

# GATEWAY

THE DEEP SPACE LAUNCH COMPLEX

## *Exhibit Fact Sheet*

Upon entering *Gateway*<sup>TM</sup>: *The Deep Space Launch Complex* on the first level, “space travelers” will be greeted with a futuristic design intended to set the stage for their journey. Displayed like massive space sculptures in an outdoor garden, visitors will be surrounded by actual flight flown artifacts and full-scale models, thoughtfully placed around the room to help tell the story of the now and next of space travel. Some, like the SpaceX Falcon 9 booster, are even suspended from above, allowing for a 360-degree view.

### **Aerojet Rocketdyne RL10 Upper-stage Rocket Engine**

Aerojet Rocketdyne provided the RL10 upper-stage rocket engine that is displayed at *Gateway: The Deep Space Launch Complex*. The RL10 has been the nation’s premiere high-performance upper-stage rocket engine for more than 50 years. Today, multiple models of the RL10 carry the engine’s legacy forward as the launch industry’s “workhorse” by powering the upper stages of the ULA Atlas V and Delta IV Heavy launch vehicles. Additionally, the RL10 is slated to power the upper stage of NASA’s Space Launch System (SLS) deep space exploration rocket set to launch later this year. A single RL10 will power the Interim Cryogenic Propulsion Stage of SLS for the first three missions, and then four RL10 engines will support the more powerful Exploration Upper Stage that is being developed for future versions of SLS.

### **Boeing Crew Space Transportation-100 Starliner Mockup Capsule (full-scale engineering model)**

This wood, fiberglass, and plastic mockup of a Boeing Crew Space Transportation (CST)-100 Starliner crew module was created by Bigelow Aerospace and used by Boeing in Houston to test how the capsule would work during a real mission. Boeing engineers and NASA astronauts have spent thousands of hours inside.

The CST-100 Starliner spacecraft was designed to accommodate up to seven passengers or a mix of crew and cargo. For NASA missions to the International Space Station (ISS), it will carry a mix of four NASA or international partner astronauts with room for a fifth paying passenger. The spacecraft has an innovative weldless structure and is reusable up to 10 times. It is an American-built capsule certified for a ground landing, thanks to its parachute and airbag systems. It also flies and docks autonomously.

## **Boeing Spacesuit**

Constructed by “MythBusters” Adam Savage, the 2021 ILC Dover version of the Boeing spacesuit features authentic elements of those to be worn by Starliner astronauts. The suit is designed to give astronauts a safe and comfortable trip to and from low-Earth orbit. It is lighter, cooler and more flexible than previous spacesuits, weighing in at 20 pounds, 10 pounds lighter than suits worn by space shuttle astronauts. Designed to meet all NASA requirements for safety and functionality, the suit evolved from those worn by U-2 aircraft pilots and Gemini astronauts in the 1950s and 1960s, using modern materials and manufacturing processes.

“Rosie,” the anthropomorphic human Boeing uses for testing in uncrewed missions, wears this suit, which bears the mission patch from the first Starliner mission. Guests can interact with this artifact, examining the helmet, suit and gloves individually and are even able to “try on” the gloves by placing their hands over the kiosk controller. A Boeing spacesuit like this one will be worn by all crew members who fly aboard the company’s CST-100 Starliner spacecraft.

## **Boeing Starliner Simulator (full-scale model)**

The Boeing CST-100 Starliner Simulator is a full-scale exhibit of the spacecraft’s crew module and cockpit. Like the flight simulator that Starliner astronauts spend thousands of hours training on at NASA Johnson Space Center in Houston, this hands-on exhibit allows future pilots to practice the spacecraft’s approach and docking to the ISS. The simulator provides visual display cues and a translational hand controller, designed based on the experiences of Boeing veteran astronaut Chris Ferguson.

## **LIFE Habitat Cut-Away (scale model)**

A Large Inflatable Fabric Environment, known as LIFE, is a habitat designed for four to 12 crew members for long-duration space missions. Able to be used in low-Earth orbit, Mars transport, and Lunar and Mars surface habitation, it is compatible with many launch vehicles. This one-quarter scale model shows the three levels, including a kitchen, garden, sleeping quarters and lab space in the habitat. At full scale, the habitat is 27 feet in diameter.

