

National Aeronautics and
Space Administration



ORION

JULY 2015

ORION'S NEW EM-1 FAIRING SYSTEM DESIGN PASSES THE TEST





LET THE TESTING BEGIN

The Orion Program officially opened the new Orion Integrated Test Lab at Lockheed Martin's Watertown campus on July 14. NASA program managers, media and employees attended the ribbon cutting and open house events to learn more about how the new lab will mitigate risk for NASA's Exploration Mission-1. Orion's harnessing, electrical power, sensors, avionics and flight software needed to support Exploration Mission-1 (EM-1) will be assembled in the spacecraft mockup to help engineers verify the configuration of the elements prior to installing them on the flight vehicle.

- ▶ [Denver Business Journal](#)
- ▶ [9 News Denver](#)



ORION EXPERTS DRAW A CROWD AND MAKE HEADLINES

NASA and Lockheed Martin Orion team members supported various events and media opportunities at the EAA AirVenture Oshkosh Air Show in Wisconsin. Larry Price, Lockheed Martin Orion deputy program manager, and Susan Baggerman, NASA's health and medical technical authority for Orion (pictured here), participated in several space themed panels and presentations. NASA's Glenn Research Center led the effort for a NASA exhibit at the show and the Space Launch System/Orion industry team members supported a deep-space exploration exhibit.

ORION'S NEW, IMPROVED FAIRING SEPARATION SYSTEM TAKES ON HEFTIER LOADS AND SHEDS A FEW POUNDS

Orion engineers successfully completed testing of design changes made to the spacecraft's fairing separation system at Orion prime contractor Lockheed Martin Sunnyvale, California, facility on July 29. These changes resulted from data collected during Orion's first test flight on Dec. 5, 2014.

Three massive fairing panels encase Orion's service module during the spacecraft's climb to space, helping it endure the aerodynamic pressure, heat, wind and acoustics it encounters. The panels are jettisoned after they are no longer needed, allowing the spacecraft to continue its journey.

The separation tests took about three seconds and evaluated new design changes, including new push-off springs that push on the fairing for a longer period of time to provide increased safety and reliability. As part of an ongoing mass reduction effort, the team used four crew module structural attachments instead of six.

Star trackers, or cameras that provide positioning from the stars, are used for navigation on the spacecraft. The fairing separation system pulls off the star tracker covers which prevent contamination before launch, and this process was tested for the first time.

In addition, these tests evaluated different pyrotechnic variances and higher loads, or pressures, in order to prepare for Exploration Mission-1, when Orion is launched on NASA's new Space Launch System rocket. The team was also able to collect shock data, which will be provided to ESA (European Space Agency) to support their work designing, building and testing the service module. In fact, these same fairings will be used for service module acoustics and vibration testing taking place at NASA's Plum Brook Station facility in Sandusky, Ohio, later this year.

- ▶ [Watch a replay of the Google+ Hangout](#)

