

IAF HUMAN SPACEFLIGHT SYMPOSIUM (B3)
Governmental Human Spaceflight Programmes (Overview) (1)

Author: Mr. John Guidi
NASA, United States, john.guidi@nasa.gov

Dr. Stefaan De Mey
European Space Agency (ESA), The Netherlands, stefaan.de.mey@esa.int

Dr. Christian Lange
Canadian Space Agency, Canada, christian.lange@asc-csa.gc.ca

Dr. Matthew Bamsey
Canadian Space Agency, Canada, matthew.bamsey@asc-csa.gc.ca

Mr. Jean BLOUVAC
Centre National d'Etudes Spatiales (CNES), France, jean.blouvac@cnes.fr

Mrs. Kandyce Goodliff
National Aeronautics and Space Administration (NASA)/Langley Research Center, United States,
kandyce.e.goodliff@nasa.gov

Mr. Marc J. Haese
Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany, marc.haese@dlr.de

Dr. Markus Landgraf
European Space Agency (ESA), The Netherlands, Markus.Landgraf@esa.int

Dr. Simone Pirrotta
Italian Space Agency (ASI), Italy, simone.pirrotta@est.asi.it

Mr. Naoki Satoh
Japan Aerospace Exploration Agency (JAXA), Japan, naoki.satoh1@jaxa.jp

THE 2022 UPDATED LUNAR EXPLORATION SCENARIO FOR THE GLOBAL EXPLORATION
ROADMAP (GER): THE GROWING GLOBAL EFFORT AND MOMENTUM GOING FORWARD TO
THE MOON AND MARS**Abstract**

In January 2018 the International Space Exploration Coordination Group (ISECG) issued its third edition of the Global Exploration Roadmap. It reflects the consensus of ISECG space agencies on a common strategy and roadmap for expanding human presence into the Solar System, with the surface of Mars as the long-term goal. The GER was augmented in 2020 and again in 2022 after rapid advances in agency lunar planning for human exploration, corresponding science goals and technology development strategies. These advances in lunar exploration plans of ISECG agencies are captured in the updated GER reference lunar surface exploration scenario in 2022. Based on the “ISECG Exploration Goals” and “Sustainability Principles”, and building on inputs from the various agencies, lunar surface exploration objectives have been refined and aligned with current agency goals and new agency aspirations. A sustainable operation on and around the Moon is recognised as a shared goal directly contributing to enabling human missions to Mars. Key elements for achieving higher levels of sustainability are longer surface missions by surviving the lunar night, and the introduction of reusable elements. ISECG also initiated further analysis related to the potential of In-Situ Resource Utilisation, including the use of regolith and water ice on the lunar surface, which may create opportunities in the coming decades.