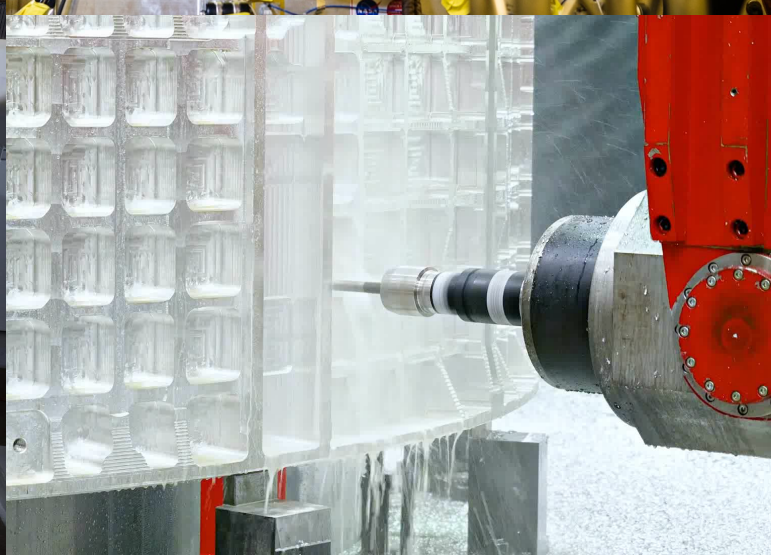
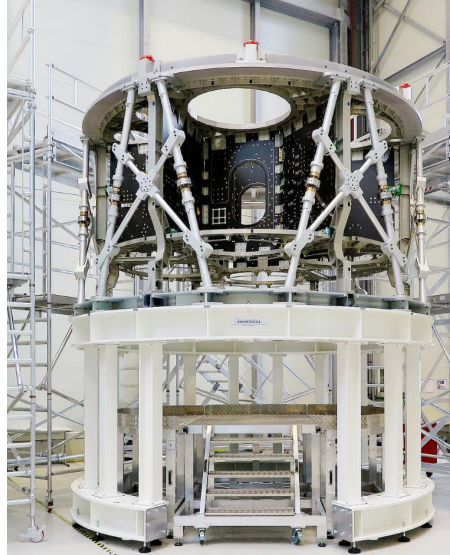


Lockheed Martin Status



- **Line of Business Reorganization**
- **Orion and Secondary Payloads**
- **Deep Space Gateway**
- **Robotics**

Scott Norris
Tim Cichan
Chris Norman



Some images courtesy of NASA

Deep Space Gateway

Habitat Support Vehicle
Provides power, propulsion, communications, and breathable gases for the Deep Space Gateway

