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Contribution of Space Activities to Solving Global Societal Issues (2)

Author: Mr. Adriano Autino
Space Renaissance International, Italy

Dr. Stefano Ferretti
European Space Policy Institute (ESPI), Austria

Mr. Alfredo Roma
European Space Policy Institute (ESPI), Italy

Dr. Luigina Feretti
INAF, Italy
Mr. Stefano Antonetti
D-Orbit SpA, Italy

BUILDING IN SPACE: FIRST STEPS IN CIVIL EXPANSION BEYOND EARTH

Abstract

Space Renaissance International, with a key role played by its Italian chapter, organized a stakeholders platform and discussion forum around the theme of changing paradigm, from space exploration to civil expansion and settlement beyond Earth.

The various members contributed with insights and views from Space Agencies, industry and academia, including also new space entrepreneurs, students and civil society representatives. The objective of this initiative is to highlight the relevance of the new space paradigm for the economy, with a focus on Italy, while evaluating the valuable benefits and opportunities of social and cultural developments related to space activities.

The key element of this paper is to identify key recommendations and future strategies to accompany the transition from the current space exploration approach, towards an innovative concept of “space industrialization”, which includes the construction and maintenance of space infrastructures directly in space, also by reusing space debris and space resources, and by developing new capabilities for civil passenger transportation and accommodation in space.

Some examples are provided in terms of reusable launch systems approaches (e.g. Space X) and Additive Layer Manufacturing technology, highlighting the technological and economic benefits for the industrial development of Earth’s orbit and beyond.

The paper further elaborates on enabling technologies that could be further investigated as a first priority: low-cost orbital transport for civil passengers, inter-orbital maneuverability concepts, horizontal takeoff and soft acceleration during Earth to orbit travel, innovative and safer re-entry approaches. Among others, priority should also be given to scientific research to protect life and health; e.g. cosmic radiation protection, space habitats with artificial gravity by rotation, artificial ecosystems and exo-gardening and horticulture.

This framework also includes reflections on key legal aspects, and a critical review of the Outer Space Treaty of 1967 and the International Maritime Law.

The paper in its conclusion highlights how the leaders of such technological developments will benefit from significant returns on investments , but could also ignite a new Renaissance, five hundred years after the Italian one.