NASAfacts

Ground System Development and Operations Program

The Ground Systems Development and Operations Program (GSDO) is one of three NASA programs based at the agency's Kennedy Space Center in Florida. The program was established to develop and use the complex equipment required to safely handle rockets and spacecraft during assembly, transport and launch.

The program's mission is to prepare the center to process and launch the next generation of rockets and spacecraft in support of NASA's exploration objectives by developing the necessary ground systems, infrastructure and operational approaches.

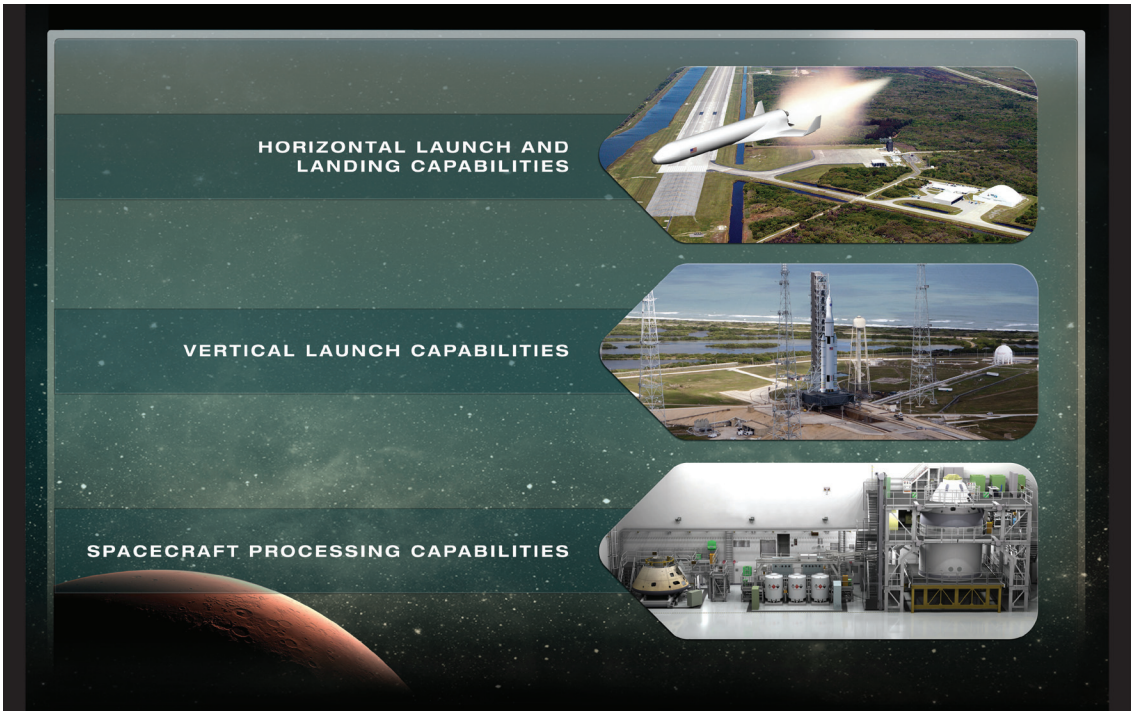
Unlike previous work focusing on a single kind of launch vehicle such as the Saturn V rocket or space shuttle, engineers and managers in GSDO are preparing infrastructure to support several different kinds of spacecraft and rockets that are in development. Products and systems devised at Kennedy could be used at other launch sites as well.

A key aspect of the program's approach to long-term sustainability and affordability is to make processing and launch infrastructure available to commercial and other government customers, thereby distributing the cost among multiple users and reducing the cost of access to space for NASA.

NASA is developing a heavy lift booster called the Space Launch System, or SLS, and is working with several private companies to produce rockets and spacecraft to take astronauts to low-Earth orbit and the International Space Station.

Announced in 2011, the SLS is set to be the most powerful U.S. rocket since the Saturn V took astronauts to the moon, and will act as the cornerstone for NASA's future human space exploration.

Working closely with those developmental projects, GSDO is overseeing efforts to use a catalog of spaceflight facilities at Kennedy. Some of the facilities already are being refurbished and modified for future use, most noticeably Launch Pad 39B. The launch pad hosted space shuttle launches throughout



that program's 30 years, but its shuttle-specific facilities have been removed to allow four or more different kinds of rockets to lift off from the pad.

