



# GSDO

GROUND SYSTEMS  
DEVELOPMENT & OPERATIONS

## EXPLORATION BEGINS HERE



### PROGRAM HIGHLIGHTS • OCTOBER 2015

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>.

## Ground Systems Program Begins Critical Design Review

The NASA program tasked with preparing Kennedy Space Center in Florida to process and launch the next generation of rockets and spacecraft kicked off its critical design review Oct. 6. This review is an important milestone for the Ground Systems Development and Operations Program (GSDO) as it will demonstrate that upgrades to necessary facilities and ground support equipment are on track for the first integrated mission with the agency's Space Launch System (SLS) rocket and Orion spacecraft.

"We've worked hard the past several years," said Mike Bolger, GSDO program manager, as he welcomed managers and engineers from across the agency to Kennedy Space Center. "Seeing the Space Launch System and Orion roll out from the Vehicle Assembly Building is going to be quite a sight, and I'm really looking forward to it."

NASA's three exploration systems development programs -- GSDO, SLS and Orion -- have been pursuing parallel development paths that keep each program progressing toward the first SLS and Orion mission. Orion will be the safest, most advanced spacecraft ever built. NASA's SLS will be the world's most power-

ful rocket and will launch astronauts on Orion to explore multiple, deep-space destinations. For its part, GSDO teams specialize in three areas: the first team works to connect a spacecraft with a rocket, move the launch vehicle to the launch pad and send it to space; the second team ensures all processing systems safely prepare a spacecraft for flight; and the third modernizes communications used to launch astronauts into space.

Specifically, the GSDO critical design review will look at the Vehicle Assembly Building, Launch Control Center, mobile launcher, crawler-transporter, Launch Pad 39B and the Multi Payload Processing Facility. Upgrades and designs currently in progress will be reviewed to ensure they will be ready to support all system and processing requirements for a launch of the SLS rocket and Orion spacecraft.

"When I look at what we've accomplished, and where we are, we are on track and I couldn't be more proud of this team," said Bob Cabana, Kennedy center director.

The design review will continue at Kennedy through December.



Kennedy Space Center Director Bob Cabana speaks during the kickoff meeting Oct. 6 of the critical design review for the Ground Systems Development and Operations Program at NASA's Kennedy Space Center in Florida. Photo credit: NASA/Daniel Casper

# Ground Systems Team Spotlight

Brett Raulerson, CMRP, is a project manager on the Test and Operations Support (TOSC) contract at NASA's Kennedy Space Center. He works for ERC and feels very fortunate to have a close relationship with the company's corporate office in Huntsville, Alabama, and the TOSC leadership at Kennedy.

Raulerson and co-workers support the Ground Systems Development and Operations Program (GSDO). They receive requirements to build new equipment or modify existing equipment and take the steps required to make it happen.

Recently, Raulerson's responsibilities also include mobile launcher operations planning and development.

"I spend a lot of time with the mobile launcher element team working on concepts of operations, design reviews and cost avoidances," Raulerson said.

He also has been supporting the development of the Ground Operations Planning Database for the last five years as the writer of sections pertaining to the mobile launcher.

During the Space Shuttle Program, he was manager of the mobile launcher platform group. He spent 34 years working on that hardware, first as a technician, and then as supervisor of the Mobile Launcher Platform 2 operations. He was then assigned the senior manager for all

three mobile launcher platforms.

"It was very difficult winding down the shuttle program and seeing long-time friends leave for other jobs. But, I think we did it with pride and professionalism, and I was so fortunate to be a part of such an awesome team."

Raulerson said the mobile launcher operations teams has done an exceptional job gathering input from the workers that will actually be doing the operations.

"We invite the engineers and technicians to weigh in on every decision that may change the way we do something to ensure that we're not missing something," Raulerson said. "There's a lot of experience and knowledge in our workforce and it would be a mistake not to tap into it."

One of his most memorable moments at Kennedy was when he was asked to ceremoniously turn over mobile launcher platform 1 from the Space Shuttle Program to the Ares 1-X test flight.

Raulerson grew up on the Space Coast watching the Apollo launches and unmanned rocket launches. He became a big enthusiast when he started working at Kennedy and saw firsthand the pride and commitment of the people working here.

He received a Bachelor of Science in public administration from Barry University in 2008.

Raulerson and his wife, Suzanne, have



been married for almost 29 years. They have four children and five grandchildren.

His interests include kayaking and biking. He's also done some hiking along the Appalachian Trail.

He would like to keep his first car in the past. Currently, he drives a Jeep Wrangler because it may best describe his personality.

"I really enjoy the outdoors and I keep the roof off as much as the weather allows," Raulerson said. "It's not real practical, but it is fun and I can get my kayak to places I otherwise couldn't."

