



Launch Complex 39B

Significant upgrades and enhancements have been completed or are in progress at Launch Complex 39B at NASA's Kennedy Space Center in Florida. Exploration Ground Systems (EGS) is preparing the pad to support the launch of the agency's Space Launch System (SLS) rocket and Orion spacecraft for Artemis missions to the Moon and deep space destinations including Mars.

Pad subsystems used for the Apollo and Space Shuttle programs were replaced or upgraded to support the SLS and 21st century multi-user spaceport.

The flame trench walls beneath the surface of the pad on the north side were upgraded with new, fire-resistant bricks. A new flame deflector has been installed. The energy of the rocket's flame at liftoff will be diverted to the north side of the flame trench. The south side of the flame trench was repaired and will remain a concrete surface. The north side of the flame trench is about 571 feet long, 58 feet wide and 42 feet high.

Three, 600-foot-tall masts with overhead wires used to transmit electrical energy were installed around the perimeter of the pad to provide lightning protection for launch vehicles as they are processed and launched from the pad. The tower that holds about 400,000 gallons of water to provide sound suppression during launch was sandblasted and repainted so it can continue to withstand the corrosive salt air from the nearby Atlantic Ocean.

Groundbreaking for a new liquid hydrogen (LH2) storage tank took place at the pad in December 2018. Buildup of the new tank is in progress. The new tank replaces the previous shuttle-era tank. The largest tank ever built for NASA will hold about 1.25 million gallons of usable LH2 to accommodate requirements for the SLS rocket to send Artemis missions to the Moon and on to Mars.

Refurbishment at the pad included installation of new bypass lines and valves, removal of the heritage liq-



An aerial view of Launch Complex 39B at NASA's Kennedy Space Center in Florida. In view on the pad is the mobile launcher that will be used to launch the agency's Space Launch System with Orion spacecraft atop on Artemis missions. Photo credit: NASA/Kim Shiflett

liquid oxygen (LO2) vaporizer, and removal and replacement of fire suppression piping around the entire pad complex. The catacomb roof above the pad was reinforced, a liquid hydrogen (LH2) separator vaporizer was installed, and the heritage Environmental Control System equipment was demolished and new equipment was installed.

The guiding principle behind the upgrades and modifications is to make the area a “clean pad,” which will allow a variety of companies to launch their rockets from the pad. The basics that every rocket needs remain in place, such as electrical power, a water system, flame trench and safe launch area. The other needs of individual rockets, including access for workers, can be met with the towers or other structures that deliver the rocket to the pad.

For SLS, engineers and technicians are planning to do almost all of their preparations inside the Vehicle Assembly Building (VAB) before the launcher goes to the pad. This reduces the amount of required time needed to be on the pad to 10 days or less ahead of liftoff.

Major History Facts

Apollo 10 was the first mission to begin at Launch Pad 39B when it lifted off May 18, 1969, to rehearse the first Moon landing. Three crews of astronauts launched to the Skylab space station in 1973 from Pad B. Three Apollo astronauts who flew the historic Apollo-Soyuz mission to link up in space also launched from Pad B.



Build-up of a new liquid hydrogen (LH2) storage tank is in progress at Launch Complex 39B. The new tank will hold 1.25 million gallons of usable LH2 to support future launches, including Artemis missions to the Moon and on to Mars. Photo credit: NASA/Cory Huston

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Construction is complete on the main flame deflector in the flame trench at Launch Complex 39B at NASA's Kennedy Space Center in Florida. Photo credit: NASA/Kim Shiflett

Fun Facts

- During refurbishment projects, 1.3 million feet of copper cables were removed and replaced with 300,000 feet of fiber cable.
- The water tower for the Ignition Overpressure and Sound Suppression System (IOP/SS) holds roughly 400,000 gallons of water, or enough to fill 27 average pools. This water is dumped on the mobile launcher and inside the flame trench in less than 30 seconds. The IOP/SS peak flow rate is 1.1 million gallons per minute, high enough to empty roughly two Olympic-size swimming pools in one minute.
- The three lightning towers are about 600 feet tall – taller than the Vehicle Assembly Building, which is 525 feet tall.
- The catacomb roof was reinforced to be able to support 25.5 million pounds - the equivalent of 2,125 average-size African elephants.
- The refurbished flame trench and new flame deflector will withstand temperatures of between 3,000 and 5,600 degrees Fahrenheit during launch.
- More than 96,000 bricks were installed on the walls of the flame trench during the refurbishment project.
- The flame trench is 450 feet long; that's equal to the length of about 1.5 football fields.
- The flame deflector is made up of about 150 steel plates, each weighing up to 4,000 pounds.
- Liquid oxygen and liquid hydrogen tanks store super-cooled liquid gases (that are used for propellant) at minus 297 and minus 423 degrees Fahrenheit, respectively.