



NASA's Space Launch System: A Cornerstone Capability for Exploration

Stephen D. Creech

Deputy Manager, Spacecraft/Payload Integration & Evolution
Space Launch System Program

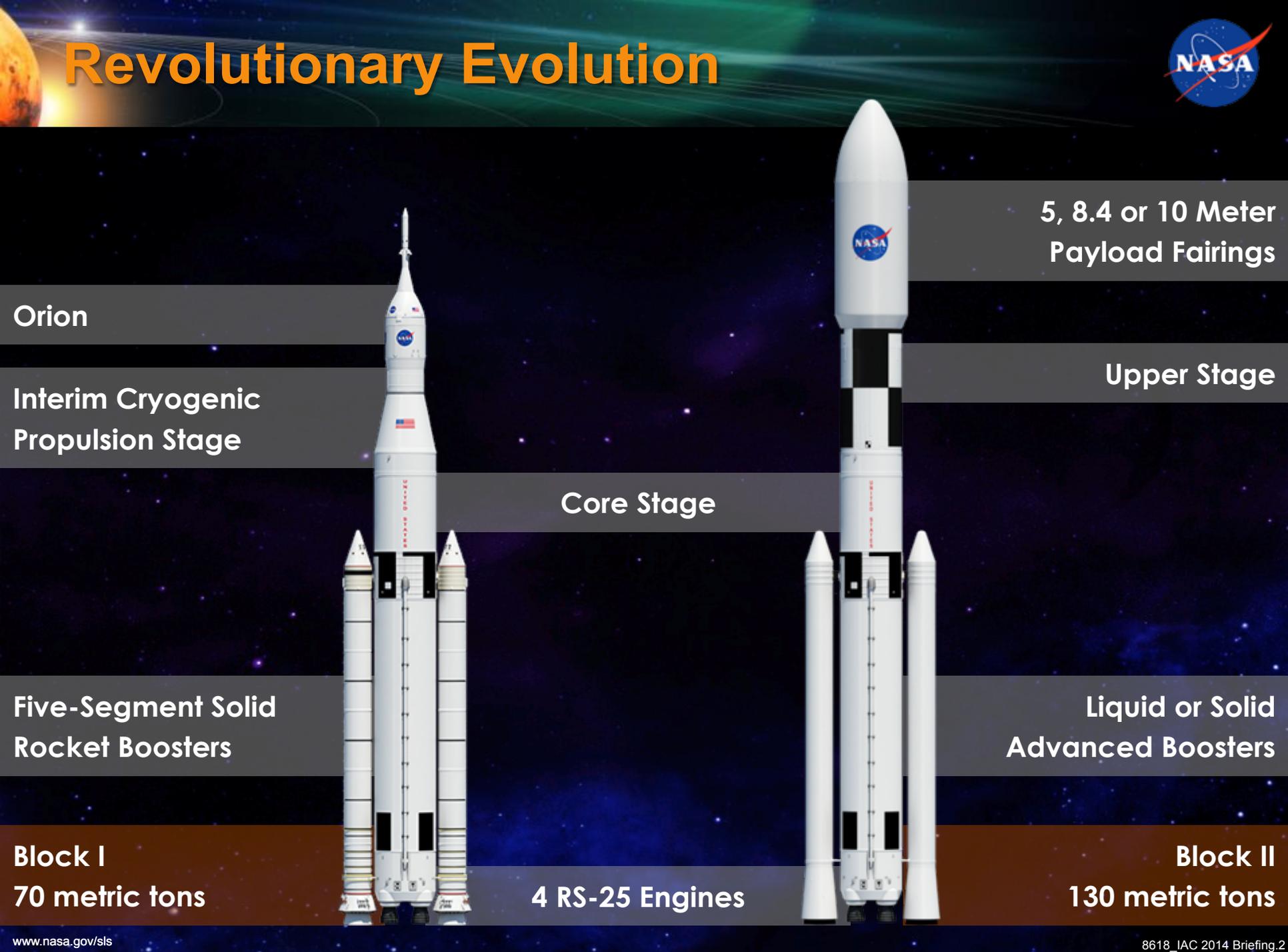
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Space Launch System



