

# **Chronology of KSC and KSC Related Events for 2005**

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## FOREWORD

This 2005 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.

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Engulfed by flames and smoke, NASA's Deep Impact spacecraft lifts off at 1:47 p.m. EST January 5, 2005, from Launch Pad 17-B, Cape Canaveral Air Force Station, Fla. A NASA Discovery mission, Deep Impact is heading for space and a rendezvous 83 million miles from Earth with Comet Tempel 1. After releasing a 3- by 3-foot projectile (impactor) to crash onto the surface July 4, 2005, Deep Impact's flyby spacecraft will reveal the secrets of the comet's interior by collecting pictures and data of how the crater forms, measuring the crater's depth and diameter as well as the composition of the interior of the crater and any material thrown out, and determining the changes in natural outgassing produced by the impact. It will send the data back to Earth through the antennas of the Deep Space Network.

## JANUARY 2005

### **January 1: Revamped Shuttle fuel tank begins trip to Space Coast**

Kennedy Space Center soon will have the missing piece it needs to assemble a space shuttle for launch this spring. The first redesigned external fuel tank, overhauled to prevent the kind of breakaway foam insulation that doomed Columbia, set out of its New Orleans port on Friday (December 31) morning bound for Florida. The 154-foot rust colored tank, lying horizontally on a giant barge, will float across the Mississippi River delta and Gulf of Mexico to the Florida Keys. Once around the southern tip of Florida, the barge will turn north along the Atlantic Coast, bound for Port Canaveral. The Lockheed Martin-built tank should arrive here sometime Wednesday. ["Revamped shuttle fuel tank begins trek to Space Coast," **Florida Today**, January 1, 2005, p 1A.]

### **January 4: New Aerospace Safety Advisory Panel Member**

Dr. Amy Donahue will join the Aerospace Safety Advisory Panel (ASAP), an independent organization advising NASA on the safety of operations, facilities, and personnel. Donahue replaces Dr. Rosemary O'Leary, who recently decided to step down from the panel. Under the Intergovernmental Personnel Act, Donahue serves as Senior Advisor to the NASA Administrator for Homeland Security. She also serves as a member of the Stafford-Covey Return to Flight Task Group, the independent panel overseeing NASA's implementation of the Columbia Accident Investigation Board recommendations. ["NASA Announces New Aerospace Safety Advisory Panel Member," **NASA News Release #05-003**, January 4, 2005.]

### **January 5: Deep Impact Spacecraft To Launch Aboard Delta 2**

Launch of NASA's Deep Impact spacecraft is scheduled for Jan. 12, 2005, at about 1:48 p.m. EST. Liftoff will occur aboard a Boeing Delta II rocket from Pad 17-B at Cape Canaveral Air Force Station, Fla. On July 4, 2005, the Deep Impact spacecraft will arrive at Comet Tempel 1. ["Deep Impact Spacecraft Launching Aboard Delta 2, January 12," **NASA News Release #02-05**, January 5, 2005.]

### **January 6: Elements In Place For Space Shuttle Return To Flight**

NASA marked a major milestone for the Space Shuttle's Return to Flight, as the redesigned External Tank rolled out today from the barge that carried it to the agency's Kennedy Space Center (KSC), Fla. The tank was taken to the Vehicle Assembly Building (VAB) for a final checkout. It will eventually be attached to the twin Solid Rocket Boosters and the Space Shuttle Discovery for its Return to Flight mission, STS-114. NASA and Lockheed Martin Corp. spent nearly two years modifying the 15-story, rust-colored tank to make it safer. Among dozens of changes is a redesigned forward bipod fitting to reduce the risk to the Shuttle from falling debris during ascent. Reducing the debris risk was a key recommendation of the Columbia Accident Investigation Board. The External Tank arrived at KSC after a 900-mile journey at sea. It departed NASA's Michoud Assembly Facility in New Orleans on Dec. 31. It was transported via Pegasus, NASA's specially designed barge. The Solid Rocket Booster retrieval ship Liberty Star brought the barge to Port Canaveral yesterday. The barge was moved by tugs to the KSC Turn Basin, the tank off-loaded and transported to the Vehicle Assembly Building. "The team here at KSC is tremendously excited to receive the final Shuttle element for the Return to Flight mission," said Mike Wetmore, director of Shuttle processing at KSC. "We have an experienced team in place that

will complete the final checkout and processing of the tank and prepare it for its final journey out to the launch pad before flight." The Return to Flight mission is targeted for a launch window beginning in May. The seven-member Discovery crew will fly to the International Space Station primarily to test and evaluate new procedures for flight safety, Shuttle inspections and repair techniques. ["All NASA Elements In Place For Space Shuttle Return To Flight," **NASA News Release #05-006**, January 6, 2005.]

#### **Student pilot questioned after violating NASA airspace**

A student pilot believed to be from Vero Beach told officials that he was lost in a cloud bank on his way to St. Augustine Airport when he wound up in restricted air space over Cape Canaveral. The pilot corrected course and landed the Piper PA-28-161 at St. Augustine on Thursday, where he was met by deputies with the St. Johns County Sheriff's Office. Web posted. (2005). [Student pilot questioned after violating NASA airspace [Online]. Available WWW: <http://www.floridatoday.com/> [2005, January 7].]

#### **NASA Names New Exploration Systems Directorate Deputy**

Steve Isakowitz has been selected as the Deputy Associate Administrator for the Exploration Systems Mission Directorate. He is currently NASA's Comptroller. Isakowitz will assist with setting priorities, directing the identification, development and validation of exploration systems, and the related technologies needed to support the Vision for Space Exploration. ["NASA Names New Exploration Systems Directorate Deputy," **NASA News Release #05-008**, January 6, 2005.]

#### **Space policy goes private**

The White House released its new space-transportation policy Thursday, a blueprint that emphasizes the administration's support for a long-term move toward commercializing large parts of the industry. In the first wholesale revision of the policy since 1994, the administration orders the Defense Department and NASA to work closely in determining the long-term plan for funding and using heavy-lift rockets being developed by the military for satellites and other unmanned missions. Ultimately, the policy calls for the two agencies to recommend to the president the best option for an even bigger rocket to replace the space shuttle for future manned flights. ["Space policy goes private," **Orlando Sentinel**, January 7, 2005, p A17.]

#### **January 7: Space Shuttle Processing Status Report**

Discovery (OV-103); During the holiday period, technicians completed a tremendous amount of work in preparation for Discovery's Return to Flight mission, designated STS-114, to the International Space Station. Closeouts continue of the Reinforced Carbon-Carbon (RCC) panels and carrier panels, a Thermal Protection System between the RCC and the orbiter structure allowing technicians access to the area. The new Orbiter Boom Sensor System (OBSS) arrived at Kennedy Space Center on Dec. 22, 2004 and was taken to the Remote Manipulator System lab in the Vehicle Assembly Building (VAB) for final checkout and testing prior to moving over to the Orbiter Processing Facility (OPF) for installation into Discovery. The 50-foot long OBSS will attach to the Remote Manipulator System, or Shuttle robotic arm, and is one of the new safety measures for Return to Flight, equipping the orbiter with cameras and laser systems to inspect the Shuttle's Thermal Protection System while in space. The redesigned External Tank for the STS-114 mission arrived at KSC on Jan. 5 and was moved to the VAB for final processing prior to being attached to the

Solid Rocket Boosters for flight. Atlantis (OV-104); Technicians also completed a tremendous amount of work in preparation for Atlantis' Return to Flight mission. In OPF Bay 1, Atlantis was powered-up on Dec. 29, 2004, following an extensive power down period to complete the final wiring for the Return to Flight modifications, including the new OBSS, wing leading edge sensors and the External Tank separation camera. Radiator ground support equipment is installed and connections are in work in preparation for radiator functionals. Thermal Protection System blanket installation continues in the Forward Reaction Control System cavity. Checkout of the new wing leading edge instrumentation was completed. Rudder Speed Brake actuators and panels have been installed, and measurements have been taken. The drive lock is scheduled to be installed next. Endeavour (OV-105); Space Shuttle Endeavour is in its Orbiter Major Modification period, which began in December 2003. Endeavour is in the Vehicle Assembly Building for a temporary stay, clearing OPF Bay 2 for a scheduled maintenance period. The orbiter is scheduled to be rolled back into the bay on Jan. 12. Owner-press-release. (2005). **Space Shuttle Processing Status Report S2-01** [Online]. Available E-mail: owner-press-release@spinoza.public.hq.nasa.gov [2005, January 7].]

### **Astronaut Confident Shuttle Will Be Safe**

The astronauts who will make NASA's first shuttle flight since the Columbia disaster said Friday they are confident it will be a safe voyage, and while they won't be able to fix a hole the size of the one that doomed Columbia, they will have options the last crew did not. "There has been so much testing done that our confidence has gone way up," said Air Force Col. Eileen Collins, commander of the mission aboard Discovery. She noted that she and her crew have been "very, very heavily involved" in the day-to-day flight preparations and decision-making. The seven astronauts will also have the international space station as a haven, if their shuttle is damaged beyond repair by fuel-tank debris. Collins, the only woman to command a space shuttle flight, said "It's time for us to go fly." The astronauts traveled to Kennedy Space Center from Houston to view the redesigned external fuel tank that will propel them to orbit as early as May. They also got a look at the new inspection boom that they will use in space to scour their ship's belly and wings for any damage. Web posted. (2005). [Astronaut confident shuttle will be safe [Online]. Available WWW: <http://www.cnn.com/> [2005, January 7].]

### **KSC engineer meets astronauts before leaving for Iraq**

Kennedy Space Center engineer Bill McQuade said he felt honored to meet the shuttle crew Friday, not long before he ships out to Iraq. McQuade, who lives in Titusville with wife Caroline and one of his two daughters, is in the Army Reserve and will work for the Judge Advocate General corps in Baghdad. "For NASA I'm an engineer, but for the Army, I'm an attorney," he said. He's received word that he will soon get deployment orders. He works on fuel cells for Discovery, the orbiter that Eileen Collins and her crew will fly, perhaps by this spring, in the first flight since the Columbia accident. He'll have to watch their flight from halfway across the world. ["KSC engineer meets astronauts before leaving for duty in Iraq," **Florida Today**, January 8, 2005, p 8A.]

### **Delta 4 engines suffers sensor glitch**

Errant readings from sensors inside the inaugural Boeing Delta 4-Heavy rocket triggered the premature shutdown of its three main engines during ascent last month, causing a massive underspeed that the vehicle's upper stage could not overcome and resulting in a final orbit

lower than planned, the U.S. Air Force said Friday. A team investigating results of the test launch are confident the problem can be resolved. Web posted. (2005). [Delta 4-Heavy's engines snuffed out by sensor glitch [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, January 7].]

### **Orlando fails bid for NASA center**

Orlando is out of the running for a lucrative business-services center NASA plans to open later this year, the agency announced Friday. Through several delays and a complete change in the rules of the competition, government and economic-development officials from throughout Central Florida had coveted the planned Shared Services Center. They were enticed by the prospect of almost 500 jobs, paying an average of \$50,000 a year, and long-term plans for as many as 1,500 workers. But of the six cities competing, only Huntsville, Ala.; Brook Park, Ohio, near Cleveland; and southwest Mississippi remain in contention. NASA plans to award a contract for the center in May. ["Orlando fails to woo bidders for NASA center," **Orlando Sentinel**, January 8, 2005, p A1.]

### **January 10: Veteran shuttle leader retires**

The only U.S. astronaut to command five space flights has retired to pursue other interests, NASA announced Tuesday. James Wetherbee, 52, flew about the space shuttle six times and most recently worked at the Johnson Space Center in Houston with a technical authority which identifies and analyzes possible hazards, and determines launch readiness. He retired from the agency Jan. 3. ["Veteran shuttle leader retires," **Florida Today**, January 12, 2005, p 7A.]

### **January 12: Endeavour Maintenance Slips**

According to NASA sources, tomorrow (13 Jan) the PRCB (Program Requirement Control Board) will be told that OV-105 (Endeavour) maintenance will not be completed in time to support the STS-117 launch. A schedule slip of approximately 4 months will be identified. KSC has adjusted its resources to support preparation of OV-103 (Discovery) and OV-104 (Atlantis) for flight and is going to go to a 24/7 schedule to support the STS-114/STS-300 Rescue missions and STS-121. In addition, charts will be presented at the PRCB suggesting a waiver of the 3 year period between major maintenance overhauls for OV-104 so as to allow more flights to compensate for the lack of a flight-ready OV-105. Web posted. (2005). [Endeavour Maintenance Slips [Online]. Available WWW: <http://www.nasawatch.com/> [2005, January 12].]

### **NASA's Deep Impact Launched**

NASA's Deep Impact spacecraft was launched aboard a Boeing Delta 2 rocket at 1:47:08 p.m. EST today from Cape Canaveral Air Force Station, SLC-17B, to Comet Tempel 1. The mission will use an impactor to blast the comet. The mothership will study the impact and provide the first view inside a comet. The rocket flew in the 7925 vehicle configuration. Launch was delayed from Dec. 30 to give more time for launch preparations and delayed from Jan. 8, to replace interstage components on the rocket. Web posted. (2005). [Mission Status Center [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, January 12].]



### **NASA not worried by craft shutdown**

A comet-chasing NASA spacecraft went into a protective standby mode after launch Wednesday, but officials said the problem won't threaten its \$330 million mission. The Deep Impact spacecraft, which is destined to smash into Comet Tempel 1 on July 4, automatically shut down all but essential systems within an hour of launch from Cape Canaveral Air Force Station. The reason: Fault protection software detected higher-than-expected temperatures in the spacecraft's propulsion system. NASA officials said the problem likely will be fixed quickly. Deep Impact's power-producing solar arrays were deployed and locked into place, and the spacecraft had turned itself toward the sun. That means spacecraft batteries will automatically charge, which is key to keeping the probe alive while engineers attempt to resolve the problem. Web posted. (2005). [NASA not worried by craft shutdown [Online]. Available WWW: <http://www.floridatoday.com/> [2005, January 12].]

### **January 13: Fire Extinguished Inside VAB**

At approximately 2 p.m. today, emergency fire fighting crews responded to a fire on the low bay roof in the Vehicle Assembly Building that sent smoke into the electrical duct area of D tower in the Launch Complex 39 area. There were no injuries and no damage to space flight hardware. Kennedy Space Center fire and rescue personnel quickly responded to the scene. As a precautionary measure, 270 employees were evacuated from the building. The KSC on-scene commander reported the fire out at 4:15 p.m. after a sweep of the area. The cause of the incident is under investigation and more information will be released as it becomes available. ["Fire Extinguished Inside Vehicle Assembly Building," **NASA News Release #07-05**, January 13, 2005.]

### **Spacecraft jolts into action**

A NASA spacecraft destined to collide with a comet and photograph the aftermath was awakened from a protective sleep mode Thursday as it zipped toward a celestial July 4 fireworks show. A day after the Deep Impact spacecraft launched from Cape Canaveral, ground controllers sent up computer commands that turned on all systems, and the interplanetary probe was deemed to be in good health. ["Spacecraft jolts into action," **Florida Today**, January 14, 2005, p 1A & 3A.]

### **January 14: Space Shuttle Processing Status Report**

Discovery (OV-103); Technicians continue system testing in support of Discovery's roll over to the Vehicle Assembly Building (VAB) in March for the Return to Flight mission, designated STS-114, to the International Space Station. The dome mounted heat shields, the semi-circle sections of Thermal Protection System tile that are bolted around the engine interfaces, have been installed for flight. The new Orbiter Boom Sensor System (OBSS) is in the Remote Manipulator System lab in the VAB for final checkout and testing. It is scheduled to be moved over to the Orbiter Processing Facility (OPF) and installed on Discovery next week. The 50-foot-long OBSS will attach to the Remote Manipulator System, or Shuttle robotic arm, and is one of the new safety measures for Return to Flight, equipping the orbiter with cameras and laser systems to inspect the Shuttle's Thermal Protection System while in space. Stacking of the Solid Rocket Boosters for the STS-114 mission is complete and the team is continuing with closeouts. Following the arrival of the redesigned External Tank at Kennedy Space Center on Jan. 5, the tank was moved to the VAB and lifted into the checkout cell for final processing. Technicians are beginning

preparations for the aft hard-point closeout spray and should begin that task this weekend. Atlantis (OV-104); Processing of Atlantis for its mission to the International Space Station continues to progress well with orbiter system testing now under way. The Rudder Speed Brake actuators and panels are installed and the optics checks are complete and good. Fuel cells No. 2 and 3 are installed. Fuel cells use oxygen and hydrogen to provide electrical power and water during a mission. The airlock is scheduled for installation this weekend and the Forward Reaction Control System will be installed as early as next week. Endeavour (OV-105); Space Shuttle Endeavour is in its Orbiter Major Modification period, which began in December 2003. Endeavour was moved from the Vehicle Assembly Building back to the Orbiter Processing Facility on Jan. 12 following the completion of a scheduled maintenance period in the bay. When Endeavour was rolled back into the bay, there was a technical problem with the communications equipment and the tug driver did not clearly hear the "stop" command. The orbiter rolled 2-4 inches past its normal location and one tile on the leading edge of the vertical stabilizer came into contact with a work platform. There was no structural damage, and the tile will be repaired. Owner-press-release. (2005). **Space Shuttle Processing Status Report S05-002** [Online]. Available E-mail: owner-press-release@spinoza.public.hq.nasa.gov [2005, January 14].]

### **NASA: Space plans to firm up**

The nation this year will get its first glimpse of the spaceships and rockets that will replace the shuttles and carry astronauts back to the moon, top NASA leaders said Friday. A series of vital decisions this year – the first of which will be made this month – will provide Florida’s Space Coast with telling clues about whether Kennedy Space Center will remain America’s gateway to the solar system. The agency will pick two industry teams this summer to build prototypes of the Crew Exploration Vehicle, a transport ship expected to replace NASA’s three remaining shuttle orbiters. Also in store: decisions about what kind of launch vehicle will rocket crews and cargos to the moon. That will provide a strong indication of whether those expeditions will blast off from KSC, Cape Canaveral Air Force Station or elsewhere. “This is a major decision,” said Craig Steidle, chief of NASA’s exploration systems office. Steidle joined outgoing NASA Administrator Sean O’Keefe in a visit to KSC on the one-year anniversary of a speech in which President Bush set the course for the future of the nation’s human space exploration program. The initiative calls for NASA to complete construction of the International Space Station and retire the shuttles by 2010. A series of robotic scout missions will start flying to the moon in 2008, and astronauts would return to the lunar surface between 2015 and 2020. Web posted. (2005). [NASA: Space plans to firm up [Online]. Available WWW: <http://www.floridatoday.com/> [2005, January 14].]

### **January 17: Hall of Fame to induct pilot, spacewalkers**

An early Space Shuttle test pilot and two pioneering spacewalkers have been selected by a committee of their peers and colleagues to be inducted this April into the U.S. Astronaut Hall of Fame in Florida. Announced late last week by the Astronaut Scholarship Foundation, which oversees the selection, the 2005 class of inductees are the fourth group of Space Shuttle fliers to be honored with inclusion in the Hall, which opened in 1990, and counts all Mercury, Gemini, Apollo and Skylab astronauts among its 57 members. The 2005 inductees are Joseph Allen, Gordon Fullerton, and Bruce McCandless. Web posted. (2005). [Hall of Fame to induct pilot, spacewalkers [Online]. Available WWW: <http://www.collectspace.com/> [2005, January 17].]

**January 18: Workers shift to Discovery, Atlantis**

Shuttle Endeavour is on the back burner, temporarily. In a bid to make sure that shuttle Discovery and rescue-vehicle Atlantis are ready to fly by the May 14 to June 3 launch window, NASA is shifting workers and resources from Endeavour's overhaul work to processing the two vehicles first in line to fly. "Those are the vehicles we need to fly first," said Bill Readdy, the former astronaut who is the top manager for human spaceflight at the agency's headquarters in Washington, D.C. Atlantis and Discovery are set to fly the first four missions this year and next – two flights to prove their design and safety changes and then two to restart the construction of the International Space Station. Endeavour's first intended flight would be the fifth, STS-117, sometime in 2006, although NASA could alter its plans. Workers who have been toiling on Endeavour are reassigned to Discovery and Atlantis to help NASA catch up on some processing work that had fallen slightly behind schedule – for example, because of work days lost to the multiple hurricane shutdowns at the space center. Readdy said that while the shift could mean a months-long delay for Endeavour's processing to return to flight, that's not certain, and it's a small trade-off amid far more important goals for the entire shuttle program. The impact, he said during a visit to the Kennedy Space Center last week, is minimal. Web posted. (2005). [Workers shift to Discovery, Atlantis [Online]. Available WWW: <http://www.floridatoday.com/> [2005, January 18].]

**January 19: Expendable Launch Vehicle Status Report**

Mission: Deep Impact; Launch Vehicle: Boeing Delta II 7925; Launch Pad: Pad 17-B, Cape Canaveral Air Force Station, Fla.; Launched: January 12, 2005. The launch of the Deep Impact spacecraft occurred successfully aboard a Boeing Delta II rocket at 1:47:08.574 p.m. EST on Jan. 12. The spacecraft was brought out of safe mode on Jan. 13 and is functioning normally. Spacecraft checkout is under way. The first course adjustment maneuver is scheduled to occur as planned Feb. 11, which will be 30 days after launch. The overall Deep Impact mission management for this Discovery class program is conducted by the University of Maryland in College Park, Md. Deep Impact project management is handled by the Jet Propulsion Laboratory in Pasadena, Calif. The spacecraft was built for NASA by Ball Aerospace and Technologies Corporation. Mission: Demonstration of Autonomous Rendezvous Technology (DART); Launch Vehicle: Pegasus XL (Orbital Sciences Corporation); Launch Date: March 2, 2005 NET; Launch Window: 9:35 a.m. - 9:42 a.m. PST. The payload test team is finalizing its review of the Pegasus second-stage loads data, or G-force the DART payload may experience during launch. The additional analysis is being done to ensure mission success. In the Orbital Sciences Pegasus hangar at Vandenberg Air Force Base, Calif., launch vehicle processing activities have resumed. Launch is scheduled for no earlier than March 2, subject to availability of downrange tracking assets. Testing of the launch vehicle Reaction Control System (RCS) regulator is under way this week. This is being done after some minor leakage of gaseous nitrogen was detected and the regulator was repaired. Though the payload fairing was removed, the DART spacecraft has remained mated to the Pegasus XL launch vehicle since the stand-down. The fairing is scheduled to be enclosed around DART once again on Feb. 23-24. The Pegasus XL is scheduled to be mated to the Orbital Sciences L-1011 carrier aircraft on Feb. 26. DART was designed and built for NASA by Orbital Sciences Corporation as an advanced flight demonstrator to locate and maneuver near an orbiting satellite. The DART spacecraft weighs about 800 pounds, is 6 feet long and 3 feet in diameter. The Orbital Sciences Pegasus XL vehicle will launch DART into a circular polar orbit of 475 miles. DART project management is the responsibility of

NASA's Marshall Space Flight Center and the NASA launch management is the responsibility of the Kennedy Space Center's Launch Services Program. Mission: NOAA-N (National Oceanic & Atmospheric Administration); Launch Vehicle: Boeing Delta II 7320; Launch Pad: SLC-2, Vandenberg Air Force Base, Calif.; Launch Date: March 19, 2005; Launch Window: 2:22:01 - 2:32:01 a.m. PST. The NOAA-N spacecraft arrived at Vandenberg Air Force Base at 10 a.m. PST on Jan. 13 from the Lockheed Martin plant in Sunnyvale, Calif. It was taken to NASA spacecraft processing hangar 1610 located on North Vandenberg Air Force Base. The spacecraft was unloaded from its transporter and placed onto an assembly and test stand. It was mated to the Delta II payload attach fitting on Jan. 15. Mechanical and electrical ground support equipment was set up and the necessary connections were made with the spacecraft. Spacecraft battery conditioning is now under way. The erection of the Boeing Delta II launch vehicle at Space Launch Complex 2 began on Jan. 12 with the erection of the first stage and interstage adapter. The three strap-on solid rocket boosters were attached to the vehicle on Jan. 17. The second stage is scheduled to be hoisted atop the first stage later this week. After launch, NOAA-N will be renamed NOAA-18 and will provide measurements of the Earth's surface and atmosphere that will be entered into NOAA's weather forecasting models and used for other environmental studies. Each day, the satellite will send data to NOAA's Command and Data Acquisition station computers, adding vital information to forecasting models, especially over the oceans, where conventional data is lacking. Launch management is the responsibility of the NASA Kennedy Space Center Launch Services Program office. KSC News Center (2005). **Expendable Launch Vehicles Status Report** ELV-011905 [Online]. Available E-mail: [ksc@newsletters.nasa.gov](mailto:ksc@newsletters.nasa.gov) [2005, January 19].]

**January 20: Cape launch site could host commercial rockets**

As Lockheed Martin's Atlas program prepares to fly away from Cape Canaveral's Complex 36, an advanced breed of rockets being developed by a self-made millionaire is expected to breathe new life into the historic site. Space Exploration Technologies Corp., founded by Elon Musk, is seeking to lease the two-pad facility that opened in the 1960s and will host its 145<sup>th</sup> and final Atlas rocket launch next week. SpaceX has begun a year-long bureaucratic safety and environmental review that will, if all goes well, lead to a rejuvenation of the pads to support the Falcon 1 and Falcon 5 rockets. The two-stage, small-satellite launcher Falcon 1 will call pad 36A its Florida home. That is Complex 36's northern pad, which has been active since 1962. The larger, more powerful Falcon 5 is headed for the site's pad 36B that entered service in 1965. SpaceX which named its rockets after the Star Wars Millennium Falcon, already has launch sites at Vandenberg Air Force Base in California and the U.S. government's South Pacific Kwajalein locale in the Marshall Islands. Web posted. (2005). [Cape launch site could host new commercial rocket fleet [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, January 20].]

**Shuttle surface more vulnerable than suspected**

The space shuttle's skin is turning out to be even more fragile than ANSA engineers thought, its scientists and engineers say. Impact tests and analysis performed as part of the return-to-flight effort show that pieces of insulating foam that weigh less than a half an ounce can cause small cracks and damage to the surface coating on the heat-resistant panels on the leading edge of the wing, agency officials said this week. They said the foam pieces could, under the heat of re-entry into the atmosphere, lead to the kind of damage that destroyed the shuttle Columbia two years ago. John Muratore, the manager of systems

engineering and integration for the space shuttle program, said the agency had figured out how to keep pieces even that small from hitting the orbiter by refining the process of applying the foam to the tank. Web posted. (2005). [Shuttle Surface More Vulnerable Than Suspected [Online]. Available WWW: <http://www.nytimes.com/> [2005, January 20].]

### **January 21: Space Shuttle Processing Status Report**

Discovery (OV-103); Mission: STS-114; 17th ISS Flight (LF1) - Multi-Purpose Logistics Module; Vehicle: Discovery (OV-103); Location: Orbiter Processing Facility Bay 3; Launch Date: Launch Planning Window May 12 - June 3, 2005 Launch Pad: 39B; Crew: Collins, Kelly, Noguchi, Robinson, Thomas, Lawrence and Camarda; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Processing continues in the Orbiter Processing Facility (OPF) for Return to Flight mission (STS-114) to the International Space Station. Testing of the thousands of systems onboard Discovery is 80 percent complete. Preparations for leak tests of the crew module were performed yesterday. Main Propulsion System leak checks are complete. Following final checkout, testing and installation of the avionics box, the new Orbiter Boom Sensor System (OBSS) was transferred from the Remote Manipulator System lab in the Vehicle Assembly Building (VAB) to the OPF Thursday. The boom is scheduled for installation into the starboard side of Discovery's payload bay early next week. The 50-foot-long OBSS will attach to the Remote Manipulator System Shuttle robotic arm. It is one of the new safety measures for Return to Flight, equipping the orbiter with cameras and laser systems to inspect the Shuttle's Thermal Protection System while in space. In integrated operations in the VAB, the team is working final closeouts of the stacked Solid Rocket Boosters for STS-114. The External Tank (ET) is located in the checkout cell, and technicians have completed the aft hard-point closeout foam spray. The aft hard-point is an area of the tank where the ET is mated to the transporter. ATLANTIS (OV-104); Mission: STS-121; 18th ISS Flight (ULF1) - Multi-Purpose Logistics Module/Crew Rotation; Vehicle: Atlantis (OV-104); Location: Orbiter Processing Facility Bay 1; Launch Date: Launch Planning Window July 12 - August 3, 2005; Launch Pad: 39B; Crew: Lindsey, Kelly, Sellers, Fossum, Nowak and Wilson; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Technicians continue processing Atlantis for its mission to the International Space Station. Orbiter system testing is well under way. The airlock was installed on Monday, and the hatch functional test was successfully completed. The left inboard, left outboard and right inboard body flap actuators are installed for flight. Fuel cell electrical connections are nearing completion. Fuel cells use oxygen and hydrogen to provide electrical power and water during a mission. Atlantis' Forward Reaction Control System was moved to the OPF Wednesday for installation on the vehicle. Freon coolant loop No. 2 servicing is complete. Wing leading edge sensor installation and wiring modifications for the ET camera continue. Endeavour (OV-105); Space Shuttle Endeavour is in its Orbiter Major Modification period, which began in December 2003. Owner-press-release. (2005). **Space Shuttle Processing Status Report** S05-003 [Online]. Available E-mail: [owner-press-release@spinoza.public.hq.nasa.gov](mailto:owner-press-release@spinoza.public.hq.nasa.gov) [2005, January 21].]

### **January 25: Team to take charge of NASA shuttle safety**

Newly appointed technical gurus will take the ultimate responsibility for shuttle-safety issues, NASA officials told workers at Kennedy Space Center on Tuesday. The "warrant holders" are accountable for their areas of expertise under the Independent Technical Authority, which NASA established at the behest of the Columbia Accident Investigation Board. The Independent Technical Authority will encourage more analysis of potential hazards while



signing off on safety, said Bryan O'Connor, NASA's head of safety and mission assurance. Web posted. (2005). [Team to take charge of NASA shuttle safety [Online]. Available WWW: <http://www.floridatoday.com/> [2005, January 25].]

### **January 26: Expendable Launch Vehicles Status Report**

Mission: Demonstration of Autonomous Rendezvous Technology (DART); Launch Vehicle: Pegasus XL (Orbital Sciences Corporation); Launch Date: TBD; Launch Window: TBD. In the Orbital Sciences Corporation hangar at Vandenberg Air Force Base, Calif., a leak was observed last week during testing of the gaseous nitrogen regulator associated with the Pegasus launch vehicle's Reaction Control System (RCS). The regulator is used to maintain proper pressure in the RCS during flight. The regulator must be removed and replaced. It is located within the forward portion of the Pegasus third stage. On Tuesday, DART was removed from the Pegasus to obtain access to the regulator. The spacecraft has been rotated to a vertical position, moved to a clean room and placed on a test stand. A new launch date has not been determined. A revised schedule is being developed and should be finished next week with an assessed date for launch management coordination. Mission: NOAA-N (National Oceanic & Atmospheric Administration); Launch Vehicle: Boeing Delta II 7320; Launch Pad: SLC-2, Vandenberg Air Force Base, Calif.; Launch Date: March 19, 2005; Launch Window: 2:22:01 - 2:32:01 a.m. PST. In California, processing of the NOAA-N weather satellite continues on schedule in NASA spacecraft processing hangar 1610 located on North Vandenberg Air Force Base. The Spacecraft Electrical Performance Test is currently under way. Battery conditioning was completed as scheduled last week. The Solar Array Illumination Telemetry Test is scheduled for Feb. 4. The final instrument inspections and associated instrument close-outs for flight will be performed Feb. 15-16. The spacecraft is currently scheduled to be taken to the launch pad to be mated with the Delta II rocket on Feb. 25. At Space Launch Complex 2, the first power-on testing of the Boeing Delta II launch vehicle is scheduled to begin on Jan. 31. The Vehicle Guidance and Control Qualifications, which are tests of the Delta II guidance and control systems, are scheduled for Feb. 7. The First Stage Liquid Oxygen "LOX" Leak Checks, a countdown test that involves loading liquid oxygen aboard the first stage and also serves as a countdown certification for the launch team, will be held on Feb. 11. The build-up of the Boeing Delta II at the pad began on Jan. 12 with the erection of the first stage and interstage adapter. The three strap-on solid rocket boosters were attached to the vehicle on Jan. 17. The second stage was hoisted atop the first stage on Jan. 20. After launch, NOAA-N will be renamed NOAA-18 and will provide measurements of the Earth's surface and atmosphere that will be entered into NOAA's weather forecasting models and used for other environmental studies. The spacecraft will be turned over from NASA to NOAA after on-orbit checkout is complete. KSC News Center (2005). **Expendable Launch Vehicles Status Report** ELV-012605 [Online]. Available E-mail: [ksc@newsletters.nasa.gov](mailto:ksc@newsletters.nasa.gov) [2005, January 26].]

### **NASA: Shuttle mission to space station in December**

NASA confirmed to its international space station partners on Wednesday that it plans to return the U.S. space shuttle to flight this year with test launches in the late spring and late summer and to resume assembly of the orbital complex starting with a shuttle flight in December. Meeting in Montreal, the heads of the five space agencies building the station: United States, Russia, Europe, Japan and Canada, said they were confident the station's assembly would be completed by the end of the decade. Attending his last heads-of-agencies meeting before he leaves NASA, Sean O'Keefe said NASA is committed to delivering its

partners' hardware to the station before the shuttle is retired. He repeated the U.S. goal of taking the shuttle out of service in 2010 after performing "the fewest number of flights" as needed to meet NASA's obligations to station construction. Web posted. (2005). [NASA: Shuttle mission to space station in December [Online]. Available WWW: <http://www.floridatoday.com/> [2005, January 28].]

### **State fears losing grip on space**

Industry and agency leaders Wednesday laid out the case to lawmakers for state help to keep Florida's leading position in space matters. First is to recognize that Florida doesn't have a lock on its pre-eminent position. Fourteen other states with space activities are "nipping at our heels," said Winston Scott, director of the Florida Space Authority. "It's imperative we in Florida realize how stiff the competition is." Among the keys: incentives for industry to build near the Kennedy Space Center, develop cheaper commercial launch-range services and encourage space tourism initiatives. In the short term, KSC director Jim Kennedy hinted at positive elements of President Bush's federal budget proposal, due out in February. Kennedy said four of NASA's 10 centers will have layoffs in the next year. KSC is not among them. There will be 280 new hires at KSC, he said. But as the nation's space program phases out the shuttle program, the next six years mark a critical period for Florida. Scott said the biggest growth in the space industry in the next decade would come from small commercial launches and private space flight. ["State fears losing grip on space," **Florida Today**, January 27, 2005, p 10B & 9B.]

### **January 27: NASA Remembrance Day**

Administrator Sean O'Keefe designated the last Thursday in January as NASA Remembrance Day, a day for the entire NASA family to take a moment to remember those who died in the pursuit of space exploration. This year NASA Remembrance Day is Thurs., January 27. Please pause for a few moments at 1:58 p.m. that day to remember all those who have given their lives in pursuit of the dream of going to the stars, including the crews of Apollo 1, Space Shuttle Challenger and Space Shuttle Columbia. E-mail distribution. (2005). [KSCDailyNews @kscems.ksc.nasa.gov] [Electronic]. **KSC Daily News – 1/28/05**, Re: "NASA Remembrance Day Is Today," [January 27, 2004.].]

### **Panel: Keeping skilled workers a major concern**

NASA should be concerned not only with flying shuttles but also with keeping skilled workers and contractors and preparing facilities for the next generation of spaceships, a safety oversight panel said Thursday. The Aerospace Safety Advisory Panel, which met at the Florida Space Authority in Cape Canaveral, pointed out it may be difficult to keep employees as the shuttle program winds down during the next decade and the next vehicle is developed. The panel had positive things to say about NASA's new Independent Technical Authority. Experts within the authority have the final say when it comes to making safety decisions and issuing waivers. Kennedy Space Center is busy with construction, post-hurricane repairs and preparations for return to flight, the panel members found during their visit. Web posted. (2005). [Panel: Keeping skilled workers a major concern [Online]. Available WWW: <http://www.floridatoday.com/> [2005, January 27].]

### **January 28: Space Shuttle Processing Status Report**

Mission: STS-114 - 17th ISS Flight (LF1) - Multi-Purpose Logistics Module; Vehicle: Discovery (OV-103); Location: Orbiter Processing Facility Bay 3; Launch Date: Launch

Planning Window May 12 - June 3, 2005; Launch Pad: 39B; Crew: Collins, Kelly, Noguchi, Robinson, Thomas, Lawrence and Camarda; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. In Orbiter Processing Facility (OPF) bay 3, processing continues to progress well for Discovery's Return to Flight mission, designated STS-114, to the International Space Station. Orbiter Maneuvering System redundant electrical circuit verification testing is complete. Rudder Speed Brake cove panel installation is complete, and work is under way to complete the seal and Thermal Protection System blanket installation. On Jan. 24, the new Orbiter Boom Sensor System (OBSS) was installed into the starboard side of Discovery's payload bay. Measurements of the boom and Remote Manipulator System camera clearance checks are complete. The 50-foot-long OBSS will attach to the Remote Manipulator System, or Shuttle robotic arm, and is one of the new safety measures for Return to Flight, equipping the orbiter with cameras and laser systems to inspect the Shuttle's Thermal Protection System while in space. In the Vehicle Assembly Building, the Solid Rocket Boosters for the STS-114 mission are stacked on the Mobile Launcher Platform and final closeouts continue. Right-hand External Tank attach ring foam application is complete. The Return to Flight External Tank, ET-120, is located in the checkout cell and technicians are nearly complete with the electrical checkouts. The External Tank is scheduled to be moved to the integration cell and mated with the Solid Rocket Boosters on Feb. 9. Mission: STS-121 - 18th ISS Flight (ULF1) - Multi-Purpose Logistics Module/Crew Rotation; Vehicle: Atlantis (OV-104); Location: Orbiter Processing Facility Bay 1; Launch Date: Launch Planning Window July 12 - August 3, 2005; Launch Pad: 39B; Crew: Lindsey, Kelly, Sellers, Fossum, Nowak and Wilson; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Technicians continue to process Atlantis in Orbiter Processing Facility bay 1 for its mission to the International Space Station. Preparations are under way to service water coolant loop No. 1, with servicing scheduled for this weekend. The body flap actuator installation continues with three of the four actuators installed. The left-hand Orbiter Maneuvering System (OMS) pod was removed Thursday and will be moved to the Hypergol Maintenance Facility early next week. The pod was removed so that inspections could be performed on the thrusters. Following thorough inspections of the thrusters on another OMS pod, it will be transferred to the bay for installation on the vehicle. The aft flight desk mission and event timer was installed on Wednesday. The drive shafts for the Manipulator Positioning Mechanisms that will support the new Orbiter Boom Sensor System were installed on the starboard side of Atlantis' payload bay. Endeavour (OV-105); Space Shuttle Endeavour is in its Orbiter Major Modification period, which began in December 2003. Owner-press-release. (2005). **Space Shuttle Processing Status Report S05-04** [Online]. Available E-mail: [owner-press-release@spinoza.public.hq.nasa.gov](mailto:owner-press-release@spinoza.public.hq.nasa.gov) [2005, January 28].]

### **Mahone Named Acting Chief of Strategic Communications**

NASA Administrator Sean O'Keefe has named Glenn Mahone as the agency's Acting Chief of Strategic Communications, effective immediately. Mahone currently serves as Assistant Administrator for Public Affairs and Senior Advisor to the Office of the Administrator. As head of strategic communications, Mahone's primary responsibility will be to develop NASA wide communication strategies to better communicate the agency's mission of exploration and discovery with a variety of internal and external audiences. ["Glenn Mahone Named Acting Chief of Strategic Communications," **NASA News Release #05-032**, January 28, 2005.]



### **Shuttle's return-to-flight panel issues third report**

The panel overseeing NASA's progress toward safely returning the shuttles to flight wants to make sure people understand its members are not the ones that will give the "go" for launch. The Stafford-Covey Return To Flight Task Group issued its third report and, in doing so, made its strongest statement yet that the members of the panel are not ruling on whether it's safe to fly shuttles. Instead, the panel is only reviewing NASA's progress on implementing the 15 specific recommendations of the Columbia Accident Investigation Board, plus the agency's effort to stage a rescue mission. The panel's report indicates that while NASA may not achieve each individual recommendation, as a whole, the agency is making progress on the broader goals of reducing the risk of shuttle flights. The report is available online at [www.returntoflight.org](http://www.returntoflight.org). Web posted. (2005). [Shuttle's return-to-flight panel issues third report [Online]. Available WWW: <http://www.floridatoday.com/> [2005, January 28].]

### **January 31: Countdown ticks for shuttle liftoff**

A pair of 149-foot booster rockets already are stacked inside the Vehicle Assembly Building at the Kennedy Space Center. A redesigned external fuel tank is ready to be connected to them next week. Workers will hoist orbiter Discovery into position early next month and, a little over a week later, they'll roll the shuttle out to the launch pad. Atlantis, being readied to fly a rescue mission if need be, is not far behind. Two years after the Columbia accident, KSC finally is prepping shuttles for launch again and NASA plans test flights in May and July before resuming construction of the International Space Station in December. Clearly, the long hiatus at America's human spaceport is nearing its end. "The feeling here at Kennedy Space Center is that we've really turned the corner from recovering from the accident to preparing for the next mission," said Michael Leinbach, who leads the shuttle launch team. "We've finally made it." As the final months, weeks and days count down, the stakes for the agency, human spaceflight and the Space Coast could not be higher. Caretaker crews on the international station are finding it increasingly difficult to operate the half-built outpost without periodic shuttle supply runs. Its main oxygen generator keeps breaking down, reserve supplies of breathing air are limited and serious food and water shortages nearly forced evacuation late last year. Making matters worse: severe NASA-imposed launch safety restrictions that could delay the shuttle's return to flight until the spring of 2006 if Discovery is not off the ground by August. That would increase the chance of a station evacuation and reduce to nil the already-slim chances of completing outpost construction by 2010 -- a target set by President Bush when he announced plans to return astronauts to the moon by 2020. "So there is a sense of urgency," said NASA deputy spaceflight chief Michael Kostelnik. The situation "calls for a return to flight as expeditiously as we can," he added. Congress and the public are watching to see if NASA has fixed past mistakes and can be trusted with the billions of dollars of public money needed to fund a decades-long effort to send people to the moon, Mars and beyond. Everyone now has their eyes on Kennedy Space Center. "The focus is on Florida," said NASA deputy shuttle program manager Wayne Hale. But a number of high hurdles remain. The most obvious is time. The simultaneous processing of both Discovery and Atlantis is so challenging NASA is shifting hundreds of workers who were overhauling Endeavour to help with the other two orbiters. Parallel processing of orbiters is not new. Having a second ready enough to fly a rescue mission is. NASA is committed to having a second shuttle almost ready to launch in the event of an emergency on either of the first two post-Columbia test flights. The reason: The agency has not found a way to repair in flight the type of catastrophic damage that doomed Columbia and seven astronauts. A 1.7-pound wedge of external tank foam insulation punched a hole in

Columbia's left wing 82 seconds after launch. The breach allowed hot gasses to rip the ship apart during an ill-fated atmospheric reentry two years ago today. Serious damage like that would prompt Discovery's seven astronauts to hole up aboard the international station. A scaled-back crew of four then would launch aboard Atlantis -- after round-the-clock processing at KSC -- on a mission to bring them back to Earth. "We can't launch Discovery without being prepared to take on that mission," Leinbach said. "So we have to have both ready." A huge workload still must be finished before the planned May 14 launch of Discovery. Not only must a shuttle be stacked on the mobile launch platform, it must be moved to the pad, checked over exhaustively and packed with its cargo. But, said Michael Wetmore, shuttle processing director at KSC, "We're going to make it. We're going to be there in May." The challenging schedule is welcome for many of the 5,400 NASA and contractor employees who work on the shuttle program at KSC. Also, while standard launch prep is happening, NASA must complete a series of design certification reviews over the next eight weeks. The reviews are aimed at making certain that all post-Columbia safety changes are based upon sound engineering judgment and have been thoroughly tested. Engineers and inspectors from NASA centers across the country will explain modifications and why they were made. An example: Work that went into developing a new orbital inspection boom will be reviewed. Equipped with two laser sensors, the 50-foot boom -- an extension of the shuttle's robot arm -- will enable orbiting astronauts to inspect shuttle wing panels and heat-resistant tiles for damage once they are in space. The thermal armor protects shuttles and their crews from temperatures that can exceed 3,000 degrees Fahrenheit during a fiery plunge back through the atmosphere. NASA also modified external tanks to prevent large custom-crafted pieces of foam insulation from jeopardizing the safety of shuttle crews. Those changes will be examined this month and next by NASA program managers and a group of independent experts overseeing the agency's bid to return the shuttle fleet to service. Any late issues about the tank -- especially if they require physical changes -- probably would delay the flight. "We have to make sure...that all these changes we have made are really as good as we think they are," Hale said. In some cases, NASA still has tests to complete. NASA aims to fill Discovery's external tank at the launch pad on March 30. More than a half-million gallons of supercold liquid hydrogen and liquid oxygen will be pumped into the 15-story tank during the three-hour, fuel-loading test. The aim is to test tank changes as well as 40-year-old ground fuel lines that haven't been used in two years. The test also will serve as a dress rehearsal for NASA's shuttle launch team. Afterwards, they'll drain the tank until launch day. The independent oversight group, which is headed by former astronauts Thomas Stafford and Richard Covey, will meet in mid- to late March to review NASA work on return-to-flight recommendations made by Columbia accident investigators. The group's final report is due 30 days before launch. NASA managers will hold a flight readiness review on April 26. Traditionally, a firm launch date is set at that meeting. NASA engineers, meanwhile, still are working on techniques for repairing damaged wing panels and tiles. At best, the Discovery crew might be able to fix four-inch holes or cracks in the vulnerable panels as well as gouges or dents in fragile tiles. Discovery's astronauts say the external tank modifications will prevent the shedding of foam pieces large enough to down a shuttle. And if need be, they say they can camp out on the international station until a rescue mission can be carried out. "I'm pretty confident that we're not going to need to do that type of repair. But if it happens, we have alternatives," said Discovery mission commander Eileen Collins. In any case, she said, "It's time for us to go fly." Web posted. (2005). [Countdown ticks for shuttle liftoff [Online]. Available WWW: <http://www.floridatoday.com/> [2005, January 31].]



Launch Complex 36 sits along the Atlantic coast on Cape Canaveral Air Force Station, Florida. Visible in this image are the Complex's two launch pads as well as its circular, concrete "blockhouse."

## FEBRUARY 2005

### February 1: **Columbia debris aids in research**

Two years after the fatal accident that destroyed it, shuttle Columbia is helping scientists and engineers solve problems and make the shuttles and future spaceships safer. The puzzle pieces they're using are parts of Columbia collected by searchers in eastern Texas. The parts are housed in a hallowed lending library in the Vehicle Assembly Building at Kennedy Space Center. Unlike the locked-up relics of other space accidents, the fragments have extended the life and worth of Columbia. "Folks have been very appreciative that she's still around and we're doing something and not just forgetting about it," said Scott Thurston, the manager for orbiter Atlantis who's in charge of the Columbia Research and Preservation Project. Some of the research is helping efforts to return the shuttle fleet to space. For instance, NASA is using thrusters from Columbia to develop non-destructive testing techniques. At KSC, experts at the Materials Analysis Lab have reduced cracked metal fasteners from Columbia's wings to the tiniest size to see whether there are flaws that might be repeated on other shuttles. The work was requested by a member of the Columbia Accident Investigation Board and assigned by the new NASA Engineering and Safety Center at Langley. Analysts embed a bolt cross-section in what looks like a half-dollar-size hockey puck, which is polished and etched with acid to bring out any boundaries or flaws. The metal gleams silver, flush with the surface of the black puck, and is magnified 500 times. "When you look at the structure, you reveal the microscopic structure of the metal," structural material engineer Don Parker said. The good news is that grains are visible, as expected, but the metal isn't flawed, he said. So the bolt cracks probably occurred when Columbia broke apart or hit the ground. The lessons learned in this kind of investigation will be applied to next-generation vehicles, too, said Steve McDaniels, failure analysis and materials evaluation chief at KSC. Web posted. (2005). [Columbia debris aids in research [Online]. Available WWW: <http://www.floridatoday.com/> [2005, February 1].]

### **Return To Flight Crew Performs Test**

The crew of the Space Shuttle Discovery, Return to Flight mission (STS-114), will be at NASA's Kennedy Space Center, Fla., Feb. 10-11 to participate in the Crew Equipment Interface Test (CEIT). During CEIT the crew will train with equipment they will use in orbit, visit International Space Station elements in the processing facility and work with flight equipment on Discovery in the Orbiter Processing Facility. STS-114 is targeted for launch during a window from May 12 through June 3. The seven-member crew will fly to the Station primarily to evaluate procedures for flight safety, including Shuttle inspection and repair techniques. ["NASA'S Shuttle Return To Flight Crew Performs Test and Meets Media," **NASA News Release #M05-012**, February 2, 2005.]

### **NASA says thanks**

Letter by Jefferson D. Howell, Director, Johnson Space Center: Two years ago the communities of East Texas found themselves at the center of a national tragedy following the loss of Columbia and its crew. For months you opened your hearts and homes to the recovery teams who worked under trying circumstances to bring the crew, and Columbia, home. We will always remember with gratitude the care and generosity you showed us. Today, we mark a solemn anniversary, but one that also holds promise for the future. In a few months, Discovery will launch from the Kennedy Space Center in Florida, carrying forward the dreams and aspirations of the Columbia crew and visibly demonstrating their

inspiration to our workforce and our nation. We have worked diligently over the past two years making improvements to the space shuttle and preparing to safely fly it again. We are committed to improving ourselves as well. We have changed how we do business and how we communicate with each other, to ensure the safest program possible. The NASA team believes we can do no less. That is our commitment to the crew of Columbia and to our East Texas family. I speak from my heart when I say you will always hold a special place in the hearts of our NASA family. Thank you. Web posted. (2005). [Letter: NASA says thanks by Jefferson D. Howell, Jr., director, NASA Johnson Space Center, Houston, [Online]. Available WWW: <http://www.lufkindailynews.com/> [2005, February 1].]

### **Two Years After Columbia, NASA Points to Lessons Learned**

Even as NASA marks the second anniversary of the Columbia accident, and the tragic loss of seven astronauts returning home after a successful flight, agency officials and astronauts are looking toward a return to space shuttle flights. All the pieces for NASA's next shuttle launch, Discovery's STS-114 mission, sit at NASA's Kennedy Space Center (KSC), where engineers work to prepare them for flight with the lessons learned from the Feb. 1, 2003 loss of Columbia and its crew fresh in their mind. "I think the agency is a different agency today than it was two years ago," said Jim Kennedy, director of the Kennedy Space Center -- NASA's Florida spaceport -- in a telephone interview. "We now have a really strong group of checks and balances, and we're a better agency for it." Columbia was destroyed during reentry by a disaster precipitated days earlier during launch, when a chunk of foam from its external fuel tank gouged a hole in the shuttle's left wing. NASA has spent the two years since devising safer ways for humans to reach space. In the meantime, the space agency's three remaining shuttles have been grounded, leaving only Russian Soyuz spacecraft to ferry new crews to the International Space Station (ISS). "Because of the Columbia accident we are constantly, diligently, 24-7, working at fixing it so that we know that when it comes time to fly we have done our absolute best," said NASA chief Sean O'Keefe during a recent memorial service for the crew of Columbia, as well as the lost astronauts of the 1986 Challenger accident 1967 Apollo 1 fire. "We will never eliminate the inherent risk, though I know each of us will work to minimize that risk." Among that work was the installation of new sensors along Discovery's wings to check for impacts, as well as an orbiter boom designed to scan the integrity of orbiter's underbelly in space and a redesigned external fuel tank that agency officials claim is the safest ever built. But the agency has also worked to revamp its internal culture, which was cited by Columbia accident investigators as a contributor to the accident. Web posted. (2005). [Two Years After Columbia, NASA Points to Lessons Learned [Online]. Available WWW: <http://www.space.com/> [2005, February 1].]

### **NASA Head Fans Hubble Controversy**

In what may be his last public speech as NASA administrator, an outspoken Sean O'Keefe Monday bluntly criticized a National Academy of Sciences' recommendation that space shuttle astronauts should be dispatched to service the Hubble Space Telescope, a mission that was canceled after the 2003 Columbia accident. "They're treating it as if (the shuttle's return to flight) has already happened," O'Keefe said during the keynote address of a two-day Vision for Space Exploration conference being held in Orlando. The task force assigned to oversee NASA's implementation of the accident investigation board's findings says the agency is "nowhere near meeting all the objectives," O'Keefe added. "We still have a long way to go." Among the [Columbia Accident Investigation Board] panel's recommendations



was for NASA to develop a method for rescuing a shuttle crew should their ship become too damaged to safely return to Earth. O'Keefe immediately canceled the final Hubble servicing mission because astronauts flying to the telescope could not reposition their ship to reach the space station for shelter in case of an emergency. An alternative plan to develop a robot to service the telescope was panned by the National Academy of Sciences' panel as being too technically risky. But the real obstacle appears to be the mission's cost, estimated at \$1 billion. The White House reportedly is planning to ax funds in NASA's 2006 spending plan for a robotic servicing mission for Hubble. The budget is scheduled to be released on Monday. O'Keefe also warned that while NASA's overall budget is expected to increase, programs that are not tightly aligned with the president's Vision for Space Exploration — a plan unveiled last year to return humans to moon and beyond — will be cut. "People who don't want programs to end find a friendly member of Congress," O'Keefe said, adding that it is not the pork barrel local projects routinely added into NASA's budget by legislators that hampers the agency. "Those are bad enough, but that's just nickel and dime stuff," O'Keefe said. "The bigger problem is in the mirror: It's us." He urged the contractor and NASA community to accept that "some programs that don't fit into the president's vision must fall by the wayside." Web posted. (2005). [NASA Head Fans Hubble Controversy [Online]. Available WWW: <http://dsc.discovery.com/> [2005, February 1].]

### **Bush to ask for more money for NASA**

The White House will ask Congress next week to increase NASA's budget again in 2006 to help finance President Bush's plans for manned missions to the moon and Mars. Outgoing NASA Administrator Sean O'Keefe made the announcement Monday (January 31) during his keynote speech to the First Space Exploration Conference at Walt Disney World. More than 1,000 participants from NASA and industry are meeting in Central Florida for three days to discuss strategies for making Bush's space vision a reality. O'Keefe did not specify what the amount of the requested budget increase for 2006 would be. Web posted. (2005). [Bush to ask for more money for NASA [Online]. Available WWW: <http://www.orlandosentinel.com/> [2005, February 1].]

### **Last Atlas 3 rocket to blast off**

A top-secret payload is scheduled to blast off aboard an Atlas rocket early Thursday, marking the end of an era at Launch Complex 36 at Cape Canaveral Air Force Station. The 17-story rocket -- which is slated to take off at 2:41 a.m. Thursday (February 3)-- will be the last Atlas to fly from the dual-pad complex -- home to the venerable launch vehicles since 1961. "It's going to be sad but celebratory," said Julie Andrews, a spokeswoman for Atlas manufacturer Lockheed Martin. "There's a lot tied up in that real estate." Just north of the tip of the Cape, the complex was built in 1961 and 1962 for NASA's Atlas-Centaur program. A total of 144 missions -- including historic NASA Surveyor, Mariner and Pioneer flights -- have been launched from the two pads there. Thursday's scheduled flight will be the last launch of a Lockheed Martin Atlas 3 rocket, and if all goes well, the 75th consecutive success for the company's Atlas family of rockets. Future missions will be launched on Atlas 5 rockets at Launch Complex 41. A new tenant -- SpaceX of El Segundo, Calif. -- intends to begin launching Falcon 1 and Falcon 5 rockets from Complex 36 in late 2006. The last Atlas 3 will carry a classified payload for the National Reconnaissance Office. But the weather forecast for the flight is not good. A low-pressure system is expected to sweep across northern Florida from the Gulf of Mexico, bringing with it thick clouds and isolated showers. Meteorologists say there is an 80 percent chance that conditions will prohibit a

launch Thursday. The weather is expected to improve a bit on Friday. There's a 60 percent chance that thick clouds and gusty winds would prohibit a launch that day. Web posted. (2005). [Last Atlas 3 rocket to blast off Thursday [Online]. Available WWW: <http://www.floridatoday.com/> [2005, February 1].]

## **February 2: Expendable Launch Vehicle Status Report**

Mission: Demonstration of Autonomous Rendezvous Technology (DART); Launch Vehicle: Pegasus XL (Orbital Sciences Corporation); Launch Date: TBD; Launch Window: TBD. In the Orbital Sciences Corporation hangar at Vandenberg Air Force Base, Calif., the Reaction Control System (RCS) on the Pegasus launch vehicle has been depressurized and the leaking gaseous nitrogen regulator was removed. The regulator was shipped on Jan. 28 to Orbital's plant in Dulles, Va., for analysis. The leak was observed last week during testing of the RCS. This regulator is used to maintain proper pressure in the RCS during flight and is located within the forward portion of the Pegasus third stage. The DART spacecraft was removed from the Pegasus third stage on Jan. 25 to obtain access to the regulator. The spacecraft has been rotated to a vertical position, moved to a clean room and placed on a test stand. The new launch date has not yet been determined. A revised schedule continues to be developed this week. Mission: NOAA-N (National Oceanic & Atmospheric Administration); Launch Vehicle: Boeing Delta II 7320; Launch Pad: SLC-2, Vandenberg Air Force Base, Calif.; Launch Window: 2:22:01 - 2:32:01 a.m. PST. In California, processing of the NOAA-N weather satellite continues on schedule in NASA spacecraft processing hangar 1610 located on North Vandenberg Air Force Base. The Spacecraft Electrical Performance Test which was under way last week has been successfully completed. The Solar Array Illumination Telemetry Test is scheduled for Feb. 4. The final instrument inspections and associated instrument close-outs for flight will be performed Feb. 15-16. The spacecraft is currently scheduled to be taken to the launch pad to be mated with the Delta II rocket on Feb. 25. At Space Launch Complex 2, preparations for launch are going well. The first power-on testing of the Boeing Delta II launch vehicle began on Jan. 31 as scheduled. The Vehicle Guidance and Control Qualifications, which are tests of the Delta II guidance and control systems, are now planned for Feb. 4. The First Stage Liquid Oxygen "LOX" Leak Checks, a countdown test that involves loading liquid oxygen aboard the first stage and also serves as a countdown certification for the launch team, will be held next week on Feb. 10. The build-up of the Boeing Delta II at the pad began on Jan. 12 with the erection of the first stage and interstage adapter. The three strap-on solid rocket boosters were attached to the vehicle on Jan. 17. The second stage was hoisted atop the first stage on Jan. 20. After launch, NOAA-N will be renamed NOAA-18 and will provide measurements of the Earth's surface and atmosphere that will be entered into NOAA's weather forecasting models and used for other environmental studies. The spacecraft will be turned over from NASA to NOAA after on-orbit checkout is complete. KSC News Center (2005). **Expendable Launch Vehicle Status Report** ELV-020205 [Online]. Available E-mail: [ksc@newsletters.nasa.gov](mailto:ksc@newsletters.nasa.gov) [2005, February 2].]

## **Boeing hopes for end of ban on rocket work**

Officials of The Boeing Co. said Wednesday they are hoping a ban on bidding on future military rocket work is lifted this year. But they conceded that is something they thought would have occurred months ago. Bruce Melnick, vice president of Boeing Florida Operations at Kennedy Space Center, said Wednesday in a conference call that he expected the company to be able to bid on rocket work with the military late last year, but that there

were “some surprises” in recent months, including litigation related to Boeing and a scrutinized tanker deal. Melnick said the testimony in that case wrapping up could be the “last hurdle” before the company can bid again on military rocket work. He also said the local employment in the company’s shuttle operations should be unchanged in 2005. Web posted. (2005). [Boeing hopes for end of ban on rocket work [Online]. Available WWW: <http://dsc.discovery.com/> [2005, February 1].]

### **February 3: Atlas Rocket Launches**

An Atlas III rocket lifted off into space carrying a secret military payload for the National Reconnaissance Office, the agency that oversees the nation's constellation of spy satellites. A representative for the National Reconnaissance Office said the satellite will provide additional capability for the military's intelligence gathering mission. The launch was the sixth and final mission for the 170-foot Atlas III rocket, which has been replaced by the Atlas V, a larger, more powerful rocket designed to reduce costs and provide reliable access to space for heavier military cargoes. There was also a ceremonial shutdown at the launch pad. Crews dimmed the lights at Launch Complex 36 after liftoff because it was the last time they'll use that pad. Web posted. (2005). [Atlas Rocket Launches Carrying Spy Satellite [Online]. Available WWW: <http://www.wesh.com/> [2005, February 3].]

### **Atlas rocket workers say goodbye to Complex 36**

After heart-felt speeches and toasts to say goodbye to the launch site that Atlas-Centaur rockets have called their Cape Canaveral home since the 1960s, the spotlights shining on Complex 36 were turned off in a ceremony following's Thursday's liftoff. The spy satellite deployment mission marked the 75th consecutive successful Atlas rocket launch in more than a decade, including all six Atlas 3 flights. But despite that achievement, there was a distinct sense of sadness across the Atlas program because this was ending of four decades of flights from Complex 36. "Complex 36 is one of America's oldest continuously operating launch sites and the last of the U.S. launch sites to use a traditional blockhouse to control the launch," Jim Spornick, Lockheed Martin's vice president for the Atlas programs, said in a post-launch ceremony from the Cape's Atlas Spaceflight Operations Center. "It is very fitting that we pay tribute to a place that has served America and mankind so well and honor the men and woman who have given so much of themselves with the missions launched from Complex 36 to make the Atlas program what it is today." Atlas launch conductor Ed Christiansen, still seated at his console in the blockhouse where he orchestrated the countdown, offered an emotional "toast" to the two-pad site. "We're here in the blockhouse this morning having just launched the last Atlas 3," Christiansen said. "Last year we said farewell to Complex 36A, and this year is 36B and the blockhouse. The blockhouse is where we directly control both pads...further, it houses our ground computer system. "Atlas-Centaur has launched many important payloads for our NASA, Air Force, NRO, Navy and commercial customers. The Surveyor spacecraft paved the way for lunar landings by Apollo. Throughout the 1960s and early 1970s, virtually every interplanetary mission launched by the United States was launched on an Atlas-Centaur from Complex 36. Further, many satellites vital to our security and world's communications have left from here under the control of these consoles. Pad 36A, which saw the first of its 69 launches in 1962, hosted its last liftoff in August 2004. Thursday's flight from pad 36B was the 76th since opening 1965. The final launches from both pads, by coincidence, carried National Reconnaissance Office payloads. Web posted. (2005). [Atlas rocket workers say goodbye to Complex 36 [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, February 3].]



#### **February 4: Space Shuttle Processing Status Report**

Discovery (OV-103); Mission: STS-114 – 17<sup>th</sup> ISS Flight (LF1) - Multi-Purpose Logistics Module; Location: Orbiter Processing Facility Bay 3; Launch Date: Launch Planning Window May 12 to June 3, 2005; Launch Pad: 39B; Crew: Collins, Kelly, Noguchi, Robinson, Thomas, Lawrence and Camarda; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Orbiter system testing is about 85 percent complete on Discovery for Return to Flight mission (STS-114) to the International Space Station. In Orbiter Processing Facility (OPF) bay 3, testing includes Auxiliary Power Unit controller checkout, External Tank door functional tests, and filling the water spray boiler tanks. Rudder Speed Brake seals installation is complete and Thermal Protection System blanket bonding continues on the vertical stabilizer. Checkout work is ongoing with the new Orbiter Boom Sensor System (OBSS) on the starboard side of Discovery's payload bay. Since the OBSS is a new piece of hardware, the payload bay doors were closed for clearance checks. Wire harness continuity checks continue on the Manipulator Positioning Mechanism, which are the pedestals that hold and latch the boom in the payload bay. In the Vehicle Assembly Building (VAB), the Solid Rocket Boosters (SRB) for the STS-114 mission are stacked on the Mobile Launcher Platform and final closeouts continue. On the Solid Rocket Booster hardware for the following mission, STS-121, paint flaking was found on the aft inactive stub, an attach ring surrounding the booster located approximately 10 feet below the point where the External Tank is mated to the SRBs. Program management determined pull tests of that area should be completed on Discovery's stack as well. Although no paint flaking was found, the tests did show some areas of low paint adhesion. Technicians will repair the areas of concern. The External Tank is scheduled to be moved to the integration cell and mated with the Solid Rocket Boosters on Feb. 21. This should not affect Discovery's roll over to the VAB for mating. Atlantis (OV-104); Mission: STS-121 – 18<sup>th</sup> ISS Flight (ULF1) – Multi-Purpose Logistics Module/Crew Rotation; Location: Orbiter Processing Facility Bay 1; Launch Date: Launch Planning Window July 12 – August 3, 2005; Launch Pad: 39B; Crew: Lindsey, Kelly, Sellers, Fossum, Nowak and Wilson; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Processing and system testing continues on Atlantis in Orbiter Processing Facility bay 1 for its mission to the International Space Station. The final body flap actuator was installed on Atlantis in preparation for body flap installation early next week. The Rudder Speed Brake installation is nearly complete, with seal installation and Thermal Protection System blanket bonding on the vertical stabilizer ongoing. The left-hand Orbiter Maneuvering System (OMS) pod that was removed from Atlantis was moved to the Hypergol Maintenance Facility on Monday. The pod was removed so that inspections could be performed on the thrusters. Following thorough inspections of the thrusters on another OMS pod that will replace the one removed will be transferred to the bay for installation on the vehicle. Cable installation for the new wing leading edge accelerometer sensors in the right-hand wing is complete. Water Spray Boiler No. 3 checkout was successfully completed. Radar altimeter testing is complete. Installation of the right- and left-hand main landing gear environmental seal continues. Endeavour (OV-105); Space Shuttle Endeavour is in its Orbiter Major Modification period, which began in December 2003. Owner-press-release. (2005). **Space Shuttle Processing Status Report** S2-05 [Online]. Available E-mail: [owner-press-release@spinoza.public.hq.nasa.gov](mailto:owner-press-release@spinoza.public.hq.nasa.gov) [2005, February 4].]

**February 7: NASA's budget enables new age of exploration**

The following is a statement by NASA Administrator Sean O'Keefe about the Administration's fiscal year 2006 budget proposal and the Vision for Space Exploration. "The fiscal 2006 NASA budget reaffirms the President's commitment to the Vision for Space Exploration and provides us the next step in implementing it. The exploration Vision provides a historic opportunity to focus NASA for the long term, and the process is well under way. We are transforming NASA and making great progress. We at NASA have embedded a safety culture that both embraces competition -- to bring out the best ideas from industry, universities and NASA centers -- and seeks innovation, to find the best solutions to technical and management challenges. We have enhanced our long-range planning to improve our decision making, and we have built a sound management foundation, based on the President's Management Agenda, to streamline our corporate structure and invigorate our field centers. The preparations for returning the Shuttle fleet to flight are continuing. On the International Space Station, we are in our fifth year of continuous presence on orbit. Our programs to explore the solar system continue to amaze us with the new and unexpected information returned from Mars, Saturn's moon Titan and other distant points in the universe. We are laying the groundwork for future exploration by beginning the design competition for the Crew Exploration Vehicle, which will have flight demonstrations in 2008. Building blocks are being placed to return astronauts to the moon. We have awarded more than 100 contracts for exploration technologies, based on 600 proposals and 5000 letters of interest. The more than 17 billion hits to our NASA Web site are a testament to the intense, world-wide public interest in our activities. The Vision for Space Exploration remains an Administration priority even in this challenging budget environment. The continued priority for and support of exploration has enabled a gradually growing NASA budget over the next five years. The budget maintains resolute focus on exploration priorities and critical milestones, based on our science priorities. The budget supports critical national needs and revolutionary technologies. In our Aeronautics Mission Directorate, it protects aviation safety, security and airspace systems activities. It restructures vehicle systems work to focus on technology breakthroughs and near-term demonstrations. The President's fiscal 2006 budget request for the Science Mission Directorate builds on our recent scientific successes and projects a 23 percent increase in the total science budget by 2010. The budget proposal maintains investments in next-generation Earth-observing satellites to support our climate research efforts. In our education endeavors, the budget allows us to continue to inspire the next generation of explorers with programs such as explorer schools and scholarships for service. For the Exploration Systems Mission Directorate, the request includes an 18 percent increase. The budget supports exploration systems' research and technology to enable designs for sustainable exploration; funding for Project Prometheus to test a nuclear reactor in 2008 and fly a demonstration mission within a decade; and more than \$800 million for human systems research and technology, directly linked to exploration requirements for human missions to the moon and beyond. The budget proposal maintains the return-to-flight of the Space Shuttle fleet as our top priority, and it includes close to \$2 billion for the Space Station. This level of funding will enable NASA to meet obligations to international partners. NASA will also proceed with plans to retire the Shuttle in 2010, while ensuring safe missions for the life of the fleet. The fiscal 2006 budget assumes an ongoing effort to retool our institution based on best achieving our priorities for the Vision for Space Exploration. This will require adjustments to work-force skill distribution, physical capital, facilities and innovations in management structure. The end result will transform NASA field centers for the coming decade through improved

agility and competitiveness. The sustainable implementation of the Vision will provide our legacy to future generations. With this budget, the torch is passed from the pioneers, who first took us to the moon, to their heirs, who will take us into deep space to stay." ["NASA's Budget Enables New Age of Exploration," **NASA News Release #05-039**, February 7, 2005.]

### **February 8: Cuts target shuttles, defense**

NASA plans to cut some of its 28 remaining shuttle missions to save money, finish the International Space Station and retire the three-orbiter fleet by 2010, agency officials said Monday. President Bush's 2006 budget asking Congress for \$16.5 billion for the space agency reaffirms his commitment to refocus NASA on human exploration, phasing out spending on the shuttles and cutting other projects to free billions of dollars for a new spaceship as well as missions to the moon and Mars. The spending plan, a 2.4 percent increase from the current funding level and submitted to Congress on Monday, also cut funding for a mission to rescue the ailing Hubble Space Telescope and pushed back or eliminated money for some big-ticket science missions and aeronautics research. The 2010 shuttle retirement deadline, combined with potential flight reductions, may stir fears of layoffs at the Kennedy Space Center. The plan leaves a four-year gap between the last shuttle flight and first crewed mission of the replacement ship. "The truth of the matter is the future is bright. We are the launch operations of this agency and will sustain that responsibility for the long, long term to come," KSC Director James Kennedy told workers in a private speech Monday. Through 2006, the agency expects to have spent about \$1.5 billion making safety improvements mandated after the 2003 Columbia disaster that killed seven astronauts. The work is almost complete, with the next launch set sometime in May or June. Spending to develop the replacement Crew Exploration Vehicle for astronauts and nuclear power plants for future deep space missions will continue to grow in coming years. NASA and the White House are seeking \$3.1 billion for the new "exploration systems" projects, an increase of nearly \$600 million from 2005, according to budget documents. Democrats complained Bush is short-changing science. "The priorities in this budget are not merely harmful, they push this country on a downward slide to losing our global science and technological edge," said Rep. Bart Gordon, D-Tenn., senior Democrat on the House Science Committee. O'Keefe and other NASA managers said science spending is increasing, specifically robotic probes bound for the moon and Mars as well as a telescope to replace Hubble. If approved, NASA's budget request would be a political victory for the agency in a year when other federal departments are being cut or getting very small increases. However, the NASA budget through 2009 is now projected to be \$1.7 billion lower than what had been forecast a year ago. Web posted. (2005). [Cuts target shuttles, defense [Online]. Available WWW: <http://www.floridatoday.com/> [2005, February 8].]

### **NASA Gets Increased Funding to Explore the Moon, Mars**

NASA won a significant 2006 budget increase yesterday to \$16.5 billion to fund President Bush's initiative to pursue human exploration of the moon and Mars in 2006, but killed plans to service the Hubble Space Telescope. The NASA figures are part of a national science and technology budget that is generally flat, and in many respects smaller, than that of the current year. Although NASA Administrator Sean O'Keefe acknowledged that science funding had declined for most agencies during "these challenging times," the "specific policy direction set by the president" for NASA had kept it from feeling the budget ax. NASA's \$16.5 billion budget request was 2.4 percent higher than 2005's final appropriation of \$16.1

billion. "The president's endorsement is unabated," O'Keefe told reporters at a NASA headquarters budget briefing. A little over a year ago, Bush announced a "Vision for Space Exploration" to return to the moon by 2020 and eventually travel to Mars. NASA plans to achieve these objectives in a series of "spirals," developing technologies to be used first at the international space station, then modified for subsequent expeditions. NASA designated \$753 million for development of the "crew exploration vehicle," the next-generation spaceship targeted to replace the space shuttle by 2014. The vehicle is the first major piece of hardware targeted for development under Bush's plan. Despite NASA's reordered priorities, however, the administration allotted \$6.8 billion for shuttle operations in 2006, the biggest single chunk of funding in the budget request. The shuttle is scheduled to resume operations in May or June after being grounded for two years after the Columbia disaster. Web posted. (2005). [NASA Gets Increased Funding to Explore the Moon, Mars [Online]. Available WWW: <http://www.washingtonpost.com/> [2005, February 8].]

### **Additional \$340 Million Is Proposed For Rockets**

While targeting some expensive weapons systems for heavy cuts, the Pentagon has proposed a \$340 million increase in the 2006 budget to keep both Boeing Co. and Lockheed Martin Corp. in the government rocket launch business. The funds would continue the Air Force's policy of "assured access" to space by sustaining two companies capable of launching government satellites. The policy has come under criticism from some in Congress who contend it is an expensive luxury. The \$340 million will boost funding for the rocket launch program to \$864 million and help ensure that government launches are profitable for Lockheed and Boeing. Analysts said the satellites that the two companies' rockets send into space are critical to the military's transformation into a modern force connected by high-tech networks. "The space guys did okay" despite the cuts the Pentagon proposed to some programs, said James Lewis, director of technology and public policy at the District-based Center for Strategic and International Studies. "That shows you where the priorities are. You can't have network-centric warfare unless you have mobile connectivity, and the best way to get mobile connectivity is through space." Bethesda-based Lockheed, the Pentagon's largest contractor, and Chicago-based Boeing have complained that without the extra funding they would lose money on the launches because prices were set in the late 1990s, when many expected a robust commercial satellite market to offset the cost of the Pentagon program. But the commercial business failed to materialize, adding substantially to the costs for launching government satellites. Web posted. (2005). [Additional \$340 Million Is Proposed For Rockets [Online]. Available WWW: <http://www.washingtonpost.com/> [2005, February 8].]

### **February 9: NASA shuffles shuttle crews**

A former Kennedy Space Center engineer who is now a NASA astronaut will make her first space flight one mission earlier than previously planned, the agency announced Wednesday. Joan Higginbotham, selected as an astronaut in 1996 after working as an engineer at KSC for nine years, has been assigned to a mission designated STS-116. The mission, tentatively scheduled for spring 2006, will deliver the third port truss segment for the International Space Station. Veteran astronaut Mark Polansky will be mission commander. Joining Polansky and mission specialist Higginbotham will be first-time pilot William Oefelein and mission specialists Robert Curbeam, Nicholas Patrick and Christer Fuglesang. Fuglesang is a Swedish astronaut from the European Space Agency. Higginbotham and Polansky previously were assigned to a mission designated STS-117, a flight commanded by veteran

astronaut Rick Sturckow. The crew for that mission now includes rookie pilot Lee Archambault and mission specialists James Reilly, Richard Mastracchio, Patrick Forrester and Steven Swanson. The second starboard truss will be hauled to the station on that flight. The shuffling among crews is because of shifting mission objectives after the 2003 Columbia accident and President Bush's directive to complete construction of the station and retire the shuttles by 2010. Web posted. (2005). [NASA shuffles shuttle crews [Online]. Available WWW: <http://www.floridatoday.com/> [2005, February 10].]

### **Expendable Launch Vehicle Status Report**

Mission: Demonstration of Autonomous Rendezvous Technology (DART); Launch Vehicle: Pegasus XL (Orbital Sciences Corporation); Launch Date: TBD; Launch Window: TBD. In the Orbital Sciences Corporation hangar at Vandenberg Air Force Base in California, work continues to prepare the Pegasus XL for the launch of the DART spacecraft. The gaseous nitrogen regulator has been repaired and the Reaction Control System is now being returned to Vandenberg for reinstallation on the Pegasus next week. Once that is complete, the DART spacecraft can be re-mated to the launch vehicle. A preliminary review has been performed on the loads imparted by the Pegasus launch vehicle on the DART spacecraft. There has also been additional testing to ensure that the flight hardware on DART can withstand the change in vehicle loads. The final loads analysis is scheduled to be complete late this month. Mission: NOAA-N (National Oceanic & Atmospheric Administration); Launch Vehicle: Boeing Delta II 7320; Launch Pad: SLC-2, Vandenberg Air Force Base, Calif.; Launch Date: TBD; Launch Window: TBD. During testing of NOAA-N at Vandenberg Air Force Base in California, an out-of-specification frequency change was detected to have occurred in one of the spacecraft's four S-Band transmitters. The drift of the center frequency means that tracking stations on the ground would have difficulty locking on to the signal. When last measured in December 2004, the frequency was nominal. Failure analysis must be performed to determine why the center frequency has drifted, which will lead to a determination being made on whether the transmitter needs to be removed and replaced, and whether there should be concern for the other transmitters. These units are not easily accessible. A launch postponement is necessary, though at this time the length of the delay is not known. At Space Launch Complex 2, preparations for launch of the Boeing Delta II are going well. The First Stage Liquid Oxygen "LOX" Leak Check originally scheduled for this week is being rescheduled as a result of the launch postponement. The first power-on testing of the Boeing Delta II launch vehicle began on Jan. 31. The Vehicle Guidance and Control Qualifications, which are tests of the Delta II guidance and control systems, occurred Feb. 4. The build-up of the Boeing Delta II at the pad began on Jan. 12 with the erection of the first stage and interstage adapter. The three strap-on solid rocket boosters were attached to the vehicle on Jan. 17. The second stage was hoisted atop the first stage on Jan. 20. KSC News Center (2005). **Expendable Launch Vehicle Status Report** ELV-020905 [Online]. Available E-mail: [ksc@newsletters.nasa.gov](mailto:ksc@newsletters.nasa.gov) [2005, February 9].]

### **February 10: Veteran astronaut to sub for O'Keefe**

Veteran shuttle astronaut Frederick Gregory will take over as NASA's acting administrator next week. Gregory is currently second in command at the space agency. He will step into the top job until President Bush nominates, and the U.S. Senate confirms, a replacement for Sean O'Keefe, agency spokesman Robert "Doc" Mirelson said Wednesday. O'Keefe's last official day is Friday. Citing personal and financial reasons, O'Keefe decided in December to take a job as chancellor of Louisiana State University's Baton Rouge campus after three years



as NASA's chief. Web posted. (2005). [Veteran astronaut to sub for O'Keefe [Online]. Available WWW: <http://www.floridatoday.com/> [2005, February 10].]

### **Gehman: NASA is meeting intent of Columbia board**

The chairman of the Columbia Accident Investigation Board believes NASA has made a credible attempt to meet the spirit and intent of the board's return-to-flight recommendations, even though the agency will not have certified tile or wing leading edge repair techniques in place before Discovery blasts off in May. Harold Gehman, the retired admiral who chaired the independent panel that investigated the Columbia disaster, said he has no objections to NASA's plan to resume shuttle flights in May while testing and analyses continue. But Gehman said that does not mean NASA can ever give up trying to perfect repair techniques, or worse, stop listening to the concerns of the agency's engineering community when problems arise. Web posted. (2005). [Gehman: NASA is meeting intent of Columbia board [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, February 10].]

### **February 11: Space Shuttle Processing Status Report**

Discovery (OV-103); Mission: STS-114 – 17<sup>th</sup> ISS Flight (LF1) - Multi-Purpose Logistics Module; Location: Orbiter Processing Facility Bay 3; Launch Date: Launch Planning Window May 12 to June 3, 2005; Launch Pad: 39B; Crew: Collins, Kelly, Noguchi, Robinson, Thomas, Lawrence and Camarda; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Processing continues on orbiter Discovery in Orbiter Processing Facility bay 3 for its Return to Flight mission, designated STS-114, to the International Space Station (ISS). The STS-114 crew visited Kennedy Space Center this week for the Crew Equipment Interface Test (CEIT). Prior to each flight, crews participate in the CEIT for hands-on training and hardware familiarization. The crew performs a vehicle walk-around to inspect the Thermal Protection System and enters the payload bay to inspect the new Orbiter Boom Sensor System. System testing continues with fuel cell valve tests, Auxiliary Power Unit controller checkout and payload bay door functional tests. Flight crew equipment technicians began installing tools into the mid-deck lockers in support of the CEIT. In the payload bay, the keel yolk assembly for an external stowage platform was installed. The platform will be deployed and mounted to the ISS and will be used by crews as a permanent spare parts facility on the Station. In the Space Station Processing Facility, prep work is under way for the installation of the racks into the Multi-Purpose Logistics Module (MPLM), named Raffaello. The racks hold the supplies, including food, clothing and spare parts. In the Vehicle Assembly Building, all final closeouts have been completed on the External Tank (ET) in the checkout cell prior to the tank being mated, or attached, to the Solid Rocket Boosters (SRB). Repairs continue to progress well on the Solid Rocket Booster aft inactive stub, an attach ring surrounding the booster located approximately 10 ft. below the point where the External Tank is mated to the SRBs. In preparation for ET/SRB mate, alignment optics will begin on Monday. The External Tank is scheduled to be moved to the integration cell and mated with the SRBs on Feb. 21. Atlantis (OV-104); Mission: STS-121 – 18<sup>th</sup> ISS Flight (ULF1) – Multi-Purpose Logistics Module/Crew Rotation; Location: Orbiter Processing Facility Bay 1; Launch Date: Launch Planning Window July 12 – August 3, 2005; Launch Pad: 39B; Crew: Lindsey, Kelly, Sellers, Fossum, Nowak and Wilson; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Technicians continue to process Atlantis in Orbiter Processing Facility bay 1 for its mission to the International Space Station. The body flap power drive unit is installed in preparation for body flap installation on the vehicle for

flight early next week. Optics alignment is complete on the Remote Manipulator System's Manipulator Positioning Mechanisms (MPM). MPMs are the pedestals that hold and latch the Shuttle's robotic arm and new boom in the payload bay. Electrical checkout is complete on the MPMs on the starboard side, which is the side where the boom will be installed. The new left-hand Orbiter Maneuvering System (OMS) pod is scheduled to be installed next week. An OMS pod was removed from Atlantis and moved to the Hypergol Maintenance Facility for inspections on the thrusters. Connector mates for Auxiliary Power Units No. 1, 2 and 3 are complete and the controllers are installed. Endeavour (OV-105). Space Shuttle Endeavour is located in Orbiter Processing Facility bay 2 and is in its Orbiter Major Modification period, which began in December 2003. Owner-press-release. (2005). **Space Shuttle Processing Status Report S2-06** [Online]. Available E-mail: [owner-press-release@spinoza.public.hq.nasa.gov](mailto:owner-press-release@spinoza.public.hq.nasa.gov) [2005, February 11].]

### **Moon-rock thief says he's sorry**

Thad Roberts, the mastermind behind the 2002 theft of NASA moon rocks, returned to Central Florida on Friday, February 11, 2005. Sentenced in 2003 to eight years, Roberts, 28, won a re-sentencing when an appeals court ruled U.S. District Judge Anne C. Conway had erred by giving him more time than the federal sentencing guidelines permitted without adequately determining whether his crime greatly disrupted the original sentence Friday, reducing it by 10 months. In July 2002, Roberts and two other interns stole a 585-pound safe containing moon rocks and Martian meteorites worth at least \$21 million from Everett K. Gibson, Jr.'s laboratory at Johnson Space Center. They also destroyed about 30 years' worth of Gibson's research records. The case was tried in Orlando because Roberts and two co-defendants were arrested a week after the theft when they tried to sell the mission specimens to undercover FBI agents at an area hotel. Friday's hearing determined that the theft destroyed the value of the rocks as research specimens, because the theft broke a chain of custody that began the moment astronauts picked the rocks off the surface of the moon in 1969. The hearing set the cost of the theft to NASA, taxpayers and Gibson at about \$7 million in lost research and productivity. Web posted. (2005). [Moon-rock thief says he's sorry [Online]. Available WWW: <http://www.orlandosentinel.com/> [2005, February 12].]

### **NASA reviews which shuttle repairs to test**

Top NASA managers are expected to sign off next week on a plan for astronauts to test shuttle-repair techniques during Discovery's planned return to flight in May. Program officials have been evaluating five potential repairs for the thermal-protection system that shields the spaceship during its fiery plunge home through Earth's atmosphere. Three of the repairs are for the heat tiles that primarily cover the shuttle's belly. Two are for the reinforced carbon-carbon, or RCC, material that protects the leading edges of the wings. ["NASA reviews which shuttle repairs to test," **Orlando Sentinel**, February 12, 2005, p A20.]

### **February 12: Launch shifts a day because of lighting needs**

Shuttle program managers will recommend Friday that NASA move the target launch for the first post-Columbia mission back one day to May 15 to get better lighting during flight. Lighting conditions that day will enable NASA to capture the clearest images of the shuttle's redesigned external fuel tank during Discovery's nine-minute ride to orbit and as the tank falls away from the orbiter in space. Senior NASA officials are expected to approve the change. The Space Flight Leadership Council is set to meet Friday to discuss the issue with

shuttle program managers. If the shuttle launches May 15, liftoff would happen at about 3:50 p.m. Lighting conditions will remain good enough to allow a launch through June 3. After that, NASA would have to wait until July. NASA is hoping to get the first two shuttle missions off the ground, if possible, by then. That could free the agency to resume construction flights to the International Space Station later this year. That's important because the agency faces a tight schedule to get in the 25 to 30 flights necessary to complete construction of the orbiting lab. President Bush has ordered the agency to finish that work and retire the space shuttles by 2010 as part of the new Vision for Space Exploration. Web posted. (2005). [Launch shifts a day because of lighting needs [Online]. Available WWW: <http://www.floridatoday.com/> [2005, February 16].]

### **Lockheed plans 425 layoffs**

Lockheed Martin is cutting 425 rocket jobs at Cape Canaveral during the next few months as the company closes its Atlas 3 and Titan 4 operations. The formal announcement is no surprise to the engineers and technicians who have known for years they were launching the last of the rockets. The company employs about 1,400 people in Brevard. The final Atlas 3 lifted off Feb. 3. The Titan 4 is set to fly for the last time from Cape Canaveral Air Force Station on April 6. All workers will get 60 days notice. ["Lockheed plans 425 layoffs," **Florida Today**, February 12, 2005, p 1A & 6A.]

### **February 16: Weldon's new post may help NASA**

Rep. Dave Weldon won a promotion in the ongoing shuffle to reorganize the powerful House Appropriations Committee. Weldon, R-Indialantic, now in his sixth term as a congressman representing much of the Space Coast, was selected to be vice chairman of the newly formed appropriations subcommittee on science, state, justice and commerce. As vice-chairman, Weldon will be second-in-command to Rep. Frank Wolf, R-Md., the subcommittee's chairman. ["Weldon's new post may help NASA," **Florida Today**, February 16, 2005, p 1B.]

### **February 17: NASA work force safe for now**

NASA's 18,000-person work force will remain intact, at least for the next 19 months, a space agency official said Thursday. After that, as many as 2,000 NASA positions could be eliminated, according to James Jennings, an associate deputy administrator who appeared Thursday before the House Science Committee. He told worried lawmakers there is enough money in the budget to maintain current employment levels until Oct. 1, 2006. In the coming months, space agency officials will decide how to move to a leaner work force that could take NASA out of the shuttle era and into a new period of exploration aimed at sending astronauts back to the moon and to Mars. "NASA is starting to make sweeping changes to its workforce and centers," said Rep. Bart Gordon of Tennessee, senior Democrat on the committee. "Neither Congress nor NASA's own employees are being given a clear picture of what is planned." Jennings said about 325 NASA employees accepted buyouts recently. A second round of offers was authorized Feb. 7. Thursday's hearing was the first in Congress to examine President Bush's \$16.5 billion fiscal 2006 budget request for NASA. Rep. Sherwood Boehlert, R-N.Y., the committee's chairman, said: "I don't think NASA should be our top budget priority. In a budget as excruciatingly tight as this one, NASA probably should not get as much as the president has proposed." The 2.4 percent increase Bush requested for NASA stands out in a budget where most other non-defense agencies are having their budgets cut or held flat. Web posted. (2005). [NASA work force



safe for now [Online]. Available WWW: <http://www.floridatoday.com/> [2005, February 18].]

### **3rd person discussed for station**

International Space Station managers are considering when to add a third crew member once space shuttles start flying again, a NASA official said Thursday. To conserve supplies, the crew's size was reduced to two after the Columbia accident two years ago. Russian cargo and passenger ships have carried food, gear and people ever since. "We are looking very closely at when we're going to add a third crew member," said Mark Geyer, station manager for operations and integration. NASA officials are discussing the logistics and other issues with their Russian counterparts, he said. Among the options are sending a European to the station, possibly on the shuttle set to go after Discovery flies in May or June. Six astronauts have been named to the July shuttle mission, potentially leaving room to fly a station crew member. A station astronaut who flew on the July shuttle mission could be an "overlap" crew member who would serve part of his stay with the two men of Expedition 11 and the rest with the next. In the past, station crews have trained, arrived and departed together. Web posted. (2005). [3rd person discussed for station [Online]. Available WWW: <http://www.floridatoday.com/> [2005, February 18].]

### **Shuttle repair plans remain uncertain**

Independent experts still can't say whether NASA shuttle-repair techniques will meet an accident-board mandate to provide astronauts with ways to fix deadly damage in orbit, an official said Thursday. With the agency's first post-Columbia mission targeted for launch May 15, the independent panel overseeing NASA's bid to return its shuttle fleet to service won't formally address the issue until late next month. "We continue to look at that," said former NASA astronaut Dick Covey, co-chairman of the Return to Flight Task Group. "And as we come to the conclusion of our fact-finding and our deliberations, we'll be more prepared to say whether or not the actions taken are going to meet the intent" of the Columbia Accident Investigation Board. The board told NASA to "develop a practicable capability to inspect and effect emergency repairs to the widest possible range of damage" to shuttle thermal tiles and wing panels. NASA since has tested several methods for repairing gouges and dents in tiles, as well as wing panel cracks and holes up to 6 inches in diameter. But the agency has put on the back burner an effort to develop a means to repair wing panel holes up to 16 inches across. NASA instead is relying on modifications that are expected to prevent large chunks of foam insulation that could cause severe damage from falling off the shuttle's external tanks. "The capabilities that they are able to deliver on the first flight are ones we need to go talk about within the task group and complete our assessment based on that," Covey said. Columbia and its seven astronauts were lost after a 1.7-pound piece of external tank foam insulation blasted a 6- to 10-inch hole in the shuttle's left wing. The breach allowed hot gasses to rip the ship apart during atmospheric re-entry. Covey said NASA has finished work on seven of the 15 recommendations the accident board told NASA to complete before returning shuttles to space. NASA must finish work on the other eight by the end of March in order to launch in May. The panel's report must be delivered to NASA's administrator at least 30 days before launch. Web posted. (2005). [Shuttle repair plans remain uncertain [Online]. Available WWW: <http://www.floridatoday.com/> [2005, February 18].]

**February 18: Discovery of Pluto reaches 75th anniversary**

The planet Pluto turns 75 this month. Clyde Tombaugh discovered the ninth planet in the solar system on the afternoon of February 18, 1930, while he meticulously examined a pair of deep sky photographs at Lowell Observatory. Web posted. (2005). [Discovery of Pluto reaches 75th anniversary [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, February 7].]

**Space shuttle program poised for return in May**

NASA managers today set May 15 as the target launch date for the first post-Columbia shuttle mission, saying they are confident remaining technical issues, an independent review and a mountain of paperwork can be closed out in time for flight. Launch director Michael Leinbach said the processing schedule includes about 12 days of contingency time to handle unexpected problems between now and then and "we feel good about that date." The current schedule calls for engineers to attach Discovery's redesigned external fuel tank to a pair of already assembled solid-fuel boosters around Feb. 25 and for Discovery to be bolted to the side of the tank March 18. The assembled spacecraft then will be hauled to launch pad 39B on March 25 and the tank will be loaded with supercold liquid oxygen and liquid hydrogen rocket fuel April 7 in a test that will serve as a dress rehearsal for launch. Commander Eileen Collins and her six crewmates plan to strap in aboard Discovery on April 29 for a practice countdown and if all goes well, the actual countdown will begin May 12 for a launch around 3:50 p.m. on May 15. Columbia's launch window extends to June 3, based on the orbit of the shuttle's destination - the international space station - and because of a self-imposed requirement to not only launch the first two post-Columbia flights in daylight but also to ensure external tank separation in sunlight for photo documentation. If NASA can't get Discovery off the ground by June 3 or thereabouts, the flight will slip to mid July. But Leinbach is optimistic it won't come to that. "After the tanking test is done, the remainder of the pad flow is very standard to us," he said. "And so I'll just tell you, this date feels real good to me." Fifteen of the 29 recommendations made by the Columbia Accident Investigation Board must be completed before Discovery's return to flight. As of today, only seven of those 15 have been fully addressed to the satisfaction of an independent panel charged with monitoring NASA's implementation of those recommendations. But on Thursday, panel co-chairman Richard Covey, a Boeing executive and former shuttle commander, said he saw no major roadblocks to closing out the remaining items before the board ends its work March 31. William Readdy, NASA's associate administrator for space operations agreed and told reporters today "we have every expectation we are going to close all of them." Web posted. (2005). [Space shuttle program poised for return in May [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, February 18].]

**Survey mixed on NASA progress**

NASA is making solid progress in fixing its broken safety culture but many in the agency still see no change since Columbia and seven astronauts were lost in February 2003, a survey released Friday said. More managers than rank-and-file workers perceive positive change in a safety climate that contributed as much to the Columbia disaster as the debris strike that doomed the shuttle's crew, the survey said. Still, the improvement to date indicates that NASA's bid to transform its culture is gaining momentum as the agency aims to return its shuttle fleet to service in mid-May. "Statistically and anecdotally, the progress is real," said Scott Stricoff, president of Behavioral Science Technology Inc. of Ojai, Calif. NASA space operations chief William Readdy called the effort "a work in progress." Accident

investigators traced the Columbia disaster to a piece of foam insulation that fell off the shuttle's external tank and damaged its left wing in flight, allowing hot gasses to rip the ship apart during atmospheric re-entry. But they placed equal blame on a "broken safety culture," one in which managers stifled dissenting opinions and engineers were afraid to raise safety concerns about the foam strike. Web posted. (2005). [Survey mixed on NASA progress [Online]. Available WWW: <http://www.floridatoday.com/> [2005, February 19].]

### **February 18: Space Shuttle Processing Status Report**

Discovery (OV-103); Mission: STS-114 – 17<sup>th</sup> ISS Flight (LF1) - Multi-Purpose Logistics Module; Location: Orbiter Processing Facility Bay 3; Launch Date: Launch Planning Window May 15 to June 3, 2005; Launch Pad: 39B; Crew: Collins, Kelly, Noguchi, Robinson, Thomas, Lawrence and Camarda; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. At today's Space Flight Leadership Council, NASA managers met and refined the launch planning window for orbiter Discovery's Return to Flight mission, designated STS-114, to the International Space Station to May 15 - June 3, 2005. This is to accommodate for daylight launch attempts and to ensure the most detailed and clear photography of the External Tank. Orbiter system testing is approximately 90 percent complete on Discovery in Orbiter Processing Facility bay 3, work continued on the Auxiliary Power Unit controller checkout and drain system checks. Orbital Maneuvering System heat shields were installed and controller checkouts were completed. Thermal Protection System blanket bonding continues on the vertical stabilizer, which is the tail of the orbiter. Checkout work is progressing with the new Orbiter Boom Sensor System on the starboard side of Discovery's payload bay. Testing on one of the boom sensor packages is complete. Manipulator Positioning Mechanism (MPM) adjustments were completed and closeouts continue. The MPMs are the pedestals that hold and latch the boom in the payload bay. In the Vehicle Assembly Building, all final closeouts have been completed on the External Tank (ET) in the checkout cell prior to the tank being mated, or attached, to the Solid Rocket Boosters (SRBs). The SRBs for the STS-114 mission are stacked on the Mobile Launcher Platform and closeouts and preps for ET attaching, or mating, continue. SRB alignment optics were completed this week in preparation for the ET mating. Repairs continue on the SRB aft inactive stub ring, an attach ring surrounding the booster located about 10 feet below the ET attach point. The paint replacement on the stub ring is complete, and pull tests are planned for this weekend. The ET is scheduled to be moved to the integration cell and mated with the SRBs no earlier than Feb. 25. Atlantis (OV-104); Mission: STS-121 – 18<sup>th</sup> ISS Flight (ULF1) – Multi-Purpose Logistics Module/Crew Rotation; Location: Orbiter Processing Facility Bay 1; Launch Date: Launch Planning Window July 12 – July 31, 2005; Launch Pad: 39B; Crew: Lindsey, Kelly, Sellers, Fossum, Nowak and Wilson; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Processing and system testing continues on Atlantis in Orbiter Processing Facility bay 1 for its mission to the International Space Station. The body flap installation was completed this week, and the left-hand Orbital Maneuvering System pod was also installed. Water coolant loop No. 1 servicing is under way, and water coolant loop No. 2 is scheduled for de-servicing over the weekend. The Rudder Speed Brake installation is nearly complete, while seal installation and Thermal Protection System blanket bonding on the vertical stabilizer is ongoing. Fuel cell No. 3 mechanical mates and re-pressurization are complete and leak checks have been successfully performed on all three fuel cells. Preparations are under way for the installation of the Forward Reaction Control System next week. Mobile Launch Platform No. 3 was moved into High Bay 3 of the VAB this week, in preparation for STS-121 stacking. Endeavour

(OV-105); Space Shuttle Endeavour is in its Orbiter Major Modification period, which began in December 2003. Owner-press-release. (2005). **Space Shuttle Processing Status Report S2-07** [Online]. Available E-mail: [owner-press-release@spinoza.public.hq.nasa.gov](mailto:owner-press-release@spinoza.public.hq.nasa.gov) [2005, February 18].]

### **February 22: Endeavour switches hangars**

Orbiter Endeavour made an unusual trip Tuesday to a hangar near the shuttle-landing strip at Kennedy Space Center. It was towed there so workers can reconfigure platforms and perform maintenance in Orbiter Processing Facility 2. Usually, shuttles use the Vehicle Assembly Building as a backup garage, but potentially hazardous operations there prompted the move to the Florida Space Authority's Reusable Launch Vehicle hangar. Endeavour, the youngest of three remaining shuttles, also is the farthest from flight. It's in the middle of an overhaul and is missing wing panels, engines and other major parts. It may not be ready to fly until next year or later. In fact, some workers have been shifted from Endeavour to work on Discovery and Atlantis. "Endeavour has really taken a backseat as far as processing is concerned, so we can ensure those first two flights are safe," NASA spokeswoman Jessica Rye said at KSC. Discovery is scheduled to lead the fleet back to flight as early as May 15, and Atlantis, scheduled to fly in July if all goes well, has to be ready early in case Discovery's crew needs a rescue. NASA plans to provide a haven for shuttle astronauts on the International Space Station should the orbiter sustain damage that would make it too dangerous for the ship to re-enter the atmosphere. The second shuttle would take them home. While Endeavour is in the hangar, workers will perform a test to make sure a new ground radar that will be used for debris detection during launches won't disrupt the shuttles' electronics. ["Endeavour switches hangars," **Florida Today**, February 23, 2005, p 1B.]

### **Team helps KSC make talk effective**

Culture training is coming to Kennedy Space Center this week. A consulting company is sending trainers to the shuttle's home base this week to begin meeting with managers -- and ultimately employees -- about ways to improve communication and interpersonal issues that investigators say contributed to the 2003 loss of Columbia and seven astronauts. The firm, Behavioral Science Technology Inc. of Ojai, Calif., has been working with large segments of the agency's 18,500 workers at other locations across the country. Initial work has been done at Johnson Space Center in Houston, where the bulk of the shuttle program's decision-makers are based, as well as a few other NASA centers. Some preliminary work has been done with the Safety and Mission Assurance divisions at KSC. But the full implementation of the training is just now getting under way at the space center. "I don't think there was a reason to wait," said Thomas Krause, the company's chairman. "We didn't want to do more than three at the beginning. Johnson was high on the list for obvious reasons." The team wanted to do initial work with several groups, take time to adapt to NASA's needs, and then expand to other groups. The work at KSC will not be completed before the shuttle program's return to flight, but Krause stressed that culture change is a long-term effort. The company has a five-year contract with NASA to implement the training. The work to be done at KSC mirrors training already given to top managers, including recently departed administrator Sean O'Keefe and top shuttle program managers in Houston. BST analysts interview managers as well as many of the people they work with every day. They sit in on meetings, taking careful notes and observing every detail down to a person's body language. The process gives the consultants a chance to see not only the managers' attitudes and

intents but how employees perceive them. The latter is just as important. A manager might not realize they are intimidating or pushing back differing opinions, but the employees might feel that fear. At KSC, where the training is just starting, a recent survey of the safety team showed the gap. Forty percent of safety managers surveyed by BST said they've seen improvements in the agency culture. On the front lines, less than 10 percent of safety workers gave comments indicating they've seen such changes. Web posted. (2005). [Team helps KSC make talk effective [Online]. Available WWW: <http://www.floridatoday.com/> [2005, February 23].]