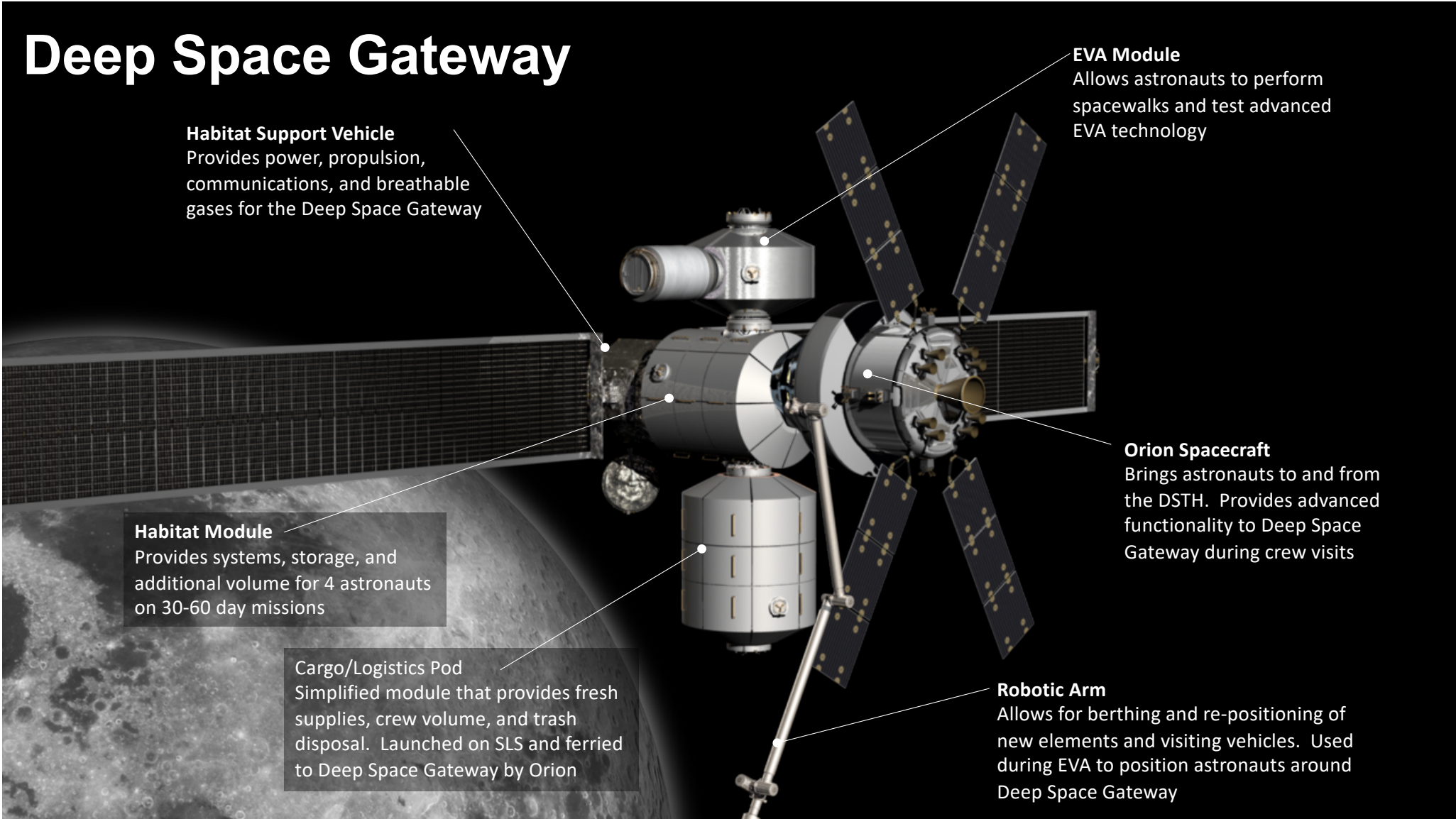
EVA Module
Allows astronauts to perform spacewalks and test advanced EVA technology

Habitat Module
Provides systems, storage, and additional volume for 4 astronauts on 30-60 day missions

Orion Spacecraft
Brings astronauts to and from the DSTH. Provides advanced functionality to Deep Space Gateway during crew visits

Cargo/Logistics Pod
Simplified module that provides fresh supplies, crew volume, and trash disposal. Launched on SLS and ferried to Deep Space Gateway by Orion

Robotic Arm
Allows for berthing and re-positioning of new elements and visiting vehicles. Used during EVA to position astronauts around Deep Space Gateway



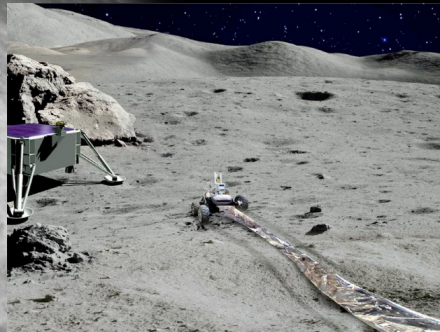
Lunar Science

- Communications Relay
- Telerobotics
- Radio Astronomy
- Radiation
- Sample Return

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Rover Image Courtesy MDA



<https://sservi.nasa.gov/articles/telerobotic-antenna-deployment/>



Lander Graphic Courtesy JPL



Deep Space Gateway Robotics

◆ Design Considerations

◆ Deep Space Habitat

- ◆ Control all robotic systems from single station (manipulator, internal/external free-flyers, surface robotics)
- ◆ Provide multiple methods of control for robotic systems (teleoperation, automated/scripted, task-level autonomous operations)
- ◆ Operator awareness when operating remote systems (image/video display, telemetry handling and display)

◆ Robotic Systems

- ◆ Changes in how the systems are operated will impact how systems are designed (especially power and communications)
- ◆ Need to develop operational strategies that support crew focused operation.

◆ LM Status

- ◆ Developing use case concepts that drive design and developing requirements for a workstation.
- ◆ Investigating use of virtual and augmented reality.