Revolutionary Evolution



5, 8.4 or 10 Meter Payload Fairings

Upper Stage

Core Stage

Liquid or Solid Advanced Boosters

Block II

130 metric tons

4 RS-25 Engines

Orion

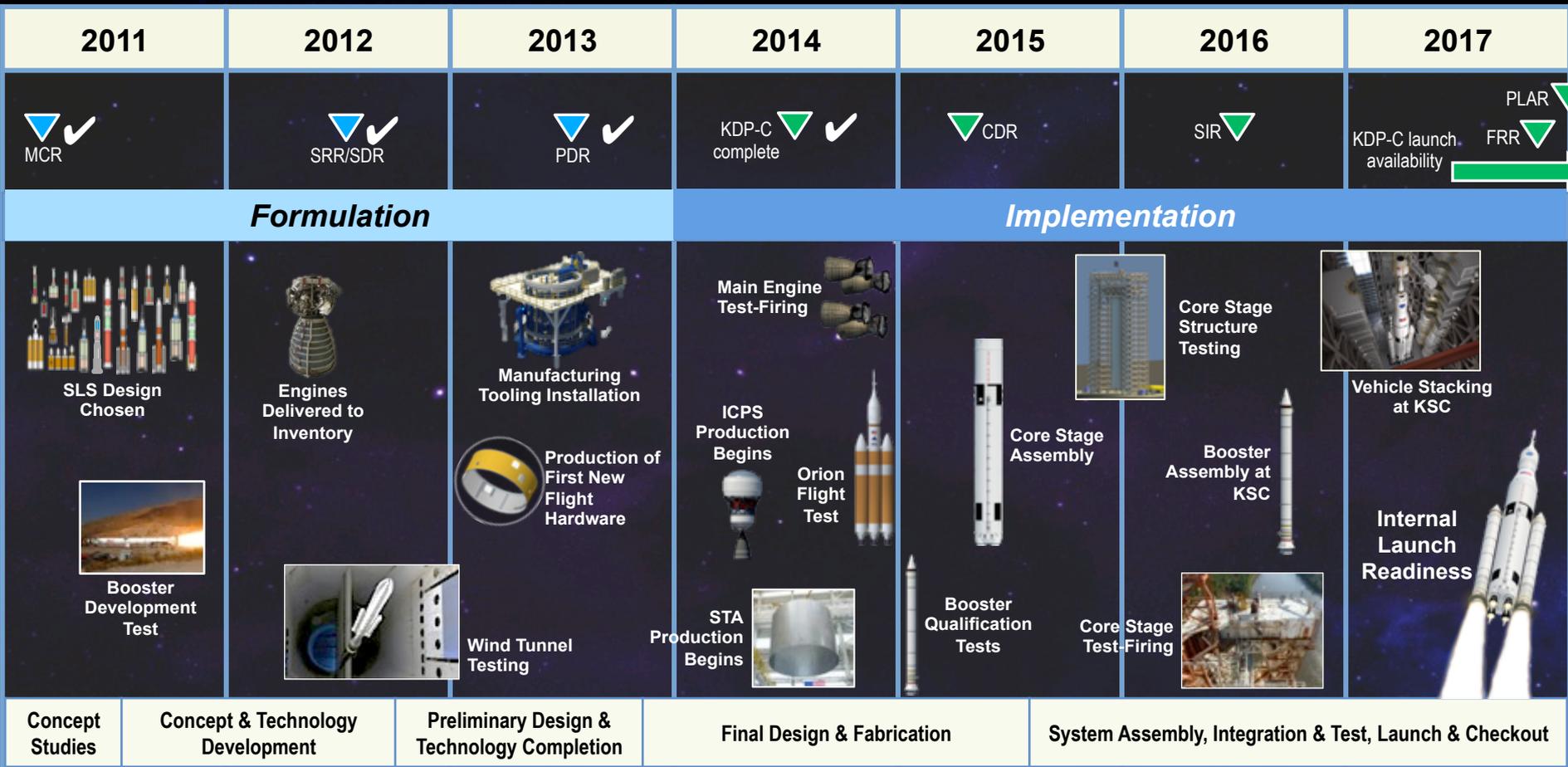
