

SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)  
Launch Vehicles in Service or in Development (1)

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ARIANE 5 ECA PERFORMANCE IMPROVEMENT PLAN STATUS

**Abstract**

The ARIANE 5 ECA launcher is the European workhorse launcher. The current version, dubbed 'PA-2' was successfully qualified in 2009 in a generic way by ASTRIUM-ST within an ESA programme.

During the exploitation phase, ESA finances so-called "level 1" post flight analysis, based on flight measurements, that provide very important information on the launcher behaviour and its functional parameters at stages and engines level.

In addition to these key information, some in-house analyses were performed at CNES and ESA but also at ASTRIUM, SNECMA and ARIANESPACE in order to identify some affordable improvements that could allow to increase the ECA performance.

The status in 2009 was sufficiently promising to initiate a project called 'A5ECA Performance Improvement Plan'. Its objective is to achieve at least 10,000 kg performance equivalent single launch for GTO mission by mid 2012. Actually, the different improvement tracks will be progressively applied in flight between beginning 2011 and mid 2012..

This paper will address the current status and main results of the performance improvement plan, including first flight results. It will focus on the technical description of the most promising selected options that are being qualified at launch system level. Among them are: - Interface Flange deletion at upper part level - Reduction of uncertainties and dispersions for VULCAIN 2 and HM7B propulsive parameters based on post flight data analysis - Improvement of the LH2 thermal residual mastering of the ESC-A upper stage - ESC-A LH2 tank over-loading - Optimisation of the VULCAIN 2 and HM7B mixture ratio within the qualified domain - System constraints release...

The corresponding expected payload mass gain will be provided.