National Aeronautics and Space Administration

Exploration Systems Development

NASA facts

NASA's Exploration Systems Development programs are working together to build the crew vehicle, evolvable rocket, and ground systems and operations that will enable the agency's bold new missions to extend human existence beyond the moon, to an asteroid, to Mars and across the solar system.

Orion: The Spacecraft

NASA's Orion spacecraft is designed to support human exploration missions to multiple destinations in deep space. Named after one of the most prominent constellations in the night sky and building upon more than 50 years of spaceflight research and development, Orion is designed to meet the evolving needs of our nation's deep space exploration program for decades to come. Its versatile design will allow it to safely carry and sustain a crew of two to four for 21 days and can evolve to support a six-person crew on extended-duration missions.

Orion's first flight test is scheduled to launch from Cape Canaveral Air Force Station in Florida in December 2014.

Space Launch System: The Rocket

NASA's Space Launch System is the first rocket and launch system capable of powering humans, habitats and support systems to deep space — creating new opportunities for human and scientific exploration.

The Space Launch System will carry the Orion spacecraft as well as cargo and other systems, equipment and scientific payloads to deep space. Its lift capabilities will evolve from 70 metric tons (77 tons) up to 130 metric tons (143 tons) based on future mission requirements. The Space Launch System will be the most powerful rocket in history; it is designed to meet a variety of crew and cargo needs and to support future asteroid, Mars and science missions.

The Space Launch System's first mission will launch the Orion spacecraft into deep space from a modernized Kennedy spaceport.

Ground Systems Development and Operations: The Multi-User Spaceport

NASA's Ground Systems Development and Operations is modernizing NASA's legendary launch site at the agency's Kennedy Space Center in Florida into a 21st-century spaceport with capabilities to launch spacecraft built and designed by both NASA and private industry. Removal and demolition of the shuttle-era platforms in the Vehicle Assembly Building is just one example of the necessary infrastructure design, development and refurbishment activities needed to support a variety of multi-use robotics and spacecraft. This collaborative approach develops common space launch standards across the industry.

NASA's next-generation launch site will be completed by 2017, when it will launch the first integrated flight of the Space Launch System and Orion from Kennedy.

What's Next? Orion's First Flight

Exploration Flight Test-1
NASA's Orion crew capsule will take its first steps to deep space in December 2014. The uncrewed Orion will launch atop a Delta IV Heavy rocket from Cape Canaveral Air Force Station — traveling to an altitude of 3,600 miles above Earth's surface, more than 15 times farther than the International Space Station. The two-orbit, four-hour uncrewed flight test will help engineers evaluate many of the systems critical to crew safety, including the heat shield, parachute system and launch abort system. Splashdown will occur off the coast of Baja California, where Orion will be recovered and returned to Kennedy for processing.

EFT-1 will serve as a pathfinder to validate innovative approaches to space systems development to reduce cost and demonstrate spacecraft post-landing recovery procedures.

Exploration Mission-1
The first fully integrated mission of NASA's Orion spacecraft and Space Launch System will launch from a modernized Kennedy spaceport. The 70-ton evolvable rocket will send an uncrewed Orion into lunar distant retrograde orbit, a large orbit around the moon that is farther into space than any human spaceflight system has ever ventured. It will splash down 25 days after launch off the coast of Baja California.

Exploration Mission-2
The first crewed mission will launch the Orion spacecraft along the same trajectory as that of Exploration Mission-1, bringing crew to space for up to two weeks.

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