Interim Cryogenic Propulsion Stage

Five-Segment Solid Rocket Boosters

Block I

70 metric tons

SLS Milestone Schedule

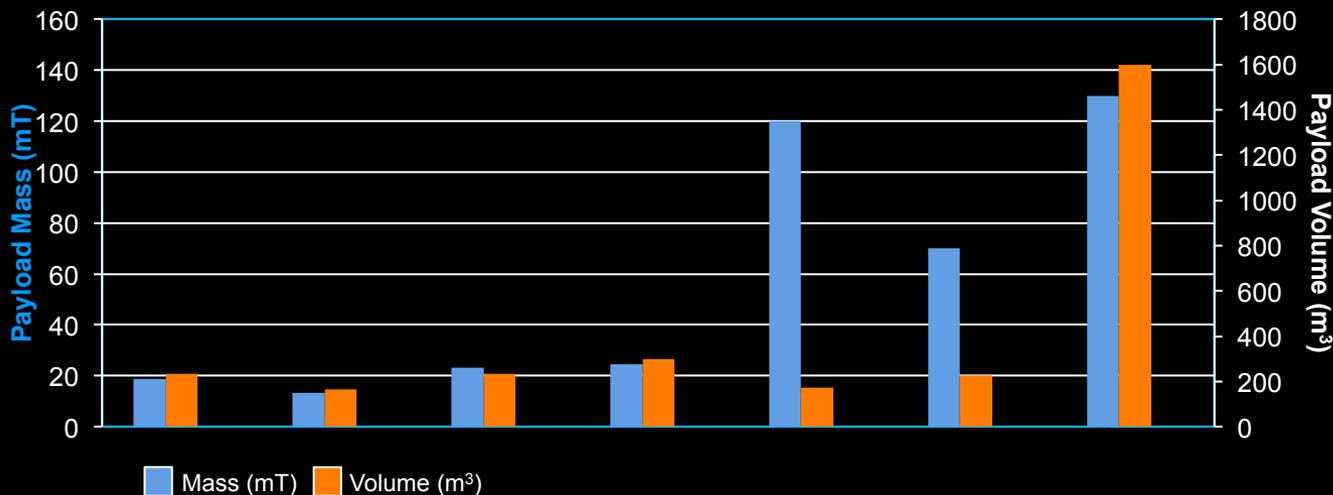
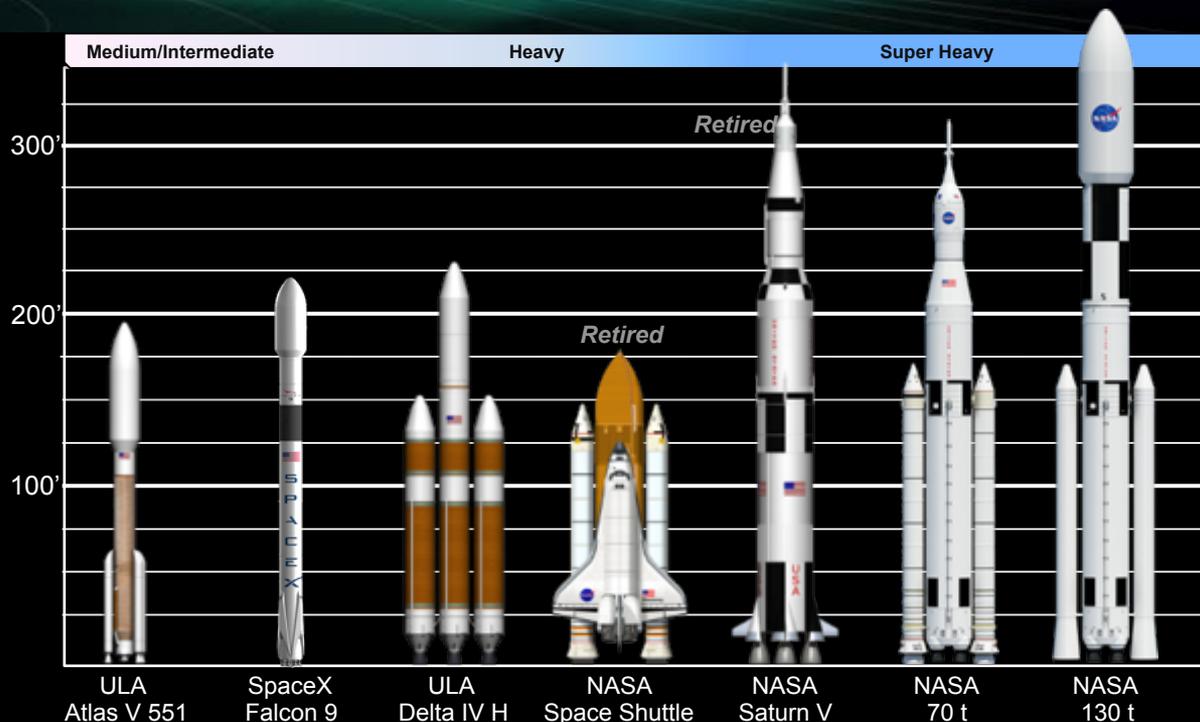


