The crawler-transporter that will carry NASA’s Space Launch System (SLS) and Orion spacecraft to Launch Pad 39B for launch on Exploration Mission-1 in 2017 recently passed the first phase of an important milestone test at Kennedy Space Center in Florida.

The Ground Systems Development and Operations Program completed testing of the new traction roller bearings on crawler-transporter 2 (CT-2), on two of the massive vehicle’s truck sections, A and C, in late January.

During the test, CT-2 was driven unloaded on crawler-way C, between the Vehicle Assembly Building and Ordnance Road.

As the crawler moved along, the left- and right-hand steering was tested in both directions. Workers performed visual inspections of the roller bearing pumps, valves and lines to ensure that the grease injectors worked properly and provided the required flow of grease to the new roller assemblies.

“The temperature of the roller assemblies were monitored and recorded using newly-installed thermocouples,” said Mike Forte, a senior project manager with QinetiQ on the Engineering Services Contract. “We were looking for any anomalies and establishing a baseline operating temperature for the new roller assemblies.”

Forte said temperature data on the surface of the roller assemblies also was collected using handheld infrared temperature monitoring devices. “We also closely monitored the system for any unanticipated vibrations or noise, which are indications of problems,” Forte added.

The test was a collaborative effort that involved about 30 NASA and contractor engineers and technicians from Kennedy and Ames Research Center in Moffett Field, Calif.

Upgrades to CT-2 include 88 new traction roller bearing assemblies, a modified lubrication delivery system, and a new temperature monitoring system that includes 352 new thermocouples.

Forte said subsequent tests will be used to establish permanent operational warning and shutdown limits for a fully-loaded crawler-transporter.

CT-2 returned to the VAB on Jan. 31 to install new roller bearing assemblies on the B and D truck sections. Another test is scheduled for November, after installation of the second set of bearings has been completed.

Upgrades to CT-2 are necessary in order to increase the lifted-load capacity from 12 million to 18 million pounds to support the weight of the mobile launcher and future launch vehicles, including the SLS and Orion.
Day of Remembrance highlights importance of lessons learned

By Steven Siceloff
Spaceport News

Kennedy Space Center continues to make strides in exploration without forgetting the hard-learned lessons of the past, former astronaut Bob Cabana, director of NASA’s primary launch site, said during a ceremony marking Remembrance Day.

“I think it’s really important that we take time to remember those who paid the ultimate sacrifice in the quest to explore,” Cabana said. “We want to make sure that we learn from the mistakes we made in the past so we don’t make the same mistakes again as we move forward. We’ve gotten better and their sacrifice was not in vain because we’ve gone on and done better things and we’re going to continue that as we continue to explore.”

Cabana was joined at the Space Mirror Memorial by Janet Petro, Kennedy’s deputy director. The two walked a wreath beneath umbrellas to the base of the mirror at Kennedy Space Center’s Visitor Complex during a brief ceremony. The 42.5-foot-high, 50-foot-wide black granite memorial is engraved with the names of 20 people who were lost in the cause of space exploration, including the crews of Apollo 1, Challenger’s STS-51L and Columbia’s STS-107 missions.

Charles Bolden, NASA administrator and also a former astronaut, marked the day at Arlington National Cemetery in Virginia, the resting place of some of the lost astronauts.

Bolden said today’s missions show that the promise of exploration is being fulfilled thanks in part to the sacrifices made by the crews.

“Today, their legacy lives on as the International Space Station fulfills its promise to help us learn to live and work in space and move farther into the solar system,” Bolden said in a statement. “We honor them by making our dreams of a better tomorrow reality and by acting to improve life for all of humanity.”

Health, wellness activities in full gear

Care to take the President’s Active Lifestyle Challenge? Want to learn more about the seven dimensions to personal health and wellness? During the month of February, topics such as these will coincide with wellness activities and training across Kennedy.