Also in support of the SLS, the crawler-transporter, Vehicle Assembly Building, the Launch Control Center's Young-Crippen Firing Room 1 and the new mobile launcher are undergoing modifications for their new roles.

The Orion Multi-Purpose Crew Vehicle, which will carry the astronauts who will be launched into space on the SLS, will be processed in Kennedy's refurbished Operations and Checkout (O&C) building. The state of Florida previously provided $35 million for refurbishment of the O&C high bay, and the facility is fully operational and certified for its transition to Orion final assembly and checkout.

Three Teams

The Ground Systems Development and Operations Program specializes in three areas and works in teams on each specialty.

The Vehicle Integration and Launch team focuses on the equipment, management and operations required to safely connect a spacecraft with a rocket, move the launch vehicle to the launch pad and successfully send it into space. The work entails use of many of the facilities unique to Kennedy Space Center, such as the 52-story Vehicle Assembly Building, the dual launch pads 39A and B and the 3-mile-long runway at the Shuttle Landing Facility.

MORE INFORMATION ONLINE

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

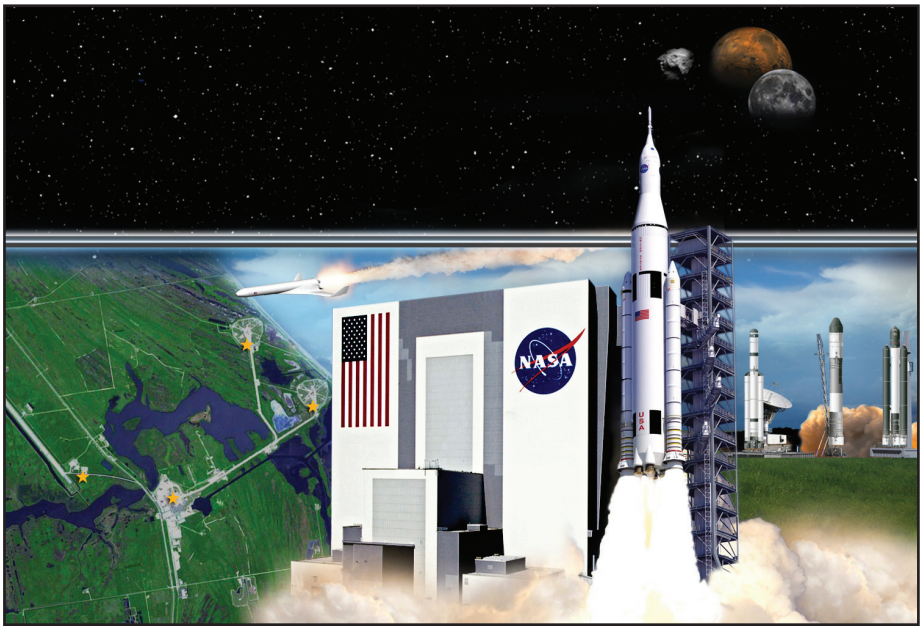
The group already is at work on the mobile launcher (ML), which recently was built and will be modified for the Space Launch System. The ML is a platform and tower designed to support the rocket and Orion and position connectors to the spacecraft, including a walkway astronauts will use to board Orion.

The crawler-transporters that carried the Saturn V rockets and space shuttle to the launch pad for more than 40 years also will carry the next generation of launch vehicles and spacecraft to the launch pads. One of the transporters is being strengthened to support the large SLS, as well.

The Offline Processing and Integration team will develop ways to handle the Orion spacecraft, rocket stages and launch abort system before they are all assembled into one vehicle. The work will take place in several facilities in Kennedy's industrial area, including the O&C Building, the Multi Payload Processing Facility, the Launch Abort System Processing Facility and others. The buildings were built specifically for the demanding processing work involved with preparing spacecraft for flight. Such preparations can include software loading, final assembly and the loading of chemicals and propellants, depending on the spacecraft.

Another team is modernizing the Command Control Communications and Range systems involved in launching astronauts into space. In addition to bringing computers, tracking systems and other networks up to date, the team is creating systems that can handle several different kinds of spacecraft and rockets. The computers, antennas and software are expected to reduce the need for a large launch team.

Kennedy has a 50-year history serving as our nation's gateway to exploring the universe. Taking the knowledge and assets of NASA's successful space past, the Ground Systems Development and Operations Program is determined to build a successful and diverse future in spaceflight.



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