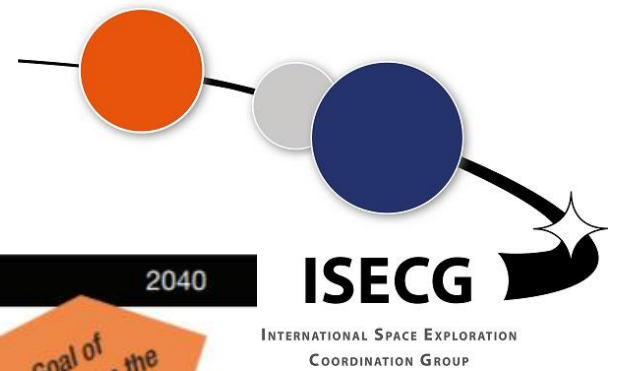


LUNAR EXPLORATION AT THE EUROPEAN SPACE AGENCY

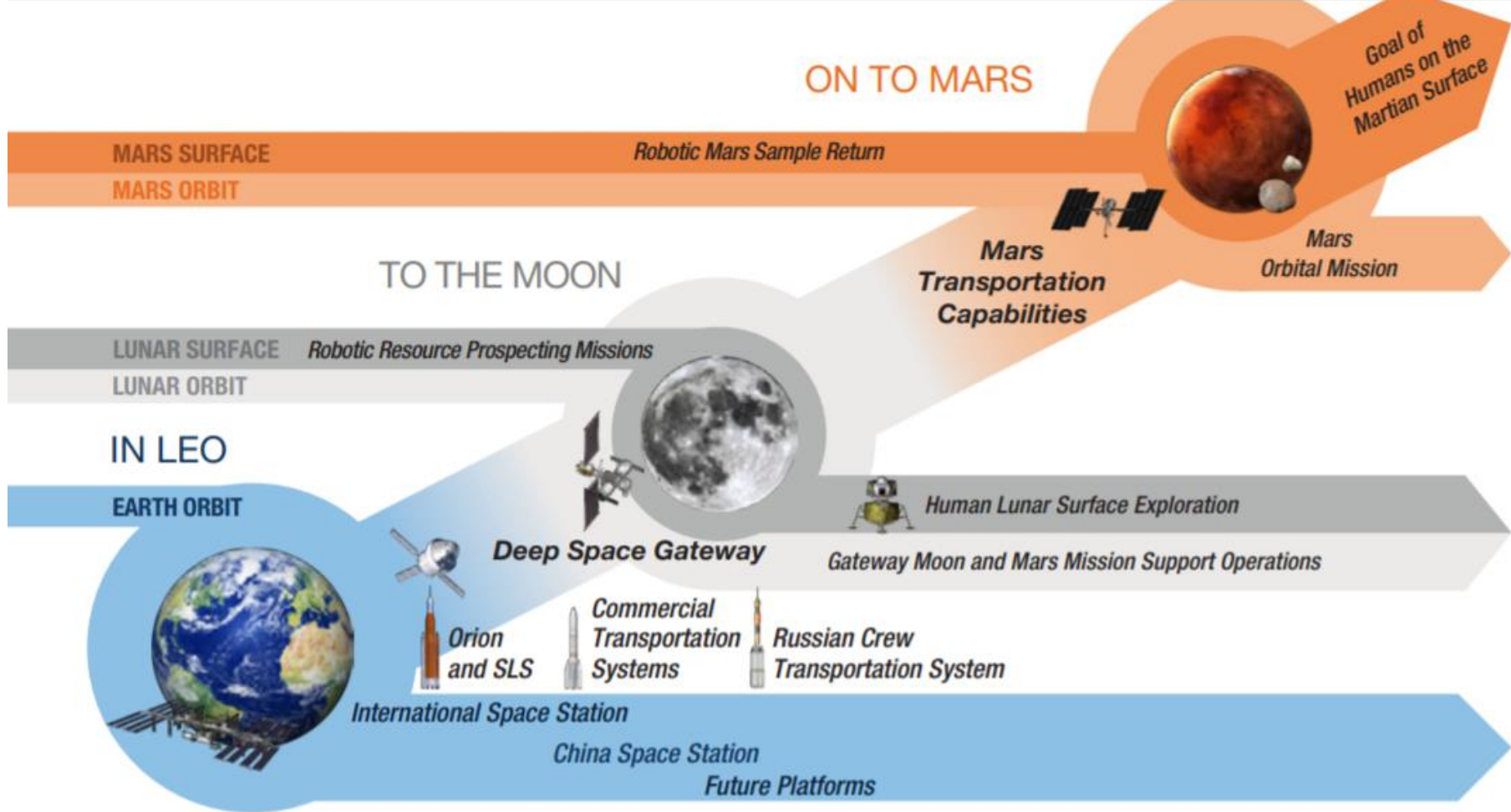
→ UNITED SPACE IN EUROPE

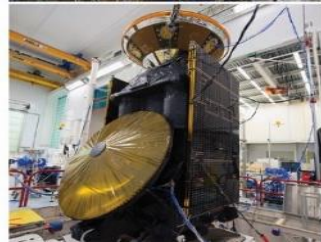
