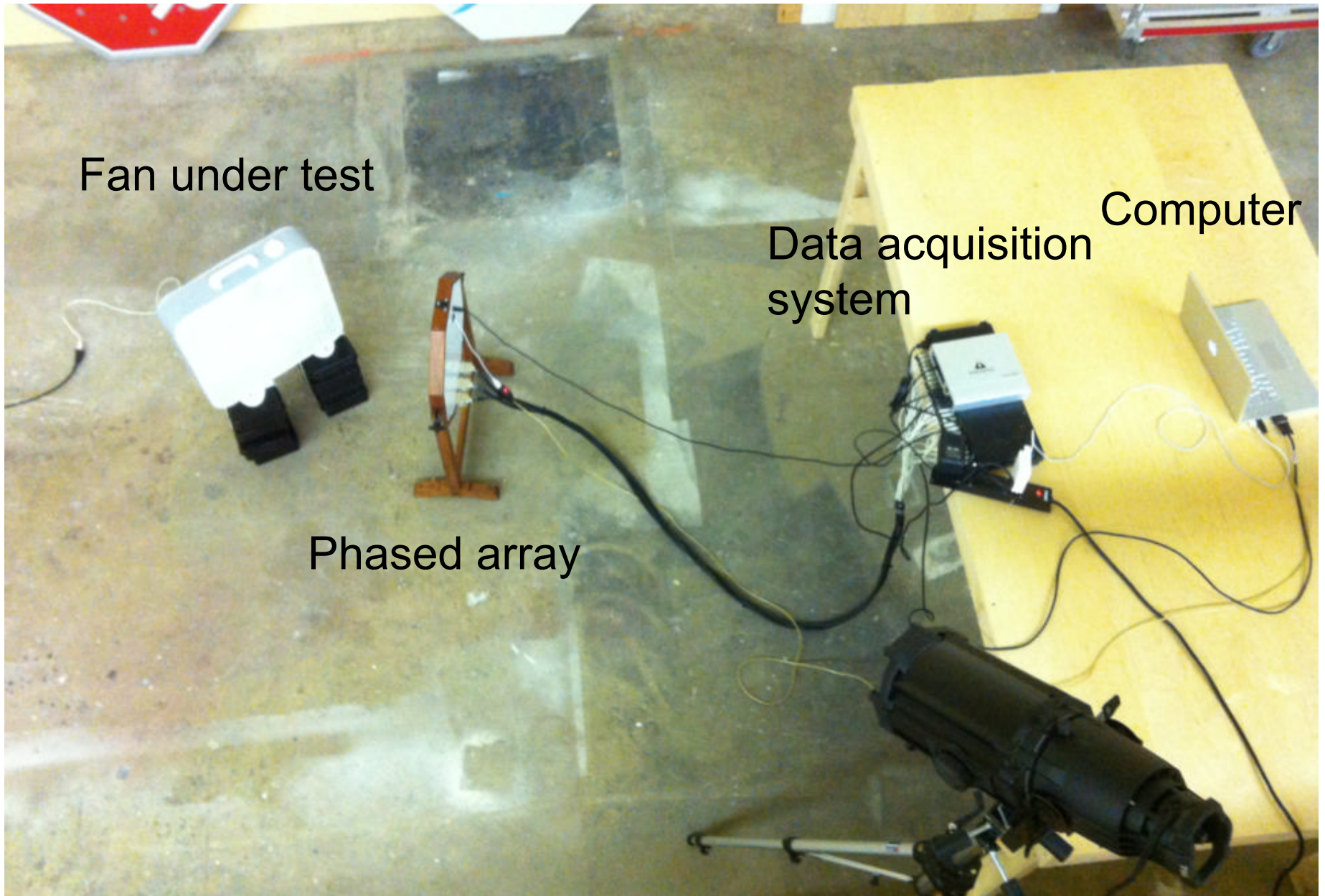


Box Fan Test

Bob Dougherty
President, OptiNav, Inc.

