

Progress on a 100 kW Fully HTS Propulsion Motor for Zero Emission Aviation

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Abstract–This presentation presents the latest technical progress on the development of a 100 kW fully HTS propulsion motor for zero emission aviation applications. The purpose of this development is to technically prove that superconducting motor is a viable technical route to produce high power density propulsion motors for zero emission aviation. The motor is in an axial-flux topology with two armatures and one rotor, consisting of in total 16 HTS double pancake coils. Analytical and FEM modeling results for the motor as well as the HTS double pancake coils will be presented. The HTS armature design and testing results in a temperature range among 30K- 77K will be presented, which include the use of sub-cooled LN2 and helium gas as coolants. The HTS rotor design and its charging concept will be presented, which include pre-liminary testing results and simulation results. The cooling system design of the motor will also be presented with preliminary testing results. The presentation will also introduce the next steps for development and testing.

Keywords (Index Terms)– HTS, superconducting motor, aircraft propulsion, zero emission aviation

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