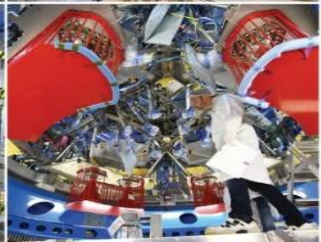
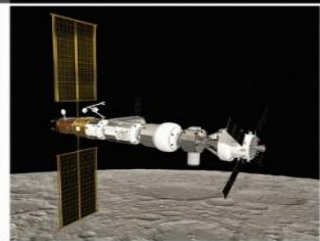
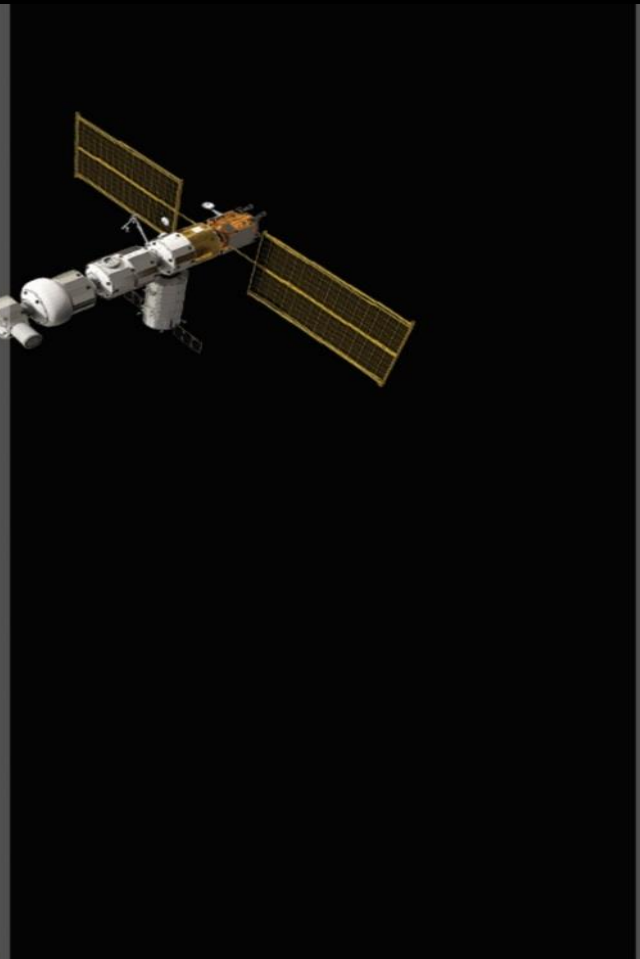
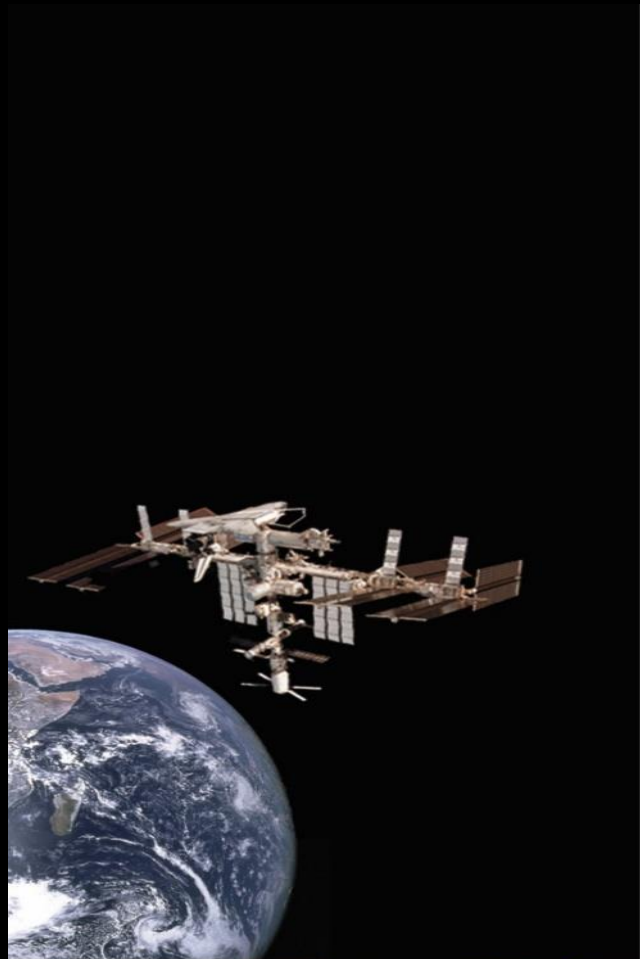


