Acoustic Tomography System

Cooperative Research and Development Final Report

CRADA Number: CRD-12-00480, Project 8, Modification 7

NREL Technical Contact: Patrick Moriarty

NREL is a national laboratory of the U.S. Department of Energy
Office of Energy Efficiency & Renewable Energy
Operated under Contract No. DE-AC36-08GO28308

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Technical Report
NREL/TP-5000-97626
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NOTICE

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Cooperative Research and Development Final Report

Report Date: September 9, 2025

In accordance with requirements set forth in the terms of the CRADA agreement, this document is the CRADA final report, including a list of subject inventions, to be forwarded to the DOE Office of Scientific and Technical Information as part of the commitment to the public to demonstrate results of federally funded research.

Parties to the Agreement: University of Colorado Boulder

CRADA Number: CRD-12-00480-7, Project 8, Modification 7

CRADA Title: Acoustic Tomography System

Responsible Technical Contact at NREL:

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Sponsoring DOE Program Office(s):

Office of Energy Efficiency and Renewable Energy (EERE), Wind Energy Technologies Office

Joint Work Statement Funding Table showing DOE commitment:

No NREL Shared Resources.

Estimated Costs	NREL Shared Resources a/k/a Government In-Kind
Year 1	$.00
Year 2, Modification #1	$.00
Year 3, Modification #2	$.00
Year 4, Modification #3	$.00
TOTALS	$.00

Executive Summary of CRADA Work:

NREL will install the University of Colorado Cooperative Institute for Research in Environmental Sciences (CU/CIRES) acoustic tomography array at the National Wind Technology Center (NWTC).

CRADA benefit to DOE, Participant, and US Taxpayer:

- Assists laboratory in achieving programmatic scope, and
- Adds new capability to the laboratory's core competencies

Summary of Research Results:

Statement of Work

NREL will install the CU/CIRES acoustic tomography array at the National Wind Technology Center (NWTC). The system consists of 9 freestanding towers of 9.1m height that are currently located at the NWTC. On these towers are installed a series of microphones and speakers. One center tower holds a sonic anemometer and temperature probe. The purpose of the acoustic tomography system is to measure complex flow fields surrounding wind turbine arrays that influence wind farm energy production and reliability. There is currently no funding to test and research the system (just install it), but NREL and CU researchers will write proposals that will fund the actual research with this unique measurement technology.

Task Descriptions

The project will involve the following steps:

1. Design/safety review of system installation
2. Install conduit and run instrument cables to nearest data shed
3. Pour foundations
4. Install towers
5. Assemble speakers, microphones, data acquisition and control systems and other instruments
6. System checkout and adjustment

The work completed under this CRADA has been documented in Section 3 of the following report published on OSTI as "Acoustic Travel-Time Tomography for Wind Energy," OSTI ID: 1907063. A link to the technical report is provided: https://www.osti.gov/biblio/1907063

Subject Inventions Listing: None

ROI#: None