chapter in the history of space exploration. Shuttle Discovery blasted off Tuesday evening from Kennedy Space Center on the last flight to Mir while the outpost was passing over Ireland on its 70,183rd orbit of Earth. The ship is to arrive early Thursday afternoon at the station, where the crew will be reunited with U.S. astronaut Andy Thomas, who has lived there since January. Discovery is to remain docked at Mir for four days while the seven astronauts and two cosmonauts from the two ships unload food and other supplies for the Russians who will remain aboard. Discovery's flight had a perfect start with an on-time launch at 6:06 p.m. in sweltering heat that hit 97 degrees Fahrenheit earlier – a record for a

launch day. NASA's safety limit for launching a shuttle is 99 degrees Fahrenheit. The 97 degree heat at the launch pad caused a couple of minor technical problems before Discovery left. NASA decided to launch four minutes earlier than planned to avoid other potential glitches, heat-related or otherwise, that could ground the shuttle. Discovery took an extra 7,500 pounds of supplies to Mir because it used a new, lighter fuel tank. The tank "performed beautifully," said launch integration manager Don McMonagle. Two of Discovery's maneuvering jets failed on the way up to orbit, but NASA can work around the problem, McMonagle said. On board for the 91st shuttle launch were commander Charles Precourt, pilot Dominic Gorie, flight engineer Wendy Lawrence, Franklin Chang-Diaz, Janet Kavandi and former cosmonaut Valery Ryumin, Russian manager of shuttle-Mir operations. Discovery is scheduled to land at Kennedy Space Center on June 12. The shuttle fleet will not fly again until Oct. 29, when Discovery carries Sen. John Glenn on the Mercury 7 astronaut's return to space. Glenn has not flown since he became the first American to orbit the planet in 1962. He will be 77 when Discovery lifts off, making him the oldest person to fly in space. ["Final flight to Mir begins," **Florida Today**, June 3, 1998, p 1A & 8A. "Shuttle is on quest for elusive particles," **The Orlando Sentinel**, June 3, 1998, p A-6. William Harwood. (1998). **The Washington Post** [Online]. Available WWW: www.washingtonpost.com/wp-srv/inatl/longterm/mir/mir.htm [1998, June 3].]

◆ Space Shuttle Status Report, Tuesday, June 2, 1998. STS-91: Final Mir docking, SPACEHAB-SM, Alpha Magnetic Spectrometer (AMS). Space Shuttle Discovery launched today from KSC's Launch Pad 39A at 6:06 p.m. EDT. Though the launch team did slightly delay operations to load the external tank with cryogenic propellant this morning to evaluate a few minor technical issues, no major concerns were worked during the remainder of the countdown. As planned, launch managers determined the exact orbital location of the Russian space station Mir during the countdown's T-9 minute built-in hold. Managers then decided to launch Discovery at 6:06 p.m. EDT to achieve optimum Shuttle system performance and to accommodate Shuttle/Mir rendezvous activities slated for Thursday. Mir continues to maintain a stable attitude control environment and is ready to support docking operations on Flight Day 3. STS-91 is the final Shuttle flight scheduled to join with the Mir and will be orbiter Discovery's first Mir docking. The primary objective of the mission is to pickup U.S. astronaut Andrew Thomas and return him to Earth concluding four months of on orbit research. More than 3,000 pounds of supplies and water will be transferred to Mir during the four-day Shuttle/Mir union. The solid rocket booster recovery ships were deployed Monday at about 3 p.m. and are expected to arrive in Port Canaveral Thursday afternoon with boosters in-tow. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, June 2].]

◆ Delays to the International Space Station are burning $100 million a month, according to a General Accounting Office study. The massive orbiting research lab is 18 months behind schedule, including a five-month delay announced recently because of problems with a key Russian component. So far, delays and other problems have meant nearly $2 million in extra costs for the United States. And further delays are possible, according to the report issued this week. Two key senators who ordered the GAO study, Republican Sens. John McCain and Bill Frist, said the report concerns them. NASA needs to do more to control costs and should be held more accountable for cost overruns, said the senators, who are supporters of the station. Costs to develop the space station have jumped by billions

because of overruns with contractor Boeing, Russia's problems delivering on their part of the deal and other mix-ups. The U. S. tab for the project will be almost $96 billion, including operating it for 10 years, according to the study. That is almost $2 billion more than GAO estimated three years ago. The station is the work of an international consortium. It is scheduled to be completed by December 2003. ["Space station's costs trouble 2 GOP senators," **The Orlando Sentinel**, June 3, 1998, p A-5.]

JUNE 3: Space Shuttle Status Report, Wednesday, June 3, 1998. STS-91: Following a successful launch yesterday at 6:06 p.m., Shuttle Discovery continues to orbit the Earth today every 90 minutes. Post launch inspections of Launch Pad 39A revealed no major damage and no unusual debris. The solid rocket booster recovery ships were on station with the STS-91 boosters at about 6:45 p.m. yesterday off the coast of Jacksonville, FL. Preliminary inspections revealed no significant damage to the boosters. The recovery ships are expected to arrive at Hangar AF late tomorrow morning with boosters in tow. Recovery ship Freedom is expected at the hangar by 10:30 a.m. and Liberty is expected to arrive at about 12:30 p.m. STS-88: Today, technicians are installing the hydraulic pump that supports Endeavour's recently replaced auxiliary power unit (APU) No. 3. APU leak and functional testing continues through tomorrow with APU lubrication oil servicing also slated for tomorrow. Shuttle main engine heat shield attach point rework continues. Thursday, workers will replace orbiter window No. 8. Next week, water spray boiler servicing begins. STS-93: Replacement of Columbia's nose landing gear wheels and tires is complete. Technicians removed the extended duration orbiter (EDO) pallet last week. Preparations to remove the orbiter's power reactant storage and distribution system tank set No. 5 are in work. Main propulsion system leak and functional testing continues. Preparations to remove APUs No. 1 and No. 3 from the orbiter begin this week. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, June 3].]

JUNE 4: Space Shuttle Status Report, Thursday, June 4, 1998. STS-91: The Space Shuttle Discovery successfully docked with the Russian Mir Space Station today at 12:58 p.m. EDT. Solid rocket booster recovery ship Freedom arrived at Hangar AF today at about 10:30 a.m. with the left-hand booster in tow. Recovery ship Liberty arrived at about 12:30 p.m. with the right-hand booster in tow. Booster recovery operations, off the coast of Jacksonville, FL, went well with all parachutes recovered and no significant booster damage noted following preliminary inspections. Hands-on inspections are slated to begin Monday. STS-88: Technicians completed installation of the hydraulic pump that supports Endeavour's auxiliary power unit (APU) No. 3. APU leak and functional testing continues and APU lubrication oil servicing begins today. Shuttle main engine heat shield attach point rework continues. Forward reaction control system interface verification testing is in work and preparations to replace orbiter window No. 8 are under way. Next week, water spray boiler servicing begins. STS-93: Leak and functional testing of Columbia's liquid oxygen main propulsion system is complete. APUs No. 1 and No. 3 lubrication oil off load is also complete, in preparation for removal of both APUs. Preparations to remove the orbiter's power reactant storage and distribution system tank set No. 5 continue and tank set No. 4 removal preparations will follow. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, June 4].]

◆ The last Shuttle-Mir docking is scheduled to take place today when STS-91 Mission Commander Charlie Precourt maneuvers Discovery to link up with the Russian space station at approximately 12:58 p.m. The event might not be televised due to problems with the orbiter's KU-band communication system. Once docked, the Shuttle and Mir crew members will begin transferring more than 3,000 pounds of supplies and water to the station during the four days that the two space vehicles will remain mated together. Moving over to Discovery for the return trip home will be astronaut Andy Thomas, who has been working and performing experiments aboard Mir since Jan. 25. Most of the long-term U.S. experiment hardware that has been aboard during the Shuttle-Mir program will also be transported back to Earth aboard the orbiter. With Pilot Dominic Gorie at the controls, Discovery is scheduled to undock at about noon on June 8. Landing is planned for about 2 p.m. June 12. ["Discovery to dock with Mir today; Thomas to transfer," **KSC Countdown**, June 4, 1998.]

◆ NASA has formed the Office of Human Space Flight Programs in Russia to oversee the transition from the Phase 1 Shuttle-Mir program to the assembly and operation of the International Space Station (ISS). Astronaut Michael A. Baker will be lead representative in this office to the Russian Space Agency and its contractors. The move places Russian liaison for all human space flight operations under one office and consolidates preparations for the assembly of the ISS. These activities include mission operations, crew training, logistics and technical liaison with Russian space organizations. [**KSC Countdown**, June 4, 1998.]

◆ Twenty-five women and men will make up the astronauts candidate class of 1998, scheduled to arrive at the Johnson Space Center, Houston, TX, in mid-August to begin one year of training and evaluation. This year's class consists of eight pilot and 17 mission specialist candidates, including Barbara Morgan, who was named as an Educator Mission specialist in January. Of the 25 class members, 21 are male and four are female. ["NASA names astronaut class of 1998," **NASA News Release #98-97**, June 4, 1998.]

JUNE 5: Kennedy Space Center will host the premiere for the film "Armageddon" this month. "Armageddon," a film about the possible demise of humankind via an earthbound meteorite, opens nationwide July 1. It will premiere at KSC on June 29. Disney's Touchstone Pictures, the film's production company, said the guest list had been completed, but invitations had not been sent. Most likely, few KSC workers will be invited. But actors such as Bruce Willis, Billy Bob Thornton, Ben Affleck, Liv Tyler and Steve Buscemi, as well as producer Jerry Bruckheimer and director Michael Bay, all have been confirmed to attend the invitation-only premiere screening and private party. The screening will take place in a state-of-the-art theater being built by Disney technicians outside the Apollo/Saturn 5 Center. The party after the premiere will include performances by Aerosmith, which is fronted by Steven Tyler, Liv Tyler's father. The band recorded several songs for the film's soundtrack. On June 30, a screening of the film will be shown to KSC crew members and winners of a contest sponsored by *Florida Today*. ["Film's premiere will bring celebs to KSC," **Florida Today**, June 6, 1998, p 1A.]

JUNE 6: Someone will strum a guitar and lead songs in Russian and English. Everyone will exchange gifts. And astronaut Andy Thomas will get ready to leave his space home. The crews of shuttle Discovery and the Russian station Mir will hold a goodbye party today

on their last full day before the shuttle leaves Monday. Thomas has been living on the station since January as America's final visitor to Mir in NASA's joint program with the Russians. Launched June 2 from Kennedy Space Center, Discovery arrived at Mir on Thursday for NASA's final visit to the Russian laboratory. Hatches between the two craft will be closed midday Monday. Departure is set for noon. Discovery is to return to KSC Friday. ["Sadness, celebration mark end of Mir era," **Florida Today**, June 7, 1998, p 1A.]

◆ A Russian space tug that will be the first part of NASA's planned international space station to be launched recently was given a moniker: "Zarya" – which is the Russian word for "sunrise" or "dawn." Previously known as the Functional Cargo Block, the space tug is scheduled to be launched Nov. 20 on a Russian rocket at Baikonur Cosmodrome in Kazakstan. A U.S. docking module dubbed "Unity" will be attached to the tug in December. The Russian space tug – which was financed by the United States and built by Russia – is equipped with propulsion systems that will be needed to keep the embryonic outpost in orbit during the early stages of station construction. ["Russia names station space tug," **Florida Today**, June 7, 1998, p 1E.]

◆ A man was airlifted to a hospital with a serious head injury Saturday afternoon after his vehicle overturned at Kennedy Space Center. The man, whose name was not released, was found about 3:20 p.m. with his Jeep pickup on top of him, according to KSC spokesman Bruce Buckingham. A passer-by who came upon the accident called for help and used a jack to lift the truck off the man, Buckingham said. The man was flown to Orlando Regional Medical Center. The accident occurred off Kennedy Parkway about three miles south of Haulover Canal. Buckingham said the man apparently was driving north on Kennedy Parkway when his truck hit a culvert. KSC security officials investigated the accident. Because of some of the items found in and around the truck, it is believed the man was either going or returning from fishing, KSC officials said. The man was in an area that is usually open to the public. ["Fisherman injured in KSC accident," **Florida Today**, June 7, 1998, p 2B.]

JUNE 8: Space Shuttle Status Report, Monday, June 8, 1998. STS-91: The Space Shuttle Discovery undocked on-time from the Russian Mir Space Station today at 12:01 p.m. EDT. This event marks the 9th and final planned Shuttle/Mir docking. The STS-91 solid rocket boosters are undergoing hands-on inspection at Hangar AF today. So far, workers are reporting that the booster segments are in very good condition. Booster disassembly efforts begin later this week. STS-88: Interface verification testing of Endeavour's forward reaction control system is complete. Auxiliary power unit (APU) leak and functional testing continues and APU lubrication oil servicing is in work. Shuttle main engine heat shield attach point rework continues. Work to replace orbiter window No. 8 occurs this week and water spray boiler servicing preparations are under way. STS-93: Technicians have removed Columbia's APU No. 1 and preparations to remove APU No. 3 are in work. The commander and pilot flight seats have also been removed from the orbiter. Leak and functional testing of Columbia's liquid helium main propulsion system is under way. This week workers will perform standard torque checks of the wing-to-fuselage bolts and conduct gaseous oxygen system leak checks. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, June 8].]

◆ Mike Mott, NASA Associate Deputy Administrator (Technical), has announced his plan to leave NASA to join Boeing Space Transportation, Seal Beach, CA, as Vice President, Business Development. Mott, one of the Agency's top three managers, has served the NASA Administrator since January 1994. ["Michael I. Mott to leave NASA," **NASA News Release #98-99**, June 8, 1998.]

◆ Monday's undocking of the shuttle orbiter Discovery from the Russian Mir space station signified the end of Phase One of the International Space Station program. After a final farewell, the crews closed the hatches between the two space vehicles at 9:07 a.m. Once Discovery was undocked, STS-91 Pilot Dominic Gorie performed a last inspection flyaround of the Mir. The crew then focused their attention on recording data from the Apha Magnetic Spectrometer and microgravity experiments in the payload bay and the middeck crew cabin area. Discovery is still scheduled for a landing at KSC's Shuttle Landing Facility at about 2 p.m. June 12. [**KSC Countdown**, June 9, 1998.]

JUNE 9: Senate appropriators acknowledged Tuesday the international space station has deep financial and schedule problems as they passed a one-year spending bill that does little to address the project's shortcomings. The bill was easily approved by voice vote of the Senate appropriation subcommittee with jurisdiction over NASA, the departments of Veterans Affairs, Housing and Urban Development and other independent agencies. The measure now goes to the full committee for approval before it can be taken up by the full senate. A similar process begins next week in the House. The Senate bill would give NASA $13.6 billion in the fiscal year that starts Oct. 1, about $150 million more than requested by President Clinton. The measure also would provide $2.3 billion for the station, busting the $2.1 billion annual spending cap NASA, the Clinton administration and Congress had attempted to maintain since the project was redesigned in 1994. While there are no significant new starts or policy changes for NASA, there is an important accounting switch for the multi-nation space station. Citing years of frustration over NASA and the Clinton administration shifting budget projections and launch targets for the station, senators split the Human Space Flight account into separate accounts – one for the station and another for launch vehicles and payload operations. Lawmakers also inserted language expressing alarm at a recent report by an independent cost assessment and validation team that projected the station would cost $7 billion more and take 38 months longer to build than previously expected. ["Senate subcommittee approves space budget," **Florida Today**, June 10, 1998, p 10A.]

◆ A $150 million mission to boost a television satellite into orbit for Norway went off smoothly Tuesday evening from the Space Coast. A Boeing Delta 2 rocket lifted off from Cape Canaveral Air Station at 8:35 p.m., carrying the Thor-3 satellite into space. Launch was delayed for two hours because of a pressure problem at the pad. The spacecraft is expected to enter service Aug. 1, joining a handful of other spacecraft under the control of Telenor Satellite Services AS of Oslo, Norway. The next launch from the Space Coast is scheduled for June 18 when a Lockheed Martin Atlas 2AS rocket is to deliver an international television satellite into orbit. The launch window will extend from 6:48 to 8:08 p.m. ["Delta 2 rocket puts satellite into orbit for Norwegians," **Florida Today**, June 10, 1998, p 10A.]

JUNE 10: Space Shuttle Status Report, Wednesday, June 10, 1998. STS-91: The Space Shuttle Discovery continues to orbit the Earth every 90 minutes providing a research platform for the Alpha Magnetic Spectrometer. Hands-on inspection of the STS-91 solid rocket boosters is complete and reports indicate that the boosters are in excellent condition. Weather forecasters expect generally favorable weather conditions on Friday to support both Shuttle landing opportunities at KSC. The first KSC opportunity is at 2:03 p.m. EDT and the second is at 3:39 p.m. Edwards Air Force Base, CA is not expected to be called up to support Friday's landing activities. STS-88: Checkout of Endeavour's orbiter maneuvering system (OMS)/reaction control system flight controls is complete. Auxiliary power unit (APU) lubrication oil servicing is in work and ammonia servicing preparations are under way. Water spray boiler checks are in work today and Shuttle main engine heat shield attach point rework continues. Next week, connections of the right hand OMS pod crossfeed transfer lines begin. STS-93: Technicians have completed removal of APUs No. 3 and No. 1 and replacement of both units is in progress. Standard torque checks of the wing-to-fuselage bolts are under way. Removal of Columbia's Spacelab fluid lines and tests of the tactical air command and navigation system are scheduled to occur later this week. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, June 10].]

JUNE 11: Space Shuttle Status Report, Thursday, June 11, 1998. STS-91: Discovery's seven-member flight crew is occupied today with preparations for tomorrow's Shuttle landing activities. At Hangar AF, inspections of the solid rocket boosters are complete and disassembly of the booster segments is under way. Removal of the aft skirts is complete and nozzle removal begins today. Weather forecasters expect favorable weather conditions on Friday to support both Shuttle landing opportunities at KSC. The first KSC opportunity is at 2 p.m. EDT and the second is at 3:36 p.m. Edwards Air Force Base, CA is not expected to support Friday's landing activities. STS-88: Endeavour's auxiliary power unit (APU) lubrication oil servicing and ammonia servicing are complete. Water spray boiler checks are in work and Shuttle main engine heat shield attach point rework continues. Next week, connections of the right hand OMS pod crossfeed transfer lines begin. STS-93: Testing of Columbia's gaseous hydrogen main propulsion system is complete. Removal of the Spacelab fluid lines concluded yesterday. Technicians are installing APUs No. 3 and No. 1 today. Standard torque checks of the wing-to-fuselage bolts continue. Efforts to replace portions of Columbia's flight deck floor are under way and inspections of the carbon dioxide removal system are scheduled through next week. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, June 11].]

JUNE 12: Space Shuttle Status Report, Friday, June 12, 1998. STS-91: The orbiter Discovery returned to Earth today landing on KSC's runway 15 at 2 p.m. EDT. Today's landing concludes the 9th and final Shuttle/Mir docking mission and returns astronaut Andrew Thomas home after more than four months onboard the Russian outpost. Clear weather conditions at KSC supported flight controllers' decision to land Discovery on the first of two opportunities. This was the 44th KSC landing in Shuttle Program history and 15th consecutive KSC landing. The orbiter landed on orbit 155 having traveled 3.8 million statute miles. The STS-91 crew will spend the night at KSC and depart for their homes in Houston, TX tomorrow afternoon. Following SPACEHAB destow activities on the runway, Discovery will be towed to Orbiter Processing Facility bay 2 arriving at about 11

p.m. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, June 12].]

◆ For more than three years an American flag adorned the inside of the Russian space station Mir, plastered next to its Russian counterpart. Earlier this month, Andy Thomas spoke to Earth from in front of that flag, talking about wanting ice cream and sunshine after 4 ½ months in space. Friday at 2 p.m., Thomas came home to sunshine and Oreo ice cream. The space shuttle Discovery landed at Kennedy Space Center, returning Thomas and that flag to U.S. soil. The flag no longer is needed as a backdrop to emphasize Russian-American space cooperation, because the shuttle-Mir program is over. But Discovery commander Charlie Precourt asked that the flag, an optical data disk and a wrench used to repair Mir be sent as symbols to the international space station. The first segment of the massive project is supposed to be launched late this year. NASA Administrator Dan Goldin promised the Mir veteran a hug, brought roses and arranged for an ice-cream delivery to Thomas, who was carried off the shuttle in a reclining seat. ["Shuttle ferries U.S. flag back from outpost on Mir," **The Orlando Sentinel**, June 13, 1998, p A-12.]

JUNE 15: Space Shuttle Status Report, Monday, June 15, 1998. STS-95: Discovery was towed into OPF bay 2 Friday at about 11 p.m. following an on time landing at KSC's Shuttle Landing Facility. Over the weekend, draining of the orbiter's power reactant storage and distribution system was completed. Post flight inspections of Discovery's thermal protection system revealed 198 debris hits to the orbiter's outer surface. On the orbiter's lower surface, only 44 hits measured 1-inch or greater. Payload bay door opening is slated for Thursday and payload removal follows on Friday. Technicians will remove the forward reaction control system on Thursday to accommodate planned thruster replacement work. Engineers will also begin evaluations of the troubled Ku-band system this week. Removal of the nozzles from the STS-91 solid rocket boosters is complete and shipment of the nozzles to Utah for final inspections occurs today. STS-88: Endeavour's water spray boiler checks continue. Technicians are conducting fit checks on the androgynous peripheral docking system to ensure compatibility with the International Space Station. Checks of a fuel cell relief valve panel are in work. Thursday, connections of the right hand OMS pod crossfeed transfer lines begin and ammonia system servicing is scheduled this week. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, June 15].]

JUNE 16: The solid rocket booster (SRB) recovery ship Freedom Star is expected to arrive at Port Canaveral today towing a barge containing a Shuttle super lightweight external tank (ET). This is the first time that a recovery ship has transported an ET to Florida from the Michoud Assembly Facility in Louisiana. The two recovery ships were modified and outfitted with towing equipment last year so they could be used to replace a contractor towing service. The changeover is expected to have a potential cost-savings to KSC of about $50,000 per trip. The tank towed on this five-day trip will fly on the STS-95 mission in October. ["SRB recovery ship completes first tank tow today," **KSC Countdown**, June 16, 1998.]

JUNE 17: Officials with California aerospace giant Lockheed Martin will tour KSC in their effort to decide where to base a next-generation spaceship called VentureStar. The reusable

vehicle, which will eventually replace NASA's space shuttle fleet, is viewed as the key to the Space Coast's survival in the 21st century commercial space industry. Some of Florida's top economic development experts, who want the state to remain the nation's primary gateway to space, will play host at the important meeting. Lockheed Martin will decide in the fall of 1999 where VentureStar will operate, and the competition is tough. Initially, 10 states put together proposals, but the list now tops 18. The company plans 35 to 40 VentureStar launches a year, meaning the winner will get thousands of jobs and billions of dollars in space-related business. Florida recruiters began preparing their pitch four months ago with the creation of a team headed by U.S. Rep. Dave Weldon, R-Palm Bay, and Gov. Lawton Chiles. Carol Lane, a director of business development for Lockheed Martin, would not say what state is the leading candidate. She did say the company is looking for the cheapest and best place to launch. The state already has pledged $4 million for a hangar at Kennedy Space Center that eventually could house VentureStar. It also is working with Congress to allow for more commercial launches at Cape Canaveral Air Force Station. ["VentureStar officials size up KSC," **Florida Today**, June 17, 1998, p 1A.]

◆ NASA chief Daniel Goldin acknowledged Wednesday the international space station has significant budget and schedule problems but said construction will begin as planned this fall. Goldin's position was presented to House lawmakers in a 29-page report in which he stated NASA will wait until February to finish a plan to attack the trouble. That drew immediate criticism from members of Congress, including some who back the project. Goldin's report – which will be aired by the Science Committee in a Wednesday hearing – contained the agency's response to an independent review panel's damning assessment in April. The study said the station could cost $7.3 billion more than NASA estimated and will not be completed until late 2004 or possibly February 2007. The February 2007 date is more than three years behind the current deadline. Goldin wrote that NASA "will spend the next few months carefully scrubbing these estimates, examining other alternatives and assessing the urgency for making" more changes to the station program. He also wrote that a final plan to deal with the problems will be ready in February, which is when President Clinton will submit his fiscal year 2000 budget to Congress. ["NASA admits to flaws in space station plan," **Florida Today**, June 18, 1998, p 1A & 2A.]

◆ Regis Philbin and Kathie Lee Gifford will broadcast their daily talk show, "Live... with Regis and Kathie Lee," at Kennedy Space Center on June 29, in conjunction with the premiere that day of the film "Armageddon," which was filmed at KSC. ["Get your tickets now to see Regis, Kathie Lee," **Florida Today**, June 18, 1998, p 2A.]

JUNE 18: Space Shuttle Status Report, Thursday, June 18, 1998. STS-95: Technicians have gained access to Discovery's aft compartment and preparation for orbiter maneuvering system fuel tank draining is now in work. Yesterday, workers removed the orbiter's forward reaction control system and today it will be moved to the Hypergol Maintenance Facility for planned thruster replacement work. Initial inspection of the troubled Ku-band system is complete and engineering evaluation is under way. Payload demates are ongoing and payload removal occurs tomorrow. Dumping of the flight recorder data to ground support equipment is also complete. Shuttle main engine post flight inspections are in work this week. STS-88: Endeavour's water spray boiler checks continue. Connection of the right hand OMS pod crossfeed transfer lines is in work. Testing of the orbiter's network signal processor continues. STS-93: Checks of Columbia's flash evaporator system are complete.

The orbiter's Ku-band antenna has been stowed in the payload bay and the doors will be closed today. Drag chute installation is in work today and electrical connections begin tomorrow. Window inspections are in work and polishing begins next week. Columbia's auxiliary power units No. 3 and No. 1 will be installed into the orbiter beginning Wednesday. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, June 18].]

◆ An Atlas rocket was launched Thursday evening on its way to deliver an Intelsat communications satellite to orbit. The spacecraft will provide TV and Internet services between North America, South America and Europe. The Lockheed martin rocket began its $253 million mission at 6:48 p.m. from Cape Canaveral Air Station. ["Atlas rocket fires satellite into orbit," **Florida Today**, June 19, 1998, p 2A.]

JUNE 19: Not live. Not from Kennedy Space Center, anyway. Producers for "Live...with Regis and Kathie Lee" confirmed Friday afternoon the show will not come to Brevard County on June 29. That's when the talk show was supposed to be broadcast live from the Rocket Garden at the Visitor Complex at Kennedy Space Center. The Regis Philbin and Kathie Lee Gifford celebrity chat program was supposed to dovetail with that night's premiere of the motion picture "Armageddon." "Apparently, (show producers) couldn't get commitments from the stars to appear on the show," said AJ Duncanson with Watermark, the local publicity agency that handles activities at the KSC's Visitor Complex. ["Regis and Kathie Lee skip KSC visit," **Florida Today**, June 20, 1998, p 2B.]

JUNE 20: With NASA planning to fly Sen. John Glenn aboard the shuttle in October, Jerrie Cobb, 67, wonders whether there's room for another aviation pioneer. Shortly after selecting the original Mercury 7 astronauts in 1959, NASA began a secret program to determine whether women were capable of flying into space. The first woman picked was Jerrie Cobb. NASA under pressure from the Mercury 7 astronauts and others, killed the women's training program in 1961. Two years after the women's program was canceled, Russia became the first nation to fly a woman, a textile factory worker named Valentina Tereshkova, into space. It would be 22 years before the United States followed suit. In 1995 Eileen Collins was preparing to be the first American woman to pilot a shuttle. She invited Cobb and the dozen other women, who were part of the female astronaut program when it was canceled in 1961, to attend her launch. The astronaut asked the women whether there was anything they wanted to give her to take into space. Cobb gave her a gold pin of an extinct Columbian bird, the Indian condor. The response from NASA has been cool concerning Cobb's request to fly in the shuttle. A NASA official wrote in April that the space agency couldn't fly everyone who wanted to board the shuttle. "This compels us to fly those fortunate few who, by representing us all, can return to us the most benefit from the precious resource," says Joseph Rothenberg, NASA's associate administrator for spaceflight. ["Pioneer flier aims for liftoff," **Florida Today**, June 21, 1998, p 4A.]

JUNE 21 - 22: Four thousand acres burned in the southeast corner of Kennedy Space Center. The fire started June 21 and burned a couple days. It closed State Road 3, the main route employees take to KSC. Most of the acreage burned was undeveloped, but the fire threatened several orange groves. People visiting the Kennedy Space Center Visitor Center

at times had to brush ash off their clothes as they walked through thick smoke, but attendance numbers were not affected. ["Merritt Island National Wildlife Refuge," **Florida Today**, August 2, 1998.]

JUNE 24: Hundreds of jobs could be lost starting in October when service and support contracts at Kennedy Space Center and Cape Canaveral Air Station are merged for the first time, according to U.S. Rep. Dave Weldon. In a rare move, U.S. Sen. Bob Graham, D-Miami Lakes, and U.S. Rep. Carrie Meek, D-Miami, have joined the Palm Bay Republican in sending a letter to NASA chief Dan Goldin expressing their fear about what the reductions could do to the Space Coast's economy. The consolidation's goal is to cut an estimated 760 to 1,140 jobs over the course of the 10-year contract. That is 20 percent to 30 percent of the 3,800 service workers at both sites, officials said. Currently, KSC and the air station have separate contracts to handle a wide range of services needed to keep the installations running on a day-to-day basis. Engineers and technicians involved in launching NASA's space shuttles and unmanned military and commercial rockets fall under different contracts and would not be affected. Despite the bleak outlook, some officials say the reductions are necessary if the Space Coast is to become more competitive in the rapidly growing international commercial launch market. EG&G Florida, Inc. now runs base operations at KSC, while Johnson Controls World Services does the same at the air station. Air Force and NASA officials serving on the board of directors to select the new contract said they were prevented by law from discussing the matter. ["Contract consolidation could cost jobs," **Florida Today**, June 25, 1998, p 1A & 18A.]

JUNE 27: John Glenn won't ride shuttle Discovery into space until late October. But already most hotels are booked, there's talk of parades in his honor and the media are preparing to mob the area. Tourism officials expect more than 120,000 people to converge on the Space Coast for Glenn's launch. Tourists and locals already are sporting T-shirt tributes to the senator, and tourist attractions at Kennedy Space Center are beefing up their Glenn exhibits. The hoopla is building because Glenn is the best known of America's astronauts. He became world famous in 1962, when he piloted Friendship 7 around the Earth three times. It was America's first manned orbital launch. Glenn is set to blast off Oct. 29 on a nine-day flight. He will be 77. Once he is aloft, he will become the oldest man to fly in space. Glenn's official mission is to learn about aging in space. But his flight also will give the agency a public relations bonanza before it starts building its over-budget, far-behind-schedule international space station in November. The timing of the flight couldn't be better for Brevard County either. The excitement will provide a major economic boost during what normally is the slow season before winter visitors arrive. Estimates of 120,000 people viewing Glenn's liftoff – from roadways, beaches and Kennedy Space Center – would make it among the most watched shuttle launches. It would be well short of the record held by the launch of Apollo 11 on the first moon landing mission in July 1969: Police estimated 750,000 to 900,000 people jammed the area. Shuttle Discovery drew about 250,000 people in September 1988, when it blasted off on NASA's first shuttle mission after the Challenger disaster 2 ½ years earlier. The KSC Visitor Complex and the Astronaut Hall of Fame are bolstering Glenn-related exhibits. The Astronaut Hall of Fame is offering a special guide to the John Glenn artifacts it has on display. Other events are being planned at the museum to coincide with Glenn's flight. National news organizations are showing a strong interest in Glenn's mission, shattering a ho-hum attitude that has surrounded shuttle flights in recent years. "From all over the world, we are seeing (media) interest. To see that

level of interest, you would have to go back to the Apollo program," said Doug Ward, spokesman at Johnson Space Center in Houston. ["Area economy to soar with Glenn's flight," **Florida Today**, June 28, 1998, 1A & 2A.]

JUNE 28: Faster than "Contact"! More powerful than "The Cape"! Able to leap "From the Earth to the Moon" in a single bound! It's the world premiere of "Armageddon" at Kennedy Space Center Monday night! The screening bash will be held at NASA's Saturn 5 Museum. KSC spokeswoman Lisa Malone isn't making concessions, not with having to entertain some 500 media projects a year. On the other hand, given the extensive planning by Touchstone Pictures' advance men, NASA reasoned that accommodating Hollywood was a no-lose proposition. "We wanted to cooperate as best we could, because of the high number of potential viewers and the favorable impression of NASA in the storyline, even though it was science fiction," Malone says. "What made this very intense for us was that they were here for 10 days straight, working long hours at various locations, sometimes simultaneously. It's a big job to get your arms around. We had to call in our 'surge employment.' These are groups of retirees who've worked here before and agree to help us during launches, landings and film crews. We really need them." "Armageddon" director Michael Bay ("The Rock") sends Bruce Willis, Ben Affleck and Steve Buscemi and a motley crew of oil riggers aboard a pair of space shuttles to destroy a Texas-size asteroid hurtling toward Earth at 22,000 miles per hour. Complicating matters only somewhat is that NASA has 18 days' notice to get it done. Billy Bob ("Slingblade") Thornton stars as the can-do space agency director with a genius for improv. ["Whether blast or bombast, film with 1,000 local extras makes a major splash here," **Florida Today**, June 28, 1998.]

