

IGLUNA – ESA_Lab@CH

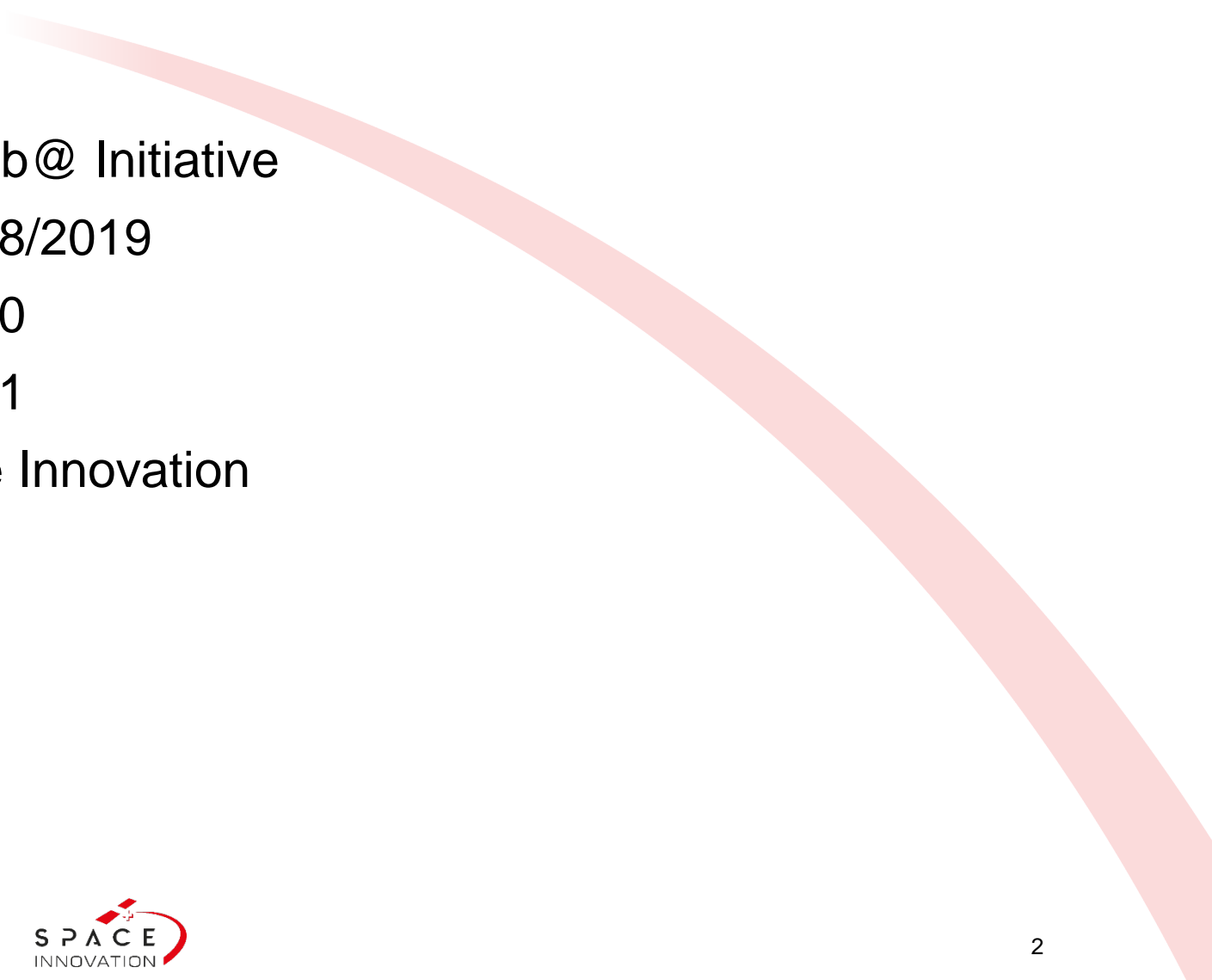


July 2021





Content

- + The ESA_Lab@ Initiative
 - + IGLUNA 2018/2019
 - + IGLUNA 2020
 - + IGLUNA 2021
 - + About Space Innovation
- 

Engaging students across Europe to showcase innovative technologies

- + Demonstrating how to sustain life in an extreme environment
- + For the future of space exploration and the improvement of life on Earth
- + Educating the next generation of space experts
- + Engineering, science, life support and design projects
- + Bottom-up approach and technology transfer
- + Over 500 students from more than 20 universities across the world



Igniting innovation



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Confederaziun svizra
Swiss Confederation
Federal Department of Economic Affairs,
Education and Research EAER
State Secretariat for Education,
Research and Innovation SERI
Swiss Space Office

ESA_Lab@ Initiative

Cooperation



- + International platform
- + Interdisciplinary collaboration

Inspiration



- + Student education
- + Next generation of space experts

Development



- + Maturity of key technologies
- + Future of space exploration

ESA_Lab@ Coordination – Mobilizing partners



IGLUNA 2018/2019 – a habitat in ice

- + Demonstrator project of ESA_Lab@ initiative
- + Paving the way with lessons learned for future ESA_Lab@ activities
- + Engaging students from across Europe



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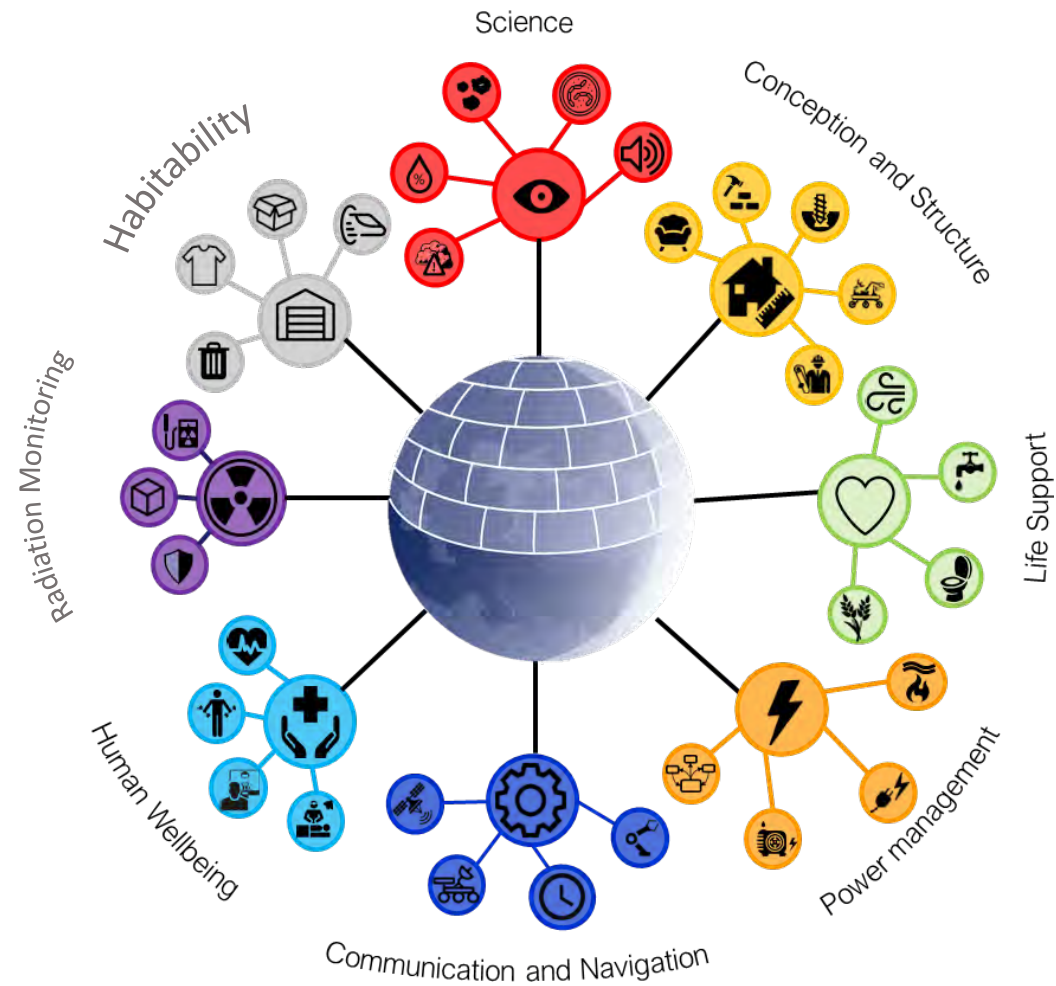


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State Secretariat for Education,
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Swiss Space Office

IGLUNA – Research topics



IGLUNA 2018/2019 – Student projects



IGLUNA 2019

Life Support Systems	Conception & Structure	Communication & Navigation	Power Management	Human Well-being	Science
P02_Human waste based agriculture	P01_CHIRON	P08_Digging & navigation robot	P18_POWER System	P13_CYCLAMINA	P12_Experiment box
P04_Algal bioreactor	P06_Habitat in lunar lava-tubes	P14_GLACIER		P10_Wearable health monitoring	P15_Science laboratory
P05_Greenhouse module	P07_Habitat in ice structure			P11_Smart monitoring system	P16_Geological experiments
P09_Oxygen production	P19_3D virtual reality model			P20_Physical activity training	P17_3D-printed ice saw
	P03_Sociokinetic analysis				

