

Government Contract Exhibit

This experimental radar network is based on the new technologies and user research conducted by the CASA (Collaborative Adaptive Sensing of the Atmosphere) project. CASA is an NSF Engineering Research Center supported primarily by the Engineering Research Centers Program of the National Science Foundation under **NSF Cooperative Agreement No. EEC-0313747**. University of Massachusetts, Amherst is the lead university of CASA.

Narrative: CASA is dedicated to revolutionizing our ability to observe, understand, predict, and respond to hazardous weather events. The center has pursued an innovative, densely networked radar sensing paradigm to overcome the resolution and coverage limitations of traditional weather radars. The low-power, short-range and close spacing of these radars gives them the ability to scan low to the ground with very high spatial resolution. Overlapping coverage allows each voxel in the network to be simultaneously viewed by two or more radars, allowing for multi-Doppler wind vector retrievals and a solution to the increased attenuation experienced at X-band. The CASA concept and related enabling technologies developed by the CASA enterprise have been validated and evaluated in a prototype system-level test bed located in southwestern Oklahoma. The test bed has been relocated to the DFW Metroplex with the following project goals:

1. To develop high-resolution, two and three-dimensional mapping of current and future atmospheric conditions, focusing on the lower atmosphere, to detect and forecast severe wind, tornado, hail, ice, and flash flood hazards.
2. To create impacts-based, urban-scale warnings and forecasts for a range of public and private decision-makers that result in measureable benefit for public safety and the economy.
3. To demonstrate the value of collaborative, adaptive X-band radar networks to existing and future sensors, products, performance metrics, and decision-making; and assess optimal combinations of observing systems.
4. To develop models for federal/municipal/private partnerships that fund new observation technologies and on-going interdisciplinary weather system research.

The experimental radar network in DFW Metroplex will support the conduct of two recent NSF awards made to CASA:

1. Award Title and number: "Hazard SEES Type 2: Next Generation, Resilient Warning Systems for Tornadoes and Flash Floods", **Award No. AGS-1331572**.

Narrative: This multi-institution project will design, develop, demonstrate and evaluate next-generation, resilient warning systems for rapid-onset hazards, such as tornadoes and flash floods. Using high spatio-temporal observations and short-term forecasts of lower-atmospheric conditions, this system will deliver user-centric, context-aware forecasts and warnings resulting in significant improvements in public response. As technology and its application evolve, and as our understanding of complex interactions among natural hazards, technology and human behavior improves, warnings must also evolve and change. This effort will develop a systems-

level framework and underlying technology, firmly grounded in an understanding of human behavioral response, to leverage these changes to better meet the ultimate goal of improving safety for both people and property.

2. Award Title and number: "CASA Warning System Innovation Institute", **Award No. IIP-1237767.**

Narrative: This NSF Accelerating Innovation Research (AIR) project will create an innovation ecosystem between/among public-private partners to provide weather warning systems, technologies, and processes. Assessing the guidelines for optimal scale of rainfall-runoff and employing high resolution analyses of the current state of the atmosphere will enable pinpointing areas where storm development will occur. Additionally, social science methods will evaluate human response to flood warnings with recommended warning strategies.

Additional information on the project can be obtained by contacting:

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