JUNE 29: Space Shuttle Status Report, Monday, June 29, 1998. STS-95: With evaluation of Discovery's Ku-band antenna now complete, engineers have determined that an electronic failure caused the data transmission problem experienced on STS-91. The system's deployment assembly will be replaced. Today, orbiter maneuvering system functional testing is in work. Leak tests on the flash evaporator system are under way and troubleshooting of the fuel cell water relief valve continues. Technicians will set up platforms in the orbiter's midbody today to gain access to the orbiter docking system. Electrical demates of the docking system base begin tomorrow. STS-88: Leak checks on Endeavour's right hand orbiter maneuvering system cross-feed lines are complete. Technicians are checking Endeavour's fuel cell water relief valve to compare data with Discovery's leaky valve. Cycling of the nose landing gear is in work and checks of the power reactant storage and distribution system are under way. Water spray boiler servicing begins today. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, June 29].]

JUNE 30: KSC's Huey UH-1 helicopter is being flown to help Florida's Division of Forestry pinpoint the location of wildfires that have ignited throughout the state for the past several weeks. The state office requested assistance from the space center last week. The helicopter, which is outfitted with a Forward Looking Infrared Radar (FLIR) system and portable global positioning satellite (GPS) system, has helped ground forces prioritize their firefighting efforts and determine evacuation routes since June 23. An infrared camera that is part of the FLIR collects temperature data and images, while the GPS system provides the exact coordinates of the fires and passes the data on to firefighters on the

ground. KSC's security team routinely uses the FLIR equipment prior to Shuttle launch and landing activities to ensure that the areas surrounding the launch pad and runway are clear of unauthorized personnel. EG&G Florida operates the NASA-owned helicopter. The KSC security team has been called on before to support missing person searches and wildlife tracking activities on the Merritt Island National Wildlife Refuge. ["KSC helps state flight brush fires," **KSC Countdown,** June 30, 1998.]

JULY

JULY 2: KSC is continuing to provide support to the community to help battle wildfires. This week, the space center provided a fire engine, advanced life support ambulance and crews to assist Brevard County fire departments while they battled this week's fires in the Mims and Scottsmoor areas. The space center has also stationed an Aircraft Rescue and Fire Fighting Vehicle to support U.S. Forestry Service aircraft engaged in water drops and fire-fighting support operations at Tico Airport in Titusville. Earlier, a KSC helicopter equipped with forward looking infrared radar (FLIR) was used to provide additional assistance to local, county, federal and state agencies when they request help in reducing the wildfire threat to Florida communities. ["KSC aids Brevard fire departments in Mims, Scottsmoor," **KSC Countdown**, July 2, 1998.]

◆ NASA engineers grew increasingly concerned Thursday about the effects of wildfires on the "clean rooms" where modules of the new international space station are stored. Wildfires raged about 10 miles from Kennedy Space Center, spokesman Bruce Buckingham said. So far, filters and air handlers in the clean rooms have managed to cope with the airborne debris. "Nothing is burning on the base yet, but there is concern because we have 100,000 acres here," he said. The Space Center is part of a national wildlife refuge full of pine, scrub brush and marshland. Most of the base is separated from the mainland fires by the Indian River. Last week, lightning ignited several fires on the Cape, burning about 4,000 acres, Buckingham said. Also Thursday, NASA employees took carloads of donated food, water and toiletries to fire victims. ["'Clean rooms' worry NASA," **Florida Today**, July 3, 1998, p 1B.]

JULY 6: Space Shuttle Status Report, Monday, July 6, 1998. STS-95: Last week, the power converter units that supported the STS-91 payloads were removed from Discovery's cargo bay. Functional testing of Discovery's main propulsion system is in work. Preparations are under way to remove the Shuttle main engines later this week. Today, main engine heat shield removal is continuing. Post flight waste management system servicing is in progress. Installation of the integrated vehicle health monitoring system (IVHM) begins this week. The IVHM upgrade, already installed on Columbia, provides real-time Shuttle system monitoring capability to ground and flight controllers. STS-88: Endeavour's forward multiplexer demultiplexer and its dedicated signal conditioner are being replaced. Corrosion repair on the main engine heat shield attach points continues. Technicians are working to replace a pyrotechnic electrical harness on the orbiter's fire protection system. Testing of Endeavour's power reactant storage and distribution system is scheduled this week. STS-93: Corrosion repair of Columbia's external tank umbilical doors continues. Workers are servicing the coolant loops for the orbiter's three fuel cells. Replacement of water spray boiler No. 3 is in progress. Auxiliary power units No. 1 and No. 3 will be installed beginning Thursday. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, July 6].]

◆ The ribbon-cutting ceremony for the new Space Shuttle Main Engine Processing Facility (SSMEPF) next to Orbiter Processing Facility bay 3 will be held at 9:30 a.m. Monday, July 6. KSC Director Roy Bridges will give the opening remarks. Other participants will be U.S. Congressman Dave Weldon; Bob Sieck, KSC Director of Shuttle

Processing; Donald McMonagle, Launch Integration Manager; and Rocketdyne Vice President John Plowden. The 34,600 square-foot SSMEPF will be the new home for KSC Shuttle main engine operations, which currently take place in the Vehicle Assembly Building (VAB). The new facility was constructed to improve the capacity and efficiency of main engine operations while increasing safety in the VAB. ["Space Shuttle Main Engine Processing Facility to open July 6," **KSC Countdown**, July 2, 1998.]

JULY 7: During the battle against brush fires in the north Brevard County area last week, a task force made up of KSC Fire Rescue Services personnel and equipment and other units were able to save 54 structures from destruction, including 42 homes. Seventeen space center firefighters were on the front lines from June 30 through July 5 along with one fire engine and an advanced rescue and fire-fighting vehicle. The center also supplied a railroad car with 20,000 gallons of water to the rural Mims area where there are no fire hydrants. Another five Rescue Services workers and a 5,000-gallon water tank truck continue to provide help for U.S. Forestry Service and other agency aircraft at the Space Coast Executive Airport (TICO) in Titusville. The airport services as a center of operations for aircraft that are used to drop water and fire retardants on the fires. The help that KSC provides to the community is a part of the center's Mutual Aid Support program. ["KSC firefighters help save homes, business in North Brevard," **KSC Countdown**, July 7, 1998.]

◆ NASA's Johnson Space Center, Houston, TX, has modified its contract with United Space Alliance (USA) of Houston to include more than $900 million in work on the Space Shuttle's solid rocket booster and other shuttle elements. USA is the prime contractor for the space shuttle fleet operations. This $919.5 million cost-plus-award-fee/incentive-fee contract modification includes work previously performed under three separate NASA contracts: work on the boosters performed by USBI at Kennedy Space Center in Florida; design and production of primary shuttle avionics software by Lockheed Martin in Houston; and processing of flight crew equipment, including space suits, personal equipment and tools, performed by Boeing Aerospace Operations in Houston. The new work comes under Phase 2 of NASA's space flight operations contract with USA. Under Phase 1 of the contract, NASA consolidated operations of 12 separate contracts under USA. Phase 2 will consolidate an additional 16 contracts as part of a continuing NASA effort to transfer day-to-day shuttle operations from government employees to private companies. The performance period under Phase 2 runs through Sept. 30, 2002. ["NASA awards more shuttle work to USA," **NASA News Release #c98-h**, July 7, 1998.]

◆ Funding for NASA's international space station survived Tuesday despite efforts by Sen. Dale Bumpers to scuttle the project. With his retirement looming in January, Bumpers, D-Ark., tried one last time to cut off money for the project, but the Senate voted 66-34 to reject the idea. The senator has tried for eight years to kill the space station, which could cost as much as $93 billion to build and operate. ["Station survives another attempt to scuttle project," **Florida Today**, July 8, 1998, p 2A.]

JULY 8: A group of 20 U.S. Division of Forestry firefighters from Mississippi and California spent half a precious day off Wednesday touring the Kennedy Space Center and resting up before heading back to work early tomorrow. They rode down the three-mile-long landing strip where space shuttles return to Earth and walked underneath shuttle Columbia in its hangar, where workers are preparing it for a January flight. They took a

tour of the Vehicle Assembly Building and visited the launch pad that shuttle Discovery will use in October to start a nine-day flight that returns Sen. John Glenn to space. Everywhere they went, the firefighters were stopped by KSC and United Space Alliance workers who wanted to thank them for their efforts. ["Firefighters, volunteers get tour, thanks from KSC staff," **Florida Today**, July 9, 1998, p 4A. "Firefighters get behind scenes tour of KSC," **KSC Countdown**, July 9, 1998.]

JULY 13: Space Shuttles Columbia, Discovery and Endeavour will rest in their bays Thursday, with only security officers to keep the ships company. The rest of Kennedy Space Center's 14,000 contractor employees will be seated before television screens beginning at 8 a.m. watching a forum on safety called "Super Safety Day." The day long session marks the first time all of KSC's employees have devoted a day to training. NASA, Air Force and industry officials will roll out their new "safety culture," which assigns safety responsibility to all employees, from shuttle maintenance and payload processing to grounds keeping. Safety once was the purview of the safety office, officials said. "Now the safety office becomes a consultant, trainer and adviser," said Al Sofge, associate director of safety and mission assurance at KSC. Speakers and panelists will include KSC Director Roy Bridges, 45th Space Wing Commander Brig. Gen. Randall Starbuck and Gordon Fullerton, former astronaut and current research pilot at NASA's Dryden Flight Research Center in Edwards, Calif. Their words will be piped to various locations around the center, said KSC spokesman Bruce Buckingham. "Pretty good isn't good enough," Buckingham said. "We want a safety record that shows no violations at all...We know that is pretty near impossible, but we want to strive for that." ["'Culture' of safety grows at KSC," **Florida Today**, July 14, 1998, p 1A.]

JULY 16: Space Shuttle Status Report, Wednesday, July 15, 1998. KSC's Shuttle status reports will be issued throughout the summer on a periodic basis. The typical rule of thumb will be you can generally expect a status report each working day once the Space Shuttle is at the pad. (Discovery is scheduled to roll out to the pad for mission STS-95 during the third week in September.) Until that time, status reports will be issued once or twice a week or only as events warrant. Other reports (expendable launch vehicle status and payload status reports) will be issued periodically as well. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, July 15].]

◆ Groucho's Comedy Club was the location of a fund-raiser for the Space Cats Club. Space Cats is a nonprofit group working for the protection of feral cats at Kennedy Space Center. The event was hosted by the United Space Alliance NMA Chapter 380. ["Comedy fund-raiser benefits feral cats," **Florida Today**, July 16, 1998.]

◆ The new head of United Space Alliance said Thursday one of his top goals is to make sure a layoff like the one in January of more than 500 local alliance employees does not happen again. "It was painful for the individuals involved, and we're concerned about them," Russ Turner told well-wishers at a reception in his honor at the Howard Johnson Plaza Hotel. "It had an impact on the whole community." He said the company can avoid that painful experience by "keeping the shuttle and international space station sold in Washington." Turner, who is based at the alliance's Houston headquarters, recently was named president and CEO. He successes Paul B. Smith, who announced his retirement

June 15. The alliance is a joint venture of Boeing and Lockheed Martin that oversees day-to-day operations of the space shuttle for NASA. Turner also reassured the crowd that safety will continue to be a top priority, not just for the astronauts and the shuttle, but for the entire work force. ["New CEO of United Space Alliance vows to avoid future layoff pain," **Florida Today**, July 17, 1998, p 1B.]

JULY 17: The July launch of a Japanese TV satellite has been delayed while engineers complete an investigation into problems with three similar spacecraft already in orbit. The launch of the Hughes Space and Communications built JCSAT 6 aboard an Atlas rocket was scheduled for July 29 from Cape Canaveral Air Station. ["Problems stall satellite launch," **Florida Today**, July 18, 1998, p 2A.]

◆ Repair work is progressing on the $6.2 million rotating Space Mirror, which broke and ground to a halt in November at the Kennedy Space Center Visitor Complex. The 25-ton memorial to astronauts who died in the line of duty sits in front of the popular tourist attraction. Jim DeSantis, president of the nonprofit Astronaut Memorial Foundation, said the rotating mirror's mechanism should be back in operation before astronaut John Glenn returns to space Oct. 29. The mirror's electrical system is undergoing $22,000 worth of repairs, DeSantis said. Bids for fixing the more expensive structural damage will be opened within two weeks. DeSantis said the mirror broke because of human error after a planned power outage at KSC. ["Space Mirror to be turning by October," **Florida Today**, July 18, 1998, p 1B & 2B.]

JULY 21: He conquered space, but was powerless against a more earthly opponent: leukemia. Alan Shepard, one of the revered astronauts of Project Mercury and one of only 12 men to walk on the moon, died Tuesday in California after a lengthy illness. He was 74. Shepard gained hero status May 5, 1961, when he made a 15-minute suborbital flight in the Freedom 7 spacecraft and became the first American to fly in space. Almost a decade later, in January 1971, Shepard returned to space and achieved a childhood dream when he became the fifth human being to walk on the moon and the first lunar golfer – whacking two golf balls with a smuggled six-iron. Only four of the "Mercury Seven" are still living – Gordon Cooper, John Glenn, Scott Carpenter and Walter Schira. Beth Dickey. (1998). **ABC News** [Online]. Available WWW: www.abcnews.com/sections/science/DailyNews/shepard980722.html [1998, July 22].]

JULY 23: Space Shuttle Status Report, Thursday, July 23, 1998. STS-95: Shuttle Discovery's main engine heat shields were removed July 9 and the engines were pulled July 10. The orbiter maneuvering system (OMS) has undergone evaluation and troubleshooting in recent weeks due to problem indications during the STS-91 flight. Three of Discovery's right hand OMS pod thrusters have been replaced and leak checks are in work today. Also, a propellant valve position indicator on the left hand OMS pod was replaced yesterday. Earlier this week, the main propulsion system's liquid oxygen system underwent routine leak and functional tests. Today, preparations are under way to cut out the orbiter's leaky water relief valve. Removal of the fuel cell No. 3 relief valve occurs tomorrow. STS-88: Endeavour's modular auxiliary data system interface verification is complete. Preparations for remote manipulator system (RMS) removal are also complete and the RMS is being removed from the orbiter today. Testing of the orbiter's microwave scanning beam landing system is in progress. STS-93: Installation of Columbia's new lightweight commander and

pilot seats is complete and functional tests on the seats are in work. Middeck locker installation is also complete. Servicing of the orbiter's three freon coolant loops continues. Checkout and servicing of the water spray boiler and pressure tests of the flash evaporator system are under way. Columbia's window No. 1 is being replaced this week. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, July 23].]

◆ The 12-part cable drama on space, "From the Earth to the Moon," HBO's sweeping chronicle of America's space program, received a leading 17 nominations Thursday for the Primetime Emmy Awards. ["Emmy nominations shoot for the 'Moon,' **Florida Today**, July 24, 1998, p 1D.]

JULY 27: Space Shuttle Status Report, Monday, July 27,1988. STS-95: Thruster replacement work on Discovery's right hand orbital maneuvering system (OMS) pod and subsequent leak checks and X-rays are complete. Functional checks of Discovery's newly installed crew seats are also complete. Over the weekend, technicians removed the leaky fuel cell No. 3 water relief valve and today, installation of a replacement valve is scheduled. Discovery's forward reaction control system will be delivered to the OPF today for installation into the orbiter later this week. STS-88: Removal of Endeavour's remote manipulator system (RMS) is complete and repair of the RMS will follow. Testing of the orbiter's microwave scanning beam landing system is complete. Payload premate testing begins later this week. STS-93: Calibration of Columbia's main propulsion system pressure transducer is complete. Replacement of the orbiter's overboard waste valve is in work and water spray boiler servicing continues. This week, workers will conduct pressure tests on the orbiter's flash evaporator system and install window No. 1. ATLANTIS / OV-104 - Orbiter Maintenance Down Period (OMDP): Orbiter Atlantis continues to undergo its planned OMDP for inspections, maintenance and enhancements in Palmdale, CA. Last week technicians completed the structural inspection portion of the overhaul reporting no significant problems. Work on the elevon flipper doors is also finished. Improvements to Atlantis' cockpit are nearing completion. Atlantis is scheduled to return to KSC on Sept. 30 to begin processing for its next mission. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, July 27].]

◆ In its mid-'60s heyday, Space Launch Complex 37 sent eight Saturn rockets into outer space – including the first test flight of an unmanned lunar module. The pad on the north side of Cape Canaveral Air Station shut down in 1971, launching an inglorious quarter century of erosion and neglect. On Monday, its lengthy hibernation ended. The Boeing Co. detailed its plans for a new $250 million launch complex on the site, where it will send its new family of Delta 4 rockets into space. Construction has started on the 130-acre site, which will create 250 launch support jobs and several hundred construction jobs. Its first rocket launch is set for January 2001. "We intend to build a completely new launch pad with a final assembly building, as well as other improvements to the site," said Gale Schluter, vice president of Boeing Expendable Launch Systems. Boeing first said it would build the complex in late September, when it was awarded part of the contract to build the next generation of unmanned rockets for the Air Force. Capable of handling as many as 18 launches a year, the complex will serve both military and commercial customers and boost Brevard County as it struggles to retain a healthy share of worldwide launch business. Space

Launch Complex 37 was built in 1962 for more than $40 million. The complex was occupied in January 1963 and supported NASA's Saturn 1 and Saturn 1B programs. From 1964 to 1968, the site supported eight Saturn missions, including Apollo 5, the first flight of an unmanned lunar module. ["$250 million launch complex planned at Cape," **Florida Today**, July 28, 1998, p 1B & 2B.]

JULY 28: A memorial service honoring the life of Alan Shepard (Rear Admiral, USN, Ret.), the first American in space, will take place at NASA's Johnson Space Center, Houston, TX, at 2 p.m. CDT Saturday, Aug. 1, in the Teague Auditorium. Attendance at the service is limited to family members, invited dignitaries and NASA employees. ["August 1 memorial service planned for Alan Shepard," **NASA News Release #N-98-48**, July 28, 1998.]

◆ A 300-acre brush fire burned out of control into the night Tuesday in a remote marsh at Kennedy Space Center. Two helicopters being used to drop water on the blaze were called off when a storm moved over the area late Tuesday afternoon. However, the rain did not appear to help squelch the blaze. More than 300 acres had been burned in the area south of the shuttle landing strip by about 6:30 p.m. U.S. Fish and Wildlife officials said. Lightning from a thunderstorm Monday night is suspected of sparking the fire, north of NASA causeway and east State Road 3. The storm moved through the area about 9:30 p.m. NASA security officers spotted the fire about 12:30 a.m. Tuesday and notified Fish and Wildlife. Because the blaze was in a remote, swampy area, firefighters had to wait until daybreak to gain access to it. By then it had scorched 120 acres. The helicopters began water drops about 8 a.m. They were called off about 6 p.m. when the rain moved in. ["Fire at KSC marsh out of control," **Florida Today**, July 29, 1998, p 1B.]

JULY 29: Johnson Controls said Tuesday it has won a $133 million contract for still and motion picture photography at Cape Canaveral Air Station and at NASA's Kennedy Space Center. The U.S. Air Force's 45th Space Wing awarded the contract, which is effective Saturday and runs through July 2006. Johnson Controls, based in Milwaukee, beat out a competing bid from the current holder of that contract, Bionetics Corp. of Hampton, VA. The contract calls for Johnson Controls to furnish the Air Force and NASA Florida sites with still, motion picture and video photography services for space launch and landing events. ["Johnson Controls wins photography contract," **Florida Today**, July 29, 1998, p 7A.]

◆ Walter Cronkite once was the most trusted newsman in the nation, while John Glenn was entrusted to make America's ride around the planet. History will bring them together again at Kennedy Space Center in October when Cronkite helps CNN cover Glenn's return to space aboard shuttle Discovery. Cronkite was in the anchor's seat for CBS in 1962, when Glenn became the first American to orbit Earth. He also reported on the space program throughout the Mercury, Gemini and Apollo programs. Glenn is scheduled to lift off October 29 on a nine-day mission in which he will study the aging process. He will be 77 when he flies. ["Cronkite to report on Glenn launch," **Florida Today**, July 30, 1998, p 1A.]

◆ With no discussion, the House on Wednesday defeated an amendment that would have canceled funding for the international space station. Members voted 323-109 to provide

$2.1 billion to keep the planned orbiting research facility alive. ["Space station funding survives challenge," **Florida Today**, July 30, 1998, p 6A.]

JULY 30: Space Shuttle Status Report, Thursday, July 30, 1998. STS-95: Work continues on Discovery's replaced fuel cell No. 3 water relief valve. Preparations to install the orbiter's forward reaction control system are complete and installation begins tonight. FRCS interface verification testing (IVT) starts Monday. Fuel cell voltage testing is scheduled for tomorrow. Installation of the integrated vehicle health monitoring system (IVHM) begins today and continues through next week. IVHM is part of the Shuttle upgrade effort to reduce ground processing time and improve real-time insight into an orbiter's performance in-flight through a modernized onboard instrumentation system. Auxiliary power unit and main propulsion system leak and functional tests are slated for next week. STS-88: Endeavour's payload premate test is in work. Main engine heat shield attach point rework continues. The orbiter's waste collection system will undergo functional tests later today. Tunnel adapter installation is planned for early next week. STS-93: Yesterday, technicians removed Columbia's gaseous nitrogen tank to gain access to power control assembly No. 1 and digital command assembly No. 1 for replacement. The new PCA and DCA will be installed later today. Hydraulic pump connection to auxiliary power units No. 1 and No. 3 is under way. Window No. 1 is being installed and orbiter window polishing begins Monday. ATLANTIS / OV-104 - Orbiter Maintenance Down Period (OMDP): Orbiter Atlantis continues to undergo its planned OMDP for inspections, maintenance and enhancements in Palmdale, CA. Last week technicians completed the structural inspection portion of the overhaul reporting no significant problems. Work on the elevon flipper doors is also finished. Improvements to Atlantis' cockpit are nearing completion. Atlantis is scheduled to return to KSC on Sept. 30 to begin processing for its next mission. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, July 30].]

JULY 31: The Italian Space Agency's Leonardo Multi-Purpose Logistics Module (MPLM) for the International Space Station (ISS) arrived at KSC's Shuttle Landing Facility from Turin, Italy aboard a special Beluga air cargo plane. Once offloaded, the module was installed into a Space Station Processing Facility (SSPF) workstand on Sunday. The 4 ½-ton Leonardo is the first of three modules to be supplied for the space station by Italy. Leonardo will be launched on the STS-100 mission currently planned for December 1999. ["Italian Space Agency Space Station module to arrive at KSC Friday," **KSC Countdown,** July 30, 1998.]

◆ A Kennedy Space Center worker and a former NASA employee have pleaded guilty in federal court to downloading inappropriate material from the Internet onto NASA computers. The case, which surfaced sometime this year, was investigated by special agents from NASA's Office of Inspector General, the U.S. Customs Service and computer security personnel from United Space Alliance. ["2 aerospace workers guilty...," **Florida Today**, August 1, 1998, p 1A.]

AUGUST

AUGUST 1: Alan Shepard, one of NASA's original seven Mercury 7 astronauts, was honored Saturday at an emotional ceremony before a packed auditorium at Johnson Space Center. Among the guests were all four remaining Mercury spacemen – John Glenn, Scott Carpenter, Wally Schirra and Gordon Cooper – who talked about Shepard with reverence and warm humor. Two other original Mercury astronauts, Gus Grissom and Deke Slayton, also have died. ["Heartfelt memorial honors Shepard," **Florida Today**, August 2, 1998, p 1A & 2A.]

AUGUST 2: A newsman all his professional life, Dick Young first covered NASA as a reporter and then worked as the agency's media chief at Kennedy Space Center. Friends say they will remember his sharp wit and dedication to the space program when they celebrate his life during a private gathering in September at the U.S. Astronaut Hall of Fame. Young died Sunday at his home in Edgewater after a long illness. He was 69. "He had a tremendous memory and a tremendous dry humor," said George Meguiar of Cocoa Beach, a longtime fried. A West Virginia native, Richard N. Young went to college in New England and graduated in 1953 from Boston University with a law degree. He then moved to Florida and became an aerospace columnist and reporter for *The Sentinel-Star* newspaper in Orlando for seven years. During that time, he also worked as a correspondent for *Time* magazine. An early supporter of cooperative space exploration, Young was one of the first reporters to visit the former Soviet Union's cosmonaut training center near Moscow in 1968. A year later, he joined NASA's news staff and eventually became media chief at KSC. He retired in 1994 after 25 years of fielding questions from reporters. At the time of his death, Young was on the board of the Merritt Island National Wildlife Association. Young, formerly of Merritt Island, is survived by his wife, Marcy; two daughters, Lisa Butler of Alabama and Debbie Edwards of Stuart; and two grandchildren. ["Former NASA news chief Young dies," **Florida Today**, August 6, 1998, p 3B. "Space center's former media chief Dick Young dies," **The Orlando Sentinel**, August 7, 1998, p D-1 & D-2.]

AUGUST 3: The rapturous raptor known more simply as the American bald eagle is swooping its stealthy claws into so many lakes, rivers, and streams coast to coast that federal officials are now set to remove the national symbol from the endangered species list. Classified as endangered in 1978, the bald eagle was reclassified into the less-periled category of "threatened" three years ago. After regional, state-to-state hearings that begin this week in Sacramento, Calif., the new rule could become law as early as late 1999. The bald eagle will still be protected by two federal acts, the Bald Eagle Protection Act and the Migratory Bird Treaty Act, which will remain in place after the eagle is delisted. Daniel B. Wood. (1998). **ABC News** [Online]. Available WWW: www.abcnews.com/sections/science/DailyNews/eagle980803.html [1998, August 3].]

◆ Space Shuttle Status Report, Monday, August 3, 1998. STS-95: Last Friday, workers completed Discovery's fuel cell voltage tests, and the orbiter's forward reaction control system (FRCS) was installed. FRCS interface verification testing is under way. The recently replaced fuel cell water relief valve is being brazed to the panel today. Installation of the integrated vehicle health monitoring system continues, and main landing gear wheel and tire installation is in work. Auxiliary power unit and main propulsion system leak and functional tests are scheduled for this week. STS-88: Endeavour's payload premate test continues with

video and communication checks in work today. Main engine heat shield attach point rework continues. Functional tests of the orbiter's waste collection system continue. Tunnel adapter installation is planned for early next week. STS-93: Connection of the hydraulic pumps for auxiliary power units No. 1 and No. 3 is complete. Technicians are replacing Columbia's power control assembly No. 1 and digital command assembly No. 1 this week. Window No. 1 has been installed and orbiter window polishing begins today. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, August 3].]

AUGUST 4: The STS-88 crew has gained a new member. Veteran cosmonaut Sergei Krikalev joins Commander Bob Cabana, Pilot Rick Sturckow, and Mission Specialists Nancy Currie, Jerry Ross and Jim Newman aboard Endeavour on the first U.S. element flight for the International Space Station in December 1998. Krikalev eventually will be one of the first full-time residents aboard the Station. That won't be his first venture living in space, however. He has already accumulated more than one year and three months in space as a member of two Mir space station crews. He also flew on board Discovery in February 1994 as a member of the STS-60 crew, operating the Shuttle's robotic arm and supporting a variety of science experiments. His experience in both the U.S. and Russian programs, plus his familiarity with the Shuttle, make him a valuable addition to the STS-88 crew. ["Russian cosmonaut added to STS-88 crew," **KSC Countdown**, August 4, 1998.]

AUGUST 5: With Russian money problems continuing to haunt NASA's international space station, the agency is planning to shift crucial Russian work to the shuttle fleet. Russia was expected to provide more than 40 flights during station construction to keep it supplied and boosted in orbit, but it now appears the country will not be able to afford all of them. In response, NASA plans to modify the steering thrusters on its four shuttles so that when the ships visit the outpost they can push the structure into a higher orbit, NASA Administrator Daniel Goldin said Wednesday. Initially, the steering modifications will be paid from NASA's current-year budget, Goldin told the House Science Committee. Although the 1-million-pound station will be in outer space, its orbit will constantly decay as the result of drag and gravity. Repeated reboosts will be needed to keep the structure from plunging into the atmosphere and burning. NASA also might increase the fuel-carrying capacity of the two large maneuvering engines the ships will use to steer in orbit. This, too, would give the shuttles added ability to boost the station's orbit. Beyond that, NASA is looking at building a new craft to be flown to the $50 billion station, where it would serve as an on-board booster, Goldin said. ["NASA to modify shuttles to handle more station work," **Florida Today**, August 6, 1998, p 1A.]

AUGUST 6: Godspeed John Glenn, a commemorative exhibit honoring the life and career of the former Mercury program astronaut and U.S. Senator, opened this week at the U.S. Astronaut Hall of Fame. Among the many items on display are the flight operations manual Glenn used during his Mercury mission and the Collier trophy presented following that space flight. [**KSC Countdown**, August 6, 1998.]

AUGUST 10: Space Shuttle Status Report, Monday, August 10, 1998. STS-95: Electrical tests on Discovery's orbiter maneuvering system and auxiliary power unit leak and functional tests are complete. Integrated hydraulic tests begin today. Water spray boiler

servicing is in work and gaseous nitrogen servicing of the orbiter's life support system is under way. Installation of the integrated vehicle health monitoring system continues and heat shield rework is nearing completion. STS-88: Electrical testing of Endeavour's orbiter docking system is complete. Main engine heat shield attach point rework continues. Power converter units No. 1 and No. 2 are being installed today. Tunnel adapter installation begins next Wednesday. STS-93: Columbia's power control assembly No. 1 and digital command assembly No. 1 have been replaced. Technicians are troubleshooting a leaky waste tank valve on board the orbiter. The STS-93 super lightweight external fuel tank arrives at KSC from its manufacturing facility in New Orleans this week. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, August 10].]

AUGUST 11: KSC managers were officially notified last week that every NASA organization at the space center has met the requirements for ISO 9001 certification. The certificate of ISO registration will be presented to KSC Director Roy Bridges by representatives of Det Norske Veritas (DNV) Inc. at 9 a.m. today. The presentation follows a successful independent audit by DNV, an international ISO certification organization, of the KSC Management System in May of this year. KSC's certification applied to management of space systems, test and launch techniques, development of associated technologies and enhancement of core capabilities. ["NASA/KSC becomes ISO certified; ceremony on NASA TV today," **KSC Countdown**, August 11, 1998.]

AUGUST 12: Investigators will be searching the sea today for debris and answers to why a Titan IV-A rocket carrying a national security spy satellite blew up 40 seconds after liftoff. The Titan IV-A launch vehicle with a National Reconnaissance Office (NRO) payload was launched from Space Launch Complex 41 at 7:30 a.m., August 12, 1998. The blast early Wednesday occurred four miles above the Atlantic Ocean, about a half-mile east of the launch pad at Cape Canaveral Air Station. That area is expected to be ground zero for a search for rocket debris that could hold a clue to the $1.3 billion mystery. It also will be the center of a restricted zone while the search is under way, said U.S. Coast Guard officials, who declared a 5-square-mile area of ocean closed to traffic Wednesday night. Air Force Brig. Gen. F. Randall Starbuck, commander of the 45th Space Wing, said the rocket was working well until something on board exploded 40 seconds after liftoff. Within two seconds, flight controllers issued a destruct signal to destroy the rocket. Wednesday's explosion came during the 25th and final launch of a Titan IV-A. Officials have considered it a reliable rocket because only one other has exploded during a launch in nine years. Former Space Wing commander Maj. Gen. Robert Hinson, who headed the unit when a Delta rocket exploded 13 seconds after liftoff last year, will head the official inquiry into the latest mishap. The next Titan launch is scheduled for December. ["Titan IV-A $1.3 billion go up in smoke," **The Orlando Sentinel**, August 13, 1998, p A-1. "Titan Mishap," **Emergency Bulletin (KSC)**, Volume 1, Issue 1, August 14, 1998.]

AUGUST 14: An investigation into the rocket explosion that destroyed a U.S. spy satellite this week will require perhaps the largest maritime salvage operation since the one after the 1986 Challenger disaster, officials said Friday. Investigators cannot yet say how much it will cost or how many vessels will be involved in raising the remains of the Air Force Titan 4 rocket and its top-secret payload from the floor of the Atlantic Ocean. What is clear, though, is that recovering the wreckage is crucial to pinpointing the cause of one of the

costliest failures in U.S. spaceflight history. The $344 million Titan 4 and its clandestine cargo – a National Reconnaissance Office satellite – erupted into a cascading fireball 40 seconds after launch Wednesday from Cape Canaveral Air Force Station. A split-second before the explosion, the nose of the 194-foot rocket began to pitch downward – signaling the end to what had been a normal flight. Two Titan 4 missions, meanwhile, are scheduled from the Cape in December and January, and preparations for those flights will continue as the investigation unfolds. Exactly when the probe will be completed, however, is anybody's guess. ["Recovering entire satellite crucial," **Florida Today**, August 15, 1998, p 1A & 2A.]

AUGUST 15: Highlander Technologies Inc., of Titusville has received a contract to provide engineering support to Kennedy Space Center. Financial terms were not disclosed. NASA-KSC contractor Dynacs Engineering Services Co. awarded the subcontract to Highlander, which will develop and Internet-connected database and software for KSC security systems. [**The Orlando Sentinel**, August 16, 1998.]