February 2, 2011







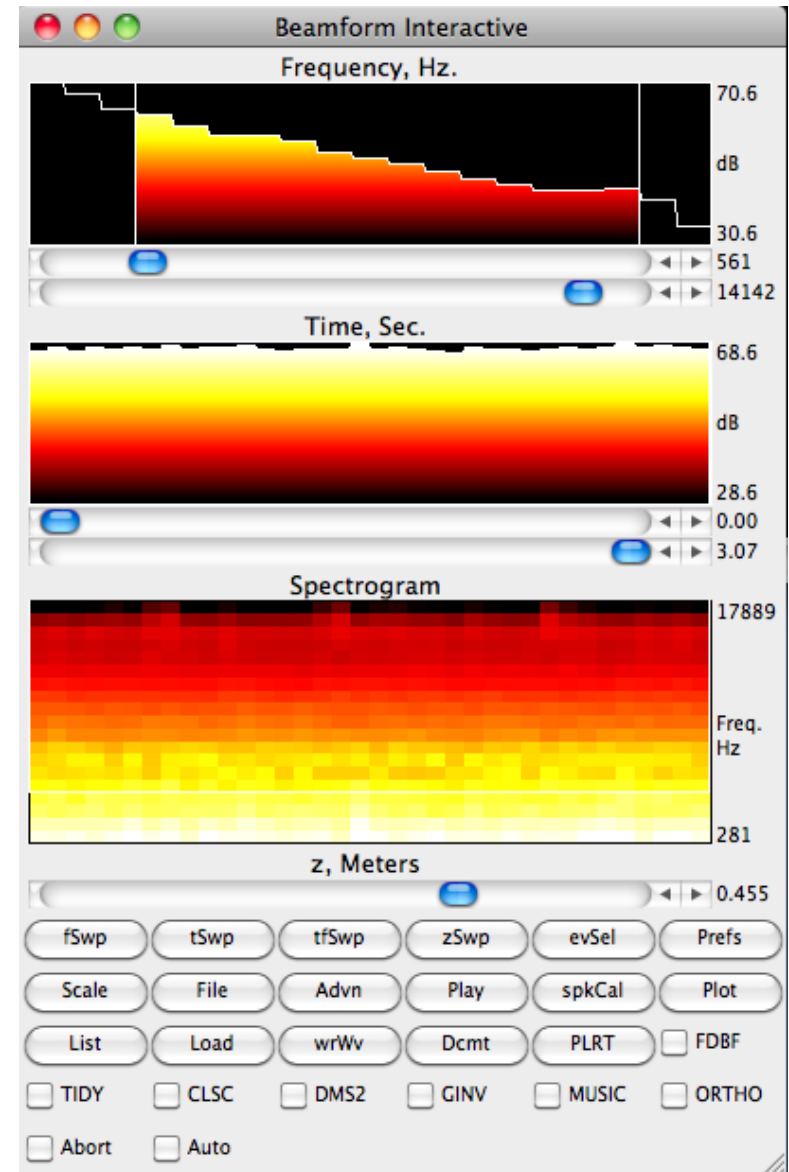
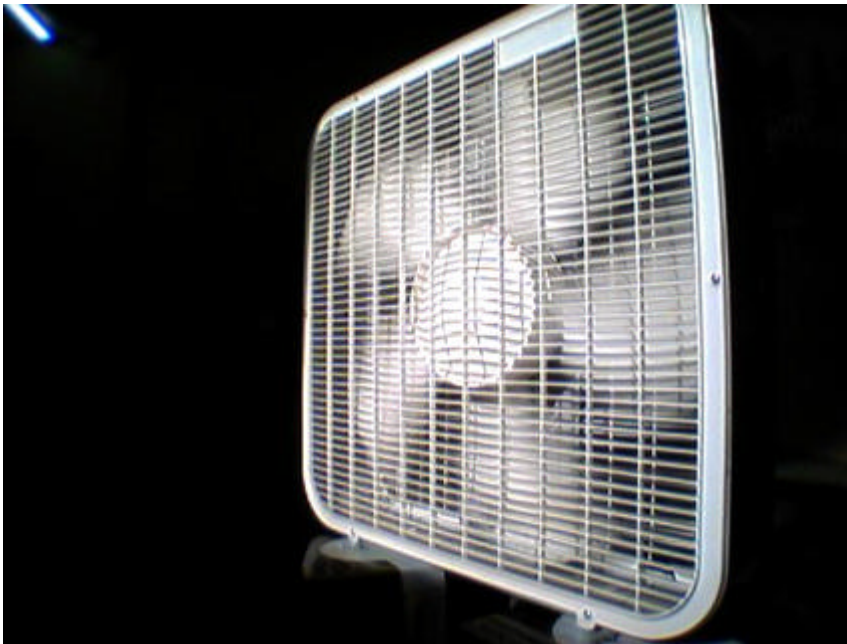
Rear (intake) view



