

SMALL SATELLITE MISSIONS SYMPOSIUM (B4)
Small Satellites Potential for Future Integrated Applications and Services (4)

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CUBESAT: AN EMERGENCE OF SMALL SATELLITE INNOVATION

Abstract

CubeSat is a pathfinder initiative that has developed a standardized class of picosatellites, allowing rapid development and launch of small payloads into space for much lower cost than traditional payloads. With over 100 organizations, universities, government agencies and private companies involved globally, the standard allows developers from an immensely diverse range of technology and budget backgrounds to complete flight ready hardware very quickly; usually within two years. By utilizing a standard robust deployment platform for all CubeSats, developers are able to maintain consistency within their programs, increasing efficiency and continuity. Educational institutions, commercial industry partners, and government agencies all receive high returns through the program by providing students with practical engineering experience while achieving high level scientific research. With the rapid growth of the program and growing list of successful missions, CubeSats are setting the trend for small satellite innovation.

California Polytechnic State University, in collaboration with Stanford University, conceived the CubeSat standard with the intent of stimulating the aerospace industry at the educational level. The program was to provide university students with real, hands on engineering experience that would translate into effective and consistent engineering practice. Students would have the chance to be involved at all stages of design, manufacture and launch, culminating in seeing their work orbit Earth. In order for the program to be successful, satellites must be cost effective and have a consistently reproducible design. By creating and maintaining a standard specification for all CubeSats, developers across the world are able to build satellites independently, eliminating a significant portion of the time and cost associated with the initial design and interfacing with the launch vehicle. The CubeSat standard also allows the use of a single deployment mechanism, the Poly Picosatellite Orbital Deployer (P-POD), to deploy all satellites, further decreasing cost by eliminating the need for developers to design an interface for their payloads. To ensure that every available opportunity to launch CubeSats is capitalized, the P-POD was designed to be compatible with many launch vehicles in a variety of unconventional mounting configurations. The P-POD's flexibility and versatility make it the ideal interface for a rapid and cost effective satellite program while its durability and reliability minimizes risk for both the launch vehicle and primary payloads. The CubeSat program ensures that the standard is maintained and a consistent network is established between developers, industry organizations and launch providers.

Clearly, the advantages of standardized satellites and deployers are not limited to university experiments. With modern technological advancements, the possibility of using standardized small satellites for space missions provide endless opportunities for government programs and commercial organizations. The innovation displayed by the CubeSat program has lead to the expansion of the industry and creation of a new commercial market. Everyone wants a way to save time and money without compromising the high level of engineering required to achieve successful space missions. CubeSats will emerge as a practical and cost effective option within the aerospace industry and may be the future of space technology.