The Global Exploration Roadmap



2020 2030 2040



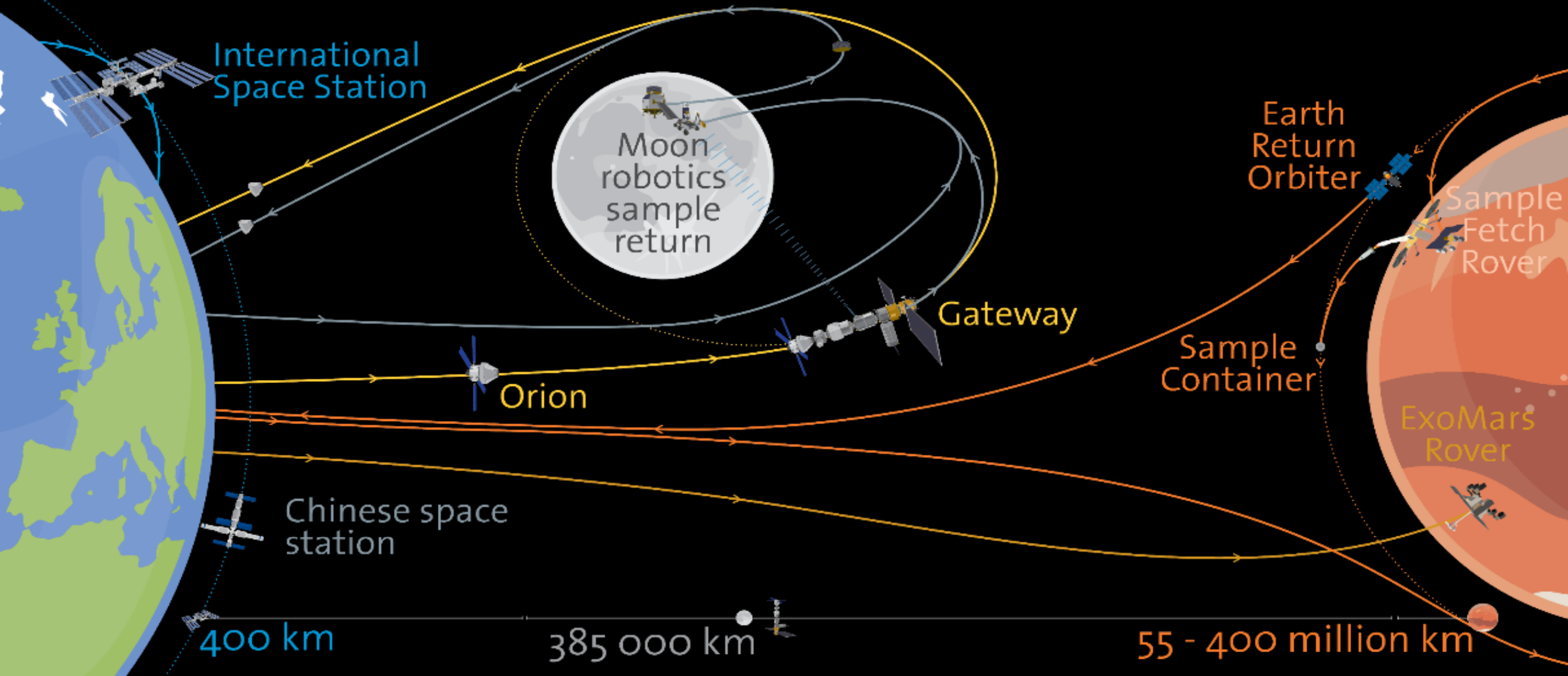


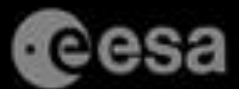
Cornerstone 1
Humans in Low Earth Orbit

Cornerstone 2
Humans beyond Low Earth Orbit

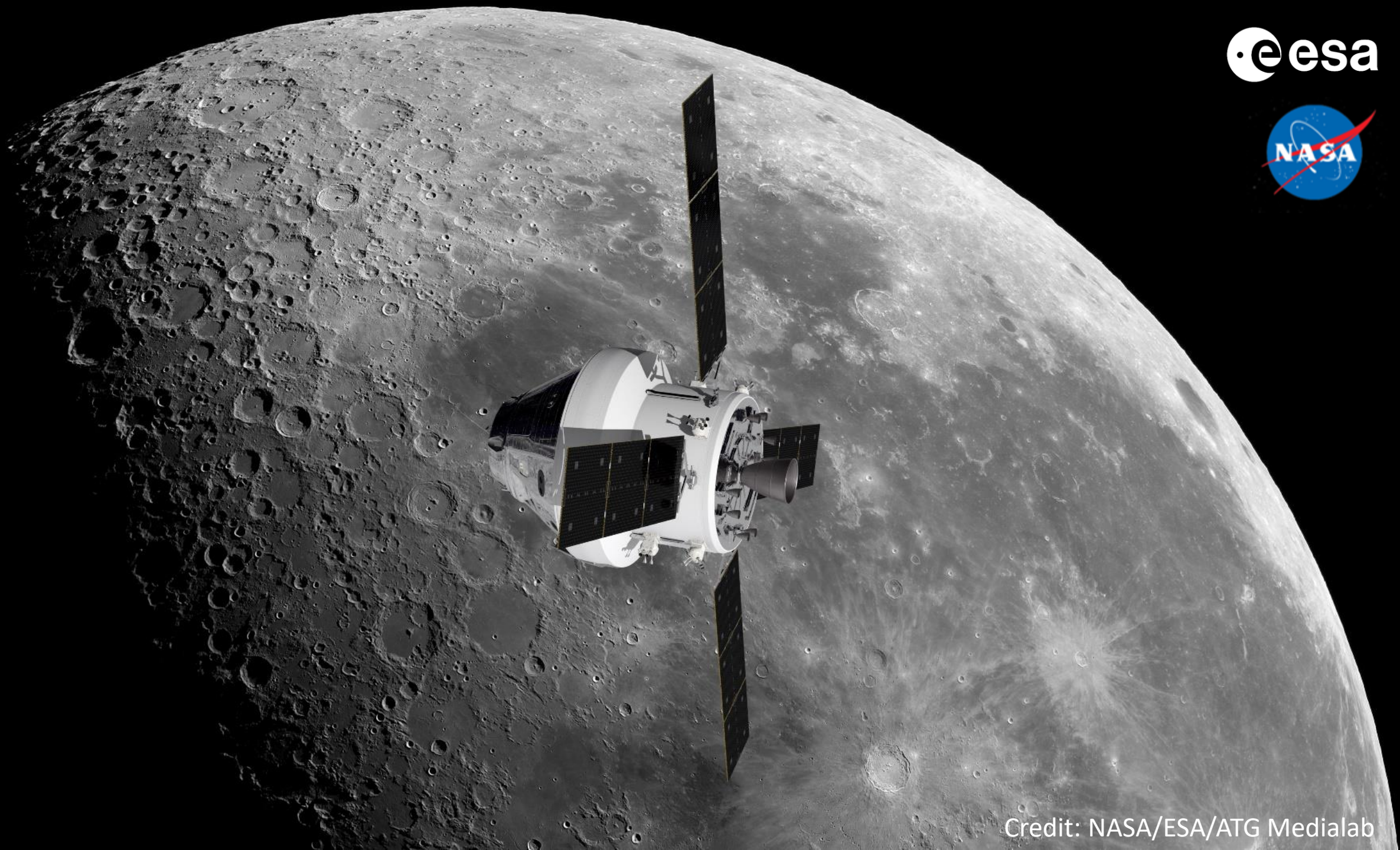