KSC Health & Wellness Fair
Feb. 19 from 9 a.m. to 3 p.m.
OSB II 5th floor
Conference Rooms

Participating Organizations

- KSC Health Education and Wellness Program
- KSC Fitness Center
- KSC Employee Assistance Program
- KSC Ergonomics Program
- KSC RehabWorks
- KSC Massage Therapy Clinic
- KSC Weight Watchers Group
- KSC Sports Groups: Running, Scuba, Ski, Soccer, Bicycling and Tennis
- NASA Safety Reporting System (NSRS), NASA Safety Center (NSC) and Government Industry Data Exchange Program (GIDEP)
- Acupuncture, Healthy Healing Acupuncture
- American Heart Association
- Assistance Dogs for Independent Living, Canine Companions
- Bike Touring, Bike Florida
- Bicycle Rules (Safety and Routing), Florida Bicycle Association
- Diabetic Care Group, Health and Fitness, Orthopedic Group, and Sleep Apnea, Parrish Medical Center
- Go Native, Surfing, Fishing, and Swimming
- Appleseed Health Foods
- Holistic Approach to Mental Wellness, Holistic Mental Wellness
- Running Shoes, Apparel, Safety and Events, Running Zone
- Senior Care, A Place for Mom
- Water and Boating Safety, Titusville Sail and Power Squad
- Water Safety, Health First
- Boating Regulations and Public Small Watercraft, Coast Guard Auxiliary
- Continuing Education
- Eastern Florida State College
- Webster University
- Keiser University

Transportation
Bus transportation will be available from the main (northside) entrance of the SSPF, O&C and Headquarters at 30-minute intervals beginning at 9 a.m. with the last bus departing at 2 p.m.
Kennedy Space Center’s Special Rescue Operations firefighters practiced vehicle rescue operations using special tools, including the Jaws of Life, on Jan. 10 at an auto salvage yard near the center.

By Linda Herridge
Spaceport News

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nedy Space Center’s Protective Services Office considers the safety of each employee and visitor on the center a top priority every day. In order to ensure that safety, Kennedy’s Special Rescue Operations firefighters conduct training using the Jaws of Life and other advanced rescue tools at a facility nearby.

Recently, Kennedy’s firefighters achieved Pro Board Certification in aerial fire truck operations. Now, with the completion of the Jaws of Life training, the Protective Services Office is one step closer to achieving certification in vehicle machinery extrication.

“One of the missions of the Protective Services Office is to oversee fire rescue services,” said Tim Moore, Fire Rescue Emergency Management specialist in the protective services office. “Our main goal is life. Our second goal is mission. Our third goal is the property itself.”

“The type of training we completed was vehicle and machinery extrication,” said Dave Seymour, battalion chief. “We practiced extrication skills using a vehicle that had been damaged in an accident.”

During the training, firefighters wearing full gear used very simple tools, such as axes, to highly specialized tools to clear away windows. They also used a hydraulic cutting tool, capable of up to 50,000 pounds of force, to remove the roof of the vehicle. Then they practiced using the Jaws of Life on the vehicle in order to simulate the rescue of a trapped and injured person.

Seymour said that in response to a motor vehicle accident on the center, a fire engine would be dispatched with basic life-saving tools. If, after an assessment of the scene, it is determined that the rescue is more complicated, then a squad truck would be dispatched that carries more advanced rescue tools.

“The type of equipment that we have available to us on the squad truck can range from a very simple center punch for clearing windows, all the way up to the Jaws of Life, which is a hydraulic tool that has up to 100,000 pounds of spreading force,” Seymour said.

Michael Hayes, the assistant chief of Safety and coordinator for the Special Rescue Operations Team, said there are several types of rescue scenarios.

“The special rescue team is a diverse group of individuals that are trained at a higher level than the standard firefighters,” Hayes said. “We train to provide rope rescue, which would be an elevated rescue from the side of a building or tower; confined space rescue, which would be rescuing somebody from a manhole or vault; and vehicle extrication using the Jaws of Life.”

Hayes said for vehicle extrication, the firefighters have to complete a 40-hour operational class, which is compliant with the National Fire Protection Association. Then they will advance to the technician level 2, which is an additional 40 hours of training.

“The Kennedy Space Center Fire Rescue Services is second to none,” Moore said. “We require all of our firefighters to be certified in each discipline they perform in.”
Efforts underway to develop better batteries for electric vehicles

By Rob Granath  
Spaceport News

Electricity producing batteries are a vital part of daily life on Earth and in space. Power storage devices keep spacecraft operating, cars running, cell phones connected and flashlights lit. The Advanced Research Projects Agency-Energy (ARPA-E) now is funding 22 projects across 15 states with a total of $36 million to develop better, more efficient power sources for electric vehicles (EV).

