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# SPACE LAUNCH SYSTEM

A NEW CAPABILITY FOR SPACE EXPLORATION

**Angie Jackman**  
**Space Launch System**

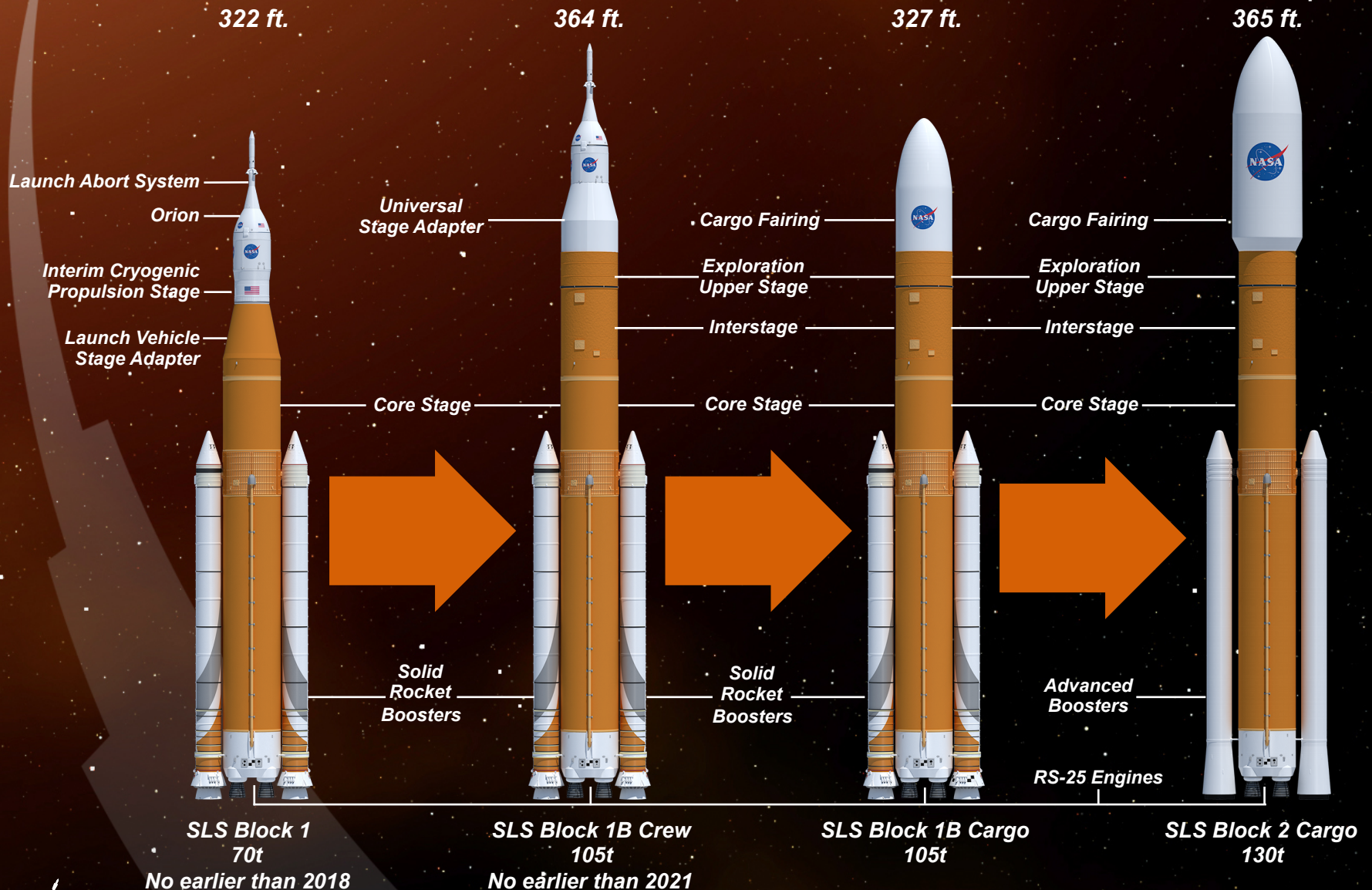
29 March 2016

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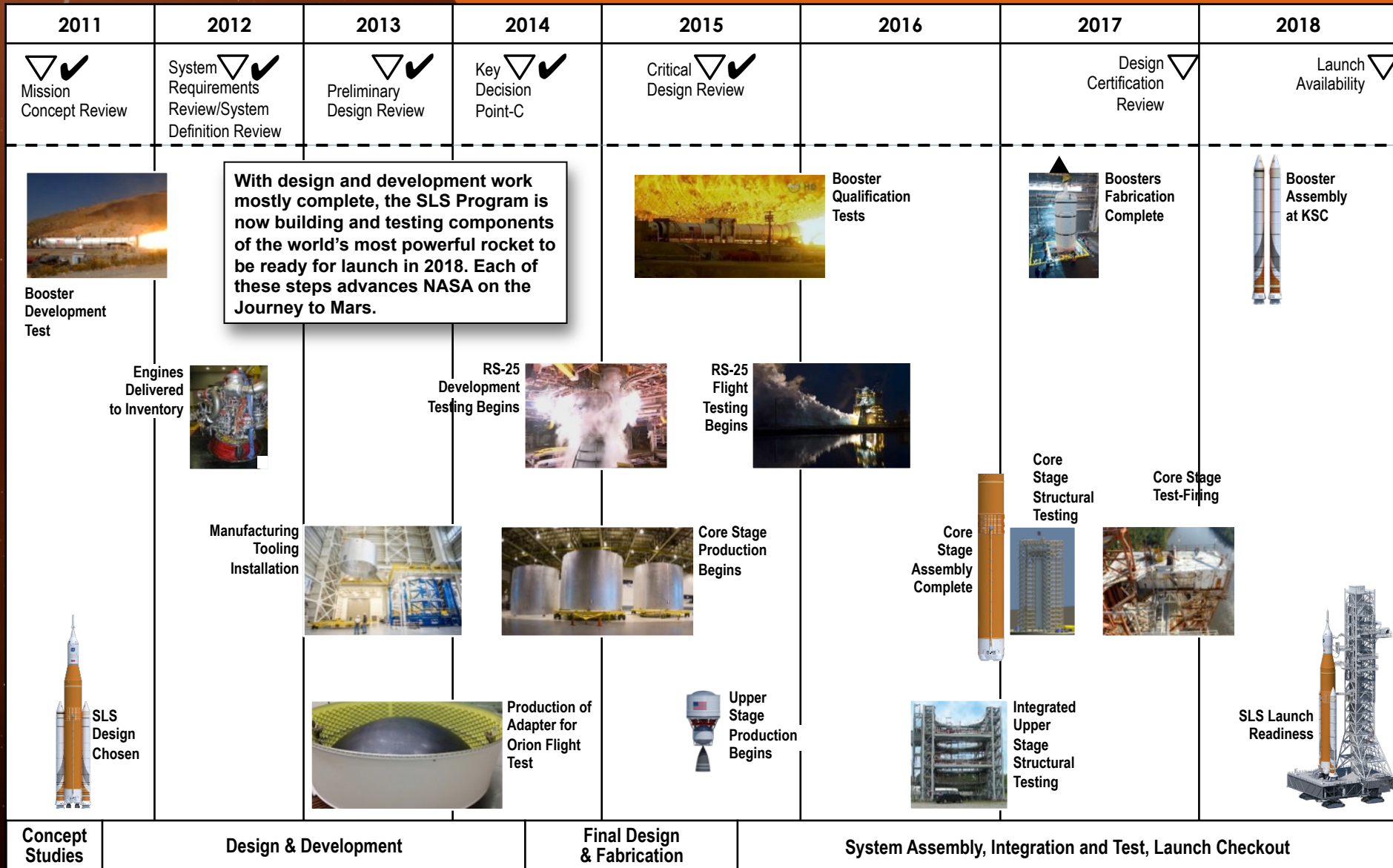


# SLS Evolution Overview





# Space Launch System Path to the Pad