Cornerstone 3
Robotic Lunar Exploration

Cornerstone 4
Robotic Mars Exploration



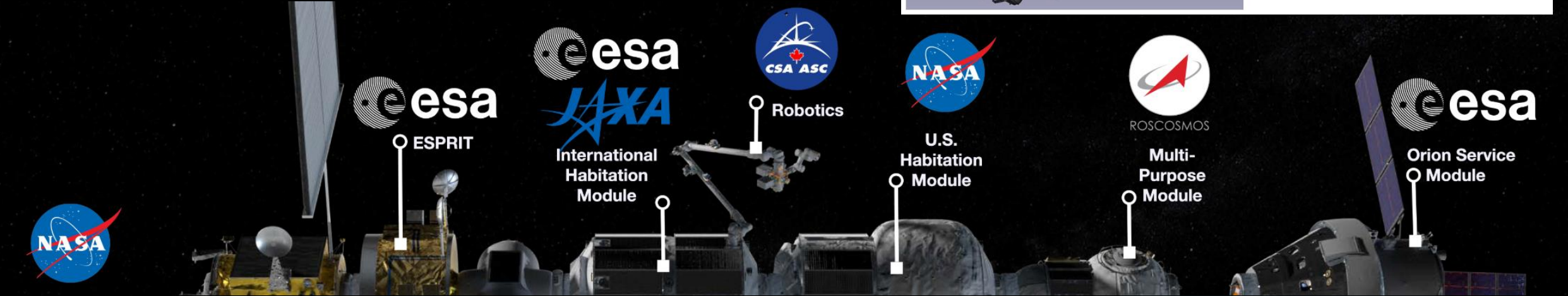
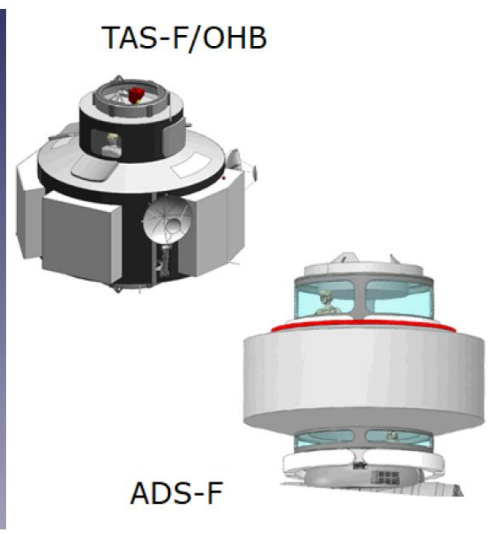
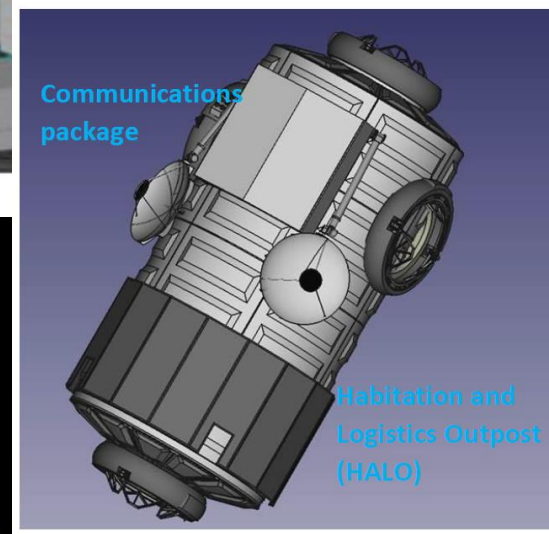
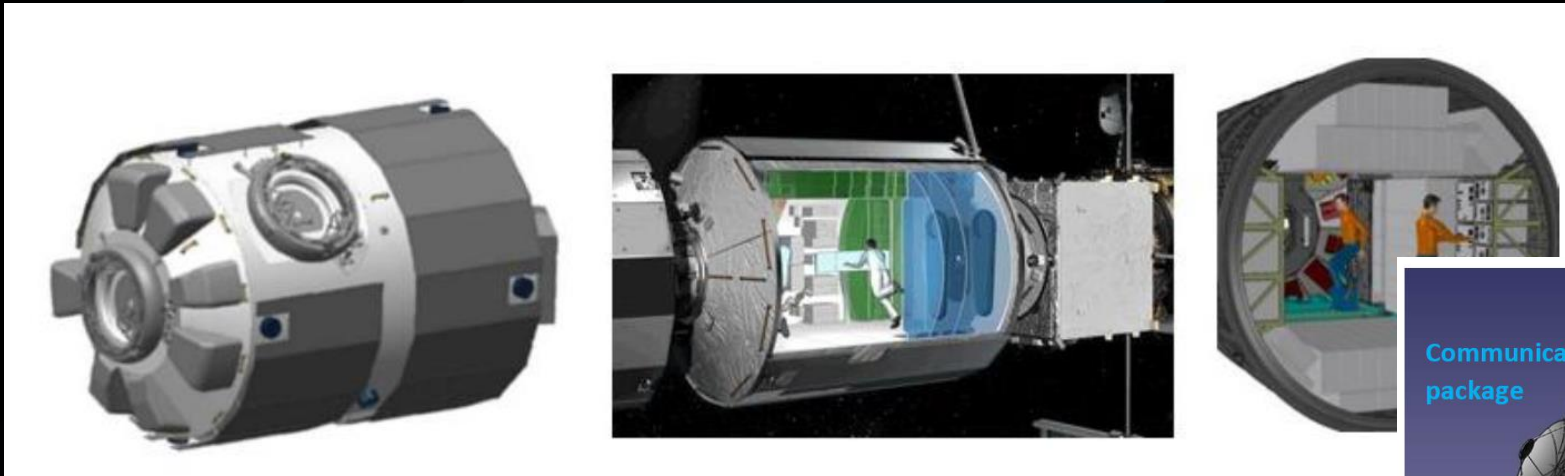


