

HUMAN SPACEFLIGHT SYMPOSIUM (B3)
Interactive Presentations (IP)

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RECENT DEVELOPMENTS ON DLR'S POST-ISS CONCEPT

Abstract

What will happen after the International Space Station's operational lifetime ends? How could a future crewed Low Earth Orbit (LEO) platform look like with the lessons learnt from the ISS experiences in mind? How could a future role share be organized and what use cases and applications could a future platform offer? What is the long-term big picture for future human LEO activities? These questions are currently under investigation in the course of the German Aerospace Center (DLR) "Post-ISS" activities.

A very promising answer is proposed by the Orbital Hub concept which has been developed by DLR's System Analysis Space Segment department in Bremen together with scientists, international space industry and recently together with international institutions using DLR's Concurrent Engineering Facility. The concept consists of a small modular crewed part called Base Platform and a dockable, serviceable, but uncrewed experiment platform referred to as Free Flyer. One major advantage of such a scenario is the decoupling of the habitat and the payload platform leading to higher flexibility, reduced attitude and pointing restrictions as well as less security concerns.

The single modules of the Orbital Hub have been designed under the premise of modularity and each with their own dedicated functionalities and responsibilities. Therefore they could also be used as building blocks for different platform concepts together with modules from other international partners and re-used ISS parts to serve for diverse mission objectives and political requirements. In the long-term, the DLR vision is to have the Orbital Hub as a central node of a platform cluster building up an environment for resource sharing, exchange and collaboration in LEO, referred to as "Space City".

The present paper gives an overview about the technical design, development progress and ongoing activities around this concept including e.g. joint studies with international partners. The paper assesses the possible combinations of the Orbital Hub modules together with both existing ISS parts and spacecraft under development or planned for the future. Furthermore it offers an outlook on the role and opportunities of the Orbital Hub or similar platforms in the context of larger LEO formations for human space-flight.