### **Historical Reunion Celebrates Centaur Booster**

A commemorative ceremony and historical reunion honoring the Centaur stage booster, "Celebrating Centaur: Then and Now," will take place from 9:30 a.m. to 3:30 p.m. Friday, Feb. 25, at the Lockheed Martin Atlas Spaceflight Operations Center on Cape Canaveral Air Force Station. More than 150 personnel who worked on the Centaur program over a span of more than 40 years will be on hand to reminisce about their participation in the program's storied history. They also will hear a bevy of space industry leaders discuss the rocket's past, present and future legacy. The Centaur high-energy upper stage has been used for 128 missions for NASA, in addition to its history of commercial and U.S. Air Force missions launched aboard the Atlas and Titan. Ceremony participants include Jim Kennedy, director of the Kennedy Space Center; U.S. Air Force Brig. Gen. (Select) Mark Owen, commander of the 45th Space Wing; and Steve Francois, director of NASA's Launch Services Program Office. Other guest speakers include Jim Spornick, Lockheed Martin Atlas Program vice president; Adriane Laffitte, director of Atlas Programs at Cape Canaveral; and Dr. Virginia P. Dawson, co-author of "Taming Liquid Hydrogen: The Centaur Upper Stage Rocket 1958-2002." The Centaur, developed by NASA and originally manufactured by General Dynamics, had its first successful launch on Nov. 27, 1963, atop an Atlas booster from 36A. With only a single exception, every NASA spacecraft bound for the outer planets has been launched using a Centaur. The Centaur legacy will continue this year with the launch of the Mars Reconnaissance Orbiter, and in 2006, with the launch of Pluto New Horizons to the outermost planet in the Solar System. ["Historical Reunion, Tours Feb. 25 Celebrate Centaur Booster," **NASA News Release #15-05**, February 22, 2005.]

### **February 24: Astronaut trains for risky rescue**

NASA astronaut Steve Lindsey is training for what would be the most spellbinding mission in shuttle program history. Lindsey and three other astronauts would rocket off on an unprecedented and risky rescue mission if Discovery suffers potentially deadly damage during NASA's first post-Columbia flight. The prospect might seem daunting. But Lindsey, a former military test pilot, thinks shuttle safety improvements make the need of a rescue flight slim. "I really want to emphasize that this is really a last resort we're talking about here," said Lindsey, a veteran of three shuttle flights. "I mean, a whole bunch of stuff would have to go really wrong before we get there." NASA's ability to pull off a rescue mission has been a key topic since an undetected hole in Columbia's left wing allowed hot gasses to rip the ship apart during re-entry in February 2003. NASA officials at the time insisted there was nothing that could have been done to save the Columbia crew even if they had known about the damage. Columbia carried no robot arm for inspections and no repair kit. The ship didn't have enough fuel to reach the station. A spacewalk would have been too risky, and a rescue mission would have been impossible, NASA officials said. Columbia accident investigators came to a different conclusion. They determined Atlantis could have been



pressed into service had NASA recognized early on how severely Columbia had been damaged. Dangerous but doable spacewalks could have been conducted to escort Columbia's crew to Atlantis for a safe return to Earth. "The type of rescue they would have had to mount for that would have been, quite frankly, far, far more difficult than what we're talking about here," Lindsey said. NASA in all likelihood would have to put Lindsey's crew and another shuttle at risk before investigators pinpointed the cause of Discovery's damage. And even if it was apparent, it's unlikely a permanent fix could be in place before the rescue mission would have to get under way. "That would really be a serious decision in and of itself," Lindsey said. But the risk is one he and fellow astronauts would be willing to take. "One thing I can tell you is if we had crewmates in danger, we would do just about anything if we could bring them back," Lindsey said. "That's human nature, and that's the way our office feels." Web posted. (2005). [Astronaut trains for risky rescue [Online]. Available WWW: <http://www.floridatoday.com/> [2005, February 24].]

### **February 25: Space Shuttle Processing Status Report**

Discovery (OV-103); Mission: STS-114 – 17<sup>th</sup> ISS Flight (LF1) - Multi-Purpose Logistics Module; Location: Orbiter Processing Facility Bay 3; Launch Date: Launch Planning Window May 15 to June 3, 2005; Launch Pad: 39B; Crew: Collins, Kelly, Noguchi, Robinson, Thomas, Lawrence and Camarda; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. In Orbiter Processing Facility bay 3, orbiter system testing is 96 percent complete on Discovery for its mission, designated STS-114, to the International Space Station. Final work and closeouts are progressing well in preparation for Discovery's roll over to the Vehicle Assembly Building mid-March. The payload bay doors are scheduled to be closed on Monday for installation of a few remaining door-hinge carrier panels. The payload bay doors will then be opened to verify correct placement of the carrier panels. Once this is complete, the payload bay doors will be closed the final time next week for flight. Work continues on seal installation on the main and nose landing-gear doors, and will be followed by functional tests to ensure the proper compression of the doors. In the Vehicle Assembly Building, paint and cork repairs are complete on the Solid Rocket Boosters' (SRBs) aft inactive stub ring, an attach ring surrounding the booster located about 10 feet below the External Tank (ET) attach point. The ET is scheduled to be moved from the checkout cell to the integration cell and mated, or attached, to the twin SRBs on Monday. Atlantis (OV-104); Mission: STS-121 – 18<sup>th</sup> ISS Flight (ULF1) – Multi-Purpose Logistics Module/Crew Rotation; Location: Orbiter Processing Facility Bay 1; Launch Date: Launch Planning Window July 12 – July 31, 2005; Launch Pad: 39B; Crew: Lindsey, Kelly, Sellers, Fossum, Nowak and Wilson; Inclination/ Orbit Altitude: 51.6 degrees/122 nautical miles. Technicians continue to process Atlantis in Orbiter Processing Facility (OPF) bay 1 for its mission, designated STS-121, to the International Space Station. Powered-up system testing continues with water coolant loop No. 1 servicing and No.2 deservicing, fuel cell leak checks, as well as Global Positioning System and orbiter docking system testing. The Remote Manipulator System, or Space Shuttle arm, was delivered to the bay Thursday for installation into Atlantis' payload bay this weekend. The Forward Reaction Control System was installed on the vehicle Monday, and work continues on bolt installations. Rudder Speed Brake installation is nearly complete, while seal installation and Thermal Protection System blanket bonding on the vertical stabilizer is ongoing. Endeavour (OV-105); On Tuesday, orbiter Endeavour moved from the OPF to the Florida Space Authority's Reusable Launch Vehicle hangar at Kennedy Space Center. While in the hangar, Endeavour will be tested to see how orbiters respond to a new radar system that will be used to detect debris during

launch. In the OPF, work includes modifications to the bay and platform validation. Endeavour will remain in the hangar for approximately 30 days, then return to the OPF. Owner-press-release. (2005). **Space Shuttle Processing Status Report S2-08** [Online]. Available E-mail: [owner-press-release@spinoza.public.hq.nasa.gov](mailto:owner-press-release@spinoza.public.hq.nasa.gov) [2005, February 25].]

**February 27: Calculating which risks to worry about most**

Tools to quantify risk are useful but not the final word on whether space missions are safe. Recently, NASA put the chances of a shuttle disaster at one in 123 missions. In its first major risk assessment in 1995, the odds were 1 in 145. In reality, out of 113 missions so far, two have been lost — about one in 57 missions — pointing to the difficulty of trusting numbers. “The numbers are never correct in the end. You can’t validate them, for one thing,” said the University of Virginia’s James Lambert. He is associate director for the Center for Risk Management of Engineering Systems, which looks at the possibility of catastrophic events. “What does it mean when you’ve got one in a million and you can launch three missions and they all succeed or one fails?” he said. “You can’t validate a one-in-a-million kind of result. You’d need 10 million trials.” The value is in insights derived from risk assessments — the revelation of potential problems, Lambert said. The NASA studies, called probabilistic risk assessments, look at software glitches, hardware failures and human mistakes. They try to predict how things fail, the consequences and the probabilities. But risk assessments have trouble identifying a sequence of events that can lead to catastrophe — for instance, the time, angle and speed of the chunk of foam that fell off Columbia’s external tank, struck the left wing and led to a breach that proved fatal for seven astronauts two years ago. “They’re unique events in the history of the universe,” said Ali Mosleh, director of the University of Maryland’s Center for Risk and Reliability, which developed one of the software tools NASA uses for its risk studies. Risk assessments try to predict classes of events, rather than specific ones. In the late 1990s, NASA began to build up its ability to assess risk, Mosleh said. The agency is still catching up. In some areas, the agency will be a leader in risk assessment, he said, but “there’s a lot of room for improvement.” One area where NASA needs more analysis is “organization factors,” he said, or the influence of human decisions on risk. “If you look closely at both Challenger and Columbia, you see traces of that,” Mosleh said. The Aerospace Safety Advisory Panel recently urged NASA to use probabilistic risk assessments narrowly and avoid stringing together different kinds of simulations to draw a conclusion. “We must make sure that we use it for what it’s meant for,” said panel member Deborah Grubbe, a former consultant to the Columbia Accident Investigation Board and DuPont’s corporate safety chief. Despite risk analysis, there will always be the “unknown unknowns,” as Grubbe calls them, “and that’s the thing that bites you.” NASA spokeswoman Melissa Mathews said the agency has been working on a new probabilistic risk assessment for more than five years. Because it’s still under review, the agency would not allow one of its own risk experts be interviewed. Web posted. (2005). [Calculating which risks to worry about most [Online]. Available WWW: <http://www.floridatoday.com/> [2005, February 27].]



The second redesigned External Tank (ET-121) moves slowly on the road from the Turn Basin to the Vehicle Assembly Building in the background. The tank recently arrived at the Turn Basin aboard a barge after its 900-mile journey at sea from the Michoud Assembly Facility in New Orleans. In addition to the Return to Flight modifications, this tank has been outfitted with temperature sensors and accelerometers, used to measure vibration. These sensors will gather information about how the tank performs during flight. The tank is designated for use on Return to Flight mission STS-121, which has a launch window of July 12 to July 31, 2005.



## MARCH 2005

### **March 1: KSC workers connect external tank, boosters**

Kennedy Space Center is another step closer to sending a shuttle into space after connecting the external fuel tank with a pair of solid rocket boosters Monday. The work was expected to continue into the night, NASA spokeswoman Jessica Rye said. "It's normally a good two-to three-shift operation," she said. Besides minor delays for a false smoke alarm and safety precautions, such as re-reading procedures, all was going well Monday afternoon, she said. A crane lifted the external tank, which is fueled with liquid oxygen and liquid hydrogen before launch, and moved it from its checkout cell into the high bay -- the area of the vast Vehicle Assembly Building where the mobile launch platform is. The tank was then lowered between the vertical solid rocket boosters. Eventually, these parts will be mated to the orbiter Discovery, which is set to fly no earlier than May 15. "This step is the first major integration milestone to get us to the shuttle stack that would roll out to the pad," Rye said. "So this is a major milestone for return to flight." Discovery is scheduled to roll out to the launch pad March 25. Web posted. (2005). [KSC workers connect external tank, boosters [Online]. Available WWW: <http://www.floridatoday.com/> [2005, March 1].]

### **NASA Issues Solicitation for Crew Exploration Vehicle**

NASA's Exploration Systems Mission Directorate today issued a Request for Proposals (RFP) for the Crew Exploration Vehicle (CEV). The CEV is the spacecraft that will carry astronauts beyond low-Earth orbit and to the moon by 2020. The nation's Vision for Space Exploration set a goal of developing a new CEV by 2014. The CEV represents one building block in a future exploration architecture that can send astronauts to the moon and form the basis for exploration missions to other destinations. The contract to build the CEV is a full and open competition. The anticipated period of performance is September, 2005 through December, 2008. The CEV acquisition will use a phased approach that anticipates a maximum of two contractors. The two contracts will be Cost-Plus-Award-Fee. As part of the Phase 1 contract, the contractors will conduct a demonstration flight that provides risk reduction for the human-rated CEV to be delivered in 2014. The Phase 1 portion of the contract will end with a planned down select to a single prime contractor in late 2008. ["NASA Issues Solicitation For Crew Exploration Vehicle," **NASA News Release #05-063**, March 1, 2005.]

### **March 2: Hall of Fame to induct three**

Three history-making shuttle astronauts will bring the number of space explorers enshrined at Titusville's Astronaut Hall of Fame to 60 after this spring's 2005 induction ceremony. Bruce McCandless, Joe Allen and Gordon Fullerton will join the elite club April 30 after being voted in by a committee of current Hall of Fame astronauts, former NASA officials, and flight directors, historians and journalists. McCandless and Allen are best known for their accomplishments on ground-breaking spacewalks, while Fullerton was among the pioneering shuttle pilots. They'll join the likes of John Glenn, Neil Armstrong, John Young and Sally Ride, who are honored at the State Road 405 facility. The new group is the fourth group of shuttle astronauts added to the hall roster. Earlier ones all came from the Mercury, Gemini, Apollo and Skylab missions. To be eligible, an astronaut must be retired and his or her first flight must have happened at least 20 years before. The selection panel seeks astronauts who've made contributions to the U.S. space program in their flights and back on

Earth. Web posted. (2005). [Hall of Fame to induct three [Online]. Available WWW: <http://www.floridatoday.com/> [2005, March 2].]

### **SGS Wins George M. Low Award**

Space Gateway Support (SGS) has just been announced as the winner in the Large Service Category of the prestigious NASA George M. Low Award for quality excellence. SGS is the first recipient of one of the annual awards to a KSC contractor since 1991. E-mail distribution. (2005). [Sample, William A. Re: "SGS Wins George M. Low Award" [Electronic]. **JBOSC Postmaster**, [March 2, 2005].]

### **March 3: Mock launch tests shuttle team**

A clever team of flight controllers conspired Wednesday to riddle NASA's shuttle managers with technical glitches during a practice launch at Kennedy Space Center. And it's not over yet. Wednesday's mock launch was part of a longer simulation during which managers and workers will practice how to solve life-or-death problems under the most realistic conditions. The Simulation Supervisor, head of the team dreaming up the practice mission's plot, gave NASA plenty to work on over the next five days. Two pieces of debris might have hit the orbiter. A main engine problem left Discovery off target, which kept astronaut Andy Thomas from snapping pictures of the external fuel tank falling away from the orbiter in space. That's one less piece of evidence the managers can use to decide if the crew should fly home as-is, repair the damage or wait for rescue. The setup is great because "the point of the sim is to exercise the debris and damage assessment," deputy shuttle program manager Wayne Hale said afterward. NASA is doing more simulations at the behest of Columbia accident investigators, who said bad management decisions were as much to blame for the 2003 disaster as the foam that blasted a hole in the wing. In the real world, all the shuttles remain on the ground. Discovery is set to launch May 15. Web posted. (2005). [Mock launch tests shuttle team [Online]. Available WWW: <http://www.floridatoday.com/> [2005, March 3].]

### **90<sup>th</sup> Anniversary of NACA**

Today NASA marked the 90th anniversary of its predecessor, the National Advisory Committee for Aeronautics (NACA). From March 3, 1915, until its incorporation into NASA on Oct. 1, 1958, NACA provided technical advice to the U.S. aviation industry and conducted cutting-edge research in aeronautics. NACA was created by President Woodrow Wilson to, "direct and conduct research and experimentation in aeronautics, with a view to their practical solution." NASA has continued this tradition. ["NASA Celebrates 90 Years of Aeronautics Excellence," **NASA News Release #05-067**, March 3, 2005.]

### **March 4: Space Shuttle Processing Status Report**

Mission: STS-114 - 17th ISS Flight (LF1) - Multi-Purpose Logistics Module; Vehicle: Discovery (OV-103); Location: Orbiter Processing Facility Bay 3; Launch Date: Launch Planning Window May 15 - June 3, 2005; Launch Pad: 39B; Crew: Collins, Kelly, Noguchi, Robinson, Thomas, Lawrence and Camarda; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Technicians continue to process orbiter Discovery in preparation for the rollover to the Vehicle Assembly Building (VAB) later this month. In Orbiter Processing Facility bay 3, orbiter system testing is nearly complete on Discovery for its mission, designated STS-114, to the International Space Station. In preparation for payload bay door closure, processing continues with work on the Boom Manipulator Positioning Mechanism

assembly fasteners, installation and verification of the Remote Manipulator System camera, and inspections of the airlock wiring. Thermal Protection System blanket bonding continues on the Rudder Speed Brake. Main landing gear thermal barrier installations are complete. On Monday, the External Tank was mated, or attached, to its twin Solid Rocket Boosters in the VAB. Prior to orbiter Discovery joining the stack, final closeouts on the External Tank will include attaching the new bolt catcher and electrical cable connections, as well as installing an aerodynamic fairing and the bi-pod struts, which are the attach points for the nose of the orbiter to the tank. Rack installation into the Multi-Purpose Logistics Module Raffaello began today and is scheduled to continue through mid-March. Raffaello will deliver a variety of supplies, to include clothing, food and spare parts. The Human Research Facility-2 (HRF-2) science rack will be installed at the beginning of next week. HRF-2 will deliver additional biomedical instrumentation and research capability to the Station. HRF-1 contains an ultrasound unit and gas analyzer system and has been operational in the U.S. Lab since May 2001. Both racks provide structural, power, thermal, command and data handling, and communication and tracking interfaces between the HRF biomedical instrumentation and the U.S. Lab, Destiny. Mission: STS-121 - 18th ISS Flight (ULF1) - Multi-Purpose Logistics Module/Crew Rotation; Vehicle: Atlantis (OV-104); Location: Orbiter Processing Facility Bay 1; Launch Date: Launch Planning Window July 12 - July 31, 2005; Launch Pad: 39B; Crew: Lindsey, Kelly, Sellers, Fossum, Nowak and Wilson; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Processing continues on Atlantis in Orbiter Processing Facility (OPF) bay 1 for its mission, designated STS-121, to the International Space Station. Water coolant loop No. 2 was deserviced in support of flex hose work. Initial leak checks of the crew module were completed and determined to be good. Rudder Speed Brake work continues with seal installations, and panel rigging is in work. On Atlantis' wing leading edge, all Reinforced Carbon-Carbon panels and components have been installed for flight. Left-hand lower leading Edge Sub System (LESS) panels 1 through 22 have been installed, and left-hand upper LESS panel installation is in work. Endeavour (OV-105). Orbiter Endeavour remains in the Florida Space Authority's Reusable Launch Vehicle hangar at Kennedy Space Center. While in the hangar, Endeavour is undergoing testing to see how orbiters respond to a new radar system that will be used to detect debris during launch. In the OPF, work includes modifications to the bay and platform validation. Endeavour will remain in the hangar for approximately 30 days, then return to the OPF. Owner-press-release. (2005). **Space Shuttle Processing Status Report** S2-09 [Online]. Available E-mail: [owner-press-release@spinoza.public.hq.nasa.gov](mailto:owner-press-release@spinoza.public.hq.nasa.gov) [2005, March 4].]

### **March 7:**

### **ISS Traveling Exhibit on Display at KSC Visitor Complex**

NASA is bringing the excitement of human space flight to the Kennedy Space Center Visitor Complex, offering an exciting new interactive exhibit that puts visitors "inside" the International Space Station -- the world's only orbiting laboratory. Through March 31, visitors will board "Space Station Imagination" to catch a glimpse of how astronauts live and work in space. "Space Station Imagination" is comprised of two 48-foot trailers linked to form two modules of the Space Station: the Habitation Module, or living quarters, where the astronauts sleep, eat and tend to personal hygiene, and the Laboratory Module where multiple microgravity experiments are performed. Visitors can see examples of features of the habitation and laboratory modules. Animatronics "astronaut" Dr. Emily greets visitors as she awakens to start her day onboard this international orbiting laboratory. Displays show how a space toilet and shower work like vacuum cleaners with very little gravity, as well as how astronauts eat and sleep aboard the Station. A centrifuge displays how scientists might

study the effects of varying levels of gravity on plants, animals and materials. Using actual footage from the Station, three short video presentations entertain and inform viewers with the story of human space exploration and the International Space Station program. The complete tour of the exhibit takes about 20 minutes. ["ISS Traveling Exhibit on Display at Kennedy Space Center Visitor Complex," **KSC News Release #22-05**, March 7, 2005.]

### **Search for O'Keefe's successor drags on**

It has been 10 weeks since then-administrator Sean O'Keefe said he was leaving NASA to take a high-paying university job. Without a permanent replacement named, lawmakers and experts worry there's no one to lead the sensitive political and public relations efforts necessary to get President Bush's space exploration vision moving. While there have been spasms of speculation about the Bush administration naming a replacement for O'Keefe, no nominee has been declared. Shuttle veteran and longtime NASA executive Fred Gregory is temporarily at the helm of the 18,000-person agency. Web posted. (2005). [Search for O'Keefe's successor drags on [Online]. Available WWW: <http://www.floridatoday.com/> [2005, March 7].]

### **NASA announces requirements for craft replacing shuttles**

Ending months of speculation, NASA has revealed its requirements for a new manned spaceship to succeed the shuttle fleet. The craft, named the Crew Exploration Vehicle, is the centerpiece of President Bush's visionary plan to send humans back to the moon and on to Mars. According to a list of objectives the space agency sent to major aerospace companies, the CEV will be designed to carry four to six astronauts into Earth orbit in 2014. It's supposed to land a crew on the moon in 2020, and then establish a lunar base where humans can live for months at a stretch. If it works, it'll be the first time humans will have set foot on the moon since the last Apollo astronauts, Eugene Cernan and Harrison Schmitt, departed on Dec. 15, 1972. To carry out the president's proposal, NASA expects several teams of contractors - led by such titans as Boeing, Lockheed Martin and Northrop Grumman - to submit competing proposals for the Crew Exploration Vehicle this spring. Two finalists will be selected this summer, and a winner will be chosen in 2006. The lengthy notice from the space agency, dated March 1, outlines a three-phase plan for returning to the moon. Web posted. (2005). [NASA announces requirements for craft replacing shuttles [Online]. Available WWW: <http://www.realcities.com/mld/krwashington/11074470.htm> [2005, March 7].]

### **March 8: Technical issues delay shuttle work**

NASA will wrap up work on shuttle Discovery a few days later than planned, delaying movement of the orbiter to the Vehicle Assembly Building and probably to the launch pad. Workers were trying to figure out why a seal didn't set properly on the landing-gear doors during testing, Kennedy Space Center spokesman Bruce Buckingham said Monday. "We had to open them back up and understand exactly what happened there and make repairs and corrections to that," he said. Several other technical issues -- including replacement of an auxiliary power unit -- contributed to the delay. The orbiter was to move to the Vehicle Assembly Building, where it will be connected to its external tank and twin solid rocket boosters, on March 18. The rollover shifted to March 21. The shuttle was to head to the launch pad on March 25 but probably will move later, Buckingham said. Impact to other dates, such as a tanking test scheduled for early April, isn't clear. Padding is built into the schedule. The shuttle team is aiming for final closure of the payload bay doors by the end of

the week. Web posted. (2005). [Technical issues delay shuttle work [Online]. Available WWW: <http://www.floridatoday.com/> [2005, March 8].]

**March 9: NASA helps record flight**

NASA technology played critical roles in last week's record-breaking solo, nonstop flight around the world by wealthy adventurer Steve Fossett. On a gangly airplane created by Burt Rutan, the genius designer behind the world's first privately fielded space vehicle SpaceShipOne, Fossett took off from Salinas, Kan., and flew three days around the world without stopping for fuel or sleep or anything else, before touching back down at the same rural airport Thursday. Fossett's trip might not have been possible without the help of tools provided by NASA's space agency. People at Kennedy Space Center and three other NASA centers contributed technology for the video test and, last week, also aided in monitoring Fossett's historic flight. In addition to the communications feed, NASA loaned the GlobalFlyer team a device called Personal Cabin Pressure Monitor. And, the team had to modify it to function in a special way for Fossett's mission. The device monitors the pressure in the cabin and alerts a pilot of potentially dangerous conditions. In this case, GlobalFlyer's cabin is incredibly loud. The device typically sounds an audible alarm. Fossett would have never heard that over the roar inside the GlobalFlyer's cockpit. Instead, the team modified the alarm to vibrate if there was a problem -- much like a cellular phone sent to vibrate. "We're proud of our very talented, dedicated people and cutting-edge technologies and look forward to even more partnering in the future," said William Readdy, NASA's Associate Administrator for Space Operations. Web posted. (2005). [NASA helps record flight [Online]. Available WWW: <http://www.floridatoday.com/> [2005, March 9].]

**Space Tourism Group Picks Florida Launch Site**

A private space tourism firm with plans to launch civilians on suborbital joyrides has pinned down its launch pad with a little help from the U.S. Air Force (USAF). The firm, Temecula, New Mexico's AERA Corp., has signed an agreement with the USAF to use launch complexes at Florida's Cape Canaveral Air Force Base for future passenger space shots. AERA's agreement with USAF, renewable after five years, allows the company access to the Air Force Station's launch facilities and support facilities as a base for Altairis, six-passenger spacecraft currently slated to begin test flights -- and possibly a commercial spaceflight - in the fall of 2006. But even with a launch site in hand, AERA Corp. still faces major challenges ahead to make its spaceflight goals. While the company has funding from venture capitalists, plans for a spacecraft production facility are still being finalized. Commercial spaceflight regulation hurdles and hiring needs are also a challenge. Reynolds said the Altairis spacecraft is an evolved version of a vehicle designed by Bill Sprague -- AERA founder and CEO -- while he led his American Astronautics team during the Ansari X Prize competition. The current design calls for a vertical launch spacecraft that would then make a horizontal landing. AERA plans to unveil its Altairis design in spring 2005 during an event in New York City, company officials said. Passenger launches would include pre-flight training and a 40-minute ride, according to AERA's website. Web posted. (2005). [Space Tourism Group Picks Florida Launch Site [Online]. Available WWW: <http://www.space.com/> [2005, March 9].]

**March 10: Rocket contractor cutting up to 100 jobs at the Cape**

Jacobs Sverdrup Space Services Group plans to cut as many as 100 jobs at Cape Canaveral Air Force Station once the Titan 4 rocket program ends next month. Jacobs provides



launch-pad support services for the Titan and other government-funded rocket programs on the Cape. The final Titan 4 launch from Cape Canaveral is set for April 6. Last month, Lockheed Martin said it would lay off 425 Cape Canaveral employees, including 325 attached to the Titan 4. Lockheed builds the Titan 4 and is the program's primary contractor. The Titan 4 has been used to launch military satellites since 1989. Lockheed's next-generation rocket, the Atlas 5, will replace the Titan. Eldridge said Lockheed would be furnishing its own support for Atlas 5 launches. Web posted. (2005). [Rocket contractor cutting up to 100 jobs at the Cape [Online]. Available WWW: <http://www.orlandosentinel.com/> [2005, March 10].]

**March 11: Rocket hauls satellite into space from Cape**

An Atlas 5 rocket roared from its seaside pad this afternoon, carrying into space a satellite designed to provide broadband access to mobile users. The Inmarsat 4 is the first of a new breed of spacecraft designed to provide broadband internet and intranet content, video-on-demand, video conferencing, fax, e-mail, phone and local area network access to mobile users almost anywhere in the world. The launch occurred at 4:42 p.m. from Complex 41. Web posted. (2005). [Rocket hauls satellite into space from Cape [Online]. Available WWW: <http://www.orlandosentinel.com/> [2005, March 11].]

**Voyager missions may be shut down**

NASA's twin Voyager space missions may have to close down next October for lack of money, agency officials said. "We are currently developing a plan for shutdown," Edward Stone of the California Institute of Technology, and a project scientist for Voyagers 1 and 2, told the British journal Nature. NASA currently spends over \$4 million per year on the Voyager missions -- a small fraction of the agency's \$16.2 billion annual budget, but possibly expendable at a time of increased costs as NASA scrambles to fund returning the shuttle fleet to flight and getting the new space exploration program off the ground. Though launched in 1977, the two Voyagers could continue to provide data to scientists for another decade or more, even though they are more than 8.7 billion and 6.8 billion miles (14 billion and 11 billion kilometers), respectively, from Earth. Both spacecraft are on the verge of reaching the edge of the solar wind and entering true interstellar space. Web posted. (2005). [Voyager missions may be shut down [Online]. Available WWW: <http://www.washingtontimes.com/> [2005, March 11].]

**Shift to moon-Mars focus affects 2,680 NASA jobs**

About 15 percent of NASA's civil service workforce will be transferred or paid to leave by the end of fiscal 2006 as the agency focuses on President Bush's vision for exploring the moon and Mars. More than 2,680 jobs will be affected as NASA transforms its labor force to support U.S. goals in space. Officials delivered the news to NASA employees across the country in a closed-circuit broadcast Thursday. "This is about reshaping the workforce, more so than downsizing the workforce like we did in the 1990s," Associate Administrator James Jennings told reporters later. On Friday, the agency's largest union, the International Federation of Professional and Technical Engineers, attacked the plan as reckless and misguided. "It threatens the future viability of NASA, in our opinion," IFPTE legislative director Matthew Biggs told *Government Executive*. The union represents more than 8,000 NASA employees at five of the agency's 10 field installations. In January 2004, President Bush laid out an ambitious plan to return Americans to the moon by 2020, this time to stay, and to use the lunar base as a steppingstone to Mars. The plan marks the space shuttle for

retirement in 2010, after NASA finishes building the International Space Station. For more than a year, NASA has been studying how to match its workers' skills and experience with the new mission requirements. Agency leaders recently concluded that those with the wrong credentials must go. Officials are looking to refill some of the positions with experts in nuclear propulsion and power generation for deep-space expeditions. Most of the superfluous jobs are in launch technology programs that NASA has canceled because they didn't fit the space exploration vision, and in the agency's aeronautics program, which is shrinking for the same reason. The cuts are expected to come primarily from field installations in California, Ohio and Virginia. Jennings declined to reveal the list of installations and targeted positions until after officials approve them on May 1. Web posted. (2005). [Shift to moon-Mars focus affects 2,680 NASA jobs [Online]. Available WWW: <http://www.govexec.com/> [2005, March 11].]

### **NASA supervisor fined for taking plywood**

Days before Hurricane Frances (August 31, 2004) hit on Labor Day weekend, James Ronnie Sanders was busy supervising his staff as they prepared Kennedy Space Center for a second storm weeks after Hurricane Charley struck. In hardware stores across Central Florida and beyond, plywood used to board up homes had become a precious commodity. So the 33-year NASA veteran -- a maintenance and facilities manager -- thought nothing when he requested that two other managers help load 10 sheets of plywood onto a government truck and deliver them to his Titusville home while they were on government time. On Thursday, he pleaded guilty in Orlando's federal court to embezzling the NASA material and apologized to U.S. Magistrate Karla R. Spaulding, who spared him by fining him instead of sending him to prison. Web posted. (2005). [NASA supervisor fined for taking plywood before Hurricane Frances [Online]. Available WWW: <http://www.orlandosentinel.com/> [2005, March 11].]

### **Space Shuttle Processing Status Report**

Mission: STS-114 - 17th ISS Flight (LF1) - Multi-Purpose Logistics Module; Vehicle: Discovery (OV-103); Location: Orbiter Processing Facility Bay 3; Launch Date: Launch Planning Window May 15 - June 3, 2005; Launch Pad: 39B; Crew: Collins, Kelly, Noguchi, Robinson, Thomas, Lawrence and Camarda; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Final processing work continues in Orbiter Processing Facility (OPF) bay 3 on orbiter Discovery for its Return to Flight mission, designated STS-114, to the International Space Station. In preparation for the rollover to the Vehicle Assembly Building (VAB) this month, technicians are completing final closeouts of the payload bay and cleaning it for the final closing of its doors next week. Seal installations and cycle checks continue on the main and nose landing gear doors. All work associated with the Rudder Speed Brake is complete for flight, including the final strip and tab installations, and painting and Thermal Protection System blanket bonding on the vertical stabilizer. In the VAB, final closeouts of both the External Tank and the Solid Rocket Boosters (SRBs) continue in preparation for orbiter rollover and Discovery being mated, or attached, to the tank. The upgraded SRB bolt catchers were installed this week. A bolt catcher is a vertical bolt mechanism at the forward end that attaches each booster to the tank. At approximately two minutes into launch, SRB separation begins when pyrotechnic devices fire to break the 25-inch, 62-pound steel bolts. One half of the bolt is caught in canister-like "bolt catchers" located on the tank; the other half remains with the boosters. Discovery is flying with a modified bolt catcher, which was upgraded from a two-piece welded design to a one-piece,

machine-made design. Eliminating the weld makes a structurally stronger bolt catcher design. Installation of resupply stowage racks into the Multi-Purpose Logistics Module Raffaello in preparation for flight began on March 4 and is scheduled to be complete next week. The Human Research Facility-2 (HRF-2) science rack was installed on Tuesday and post-installation closeouts were completed the next day. Raffaello will hold a variety of supplies including food, clothing and spare parts for the Space Station. The HRF-2 will provide additional biomedical instrumentation and research capabilities for the Station and will be installed in the U.S. Laboratory, Destiny. Mission: STS-121 - 18th ISS Flight (ULF1) - Multi-Purpose Logistics Module/Crew Rotation; Vehicle: Atlantis (OV-104); Location: Orbiter Processing Facility Bay 1; Launch Date: Launch Planning Window July 12 - July 31, 2005; Launch Pad: 39B; Crew: Lindsey, Kelly, Sellers, Fossum, Nowak and Wilson; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Technicians continue processing Atlantis in OPF bay 1 for its mission, designated STS-121, to the International Space Station. The right-hand Orbital Maneuvering System (OMS) pod was removed Wednesday and returned to the Hypergol Maintenance Facility. The pod was removed due to time and cycle requirements for the pod's thruster. Another OMS pod will be delivered next month for installation. Checkout and installation of the four Manipulator Positioning Mechanisms that will hold an Orbiter Boom Sensor System (OBSS) on the starboard side of Atlantis' payload bay is under way. The 50-foot-long OBSS will attach to the Remote Manipulator System, or Shuttle robotic arm, and is one of the new safety measures for Return to Flight. It equips the orbiter with cameras and laser systems to inspect the Shuttle's Thermal Protection System while in space. NASA's second redesigned Space Shuttle External Tank, designated for use on mission STS-121, arrived at Port Canaveral Wednesday, following a 900-mile journey at sea from the Michoud Assembly Facility in New Orleans by NASA's Solid Rocket Booster retrieval ship Freedom Star. Late next week, tugs will bring the barge to KSC where the tank will be offloaded and transported to the Vehicle Assembly Building. Endeavour (OV-105); Endeavour is in its Orbiter Major Modification period, which began in December 2003. Owner-press-release. (2005). **Space Shuttle Processing Status Report S2-10** [Online]. Available E-mail: owner-press-release@spinoza.public.hq.nasa.gov [2005, March 11].]

### **GOES-N Satellite Arrives At KSC**

The latest Geostationary Operational Environmental Satellite (GOES) developed by NASA for the National Oceanic and Atmospheric Administration (NOAA), called GOES-N, arrived today by a C17 military cargo aircraft at Kennedy Space Center's Shuttle Landing Facility from the manufacturing plant in El Segundo, Calif. The GOES-N satellite is targeted to launch May 4 onboard a Boeing expendable launch vehicle Delta IV (4,2) with a 3-burn second stage operation. Once in orbit GOES-N will be designated GOES-13 and will complete checkout and be placed in on-orbit storage as a replacement for an older GOES satellite. After arriving, the satellite was transported to Astrotech in Titusville, Fla., where final testing of the imaging system, instrumentation, communications and power systems will be performed. These tests will take approximately two months to complete. Then the spacecraft will be fueled with propellant for the attitude control system, encapsulated in the nose fairing and prepared for transport to the launch pad. GOES-N is the first spacecraft to be launched in the new GOES-N/O/P series of geostationary environmental weather satellites. The GOES satellites continuously provide observations of 60 percent of the Earth including the continental United States, providing weather monitoring and forecast operations as well as a continuous and reliable stream of environmental information and

severe weather warnings. ["GOES-N Satellite Arrives At KSC For Final Pre-Launch Testing," **NASA News Release #24-05**, March 11, 2005.]

### **Bush selects Griffin as NASA Administrator**

President Bush nominated one of the architects of his father's space-exploration plan to run NASA as the agency embarks on a new mission to send humans to the moon and Mars. Michael Griffin, 55, a technology guru who's worked with NASA, the Pentagon and the CIA on space and other cutting-edge projects, is coming back to the space agency with a passion for manned exploration and a belief that parts of the space shuttle could become the next moon rocket. The nomination, which requires Senate confirmation, bodes well for Kennedy Space Center and tens of thousands of space workers on Florida's Space Coast at a time when NASA is cutting work at some of its centers and might even shut some of them down in the not-too-distant future. "I am an unabashed supporter of space exploration in general, and of human space flight in particular," he told Congress in October 2003. "I believe that the human space flight program is in the long run possibly the most significant activity in which our nation is engaged." Griffin is head of the space department at Johns Hopkins University's Applied Physics Laboratory, a respected research hotbed which has worked closely with NASA on -- among others -- a past mission to land on an asteroid, a probe on the way to Mercury and planned flight to Pluto. Griffin served as chief of NASA's exploration office from 1991 and 1993, a time during which the agency was working a moon-Mars plan proposed by the first President Bush. Web posted. (2005). [Bush picks 'visionary' from Johns Hopkins as new NASA Administrator [Online]. Available WWW: <http://www.floridatoday.com/> [2005, March 12].]

### **March 15: Second shuttle fuel tank arrives at the Cape**

NASA's second redesigned Space Shuttle External Tank, designated for use on Atlantis' Return to Flight mission STS-121, is now in place at NASA's Kennedy Space Center, Florida. Following a 900-mile journey at sea from the Michoud Assembly Facility in New Orleans by NASA's Solid Rocket Booster Retrieval Ship Freedom Star, the External Tank was off-loaded from the barge and transported to the Vehicle Assembly Building. In response to the Columbia Accident Investigation Board's recommendation, the new tank incorporates several safety improvements, including an improved bipod fitting that connects the tank to the orbiter. In addition, NASA's second redesigned tank has been outfitted with temperature sensors and accelerometers, used to measure vibration. These sensors will gather information about how the tank performs during flight. In the VAB, the tank will be raised this week from a horizontal to a vertical position, then lifted high into a storage cell, or "checkout cell," where it undergoes inspections of the mechanical, electrical and thermal protection systems. New processing activities resulting from redesign of the tank include inspection of the bipod heater and External Tank separation camera. When tank preparations are complete, it will be attached to Atlantis' Solid Rocket Boosters, on the Mobile Launch Platform. STS-121 is NASA's second Return to Flight mission, carrying a seven-member crew to the International Space Station during a launch planning window of July 12 through July 31. Web posted. (2005). [Second shuttle fuel tank arrives at the Cape [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, March 15].]

### **Vandenberg launch schedule pulled from Web site**

Because of security concerns, the Air Force is no longer providing an online schedule for unclassified launches at Vandenberg Air Force Base. The military's Web site has been

providing upcoming mission information for five years. A base spokesman, Captain Todd Fleming, said the Air Force is still evaluating potential security risks involved with providing launch details to the public. Web posted. (2005). [Vandenberg launch schedule pulled from Web site [Online]. Available WWW: <http://www.kesq.com/> [2005, March 15].]

**March 16: Launch work force likely to decline**

The number of people working at Kennedy Space Center could drop by several thousand around 2010, when there will be no more shuttles or pieces of the International Space Station to prepare for flight. "It's inevitable," the director of the space center, James Kennedy, told more than 100 people gathered at *FloridaToday* on Wednesday for a forum about the space shuttle's return to flight and the future of NASA's exploration program. "Will we sustain 14,000 people beyond 2010? I doubt it," Kennedy said. "We don't think it will take 14,000 people to do that job. Is it 10,000? Or 12,000? I don't know." Kennedy's assessment is the most direct acknowledgement by a NASA or KSC official that the launch workforce on Florida's Space Coast is bound to drop in the decades ahead, not just because of the retirement of the space shuttle, but because NASA and its contractors are aiming to develop systems that are cheaper to fly. That means vehicles will be launched using a smaller work force than has been possible over the past several decades. What Kennedy, and many other NASA officials, have repeated again and again is that future missions will continue launching from here. The launch pads and support buildings are already here. It's the right geographic location. Expert workers are in place here. Kennedy even indicated that the more NASA studies its needs for heavy-lift launchers, the more attractive derivations of the space shuttle look as candidates. Asked about the "gap" in U.S. human space flights between the 2010 retirement of the space shuttle and the scheduled 2014 inaugural flight of its replacement, the panelists cautioned against worrying too much right now about that. Kennedy said the shuttle could fly a couple years longer than planned if that's what it takes to finish the space station, and he noted that unmanned test flights of the early prototypes of the Crew Exploration Vehicle could begin as early as 2008. So, he said, there could be a "negative gap" between the two vehicles launching from here. Web posted. (2005). [Launch work force likely to decline [Online]. Available WWW: <http://www.floridatoday.com/> [2005, March 17].]

**March 18: Time frame tightens for shuttle to-do list**

Shuttle Discovery's move from its hangar has been delayed again because of technical issues, pushing back key dates that lead up to launch. There still is enough padding in the schedule for NASA to launch on the first day of its planned window -- May 15. However, each delay eats more of the extra time. People already are working weekends to get Discovery ready. When the ship's external fuel tank arrived at Kennedy Space Center in January, NASA expected the shuttle to roll to the launch pad around March 16 -- two days ago. Now it appears it might not move to the pad until the first week of April. "They are not really focusing on schedules," Kennedy Space Center spokeswoman Jessica Rye said. "They are focusing on milestones, and what is the work left to be done." The Columbia Accident Investigation Board found that NASA was too schedule-driven and that pressure to meet deadlines compromised safety. Rye stressed May 15 is the beginning of a launch window that lasts almost three weeks. Launch could happen as late as June 3. If not by then, however, NASA will have to wait until July. Work on Discovery could be finished by March 27, Easter Sunday, putting its move to the Vehicle Assembly Building on March 28. If work finishes early, a less likely rollover date is March 26. It takes about a week to connect the



orbiter to the external fuel tank and solid rocket boosters, so if Discovery leaves its hangar March 28, rollout to the launch pad could happen around April 4. Web posted. (2005). [Time frame tightens for shuttle to-do list [Online]. Available WWW: <http://www.floridatoday.com/> [2005, March 18].]

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Kennedy Space Center. While in the hangar, Endeavour underwent testing to see how orbiters respond to a new radar system that will be used to detect debris during launch. In the OPF, work included modifications to the bay and platform validation. Endeavour will return to OPF bay 2 today. Owner-press-release. (2005). **Space Shuttle Processing Status Report** S2-11 [Online]. Available E-mail: owner-press-release@spinoza.public.hq.nasa.gov [2005, March 18].]

### **Crew Checks Out Equipment for RTF**

The astronauts of the Space Shuttle Discovery got a chance today to work with some of the equipment they will be taking to space. Flight commander Eileen Collins and her crew were at NASA's Kennedy Space Center, Fla., for the Payload Crew Equipment Interface Test. The Return to Flight mission of the Space Shuttle (STS-114) is targeted for launch during a window from May 15 to June 3. Returning the Shuttle to flight and completing the International Space Station are the first steps in the Vision for Space Exploration, a stepping-stone strategy toward new exploration goals. STS-114 is the first of two test flights following the Columbia accident. The seven-member Discovery crew will fly to the Station to evaluate procedures for flight safety, including orbiter inspection and repair techniques, and will deliver much-needed supplies. The astronauts performed tests today to ensure the equipment for the mission's three spacewalks worked properly, and they inspected the cargo containers installed in the Italian-built Multi-Purpose Logistics Module, called Raffaello. They performed fit checks on the Thermal Protection System (TPS) repair sample box, the Control Moment Gyro (CMG), and the External Stowage Platform-2 (ESP2). The sample box contains pieces of the Shuttle's heat-shielding tile. The samples will enable the crew to test new on-orbit repair techniques recommended by the Columbia Accident Investigation Board. The new gyroscope will replace an inoperable one on the International Space Station. CMGs provide attitude control for the Station, keeping it properly positioned in space. The ESP2, similar to a large toolbox, will carry replacement parts to the Station. The platform will be deployed, attached to the Station's airlock and used as a permanent spare parts facility. ["Shuttle Crew Checks Out Equipment for Return To Flight Mission," **NASA News Release #05-080**, March 18, 2005.]

### **March 20: NASA's culture still poses danger, ex-astronauts say**

Eight weeks before the space shuttle is due to start flying again, two prominent astronauts who left NASA recently say the agency has failed to fix cultural problems within the space program that helped cause the loss of shuttle Columbia in early 2003. NASA officials still too often allow concerns about schedule and cost, rather than safety, to dictate operations, according to James Wetherbee, the first astronaut to command five shuttle missions, and John Young, who commanded Columbia on the first shuttle flight in 1981. "We're operating the same way," says Wetherbee, in his first comments about why he left the agency in January. Wetherbee, 52, says he left his job on the safety staff at the Johnson Space Center in Houston out of frustration at the slow pace of progress. He still consults for NASA and is writing a book about his time there. "You have to do what we did in the Apollo program. You have to plan for the worst and hope for the best," says Young, 74, who walked on the moon. "And I don't think we're doing that." He retired as an associate director at Johnson in 2004. Neither former astronaut says he thinks the next flight is in danger, but Wetherbee worries that another tragedy is possible if the culture doesn't change. He expresses concern about what he says is management's failure to treat workers' suggestions with respect. And Young says too many shuttle personnel are still too confident in the vehicle's safety. NASA

has begun better safety training. "This kind of change is not something that happens very rapidly," says James Jennings, NASA's management chief, in response to Wetherbee and Young. Jennings acknowledges that NASA hasn't yet rolled out the training to fix the culture at Florida's Kennedy Space Center, where shuttles are housed and launched, and the shuttle program at Johnson. "To me, the more important part is ... have we all agreed that we have to do a more thorough job of making sure we're safe to fly?" says Wayne Hale, deputy shuttle program manager. "We have had a very thorough and in-depth culture change in that regard." Web posted. (2005). [NASA's culture still poses danger, ex-astronauts say [Online]. Available WWW: <http://www.usatoday.com/> [2005, March 20].]

### **March 21: NASA plans for the unthinkable**

When Discovery is launched in a few months, a four-man rescue squad will be standing by. It's a plan for the unthinkable. "It's a place where we don't want to go. We're training for a mission we never want to fly," says the team's commander, Air Force Col. Steven Lindsey. A rescue mission -- which might require the president's approval -- is fraught with complexities: \* A second launch would have to be done hastily, without all the usual tests, possibly putting the rescue shuttle -- Atlantis -- and its crew in harm's way. \* The astronauts on the first shuttle, Discovery, would hole up at the international space station. Designed to house three people, it would be crammed with nine. And everyone would hope the station's often-broken oxygen generator would do its job. \* Discovery would have to be pushed off by remote control into the ocean to make room for Atlantis at the space station. \* If all worked as planned, Atlantis would return to Earth holding an unprecedented 11 people. And even if NASA managed to pull off this nightmare scenario, it would likely mean an end to the shuttle program five years before its time. Never before in 44 years of human spaceflight has NASA gone to such lengths to have a spaceship ready to rush to another's assistance. At Kennedy Space Center, hundreds of employees are toiling around the clock on the possibility. Discovery can't lift off unless Atlantis is ready to fly one month later. It is a self-imposed requirement for the next two shuttle flights and goes beyond the list of recommendations from the panel that investigated the Columbia accident. Web posted. (2005). [NASA plans for the unthinkable [Online]. Available WWW: <http://www.usatoday.com/> [2005, March 21].]

### **Return to Flight Message from the STS-114 Commander**

Return to Flight Message from the STS-114 Commander, Eileen Collins: In just a few weeks, Discovery is scheduled to launch from the Kennedy Space Center. This is an important event in all our lives, not just the seven people who will fly aboard Discovery, but also the thousands of you whose work is making it possible for us to return the Shuttle fleet to space safely. The past two years have challenged all of us to look closely at the work we do and ask 'how can I do this better?' For me personally, these challenges have brought renewed strength and commitment -- to my family, friends and coworkers, and to making sure I do the best possible job I can as Commander of this mission. I believe we are all stronger for having met these challenges and that collective strength is allowing us to return to flight safely, complete the International Space Station, and move forward with the Vision for Space Exploration. When Discovery lifts off the launch pad, my entire crew knows that we will carry your hearts and dreams with us. Thank you for your creativity, your dedication and your commitment. Eileen Collins, Commander, STS-114. E-mail distribution. (2005). [Re: "Return to Flight Message from the STS-114 Commander" [Electronic]. **KSC**

**NASA\_INC Message Center** [KSCNASA\_INCMessagesCenter@ksce.ms.ksc.nasa.gov], [March 21, 2005].]

**March 22: NASA shuttle schedule tightens**

NASA managers say the schedule for the planned May 15 launch of the Space Shuttle Discovery is tight but doable if "everything was to go all our way." The STS-114 mission will mark the first shuttle flight since the fleet was grounded after the Columbia accident on Feb. 1, 2003. The direct cause of the Columbia accident was a piece of insulating foam that fell off the external tank and damaged Columbia's wing. Even though the design requirement specifies that no foam or other debris is allowed to come off the tank, it has occurred on almost every shuttle mission. Engineers at NASA's Marshall Space Flight Center didn't consider the falling foam to be a safety issue, just a nuisance that would lead to additional maintenance to repair the damage to the shuttle's delicate heat-protection system. During the launch of Columbia on its doomed flight, a piece of foam weighing less than 2 pounds fell off the tank and slammed into the wing at 500 mph, creating a 10-inch hole. During re-entry, superheated gases entered that hole and destroyed the wing, leading to the destruction of the shuttle. A newly designed tank is supposed to eliminate most of the falling foam, but Marshall's engineers say they cannot prevent small pieces from falling during future launches. Marshall Manager Michael Kostelnik said, "We have scheduled the 15th of May as our targeted launch date. It should be clearly understood that this is a 'not earlier than' date, which gives us the earliest opportunity we can bring all of the processing elements together." Discovery was scheduled to leave its hangar Friday, but the move was delayed. It is now expected to leave the hangar Monday. Shuttle program manager Bill Parsons said the delay "did eat a little into our contingency" days. After Discovery is attached to the newly certified external tank and solid rocket boosters, it will be rolled to its seaside launch pad in early April. An independent oversight panel is expected to give its approval and certify that NASA has fulfilled all of the changes recommended last April by the Columbia Accident Investigation Board. Mr. Parsons said, "We normally have about five contingency days, if we roll over on the 28th, we've got two or three. We would prefer to have a few more of those." NASA will wait until mid-April before deciding whether to change the May 15 planning date for Discovery's launch. One of the key requirements for the next two shuttle missions is to launch during daylight. Discovery's destination is the International Space Station. The daylight launch requirement limits the available launch dates from May 15 to June 3. If Discovery doesn't launch by June 3, the next opportunity will be in July. Another requirement is the capability to have another shuttle ready to launch as a rescue vehicle within six weeks if necessary. Atlantis is being prepared in conjunction with Discovery just in case it is needed. Web posted. (2005). [NASA shuttle schedule tightens [Online]. Available WWW: <http://www.washingtontimes.com/> [2005, March 22].]

**Special Screening of "Apollo 13"**

To mark the 10<sup>th</sup> anniversary of the Academy Award-winning film "Apollo 13," Jim Lovell, commander of Apollo 13, will introduce a special screening of the IMAX version at 7 p.m. March 22 in the Kennedy Space Center Visitor Complex. Following the film, actor Tom Hanks, director Ron Howard and executive producer Brian Grazer will be available via satellite from Los Angeles, to answer questions from the audience. ["You Are Invited To Attend a Special Screening of "Apollo 13," **KSC Countdown**, March 17, 2005.]

**March 23: NASA will limit launch crowds**

NASA will limit the number of VIPs, tourists and journalists who can attend future shuttle launches at Kennedy Space Center and how close they can get to the launch pad, officials said Tuesday. The agency also will establish "keep-out zones" during landings, clearing areas the shuttle crosses over during final approach to KSC's runway. Moreover, damaged shuttles -- or those that have suffered serious systems failures -- will be diverted to a back-up landing site in New Mexico if public safety might be jeopardized during re-entry. The post-Columbia policy changes are aimed at protecting people who could be exposed to deadly debris during a shuttle launch explosion or an ill-fated atmospheric re-entry. NASA safety chief Bryan O'Connor said the number of visitors on KSC grounds during launches will be limited to 20,000 to 25,000 people. In the past, NASA has hosted up to 60,000 people for launches. Strict crowd control will be applied at KSC viewing sites, some of which are situated just outside a 3-mile launch danger zone that surrounds the twin shuttle pads. "We will pay careful attention to where people are located at the Cape for shuttle launches," O'Connor said. "They can't all get right up to the 3-mile limit. They'll be spread out over various places." The limits aim to bring NASA into compliance with a national standard for protecting launch site workers and spectators from deadly debris in a launch disaster. Web posted. (2005). [NASA will limit launch crowds [Online]. Available WWW: <http://www.washingtontimes.com/> [2005, March 22].]

**Monday looks promising for shuttle rollover, NASA says**

Shuttle Discovery is scheduled to move from its hangar to the 52-story Vehicle Assembly Building Monday as NASA presses ahead with preps for launch of its first post-Columbia mission May 15. In a meeting at Kennedy Space Center on Wednesday, NASA managers determined that all work needed to prepare for the so-called rollover should be completed in time to move the spaceship about 9 a.m. that day. Once in the VAB, Discovery will be hoisted atop a mobile launcher platform and then connected to a 15-story external tank that has two solid rocket boosters attached to it. The fully assembled shuttle is to be rolled out to launch pad 39B on April 4. NASA shuttle program manager Bill Parsons told reporters this week that preparations for the targeted May 15 launch remain on track. The agency only has three or four extra days in its schedule of work that needs to be completed to have the shuttle ready for launch that day. Discovery now is scheduled to take off during a launch period that will extend from May 15 to June 3. The next opportunity to launch after that: A window from July 12 to Aug. 3. A firm launch date will be set after a flight-readiness review scheduled for late April. Web posted. (2005). [Monday looks promising for shuttle rollover, NASA says [Online]. Available WWW: <http://www.floridatoday.com/> [2005, March 24].]

**Sessions focus on space business**

Space Day in Florida's Capitol focused on attracting business to the state to take up employment opportunities lost as the shuttle nears retirement. NASA executives, industry representatives and state space agency officials worked the halls of the Capitol on Wednesday, pressing their agenda for state involvement in keeping Florida's space industry vital. During the sixth annual event, those folks made their case to House Speaker Allan Bense and Gov. Jeb Bush, plus a host of individual lawmakers. "We need to start making course correction of what we're doing," said Adrian Laffitte, of Lockheed Martin Corp., and chairman of the Space Day committee that organized the event. Rep. Bob Allen, a Merritt Island Republican who is chairman of the House Spaceport & Technology Committee, supported the approach. "You should be targeting today's events as business meetings to go



after business other than" launch-related activities, Allen said. A bill by the committee proposes to feed tax revenue from the Kennedy Space Center Visitor Complex -- about \$4 million a year -- into a trust fund for a business-feeder loan program. Jim Kennedy, director of Kennedy Space Center, updated members of Allen's committee about the plan to return the shuttle to space for the first time since Columbia broke up over Texas in February 2003. Launch is scheduled for May 15. "We're T-minus 53 days and counting," Kennedy said. But, as the shuttle program is scheduled to phase out in 2010, Kennedy suggested immediate action to ensure Florida's role in future space missions and preserve a valuable, highly trained work force. The space center saw its employee base fall from 32,000 at the height of Apollo to 14,000 for the shuttle, Kennedy said. In 2010, when the shuttle is due to make its last flight, KSC is expected to draw down its workers to about 10,000. Manned moon and Mars missions are scheduled to begin within a few years of the shuttle retirement. Kennedy and others said attracting research and development companies that would manufacture and assemble key components of the crew exploration vehicle to be used in the next phase of space exploration is key. And the time to pursue those businesses is now, he said. "It's a bright future for us if we seize the moment," said Rep. Ralph Poppell, R-Vero Beach. "We can't wait for it to happen, we have to make it happen." Web posted. (2005). [Sessions focus on space business [Online]. Available WWW: <http://www.floridatoday.com/> [2005, March 24].]

#### **Safety report calls for uncrewed space shuttles**

NASA should retire the shuttles as soon as possible and consider converting them into uncrewed vehicles in order to finish the International Space Station, says an independent safety report. "That's the primary option we hope could be looked at seriously," says Joseph Pelton, who led the project at the Space and Advanced Communications Research Institute at George Washington University, US. The institute released the report on Wednesday, a day after NASA gave an update on its progress towards returning the shuttles to flight. Agency officials were not available to provide comments on the safety report. "We do not consider these conclusions to be either 'pro' or 'con' NASA's current programs," the report states. "Rather, we see our findings as a means to identify ways in which NASA programs could be made safer and more effective." The group recommended that NASA follow all of the Columbia Accident Investigation Board's recommendations on making the shuttles safer, but said the space agency should go further still. The reports says the most pressing issues include the lack of an emergency escape system from the shuttle, the potential for space junk to hit a spacewalking astronaut or the shuttle, and the use of safety waivers to permit shuttles to launch. It also says that NASA should have a full accounting of all safety concerns. The report listed more than 40 specific technical and management issues. Converting one or more of the shuttles into uncrewed vehicles may be a way to finish the International Space Station while also reducing the risk to astronauts, the report said. The shuttle is the only vehicle that can carry the large items needed for ISS construction. The report also recommended bringing back the X-38 program, a prototype for the Crew Return Vehicle for the ISS. NASA axed that program after going over budget on the station. The report was commissioned by the Space Shuttle Children's Trust Fund - established after the shuttle Challenger accident in 1986 - for the families of lost astronauts. Web posted. (2005). [Safety report calls for uncrewed space shuttles. [Online]. Available WWW: <http://www.newscientist.com/> [2005, March 24].]

**March 24: NASA has few ideas for keeping its workers**

NASA has made limited progress toward thinking up ways to keep its skilled shuttle workers as the program winds down, a new Government Accountability Office report says. One problem is that the focus on returning the shuttles to flight hasn't given NASA time to assess future needs, the report says. NASA's vision for space exploration involves retiring the shuttles in 2010, after finishing assembly of the International Space Station, and developing a replacement ship to take astronauts to the moon and Mars. "Program officials indicated that they are faced with uncertainties regarding the implementation of future aspects of the Vision and lack the requirements needed on which to base their workforce planning efforts," the report says. In a letter to the GAO, Congress' auditing arm, acting NASA administrator Fred Gregory said the agency was "carefully and methodically laying the foundation that will be needed to address a comprehensive transition approach." NASA will decide whether to use shuttles to carry heavy cargo to orbit even after assembly of the station is complete, he wrote. The entire shuttle work force -- not just at Kennedy Space Center -- includes about 2,000 government workers and 15,600 through prime contractor United Space Alliance, the report said. Additional workers also support the program. NASA is still having trouble recruiting and retaining skilled workers, the report said. United Space Alliance -- a joint venture of Lockheed Martin and Boeing formed to support the shuttle program -- expects to have trouble convincing potential workers that they'll have job security. "In addition, they said that the lack of job security may be reflected in poor morale, inattention to details, errors, accidents, absences, and attrition," the report said. NASA plans to assess its hardware and facilities this year so managers can look at how many workers will be needed. Space leaders will gather next week in Nashville to talk about the future of the shuttles and station. Web posted. (2005). [NASA has few ideas for keeping its workers [Online]. Available WWW: <http://www.floridatoday.com/> [2005, March 25].]

**Briefing held for New Horizons Environmental Impact**

A Draft Environmental Impact Statement (DEIS) for NASA's planned New Horizons mission to Pluto has been released for a 45-day public comment period that ends April 11. A press briefing will be held at 10 a.m. EST on March 29 at NASA's Kennedy Space Center (KSC) News Center to acquaint the media with the mission to Pluto and its moon, Charon, and the Draft Environmental Impact Statement associated with the launch. The power source for the spacecraft, a radioisotope thermoelectric generator (RTG), uses heat from the decay of plutonium dioxide to produce electricity. The DEIS examines potential environmental impacts under three scenarios: a normal launch, a launch accident with no radiological release from the RTG, and a launch accident involving a radiological release. At 6 p.m. March 29 and 1 p.m. March 30, NASA will host public meetings at the Florida Solar Energy Center in Cocoa, where the general public can comment on the DEIS and learn more about the proposed mission to Pluto and the steps whereby NASA arrives at a recommendation to the NASA Administrator to proceed with the launch. After National Environmental Policy Act reviews, if NASA decides to proceed with the mission, the spacecraft will await presidential approval to launch on January 11, 2006. ["Press Briefing to be held March 29 for Pluto New Horizons Environmental Impact Statement," **NASA News Release #27-05**, March 24, 2005.]

### Space Shuttle Processing Status Report

Mission: STS-114 - 17th ISS Flight (LF1) - Multi-Purpose Logistics Module; Vehicle: Discovery (OV-103); Location: Orbiter Processing Facility Bay 3; Launch Date: Launch Planning Window May 15 - June 3, 2005; Launch Pad: 39B; Crew: Collins, Kelly, Noguchi, Robinson, Thomas, Lawrence and Camarda; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Technicians in Orbiter Processing Facility bay 3 make final preparations for Discovery's rollover to the Vehicle Assembly Building (VAB) on Monday, March 28. The work is completed in the payload bay on the fasteners in the wire trays that were causing minor chafing on the tubing surrounding the wires. The wire tray covers were removed, the chafe protection added, and then borescope inspections were performed to ensure there was clearance between the fasteners and the wires. The payload bay doors were closed today, following payload bay cleaning, final radiator inspections and completion of closeout photography. The payload bay doors will be reopened at the launch pad for the installation of the payload, the Italian-built Multi-Purpose Logistics Module (MPLM) Raffaello. Discovery will be powered down tomorrow in preparation for its rollover. The aft area of the vehicle where the Space Shuttle Main Engines and Main Propulsion System are located is closed out for flight. Over the weekend, technicians will remove the ground support equipment stands from the vehicle and take final vehicle weight and center of gravity measurements. Discovery will be loaded on the Orbiter Transporter System on Sunday. Once Discovery arrives in the VAB, a sling will lift and lower the vehicle between its twin Solid Rocket Boosters and Discovery will be mated, or attached, to its redesigned External Tank. Once mated, the fully assembled Space Shuttle stack will undergo final closeouts including installation of the new digital camera in the orbiter, electrical and mechanical attachments, umbilical checks, and the interface verification test. In the Space Station Processing Facility, cargo stowage installation into the MPLM Raffaello continues in preparation for MPLM hatch closure scheduled for mid-April. Raffaello will carry supplies such as food, clothing and spare parts to the International Space Station. The STS-114 crew participated in the Payload Crew Equipment Interface Test on March 18. The crew performed equipment interface fit checks of the Thermal Protection System repair sample box, the Control Moment Gyroscope and the External Stowage Platform-2, in preparation for the mission's three scheduled spacewalks. The crew also inspected the resupply stowage containers installed in Raffaello. Mission: STS-121 - 18th ISS Flight (ULF1) - Multi-Purpose Logistics Module; Vehicle: Atlantis (OV-104); Location: Orbiter Processing Facility Bay 1; Launch Date: Launch Planning Window July 12 - July 31, 2005; Launch Pad: 39B; Crew: Lindsey, Kelly, Sellers, Fossum, Nowak and Wilson; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Technicians continue work in OPF bay 1 for Atlantis' mission, designated STS-121, to the International Space Station. On orbiter Endeavour, wiring was found in a cable tray in the payload bay that showed the fasteners were causing minor chafing on the tubing surrounding the wires. Rework on Discovery is complete and borescope inspections of wire trays on Atlantis continue. Atlantis' new Orbiter Boom Sensor System (OBSS) arrived at Kennedy Space Center last week and was transported to the Remote Manipulator System lab in the VAB for checkout and final testing before installation in the vehicle. The boom is scheduled to arrive in the bay on April 4 for installation on April 6. The four Manipulator Positioning Mechanisms that will hold Atlantis' OBSS on the starboard side of the payload bay are installed. The 50-foot-long OBSS will attach to the Remote Manipulator System, or Shuttle robotic arm, and is one of the new safety measures for Return to Flight, equipping the orbiter with cameras and laser systems to inspect the Shuttle's Thermal Protection System while in space. Next week Solid Rocket

Booster (SRB) stacking will begin for Atlantis' launch. The right aft booster is scheduled to be moved from the Rotation Processing and Surge Facility to the VAB and lifted onto the Mobile Launch Platform. The External Tank (ET) remains in the checkout cell for final testing. Following the completion of SRB stacking, the ET will be moved and attached to the SRBs in late April. Endeavour (OV-105); Endeavour is in its Orbiter Major Modification period, which began in December 2003. Owner-press-release. (2005). **Space Shuttle Processing Status Report** S2-12 [Online]. Available E-mail: owner-press-release@spinoza.public.hq.nasa.gov [2005, March 25].]

**March 26: Powerhouse: Shuttle-related money fuels county**

NASA and its space contractors form the biggest economic engine in Florida, but their impact is concentrated in the homes and businesses of North Brevard County. In 2003, the last year NASA completed a study, the agency and Kennedy Space Center injected \$1.42 billion of outside money into the state's economy. That included \$849 million in direct pay and benefits to workers' households and \$580 million in purchases from contractors, an economic study found. More than 90 percent of that stayed in Brevard. "The total economic impact of NASA in Florida is unmatched by any other single economic entity in the state," the report said. "The impact of NASA would exceed that of Disney," said Warren McHone, a University of Central Florida economics professor who produced the report as a private consultant. That's possible because the space work force is huge, its salaries are double or triple those in the tourism industry, and the money from NASA comes to Florida and stays, while a share of Disney profits move to Wall Street or Southern California, he said. The biggest economic benefit comes by way of workers spending their pay on homes, goods and services in Brevard County. Web posted. (2005). [Powerhouse: Shuttle-related money fuels county [Online]. Available WWW: <http://www.floridatoday.com/> [2005, March 27].]

**March 28: NASA Tries To Change Culture At KSC**

More than two years after the Columbia tragedy, NASA is finally moving to address one of its major causes at the Kennedy Space Center. Formal training to change that is just now beginning at Kennedy Space Center. Columbia accident investigators say NASA needs a change of attitude -- a new approach to handling problems that threaten the astronauts. That cultural retraining began last year at the Johnson Space Center Mission Control, but the Kennedy Space Center was lower on the priority list. Dr. Phil Meade has a big job -- change the attitude and workplace culture of more than 10,000 people at the Kennedy Space Center. Columbia accident investigators have said the culture was as much to blame for the deaths of seven astronauts as was the piece of foam insulation that made the fatal hole in Columbia's wing. "The actual fact that we had succeeded so many times in the past made people feel like we couldn't fail," Meade said. So, beginning now, a team of outside consultants will work with Kennedy Space Center managers and leaders. But with the return-to-flight launch about seven weeks away, it's impossible to make meaningful changes in that time. "It takes about five to seven years to change the culture," Meade said. Kennedy Space Center workers have had to wait their turn for this training; Mission Control in Houston got it first. That's where the communications and attitude problems that plagued Columbia were identified. But part of the poor communication was between Kennedy Space Center photo analysts, who had seen the foam hit, and Johnson Space Center managers, who did not act on it. Moreover, launch decisions at Kennedy Space Center can be as important as in-flight decisions in Houston. Rank-and-file workers say they get the message anyway. "Part of my

mind-set is what I did is a direct reflection on not only on the success of the machine but there's lives at stake," said Jim Jeffers, a Kennedy Space Center employee. Kennedy Space Center management has done its own work in advance of the arrival of outside consultants. One important change has been to change the safety organization at Kennedy Space Center so that inspectors no longer report to managers who are trying to keep the launches on schedule. Web posted. (2005). [NASA Tries To Change Culture At KSC [Online]. Available WWW: <http://www.wesh2news.com/> [2005, March 28].]

### **White Sands prepared for any emergency shuttle landing**

NASA will need to provide additional equipment at White Sands Missile Range for any emergency space shuttle landings, an official says. An 800-foot crane would be needed to mount the shuttle atop a Boeing 747 airplane to return the shuttle to Cape Canaveral, Fla., said Bob Mitchell, manager of White Sands Space Harbor. White Sands is a backup landing site for space shuttle missions, and the only time a shuttle has used the site was the Columbia, on March 30, 1982 (STS-3). "We've always been ready if called upon," Mitchell said. "Improvements to the facility have continued to be made and the space harbor is in good shape." The National Aeronautics and Space Administration said Tuesday it would institute strict crowd control for space shuttle launches and landings and rely more on White Sands to better protect the public when flights resume in a few months. Bob Plante, spokesman for the NASA White Sands Test Facility, said it could be expensive for NASA to permanently equip White Sands Space Harbor with everything needed for shuttle landings. "In any event, White Sands Space Harbor will be prepared," he said. Web posted. (2005). [White Sands prepared for any emergency shuttle landing [Online]. Available WWW: <http://www.freewmexican.com/> [2005, March 28].]

### **Astronaut Class of 2004 at KSC**

The astronaut candidate class of 2004 will be at the Kennedy Space Center, Fla., April 4 through 6 to participate in firefighting training and familiarization tours. The class of 14 candidates, selected on May 6, 2004, includes three candidates from the Japan Aerospace Exploration Agency (JAXA) as well as three educator astronauts, who were school teachers chosen from among thousands of applicants. During their visit, the candidates will tour the Orbiter Processing Facility, Space Station Processing Facility, Vehicle Assembly Building, Launch Control Center, Shuttle Landing Facility and the Space Shuttle Launch Pads. The candidates will also participate in activities at the Kennedy Space Center Visitor Complex and the Florida State Science and Engineering Fair in Orlando, the afternoon of April 6. ["Astronaut Candidates At NASA's Kennedy Space Center For Training," **NASA News Release #29-05**, March 28, 2005.]

### **March 29: Shuttle Discovery moved to assembly building**

NASA passed a significant milestone in its two-year quest to return the shuttle fleet to flight when shuttle Discovery left its processing hangar early Tuesday and made a quarter-mile journey to the assembly building. The move was the first tangible sign that NASA is beyond focusing on vehicle improvements after the 2003 Columbia space shuttle disaster and has turned its attention to something it has done 113 times already: preparing a space shuttle for launch. "The big step is getting out of the (hangar) because now what is in front of us is relatively standard processing," said Kennedy Space Center spokeswoman Jessica Rye. A newly designed external fuel tank and twin solid rocket motors already are positioned inside the massive assembly building, awaiting Discovery's arrival. Workers plan to attach a harness



around the 100-ton spaceship, then use an overhead crane to hoist it into a vertical position so it can be attached to the fuel tank. The booster rockets already have been bolted to the tank. Completing the dozens of mechanical and electrical connections will take another day, then several days of testing and certification are planned. NASA is scheduled to move Discovery to the launch pad next Monday. Before Discovery is cleared for flight, however, NASA wants to test how well the new fuel tank does its job. The tank has been the primary focus of NASA's efforts to improve shuttle safety following the February 1, 2003, Columbia accident. The shuttle was destroyed and its seven-member crew killed because of damage to the ship's wing caused by a wedge of foam insulation falling off the fuel tank and striking Columbia during launch. The damage was undetected until 16 days later, when the shuttle attempted to fly through the atmosphere for landing. Superheated gases ate into the wing breach, dooming the ship and crew. Upon recommendation of the Columbia Accident Investigation Board, NASA removed the foam wedges and installed heaters instead to keep ice from building up on the outside of the tank once it is filled with cryogenic propellants for launch. The agency has long been wary of ice breaking off the tank during launch and affecting the shuttle. The tanking test, a 12-hour dress rehearsal for launch, is scheduled for April 14. "We want to let the team see how the new heaters react so they're not seeing something for the first time on launch day," Rye said. Web posted. (2005). [Shuttle Discovery moved to assembly building [Online]. Available WWW: <http://www.reuters.com/> [2005, March 29].]

**March 30: NASA: Probe no safety risk**

NASA is offering people a chance to comment today on a planned mission to Pluto that will carry nuclear fuel. The New Horizons mission will use a plutonium-powered radioisotope thermoelectric generator for power in deep space, where sunlight isn't intense enough to run the spacecraft. It's like the generators that flew in the Cassini mission to Saturn -- in fact, it's a spare from that probe. "RTGs have a proven track record and safety record," Kurt Lindstrom, NASA's executive for the mission, said Tuesday at Kennedy Space Center. Several safety reviews and opportunities for public comment remain before the planned January launch. The agency has released a draft environmental impact statement, a document outlining the risk to the public in the event of a launch explosion or some other disaster. Ultimately, the mission must receive President Bush's approval. Pluto is the last planet humans have not studied with a spacecraft. This probe will not only study Pluto and its moon, Charon, as it flies by, but will continue on to the mysterious ring of icy objects known as the Kuiper Belt. The schedule has been challenging, said Orlando Figueroa, a deputy associate administrator in NASA's science directorate, but Lindstrom said there's a good chance of launching in 2006. New Horizons will launch on a Lockheed Martin Atlas 5 rocket from Cape Canaveral Air Force Station. Web posted. (2005). [NASA: Probe no safety risk [Online]. Available WWW: <http://www.floridatoday.com/> [2005, March 30].]

**Shuttle safety task group needs more time**

The US federal advisory group charged with checking that NASA makes the necessary safety changes to the space shuttle program says it needs more information to complete its job. It could turn into another setback for returning the shuttles to flight. The Return to Flight Task Group was initially scheduled to deliver an update to NASA on Thursday. But on Wednesday, after two days of meetings, the group, led by retired astronauts Thomas Stafford and Richard Covey, decided they could not adequately assess NASA's progress without additional information and so postponed their public meeting. The shuttle Discovery is

scheduled to lift off between 15 May and 3 June 2005. If Discovery falls behind and cannot launch in May or June, the next launch window opens between 12 and 31 July 2005. "At the moment, the May-June window is still viable," says NASA spokesman Allard Beutel. But of the 15 safety recommendations made by the Columbia Accident Investigation Board, the task group says NASA has completed just eight. In particular, the task group is waiting for NASA reviews of tests to define how much damage the shuttle's exterior can withstand and studies of what would be considered a successful repair of any damaged tiles and panels, as performed by spacewalking astronauts. NASA says it plans to hold those reviews in mid April. After that, the task group will brief the NASA administrator and release its final report. Originally, the task group said it would give NASA its final assessment 30 days before the first shuttle launch. The task group is also monitoring NASA's progress in preparing the International Space Station as a safe haven for shuttle crews stranded in space in the event that the shuttle incurs damage. Technicians at the Kennedy Space Center in Florida, continue to prepare Discovery for its mission. The orbiter has been moved to the massive Vehicle Assembly Building and on Wednesday was attached to the external tank and solid rocket boosters. The space shuttle could roll out to Launch Pad 39B as early as Monday. Web posted. (2005). [Shuttle safety task group needs more time [Online]. Available WWW: <http://www.newscientist.com/> [2005, April 1].]

### **March 31: NASA's backbone (editorial)**

More than 3.3 million hours of work, 8,000 inspections, and 25,000 pieces of hardware added or replaced. That's the amount of labor NASA and contractor workers have done on shuttle Discovery, which is finally out of its hangar and getting outfitted with its twin solid rocket boosters and fuel tank. If all goes well, the ship will be rolled out to its launch pad Monday in a major milestone toward its planned liftoff between May 15 and June 3, on the first mission since the Columbia disaster. NASA continues to be under the microscope -- and correctly so -- to make certain it's living up the letter and spirit of the safety changes mandated by investigators who probed Columbia's loss. But it's also necessary to praise the round-the-clock dedication of the Kennedy Space Center workforce that has had the daunting task of preparing Discovery for its mission and reviving the nation's human spaceflight program. They've risen to the occasion again, proving they remain the backbone of NASA. They have been skillfully preparing the shuttle fleet for flight for nearly 25 years, quietly and professionally doing what no one else in the world can. They never get the public attention they deserve, but they're not in it for the glamour. They do it because they believe exploring space is part of our collective destiny, and that our community has a front-line role in making that happen. Web posted. (2005). [NASA's backbone (editorial) [Online]. Available WWW: <http://www.floridatoday.com/> [2005, March 31].]

### **Group tackles launch waivers for shuttle flight**

While NASA's space shuttle Discovery prepares to rollout to its launch pad, a team of engineers are working through a mountain of safety waivers to ensure the orbiter is safe for flight. "We're very close, but I don't know if we're going to have every one examined [by launch day]," NASA's space shuttle deputy manager Wayne Hale told reporters Wednesday. "We will likely have some handful of waivers for the flight." As part of NASA's Return to Flight efforts, the space shuttle program has turned waiver approval over to a safety panel dubbed the Independent Technical Authority (ITA), which is separate from the shuttle program and headed by the agency's chief engineer, Rex Geveden. "In the case of Columbia, [the shuttle] program office really owned all the technical requirements, but also

evaluated itself on them, and that's the thing," Geveden told SPACE.com. "You really ought to have an independent panel so that you can look at [waivers] without the pressure of cost and schedules." Discovery, NASA's first shuttle to launch since Columbia's loss, is currently slated to lift off no earlier than May 15 of this year. The orbiter will carry NASA's STS-114 mission, commanded by veteran astronaut Eileen Collins, to test new tools and procedures for shuttle safety, as well deliver much needed supplies to the international space station (ISS). Waivers occur when NASA engineers find potential glitches in orbiter systems that could affect the safety or performance of a shuttle during flight. But before the Columbia accident, the waiver system was woefully ineffective, NASA officials said. "The waiver system at NASA prior to Columbia was inappropriate," said Hale. "We had a huge number of waivers that clogged the system, not allowing us to sift out the safety concerns." Before Columbia launched in January 2003, about 6,000 waivers sat on the orbiter's books, most without any plans to address or eliminate them from the roster, Hale added. "There has been a lot of energy spent over what will constitute a waiver," Geveden said, adding that flight rule modifications or other emergencies may spur new waivers. "It's not just designs and drawings." But since then, shuttle and ITA officials have managed to weed out hundreds that were simply obsolete since they referred to components that were no longer used aboard shuttles. Hundreds more were thrown out because they were impractical, such as one arcane requirement that called for a waiver for each piece of flight hardware that emits electromagnetic interference. According to NASA's most recent edition of its Return to Flight implementation plan, a large number of waivers could be unavoidable if the space agency were forced to launch a rescue shuttle to pick up a stranded orbiter crew at the space station. "If you have to change a flight rule in the middle of a flight, like in a 'safe haven' contingency, then that will be looked at by the Technical Authority," Geveden said. Web posted. (2005). [Group tackles launch waivers for shuttle flight [Online]. Available WWW: <http://www.cnn.com/> [2005, March 31].]



Framed in the open doors of the Vehicle Assembly Building (VAB) at NASA's Kennedy Space Center, Space Shuttle Discovery meets the light of day as it begins its long, slow journey to Launch Pad 39B. First motion was at 2:04 p.m. EDT. The Shuttle comprises the orbiter, External Tank (ET) and twin Solid Rocket Boosters (SRBs). The Space Shuttle rests on the Mobile Launcher Platform, which is moved by the Crawler-Transporter underneath. The Crawler is 20 feet high, 131 feet long and 114 feet wide. It moves on eight tracks, each containing 57 shoes, or cleats, weighing one ton each. Loaded with the Space Shuttle, the Crawler can move at a maximum speed of approximately 1 mile an hour. A leveling system in the Crawler keeps the Shuttle vertical while negotiating the 5 percent grade leading to the top of the launch pad. Launch of Discovery on its Return to Flight mission, STS-114, is targeted for May 15 with a launch window that extends to June 3. During its 12-day mission, Discovery's seven-person crew will test new hardware and techniques to improve Shuttle safety, as well as deliver supplies to the International Space Station. Discovery was moved on March 29 from the Orbiter Processing Facility to the VAB and attached to its propulsion elements, a redesigned ET and twin SRBs.

## APRIL 2005

### **April 1: NASA Plans for Shuttle Retirement**

NASA's future success depends, in part, on how well it plans for the phase-out of the space shuttle program over the next five years without sacrificing expertise and critical industrial suppliers needed for future endeavors, said experts at NASA's annual space operations summit. Not only must NASA managers dispense with \$17 billion of shuttle program assets, they must do so while maintaining a robust enough program to fly about five times a year in order to finish the International Space Station by 2010, when the fleet is scheduled to be retired. Currently, no other launch vehicles can carry the station's large modules and truss segments to orbit. And that is just the beginning. Phase-outs, as NASA has learned from the military's shutdown of its Titan 4 rocket program, can be very expensive, particularly to retain key personnel through the final missions. The military, for example, paid critical team members a bonus of a year's salary to stay with the program through the final Titan 4's flights, scheduled for this year, according to Dennis Granato, Northrop Grumman's director of missile defense and a member of the summit's Industry Panel. In addition, the phase-out of the shuttle will occur as NASA ramps up development of its new program to return astronauts to the moon, the first step of the Vision for Space Exploration initiative outlined by President George W. Bush last year. "This is about transforming the organization into what we're going to need for decades to come," NASA's associate administrator for space flight Bill Readdy said Friday at the closing of NASA's Integrated Space Operations Summit in Nashville, Tenn. "To make the Space Exploration Vision a reality," added Readdy's deputy, Michael Kostelnik, "we have got to do the right things with the space shuttle and return to flight and the space station. It starts right here." NASA's Space Flight Leadership Council met behind closed doors Friday afternoon to consider the recommendations of six panels and determine which, if any, to present to the NASA administrator for further action. The agency's prime concern is how to retain its skilled workers and contractors, particularly during the gap between the shuttle's planned retirement and the first flights of the new Crew Exploration Vehicle. Web posted. (2005). [NASA Plans for Shuttle Retirement [Online]. Available WWW: <http://dsc.discovery.com/> [2005, April 1].]

### **Paperwork delay threatens May launch of shuttle**

NASA is late in supplying vital information to the task force overseeing the agency's effort to resume shuttle flights for the first time since the Columbia disaster – a delay that could force the postponement of Discovery's launch in May. A top shuttle official said Friday that it is taking the space agency longer than expected to put together the necessary paperwork and documentation, and to complete the final reviews on the design changes and other improvements made to the shuttle in the wake of the 2003 catastrophe. Another two weeks of reviews will be needed before that information is available, said Michael Kostelnik, deputy associate administrator for the shuttle and station programs. Earlier this week, the task force indefinitely delayed a meeting to assess NASA's progress, saying it was awaiting the necessary data. NASA is aiming for a May 15 launch of Discovery, but the chances that the space agency can meet that date are slipping because of the paperwork delay and the many postponements in getting the shuttle to the pad. NASA has from May 15 to June 3 to launch Discovery. Otherwise, it must wait until mid-July for the proper daylight conditions needed to photograph the entire ascent. ["Paperwork delay threatens May launch of shuttle," **Orlando Sentinel**, April 2, 2005, p A19.]



## Space Shuttle Processing Status Report

Mission: STS-114 - 17th ISS Flight (LF1) - Multi-Purpose Logistics Module; Vehicle: Discovery (OV-103); Location: Vehicle Assembly Building; Launch Date: Launch Planning Window May 15 - June 3, 2005; Launch Pad: 39B; Crew: Collins, Kelly, Noguchi, Robinson, Thomas, Lawrence and Camarda; Inclination/ Orbit Altitude: 51.6 degrees/122 nautical miles. Discovery was rolled from its hanger, Orbiter Processing Facility (OPF) bay 3, to the Vehicle Assembly Building (VAB) on Tuesday, March 29. First motion of the vehicle was at 1:29 a.m. EST. Once Discovery arrived in the VAB, a sling lifted and lowered the vehicle between its twin Solid Rocket Boosters and Discovery was mated, or attached, to its redesigned External Tank. Mating operations were completed yesterday and the sling was removed from the vehicle. Technicians are currently working final closeouts on the fully assembled Space Shuttle stack. The liquid oxygen and liquid hydrogen electrical mates continue. The installation of a new digital camera in the orbiter is scheduled for today. The Shuttle will be powered up tomorrow for the interface verification test to be performed. Space Shuttle Discovery could begin its four-mile journey to Launch Pad 39B atop a Crawler Transporter as early as 12 a.m. Tuesday, April 5. In the Space Station Processing Facility, cargo stowage installation into the MPLM Raffaello continues in preparation for MPLM hatch closure scheduled for mid-April. Raffaello will carry supplies such as food, clothing and spare parts to the International Space Station. Mission: STS-121 - 18th ISS Flight (ULF1) - Multi-Purpose Logistics Module; Vehicle: Atlantis (OV-104); Location: Orbiter Processing Facility Bay 1; Launch Date: Launch Planning Window July 12 - July 31, 2005; Launch Pad: 39B; Crew: Lindsey, Kelly, Sellers, Fossum, Nowak and Wilson; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. In OPF bay 1, technicians continue processing Atlantis for its mission to the International Space Station. The commander and pilot seat installation on the flight deck is under way. Space Shuttle Main Engine (SSME) installation began today with an engine for position No. 1 being moved from the SSME Shop to the bay installed in Atlantis. The other two engines are scheduled to be installed later today. Atlantis' new Orbiter Boom Sensor System (OBSS) is in the Remote Manipulator System lab in the VAB for checkout and final testing before installation in Atlantis. The boom is scheduled to arrive in the bay on April 4 for installation on April 6. The 50-foot-long OBSS will attach to the Remote Manipulator System, or Shuttle robotic arm, and is one of the new safety measures for Return to Flight, equipping the orbiter with cameras and laser systems to inspect the Shuttle's Thermal Protection System while in space. Solid Rocket Booster (SRB) stacking for Atlantis' launch began when the left aft booster was moved from the Rotation Processing and Surge Facility to the VAB yesterday. It will be lifted onto the Mobile Launch Platform early next week. The External Tank remains in the checkout cell for final testing. Following the completion of SRB stacking, the tank will be moved and attached to the SRBs in late April. Endeavour (OV-105); Endeavour is in its Orbiter Major Modification period, which began in December 2003. Owner-press-release. (2005). **Space Shuttle Processing Status Report** S05-013 [Online]. Available E-mail: owner-press-release@spinoza.public.hq.nasa.gov [2005, April 1].]

### **April 2: NASA sets launch date for robotic spacecraft**

After a series of delays, NASA has scheduled April 15 as the launch date for the first robotic spacecraft designed to rendezvous in orbit with other satellites without any human intervention. "We're prepared for launch," launch director Omar Baez said Friday during a televised news conference from NASA's Marshall Space Flight Center in Huntsville, Ala.

"The next two weeks are crucial. There's a lot of work that's got to be done, but we're getting there." If all goes as planned, the DART spacecraft - short for Demonstration of Autonomous Rendezvous Technology - will soar into space off the California coast, catch up with an orbiting Defense Department satellite and maneuver around it, making close approaches and moving away. The \$110 million mission will last about 24 hours. The U.S. space program has so far relied on astronauts to perform maneuvers between spacecraft in orbit and perform repairs on them. If the DART mission is successful, it will lay the foundation for future manned and unmanned explorations using such technology. Future applications could include robotic delivery of cargo to the international space station and automated docking and repair between spacecraft in orbit. DART is equipped with on-board computers and sensors to perform tasks without human guidance. "The goal of DART is to basically have an autopilot," said Jim Snoddy, DART project manager at Marshall. "If you don't have astronauts, you have a way to totally turn it over to an autonomous system." The 800-pound spacecraft will be mated to a Pegasus winged rocket and mounted on Orbital Sciences Corp.'s Stargazer L-1011 aircraft at Vandenberg Air Force Base on the coast northwest of Los Angeles. The aircraft will carry the rocket over the Pacific and launch it at an altitude of about 40,000 feet. After entering a polar orbit more than 400 miles high, DART will travel around the Earth and join up with three satellites. It will then begin interacting with one of them, an experimental communications satellite that was launched in 1999 and carries special reflectors for use in guidance systems like the one aboard DART. Web posted. (2005). [NASA sets launch date for robotic spacecraft [Online]. Available WWW: <http://www.thedesertsun.com/> [2005, April 2].]

#### **April 4: New Abort Landing Site For Shuttle In France**

The United States and France have agreed that the Istres Air Force Base, near Marseille, will be a formal Transatlantic Abort Landing (TAL) site for space Shuttle launches when the fleet returns to flight later this year. A TAL would be required for an engine failure or any other emergency that calls for an abort to keep the vehicle flying east. It could also be used in any other case of emergency if the Shuttle cannot execute a Return-to-Launch-Site abort procedure back to the Kennedy Space Center. To prepare for possible Shuttle landings, the Istres facility will be equipped with a new microwave landing system and specialized lighting. Web posted. (2005). [New Abort Landing Site For Shuttle In Istres, France. [Online]. Available WWW: <http://www.spacedaily.com/> [2005, April 4].]

#### **Shuttle Discovery rollout delayed a day**

The rollout of shuttle Discovery to the launch pad has been delayed until no earlier than 2 a.m. Wednesday. High humidity in the Vehicle Assembly Building at Kennedy Space Center, where the orbiter has been stacked with its external tank and solid rocket boosters, has slowed work on heat-protection tiles, NASA spokeswoman Jessica Rye said. "We always do some minor step-and-gap tile bonding once we get to the VAB," she said. Workers are doing final checks and closeout work in areas around the points at the ship's nose and where the orbiter attaches to the tank. "That's just a typical thing we would do over there," she said. "We usually just have more time as far as that's concerned to worry about Mother Nature and humidity." Most tile work is done while the ship is in its hangar. Discovery rolled from its hangar to the Vehicle Assembly Building a week ago. Usually, it takes five days to get a shuttle ready in the Vehicle Assembly Building, Rye said. This time, seven days were allotted, though the work is taking longer. The launch planning window for Discovery extends from

May 15 to June 3. Web posted. (2005). [Shuttle Discovery rollout delayed a day [Online]. Available WWW: <http://www.floridatoday.com/> [2005, April 4].]

### **Lockheed Martin rocket delivered to NASA**

Lockheed Martin has delivered the rocket that will launch the Mars Reconnaissance Orbiter mission to Mars from Cape Canaveral Aug. 10. The Atlas V, called AV-007, was built by Lockheed Martin Space Systems at its facilities near Denver and was shipped from Denver to Cape Canaveral in two stages. The Centaur upper stage was shipped out first on March 29, aboard a cargo aircraft and arrived at Cape Canaveral that afternoon. Two days later, the Atlas V's booster stage was shipped from Denver to Cape Canaveral. The Atlas launch team will assemble the two pieces and begin launch testing. When fully stacked and loaded with the Mars Reconnaissance Orbiter, the Atlas will stand almost 19 stories tall at a height of 188 feet. "This is a very exciting week for all of us on the Atlas program and the Mars Reconnaissance Orbiter team" James V. Spornick, Lockheed Martin Atlas program vice president, said in a statement. "Atlas is taking us back to Mars and this year, in particular, holds a very special place in history for NASA and the exploration of our solar system." Atlas launched the Mariner missions to Mars in the 1960s. Mariner 4 provided the first ever close-up images of another planet in the solar system during its Mars flyby in 1965, Spornick said in a statement. Lockheed Martin Space Systems, headquartered near Denver, is the prime contractor for the Mars Reconnaissance Orbiter project. Web posted. (2005). [LockMart rocket delivered to NASA [Online]. Available WWW: <http://denver.bizjournals.com/> [2005, April 4].]

### **Space Shuttle Processing Status Report**

Mission: STS-114 - 17th ISS Flight (LF1) - Multi-Purpose Logistics Module; Vehicle: Discovery (OV-103); Location: Orbiter Processing Facility Bay 3; Launch Date: Launch Planning Window May 15 - June 3, 2005; Launch Pad: 39B; Crew: Collins, Kelly, Noguchi, Robinson, Thomas, Lawrence and Camarda; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Technicians continue to process orbiter Discovery in preparation for the rollover to the Vehicle Assembly Building (VAB) later this month. In Orbiter Processing Facility bay 3, orbiter system testing is nearly complete on Discovery for its mission, designated STS-114, to the International Space Station. In preparation for payload bay door closure, processing continues with work on the Boom Manipulator Positioning Mechanism assembly fasteners, installation and verification of the Remote Manipulator System camera, and inspections of the airlock wiring. Thermal Protection System blanket bonding continues on the Rudder Speed Brake. Main landing gear thermal barrier installations are complete. On Monday, the External Tank was mated, or attached, to its twin Solid Rocket Boosters in the VAB. Prior to orbiter Discovery joining the stack, final closeouts on the External Tank will include attaching the new bolt catcher and electrical cable connections, as well as installing an aerodynamic fairing and the bi-pod struts, which are the attach points for the nose of the orbiter to the tank. Rack installation into the Multi-Purpose Logistics Module Raffaello began today and is scheduled to continue through mid-March. Raffaello will deliver a variety of supplies, to include clothing, food and spare parts. The Human Research Facility-2 (HRF-2) science rack will be installed at the beginning of next week. HRF-2 will deliver additional biomedical instrumentation and research capability to the Station. HRF-1 contains an ultrasound unit and gas analyzer system and has been operational in the U.S. Lab since May 2001. Both racks provide structural, power, thermal, command and data handling, and communication and tracking interfaces between the HRF biomedical instrumentation

and the U.S. Lab, Destiny. Mission: STS-121 - 18th ISS Flight (ULF1) - Multi-Purpose Logistics Module/Crew Rotation; Vehicle: Atlantis (OV-104); Location: Orbiter Processing Facility Bay 1; Launch Date: Launch Planning Window July 12 - July 31, 2005; Launch Pad: 39B; Crew: Lindsey, Kelly, Sellers, Fossum, Nowak and Wilson; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Processing continues on Atlantis in Orbiter Processing Facility (OPF) bay 1 for its mission, designated STS-121, to the International Space Station. Water coolant loop No. 2 was deserviced in support of flex hose work. Initial leak checks of the crew module were completed and determined to be good. Rudder Speed Brake work continues with seal installations, and panel rigging is in work. On Atlantis' wing leading edge, all Reinforced Carbon-Carbon panels and components have been installed for flight. Left-hand lower Leading Edge Sub System (LESS) panels 1 through 22 have been installed, and left-hand upper LESS panel installation is in work. Endeavour (OV-105); Orbiter Endeavour remains in the Florida Space Authority's Reusable Launch Vehicle hangar at Kennedy Space Center. While in the hangar, Endeavour is undergoing testing to see how orbiters respond to a new radar system that will be used to detect debris during launch. In the OPF, work includes modifications to the bay and platform validation. Endeavour will remain in the hangar for approximately 30 days, then return to the OPF. Owner-press-release. (2005). **Space Shuttle Processing Status Report S2-09** [Online]. Available E-mail: [owner-press-release@spinoza.public.hq.nasa.gov](mailto:owner-press-release@spinoza.public.hq.nasa.gov) [2005, April 4].]

#### **April 5: Shuttle May Miss Liftoff Date Now Penciled In**

There is a 50 percent chance that NASA will have to delay launching the space shuttle Discovery for perhaps a week beyond May 15, its planned liftoff date, an agency official said on Tuesday. Despite considerable progress toward returning the shuttle fleet to orbit, said the official, William Parsons, delays in safety assessments and routine preflight preparations are making it hard to reach the goal of launching the Discovery at the beginning of a 20-day "window" that begins on May 15. "It's 50-50 right now that we can make the opening of the window," Mr. Parsons, the manager of the space shuttle program, told reporters in a briefing. He added that he was confident that the Discovery would be ready to begin its 12-day mission to the International Space Station before June 3. But readying the shuttle for flight, including mating the shuttle with its external fuel tank and rocket boosters, has taken longer than planned, he said. If the National Aeronautics and Space Administration cannot launch the shuttle before June 3, it will have to delay the mission until July. Launching windows are based on when conditions like the position of the space station are optimal. While workers at the Kennedy Space Center in Florida have done everything they can to get the Discovery ready, Mr. Parsons said, a series of minor delays have used up all contingency days allowed in the schedule for unexpected problems. He insisted that NASA was not rushing to meet a scheduled launching date, a practice for which the agency has been criticized because it compromises safety. Web posted. (2005). [Shuttle May Miss Liftoff Date Now Penciled In, Official Says [Online]. Available WWW: <http://www.nytimes.com/> [2005, April 5].]

#### **NASA: Debris poses risks**

NASA managers acknowledged Tuesday that the space shuttle's improved external fuel tank still could shed pieces of debris capable of causing critical damage on future flights. Parts of the 15-story tank have been redesigned in the two years since a suitcase-sized piece of foam insulation broke free during launch and smashed a hole at least 6 inches wide in the leading edge of shuttle Columbia's left wing. Superhot gases entered the breach and eventually

caused the ship to break up over Texas as it descended through Earth's atmosphere toward a landing at Kennedy Space Center. With NASA spending \$205 million in tank modifications through 2006, shuttle managers are calling the new version the safest ever. The goal during Discovery's expected return to flight next month is to limit bits of foam debris capable of striking critical parts of the shuttle to less than 0.03 pounds – about the weight of a coffee cup. Nevertheless, officials at Johnson Space Center conceded Tuesday that a piece that small still could cause disaster if it hit a particularly vulnerable area at the wrong speed and angle. [“NASA: Debris poses risks,” Orlando Sentinel, April 6, 2005, p A1 & A11.]

**April 6: Petition: Grissoms should get spacesuit**

A Connecticut schoolgirl is fighting the federal government over an artifact of space exploration history. Amanda Meyer, 15, of Madison, Conn., has launched a petition drive to have the Mercury spacesuit worn by Gus Grissom returned to his family. Meyer says the family told her they want the suit to tour the country to help keep the late astronaut's memory alive. Despite almost 500 signatures on an Internet petition, the silver suit likely will remain in the Astronaut Hall of Fame near Kennedy Space Center, where it is the focus of an exhibit on the Mercury program. The suit's staying put, said Peter Golkin, a spokesman for the Smithsonian's Air and Space Museum, which claims the suit. "You've got to give young Amanda credit for being interested," Golkin said. "Gus Grissom's certainly a great role model for someone who wants to be an astronaut. But I don't think she got her facts straight." Meyer learned about the suit's disputed ownership while writing an essay about Grissom, who died during an Apollo training accident in 1967. Grissom's son, Scott, told her in February that the family was upset that they had lost control of the suit. The second U.S. citizen to fly into space, Grissom wore the silver suit during a 15-minute flight on the Liberty Bell 7 capsule in 1961. At some point, he took it home. In 1990, the family lent the suit and several personal items to the Astronaut Hall of Fame, which was formed by a group of astronauts but is now owned by a private company under contract to NASA. The Hall of Fame displays eight NASA artifacts, including the Apollo 14 capsule. The museum returned Grissom's personal items in 1997 but kept the suit. Web posted. (2005). [Petition: Grissoms should get spacesuit [Online]. Available WWW: <http://www.floridatoday.com/> [2005, April 6].]

**Web sponsorship opportunity for upcoming shuttle missions**

NASA has a sponsorship opportunity for companies to place their corporate identity on NASA's popular Web site for two of its highest-profile missions this year. In return, this partnership would provide NASA increased Internet capabilities during events related to the upcoming Space Shuttle missions of Discovery (STS-114) and Atlantis (STS-121). NASA is expecting 20 to 30 million visits to its Web site during each of these missions. Proposals are being solicited from now until Wednesday, April 13, at 4:30 p.m. EDT. Interested parties can refer to the NASA Acquisition Internet Service (NAIS) for the official announcement. The Discovery and Atlantis Space Shuttle missions are the first since the Columbia accident in February 2003. Launch of Discovery for its Return to Flight mission is targeted for May 15 with a launch window that extends to June 3. Atlantis' targeted launch window is from July 12 through 31. During both missions, crews will test new hardware and techniques to improve Space Shuttle safety, as well as deliver supplies to the International Space Station. [“Web sponsorship opportunity for upcoming space shuttle missions,” **NASA Release #M05-055**, April 6, 2005.]



