

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

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ARIANE 5 LAUNCH SYSTEM ADAPTATION FOR JWST MISSION PREPARATION

Abstract

The launch of James Webb Space Telescope (JWST) was successfully performed by Ariane 5 from French Guiana on December 25th 2021. The unique nature of the JWST mission led to various adaptations of the Ariane 5 launch system to fulfill stringent cleanliness and hygrometry requirements all along the launch preparation. In addition, given the particular payload configuration, a specific laser fairing guiding device had to be implemented to allow payload encapsulation under the fairing.

JWST integration and test activities in the Final Assembly Building (BAF) had to be performed in ISO Class 7 equivalent conditions under Volatile Organic Compounds (VOC) protection and monitoring. For this purpose a dedicated air supply system equipped with Airborne Molecular Contamination (AMC) filters was installed in the umbilical mast.

The fairing itself was specially sealed to protect the inner environment and, to guarantee ISO Class 7, BAF Composite Hall (BAF HC) facilities were upgraded with a removable "air shower curtain" contain-

ment enclosure between the mobile platforms around James Webb.

The JWST observatory was not compliant with the usable volume under the fairing nominally defined for Ariane 5. This implied very low margins between fairing and JWST envelope volumes. It was decided to create a centering and guiding system to ensure utmost precision during positioning of the fairing over the Observatory and to guarantee clearance during the dynamic encapsulation phase. This system was installed on the fairing, on the Vehicle Equipment Bay (VEB), and between ground platforms inside the air shower curtain installation.

The preparation of these Ariane 5 launch system adaptations started several years before the launch campaign, with close cooperation and coordination between Arianespace, Arianegroup, CNES, BET, ESA and NASA. This paper describes their specificities and addresses the challenges experienced to achieve the successful mission preparation.