## Design Visualization Operations Topic of KEA-127

Jerad Merbitz, the Small Class Vehicle Operations manager for GSDO, and David Zeiters, systems engineer and technical lead for the CAD Concept Modeling and Visualization Group with SGT Inc. on the Engineering Services Contract (ESC) gave a presentation on 3-D modeling and design visualization during the Kennedy Engineering Academy-127 on Oct. 20.

Merbitz and Zeiters described how during development of Launch Pad 39C, design visualization enabled the creation of multiple concepts of operation that have helped customers understand the capabilities Kennedy Space Center has to offer.

"As engineers, some of the greatest

things we do is create and innovate," Merbitz said. "From these ideas, we use 3-D CAD modeling and visualization to create concepts."

Merbitz described how 3-D modeling and design visualization is used as a tool for concept development. It provides a systems engineering approach to bring all the system's components together to check compatibility, design fit, interactions, interferences and operational flow validation.

To create a 3-D visualization image of Launch Pad 39C and ground support equipment, including a deployable launch system, mobile cranes and universal propellant servicing system, Zeiters described how the ESC Viz Works

team used information from CAD design models, existing engineering drawings, and even went in the field to take measurements in order to create the images and an animation of Launch Pad 39C.

"Illustrating the pad with the use of CAD-generated images and through design visualization will help potential customers understand various ground processing layouts and launch configurations," Merbitz said.

As the center continues to transform into a multi-user spaceport, Merbitz said Kennedy has a lot of facilities and infrastructure that could be made available to industry. One of the tools to showcase Kennedy's capabilities is through the use of 3-D design visualization.

# Industry Spotlight: Ivey's Construction

Ivey's Construction was founded in 1973 by Wade Ivey and is now owned by his son, Kevin Ivey. Ivey's is a small family business that has a long history of successfully performing difficult and challenging construction projects.

Historically, Ivey's performed construction work at NASA's Kennedy Space Center beginning in 1975 as NASA began to convert the center's facilities from the Apollo Program to the Space Shuttle Program. Over the years, the company has performed more than 1,000 new construction and construction renovation projects at Kennedy and Cape Canaveral Air Force Station.

"We had the great honor of transporting and installing space shuttle Atlantis in her new home at the Kennedy Space Center Visitor Complex," Ivey said. "It just seems natural for Ivey's to be involved in NASA's future exploration missions."

Today, Ivey's Construction offers a full range of services including general contracting, construction management, design build, and work as an American Institute of Steel Construction (AISC) advanced structural steel erector. The company has completed projects at the Savannah River Site in Aiken, South Carolina; Vandenberg Air Force Base in California; the Nevada Test Site; and the Pentagon in Virginia. Specialties include all phases of steel erection, heavy rigging, rebar, concrete, carpentry, metal framing and drywall.

For the Ground Systems Development and Operations Program (GSDO), Ivey's currently is performing work on the fire suppression systems in the Vehicle Assembly Building (VAB), the Launch Control

Center (LCC) and the VAB Utility Annex.

Ivey's also is performing work in other Kennedy facilities for GSDO, including Launch Complex 39B, the Launch Equipment Test Facility and the Operations and Checkout Building.

Ivey's work in the VAB includes demolition of the existing fire protection systems, and diesel and electric fire pumps in the VAB, LCC and Utility Annex. The company is replacing more than 20,000 linear feet of fire protection supply piping, installing new diesel- and electric-motor-driven fire pumps, controllers, auto-transfer switches, piping, power, and fire alarms.

A 1.4-million-gallon water storage tank also is being refurbished.

"The VAB is a very large and busy place," Ivey said. "We've come up with some outside-the-box approaches to overcome the daily challenges for access to our work. Partnering among trades and coordinated efforts among contractors, subcontractors and NASA operations is vital for success."

The company has had more than 50 people working on the fire suppression project alone, with many more when all of their aerospace projects are included.

"I think that NASA's exploration beyond low-Earth orbit is vitally important to the U.S. and the world," Ivey said. "We need to challenge ourselves to take that next step in space travel. We cannot sit still, we need to move forward if we want to reap the benefits and discoveries that await."

Ivey said his company looks forward to the many challenges to come.



Ivey's Construction is performing upgrades to the fire suppression system in the Vehicle Assembly Building at NASA's Kennedy Space Center. In the photo at left, new fire pumps, controllers and fire protection piping have been installed on level 20 of the 525-foot-tall building. In the photo at right, an Ivey's Construction worker field welds 12-inch fire protection piping across the entry to VAB High Bay 4. Photo credit: Ivey's Construction

# Employee Spotlight: Chad Brown

Chad Brown is the lead flight integration engineer for the Space Launch System (SLS) launch vehicle in the Ground Systems Development and Operations Program (GSDO) at NASA's Kennedy Space Center.