MCR: Mission Concept Review	CDR: Critical Design Review
SRR: System Requirements Review	SIR: System Integration Review
SDR: System Definition Review	FRR: Flight Readiness Review
PDR: Preliminary Design Review	PLAR: Post-Launch Asses. Review

SLS Mass Lift Capability



- ◆ SLS initial configuration offers 70 t to LEO.
- ◆ Future configurations offer 105 and 130 t to LEO.
- ◆ Mass capability benefits mean larger payloads to any destination.



SLS Payload Volume Capacity



- ◆ SLS is investigating utilizing existing fairings for early cargo flights, offering payload envelope compatibility with design for current EELVs
- ◆ Phase A studies in work for 8.4m and 10 m fairing options



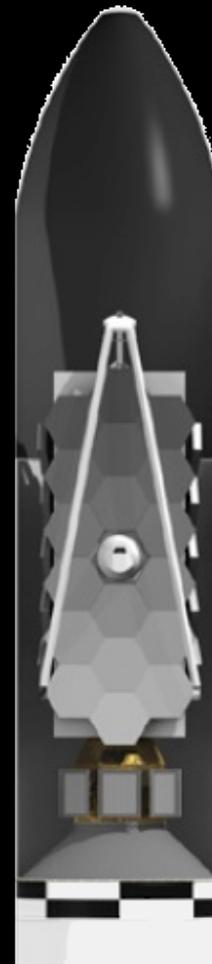
4m x 12m
(100 m³)



5m x 14m
(200 m³)



5m x 19m
(300 m³)

