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OHB Vision for Lunar Exploration

Overview

- A Common Vision
- Key Elements for Extended Lunar Exploration
 - European Activities
 - International Cooperation
 - Industrialization of Infrastructure
 - Extended Public Outreach
- Key Technological Challenges

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Sharing a Common Vision

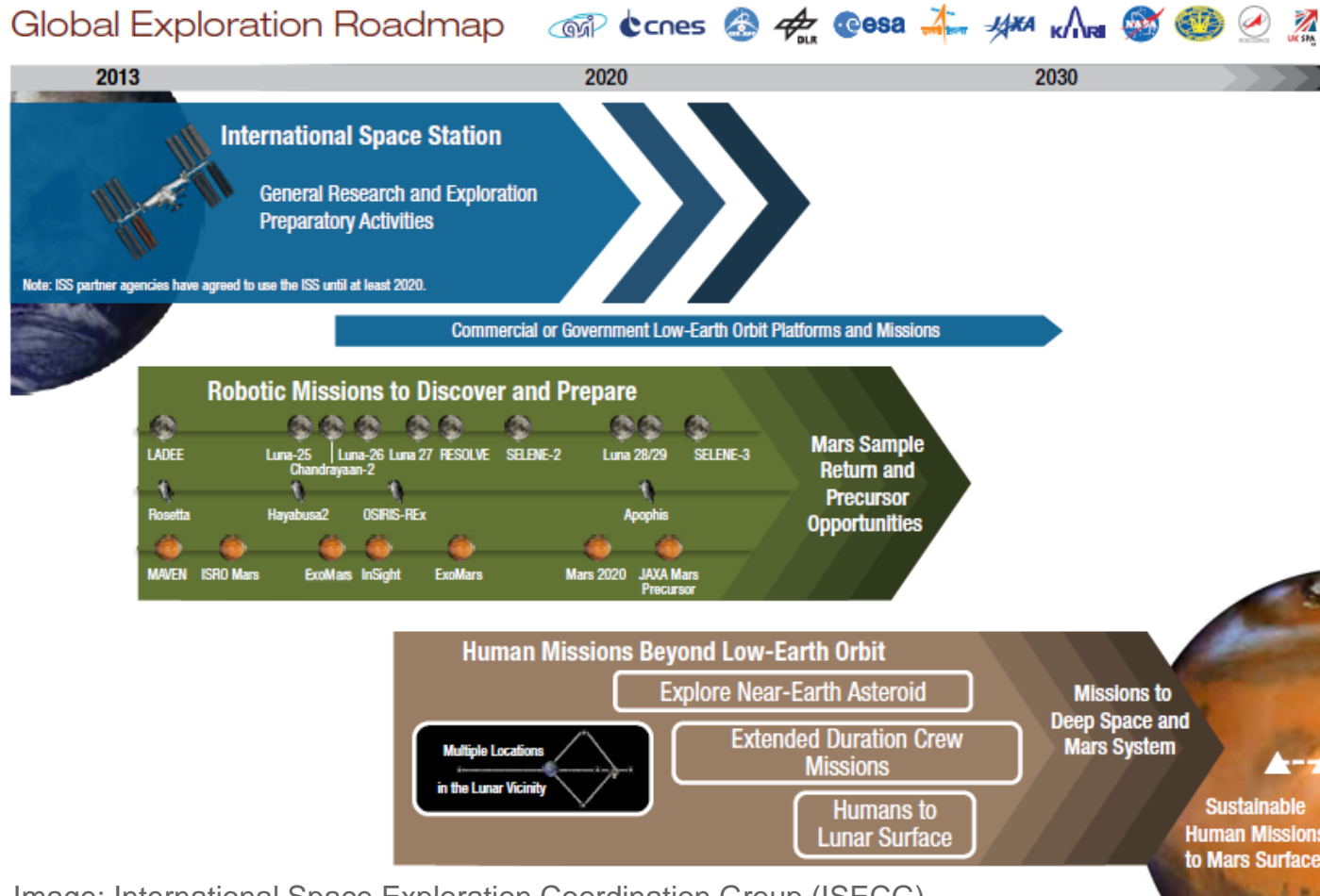


Image: International Space Exploration Coordination Group (ISECG)