Working for GSDO, he acts as the liaison between GSDO and the SLS Program based at Marshall Space Flight Center in Huntsville, Alabama. As the lead flight integration engineer, he facilitates the development and refinement of requirements and executes program-to-program assessments. He also assists in conducting "what if" assessments for the agency as it works to map out the journey to Mars and other deep-space destinations.

"One of the coolest things that I get to do is to support multiple assessments on the evolution of the launch vehicle along with its future utilization for exploration missions," Brown said. "The SLS is a real game changer for space exploration beyond low-Earth orbit."

He currently is participating in the mission planning efforts for sending astronauts to an asteroid, traveling to cislunar space (beyond the moon), a spacecraft to Europa, and sending men and women to Mars.



Brown also represents the GSDO Program at public outreach events, where he talks about the great work that GSDO is doing, and helps to inspire future generations of explorers.

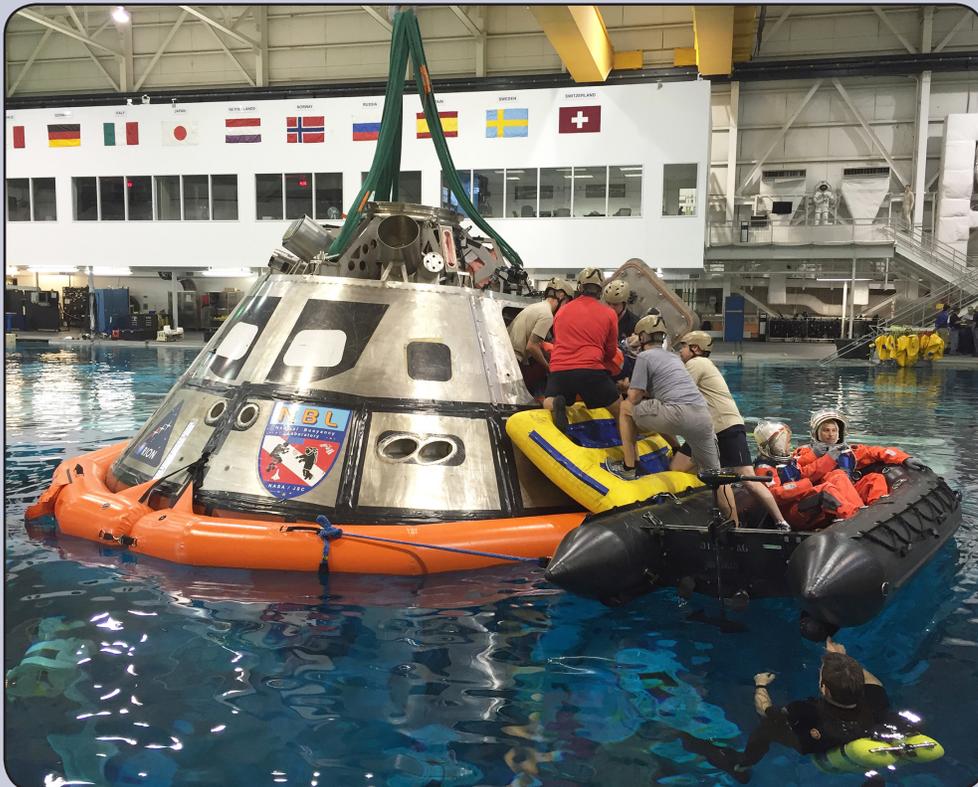
"I truly believe in the statement 'Exploration Begins Here,' where the 'here' is

what GSDO is building every day," Brown said.

Brown's hometown is Bailey, North Carolina. He has a Bachelor of Science in mechanical engineering. He began working at Kennedy in 2004 as a structural engineer for the Launch Services Program.

Brown's first car was a 1973 Chevrolet Rally Sport Camaro, gold with black racing stripes. His hobbies include photography and rockets.

He and his wife, Lisa, have been married for 16 years. They have two children, Lindsey, 6, and Connor, 8. They have a saltwater aquarium with tropical fish. Their daughter named one of the fish "Elsa."



Team members from NASA's Orion and the Ground Systems Development and Operations (GSDO) Programs practice egress training Oct. 6-8 using a mockup of the Orion crew module in the 6.2-million-gallon Neutral Buoyancy Laboratory at the agency's Johnson Space Center in Houston. During the three-day testing, personnel simulated approaching the spacecraft floating in the Pacific Ocean and what it would take to assist the crew as they exit. The team evaluated the layout of equipment inside the spacecraft, the gear that will be used during the recovery process, and the most efficient way for astronauts to get out of the spacecraft after weeks or months away from Earth. Orion is the spacecraft that will launch atop NASA's Space Launch System rocket on Exploration Mission-1 in 2018. Photo credit: NASA/Amber Philman