AUGUST 17: Deep Space 1 arrives at KSC on Monday, Aug. 17. It is part of the New Millennium Program, which is focusing on testing high-risk, advanced technologies in space with low-cost flights. The mission of Deep Space 1 will take it by the near-Earth asteroid 1992 KD, and possibly two comets. It will carry two advanced science instruments – a Miniature Integrated Camera and Imaging Spectrometer (MICAS) and a Plasma Experiment for Planetary Exploration (PEPE). One of the scientific goals of Deep Space 1 is to find out the effects of solar electric propulsion on solar wind measurements. Launch date is Oct. 15 aboard a Delta II rocket. ["Deep Space 1 to test advanced technologies, fly by asteroid," **KSC Countdown**, August 13, 1998.]

◆ Countdown is more than two months away. The only things going faster than the 8,300 hotel rooms along the Space Coast are the VIP passes that allow a few lucky shuttle junkies access onto Kennedy Space Center property for the launch. "We've been sold out since March, and we're still getting calls every day," said Debra Green, general manager of the 300-room Hilton in Cocoa Beach and president of the Cocoa Beach Hotel Motel Association. "The entire county is sold out. It's going to be huge. We're telling people to book in Orlando and Volusia County." From Titusville to Melbourne, the talk is of the former astronaut turned U.S. senator who will take a second ride into space in October aboard the shuttle Discovery. The county expects between 200,000 and 250,000 space enthusiasts in town for the Oct. 29 launch, lured by the nostalgia of NASA's early days. Visitors already are snapping up commemorative T-shirts at the Kennedy Space Center Visitor Complex and signing a guest book at the U.S. Astronaut Hall of Fame, which has opened a special exhibit on Glenn. There hasn't been this much excitement about a space shuttle launch since 1988, when American astronauts returned to space two years after the Challenger explosion. Between 6,000 and 7,000 reporters are expected, and CNN announced that Walter Cronkite, the former CBS anchor who reported Glenn's 1962 flight, will help with coverage of the launch. ["Glenn's 2nd flight into space giving Brevard hotels a lift," **The Orlando Sentinel**, August 18, 1998, p 1B & 4B.]

◆ Space Shuttle Status Report, Monday, August 17, 1998. STS-95: Discovery's ammonia servicing work was completed Friday. Preparations are under way for Shuttle main engine installation this week. Installation and testing of the integrated vehicle health monitoring system continue and water spray boiler servicing is in progress. Standard torque checks of

the wind to fuselage attach bolts are slated for today. STS-88: Cable testing of Endeavour's orbiter docking system is in work and ODS functional testing begins tomorrow. Replacement of the orbiter's aft hatch seal is under way and leak checks will follow. Installation of power converter units No. 1 and No. 2 continues. Tunnel adapter installation begins Friday. STS-93: In the Orbiter Processing Facility, technicians have completed rework of hypergolic ground support equipment that will support Columbia this processing flow. Preparations for ball valve leak checks are in work today. Orbiter window No. 5 is being installed this week. The STS-93 super lightweight external fuel tank arrived at KSC last week and was moved into the VAB transfer aisle yesterday. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, August 17].]

AUGUST 20: Kennedy Space Center Shuttle launch team members are undertaking a practice run today to keep minds fresh during the unusual five-month pause between launches. About 150 people responsible for executing Shuttle launch commands are manning their firing room consoles during the integrated simulation, going through a battery of standard prelaunch tests. They are also being tested through a series of 12 to 14 major problems randomly being thrown at them, all conjured up by the KSC Simulation Team. Since June, the launch team has taken advantage of the available time for additional training. By Oct. 29, the target launch date for the next Shuttle mission, they will have conducted three external fuel tank loading simulations, a simulated loading of hypergolic propellants into the orbiter maneuvering system and reaction control system, and two launch countdown simulations. ["Launch team keeps fresh with practice runs," **KSC Countdown**, August 20, 1998.]

◆ Aerospace workers are preparing for the worst. A contract designed to merge service and support operations at Brevard County's space facilities and a military installation is just days from being awarded. The Joint Base Operations & Support Contract – which combines service and support functions at Cape Canaveral Air Station, Kennedy Space Center and Patrick Air Force Base – will be awarded sometime next week, Chris Hunt, vice president of Transport Workers Union Local 525, said NASA sources told him Thursday. A NASA spokesman would not confirm or deny Hunt's statement. The Air Force would not comment. The consolidated NASA/Air Force contract, worth $2 billion to $3 billion, could result in an estimated 760 to 1,140 job cuts at KSC and the air station over its 10-year lifetime. That is 20 percent to 30 percent of the 3,800 service and support workers at the two sites, officials said. The new contract, which will take effect Oct. 1, doesn't cover engineers and technicians involved in launching space shuttle and rockets. "It's really up to the contract winner to determine how they will best perform the contract," said NASA spokesman Bruce Buckingham. ["Launch-support workers brace for contract signing," **Florida Today**, August 21, 1998, p 12C & 11C.]

AUGUST 21: NASA's Kennedy Space Center, FL, Director Roy Bridges today announced Space Gateway Support (SGS) of Herndon, VA, has been selected for award of a government contract to perform base operations for Kennedy and the 45th Space Wing, which includes Cape Canaveral Air Station and Patrick Air Force Base. SGS is a joint venture of Northrop Grumman Technical Services, Herndon, VA; ICF Kaiser Defense Programs, Inc., Fairfax, VA; and Wackenhut Services, Inc., Palm Beach Gardens, FL. The cost-plus award fee contract features a five-year basic performance period, beginning Oct. 1,

1998, and an option for a five-year extension. The potential value of the contract, called the Joint Base Operations Support Contract (J-BOSC), exceeds $2 billion over 10 years. SGS will perform work that is being performed by Kennedy's Base Operations Contract, EG&G Florida, and the 45th Space Wing's Launch Base Support contractor, Johnson Controls, and 16 other individual base-support contracts. The Joint Performance Management Office, a new organization staffed with a mixture of NASA and Air Force employees, will manage the J-BOSC contract. The Executive Director of the office will report to a Board of Directors. The board's chair and vice chair will rotate every two years between the Kennedy director and 45th Space Wing commander. ["SGS Awarded NASA and Air Force Joint Base Contract," **NASA Contract Announcement #C98-m**, August 21, 1998.]

◆ Jim DeSantis, president of the Astronauts Memorial Foundation for the past six years, has resigned effective Oct. 16. ["Astronauts foundation chief resigns," **Florida Today**, August 22, 1998, p 1B.]

AUGUST 24: About 400 jobs will be lost at Kennedy Space Center, Patrick Air Force Base and Cape Canaveral Air Station under a new $2.2 billion contract awarded on Friday. Space Gateway Support of Herndon, VA., a joint venture headed by aerospace giant Northrop Grumman, announced on Monday it will hire 2,500 workers for so-called "base operations" when SGS takes over on Oct. 1. That's a 14 percent reduction from the current work force of about 2,900 employed under separate contracts by EG&G Florida and Johnson Controls. The consolidated 10-year contract covers a variety of support jobs, ranging from garbage collection to firefighting to security. The areas that will receive the heaviest job cuts haven't been determined. KSC Director Roy Bridges speculated last week that higher-paid management staff are among the most vulnerable to job cuts, because NASA and the Air Force have duplicate staffs. The new contract is expected to save NASA and the Air Force about $900 million over 10 years. Officials say savings will go for infrastructure improvements and will be passed on to commercial launch customers to help Cape Canaveral stay competitive with rival launch sites in the United States and abroad. ["Space operations to lose 400 jobs in contract shift," **The Orlando Sentinel**, August 25, 1998, p C-1 & C-4.]

◆ Space Shuttle Status Report, Monday, August 24, 1998. STS-95: Last week, Discovery's main engines were installed. On Saturday, KSC technicians began precautionary efforts to secure Discovery, Endeavour and Columbia in their respective OPF bays due to the threat of Hurricane Bonnie. Discovery's payload bay doors were closed and the orbiter was powered down. Managers will continue to monitor the hurricane's status and hope to resume processing later today. Once the decision to proceed is made, workers will power up the orbiter and launch processing system, open the payload doors and deploy the Ku band antenna. Also, main engine securing and pump torque checks are scheduled. Payload premate testing will follow payload bay door opening. Work delays due to hurricane preparedness efforts are not expected to impact any major Shuttle processing milestones. STS-88: Endeavour's power converter unit installation is complete. Functional checks on the orbiter docking system (ODS) were conducted last week and ODS electrical testing begins tomorrow. On Saturday, due to the threat of Hurricane Bonnie, Endeavour's payload bay doors were closed and the orbiter was powered down. Once processing resumes, workers will power up the orbiter and launch processing system and open the payload doors. Main engine heat shield attach point rework and tunnel adapter installation efforts

will also resume. STS-93: On Saturday, as a precaution due to the threat of Hurricane Bonnie, Columbia's payload bay doors were closed and the orbiter was powered down. Managers will continue to monitor the hurricane's status and hope to resume processing later today. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, August 24].]

AUGUST 25: Louise Shepard, the wife of pioneering Mercury astronaut Alan Shepard, died Tuesday night on an airline flight to her hometown, officials said. Her death follows the July 21 death of Alan Shepard, one of the original seven astronauts and America's first space traveler. ["Shepard's wife, Louise, dies on flight," **Florida Today**, August 27, 1998, p 1B.]

AUGUST 26: For the second time in as many weeks, a rocket carrying a multi-million-dollar satellite exploded shortly after launch Wednesday from Cape Canaveral Air Station. With memories of the Aug. 12 explosion of an Air Force Titan IV-A rocket and its $1 billion spy satellite still fresh, Boeing's new Delta III rocket lifted off from Launch Complex 17B on its maiden flight at 9:17 p.m. The first minute and 20 seconds went according to plan but then, as the Delta was jettisoning some of its nine solid-fuel boosters, the rocket pitched forward and exploded in a spectacular fireball of liquid hydrogen and oxygen. Television replays shows the blast emanating from the mid-body of the rocket's lower stage. A state-of-the-art Galaxy X communications satellite was destroyed. No one was hurt. "After separation of the first six solid-rocket boosters, we experienced an explosion," Boeing flight commentator Greg High said. "We have no idea exactly what happened." One piece of wreckage appeared to explode as it hit the water. But most of the flaming debris fell harmlessly into the Atlantic Ocean and proved no threat to coastal residents in Brevard County. The Delta III, a beefed-up version of the long-successful Delta II, has strap-on rocket motors and a more powerful upper-stage engine that allow it to hurl up to 8,400 pounds into high Earth orbit – almost double the Delta II's capacity. Boeing officials billed the Delta III as an evolutionary step toward an even larger launch vehicle, the Delta IV, which they plan to have ready by 2001. The next Delta III launch was scheduled for spring of 1999. ["2nd rocket explodes," **The Orlando Sentinel**, August 27, 1998, p A-1 & A-14.]

◆ Legislation expected to come out of Congress this year could double the number of commercial launches from Kennedy Space Center and add hundreds of millions of dollars to the local economy. U.S. Rep. Dave Weldon, R-Palm Bay and U.S. Sen. Bob Graham, D-Miami Lakes, met at Port Canaveral on Wednesday to discuss the Commercial Space Act they have sponsored. The bill has been approved by both the House and Senate, but a final bill reconciling versions between the two legislative bodies needs to be approved by year's end. KSC is slowed in its effort to attract commercial launches because it faces more restrictions than competing foreign markets such as France and China. While the U.S. builds 70 percent of all the satellites launched, it launches only 30 percent of them. There are about 35 commercial launches a year in the United States, 25 of which fly from KSC. Another 100 or so commercial launches are from overseas sites. One restriction is in the ability it has to track rockets and missiles after launch to ensure they are headed for the correct orbit. KSC's tracking range is taxed tracking NASA and Department of Defense launches, often meaning commercial launches have to be postponed or companies can't get

a firm commitment on launch dates. Another restriction is that other countries allow reusable vehicles for commercial launches, reducing the cost. The United States allows only NASA to launch reusable vehicles, but none of the commercial companies. The act would have government agencies, such as the U.S. Air Force and NASA, study how to expand KSC's ability to monitor launches. It also would allow private companies to get licenses for reusable vehicles. Weldon and Graham – who sponsored the legislation in their respective legislative bodies – said the bill is very popular in Congress. The only thing that could hold it up, they said, is that there is not much time left for legislation to be finalized. ["Bill may help space industry," **Florida Today**, August 27, 1998, p 1B & 2B.]

AUGUST 27: State Road 528 is getting a new name. Commonly known as the Beeline, the stretch of road from Hwy. 436 near Orlando International Airport to U.S. Hwy. 1 in Cocoa is being renamed Kennedy Space Center Highway. A special unveiling ceremony for the new signage takes place today, Aug. 27, at 10 a.m. on the westbound highway shoulder 2.5 miles west of State Road 3. Participating in the ceremony are Roy Bridges, KSC Director; Rick Abramson, president and CEO of Delaware North Parks Services of Spaceport, Inc.; and J.B. Kump, Communications & External Relations for Florida Boeing Operations. Also, U.S. Representative Dave Weldon; State Representative Randy Ball; State Senator Charles Bronson; and Malcolm Kirschenbaum, vice-president of EKS, Inc. and member of the board of directors of the Florida Department of Transportation. ["KSC on the map with renaming of SR528," **KSC Countdown**, August 27, 1998.]

◆ Space Shuttle Status Report, Thursday, August 27, 1998. STS-95: Securing Discovery's main engines and main propulsion system leak and functional tests are complete. Potable water servicing is in progress and preparations for tunnel adapter installation have resumed. Today, technicians are installing the main engine heat shields and proceeding with integrated vehicle health monitoring hardware installation in the aft and midbody compartments. This afternoon the Ku-band antenna will be deployed and undergo electronic retests. In high bay 1 of the Vehicle Assembly Building, mating of the external tank and solid rocket boosters was completed Tuesday. STS-88: Installation of Endeavour's transfer tunnel adapter is complete. Strongbacks have been installed on the payload bay doors and the right hand radiators are deployed. Power converter unit electrical mates are in work today. Workers have resumed main engine heat shield work. Electrical system testing on Endeavour's orbiter docking system is slated through today. This afternoon freon coolant loop No. 2 will be deserviced. STS-93: Functional checks of Columbia's fuel cells are complete. Troubleshooting of the fuel cell No. 2 pulse code modulator is under way. Technicians are also working to replace an overboard waste dump valve. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, August 27].]

◆ The Delta 3 accident might put in jeopardy some upcoming launches of its sistership – the Delta 2 – on which its design is based. Boeing officials say they hope to exonerate the rockets' common systems quickly, which would allow a Delta 2 to fly Sept. 1 from Vandenburg Air Force Base in California. The next Delta 2 launch from Cape Canaveral is set for Oct. 15. Its mission is to carry NASA's Deep Space 1 probe on the start of a journey to study an asteroid. Beyond that, two more Delta launch are scheduled for NASA in December and January – both are NASA Mars probes that are to continue to agency's search for past or current signs of life on the Red Planet. While concerned about the

mishap, NASA officials say they will keep working toward the Oct. 15 liftoff of the asteroid probe. The mission must get underway by early November so the spacecraft can catch its target. In addition to the NASA flights from Florida, a Delta 2 mission is scheduled for the Cape on Nov. 14, with the launch of a Russian communications satellite. Another Delta 2 is scheduled in December from California with an Air Force research satellite. ["Delta 2 launches in jeopardy," **Florida Today**, August 28, 1998, p 2A.]

AUGUST 28: A guidance system failure doomed the inaugural launch of Boeing's Delta 3 rocket on a $225 million satellite-delivery mission, investigators confirmed Friday. Investigators also confirmed it was the rocket's cargo – a 4-ton TV satellite – that slammed into the Atlantic Ocean, sending up an eerie orange mushroom cloud several minutes after the Delta exploded Wednesday night. Still unclear, however, is exactly what caused the rocket's guidance system to go awry about 55 seconds into flight. Investigators hope to answer that question quickly enough to clear smaller Delta 2 rockets for flights within the next week. Boeing officials expect to fly a second Delta 3 in February. ["Guidance system on Delta at fault," **Florida Today**, August 29, 1998, p 1A & 4A.]

AUGUST 31: Space Shuttle Status Report, Monday, August 31, 1998. STS-95: Over the weekend, workers completed installation of Discovery's main engine heat shields. Installation of the integrated vehicle health monitoring (IVHM) system brackets are complete and IVHM sensor installation is nearing completion. Today, technicians are conducting orbiter integrated hydraulic testing and preparing for tunnel adapter installation slated to occur later today. Closeouts of the orbiter's midbody compartment continue in preparation for Wednesday's Crew Equipment Interface Test. Testing of the Ku-band antenna continues. In high bay 1 of the Vehicle Assembly Building, external tank and solid rocket booster mating closeouts are ongoing. STS-88: Installation of the forward extension of Endeavour's transfer tunnel is complete. Connection of the orbiter docking system pyrotechnic devices and servicing of freon coolant loop No. 2 are also complete. Main engine heat shield inspections and the power converter unit interface verification test are in work. STS-93: Troubleshooting of the fuel cell No. 2 pulse code modulator continues. Technicians are also working to replace an overboard waste dump valve. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, August 31].]

DURING AUGUST: The most visible landmark at KSC, the 525-foot tall Vehicle Assembly Building (VAB) is getting a facelift. EG&G Florida painters have been repainting the 209-foot long American flag and replacing the 22-year old Bicentennial Emblem with the NASA logo, just in time for NASA's 40th anniversary in October. The painting will require about 550 gallons of red, white and blue paint to cover the entire 73,000-square foot area. Two workers on each of six platforms, which are suspended from the top of the VAB, are using rollers and brushes to apply the paint. Spray painting is prohibited due to possible over-spray damage to vehicles and equipment. The painting is expected to be completed in mid-September. ["VAB gets makeover, new design for 40th anniversary," **KSC Countdown**, August 18, 1998.]

◆ Extending its long history with Lockheed Martin's Atlas, NASA has exercised two more options under its existing Intermediate Expendable Launch Vehicle (IELV) contract with Lockheed Martin Commercial Launch Services (ILS). Atlas has been selected to launch two

tracking and data relay satellites – TDRS I and J – in December 2001 and June 2002, respectively. The satellites will launch on Atlas IIA launch vehicles from Cape Canaveral Air Station. ["NASA extends Atlas Lockheed business," **The Brevard Technical Journal**, August 1998, p 28.]

SEPTEMBER

SEPTEMBER 1: NASA Administrator Daniel S. Goldin has named Alan Ladwig Senior Advisor to the NASA Administrator, Edward Heffernan Associate Administrator for Legislative Affairs, and Lori Garver Acting Associate Administrator for Policy and Plans. Heffernan's appointment became official on Aug. 14, 1998, Ladwig's and Garver's on Aug. 28, 1998. ["Ladwig, Heffernan and Garver named to key NASA roles," **NASA News Release #98-157**, September 1, 1998.]

◆ Boeing's fleet of Delta 2 rockets will return to flight Friday, clearing the way for two upcoming NASA missions to Mars and another to study an asteroid, company officials said Tuesday. An investigation, meanwhile, is continuing into the guidance system failure that doomed the Aug. 26 maiden launch of a more powerful Boeing Delta 3 rocket on a $225 million satellite-delivery mission. The company's smaller Delta 2 rockets were temporarily grounded in the wake of the Delta 3 launch explosion, which destroyed a commercial TV satellite. ["Rockets scheduled to soar despite blast investigation," **Florida Today**, September 2, 1998, p 2A.]

SEPTEMBER 2: One of the nation's costliest space launch failures was caused by something any homeowner can relate to – a split-second power outage. That's what happened Aug. 12, when a battery powering the guidance system of an Air Force Titan 4A rocket failed, triggering an explosion that destroyed the vehicle and a secret spy satellite, Pentagon officials said Wednesday. "The question we have to answer for ourselves now is, 'Why did it (the power failure) happen?'" said Air force Maj. Gen. Robert Hinson, who is heading the investigation. With a hangar full of recovered rocket wreckage around him, Hinson outlined the final moments of the failed $1 billion mission. Thirty-nine seconds after the Titan blasted off from Cape Canaveral Air Station, the flow of electricity from the guidance system battery was interrupted for a fraction of a second. A split second later, after battery power was restored, the Titan's guidance control computer sent a command that resulted in the rocket pitching down and to the right while traveling about 675 mph at 17,000 feet. That caused the rocket to break up, triggering its automatic destruct system. Range safety officers also sent destruct signals to the exploding rocket to make certain it would not threaten the coastal population. The debris fell harmlessly into the Atlantic Ocean. ["Titan 4 blast blamed on brief battery power outage," **Florida Today**, September 3, 1998, p 1A.]

SEPTEMBER 3: Space Shuttle Status Report, Thursday, September 3, 1998. STS-95: Technicians have completed premate testing for the robot arm. Functional tests on Discovery's external airlock upper hatch and replacement of a faulty electronic assembly that supports the Ku-band antenna are also complete. Valve leak checks on the orbiter maneuvering system oxidizer storage tanks are under way and fuel tank checks concluded yesterday. The STS-95 flight crew participated in the Crew Equipment Interface Test yesterday, familiarizing themselves with the orbiter's midbody and crew compartments. Today, workers will complete installation and relocation of sensors for the integrated vehicle monitoring system (IVHM) and IVHM system testing follows this evening. Over the weekend, technicians will perform Ku-band system testing and prepare for payload bay door closure slated for the middle of next week. In the Vehicle Assembly Building this week, workers completed installation of an accelerometer on the external tank and a camera

on the left solid rocket booster's forward assembly. Data will be collected with these tools during ascent as part of the Shuttle program's study on how external tank foam debris impacts orbiter tile damage. STS-88: Removal of Endeavour's main landing gear wheels and tires is complete and the nose landing gear wheels are installed. Radiator No. 4 installation is in work today and tomorrow. Preparations are in progress for robot arm installation tomorrow. Main engine heat shield work continues and engine installation begins next week. STS-93: Preparations for fuel cell voltage testing are ongoing and testing begins later today. Testing of the overboard waste dump valve and heater is under way. Heat shield corrosion control efforts continue. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, September 3].]

◆ Johnson Controls and EG&G Florida are protesting their loss of the base-operations contracts for Kennedy Space Center, Patrick Air Force Base and Cape Canaveral Air Station. A consolidated 10-year contract, worth an estimated $2 billion, was awarded Aug. 21 to Space Gateway Support, a Virginia-based consortion headed by Northrop Grumman. Johnson Controls and EG&G had held the operations contracts for more than a decade. ["Firms protest NASA loss," **The Orlando Sentinel**, September 4, 1998, p 1B.]

SEPTEMBER 4: The Unity connecting module, the first U.S. built component of the International Space Station, moved a step closer to orbit this week when Boeing, the manufacturer of Unity, officially headed over the module's "keys" to NASA. NASA officially accepted the module after review and certification of Unity's construction by NASA and Boeing station managers at NASA's Kennedy Space Center. Unity is scheduled for launch aboard Space Shuttle Endeavour on STS-88 mission on Dec. 3. Unity is a critical component of the International Space Station, a six-sided connector with a berthing port on each side. Along with Unity at Kennedy, more than a half-dozen major pieces of U.S. and foreign-built hardware are now being prepared for launch. ["NASA accepts "keys" to first U.S. built station component," **NASA News Release #98-160**, September 4, 1998.]

SEPTEMBER 5: The public's ration of coveted car passes for prime viewing sites at Kennedy Space Center is long gone. One of America's original Mercury 7 astronauts, John Glenn, is scheduled to return to space Oct. 29. At 77, the Ohio senator, who became the first American to orbit Earth in 1962, will become the oldest human to fly in space. The mission is creating a demand for launch viewing passes that far outstrips supply. Like any shuttle launch, NASA is issuing 5,000 passes. Pass holders are allowed to take cars, trucks and vans to a NASA Causeway viewing site. Most of the passes – 3,650 – are being distributed to KSC workers and the public in communities surrounding other NASA centers. The remainder are being doled out to 1,350 people who have sent requests to NASA. The company that runs the KSC Visitor Complex, Delaware North Parks Services of Spaceport Inc., will be allotted 1,500 launch-viewing tickets for sale to the public. The tickets, at $10 each, will go on sale five days before the launch. ["Passes to watch historic Glenn launch hard to get," **Florida Today**, September 6, 1998, p 1A.]

SEPTEMBER 10: Space Shuttle Status Report, Thursday, September 10, 1998. STS-95: Technicians have completed checks of Discovery's Ku-band antenna system and plan final stowage later today. Pressurization of the landing gear tires for flight is also complete. Checkout of the robot arm concluded earlier this week and orbiter midbody close-outs

continue on schedule. Preparations are under way for tomorrow night's payload bay door closure. Today, workers are conducting aft compartment structural leak checks and completing forward compartment close-outs. Saturday, Discovery's weight and center of gravity determination tests are scheduled and Sunday the vehicle will be placed on the orbiter transfer vehicle for Monday's rollover to the Vehicle Assembly Building. In the VAB this week, workers completed installation of an accelerometer on the external tank and a camera on the left solid rocket booster's forward assembly. Data will be collected with these tools during ascent as part of the Shuttle program's study on how external tank foam debris contributes to orbiter tile damage. The focal point of the camera is delineated by a grid of small marks on the external tank near the left forward SRB/ET attach point. These marks may be visible when the Shuttle rolls out to Pad 39B on Sept. 21. STS-88: Endeavour's main landing gear wheel installation is complete. Workers removed radiator No. 3 from the orbiter's payload bay door yesterday. The removed radiators are being replaced by units outfitted with a new protective layer meant to reduce micro-meteorite impacts in flight. Radiator No. 2 will be replaced today. Shuttle main engine installation began today and preparations for external airlock leak checks are in progress. Functional tests on the tunnel adapter's upper hatch and robot arm checks are scheduled to occur later today. STS-93: Nitrogen servicing of Columbia's environmental control and life support system is complete. Hydrogen leak checks on the orbiter's power reactant storage and distribution system are in work. Technicians are draining the orbiter's waste tank today before replacing a faulty overboard dump valve. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, September 10].]

SEPTEMBER 13: America's commercial launch industry reached its 100th mission last week with the successful flight of Boeing Delta rocket from Vandenberg Air Force Base in California. The 100th commercial rocket mission blasted off Sept. 8, marking a milestone for one of the fastest growing industries in the United States. The first 50 commercial launches occurred during six years, from March 1989 to August 1995, while the next 50 took only three years. The landmark launch was a Delta II rocket carrying a cluster of five communications satellites for the Iridium global wireless telephone system into low Earth orbit. Revenue from U.S. commercial launches this year is $757.5 million and could approach $1.4 billion by year's end. ["Commercial launch industry reaches its 100th mission," **Florida Today**, September 13, 1998.]

SEPTEMBER 14: Space Shuttle Status Report, Monday, September 14, 1998. STS-95: Over the weekend, workers performed weight and center of gravity tests on Space Shuttle Discovery before lowering it onto the orbiter transfer vehicle. At about 10 a.m. today, Discovery rolled out of KSC's Orbiter Processing Facility bay 2. The orbiter arrived in the Vehicle Assembly Building a short while later and was lifted from the orbiter transfer vehicle at about 4:30 p.m. Discovery will be soft mated to the external fuel tank at about 6 a.m. tomorrow. Hard mate connections will follow Tuesday and interface verification tests will be conducted prior to next Monday's rollout to Launch Pad 39B. STS-88: Workers completed electrical connections of Endeavour's auxiliary power converter unit. Shuttle main engine installation is complete and engine securing is in work. Replacement of radiator No. 2 is under way. The orbiter's radiators are being replaced by units outfitted with a new protective layer meant to reduce micro-meteorite impacts in flight. Functional tests on the robot arm continue and external airlock leak checks are in progress. STS-93:

Hydrogen leak checks on Columbia's power reactant storage and distribution system continue. The orbiter's waste tank overboard dump valve is being replaced. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, September 14].]

◆ When Discovery launches U.S. Sen. John Glenn and six other crew members into orbit on Oct. 29, veteran space buffs will notice the difference. The futuristic NASA logo dubbed "the worm" had adorned the shuttle fleet since Columbia's maiden flight 17 years ago. It's gone. Instead, one of NASA's original blue "meatball" emblems decorates each side of the fuselage. A larger meatball – 6 feet in diameter – has been painted on the left wing. A crowd of 100 or so spectators caught a glimpse of Discovery's new look Monday, when workers rolled the shuttle from its service hangar to Kennedy Space Center's giant Vehicle Assembly Building. Most of those watching seemed to like the change. Some, such as launch integration manager Don McMonagle, weren't overly concerned with the emblem choice. "As long as we're in space," McMonagle said, "I don't care which one is on the orbiter." Discovery will be mated this week to its external fuel tank and twin rocket boosters before it's slowly rolled out to launch pad 39B late Sunday or early Monday. KSC officials said Discovery's latest paint job was scheduled long ago; the timing – right before Glenn's flight – is coincidence. In fact, the worm was made an endangered species about three years ago in an effort by NASA Director Dan Goldin to take the agency back to its symbolic roots in the 1960s and the late '50s. "We've been trying to eradicate the worm and go back to our original [meatball] emblem for some time," KSC spokesman Bruce Buckingham said. "Whenever there's a chance to remove the worm, we do it." Discovery isn't the only thing getting a face lift at KSC these days. With NASA celebrating its 40th birthday Oct. 1 and the Glenn launch scheduled four weeks later, paint brushes have become almost as common here as calculators. An office building near the shuttle hangars and the grandstand where the world's new media will view Glenn's launch are two of the latest places to get fresh coats of paint. But by far the biggest job has been refurbishing the facade of the 525-foot-high Vehicle Assembly Building. A dozen workers are using 700 gallons of red, white and blue to coat the front of the building and hide its 22-year-old U.S. Bicentennial symbol. Its replacement? The world's largest meatball, covering 12,300 square feet. ["That old 'meatball' is new again at NASA," **The Orlando Sentinel**, September 15, 1998, p A-5.]

SEPTEMBER 15: NASA's Mars Climate Orbiter is undergoing final preparations in the Spacecraft Assembly and Encapsulation Facility-2 at KSC for launch in December. The spacecraft arrived Sept. 12 at the Shuttle Landing Facility following its flight from the Lockheed Martin Astronautics plant in Denver, Colo. Among the processing activities planned are a functional test of the science instruments and the basic spacecraft subsystems. Also, checks of the communications system will be performed, including a verification of the spacecraft's ability to send data via the tracking stations of the Deep Space Network to the Jet Propulsion Laboratory (JPL) in Pasadena, Calif., and the Lockheed Martin plant. The orbiter will be used primarily to support its companion Mars Polar Lander spacecraft, planned for launch in January 1999, and then will monitor the Martian atmosphere and image the planet's surface on a daily basis for one Martian year (1.8 Earth years). ["Mars Climate Orbiter being readied for launch on Dec. 10, 1998," **KSC Countdown,** September 15, 1998.]

◆ NASA's Life Sciences Division is sponsoring the Challenge Mission, a unique outreach event, from Sept. 23-30, 1998, in Key Largo, FL. The Challenge Mission is an eight-day deployment of the Scott Carpenter Space Analog Station on the sea floor off Key Largo. The station is a fully functioning, submersible habitat that serves as a demonstration analog setting for concepts and challenges of systems needed for human exploration of space. Invited individuals and representatives of the Challenge Project museum and national organization partners will be joined by Space Life Sciences experts in the space analog station. ["Going 'all out' under water," **NASA News Release #N98-56**, September 15, 1998.]

SEPTEMBER 16: John Glenn: Mercury astronaut, American hero, prestigious U.S. senator. Now, a willing guinea pig. During his planned Oct. 29 mission aboard shuttle Discovery, every beat of Glenn's 77-year-old heart will be tracked by a monitor strapped around his waist. A tube will be inserted into a vein in his arm, allowing blood samples to be drawn regularly without him getting stuck with a needle each time. He will swallow bullet-size thermometer pills to detect his temperature, wince through shots, give urine samples and wear an electrode-covered cap to bed so the quality of his slumber can be monitored. It's all part of NASA's justification for sending Glenn back into space: to conduct intensive research on aging that might alleviate elderly problems such as balance disorders, brittle bones and weak muscles. Despite all the trappings of top-shelf science, critics say the potential research payoff of Glenn's flight is slim at best and a sham at worst. They contend that findings based on one elderly man – and an extremely healthy one at that – cannot be translated to the 34 million Americans who are 65 or older. The result is a rancorous debate on the merits of flying the first American to orbit the Earth in 1962, with critics calling it pure political payback and supporters staunchly endorsing the mission's scientific goals. "This is basic, fundamental research," Glenn told reporters soon after NASA announced his flight in January. "All of this gives us the potential not only of dealing with the frailties of our already aged population but of helping younger people avoid problems as they get old." During Discovery's nine-day sojourn, the crew will oversee studies of the sun's winds and test equipment that is to be installed on the Hubble Space Telescope during a flight to improve the observatory in 2000. But that work will likely be over shadowed by Glenn and his medical experiments, which will explore the ailments shared by elderly people on Earth and astronauts whose bodies are subjected to weightlessness. Both groups suffer from weakened bones and muscles, sleep disturbances, depressed immune systems and balance problems. Noting the similarities after reading some medical books, Glenn began lobbying NASA in the summer of 1996 to send him back into space, and eventually landed the seat on Discovery. Critics say Glenn is being rewarded for defending President Clinton and Vice President Gore during last year's Senate hearings on possible illegal campaign contributions the administration received during the 1996 election. Cooky Oberg, author of several aerospace books and an outspoken critic of Glenn's mission, and others contend if NASA really wanted to study aging issues, it would conduct ongoing research using senior members of its own astronaut corps. The oldest space flier to date – astronaut Story Musgrave, who was 61 on his final launch in November 1996 – retired last year after six shuttle missions. The reason: NASA told him he would not fly again. Critics say Musgrave, a physician, and others like him would make far better subjects than a politician who hasn't been in orbit for 36 years. NASA officials disagree with the critics. They say Glenn is a healthy and suitable subject, a former Marine fighter pilot accustomed to fast flying and still capable of piloting his own plane. And while

conceding Glenn's research will not produce any breakthroughs, supporters say it could spur valuable future work. In all, the researchers behind Glenn's experiments say he is a unique test subject who could bring them vital information. ["Science or free ride?" **Florida Today**, September 17, 1998, p 1A & 2A.]