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Key #1: Agency-Led Building of European Capabilities

- ESA Vision (2014): “Provide access to the Moon’s surface to drive European discovery, innovation and inspiration.”
- SMART-1
- Lunar Lander
- Ongoing: Lunar Polar Sample Return Phase A



Image: ESA



Image: ESA

Key #2: Agency-Led International Cooperation

- USA

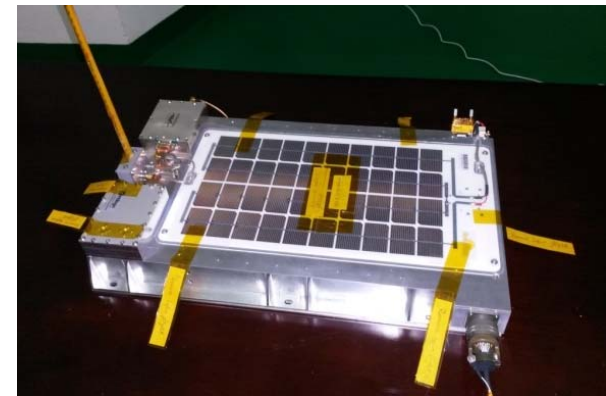
- MPCV follow-on



Image: Sierra Nevada Corporation

- China

- Precursor: 4M



- Russia

- ESA Payloads on Luna-27

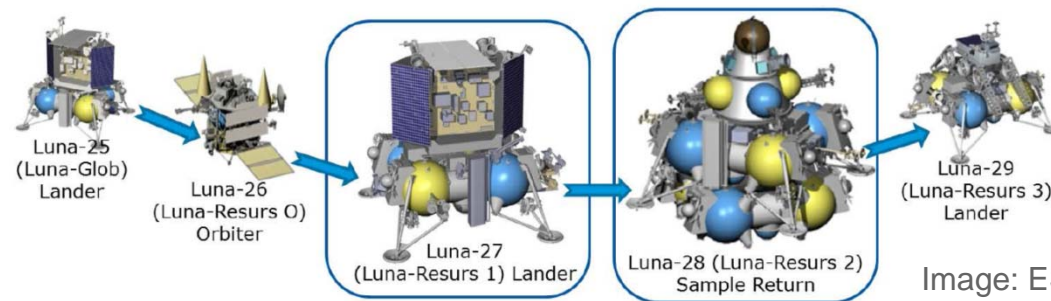


Image: ESA

Key #3: Industrialization of Infrastructure

- Extended lunar presence requires utmost cost-efficiency
- After precursor missions: Industrialization required
- „What instead of how“, allowing risk-taking by industry
- OH B example: Mona Lisa study, funded internally with co-funding by DLR
- Purely commercial activities (e.g. tourism) can follow, given legal and policy support

