

IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
In Orbit - Postgraduate Space Education (4)

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THE SPACESHIP EAC INITIATIVE: HISTORY, TEAM, ACTIVITIES AND PERSPECTIVE

Abstract

The European Space Agency (ESA) is currently involved in the preparation of the future human exploration missions together with other national agencies and private companies. The ESA European Astronaut Centre (EAC) in Cologne, Germany, is responsible for astronaut training, real-time operations and medical support for the European part of the International Space Station (ISS) program. However, the centre is also preparing itself for future space exploration mission beyond Low Earth Orbit (LEO) and especially for lunar operations as the Moon is the next logical step for a sustainable exploration strategy. The Spaceship EAC initiative aims to foster activities for human spaceflight beyond LEO, leveraging from EAC personnel and expertise given by more than 30 year of experience. It is part of the Exploration Preparation, Research and Technology (ExPeRT) team, an ESA entity which falls under the Directorate of Human and Robotic Exploration Programmes (D/HRE) that is responsible of implementing the European Exploration Envelope Programme (E3P). Three main pillars are forming the mission statement of Spaceship EAC: enhance, enable and inspire. By using the Spaceship EAC team and network, this initiative shall enhance EAC to better prepare and adapt to technology and exploration opportunities. The team is carrying out research on Low Technology Readiness Level (TRL) concepts for human spaceflight: the approach used is pragmatic and demonstration driven, always targeting innovative solutions and products. The thematic areas into which Spaceship EAC is focus are: advanced manufacturing, robotics, off-world living, disruptive technologies, space resources and energy. The technologies explored are fundamental to close the knowledge gaps in lunar science, eventually leading to safely live and work on the Moon as for the ESA Moon Village vision. Importantly, the initiative links with related activities within ESA and with varied stakeholders across Europe, forming a collaborative environment to advance many low-level technologies and concepts. The initiative is led by a Science Advisor with an ESA astronaut as additional support. The team is formed by young graduate trainees and early stage researchers, including visiting doctoral students and post-docs. Since its official start, Spaceship EAC already hosted more than 100 graduate students and visiting researchers from ESA member states. Other Spaceship-type of initiatives have been recently establish in other ESA sites with different focus, but following the same work approach. The present work is intended to present the history and future perspective of this ESA initiative, also describing the most important achievements realised by the team.