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AN AFFORDABLE MODEL FOR ENDURING ISS MISSION OPERATIONS WITH INCREASED
SCIENTIFIC PRODUCTIVITY

Abstract

The current model of operations for the International Space Station (ISS) is an exercise in futility. Persistent maintenance, risk aversion, high ground support and logistics costs and a lack of scientific productivity have rendered the world's single most expensive laboratory severely underutilized.

An alternate management paradigm for ISS operations, based upon an approach utilized by national, state and local governments for the maintenance of public infrastructure (e.g., roadways), is presented. These governments, instead of trying to become experts at estimating the costs of, planning for and conducting repairs and upkeep on this infrastructure instead hire a commercial vendor to perform this purpose. The commercial provider will be responsible for the day-to-day operations and maintenance which could be performed by their own staff and/or robots. This frees station staff time to focus on productive scientific research and other tasks.

Utilizing a progressive service level agreement (SLA), the international partners in the ISS create a standard for the commercial vendor to deliver, with financial incentives and penalties, based upon performance. The vendor is then free to maintain, operate and/or upgrade the station as needed to meet its commitments under the SLA. Because of the progressive nature of the SLA, the vendor will be encouraged to commit to upgrades early during the term of its contract, for which it will receive payback over the term. The costs and benefits are fixed at the onset, creating budgeting certainty for national policy makers in the partner nations.

The proposed approach will enjoy immediate benefits from the consolidation of numerous redundant functions, currently scattered across the globe, into a combined management facility (prospectively located in London). The vendor will be responsible for delivering, based on a SLA-derived schedule, a set number of staff to and from the station and providing a fixed level of uplift and downlift mass capability. This approach will, in addition to providing immediate benefits, demonstrate the viability of this type of efficient management paradigm for use in future space exploration efforts.

This paper presents a comprehensive plan for ISS operations under the proposed paradigm, contrasts it with the existing ISS approach and analyzes (both quantitatively and qualitatively) the benefits produced by the prospective strategy. The utility of this approach for facilitating a 10-year and 15-year ISS mission extension is considered.