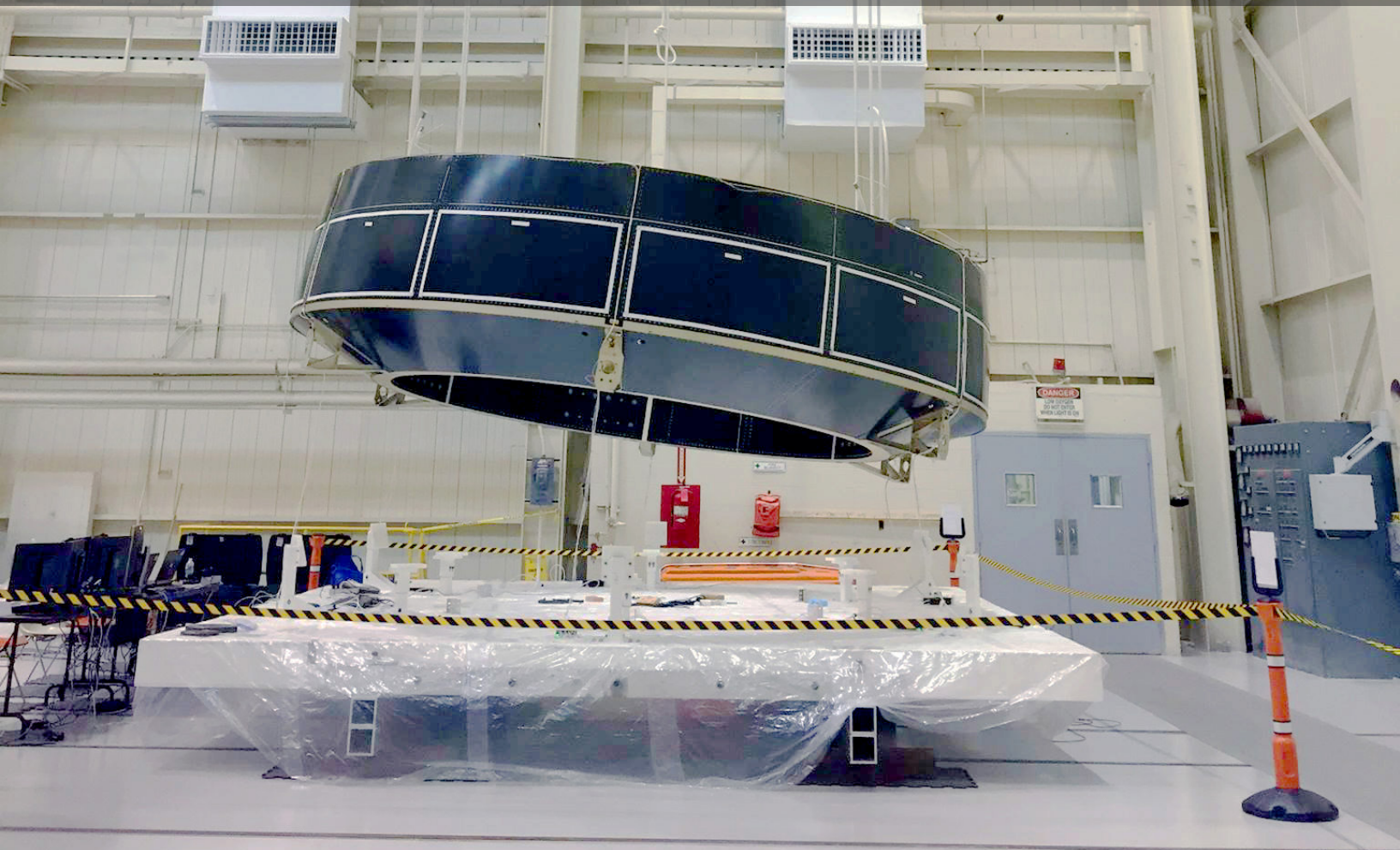
GETTING READY TO SHAKE THINGS UP

Engineers at NASA's Plum Brook Station in Sandusky, Ohio, began the first of a series of modal tests on a structural mockup of the crew module adapter (CMA) for Orion. The CMA will connect the capsule to the ESA-provided service module for the spacecraft's next mission, Exploration Mission-1. The service module is designed to be the powerhouse that fuels and propels Orion in space.

The tests at Plum Brook Station shake structural elements at various frequencies to simulate how launch vibrations and acoustics will affect the spacecraft during its trip to space atop the Space Launch System rocket. They are being conducted ahead of the arrival of a structural mockup of the ESA service module to the facility this fall for additional testing.

Engineers are using a "building block" approach to testing in which they evaluate each piece as the elements composing the service module are stacked atop each other to validate its integrity before flight hardware begins arriving in 2017.

► [Read more on Orion's NASA Blog](#)



ORBITAL ATK BEGINS WORK ON ORION'S CREW SAFETY SYSTEM



Orion subcontractor Orbital ATK was awarded the contract to develop the Orion Launch Abort System (LAS) abort motor. The abort motor, manufactured at Orbital ATK facilities in Magna, Promontory and Clearfield, Utah, is a powerful solid rocket motor designed to ensure crew safety.

