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Author: Dr. Asha Balakrishnan
Science and Technology Policy Institute, United States

Mr. Lucas Pratt
Science and Technology Policy Institute, United States
Ms. Emily Nightingale
Science and Technology Policy Institute, United States

TECHNICAL EFFECTS OF NASA'S CUBESAT LAUNCH INITIATIVE

Abstract

While originally created in 1999 at Cal Poly and Stanford as a university design standard, CubeSats have found their place as an educational tool, a technology development platform, and for some startups such as Planet Labs, a viable commercial system.

Part of the support that has enabled CubeSats includes NASA's CubeSat Launch Initiative (CSLI), part of the NASA Launch Services Program. Since 2009, CSLI has sponsored approximately 100 CubeSats from academia, government and industry to launch as secondary payloads. Through this support, it may have enabled new participants such as university programs and commercial startup companies that would otherwise find launch too expensive. The cost savings can be significant, as launch tends to represent a significantly greater proportion (up to 50 percent) of CubeSat program budgets than those of larger satellites.

Beyond direct mission sponsorship, part of the value of CSLI activities is in qualifying CubeSat deployers on NASA launch vehicles, up to and including the International Space Station. The qualification process helps to mitigate the perception of risk associated with secondary payloads. The additional degree of first-time launch integration and testing for a deployer that would otherwise be required can make launching a secondary payload unprofitable for the launch vehicle, or overly expensive for the CubeSat developer.

This paper seeks to explore the historical effects of both direct mission sponsorship and launch vehicle qualification since the beginning of the CSLI program, comparing the opportunities available for CubeSats over the course of the program from CSLI to the rest of the launch landscape, including the manifests of other government opportunities and commercial providers, available launch vehicles, and qualified deployers.