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# of a gas-combustion infrasound source

An invaluable tool in characterizing any receiver is a source with known and repeatable signal characteristics. This talk discusses development and characterization of a non-explosive, coherent source within the IMS infrasound band for the purpose of on-site calibration and detection system testing. Development of an infrasound band source is challenging because of the requirement to move a large volume of air to generate useful signal levels. According to the simple source equation, as frequency decreases, the volume velocity must increase by the inverse factor of the frequency in order to maintain an equal pressure amplitude at equal range. For this reason, a novel method is being developed using the large energy density available in gas combustion for periodic thermal expansion of an air mass. This engineering development builds on previous academic work (funded in part by the Graduate Program in Acoustics at Penn State) by the authors (Smith and Gabrielson, J. Acoust. Soc. Am.137, 2407(2015) and Smith and Gabrielson, Proc. Mtgs. Acoust. 176 ASA, Vol.35, 045004(2018)). Measurements from a large liquid-propane burner system from a hot air balloon, comparisons with a first-order thermodynamic model, and design and development of a purpose built propane burner for infrasound generation will be discussed.

Primary author: SMITH, Chad (The Pennsylvania State University, Applied Research Laboratory)

Presenter: SMITH, Chad (The Pennsylvania State University, Applied Research Laboratory)

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