

SPACE OPERATIONS SYMPOSIUM (B6)
Mission Operations, Validation, Simulation and Training (3)

Author: Mr. PARIMALARANGAN THIRUNARAYANAN
ISTRAC/ISRO, India, tprangan@istrac.org

Mr. ALOK KUMAR GUPTA

ISTRAC/ISRO, India, alok@istrac.org

Mr. SANGAMESH KATTIGINALLI RAMALINGIAH

ISTRAC/ISRO, India, sangam@istrac.org

Mr. NAGARAJ HEBBALE NARAYANA

ISTRAC/ISRO, India, nagaraj@istrac.org

Dr. Indra Arumugam

ISTRAC/ISRO, India, indraa@istrac.org

Mr. Pitchaimani M

ISTRAC/ISRO, India, mpmani@istrac.org

Mr. Chandrasekhar B.S.

ISTRAC/ISRO, India, sekhar@istrac.org

AUTOMATION OF PRELAUNCH SIMULATIONS FOR INDIAN LEO AND PLANETARY MISSIONS

Abstract

ISTRAC is bestowed with the responsibility of operating the Indian Low Earth Orbiting and Planetary Missions. A good prelaunch simulation meticulously planned and systematically executed, ensured the comprehensive readiness of the integrated ground systems for the Launch and Initial Phase operations. In order to streamline the simulation planning and related activities, the Simulation Scheduler was automated through ASSET (Automated Simulations Scheduling Tool). The other one, WeB-SSTAR, a single window access that provided all simulation resources, details of activities, feedback, actions, closeout, status and statistics.

Automated generation of simulation schedules (ASSET) engaged iterative waterfall for the design approach and embraced the flexibility to handle the change in launch dates and changes in number of various simulation events. The generation of simulation schedule was sequentially produced by the simple input of launch date and ported to WeB-SSTAR. The software is coded on C-language, developed and deployed on Linux platform.

Also, a single-window access related to all simulation activities enveloping simulation resources, status monitoring, action uploading and closeout implemented through WeB-SSTAR. This was developed and deployed in a window-server based environment in three-tier architecture. Microsoft-based Net framework is used as development tool that enabled easy portability and swift development of the application. Dreamviewer, a GUI based tool is utilized for the front end design. Window/Linux supported hardware served as Web clients. The totally automated system for the generation of the simulation schedule and employing the single-window access for conduction and monitoring the progress of the simulation was successfully employed during the launch of RISAT-1 and Megha-Tropiques satellites, preceding two missions of ISRO.

The customary change of lift-off date is easily adopted to generate further simulation schedule just by click of a mouse and the single window access ensured up-to-date status and timely information flow for those involved in simulations and the management hierarchy. Compared to the earlier practice, automation has brought down the simulation rescheduling time by many an order of magnitude and ensured the availability of simulation archives for future reference and analysis. The automation of the whole process

has made the simulations more systematic, accountable and elegant. Above all, the entire simulation exercise is now person-independent. This paper shall cover the details of design, development and implementation aspects of the automation process, which has aided quick resolution of the issues and rapid rescheduling of the simulation events, due to change in the launch date, support station inclusion/exclusion etc.