

SMALL SATELLITE MISSIONS SYMPOSIUM (B4)  
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CUBESAT PROGRAM JUSTIFICATION MODEL

**Abstract**

As the first decade of the 21st century draws to a close, many countries are considering the role of space technology in their science and technology portfolios. Countries with no previous or expressed interest in space technology are now assessing potential applications of space technology. National space agencies through bilateral agreements, the United Nations Committee on the Peaceful Uses of Outer Space (UN COPUOS), non governmental organizations (NGOs), and some private entities are extolling the benefits of space technology, products and services for the emerging and developing world. Some countries contemplate strategies to develop indigenous space technology capacity. The range of space technology capacity building may include goals such as developing a cadre of STEM 21st century workforce, increasing utilization of space data products and services, establishing a satellite manufacturing base, purpose-built space launch facilities, or even developing space launch capability.

A new paradigm in the satellite community is the practice of developing small satellites, satellites with a mass under 500 kilograms and capabilities comparable to much larger satellites. Small satellites have been described as a disruptive technology due to their significantly lower costs and faster development cycles. Workshops and conferences are held specifically focused on the potential of small satellite capabilities. A particular class of small satellite with a 1kg mass, the CubeSat, initially developed as an educational platform, has attracted considerable interest from academic, government and industry stakeholders. Over 50 cubesats have been developed and launched into orbit. More than 100 universities across the globe are pursuing CubeSat development.

Awareness of the potential utility of CubeSats has reached a level where private industry is beginning to commercialize the technology. Indigenous space technology capacity may be facilitated and augmented by CubeSats. In light of the interest by academic, State, and private entities within countries to develop CubeSat programs, how do stakeholders measure success?

This paper attempts to provide a validation guide to assess and justify the utility of a CubeSat program to the aforementioned goals. It intends to utilize OECD/World Bank measurements to measure against past and future CubeSat programs as models, by which interested nations may extrapolate to understand the benefits and hurdles that must be overcome and conduct their own program in the future.