SPACE SYSTEMS SYMPOSIUM (D1)
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SOFTWARE REUSE FOR COMMON EGSE AND MCS

Abstract

Although the EGSE (Electrical Ground Support Equipment) and MCS (Mission Control System) have many similar or even identical functions, the EGSE used for assembly, integration and validation phase and the MCS for the mission operations phase are normally developed separately and used by different groups of engineers. However, the demand for the single common ground system for EGSE and MCS has increased rapidly in order to minimize risk, reduce cost and improve overall product quality. To keep up with the increasing demand, related international standards such as ECSS (European Cooperation for Space Standards) E70 are established. Based on those standards, the common ground system such as EPOCH, Hifly and SCOS-2000 developed and many space missions have used or will use it. In this paper, we introduce CGS (Common Ground System) for Korean satellite programs and give a brief overview on the CGS. This paper also includes the lessons learned from the development of the CGS. In fact, the CGS is used and implemented for AIT (Assembly, Integration and Test) activities. However, the major software components such as command generator, telemetry parser and DB manager are reused for the implementation of MCS. Therefore, the MCS is also based on the same spacecraft database as the CGS. This can lead to schedule and cost savings as avoiding implementing the same software components and minimize risks (mistakes made once and debugging will not be repeated). In future work, we plan to enhance the CGS for improving the reusability, maintainability and portability. For example, the CGS will be expanded to take into account the functionality of multi-mission and multi-domain for future korean space missions. Moreover, in order to perform autonomous operations and describe test and operation procedures, it will support the procedure automation language for both test and mission operation such as PLUTO (Procedure Language for Use in Test and Operations) which is published as an ECSS standard and Spacecraft Test and Operations Language (STOL) which is developed by NASA (National Aeronautics and Space Administration) and is used in numerous ground systems today. The procedure automation language must be easy to use and can be used to monitor spacecraft telemetry and send commands to ground equipment or a spacecraft.