

NASA Mission Summary

National Aeronautics and
Space Administration
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STS-131 MISSION SUMMARY

April 2010

SPACE SHUTTLE DISCOVERY

Discovery's flight will deliver supplies and equipment to the International Space Station. Inside the shuttle's cargo bay is the *Leonardo* Multi-Purpose Logistics Module (MPLM), a pressurized "moving van" that will be temporarily installed to the station. The module will deliver supplies, a new crew sleeping quarters and science racks that will be transferred to the station's laboratories. The 13-day mission will include three spacewalks to switch out a gyroscope on the station's truss, or backbone, install a spare ammonia storage tank and return a used one, and retrieve a Japanese experiment from the station's exterior.

CREW

	<p>Alan Poindexter Commander (Captain, U.S Navy) <ul style="list-style-type: none"> • Second spaceflight (pilot on STS-122) • Age: 48; Hometown: Rockville, Md. • Married with two children • Enjoys water skiing, motorcycling and fishing • Call Sign: Dex </p>		<p>Jim Dutton Pilot (Colonel, U.S. Air Force) <ul style="list-style-type: none"> • First spaceflight (2004 astronaut class) • Age: 41; Hometown: Eugene, Ore. • Married with four sons • Test pilot, 3,300+ hours in 30+ different aircraft • Call Sign: Mash </p>
	<p>Rick Mastracchio (Muh-strack-ee-oh) Mission Specialist-1 <ul style="list-style-type: none"> • Veteran of two spaceflights, STS-106, STS-118 • Age 50, Hometown: Waterbury, Conn. • Member, Institute of Electrical and Electronics Engineers • Enjoys furniture making and wood working </p>		<p>Dottie Metcalf-Lindenburger Mission Specialist-2 <ul style="list-style-type: none"> • First spaceflight (2004 astronaut class) • Age: 34, Hometown: Fort Collins, Colo.. • Married with one child • Completed 10+ marathons, Boston in 2004 • Former high school science teacher </p>
	<p>Stephanie Wilson Mission Specialist-3 <ul style="list-style-type: none"> • Veteran of two spaceflights, STS-121, STS-120 • Age: 43, Born: Boston, Mass. • Bachelor's degree from Harvard University, master's degree from University of Texas • Enjoys snow skiing, music, stamp collecting </p>		<p>Naoko Yamazaki (NOW-ko Yah-mah-ZAH'-kee) Mission Specialist-4 Japan Aerospace Exploration Agency astronaut <ul style="list-style-type: none"> • First spaceflight (selected by JAXA in 1999) • Age: 39; Born: Matsudo, Chiba Prefecture • Married with one child • Twitter feed: @Astro_Naoko </p>
	<p>Clay Anderson Mission Specialist-5 <ul style="list-style-type: none"> • Veteran of one spaceflight in 2007 • Age: 51, Hometown: Ashland, Neb. • Married with two children • Spent 152 days on station for Expedition 15/16 • Twitter feed: @Astro_Clay </p>		<p>Space Shuttle Discovery <ul style="list-style-type: none"> • STS-131 is the 33rd shuttle flight to the station • STS-131 is the 131st shuttle flight • STS-131 is Discovery's 38th flight • Carries ~27,000 pounds of cargo on STS-131 • STS-131 is the second flight in 2010 • After STS-131, Discovery's last flight is STS-133 </p>



The crew patch highlights the shuttle in the Rendezvous Pitch Maneuver, where station astronauts take photos that are analyzed back on Earth to clear the heat shield for re-entry. It illustrates the teamwork and safety process behind each shuttle launch. In the cargo bay is the MPLM. Out of view and directly behind the MPLM, is the Ammonia Tank Assembly. The shuttle orbit is illustrated by the three gold bars of the astronaut symbol, and its elliptical wreath contains the orbit of the station. The star atop the symbol is the dawning sun, which is spreading its early light across the Earth. The background star field contains seven stars, one for each crew member.

