

Once Explorers, Always Explorers
Europe's Space Exploration Programme

*Space19+: European Exploration
Envelope Programme – Period 2*

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On behalf of David Parker

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Exploration @ESA is Strategy-Driven

"focused on solar system destinations where humans will someday live and work."

Global Exploration Strategy Framework Document, 2007

ESA Scientific Programme

'bottom-up' + mandatory

- **competitive mission selection** among proposals from science community

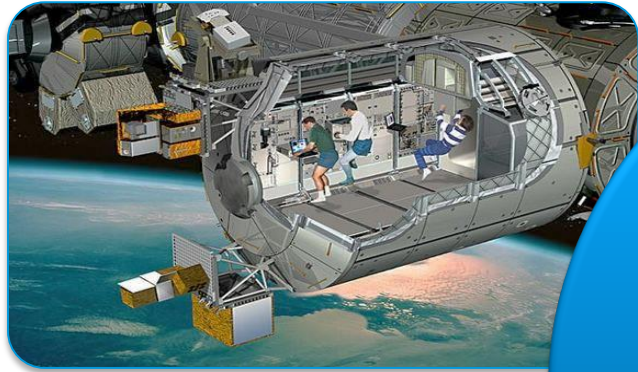


ESA Exploration Programme

'top-down' + optional

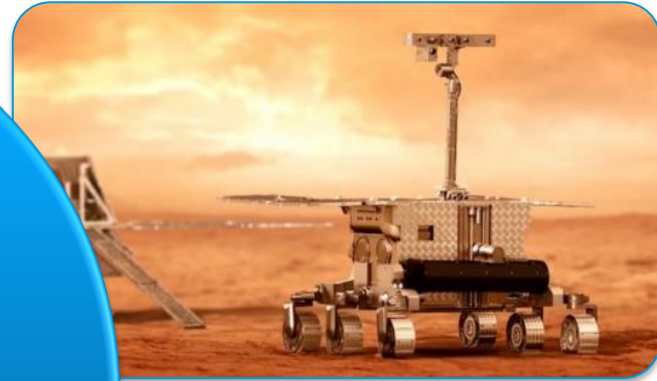
- **step-wise** with goal of extending human reach to Mars surface

Why Explore ?



New
knowledge

Challenge
driven
innovation



Inspiration
Motivation
Education

Global
partners



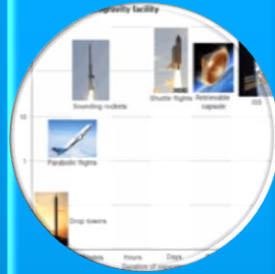
E3P Period 1 content: 2017-2020



Safe ISS
operation &
astronaut
missions



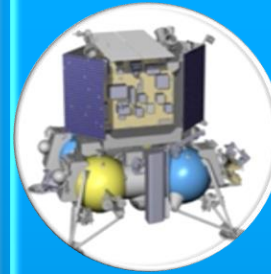
Service
modules for
first two
Orion
missions



World-class
science in
the space
environment



First Mars
life search
mission



First
European
science &
technology
for lunar
surface



New human
and robotic
missions
readied for
decision at
Space19+

Technology, Commercial Partnerships and Benefit Management

E3P Supports UN Sustainable Development Goals



AstroPlant



- **AstroPlant:** Contributing to e.g. quality education and fighting the habits of consumption
- **EML:** Development of improved industrial alloys
- **MELiSSA:** Waste water treatment technology



EML



MELiSSA

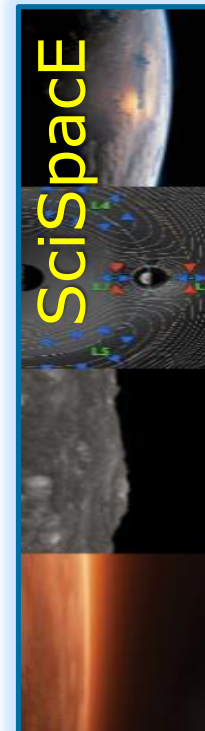


- Global context for exploration clearer than for many years
- What role for Europe ?



