SCORPIUS PROTOTYPE

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SCORPIUS PROTOTYPE - TOWARDS A PROOF OF CONCEPT OF A CLOSED HABITAT ON-GROUND DEMONSTRATION INTEGRATING MAIN BLSS FUNCTIONS

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Key words: ground demonstration, terrestrial to Space technology transfer (spin-in), BLSS modules interfacing and integration, short to long term manned R&D campaign, preparation and financing of manned space missions, closed habitat specification definition.

First, the presentation will address the relevance of Earth-based applications of bioregenerative life support system (BLSS) for terrestrial sustainability. It will then introduce the challenges and ESTEE's approach for designing a terrestrial closed habitat demonstrator such as Scorpius Prototype (SP1), and the kind of research campaigns that can be implemented within a ground simulator. SP1 is an autonomous terrestrial solution integrating existing and emerging BLSS-related technologies. This prototype of a (semi-)closed system has been fully designed in 2017-2018 and its building is about to be started. This proof of concept is aimed to become a first step towards the on-ground development of a BLSS simulator with the highest possible level of material loop closure. Most space agencies develop a long-term roadmap for ground simulation of LSS with humans, especially as they are working on higher technology readiness levels compared to the ones of SP1. Nevertheless, one can consider that there is nowadays a clear need for an integrated closed habitat demonstrator such as SP1, in order to enhance the preparation and financing on Earth of manned space missions. Finally, the presentation will discuss the interest and benefits of establishing a standard on closed habitat specifications, in order to facilitate the synergies between Earth and space stakeholders working on sustainable, autonomous, and self-sufficient habitats.

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