Reconfigurable Antenna and Cognitive Radio for Space Applications

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Abstract

This presentation briefly discusses a research effort on mitigation techniques of radio frequency interference (RFI) on communication systems for possible space applications. This problem is of considerable interest in the context of providing reliable communications to the space vehicle which might suffer severe performance degradation due to RFI sources such as visiting spacecrafts and various ground radar systems. This study proposes a communication system with Reconfigurable Antenna (RA) and Cognitive Radio (CR) to mitigate the RFI impact. A cognitive radio is an intelligent radio that is able to learn from the environment and adapt to the variations in its surrounding by adjusting the transmit power, carrier frequency, modulation strategy or transmission data rate. Therefore, the main objective of a cognitive radio system is to ensure highly reliable communication whenever and wherever needed [1]. To match the intelligent adaptability of the cognitive radio, a reconfigurable antenna system will be required to ensure the system performance. The technical challenges in design such a system will be discussed in this presentation.

[1] Adam Schlesinger, "Software-Defined Radio for Space-to-Space Communications," NASA Johnson Space Center, MSC-24465-1, NASA Tech Briefs.

Intelligent communication system with Reconfigurable Antenna (RA) and Cognitive Radio (CR)

Author Biography

Dr. Shian Hwu work for Space Shuttle, Space Station, Orion Crew Return Vehicle and other NASA spacecraft communications and tracking systems at the NASA Johnson Space Center, Houston, Texas, for more than 20 years. He authored over 60 IEEE and AIAA technical papers. He received the Lockheed Martin President's Technical Excellence Award and NASA Johnson Space Center Silver Snoopy Award.