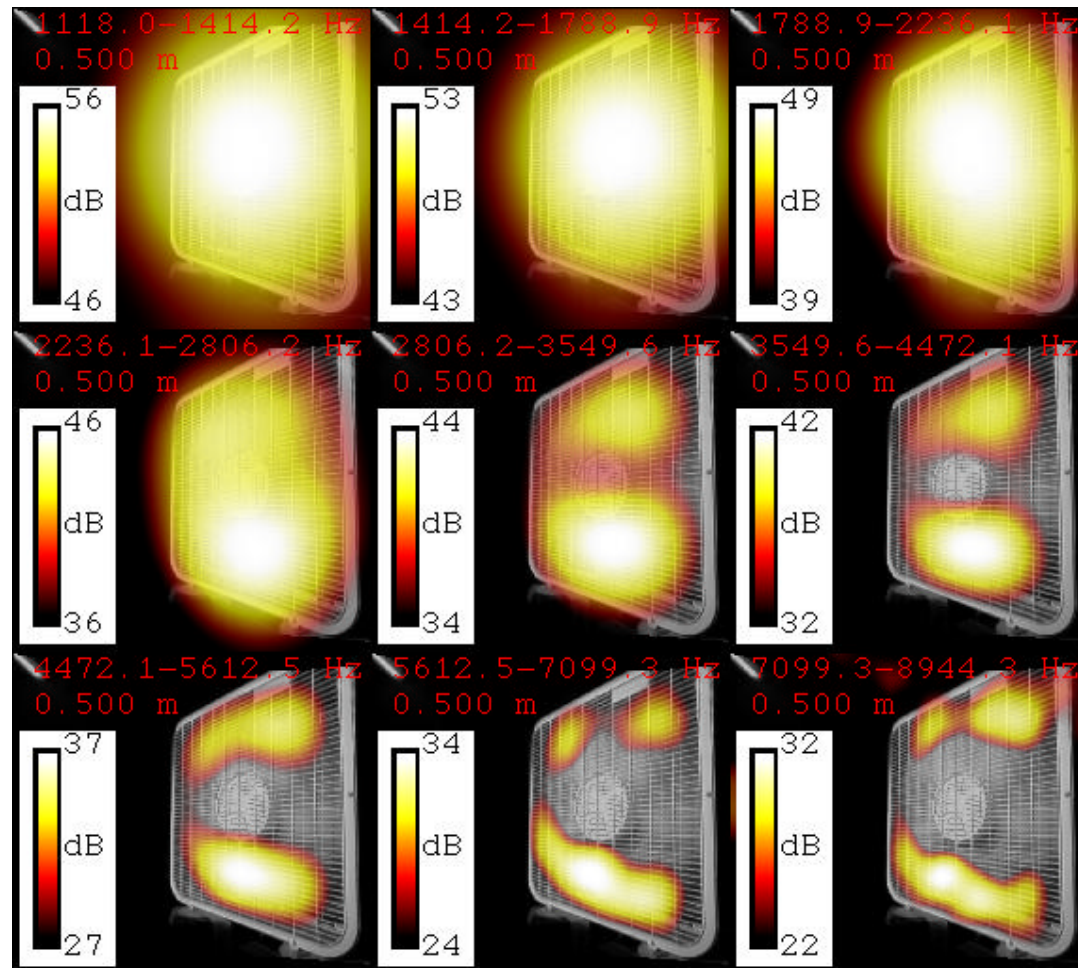
Grilles

Motor support struts

