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Strategies & Architectures as the Framework for Future Building Blocks in Space Exploration and Development (1)

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AN APPROACH TO ENDOGENOUSLY INCENTIVIZING COMMERCIAL PARTICIPATION THROUGH SYSTEM ARCHITECTURE CHOICES

Abstract

Space Agencies are increasingly interested in stimulating non-traditional players to participate more broadly in the space enterprise. Historically, high barriers to entry to the space market have included challenges of working with the government customer and high technical and financial risks associated with the complexity of space exploration. More recently, agencies have used inducements (e.g., new contracting mechanisms, access to testing facilities) to mitigate these barriers. For example, COTS contracts mitigate technical and financial risks by providing access to NASA expertise and reducing the amount of capital required upfront to develop a complex technology. In this paper we explore the viability of an alternative strategy. Instead of providing inducements, which essentially subsidize participation, NASA can treat "commercial suitability" as another "-ility" and make it an explicit criterion of the initial architecture selection. This can be an effective option when multiple equivalent architectures (as evaluated against traditional cost, schedule, performance measures) differ on their "commercial suitability." Here, "commercial suitability" considers whether a for-profit entity would choose to respond to an opportunity (e.g., RFP) without any inducements (i.e., based on analysis of the associated technical and financial benefits and risk). To explore this idea, the paper begins with a review of the existing methods NASA uses to induce companies to participate in space endeavours. It then identifies how commercial companies assess whether to respond to a request for proposal. This forms a basis for developing a scorecard for assessing the commercial suitability of a particular technology, by itself and as part of a systems architecture. A process for analysing "commercial suitability" as an "-ility" is then proposed: it combines the scorecard with a quantitative optimization framework. Implications of this alternative approach for broadening commercial involvement in the space enterprise are discussed.