



5...4...3...2...1...

SPACE LAUNCH SYSTEM

A NEW CAPABILITY FOR SPACE EXPLORATION

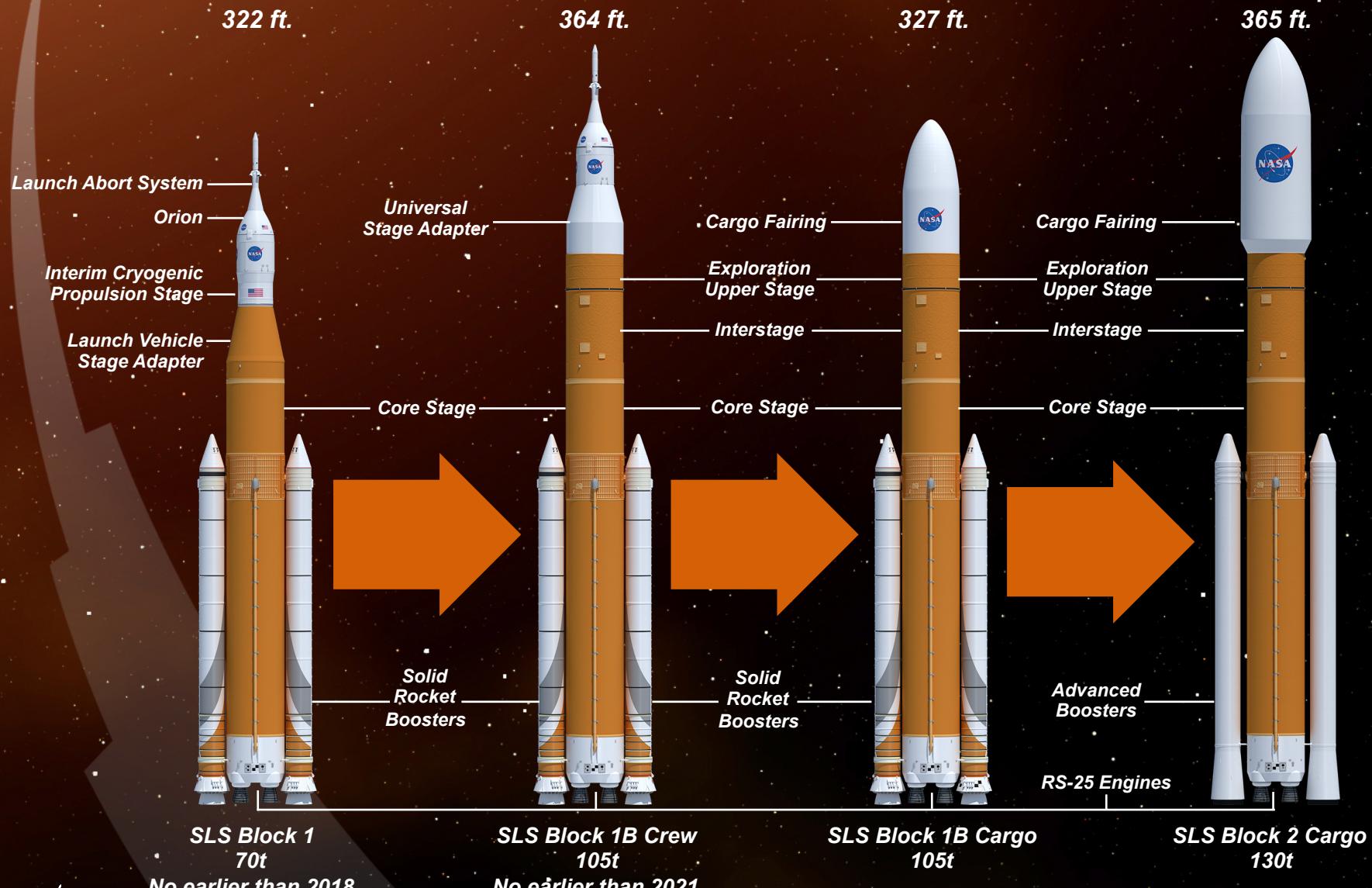
Angie Jackman
Space Launch System

29 March 2016

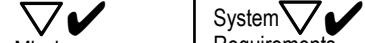
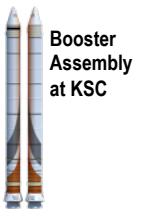
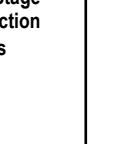
angie.jackman@nasa.gov
nasa-slspayloads@mail.nasa.gov



SLS Evolution Overview



Space Launch System Path to the Pad

2011	2012	2013	2014	2015	2016	2017	2018
 Mission Concept Review	 System Requirements Review/System Definition Review	 Preliminary Design Review	 Key Decision Point-C	 Critical Design Review			
 Booster Development Test	 With design and development work mostly complete, the SLS Program is now building and testing components of the world's most powerful rocket to be ready for launch in 2018. Each of these steps advances NASA on the Journey to Mars.	 RS-25 Development Testing Begins	 Booster Qualification Tests	 RS-25 Flight Testing Begins		 Boosters Fabrication Complete	 Booster Assembly at KSC
 SLS Design Chosen	 Engines Delivered to Inventory	 Manufacturing Tooling Installation	 Production of Adapter for Orion Flight Test	 Core Stage Production Begins	 Core Stage Assembly Complete	 Core Stage Structural Testing	 Core Stage Test-Firing
 Concept Studies	 Design & Development		 Final Design & Fabrication		 System Assembly, Integration and Test, Launch Checkout		

