

IAF HUMAN SPACEFLIGHT SYMPOSIUM (B3)  
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FORECASTING FUTURE COMMERCIAL AND GOVERNMENT DEMAND IN LOW EARTH ORBIT

**Abstract**

The U.S. Congress's NASA Authorization Act of 2017 includes an International Space Station (ISS) Transition Plan, specifically "to transition in a step-wise approach from the current regime that relies heavily on NASA sponsorship to a regime where NASA could be one of many customers of a low-Earth orbit non-governmental human space flight enterprise." This vision may include a transfer of all or parts of the ISS itself to commercial entities, in concert with the ISS International Partner agencies, or a complete transition off the ISS to other commercial platforms in LEO. In either scenario, NASA intends to segue its government role from a supplier of its own LEO services to a customer of commercially-provided services for its needs.

NASA has examined its potential future needs in LEO, which may include space life and physical sciences research derived from the National Academies Decadal Survey, limited microgravity human research, technology demonstrations, life testing of systems intended to be deployed in deeper space, and crew training. Earth science, astrophysics, and planetary science payloads could also be deployed if platforms offer opportunities at an advantageous price point over standalone missions.

Although there are many LEO commercial service and capability suppliers on the horizon, the ultimate viability of a non-government enterprise is dependent upon whether there will be sufficient demand for those capabilities and services beyond NASA's needs. Commercial entities must have realistic business cases that do not rely on NASA as a primary tenant, but as one of many customers.

The Science Technology Policy Institute (STPI) performed an evaluation to determine whether a future privately-owned and operated human-tended space station could generate sufficient revenues from a variety of possible activities to cover the operations and capital costs of such an endeavor. This evaluation considered a range of possible activities, associated costs and revenues based on inputs from interviews with over 70 experts, by examining current ISS activities, and by drawing on other sources to determine likely future activities and market size in order to develop separate cost methodologies for each posited activity. In addition, the Center for Advancement of Science in Space (CASIS), which manages the ISS U.S. National Lab, conducts regular value impact assessments of its user portfolio to project potential revenues from commercial activities resulting from ISS U.S. National Lab activities.

This paper will summarize those forecasts and what the implications are for sustainability of private-sector platform(s) in LEO.