Next Generation More-Electric Aircraft: A Potential Application for HTS Superconductors

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Abstract—Sustainability in the aviation industry calls for aircraft that are significantly quieter and more fuel efficient than today's fleet. Achieving this will require revolutionary new concepts, in particular, electric propulsion. Superconducting machines offer the only viable path to achieve the power densities needed in airborne applications. This paper outlines the main issues involved in using superconductors for aeropropulsion. We review the work done under a 5-year program to investigate the feasibility of superconducting electric propulsion, and to integrate, for the first time, the multiple disciplines and areas of expertise needed to design electric aircraft. It is shown that superconductivity is clearly the enabling technology for the more efficient turbo-electric aircraft of the future.

Index Terms — Aircraft, electric propulsion, superconducting motor

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