

SPACE PROPULSION SYMPOSIUM (C4)
Propulsion Systems I (1)

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FIRST RESULTS FROM TP-X TURBINE TESTS AND VERIFICATION RESULTS FROM VINCI
TURBINES IN ENGINE TESTING

Abstract

Volvo Aero is today participating in the Vinci and TPX technology demonstration programs providing state-of-the-art turbine technology for European launcher upgrades and developments. At the present time both programs are in a phase of intense verification testing at turbo-pump and engine level respectively and first test results are available proving turbine functionality and performance.

In August 2006, the first Vinci development program had been finalized with successful engine tests and demonstration of the expander cycle engine capability. Throughout the engine tests, the turbines operated as expected without any malfunction, demonstrating the success of the turbine development program at VAC. Now, a new phase to improve the engine capability further in the frame of a 3 years technology demonstration program is being finalised and a second development phase has commenced in order to bring the improved engine components into operation. The present paper addresses the latest advances of the Vinci turbine development focusing on:

- Verification of the cost efficient and robust turbine blisk design and manufacturing with the help of an advanced turbine blisk vibration measurements in engine operation

- Introduction of light-weight materials and advanced manufacturing technologies for turbine manifolds

The TPX program is conducted in cooperation with the Swedish National Space Board, the French National Space Agency and Snecma Safran with the main purpose to demonstrate cost efficient turbopump and turbine technologies for future launcher engine applications. The TPX program is now being finalised and demonstrator tests are ongoing. In the present paper results from the demonstrator tests will be presented focusing on:

- Verification and demonstration of low cost technologies for possible introduction in a future development program, such as blisks for high speed turbines

- Verification of a state-of-the-art design approach, including increased utilisation of advanced CFD analyses and improved FEM models to increase the range and accuracy of the turbine characteristics and verification of turbine mechanical integrity