

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

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THE NEW ARIANE U/S TEST FACILITIES P5.2

Abstract

In the frame of the Ariane program a new upper stage for the heavy European launcher is under development. The Upperstage is powered by the Vinci engine. Maturation and qualification of this stage/engine configuration is foreseen to be done by tests on a dedicated test bench at Lampoldshausen test area. The test bench P5.2 is under development by DLR Lampoldshausen, who has a unique experience in Europe for designing, erecting, receipting and operating hot firing test facilities (sea-level and altitude simulation) as there are the ESA facilities P3.2, P4.1 and P4.2 as well as P5. The paper gives first an overview about the test bench itself with the main parts (building, technical rooms, test cell and thrust frame, gas- and cryo-supply lines, mounting platform and gas jet guiding system, MCC-system) as well as about synergies with already existing supply facilities in the test area. As a test facility has to be “single fault tolerant”, already safety and security aspects based on the legal and internal requirements wrt person and environment injuries have to be considered during the construction phase. The different test bench acceptance phases R1 (tests using inert media) and R2 (tests using original media) with mock-up tanks before integration of the specimen are described. The facility will be operational in 2017 in order to realise Ariane Upperstage development tests in 2018. These tests are presented in the following chapter, giving an overview about e.g. the so called M/Q campaign. The U/S test scenarios as filling and deloading of cryo-genic tanks, qualification of the propulsion system and hot-run procedures are explained, taking into account nominal test durations as under flight conditions including waiting phases between several burst ignitions and a total hot run duration up to 1.250 seconds. Finally a short summary about different possibilities of additional tests and DLR supports for the future ELA4 complex in French Guyana is presented.