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M3Or3A-04: [Invited] Lightweight cryoresistive and superconducting aerospace power transmission cables: experiments and theory

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A NASA University Leadership Initiative program with The Center for Cryogenic High-Efficiency Electrical Technologies for Aircraft (CHEETA) and a separate ARPA-E Connecting Aviation By Lighter Electrical Systems (CABLES) program have been developing cryogenic, medium voltage, high amperage, and lightweight aerospace power cables. The research presented here includes the motivation behind these demonstrations, cable and termination designs paradigms, theoretical modeling using a 1 D lumped parameter model and finite element modeling, and results of sub scale ground demonstration experiments. The final two-pole design and testing will include HTS and cryoresistive cables from both ARPA-E and NASA demonstration programs joined electrically in series, using a novel cryogenic junction.

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