Recent Progress Toward Launch



Core Stage production at Michoud



Booster testing at Orbital ATK



Engine testing at Stennis Space Center



Test stand construction at Marshall



Stage adapter welding at Marshall

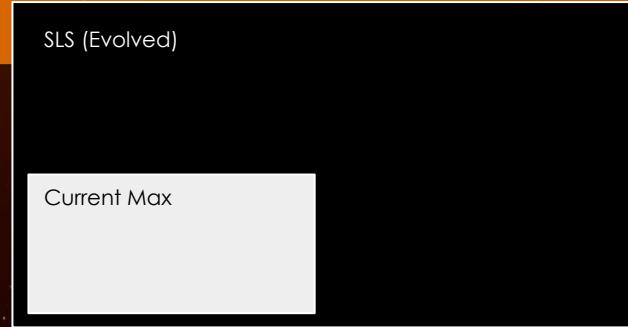


Upper stage production at ULA

Benefits of Space Launch System

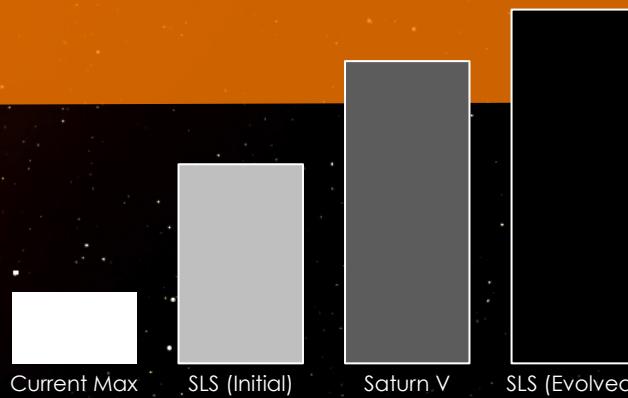
Volume

- Space Launch System will be able to offer payload accommodations with five times more volume than any contemporary launch vehicle.
- Payload fairings of up to 10-meter diameter are planned.



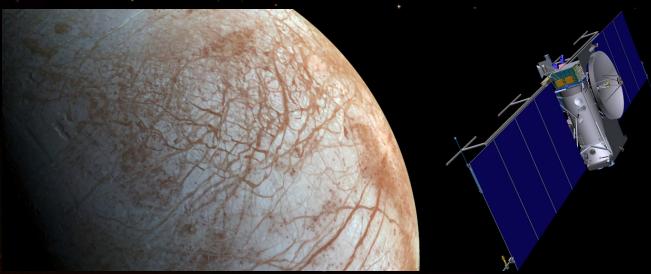
Mass

- Space Launch System will offer an initial capability of greater than 70 metric tons to low Earth orbit; current U.S. launch vehicle maximum is 28 t.
- Evolved version of SLS will offer greatest-ever capability of greater than 130 t to LEO.