# 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



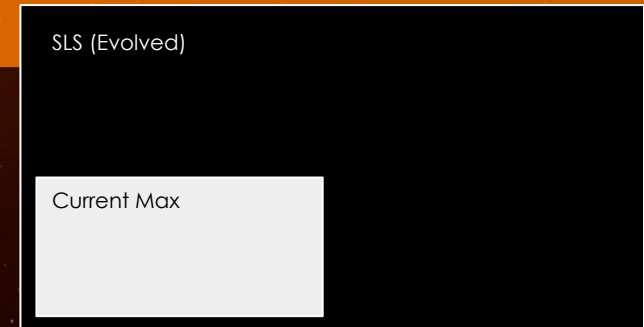
Upper stage production at ULA



# Benefits of Space Launch System

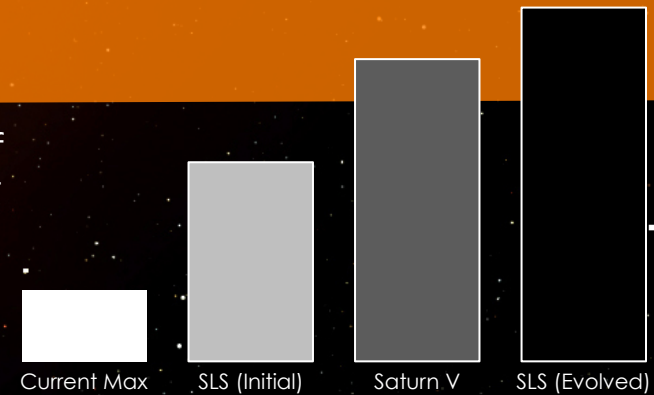
## Volume

- 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.



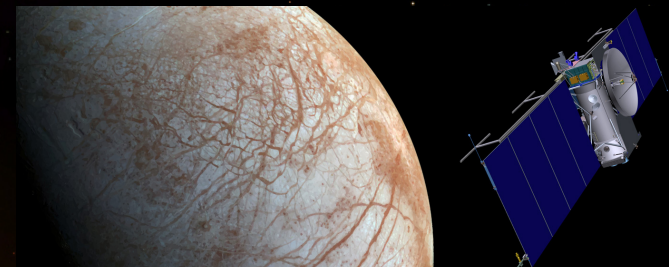
## Mass

- 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.