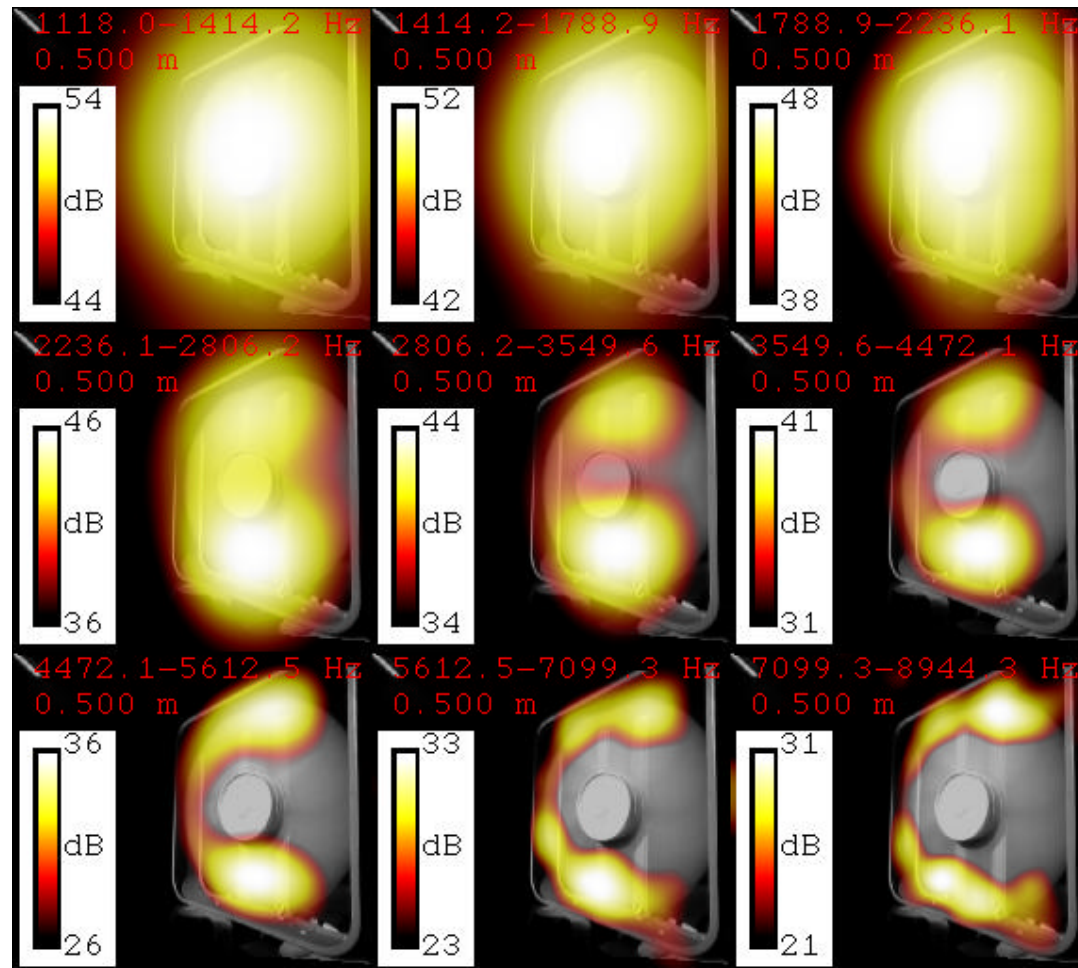
Acquire data and process with beamforming code