◆ NASA has a new plan for keeping Moscow's piece of the International Space Station afloat: Buy a couple of Russian space capsules for about $100 million and hope some of the money reaches the station's long-overdue crew quarters. Under a deal expected to be wrapped up this week, the U.S. space agency would get delivery of the three-person Soyuz capsules by 2002. The two craft would serve as escape pods for the space station until a larger, American-made lifeboat is developed. Although there's still some haggling over price, the Russians would likely get about $100 million. NASA says that's enough for the Russian space agency to finish its principal contribution to the station – the crew quarters, known as the service module – and to finance the station's control center and early resupply flights. "It's about more than just the service module," said Joseph Rothenberg, NASA's associate administrator for space flight. "Without the control center, the service module doesn't do us any good." ["U.S. may buy 2 spacecraft from Russians," **The Orlando Sentinel**, September 17, 1998, p A-1.]

SEPTEMBER 17: Space Shuttle Status Report, Thursday, September 17, 1998. STS-95: In VAB high bay 1, orbiter Discovery is mated to the external tank and Shuttle interface testing is in progress. Main propulsion system leak checks are under way and preparations begin tomorrow for the Shuttle's rollout to Launch Pad 39B. Discovery is slated to begin its 4.2 mile trip to the pad at about 2 a.m. on Monday, Sept. 21 and should be hard down on the pad surface around 8 a.m. STS-88: Functional tests of the hatch on Endeavour's tunnel adapter are complete. Replacement of the orbiter's right hand payload bay door radiators is complete and the radiator coolant loop will be serviced next week. Main engine and main propulsion system integrated testing is ongoing and freon coolant loop No. 2 servicing is in work. Engine heat shield installation is scheduled today. Payload electrical connection testing is under way and robot arm checks are complete. Auxiliary power converter unit interface tests begin today. STS-93: Columbia's Ku-band system is undergoing tests and the antenna has been deployed. Replacement of the orbiter's waste tank overboard dump valve continues. Tests on the power reactant storage and distribution system continue and auxiliary power unit water servicing is in progress. OV-104 Atlantis - Return from OMDP in Palmdale, CA: Shuttle workers in Palmdale, CA, hand-over responsibility for orbiter Atlantis to KSC Monday, Sept. 21, for ferry flight preparations. Atlantis is scheduled to be bolted atop NASA's Shuttle Carrier Aircraft, a modified Boeing 747, and flown cross-country to KSC's Shuttle Landing Facility next week. Current plans have the ferry flight departing California at first light on Sept. 22 and arriving in Florida the next afternoon. Forecasters indicate the possibility of adverse weather conditions early next week, so Shuttle managers will closely monitor weather trends in California as they plan to bring Atlantis home. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, September 17].]

◆ A Navy salvage team has recovered about 80 percent of the spy satellite destroyed during a failed launch attempt on Aug. 12. The rocket carrying the top-secret satellite – a Titan IV-A belonging to the Air Force – exploded seconds after liftoff from Cape

Canaveral Air Station. The 61-member Navy dive team has also pulled up about 30 percent of the Titan from a debris field on the floor of the Atlantic Ocean, one to five miles off the Brevard County coast in 50-foot-deep water. Air Force officials said Thursday that several important components from both the satellite and the rocket remain on the ocean floor. Divers plan to continue searching with metal detectors and sonar equipment. The satellite and the Lockheed Martin rocket were worth an estimated $1.3 billion. An accident investigation board has yet to release its findings, but engineers say the explosion was probably caused by a brief power loss that confused the Titan's guidance system. ["Divers get spy-satellite debris," **The Orlando Sentinel**, September 18, 1998.]

SEPTEMBER 18: To launch or not to launch. That is the question NASA and its global partners will be asking in Moscow the next two weeks during meetings that could lead to another Russian-caused delay in construction of the International Space Station. Whether it makes sense to send up the first two parts of the station as scheduled in November and December – despite Russia's failure to finish a crucial third piece of the outpost – will be the issue at hand. The first station flight – launch of a Russian space tug financed by the United States – still is scheduled to take place in two months, but it could be delayed until early next year. Not even senior NASA officials can say whether the current station construction schedule, which lays out an intricate series of 34 U.S. shuttle and nine Russian rocket flights, should be saved or shredded. "The schedule is so indefinite at this point that I'm not sure what's going to happen," said Frederick Gregory, chief of NASA's Office of Safety and Mission Assurance at the agency's headquarters in Washington, D.C. ["Meeting could bring more space station delays," **Florida Today**, September 19, 1998, p 1A & 2A.]

SEPTEMBER 21: NASA will ask Congress to approve at least $1.2 billion more over the next four or five years to keep the International Space Station from foundering, a senior agency official said Monday. Joseph Rothenberg, the agency's associate administrator for space flight, said $660 million of that amount would go directly to Russia to buy Soyuz and progress space vehicles as well as other support services. About $600 million more would be spent at home to modify NASA's space shuttle fleet, which will be needed to take the place of Russian vehicles that were to deliver fuel and supplies to the outpost. The goal is to keep station construction on schedule and reduce U.S. reliance on Russia, which can't meet its obligations because of its financial and political crises, Rothenberg said. NASA wants to launch the first station piece Nov. 20 aboard a Russian rocket. The next segment is to be launched Dec. 3 on shuttle Endeavour from Kennedy Space Center. Three months ago, NASA Administrator Daniel Goldin told a congressional committee he would not ask for more money for the project, and less than eight weeks ago the House voted overwhelmingly to keep the station alive. It is not clear whether NASA will ask Congress for a new appropriation or find the $1.2 billion in its own budget. Rothenberg said NASA is discussing funding options with the White House and Congress as well as negotiating with Russian space officials on a purchase price for goods and services. ["NASA seeks $1.2 billion to keep space station alive," **Florida Today**, September 22, 1998, p 1A.]

◆ Shuttle Discovery is poised on its launch pad today for an October mission with John Glenn aboard, but NASA officials are keeping tabs on Hurricane Georges, which may force the ship back indoors. As Discovery made the 4-mile trek to its launch pad early Monday, Georges was bearing down on the U.S. Virgin Islands, tearing up trees, flooding roads and forcing thousands from their homes. At this point, NASA officials don't know whether the

hurricane will threaten Florida's coast or head north toward the Carolinas. NASA decided to move Discovery to its launch pad at Kennedy Space Center as planned. However, they are ready to move the ship back to the Vehicle Assembly Building, if needed. The trip between the VAB and the launch pad takes six hours. The spaceship is scheduled for an Oct. 29 launch on a flight that includes the return to space of Glenn, who in 1962 became the first American to orbit Earth. ["Discovery rolls to launch pad," **Florida Today**, September 22, 1998, p 1A.]

SEPTEMBER 22: Space Shuttle Status Report, Tuesday, September 22, 1998. STS-95: Space Shuttle Discovery rolled out of the Vehicle Assembly Building yesterday at about 2 a.m. and arrived at pad 39B at about 8 a.m. The Rotating Service Structure was moved into place at 10 a.m. providing orbiter access to pad workers. Launch pad validations are in work and Shuttle main engine flight readiness testing begins later today. Shuttle managers are closely monitoring the progress of Hurricane Georges and developing precautionary plans to roll back Shuttle Discovery into the VAB if needed. At 11 a.m. today, managers declared a Hurricane Condition IV at KSC which means forecasters are predicting up to 50 knot winds within 72 hours. Tomorrow morning, weather forecasters will brief KSC managers on the hurricane's latest developments and the Hurricane Condition will be addressed again. If Hurricane Condition III (50 knot winds within 48 hours) is declared tomorrow, managers could opt to begin rollback preparations as early as tomorrow. If a Shuttle rollback becomes necessary, managers do not expect an impact to Discovery's target launch date. STS-88: Endeavour's radiator deployment was completed successfully. Robot arm connector testing is complete and closeout work is under way. Freon coolant loop No. 2 servicing preparations are in progress and potable water servicing is in work. Orbiter window No. 8 is being replaced today. In the VAB, preparations are under way for external tank/ solid rocket booster mating activities slated for later today. STS-93: Columbia's power reactant storage and distribution system testing is complete. Mass memory unit No. 2 loading is scheduled for later today. Leak checks of the replaced overboard waste dump valve occur today. OV-104 Atlantis - Return from OMDP in Palmdale, CA: Due to high winds in Palmdale, CA, yesterday, workers were unable to mate orbiter Atlantis to NASA's Shuttle Carrier Aircraft. Those mating activities have been rescheduled for today. If weather permits, the cross-country ferry flight begins at first light Wednesday morning and continues on to Ft. Hood, TX, for refueling. Currently the flight plan calls for an overnight stay in Ft. Campbell, KY, and with a Thursday midday departure, Atlantis would arrive at KSC Thursday afternoon Sept. 24. These plans are subject to available daylight and weather conditions on the flight path. Shuttle managers will also factor Hurricane Georges' progress and potential threat to KSC into any flight plan decisions. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, September 22].]

◆ Hundreds signed a giant mural-sized good luck card for John Glenn and the crew of the upcoming flight of shuttle Discovery at Kennedy Space Center Visitor Complex. The shuttle flight, scheduled for Oct. 29, features space pioneer Glenn's return to orbit. ["Well-wishers sign giant card," **Florida Today**, September 23, 1998, p 1A.]

◆ It has a futuristic engine to power its 120-million-mile flight to an asteroid. It has a cutting-edge navigation system and 10 other new technologies that could change space travel forever. Now all NASA's Deep Space 1 probe needs is a launch date. The agency

will decide next week whether to try launching the $152 million mission on Oct. 15 or Oct. 25 aboard a Boeing Delta 2 rocket from Cape Canaveral Air Station, officials said Tuesday. Although still preparing for the earlier date, NASA may postpone the flight so that a broken heater in the spacecraft's engine can be repaired. In the end, NASA has until Nov. 10 to get the mission started and still catch up with the desired asteroid in July 1999. Once under way, Deep Space 1's main purpose is to test a dozen new technologies that make spacecraft smaller and more capable of flying without assistance from controllers on Earth. The centerpiece of new technology is an ion-propulsion engine that is powered by electrically charged atoms instead of the chemicals used in conventional engines. ["NASA to announce launch date for Deep Space probe next week," **Florida Today**, September 23, 1998, p 6A.]

SEPTEMBER 23: Space Shuttle Status Report, Wednesday, September 23, 1998. STS-95: Launch pad validations and planned orbiter/external tank base plate modifications are complete. Discovery's main engine flight readiness test is in work. KSC managers continue to closely monitor the progress of Hurricane Georges and have developed a precautionary plan to roll back Shuttle Discovery into the VAB if needed. At noon, officials declared a Hurricane Condition III and Shuttle managers decided to begin preparations to roll back Shuttle Discovery. About 20 hours of preparation work is required for the Shuttle to be ready for first motion toward the VAB. Consequently, transportation of the Shuttle vehicle could begin as early as 7 a.m. tomorrow. KSC managers plan to meet again at 6 a.m. tomorrow before giving the order to begin rollback. Hurricane Condition III means forecasters predict about 50 knot winds in the immediate area within 48 hours. Shuttle operational constraints call for rollback procedures if winds at the launch pad are expected to be above 69 mph steady state. Rollback operation must be performed before steady state winds reach 48 mph. Based on the unpredictable nature of hurricanes, KSC managers have made this precautionary decision to minimize risk and to provide appropriate protection to KSC personnel and to the Space Shuttle national asset. STS-88: With the declaration of Hurricane Condition III at KSC today, workers will begin preparations to secure Endeavour in the OPF today. Preparations for payload bay door closure will be performed in the event that closure becomes necessary. STS-93: With the declaration of Hurricane Condition III at KSC today, workers will begin preparations to secure Columbia in the OPF today. OV-104 Atlantis - Return from OMDP in Palmdale, CA: Shuttle Atlantis departed Palmdale, CA today at about 9:45 a.m. EST atop NASA's Shuttle Carrier Aircraft, a modified Boeing 747. Current ferry flight plans have Atlantis stopping at Gray Army Airfield in Ft. Hood, TX, for refueling. The ferry will continue on to Ft. Campbell, KY, for an overnight stay. Depending on weather conditions on the flight path and at KSC, the managers plan to depart Kentucky by noon tomorrow and arrive at KSC Thursday afternoon. These plans are subject to available daylight and weather conditions on the flight path. Shuttle managers will also factor Hurricane Georges' progress and potential threat to KSC into any flight plan decisions. Another overnight stay in Ft. Campbell is possible. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, September 23].]

SEPTEMBER 24: Space Shuttle Status Report, Thursday, September 24, 1998. STS-95: Preparations to roll back Shuttle Discovery from Launch Pad 39B are complete and workers are ready to begin the transfer back to the Vehicle Assembly Building. At 6:30 a.m. today, Shuttle managers made a precautionary decision to roll back Discovery with first motion planned for 7:30 a.m., but a local weather system caused a delay. First motion has

been rescheduled for 10 p.m. tonight with VAB arrival at about 5 a.m. Friday. Forecasters will continue to monitor the local weather system that poses a threat of lightning and will brief Shuttle managers before the transfer begins. Managers continue to closely monitor the progress of Hurricane Georges and KSC remains in a Hurricane Condition III expecting 50 knot winds within 48 hours. Forecasters indicate less than a 20 percent chance of Georges tracking directly toward KSC and predict the storm will be off the coast of Tampa, FL, by Saturday. However, with rain bands, wind gusts, and the possibility of tornadoes associated with the eastern edge of the storm, KSC managers are taking all appropriate precautions. Managers will address KSC's Hurricane Condition as new weather information is available throughout the day. STS-88: KSC remains in a Hurricane Condition III today and workers will continue preparations to secure Endeavour in the OPF. Preparations for payload bay door closure will be performed if necessary. STS-93: KSC remains in Hurricane Condition III and workers continue with preparations to secure Columbia in the OPF today. OV-104 Atlantis - Return from OMDP in Palmdale, CA: Shuttle Atlantis remained overnight in Ft. Campbell, Kentucky, atop the Shuttle Carrier Aircraft. Ferry flight managers are monitoring the progress of Hurricane Georges and plan to remain in Kentucky until an appropriate departure time can be determined. Shuttle managers at KSC will not be ready to receive Atlantis any earlier than Saturday due to operational constraints associated with hurricane preparedness. Depending on weather conditions on the flight path and at KSC, Atlantis' arrival at KSC could be delayed until early next week. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, September 24].]

◆ The presentation of flags to the mayors of two municipalities in Puerto Rico, has been postponed due to the hurricane conditions in the country earlier this week. It will be rescheduled at the mayors' convenience. The flags flew on STS-90, which was launched April 17, 1998. ["Flag presentation," **KSC Countdown**, September 17, 1998. "Flag Ceremony Postponed," **KSC Countdown**, September 24, 1998.]

SEPTEMBER 25: Space Shuttle Status Report, Friday, September 25, 1998. STS-95: Yesterday evening, KSC managers decided to keep Shuttle Discovery at Launch Pad 39B. Though preparations to roll back to the Vehicle Assembly Building due to Hurricane Georges were complete, local weather posed a threat of lightning that exceeded rollback weather criteria. With the rollback first motion on hold, managers monitoring the progress of Hurricane Georges determined that the threat to flight hardware was greater from lightning during a rollback than that of the hurricane. As a result, the rollback was canceled and the rotating service structure returned to position around Discovery. Hurricane Georges is expected to remain on a northwest path near the west coast of Florida and gusting winds at KSC are not expected to exceed 40 mph. Launch pad weather protection will provide Discovery the necessary shelter from heavy rain and wind gusts. The lightning protection system at the pad will provide additional defense for the Shuttle through the weekend. All activities planned for launch of mission STS-95 remain on schedule. STS-88: Endeavour remains secure in the OPF today and the rudder speed brake shaft has been installed. Tunnel adapter aft hatch opening and main propulsion system leak and functional testing are complete. Window No. 8 replacement and payload bay door closing are also complete. Shuttle managers today are evaluating the possibility of reopening the orbiter's payload bay doors and resuming scheduled midbody work. STS-93: Columbia remains

secured in the OPF today with the payload bay doors closed. Overboard waste tank valve leak checks are complete following recent valve replacement efforts. Ku-band electronic assembly installation is scheduled for today. OV-104 Atlantis - Return to KSC: Shuttle Atlantis remains in Ft. Campbell, KY, atop the Shuttle Carrier Aircraft. Ferry flight managers are monitoring the progress of Hurricane Georges and plan for Atlantis to remain in Kentucky until weather permitted its return to KSC. Sunday, KSC workers are scheduled to begin efforts to reconfigure the Mate/Demate Device (MDD) from its current hurricane ready configuration. The MDD, located at KSC's Shuttle Landing Facility (SLF), is used to remove the orbiter from the top of the Shuttle Carrier Aircraft before workers tow the orbiter to the OPF hangar. Currently, Shuttle managers expect Atlantis to arrive at KSC on Monday, pending favorable weather assessments. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, September 25].]

◆ NASA has awarded a $3.44 billion contract to Lockheed Martin Space Operations Co., Houston, TX, to manage the Agency's space operations activities. The Consolidated Space Operations contractor will manage all of NASA's data collection, telemetry and communication operations supporting its Earth-orbiting satellites, planetary exploration, and human space flight activities. The contract shifts management responsibility from five NASA centers to a single entity, which is an unprecedented step for an operation of this magnitude. This effort is being closely observed by other government agencies that also are reviewing consolidating their operations. "This contract is projected to save the American taxpayers approximately $1.4 billion over 10 years," said Daniel S. Goldin. The basic contract amounts to $1.90 billion for a duration of five years, including a three-month phase-in period. The contract runs from October 1998 to December 2003. The award also contains options totaling $1.54 billion, which includes a five-year extension of the basic effort (January 2004 through December 2008); additional options for work at the Kennedy Space Center, FL; and enhanced mission and data service support for the International Space Station program. ["Lockheed Martin Space Operations Co. awarded contract to manage NASA's Space Operations," **NASA Contract Announcement #c98-p**, September 25, 1998.]

◆ The threat of Hurricane Georges caused NASA Administrator Dan Goldin and an entourage of top agency officials to call off a Friday visit to Kennedy Space Center. The agency had planned a ceremony with the president of the Italian Space Agency, who was to hand over an Italian-made module to NASA for the International Space Station. Afterward, Goldin and a cadre of senior NASA station officials were to discuss station issues, including the ever-worsening problems with Russia's participation in the project. Those expected at the event included Joseph Rotenberg, NASA's associate administrator for space flight, and Randy Brinkley, NASA's manager of the space station. A new date has not been set for the ceremony and a possible Goldin visit. ["Storm forces Goldin to delay visit to KSC," **Florida Today**, September 26, 1998.]

SEPTEMBER 26: A senator from Ohio wants to rename a Cleveland-based NASA facility in honor of his fellow legislator and returning astronaut Sen. John Glenn. Glenn, 77, the state's senior senator and the first American to orbit the Earth, is scheduled for an Oct. 29 launch on a nine-day mission to study elderly health problems on shuttle Discovery. Sen. Mike DeWine, a freshman Republican, plans to honor his colleague by offering

legislation to rename NASA's Lewis Research Center after Glenn, a Democrat who is retiring after 24 years in the Senate. A spokesman for Glenn said that the astronaut is honored by DeWine's intentions. However, even if DeWine is successful, NASA would not have to agree to change the name just because Congress ordered it. The Ohio-based space center is named after George W. Lewis, an early supporter of spaceflight and research director from 1924 to 1947 at a predecessor agency to the National Aeronautics and Space Administration. ["Senator wants to rename NASA facility after Glenn," **Florida Today**, September 27, 1998.]

SEPTEMBER 27: The orbiter Atlantis arrived at the SLF on Sunday, Sept. 27, atop NASA's Shuttle Carrier Aircraft, a modified Boeing 747, after a 5-day trip from California. After demating at the SLF, Atlantis was moved to the OPF 2. The orbiter spent 10 months in Palmdale, CA, being upgraded and modified for flight. Atlantis is next scheduled to fly in June 1999 for mission STS-92, the third flight for the International Space Station. ["Upgraded Atlantis arrives after flight from California," **KSC Countdown**, September 29, 1998.]

SEPTEMBER 28: Space Shuttle Status Report, Monday, September 28, 1998. STS-95: Over the weekend, Discovery was secured at Launch Pad 39B with standard weather protection. As Hurricane Georges passed Florida's west coast, winds at KSC did not exceed 23 mph. Last night, the Rotating Service Structure was retracted and the payload canister arrived at the pad. The SPACEHAB, Spartan and HOST payloads are being installed in the pad's payload changeout room today. Installation of the vertical payload assortment into the orbiter's cargo bay occurs tomorrow. Launch pad validations are in work today. STS-88: Endeavour's payload bay doors were opened Friday and radiator deployment is complete. Cabin air circulation system inspection and maintenance has been performed. The various cameras onboard the orbiter are undergoing standard inspections. Potable water servicing and radiator functional tests are slated to begin today. STS-93: Columbia's payload bay doors will be opened today and resume work in the orbiter's midbody compartment. Installation of the Ku-band electronics assembly continues. OV-104 Atlantis - Returns to KSC from Palmdale, CA: Shuttle orbiter Atlantis arrived at KSC's Shuttle Landing Facility yesterday at about 10 a.m. Flying atop the Shuttle Carrier Aircraft (SCA), Atlantis' ferry flight departed Ft. Campbell, KY, Sunday morning. KSC workers demated the orbiter from the SCA and began tow operations to Orbiter Processing Facility bay 2 at bout 8:30 a.m. today. Atlantis will now undergo processing for its next launch slated for June of 1999. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, September 28].]

◆ Coming soon to a toy store near you: The "Hot Wheels" action packed version of senator-astronaut John Glenn, his Friendship 7 capsule from long ago and the space shuttle he'll soon be riding on. Glenn is prominently featured in Mattel Toy's latest joint venture with NASA, in advance of the Oct. 29 launch of the Space Shuttle Discovery. It features a miniature senator in navy suit and red tie, as well as figures wearing Glenn's shuttle crew suit and a third wearing the famous silver suit from Glenn's first space trip in 1962. Glenn, 77, will not be compensated. "This is to get kids excited about our nation's space program," spokesman Jack Sparks said. ["Mattel turns Glenn into an action figure," **Florida Today**, September 29, 1998.]

SEPTEMBER 29: Space Shuttle Status Report, Tuesday, September 29, 1998. STS-95: Launch pad validations are complete at pad 39B and the Rotating Service Structure has been extended around Shuttle Discovery. Installation of the vertical payloads into the pad's payload changeout room is complete and the orbiter's payload bay doors will be opened this morning. The SPACEHAB, Spartan and HOST payloads will be installed into the orbiter tomorrow and payload interface verification testing begins Thursday. STS-88: Endeavour's payload bay doors remain open while the orbiter undergoes work in the midbody compartment. Cabin air circulation system inspection and maintenance is complete. Inspections of the orbiter's various onboard cameras continue. Potable water servicing and radiator functional tests are ongoing. STS-93: Columbia's payload bay doors are open and cycling tests of the Ku-band electronics assembly are complete. Auxiliary power unit testing is in work today. STS-92: Orbiter Atlantis was towed from the Shuttle Landing Facility to OPF bay 2 yesterday. With work platforms in place around the vehicle, technicians will begin deconfiguring Atlantis from its current ferry flight setup. Next week, the aerodynamic and protective tail cone will be removed from the Shuttle orbiter's aft engine compartment. Workers will powerup the vehicle Monday and the payload bay doors will be opened. Removal of the simulated orbiter maneuvering system pods begins late next week. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, September 29].]

◆ Ten years ago on Sept. 29, 1988, shuttle Discovery lifted off on a five-day mission, the first since the Challenger accident in January 1986. Today, NASA can look back on the past decade with pride. It has safely flown 66 shuttle missions, including notable voyages to deliver the Hubble Space Telescope into orbit, to send probes to Venus and Jupiter, and to repeatedly link up with the Russian space station Mir. ["NASA faces woes after decade of success," **Florida Today**, September 27, 1998, p 1A & 2A.]

◆ It's a race to beat John Glenn into space. NASA must launch its Deep Space 1 mission to an asteroid just before Glenn's Oct. 29 flight on shuttle Discovery or risk an indefinite delay, officials said Tuesday. Designed to test new technologies, the probe is to fly near an asteroid in July 1999 and maybe a comet in 2001. Officials wanted to launch the probe Oct. 15, but spacecraft preparations are taking longer than expected. NASA now is aiming for an Oct. 25 start. The flight is to begin at 6:59 a.m. on a Boeing Delta 2 rocket from Cape Canaveral Air Station. If delayed by weather or technical problems, NASA has until Oct. 27 to launch the spacecraft. Then the mission would have to wait while Discovery attempts to fly on the 29th with Glenn aboard. That's because all rocket launches share the same Air Force tracking system, and two days are needed between launch attempts to prepare it for the next flight. If Discovery launches on time, Deep Space 1 would get a final launch shot Oct. 31. But if Discovery is delayed a day, things get dicey. Deep Space 1's rocket is on the same pad that must be used for another NASA mission, the planned Dec. 10 launch of the Mars Climate Orbiter probe to study Martian weather. Technicians would have to start disassembling the Deep Space rocket no later than Oct. 31 so the Mars mission could be ready to go Dec. 10. The Mars mission has priority over Deep Space 1 because it must be launched during a specific window to reach the planet. ["New craft's launch window shrinks," **Florida Today**, September 30, 1998, p 1A.]

SEPTEMBER 30: Space Shuttle Status Report, Wednesday, September 30, 1998. STS-95: At Launch Pad 39B, Discovery's payload bay doors were opened yesterday. Today workers will install the vertical payloads into the orbiter. The new Space-to-Space Orbiter Radio (SSOR) will be installed and tested today. SSOR is being tested for use during the International Space Station (ISS) construction process and will facilitate communication between Shuttle crew members, space walking astronauts and ISS crew members without relying on ground stations for transmission. Preparations are under way for tomorrow's helium signature leak test. STS-88: Fuel servicing of Endeavour's auxiliary power units was performed yesterday. Auxiliary power converter unit inspections began yesterday and will conclude today. Functional tests on the orbiter's main landing gear are in work. Tomorrow, workers will stow the flight crew equipment in preparation for the Crew Equipment Interface Test on Saturday. Preparations for payload bay door closure are under way. STS-93: Columbia's waste tank leak checks continue today. Preparations for next week's payload premate test are in work. Servicing of the auxiliary power unit fuel lines is in progress. The orbiter's body flap and elevon vertical tiles are being removed to support upcoming structural testing. STS-92: Orbiter Atlantis was lowered onto hydraulic jacks in the OPF yesterday. Workers are gaining access to the aft engine compartment today and post ferry flight inspections are under way. Technicians will be occupied with efforts to deconfigure Atlantis from its ferry flight setup over the next two weeks. Removal of the simulated forward reaction control pod and orbiter maneuvering system pods begins late next week. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, September 30].]

OCTOBER

OCTOBER 1: Space Shuttle Status Report, Thursday, October 1, 1998. STS-95: The SPACEHAB, Spartan and HOST payloads were installed in Discovery's cargo bay yesterday at Launch Pad 39B. Orbiter hydraulic system closeouts are complete. The Space-to-Space Orbiter Radio (SSOR) has been installed and functional tests concluded last night. Preparations continue for tomorrow's helium signature leak test. The Spartan payload interface verification test is under way. STS-88: Endeavour's auxiliary power converter unit inspections concluded yesterday. Integrated hydraulic testing is complete and functional tests on the orbiter's main landing gear continue. Workers are stowing the flight crew equipment inside the orbiter's crew compartment in preparation for the Crew Equipment Interface Test on Saturday. Secondary payload installation is in work and preparations for payload bay door closure continue. STS-93: Columbia's waste tank leak checks continue. Preparations for next week's payload premate test are in work. Servicing of the auxiliary power unit fuel lines continues. Preparations for upcoming structural tests on the orbiter's body flap and elevon are in progress. STS-92: Workers are setting up platforms to gain access inside orbiter Endeavour. Technicians accessed the orbiter's aft engine compartment yesterday and routine receiving inspections are under way. Technicians continue with efforts to deconfigure Atlantis from its ferry flight setup over the next two weeks. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, October 1].]

◆ NASA officials are tightening security at Kennedy Space Center for John Glenn's shuttle launch this month, aware that terrorists could target the ship or the hundreds of dignitaries in attendance. "It is more than sitting forward in the saddle a little bit. We're actually intensifying in areas that are transparent to our (security) community," said KSC Security Director Calvin Burch. "This all seems to be happening when we have a lot of international unrest. We do keep in touch with federal, state and local intelligence groups and keep advised of the international situation and threats that might be directed toward us." All 535 members of Congress – 435 congressmen and women and 100 senators – have been invited to KSC to watch the 77-year-old Ohio senator return to space aboard shuttle Discovery on Oct. 29. Vice President Al Gore also may attend as well as many foreign dignitaries, Burch said. Those officials, along with the $2 billion shuttle and the high-profile nature of Glenn's mission, potentially make the launch a terrorist target. Special anti-terrorist teams armed with advanced weapons will be on hand to support KSC's regular security force, which carries sidearms and uses guard dogs, Burch said. Access to KSC will be tight. The Defense Department, Secret Service, State Department and other agencies will have a hand in security, Burch said. ["KSC boosts security for Glenn flight," **Florida Today**, October 1, 1998, p 1A.]

◆ In all likelihood, Sen. John Glenn, a former astronaut who is returning to space, has cast his last vote in the Senate – No. 9,414. Glenn, 77, who is retiring after 24 years in the Senate, will go to Houston today for the last phase of training prior to his Oct. 29 launch aboard the shuttle Discovery. "Yeah, I'll miss it, sure," said Glenn, a Democrat. "But you move on to other things. That's it." What he will miss most, he said, "is being able to work on things that I have a particular interest in." What was likely his last roll call vote was recorded Tuesday (Sept. 29) as the Senate was trying to decide whether to invoke closure –

or shut off debate – on a motion to proceed with consideration of legislation related to Internet taxation. Glenn voted with the majority on the move to shut off debate. As his space shuttle training has intensified, Glenn has missed an increasing number of votes, but his staff insists he hasn't been absent on anything where he would have made a difference against the Republican majority. The Ohio senator, who became the first American to orbit Earth in 1962, will be doing experiments relating to the similarities of the aging process and space flight on the human body. ["Glenn wraps up duties as Senator," **Florida Today**, October 1, 1998, p 4A.]

◆ The futuristic world of space discovery makes history today as a piece of Americana on a postage stamp. A 5-stamp pane of 32-cent postage stamps will be issued today after a kick-off ceremony at the Kennedy Space Center Visitors Complex's shuttle plaza. The ceremony doubles as the opening event for NASA's 40th anniversary activities and launches National Stamp Collecting Month. Aerospace artist Attila Hejja, shuttle astronaut Dr. Don Thomas and the inspector general of the U.S. Postal Service, Karla Corcoran, will be at the 11 a.m. ceremony. Two hundred children from Lewis Carroll Elementary on Merritt Island and Mims Elementary have been invited. Melissa Tomasso, spokeswoman for the KSC Visitors Complex, said this will be the second first-issue stamp at KSC. A first-day issue in 1994 celebrated the 25th anniversary of the first moon landing, Tomasso said. In addition, there was a second-day issue honoring Pathfinder, Tomasso said. Hejja designed the five individual stamps so that they come together to form a futuristic scene, complete with space vehicles, space ships, a city and space explorers, said Barry Ziehl, spokesman for the U.S. Postal Service out of Washington, D.C. Design elements include hidden images, including spaceships and a man on the moon, that can be viewed only through a decoder lens. The decoder is sold separately for $4.95. The header of the stamps appears to be floating off the pane. The Postal Service has printed 185 million of the 32-cent stamps. ["New space stamp debut at KSC," **Florida Today**, October 1, 1998, p 1B & 2B.]

◆ It was 40 years ago today that NASA was created. On Oct. 1, 1958, NASA officially opened for business with five facilities inherited from the National Advisory Committee on Aeronautics (NACA), which was created in 1916 to be the civilian government organization performing research in aviation. That same day, President Eisenhower issued an executive order transferring space projects and appropriations from other space programs to NASA. These gave NASA 8,240 staff (8,000 from the NACA) and a budget of approximately $340 million. T. Keith Glennan, the president of the Case Institute of Technology in Cleveland, OH, was named NASA's first administrator and NACA Director Hugh Dryden was named deputy administrator. ["Happy Anniversary, NASA!" **KSC Countdown**, October 1, 1998.]