#### **April 7: Titan 4 rocket temporarily delayed**

The final Titan rocket to fly from Cape Canaveral, originally scheduled for this weekend, is searching for a new launch date after encountering trouble with balky ground equipment. Liftoff of the Lockheed Martin Titan 4B booster from Complex 40 carrying a classified national security payload was supposed to happen sometime between 8 and 10:30 p.m. EDT Sunday. But difficulties loading storable propellants into the first and second stages earlier this week forced delays to Monday, then Tuesday and now the Air Force has no official target date selected. Problems cropped up when technicians were preparing to pump Aerozine 50 fuel -- a mixture of hydrazine and unsymmetrical dimethyl-hydrazine -- and nitrogen tetroxide oxidizer into the two stages. But gremlins in the ground equipment scuttled the timeline. "We've had a couple of hardware issues with our ground support equipment that has just caused us some delays," Ben Dusenbery, Lockheed Martin's director of Titan launch operations at Cape Canaveral, said in an interview this week. The first and second stages have since been filled with the Aerozine 50 propellant. However, problems with the hardware used for loading the nitrogen tetroxide have persisted. Officials noted that the glitches reside in the pad systems and not the Titan 4 rocket itself. Web posted. (2005). [Cape's goodbye to Titan 4 rocket temporarily delayed [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, April 7].]

#### **NASA's Space Shuttle Discovery Arrives At Launch Pad**

NASA's Space Shuttle Discovery arrived at its launch pad completing the next major milestone for Return to Flight of America's Space Shuttle program. The Shuttle arrived at its launch pad at 12:30 a.m. This was approximately three hours later than its scheduled arrival. The slight delay was caused when Shuttle processing team members had to replace a Programmable Logic Controller (PLC) circuit card on the Crawler Transporter during the final leg of its journey. The Crawler Transporter is the vehicle which transports the Space Shuttle and its Mobile Launcher Platform to the launch pad. The PLC is an indicator that relays height measurements to the Crawler's operators while it's in motion. The issue occurred during Discovery's initial attempt to climb the incline ramp leading to Pad 39B. When observed, technicians decided to stop the rollout and then reverse Discovery back down the incline ramp to level ground to test and then replace the circuit card. Once the new card was in place, the Crawler functioned normally and the rollout was completed. The Space Shuttle remained level and in a safe configuration throughout all movements and during the changeout of the card. Once in place at the launch pad, the shuttle team continued preparation of Discovery for its scheduled launch set for a window of May 15 to June 3. ["NASA's Space Shuttle Discovery Arrives At Launch Pad," **NASA News Release #31-05**, April 7, 2005.]

#### **Expendable Launch Vehicle Status Report**

Demonstration of Autonomous Rendezvous Technology (DART); Launch Vehicle: Pegasus XL (Orbital Sciences Corporation); Launch Date: April 15, 2005; Launch Window: 10:25 a.m. PDT; In the Orbital Sciences Corporation hangar at Vandenberg Air Force Base in California, DART has been re-mated to the Pegasus launch vehicle and fairing reinstallation will be completed today. Flight Simulation 4A was completed on April 1 as scheduled with a nominal outcome. The Flight Readiness Review will occur later this week. The Launch Readiness Review, the final review to be held, is set to occur one day before launch. All Pegasus launch vehicle and DART spacecraft issues have been resolved. The Orbital Sciences L-1011 aircraft arrives at Vandenberg Air Force Base today. The Pegasus will be

integrated with the Orbital Sciences L-1011 carrier aircraft late this week. A Combined Systems Test of the Pegasus/DART/L-1011 combination will be conducted over the weekend. A launch countdown and mission dress rehearsal is scheduled for early next week. At this time, there are no issues or concerns and launch is on schedule for April 15. Mission: NOAA-N (National Oceanic & Atmospheric Administration); Launch Vehicle: Boeing Delta II 7320; Launch Pad: SLC-2, Vandenberg Air Force Base, Calif.; Launch Date: May 11, 2005; Launch Window: 3:21:01 - 3:31:01 a.m. PDT. At Vandenberg Air Force Base in California, replacement of a faulty S-band transmitter on NOAA-N has been completed and the satellite was successfully retested. The spacecraft batteries have been discharged in preparation for its two-day installation into the transportation canister during the third week of April, followed by the trip to nearby Space Launch Complex 2. At the pad, preparations for launch of the Boeing Delta II are going well and there are no issues or concerns. The next major milestone, which occurs next week, is the loading of the first stage with liquid oxygen to check for leaks. The launch team will also conduct a countdown and recycle exercise as part of crew certification required for launch. To follow, a Simulated Flight will be conducted. This is an electrical test that ensures all flight systems of the Delta II are operational and that the vehicle is ready for NOAA-N to be mated to the rocket. The final milestone is the Flight Program Verification at the end of April, an integrated test to verify the capability of the Delta II and NOAA-N to operate in unison during launch. Upon successful completion of this test, the fairing can be installed around the spacecraft. This is scheduled to occur the first week of May. At this time, there are no issues or concerns and launch is on schedule for May 11. After launch, NOAA-N will be renamed NOAA-18 and will provide measurements of the Earth's surface and atmosphere that will be entered into NOAA's weather forecasting models and used for other environmental studies. The spacecraft will be turned over from NASA to NOAA after on-orbit checkout is complete. KSC News Center (2005). **Expendable Launch Vehicles Status Report** ELV-040705 [Online]. Available E-mail: [ksc@newsletters.nasa.gov](mailto:ksc@newsletters.nasa.gov) [2005, April 7].]

### **I'm not worried, Discovery commander says**

As she prepares to return a crew of astronauts to space, Discovery shuttle commander Eileen Collins said Thursday that her crew won't fly if NASA doesn't meet a task force's safety recommendations. "If we ever get to the point where a recommendation is not filled in anyone's mind, we are not going to fly," the retired Air Force colonel said with her six-member crew during a news conference at Johnson Space Center in Houston. But the agency's only female commander said she is confident NASA has met all the requirements – and exceeded some. "We have come a long way, and in that respect, we are ready to fly this mission," she said, adding neither the task force nor the space agency's work is complete. So far, the agency has met seven of the Columbia Accident Investigation board's 15 recommendations for resuming shuttle flights. Another is on the verge of being fulfilled, and virtually all the paperwork for the remaining seven has been submitted to the task force overseeing NASA's return-to-flight effort. ["I'm not worried, Discovery commander says," **Orlando Sentinel**, April 8, 2005, p A16.]

### **April 8: NASA officials lay out shuttle mission schedule**

NASA officials on April 7 laid out the day-to-day schedule for the space shuttle's return-to-flight mission (STS-114), which will spend 13 days in orbit testing new safety procedures and resupplying the International Space Station (ISS). Shuttle Discovery is scheduled to fly during a launch window lasting from May 15 to June 3. The crew will spend their first day in

orbit preparing for the inspection of the shuttle's thermal tiles and reinforced carbon-carbon (RCC) panels that will take place on Day 2. Preparations will include sending data from the shuttle's new debris impact sensors down to mission control for analysis. "It's important to us to bring [the data] down on Flight Day 1, because if we do see indications of impact, those indications will help focus our inspections over the next couple of days," STS-114 Lead Shuttle Flight Director Paul Hill said during a press conference at Johnson Space Center in Houston. On Day 2, the crew will use the Orbiter Boom Sensor System (OBSS) to scan the leading edges of the shuttle's wings for damage, starting with the starboard wing. Each wing will take 45 minutes, Hill said. The crew then will use the OBSS to scan the shuttle's nose cap and underside. On Day 3, the shuttle will dock with the space station. On Day 4, the astronauts will transfer the Multi-Purpose Logistics Module (MPLM) out of the shuttle's cargo bay and install it on the ISS in preparation for cargo transfer. Day 5 will include the mission's first spacewalk, when the crew will demonstrate repair techniques for shuttle tiles and RCC developed in response to the Columbia accident. On Day 6 the crew will transfer supplies from the MPLM into the station, as well as fill the MPLM with unwanted items from the ISS. On Day 7 the crew will perform a spacewalk to replace one of the station's failed Control Moment Gyros (CMGs), which the ISS uses for attitude control. On Day 8 they will clean up from the spacewalk and get a half-day of free time. During their third and final spacewalk on Day 9, the astronauts will install the External Stowage Platform on the ISS and complete all MPLM transfers. On Day 10 the MPLM will be placed back in the shuttle's cargo bay using the station's robotic arm. On Day 11 the shuttle will be undocked from the station, and on Day 12 the crew will prepare for re-entry and landing. The crew will return home on Day 13. E-mail distribution. (2005). [Aviation Week's Aerospace Daily & Defense Report Re: "NASA officials lay out shuttle mission schedule," [Electronic]. Vol. 214, No. 6, [2005, April 8].]

**April 11: DART Spacecraft to launch on Pegasus XL Rocket April 15**  
NASA's Demonstration of Autonomous Rendezvous Technology (DART) spacecraft is scheduled to launch from an Orbital Sciences Pegasus XL vehicle on Friday, April 15, during a 7-minute launch window which extends from 10:21:49 - 10:28:49 a.m. PDT. The drop of the Pegasus from the L-1011 carrier aircraft is targeted to occur within the launch window at 10:25 a.m. PDT at a location over the Pacific Ocean approximately 100 miles offshore from Vandenberg Air Force Base, Calif. The DART spacecraft is about 6 feet long and 3 feet in diameter, weighing approximately 800 pounds with fuel. It will be placed into a 472-mile-high circular polar orbit at an inclination of 97.7 degrees. DART will demonstrate key technologies required for spacecraft to rendezvous with other craft, such as satellites, without human intervention. DART will combine key autonomous technologies to actually rendezvous with a target satellite during the mission. It is the first demonstration program selected by NASA's Exploration Systems Mission Directorate to develop technologies for the Vision for Space Exploration. NASA's John F. Kennedy Space Center in Florida is responsible for countdown and launch management; NASA's Marshall Space Flight Center in Huntsville, Ala., is responsible for the overall DART mission management and associated technology development; and Orbital Sciences Corporation is responsible for providing the Pegasus launch service and for building the DART satellite. ["DART Spacecraft to launch on Pegasus XL Rocket April 15," **NASA News Release #32-05**, April 11, 2006.]

**April 12: Senate committee moves on NASA leader**

A Senate committee praised President George W. Bush's choice as administrator of the U.S. space agency and gave rocket scientist Michael Griffin a daunting list of tasks, including saving the Hubble telescope and speeding the delivery of a new manned space vehicle. The Senate Commerce Committee scheduled a vote later in the day on Griffin, with members saying it was urgent to get Griffin on the job at NASA before the planned launch next month of the first space shuttle since the Columbia broke up over Texas in February 2003. Griffin, would be the 11th administrator of the National Aeronautics and Space Administration since its founding in 1958 in the aftermath of the Soviet Union's launch of Sputnik 1, the world's first artificial space satellite. He would succeed Sean O'Keefe, who left the post in February to become chancellor of Louisiana State University. Several senators urged Griffin to act to resuscitate the Hubble Space Telescope, which is wearing down and will die unless costly and potentially risky action is taken to save it. Griffin said the knowledge of the universe gained from the Hubble compares to Einstein's theory of relativity. Citing the costs of an unmanned fix, however, he said he would "like to take the robotic mission off the table." He said he would reassess the possibility of a manned mission to the telescope after shuttle flights are resumed. Web posted. (2005). [Senate committee moves on NASA leader (*Associated Press*) [Online]. Available WWW: <http://www.washingtonpost.com/> [2005, April 12].]

**Griffin's priorities: shuttles, new craft**

Keeping the rocket launch pads at Kennedy Space Center from falling silent later this decade will be a top priority for the aerospace engineer and executive nominated to become the next NASA administrator. Michael Griffin told a Senate panel Tuesday that, if confirmed, his first priority will be getting the remaining three space shuttles flying safely again. After that, Griffin said, he would work to make sure the agency builds new vehicles to reach the moon and Mars sooner than forecast by previous NASA administrator Sean O'Keefe. "I don't believe we wish to see a situation where the United States is dependent on any partner for human access to space," said Griffin, who holds advanced degrees in physics, engineering and business. The National Aeronautics and Space Administration's current timeline calls for the shuttles to be retired in 2010, five years before a new craft, currently designated as the Crew Exploration Vehicle, will be available. Griffin, who worked previously as NASA's chief engineer and associate administrator for space exploration, said there is no reason why it should take so long. "It seems unacceptable to me," Griffin said, noting NASA developed the Gemini spacecraft in just more than three years and the Apollo vehicles in about six years. In his brief appearance before the Senate Commerce, Science and Transportation Committee on Tuesday, Griffin expressed support for President Bush's vision to send astronauts back to the moon and on to Mars. Committee Chairman Ted Stevens, R-Alaska, said he hopes to hold a panel vote on Griffin's nomination quickly so the Senate can vote by Friday on confirming him. Griffin would become the 11th administrator in NASA's 47-year history. ["Griffin's priorities: shuttles, new craft," **Florida Today**, April 13, 2005, p 1A & 6A.]

**April 13: Dr. Michael D. Griffin To Become NASA Administrator**

The U.S. Senate tonight confirmed the nomination of Dr. Michael D. Griffin as NASA's 11th Administrator. He is expected to be sworn in later this week. President George W. Bush nominated Dr. Griffin as NASA Administrator in March, while he was serving as the Space Department Head at Johns Hopkins University Applied Physics Laboratory,

Baltimore. Dr. Griffin was President and Chief Operating Officer of In-Q-Tel, Inc., before joining Hopkins in April 2004. He also served in several positions within Orbital Sciences Corporation, Dulles, Va., including Chief Executive Officer of Magellan Systems, Inc. Earlier in his career, Dr. Griffin served as Chief Engineer at NASA and as Deputy for Technology at the Strategic Defense Initiative Organization. He also has served as an adjunct professor at the University of Maryland, Johns Hopkins University and George Washington University. ["Dr. Michael D. Griffin To Become NASA Administrator," **NASA Release**, April 13, 2005.]

**April 14: Shuttle fuel tank test is under way**

NASA is fueling a space shuttle for the first time since January 2003. After gloomy weather fears prompted NASA to delay for a couple of hours earlier this morning, the critical test got underway just after 8 a.m. this morning at Kennedy Space Center. Engineers had been scheduled to begin filling shuttle Discovery's redesigned tank at 5:30 a.m. but meteorologists said there was a chance of thunderstorms and possibly hail this afternoon. Heavy rain and hail could damage the fragile thermal tiles that protect the shuttle from the intense heat – up to 3,000 degrees Fahrenheit – encountered during atmospheric reentry. Things looked better around 7:30 a.m. and the launch team started pumping fuel into the tank at 8:14 a.m. Today's test is considered key to NASA plans to launch its first post-Columbia shuttle mission next month. With the fully assembled shuttle perched on launch pad 39B, engineers will pump 526,000 gallons of supercold liquid hydrogen and liquid oxygen into the bullet-shaped fuel reservoir. An eight-member inspection team then will head out to the pad and try to spot any build-up of ice that might break free from the tank during launch and damage the shuttle. The test is aimed primarily at checking out changes made to the 15-story tank in the wake of the February 2003 Columbia accident. The test is a key milestone in NASA's bid to return its shuttle fleet to service. If all goes well, then only standard prep work would need to be completed before flight. It's being broadcast live on NASA Television this morning. Discovery remains scheduled to launch on May 15. Web posted. (2005). [Shuttle fuel tank test is under way [Online]. Available WWW: <http://www.floridatoday.com/> [2005, April 14].]

**NASA managers elated with shuttle fueling test**

The space shuttle's redesigned fuel tank sailed through a critical tanking test today, giving NASA managers increased confidence about launching Discovery on the first post-Columbia shuttle mission next month. "We had an outstanding day today," said Wayne Hale, deputy manager of the shuttle program and chairman of NASA's mission management team. "After a long period of preparation, we're beginning to see our operations come to fruition. Today, we saw the newly modified external tank perform in an outstanding manner, we saw Discovery, which has gone through about three years of modifications, perform in an outstanding manner. And I have to also say the launch pad, the facility, which has gone through a major modification and extensive re-work, performed almost without flaw of any consequence." Web posted. (2005). [NASA managers elated with shuttle fueling test [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, April 14].]

**April 15: NASA boss shows his funny side on first day**

Don't call him Mr. Griffin, or Dr. Griffin, he said. Just call him Mike. The new chief of America's space agency told the troops in an impromptu question-and-answer session that



he wanted to be treated "like just another person. The NASA Administrator is not royalty." He took a light-hearted, humble approach in his first words to the agency's work force. In his first day on the job, after the U.S. Senate rushed to confirm him Wednesday night, Griffin met with the agency's employees at headquarters in Washington and at centers across the country via NASA Television. He didn't say much different than he told his Senate questioners earlier this week during confirmation hearings, but he took questions and promised to always consider workers' input before making decisions. Griffin was sworn in Thursday. Most important, Griffin said his top priority is the decision about returning the space shuttles to flight. He didn't hint what his decision would be, but he said reviewing the shuttle's safety and readiness to return to space would dominate his life for the next few weeks. Discovery, on the launch pad, is set to fly sometime between May 15 and June 3 if all continues to go as planned with preparations at Kennedy Space Center. However, an independent task group is not finished reviewing NASA's progress, and shuttle managers are still engaged in key reviews of whether problems that caused Columbia have been fixed. In the end, Griffin will be asked to make the call whether to fly or not. After that, Griffin said he intends to visit with leaders of NASA's science, aeronautics and exploration offices. He wants to check on the progress made thus far implementing President Bush's policy to send astronauts back to the moon by 2020 and later on to Mars. Griffin said he plans, as soon as possible, to tour every NASA center and meet with workers. He's no stranger to the agency, having filled various roles inside and for contractors working closely with NASA. However, Griffin joked this was his last chance to work at NASA. "After this, I can never work in this town again." Web posted. (2005). [NASA boss shows his funny side on first day [Online]. Available WWW: <http://www.floridatoday.com/> [2005, April 15].]

#### **Raffaello Logistics Module Sealed For Space Shuttle Flight**

A milestone in preparation for Space Shuttle Discovery's Return to Flight Mission (STS-114) was achieved on April 14 when the hatch was closed on the Multi-Purpose Logistics Module, Raffaello, at NASA's Kennedy Space Center, Fla. (KSC). The module will carry 12 racks of cargo to the International Space Station (ISS), including food, clothing, spare parts and research equipment. "With hatch closure of Raffaello, we are one step closer to Return to Flight and resuming re-supply and assembly of the Station," said Tip Talone, director of International Space Station and Payload Processing at KSC. "The processing team did a superior job." The Boeing Company, KSC and NASA prime contractor for ISS element processing, prepared Raffaello for flight. The module was built by the Italian Space Agency for NASA under a cooperative space agreement. ["Raffaello Logistics Module Sealed For Space Shuttle Flight," **NASA News Release #34-05**, April 15, 2005.]

#### **NASA Launches Dart Spacecraft**

NASA's Demonstration of Autonomous Rendezvous Technology (DART) spacecraft successfully launched today at 1:25 p.m. EDT (10:25 a.m. PDT) from Vandenberg Air Force Base, Calif., beginning a 24-hour mission to demonstrate technologies required to locate and autonomously rendezvous with another craft in space using only computers and sensors. Web posted. (2005). [NASA Launches Dart Spacecraft [Online]. Available WWW: <http://www.floridatoday.com/> [2005, April 15].]

#### **April 16: Glitch ends NASA's robotic mission**

A NASA robotic spacecraft located a Pentagon satellite in space with no help from human controllers, but the mission ended early when the computer-driven craft detected a fuel

problem, the mission manager said Saturday. The experimental DART spacecraft – short for Demonstration of Autonomous Rendezvous Technology – had moved to within 300 feet of the satellite orbiting 472 miles above Earth but ended its approach late Friday, about 11 hours into the mission. The 800-pound craft was supposed to have maneuvered around the satellite, getting as close as 15 feet, for an additional 12 hours before disintegrating in orbit. The DART spacecraft was launched from a aircraft Friday morning (April 15). [“Glitch ends NASA’s robotic mission,” **Orlando Sentinel**, April 17, 2005, p A3.]

**April 18: Could shuttle land without crew aboard?**

NASA engineers are studying options for returning a space shuttle from orbit and landing it with no one aboard if astronauts need to take refuge on the international space station. Shuttles already have a system that can automatically perform most landing functions. However, some key tasks -- such as lowering the landing gear and deploying a pair of probes that collect airspeed, altitude and temperature data during the last moments of flight -- require an astronaut at the controls. The potential changes would allow the flight team on the ground to land an unmanned shuttle completely by remote command. "When we designed the shuttle years ago, they weren't [connected] for a variety of reasons," said Wayne Hale, NASA's deputy director of the shuttle program. "The modifications to allow that capability to be automated are going to take some time." If that capability becomes a reality, it could give NASA an alternative to scuttling a damaged orbiter. Plans developed in the wake of the 2003 Columbia accident raise the possibility that future shuttle crews might seek haven at the space station if there is evidence their ship needs repairs, rather than risk the fiery plunge home through Earth's atmosphere. Under that scenario, a rescue shuttle would be dispatched to retrieve them. Current plans call for the damaged orbiter to be ditched in the ocean to allow the rescue mission to dock at the station. If, however, flight controllers had the ability to land the shuttle automatically, it might allow NASA to take a chance on bringing home an unmanned ship with repairs made in orbit. "This is sort of a last-ditch effort to salvage the orbiter," said Phil Engelauf, a veteran mission-operations manager at NASA's Johnson Space Center in Houston. Two types of orbiter modifications are being considered. One would permanently wire all landing commands into a computer that could be controlled from the ground. Another more temporary fix would run jumper cables from certain crew-controlled switches to a box that receives commands from the ground. "The least intrusive versions, which are the riskiest in execution, you probably could have ready in maybe a year, maybe six months," Hale said. "The more intrusive things would take several years to engineer." All of the shuttle's 111 touchdowns to date have been done manually by astronauts instead of relying on the orbiters' current autopilot system. The second, third and fourth shuttle missions in 1981 and 1982 used the autopilot system to descend to as low as 125 feet before the crew took over. Web posted. (2005). [Could shuttle land without crew aboard? [Online]. Available WWW: <http://www.orlandosentinel.com/> [2005, April 18].]

**NASA Chief Weighs Shuttle's Safety Compliance**

The new administrator of NASA said Monday that he would consider approving the space shuttle to fly again even if an oversight group monitoring changes since the Columbia accident did not sign off on every preflight recommendation. Dr. Michael D. Griffin, whom the Senate confirmed last week to run the National Aeronautics and Space Administration, said at his first news conference that he would seriously consider the opinions of outside advisers before approving the resumption of shuttle flights. But Dr. Griffin said that the final call would have to be made based on the opinion of technical managers who are

overseeing the program and all the changes in hardware and procedures instituted after the loss of the Columbia two years ago. "I don't believe technical decisions are a voting matter," he said. Dr. Griffin, an engineer and a physicist, said it was too early to say under what circumstances he might approve new shuttle flights if there was a disparity of opinions among outside advisers and program managers. He said that NASA would study each issue that came up, and that he and other managers would make decisions for which they would hold themselves responsible. "Advisory groups advise," Dr. Griffin said. "The NASA managers have the responsibility for executing the program." Web posted. (2005). [NASA Chief Weighs Shuttle's Safety Compliance [Online]. Available WWW: <http://www.nytimes.com/> [2005, April 19].]

**April 20: Gehman: Panel won't 'grade' NASA**

The investigators of the 2003 Columbia disaster will not "grade NASA's paper" on whether the agency has fully satisfied recommended safety reforms before returning the shuttles to flight this year. The leader of the Columbia Accident Investigation Board, retired Navy Admiral Harold W. Gehman, also said members agreed two years ago that "if we felt we were being blown off, we would go public." A month before NASA plans to launch Discovery on the first post-Columbia mission, Gehman said the board's recommendations should be judged as a whole rather than separate issues. Even if individual fixes are imperfect, the board believed an effort to attack the causes of the accident from many fronts would prevent another Columbia-like tragedy. "The purpose of our recommendations was to break a chain of causal events that starts with the release of foam and ends with the death of astronauts," said Gehman, 62, of Virginia. "You need to break the chain in as many places as you can." That means NASA can't stop at redesigning the external fuel tank to minimize debris that could hit the orbiters during launch, Gehman said. That's why the board also recommended improving launch photography to better track debris, inspecting the orbiter in space and even developing ways to repair damaged parts of the heat shield before trying to return a shuttle to Earth. The last item has prompted the most questions from outsiders trying to assess NASA's progress implementing the accident board's recommendations. Astronauts will test three heat-shield repair methods on Discovery's flight, but all are aimed at fixing small dings, cracks or holes. NASA has yet to find a way to repair large breaches, such as the pizza-sized hole that doomed Columbia. "We asked them to go produce some capability, the best that they could do, and also to keep working at it," Gehman said. Web posted. (2005). [Gehman: Panel won't 'grade' NASA [Online]. Available WWW: <http://www.floridatoday.com/> [2005, April 20].]

**Launch date may be set today**

NASA is considering a new launch date for the first post-Columbia mission. A decision could come today. Top managers, including new NASA Administrator Michael Griffin, met Tuesday at Kennedy Space Center for a critical design review of all safety modifications made to shuttles since the 2003 Columbia accident. Among the topics: design changes to the shuttle's 15-story external fuel tank and the certification of a heat-shield inspection boom. Managers also weighed the amount of work that still must be completed before Discovery and seven astronauts launch on a test flight to the International Space Station. The existing launch window extends from May 15 to June 3. NASA might not be able to complete all the work in time to launch May 15. "Senior NASA leaders are meeting to decide on a tentative launch date within the window," said Robert 'Doc' Mirelson, an agency spokesman. NASA also must have Atlantis nearly ready to fly before Discovery can launch.

Atlantis will be on standby to rescue Discovery's crew if something goes wrong on their flight. Launch preparations for Discovery are proceeding as planned, said KSC spokeswoman Jessica Rye. But she added there are "normal threats" to the Atlantis schedule. NASA still plans to move Atlantis to the Vehicle Assembly Building on May 23 for a launch as early as June 14, if necessary. Web posted. (2005). [Launch date may be set today [Online]. Available WWW: <http://www.floridatoday.com/> [2005, April 20].]

#### **Titan 4 rocket could launch from Cape late next week**

With a little ingenuity, elbow grease and help from 3,000 miles away, the Titan 4 rocket team is working to overcome ground equipment headaches that have kept the big booster bolted to its Cape Canaveral launch pad this month instead of flying a classified national security space mission. The planned April 6 liftoff to place a spy satellite into Earth orbit was scrapped while technicians wrestled with trouble loading hazardous nitrogen tetroxide propellant into the rocket's first and second stages. The problem was traced to corrosion emanating from the ground storage tanks that clogged a filter in launch pad pipes and hurt a pumping unit at Cape Canaveral's Complex 40. The situation prevented the oxidizer from flowing into the rocket. Web posted. (2005). [Titan 4 rocket could launch from Cape late next week [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, April 20].]

#### **April 21: NASA postpones launch of Discovery to May 22**

NASA has postponed the return-to-flight mission of the shuttle Discovery from May 15 to May 22 to ensure the program will have enough time to complete all remaining preflight reviews. "The 15th was always just a target," Shuttle Program Manager Bill Parsons told reporters during a teleconference April 20. "We always knew we were going to re-evaluate that when we got a little bit closer." The launch window will remain open until June 3. The shuttle program held its design certification review (DCR) at Kennedy Space Center on April 19, during which managers reviewed the many changes that have been made to the system in response to the Columbia accident. Newly appointed NASA Administrator Michael Griffin sat in on the meeting. All the new design elements have been certified except for the Orbiter Boom Sensor System (OBSS), which astronauts will use to inspect Discovery for damage in orbit. Manufacturer MacDonald Dettwiler and Associates is conducting additional analysis to ensure the 50-foot boom will withstand flight loads. The OBSS should be fully certified by mid-May. On April 26 and 27, the shuttle program will conduct a follow-up debris verification review, to close out three lingering areas of concern on the external tank that could pose a debris threat (DAILY, April 15). Engineers are considering workarounds or possible last-minute design changes to mitigate the threat. "We feel pretty confident we'll get closure on these," Parsons said. Shuttle officials hope to make their final presentations to the Stafford-Covey review panel on May 4-6, Parsons said. The panel originally had hoped to report its conclusions to the NASA administrator a month before launch, but postponed its final meeting to await more data. E-mail distribution. (2005). [Aviation Week's [Aerospace Daily & Defense Report](#) Re: "NASA postpones launch of Discovery to May 22," [Electronic]. Vol. 214, No. 15,[2005, April 21].]

#### **April 22: NASA Is Said to Loosen Risk Standards for Shuttle**

NASA officials have loosened the standards for what constitutes an acceptable risk of damage from the kind of debris that led to the disintegration of the shuttle Columbia as it was returning from space two years ago, internal documents show. The move has set off a

debate within the agency about whether the changes are a reasonable reassessment of the hazards of flight or whether they jettison long-established rules to justify getting back to space quickly. Experts who have seen the documents say they do not suggest that the shuttle Discovery - scheduled to lift off from Cape Canaveral, Fla., on May 22 - is unsafe, but a small but forceful minority say they worry that NASA is repeating a practice that contributed to the Columbia disaster: playing down risks to continue sending humans into space. The documents were given to The New York Times by several NASA employees, who asked not to be named, saying they feared retribution. The documents, by engineers and managers for the space agency, show at least three changes in the statistical methods used in assessing the risks of debris like ice and insulating foam striking the shuttle during the launching. Lesser standards must be used to support accepting the risks of flight, one presentation states, "because we cannot meet" the traditional standards. NASA officials say that the shuttle is safer than it has ever been because of changes made after the Columbia accident in February 2003, and they have long acknowledged that not all debris risk can be eliminated. "There is still going to be a possibility that a golden BB could get us," N. Wayne Hale Jr., the deputy director of the space shuttle program, told reporters in briefings this month. NASA is completing its analysis of 177 possible debris sources and is about to present the data to the task force evaluating whether the shuttle Discovery is safe enough to lift off as scheduled during the two-weeks beginning May 22. That group - named for Thomas P. Stafford and Richard O. Covey, the two former astronauts who are leading it - postponed its final public meeting late last month and told NASA that it needed more information, including further details about the shuttle's ability to withstand impact from debris. When asked whether the task force had seen the documents obtained by The Times, David Drachlis, a spokesman, said that it had not but that "essentially, all of the information you described has been presented to the task group." NASA went back to perform additional debris reviews before making a final presentation to the Stafford-Covey group, which will then present a report to Dr. Michael D. Griffin, the agency's new administrator. Web posted. (2005). [NASA Is Said to Loosen Risk Standards for Shuttle [Online]. Available WWW: <http://www.nytimes.com/> [2005, April 22].]

### **Space Shuttle Processing Status Report**

Discovery (OV-103); Mission: STS-114 - 17th ISS Flight (LF1) - Multi-Purpose Logistics Module; Vehicle: Discovery (OV-103); Location: Launch Pad 39B; Launch Date: Launch Planning Window: May 22 - June 3, 2005; Crew: Collins, Kelly, Noguchi, Robinson, Thomas, Lawrence and Camarda; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. On Wednesday, following the Space Shuttle Program's Design Certification Review (DCR) the previous day, senior management identified May 22 as the target launch date for STS-114 in the May 15 - June 3 launch window. This will allow additional time to complete the required engineering analysis, validation and verification testing of the Shuttle for a safe Return to Flight. Work continues at Launch Pad 39B for Discovery's launch to the International Space Station (ISS). The payload bay doors were opened Tuesday and the Remote Manipulator System, or Shuttle arm, and the Orbiter Boom Sensor System clearance checks are complete. Flight readiness tests have been successfully performed on all three Space Shuttle Main Engines. This weekend, technicians will finalize work to prepare for loading the hypergolic propellants for flight. This process includes loading the propellants, monomethyl hydrazine and nitrogen tetroxide, into the Orbiter Maneuvering System and the Forward Reaction Control System. On April 28, the Rotating Service Structure will be rotated away from the vehicle in preparation for hot-fire tests of the Auxiliary Power Units



on Discovery and the right-hand Solid Rocket Booster Hydraulic Power Unit. Two of the payloads that will travel to the ISS were installed into the Payload Transportation Canister this week in preparation for their move to Launch Pad 39B. The External Stowage Platform-2 (ESP-2) was installed on Tuesday and the Lightweight Multi-Purpose Experiment Support Structure Carrier (LMC) was installed on Wednesday. The ESP-2 will carry replacement parts to the Station and will be deployed and attached to the Station's airlock as a permanent spare-parts facility. The LMC will carry a replacement Control Moment Gyroscope and a tile repair sample test kit. The Multi-Purpose Logistics Module Raffaello is scheduled to be installed on Monday, with transfer to the pad scheduled to occur at the end of next week. Mission: STS-121 - 18th ISS Flight (ULF1) - Multi-Purpose Logistics Module; Vehicle: Atlantis (OV-104); Location: Orbiter Processing Facility Bay 1; Launch Date: Launch Planning Window: July 12 - July 31, 2005; Launch Pad: 39B; Crew: Lindsey, Kelly, Sellers, Fossum, Nowak and Wilson; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Technicians continue processing Atlantis in Orbiter Processing Facility bay 1 for its mission, designated STS-121, to the International Space Station. On Thursday, the STS-121 crew arrived at Kennedy Space Center for the Crew Equipment Interface Test. The test provides the crew an opportunity to get a hands-on look at the orbiter and equipment they will be working with on the mission. Orbiter system testing is nearly 60 percent complete. Technicians finished installing the engines' dome-mounted heat shields, the two semi-circled-shaped sections of Thermal Protection System tile that fit around the engine interfaces. The interface verification test continues on the right-hand Orbiter Maneuvering System pod. Following the installation of the new landing gear door thermal barrier seal, the nose landing gear was retracted for seal compression checks. Solid Rocket Booster (SRB) stacking for Atlantis' launch continues in the VAB high bay 3. The External Tank remains in the checkout cell for final testing. Following the completion of SRB stacking, the tank will be moved and attached to the SRBs on May 6. Endeavour (OV-105); Endeavour is in its Orbiter Major Modification period, which began in December 2003. Owner-press-release. (2005). **Space Shuttle Processing Status Report** S2-15 [Online]. Available E-mail: owner-press-release@spinoza.public.hq.nasa.gov [2005, April 22].]

**April 25: He made history with space coverage**

Howard Benedict, one of the first journalists to chronicle the race to the moon, will be remembered as a gracious teacher and a walking encyclopedia who turned his generosity toward fulfilling students' dreams as head of the Astronaut Scholarship Foundation. Benedict, 77, died Monday at home. He covered more than 2,000 rocket and missile launches during his 37 years reporting for The Associated Press. He also wrote three books on space and co-wrote a fourth. Web posted. (2005). [He made history with space coverage [Online]. Available WWW: <http://www.floridatoday.com/> [2005, April 27].]

**April 26: Pact promotes business, space link**

Informally, the Economic Development Commission of Florida's Space Coast has always promoted business opportunities in Brevard County that relate to the space program. Tuesday, representatives of the Rockledge-based economic development agency made it an official mission to work hand in hand with NASA and the Kennedy Space Center to promote and look for ways to boost space-related business in Brevard. The three-year agreement is the first agreement of its type between KSC and an economic development agency. "It's all about teamwork," said KSC Director Jim Kennedy. "We know now the EDC will play a meaningful role in (KSC's) future," said Lynda Weatherman, chief executive

officer and president of the Economic Development Commission. The EDC will promote business resources at KSC, including facilities and personnel, and also look for businesses that want to be involved in future space missions from the space center. The EDC will work more closely with KSC Deputy Director Woodrow Whitlow on economic development matters. Whitlow also will continue serving on the EDC's board of directors while the EDC will participate more closely with KSC's Business Development Office. ["Pact promotes business, space link," **Florida Today**, April 27, 2005, p 1C.]

**April 27: Cape's final Titan launch a 'bitter pill' for workers**

A pair of Titan 4 rockets, built by Lockheed Martin, are standing on their respective launch pads at Florida's Cape Canaveral Air Force Station and California's Vandenberg Air Force Base awaiting blastoff to carry spy satellite payloads into Earth orbit for the U.S. National Reconnaissance Office. The Cape mission is slated for Friday night, marking the 168th and last Titan vehicle to fly from the Space Coast since 1959. About 300 Lockheed Martin workers will lose their jobs 60 days after launch, while another 125 will face the same fate over the next year after finishing efforts to safe and secure the rocket facilities and pad. The end of Titan at Cape Canaveral will impact upwards of 600 to 700 people, officials say, when also counting other companies supporting Titan such as Alliant Techsystems, Boeing and Honeywell. "It is a pretty big army that has to launch a Titan 4," said Lt. Col. Jimmy Comfort, commander of the 3rd Space Launch Squadron at the Cape and the Air Force launch director. Web posted. (2005). [Cape's final Titan launch a 'bitter pill' for workers [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, April 27].]

**Rocketdyne sale likely to be final this summer**

Officials for The Boeing Co. said Wednesday the sale of a part of the company based at the Kennedy Space Center to Pratt & Whitney should be finalized this summer, and that it appears most of the 130 employees involved should keep their jobs. In February, Chicago-based Boeing announced a deal to sell California-based Rocketdyne Propulsion & Power to Pratt & Whitney, a unit of United Technologies Corp., for \$700 million. Rocketdyne employs 130 people at Kennedy Space Center and 3,000 people overall. The sale to Pratt & Whitney includes Rocketdyne operations in Alabama, California, Florida and Mississippi. As part of Boeing Integrated Defense Systems' Launch & Orbital Systems segment, the business being divested generated nearly \$700 million in revenue during 2004. The Rocketdyne jobs at Kennedy Space Center "have been frozen," said Bruce Melnick, vice president of Boeing Florida Operations. The employees who work for Rocketdyne now are "not allowed to move to other Boeing jobs while this deal is going through," he said. "We fully expect that Pratt & Whitney . . . wants to employ most of the Boeing folks." Rocketdyne Propulsion & Power formerly was owned by North American Aviation and Rockwell International. From its beginnings following World War II, Rocketdyne has worked in rocket engine development, testing and performance. Web posted. (2005). [Rocketdyne sale likely to be final this summer [Online]. Available WWW: <http://www.floridatoday.com/> [2005, April 28].]

**Mystery ship may track Titan rocket**

A mystery ship that has been cloaked in secrecy since it docked in Portland Harbor three weeks ago may carry equipment used to observe a U.S. air force rocket on a top-secret mission, a newspaper reported Wednesday. The rocket's flight path would take it over the ocean on a trajectory roughly parallel to the U.S. and Canadian east coasts, the Portland

Press Herald reported. The Air Force could launch the rocket from Cape Canaveral, Fla., as early as Friday. The *Sage* has been tied up in Portland Harbor for about three weeks, and people on the waterfront have been speculating about the nature of its mission. Some believe it is has been deployed to track the Space Shuttle Discovery. The ship's captain is not talking, and neither are the Air Force, NASA or Lockheed Martin, a defense contractor that apparently leased the vessel. Earlier this month, the U.S. Air Force postponed the launch of the Titan IVB rocket after the Canadian government expressed concern that its 11-ton booster engines jettisoned from the main rocket could crash into the ocean near Newfoundland's offshore oil platforms. Oil companies planned to evacuate 325 crew members from the oil platforms. The Titan rocket is carrying a satellite for the U.S. National Reconnaissance Organization. The Air Force has told Canada it will destroy the rocket if there is a problem. Web posted. (2005). [Mystery ship may track Titan rocket being launched along Canada's East Coast [Online]. Available WWW: <http://www.cbc.ca/> [2005, April 28].]

### **NASA Honored By Small Business Administration**

NASA's Office of Small and Disadvantaged Business Utilization was presented with the prestigious Frances Perkins Vanguard Award at a luncheon hosted by the U.S. Small Business Administration yesterday afternoon. The award was presented to NASA for excelling in its utilization of women-owned small businesses. The Frances Perkins Vanguard Award honors government agencies, government officials and corporations in the private sector that use women-owned small businesses as prime contractors, subcontractors and suppliers. During FY 2004, NASA awarded a total of \$847 million to women owned small businesses; \$323 million in prime contracting and \$524 million in subcontracting, setting agency records in both categories. This amount is nearly a \$200 million increase over dollars awarded to women-owned firms in FY 2003. It also represents NASA's highest total dollars ever awarded to women owned small businesses. ["NASA Honored By Small Business Administration," **NASA News Release #05-107**, April 27, 2005.]

### **April 29: Space Shuttle Processing Status Report**

Discovery (OV-103); Mission: STS-114 - 17th ISS Flight (LF1) - Multi-Purpose Logistics Module; Vehicle: Discovery (OV-103) Location: Launch Pad 39B; Launch Date: Launch Planning Window: July 13 - 31, 2005; Launch Pad: 39B; Crew: Collins, Kelly, Noguchi, Robinson, Thomas, Lawrence and Camarda; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. NASA announced today further testing of ice formation, debris liberation and analysis of the External Tank (ET) liquid oxygen feedline bellows area is needed prior to a safe Return to Flight. The Shuttle Program will continue testing the feedline bellows area through the end of May. Analysis should be completed about mid-June. Plans include adding a new heater to the feedline bellows to minimize the potential for ice and frost buildup. The modification kit for this heater is scheduled to arrive at KSC May 5 for installation on Atlantis' tank, ET-121, in the Vehicle Assembly Building (VAB). The decision was made to perform the modification on Atlantis first, since it is in the VAB, the best location to complete the work. Discovery remains at Launch Pad 39B for troubleshooting two issues that arose during the ET tanking test April 14. Engineers are evaluating two hydrogen sensors in the ET that gave intermittent readings. These sensors serve as fuel gauges to tell the Space Shuttle Main Engines the level of remaining propellants. The other issue is a hydrogen pressurization relief valve that cycled 13 times during the tanking test, versus the standard 8 to 9 times. This valve cycles to ensure the hydrogen stays at the correct

temperature. The STS-114 crew will arrive for the Terminal Countdown Demonstration Test (TCDT) Sunday, with countdown activities on Weds. May 4. Following the troubleshooting and TCDT activities, Discovery will roll back from the pad to the VAB. In the VAB, the new liquid oxygen feedline bellows heater modification will be performed on its ET. The Multi-Purpose Logistics Module Raffaello will not be transferred to the pad as previously scheduled. It will be installed in Discovery's payload bay closer to launch. Mission: STS-121 - 18th ISS Flight (ULF1) - Multi-Purpose Logistics Module; Vehicle: Atlantis (OV-104); Location: Orbiter Processing Facility Bay 1; Launch Date: Lighted Launch Planning Window: September 9 - 24, 2005; Launch Pad: 39B; Crew: Lindsey, Kelly, Sellers, Fossum, Nowak and Wilson; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Technicians continue processing Atlantis in Orbiter Processing Facility bay 1 for its mission (STS-121) to the International Space Station. Due to the change in the launch planning window for Discovery, Atlantis' window was moved to September. The orbiter's nose and main landing gear are extended following the addition of the new Thermal Protection System seal. The landing gear functional test is scheduled for this weekend. Auxiliary Power Unit heater checks are complete. Installation of the Rudder Speed Brake thermal blankets continues. The tile work and the umbilical door functional test on the External Tank door are complete. Solid Rocket Booster stacking for Atlantis is almost complete in VAB high bay 3. The left-forward segment was lifted and attached yesterday, and the right-forward segment is being lifted today. The ET is in the checkout cell for final testing. Endeavour (OV-105); Endeavour is in its Orbiter Major Modification period, which began in December 2003. Owner-press-release. (2005). **Space Shuttle Processing Status Report** S05-016 [Online]. Available E-mail: owner-press-release@spinoza.public.hq.nasa.gov [2005, April 29].]

### **NASA Announces New Window for Shuttle Return To Flight**

NASA announced today July 13 to 31 is the new launch planning window for the Space Shuttle Discovery mission. The new window gives the agency time to do additional work to ensure a safe Return to Flight for Discovery and its crew. Today's announcement follows Space Shuttle Program reviews over the past two weeks. Managers identified the need to do more work to validate engineering analyses of potential debris hazards and to make some additional modifications to the external fuel tank. NASA officials and program managers agreed late Thursday to take the time to complete the work. "This is consistent with our overall approach to the STS-114 mission, which is that we're going to return to flight, we're not going to rush to flight," NASA Administrator Michael Griffin said at a morning news conference at NASA Headquarters. "Our intent with this effort is to make certain we are as safe as we know how to be before we launch the Space Shuttle and its crew. We want it to be right." "From the beginning we've been milestone-driven," said William Readdy, NASA associate administrator for Space Operations. "This time, the milestones on debris and ice analyses, propulsion system troubleshooting and External Tank modifications drove us to retarget for July. We've never been reluctant to adjust the dates as information becomes available." The Return to Flight mission will take Shuttle Commander Eileen Collins and six crew members to the International Space Station. The mission is the first of two test flights to evaluate new thermal protection system inspection and repair techniques and to deliver supplies and equipment to the Station. ["NASA Announces New Window For Shuttle Return To Flight," **NASA News Release #05-113**, April 29, 2005.]



Following the mock countdown and emergency egress practice from the Fixed Service Structure on Launch Pad 39B, STS-114 crew members come together for a group photo on the 225-foot level. Pictured, from left, are Mission Specialists Andrew Thomas, Charles Camarda and Wendy Lawrence, Commander Eileen Collins, Mission Specialists Stephen Robinson and Soichi Noguchi, and Pilot James. Kelly. This culminates the pre-launch training known as Terminal Countdown Demonstration Test (TCDT) activities.



## MAY 2005

### **May 2: NASA'S next Mars spacecraft arrives in Florida**

A large spacecraft destined to be Earth's next robotic emissary to Mars has completed the first leg of its journey, a cargo-plane ride from Colorado to Florida in preparation for an August launch. NASA's Mars Reconnaissance Orbiter (MRO) is an important next step in fulfilling NASA's vision of space exploration and ultimately sending human explorers to Mars and beyond. The spacecraft's prime mission will run through 2010. During this period the project will study Mars' composition and structure, from atmosphere to underground, in much greater detail than any previous orbiter. It also will evaluate possible sites for future martian landings and will serve as a high-data-rate communications relay for surface missions. "Great work by a talented team has brought Mars Reconnaissance Orbiter to this milestone in our progress toward a successful mission," said Jim Graf of NASA's Jet Propulsion Laboratory (JPL), Pasadena, Calif., project manager for the mission. The spacecraft arrived at Kennedy Space Center's Shuttle Landing Facility on April 30 aboard a C-17 cargo plane and was taken to the Payload Hazardous Servicing Facility to begin processing. It was built near Denver by Lockheed Martin Space Systems. Launch is scheduled for Aug. 10 at 7:53:58 a.m. EDT, at the opening of a two-hour launch window. ["NASA'S next Mars spacecraft arrives in Florida for final checkout," **NASA News Release #05-114**, May 2, 2005.]

### **May 4: STS-114 Countdown Rehearsal**

The shuttle Discovery's crew strapped in today for a dress rehearsal countdown while program managers continued assessing what work needs to be done - and whether it can be completed in time - for a July 13 launch attempt. In a traditional pre-flight milestone, commander Eileen Collins, pilot James Kelly, Stephen Robinson, Soichi Noguchi, Andrew Thomas, Wendy Lawrence and Charles Camarda donned their bright orange pressure suits and began climbing aboard Discovery shortly after 8 a.m. EDT (1200 GMT). The countdown proceeded to the T-minus four-second mark when it ended with a simulated abort and main engine shut down at 11 a.m. EDT (1500 GMT). The test went smoothly and other than a minor communications glitch caused by a switch in the wrong position, no major problems were encountered. Web posted. (2005). [Engineers assess space shuttle launch schedule [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, May 4].]

### **NOAA-N Launch Date Set**

NASA is set to launch the new National Oceanic and Atmospheric Administration (NOAA) Polar-orbiting Operational Environmental Satellite (POES), another critical link in the development of a global Earth-observation program. The spacecraft, NOAA-N, will lift off at 6:22 a.m. EDT, May 11, 2005, from Vandenberg Air Force Base, Calif. NOAA-N will replace NOAA-16, in operation since September 2000, and join NOAA-17, launched in June 2002. Once in orbit, NOAA-N will be renamed NOAA-18. NOAA maintains a constellation of two primary polar-orbiting satellites. The global data from these satellites are used extensively in NOAA's weather and climate prediction models. ["NASA & NOAA set to launch new environmental satellite," **NASA News Release #05-117**, May 4, 2005.]

### **May 9: Second Fueling Test On Discovery**

NASA will conduct a second fueling test on Discovery at the launch pad before returning the space shuttle to the hangar and replacing its tank with a safer, updated model. Despite the extra work, shuttle managers still hope to launch Discovery in mid-July on the first mission since the 2003 Columbia disaster. Discovery's first fueling test, on April 14, uncovered sensor and valve problems that still puzzle engineers. NASA hopes to better understand the trouble by filling Discovery's fuel tank sometime the week of May 15, said spokeswoman Jessica Rye. Rye said Discovery will then be moved off the launch pad and back into the Vehicle Assembly Building (VAB) in late May for a tank swap. Shuttle managers decided to remove Discovery's fuel tank, which is attached to a pair of booster rockets, and install a brand new set that had been meant for the second post-Columbia flight, by Atlantis. A heater will be inserted on the new tank to prevent the buildup of ice once super-cold fuel is pumped in right before liftoff. Just last week, engineering tests found ice to be as dangerous as flying foam. Web posted. (2005). [NASA to conduct second fueling test [Online]. Available WWW: <http://www.cnn.com/> [2005, May 9].]

### **Stennis Gets Shared Services Center**

John C. Stennis Space Center has been chosen for a multimillion-dollar center that will employ 500 people and pay an average wage of \$55,000 a year. CSC and Lockheed Martin were awarded the contract to operate the center, which will initially support the financial records of 20,000 NASA employees. Stennis Space Center in Hancock County beat out sites in Alabama, Florida, Texas, Virginia and Ohio as the choice for a new NASA center that will bring hundreds of high-paying jobs and millions of dollars to the local economy. Web posted. (2005). [Stennis lands NASA shared services center. [Online]. Available WWW: <http://www.sunherald.com/> [2005, May 9].]

### **Space Shuttle Processing Status Report**

Mission: STS-114 - 17th ISS Flight (LF1) - Multi-Purpose Logistics Module; Vehicle: Discovery (OV-103); Location: Launch Pad 39B; Launch Date: Launch Planning Window July 13 - 31, 2005; Launch Pad: 39B; Crew: Collins, Kelly, Noguchi, Robinson, Thomas, Lawrence and Camarda; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Following Space Shuttle Program management discussions, a plan was laid out reflecting how the program will move toward the STS-114 Return to Flight launch. Preparations are under way for a tanking test no earlier than the week of May 15 to continue troubleshooting two issues that arose during a tanking test on April 14. Engineers are evaluating the liquid hydrogen sensors in the tank that gave intermittent readings during last month's test. These sensors serve as fuel gauges to notify the Space Shuttle Main Engines to shut down when propellants reach a certain level in the tank. This is critical in the safe operation of the main engines. Engineers are continuing to evaluate a liquid hydrogen pressurization relief valve that cycled more times during the tanking test than is standard. This valve opens and closes to ensure the liquid hydrogen stays at the correct temperature. Following the tanking test, technicians will begin preparations for rolling Space Shuttle Discovery back to the Vehicle Assembly Building (VAB). Once in the VAB, Discovery most likely will be destacked from its External Tank (ET) and lowered into the transfer aisle. This will be the eighth destacking in the program's history following a rollback. In parallel, the ET (ET-121) and Solid Rocket Boosters scheduled to fly with orbiter Atlantis on mission STS-121, is being prepared to fly with Discovery on mission STS-114. The preparation of ET-121 is in the VAB's checkout cell. A new heater will be added to the feedline bellows to minimize the potential for ice and

frost buildup. This heater modification will be installed over the next 24 days. Once Discovery returns to the pad, another tanking test may be performed to test the new modifications. Mission: STS-121 - 18th ISS Flight (ULF1) - Multi-Purpose Logistics Module; Vehicle: Atlantis (OV-104); Location: Orbiter Processing Facility Bay 1; Launch Date: Lighted Launch Planning Window September 9 - 24, 2005; Launch Pad: 39B; Crew: Lindsey, Kelly, Sellers, Fossum, Nowak and Wilson; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Processing continues on Atlantis in Orbiter Processing Facility bay 1 for its mission, designated STS-121, to the International Space Station. Vehicle power-up testing is about 70 percent complete. Closeouts continue in the forward and aft areas of the orbiter. A new Thermal Protection System seal has been added in the nose and main landing gear. Hydraulics were powered up, and preparation continues for a scheduled landing gear functional test. Servicing of the potable water system is finished. Port and starboard Manipulator Positioning Mechanisms were successfully cycled from full stow to full deploy. These are the pedestals that hold the Remote Manipulator System, or Shuttle robotic arm, and the Orbiter Boom Sensor System in the payload bay. Rudder Speed Brake Thermal Protection System tile and blanket installation continues. Atlantis will likely fly with ET-119. The ET is scheduled to arrive from the Michoud Assembly Facility in New Orleans next month. Stacking of the Solid Rocket Boosters is complete in high bay 1, and the joint closeouts are under way. Owner-press-release. (2005). **Space Shuttle Processing Status Report** S05-07 [Online]. Available E-mail: owner-press-release@spinoza.public.hq.nasa.gov [2005, May 9].]

**May 10: Trial Starts For NASA Employee**

Every bolt turned out to be tightened properly, but a former NASA inspector faces up to life in prison if found guilty of falsifying 83 job-performance checks on shuttle Discovery. The trial that began Monday in federal court in Orlando pits the space agency's three-step safety program against veteran employee Billy T. Thornton, who claims he did everything right. Thornton, 54, of Port St. John worked for NASA for 15 years as a quality-control specialist. His job was to assure that work was done correctly by the space agency's private contractor, United Space Alliance. NASA fired Thornton in September 2003, and he was arrested 13 months later on charges of falsifying 83 inspections between October 2002 and May 2003, court records show. Web posted. (2005). [Ex-NASA inspector's work goes on trial. [Online]. Available WWW: <http://www.orlandosentinel.com/> [2005, May 10].]

**May 11: High winds delay launch of weather satellite**

High winds delayed NASA's bid to launch a weather forecasting satellite from California this morning. The space agency will try again Thursday morning with a targeted launch time of about 6:22 a.m. Eastern from Vandenberg Air Force Base. A team from Kennedy Space Center is running the west coast launch. NASA had to call off this morning's launch on Tuesday night because high winds prevented rollback of the service tower surrounding the Delta 2 rocket. There is a new 10-minute launch window from 6:22-6:32 EDT on Thursday morning. The NOAA-N satellite is part of a network of spacecraft that provide data for both weather forecasting and climate research. Web posted. (2005). [High winds delay launch of weather satellite. [Online]. Available WWW: <http://www.floridatoday.com/> [2005, May 11].]

### **Damaged VAB flag gets face lift**

Kennedy Space Center's Vehicle Assembly Building is proudly flying its huge U.S. flag again. Monday morning, workers on scaffolding put the finishing touches on repair work to the 209-foot-tall flag painted on the side of the Center's -- and the Space Coast's -- biggest and most visible building. About 450 feet above the ground, painters repaired and repainted portions of the flag defaced by a pair of hurricanes that slammed the east coast of Florida in 2004. Fierce winds from hurricanes Frances and Jeanne pulled dozens of gigantic metal panels from the side of the 52-story assembly building, where NASA's space shuttles are put together before being moved to the launch pad. NASA had hoped to get the work finished in time for the return to flight of the shuttles in the wake of the 2003 Columbia accident. The anticipated launch is expected to draw as many as 3,000 media representatives to the Space Coast. One of the media's favorite backdrops for live television shots is the gigantic VAB, with its NASA logo and the huge U.S. flag. That image would have been pockmarked without the repairs. With the launch delayed to July, NASA may have time to finish touching up the rest of the front facade of the VAB, which took the brunt of the storms' beating. Workers were splashing the last swaths of paint on the bottom of the stripes just after sunrise. It was a big job. The flag is 209 feet tall and 110 feet across. The landmark can be seen for miles to the south of KSC, letting northbound drivers know they are close to America's spaceport. The permanent repairs are not complete, but the overall appearance of KSC's centerpiece is improving dramatically. Web posted. (2005). [Damaged VAB flag gets face lift. [Online]. Available WWW: <http://www.floridatoday.com/> [2005, May 11].]

### **CSC wins contract to support 45<sup>th</sup> Space Wing**

Computer Sciences Corporation (NYSE: CSC) announced today that Space Coast Launch Services LLC (SCLS), a CSC-led joint venture with The Shaw Group Inc. (NYSE: SGR), has won a contract to provide space command operations, maintenance and sustainment support to the U.S. Air Force's 45th Space Wing for unmanned space vehicle launches. CSC estimates the value of the award, which has a five-month base period and 10 one-year options, to be approximately \$335 million if all options are exercised. Under the terms of the agreement, CSC's SCLS team will provide operations, maintenance and engineering support to critical launch, spacecraft and ordnance facilities and support systems. Web posted. (2005). [CSC wins contract worth approximately \$335 million to support U.S. Air Force's 45<sup>th</sup> Space Wing. [Online]. Available WWW: <http://www.astroexpo.com/> [2005, May 11].]

### **Launch plans changed again**

NASA will swap external fuel tanks for the space shuttle Discovery to stay on schedule for a launch sometime during the last two weeks of July. The latest change of plans in the first shuttle mission since the Columbia disaster more than two years ago came a week after space agency managers postponed Discovery's May launch date. NASA wants to add a small heater to an exposed fuel line on the tank that tends to accumulate ice before liftoff. The heater can't be installed on Discovery's original tank until the spacecraft is moved into the Vertical Assembly Building at Kennedy Space Center in central Florida. Discovery has been sitting on a launch pad at Kennedy for the past five weeks, and it will stay there for at least another week while Kennedy workers test the tank's systems by filling it with super-cold fuel, said Marion LaNasa, spokesman for Lockheed Martin Space Systems, which makes the external tanks at NASA's Michoud Assembly Facility in eastern New Orleans. To speed up the process of preparing Discovery for its new launch window of July 13 to 31, workers will

install the heater on a second tank already in the Vertical Assembly Building. It will attach Discovery to that tank after the shuttle is rolled back from the pad. Originally, NASA managers had planned to attach the second tank to the shuttle Atlantis and rely on that orbiter as a rescue vehicle in case something prevented Discovery from returning to Earth. Web posted. (2005). [Launch plans changed again. [Online]. Available WWW: <http://www.nola.com/> [2005, May 11].]

**May 12: Delta 4 Heavy parts arrive on Space Coast**

It arrived by ship from Decatur, Ala., and will leave straight up from a launch pad at Cape Canaveral Air Force Station. Sections of the second Delta 4 Heavy arrived in Brevard County this week from a Boeing factory after a nearly 1,400-mile sea voyage from the Gulf Coast. The pieces are scheduled to be assembled here into a triple-engined booster that is to fly in late October with a Defense Support Program satellite. If all goes well, this flight would be the first operational mission for the rocket. Boeing sent it aloft last year on a test mission. Web posted. (2005). [Delta 4 Heavy parts arrive on Space Coast. [Online]. Available WWW: <http://www.floridatoday.com/> [2005, May 12].]

**Transfer of workers to Cape unfeasible**

Whenever the Pentagon reassesses the need for all its bases, someone invariably raises the question about moving the space-support operations at Patrick Air Force Base to Cape Canaveral Air Station. A study was done in 1998 by the 45th Space Wing Safety Office found that such a move would be too dangerous to military and civilian workers at the Cape during launches. There aren't enough safe areas at the Cape to accommodate more people should a rocket explode during liftoff, the report said. If additional personnel are moved from Patrick to the Cape, they'd have to be evacuated every time there was a launch, said Louis Ullian, who was deputy chief of range safety for the Air Force for 40 years before retiring in 1997. As it is now, employees must leave their work stations during launches -- depending on which launch pad is being used and the type rocket being launched. With newer, larger heavy-lift rockets being used, the hazards areas could expand, he said. Work efficiency is another issue. Because launches often don't go on schedule, workers would likely have to leave the station more than once for the same launch. Other work at the Cape would also be disrupted, the 1998 report said. This is why the station and Patrick were set up the way they were, Ullian said. Web posted. (2005). [Transfer of workers to Cape unfeasible. [Online]. Available WWW: <http://www.floridatoday.com/> [2005, May 12].]

**Winds again delay Delta launch**

For the second straight day high winds have delayed the launch of a weather satellite from California. The Delta 2 was scheduled to lift off Thursday morning, but the launch was postponed Wednesday evening because winds at Vandenberg Air Force Base in California were too high to permit the mobile service tower at the launch site to be retracted. High winds had also forced a similar scrub 24 hours earlier. The launch is now scheduled for Friday at 6:22 am EDT (1022 GMT), with winds forecast to be acceptable for tower retraction on Thursday evening. The rocket will launch the NOAA-N weather satellite into polar orbit. NOAA-N is the latest in a series of Polar Operational Environmental Satellites that complement other weather satellites in geosynchronous orbit, providing atmospheric sounding and other data. Web posted. (2005). [Winds again delay Delta launch. [Online]. Available WWW: <http://www.spacetoday.net/> [2005, May 12].]



### **Shuttle's Retirement May Affect ISS Construction**

NASA's looming deadline to retire its space shuttle fleet by 2010 may complicate plans to complete the International Space Station, according to the agency's top official. NASA Administrator Michael Griffin said that while completing the ISS is a major goal of both, the agency's return to flight effort and its exploration vision, meeting the challenge by the 2010 deadline may prove difficult. "We may not be able to make the exact completion date that we desire," Griffin told reporters during a recent shuttle update. "But we will complete it." Retiring the three remaining space shuttles in favor of a new crew-carrying vehicle is a hallmark of NASA's exploration vision – announced by President Bush in January 2004 – which calls for a return of human explorers to the moon, then sending them to Mars and beyond. The first steps in that vision are resuming shuttle flights and fulfilling NASA's ISS commitments with its international partners. "The President, the space policy that we have, is very firm in that the shuttle will retire in 2010," Griffin said. "What we'll do if we don't complete the International Space Station by then is look at other means to complete it." Griffin and other NASA spaceflight officials said the agency will accelerate plans for the shuttle's successor, dubbed the Crew Exploration Vehicle (CEV), in hopes of minimizing – if not completely closing – any gap in NASA's human spaceflight capability. NASA had previously expected the first human-carrying CEV flight no earlier than 2014. Web posted. (2005). [Shuttle's Retirement May Affect ISS Construction, NASA Chief Says. [Online]. Available WWW: <http://www.space.com/> [2005, May 12].]

### **Gene Cernan Awarded Ambassador of Exploration Honor**

Apollo 17 Commander Eugene A. Cernan today received NASA's first Ambassador of Exploration Award during a special symposium at the U.S. Naval Air Station in Pensacola, Fla. The award will remain on display at the National Museum of Naval Aviation. The Ambassador of Exploration Award was announced last July during the 35th anniversary celebration of the Apollo 11 lunar landing. It recognizes the sacrifices and dedication of the Apollo, Gemini and Mercury astronauts. Each astronaut or their surviving families will be presented a lunar sample, part of the 842 pounds of moon rocks and soil returned during the six lunar expeditions from 1969 to 1972. CBS journalist Walter Cronkite also is an honoree. ["Gene Cernan Awarded Ambassador of Exploration Honor," **NASA News Release #05-122**, May 12, 2005.]

### **May 13: Faster space timetable a boost for Brevard**

NASA's plan to speed development of a new spaceship likely will save thousands of jobs at Kennedy Space Center and enable the agency to keep pumping billions of dollars into Central Florida's economy. NASA aims to retire its shuttle fleet in 2010 and new Administrator Michael Griffin wants to have a replacement ship ready to fly by then, he told a Senate subcommittee in Washington, D.C. The Crew Exploration Vehicle was not expected to be ready to fly astronauts until 2014. "This significantly decreases the four-year gap that once was in place and now could all but be eliminated," said James Kennedy, director of the Kennedy Space Center. "This is great news for our work force and the Space Coast community as a whole." Also good news for Brevard County: Griffin is leaning toward using the core of the shuttle system -- its external tank, solid rocket boosters and main engines -- for a heavy-lift launcher to get cargo off the Earth for missions to the moon and Mars. Griffin, meanwhile, said he plans to cut the number of shuttle missions to the minimum needed to complete the International Space Station for safety and financial reasons. About 28 are now planned, but Griffin said up to 10 of those missions could be

eliminated. The earlier the new vehicle is flying, the better for the Space Coast and its 25,000-plus space workers. An extended hiatus in human space flights from the Cape worried everyone from technicians who work on shuttles to local economic development officials and influential members of Congress. Some legislators said the hiatus also might be a national security threat. Griffin's plans to eliminate the hiatus between spaceships and keep flying some shuttle components on new missions offers job security to managers, engineers, technicians and administrative workers at KSC and Cape Canaveral Air Force Station. Narrowing the gap also would help NASA maintain a skilled work force with unique expertise. Laid-off workers otherwise might be forced to relocate. Economic development officials already were working to avoid repeating the devastating job losses seen at KSC after the last moon mission and before the start of the shuttle program. From a peak of 25,895 employees in 1968, the KSC work force plummeted to a low of 8,441 in 1976, the year after the Apollo Soyuz Test Project. The July 1975 mission to dock with a Russian Soyuz spacecraft was the last human mission to fly from the United States until NASA's first shuttle flight in April 1981. The resulting job losses forced many families to pull up roots and seek work elsewhere. As it stands, fewer people will be needed to maintain and fly the Crew Exploration Vehicle. But economic development officials are working on other means for maintaining the space work force here. Web posted. (2005). [Faster space timetable a boost for Brevard. [Online]. Available WWW: <http://www.floridatoday.com/> [2005, May 13].]

#### **NASA rules unclear, judge says**

A judge Thursday threw out all but four of 166 charges against a former NASA employee accused of falsifying inspections on the space shuttle Discovery. Billy Thomas Thornton, 54, was accused of failing to make 83 safety inspections over nine days from October 2002 to May 2003. NASA fired the 15-year employee in September 2003. After federal prosecutors rested their case, U.S. District Judge Gregory Presnell ruled they had failed to prove Thornton didn't oversee work by technicians from NASA contractor United Space Alliance, or that he committed fraud by putting his stamp on paperwork showing the work had been done. The remaining charges involve whether Thornton properly inspected work done on Discovery's right wing. Web posted. (2005). [NASA rules unclear, judge says. [Online]. Available WWW: <http://www.floridatoday.com/> [2005, May 13].]

#### **Pad electrical trouble scrubs Delta rocket launch**

Today's scheduled California liftoff of the Boeing Delta 2 rocket to deploy the latest polar-orbiting weather satellite was scrubbed by electrical gremlins in the system that floods the launch pad with critical cooling and sound-dampening water during the fiery blastoff. "We have scrubbed for the day due to insufficient time to deal with an electrical problem at the launch pad associated with the water deluge system pumps and the electrical system feeding the pump house," NASA spokesman George Diller said. After back-to-back postponements for strong winds that prevented retracting the pad's service tower on Tuesday and Wednesday evenings, this third countdown appeared to be going smoothly. But engineers began wrestling with the pump problems as clocks entered the final hours. Officials delayed loading super-cold liquid oxygen into the rocket's first stage while troubleshooting continued at Vandenberg Air Force Base's Space Launch Complex-2 West pad. In the end, the prospect of performing the repair job, fueling the rocket and completing the countdown for liftoff during the day's tight 10-minute launch window was too much to accomplish. The Delta rocket must launch between 1022:01 and 1032:01 GMT (6:22:01-6:32:01 a.m. EDT;

3:22:01-3:32:01 a.m. PDT) to haul the 3,100-pound NOAA-N weather satellite into its precise polar orbit, leaving little margin to deal with last-minute issues that arise in the countdown. Web posted. (2005). [Pad electrical trouble scrubs Delta rocket launch. [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, May 13].]

### **NASA Announces Crew Members for Space Missions**

NASA and its international partners have named new crew members for upcoming missions to the International Space Station (ISS). U.S. astronaut William S. McArthur, Jr. and Russian cosmonaut Valery I. Tokarev will serve on the International Space Station as the crew of Expedition 12. They will travel to the ISS on board a Russian Soyuz spacecraft later this year for their six-month mission. McArthur is the Expedition 12 commander and Tokarev is the flight engineer. Thomas Reiter, a European Space Agency (ESA) astronaut, will also carry out a long-duration mission on the Station. He will fly to the Station aboard the Space Shuttle Atlantis on mission STS -121, planned for a September 2005 launch. Reiter will work on the Station as part of an agreement between the Russian Federal Space Agency and ESA. Reiter's arrival on the Station marks the return to a three-person crew. Station crews were reduced to two members in May 2003, to conserve onboard resources until the Shuttle, with its considerable cargo capability, could again deliver supplies. Reiter joins the crew of STS-121: Commander Steve Lindsey, Pilot Mark Kelly and Mission Specialists Piers J. Sellers, Mike Fossum, Lisa Nowak, and Stephanie Wilson. Reiter will return to Earth aboard STS-116 or a Russian Soyuz after his stay aboard the Station. STS-121 is the second scheduled test flight for the Shuttle since the Columbia accident on February 1, 2003, and the first to transport a crew for a long-duration Station mission since 2002. Atlantis will carry supplies and equipment to the ISS, and the crew will test upgraded Shuttle safety equipment and procedures. ["NASA Announces Crew Members for Shuttle and Station Missions," **NASA News Release #05-124**, May 13, 2006.]

### **Space Shuttle Processing Status Report**

Mission: STS-114 - 17th ISS Flight (LF1) - Multi-Purpose Logistics Module; Vehicle: Discovery (OV-103); Location: Launch Pad 39B; Launch Date: Launch Planning Window July 13 - 31, 2005; Launch Pad: 39B; Crew: Collins, Kelly, Noguchi, Robinson, Thomas, Lawrence and Camarda; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Work continues at Launch Pad 39B in preparation for an External Tank (ET) tanking test scheduled for no earlier than May 19. Engineers and technicians are adding instrumentation to the tank to help troubleshoot two issues that arose during a tanking test on April 14. The instrumentation will provide data to analyze the liquid hydrogen sensors that gave intermittent readings and the liquid hydrogen pressurization relief valve that cycled more times than standard during last month's test. The tanking test involves the ground operations team at KSC filling the ET with liquid oxygen and liquid hydrogen fuel. The team evaluates how the tank, orbiter, Solid Rocket Boosters (SRBs) and ground systems perform under when the tank is filled with the two ultra-low temperature fuels. The tank filling and draining portion of the test will take about 11 hours and includes a simulated countdown through the T minus 31 second hold. The test operations at KSC will take approximately 48 hours. Following the tanking test, technicians will begin preparations for rolling back Discovery to the Vehicle Assembly Building (VAB) by the end of the month. In the VAB Discovery will be removed from its ET and lowered into the transfer aisle. In the VAB preparations of ET-121 continued in the checkout cell. Final checkout of the vent valve assembly is complete. The change-out of the liquid oxygen and liquid hydrogen diffusers is

complete. Following the ET/SRB mate review next week, the tank will be moved from the checkout cell and attached to the SRBs in the integration cell. Once in the integration cell, a new heater will be added to the feedline bellows to minimize the potential for ice and frost buildup. It will take about 24 days to perform the modification. Mission: STS-121 - 18th ISS Flight (ULF1) - Multi-Purpose Logistics Module; Vehicle: Atlantis (OV-104); Location: Orbiter Processing Facility Bay 1; Launch Date: Lighted Launch Planning Window September 9 - 24, 2005; Launch Pad: 39B; Crew: Lindsey, Kelly, Sellers, Fossum, Nowak and Wilson; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Processing continues on Atlantis in Orbiter Processing Facility bay 1 for its mission (STS-121), to the ISS. The vehicle is powered down in support of orbiter electrical wiring and connector work. Forward, midbody and aft area closeouts continue. Camera verification is complete on the Remote Manipulator System, or Shuttle arm, in the payload bay. Payload bay door clearance checks were successfully completed on the Orbiter Boom Sensor System on the starboard side of the payload bay. Nose and main landing gear cycles continue in preparation for the landing gear functional test, scheduled for today. Thermal Protection System tile installation is complete on the payload bay door hinge area and technicians are performing tile bond verification. Endeavour (OV-105); Endeavour is in its Orbiter Major Modification period, which began in December 2003. Owner-press-release. (2005). **Space Shuttle Processing Status Report** S05-018 [Online]. Available E-mail: owner-press-release@spinoza.public.hq.nasa.gov [2005, May 13].]

#### **PAFB stands to lose Navy submarine unit**

The 200 or so jobs that Patrick Air Force Base may lose if the Pentagon's base closing recommendation is accepted will come from a small Navy unit at Port Canaveral, according to the base's public affairs office. The Naval Ordnance Test Unit supports Trident submarines missile testing. In the past, the Navy has launched new or upgraded submarine-launched ballistic missiles from Cape Canaveral Air Force Station, though it has been some time since it has done so. ["PAFB stands to lose Navy submarine unit," **Florida Today**, May 13, 2006, p 1B.]

#### **May 16: NASA delaying, canceling future efforts**

NASA plans to delay, defer or cancel a number of far-term programs to pay for cost overruns in current programs and other pressing bills such as the shuttle's return to flight and Hubble Space Telescope servicing, the agency says. Some future Mars missions will be deferred "indefinitely," according to Administrator Michael Griffin, to help pay for the successful Mars Exploration Rovers and the upcoming Mars Reconnaissance Orbiter (MRO), set to launch in August. Several space science programs such as MRO and the Pluto New Horizons mission have experienced "notable cost growth," Griffin says, which will be balanced by cutting programs still in the development phase. To service Hubble, NASA plans to defer work on future space telescopes like the Space Interferometer Mission (SIM) and Terrestrial Planet Finder (TPF). Work on both efforts now will be restricted to "at most, instrument and technology development," Griffin says. E-mail distribution. (2005). [Aviation Week's Aerospace Daily & Defense Report Re: "NASA delaying, canceling future efforts to pay for more pressing bills," [Electronic]. Vol. 214, No. 32, [May 16, 2005].]

#### **New NASA office to assume 'major responsibility'**

NASA's upcoming Office of Plans, Analysis and Evaluation will assume "major responsibility for helping get our programs on track," according to Administrator Michael

Griffin. The new office will assess whether programs are meeting their cost, schedule and performance goals, and make recommendations about them, Griffin says. In addition, "the new office will carry a directorate for advanced planning, helping to remove some of the responsibility for the advanced planning function from those mission directorates which must carry it out," he says. To avoid a "fox in the henhouse" problem, NASA's mission directorates must focus on executing the direction given to them, and not come up with that direction themselves, Griffin says. E-mail distribution. (2005). [Aviation Week's Aerospace Daily & Defense Report Re: "New NASA office to assume 'major responsibility' for keeping programs on track," [Electronic]. Vol. 214, No. 32, [May 16, 2005].]

### **NASA Postpones Satellite Launch**

NASA's launch of the NOAA-N polar-orbiting environmental satellite for the National Oceanic and Atmospheric Administration (NOAA) has been postponed. NOAA-N will launch no earlier than 6:22 a.m. EDT, Friday, May 20. The satellite has a 10-minute launch window. After the launch attempt last Thursday, a vent hose in the launch vehicle broke loose possibly causing contamination of the payload. Samples must be taken from NOAA-N to ensure any possible contaminants do not exceed allowable limits. Launch managers will review test results before announcing a definite launch date. ["NASA Postpones Satellite Launch," **NASA News Release #05-119**, May 16, 2006.]

### **May 17: Can shuttle replacement be built here?**

NASA's next spaceship almost certainly will launch from Florida's Space Coast. Now, local and state economic development officials are mounting a campaign to build it here. The recruitment effort got a boost this month when the Florida Legislature agreed to provide \$3 million to help local and state officials woo companies competing for a multibillion-dollar contract to build the new spaceship, which will replace NASA's shuttles after they retire in 2010. "We are reaching out to the contractors to see what it is that we need to do as a state to capture some of the work that, in the past, we haven't been able to do," said Lynda Weatherman, president and chief executive officer of the Economic Development Commission of Florida's Space Coast. "We're not just going to wait around." Florida long has had a lock on the work necessary to prepare and launch NASA, Department of Defense and commercial space missions. But the rockets and spaceships that launch from the Space Coast always have been built in other states and transported here. Weatherman's group, along with the Florida Space Authority and other organizations, hope they can persuade companies to build the Crew Exploration Vehicle in Florida. Web posted. (2005). [Can shuttle replacement be built here? [Online] Available WWW: <http://www.floridatoday.com/> [2005, May 17].]

### **May 18: NASA trials BlackBerrys for engineering reports**

The National Aeronautics and Space Administration (NASA) is soon to begin a pilot project using BlackBerry mobile devices to give engineers working on the space shuttle access to reports on the move. The space agency is already using business intelligence (BI) tools to monitor the preparation of the shuttle, said Ronald Phelps, project manager in NASA's Shuttle Business Office. "We made a decision several years ago to hand over more and more of the day-to-day processing to contractors and move NASA out of that," Phelps told silicon.com. As a result NASA had to develop the capability to look at its contractors' processes and make sure the work is being done properly, by using a web-based reporting system built on technology from BI company Information Builders. "The system allows us



to gather the data produced by the contractor or NASA engineers to make us comfortable that the vehicle is ready to fly," Phelps said, speaking at the Information Builders Summit 2005 user conference. NASA has also integrated with the reporting system its electronic logging system, which is used by engineers to report the work they've done, and will soon add a surveillance system which helps to check that all the work done on the shuttle has been completed correctly. Phelps said the BlackBerry project - using NASA's own internal wireless network - will start with around 20 to 30 engineers but will have the capacity to grow. Web posted. (2005). [NASA trials BlackBerrys for engineering reports [Online] Available WWW: <http://www.silicon.com/> [2005, May 18].]

**May 19: NASA studying Titan IV phaseout**

NASA is studying the phaseout of the Air Force's Titan IV rocket and other programs as it forms its plan for retiring the space shuttle and introducing the Crew Exploration Vehicle (CEV) - a plan being anxiously awaited by shuttle contractors worried about retaining their work force and expertise during the transition. In addition to Titan IV, "we have gone back and studied lessons learned on the Saturn/Apollo to shuttle transition," NASA Administrator Michael Griffin said during testimony before the Senate Commerce Committee's space subcommittee May 18. "Some of those lessons are good ones and some are things to be avoided. We are paying attention." The prime contractor for shuttle operations is United Space Alliance (USA), a joint venture of Lockheed Martin and Boeing that employs more than 10,000 people. Griffin promised lawmakers that NASA would work "hand in glove" with USA to effect "the most orderly transition that we can." USA President and CEO Michael McCulley said that although he expects no problems with recruiting or retention for the next year or so, his work force is beginning to think about what they will do after the shuttle is gone. He said he hopes to receive firm guidance from NASA "sooner rather than later." According to a new report from the Government Accountability Office, NASA has made "limited progress" so far in its planning efforts for the transition. In their own planning, contractors essentially must wait to follow NASA's lead, according to Allen Li, GAO's director of acquisition and sourcing management. NASA is studying how it can accelerate the CEV to minimize the gap in America's human spaceflight capability after the shuttle orbiter's 2010 retirement. Subcommittee Ranking Member Bill Nelson (D-Fla.) pressed Griffin to discuss alternatives in the event that the CEV can't be accelerated to 2010 or shortly thereafter, including keeping the shuttle flying longer. Griffin held fast to the 2010 retirement date, stressing the importance of phasing out the costly "standing army" that supports the shuttle. "I've got to retire the shuttle in order to have the money to do the things that you and I both want to do," Griffin told Nelson. With its large work force and infrastructure, the shuttle fleet costs \$4.5 billion annually whether the system flies or not, Griffin said. The CEV "must have lower fixed costs, or we, the United States, will not have effected any improvement," Griffin testified. E-mail distribution. (2005). [Aviation Week's Aerospace Daily & Defense Report Re: "NASA studying Titan IV phaseout as it plans shuttle retirement," [Electronic]. Vol. 214, No. 35, [May 19, 2005].]

**Griffin looks for ways to maintain work force**

NASA and United Space Alliance are working on ways to keep shuttle workers at Kennedy Space Center and elsewhere employed in the space program after the orbiters retire in 2010, top officials from the space agency and its private shuttle contractors told Congress on Wednesday. NASA Administrator Michael Griffin said the spaceship that will replace the shuttle for flights to the International Space Station and the moon is being designed with an

eye toward saving money. "The new system must have lower fixed costs," Griffin said of the proposed Crew Exploration Vehicle in a hearing before a Senate oversight committee. "Lower fixed costs mean a smaller work force." However, Griffin and his contractor counterparts testified they already are studying how best to shift thousands of shuttle workers to jobs on the new spaceship or to opportunities on other projects related to NASA's new initiative to send astronauts to the moon and Mars. The space agency and its contractors face a challenge in coming years as people working on the shuttle program see the end approaching and start worrying about their futures. Griffin and contractor officials said they are worried engineers, technicians and others will flee the program for job security, creating a shortage of skilled space workers just as the United States is trying to field a new vehicle and expand exploration. Web posted. (2005). [Griffin looks for ways to maintain work force [Online] Available WWW: <http://www.floridatoday.com/> [2005, May 19].]

### **NASA Announces New Centennial Challenge**

NASA, in collaboration with the Florida Space Research Institute (FSRI), today announced a new Centennial Challenges prize competition. The MoonROx (Moon Regolith Oxygen) challenge will award \$250,000 to the first team that can extract breathable oxygen from simulated lunar soil before the prize expires on June 1, 2008. For the MoonROx challenge, teams must develop hardware within mass and power limits that can extract at least five kilograms of breathable oxygen from simulated lunar soil during an eight-hour period. The soil simulant, called JSC-1, is derived from volcanic ash. The oxygen production goals represent technologies that are beyond existing state-of-the-art. NASA's Centennial Challenges promotes technical innovation through a novel program of prize competitions. It is designed to tap the nation's ingenuity to make revolutionary advances to support the Vision for Space Exploration and NASA goals. "Oxygen extraction technologies will be critical for both robotic and human missions to the moon," said FSRI Executive Director Sam Durrance. "Like other space-focused prize competitions, the MoonROx challenge will encourage a broad community of innovators to develop technologies that expand our capabilities," he added. The Centennial Challenges program is managed by NASA's Exploration Systems Mission Directorate. FSRI is a state-wide center for space research. It was established by Florida's governor and legislature in 1999. ["NASA Announces New Centennial Challenge," **NASA News Release #05-128**, May 19, 2005.]

### **May 20: New weather satellite heads for orbit**

A new weather forecasting satellite is in space off this morning aboard a Delta 2 rocket from the California coast. The NOAA-N spacecraft will join a network of similar satellites that help forecasters predict the weather and researchers study Earth's climate. Liftoff came eight days after the first attempt by NASA's rocket launch team, which is based at Kennedy Space Center. Four consecutive days of attempts beginning last Thursday were thwarted first by high winds and then by glitches at the launch complex at Vandenberg Air Force Base. This morning, however, the Delta 2 lifted off without a problem at 6:22 a.m. Eastern time or in the middle of the night on the west coast. The launcher's upper stage engine will ignite once more this morning to push the spacecraft into its proper orbit. Web posted. (2005). [New weather satellite heads for orbit [Online] Available WWW: <http://www.floridatoday.com/> [2005, May 20].]

### **Shuttle Discovery tanking test begins at KSC**

NASA is fueling Discovery's external tank this morning in a bid to troubleshoot problems with critical engine sensors and valves. NASA managers gave the go-ahead to start fueling Discovery around 5:30 a.m. EDT. Supercold propellants are slowly pumping into the 15-story tank. It will take the launch team at Kennedy Space Center about three hours to fill the tank with more than a half million gallons of liquid oxygen and liquid hydrogen. The shuttle team will take advantage of the fueling test to get another look at how and where ice forms on the tank in addition to how the redesigned foam insulation performs in general. However, the primary reason for doing a second tanking test is to figure out a problem that cropped up during a similar test in April. During that test, sensors that serve as fuel gauges and a pressure-relief valve failed to operate properly. The sensors produced an intermittent stream of data, and the valve opened and shut more than expected. NASA engineers want to pinpoint the causes of the problems and take any corrective action before launching the agency's first post-Columbia shuttle mission, which now is scheduled to lift off between July 13 and July 31. The fuel-depletion sensors constantly measure the amount of propellant left in the 15-story tank as the shuttle makes its nine-minute climb into orbit. The relief valve is designed to keep pressures within the tank at proper levels during fuel-loading operations and flight. NASA plans to move Discovery from launch pad 39B to the KSC Vehicle Assembly Building as early as Tuesday so the ship can be outfitted with a new external tank equipped with a fuel pipeline heater. Managers decided to make that move after dangerous amounts of ice built up around a 70-foot propellant line on the outside of Discovery's tank during last month's fuel-loading test. Web posted. (2005). [Shuttle Discovery tanking test begins at KSC [Online] Available WWW: <http://www.floridatoday.com/> [2005, May 20].]

### **NASA may partially abandon station**

NASA may have to partially abandon the International Space Station if the Bush administration can't figure a way around a law that prevents the United States from paying Russia for future flights to the orbiting outpost. "If we don't have (an) agreement with the Russians, then we won't be able to have people in space for long periods of time," said U.S. Rep. Sherwood Boehlert, R-N.Y., chairman of the House Science Committee. Boehlert said he and other congressional leaders want a new agreement for more Russian Soyuz flights, but not if it means backing down on concerns that Russia may be passing along weapons secrets to Iran. The Iran Nonproliferation Act bans U.S. payments to Russia for services related to the \$100 billion international station unless the president confirms Russia is working to prevent its scientists and engineers from passing weapons technology to Iran. Exempted from the 2000 ban were 11 flights of the Russian-built Soyuz spacecraft to and from the station. The last of the exempted 11 Soyuz flights to carry a U.S. astronaut launches in September and returns in April 2006. Web posted. (2005). [NASA may partially abandon station [Online] Available WWW: <http://www.floridatoday.com/> [2005, May 20].]

### **Visiting NASA chief addresses KSC's future**

NASA carried out another fueling test on shuttle Discovery on Friday, clearing the way for the spaceship to be rolled off its launch pad so it can be outfitted with a new external tank. At the same time, NASA's chief Michael Griffin visited Kennedy Space Center and spoke frankly about the loss of jobs that will come once the shuttle fleet is retired in 2010 and replaced with a new vehicle. The administrator said KSC's work force has unique skills that will not go to waste. But he also said the space program will be evolving in a way that eliminates some jobs. "I'm certain that our overall base of NASA employment will remain

pretty stable," Griffin said at a news conference. But the changes are not "going to happen without some individual pain. . . . It's wrenching and it's painful, but the space program needs to move forward." Griffin visited KSC during a second fueling test of shuttle Discovery, which had been moved to its launch pad last month in expectation of a May flight. For both fueling tests, NASA filled Discovery's 15-story external tank with 500,000 gallons of liquid oxygen and liquid hydrogen. In the first test, engineers discovered problems with sensors and a valve on the tank. They also found potentially dangerous ice buildup around a pipeline on the tank, and officials decided to delay the May launch attempt so Discovery could get a new tank. NASA fears that chunks of ice could fall off the tank during launch and become dangerous projectiles. Shuttle-program manager Bill Parsons said Discovery's new tank will avoid the ice buildup because a heater will be placed on the pipeline. Parsons said Friday's test fueling went well. Earlier, Griffin praised the KSC work force for its dedication and said he did not see any reason Discovery won't fly in July as now planned. Web posted. (2005). [Visiting NASA chief addresses KSC's future [Online] Available WWW: <http://www.orlandosentinel.com/> [2005, May 21].]

### **Chief: Get ready for no shuttle**

Workers should get ready for a future without a space shuttle, NASA administrator Mike Griffin said Friday at Kennedy Space Center. "I report to the president," he told journalists. "The president has said we're retiring the orbiter by 2010, and that's what we're doing." The agency should have an updated construction plan ready by summer's end that would outline how much of the International Space Station might be finished by the time the shuttles stop flying, he said. A strategy for graduating to the next-generation ship would evolve over the next year or so. As a replacement for the shuttles is built, some jobs inevitably will change at KSC, and some will be lost, Griffin said. "Not everyone will transition," he said. "One of the main issues with the orbiter is how much it takes to care and feed the fleet." Griffin also spoke with employees, acknowledging that for some, the transition wouldn't be fun. "You enter a period where you need to watch out for yourself, and you need to look out for new opportunities." The space program has to evolve, he said. His goal is to narrow the gap between the end of the shuttles and the launching of the next ship. A shorter gap would mean losing fewer skilled workers, but he also said he wouldn't rush the project. "If it takes more than five years, then it does," Griffin said. "It will take what it takes." He said he believed he was appointed by President Bush because he concurs with the vision that will retire the shuttle and develop missions to the moon and Mars. In the meantime, one of his priorities has been to return the shuttles to flight. NASA has improved the culture that contributed to the 2003 Columbia accident, he said, but it isn't as good as he wants it to be. He said this was one of several visits he has made to KSC while working with rockets and shuttle cargo, and it's "the greatest place in the world to be. Wish I could figure out a way to put NASA headquarters here." Web posted. (2005). [Chief: Get ready for no shuttle [Online] Available WWW: <http://www.floridatoday.com/> [2005, May 21].]

### **Space Shuttle Processing Status Report**

Mission: STS-114 - 17th ISS Flight (LF1) - Multi-Purpose Logistics Module; Vehicle: Discovery (OV-103); Location: Launch Pad 39B; Launch Date: Launch Planning Window July 13 - 31, 2005; Launch Pad: 39B; Crew: Collins, Kelly, Noguchi, Robinson, Thomas, Lawrence and Camarda; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. At Launch Pad 39B, an External Tank (ET) tanking test is in progress today for the Return to Flight (STS-114) mission to the International Space Station. The ground operations team at

KSC fills the ET with liquid oxygen and liquid hydrogen propellants. The team evaluates how the tank, Orbiter, Solid Rocket Boosters and ground systems perform under "cryo-load," when the tank is filled with the two ultra-low-temperature propellants. The tank filling and draining portion of the test takes about 11 hours. It includes a simulated countdown through the T minus 31 second hold. Prior to the test, engineers and technicians added new ET instrumentation to troubleshoot two issues from the April 14 tanking test. The instrumentation will provide data to analyze the liquid hydrogen sensors that gave intermittent readings and the liquid hydrogen pressurization relief valve that cycled more times than standard during April's test. On Monday, Discovery will undergo hot-fire tests of Auxiliary Power Units. Technicians are preparing to roll Discovery to the Vehicle Assembly Building (VAB) on May 24. Discovery will be detached from its ET and lowered into the transfer aisle. On or about June 7, Discovery will be lifted and attached to its new ET and Solid Rocket Boosters. It will roll out to the launch pad in mid-June. On Thursday in the VAB, ET-121 was moved from the checkout cell and attached to its Solid Rocket Boosters in high bay 3. The move was postponed one day to troubleshoot an issue with the crane. While the sling was being attached on Wednesday, the crane moved and caused a minor foam scrape (3/4-inch) on the intertank area. The small area will be repaired in the integration cell. A new heater will be added to the feedline bellows to minimize the potential for ice and frost buildup. Mission: STS-121 - 18th ISS Flight (ULF1) - Multi-Purpose Logistics Module; Vehicle: Atlantis (OV-104); Location: Orbiter Processing Facility Bay 1; Launch Date: Launch Planning Window September 9 - 24, 2005; Launch Pad: 39B; Crew: Lindsey, Kelly, Sellers, Fossum, Nowak and Wilson; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Technicians continue power-up testing on Atlantis in Orbiter Processing Facility bay 1 for its mission (STS-121) to the Space Station. The vehicle is powered down in support of orbiter electrical wiring and connector work. Forward, mid-body and aft area closeouts continue. Earlier this week, a small crack was found in a retract link assembly on the right-hand main landing gear. The assembly will be removed and replaced. The left-hand main landing gear Thermal Protection System (TPS) step and gap measurements are complete. The new TPS seal is installed for flight and the compression checks were successfully completed. In the Space Station Processing Facility, the Minus-Eighty-Degree Laboratory Freezer for the Station science rack is being installed into the Multi-Purpose Logistics Module Leonardo. Leonardo will fly on STS-121. The rack, known as MELFI, will provide cooling and storage for scientific experiment samples and perishable materials in four insulated containers known as "dewars" with independently selectable temperatures of minus 80 and 26 degrees Celsius and plus four degrees Celsius. MELFI will also be used to transport samples to and from the Station. MELFI is provided as laboratory support equipment by the European Space Agency. Endeavour (OV-105); Endeavour is in its Orbiter Major Modification period, which began in December 2003. Owner-press-release. (2005). **Space Shuttle Processing Status Report** S05-019 [Online]. Available E-mail: owner-press-release@spinoza.public.hq.nasa.gov [2005, May 20].]

### **U.S.: No billboards in space**

The U.S. government does not want billboards in space. The Federal Aviation Administration proposed to amend its regulations to ensure that it can enforce a law that prohibits "obtrusive" advertising in zero gravity. Currently, the FAA lacks the authority to enforce the existing law. Web posted. (2005). [U.S.: No billboards in space [Online]. Available WWW: <http://www.cnn.com/> [2005, May 20].]



**May 22: Rollback reset for gear check**

Shuttle Discovery will stay at the launch pad a few extra days so inspectors can check its landing gear for cracks. Kennedy Space Center workers recently spotted tiny cracks in sister ship Atlantis' landing gear, and NASA wants to make sure the flaw is not fleetwide before Discovery flies the first shuttle mission since the 2003 Columbia catastrophe, agency spokeswoman Jessica Rye said Sunday. A crawler-transporter was to haul Discovery back to the Vehicle Assembly Building early Tuesday morning. Now, rollback is set for Friday. Meanwhile, inspectors will use a borescope -- a rigid tube with a camera on its end -- to peer inside the wheel well looking for gear defects. Engineering photographs of Discovery's gear, taken before the shuttle rolled to the launch pad, show no cracks. Engineers want another look. The reason: The gear is critical to the safety of the shuttle. The cracked part in Atlantis' gear is the uplock mechanism, a hook of sorts that keeps the landing gear in place during flight but must work so the wheels deploy properly as the orbiter glides to the runway. After the inspection, NASA plans an auxiliary power unit test-firing Wednesday and rollback on Friday. Once back inside the VAB, shuttle workers will move Discovery from one set of tank and solid rocket boosters to another modified to resolve concerns about ice debris and a glitchy valve. Current plans call for Discovery to return to the pad in mid-June and launch sometime between July 13 and July 31. Web posted. (2005). [Rollback reset for gear check [Online] Available WWW: <http://www.floridatoday.com/> [2005, May 23].]

**May 23: Space Shuttle Processing Status Report**

Mission: STS-114 - 17th ISS Flight (LF1) - Multi-Purpose Logistics Module; Vehicle: Discovery (OV-103); Location: Launch Pad 39B; Launch Date: Launch Planning Window July 13 - 31, 2005; Launch Pad: 39B; Crew: Collins, Kelly, Noguchi, Robinson, Thomas, Lawrence and Camarda; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Technicians are preparing to roll Space Shuttle Discovery from the launch pad to the Vehicle Assembly Building, now scheduled for early morning on Thursday, May 26. Once there, orbiter Discovery will be demated, or removed, from its External Tank (ET) and lowered into the transfer aisle. On or about June 7, Discovery will be lifted and attached to its new ET and Solid Rocket Boosters. Discovery is expected to be rolled back out to the pad in mid-June. Engineers are also investigating part of Discovery's main landing gear door, after a small crack was found last week in a retract link assembly on the right-hand main landing gear on orbiter Atlantis in Orbiter Processing Facility bay 1. The Atlantis assembly was removed and will be replaced with a spare. Engineers have looked at the closeout photos of the link assembly on Discovery. The initial review indicates the link assembly does not appear to have any cracks. To ensure there are no cracks in the assemblies, technicians will enter Discovery's payload bay and perform borescope inspections of the area, an inspection that can only be accomplished at the pad. This additional work does not impact the launch planning window of July 13-31. Following the inspections, Discovery will undergo hot-fire tests of its Auxiliary Power Units, currently scheduled for Wednesday. Owner-press-release. (2005). **Space Shuttle Processing Status Report** S05-020 [Online]. Available E-mail: [owner-press-release@spinoza.public.hq.nasa.gov](mailto:owner-press-release@spinoza.public.hq.nasa.gov) [2005, May 23].]

**May 24: Voyager spacecraft ventures into mysterious realm**

NASA's intrepid Voyager 1 space probe has begun its journey to the stars and is now exploring the farthest reaches of the Sun's influence where the solar wind strangely interacts with interstellar space, agency officials formally announced on Tuesday. At the 2005 Joint Assembly Meeting of the American Geophysical Union in New Orleans, scientists revealed

new findings that confirm the passage of the Voyager 1 spacecraft into an uncharted region of the far outer solar system, where the magnetic field intensifies and the solar wind is drastically slowed and becomes super-heated. Voyager 1 and its twin Voyager 2 were both launched aboard Titan rockets from Cape Canaveral, Florida, in 1977 to embark on a "grand tour" to visit the outer planets. Both are now approaching their 28th birthday and continue on extended missions to beam data back to Earth as it leaves the solar system headed for interstellar space. Web posted. (2005). [Voyager spacecraft ventures into mysterious realm [Online] Available WWW: <http://www.spaceflightnow.com/> [2005, May 24].]

### **May 26: Shuttle Discovery's rollback begins**

Shuttle Discovery is headed back to the Vehicle Assembly Building, where a new set of booster rockets and external fuel tank are waiting. The crawler-transporter moved its first few inches on the pad at 6:44 a.m., beginning a journey that will last at least six-and-a-half hours. Rollback was to start around 2 a.m., but delays finalizing engineering paperwork held up those plans. In the VAB over the next couple of weeks, Discovery will be mated with a new fuel tank outfitted with a heater designed to prevent ice from forming. Ice and insulating foam, like the piece that caused a deadly breach in Columbia's wing, are the most common sources of dangerous debris that can come off the tank and boosters during launch. Tests reveal that, without the new heater, ice buildup on a pipeline outside the tank could be a problem as it is filled with supercold rocket propellants. On Wednesday, workers tested Discovery's auxiliary power units, which run the hydraulic system that helps steer the orbiter. The test showed no signs of problems, KSC officials said. Inspections of the ship's landing-gear also found no problems. A small crack on sister ship Atlantis prompted the checkup. Unlike Atlantis, "inspections at this point show there are no indications of any cracks in that area," NASA spokeswoman Jessica Rye said. Discovery rolled out to pad 39B on April 6. If all goes as planned, the shuttle will roll out to the pad again in mid-June. NASA officials hope it will fly during a launch window that opens July 13. Web posted. (2005). [Shuttle Discovery's rollback begins [Online] Available WWW: <http://www.floridatoday.com/> [2005, May 26].]

### **Shuttle accident ends dream**

NASA was close to naming CNN correspondent Miles O'Brien as the first American journalist in space when the Columbia accident occurred in 2003. O'Brien broke two years of public silence this week to discuss the potential mission, which was confirmed by former NASA officials. Talks also were under way to use his flight to launch a program where reporters, artists and writers would travel on the space shuttle to describe the experience of living and working in orbit for audiences back on Earth. Like a similar program abandoned in the wake of the 1986 Challenger disaster, the effort ended before it began when Columbia broke up while returning to Earth. CNN began seriously discussing the possibility of flying O'Brien in space with NASA and the Russians in early 2001. The Russians had launched Japanese television reporter Toyohiro Akiyama to the Mir space station in 1990 -- the only journalist to have flown in orbit. However, negotiations between CNN and Moscow bogged down because of the \$12 million price tag for the flight. Web posted. (2005). [Shuttle accident ends dream [Online] Available WWW: <http://www.orlandosentinel.com/> [2005, May 26].]

### **Expendable Launch Vehicle Status Report**

Mission: CALIPSO/CloudSat; Launch Vehicle: Boeing Delta 7420 DPAF; Launch Pad: Space Launch Complex 2, Vandenberg Air Force Base (VAFB), Calif.; Launch Date: NET, July 22, 2005; Launch Window: TBD. The CloudSat spacecraft arrived via truck at VAFB May 2 from Ball Aerospace & Technologies Corp., Boulder, Colo. The Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observation spacecraft (CALIPSO) arrived May 20 from France aboard an Antonov cargo plane. Both are being processed at the VAFB Astrotech Payload Processing Facility. Electrical and spacecraft transmitter testing on CloudSat is complete. The CALIPSO post-arrival state-of-health checks continue, and electrical ground-support equipment is being set up for additional testing. The Wide Field Camera is scheduled for integration tomorrow with the spacecraft. CALIPSO and CloudSat will provide never-before-seen 3-D perspectives of how clouds and aerosols form, evolve, and affect weather and climate. CALIPSO and CloudSat will fly in formation with three other satellites to enhance understanding of climate systems. Part of the NASA Earth System Science Pathfinder program, CALIPSO is a collaborative effort with the French space agency, Centre National d'Etudes Spatiales (CNES); Ball Aerospace; and France's Institut Pierre Simon Laplace. Mission: Mars Reconnaissance Orbiter (MRO); Launch Vehicle: Lockheed Martin Atlas V 401; Launch Pad: Complex 41, Cape Canaveral Air Force Station (CCAFS), Fla.; Launch Date: August 10, 2005; Launch Window: 7:53:59 to 9:53:58 a.m. (EDT). The MRO arrived April 30 at the Kennedy Space Center (KSC) Shuttle Landing Facility aboard a C-17 cargo plane. It was taken to the Payload Hazardous Servicing Facility (PHSF) for processing. End-to-end communications system testing with the Deep Space Network (MIL-71) ended May 21. The final functional test of the Shallow Radar (SHARAD) instrument was completed on May 24. SHARAD was provided by the Italian Space Agency. A full range-of-motion gimbal test of the MRO high-gain antenna was completed on May 25. The Atlas V arrived March 31 at CCAFS on board an Antonov cargo plane. It was taken to the high bay at the Atlas Spaceflight Operations Center. The Atlas booster stage was transported to the gantry-like Vertical Integration Facility (VIF) at Space Launch Complex 41 and erected on May 6. The Centaur upper stage will arrive June 6. It will be mated to the Atlas on June 17. The MRO will be transported from the PHSF to the VIF on July 28. It will be hoisted atop the launch vehicle for final launch preparations. The spacecraft is scheduled for a functional test Aug. 1; followed by launch vehicle and spacecraft integrated testing and closeouts. KSC News Center (2005). **Expendable Launch Vehicles Status Report** E05-01 [Online]. Available E-mail: [ksc@newsletters.nasa.gov](mailto:ksc@newsletters.nasa.gov) [2005, May 26].]

