



Vehicle Assembly Building



NASA's Vehicle Assembly Building (VAB) at Kennedy Space Center in Florida is one of the largest buildings in the world by volume. The VAB, which served as the final assembly point for space shuttles for 30 years, has been upgraded to support NASA's 21st century launch complex. Photo credit: NASA/Kim Shifflett

The Vehicle Assembly Building, or VAB, is a national landmark that remains a central element in NASA's plans to launch people and equipment deep into space on missions of exploration, including the agency's Artemis program. Built at NASA's Kennedy Space Center in Florida, the VAB will serve as the central hub of the premier multi-user spaceport, capable of processing several different kinds of rockets and spacecraft at the same time.

Whether the rockets and spacecraft are going into Earth orbit or being sent into deep space, the iconic facility will have the infrastructure to prepare them correctly for their missions. The VAB remains the only facility where assembly of a rocket occurred that carried humans beyond low-Earth orbit and on to the Moon. For 30 years, it also served as the final assembly point for space shuttles, where solid rocket boosters were stacked, external fuel tanks were mated to the boosters and shuttle orbiters were attached to the booster/tank prior to roll out to the launch pad.

The Exploration Ground Systems Program is leading an extensive refurbishment of the VAB to prepare it for the next chapter in human exploration. The modernization calls for a flexible setting rather than configuring the whole building toward supporting one design.

Old communications, power and vehicle access resources are being replaced with modern, efficient systems. Some of the utilities and systems slated for replacement have been used since the VAB opened in 1965. Apollo-era water, sewer and drainage piping is being replaced, and installation of a new fire protection system is nearly complete.

The enormous structure is made of concrete and steel, which has naturally aged over the years. Studies and field investigations were completed to identify corrosion to steel and ground support equipment, and identify and repair spalling in the concrete.

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A metamorphosis has occurred in one of the VAB's four high bays, High Bay 3. Several miles of Apollo/shuttle-era abandoned copper and lead-shielded cabling were removed to make room for installation of state-of-the-art command, communication and control systems that will be needed to perform vehicle testing and verification prior to rollout to the launch pad.

The shuttle-era work platforms also were removed. Ten levels of new work platforms, 20 platform halves altogether, were installed in the high bay. These platforms will surround NASA's Space Launch System (SLS) rocket and the Orion spacecraft and allow access during processing for missions, including the first uncrewed flight test of Orion atop the SLS rocket.

The VAB was constructed for the assembly of the Apollo/Saturn V moon rocket, the largest rocket made by humans at the time. The last structural beam was positioned in the VAB in 1965. The interior construction, including the construction of the extensible work platforms, was completed in 1966. The building is located 3.5 miles from Launch Pad 39A and 4.2 miles from Launch Pad 39B. A pair of crawler-transporters, some of the largest machines ever to move on land, were used to carry the completed rockets to the pad.

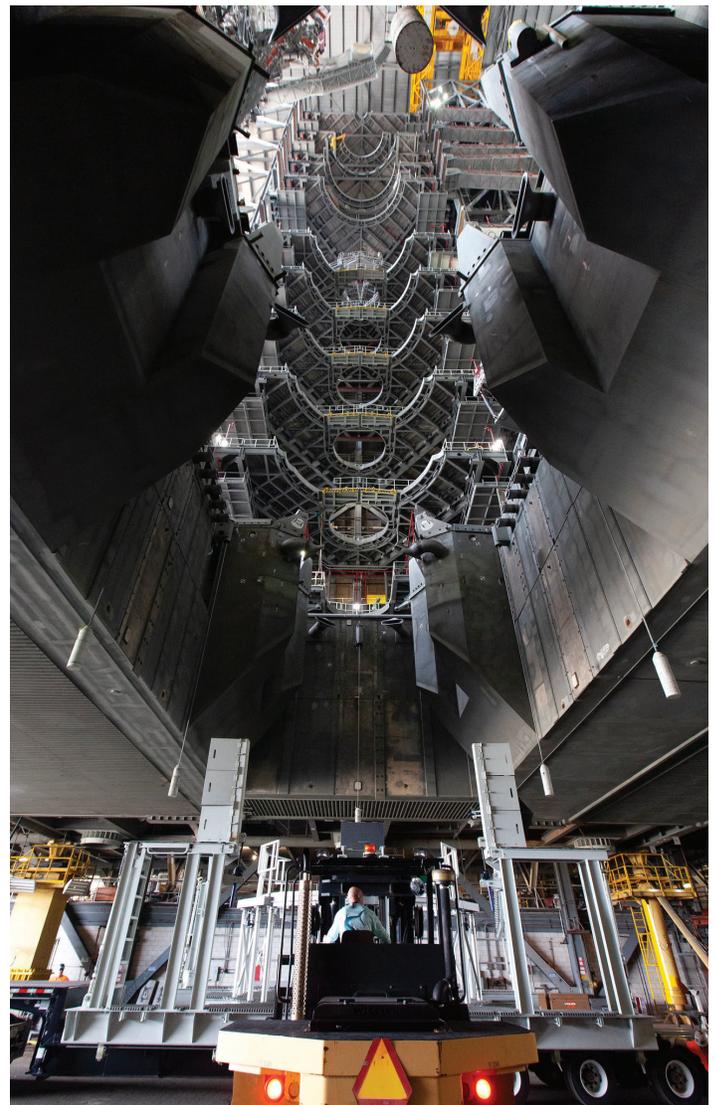
One of the largest buildings in the world by area, the VAB covers eight acres, is 525 feet tall and 518 feet wide. It is made up of 65,000 cubic yards of concrete and its frame is constructed from 98,590 tons of steel. It stands atop a support base of 4,225 steel pilings driven 164 feet into bedrock.

The building also is home to the largest American flag, a 209-foot-tall, 110-foot-wide star spangled banner painted on its south side. A 12,300-square-foot NASA logo also adorns the south side of the massive facility. The flag and logo were repainted as part of the refurbishment of the building.

The tallest portion of the VAB is called the high bay. There are four high bays, two on the east side, and two on the west side of the building. Each has a 456-foot-high door. The doors are the largest in the world and take about 45 minutes to open or close completely.

The lower structure, called the low bay, has large areas of its own that may be used to store rocket components until they are needed. A transfer aisle down the center of the VAB connects the bays, allowing massive components and equipment to be rolled into the building, lifted and assembled on a specialized platform that is carried to the launch pad.

There are five overhead cranes inside the VAB, including two that can hold 325 tons. These are critical to picking up the



The engine service platform that will provide access to the core stage of the Space Launch System (SLS) rocket is moved beneath the mobile launcher in High Bay 3 of the Vehicle Assembly Building at NASA's Kennedy Space Center in Florida on June 14, 2019. The large work platform is designed to provide unrestricted access to the RS-25 engines on the SLS core stage from the mobile launcher. The service platform will be used for Artemis I and subsequent missions. Photo credit: NASA/Ben Smegelsky

heaviest elements of rockets and placing them carefully into position before launch. Operated from cabs near the VAB's ceiling, the cranes are precise enough to lower an object onto an egg without cracking it.

Combining established capabilities with modern needs is the primary goal as the world's most famous landmark of space exploration is being upgraded to support NASA's 21st century launch complex.

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