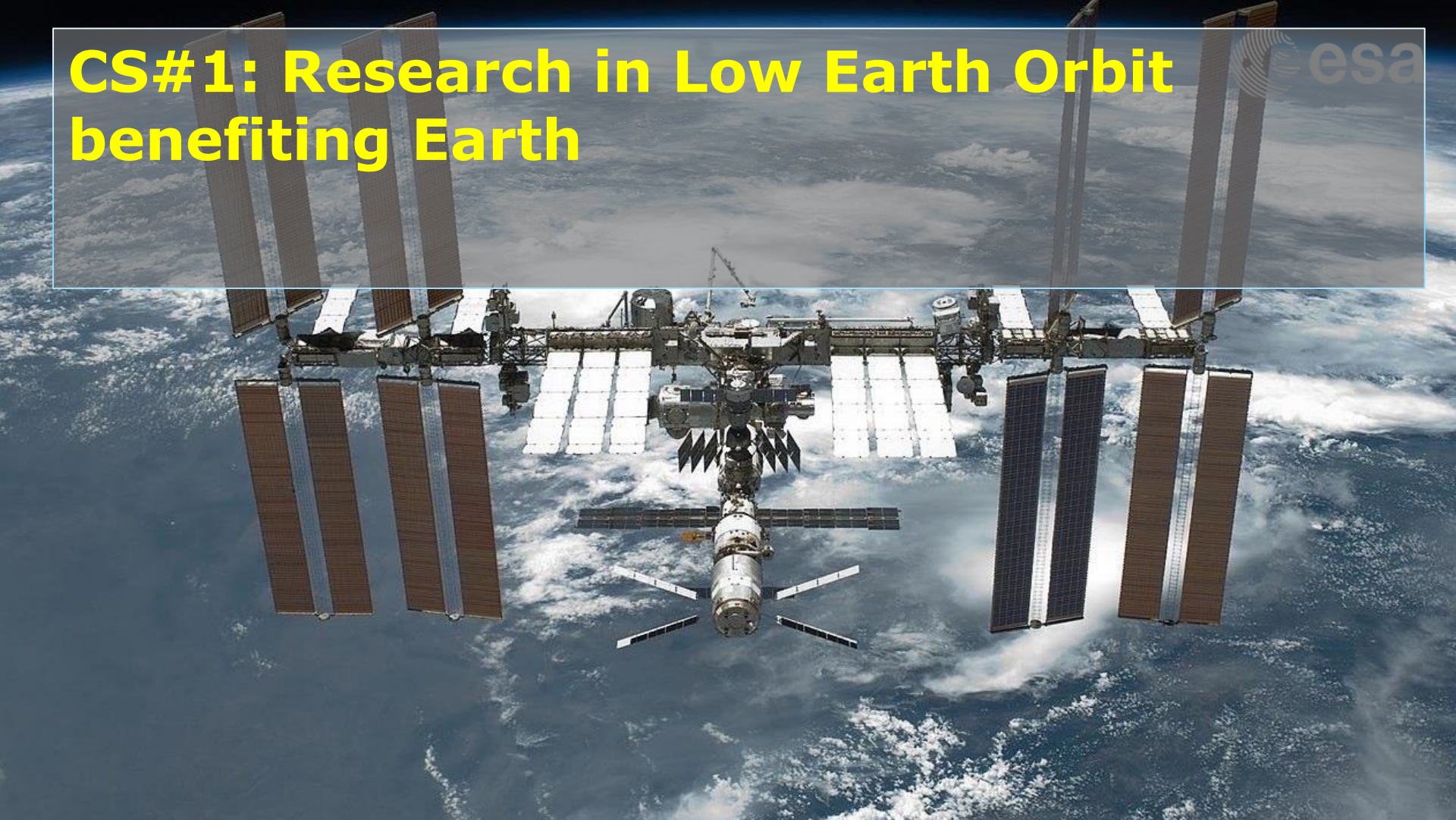
E3P Future programme

6 Activities; 4 Cornerstone campaigns; 1 Programme



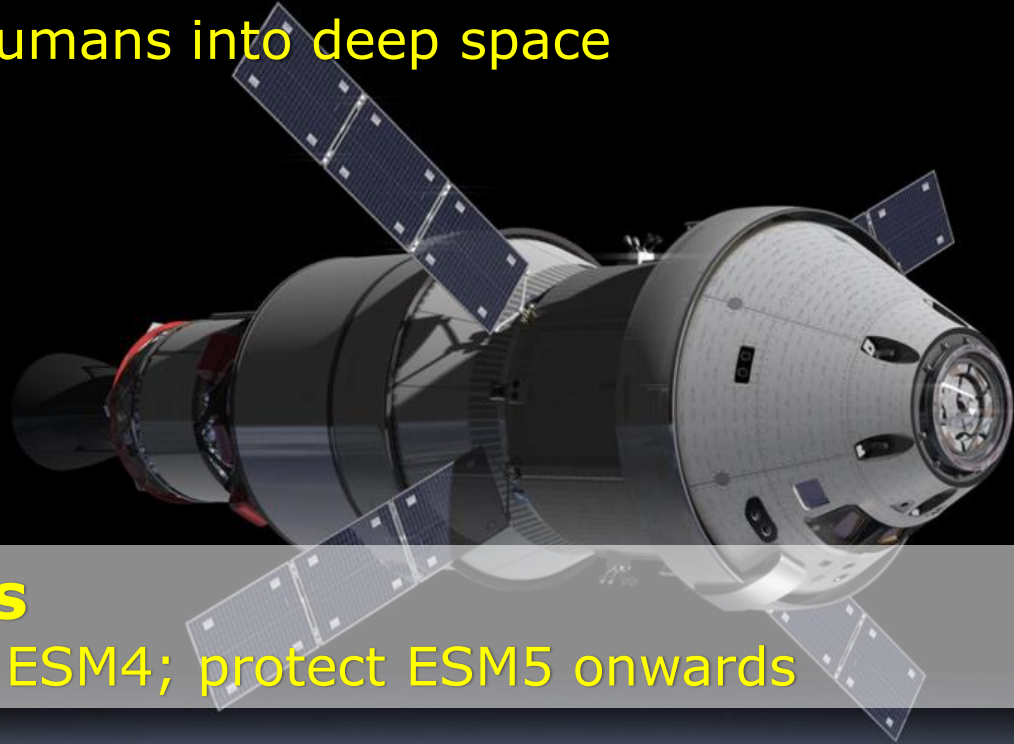