- + 20 students teams
- + 13 universities
- + 9 EU countries
- + Over 150 students
- + CERN and MIT participation

IGLUNA 2018/2019 – Kick-off Event



IGLUNA 2018/2019 – Reviews

- + Based on the European Cooperation for Space Standardization (ECSS)
- + To introduce students to systems engineering best practices
- + Simplified but in line with the review processes of formal space projects



Preliminary Design Review (PDR)



Critical Design Review (CDR)



Readiness Review (RR)

IGLUNA 2018/2019 – Field Campaign in Zermatt

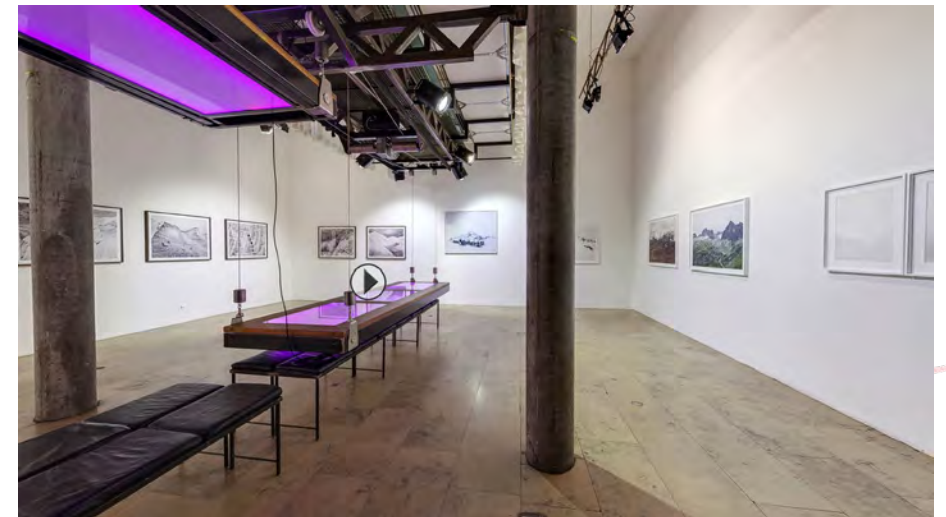


Matterhorn Glacier Paradise

- + Inside a glacier cave
- + The highest cable car station in Europe (3'883m)

Backstage Hotel Vernissage

- + Exhibition
- + Downtown in Zermatt







CIRCA DIA

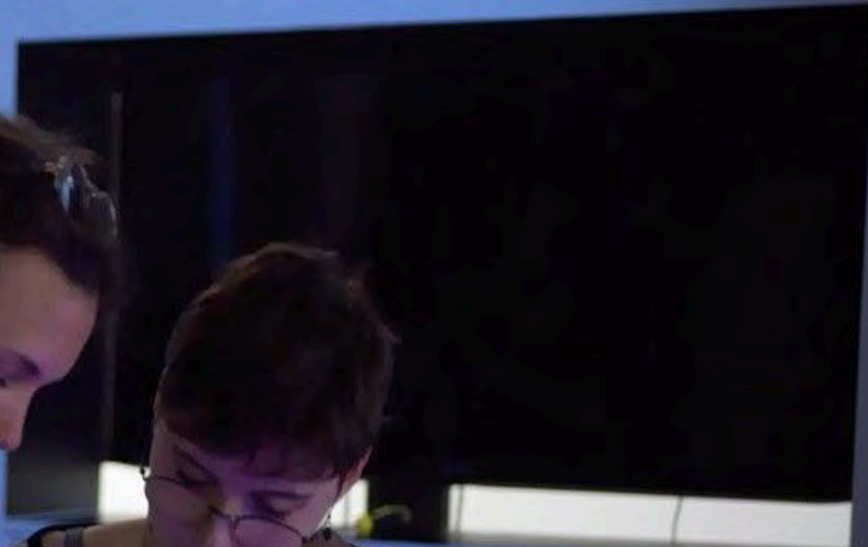
A PERSONALIZED AND IMMERSIVE EXERCISE EXPERIENCE



...combines physical exercise with
...has a reaction in the virtual world
...can work out while being fully im

LEAP

A PERSONALIZED AND IMMERSIVE EXERCISE EXPERIENCE



...combines physical exercise with
...has a reaction in the virtual world
...can work out while being fully im





IGLUNA 2018/2019 – Partners and sponsors

EPFL

ETH

Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Zürich University
of Applied Sciences
zhaw

HOCHSCHULE
LUZERN



Warsaw University
of Technology

VU UNIVERSITY
AMSTERDAM



ESTEE
EARTH SPACE TECHNICAL
ECOSYSTEM ENTERPRISES



ILEWG

RWTH AACHEN
UNIVERSITY

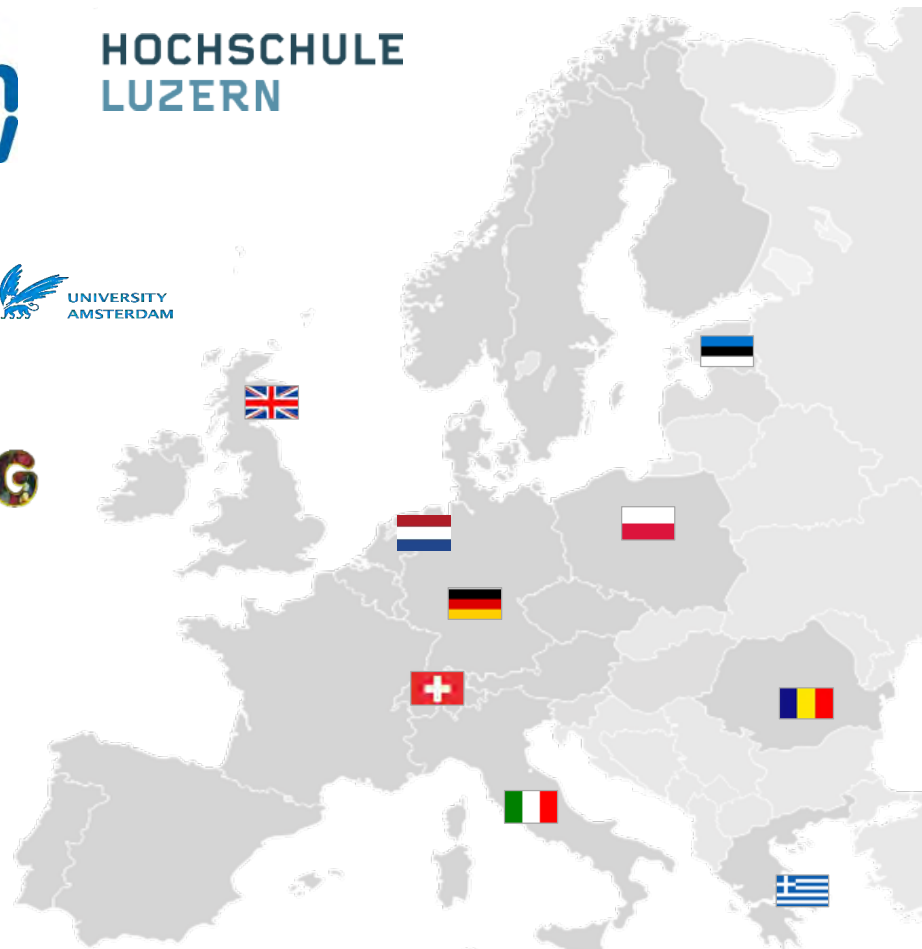
TAL
TECH

University of
Strathclyde
Glasgow



POLITECNICO
MILANO 1863
SCUOLA DEL DESIGN

MIT
Massachusetts
Institute of
Technology



MATTERHORN
ZERMATT BERGBAHNEN



ZERMATT
MATTERHORN®

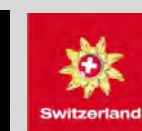
Swiss Youth
Hostels®
Zermatt

Alpin Cargo

SWISSAPOLLO
SPACE FOR INSPIRATION

VIST

Forbes
Marshall



IGLUNA 2020 – space habitat with remote operations

- + Based on the ESA_Lab@ initiative
- + Building up on IGLUNA 2018/2019
- + Developing bottom-up ideas into technologies for the future of space exploration



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Swiss Space Office

IGLUNA 2020 – ESA_Lab@CH

- + October 2019: signature of the Memorandum of Collaboration in Paris
- + Volker Gass (Space Innovation Director) and Jan Wörner (former ESA Director General)
- + IGLUNA as a platform to enable
 - + Collaboration
 - + Education
 - + Technologies demonstration



