

# Space Shuttle: Flights to set records

By James Hartsfield

**F**resh on the heels of making space history in 2001 by completing the first phase of International Space Station (ISS) assembly in orbit, the Space Shuttle will continue a string of space firsts during six missions in 2002.

"In the past 12 months, we've completed some of the most challenging space flights in history," Space Shuttle Program Manager Ron Dittmore said. "In the next year those challenges will continue with missions just as complex. The team continues to excel safely and successfully, and 2002 promises to be just as rewarding as the past year."

The coming year will be marked by the shuttle fleet matriarch *Columbia's* return to space on the first non-station shuttle flight in more than two years. Flights by *Atlantis* and *Endeavour* will begin the expansion of the ISS. *Discovery* will remain on the ground in 2002 for standard maintenance and inspections.

"We have simultaneously been planning, training and flying the most complex shuttle missions we have ever done, and the results have been truly awe-inspiring," Chief Flight Director Milt Heflin said. "The team has tremendous reason to be proud of its accomplishments, but not much time to bask in them because the year ahead holds more of the same. But it is exactly that challenge on which I think Mission Control, the planners, the trainers, the crews and the entire team thrive. These kinds of missions are why they work here."

During 2002, shuttles will add more than 50 tons of additional components to the station. They also will service the Hubble Space Telescope and conduct an extended research mission. NASA will break a record set only last year for the most space walks ever conducted in a single year.

"Space walks will never become routine, but we have entered an era of space exploration now where they will continue to become more common," Heflin said. "But no matter how many or how often crews leave their spacecraft, each EVA remains just as exciting to prepare and conduct and just as rewarding to complete."

From space shuttles alone, 15 space walks are planned this year. Coupled with seven space walks that are planned by crews from the ISS, the record for annual space walks will be shattered.

In 2001, 18 space walks were conducted – 12 from the shuttle and six from the station – the most by far of any year to date. This year also will see the shuttle carry more than three dozen new experiments to the station and two new laboratory experiment racks. ❖



## Here's a look at this year's scheduled missions:

### February

*Columbia* will start out the new year's shuttle missions with a flight to the Hubble Space Telescope on STS-109, the fourth mission to service the space telescope since its launch in 1990. Five space walks will be conducted during the flight to install an advanced new camera system, attempt to reactivate an existing infrared instrument system, install new solar arrays and install a new power controller. The mission will extend the lifetime and capabilities of the now-famous orbiting telescope.

"*Columbia's* flight to service Hubble, as we continue to oversee station operations, signals a return for us this year to conducting two distinct activities in space, completely independent of one another," Heflin added. "That's something we haven't done in awhile, and it adds yet another element of complexity to the year ahead."

When *Columbia* launches, it also will become only the second shuttle ever to fly with a new "glass cockpit," which was installed as part of maintenance and modifications completed in 2001. *Atlantis* was the first shuttle orbiter to debut the new cockpit in May 2000 on mission STS-101.

The new cockpit has 11 full-color, flat-panel displays that replace 32 gauges and electromechanical instruments and four cathode-ray tube monitors in the old cockpit. The new cockpit is lighter, uses less power and sets the stage for a future "smart cockpit" for the shuttle that is now in development – a cockpit that will feature new, more intuitive displays to reduce pilots' workloads during critical periods.

### April

*Atlantis* will lift off on STS-110 to begin the shuttle fleet's expansion of the station, delivering the first of three giant truss segments to be launched this year. The truss will form the central segment of what will eventually become a more than 300-foot cross-beam for the station to support future solar arrays, radiators and external experiments.

*Atlantis* also will carry the first part, called the mobile transporter, of a system that will provide a mobile base for the station's robotic arm to allow it to move up and down the eventual football-field-long truss. Four space walks will be conducted from *Atlantis* to install the new station components in one of the most complex station flights of the year.

### May

*Endeavour* is scheduled to launch on STS-111 to carry a fifth crew to the station, as well as the Leonardo logistics module filled with experiments and supplies. *Endeavour* also will deliver the mobile base system to the station, the second part of the mobile platform for the station's innovative Canadarm2 robotic arm. Two space walks will be conducted while *Endeavour* is at the station to hook up the arm's base and perform other assembly tasks.

### June

*Columbia* will fly again on STS-107, an international mission dedicated to micro gravity science that will carry a double Spacehab module filled with 32 experiments involving 59 separate investigations. A suite of eight additional investigations in *Columbia's* payload bay, together called FREESTAR, will include studies ranging from fluid physics to a student satellite. The mission's scientific work will involve the fields of materials science, combustion, fundamental physics and biology. The mission will be an extended flight with a duration of 16 days.

### August

Expansion of the ISS will resume as *Atlantis* makes its second visit of the year to the complex, carrying the first starboard side truss segment. The new segment will be attached to the end of the central segment delivered in March. The connections will be finalized during two space walks.

### September

The final mission of 2002 will see *Endeavour* visit the station again, attaching a port side truss segment to the station, completing almost half the length of the final truss. *Endeavour* also will deliver a sixth crew to the station. Two space walks will be performed to connect the new truss segment, and the truss will measure about 133 feet long by the end of the year.

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