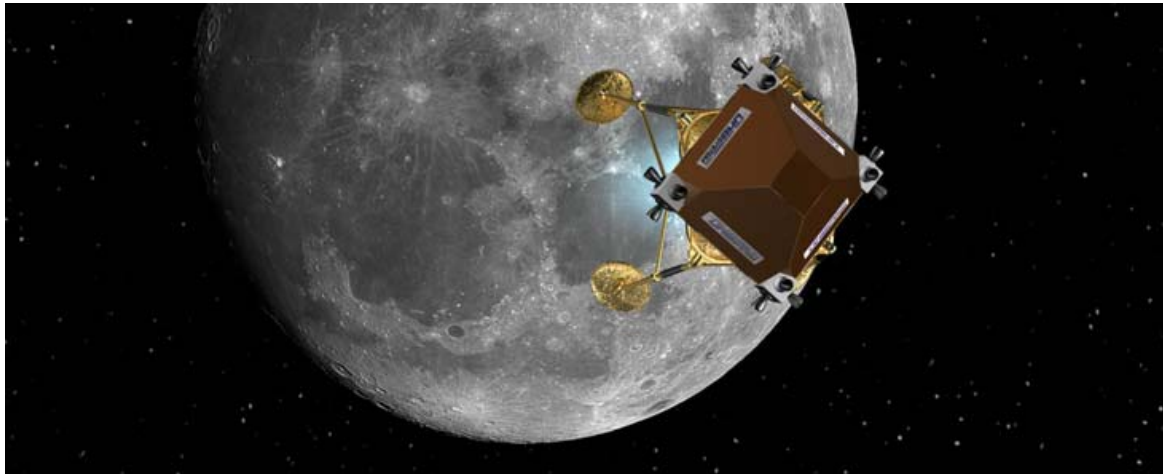


Image: SpaceX

OHG Examples of Industry-Led Exploration

Mona Lisa

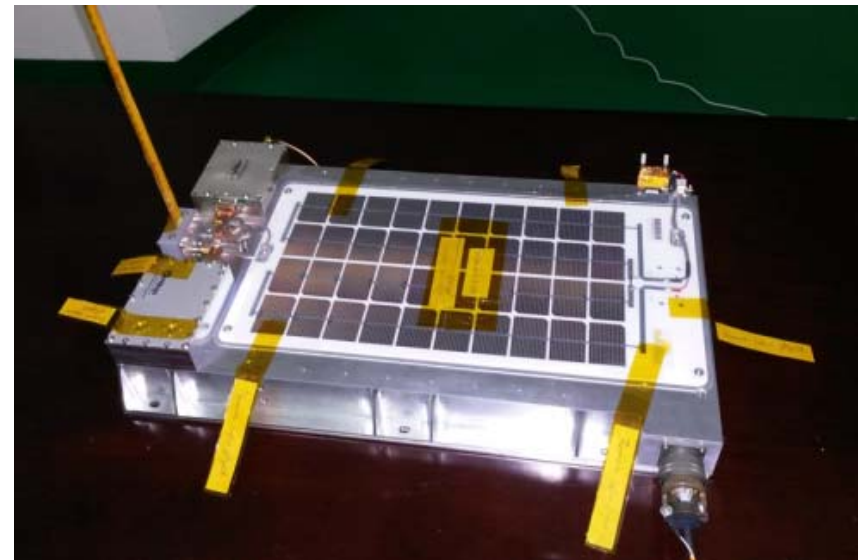
- First Step: Orbiter for surface mapping (among others)
- Second Step: Multifunctional Landing Vehicle
- Model Payload: AstroHab (astrobiology and life sciences)



OHB Examples of Industry-Led Exploration

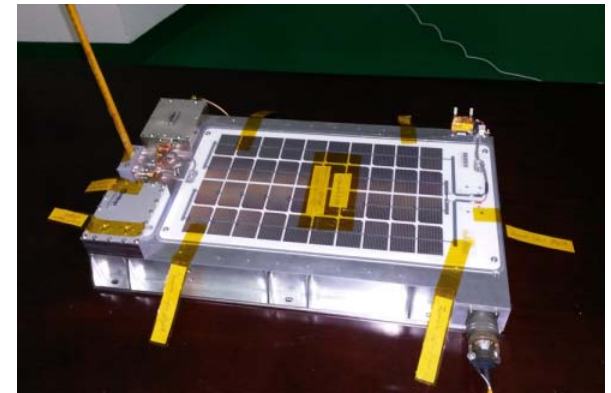
Manfred Memorial Moon Mission (4M)

