

SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)  
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Author: Dr. Carina Dorbath  
MT Aerospace AG, Germany

Mr. Ralf Harmond  
Germany

Mrs. Birte Hoeck  
MT Aerospace AG, Germany

MT AEROSPACE'S RECENT DEVELOPMENTS IN CFRP MANUFACTURING TECHNOLOGIES

**Abstract**

Due to the increasing international competition and growing pressure in cost in the launcher segment, enhanced technologies and competences for efficient development as well as production methods have to be evolved. In recent years MT Aerospace AG has promoted developments in the field of CFRP (carbon fiber reinforced plastics) technologies for the launcher segment. Therefore multiple projects focusing on selected promising technologies were initiated and conducted at MT Aerospace.

In ComBo (Composite Booster), a Bavarian funded project within the BayernFIT-program which was conducted from 2010 to 2014 at MT Aerospace, a booster casing with thermoplastic matrix system at the diameter of 1.3 m and the length of 4 m was developed, manufactured and successfully tested in a static burst test.

The MT Aerospace research project PolyMET focuses on stringer reinforced CFRP structures, e.g. for an application in launcher interstages or other launcher structures under axial compression. Therefore, a sub scale cylindrical test article is designed consisting of a carbon fiber reinforced thermoplastic (CFRTP) skin supported by Aluminum stringers and CFRTP rings. The cylinder is manufactured under MT Aerospace responsibility and will be tested under axial compression to verify the hybrid design concept.

The ESA FLPP project FORC (Fiber Reinforced Optimized Rocket Case), which was initiated in 2013 focuses on the large CFRP booster casing manufacturing technology for upcoming new European launcher using dry fiber winding / dry fiber placement process with resin infusion. Therefore, a CFRP booster casing with a diameter of 3.5 m and a length of 6 m is designed and currently manufactured. The FORC booster casing will be tested in a static burst test in late 2016, raising MT Aerospace's resin infusion technology to TRL 6.

Within the approved Ariane 6 program, the development of a new composite booster was included, the P120C Casing – New Technology – Project, based on the resin infusion technology currently used within the FORC project. In the technology phase of this project, the manufacturing technology will be further developed and applied resulting in the production and testing of a so called "Pathfinder" casing with the objective to demonstrate TRL 6 for the P120C IMC (insulated motor case) for Ariane 6 and VEGA C.

This paper presents the programmatic overview of the CFRP technology projects at MT Aerospace as well as the status and relevant results of these projects. An outlook will be given on ongoing and planned activities.