OCTOBER 2: Space Shuttle Status Report, Friday, October 2, 1998. STS-95: At the launch pad yesterday, workers completed preparations for Discovery's helium signature leak test. The leak test began this morning and concludes this afternoon. Routine leak checks of the orbiter's onboard liquid oxygen storage tanks are also in work today. The Spartan payload interface verification test (IVT) concluded yesterday and the SPACEHAB IVT is under way today. STS-88: Workers will complete efforts to stow Endeavour's flight crew equipment today. The STS-88 Shuttle crew will participate in the Crew Equipment Interface Test this Saturday, familiarizing themselves with the orbiter's midbody and crew compartments. Yesterday, secondary payload installation was completed and the Ku-band system retest was performed. STS-93: Columbia's waste tank leak checks are complete and

functional tests of the entire waste control system are slated for next week. Preparations for next week's payload premate test continue. Leak checks on the orbiter's auxiliary power unit exhaust ducts are in work today. Preparations for upcoming structural tests on the orbiter's body flap and elevon continue. STS-92: Workers continue to gain access inside orbiter Atlantis to conduct standard receiving inspections. Next week, technicians will focus on removing the various components required for ferry flight operations. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, October 2].]

◆ With passes for prime viewing sites at Kennedy Space Center hard to come by, fans have an alternative place to watch the historic launch of John Glenn. The U.S. Space Walk of Fame, a tract of riverfront land where shuttle-launch watchers traditionally gather, will be used for KSC Visitor Complex launch packages. Instead of free parking and no amenities, visitors will pay $20 each for a package that includes a reserved parking spot, a John Glenn T-shirt, entertainment by local bands, launch status briefings and NASA countdown commentary. Concession stands will sell food, and portable potties will be available. The company that operates the KSC Visitor Complex, Delaware North Parks Services of Spaceport, teamed with the Space Walk of Fame Foundation to lease the privately owned tract. Fronting the Indian River, the site is across State Road 402 from Sand Point Park and stretches from the Max Brewer Causeway to just north of the Gemini Monument. ["Shuttle-viewing packages to be sold for Glenn liftoff," **Florida Today**, October 2, 1998, p 1A.]

◆ The launches of the first International Space Station components – the Zarya module and the Unity module – remain on schedule following a series of technical meetings in Moscow that concluded today with a meeting of representatives from all international partners. In today's meeting, all station partners reviewed and concurred with a plan to maintain the current launch schedule for Zarya, which will launch on a Russian Proton booster Nov. 20 from the Baikonur Cosmodrome, Kazakhstan, and for Unity, which will launch on the Space Shuttle Endeavour Dec. 3 from KSC. ["Statement following conclusion of Moscow meetings," **NASA News Release #98-176**, October 2, 1998.]

OCTOBER 4: Twenty-five days is all the time that's left before John Glenn's scheduled liftoff Oct. 29 aboard shuttle Discovery on his long awaited return to space. Glenn and the rest of Discovery's crew have been training for months and will be at Kennedy Space Center this week for a final countdown rehearsal. It will be their last visit to the spaceport until launch week. ["All systems go for Oct. 29 liftoff," **Florida Today**, October 4, 1998, p 1E.]

OCTOBER 5: Space Shuttle Status Report, Monday, October 5, 1998. STS-95: On Friday, Discovery's helium signature leak test was successfully completed and the Spartan payload interface verification test (IVT) was also performed. Over the weekend, the SPACEHAB IVT was completed and the orbiter's payload bay doors were closed. Loading of hypergolic propellants into the orbiter's onboard storage tanks begins today with oxidizer loading. Fuel loading occurs tomorrow. Preparations for Friday's Terminal Countdown Demonstration Test are in work. The STS-95 flight crew arrives tomorrow to begin familiarization activities at KSC prior to the actual dress rehearsal on Friday. STS-88: On Saturday, the STS-88 flight crew and KSC Shuttle workers conducted the Crew Equipment

Interface Test. Inspection activities were conducted in Endeavour's midbody and crew compartments. Workers are installing two secondary payloads in the cargo bay today. Hydraulic checks on Shuttle main engine No. 2 are scheduled today and robot arm checks begin this afternoon. Final testing of the Ku-band antenna system and final inspections of the orbiter's radiator and payload bay are scheduled in preparation for next Monday's transfer of Endeavour to the Vehicle Assembly Building. STS-93: Columbia's mechanical systems are undergoing checks today. Functional tests of the waste collection system are scheduled this week. Preparations for the payload premate test continue. Next week, main engine installation begins followed by heat shield installation. STS-92: Access platforms continue to be installed in and around Atlantis as technicians proceed with standard receiving inspections. Preparations are under way for orbiter power system validations tomorrow. Workers are also occupied with efforts to deconfigure the orbiter from the recent ferry flight setup. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, October 5].]

◆ The United States will buy Russia's research time on the International Space Station for $60 million. By doing so, it may help keep the cash-strapped Russian Space Agency afloat and help it complete the module that will house the space station's crew, officials said. NASA's effort was aimed at preventing more costly delays in building and launching the 16-country International Space Station. ["NASA buys Russia's station research time," **Florida Today**, October 6, 1998, p 6A.]

OCTOBER 6: Space Shuttle Status Report, Tuesday, October 6, 1998. STS-95: Loading of hypergolic propellant into Discovery's onboard storage tanks continues. Oxidizer loading concluded yesterday and fuel loading begins today. Tomorrow morning, the orbiter's payload bay doors will be opened and payload interface verification testing will resume. Preparations for the Terminal Countdown Demonstration Test (TCDT) are in work. The STS-95 flight crew arrives at KSC's Shuttle Landing Facility this evening to participate in mission familiarization activities and TCDT exercises on Thursday and Friday. STS-88: Installation of the Imax camera inside Endeavour's cargo bay was completed last week and camera connection verifications were completed yesterday. Checks of the orbiter docking system fan are complete and final Ku-band testing concluded yesterday. The orbiter's aft compartment closeouts are ongoing and checks of the Shuttle main engine No. 2 yaw actuator continue. Final inspections of the orbiter's radiators and payload bay are in progress. Secondary payload installation continues. Preparations for Monday's transfer of Endeavour to the Vehicle Assembly Building proceed on schedule. STS-93: Columbia's mechanical systems are undergoing checks this week. Functional tests of the waste collection system will conclude today. Preparations for the payload premate test continue. Technicians are preparing for auxiliary power unit fuel line connections today. Shuttle main engine installation is scheduled for next week and engine heat shield installation follows. STS-92: Access platforms continue to be installed in and around Atlantis as technicians proceed with standard receiving inspections. Preparations are under way for orbiter power system validations tomorrow. Workers are also occupied with efforts to deconfigure the orbiter from the recent ferry flight setup. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, October 6].]

◆ The STS-95 Discovery crew arrived at Kennedy Space Center late Tuesday in their T-38 jets after thunderstorms in Houston delayed their departure for several hours. John Glenn, a former Marine fighter pilot, rode as a passenger in a jet flown by Discovery's commander, Curt Brown. Smiling and swatting at bugs, Glenn, 77, appeared fit and spry as he was greeted immediately by KSC's director Roy Bridges and a humid Florida night. "We sure do appreciate you all coming out and feeding the mosquitoes," Brown jokes to the group of about 60 reporters and photographers. "But we're happy to be down in Florida. We've been training very hard for the last 7 ½ months. The practice countdown marks a big milestone in our training." During nine days in orbit, Brown and his crew are to conduct a mixture of medical and astronomy experiments. But the attention promises to be on Glenn, who made NASA's first orbital flight in 1962 and hasn't been in space since. The journey will make Glenn the oldest space traveler to date and will carry him back to the territory he was the first to chart for America 36 years ago. In those days, Glenn as a lieutenant colonel with 5,000 hours' flight time and an impressive record as a daring fighter pilot in two wars. Today, Glenn is a retiring, four-term Democratic senator from Ohio whose gray and freckled countenance is triggering a wave a nostalgia for NASA's glory days. But the returning hero will not get any breaks this week, as NASA officials say they will run the crew through the regular practice countdown that precedes every shuttle flight. "John Glenn will participate in this week's activities to their fullest extent," said KSC spokesman Joel Wells. Their activities will get unusual attention from about 100 reporters, photographers and television cameramen who have flocked this week to KSC, mainly to follow Glenn around. ["Glenn arrives at Cape," **Florida Today**, October 7, 1998, p 1A & 6A.]

◆ The workers who operate tracking cameras that monitor all rocket and space shuttle launches are threatening to strike, which could disrupt a busy launch schedule. Members of the International Cinematographers Guild Local 600 are in a contract dispute with Computer Science Ratheon, the Air Force contractor that runs the camera operation. ["Strike could delay launches," **Florida Today**, October 7, 1998.]

OCTOBER 7: If the White House and Congress don't give NASA money to bail out its Russian partners, it will be time to pull the plug on the $40 billion International Space Station, NASA Administrator Daniel Goldin said Wednesday. Goldin's startling comment came under pressure from angry lawmakers during the hastily arranged hearing to explore NASA's request for an additional $1.2 billion for the outpost. "If we cannot fund this properly because of the budget deal, then maybe we ought to cancel the space station," said Goldin in response to pointed questions by republican and Democratic members of the House Science Committee. "I would say this project will have to be terminated unless there is a commitment by the government that we have to give it the resources we need." In an unusual display of candor, Goldin acknowledged that the huge difficulties posed by the project had pushed him to the brink of resignation, but he decided against it. Despite the vast uncertainties about funding, Goldin confirmed he still intends to launch the first Russian-built piece of station hardware in November, followed Dec. 3 by shuttle Endeavour with a connecting node. ["No cash, no station, Goldin says," **Florida Today**, October 8, 1998, p 1A & 5A.]

OCTOBER 8: Space Shuttle Status Report, Thursday, October 8, 1998. STS-95: The KSC test team assembled in the launch control room this morning to begin the Terminal

Countdown Demonstration Test and the simulated countdown clock began at 10 a.m. today. The STS-95 flight crew will participate in orbiter and payload familiarization activities today. Tomorrow morning, they will don their launch and entry suits for a full dress rehearsal of launch day activities, including entry and egress from the orbiter's crew compartment. Loading of hypergolic propellant into Discovery's onboard storage tanks was completed earlier this week. A cavity purge of the orbiter's main propulsion system concluded last night. Loading of the orbiter's mass memory unit (MMU) is complete and replacement of MMU No. 2 is scheduled. The payload bay doors are currently open and the payload interface verification test is complete. STS-88: Endeavour's aft compartment closeouts continue with adjustments to the main engine No. 2 yaw actuator planned this week. A final hydraulic check of the orbiter's main landing gear is slated today. Preparations to transfer Endeavour from the Orbiter Processing Facility to the Vehicle Assembly Building are under way. Closeouts of the orbiter's payload bay are in work and the cargo bay doors will be closed Saturday. Vehicle pressurization tests occur Sunday and orbiter weight and center of gravity tests are set for Monday. Endeavour will roll to the VAB on Tuesday morning and be mated to the external tank and solid rocket boosters stacked in VAB high bay 3. STS-93: Columbia's mechanical systems are undergoing checks this week. Technicians are connecting the auxiliary power unit fuel lines today. Shuttle main engine installation is scheduled for next week and engine heat shield installation follows. STS-92: Access platforms continue to be installed in and around Atlantis as technicians proceed with standard receiving inspections. The orbiter was powered up yesterday for the first time since its 10-month overhaul. The new multifunctional electronic display system or "glass cockpit" is being tested this week. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, October 8].]

◆ John Glenn tried to promote science over sentiment Thursday in a vigorous bid to stress the potential research benefits of his reunion with spaceflight. Glenn, 77, said the experiments planned for his Oct. 29 shuttle Discovery mission are more important than his quest to get back into space, where he made history in 1962 as the first American to orbit Earth. He also rejected the notion that spaceflight should be open to more non-astronauts. "I don't look at myself as just the average civilian coming back in," he said. "I have had experience, albeit a long time ago, (but) I was coming back in for a very specific purpose like other payload specialists have done in the past." Discovery's crew is at Kennedy Space Center this week to practice for a liftoff that promises to be NASA's most high-profile mission in years. ["Glenn promotes flight's merits," **Florida Today**, October 9, 1998, p 1A.]

OCTOBER 9: Space Shuttle Status Report, Friday, October 9, 1998. STS-95: The KSC test team and the STS-95 flight crew successfully completed the Terminal Countdown Demonstration Test today at about 11 a.m. Today's launch day dress rehearsal culminated with a simulated Shuttle main engine cut-off at T-3 seconds on the countdown clock. TCDT allows the launch team and crew to practice launch day activities and to validate emergency egress procedures. The crew returned to their homes in Houston, TX, this afternoon and will complete their mission training at Johnson Space Center. Preparations to replace Discovery's mass memory unit No. 2 are under way. At pad 39B, the Rotating Service Structure will be retracted for Saturday's KSC Open House and extended in place around the Shuttle immediately following the event. Shuttle managers will meet at KSC

Tuesday for the Flight Readiness Review and are expected to announce Oct. 29 as the official launch date for mission STS-95. STS-88: Adjustments to Endeavour's main engine No. 2 yaw actuator are complete and aft compartment closeouts proceed on schedule. Final hydraulic checks of the orbiter's main landing gear concluded yesterday. Preparations to transfer Endeavour from the Orbiter Processing Facility to the Vehicle Assembly Building continue. Closeouts of the orbiter's payload bay are in work and the cargo bay doors will be closed Saturday. Vehicle pressurization tests occur Sunday and orbiter weight and center of gravity tests are set for Monday. Endeavour is slated to roll to the VAB on Tuesday morning and then be mated to the external tank and solid rocket boosters stacked in VAB high bay 3. STS-93: Columbia's mechanical systems are undergoing checks this week. Technicians completed fuel line connections for orbiter auxiliary power units No. 1 and No. 3. Shuttle main engine installation is scheduled for next week and engine heat shield installation follows. STS-92: Atlantis' receiving inspections continue. Preparations for payload bay door opening are in work. Powered orbiter testing began yesterday for the first time since the Orbiter Maintenance Down Period. The new multifunctional electronic display system or "glass cockpit" is being tested this week. Preparations to remove the simulated forward reaction control system are under way. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, October 9].]

◆ An Atlas II-A rocket carrying a replacement TV satellite for use over Europe and the Middle East roared of the launch pad Friday, on target and on schedule. The successful 6:50 p.m. launch broke the recent string of liftoff explosions at Cape Canaveral Air Station. ["Atlas roars into space from Cape," **The Orlando Sentinel**, October 10, 1998, p A-8.]

◆ John Glenn left Florida on Friday a bona fide member of shuttle Discovery's crew, waving with the other astronauts at cameras pointed mainly at him. The 77-year-old sailed through four days of final launch training at Kennedy Space Center, where NASA officials said he is ready for his scheduled Oct. 29 return to space. But by week's end, NASA learned that nothing will make the American hero what he seemingly wants most – to be viewed as a regular shuttle astronaut out to do a job. Despite every effort to blend in with Discovery's crew, the retiring U.S. senator could not escape the fascination or skepticism surrounding his role in the flight. At one point, he even tried scolding the media into focusing on the potential science benefits of the mission instead of his every move. But there is no chance Glenn – the first American to orbit Earth in 1962 – will fade into the background. Even NASA's astronauts can't see him as simply another member of the crew. "Everyone looks at John with a little bit of awe because it's *John Glenn*," said astronaut Rick Linnehan, who is assigned to help Discovery's astronauts get ready to fly on launch day. The Discovery crew's last day at KSC began at 6 a.m. Friday when they rose and began a dress rehearsal of what they will experience on launch day. The practice session ended about 11 a.m. with the crew pretending that an emergency had forced a halt to the countdown and a speedy retreat. The crew left KSC after lunch with Glenn as a passenger in the back seat of T-38 jet flown by Discovery Commander Curt Brown. ["Glenn ready for return trip," **Florida Today**, October 10, 1998, p 1A & 2A.]

◆ As the House and Senate lurched toward adjournment, the two bodies cleared legislation that commercial space advocates have been pushing for some time. The Commercial Space Act of 1998 gives the Federal Aviation Administration the authority to

regulate and license reusable launch vehicles developed by U.S. companies. Until now, non-governmental companies could send rockets to orbit to deploy satellites, but in theory they could not fly their vehicles or payloads back to Earth. Realistically, NASA's shuttles are the only reusable space vehicles in existence. But several companies are pursuing a new generation of single-stage-to-orbit craft that holds out hope for dramatically reducing the cost of access to space. Creating a government mechanism to monitor the safe launch and re-entry of these vehicles was essential if this aerospace niche is to survive. ["Commercial Space Act launches ventures for private businesses," **Florida Today**, October 10, 1998, p 5A.]

OCTOBER 10: KSC Open House will feature a display at Complex 14 at Cape Canaveral Air Station (CCAS). The blockhouse at the launch site where astronaut John Glenn lifted off on the first U.S. orbital mission will be open. The structure is a restored historical site and features displays on launches from that pad. Glenn rode into orbit aboard his Friendship 7 Mercury capsule atop an Atlas rocket from Complex 14 on Feb. 20, 1962. More than 33,600 employees and guests attended the KSC Open House. The sites recording the highest number of visitors were the Launch Control Center and the Orbiter Processing Facility. [**KSC Countdown**, October 1, 1998. **KSC Countdown**, October 15, 1998.]

OCTOBER 12: Fireworks, reserved viewing sites with live music, John Glenn memorabilia and a welcome-home parade are all in the works as Space Coast communities and businesses prepare for the Oct. 29 shuttle launch. As the Kennedy Space Center Visitor Complex prepares to capitalize on the desire of thousands to witness Glenn's return to orbit, QVC is planning a home shopping broadcast from the launch-viewing site. A quarter-million people are expected to watch the launch that will take Glenn back into orbit. Although crowds gather for every shuttle launch, it has been 15 years since a launch has drawn crowds rivaling the one expected for Glenn's return. Plans for a parade, a fireworks show and a carnival atmosphere are reminiscent of the early moon shots, when crowds were so large people slept on the U.S. 1 median, said Bob Hudson, publisher emeritus of the weekly *Star-Advocate* and a local historian. Hudson said that in the late 1960s and early 1970s, organized efforts to capitalize on tourism included a rock band at a mall and churches selling food. The V.I.P. site at Kennedy Space Center is being reserved for national figures. A by-invitation-only event, the reception is for people who normally would be invited to watch from KSC, said Heidi Brandow, president of the Cocoa Beach Area Chamber of Commerce. The chamber also is working with the cities of Cocoa Beach and Cape Canaveral and with the Space Coast Office of Tourism to plan the parade. The date will be announced after the astronauts return, said Bonnie King of the tourism office. ["Space Coast catching Glenn fever," **Florida Today**, October 13, 1998, p 1B & 2B.]

OCTOBER 13: Space Shuttle Status Report, Tuesday, October 13, 1998. STS-95: Over the weekend, the Rotating Service Structure was retracted for Saturday's KSC Open House and extended in place around the Shuttle immediately following the event. On Monday, workers completed the HOST payload Interface Verification Test and HOST end-to-end testing is in work today. Discovery's midbody umbilical connections were made yesterday and leak checks are complete. Technicians have also removed a faulty mass memory unit (MMU) and replacement of MMU No. 2 is slated for Thursday. Tonight, workers will install the astronaut contingency space suits into the orbiter. Payload closeout activities are

scheduled through the remainder of the week. Shuttle managers have gathered at KSC today for the STS-95 Flight Readiness Review and are expected to announce Oct. 29 as the official launch date for Shuttle Discovery. STS-88: Endeavour's aft compartment doors are installed and the engine compartment is closed-out for flight. Nose landing gear tire pressurization is complete. Final payload bay cleaning and radiator inspections are complete and the payload bay doors were closed last night in preparation for OPF roll out. Tonight, workers will perform the weight and center of gravity test and tomorrow Endeavour will be mounted on the orbiter transfer vehicle. The orbiter is expected to begin first motion to the Vehicle Assembly Building by late Wednesday night. By Thursday, Endeavour will be mated to the external tank and solid rocket boosters in VAB high bay 3. STS-93: Technicians completed fuel line connections for the orbiter's auxiliary power units last week. Shuttle main engine installation begins Thursday and engine heat shield installation follows in two weeks. STS-92: Workers have removed the forward reaction control system simulator kit and will transfer it to the Hypergolic Maintenance Facility. The payload bay doors will be opened this week and the ferry flight tail cone will be removed today. Powered orbiter testing continues. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, October 13].]

◆ NASA announced today it will delay shipment of the Advanced X-ray Astrophysics Facility (AXAF) from the prime contractor, TRW Space and Electronics Group, Redondo Beach, CA, to Kennedy Space Center, FL. The postponement, made following a review by NASA and TRW, will allow additional time for TRW to complete testing of the observatory and to replace an electrical switching box. AXAF had been scheduled for shipment later this month to meet a Jan. 21, 1999, launch date. NASA also has directed a review of AXAF, by NASA Chief Engineer Dr. Daniel Mulville to be completed by mid-January 1999. A new shipment date and a new launch date will be confirmed after the review. ["NASA delays shipment of X-ray Telescope to Kennedy Space Center to allow additional testing," **NASA News Release #98-185**, October 13, 1998.]

◆ The state will build a research facility at NASA's Kennedy Space Center in a move that could help lure a next-generation spaceship to the area. Construction will begin next year on a $15 million Life Sciences Research Facility, which will provide 100,000 square feet of laboratory space for scientists preparing medical experiments. The experiments could be flown on space shuttles or aboard NASA's International Space Station. They also could fly on Lockheed Martin's VentureStar, a proposed low-cost reusable launcher that is expected to replace the shuttle. The company hopes to use VentureStar to capture the market for launching people and experiments to the international station, construction of which is to begin next month. Company officials have said their site selection will be based partly on the availability of research facilities such as the one to be built at KSC. Lockheed Martin plans to select a VentureStar launch site by the end of 1999 and begin launching in 2003 or 2004. Construction of the Life Sciences Research Facility is expected to be complete in 2001. NASA has agreed to lease a large portion of the facility to consolidate life sciences research now carried out at Cape Canaveral Air Station. ["State plans $15 million lab at KSC," **Florida Today**, October 14, 1998, p 1A.]

OCTOBER 14: Space Shuttle Status Report, Wednesday, October 14, 1998. STS-95: At the completion of yesterday's Flight Readiness Review, Shuttle managers announced Oct. 29

as the official launch date for STS-95. At the pad, workers installed the astronaut contingency space suits last night. The HOST payload end-to-end test is complete and payload closeout activities continue this week. Verification tests of the onboard Space-to-Space Radio communication system are scheduled today. Technicians will also perform standard crew cabin leak checks today. Replacement of mass memory unit No. 2 begins Thursday. STS-88: Endeavour's final structural leak checks were completed yesterday. Workers are completing orbiter weight and center of gravity tests, and today at noon, Endeavour will be mounted on the orbiter transfer vehicle. The orbiter is expected to begin first motion to the Vehicle Assembly Building as early as 6 a.m. tomorrow. Thursday afternoon, efforts begin to mate the orbiter to the external tank and solid rocket boosters in VAB high bay 3. STS-93: Columbia's main engine installation begins Thursday and engine heat shield installation follows in two weeks. The AXAF payload is now expected to arrive at KSC in early January and the payload premate test will move accordingly to mid-November. Shuttle managers are reviewing the possible impact to the STS-93 major milestones. STS-92: Technicians are gaining access to Atlantis' midbody compartment. Receiving inspections continue on schedule and electrical system validation is in work. Payload bay door opening occurs this week and the ferry flight tail cone removal continues. Lisa Malone. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, October 1].]

◆ NASA TV play-by-play announcer Lisa Malone said she hasn't had time to think about a phrase she will use to immortalize John Glenn's scheduled record-breaking return to space Oct. 29. The 77-year-old Ohio senator and former Mercury 7 astronaut will fly on shuttle Discovery, becoming the oldest man in space. In 1962, he flew an Atlas rocket into space to become the first American to orbit the Earth. "I really haven't put the slightest thought into it," Malone said. "I don't know what I'm going to say." Seconds before Glenn liftoff of the first time, Scott Carpenter said "Godspeed, John Glenn." Malone said she will write down a phrase the night before the launch, as she usually does when it's her turn to call a liftoff. This time, she said she may try to incorporate Carpenter's words, but only if no one else says it to the crew during the minutes before the launch. "To bring back some nostalgia," she said. Malone has served as NASA's launch commentator for the last 20 flights, and usually little attention is paid to what she says as the ship leaves the launch pad. NASA spokesman Bruce Buckingham said the parallel between Malone's job and a sports announcer is fair. Her words will be broadcast to millions of people across the globe watching the launch on television. The crew, however, will not hear her. Instead, they will hear the technical crew updating them during the countdown. In that regard, not much has changed. In 1962, Glenn heard a recording of Carpenter's words after he returned from space. Whatever is said this time, however, Malone also should acknowledge the rest of the seven-person crew, even if she mentions only Glenn's name, Buckingham said. ["Words offered for sending off Glenn," **Florida Today**, October 15, 1998, p 1A & 2A.]

OCTOBER 15: Space Shuttle Status Report, Thursday, October 15, 1998. STS-95: At the pad, workers completed installation and final checks of the astronaut contingency space suits yesterday. Final testing of the new space-to-space radio communication system is also complete. This morning Discovery's crew cabin and SPACEHAB pressure decay leak checks began. Mass memory unit No. 2 will be installed in the orbiter this afternoon and MMU loading begins tomorrow. SPACEHAB early stow activities begin tomorrow and early next week orbiter aft compartment closeouts occur. STS-88: Endeavour was mounted

on the orbiter transfer vehicle yesterday and began first motion to the Vehicle Assembly Building at 6:18 a.m. today. The orbiter is currently located in the VAB transfer aisle and will be mated to the STS-88 external tank and solid rocket boosters in VAB high bay 3 later today. The Shuttle Interface Test will be conducted through Monday and the entire Shuttle stack will roll out to Launch Pad 39A on Wednesday beginning at 7 a.m. STS-93: The AXAF payload is now expected to arrive at KSC in early January and the payload premate test will move accordingly to mid-November. Shuttle managers are reviewing the possible impact to the STS-93 major milestones. STS-92: Removal of Atlantis' ferry flight tail cone is complete. Technicians continue to gain access to the orbiter's midbody compartment and receiving inspections continue on schedule. Orbiter electrical system validations continue. Preparations are in work for removal of the simulated orbiter maneuvering system pods. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, October 15].]

OCTOBER 16: Space Shuttle Status Report, Friday, October 16, 1998. STS-95: Pressure decay tests on Discovery's crew cabin and SPACEHAB module are complete. Mass memory unit (MMU) No. 2 was installed in the orbiter yesterday and MMU loading occurs today. SPACEHAB early stow activities are in work today and reparations are under way for next week's orbiter aft compartment closeouts. STS-88: Endeavour is hard mated to the external tank in Vehicle Assembly Building high bay 3. Tail service mast mates are in work today. KSC launch controllers are conducting the standard launch countdown simulation today in firing room No. 3. Umbilical mates and leak checks are slated for tonight. The Shuttle Interface Test begins at about 3 a.m. on Monday. The Shuttle is scheduled to roll out to Launch Pad 39A on Wednesday beginning at 7 a.m. STS-93: The AXAF payload is now expected to arrive at KSC in early January and the payload premate test will move accordingly to mid-November. Shuttle managers are reviewing the impact to the STS-93 major milestones. STS-101: Preparations are in work for removal of Atlantis' simulated orbiter maneuvering system pods on Monday. Technicians continue to gain access to the orbiter's midbody compartment and receiving inspections proceed on schedule. Orbiter electrical system validations continue and troubleshooting of the aft compartment power control assembly are in work. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, October 16].]

OCTOBER 18: The big questions facing NASA scientists was pretty straightforward in February 1962: Can humans safely travel in space? Two earlier U.S. astronauts had returned A-OK. Still, flight doctors worried. Forty-year-old Marine Col. John H. Glenn Jr. would be the first American to orbit the Earth. Glenn's three-orbit mission was a landmark success. A few of the more far fetched fears about spaceflight were laid to rest. Now, more than three decades later, the simple science questions of the early '60s have gone the way of the pillbox hat. The 77-year-old Ohio senator and national hero is taking considerable heat for his planned Oct. 29 return to space aboard shuttle Discovery. This time, the potential science payoff is murkier. Skeptics question whether the rationale for flying Glenn – to put him through a battery of in-orbit medical tests – is a fig leaf covering another agenda. Glenn emphatically disagrees. "If you eliminate the science benefit then there's no reason except that I want to go again," Glenn said. "But that's not a justification for sending someone. There's lots of people who would like to go." Officials at the National

Aeronautics and Space Administration say Glenn is going because he is an ideal test subject. Some of the effects of spaceflight – bone loss, weakened muscles, loss of balance and sleeplessness – mirror the aging process. Who better to look for possible links than an aging Mercury astronaut with a meticulously documented medical history? Critics are saying other things: That Glenn's trip is more of a sentimental journey than a research mission. That the assignment is a political quid pro quo for his past support of NASA and the Clinton administration. That the real goal is a public-relations windfall designed to rekindle flagging interest in the space program. NASA researchers acknowledge that a single flight by one older astronaut will not yield revolutionary results. But they contend Glenn will be a valuable reference point in larger studies on the effects of space. For Glenn, the nine-day flight will be one long visit to the doctor's office. Much of it won't be pleasant. In all, Glenn will participate in 10 experiments, examining how weightlessness affects balance, blood pressure, bones, muscles, the immune system, heart rates and sleep. Besides the life-science research, 73 other experiments are planned aboard shuttle Discovery. ["Some say mission is flight of fancy," **The Orlando Sentinel**, October 18, 1998, p A-1, A-8 & A-9.]

OCTOBER 19: Space Shuttle Status Report, Monday, October 19, 1998. STS-95: Mass memory unit (MMU) No. 2, now on board Discovery, was loaded and retested on Friday. SPACEHAB early stow was also completed last week. Orbiter aft compartment closeouts are in work today. Flight crew equipment stowage begins today and continues through Friday. Ordnance installation occurs Tuesday through Thursday. Payload bay closeouts begin Thursday and the payload bay doors will be closed for flight later that evening. STS-88: Shuttle Endeavour is located in Vehicle Assembly Building high bay 3. KSC launch controllers completed launch countdown simulation exercises Friday in firing room No. 3. Orbiter and external tank mating concluded Saturday. The Shuttle Interface Test is under way and umbilical leak checks are in work. Endeavour is scheduled to roll out to Launch Pad 39A early Wednesday morning. The threat of thunderstorms on Wednesday has Shuttle managers considering a 2 a.m. first motion time for the Shuttle's roll out from the VAB. STS-93: Preparation is in work for Columbia's November payload premate test. The AXAF payload is now expected to arrive at KSC in early January. Shuttle managers are reviewing the impact to the STS-93 major milestones. STS-101: Removal of Atlantis' left-hand simulated orbiter maneuvering system pod is in progress. Receiving inspections proceed on schedule. Orbiter electrical system validations continue and troubleshooting of the aft compartment power control assembly continues. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, October 19].]

◆ Countless cars. Bumper-to-bumper traffic. Hot, frustrated drivers. Road rage. That is what Space Coast residents can expect next week when NASA tries to launch John Glenn on shuttle Discovery. Tens of thousands of visitors will be on hand to watch the Oct. 29 liftoff, creating enormous traffic problems that will come to a head when everyone tries to leave the area. "It's going to be terrible," said Titusville Police Lt. Skip Toney. "This will probably be bigger than (the first shuttle launch in 1981.) It's going to be two or three hours to get anywhere." From Patrick Air Force Base to Port Canaveral to Titusville, the roads will be overwhelmed with vehicles, law enforcement agencies say. Officials even expect a traffic jam of sorts in the Banana River and the waters around Port Canaveral as boaters try to gain a good vantage point. Crowds may rival the Apollo launches that sent men tot he moon in the late 1960s and early 1970s, when hundreds of thousands of

spectators showed up. ["Historic launch, historic gridlock," **Florida Today**, October 19, 1998, p 1A & 2A.]

◆ Boeing officials announced Monday that they have finished an investigation into the August explosion of their new Delta 3 rocket and are making changes to the rocket's computer software. The Aug. 26 maiden flight of the Delta 3 rocket from Cape Canaveral Air Station ended in an explosion when the vehicle's guidance system malfunctioned and caused the rocket to roll from side to side. Officials said changes in the software will solve the problem. ["Officials: Software caused Delta 3 blast," **Florida Today**, October 20, 1998, p 1B.]

OCTOBER 20: President Clinton announced Tuesday he will fly to Kennedy Space Center to witness John Glenn's flight aboard shuttle Discovery on Oct. 29. The president is attending the launch "to recognized Sen. Glenn's historic return to space to recognize the importance of our nation's space program and the hard work of the men and women that make that program possible," said White House press secretary Joe Lockhart. Brevard County sheriff's spokeswoman Joan Heller said the president likely will fly into either Kennedy Space Center aboard Air Force One or helicopter there after flying to Patrick Air Force Base. Clinton will be only the second president to witness a launch – President Nixon was at KSC for the 1969 liftoff of Apollo 12. Clinton won't be the only VIP in town on launch day – three planes full of assorted dignitaries and officials will be flying into the Space Center Executive Airport in Titusville. Nearly 2,500 journalists will be on hand when Discovery takes flight Oct. 29. ["Clinton catches Glenn fever," **Florida Today**, October 21, 1998, p 1A & 2A.]

◆ A Lockheed Martin Atlas rocket delivered a Navy communications satellite to orbit early Tuesday, clearing the way for two more launches this week from Cape Canaveral Air Station. Next up is a rare visitor to the Space Coast – an Orbital Science Pegasus rocket with a Brazilian satellite. A third rocket launch this week is set for Saturday or Sunday (Oct. 24 or 25). It is a Boeing Delta 2 rocket carrying NASA's Deep Space 1 spacecraft to an asteroid. ["Two more launches scheduled this week," **Florida Today**, October 21, 1998, p 2A.]