CS#1: Research in Low Earth Orbit benefiting Earth

esa



NASA's Orion spaceship

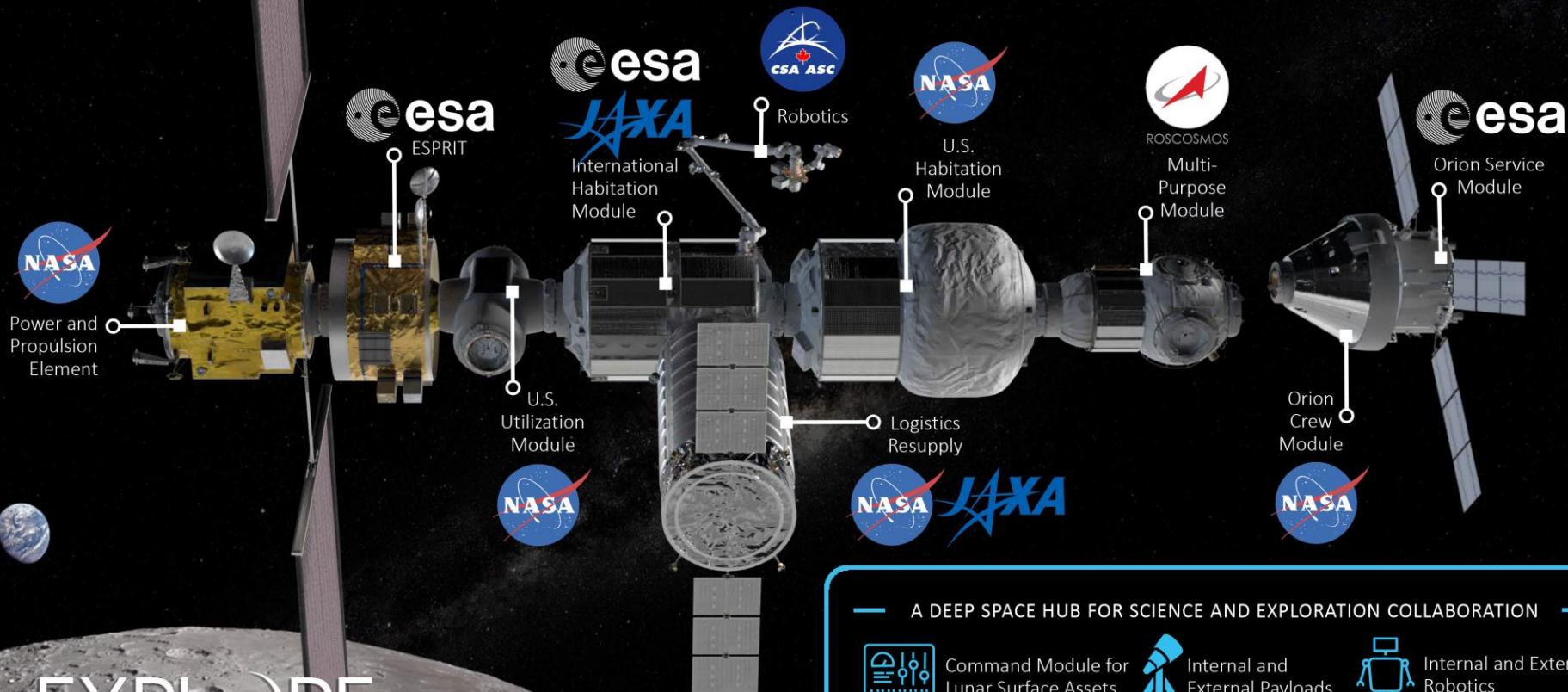
Europe already at the heart of the next spacecraft to carry humans into deep space