### **Feds close Orbital Sciences plant in Chandler**

Federal authorities shut down a major defense contractor plant Thursday morning in Chandler (Arizona), telling workers to go home as agents scoured the facility. Agents with the Defense Criminal Investigative Service were seen at the Orbital Sciences Corp. campus, but it was not known which federal agency served the search warrant. The obscure agency is the investigative arm of the Inspector General of the Department of Defense that investigates terrorism, cybercrimes and technology transfers. The Chandler operations are focused on developing and building launch vehicles for the U.S. military, NASA and commercial customers. Employees at the corporate office in Dulles, VA, were also asked to leave Thursday morning. Among the rockets produced by the Launch Systems Group at Chandler are the Taurus, Minotaur and Pegasus. Web posted. (2005). [Feds close Orbital Sciences plant in Chandler [Online] Available WWW: <http://www.eastvalleytribune.com/a> [2005, May 26].]

### **A space in city history**

John Young, one of Orlando's most famous sons and the first man to fly into space from Earth six times, was honored as a history maker Thursday. Young accepted the inaugural John Young History Maker Award at the Orange County Regional History Center. The award recognizes Central Floridians whose lifetime of achievement has made a historic impact on the community, its residents and the country. ["A space in city history," **Orlando Sentinel**, May 27, 2005, p B1 & B7.]

### **May 27: Space Shuttle Processing Status Report**

Mission: STS-114 - 17th ISS Flight (LF1) - Multi-Purpose Logistics Module; Vehicle: Discovery (OV-103); Location: Vehicle Assembly Building; Launch Date: Launch Planning Window July 13 - 31, 2005; Launch Pad: 39B; Crew: Collins, Kelly, Noguchi, Robinson, Thomas, Lawrence and Camarda; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Space Shuttle Discovery is back in the Vehicle Assembly Building (VAB). It was rolled back from Launch Pad 39B yesterday. First motion occurred at 6:44 a.m. Discovery, carried by a Crawler Transporter, entered the VAB at 4:30 p.m. following a 10-hour trip. The rollback was briefly interrupted due to a bearing issue on the Crawler Transporter when it was a third of a mile from the VAB. The 4.2-mile journey was the 15th rollback in Space Shuttle Program history. Rollback had been postponed two days to allow technicians to perform borescope inspections of the retract link assembly in Discovery's landing gear door. The inspection took place on the left-hand assembly and did not identify any cracks. The closeout photos of the right-hand assembly were reviewed and showed no cracks. Following the inspections, Discovery underwent tests of its Auxiliary Power Units on Wednesday. Preparations are under way to demate, or remove, Discovery from its External Tank (ET-120) and Solid Rocket Boosters on May 31. Once Discovery has been lowered onto the Orbiter Transporter System in the VAB transfer aisle, it will be moved in front of high bay 3 in preparation for being lifted and attached to ET-121 on June 7. ET-121 was originally scheduled to fly with Atlantis on the second Return to Flight mission, STS-121. In the VAB, a new heater was added to ET-121 on the feedline bellows, part of the pipeline that carries the liquid oxygen to the orbiter's main engines. The heater is designed to minimize the potential for ice and frost buildup. Final work is ongoing, including pull tests to ensure the heater is bonded properly and Thermal Protection System foam spray closeouts. The heater work is set to be completed in time for the orbiter to be attached on June 7. Discovery will roll back out to Launch Pad 39B in mid-June. The Multi-Purpose Logistics Module Raffaello was transferred back to the Space Station Processing Facility to allow the mission processing team access to address concerns with fasteners inside the module that do not have an adequate running torque to act as a secondary locking feature. The assessment and additional work is being conducted to ensure that the fasteners do not disengage during ascent. Raffaello's hatch is scheduled to be opened on May 31. The additional tasks will not impact the STS-114 launch planning window. Mission: STS-121 - 18th ISS Flight (ULF1) - Multi-Purpose Logistics Module; Vehicle: Atlantis (OV-104); Location: Orbiter Processing Facility Bay 1; Launch Date: Lighted Launch Planning Window September 9 - 24, 2005; Launch Pad: 39B; Crew: Lindsey, Kelly, Sellers, Fossum, Nowak and Wilson; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Technicians continue power-up testing on Atlantis in Orbiter Processing Facility bay 1 for its mission, designated STS-121, to the International Space Station. Forward-, midbody- and aft-area closeouts continue. Following the discovery of a small crack in a retract link assembly on the right-hand main landing gear, the assembly

was removed from the vehicle and sent for analysis. A spare assembly was installed in the vehicle Thursday. To lower the main landing gear, a mechanical linkage released by each gear actuates the doors to the open position. The landing gear reached the full-down and extended position within 10 seconds and are locked in the down position by spring-loaded down-lock bungees. Space Shuttle Main Engine leak checks and hydraulics leak checks are complete. Final flight controls cycling is finished. Orbiter KU-Band antenna testing and flight controls aerosurface checkout also are complete. Owner-press-release. (2005). **Space Shuttle Processing Status Report** S05-021 [Online]. Available E-mail: owner-press-release@spinoza.public.hq.nasa.gov [2005, May 27].]

**May 31: Report finds fault with NASA over shuttle alternatives**

Government auditors faulted NASA on Tuesday for failing to adequately investigate cheaper, safer alternatives to the space shuttle for delivering parts and supplies to the International Space Station. With just five years until the three remaining shuttles retire, NASA has 28 flights scheduled to complete work on the orbiting research laboratory. That's a flight rate of more than five shuttle missions per year, which even agency leaders acknowledge could prove to be too many. Lawmakers in Congress have pressed the agency to examine lower-cost missions to the space station using expendable rockets and cargo containers. Last year, NASA headquarters officials dismissed the notion as too costly and risky. But those conclusions lacked supporting documentation, according to a 10-month study by the Government Accountability Office, the investigative arm of Congress. The GAO findings likely will have little real influence on NASA because agency officials, spurred on by new administrator Mike Griffin, are conducting more detailed analysis of the technology and costs involved in shifting some of the space station missions from the shuttle to other delivery vehicles. At a May Senate hearing, Griffin acknowledged the shuttles may not be up to making 28 flights in five years. He said shuttle program engineers and managers are considering dropping some of the missions. A new cargo-only module could be employed to replace the lost shuttle missions, Griffin said. The agency is currently evaluating 26 proposals from companies interesting in ferrying cargo to and from the space station. NASA officials indicated they agree with the GAO's findings and outlined ongoing efforts to accelerate the design and production of a cargo-only launch vehicle. ["Report finds fault with NASA over shuttle alternatives," **Florida Today**, June 1, 2005, p. 1A & 7A.]





NASA Special Agent Dan Oakland holds up a long-lost spacesuit recently uncovered at the Cape Canaveral Air Force Station (CCAFS) in Florida. A recent venture into a long-locked room at CCAFS uncovered interesting artifacts of a by-gone era: retired space suits from Americans who trained in the 1960s to be astronauts aboard an Air Force orbiting reconnaissance laboratory. Two security officers were doing a check of a facility at Launch Complex 5/6 blockhouse. Oakland and Security Manager Henry Butler, who is with Delaware North Parks and Resorts, the company that oversees the museum, discovered a locked room.

JUNE 2005

**June 1: NASA didn't explore ISS resupply options adequately**

NASA did not adequately explore alternatives to the space shuttle for ferrying cargo to the International Space Station, according to a new report from the Government Accountability Office (GAO). NASA has maintained that the shuttle is the best and most cost-effective option for station supply and assembly because of its payload capacity and the fact that the station's modules were built to be transported in the shuttle's cargo bay. Skeptical lawmakers Sen. Sam Brownback (R-Kan.) and Rep. Dana Rohrabacher (R-Calif.) asked GAO to investigate the agency's conclusions. NASA conducted an informal assessment of alternate launch systems in 2004. Although it identified "significant challenges" with using any other system for station assembly, its work was "insufficient to conclude that the shuttle was the best option for logistics support missions prior to the proposed retirement of the space shuttle in 2010," GAO says. The agency relied primarily on experts at its headquarters in Washington and did not document the proceedings and decisions reached along the way, according to the report. At the moment, NASA is evaluating responses to a request for information released in September 2004 seeking information on commercial resupply of the station after 2010. Although the agency would not rule out the possibility of commercial resupply flights taking place before then, it told GAO that this would not eliminate any of the remaining scheduled shuttle flights. E-mail distribution. (2005). [Aviation Week's Aerospace Daily & Defense Report Re: "NASA GAO: NASA didn't explore ISS resupply options adequately," [Electronic]. Vol. 214, No. 43, [June 1, 2005.].]

**New event veers to space business**

Florida's space community is combining two venerable conferences to create a new symposium that will focus on attracting new business as NASA heads back to the moon and a potentially lucrative space tourism industry emerges. Florida Space 2005 will be from Nov. 15 to 17 at the Kennedy Space Center Visitor Complex. The three-day event replaces the annual Space Congress, which was the longest-running conference in the industry, and the Cape Canaveral Spaceport Symposium. The old events focused on the technical end of the space business – designing, developing and operating the launch pads, rockets, spaceships, satellites and processing facilities that are central to U.S. civil, commercial and military space. But Jim Banke, vice president of Florida operations for The Space Foundation, says the revamped conference will revolve around the business of space and new opportunities on the horizon. "The new conference will have very much of an economic-development and space-policy feel to it, much more so than the predominantly technical conferences that we've seen here in the past," he said. Central to this year's conference will be new business opportunities that will be created by the new direction NASA is taking and a new space tourism industry that is on the verge of becoming reality. ["New event veers to space business," Florida Today, June 1, 2005, p 3B.]

**June 2: Discovery might return to pad ahead of schedule**

Shuttle Discovery is to be separated from its fuel tank and rocket boosters this morning, after its rollback last week to the Vehicle Assembly Building at Kennedy Space Center. Though the maneuver was behind schedule, the shuttle could return to the launch pad earlier than thought, a spokeswoman said. The shuttle was rolled back from the launch pad so it could be mated with a modified tank originally scheduled to fly with Atlantis. Lightning storms halted crane operations inside the vast assembly building Wednesday. The safety

precaution slowed workers' efforts to "de-mate" the orbiter from its external fuel tank and boosters. "They lifted the sling this morning, and they're working on attaching the sling to Discovery," NASA spokeswoman Jessica Rye said Wednesday. Discovery is scheduled to be mated with its new tank around June 7, then roll out to the launch pad -- again -- on June 14. But despite the delays this week, it may be able to mate and move a couple of days earlier than planned, Rye said. Final wire routing and spraying of insulating foam is taking place on the fuel tank that will fly with Discovery, she said. The tank has a new heater designed to prevent buildup of ice during fueling with supercold propellants. Ice can fly off the tank during launch and damage the orbiter. NASA anticipates Discovery will fly in a launch window that extends from July 13 to July 31. Web posted. (2005). [Discovery might return to pad ahead of schedule [Online]. Available WWW: <http://www.floridatoday.com/> [2005, June 2].]

### **Kennedy: CEV may evolve from shuttle**

The next spaceship to carry humans from Cape Canaveral is likely to be a descendant of the space shuttle, even though some jobs will be lost in the transition, Kennedy Space Center Director Jim Kennedy said Thursday. "What we will do for sure -- you can take this to the bank -- is that we are going to provide the launch operations for the vehicles of the future," he told the Melbourne Chamber of Commerce over breakfast at the Rialto Place Hilton. "It's looking more and more like the vehicles of the future will be derived from the shuttle. There was some talk of getting away from shuttle and moving to expendable launch vehicles," but new NASA Administrator Michael Griffin "strongly believes in capitalizing on the investments that have already been made," Kennedy said. It's possible the new ship could use an external fuel tank and solid rocket boosters like the shuttle, Kennedy said. A major announcement regarding the next-generation ship is expected in July, he said. Griffin and other NASA officials have been hinting for weeks, in Congressional testimony and in meetings with reporters, that the agency is leaning toward using shuttle components in the launch system necessary to deliver people and cargo to space for missions to the moon and beyond. Though Kennedy said he doesn't expect today's staffing of about 15,000 civil servants and contractors at KSC once the shuttles are retired by 2010, "this is where you're going to launch the vehicles for the exploration vision," he said. Preparing the next ship for flight is expected to be less labor-intensive. "That's the good thing, but it's also the bad thing for us economically as a community," he told business leaders. Web posted. (2005). [Kennedy: CEV may evolve from shuttle [Online]. Available WWW: <http://www.floridatoday.com/> [2005, June 3].]

### **Shuttle embarks on tank transfer**

Shuttle Discovery dangled from a crane high inside the Vehicle Assembly Building on Thursday afternoon during a daylong effort to remove the orbiter from its external fuel tank. The shuttle team at Kennedy Space Center is swapping out Discovery's fuel tank with one modified to resolve safety concerns related to dangerous ice debris and a glitchy fuel valve. The new tank and twin solid rocket boosters attached to it were to fly with Atlantis on the second post-Columbia mission. Now they're flying on the first flight, set for July. By Thursday evening, the crane operators had gently lowered Discovery onto its orbiter transporter in the center aisle of the assembly building. The orbiter will wait a few days on the 76-wheel hauler as workers ready its new tank, boosters and mobile launch pad. The final prep work, including adding a heater to prevent ice chunks from forming on a pipeline, is going so well that NASA might get Discovery back to the launch pad a day or so sooner.

Discovery could be attached to its new external tank and boosters on Monday, one day earlier than planned. If so, the fully assembled shuttle could go back to the pad on June 13, also one day early. Web posted. (2005). [Shuttle embarks on tank transfer [Online]. Available WWW: <http://www.floridatoday.com/> [2005, June 3].]

### **June 3: With last Titan gone, workers leave Cape**

The end of the Titan rocket program is taking a bite out of Cape Canaveral Air Force Station's civilian work force. Two contractors -- Jacobs Sverdrup Space Services Group and Science Applications International Corp. -- plan to lay off about 160 workers later this month, company officials said Friday. Another contractor, Lockheed Martin Space Systems, previously announced it is trimming its rocket work force by about 425 employees through this year and beyond. Most of the layoffs will be this summer, said Lockheed Martin spokeswoman Julie Andrews. The last Titan rocket launch from Cape Canaveral occurred April 29 and ended a program that employed thousands of people on the Space Coast over four decades. Shortly after the launch, Lockheed Martin issued 60-day layoff notices to many of its Titan workers. Of the 425 Lockheed Martin workers being let go, about 325 come from the Titan program and the other 100 come from the Atlas rocket program. The Atlas program has been scaled down but will continue at the Cape, Andrews said. The Atlas layoffs will be completed by the end of the year, while a few Titan workers will remain on the job for up to another year or two. When the job cuts are done, Lockheed Martin's Titan and Atlas staff at the Cape will be reduced from about 800 to 150, including engineers, administrative personnel and unionized laborers, Andrews said. Jacobs Sverdrup plans to lay off 100 workers by June 23, according to a Worker Adjustment and Retraining Notification notice filed by the company with the Florida Agency for Workforce Innovation. The jobs include professional, scientific and technical services. Web posted. (2005). [With last Titan gone, workers leave Cape [Online]. Available WWW: <http://www.floridatoday.com/> [2005, June 4].]

### **Larry Crawford Retires After 35 Years of Service**

James L. "Larry" Crawford, director of Kennedy Space Center's Safety and Mission Assurance (S&MA) organization, is retiring today after 35 years of dedicated service to NASA and the U.S. Army. Crawford joined KSC in 2004 to lead the new S&MA organization, which was created to centralize the safety and mission assurance activities into a single, effective organization. Through his leadership, the Center's safety and mission assurance program was tremendously strengthened. ["Larry Crawford Retires After 35 Years of Service to Nation, **NASA News Release #46-05**, June 3, 2006.]

### **Space Shuttle Processing Status Report**

Mission: STS-114 - 17th ISS Flight (LF1) - Multi-Purpose Logistics Module; Vehicle: Discovery (OV-103); Location: Vehicle Assembly Building; Launch Date: Launch Planning Window July 13 - 31, 2005; Launch Pad: 39B; Crew: Collins, Kelly, Noguchi, Robinson, Thomas, Lawrence and Camarda; Inclination/ Orbit Altitude: 51.6 degrees/122 nautical miles. In the Vehicle Assembly Building (VAB), orbiter Discovery was demated, or removed, from its External Tank (ET-120) and Solid Rocket Boosters in high bay 1 on June 2. Discovery was lowered by crane onto the Orbiter Transporter System in the VAB transfer aisle. The vehicle will be moved in front of high bay 3 in preparation for being lifted and attached to its new tank, ET-121, on June 6. That tank was originally scheduled to fly with Atlantis on the second Return to Flight mission, STS-121. A new heater was added to the

tank's feedline bellows, part of the pipeline that carries the liquid oxygen to the orbiter's main engines, to minimize the potential for ice and frost buildup. Once mated to the new tank, technicians will work final closeouts on the fully assembled Space Shuttle stack, and perform liquid oxygen and liquid hydrogen electrical mates and an interface verification test. Discovery is currently scheduled to return to Launch Pad 39B on June 13. Mission: STS-121 - 18th ISS Flight (ULF1) - Multi-Purpose Logistics Module; Vehicle: Atlantis (OV-104); Location: Orbiter Processing Facility Bay 1; Launch Date: Lighted Launch Planning Window September 9 - 24, 2005; Launch Pad: 39B; Crew: Lindsey, Kelly, Sellers, Fossum, Nowak and Wilson; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Technicians continue power-up testing on Atlantis in Orbiter Processing Facility bay 1 for its mission to the International Space Station. Forward-, midbody- and aft-area closeouts are continuing. Atlantis is currently scheduled to be rolled from the processing facility to the Vehicle Assembly Building in mid-July. Electrical test checkout of the Orbiter Maneuvering System and Forward Reaction Control System is ongoing. Next week, technicians will begin cleaning the payload bay. Once all the work is completed, the payload bay doors will be closed in the Orbiter Processing Facility for the final time prior to flight. The third redesigned External Tank (ET-119) is scheduled to be shipped from the Michoud Assembly Facility in New Orleans to Kennedy Space Center on June 9. It will arrive via a specially designed barge about five days later. ET-119 may fly with Atlantis on its Return to Flight mission. Endeavour (OV-105); Endeavour is in its Orbiter Major Modification period, which began in December 2003. Owner-press-release. (2005). **Space Shuttle Processing Status Report** S05-021 [Online]. Available E-mail: owner-press-release@spinoza.public.hq.nasa.gov [2005, June 3].]

#### **June 6: NASA nixes third tanking test for shuttle Discovery**

NASA managers today ruled out a third tanking test for the shuttle Discovery, keeping launch of the first post-Columbia mission on target for July 13. The launch window extends to July 31 and as of this writing, engineers have five days of contingency time in the launch processing schedule to handle unexpected problems between now and the opening of the window. Still to come: final disposition of questions about the risk posed by ice debris during launch; a final report by the Stafford-Covey Return to Flight Task Group regarding NASA's implementation of post-Columbia safety upgrades; and a formal flight readiness review to clear Discovery for flight. The debris verification review, which will quantify the threat posed by ice debris based on a flurry of recent tests and extensive analysis, is targeted for June 24, followed by the Stafford-Covey group's final meeting and the two-day flight readiness review, which will be held at the Kennedy Space Center. Among the debris threats still on the table is the question of possible ice buildups around brackets near the top of the external tank. Assuming no show stoppers emerge during the meetings later this month, commander Eileen Collins and her crew will fly to Kennedy July 9 for the start of the countdown to blastoff of the 114th shuttle mission. Liftoff July 13 is targeted for 3:51 p.m. EDT (1951 GMT). Web posted. (2005). [NASA nixes third tanking test for shuttle Discovery [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, June 6].]

#### **Expendable Launch Vehicle Status Report**

Mission: Mars Reconnaissance Orbiter (MRO); Launch Vehicle: Lockheed Martin Atlas V 401; Launch Pad: Space Launch Complex 41 (SLC-41); Cape Canaveral Air Force Station (CCAFS), Fla.; Launch Date: August 10, 2005; Launch Window: 7:53:58 to 9:53:58 a.m. (EDT). The Electra instrument, a telecommunications package, was installed May 26. Electra



performance testing was successfully completed May 27. Power-on testing continues. Final Command and Data Handling system performance testing is complete. Flight batteries are scheduled for installation next week. The Centaur upper stage for the Atlas V arrives today at CCAFS. It will be taken to the hangar at the Atlas Space Operations Center. On June 17, it will be transported to the Vertical Integration Facility (VIF) at SLC-41 and hoisted atop the Atlas stage to begin checkout. The Atlas stage was erected May 6 in the VIF. A countdown wet dress rehearsal, with the launch vehicle fully fueled, is scheduled in early July. The MRO will be transported from the Payload Hazardous Servicing Facility at KSC to the VIF at SLC-41 in late July. It will join the Atlas V for the final phase of launch preparations. The spacecraft will undergo functional tests and a final week of integrated testing and closeouts. Mission: CALIPSO/ CloudSat; Launch Vehicle: Delta 7420 DPAF; Launch Pad: Space Launch Complex 2 (SLC2), Vandenberg Air Force Base (VAFB), Calif.; Launch Date: TBD; Launch Window: TBD. Initial CALIPSO state-of-health checks are complete. The Wide Field Camera is integrated with the spacecraft. A comprehensive checkout of the satellite is under way. CloudSat processing is complete. When processing resumes June 23, technicians will conduct battery reconditioning, spacecraft fueling and mate the lower Dual Payload Attach Fitting. The stacking of the Delta II launch vehicle at SLC2 will begin in mid-June. KSC News Center (2005). **Expendable Launch Vehicles Status Report** E05-02 [Online]. Available E-mail: [ksc@newsletters.nasa.gov](mailto:ksc@newsletters.nasa.gov) [2005, June 6].]

#### **NASA installs modified fuel tank**

Kennedy Space Center workers gave shuttle Discovery a new fuel tank Monday, and the spaceship should be back at the launch pad within a week. After a half-day of prep work, a heavy-duty yellow crane hoisted Discovery skyward inside the 52 story Vehicle Assembly Building. The workers carefully attached the orbiter to its new fuel tank and solid rocket boosters. Six or seven days of work remain to complete all the hookups between the ship, the orange fuel tank, booster rockets and the mobile launcher platform. NASA currently plans to haul Discovery back to the launch pad beginning at 2 a.m. Monday. The planned rollout is one day earlier than predicted when managers first decided to bring Discovery back to the assembly building to swap fuel tanks. That decision, which delayed the first shuttle mission since the 2003 Columbia accident from May to July, was made so that Discovery could use a tank modified with a heater to prevent dangerous chunks of ice from growing on a pipeline that runs along the outside of the fuel tank. Discovery's new fuel tank was going to fly with Atlantis on the second post-Columbia shuttle mission. In addition to the heater, NASA replaced a filter inside the tank because it remains a prime suspect in the erratic operation of a liquid hydrogen valve that opened and closed more times than usual during two fueling tests. Meanwhile, shuttle managers have decided against a third fueling test. ["NASA installs modified fuel tank," **Florida Today**, June 7, 2005, p 1B.]

#### **June 7: Governor prepared to form space panel**

Gov. Jeb Bush could act by Friday to create a commission to plot Florida's future in space, following the Legislature's refusal to do so. A bill to create the Commission on the Future of Space in Florida tanked on the last day of the spring session, apparently killed by unrelated amendments. Bush's economic policy advisers have told legislative leaders the governor intends to use an executive order to create the commission anyway, in time to produce recommendations before the next session. An unspecified Bush executive order is on the agenda for Friday's board meeting of the Florida Space Authority. The aim of the commission would be to protect the \$4.5 billion annual space industry impact in the state as

the nation's space program moves to embrace the president's space exploration priorities. Those don't include the shuttle, scheduled for retirement beginning in 2010. Akin to its predecessor in 1987, the commission would have the task of finding a new niche for Florida in the increasingly privatized space industry, and then recommend resources to invest. Web posted. (2005). [Governor prepared to form space panel [Online]. Available WWW: <http://www.floridatoday.com/> [2005, June 7].]

### **Space suits for spies-in-training found**

Plucked from piles of decomposing film, cardboard boxes and, as one NASA employee tactfully put it, "evidence of rodent activity," two sky-blue spacesuits recently returned to the light of day, anachronisms from an abandoned U.S. military program to put spies in space. Identified by fire marshals at Florida's Kennedy Space Center as a hazard, the suits were found because film stored in Blockhouse 5/6 at nearby Cape Canaveral Air Force Station, had been earmarked for removal. When security officials arrived at the building, they found a locked room with no key, NASA exhibits developer Luis Berrios told Reuters in an interview Tuesday. Security officers finally located a master key and explored by flashlight as the building had been without electricity for years, said Berrios, a design specialist hired by Kennedy Space Center to work with its museum and tourist center. An ad hoc storage chamber, the place housed an eclectic collection of junk from 40 years of space flight, including old film canisters, electrical equipment and one shuttle main landing gear tire (used). Opening a locker-sized blue box on the floor, the searchers made an unusual discovery: tucked inside were a pair of sky-blue spacesuits and four or five pairs of blue gloves. "We're supposed to cover all the nooks and crannies of Kennedy Space Center -- places most folks don't go to or even know about," said NASA security officer Dann Oakland. "I've never found anything like this, though." The discovery sent space historians scrambling to identify the suits, one of which bears the number 008 and the word "LAWYER" in capital letters on the left sleeve. The other was simply and appropriately numbered 007. "Lawyer" turned out to be Lt. Col. Richard Lawyer, who was among the first group of astronauts chosen by the Air Force to serve in its Manned Orbiting Laboratory, or MOL. The project, started in 1963, aimed to station military officers aboard a small space station in orbit for reconnaissance. MOL was to use a modified NASA Gemini capsule to put two crewmen in space for up to a month at a time. "The program didn't get too far," said Roger Launius, head of the Smithsonian Air and Space Museum's space history department. "The Department of Defense never found a good reason to fly people in space." The program was mothballed in 1969 and over time most of the 22 MH-7 training suits produced by Hamilton Standard for the MOL astronauts were collected and transferred to the Smithsonian for preservation and public display. At some point, however, at least two outfits disappeared. "I wish I knew how they got there," Launius said. "The MOL suits are nice. They are very close to some of the Apollo suits which were made in the same era. The unique thing everybody sees is that these are blue and the others are white." For its find, the Kennedy Space Center is expected to be rewarded with an MOL suit it can display at its own visitors center museum, said Barrios. But it will probably not be one of the MOL suits found in Blockhouse 5/6. Decontamination of the material in those suits will take some time. Web posted. (2005). [Space suits for spies-in-training found [Online]. Available WWW: <http://www.reuters.com/> [2005, June 7].]

**June 8: NASA cancels \$10 million culture change contract**

NASA is canceling its contract with a California-based behavior consultant at the end of June, but said it is not abandoning its culture change initiative. Behavioral Science Technology of Ojai, Calif., is 16 months into a three-year campaign to reform NASA's safety climate and culture in the aftermath of the February 2003 accident that destroyed a \$2 billion space shuttle and killed seven astronauts. "The BST contract is going to be curtailed, but NASA continues to maintain its strong safety culture and commitment to a safe work environment," agency spokesman David Steitz told *Government Executive* Wednesday. "Our commitment to safety is constantly evolving, and we will adjust our activities in this area as appropriate." The decision came from NASA's Office of Program Analysis and Evaluation and the agency's Office of Institutions and Management, with approval from Administrator Michael Griffin. Agency officials did not provide specifics about what led to the move. Web posted. (2005). [NASA cancels \$10 million culture change contract [Online]. Available WWW: <http://www.govexec.com/> [2005, June 8].]

**NASA Near to Meeting Safety Requirements**

NASA has met all but 3 of 15 safety requirements for returning the space shuttle fleet to orbit and should be able to complete them in time to launch the Discovery in July, an oversight group said on Wednesday. The panel, headed by two former astronauts, Thomas P. Stafford and Richard O. Covey, said that it needed more time to analyze data before deciding whether NASA had complied with the last three recommendations but that the work was 90 percent complete. In a news conference at the Johnson Space Center in Houston, panel members said they saw no "show stoppers" that would prevent a liftoff in July. The Columbia Accident Investigation Board, which found that the shuttle had been damaged by debris on liftoff, made 15 recommendations that it said must be put in place before flights resumed. NASA appointed the Stafford-Covey panel to monitor compliance. Web posted. (2005). [NASA Near to Meeting Safety Requirements for Launching in July [Online]. Available WWW: <http://www.nytimes.com/> [2005, June 9].]

**NASA Exercises Two Space Station Contract Options**

NASA's Johnson Space Center (JSC) in Houston has exercised two contract options with The Boeing Company for continued work on the U.S. segment of the International Space Station. The options are valued at \$316 million. The options were exercised on the International Space Station Program United States On-Orbit Segment (USOS) Acceptance and Vehicle Sustaining Engineering Contract. The contract value for option No. 1 is approximately \$158 million and the value for Option No. 2 is approximately \$159 million; increasing the total contract value to \$12.6 billion and extending the period of performance by an additional year to Sept. 30, 2007. The completion form, cost-plus-award-fee contract was initially awarded in 1993 and extended last year. Boeing will continue to provide delivery and on-orbit acceptance of U.S. components for the Space Station; sustaining engineering of USOS hardware and software, hardware and software provided to International Space Station partners; post-production support of USOS hardware and hardware provided to international partners and participants; and Space Station end-to-end subsystem management for most of the Station's subsystems including electrical, electronic and electromechanical parts. The contract includes work at JSC; Kennedy Space Center, Fla.; Marshall Space Flight Center, Huntsville, Ala.; immediate areas surrounding those centers; and work at other locations in and outside the U.S. ["NASA Exercises Two Space Station Contract Options," **NASA Contract Release #C05-0**, June 8, 2005.]

### **NASA study raises odds of fatal space-debris strike**

A new NASA risk analysis is raising fears the shuttle could stand a higher chance of being destroyed by space debris than previously thought. Steve Poulos, manager of Orbiter Projects Office at Johnson Space Center in Houston, acknowledges there is "a debate" inside the agency about the threat posed by space debris. One school of thought is that a fatal debris strike is 'probable,' Poulos said. But he said others think such an event is likely to be "infrequent." Space debris, including bits of rock, pieces of old satellites and other trash, often collide with the shuttle as it circles Earth but usually causes no serious harm. Before the Columbia disaster, NASA estimated the spacecraft stood only a 1-in-500 chance of being destroyed by space debris. That's well below the shuttle program's goal of 1-in-200 chance. But an analysis dated April 26 places the odds that orbital debris could destroy the next shuttle at a range from 1 in 54 to 1 in 113. The change in the risk estimate stems from recent tests showing that the shuttle's heat shield is more fragile than NASA had realized. Shuttle Discovery is scheduled to launch July 13 on a mission to the International Space Station. NASA has taken steps to protect Discovery from space debris once it is in orbit. ["NASA study raises odds of fatal space-debris strike," Florida Today, June 8, 2005, p 1A & 5A.]

### **June 9: In Start of Expected Shake-Up, an Official at NASA Resigns**

A NASA official who led efforts to develop the next generation of spacecraft has announced his resignation, the first in what are expected to be dozens of resignations or reassignments as the new administrator, Michael D. Griffin, asserts his control over the agency. In recent days, NASA headquarters has sent out dozens of letters to officials letting them know that they will be reassigned or will have to leave the agency, and has canceled a closely watched contract with a company that had been brought in to improve the agency's much-criticized safety culture. The departing official, Craig Steidle, is a retired Navy admiral whom Dr. Griffin's predecessor, Sean O'Keefe, hired in January 2004 to lead the Office of Exploration Systems. Once Dr. Griffin was confirmed in April, he quickly reversed central elements of Admiral Steidle's plan for vehicles to succeed the space shuttle, calling for plans that could lead to a more rapid development at lower cost, and with more of the technical decisions being resolved within the National Aeronautics and Space Administration and not by the contractors. "The administrator is and has been in the process of choosing his leadership team," said Robert Mirelson, a spokesman for the agency. "That's nothing new in government, and that's certainly nothing new at NASA." Web posted. (2005). [In Start of Expected Shake-Up, an Official at NASA Resigns [Online]. Available WWW: <http://www.nytimes.com/> [2005, June 9].]

### **NASA Prepares Alternative Landing Sites for STS-114**

While the upcoming launch of the space shuttle Discovery will mark the return to flight of NASA's space shuttle fleet, that is only the beginning, and great care is being taken to assure a successful mission throughout, particularly the landing, wherever it might take place. To ensure a safe return of Discovery's astronaut crew, shuttle officials at NASA's Dryden Flight Research Center and Edwards Air Force Base have conducted training drills in the off-chance the orbiter makes a West Coast landing instead of touching down at Kennedy Space Center (KSC) in Florida as planned. While KSC is NASA's preferred landing site for Discovery's STS-114 flight, as well as all shuttle missions since 1990, the space agency turns to Edwards Air Force Base, Calif. and White Sands, N.M. when weather conditions make a

Cape Canaveral landing impossible. Thunderstorms, wind speeds and cloud ceilings will all play a role in whether shuttle flight controllers opt for a contingency landing, shuttle officials said. If Discovery's STS-114 mission goes according to plan, the shuttle should land at KSC during daylight, though NASA officials said it is not a flight constraint. The last shuttle to land at Edwards was Endeavour during the STS-111 mission in June 2002, but Dryden and military officials are always prepared to receive an orbiter. Web posted. (2005). [Safe Harbors: NASA Prepares Alternative Landing Sites for STS-114 [Online]. Available WWW: <http://www.space.com/> [2005, June 9].]

### **New space shuttle landing site established**

The governments of the United States of America and the French Republic have agreed to establish a Transoceanic Abort Landing (TAL) site for NASA's Space Shuttle at Istres Air Base 125, in the South of France. The agreement was signed in Washington this week by NASA Administrator Michael Griffin and the Ambassador of France, His Excellency Jean-David Levitte. The agreement covers Space Shuttle missions supporting the International Space Station. It provides for landing at the French Air Force base for a Shuttle that encounters an emergency during launch. The TAL sites could be used if a Shuttle is unable to reach orbit or a landing site in the U.S. This agreement permits the U.S. government to place equipment and personnel at the base in advance of Space Shuttle missions; to perform weather monitoring; to ensure NASA navigational facilities and landing aids are operational; to provide search and rescue capability and medical evacuation support. Web posted. (2005). [New space shuttle landing site established [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, June 9].]

### **NASA's Griffin says launch decision near**

NASA said Thursday it had made progress in returning the shuttles to flight, though the orbiters still are vulnerable to disastrous hits by debris, a risk the agency accepts. In an introduction to the updated [Return to Flight plan] report, new Administrator Mike Griffin said NASA would not rush to flight, though it was close to making an "informed decision" about launching shuttle Discovery in July. "Human space exploration is not and will never be without risk," he wrote. "However, I am convinced that this Nation and this Agency can execute the bold exploration agenda set forth by the President as safely as humanly possible." The 288-page report summarizes how NASA has attempted to address the recommendations of the Columbia Accident Investigation Board. Among other topics, the report goes into detail on efforts to make the shuttles more resistant to debris hits and heat. There will be more protection for vulnerable wing panels, the landing gear area, selected panels and side windows. The report also sums up NASA's evaluation of the danger posed by foam and ice as they are shed by the external fuel tank. NASA is concluding its debris analysis before the flight readiness review at the end of June. ["NASA's Griffin says launch decision near," **Florida Today**, June 10, 2005, p 5A.]

### **Housing stranded shuttle crew would be stressful**

A day after a blue-ribbon panel endorsed a plan to house shuttle astronauts aboard the international space station in the event of an emergency, the station's flight engineer, John Phillips, acknowledged Thursday that any attempt to carry out such a plan would prove difficult. NASA chartered the independent panel to oversee the space agency's "return to flight" effort. The "safe haven" contingency calls for the station to provide shelter to a shuttle crew in the event an orbiter is damaged upon liftoff and cannot safely re-enter



Earth's atmosphere. In such a scenario, up to 10 people would live aboard the station for six to eight weeks while another orbiter was prepared to undertake a rescue mission. Consumables are an issue on the space station since the shuttle was its main resupply ship. Also, the station's main oxygen generator, which had been malfunctioning for months, recently broke down completely. The international space station and the Russian Soyuz capsule, which serves as the station's "life boat," carry a limited supply of bottled oxygen. Every day, crew members are burning two "oxygen candles" -- canisters of oxygen perchlorate, which, when ignited, generate oxygen. If all goes as scheduled, the orbiting space station next month will play host to the crew of the shuttle Discovery. Web posted. (2005). [Station crew: Housing stranded shuttle crew would be stressful [Online]. Available WWW: <http://www.cnn.com/> [2005, June 9].]

### **Space Shuttle Processing Status Report**

Discovery (OV-103); Mission: STS-114 - 17th ISS Flight (LF1) - Multi-Purpose Logistics Module; Location: Vehicle Assembly Building (VAB); Launch Date: Launch Planning Window: July 13 to 31; Launch Pad: 39B; Crew: Collins, Kelly, Noguchi, Robinson, Thomas, Lawrence and Camarda; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. On Tuesday in the VAB, Discovery was mated with a new External Tank (ET-121). Final closeouts and integration tests are being performed. Discovery is scheduled to begin the four-mile journey to Launch Pad 39B at 3 a.m. EDT, June 14. After several weeks of data evaluation from two previous tanking tests, program managers decided not to do another one prior to Discovery's launch. They reviewed data from two previous tests on ET-120, Discovery's original tank. One major change to Discovery's new ET is the addition of a heater on the feedline bellows to prevent ice forming during fueling and launch. The bellows is a joint on the outside of the tank, not insulated with foam, to allow expansion, contraction and movement during fueling of super-cold liquid oxygen before launch. The line feeds oxygen to the Shuttle main engines at start-up and throughout the 8.5 minute climb to orbit. Another change to the ET is in the hydrogen diffuser. A diffuser is a fabricated tube, which consists of a core and screen assembly. It diverts the flow into radial jets that are dispersed by the wire screen. There are two diffusers per ET at the top of the hydrogen and oxygen tanks. Discovery's new ET uses a certified plain, two wire weave. ET-120 had a tighter woven mesh than was expected. The data review showed the out-of-specification diffuser may have been the contributing cause of a liquid hydrogen pressurization problem. A vent valve cycled 13 times during the tanking tests, versus the standard eight to nine times. The valve opens and closes to ensure the liquid hydrogen stays at the correct pressure in the final two minutes prior to launch. Discovery's new ET originally was planned to fly with Atlantis on the second Return to Flight mission, STS-121. A decision will be made next week as to which External Tank, ET-120 or 119, will be used for STS-121. In the Space Station Processing Facility, work on resupply stowage rack fasteners inside the Multi-Purpose Logistics Module Raffaello is complete. The hatch was closed for flight Monday. Raffaello is scheduled to be installed in the Payload Transportation Canister today, and it is set to be rotated to the vertical position over the weekend. Payloads transfer to Launch Pad 39B is scheduled for June 13. Discovery's launch date will be selected after the Flight Readiness Review June 29-30. Atlantis (OV-104); Mission: STS-121 - 18th ISS Flight (ULF1) - Multi-Purpose Logistics Module; Location: Orbiter Processing Facility Bay 1; Launch Date: Lighted Launch Planning Window: September 9 to 24 Launch Pad: 39B; Crew: Lindsey, Kelly, Sellers, Fossum, Nowak and Wilson; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Power-up system testing is 95 percent complete on Atlantis. Forward, mid-

body and aft-area closeouts continue. Atlantis is scheduled to be rolled from the processing facility to the VAB in mid-July. Technicians continue to bond Thermal Protection System tiles to Atlantis, with only nine tiles remaining. Work on the Rudder Speed Brake (RSB) is complete. The 14-month process included removing, inspecting and reinstalling the four RSB actuators and panels, and the Thermal Protection System blankets. While the panels were removed, they were bead blasted and painted for additional corrosion control. Technicians began cleaning the payload bay in preparation for final door closing June 14. The landing gear functional test is scheduled for next week. Owner-press-release. (2005). **Space Shuttle Processing Status Report S05-023** [Online]. Available E-mail: owner-press-release@spinoza.public.hq.nasa.gov [2005, June 9].]

**June 10: NASA releases latest estimates for return-to-flight cost**  
NASA released the latest revision to its shuttle return-to-flight implementation plan on June 9, including the latest cost estimates for return to flight initiatives in fiscal 2005 and 2006. NASA estimates that it will spend a total of \$602 million on return to flight activities in FY '05, of which \$413 million has been formally approved by the space shuttle's Program Requirements Control Board. NASA so far has identified about \$288 million in return to flight activities for FY '06, including \$188 million that has been approved by the PCRB, \$26 million that has been reviewed but not yet formally approved, and \$74 million in tasks that still are being reviewed. Costs for FY '05-'06 are expected to change as NASA gains experience following the orbiter's return to flight, currently scheduled for July. " FY 2006 is planned to be a transition year for the shuttle program," NASA said. Return-to-flight (RTF) technical content "that must be sustained from the program's remaining service life, along with the work force required to continue safe flight, will be absorbed into the program's baseline. Therefore, at the end of FY 2006, RTF costs will no longer be budgeted or reported separately." E-mail distribution. (2005). [Aviation Week's Aerospace Daily & Defense Report Re: "NASA releases latest estimates for return-to-flight cost," [Electronic]. Vol. 214, No. 50, [June 10, 2005].]

#### **Panel named to study Florida's space future**

Gov. Jeb Bush today established a Commission on the Future of Space and Aeronautics in Florida. Lt. Gov. Toni Jennings made the formal announcement today in Cape Canaveral saying, "For more than 50 years, Florida has served as the backbone of the nation's space program. But, as the increasingly global space industry evolves, we can not take this status for granted." The commission includes leaders with experience in space and related fields. The group will prepare recommendations for Bush and the Legislature by Jan. 31, 2006. Web posted. (2005). [Panel named to study Florida's space future [Online]. Available WWW: <http://www.floridatoday.com/> [2005, June 10].]

**June 11: NASA Chief to Oust 20**  
New NASA Administrator Michael D. Griffin has decided to replace about 20 senior space agency officials by mid-August in the first stage of a broad agency shake-up. The departures include the two leaders of the human spaceflight program, which is making final preparations to fly the space shuttle for the first time in more than two years. Senior NASA officials and congressional and aerospace industry sources said yesterday that Griffin wants to clear away entrenched bureaucracy, and build a less political and more scientifically oriented team to implement President Bush's plan to return humans to the moon by 2020 and eventually send them to Mars. The moon-Mars initiative has put severe pressure on

NASA's budget, forcing Griffin into a difficult balancing act -- trying to build quickly a next generation spaceship without crippling programs ranging from Earth observation satellites and aeronautics research to maintaining the Hubble telescope. At the same time, the sources said, Griffin wants to restore NASA's glamour, reasserting the engineering and science leadership that has been eroding since the Apollo era. To this end, the sources said, he is willing to oust as many as 50 senior managers in a housecleaning rivaling the purge after the 1986 Challenger explosion. Web posted. (2005). [NASA Chief to Oust 20 [Online]. Available WWW: <http://www.washingtonpost.com/> [2005, June 11].]

**June 13: With new tank in tow, Discovery ready to roll**

Workers at Kennedy Space Center expect to see a familiar sight overnight -- shuttle Discovery rolling again to the launch pad. The shuttle, stacked with a new fuel tank equipped with an ice-preventing heater, is scheduled to inch out of the Vehicle Assembly Building early Tuesday morning. The time is in flux because of concerns about rain and storms developing later in the day. "We are looking at weather," NASA spokeswoman Jessica Rye said. Discovery previously rolled to the pad April 6, then was pulled back after a tanking test revealed concerns about ice forming on part of the fuel tank when cold propellants were loaded. Ice can break off during launch and damage the orbiter. Workers were finishing final testing and connections over the weekend. "The work is progressing very well," Rye said. Early this morning, Discovery's cargo -- including a new stabilizing gyro for the International Space Station -- was supposed to travel to the pad ahead of the shuttle. That way, workers only have to rotate the service structure that encloses and protects the ship once, saving two days, Rye said. NASA will set a launch date within the July 13-31 window during a flight readiness review June 29-30. Web posted. (2005). [With new tank in tow, Discovery ready to roll [Online]. Available WWW: <http://www.floridatoday.com/> [2005, June 13].]

**NASA: Earliest manned moon landing in 2015**

The next mission to land a man on the moon will take place in 2015 at the earliest, the new chief of the United States' space program said on Monday, adding the mission could be followed by the construction of a multinational space station there. But NASA has not yet decided what vehicles will be used to reach the moon, or what will succeed the ageing space shuttle fleet, which is due to be retired in 2010. "I don't have a specific date, but sometime between 2015, which is the earliest we think we can do it, and 2020, which would be the latest," said Michael Griffin, the new administrator of NASA, when asked at the Paris Air Show about NASA plans to return to the moon. The last manned mission to the moon was NASA's Apollo 17 in 1972. Griffin, who took over the top job at the U.S.'s National Aeronautics and Space Administration in April, is hoping to fulfill U.S. President George W. Bush's high-profile plan to return humans to the moon and possibly to land on Mars. NASA will make decisions on what craft will be used to reach the moon in the next few months, Griffin said: "I am hoping we will have some fairly firm conclusions by the end of this summer." NASA is weighing up competing bids for the so-called Crew Exploration Vehicle (CEV), the successor to the space shuttle, which will be retired in 2010. The new vehicle is expected to be compatible with the International Space Station and to play a role in a manned mission to the moon. Web posted. (2005). [NASA: Earliest manned moon landing in 2015 [Online]. Available WWW: <http://www.cnn.com/> [2005, June 14].]

### **NASA Selects Contractors For Crew Exploration Vehicle Work**

NASA today announced the selection of Lockheed Martin Corp. and the team of Northrop Grumman Corp. and The Boeing Co. that will lead to an award to build the agency's Crew Exploration Vehicle (CEV). The selection is part of NASA's plan to have two contractors compete in the design and production process for the Space Shuttle's replacement. NASA's Vision for Space Exploration calls for the CEV to carry up to six astronauts beyond low-Earth orbit soon after the Space Shuttle is retired in 2010, and then on to the moon as early as 2015. The CEV acquisition strategy is a multi-phased project. Phase 1 called for industry to mature their crewed vehicle designs and demonstrate their ability to manage the cost, schedule, and risk of human-rated spacecraft development. Phase 2, covering final CEV design and production, was scheduled to start with a down-selection to a single industry team in 2008. To reduce or eliminate the gap between the Shuttle's retirement in 2010 and an operational CEV, the Phase 2 down-selection is planned for 2006. Results of NASA Administrator Michael Griffin's Exploration Systems Architectural Study will be incorporated into a Call For Improvements later this year to invite Phase 2 proposals from the Phase 1 contractors. ["NASA Selects Contractors For Crew Exploration Vehicle Work," **NASA News Release #05-146**, June 13, 2005.]

### **Rocket slips a day**

The launch of a Boeing rocket from the Cape with a new weather satellite has been delayed a day, to June 24, because of concerns with the performance of an engine part during a dress rehearsal. The hydraulic turbo pump assembly on the Delta 4 rocket is being replaced, Boeing spokesman Robert Villanueva said Monday. The new launch window for the GOES-N satellite extends from 6:14 to 6:59 p.m. EDT. ["Rocket slips a day," **Florida Today**, June 14, 2005, p 6A.]

### **June 14: Top NASA officials admit they plan to leave agency**

NASA's top managers for human spaceflight and science will leave the agency as new Administrator Mike Griffin continues to prepare to surround himself with fresh leadership. William Readdy, associate administrator for space operations, said Monday in an e-mail to employees that Griffin offered him a different NASA job after Discovery flies the first shuttle mission since the 2003 Columbia disaster. Readdy, a former astronaut said he has not decided whether to stay. Al Diaz, associate administrator for science, said in a similar e-mail to his staff that he decided to retire a year ago, long before President Bush picked Griffin to take over NASA. The exodus is not unusual given the change in administrators. Typically, top managers will leave on their own or be asked to leave so the new boss can appoint his own team. There has been no word yet on who Griffin will choose for the vacancies or when. Last week exploration systems chief Craig Steidle opted to resign rather than accept Griffin's offer of a different post. Steidle led NASA's bid to develop a shuttle replacement spaceship to carry astronauts to the space station, the moon and ultimately Mars. On Monday, NASA formally announced Steidle's departure and said another headquarters manager, Doug Cooke, will run exploration systems until a successor is named. Otherwise, the agency would not discuss specific personnel changes, spokesman Dean Acosta said. Web posted. (2005). [Top NASA officials admit they plan to leave agency [Online]. Available WWW: <http://www.floridatoday.com/> [2005, June 14].]

### **NASA's Shuttle Cargo Ready For Return To Flight**

The cargo for the Space Shuttle Discovery's historic Return to Flight mission (STS-114) arrived yesterday at Launch Pad 39-B at NASA's Kennedy Space Center, Fla. Discovery's payload includes the Multi-Purpose Logistics Module Raffaello, the Lightweight Multi-Purpose Experiment Support Structure Carrier (LMC), and the External Stowage Platform-2 (ESP-2). NASA's Italian-built Raffaello will carry 12 large racks filled with food, clothing, spare parts and research equipment to the International Space Station. Included in the cargo is the Human Research Facility-2 that will expand the Station's capability to support human life sciences research. The LMC will deliver a Control Moment Gyroscope to replace an inoperable one that failed in August 2002. Gyroscopes provide attitude control for the Station keeping it properly oriented without use of rocket fuel. A Thermal Protection System repair sample box containing pieces of the Shuttle's heat-shielding tile is also installed on the LMC. The samples will enable crew members to test new on-orbit repair techniques. The ESP-2 will carry replacement parts to the Station. The platform will be deployed, attached to the Station's airlock, and serve as a permanent spare parts facility. Returning the Shuttle to flight and completing the Space Station are the first steps in the Vision for Space Exploration, a stepping stone strategy toward new exploration goals. Using the Station to study human endurance and adaptation in space, and to test new technologies and techniques, NASA will be prepared for longer journeys on to the moon, Mars and beyond. Discovery's Return to Flight mission is targeted for July 13 with a launch planning window that extends through July 31. ["NASA's Shuttle Cargo Ready For Return To Flight," **NASA News Release #05-149**, June 14, 2005.]

### **Make oxygen from moon dirt?**

Florida Tech researchers have gotten involved in NASA's bid to produce oxygen from lunar soil. The space agency has awarded the Melbourne university a \$430,000 grant as part of a multi-million-dollar effort involving Kennedy Space Center, British Titanium and Cambridge University. The project, called ILMENOX, is aimed at allowing astronauts to produce oxygen on the moon primarily for use to refuel spaceships. Perhaps the biggest reason: the liquid oxygen needed for rocket fuel is heavy and every pound of cargo that NASA has to take on jaunts of dollars and eliminates the capability to take something else along in its place. The agency has a \$250,000 prize outstanding to the first team capable of producing about 11 pounds of breathable oxygen from simulated lunar dirt, a material created at Johnson Space Center that is similar to volcanic ash. The so-called Centennial Challenge prize, co-sponsored by the Brevard-based Florida Space Research Institute, will go to the first team to prove its technology works before a 2008 deadline. ["Make oxygen from moon dirt?" **Florida Today**, June 15, 2005, p 3B.]

### **July 15: Discovery moves back to launch pad**

NASA returned the space shuttle Discovery to the launch pad Wednesday for the first mission since the Columbia disaster, after replacing the external fuel tank with a new model designed to prevent dangerous ice buildup. Shuttle managers are aiming for a liftoff as early as July 13. Discovery's four-mile trek from the assembly building to the launch pad aboard the giant shuttle transporter took more than nine hours. The morning trip was halted several times because of overheated bearings in the transporter, and the speed fell below the usual mile per hour. Discovery was transported to the pad in April but removed May 26 after NASA determined that potentially deadly pieces of ice could form over an expansion joint on the external fuel tank after the super-chilled fuel was loaded. Managers decided to install a



heater at the joint, located along the feed line for liquid oxygen. NASA replaced Discovery's fuel tank with one intended for Atlantis on the second post-Columbia flight, because it was quicker to add a heater to the expansion joint on that second tank. Discovery also got the two booster rockets intended for Atlantis. Web posted. (2005). [Discovery moves back to launch pad [Online]. Available WWW: <http://www.cnn.com/> [2005, June 15].]

### **Nature of KSC's ride still being designed**

A \$51 million attraction planned for the Kennedy Space Center Visitor Complex is expected to simulate a shuttle launch, but officials won't confirm its nature or whether it will exert extra gravity force like the "Mission: Space" ride at Epcot. KSC won't reveal the details of its "Shuttle Launch Experience" until all agreements are signed, spokeswoman Andrea Farmer said Tuesday. "Once the deal and the final paperwork are completed . . . then we will have details available," she said. The Florida Space Authority, a state economic development agency based in Cape Canaveral, is contributing a \$35 million loan to the project. Web posted. (2005). [Nature of KSC's ride still being designed [Online]. Available WWW: <http://www.floridatoday.com/> [2005, June 15].]

### **June 16: Expendable Launch Vehicle Status Report**

Mission: Mars Reconnaissance Orbiter (MRO); Launch Vehicle: Lockheed Martin Atlas V 401; Launch Pad: Space Launch Complex 41 (SLC-41), Cape Canaveral Air Force Station (CCAFS), Fla.; Launch Date: August 10, 2005; Launch Window: 7:53:58 to 9:53:58 a.m. (EDT). Power-on testing continues. On June 6, the spacecraft's flight batteries were installed and activated. Autonomous self-testing was completed June 14. Installation of the thermal blankets is under way. The Centaur upper stage for the Atlas V arrived at CCAFS on June 6. On June 17, it will be transported to the Vertical Integration Facility (VIF) at SLC- 41 and hoisted atop the Atlas stage to begin checkout. A countdown wet dress rehearsal with the launch vehicle fully fueled is scheduled in early July. The MRO will be transported from the Payload Hazardous Servicing Facility at NASA's Kennedy Space Center to the VIF at SLC-41 in late July. It will join the Atlas V for the final phase of launch preparations. The spacecraft will undergo a functional test and a final week of integrated testing and closeouts. Mission: CALIPSO/CloudSat; Launch Vehicle: Delta 7420 DPAF; Launch Pad: Space Launch Complex 2 (SLC2), Vandenberg Air Force Base (VAFB), Calif.; Launch Date: No Earlier than August 22, 2005; The launch of CALIPSO/CloudSat will occur aboard a Boeing Delta II rocket from NASA's Space Launch Complex 2 at VAFB in California. The Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observation (CALIPSO) spacecraft continues to undergo comprehensive checkout, which is scheduled to be completed this week. Atmospheric testing of the spacecraft's laser was completed June 15. CloudSat is undergoing a battery trickle charge. When processing of the satellite resumes June 23, technicians will conduct battery reconditioning and spacecraft fueling. It will then be mated to the lower Dual Payload Attach Fitting. The stacking of the Boeing Delta II at SLC2 began June 14 with the hoisting of the first stage into the launcher. Attachment of the four strap-on solid rocket boosters is under way. The second stage will be hoisted into position June 20. The payload fairing was lifted inside the clean room within the mobile service tower June 13. KSC News Center (2005). **Expendable Launch Vehicles Status Report** E05-03 [Online]. Available E-mail: [ksc@newsletters.nasa.gov](mailto:ksc@newsletters.nasa.gov) [2005, June 16].]

**June 17: NASA Chief Says Schedule for Shuttles Is Unrealistic**

Dr. Michael D. Griffin, the new administrator of NASA, said Thursday that there was no way the space shuttle fleet would be able to complete the 28 flights now planned before its retirement in 2010. A reduced schedule will lead to significant changes in how the International Space Station is assembled and supplied, he said. The station depends largely on the shuttle fleet to ferry equipment, supplies and crew members, but the shuttles have been grounded since the loss of the Columbia and its crew in February 2003. While the space agency is still studying how many missions the shuttles can undertake once they resume flight, as early as next month, Dr. Griffin said there could be as few as 15 and no more than 23, because of the time it takes to process and fly missions. "I'll be very strong on this," he said in an interview. Study groups at NASA are looking into alternatives for assembling the station, the shuttle's main job, and will consult with the White House before presenting details to the other partners in the station project, including Russia, the European Space Agency, Japan and Canada. In his interview, Dr. Griffin declined to comment "on what I might do on the organizational wiring diagram" but said he was hoping to build a team of officials with "expertise, energy, integrity, the ability to see and to grasp the big picture" and to "work well with others." Web posted. (2005). [NASA Chief Says Schedule for Shuttles Is Unrealistic [Online]. Available WWW: <http://www.nytimes.com/> [2005, June 17].]

**NASA trims safety waivers**

NASA's shuttles are set to return to flight with 90 percent fewer known problems -- many of which could prompt disaster -- than were on the books when Columbia blasted off on its doomed flight in 2003. An exhaustive two-year review of every known violation of shuttle engineering and safety requirements has slashed the number of "waivers" of those requirements from nearly 6,000 to about 500, shuttle program officials said. The review, in response to criticism from outside reviewers and a recommendation by the Columbia Accident Investigation Board, has left decision-makers with a far more manageable number of potential dangers to track. Reviewers identified thousands of waivers for parts that no longer fly, systems that have since been redesigned or procedures no longer relevant to the kinds of missions the orbiter flies. Eliminating unnecessary and obsolete waivers gives managers a clearer view of the ones that do pose risk to the remaining shuttles and the astronauts aboard, the agency says. "Bottom line," said Wayne Hale, deputy manager of the Space Shuttle Program at Johnson Space Center, "we have a much more useful system since we have eliminated the clutter and out-of-date paperwork. Now, the remaining waivers will be something that keeps management attention focused on our real problems and the open work ahead of us." Several safety groups, however, said NASA's practice over the years showed the agency was more likely to waive requirements than fix the problem. Often, they found, the space agency would grant a waiver that would never go away. In 2003, most of the waivers on the books had been in place since a purge prompted by the Challenger accident. The number of waivers and the way NASA approves them "makes the risks accepted for launch invisible to space shuttle program managers in their decision-making," said the Shuttle Independent Assessment Team during a wide-ranging investigation that followed a near-disastrous engine malfunction during a 1999 Columbia launch. The shuttle program is preparing the specific numbers for its Flight Readiness Review the last week of June at the Kennedy Space Center. Not all of the remaining 500 or so waivers are for problems with the most critical systems -- flaws that could lead to another disaster. That number was not immediately available. However, the lower number is a positive step that

"allows the SSP management to understand which waivers represents real safety issues and which were merely administrative. This in turn clarifies the level of risk associated with each waiver," the space agency reported in the latest version of its return to flight plan. Web posted. (2005). [NASA trims safety waivers [Online]. Available WWW: <http://www.floridatoday.com/> [2005, June 17].]

### **NASA team confident shuttles will be ready**

The team at Kennedy Space Center is confident Discovery and Atlantis will be ready in time to launch the return-to-flight mission in July as planned, NASA officials told community leaders at a breakfast Friday. "It's been a pretty tough 21/2 years," said Michael Wetmore, the Merritt Island man who heads shuttle processing at the space center. "We're now very confident that light at the end of the tunnel is not a train." Discovery, set to fly the first shuttle mission since the 2003 Columbia disaster, is at the launch pad with five extra days in the schedule between now and the first available launch date, July 13. Discovery could fly any time between that day and July 31. Atlantis, which will be on standby, ready to fly a rescue mission during Discovery's flight, is scheduled to roll to the Vehicle Assembly Building around July 19. Wetmore said that's early enough to support a rushed flight to the International Space Station in the event Discovery is crippled and the astronauts become stranded at the orbiting outpost. The processing of the two vehicles, which has involved more than 6 million work hours, is unlikely now to cause a delay unless something unexpected comes up, Wetmore said. Instead, the remaining concerns deal with launch debris, particularly ice. A final engineering review of the NASA's debris analysis is set for Friday at Kennedy Space Center. Top managers, including Administrator Mike Griffin, will be here to review whether the last remaining debris sources pose an unacceptable risk that would prevent launching in July as planned. Web posted. (2005). [NASA team confident shuttles will be ready [Online]. Available WWW: <http://www.floridatoday.com/> [2005, June 18].]

### **Space Shuttle Processing Status Report**

Mission: STS-114 - 17th ISS Flight (LF1) - Multi-Purpose Logistics Module; Vehicle: Discovery (OV-103); Location: Launch Pad 39B; Launch Date: Launch Planning Window July 13 - 31, 2005; Launch Pad: 39B; Crew: Collins, Kelly, Noguchi, Robinson, Thomas, Lawrence and Camarda; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. On Wednesday, Discovery was rolled out to Launch Pad 39B by a giant Crawler Transporter. The four-mile journey began at 1:58 a.m., and the Space Shuttle arrived more than 10 hours later at 12:17 p.m. The Crawler Transporter, which has a top speed of about one mph, traveled even slower than normal. It stopped frequently so engineers could address overheating bearings. The payload canister, including NASA's Italian-built Multi-Purpose Logistics Module Raffaello, was transferred to the launch pad on June 13. The payload bay doors were opened yesterday in preparation for payload installation in the payload bay today. Following installation, payload connections are scheduled for this weekend, and payload/orbiter interface testing will begin early next week. Preparations have begun for loading of hypergolic propellants, currently scheduled for June 22. This process includes loading the propellants, monomethyl hydrazine and nitrogen tetroxide, into the Orbiter Maneuvering System and the Forward Reaction Control System. Mission: STS-121 - 18th ISS Flight (ULF1) - Multi-Purpose Logistics Module; Vehicle: Atlantis (OV-104); Location: Orbiter Processing Facility Bay 1; Launch Date: Lighted Launch Planning Window September 9 - 24, 2005; Launch Pad: 39B; Crew: Lindsey, Kelly, Sellers, Fossum, Nowak and

Wilson; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Power-up system testing is nearly complete on Atlantis in Orbiter Processing Facility bay 1 for its mission to the International Space Station. The payload bay has been cleaned for flight and the doors closed. Around the hinge line of the doors, technicians have completed installing the tile which makes up the Shuttle's heat shield, or Thermal Protection System. The doors were opened one more time to perform checks of those tiles, and the payload bay doors were closed for the final time in the Orbiter Processing Facility prior to flight. Technicians continue performing nose and main landing gear cycles to check out compression of the new thermal barrier seals that were added. The landing gear functional test is now scheduled for as early as the middle of next week. In the Vehicle Assembly Building, the External Tank (ET-120) and Solid Rocket Boosters originally scheduled to fly with Space Shuttle Discovery are located in high bay 1. This stack will now fly with Atlantis. The liquid oxygen feedline bellows heater has been added to this tank and final foam closeouts are progressing. Endeavour (OV-105); Endeavour is in its Orbiter Major Modification period which began in December 2003. External Tank/Solid Rocket Boosters: The third redesigned External Tank (ET-119) arrived at Kennedy Space Center today. It will be offloaded Monday and transferred to the Vehicle Assembly Building. ET-119 is currently scheduled to fly with Atlantis on mission STS-115. Owner-press-release. (2005). **Space Shuttle Processing Status Report** S05-24 [Online]. Available E-mail: owner-press-release@spinoza.public.hq.nasa.gov [2005, June 17].]

**June 18: Lease details threaten KSC park**

NASA would have to seek a new developer for a research park at Kennedy Space Center if the state decides a proposed lease is too restrictive. The anchor building for the International Space Research Park, the Space Life Sciences Lab, is open and running. But the rest of the park remains undeveloped, and no one can sign an agreement to open a business there as long as the lease between NASA and the Florida Space Authority remains unsigned. The authority, an economic development agency at Port Canaveral that represents the state, brought up the concerns at a board meeting last week. Among several sticking points are requirements that NASA approve developer agreements and subleases, and a rule that allows the agency to kick out tenants without compensation. "These are real serious issues," authority Director Winston Scott said. Some of the obstacles stem from federal law; "some of it is NASA culture," said Scott, a former astronaut. NASA doesn't argue that the kick-out clause needs work to become business-friendly. Though the rule is in the code of federal regulations, agencies have some flexibility in implementing it, said Jim Ball, NASA's spaceport development manager and project manager for the park. "It puts the state's investment at huge risk," said Tracy Hegler, manager of spaceport transportation planning for the Florida Space Authority. "Both parties have interests that they have to protect," Ball said, "and obviously NASA's overwhelming priority is to assure that we manage the land of the Kennedy Space Center in a fashion that does not compromise its ability to meet the national mission." NASA and the state signed a memorandum of understanding in 2001, but the final details were not set. Nonetheless, Ball said, "We think those issues largely had been worked out, many of them." Various studies and fees add up to a \$665,000 investment in the park so far, the Florida Space Authority says. If the agreement with NASA doesn't change, the Florida Space Authority would assume all the financial liability and risk for the park, Hegler said. The authority could recommend that the state back out of the deal, Scott said. If so, NASA would seek a new partner, though Ball said he had confidence NASA and the authority could work things out. Kennedy Space Center sees the park as providing important

support for the vision for space exploration. Web posted. (2005). [Lease details threaten KSC park [Online]. Available WWW: <http://www.floridatoday.com/> [2005, June 18].]

**June 19: Weather satellite launch delayed by lightning**

Lightning strikes uncomfortably close to Boeing's Delta 4 rocket pad at Cape Canaveral is prompting technicians to re-verify electronics and circuitry before a U.S. weather observatory can be launched into space this month. Liftoff had been targeted for Friday, June 24 from pad 37B at the Florida spaceport. But severe thunderstorms on Thursday, June 16 brought intense lightning over the Delta 4 launch site. Managers have ordered the precautionary checks of systems before the rocket and its payload can be cleared for flight. The launch is tentatively rescheduled for Sunday, June 26 during a 45-minute liftoff opportunity extending from approximately 6:13 to 6:58 p.m. EDT (2213-2258 GMT). The two-stage rocket will ferry into orbit the Geostationary Operational Environmental Satellite-N, or GOES-N. The spacecraft is the latest in a long series of U.S. weather satellites that provide the imagery seen daily during news broadcasts. The combined launcher and payload are valued at \$475 million. This mission had been postponed from June 23 to June 24 to allow the replacement of a hydraulic turbopump inside the rocket's first stage main engine that is critical to operating internal valves and steering the vehicle during ascent. Web posted. (2005). [Weather satellite launch delayed by lightning [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, June 19].]

**June 20: Guinness recognizes X-43A scramjet speed record**

It is official. The new world speed record for a jet-powered aircraft, set by NASA in November, has been officially recognized by Guinness World Records. Web posted. (2005). [Guinness recognizes X-43A scramjet speed record [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, June 20].]

**Office to shape NASA's future**

NASA is creating a new office at its Washington headquarters to independently review agency programs and proposals, starting with studies that could shape the future of the shuttles and international Space Station as well as the effort to hurry development of a new spaceship that would carry astronauts back to the moon. The small organization will look at everything from the cost to the technical feasibility of projects, and then provide advice to Administrator Michael Griffin before he makes decisions, the space agency announced Monday. Griffin named Scott Pace, a former Congressional staffer, to run the new Office of Program Analysis and Evaluation. ["Office to shape NASA's future," **Florida Today**, June 21, 2005, p 1A. & 6A.]

**June 21: Weekend Delta 4 launch delayed to next month**

Concerns over the onboard batteries that power the Boeing Delta 4 rocket's safety destruct system has forced another delay in launching the GOES-N civilian weather satellite. Sunday evening's planned liftoff from Cape Canaveral will be postponed until sometime in July as a result. Web posted. (2005). [Weekend Delta 4 launch delayed to next month. [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, June 21].]

**Architect of Air Force space and missile programs dies**

Retired Gen. Bernard Adolph Schriever, widely regarded as the father and architect of the Air Force space and ballistic missile programs, died of natural causes at home in Washington



on Monday. He was 94. Web posted. (2005). [Architect of Air Force space and missile programs dies [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, June 21].]

### **June 22: Contract managers win award**

Jim Kennedy beamed after learning that not one, but three managers for local contractors working with Kennedy Space Center were awarded one of the space agency's highest honors. Dan LeBlanc of the KSC Visitor Complex, Dan Houston of Lockheed Martin Corp. and William Sample of Space Gateway Support were 2005 recipients of the NASA Distinguished Public Service Medal. The medal is the highest award the space agency bestows upon someone who is not a government employee -- the "biggest of the big awards" as Kennedy said at a recent breakfast for Brevard County community leaders. "For your center to get three senior leaders from our contractors to get three distinguished public service medals is unprecedented," said Kennedy, who is the director of the Kennedy Space Center. "It makes me proud to be the center director." The three winners of the award were: \* Dan LeBlanc is the chief operating officer of Delaware North Parks and Resorts at KSC Inc., the private firm that operates the space center's visitor complex. LeBlanc, who handled marketing and other duties for the company before taking over the local operation in 2002, has been a key leader through expansions of the tourist attraction despite the travel downturn created by the Sept. 11 terrorist attacks. The company acquired control of the Astronaut Hall of Fame, which faced financial difficulty and possible closure in 2002 if Delaware North had not stepped in and made the exhibit part of the official KSC museum. Now, the firm is looking at adding a multimillion dollar ride at the complex that would put tourists into a simulated shuttle experience. \* William Sample is president of Space Gateway Support, a venture that has a multibillion-dollar contract to provide support services at Kennedy Space Center, Patrick Air Force Base and Cape Canaveral Air Force Station. Sample also recently won another high-profile NASA service award -- the George M. Low award in the services category. His company provides everything from security guards, firefighters and police to maintenance staff at the three space-related government installations here on the Space Coast. The \$3 billion Joint Base Operations Support Contract has been a money-saving breakthrough for NASA and the military. \* Dan Houston is a Lockheed program manager in charge of a unit that provides computing services for NASA's Office of Space Flight at KSC. The agency's Outsourcing Desktop Initiative is a program at several NASA centers, including KSC, to improve the management and service of thousands of desktop computers for government and contractor employees. The three local men went to Washington to collect the awards from NASA's deputy administrator, former shuttle astronaut Fred Gregory, and the associate administrator for institutions and management, Jim Jennings. Web posted. (2005). [Contract managers win award [Online]. Available WWW: <http://www.floridatoday.com/> [2005, June 22].]

### **Senate subcommittee adds Hubble funding**

A subcommittee of the Senate Appropriations Committee added \$250 million to NASA's proposed 2006 budget to support a servicing mission for the Hubble Space Telescope. The Commerce, Justice, Science subcommittee marked up an appropriations bill Tuesday that includes \$16.4 billion for NASA in the next fiscal year. Senators, led by longtime Hubble proponent Barbara Mikulski (D-MD), added \$250 million to the budget to help pay for a possible shuttle servicing mission to the telescope. NASA has not committed to such a mission yet, but NASA administrator Michael Griffin said shortly after starting work at the

agency two months ago that he would be open to approving such a mission once the shuttle safely returns to flight. Neither the original NASA budget proposal, nor a House version of the appropriations bill, included such funding. Despite the additional funding the full NASA budget still falls about \$60 million short of the President's request and about \$75 million less than what the House approved last week. Details about which programs were cut were not immediately released, but senators said that the shuttle, ISS, and CEV programs are fully funded in the budget. The full appropriations committee is scheduled to take up the bill later this week. Web posted. (2005). [Senate subcommittee adds Hubble funding [Online]. Available WWW: <http://www.spacetoday.com/> [2005, June 22].]

**June 23: Report Says Space Program Is Lacking Money and Focus**

Three weeks before the Discovery is to return the nation's space shuttle fleet to orbit, two influential experts say the Bush administration's plans for human space exploration are doomed to failure without a major infusion of money and fundamental changes in space policy. "Current U.S. space policy presents a paradoxical picture of high ambition and diminishing commitment," the experts state in a paper being released today by the American Academy of Arts and Sciences in Cambridge, Mass. The paper was written by George Abbey, director of the Johnson Space Center in Houston from 1995 to 2001, and Dr. Neal Lane, the White House science adviser under President Bill Clinton from 1998 to 2001. It comes from a series of workshops with space companies and international agencies and from experts meeting at the academy and at Rice University in Houston, where both authors of the paper now work as senior fellows of the James A. Baker III Institute for Public Policy. The authors say they are hopeful about NASA's new administrator, Michael D. Griffin, who has technical expertise and has begun to change a management culture widely blamed for the loss of the shuttle Columbia two years ago. But they wrote that "current space policy is ill defined and its future path is uncertain." A NASA spokesman, Allard Beutel, said the agency would have no comment because officials had not seen the paper. But in an interview last week, Dr. Griffin vigorously defended the administration's space plans, saying, "If I were to write down on a sheet of paper what NASA should be doing, it would be very like what we are trying to do today." Web posted. (2005). [Report Says Space Program Is Lacking Money and Focus [Online]. Available WWW: <http://www.nytimes.com/> [2005, June 23].]

**Expendable Launch Vehicle Status Report**

Mission: Mars Reconnaissance Orbiter (MRO); Launch Vehicle: Lockheed Martin Atlas V 401; Launch Pad: Space Launch Complex 41 (SLC-41), Cape Canaveral Air Force Station (CCAFS), Fla.; Launch Date: August 10, 2005; Launch Window: 7:53:58 to 9:53:58 a.m. (EDT). Power-on testing continues to go well. The high-gain antenna will be installed Friday. The solar arrays are being cleaned and inspected in preparation for installation; planned for June 28. On June 17, the Centaur upper stage for the Atlas V was transported from the hangar at the Atlas Space Operations Center to the Vertical Integration Facility (VIF) at SLC-41. It was hoisted atop the Atlas stage to begin checkout. The Launch Vehicle Readiness Test is under way. A countdown wet dress rehearsal with the launch vehicle fully fueled is scheduled in early July. The MRO will be transported from the Payload Hazardous Servicing Facility at KSC to the VIF in late July. It will join the Atlas V for the final phase of launch preparations. The spacecraft will undergo a functional test, a final week of integrated testing and closeouts. Mission: CALIPSO/ CloudSat; Launch Vehicle: Boeing Delta II 7420 DPAF; Launch Pad: Space Launch Complex 2 (SLC2), Vandenberg Air Force Base (VAFB), Calif.; Launch Date: No Earlier Than August 22, 2005. The Cloud-Aerosol Lidar

and Infrared Pathfinder Satellite Observation (CALIPSO) spacecraft completed comprehensive checkout on June 17. Atmospheric testing of the spacecraft's laser was completed June 15. CloudSat is undergoing a battery trickle charge, which will be followed by about one week of battery reconditioning. Technicians are also performing some additional spacecraft testing. On June 14, the stacking of the Boeing Delta II at SLC2 began with the hoisting of the first stage into the launcher. Attachment of the four strap-on solid rocket boosters is under way. CALIPSO and CloudSat are highly complementary and together will provide never-before-seen, 3-D perspectives of how clouds and aerosols form, evolve, and affect weather and climate. CALIPSO and CloudSat will fly in formation with three other satellites in the A-train constellation to enable an even greater understanding of our climate system from the broad array of sensors on these other spacecraft. KSC News Center (2005). **Expendable Launch Vehicles Status Report** E05-04 [Online]. Available E-mail: [ksc@newsletters.nasa.gov](mailto:ksc@newsletters.nasa.gov) [2005, June 23].]

#### **June 24: Senate panel endorses Bush's space vision**

The last time Congress passed legislation authorizing NASA programs and spending, much of the focus was on controlling the runaway costs of the International Space Station. What a difference five years makes. A Senate panel approved a NASA authorization bill Thursday that embraces the exploration vision President Bush articulated in a speech at the space agency's headquarters 17 months ago. Although NASA is already spending money and making plans for new vehicles and missions to take astronauts to the moon, which Bush requested, Congress has not officially endorsed the president's plan. The authorization bill, passed by the Senate Commerce, Science and Transportation Committee, would give NASA the green light to proceed. "The exploration, development and permanent habitation of the moon will inspire the nation, spur commerce, imagination and excitement around the world and open the possibility of further exploration of Mars," according to the legislation, which now goes to the full Senate for a vote. The House has yet to introduce its version. Rep. Sherwood Boehlert, R-N.Y., chairman of the House Science Committee, has promised legislation this summer. While looking to the future, the Senate bill also seeks to protect NASA personnel working at Kennedy Space Center, Johnson Space Center and elsewhere in support of the shuttle program. The legislation would bar the space agency from retiring the three remaining shuttle orbiters until after the shuttle's successor craft is proven safe for astronauts. Web posted. (2005). [Senate panel endorses Bush's space vision [Online]. Available WWW: <http://www.floridatoday.com/> [2005, June 24].]

#### **NASA ready to fly in July**

Breakaway ice and foam insulation from an external fuel tank still could cause lethal damage, but NASA shuttle program managers deem the risk acceptable and intend to launch Discovery in mid-July, officials said Friday. After a daylong review of debris dangers, the managers said they still aim to launch NASA's first post-Columbia mission during a window that will extend from July 13 to July 31. The dangers presented by ice and foam debris are well understood, the managers added, saying they think the agency will be ready to send Discovery and seven astronauts aloft at the opening of the 18-day window. "We have every opportunity to make the opening of the window," said NASA shuttle program manager William Parsons. Several key meetings still must be completed before NASA sets a firm launch date for the test flight to the International Space Station. An independent oversight group will meet Monday to review work NASA has done to implement 15 "return-to-flight" recommendations made by Columbia accident investigators. Headed by former astronauts

Thomas Stafford and Dick Covey, the group has approved work done on 12 of the recommendations. Parsons said he was "fairly confident" the panel would endorse work done on the final three: Eliminating external tank debris, increase the shuttle orbiter's ability to withstand damage and providing astronauts with the means to inspect and repair their ships. But he noted that some among the group still question whether NASA has met the intent of the inspect-and-repair recommendation. A flight readiness review is set for Wednesday and Thursday at Kennedy Space Center. A firm launch date is to be set after the meetings. Web posted. (2005). [NASA ready to fly in July [Online]. Available WWW: <http://www.floridatoday.com/> [2005, June 25].]

### **Space Shuttle Processing Status Report**

Discovery (OV-103); Mission: STS-114 - 17th ISS Flight (LF1); Payload: Multi-Purpose Logistics Module; Location: Launch Pad 39B; Launch Date: Launch Planning Window July 13 - 31, 2005; Launch Pad: 39B; Crew: Collins, Kelly, Noguchi, Robinson, Thomas, Lawrence and Camarda; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. This week, Discovery is at Launch Pad 39B, and technicians are completing the final steps in preparation for a launch to the International Space Station in the July 13-31 window. Loading of hypergolic propellants began on Wednesday and is scheduled to be completed next week. This process includes loading the propellants, monomethyl hydrazine and nitrogen tetroxide, into the Orbiter Maneuvering System and the Forward Reaction Control System. The cargo, including NASA's Italian-built Multi-Purpose Logistics Module Raffaello, was installed in the payload bay on June 17, followed by payload connections and payload/orbiter interface testing. Next week, the payload bay sharp-edge inspection will be performed and the payload bay doors will be closed for flight. Yesterday, the Space Shuttle Program completed the Design Certification Review (DCR). The review was held to ensure that major program baseline changes since the DCR have been properly integrated and certified for flight. Today, program leaders met for the Debris Verification Review (DVR) to summarize the extensive debris assessment effort that has been completed and to present the flight rationale for the debris. The DVR reached the conclusion that the potential for debris had been reduced to a more reasonable level, and this was the recommendation the Shuttle Program Manager accepted. Next week, the Flight Readiness Review (FRR) will be held on June 29 and 30, and a launch date could be selected at the end of the review.

Atlantis (OV-104); Mission: STS-121 - 18th ISS Flight (ULF1); Payload: Multi-Purpose Logistics Module Location: Orbiter Processing Facility Bay 1; Launch Date: Lighted Launch Planning Window September 9 - 24, 2005; Launch Pad: 39B; Crew: Lindsey, Kelly, Sellers, Fossum, Nowak, Wilson and Reiter; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Technicians continue processing Atlantis in Orbiter Processing Facility bay 1 for its mission to the International Space Station. The landing gear functional test was successfully completed. The landing gear was cycled several times prior to the test to checkout compression of the new thermal barrier seals that were added for Return to Flight. In the Vehicle Assembly Building (VAB), the External Tank (ET-120) and Solid Rocket Boosters originally scheduled to fly with Space Shuttle Discovery are located in high bay 1. This stack will now fly with Atlantis. Early next week, a Crawler Transporter will move the stack to high bay 3, so work and modifications can be performed in high bay 1 of the VAB.

Endeavour (OV-105); Endeavour is in its Orbiter Major Modification period which began in December 2003. Owner-press-release. (2005). **Space Shuttle Processing Status Report** S05-025 [Online]. Available E-mail: [owner-press-release@spinoza.public.hq.nasa.gov](mailto:owner-press-release@spinoza.public.hq.nasa.gov) [2005, June 24].]

**June 27: Task force costs extra \$4M**

NASA will end up spending three times more than anticipated to pay for an independent review of the agency's response to recommendations made by Columbia accident investigators. The extra cost -- about \$4 million -- is the result of significant delays in returning NASA's shuttle fleet to service. The Return To Flight Task Group, headed by former astronauts Thomas Stafford and Dick Covey, will have its final meeting today in Washington. A summary of its final report will be delivered Tuesday morning to NASA Administrator Mike Griffin. He will then decide whether NASA should proceed with plans to launch Discovery in July on the first shuttle mission since the 2003 disaster. NASA's former administrator, Sean O'Keefe, set up the Stafford-Covey group in July 2003 just before the release of the Columbia Accident Investigation Board's report. Their job: provide the administrator with an outside assessment of actions taken by NASA's shuttle program to implement the safety fixes recommended by the accident board. At the time, NASA expected to spend \$2 million. But Dave Drachlis, spokesman for the Return To Flight Task Group, said that estimate was based on returning the shuttles to flight by December 2003. The launch plans were pushed back repeatedly as NASA encountered technical difficulties while redesigning the external tank, developing an orbital inspection boom and putting in place a means for astronauts to make emergency repairs in space. Now, task force operations are expected to cost \$6 million, based on a return to flight in July. Drachlis said 90 percent of the money had been spent by late May. Included in the total is the cost of an office near Johnson Space Center in Houston; hourly wages and travel expenses for the 26 members of the panel and 12 staffers; periodic rental of facilities for public meetings; and information technology support. The group so far has held meetings in Brevard County, Houston, and Huntsville, Ala. Members also have visited NASA headquarters in Washington as well as contractor factories in Texas, Louisiana and Utah. Task group members were paid at a rate equivalent to a federal government employee who makes \$116,519 a year. None of the members worked full time, however. Instead, they filed the number of hours worked and received an equivalent hourly rate: \$55.83 an hour. Drachlis said board members averaged eight to 10 hours of task group work per week. Five board members declined any pay, Drachlis said. Web posted. (2005). [Task force costs extra \$4M [Online]. Available WWW: <http://www.floridatoday.com/> [2005, June 27].]

**June 28: Panel finds NASA falls short on shuttle fixes**

An independent panel reviewing NASA's compliance with recommendations made in the wake of the Columbia accident found that the agency has failed to meet three critical recommendations, but members of the panel said that this shortcoming should not affect next month's scheduled launch. The Stafford-Covey Return to Flight Task Group, meeting for the final time Monday, concluded that NASA did not fully meet three of 15 recommendations made in August 2003 by the Columbia Accident Investigation Board (CAIB). Those recommendations cover eliminating debris from the external tank during launch, strengthening the orbiter against impacts, and developing on-orbit repair techniques for damaged shuttle tiles and panels. However, members of the task force said Monday that NASA went to great effort to try to meet those recommendations, and that the shuttle is probably safe to fly despite those issues. NASA has scheduled a flight readiness review for later this week to review planning for the STS-114 shuttle mission, scheduled for launch between July 13 and 31. NASA is expected to announce a specific launch date after the meeting. NASA officials previously indicated that they would make their decision



independent of the task group's final report. Web posted. (2005). [Panel finds NASA falls short on shuttle fixes [Online]. Available WWW: <http://www.spacetoday.net/> [2005, June 28].]

### **Plans for the Space Station**

The Bush administration will ask Congress to amend a law that prevents the country from buying spacecraft and other services from Russia for the International Space Station, Dr. Griffin announced Tuesday. In testimony before the House committee, Dr. Griffin said the administration was working on language for an amendment that would allow the United States to purchase Russian equipment needed to assure a continued American presence on the orbiting station. An agreement that requires Russia to supply Soyuz rescue ships for international crews on the station expires in April. The Iran Nonproliferation Act prohibits payments by the United States to Russia for goods and services for the space station because Russia had helped Iran develop rocket and nuclear technology. Web posted. (2005). [Plans for the Space Station [Online]. Available WWW: <http://www.nytimes.com/> [2005, June 28].]

### **Discovery is a go for July**

NASA Administrator Mike Griffin has decided to go forward with the launch of shuttle Discovery in July even though the agency has not accomplished some safety reforms recommended by Columbia accident investigators. In testimony before the House Science Committee on Tuesday, Griffin acknowledged the agency can't eliminate all dangerous launch debris or repair heat-shield damage in orbit to the degree suggested by the Columbia Accident Investigation Board. However, Griffin said the agency has made enough progress since the 2003 catastrophe to reduce the risk of returning the shuttles to space enough to justify launching now rather than later. Waiting longer will not eliminate the danger, Griffin said. "We must say we have reduced the risk due to debris to an acceptable level or we must say that we don't ever want to fly the shuttle again," Griffin said. "We do not have a better technical approach to dealing with it than the one we have put forward." Griffin's comments came one day after the independent Stafford-Covey Return To Flight Task Group determined that NASA had met 12 of the 15 safety recommendations that the Columbia investigators said should be complete before the shuttles fly again. Griffin flew to Florida on Tuesday evening to participate in the two-day Flight Readiness Review beginning today at Kennedy Space Center. During the meetings, shuttle managers will go over all technical and safety issues to determine whether Discovery is safe and ready to launch. At the conclusion of the conference Thursday, the space agency aims to announce a firm launch date between July 13 and July 31. Griffin expressed optimism, saying that as far as processing the vehicle goes, NASA is ready to launch Discovery soon. "We have several days of slack available between today and a launch on July 13," Griffin said. "We look like we're in pretty good shape." Web posted. (2005). [Discovery is a go for July [Online]. Available WWW: <http://www.floridatoday.com/> [2005, June 29].]

### **June 29: Expendable Launch Vehicle Status Report**

Mission: Mars Reconnaissance Orbiter (MRO); Launch Vehicle: Lockheed Martin Atlas V 401; Launch Pad: Space Launch Complex 41 (SLC-41), Cape Canaveral Air Force Station (CCAFS), Fla.; Launch Date: August 10, 2005; Launch Window: 7:53:58 to 9:53:58 a.m. (EDT). Power-on testing continues to go well. The high-gain antenna was installed on June 24. The solar arrays have been cleaned, inspected and installed. This week, the solar arrays

will be deployed, inspected and stowed for launch. The Centaur upper stage for the Atlas V is at the Vertical Integration Facility (VIF) at SLC-41. It was hoisted atop the Atlas stage to begin checkout. The Launch Vehicle Readiness Test continues. A countdown wet dress rehearsal with the launch vehicle fully fueled is scheduled for early July. The MRO will be transported from the Payload Hazardous Servicing Facility at KSC to the VIF in late July. It will join the Atlas V for the final phase of launch preparations. The spacecraft will undergo a functional test, a final week of integrated testing and closeouts. Mission: Cloud-Aerosol Lidar & Infrared Pathfinder Satellite Observation and CloudSat (CALIPSO/CloudSat); Launch Vehicle: Boeing Delta II 7420 DPAF; Launch Pad: Space Launch Complex 2 (SLC2), Vandenberg Air Force Base (VAFB), Calif.; Launch Date: No Earlier Than August 22, 2005. CloudSat completed battery reconditioning late Monday. Technicians are also performing some additional spacecraft testing. Stacking of the Boeing Delta II at SLC-2 and attachment of the four strap-on solid rocket boosters is complete. KSC News Center (2005). **Expendable Launch Vehicles Status Report** E05-005 [Online]. Available E-mail: [ksc@newsletters.nasa.gov](mailto:ksc@newsletters.nasa.gov) [2005, June 29].]

### **June 30: New Laser Scanners to Detect Shuttle Tile Damage**

NASA has developed a new three-dimensional laser scanner to seek out cracks and other damage amidst the thousands of ceramic tiles that protect space shuttles from the heat of reentry. Smaller and faster than their orbital counterparts, the prototype scanners may help astronauts and ground engineers track tile other thermal protection system damage with more accuracy than ever before. "This is a direct result of the return to flight project," said Joe Lavelle, a senior research engineer for three-dimensional instrumentation at NASA's Ames Research Center, where the prototypes were built. Lavelle said two of the handheld, prototype laser scanners will be sent to NASA's Kennedy Space Center (KSC) in the next month, where shuttle engineers are expected to put them through their paces on sample tiles and calibration blocks. If all goes well, they may graduate up to scan tiles on hangar-bound orbiters like Atlantis and Endeavour – engineers are preparing Discovery for flight atop Launch Pad 39B. Two additional scanners will be delivered to KSC by October 2005, he added. Web posted. (2005). [New Laser Scanners to Detect Shuttle Tile Damage [Online]. Available WWW: <http://www.space.com/> [2005, June 30].]

### **NASA Gives Go For Space Shuttle Return To Flight**

NASA has cleared the Space Shuttle to Return to Flight. After a two-day Flight Readiness Review meeting at NASA's Kennedy Space Center in Florida, senior managers approved a July 13 launch date for Discovery. Commander Eileen Collins and her crew are scheduled to lift off at 3:51 p.m. EDT on the first U.S. space flight since the February 2003 loss of the Shuttle Columbia. "After a vigorous, healthy discussion our team has come to a decision: we're ready to go," NASA Administrator Michael Griffin said after the meeting. "The past two and half years have resulted in significant improvements that have greatly reduced the risk of flying the Shuttle. But we should never lose sight of the fact that space flight is risky." NASA's Associate Administrator for Space Operations, William Readdy, chaired the Flight Readiness Review, the meeting that traditionally sets launch dates and assesses the Shuttle's fitness to fly. Joining Collins aboard Discovery will be pilot Jim Kelly and Mission Specialists Steve Robinson, Andy Thomas, Wendy Lawrence, Charlie Camarda and Soichi Noguchi, a Japan Aerospace Exploration Agency astronaut. The crew will test design changes that will reduce the chances of damage to the Shuttle, procedures for in-flight inspection of the Space Shuttle heat shield, and repair techniques -- all in response

to the Columbia accident. The mission also features three spacewalks, including one to replace a Space Station gyroscope. Aboard the Station, Expedition 11 Commander Sergei Krikalev, a Russian Federal Space Agency cosmonaut, and Flight Engineer and NASA Station Science Officer John Phillips will greet Discovery. Krikalev and Phillips are on a six-month mission. They have been aboard the Station since April 17. Returning the Space Shuttle to flight is the first step in the Vision for Space Exploration, a plan for humans to journey into the cosmos. The Space Shuttle will be used to continue construction of the International Space Station, a crucial test bed for exploration missions. ["NASA Gives Go For Space Shuttle Return To Flight," **NASA News Release #05-171**, June 30, 2005.]

### **Different bills have different effect on Brevard**

Two versions of a bill working through Congress could have differing effects on Kennedy Space Center and Brevard County this decade and next. Senators and members of the House of Representatives have been working on their own takes on a NASA authorization bill that spells out how the space agency should approach the post-shuttle years, among other requirements. A House subcommittee on Wednesday approved a bill with more checks and balances on NASA than are in the Senate's. The two bills also offer conflicting views on retiring the three remaining space shuttles. But Ken Calvert, the California Republican who chairs the House Subcommittee on Space and Aeronautics, downplayed the differences. "I don't see any show stoppers," Calvert said. Republicans in the House and Senate are eager to pass a NASA authorization bill this year, the first since 2000, if only to officially endorse President Bush's moon-Mars exploration initiative announced 17 months ago. The House bill, which now goes to the full Science Committee for consideration, stipulates that the three remaining shuttles should retire in 2010 to comply with recommendations by the Columbia Accident Investigation Board. The Senate bill, approved by committee last week, directs NASA to continue flying the shuttles until a replacement vehicle is certified, which could occur sometime between 2010 and 2014. The distinction is an important one for NASA and contractor employees working at Kennedy Space Center. Workers are deeply concerned that the end of the shuttle era will mean an end to their space center careers. A significant disruption to the space center work force also would be harmful to the region's economy. Sensitive to the economic wellbeing of space workers, the House bill requires NASA to submit an agency-wide strategy on personnel but does not prohibit layoffs. Democrats withheld support for the legislation Wednesday to demonstrate their concern that the bill doesn't go far enough to protect NASA's other areas of study -- aeronautics, space science, Earth science and microgravity research. Six of the panel's seven Democrats who were present abstained from voting Wednesday, but the bill was approved anyway. Web posted. (2005). [Different bills have different effect on Brevard [Online]. Available WWW: <http://www.floridatoday.com/> [2005, June 30].]

### **Man who designed structures at KSC dies at 82**

The huge machines that carried moon rockets and still carry space shuttles outlived the brilliant man who created them. Donald Buchanan of Titusville died June 13 at 82. Among those who honored him at his funeral was Kennedy Space Center Director Jim Kennedy, who compared him to rocket pioneer Wernher Von Braun. A mechanical engineer, he started work with the agency that was NASA's predecessor in 1949. He moved to the Army ballistic Missile Agency in Alabama, then to NASA, designing equipment that would help launch Saturn rockets at Kennedy Space Center. He moved to the Space Coast in July 1965 and was placed in charge of developing the facilities that would send the Saturn 5 rockets to

the moon. The most exciting moment for Buchanan was the nov. 9, 1967, launch of the first Saturn 5, which provide the mobile system worked. [“Man who designed structures at KSC dies at 82,” **Florida Today**, June 30, 2005, p 5B.]



A fish-eye view shows Space Shuttle Discovery moments after liftoff from Launch Pad 39B on the historic Return to Flight mission STS-114. At left is the Fixed Service Structure with the White Room appearing to be suspended in mid-air. The White Room provides the astronauts access into the orbiter. The liftoff occurred at 10:39 a.m. EDT. On this mission to the International Space Station the crew will perform inspections on-orbit for the first time of all of the Reinforced Carbon-Carbon (RCC) panels on the leading edge of the wings and the Thermal Protection System tiles using the new Canadian-built Orbiter Boom Sensor System and the data from 176 impact and temperature sensors.



## JULY 2005

### **July 1: Space Shuttle Processing Status Report**

Discovery (OV-103); Mission: STS-114 - 17th ISS Flight (LF1); Payload: Multi-Purpose Logistics Module; Location: Launch Pad 39B; Launch Date: July 13, 3:51 p.m. EDT; Launch Pad: 39B; Crew: Collins, Kelly, Noguchi, Robinson, Thomas, Lawrence and Camarda; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Yesterday, the Space Shuttle Program concluded a two-day Flight Readiness Review meeting by announcing a launch date of July 13, 2005. The next major review of launch readiness will occur two days before launch (L-2) when the Mission Management Team meets to give the final authorization for launch. At Launch Pad 39B, final preparations for the launch of Discovery are under way. Loading of hypergolic propellants continued and should be completed this weekend. This process includes loading the propellants monomethyl hydrazine and nitrogen tetroxide into the Orbiter Maneuvering System and Forward Reaction Control System. The STS-114 flight crew visited the pad yesterday to perform an inspection for sharp edges in the orbiter. After the crew inspection was complete, a payload contamination walkdown was performed, closeout photos were taken and the payload bay doors were closed for flight. All four Extravehicular Mobility Units (EMUs) have been installed in the orbiter. The EMU spacesuits will be worn by the flight crew during the three spacewalks that are scheduled during the mission. Atlantis (OV-104); Mission: STS-121 - 18th ISS Flight (ULF1); Payload: Multi-Purpose Logistics Module; Location: Orbiter Processing Facility Bay 1; Launch Date: Lighted Launch Planning Window September 9 - 24, 2005; Launch Pad: 39B; Crew: Lindsey, Kelly, Sellers, Fossum, Nowak, Wilson and Reiter; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Technicians continue processing Atlantis in Orbiter Processing Facility bay 1 for its mission to the International Space Station. Orbiter modal testing was completed this week. This test involves using devices referred to as "shakers," which send vibrations throughout the Orbiter. Measuring instruments called accelerometers are positioned all over the vehicle to read the effects of the vibrations, in order to check the structural health of the vehicle. Early Tuesday morning, the Mobile Launch Platform carrying the STS-121 External Tank (ET-120) and twin Solid Rocket Boosters was moved from High Bay 1 in the Vehicle Assembly Building to High Bay 3. The move was made to allow for modification work to take place in High Bay 1. Endeavour (OV-105); Endeavour is in its Orbiter Major Modification period which began in December 2003. Owner-press-release. (2005). **Space Shuttle Processing Status Report** S05-026 [Online]. Available E-mail: [owner-press-release@spinoza.public.hq.nasa.gov](mailto:owner-press-release@spinoza.public.hq.nasa.gov) [2005, July 1].]

### **July 2: NASA reviews past close calls**

A rocket fuel fire during atmospheric re-entry that ended in explosions on the runway in 1983. A launch pad fire with six astronauts aboard a fully fueled shuttle in 1984. A brake failure and blown tire during a 1985 landing with a U.S. Senator aboard. An orbital debris strike in 1992 that caused the type of wing damage that doomed Columbia and seven astronauts in 2003. Amid the final push to return NASA's shuttle fleet to service, senior managers at Johnson Space Center in Houston are taking time to review the harrowing details of a dozen past shuttle missions that nearly ended in disaster. Deputy shuttle program manager Wayne Hale came up with the idea at a risk conference in California in 2004. Jim Lovell, commander of the Apollo 13 mission, recounted how a chain of seemingly minor events over the course of four or five years led to the fuel tank explosion that crippled the spaceship and prompted a now-legendary effort to get the crew home safe. "I was amazed

at the number of NASA people in that room that had never heard that part of the story. It was news to them. There is history here that is not getting to the right people," Hale said. A note to shuttle program workers was issued to solicit suggested cases, and 12 were selected. With Discovery perched on launch pad 39A for its first flight, the main engines ignited and then shut down four seconds before liftoff when a fuel valve failed. Explosive liquid hydrogen leaked and ignited, burning for at least 12 minutes as six astronauts scurried from shuttle. A water spray system on the pad extinguished the fire, but managers never ordered the astronauts, including Hawley, to evacuate gantry. They lacked confidence in the metal baskets that would whisk astronauts down a 1,200-foot cable to the ground. Web posted. (2005). [NASA reviews past close calls [Online]. Available WWW: <http://www.floridatoday.com/> [2005, July 2].]

### **Space center to launch fun ride**

The Kennedy Space Center Visitor Complex is building The Shuttle Experience, a multimillion-dollar simulator attraction that will add some high-tech, gee-whiz fun to the center, adjacent to the nation's space-shuttle launch operations. Site work has begun and plans are to be announced next week for the new attraction, which, though "not a Space Mountain" or roller coaster, will boost the visitor center's excitement quotient, said state Rep. Bob Allen, R-Merritt Island, whose Brevard County district includes the space center. The attraction, which will simulate a shuttle launch and landing, is being built in the same area where a mock orbiter display is now located. Delaware North Cos., the privately held company that contracts with the federal government to run the visitor complex, charges admission just like other tourist attractions and is building the simulator with financial help from state industrial revenue bonds. The company's hospitality group, now called Delaware North Companies Parks & Resorts, won the NASA contract to operate the KSC Visitor Complex in 1995. ["Space center to launch fun ride," **Orlando Sentinel**, July 2, 2005, p 1C & 2C.]