Credit: NASA/ESA/ATG Medialab



Credit: NASA/ESA/ATG Medialab





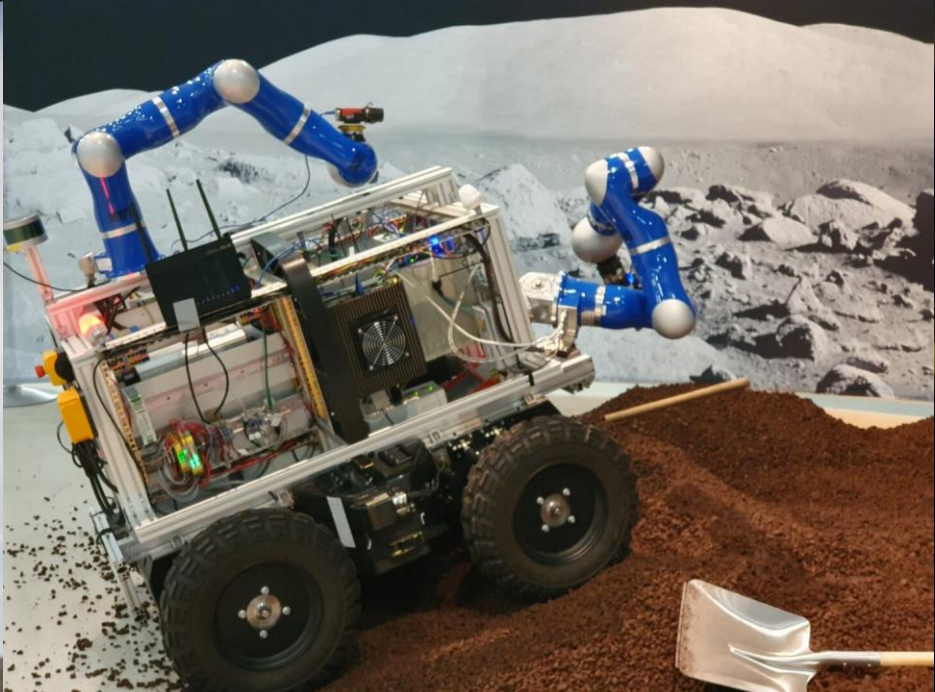
ESA UNCLASSIFIED - For Official Use





Forward to the Moon







CLPS Lander



Lunar Resource Lander

Opportunity science & technology missions

Mission Phase A/B1/B2

Cis-lunar Transfer Vehicle

