AEROSPACE AMERICA

SPACE RESCUE

Human spaceflight's Achilles' heel — stranding customers without a rescue plan PAGE 22

YOUR ARTEMIS I MISSION GUIDE

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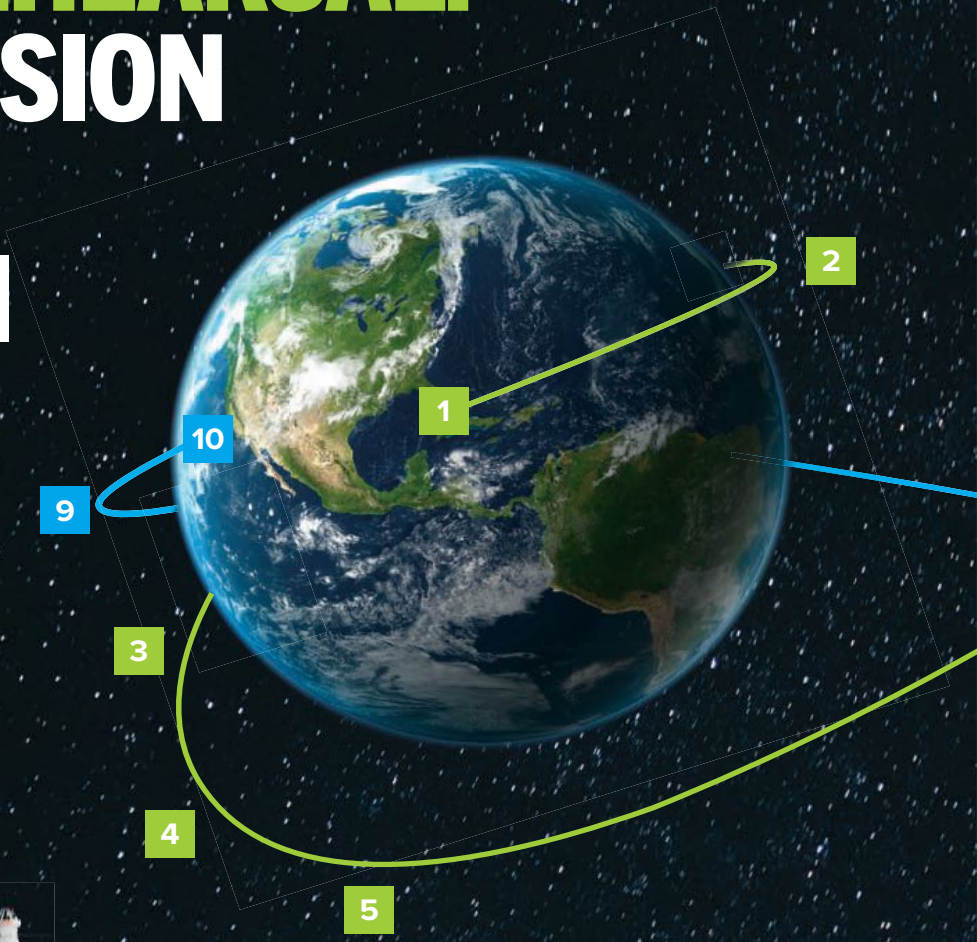
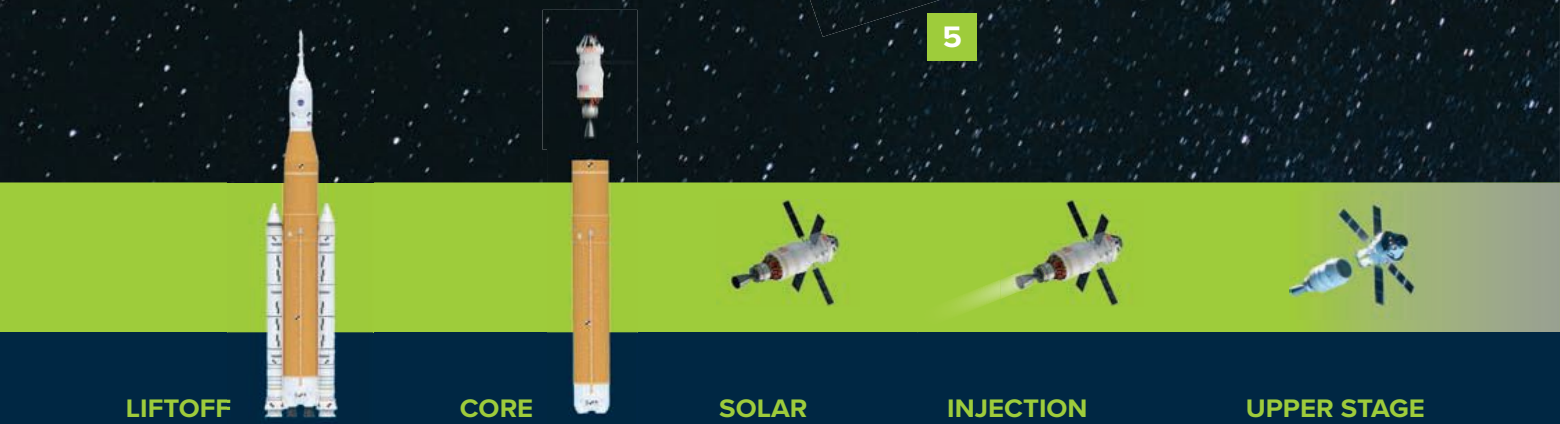
AIAA
SHAPING THE FUTURE OF AEROSPACE