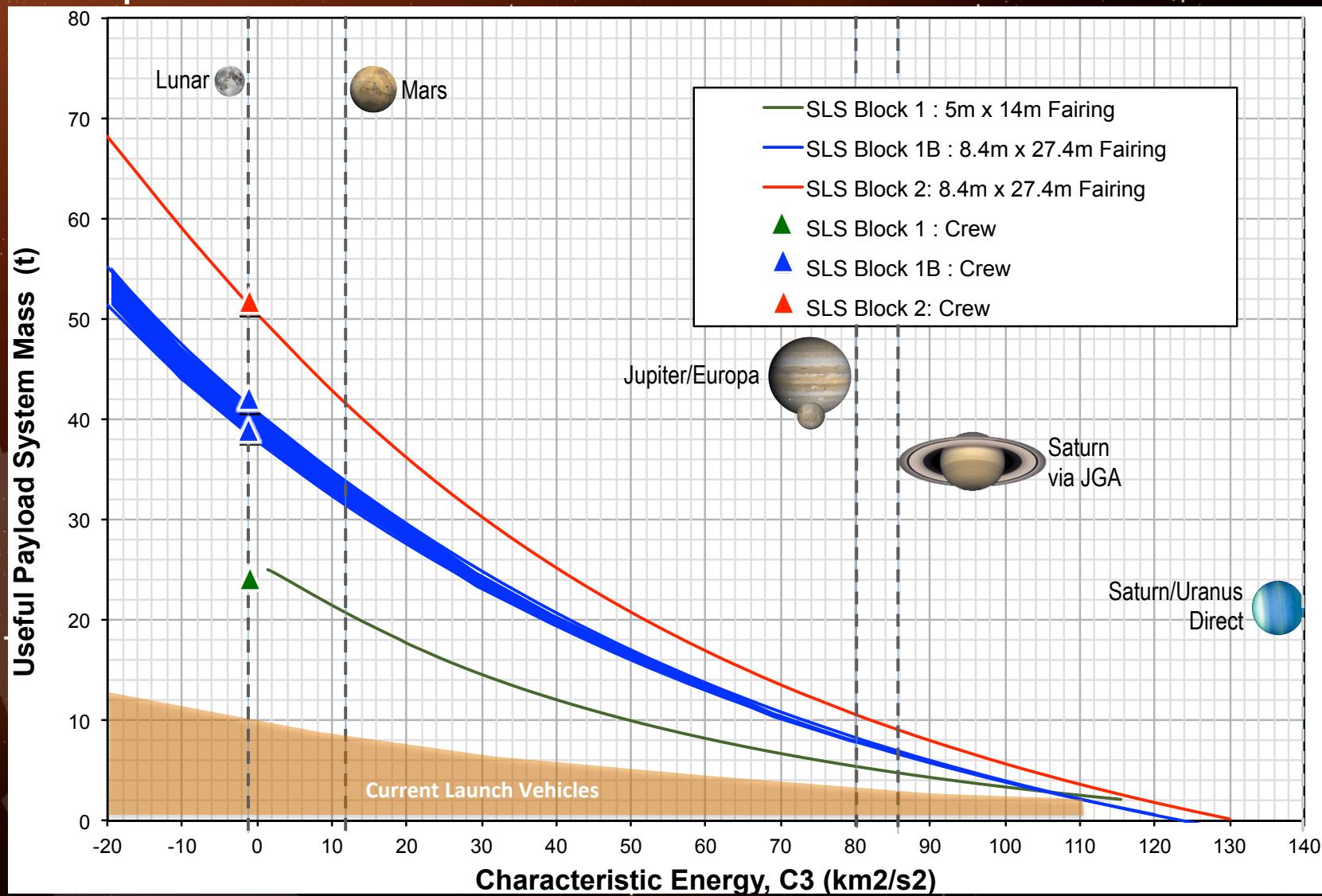


Departure Energy

- SLS offers reduced transit times to the outer solar system by half or greater.
- Higher characteristic energy (C3) also enables larger payloads to destination.