Space19+ actions

- Secure ESM3 and ESM4; protect ESM5 onwards

GATEWAY CONFIGURATION CONCEPT



EXPLORE
MOON to MARS

A DEEP SPACE HUB FOR SCIENCE AND EXPLORATION COLLABORATION



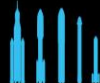
Command Module for Lunar Surface Assets



Internal and External Payloads



Internal and External Robotics



Mixed Fleet Deliveries



Human Lunar Surface Systems



International Crew

CS#2: The Lunar Gateway

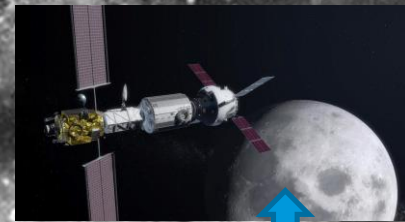
Space 19+ Actions

- **ESPRIT** - European System Providing Refuelling, Infrastructure and Telecommunications
- **I-Hab** (International Habitation module)

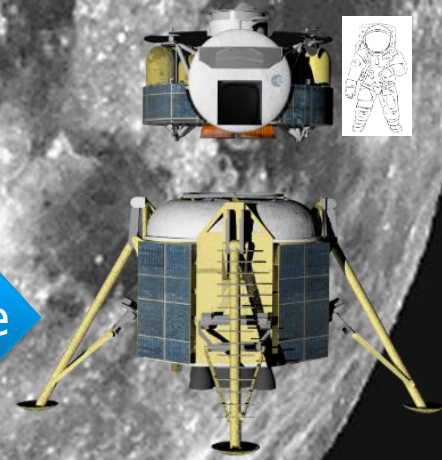
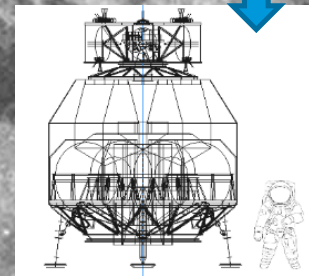
- Industrial opportunities
- Science opportunities



C#3: Robotic Lunar exploration campaign



Gateway operational



Robotic opportunity missions

HERACLES/Robotic Precursor

Roles in Human Architecture

Period 2

Period 3

Period 4



CS #4 The First Round Trip to Mars



A Robotic Mars Sample Return (NASA + ESA) Mars Sample Return Campaign



Mars 2020
Rover



Sample Return
Lander



Science Facilities



International

A close-up, first-person perspective of an astronaut in a white space suit. The astronaut's helmet is visible, reflecting the Earth and the station. A German flag patch is on the right shoulder. The background shows the complex structure of the International Space Station and the blue and white clouds of Earth.

Thank you

<http://youbenefit.spaceflight.esa.int>