

Invited Speaker 12

European Space Agency (ESA)'s human research science activities

Melike Balk^{1,*}, **Inês Antunes**¹, **Gabriel Rios**² and **Angelique van Ombergen**³

¹ Telespazio for the European Space Agency

² Space Applications NV for the European Space Agency

³ Human and Robotic Exploration Directorate, European Space Agency

* Correspondence: melike.balk@ext.esa.int

Abstract

The mission of the European Space Agency (ESA)'s human spaceflight and robotic exploration (HRE) programme is a sustainable and international endeavour to visit new places and make novel discoveries. The ESA HRE strategy includes three destinations where humans will work with robots to gather new knowledge: low-Earth orbit on the International Space Station, the Moon and Mars. To enable human exploration beyond low Earth orbit it is crucial to reduce the risks of spaceflight in human health and performance. ESA is running a dedicated research programme that leads to the development and delivery of human health, performance, and countermeasures and risk mitigation solutions for unwanted effects from space hazards, and advanced habitability and medical support technologies. The main research topics focus on human health and performance (physiology and behavioural health), radiation, habitability and medical capabilities. Furthermore, space and space analogues also offer unique possibilities to study health problems related to diseases, ageing and immobility which then might yield benefits for terrestrial medicine. This presentation will focus on ESA's Human Exploration activities, including mainly human research across the variety of platforms and destinations within the ESA HRE portfolio. Here, the aim to outline recent highlights stemming from ESA Life Sciences research, focusing mainly on Human research activities, the research priorities for the future, and how the science community can get involved with ESA's HRE science programme.

Keywords: ESA; human physiology; Space research; International Space Station; planetary exploration

Acknowledgments

This work received no external funding.



In *Scientific Letters*, works are published under a CC-BY license (Creative Commons Attribution 4.0 International License at <https://creativecommons.org/licenses/by/4.0/>), the most open license available. The users can share (copy and redistribute the material in any medium or format) and adapt (remix, transform, and build upon the material for any purpose, even commercially), as long as they give appropriate credit, provide a link to the license, and indicate if changes were made (read the full text of the license terms and conditions of use at <https://creativecommons.org/licenses/by/4.0/legalcode>).