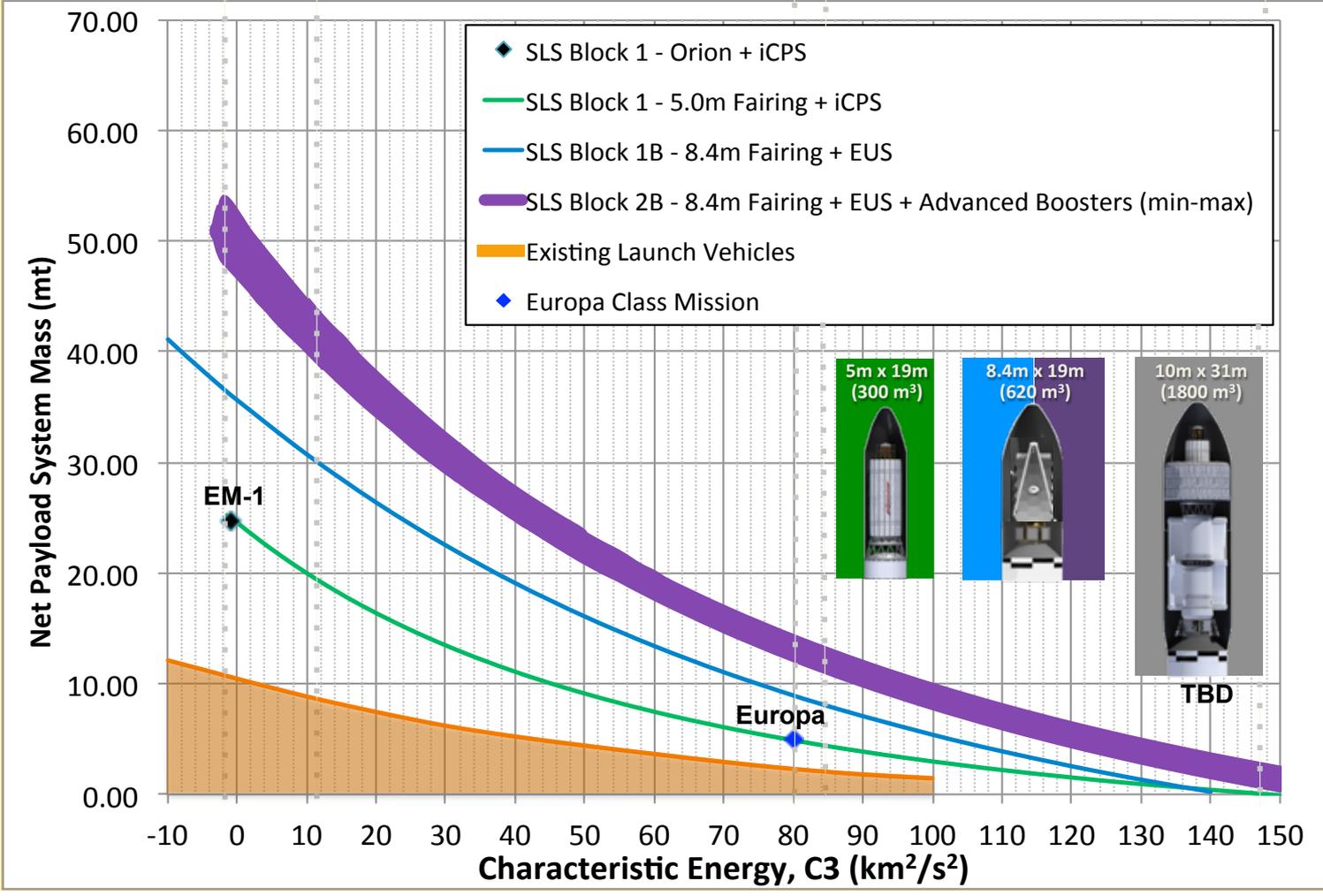


8.4m x 31m
(1200 m³)



10m x 31m
(1800 m³)

SLS Characteristic Energy



The Journey to Mars



EARTH RELIANT

MISSION: 6 TO 12 MONTHS
RETURN TO EARTH: HOURS



Mastering fundamentals
aboard the International
Space Station

U.S. companies
provide access to
low-Earth orbit

PROVING GROUND

MISSION: 1 TO 12 MONTHS
RETURN TO EARTH: DAYS



Expanding capabilities by
visiting an asteroid redirected
to a lunar distant retrograde orbit

The next step: traveling beyond low-Earth
orbit with the Space Launch System
rocket and Orion spacecraft



