

NASA Mission Summary

National Aeronautics and
Space Administration
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STS-119 MISSION SUMMARY

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SPACE SHUTTLE DISCOVERY (STS-119)

Discovery's STS-119 flight will deliver the International Space Station's fourth and final set of solar array wings, completing the station's truss, or backbone. The arrays will provide the electricity to fully power science experiments and support the station's expanded crew of six in May. The 14-day mission will feature four spacewalks to help install the S6 truss segment to the starboard, or right, side of the station and the deployment of its solar arrays. The flight also will replace a failed unit for a system that converts urine to potable water. The shuttle also will deliver the first Japan Aerospace Exploration Agency's resident station crew member and bring back a U.S. astronaut after more than three months aboard the orbiting laboratory.

CREW

	<p>Lee Archambault (ARSH-um-boe) Commander (Colonel, U.S. Air Force)</p> <ul style="list-style-type: none"> • Veteran of one spaceflight, pilot on STS-117 • Age: 48, Hometown: Bellwood, Ill. • Married with three children • Logged 4,250+ hours in 30+ different aircraft • Enjoys bicycling, weightlifting and ice hockey 		<p>Tony Antonelli (an-tuh-NEL-lee) Pilot (Commander, U.S. Navy)</p> <ul style="list-style-type: none"> • First spaceflight • Age: 41, Born: Detroit • Married with two children • Logged 3,200+ hours in 41 different aircraft • Interests include snow boarding and NASCAR
	<p>Joseph Acaba (ah-CAH-bah) Mission Specialist-1</p> <ul style="list-style-type: none"> • First spaceflight • Former middle and high school science teacher • Age: 41, Hometown: Anaheim, Calif. • Served two years in U.S. Peace Corps • Enjoys camping, kayaking and scuba diving 		<p>Steve Swanson Mission Specialist-2</p> <ul style="list-style-type: none"> • Veteran of one spaceflight, STS-117 • Accumulated over 13 hours in two spacewalks • Age: 48, Hometown: Steamboat Springs, Colo. • Ph.D. computer science, Texas A&M, 1998 • Married with three children
	<p>Richard Arnold Mission Specialist-3</p> <ul style="list-style-type: none"> • First spaceflight • Former middle and high school science teacher • Age: 45, Hometown: Bowie, Md. • Married with two daughters • Enjoys guitar, running, camping 		<p>John Phillips Mission Specialist-4</p> <ul style="list-style-type: none"> • Veteran of two flights and one spacewalk • Expedition 11 flight engineer • Age: 57, Hometown: Scottsdale, Ariz. • Ph.D. geophysics & space physics 1987, UCLA • Married with two children
	<p>Koichi Wakata (ko-EE-chee) (wah-KAH-tah) Mission Specialist-5/Expedition 18 Flight engineer</p> <ul style="list-style-type: none"> • Veteran of two spaceflights, STS-72 & STS-92 • Age: 45, Born: Saitama, Japan • Ph.D. aerospace engineering, Kyushu-U, 2004 • Married with son • Returns on STS-127, targeted June 2009 		<p>Sandra Magnus Expedition 18 Flight Engineer & Science Officer Mission Specialist-5</p> <ul style="list-style-type: none"> • Flew on STS-112 & 126 in November to station • Ph.D. material science & engineering, GIT 1996 • Age: 44, Born: Belleville, Ill. • Returns to Earth on STS-119
 <p>The STS-119 patch shape is of a solar array viewed at an angle. The station is in the center, below the gold astronaut symbol. The gold array highlights the mission's installation of the truss segment and deployment of its arrays. The Japanese Kibo module is marked by a red circle. The 17 white stars represent, in the crew's words, "the enormous sacrifice the crews of Apollo 1, Challenger, and Columbia have given to our space program." The U.S. flag flowing into the shuttle signifies the U.S.'s support for our space program.</p>			

SPACEWALKS Each will last approximately 6.5 hours.