IGLUNA 2020 – Student projects



IGLUNA 2020

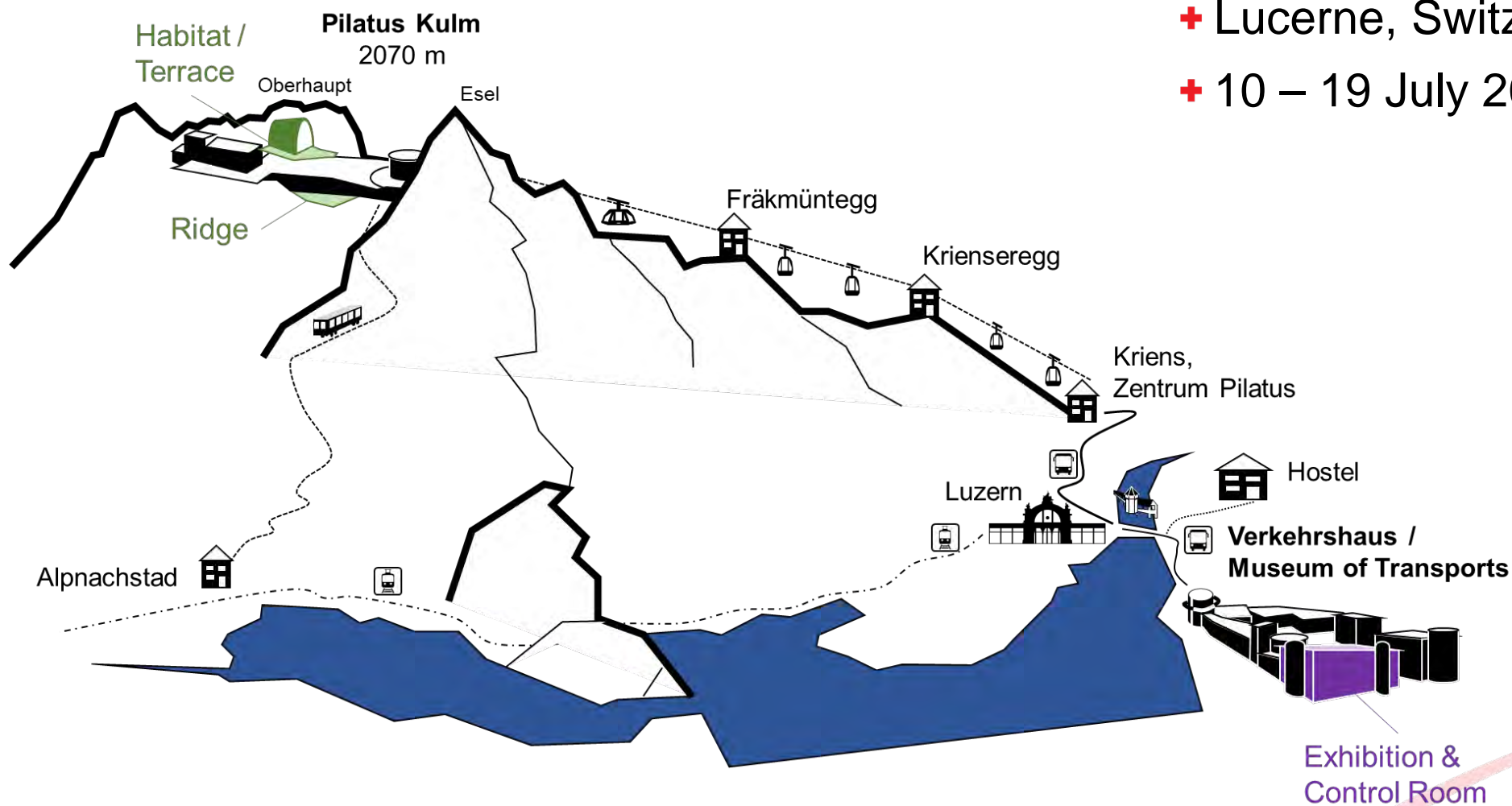
Life Support Systems	Habitat Conception & Structure	Communication & Navigation	Power Management	Human Well-being	Science
P01_MELISSA	P07_HABITAT	P11_CELESTIAL	P15_POWERHAB	P10_FOCUS	P14_LDMS FOR LIFE
P02_GROWBOT HUB	P08_AMPEX	P13_LIGHT		P12_SMART LUNAR CLOTHING	
P03_SWAG		P16_ROVER			
P04_V-GELM					
P05_SAMPLE					
P06_HYDRATION II					

- + 15 students teams
- + 15 universities
- + 10 countries
- + Over 130 students

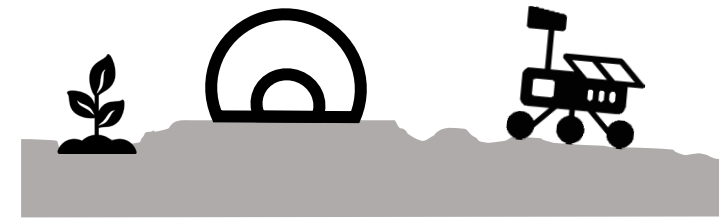
IGLUNA 2020 – Field Campaign initial concept

