



GSDO

GROUND SYSTEMS
DEVELOPMENT & OPERATIONS

EXPLORATION BEGINS HERE



PROGRAM HIGHLIGHTS • JULY 2013

At NASA's Kennedy Space Center in Florida, the Ground Systems Development and Operations (GSDO) Program Office is leading the center's transformation from a historically government-only launch complex to a spaceport bustling with activity involving government and commercial vehicles alike. GSDO is tasked with developing and using the complex equipment required to safely handle a variety of rockets and spacecraft during assembly, transport and launch. For more information about GSDO accomplishments happening around the center, visit <http://go.nasa.gov/groundsystems>.

A Note From Our Leader

As we continue to prepare Kennedy Space Center for its unique role in future space exploration, I would like to thank the GSDO workforce for its diligence and continued support of NASA's vision for a 21st century space launch complex.

The center is making great progress in preparing critical facilities for the Space Launch System (SLS) and Orion crew module and a variety of other launch vehicles.

In the Vehicle Assembly Building, High Bay 3 is being prepared for new reconfigurable work platforms that will support SLS processing. The crawler-transporter and mobile launcher are being upgraded and modified so they are ready to carry the weight of the SLS and Orion crew module to the pad. At Launch Pad 39B, construction crews are upgrading the crawlerway surface, the crawler track panels and the supporting roof structure. The shuttle-era flame trench and Apollo-era bricks are being removed to make way for a new flame trench system.

Inside the Operations and Checkout Building high bay and other facilities, the Orion crew module is being processed and tested to confirm that the spacecraft is ready for Exploration Flight Test-1 in 2014.



Mike Bolger
GSDO Acting Program Manager

We also are busy developing a new launch control system in the Launch Control Center and upgrading our communications systems across Kenedy.

It is an exciting time to be here at the space center as we design, build and test the launch systems and infrastructure of our future. It will take us all pulling together to accomplish our goals, but I know that we are up to the job and I'm proud to be a part of the team!



The quick disconnect for a modified instrument unit and liquid hydrogen tilt-up umbilical was tested at the Launch Equipment Test Facility by GSDO engineers at Kennedy Space Center on July 11. The umbilical will be partially reutilized for the Orion Service Module Unit. Photo credit: NASA

Vehicle Assembly Building Prepared for Another 50 Years of Service

Construction of the Vehicle Assembly Building (VAB) at NASA's Kennedy Space Center began a half-century ago this summer. After serving through the Apollo and Space Shuttle Programs, the mammoth structure is now undergoing renovations to accommodate future launch vehicles and to continue as a major part of America's efforts to explore space for another 50 years.



An aerial view taken on Nov. 9, 1964, shows the Vehicle Assembly Building under construction. Photo credit: NASA

Construction began with driving the first steel pilings on Aug. 2, 1963. It was part of NASA's massive efforts to send astronauts to the moon for the Apollo Program. Altogether, 4,225 pilings were driven down 164 feet to bedrock with a foundation consisting of 30,000 cubic yards of concrete. Construction of the VAB required 98,590 tons of steel.

When completed in 1965, the VAB was one of the largest buildings in the world with more than 129 million cubic feet of interior volume. The structure covers eight acres, is 525 feet tall, and 518 feet wide.



The Apollo 11 rocket towers over Kennedy Space Center's crawlerway during the May 20, 1969, rollout from the Vehicle Assembly Building to Launch Pad 39A. Photo credit: NASA