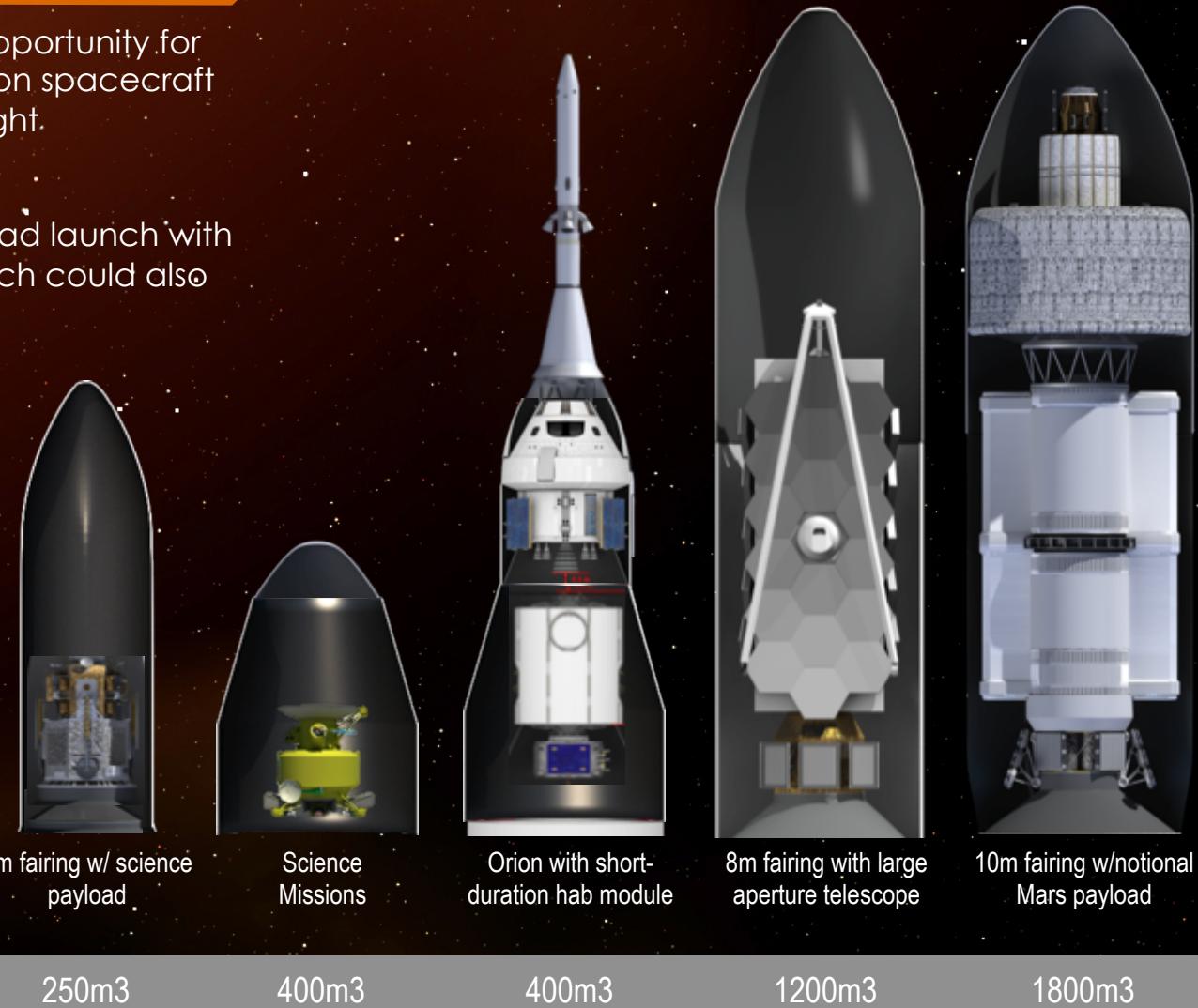
SLS Payload Mission Capture



SLS Payload Accommodations

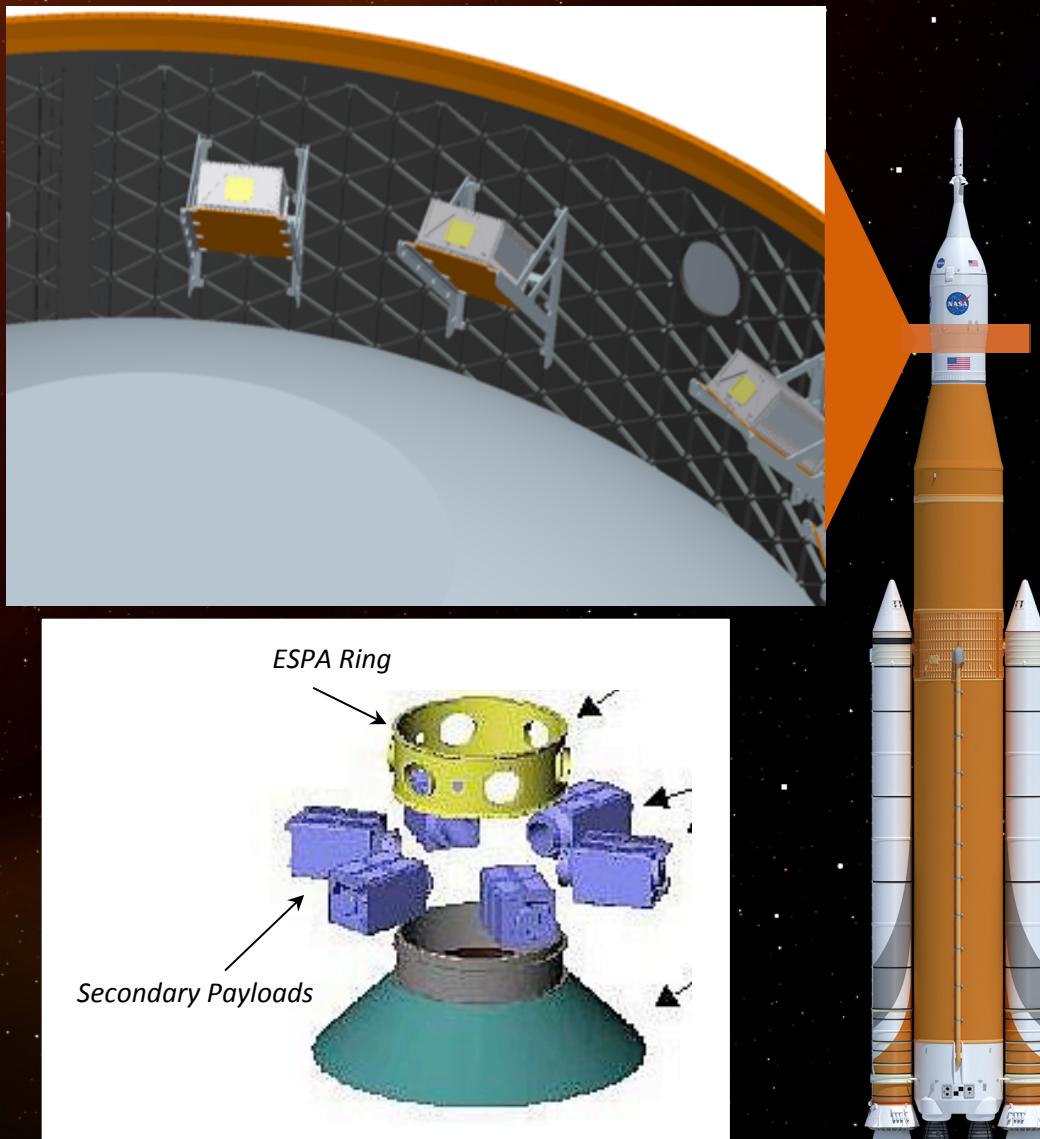
Fairing Availability

- ◆ Universal Stage Adapter offers opportunity for co-manifested payloads with Orion spacecraft or near-term 8.4-meter lower-height accommodations.
- ◆ USA can also support dual-payload launch with industry-standard 5-m fairing, which could also fly on Block 1 configuration.
- ◆ Universal Stage Adapter accommodations early as soon as 2023; 8.4- and 10-meter fairings available in the mid- and late-2020s, respectively.

