



## Mobile Launcher



NASA's mobile launcher (ML) atop crawler-transporter 2 moves along the crawlerway and nears the turn to Launch Pad 39B on Sept. 10, 2019 at NASA's Kennedy Space Center in Florida. NASA's Exploration Ground Systems moved the mobile launcher to the launch pad, where teams will complete testing and checkout on the launcher for the Artemis I mission. Photo credit: NASA/Ben Smegelsky

The mobile launcher (ML) is the ground platform structure that will launch NASA's Space Launch System (SLS) rocket and Orion spacecraft on Artemis missions to the Moon and on to Mars. The ML is designed to support the assembly, testing, checkout and servicing of the rocket, as well as transfer it and Orion to the launch pad. It serves as the structural platform from which both SLS and Orion will be put through a series of prelaunch tests before actual launch.

The 370-foot-tall, 11 million-pound steel structure was modified by NASA's Exploration Ground Systems (EGS). The flame bucket on the base of the ML was widened from 22 x 22 to 34 x 64 feet to accommodate the SLS and boosters configuration when stacked on the structure.

J.P. Donovan Construction installed and integrated ground support equipment systems onto the mobile launcher, modifying the structure with the systems necessary to assemble, process and launch NASA's integrated SLS rocket and Orion spacecraft. The scope of work included installing more than 800 mechanical, electrical and fluid panels, 300,000-plus feet of cabling, and miles of tubing and piping that will support the SLS rocket.

The base of the ML contains two tail service mast umbilicals used to provide liquid hydrogen and liquid oxygen to the SLS. Eight vehicle support posts (four per booster) are attached to the base. The tower contains several umbilicals that will connect to the SLS rocket in various locations, including the boosters, Core Stage and the Interim Cryogenic Propulsion

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Stage Umbilical (2nd stage). The Orion Service Module Umbilical will connect to the Orion service module. These umbilicals will provide power, data, cryogenics, environmental control, pneumatics and stability to the SLS rocket and Orion spacecraft. The Crew Access Arm will provide access for entry into and exit from the crew module.

In June 2019, NASA awarded a contract for the design and construction of Mobile Launcher 2 for EGS to Bechtel National Inc., of Reston, Virginia. This second mobile launcher will be used to assemble, process and launch the SLS Block 1B rocket and Orion spacecraft from Launch Pad 39B for missions under NASA's Moon to Mars exploration approach.

For more information about EGS and NASA's deep space destinations, including Artemis missions to the Moon and on to Mars, visit <http://www.nasa.gov/groundsystems>.

## By the Numbers

- Two-story base: 25 feet high, 158 feet long and 133 feet wide
- Sits 22 feet off the ground, "0" deck is 47 feet off the ground
- Height of six steel mounts: 22 feet (in VAB or on launch pad)
- Height above the ground of ML deck when positioned on six steel mounts: 47 feet (in VAB or on launch pad)
- Interface points on the aft skirt: eight to support the vehicle (4 per booster) on mobile launcher which are rise-off connections at liftoff, along with one Aft Skirt Electrical Umbilical and one Aft Skirt Purge Umbilical per booster
- Tower: 40 feet square, about 345 feet tall, 662 steps
- Tower floor levels: generally every 20 feet for personnel access to vehicle and ground support equipment
- Approximate weight: 10.5 million pounds (approximate weight when complete)

*Right: An aerial view of Launch Complex 39B at NASA's Kennedy Space Center in Florida, with Exploration Ground Systems' mobile launcher for the Artemis 1 mission on the pad. Photo credit: NASA/Frank Michaux*



*A wet flow test at Launch Pad 39B on September 13, 2019, tested the sound suppression system that will be used for launch of NASA's Space Launch System for the Artemis I mission. During the test, about 450,000 gallons of water poured onto the Pad B flame deflector, the mobile launcher flame hole and onto the launcher's blast deck. Photo credit: NASA/Kim Shiflett*



Find out more about **Exploration Ground Systems** and NASA's deep space exploration, including the Moon, Mars and beyond at <https://www.nasa.gov/exploration/systems/ground/index.html>

National Aeronautics and Space Administration

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

[www.nasa.gov](http://www.nasa.gov)

FS-2019-11-2787-KSC