+ Lucerne, Switzerland

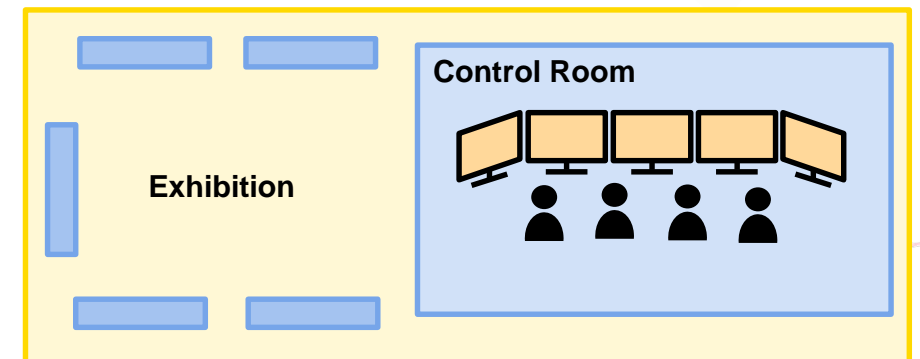
+ 10 – 19 July 2020



IGLUNA 2020 – Field Campaign initial concept



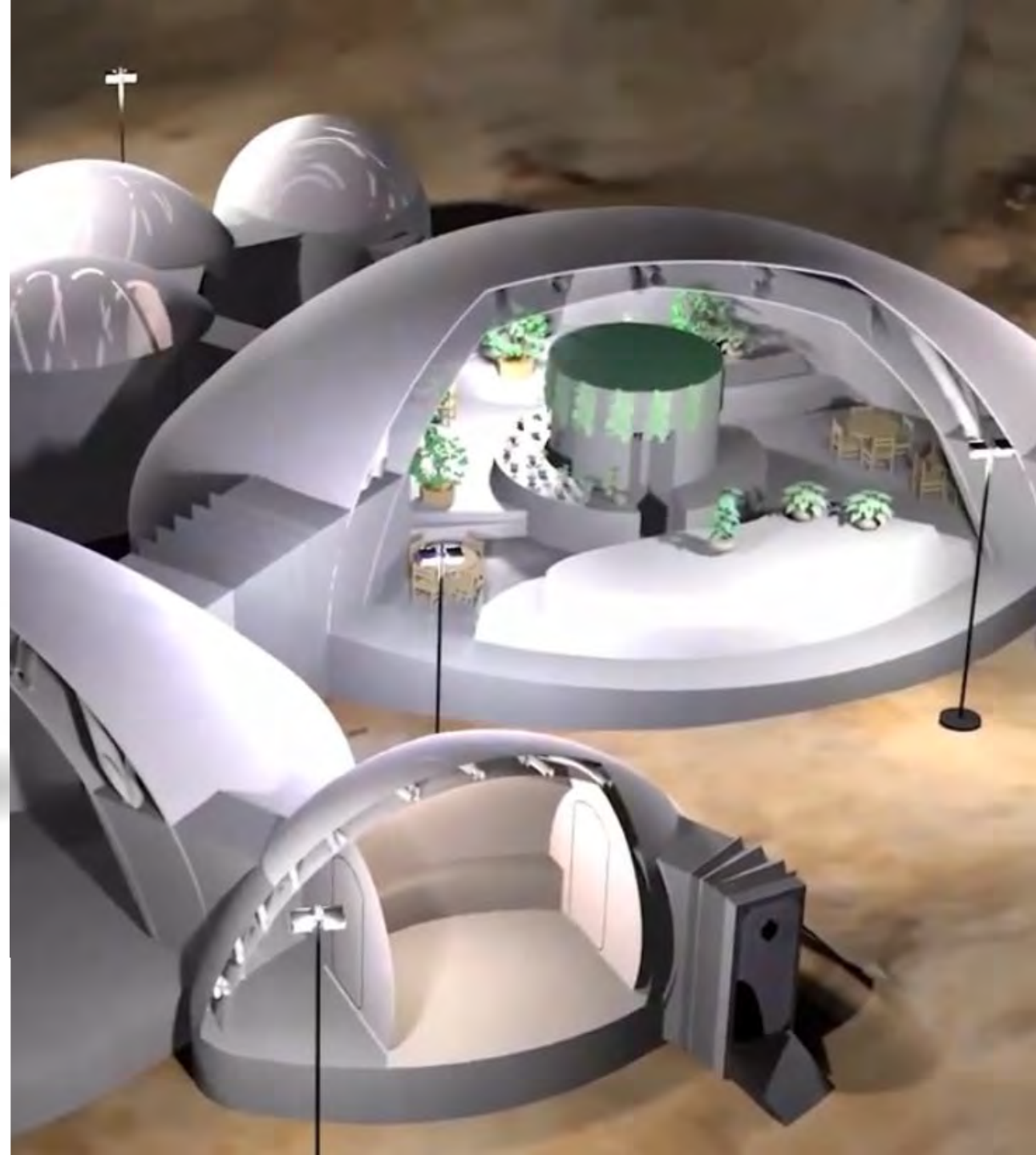
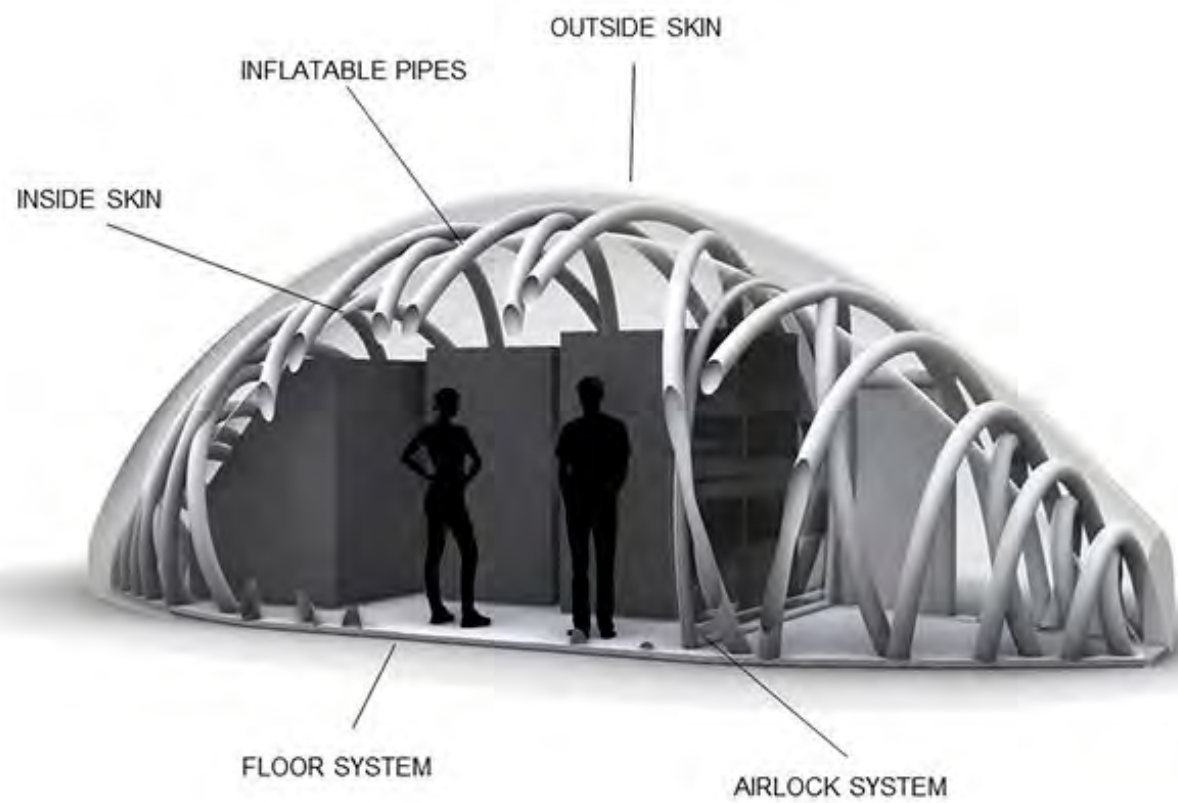
Remote Control
operations



IGLUNA 2020 – Field Campaign updated concept

- + Virtual Field Campaign
- + 10 – 19 July 2020
- + Student projects show
- + Space experts presentations
- + Bilateral talks with experts
- + > 25 live events





TEAM P11 - CELESTIAL





Alexander Gerst - ESA Astronaut



astrocast



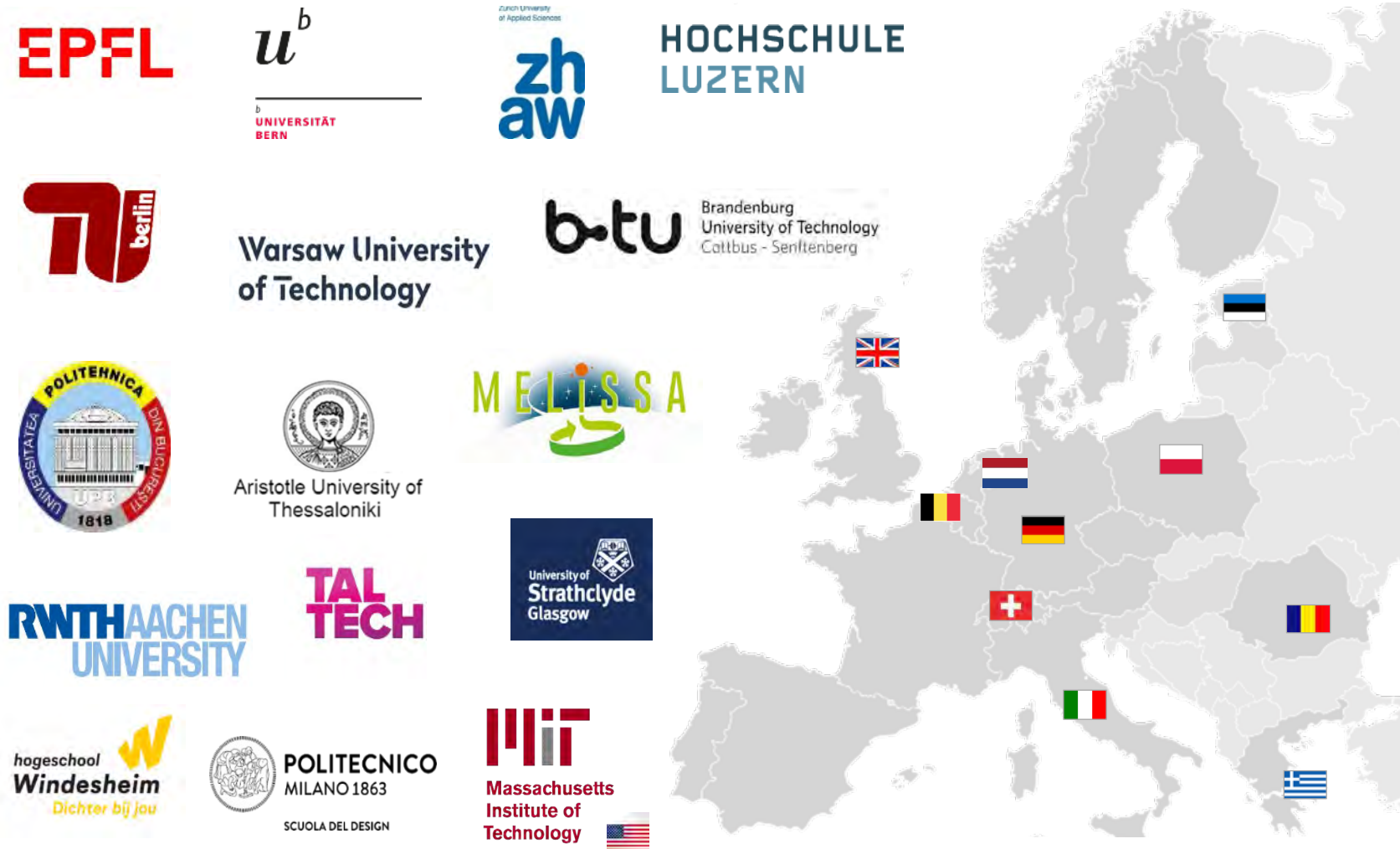
i space



Jan Wörner - ESA Director General



IGLUNA 2020 – Partners and sponsors



IGLUNA 2021 – space habitat with remote operations

- + Based on the ESA_Lab@ initiative
- + Building up on the two past editions
- + Developing bottom-up ideas into technologies for the future of space exploration
- + Highlight potential commercial applications on Earth and in space



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IGLUNA 2021 – Student projects