Mission Phase A/B1/B2

European Large Logistics Lander

Lunar Pathfinder comsat



Commercial Lunar products and services

Payload Phase B1/B2

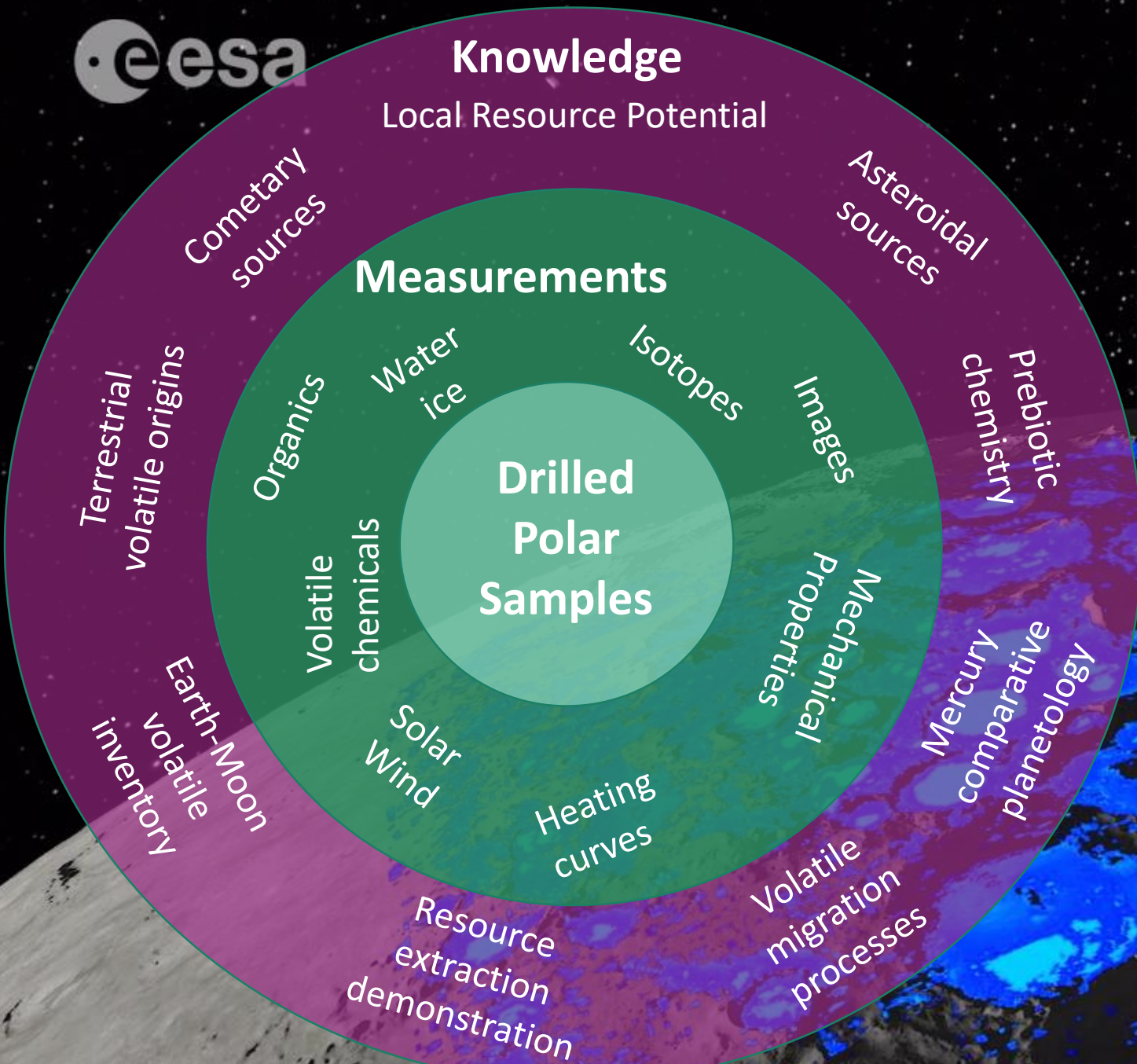
Space Resources Campaign



Period 2 (2020-22)

Period 3 (2023-25)

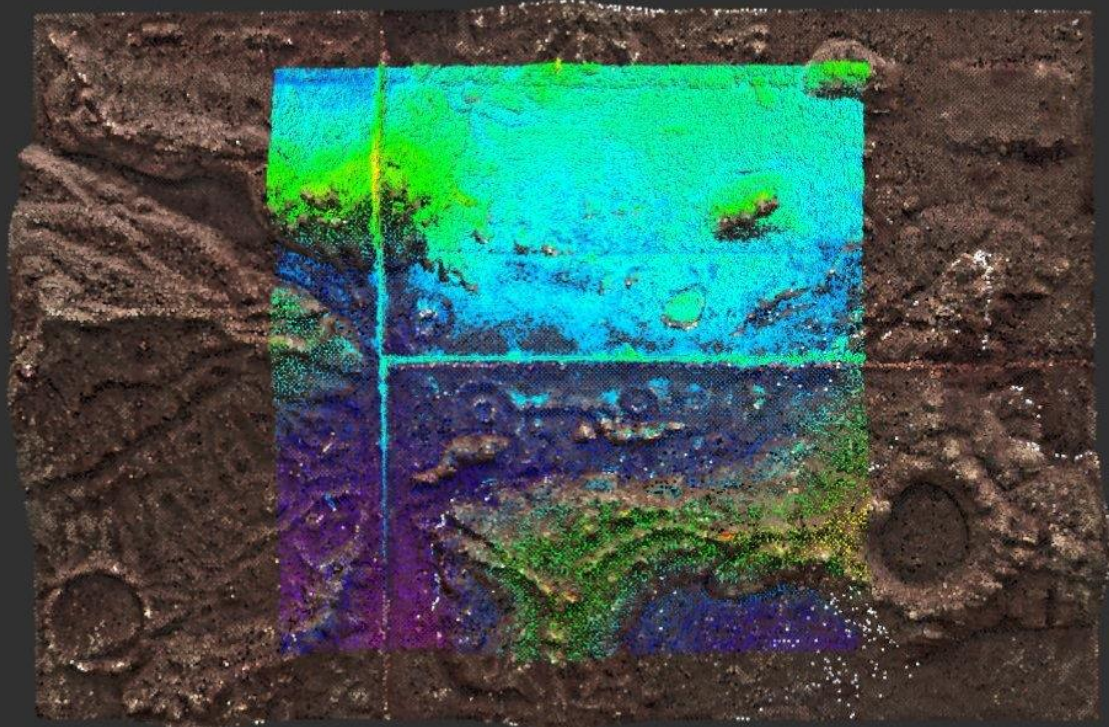
Period 4 (2026-28)

