

COSIE – COUPLING SYSTEM FOR INTEGRATION OF ENGINE

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Abstract: The German Aerospace Centre (DLR) Lampoldshausen manages and operates on behalf of the European Space Agency (ESA) several ESA owned test facilities on the DLR test site at Lampoldshausen. The ESA owned test facilities are the test benches P3, P4, P5 and P5.2. On the test facility P3 engine thrust chambers or engine components are tested. The high-altitude simulation test facility P4 with the two test positions P4.1 and P4.2 is used for upper stage engine testing under high altitude simulation conditions. The test position P4.1 is dedicated to the new European cryogenic upper stage engine Vinci® and at the test position P4.2 the Ariane 6 Astris kick stage engine BERTA is tested. Tests on the new Ariane 6 cryogenic main stage engine Vulcain® 2.1 are carried out on the test facility P5. Currently the test facility P5 is enhanced for the use of liquid methane (LCH4) for testing the newly developed LOX-LCH4 engine Prometheus. On the new upper stage test facility P5.2 the Ariane 6 upper stage is tested.

For the integration for the acceptance testing of the Vinci® production engines into the test stand a Coupling System for Integration of Engine, the so called COSIE, shall be developed and used. This coupling system shall enable a quick "plug-and-play" connection in order to minimize the integration and verification time of the Vinci® engine into the test stand and thereby allow to minimize the (or respect the requested maximum) time duration of the Vinci® engine on the test stand.

The paper will describe the major parts of the system, the different operational steps with the tool from mounting during the Vinci® engine integration until dismounting after returning the engine back from the test stand into the integration hall and what are the advantages and disadvantages of such a system.