New-Look Atlantis Ready for Date with Station

Boeing Delivers Souped-Up Shuttle

America, your spaceship is ready.

Fresh from a 10-month tune-up at the Boeing Reusable Space Systems Palmdale facility, Space Shuttle Atlantis emerged from a cavernous hangar in the desert this morning a new bird, both inside and out.

From the changes to her exterior insignias to her ultramodern cockpit and navigation system, Atlantis now takes her place as the world's safest and most reliable, operationally efficient and capable spaceship, ready to take on America's next giant leap in space: building the International Space Station.

To a medley of stirring space-themed movie music, a crowd of approximately 10,000 Boeing Southern California employees, their families, and invited guests cheered and waved American flags as Atlantis rolled out, a week ahead of schedule. Among them, several astronauts and 350 Boeing Palmdale employees for whom the $68 million Atlantis orbiter major modification (OMM) project was not just a job, but a labor of love.

United Space Alliance (USA) President and Chief Executive Officer Russ Turner called the revitalized Atlantis a technological marvel. "Today we witness the next step in the continual evolution of humankind's most advanced space transportation system, the Space Shuttle, as it prepares to meet tomorrow's challenges," he said. "The Atlantis modifications represent a major milestone for NASA, United Space Alliance and Boeing that will help ensure the Shuttle remains a versatile, reliable and safe workhorse for human spaceflight well into the next century." Boeing conducted the Atlantis work under contract to USA, the prime contractor for NASA's Shuttle program.

"The great job you've done on the Atlantis is represented here today," said Rep. Dana Rohrabacher (R-Calif., 45th District). "You have hit a home run-another home run-for America today." A senior member of the powerful House Science Committee, Rohrabacher is chairman of the Space and Aeronautics Subcommittee and a leading advocate of technology and aerospace programs that lower the cost of getting into space.

Boeing Reusable Space Systems Vice President and General Manager Rick Stephens congratulated the Boeing Atlantis modification team on a job well done. "I'm extremely proud of the tremendous job each of you has done to make this spacecraft, which you built, the best in the world," he said. "Many of the first-time modifications you performed, such as the new cockpit displays, were tremendously complex.

"With more than 900,000 man-hours expended in just 10 months of work, I know many of you have made significant personal sacrifices to ensure that Atlantis met NASA's delivery schedule. That you have done so, and done so with world-class quality, is a testament to your talent, experience and dedication."

During this most extensive OMM ever performed, Atlantis received a comprehensive structural inspection and more than 100 major modifications aimed at better, safer and more efficient vehicle performance and expanded mission capabilities.

The structural inspection entailed literally disassembling and then reassembling many of the vehicle's 2,000,000 components. Inspectors scoured every inch of the 13-1/2 year-old ship using the latest technologies to search for possible fatigue, corrosion, or broken rivets or welds. As on previous orbiter inspections, results confirmed Atlantis' to be in excellent condition, free of significant corrosion or degradation.

The highlight of this OMM-Atlantis second-was the Shuttle fleet's first installation of a $9 million "glass cockpit" called the Multifunction Electronic Display Subsystem (MEDS). Technicians literally gutted Atlantis' cockpit to replace four existing cathode ray tube screens and numerous mechanical gauges and instruments with full-color flat-panel displays. This will allow Shuttle crews to operate with the convenience and control of the most advanced commercial and military flat-panel display technology available today.

Developed by Honeywell Space Systems, Phoenix, Ariz., MEDS is a space-qualified adaptation of the display technology used on the Boeing 777. It will provide Shuttle crews with easy access to vital information through the two and three-dimensional color graphic and video capabilities of its onboard information management system. Information will be interchangeable between screens, allowing crews to select the display format that best suits the needs of their particular mission.

Atlantis' forward flight deck was equipped with nine MEDS displays, while two MEDS units were installed in the aft flight deck to support payload operations. Each display unit measures 8 by 8.5 by 8.65 inches, weighs 18 pounds, uses 67 watts of power and has a resolution of 172 dots per square inch.

The change to MEDS is necessary because present electro-mechanical devices are becoming obsolete and increasingly expensive to maintain. Besides reducing maintenance costs, MEDS will reduce vehicle weight and power consumption, improve Shuttle reliability and performance and improve Shuttle safety by simplifying cockpit panels and providing a redundant display

capability. MEDS is also capable of future upgrades to expand vehicle and payload management, simplify crew training, reduce orbiter turnaround time, eliminate obsolete hardware and to provide modular building blocks that will help NASA reach its long-term goal of achieving commonality among the avionics systems of Shuttle, Space Station and future initiatives.

Atlantis was also equipped to become the first orbiter to be guided by satellite-based navigation. The current TACAN navigation system was removed and replaced with a triply-redundant system that operates through signals from the Boeing-built Navstar Global Positioning System (GPS) satellites, the world's most accurate navigation system.

The three-string GPS system will provide accurate vehicle attitude and location data. It promises to reduce Shuttle program costs by eventually allowing removal of several ground stations at NASA's Kennedy Space Center (KSC) and the trans-Atlantic abort landing sites, which are becoming obsolete and costly to maintain. Together with other planned navigation enhancements, the three-string GPS system could one day enable Shuttle landings in poor visibility conditions.

An additional series of modifications has enabled Atlantis to join sister ships Discovery and Endeavour in supporting ISS construction, which begins this fall. The docking system Atlantis has used for seven missions to Russia's Mir space station was modified to become a fully functional airlock complete with spacesuit services and crew communications capabilities. It was also relocated within Atlantis'payload bay to provide adequate structural clearance with the ISS exterior. Additional ISS-related modifications increased the orbiter's cooling and power capacities to support Station payloads and upgraded the ship's UHF space communications system.

Operational enhancements included increasing Atlantis' load-carrying capability, a series of measures to reduce the orbiter's weight and upgrades to her thermal protection system tiles and blankets.

Safety and reliability enhancements included provisions to protect the orbiter's cooling system and the leading edges of her wings from space debris, a structural beef-up of the crew module floor, and enhancements to the vehicle's hydraulic system.

Atlantis also got a new paint job of sorts. Artists removed the NASA "worm" logos that have adorned the vehicle's right wing and upper-rear payload bay doors and replaced them with NASA's original "meatball" logo, which was readopted by the space agency in 1992. They also replaced the letters "USA" on the left wing with the words "United States."

For the first time ever, Boeing Palmdale personnel also performed preflight vehicle checkouts. The move is expected to reduce the time required to process Atlantis for her next flight by up to two months.

Atlantis is scheduled to be mated to a NASA 747 Shuttle Carrier Aircraft on Monday and will depart for her cross-country ferry flight to NASA KSC on Tuesday. Up next for Atlantis: a date with the International Space Station on an as-yet unassigned mission next year.

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