

DII successfully completed Wind Tunnel Tests on Optimized Tiltrotor

A part of the Clean Sky initiative, funded by the European Union under the FP7 Program, the Green Rotorcraft ITD addressed the challenge of halving the specific impact of rotorcraft operations on the environment, operating together with other already launched technology programmes at European or national levels. A consortium involving DII and the research group led by prof. Ernesto Benini, Hit09 Srl (I) and RUAG Aviation (CH) underwent a research program for both computational fluid dynamics (CFD) investigations/optimizations and wind tunnel tests (see pictures), which aimed to validate fuselage drag reduction measures for a tilt-rotor configuration that had been developed only by CFD analysis. The DREAM-TILT wind tunnel campaign performed in RUAG's Large Wind Tunnel in 2016 successfully confirmed the drag reduction goals (-5%) predicted by design optimization studies. Leonardo Helicopters (formerly AgustaWestland), the DREAM-TILT topic manager and owner of the wind tunnel model, also commissioned the consortium to perform three-component Particle Image Velocimetry (S-PIV) measurements to improve understanding of the complex flow structures and to validate CFD imulations.

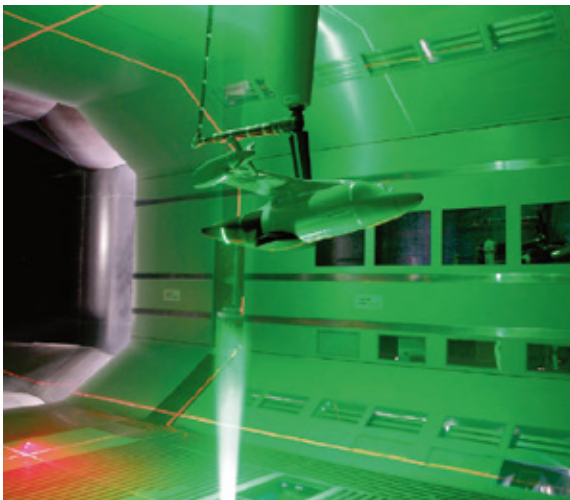


Fig. 1. Optimized tiltrotor 1:8 scaled model during wind tunnel testing at RUAG's Large Wind Tunnel.

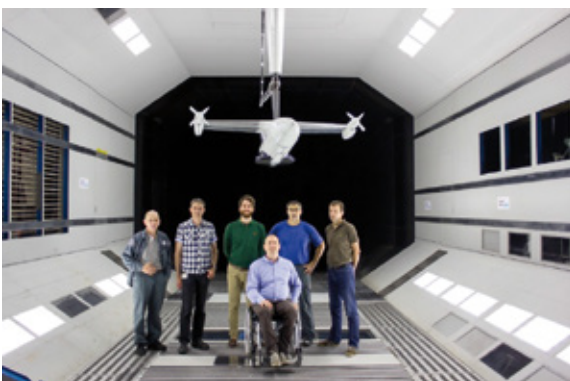


Fig. 2. Partners of the DREAM-TILT project underneath the optimized tiltrotor model at RUAG's Large Wind Tunnel.

Ingegneria dei sistemi
meccanici
Mechanical systems

DII research group

Fluid Machines
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Main research topics:

- Advanced optimization methods applied to drag reduction in aircraft design
- Validation of Computational Fluid Dynamics (CFD) predictions using large-scale wind tunnel testing
- Stereo Particle image velocimetry (S-PIV) in wind tunnel testing