

ASCEND - A First Step Towards Cryogenic Electric Propulsion for Aircraft?

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Abstract— ASCEND (Advanced Superconducting and Cryogenic Experimental power train Demonstrator), AIRBUS intends to demonstrate the potential and feasibility of a cryogenic and superconducting powertrain to breakthrough aircraft electric propulsion performances. Cooling conventional electric technologies to cryogenic temperature and using “high temperature” superconductivity technologies are promising to significantly increase the performance of electric propulsion systems. Over the past three years, through various projects, Airbus has evaluated superconducting and cryogenic technologies on electric systems and will use this project to explore the feasibility and accelerate the maturity of these promising technologies in order to optimise the propulsion architecture ready for low-emission and zero-emission flight. Results are expected to show the potential for component weight and electrical losses to be at least halved, as the volume and complexity of systems installation is reduced, as well as a reduction in voltage to below 500V, compared to current systems.

Keywords (Index Terms) — ASCEND, electric aircraft, cryogenic and superconducting powertrain.

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