LUNAR REHEARSAL: YOUR MISSION GUIDE TO ARTEMIS I

NASA will conduct an uncrewed lunar practice run to test its Space Launch System rocket before it carries astronauts. This upcoming mission, Artemis I, will be a precursor to a similar crewed flight to be followed by a lunar landing targeted for 2024. Pull out this guide and refer to it as Artemis I unfolds.





LIFTOFF

LAUNCH +0

1 A NASA Space Launch System rocket blasts off from Kennedy Space Center, Florida, in the design's inaugural launch, from Launch Complex 39B, notable as the pad for the Apollo 10 "dress rehearsal" for the 1969 moon landing. Three minutes after liftoff, Orion capsule jettisons its launch abort rockets and protective shroud.

CORE SEPARATION

+8 MINS

2 SLS core stage separates at 161 kilometers for disposal into the Atlantic Ocean, while upper stage, service module and Orion capsule continue climbing.

SOLAR ARRAYS OUT

+16 MINS

3 Orion service module deploys four solar arrays.

INJECTION BURN

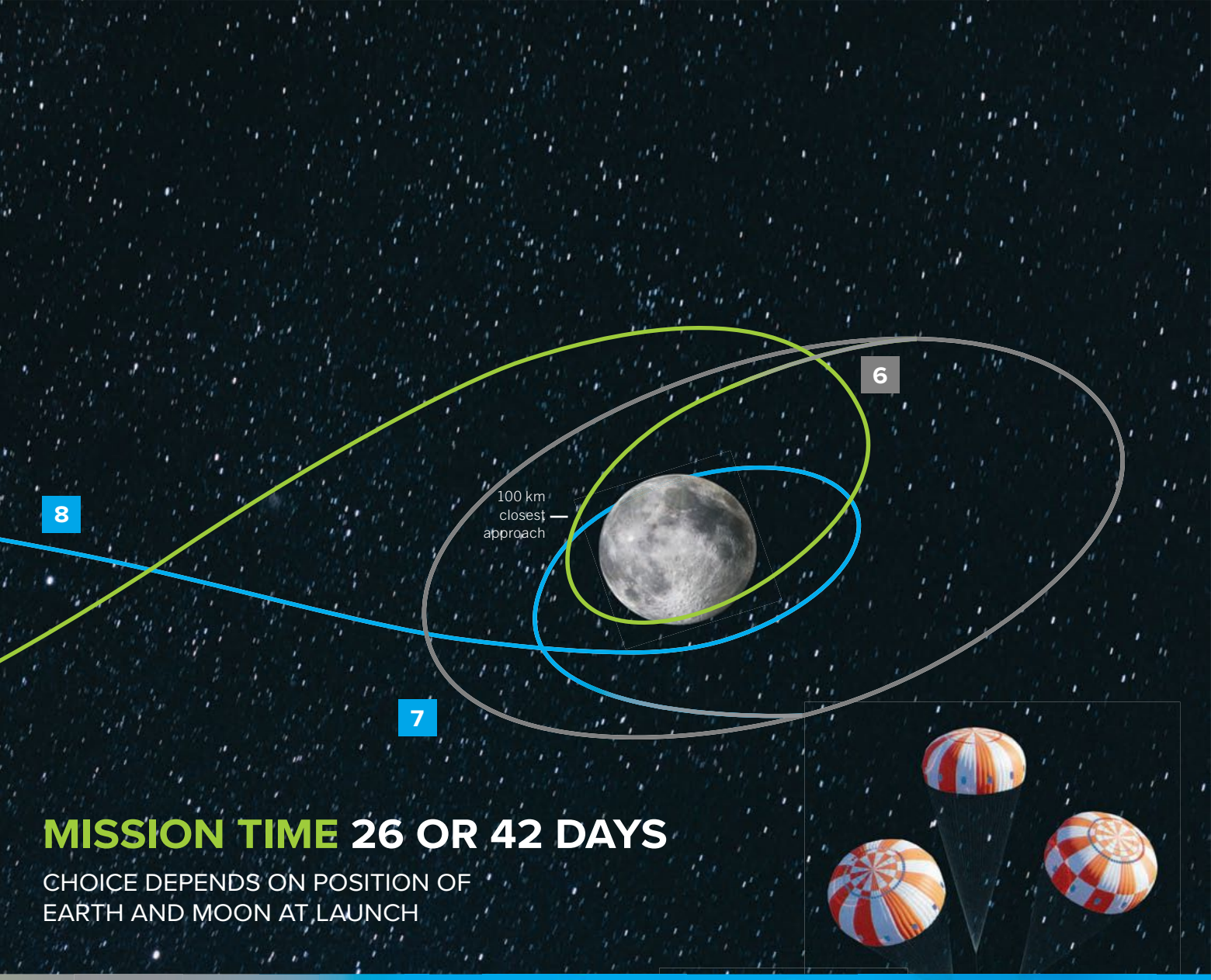
+1.5 HRS

4 Upper stage (Interim Cryogenic Propulsion Stage) fires its RL-10 engine for 20 minutes in a 110-kilonewton translunar injection burn, setting Orion on a lunar trajectory.

UPPER STAGE DISPOSAL

+2 HRS

5 Upper stage separates from Orion crew and service modules, which continue toward the moon. Ten cubesats spring free from the adapter attached to the stage, which fires its engine for a final time to send it into an orbit around the sun.