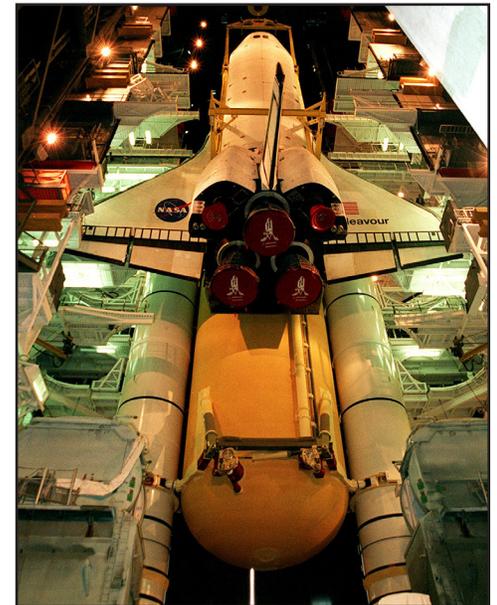
The VAB was constructed 3.5 miles from Launch Pad 39A and 4.2 miles from Launch Pad 39B. A pair of crawler-transporters, among the largest machines ever built to move on land, carried the assembled rockets to the pads.

After the conclusion of Apollo in the late 1970s, the building was refurbished to accommodate the space shuttle. Inside the VAB, the shuttle solid rocket boosters were stacked atop a mobile launcher platform.

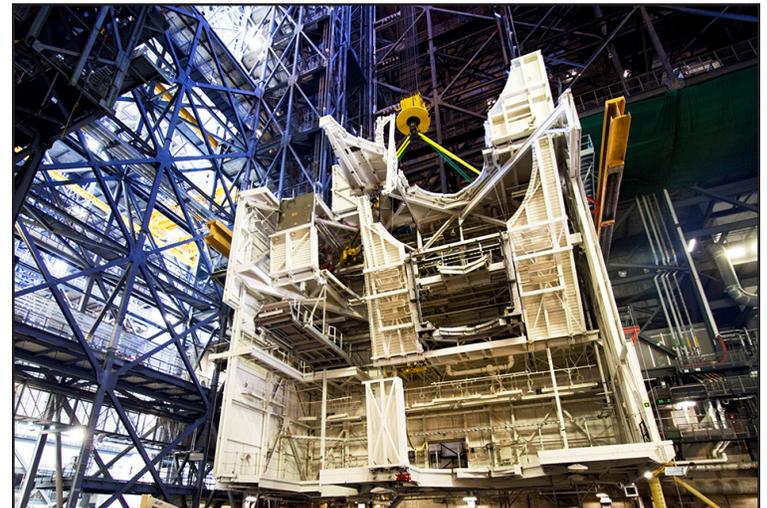
The external fuel tank was attached between the two boosters and the orbiter mounted to the tank.

Modifications of the VAB are underway to support the Space Launch System (SLS) and Orion spacecraft, which also will result in the ability to process multiple launch vehicle types. SLS will be the agency's advanced heavy-lift launch vehicle, providing a new capability for human exploration beyond Earth orbit.

Last year shuttle-era work platforms were removed from the VAB's High Bay 3 as a project of Ground Systems



Space shuttle Endeavour was mated with its external fuel tank and solid rocket boosters Dec. 3, 1999, in the VAB for the STS-99 mission. Photo credit: NASA



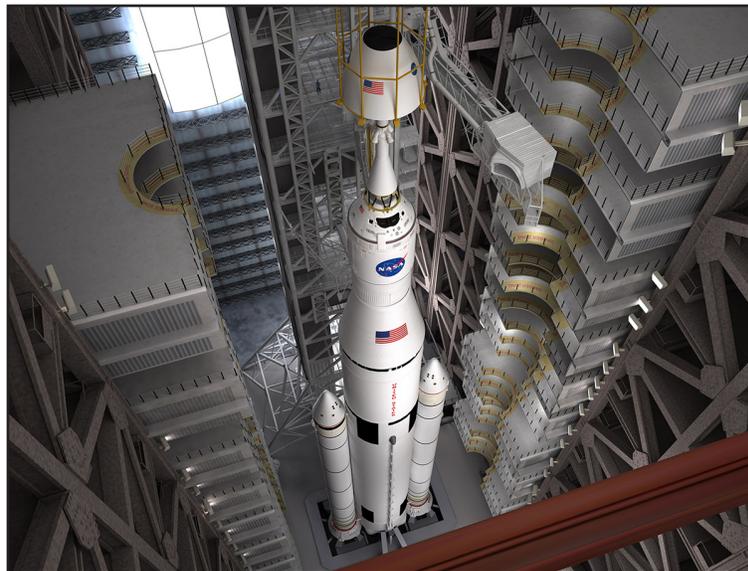
A large space shuttle-era work platform was removed from High Bay 3 of the Vehicle Assembly Building on Oct. 24, 2012. Photo credit: NASA

