

18th IAA 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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MARKET CHARACTERIZATION FOR ON-ORBIT SERVICING, ASSEMBLY, AND
MANUFACTURING**Abstract**

This paper reports on a framework for characterizing the on-orbit servicing, assembly, and manufacturing (OSAM) market. OSAM has the potential to alter existing business practices and establish new markets. However, prospective OSAM providers, customers and enablers lack a widely accepted common understanding of the potential marketplace and a common lexicon. Furthermore, the OSAM market is particularly challenging to describe due to the complexity of missions, the variety of technologies involved, and the deviation from current operations. Consequently, OSAM stakeholders are in need of a common understanding of potential services and potential markets for those services.

To develop a framework for the OSAM market, this study synthesized assessments of commercial business plans, the commercial satellite market, strategic technology plans, future mission plans, and previous analytical assessments and characterizations of individual OSAM activities. To characterize the potential market place, this report developed demand based market assessments; and analyzed government policy statements; current and proposed space and research budgets; and interviews with government, industry, and other key OSAM stakeholder representatives.

The resulting framework organizes current and prospective OSAM activities into an activity breakdown structure. This structure is a collectively exhaustive, mutually exclusive catalog of OSAM activities used to describe OSAM actions, allowing them to be modeled in a demand-based forecast. The structure is agnostic of technology, levels of human, or robotic participation. This paper also provides a framework of promising OSAM markets (groups of commercially related activities united by common capability needs, demand drivers, mission types, stakeholder participants, or other similar characteristics) based on the analysis of the OSAM activities. Fifteen promising markets are identified and assessed for target customers, indications of demand, interdependencies with other markets, and other significant characteristics associated with that market.

The activities detailed in this paper will allow OSAM stakeholders to effectively communicate research, mission demonstrations, and business plans in a coherent and uniform manner. Government and commercial satellite operators can lean on the framework to inform investment decisions and plan future missions. Insurers can use the information for future assessments and fees. Prospective OSAM providers can use this study to validate and focus business plans. This study will also help ground and inform discussions around upcoming government and commercial missions, such as Northrop Grumman's Mission Extension Vehicle, OSAM-1, OSAM-2 and RSGS.