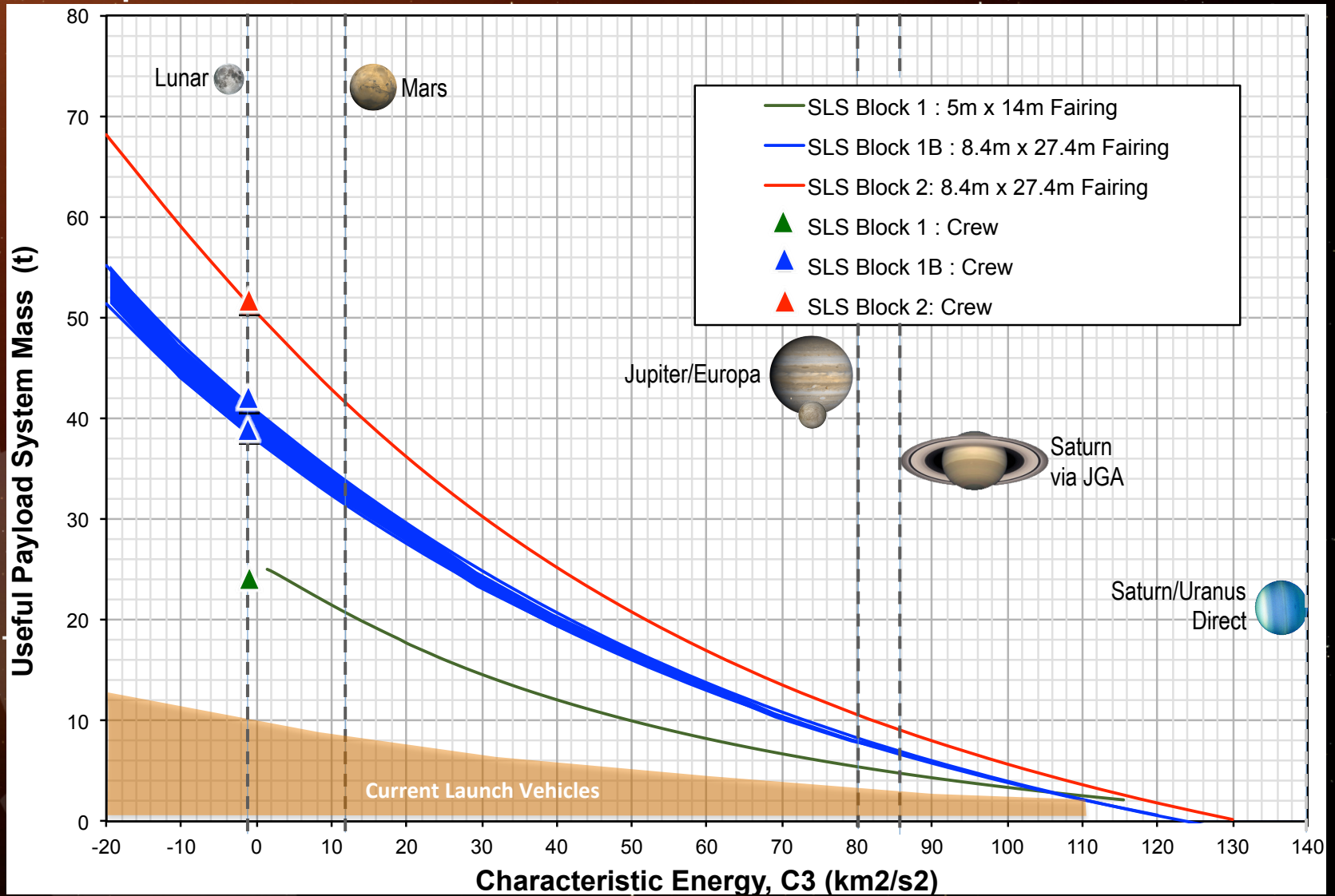


## Departure Energy

- 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

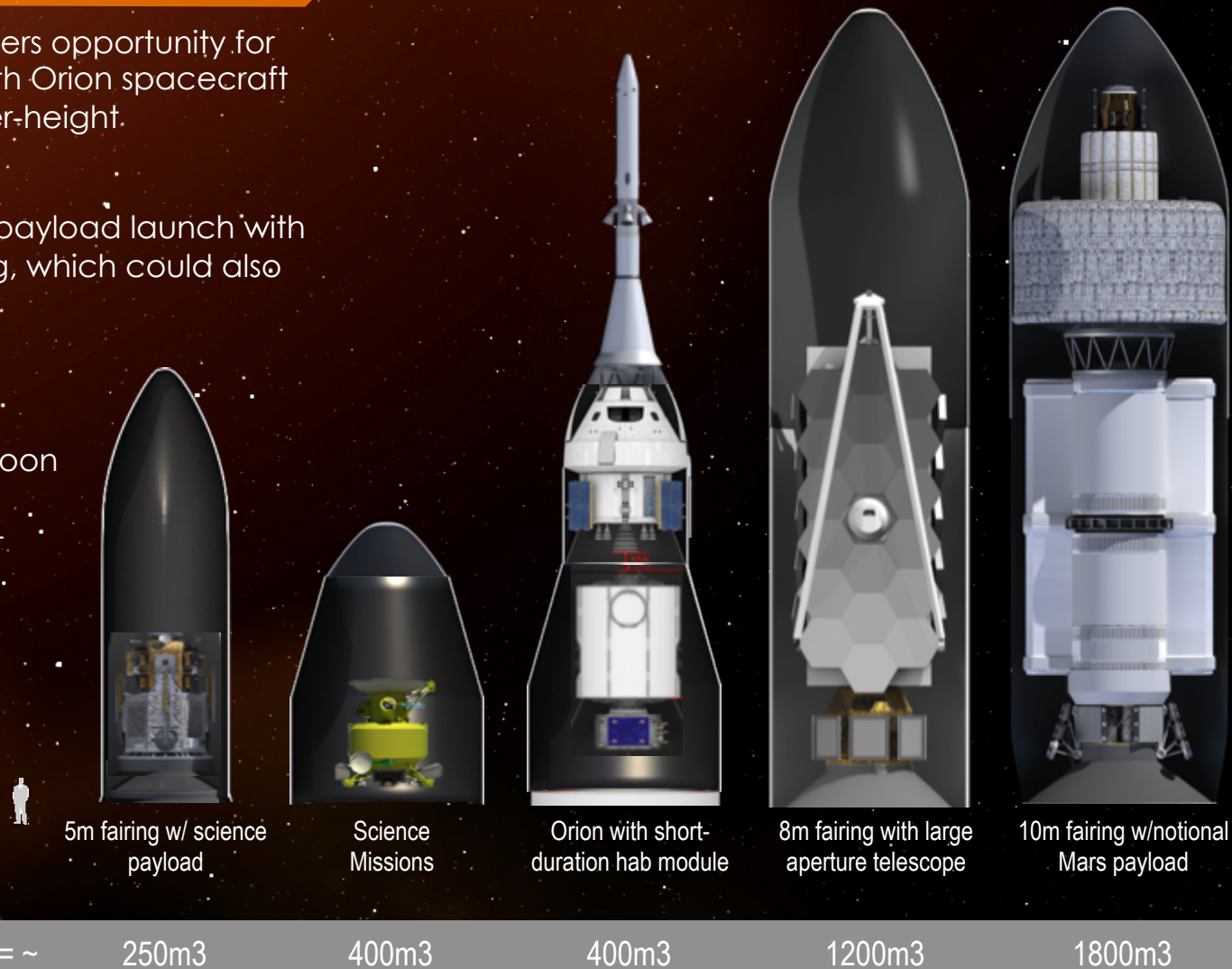