Orion's LAS is a unique safety feature, similar to an ejection seat found in a fighter jet. If an emergency were to occur at the launch pad, or during lift-off and ascent, the abort system would rapidly propel the crew module away from the rocket and land the vehicle at a safe location.

Under the recently signed agreement, the primary objective

is to complete design, development, test and qualification of the abort motor.

Major milestones in the process include structural tests, loads tests, igniter open air tests, and motor static firing tests. These tests will ultimately qualify the abort motor for operational missions.

The agreement with Lockheed Martin provides funding for the launch abort motor through Exploration Mission-2, Orion's first mission with astronauts.

► [Read the full story](#)



ORION TEAM MEMBERS RECOGNIZED FOR FLIGHT TEST ACCOMPLISHMENTS

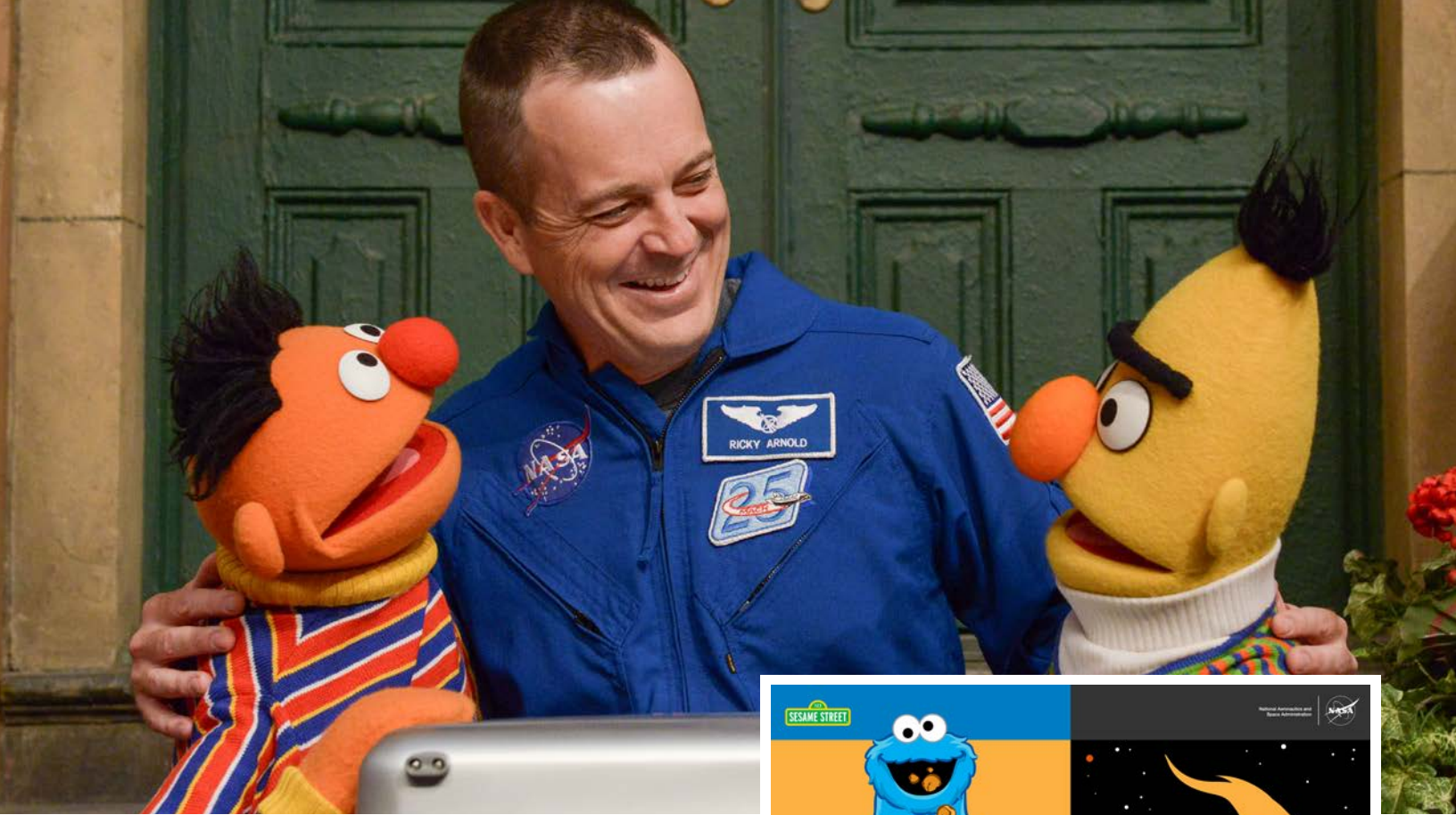
The NASA and Lockheed Martin Orion Program management team conducted a series of supplier visits and Exploration Flight Test-1 employee recognition events in Colorado July 14-16. Site visits included ULA, Paradigm, SEAKR Engineering, Ball Aerospace and the Lockheed Martin Waterton site where hundreds of Orion employees also enjoyed their annual program picnic. Several media, manufacturing association representatives, and elected officials attended some of the events and congratulated team members on Orion's successful flight test last year.

