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An Investigation and Optimization of Coaxial Rotors for UAS Noise Reduction

Abstract:

The author and others have sought to reduce the noise created by unmanned aircraft systems (UAS) propellers/rotors by various modifications: leading edge serrations, trailing edge serrations, leading edge slots, trailing edge slots, upper surface treatments, trailing edge treatments, etc. The modifications were made to commercial-off-the-shelf (COTS) propellers/rotors. The current study utilized two COTS propellers/rotors mounted coaxially. The angular separation and the pitches of the propellers/rotors were varied in order to optimize the noise and thrust produced by the pair. The tests were repeated for propellers/rotors having different blade planforms. All coaxial pairs were compared to one another and to individual propellers/rotors.

Biography:

Mark "Nate" Callender joined the Aerospace Department at Middle Tennessee State University (MTSU) in 2005. He earned an M.S. in Aviation Systems and a Ph.D. in Engineering Science from the University of Tennessee Space Institute. He teaches courses within and coordinates the Aerospace Technology concentration; supervises the Aerospace Technology Laboratory; mentors undergraduate and graduate researchers (Aerospace Technology seniors, URECA Scholars, Honors students, and Masters students); chairs departmental and university committees; is a member of the EXL, Honors, and Graduate faculty; and is an Associate Chair of the Aerospace Department.



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