SPACE OPERATIONS SYMPOSIUM (B6)
New Operations Concepts (2)

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AUTOMATION EFFORTS IN SPACECRAFT TESTING

Abstract

Ongoing ISRO programmes envisage 6 to 8 Spacecrafts per year in LEO, GEO and Scientific areas. With ever growing numbers and complexity of spacecrafts, there is a need to quickly, efficiently and accurately test the spacecraft in a diverse set of environments from the disassembled testing phase to environmental simulation and through launch preparation. The only way to fulfill this need is to improve automation as this is considered crucial to efficient and cost effective spacecraft testing operations.

The in-house developed Automatic Checkout Software System(ACSS), a suite of applications at the heart of the Spacecraft Checkout System(SCS) provides a set of services to carry out spacecraft testing operations with a configurable level of automation, limiting on one side manpower requirements and to keep the complexity of the scheduling and operations of the whole system to automated processes. At the core is the Automatic Test Sequence interpreter providing a single point of control, interpreting and executing the Spacecraft Test Procedures written using the instructions supported by in-house developed Checkout Command Language(CCL). A host of real-time, off-line and support packages exist for the acquisition and processing of Telemetry Data, Telecommand Processing, data presentation and distribution, archival, retrieval, data analysis, anomaly processing and reporting.

Current level of automation includes open system architecture with all the standardized interfaces which are supported by well proven Checkout Command Language (CCL) for preparing test procedures in advance, very versatile data processing, presentation and analysis tools. This has enabled us to achieve error free spacecraft testing with minimum human intervention, repetivity of tests are assured at various phases of testing. Testing time has reduced by more than 50 percent and also provides a standard way of testing across the spectrum spacecrafts that ISRO produces. Further improvements are planned in the area of Automatic Test Scheduler , better alerts for more efficient testing, multi-sequencing and execution of test procedures aiding parallel tests to cut down test time and a host of other enhanced features.

This paper will present in deatil the automation efforts in spacecraft testing at ISRO stressing the advantages it has provided in terms of saving time, efforts and meeting the tight schedules of ISRO programmes efficiently and effectively with minimum manpower.