IGLUNA 2021

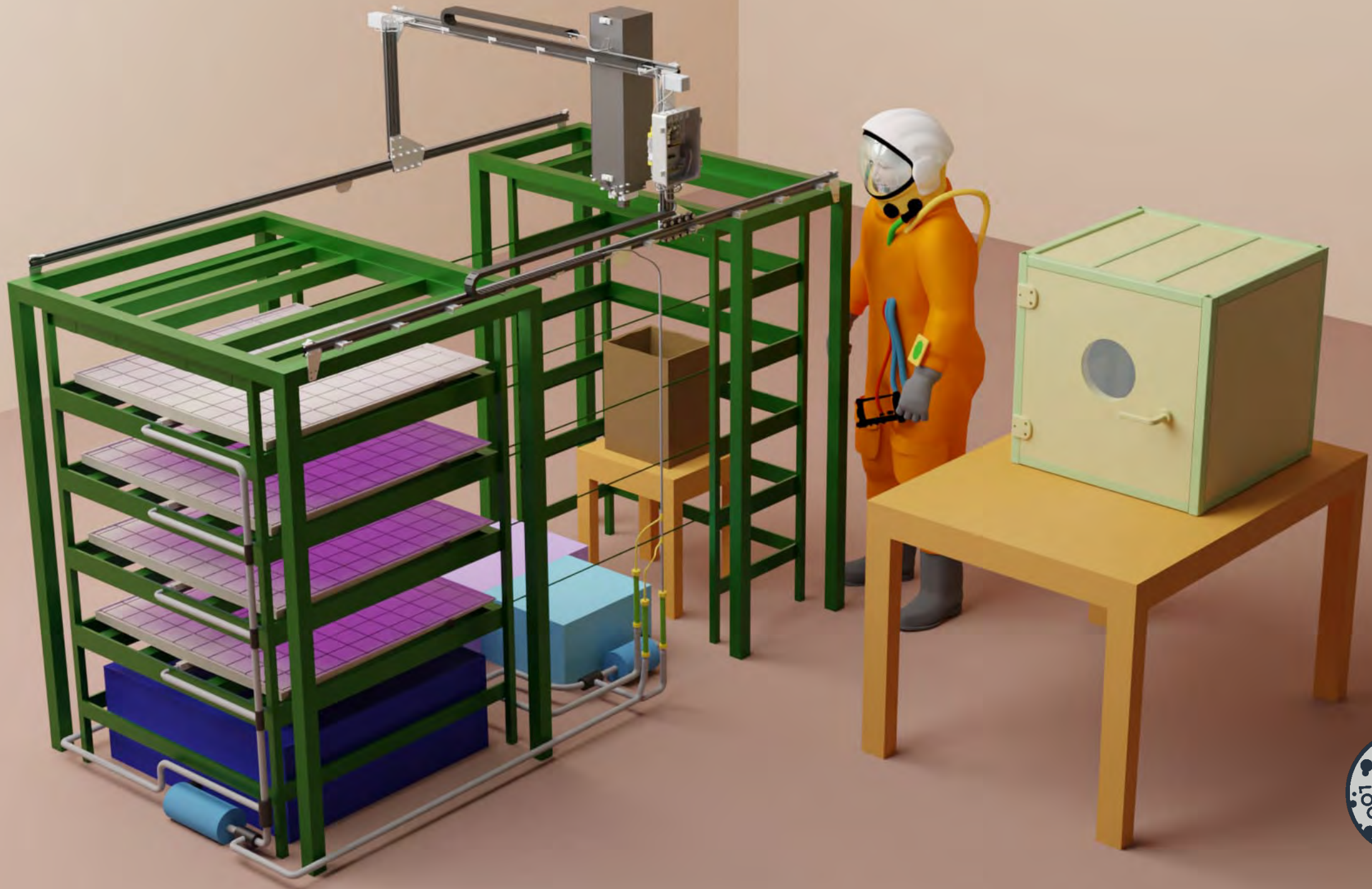
Life Support Systems	Habitat Conception & Structure	Communication & Navigation	Power Management
P01_GROWBOTHUB	P05_AIX2SPACE	P07_CORODRO	P12_POWERHAB
P02_LOOPS-M	P06_INFLATABLE HABITAT	P08_LIGHT	
P03_LUIEE		P09_LUNAR ZEBRO	
P04_SAMPLE 2		P10_MISTLAB	
		P11_REBELS	

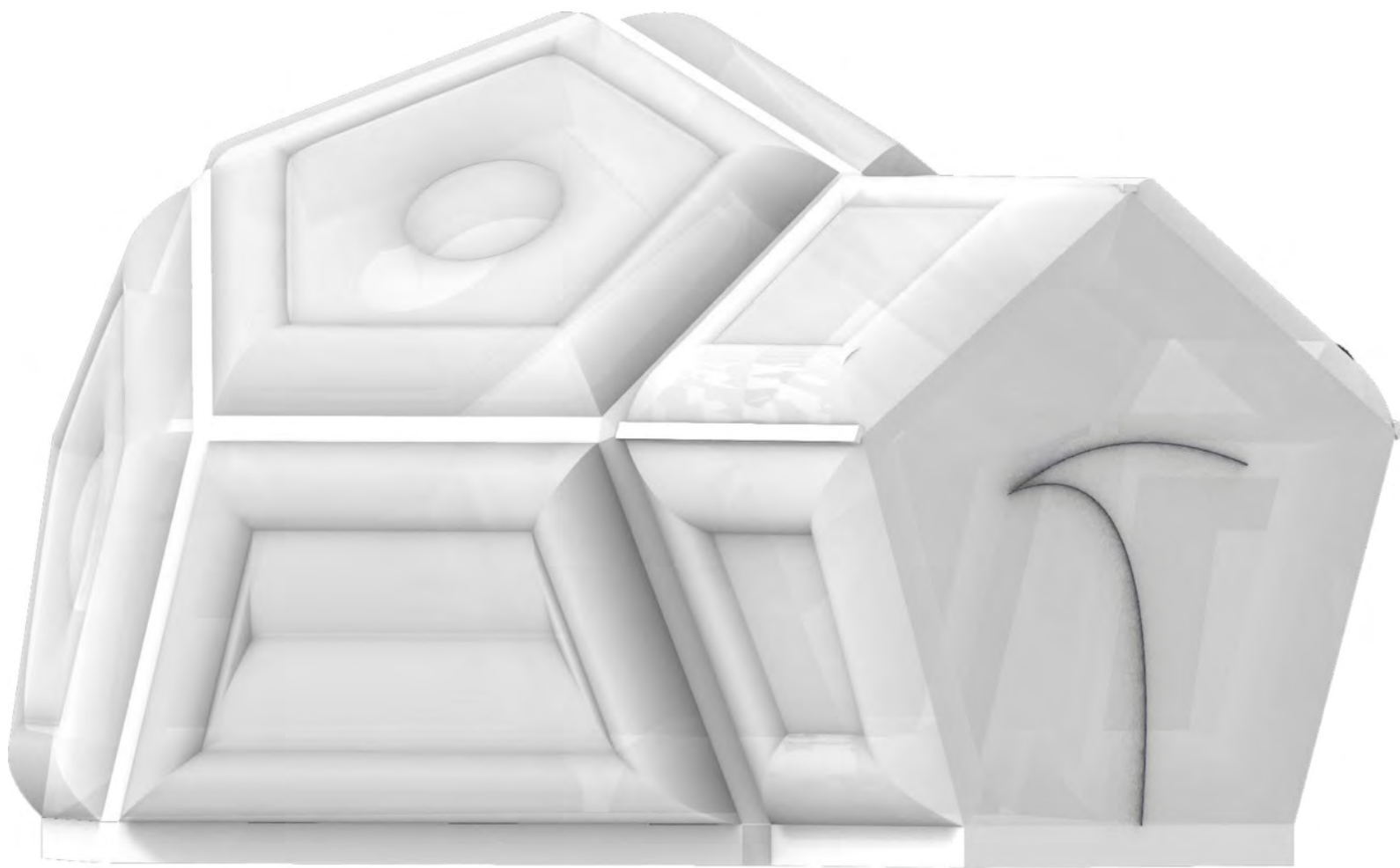
- + 12 students teams
- + 12 universities
- + 9 countries
- + Over 220 students