Development and Operations (GSDO), to accommodate the SLS heavy-lift rocket.

Plans for 2014 include awarding the construction contract for new access platforms, including structures and systems required for the SLS.

As plans move ahead to outfit the VAB with the new infrastructure, code upgrades and safety improvements, the building will continue in its role as a central hub for the Florida spaceport well into the future.

For the complete story, visit <http://go.nasa.gov/1bLVLOs>.



A conceptual look at the future of the Vehicle Assembly Building configured for processing NASA's Space Launch System.

Employee Spotlight - Herb Rice

Herb Rice, an aerospace engineer in the GSDO Program Office at Kennedy Space Center, recently celebrated 45 years at the space center. He currently serves as the GSDO representative on the inter-program committee that handles communication between program elements for the Space Launch System effort.

He began his career as an electrical design engineer for the Launch Complex 39 Environmental Control System in January 1968.

Among his favorite memories was the Apollo 11 mission and activities leading up to the historic first mission to land on the moon's surface.

"Neil Armstrong and two guards sometimes jogged in the parking lot behind my office in the Headquarters building," Rice said. "And when the crew took off we held our fingers crossed for about three days until the lunar landing, which occurred very early in the morning."

Rice recalls that almost everyone in the world listened to the audio in near-real-time just before the landing.

"And with the words 'The Eagle has landed,' Neil set off the largest and wildest Brevard County-wide party that has ever

occurred in this area," Rice said.

During the Space Shuttle Program, Rice led a 100-person group that developed the initial Ground Operations Aerospace Language (GOAL) software that was used to process and launch the shuttles. He later served as the electrical/electronic branch chief of the Level IV group that processed SpaceLab payloads.

His favorite memory from that time was the very first shuttle launch. It was the first time the GOAL software was really going to do its job. It was a job that the software had never done before.

"By the time the shuttle reached an altitude of about 100 feet I knew it had worked. Happy day, happy day," Rice said.

If he hadn't worked at Kennedy, Rice would have liked to play professional football, specifically as a linebacker.

