

SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)  
Launch Services, Missions, Operations, and Facilities (2)

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ELABORATION OF ARIANE 6 OPERATIONAL CONCEPT WITH A CONCURRENT  
ENGINEERING APPROACH

**Abstract**

In December 2014, the ESA Council at Ministers level has decided the launch of the Ariane 6 / VEGA-C program development. The overarching aim of Ariane 6 is to provide guaranteed access to space for Europe at a competitive price without requiring public sector support for exploitation. ESA has the role of Procuring entity and Launch System Architect (LSA). As Launch System Architect, ESA ensures the coherence on the Launcher System and the Launch base in the elaboration of the operational concept.

The ambitious High Level Requirements of Ariane 6 Project lead to design the Launch System for efficient operations. In this frame, operations should be taken "end-to-end":

- From manufacturing until end of Launch Service,
- All over the lifecycle of the Launch System,
- Encompassing the Launcher System Launch Base across the whole Launch System
- Including the Launch Service Customer's / payload

Concept of operations shall define the vision on how the Launch System will be operated during the Ariane 6 lifecycle. This pull production approach leads to drives the Launch System design, development, initial operations and ramp-up up to full operational capability.

Given the short development time for A6 (decision to start development in dec-2014 for a maiden flight in 2020), the A6 LSA team has decided to follow a concurrent engineering approach including the two primes contractors (ASL and CNES/DLA/SDS) in the elaboration of the Operational Concept.

The team is iteratively evaluating alternative solution until convergence on the recurring cost implied by the operational concept. At each step, impact on the Launch Base requirements and their running costs (operations and maintenance) are evaluated . Interface requirements are kept updated and design elements are capitalized to reduce the slack between requirements finalization and preliminary design completion. This process allows the system to freeze in parallel the requirement, the process and product design.

The paper will present concurrent engineering methods and tools applied within Ariane 6 project related to the elaboration of the operational concept with the prime contractors. Then the outcome will be summarized in presenting the A6 operational concept. Finally the paper will draw lessons learned from this approach.