IGLUNA 2021 – Projects overview

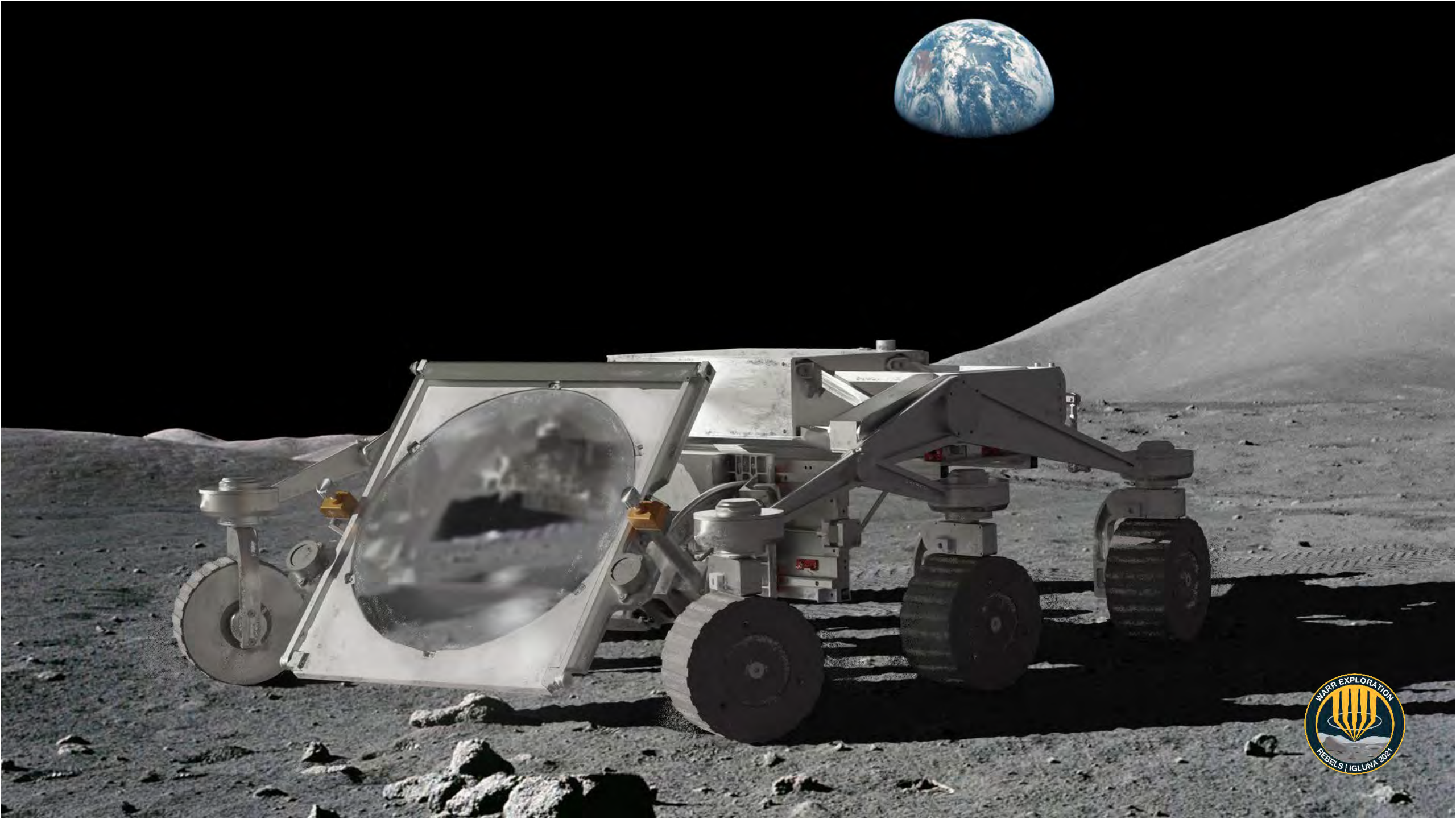
- + Focus on navigation and mapping technologies
 - + Rovers
 - + Drone
 - + Augmented reality
- + Life support systems
 - + Greenhouse
 - + Plant production
 - + Water extraction
- + Conception and structure
 - + Inflatable habitat
 - + Fibre production
- + Power system









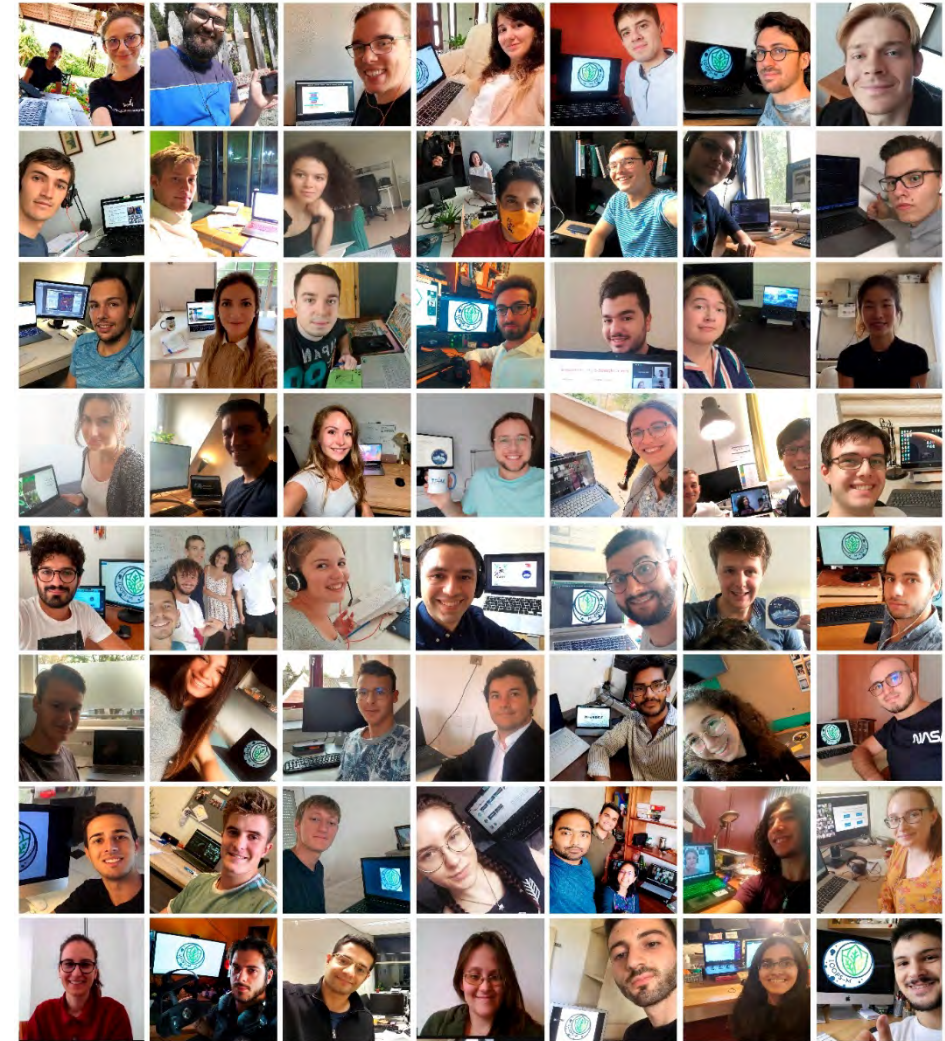


IGLUNA 2021 – Milestones



IGLUNA 2021 – Kick-off Event

- + 9 – 11 September 2020
- + Online
- + Presentation of the preliminary concepts
- + Workshops
- + Guests presentations
- + Meeting the other student teams and the coaches



IGLUNA 2021 – Midterm Event

- + 2 – 4 March 2021
- + Online
- + Halfway point of the project
- + Coordination on the Field Campaign operations
- + Sharing progresses
- + Meeting space professionnals
- + Networking



IGLUNA 2021 – Expert board



- + Evaluating the teams during the reviews
- + Mentoring the students with their knowledge
- + > 45 experts

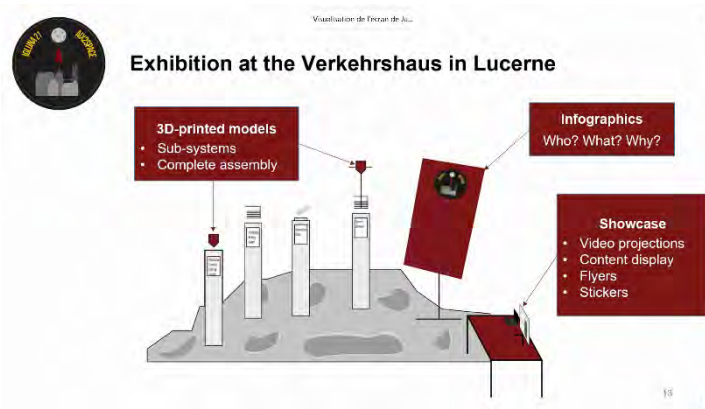
IGLUNA 2021 – Reviews

Preliminary Design Review



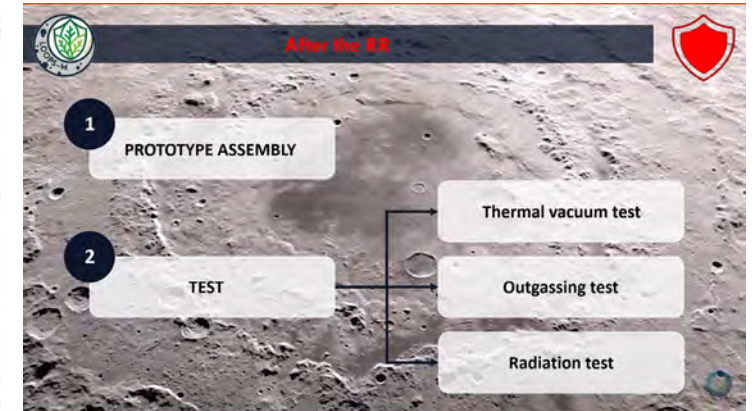
- + Detailed project outline
- + Operational, technical and organizational feasibility

Critical Design Review



- + Final design selected
- + Defined project plan
- + Secured partners and sponsoring

Readiness Review



- + Ready for the Field Campaign
- + Detailed operations plan
- + System in compliance with the risks and constraints

