17th IAA SYMPOSIUM ON BUILDING BLOCKS FOR FUTURE SPACE EXPLORATION AND DEVELOPMENT (D3)
Systems and Infrastructures to Implement Sustainable Space Development and Settlement - Systems (2A)

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SPACE SCIENCE AND TECHNOLOGY PARTNERSHIP FORUM: INSIGHTS AND RECOMMENDATIONS FOR COLLABORATION ON IN-SPACE ASSEMBLY

Abstract

The Space Science and Technology (S&T) Partnership Forum was established in 2015 with participation from the United States Air Force, the National Aeronautics and Space Administration (NASA), and the National Reconnaissance Office. Seeking to leverage synergies and influence agency portfolios with a focus on key pervasive and game-changing technologies, the interagency S&T Partnership Forum successfully identified and prioritized several collaboration topics areas with high potential for future cross-agency work. One of the thirteen collaboration topic areas identified was autonomous and semi-autonomous in-space assembly (iSA). The strategic framework for the collaboration topic area involved a 3-phase approach, with each phase providing recommendations to government agencies of needed capabilities for in-space assembly within the partnership and the larger community.

The framework of the in-space assembly collaboration topic began with the prioritization of a comprehensive list of the needs for capabilities across the agencies against a consensus of evaluation criteria. Planned and existing demonstration platform missions were characterized to a first order on their ability to support additional capability demonstrations in addition to their primary mission. Capability roadmaps,

Venn diagrams, bubble charts, and scorecards (an overview of each individual capability) were used to visualize the results of the analysis on the data, which revealed areas of possible interagency collaboration, investment gaps in capabilities relative to the need, and capabilities that warrant engagement across multiple agencies to eliminate potential inefficiencies (e.g. budget, portfolio, technology demonstrations, capability development). The S&T Partnership iSA facilitation and analysis team, led by NASA under the direction of the Office of Chief Technologist, held three technical interchange meetings to facilitate discussion about potential collaboration; two were among the government agencies, and the third included a public forum between government and commercial participants with interests for in-space assembly activities as well as an online market research questionnaire for publically available information on commercial iSA activities.

This paper summarizes the entire process executed by the S&T iSA facilitation and analysis team to acquire and analyze the data to obtain the observations and recommendations for interagency government collaboration and strategies for future development of in-space assembly. Additional insights obtained from assessment of commercial developments, challenges, and needs are included in the analysis to identify potential public-private development synergies. The overall results, insights, and recommendations for government and industry collaboration are presented.