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SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
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FREGAT UPPER STAGE UPGRADES DEVELOPMENT STATUS

Abstract

The development of the Fregat upper stage used for Soyuz flights was accomplished under an ESA contract for the launch of the Cluster II satellites from Baikonur in 2000. 9 launches were executed with this first version of the Fregat stage.

Initial improvements were introduced in 2004 for the launch of the MetOp-A satellite in 2006. These improvements included a specific impulse increase and mass reduction which were ground qualified by an extensive test program. A dedicated full scale test model was developed and submitted to a wide range of mechanical test programs, including autonomous and combined verification with the Soyuz third stage.

A total of 10 missions were successfully executed on the basis of this new Fregat configuration. The first and second flight models from the Guiana Space Centre are already produced based on this configuration.

To obtain the performance objectives of the Galileo missions, it was necessary to again improve the Fregat performance. This target was reached by increasing both the propellant tanks capacity and the structural carrying capability. To qualify this new version, called Fregat MT, a new full scale test model was built and submitted to a dedicated ground test program.

A first step of structural improvements was successfully introduced in flight with the Globalstar-2 missions from Baikonur in October 2010. The next step will be the introduction of the improved propellant tanks capacity for the Galileo IOV mission from the Guiana Space Centre in 2011.

This paper will describe the test model configuration, test plan, ground test results and flight results that were obtained since October 2009 to demonstrate the flight capacity of the Fregat MT in 2011, paving the way for all future commercial missions performed by Arianespace with the Soyuz STB / Fregat MT launch system..