

EDEN ISS: Analogue Testing of Plant Cultivation for Space

Dr. Daniel Schubert

Institute of Space Systems, DLR

Sustained human presence in space requires the development of new technologies to maintain environmental control, to manage wastes, to provide water, oxygen, food and to keep future astronauts healthy and psychologically fit. The cultivation of higher plants in dedicated greenhouse modules is advantageous from this regard due to their ability to be used for food production, carbon dioxide reduction, oxygen production, water recycling and waste management. Furthermore, fresh crops are not only beneficial for human physiological health, but also have a positive impact on crew psychological well-being.

Under the lead of DLR (Institute of Space Systems), the EDEN ISS project team focused on advancing bioregenerative life support systems, in particular plant cultivation technologies and procedures for space and planetary habitats. Over the last four years, essential Controlled Environment Agriculture technologies were designed, developed and integrated within the Mobile Test Facility, consisting of two interconnected 20 ft shipping containers. During a dedicated analogue test mission at the German Neumayer III research station in Antarctica, the greenhouse system provided a variety of fresh pick-and-eat crops for the overwintering crew of 10 members. This was of particular importance during their 8 months long isolation phase, when no plane or ship resupply of the station occurred.

The presentation will give a general overview the project and focuses on the deployment- and isolation phase of the EDEN ISS research platform in Antarctica.



EDEN ISS:

The international EDEN ISS consortium comprises experts from academia, research institutes, and industry of eight countries (Germany, Austria, Sweden, USA, Canada, Italy, The Netherlands, and Ireland). The project reflects a multidisciplinary group of experts representing aerospace engineering, agriculture, horticulture, microbiology, polar and marine research, food science, medicine, and psychology.