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## **M3Or3A-03: [Invited] Development of high-temperature superconducting CORC® power cables for electrified aviation and naval applications**

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Electric power systems on future electric ships and twin aisle electric aircraft require lightweight high-temperature superconducting (HTS) dc cables and connectors capable of delivering electric power in the order of tenths of MW. Conductor on Round Core (CORC®) power cables developed by Advanced Conductor Technologies (ACT) provide a unique solution by offering high operating currents, in the order of 5 kA per pole, that in combination with an operating voltage of 10 kV, results in a capacity of 50 MW. The cables being designed with fault-current-limiting (FCL) abilities that will increase the safety to the electric propulsion of the aircraft. ACT has also developed practical cable terminations that for a compact interface between the helium gas cooled CORC® cables and room temperature.

An overview of the advancement of CORC® power cables for electric aircraft and shipboard uses is provided. The lapped dielectric we developed for CORC® power cables is rated for up to 12 kV and designed to be coolant independent. The dielectric is suitable for the gaseous helium cooling most likely present in aviation and naval applications, while allowing for customization depending on the required voltage rating. The results of our recent test of a 2-pole dc CORC® power cable containing compact terminations that was operated at a current of 4 kA and a voltage of 12 kV while cooled with cryogenic helium gas are outlined.

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