SYMPOSIUM ON BUILDING BLOCKS FOR FUTURE SPACE EXPLORATION AND DEVELOPMENT (D3)
Strategies & Architectures as the Framework for Future Building Blocks in Space Exploration and Development (1)

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BUILDING BLOCK ELEMENTS AND ENABLING TECHNOLOGIES FOR EXPLORATION

Abstract

The future exploration scenarios discussed by the major spacefaring countries within the International Space Exploration Coordination Group (ISECG) are focus at the identification of shared exploration objectives and at the definition of a coordinated framework for expanding the human presence beyond the Low Earth Orbit. The intention is to define a Global Exploration Roadmap (GER) that takes into account the different players' interests and capabilities to provide both independent contributions and/or participation in cooperation with other actors.

To this end, it is essential to identify the potential European Contributions to an International Exploration Scenario in terms of strategic Building Block Elements and products, and the associated enabling technologies that can allow their proper development.

As a result of the most recent investigations of the Scenario Studies for Human Spaceflight and Exploration, a reference European Roadmap with 'cornerstones' and 'core' elements has been identified. The reference roadmap moved around two major frameworks, LEO and beyond-LEO, and was focused on Moon as next destination (in line with GER indications).

Associated with that European Roadmap and its elements, a deep assessment of the required enabling technologies has been performed, showing that most of them are available or presently under development in Europe, but with some of them having criticalities with respect to their Technology Readiness Level (TRL) as needed for the intended missions.

In this context, development programs (up to at least TRL-5) for the low-TRL technologies have been assessed, and then flown down into a global Technology Roadmap with the main intent to address when key decision points should be set in order to start the development of the enabling technologies. Also, the roadmap was set up taking into account possible commonalities and synergies among the Building Block Elements and their associated technologies, as these are of aspects of utmost importance to reduce the technical effort and costs.

To secure a competitive position to the European Industry, timely decisions on enabling technology development needed for the post LEO exploration phase should be taken.