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Strategies & Architectures as the Framework for Future Building Blocks in Space Exploration and Development (1)

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# MAMBA – MOON AND MARS BASE ANALOG

**Abstract**

Despite impressive progress in robotic exploration of celestial bodies, robots are believed to never reach the effectiveness and efficiency of a trained human. Consequently, ESA proposes to build an international Moon Village in roughly 15 years and NASA plans for the first manned mission to Mars shortly after.

One of the challenges still remaining is the need for a shelter, a habitat which allows human spacefarers to safely live and work on the surface of a celestial body. Although various prototype habitats have been built and inhabited during the last decade, they typically share two fundamental flaws: First, they usually consist of a single space, which may become uninhabitable after depressurization due to just one single catastrophic event. Second, none of the habitats provides shielding against radiation, one of the major health concerns for spacefaring crews.

Project MaMBA will address these two problems at the root and build an underground habitat comprised of five connected, but independent modules. The habitat will serve for testing technologies like life support, power systems, and interplanetary communication. Special attention will be given to the development of the geoscience laboratory module. In addition to the technological aspects, the envisioned habitat will serve as a unique test ground for studies on the effects of underground habitation on a crew.