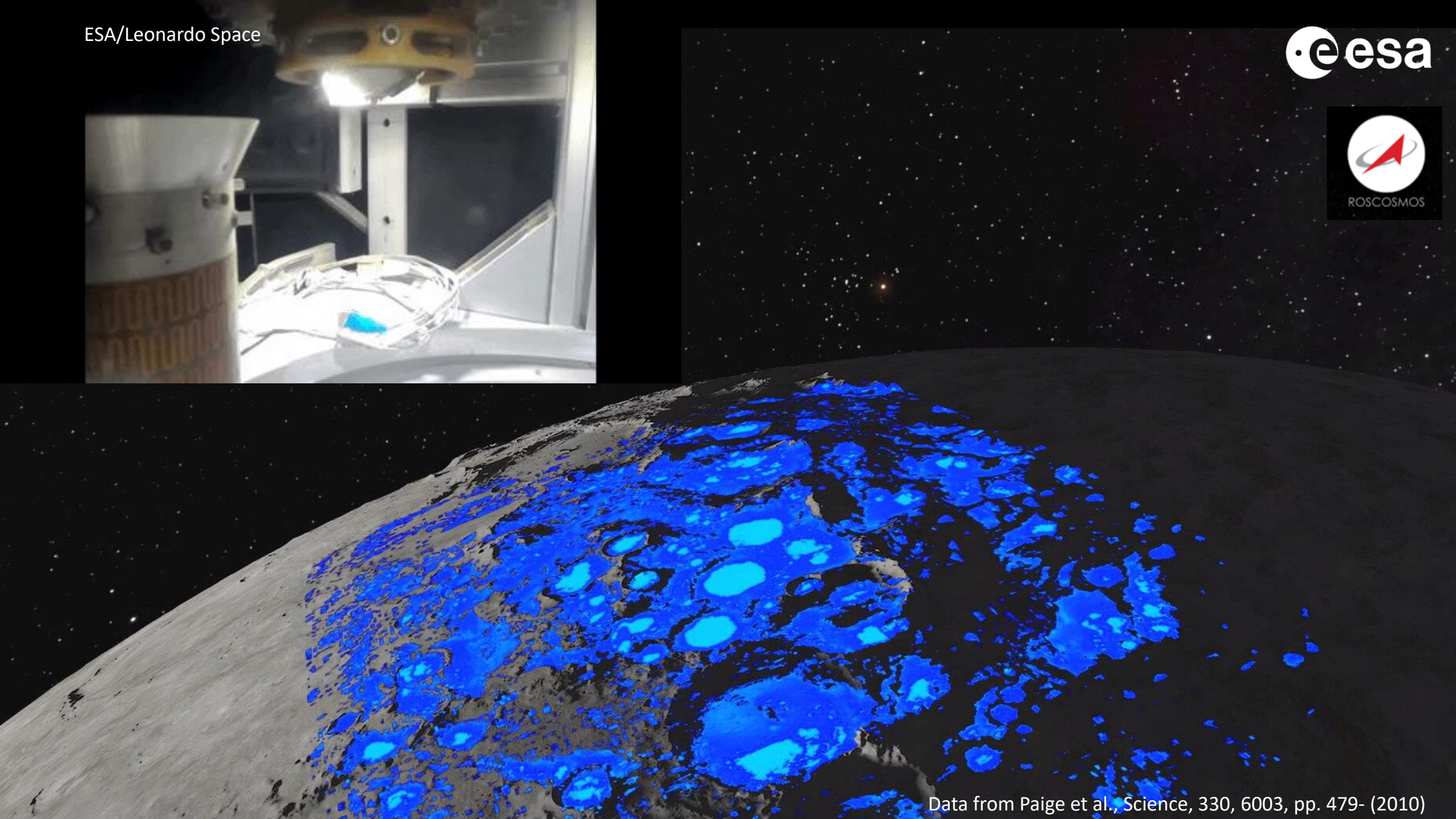


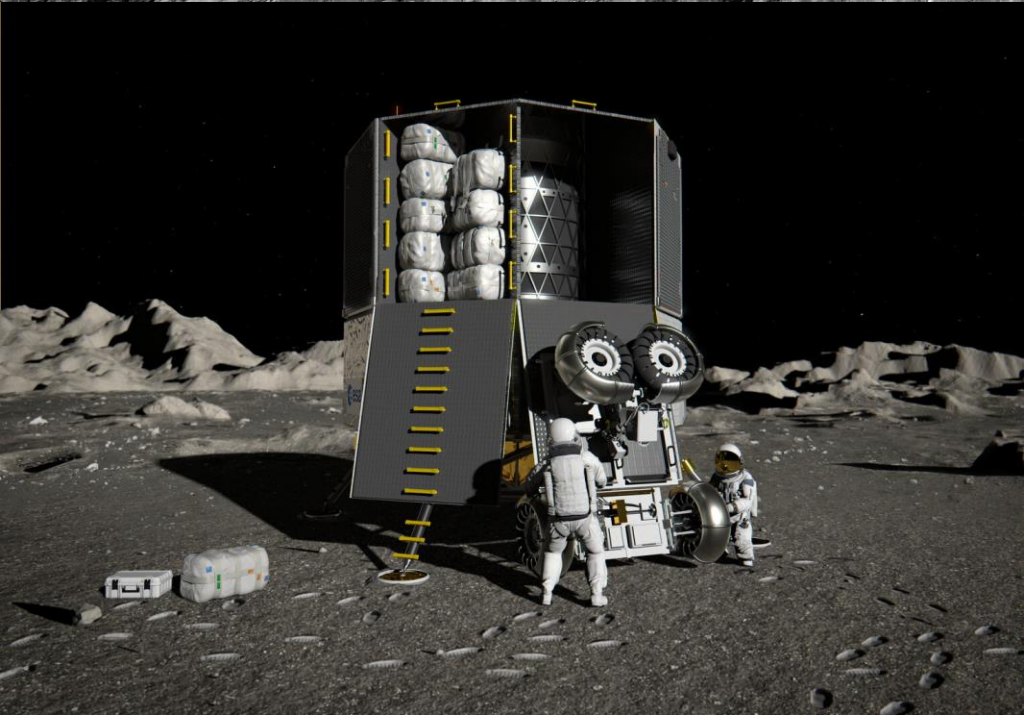
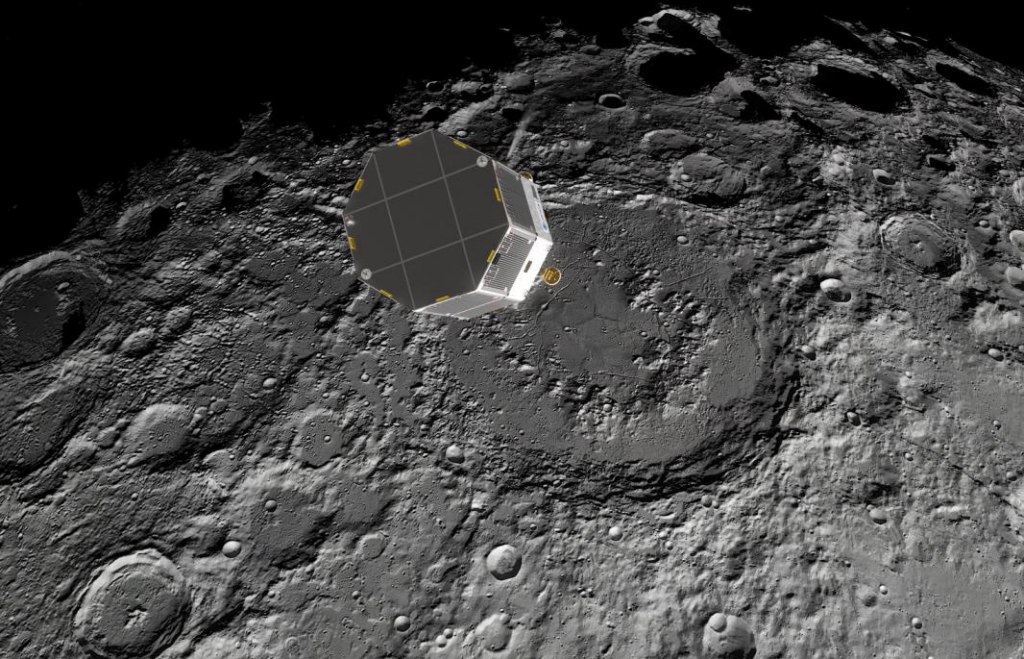
Missions of Opportunity

