

## ArianeGroup continues ETID hot-fire tests with first full-scale 3D-printed combustion chamber injector head

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- **ETID (Expander-cycle Technology Integrated Demonstrator) aims to prove innovative technologies for future upper-stage rocket engines**
- **A hot-fire testing campaign has been successfully in progress since June 2018**

The Expander-cycle Technology Integrated Demonstrator (ETID) is a full-scale demonstrator of an innovative thrust chamber for a future upper-stage rocket engine in the 10-metric ton thrust class. It aims to prove various technologies and manufacturing methods, such as additive manufacturing, laser ignition, and cost-efficient materials.



The current test configuration incorporates ArianeGroup's first full-scale 3D-printed injector head for next-generation thrust chamber assemblies. It has now successfully performed the first hot-fire tests in representative conditions on the German Aerospace Center (DLR) P3.2 test bench in Lampoldshausen. Drawing on experience from earlier, smaller-scale R&T activities, this single-piece injector head, made of Inconel 718, is the latest development step in the

field. It is printed by powder bed-based selective laser melting and replaces conventional injector heads made of more than 200 individual pieces. This will significantly help to simplify the production and assembly of future rocket engines.

ETID is part of ESA's Future Launchers Preparatory Program, which aims to increase the future competitiveness of European launchers by creating ready-made technical solutions which can be transferred for quick development projects with minimal cost, effort, and risk. ArianeGroup in Germany is lead contractor for the ETID program, and European partners GKN Aerospace in Sweden, APP in the Netherlands, Safran Aero Boosters in Belgium, and Carinthian Tech Research in Austria have provided hardware components. Hot-fire testing has been taking place since June 2018 at the DLR's P3.2 test facility: the set-up tests and the first test series, now completed with good results, totaled 1,370 seconds of operation.

**Press contacts:**

Astrid EMERIT - T. +33.6.86.65.45.02  
[astrid.emerit@ariane.group](mailto:astrid.emerit@ariane.group)

## Press release

Julien WATELET - T. +33.6 88.06.11.48  
[julien.watelet@ariane.group](mailto:julien.watelet@ariane.group)

### **About ArianeGroup**

ArianeGroup develops and supplies innovative and competitive solutions for civil and military space launchers, with expertise in all aspects of state-of-the-art propulsion technologies. ArianeGroup is lead contractor for Europe's Ariane 5 and Ariane 6 launcher families, responsible for both design and the entire production chain, up to and including marketing by its Arianespace subsidiary, as well as for the missiles of the French oceanic deterrent force. ArianeGroup and its subsidiaries enjoy a global reputation as specialists in the field of equipment and propulsion for space applications, while their expertise also benefits other industrial sectors. The group is a joint venture equally owned by Airbus and Safran, and employs approximately 9,000 highly qualified staff in France and Germany. Its 2017 revenues amounted to 3.4 billion euros.

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