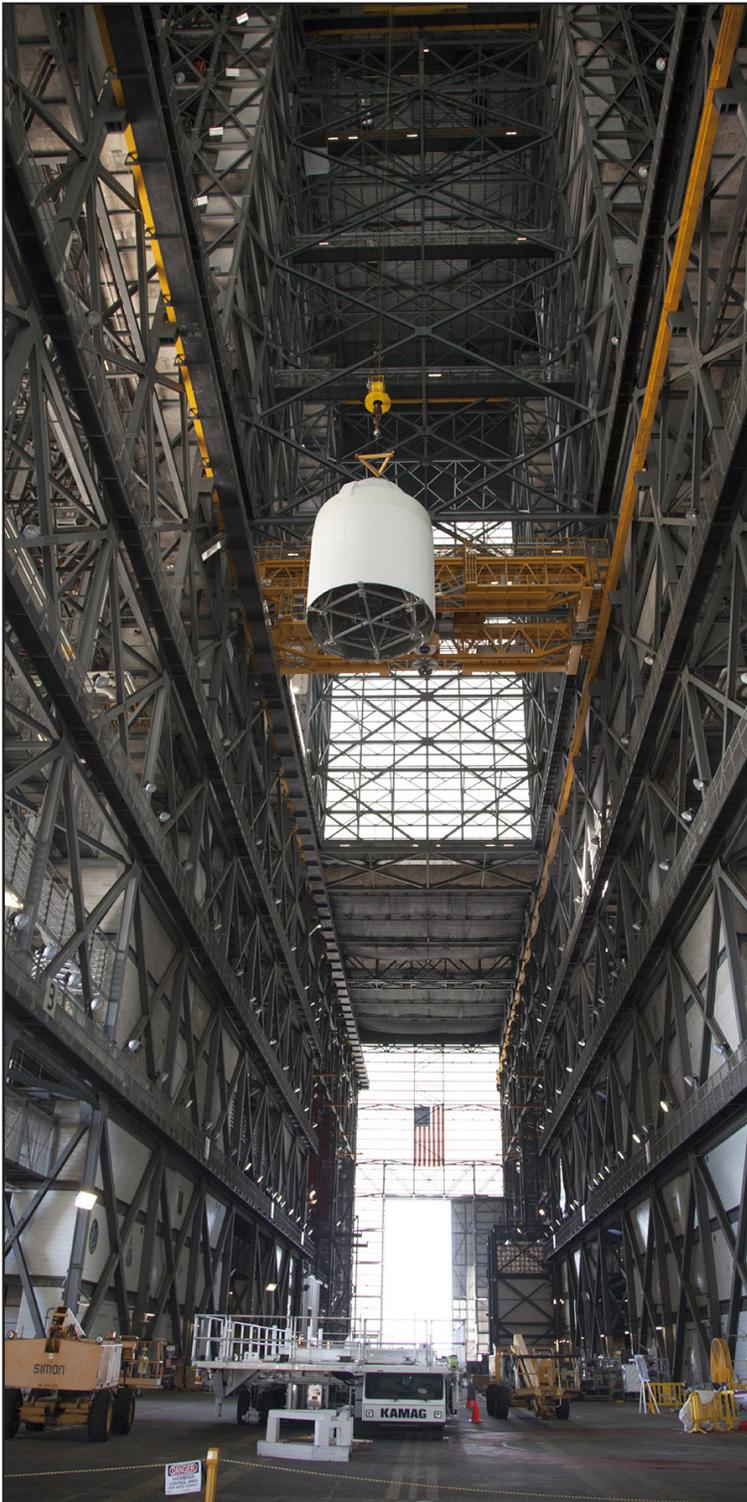
His family includes one daughter who is a teacher in West Florida, and one granddaughter who is a high school senior. His first car was a very old Dodge that cost him about \$300.

In his spare time, he plays basketball twice a week, goes rock-and-roll dancing every weekend, and is an avid photographer, adding about 20,000 high-resolution digital photographs to his collection each year.



Herb Rice, center, an aerospace engineer in the GSDO Program Office at Kennedy Space Center, recently was recognized for 45 years of service at the center. From left are GSDO Deputy Program Manager Jennifer Kunz, Rice, and Center Director Bob Cabana. Photo credit: NASA

Activities in the Vehicle Assembly Building Transfer Aisle



In the transfer aisle in the Vehicle Assembly Building, a crane operator lifts a full-size mock-up of the Orion spacecraft high in the air for transfer to High Bay 4 on July 12. Crane operators and technicians practice stacking and de-stacking operations in order to keep processing procedures and skills current for the Ground Systems Development and Operations Program. Photo credit: NASA

Orion Activities in the Operations and Checkout Building High Bay



A Lockheed Martin technician performs tube welding on the Orion crew module for Exploration Flight Test 1 inside a clean room processing cell in the Operations and Checkout Building high bay. Photo credit: NASA



Inside the Operations and Checkout Building high bay, the Orion service module spacecraft adapter cone for Exploration Flight Test 1 has arrived for checkout and processing. Tooling and test fixtures have been attached to the cone. Photo credit: NASA

To view a video of the Orion Fit Check, visit:
http://www.youtube.com/watch?v=_3rKiMdk7So