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AVIONICS ON THE INTERNATIONAL SPACE STATION: AN UPDATE

Abstract

For decades, the International Space Station (ISS) has provided a distinctive platform in low Earth orbit for experimental research. In support of this platform is a family of avionics systems that enables reliable data distribution of the many science payloads installed, and future internal and external payloads. These avionics systems include the following:

- The Command and Data Handing System (C&DH), with fiber and serial buses for critical core ISS data and telemetry
- The Communications and Tracking System, with wireless space to ground links, ground network facilities, and ISS components
- The Guidance, Navigation, and Control System that regulates the ISS attitude
- The Joint Station Local Area Network System that enables connectivity to all ISS Ethernet devices

This paper provides an update to the ISS avionics hardware system architecture, last presented at IAC in 2003, with a focus on the C&DH system. This update includes design change successes, test bed architecture, performance upgrades, and lessons learned in the operation of all ISS avionics. We conclude with an outlook on future avionics system enhancements required to support additional modulate and payload expansions taking place on the ISS, and how these avionics systems translate to the Lunar Gateway architecture.