

GSAW 2014 Tutorial C:

Consultative Committee for Space Data Systems (CCSDS)

Length: Half day

Overview:

The CCSDS tutorial provides an overview of the Consultative Committee for Space Data Systems (CCSDS) standards for communications. It includes an organizational description and examples of practical applications to the standards that have been adopted by a majority of the world's space agencies. It presents descriptions of the publications and adopting agencies, and example protocol implementations for ground-ground, ground-space and space-space communication links. It provides a graphical depiction of the CCSDS protocol stack with references to the more common OSI stack. It includes descriptions of applications for high-latency and error-prone links, reasons to include different forms of forward error correction and compression, practical reasons for using packets in space, considerations for making more systems IP-based, concerns over security, new applications of short and medium distance wi-fi techniques, and interoperability interests between civil and defense systems. Questions related to new standards proposed for user interfaces are also explored. At the conclusion of the course, the instructor will sing a song written to honor the father of CCSDS, Mr. Adrian Hooke, which is entitled, "I am the Very Model of a Modern Rocket Scientist."

Instructor: Robert Ritter, Integral Marketing

Biography:

Mr. Robert Ritter is the Chief Engineer and a partner in the manufacturer's representation firm, Integral Marketing. He was formerly a Director of Communication Systems Engineering for RT Logic Corporation, of Colorado Springs, Colorado. He has more than 25 years of experience in designing ground system architectures for satellite missions, and data communication networks. Robert has been involved in many worldwide programs implementing CCSDS Standards, and he has worked closely with DoD, NASA, ESA and other agency personnel to find practical means for standards adaptation and co-utilization of assets. He has designed boards for communications and signal processing, has written signal processing and simulation software, and has taught numerous courses in the past, including CCSDS in many international locations. Mr. Ritter has a BSEE from the University of Virginia, an MSEE from Virginia Tech, and an MBA from George Mason University.

Description of Intended Students and Prerequisites:

The CCSDS tutorial is an introductory program for engineers and managers who are designing or specifying spacecraft ground or space communication systems. It is applicable for spacecraft designers who are contemplating adaptation of standards for buses and payloads. It is also useful for mission planners and space agency personnel who are involved in specifying or approving communication and control systems. Students should have a general technical competency and understanding of communications theory, protocols and systems.

What can Attendees Expect to Learn:

Note: The CCSDS standards organization is working hard to cooperate with other standards organizations, especially in their recent Delay (and Disruption) Tolerant Networking (DTN) programs. I will cover recent changes and adaptations to CCSDS, including: DTN, Space Internetworking Services, new coding and ranging techniques, new missions adapting subsets of CCSDS, and reasons for selective adaptation. I will also discuss some of the recent proposals by agencies outside the USA that believe the look-and-feel of hardware and software human interfaces should be standardized. This is something that has historically been considered undesirable by American commercial competitors who wish to stand-out.