NASA Successfully Tests 3D-Printed Rocket Engine Parts

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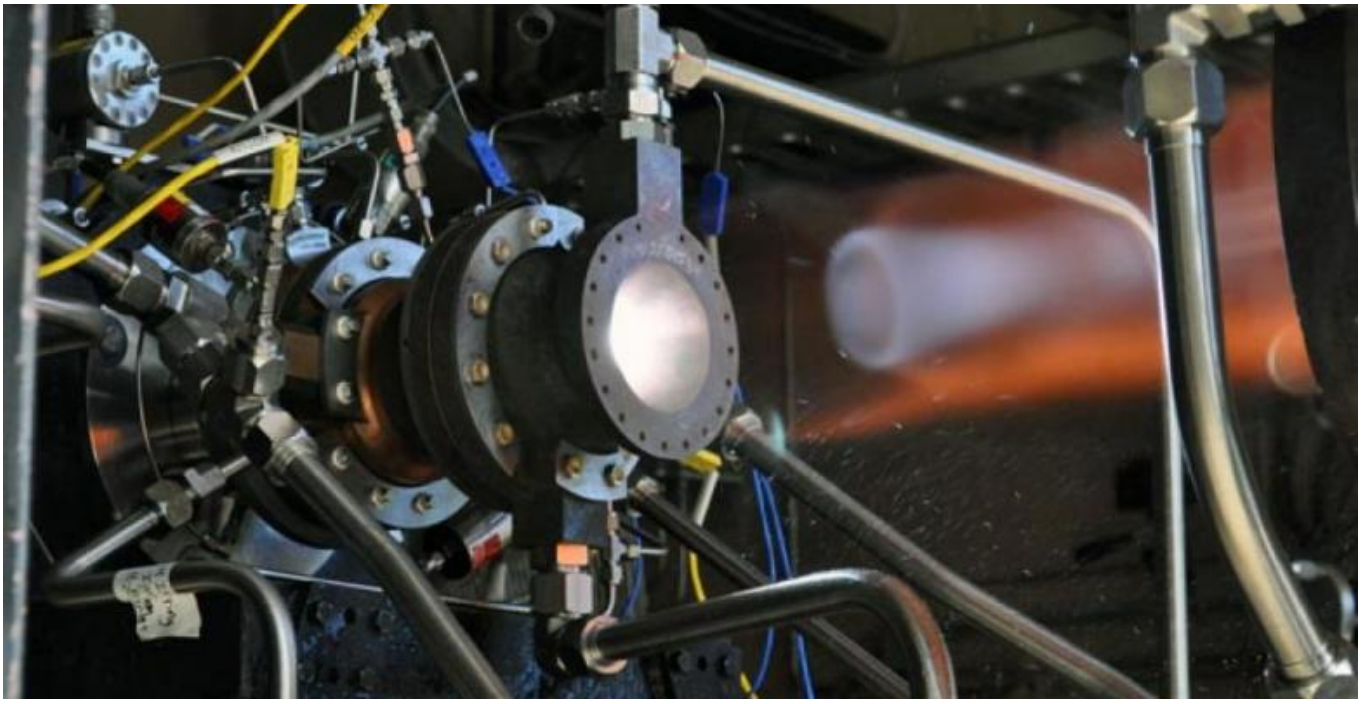

Aerojet Rocketdyne (AR) at NASA's Glenn Research Centre in partnership with NASA successfully completed the first hot-fire tests on an advanced rocket engine thrust chamber assembly using copper alloy materials.

This was the first time a series of rigorous tests confirmed that 3-D manufactured copper parts could withstand the heat and pressure required of combustion engines used in space launches, NASA said.

In all, NASA and AR conducted 19 hot-fire tests on four injector and thrust chamber assembly configurations, exploring various mixture ratios and injector operability points and were deemed fully successful against the planned test programme.

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"The successful hot fire test of subscale engine components provides confidence in the additive manufacturing process and paves the way for full scale development," said Tyler Hickman, lead engineer for the test at Glenn.

The work is a major milestone in the development and certification of different materials used in this manufacturing process, NASA said.

According to AR, copper alloys offer unique challenges to the additive manufacturing processes. The micro-structure and material properties can be well below typical copper.

So they have worked through a regimented process to optimise and lock down processing characteristics and have performed rigorous materials tests to know how the alloy performs structurally.

"Additively manufactured metal propulsion components are truly a paradigm shift for the aerospace industry," said Paul Senick, Glenn project manager.

"NASA and its commercial partners continue to invest in additive manufacturing technologies, which will improve efficiency and bring down the cost of space launches and other earth applications," said Mr Senick.