Several NASA and Lockheed Martin Orion Program individuals and teams were also recognized at the NASA Honor Awards ceremony at Johnson Space Center in Houston on July 7.

► **See the complete listing of all 2015 honorees**

In addition, Griff Corpening, deputy manager of technical integration for Orion Flight Test Management received the prestigious Space Flight Awareness Silver Snoopy Award from Astronaut Doug Hurley on July 21. The Silver Snoopy is a special honor award given to NASA employees and contractors for outstanding achievements related to human flight safety and mission success.

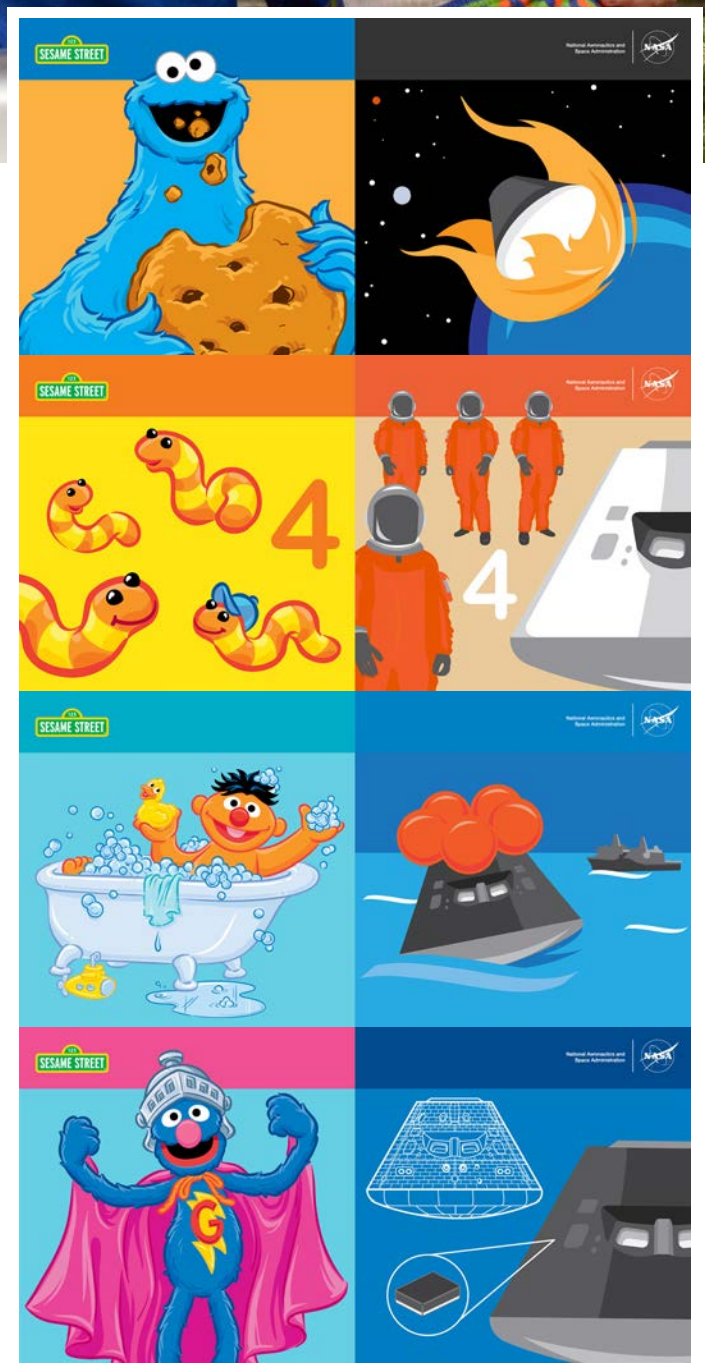




ASTRONAUT RICKY ARNOLD NAVIGATES THE BIG APPLE TO GET TO SESAME STREET

NASA astronaut Ricky Arnold visited with Sesame Street characters while returning several treasured mementos from the residents of 123 Sesame Street that were flown aboard Orion during Exploration Flight Test-1 in December 2014. The precious cargo included Cookie Monster's cookie, Ernie's Rubber Duckie, Super Grover's cape, and Oscar the Grouch's pet worm Slimy – Orion's first crew character. The return of the characters' personal flown items were featured in a series of social media postings on Twitter and Facebook. The fun-filled campaign reached out to existing partners working with the Orion team moving forward toward Exploration Mission-1 (EM-1). The shareables introduced audience members who are following the developing social media story to NASA's own cast of characters who all play a very important role in the success of EM-1 and future deep space exploration.

► [Read the full story](#)





Orion engineer Matt Schottel conducted a Museum Alliance webchat with the Patrick Health Public Library in Boerne, Texas, on July 9 and Orion engineer Stu McClung presented on the spacecraft during a webchat with John C. Wells Planetarium in Virginia on July 14 (pictured here).