- **First ever privately financed lunar mission**
- Flyby around the Moon and entry into inclined orbit
- Launched 23 October 2014 with Long March 3 from Xichang/China
- Operated for more than 250 hours
- Small spacecraft, transmitting:
 - telemetry
 - results of radiation dosimeter experiment
 - messages in memory of Pr. Fuchs
 - greetings from all around the world



Key #4: Public Outreach

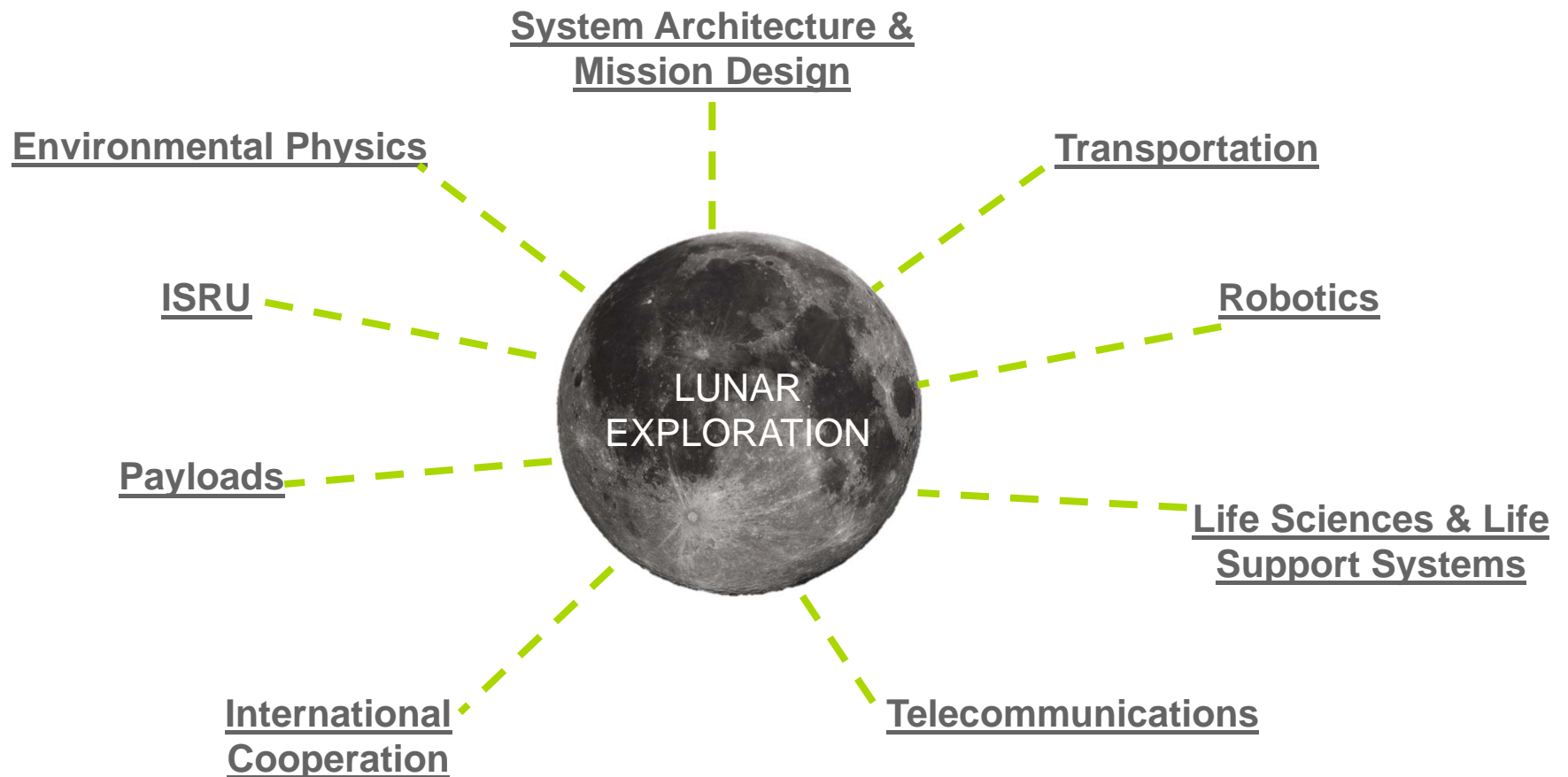
- Lunar exploration offers great Outreach opportunities, lots of visibility, and public engagement
- More public outreach will yield more public support
- Necessary step to prepare for large-scale endeavors
- Example: 4M Public Outreach Campaign
 - Raised public interest for outer space missions
 - Contest organized by LuxSpace to receive as many messages as possible
 - Considerable interest from the radio amateur community



