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## THE BIGGEST BREAKTHROUGH IN PROPULSION SINCE THE

# **JET ENGINE**

Reaction Engines Ltd. can announce today the biggest breakthrough in aerospace propulsion technology since the invention of the jet engine. Critical tests have been successfully completed on the key technology for SABRE, an engine which will enable aircraft to reach the opposite side of the world in under 4 hours, or to fly directly into orbit and return in a single stage, taking off and landing on a runway.

SABRE, an air-breathing rocket engine, utilises both jet turbine and rocket technology. Its innovative pre-cooler technology is designed to cool the incoming airstream from over 1,000°C to minus 150°C in less than 1/100th of a second (six times faster than the blink of an eye) without blocking with frost. The recent tests have proven the cooling technology to be frost-free at the crucial low temperature of -150°C.

The European Space Agency (ESA) has evaluated the SABRE engine's pre-cooler heat exchanger on behalf of the UK Space Agency, and has given official validation to the test results:

"The pre-cooler test objectives have all been successfully met and ESA are satisfied that the tests demonstrate the technology required for the SABRE engine development."

Minister for Universities and Science, David Willetts said:

"This is a remarkable achievement for a remarkable company. Building on years of unique engineering know-how, Reaction Engines has shown the world that Britain remains at the forefront of technological innovation and can get ahead in the global race. This technology could revolutionise the future of air and space travel."

Well over 100 test runs, undertaken at Reaction Engines Ltd's facility in Oxfordshire, integrated the ground-breaking flight-weight cooling technology and frost control system with a jet engine and a novel helium cooling loop, demonstrating the new technologies in the SABRE engine that drive its highly innovative and efficient thermodynamic cycle. This success adds to a series of other SABRE technology demonstrations undertaken by the company including contra-rotating turbines, combustion chambers, rocket nozzles, and air intakes and marks a major advance towards the creation of vehicles like SKYLON — a new type of reusable space vehicle that will be powered by SABRE engines, designed primarily to transport satellites and cargo into space.

### Wednesday 28 November 2012

Alan Bond, who founded Reaction Engines to re-build the UK's rocket propulsion industry and has led the research from the start, said:

"These successful tests represent a fundamental breakthrough in propulsion technology. Reaction Engines' lightweight heat exchangers are going to force a radical re-think of the design of the underlying thermodynamic cycles of aerospace engines. These new cycles will open up completely different operational characteristics such as high Mach cruise and low cost, re-usable space access, as the European Space Agency's validation of Reaction Engines' SABRE engine has confirmed. The REL team has been trying to solve this problem for over 30 years and we've finally done it. Innovation doesn't happen overnight. Independent experts have confirmed that the full engine can now be demonstrated. The SABRE engine has the potential to revolutionise our lives in the 21<sup>st</sup> century in the way the jet engine did in the 20<sup>th</sup> Century. This is the proudest moment of my life."

Dr Mark Ford, ESA's Head of Propulsion Engineering, said:

"One of the major obstacles to developing air-breathing engines for launch vehicles is the development of lightweight high-performance heat exchangers. With this now successfully demonstrated by Reaction Engines Ltd, there are currently no technical reasons why the SABRE engine programme cannot move forward into the next stage of development."

### **Notes to editors**

- 1. Reaction Engines Limited (REL) is a privately funded UK Company with core capabilities in the research, design, manufacture, development and testing of ultra-lightweight heat exchangers for aerospace applications and the advanced SABRE engines and vehicles, such as SKYLON, that they enable.
- **2.** The viability of the SABRE engine has been independently validated by the European Space Agency during a review undertaken at the request of the UK government.
- 3. SABRE powered reusable space planes like SKYLON will dramatically cut the cost of launching satellites by more than 10 times. The global space market is worth £185 billion annually £9.1 billion to the UK. The development of these vehicles offers major economic opportunities.
- **4.** For further information please contact Ben Gallagher at Reaction Engines Ltd <a href="mailto:ben.gallagher@reactionengines.co.uk">ben.gallagher@reactionengines.co.uk</a>, +44 (0)7770 735273.

More information about Reaction Engines Ltd, SABRE and SKYLON can be found on <a href="https://www.reactionengines.co.uk">www.reactionengines.co.uk</a>, including an interview with Alan Bond.