

Small Satellites (13)

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THE EVALUATION OF ONBOARD ELECTRONICS MANUFACTURE WITH SOC AND SIP TECHNIQUES IN SATELLITES

Abstract

System on chip (SoC) and system in package (SiP) have been considered as two sophisticated highly integration techniques to obtain miniaturization, low power and high data bandwidth in electronics system. SoC is a kind of silicon integration of multiple CMOS devices into a single die. SiP is a kind of integration of multiple chips produced on different semiconductor lines, such as digital and analog devices, memory devices and logic devices, or active and passive devices, onto a ceramic substrate. With SoC and/or SiP, the onboard data handling system in small satellites can be miniaturized to a single package and the processing board to a single chip, which has several orders of magnitude reduction in weight and volume than PCB-based system. As small- or nano- satellites have become a new driving force for space economy, more vendors have queued up to tow their satellites into near-earth orbit or beyond. To decrease the weight and save power, satellites have become smaller than ever. Since the aero-electronics system occupied much of the weight and volume of spacecrafts, the design choices of electronics system with SoC and SiP have attracted attention in satellites manufacturing. The full paper proposes the comparison to the SoC and SiP design flow and two design cases have been studied to verify the satisfaction in avionics and aero-electronics. A conclusion and discussion will be given for the design principles with SoC and SiP techniques.