- PILOT and PROSPECT (Luna-27)
- Science, technology and ISRU payload preparation
- New possibilities: Commercial, Chang'e+ series, NASA (CLPS), JAXA

Map of polar water ice stability within 1m (Paige et al. 2010.)

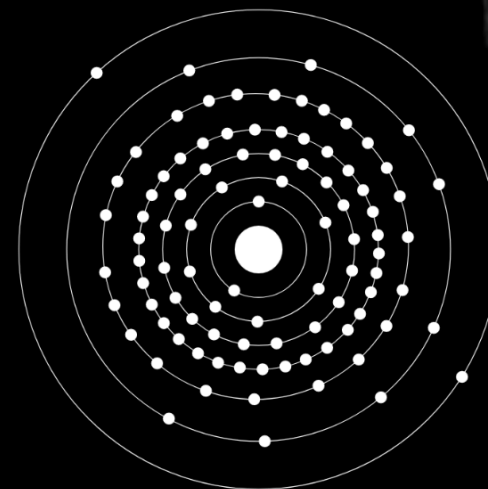
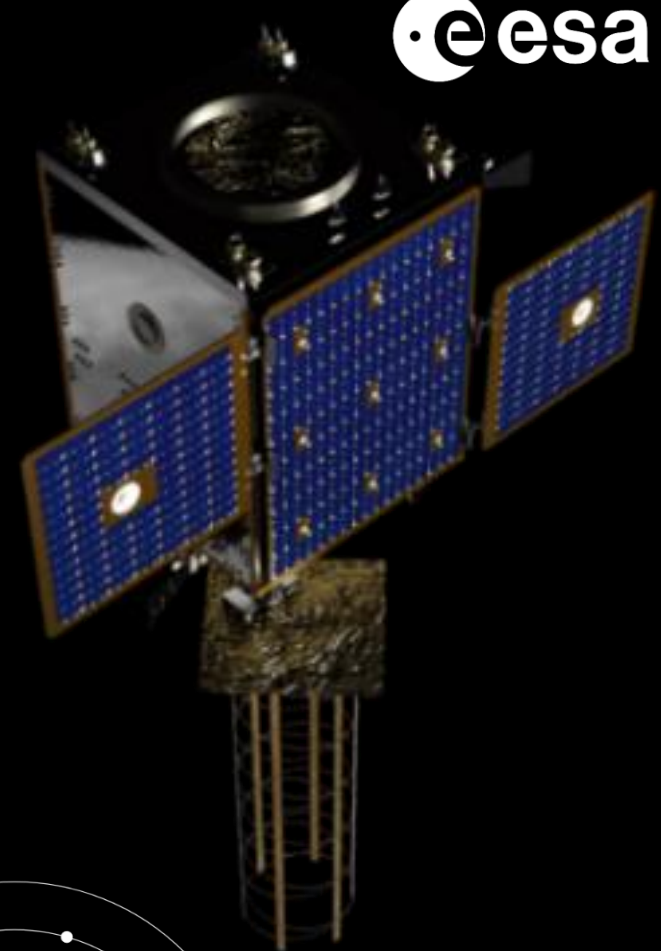






THE MOON AS A SPACEPORT TO THE UNIVERSE











Thank you!

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Strategy & Innovation Team

Directorate of Human and Robotic Exploration