# SLS Payload Accommodations

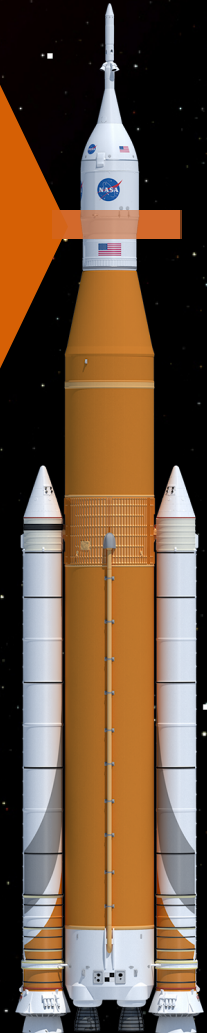
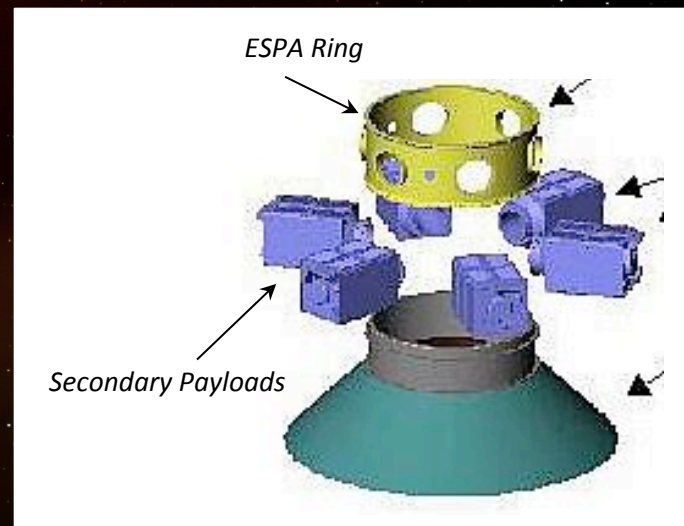
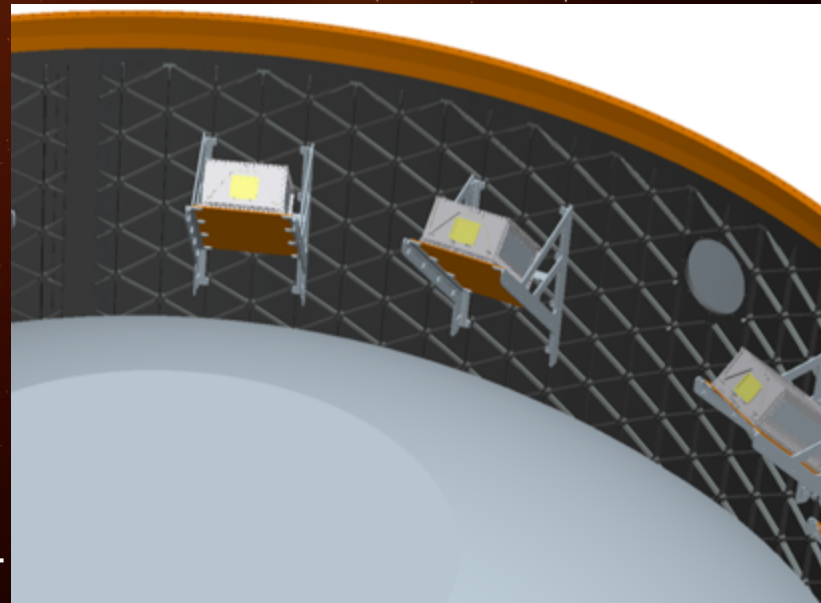
## Fairing Availability

