

IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)  
New Worlds - Non-Traditional Space Education and Outreach (7)

Author: Dr. Tatiana Benavides  
Swiss Space Center, Switzerland, tatiana.benavides@epfl.ch

Mr. Oliver Kirchhoff  
Swiss Space Center, Switzerland, oliver.kirchhoff@epfl.ch

Dr. Gaetan Petit  
Swiss Space Center, Switzerland, gaetan.petit@epfl.ch

Dr. Gilles Feusier  
Swiss Space Center, Switzerland, gilles.feusier@epfl.ch

Dr. Camille Pirat  
Swiss Space Center, Switzerland, camille.pirat@epfl.ch

Prof.Dr. Volker Gass  
Ecole Polytechnique Fédérale de Lausanne (EPFL), Swiss Space Center (SSC), Switzerland,  
volker.gass@epfl.ch

## ESA\_LAB DEMONSTRATOR PROJECT: IGLUNA

**Abstract**

IGLUNA, as a demonstrator pilot project, is aimed at supporting and accelerating the ESA\_Lab initiative. The lessons learned from IGLUNA will help for the implementation of future ESA\_Labs. The Swiss Space Center (SSC) leads the project and the main systems engineering activities, mentors the students, coordinates the events, and communicates to the general public to improve the outreach.

The nature of the project is to stimulate student education and exchange through an international, interdisciplinary, and collaborative project on the topic: "A Human Habitat in Ice: Demonstrating key enabling technologies for life support in frozen worlds". During the project, university students apply their knowledge to solve a technical challenge, increasing in parallel the maturity of technologies relevant to the space domain. The purpose of the mission is to investigate a novel approach to enable human settlement at the moon directly inside the ice craters near the poles. The topics covered go from the habitat conception and construction to life support systems, power management, communication and navigation, radiation monitoring, as well as human well-being and science.

20 student teams from 13 universities from 9 countries around Europe, are working together during two academic semesters in 2018/2019 on their projects. Reviews were scheduled based on systems engineering best practices and simplified with respect to a formal space project review process. The student projects started in September 2018 with a Kick-off Event in Zurich as a first encounter of the teams, followed by SSC coaches visits to the teams at their local universities for the Preliminary Design Review in November. The Mid-term Event in Geneva featured the Critical Design Review in January 2019, with the subsequent Readiness Review team visits in April.

During the Field Campaign, all of the teams will meet and bring together their technologies in Zermatt, Switzerland, from 17 June to 3 July 2019. Inside an ice cave at the Glacier Palace of Klein Matterhorn, the teams will build a 36m<sup>2</sup> human habitat and test their equipment in an extreme environment. Downtown in Zermatt, students will also present their projects in an exhibition hall.

The oral presentation at IAC will cover all aspects of the overall IGLUNA project management as a first ESA\_Lab precursor coordinated by the Swiss Space Center. It will include the preparation phase, co-

ordination of the student projects, description of the milestones reached, results from the Field Campaign, and the next steps towards the implementation of future ESA Labs.