OCTOBER 21: Space Shuttle Status Report, Thursday, October 22, 1998. STS-95: Discovery's aft compartment closeouts and flight crew equipment stowage continue on schedule. The orbiter's aft compartment doors will be installed at midnight tomorrow. Ordnance installation is in work through Thursday. Payload bay closeouts begin tomorrow and the payload bay doors will be closed for flight tomorrow night. Routine prelaunch inspections of the external tank and solid rocket boosters are slated for tomorrow. STS-88: Shuttle Endeavour is now hard down on Launch Pad 39A. The Shuttle began its 3.4-mile trip from the Vehicle Assembly Building to the pad at about 2:18 a.m. today. Launch pad validations are under way and tonight workers will conduct a planned hot fire of Endeavour's auxiliary power units No. 1 and No. 3. The Rotating Service Structure will be extended around the vehicle early Thursday morning and main engine flight readiness testing follows later in the day. The Unity Connecting Module payload arrives at the pad Monday for installation in the pad's payload changeout room. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, October 21].]

OCTOBER 22: Space Shuttle Status Report, Thursday, October 22, 1998. STS-95: Preparations for the launch of Shuttle Discovery continue on schedule. At the launch pad, ordnance installation and pressurization of the orbiter's maneuvering and reaction control systems are complete. Discovery's aft compartment closeouts continue with the aft compartment doors slated for installation early tomorrow morning. Routine prelaunch inspections of the external tank and solid rocket boosters are in work today. Payload bay closeouts conclude today and the payload bay doors will be closed for flight tonight. STS-88: At Launch Pad 39A, the Rotating Service Structure was extended around the vehicle at about 9 a.m. today and pad validations are under way. Last night, workers successfully completed a hot fire test of Endeavour's auxiliary power units No. 1 and No. 3. Tonight the Shuttle main engine Frequency Response Test will be conducted and tomorrow workers begin standard hydraulic system tests. No work is scheduled over the weekend. The Unity Connecting Module payload arrives at the pad Monday for installation into the payload changeout room. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, October 22].]

OCTOBER 23: Space Shuttle Status Report, Friday, October 23, 1998. STS-95: KSC launch managers are not working any major concerns as preparations for the STS-95 launch countdown proceed on schedule. At the launch pad, ordnance closeouts are complete and Discovery's aft compartment doors are installed. Last night, installation of the robot arm elbow camera was delayed, but is now complete. Payload bay closeouts concluded this morning and the payload bay doors will be closed for flight midday today. This afternoon, workers will verify the torque of a few screws in the external airlock and flight crew equipment stowage will conclude tomorrow. Though managers are closely watching the tropical activity in the Caribbean, preliminary weather forecasts indicate favorable conditions for Thursday's launch of Shuttle Discovery. STS-88: At Launch Pad 39A pad validations are complete. Last night, Endeavour's main engine tests began. Gusting winds at the pad prevented workers from executing planned hydraulic work today, but improving weather conditions will allow completion of the work next week. The Unity Connecting Module payload arrives at the pad Monday for installation into the payload changeout room. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, October 23].]

◆ Workers at Kennedy Space Center's Space Station Processing Facility on Friday moved the first element of the International Space Station into the payload transporter canister for its move to the Orbiter Processing Facility. Named, Unity, the element will be the connecting passageway between the living and working areas of the planned International Space Station. ["Unity moves toward joint space venture," **Florida Today**, October 24, 1998, p 1B.]

OCTOBER 24: Deep Space 1 Mission Status Report, October 24, 1998. Deep Space 1, the first spacecraft in NASA's New Millennium Program of missions to flight-test new technologies, blasted into space at 8:08 a.m. Eastern time today from Cape Canaveral Air Station, FL. Deep Space 1 separated from the Delta II launch vehicle about 550 kilometers (345 miles) above the Indian Ocean and was sent on its way to test 12 technologies in

coming months. The spacecraft is on a trajectory to fly by asteroid 1992 KD in July 1999, allowing further validation of two science instruments. All critical spacecraft systems, such as power, temperature and attitude control were performing well, the spacecraft team reported from the Jet Propulsion Laboratory, Pasadena, CA. Two technologies -- large solar arrays and a new radio transmitter/ receiver -- were validated within the first two hours after launch. "The Deep Space 1 spacecraft is in fine health and is ready to begin its mission of technology validation," said Deputy Mission Manager Dr. Marc Rayman at JPL. Telemetry was received from the spacecraft through NASA's Deep Space Network at 1 hour, 37 minutes after launch, and 13 minutes later it was determined that the spacecraft's two solar arrays had been deployed. A key new technology, the spacecraft's ion engine, will be tested for the first time in approximately two weeks. The New Millennium Program is designed to test new technologies so that they can be confidently used on science missions of the 21st century. Bruce Buckingham. (1998). **Deep Space 1 Mission Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, October 24].]

OCTOBER 25: Space Shuttle Status Report, Sunday, October 25, 1998. STS-95: Preparations to begin the STS-95 launch countdown continue on schedule. Yesterday, workers began stowing the flight crew's equipment onboard Discovery. Forecasters are monitoring the progress of Hurricane Mitch in the Caribbean, but preliminary weather forecasts indicate generally favorable conditions for Thursday's launch of Shuttle Discovery. Launch managers will receive an official weather briefing from Air Force weather forecasters Monday. The flight crew is slated to arrive at KSC's Shuttle Landing Facility Monday at about 2 p.m. STS-88: Over the weekend, workers completed tests on Shuttle Endeavour's main engines. Orbiter hydraulic work will resume next week. The Rotating Service Structure retracts away from the vehicle at about 6:30 p.m. today in preparation for tomorrow's arrival of the Unity Connecting Module payload at Launch Pad 39A. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, October 25].]

OCTOBER 26: Space Shuttle Status Report, Monday, October 26, 1998. STS-95: The launch countdown for mission STS-95 began on time today at 8 a.m. Launch managers are not working any significant technical issues at this time and preparations for Thursday's 2 p.m. launch continue on schedule. Final vehicle close-outs are in work and Discovery's backup flight systems will be loaded into the orbiter's general purpose computers today. Tonight the orbiter's navigational systems will be activated. Loading of the Power reactant storage and distribution system (PRSD) with cryogenic reactants begins tomorrow morning. Air Force weather forecasters are indicating a 40 percent chance that weather could prohibit launch on Thursday. The forecast calls for scattered to broken clouds at 4000 feet and scattered clouds at 20000 feet; visibility at 7 miles; winds at 16 knots gusting to 23 knots from the northeast; temperature at 79 degrees F; relative humidity at 62 percent. The primary concerns are low level winds, a slight chance of showers and a low cloud ceiling. Currently, the 24-hour and 48-hour scrub turnaround forecast indicates a 40 percent chance of weather violation. Managers continue to monitor the progress of Hurricane Mitch in the Caribbean, currently moving in a west-northwesterly direction away from Florida's east coast. Mitch is not expected to affect Thursday's weather. The STS-95 flight crew is slated to arrive at KSC's Shuttle Landing Facility today at about 2 p.m. The crew members are: Commander Curt Brown, Pilot Steve Lindsey, Missions Specialists Stephen Robinson, Scott

Parazinski, Pedro Duque, and Payload Specialists Chiaki Mukai and John Glenn. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, October 26].]

◆ John Glenn and five of Discovery's astronauts arrived at Kennedy Space Center on Monday. "I have been pleasantly surprised at the outpouring of interest in this flight," Glenn said. "It's really gratifying to see people get so fired up about the space program again." Scott Parazynski was flown in later. His T-38 jet had a battery problem during a fuel stop on the way from Johnson Space Center. A former Marine fighter pilot in World War II and the Korean War, Glenn rode as a passenger in the jet of Discovery's commander, Air Force Lt. Col. Curt Brown. As usual when a crew gets to KSC before launch, they flew over their spaceship's launch pad. They saw not only Discovery but also shuttle Endeavour, which is being readied for launch Dec. 3 on the first U.S. mission to start building the International Space Station. Brown then led the crew in a slightly shaky "Happy Birthday" serenade of Discovery astronaut Steve Robinson, who turned 43 on Monday. The crew went on to greet family and friends who were waiting, including Glenn's entourage. The countdown clocks started at 8 a.m. Monday, and officials reported no problems in the complex three-day process to get Discovery ready for a flight that will be watched around the globe. The crew will spend the next two days reviewing their flight plan for the nine-day mission. Discovery's crew of seven also includes pilot Steve Lindsey, Japanese astronaut Chiaki Mukai and European Space Agency astronaut Pedro Duque. ["Glenn, Discovery crew step closer to history," **Florida Today**, October 27, 1998, p 1A & 2A.]

OCTOBER 27: Space Shuttle Status Report, Tuesday, October 27, 1998. STS-95: The launch countdown for STS-95 proceeds on schedule for Thursday's 2 p.m. liftoff of Shuttle Discovery. Mission managers are not working any significant technical concerns at this time and launch preparations continue at Launch Pad 39B. Today at 4 a.m. workers began loading the orbiter's power reactant storage and distribution system with cryogenic reactants and that operation will conclude at about noon today. The STS-95 flight crew arrived at KSC's Shuttle Landing Facility yesterday afternoon at about 3 p.m. Today the crew will participate in routine medical exams, conduct flight crew equipment fit checks, participate in standard mission briefings and enjoy some free time with their family members. The crew of mission STS-95 are: Commander Curt Brown, Pilot Steve Lindsey, Missions Specialists Stephen Robinson, Scott Parazinski, Pedro Duque, and Payload Specialists Chiaki Mukai and John Glenn. Air Force weather forecasters have improved their forecast to indicate a 30 percent chance that weather could prohibit launch on Thursday. The forecast calls for scattered to broken clouds at 4,000 feet and scattered clouds at 20,000 feet; visibility at 7 miles; winds at 14 knots gusting to 20 knots from the northeast; temperature at 79 degrees F; relative humidity at 62 percent. The primary concerns are surface winds, a slight chance of showers, and a low cloud ceiling. Currently, the 24-hour and 48-hour scrub turnaround forecasts indicate a 40 percent chance of weather violation. Managers continue to monitor the progress of Hurricane Mitch in the Caribbean, currently moving westward away from the Florida Coast at 7 knots. Mitch is not expected to affect Thursday's weather at KSC. REVISION A: The launch countdown for STS-95 proceeds on schedule for Thursday's 2 p.m. liftoff of Shuttle Discovery. Launch managers are not working any significant technical concerns at this time and launch preparations continue at Launch Pad 39B. Today at about 1:15 p.m., efforts to load the orbiter's power reactant storage and distribution

system with cryogenic reactants concluded and the pad reopened for routine work. SPACEHAB late stow activities are under way this afternoon. Air Force weather forecasters have improved their forecast to indicate a zero percent chance that weather could prohibit launch on Thursday. The forecast calls for scattered clouds at 4,000 feet; visibility at 7 miles; winds at 10 knots gusting to 15 knots from the northeast; temperature at 79 degrees F; relative humidity at 62 percent. Hurricane Mitch is now drifting west-southwest further away from Florida's coast. Surface high pressure is also building near Central Florida and these conditions will lead to light winds and a more stable airmass. Currently, the 24-hour and 48-hour scrub turnaround forecasts also indicate a zero percent chance of weather violation. The STS-95 flight crew arrived at KSC's Shuttle Landing Facility yesterday afternoon. Today the crew have participated in routine medical exams, conducted flight crew equipment fit checks, participated in standard mission briefings and are enjoying some free time with their family members. The STS-95 crew are: Commander Curt Brown, Pilot Steve Lindsey, Missions Specialists Stephen Robinson, Scott Parazinski, Pedro Duque, and Payload Specialists Chiaki Mukai and John Glenn. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, October 27].]

◆ Credentials have been issued to 3,750 media representatives for the liftoff of Discovery, more than 12 times the typical media attendance for shuttle launches in the 1990s. By comparison, 379 reporters covered Glenn's historic Mercury flight aboard Friendship 7 in 1962. For the Apollo 11 moon shot, 2,700 reporters requested access. Yet, this event has not generated a record-setting media horde. Credentials for nearly 5,200 journalists were issued in 1988 for the first shuttle launch after the Challenger explosion, although only 2,300 showed up. About 4,000 journalists requested access for the inaugural shuttle mission in 1981 – with 2,700 on hand for the launch. Still, Glenn has inspired standing-room-only media crowds at routine pre-launch drills that generally go unnoticed. ["Glenn flight fuels media frenzy: Is it all the write stuff?" **The Orlando Sentinel**, October 28, 1998, p A-8.]

◆ *Audiences in 20 cities – and at KSC (but not the rest of Central Florida) – will watch Sen. John Glenn's historic return to space in the first live, high-definition broadcast of a Shuttle launch. The launch paves the way for the introduction of digital television in November. *The people of Western Australia have once again been asked to turn on the lights when John Glenn passes overhead during his historic return to space. The Western Australia state government said it wants residents to help recreate the sight Glenn saw as he passed over during his 1962 flight. *Some 30 private and executive jets have confirmed plans to fly into Space Coast Regional Airport south of Titusville this afternoon and Thursday morning. *The Titusville Post Office is setting up two special locations Thursday to postmark envelopes with a special John Glenn Returns to Space pictorial cancellation. *BellSouth technicians are scrambling to set up phone lines to accommodate the mass of media descending on Cape Canaveral for the John Glenn shuttle launch, company officials said Tuesday. More than 900 new phone lines have been installed, with another 300 expected to be installed for the Thursday launch. *Lt. Gov. Buddy MacKay will join President Clinton and Gov. Lawton Chiles to watch space shuttle Discovery vault a fellow Democrat, U.S. Sen. John Glenn, into orbit. *The boys in the blockhouse who first blasted John Glenn into space unanimously agree he is far safer lifting off on the shuttle than atop that trembling Atlas missile that took him into orbit 36 years ago. ["Glenn watch," **Florida Today**, October 28, 1998, p 7A, 8A & 9A.]

◆ The heart of NASA's historic Mercury Mission Control Center might find a new home next year, but the proposal already is controversial. NASA is considering consolidating all equipment from the famed but aging control center in a $2.7 million tourist attraction to be raised at the Kennedy Space Center Visitor Complex between January and September. But there are those who want the central part of the building – the flight control room and all the equipment within it – to remain right where it is: in a building about a mile from the twin Delta launch pads at Cape Canaveral Air Station. Designated a historical landmark in 1984, the Mercury Mission Control Center played a key role in early U.S. space flight, including the February 1962 launch of John Glenn on America's first orbital mission. Inside the building is the flight control room where engineers kept vigil over America's earliest piloted space missions. The original flight control consoles remain in place, along with the colorfully lighted wallsize world map that helped engineers keep track of Mercury spacecraft – and their astronaut pilots – during six missions between May 1961 and May 1963. But the building itself is decrepit: The roof leaks, the electrical wiring is in need of repair, some of the walls and ceilings in the facility are laced with asbestos, and it is not accessible for people with disabilities. "It's an old building, and it would take a lot of money to bring it up to snuff," said James Ball, chief of the KSC Visitors Services Branch. Complicating matters is the fact that the control center often is closed to the public because of hazardous operations at the nearby Delta launch pads. As a result, NASA is proposing to move the equipment from the control center to a new Early Space Exploration attraction to be built at the KSC Visitor Complex. The space agency is conferring with state and federal historical preservation officials and will gather public comment on the idea before making a final decision. ["Historic Mercury site threatened," **Florida Today**, October 28, 1998, p 7A.]

◆ When President Clinton comes to Kennedy Space Center to watch John Glenn's liftoff Thursday, he'll be following a long tradition. *On Feb. 23, 1962 – just three days after Glenn made his first flight – President John F. Kennedy took part in a celebratory parade at the Cape and presented the astronaut with the NASA Distinguished Service Medal. He toured Atlas, Titan and Saturn launch complexes in September 1962 and was on hand for the Polaris launch Nov. 16, 1963, just six days before his death in Dallas. *Lyndon Johnson visited KSC with President Kennedy in February 1962 and made an impromptu stop in Sept. 1964. During the later visit, he was briefed by Wally Schirra – one of the original Mercury astronauts – on what then was a new, two-man Gemini spacecraft. In Sept. 1966, Johnson showed up with West German Chancellor Ludwig Erhard and gave a speech to workers in the Vehicle Assembly Building. That was Johnson's fifth trip to the Cape. During his tenure as vice president, he toured launch facilities in Oct, 1961 and was with Kennedy at KSC in Sept. 1962. After returning to private life, he attended the Apollo 11 launch as a civilian VIP. *President Jimmy Carter took part in NASA's 20th anniversary celebration on Oct. 1, 1978, doling out awards to astronauts in the cavernous assembly building. *When George Bush was vice president, he got the lowdown on shuttle operations at KSC from astronaut John Young and Robert Crippen in Mar. 1981, less than a month before the two blasted off on NASA's first shuttle flight. He helped dedicate new Spacelab processing facilities at KSC in Feb. 1982 and was on hand for a Labor Day picnic in 1983. Bush's last visit was Jan. 28, 1986, the day Challenger exploded. *Vice President Hubert Humphrey toured both KSC and Cape Canaveral Air Station on Feb. 22, 1965. *Vice President Dan Quayle toured KSC Launch Control Center during a Feb. 1991

practice countdown, and he watched shuttle Endeavour blast off on a space science mission in Sept. 1992. Bush's vice president also played a role in the May 1991 dedication of the Space Mirror astronaut memorial at the KSC Visitor Complex. ["The Cape lures Presidents," **Florida Today**, October 28, 1998, p 7A.]

OCTOBER 28: Space Shuttle Status Report, Wednesday, October 28, 1998. STS-95: Preparations for Thursday's 2 p.m. launch of Shuttle Discovery continue on schedule and launch managers are not working any major technical issues at this time. This morning workers completed efforts to install the SPACEHAB experiments in the orbiter payload bay and the airlock has been closed for flight. Discovery's communication systems will be activated today and flight crew equipment late stow activities begin at about 3:30 p.m. The Rotating Service Structure will retract away from the Shuttle at 8 p.m. today and the launch countdown will resume counting at T-11 hours at 11:40 p.m. External tank loading operations begin at about 5:40 a.m. tomorrow. Air Force weather forecasters continue to indicate a zero percent chance that weather could prohibit launch on Thursday. The forecast calls for few clouds at 4,000 feet; visibility at 7 miles; winds at 10 knots gusting to 15 knots from the northeast; temperature at 79 degrees F; relative humidity at 64 percent. Hurricane Mitch is still drifting westward away from Florida's coast and will not impact Thursday's launch attempt. Currently, the 24-hour and 48-hour scrub turnaround forecasts also indicate a zero percent chance of weather violation. Today some of the crew will take flights in the T-38 training jets from the KSC Shuttle Landing Facility this afternoon. The crew will also receive an orbiter and payload systems briefing this afternoon. After the Commander and Pilot perform runway approaches aboard the Shuttle Training Aircraft in the evening, the entire crew will visit the launch pad and say their preflight good-byes to visiting family members. The STS-95 crew are: Commander Curt Brown, Pilot Steve Lindsey, Missions Specialists Stephen Robinson, Scott Parazinski, Pedro Duque, and Payload Specialists Chiaki Mukai and John Glenn. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, October 28].]

◆ Security for the launch was tightened Wednesday because of threats against Clinton, Glenn and shuttle Discovery. At the entrance to the Kennedy Space Center launch site, motorists were asked to drive slowly over cameras that examined the underside of their vehicles for car bombs. Vehicles also were searched by guards carrying 9mm semiautomatic weapons, and bomb-sniffing dogs were brought out. "We've had some unspecified threats...where there are some people that could do some harm, and so we're taking it very seriously," said Paul Morris, chief of security at KSC. "The kooks are out there too, but there are also credible threats that are prompting the heightened security alert." About 70 members of Congress and dozens of celebrities also are attending the launch. The Clintons will fly into Cape Canaveral Air Station. They are expected to view the liftoff from the roof of the Launch Control Center. ["KSC tightens security as Clintons fly in today," **Florida Today**, October 29, 1998, p 1A.]

◆ Celebrities expected for Discovery launch: Leonardo DiCaprio, John F. Kennedy, Jr. and wife Carolyn Bessette Kennedy, Garth Brooks, Steven Tyler and the rest of Aerosmith, James Cameron, Bruce Willis, Corbin Bernsen, Bruce Boxleitner, Melissa Gilbert, Al Neuharth, Caroline Kennedy Schlossberg, Ted Kennedy, Jimmy Buffett, Sen. John Warner, Buzz Aldrin and Wally Schirra, Tom Brokaw, Tom Hanks, Steven Spielberg, Walter

Cronkite, Dan Rather and Peter Jennings. ["Unsinkable DiCaprio turns Cape on end," **The Orlando Sentinel**, October 29, 1998, p A-2.]

OCTOBER 29: Space Shuttle Status Report, Thursday, October 29, 1998. STS-95: Space Shuttle Discovery and the seven-member STS-95 flight crew launched from KSC's Launch Pad 39B today at 2:19 p.m. and the orbiter is performing well on orbit. Launch managers worked very few technical issues throughout the day's countdown activities, but encountered a few delays in the last 9 minutes of the countdown. The countdown clock remained in a planned T-9 minute hold for an additional 9 minutes while launch managers and Shuttle Commander Curt Brown verified three alarms heard in Discovery's cockpit. At T-5 minutes the NASA Test Director required an additional unplanned hold due to an Air Force Range Operations report of unknown aircraft flying in KSC's restricted airspace. When the countdown resumed, range officials reported again that several aircraft had been detected inside the restricted area. Once the restricted area was confirmed clear, the launch count continued to a successful liftoff. Shuttle managers are investigating the loss of an item from the aft of the orbiter that could be the orbiter's drag chute door. The item appeared to fall from the Shuttle soon after main engine start. The KSC inspection team will review film of the launch and recover debris at the pad to determine the exact turn-of-events. The door covers the compartment where the drag chute is housed and is located beneath the orbiter's vertical stabilizer and above the three main engines. Though the drag chute is deployed after landing gear touchdown to assist in slowing the orbiter, it is not required for landing. The chute was an addition to the Shuttle's original configuration in 1992 after 46 successful landings without a drag chute. Solid rocket booster recovery operations are under way off the eastern coast of Florida and NASA's recovery ships Freedom Star and Liberty Star are expected to return to Port Canaveral with the boosters in tow tomorrow afternoon. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, October 29].]

◆ For three minutes Thursday, President Clinton and Hillary Clinton were just like 250,000 other people on the Space Coast. They perched in a high spot, waited and watched as 77-year-old Sen. John Glenn was launched into space. A minute into the launch, the First Couple silently passed a pair of binoculars back and forth for a better look. Finally, breaking into a big smile, Hillary Clinton said, "It's amazing." Both Clintons clapped and cheered from the roof of Kennedy Space Center's Launch Control Center when the booster rockets separated. "I cannot tell you how overwhelmed with emotion I am," Hillary Clinton said after the launch. "It is a thrill of a lifetime." Clinton was only the second president to view a space launch. In doing so, he may have given a boost to NASA, which perennially scratches for budget dollars. He pronounced Glenn's flight "a great day for America and a great day for our senior citizens," saluting the senator as "a genuine American hero." NASA and KSC employees said the president's attendance at the launch can only help the space program. In the launch control room with the Clintons after Discovery blasted off, NASA Administrator Dan Goldin said Clinton was "the first president of the United States with courage to come down here and watch a shuttle launch in real time." KSC workers also lauded Clinton's decision. After visiting the firing room, the Clintons greeted 100 workers in the lobby of the Launch Control Center where NASA employees enjoyed the traditional post-launch meal of beans and cornbread. Hillary Clinton drew the most applause, particularly when she said average Americans could learn from the

workers' sense of teamwork. "We ought to be more like a team in America every day," she said. Someone in the crowd yelled, "You go, Hillary," and the cheers grew louder, forcing the First Lady to pause. She told the crowd she always wanted to be an astronaut, and said space exploration is the key to the future. Clinton said that as he stood on the rooftop, "We felt the ceiling rumble beneath our feet." He thanked NASA and added, "And of course I want to thank John Glenn, my good friend and a genuine American hero." The Clinton's arrived at Cape Canaveral Air Station at 12:30 p.m., about 15 minutes behind schedule, and were greeted by a short line of well-wishers. Clinton said the idea to view the launch was his wife's. "A year ago, she said we should make a list of things we want to get done before this term is over," Clinton said. "I said, 'OK, what is first on your list?' And she said, 'We have to go to a space launch." Clinton, in an interview with CNN, pronounced himself an advocate for "continued aggressive exploration of space." "It's an important day for the space program. But it's a great day for America, a great day for our senior citizens, and I hope that all Americans share the exuberance that I feel today," Clinton said. ["'A thrill of a lifetime'," **Florida Today**, October 30, 1998, p 5A.]

OCTOBER 30: Space Shuttle Status Report, Friday, October 30, 1998. STS-95: Following yesterday's successful launch, Space Shuttle Discovery continues to perform very well on orbit while the crew remains busy with in-flight experiment activity. Post launch inspections of Launch Pad 39B have revealed no abnormal damage. Yesterday afternoon, KSC's debris inspection team located debris related to the loss of Discovery's drag chute door on the crawlerway that slopes down from the pad surface. This morning, managers reported that about 95% of the door's material was collected before nightfall yesterday and an additional walkdown of the area is being conducted today. Ongoing analysis of the collected debris and of launch film footage will help Shuttle managers determine the cause of the door's detachment. Flight controllers are confident that the missing door will not impact the safety of this Shuttle flight and expect a safe and successful landing on Nov. 7. Though the drag chute is deployed after landing gear touchdown to assist in slowing the orbiter, it is not required for landing. The chute was an addition to the Shuttle's original configuration in 1992 after 46 successful landings without a drag chute. KSC's solid rocket booster recovery ships, Freedom Star and Liberty Star, are en route to Cape Canaveral with boosters en tow. The left hand booster is expected to arrive at Port Canaveral at about 3 p.m. today followed by the right hand booster's arrival at 4 p.m. Preliminary reports indicate no significant damage to the boosters. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, October 30].]

◆ Three of five airplanes that violated restricted airspace around Kennedy Space Center minutes before Thursday's launch of shuttle Discovery have been identified. The Federal Aviation Administration is in the process of contacting the owners to find out who was flying each of the planes, FAA spokeswoman Kathleen Bergen said Friday. Registration numbers on the tails of two planes, obtained by security pilots monitoring the restricted airspace, were used to identify the owners. A third plane was followed to a landing site. During countdowns, flight is restricted within a five-nautical-mile radius from the launch pad. The flight-restriction zone is designed to ensure the safety of the launch, people on the ground and other aircraft in the area, Bergen said. The five planes flew into the restricted airspace just before launch time, causing about a 10-minute delay. ["3 of 5 planes that flew too close to pad identified," **Florida Today**, October 31, 1998, p 1A.]

NOVEMBER

NOVEMBER 1: Engineers are still investigating why a small door covering shuttle Discovery's drag chute compartment fell off within seconds of liftoff on Thursday. The missing door isn't expected to affect the mission. Other items, such as insulation, have come loose from the shuttle in the past. Investigators hope to determine what happened sometime this week. Eighteen pieces, or about 90 percent, of the door were recovered from the grass around Kennedy Space Center's launch pad 39B. The 11-pound piece of aluminum, which measures about 18 inches by 22 inches, is located on the rear of the shuttle, above the main engines. A small mortar fires during landing, causing the door to swing open and pop off, releasing the drag chute. The door is replaced before each mission. The frame holding the door is replaced about every 10 missions. The investigation team has determined that the mortar didn't fire prematurely, said Jack King, a spokesman for shuttle contractor United Space Alliance. Technicians are looking at the pins that hold the door on, among other things. Mission managers haven't decided whether to deploy the chute for Discovery's landing Saturday. They don't have to. The first 47 missions didn't use chutes. The missing door shouldn't affect the shuttle's fiery return through Earth's atmosphere, either. Temperatures in the compartment are expected to stay well within acceptable limits. ["No answers yet on why door fell off," **The Orlando Sentinel**, November 1, 1998, p A-22.]

◆ Press credentials issued for John Glenn's launch in 1962: 300. Credentials issued for Thursday's Glenn launch: 3,500-plus. Estimated number of people who watched QVC cable channel hawking launch related items at Kennedy Space Center: 90 million. Number of Titusville High School's 2,000 students who showed up Thursday: 58. Hotel and motel rooms and condos available for rent in Brevard: 8,500. Vacancies on Thursday: 0. Distance visitors had to go to find an open room: 60 miles. Average daily attendance at the Astronaut Hall of Fame: 400. Attendance at the Hall of Fame on Thursday: 10,000. Number of T-shirts printed by Space Shirts Co. for the 1990 Hall of Fame Bowl: 14,000. T-shirts the company printed for Glenn launch: 30,000-plus. Number of T-shirts sold on a normal day: 3,000. Brevard County Sheriff's Office deputies working the launch Thursday: 100. Deputies normally working in that area: 33. Estimated number of signatures on a 40-foot-long mural of John Glenn at KSC Visitor Complex: 5,000. Money that Glenn-related tourism was believed to have brought to Brevard: $20 million. ["By the numbers," **Florida Today**, November 1, 1998, p 1A.]

NOVEMBER 2: Space Shuttle Status Report, Monday, November 2, 1998. STS-95: Space Shuttle Discovery continues to provide an excellent platform for research activities under way on mission STS-95. All systems onboard Discovery are operating very well. Today at about 7:45 a.m., technicians began inspections on the STS-95 solid rocket boosters in Hangar AF. Over the weekend, workers retrieved the video camera that had been installed inside the left booster's forward assembly segment. Footage from that camera is being evaluated by Shuttle external fuel tank and orbiter engineers as part of an ongoing study on how debris contributes to orbiter tile damage. Evaluations of Discovery's drag chute door continue and preliminary reports indicate that the drag chute remains inside its housing in the orbiter's aft compartment and has not been inadvertently deployed. Mission managers do not currently plan to deploy the chute during Discovery's landing operations on Saturday. STS-88: The Unity connecting module arrived at Launch Pad 39A last week

and was installed in the payload changeout room on Oct. 26. Last Wednesday, cable routing was completed for the ground support equipment used during payload verification tests. Endeavour's payload bay doors are open and payload testing is in work this week. Unity will be installed in the orbiter's cargo bay Nov. 13. Endeavour's helium signature leak tests begin tomorrow and preparations are in work today. Gaseous nitrogen servicing of the orbiter's water spray boiler No. 3 and main engine testing also occur this week. Tomorrow, the STS-88 flight crew arrives at KSC's Shuttle Landing Facility at about 6:30 p.m. to participate in this week's Terminal Countdown Demonstration Test activities. The crew will be briefed on orbiter and payload operations while at KSC. They will practice emergency egress activities Thursday and conduct a launch day dress rehearsal on Friday. STS-93: Adjustments of Columbia's freon coolant loops No. 1 and No. 2 are complete. Ku-band system tests are also complete. Shuttle main engine installation is in work with engines No. 1 and No. 2 already in place. Structural modal test preparations are under way and auxiliary power unit leak and functional checks are in work. Solid rocket booster stacking operations have resumed in the Vehicle Assembly Building. STS-101: Removal of Atlantis' simulated orbiter maneuvering system pods was completed last week. The orbiter's aft compartment power control assembly is undergoing some work this week as orbiter receiving inspections continue. Leak checks on the external airlock are also in work. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, November 2].]

NOVEMBER 3: Space Shuttle Status Report, Tuesday, November 3, 1998. STS-95: Having passed the halfway mark on this flight, Shuttle Discovery continues to perform very well on orbit. Evaluations of Discovery's drag chute door continue and preliminary reports indicate that the drag chute remains inside its housing in the orbiter's aft compartment. Mission managers do not currently plan to deploy the chute during Discovery's landing operations on Saturday. At Hangar AF, inspections of the STS-95 solid rocket boosters continue on schedule. STS-88: At Launch Pad 39A, Endeavour's helium signature leak tests are in work today. Gaseous nitrogen servicing of the orbiter's water spray boiler No. 3 and main engine testing also occur this week. Endeavour's payload bay doors are open and payload testing is in work this week. The Unity connecting module will be installed in the orbiter's cargo bay Nov. 13 and functional testing of Unity's pressurized mating adapters No. 1 and No. 2 are scheduled today. At about 6:30 p.m. today, the STS-88 flight crew is slated to arrive at KSC's Shuttle Landing Facility to participate in this week's Terminal Countdown Demonstration Test activities. The crew will be briefed on orbiter and payload operations while at KSC. They will practice emergency egress activities Thursday and conduct a launch day dress rehearsal on Friday. STS-93: Installation of Columbia's main engines is complete and engine securing is in work. Potable water servicing concluded yesterday. Orbiter landing gear functional and nose wheel steering checks are under way. Fuel cell verifications are also in progress. Preparations for the structural modal test continue. Solid rocket booster stacking operations continue in the Vehicle Assembly Building. STS-101: Work on Atlantis' aft compartment power control assembly is complete. Evaluations of the orbiter's flash evaporator system (FES) are also complete and the FES controller may need to be replaced. Leak checks on the external airlock are also in work. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, November 3].]

◆ The crew of STS-88 arrives late today for TCDT. Mission STS-88 is the first American flight for the International Space Station, launching the Unity connecting module. The launch is targeted for the early morning hours of Dec. 3. ["STS-88 crew arrival today for Terminal Countdown Demonstration Test," **KSC Countdown**, November 3, 1998.]