- ◆ 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



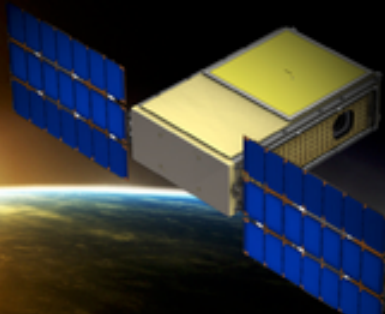


# New Opportunities for SmallSats

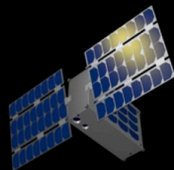
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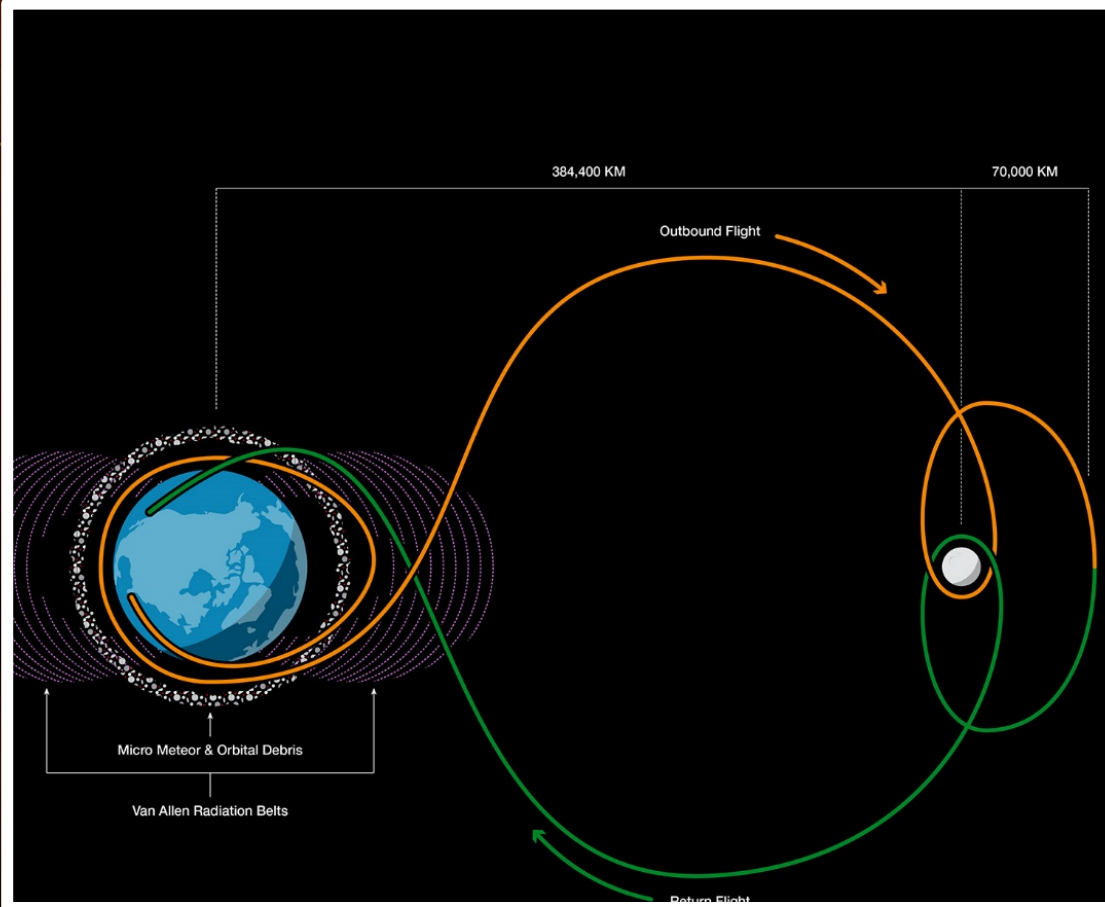
Biosentinel