MISSION TIME 26 OR 42 DAYS

CHOICE DEPENDS ON POSITION OF EARTH AND MOON AT LAUNCH

ORBITAL PHASE

DAYS 5-16 (SHORT)

DAYS 5-24 (LONG)

6 Orion's service module fires its main engine in a 26-kilonewton burn that slows capsule for capture into a distant retrograde orbit. Orion spends 7 or 16 days traveling about 70,000 kilometers beyond the moon, orbiting in an opposite direction to how the moon orbits Earth.

RETURN TO EARTH

DAYS 16-19 (SHORT)

DAYS 24-32 (LONG)

7 Orion service module fires main engine to leave distant retrograde orbit, then again on lunar approach to accelerate Orion for a slingshot around moon and back toward Earth.

SERVICE MODULE SEP

DAY 25 (SHORT)

DAY 42 (LONG)

8 After a 6 or 10-day transit, during which Orion's service module fires main engine as needed to adjust course, service module jettisons from crew capsule and later burns up in the atmosphere.

REENTRY

DAY 25 (SHORT)

DAY 42 (LONG)

9 Orion crew capsule plunges into atmosphere, its heat shield protecting it against temperatures of about 2,700 degrees Celsius.

SPLASHDOWN

DAY 25 (SHORT)

DAY 42 (LONG)

10 Orion capsule releases 11 parachutes in succession to slow itself before it splashes into the Pacific Ocean, as most Apollo capsules did.