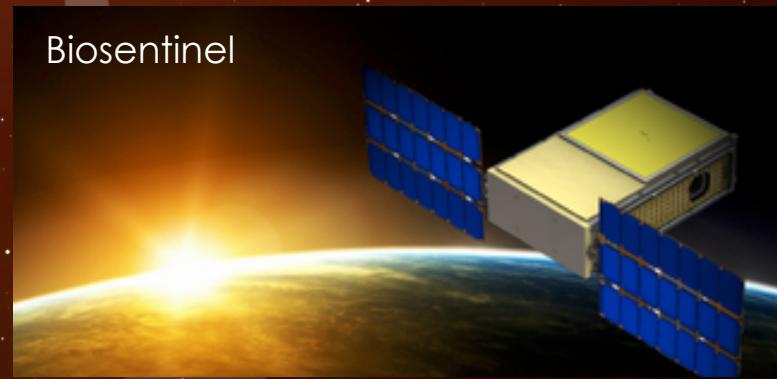
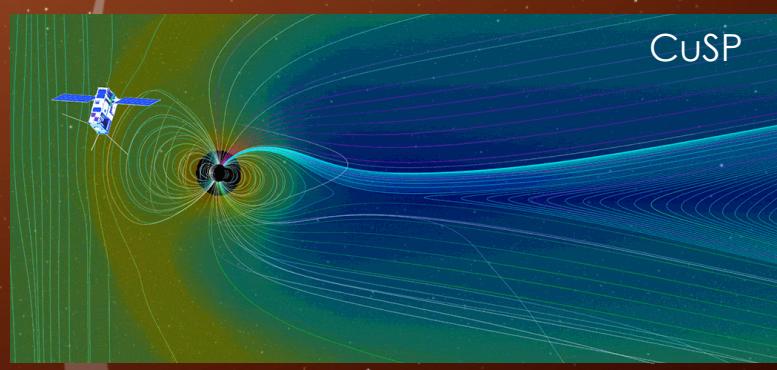


Secondary Payload Capability

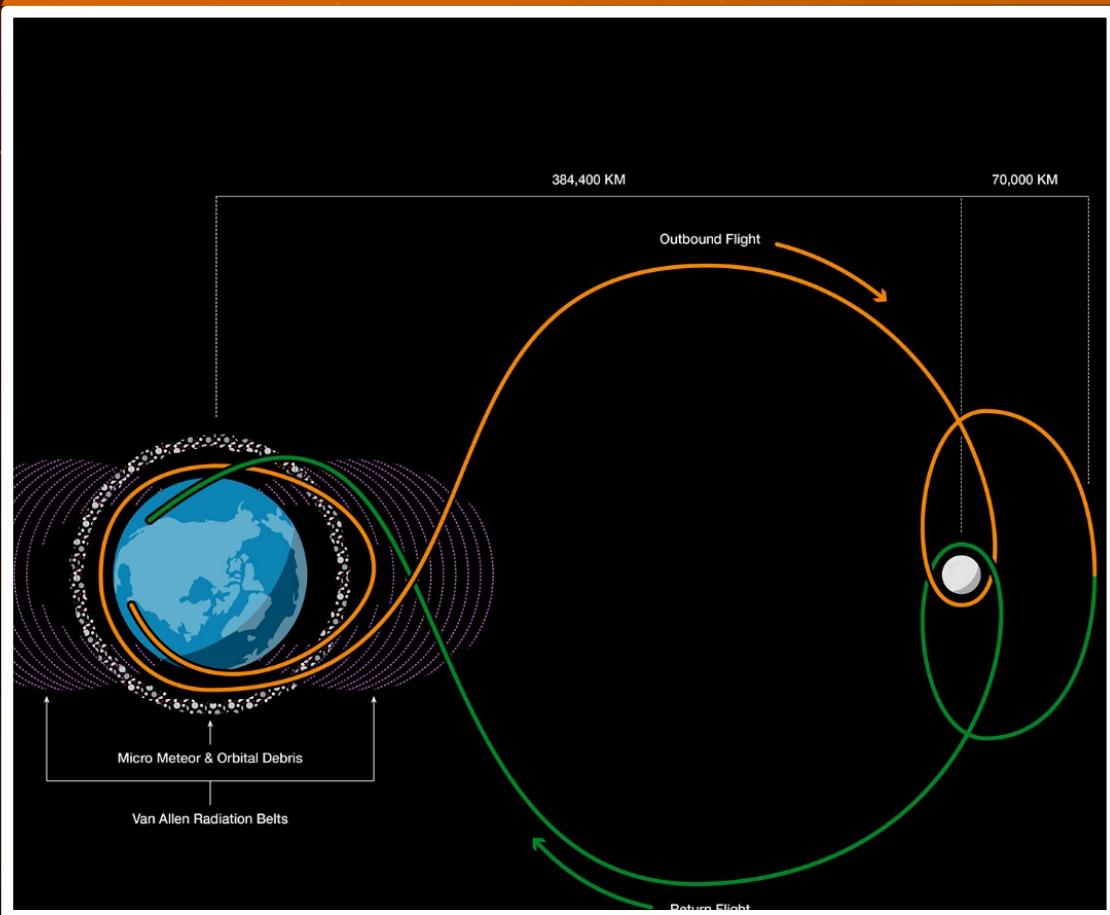
- Block 1 vehicle offers at least thirteen 6U payload locations
- 6U volume/mass is the current standard (14 kg payload mass)
- Payloads will be “off” from roll-out through Orion separation and payload deployment
- Payload Deployment System Sequencer; payload deployment will begin with pre-loaded sequence following MPCV separation and ICPS disposal burn
- Payload requirements captured in Interface Definition and Requirements Document
 - Block 1B and 2 vehicles offer up to six larger, ESPA-class secondary payload (>180 kg) accommodations



