

**House Science, Space and Technology Committee
Subcommittee on Space and Aeronautics**

***“Examining NASA’s Development of the Space Launch System and
Orion Crew Capsule”***

Statement by

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“Orion Multi-Purpose Crew Vehicle”

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Chairman Palazzo, Ranking Member Costello and Members of the Space and Aeronautics Subcommittee, it is a pleasure for me to testify before you today concerning the Orion spacecraft and its contribution to the future of America’s human space exploration program.

From the days of Apollo, our nation’s space program has been built on the foundation of strong, bi-partisan political support. Indeed, continued support from both parties sustained through multiple Congresses and Presidents will be essential to the future of America’ space exploration program, and to ensuring value from our national investment in human spaceflight. I am, therefore, pleased to see Congress, NASA and the President establish the development of Orion and the Space Launch System or “SLS” as a top national investment priority for space.

As you are well aware, Orion is the world’s first interplanetary spacecraft supporting safe, long-duration, human exploration and scientific discovery missions to deep-space, including the moon, asteroids, the moons of Mars, and ultimately Mars, itself. Orion is complementary to – and, indeed, has contributed to the development of – NASA’s commercial space transportation initiative for operational support to the International Space Station in low-Earth orbit.

The NASA-Lockheed Martin Orion industry team is comprised of Lockheed Martin, Aerojet, ATK, Hamilton Sundstrand, Honeywell, and many small business suppliers in 41 states. It is an exceptional team that includes some of the youngest and most highly motivated engineers employed by Lockheed Martin. On the Government side it is led by NASA's Johnson Space Center in Houston, and involves a number of other NASA Centers across the country. The Orion team continues to make tremendous progress developing, manufacturing, assembling, and testing this state of the art space exploration vehicle.

We are currently advancing toward our next major milestone, Exploration Flight Test-1 or "EFT-1" in 2014, leading to follow-on orbital flight testing (Exploration Mission-1 or "EM-1") and subsequent crewed missions far beyond low-Earth orbit into deep space (Exploration Mission 2 or "EM-2").

The following are examples of major program technical progress and our commitment to crew safety and system reliability:

- We successfully tested a new Launch Abort System or "LAS" during the Pad Abort-1 test at White Sands Missile Test Range in New Mexico to demonstrate our ability to protect the crew under emergency conditions. The LAS required development of three new rocket motors with key work accomplished by ATK in Maryland and Utah and Aerojet in California.
- In collaboration with NASA and our Colorado-based Ball Aerospace teammate, we developed an innovative navigation and docking system called "STORRM" which was successfully tested during Space Shuttle mission STS-134.

- We have completed parachute tests at the Yuma Proving Ground in Arizona; we are continuing water landing tests at the Hydro Basin facility at NASA's Langley Research Center in Virginia; and we are conducting propulsion testing at a Lockheed Martin facility located at NASA's Stennis Space Center in Mississippi.
- We successfully completed space flight acoustic and vibration testing on the Orion Ground Test Article spacecraft at Lockheed Martin facilities in Colorado after demonstrating advanced, state-of-the-art friction-stir welding manufacturing techniques at NASA's Michoud Assembly Facility in Louisiana.
- We delivered the EFT-1 Orion crew module to the Operations & Checkout facility – America's "Spacecraft Factory of the Future" – at NASA's Kennedy Space Center in Florida, with work moving forward on critical subsystem installation and assembly.

The NASA-Lockheed Martin team also initiated major affordability measures and streamlined Orion program management oversight by incorporating proven commercial practices to ensure our ability to work within constrained NASA budgets while keeping the program moving forward.

That said, it remains critically important that Congress maintain FY2013 funding at the current level to ensure timely and successful implementation of EFT-1 in 2014, as well as outyear budgets to support a robust crew safety - risk mitigation demonstration test (Exploration Mission-1) leading to first crewed mission with Exploration Mission-2. In fact, Orion's "considerable progress" and the importance of our continued commitment

to crew safety, reliability and risk mitigation testing was emphasized by the Aerospace Safety Advisory Panel (ASAP) in its most recent review of the Orion and SLS programs.

As I have already indicated, Exploration Flight Test -1 or “EFT-1” is the next major program milestone on the way to opening a new era of human space exploration and scientific discovery.

The EFT-1 Orion spacecraft will fly without crew aboard an existing Delta-IV Heavy launch vehicle from NASA’s Kennedy Space Center in Florida in 2014. It will send Orion 3,600 miles into space – more than 15 times farther away from Earth than the International Space Station. It will test the systems needed for a high-energy return for missions beyond low-Earth orbit. Orion will re-enter the atmosphere at nearly 20,000 miles per hour – speeds not seen since Apollo; and it will experience temperatures of almost 2,000 degrees Fahrenheit – higher than any human spacecraft since astronauts returned from the moon.

Bottom-line: EFT-1 is needed to reduce program technical risk and demonstrate important integrated performance capabilities necessary to ensure mission success and crew safety.

As NASA’s Orion Program Manager Mark Geyer stated recently: “We can test parachutes by dropping them from a plane. We can test thrusters in stands on the ground. We can check the splashdown in a water tank. We can test all the pieces and parts, but a space flight is the only place we can see all these things work together and work under the real conditions they will face with a crew onboard.”

EFT-1 will be followed by another uncrewed orbital flight test called Exploration Mission-1 or “EM-1” in 2017 which will fly on the new Space Launch System or “SLS” rocket managed by NASA’s Marshall Space Flight Center in Alabama. EM-1 will put the entire, integrated exploration system through its paces, demonstrate human mission capability, and set the stage for first Orion-SLS crewed mission operations to deep space.

Mr. Chairman, with your leadership and continued bi-partisan support of this Committee, Congress and the President, Orion – together with SLS – is prepared for unprecedented missions of exploration and discovery, taking humans further into the solar system than ever before experienced, while encouraging STEM education among our youth and providing high-tech careers and jobs.

Thank you again for this opportunity to testify and I look forward to your questions.