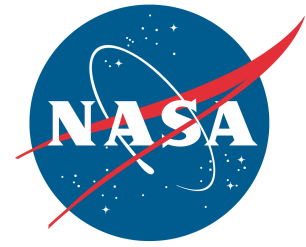


NASA Mission Summary

National Aeronautics and
Space Administration

Washington, D.C. 20546
(202) 358-1100



STS-127 MISSION SUMMARY

July 2009

SPACE SHUTTLE ENDEAVOUR (STS-127)

Endeavour's flight will deliver the final components of the Japan Aerospace Exploration Agency's (JAXA) Kibo laboratory to the International Space Station. The 16-day mission will include five spacewalks and the installation of two platforms outside of the Japanese module. One platform is permanent and will serve as a type of porch for experiments that require direct exposure to space. The other is an experiment storage pallet that will be detached and returned with the shuttle. During the mission, Kibo's robotic arm will exchange three experiments from the pallet to the platform. Future experiments also can be transferred to the platform from the inside using the laboratory's airlock. Endeavour also will deliver a new crew member and bring back another after more than three months aboard the station.

CREW

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|---|---|---|---|
|  | <p>Mark Polansky (puh-LAN-skee) Commander</p> <ul style="list-style-type: none"> • Veteran of two spaceflights, STS-98 & 116 • Age: 53, Hometown: Edison, N.J. • Married with two children • Writes on Twitter feed @Astro_127 |  | <p>Doug Hurley (HUR-lee) Pilot (Colonel, U.S. Marine Corps)</p> <ul style="list-style-type: none"> • First spaceflight • Age: 42, Hometown: Apalachin, N.Y. • Logged 3,200+ hours in 22 different aircraft • Enjoys hunting, cycling and NASCAR races |
|  | <p>Christopher Cassidy Mission Specialist-1 (Commander, U.S. Navy)</p> <ul style="list-style-type: none"> • First spaceflight • Age: 39, Hometown: York, Maine • Married with three children • U.S. Navy SEAL for 10 years |  | <p>Julie Payette (pie-YET) Mission Specialist-2 (Canadian Space Agency)</p> <ul style="list-style-type: none"> • Veteran of one spaceflight, STS-96 in 1999 • Age: 45, Hometown: Montreal, Quebec • Married with two children • Holds a commercial pilot's license, plays piano |
|  | <p>Tom Marshburn Mission Specialist-3</p> <ul style="list-style-type: none"> • First spaceflight • Age: 48, Hometown: Statesville, N.C. • Married with one daughter • Was emergency doctor, NASA flight surgeon |  | <p>Dave Wolf Mission Specialist-4</p> <ul style="list-style-type: none"> • Veteran of three flights and four spacewalks • Spent 128 days on Russian space station Mir • Age: 52, Hometown: Indianapolis • M.D. from Indiana University, 1982 |
|  | <p>Tim Kopra (CO-prah) Mission Specialist-5/Expedition 20 Flight Engineer</p> <ul style="list-style-type: none"> • First spaceflight (Colonel, U.S. Army) • Age: 45, Hometown: Austin, Texas • Married with two children • Returns to Earth on STS-128 |  | <p>Koichi Wakata (ko-EE-chee) (wah-KAH-tah) Expedition 18, 19 & 20/Mission Specialist-5</p> <ul style="list-style-type: none"> • Flew on STS-72, STS-92 & STS-119 to station • Age: 45, Born: Saitama, Japan • Ph.D. aerospace engineering, Kyushu-U, 2004 • Married with son. Returns to Earth on STS-127 |



Patch description from the crew: Bathed in sunlight, the blue Earth is represented without boundaries to remind us that we all share this world. In the center, the golden flight path of the space shuttle turns into the three distinctive rays of the astronaut symbol culminating in the star-like emblem characteristic of the Japan Aerospace Exploration Agency, yet soaring further into space as it paves the way for future voyages and discoveries for all humankind.

SPACEWALKS Each will last approximately 6.5 hours.

