Combustion chambers are naturally prone to acoustic instabilities that originate from flame propagation. Passive devices such as combustor chamber baffles, resonators, and injection liners have proven to attenuate acoustic instabilities that degrade the integrity of engine components. Each of these items has a significant role in reducing acoustic wave fluctuations through the transfer of energy resulting in viscous dissipation. Acoustic energy viscous dissipation effects are measured and quantified for damping suppression devices tested in combustion chambers. Microphones measurements record acoustic pressure wave amplitudes to determine viscous damping effects as sound waves travel under static and flow conditions. Passive control devices are developed and tested to attenuate combustor flame acoustic instabilities. Acoustic modes and absorption characteristics for combustor acoustic wave instabilities are analyzed using various suppression devices that include new design methods that enable enhanced damping effectiveness to increase. Microphone diagnostics capture the viscous damping behavior to identify and quantify viscous dissipation effect to acoustic instabilities.

Major: Select

Educational Career:
Bachelor's of Mechanical Engineering, BS, 2008, North Carolina State University
Master's of Mechanical Engineering, MS, 2015, Old Dominion University

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Approved for distribution by Kareem Ahmed, Committee Chair, on June 21, 2019.

The public is welcome to attend.