NOVEMBER 4: Space Shuttle Status Report, Wednesday, November 4, 1998. STS-95: Systems onboard Discovery continue to perform very well in flight. Shuttle managers have thoroughly reviewed the data gathered to date on Discovery's drag chute door. Launch film footage, on board orbiter temperature and stress sensors, and computer model analysis give flight controllers the confidence to proceed as planned with normal reentry and landing operations without deploying the drag chute. A safe and successful landing at KSC's Shuttle Landing Facility is expected Saturday at about noon. Preliminary forecasts indicate generally favorable weather to support Saturday's landing at KSC. The remnants of tropical storm Mitch will pass through Florida tomorrow and Friday and related rain and winds are expected to move off Florida's east coast Friday night, allowing for favorable weather on Saturday. Winds are expected out of the northeast at about 12 knots, gusting to 17 knots. Forecasters do not expect cross winds at the SLF to exceed 14 knots and head/tail winds should not be above 9 knots. STS-88: At Launch Pad 39A, Endeavour's helium signature leak tests are in work today. Gaseous nitrogen servicing of the orbiter's water spray boiler No. 3 and main engine testing also occur this week. Endeavour's payload bay doors are open and payload testing is in work this week. The Unity connecting module will be installed in the orbiter's cargo bay Nov. 13 and functional testing of Unity's pressurized mating adapters No. 1 and No. 2 are scheduled today. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, November 4].]

NOVEMBER 5: Space Shuttle Status Report, Thursday, November 5, 1998. STS-95: Shuttle Discovery continues to provide an excellent platform for the many research activities occurring on board during these final days of the mission. Discovery and crew are scheduled to return to KSC's Shuttle Landing Facility on the first of two landing opportunities Saturday at about 12:06 p.m. The second KSC landing opportunity is available at about 1:47 p.m. Preliminary forecasts indicate generally favorable weather to support Saturday's landing at KSC. Tropical storm Mitch is passing through south and central Florida today and should move off Florida's east coast by tomorrow night, providing good weather on Saturday. Winds are expected out of the northeast at about 10 knots, gusting to 15 knots. Forecasters do not expect crosswinds at the SLF to exceed 14 knots and head/tail winds should not be above 9 knots. Clouds are forecast to be scattered at 4,000 feet; visibility at 7 miles; temperature at 70 degrees F; and relative humidity at 60 percent. STS-88: At Launch Pad 39A, Endeavour's helium signature leak tests and secondary payload tests are complete. Gaseous nitrogen servicing of the orbiter's water spray boiler No. 3 and main engine testing occur this week. The STS-88 flight crew is at KSC to participate in the Terminal Countdown Demonstration Test. Crew members are being briefed on orbiter and payload activities, practicing emergency escape procedures and conducting a full dress rehearsal of launch day activities on Friday. The countdown test culminates with a simulated main engine cutoff at 11 a.m. tomorrow. The Unity connecting module will be installed in the orbiter's cargo bay Nov. 13. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, November 5].]

NOVEMBER 6: Space Shuttle Status Report, Friday, November 6, 1998. STS-95: On board Shuttle Discovery, the flight crew will conclude their research activities today and begin preparations for tomorrow's landing at KSC's Shuttle Landing Facility. Because forecasters expect Sunday's weather to deteriorate somewhat, mission managers have decided to bring up backup landing support at Edwards Air Force Base, CA, on Saturday. There are two landing opportunities at both KSC and Edwards tomorrow. KSC's first opportunity is at about 12:04 p.m. and the second opportunity is at about 1:45 p.m. The Edwards opportunities are at about 1:35 p.m. and 3:17 p.m. Commander Brown will perform a deorbit burn of the orbiter maneuvering system about one hour prior to touch down. Preliminary forecasts indicate generally favorable weather to support Saturday's landing at KSC. Winds are expected out of the northeast at about 10 knots, gusting to 15 knots. Forecasters do not expect sustained crosswinds at the SLF to exceed 14 knots. Clouds are forecast to be scattered at 4,000 feet; visibility at 7 miles; temperature at 70 degrees F; and relative humidity at 60 percent. Though Shuttle managers do not expect to execute them, precautionary plans are in place to accommodate a deployment of Discovery's drag chute during reentry or after wheels stop at the SLF. The Shuttle Training Aircraft that performs routine weather observations prior to landing and during final approach will also visually monitor Discovery's drag chute compartment. After touchdown, KSC ground controllers plan to proceed with normal post landing activities with a cone shaped safety clear extending 600 feet from Discovery's aft compartment. About 1 1/2 hours after landing, KSC workers will perform remote visual inspections of the pyrotechnic wires that initiate the mortar that jettisons the drag chute. If no heat or stress damage is visible, standard post flight operations will proceed culminating with the towing of Discovery to Orbiter Processing Facility bay 1 about 8 hours after landing. Currently, managers expect the pyrotechnic wire inspections to reveal no damage and plan to proceed with normal operations. STS-88: At Launch Pad 39A, the Terminal Countdown Demonstration Test concluded at about 11 a.m. today. Crew members successfully conducted a launch day dress rehearsal complete with an orbiter crew compartment ingress and simulated main engine cut-off at T-5 seconds. The crew then practiced emergency egress procedures assisted by the KSC close-out crew. The crew departs KSC today at about 2:15 p.m. headed for their homes in Houston, TX. Orbiter inertial measurement unit calibration occurs today and preparations for payload interface verification testing are in work. The Unity connecting module will be installed in the orbiter's cargo bay Nov. 13. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, November 6].]

◆ The orbiter Discovery is scheduled to land at Kennedy Space Center on Saturday, Nov. 7 at 12:04 p.m. EST completing its nine-day STS-95 mission which was launched from KSC on Oct. 29. Landing at KSC's Shuttle Landing Facility (SLF) is slated to occur on orbit 135 at mission elapsed time 8 days, 21 hours, 44 minutes. Deorbit burn will occur at about 10:53 a.m. Saturday. The two KSC landing opportunities on Saturday are: 12:04 p.m. and 1:45 p.m. EST. Managers have decided to call up the back-up landing location at Edwards Air Force Base (EAFB), CA, for a possible landing on Saturday. This is due to weather concerns on both coasts Sunday. The two EAFB landing opportunities on Saturday are: 1:35 p.m. and 3:17 p.m. EST. If managers must keep Discovery in orbit an additional day, three landing opportunities are available on Sunday at KSC and two at EAFB. KSC Sunday

landing times are: 10:17 a.m., 11:58 a.m. and 1:39 p.m. EST. EAFB Sunday landing times are: 11:49 a.m. and 1:30 p.m. EST. This landing of Discovery will mark the 45th landing at KSC in the history of Space Shuttle flight. It will be the 16th consecutive landing at KSC and the 23rd in the last 24 shuttle flights. Discovery is currently on the 92nd Space Shuttle mission in the history of the program. Following landing, select members of the crew are scheduled to participate in a press conference at the KSC Press Site auditorium. The event will be carried live on NASA TV beginning at about 6 p.m. On the day following landing, the entire crew will depart for Houston, TX, at about 10 a.m. SLF and KSC Ground Operations: The Shuttle Landing Facility was built in 1975. It is 300 feet wide and 15,000 feet long with 1,000 foot overruns at each end. The strip runs northwest to southeast and is located about 3 miles northwest of the 525-foot tall Vehicle Assembly Building. Once the orbiter is on the ground, safing operations will commence and the flight crew will prepare the vehicle for post-landing operations. The Crew Transport Vehicle (CTV) will be used to assist the crew, allowing them to leave the vehicle and remove their launch and re-entry suits easier and quicker. The CTV and other KSC landing convoy operations have been "on-call" since the launch of Discovery Oct. 29. The primary functions of the Space Shuttle recovery convoy are to provide immediate service to the orbiter after landing, assist crew egress, and prepare the orbiter for towing to the Orbiter Processing Facility. Convoy vehicles are stationed at the SLF's mid-point. About two hours prior to landing, convoy personnel don SCAPE suits, or Self Contained Atmospheric Protective Ensemble, and communications checks are made. A warming-up of coolant and purge equipment is conducted and nearly two dozen convoy vehicles are positioned to move onto the runway as quickly and as safely as possible once the orbiter coasts to a stop. When the vehicle is deemed safe of all potential explosive hazards and toxic gases, the purge and coolant umbilical access vehicles move into position at the rear of the orbiter. Following purge and coolant operations, flight crew egress preparations will begin and the CTV will be moved into position at the crew access hatch located on the orbiter's port side. A physician will board the Shuttle and conduct a brief preliminary examination of the astronauts. The crew will then make preparations to leave the vehicle. Following departure from the SLF, the crew will be taken to their quarters in the O&C Building, meet with their families and undergo physical examinations. The crew is scheduled to depart for JSC Sunday morning. If Discovery lands at Edwards, an augmented KSC convoy team will be on-site to safe the vehicle, disembark the crew and move the orbiter to the Mate/Demate Device. The turnaround team will be deployed to Edwards by charter aircraft on landing day. About 7-8 hours after Discovery lands at KSC, the orbiter will be towed to Orbiter Processing Facility bay 1 for post-flight deservicing. Operations in the OPF will be made to prepare Discovery for is next Space Shuttle mission, STS-96, currently targeted for launch in May. ["Discovery Scheduled to land at KSC completing mission STS-95," **KSC News Release #138-98**, November 6, 1998.]

NOVEMBER 7: The world's oldest astronaut is heading home. John Glenn and six Discovery crew mates are scheduled to glide onto the shuttle runway at 12:04 p.m. today, wrapping up the most closely watched U.S. spaceflight in more than a decade. About 900 dignitaries, media and family members – including Glenn's wife and children – will be on hand to greet the crew. The weather is expected to cooperate, although low clouds and increasing wind could pose a problem. "They're forecasting scattered clouds at 4,000 feet, which is a go condition," said Linda Ham, entry flight director. Crosswinds at the landing site are expected to be just below the allowable limit of 17 mph. ["Oldest astronaut will

wrap up long-delayed encore today," **The Orlando Sentinel**, November 7, 1998, p A-1 & A-14.]

◆ John Glenn is back from the orbital paradise where he worked, played and prayed for nine historic days in America's space program. Shuttle Discovery returned the astronaut and his six crew mates to Kennedy Space Center on Saturday, ending Glenn's journey back into space and the embrace of an admiring public. He later walked off the shuttle on his own and into a mobile medical trailer where all astronauts are taken immediately after landing. Two hours passed before a visibly shaken Glenn emerged from the trailer, holding onto both railings of the staircase. The world's oldest spaceman then walked around Discovery, stepping carefully and slowly as he began to re-adapt to Earth's gravity – a typical reaction many astronauts feel. Glenn and his crew mates then were taken to their quarters for a reunion with family members and medical checks. Glenn's doctor pronounced him in good shape. The crew is scheduled to leave KSC after a press conference and return to Johnson Space Center in Houston. The end of Glenn's flight clears the way for shuttle Endeavour's planned Dec. 3 launch and the start of NASA's most daunting challenge since landing men on the moon – building the International Space Station. ["'One-g and I feel fine,' Glenn says," **Florida Today**, November 8, 1998, p 1A & 6A.]

◆ Space Shuttle Status Report, Saturday, November 7, 1998. STS-95: Space Shuttle Discovery and her seven-member flight crew returned to KSC today on the first landing opportunity at 12:04 p.m. EST. Today's landing concluded a nine day research mission of historic significance. Weather forecasters closely monitored the cross wind conditions at KSC's Shuttle Landing Facility today and gave flight controllers a "go" forecast in time for the deorbit burn at 10:53 a.m. The drag chute was not deployed and had no impact on the otherwise flawless landing. Planned visual inspections of the orbiter's drag chute compartment commenced about 1 hour after touchdown and revealed that the chute was intact postflight. Inspections also confirmed that pyrotechnic wiring associated with the drag chute mortar was in excellent condition, allowing KSC managers to proceed with routine post landing activities. After about 8 hours of SPACEHAB destow efforts, Discovery will be towed to Orbiter Processing Facility bay 1. This was the 45th KSC landing in Shuttle history and the 16th consecutive KSC landing. Discovery landed on orbit 135 having traveled 3.6 million statute miles. The STS-95 crew will remain overnight at KSC and depart for their homes in Houston, TX, tomorrow at about 11:30 a.m. EST. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, November 7].]

NOVEMBER 9: Space Shuttle Status Report, Monday, November 9, 1998. STS-88: Last week, KSC's launch team and the STS-88 flight crew successfully completed Terminal Countdown Demonstration Test activities. Endeavour's inertial measurement unit calibrations are complete. Shuttle main engine ignitor testing concluded last week. Today, interface verification testing begins with the Unity connecting module at Launch Pad 39A. Unity is slated for payload bay installation Nov. 13. Preparations for next week's hypergolic propellant loading activities are in work. STS-93: Columbia's ammonia system servicing is complete. Leak and functional tests of the orbiter's auxiliary power units concluded last week. Hydraulic checks of the main propulsion system are also complete. Shuttle main engine securing continues and aft compartment closeouts are in work. Engine heat shield

installation begins this week. Structural modal test preparations continue and auxiliary power unit lubrication servicing occurs later this week. Next week, integrated hydraulic and flight control system testing begins. Solid rocket booster stacking operations continue in the Vehicle Assembly Building. STS-96: Following Saturday's successful noon landing of orbiter Discovery at KSC's Shuttle Landing Facility, SPACEHAB experiment destow activities concluded about 8 hours later and the orbiter was towed into OPF bay 1 by 10 p.m. Over the weekend, technicians drained the power reactant storage and distribution system of all cryogenic reactants. They are currently working to purge Discovery's main engines. Orbiter access platforms are being installed today and the payload bay doors are slated to be opened by midweek. By early next week, payload removal will conclude. Preliminary inspections reveal the drag chute and its housing compartment to be in good condition, but a thorough evaluation is under way to determine the cause of the drag chute door incident. Inspections of Discovery's underside revealed about 136 debris hits to the black thermal protective tiles with about 42 hits measuring 1 inch or greater. Processing work for the orbiter's next mission will resume following routine post-flight inspections and deconfiguration. STS-101: Installation of Atlantis' hand controller for the robot arm is complete and overall remote manipulator system installation concludes early next week. Leak checks on the orbiter's oxygen system crossover valves are in work. This week workers will replace orbiter window No. 4. The auxiliary power unit lines will be connected next Wednesday. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, November 9].]

◆ The woman whose words rocketed John Glenn and shuttle Discovery into space soon will do the same for Rosie O'Donnell. NASA commentator Lisa Malone recorded the introduction for the Rosie O'Donnell Show this week. It will be broadcast Tuesday. Malone, who has announced about 20 space shuttle launches, will be seen chatting with O'Donnell for a few minutes before "Superman" actor Christopher Reeve and Cher appear. "I've been so busy and so exhausted by the (Discovery) flight, I haven't really had time to prepare for it," Malone said before she left Monday. ["NASA rep talks," **Florida Today**, November 11, 1998, p 1D.]

NOVEMBER 10: Space Shuttle Status Report, Tuesday, November 10, 1998. STS-88: At Launch Pad 39A, orbiter and secondary payload interface verification test (IVT) preparations are complete. Workers have also completed the IVT for Endeavour's primary payload, the Unity connecting module. Unity is slated for payload bay installation Nov. 13. This week, forward reaction control system connections are scheduled and preparations for next week's hypergolic propellant loading activities continue on schedule. STS-93: Columbia's main engine securing is complete. Filling of the water spray boiler's core is also complete. Orbiter aft compartment closeouts and main engine/main propulsion system integrated tests are in progress. Engine heat shield installation is in work. Structural modal test preparations continue and auxiliary power unit lubrication servicing occurs later this week. Next week, integrated hydraulic and flight control system testing begins. Solid rocket booster stacking operations continue in the Vehicle Assembly Building. STS-96: Technicians have completed removal of the drag chute mortar from Discovery's aft compartment. Primary access has been gained to the orbiter's crew module, and power reactant storage and distribution system tank purging is complete. Main engine purge efforts concluded yesterday. Orbiter access platforms are being installed today in the aft compartment and preparations for tomorrow's payload bay door opening are in progress.

Payload removal will conclude early next week. STS-101: Replacement of Atlantis' window No. 4 is complete. Remote manipulator system installation continues and will conclude early next week. Leak checks on the orbiter's oxygen system crossover valves are in work. The auxiliary power unit lines will be connected next Wednesday. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, November 10].]

NOVEMBER 11: The futuristic ion engine flying on NASA's Deep Space 1 probe mysteriously shut down within minutes of being turned on this week. Ground controllers are trying to figure out what went wrong. It was the first time since Deep Space 1's launch 2 ½ weeks ago that controllers turned on the ion engine, the most intriguing of 12 "Star Trek"-style technologies being tested on the $152 million mission. The engine must work for Deep Space 1 to rendezvous with asteroid 1992 KD in July. ["Space probe's ion engine shuts down," **Florida Today**, November 12, 1998, p 1A.]

NOVEMBER 12: Space Shuttle Status Report, Thursday, November 12, 1998. STS-88: At Launch Pad 39A, leak checks of the hydraulic hoses on Endeavour's main engine No. 2 yaw actuator are complete and good. Preparations continue for next week's hypergolic propellant loading operations. Mating of the orbiter midbody umbilical unit is in progress. The first U.S. component for the International Space Station, the Unity connecting module, will be installed in the Shuttle's payload bay tomorrow. STS-93: Columbia's main engine/main propulsion system integrated tests are complete. Checks on the multifunction cathode ray tube display screen located on the orbiter's flight deck concluded this week. Engine heat shield installation and aft compartment closeouts continue. Workers will replace a damaged sensor for freon coolant line No. 2. Structural modal test preparations continue and auxiliary power unit lubrication servicing is underway. Tonight, the STS-93 flight crew arrives at KSC to participate in tomorrow's Crew Equipment Interface Test. Solid rocket booster stacking operations continue in the Vehicle Assembly Building. STS-96: Workers have opened Discovery's payload bay doors and completed functional tests on the doors. Preparations are in work to remove the complement of STS-95 payloads from the orbiter cargo bay. Payload removal begins at about 8 a.m. tomorrow and the canister will depart OPF bay 3 at about 6 p.m. Inspections of main engines and drag chute compartment continue. Preparations for hypergolic deservicing and forward reaction control system functional tests begin this week. STS-101: Atlantis' auxiliary power unit lines are connected. Remote manipulator system installation continues and will conclude early next week. The new space-to-space radio communication system is being installed inside the orbiter. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, November 12].]

◆ Two brothers who tried to auction what they claimed was a "moon rock" given by astronaut John Glenn to their father were indicted Thursday for fraud. The federal indictment alleges that the brothers, both of Atlanta, conspired to sell the rock through a New York auction house. They claimed that Glenn gave the rock, which he got from astronaut Alan Bean, to their now-deceased father for his work with NASA. ["2 are charged with fraud for 'moon rock' claims," **The Orlando Sentinel**, November 13, 1998.]

NOVEMBER 13: To NASA's relief, Russian space officials have withdrawn a last-minute request to launch the International Space Station into an orbit closer to Mir. Putting the new space station considerably closer to Mir would have allowed the cash-strapped Russians to haul a few thousand pounds of scientific equipment from the old outpost to the new one. But after "frank and candid" discussions between the two partners, Russia dropped its request, Randy Brinkley, space station program manager, said Friday. ["Russians drop request to change orbital position of space station," **Florida Today**, November 14, 1998.]

NOVEMBER 16: The U.S. Laboratory module, considered the centerpiece of the International Space Station, arrived today at the Kennedy Space Center. Targeted for launch aboard the Shuttle Endeavour in February 2000, the module will undergo final pre-launch preparations at KSC's Space Station Processing Facility. NASA's "Super Guppy" aircraft transported the module to Kennedy's Shuttle runway from the Marshall Space Flight Center, in Huntsville, AL, where it was built. The laboratory module is 28 feet in length, 14 feet in diameter, and weighs 32,000 pounds. Comprising it are three cylindrical sections with two end cones. Each end cone contains a hatch opening through which the astronauts will enter and exit the lab. The exterior of the module is made of aluminum and features a waffle pattern that strengthens the hull. It will be covered with an insulation blanket to protect the module from the harsh temperatures of outer space. Next, an intermediate debris shield, made of material similar to that of bulletproof vests, will protect the module against space debris and micrometeoroids. Finally, the aluminum debris shield will then be placed over the intermediate debris shield for added protection and to reflect the intense sunlight, reducing the load on the air conditioning system. It is planned to be taken into space for mating to the other International Space Station elements on station flight designated as "5A." ["U.S. Laboratory module arrives at Kennedy Space Center," **NASA News Release #141-98**, November 16, 1998.]

◆ NASA Administrator Daniel S. Goldin today named Dr. Edward J. Weiler as Associate Administrator for NASA's Office of Space Science, effective immediately. ["Weiler named Associate Administrator for Space Science," **NASA News Release #98-204**, November 16, 1998.]

NOVEMBER 19: Space Shuttle Status Report, Thursday, November 19, 1998. STS-88: Yesterday, hypergolic propellant loading operations were successfully completed. Today, the payload bay doors will be opened and final checks of the Unity connecting module will be conducted. Also, the astronauts' spacesuits to be used during the mission's three spacewalks will be installed today and checked out tomorrow. Preparations to purge the external tank are also underway. Managers determined today that the drag chute on Endeavour will not be used during landing this mission. Since no definitive determination has been reached as to why the drag chute door fell off during the launch of Discovery last month, the mortar that deploys the drag chute on Endeavour will be removed and the chute door replaced with one that can be bolted to the orbiter. Tests and analysis are continuing regarding Discovery's chute door but no conclusion is expected prior to the launch of Endeavour. STS-93: Columbia's payload bay doors are being closed today in preparation for this weekend's scheduled structural tests. The tests are being conducted as a part of the final structural checks prior to preparations for rollout to the pad early next year. Solid rocket booster stacking operations in the Vehicle Assembly Building are now complete and close-outs are in work. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle**

Status Report [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, November 19].]

◆ The foundation for NASA's International Space Station was laid early today as a Russian space tug rocketed into orbit, where it will serve as the cornerstone for the $50 billion outpost. An 18-story Proton rocket lifted off from Baikonur Cosmodrome in Kazakstan, sending the $240 million tug – called Zarya, or sunrise – into an orbit 220 miles above Earth. The 1:40 a.m. liftoff marked the first of 45 U.S. shuttle and Russian rocket mission required to build the station, a job considered by many to be the most complex engineering endeavor in human history. Financed by the United States and built in Russia, the 24.5 ton tug will provide the propulsion system need to keep the station in orbit during the early stages of construction. About the size of a long camper-trailer, it also will serve as the station's initial power production plant, using two 35-foot solar wings to generate electricity to run the outpost's systems. ["Russians launch 1st station piece," **Florida Today**, November 20, 1998, p 1A.]

NOVEMBER 23: Space Shuttle Status Report, Monday, November 23, 1998. STS-88: Last week, Endeavour's payload bay doors were opened to support spacesuit installation and checks. Spacesuit checks are complete. Ground support equipment needed for routine vertical payload operations is in position and payload bay closeouts will conclude Sunday, Nov. 29. Endeavour's ordnance testing resumes tonight. Orbiter aft compartment closeouts continue today and will conclude late tomorrow night with the installation of the aft compartment doors. Shuttle and International Space Station (ISS) managers are gathering at KSC for the Flight Readiness Review today and tomorrow. After reviewing Space Shuttle system and ISS topics, managers are expected to announce Dec. 3 as the official STS-88 launch date. STS-93: Columbia's orbiter maneuvering system and reaction control system electrical checks concluded last week. Friday the orbiter's payload bay doors were closed in preparation for Saturday's structural modal tests. Modal testing concluded Saturday evening. Tile work is under way on Columbia's external tank umbilical doors. Last week the main engine carrier panels were installed and next Monday main engine insulation foaming begins. Solid rocket booster stacking operations in the Vehicle Assembly Building are complete and close-outs continue. STS-96: Discovery's forward reaction control system was removed from the nose of the orbiter on Friday. Workers completed hypergolic deservicing last week. The orbiter's main engine heat shields will be removed today and engine removal begins next week. Today workers will perform post flight tests on the new Integrated Vehicle Health Monitoring system in Discovery's main propulsion system. STS-101: Atlantis' orbiter maneuvering system high point bleed line removal continues today. Main propulsion system (MPS) electrical checks began Friday and MPS leak checks are under way. Installation of thermal protective tiles on Atlantis' forward and aft compartments continue this week. Tile waterproofing is also in work today. Window inspections are ongoing and polishing begins tomorrow. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, November 23].]

NOVEMBER 24: The ion propulsion system on NASA's Deep Space 1 spacecraft came to life Tuesday, Nov. 24, and has continued running smoothly since. The engine started up at 5:53 p.m. EST, in response to commands sent to the spacecraft. After running overnight in low-thrust mode, engineers commanded the engine to switch to higher-thrust modes

today. The mission team plans to leave the engine running over the four-day Thanksgiving weekend. ["Deep Space 1 ion propulsion system starts up," **NASA News Release #98-215,** November 25, 1998.]

NOVEMBER 25: NASA program managers set Dec. 3 as the official launch date for the STS-88 mission aboard Space Shuttle Endeavour. This the first Shuttle mission dedicated to the assembly of the International Space Station (ISS), the largest and most complex international cooperative science and engineering venture in history. The six-member flight crew will work to mate Endeavour's primary payload, the U.S.-made Unity connecting module, to the Russian-built Zarya control module during the 12-day mission. The Flight Readiness Review, held at Kennedy Space Center, began Monday (November 23) afternoon allowing all Shuttle and ISS project offices to evaluate the flight readiness of the astronaut crew, vehicle and cargo, along with the launch and mission control teams. ["First U.S. station element to be launched Dec. 3," **NASA News Release #98-214**, November 25, 1998.]

◆ NASA Administrator Daniel Goldin and the President of the Italian Space Agency, Sergio De Julio, mill meet at the Kennedy Space Center on Thursday, Dec. 3 for a ceremonial event transferring the "Leonardo" Multipurpose Logistics Module (MPLM) from the Agenzia Spaziale Italiana (ASI) to NASA. The MPLM, a reusable logistics carrier, will be the primary delivery system used to resupply and return station cargo requiring a pressurized environment. It is one of Italy's major contributions to the International Space Station Program. The cylindrical module is approximately 21 feet long and 15 feet in diameter, weighting almost 4.5 tons excluding its capability to hold up to 20,000 pounds of contents. Launched in the Space Shuttle's payload bay, it will be docked to the International Space Station once on orbit. It will transport supplies, science experiments, spare parts and other logistical components to the International Space Station. A ceremonial signing of a document signifying the transfer of Leonardo, the first of three MPLM carriers, is to be held at the International Space Station Center located adjacent to the Space Station Processing Facility. This activity will begin at 5:45 a.m. following the STS-88 launch on Thursday, Dec. 3. ["Leonardo MPLM transfer ceremony to be held at KSC Dec. 3," **NASA News Release #146-98**, November 25, 1998.]

NOVEMBER 26: A Titusville company wants to launch a new rocket that caters to the growing number of commercial communications satellites waiting to be launched. E'Prime Aerospace is seeking a license from the Federal Aviation Administration to launch its proposed Eagle rocket from three possible locations, including Kennedy Space Center. Formed in 1987, E'Prime originally planned to base its rocket design on the military's Peacekeeper ballistic missile. Their plan was stymied, however, when the Cold War ended and the government signed treaties to curtail production of the missiles, which were built to carry nuclear warheads. Forced to go back to the drawing board, E'Prime has come up with the Eagle. Fueled by solid propellant, the rocket could carry small satellites between 1,300 and 10,000 pounds. The company is aiming for its first launch in spring 2000. ["Local company wants to fly new rocket," **Florida Today**, November 27, 1998, p 1A.]

NOVEMBER 30: Space Shuttle Status Report, Monday, November 30, 1998. STS-88: The launch countdown for STS-88 began on schedule today at 7 a.m. in KSC Firing Room 3. Endeavour's aft compartment closeouts concluded last week and orbiter maneuvering

system/reaction control system flight pressurization is complete. Today workers are finishing final payload bay closeouts and the payload bay doors will be closed for flight this afternoon. Operations to load the power reactant storage and distribution system with cryogenic reactants begins tomorrow at 3 a.m. Tomorrow afternoon workers will demate the orbiter midbody umbilical unit and retract it into the Fixed Service Structure. The flight crew arrived at KSC's Shuttle Landing Facility yesterday in preparation for Thursday's launch. Today they will conduct flight crew equipment checks and take flights in the Shuttle Training Aircraft. Air Force weather forecasters are indicating a 60 percent chance that weather could prohibit launch on Dec. 3. The threat of low cloud ceilings and showers are the primary concern. The forecast calls for clouds scattered at 4,000 feet and broken at 25,000 feet; visibility at 7 miles; winds from the ENE at 10 knots and gusts to 15 knots; Temperature at 72 degrees F; and relative humidity at 79 percent. The probability of weather prohibiting launch for a 24-hour scrub turnaround remains 60 percent and the 48-hour turnaround forecast is at 40 percent. STS-88 Crew, Commander (CDR): Robert Cabana; Pilot (PLT): Fredrick Sturckow; Mission Specialist (MS1): Jerry Ross; Mission Specialist (MS2): Nancy Currie; Mission Specialist (MS3): Jim Newman; Mission Specialist (MS4): Sergei Krikalev. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, November 30].]

◆ NASA is warning pilots to keep their planes out of shuttle Endeavour's way during the spaceship's planned launch early Thursday. Officials said Tuesday they don't want a repeat of last month's delay in the flight of shuttle Discovery, which had to wait about 10 minutes before launching while five planes were chased from restricted air space. Discovery, which was carrying astronaut John Glenn, had the luxury of a 2 ½ hour period in which to launch. But Endeavour has only a 10-minute span for liftoff on its mission, which calls for it to catch up with a Russian-made component of the International Space Station already in orbit. "It is crucial that the shuttle launch team not be delayed with costly distractions like airspace violators," said Ralph Roe, Kennedy Space Center's launch director. "Violating these restrictions is not only unsafe for the astronauts, but it's unsafe for the violator." On launch day, the restricted air space is monitored by the Air Force, and three planes from the Federal Aviation Administration are ready to escort violators from the area. The FAA is in charge of finding and sanctioning any pilots who willfully fly into the restricted areas. ["NASA warns pilots to steer clear of launch area," **Florida Today**, December 1, 1998, p 2A.]

DECEMBER

DECEMBER 1: Space Shuttle Status Report, Tuesday, December 1, 1998. STS-88: Shuttle Endeavour's payload bay closeouts are complete and the doors are closed for flight. The orbiter's backup flight systems have been tested and load tests on the Shuttle's data processing system are complete. Loading of cryogenic reactants into Endeavour's power reactant storage and distribution system concluded early this afternoon. Later today, the orbiter midbody umbilical unit will be demated and retracted into the Fixed Service Structure at Pad 39A. The orbiter's navigation system self tests and main engine final preparations are also slated to occur today. In keeping with the flight crew's on orbit sleep cycle, crew members will wake up today at 2:30 p.m. A launch pad visit and walk-down is slated for this evening and T-38 training jet flights from the Shuttle Landing Facility will complete the crew's activities for the day. Air Force weather forecasters continue to indicate a 60 percent chance that weather could prohibit launch on Dec. 3. The threat of low cloud ceilings and showers are the primary concern. The forecast calls for clouds scattered at 4,000 feet and broken at 25,000 feet; visibility at 7 miles; winds from the ENE at 10 knots and gusts to 15 knots; temperature at 72 degrees F; and relative humidity at 79 percent. The probability of weather prohibiting launch for a 24-hour scrub turnaround remains 60 percent and the 48-hour turnaround forecast is at 40 percent. Crew: Commander (CDR): Robert Cabana; Pilot (PLT): Fredrick Sturckow; Mission Specialist (MS1): Jerry Ross; Mission Specialist (MS2): Nancy Currie; Mission Specialist (MS3): Jim Newman; Mission Specialist (MS4): Sergei Krikalev. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, December 1].]

◆ The promise of a few creature comforts and assurance of a good launch-viewing site are worth $22 to the people expected to gather near downtown Titusville for Thursday's 3:59 a.m. shuttle liftoff. Delaware North Park Services has, for the second time, leased the Poe family property at the intersection of Indian River Avenue and the A. Max Brewer Memorial Parkway (the Garden Street extension). Melissa Tomasso, spokeswoman for Delaware North, said the company is not expecting anywhere near the 8,000-strong crowd that gathered on the field for John Glenn's return to space. The company expects about 2,000 people Thursday morning, she said. For the $22 a-person ticket price, people will get a T-shirt with an International Space Station theme, assured parking and access to portable toilets and concession stands. Six-time astronaut Storey Musgrave will be there to sign autographs and to give a mission briefing, Tomasso said. ["Many tickets available to watch shuttle launch," **Florida Today**, December 2, 1998, p 2A.]