- On flight day 4: Wolf and Kopra will prepare connecting mechanisms for Kibo and the exposed facility, which the station's robotic arm will install later in the day. They also will release bolts on an ammonia tank assembly as get-ahead work for the next shuttle mission, STS-128. Then, both will work to deploy a cargo carrier on the port truss that was jammed and couldn't be done on STS-119. Finally, the spacewalkers will deploy an attachment system that will be used to hang spare parts on the station's truss, or backbone.
- On flight day 6: Wolf and Marshburn will transport spare parts from a cargo carrier to a stowage platform on the station's truss. These parts include: an antenna, a pump module and a rail mechanism that allows a transporter to move up and down the truss. They also will relocate a grapple bar as a get-ahead for the STS-129 mission, targeted for November. Lastly, they will install a camera that will provide video of experiments on the forward end of the exposed facility.
- On flight day 8: Wolf and Cassidy will prepare the exposed facility for experiment transfers and replace four out of the six batteries on the port side truss where they are housed to provide power for the truss.
- On flight day 10: Cassidy and Marshburn will replace the final two batteries on the port truss. Also, they will install a second camera that will provide video of experiments on the aft end of the exposed facility.
- On flight day 13: Cassidy and Marshburn will remove covers from the Dextre robotic arm, reconfigure cables on a panel for some circuit breakers and deploy two additional payload attachment systems. Finally, they will replace an aging camera system on the starboard truss.

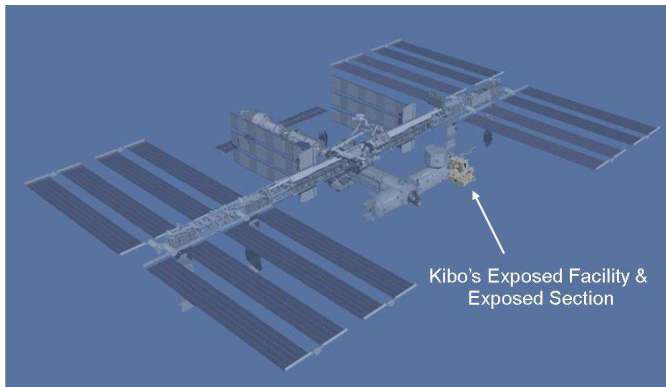


Figure 1: Space station configuration after STS-127

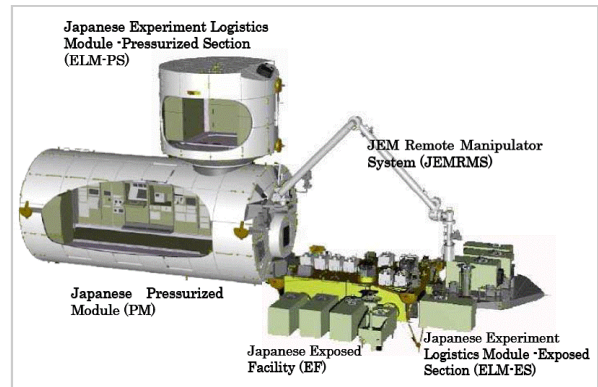


Figure 2: Kibo and its components

FACTS & FIGURES

- STS-127 is the 127th space shuttle flight, the 29th to the station, the 23rd for Endeavour and the third in 2009. Seven flights to the station remain before the shuttles retire in 2010.
- Based on where he's sitting on the shuttle, when Cassidy launches into orbit, he will become the 500th person in history to fly into space.
- Kopra will replace Wakata on the first six-person crew aboard the space station.
- The Kibo laboratory—which means “hope” in Japanese—is the country's major contribution to the station.
- Kibo is equipped with its own airlock and robotic arm for external experiments.
 - Kibo experiments and systems are operated from the Japan Aerospace Exploration Agency's control center called the Tsukuba Space Center, just north of Tokyo.
 - The Exposed Facility is a platform that can hold up to 10 experiment payloads at a time and measures 18.4 feet wide, 16.4 feet high and 13.1 feet long.
 - The Exposed Section is a pallet that can hold three experiment payloads. It measures 16.1 feet wide, 7.2 feet high and 13.8 feet long.
- On flight day 7, the shuttle's robotic arm will unberth the exposed section from the shuttle's payload bay, hand it off to the station's arm, and then install it on the side of the exposed facility.
 - On flight day 9, Kibo's robotic arm will pluck three payloads from the exposed section and transfer them to the exposed facility. The experiments are: Monitor of All-sky X-ray Image (MAXI), monitors astronomical X-ray objects; Space Environment Data Acquisition Equipment - Attached Payload (SEDA-AP), measures space environment data at the Exposed Facility; and Inter-Orbit Communication System (ICS), provides communications between Kibo and Tsukuba.
 - On flight day 12, the station's robotic arm will hand off the exposed section to the shuttle's arm for return in Endeavour's payload bay.