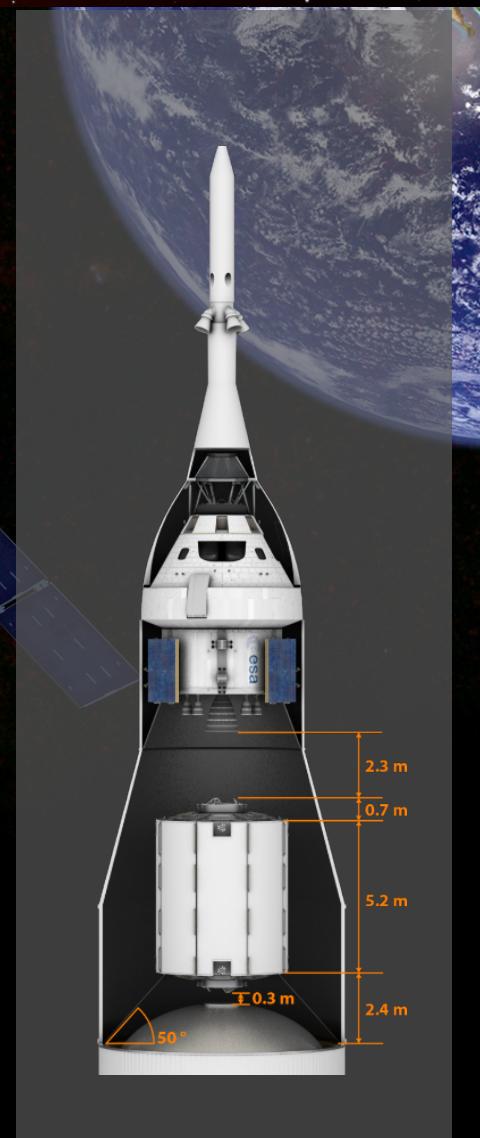
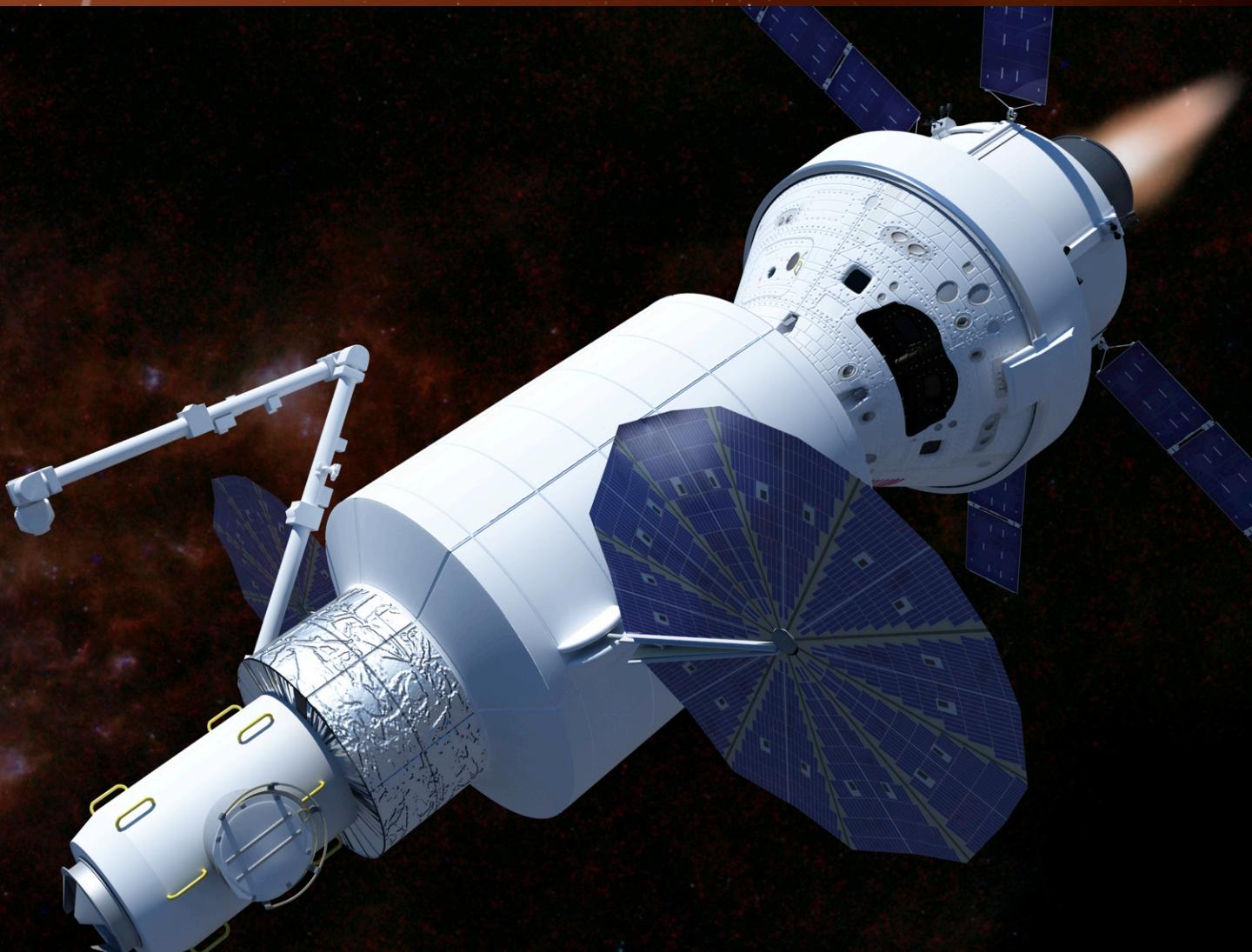
New Opportunities for SmallSats



