NASAfacts

Orion Facilities
at Kennedy Space Center

The Orion crew module is lifted onto a specialized stand so technicians can begin processing the spacecraft into a flight-ready spacecraft.

The manufacturing, processing and operation of NASA's Orion spacecraft program, also known as the multi-purpose crew vehicle or MPCV, requires numerous facilities at NASA's Kennedy Space Center in Florida for preflight processing and postflight de-servicing following three decades of work supporting the space shuttle fleet.

The renovations of facilities, overseen by NASA's Ground Systems Development and Operations Program, or GSDO, have been completed in some facilities while others continue to undergo modifications. Once renovations are finished, Kennedy will be equipped to conduct the factory assembly of a spacecraft, hazardous servicing and launch operations, an end-to-end capability the center has not possessed before. Previously, such as during the Apollo Program, the spacecraft arrived at Kennedy fully assembled and the center's job was to put on the finishing touches and launch the mission.

An Orion assembled for a mission will consist of a crew module larger than the Apollo capsule that went to the moon, a service module carrying the consumables astronauts will need for missions into deep space and the Launch Abort System, or LAS, a small rocket capable of pulling the capsule and astronauts to safety in case of a launch emergency.

Once the spacecraft's major pieces are put together, they will be taken to the iconic Vehicle Assembly Building and placed atop the Saturn V-class Space Launch System, or SLS, rocket for launch.

Getting to that point will require work at several facilities at Kennedy:

Operations & Checkout Building High Bay

The Operations & Checkout Building, or O&C, has played a large role in NASA's spaceflight history. It was the first building finished at Kennedy and has housed Astronaut Crew Quarters since the mid-1960s when Gemini astronauts stayed there prior to launch. The high bay was used during Apollo to process and test the command, service and lunar modules before flight. It also processed Spacelab modules and hardware that flew on space shuttle missions and was used to process some of the truss structures used on the International Space Station.

The high bay underwent an extensive, two-year renovation starting in 2007 to outfit the facility for the final assembly of the Orion spacecraft. Space Florida, Lockheed Martin and NASA paid about $55 million for a full refurbishment that involved everything from replacing the entire facility support infrastructure, to new overhead cranes to support manufacturing and assembly work. General contractor Hensel Phelps performed the work.

With the renovations completed, unique tooling stations and fixtures were installed in the high bay before full-size test articles of the Orion spacecraft were brought in for pathfinding events and Exploration Flight Test-1 flight processing.

The first Orion that will go into space arrived in the high bay in June 2012 in the form of a primary structure pressure vessel. It will be fully assembled into a flight-ready spacecraft in time for an uncrewed flight

The High Bay of the Operations and Checkout Building began work on the first Orion slated to fly in space shortly after the welded crew module was delivered to NASA's Kennedy Space Center in Florida.

test aboard a Delta IV rocket in 2014.

As the Orion design is proven during several flight tests, the high bay is expected to operate like a high-tech factory floor, with spacecraft readied for new missions into deep space.

The Launch Abort System Facility is being outfitted and prepared for use by NASA's Orion Program to process the Launch Abort System.

Launch Abort System Facility (Formerly the Canister Rotation Facility, or CRF)

The Launch Abort System for Orion, or the LAS, is a 44-foot-tall, solid-fueled rocket that will be positioned atop the spacecraft during launch and ascent into orbit. The rocket will activate in the unlikely case that a launch emergency occurs and the astronauts' safety is threatened. In that case, the LAS, with more thrust than the Atlas booster that launched John Glenn into orbit in 1962, will ignite and lift the spacecraft and its crew away from the failing launch vehicle.

National Aeronautics and Space Administration

John F. Kennedy Space Center
Kennedy Space Center, FL 32899

www.nasa.gov

Because the LAS is taller than many processing facilities at Kennedy, it will be prepared horizontally inside the Launch Abort System Facility, or LASF, the facility that was used to lift and rotate the canister that carried space shuttle payloads to the launch pad.

The LASF has cranes and the other equipment needed to manage the LAS for launch processing. Once ready for flight, the LAS will be trucked to the Vehicle Assembly Building at Kennedy where it will be placed on top of the Orion spacecraft.

Working inside these facilities at Kennedy, technicians will process Orion spacecraft for ambitious missions far beyond Earth orbit. With the modules built up and assembled, the Orion module and its LAS will be taken to the Vehicle Assembly Building to be stacked atop the SLS rocket. The completed Orion/SLS will launch from Launch Complex 39 shortly afterward for voyages to asteroids, Mars and other destinations in the solar system.

A mock-up Orion spacecraft is wheeled into the Multi-Payload Processing Facility at NASA's Kennedy Space Center in Florida.

Multi-Payload Processing Facility

The Multi-Payload Processing Facility, or MPPF, at Kennedy will be used to fuel Orion spacecraft with hazardous propellants and other chemicals the spacecraft and astronauts will need to maneuver and carry out their missions in space.

The MPPF also will be used by technicians to de-service spacecraft after they've returned to Earth. The facility is equipped with specialized equipment to remove unused propellants from Orion tanks before technicians at other facilities break down the spacecraft for future flights.

More information online

For more information on the Ground Systems Development and Operations Program, go to **http://go.nasa.gov/groundsystems**