

ASCEND: The First Step Towards Cryogenic Electric Propulsion

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Abstract — With ASCEND (Advanced Superconducting and Cryogenic Experimental powertrain Demonstrator), AIRBUS intends to demonstrate the potential and feasibility of a cryogenic and superconducting powertrain to breakthrough aircraft electric propulsion performances. Cooling at cryogenic temperature conventional electric technologies and using "high temperature" superconductivity technologies are promising to significantly increase performances of electric propulsion systems especially if liquid hydrogen at 20K is on board.

ASCEND will also assess electric architectures from several hundred kilowatts to multi-megawatt applications with and without liquid hydrogen on board. It will support decision making-processes for the type of propulsion system for future aircraft. After 1.5 years, the demonstrator is at the end of the detailed design phase and the manufacturing of components is ongoing. The presentation will be focused on an update of the project.

Keywords (Index Terms) — ASCEND; aircraft; electric propulsion; cryogenic; High temperature superconductors; aircraft; hydrogen