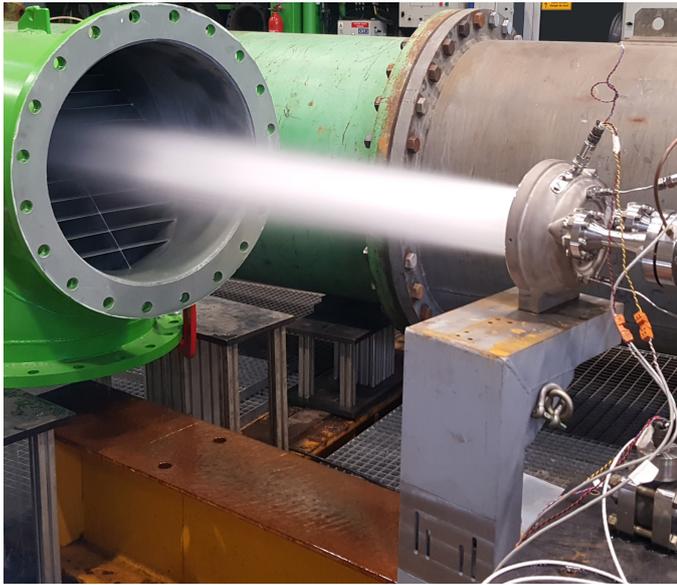




ArianeGroup

# Acceptance of a key Vulcain 2.1 engine component

The cavities of the Vulcain 2.1 engine gas generator injection head must not be polluted or clogged by the water used on the hydraulic test bench. A new filtration system was developed to ensure proper testing.



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## OUR CUSTOMER

**Corporate name**  
ArianeGroup

**Turnover**  
2.7 billion euros in 2020

**Workforce**  
About 7,600 employees in France and Germany

**Business activity**  
A 50/50 joint venture between Airbus and Safran, ArianeGroup is the European leader in access to space, serving institutional and commercial clients as well as the strategic independence of Europe.

**D**esigned by ArianeGroup, the cryogenic Vulcain 2.1 engine, which will propel the Ariane 6 launcher during the first eight minutes of flight, successfully passed the different static fire test phases. In order to simplify and reduce production costs, ArianeGroup modified the manufacturing processes for many of the engine parts, and namely the gas generator injection head. Previously a multi-part assembly of over a hundred elements, it is now a unified part made by additive manufacturing. To test compliance of this geometrically complex nickel-alloy part with numerous

cavities, ArianeGroup chose non-destructive hydraulic testing. A test bench adapted to application requirements was set up by Cetim in order to take measurements (pressure, flow, etc.) at both oxygen and hydrogen inputs, as well as over ten outputs. The objectives were to measure pressure loss and ensure homogeneous injection flow.

## Fine particle filtration under high pressure

To avoid all particle contamination of the very narrow internal cavities, the water on this test bench must be extremely clean. Therefore, Cetim designed a dedicated filtration system to ensure that the water circulating in the injection head during testing contains no

particles larger than 300µm. Filters, fixation interfaces and tightening techniques were selected after in-depth study to ensure mechanical strength of the filters during testing at pressures of up to 30 bars.

*“The Cetim technical team demonstrated great ingenuity in designing and setting up the filtration system to protect our material from waterborne pollution. During various test phases, they were reactive and always ready to adapt to our needs,”* declared Alexandre Barata, ArianeGroup functional manager for the gas generator.

## Cetim's asset



Proven expertise in testing and validating new designs, conducting acceptance tests and determining hydraulic performance of in-service equipment in a “Cofrac essais n°1-0037” certified laboratory (scope of accreditation available on [www.cofrac.fr](http://www.cofrac.fr)) for pumps, valves & fittings and turbines.