



EDEN ISS – *growing food for space exploration*

A new project is underway under the European Union's *Research and Innovation Action* program Horizon 2020, within the topic of 'Space exploration / Life support.' Thirteen international organizations, including universities, corporations and small businesses, in the cross-disciplinary fields of food growth, life support, engineering and design come together in taking one step further towards the independent exploration in worlds unknown such as the Moon or Mars. During the four year project, they will collaboratively develop innovations in cultivating food in closed-loop systems.

EDEN ISS is a project focused on the '*Ground Demonstration of Plant Cultivation Technologies and - Operation in Space*' and the enhancement of those technologies, '*For Safe Food Production on-board the International Space Station (ISS) and Future Human Space Exploration Vehicles and Planetary Outposts.*'

The consortium is led by the German Aerospace Center (DLR) Institute of Space Systems in Bremen, Germany and includes the following partners;



EDEN ISS team photo, Credit: DLR 2015

- DLR Institute of Aerospace Medicine in Cologne, Germany
- LIQUIFER Systems Group, Austria
- National Research Council, Italy
- University of Guelph, Canada
- Alfred Wegener Institute for Polar and Marine Research, Germany
- Enginsoft S.p.A., Italy
- Airbus Defense and Space, Germany
- Thales Alenia Space Italia S.p.A., Italy
- Aero Sekur S.p.A., Italy
- Wageningen University and Research, the Netherlands
- Heliospectra AB, Sweden
- Limerick Institute of Technology , Ireland
- Telespazio S.p.A., Italy

The overall goal of the EDEN ISS project is to further advance key controlled environment agriculture technologies beyond the state-of-the-art, including; an advanced nutrient delivery system, a high performance LED lighting system, a bio-detection and decontamination system and food quality and safety procedures and technologies.

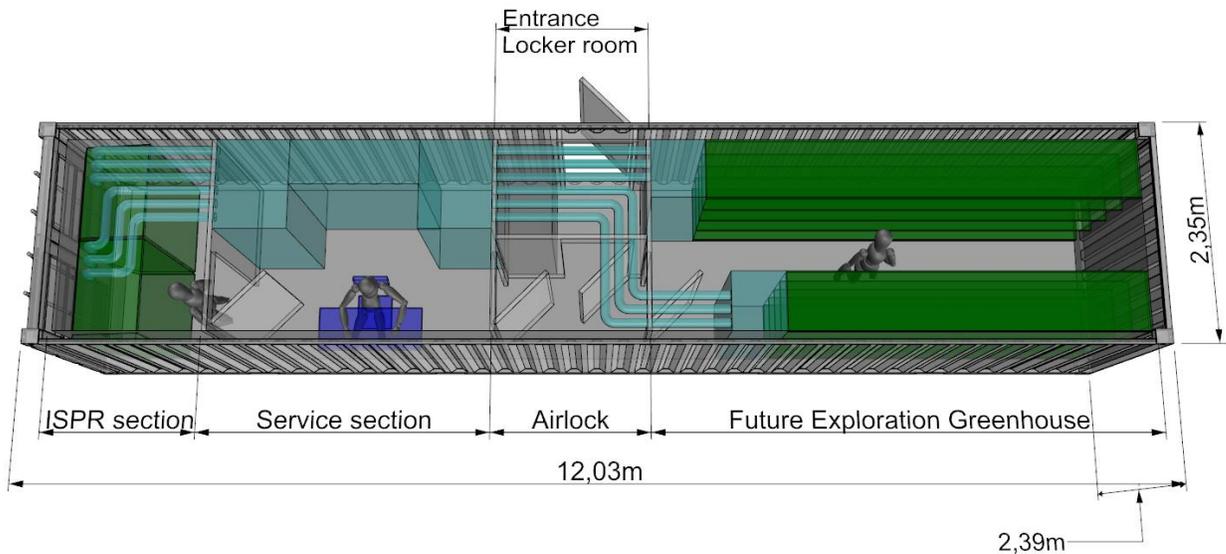


Credit: DLR

A mobile container-sized greenhouse test facility will be built to demonstrate and validate different key technologies and procedures necessary for safe food production within a (semi-) closed system.

The test facility will be designed to fit into standardized shipping containers and will consist of three essential 'parts.'

The *service section* will house the main support subsystems, including; thermal, power, air ventilation and nutrient/water subsystems and will provide working space for pre- and harvest procedures. The *International Standard Payload Rack (ISPR)* section will contain two rack systems for plant production (similar to the rack-type used on the ISS) and the *Future Exploration Greenhouse (FEG)* will consist of a highly adaptable multi-shelf growth system, capable of maintaining a number of different environmental settings.



Credit: LIQUIFER Systems Group 2015

The plant cultivation technologies will first be tested in a laboratory setting at the sites of the consortium partners. All systems will be integrated at DLR in Bremen, followed by an extensive test period. In October 2017, the complete facility will be shipped to the German Neumayer III station in Antarctica. The station is operated by the Alfred-Wegener-Institute and has unique capabilities and infrastructure for testing plant cultivation under extreme environmental and logistical conditions. It is foreseen that the container-sized greenhouse of the EDEN ISS project will provide year-round fresh food supplementation for the Neumayer Station III crew.