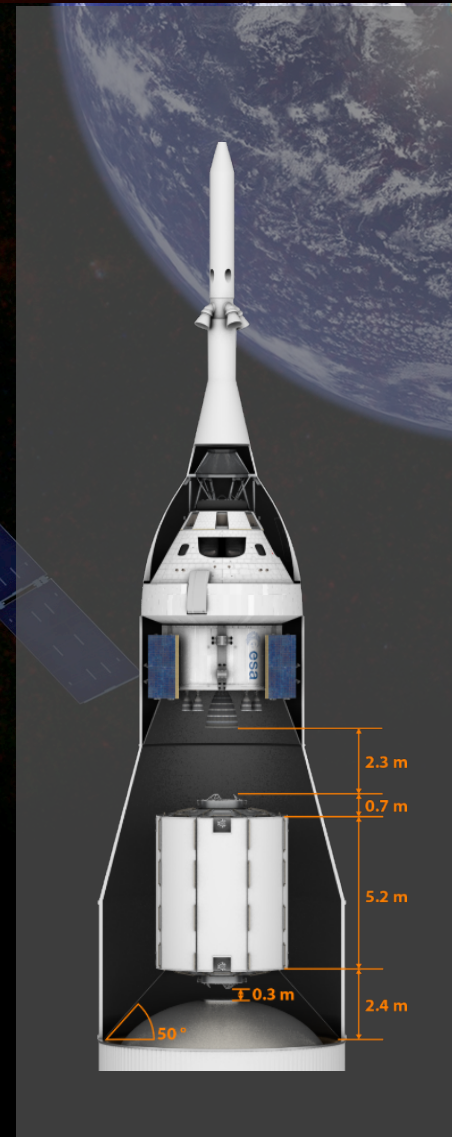
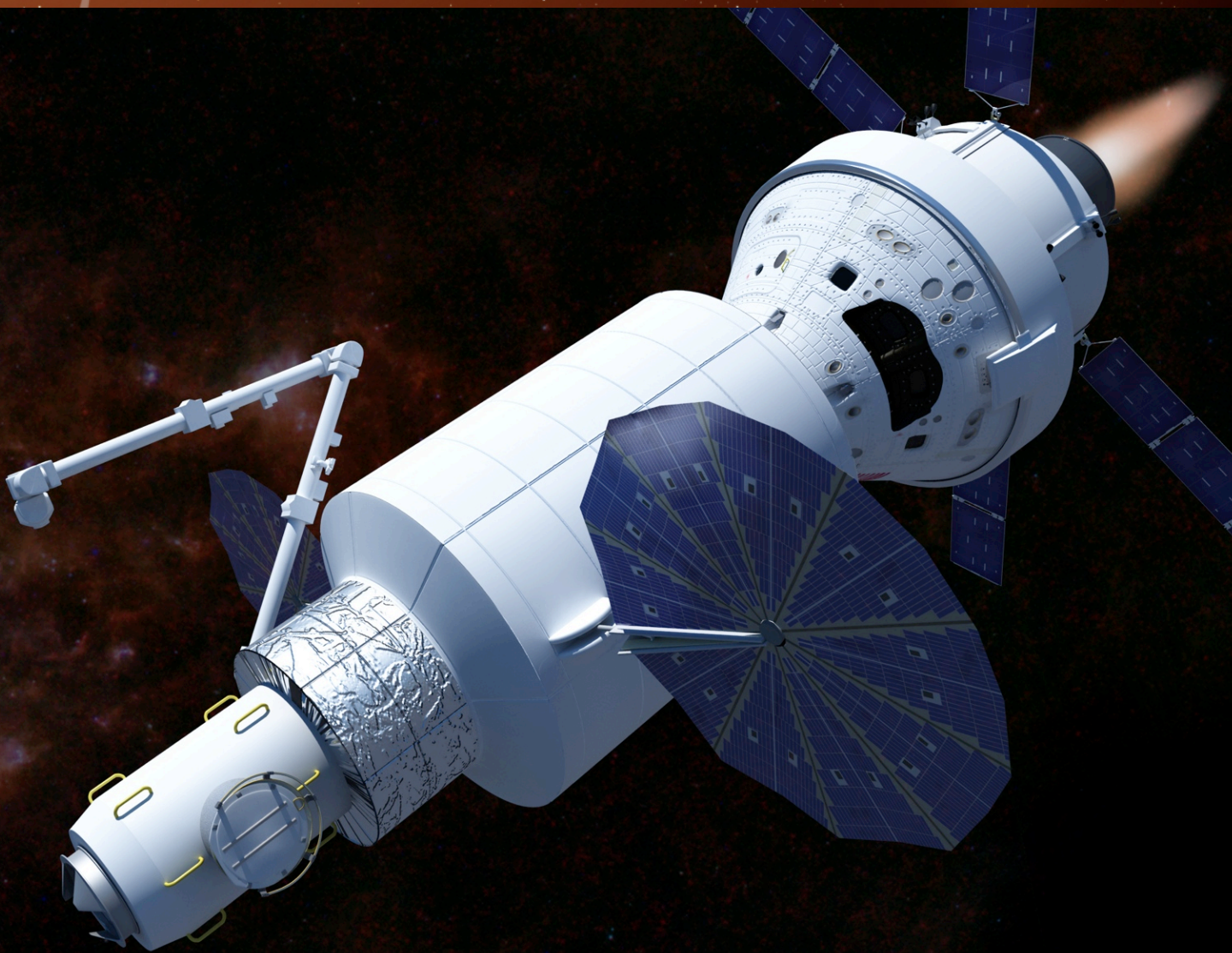
LunaH-Map



