

Developing Wireless Spacecraft Data Bus for Multiple Satellite Sensors Data Acquisition

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The extensive ground use of wireless communication stimulates the application of wireless data bus in space, particularly for the application of data acquisition from multiple satellite sensors. The current ground wireless systems such as Bluetooth and WiFi have advantages of less complex and flexibilities in data system configuration. They are standardized and efficient, smaller and more economical than wired bus. One effective wireless bus solution recently proposed has been a Bluetooth communication bus, to reduce bus volume and design complexity while maintaining the integrity of the design and even improving upon current standards.

In this paper, the Bluetooth wireless bus is briefly reviewed; a testbed is introduced for the design, building and test of such Bluetooth wireless spacecraft data bus. The frequency selection, transmission method, power consumption, effective range, network access and control, EMI and EMP compatibility are described. The test results indicate that the interfaces are simplified while maintaining high data rates due to the plug and play features and the reducible use of cables and connectors. The building cost and estimated development cycle are reduced by using existing standardized hardware/software and the reliability might be increased if further studies of space qualification can be conducted. In the end, a flight model on a Cubesat or Microsat is recommended for technical demonstration of such Bluetooth wireless bus in space.