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Author: Dr. Jordi Puig-Suari  
California Polytechnic State University, United States

Mr. Roland Coelho  
California Polytechnic State University, United States

Dr. Victor Aguero  
United States

Dr. Scott Williams  
United States

CUBESAT LAUNCH EXPERIENCES AND NEW LAUNCH OPPORTUNITIES

**Abstract**

A total of 44 CubeSats have successfully been placed into orbit from 2003 through the end of 2010 on 8 different launch vehicles. An additional 16 more CubeSats were launched but fell victim to 2 different launch vehicle failures. Overall, the CubeSat standard has been very successful and has significantly increased the interest in the development of very small spacecraft.

The Cal Poly/SRI team is involved in the integration of most of the CubeSats launched in the US and Russia. Their experiences will be the basis for this paper. The paper will present an overview of the accomplishments and some lessons learned from these launch campaigns. Some of these lessons learned include:

- The need for streamlined and standardized processes and procedures to process with large numbers of spacecraft.
- The increased quality control requirements as CubeSat launches move to high value missions.
- The differences between launch provider organizations.

The paper will include a discussion of some of the changes that may be required as the CubeSat program adjusts to the increased in launch activity. This includes the emergence of CubeSat “deployer aggregator” systems such as the Naval Post Graduate School’s NPSCuL and the development of CubeSat accommodations standardized across different launch vehicles. These systems can simplify the launch vehicle interface when large numbers of CubeSats are being launched.

The paper will also discuss the rapidly expanding launch opportunities for the CubeSat community, with particular emphasis on new U.S. launch opportunities being developed. This discussion will include the requirements for CubeSats to be accepted in different launch opportunities including the qualification and schedule requirements.

Finally, given the fact that the CubeSat standard was developed as a means to launch student satellites, the paper will discuss CubeSat launch opportunities for University developed spacecraft including University specific opportunities such as NASA’s ELaNa program and ESA’s VEGA demo flight.