

IAF SPACE EXPLORATION SYMPOSIUM (A3)
Space Exploration Overview (1)

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PREPARING POTENTIAL EUROPEAN ROLES IN THE INTERNATIONAL EXPLORATION OF
THE MOON WITHIN THE EUROPEAN EXPLORATION ENVELOPE PROGRAMME

Abstract

The GER¹ published in January 2018 gives us an indication about how space exploration could be implemented by the international agencies. In it, the agencies of the ISECG have conceptualised a mission scenario of returning humans to the Moon within the next 10 to 12 years². The architecture supports a crew of four astronauts for five missions of 42 days of exploration on the lunar surface. The target regions represent previously unexplored geology on the polar far side of the Moon³. The focus of the content of the lunar exploration cornerstone of the European Exploration Envelope Programme⁴ is the development of a demonstrator mission as an ESA-led contribution, in the frame of an international agreement with CSA and JAXA and in coordination with NASA. The demonstrator mission adds an element of scientific utilisation to the objectives of the Lunar Orbital Platform – Gateway (LOP-G), and prepares of the return of humans to the Moon’s surface. This robotic demonstrator, tentatively named Human-Enabled Robotic Architecture and Capability for Lunar Exploration and Science⁵⁶⁷ (HERACLES), provides benefits of programmatic readiness to develop human vehicles, as well as the return of up to 15 kg of lunar samples from unexplored regions via the LOP-G and Orion. The HERACLES mission will certainly evolve with its context, but the basic scenario is sufficiently stable to take the next steps in its definition. Potential European roles in e.g. a future reusable human ascent and command module or other elements of the architecture will have to be informed by the evolution of the global context.

¹The Global Exploration Roadmap, published by the International Space Exploration Coordination Group, January 2018

²R. J. Whitley et al., Global Exploration Roadmap Derived Concept for Human Exploration of the Moon, GLEX?2017?3.2A.1

³A Global Lunar Landing Site Study to Provide the Scientific Context for Exploration of the Moon, David A. Kring and Daniel D. Durda (eds.) Lunar and Planetary Institute Contribution No. 1694, 2012

⁴D. Parker et al., The European Space Exploration Envelope Programme: ESA’s Answer to an Inclusive Exploration Vision For a United Space In Europe, IAC-17,B3,1,4,x40748, 2017

⁵M. Landgraf et al., LEAG Annual Meeting, Abstract 1863, 2015

⁶D. Kring, Exploring The Solar System With An Integrated Human And Robotic Deep Space Program, Lunar Planetary Institute, Planetary Science Vision 2050 Workshop 2017

⁷V. Hipkin et al., Canadian Space Agency Activities And Science Priorities Related To Lunar Surface Exploration, LEAG Annual Meeting, Abstract 5054, 2017