IGLUNA

Field Campaign

A space habitat

Lucerne, 16 - 25 July 2021
Swiss Museum of Transport and Mount Pilatus

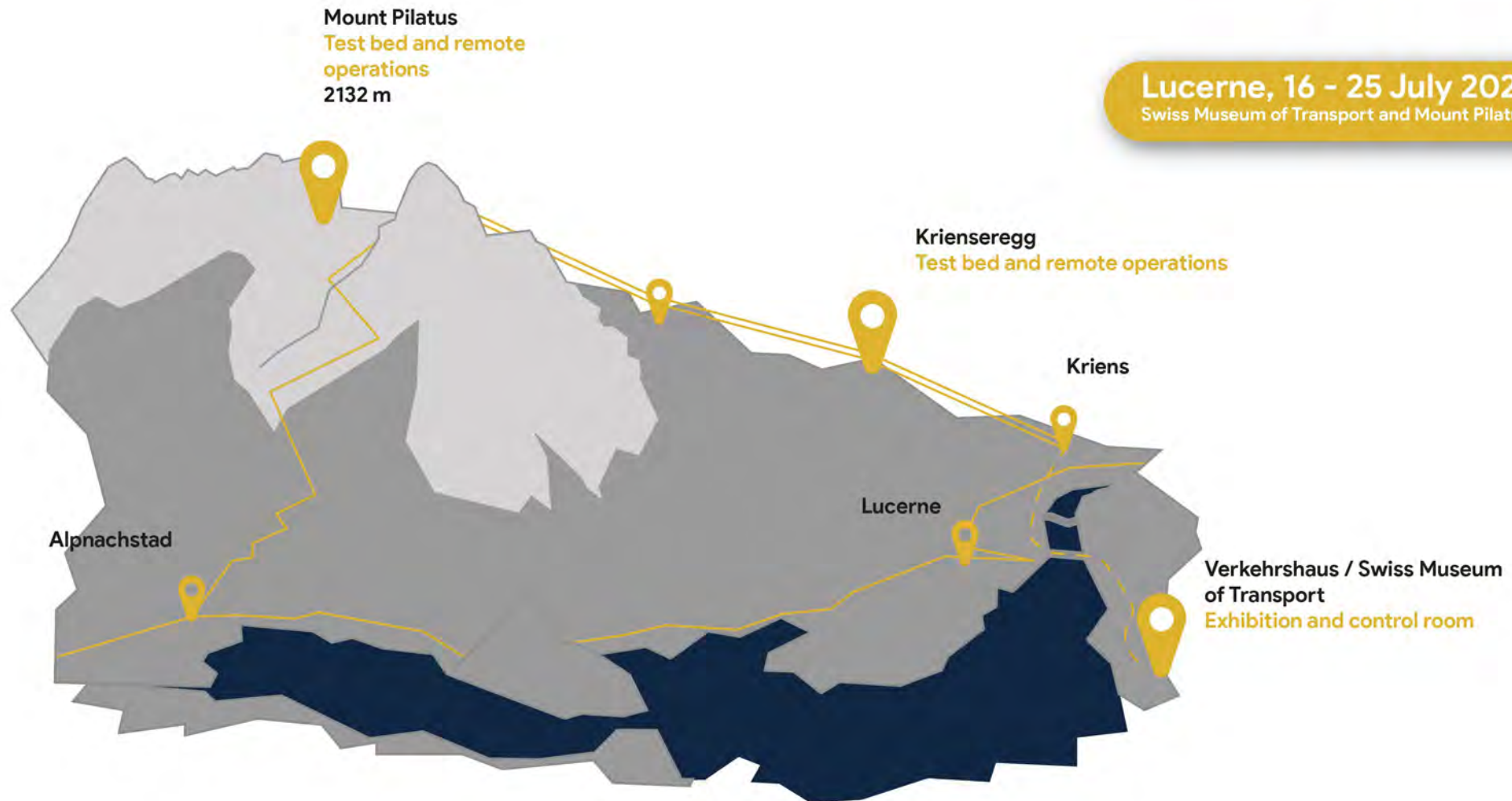
Remote operations



IGLUNA 2021 – Field Campaign



Lucerne, 16 - 25 July 2021
Swiss Museum of Transport and Mount Pilatus





IGLUNA 2021 – Field Campaign

+ 16 – 25 July 2021

+ Hybrid: in Lucerne and online

+ Closure of IGLUNA 2021

+ Demonstration and tests of the projects

+ Test bed and remote operations on Mount Pilatus (Pilatus-Kulm Terrace and Krienseregg)

+ Exhibition and control room at the Verkehrshaus – Swiss Museum of Transport

+ Interactive activities for the public

+ Project shows, official ceremonies, tours and other events

+ Programme and more information on www.space-innovation.ch/igluna

IGLUNA 2021 – Field Campaign

IGLUNA 2021

–
16 – 25 July 2021
Hybrid

Events held in Lucerne
(Switzerland) with livestream on
Space Innovation's YouTube
channel.

The public is invited to attend the
operations on site throughout
the Field Campaign.

Project shows are viewed online
only.

*no livestream

Time indicated in CEST

Fri 16

OFFICIAL CEREMONIES

16:00 Inauguration at
the Verkehrshaus

Sat 17

GUESTS

Claude Nicollier visits
the teams in Lucerne*

PROJECT SHOWS

16:00 P12 PowerHab

Sun 18

PROJECT SHOWS

16:00 P07 CoRoDro

Mon 19

GUESTS

11:00 ESA Director
General and the Swiss
Space Office meet the
teams

PROJECT SHOWS

14:00 P02 LOOPS-M

16:00 P08 LIGHT2

Tue 20

PROJECT SHOWS

14:00 P06 Inflatable
Habitat

16:00 P10 MISTLab

Wed 21

PROJECT SHOWS

14:00 P04 SAMPLE 2

16:00 P05 AIX2SPACE

Thu 22

PROJECT SHOWS

14:00 P03 LUIEE

16:00 P09 Lunar Zebro

Fri 23

PROJECT SHOWS

14:00 P11 REBELS

16:00 P01 GrowBotHub

Sat 24

GUESTS

Thomas Reiter visits
the teams in Lucerne*

PRESENTATIONS

18:15 - 19:30 Thomas
Reiter "Space for
Europe: an overview of
ESA's space activities"
at the Verkehrshaus

Sun 25

OFFICIAL CEREMONIES

15:00 Closing Ceremony
at the Pilatus Kulm

IGLUNA 2021 – Partners and sponsors

EPFL

ISAE
Institut Supérieur de l'Aéronautique et de l'Espace
SUPAERO

TU Delft
Delft University of Technology

University of
Strathclyde
Glasgow

Technische
Universität
Berlin
TU
berlin

b-tu
Brandenburgische
Technische Universität
Cottbus - Senftenberg

TUM
TECHNISCHE
UNIVERSITÄT
MÜNCHEN

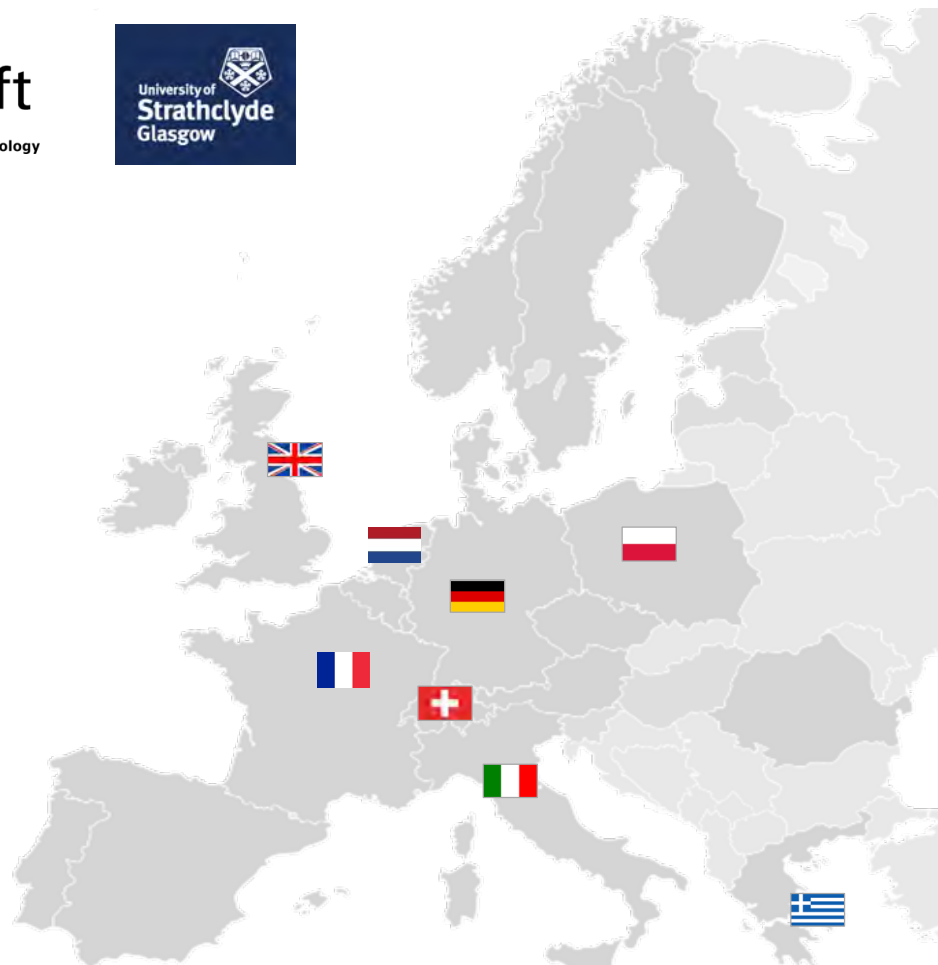
RWTH AACHEN
UNIVERSITY

**Warsaw University
of Technology**

SAPIENZA
UNIVERSITÀ DI ROMA

ARISTOTLE
UNIVERSITY
OF THESSALONIKI

POLYTECHNIQUE
MONTREAL



SPACE
INNOVATION

verkehrshaus

PILATUS
LUZERN

Lucerne University of
Applied Sciences and Arts

HOCHSCHULE
LUZERN

RHEIN **TEC**
EMERGING | MARKET | ENGINEERING

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Space Innovation's Mission



To strengthen Switzerland's space capabilities...

