New Water Reclamation System Headed for Duty on Space Station

May 12 2008

International Space Station crews soon will have a new water reclamation system that will recycle wastewater, allowing up to six crew members to live aboard the orbiting laboratory.

The latest addition to the station's life support system departs today from NASA's Marshall Space Flight Center in Huntsville, Ala., to NASA's Kennedy Space Center, Fla., for final flight preparations.

The new Water Recovery System, or WRS, is the second part of a comprehensive life support system for the station. It is scheduled to fly aboard space shuttle Endeavour on STS-126 targeted for later this year. The first part of the system, the Oxygen Generation System, was launched on shuttle Discovery in July 2006. The two systems are part of NASA's Regenerative Environmental Control and Life Support System, or ECLSS, for the station.

"Recycling will be an essential part of daily life for future astronauts, whether on board the space station or living on the moon," said Mike Suffredini, the station program manager. "Delivering this hardware is an important step in achieving the station's full potential, allowing for additional crew members and more scientific research."

By recycling, the system reduces the dependence on Earth resupply by cutting the amount of water and consumables needed to be launched by about 15,000 pounds, or 6,800 kilograms, a year.

"As early as the late 1960's we knew sustaining life in space would require recycling water and oxygen," said Bob Bagdigian, ECLSS project manager. "A number of us have experienced the entire lifecycle of this technology, all the way from early ideas to implementation. Knowing that we will soon see this system completed, gives us great pride."

Through a series of chemical treatment processes and filters, the Water Recovery System creates water clean enough to drink. In fact, part of the same process has been used in Third World countries to produce drinkable water.

A distillation process is used to recover water from urine. The process occurs within a rotating distillation assembly that compensates for the absence of gravity, aiding in the separation of liquids and gases in space. Once distilled, the water from the urine processor is combined with other wastewaters and delivered to the water processor for treatment.

The water processor removes free gas and solid materials such as hair and lint, before the water goes through a series of filtration beds for further purification. Any remaining organic contaminants and microorganisms are removed by a high-temperature catalytic reaction. These rigorous treatment processes create water that meets stringent purity standards for human consumption.

Engineers at Marshall and at Hamilton Sundstrand Space Systems International Inc., Windsor Locks, Conn., led the design and development of the Water Recovery System.

Source: NASA