

SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Future Space Transportation Systems Verification and In-Flight Experimentation (6)

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A PERSPECTIVE ON DEVELOPMENT FLIGHT INSTRUMENTATION AND FLIGHT TEST
ANALYSIS PLANS FOR ARES I-X

Abstract

NASA's Constellation Program will take a significant step toward completion of the Ares I crew launch vehicle with the flight test of Ares I-X and completion of the Ares I-X post-flight evaluation. The Ares I-X Flight Test Vehicle is an ascent development flight test that will acquire flight data early enough to impact the design and development of the Ares I. As the primary customer for flight data from the Ares I-X mission, Ares I has been the major driver in the definition of the Development Flight Instrumentation (DFI). This paper focuses on the DFI development process and the plans for post-flight evaluation of the resulting data to impact the Ares I design.

Ares I-X is a suborbital test flight planned for no sooner than July 11, 2009. Like Ares I, the First Stage, a modified Space Shuttle four segment RSRM, will provide primary propulsion from liftoff to stage separation. The First Stage will fire for approximately two minutes prior to separation. After separation from the simulator, the First Stage will descend and splashdown in the Atlantic Ocean to be recovered. Meanwhile, the simulator comprised of the Crew Module/Launch Abort Simulator, the Upper Stage Simulator the interstage, and the First Stage frustum continues in an uncontrolled, ballistic trajectory until impact in the Atlantic Ocean farther downrange.

Efforts for determining the DFI for Ares I-X began in the fall of 2005, and significant effort to refine and implement the Ares I-X DFI has been expended since that time. This paper will present a perspective in the development and implementation of the DFI. Emphasis will be placed on the process by which the list was established and changes were made to that list due to imposed constraints. The paper will also discuss the plans for the analysis of the DFI data following the flight, including a quick-look summary of the test, assessment of whether the flight test objectives were achieved, and a summary of flight evaluation tasks to be performed in support of tools and models validation for design and development.