



## Technologies for the construction of space infrastructures

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### Abstract

In the new space ecosystem, the future of Human Space Exploration is becoming of interest not only for Space agencies and industries, but also for new space entrepreneurs and civil society. This new space paradigm promises economic benefits and valuable opportunities for social and cultural developments related to space activities. The future strategies that could accompany the transition from the traditional space exploration approach, towards innovative concepts, include the construction and maintenance of orbital infrastructures directly in space, also by reusing space debris and by exploiting space resources. The exploration of new planets, the construction of a Moon base, the successful completion of a long duration mission to Mars, the continued operations of the International Space Station, all require innovative manufacturing and repair technologies, that could well operate in space and suit a variety of systems, such as crew pressurised modules, radiators, fluid systems, pipe lines and truss structures, engines and aero-shells. This idea of "space industrialization" would require a number of innovative concepts and technologies, some of which are already close to becoming potential game changers: reusable launch systems and sub-orbital transport for civil passengers; Additive Layer Manufacturing (3D printing) and innovative welding processes; on-orbit assembly and servicing; new solutions to better live and work in Space.

**Stefano Ferretti** - Dr. Stefano Ferretti is a Resident Fellow of the European Space Policy Institute, where he deals with space governance and innovation, future space services and sustainable development. Previously he held various positions in Space agencies and industry, working on both the development and the exploitation of the International Space Station. He holds a PhD, with a dissertation on Innovative Technologies for Space Habitats and a Master in Mechanical Engineering from the University of Bologna, and is registered as a certified engineer in Rome. He also completed a Master of Space Studies in Strasbourg, France, at the International Space University, and the Space Studies Program (SSP01) hosted by ZARM in Bremen, Germany.