Abstract – Automated space operations command and control software development and its implementation must be an integral part of the vehicle design effort. The software design must encompass autonomous fault detection, isolation, recovery capabilities and also provide “single button” intelligent functions for the crew. Development, operations and safety approval experience with the Timeliner system on-board the International Space Station (ISS), which provided autonomous monitoring with response and single command functionality of payload systems, can be built upon for future automated operations as the ISS Payload effort was the first and only autonomous command and control system to be in continuous execution (6 years), 24 hours a day, 7 days a week within a crewed spacecraft environment. Utilizing proven capabilities from the ISS Higher Active Logic (HAL) System, along with the execution component design from within the HAL 9000 Space Operating System, this design paper will detail the initial HAL System software architecture and interfaces as applied to NASA’s Habitat Demonstration Unit (HDU) in support of the Advanced Exploration Systems, Autonomous Mission Operations project. The development and implementation of integrated simulators within this development effort will also be detailed and is the first step in verifying the HAL 9000 Integrated Test-Bed Component designs’ effectiveness. This design paper will conclude with a summary of the current development status and future development goals as it pertains to automated command and control for the HDU.

REFERENCES


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