### **July 6: NASA watching TS Dennis**

NASA is watching Tropical Storm Dennis as it prepares for the July 13 launch of Discovery. If there is a risk of winds 69 mph or higher, NASA could roll the shuttle back to the Vehicle Assembly Building. The space agency would make its launch decision today or Thursday. The forecast is for Dennis to be hundreds of miles west of Florida on Sunday in the Gulf of Mexico and not a direct threat to Brevard County. But forecasters warn the storm could shift hundreds of miles by the time it reaches land, possibly bringing it into Florida. Web posted. (2005). [Online]. Available WWW: <http://www.floridatoday.com/> [2005, July 6].]

### **Apollo-Soyuz project turns 30**

The Space Coast is preparing to celebrate the 30<sup>th</sup> anniversary of a breakthrough in international space relations, the docking in orbit of spaceships launched by the U.S. and Russia. Two events next weekend at the Kennedy Space Center Visitor Complex will commemorate the 1975 Apollo-Soyuz Test Project, when three NASA astronauts and two cosmonauts spent two days working together in space. The mission is credited with establishing the good space relations that helped lay the groundwork for the International Space Station two decades later. Actor John Travolta, a pilot and space enthusiast, will host the Apollo-Soyuz Test Project Anniversary Gala at the visitor Complex on July 15. Proceeds from the sold-out event will benefit the Astronaut Scholarship Foundation, a group established by the Mercury 7 astronauts to provide financial assistance to college students

pursuing science and engineering degrees. Travolta will be joined at the gala by four of the five men who flew on the mission – Americans Thomas Stafford and Vance Brand and Russians Valery Kubasov and Alexei Leonov. A third U.S. crew member, Deke Slaton, died in 1993. [“Apollo-Soyuz project turns 30,” **Florida Today**, July 6, 2005, p 3B.]

**July 7: Space Shuttle Processing Status Report**

Discovery (OV-103); Mission: STS-114 - 17th ISS Flight (LF1); Payload: Multi-Purpose Logistics Module; Location: Launch Pad 39B; Launch Date: July 13, 3:51 p.m. EDT; Crew: Collins, Kelly, Noguchi, Robinson, Thomas, Lawrence and Camarda; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. At Launch Pad 39B, final preparations for the launch of Discovery's Return to Flight mission to the International Space Station continue. Launch countdown preparations have begun in firing room 3 of the Launch Control Center in anticipation of the countdown beginning on Sunday at 6 p.m. at the T-43 hour mark. Stowing of the flight crew equipment lockers into the orbiter mid-deck is underway and will continue tomorrow. Mid-deck flight seats will be installed on Monday. Ordnance installation is complete. Aft closeouts continue and are scheduled to be complete tomorrow. Drag chute instrumentation checkout is complete. Loading of hypergolic propellants is complete. This process includes loading the propellants monomethyl hydrazine and nitrogen tetroxide into the Orbiter Maneuvering System and the Forward Reaction Control System. Today, the hypergolic pressurization of the propellant systems was completed. Friday, the pad structure and surface will be washed down in preparation for flight. Also tomorrow, the new wing leading edge sensors that will monitor impacts or temperature changes will be programmed for flight. NASA weather officers are tracking Hurricane Dennis and its possible impact at Kennedy Space Center. The current forecast shows only a slight chance of more than 40 knot winds effecting KSC on Saturday. A decision will be made this evening if preparations should begin for a possible rollback of Space Shuttle Discovery. A decision on rollback would not be made until tomorrow. At this point, none of the preparations will impact the July 13 launch date. Owner-press-release. (2005). **Space Shuttle Processing Status Report** S05-027 [Online]. Available E-mail: owner-press-release@spinoza.public.hq.nasa.gov [2005, July 7].]

**KSC launches plan to compete with parks**

A \$160 million redevelopment plan -- including nine new rides and exhibits -- is aiming to transform Kennedy Space Center Visitor Complex into an attraction that could better compete with the Orlando area's theme parks. The KSC Visitor Complex's plan, announced Wednesday, also could help attract more overnight visitors to the Space Coast. The theory is that they will find the nine new exhibits will make it more worthwhile for them to spend a full day or two days visiting the complex. That would boost business at local hotels, restaurants and shops that depend on tourists for much of their revenue. The centerpiece of the 10-year plan for the Visitor Complex is a much-anticipated \$60 million Shuttle Launch Experience motion simulator that is designed to simulate a shuttle liftoff. Construction begins this month, and it's expected to open in early 2007. Roughly 1.5 million visitors pass through the gates of the Visitor Complex each year. Web posted. (2005). [KSC launches plan to compete with parks [Online]. Available WWW: <http://www.floridatoday.com/> [2005, July 7].]

**July 8: Discovery preps resume**

Kennedy Space Center workers disconnected power and communications cables between shuttle Discovery and the launch pad overnight in preparation for a possible rollback if Hurricane Dennis drives extreme winds to the Space Coast. However, early this morning, work on the steps toward an on-time Wednesday liftoff also resumed. If Dennis continues on a track far from central Florida - as this morning's forecasts indicate - NASA could reverse some of the rollback preparations done during the night and still be in position to launch at 3:51 p.m. on July 13. Hurricane Dennis, near Cuba, now appears on a course that would make landfall slightly west of Thursday's forecast. The late Thursday forecasts prompted NASA managers to begin preparations for a possible rollback. The idea was to keep open the option of moving the shuttle to safe shelter if the storm's outer edge brought potentially dangerous wind to central Florida. That appears less likely now, though the shuttle launch weather officer will be keeping a close eye on the storm. Web posted. (2005). [Discovery preps resume [Online]. Available WWW: <http://www.floridatoday.com/> [2005, July 8].]

**NASA solicits interest in use of Shuttle Landing Facility**

NASA today issued a formal request for expressions of interest by non-NASA organizations, including commercial space companies, for use of the Shuttle Landing Facility (SLF) at the Kennedy Space Center (KSC), Fla. The announcement is the first step in considering how and when NASA can expand access to available capacity at the SLF by government, commercial, and academic organizations. NASA's use of the SLF to support the Space Shuttle Program and other agency activities has precedence over prospective users through the remaining operational life of the orbiter and beyond. NASA is seeking to accommodate conditional access by additional users. NASA is investigating the potential to support research and technology demonstration flights of piloted, unpiloted, and spaceflight vehicles; parabolic research and demonstration flights; academic and commercial space flight research and demonstration flights; logistical support, and others. Uses that can be readily accommodated at nearby airports, such as executive aircraft flights and conventional commercial passenger aircraft flights, will not be considered. Areas of interest are described in the Request For Information (RFI) published on today's Federal Business Opportunities Website. The RFI is a part of NASA's ongoing efforts to support the President's Management Agenda and the U.S. Space Transportation Policy. "The SLF is a unique facility, and we would like to see its full use by the nation's aerospace community," said NASA's Associate Administrator for Space Operations William Readdy. Organizations have until August 30 to respond with detailed expressions of interest. Based on those responses, NASA will determine what uses can be accommodated on the SLF. NASA anticipates developing policies, plans, and procedures in coordination with the Air Force and FAA to enable SLF access to non-NASA users. Web posted. (2005). [NASA solicits interest in use of Shuttle Landing Facility [Online]. Available WWW: <http://www.floridatoday.com/> [2005, July 8].]

**NASA announces shuttle launch countdown**

The countdown for NASA's Return to Flight launch of Space Shuttle Discovery (STS-114) starts at 6 p.m. EDT, July 10. Discovery's crew will test new equipment and procedures to increase Shuttle safety, deliver spare parts and supplies to the International Space Station. NASA's Kennedy Space Center (KSC) launch team will conduct the countdown from Firing Room 3 of the Launch Control Center. The countdown includes nearly 27 hours of built-in

hold time and a preferred launch at approximately 3:51 p.m. EDT, July 13. The launch window is approximately five minutes. This historic mission is the 114th Shuttle flight and 17th U.S. flight to the Station. The 12-day mission has a planned KSC landing at approximately 11:01 a.m. EDT, July 25. [“NASA announces shuttle launch countdown & key events,” **NASA News Release #M05-114**, July 8, 2005.]

### **Space Shuttle Processing Status Report**

Discovery (OV-103); Mission: STS-114 - 17th ISS Flight (LF1); Payload: Multi-Purpose Logistics Module; Location: Launch Pad 39B; Launch Date: July 13, 2005, 3:51 p.m. EDT; Crew: Collins, Kelly, Noguchi, Robinson, Thomas, Lawrence and Camarda; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Final preparations for the launch of Discovery's Return to Flight mission to the International Space Station continue at Launch Pad 39B. Following the weather briefing at 6:30 a.m. today, hurricane rollback preparations were discontinued and processing resumed toward a July 13 launch. The only hurricane preparations that began last night were ordnance disconnects. The reconnection of that ordnance will begin late tonight. Due to weather concerns associated with Hurricane Dennis, the STS-114 crew will now arrive one day early via a Gulf Stream on Saturday, July 9 at 6:30 p.m. at the Shuttle Landing Facility at NASA's Kennedy Space Center. Launch countdown preparations have begun in firing room 3 of the Launch Control Center in anticipation of the countdown beginning on Sunday at 6 p.m. at the T-43 hour mark. Today, the pad structure and surface areas were prepared for launch activities. Also, the new wing leading edge sensors that will monitor impacts or temperature changes were programmed for flight. Owner-press-release. (2005). **Space Shuttle Processing Status Report S05-028** [Online]. Available E-mail: [owner-press-release@spinoza.public.hq.nasa.gov](mailto:owner-press-release@spinoza.public.hq.nasa.gov) [2005, July 8].]

### **Restrictions in Effect For All Space Shuttle Launches**

Space Shuttle Discovery's first launch opportunity is on July 13 at 3:51 p.m. and the launch window extends for five minutes. At NASA's request, U.S. Air Force and U.S. Coast Guard surveillance aircraft will patrol KSC's airspace boundaries on launch day. Violators will be intercepted by patrol forces, thoroughly investigated and will be subject to FAA enforcement action. A number of restrictions remain in effect around the Kennedy Space Center (KSC) during the hours immediately following the launch of a Space Shuttle. [“Airspace, Bridges and Waterway Restrictions in Effect For All Space Shuttle Launches,” **NASA News Release #58-05**, July 8, 2005.]

### **KSC SWAT team ready for anything**

With NASA's first post-Columbia shuttle mission set to launch next week, and in the wake of terrorist attacks in London on Thursday, Kennedy Space Center SWAT Team Commander David Fernandez and 28 colleagues are ready to take on any dangerous situation. The Special Weapons and Tactics team is responsible for protecting the nation's shuttle fleet as well as rockets, spacecraft, launch pads, assembly buildings and processing facilities worth billions of dollars. The SWAT team works three shifts, 24 hours a day, seven days a week, 365 days a year, to keep hardware, facilities and workers at the coastal launch sites out of harm's way. They'll be responsible for protecting the Discovery crew and an estimated 25,000 workers, VIPs and visitors who will be at KSC or the air station when NASA is scheduled to launch Wednesday. [“KSC SWAT team ready for anything,” **Florida Today**, July 8, 2005, p 4A.]



**July 9: Space Shuttle Processing Status Report**

Discovery (OV-103); Mission: STS-114 - 17th ISS Flight (LF1); Payload: Multi-Purpose Logistics Module; Location: Launch Pad 39B; Launch Date: July 13, 2005, 3:51 p.m. EDT; Crew: Collins, Kelly, Noguchi, Robinson, Thomas, Lawrence and Camarda; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. The STS-114 crew arrived at 6:30 p.m. today at the Shuttle Landing Facility at NASA's Kennedy Space Center aboard a Gulf Stream aircraft from Johnson Space Center in Houston. Final preparations for the launch of Discovery's Return to Flight mission to the International Space Station continue at Launch Pad 39B. The ordnance reconnections are complete and the vehicle was powered up. The ordnance was previously disconnected in preparation for any possible concerns associated with Hurricane Dennis. Closeout of the aft compartment is complete. Launch countdown preparations are nearing completion in firing room 3 of the Launch Control Center. The STS-114 launch countdown begins tomorrow evening at 6 p.m. at the T-43 hour mark. The Solid Rocket Booster retrieval ships Liberty Star and Freedom Star will depart from KSC at noon on Tuesday and travel to their location for launch, about 140 nautical miles downrange of the launch pad. Owner-press-release. (2005). **Space Shuttle Processing Status Report** S05-029 [Online]. Available E-mail: [owner-press-release@spinoza.public.hq.nasa.gov](mailto:owner-press-release@spinoza.public.hq.nasa.gov) [2005, July 9].]

**July 10: Poll: Shuttle supported, faith in NASA slipping**

Americans strongly support the space shuttle program, but just more than half of those polled think highly of NASA's performance, according to a USA TODAY/ CNN/Gallup Poll taken weeks before the intended launch of the first shuttle flight in 2½ years. The poll found that the shuttle is very popular. Nearly three-quarters of those surveyed said the United States should continue the shuttle program, which is 34 years old. Twenty-one percent said the shuttle program should not continue. Twenty percent of those polled have a "great deal" of confidence that NASA can prevent accidents like that of shuttle Columbia, which disintegrated in 2003 after being hit by errant debris. The three remaining shuttles have been grounded since the accident, which killed the crew of seven. Faith in NASA's ability to avoid a repeat of the Columbia accident has slipped. The day after the loss on Feb. 1, 2003, 38% of those polled said they had a "great deal" of confidence that NASA could prevent another accident. NASA plans to launch the shuttle Discovery on Wednesday. The flight will take supplies to the International Space Station and test new safety measures. NASA — the federal agency in charge of the shuttles, the space station and scientific craft such as the Mars rovers — drew mixed notices in the latest poll. NASA's job performance was rated "poor" or "only fair" by 40% of those surveyed; 53% rated it "excellent" or "good." NASA spokesman Dean Acosta said any politician would be glad to have an approval rating of 53%. "We look at that as a positive but recognize that we always have room to improve," he said. Public opinion of NASA will be crucial as the space agency works to fulfill President Bush's ambitious plan to send astronauts back to the moon and on to Mars. A proposal by President Bush's father to send Americans to Mars foundered after receiving tepid support. The latest poll illustrates the drop off in support when money is a factor. When respondents were asked how they felt about the United States setting aside money to land humans on Mars, 58% opposed the idea and 40% approved it. Results are based on a survey of 1,009 adults polled June 24-26. The margin of error is +/-3%. Web posted. (2005). [Poll: Shuttle supported, faith in NASA slipping [Online]. Available WWW: <http://www.usatoday.com/> [2005, July 10].]

### **Space Shuttle Processing Status Report**

Discovery (OV-103); Mission: STS-114 - 17th ISS Flight (LF1); Payload: Multi-Purpose Logistics Module; Location: Launch Pad 39B; Launch Date: July 13, 2005, 3:51 p.m. EDT; Crew: Collins, Kelly, Noguchi, Robinson, Thomas, Lawrence and Camarda; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. The launch countdown clock began at 6 p.m. EDT at the T-43 hour mark counting down toward a launch of Space Shuttle Discovery on mission STS-114 on Wednesday at 3:51 p.m. The launch control team members are in firing room 3 of the Launch Control Center at NASA's Kennedy Space Center and will be monitoring their system consoles. The STS-114 crew spent the day in various reviews including a briefing with the Astronaut Support Personnel and the Vehicle Integration Test Office and a bench review of the items in the tile repair kit and the new Cure in Place Ablator Applicator for use in on-orbit tile repair. Today, the L-3 day weather forecast shows that probability of weather prohibiting the launch of Discovery is 30 percent, with the probability of weather prohibiting tanking at only five percent. Temperature at launch is forecast at 86 degrees and a relative humidity of 70 percent. The Solid Rocket Booster retrieval ships Liberty Star and Freedom Star will depart from KSC at noon on Tuesday and travel to their location for launch, about 140 nautical miles downrange of the launch pad. Owner-press-release. (2005). **Space Shuttle Processing Status Report S05-030** [Online]. Available E-mail: [owner-press-release@spinoza.public.hq.nasa.gov](mailto:owner-press-release@spinoza.public.hq.nasa.gov) [2005, July 10].]

#### **July 11: Discovery ready for liftoff**

The space shuttle Discovery returned America to space two years after the Challenger explosion in 1986. This year, Discovery will attempt the feat again. Discovery is scheduled to launch from Florida's Kennedy Space Center on Wednesday. NASA hopes the shuttle will restore confidence in the United States' embattled shuttle program after the loss of Columbia in 2003. Following a wrenching overhaul of the shuttle program, and much of the agency, NASA officials say they can safely mount another space shuttle mission. The space agency plans to return to the international space station, the moon and eventually press on to Mars under President Bush's Vision for Space Exploration. NASA is currently refining its shuttle and space station building options. In June, NASA administrator Michael Griffin told the House Science Committee the shuttle could not fly the 28 missions needed to finish building the space station before retiring the shuttle fleet in 2010. Griffin told lawmakers he would have a refined mission plan by later this summer. The space agency has operated under enormous scrutiny since Columbia burned up during reentry in 2003. Foam struck Columbia's left wing during launch, a problem observed and virtually ignored by mission managers. Once the shuttle entered the atmosphere, superheated gasses destroyed the vehicle. The disaster prompted the appointment of an independent panel, the Columbia Accident Investigation Board, to investigate the tragedy. The 13-member panel found NASA had systematically ignored signs the shuttle was operating unsafely and repeated the mistakes that led to the destruction of Challenger 17 years earlier. NASA says even before CAIB issued its report, it began cataloging potential threats to the shuttle and seeking to eliminate them. NASA said shuttle engineers crawled through each orbiter and found unsuspected problems. Rudder gears were installed backwards in the tail assembly. Corrosion had eaten away at critical components in the wing flaps. NASA also retested tolerances for shuttle materials so that mission controllers could decide whether a damaged shuttle, like Columbia, could be repaired. By June, NASA said it had fulfilled 12 of CAIB's 15 Return to Flight

recommendations. Despite the critical report which also praised NASA's efforts to improve the vehicle's safety, NASA administrator Griffin felt confident that Discovery was safe enough to launch during its July 13-31 window. It has been a formidable task. The shuttle stands among the most complex vehicles ever constructed, says NASA. Each orbiter weighs about 4.5 million pounds, containing 230 miles of wires and 2.5 million working parts. The three main engines, the most efficient rocket engines ever built, burn enough fuel to drain a swimming pool in 20 seconds and create 375,000 pounds of thrust. All of this machinery accomplishes one lofty goal: to safely send humans into space and return them home. Despite regular additions and upgrades, the vehicles are a mix of cutting-edge and obsolete technology. The shuttles, which first launched at Kennedy Space Center in 1981, will have to fly much longer if the Vision for Space Exploration is fulfilled. Bush has set 2010 as the year to finish the space station and retire the shuttle fleet. That goal has been affirmed by Griffin. For now, that means accepting the risk of the shuttle in the coming years. NASA must convince Congress and the public that putting humans in space is worth the enormous resources devoted to it, and can be done safely enough. Realistically, the risks will not be eliminated until the last shuttle takes off from Kennedy Space Center, says NASA. Web posted. (2005). [Ready for liftoff [Online]. Available WWW: <http://www.cnn.com/> [2005, July 11].]

### **STS-114 countdown begins**

The countdown for Wednesday (July 13) afternoon's launch of the shuttle Discovery started Sunday evening with no technical issues reported and a favorable weather forecast. The STS-114 countdown began at 6 pm EDT (2200 GMT) Sunday for a launch at 3:51 pm EDT (1951 GMT) Wednesday. NASA managers said Sunday that the shuttle was in "excellent shape" with no known technical issues that could delay the launch. Forecasts called for a 70 percent chance of favorable weather on Wednesday, although the weather is expected to degrade later in the week. Web posted. (2005). [STS-114 countdown begins [Online]. Available WWW: <http://www.spacetoday.net/> [2005, July 11].]

### **Space Shuttle Processing Status Report**

Discovery (OV-103); Mission: STS-114 - 17th ISS Flight (LF1); Payload: Multi-Purpose Logistics Module; Location: Launch Pad 39B; Launch Date: July 13, 2005, 3:51 p.m. EDT; Crew: Collins, Kelly, Noguchi, Robinson, Thomas, Lawrence and Camarda; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Following the start of the countdown clock last night at 6 p.m., technicians and the launch team began to work final procedures and closeouts for Space Shuttle Discovery's launch to the International Space Station on mission STS-114. Launch remains on schedule for 3:51 p.m., July 13. Preparations are complete for the loading of the Power Reactant Storage Distribution system. This is the operation where the liquid hydrogen and liquid oxygen for the fuel cells is loaded on the orbiter Discovery. The fuel cells provide power to the electrical systems while the vehicle is on orbit. The byproduct is drinking water. Today, the L-2 day weather forecast shows that the probability of weather prohibiting the launch of Discovery is 30 percent, with the probability of weather prohibiting tanking at only five percent. Temperature at launch time is forecast at 86 degrees and a relative humidity of 70 percent. The STS-114 crew will spend today in various reviews including a payload systems briefing. Earlier this morning, Commander Eileen Collins and Pilot Jim Kelly flew several landing approaches at the Shuttle Landing Facility in the Shuttle Training Aircraft. The Solid Rocket Booster retrieval ships Liberty Star and Freedom Star will depart from KSC tomorrow at noon and travel to their location for launch, about 140

nautical miles downrange of the launch pad. Owner-press-release. (2005). **Space Shuttle Processing Status Report S05-031** [Online]. Available E-mail: owner-press-release@spinoza.public.hq.nasa.gov [2005, July 11].]

**July 12:**

### **Reporters from across the globe descend on the Cape**

Members of the news media have descended upon central Florida this week as NASA prepares to launch the first space shuttle mission since Columbia's ill-fated flight two-and-a-half years ago that left the fleet grounded. The eyes of the world will focus on Kennedy Space Center Wednesday when shuttle Discovery rumbles into space to embark on a 12-day mission to service the international space station. The NASA public affairs office at KSC is responsible for accommodating reporters and photographers covering space shuttle launches, and officials say they began preparing for the onslaught of media over a year ago as it became clear Discovery's mission was nearing. "We've been planning a long time for this," said Bruce Buckingham, the news chief at Kennedy Space Center. All told, Buckingham said approximately 2,800 persons were badged for a variety of networks, television stations, newspapers, magazines, and web sites around the world. Officials estimate 700 foreign reporters -- a quarter of the total number -- were accredited representing about 30 countries. Japan enjoys a large contingent of media at the space center due to Discovery's mission specialist and lead spacewalker Soichi Noguchi. A wild card in the final tally is determining the number of reporters who were planning to attend the May launch will opt not to come to Cape Canaveral to cover the liftoff in July, Buckingham said. Officials predict around 2,000 people will actually arrive and pick up a badge this week. Some television stations arrived a bit later than planned due to the coverage of Hurricane Dennis that battered the Gulf Coast over the weekend. By Tuesday, a few dozen satellite trucks had taken their spots around the Kennedy Space Center press site, along with large numbers of high-volume mobile trailers. Scaffolding had been erected across the press site lawn overlooking the famous countdown clock. Throughout the history of U.S. manned spaceflight, press members have turned out to attend milestone missions for over 40 years. For John Glenn's orbital Mercury flight in 1962, 379 reporters and photographers were at Cape Canaveral. Both the Apollo 11 moon landing in 1969 and the first space shuttle flight in 1981 garnered the attention of some 2,700 members of the press who showed up to receive badges. Numbers gradually waned through the 1980's, with spikes of about 1,700 media officials for the launch of Sally Ride -- the first American woman in space -- in 1983 and of around 2,300 in 1988 for STS-26, the first shuttle mission after the Challenger accident two years earlier. In the 1990's, the average press corps for a shuttle launch reached around 350 members strong. Some missions saw fewer than 200 reporters at the KSC press site, while others such as the launch of the Hubble Space Telescope and the first Shuttle-Mir program flight were above normal. John Glenn's return to space aboard Discovery in 1998 also rose to the world stage, prompting 3,750 requests but KSC officials could not say Tuesday how many reporters actually attended the launch. Web posted. (2005). [Reporters from across the globe descend on the Cape [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, July 12].]

### **Expendable Launch Vehicle Status Report**

Mission: Mars Reconnaissance Orbiter (MRO); Launch Vehicle: Lockheed Martin Atlas V 401; Launch Pad: Space Launch Complex 41 (SLC-41), Cape Canaveral Air Force Station; Launch Date: August 10, 2005; Launch Window: 7:53:58 to 9:53:58 a.m. (EDT). Power-on testing continues to go well. Solar arrays will be deployed, inspected and stowed for launch.

The Centaur upper stage for the Atlas V is at the Vertical Integration Facility (VIF) at SLC-41. It was hoisted atop the Atlas stage to begin checkout. The Launch Vehicle Readiness Test continues. A countdown wet dress rehearsal with the launch vehicle fully fueled was completed July 7. Spacecraft fueling is scheduled for July 18. A spin test to ensure balance of the spacecraft will be completed by July 20. The MRO will be transported from the Payload Hazardous Servicing Facility to the VIF in late July. It will join the Atlas V for the final phase of launch preparations. Mission: Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observation and CloudSat (CALIPSO/CloudSat); Launch Vehicle: Boeing Delta II 7420 DPAF; Launch Pad: Space Launch Complex 2 (SLC2), Vandenberg Air Force Base, Calif.; Launch Date: NET September 11, 2005. CloudSat completed battery reconditioning June 27. The second stage of the Delta II vehicle is planned to be hoisted atop the interstage Thursday. Processing of the CALIPSO spacecraft is complete. KSC News Center (2005). **Expendable Launch Vehicles Status Report E05-006** [Online]. Available E-mail: [ksc@newsletters.nasa.gov](mailto:ksc@newsletters.nasa.gov) [2005, July 12].]

#### **Statement From The Columbia Families On Return To Flight**

The following is a statement from the families of the Space Shuttle Columbia mission STS-107: "As NASA prepares to launch the Shuttle Discovery, we, the Columbia Families, would like to show our support for the STS-114 crew and all the dedication and talent of those who supported this Return to Flight effort. We have had two and one half years to reflect daily on the loss of our loved ones as the Shuttle Columbia (STS 107) broke apart over Texas on February 1, 2003. In the aftermath of the Columbia tragedy we saw our nation's space program reinvent itself. The extraordinary efforts of local, state and national organizations involved in the recovery effort, the Columbia Accident Investigation Board, the Return to Flight Task Group and all the NASA and aerospace industry workforce implementing the Return to Flight effort have clearly done an exemplary job in defining and reducing the technical risk as much as possible. As the families of Apollo 1 and Challenger before us, we grieve deeply but know the exploration of space must go on. We hope we have learned, and will continue to learn, from each of these accidents, so that we will be as safe as we can be in this high risk endeavor. As important as solving the technical risk is, we must be vigilant to ensure the organizational and cultural issues that contributed to Apollo, Challenger, and Columbia are forever remembered. Under the leadership of the new NASA Administrator, we have every confidence that the sacrifice of our loved ones and those that preceded them will be realized for the benefit of all humankind. Godspeed Discovery." ["A Statement From The Columbia Families On NASA's Return To Flight," **NASA News Release #05-180**, July 12, 2005.]

#### **NASA Awards Crew Exploration Vehicle Contracts**

NASA today authorized two eight-month contracts, each worth approximately \$28 million, one to Lockheed Martin Corp. and the other to the team of Northrop Grumman Corp. and The Boeing Co. to support a July 2006 review of the engineering systems for the agency's new Crew Exploration Vehicle (CEV). During this contract period, in addition to performing sustained engineering in support of the CEV review, the contractors will continue to develop designs for NASA's next-generation vehicle for human space flight and demonstrate ability to manage cost, schedule and risk. Results of NASA's Exploration Systems Architectural Study, which defines parameters for the new vehicle to replace the Space Shuttle, will be incorporated into a "call for improvements" to be released later this year, inviting proposals from the selected contractors. These proposals will be evaluated for



the final selection of a single CEV contractor. Originally, the selection of a single industry team was planned for 2008, but to reduce or eliminate the time between the Shuttle's retirement in 2010 and the first CEV flight, the selection is planned for early 2006. The CEV is expected to carry up to six astronauts beyond low-Earth orbit soon after the Space Shuttle is retired in 2010, and then on to the moon as early as 2015. The CEV is a key element of the nation's Vision for Space Exploration, which returns human explorers to the moon, Mars, and beyond. ["NASA Awards Crew Exploration Vehicle Contracts," **NASA Contract Release #C05-q**, July 12, 2005.]

### **NASA Signs With Yahoo! & Akamai**

NASA has signed innovative agreements with Yahoo! Inc. and Akamai Technologies, Inc. to help bring the Space Shuttle's return to flight mission (STS-114) to millions of Internet users through the NASA Web Portal. Yahoo! Inc., of Sunnyvale, Calif., will provide live streaming of NASA TV mission coverage in Windows Media format and be the only other official online host of NASA TV footage beyond the NASA website. Akamai, of Cambridge, Mass., will stream NASA TV for RealPlayer and deliver all other Web content during the mission. "We're very excited to be able to offer this expanded coverage to the public," said NASA's Associate Administrator for Space Operations, William Readdy. "Internet users will be able to follow every event from launch through landing, including the spacewalks. Thanks to this agreement, they'll be able to do so at no additional cost to the taxpayers." With a 12-day mission that includes three spacewalks, NASA expects to deliver more data to users than it has for anything but the Mars Exploration Rovers, which are still going strong after 18 months on the mysterious red planet. Akamai's agreement with NASA builds on its existing role as the content-delivery provider for the Web portal. Akamai has agreed to expand the portal's available bandwidth by more than 30 times. "We are pleased to play a role in NASA's awe-inspiring Shuttle mission return to space by bringing the event through the Internet to enthusiasts around the world," said Keith E. Johnson, vice president of public sector, Akamai. "This is another significant milestone for the Internet, and for organizations that take advantage of a globally distributed, on-demand computing platform that delivers Web content to users around the world." NASA's agreement with Yahoo! is one of the agency's first online media partnerships. Under the terms of the agreement, Yahoo! will provide a co-branded Windows Media Player that will stream the mission's official online video on the Web sites of both NASA and Yahoo! Video for both sites will be streamed through Yahoo!'s servers and the company has secured more than 50 gigabits per second of available bandwidth for the event. Additionally, the video of the Shuttle mission will be promoted throughout Yahoo!'s network, including the Yahoo! front page, the most trafficked Web page in the world. "The Space Shuttle's Return to Flight is an important event, worthy of putting the strength of the Yahoo! network and technology infrastructure behind it," said Scott Moore, vice president of content operations for Yahoo! "Making this event available at no cost to Yahoo!'s audience of nearly 400 million users will bring the Shuttle mission to millions of additional consumers." The STS-114 mission is NASA's second major online event for July. It follows the highly successful coverage of the Deep Impact comet interception mission. More than 118,000 people watched the webcast of NASA TV mission coverage, and the portal served up 80 million Web pages. Peak traffic may go as high as nearly three times NASA's previous best during Deep Impact and 150 times normal operations. The NASA Web Portal is jointly managed by the Office of Public Affairs and NASA's Chief Information Officer. eTouch Systems of Fremont, Calif., is the

prime contractor. ["NASA Signs With Yahoo! & Akamai To Bring Shuttle Mission Online," **NASA News Release #05-182**, July 12, 2005.]

### **Space Shuttle Processing Status Report**

Discovery (OV-103); Mission: STS-114 - 17th ISS Flight (LF1); Payload: Multi-Purpose Logistics Module; Location: Launch Pad 39B; Launch Date: July 13, 2005, 3:51 p.m. EDT; Crew: Collins, Kelly, Noguchi, Robinson, Thomas, Lawrence and Camarda; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. The countdown to launch Discovery remains on schedule for Wednesday at 3:51 p.m. EDT. Just one day prior to the launch of Space Shuttle Discovery, closeouts and procedures are finalized for the liftoff of the Return to Flight mission, STS-114, to the International Space Station. The countdown clock is in a scheduled built-in hold at T-11 hours (Time Minus 11 hours) and will pick up at 11 p.m. EDT tonight. At about 5 p.m. today during routine closeouts at the launch pad, the cover of Discovery's window number seven, one of the overhead crew cabin windows, fell about 65 feet and hit a carrier panel on the left Orbital Maneuvering System (OMS) pod, damaging several tiles. The tiles were on a single carrier panel, which fits over the area. A spare carrier panel was taken to the pad and used to replace the damaged panel. The replacement procedure took about an hour to complete. This operation impacted the planned roll back of the Rotating Service Structure from 7 p.m. to about 8:30 p.m. The launch on Wednesday will not be impacted as a result. The countdown is in a planned, built-in hold at the T-11 hour mark. No other issues are being tracked by the launch team. Loading of the Power Reactant Storage Distribution system is complete. This is the operation where the liquid hydrogen and liquid oxygen for the fuel cells is loaded on Discovery. The fuel cells provide power to the electrical systems while the Shuttle is in orbit. The byproduct is drinking water. Setup and checkouts of the Space Shuttle Main Engines have begun. Tomorrow morning as early as 5:30 a.m. EDT, the External Tank will be filled with about 500,000 gallons of liquid oxygen and liquid hydrogen. To fill the tank takes about three hours. Today, the L-1 day weather forecast shows that the probability of weather prohibiting the launch of Discovery is 40 percent, with the probability of weather prohibiting tanking at only five percent. Temperature at launch time is forecast at 86 degrees and a relative humidity of 70 percent. The STS-114 crew spent today in various briefings including an Astronaut Support Personnel ingress briefing. This morning, Commander Eileen Collins and Pilot Jim Kelly flew several landing approaches at the Shuttle Landing Facility in the Shuttle Training Aircraft. The Solid Rocket Booster retrieval ships Liberty Star and Freedom Star departed from KSC at about 12:30 p.m. and are traveling to their location for launch, about 140 nautical miles downrange of the launch pad. Owner-press-release. (2005). **Space Shuttle Processing Status Report S05-032** [Online]. Available E-mail: owner-press-release@spinoza.public.hq.nasa.gov [2005, July 12].]

#### **July 13: Discovery launch set to go**

The launch of the space shuttle Discovery will go ahead as scheduled Wednesday after technicians replaced two protective tiles damaged near the spacecraft's tail Tuesday, a NASA spokeswoman said. The tiles were damaged when a cover panel on the No. 7 cockpit window fell off as the orbiter sat on the launch pad late in the afternoon, officials said. "Everything looks good," Discovery vehicle manager Stephanie Stilson told reporters. "This is a minor repair for us." Wednesday's scheduled launch will be the first mission for the shuttle program since the Columbia disaster in February 2003 that killed all seven astronauts aboard. Liftoff is set for 3:51 p.m. ET from launch pad 39B. Stilson said the window cover

-- which weighs less than 2 pounds -- was discovered after it had fallen about 65 feet. The cover is designed to protect the windows while the shuttle is on the launch pad and is removed before liftoff. NASA did not know how the shield had come loose, she said. Discovery was cleared to "go" earlier Tuesday, despite a 40 percent chance of bad weather at launch time. NASA has committed to daytime launches for the next two shuttle missions to ensure ideal lighting conditions for the cameras that will scrutinize the shuttle's ascent into orbit. For most of its scheduled 13-day mission, designated STS-114, the crew will devote its time to inspecting and testing repairs. Web posted. (2005). [Discovery launch set to go [Online]. Available WWW: <http://www.cnn.com/> [2005, July 13].]

### **Fighter jets, surveillance aircraft bolster KSC security**

Security in and around Kennedy Space Center will be tight today as NASA and the military employ fighter jets and high-tech surveillance aircraft to protect Discovery and its crew. A 30-mile no-fly zone for civilian aircraft will be in effect and six F-15 Strike Eagles and an AWACS plane will patrol the airspace around the space center, according to North American Aerospace Defense Command officials. On the ground, hundreds of security officers will patrol the 160,000 acres that make up Kennedy Space Center and the surrounding Cape Canaveral Air Force Station. "The process is the same for each shuttle launch," said Bill Sample, the president of Space Gateway Support, the private security agency contracted by the space center. The agency has 3,000 contracted employees, including armed SWAT teams. Officials say they have received no specific threats but, nonetheless, add that they have brought in additional security officers to handle the event. Space Gateway officials wouldn't confirm exact numbers, but say they have more than 500 security officers working at Kennedy Space Center. They also have specially-trained SWAT teams that escort astronauts and dignitaries. Outside Kennedy Space Center, local police will be focused on the traffic congestion expected to be caused by an estimated 250,000 spectators. "We're just expecting gridlock on the roadways and just hope that everybody will be careful and pay attention," said Andrew Walters, spokesman for the Brevard County Sheriff's Office. Web posted. (2005). [Fighter jets, surveillance aircraft bolster KSC security [Online]. Available WWW: <http://www.floridatoday.com/> [2005, July 13].]

### **Message from NASA Administrator**

NASA Administrator's Launch Day Message: This afternoon, the eyes of the world will be on NASA and our effort to launch the Space Shuttle Discovery and its brave crew. The launch of STS-114 will culminate two and a half years of dedicated work to make the Space Shuttle program, and NASA as a whole, stronger and safer. I want to thank each and every member of the NASA team for your hard work and commitment to excellence. A successful Shuttle flight will represent a major step toward our nation's ambitious Vision for Space Exploration. The flight of Discovery to the International Space Station will demonstrate the frontier spirit that drives us all -- the desire to explore, discover, and understand the universe we live in, and to settle new territory when it becomes possible to do so. We approach this launch with a better understanding of the risks inherent to space flight. On this eventful day, we must recognize the legacy of the heroic astronauts who have brought us to this point. Among these great pioneers, the Apollo 1, Challenger and Columbia astronauts, and many other fallen heroes, are very much on our minds. We will never forget their contributions to the conquest of space. Our crew is ready to go. Commander Eileen Collins, pilot James Kelly, and mission specialists Charlie Camarda, Wendy Lawrence, Soichi Noguchi, Stephen Robinson, and Andy Thomas are eager to test

and validate new hardware and safety procedures for the Shuttle and deliver vital supplies and equipment to the International Space Station. On behalf of the entire NASA team, I am humbled to express a thought that unites the hearts of billions of people around the world: Godspeed Discovery. Mike. Web posted. (2005). [NASA Administrator's Launch Day Message [Online]. Available WWW: <http://www.spaceref.com/> [2005, July 13].]

### **Congressional delegation expected at launch**

U.S. Rep. John R. Kuhl Jr., R-Hammondspport, will be joined at today's launch by U.S. Rep. Sherwood Boehlert, R-New Hartford. Boehlert is on the House Science Committee and is a leading a congressional delegation to Cape Canaveral. The delegation includes House Majority Leader Tom DeLay, R-Texas, and House Chaplain the Rev. Daniel Coughlin. Coughlin will lead a service in the Capitol at 9:30 a.m. today to pray for the safety and well-being of the Discovery crew. The delegation is scheduled to arrive in Florida at 1:15 p.m. for a prelaunch briefing, a tour and to view the launch. Web posted. (2005). [Congressional delegation expected at launch [Online]. Available WWW: <http://www.stargazettenews.com/> [2005, July 13].]

### **Rocketcam to provide live video**

As the space agency prepares for today's scheduled 12:50 p.m. Return to Flight launch of the space shuttle Discovery, Ridenoure's Ecliptic Enterprises Corporation has a RocketCam in place. It's designed to provide live, real-time videos looking down on the orbiter from above on the orange, external tank. The RocketCam, flown as a technology demonstration aboard the space shuttle Atlantis in October 2002, was not flown on STS-113, the Columbia mission that broke apart upon re-entry in February 2003. Web posted. (2005). [RocketCam ready for NASA launch [Online]. Available WWW: <http://www.pasadenastarnews.com/> [2005, July 13].]

### **Sensor Malfunction Causes Delay of Shuttle's Flight**

In a frustrating setback just 2 hours and 20 minutes before liftoff, NASA postponed the flight of the space shuttle Discovery on Wednesday because of a malfunction in a fuel sensor that engineers thought they had fixed a month ago. "All I can say is, 'Shucks,'" said N. Wayne Hale, the shuttle program's deputy manager. "We ran out of gas." When the order to stand down was issued shortly after 1:30 p.m., the Discovery's seven astronauts had already been strapped into their seats, after a morning in which they had been sent off to the launch pad to thunderous applause from NASA employees. They were to have lifted off at 3:51 in a 12-and-a-half-day mission to the International Space Station - a return to orbit at last for a shuttle fleet that has been grounded since the loss of the Columbia and its crew of seven on Feb. 1, 2003. Officials said they could not say how long it would take to fix the sensor problem, which they called an "unexplained anomaly" because they were still going through the arduous process of tracking down its source. Mr. Hale said the earliest possible launch opportunity, if the problem is easy to find, would be Saturday afternoon. If the repairs must be done in the enormous hangar called the Vehicle Assembly Building, the process of rolling the shuttle back, doing the work and returning it to the launching pad could take weeks. The decision to scrub was made by the launch director, Mike Lienbach. He cited a part of the external tank called the ECO sensor, which monitors the level of liquid hydrogen in the external fuel tank. There are four sensors in the tank, and all must be operating properly before liftoff. If the fuel tanks run unexpectedly low during ascent, the sensors will set off a controlled shutdown of the engines so they do not run on empty. The sensor failed during a

countdown test after the tank had been filled with liquid hydrogen. Controllers sent a command that should have forced all four sensors to give a "dry" reading. Three complied, but Sensor 2 was stuck on "wet." The sensors emerged as a problem during a test of the filled external fuel tanks in April, in which another sensor failed in a slightly different way. The fact that the malfunction could not be duplicated or explained was part of the reason NASA decided to delay Discovery's launch two months, from the original date of May 15. Since then, NASA workers swapped external tanks so that Discovery was using different equipment. Workers also replaced the suspect part of the chain of electronics between controllers and the sensor, known as the point sensor box. The component, like many parts of the shuttle, is based on 1980's technology and still uses components like transistors soldered onto circuit boards. Workers replaced Discovery's original point sensor box with the same component from the shuttle Atlantis, but it, too, showed problems in testing. They then replaced that box with one from the shuttle Endeavour. After the equipment had been tested and swapped, officials said that a second tanking test was not necessary because the use of an entirely different tank with its own hardware should have eliminated the problem. The problem did not show up again after extensive testing. At the NASA flight readiness review last month, the ECO sensor issue was declared all but resolved. At the news conference to announce the postponement, Dr. Griffin, looking ruffled and weary, said intermittent problems like a sensor that only fails at odd times are "the hardest of all of these problems to work." He said that the sensor had been sitting in the filled tank "for several hours before it showed its head." Web posted. (2005). [Sensor Malfunction Causes Delay of Shuttle's Flight [Online]. Available WWW: <http://www.mytimes.com/> [2005, July 14].]

#### **NASA and White House Discuss Early Shuttle Retirement**

NASA is considering retiring a Space Shuttle orbiter in 2007 and beginning modifications to one Shuttle launch pad at the Kennedy Space Center under a plan now being reviewed at NASA headquarters, according to senior agency sources. Driving the idea of a phased retirement of the space vehicles are two concerns. The first is a desire for finding new sources of funds to pay for advancement of the President's moon-to-Mars plan. And secondly NASA Administrator Michael D. Griffin's fears of a third Shuttle accident. A source familiar with Griffin's thinking said he is worried that an age-related malfunction would trigger a Shuttle catastrophe. As a result, the space chief is seeking to retire the individual Space Shuttle orbiters as quickly as possible. No final decision has been made - but discussions continued as Discovery was being prepared for launch. Web posted. (2005). [NASA and White House Discuss Early Shuttle Fleet Retirement [Online]. Available WWW: <http://www.nasawatch.com/> [2005, July 13].]

#### **July 14: Discovery launch date remains up in the air**

The shuttle Discovery's delayed launch on the first post-Columbia mission is off until at least Sunday, officials said today, and unless engineers find an obvious, simple-to-fix problem in the next day or so, the flight will be put on hold indefinitely. NASA is keeping Discovery in a countdown configuration just in case engineers come up with a quick fix. But shuttle processing manager Mike Wetmore said the team can't maintain that level of readiness indefinitely and that in all likelihood, they will back out of the countdown configuration Friday. At that point, launch would be on indefinite hold pending the outcome of much more extensive troubleshooting. The shuttle's launch window closes July 31. The next window runs from Sept. 9 through Sept. 24. If Discovery can't be quickly fixed, the flight could slip into September, pushing the second post-Columbia mission into a relatively tight



November window that opens Nov. 7 and closes Nov. 10. NASA managers are already looking into what might be done to extend the November window if worse comes to worse. Discovery was grounded Wednesday two-and-a-half hours before blastoff when a routine computerized test revealed problems with one of four hydrogen fuel sensors in the shuttle's external fuel tank. The sensors are part of a backup system intended to make sure the ship's engines don't shut down too early or run too long, draining the tank dry with potentially catastrophic results. All four sensors are required for a countdown to proceed. Web posted. (2005). [Discovery launch date remains up in the air [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, July 14].]

### **Space Shuttle Processing Status Report**

Discovery (OV-103); Mission: STS-114 - 17th ISS Flight (LF1); Payload: Multi-Purpose Logistics Module; Location: Launch Pad 39B; Launch Date: July 13, 2005, 3:51 p.m. EDT; Crew: Collins, Kelly, Noguchi, Robinson, Thomas, Lawrence and Camarda; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Space Shuttle managers say the launch of NASA's Space Shuttle Return to Flight mission, STS-114, will take place no earlier than Sunday, July 17. If Space Shuttle Discovery does launch Sunday, it would lift off at 2:14 p.m. EDT. Mission Management Team and engineering meetings took place last night and today at NASA's Kennedy Space Center. Team members reviewed data and possible troubleshooting plans for the liquid hydrogen tank low-level fuel cut-off sensor. The sensor failed a routine prelaunch check during the launch countdown yesterday afternoon, causing mission managers to scrub Discovery's first launch attempt. The sensor protects the Shuttle's main engines by triggering their shutdown in the event fuel runs unexpectedly low. The sensor is one of four inside the liquid hydrogen section of the External Tank (ET). A new official launch date will be scheduled once a troubleshooting plan is complete and engineers are working on a solution. Space Shuttle Program managers plan a series of meetings tomorrow to discuss the problem and finalize the troubleshooting plan. The launch control team began troubleshooting while the liquid oxygen and liquid hydrogen were drained from the ET last night. The No. 2 liquid hydrogen sensor in the External Tank's liquid hydrogen tank continued to read "wet" and did not transition to a "dry" indication once the tank was completely drained. Following detanking operations, the same commands that were sent during the launch countdown were repeated while draining. While going through commands, sensor No. 2 continued to show "wet" instead of "dry." The firing room then reissued commands and the sensor went to "dry" as it should have. Another round of commands was sent and sensor No. 2 performed as expected, with all sensors in the "dry" state. Space Shuttle Discovery remains at Launch Pad 39B. The Rotating Service Structure was rotated back around the vehicle last night. The STS-114 crew, led by Commander Eileen Collins, remains at Kennedy Space Center while engineers assess the problem. During their 12-day Return to Flight mission to the International Space Station, Discovery's seven crew members will test new techniques and equipment designed to make Space Shuttle missions safer. They'll also deliver supplies and make repairs to the Space Station. Owner-press-release. (2005). **Space Shuttle Processing Status Report** S05-033 [Online]. Available E-mail: [owner-press-release@spinoza.public.hq.nasa.gov](mailto:owner-press-release@spinoza.public.hq.nasa.gov) [2005, July 14].]

### **July 15: Experts Are Devising Action Plan for Shuttle**

NASA engineers drafted a nationwide team of troubleshooters Thursday to figure out why a candy-bar-size sensor malfunctioned in the external fuel tank of the space shuttle Discovery the day before, aborting the mission less than two hours before liftoff. Deputy shuttle

program manager Wayne Hale said "it is still theoretically possible" that planners could attempt a launch Sunday, "but this represents a really optimistic good-luck scenario which is not really realistic." Hale said the experts -- hundreds of NASA scientists and outside contractors at agency centers nationwide -- were divided into 12 groups to develop a plan of action to be vetted by Discovery mission managers at Kennedy Space Center on Friday. "At that point we'll make a decision about the way forward," Hale said. The countdown for Discovery, which was slated to embark on the first shuttle mission since Columbia disintegrated on reentry 2 1/2 years ago, was called off Wednesday when a hydrogen fuel sensor deep in the external fuel tank failed to respond properly to test signals. Hale said launch planners had sent out a call across the country, gathering the history of the external tank, the history of Discovery, original diagrams of the sensor system and the factory history of transistors in the system that were "not assembled to the best standard 20 years ago," when much of the shuttle technology was developed. The sensor enigma originally arose in April when two hydrogen sensors cycled incorrectly during a fuel "tanking test," and extensive troubleshooting was unable to find the cause. Web posted. (2005). [Experts Are Devising Action Plan for Shuttle [Online]. Available WWW: <http://www.washingtonpost.com/> [2005, July 15].]

### **Congress Takes Costly Trip to See Shuttle**

Forty-four members of Congress flew to Cape Canaveral for the scrubbed launch of space shuttle Discovery at a cost of more than \$73,000, according to figures provided to The Associated Press on Thursday. Some lawmakers would be willing to try again once NASA sets a new launch date, but it depends on the congressional schedule. The Air Force flew 35 lawmakers to Florida on Wednesday in two C40B aircraft, the equivalent of a 737-700 business jet. The cost, based on an hourly rate of \$7,960, totaled \$63,680, the service said. The round trip is about four hours. NASA ferried nine House members in a smaller executive jet, similar to the type used by corporate executives. The space agency said the cost of that plane was \$9,456. The House and Senate members spent several hours on the ground getting briefed by top NASA officials and meeting with reporters before heading back to Washington. NASA canceled the launch of Discovery about 2 hours before the scheduled liftoff, due to a faulty fuel gauge that read full when it should have read empty. NASA said Thursday that it would not make another attempt to launch until Sunday at the earliest. Most lawmakers will be in their home districts over the weekend, so it's doubtful that delegations could be organized for a Sunday launch. If there's a launch next week, House Science Committee chairman Sherwood Boehlert, R-N.Y., would be interested in leading another delegation, committee spokesman Joe Pouliot said. The leader of the Senate delegation, Kay Bailey Hutchison, R-Texas, also would be willing to try again, her spokesman said. Hutchison is chairwoman of the Senate Commerce Committee's science and space subcommittee. Web posted. (2005). [Congress Takes Costly Trip to See Shuttle [Online]. Available WWW: <http://www.ap.com/> [2005, July 15].]

### **Discovery tanks drained; no try Sunday**

NASA engineers drained the tanks onboard Discovery that hold liquid hydrogen and liquid oxygen for the shuttle's fuel cell system early today, a move that means the agency will not be making a launch attempt Sunday. We expect an announcement later today on what the new earliest possible launch date is for the first mission since Columbia. The fuel cell system generates electricity to power all spaceship systems during flight. The tanks are located beneath the lining of the shuttle's 60-foot-long cargo bay. Mission managers had said

Thursday that it was unlikely engineers would be able to find and fix a problem with fuel gauges in the shuttle's external tank in time to launch Sunday. The off-loading of liquid hydrogen and liquid oxygen from the fuel cell tanks, meanwhile, puts NASA in a position where the agency would not be able to complete all work necessary to have Discovery ready to launch on Sunday. Engineers are meeting at Kennedy Space Center now to plot out a fuel gauge troubleshooting plan. A technical review of the plan is scheduled for 12:30 p.m. The Mission Management Team will meet at 3:30 p.m. to decide on a course of action. Web posted. (2005). [Discovery tanks drained; no try Sunday [Online]. Available WWW: <http://www.floridatoday.com/> [2005, July 15].]

**July 18: NASA to outline fuel sensor plan**

Discovery's astronauts are heading home to Houston on Tuesday, but just for a day. They will be back at Kennedy Space Center in time for any launch attempt the agency might make later this week. Meanwhile, engineers continue meeting Monday in a bid to resolve the fuel sensor problem that scrubbed last week's launch. A weekend of work has not solved a mysterious fuel-sensor problem that postponed last week's shuttle launch. Sunday night, NASA remained unable to say when Discovery might be ready to blast off on the first shuttle mission since the 2003 Columbia disaster. "At this point, they have not found anything throughout the troubleshooting that would indicate why the sensor failed," Kennedy Space Center's Jessica Rye said. Managers, engineers and technicians were meeting late Sunday to go over everything they tried during the weekend and to discuss what to do next. Web posted. (2005). [NASA to outline fuel sensor plan later today [Online]. Available WWW: <http://www.floridatoday.com/> [2005, July 18].]

**Space Adventures, Ltd., open KSC office**

Space Adventures, Ltd., the world's leading space experiences company, announced today the establishment of a Suborbital Vehicle and Spaceport Development office at the Kennedy Space Center. The office will coordinate the worldwide effort in finalizing the company's suborbital spaceflight program and will be located at the Center for Space Education building, the home of the Astronaut Memorial Foundation. Space Adventures, the only company to have successfully launched private space explorers to the International Space Station, is headquartered in Arlington, Va. with offices in Moscow and Tokyo. It offers a variety of programs such as Zero-Gravity and MiG flights, cosmonaut training, spaceflight qualification programs and reservations on future suborbital spacecrafts. The company's advisory board comprises Apollo 11 moonwalker Buzz Aldrin, shuttle astronauts Kathy Thornton, Robert (Hoot) Gibson, Charles Walker, Norm Thagard, Sam Durrance, Byron Lichtenberg, Pierre Thuot and Skylab astronaut Owen Garriott. Web posted. (2005). [Governor Bush and Space Adventures Announce the Opening of a Suborbital Vehicle and Spaceport Development Office [Online]. Available WWW: <http://www.spaceadventures.com/> [2005, July 18].]

**NASA Is Pushing for a Shuttle Liftoff**

NASA is examining several ways to launch the space shuttle Discovery next week even if it has not completely solved the puzzle of the faulty fuel level sensor that caused the launching to be scrubbed last week, officials said yesterday. Shuttle program officials said engineers worked through the weekend on the problem. "I want one of those 'eureka' moments," said N. Wayne Hale, the deputy manager of the shuttle program. The original designer of one of the suspect pieces of equipment, known as the point sensor box, has come out of retirement

to help, Mr. Hale said. But so far, an eureka moment has eluded NASA, and officials are looking for ways to return to flight before the current launching window closes on July 31. If they are unable to launch by then, the next window opens on Sept. 9. Officials said that if they did not find the source of the problem, they would consider filling the shuttle's external tank as early as next Tuesday with liquid hydrogen and liquid oxygen fuel, a procedure known as a tanking test. That test would come closest to duplicating the conditions under which the sensor failed two and a half hours before launching last Wednesday. If the system works as hoped with the tanks loaded, the agency might make the highly unusual move of putting the astronauts on the shuttle the next day and launching, if other safety criteria are met, Mr. Hale said. Web posted. (2005). [NASA Is Pushing for a Shuttle Liftoff [Online]. Available WWW: <http://www.nytimes.com/> [2005, July 19].]

### **July 20: NASA to move Atlantis for September launch**

While NASA hopes to get shuttle Discovery cleared for flight next week on the first post-Columbia mission, workers at Kennedy Space Center will move Atlantis from its hangar to the Vehicle Assembly Building later today for mating with an external fuel tank and solid rocket boosters. Atlantis is being prepped to launch in September to haul supplies to the space station and conduct more shuttle demonstration tests. Web posted. (2005). [NASA to move Atlantis for September launch [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, July 20].]

### **NASA fights clouds for view**

Shuttle weather forecasters have long considered whether clouds might endanger a launch. Now, they're looking at clouds to see whether they block cameras. Meteorologists working with NASA and the Air Force came up with a way to predict the chance of clear views. "We've essentially doubled the number of cameras on the ground," shuttle launch director Mike Leinbach said. "Early on, we realized, well, they don't do you any good if you can't see through clouds." Three-dimensional cloud measurements would have been too costly, and human observations would have been too subjective. There are 10 camera sites, five north of the Kennedy Space Center launch pads and five south. Each has an extra camera that will be running, just in case. The meteorologists are confident they can predict whether clouds will get in the way of the critical views necessary for those first two launches. Web posted. (2005). [NASA fights clouds for view [Online]. Available WWW: <http://www.floridatoday.com/> [2005, July 20].]

### **Shuttle crew takes quarantine break**

Engineers kept testing and meeting at Kennedy Space Center on Tuesday, trying to solve Discovery's fuel sensor problem, while the astronauts enjoyed several hours out of quarantine. Eileen Collins and her crew were released from quarantine until late afternoon Tuesday, so they'll still be eligible for a potential launch attempt next Tuesday. Pilot Jim Kelly, Wendy Lawrence, Steve Robinson and Andy Thomas flew to Houston; then Kelly flew back, she said. The others stayed in Florida. All are expected to gather at Johnson Space Center in Houston on Thursday for a simulation of their ascent to orbit. They'll stay at the new crew quarters there Thursday night, and then return to Kennedy Space Center on Friday. Meanwhile, engineers and managers are still trying to figure out why a liquid hydrogen sensor in Discovery's external tank failed in a test during the countdown a week ago. NASA hasn't ruled out a fueling test before a launch attempt. The supercold propellants in the external tank may play some role in the function of the sensors in the tank

and the associated electronics on the orbiter. Whether it's a test or a launch attempt, it won't take place earlier than Tuesday. Web posted. (2005). [Shuttle crew takes quarantine break [Online]. Available WWW: <http://www.floridatoday.com/> [2005, July 20].]

### **2 boaters hurt near Kennedy Space Center**

Brevard County Fire Rescue crews responded today to reports of a man and woman injured after an explosion on a boat along Banana Creek - not far from Vehicle Assembly Building at the Kennedy Space Center. The accident was reported to rescue crews about 8:25 a.m. It occurred just north of State Road 405 and about three miles from the space shuttle landing strip. "All we know is that there was an explosion on the boat," said Bruce Buckingham, a spokesman for the space center. Kennedy Space Center security officers responded immediately to the rescue effort. Public boating is allowed in the area; however access to the shoreline, part of the space center property, is restricted, Buckingham said. Banana Creek connects to the Indian River, which contains the Intracoastal Waterway. Several rescue boats were able to reach the injured boaters. The Brevard County Sheriff's helicopter was also called to the area. A medical helicopter from Holmes Regional Medical Center in Melbourne was placed on alert. No information was immediately available on the condition of the couple. Web posted. (2005). [2 boaters hurt near Kennedy Space Center [Online]. Available WWW: <http://www.floridatoday.com/> [2005, July 20].]

### **July 21: NASA honors former astronaut John Young**

Space pioneer John Young has been named a NASA Ambassador of Exploration. The award along with a commemorative moon rock, were presented Wednesday during a ceremony at the Houston Museum of Natural Science. The awards remain the property of the National Aeronautical and Space Administration, but are displayed at a museum or educational institution of the recipient's choice. NASA says the goal of the awards is to inspire a new generation of explorers. Young was the first human to fly in space six times and launch seven times; six from Earth and once from the moon. He is the only astronaut to pilot four different types of spacecraft, flying in the Gemini, Apollo and Space Shuttle programs. Young is also the longest serving astronaut in history. The retired U.S. Navy captain and test pilot joined NASA in 1962 and retired last December. Young served as chief of NASA's Astronaut Office for 13 years, and served eight years as an assistant and associate director of NASA's Johnson Space Center. Web posted. (2005). [NASA honors former astronaut John Young [Online]. Available WWW: <http://www.washingtontimes.com/> [2005, July 21].]

### **July 28 next rocket launch**

A Boeing Delta 4 rocket, with the Geostationary Operational Environmental Satellite-N (GOES-N) weather satellite for NASA and the National Oceanic and Atmospheric Administration, is scheduled to launch July 28<sup>th</sup> from Pad 37 at Cape Canaveral Air Force Station in Florida. Launch window is to be announced. Web posted. (2005). [July 28 next rocket launch [Online]. Available WWW: <http://www.washingtontimes.com/> [2005, July 21].]

### **Discovery shoots for launch Tuesday morning**

NASA will try to launch shuttle Discovery and seven astronauts on Tuesday morning after a week of engineering detective work to solve a mysterious fuel-sensor failure that stopped the first countdown last Wednesday. Sensor tests and modifications will continue today and



Friday, with a three-day countdown beginning just after noon Saturday. NASA does not plan another fueling test before launch, but will repeatedly test the sensors during the countdown. If the sensors perform as expected, NASA will try to launch Discovery at 10:39 a.m. Tuesday. Plans are not final, but NASA's backup launch attempts -- in the case of minor technical glitches or bad weather -- would be July 27, July 29 and July 31. Additional launch tries in the first few days of August are under consideration. "Right now, we think we have eliminated all of the common causes that we think could do this," shuttle program manager Bill Parsons said. If anything unexpected happens during the countdown, Parsons said, "then we'll have a scrub." The sensors near the bottom of the liquid hydrogen tank send signals to the shuttle's computers, indicating whether there is rocket fuel left. If the sensors indicate the tank is empty, the computer safely shuts down the main engines so they do not run dry. Sensor failure could leave the engines running on empty, stressing the fast-moving parts so much they would break apart and destroy the ship. The opposite failure is problematic as well. If two of the sensors wrongly indicate the tank is empty before it really is, the computers could shut off the engines too soon, leaving the shuttle crew in a perilous abort or emergency landing situation. Current launch rules require all four sensors in the liquid hydrogen tank to work. Web posted. (2005). [Discovery shoots for launch Tuesday morning [Online]. Available WWW: <http://www.floridatoday.com/> [2005, July 21].]

#### **Woman injured after boat explodes**

A 58-year-old woman was critically injured Wednesday in an explosion that ripped apart her fishing boat on the Indian River near Kennedy Space Center. The fuel tank of the 18-foot boat apparently exploded about 8:25 a.m. Wednesday, seriously injuring the woman but not her husband, officials said. It happened about 100 yards from the Indian River Lagoon shoreline of Kennedy Space Center. The explosion was not considered a security breach, NASA spokesman Bruce Buckingham said. Web posted. (2005). [Woman injured after boat explodes [Online]. Available WWW: <http://www.floridatoday.com/> [2005, July 21].]

#### **NASA's Shuttle Crew Returns to KSC Tomorrow For Launch**

The crew of Space Shuttle Discovery's Return to Flight mission (STS-114) will return to NASA's Kennedy Space Center (KSC) at 11:30 a.m. EDT Friday, July 22. The seven astronauts led by Commander Eileen Collins, left KSC over the past couple of days to participate in prelaunch training at NASA's Johnson Space Center, Houston. Collins is expected to make a brief statement to the media after arrival. Her comments and arrival activities will be carried live on NASA Television. The crew is scheduled to arrive via their T-38 aircraft at KSC's Shuttle Landing Facility (SLF). The crew includes Pilot James Kelly and Mission Specialists Soichi Noguchi, Stephen Robinson, Andrew Thomas, Wendy Lawrence and Charles Camarda. ["NASA's Shuttle Crew Returns to KSC Tomorrow For Launch, **NASA News Release #63-05**, July 21, 2005.]

#### **July 22:**

#### **Expendable Launch Vehicle Status Report**

Mission: Mars Reconnaissance Orbiter (MRO); Launch Vehicle: Lockheed Martin Atlas V 401; Launch Pad: Space Launch Complex 41 (SLC-41), Cape Canaveral Air Force Station; Launch Date: August 10, 2005; Launch Window: 7:54 to 9:39 a.m. EDT. The Launch System Verification Test, spacecraft power-on testing and fueling is complete. A spin test to ensure balance of the spacecraft was conducted July 12. The mate of the MRO spacecraft to the launch vehicle payload adapter should be completed this week. The MRO will be encapsulated into the Atlas fairing beginning on Monday. On July 28, the MRO will be

transported from the Payload Hazardous Servicing Facility to the Vertical Integration Facility at SLC-41, where it will join the Atlas V for the last phase of launch preparations. This is the first government-civil launch of an Atlas V. NASA technical efforts for certification of the Atlas V 401 launch vehicle are in the final stages. A second countdown wet dress rehearsal with the launch vehicle fully fueled was conducted on July 19. During the July 7, T-4 minute hold wet dress rehearsal, the Centaur liquid hydrogen (LH2) tank experienced a very slow, but atypical pressure oscillation. While the pressure values were not breaking operational limits, the data showed a possibility they could be violated during the remaining countdown. The Centaur LH2 Self Regulating Vent Valve (SRV) was changed and is operating properly under ambient temperature conditions. The rehearsal was necessary to test this new valve under cryogenic conditions. Mission: Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observation and CloudSat (CALIPSO/CloudSat); Launch Vehicle: Boeing Delta II 7420 DPAF; Launch Pad: Space Launch Complex 2 (SLC2), Vandenberg Air Force Base (VAFB), Calif.; Launch Date: September 29, 2005. The CALIPSO team is scheduled to return to VAFB July 26 to start spacecraft launch activities. The CloudSat team is scheduled to return to VAFB in early August to begin battery reconditioning. CALIPSO and CloudSat are highly complementary and together will provide never-before-seen, 3-D perspectives of how clouds and aerosols form, evolve, and affect weather and climate. CALIPSO and CloudSat will fly in formation with three other satellites in the A-train constellation to enhance understanding of our climate system. KSC News Center (2005). **Expendable Launch Vehicles Status Report E05-007** [Online]. Available E-mail: [ksc@newsletters.nasa.gov](mailto:ksc@newsletters.nasa.gov) [2005, July 22].]

#### **Return to Flight Launch Countdown Begins Again Saturday**

NASA will begin the countdown for the second Return to Flight launch attempt of Space Shuttle Discovery at noon EDT, July 23, 70 hours before the targeted liftoff. On mission STS-114, Discovery's seven-member crew will test new equipment and procedures to increase the safety of the Space Shuttle and deliver supplies to the International Space Station. NASA's Kennedy Space Center (KSC) launch team will conduct the countdown from Firing Room 3 of the Launch Control Center. The countdown includes nearly 28 hours of built-in hold time, leading to a preferred launch time at about 10:39 a.m. EDT July 26. The launch opportunity lasts for about five minutes. This mission is the 114th Shuttle flight and 17th U.S. flight to the Station. The 12-day mission has a planned KSC landing at approximately 5:46 a.m. EDT, Aug. 7. ["Return to Flight Launch Countdown Begins Again Saturday," **NASA News Release #05-198**, July 22, 2005.]

#### **Lawmakers endorse Bush's space vision**

The House Friday overwhelmingly endorsed President Bush's vision to send man back to the moon and eventually on to Mars as it passed a bill to set NASA policy for the next two years. The bill passed 383-15 after a collegial debate in which lawmakers stressed their commitment to not just Bush's ambitious space exploration plans but also to traditional NASA programs such as science and aeronautics. There is some tension between Congress and the White House over the balance between Bush's vision for space exploration and other NASA initiatives. Originally, the measure would have shifted \$1.3 billion in funds from exploration to other NASA programs. But after administration objections lawmakers added the money back to the budget for exploration during floor debate. That was done by adding to the bill's bottom line -- now at \$34.7 billion -- not at the expense of science and aeronautics. Democratic Rep. Bart Gordon of Tennessee said Bush's ambitious Moon and

Mars missions "should not be done by cannibalizing other NASA missions." The bill is the first NASA policy measure -- its budget is funded by a separate bill -- to pass the House in five years. It advanced as the space agency tries to rebound from the Columbia disaster in February 2003 with the launch of the space shuttle Discovery next Tuesday. The measure permits but does not explicitly endorse retiring the space shuttle fleet by 2010, as the administration would like to do. It directs the agency to launch a new crew exploration vehicle -- which would lack the full capabilities of the shuttle but could travel to the international space station -- as close to 2010 as feasible. NASA's plans call for a new vehicle to be ready by 2014, which unnerves lawmakers who do not want the United States to have to rely on other countries to catch a lift to the space station. A companion Senate measure approved by the Commerce, Science and Transportation panel last month would bar NASA from retiring the shuttle before a replacement vehicle is ready. Web posted. (2005). [Lawmakers endorse Bush's space vision [Online]. Available WWW: <http://www.floridatoday.com/> [2005, July 22].]

### **Shuttle Atlantis Takes a Short Trip**

Despite two delay-filled days, the shuttle Atlantis is safely inside NASA's massive Vehicle Assembly Building (VAB) after a brief hop forward in its long road toward space. Shuttle engineers rolled the Atlantis orbiter into the VAB, where it will be mated to its external tank-solid rocket booster launch stack for NASA's STS-121 mission, at about 10:20 a.m. EDT (1420 GMT) Friday. Landing gear glitches plagued Atlantis' rollover from its Orbiter Processing Facility (OPF) to the VAB. Initially slated to rollover in the morning hours of July 20, Atlantis did not start moving until about 9:41 a.m. EDT (1341 GMT) Friday, and five minutes later breached the outer doors of its OPF hangar. On July 20, engineers found a faulty tire pressure sensor connection between Atlantis' front left tire and the orbiter, prompting engineers to change out the tire, which NASA officials said was an easier fix than repairing the connector itself. Additional problems retracting Atlantis landing gear, which must be tucked inside the orbiter during rollover operations, also delayed the event, NASA officials added. "This is great," a NASA shuttle worker said as the orbiter rolled past photographers, reporters and excited NASA employees, "especially after all this delay." NASA has tapped Atlantis as its second shuttle to launch since the 2003 Columbia disaster. Its STS-121 mission, set to launch in September with astronaut Steven Lindsey in command, is the final test flight to shakedown new orbiter inspection tools and methods, as well as external tank modifications, before the space agency resumes major construction missions to complete the International Space Station (ISS). The mission will follow the STS-114 spaceflight of Discovery, which is slated to launch at 10:39 a.m. EDT (1439 GMT) on July 26. Atlantis is expected to serve as a rescue ship for the STS-114 astronauts in the unlikely event that Discovery is severely damaged during flight and its crew forced to take refuge aboard the ISS. The orbiter will hold updated cameras and sports a new, 50-foot (15-meter) boom tipped with cameras and laser sensors to probe vulnerable heat-resistant areas for damage during flight. During a spacewalk, an STS-121 astronaut will ride the end of the boom, which will be attached to the tip of Atlantis' robotic arm, to test its dynamics with such a load. Web posted. (2005). [Shuttle Atlantis Takes a Short Trip [Online]. Available WWW: <http://www.space.com/> [2005, July 22].]

### **July 23:**

### **Countdown clocks ticking again for NASA's return to space**

NASA today started the countdown again to launch shuttle Discovery after extensive troubleshooting to fix the faulty sensor that scuttled the first attempt. Liftoff is set for 10:39

a.m. EDT Tuesday from Kennedy Space Center, with forecasters predicting a 60 percent chance of favorable weather. Discovery's astronauts arrived in Florida on Friday, saying they hope for dry skies when they climb aboard their spaceship again. The main weather issues for Tuesday are isolated showers and clouds in the launch area, said shuttle weather officer Kathy Winters. She said Tropical Storm Franklin, a concern earlier in the week, has been written off as a threat for the launch. Once in orbit, Discovery's crew is to dock at the international space station to deliver supplies and make a series of spacewalks. The mission is NASA's first shuttle flight in the more than 2 years since seven astronauts died aboard Columbia in 2003. Discovery already was fueled and just hours from liftoff July 13 when a fuel sensor failed to respond to computer commands during routine pre-launch testing. NASA called off the launch to fix the sensor. Web posted. (2005). [Countdown clocks ticking again for NASA's return to space [Online]. Available WWW: <http://www.orlandosentinel.com/> [2005, July 23].]

### **Launch tickets on sale**

The Kennedy Space Center Visitor Complex reopened ticket sales Friday for viewing Tuesday's scheduled launch of shuttle Discovery. But the pace of sales was so brisk, a spokesman wasn't sure how many tickets would be left by today for launch viewing from the visitor complex or the U.S. Astronaut Hall of Fame. The visitor complex had sold 10,000 tickets for the scheduled July 13 launch, which was delayed by technical problems. For Tuesday's launch, it expected to sell an additional 2,000 tickets. Dan LeBlanc, chief operating officer of Delaware North Companies Parks & Resorts at Kennedy Space Center Inc., which operates the KSC Visitor Complex, said the tickets became available mainly because he had leftover capacity from the first launch attempt. He made a conservative estimate of how many people would not return for another launch, and there were some hardship refunds. The KSC Visitor Complex opens at 6 a.m. Tuesday. The launch is scheduled for 10:39 a.m. Web posted. (2005). [Launch tickets on sale [Online]. Available WWW: <http://www.floridatoday.com/> [2005, July 23].]

### **July 24: Fewer visitors expected Tuesday**

Tourism revenue from Tuesday's scheduled launch of the shuttle Discovery is projected to be millions of dollars less than was predicted for July 13, when the launch was scrubbed because of technical problems. Still, Rob Varley, executive director of the Space Coast Office of Tourism, estimates that people coming for Tuesday's launch will spend \$8 million to \$10 million while they're in Brevard County at local hotels, restaurants, bars and stores. "I think about 150,000 to 175,000 people will come to see the launch, and about 10,000 will stay in hotels," Varley said. "They're going to come back, and drop money in restaurants. Most people will stay for lunch, and the key is a lot of day-trippers won't fight the traffic to go back." Tuesday's launch is scheduled for 10:39 a.m. The July 13 launch was scheduled for 3:51 p.m., with the scrub coming about 1:30 p.m. that day. Web posted. (2005). [Fewer visitors expected Tuesday [Online]. Available WWW: <http://www.floridatoday.com/> [2005, July 24].]

### **Shuttle managers outline plans to monitor fuel sensors**

NASA managers today cleared the shuttle Discovery for another launch try Tuesday, weather permitting, on a critical flight to service and resupply the international space station. The decision came after senior managers agreed on a strategy that would permit blastoff even if - and only if - the shuttle experiences a fuel sensor problem like the one that

grounded the ship July 13. "I've delved into this situation as thoroughly as my intellect permits," NASA Administrator Michael Griffin told reporters late today. "And I'm quite comfortable with where we are. ... Even if (a sensor failure) does recur, we're still two-failure tolerant, so it's not a safety of flight issue." Asked if he was concerned about any public perception NASA had "launch fever" and was not giving the sensor issue the attention it might deserve, Griffin said "I think what you want coming out of the Columbia accident and the loss of Columbia and the soul-searching examination that NASA has undertaken since then, what you want of NASA is that we make the right technical decisions, that we do the right thing to the extent that we can figure that out. Which is hard." Forecasters continue to predict a 60 percent chance of acceptable weather during Discovery's five-minute launch window. The window opens at 10:39:00 a.m. - the same time Columbia blasted off on its final mission two-and-a-half years ago - and closes at 10:43:56 a.m. The forecast is 60 percent "go" Wednesday and 70 percent favorable Thursday. But the real question mark is how Discovery's fuel sensors will operate when the shuttle's external tank is loaded with supercold rocket fuel early Tuesday. Despite exhaustive, around-the-clock tests, engineers were never able to find the problem that caused hydrogen main engine cutoff - ECO - sensor No. 2 to "fail wet" during the July 13 launch attempt. The ECO sensors are part of a backup system that ensures the shuttle's main engines shut down normally before the tank runs out of fuel. NASA launch rules require all four ECO sensors to be operating before a countdown can proceed. But in a routine pre-launch test during Discovery's first launch try, ECO sensor No. 2 continued indicating it was wet after computer commands were sent to simulate a dry tank. The countdown was called off and engineers mounted a major effort to track down the cause of the problem. Engineers plan to begin pumping liquid oxygen and hydrogen rocket fuel into Discovery's external tank around 12:30 a.m. Tuesday. Two minutes after the hydrogen ECO sensors are submerged in super-cold hydrogen, engineers will begin sending commands to simulate a dry tank to make sure none of the sensors have "failed wet." Then, just before the crew straps in around 7:19 a.m., the commanding will stop and the main countdown computer will carry out a series of checks to verify the sensors change state, from wet to dry and back again, on command. A final check is planned about a half-hour before liftoff. "We are going to continuously check the validity of the signal from the sensor all the way to the orbiter computers during the tanking (process) so if at any time any one of these circuits fails, we will know about it, we'll be able to isolate time-wise when it happened, we'll be able to know what was going on in the ship, either electrically or thermally, so that will give us a clue to where the problem might lie," Hale explained. To help isolate the problem during fuel loading, engineers swapped the wiring between ECO sensors 2 and 4. If a problem shows up during fueling with sensor No. 4, engineers will have high confidence the problem is in the sensor itself or somewhere in the wiring between the sensor and the point sensor box. If sensor No. 2 misbehaves, they will have high confidence the problem is in the point sensor box. Because electrical interference could still be a contributing factor, engineers will conduct checks during the final hours of the countdown to isolate any such signatures. Web posted. (2005). [Shuttle managers outline plans to monitor fuel sensors [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, July 24].]

**July 25: Space Shuttle Processing Status Report**

Discovery (OV-103); Mission: STS-114 - 17th ISS Flight (LF1); Payload: Multi-Purpose Logistics Module; Location: Launch Pad 39B; Launch Date: July 26, 2005 at 10:39 a.m. EDT; Crew: Collins, Kelly, Noguchi, Robinson, Thomas, Lawrence and Camarda;



Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Space Shuttle Discovery is at Launch Pad 39B undergoing final inspections and preparations for tomorrow's Return to Flight launch attempt at 10:39 a.m. to the International Space Station. The countdown clock is in a scheduled built-in hold at T-11 hours (Time Minus 11 hours) and will pick up at 5:44 p.m. EDT tonight. Loading of the Power Reactant Storage Distribution system is complete. This is the operation where the liquid hydrogen and liquid oxygen for the fuel cells is loaded on Discovery. The fuel cells provide power to the electrical systems while the Shuttle is in orbit. The byproduct is drinking water. The Rotating Service Structure will be rotated away from Discovery this afternoon at 1:30 p.m. in preparation for launch. The STS-114 crew arrived at Kennedy Space Center on Friday. Since Friday, Commander Eileen Collins and Pilot Jim Kelly have been practicing orbiter approaches and landings in the Shuttle Training Aircraft. The crew is scheduled to wake up just after midnight tonight and will leave Crew Quarters for the launch pad at 6:49 a.m. tomorrow. Solid Rocket Booster retrieval ships Liberty Star and Freedom Star departed from KSC yesterday and are traveling to their location for launch, about 140 nautical miles downrange of the launch pad. Today, the L-1 day weather forecast shows that the probability of weather prohibiting the launch of Discovery is 40 percent, with the probability of weather prohibiting tanking at only five percent. Temperature at launch time is forecast at 84 degrees and a relative humidity of 77 percent. Owner-press-release. (2005). **Space Shuttle Processing Status Report 05-034** [Online]. Available E-mail: [owner-press-release@spinoza.public.hq.nasa.gov](mailto:owner-press-release@spinoza.public.hq.nasa.gov) [2005, July 25].]

### **NASA to Launch Despite Sensor Problem**

NASA said it will allow Discovery to lift off Tuesday on the first post-Columbia shuttle flight even if a baffling fuel-tank sensor problem resurfaces. NASA workers rewired some of the sensors and made other electrical repairs after the failure forced the space agency to postpone the shuttle's launch while astronauts were boarding Discovery on July 13. The space agency's own launch rule – in place since the 1986 Challenger disaster – requires that all four hydrogen fuel gauges in the external tank be working properly, though only two are actually needed. Engineers still do not fully understand the reason for the failure. But NASA will go ahead with the rescheduled launch at 10:39 a.m. Tuesday if the problem doesn't recur or if it is found only in the two sensors that have been rewired, Wayne Hale, deputy manager of the shuttle program, said Sunday. "If the problem recurs ... we're going to do some more tests just to make sure we understand what is causing this to happen and if we're comfortable that we have a good understanding, then we can go fly," Hale said. It will be the first shuttle flight since the Columbia disaster 2 1/2 years ago. NASA Administrator Michael Griffin said he is comfortable with the decision and even hopes the problem recurs to help pinpoint the source of the trouble. He acknowledged that the public might perceive that the space agency is rushing to launch, but insisted it was the right technical judgment. "It's not a safety-of-flight issue," Griffin said. Although the focus of NASA's attention has been on the sensor, rain and clouds may end up causing more concern on launch day. Forecasters put the odds of good launch weather Tuesday at 60 percent. Additionally, the weather at the overseas emergency landing sites is not looking good. Web posted. (2005). [NASA to Launch Despite Sensor Problem [Online]. Available WWW: <http://www.washingtonpost.com/> [2005, July 25].]

### **KSC workers dress loud, proud for launch**

United Space Alliance workers are proud of the work they've done to get Discovery in the air, and they're not afraid to show it. Just check out the loud, flowered shirts they'll be wearing on launch day. And they're hoping other Brevard County residents will share their return-to-flight pride by donning Hawaiian shirts. Loud and Proud Day goes back to 1987, the year after the Challenger accident, said Melanie Bailey, who has worked at Kennedy Space Center since 1980, where she is a production control lead for USA. "It started out back then on Friday," she said. "Then it went to every launch day." The habit waned a bit in the '90s, though Bailey said some KSC old-timers never stopped. After the 2003 Columbia accident, the practice was revived as a way of showing camaraderie. It has now spread across the space center and beyond. "We've even had people in Houston buy shirts," Bailey said. While USA workers order matching shirts from a company in Hawaii -- including shirts for the astronauts -- Bailey said people can wear any loud top they want. The louder the better. Bailey thinks it would be great if others along the Space Coast would dress in loud colors Tuesday. "I think it would be kind of cool," she said. Web posted. (2005). [KSC workers dress loud, proud for launch [Online]. Available WWW: <http://www.floridatoday.com/> [2005, July 25].]

**July 26: Shuttle Launches as Planned, Starting 12-Day Journey in Space**  
With a stuttering roar that shook the air for miles around, the shuttle Discovery lifted off this morning. The launching, at 10:39:00 into a startlingly blue sky, is a milestone for NASA, which has struggled for two and a half years to find and fix the problems that caused the loss of the shuttle Columbia and its crew of seven astronauts in February 2003. In the moments before the final countdown began, each group with responsibility for the shuttle within NASA gave its recommendation to go forward, ending with N. Wayne Hale, the deputy manager of the shuttle program, who said, "we are go for launch." The launch director, Michael Leinbach, then addressed the crew: "Good luck, godspeed - and have a little fun up there." Minutes later, the shuttle rose into the morning sky on a column of fire and smoke that flushed birds out of the surrounding Merritt Island National Wildlife Refuge and set off car alarms in parking lots across the space center. NASA officials said experts were studying what appeared to be images of objects falling away during the ascent but that it was too early to know whether or not it is a serious matter. "The guys are going over that frame by frame," said N. Wayne Hale, the deputy manager of the shuttle program. The 13-day mission will be a busy one for the crew. As the shuttle approaches the International Space Station, it will be examined closely by the station crew of Sergei K. Krikalev, the Russian commander, and John L. Phillips, the American flight engineer, in a new and somewhat risky maneuver. Discovery is carrying tons of supplies that will have to be transferred from the shuttle to the station; two and a half years worth of broken equipment and trash will be carried back in the shuttle's payload bay. About 600 feet from the station, Colonel Collins will stop the shuttle and execute a tricky pirouette maneuver that rotates the 100-ton orbiter nose up 360 degrees. While the bottom of the orbiter is facing the station, the station crew will take detailed pictures. After the maneuver, which should take about eight minutes, the shuttle will dock with the station, on the third day of the mission. The shuttle crew will also take part in an additional inspection of the shuttle's thermal protection system using the shuttle's robotic arm; on the ground, mission controllers will be going over the vast amount of data from launching cameras and the on-orbit inspections to see if the shuttle sustained damage during launching, and whether the efforts NASA has made to reduce launching debris have been effective. Spacewalks will begin on the fifth day of the mission. Dr. Robinson and Mr.

Noguchi will take three spacewalks, each planned to take six and a half hours, in which they will test new techniques for repairing the shuttle's protective panels. They will install a control gyroscope in the space station to replace one that failed in June 2002, and restore power to another one that has not worked since the failure of a circuit breaker in March. They will also install a large tool cabinet on the outside of the station. During the overnight preparations for launch, there was no sign of the sensor troubles that bedeviled NASA's last attempt to launch. The first lady, Laura Bush, attended the launch, as well as Gov. and Mrs. Jeb Bush and their daughter, Noelle Bush. The number of government officials was somewhat smaller than the one that gathered for the July 13 attempt, when 44 members of Congress flew to Florida to attend. Members of the families of the astronauts killed in the Columbia and Challenger disasters attended as well. The crew, Commander Eileen Collins and her six crewmates - pilot James Kelly, flight engineer Robinson, Soichi Noguchi, Andrew Thomas, Wendy Lawrence and Charles Camarda - began to enter the shuttle cabin at 7:17. During the July attempt, many of the crew members took a moment on camera before entering the cabin to hold up banners and send silent signs to family and friends; this time there was less mugging, though Mr. Camarda, who grew up in Queens, N.Y., held up a sign reading, "Hi, Dad." Soichi Noguchi, who is from Japan, waved and held up a sign that, on one side, was a parody of the "get out of jail free" from the Monopoly game; It read "get out of quarantine free." The other side of the sign said "Out to Launch." He then unfurled a banner of the Japanese Aerospace Exploration Agency. "Today Mother Nature smiled on us and I also think that the Columbia crew smiled on us," William F. Readdy, the associate administrator for space operations, said at a news conference. "We owe them and their families a debt of gratitude. The entire NASA family does," he said. Web posted. (2005). [Shuttle Launches as Planned, Starting 12-Day Journey in Space [Online]. Available WWW: <http://www.nytimes.com/> [2005, July 26].]

#### **Fighter jets divert small plane after zone violated**

Fighter jets patrolling the skies around Kennedy Space Center diverted one private plane that crossed over into the no-fly zone imposed around the launch site of the shuttle Discovery. Officials said a Piper Cub-J3 was spotted by radar west of the space center within the 40-mile flight restriction zone set up as a security precaution about 1:33 a.m. The plane, diverted by two F-16s, crossed the restriction zone sometime between 10 a.m. and the release of the shuttle's 9-minute launch hold. "If they had been any closer they would have pulled on the countdown," said Mike Kucharek, spokesman for NORAD, the military strategic command agency coordinating air security for the shuttle flight. "But it was far out enough that it didn't affect the launch. The F-16s dropped three flares to get the pilot's attention. As soon as they saw the flares they left the area," he said. The plane landed in a private airfield in DeLand, officials said. NORAD assigned three pairs of F-16 fighter jets to enforce the flight restriction zone for private aircraft. The fighter jets were also accompanied by an AWACS Boeing 767, a military aircraft typically used to monitor air traffic and radar. Web posted. (2005). [Fighter jets divert small plane after zone violated [Online]. Available WWW: <http://www.floridatoday.com/> [2005, July 26].]

#### **President Wishes Discovery Safe and Successful Mission**

Statement of President George W. Bush: "On behalf of all Americans, I wish the crew of the Space Shuttle Discovery a safe and successful mission. Today's launch marks NASA's return to flight following the tragic loss of the Space Shuttle Columbia crew in February 2003. I thank the men and women of NASA who have dedicated themselves to putting our space

program back on track. Our space program is a source of great national pride, and this flight is an essential step toward our goal of continuing to lead the world in space science, human space flight, and space exploration." Web posted. (2005). [President Wishes Crew of Space Shuttle Discovery Safe and Successful Mission [Online]. Available WWW: <http://www.spaceref.com/> [2005, July 26].]

### **Science Democrats: Great Day for NASA and Shuttle Discovery**

U.S. House Science Committee Ranking Member Rep. Bart Gordon (TN) and Space and Aeronautics Subcommittee Ranking Member Rep. Mark Udall (CO) today praised the NASA crew, scientists and support staff on a successful return to flight with the Space Shuttle Discovery. "Seems the second time's the charm today," said Rep. Gordon. "Our prayers are with Commander Collins and her crew these next 12 days as they work to complete their mission and return home safely. What we learn on this mission will help us to better address future challenges and make future space flights safer. This tireless team of NASA engineers, scientists and support staff deserve our congratulations," added Rep. Gordon. "The successful launch of the Discovery Space Shuttle is an event NASA and the American people should feel proud of. Returning to flight will allow the space program to move forward with servicing Hubble, completing the International Space Station, and advance the return of humans to the moon and beyond," concluded Rep. Udall. "I congratulate all those who have worked to return Americans to space." The House Science Committee maintains jurisdiction over NASA and has closely monitored activities in preparation for today's historic event. NASA Administrator Dr. Mike Griffin testified before Committee Members recently and reiterated NASA's readiness to resume shuttle flights. Web posted. (2005). [Science Democrats: Great Day for NASA and Shuttle Discovery [Online]. Available WWW: <http://www.spaceref.com/> [2005, July 26].]

### **Launch managers celebrate with traditional NASA meal**

Fifteen minutes after the shuttle Discovery rocketed America's space dreams back into orbit, the men and women pushing all the right buttons were in the mood to celebrate, NASA-style. Open up the tins of beans and corn bread. "We have a shuttle that works!" Launch Director Mike Leinbach bellowed across the Firing Room at NASA's Launch Control Center on Tuesday. Scores of engineers and other launch officials still manning their stations, still wearing their headsets, and still looking serious before their monitors finally broke out in thunderous applause -- 21/2 years after the Columbia tragedy halted the shuttle program. "I want to thank you from the bottom of our hearts for all Americans, for all the people of the world, for the great work you've done," Leinbach said. "Two and a half years ago, you set out to find the problems, fix the problems and fly again. Ladies and gentlemen, we have flown again." The thanks and congratulations poured directly into the launch team from others, including first lady Laura Bush, who rushed over to Launch Control after watching the liftoff from the VIP viewing area a couple miles away. "I want to say congratulations to everybody," Bush said in brief comments to the launch team. "This is terrific. Thank you so much for your hard work and inspiration." After Discovery went up without any apparent hitch and Laura Bush congratulated everyone, NASA Administrator Michael Griffin thanked them "for making me look good my first time out." Discovery Vehicle Manager Stephanie Stilson expressed her respect, and Scott Higginbotham, a mission manager, told his colleagues they were heroes. Leinbach opened the celebration with words that only Kennedy Space Center officials would relish. "Beans are on," he said, signaling the beginning of the traditional corn bread-and-beans buffet in the downstairs

lobby following launches. There, Kennedy Space Center Director James Kennedy described his mood as total elation. "I was telling [Marshall Space Flight Center Director] Dave King right before we lifted off, 'It's an interesting business that you can go from being scared to death to total elation in nine minutes,'" Kennedy said. "And you met me on the total-elation side of things. It is such an awesome experience." But while the success led to a few smiles and handshakes among those who feasted in the lobby, many looked more restrained than elated, as if they were allowing themselves just a moment of backslapping before heading back to work. They had sent Discovery on a 12-day mission. But thoughts of Columbia breaking up over the Texas sky on a crisp February morning in 2003 still lingered. Everyone knew the hard part had only just begun. Web posted. (2005). [Launch managers celebrate with traditional NASA meal [Online]. Available WWW: <http://www.orlandosentinel.com/> [2005, July 27].]

### **Yahoo's Video Mission With NASA**

As the space shuttle Discovery soared into the sky on Tuesday morning, it opened a new era in U.S. space exploration. It also launched a new era in Internet video. The Return to Space Mission is the first to be continuously broadcast over the Internet, thanks to a partnership between NASA and Yahoo. Anyone with a Web connection will be able to check in on the astronauts' doings, any time of the day or night. Yahoo is the official provider of Webcast coverage of the Discovery mission. It plans to provide round-the-clock live video footage of the 12-day mission, including the take-off, space walks and the shuttle landing. "People who spend a lot of time on the Internet just love space travel," said Scott Moore, vice president of content for Yahoo. "I think there will be huge user interest in it." In fact, he thought it had the potential to be the largest live Webcast event ever, a record recently set by AOL's delivery of the Live8 concerts. Yahoo created a co-branded Windows Media Player that will stream NASA's live feed of the mission, available on the Web sites of both NASA.com and Yahoo. Coverage will be featured in a large box on the front page of Yahoo.com. The Internet media company will promote it throughout its network, while its global sites also will offer the streams. Yahoo will use its own infrastructure. Moore said the company's bandwidth and delivery mechanisms were ready to roll. Yahoo will monitor server loads and modify the delivery bit rate if necessary. "We're in the very early days of Webcasting. It's not a perfect science," he said. "As the audience scales up we may have to monitor and deal with it. That's where our experience comes into play." Web posted. (2005). [Yahoo's Video Mission With NASA [Online]. Available WWW: <http://www.internetnews.com/> [2005, July 26].]

### **July 27: Intense Hunt for Signs of Damage Could Raise Problems**

Now that the Discovery is in orbit, the examination begins. Its 12½-day mission will be the most photographed in the history of the shuttle program, with all eyes on the craft to see if it suffered the kind of damage from blastoff debris that brought down the Columbia in February 2003. There were cameras on the launching pad, cameras aloft on planes monitoring the ascent, cameras on the shuttle checking for missing foam on the external fuel tank, and a camera on the tank itself. One camera caught a mysterious object falling from the shuttle at liftoff; radar detected another, about two minutes into the flight. Cameras aboard the shuttle and the International Space Station will monitor the Discovery until the end of its mission. But all this inspection may be a mixed blessing. The more NASA looks for damage, engineers and other experts say, the more it will find. And the risks of overreaction to signs of damage while the shuttle is in orbit may be just as great as the risks of playing them down. Now, though, it will be far easier to spot such damage while the shuttle is still



in orbit. Thanks to a \$15 million laser camera system developed by a Canadian company, Neptec, for example, NASA can detect a crack of just two-hundredths of an inch, the width of two business cards pressed together. On the leading edge of the orbiter's wing, such a crack could admit dangerous amounts of superheated gas during re-entry. A similar crack elsewhere might not. Techniques will be tested during a spacewalk in coming days, but they are not ready for an actual repair, and the Discovery astronauts have said they would not want to trust any patchwork on a return to Earth. Another option, the "safe haven" plan, would involve abandoning the \$2 billion shuttle and having the astronauts wait in the space station for a rescue mission. For that to work, another shuttle would have to be launched within a few weeks. That is theoretically possible but carries risks of its own: the chance, for example, that the orbiting astronauts would run out of food, water or oxygen before the mission could be mounted. "There is risk in anything you do," Kyle Herring, a NASA spokesman, said. "Staying at the station is risky." Web posted. (2005). [Intense Hunt for Signs of Damage Could Raise Problems of Its Own [Online]. Available WWW: <http://www.nytimes.com/> [2005, July 27].]

**July 28: Result of shuttle photo shoot**

High-resolution photos taken Thursday when the shuttle Discovery executed an unprecedented backflip in space showed no significant damage, indicating the orbiter should be safe to return to Earth next week, officials said. The photos and launch video showed that Discovery suffered 80 percent less damage to its underside than shuttles on previous flights. Before the Columbia accident in 2003, NASA had found that shuttles averaged about 150 debris hits, most of them well under 1 inch. Mission managers said they have identified 26 small marks on Discovery, none of which raises major concerns. Web posted. (2005). [Result of shuttle photo shoot: a thumbs-up [Online]. Available WWW: <http://www.chicagotribune.com/> [2005, July 29].]

**July 29: Crew Expresses Surprise at Foam Shedding**

The commander of the space shuttle Discovery voiced surprise Friday that foam fell off the external fuel tank during this week's launch but said she didn't think the development had done any serious damage to the orbiter. "It wasn't what we had expected," Commander Eileen Collins admitted. She said NASA had a good plan to inspect the shuttle and its delicate system of heat-resistant tiles that protect it upon re-entry into the Earth's atmosphere. NASA officials said Thursday that analysis of camera footage from the launch showed a small piece of foam may have struck the wing of the orbiter -- a scenario eerily similar to the accident that doomed the shuttle Columbia in February 2003. As a result of the latest shedding, the space agency said it would suspend future shuttle flights until it re-evaluated why the foam continues to fall from the tank. The manager of NASA's orbiter program office, Steve Poulos, said a detailed examination of the orbiter has turned up nothing that might present a safety issue for Discovery or its seven astronauts. He also took issue with characterizations that NASA had "grounded" the shuttle fleet. "We are not grounded. We have a crew in flight," he said. Shortly after Tuesday's launch, NASA officials said that camera footage shot of the external fuel tank showed a large piece of foam -- believed to be 24 to 33 inches long, 10 to 14 inches wide and 2.5 to 8 inches thick -- sheared away from the tank. Though the piece of foam fell away into space and didn't strike Discovery's orbiter, NASA decided to suspend future shuttle missions and take another look at why foam was falling off the tank, a problem engineers thought they had solved after Columbia's demise. By Thursday (July 28) evening, NASA determined that a much smaller

piece of foam may have struck the orbiter's right wing. Additional analysis of camera footage showed three small pieces of foam separated from the tank at an altitude of about 200,000 feet, and one went in an upward trajectory that took it toward the wing, Hale said. While the size of the foam piece is unknown, a gap in the area where the pieces are believed to have originated was about 7 inches long and 2 inches wide, he said. Hale said detection sensors on the leading edge of the wing did not show any impact and an examination of the wing panels did not turn up any damage. Calculations of the force of the impact also showed it would have had about 1/10th of the energy necessary to cause damage, he said. Inspections will continue Friday, with NASA expected to make a decision Sunday on whether to clear the spacecraft to return to Earth. Discovery is scheduled to remain docked to the International Space Station until August 5 and return to Kennedy Space Center on August 7. During Discovery's launch Tuesday, the vehicle struck a bird seconds after liftoff. Hale said ground crews have not recovered any remains of the bird, which may have been incinerated in the shuttle's fiery plume. "We've never seen a bird strike before in the history of the program," Hale said, noting that the tremendous noise of a shuttle launch usually scares birds away. "This guy didn't clear the area." Web posted. (2005). [Shuttle crew expresses surprise at foam shedding [Online]. Available WWW: <http://www.cnn.com/> [2005, July 29].]

### **What's the Impact of Grounding the Fleet?**

The specter of another extended grounding of NASA's shuttle fleet is prompting uncertainty about the future of the orbiters as well as the International Space Station so reliant upon its regular visits. NASA could need several months — and maybe longer — to figure out and then fix what-ever caused a two-foot-long slab of foam to shake free of Discovery's external fuel tank and nearly hit the orbiter's wing. NASA says the shuttles will not fly again until it completely fixes the foam debris problem that destroyed Columbia and could have led to a horrendous repeat disaster on Discovery's current flight. Space workers from California to Florida and space station partners around the world all face potential impacts depending on how long the shuttle fleet is out of service this time. And, because the news that the foam still is dangerous is so new and the need for NASA's engineering legions to focus first on bringing Discovery's crew home safely, NASA has few answers. Shuttle program officials tried to allay anxiety by stressing their commitment to resuming flights and construction of the space station. The impact, for now, is that shuttle Atlantis probably will not fly the second post-Columbia mission in September as planned. While rumors of potential lay-offs swept through the shuttle community — something that always seems to follow news of a stand down — NASA officials stressed that fixing the foam problem means there's more work to do rather than less. Web posted. (2005). [If grounding lingers, what's the impact? [Online]. Available WWW: <http://www.floridatoday.com/> [2005, July 29].]

### **Photography stuns NASA**

NASA is getting back an unprecedented deluge of pictures and video of shuttle Discovery's historic return-to-flight mission. The early review is in, and the pictures are so good that even NASA is stunned. Discovery's flight, the first since the Columbia accident, has been the most photographed shuttle mission in the history of the 24-year program. There's been live video, as the shuttle rocketed to orbit, of a hunk of foam peeling off the external fuel tank and zipping past the wing. We've seen video, shot from a remote camera mounted on the tank, of Discovery drifting away after reaching orbit that drew "wows" and "oohs" from astronauts watching the show on NASA Television. Pictures snapped in orbit of the

shuttle's belly have been so clear that you can read serial numbers on individual heat-shield tiles. In addition to all the extra imagery collected from the ship itself, more than 100 government cameras were aimed at the shuttle as it thundered off the launch pad Tuesday morning bound for the space station. NASA added a third set of tracking cameras at the perimeter of launch pad 39B and dozens more up and down the coast, some as far as 38 miles away. Some are outfitted with lenses 10 times as big as a normal photographer uses. A few are really telescopes, zooming in on an object moving away very fast. The shuttle's solid rocket boosters, external fuel tank and a compartment in the orbiter's belly are outfitted with high-resolution digital cameras that snapped pictures of the vehicle and tank insulation. Web posted. (2005). [Photography stuns NASA [Online]. Available WWW: <http://www.floridatoday.com/> [2005, July 29].]

### **Griffin cautions against overreaction**

NASA administrator Mike Griffin said today that panic is an overreaction to the 0.9-pound foam piece that broke away from the external tank and missed Discovery some two minutes into a nearly flawless launch on Tuesday. "I think we're going to fix it in short order," Griffin said at a teleconference. "I believe folks really have overreacted a little bit. We have always said perfection was unattainable." Fixing the tank will not cause the next launch to be delayed until 2006. "We're not conceding that," he said. Atlantis is being prepared at Kennedy Space Center for the next shuttle mission. Launch windows are available in September and November plus March of 2006. Discovery received 25 minor dings during the launch, six times less than the average number of 145 seen on orbiters after re-entry. "This is the cleanest flight practically that we have ever seen," said Griffin. "Discovery is the cleanest bird we've seen." Griffin repeated statements that NASA engineers were wrong in their assessment of the stability of the foam on the PAL ramp which pulled away during launch. Griffin said the White House, which set the 2010 retirement date for the shuttle program, had not changed that date. Web posted. (2005). [Griffin cautions against overreaction [Online]. Available WWW: <http://www.floridatoday.com/> [2005, July 29].]