The Robust Affordable Next Generation Energy (RANGE) Storage Systems effort kicked off when NASA and ARPA-E officials advertised with representatives from other agencies, industry and universities gathered at the Kurt H. Debus Conference Facility at the Kennedy Space Center Visitor Complex on Jan. 28 and 29. The project aims to accelerate widespread EV use by dramatically reducing the costs of electricity producing batteries are a vital part of daily life on Earth and in space. Power storage devices keep spacecraft operating, cars running, cell phones connected and flashlights lit.

“ARPA-E was authorized in 2007 and first funded in 2009. The agency invests in high-potential, high-impact energy technologies that are too early for private-sector investment. According to Eric Rolfhing, Ph.D., ARPA-E’s deputy director for Technology, his organization is changing what’s possible by thinking big, thinking bold and thinking differently about energy innovation. “We are trying to bridge from basic science into prototype engineering technology and then bridge that technology, if successful, into some marketable transition,” he said. As part of the forum, Robert Huggins, Materials Science professor emeritus at Stanford University in California, reviewed the development of batteries and recent research into new technologies for use in electric vehicles. He noted that many are looking for the next big step in the technology’s evolution.

“ARPA-E’s RANGE program seeks to improve EV driving range and reduce vehicle costs by re-envisioning the total EV battery system, rather than working to increase the energy density of individual batteries,” said Thomas Millar, a research engineer at NASA’s Glenn Research Center in Ohio, noted that electricity-producing fuel cells became the primary power source during Gemini and continued through the Space Shuttle Program.

Fuel cells convert chemical energy from a fuel, such as hydrogen, into electricity through a chemical reaction with oxygen. Fuel cells are different from batteries in that they require a constant source of fuel and an oxidizer to sustain the chemical reaction. Fuel cells can, however, produce electricity continually, but are limited by supplies of fuel and oxygen. Millar also noted that the Apollo Program’s Lunar Roving Vehicle was battery-powered. The jeep-like car allowed the crews of Apollo 15, 16 and 17 to drive more than 22 miles on the moon. While the space station’s electricity is supplied primarily through large solar arrays, many systems on all of America’s human-rated spacecraft have depended on batteries. Additionally, batteries have been used as supplemental power sources on probes such as the Mars Pathfinder rover, Sojourner, which landed on the Red Planet during 1997.

“Every gram that I try to get from the Earth’s surface up into orbit takes eight to nine grams of propellant. Anything you can do to reduce mass is of importance to NASA.” RANGE projects also will focus on multifunctional energy storage design systems that use these robust storage systems to simultaneously serve other functions in a vehicle, further reducing the overall system’s effective and overall EV weight. For one of the projects, the University of California, San Diego, will receive approximately $3.5 million to engineer a low-cost, lightweight battery and to redesign vehicle frames so the battery becomes an integral part of a vehicle’s support structure.
Scenes around Kennedy and beyond...

Children and their parents enjoyed Wild Wild West Days at the Kennedy Child Development Center on Jan. 27-31. Activities centered around what it was like to live and survive in the Wild West. On Jan. 31, the children dressed up in western wear and enjoyed pony rides and a petting zoo, featuring rabbits, goats, a pig and a donkey.

Technicians attach a bridge crane to the Orion ground test vehicle Feb. 3 to prepare for heat shield removal inside the Vehicle Assembly Building. The test vehicle is being prepared for its move to Langley Research Center in Hampton, Va., for a water drop test.

Technicians move a solid rocket motor to a different transporter inside the Solid Rocket Motor Processing Facility on Dec. 19, 2013, at Vandenberg Air Force Base in California. The motor will be attached to the United Launch Alliance Delta II rocket slated to launch NASA’s Orbiting Carbon Observatory-2 (OCO-2) spacecraft in July 2014.
NASA names Ralph Roe chief engineer

Spitzer, Hubble take epic look back in time
Beware: Do not overlook threat of winter tornadoes

45th Weather Squadron
For Spaceport News

The winter tornado season in central Florida typically peaks from February to April. However, as Palm Coast saw last month, winter tornadoes can strike here as early as December. Are you prepared?