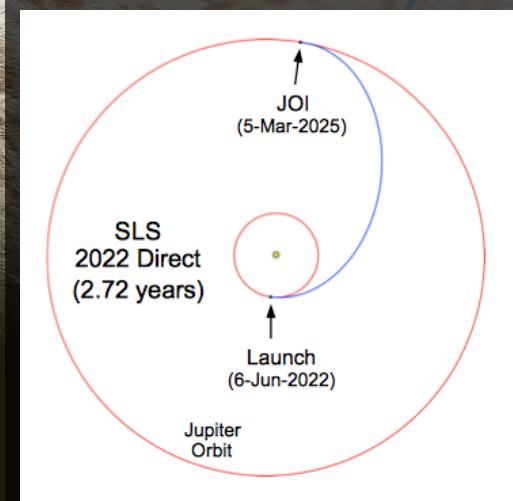
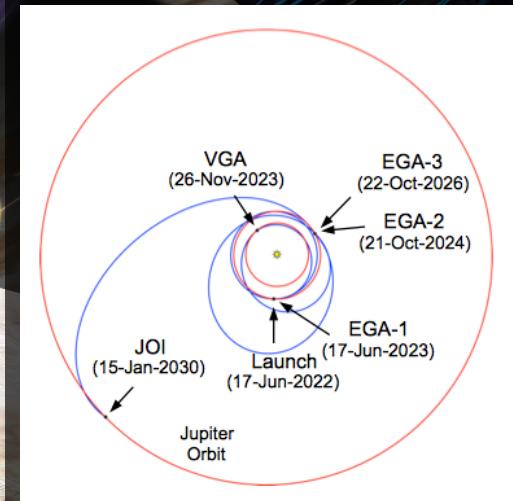
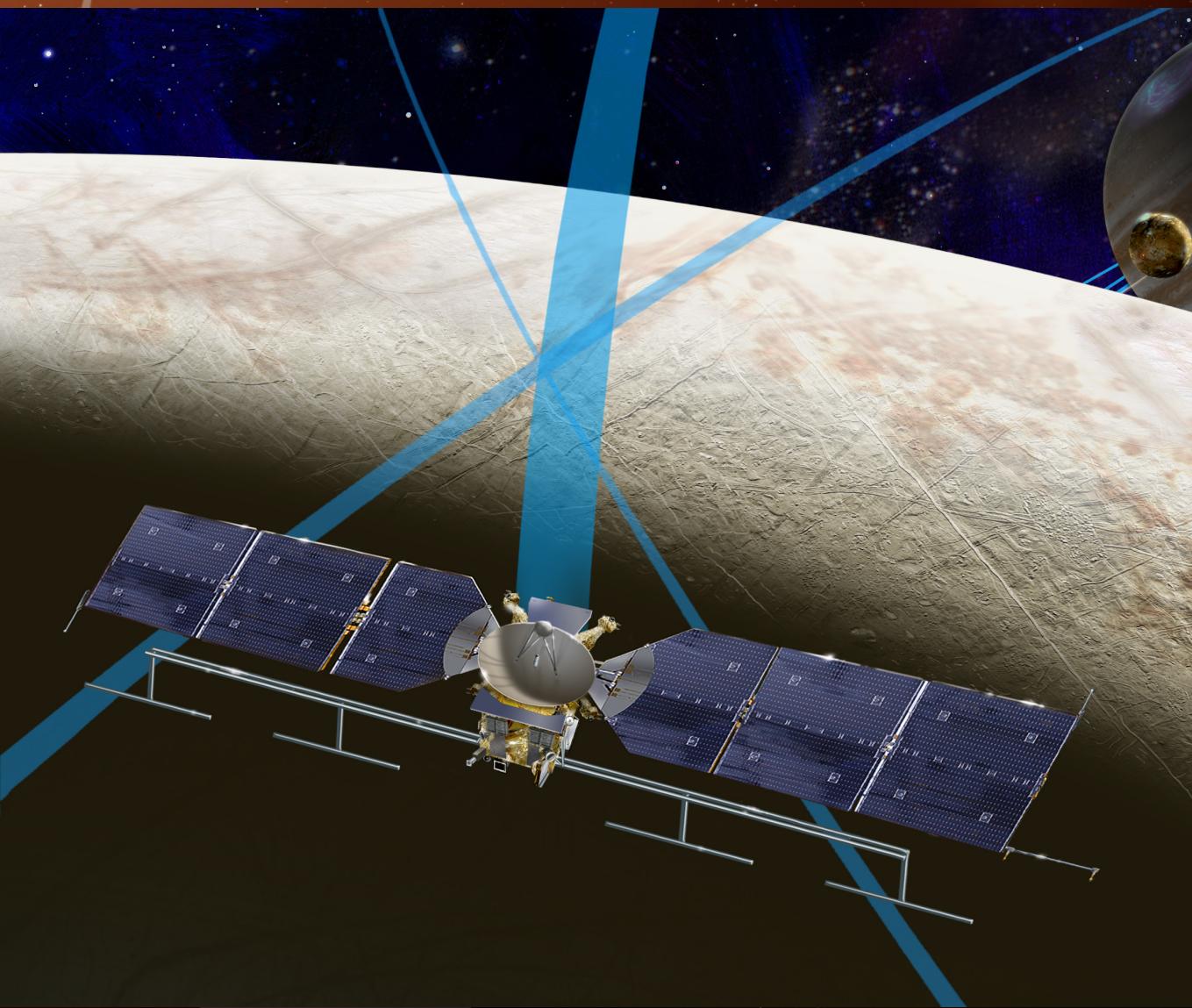
EM-1 Trajectory