## **Lockheed Martin Space Habitat (full-scale mockup)**

This full-scale mockup of what a habitat orbiting the Moon can look like shows the need to take advantage of all the space – both on the “floor” and the “ceiling” – to get the most functionality. The habitat is 14.7 feet in diameter.

## **NASA Space Launch System (SLS) Rocket (scale model)**

This rocket model, built to 1/25 of the actual size of the SLS, has been updated this year with a new paint scheme to match the SLS rocket launching the Artemis 1 mission.

## **Orion Exploration Flight Test-1 capsule (flight flown)**

Prominently centered in the exhibit hall is the flight flown Orion Exploration Flight Test-1 (EFT-1). Launched on December 5, 2014, the maiden voyage of Lockheed Martin’s capsule orbited Earth at an altitude of 3,600 miles, more than 15 times farther in distance than the ISS. The entire mission lasted 4.5 hours with the capsule splashing down in the Pacific Ocean.

The Orion spacecraft will play a key role in NASA's Artemis missions. This exhibit includes three interactive OLED screens covering *Getting to Space*, *Life in Space*, and *There and Back Again*.

### **Orion Heatshield Tiles**

Provided by Lockheed Martin, these three tiles were used in the Orion heatshield composition.

### **Sierra Space Dream Chaser (full-scale model)**

Sierra Space products and programs are working toward a more accessible space economy, rapidly advancing toward the launch of the world's only winged commercial spaceplane, the Dream Chaser<sup>®</sup>, a model of which will be on display in Gateway.

As the next generation of space transportation, the Dream Chaser will perform cargo supply and return missions for NASA, set to begin in late 2022, delivering up to 12,000 pounds of cargo to the ISS in one trip. The return journey will carry critical data, generated by ISS researcher experiments, enabling earth-bound scientists to benefit from much faster access to these unique results. Dream Chaser is a reusable spaceplane, uniquely capable of a smooth low 1.5 G atmospheric re-entry for crew and cargo transportation with the ability to land on existing commercial runways worldwide.

### **Sierra Space Shooting Star<sup>™</sup> (full-scale mockup)**

The multi-use logistics model is a 15-foot transport vehicle that attached to the Dream Chaser spaceplane. The module will carry up to 10,000 lbs. of pressurized and unpressurized cargo to the ISS under NASA's Commercial Resupply Services contract.

The module was designed to burn up upon re-entry, disposing of trash and other unwanted materials from the ISS. Attached to the Shooting Star is an additional cargo module.

### **SpaceX Cargo Dragon COTS-2 (flight flown)**

This flight flown Dragon was the first commercial spacecraft to deliver and return cargo from the ISS in May 2012. Two interactive displays will showcase the evolution of the Cargo Dragon COTS-2 to the current cargo and crew versions; as well as the story of launches, landings and the reusability of the Dragon capsules, the first stage of the Falcon 9, and the fairings, respectively.

### **SpaceX Falcon 9 Rocket Booster (flight flown)**

Seeing the SpaceX Falcon 9 booster suspended from the ceiling is a jaw-dropping experience for guests. Booster B1023 launched May 27, 2016 on its first mission, Thaicom 8, and successfully landed on the drone ship, Of Course I still Love You. For its second mission, the B1023 was converted to a side booster for the Falcon Heavy Demo on February 6, 2018, which famously launched a bright red Tesla Roadster into space. Following the mission, the booster landed successfully on Landing Zone 1 at Cape Canaveral. It is considered a "Full Thrust" version that predates the Block 4 and Block 5 versions.

The second level of Gateway offers an unprecedented opportunity to come nose to nose with the booster, providing the closest vantage point possible.

### **United Launch Alliance Delta IV Heavy Rocket Model**

This rocket model was built to 1/20 of the actual size of the ULA Delta IV Heavy rocket. The rocket was used to launch the Orion EFT-1 capsule.

### **United Launch Alliance Atlas V Rocket Model**

The Atlas V model on loan from ULA is 1/25 scale. This is the rocket set to launch the Starliner missions.