

# Mobile Launcher



*Cranes and rigging are used to lift up and install the rail that will support the Core Stage Forward Skirt Umbilical (CSFSU) on the mobile launcher tower at NASA's Kennedy Space Center in Florida. The mobile launcher tower will be equipped with a number of lines, called umbilicals that will connect to the Space Launch System (SLS) rocket and Orion spacecraft for Exploration Mission-1 (EM-1). Exploration Ground Systems is overseeing installation of the umbilicals. Photo credit: NASA/Leif Heimbald*

The mobile launcher is the ground structure that will be used to assemble, process and launch NASA's Space Launch System (SLS) rocket and Orion spacecraft from Launch Pad 39B at the agency's Kennedy Space Center in Florida for missions to deep space destinations, such as the Moon, Mars and beyond.

During preparations for launch, the crawler-transporter will pick up and move the mobile launcher into High Bay 3 in the Vehicle Assembly Building. The launcher will be secured atop support posts and the crawler will move out. The Orion spacecraft will be stacked atop the SLS rocket and processed on the mobile launcher. The launcher is designed to support the assembly, testing, checkout and servicing of the rocket, as well as transfer it to the pad and serve as the structural platform from which it will launch.

The mobile launcher consists of a two-story base that is the platform for the rocket and a tower that will be equipped with a number of connection lines, called umbilicals, and launch accessories that will provide SLS and Orion with power, communications, coolant, fuel, and stabilization prior to launch. The tower also contains a walkway for personnel and equipment entering the crew module during launch preparations.

The launcher will roll out to the pad for launch on top of the crawler-transporter, carrying SLS and Orion. After the crawler-transporter makes its eight-hour trek to the pad just over four miles away, engineers will lower the launcher onto the pad and remove the crawler-transporter. During launch, each umbilical and launch accessory will release from its connection point, allowing the rocket and spacecraft to lift off safely from the launch pad.

## By the Numbers

- Total height above ground: 380 feet
- Two-story base: 25 feet high, 165 feet long and 135 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 mobile launcher deck when positioned on six steel mounts: 47 feet (in VAB or on launch pad)
- Attach points on the aft skirt: Eight to hold the vehicle (4 per booster) on mobile launcher platform during transfer to pad and disconnect at liftoff
- Tower: 40 feet square, about 355 feet tall
- Tower floor levels: every 20 feet for personnel access to vehicle and ground support equipment
- Approximate weight: 10.5 million pounds (approximate weight when complete)



A crane lifts the Orion Service Module Umbilical high up for installation on the mobile launcher tower at NASA's Kennedy Space Center in Florida on March 16, 2017. Exploration Ground Systems is overseeing upgrades to the mobile launcher to support the launch of NASA's Space Launch System rocket and Orion spacecraft. Photo credit: NASA/Leif Heimbald



Construction workers on the deck of the mobile launcher at NASA's Kennedy Space Center in Florida, prepare to install a vehicle support post May 22, 2017. A total of eight support posts were installed to support the load of the Space Launch System's (SLS) solid rocket boosters, with four posts for each of the boosters. Exploration Ground Systems is overseeing upgrades to the mobile launcher. Photo credit: NASA/Leif Heimbald

The mobile launcher structure is being modified by NASA'S Exploration Ground Systems (EGS) Program. Hensel Phelps constructed the structure and facility support systems during the first phase of development. The design and prototyping of the necessary ground support equipment subsystems was performed by Vencore, the Kennedy engineering services contractor. JP Donovan Construction Inc. performed the work to widen the opening on the base of the launcher from approximately 22x22 feet to 34x64 feet to accommodate the configuration of the SLS and its twin solid rocket boosters.

NASA selected J.P. Donovan Construction Inc. for the current phase of work under a firm, fixed-price contract, installing and integrating ground support equipment systems onto the mobile launcher, modifying the structure with the systems necessary to assemble, process and launch NASA's SLS rocket and Orion spacecraft. The scope of work includes 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. RS&H completed the structural design and is providing engineering support to the team and the construction of that design.

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>

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