

BUSINESS INNOVATION SYMPOSIUM (E6)

New space individuals, projects, programs, or business units: innovation, entrepreneurship & investment at the microscopic level of analysis (1)

Author: Dr. Bhavya Lal

IDA Science and Technology Policy Institute, United States

Mr. Jonathan Behrens

IDA Science and Technology Policy Institute, United States

A THEORETICAL CONSTRUCT TO ASSESS THE ROLE OF GOVERNMENT IN SUPPORTING THE SMALL SATELLITE SECTOR

Abstract

In the coming decades, the small satellite sector is expected to be a multi-billion plus dollar, commercially viable sector. Beyond public investment, private parties have invested billions into the industry. Questions have been raised, therefore, on whether the smallsat sector still requires government support. In this paper, we use the concept of comparative advantage, a concept developed in economic theory where “an agent has a comparative advantage at producing something if they can produce it at lower [opportunity or marginal] cost than anyone else,” to examine the role of government in supporting the small satellite sector. In principle, the government should fund projects where it has a comparative advantage over all other agents, in particular where there may be market and systemic failures. We reviewed primary sources and interviewed a cross-section of experts, active across the small satellite value chain, to identify current funding mechanisms in place for technology development and commercialization.

We begin the paper by defining market and systemic failures in the context of small satellite technology development. Subsequently a framework is developed, based on both failures, to identify where investment by non-government actors is inadequate for certain areas of space technology that serve the public interest, and thus where government ought to invest. Market and systemic failure arguments fall into three general categories: (1) Private firms in free markets have no incentive to invest more fully in low-TRL technology or platform technologies such as propulsion systems for small satellites when they cannot—for a variety of reasons related to risk, timeline of return, insufficient demand, and other factors—get a full return on their investment; (2) (Most) firms have little incentive to invest in creating paradigmatic shifts that could potentially disrupt their current, profitable business models; (3) With perhaps a few exceptions, firms do not see the full complexity of the technology ecosystem and are not in a position to (nor do they feel a responsibility to) provide vision and strategic planning for that ecosystem, therefore leading to systematic coordination failures. Government, which has a complementary set of concerns and perspectives, therefore has a critical role to play in funding some areas of technology development or partnering with the private sector to provide the needed leadership on a national level. This theoretical framework is explained in the context of decision-making at NASA’s Space Technology Mission Directorate.