### **July 31: Bulging Cloth on Shuttle Raises Issue of Repairs**

Two errant strips of heavy insulating cloth, each protruding by about an inch, have set off debate within NASA over whether they may cause hazardous overheating as the shuttle Discovery returns to Earth. If so, the agency may order the first spacewalk to the underside of the orbiter to correct the problem, officials said Sunday. Analysts are still studying whether these strips of material, called gap filler, poking out of the shuttle's underbelly by about an inch, could lead to unusual patterns of heating during re-entry. If they are poking out at the forward end of the shuttle, as both of these are, the heating could affect parts of the craft's belly downstream, with some areas becoming as much as 25 percent hotter and beginning the most severe heating earlier than usual. That could potentially be a threat to its structure. The agency's two-and-a-half-year effort to restrict the kind of debris that brought down the shuttle Columbia in February 2003 has reduced the number of scars on the shuttle's underside to one-sixth of the fleet's average. But a 0.9-pound piece of foam that came off the external tank during ascent compelled agency officials to suspend further flights until the foam problem is fixed. Mission managers expect to have enough data and aerodynamic analysis about the gap fillers to reach a conclusion by Monday, Mr. Hill said. The space agency, through a long examination of all previous landings with protruding bits of gap filler, is comfortable with protrusions of a quarter of an inch in these areas, he said. But the two pieces on this flight are 1.1 inches 0.6 inches. The Discovery and the

International Space Station have been outfitted with more cameras and sensors than ever before. Therefore, mission managers say, they may be detecting a phenomenon that has occurred unseen in the past; it is possible that the felt-like material burns down like a wick during re-entry. Web posted. (2005). [Bulging Cloth on Shuttle Raises Issue of Repairs [Online]. Available WWW: <http://www.nytimes.com/> [2005, August 1].]

### **News media's pessimism aggravates NASA, crew**

Seven astronauts and legions of ground troops have worked on what is one of the most productive test flights in the space program's history. Discovery's heat-shield is near-pristine, in better shape for atmospheric re-entry than perhaps any orbiter has been before. The external fuel tank redesigned after the Columbia disaster appears to have shed less debris than any of the 113 previously flown. Commander Eileen Collins effortlessly piloted Discovery through a pair of never-before-tried maneuvers that left engineers and observers on the ground staring with wonder. And a suite of cameras, sensors and other tools dreamt up to document the performance of the suspect fuel tank and condition of the orbiter's heat shield are over-achieving. But news media, politicians, pundits and longtime shuttle critics seized this week on the "G word" – grounded. Some took it a gigantic leap forward to suggest the shuttles ought to be sent to museums as unsafe relics so NASA can move on to a new spaceship. And NASA now has so much data optimists believe they're getting the information they need to figure out and fix what caused four oversized hunks of foam to pop off various spots on the tank. Some, from Griffin down to line engineers, say flying again -- and soon -- is within grasp. "To me, it's a bump in the road," said Dick Jones of Cape Canaveral, who on Friday night was celebrating his retirement as the external tank's operations manager at Kennedy Space Center for shuttle contractor United Space Alliance. "We've had problems before. . . . We'll get it fixed, and we'll carry on." Web posted. (2005). [News media's pessimism aggravates NASA, crew [Online]. Available WWW: <http://www.floridatoday.com/> [2005, July 31].]



Discovery is pushed from the mate/demate device on NASA Kennedy Space Center's Shuttle Landing Facility. Discovery was returned to NASA Kennedy Space Center on a ferry flight atop the Shuttle Carrier Aircraft (SCA) from Edwards Air Force Base in California, arriving Aug. 21. The SCA is in the background. Discovery will be towed to the Orbiter Processing Facility where the Multi-Purpose Logistics Module Raffaello still inside will be removed from the payload bay and transferred to the Space Station Processing Facility. The orbiter will then begin processing for the second Return to Flight mission, STS-121, scheduled for launch no earlier than March 2006.



## AUGUST 2005

### **August 1: Astronaut to make first in-flight repair**

NASA will send an astronaut on an unprecedented in-flight shuttle repair mission to remove filler material protruding from heat-resistant tiles on Discovery's underbelly. Analysis showed that protrusions in two areas could produce excessive heat during re-entry and threaten the spacecraft. "It was prudent to take action so that we wouldn't have to worry about some of the worst consequences," said Wayne Hale, NASA's deputy shuttle program manager, at a news conference Monday evening. During Wednesday's (August 3) planned spacewalk, astronaut Steve Robinson will be dangled from a robotic arm on the international space station and maneuvered to the bottom of Discovery to remove what NASA calls "gap fillers." Gap fillers are thin fabric stiffened with a ceramic material and used to plug gaps between the shuttle's tiles. One keeps tiles from vibrating against each other during liftoff and has no purpose for re-entry. The other is designed to prevent repeated overheating of a gap between two tiles. However, not having it in place during a single re-entry would still be "well within our safety margins," Hale said. If he cannot pull the gap fillers loose, Robinson will use a tool to cut them flush, or nearly flush, with the tiles, so they don't interfere with the shuttle's aerodynamic flow during re-entry to Earth's atmosphere, Hale said. Discovery can return safely without either of the gap fillers in place, Hale said. The in-flight repair would be a first for the program and is also considered risky, given the potential to damage the craft, said Cindy Begley, the mission's spacewalk manager. During the procedure, scheduled to last 90 minutes, Robinson will only be visible to the other members of Discovery via a camera on the space shuttle's boom. A second astronaut, Soichi Noguchi, will be spacewalking at the same time, but he will be working on other tasks -- among them, installation of an external storage platform on the space station. Web posted. (2005). [Astronaut to make first in-flight repair [Online]. Available WWW: <http://www.cnn.com/> [2005, August 2].]

### **Expendable Launch Vehicle Status Report**

Mission: Mars Reconnaissance Orbiter (MRO); Launch Vehicle: Lockheed Martin Atlas V 401; Launch Pad: Space Launch Complex 41 (SLC-41), Cape Canaveral Air Force Station; Launch Date: August 10, 2005; Launch Window: 7:54 - 9:39 a.m. EDT. The MRO spacecraft has been mated with the Atlas V for the last phase of launch preparations. This will be the first government civil launch of an Atlas V. The launch vehicle will perform an Integrated Systems Test (IST) later today to verify electrical compatibility. The final stages of the launch campaign begin with the Flight Readiness Review on Aug. 4, and the Launch Readiness Review is Aug. 8. Mission: Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observation and CloudSat (CALIPSO/ CloudSat); Launch Vehicle: Boeing Delta II 7420 DPAF; Launch Pad: Space Launch Complex 2 (SLC2), Vandenberg Air Force Base (VAFB), Calif.; Launch Date: September 29, 2005. The CloudSat team returns to VAFB later today to begin battery reconditioning. The CALIPSO team returns to VAFB August 8 for launch processing. KSC News Center (2005). **Expendable Launch Vehicles Status Report** E05-008 [Online]. Available E-mail: [ksc@newsletters.nasa.gov](mailto:ksc@newsletters.nasa.gov) [2005, August 1].]

### **August 2: NASA devises technique to remove gap fillers**

Engineers, technicians and astronauts worked as late as 4 a.m. during the weekend to devise the technique astronaut Steve Robinson will use Wednesday to remove two gap-fillers from between tiles near the shuttle's nose. Robinson, on his third spacewalk, will use his fingers

to pluck a tab of heat-resistant cloth from between tiles behind the shuttle's front wheel. His technique for the operation has been improvised at Johnson Space Center. If the ceramic cloth strips don't come loose with a tug, they will be sawed off with a curved hacksaw blade or cut off with scissors. The technique was devised at facilities all over JSC, including the nearby 6.2 million gallon Neutral Buoyancy Lab, where astronauts float underwater to simulate weightlessness. In the gigantic swimming pool, technicians mounted a panel of heat shield tiles with gap-fillers tucked in so astronauts could see how the tiles react when they tugged on the gap-fillers. Piers Sellers and Mike Fossum, who are scheduled to fly on the next shuttle mission, helped perfect the procedure on the ground. They also got help from some of the agency's most experienced spacewalkers and from experts at Kennedy Space Center. Web posted. (2005). [Improvisation not unusual in space [Online]. Available WWW: <http://www.floridatoday.com/> [2005, August 2].]

### **Redesign Is Seen for Next Craft**

For its next generation of space vehicles, NASA has decided to abandon the design principles that went into the aging space shuttle, agency officials and private experts say. Instead, they say, the new vehicles will rearrange the shuttle's components into a safer, more powerful family of traditional rockets. The plan would separate the jobs of hauling people and cargo into orbit and would put the payloads on top of the rockets - as far as possible from the dangers of firing engines and falling debris, which were responsible for the accidents that destroyed the shuttle Challenger in 1986 and the Columbia in 2003. By making the rockets from shuttle parts, the new plan would draw on the shuttle's existing network of thousands of contractors and technologies, in theory speeding its completion and lowering its price. "The existing components offer us huge cost advantages as opposed to starting from a clean sheet of paper," the new administrator of NASA, Michael D. Griffin, told reporters on Friday. The plan for new vehicles is to be formally unveiled this month. Its outlines were gleaned from interviews and reviews of trade reports, Congressional testimony and official statements. On Friday, Dr. Griffin emphasized the plan's safety, telling reporters that the new generation of rockets would have their payloads up high to avoid the kinds of dangers that doomed the Columbia two and a half years ago and threatened the Discovery last week when insulating foam broke off its fuel tank shortly after liftoff. Congress would have to approve the initiative, and many questions remain. The three remaining shuttles are to be retired by 2010 under the Bush administration's plan for space exploration, which is intended to return humans to the Moon and eventually Mars. The new vehicles would sidestep the foam threat altogether, and its supporters say they would have other advantages as well. The larger of the vehicles, for lifting heavy cargoes but not people, would be some 350 feet tall, rivaling the Saturn 5 rockets that sent astronauts to the Moon. The smaller one, for carrying people, would still dwarf the shuttle, which stands 184 feet high with its attached rockets and fuel tank. The spaceships would no longer look like airplanes. Their payloads whether humans or cargo, would ride in capsules at the top rather than alongside the fuel tank - standard practice until the shuttle era. Rather than gliding back to Earth, they would deploy parachutes and land on the ground in the Western United States. Several analysts said that retaining the shuttle contractors would probably help the effort not only financially, but also politically. In Florida alone, a state with blood ties to the White House, the shuttle program employs some 14,000 technicians and engineers, managers and contractors. Web posted. (2005). [Redesign Is Seen for Next Craft, NASA Aides Say [Online]. Available WWW: <http://www.nytimes.com/> [2005, August 2].]

### **GOES-N launch delayed by problem with spacecraft**

The launch of the National Oceanic and Atmospheric Administration's GOES-N weather satellite has been delayed to no earlier than Aug. 5 while manufacturer Boeing troubleshoots a problem with the spacecraft. Liftoff had been scheduled for July 29 on a Boeing Delta IV rocket from NASA's Kennedy Space Center in Florida. NASA is managing the launch of GOES-N for NOAA. A slew of technical issues has caused the launch of GOES-N to slip repeatedly from its original target date in May. GOES-N is the first in a series of three next-generation Geostationary Operational Environmental Satellites built by Boeing. Originally targeted for late 2001, the launch of GOES-N was delayed by a combination of spacecraft development issues and switching the satellite from a Delta III to a Delta IV. . E-mail distribution. (2005). [Aviation Week's [Aerospace Daily & Defense Report](#) Re: "GOES-N launch delayed by problem with spacecraft," [Electronic]. Vol. 215, No. 22, [August 2, 2005].]

### **Bush calls astronauts**

President Bush called astronauts aboard Discovery and the International Space Station today and wished them continued success on their ground-breaking mission. In a brief conversation with shuttle commander Eileen Collins, the president assured them that the American people are praying for a safe re-entry and landing. Bush said he supports the shuttle mission. His wife, Laura, who attended the launch from Kennedy Space Center, has become an enthusiastic supporter of the space program. Here is the text from the president's call: Bush: "I wanted to tell you all how proud the American people are of our astronauts. I want to thank you for being risk takers for the sake of exploration. I want to welcome our Japanese, Australian and Russian friends and wish you Godspeed in your mission. I know you've got very important work to do ahead of you and we look forward to seeing the successful completion of this mission. Obviously, as you prepare to come back, a lot of Americans will be praying for a safe return. Thanks for being such great examples of courage for a lot of our fellow citizens." Shuttle Commander Eileen Collins: "We really enjoy what we're doing. We really believe in our mission, and we believe in space exploration and getting people off the planet and seeing what's out there. The steps we're taking right now are really worth it." Bush: "I agree with you. I think what you're doing is really important. You've got a strong supporter for your mission here in the White House. Laura (Bush) went down and watched the launch in Florida with my little brother, Jeb, and came back all excited about the energy on the east Coast of Florida. We're with you and wish you all the very best. Thanks for taking my phone call. Now get back to work." Web posted. (2005). [Bush calls astronauts, says wife now a huge space fan [Online]. Available WWW: <http://www.floridatoday.com/> [2005, August 2].]

### **MRO Prelaunch Webcast, Launch Coverage Set For Aug. 9-10**

NASA Direct, Kennedy Space Center's Internet broadcasting network, is featuring a prelaunch webcast and launch day coverage of the Mars Reconnaissance Orbiter (MRO) mission. The launch is set for Wednesday, Aug. 10, from Cape Canaveral Air Force Station, with a launch opportunity from 7:54 to 9:39 a.m. EDT. All coverage can be viewed through the NASA portal Web site at [http://www.nasa.gov/mission\\_pages/MRO/main/index.html](http://www.nasa.gov/mission_pages/MRO/main/index.html). Web coverage begins Tuesday, Aug. 9, with a prelaunch webcast overview of the MRO's mission at 10:30 a.m. EDT. The webcast includes informative interviews and a question-and-answer session with experts highlighting the spacecraft, science of the mission, and what they hope to learn from

the orbiter's observations above, on and below the Martian surface. ["MRO Prelaunch Webcast, Launch Coverage Set For Aug. 9-10," **NASA News Release #72-05**, August 2, 2005.]

### **August 3: Astronaut Is Optimistic on Repairs**

Stephen K. Robinson, the astronaut who will try to pluck two thin pieces of protruding cloth from the underside of the shuttle Discovery on Wednesday morning, said Tuesday that the risks of the operation were manageable and the tools well understood. "The main tools that I plan to use are right here," Dr. Robinson said, moving his thumb and forefinger together, in an early morning interview from the International Space Station. The two bits of cloth, known as gap fillers, are protruding about an inch near the nose of the Discovery. NASA ordered Wednesday's spacewalk because analysts were unable to allay concerns that the protrusions could cause unusual and potentially dangerous patterns of heating on the bottom of the shuttle and along the leading edge of the wings. The stiff, thin pieces of ceramic-treated fabric act as spacers, keeping delicate insulating tiles from grinding together during the shuttle's rattling ascent and as its body expands and contracts in extreme temperatures. Dr. Robinson said his main concern would be watching his head. "I'll be leaning in toward the orbiter," he said, adding that his helmet added inches to his height. "So that's what I'll be most careful with." If the strips do not yield with gentle force, Dr. Robinson can also try forceps, a special hacksaw and scissors developed for spacewalks. Over three days of intense analysis, mission managers struggled to balance the risks of a spacewalk - it would be the first to the underside of the shuttle and would encompass the first repair to an orbiting shuttle - with the risks of re-entering Earth's atmosphere with protruding gap fillers. Web posted. (2005). [Acknowledging Risks, an Astronaut Is Optimistic on Repairs [Online]. Available WWW: <http://www.nytimes.com/> [2005, August 3].]

### **Discovery hit by bird at launch**

Usually, the birds fly away at the first sign of the deafening rumble of the space shuttle's main engines. But not this time. Apparently, one rather large bird either did not hear the noise or failed to act fast enough to the warning. As shuttle Discovery roared off the launch pad, just before clearing the tower at pad 39B, the tip of the external fuel tank smashed into a bird. The thumping blow almost certainly killed the bird, though a post-launch inspection of the launch pad revealed no feathers or other remnants to prove its ultimate fate. The bird did not, however, hurt the shuttle in any way. Still, as silly as it sounds, birds pose a threat to the shuttle while it's perched on the pad, launching or returning to the three-mile landing strip at Kennedy Space Center. Brevard County's spaceport is part of a national wildlife refuge, hugging the Atlantic oceanside, an inviting habitat for birds of all kinds and many of immense size. NASA has long wrestled bird problems at the spaceport. Woodpeckers once poked holes in the insulating foam on an external fuel tank, forcing NASA to roll a shuttle back from the launch pad to the Vehicle Assembly Building for repairs. For landings, NASA sends a crew out to scare off the birds just before final approach so the fast-moving orbiter is not damaged by smashing into a big bird. NASA engineers, who by nature worry about everything, long ago dismissed the idea of a bird strike on a shuttle launch. But, of course, they did study it long ago, and there is detailed paperwork on the potential hazard. The engineers ultimately determined that the noise just before liftoff scares away most of the birds. Photographs of launches often show birds flying away from the fire and billowing smoke surrounding the rising shuttle. That was until July 26. The bird's impact with the top of the tank was captured on launch films. It can be seen above the tank in one frame, then

impacting the tank. Other shots captured the bird falling away. "We've never seen a bird strike before in the history of the program," deputy shuttle program manager Wayne Hale said. Web posted. (2005). [The bird that didn't get away [Online]. Available WWW: <http://www.floridatoday.com/> [2005, August 3].]

### **MRO scheduled for Aug. 10 launch**

Launch of NASA's Mars Reconnaissance Orbiter (MRO) spacecraft is scheduled for Wednesday, Aug. 10, at 7:54 a.m. EDT from Cape Canaveral Air Force Station, Fla. The launch window extends until 9:39 a.m., a duration of 105 minutes. Liftoff will occur aboard a Lockheed Martin Atlas V-401 rocket from Launch Complex 41. Should launch be postponed for 24 hours for any reason, the next launch time will be 7:50 a.m. on Aug. 11. The MRO, NASA's next big step in the exploration of the Solar System, will examine Mars in unprecedented detail from low orbit and return more data about that planet than all previous Solar System missions combined. ["Mars spacecraft to be launched aboard Atlas Rocket Aug. 10," **NASA Media Advisory #73-05**, August 3, 2005.]

### **August 4: NASA ponders second repair in space**

NASA engineers are expected to decide today if Discovery astronauts need to perform another repair to the shuttle's exterior. Of concern is whether a damaged thermal blanket under one of the cockpit windows would tear away during re-entry to Earth's atmosphere and strike the orbiter, especially when the shuttle slows from Mach 20 to less than Mach 6, deputy shuttle program manager Wayne Hale said. Engineers estimate that any chunk of the blanket would weigh less than an ounce, Hale said. But NASA officials have to be concerned about "where might it go and what might it do." Photos of the 20-inch-by-4-inch blanket show that it was punctured at one end -- possibly by debris -- and "poufed out" at the other, Hale said. The new concerns come a day after shuttle astronaut Steve Robinson removed fabric gap fillers from Discovery's exterior during his six-hour spacewalk. The fillers were sticking out from heat-resistant tiles on the shuttle's belly. NASA had worried that protrusions of the fabric would cause excessive heating during re-entry. "I'm grasping and pulling. ... It's coming out very easily. ... Beautiful," Robinson said during the procedure. On Thursday, the crew will continue to transfer cargo from the space station to the shuttle's Raffaello multipurpose logistics module and then get some well-deserved downtime. Discovery is scheduled to return to Earth on August 8. Web posted. (2005). [NASA ponders second repair in space [Online]. Available WWW: <http://www.cnn.com/> [2005, August 4].]

### **Discovery crew honors fallen astronauts**

On a day when her crew remembered those who died on space shuttle Columbia, Discovery Commander Eileen Collins said Thursday she's confident about returning home safely next week. Deputy shuttle program manager Wayne Hale said overall Discovery is in good shape, but there remains one lingering issue: a hole torn in a thermal blanket near the cockpit window. A fourth unplanned spacewalk may be necessary to take care of the problem. The soonest the spacewalk could occur would be Saturday, which would delay Discovery's scheduled undocking from the international space station and result in the shuttle's return to Earth being pushed back a day until at least Tuesday. Meanwhile, as Discovery orbited the Earth Thursday, the shuttle's crew sent down images of the planet below and each crew member took a few minutes to discuss space exploration, its costs and remembered those who didn't make it home. Based on the Columbia tragedy, Discovery's astronauts have



spent a majority of their test flight mission inspecting their ship, making repairs and testing out new repair techniques. Web posted. (2005). [Discovery crew honors fallen astronauts [Online]. Available WWW: <http://www.floridatoday.com/> [2005, August 4].]

### **Explosives to topple Cape launch pad**

One of Cape Canaveral's oldest launch pad structures, crippled by corrosion after standing idle for a quarter century, will come crashing down Saturday. The 179-foot tall mobile service tower that helped ready Atlas rockets for blastoff from Complex 13 is being knocked to the ground due to safety and environmental concerns. The Air Force opted to explosively topple the structure, giving crews easier access to chop up the 2.6-million pound tower for underground burial. The riskier option of dismantling the standing tower piece by piece was ruled out given its weakened condition. Workers have strategically placed nearly 50 charges amounting to 171 pounds of explosives on the Complex 13 tower that will fire within a second. The first explosions will occur at the structure's 43-foot level, followed milliseconds later by detonations at the bottom to destroy the support legs and causing the tower to fall over, project officials explained. Complex 13 was one of four Atlas ballistic missile pads built side by side at the Cape. Construction of the complex began in August 1956 for \$4.5 million, and it hosted its first Atlas missile liftoff on August 2, 1958. Over the next four years, 29 additional missiles were test-fired from there. New structures, including the tower being demolished Saturday, were built when the pad was modified to support Atlas rockets with Agena upper stages for launches of satellites starting in October 1963. Pairs of nuclear-detection spacecraft, called VELA, were flown on the first missions from the overhauled pad, followed by NASA's Mariner 3 probe bound for Mars. NASA took control of the complex from the Air Force in 1966, leading to launches of several Lunar Orbiter craft to map the moon's surface as a precursor to Apollo. The Air Force regained the pad in 1968, using it to launch a series of military payloads on Atlas-Agena rockets. The site was deactivated in April 1978 after serving as the starting point for 51 Atlas missile and Atlas-Agena boosters. Web posted. (2005). [Explosives to topple Cape launch pad this weekend [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, August 4].]

### **Discovery cleared for landing**

Space Shuttle mission managers today completed their assessment of Discovery's fitness to handle the rigors of re-entry into the atmosphere. "We have cleared Discovery to re-enter," said Wayne Hale, chairman of the Mission Management Team (MMT), during a news conference at NASA's Johnson Space Center, Houston. The MMT determined the Orbiter's heat shield and other systems are in good shape. They also decided a spacewalk is unnecessary to repair damage to a thermal blanket on Discovery's outer skin. ["NASA clears space shuttle Discovery for landing, **NASA News Release #05-214**, August 4, 2005.]

### **August 5: NASA Rules Out a Fourth Spacewalk**

NASA has decided against a fourth spacewalk for the Discovery astronauts that would have involved repairing an insulating blanket that had pulled out near the commander's window. In an afternoon briefing, N. Wayne Hale, the deputy manager of the shuttle program, acknowledged that there was still some uncertainty about the risk posed by the blanket. Much of the upper fuselage of the shuttle is covered with such blankets, which are woven of heat-resistant fabric. The worst of the heat from re-entry is experienced by the leading edges of the wing and the nose, which are covered with a carbon composite that can hold up under temperatures of thousands of degrees. The underside of the shuttle is covered with

heat-resistant ceramic tiles that can take almost as much punishment. The top of the craft, however, experiences far less heating, and so NASA covers it with insulation blankets. The damage was apparently caused by a strike by debris during launching, mission managers have said. Analysts were concerned that the puffed-out blanket might expose the orbiter to too much re-entry heat, but were most concerned that the blanket might shed pieces under the stress of re-entry and that those pieces might hit other parts of the craft and cause damage. Web posted. (2005). [NASA Rules Out a Fourth Spacewalk to Repair Shuttle [Online]. Available WWW: <http://www.nytimes.com/> [2005, August 5].]

### **Shuttle Foam Inquiry**

Technicians who repaired a half-inch dent on the space shuttle Discovery's enormous external fuel tank well before liftoff may have caused the foam-shedding incident that led to the grounding of future shuttle flights, NASA employees said Friday. The seemingly minor damage and repair is in the spot where a 0.9-pound piece of insulating foam dropped away from the tank two minutes into liftoff, the employees said. If the connection between the two actions is established, that could solve the mystery that has roiled the space program since July 26, when the large foam piece was caught on camera as it flew off the tank and narrowly missed the shuttle. There are a great many such repairs throughout the external tank, and extensive records are kept on all repairs. More extensive repairs to foam might require carving away foam and pouring in replacement foam or entirely rebuilding a section of the foam covering. The next shuttle launching has been tentatively scheduled for Sept. 22, said William Gerstenmeier, the space station program director, who spoke at a briefing on Friday afternoon. That deadline is optimistic, NASA employees say. Dr. Griffin insisted at his briefing that he and his agency were determined to try. Web posted. (2005). [Repair to Dent Is Studied in Shuttle Foam Inquiry [Online]. Available WWW: <http://www.nytimes.com/> [2005, August 6].]

### **NORAD Squadron Watches Over Discovery**

NASA isn't the only entity watching closely as the space shuttle Discovery prepares for return to earth. The First Space Squadron at NORAD is watching the shuttle and everything that might get in its way. Inside Cheyenne Mountain workers with the First Space Squadron keep their eyes on 86-hundred pieces of man-made space debris floating around earth in different orbits. They range from the size of a baseball to some as big as a bus. They monitor data from a network of thirty sensors. One is on a satellite and the rest are on the ground. Their goal is to keep an eye on everything within thirty-five miles of the shuttle. A staff of eight at NORAD and at another center in Virginia will watch Discovery and everything around it every minute until its scheduled landing on Monday. After that they will continue their watch on all of the objects in space and stand ready to notify appropriate governments around the world before these objects re-enter the earth's atmosphere. Web posted. (2005). [NORAD Squadron Watches Over Discovery [Online]. Available WWW: <http://www.krdotv.com/> [2005, August 5].]

### **NASA announces space shuttle Discovery landing schedule**

Commander Eileen Collins and the six-member Space Shuttle Discovery crew are scheduled to land at NASA's Kennedy Space Center (KSC) at approximately 4:46 a.m. EDT, Monday. Discovery began the 13-day Return to Flight (STS-114) mission July 26. Landing at KSC's Shuttle Landing Facility (SLF) is planned for orbit 201 at mission elapsed time 12 days, 18 hours, 07 minutes. The deorbit burn is at approximately 3:43 a.m. EDT. A second KSC

landing opportunity is also available Monday at 6:21 a.m. EDT, with a deorbit burn at 5:19 a.m. EDT. Two landing opportunities are planned for the back-up landing location at Edwards Air Force Base (EAFB), Calif., on Monday. The first opportunity is 7:52 a.m. EDT; the second is 9:27 a.m. EDT. If Discovery lands at EAFB, an augmented KSC convoy team will be on-site for post-landing processing and disembarking the crew. The turnaround team will be deployed to EAFB by charter aircraft on landing day. If Discovery must stay in orbit beyond Monday, two landing opportunities are available at KSC on Tuesday at 5:09 a.m. and 6:45 a.m. EDT. Two additional times are also available at EAFB on Tuesday. If landing occurs as scheduled, it will be the 62nd at KSC and the 15th night Kennedy landing in the history of the Shuttle program. About an hour after touchdown, the STS-114 crew will be taken to their KSC quarters to meet with their families and for initial physicals. ["NASA announces space shuttle Discovery landing schedule," **NASA News Release #05-215**, August 5, 2005.]

### **August 6: Jets set to shadow Discovery**

For the first time in the program's history, three airplanes will track the space shuttle's descent through Earth's atmosphere before it touches down at 4:46 a.m. Two modified weather aircraft called WB-57s will fly at about 65,000 feet, and a modified missile defense jet will fly at 45,000 feet - about 100 nautical miles below Discovery as it races across the Florida panhandle. The planes will be moving much slower than the shuttle, which will be slowing down as it cuts through the atmosphere from 11 times the speed of sound, or Mach 11, to about seven times the speed of sound, or Mach 7. A key moment will be when the hot gases that surround the shuttle move from a smooth flow to a turbulent one. Web posted. (2005). [Jets set to shadow Discovery [Online]. Available WWW: <http://www.dailypress.com/> [2005, August 6].]

### **NASA Chief Takes On Critics**

As the crew of the slightly damaged orbiter Discovery began preparations Friday to undock from the International Space Station, NASA Administrator Michael D. Griffin defended the shuttle mission, calling it one of the cleanest on record. "It's been a magnificent flight," Griffin said during an appearance with Texas legislators at the Johnson Space Center. "I don't know what people could want that they haven't seen." He said critics had fixated on the flight's flaws, such as insulating foam shedding from the craft's external fuel tank during liftoff and the need for a first-ever spacewalk to remove protrusions on the underside of Discovery. Not only do critics see a glass half-empty, but, to them, "there is no glass," Griffin said. He said the crew had accomplished everything it set out to do — replacing a faulty gyroscope on the space station, repairing a second one and delivering 12,107 pounds of water, equipment and food. Just as crucial for the crowded, half-built space station, Discovery will return home with 7,055 pounds of trash and broken machinery. "The crew has done a huge amount," Griffin said. Web posted. (2005). [NASA Chief Takes On Critics [Online]. Available WWW: <http://www.latimes.com/> [2005, August 6].]

### **Sept. 22 Is Earliest Launch Date for Shuttle Atlantis**

NASA said Friday that fixing the space shuttle's external fuel tank will delay the liftoff of the shuttle Atlantis until the final days of the September launch window and, perhaps, beyond. William H. Gerstenmaier, space station program manager, said engineers have decided to target Sept. 22 as the earliest Atlantis launch date, with four attempts possible before the window closes five days later. Atlantis was at the Kennedy Space Center preparing for

launch in case the shuttle Discovery, docked at the space station, suffered damage grave enough to require that it be abandoned. But NASA "stood down" the emergency launch Thursday after clearing Discovery for reentry. Discovery was set to undock Saturday in preparation for a landing at Kennedy early Monday morning. The launch window for Atlantis's regular mission will open Sept. 9, but the chances of making that date dimmed abruptly when Discovery's external tank shed four large pieces of foam insulation during its July 26 launch. Discovery emerged relatively unscathed, but NASA grounded the fleet until the cause of the foam loss is found and fixed. Although the external tank lost four unacceptably large pieces of foam, the early focus is on a one-pound chunk that broke away from a ridge designed to protect cables and pressure lines from turbulence during launch. Web posted. (2005). [Sept. 22 Is Earliest Launch Date for Shuttle Atlantis [Online]. Available WWW: <http://www.washingtonpost.com/> [2005, August 6].]

### **August 7: Shuttle will take new path back**

Space shuttle Discovery's seven astronauts are homeward bound. They'll spend today making final preparations, and then, if all goes as scheduled, swoop into Kennedy Space Center at 4:46 a.m. Monday. If the weather or some other problem gets in the way, Discovery will have a second chance to land at 6:21 a.m. The shuttle will take a different approach to Florida, flying over Nicaragua, Costa Rica and the western tip of Cuba before entering U.S. airspace near Naples and heading over Lake Okeechobee to KSC. Discovery's crew left the international space station early Saturday after exchanging farewells, hugs and handshakes with the outpost's two-man crew. It was the first shuttle visit to the orbiting complex since 2002. With Discovery's pilot Jim Kelly at the controls, the shuttle undocked from the station at 3:24 a.m. and moved about 400 feet away before flying a full loop around the outpost. Inside Discovery, the crew snapped pictures of the glistening station. NASA engineers will analyze the photos as a routine measure to monitor the station's condition. Agency managers said the undocking and fly-around went "by the book." On Monday, NASA will try to land only in Florida. If weather keeps the shuttle in orbit another day, the agency then would look at landing in Florida or the backup site in California on Tuesday. Web posted. (2005). [Shuttle will take new path back [Online]. Available WWW: <http://www.orlandosentinel.com/> [2005, August 7].]

### **KSC Landing team in high gear**

The landing convoy at Kennedy Space Center is equipped to help the shuttle adjust to its unnatural environment -- the ground. The trucks keep the spaceship's power running and its cooling flowing, and eventually tow it back to its hangar. Several new vehicles are ready to greet Discovery. "These new vehicles that we're using are significantly larger and a little more complex than some of the ones we had before," said Chris Hasselbring of Rockledge, leader of the integrated landing operations group for United Space Alliance. A couple of months ago, the landing team gave the trucks a spin. Not exactly hot rods, they cruised about 10 mph up State Road 3 from the hangar that once held Columbia accident debris toward an entry point on the shuttle runway. The tall vehicles drove around hanging traffic lights to avoid running into them. The simulation let the team practice with updated versions of its equipment, which includes: \* The purge unit. It helps cool the frame of the orbiter, which has just been through the heat of re-entry, and push out toxic vapors that might have built up inside. \* The ground cooling unit, which keeps the ship and its cargo, such as sensitive science experiments, cool after the orbiter's internal cooling has shut off. \* The multi-purpose logistics module service vehicle (also known by the acronyms MPLM SV

or MSV). It powers and monitors data from the reusable cargo modules carried to the International Space Station by NASA's shuttles. There also is an orbiter access vehicle, which has stairs leading to a tiny room that provides access to the ship's hatch. There's a new door in the side of the room so it can be hooked up to another vehicle, making it easier to remove items from the crew cabin. It usually takes five or six hours for post-landing operations, Hasselbring said, from touchdown to completion of the ship's tow to its hangar. Though the trucks are large and loud, they seem almost lost on the landing strip, which is much larger than runways at airports. The Shuttle Landing Facility strip is 15,000 feet long, with a 1,000-foot overrun at each end, and it is 300 feet wide. The shuttle lands from the northwest, called Runway 15, or the southeast, Runway 33, depending on winds. Web posted. (2005). [Landing team in high gear [Online]. Available WWW: <http://www.floridatoday.com/> [2005, August 7].]

### **August 8: Discovery to land Tuesday**

The crew of the shuttle Discovery received an extra day in space on Monday when NASA decided against landing at the Kennedy Space Center here because of variable weather. Shuttle program officials said they were determined to land the Discovery on Tuesday and would take advantage of several opportunities in Florida and at backup sites on the West Coast. "We will attempt to land somewhere tomorrow," LeRoy Cain, flight director for the shuttle's re-entry, said after announcing, with obvious disappointment, that he had scratched a Monday landing. "I just couldn't quite get comfortable with the overall conditions today." Officials said their preference on Tuesday would be to take one of two landing opportunities at the Kennedy center, which would bring Eileen M. Collins, the retired Air Force colonel commanding the mission, and the other six crew members back to where their mission started 14 days earlier. Failing a chance at a Florida landing, officials said there were also two chances to come down at Edwards Air Force Base northwest of Los Angeles, where good weather was predicted all week. There was also a more distant possibility of landing at the White Sands Missile Range in New Mexico, where conditions were not as favorable because of a chance of showers. Tuesday's landing opportunities in Florida were at 5:07 a.m. and 6:43 a.m. Eastern time. If conditions there prohibited landing, then controllers had the choice of 8:12 a.m. Eastern time at Edwards or 8:13 a.m. at White Sands, or the final chance of the day at 9:47 a.m. at Edwards. In more than two decades of flying, shuttles have landed 61 times at Kennedy, which was designated the main landing site in 1991. Early in the program, the orbiters commonly landed at Edwards if anything discouraged an East Coast touchdown. Ultimately, orbiters ended their missions 49 times at Edwards, the last being the Endeavour in 2002, said Jim Rostohar, a Johnson Space Center spokesman. The shuttle has enough food, air and power to stay safely in orbit through Wednesday if last-minute problems prevent landing on Tuesday. Web posted. (2005). [NASA Determined to Land Shuttle Tuesday Morning [Online]. Available WWW: <http://www.nytimes.com/> [2005, August 6].]

### **August 9: Discovery lands at Edwards**

The shuttle Discovery glided back to Earth in a predawn landing here in the Mojave Desert on Tuesday, after a mission of 14 days and 5.8 million miles that successfully returned NASA to human spaceflight but also added pressure on the agency to move beyond the shuttle program. "We're happy to be back," the shuttle's commander, Col. Eileen M. Collins, said shortly after the Discovery touched down. "We congratulate the whole team on a job well done." The Discovery mission blended success and frustration, hope and poignancy.



The shuttle program manager, William W. Parsons, called it a "wildly successful mission." But the launching was delayed repeatedly, and a problem with a fuel level sensor forced mission controllers to scrub a planned July 13 effort just two and a half hours before liftoff. And though modifications made to the external fuel tank resulted in far less launching debris than usual, five large pieces of foam - one weighing nearly a pound - popped off the tank, showing that a potentially fatal problem had not been corrected. NASA has said that until the foam mystery is solved and the problem fixed, shuttles will not fly again. On paper, the goals of this mission were straightforward: resupplying the space station and testing an external tank that had been modified so as not to shed the kind of launching debris that doomed the Columbia. But the crew - Colonel Collins and Col. James M. Kelly, Stephen K. Robinson, Wendy B. Lawrence, Charles J. Camarda, Andrew S. W. Thomas and Soichi Noguchi of Japan - ended up having a busy two weeks. The shuttle was originally supposed to come home to the Kennedy Space Center in Florida. But unpredictable weather and rain uncomfortably close to the center led mission managers to "wave off" four Florida landing opportunities in two days, and finally to call for a change of plans. Colonel Collins took over the controls from the guidance computers once the shuttle dropped below supersonic speed, and she brought the spacecraft - at that point, essentially a brick with wings - in for its touchdown on the air base's 15,000-foot concrete runway 2-2 at 8:11:22 a.m. Eastern time, a half-minute ahead of schedule. Web posted. (2005). [NASA Must Tackle Foam, Fuel Tank and Future of the Program [Online]. Available WWW: <http://www.nytimes.com/> [2005, August 10].]

### **Gyro glitch delays new Mars probe**

NASA has delayed launch of its Mars Reconnaissance Orbiter by at least a day, until 11 August. The postponement was called after a gyroscope of the type used in the Atlas V launch vehicle failed while being incorporated into a rocket unrelated to the MRO mission. The space agency does not want to take any chances with their \$500 million spacecraft, the only one scheduled to reach Mars in 2006. It wants to be sure that the failure will not affect MRO's launch vehicle. Gyroscopes are vital components in rockets, providing orientation data to the launch vehicle's flight control system. The Atlas V includes a pair of Redundant Rate Gyro Units - if one fails, the backup unit takes over. The failure occurred as the gyro was being assembled at the factory of a subcontractor to Lockheed Martin, builder of the Atlas V. Company engineers worked overnight on Tuesday to dismantle the failed gyro. Once they identify the defective component, they will check whether the problem could affect other components from the same batch. If that is the case, NASA will check if the gyros on the launch pad include components from that batch. NASA expects to have an answer by noon on 10 August. A spokesman was not sure how long any replacement process would take, but it might cause a further delay. The launch window extends to 30 August. Web posted. (2005). [Gyro glitch delays new Mars probe [Online]. Available WWW: <http://www.newscientist.com/> [2005, August 10].]

### **Will other worlds beckon Collins?**

When space shuttle commander Eileen Collins guided the Discovery to a smooth landing Tuesday, the 48-year-old was most likely capping off her stellar career as an active-duty astronaut. Like a coach who knows he'll leave after a tournament, a commander wouldn't announce her retirement outright before completing her last mission. But with four flights behind her, Collins has hit NASA's unofficial limit. The recently retired Air Force colonel has hinted that after completing this mission, officially STS-114, she'll make room for those

who haven't yet experienced liftoff, some of whom have been waiting since 1996. After a string of setbacks, NASA is hard-pressed to find enough seats for all its astronauts. Roughly 100 stand ready to log time in space; half have yet to leave Earth. But the most optimistic plans allot only 28 more flights before the shuttle fleet retires in 2010. If Collins retires, the space agency will lose its best-known astronaut on active duty. On her first flight in 1995, the former test pilot became the first woman to pilot the shuttle. On her third flight, in 1999, she became the shuttle's first female commander. Web posted. (2005). [Will other worlds beckon Collins? [Online]. Available WWW: <http://www.houstonchronicle.com/> [2005, August 9].]

### **O'Keefe pleased with shuttle's safe landing**

Former NASA chief Sean O'Keefe expressed a strong feeling of satisfaction Tuesday over the safe landing of the Space Shuttle Discovery. The new LSU chancellor was one of millions who watched the shuttle touch down in the morning hours in California. O'Keefe said the astronauts make it look easy but landing the shuttle is always a huge challenge. He affirmed the extreme importance of the foam insulation coming off the shuttle at take-off but he believes it is a problem that can be overcome. "I don't think it's going to be a show stopper by any means," O'Keefe said. "I think it's more of continually learning what it takes to do this. It's tough stuff." O'Keefe recently signed a one year contract with NBC to be interviewed about the shuttle program. LSU officials are pleased with the deal because it will mean increased national exposure for the university. Web posted. (2005). [O'Keefe pleased with shuttle's safe landing [Online]. Available WWW: <http://www.2theadvocate.com/> [2005, August 9].]

### **August 10: Throng lauds heroes**

In a reunion both joyous and tearful, Discovery's astronauts returned to their families and friends in Houston on Wednesday. A day after completing a historic space shuttle return-to-flight mission with a landing in the California desert, the seven members of the crew received a hero's welcome in an Ellington Field hangar jam-packed with space workers, politicians and well-wishers. Commander Eileen Collins and several other members of the crew cried or nearly cried, as they spoke to supporters about their flight and their feelings upon having completed the years-long quest to get the shuttles back to space. Chief among those receiving thanks: spouses, children and the army of workers across the country who made the flight possible. "To my children," a watery-eyed Collins said, "I'm back and I'm happy to say I'll be able to spend more time with you. I want to thank the Lord God, for answering all of your prayers and bringing us back safely." The shuttle pilot Jim "Vegas" Kelly, who Collins proclaimed destined to become a shuttle commander, also thanked his wife and kids before offering an eloquent tribute to the hands-on shuttle workers at Kennedy Space Center and other sites across the country. "What we're really saying is that all of the people that put that vehicle together, and put their heart and soul into this vehicle, it was the cleanest vehicle I've ever seen," Kelly said. "Everybody out there who had hands on the vehicle and had anything to do with putting this vehicle together, we applaud you. You guys did an absolutely fantastic job." Hundreds of those workers, at least the ones from Johnson Space Center, sweated in the steamy Texas weather for hours waiting for the crew's arrival. Then, the crowd went bonkers as the astronauts walked in one by one with spouses on their arms or their young kids clinging to their legs. They were clearly stunned by the size -- and boisterous nature -- of the throng. "I think it's been way too long since a shuttle crew stood here and expressed their appreciation for all that you do," mission specialist Andy

Thomas said. "I certainly hope it won't be long until another shuttle crew stands here." Web posted. (2005). [Throng lauds heroes [Online]. Available WWW: <http://www.floridatoday.com/> [2005, August 11].]

### **KSC crew finds taking out space garbage really stinks**

When the folks at Kennedy Space Center crack open a cargo canister Discovery carried to and from the International Space Station, their first priority is not to grab the gear. It's to air it out. Raffaello is the first cargo module flown in three years. It holds 6,600 pounds of stuff -- three times what was taken to space -- and it's packed with not only used and broken gear, but old clothes. Workers will crack open both ends of Raffaello once it's back at the Space Station Processing Facility. They'll run a fan that has charcoal filters to capture that not-so-pleasant smell before diving in. The more than 500 pounds of clothes and personal items go back to Johnson Space Center. Important gear goes all over the place -- for instance, parts for an automated navigation system that will be returned to the Russians for refurbishment. There's a 330-pound piece of the Elektron oxygen generator, a materials science experiment, broken lights, two jet packs used in spacewalks, treadmill hardware, 12 pairs of spacewalk gloves. Web posted. (2005). [KSC crew finds taking out space garbage really stinks [Online]. Available WWW: <http://www.floridatoday.com/> [2005, August 10].]

### **KSC workers prepare Discovery for trip home**

Almost 250 people from the Kennedy Space Center will help fetch Discovery from California and take the spaceship back to its home port here on Florida's Space Coast. Seventy-eight people were at the desert landing strip at Edwards Air Force Base just in case NASA needed to land Discovery there Tuesday. Another 170 or so will leave today bound for the Mojave Desert to ready the ship for its ride home. It will take about seven days to get the orbiter ready for mounting aboard a modified 747 jumbo jet for its return to KSC. The flight home could take one, two or more days based on past experience. Not all of the work in California is spent on the ferry flight. Some "get-ahead" processing work toward the next mission is done at the same time. NASA wants to get Discovery ready as quickly as possible because the orbiter needs to be ready to be on standby as a rescue vehicle for Atlantis' upcoming mission, which remains officially scheduled to launch no earlier than Sept. 22. Web posted. (2005). [Shuttling orbiter to KSC complex [Online]. Available WWW: <http://www.floridatoday.com/> [2005, August 10].]

### **Probe to pave way for Mars**

A spacecraft launching Thursday morning from the Cape will see Mars in the same way our satellites see Earth: in stunning detail. "Mars Reconnaissance Orbiter is a weather satellite, a geological explorer, a communications satellite and an exploration pathfinder," said Doug McCuiston, NASA's Mars exploration program director. The launch window for the Lockheed Martin Atlas 5 rocket is 7:50 a.m. to 9:35 a.m. Thursday from Cape Canaveral Air Force Station, reflecting a one-day delay. The company is looking at whether a steering-system part that failed in testing at the manufacturer has a unique flaw, or if the problem may also be found in the parts on this rocket. More information is expected this morning. The rocket has to launch by Sept. 5. There's an 80 percent chance of acceptable weather Thursday, Air Force forecasters said. Web posted. (2005). [Probe to pave way for Mars [Online]. Available WWW: <http://www.floridatoday.com/> [2005, August 10].]

### **Discovery appears to have very little damage-NASA**

Shuttle Discovery appears to have suffered very little damage on its latest mission, though a detailed analysis is yet to be completed, a NASA spokeswoman said on Wednesday. "It's one of the cleanest vehicles they've ever seen," said Leslie Williams, a spokeswoman at NASA Dryden Flight Research Center at Edwards Air Force Base in California. Discovery landed at Edwards on Tuesday, capping a 14-day mission that marked NASA's return to human space flight. The shuttle program had been grounded for 2-1/2 years after the shuttle Columbia broke up when re-entering the Earth's atmosphere in 2003, killing all seven astronauts on board. NASA again suspended shuttle missions after Discovery's fuel tank shed a piece of insulation foam during ascent, the same problem that doomed Columbia by damaging its wing. NASA diverted Discovery to California after skipping four chances to land at its home port, the Kennedy Space Center in Florida, because of menacing thunderstorms Monday and Tuesday. Because of the change in the landing site, about 170 NASA experts and contractors are now en route to Edwards to fully evaluate the shuttle's condition and prepare it to be sent back to Kennedy, Williams said. It will be between seven and 10 days before Discovery is flown back to Florida atop a modified Boeing 747 aircraft. Web posted. (2005). [Discovery appears to have very little damage-NASA [Online]. Available WWW: <http://www.reuters.com/> [2005, August 10].]

### **Pentagon Signs Off on NASA Launcher Plans**

The U.S. Department of Defense has signed off on NASA's plan to use major space shuttle components as the basis for separate vehicles that will launch the agency's new crew transport and 100-ton loads of Moon-bound cargo. The U.S. Space Transportation Policy issued by the White House in January requires NASA to coordinate its future launch vehicle plans with the Pentagon and submit a joint recommendation to the president on the nation's next heavy-lift rocket. NASA Administrator Mike Griffin and U.S. Air Force Undersecretary Ronald Sega, the Pentagon's top space official, sent the White House a letter Aug. 5 outlining a joint strategy for the use and development of national launch systems. The two-page letter says "NASA will initiate development of a Crew Launch Vehicle derived from Space Shuttle solid rocket boosters with a new upper-stage for human spaceflight missions in the 25-30 metric-ton-class following retirement of the Space Shuttle in 2010. NASA then plans to develop a new 100 metric-ton-class launch vehicle derived from existing capabilities with the Space Shuttle external tanks and solid rocket boosters for future missions to the Moon." The letter also says NASA and the Pentagon will use the Atlas 5 and Delta 4 rockets developed under the U.S. Air Force's Evolved Expendable Launch Vehicle (EELV) program "for all intermediate and larger payloads for national security, civil, science, and International Space Station cargo re-supply missions in the 5-20 metric-ton-class to the maximum extent possible." The letter further noted that new commercially developed launchers, should they become available, will be allowed to compete for such missions. NASA and the Pentagon, according to the letter, have agreed to complete a joint cost benefit analysis in the coming months of phasing out Boeing's Delta 2 rocket in favor of the EELV. Although the Air Force has largely moved on to the EELV, the smaller Delta 2 remains NASA's workhorse for launching medium-sized science satellites and interplanetary probes. Also according to the letter, the Pentagon will consider using NASA's proposed heavy-lift launcher for any future military missions that might require such a powerful rocket. But it is unlikely, the letter says, that the Pentagon would endorse a shuttle-derived vehicle as an EELV back-up "due to the significant risk, reliability, and cost of modifications required to [Defense

Department] satellites and infrastructure.” Web posted. (2005). [Pentagon Signs Off on NASA Launcher Plans [Online]. Available WWW: <http://www.space.com/> [2005, August 10].]

**August 11: Atlas 5 launch postponed 24 hours**

The Atlas 5 launch team knew what happened but not the cause of this morning's liquid hydrogen fueling problem, prompting the countdown to be scrubbed to further investigate the trouble before trying to boost NASA's Mars Reconnaissance Orbiter on its way to the Red Planet. "We had gotten liquid oxygen loaded into both (Atlas and Centaur) stages, and as we were getting into automatic loading of liquid hydrogen into the Centaur we had the propellant load system showing that the sensors were dry when some of the screens and the data that we were getting was showing wet. So we had a discrepancy there," explained NASA launch manager Chuck Dovale. "We backed out of that and went into a troubleshooting mode. (It) wasn't really clear what the cause was. One option we were going to do was override the automatic software and load manually just to a percentage (of the tank level) to see if our troubleshooting steps were heading in the right direction. Subsequent to that, additional software then locked us out of that manual loading. "So we got ourselves into a condition where we were not quite sure what the cause was and we felt that we didn't have enough time in the window to pursue it any further. So we are currently in a detanking mode and we'll continue troubleshooting and hopefully resolve that and be able to attempt tomorrow." The rocket will remain on the launch pad as the team presses ahead with a 24-hour countdown recycle for liftoff at 7:43 a.m. EDT (1143 GMT), if the hydrogen system issue can be fixed in time. Web posted. (2005). [Mission Status Center [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, August 11].]

**September shuttle launch unlikely**

Shuttle Atlantis is not likely to be ready to fly in September as planned because there's been no easy fix identified to deal with the lingering problem of foam popping off the external fuel tank. Bill Gerstenmaier, the NASA manager leading the investigation of the loss of foam during Discovery's launch last month, said that one or more areas of the tank are going to face some "minor engineering modifications." That is not the kind of change that can be done in time to support a launch in five or six weeks from now. "There is no immediate answer or problems that jump out at us," Gerstenmaier said in a meeting with reporters today. NASA has said the soonest Atlantis could fly was sometime between Sept. 22 and Sept. 26. Gerstenmaier said the space shuttle program has not officially decided to call off the September flight, but he does not see a way to fix the foam problem in time to make such a schedule possible. The next available launch window is a short, four-day opportunity in November. There may be similarly short opportunities in December or January, but the next extended launch window is in March 2006. Web posted. (2005). [September shuttle launch highly unlikely [Online]. Available WWW: <http://www.floridatoday.com/> [2005, August 11].]

**August 12: Mars Reconnaissance Orbiter Launched**

A Lockheed Martin Atlas 5 rocket boosted NASA's Mars Reconnaissance Orbiter into space today, kicking off a \$720 million mission to sniff out underground ice deposits, to map the red planet's geology with unprecedented clarity and to monitor its tenuous, dusty atmosphere in an ongoing scientific assault. The 4,800-pound solar-powered satellite, equipped with a 10-foot-wide antenna to beam a torrent of data back to Earth, also will



serve as a communications satellite, relaying measurements and observations from current and future Mars landers while using its own ultra-high-resolution camera and other instruments to identify possible landing sites. The MRO mission got underway with a ground-shaking roar at 7:43 a.m. today as the Atlas 5 rocket thundered to life and vaulted away from launch complex 41 at the Cape Canaveral Air Force Station. A launch attempt Thursday was called off because of problems with the Centaur second stage's liquid hydrogen fueling system. It turned out to be a software glitch caused by a nearby lightning strike during a thunderstorm earlier in the day. There were no significant problems today and 58 minutes after climbing away through a clear blue sky, MRO was gently released from the rocket's spent upper stage. Within 20 minutes, its two solar arrays and its main dish antenna unfolded and locked in place as planned. Web posted. (2005). [Sharp-eyed orbiter dispatched to Mars [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, August 12].]

### **Gerstenmaier to lead NASA Space Operations**

NASA Administrator Michael Griffin announced today that William H. Gerstenmaier will serve as associate administrator for Space Operations at NASA Headquarters in Washington. Since June 2002, Gerstenmaier has been program manager of the International Space Station Office at NASA's Johnson Space Center in Houston. As associate administrator for the Space Operations Mission Directorate, Gerstenmaier directs NASA's human exploration of space. He also has programmatic oversight for International Space Station, Space Shuttle, Space Communications and Space Launch Vehicles. [William H. Gerstenmaier selected to lead NASA Space Operations," **NASA News Release #05-223**, August 12, 2005.]

### **August 14: Atlas 5 gears up for Pluto launch after Mars success**

Lockheed Martin's venerable family of Atlas rockets are in the midst of a back-to-back lineup of interplanetary launches, the first deep space missions for Atlas boosters in over 27 years. Friday morning's successful launch of the Mars Reconnaissance Orbiter aboard an Atlas 5 rocket marked the first planetary science mission carried aboard an Atlas vehicle since Pioneer 13 flew to Venus three decades ago. Pioneer 13 was launched August 8, 1978, aboard a heritage model of Atlas-Centaur rockets from Cape Canaveral's Complex 36A, located just a few miles south of the cutting edge Complex 41 that was the starting point for the Atlas 5's spectacular blastoff Friday morning. The \$720 million Atlas payload is heading outward in the solar system, where it will enter orbit around Mars on March 10 of next year to begin over four years of comprehensive mapping, subsurface exploration, and communications relay duties for current and future landers. "(Atlas) sent us on a course that was almost picture-perfect, and we could not have asked for a better launch," said MRO project manager Jim Graf. Web posted. (2005). [Atlas 5 gears up for Pluto launch after Mars success [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, August 14-15].]

### **August 15: GOES-N Mission Status Report**

The 330-foot tall mobile service tower has been retracted from the Boeing Delta 4 rocket at Cape Canaveral's launch pad 37B in preparation for today's liftoff to place the GOES-N weather satellite into Earth orbit. Liftoff remains scheduled for 6:32 p.m. EDT, the opening of a 34-minute window that extends to 7:06 p.m. EDT (2232-2306 GMT). This fifth flight of Delta 4 has been delayed multiple times, pushing back its early May launch date to today because due to a series of rocket and payload issues. But officials say all of the problems

have been resolved. Web posted. (2005). [Mission Status Center [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, August 15].]

**August 16: Delta 4 rocket launch put on extended hold**

A second attempt at launching the GOES-N weather spacecraft aboard the Delta 4 rocket was scrubbed due to a last minute technical problem. Launch of the GOES-N spacecraft has been postponed indefinitely because the rocket's safety-destruct system batteries have reached their expiration date. Faced with the onset of the GOES orbital eclipse season and the length of time it would take to replace the batteries, mission managers are delaying the launch for an extended period. A new launch date hasn't been set but the eclipse period lasts through early October. Web posted. (2005). [Mission Status Center [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, August 16].]

**Shuttle to start home Wednesday**

Shuttle Discovery should be home by the weekend. NASA's shuttle carrier aircraft, carrying Discovery piggyback, is set to take off from California at dawn Wednesday (August 17). If bad weather doesn't get in the way, the ferry flight could end as early as Thursday evening with a fly-over along Brevard County's beaches. "That's the earliest," Kennedy Space Center's Bruce Buckingham said. "That all depends on the weather." The carrier plane, a modified Boeing 747, flies low and slow with a delicate spaceship vulnerable to damage from high winds or rain. Cruising at about 15,000 feet, "they've got to dodge thunderstorms and fly around the weather," Buckingham said. Ferrying the shuttle home usually takes two to three days, if the weather is good. The plane can only fly during daylight. ["Shuttle to start home Wednesday," **Florida Today**, August 16, 2005, p 6A.]

**August 17: Geveden selected as NASA Associate Administrator**

NASA Administrator Michael Griffin today named Rex Geveden as the agency's associate administrator. In this capacity, Geveden has oversight for all the agency's technical missions' areas and field center operations. He will be responsible for programmatic integration between NASA's mission directorates and field centers. He has been serving as acting associate administrator since June. ["Geveden selected as NASA Associate Administrator," **NASA News Release #05-227**, August 17, 2005.]

**STS-114 largest live Web event in history**

Interest in NASA's flight of the Space Shuttle Discovery and STS-114 may have generated one of the largest live Web events in the history of the Internet. Tracking records for [www.nasa.gov](http://www.nasa.gov) show more than 2.6 million visitors tuned into coverage at some point during the highly successful two-week mission. Internet users simultaneously watched approximately 435,000 webcast streams of NASA Television during the launch and nearly 400,000 during the Shuttle's landing on August 9th. NASA's webcasts nearly quadrupled an agency record set in July during Deep Impact's encounter with Comet Tempel 1. During that mission, NASA sent out 118,000 webcast streams on July 4. In January 2004, the agency transmitted just under 50,000 streams for the Mars Exploration Rover landings. During the Space Shuttle launch, NASA Portal Web traffic reached a new record of 200,000 pages per minute, with landing-related traffic close behind at 150,000 pages per minute. To put this into perspective, the new peak represents an equivalent rate of 9 billion page views per month. For Discovery's launch, NASA's Return to Flight Web delivery sponsors, Yahoo! and Akamai, were sending data at a rate of more than 45 gigabits per second. During the

entire Space Shuttle Discovery mission, 270 terabytes of information that would fill 60,000 DVDs, was delivered to the public. [“Space Shuttle internet interest reaches new heights,” **NASA News Release #05-228**, August 17, 2005.]

**August 18: Next shuttle launch: March 2006**

As expected, NASA managers today announced the next space shuttle flight will be delayed until at least next March to give engineers time to fix the external tank foam insulation problems that marred shuttle Discovery's launch last month. At the same time, NASA Administrator Michael Griffin said he welcomed highly critical observations included in the final report of the Stafford-Covey Return to Flight Task Group, an advisory panel charged with assessing the agency's implementation of post-Columbia safety recommendations. In a strongly worded "minority report," seven of the task group's 26 members blasted NASA's management of the post-Columbia shuttle program, blaming poor leadership for ongoing, pervasive "cultural" problems and an erosion of engineering rigor that raise questions about the agency's willingness to fly without a thorough understanding of the risks involved. Bill Gerstenmaier, newly appointed head of space operations at NASA headquarters, said the decision to push the next shuttle flight back to the March time frame was unavoidable given the work needed to fix the external tank foam shedding problem. Because of a NASA-imposed requirement to launch the next flight in daylight, and to ensure the tank is jettisoned in daylight to permit photo documentation, NASA only had two launch windows left this year: Sept. 22-25 and Nov. 7-10. Another brief window was available Jan. 4-7, 2006. The target window opens March 4 and closes March 19. Engineers are hopeful the opening can be moved up one day, to 3:46 p.m. March 3, but that remains to be seen. The next window opens May 3 and runs through May 22 and the window after that runs from June 30 to July 19. Engineers still don't know what caused a large piece of foam to separate from a so-called "PAL ramp" on Discovery's external tank. But NASA now plans to ship the next tanks in the launch sequence back to Lockheed Martin's Michoud Assembly Facility near New Orleans where the PAL ramps likely will be removed and then rebuilt from scratch. One benefit of the launch delay is that NASA can now use Discovery for the next mission instead of Atlantis as originally planned. The original plan called for Atlantis to be used for the second and third post-Columbia missions, in large part because Atlantis is lighter than Discovery and the third payload is made up of heavy solar array components. "So do I have a crisis of confidence in the team that made almost every thing work right? Of course not," NASA Administrator Mike Griffin said. "We're going to take the data and see where it leads us and we're going to fix those things that we didn't get right. But In a very important sense, this was the first try that the tank team, shuttle team, the NASA team ever really made to reduce the foam shedding to a minimal and acceptable level. I think they did pretty darn well for the first try. And that's how I'd like people to view it." Web posted. (2005). [Next shuttle launch: March 2006 [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, August 18].]

**Discovery set to return to KSC**

NASA's Space Shuttle Discovery ferry flight departs no earlier than Friday morning, Aug. 19, and arrives at KSC no earlier than 5:30 p.m. EDT, Saturday. Live coverage of Discovery's departure and arrival will be available on NASA TV. The Shuttle's flight and refueling stops depend on weather along the route. Weather restrictions may cause unexpected changes to the flight path and arrival delays. [“NASA’s shuttle Discovery set for return to Kennedy Space Center,” **NASA Media Advisory #M05-141**, August 18, 2005.]

### **August 21: Discovery returns home to Florida**

Space shuttle Discovery returned to Florida's Kennedy Space Center atop a NASA 747 on Sunday, 12 days after it was detoured from Earth orbit to California. The landing returns to home base the first shuttle to fly after the 2003 Columbia disaster that killed all seven crew members. Perched on the back of a modified Boeing 747, Discovery set off for Florida earlier in the day from Barksdale Air Force Base in Louisiana, where it had spent the night en route from its landing site at California's Edwards Air Force Base. Discovery and the 747 touched down in Florida just before 10 a.m. ET. About a half hour earlier, Discovery astronaut Steve Robison arrived from Houston aboard a T-38 Talon to welcome home the spacecraft he was aboard two weeks ago. Bad weather kept Discovery at Barksdale for an extra day after it landed there Friday. A KC-135 Stratotanker aircraft flew about 100 miles in front of the jet carrying Discovery to monitor the weather in its flight path. NASA has stringent weather criteria for landing and transporting shuttles. Web posted. (2005). [Discovery returns home to Florida [Online]. Available WWW: <http://www.cnn.com/> [2005, August 22].]

### **Delta 4 Readied at Vandenberg Air Force Base**

The inaugural launch of Boeing's Delta 4 rocket from the overhauled Space Launch Complex-6 (SLC-6) pad at Vandenberg Air Force Base in California is nearing. That booster, flying in the same configuration as the GOES-N rocket with two cryogenic stages, a four-meter payload fairing and two strap-on solid rocket motors, could launch by the end of September. A Wet Dress Rehearsal, or WDR, is scheduled for this Friday to run through a complete launch day simulation. The Boeing-made booster will be the largest rocket ever flown from SLC-6, which has a history dating to the Air Force's Manned Orbiting Laboratory project of the 1960s. It's also the former California launch pad for the space shuttle, but the site was mothballed in the late 1980s before any shuttles flew from the complex. The site was used briefly in the 1990s for Lockheed Martin's small Athena rocket. The Delta 4 currently stands on the pad without its payload -- a classified spy spacecraft cargo for the U.S. National Reconnaissance Office. The payload will be transported to SLC-6 and bolted atop the rocket once a successful WDR is completed. Web posted. (2005). [Boeing teams gearing up for reshuffled launch schedule [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, August 21].]

### **Emergency landing site at French air base**

When the space shuttle blasts off, which space agency officials say won't be until March, astronauts will have the option of making an emergency landing at a French air base, if needed. The United States and France have agreed to establish an emergency landing site for the shuttle at Istres air base, north of Marseille. NASA administrator Michael Griffin and French Ambassador Jean-David Levitte signed the agreement in Washington in June, according to a NASA news release. The base will be one of many Transoceanic Abort Landing sites that are spread across the globe. The landing strips would be used if the shuttle had a problem after launch and had to make an emergency landing. Under the new agreement, American military personnel would return to the base, but only during shuttle launches. U.S. military emergency teams trained in shuttle rescue operations and under the guidance of the Department of Defense Manned Space Flight Support Office deploy to the emergency landing sites prior to launch, according to NASA spokeswoman Debbie Rahn. She did not know which units might deploy to Istres. Ramstein Air Base in Germany and

Naval Station Rota in Spain send personnel to the two primary abort landing sites at Zaragoza and Morón Air Base in Spain. One reason Istres was selected was because its three-mile runway is one of the longest airstrips in Europe, Rahn said. Additional lighting and concrete pads for more landing aids will be built at the base so it is ready for the next launch. NASA has said another shuttle launch won't happen until March as it tries to solve the problem of insulation foam breaking off during launch. Web posted. (2005). [In a pinch, future shuttles could land in France [Online]. Available WWW: <http://www.estripes.com/> [2005, August 21].]

**August 23: Waterspout whirls briefly near KSC landing site**

A strong thunderstorm cell spawned a waterspout that touched down briefly near the shuttle landing facility at Kennedy Space Center this morning. There were no reports of any damage as the waterspout moved onto land about 10:55 a.m., nearly a half-mile north of the landing area where shuttle Discovery returned Sunday. "We got a couple reports that it was the ground for several minutes," said John Pendergrast, a meteorologist with the National Weather Service in Melbourne. The thunderstorm was part of a fast-developing system of storms expected to linger over much of Brevard County for the remainder of the afternoon, Pendergrast said. The showers were also expected to be fueled by afternoon sea breezes and will increase rain chances to 30 percent for much of the area, officials said. Web posted. (2005). [Waterspout whirls briefly near KSC landing site [Online]. Available WWW: <http://www.floridatoday.com/> [2005, August 23].]

**Kross named director Safety and Mission Assurance**

NASA Kennedy Space Center Director Jim Kennedy announced this week that Denny A. Kross has been named the director of the Safety and Mission Assurance organization at KSC. Kross will lead the nearly 250 professionals who provide an independent review and oversight to the programs at KSC that ensure mission success is accomplished and a safe workplace is achieved. "I have the utmost confidence in Denny's leadership abilities and am pleased he will lead our safety organization at the Center," said Kennedy. "This is a pivotal position on the management team, and Denny's tremendous technical background in the Shuttle program, coupled with his extensive aerospace experience within NASA, are welcome additions." Prior to his selection, Kross served as Space Shuttle deputy program manager at KSC since April 2004, where he was responsible for all aspects of Space Shuttle preparation, launch and return of the orbiter to KSC following flight. "Denny is a leader, a proven program manager and a seasoned engineer with many years of experience with human space flight programs," said Bryan O'Connor, chief of Safety and Mission Assurance at NASA Headquarters, Washington. "We welcome him as our newest Safety and Mission Assurance director." [Denny A. Kross named Director of Safety and Mission Assurance at KSC," **NASA News Release #84-05**, August 23, 2005.]

**August 24: Grissom Spacesuit in Tug of War**

Through letters, phone calls and an Internet petition, Amanda Meyer of Madison, Conn., a high school sophomore is waging a campaign to get federal officials to relinquish control of a spacesuit worn by astronaut Virgil I. "Gus" Grissom during a 15-minute suborbital flight in the Liberty Bell 7 capsule in 1961. Grissom, picked to be one of NASA's original seven Mercury astronauts in 1959, died in a fire aboard Apollo 1 during a launch pad test on Jan. 27, 1967. His family wants to keep his suit from the earlier mission. The suit, which is on display at the Astronaut Hall of Fame near the Kennedy Space Center in Florida, has been



the focus of a long tug of war between Grissom's family and the national space agency. Family members say Grissom rescued the suit from the scrap heap in 1961 and brought it home, where it hung in a closet with his wife's clothing for nearly 30 years. In 1990, they lent it and other artifacts to the Hall of Fame, then a privately run museum in Titusville, Fla. After the museum was taken over by a NASA contractor in 2002, the Grissoms wanted their part of the collection back. The family was able to retrieve Grissom's watch, a cowboy hat, a patch and an American flag, but NASA refused to hand over the spacesuit. NASA records indicate that Grissom signed the suit out in 1965 to take it to a show-and-tell event for his children and never brought it back, said Roger D. Launius, chairman of the space history division at the National Air and Space Museum here. (The museum is part of the Smithsonian Institution, which acquired the suit from NASA in 2003.) The suit will remain at the space center museum at least until the end of the year, when the current loan expires, Launius said. Conceivably it could be moved to the Air and Space Museum's Steven F. Udvar-Hazy Center in Chantilly, the Air and Space Museum downtown, or some other museum, if it does not stay where it is, he said. Web posted. (2005). [Grissom Spacesuit in Tug of War [Online]. Available WWW: <http://www.washingtonpost.com/> [2005, August 24].]

**August 26: KSC delays shipping shuttle tank**

Kennedy Space Center officials kept close tabs Thursday on Hurricane Katrina, but work otherwise went on as scheduled. Forecasters expected up to an inch-and-a-half of rain but sustained winds were not expected to top 58 mph, a level that would trigger a higher state of alert. The storm held up the shipment by barge of a shuttle external tank back to its manufacturing plant in New Orleans. NASA managers decided to keep the barge docked at Port Canaveral rather than sending it around the southern tip of Florida in a storm. "They're going to find a quiet harbor to moor its at and stay out of harm's way until the storm passes," spokesman Bruce Buckingham said. The tank is being shipped back to the plant as part of an investigation into a dangerous foam-shedding event during Discovery's July launch on NASA's first shuttle mission since the 2003 Columbia accident. A one-pound piece of foam insulation similar to the one that doomed Columbia's crew broke free from Discovery's tank two minutes after launch, barely missing the shuttle's right wing as the ship climbed toward orbit. Web posted. (2005). KSC delays shipping shuttle tank [Online]. Available WWW: <http://www.floridatoday.com/> [2005, August 26].]

**Shuttle Processing Status Report**

Discovery (OV-103); Mission: STS-121 - 18th ISS Flight (ULF1); Payload: Multi-Purpose Logistics Module; Location: Orbiter Processing Facility Bay 3; Launch Date: NET March 2006; Launch Pad: 39B; Crew: Lindsey, Kelly, Sellers, Fossum, Nowak, Wilson and Reiter; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Following Discovery's return from Edwards Air Force Base in California atop the Shuttle Carrier Aircraft on Sunday, the vehicle was rolled into Orbiter Processing Facility bay 3 to begin its processing for the second Space Shuttle Return to Flight test mission, STS-121. The orbiter was placed on its jacks and work stands were installed around the vehicle. Obiter window inspections are complete and protective covers installed. The payload bay doors were opened on Wednesday. Atlantis (OV-104); Mission: STS-115 - 19th ISS Flight (12A); Payload: P3/P4 Solar Arrays; Location: Vehicle Assembly Building; Launch Date: TBD; Launch Pad: 39B; Crew: Jett, Ferguson, Tanner, Burbank, MacLean, Stefanyshyn-Piper; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Orbiter Atlantis remains in the Vehicle Assembly

Building attached to its External Tank (ET-120) and Solid Rocket Boosters. Preparations are under way to demate, or remove, Atlantis from its ET. Atlantis will be lowered next week into the transfer aisle and be rolled back to Orbiter Processing Facility Bay 1 in early September. ET-120, the first redesigned ET to arrive at KSC, will eventually be sent back to the Michoud Assembly Facility for further testing. In the Vehicle Assembly Building, the Solid Rocket Boosters will be destacked and sent back to ATK Thiokol in Utah for refurbishment. In December, the booster segments will have reached the end of the time allowable for segments to be stacked prior to a launch. A new booster stack will be built for Atlantis' launch. Endeavour (OV-105); Endeavour is in its Orbiter Major Modification period, which began in December 2003. External Tank: External Tank 119, the third redesigned tank to arrive at Kennedy Space Center, was moved from the checkout cell in the Vehicle Assembly Building and loaded onto Pegasus, NASA's specially designed barge, on Tuesday for transport to the Michoud Assembly Facility in New Orleans. The tank will be returned for further evaluation, inspection and redesign prior to the next Return to Flight mission, designated STS-121. Owner-press-release. (2005). **Space Shuttle Processing Status Report** [Online]. Available E-mail: owner-press-release@spinoza.public.hq.nasa.gov [2005, August 26].]

### **Expendable Launch Vehicles Status Report**

Mission: Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observation and CloudSat (CALIPSO/CloudSat); Launch Vehicle: Boeing Delta 7420 w/Dual Payload Attach Fitting (DPAF); Launch Pad: Space Launch Complex 2 (SLC2), Vandenberg Air Force Base, Calif.; Launch Date: NET, September 29, 2005. The CloudSat spacecraft was fueled Aug. 14 and the fuel tanks pressurized Aug. 15; CALIPSO was fueled Aug. 24 and the fuel tanks pressurized Aug. 25. CloudSat was mated to the DPAF Aug 23. Installation of the upper half of the DPAF for CALIPSO was completed today. The CALIPSO Mission Readiness Review was today. The CloudSat Mission Readiness Review is scheduled for Thursday, Sept. 1. As a part of the NASA Earth System Science Pathfinder program, CALIPSO is a collaborative effort with the French space agency Centre National d'Etudes Spatiales, Ball Aerospace, Hampton University, Va. and France's Institut Pierre Simon Laplace. Ball Aerospace is responsible for CALIPSO's scientific instrument and communications suite, including the lidar and Wide Field Camera. NASA's Launch Services Program at KSC provides government launch services for this mission through Boeing Expendable Launch Systems. KSC News Center (2005). **Expendable Launch Vehicles Status Report** E05-009 [Online]. Available E-mail: ksc@newsletters.nasa.gov [2005, August 26].]

### **August 28: Next generation will alter KSC**

U.S. astronauts will launch to the moon on sleek, single, shuttle booster rockets and the first new upper-stage rocket this country has developed in more than a decade, NASA and the Pentagon have told the White House. Lunar landers and other gear needed for extended visits to the moon will be lofted by gargantuan launchers as big as the Apollo-era Saturn 5, the most powerful rockets ever flown. The new moon rockets, cobbled together primarily from proven shuttle components, still will blast off from Kennedy Space Center. But the transition from the shuttle to moon missions will change the face of the Brevard County spaceport. Landmark facilities such as the hangars where the orbiters are readied for flight likely will be shuttered as the orbiters retire in 2010. NASA no longer will need the KSC runway for shuttle landings or the factory where workers hand-craft heat-shielding tiles and blankets. KSC's 14,500-person work force will shrink by as much as one-third in the next

decade. But NASA and its contractors hope attrition will reduce layoffs. About one-third of shuttle workers are old enough to retire by 2011. In speeches this year, KSC director Jim Kennedy has speculated KSC employment could drop to as low as 10,000, but he would not comment on the employment picture for this article. NASA's rocket decision, expected to be announced next month, is outlined in an Aug. 5 letter to John Marburger, director of the White House Office of Science and Technology Policy. "NASA will initiate development of a Crew Launch Vehicle derived from space shuttle solid rocket boosters with a new upper stage for human spaceflight," said the letter, signed by NASA Administrator Mike Griffin and the Pentagon's top space official, ex-astronaut Ron Sega. The so-called "single stick" rocket could be ready to launch a proposed Crew Exploration Vehicle by 2011, minimizing the gap in the country's ability to get people into space after the orbiters retire. Griffin and Sega also said NASA will field a heavy-lift launcher rivaling Saturn 5 moon rockets in sheer power and payload capability. Web posted. (2005). [Next generation will alter KSC [Online]. Available WWW: <http://www.floridatoday.com/> [2005, August 28].]

**August 29: Hurricane Katrina hits Gulf Coast**

Hurricane Katrina barreled into the Gulf Coast just outside New Orleans around daybreak Monday as a category 3 storm. Considering the scope of its impacts, Katrina was one of the most devastating natural disasters in United States history. Web posted. (2005). [Tropical Cyclone Report Hurricane Katrina [Online]. Available WWW: <http://www.nhc.noaa.gov/> [2005, December 20].]

**August 30: NASA examines Discovery's leading-edge panels**

Thermography of Space Shuttle Discovery's wing leading-edge panels began on 30 August at the Kennedy Space Center's Orbiter Processing Facility (OPF). The inspection has not been carried out before and is a return-to-flight activity peculiar to Discovery. The orbiter's 22 wing leading-edge panels were examined using thermography before the mission when they were not on the vehicle to provide baseline data. They are now being examined for degradation, while still on the orbiter. However, NASA has yet to make any decisions on any other RTF-related actions. "We have yet to determine the full impact of return-to-flight activities on processing flow," says NASA. On the same day the thermography started, the Italian-built Leonardo Multi-Purpose Logistics Module (MPLM) was removed from Discovery's cargo bay. An MPLM will go back into the bay eventually because the module's 2t (4,400lb) capacity is needed for the next mission – STS-121 – to resupply the International Space Station. The Orbital Boom Sensor System was also to be removed last week, along with the Shuttle's robotic arm. This is to allow access to areas such as avionics boxes and is normal practice. Landing at Kennedy's runway 15 on 21 August, Discovery was de-mated from its Boeing 747 carrier aircraft and lowered on to its own landing gear. The following day it was moved into the OPF and work began on removing its payload. Next week, Discovery's three Space Shuttle Main Engines (SSME) will be removed. They will be replaced by engines now at Kennedy's SSME processing facility. Web posted. (2005). [NASA examines Discovery's leading-edge panels [Online]. Available WWW: <http://www.flightinternational.com/> [2005, September 5].]

**August 31: Michoud, Stennis escape catastrophic damage**

NASA's Michoud Assembly facility in New Orleans and Stennis Space Center in Mississippi escaped catastrophic damage from Hurricane Katrina, although the devastating effects of the

storm on the surrounding areas and employee homes is certain to affect the agency's efforts to launch the space shuttle in March 2006. No formal damage assessment has taken place at either site, the potential dollar cost to NASA remains unknown. There are no reports of injuries at Michoud or Stennis, although "both places are going to be closed while the recovery effort goes on, and that could be a while," NASA spokesman Allard Beutel said. "We know it's going to have an impact on overall [shuttle] scheduling." Katrina surged ashore in Louisiana Aug. 29 with 140 mph winds, flooding the low-lying city of New Orleans and wreaking havoc in Mississippi and Alabama. Emergency crews are using helicopters and boats to rescue stranded residents who have taken to rooftops to avoid the rising waters. The 830-acre Michoud facility, where Lockheed Martin builds the shuttle's external tanks, was under one to two feet of water during the height of the storm, according to Lockheed Martin spokesman Harry Wadsworth. Although the water later receded, the city began flooding again Aug. 30 after a crucial levee broke. The storm did "sporadic" roof damage to various buildings at Michoud, but the eight completed external tanks at the facility seem to have escaped harm, Wadsworth said. An emergency crew of 20-30 people stayed onsite through the storm and still is there, he said. Stennis Space Center seems to have fared better than its surrounding areas, and now is being used as a safe haven by stranded NASA employees and other local residents. The Federal Emergency Management Agency is using Stennis as a staging area for rescue efforts, according to Beutel. The rocket test stands at Stennis appear to have weathered the storm well, he said. E-mail distribution. (2005). [Aviation Week's [Aerospace Daily & Defense Report](#) Re: "Michoud, Stennis escape catastrophic damage, but shuttle schedule uncertain," [Electronic]. Vol. 215, No. 43, [August 31, 2005].]

### **Tanks fine; shuttle may feel impact**

An early assessment of NASA facilities in the path of Hurricane Katrina showed no damage to space hardware so far, but the painstaking recovery could make it hard to meet a March shuttle launch date. There was damage but no injuries at Michoud Assembly Facility in New Orleans, where eight of the shuttles' external fuel tanks are in the works. Recovery efforts will be so massive that NASA can't say when the facility will be up and running again. NASA is rethinking the fuel tanks' design after dangerously large chunks of foam insulation fell off Discovery's tank during its launch last month. To meet a launch target of March, a redesigned tank would have to be delivered to KSC by around November. "It's just way too early to tell what kind of impact it's going to have on schedules at this point," NASA spokesman Allard Beutel said of the storm. A fuel tank poised to head to Michoud from Kennedy Space Center is holed up on its barge at Port Canaveral, NASA spokeswoman Jessica Rye said. It will stay there or be stowed at KSC until Michoud is operational. Meanwhile, Stennis Space Center in southern Mississippi, about halfway between New Orleans and Biloxi, still shelters hundreds of employees, their families and members of the public. Its engine-testing facilities were in good shape, NASA reported. Web posted. (2005). [Tanks fine; shuttle may feel impact [Online]. Available WWW: <http://www.floridatoday.com/> [2005, August 31].]

### **Leaders pitch space ideas**

Business leaders on Wednesday challenged a state panel to think outside the traditional boundaries of NASA in trying to preserve Florida's space industry -- with a focus on industries in which their companies are involved. The executives pitched their ideas -- from space-technology research to space tourism -- to a panel created by Gov. Jeb Bush called the

Commission on the Future of Space & Aeronautics in Florida, which met Wednesday in Tampa. Bush created the commission in June after new NASA Administrator Mike Griffin, nominated this year by the governor's brother, President Bush, laid out plans to retire the space shuttle by 2010, and develop a new vehicle for manned and unmanned trips to the moon and Mars in following years. The commission, which held its first meeting at Cape Canaveral in July, is charged with making recommendations on where the state should focus to maintain and enhance its standing in the space industry. The commission is expected to deliver its recommendations to Gov. Bush and the Florida Legislature by January. Web posted. (2005). [Leaders pitch space ideas [Online]. Available WWW: <http://www.floridatoday.com/> [2005, August 31].]





A truck with a 1-megawatt generator drives past NASA Kennedy Space Center's Vehicle Assembly Building on its way to Stennis Space Center in Mississippi. Stennis suffered damage and power outages from Hurricane Katrina. KSC is sending a helicopter with medical supplies and an Emergency Medical Technician to Stennis, plus a 1-megawatt generator, 125- and 225-kilowatt generators, and 1,000 gallons of diesel fuel. Michoud Assembly Facility near New Orleans was also left without power.

## SEPTEMBER 2005

### **September 1: Fuel tank can not go back as scheduled**

NASA started to take fully assembled shuttle Atlantis apart at Kennedy Space Center on Wednesday, while plans are on hold to send another external fuel tank back to its production plant in New Orleans. Ripple effects from Hurricane Katrina raised serious doubts about the agency's ability to launch its next mission in March. Up to 70 percent of the people who work at a shuttle external tank manufacturing plant in New Orleans had their homes damaged or destroyed when Katrina swept ashore this week, NASA officials said. Its storm surge swamped the Michoud Assembly Facility with as much as 2 feet of water. Electrical power and communications were knocked out. Water service was interrupted. The Lockheed Martin factory will remain closed until at least Tuesday, but it might take several weeks to restore power, communications and other utilities. It's also uncertain how soon workers will be able to return. Plans to ship three tanks, including the one for NASA's next mission, back to Michoud for retrofitting are on indefinite hold. The 15-story tank for NASA's next mission will be returned to the 52-story KSC Vehicle Assembly Building from Port Canaveral. Loaded onto a covered barge, it began a trip back to Michoud last week but since has been sheltered at Port Canaveral to avoid the storm. Now, it's unclear when the tank will be shipped, Buckingham said. Web posted. (2005). [Fuel tank can't go back as scheduled [Online]. Available WWW: <http://www.floridatoday.com/> [2005, September 1].]

### **September 2: NASA Considers Fixing Shuttle Fuel Tanks at KSC**

NASA might repair and modify shuttle external tanks at Kennedy Space Center to make up for time lost to an extended shutdown of a manufacturing plant in New Orleans. No final decisions have been made, but a team is developing options that include performing the work in the 52-story Vehicle Assembly Building or a payload processing facility in the KSC Industrial Area. "We're looking at different alternatives to offset the loss of work" at Michoud Assembly Facility in Louisiana, said KSC spokesman Bruce Buckingham. "We expect Michoud is going to be without power for at least a month or longer, so we've been asked to form a team to develop options to perform repairs and modification work here." The Lockheed Martin external tank factory was knocked out of action when Hurricane Katrina swept ashore earlier this week, devastating cities and towns across the Gulf Coast. Buckingham said the KSC team is identifying buildings that much of which must be done while the 154-foot tanks are lying horizontally. Among possible locations: The transfer aisle of the Vehicle Assembly Building, a ground floor area between high bays that stretches some 718 feet from the north to the south side of the building; The KSC Operations and Checkout Building, which features a lengthy, environmentally controlled low bay where NASA has worked on Gemini and Apollo spacecraft as well as Skylab, the nation's first space station, and European Spacelab modules. The team also is examining what ground support equipment would be needed to perform repair and modification work at KSC. Another factor: Identifying people at KSC and Michoud who have the right skills and certifications to perform the work. Web posted. (2005). [NASA Considers Fixing Shuttle Fuel Tanks at KSC [Online]. Available WWW: <http://www.floridatoday.com/> [2005, September 2].]

### **Space Shuttle Processing Status Report**

Discovery (OV-103); Mission: STS-121 - 18th ISS Flight (ULF1); Payload: Multi-Purpose Logistics Module; Location: Orbiter Processing Facility Bay 3; Launch Date: NET March

2006; Launch Pad: 39B; Crew: Lindsey, Kelly, Sellers, Fossum, Nowak, Wilson and Reiter; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Discovery is in Orbiter Processing Facility bay 3 with processing under way for the second Space Shuttle Return to Flight test mission, STS-121. The plugs installed in the Orbiter Maneuvering System and the Forward Reaction Control System for the ferry flight from California were removed. Preparations to remove the three Space Shuttle Main Engines from Discovery continue, with engine removal to begin late next week. The Orbiter Boom Sensor System is currently scheduled to be removed from the payload bay early next week following the holiday weekend. Technicians have begun thermography of the 22 Reinforced Carbon-Carbon panels on each wing leading edge. Thermography is a procedure that uses high intensity light to heat areas that are immediately scanned with an infrared camera. Atlantis (OV-104); Mission: STS-115 - 19th ISS Flight (12A); Payload: P3/P4 Solar Arrays; Location: Vehicle Assembly Building; Launch Date: TBD; Launch Pad: 39B; Crew: Jett, Ferguson, Tanner, Burbank, MacLean and Stefanyshyn-Piper; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Orbiter Atlantis was demated, or removed, from its propulsion elements, an External Tank and twin Solid Rocket Boosters, and lowered into the Vehicle Assembly Building (VAB) transfer aisle today. Atlantis will remain in the VAB until after the holiday weekend and be rolled back to Orbiter Processing Facility Bay 1 on Tuesday, Sept. 6. Endeavour (OV-105); Endeavour is in its Orbiter Major Modification period, which began in December 2003. External Tank: External Tank 119, the third redesigned tank to arrive at Kennedy Space Center, was moved from Port Canaveral back to the Turn Basin today. The tank will be offloaded and moved to the Vehicle Assembly Building next Wednesday, Sept. 7. The tank was loaded onto Pegasus, NASA's specially designed barge, for transport to the Michoud Assembly Facility in New Orleans. The tank was held at Port Canaveral due to the impacts of Hurricane Katrina. Due to the impacts of the hurricane, the Space Shuttle Program formed a team to review possible options and locations for performing some of the External Tank processing at Kennedy Space Center. Owner-press-release. (2005). **Space Shuttle Processing Status Report** S05-036 [Online]. Available E-mail: owner-press-release@spinoza.public.hq.nasa.gov [2005, September 2].]

### **September 3: NASA moving Atlantis back to hangar**

A six-month slip in NASA's next shuttle mission, coupled with hurricane damage to its external tank factory in New Orleans, is prompting the agency to move a lot of hardware around Kennedy Space Center. The orbiter Atlantis was hoisted off a mobile launcher platform in the KSC Vehicle Assembly Building on Friday, the first step in taking apart a fully assembled shuttle. The spaceship, which will be moved back to its processing hangar Tuesday, was connected to a 15-story external tank with attached solid rocket boosters. Technicians will begin disassembling the tank-booster set next week. "We don't want the shuttle to stay stacked because we won't be launching until next year," said KSC spokeswoman Jessica Rye. Shuttle external tanks will all undergo modifications to prevent shedding of foam insulation in flight. The 2003 Columbia accident was caused by breakaway foam, and a large piece of insulation fell off Discovery's tank during the first post-Columbia launch in July. Atlantis' segmented boosters will be taken apart because they would have been stacked for 12 months in December, exceeding a time limit. A new set will be built up and the old segments will be shipped back to their Utah manufacturer. The fuel tank for NASA's next mission, which is set for launch next March but faces likely delays, arrived back at KSC on Friday. The barge carrying it was headed back to the Michoud Assembly Facility in New Orleans, but reversed course to avoid Hurricane Katrina. The storm seriously

damaged the factory. Designated ET-119, the tank will be offloaded from the covered barge Wednesday and moved into the Vehicle Assembly Building. Web posted. (2005). [NASA moving Atlantis back to hangar [Online]. Available WWW: <http://www.floridatoday.com/> [2005, September 3].]

#### **September 6: NASA secures shuttle, fuel tank**

The orbiter Atlantis rolled from the Vehicle Assembly Building back into its hangar Tuesday as NASA prepared Kennedy Space Center for high winds and heavy rains from a storm brewing offshore. And the external tank for the next shuttle mission is scheduled to be moved into the VAB today. NASA meteorologists forecast sustained winds of 23 mph today with gusts up to 40 mph. The storm -- which was expected to strengthen into Tropical Storm Ophelia -- threatened to dump as much as 15 inches of rain in some areas. Five to 10 inches were expected elsewhere. "The big concern is that it's a slow-mover, and there's going to be a lot of rain, so there could be flooding in low-lying areas," KSC spokesman George Diller said. More rain and winds topping 58 mph are expected at KSC on Thursday. NASA plans to move the external tank for its next shuttle mission into the 52-story KSC Vehicle Assembly Building today. Secured inside a covered barge, the 154-foot-long tank returned to KSC last week after Hurricane Katrina prompted NASA to cancel a trip back to Michoud Assembly Facility in New Orleans. Damage from Katrina forced NASA to indefinitely close the factory, which remains reachable only via helicopter and boat. The fuel tank could ride out the storm on the barge if necessary, KSC spokeswoman Jessica Rye said. Engineers say it would be safe there even if the storm developed into a Category 1 hurricane with winds between 74 and 95 mph. Web posted. (2005). [NASA secures shuttle, fuel tank [Online]. Available WWW: <http://www.floridatoday.com/> [2005, September 7].]

#### **Expendable Launch Vehicles Status Report**

Mission: Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observation and CloudSat (CALIPSO/CloudSat); Launch Vehicle: Boeing Delta 7420 w/Dual Payload Attach Fitting (DPAF); Launch Pad: Space Launch Complex 2 (SLC2), Vandenberg Air Force Base, Calif.; Launch Date: NET Oct. 1, 2005. Due to other Delta II launch and test activity, CALIPSO/CloudSat is tentatively scheduled for no earlier than Oct. 1, pending the availability of the Western Range. CALIPSO was installed onto the payload attach fitting on Aug. 30 and is being installed within the upper portion of the DPAF today. CloudSat processing activities are complete. Battery charging will continue until the spacecraft is transported to the launch pad along with CALIPSO on Sept. 13. The CloudSat Mission Readiness Review was successfully completed on Sept. 1. The Delta II preparations at NASA's Space Launch Complex 2 are complete and the launch vehicle is awaiting arrival of the CALIPSO/CloudSat payloads for installation atop the second stage. KSC News Center (2005). **Expendable Launch Vehicles Status Report** E05-010 [Online]. Available E-mail: [ksc@newsletters.nasa.gov](mailto:ksc@newsletters.nasa.gov) [2005, September 6].]

#### **September 7: No shuttle flights for a year?**

As NASA continues to assess the impact of Hurricane Katrina on the future of the shuttle program, at least one official is warning it could take up to a year before the next flight takes off. The space agency grounded future shuttle flights after a fuel tank insulation problem was found during Discovery's mission a month ago. The pre-Katrina hope was for a new shuttle flight in March 2006, but after NASA's Michoud facility in New Orleans was hit during the hurricane, analysts expected that mission to slip into May. That now may turn out

to be overly optimistic — and not just because of the hurricane damage. MSNBC.com has obtained an “extremely preliminary” planning document written by Wayne Hale, NASA’s deputy shuttle program manager, in which he concludes: “Launch dates before the fall of 2006 may not be credible.” Sources point out that this is not a proposed schedule, much less an official “schedule slip” — at least so far. A lot of “worst case” planning is going on, to identify bottlenecks. Once that’s been done, reallocation of resources and allocation of high levels of cleverness can do much to streamline the process, they said. A NASA spokeswoman said Wednesday that no decision had been made yet on a new launch window and that the agency was still determining the extent of the hurricane damage. Hale’s memo also gives an overview of the hurricane’s impact at other NASA locations: “Rail transportation of [Solid Rocket Motors] normally utilizes the rail terminals in the New Orleans area,” he writes. “KSC [in Florida] is being affected since power generation in Florida is dependent on natural gas from offshore production,” he continues, adding that “conservation of electricity has been mandated and impact to work at KSC is possible.” Web posted. (2005). [No shuttle flights for a year? [Online]. Available WWW: <http://www.msnbc.com/> [2005, September 7].]

#### **September 8: Katrina puts shuttle plans in disarray**

With two space shuttle facilities damaged by Hurricane Katrina and hundreds of workers left homeless, NASA is reassessing the prospects of launching another shuttle mission next year. Before the hurricane struck the Gulf Coast last week, NASA had hoped to launch Discovery in March. The storm put those plans in disarray, although NASA officials weren't ready Thursday to officially give up on a spring launch, saying it would be foolish to rule anything in or out. "Right now, we're still addressing what the implications are on the shuttle launch schedule, and if I say I don't know what those are, that's an understatement," NASA Administrator Michael Griffin told employees in a televised address. Griffin downplayed an internal memo written September 1 by acting shuttle program manager Wayne Hale, who indicated a launch before fall 2006 might not be possible given the hurricane damage and the ongoing effort to prevent foam insulation from falling off shuttle fuel tanks. At a news conference later Thursday, Bill Gerstenmaier, head of NASA's space operations, refused to speculate on when the space shuttle might fly again, saying "It's really too difficult to predict." NASA may end up repairing fuel tanks at Kennedy Space Center in Florida, as opposed to the hurricane-damaged Michoud Assembly Facility in New Orleans, where the tanks are made, Gerstenmaier said. NASA's Stennis Space Center near Bay St. Louis, Miss., where shuttle main engines are tested, was also damaged by the hurricane. The damage at both sites was primarily to roofs, but one of the eight fuel tanks at Michoud was dinged by debris. The space agency estimates the hurricane caused at least \$1 billion in damage at those facilities. NASA, meanwhile, was keeping an eye on Tropical Storm Ophelia, which was stalled off the coast Thursday and drenching the Kennedy Space Center. Last summer, the space agency's launch and landing site took the brunt of three hurricanes, which punched big holes into the massive building where shuttles are attached to their boosters and fuel tanks. "This time, it was Michoud's turn to take a bullet for the team," said Griffin, who visited the New Orleans plant Wednesday. Web posted. (2005). [Katrina puts shuttle plans in disarray [Online]. Available WWW: <http://www.cnn.com/> [2005, September 8].]

#### **NASA Modifies Boeing International Space Station Contract**

NASA signed a \$68.35 million modification to the International Space Station contract with The Boeing Company. The modification provides a system to supply Station electrical power



to docked Space Shuttles, enabling the Orbiter to stay longer at the complex. The Station-Shuttle Power Transfer System (SSPTS) allows the Orbiter to use electricity generated by the Station's solar arrays. The additional Station power supplements Shuttle fuel cells, saving onboard supplies of hydrogen and oxygen. The change includes the design, development, manufacture, qualification, testing, delivery and instructions for installation of the SSPTS hardware, software and support equipment into the Station and Shuttle. The work will be performed at Boeing facilities in Houston; Kennedy Space Center, Fla.; Canoga Park, Calif.; Huntington Beach, Calif.; and Seattle. [“NASA Modifies Boeing International Space Station Contract,” **NASA Contract Release #C05-t**, September 8, 2005.]

**September 11: NASA life sciences research faces cuts**

Huge cuts to NASA life sciences mean a state-funded building at Kennedy Space Center planned as the anchor of a space research park won't be used as designed. NASA is diverting the money toward developing a new generation of spaceships for carrying people. It may restore enough funds -- \$6 million of a \$17.5 million cut in life sciences at KSC -- to keep the lab open, officials say, but research on topics such as growing plants for food on long flights to Mars will be axed. "We've been having meetings on how we can refocus the activities within the laboratory," said Charlie Quincy, chief of the biological sciences office at Kennedy Space Center. For instance, research on water purification would have broad applications, he said. He pointed out that the Space Life Sciences Lab, which opened in 2003 as a joint project with the state of Florida, already isn't fulfilling one intended role -- supporting biological experiments on the space station. The state spent \$30 million helping build the lab and the road that will thread through the research park, institute director Sam Durrance recently told Florida's new space commission. "NASA is committed to our partnership with the state," KSC Director Jim Kennedy said at the August meeting. "We really are concerned about pulling the rug out from under our friends. . . . The last thing NASA will do is lock down and walk away." The authority has said it could back out if, among other things, the lease let NASA boot tenants on short notice without compensation. Officials at KSC have asked NASA to waive that clause, said Spaceport Development Manager Jim Ball. He's more optimistic that they will come to terms. The authority's board may vote on the agreement at its meeting Sept. 15. Web posted. (2005). [NASA life sciences research faces cuts [Online]. Available WWW: <http://www.floridatoday.com/> [2005, September 11].]

**September 12: Delta 2 fleet faces possible phasing out**

NASA and the Pentagon might phase out Delta 2 rockets in favor of new launchers, shutting down a workhorse fleet that has lofted military navigation satellites as well as missions to Mercury and Mars. The potential move is outlined in a recent letter to John Marburger, director of the White House Office of Science and Technology Policy. The Aug. 5 letter says NASA and the Defense Department "will jointly pursue a cost-benefit analysis on phasing out Delta 2 launch vehicles" in favor of Evolved Expendable Launch Vehicles developed by the Pentagon. The so-called EELVs are the Boeing Delta 4 and Lockheed Martin Atlas 5 families of launch vehicles. The analysis is to be completed "in the coming months," says the letter. NASA Administrator Mike Griffin and former NASA astronaut Ronald Sega, who now is the Department of Defense Executive Agent for Space, signed it. NASA and Pentagon officials involved in the analysis declined comment. But both NASA and the Pentagon still have a combined 25 missions planned on older Delta 2 rockets. NASA's current schedule calls for the agency to launch 15 missions on Delta 2 rockets

through 2009, Kennedy Space Center spokesman George Diller said. Web posted. (2005). [Fleet faces possible phasing out [Online]. Available WWW: <http://www.floridatoday.com/> [2005, September 11].]

### **NASA Moving Louisiana Workers To KSC**

NASA leaders are relocating workers from its hurricane-ravaged Michoud facility to the Kennedy Space Center in hopes of keeping the best schedule for the next shuttle flight. Those familiar with the shuttle program know that the Michoud facility near New Orleans is where work is done on the shuttle's external tanks. Jim Kennedy, the director of KSC, confirmed Monday the agency's plans to temporarily relocate around 140 workers from that facility. "We are inviting the Michoud people to come to the Kennedy Space Center, coordinated with the shuttle program, to bring the people here so they have a home to live out of and a place to work," he said. "We already have two of their external tanks here, so we're in the process of identifying facility locations here where they can do work on the external tanks to enable us to get back to flying again as soon as possible." Kennedy stressed that this would only be a temporary move until the Michoud facility can be fixed. Web posted. (2005). [NASA Moving La. Workers To KSC [Online]. Available WWW: <http://www.wesh.com/> [2005, September 12].]

### **September 13: Parsons returning as head of Stennis**

William "Bill" Parsons, who led NASA's recent Return to Flight mission as shuttle program manager, is returning as director of Stennis Space Center in Hancock County. Parsons replaces retired Rear Adm. Thomas Donaldson. Web posted. (2005). [Parsons returning as head of Stennis [Online]. Available WWW: <http://www.clarionledger.com/> [2005, September 13].]

