unclassified
SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

Form Approved OMB No. 0704-0188

1a. REPORT SECURITY CLASSIFICATION: Unclassified	1b. RESTRICTIVE MARKINGS
2a. SECURITY CLASSIFICATION AUTHORITY	3. DISTRIBUTION/AVAILABILITY OF REPORT: Approved for public release; distribution unlimited
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE	
4. PERFORMING ORGANIZATION REPORT NUMBER(S)	5. MONITORING ORGANIZATION REPORT NUMBER(S): AFOSR-TR- 95-0297
6a. NAME OF PERFORMING ORGANIZATION: Clemson University; 6b. OFFICE SYMBOL (If applicable)	7a. NAME OF MONITORING ORGANIZATION: AFOSR/~~NL~~ NM
6c. ADDRESS (City, State, and ZIP Code): Sponsored Programs, College Station Box 345355, Clemson, SC 29634-5355	7b. ADDRESS (City, State, and ZIP Code): James T. Kroll, Major, Bldg. 410, Bolling AFB, DC 20332
8a. NAME OF FUNDING/SPONSORING ORGANIZATION: AFOSR; 8b. OFFICE SYMBOL (If applicable): ~~NL~~ NM	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER: F49620-93-1-0552
8c. ADDRESS (City, State, and ZIP Code): Bldg. 410, Bolling AFB, DC 20332	10. SOURCE OF FUNDING NUMBERS: PROGRAM ELEMENT NO. 61103D; PROJECT NO. 3484; TASK NO. BS; WORK UNIT ACCESSION NO.

11. TITLE (Include Security Classification): A Proposal to Acquire a 915 MHz Doppler/Interferometer Radar System: Final Report (unclassified)

12. PERSONAL AUTHOR(S): M.F. Larsen

13a. TYPE OF REPORT	13b. TIME COVERED	14. DATE OF REPORT (Year, Month, Day)	15. PAGE COUNT
Final Technical	FROM 9/15/93 TO 9/14/94	1995/03/20	6

16. SUPPLEMENTARY NOTATION: None

17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
FIELD	GROUP	SUB-GROUP	wind profilers, clear-air radar measurements, vertical velocity measurements

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

Funds were granted to Clemson University to acquire and install a UHF radar interferometer system for measurements of winds, waves, and turbulence parameters in the atmospheric boundary layer. The radar equipment was acquired, and the system has been installed at a site approximate five miles from the main campus. The Doppler radar wind profiling and interferometric capabilities of the system have been tested.

20. DISTRIBUTION/AVAILABILITY OF ABSTRACT: ☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT. ☐ DTIC USERS	21. ABSTRACT SECURITY CLASSIFICATION: unclassified
22a. NAME OF RESPONSIBLE INDIVIDUAL: James Kroll, Major	22b. TELEPHONE (Include Area Code): (202) 767-5021; 22c. OFFICE SYMBOL: ~~NL~~ NM

DD Form 1473, JUN 86 — Previous editions are obsolete. — SECURITY CLASSIFICATION OF THIS PAGE

Abstract

Funds were granted to Clemson University to acquire and install a UHF radar interferometer system for measurements of winds, waves, and turbulence parameters in the atmospheric boundary layer. The radar equipment was acquired, and the system has been installed at a site approximately five miles from the main campus. The Doppler radar wind profiling and interferometric capabilities of the system have been tested.

Final Technical Report

A Proposal to Acquire a 915 MHz Doppler/Interferometer Radar System

DEPSCoR Grant # F49620-93-1-0552

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Report Submitted: 20 Mar 1995

Progress Report

Funds were granted to Clemson University under DEPSCoR Grant # F49620-93-1-0552 to acquire and install a 915-MHz radar interferometer system at a location near the main campus. The radar equipment was purchased from Radian Corporation located in Boulder, Colorado, and delivered to Clemson University at the beginning of June 1994.

The original proposal involved the procurement of a 915-MHz radar interferometer system. The 915-MHz frequency is one of the standard frequencies used by Radian Corporation for their boundary layer radar wind profilers. The Clemson system required modifications by Radian to include four additional spaced receiving antennas and the associated data acquisition required to operate in the interferometry mode. At the time when the purchase was being negotiated, Radian had just completed the development and construction of some of the first 1290-MHz radar systems. It therefore became possible for us to acquire a 1290-MHz system rather than the originally anticipated 915-MHz system. We decided to opt for the higher frequency since the system was functionally equivalent in all respects to the lower-frequency system but would provide the possibility of collocating the radar with other boundary layer radars operating at 915 MHz as opportunities arise in the future.

The system that was purchased includes the transmitter and multiplexed receiver capable of sampling five separate receiving antennas. The data acquisition hardware consists of a PC with A/D boards for digitizing and sampling the received signals, array processor boards for on-line signal integration, and pulse generating boards. The transmitter is capable of producing 800 Watts peak power and 100 m range gates. The antenna configuration consists of a main phased array that produces five beam directions including vertical and 18° off-vertical in each of the four main cardinal directions. The main antenna is capable of both transmission and reception and measures approximately 2 m x 2 m. The four additional receiving antennas are phased to look in the vertical direction only and measure approximately 1 m x 1 m.

The system was installed during the third week in June and has been operating at the location since that date. The site that was chosen for the radar installation is a newly developed observatory located within the Fants Grove Wildlife Management area operated by the Forestry School of Clemson University. The location is within five miles of campus but is isolated from electromagnetic interference and from light pollution. Commercial power is available at the site. Telephone and water lines approach the edge of the property so that additional utilities can easily be installed in the future. In all, four to five acres are available at the observatory for future expansion.

COMPLETED PROJECT SUMMARY

TITLE: A Proposal to Acquire a 915-MHz Doppler/Interferometer Radar System

PRINCIPAL INVESTIGATOR:

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INCLUSIVE DATES: 15 September 1993 to 14 September 1994

CONTRACT/GRANT NUMBER: F49620-93-1-0552

SENIOR RESEARCH PERSONNEL: M. F. Larsen

JUNIOR RESEARCH PERSONNEL: None

PUBLICATIONS: None

ABSTRACT OF OBJECTIVES AND ACCOMPLISHMENTS:

Funds were granted to Clemson University to acquire and install a UHF radar interferometer system for measurements of winds, waves, and turbulence parameters in the atmospheric boundary layer. The radar equipment was acquired, and the system has been installed at a site approximately five miles from the main campus. The Doppler radar wind profiling and interferometric capabilities of the system have been tested.