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IN REVIEW



TWO BAD DAYS
Questioning conventional wisdom after Antares, Virgin Galactic/Page 4

“**T**hresholds of Space,” a retrospective exhibition of work by David Nixon, one of space architecture’s most prominent figures, was launched in Prague, Czech Republic, in late 2013 and is traveling to London in 2015-2016. Spanning a period from 1982 to 2012, Nixon’s work reveals the trajectory that space architecture developed as a profession, and “Thresholds of Space” is a milestone in the history of space architecture exhibitions.

With NASA Innovative and Advanced Concept funding, **Water Walls** was launched as a space architecture concept. Led by Astrostructure, the team aims to provide a life-support system that is biologically and chemically passive, based on highly reliable forward osmosis processes. The Water Walls would process urine and wash water, process air to remove carbon dioxide, and grow food using green algae, all while protecting crews from the harmful radiation of space. A system of Water Walls bags, including all the subsystems and their various component bag types, can be installed into a full-featured space habitat.

Another project that promotes sustainable living in space is the **Veggie** Vegetable Production Unit. Orbital Technologies Corp. has been awarded NASA contracts to support the development and flight of this deployable growth unit designed to produce fresh vegetables on the International Space Station. Easily stowable, it consists of a plant cultivation device that provides lighting and nutrient supply for a growing area of 0.17 square meters.

Significant architectural work has been carried out at NASA’s Jet Propulsion Laboratory by the **Exploration Systems Concepts Group** of the Mission Systems Concepts Section. The initiative is to develop workstation and rack and standoff designs for deep space habitats. Parts of the design were tested in cooperation with the NASA Desert RATS — Research and Technology Studies — in missions between 2010 and 2012.

In Europe, a **Self-Deployable Habitat for Extreme Environments** is under construction. This three-year project will conclude in 2015. It is being developed under a contract awarded through the European Commission’s Seventh Framework



University of Tartu



SHEE Consortium, Self-Deployable Habitat for Extreme Environments manufacturing.

Programme-Space, with two space architecture companies (out of seven partners) as main contributors: Liquefier Systems Group of Austria and Space Innovations of the Czech Republic.

Despite not being selected for NASA’s Commercial Crew Program, Sierra Nevada continues work on its winged, lifting-body **Dream Chaser** spacecraft, and returns to the age-old problem of size and launch mass. Interior architectural designs surrounding crew systems include innovative seating for four crewmembers and cargo stowage are under development. Integrating human factors with operations such as nominal and emergency ingress and egress poses complex and novel spatial design problems, and a challenge for space architects and designers.

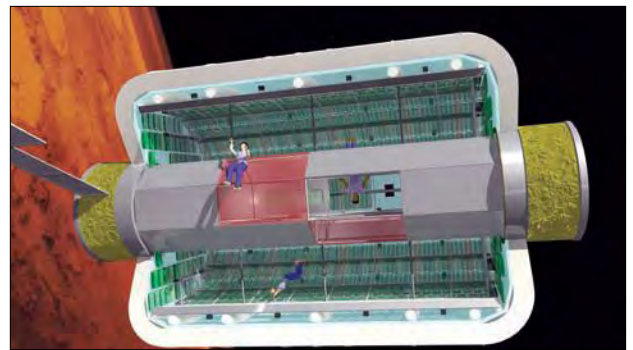
A research challenge was presented to students at Vienna University of Technology with the **MASH project**, which resulted in a concept for a deployable and portable emergency shelter for use on Mars. This academic experience was carried out in one of the few universities that offer studio-based practices and is an example of how central education is for space architecture to be ready for Mars.

Creative thinking and innovative practice in the context of education allows for the renewal of space architecture and industrial design and guarantees the continuity of a field that has been in progressive development for the last 20 years. ▲

Building toward sustainable living in space

by Maria João Durão, Barbara Imhof, Don Barker and Mark Kerr

The Space Architecture Technical Committee focuses on the architectural design of the environments where humans will live and work in space, including facilities, habitats and vehicles.



François Lévy

Water Walls air revitalization bags inside the perimeter of an inflatable habitat.