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COMPREHENSIVE HIGH-LEVEL AVIONICS SYSTEMS FOR EXPLORATION

Abstract

With a growing demand for cheaper access to space, a new type of avionics system is needed that bridges the gap between larger fault-tolerant systems and smaller systems designed for cubesats. The Comprehensive High-level Avionics Systems for Exploration (CHASE) fulfills this need with an open-source solution that provides high-reliability avionics in an inexpensive package.

The CHASE hardware provides radiation tolerance through hardware redundancy, a feature lacking in currently available cost-effective cubesat systems. The hardware provides power management systems, fault-tolerant processing systems, a high-performance Inertial Measurement Unit (IMU), and a versatile software-defined radio. CHASE provides multiple SpaceWire and programmable digital IO ports.

The CHASE project includes the development of a comprehensive set of flexible software libraries for common systems. These will allow a faster development process and standardization between spacecraft. CHASE provides a versatile platform on which to build a variety of spacecraft, and its open-source nature allows it to be easily expanded for more complex missions.