

Infrasonics

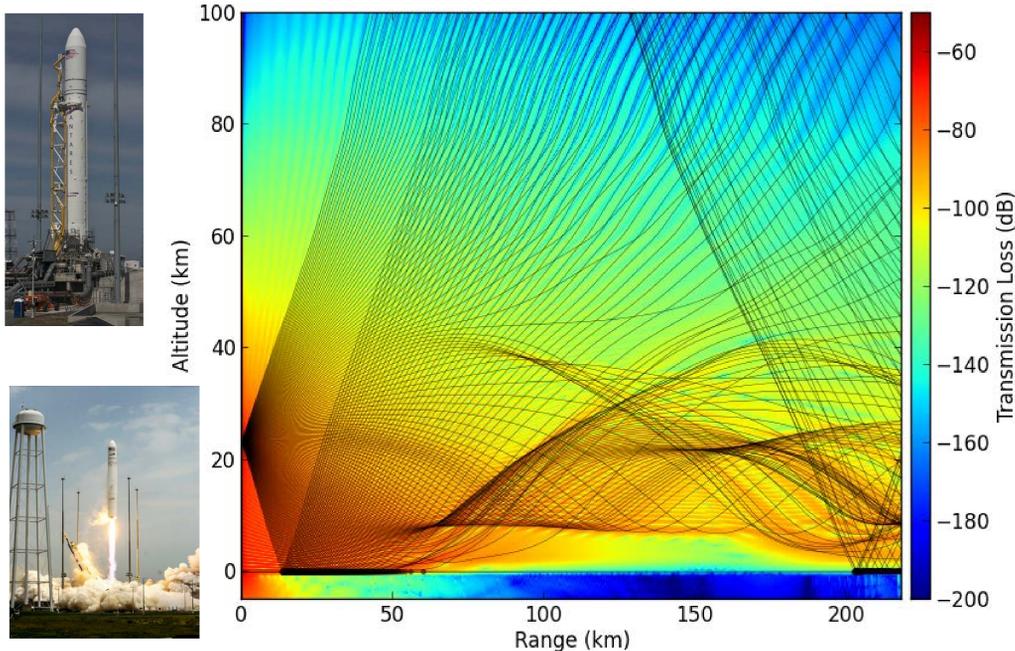


S&T Campaign: Information Sciences
Sensing and Effecting

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Research Objective

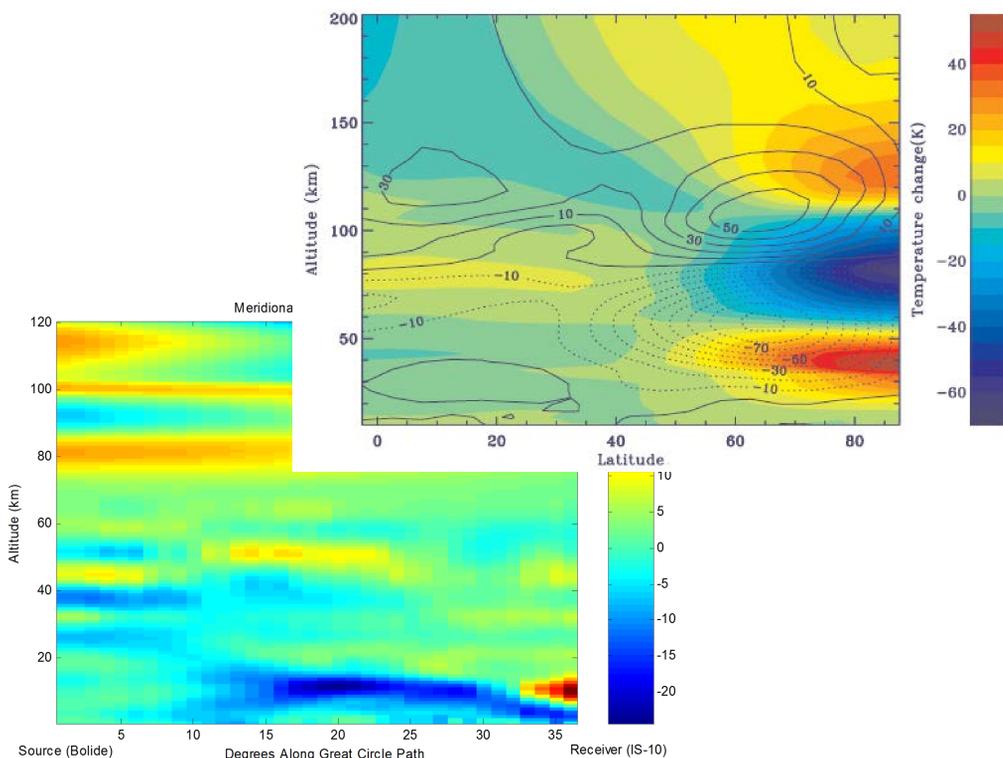
- Development of accurate infrasound propagation models that account for environmental effects.
- Provide realistic atmospheric data cubes for infrasound propagation models from the surface to 180 km AGL.
- Develop models to design and predict performance of novel, portable wind screens for infrasound microphones.