- On flight day 5, from inside, Phillips and Wakata will use the station's robotic arm to put the S6 truss segment into position. Spacewalkers Swanson and Arnold will assist with the installation of the S6 and unstow the solar array blanket boxes on the array structure. The arrays will be deployed on flight day 8. The astronauts also will deploy a heat dissipating radiator on the S6 truss.
- On flight day 7, Swanson and Acaba will begin work to prepare a set of batteries for removal on the P6 truss. The batteries will be replaced on the STS-127 mission. They will deploy attachment fixtures on the P3 and S3 trusses and hook up new fluid connections between the P1 and P3 truss segments.
- On flight day 9, Arnold and Acaba will relocate equipment carts, remove and replace a circuit breaker, lubricate the hand of the station's robotic arm, and install thermal blankets on the Dextre robot. Dextre can be attached to the station's arm to handle smaller components typically requiring a spacewalker.
- On flight day 11, Swanson and Arnold will install a GPS antenna on the exterior of the Japanese logistics module and photograph the radiators on the truss, using both regular and infrared cameras. In September, ground controllers noticed damage to one panel of the starboard radiator, and the photos will help them determine how the damage is affecting it. The spacewalkers also will configure cables on an electrical panel on the Z1 truss, install a wireless helmet camera antenna on the S3 truss and continue the installation of payload attachment devices on the S3.

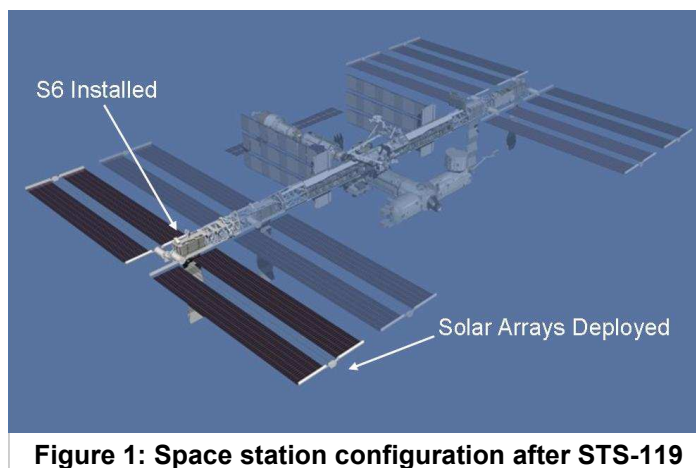


Figure 1: Space station configuration after STS-119

FACTS & FIGURES

- STS-119 is the 125th space shuttle flight, the 28th flight to the station, the 36th flight for Discovery and the first flight in 2009. Eight flights to station and one to NASA's Hubble Space Telescope remain before the shuttles retire in 2010.
- The flight features two of the three former school teachers selected as mission specialists in the 2004 Educator Astronaut Class. Teacher-turned-astronaut Dottie Metcalf-Lindenburger is targeted to launch in February 2010.
- The truss is a high-tech girder structure made up of 11 segments. It provides the backbone for the station, supporting the U.S. solar arrays, radiators and other equipment.
- To install the S6 truss segment, the station's robotic arm must extend its reach just about as far as it will go (about 57 feet), leaving it with very little room to maneuver.
 - The S6 truss segment weighs a little more than 31,000 pounds.
 - After S6 installation, the truss will be 335 feet long.
- Each solar array wing has two 115-foot-long arrays, for a total wing span of 240 feet, including the equipment that connects the two wings and allows them to twist as they track the sun.
 - Altogether, the station's arrays can generate as much as 120 kilowatts of usable electricity – enough to provide about forty-two 2,800-square-foot homes with power. The addition of the S6 will nearly double the amount of power for station science — from 15 kilowatts to 30 kilowatts.
- The Urine Processing Assembly that removes impurities from urine in an early stage of the recycling process is not working. The entire Water Recovery System was delivered and installed during the STS-126 mission in November. Astronauts were able to coax it into use by performing in-flight maintenance, but a distillation unit failed after Endeavour's departure. The replacement unit will fly in Discovery's middeck and be installed by Sandra Magnus while other crew members are working on the mission's second spacewalk.
- Discovery will fly one heat shield tile underneath its left wing that will have a bump raised 0.25 inches so that heating effects are monitored at about Mach 15 during reentry, when the smooth, laminar flow of air close to the shuttle's surface becomes turbulent or is disrupted. This information will support computer modeling and design efforts for the shuttle and NASA's next-generation spacecraft.