SPACEWALKS Each will last approximately 6.5 hours and will feature Anderson and Mastracchio .

- On flight day 5, The crew inside will use the station's robotic arm to remove a new ammonia tank from shuttle's payload bay and temporarily stow it on the station. Ammonia is used to move excess heat from inside the station to the radiators located outside. The spacewalkers then will retrieve a seed experiment outside the Japanese laboratory. Next, the pair will install a grapple bar to the new ammonia tank on the station's truss. The pair also will replace a failed gyroscope that is part of the station's navigation system. Lastly, working on the truss, they will prepare six batteries for removal and replacement on the STS-132 mission in May.
- On flight day 7, using the station's arm, the astronauts will remove the empty ammonia tank from the station's truss and temporarily stow it on an equipment cart. The new tank then will be installed and connected to the truss for use. The station's arm then will temporarily stow the old tank on another part of the station's structure until the mission's third spacewalk. Anderson and Mastracchio also will retrieve debris shields from the Quest airlock to return to Earth.
- On flight day 9, using the station's arm, the crew will move the old tank into the shuttle's payload bay for return to Earth. The spacewalkers also will remove the grapple bar from the old ammonia tank and stow it on a spare parts platform. The pair then will work on the Dextre robot, installing a plate and camera light. Lastly, they will remove thermal covers on Dextre and replace a burned out light on a truss camera.



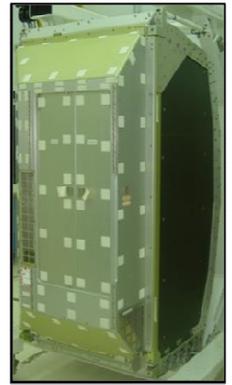
Shuttle carrying MPLM



The WORF flight rack



The MARES system



Sleeping Quarters

FACTS & FIGURES

- Three flights to the station remain after STS-131 before the shuttles retire in 2010.
- Metcalf-Lindenburger is one of the three former school teachers selected as mission specialists in the 2004 Educator Astronaut Class.
- The MPLM will carry about 17,000 pounds of cargo. Using the station's robotic arm, it will be installed to the station on flight day 4 and returned to the shuttle's cargo bay on flight day 11 for its return to Earth. Inside the MPLM:
 - The Muscle Atrophy Research and Exercise system rack, or MARES, will give crew members a way to assess the strength of their muscles while in space. MARES will help astronauts exercise seven different human joints, gauge the strength of the muscles around those joints and decide how the countermeasures designed to prevent muscle atrophy are working.
 - The Window Observational Research Facility, or WORF, will add cameras, multispectral and hyperspectral scanners, camcorders and sensors to enhance astronauts' ability to do work outside the Destiny laboratory. With those instruments, the crew will be able to study global climates, land and sea formations and crop weather damage like never before.
 - The EXPRESS Rack, a rack system that transports, stores and supports experiments. EXPRESS stands for EXpedite the PRocessing of Experiments to the Space Station. The EXPRESS Rack system supports science payloads in several disciplines, including biology, chemistry, physics, ecology and medicine.
 - Other racks include: zero-g stowage racks, which offer a place to stow tools and many other objects; re-supply stowage racks, which allow payloads to be transferred easily to the station from the MPLMs; and re-supply stowage platforms, which serve as an additional storage area.
 - The shuttle will carry the last of four crew sleeping quarters. It will be stowed in the Harmony module.
 - Discovery also will bring up a third Minus Eighty Laboratory Freezer for ISS – or MELFI.
 - MELFI will support a wide range of life science experiments by preserving biological samples (blood, saliva, urine, microbial or plant) collected on station for return and analysis on Earth.
- Also being delivered is equipment that will enable a new water production service onboard the station. The equipment will use the station's excess carbon dioxide and hydrogen to produce water and methane. The methane will be vented into space and the water will be treated then used. The device, known as "Sabatier," is expected to be fully operating in the fall.