A Fault Management System for Deep-Space CubeSats

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The realm of small deep-space satellites is both a developing and exciting sector in engineering. The accessibility that comes with small format satellites(CubeSats) is unparalleled in the space industry. 1U CubeSats, which are satellites that are no more than 10cm x 10cm, are small but can perform full experiments in space. But as with most electronics systems in the space industry, they are usually outdated because of the transistor feature size required to maintain a functioning satellite in a radiation rich environment. In this project, an adaptive electronic system that's able to troubleshoot software upsets(caused by cosmic radiation), and reactively adapt and attempt to remedy the problem was developed. This system uses multiple processors that can sync and operate in parallel to complete tasks, as well as diagnose upsets through a custom communication protocol (redC).

Awards Won:

National Security Agency Research Directorate : Third Place Award "Cybersecurity"