Overview

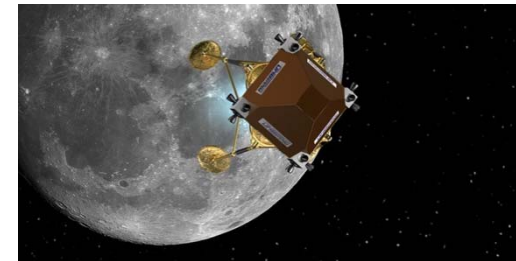
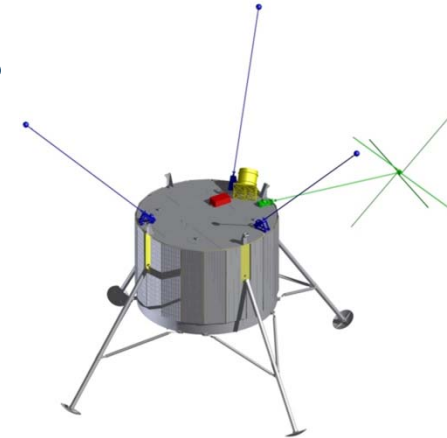
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Key Technological Challenges



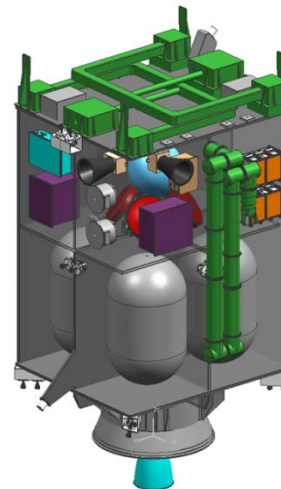
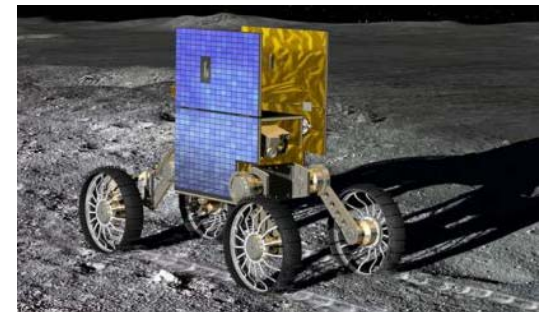
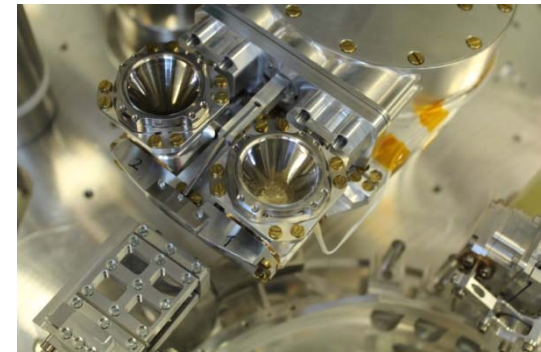
OHG Technology Development Activities

- Environmental Physics
 - L-DEPP
 - L-DAP
- System Architecture & Mission Design
 - SMART-1
 - LUROP
 - Mona Lisa
 - Lunar Polar Sample Return
- Transportation
 - Dream Chaser (cooperation with Sierra Nevada)
- Telecommunications
 - SmallGeo / Electra



