

Rotor Cooling System for the Asumed superconductive Motor

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Abstract. The consortium of the Advanced Superconducting Motor Experimental Demonstrator (ASuMED) develops, builds and tests the first fully superconductive motor for aerospace applications. The cryogenic topology of the motor is based on a dual-cryostat concept, which consists of two separate cryostats for the rotor and the stator.

The rotor cryostat cooling system is based on forced convection of gaseous helium along the inside of the rotor. The flow, pressure and temperature of the helium circulation are controlled by a support unit outside the motor. Detailed flow and heat transfer analyses of the externally controlled cooling system have shown the potential to achieve the required cooling capacity.

Two consecutive tests are foreseen to demonstrate the feasibility of the cooling system. The goal of the first test with the Warm Demonstrator is to proof the functionality of the mechanical design, the hydrodynamics of the circulation system and the ferrofluidic rotating seals. The goal of the second test with the Cold Demonstrator is to proof the cooling capacity and determine the magnetic performance of the superconducting motor. First results of the Warm Demonstrator test will be presented.