### **September 14: KSC sends coveted supplies to Gulf facilities**

A hurricane relief flight took off from Kennedy Space Center on Wednesday carrying parts critical to turning the power back on at the space shuttle external tank factory in New Orleans. A NASA jet delivered 10 precious outdoor electrical distribution switches, which are nearly impossible to buy in powerless New Orleans. The parts, readily available on warehouse shelves in Brevard County, are expected to be enough to finish setting up a patchwork system to restore electricity at the Michoud Assembly Facility. That's not all KSC is sending to hurricane-battered NASA facilities in Louisiana and Mississippi. Workers loaded the airplane -- and a moving truck -- with boxloads of fresh clothes, food, toiletries and other provisions desperately needed by colleagues who are trying to revive NASA facilities while dealing with their own tragedies. The shipments are bound for Stennis Space Center in Mississippi, then on to the tank factory. "We can't fly without their support," said Wayne Kee, emergency preparedness officer at KSC, who went on the flight Wednesday. The engine testing at Stennis and tank building at Michoud "is vital to returning to flight again." Shuttle flights are indefinitely delayed while the agency gets the two facilities up and running and continues investigating the lingering problem of dangerous foam debris falling off the external tank in flight. The jet also took two KSC security agents to relieve exhausted colleagues assigned to guard both NASA centers. "We don't deserve any extra recognition. This is our job," said agent Roger Langevin, before toting his suitcase, a sleeping bag and a pillow onto the Gulfstream corporate jet. Web posted. (2005). [KSC sends coveted supplies to Gulf facilities [Online]. Available WWW: <http://www.floridatoday.com/> [2005, September 15].]

### **NASA to unveil moon plan**

NASA briefed senior White House officials Wednesday on its plan to spend \$100 billion and the next 12 years building the spacecraft and rockets it needs to put humans back on the Moon by 2018. The space agency now expects to roll out its lunar exploration plan to key Congressional committees on Friday and to the broader public through a news conference on Monday, Washington sources tell SPACE.com. U.S. President George W. Bush called in January 2004 for the United States to return to the Moon by 2020 as the first major step in a broader space exploration vision aimed at extending the human presence throughout the solar system. NASA has been working intensely since April on an exploration plan that entails building an 18-foot blunt body crew capsule and launchers built from major space shuttle components including the main engines, solid rocket boosters and massive external fuel tanks. That plan, called the Exploration Systems Architecture Study, was presented by NASA Administrator Mike Griffin, his space operations chief Bill Gerstenmaier and several other senior agency officials Wednesday afternoon to senior White House policy officials, including an advisor to U.S. Vice President Richard Cheney and the president's Deputy National Security Advisor J.D. Crouch. Web posted. (2005). [NASA to unveil moon plan [Online]. Available WWW: <http://www.cnn.com/> [2005, September 15].]

### **September 15: NASA Awards Launch Services Contract**

NASA has awarded a Small Class Acquisition contract to the Orbital Sciences Corporation of Dulles, Va. The contract extends an existing NASA Launch Services (NLS) contract awarded in 1999. It enables the agency to order launch services for up to 30 new missions with a minimum capability to deliver a 250 kilogram payload (approximately 550 pounds) to a 200-kilometer (approximately 124 miles) circular orbit with an inclination of 28.5 degrees. The new contract is an Indefinite Delivery/Indefinite Quantity (IDIQ) contract with an ordering period through June 2010. The minimal total contract amount of this contract is \$100,000. If NASA orders all 30 missions, the total estimated value of all launch services awarded under the NLS IDIQ contracts could reach \$5 billion. The principal work locations for Orbital Sciences Corporation are Dulles, Va.; Chandler, Ariz.; Vandenberg Air Force Base, Calif.; and Mojave, Calif. The Launch Services Program Office at Kennedy Space Center, Fla., is responsible for the program management of NLS. The NLS contract provides launch services to support the goals and objectives of NASA's Science, Space Operations, and Exploration Systems Mission Directorates. ["NASA Awards Launch Services Contract to Orbital Sciences Corp.," **NASA News Release #C05-v**, September 15, 2005.]

### **Expendable Launch Vehicles Status Report**

Mission: Cloud-Aerosol Lidar & Infrared Pathfinder Satellite Observation/CloudSat (CALIPSO/CloudSat); Launch vehicle: Boeing Delta 7420 with Dual Payload Attach Fitting (DPAF); Launch pad: Space Launch Complex 2; Launch site: Vandenberg Air Force Base (VAFB), California; Launch date: NET Oct. 26, 2005; Launch window: 6:01 a.m. EDT. Due to Range schedule conflicts, launch of CALIPSO/CloudSat is tentatively scheduled for no earlier than Oct. 26, pending approval of the Western Range. CALIPSO/CloudSat processing activities are complete. Battery charging will continue until both spacecraft are transported to the launch pad in early October. The Delta II preparations at NASA's Space Launch Complex 2 are complete, and the launch vehicle is awaiting arrival of the CALIPSO/CloudSat payloads for installation atop the second stage. KSC News Center

(2005). **Expendable Launch Vehicles Status Report** E05-011[Online]. Available E-mail: [ksc@newsletters.nasa.gov](mailto:ksc@newsletters.nasa.gov) [2005, September 15].]

**September 16: Florida suspends research park plans**

The state is suspending work on a planned research park at Kennedy Space Center. There is not enough interest from private developers, prospective tenants or NASA to justify spending another \$90 million or more of taxpayers' money on the project, according to Florida Space Authority officials and their consultants. Lt. Gov. Toni Jennings, chair of the space authority's board, instructed staff Thursday to stop spending money on lawyers, consultants and other work to develop the new park on 320 acres on the southwestern edge of KSC. The board did not vote to kill the project, but Jennings' direction had the apparent unanimous backing of the board and authority staff. "It kind of looks like it's not the time to do the things we looked at originally," said Silas Baker, vice chairman of the authority board. Florida and NASA officials embarked on the research park idea several years ago, touting a unique opportunity to expand the area's space business beyond launching shuttles and rockets. The park was part of Florida's strategy to capitalize on NASA's planned human expeditions to the moon and Mars, replacing jobs to be lost when the shuttles retire in 2010. Government studies indicated about 8,000 people might work in the park by 2023. Thursday, however, the space authority said three different outside consultants found the park would be a difficult sell to private companies and tenants for two key reasons: \* First, prospective tenants are less bullish about investing money in a research facility given the uncertainties about NASA's long-term plans and the agency's short-term budget cuts in science and research -- the kind of work planned in the park. \* Second, the increased regulation and risk of building on federal government property made the likely price to rent laboratory space in the new park significantly higher than existing parks in the Titusville area. Furthermore, Jennings and other board members worried the existing Space Life Sciences Lab could become underused as NASA shifts funding from the kind of research done at the lab to building new rockets and ships. The state spent almost \$30 million building the state-of-the-art lab and part of a highway winding through vacant land that was to become the research park. It also pays about \$7 million a year to keep the facility running. NASA's planned cuts in life sciences were eased a bit with a promise from KSC Director Jim Kennedy that the agency would make sure there was at least \$6 million for one last year to cover the costs of keeping the lab open. Jennings and others said it's unlikely even those funds will be available beyond one more year unless Congress intervenes. Web posted. (2005). [Florida suspends research park plans [Online]. Available WWW: <http://www.floridatoday.com/> [2005, September 16].]

**Roy D. Bridges, Jr. retires from NASA**

Roy D. Bridges, Jr., director of NASA's Langley Research Center, will retire from NASA. Bridges came to Langley after serving as Director of NASA's John F. Kennedy Space Center (KSC) for over six years. In that capacity, he was responsible for managing facilities and activities related to the processing and launch of the Space Shuttle, processing and integration of Shuttle payloads and those aboard Expendable Launch Vehicles (ELVs), as well as final tests and preparation of elements delivered to the International Space Station via Shuttle. He was also responsible for managing the acquisition and launch of all NASA ELV missions. "Roy Bridges has spent a lifetime in the service of his country, much of it with NASA. As both an astronaut and a center director, he has met all challenges, in good times and bad, with courage and competence. He will be missed by the entire NASA community,"

said NASA Administrator Mike Griffin. ["Griffin's Statement on the Retirement of Langley's Roy Bridges," **NASA News Release #05-269**, September 16, 2005.] Web posted. (2005). [Leadership, Roy D. Bridges [Online]. Available WWW: <http://www.nasa.gov/centers/langley/about/bridges.html> [2004, November 30].]

**September 17: NASA plans to resume work at Michoud Assembly Facility**

Recovery efforts at NASA's Michoud Assembly Facility in New Orleans are progressing better than originally anticipated, almost three weeks after Hurricane Katrina struck. Power has been restored to the entire complex where space shuttle external fuel tanks are made. Temporary repairs have been made to damaged buildings. Due to the progress, the Space Shuttle program has decided to keep tank work at Michoud. The program had explored the option of moving some tank work to NASA's Kennedy Space Center, Fla. Officials determined that by the time Kennedy's facilities were outfitted to do tank work, Michoud would already be operational. The agency is now assessing the work force needed to start and maintain minimal operations at Michoud. The main priority will be to ensure temporary housing for NASA civil servants and contractors whose homes were destroyed by Katrina. Preparations are also under way to ship two external tanks from Kennedy back to Michoud by barge. External tank #120 is expected to arrive at Michoud in early October. It will be examined and portions of it dissected to better understand why foam came off during Space Shuttle Discovery's launch last July. External tank #119 will be sent back to Michoud in late October. Web posted. (2005). [NASA plans to resume work at Michoud Assembly Facility [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, September 17].]

**September 19: NASA Planning Return to Moon within 13 Years**

Combining an old concept, existing equipment and new ideas, NASA gave shape on Monday to President Bush's promise to send humans back to the Moon by the end of the next decade. Michael D. Griffin, the agency's new administrator, detailed a \$104 billion plan that he said would get astronauts to the Moon by 2018, serve as a steppingstone to Mars and beyond, and stay within NASA's existing budget. The plan would use a new spacecraft similar to the Apollo command capsule of the original Moon program, and new rockets made up largely of components from the space shuttle program. "It is very Apollo-like," Dr. Griffin said, "but bigger. Think of it as Apollo on steroids." The plan drew a mixture of praise and criticism from lawmakers and space experts. The chairman of the House Science Committee, Representative Sherwood Boehlert, Republican of New York, said it appeared to be "the safest, least expensive and most efficient way" of moving forward in space exploration, but added that current cost overruns in other NASA programs might make it hard to develop the new vehicle on schedule. Dr. Griffin's announcement laid out a timetable and a budget, putting flesh on the bones of a proposal that Mr. Bush announced in January 2004 but had never described in detail. Dr. Griffin said that after adjusting for inflation, the program would cost just 55 percent of what it cost to put a dozen men on the lunar surface from 1969 to 1972. The pay-as-you-go plan, approved by the White House last week, would stay within NASA's \$16-billion-a-year budget through a combination of retiring the space shuttle, finishing the International Space Station and reallocating money from other NASA programs. The new craft, called the crew exploration vehicle, would perch the astronauts' capsule above the rockets that power it into space, rather than alongside them as with the shuttle. NASA officials said it would be 10 times as safe as the shuttle, with a projected failure rate of 1 in 2,000, as opposed to 1 in 220 for the shuttle. The increased safety, they said, will be due in part to escape rockets that will be able to jettison the capsule



away from the booster rocket in the event of an accident. Dr. Griffin said the vehicle would be able to take as many as six astronauts to the space station, or fewer astronauts and some cargo. Or it could fly robotically without a crew, he added, carrying up some 25 tons of cargo, about as much as a shuttle can carry. The wingless craft, weighing 50 percent more than the Apollo, could carry a crew of four to the Moon. It would be carried aloft on a modified version of one of the shuttle's solid-fueled rocket boosters and a new second stage using one of the shuttle's main liquid-fueled engines. For Moon voyages, the craft would rendezvous in Earth orbit with lunar components lifted on a big new cargo rocket. This heavy-cargo rocket, which could put 125 tons into orbit, would comprise two extended shuttle solid-fuel boosters attached to a liquid hydrogen-oxygen first stage made of an extended shuttle external fuel tank with five shuttle main engines. Atop this would be a new second stage using one or more of the shuttle main engines. The bigger rocket, capable of lifting the payload of the Saturn V, which sent men to the Moon decades ago, would put into Earth orbit another rocket that could carry a landing craft and the crew vehicle to the Moon. The Moon mission would be accomplished in stages. Lockheed is the leader of a consortium that currently has a \$28 million contract to design the crew exploration vehicle. Another team, headed by the Boeing Company and Northrop Grumman, has an identical contract to design an alternative. NASA is expected to select the winning design next spring. Web posted. (2005). [NASA Planning Return to Moon Within 13 Years [Online]. Available WWW: <http://www.nytimes.com/> [2005, September 20].]

**September 20: Hale selected as Space Shuttle Program Manager**

NASA today announced the selection of N. Wayne Hale Jr. as manager of the Space Shuttle Program. He has been deputy manager since July 2003 and succeeds Bill Parsons, who returned to NASA's Stennis Space Center in Mississippi as its director. Hale began his career with NASA in 1978 in the Propulsion Systems Section of Flight Operations at NASA's Johnson Space Center, Houston. For the next 10 years, he progressed into management, becoming a lead propulsion systems officer in Mission Control. He later headed the Propulsion Systems Section from 1985 to 1988. That experience led Hale into the Flight Director Office of the Mission Operations Directorate in 1988. During that tenure, he oversaw flight control teams in Mission Control during all aspects of 40 space shuttle missions, 28 overseeing the critical ascent and entry phases. His last two years as a flight director were spent as deputy chief flight director for shuttle operations. In early 2003, Hale was tapped to serve as launch integration manager at NASA's Kennedy Space Center in Florida. Following the Space Shuttle Columbia accident, Hale joined the Space Shuttle Program Office as deputy manager and also was selected to chair the program's Mission Management Team (MMT). In that capacity, Hale was instrumental in restructuring the MMT, focusing on ensuring the membership is completely cross-trained in all aspects of missions, while also ensuring all levels of expertise have input into problem solving. Web posted. (2005). [NASA selects new space shuttle program manager [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, September 20].]

**September 21: Mission Control shut down**

Hurricane Rita's approach spurred NASA to close Mission Control at the Johnson Space Center on Wednesday, leaving oversight of the international space station and its two-man crew to a Russian control facility outside Moscow. The 15,000-person center near Clear Lake was closed to all but a small security team monitoring the control center. Web posted.

(2005). [Mission Control shut down [Online]. Available WWW: <http://www.houstonchronicle.com/> [2005, September 21].]

**September 23: KSC deputy takes top job at Ohio center**

Kennedy Space Center deputy director Woodrow Whitlow is returning to Ohio to take the top job at NASA's Glenn Research Center. Whitlow was a top research manager at the Cleveland, Ohio, center before coming to KSC in 2003 in the wake of the Columbia shuttle disaster. He has been with the space program since 1979, including tours at NASA Headquarters and the Langley Research Center in Virginia. At Glenn, he will succeed director Julian Earls, who is retiring from the space agency later this year. Glenn employs 3,300 people on a variety of research projects in aeronautics and space propulsion among other topics. Web posted. (2005). [KSC deputy takes top job at Ohio center [Online]. Available WWW: <http://www.floridatoday.com/> [2005, September 23].]

**Rocket launch from Vandenberg**

The six-story Minotaur rocket soared off its launch pad at 7:24:29 p.m. PDT (10:24:29 p.m. EDT; 0224:29 GMT) from Vandenberg Air Force Base in California carrying an experimental military spacecraft. The Orbital Sciences-managed Minotaur rocket uses decommissioned first and second stages from a Minuteman 2 ICBM missile and solid-propellant motors from the commercial Pegasus rocket program for its third and fourth stages. The vehicle is designed to provide the U.S. government with reliable access to space for small satellites. The \$20 million Minotaur deployed into a sun-synchronous orbit around the planet's poles the Space Test Program-R1 mission's Streak satellite. Built by General Dynamics C4 Systems/Spectrum Astro Space Systems in Gilbert, Arizona, the craft will be operated by the Defense Advanced Research Projects Agency. Web posted. (2005). [Rocket launch paints sky with breath-taking scene [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, September 23].]

**September 24: NASA's Pluto Space Probe Begins Launch Preparations**

NASA's New Horizons spacecraft arrived at the Kennedy Space Center, Florida on Saturday for final preparations and testing for the probe's decade-long journey. It will be the first spacecraft to visit Pluto and its moon Charon. New Horizons arrived at Kennedy's Shuttle Landing Facility aboard a U.S. Air Force C-17 cargo plane and was moved to a clean room for processing and testing. It is scheduled to launch on a Lockheed Martin Atlas V rocket in January 2006. Following final launch approval, liftoff is scheduled for Jan. 11, 2006, during a two-hour launch window that opens at 2:07 p.m. EST. Launch windows are also available daily from Jan. 12 through Feb. 14, 2006. New Horizons is the first mission in NASA's New Frontiers program of medium-class planetary missions. ["NASA's Pluto Space Probe Begins Launch Preparations," **NASA News Release #05-283**, September 26, 2005]

**September 26: Delta 2 rocket lifts GPS satellite**

The most advanced navigation satellite ever built headed toward an operating orbit high above Earth Sunday after a late-night launch from Cape Canaveral Air Force Station. With the \$75 million satellite nestled in its protective nosecone, a 12-story Delta 2 rocket blasted off from launch complex 17A at 11:37 p.m., its main engine and strap-on solid rocket boosters igniting in a brilliant flash. The Boeing Co. rocket carved a fiery trail through the night sky, arcing out over the Atlantic Ocean as it propelled its payload -- a Navstar Global Positioning System satellite -- toward an orbit some 12,600 statute miles above the planet.

Web posted. (2005). [Delta 2 rocket lifts GPS satellite [Online]. Available WWW: <http://www.floridatoday.com/> [2005, September 26].]

### **Shuttles unlikely to take early retirement**

The White House this month asked NASA how much money could be saved by shutting down the shuttle program immediately instead of waiting until 2010 as planned. A group of Republican lawmakers led by Mike Pence of Indiana last week said the \$104 billion to replace the shuttles with a new spaceship and rockets to carry astronauts back to the moon ought to be canceled to help pay to rebuild the hurricane-wrecked Gulf Coast. Key Congressional leaders said there is little political support for either suggestion. The two suggestions, however, when coupled with growing political pressure to cut federal spending to offset recovery costs from Hurricanes Katrina and Rita, is spawning angst at Kennedy Space Center and other NASA facilities. Brevard County lawmakers said they are confident NASA's budget for the shuttle program will remain intact, as will funding for the initial development of the hardware to send astronauts back to the moon. An early shutdown of the shuttle program would cost billions, including fees for breaking multi-billion dollar contracts with U.S. companies that work on the shuttle as well as international station partners. The Office of Management and Budget declined to comment on why it asked for early retirement estimates, sending questioners to NASA. Bob Jacobs, a spokesman at NASA's headquarters in Washington, said there has been no change in national policy regarding the shuttle retirement. "The plan is to retire the shuttles in 2010," he said. "Terminating the shuttle program abruptly at this time, while superficially attractive from some points of view, carries with it grave consequences for American preeminence in space, and would be utterly devastating to the workforce we will need to carry out any future human spaceflight program," Griffin said in a speech last month. By contrast, an orderly transition from the shuttle to the next program will help NASA retain workers and facilities needed for the moon missions, Griffin said. Web posted. (2005). [Shuttles unlikely to take early retirement [Online]. Available WWW: <http://www.floridatoday.com/> [2005, September 26].]

### **NASA Facilities Weather Hurricane Rita**

The three NASA facilities that were in the path of Hurricane Rita are making damage assessments and cleaning up today. NASA's Johnson Space Center in Houston, Michoud Assembly Facility in New Orleans and Stennis Space Center in south Mississippi sustained minor or no storm damage. ["NASA Facilities Weather Hurricane Rita," **NASA News Release #05-285**, September 26, 2005.]

### **Contest lets collegians launch rockets at Cape**

A new contest will give Florida college students a chance to launch rockets from the Cape next June. Monday, officials signed the contest into existence at the Florida Space Authority in Cape Canaveral, thanks to money from the state. The move should head off worries that students will have to take their projects to NASA's Wallops launch facility in Virginia, said state Rep. Thad Altman, a Melbourne Republican. The Florida Space Pioneer Cup will take place at the Cape's launch complex 47, which is operated by the Florida Space Authority, in June. Web posted. (2005). [Contest lets collegians launch rockets at Cape [Online]. Available WWW: <http://www.floridatoday.com/> [2005, September 27].]

### **Voyager 1 passes termination shock**

Astronomy teams report that the 28-year-old NASA spacecraft has reached a new frontier, passing a boundary that separates the solar system from deep space. Two years ago, NASA announced that Voyager 1, which has gone farther into space than any other spacecraft, showed signs of approaching the region. But this claim was not universally accepted. Now four teams monitoring Voyager report the spacecraft passed the termination shock on or about Dec. 16, 2004, at a distance of 8.74 billion miles from the sun. Voyager 1 was launched from Cape Canaveral Air Force Station pad 41 on September 5, 1977. Web posted. (2005). [A new sojourn for Voyager 1 [Online]. Available WWW: <http://www.usatoday.com/> [2005, September 26].]

### **September 27: Shuttle Endeavour returning to launch processing**

NASA sent electrical power surging through shuttle Endeavour on Tuesday (0945), signaling the end of a major overhaul and its return to normal launch processing. About 75 workers gathered around the \$1.8 billion spaceship when a red-and-white "Vehicle Powered" sign lit up inside the shuttle's hangar for the first time since August 2003. "There was certainly a big cheer that went up in that room when that sign lit up," said Tassos Abadiotakis, NASA's lead vehicle manager at Kennedy Space Center and the senior engineer in charge of preparing Endeavour for flight. "It's really a big deal when we've got the ship back together enough to power it up and start (preflight) testing on the vehicle." NASA sidelines shuttle orbiters after every eight flights for extensive inspections and modifications. Endeavour, which was built to replace Challenger after it was lost in a 1986 launch explosion, was taken out of service in December 2003. The spaceship underwent 124 modifications. Some were safety modifications ordered after the 2003 Columbia accident; others already had been planned. Technicians inspected more than 150 miles of electrical wiring. They replaced more than 1,000 heat-shielding tiles, which protect orbiters and astronauts from intense heat -- up to 3,000 degrees -- during atmospheric re-entry. A faulty braking system critical to safe landings was repaired. The ship also was rigged so a new orbital inspection boom can be installed in its payload bay before its next flight. Final tests to Endeavour's new cockpit will be conducted during the next seven to 10 days, and then technicians will begin about 8,000 preflight tests. Abadiotakis said Endeavour will be ready to fly in about 10 to 11 months. Web posted. (2005). [Shuttle Endeavour returning to launch processing [Online]. Available WWW: <http://www.floridatoday.com/> [2005, September 27].]

### **Shuttle tank shipped to New Orleans**

Less than a month after being hit by Hurricane Katrina, NASA's Michoud Assembly Facility in New Orleans is gearing up to restart processing space shuttle fuel tanks. The work will address foam loss during Space Shuttle Discovery's launch in July. External tank #119, which is expected to be used in the next shuttle mission, departed NASA's Kennedy Space Center in Florida today. The huge, orange external tank is being transported by NASA's solid rocket booster retrieval ship Freedom Star. It will travel down Florida's Banana River en route to the Gulf of Mexico-Mississippi River outlet on its 900-mile journey. It's expected to arrive at Michoud in four or five days. Michoud workers will begin limited testing on the tank as soon as it arrives. Hurricane recovery efforts at the facility have progressed better than anticipated. Power has been restored to the entire Michoud complex, and temporary repairs have been made to damaged buildings. External tank #120 will be shipped from Kennedy to the facility in the next few weeks. Web posted. (2005). [Shuttle fuel tank

shipped to New Orleans for modification [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, September 27].]

### **Shuttle, station 2 big blunders, NASA chief says**

The shuttle and International Space Station -- the whole of the U.S. manned space program for the past three decades -- were mistakes, NASA chief Mike Griffin said Tuesday. In a meeting with USA Today's editorial board, Griffin said NASA lost its way in the 1970s, when the agency ended the Apollo program of moon visits in favor of developing the shuttle and space station, which can only orbit Earth. The shuttle has cost the United States the lives of 14 astronauts and billions of dollars in operating costs since the spacecraft's first flight in 1982. The total cost of the space station by the time it's finished -- probably in 2010 or later -- may exceed \$100 billion, though other nations will bear some of that. Only now is the nation's space program getting back on track, Griffin said. He announced last week that NASA aims to send astronauts back to the moon in 2018 in a spacecraft that would look like the Apollo capsule and would be carried into space by a rocket built from shuttle components. Griffin has made clear in previous statements that he regards the shuttle and space station as misguided. He told the Senate earlier this year that the shuttle was "deeply flawed" and that the space station was not worth "the expense, the risk and the difficulty" of flying humans to space. Asked Tuesday whether the shuttle had been a mistake, Griffin said, "My opinion is that it was. It was a design which was extremely aggressive and just barely possible, especially with the amount of funding allocated to the problem." Asked the same question about the space station, which was started in 1999 and is orbiting Earth, he said, "Had the decision been mine, we would not have built the space station we're building in the orbit we're building it in." Web posted. (2005). [Shuttle, station 2 big blunders, NASA chief says [Online]. Available WWW: <http://www.floridatoday.com/> [2005, September 27].]

### **September 28: Senate OKs NASA plan for moon and Mars**

With no debate, the Senate passed a NASA authorization bill Wednesday. The measure now must be reconciled with a version passed by the House before members can vote on a final bill. If successful, the legislation would be the first in five years to authorize NASA programs and policies. It endorses President Bush's policy to send astronauts back to the moon and on to Mars, although it does not directly fund NASA's specific programs to achieve that goal. The bill was passed by unanimous consent, which means leaders in both major political parties agreed to let the bill through without amendment. Web posted. (2005). [Senate OKs NASA plan for moon and Mars [Online]. Available WWW: <http://www.floridatoday.com/> [2005, September 27].]

### **Horowitz leads Exploration Systems Mission Directorate**

NASA Administrator Michael Griffin today named veteran space shuttle commander Scott J. Horowitz as associate administrator for the Exploration Systems Mission Directorate. He will lead the agency's efforts to develop the new spacecraft that will return astronauts to the moon, travel to Mars and other destinations in the solar system. Griffin also appointed longtime NASA engineer Doug Cooke as deputy associate administrator for the Exploration Systems Mission Directorate. Web posted. (2005). [Horowitz leads Exploration Systems Mission Directorate [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, September 28].]



**September 29: NASA devises foam fix**

NASA has a plan to fix its problem-plagued external fuel tanks, and the agency is studying the possibility of launching its next two shuttle missions in May and July. NASA aims to replace an external tank foam ramp that shed a one-pound piece of insulation on the agency's first post-Columbia mission, prompting managers to put future flights on hold. NASA shuttle chief Wayne Hale met with managers Thursday and asked them to determine what it would take to launch a second test flight in May and an International Space Station assembly mission in July. NASA's next mission officially is targeted for a March launch. But foam insulation problems and hurricane damage to agency facilities have made that all but impossible. The 2,000 workers at the Michoud Test Facility plant in Louisiana will play a key role in fixing an external tank foam ramp that shed a one-pound piece of insulation during Discovery's July 26 launch. On Discovery's return to flight, foam broke off a protuberance air load ramp that runs along the side of the 15-story tank. Its purpose: To ensure smooth airflow and minimize vibration around nearby pipes and cables. NASA plans to remove the 37-foot ramp, replacing it with a new type of foam that will be applied with more exacting techniques designed to prevent shedding. The area will be outfitted with instrumentation to better understand aerodynamic forces that could cause damage in flight. The tank for NASA's next shuttle mission is being brought by barge back to the New Orleans factory and is expected to arrive there Sunday. Engineers plan to use high-tech inspection gear to examine the ramp. Then they'll remove it and dissect it to try to learn more about the foam shedding phenomenon. A return to Kennedy Space Center by January would put NASA in position to launch in May. Web posted. (2005). [NASA devises foam fix [Online]. Available WWW: <http://www.floridatoday.com/> [2005, September 30].]

**California could host its first Delta 4 launch Monday**

The final piece of Boeing's new generation Delta 4 rocket fleet makes its long-awaited debut in the coming days when a booster blasts off from the U.S. West Coast for the first time, punctuating the company's work to develop a line of launchers and build pads in Florida and California. But launch has been delayed from Sunday (October 2) to no earlier than Monday (October 3). Web posted. (2005). [California could host its first Delta 4 launch Monday [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, September 30].]

**Contractor to plead guilty in space contract case**

An electrical contractor agreed Thursday to plead guilty to bid-rigging construction contracts for the U.S. Air Force's rocket program and agreed to help the government investigate antitrust violations committed by others. Woodson & Associates agreed to pay a \$175,000 criminal fine for participating in conspiracy to suppress and eliminate competition by rigging bids on construction contracts. The company also agreed to provide grand jury testimony, interviews and documents for the government's ongoing probe into antitrust crimes committed by contractors at the Cape Canaveral Air Force Station, Kennedy Space Center and Patrick Air Force Base. According to the plea deal, between March 1998 and June 2002, Woodson officials agreed with representatives from another electrical contracting service not to compete on contracts to install a fire alarm system and build trenches in which electrical wiring is encased and then filled with concrete at the Cape Canaveral Air Force Station. The other contractor agreed to submit intentionally high bids so Woodson & Associates would get the contracts worth \$3.7 million. The indictment didn't name the other contractor. Web posted. (2005). [Contractor to plead guilty in space contract case [Online]. Available WWW: <http://www.floridatoday.com/> [2005, September 30].]

### **KSC to install IMAX 3D system**

IMAX Corporation today announced that Kennedy Space Center Visitor Complex is upgrading the capabilities of its 2D IMAX(R) theatre to present The IMAX 3D Experience(R). The Visitor Complex is home to two IMAX theatres, the first of which opened in 1984. That theatre received an additional projection unit this month, which is being installed and will enable it to present films in stunning IMAX(R) 3D. Kennedy Space Center's other IMAX theatre is already capable of showing IMAX 3D films, and given emphatic consumer response to the format, the Space Center moved to offer IMAX 3D presentations in both theatres. "IMAX's critically-acclaimed space films offer the most realistic representation of what it's like to be in outer space, and IMAX 3D takes the experience to another level completely," said Dan LeBlanc, Chief Operating Officer, Kennedy Space Center Visitor Complex. "The Kennedy Space Center has been a fantastic venue for our highly successful space films and we're very pleased to see this world renowned institution move to offer The IMAX 3D Experience in both of its theatres," said IMAX Co-CEO's and Co-Chairmen Richard L. Gelfond and Bradley J. Wechsler. "With the release of Magnificent Desolation: Walking on the Moon 3D, we have once again taken moviegoers to where very few have gone, and continue to reinforce IMAX 3D as the most advanced three-dimensional cinematic experience in the world." Presented and narrated by Tom Hanks, Magnificent Desolation: Walking on the Moon 3D features rarely seen NASA footage, CGI imaging and live- action renditions of the lunar landscape to propel audiences nearly a quarter-million miles above the Earth's surface. The film is the next in a series of extremely successful IMAX space titles, which have grossed more than \$350 million and been enjoyed by over 85 million people worldwide. Web posted. (2005). [IMAX and Kennedy Space Center Visitor Complex Sign Deal to Install Additional IMAX(R) 3D Projection System [Online]. Available WWW: <http://www.imax.ca/> [2005, September 29].]

### **September 30: NASA Announces Kennedy VAB Contract Award**

NASA has selected Met-Con, Inc., Cocoa, Fla., for a contract to replace and upgrade siding at the Vehicle Assembly Building (VAB) in support of space shuttle operations at the agency's Kennedy Space Center, Fla. The contractor will provide all labor and material to refurbish the exterior walls that are beyond their useful life, deteriorated and damaged from previous hurricanes. The scope of this project consists of replacing the translucent panels and refurbishing the metal siding on the walls of the VAB high bay and low bay; to replace the metal siding; clean and paint the supporting structure. Met-Con, Inc. will receive a fixed price contract for \$39,422,973. The period of performance is 1180 calendar days. ["NASA Announces Kennedy VAB Contract Award," **NASA Contract Release #C05-y**," September 30, 2005.]



In NASA's Orbiter Processing Facility bay 2, workers applaud as the orbiter Endeavour's electrical system is partially powered up, after nearly 2 years. Full power-up will take place in October. Endeavour has been in its Orbiter Major Modification period, which began in December 2003. In that time, 124 modifications were completed, including installing the glass cockpit; 150 miles of wiring were inspected; and more than 1,000 tiles were bonded. This is the second full modification conducted at Kennedy.

## OCTOBER 2005

### **October 1: Next shuttle launch planned for May**

NASA is beginning planning for launching the next space shuttle mission in May 2006, rather than March, as it plans no more than 19 more shuttle flights before the fleet's retirement. New NASA shuttle program head Wayne Hale asked top managers this week to see what would be needed to launch the next shuttle mission, STS-121, in May, followed by another shuttle flight in July. STS-121 is still currently scheduled for launch in March, but disruptions caused by hurricanes Katrina and Rita have led to widespread speculation that the launch would be delayed. The launch had already been delayed from this September in order to make changes to the external tank to avoid additional foam shedding. Flight International reported Friday that current NASA plans call for no more than 19 shuttle flights before the fleet is retired in 2010: three launches in 2006 and four each year from 2007 through 2010. One shuttle flight will be reserved for a repair mission to the Hubble Space Telescope while the rest will be to the ISS. The 18 ISS flights would allow for the launch of some international ISS modules, such as Europe's Columbus and Japan's Kibo modules, but keep other modules on the ground. Web posted. (2005). [Next shuttle launch being planned for May [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, October 1].]

### **October 3: Space Gateway Support cuts staff**

Space Gateway Support, which handles a multibillion-dollar maintenance contract for operations at Kennedy Space Center and Cape Canaveral Air Force Station, has laid off 48 workers from its staff of about 3,000, company officials said Monday. Space Gateway Support spokesman Sam Gutierrez said the layoffs are related to programs ending on the company's \$3 billion Joint Base Operations Support Contract. The firm, a joint venture between Northrop Grumman Corp. and Wackenhut Services, won the 10-year contract in 1998. As part of that contract, Space Gateway Support provides such services as security guards, firefighters and police as well as maintenance staff at the space-related government installations on the Space Coast. Employees include union and nonunion workers. Gutierrez said the layoffs, effective Friday, affected "blue-collar workers" at Kennedy Space Center and Cape Canaveral Air Force Station, and include a mix of mechanics, lawn-service workers and technicians. Web posted. (2005). [Space Gateway Support cuts staff [Online]. Available WWW: <http://www.floridatoday.com/> [2005, October 4].]

### **Tropical Storm Tammy formed off east coast**

Tropical Storm Tammy formed Wednesday off Florida's east coast, prompting forecasters to issue warnings from Cocoa Beach north to South Santee River, South Carolina. At 7:30 a.m. ET, Tammy was about 20 miles (32 kilometers) east of Cape Canaveral, Florida, and about 155 miles (249 kilometers) south-southeast of Jacksonville, the National Hurricane Center in Miami said. Maximum sustained winds are near 40 mph with higher gusts, the center said. Tammy is the 19th named storm of the Atlantic hurricane season, which began June 1 and ends November 30. The storm is moving north-northwest near 16 mph (26 kph) -- its center nearly parallel to Florida's east coast. The hurricane center said heavy rains from Tammy may produce 3 to 5 inches of rainfall in parts of northern Florida, southeastern Georgia, eastern South Carolina and southeastern North Carolina. Isolated tornadoes from the storm are possible, the center said. Web posted. (2005). [Tropical Storm Tammy formed



Wednesday off Florida's east coast[Online]. Available WWW: <http://www.cnn.com/> [2005, October 4].]

### **Official offers shuttle foam loss theory**

Workers may have accidentally cut or crushed the section of foam that broke off Discovery's fuel tank during its launch two months ago — a mishap that threatened the safety of the astronauts and grounded the shuttle fleet. That is the leading theory for the cause behind the disturbing loss of foam insulation that cast a cloud over NASA's return to space, said Wayne Hale, the newly appointed manager of the space shuttle program. Hale said the shuttle will not fly again until the foam insulation problem is resolved — no sooner than spring. He also said repair work has been set back because of hurricanes Katrina and Rita. The storms dealt "a severe blow" to resuming shuttle flights and caused NASA to lose three months of work, he said. What probably happened is that during modifications to the tank at Michoud, technicians inadvertently damaged the section that ended up coming off, while working on nearby areas, Hale said. "This foam, which normally is not touched after it's applied, clearly was touched," he said. A fuel tank that finally arrived at Michoud this week from Cape Canaveral — a trip delayed by the hurricanes — will be dissected for evidence of damage. The earliest that a modified tank could be returned to Cape Canaveral is February, making a spring launch a possibility, Hale said. NASA has zeroed in on two other problems during Discovery's flight that posed safety concerns for re-entry: \* A faulty gluing process caused a couple of fabric strips to come loose and protrude from the shuttle's belly. In a dramatic spacewalk — the first time an astronaut had ever ventured beneath the shuttle's underside — Stephen Robinson removed them. The installation method is being improved and stronger testing is planned, said Steve Poulos, manager of the orbiter project office. \* A rip in a thermal blanket hanging beneath a cockpit window was traced to poor stitching; thankfully, no repairs were required in orbit. NASA is inspecting all 480 blankets on each shuttle to make sure the stitches go all the way through the material. Web posted. (2005). [Official offers shuttle foam loss theory [Online]. Available WWW: <http://www.usatoday.com/> [2005, October 4].]

### **October 5: Delta 4 grounding shuffles Vandenberg launch schedule**

California's debut launch of the Boeing Delta 4 rocket is facing an extended delay -- perhaps six weeks -- while engineers try to reconcile differing predictions of sloshing fuel inside the booster during flight. Launch dates earlier this week were scrapped to perform repairs on the cork insulator material that serves as a thermal barrier around the rocket's main engine. Preparations resumed for a Wednesday liftoff from Vandenberg Air Force Base only to be halted Tuesday because officials were worried about conflicting analytical models about the launch. Officials are devising plans to remove the classified National Reconnaissance Office satellite from atop the Delta 4 rocket's Space Launch Complex-6 pad and place it in safe storage. Meanwhile, NASA intends to ship its CloudSat and CALIPSO environmental satellites to the Space Launch Complex-2 pad on North Vandenberg around October 10 for mating atop a Delta 2 rocket. That dual-payload launch is scheduled for 3:01 a.m. PDT (6:01 a.m. EDT; 1001 GMT) on October 26. The NRO satellite for the Delta 4 mission will be brought back to SLC-6 and reunited with its rocket for liftoff no earlier than mid-November, the Air Force said. How the much-delayed GOES-N civilian weather satellite fits into this evolving plan was not clear Wednesday. That Delta 4 rocket at Florida's Cape Canaveral has been waiting to launch for months, but a variety of satellite and booster issues have postponed the commercial mission. Boeing had envisioned flying the mission around



November 5 -- one month after the Vandenberg Delta 4. The company has said it needs about 30 days between Delta 4's for post-flight data review. Web posted. (2005). [Delta 4 grounding shuffles Vandenberg launch schedule [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, October 5].]

### **NASA Modifies Space Station Payload Integration Contract**

NASA's Johnson Space Center in Houston has signed a modification to a contract with The Boeing Company. The modification is valued at more than \$94 million. The contract consolidates work done in support of international space station payload integration activities. The modification transfers a portion of work from one contract to another to consolidate activities. Work being transferred includes: payload engineering integration; payload software integration and flight software production; payload facility sustaining engineering; and logistics support. Boeing will continue to manage the overall space station payload integration process. The company will develop and maintain requirements between NASA payloads and the space station. Requirements include: station racks used to house scientific experiments; develop and deliver software payload flight configuration tables and flight displays; design and develop payload support systems; perform analyses to support certification of station facility racks; provide sustaining engineering in support of payload facilities; and provide logistics, repairs and maintenance for flight and ground units. The action modifies a completion form, cost-plus-award-fee contract. The period of performance of this change is the first quarter of fiscal year 2006 to the fourth quarter of fiscal year 2008. The contract covers work at NASA's Johnson Space Center, Kennedy Space Center, Fla., and Marshall Space Flight Center, Huntsville, Ala. ["NASA Modifies Space Station Payload Integration Contract," **NASA Contract Release #05-001**, October 5, 2005.]

### **Expendable Launch Vehicle Status Report**

Mission: Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observations and CloudSat; Launch Vehicle: Boeing Delta 7420 w/Dual Payload Attach Fitting; Launch Pad: Space Launch Complex 2, Vandenberg Air Force Base, Calif.; Launch Date: No earlier than Oct. 26, 2005; Launch Window: 6:01 a.m. EDT. The payloads are installed within the Dual Payload Attach Fitting undergoing final battery charging in preparation for transport to the launch pad. Delta II preparations are on schedule. The launch vehicle is awaiting arrival of the payloads Oct. 10 for installation on top of the second stage. Flight Program Verification, an integrated functional test for the Delta and payload, is scheduled for Oct. 13. It is the final major pre-launch test. Mission: New Horizons; Launch Vehicle: Lockheed Martin Atlas V 551 (AV-010); Launch Pad: Complex 41, Cape Canaveral Air Force Station. Fla.; Launch Date: Jan. 11, 2006 Launch Window: 2:07 to 4:07 p.m. EST. The Atlas V first stage was erected Sept. 29 at Complex 41 in the Vertical Integration Facility. If weather permits, the Centaur stage will be hoisted on top of the Atlas booster Friday. The Atlas payload fairings arrived Sept. 29. They are in the airlock at the Payload Hazardous Servicing Facility and will be moved into the clean-room high bay on Thursday. Since the arrival of New Horizons last week, spacecraft testing and processing is on schedule. On Thursday, the instrument that will measure the solar wind around Pluto will be installed. KSC News Center (2005). **Expendable Launch Vehicles Status Report E05-012** [Online]. Available E-mail: [ksc@newsletters.nasa.gov](mailto:ksc@newsletters.nasa.gov) [2005, October 5].]

### **October 6: Endeavour powered up**

Engineers cheered as electricity coursed through Space Shuttle Endeavour today for the first time in two years. The powering of Endeavour signaled the end of the orbiter's major modification period at NASA's Kennedy Space Center, Fla. "Having three operational vehicles in the fleet affords the shuttle program great schedule flexibility, as we move toward flying safely and completing the international space station," said Space Shuttle Program Manager Wayne Hale. Engineers and technicians spent 900,000 hours performing 124 modifications to the vehicle. These included recommended return to flight safety modifications, bonding more than 1,000 thermal protection system tiles and inspecting more than 150 miles of wiring. Eighty five of the modifications are complete and 39 are still underway. Two of the more extensive modifications included the addition of the multi-functional electronic display system (glass cockpit), and the three-string global positioning system. "When Endeavour was powered up, the team cheered at the completion of all of their hard work and accomplishments during the modification period," said Tassos Abadiotakis, Endeavour's vehicle manager. "The team worked tirelessly to ensure the vehicle progressed through the modification period on time and on budget." Shuttle major modification periods are scheduled at regular intervals to enhance safety and performance, infuse new technology and allow thorough inspections of the airframe and wiring. This was the second of modification period performed entirely at Kennedy. Endeavour's previous modification was completed in March 1997. Endeavour is beginning 10-12 months of launch processing and power-up testing for a future flight, possibly late next year. Web posted. (2005). [Endeavour comes to life [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, October 6].]

### **Director says KSC will add 275 jobs**

NASA's Kennedy Space Center will hire 275 new engineers in the next year to beef up its safety staff and help turn the agency's shuttle launch site into a spaceport for moon missions, officials said Thursday. Moreover, no major layoffs are anticipated at KSC when NASA retires its shuttle fleet and starts launching next-generation rockets and spaceships with a smaller work force. "My hope is with normal attrition, not the first person will have to hit the street that doesn't want to," KSC Director James Kennedy said. "Time will tell, but we are committed to trying to make that happen." In what amounted to an informal "State Of KSC" address, Kennedy briefed the center's 15,000 workers for the first time since NASA on Sept. 19 unveiled plans for rockets and spaceships that it will build for moon missions. NASA's plan still is to fly the shuttles through September 2010, completing as much International Space Station assembly work as possible between now and then. Kennedy said the agency intends to fly 18 station assembly flights -- a reduction from 28 -- plus a repair mission to Hubble Space Telescope. The No. 1 priority during that period: shuttle flight safety. The size of the KSC work force is expected to remain stable through the end of the shuttle program, Kennedy said. But he acknowledged the work force would shrink as NASA begins launching new rockets and spaceships for the moon program. A significant percentage of the existing work force, however, is expected to retire or leave for other reasons between now and 2012, so no major layoffs are expected. The new hires in the next year will be made in two areas: safety and new exploration initiatives. KSC still is completing the post-Columbia build-up of its Safety and Mission Assurance Directorate. The agency also will need engineers to modify KSC facilities, such as the Vehicle Assembly Building and twin shuttle launch pads, for the moon project. First dibs on new positions will go to employees from other NASA field centers that currently face work force reductions. Said

Kennedy: "The hiring we'll be doing to supplement the existing cadre is going to be targeted initially at our sister centers with an over-capacity." Web posted. (2005). [Director says KSC will add 275 jobs [Online]. Available WWW: <http://www.floridatoday.com/> [2005, October 7].]

#### **October 7: NASA and Zero-G Test Space Shuttle Runway Program**

NASA and Zero Gravity Corporation, known as ZERO-G, of Fort Lauderdale, Fla., have announced the firm's participation in a pilot program. It will demonstrate expanded access to and use of the space shuttle's runway and landing facility at NASA's Kennedy Space Center, Fla., for non-NASA activities. ZERO-G will conduct weightless flights from the facility using its Boeing 727-200 aircraft, called G-Force One, the weekend of Nov. 5-6. The passengers, called "Flyers," will predominantly be teachers who will perform simple microgravity experiments they can share with their students back in the classroom. The provider of weightless flights will be the first in a series of demonstration projects invited to use the landing facility to help NASA develop policy, management and operational approaches to opening the 15,000-foot runway to non-NASA use. The pathfinder project was proposed by ZERO-G in response to NASA's recent solicitation of interest in non-NASA uses for the facility. "We're excited to have ZERO-G come to the Shuttle Landing Facility as the first demonstration project in this effort to broaden the facility's use," said Kennedy Space Center Director Jim Kennedy. "Their activities to help share the experience of spaceflight with the general public, especially those educators who are developing our next generation of explorers, offer a strong synergy with NASA's own outreach and educational activities," he said. In addition to giving passengers a brief exposure to the zero gravity experience astronauts have while orbiting earth, the parabolic flights also offer a simulation of the gravity a person would feel on the moon and on Mars, providing a glimpse of what future NASA crews will encounter. Dr. Peter H. Diamandis, Chairman and CEO of ZERO-G explained, "Our flyers train just like astronauts and live their dream of being weightless. More than 1,250 customers in the last year have been able to fly with ZERO-G and company officials are excited to be part of the effort to expand use of the historic Shuttle Landing Facility." ZERO-G and NASA also are discussing future potential flight activity that will support scientists and their experiments, using Kennedy Space Center experiment-processing capabilities, as well as the availability of nearby airspace. Other potential projects proposed to NASA in response to the Request for Information are in the discussion stage with their respective organizations and are expected to be announced jointly in the near future. The pilot program is being sponsored by the Kennedy Space Center, Center Operations Directorate, and is supported by NASA's Office of Space Operations for the purpose of helping NASA implement U.S. Space Transportation Policy and the President's Management Agenda. ["NASA and Zero-G Test Space Shuttle Runway Program," **NASA News Release #05-339**, October 7, 2005.]

#### **Space Shuttle Processing Status Report**

Discovery (OV-103); Mission: STS-121 - 18th International Space Station Flight; Payload: Multi-Purpose Logistics Module; Location: Orbiter Processing Facility bay 3; Launch Date: No earlier than March 2006; Launch Pad: 39B; Crew: Lindsey, Kelly, Sellers, Fossum, Nowak, Wilson and Reiter. Discovery is in Orbiter Processing Facility bay 3 with processing under way for the second space shuttle return to flight test mission, STS-121. Thermography and eddy current inspections continue on the 22 right-hand wing reinforced carbon-carbon panels. The vehicle is scheduled to power up today to support fuel-cell coolant loop

verification, water-spray boiler servicing and the port-side manipulator positioning mechanisms pedestal rigging. Ultrasound and eddy current inspections of the three main propulsion system flow liners are complete. These inspections will ensure no microscopic cracks were formed during the STS-114 launch and mission. Mission: STS-115 - 19th ISS Flight (12A) - P3/P4 Solar Arrays; Vehicle: Atlantis (OV-104); Location: Orbiter Processing Facility bay 1; Launch Date: TBD; Launch Pad: 39B; Crew: Jett, Ferguson, Tanner, Burbank, MacLean, Stefanyshyn-Piper. Technicians continue to process orbiter Atlantis in Orbiter Processing Facility bay 1 for its mission to the International Space Station. The right-hand payload bay door was lowered to support stowing the KU-band antenna on Wednesday. In the Space Station Processing Facility, the P3/P4 cargo element is undergoing testing to verify functionality for on-orbit operations. The test, known as a "startup test" was originally performed on the element in 2002. The element flight batteries were replaced earlier this year requiring another "startup test." In order to cool the batteries and dissipate the heat generated from the test, ammonia is circulated in a continuous loop from ground-support equipment chiller carts through the flight element. In addition to testing functionality, an orbital rate capacity test is performed to determine the current capacity of the flight batteries. The capacity data is used to estimate battery capacity at time of launch and predict on-orbit battery life capacity. The P3/P4 cargo element will attach to the P1 Truss on the port side of the integrated truss segment of the station. With its two large solar arrays, P3/P4 will provide one-fourth of the total power generation capability of the completed station. Endeavour (OV-105); In Orbiter Processing Facility bay 2, orbiter Endeavour's electrical system was powered up Thursday after nearly two years. This power up signifies the end of Endeavour's orbiter major modification period that began in December 2003. During this time, technicians spent 900,000 hours completing 124 modifications, including installing the new multi-functional electronic display system, or "glass cockpit," and all recommended return to flight safety additions. Eighty-five of the modifications have been completed, with work on the additional 39 upgrades continuing in the next few months. Another large modification was the three-string global positioning system. The new system allows Endeavour to make an emergency landing at any runway, provided the runway is long enough to accept a space shuttle. External Tank; External tank 120, the first redesigned tank to arrive at Kennedy Space Center, was lowered onto the transporter in the Vehicle Assembly Building on Sept. 29. It will wait there until Pegasus, NASA's specially designed barge for transporting tanks, returns to Kennedy Space Center. The barge just transported external tank 119 to NASA's Michoud Assembly Facility near New Orleans for modification. Workers will begin limited testing on both tanks as soon as they arrive. Owner-press-release. (2005). **Space Shuttle Processing Status Report** S05-029 [Online]. Available E-mail: owner-press-release@spinoza.public.hq.nasa.gov [2005, October 7].]

### **October 8: Zero-gravity tourists head to KSC**

Teachers will experience the weightlessness of space in a weekend of parabolic flights from Kennedy Space Center during a pilot program that could bring commercial flights to the shuttle landing strip. Zero-G's proposal was one of a handful of responses to KSC's request for ideas on using the landing facility. NASA made the announcement Friday. "We're hoping this will lead to a regular thing," Zero-G spokesman Noah McMahan said. NASA also is negotiating with other organizations that submitted proposals to use the Shuttle Landing Facility, said Jim Ball, spaceport development manager at KSC. The NASA spaceships that come after the shuttles won't use the runway. They are expected to land using parachutes, probably in California. Zero Gravity Corp. mostly flies out of its Fort

Lauderdale headquarters but has a Nov. 20 flight scheduled from Titusville. A flight costs \$3,750 and creates short periods of lunar gravity, Martian gravity and zero gravity during a series of bell-curve-shaped ascents and descents. Web posted. (2005). [Zero-gravity tourists head to KSC [Online]. Available WWW: <http://www.floridatoday.com/> [2005, October 8].]

**October 12: Hurricane damage reroutes shuttle boosters**

Segments of the shuttle's solid-rocket boosters are being rerouted to and from their Utah manufacturing plant because of railway damage done by Hurricane Katrina. Katrina damaged almost 40 miles of CSX rail line between New Orleans and Pascagoula, Miss., knocking out six bridges along the way. So NASA and booster manufacturer ATK Thiokol now are shipping segments over an alternate route that winds through Alabama on its way to Kennedy Space Center. The 3,000-mile trip between KSC and Corinne, Utah, now takes a day longer than the typical 7 to 8 days to complete, but the new course carries the highly flammable segments through less populated areas. A NASA locomotive transports the rail cars over a 40-mile KSC railway that connects with the Florida East Coast Railway at a point north of Titusville and south of Haulover canal. The FEC is one of four rail companies involved in shipping booster segments to and from ATK Thiokol's manufacturing plant near Brigham City, Utah. The others are Union Pacific, Kansas City Southern and CSX. The route change is the latest repercussion Katrina has had on NASA shuttle operations. Said Tracy Yates, a spokeswoman with shuttle prime contractor United Space Alliance: "The hurricane has had impacts that no one ever would have suspected." Web posted. (2005). [Katrina damage reroutes booster trips [Online]. Available WWW: <http://www.floridatoday.com/> [2005, October 12].]

**October 13: Senator promotes KSC as assembly site**

Sen. Bill Nelson is trying to help broker a deal to make Brevard County the final assembly site for the spaceship proposed to replace NASA's shuttles and carry Americans back to the moon. Nelson, D-Melbourne, said preliminary studies show that assembling the new ships near the Kennedy Space Center launch site could save cash-strapped NASA at least \$400 million annually and protect as many as 500 local space jobs that might otherwise be lost when the shuttles retire in 2010. Nelson has private meetings today with space center director Jim Kennedy, Florida and Brevard economic development officials and possibly representatives from the two contractor teams vying to build the Crew Exploration Vehicle. NASA has made no decisions about assembly of the vehicle, though officials have ensured KSC will be the launch site for missions to the moon and Mars. Web posted. (2005). [Senator promotes KSC assembly site [Online]. Available WWW: <http://www.floridatoday.com/> [2005, October 13].]

**Expendable Launch Vehicle Status Report**

Mission: Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observations and CloudSat (CALIPSO/CloudSat); Launch Vehicle: Boeing Delta 7420 with Dual Payload Attach Fitting; Launch Pad: Space Launch Complex 2, Vandenberg Air Force Base, Calif.; Launch Date: NET November 2005 (exact date TBD) Launch Window: 5:01 a.m. EST (2:01 a.m. PST). The launch was postponed pending resolution of a problem encountered while testing launch-vehicle flight-termination system batteries. CALIPSO and CloudSat are installed within the Dual Payload Attach Fitting and are undergoing final battery charging in preparation for transport to the launch pad. Except for the battery problem, Delta II



preparations at NASA's Space Launch Complex 2 continue to go well. Mission: New Horizons Launch Vehicle: Lockheed Martin Atlas V 551 (AV-010); Launch Pad: Complex 41, Cape Canaveral Air Force Station, Fla.; Launch Date: Jan. 11, 2006 Launch Window: 2:07 to 4:07 p.m. EST. The Centaur stage was hoisted onto the Atlas booster on Tuesday, and mating should be completed by this weekend. New Horizons spacecraft testing and processing activities in the clean room are on schedule. The instrument to measure the solar wind around Pluto was installed in the spacecraft and tested Oct. 6. Spacecraft communications testing with Deep Space Network tracking stations is scheduled for tomorrow and Saturday. KSC News Center (2005). **Expendable Launch Vehicles Status Report** E05-013 [Online]. Available E-mail: [ksc@newsletters.nasa.gov](mailto:ksc@newsletters.nasa.gov) [2005, October 13].]

**October 14: NASA: May shuttle launch 'very doable'**

NASA managers said Friday that the space agency is working to resume shuttle flights as soon as next May, even as teams of engineers continue to analyze what caused a potentially critical problem during the Discovery's launch. "May looks very doable," said NASA Associate Administrator for Space Operations William Gerstenmaier. Shuttle Program Manager Wayne Hale added, "I think we're beginning to have our hands well around the technical problems that we have and to find the fixes that are going to be necessary to fly again." Elimination of large debris is key to the safe resumption of shuttle flights. Shuttle program managers said they are optimistic that testing will be completed and the modifications implemented in time to launch the shuttle between May 3 and 23. NASA now plans only 19 more shuttle flights, down from 28, Gerstenmaier confirmed. Eighteen of those missions will include docking with the international space station, with the goal of completing its assembly. The other would service the Hubble Space Telescope. NASA intends to retire the shuttle fleet in 2010. The space agency hopes to launch the next generation manned spacecraft, the Crew Exploration Vehicle, in 2012, with a manned mission to the moon coming in 2018. Web posted. (2005). [NASA: May shuttle launch 'very doable' [Online]. Available WWW: <http://www.cnn.com/> [2005, October 14].]

**October 16: Safety teams refine mission at KSC**

Two years after Columbia accident investigators ordered an overhaul of shuttle safety, the work to transform Kennedy Space Center's safety and inspection practices is nearing completion. Denny Kross, the new director of safety and mission assurance, is tweaking the reorganization and responding to a need for more expertise by adding college-educated engineers who will work with the inspectors responsible for keeping the shuttles, space station and rockets safe. "The people that have been hired here in the past year are incredibly excellent, technical people," said Kross, who's been with NASA since 1967. The front-line inspectors often do not have safety degrees, but they have military and industrial backgrounds that enrich the safety program, Kross said. "When you bring in folks like that, you get new ideas, and I think it's great," Kross said. The new engineers include young workers fresh out of college, as well as administrative staffers who will improve communication inside and outside the center. "We were very focused on the technical last year, and so now we have to fix the rest of the organization to make sure it works effectively," Kross said. The Columbia Accident Investigation Board scolded NASA's shuttle program -- and particularly KSC -- for a safety organization in which inspectors answered to the people they were supposed to monitor. The board also was concerned the number of safety employees had decreased, so NASA had to depend more on contractor

United Space Alliance for safety data. Kross is making sure the safety people are on the ground floor of the moon-Mars exploration effort, which will lead to new ships to inspect and certify. He's looking forward to the next generation. Web posted. (2005). [Safety teams refine mission at KSC [Online]. Available WWW: <http://www.floridatoday.com/> [2005, October 16].]

**October 19: Expendable Launch Vehicle Status Report**

Mission: Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observations and CloudSat (CALIPSO/CloudSat); Launch Vehicle: Boeing Delta 7420 with Dual Payload Attach Fitting; Launch Pad: Space Launch Complex 2, Vandenberg Air Force Base, Calif.; Launch Date: NET Nov. 7, 2005; Launch Window: 5:01:18 a.m. EST (2:01:18 a.m. PST). NASA, Boeing and the U.S. Air Force are working on the problem encountered while testing batteries used for the flight termination system of the Delta II. CALIPSO and CloudSat are installed within the Dual Payload Attach Fitting. CloudSat will continue to undergo final battery charging through Saturday. On Sunday, the combination will be placed in an environmentally-controlled canister and installed on the payload transporter in preparation for the trip to the launch pad. Delta II preparations at Space Launch Complex 2 continue, as the launch vehicle awaits arrival of the payloads for installation on the second stage Oct. 24. Mission: New Horizons; Launch Vehicle: Lockheed Martin Atlas V 551 (AV-010); Launch Pad: Complex 41, Cape Canaveral Air Force Station, Fla.; Launch Date: NET Jan. 11, 2006; Launch Window: 2:07 to 4:07 p.m. EST. The New Horizons spacecraft is undergoing mission simulation testing through Friday. Spacecraft cleaning and blanket closeouts are scheduled for next week. The spacecraft test team is reviewing contingency plans due to the threat from Hurricane Wilma. At Launch Complex 41, the erection of the first of five solid rocket boosters for the Atlas V began today. The second booster is scheduled for mating tomorrow. All of the boosters should be attached by mid-November. Lockheed Martin is assessing the schedule for the remaining boosters based on preparations which may be necessary for Hurricane Wilma. The Centaur stage was hoisted atop the Atlas booster on Oct. 11, and mating to the Atlas was completed on Sunday. KSC News Center (2005). **Expendable Launch Vehicles Status Report E05-014** [Online]. Available E-mail: [ksc@newsletters.nasa.gov](mailto:ksc@newsletters.nasa.gov) [2005, October 19].]

**October 21: NASA KSC Chief Medical Officer Receives Award**

Dr. Irene Long, NASA Kennedy Space Center's chief medical officer, recently was one of three women in the agency who were honored at the Women of Color Technology Awards Conference in Atlanta. She was presented with the Lifetime Achievement Award. The conference, celebrating its 10th anniversary this year, attracts thousands of the nation's top female technologists, executives and students. The awards recognize contributions made by minority women in traditionally male-dominated fields. The Career Communications Group, publisher of Women of Color, U.S. Black Engineer and Information Technology and Science Spectrum magazines, hosts the conference, with IBM Corporation as the title sponsor. Long has been at KSC since 1982. She provides executive leadership and direction, serving as the directorate's interface with center senior management and organizations to assure support to employee health and the environment. She provides long-range and strategic planning and develops related initiatives to assure proactive, preventative approaches to comprehensive medical and environmental programs. ["NASA KSC Chief Medical Officer Receives Lifetime Achievement Award," **NASA News Release #92-05**, October 21, 2005.]

**October 22:                   Hurricane Wilma**

Based on the current NHC track for Wilma, KSC and the 45th Space Wing will go to HURCON III this morning effective 8:30 am. The current projection has KSC experiencing tropical force winds all day Monday (7 am to 4 pm) with hurricane force winds within 50 miles (at about 11 am) on the current track. Forward Plans are to meet again tomorrow at noon. Assuming a continuation of the current forecast track, we would probably move to HURCON II at that time and close the Center for Monday. A decision on duty status will not be made until noon tomorrow, Sunday, October 23, 2005. E-mail distribution. (2005). [Key, Wayne M. Re: "Hurricane Wilma" [Electronic]. **Emergency Preparedness** [EmerPrep@ksccms.ksc.nasa.gov], [October 22, 2005.].]

**October 23:                   NASA plans for tight budget**

NASA does not have enough money to finish building the International Space Station, and the agency is studying more cuts in the number of shuttle flights as well as the Kennedy Space Center work force. The space agency has asked the White House for up to \$5 billion more for its budget between now and 2010. If approved, the agency would be able to fly 18 shuttle missions to the space station and one repair flight to the Hubble Space Telescope. NASA Administrator Mike Griffin has ordered deputies to craft a backup plan that would cut shuttle flights by an unspecified amount. Some options potentially could trigger thousands of layoffs at KSC. Specifically, Griffin instructed Gerstenmaier to estimate how much money could be saved and how many jobs could be cut if KSC prepared one shuttle at a time for launch instead of working on all three orbiters simultaneously. The work likely would be done in a single shift, rather than two or three. Only one shuttle hangar would be fully operational, and work in the Vehicle Assembly Building would be limited to a single external tank and solid rocket booster set. It's not known how many employees it will take to process one shuttle at a time. It is difficult to determine because safety checks and other systems would have to remain in place, regardless of the number being processed. No decisions have been made. The president's next five-year spending plan is not due to be presented to Congress until February. NASA's shuttle program, which currently employs about 14,500 people at KSC, already has estimated it could fly no more than two or three missions a year, rather than the four or five currently planned. Slowing shuttle processing to one at a time would accelerate job reductions at KSC that many expected to happen slowly over five or six years. NASA and the OMB now are working on the agency's budget for 2007 and four subsequent years. A proposal that would cover 19 shuttle missions was submitted to the OMB, but it is between \$3 billion and \$5 billion more than the current White House budget guidelines. OMB asked for a separate proposal that would keep NASA within the existing five-year shuttle budget projections. In an earlier reduction of flights, the agency axed a Japanese-built centrifuge module and a Russian electrical power tower. And NASA cut its own plans for a crew quarters module and an American-built rescue vehicle. Griffin's instructions to deputies working on the shuttle budget backup plan is to place high priority on launching remaining international partner components, such as the European and Japanese science laboratories, to avoid renegeing on commitments President Bush has said the U.S. will keep. Web posted. (2005). [NASA plans for tight budget [Online]. Available WWW: <http://www.floridatoday.com/> [2005, October 23].]

**October 23: KSC closed on Monday, Oct. 24, Due to Hurricane Wilma**

The Kennedy Space Center will be closed for business and operations on Monday, Oct. 24, due to the threat from Hurricane Wilma. KSC government and contractor employees should not report for work. The Kennedy Space Center Visitor Complex will also be closed. Today at noon, the Kennedy Space Center was placed in the HURCON II condition which means that KSC employees are being sent home. KSC has completed all necessary preparations for Hurricane Wilma. Facilities and launch pads have been secured, the payload bay doors of the three orbiters have been closed, and the New Horizons spacecraft has been placed inside its protective transportation canister. KSC will go to HURCON I status (rideout) at 8 p.m. EDT tonight, 12 hours before the expected arrival of 50-knot winds. [“KSC closed on Monday, Oct. 24, Due to Hurricane Wilma, **NASA News Release #93-05**, October 23, 2005.]

**October 24: KSC closes to prepare for Hurricane Wilma**

NASA’s Florida spaceport stood all but empty Monday, with only an emergency crew watching over space shuttles and planetary probes while winds from Hurricane Wilma howled outside. The space agency closed its Kennedy Space Center (KSC) in Cape Canaveral as Hurricane Wilma struck southwest Florida. By 11:00 a.m. EDT (1500 GMT) today, the storm had weakened to a Category 2 hurricane – down from Category 3 at landfall – with maximum winds near 105 miles per hour (165 kilometers per hour). At KSC, where most of NASA’s 13,000 spaceport workers were advised to stay home, sustained winds were blowing at about 57 miles per hour (91 kilometers per hour) – or about 50 knots – with heavy rain and stronger winds expected before 2:00 p.m. EDT (1800 GMT), KSC officials said. A tornado, one of several spawned by Hurricane Wilma, touched down near KSC, but did not appear to damage the spaceport. A small crew watched over NASA’s three space shuttles – Discovery, Atlantis and Endeavour – which sat in their hangars with their payload doors closed to protect against leaks, KSC officials said. KSC officials said they expect the spaceport to reopen Tuesday after Hurricane Wilma has passed. Web posted. (2005). [NASA workers shield space shuttle, Pluto Probe from Hurricane Wilma [Online]. Available WWW: <http://www.space.com/> [2005, October 24].]

**October 25: Cape reopens Wednesday**

NASA's Kennedy Space Center and the Cape Canaveral Air Force Station, Fla., will open for business Wednesday (October 26) morning. The center sustained minor hurricane damage. The impact of Hurricane Wilma on Kennedy facilities is being evaluated. Preliminary assessments indicate no damage to space flight hardware or NASA's space shuttle fleet. Some Kennedy facilities sustained minor roof damage or interior water damage when Wilma passed through Monday. The center's landmark Vehicle Assembly Building lost some panels on the east and west sides, and some facilities are without power. Wilma dropped 13.6 inches of rain at Kennedy's Space Shuttle Landing Facility. The highest wind gust recorded was 94 mph from the north-northwest at launch pad 39B. The maximum sustained wind was 76 mph from the north-northwest at the top of the 492-foot weather tower north of the Vehicle Assembly Building. For Kennedy employees and visitors, the Max Brewer Causeway on State Road 406, between Titusville and the center, has structural damage and is closed. Web posted. (2005). [Cape reopens Wednesday [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, October 25].]

### **NASA successfully test space shuttle main engine**

For the first time since Hurricane Katrina, NASA's Stennis Space Center in Mississippi returned to its primary business Tuesday, testing space shuttle main engines. Engineers successfully test-fired an engine for 520 seconds; the time it takes a shuttle to reach orbit. Web posted. (2005). [NASA successfully test space shuttle main engine [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, October 25].]

### **Boeing's rocket schedule hit by looming union strike**

Boeing aerospace workers across the country are preparing to strike next week, a move that would halt the company's Delta rocket launch schedule at Cape Canaveral and Vandenberg Air Force Base. The planned November 7 launch of NASA's CloudSat and CALIPSO environmental satellites has already been impacted by the battle between Boeing and its workforce. The two spacecraft were supposed to move from a processing building to the launch pad for attachment atop a Delta 2 rocket earlier this week, but officials scrubbed those plans due to the looming strike. NASA said it didn't want the satellites sitting on Vandenberg's Space Launch Complex-2 West pad if technicians went on strike. Other launches facing uncertainty are the commercial Delta 4 rocket from Cape Canaveral with the civilian GOES-N weather satellite and an Air Force mission using a Delta 4 from Vandenberg with a classified spy satellite. Both missions have been encountered significant delays for technical problems. The International Association of Machinists and Aerospace Workers voted to reject Boeing's latest contract offering. Union leaders cited the lack of retiree medical benefits for new employees, vacation and insurance costs as unacceptable parts of the proposed contract. The union includes 365 workers at Boeing's Huntington Beach facility, 288 at Cape Canaveral and 100 at Vandenberg. The workers are critical to launch activities, meaning their strike would prevent any liftoffs from occurring, Boeing said. Web posted. (2005). [Boeing's rocket schedule hit by looming union strike [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, October 25].]

### **October 26: Florida Space 2005 opening ceremony program announced**

As momentum continues to build for the inaugural Florida Space 2005 conference, Space Foundation officials announced today plans for the opening ceremony on Tuesday, Nov. 15 at 6 p.m. Florida space professionals and those with interests in Florida will gather at the Kennedy Space Center Visitor Complex Nov. 15-17 for the conference. Set in the Rocket Garden at the Kennedy Space Center Visitor Complex, the opening ceremony and reception will feature a performance from national recording artist and jazz saxophonist Jeff Kashiwa, science fair displays and recognition of science fair winners, and a fireworks display. It will be the first fireworks show to take place at the Kennedy Space Center Visitor Complex. Pratt & Whitney Rocketdyne is the co-sponsor of the opening ceremony and reception, and United Space Alliance is the co-sponsor of the opening fireworks display. In featured speeches, dynamic panel sessions, and networking opportunities, leaders from throughout the global and local space industry will meet to address the opportunities and challenges facing Florida's space industry and the resulting impact on its economy. Featured speakers include Dr. Michael Griffin, administrator, National Aeronautics and Space Administration; Gen Lance W. Lord, USAF, commander, Air Force Space Command; The Honorable Toni Jennings, lieutenant governor of Florida; Mr. Lon Rains, vice president, Editorial, Imaginova Corp. and editor, *Space News*; and The Honorable Dr. Ronald M. Sega, under secretary of the Air Force. Florida Space 2005 is expected to become the leading event serving the Florida space community. The Space Foundation is organizing the conference in association with



NASA's Kennedy Space Center, the U.S. Air Force 45th Space Wing, Florida Space Authority, and The Canaveral Council of Technical Societies. It builds on the best features of Space Congress and the Cape Canaveral Spaceport Symposium, both long-time community space events now retired, and whose heritage will be honored at this inaugural event. Web posted. (2005). [Florida Space 2005 opening ceremony program announced [Online]. Available WWW: <http://www.spacefoundation.org/> [2005, October 26].]

**October 27: Planned strike could disrupt Boeing rocket launches**

A looming union strike against The Boeing Co. is threatening to stall the upcoming launches of a NASA science mission, a top-secret Pentagon payload and a weather satellite, officials said Thursday. Starting a seven-day clock, the International Association of Machinists and Aerospace Workers District 725 notified Boeing on Wednesday that its membership intends to go on strike next week. The union represents 960 Boeing workers in Florida and California, including 753 who are involved in the company's Delta rocket program. Some 288 perform launch operations at Cape Canaveral Air Force Station, where an advanced weather satellite is being readied for launch aboard a Delta 4 rocket. Another 100 work at Vandenberg Air Force Base in California, where a NASA science satellite and a classified National Reconnaissance Office payload are being readied for launches on Delta 2 and Delta 4 rockets, respectively. Also, 365 work at the company's Huntington Beach, Calif., facility, where Boeing's Delta program office is headquartered. The NASA science mission, which involves launching two small atmospheric research satellites, was tentatively scheduled for launch Nov. 7 but now faces an indefinite delay. The potential for a strike prompted NASA to ask Boeing to delay moving the two spacecrafts to a launch pad where they were to be mounted atop a Delta 2 rocket. A strike also would trigger delays in the classified NRO mission and the launch of the National Oceanic and Atmospheric Administration weather satellite from Cape Canaveral. ["Planned strike could disrupt Boeing rocket launches," **Florida Today**, October 28, 2005, p 1A & 6A.]

**October 28: Pluto rocket damaged by Wilma**

A Lockheed Martin Atlas 5 rocket being prepared to launch NASA's first probe to Pluto was slightly damaged when Hurricane Wilma cut a swath through Florida but should still be able to launch as planned, officials said on Friday. The 200-foot tall rocket was standing vertically inside its assembly hangar at Cape Canaveral Air Force Station when Wilma blasted through on Monday, bringing wind gusts up to 76 mph to the spaceport on Florida's Atlantic coast. The hangar's rolling door, which is made of a cloth material designed to withstand winds of 145 mph, failed, causing what appears to be minor damage to the rocket and ground support equipment, said Lockheed Martin Corp. spokeswoman Julie Andrews. Inspection teams were assessing the damage on Friday. The New Horizons spacecraft, set to launch on January 11 on a decade-long voyage to Pluto, was encased in its shipping container at a processing facility during the storm. The probe contains 24 pounds of plutonium pellets, which will provide power through radioactive decay. As Pluto is 50 times farther from the sun than Earth, solar power is not a viable option for the spacecraft. NASA has until February 14 to launch the probe, which needs to fly around Jupiter in February or March of 2007 for a gravitational boost to reach Pluto and its moon Charon in July 2015. Web posted. (2005). [Pluto rocket damaged by Wilma [Online]. Available WWW: <http://www.cnn.com/> [2005, October 28].]

### **Space Shuttle Processing Status Report**

NASA's Kennedy Space Center, Fla. opened on Wednesday (October 26) following Hurricane Wilma. Some water entered facilities and there is minor structural damage, primarily to roofs. The Vehicle Assembly Building lost some panels on the east and west sides. There was no damage to flight hardware. Approximately 13.6 inches of rain was recorded at the Shuttle Landing Facility. The highest wind gust recorded was 94 mph at launch pad 39B, while the maximum sustained wind was 76 mph at the top of the 492-foot weather tower north of the Vehicle Assembly Building. NASA's space shuttle fleet is housed and processed at Kennedy. Discovery (OV-103); Mission: STS-121 - 18th International Space Station Flight; Payload: Multi-Purpose Logistics Module; Location: Orbiter Processing Facility Bay 3; Launch Date: No earlier than May 2006; Launch Pad: 39B; Crew: Lindsey, Kelly, Sellers, Fossum, Nowak, Wilson and Reiter. Discovery processing is under way for the second return to flight test mission, STS-121. Hinge installation for the right-hand payload bay door is complete. The door was closed and opened Thursday to support inspections of the radiator retract mechanism. Right-hand door inspections continue today. The forward reaction control system was removed on Wednesday. The system will be sent back to the Hypergol Maintenance Facility at Kennedy for work and inspections prior to returning to the bay for reinstallation on the vehicle. Atlantis (OV-104); Mission: STS-115 - 19th International Space Station Flight; Payload: P3/P4 Solar Arrays; Location: Orbiter Processing Facility Bay 1; Launch Date: TBD; Launch Pad: 39B; Crew: Jett, Ferguson, Tanner, Burbank, MacLean, Stefanyshyn-Piper. Technicians continue to process the orbiter for its mission to the international space station. Preparations are under way to remove a cold plate in an avionics bay. To perform the removal, water coolant loop No. 2 will be de-serviced or drained. The payload for Atlantis is the P3/P4 truss segment being prepared in the Space Station Processing Facility. The P3/P4 cargo element ammonia testing to verify functionality for on-orbit operations is complete. The P3/P4 cargo element will attach to the P1 truss on the port side of the integrated truss segment of the space station. With its two large solar arrays, P3/P4 will provide one-fourth of the total power generation capability of the station. Endeavour (OV-105); In Orbiter Processing Facility Bay 2, Endeavour continues processing following a nearly two-year major modification period. Main landing gear rigging is scheduled to begin next week. During the modification period, the body flap was removed from the vehicle and extensive work was performed. The body flap thermal protection system blankets were removed. Technicians bead blasted the flap to remove any microscopic corrosion and painted it with corrosion control paint. Reinstallation of the body flap hardware on the vehicle is under way. Owner-press-release. (2005). **Space Shuttle Processing Status Report** S05-030 [Online]. Available E-mail: owner-press-release@spinoza.public.hq.nasa.gov [2005, October 28].]

### **October 31: Expendable Launch Vehicle Status Report**

Mission: Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observations and CloudSat (CALIPSO/CloudSat); Launch Vehicle: Boeing Delta 7420 with Dual Payload Attach Fitting; Launch Pad: Space Launch Complex 2, Vandenberg Air Force Base, Calif.; Launch Date: TBD; Launch Window: 5:01 a.m. EST. CALIPSO and CloudSat are installed within the Dual Payload Attach Fitting. They continue to undergo spacecraft battery charging. The processing team is maintaining the spacecraft safely inside the payload facility at Vandenberg. NASA, Boeing and the Air Force are addressing the problem encountered while testing batteries used for the flight termination system of the Delta II. Boeing launch site technicians recently rejected a proposed new contract. Launch preparations are on hold

pending resolution of the negotiations between Boeing and the union representing the technicians. Mission: New Horizons; Launch Vehicle: Lockheed Martin Atlas V 551 (AV-010); Launch Pad: Complex 41, Cape Canaveral Air Force Station, Fla.; Launch Date: Jan. 11, 2006 Launch Window: 2:07 to 4:07 p.m. EST. On Oct. 24, Hurricane Wilma damaged the specially-built fabric MegaDoor which covers the large opening of the Atlas V Vertical Integration Facility. The Atlas 5 rocket and some ground support equipment were slightly damaged. There were no injuries. NASA and Lockheed Martin engineers and technicians are assessing the damage and the recovery process, including door repair options, to confirm the continued ability to support the launch. The spacecraft was returned to a work stand Inside the Payload Hazardous Servicing Facility. It was removed from the protective shipping container, where it had been placed before the hurricane. The spacecraft's outside surfaces are being cleaned. KSC News Center (2005). **Expendable Launch Vehicles Status Report** E05-015[Online]. Available E-mail: [ksc@newsletters.nasa.gov](mailto:ksc@newsletters.nasa.gov) [2005, October 31].]



The first group of passengers to fly on the ZERO-G aircraft are eager to get started. The Boeing 727-200 aircraft is used for weightless flights by Zero Gravity Corporation, known as ZERO-G, of Fort Lauderdale, Fla. NASA and ZERO-G demonstrated Nov. 5 the expanded access to and use of the space shuttle's runway and landing facility at Kennedy Space Center for non-NASA activities. The passengers, called "Flyers," were predominantly teachers who performed simple microgravity experiments they can share with their students back in the classroom.

## NOVEMBER 2005

### **November 2: KSC's Exploration 2005 Reorganization**

The NASA KSC Exploration 2005 Reorganization was considered "UP AND RUNNING" on Monday, October 31 when the organizational structures were stood up. To summarize the leadership team, pending HQ final approval: Scott Kerr is the new Director of Engineering Development (DX), Tip Talone is the new Director of KSC Constellation Project Office (LX), Dr. Dave Bartine is the new Director of Applied Technology (KT), and Mike Benik is the new director of Center Operations (TA). SES assignments for some of our other organizations will be posted on the KSC Internal Web Page following HQ approval. It is planned to announce the remaining supervisory selections for Center Operations (TA), KSC Constellation Project Office (LX), Engineering Development (DX), and Applied Technology (KT) on Friday, November 4. E-mail distribution. (2005). [KSC Daily News [Electronic]. **KSC Daily News - 11/2/05 - Contractor**, [November 2, 2005].]

### **NASA appoints Constellation Program managers**

Jeffrey Hanley has been appointed manager of NASA's Constellation Program. He will lead development of the nation's new spacecraft and launch system, which as part of the Vision for Space Exploration will take astronauts to the moon, Mars and beyond. Mark Geyer was appointed as deputy program manager. The Constellation Program will be based at NASA's Johnson Space Center in Houston. All of NASA's 10 field centers have program roles and responsibilities. The program will develop launch and transfer vehicles, landers and other systems. Initial missions will launch early in the next decade. Web posted. (2005). [NASA appoints Constellation Program managers [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, November 2].]

### **Boeing strike threatens satellite launches**

About 1,500 Boeing machinists went on strike at 12:01 a.m. this morning after last-minute talks broke down between their union and the company unit that operates the Delta rocket program. A federal mediator was unable to broker an agreement on raises, health benefits and retirement plans after meeting with both sides Tuesday, said Gary Quick, the chairman of the union's negotiating committee. The strike could affect satellite launch facilities operated by Boeing's Integrated Defense Systems unit at Vandenberg Air Force Base in California and Cape Canaveral. Already, the launch of one Delta rocket carrying NASA environmental satellites was delayed at Vandenberg because of the strike threat. The current three-year contract expired Oct. 23. It covers about 900 workers in Huntington Beach, Torrance, Vandenberg and Edwards Air Force Base in California; about 300 workers at Cape Canaveral in Florida; and about 300 workers at Boeing facilities in Huntsville and Decatur, Ala. Web posted. (2005). [Boeing strike threatens satellite launches [Online]. Available WWW: <http://www.floridatoday.com/> [2005, November 2].]

### **Damage prompts booster replacement for Pluto probe**

Lockheed Martin technicians are replacing one of the solid-fuel boosters attached to the Atlas 5 rocket that will launch NASA's New Horizons spacecraft to Pluto because of damage the motor sustained during Hurricane Wilma. The Atlas 5 is being assembled inside the 30-story Vertical Integration Facility at Cape Canaveral's Complex 41 in advance of the targeted January 11 liftoff that will send the five-ton New Horizons probe on its decade-long



cosmic cruise to encounter the unexplored planet Pluto. Although the center of Wilma remained well south of the Cape, the large storm delivered heavy rain and hurricane-force winds to the Space Coast on October 24 as it sliced across Florida. A third of the 41-by-275-foot reinforced fabric "MegaDoor" on the assembly building's opening that faces the launch pad tore in the storm, causing some debris to fall inside the facility. The Atlas 5's bronze first stage and Centaur upper stage were erected atop a mobile launch platform, and the first of five strap-on solid rocket boosters was attached to the first stage when Wilma blew through. Atlas 5 rockets are put together with the VIF, and then moved to the pad in the final 12 hours of the countdown. Post-storm inspections revealed a ding on the solid motor casing, prompting officials to order the booster's removal and replacement. The motor may have been safe to fly, engineers believed, but officials ruled that exchanging it would be quicker than the time required to analyze the damage and re-certify the booster. The launch campaign resumed this week following the Wilma cleanup and vehicle assessments. A second booster was added to the Atlas 5 on Tuesday, and the remaining three boosters earmarked for the mission will be installed through next week. The damaged motor was detached Wednesday. Its replacement is expected to arrive in early December. Web posted. (2005). [Damage prompts booster replacement for Pluto probe [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, November 2].]

### **International Space Station by the numbers**

In the Space Station Processing Facility the jam-packed high bay includes payloads for the next 10 missions to the half-built International Space Station. There are three remaining electric power towers and their stowed solar arrays, three Italian cargo carriers used to haul critical supplies to and from the orbiting outpost, a cylindrical Japanese science laboratory and a U.S. module that will connect the lab and another from Europe with the rest of the station. All in all, 123 tons of cargo is being readied for launch in the SSPF. More space station numbers: 16 – number of nations involved in the project; 100,000 – number of people around the world involved in the project, including workers at 500 contractor facilities in 37 U.S. states and other nations; 17,500 – speed at which the station orbits the Earth; 132.5 tons – weight of station components processed at Kennedy Space Center; 188,036 pounds – weight of station hardware at KSC that is still to be deployed; 10 – number of assembly missions currently in process at KSC; 50 – number of flights to the station to date, including 17 shuttle missions, 11 Soyuz crew transport flights, 19 Progress space freighter flights, 2 Proton assembly mission, 1 Soyuz assembly mission; 50 – number of astronauts and cosmonauts to live and work on the station. Current size and weight: 170 feet long, 90 feet high, 240 feet wide, 205 tons. ["The International Space Station by the numbers," **Florida Today**, November 2, 2005, p 6A. "We're busting at the seams," **Florida Today**, November 2, 2005, p 6A.]

### **Expendable Launch Vehicle Status Report**

Mission: Cloud-Aerosol Lidar and Infrared Pathfinder Satellite; Observations and CloudSat  
Launch Vehicle: Boeing Delta 7420 with Dual Payload Attach Fitting; Launch Pad: Space Launch Complex 2, Vandenberg Air Force Base, Calif.; Launch Date: TBD Launch Window: 5:01 a.m. EST. The satellites are installed within the Dual Payload Attach Fitting at the Astrotech payload processing facilities. When Boeing labor contract issues are resolved, the payload combination will be placed in an environmentally-controlled canister and installed on the payload transporter for the trip to the launch pad. Delta II preparations at Launch Complex 2 have gone according to schedule. Work is on hold until the payloads

arrive at the pad for installation on top of the second stage. NASA, Boeing and the Air Force are addressing the problem encountered while testing batteries used for the flight termination system of the Delta II. Mission: New Horizons; Launch Vehicle: Lockheed Martin Atlas V 551 (AV-010) Launch Pad: Complex 41, Cape Canaveral Air Force Station, Fla.; Launch Date: Jan. 11, 2006 Launch Window: 2:07 to 4:07 p.m. EST. The spacecraft is undergoing autonomy testing this week to determine whether it can function without having contact with Earth. Final thermal blanket installation will be completed this week. Hurricane Wilma caused some minor damage to the solid rocket booster that was attached to the Atlas V. As a precaution the booster is being replaced. Attachment of the remaining four solid rocket boosters resumes later this week. KSC News Center (2005). **Expendable Launch Vehicles Status Report** E05-016 [Online]. Available E-mail: [ksc@newsletters.nasa.gov](mailto:ksc@newsletters.nasa.gov) [2005, November 2].]

### **November 3: Strike grounds rocket plans**

A cross-country strike against The Boeing Co. on Wednesday halted preparations for four upcoming U.S. space launches, including the first mission to Pluto and a classified Pentagon flight. About 1,500 machinists in Florida, California and Alabama walked off the job after a federal mediator was unable to broker an agreement on pay raises, health benefits and retirement plans. Two-thirds of the striking workers are involved in Boeing's Delta rocket program; about 300 of them picketed at Cape Canaveral Air Force Station and NASA's Kennedy Space Center as well as a Boeing office building south of Titusville on Wednesday. The union's previous three-year contract expired Oct. 23. It covered 960 workers in California and Florida, including 753 people involved in the Delta rocket program. Cape Canaveral employs 288 of the machinists. The strike brought to a halt work on the upcoming launch of an advanced weather satellite from Cape Canaveral. NASA's New Horizon spacecraft, which will be the first to examine Pluto and its moons, will have to be delayed until early 2007 if it is not launched between Jan. 11 to Feb. 14. Web posted. (2005). [Strike grounds rocket plans [Online]. Available WWW: <http://www.floridatoday.com/> [2005, November 3].]

### **NASA Needs \$5 Billion More for Shuttles, Director Says**

The National Aeronautics and Space Administration needs up to \$5 billion more than previously budgeted to operate the space shuttle before the program ends in 2010, and it is looking for ways to reduce the shortfall, Michael D. Griffin, the agency administrator, said Thursday. Testifying before the House Science Committee, Dr. Griffin said the cost of operating the shuttle fleet before it is retired was higher than expected. NASA is trying to find savings in the shuttle program to avoid hurting other agency projects, while still flying enough shuttle missions to fulfill obligations to finish the International Space Station, he said. Dr. Griffin said "painful choices" might be needed to pursue President Bush's plan to send people back to the Moon before 2020. To ease budget pressure, NASA has already announced cutting half its planned space station research, sharply reducing a program to develop nuclear power for space applications and delaying planned space astronomy missions. Dr. Griffin said his agency would have to cancel or defer a number of programs, some of which he considered high priority, to sustain the exploration initiative. NASA should be able to resume space shuttle flights next spring, Dr. Griffin said. After the next shuttle test mission, Dr. Griffin said, he will decide whether it is safe to use a shuttle flight to repair and refurbish the Hubble Space Telescope. Web posted. (2005). [NASA Needs \$5

Billion More for Shuttles, Director Says [Online]. Available WWW: <http://www.nytimes.com/> [2005, November 4].]

### **D.C. and government show support for Florida Space 2005**

Although the focus at Florida Space 2005 is on the local space economy, many leaders from Washington, D.C., and government are strongly supporting the conference. Florida Space 2005 takes place Nov. 15-17 at the Kennedy Space Center Visitor Complex and intends to draw participants from throughout Florida's diverse space community and from the space sector nationwide to discuss the challenges and opportunities facing the Florida space industry. Washington D.C. and government leaders who will participate at Florida Space 2005 as speakers include Dr. Michael Griffin, administrator, National Aeronautics and Space Administration; The Honorable Dr. Ronald M. Sega, under secretary of the Air Force; Mr. Bretton S. Alexander, vice president, Government Relations, Transformational Space Corporation LLC; Mr. Lee F. Arnold, general counsel, Office of Congressman Tom Feeney; Mr. Brian Chase, assistant administrator for Legislative Affairs, National Aeronautics and Space Administration; Mr. Lon Rains, vice president, Editorial, Imaginova Corp. and editor, *Space News*; and Patricia Grace 'Patti' Smith, associate administrator for Commercial Space Transportation, Federal Aviation Administration. Highlights of the conference include the opening ceremony featuring jazz saxophonist Jeff Kashiwa, opening reception, and opening fireworks; innovative, timely panels; keynote luncheons with Dr. Griffin and Gen Lance W. Lord, USAF, commander, Air Force Space Command; a featured speech from The Honorable Toni Jennings, lieutenant governor of Florida; and the closing reception and dinner featuring Dr. Sega. Key sponsors of Florida Space 2005 are Pratt & Whitney Rocketdyne, co-sponsor of the Opening Ceremony and Reception; United Space Alliance, co-sponsor of the Opening Night Fireworks; Space Gateway Support, co-sponsor of the Wednesday Opening Luncheon; the Economic Development Commission of Florida's Space Coast and Space Coast Office of Tourism, co-sponsors of the Wednesday Happy Hour; The Boeing Co., co-sponsor of the Thursday Keynote Luncheon; L-3 Communications, co-sponsor of the Thursday Cocktail Reception; and Lockheed Martin, co-sponsor of the Florida Space Gala Dinner. Additional sponsors include Analytical Graphics, Inc. (AGI), ATK Thiokol, Delaware North Parks Services, and Perot Systems. Florida Space 2005 is conducted by the Space Foundation in association with NASA's Kennedy Space Center, the U.S. Air Force 45th Space Wing, Florida Space Authority, and The Canaveral Council of Technical Societies. It builds on the best features of Space Congress and the Cape Canaveral Spaceport Symposium, both long-time community space events now retired, and whose heritage will be honored at this inaugural event. Web posted. (2005). [D.C. and government show strong support for Florida Space 2005 [Online]. Available WWW: <http://www.spacefoundation.org/> [2005, November 3].]

### **November 4: Space Shuttle Processing Status Report**

Discovery (OV-103); Mission: STS-121: 18th International Space Station Flight; second test Mission; Payload: Multi-Purpose Logistics Module; Location: Orbiter Processing Facility Bay 3; Launch Date: No earlier than May 2006; Launch Pad: 39B; Crew: Lindsey, Kelly, Sellers, Fossum, Nowak, Wilson and Reiter. Main landing gear wheel and tire assembly and installation are complete. Pyrotechnic connection completed this week, and the drag chute installed. Water spray boilers No. 1 and 3 were serviced and are both undergoing a 24-hour decay check. Atlantis (OV-104); Mission: STS-115: 19th International Space Station Flight; Payload: P3/P4 Solar Arrays; Location: Orbiter Processing Facility Bay 1; Launch Date:

TBD; Launch Pad: 39B; Crew: Jett, Ferguson, Tanner, Burbank, MacLean, Stefanyshyn-Piper. S-band antenna installation complete. Thermal protection system gap filler inspections and rework continue in the forward and mid-body areas. All zones are identified and mapping is complete in three of the 10 zones. Mapping will be complete in all zones by Thanksgiving and pull tests will begin. This work is being performed due to two gap fillers protruding from the underside of Discovery on the first return to flight mission, STS-114. Endeavour (OV-105); In Orbiter Processing Facility bay 2, the orbiter continues processing following a nearly two-year major modification period. In the payload bay, drive shaft installation on manipulator positioning mechanisms is under way. The mechanisms are the pedestals that hold the remote manipulator system, or shuttle arm, in the payload bay. Work continues to reinstall both the body flap and the rudder speed brake. The speed brake was removed to ensure the gears in the actuators were installed in the proper configuration prior to flight. Owner-press-release. (2005). **Space Shuttle Processing Status Report S05-031** [Online]. Available E-mail: owner-press-release@spinoza.public.hq.nasa.gov [2005, November 4].]

#### **Shana Dale Confirmed as NASA Deputy Administrator**

NASA Administrator Michael Griffin applauded the U.S. Senate's confirmation of Shana Dale as NASA deputy administrator. Dale, who most recently served as deputy director for homeland and national security, is set to become the agency's 14th deputy administrator. [“Griffin Applauds Confirmation of Dale as NASA Deputy Administrator, **NASA News Release #05-386**, November 4, 2005.]

#### **Non-union crew to finish booster rocket**

Replacement workers are finishing an upper-stage booster for the plutonium-powered spacecraft NASA aims to launch to Pluto in January, Boeing officials. Striking workers are questioning whether it is safe to do so. Boeing machinists in Florida, California and Alabama went on strike Wednesday after the union and the company failed to reach an agreement on a new three-year contract. Striking workers had been preparing a Boeing upper-stage booster that will be used to propel NASA's New Horizons spacecraft on the first flight to Pluto. The solid-fueled motor is the third stage of the Lockheed Martin Atlas 5 rocket that is to fly between Jan. 11 and Feb. 14. A delay past then would force NASA to postpone the launch until early 2007. Boeing spokeswoman Tina Lange said the company intends to deliver the upper stage as scheduled on Dec. 1. Replacement technicians and inspectors from Boeing's current work force were trained and certified in advance of the strike to finish work on the upper stage, she said. "We knew the negotiations were coming, and we wanted to put in place a contingency plan because this mission is very important and has a very strict launch window," Lange said. The New Horizons spacecraft is equipped with a generator that will convert heat from the natural decay of 24 pounds of plutonium-238 into electricity to power spacecraft systems. [“Non-union crew to finish booster rocket,” **Florida Today**, November 4, 2005, p 1A.]

#### **November 5: Launch of Pluto craft draws near**

There's a mix of excitement and stress surrounding the pending launch of the first Pluto-bound spacecraft, which is undergoing final touches and testing at Kennedy Space Center. New Horizons has a new task with the announcement this week that two more moons have been found around Pluto, orbiting the planet with its large moon, Charon. The nuclear-powered spacecraft must launch within 23 days of the opening of its window Jan. 11 to save

years of flight time. An earlier launch means a gravity assist from Jupiter, along with a science boon. A later launch costs scientists more than time. A longer flight also would mean less plutonium fuel to power New Horizons beyond Pluto on a quest to survey one or two Kuiper Belt objects. That's the ring of icy bodies of which Pluto is king. Lockheed Martin is gearing up workers for intense preparations of the Atlas 5 rocket. They lost some time to Hurricane Wilma, which damaged the "megadoor" on the rocket's processing building and dinged a solid rocket booster that's being replaced. Meanwhile, engineers from Johns Hopkins University's Applied Physics Lab are working in a clean room at KSC to finish work on New Horizons, which will be delivered to the launch pad in December. They've worked hard to make their schedule, said Dave Kusnierkiewicz, mission systems engineer. By using already proven technology, they saved time and reduced risk, he said. Some testing remains. Web posted. (2005). [Launch of Pluto craft draws near [Online]. Available WWW: <http://www.floridatoday.com/> [2005, November 5].]

### **Workers cleared for rocket jobs**

Inspectors and technicians filling in for striking Boeing Co. machinists are experienced and certified to finish an upper-stage booster for a plutonium-fueled spacecraft NASA aims to launch in January, company officials said Friday. The machinists, who walked off the job this week, have raised questions about the qualifications of the workers put in place to prepare NASA's nuclear-powered New Horizons spacecraft for its trip to Pluto. The company says the replacement technicians and inspectors are highly experienced and hold all of the required certifications. "They are essentially the managers of the people who are on strike," Boeing spokeswoman Tina Lange said Friday. "These are very qualified people. In many cases, they are the people who hired and trained the people who are on strike." The developer of NASA's New Horizons spacecraft -- Johns Hopkins University Applied Physics Laboratory -- on Thursday concurred with a Boeing plan to use replacement workers to process a Star 48 upper stage that will propel the probe on the world's first mission to Pluto. The spacecraft must be launched during a window that extends from Jan. 11 through Feb. 14 or be delayed until early 2007. Boeing is scheduled to deliver the upper stage Dec. 1. Striking members of the International Association of Machinists and Aerospace Workers Local Lodge 1163 in Cape Canaveral are questioning whether the replacement workers are fully certified to do the job. Striking Boeing trainer Jimmy Williams said the company put 25 to 30 managers through classroom training needed to perform work done by rank-and-file Delta rocket technicians and inspectors. The replacement personnel on average have nine years of technician experience working on upper stages and 16 years of experience on the Delta rocket program, she said. Web posted. (2005). [Workers cleared for rocket jobs [Online]. Available WWW: <http://www.floridatoday.com/> [2005, November 5].]

### **November 6: First flights of Zero-G from KSC**

Two roller-coaster flights out of Kennedy Space Center on Saturday gave teachers educational inspiration, tourists a good time and NASA hope for future commercial partnerships. Zero-G is the first firm to join a NASA program to bring private enterprise to the shuttle landing strip, which won't be used for the next-generation spacecraft. G-Force One flew about 120 miles offshore Saturday, between Vero Beach and New Smyrna Beach, officials said. Zero-G, based in Fort Lauderdale, plans two more flights from Kennedy Space Center on Nov. 20. The agreement was for two days and four flights, said Jim Ball, spaceport development manager for NASA. For the pilot program, the company just has to pay NASA's costs. The company hopes to fly regular flights out of KSC starting next year,



said Zero-G's Noah McMahon, chief marketing officer. Ball said other pilot partnerships would be announced soon. And NASA is considering requests from companies that want to fly suborbital flights from the center. "That is a good reason to be starting with uses that are perhaps a little bit less challenging," he said, "from a standpoint of dealing with risk and safety and coordination of airspace." Web posted. (2005). [Teachers get to feel weightless [Online]. Available WWW: <http://www.floridatoday.com/> [2005, November 6].]

#### **NASA to show appreciation for Lufkin with BBQ**

NASA plans to show its appreciation to the people of Lufkin who helped with the Space Shuttle Columbia recovery effort by hosting an event on Tuesday, Nov. 8. The entire community is invited, and a barbecue dinner will be served. Marshall Space Flight Center Director Dave King, who coordinated search efforts at the Lufkin Disaster Field Office, and Randall Wade, lead for orbiter element integration at Kennedy Space Center, will offer NASA's thanks to Mayor Louis Bronaugh and the community leaders, individuals and organizations that helped after the Feb. 1, 2003 accident. The Lufkin community supported the search that resulted in the recovery of remains of all Columbia crew members and 80,000 pieces of shuttle debris. Web posted. (2005). [NASA to show appreciation for Lufkin with BBQ [Online]. Available WWW: <http://www.lufkindailynews.com/> [2005, November 6].]

#### **November 7: Coats named new JSC director**

NASA announced Monday that former astronaut Michael Coats will be the next director of the Johnson Space Center in Houston. Coats left NASA for the private sector in 1991 and had been serving as vice president of Lockheed Martin Space Systems in Denver at the time he was named JSC director. Coats replaces Jefferson Howell, who is leaving JSC to take a position at the University of Texas. Web posted. (2005). [Coats named new JSC director [Online]. Available WWW: <http://www.spacetoday.net/> [2005, November 7].]

#### **November 9: Expendable Launch Vehicle Status Report**

Mission: Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observations and CloudSat; Launch Vehicle: Boeing Delta 7420 with Dual Payload Attach Fitting Launch Pad; Space Launch Complex 2, Vandenberg Air Force Base, Calif.; Launch Date: TBD Launch Window: 5:01 a.m. EST. The satellites are installed within the Dual Payload Attach Fitting at the payload processing facilities. The payload combination will be placed in an environmentally-controlled canister and installed on a transporter for the trip to the launch pad. Delta II preparations are on hold until the payloads arrive for installation. Launch preparations will resume once two issues are resolved: the Boeing technicians' strike and the problem encountered while testing batteries used for the flight termination system of the Delta II. Mission: New Horizons; Launch Vehicle: Lockheed Martin Atlas V 551 (AV-010); Launch Pad: Complex 41, Cape Canaveral Air Force Station, Fla.; Launch Date: Jan. 11, 2006 Launch Window: 2:07 to 4:07 p.m. EST. The fit check of the Radioisotope Thermo-electric Generator power system with the spacecraft was performed this week. The generator will be installed at the launch pad. The spacecraft was weighed this week, and it will undergo a "dry" spin balance test Nov. 13-15. Hydrazine fuel for attitude control and course correction maneuvers will be loaded Nov. 17-19. A "wet" spin balance test with fuel aboard is set for Nov. 22-24. Two solid rocket boosters were attached to the Atlas V this week. Four of the five are mated. The last booster will be erected in December. KSC News Center (2005). **Expendable Launch Vehicles Status Report E05-017** [Online]. Available E-mail: [ksc@newsletters.nasa.gov](mailto:ksc@newsletters.nasa.gov) [2005, November 9].]

