



SEMINAR ANNOUNCEMENT

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European Space Agency and Standardization of Communication Protocols

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Abstract – This lecture introduces the European Space Agency (ESA) and addresses the Communications Protocols and Scenarios tackled by the Consultative Committee for Space Data Systems (CCSDS) and by the European Cooperation for Space Standardization (ECSS). The general organization of CCSDS and their Technical Areas are explained. However, focus of the lecture is mainly on the work performed within the Space Link Services Area which is in charge, within CCSDS, for developing efficient space link communications systems common to all participating agencies. This CCSDS area promotes the communication standards for the space link that interconnects a spacecraft with its ground support system or with another spacecraft by concentrating mostly on layers 1 & 2 (of the OSI protocol stack), namely: RF & modulation, channel coding and protocol sub-layers of the data link layer, for both long-haul (e.g., spacecraft to ground) and proximity links (e.g., orbiter to lander). The specific recommended standards (typically covering one OSI layer or sub-layer) developed by SLS Area are presented. The way the layering maximizes flexibility and interoperability with other commercial protocols is highlighted. Accent is put on the presence and usefulness of

options to accommodate different mission needs as well as on the characteristics of the Space Data Link Protocols representing the workhorse of space communications.

Gian Paolo Calzolari received the “Laurea in Ingegneria Elettronica” from the Sapienza University of Rome in 1984. After having worked for the Italian industry (at DATAMAT and ALCATEL-Face Standard Italia), he joined the European Space Agency (ESA) from 1987 till 2021. At the European Space Operations Centre (ESOC), he has been involved with definition of requirements, analysis, simulation, system design, and testing of the ESA ground stations equipment on telemetry, telecommand and channel coding aspects. His work also included advanced studies and international standardisation activities in the field of channel coding, communication protocols and telemetry/telecommand processing. He has been the Area Director for the Space Services (SLS) Area of the Consultative Committee for Space Data Systems (CCSDS) and chairman of the ESA Standardisation Board for Telemetry and Data Handling (STAB). He also participated in the production of the E-50 series of standards for the European Cooperation for Space Standardisation (ECSS).

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