

Electric Aircraft Superconducting DC Network Fault Protection

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Abstract — Electrification of aviation will play a key role in delivering emission and noise reduction targets for sustainable aviation. Airbus UpNext initiated the Advanced Superconducting and Cryogenic Experimental powertrain Demonstrator. A reliable high-power density and high efficiency superconducting DC distribution network will be a key enabling and transformative technology to achieve large-scale hydrogen-powered electric aircraft. Safety and reliability are the primary requirements for electric propulsion aircraft. This talk will focus on the fault protection of cryogenic and superconducting DC distribution network using a superconducting fault current limiter and a cryogenic hybrid DC circuit breaker. A prototype has been built and experimentally tested in the laboratory, which successfully interrupts kA current within 5 milliseconds. The project is under the support of UK Aerospace Technology Institute and in collaboration with Airbus.

Keywords (Index Terms) — DC distribution network, Electric aircraft, Hybrid DC circuit breaker, Superconducting fault current limiter