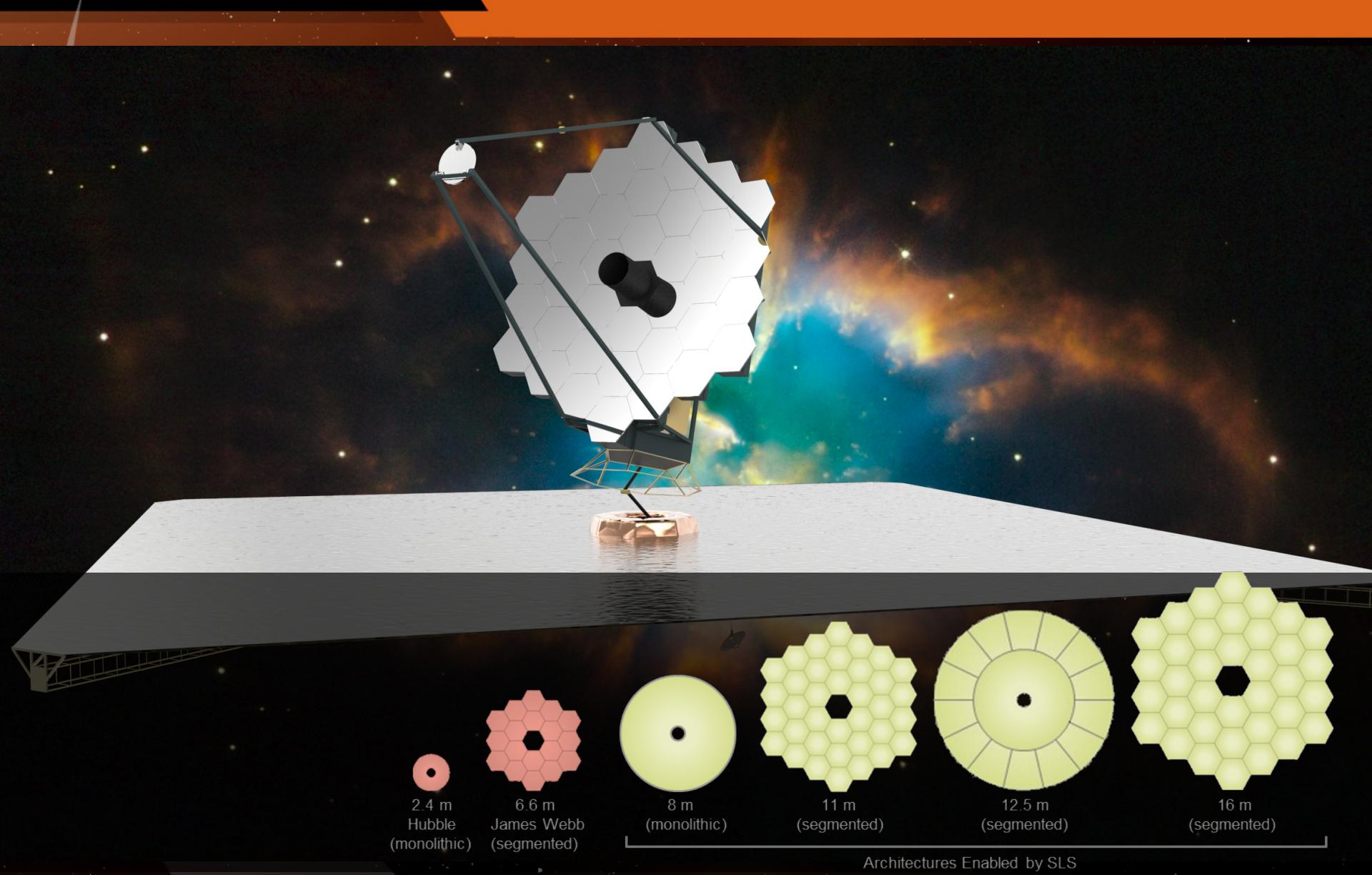
Utilization of SLS Mass Capabilities



Utilization of SLS Departure Energy



Utilization of SLS Volume



For More Information:

nasa-slspayloads@mail.nasa.gov



#JOURNEYTOMARS



www.nasa.gov



@NASA_SLS



NASASLS



[google.com/+nasa](https://plus.google.com/+nasa)



[youtube.com/nasa](https://www.youtube.com/nasa)



@explorenasa