Tornadoes are notorious for touching down during strong cold fronts moving into the area. The stronger the cold front, the higher the chance intense tornadoes will spawn. Because these cold fronts are fairly easy to predict, the potential for these tornadoes usually can be forecasted a day or more in advance; but it’s always best to be prepared.

Tornado safety is an easy two-step process.

Step No. 1, Have A Plan: Identify the safest room in your building and ensure everyone knows where it is located. The safest rooms are on the low floor, away from windows, farther inside and smaller with solid construction, such as restrooms, closets and basements.

A strong table and thick pads can protect against falling debris and motorcycle, bicycle and skateboard helmets can prevent head injuries.

People in mobile homes or other weak portable buildings should seek proper shelter elsewhere. Also, a common myth is to open windows and let the building “breathe.” Houses do not explode from decompression in a tornado and opening a window actually increases the danger.

Step No. 2, Stay Informed: The 45th Weather Squadron signals the potential for severe weather at Kennedy Space Center and Cape Canaveral Air Force Station in their daily 24-hour and weekly planning forecasts, which are available at www.patrick.af.mil.

If a threat continues, the squadron issues a severe-weather watch with a desired lead time of four hours. If tornadoes are imminent or observed, the squadron issues a tornado warning with a desired lead time of five minutes. If you receive a warning, follow local adverse weather procedures.

At home, purchase a NOAA All Hazards Radio, formerly known as a NOAA Weather Radio. One of the main reasons late night tornadoes are so dangerous is that people are sleeping and not aware of weather warnings. However, a NOAA All Hazards Radio will sound an alarm if the National Weather Service issues a weather warning for your area.

This is essential if you live in an area where there is no tornado siren. Even if you live near a siren, it may not be loud enough to wake you inside your house.

NOAA radios also provide alternatives for the hearing and visually impaired.

Be aware that NOAA radios don’t cover 2 percent of the country, so test the reception of new radios to be sure you’re covered.

If severe weather is likely, review your safety plan, include your family and remind everyone where the safe room is located. If there is time before the high winds start, store loose outside materials and close protective shutters.

If a tornado or severe weather watch is issued, listen for weather warnings and be ready to act.

Always go to your safe room if threatening weather approaches — there may not be time for an official warning.

Looking up and ahead . . .

* All times are Eastern

Feb. 27
Mission: Global Precipitation Measurement (GPM) Core Observatory
Launch Vehicle: H-IIB
Launch Site: Tanegashima Space Center, Tanegashima Island, Japan
Launch Time: 1:07 to 3:07 p.m.
Description: GPM is an international satellite mission led by NASA and JAXA to provide next-generation observations of rain and snow worldwide.

March 16
Mission: SpaceX 3 Commercial Resupply Services flight
Launch Vehicle: Falcon 9
Launch Site: Cape Canaveral Air Force Station
Launch Pad: Space Launch Complex 40
Launch Time: 4:41 a.m.
Description: SpaceX 3 will be the third commercial resupply mission to the ISS by Space Exploration Technologies (SpaceX).

March 25
Mission: Expedition 39
Launch Vehicle: Soyuz 38
Launch Site: Baikonur Cosmodrome, Kazakhstan
Launch Time: TBD
Description: Soyuz 38 will carry Russian cosmonauts Alexander Skvortsov and Oleg Artemyev, both Expedition 39/40 flight engineers, and NASA astronaut Steve Swanson, Expedition 39 flight engineer and Expedition 40 commander, to the International Space Station.

April 28
Mission: Progress 55
Launch Vehicle: Russian Soyuz
Launch Site: Baikonur Cosmodrome, Kazakhstan
Launch Time: TBD
Description: Progress 55 will deliver cargo and crew supplies to the International Space Station.

May 1
Mission: Orbital 2 Commercial Resupply Services flight
Launch Vehicle: Antares
Launch Site: Wallops Flight Facility
Launch Pad: Mid-Atlantic Regional Spaceport Pad-0A
Launch Time: TBD
Description: Orbital 2 will deliver cargo and crew supplies to the International Space Station.

To watch a NASA launch online, go to http://www.nasa.gov/ntv.