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POWERSAT – A SMALL BUT MIGHTY MISSION FOR THE GENERATION OF 100W WITHIN A  
1U FORM FACTOR**Abstract**

PowerSat is a pathfinder mission for the demonstration of high electrical power generation on board small spacecraft. Since Fall 2019, the Cal Poly CubeSat Laboratory and Deployables Cubed have been collaborating to leverage the agility and accessibility of New Space to advance technologies for high power generation. Deployables Cubed is leading the development of a 1U payload capable of deploying a solar array for the electrical power generation of up to 100W. The CubeSat Laboratory is designing and developing a 3U CubeSat bus to support the nominal functions of the payload. In particular, the CubeSat Laboratory is designing a maximum power point tracking (MPPT) based electrical power subsystem using the MAX20801 chip as well as a battery management system. As a secondary mission, PowerSat will integrate LEDs as part of the CubeSat Laboratory efforts to advance space domain awareness for small spacecraft through the use of low resources identification and tracking capabilities. Since its initiation, the project has involved over 15 undergraduate students from electrical, mechanical, and aerospace engineering majors. As of winter 2021, the project is at the conceptual design phase and a proposal was submitted to NASA's CubeSat Launch Initiative for a possible free launch in late 2022 or early 2023. During the conceptual design phase, requirements, interface control document, functional flow block diagrams and risk analysis were established. The PowerSat team plans to hold a system requirements review early spring 2021 prior to moving to the preliminary design phase. The conference manuscript and presentation will introduce the overall mission concept and detail the systems engineering based development approach of

the 3U CubeSat. Moreover, the conceptual design and preliminary functional verifications of the MPPT based electrical power subsystem will be presented as well as the conceptual design of the LED-based identification and tracking system.