Parabolic equation and ray trace acoustic propagation modeling results from an Antares rocket launch.

Challenges

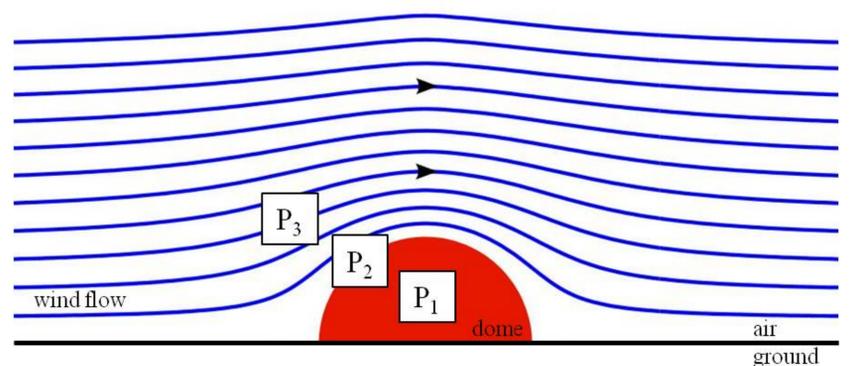
- Incorporation of terrain and large-scale turbulence effects into infrasound propagation models.
- Determining source dynamics for the generation of infrasound signals.
- Determining presence of wake vortices from wind screens.



Slice of temperature with zonal wind contours and meridional wind profiles.

ARL Facilities and Capabilities Available to Support Collaborative Research

- Quiet experimental range located in southern Maryland.
- Innovative infrasound propagation models.
- Suite of atmospheric models to generate atmospheric data cubes anywhere of interest around the globe.
- Porous fabric dome prototypes that have been shown to perform very well as wind screens for infrasound sensors.
- John M. Noble, W.C. Kirkpatrick Alberts, II, Sandra L. Collier, Richard Raspet, and Mark A. Coleman, "Wind Noise Suppression for Infrasound Sensors," ARL Tech Report, ARL-TR-6873, March 2014.
- K. Alberts, S. Tenney, and J. Noble, "Assessment of Operational Progress of NASA Langley Developed Windshield and Microphone for Infrasound," ARL Tech Report, ARL-TR-6417, April 2013.



The turbulent wind flow over a hemispherical wind screen placed on the ground.



Hemispherical wind screens with differing material covers.

Complementary Expertise/ Facilities/ Capabilities Sought in Collaboration

- Time domain wave propagation modeling over large scale terrain features.
- Access to large-scale wind tunnel with variable turbulence fields.
- Modeling capability for a variety of infrasound sources.