## EM-1 Trajectory

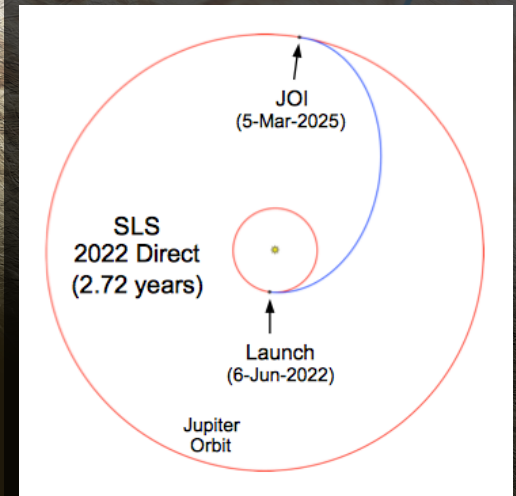
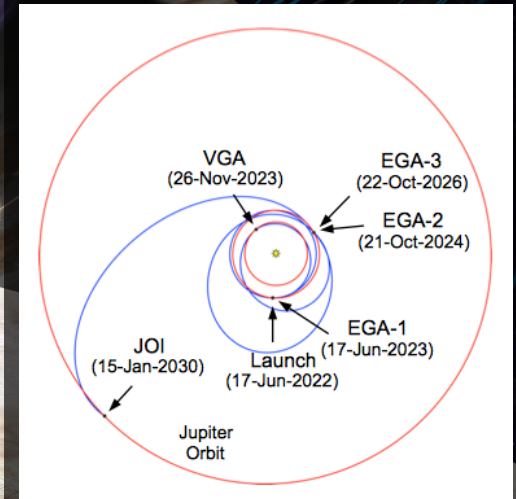
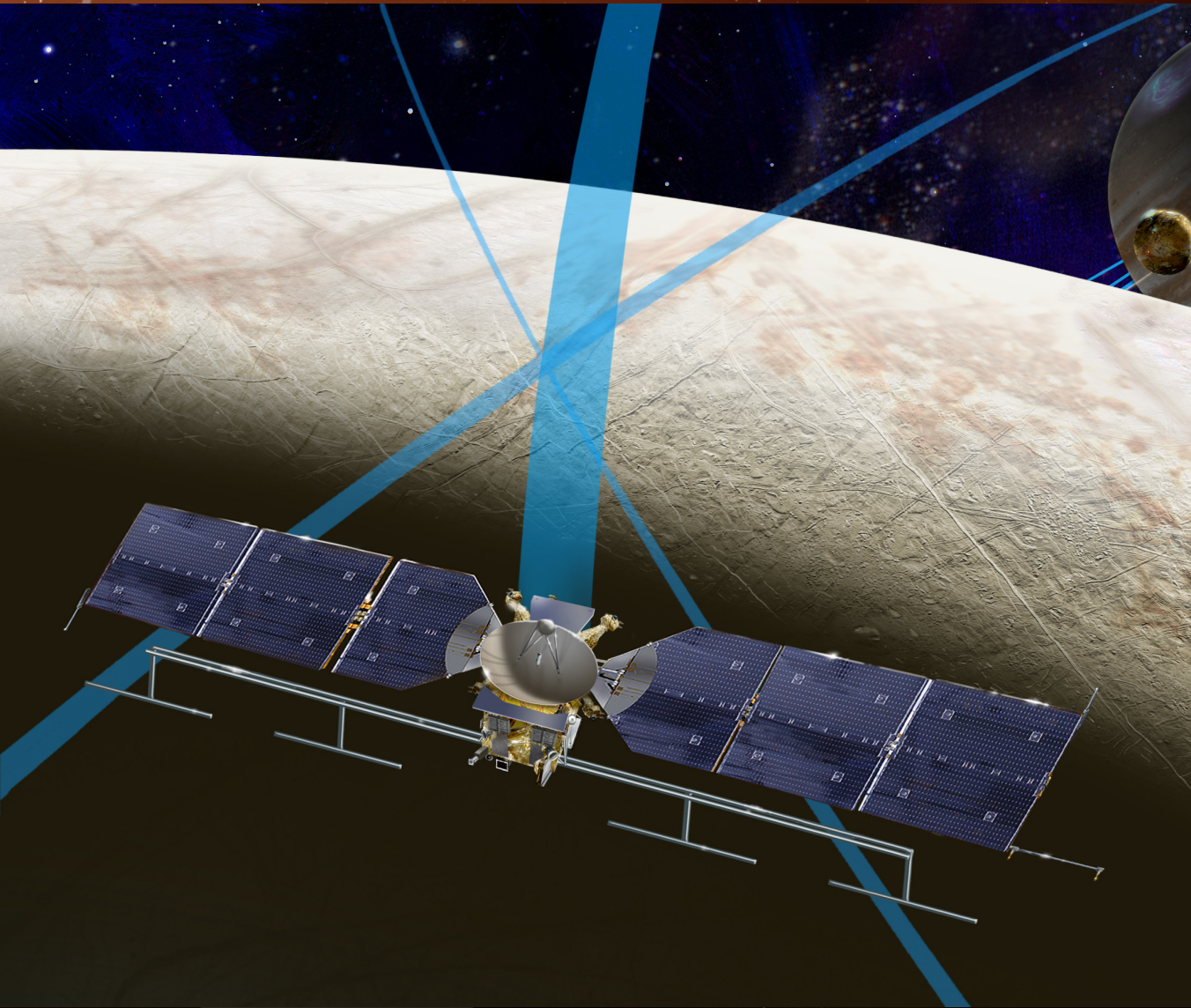