Baseline case



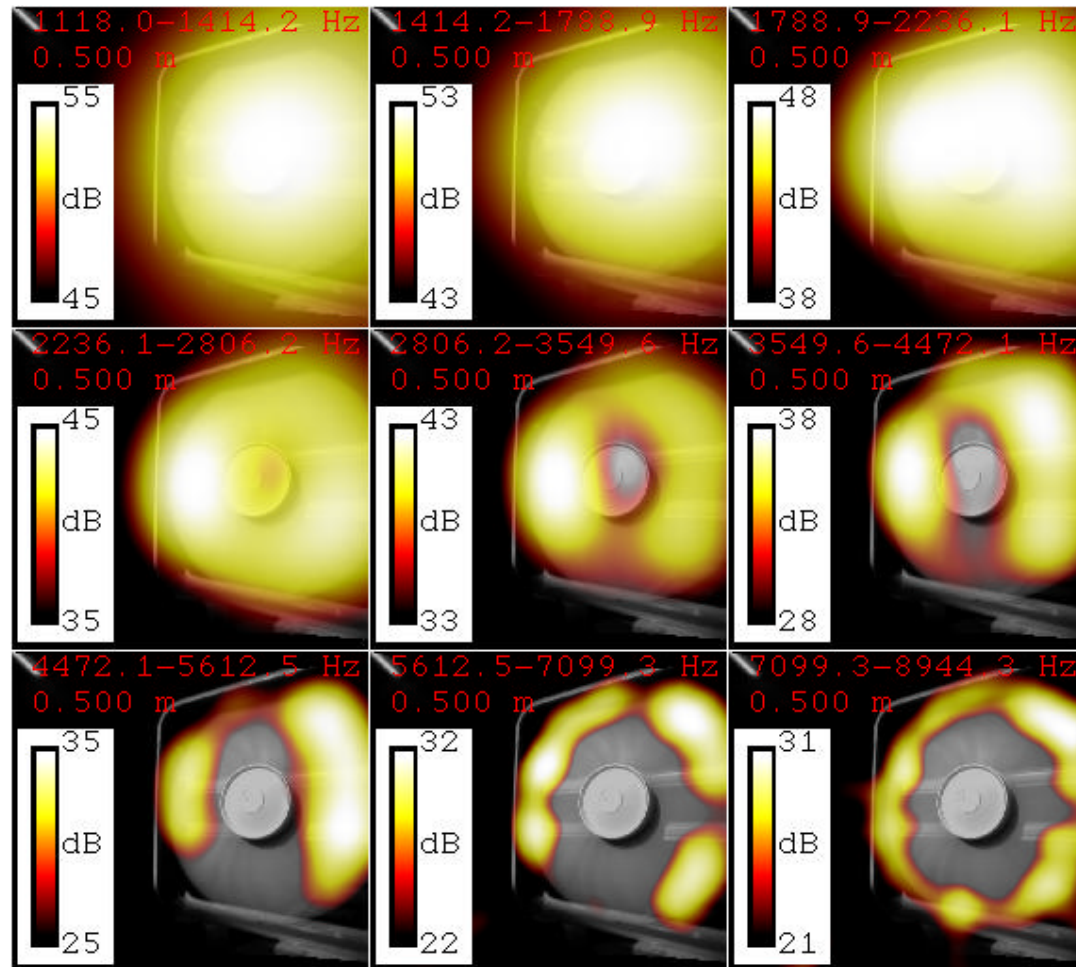
Remove front and rear grilles



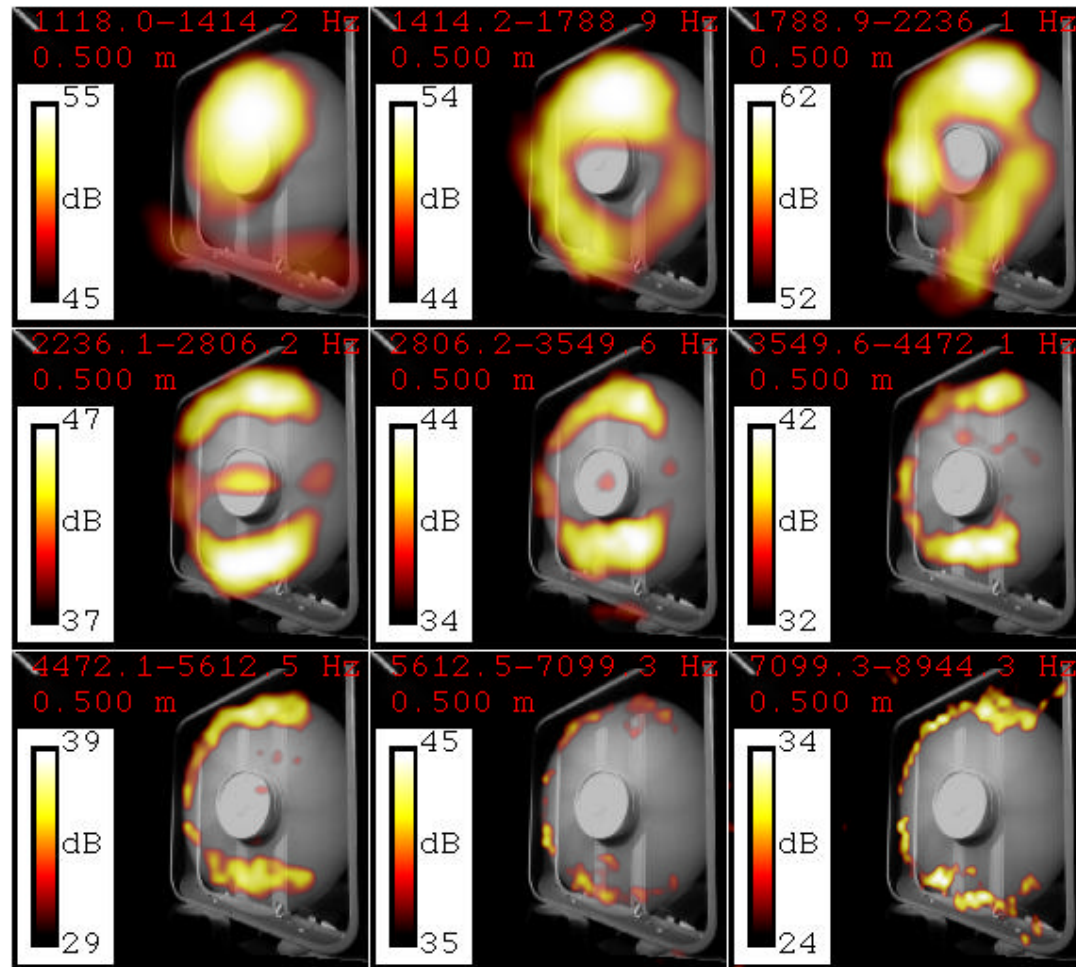
Rotate 90°



Rotate 90°



DAMAS2 deconvolution processing



Primary noise sources

- Below 1414 Hz: motor and vibration at bottom
- 1414-2236 Hz: fan mid span
- 2236-5612 Hz: interaction with motor support struts
- Above 5612 Hz: blade tips
- Front and rear grilles not noise sources

Suggestions

- Consider reversing the flow direction
- Taper the motor support struts
- Increase gap between support struts and blades
- Look at blade aerodynamics in the mid-span region
 - Is there flow separation?