SPACE POWER SYMPOSIUM (C3)
Small and Very Small Advanced Space Power Systems (4)

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THE SIMPLE THINGS MATTER MOST FOR MISSION SUCCESS

Abstract

Over the past decade one of the fastest growing sectors in the space market is the Nanosatellite sector. With missions such as UKube-1 and SEAHAWK (Ocean Colour Monitoring System) looking to deliver capabilities at a tenth of the cost and in the fifth of the time of traditional missions it is becoming ever more important to ensure Nanosatellite missions are built on solid foundations.

As the complexity and reliability requirements of Nanosatellite missions increases, the need to have a robustly designed, low cost, low volume power system increases. Where traditional space will depend on components with heritage and design redundancy to ensure reliability Nanosatellite users must also consider highly constrained physical envelopes and low budget missions.

In order to achieve compliance with these often conflicting requirements we have employed a number of techniques to deliver a system that has been integrated into over 100 different missions. By employing modular design reuse practices and a variety of compatible configurations we have been able to develop a scalable and robust system which, in its basic form, can interface to anything from 4.7W up to 110W instantaneous input power. With four output voltage buses and up to twenty-eight latching current limiter switch output stages it is possible to feed a variety of loads with different impedance characteristics, delivering up to 100W power at any given time.

By using COTS components, qualification processes and traditional space protection design methodologies we are able to bridge the gap between Nanosatellites and the perceived higher reliability of larger satellites.

In this paper we will present the steps we have taken to create a highly flexible and robust system to allow compatibility with a wide variety of missions with minimal risk and reduced integration effort. We will discuss in detail how a scalable system with optimal efficiency and several layers of protection can provide the basis for successful missions on a Nanosatellite platform.