NASA and Lockheed Martin engineers presented briefings on the Orion spacecraft to several High School Aerospace Scholars teams at Space Center Houston throughout the month of July. Speakers included: Lara Kearney, Dustin Neill, and Kelly Smith.



Lockheed Martin Orion Materials & Process Engineer Brian Foss had a web chat with summer camp kids at the Challenger Learning Center in northwest Indiana on July 21. The Challenger Network was created by the families of astronauts who lost their lives during the Space Shuttle 51-L accident in 1986.



ORION TEAM OFFERS UP A LITTLE "COMIC" RELIEF



Reporters from the technical online magazines Planet Analog and Design News, visited NASA's Johnson Space Center on July 7 and received Orion presentations from Orion's Nujoud Merancy, Stu McClung and astronaut Lee Morin.

► [Read the article](#)



Denver's 5280 Magazine published a feature story about Orion engineer Eric Coffman.

► [Read the article "Rocket Man"](#)

Members of the Orion team beamed in on this year's Space City Comic Con held the weekend of July 24-26 in Houston. Orion engineers gave festival goers a taste of what life is like working on a real spacecraft going to deep space and Astronaut Doug Wheelock as Captain America and Orion engineer Nujoud Merancy as Agent Carter (shown here) participated in the Journey to Mars panel presentation at the event.

FOLLOW THE PROGRESS OF NASA'S NEW SPACECRAFT FOR HUMAN EXPLORATION:

- NASA's Orion Blog** [Blogs.NASA.gov/Orion](https://blogs.nasa.gov/Orion)
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AUGUST:

- Orion Critical Design Review kick-off**
- Orion pathfinder closeout weld at Michoud**
- First flight weld for Exploration Mission-1**
- Parachute drop test in Yuma, Arizona**