**November 10: Cain heads shuttle launch integration at KSC**

Former flight director LeRoy Cain will direct all launch integration activities associated with the space shuttle at NASA's Kennedy Space Center, Fla., reporting directly to program manager Wayne Hale at the Johnson Space Center, Houston. He replaces astronaut Gregory C. Johnson, who returned to JSC after a year and a half. Cain, who served as the ascent and entry flight director for Discovery's STS-114 Return to Flight mission in July/August 2005, will assist with overall management, integration and operations of the Space Shuttle Program and define launch integration requirements between the shuttle and international space station programs. "LeRoy has demonstrated excellent skills in management of complex programs under very dynamic situations," Hale said. "He steps into Greg's role and assumes additional duties at a critical time when the shuttle program must hold up its corner of the new exploration initiative." After graduation from Iowa State University in 1988, Cain joined the Guidance, Navigation and Control Systems Section at JSC. He was selected to be a flight director in 1998 and worked 16 shuttle flights - six as ascent flight director and eight as entry flight director. Web posted. (2005). [Cain heads shuttle launch integration at KSC [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, November 10].]

**Space Shuttle Processing Status Report**

Mission: STS-121 - 18th ISS Flight (ULF1.1) - Multi-Purpose Logistics Module; Vehicle: Discovery (OV-103); Location: Orbiter Processing Facility Bay 3; Launch Date: TBD - No earlier than May 2006; Launch Pad: 39B; Crew: Lindsey, Kelly, Sellers, Fossum, Nowak, Wilson and Reiter; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. In Orbiter Processing Facility Bay 3 work continues to progress for Discovery's second space shuttle return-to-flight test mission, STS-121. Post-flight window inspections were performed on flight deck windows No. 2 and 3 on Monday. The remote manipulator system, or space shuttle arm, that was removed from orbiter Atlantis was transferred to the processing facility Tuesday. Preparations are under way for installation of the arm scheduled for today. The arms were switched because the arm that was installed on Atlantis has special instrumentation to gather loads data from the STS-121 mission. Mission: STS-115 - 19th ISS Flight (12A) - P3/P4 Solar Arrays; Vehicle: Atlantis (OV-104); Location: Orbiter Processing Facility Bay 1; Launch Date: TBD; Launch Pad: 39B; Crew: Jett, Ferguson, Tanner, Burbank, MacLean and Stefanyshyn-Piper; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Atlantis processing continues on schedule in Orbiter Processing Facility Bay 1 for its mission to the International Space Station. Technicians are continuing wire inspections and adding chafe protection to the reaction jet driver. The remote manipulator system was removed from the vehicle on Tuesday. Thermal protection system gap filler inspections and measurements continue in the forward and mid-body areas of the vehicle. Currently, all zones are identified and mapping is complete in nine of the 10 zones. This work is being performed due to two gap fillers that were protruding from the underside of Discovery on the first return to flight mission, STS-114. Endeavour (OV-105); Technicians continue to process Endeavour in Orbiter Processing Facility Bay 2, following a nearly two-year orbiter major modification period. Preparations are under way for painting in the mid-body scheduled to begin tomorrow. The bay will be cleared during the painting operations. In preparation for reinstallation of the body flap, the inboard and outboard actuators were installed and the fit check completed. Thermal protection system blanket work is being done in the area of the reinforced carbon-carbon nose cap. Owner-press-

release. (2005). **Space Shuttle Processing Status Report** S05-032 [Online]. Available E-mail: owner-press-release@spinoza.public.hq.nasa.gov [2005, November 10].]

### **Astronauts can fly on Russian spacecraft**

Congress amended the Iran Nonproliferation Act this week, allowing U.S. astronauts to continue to fly aboard Russian spacecraft and forestalling the possibility that the United States would lose access to the International Space Station. The Senate, which drafted the original amendment, unanimously approved a modified version of the bill late Wednesday, after similar House action two weeks ago. The amendment will be sent to the White House, where President Bush is expected to sign it. ["Astronauts can fly on Russian spacecraft," **Florida Today**, November 11, 2005, p 8A.]

### **November 13: Facilities' use up to NASA**

When the Florida Space Authority walked away from the International Space Research Park project in September, NASA and the state jointly had spent close to \$1.5 million dollars on development. In addition, the state put about \$30 million toward building the road and the Space Life Sciences Lab at the southern end of Kennedy Space Center. The lab is facing deep research cuts that make its future uncertain. Now, NASA is evaluating its options, Spaceport Development Manager Jim Ball said. Those include rethinking the concept of the research park and finding a new partner to make it happen. Officials dedicated the anchor facility, the Space Life Sciences Lab, in November 2003. Although its university and contractor researchers studied growing plants in space and other topics, the lab wasn't used for its original purpose: housing scientists and controls for experiments flying to the International Space Station. Since the dedication of the lab, which happened about 10 months after the Columbia accident, only one shuttle has flown to the station. And NASA recently announced a \$17.5 million cut in KSC's life sciences budget. The authority raised concerns about the lease for the 320-acre park during a June meeting. During negotiations, NASA assured the authority that certain terms could be eased, though the agency needed to approve tenants. Authority members balked at what they saw as a gloomier financial picture for the park and the expense of getting it established. The authority's abrupt withdrawal surprised NASA officials, whose business outlook for the park wasn't as pessimistic. One concern that drove the authority's decision was that the business climate had changed. Kennedy Space Center may redefine the park as a technology or space commerce park, Ball said, given not only the cuts in research but Florida's push to lure the contractors who will build the shuttles' successor. "So you may see a new name," he said. Web posted. (2005). [Facilities' use up to NASA [Online]. Available WWW: <http://www.floridatoday.com/> [2005, November 13].]

### **November 14: KSC News Team Receives Achievement Award**

Aviation Week & Space Technology senior editor Craig Covault has received the 2005 Harry Kolcum Memorial News and Communications Award for lifetime achievement from the National Space Club Florida Committee. The award recognizes journalists and public relations professionals for excellence in their ability to "communicate the space story" to the nation and the world. In addition, the NASA space shuttle return-to-flight Kennedy news center team was also honored with the group's public affairs award. "It's an honor to be recognized by the space community," said Covault. "Cape Canaveral/ Kennedy Space Center is one of the most vital locations in space news globally, drawing top reporters from all over the world. It has also been a place where Aviation Week & Space Technology had

the foresight to open a bureau in the early 1960s in order to give the space program its proper coverage, which we have successfully done through Harry Kolcum's tenure and whose legacy was passed to me nine years ago." The Award was named after the late Harry Kolcum, a founding member of the National Space Club Florida Committee and AW&ST managing editor, who opened its Cape Canaveral bureau during project Mercury. Web posted. (2005). [Aviation Week Group's Craig Covault Receives Lifetime Achievement Award From The National Space Club Florida Committee [Online]. Available WWW: <http://sev.prnewswire.com/> [2005, November 14].]

**November 15: Conference will boast big names**

NASA Administrator Mike Griffin is coming. So is former astronaut Ron Sega, now the Air Force's top space official. Lt. Gov. Toni Jennings and decision-makers from almost every space contractor, from giants to startups, will be here too. The organizers of a brand new space event, Florida Space 2005, are kicking off the inaugural event in a big way. The new conference, which replaces the Florida Space Congress and Cape Canaveral Spaceport Symposium, opens with a private celebration tonight at Kennedy Space Center Visitor Complex. The forerunner events focused mostly on the technical side of spaceflight, rocketry and related subjects. In its revamped format, Florida Space 2005 will center on business opportunities available as the U.S. space industry faces what could be revolutionary change. What the attendees talk about, and the actions that result, could have big implications for the tens of thousands in Brevard County who hold space jobs. "These were fine events in their time," said Jim Banke, a vice president with The Space Foundation, which is organizing the event. Florida leaders, however, wanted to "combine them and sort of create something new that takes advantage of the opportunities with the vision for space exploration and space tourism and the ongoing effort to bring new commercial space services here." Griffin today is making his first public appearance in Florida since laying out the agency's plan for new spacecraft to go to the moon. Sega will talk Thursday about where the military is headed in space launch. In between, dozens of others from the government, contractors and the news media will talk about the issues ahead for space and Florida. The stakes are high for the state and for Brevard County. Almost 15,000 people work at Kennedy Space Center for NASA or one of its contractors. Thousands more work at Cape Canaveral Air Force Station and in space-related posts at Patrick Air Force Base. Landing new parts of the industry here could offset predicted job losses from the retirement of the shuttles and other changes. From space tourism to the actual assembly of the new NASA spaceships, Florida is vying for new slices of the space pie. Web posted. (2005). [Conference will boast big names [Online]. Available WWW: <http://www.floridatoday.com/> [2005, November 15].]

**November 16: Boeing looking at merging engineering work force**

In light of the estimated \$5 billion budget shortfall facing the space shuttle program over the next few years, Boeing is considering merging elements of its shuttle and space station engineering work forces to save money and free personnel to work on new exploration-related systems. The total engineering work force for both programs numbers roughly 800 people, according to John Elbon, Boeing's International Space Station program manager. An example where "synergies" might be found is among passive thermal engineers, where there is considerable commonality between the work done on both programs. The plan so far has met with approval from NASA and United Space Alliance, the Lockheed-Boeing joint venture that manages shuttle operations. E-mail distribution. (2005). [Aviation Week's

Aerospace Daily & Defense Report Re: "Boeing looking at merging engineering work force for shuttle, station," [Electronic]. Vol. 216, No. 33, [November 16, 2005].]

### **KSC office replaces trailers and boxcars**

A sleek new office building at Kennedy Space Center offers expansive views of the launch pads, high-tech conference rooms and, most important, an escape from moldy old trailers and boxcars for workers. "This is much nicer, and the conference room facilities are wonderful," said Jamie McLean, manager of mission assurance for shuttle contractor United Space Alliance. She used to work in the "temporary" offices that were demolished earlier this year. After one of the 2004 hurricanes, she called in and asked hopefully, "Is Complex C flattened?" She was told, to her chagrin, that it looked great. Officials broke ground on the Operations Support Building 2, near the Vehicle Assembly Building, in March 2003, and it's expected to be finished next month. Some employees, such as McLean, have already moved in. She's among about 5,000 people who worked in the trailers and boxcars, said building project manager Don Minderman. The six-story building makes an elegant initial impression, from its curving windowed wall to its terrazzo-tiled lobby. Under a circular recess in the ceiling, the specially cut gold and blue pieces in the floor abstractly echo the NASA logo and its swoosh. The gold tiles point toward the elevators, like a yellow brick road. Four-pointed blue stars make for stellar accents in the floor. The first floor houses 16 training classrooms, Minderman said, and will hold about 8,000 people a month for training sessions, helping them stay certified to work on hardware flying to space. There are also executive and support offices. Some managers work in stunning triangle-shaped offices lined on two walls with windows that point toward the Vehicle Assembly Building. Anyone who cares to look out the window wall -- or the roomy balcony on the top floor -- has a vast view of the shuttle launch pads at the center and rocket launch pads at Cape Canaveral Air Force Station. Meeting rooms offer slick videoconferencing capabilities, with a couple of high-resolution screens and cameras that track active microphones so they show who's speaking. In the hallway above the doors are "ON AIR" signs, TV-style, to warn off interruptions. Small details help make the approximately 190,000 square feet livable, from higher-quality light fixtures that reduce glare to dedicated break rooms. On a larger scale, the massive two-story conference room on the top floor will seat about 350 in rows, or 170 at banquet tables. The room is expected to hold flight readiness reviews before shuttle launches. Three large screens will overlook the room, which adjoins the balcony. On the other side, also elevated, will be a soundproof booth for interpreters helping international guests. The building has hurricane-resistant windows and is supposed to withstand 140 mph winds, a Category 4. Its sensors turn on the lights and air-conditioning when workers are present and otherwise shut down lights and the cooling system to save energy. The whole project, from planning to moving people in, costs about \$47 million, Minderman said. "A new facility is wonderful," McLean said. Web posted. (2005). [KSC office replaces trailers and boxcars [Online]. Available WWW: <http://www.floridatoday.com/> [2005, November 16].]

### **NASA may scrap unused facilities**

Officials concerned with preservation will get a look today at historic but unused space facilities that face demolition. To save money and avoid safety problems, NASA proposes to get rid of the Mercury Mission Control Center at Cape Canaveral Air Force Station and the Engineering Support Building at pad 34, the site of the deadly Apollo 1 fire and early Saturn launches. "We've been invited to the meeting to find out what it's all about and to see if there's anything that can be done, cannot be done," said Stephen Benn, of the Brevard



County Historical Commission. The mission control center's consoles already are on display at the Kennedy Space Center Visitor Complex, and for security reasons, the building won't be used as a tour stop. The blockhouse and the Stonehenge-like remnants of the launch pad will remain, said Lisa Malone, NASA-KSC director of external relations and business development. Web posted. (2005). [NASA may scrap unused facilities [Online]. Available WWW: <http://www.floridatoday.com/> [2005, November 16].]

### **Expendable Launch Vehicle Status Report**

Mission: Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observations & CloudSat; Launch Vehicle: Boeing Delta 7420 with Dual Payload Attach Fitting; Launch Pad: NASA's Space Launch Complex 2, Vandenberg Air Force Base, Calif.; Launch Date: TBD; Launch Window: 5:01 a.m. EST. CALIPSO and CloudSat are installed within the Dual Payload Attach Fitting at the Astrotech payload processing facilities. The payload combination will be placed in an environmentally-controlled canister and installed on the payload transporter for the trip to the launch pad. Delta II preparations at Complex 2 are on hold until the payloads arrive for installation on the second stage. Preparations can resume when the Boeing technicians' strike is resolved. Mission: New Horizons; Launch Vehicle: Lockheed Martin Atlas V 551 (AV-010); Launch Pad: Complex 41, Cape Canaveral Air Force Station, Fla.; Launch Date: Jan. 11, 2006; Launch Window: 2:08 to 4:07 p.m. EST. The bottom portion of the payload fairing was installed this week on the Atlas V. A Launch Vehicle Readiness Review was successfully completed Tuesday. The fit check of the Radioisotope Thermo-electric Generator power system with the spacecraft was performed last week. The generator will be installed for flight at the launch pad. A "dry" spin balance test of the spacecraft will be completed this week. After Thanksgiving, hydrazine fuel for attitude control and course-correction maneuvers will be loaded on the spacecraft and a "wet" spin balance test performed. KSC News Center (2005). **Expendable Launch Vehicles Status Report** E05-018 [Online]. Available E-mail: [ksc@newsletters.nasa.gov](mailto:ksc@newsletters.nasa.gov) [2005, November 16].]

### **Congress gives NASA a \$260M budget boost**

Congress on Wednesday adopted a NASA budget that fully funds NASA's requests for the shuttle and space station programs as well as startup expenses for new rockets and ships for moon and Mars missions. The budget, adopted by a 94-5 vote in the Senate, now goes to President Bush for his signature. The measure provides the space agency with \$16.5 billion for fiscal year 2006, which began Oct. 1. That's \$260 million more than the agency received in fiscal year 2005. Included in the legislation is \$270 million more for a servicing mission to the Hubble Space Telescope. The mission, nearly called off after the Columbia accident, is a popular goal for Congress, but it still faces technical and safety reviews by NASA Administrator Mike Griffin. The agency also got more than \$3 billion the president requested to continue development of rockets and spaceships needed to return humans to the moon. NASA hopes to land astronauts on the moon again by about 2018. Griffin, upon learning of the vote, thanked Congress for supporting the ongoing transition at the space agency. Web posted. (2005). [Congress gives NASA a \$260M budget boost [Online]. Available WWW: <http://www.floridatoday.com/> [2005, November 17].]

### **November 17: Air Force pushes for Cape trade**

Amid a push to lure space business to Florida, the state also needs to make certain it pays attention to its longstanding anchor tenant – the military. That was the message retired Air

Force Maj. Gen. Jimmey Morrell delivered Thursday at Florida Space 2005, an aerospace-industry conference conducted at NASA's Kennedy Space Center Visitor Complex. "You can't have a better customer," said Morrell, a former commander of the Air Force's 45<sup>th</sup> Space Wing, which is head-quartered at Patrick Air Force Base and oversees operations at Cape Canaveral Air Force Station. "They just never go away." The military staged its first launch from Cape Canaveral on July 24, 1950, sending a modified German V-2 missile on a test flight. Known then as the Long Range Proving Ground, the Air Force station has become the military's primary East Coast space launch site. The Air Force's Eastern Range, which is based at Cape Canaveral, provides tracking, range safety and weather forecasting services for all launches – including military, NASA and commercial missions – from Florida's Space Coast. A total of 3,345 major missile, rocket and space launches have been carried out on the range, 45<sup>th</sup> Space Wing spokesman Ken Warren said. ["Air Force pushes for Cape trade," **Florida Today**, November 18, 2005, p 1B & 6B.]

### **Space Foundation inaugural Florida Space 2005 successful**

The Space Foundation, which presented Florida Space 2005 at the Kennedy Space Center Visitor Complex Nov. 15-17, declared the inaugural event a strong success. More than 350 registrants participated in the conference, and nearly 600 people attended the opening ceremony. "Florida Space brought together leaders in the space industry for a necessary discussion of the opportunities and challenges facing the Florida space economy. We are thankful for our partners and the hospitality of the state of Florida, which helped make this conference great," said Elliot G. Pulham, Space Foundation president and chief executive officer. "We are confident this event will have a positive impact for the future of Florida's space economy – and we look forward to Florida Space 2006 next year in Orlando." National recording artist Jeff Kashiwa played jazz saxophone in the Rocket Garden at the opening ceremony of Florida Space 2005 on Nov. 15. The ceremony also recognized science fair winners and Jack Wiles, the first chairman of the Canaveral Council of Technical Societies, and was accompanied by a reception, appearances by NASA astronauts Steve Frick, Ken Ham, Kay Hire, and Steve Swanson, and a fireworks display. Registrants heard innovative, timely panel discussions and featured speeches from Dr. Michael Griffin, NASA administrator; The Honorable Dr. Ronald M. Sega, under secretary of the Air Force; Gen Lance W. Lord, USAF, commander, Air Force Space Command; The Honorable Toni Jennings, lieutenant governor of Florida; Mr. Lon Rains, vice president, Editorial, Imaginova Corp. and editor, *Space News*; and Mr. John Glisch, Editorial Page editor, *Florida Today*. Web posted. (2005). [Space Foundation declares inaugural Florida Space 2005 successful [Online]. Available WWW: <http://www.floridatoday.com/> [2005, November 17].]

### **November 22: Cracks Found in Protective Foam**

NASA engineers have found tiny cracks in the foam insulation of a space shuttle fuel tank and suspect that those cracks are related to the foam debris that has come loose during launchings, agency officials said Tuesday. Although engineers are still looking for the main reason behind the foam shedding during the launching of the Discovery in July, a detailed examination of the tank that was to have flown on that mission may provide a clue, John Chapman, a project manager at the National Aeronautics and Space Administration, said at a news conference televised from the Johnson Space Center in Houston. While studying the tank and its appendages with new scanning techniques at the agency's Michoud tank factory in New Orleans, technicians found nine hairline cracks in a foam ramp that protects fuel lines outside the tank, Mr. Chapman said. Only two of the weblike cracks were visible on the

surface, he said. Wayne Hale, the shuttle program manager, said the tank had been filled twice and drained of supercold liquid hydrogen and liquid oxygen fuel while attached to the Discovery at the Kennedy Space Center in Florida. The tank was later removed for an unrelated problem, and a new tank that had not previously been fueled was flown on the Discovery. Mr. Hale said it appeared that pressure and temperature changes experienced by the tank during fueling could have caused the foam cracks. The next one or two shuttle flights will include the protective ramps, but, Mr. Hale said, tanks used on those missions will have existing ramps removed and new ones applied to reduce the chance of flaws. Mr. Hale said that if all the fuel tank studies went well, the next shuttle mission could fly next spring, with launching sometime from May 3 to May 23. But no date will be set until all work related to safety is completed, he said. Web posted. (2005). [Cracks Found in Protective Foam on an Unused Shuttle Fuel Tank [Online]. Available WWW: <http://www.nytimes.com/> [2005, November 23].]

### **Space Shuttle Processing Status Report**

Mission: STS-121 - 18th ISS Flight (ULF1.1) - Multi-Purpose Logistics Module; Vehicle: Discovery (OV-103); Location: Orbiter Processing Facility Bay 3; Launch Date: TBD - No earlier than May 2006; Launch Pad: 39B; Crew: Lindsey, Kelly, Sellers, Fossum, Nowak, Wilson and Reiter; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Technicians continue to process Discovery in Orbiter Processing Facility Bay 3 for NASA's second space shuttle Return to Flight test mission, STS-121. Powered-up system testing continues. The processing facility was cleared over the weekend for waterproofing of the payload bay door hingeline. Thermography of the wing leading edge Reinforced Carbon-Carbon panels is complete. Thermography is the non-destructive technique put in place following the Columbia accident to search for microscopic flaws in the panels. These post-flight inspections have identified two areas that will be repaired prior to the next flight. Mission: STS-115 - 19th ISS Flight (12A) - P3/P4 Solar Arrays; Vehicle: Atlantis (OV-104); Location: Orbiter Processing Facility Bay 1; Launch Date: TBD; Launch Pad: 39B; Crew: Jett, Ferguson, Tanner, Burbank, MacLean and Stefanyshyn-Piper; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Atlantis processing continues on schedule in Orbiter Processing Facility Bay 1 for its mission to the International Space Station. Reaction jet driver wire inspections and chafe protection work continue in the forward and aft areas of the vehicle. Thermal protection system gap filler inspections and measurements continue in the shuttle's forward and midbody areas. Currently, all zones are identified and mapping is complete in nine of the 10 zones. This work is being performed after two gap fillers were found protruding from the underside of Discovery on this summer's Return to Flight mission, STS-114. New installation procedures are being developed to ensure the gap fillers stay in place and do not pose any hazard on re-entry to the atmosphere. Endeavour (OV-105); Technicians continue to process Endeavour in Orbiter Processing Facility Bay 2, following a nearly two-year major modification period. The landing gear seal and gap measurements are complete and the gear is scheduled to be retracted today. Work continues around Endeavour's nose cap, including Thermal Protection System blanket installation and chin panel tile work. The chin panel is the semi-circle shaped section of Reinforced Carbon-Carbon that fits under the nose cap. External Tank; At NASA's Michoud Assembly Facility in New Orleans, shuttle engineers continue evaluating the causes of the foam loss on Discovery's launch. Detailed inspections of the Protuberance Air Load (PAL) ramp of external tank #120 are providing valuable data. During inspections, several small cracks were detected in the PAL ramp. Engineers do not yet fully understand these cracks, but they are

unlikely to have caused foam loss. Engineers plan to address PAL ramp foam loss on the upcoming mission by removing the foam, then reapplying it with new procedures. NASA is also working to prevent inadvertent worker damage to external tanks. This is suspected as a contributing factor to the loss of foam from the PAL ramp on Discovery. Preliminary assessments indicate that work area mats provide adequate protection, but more tests are planned over the next six weeks. Engineers and technicians also continue investigating the reason for the fuel sensor anomalies that delayed the launch of Discovery in July. Engineers will look at sensors inside one of the tanks at Michoud and run tests with an orbiter point sensor box. Owner-press-release. (2005). **Space Shuttle Processing Status Report** S05-033 [Online]. Available E-mail: owner-press-release @spinoza.public.hq.nasa.gov [2005, November 22].]

**November 24: Bush's Space Plan in Danger**

A large deficit in NASA's troubled shuttle program threatens to seriously delay and possibly cripple President Bush's space exploration initiative unless the number of planned flights is cut virtually in half or the White House agrees to add billions of dollars to the human spaceflight budget. Sources familiar with ongoing negotiations between NASA and the White House say the administration has no intention of spending extra money to deal with a shortfall that some space experts say could exceed \$6 billion from 2006 to 2010, when NASA plans to retire the shuttle for good. The source of the deficit is the travail that has plagued the shuttle program since the Columbia disaster in 2003. After a single flight by Discovery this summer, the orbiters -- grounded for 2 1/2 years after Columbia -- are out of action again until at least May while engineers work to make them safer. One option being considered to close the shortfall is to limit the number of flights to two per year -- 10 in all -- and cut the workforce. But shuttle program manager Wayne Hale said in a televised news conference yesterday that "frankly it doesn't save you very much money. . . . From my point of view, that's a non-starter." NASA Administrator Michael D. Griffin has said that terminating the shuttle program would be just as expensive as keeping it going. The shuttle routinely consumes more than 30 percent of NASA's budget. The impasse has put the future of Bush's "Vision for Space Exploration" in doubt less than two years after it was announced. Without extra money, experts say, NASA could have trouble developing a new "crew exploration vehicle" by 2014, as originally planned, let alone fulfilling Griffin's wish to fly it by 2012. The dilemma is also fueling an odd confrontation between the administration and Congress, where once-wary lawmakers now appear willing to provide the extra funding even as the White House backs away from its own initiative. Web posted. (2005). [Bush's Space Plan in Danger [Online]. Available WWW: <http://www.washingtonpost.com/> [2005, November 22].]

**November 27: Cape not favorite spaceport**

Private rocketeers would welcome a Florida spaceport if the right incentives were in place, a new study found. Launching tourist spaceships and other private groups from Cape Canaveral, however, might be more trouble than it's worth, according to a state-funded report. The researchers' findings echoed concerns expressed earlier this month at the Florida Space 2005 conference. The Florida Space Authority, an economic development group based in Cape Canaveral, asked aerospace consultants Futron Corp. to look at whether a commercial spaceport was feasible and potentially profitable for the state. Both answers are yes, but Futron had some caveats. "Co-locating a commercial spaceport with NASA and U.S. Air Force facilities at Cape Canaveral is probably not feasible for political and regulatory

reasons," the report said. At the Florida Space conference, Col. David Thompson of the 45th Space Wing acknowledged that the Eastern Range, which regulates launches from the Space Coast, has been criticized as providing services late and for costing too much money. "On the regulatory side, we're already doing lots of things to ease that," said Alfred Wassel of the Federal Aviation Administration's Commercial Space Transportation Safety Office, based at the Cape. The Futron study said companies developing new spaceships favored an off-site facility "due to political, regulatory, and administrative complications" at the Cape, which is perceived by some space innovators as antiquated and riddled with delays. The best and cheapest alternative, according to the report: Create a split-site spaceport elsewhere, using an existing runway for ships that take off like airplanes and separate launch facilities for rockets. Florida Space Authority spokeswoman Margo Witcher called the study "very positive" and said board members would discuss it at a meeting next month. Futron found state and federal officials commonly thought of the space issue as "a Brevard County problem," not a statewide challenge. Political support would be essential to fund a spaceport and "streamline" the rules for commercial space companies. There are some space tourism efforts in Florida, but there is serious competition from states such as New Mexico, which will host the X Prize Cup for suborbital ships. Zero-G, based in Fort Lauderdale, flew a couple of its roller-coaster-type flights out of Kennedy Space Center in a recent pilot project with NASA and plans to do more. NASA has talked with companies interested in doing SpaceShipOne-type suborbital flights from KSC but hasn't made any commitments. Web posted. (2005). [Cape not favorite spaceport [Online]. Available WWW: <http://www.floridatoday.com/> [2005, November 27].]

**November 28: Rocket merger awaiting approval**

The government, watchdog groups and would-be competitors continue to question the merger of America's two biggest rocket companies, but The Boeing Co. and Lockheed Martin Corp. say they believe the partnership will win approval by the end of the year. The two companies, facing a severe shortage of customers, hope to combine their fleets under a single company called United Launch Alliance, a 50-50 partnership modeled after the firms' United Space Alliance, which holds the contract for day-to-day operation of NASA's space shuttle fleet. Now, more than six months after they announced the merger, the companies are still waiting for approval from the Federal Trade Commission. The trade commission recently delayed its ruling on the matter based on questions from its regulators and the Pentagon. SpaceX and the watchdog organization contend the Boeing-Lockheed deal is a monopoly seeking to tighten their grip on military launches. Ron Sega, the Air Force's undersecretary for space, said the additional questions being posed to the companies is not unusual and should not be seen as government opposition to the merger. Web posted. (2005). [Rocket merger awaiting approval [Online]. Available WWW: <http://www.floridatoday.com/> [2005, November 28].]

**November 29: KSC launch ride has supporters, skeptics**

The \$60 million Shuttle Launch Experience could become the centerpiece of the Kennedy Space Center Visitor Complex when the ride opens early next year. The space shuttle-themed ride, which will be housed in a 44,000-square-foot building now being built, will be a departure -- or progression, depending on how you look at it -- for the Visitor Complex. The project promises to bring a flight-simulation ride similar to those featured at Orlando-area theme parks such as Walt Disney World and Universal Orlando. That was something considered out of NASA's realm before Delaware North took over operations of the Visitor



Complex about 10 years ago and began building up the facility. The ride will stick to the Visitor Complex's historical origins, in that it will offer a realistic simulation of a shuttle liftoff -- from the launch pad to orbit -- minus any fantasy-like elements, such as meteor showers or space creatures, Delaware North spokeswoman Andrea Farmer said. The ride will feature seating for about 40 people on a platform that will go up and down, simulating the jolts and other movements felt during a high-powered shuttle liftoff, she said. The project is "on schedule and on budget," Farmer said, although an opening date has not yet been set. Web posted. (2005). [KSC launch ride has supporters, skeptics [Online]. Available WWW: <http://www.floridatoday.com/> [2005, November 29].]

### **Revamped NASA Advisory Council**

The revamped NASA Advisory Council held its first meeting in Washington Nov. 29, under the leadership of former senator and Apollo 17 astronaut Harrison Schmitt. Other new members include former head of Air Force Materiel Command Gen. Lester Lyles, former Strategic Defense Initiative Organization head Lt. Gen. James Abrahamson (USAF), Astronaut Neil Armstrong, former Aerospace Commission member Neil DeGrasse Tyson, and former Columbia Accident Investigation Board member John Logsdon. NASA Administrator Michael Griffin has restructured the NAC with the goal of "renovating and elevating" its status within NASA. The group is charged with advising the NASA administrator on matters of policy, plans and finance. The new two-year NAC charter, signed by Griffin in October, forms subcommittees on aeronautics, finance, exploration, human capital and science. Gone are nearly all the old NAC members, who in addition to scientists and engineers included a philosopher, a priest and filmmaker James Cameron. Former NAC chair Charles Kennel, director and vice chancellor of marine sciences at the Scripps Institute of Oceanography, remains on the panel and chairs its science committee. In his opening remarks to the NAC, Griffin called the formal act of advising NASA a "privilege" that must be earned. "It should be accorded to those who only have the highest credentials of accomplishment in fields of endeavor relevant to our business," he said. "And I think that this panel today represents a group of such people who can work with us across several major areas to provide the kind of outside ... critique that we need." E-mail distribution. (2005). [Aviation Week's Aerospace Daily & Defense Report Re: "Revamped NASA Advisory Council holds first meeting in Washington," [Electronic]. Vol. 216, No. 41, [November 30, 2005].]

### **Expendable Launch Vehicle Status Report**

Mission: Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observations and CloudSat; Launch Vehicle: Boeing Delta 7420 with Dual Payload Attach Fitting; Launch Pad: Space Launch Complex 2, Vandenberg Air Force Base, Calif.; Launch Date: No earlier than mid-February 2006; Launch Window: TBD. Due to the Boeing labor strike and other issues, the earliest possible launch date is in February, 2006. The spacecraft are being prepared for an extended period in the Astrotech payload processing facilities on North Vandenberg. Starting December 19, the Western Range begins a planned two-month maintenance, upgrade and refurbishment period. Work will be performed on Range Safety tracking facilities, computers and launch support equipment. While progress has been made on the problems encountered during testing of the Flight Termination System batteries, Boeing has not formally determined and documented a root cause for engineering review. Approximately 15 days are necessary to prepare for launch once all issues are resolved. Mission: New Horizons; Launch Vehicle: Lockheed Martin Atlas V 551 (AV-010); Launch

Pad: Complex 41, Cape Canaveral Air Force Station, Fla.; Launch Date: Jan. 11, 2006; Launch Window: 2:08 to 4:07 p.m. EST. The Applied Physics Lab team is testing the autonomy software system. The testing is to confirm it would take appropriate safety actions if an unplanned condition occurred after New Horizons is far away from Earth. The scope of the testing was expanded requiring additional days for ground processing. Encapsulation is six days behind schedule, but the launch date has not changed. Encapsulation of New Horizons into the vehicle fairing is scheduled for Dec. 12; followed by transportation to Launch Complex 41 for mating to the Atlas V on Dec. 16. The fifth and final solid rocket booster was mated to the Atlas V at the Vehicle Integration Facility today. Boeing's delivery of the third stage to the Payload Hazardous Servicing Facility is on schedule for Dec. 1. Mating with the spacecraft is scheduled for Dec. 9. Hydrazine fuel for attitude control and course-correction maneuvers is scheduled for loading Dec. 4; followed by a "wet" spin balance test with fuel onboard Dec. 6-7. A tanking test of the Atlas V launch vehicle is scheduled for Dec. 5. KSC News Center (2005). **Expendable Launch Vehicles Status Report** E05-019 [Online]. Available E-mail: [ksc@newsletters.nasa.gov](mailto:ksc@newsletters.nasa.gov) [2005, November 29].]

**November 30: NASA trying to hone shuttle turnaround skills**

Amid widespread skepticism over its ability to complete the estimated 18 assembly flights required to finish the space station before the shuttle's retirement, NASA is planning training exercises and demonstrations to hone its shuttle turnaround skills, according to Associate Administrator for Space Operations William Gerstenmaier. During the first meeting of the restructured NASA Advisory Council in Washington Nov. 29, Gerstenmaier conceded that the shuttle work force became "rusty" in its turnaround skills during the downtime between the February 2003 Columbia accident and the orbiter's return to flight in July 2005. The next shuttle flight is tentatively scheduled for May 2006, while NASA grapples with lingering foam debris problems. The agency plans to conduct simulations of various shuttle turnaround activities as well as routine laboratory checks of shuttle materials to ensure they will perform correctly. "We have gotten pretty sluggish in all that," Gerstenmaier said. "We're going to actually practice and demonstrate how we return a shuttle to the ground." NAC member Lennard Fisk questioned NASA's ability to conduct 18 flights by decade's end, calling it a "success-oriented" strategy. Gerstenmaier replied that NASA thinks that 18 flights is "very doable, but I have trouble with anybody believing that based on our past performance." The most crucial International Space Station assembly flights come first in the sequence, with the last few flights dedicated to logistics and spares, Gerstenmaier said. "If we lose some flights, they're ordered such that the lowest priority flights fall off the end," he said. Gerstenmaier estimates that roughly 15 flights are necessary just to accommodate the remaining station assembly elements. Nine of those elements are waiting for launch at Kennedy Space Center in Florida, and nine are to be delivered by the ISS partner countries. At roughly 403,000 pounds in orbit today, the station is roughly half complete. Compounding NASA's difficulties is an estimated \$3-5 billion budget shortfall in shuttle operations between now and its 2010 retirement, the brunt of which is expected to be felt in fiscal 2009 and FY '10. E-mail distribution. (2005). [Aviation Week's [Aerospace Daily & Defense Report](#) Re: "NASA trying to hone shuttle turnaround skills amid skepticism," [Electronic]. Vol. 216, No. 41, [November 30, 2005].]

### **Dale sworn in as NASA deputy administrator**

Shana Dale was sworn in as NASA's 12th deputy administrator Nov. 29 in Washington, NASA said. Dale previously was deputy director for Homeland and National Security for the Office of Science and Technology Policy, Executive Office of the President. She also was chief of staff and general counsel at OSTP, and staff director for the House Science Space and Aeronautics subcommittee. E-mail distribution. (2005). [Dale sworn in as NASA deputy administrator [Electronic]. Aerospace Daily & Defense Report (ASCII) [November 30, 2005].]

### **KSC science trips out of this world**

Students attending the first day of Space Week on Tuesday saw a simulated lunar landing, got moon dust kicked in their faces (or so it appeared in a 3-D IMAX film), and learned from an astronaut how to get to the moon and Mars. "All of you are right in the middle of the age group that will command these missions," said former astronaut Jon McBride, who piloted the shuttle Challenger in 1984. About 5,600 Brevard Public Schools sixth-graders and 230 teachers are taking turns through next Thursday making the daylong field trip. The program is in its third year. The goal is to inspire students to continue studying science and math at an age when test results show they begin to lag behind their peers around the world, and to pursue science careers. For many students, it's their first trip to KSC's Visitor Complex despite growing up next door. Private donors and grants secured by the Brevard Schools Foundation will fund most of the anticipated \$106,000 cost of the trips, which includes transportation, lunch and admission to the Visitor Complex. Some private schools also are paying their own way. This year, students returned to the Apollo/Saturn V Center, where they completed a scavenger hunt to learn history about moon launches, such as the how many astronauts walked on the moon (12) and the top speed for "moon cars" (10 mph). They saw a film about the first Apollo landing, and a video explaining the new spacecraft that will replace shuttle orbiters. If they want to get on board, McBride told them, they need to stay in school and avoid drugs. Science teachers planned lessons leading up to Space Week and will follow with more to build on the experience, said Linda Copeland, science magnet coordinator at Cambridge Elementary. Students who complete a series of post-visit science activities can take their families back to KSC free of charge. Web posted. (2005). [KSC science trips out of this world [Online]. Available WWW: <http://www.floridatoday.com/> [2005, November 30].]



United Space Alliance technician Shane Colvin prepares to cut the excess gap filler from the tile on the orbiter Discovery, which is being processed in Orbiter Processing Facility Bay 3 at NASA's Kennedy Space Center. This work is being performed due to two gap fillers that were protruding from the underside of Discovery on the first Return to Flight mission, STS-114. New installation procedures have been developed to ensure the gap fillers stay in place and do not pose any hazard during the shuttle's re-entry to the atmosphere. Discovery is the scheduled orbiter for the second space shuttle mission in the return-to-flight sequence.

## DECEMBER 2005

### **December 1: Panel ponders spaceport options**

The Space Coast may have in-state competition for launching private spaceships. A consulting firm working for the Florida Space Authority has identified nine possible Florida alternatives to Kennedy Space Center and Cape Canaveral Air Force Station. They include the closed Cecil Field Naval Air Station in Jacksonville, Space Coast Regional Airport in Titusville and seven other sites along the east coast. The Florida Space Authority is expected to take up the study, prepared by aerospace consultants Futron Corp., at its next public meeting via telephone on Wednesday. Authority board members will only hear a summary of the study during Wednesday's meeting, said Margo Witcher, director of strategic projects and communication for the authority. The authority has been pushing a look at other sites because of hurdles space innovators see in navigating the bureaucracy and safety regulations associated with launching off the government-run sites in Brevard County. Outside of the government facilities, Jacksonville is deemed an attractive option because it has long, available runways at an underused facility. The consultants said an ideal spaceport runway would be at least 10,000 feet long and 200 feet wide. Only Cecil Field offers such a large stretch. The Jacksonville site already is one of many back-up runways for NASA's shuttles. The Futron study said companies developing new private spaceships favored an off-site facility "due to political, regulatory, and administrative complications" at the Air Force site, where the prime responsibility is government launches and public safety. The report did not, however, rule out the Cape as a site for space tourism. Web posted. (2005). [Panel ponders spaceport options [Online]. Available WWW: <http://www.floridatoday.com/> [2005, December 1].]

### **Milestone reached in probe prep**

Workers who replaced striking Boeing machinists delivered a rocket stage to NASA on time today, keeping the agency on track for the planned launch next month of a plutonium-powered planetary probe. With the opening of the launch window looming, the replacement workers transported a Star 48 upper stage motor to a payload processing facility at Kennedy Space Center. The solid-fuel upper stage is destined to propel the world's first mission to Pluto during a window that will extend from Jan. 11 through Feb. 14. The mission must be launched during that time to put the spacecraft on course to Pluto. Otherwise, it will be delayed until early 2007. "We're pleased to deliver the third stage on time," said Boeing spokeswoman Tina Lange. George Diller, a spokesman for NASA at KSC, said mission preparations are on schedule and that the agency aims to be ready to launch on Jan. 11. Some 1,500 Boeing machinists went out on strike Nov. 2 after the company and the International Association of Machinists and Aerospace Workers failed to reach an agreement on a new three-year contract. Most of the workers are involved in Boeing's Delta rocket program at Cape Canaveral Air Force Station and Vandenberg Air Force Base in California. About 300 are on strike at Cape Canaveral. ["Milestone reached in probe prep," **Florida Today**, December 2, 2005, p 1A & 9A.]

### **Panel: Shrink space agencies**

If you wanted to launch a rocket from Florida, to whom would you go? Members of the governor's commission on the future of space in the state said they wouldn't know either. In a meeting in Cape Canaveral on Thursday, they talked about streamlining Florida's many space organizations. "There's no one-stop shopping for space in Florida, and we need that,"



said the Space Foundation's Jim Banke, who serves on the commission. "It's confusing to people who want to do business. We think it's confusing." The commission was formed to help the state focus its efforts to lure space tourism and entice the contractors who will build the ships that will follow the shuttles. Banke's team proposed a new Florida Space Office that would oversee or absorb work now done by the Florida Space Authority, Florida Space Research Institute and other organizations. The idea is still preliminary, but Lt. Gov. Toni Jennings, who leads the commission, recognizes the need for a single voice. "Today, I couldn't tell you who's in charge of space," she said. Winston Scott, executive director of the Florida Space Authority, suggested that a new structure should be at least at the level of his organization, whose board is also headed by Jennings. There was a lot of discussion about working research, education and financing functions into a new organization. The commission's report is due in January. ["Panel: Shrink space agencies," **Florida Today**, December 2, 2005, p 1B.]

## **December 2: Space Shuttle Processing Status Report**

Mission: STS-121 - 18th ISS Flight (ULF1.1) - Multi-Purpose Logistics Module; Vehicle: Discovery (OV-103); Location: Orbiter Processing Facility Bay 3; Launch Date: No earlier than May 2006; Launch Pad: 39B1 Crew: Lindsey, Kelly, Sellers, Fossum, Nowak, Wilson and Reiter; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Technicians continue to process Discovery for NASA's second shuttle return-to-flight test mission, STS-121. Powered-up system testing and drag chute door installation continue. Once the cure on the door is complete, it will be opened to verify proper cure, and the flight pins will be installed. The orbiter boom sensor system is in the transfer aisle of the processing facility awaiting installation. Final work will be completed soon on the manipulator positioning mechanism, the pedestals that hold the boom in place in the payload bay, and the boom will be installed next week. Mission: STS-115 - 19th ISS Flight (12A) - P3/P4 Solar Arrays; Vehicle: Atlantis (OV-104); Location: Orbiter Processing Facility Bay 1; Launch Date: TBD; Launch Pad: 39B; Crew: Jett, Ferguson, Tanner, Burbank, MacLean and Stefanyshyn-Piper; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Atlantis processing continues on schedule. Thermal protection system gap-filler pull tests are complete. Work will begin soon to replace selected gap fillers identified during pull tests and analysis. This work is being performed due to two gap fillers that protruded from the underside of Discovery during STS-114. New installation procedures are being developed to ensure the gap fillers stay in place and do not pose a hazard during re-entry. Preparations to install the forward reaction control system continue. The cavity closeout photos were completed Thursday, and the installation of the system is scheduled for early next week. This control system provides the thrust for attitude maneuvers, pitch, yaw and roll, and for small velocity changes along the orbiter axis. Endeavour (OV-105); Body-flap power drive-unit installation continues in Orbiter Processing Facility Bay 2, with work focused on safety wire and insulation. The main landing gear was cycled this week to support environmental seal compression testing on compartment doors. The vehicle will remain powered down for work on the new modification, called the "station to shuttle power transfer system." The system will allow the shuttle to remain docked to the station longer. External Tank; At NASA's Michoud Assembly Facility in New Orleans, engineers continue evaluating the causes of the foam loss during Discovery's launch in July. Detailed inspections of the Protuberance Air Load ramp of external tank #120 show at least one crack that extends all the way to the tank's base foam layer. Evaluation continues on the cracks, their cause and the possibility of flying STS-121 without the ramp. Preliminary analysis indicates it is aerodynamically feasible, but

additional wind-tunnel testing will be scheduled to ensure flight integrity. Work continues to meet a May launch window. If additional testing shows the ramp is needed, external tank processing will be stopped until requirements are assessed. Owner-press-release. (2005). **Space Shuttle Processing Status Report** S05-034 [Online]. Available E-mail: owner-press-release@spinoza.public.hq.nasa.gov [2005, December 2].]

### **Cracks may delay shuttle launch**

Recently discovered cracks in a foam "ramp" on the space shuttle's external fuel tank may present an "unacceptable safety threat" to the orbiter, raising the possibility that NASA could delay its next launch while engineers decide whether to get rid of the ramp altogether, shuttle program manager N. Wayne Hale said in an internal memo. Discovery of the PAL ramp cracks during an inspection early last month marked a new setback for the troubled shuttle program, which has flown only once since Columbia disintegrated over Texas in February 2003. Hale had predicted earlier that making changes to eliminate the ramp would delay the next shuttle launch until next fall, at least four months later than currently planned. Further delays could also add cost and uncertainty to President Bush's "Vision for Space Exploration," which calls for the shuttle to finish building the international space station by 2010 and then retire, stepping aside for a new-generation spaceship designed to take humans back to the moon and eventually to Mars. In the e-mail Sunday (November 27) to shuttle engineers and managers, Hale said vertical cracks in the external tank's "protuberance air load," or PAL, ramp extended deep into the foam insulation and appear to have been caused by contraction and expansion as the tank was being filled with supercooled liquid hydrogen and oxygen. Because all shuttle fuel tanks undergo such "cryoloading," cracking "must be presumed possible in any PAL ramp on any flight vehicle," Hale wrote. As a result "this . . . represents a critical and unacceptable safety threat to the flight of the space shuttle." Hale stressed his judgments were "preliminary" but it "appears mandatory" that the shuttle team focus on eliminating the ramp altogether for all upcoming shuttle flights, including the May launch. ["Cracks may delay shuttle launch," **Orlando Sentinel**, December 2, 2005, p A16.]

### **NASA Likely To Fly Next Shuttle Sans Foam Ramp**

NASA is leaning toward flying its next space shuttle mission without the protective foam ramp that broke away from Discovery's external tank during its July return to flight, according to a spokesman for the U.S. space agency. Shuttle officials plan to meet again this month to evaluate the Protuberance Air Load (PAL) ramp issue and possibly reach a decision. "The data from the ongoing engineering analysis on the PAL ramp seems to be pointing in the direction of not flying with the PAL ramp for STS-121," said NASA spokesman Allard Beutel, referring to Discovery's next mission, tentatively slated for May 2006. Beutel said eliminating the PAL ramp would not in and of itself jeopardize the May launch opportunity, provided that wind tunnel testing now being planned for February confirms that it is safe to fly without the structure. The PAL ramp was added to the external tank early the program's history to provide a windbreak for a cable tray that runs along the tank. NASA Space Shuttle Program Manager Wayne Hale raised the possibility of eliminating the ramp from the STS-121 tank during a Nov. 22 update on work the agency has done to eliminate foam shedding. "In the long run, we have decided we would like to remove this fairly large piece of foam, just eliminate the hazard that it might cause," Hale said at the press briefing. "We think we have a very strong case to be ready to take that ramp off by the third flight tank. Some folks believe we can accelerate that and potentially even remove it for the STS-121 tank. "Several days after that press briefing, Beutel said, shuttle

officials received new data that showed that recently discovered PAL ramp cracks on tanks undergoing inspection ran deeper than previously thought. The new data persuaded Hale that NASA should give serious consideration to removing the PAL ramp before STS-121. Web posted. (2005). [NASA Likely To Fly Next Shuttle Sans Foam Ramp [Online]. Available WWW: <http://www.space.com/> [2005, December 2].]

#### **December 4: Pluto mission comes with risk**

NASA plans to stage the world's first mission to Pluto next month, launching a plutonium-powered spacecraft on an Atlas 5 rocket at Cape Canaveral Air Force Station. Destined to explore the icy edges of the solar system, the probe is equipped with a generator that will convert heat from the decay of 24 pounds of plutonium into electricity to heat and run the spacecraft systems. Government studies show that the mission poses more danger to Central Florida than a typical rocket launch. So much so, in fact, that White House approval -- which is expected early next year -- is required to give the go-ahead for launch. There is a 1 in 350 chance that a launch area accident could release radioactive plutonium somewhere in a six-county area surrounding Cape Canaveral, according to a review of public records and interviews with government officials. Anti-nuclear activists worry about worst-case scenarios spelled out in safety reports, saying an accident could devastate nearby communities, although the studies indicate the likelihood of such a disaster is about 1 in 18 million. The plutonium fuel aboard the spacecraft is not the highly explosive material used in nuclear weapons. It is a different grade only dangerous to people if reduced to fine dust. The maximum dose a person might be exposed to in most accident scenarios would be similar to seven or eight medical X-rays, according to the government studies. The type of radiation, alpha radiation, is easily shielded. It cannot penetrate the skin, clothing or even a piece of paper. It is only dangerous if inhaled or ingested. The regional risk drops to nil 40 seconds after liftoff. By that time, the 205-foot Atlas rocket will have arced out over the Atlantic Ocean, and the studies found no chance of a plutonium release if the rocket crashes into water. For New Horizons, the federal government plans to station 16 teams at sites between the southern ends of Brevard and Volusia counties. In a launch accident, radiation detection devices would enable them to determine whether plutonium was released and the relative danger, if any, to launch site workers or people in surrounding communities. Web posted. (2005). [Pluto mission comes with risk [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, December 4].]

#### **December 5: Servicing the Hubble**

Preparations for a shuttle mission to upgrade and repair the Hubble Space Telescope in late 2007 or early 2008 are picking up steam as engineers map out the details of a five-spacewalk flight designed to keep the venerable observatory alive and well through at least 2013. Servicing Mission 4, canceled by former NASA Administrator Sean O'Keefe in January 2004, is expected to be officially reinstated by current Administrator Mike Griffin if the next shuttle mission, STS-121, goes smoothly and if ongoing analyses show the flight can be conducted in relative safety. In the meantime, Hubble engineers at the Goddard Space Flight Center in Greenbelt, Md., plan to meet with their shuttle counterparts at the Johnson Space Center in Houston later this month to discuss the flight in detail. And astronauts will begin working through spacewalk scenarios in late January or early February in a giant pool used to simulate weightlessness. The current target launch date is December 2007. In the latest internal shuttle manifest, which lists 18 flights to the space station and then the retirement of the fleet in 2010, SM-4 - the only non-station mission on the books - is listed

as the 10th flight in the sequence. Web posted. (2005). [Servicing the Hubble [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, December 5].]

### **Union tells NASA to halt work on Pluto spacecraft**

The union representing striking Boeing machinists asked NASA on Monday to halt work on a plutonium-powered spacecraft, claiming it is irresponsible to allow five replacement workers to complete the job. NASA said the managers and supervisors have the skills needed to complete the work safely, and the agency intends to press ahead with plans to launch its Pluto-bound New Horizons spacecraft next month. The replacement workers "are certified, have extensive previous experience and have met the safety criteria," NASA launch services manager Steve Francois said. "No exceptions to either safety or quality assurance have been made and none are planned." The New Horizons mission must be launched during a time-critical 35-day window that opens Jan. 11. A delay past Feb. 14 would force NASA to postpone the launch until early 2007, the next time the planets are aligned properly for the trip. The mission is one of four that Delta rocket machinists were working on before they went on strike Nov. 2. Work on the other missions ceased then. The grounded missions include launch of an advanced weather satellite for the National Oceanic and Atmospheric Administration at Cape Canaveral Air Force Station. Web posted. (2005). [Union tells NASA to halt work on Pluto spacecraft [Online]. Available WWW: <http://www.floridatoday.com/> [2005, December 6].]

### **December 6: NASA seeks private replacements for shuttle trips**

With the space shuttles due to retire, NASA is looking for private companies interested in taking over the potentially lucrative business of flying cargo and crew to the International Space Station. The U.S. space agency issued a solicitation for proposals on Tuesday for firms interested in handling delivery services now provided by the three shuttles, which are due to stop flying by 2010. "Certainly this is an opportunity for the new space companies," said Jim Banke, head of Florida operations for The Space Foundation industry trade association. "They've been lobbying NASA hard for something like this for years." NASA hopes to supplement, and eventually replace, crew and cargo flights to the space station that had been planned for the shuttle fleet. The agency also may have to pare down the number of shuttle flights to the station even before they retire to pay for development of a new spacecraft. In addition to flying to the station if no commercial providers are available, the new NASA ships are being designed to carry astronauts to the moon. "We're excited about this opportunity," said Larry Williams, who handles international and government affairs for California-based Space Exploration Technologies, or SpaceX, which plans its debut rocket launch this month. SpaceX was founded and funded by Internet entrepreneur Elon Musk, who sold his online payment services firm PayPal to eBay for \$1.5 billion. Musk is developing a series of launchers, called the Falcon, which, if successful, could significantly undercut the price routinely paid to aerospace giants Lockheed Martin Corp. and Boeing Co., to send payloads into orbit. Other start-up firms that have expressed interest in NASA's space station business include t/Space, SpaceDev Inc., Constellation Services International, Inc., AirLaunch LLC, SPACEHAB Inc., Andrews Space Inc., Rocketplane Ltd., Universal Space Lines and Bigelow Aerospace, NASA's procurement Web site shows. Boeing and Lockheed Martin, which manufacture and sell the Delta and Atlas expendable launch vehicles, have kept any aspirations of becoming NASA's space station truckers under wraps. Companies have until February 10 to submit proposals to NASA for its transport services. The agency expects to award one or more contracts in May. NASA has allotted

\$500 million to pay for the initial phases of the program through 2010. Web posted. (2005). [NASA seeks private replacements for shuttle trips [Online]. Available WWW: <http://today.reuters.com/> [2005, December 7].]

### **NASA chief scales back agency's plans**

The head of NASA said on Tuesday that the U.S. space agency has had to scale back its plans even since he took the job in April because of "daunting fiscal realities." In early 2004, U.S. President George W. Bush outlined a vision of returning humans back to the moon by 2020 and eventually to Mars. Some had hoped such a program would reignite public interest in the space program that has waned since the 1960s and early 1970s. "We must also acknowledge the plain fact that we cannot do everything that was on our plate when I assumed office," NASA Administrator Michael Griffin said in prepared remarks to a conference of the American Geophysical Union in San Francisco. Griffin did not say specifically which programs might be cut or delayed by the budget constraints. Last month Griffin said the agency faced a \$3 billion to \$5 billion shortfall in its space shuttle program alone over the next five years. Web posted. (2005). [NASA chief scales back agency's plans [Online]. Available WWW: <http://www.cnn.com/> [2005, December 7].]

### **Expendable Launch Vehicle Status Report**

Mission: New Horizons; Launch Vehicle: Lockheed Martin Atlas V 551 (AV-010); Launch Pad: Complex 41, Cape Canaveral Air Force Station, Fla.; Launch Date: Jan. 11, 2006; Launch Window: 2:11 - 4:07 p.m. EST. The Atlas V was successfully tested yesterday during a launch pad "Wet Dress Rehearsal." The rehearsal was a countdown test with the launch vehicle fully loaded with propellants, including RP-1 fuel, liquid oxygen and liquid hydrogen. The fifth and last solid rocket booster was mated to the Atlas V on Nov. 29. At the Payload Hazardous Servicing Facility, Spacecraft Autonomy Testing to ensure New Horizon's ability to function without commands from Earth was successfully completed. The Boeing third stage, the upper stage booster for the spacecraft's escape from low-Earth orbit, was delivered to the Payload Hazardous Servicing Facility on Dec. 1 as scheduled. The spacecraft will be mated to the third stage on Friday. Hydrazine fuel for attitude control and course-correction maneuvers was loaded into the spacecraft on Sunday. The "wet" spin-balance test with fuel aboard is scheduled for today and tomorrow. Encapsulation of the spacecraft into the Atlas V fairing is scheduled on Dec. 12, followed by transportation to Complex 41 on Dec. 16. Mission: Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observations and CloudSat; Launch Vehicle: Boeing Delta 7420 with Dual Payload Attach Fitting; Launch Pad: Space Launch Complex 2, Vandenberg Air Force Base, Calif.; Launch Date: No Earlier Than February 2006; Launch Window: TBD; The satellites are installed in the Dual Payload Attach Fitting at the Astrotech payload processing facilities on north Vandenberg. They will remain there, before preparation for transportation to Complex 2, until a new launch date is determined. Further Delta II preparations at NASA's Space Launch Complex 2 are on hold until the payloads arrive at the pad for installation atop the second stage. Mission: Space Technology 5 (ST5); Launch Vehicle: Orbital Sciences Pegasus XL; Launch Date: Feb. 28, 2006; Launch Window: 8:57:21 to 10:19:21 a.m. EST. The spacecraft, arrived at Vandenberg Monday to begin processing at NASA Hangar 836. The craft consists of three miniaturized, autonomous micro-satellites. They will be installed in a stacked configuration within the fairing of the Pegasus and launched into a 2,800-mile-high polar orbit. After deployment, the micro-satellites will be positioned in a "string of pearls" constellation. The mission will demonstrate the ability to position spacecraft to perform simultaneous multi-point magnetic



field measurements using highly sensitive magnetometers. With the data, scientists can begin to understand and map the intensity and direction of the Earth's magnetic field, its relation to space weather events and the effects on our planet. The project is an instrumental part of the New Millennium Program to identify, develop, build and test innovative technologies and concepts that can be used in future missions. KSC News Center (2005). **Expendable Launch Vehicles Status Report** E05-020 [Online]. Available E-mail: [ksc@newsletters.nasa.gov](mailto:ksc@newsletters.nasa.gov) [2005, December 6].]

**December 7: Florida looks at spaceport plans**

Florida space officials will ask airports around the state whether they eventually will be able to adapt their facilities for launching commercial vehicles into space, officials said Wednesday. Using existing airport runways would help keep spaceport construction costs down for airplane-style horizontal launches, said Tracy Hegler, director of planning and spaceport transportation for the Florida Space Authority during a teleconference of the authority's Board of Supervisors. Airports in Titusville and Cecil Field in Jacksonville already have made inquiries about being the site of a future spaceport in Florida. Some developers envision space planes that would take off and land just like commercial airplanes do now. "We would like to work with any airports that are interested," Hegler said. The prospects of building spaceports in Florida outside the Kennedy Space Center in Brevard County where NASA currently launches space shuttles, though, worries some politicians who expressed their concerns Wednesday. "We should not allow resources to go somewhere else that might weaken our competitive advantage," said state Rep. Thad Altman, R-Melbourne. "We need to make sure, for Florida's sake, that we maximize our greatest competitive advantage." But Lt. Gov. Toni Jennings said there are certain restrictions on commercial launches at the Kennedy Space Center until the space shuttle program ends in 2010. Jennings told Altman that he shouldn't worry about Florida's government building a facility in place of the Kennedy Space Center, where NASA has launched vehicles for more than four decades. "Unless the Legislature gets a lot more generous, there's not enough money there to do that," Jennings said. A commercial spaceport could have a direct economic impact of up to \$7.4 million to \$25.5 million and employ between 40 to 115 workers between 2010 and 2015, Hegler said. The next step the Florida Space Authority plans to take is developing a business plan and a marketing strategy for a future spaceport. Florida officials, though, should focus on aiding businesses through the Federal Aviation Administration's spaceport licensing process, and monitor what the airports in Titusville and Cecil Field need to accomplish their goals, said board member Silas Baker, a retired Lockheed Martin director. "We should help anyone in the state of Florida who is interested in being in this business to get those licenses," Baker said. Web posted. (2005). [Florida looks at spaceport plans [Online]. Available WWW: <http://www.bradenton.com/> [2005, December 8].]

**December 8: Shuttle team set to debate removing tank foam ramps**

NASA managers plan to meet next week to discuss whether to ship a shuttle external fuel tank to Florida in early February without so-called PAL ramp wind detectors in hopes wind tunnel tests and computer modeling will prove the ramps aren't needed to shield external pressurization lines and a cable tray from aerodynamic buffeting. If the tank is shipped without the ramp, and if the upcoming tests confirm it's not needed to prevent a catastrophic failure, NASA will be clear to launch the shuttle Discovery next spring as planned on the second post-Columbia mission. In so doing, the agency will eliminate a

potential source of impact debris and put to rest recent concern about cracks in the foam ramps. But PAL ramps cannot be added at the Florida spaceport and if the tests show the pressurization lines and cable tray do, in fact, need shielding, the tank would have to be shipped back to Lockheed Martin's Michoud Assembly Facility near New Orleans for additional work. And that would put the next shuttle flight on indefinite hold. In that case, engineers would have to reapply the long ramp, either manually or robotically spraying on foam insulation to build a sort of dam to smooth the flow of supersonic air over the externally mounted components. More important, and potentially time consuming, they also would have to develop new application techniques or change the composition of the foam - or both - to prevent hard-to-see cracks from forming after the tank is loaded with supercold rocket fuel. And those issues will be present in the near term if shuttle managers decided to ship a tank with PAL ramps in place. Web posted. (2005). [Shuttle team set to debate removing tank foam ramps [Online]. Available WWW: <http://www.spaceflightnow.com/> [2005, December 8].]

### **NASA gives ATK/Thiokol new contract**

The National Aeronautics and Space Administration said Wednesday it chose Alliant Techsystems to serve as the prime contractor to design and develop the propulsion system for its next generation of space vehicle that it hopes will provide the means for the further human exploration of the moon, and perhaps Mars. ATK/Thiokol is under contract with NASA to produce booster motors for the space shuttle through the year 2010, the planned retirement date for that program. With only minor modifications, ATK/Thiokol intends to use its existing rocket motor technology on NASA's new project, dubbed the Crew Launch Vehicle, or CLV. The value of the new contract with NASA eventually will depend on how many rocket motors are ordered from ATK/Thiokol. The booster motors used on the space shuttle cost about \$10 million each. The solid-rocket booster motors manufactured in Utah are shipped to the launch site, where other NASA contractors are responsible for assembling and connecting them to the shuttle before blastoff. ATK expects to take over that job on the CLV. Web posted. (2005). [NASA gives ATK/Thiokol new contract [Online]. Available WWW: <http://www.sltrib.com/> [2005, December 8].]

### **December 9: Shuttle oxygen leak under investigation**

Shuttle engineers are investigating data that indicates that an oxygen leak took place in the engine compartment during July's launch of the shuttle Discovery, a leak that could have endangered the orbiter. The leak was discovered when engineers analyzed the contents of "catch bottles" in the engine compartment that collect air samples there during flight. Two of the six bottles collected high concentrations of oxygen about two minutes into Discovery's flight. However, engineers have not been able to determine if a leak actually took place during the flight, let alone where. A buildup of oxygen in the compartment could have led to a fire, although there is no evidence that the shuttle was in danger at any point during its mission. Shuttle officials believe that this issue will not pose a problem to returning the shuttle to flight next May, but still plan to investigate and close the issue before that launch. Web posted. (2005). [Shuttle oxygen leak under investigation [Online]. Available WWW: <http://www.spacetoday.net/> [2005, December 9].]

### **Space Shuttle Processing Status Report**

Mission: STS-121 - 18th ISS Flight (ULF1.1) - Multi-Purpose Logistics Module; Vehicle: Discovery (OV-103); Location: Orbiter Processing Facility Bay 3; Launch Date: No earlier

than May 2006; Launch Pad: 39B; Crew: Lindsey, Kelly, Sellers, Fossum, Nowak, Wilson and Reiter; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Processing continues for the second space shuttle mission in the Return to Flight sequence. Wire inspections and chafe protection installation continue on the reaction jet driver. The nose landing gear was cycled Thursday to support tile work on the shuttle's heat shield. The Orbiter Boom Sensor System is in the transfer aisle of the processing facility awaiting installation. The boom installation was moved to next week to allow for final work on the pedestals and latches. Technicians are removing and replacing approximately 100 gap fillers daily in a main priority area. This work is being performed due to two gap fillers that were protruding from the underside of Discovery during the last mission, STS-114. New installation procedures are being developed to ensure gap fillers stay in place and do not pose any hazard during the shuttle's re-entry to the atmosphere. Engineers are evaluating data from two catch bottles that indicated higher levels of oxygen than expected in the shuttle's aft compartment during the last mission. Six bottles automatically capture samples for two seconds in pairs at precise times after launch and through the first two minutes of flight. The higher readings have been categorized as a formal in-flight anomaly, but they could be an analysis mistake. During Discovery's launch, all three main engines performed normally, which indicated there wasn't a significant oxygen leak in the aft compartment. Engine performance and the catch bottles are the only way to detect in-flight leaks. Mission: STS-115 - 19th ISS Flight (12A) - P3/P4 Solar Arrays; Vehicle: Atlantis (OV-104); Location: Orbiter Processing Facility Bay 1; Launch Date: TBD; Launch Pad: 39B; Crew: Jett, Ferguson, Tanner, Burbank, MacLean and Stefanyshyn-Piper; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Technicians continue processing this mission to the International Space Station. Preparations are under way to drain Freon coolant loop No. 1 in support of a cold plate removal and replacement. The forward reaction control system was installed on Tuesday. This control system sits behind the nose cap and provides the thrust for rotational maneuvers and small velocity changes along the orbiter axis. Endeavour (OV-105); In Orbiter Processing Facility Bay 2, technicians continue processing after a nearly two-year major modification period. Body flap preparations are nearing completion, and installation is scheduled for late next week. Installation of water spray boilers No. 1 and 2 continues; work is focused on the safety wiring. Wiring for the new external fuel tank digital camera continued. The vehicle will remain powered down for work on a new modification called the "station to shuttle power transfer system." The new system will allow the vehicle to stay docked to the International Space Station longer than during previous missions. Owner-press-release. (2005). **Space Shuttle Processing Status Report S05-035** [Online]. Available E-mail: [owner-press-release@spinoza.public.hq.nasa.gov](mailto:owner-press-release@spinoza.public.hq.nasa.gov) [2005, December 9].]

#### **December 12: Gap filler inspections a painstaking process**

Workers at Kennedy Space Center are performing extensive inspections on the underside of shuttle orbiters after problems that prompted an unprecedented emergency repair job by spacewalking astronauts during the agency's first post-Columbia mission. Using gauges that look and operate like fish scales, technicians are testing thousands of fabric strips known as gap fillers to see whether they are bonded properly between thermal tiles on the bellies of NASA's three winged spaceships. The work is painstaking. Nevertheless, KSC workers are confident they can finish in time for a planned May flight. If one of the heat-resistant fabric strips came loose or fell out in flight, the orbiter could experience excessive heat during atmospheric re-entry, exposing the crew to a Columbia-like accident. NASA noticed the problem when shuttle commander Eileen Collins piloted Discovery on a 360-degree back

flip as it approached the International Space Station on a test flight last summer. Camera-wielding station residents scanned the bottom of the ship for damage and spotted two gap fillers sticking out. The ceramic cloth strips were among 9,000 fitted between tiles to help keep hot gas from breaching the heat shield. They also prevent tiles from rubbing against each other as the shuttle's aluminum skin flexes in flight. Protruding gap fillers could create a turbulent flow of super-heated air over the shuttle's belly during re-entry. That could lead to temperatures high enough to damage surrounding tiles or composite carbon wing panels. A new procedure is being used to make certain gap fillers are glued properly in place. In addition, a more forceful test is employed to ensure they remain secure. Technicians now apply 5 pounds of pressure to installed gap fillers. That's 10 times more force than applied during previous "pull tests." The incident on Discovery's flight prompted NASA to begin an inspection and test regime to verify that all gap fillers are properly bonded. Those that are not are being replaced. The amount of work is significant. So NASA is prioritizing the task, splitting it into three zones on the underside of the shuttle. Technicians are focusing on 3,000 gap fillers in the highest-priority zone, which stretches from beneath the orbiter's nose to an area behind the ship's nose landing gear door. It also runs along the starboard and port sides of the shuttle's belly, back to the ship's wings. Web posted. (2005). [Gap filler inspections a painstaking process [Online]. Available WWW: <http://www.floridatoday.com/> [2005, December 12].]

**December 13: Most Boeing strikers hold out**

Some striking Boeing machinists in Florida, Alabama and California are returning to work after the loss of paychecks and the expiration of medical-insurance coverage, union and company officials said. But an overwhelming majority of strikers at two national spaceports -- Cape Canaveral Air Force Station and Vandenberg Air Force Base in California -- are holding out for a contract without benefits concessions. "Five weeks into the strike, and especially with the holidays coming up, that says a lot about the fortitude of the members," said Kevin Cummings, a spokesman for the International Association of Machinists and Aerospace Workers, which represents the striking workers. About 1,500 machinists at The Boeing Co. walked off the job Nov. 2, after the company and the union failed to come to terms on a three-year contract. Their previous agreement -- which expired Oct. 23 -- provided for base annual wages between \$14,123 and \$61,755. Most of the machinists work on the company's Delta rocket program. The strike prompted an indefinite delay in the planned launch of an advanced weather satellite from Cape Canaveral for the National Oceanic & Atmospheric Administration. Also on hold are the launches of a NASA atmospheric science mission and a classified National Reconnaissance Office payload at Vandenberg. Boeing is using a small squad of managers and supervisors to finish work on an upper-stage rocket that will propel a plutonium-powered NASA spacecraft on a mission to Pluto, with the launch planned for Jan. 11. A delay past Feb. 14 would force NASA to postpone the mission until early 2007, the next time the planets are aligned properly for the trip. The 1,500 workers who walked out included 378 machinists at the two spaceports -- 282 at Cape Canaveral and 96 at Vandenberg, said Boeing spokeswoman Tina Lange. The total also includes another 365 in Huntington Beach, Calif., where the company's Delta program office is headquartered, and 294 at Boeing's Delta rocket manufacturing plant in Decatur, Ala. Web posted. (2005). [Most Boeing strikers hold out [Online]. Available WWW: <http://www.nytimes.com/> [2005, December 13].]

### **December 14: Spaceport race just got harder**

New Mexico will build a \$225 million spaceport and become the launching site for the world's first spaceliner under a deal to be finalized today. The news frustrates some Brevard County leaders. They worry Florida is missing out on too many exciting, new space projects that might make up for some of the thousands of jobs threatened by NASA's plan to retire the shuttle orbiters in 2010. "This stuff is Florida's to lose, and we've succeeded again," said state Sen. Bill Posey, R-Rockledge, who cited excessive government regulation and disorganized recruiting as the reasons Florida is seeing other states win business that seems a natural fit for Florida's Space Coast. "If you're going to space, do you want to go from the Cape or New Mexico? Come on." However, few in the aerospace industry viewed Brevard's spaceport as a contender to be home base for SpaceShipTwo. New Mexico and other remote sites offered financial and safety advantages over Florida for the kind of spaceship planned by designer Burt Rutan and Virgin Galactic, the British company selling the pricey adventure trips. Virgin Galactic, a British company founded by tycoon Richard Branson last year after seeing Rutan's SpaceShipOne become the first private craft to go to space, plans to start tourist flights as early as 2008. The company says 100 people have pledged to pay \$200,000 to be on the first missions and another 38,000 have paid deposits for subsequent flights. New Mexico saw what could be a multibillion-dollar venture capable of spawning thousands of jobs and went after it. Company officials said states such as Florida, Utah and Nevada recruited them too. New Mexico Gov. Bill Richardson was the most aggressive, though, offering to take the risk of building a made-to-order spaceport at no up-front costs to Branson's company. Virgin Galactic will repay the state during the life of a 20-year lease. The company cited New Mexico's mild climate, high altitude and wide open spaces. More than 2 million people live within about 60 miles of Cape Canaveral, causing a more costly and time-consuming process to get approval from government regulators who have to make sure no stray spaceship smashes into houses or schools. On the recruiting side, Gov. Jeb Bush has formed a commission to look at streamlining the state's many space-related organizations and identify opportunities to land some of the business related to NASA's moon-Mars initiatives as well as space tourism. Web posted. (2005). [Spaceport race just got harder [Online]. Available WWW: <http://www.floridatoday.com/> [2005, December 14].]

### **Adventurer sets sights on KSC runway**

Record-setting pilot Steve Fossett might take off from NASA's shuttle runway at Kennedy Space Center early next year on the longest flight in aviation history, officials said Wednesday. Financially backed by British entrepreneur Richard Branson, Fossett aims to fly from a site in the United States and circle the globe before crossing the Atlantic again to land at an airport near London. The 61-year-old will pilot an aircraft designed by Burt Rutan. His plan is to cover about 29,000 miles in about 90 hours, topping the current distance record by about 4,000 miles. Takeoff is tentatively set for January or February. "It will be an attempt to shatter the distance record and set a new one that can't be broken," said Brooke Lawer, a spokeswoman for Branson's Virgin Atlantic Airways. Lawer said the three-mile shuttle runway at KSC and an airport in Salina, Kan., are being considered for the nonstop, unrefueled solo flight. A final site selection could come today. The Kansas site served as the embarkation and end points for a historic Fossett flight last March, the first solo nonstop flight around the world without refueling. It covered 20,373 miles. Designed and built by Rutan's Scaled Composites LLC of Mojave, Calif., the GlobalFlyer is a single-seat, jet airplane that made the trip around the world in March in 67 hours and 1 minute. The current record for the longest flight in an airplane is held by the Voyager aircraft, which also



was designed by Rutan. His brother, Dick, and co-pilot Jeanna Yeager, flew 24,987 nonstop miles in 1986. Pilots Brian Jones and Bertrand Piccard flew the longest flight of any kind in 1999, a globe-circling trip in a balloon that covered 25,361 miles. Fossett in 2002 became the first to fly around the world nonstop in a balloon. Two years later, he piloted a sailboat around the world in the fastest time ever: 58 days and nine hours. Web posted. (2005). [Adventurer sets sights on KSC runway [Online]. Available WWW: <http://www.floridatoday.com/> [2005, December 15].]

#### **December 15: NASA Plans to Remove Some Foam From Shuttle**

A section of insulating foam that unexpectedly broke loose when the space shuttle Discovery lifted off in July will be removed from future fuel tanks to eliminate the hazard, a NASA official said Thursday. William H. Gerstenmaier, the agency's director of space operations, said a large section of foam that shielded pipes and cables on the side of the shuttle's large external fuel tank would probably not be used again. Engineers have long assumed that the area, known as the PAL ramp, needs the insulating foam to protect the equipment. But since the shuttle was designed in the 1970's, the pressurized fuel lines, fixtures and a cable box protected by the ramp have been strengthened. Now, wind-tunnel tests and computer models indicate that the foam is no longer necessary in that area. Engineers plan additional tests to make sure that removing the PAL ramp will be safe. During the launching of the Discovery, the first in the more than two years since the Columbia disaster, NASA engineers were surprised and disturbed when a one-pound chunk of foam broke free from this ramp area despite years of efforts to eliminate or reduce foam shedding. Last month, engineers found tiny cracks in the foam insulation of another fuel tank that had been filled with the shuttle's supercold liquid hydrogen and liquid oxygen propellants that may be related to foam coming loose during launchings, agency officials said. During the Discovery's flight, pieces of foam broke loose from four other areas of the redesigned tank, but Mr. Gerstenmaier said those losses had been attributed to causes other than the cracks and had been addressed with other solutions. He said the next shuttle flight could still take off next May, as NASA has tentatively planned, even with the fuel tank modifications. Officials had said previously that removing the foam ramp could push the flight to the end of 2006, but Mr. Gerstenmaier said a re-examination of old test data and new computer modeling suggested that such a long delay would be unnecessary. Web posted. (2005). [NASA Plans to Remove Some Foam From Shuttle [Online]. Available WWW: <http://www.nytimes.com/> [2005, December 16].]

#### **Space Shuttle Processing Status Report**

Mission: STS-121 - 18th ISS Flight (ULF1.1) - Multi-Purpose Logistics Module; Vehicle: Discovery (OV-103); Location: Orbiter Processing Facility Bay 3; Launch Date: No earlier than May 2006; Launch Pad: 39B; Crew: Lindsey, Kelly, Sellers, Fossum, Nowak, Wilson and Reiter; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Work continues for Discovery's second mission in the Return to Flight sequence, STS-121. The orbiter boom sensor system, the 50-foot device used to inspect the shuttle's heat shield, was installed in Discovery's payload bay on Wednesday. Adjustments of the mechanical release latches will follow in the next few weeks. Inspections of windows 9 and 10 are complete, with no anomalies reported. Wire inspections and chafe protection installation continue on the vehicle's steering jets used in space. The pull tests on the external fuel tank door latch were completed Tuesday. Technicians continue to replace daily approximately 100 gap fillers in a main-priority area. New installation procedures are being used to ensure the gap fillers stay

in place and do not pose a hazard during the shuttle's re-entry to the atmosphere. Mission: STS-115 - 19th ISS Flight (12A) - P3/P4 Solar Arrays; Vehicle: Atlantis (OV-104); Location: Orbiter Processing Facility Bay 1; Launch Date: TBD; Launch Pad: 39B; Crew: Jett, Ferguson, Tanner, Burbank, MacLean and Stefanyshyn-Piper; Inclination/Orbit Altitude: 51.6 degrees/122 nautical miles. Atlantis processing continues on schedule for its mission to the International Space Station. Freon coolant loop no. 1 was drained from the orbiter to allow a cold plate removal and replacement. The forward reaction control system, used for on orbit maneuvers, was installed last week and connections are complete. The mechanical release latches for the shuttle arm are being installed. Thermal protection system gap-filler inspections and measurements continue in the forward and mid-body areas. Four reaction control system thrusters on the orbiter maneuvering system were replaced. Endeavour (OV-105); Technicians continue to process Endeavour in Orbiter Processing Facility Bay 2. Work on the modification of the elevon lightning protection is complete. The modification stabilized the flexible metal casing on the elevon wire harness. Endeavour was powered up on Monday after being down for about two months for wiring modifications. Installation of the reinforced carbon carbon panels on wing leading edges continues. Technicians installed 15 panels on the left wing and 13 panels on the right wing. Preparation is under way for body flap installation next week. Testing of the vehicle's Global Positioning System took place this week, and hydraulic leak checks began. External Tank; Engineers continue evaluating the causes of foam loss during Discovery's launch in July. Data has been gathered about the cracks in the protuberance air load (PAL) ramp of external tank 120. Engineers are focusing on flying the next shuttle mission without the PAL ramp. The removal could affect the ice frost ramp. It is another solid piece of foam like the PAL ramp. It supports the pre-pressurization lines running down the side of the tank adjacent to the PAL ramp. To ensure flight integrity, more testing, including wind-tunnel tests, will be done to identify an engineering solution. While work continues to target a May launch window, engineers will have more information on scheduling once the engineering fix is selected. Owner-press-release. (2005). **Space Shuttle Processing Status Report S05-036** [Online]. Available E-mail: [owner-press-release@spinoza.public.hq.nasa.gov](mailto:owner-press-release@spinoza.public.hq.nasa.gov) [2005, December 15].]

### **Launches just not in the stars this year**

Ten rockets and missiles blasted off from the Space Coast in 2005, and three were hard-to-see missile firings from submarines at sea. That's fewer launches than any year since 1950, the first year the military started shooting missiles off the Cape, according to statistics maintained by the Heritage and History office at the 45th Space Wing. The lull in space launches cannot be traced to a single cause. A string of unfortunate events conspired to keep America's rockets on the ground instead of streaking across our skies. The shuttle flew for the first time since 2003, but just once because the frustrating foam problem is not solved. Big hunks came off the external fuel tank again, and NASA promptly re-grounded the fleet until next spring or summer. There are fewer satellites and other craft needing a ride to space and most of them, especially the ones built for private companies rather than NASA and the military, are flying on cheaper foreign-built rockets from overseas launch sites. Technical problems continue to plague The Boeing Co.'s Delta fleet, especially the relatively new Delta 4. The big booster has not flown since a failed launch last year, when a fuel system problem left a test satellite 10,000 miles short of its target. And, last but not least, even if Boeing were ready to launch any rockets, the technicians who get them ready to fly walked out on strike in early December. Most remain on the picket lines in a fight focused mainly on medical benefits. With a few of 2005's missions moving into 2006, however, it

could be a slightly busier launch year. Col. David Thompson, commander of the operations group at the 45th Space Wing, says the schedule indicates about 15 to 20 launches a year in 2006 and 2007. At least 150 launches are expected by 2012, Thompson said. Kennedy Space Center could become busier, for one. If NASA sticks to its current plan, 2006 could see the agency return to a pre-Columbia disaster flight rate of about four or five shuttle missions a year. That's the number necessary for NASA to keep its promises to the world to finish constructing the International Space Station. As the orbiters fly toward a scheduled 2010 retirement, the agency and its contractors intend to start test-flying the first of a new series of rockets that are envisioned to get astronauts and cargo to the station, the moon and ultimately Mars. The first practice flights of the proposed Crew Launch Vehicle, based on shuttle rocket boosters, could come in 2008. Web posted. (2005). [Launches just not in the stars this year [Online]. Available WWW: <http://www.floridatoday.com/> [2005, December 15].]

### **Glitches ground Boeing's Delta 4s**

The Boeing Company did not launch a single Delta 4 rocket from either of its coastal launch sites in 2005 and it's unknown when the relatively new vehicle will return to flight, officials said. The last Delta 4 to fly was the monstrous heavy version, which blasted off from Cape Canaveral Air Force Station in December of last year. However, during what looked like a flaw-free ride to space, its first stage failed and its payload – a mock weight simulating a satellite – ended up 10,000 miles short of its target. The problem: fuel sloshing inside the booster caused some sensors to believe the rocket's tanks had run dry, shutting down the first-stage engines earlier than expected. More than a year later, Boeing engineers and counterparts with the Air Force say they still are reviewing a proposed solution to the problem that cause the rocket's failure. ["Glitches ground Boeing's Delta 4s," **Florida Today**, December 15, 2005, p 3A.]

### **December 16: NASA Facility Serves As Launch Site For Record-Setting Flight**

NASA announced Friday the agency's Kennedy Space Center, Fla., will be the takeoff site for an attempt to set the record for the longest flight of an aircraft or balloon. NASA and Virgin Atlantic Airways' agreement to use Kennedy's Space Shuttle Landing Facility is the result of a pilot program to expand access to the shuttle's runway for non-NASA activities. An exact takeoff date for Virgin Atlantic's GlobalFlyer aircraft has not been determined and is contingent on weather. The flight is expected to take place in February. Steve Fossett will attempt to fly solo around the world, non-stop without refueling, in the aircraft designed by Burt Rutan. It is scheduled to arrive at Kennedy for preflight preparations on Jan. 6, 2006. "We're thrilled that Steve Fossett and Virgin Atlantic selected the Shuttle Landing Facility as the take-off point for this world record attempt," said Kennedy Space Center Director Jim Kennedy. "The project will further enhance our efforts to expand the facility's use." The GlobalFlyer, built by Scaled Composites, Inc., is a single pilot, ultra light aircraft designed for non-stop global circumnavigation. The plane will fly mostly at 45,000 feet at speeds faster than 285 mph. "Launching from the Kennedy Space Center at NASA will give both pilot and aircraft the ultimate launch pad for this ultimate flight," said Sir Richard Branson, chairman of Virgin Atlantic Airways. "We're excited to be able to partner with NASA on this attempt, as it is a perfect combination of innovation and aspiration." ["NASA Facility Serves As Launch Site For Record-Setting Flight," **NASA News Release #05-498**, December 16, 2006.]

### **Expendable Launch Vehicle Status Report**

Mission: New Horizons; Launch Vehicle: Lockheed Martin Atlas V 551 (AV-010); Launch Pad: Complex 41; Launch Site: Cape Canaveral Air Force Station, Florida; Launch Date: NET Jan. 17, 2006, 1:24 to 3:24 p.m. EST; Launch Window: Jan. 11 to Feb. 14, 2006. The launch of Pluto New Horizons is rescheduled for NET Jan. 17, 2006. This will enable an additional inspection of the Atlas launch vehicle. The launch services contractor, Lockheed Martin, experienced problems in September on an updated Atlas propellant tank similar to the one being flown on the Pluto New Horizons mission. We continue our work based on a 35-day launch window. A mission rehearsal with all of the launch participants was held Thursday at the Atlas Space Operations Center. The spacecraft was encapsulated into the Atlas V fairing on Tuesday at the Payload Hazardous Servicing Facility. It is being installed onto the payload transporter today. New Horizons will be moved to Launch Complex 41 on Saturday. The Integrated Systems Test, an integrated test of the launch vehicle and the spacecraft, is scheduled for Wednesday. Mission: Space Technology 5 (ST5); Launch Vehicle: Orbital Sciences Pegasus XL; Launch Site: Vandenberg Air Force Base, California; Launch Date: Feb. 28, 2006; Launch Window: 5:57:21 a.m. - 7:19:21 a.m. PST. Space Technology 5, or ST5 spacecraft, arrived at Vandenberg Air Force Base on Dec. 5 and is in NASA Hangar 836 for prelaunch preparations. Spacecraft Comprehensive Performance Testing is complete on all three spacecraft that comprise the ST5 payload. ST5 has been covered for the Christmas holidays. Other testing and spacecraft processing activities will resume on Jan. 3, 2006. Work on the Orbital Sciences Pegasus XL launch vehicle continues on schedule. Wing fit checks are under way and accelerometer installation will take place next week. Flight computer software installation is scheduled for Monday. Aft skirt installation is planned for Dec. 29-30, 2005. Flight Simulation No. 1 is scheduled for Jan. 5-6, 2006; Flight Simulation No. 2, for Jan. 25-26, 2006. Mission: Cloud-Aerosol Lidar & Infrared Pathfinder Satellite Observation/ CloudSat (CALIPSO/CloudSat); Launch Vehicle: Boeing Delta 7420 with Dual Payload Attach Fitting; Launch Pad: Space Launch Complex 2; Launch Site: Vandenberg Air Force Base, California; Launch Date: No earlier than February 2006; Launch Window: TBD. CALIPSO and CloudSat are installed in the Dual Payload Attach Fitting at the Astrotech payload processing facilities on north Vandenberg. They will remain there until a new launch date is determined and then be prepared for transportation to NASA's Space Launch Complex 2. Further Delta II preparations at the launch pad are on hold until the CALIPSO/CloudSat payloads arrive for installation atop the second stage. KSC News Center (2005). **Expendable Launch Vehicles Status Report** E05-021 [Online]. Available E-mail: [ksc@newsletters.nasa.gov](mailto:ksc@newsletters.nasa.gov) [2005, December 16].]

### **Will budget doom Atlantis?**

Several lawmakers have warned President Bush in a letter that if NASA doesn't get the budget it seeks for 2007 to 2010, it would have to retire shuttle Atlantis immediately, cutting jobs and gutting the vision for space exploration. The Office of Management and Budget's plan would "under-fund the Shuttle program by \$3 billion to \$6 billion," a Dec. 9 letter says, leading to "the immediate retirement of the Shuttle Atlantis and a cut from the needed 19 Shuttle missions to between 8 and 11 missions." John Logsdon, director of George Washington University's Space Policy Institute, said a proposal to go to two orbiters has little support. "It would mean that NASA couldn't honor its international commitments," he said, "and the policy people at the White House have said that's not acceptable." If NASA got a smaller budget increase than requested and Atlantis were retired, jobs at Kennedy Space Center would be eliminated. NASA would not be able to fix the Hubble Space

Telescope or finish the International Space Station, which "will gravely upset our international partners," the lawmakers' letter said. Scott Milburn, with the Office of Management and Budget, wouldn't reveal details of the 2007 budget, which comes out in February. Until now, he said, President Bush has increased NASA funding by 15 percent. Flying the shuttles 19 more times before their planned 2010 retirement is likely to cost at least \$22 billion, which lawmakers say is \$3 billion to \$6 billion more than what's currently allotted. Logsdon said the letter amounted to normal budget politics as negotiations progress. Though the science budget is likely to remain static under NASA Administrator Mike Griffin, he said, shuttles and the future crew exploration vehicle remain the priority, making retiring Atlantis unlikely as a compromise is reached. "It would be an unfortunate decision," he said, "and I think the people who are making that decision know it." Web posted. (2005). [Will budget doom Atlantis? [Online]. Available WWW: <http://www.floridatoday.com/> [2005, December 16].]

**December 17: Pluto probe a bit closer to liftoff**

The world's first mission to Pluto took another step toward launch Saturday with the move of the New Horizons probe to Launch Complex 41, where it will be installed atop an Atlas 5 rocket. NASA moved the interplanetary spacecraft in the dark early Saturday morning under tight security, though the reason had nothing to do with the probe's plutonium power source. The nuclear generator that will power the craft's systems will not be installed until about three days before the launch, now scheduled for no earlier than Jan. 17. George Diller, a spokesman for the Kennedy Space Center, said the reason for moving the spaceship in darkness is to protect sensitive components from sunlight. Until Saturday, the probe was undergoing final preparations and inspections in a tightly-controlled payload facility at the space center. NASA continues to aim to launch the probe sometime before Feb. 14 despite a minor setback involving the rocket. Lockheed Martin Corp. has discovered a problem with a propellant tank similar to the one to be flown with this Atlas 5, and NASA and the company decided extra time was needed for inspections. The launch was set for Jan. 11, but the extra inspections mean liftoff can't happen until at least Jan. 17. If the probe launches that day, it will be sometime between 1:24 to 3:24 p.m. Eastern time. Web posted. (2005). [Pluto probe a bit closer to liftoff [Online]. Available WWW: <http://www.floridatoday.com/> [2005, December 18].]

**December 19: New, stronger tiles will shield shuttle**

After a couple of decades of evolution, new, harder heat-shielding tiles soon will protect critical areas of the shuttle orbiter. "The original materials were based on extreme conservatism," said United Space Alliance's Martin Wilson, who runs Kennedy Space Center's thermal protection operation. The shuttle's designers originally chose a very light tile so they wouldn't have to sacrifice cargo weight while protecting the ships from the fiery heat of re-entering the atmosphere. Topped with a thin, ceramic coating, the tiles proved vulnerable to hits from debris and bits of foam that fell off the external fuel tank. The foam debris that doomed Columbia hit the leading edge of the wing, not tile, but it raised awareness of the heat shield's weaknesses. Now, several types of tile are used on the orbiters, and the newest -- called Boeing Reusable Insulation -- is the toughest. Not only is the foamlike insulation more dense; it's topped by a thicker, harder ceramic coating that has been used only around the engines before. The new tiles are stronger, but they conduct more heat to the ship's skin. They will be installed in areas that have a lot of structure to dissipate the heat, Wilson said. The weight gain from the heavier tiles is tiny in relation to



the orbiter's cargo capacity, he said. The hardened tiles will be installed as old or damaged tiles require replacement around areas deemed more vulnerable to hot gases, such as the main landing gear doors. "For now, we're pretty much putting it around the nose and the mains," said Joy Huff, NASA's lead engineer for the thermal protection system. As a bonus, the new tiles tend not to shrink during manufacture, as the old ones did, making final fitting easier. Otherwise, the creation of a tile is about the same, a painstaking process in KSC's tile shop that costs about \$1,000. Workers increasingly rely on 3-D modeling to make the fitting easier, especially when making tiles out of the newer materials. A special digital camera takes multiple images of the spot where a new tile must go. That information is loaded into a computer, and the resulting dimensions are fed into a machine that mills a form. The silica-based billets look like blocks of Styrofoam. Once a tile shape is cut, it's coated with a slurry that is hardened in a kiln. One of the new, hardened tiles, fresh out of the kiln, glows longer than an older one -- retaining more heat -- and the surface below it glimmers red hot when the tile is nudged aside. Each tile is waterproofed, and a Nomex felt pad is applied to its bottom that will help the tile "float" as the orbiter's skin expands and contracts in orbit. Between the three orbiters, NASA will install just 21 of the new tiles at first. Web posted. (2005). [New, stronger tiles will shield shuttle [Online]. Available WWW: <http://www.floridatoday.com/> [2005, December 19].]

#### **State's space groups headed for merger?**

A commission formed by Gov. Jeb Bush is ready to recommend merging Florida's main space-related organizations into a single office called Space Florida. The commission, which met via telephone conference last week, reached agreement that a single organization would save money and be less confounding to space innovators and researchers trying to do business with Florida. The recommendation will be one of many in a report to be delivered to the governor in January. After that, commission members Winston Scott and Jim Banke said it is up to the state Legislature to act to implement the changes. ["State's space groups headed for merger?" **Florida Today**, December 19, 2005, p 2B.]

#### **Atlas fuel tank to be inspected**

The concern that delayed the first mission to Pluto won't be fully explored until after the holidays. The Lockheed Martin team plans to look for potential problems in a fuel tank on the Atlas 5 rocket, but first it must be drained of the kerosene-type fuel and then purged, spokeswoman Julie Andrews said Monday. The purge will take several days and will coincide with a planned holiday break, she said. The New Horizons spacecraft, whose launch from Cape Canaveral slipped from Jan. 11 to Jan. 17, is under a time crunch. If it flies by Jan. 28, it gets to Pluto in 2015, several years faster, with a gravity assist and bonus data from Jupiter. However, it could launch through Feb. 14 and arrive later. Or, the probe could fly in 2007 and reach Pluto as late as 2020. The Jan. 17 launch date is a target but isn't firm, NASA spokesman George Diller said. "They're still mapping out a schedule for all of this," he said. The spacecraft, the first to explore Pluto and its "twin planet," the moon Charon, carries a plutonium power source. The generator will keep the instruments warm and functioning as New Horizons speeds away from the sun. The craft was mated to the Atlas 5 on Saturday. Officials said Monday they wanted to ensure the rocket is safe to launch. Web posted. (2005). [Atlas fuel tank to be inspected in January for Pluto mission [Online]. Available WWW: <http://www.floridatoday.com/> [2005, December 20].]

**December 21: 'NASAcast' Provides Audio and Video**

You no longer have to be seated in front of a TV or computer to get NASA news and information. You can take the latest NASA discoveries and developments with you, whether you're running errands or making your daily commute. The new free service is called NASAcast. It allows subscribers to download NASA features, news and other content as part of a new free podcast service. Podcasting is the latest on-the-go technology that gives users the freedom to listen to or watch news and other programs anywhere, anytime. Podcasts are digital audio and video files automatically downloaded to personal computers and transferred to an iPod or similar player. Just like a magazine subscription, a podcast delivers new information directly to you. When you subscribe, your podcast software automatically searches for new content. ["NASAcast' Provides Audio and Video For The Portable Digital Age," **NASA News Release #05-551**, December 21, 2005.]

**December 28: NASA Races To Repair Gap Fillers**

There is a sense of urgency being felt at Cape Canaveral this week at a time when space shuttle work is normally shut down for the holidays. Shuttle technicians are focused on May 2006, making the same type of repairs as those carried out for the first time in space last summer. If the shuttle's going to be ready to launch by May, it's got to have a lot of work done on its gap fillers. That's a term everyone heard a great deal about during last summer's return-to-flight mission. At that time, a spacewalking astronaut took care of two gap fillers, and before the shuttle can return to space, technicians have to work on thousands more. In the gaps between the shuttle's 25,000 tiles are little cardboardlike strips that could mean the difference between life and death for the astronauts. Those strips, or gap fillers, have to be replaced. "Right now our technicians are doing about 500 a week for the next six weeks," said Mike Rein, of NASA. It's a big job that comes with a tough schedule. If the shuttle Discovery is to be launched in May, the gap fillers have to be redone now, some even during this time when the space center is normally shut down. "They're individually looking at each one of those, pulling them out and refitting them to make sure they're ready for the next flight," Rein said. Gap fillers first entered the national vocabulary when the shuttle Discovery rendezvoused with the space station last summer. Pictures from the station showed the gap fillers sticking out and raised fears that the red-hot temperatures on the trip home could result in catastrophic damage. Astronaut Steve Robison saved the day with his spacewalking repairs. Now, in the shuttle's hangar, technicians are repeating the move. Then they are replacing the gap fillers and making sure none will slip out again. Web posted. (2005). [NASA Races To Repair Gap Fillers [Online]. Available WWW: <http://www.wesh.com/> [2005, December 28].]

**Cape contends for SpaceX launch**

A start-up firm founded by Internet mogul Elon Musk is eyeing Cape Canaveral Air Force Station as a launch site for its Falcon family of rockets. The company hasn't signed any customers for Space Coast launches, but it expects the market to heat up as NASA moves to buy commercial freight and crew transportation services from the private sector. "We're still very interested in launching from Florida. What we basically need to do is find a site that will work for us there," said Gwynne Shotwell, vice president of business development for SpaceX of El Segundo, Calif. "Frankly, I think there will be a market for Florida launches, especially with the (NASA) contract. We would expect many of those to go from the Cape. It will be big business." With the nation's shuttle fleet headed for retirement in 2010, NASA hopes to purchase from private industry crew and cargo transportation services to the

International Space Station. The agency intends to sign agreements next May for demonstration flights. SpaceX is developing three rockets -- the Falcon 1, Falcon 5 and Falcon 9. The company's aim is to reduce the cost of space launches by a factor of 10 while increasing reliability. SpaceX is offering launch services at prices that are 50 to 80 percent less than its competitors. The company already has signed deals for eight launches and is negotiating contracts for three more missions. Web posted. (2005). [Cape contends for SpaceX launch [Online]. Available WWW: <http://www.floridatoday.com/> [2005, December 28].]

# Appendix A

## 2005 NASA Space Shuttle Missions

<b>Mission</b>	<b>Launch Date</b>	<b>Vehicle</b>	<b>Launch Site</b>
STS-114 Return To Flight	7-26-2005	Discovery	KSC 39B
	<b>Landing Date</b>	<b>Payload</b>	<b>Landing Site</b>
	8-9-2005	Multi-Purpose Logistics Module Raffaello	Edwards Air Force Base, Calif. Runway 22

Web posted. (2006). [STS-114 Mission Archives [Online]. Available WWW:  
[http://www.nasa.gov/centers/kennedy/shuttle\\_operations/archives/sts-114.html](http://www.nasa.gov/centers/kennedy/shuttle_operations/archives/sts-114.html) [2006, January 4].]



In the Launch Control Center at NASA Kennedy Space Center, NASA Administrator Mike Griffin, First Lady Laura Bush, Shuttle Launch Director Mike Leinbach and Center Director Jim Kennedy pose for a photograph. Mrs. Bush witnessed the historic launch of Space Shuttle Discovery on Return to Flight mission STS-114. She is only the third First Lady to witness a Space Shuttle launch at KSC.

## Appendix B

### 2005 NASA Expendable Launch Vehicle Missions

Mission	Launch Date	Vehicle	Launch Site
Deep Impact	1-12-2005	Delta II	CCAFS 17B
DART	4-15-2005	Pegasus XL	VAFB
NOAA-A	5-20-2005	Delta II	VAFB
Mars Reconnaissance Orbiter	8-12-2005	Atlas V	CCAFS 41

Web posted. (2005. [2005Expendable Launch Vehicle Missions [Online]. Available WWW: <http://www.nasa.gov/centers/kennedy/launchingrockets/archives/2005html> [2005, August 24].]



In the Payload Hazardous Servicing Facility, the Mars Reconnaissance Orbiter is ready to be encapsulated before moving to the launch pad. The fairing protects the spacecraft during launch and flight through the atmosphere. Once in space, it is jettisoned. Launch of the MRO aboard an Atlas V rocket will be from Launch Complex 41 at Cape Canaveral Air Force Station in Florida.



**REPORT DOCUMENTATION PAGE**

*Form Approved*  
OMB No. 0704-0188

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1. REPORT DATE (DD-MM-YYYY) 10-02-2006		2. REPORT TYPE Technical Memorandum		3. DATES COVERED (From - To) 2005	
4. TITLE AND SUBTITLE  Chronology of KSC and KSC Related Events for 2005				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)  Elaine E. Liston				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)  InDyne, Inc. Kennedy Space Center, Florida, 32899				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)  National Aeronautics and Space Administration Kennedy Space Center, Florida, 32899				10. SPONSORING/MONITOR'S ACRONYM(S)  NASA	
				11. SPONSORING/MONITORING REPORT NUMBER  NASA/TM-2006-214195	
12. DISTRIBUTION/AVAILABILITY STATEMENT  Unclassified -- Unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT  This document is intended to serve as a record of KSC events and is a reference source for historians and other researchers. Arrangement is by day and month and individual articles are attributed to published sources. Materials were researched and described by the KSC Library Archivist for KSC Library Services Contractor, InDyne, Inc.					
15. SUBJECT TERMS  Budget, Discovery (Orbiter), Expendable Launch Vehicles, External Tanks, Foam Insulation, Hurricanes, Landings, Launches, Return To Flight, Space Shuttle Orbiters, STS-114, Vision for Space Exploration					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			19b. TELEPHONE NUMBER (include area code)
Unclassified	Unclassified	Unclassified		267	