



ILEWG/LUNEX EuroMoonMars & EuroSpaceHub Academy: Recent Highlights

Bernard Foing^{1,2}, Henk Rogers², Serena Crotti¹, Jara Pascual¹, and the ILEWG LUNEX EuroMoonMars Team and EuroSpaceHub Academy*

¹ILEWG LUNEX EuroMoonMars Team and EuroSpaceHub Academy

²International Moonbase Alliance & HI-SEAS, Hawaii, US

*A full list of authors appears at the end of the abstract

EuroMoonMars programme in Data Analysis, Instrumentation, Field Work and Astronautics: EuroMoonMars is an ILEWG programme [1-226] in collaboration with space agencies, academia, universities and research institutions and industries. The programme includes research activities for data analysis, instruments tests and development, field tests in MoonMars analogue, pilot projects, training and hands-on workshops, and outreach activities. Extreme environments on Earth often provide similar terrain conditions to sites on the Moon and Mars. In order to maximize scientific return it becomes more important to rehearse mission operations in the field and through simulations. EuroMoonMars field campaigns have then been organised in specific locations of technical, scientific and exploration interest. Lunex EuroMoonMars, has been organizing in collaboration with ESA, NASA, European and US universities a programme of data analysis, instrumentation tests, field work and analog missions for students and researchers in different locations worldwide since 2009, including Hawaii HI-SEAs, Utah MDRS, Iceland, Etna/Vulcano Italy, Atacama, AATC Poland, ESTEC Netherlands, Eifel Germany, etc... Analogue missions provide a practical ground in which students can test the notions learnt at the university in a realistic simulation context. Over the course of these missions, students have access to special Space instrumentation, laboratories, Facilities, Science Operations, Human Robotic partnerships. In 2023, EuroMoonMars and EuroSpaceHub Academy co-sponsored a series of EMMPOL Moonbase isolation simulation campaigns in Poland.

EuroSpaceHub programme for Space Innovation Workforce Development: The EuroSpaceHub project to facilitate accessibility to the Aerospace sector. EuroSpaceHub is a European-led project with collaborators worldwide, funded by the EIT HEI initiative - Innovation Capacity Building for Higher Education – with Agenda 2021-2027. The project includes six core partners: Vilnius TU, ISU, U C Madrid, Sikorsky Kyiv, Collabwith and Lunex. The project was created to foster collaboration, innovation and entrepreneurship in the European Aerospace sector. EuroSpaceHub Academy develops training programme for Space researchers and entrepreneurs.

Space Engineering Workforce Development: we have also developed a semester course of Space System Design Engineering at EPFL Lausanne since 2020.

Interdisciplinary Space Workforce Development: In the frame of ISU International Space University and EuroSpaceHub academy, we performed lectures, hands-on workshops including the operations of instruments on EuroMoonMars ExoGeoLab lander, workshops on MoonOutpost design performed in the frame of MSS master , or SSP Space Studies Programme. Together with ISU , EuroSpaceHub staff co-supervised various IP Individual Projects of students, and Master Research Projects.

EuroSpaceHub Participation to Congress and Events: We also co-sponsored the participation to conferences such as LPSC, EGU, IAC and the organization of events or workshops connecting the space scientists, engineers, innovators, entrepreneurs to space stakeholders. This included talks and expo booths at IAC International Astronautical Congress and Rome New Space Economy Forum.

ILEWG LUNEX EuroMoonMars Team and EuroSpaceHub Academy: B. Foing¹⁻¹⁰, H. Rogers² , S. Crotti^{3,4}, J. Pascual⁴, V. Puriené⁴, EuroSpaceHub Team⁴, A. Kolodziejczyk^{3,7}, I.R.Perrier^{3,7,9}, S. Baatout¹¹, S. Pavanello¹⁴, C. Stoker¹ , P. Ehrenfreund^{1,19}, TaiSik Lee², M. Musilova² , M. Heemskerk^{2,3} , C. Pouwels^{2,3,12} , A. Tavernier¹³ , K. McGrath^{3,7,12} , A. Ehreiser¹⁶, L.Schlarman^{3,4}, B Reymens^{3,4}, K. Gautam^{3,4}, A. Wedler¹⁶, A. Autino¹⁷, S. Heinz¹⁷ , J. Pelton¹⁷, J. Crisafulli¹⁷ , V. Beldavs¹⁷ , D Tacchini¹⁰ , S. Asfour^{3,4,10} , A. Hutchinson^{3,4}, M. Gil Navidad^{19,10} , M. Gupta^{19,10}, B. Shapiro^{19,10}, S. Ferras^{19,10}, V. Foing¹⁰, B. Demir¹⁰ , EuroMoonMars campaigns teams³, 1ILEWG MDRS campaign teams (ESA ESTEC, NASA Ames, VU Amsterdam, GWU), 2 EuroMoonMars-Intl MoonBase Alliance & HISEAs, 3ILEWG LUNEX EuroMoonMars, 4 EuroSpaceHub, 5Leiden Observatory, 6ESA ESTEC, 7EMMPOL/AATC, 8Moon Gallery Foundation, 9 IPSA, 10EuroSpaceHub Academy, 11Politecnico Torino, 12EMM CHILL-ICE Iceland team, 13U of Atacama, Chile, 14U Padova, 15TU Dublin, 16DLR Institute of Mechatronics & ROBEX/ARCHES telerobotics Etna campaigns, 17 Space Renaissance International, 18 Fotonika U Latvia, 19 ISU International Space University (foing@strw.leidenuniv.nl) We thank collaborators and partner institutions from EuroSpaceHub Consortium, EIT HEI initiative, EIT Manu-facturing and EIT Raw Materials. We acknowledge EuroSpaceHub core partners: Vilnius Gediminas Technical University (V. Puriené, L. Pečiūre et al), Collabwith (J. Pascual et al), International Space University (W. Peteers, N. Peter, C. L'Habitant), Universidad Complutense de Madrid (A.I. Gomez, J.C. Vallejo), Igor Sikorsky Kyiv Polytechnic Institute, Lunex Foundation and Euro-MoonMars programme . We thank recent collaborators of EuroMoonMars programme: A. Weert, S. Mulder, S. Kerber , A. Castro, P. Das Rajkakati, R. Heemskerk, N. Sirikan , H. Boross, M. Laffont, R. Landolina, A. Spilkin, H. Reilly, C. Mohan, G. Brady.