

Objectives

To transition various DOD radar systems technology to develop an advanced, mobile scientific instrument for atmospheric research



MWR-05XP Deployed on the Goshen WY Tornado during Vortex 2

NPS Project Contributions

- **System Hardware and Maintenance:** NPS integrated system components onto the mobile platform and performs ongoing system maintenance.
- **Theoretical Analysis:** NPS derived and will experimentally verify calibration and parameter estimation algorithms for frequency agile, phased array radars.
- **System Calibration:** NPS is calibrating the radar.
- **System Operation, Test and Evaluation:** NPS operates the radar, uses the radar in on-going experiments and evaluates results to identify new research problems.

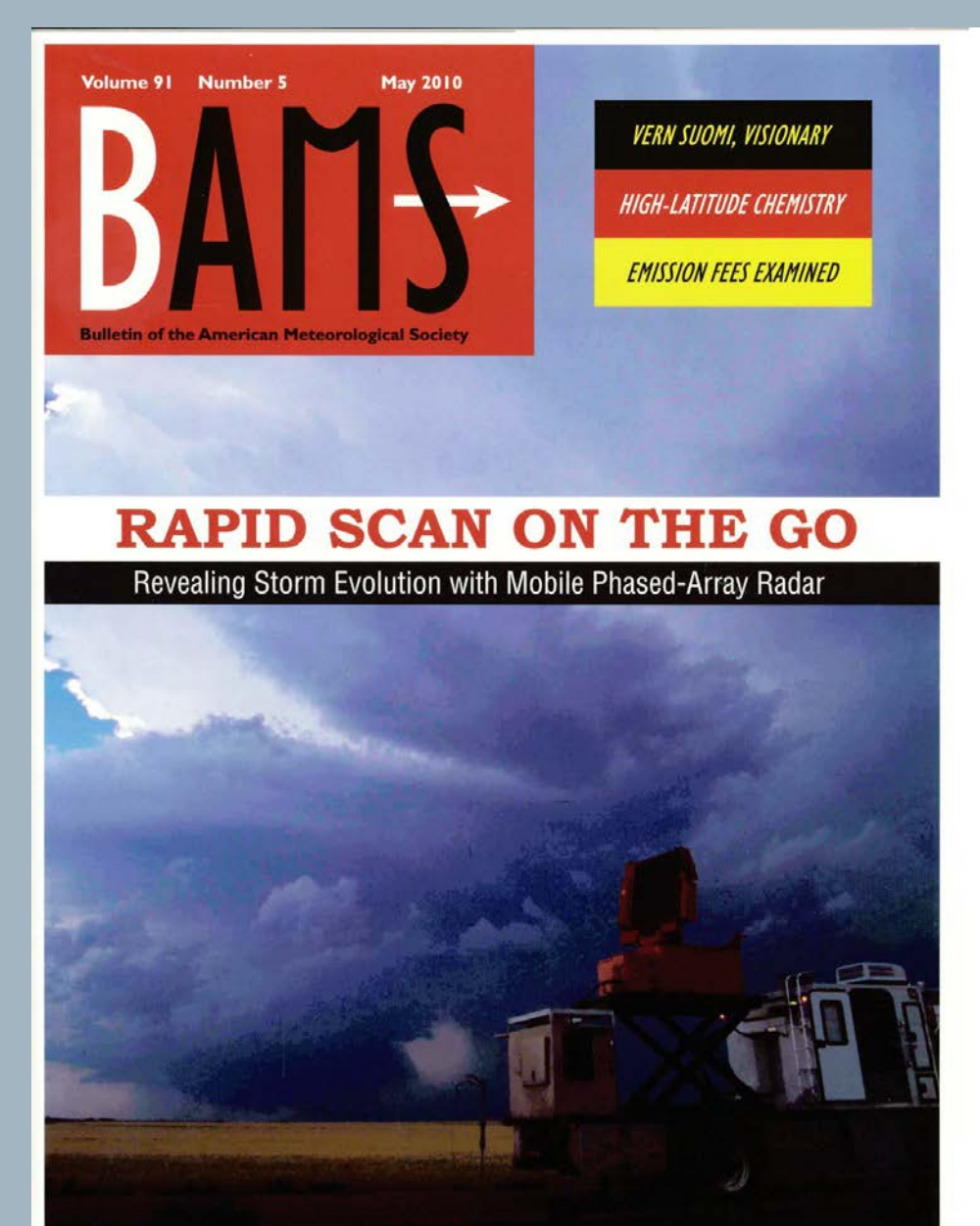
Technical Challenges: High-speed digital processing and real-time display of weather data; calibration of frequency agile, phased array radars; weather signal parameter estimation algorithms for frequency agile, phased array weather radars; data quality control; rapid volumetric update rate for observation of short (seconds) time scale atmospheric phenomena.

[1] "A Mobile, Phased-Array Doppler Radar for the study of Severe Convective Storms – The MWR-05XP. Bulletin of the American Meteorological Society BAMS May 2010 Volume 91 Number 5. Howard B. Bluestein, Michael M. French, Ivan PopStefanija, Robert T. Bluth and Jeffrey B. Knorr.

[2] Bluestein, et al., "Preliminary Results from the Fielding of a Disparate Triad of Mobile Doppler Radars to Study Severe Convective Storms", **33rd International Conf. on Radar Meteorology**, Cairns, Australia, August 6-10, 2007.

http://ams.confex.com/ams/33Radar/techprogram/paper_122770.htm.

[3] J. B. Knorr, "Weather Radar Equation Correction for Frequency Agile and Phased Array Radars", **IEEE Transactions on Aerospace and Electronic Systems**, July 2007.



Publication in Review

"Reexamining the descending midlevel tornadic vortex signature in supercells" Mon. Wea. Rev. (in review) M.M. French, H.B. Bluestein, I. PopStefanija, C.A. Baldi, and R.T. Bluth, 2013



Full Systems



TPQ-37 in the process of being transferred from the US Army to CIRPAS

Radar Specifications:

Antenna	Phased Array 90 Degree Sector Search/Track	
Frequency	S-Band	3 to 3.5 GHz
Power	130KW Peak	
PRF	Variable	
PW	1-10usec	



MPQ-53
C-Band System



SPY-1 S-Band System – Antenna being removed from a ship. These systems or subsystems are available to DOD through a transfer process.



AWACS C-130 Version



A10 currently being modified to support the research community

System Components

Transmitters

Support Subsystems

Engineering Development and Data

Aviation Applications

CIRPAS
Department of Electrical & Computer Engineering
Graduate School of Engineering & Applied Sciences

Paul D. Buczynski
ECE Department
(831) 656-2345
pbuczynski@nps.edu

Robert Bluth, Director
CIRPAS Research Center
(831) 384-2776 X10
rtbluth@nps.edu

<http://www.cirpas.org/>