MARS READY

MISSION: 2 TO 3 YEARS
RETURN TO EARTH: MONTHS



Developing planetary independence
by exploring Mars, its moons and
other deep space destinations

SLS Offers Broad Utilization Options



Human Missions to Mars



Mars Sample Return



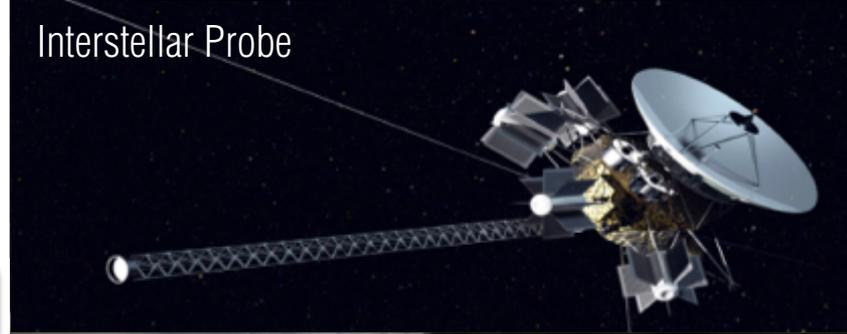
Europa Exploration



Asteroid Redirect Mission



Ultra-Large Space Telescopes

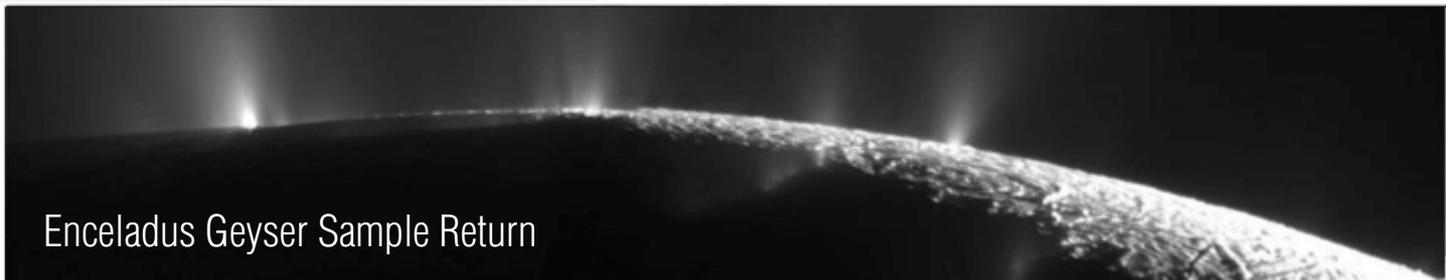


Interstellar Probe

NASA's Space Launch System



Space Stations

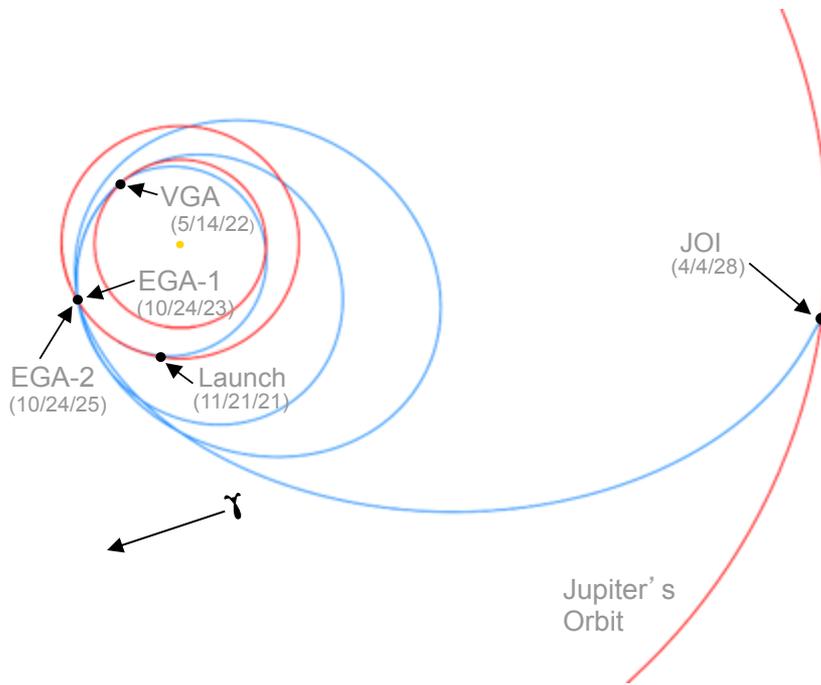


Enceladus Geyser Sample Return

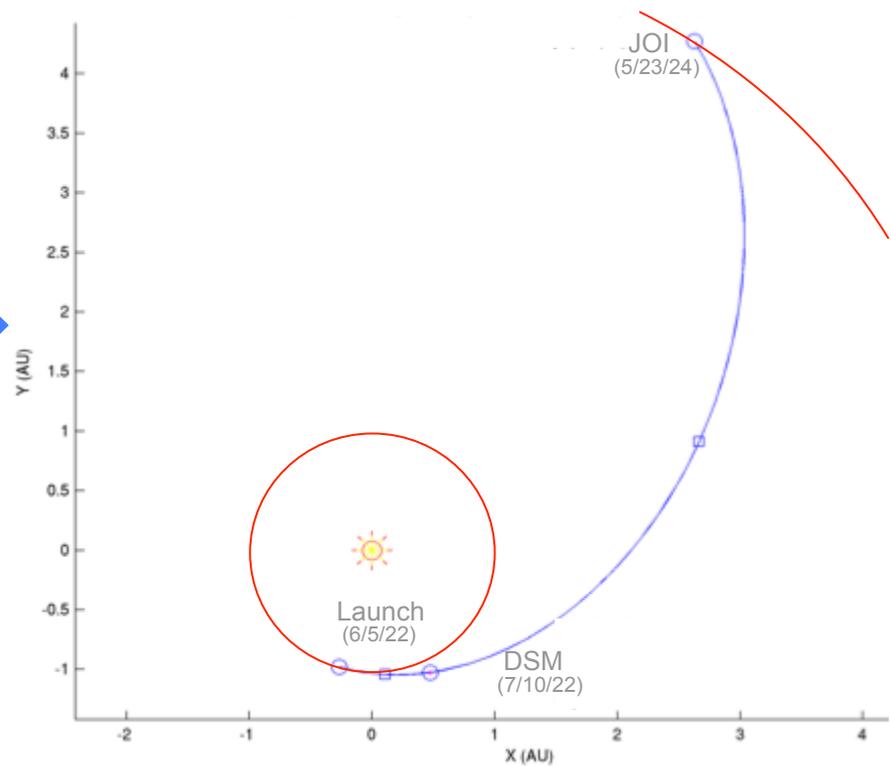
Europa Trajectory Comparison



Atlas V 551: VEEGA



SLS: Direct



REDUCES TRANSIT TIME TO EUROPA FROM 6.5 TO 2.7 YEARS

Summary



◆ SLS provides capability for human exploration missions.

- 70 t configuration enables EM-1 and EM-2 flight tests.
- Evolved configurations enable missions including humans to Mars.

◆ SLS offers unrivaled benefits for a variety of missions.

- 70 t provides greater mass lift than any contemporary launch vehicle; 130 t offers greater lift than any launch vehicle, ever.
- With 8.4m and 10m fairings, SLS will offer greater volume lift capability than any other vehicle.
- Initial ICPS configuration and future evolution will offer highest-ever C3.

◆ SLS is currently on schedule for first launch in December 2017.

- Preliminary design completed in July 2013; SLS is now in implementation.
- Manufacture and testing are currently underway.
- Hardware now exists representing all SLS elements.

