



NASA SBIR 2012 Phase I Solicitation

A3.03 Low Emissions/Clean Power

Lead Center: GRC

Proposals are sought which support electric propulsion of transport aircraft, which includes various hybrid electric concepts, such as gas turbine engine-battery combinations and turboelectric propulsion (turbine prime mover with electric distribution of power to propulsors). Turboelectric propulsion for aircraft applications will require high specific power (hp/lb or kW/kg) and high efficiency components. Cryogenic and superconducting components will be required to achieve high specific power and high efficiency. The cryogenic components include fully superconducting generators and motors (i.e., superconducting stators as well as rotors), cryogenic inverters and active rectifiers, and cryocoolers. Proposals related to the superconducting machines may include aspects of the machines themselves as well as low AC loss superconducting materials for the stator windings. Generators with at least 10 MW capacity and motors of 2 to 3 MW capacity are of interest. Technology is sought that can contribute to superconducting machines with specific power more than 10 hp/lb. Superconducting wires with filaments less than 10 micrometers in diameter are of interest. Ideas are also sought for achieving 2-3X increase in specific power for non-cryogenic motors through a multidisciplinary approach utilizing advanced motor designs, better materials, and new structural concepts. Ideas are also sought to address challenges related to high voltage power transmission in future hybrid electric aircraft. New modeling and simulation tools for hybrid electric aircraft propulsion systems are also of interest.