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# ASTRO_CASCO: AN INTEGRATED AND ROBUST TELEMETRY TRANSMISSION/RECEPTION SYSTEM FOR ANALOG ASTRONAUTS DURING EXTRAVEHICULAR ACTIVITIES (EVA)

**Abstract**

Astro_Casco is an integrated system for telemetry transmission/reception for analog space missions. Its main objectives are: to be a platform to process and reduce gathered data from on-board simulated spacesuit sensors that read health parameters from the analog astronauts; to allow access to this data in near real-time by receiving it wirelessly at the space base and/or Mission Control Center (MCC); and to serve as processing power for peripherals or other subsystems on the simulated spacesuit according to the particular needs of the mission. The purpose is to improve the analog astronauts' safety by enabling the MCC's awareness of the near real-time status (considering simulated transmission delays) of the subjects during this critical part of the mission. The system is composed of three parts: Astro_Casco data Processor and Transmitter (ACPTX), integrated into the spacesuit and connected to the sensors and/or on-board control systems; Astro_Casco Repeaters (ACR), manually placed in the field by the analog astronauts to guarantee reliability and data integrity at all moments of the EVA; and Astro_Casco Receiver (ACRX) located in the base, which ensures that the data is received, decoded, logged and visualized by the MCC and/or the base. The first prototype of Astro_Casco has been implemented and deployed during the Asclepios II space analog mission, successfully reaching the objective of sending/receiving telemetry. This first field test revealed the potential to improve the reliability of the data transmission as well as to increase the data tranmission coverage during the EVA. A second prototype has been developed with newly implemented features to fix the criticalities of the first prototype and adds extensibility for different types of sensors: analog, digital and compatible wireless wearables. This paper elaborates on the implementation and the deployment of Astro_Casco in different scenarios: urban, underground, and open space; to validate and verify its compatibility with the conditions frequently encountered in analog space missions.