Low Noise Air Amplifiers

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Objectives

Air flow amplifier technology to replace/assist rotary fans, potentially addressing key challenges in data center thermal management:

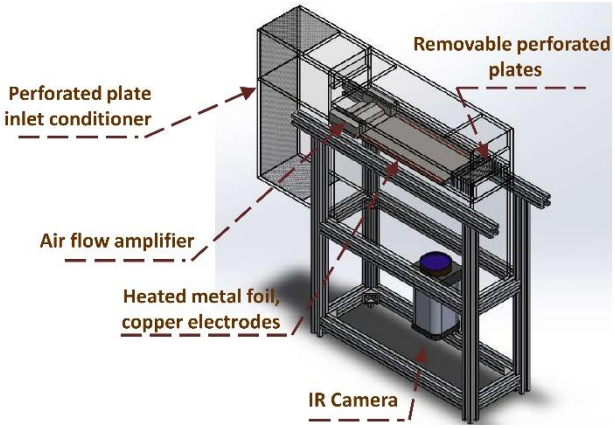
The use of rectangular linear amplifiers in more confined spaces.

Approach

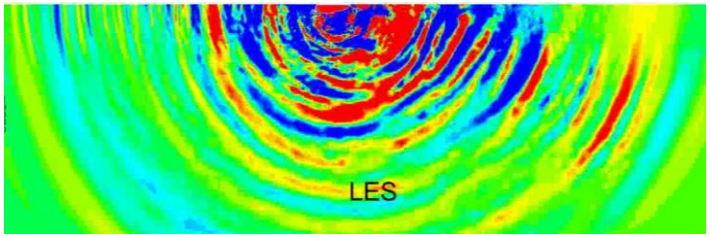
1. Construct the test setup composed of a flow channel, with a heated metal foil, capable of IR thermography, PIV velocity, and acoustic noise measurements.

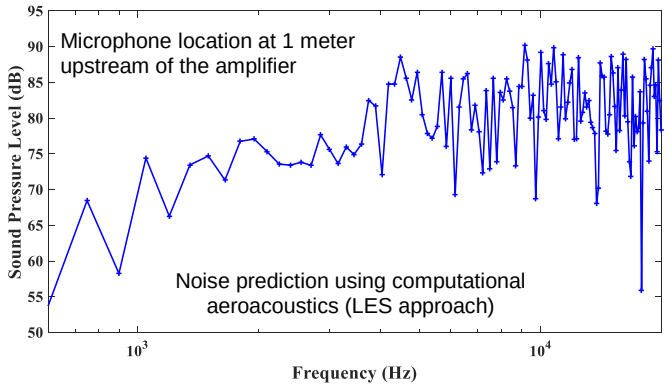
2. Validate the numerical results of aeroacoustics modeling using hybrid URANS/LES methods to help improve amplifier design for noise reduction.

3. Build lab-scale cooling demonstration, for application in a datacenter environment.



Test facility to characterize both air amplifiers and fans





Impact

- ✓ Fan curves and energy efficiency characterization.
- ✓ Increasing energy efficiency and cooling performance of data center thermal managements
- ✓ Decreasing noise emission, and improving reliability

Related Publications

- Garimella S. V., Persoons T., Weibel J., Yeh L.-T., Technological drivers in data centers and telecom systems: Multiscale thermal, electrical, and energy management, *Applied Energy* **107**: 66-80, 2013
- Garimella S. V., Yeh L.-T., Persoons T., Thermal management challenges in telecommunication systems and data centers, *IEEE Transactions on Components, Packaging and Manufacturing Technology* **2**: 1307-1316, 2012

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