# Utilization of SLS Mass Capabilities



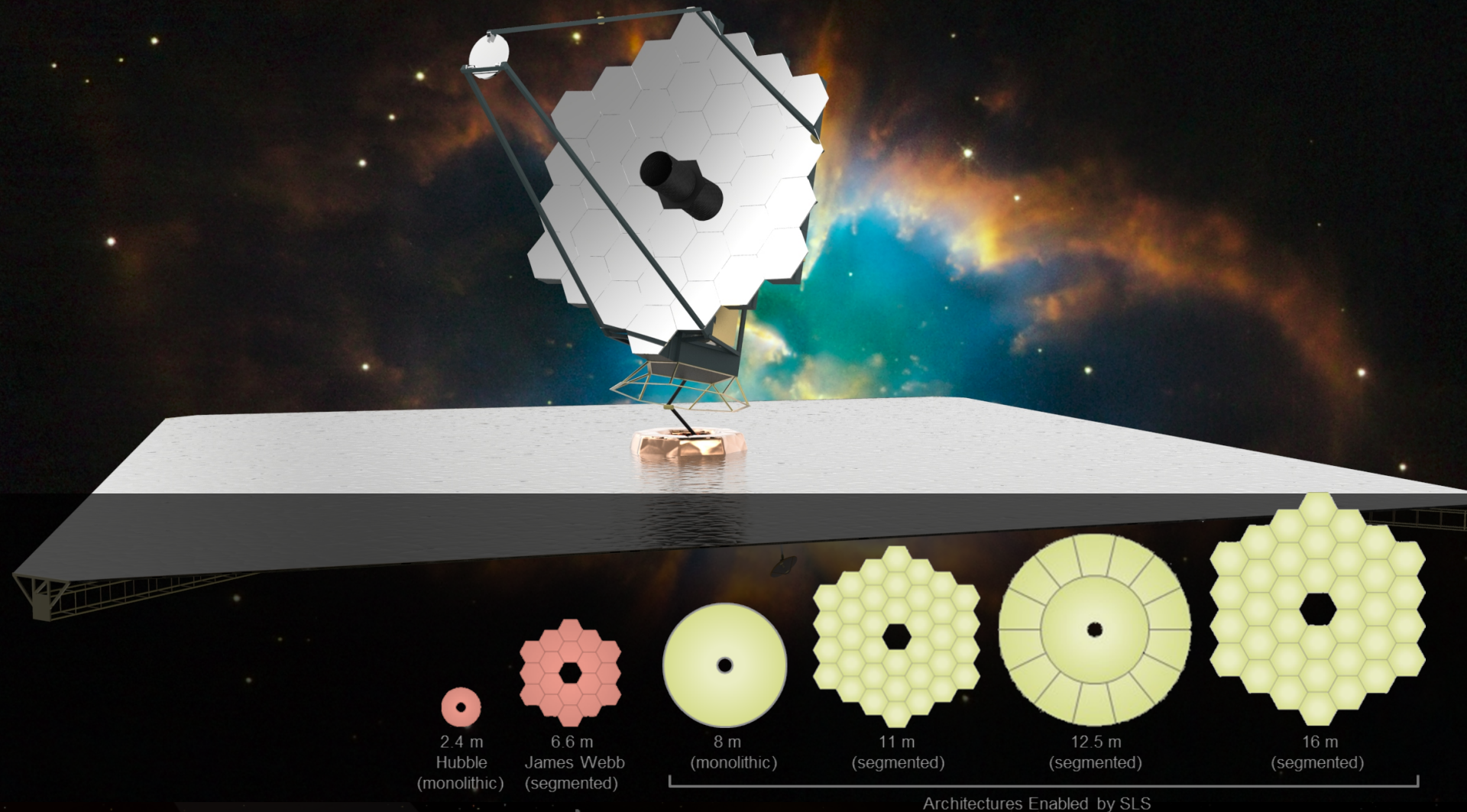


# Utilization of SLS Departure Energy





# Utilization of SLS Volume



Architectures Enabled by SLS



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