◆ NASA's International Space Station might have no name other than that – International Space Station – but the U.S. science lab that will be the centerpiece of the outpost now has a moniker of its own: "Destiny." Now undergoing preparations for a February 2000 launch, the huge can-shaped lab was so christened during a ceremony Tuesday at Kennedy Space Center. NASA officials said the name was chosen because the lab – considered the most advanced space workshop ever built – is a symbol of humanity's quest to explore, discover and understand the universe. "We think the word destiny represents the essence of the International Space Station," said NASA program manager Randy Brinkley. About the size of the fuselage of a business jet, the U.S. lab stretches 28 feet in length and weighs 32,000 pounds. It will house 13 refrigerator-sized racks for science

experiments and another 11 racks for power, cooling, humidity control and oxygen-generation systems. The lab is the third part of the space station to be named. The first part – a Russian space tug launched Nov. 20 – is called Zarya, which means "sunrise" or "dawn." The second part – a U.S. docking module to be hauled into space aboard shuttle Endeavour Thursday – is named "Unity." NASA's cornerstone project for the 21st century has been called International Space Station since shortly after President Clinton took office in 1993 and dropped the name "Freedom," which had been assigned by the Reagan administration. The names Alliance, Aurora, Sigma and Unity made NASA's short list in the mid-1990s, but none of those were ever approved. ["Science lab gets new name – Destiny," **Florida Today**, December 2, 1998, p 8A.]

◆ The door to shuttle Endeavour's drag-chute compartment shouldn't pose any problems for Thursday's launch. A similar 11-pound piece of aluminum fell off during sister ship Discovery's liftoff Oct. 29. For this mission, flight directors are bolting the door shut until they figure out what caused the earlier failure. "We hope to have a permanent fix in place by the next mission that will allow us to use the drag chute during landing," said Doug Lyons, NASA test director. The door protects the chute during launch and re-entry. It is blown off by an explosive charge, and the chute is deployed as the shuttle rolls down the runway after landing. Landing without the drag chute is not a problem. Early shuttle flights didn't even have them. ["Door not expected to be problem this time," **The Orlando Sentinel**, December 2, 1998, p A-6.]

DECEMBER 3: Space Shuttle Status Report, Thursday, December 3, 1998. STS-88: The Shuttle Endeavour remains earth bound today following a decision by launch controllers to scrub today's launch attempt. The flight crew and Shuttle vehicle are safe and operations to off-load the external tank of its 500,000 gallons of liquid propellants is currently underway. This operation is expected to be complete by about 10 a.m. At the T-4 minute mark in the launch countdown, after orbiter hydraulic systems were powered on, a master alarm in the crew cabin was noted creating a launch commit criteria violation. The launch countdown was then held at the T-31 second mark to further assess the situation. Shuttle system engineers attempted to quickly completed an assessment of the suspect hydraulic system and eventually gave an initial "go" to resume the countdown. With only seconds to respond, launch controllers were unable to resume the countdown clock in time to launch within the allotted remaining window, which was limited due to liquid oxygen (Lox) drain-back constraints. Managers are discussing the 24-hour launch turn-around plans and are expected to make a final determination later this morning. The crew of Endeavour are back in their quarters and will be shifting their sleep and work schedule by about 30 minutes earlier for a second launch attempt tomorrow. Air Force weather forecasters are indicating a 60 percent chance that weather could prohibit launch on Dec. 4. The threat of low cloud ceilings and showers are the primary concern. The forecast calls for clouds scattered at 4,000 feet; visibility at 7 miles; winds from the east at 8 knots and gusts to 12 knots; Temperature at 73 degrees F; and relative humidity at 81 percent. The probability of weather prohibiting launch for a 24-hour scrub turnaround is 40 percent. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, December 3].]

◆ NASA was to make a second attempt to launch its first space station construction mission. Endeavour's launch attempt early Thursday was scrubbed after two warning lights

began blinking in the ship's cockpit 4 ½ minutes before a planned 3:58 launch. Among the disappointed spectators was Secretary of State Madeleine Albright, who had come to see the liftoff. "What (the station) shows is how important international cooperation is on issues. We have a lot of disputes, and this is a good way for 16 countries on Earth to deal with them," said Albright. ["Alarm in the cockpit halts shuttle launch at last minute," **Florida Today**, December 4, 1998, p 4A.]

DECEMBER 4: Space Shuttle Status Report, Friday, December 4, 1998. STS-88: After a brief isolated shower near Launch Complex 39A, Endeavour launched this morning at 3:35:34 a.m. on its second launch attempt. The first attempt on Dec. 3 was scrubbed when launch controllers, following an assessment of a suspect hydraulic system, were unable to resume the countdown clock in time to launch within the remaining launch window. The shuttle's ascent to orbit was flawless. This mission begins the largest cooperative space construction project in history -- assembly of the International Space Station. Upcoming significant mission events over the nearly 12-day mission include the removal of the Unity connecting module from Endeavour's payload bay on Dec. 5 for connection to the Shuttle's docking hatch, rendezvous with the Russian-built Zarya control module on Dec. 6, and the first of three scheduled space walks by Mission Specialists Jim Newman and Jerry Ross on Dec. 7. The mission is scheduled to end with a night landing at KSC's Shuttle Landing Facility on Dec. 15 at about 10:36 p.m. EST. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, December 4].]

◆ The launch of NASA's Mars Climate Orbiter spacecraft aboard a Boeing Delta II rocket is scheduled for Thursday, Dec. 10. There a two instantaneous launch opportunities available that day. The target is the first opportunity at 1:56:38 p.m. EST. A second opportunity at 3:02:23 p.m. EST is available if necessary. Liftoff will occur from Pad A at Launch Complex 17 on Cape Canaveral Air Station. The Mars Climate Orbiter has completed final checkout and was mated to the Boeing Delta II rocket on Nov. 30. The Delta fairing was installed around the spacecraft on Dec. 4. ["Mars Climate Orbiter scheduled for launch Dec. 10," **NASA News Release #157-98**, December 4, 1998.]

◆ One of the founding fathers of the U.S. space shuttle program plans to retire from NASA in January. Robert Sieck, Kennedy Space Center's director of shuttle processing and a 34-year NASA veteran, is leaving behind the 60-hour workweeks to pursue part-time opportunities. The 60-year-old engineer will likely work as a consultant to NASA or the aerospace industry. "My priorities are to spend more time with my family and stay in Florida," Sieck said. "But I'd like to still feel like I'm doing something to support the space program." Friday's launch of the shuttle Endeavour was Sieck's last as manager of launch activities at Cape Canaveral. Afterward, to a standing ovation, he was awarded the National Aeronautics and Space Administration's highest honor – the Distinguished Service Medal - by NASA Administrator Dan Goldin as Secretary of State Madeline Albright looked on. "I don't know of anyone who has done more for America's space program than Bob Sieck," Goldin said. "He was the launch director for 52 launches. I don't know that anyone is ever going to break that record." Sieck, a native of St. Louis, joined NASA in 1964 as a systems engineer for the Gemini spacecraft. After working on the Apollo project, he moved to the shuttle program and became the engineering manager for shuttle landing tests. In 1978, Sieck was made chief shuttle project engineer. He was appointed shuttle launch director in

1984 and served in that post for most of the next 12 years, before becoming director of shuttle processing. ["Veteran of shuttle program to retire from NASA after 34 years," **The Orlando Sentinel**, December 5, 1998, p A-10.]

DECEMBER 5: JoAnn Morgan, NASA's first woman executive at Kennedy Space Center, has been honored with the 1998 Woman of Achievement Award by the Melbourne Branch of the American Association of University Women. Morgan's work was recognized before 100 members and guests at AAUW's holiday luncheon Dec. 5 at the Imperial Comfort Inn in Viera. Morgan, NASA's associate director for Advanced Development and Shuttle Upgrades at KSC, has been with the nation's manned flight program for 35 years, and she has mentored many NASA professionals. ["Executive honored," **Florida Today**, December 21, 1998, 1D.]

DECEMBER 6: Russian and American handiwork meet today in space, where the first two pieces of the International Space Station are to be joined by shuttle Endeavour's crew. The astronauts spent Saturday preparing for the job by taking an American-built module – called Unity – out of Endeavour's cargo bay and placing it atop the shuttle's docking port. Unity will remain on this perch today while shuttle Commander Bob Cabana flies the spaceship underneath the Russian-made Zarya module, which has been in orbit since its launch Nov. 20. Using the shuttle's robot arm, astronaut Nancy Currie is to latch onto the Russian segment and link it to the waiting U.S. module. The delicate paring is set for 8:36 tonight while Endeavour is flying about 240 miles above Russia. ["Station pieces join today," **Florida Today**, December 6, 1998, p 1A & 4A.]

DECEMBER 8: Space Shuttle Status Report, Tuesday, December 8, 1998. STS-88: Following last week's launch, Pad 39A is reported to have sustained less than normal damage and is now undergoing an eight-month modification and upgrade period that concludes in early August of 1999. The solid rocket booster recovery ships returned to Hangar AF on Saturday with the STS-88 boosters in tow. Full inspection of the boosters began yesterday and preliminary reports indicate that both boosters are in good condition following and excellent performance during Friday's launch of Endeavour. Shuttle Endeavour continues to perform very well on orbit and is blazing the trail for future Space Shuttle support of the International Space Station. STS-93: A transducer on Columbia's freon coolant loop No. 2 has been replaced and servicing of the coolant line is in work this week. Functional tests on the orbiter's external tank umbilical door are complete. In the Vehicle Assembly Building, external tank and solid rocket booster mating activities concluded last week and closeouts are in work this week. STS-96: Discovery's orbiter maneuvering system pod functional testing is complete, and workers have bonded and sealed the drag chute door in place for flight. Preparations to remove the Shuttle main engines are in work and heat shield removal is under way. Lubrication oil is being drained from auxiliary power unit No. 2 today. Orbiter pyrotechnic initiator controller testing is also in work this week. Later this week, flash evaporator system leak tests are scheduled. STS-101: Atlantis' gaseous nitrogen line replacement is complete. Orbiter maneuvering system bleedline removal is in work. Preparations are also under way to transfer Atlantis to the VAB for temporary storage, making way for Shuttle Endeavour's return from mission STS-88. Atlantis will transfer to OPF bay 3 following Columbia's rollover to the VAB in early January. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status**

Report [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, December 8].]

◆ Astronauts Jerry Ross and Jim Newman spent 6 ½ hours outside shuttle Endeavour on Monday, stringing electrical and data cables between two newly mated pieces of the international space station. As the astronauts neared the end of their spacewalk, flight controllers turned on the power. The connections worked, passing a milestone in the station's early construction. ["Spacewalkers power up station," **The Orlando Sentinel**, December 8, 1998, p A-1 & A-12.]

◆ A 3.9-million-year-old chunk of the moon that President Nixon gave to Honduras has been seized by federal agents who said they uncovered a plan to sell the rock for $5 million. "Operation Lunar Eclipse," an under cover investigation involving U.S. Customs, NASA and the Postal Service, was aimed at stopping the sale of bogus lunar samples. In this case, however, agents found a real one. It was brought back by astronauts on the Apollo 17 mission that lifted off Dec. 7, 1972, federal officials said. The rock was part of a larger sample the astronauts dedicated to the people of the world before then returned to Earth, said Capt. Eugene Cernan, the mission's commander. "we wanted to give a piece of this rock to each country," Cernan said Monday. "It was to be part of the archives of that nation and country." Authorities said a 60-year-old Florida man bought the tiny rock from a retired Honduran military officer. They said the Florida man called Cernan to verify the authenticity of the rock. Agents lured the man by placing a newspaper advertisement seeking moon rockets, and they seized the rock once he led them to it – encased in acrylic, stored in a safety deposit box. The man was not arrested, but he could face smuggling charges for failing to declare the rock if he brought it into the country himself, Customs spokesman Michael Sheehan said. ["Agents seize moon rock, part of Apollo 17 mission," **Florida Today**, December 9, 1998, p 2A.]

DECEMBER 9: Space Shuttle Status Report, Wednesday, December 9, 1998. STS-88: Shuttle Endeavour continues to perform very well on orbit. Inspections of the solid rocket boosters at Hangar AF continue on schedule. Preliminary reports indicate that both boosters are in good shape. STS-93: Servicing of Columbia's freon coolant loop No. 2 is now complete. Leak tests of the orbiter's crew compartment are scheduled later today. In the Vehicle Assembly Building, external tank and solid rocket booster closeouts continue on schedule. STS-96: Leak testing on Discovery's flash evaporator system is complete. Draining of lubrication oil from the orbiter's auxiliary power unit No. 2 concluded yesterday. Preparations to remove the Shuttle main engines continue and heat shield removal is in work. Orbiter pyrotechnic initiator controller testing is in progress today. STS-101: Orbiter maneuvering system bleedline removal has been rescheduled to follow Atlantis' VAB storage. Preparations are also under way to transfer Atlantis to the VAB for temporary storage, making way for Shuttle Endeavour's return from mission STS-88. Atlantis will transfer to OPF bay 3 following Columbia's rollover to the VAB in early January. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, December 9].]

◆ The next chapter of the Space Coast's opus on space travel will be hastily scribbled Friday as the area hosts the world's most famous astronaut and the crew from his latest

jaunt into history. Organizers are expecting 40,000 people to attend the STS-95 astronauts' 2-mile parade along State Road A1A from First Street South to the Doubletree Hotel. ["40,000 expected at Glenn parade," **Florida Today**, December 10, 1998, p 1A & 2A.]

◆ NASA has delayed the launch of a Mars-bound robot probe until at least Friday so a computer software glitch on the craft can be fixed. Officials are to meet again today to make a final decision for the start of the Mars Climate Orbiter mission. If the fixes are successful, the launch could occur at 1:45 p.m. or 2:52 p.m. Friday aboard a Boeing Delta 2 rocket from Cape Canaveral. NASA has to launch at one of those precise times to get the probe on a proper trajectory to Mars. The mission was set for liftoff Dec. 10 but was postponed when officials discovered a problem with software designed to protect the spacecraft from problems during launch. Mars Climate Orbiter is to make a 10-month journey to Mars, arriving there in September 1999 to conduct an intense, two-year study of Martian weather. It is to be followed by the Jan. 3 launch of NASA's Mars Polar Lander, which is to plunk down near the south pole to search for water ice. ["Computer software glitch delays launch of Mars-bound robot probe," **Florida Today**, December 10, 1998, p 2A.]

DECEMBER 10: Space Shuttle Status Report, Thursday, December 10, 1998. STS-88: All systems aboard Space Shuttle Endeavour continue to perform very well on orbit. Inspections of the solid rocket boosters at Hangar AF continue and nozzle removal is in work today. Managers plan to ship the nozzles to Utah tomorrow. STS-93: Workers are performing a routine modification on orbiter Columbia, by shimming the payload bay's aft bulkhead to ensure proper payload bay door closure. Leak tests of the orbiter's crew compartment continue. Auxiliary power unit No. 2 fuel tank pressurization is scheduled today. In the Vehicle Assembly Building, external tank and solid rocket booster closeouts continue on schedule. STS-96: Removal of Discovery's auxiliary power unit No. 2 is complete and that unit will be sent to the vendor this week for servicing. Shuttle main engine removal is in progress with engine No. 2 already removed. Engines No. 3 and No. 1 are being removed today. Orbiter pyrotechnic initiator controller testing continues. STS-101: Orbiter maneuvering system bleedline removal has been rescheduled to follow Atlantis' VAB storage. Atlantis began its transfer to the VAB at about 1:20 p.m. today and is being stored in VAB high bay 2 on hydraulic jacks. This move makes way for Shuttle Endeavour's return from mission STS-88. Atlantis will be transferred to OPF bay 3 following Columbia's planned rollover to the VAB in January. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, December 10].]

◆ Five U.S. astronauts and a Russian cosmonaut held a jubilant homewarming in orbit Thursday, turning somesaults as they officially opened NASA's $50 billion International Space Station. Both the crew of shuttle Endeavour and flight controllers on Earth called the affiar a historic joining of 16 nations in the business of space exploration. "A very significant and almost momentous event," proclaimed NASA lead flight director Robert Castle. Their first act was turning on the lights in the 35-ton outpost, where the temperature was 84 degrees. Towering out of Endeavour's cargo bay, the seven-story station was passing 247 miles above the Indian Ocean at the time. ["Station comes to life," **Florida Today**, December 11, 1998, p 1A & 2A.]

DECEMBER 11: Space Shuttle Status Report, Friday, December 11, 1998. STS-88: All systems aboard Space Shuttle Endeavour continue to perform very well on orbit. Removal of the solid rocket booster aft skirts is complete and both nozzles have been removed. Today, the nozzles will be shipped to Utah. Booster disassembly activities are on schedule with completion set for Dec. 15. STS-93: Leak tests of Columbia's crew compartment are complete. Shimming of the orbiter's payload bay aft bulkhead continues. The routine modification ensures proper payload bay door closure. Auxiliary power unit No. 2 fuel tank pressurization is scheduled today. In the Vehicle Assembly Building, external tank and solid rocket booster closeouts continue. STS-96: Removal of Discovery's main engines is complete. Orbiter pyrotechnic initiator controller testing continues and workers are replacing window No. 6 today. Preparations to remove the orbiter's robot arm are in work this week. STS-101: Yesterday, orbiter Atlantis moved from OPF bay 2 to VAB high bay 2 at about 1:20 p.m. It will be stored there on hydraulic jacks until Columbia transfers to the VAB in January. This move makes way in the OPF for Shuttle Endeavour's return from mission STS-88. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, December 11].]

◆ Mars Climate Orbiter Mission Status Report, Friday, December 11, 1998. After a one-day delay, NASA's Mars Climate Orbiter blasted off launch pad 17A at Cape Canaveral Air Station, FL, at 1:45 p.m. Eastern Standard Time today and hurtled skyward on a 9-1/2-month flight to Mars to embark on a study of the planet's climate and current water resources. The 24-hour launch delay will not change the spacecraft's arrival date at Mars on September 23, 1999, or alter its primary mapping mission. The spacecraft shot through a breezy, cloud-laced mid- afternoon sky atop a Delta II launch vehicle on the second day of the primary launch period with new onboard software to guard against overcharging the spacecraft's battery. The orbiter team tested the new software using the Mars Polar Lander spacecraft at Kennedy Space Center, FL, as a testbed. Mars Polar Lander, which will join Mars Climate Orbiter at Mars in December 1999, is currently being processed for launch on January 3, 1999. Sixty seconds after liftoff, the four solid-rocket boosters were jettisoned, two at a time, followed by first-stage separation and second-stage engine ignition. The second-stage burn lasted approximately 11 minutes, 22 seconds, placing the spacecraft in a low-Earth orbit at about 189 kilometers (117 miles) above Earth's surface. Third-stage separation occurred at approximately 2:26 p.m. EST, followed by a burn of the third-stage engine for 88 seconds. Once out of Earth's gravitational grasp, the orbiter was jettisoned from the third stage using the spacecraft's onboard thrusters to remove all remaining motion. Four minutes later, the spacecraft's solar arrays were unfolded and pointed toward the Sun for power. NASA's Deep Space Network complex near Canberra, Australia, acquired the orbiter's signal at 2:45 p.m. EST. Spacecraft controllers at Lockheed Martin Astronautics in Denver, CO, and at the Jet Propulsion Laboratory in Pasadena, CA, are now assessing the spacecraft's initial performance. Now on its way to Mars, the Climate Orbiter will rely on its low-gain and medium-gain antennas for communications with Earth during the first half of the journey to Mars. Ground-controllers will track the spacecraft 24 hours a day during the first week of cruise, then reduce tracking time to 12 hours a day using 34- meter (112-foot) antennas of the Deep Space Network. Twelve days into flight, one of the spacecraft's science instruments, the Pressure Modulator Infrared Radiometer, will be powered on and acclimated to the environment of space. The first trajectory correction maneuver to remove errors in the spacecraft's flight path introduced at the time

of launch will be performed 10 days into the cruise phase, on December 21, 1998. That thruster firing will be the largest and longest of all four trajectory correction maneuvers, lasting about 15 to 20 minutes and changing the spacecraft's velocity by about 30 meters per second (67 miles per hour). Mars Climate Orbiter and Mars Polar Lander are the second set of spacecraft to be launched in NASA's long-term program of robotic exploration of Mars. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, December 11].]

◆ Nearly 10,000 fans lined both sides of State Road A1A for a rare glimpse of an American icon and the rest of the crew from the historic Discovery mission in October. Glenn, smiling like a kindly grandfather, and the other six astronauts rode atop the back seats of red, white and blue Corvette convertibles as the crowd cheered, waved miniature flags and snapped pictures. "It's heartwarming when you see something like that, especially the kids," Glenn said afterward. "That's what the space program is all about." In a piece of poetic timing, the 2 p.m. celebration was preceded by the launch of a probe to Mars from just a few miles up the coast at Cape Canaveral Air Station. Spectators could hear the roar from the Boeing Delta 2 rocket carrying the Mars Climate Orbiter but couldn't see it because of clouds. It was one of the most ballyhooed parades in Brevard since the 1962 motorcade that brought Glenn along SR A1A from Patrick Air Force Base to Cape Canaveral. ["10,000 strong, parade fans say it all," **Florida Today**, December 12, 1998, p 1B & 4B.]

DECEMBER 14: Space Shuttle Status Report, Monday, December 14, 1998. STS-88: Endeavour's crew awoke to the sounds of James Brown's & quote; I Got You (I Feel Good),& quote; today, in honor of the good feelings evoked by this successful first International Space Station Assembly mission. That wake-up call from Mission Control at 11:36 a.m. today, marks the start of the final full-day of operations for the six-member crew of STS-88. At the time of crew wake-up, Endeavour was about 222 statute miles ahead of the space station and pulling away from the station by about 12 statute miles per orbit. The SAC-A satellite, deployed by Commander Bob Cabana last night, trails Endeavour by about 35 statute miles. Crew members will focus their activities today on preparing for their scheduled return to the Kennedy Space Center on Tuesday night. Cabana and Pilot Rick Sturckow will spend a good part of the day checking out spacecraft systems for entry and landing. At about 2:30 p.m. CST, the commander and pilot will begin checkout of the flight control systems and the performance of aerodynamic surfaces and flight controls. About an hour later, the flight crew will conduct a hot fire test of Endeavour's reaction control system jets. Shortly before 5 p.m. CST, the crew will gather for its traditional in-flight crew news conference talking with reporters at NASA centers and at Canadian Space Agency Headquarters in St. Hubert, Quebec. After about 3 hours of off-duty time, Cabana, Sturckow and Mission Specialist Jerry Ross will eject another small satellite from a canister in Endeavour's payload bay. MightySat is a 705-pound U.S. Air Force/ Phillips Laboratory satellite that will demonstrate several advanced technologies, including a composite structure, advanced solar cells, a microparticle impact detector, advanced electronics and a shock device. Deployment is set for 8:09 p.m. CST. The crew will wrap up the day's activities as they begin configuring Endeavour's cabin and stowing equipment in preparation for tomorrow's planned landing. Just before12:30 a.m. CST on Tuesday, Sturckow will stow the Ku-band antenna, which provides high data-rate relay and television. The flight control

teams in the Mission Control Center also are preparing for Tuesday's landing in Florida. Preliminary weather forecasts indicate possible scattered clouds and rain showers in the vicinity of the landing site for Tuesday's scheduled 9:54 p.m. CST landing. Endeavour is orbiting the Earth at an altitude of 247 statute miles with all systems on the space shuttle and space station operating normally. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, December 14].]

◆ Space Shuttle Status Report, Monday, December 14, 1998. STS-88: Mission controllers continue to enjoy a smooth flight with Shuttle Endeavour, experiencing no significant issues with the orbiter's onboard systems. The solid rocket booster nozzles were shipped to Utah Friday and booster segment disassembly continues toward completion tomorrow. Tomorrow, the flight crew will begin on-orbit preparations to bring Endeavour home late Tuesday night. The first two KSC landing opportunities are Tuesday at 10:56 p.m. EST and Wednesday at 12:32 a.m. EST. Mission managers have decided not to call up landing support at Edwards Air Force Base (EAFB), CA, tomorrow. Should additional time on orbit be needed, managers have additional KSC landing opportunities at 9:56 p.m. and at 11:35 p.m. EST on Wednesday. EAFB offers two back up opportunities Thursday at 1:06 a.m. and 2:43 a.m. EST. Weather forecasters are indicating the possibility of rain showers within 30 nautical miles of KSC's Shuttle Landing Facility and the likelihood for low cloud cover. The forecast calls for scattered to broken clouds at 4,000 ft and broken clouds at 8,000 ft. Winds are predicted to be from the Northeast at 10 knots gusting to 17 knots. The temperature at landing is expected to be 61 degrees F. Weather conditions at KSC are expected to improve slightly on Wednesday. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, December 14].]

DECEMBER 15: Joseph "Joe" Gordon Jr., has been selected as the new KSC Public Affairs Director. [**KSC Countdown**, December 15, 1998.]

◆ Gene Cernan joined Apollo 8 history makers Jim Lovell and Bill Anders on Tuesday night at the Apollo/Saturn V Center for a look back at 1968's Christmas mission of Dec. 21-27. ["Space hands salute Apollo 8," **Florida Today**, December 16, 1998, p 1B & 2B.]

DECEMBER 16: Space Shuttle Status Report, Wednesday, December 16, 1998. STS-88: Last night, Shuttle Endeavour and the STS-88 flight crew made a safe and successful landing on KSC runway 15. Weather concerns earlier in the week threatened to delay the Shuttle's landing, but in the hours prior to touchdown KSC weather improved dramatically allowing the Endeavour crew to return home on the first opportunity. Following routine safing of the vehicle and preliminary inspections, Endeavour was towed to Orbiter Processing Facility bay 2 arriving inside the hangar at about 5:30 a.m. Preliminary reports reveal that the orbiter is in good shape post flight. Endeavour's lower surface sustained 70 total debris hits with 21 of those being 1-inch or larger. Inspections of the orbiter will follow in the OPF along with routine post flight deservicing of the orbiter's main propulsion system, hydraulic power system and other major systems. Endeavour's next flight is on mission STS-99 in September of 1999. The flight crew will depart the Cape Canaveral Air Station skid strip tomorrow at about 11:30 a.m. bound for their homes in Houston, TX. Bruce Buckingham.

(1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, December 16].]

◆ NASA's first space station assembly flight was a stunning success, but the agency's shuttle chief warned Wednesday that safety needs to be toughened to prevent a possible catastrophe during future missions. Citing three "close calls" that could have caused shuttle accidents during the past 13 months, program boss Tommy Holloway called on project engineers to rigorously focus on flight safety. Coupled with recent rocket explosions and airline crashes, Holloway and the three mishaps should serve as a wake-up call for those responsible for the safety of astronauts who fly aboard NASA spaceships. Holloway made his comments hours after shuttle Endeavour landed late Tuesday at Kennedy Space Center, capping a flawless mission during which the crew connected the first two segments of the $50 billion International Space Station. His remarks followed an internal NASA report in October that raised questions about whether a downsized shuttle work force could keep up with a demanding space station launch schedule. In that review, dated Oct. 27, investigators said they found "no evidence" that shuttle safety is being compromised. ["Shuttle chief: Recent mishaps warrant tougher safety," **Florida Today**, December 17, 1998, p 1A & 16A.]

◆ The GOES-L weather satellite, to be launched aboard an Atlas II rocket in late March or early April, arrived today by C-5 air cargo plane at the Skid Strip on Cape Canaveral Air Station from the manufacturing plant in Palo Alto, CA. GOES-L is the fourth spacecraft to be launched in the new advanced series of geostationary weather satellites from the National Oceanic and Atmospheric Administration (NOAA). ["GOES-L weather satellite arrives at KSC for final testing," **NASA News Release #167-98**, December 16, 1998.]

DECEMBER 17: Space Shuttle Status Report, Thursday, December 17, 1998. STS-93: Shimming modifications of Columbia's payload bay aft bulkhead are complete. Today closeouts in the payload bay are under way and the payload bay doors will be closed Monday for the holiday down period. In the Vehicle Assembly Building, external tank and solid rocket booster closeouts continue. STS-96: Alcohol flushing of Discovery's auxiliary power units is complete. Workers are replacing the main engine No. 2 pitch actuator and replacing orbiter window No. 7 today. Next week, fuel cell voltage tests will be conducted. Discovery's payload bay doors will also be closed in preparation for the holiday down period. STS-101: Atlantis remains in VAB high bay 2 awaiting Columbia's move to the VAB in early January. OPF bay 3 will house Atlantis throughout the STS-101 processing flow. Workers have gained access to Atlantis' crew module to replace several ceiling panels during the temporary VAB storage period. STS-99: Endeavour is jacked and leveled in the OPF today, undergoing routine post-flight deservicing. Thorough inspections of the orbiter's exterior are complete, and engineers are reporting about 116 debris hits of which 25 are 1-inch or larger. Main engine bearing drying is complete and workers finished off-loading Endeavour's onboard cryogenics last night. Preparations are under way to open the orbiter's payload bay doors. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, December 18].]

◆ NASA's Kennedy Space Center has awarded The Boeing Company at KSC the final three-year contract extension for payload ground operations service. The value of this

option is $331.9 million which brings the total value of the 15-year contract to $1.8 billion. This contract extension is effective Jan. 1, 1999, and ends Dec. 31, 2001. This is the fifth and final extension of the payload ground operations contract awarded since the original contract was initiated in January 1987 with McDonnell Douglas Space and Defense Systems. Under the cost-plus-award-fee/incentive-fee performance based contract, The Boeing Company will continue to provide ground support, test and integration for payload operations at KSC. ["KSC extends The Boeing Company payload processing contract," **NASA News Release #169-98**, December 18, 1998.]

◆ P. Thomas Breakfield, III, Director of Safety and Mission Assurance at Kennedy Space Center and Joel R. Reynolds, KSC Safety Assurance Director, have announced their retirement from NASA. J. Chris Fairey will succeed Breakfield as director, and Ann D. Montgomery will move up to Deputy Director of Safety and Mission Assurance. This will form the Safety and Mission Assurance management team at KSC. ["Thomas Breakfield and Joel Reynolds retire from NASA; Chris Fairey and Ann Montgomery assigned to leadership positions," **NASA News Release #168-98**, December 18, 1998.]

◆ An experimental NASA rocket called the X-34 will make test flights from Kennedy Space Center starting in 2000, becoming the first new launch vehicle at KSC since the shuttles started flying in 1981, officials said. By next fall, Lockheed Martin is expected to pick three states as finalists to be the launch site for VentureStar, a next-generation spaceship that could replace NASA's shuttle fleet. To help lure VentureStar, KSC officials broke ground Friday for an $8 million complex that could serve as the hub for the X-34, VentureStar and other commercial space enterprises. The facility will feature a large hangar to house launch vehicles, a building to prepare satellites and experiments for liftoff, and administrative offices. NASA and Florida Spaceport Authority each put $4 million toward the cost of the new facility, and the state is spending another $1.6 million on recruitment campaign for VentureStar. The reusable spaceship is expected to hold the key to 21st century dominance in a global commercial launch industry that was worth $77 billion last year. Lockheed would build an assembly plant for its spaceships at the launch site as well, bringing an additional 2,000 jobs to the winning state. Officials say the promise of test flights for NASA's experimental X-34 is a good sign of more business to come. The X-34 is a small, winged rocket that is to be carried aloft by an airplane and launched in flight. But unlike any unmanned rocket before it, the X-34 is designed to return to Earth and land like an airplane. ["KSC lands X-34 site," **Florida Today**, December 19, 1998, p 1B & 4B.]

DECEMBER 21: NASA today set a new launch date for the Advanced X-ray Astrophysics Facility (AXAF), and announced that it will be renamed the Chandra X-ray Observatory in honor of the late Indian-American Nobel Laureate Subrahmanyan Chandrasekhar. The Chandra X-ray Observatory will be shipped to NASA's Kennedy Space Center, FL, on or before Jan. 28 and launched no earlier than April 8, 1999. The launch date will depend upon the actual shipping date and the results of a mid-February independent review of progress towards preparing the Cambridge, MA, operations center for launch. Chandra will be carried to space aboard the Space Shuttle Columbia on mission STS-93, commanded by astronaut Eileen Collins. The shipment of the spacecraft was delayed in mid-October so the prime contractor, TRW Space and Electronics Group, Redondo Beach, CA, could complete testing on flight software. ["NASA selects new name

and sets new launch date for Advanced Space X-Ray Telescope," **NASA News Release #170-98**, December 21, 1998.]

DECEMBER 22: Space Shuttle Status Report, Tuesday, December 22, 1998. STS-93: Columbia's payload bay doors were closed yesterday for the holiday down period. In the Vehicle Assembly Building, external tank and solid rocket boosters are in high bay 1 and closeouts will resume after the holidays. STS-96: Discovery's fuel cell voltage tests are complete. Replacement of the Shuttle main engine No. 2 pitch actuator is in work. Preparations for the holiday down period are also under way. STS-101: Atlantis remains in VAB high bay 2 awaiting Columbia's move to the VAB in early February. The orbiter's onboard tactical air command and navigation system (TACAN) is being installed. OPF bay 3 will house Atlantis throughout the STS-101 processing flow. Preparations are in work to secure the orbiter for the holidays. STS-99: Endeavour's post-flight deservicing continues. The Mighty SAT and ICBC payloads have been removed. Today, workers will close Endeavour's payload bay doors for the holiday down period. Bruce Buckingham. (1998). **Kennedy Space Center Space Shuttle Status Report** [Online]. Available E-mail: domo@news.ksc.nasa.gov/subscribe shuttle-status [1998, December 22].]

DECEMER 26: In a scientific first, a tiny microphone on NASA's Mars Polar Lander is to eavesdrop on the planet's surface. Scientists don't expect it to be noisy, but the microphone could capture blowing winds, the whistle of tiny tornadoes and the mechanical churnings of the robot explorer. Whatever the microphone does pick up will be shared with the world in 10-second sound bites on the Internet. ["Microphone will listen to Mars sounds," **Florida Today**, December 27, 1998, p 10A.]

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