OHB Technology Development Activities

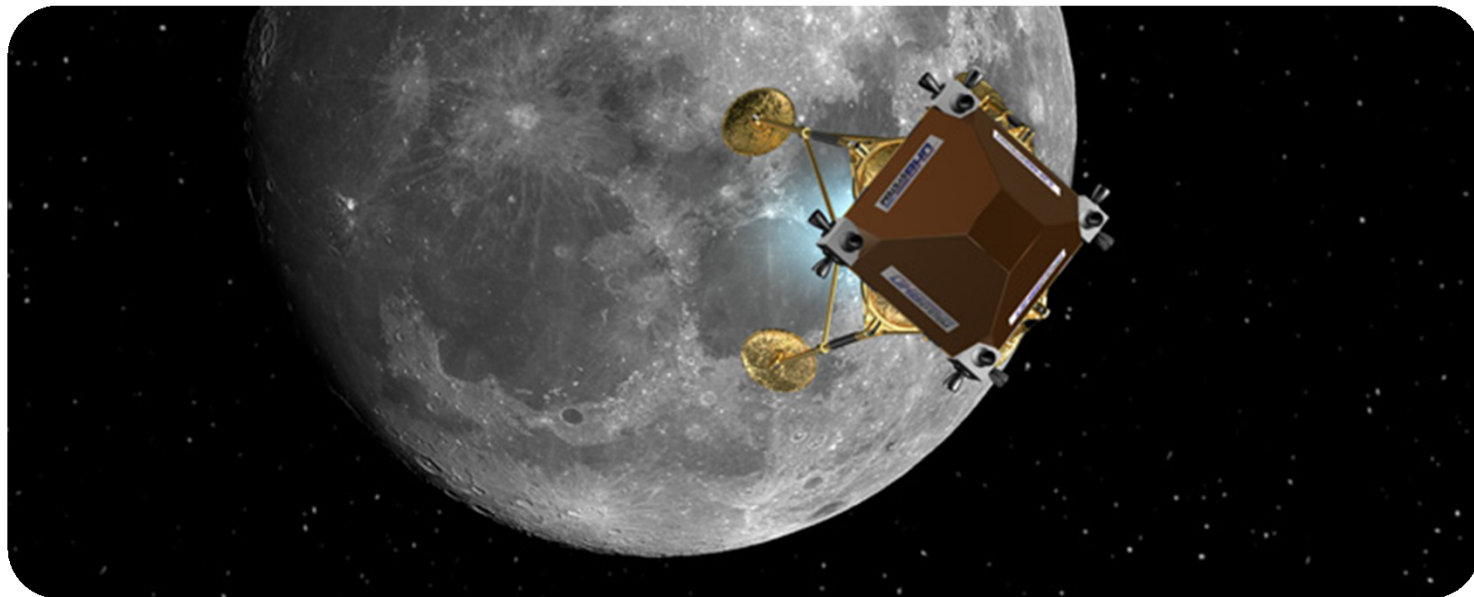
- Life Sciences & Life Support Systems
 - Environmental Simulation Chamber
- Robotics
 - ExoMars SPDS
 - PROSPECT Sample Processing and Analysis System (ProsPA)
 - Mobile Payload Element
 - L-GRASP
- In Situ Resource Utilization
 - LUISE
 - Additive Manufacturing



Summary

- A Common Vision
 - Lunar exploration in itself has long been the goal of OHB
 - Moon (especially its far side) is excellent proving ground for translunar exploration
- Key Elements for Extended Lunar Exploration
 - European Activities
 - International Cooperation
 - Industrialization of Infrastructure
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- Key Technological Challenges
 - Many relevant technologies are already available or under development
 - OHB is very active in all these fields

To the Moon...



... and beyond.