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A SUCCESSFUL COST-EFFECTIVE TAS-I STRATEGY FOR SATELLITES THERMAL VACUUM
TEST MANAGEMENT

Abstract

The Thermal Balance and Thermal Vacuum Tests (TBTVT or only TVT) can be considered the most complex activities experienced by the Satellite during its Environmental Test Campaign, due to both technical and programmatic risks and costs. Many factors influence the test duration. The main ones are: around thirty days of test execution h24; at least five teams working simultaneously on different tasks; long time to reach vacuum and temperature requirements and come back to ambient pressure; potential test facility failure; no program schedule margins (the environmental test campaign is the last phase of the Satellite production before the launch campaign). Some of the reported factors can affect the test timeline, with significant rise of costs, identified as Non-quality costs. The most critical one is the simultaneous participation of different teams not usually working all together and the relevant lack in communication, strongly contributing in creating misunderstanding with a result of schedule delay, from the preparation to the test execution. Therefore, the TVT management approach is crucial to succeed, reducing schedule risks and related extra-workload spread out over the entire team for each potential delayed day (around forty people work during TVT of a Medium-Size Satellite, like COSMO Skymed, GALILEO, SENTINEL 1). This paper aims to describe the approach defined and put in place by the Thermo-Mechanical Test Facilities Department of Thales Alenia Space Italy to secure the test schedule and mitigate risks. This approach, developed and tuned during GALILEO IOV Constellation test Campaign is based on a very optimized test process, owned by the Thermal Test Engineering, applied from the TVT Specification analysis up to the Test Report. This paper will describe the main steps concerning the process which allow to coordinate the overall activities, resulting in a cost-effective test conduction and execution. Considerations and data about schedule optimization achieved in the management of the test by the TVT optimized process will be summarized.