...and to involve players in space innovation

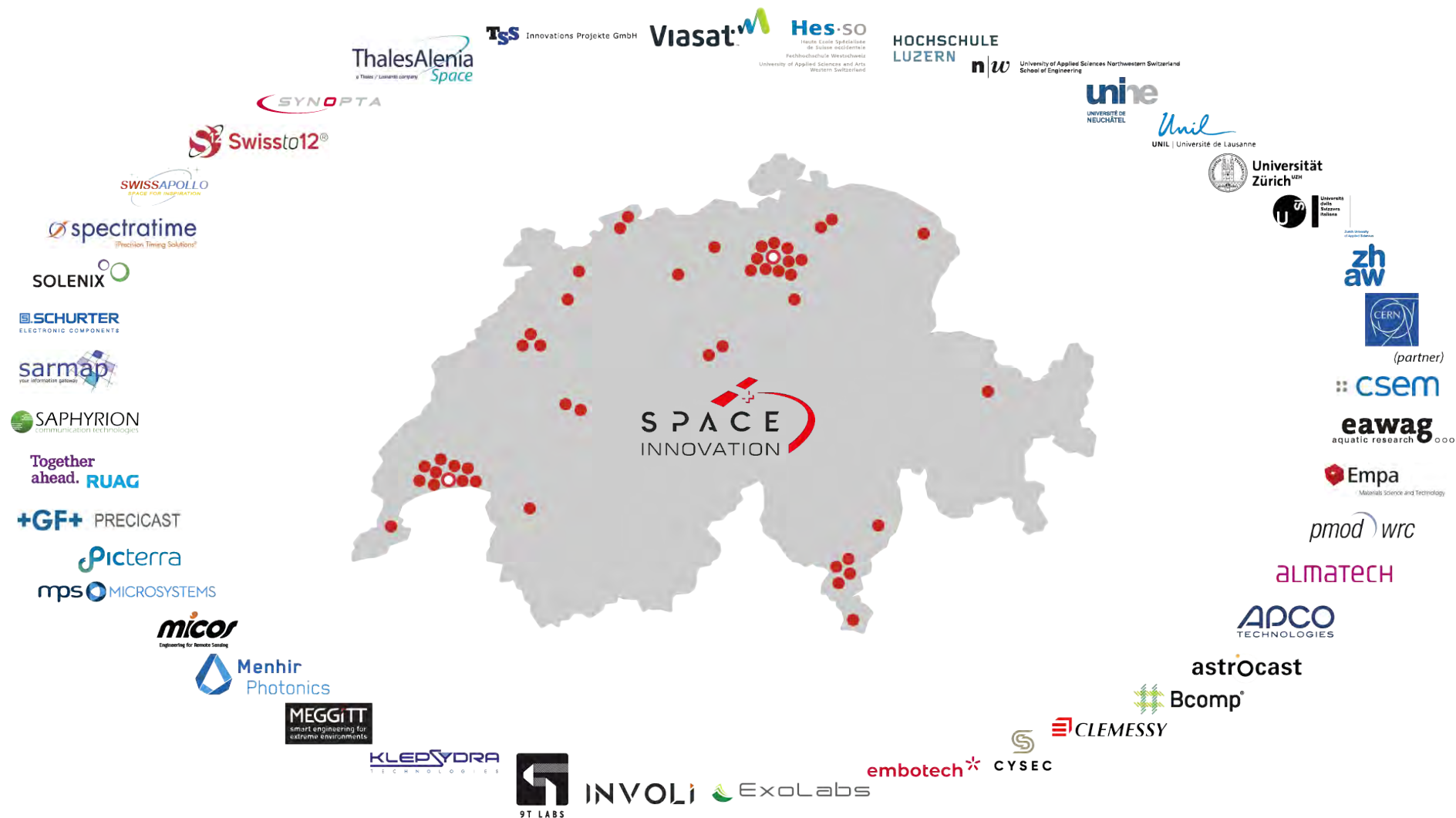
Enabling space technologies...

...to contribute to sustainable development

To network
Swiss
industries,
academia and
research
institutions.

Board of Directors

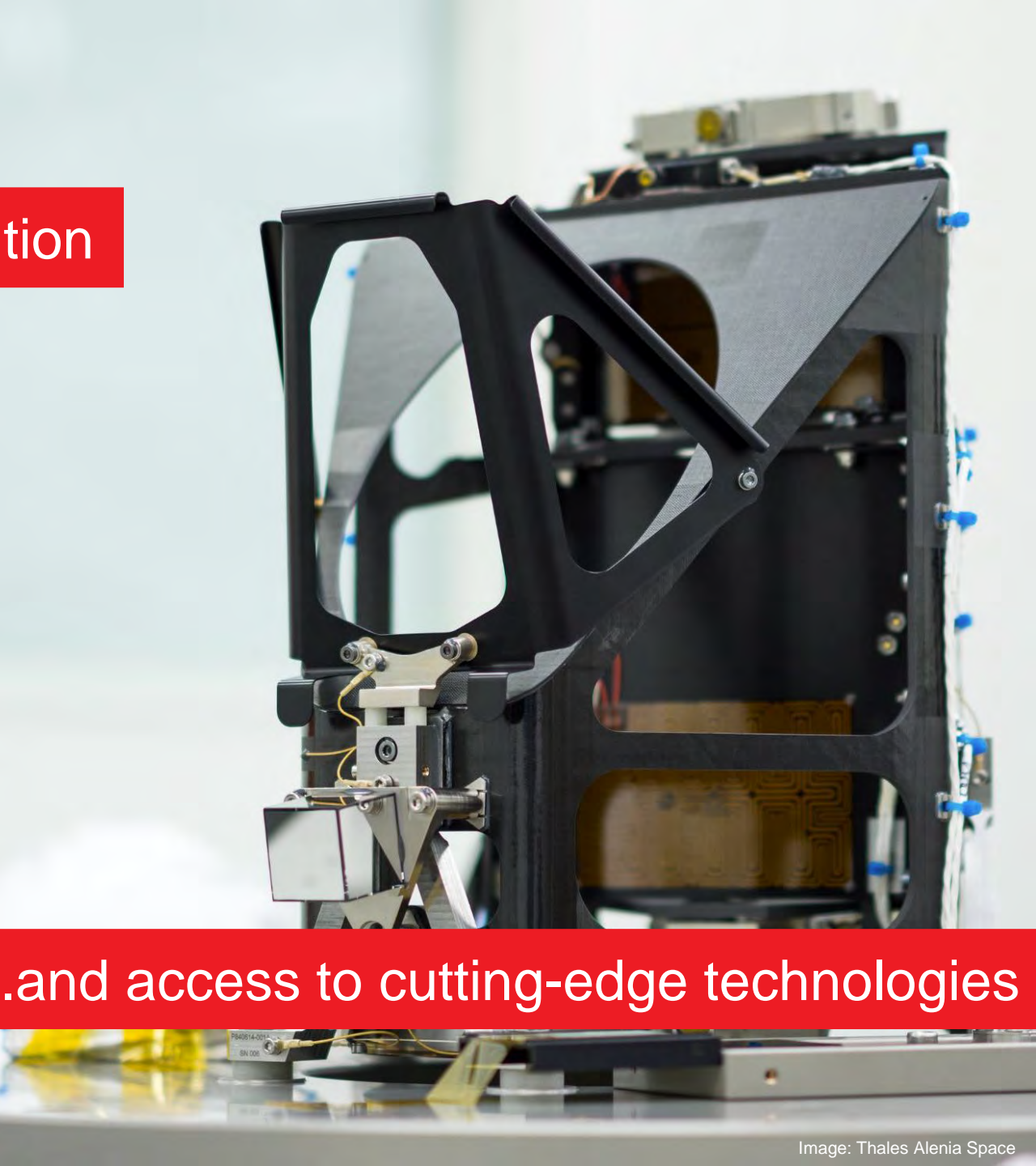
EPFL ETH zürich



A solid national and international recognition



...and access to cutting-edge technologies



Proactively advancing of member's goals...

...and establishing innovative projects with partners



Headquarters

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