

Sandy Supplemental Grant Recipient Quarterly Progress Report

**Network of Direct Broadcast Antenna Systems to Provide Real-Time
Infrared and Microwave Sounder Data to NOAA for Numerical
Weather Prediction**

Award Number: NA13NES4830007

The National Oceanic and Atmospheric Administration
National Environmental Satellite Data and Information Service
Center for SaTellite Applications and Research (STAR)

For the Period
1 January 2015 – 31 March 2015

On behalf of
The Cooperative Institute for Meteorological Satellite Studies (CIMSS)
Space Science and Engineering Center (SSEC)
at the University of Wisconsin-Madison
1225 West Dayton Street
Madison, Wisconsin 53706
608/262-0544

Liam Gumley
Principal Investigator
Liam.Gumley@ssec.wisc.edu

**Sandy Supplemental Grant Recipient Quarterly Progress Report
Network of Direct Broadcast Antenna Systems to Provide Real-Time
Infrared and Microwave Sounder Data to NOAA for Numerical
Weather Prediction**

Table of Contents

I. Introduction	3
Cooperative Institute Description	3
CI Management and Organizational Structure	3
Executive Summary of CI Banner Research Activities	4
II. Funded Project	5
Award Number: NA13NES4830007	5
Project Title: Network of Direct Broadcast Antenna Systems to Provide Real-Time Infrared and Microwave Sounder Data to NOAA for Numerical Weather Prediction.....	5
PI: Liam Gumley.....	5
NOAA Sponsor: Mitch Goldberg, NOAA/NESDIS	5
NOAA Collaborator: Timothy J. Schmit, NOAA/NESDIS/STAR	5
NOAA Sponsoring Organization: NOAA NESDIS	5
Reporting Period: 1 October 2014 – 31 December 2014.....	5
Description of Task I Activities	5
NOAA Strategic Goal(s).....	5
Research Progress	5

Sandy Supplemental Grant Recipient Quarterly Progress Report Network of Direct Broadcast Antenna Systems to Provide Real-Time Infrared and Microwave Sounder Data to NOAA for Numerical Weather Prediction

I. Introduction

Cooperative Institute Description

The Cooperative Institute for Meteorological Satellite Studies (CIMSS) is a collaborative relationship between the National Oceanic and Atmospheric Administration (NOAA) and the University of Wisconsin-Madison (UW-Madison). This partnership has and continues to provide outstanding benefits to the atmospheric science community and to the nation through improved use of remote sensing measurements for weather forecasting, climate analysis and monitoring environmental conditions. Under the auspices of CIMSS, scientists from NOAA/NESDIS and the UW-Madison Space Science and Engineering Center (SSEC) have a formal basis for ongoing collaborative research efforts. CIMSS scientists work closely with the NOAA/NESDIS Advanced Satellite Product Branch (ASPB) stationed at the UW-Madison campus. This collaboration includes a scientist from the National Climate Data Center (NCDC), who joined the NOAA NESDIS employees stationed at CIMSS.

CIMSS conducts a broad array of research and education activities, many of which are projects funded through this Cooperative Agreement with NOAA. This Cooperative Agreement identifies four CIMSS themes:

1. Satellite Meteorology Research and Applications, to support weather analysis and forecasting through participation in NESDIS product assurance and risk reduction programs and the associated transitioning of research progress into NOAA operations,
2. Satellite Sensors and Techniques, to conduct instrument trade studies and sensor performance analysis supporting NOAA's future satellite needs as well as assisting in the long term calibration and validation of remote sensing data and derived products,
3. Environmental Models and Data Assimilation, to work with the Joint Center for Satellite Data Assimilation (JCSDA) on improving satellite data assimilation techniques in operational weather forecast models, and
4. Outreach and Education, to engage the workforce of the future in understanding and using environmental satellite observations for the benefit of an informed society.

CI Management and Organizational Structure

CIMSS resides as an integral part of the Space Science and Engineering Center (SSEC). CIMSS is led by its Director, Dr. Steven Ackerman, who is also a faculty member within the UW-Madison Department of Atmospheric and Oceanic Sciences. Executive Director – Science Wayne Feltz provides day-to-day oversight of the CIMSS staff, science programs, and facilities. The individual science projects are led by University Principal

Investigators (PIs) in conjunction with a strong and diverse support staff who provide additional expertise to the research programs. CIMSS is advised by a Board of Directors and a Science Advisory Council.

The CIMSS administrative home is within the Space Science and Engineering Center (SSEC), a research and development center within the UW–Madison’s Graduate School. The independent CIMSS 5-year review panel for administration wrote that they were “...impressed by the people, systems and processes in place.” The SSEC mission focuses on geophysical research and technology to enhance understanding of the Earth, other planets in the Solar System, and the cosmos. To conduct its science mission on the UW-Madison campus, SSEC has developed a strong administrative and programmatic infrastructure. This infrastructure serves all SSEC/CIMSS staff.

The CIMSS administrative home is within the Space Science and Engineering Center (SSEC), a research and development center within the UW–Madison’s Graduate School. The SSEC mission focuses on geophysical research and technology to enhance understanding of the Earth, other planets in the Solar System, and the cosmos. To conduct its science mission on the UW-Madison campus, SSEC has developed a strong administrative and programmatic infrastructure. This infrastructure serves all SSEC/CIMSS staff.

The CIMSS mission includes three goals:

- Foster collaborative research among NOAA, NASA, and the University in those aspects of atmospheric and earth system science that exploit the use of satellite technology;
- Serve as a center at which scientists and engineers working on problems of mutual interest can focus on satellite-related research in atmospheric and earth system science;
- Stimulate the training of scientists and engineers in the disciplines involved in atmospheric and earth sciences.

Executive Summary of CI Banner Research Activities

CIMSS is a collaboration between NOAA and UW–Madison that has increased the effectiveness of research and the quality of education in the environmental sciences. In a *Space Policy* article in 1986, William Bishop, former acting Director of NESDIS, noted, “Remote sensing from space can only thrive as a series of partnerships.” He used CIMSS as a positive working example of the government-academia partnership, noting “The Institute pioneered the computation of wind speeds at cloud heights by tracking cloud features from image to image. These are now a stable product provided from the satellites to the global models at the National Meteorological Center.” CIMSS continues to be a leader in the measurement of winds from satellite observations and leads the way in many other research endeavors as outlined above. There is great value to NOAA and UW-Madison in this long-term collaboration known as CIMSS.

II. Funded Project

Award Number: NA13NES4830007

Project Title: Network of Direct Broadcast Antenna Systems to Provide Real-Time Infrared and Microwave Sounder Data to NOAA for Numerical Weather Prediction

PI: Liam Gumley

PM: Kathy Strabala

NOAA Sponsor: Mitch Goldberg, NOAA/NESDIS

NOAA Collaborator: Timothy J. Schmit, NOAA/NESDIS/STAR

NOAA Sponsoring Organization: NOAA NESDIS

Reporting Period: 1 January 2015 – 31 March 2015

Description of Task I Activities

Primarily activity involves quarter reporting.

NOAA Strategic Goal(s)

NOAA Mission Goals

1. Climate Adaptation and Mitigation: An informed society anticipating and responding to climate and its impacts
2. Weather-Ready Nation: Society is prepared for and responds to weather-related events

NOAA Strategic Plan-Mission Goals

1. Serve society's needs for weather and water
2. Understand climate variability and change to enhance society's ability to plan and respond
3. Provide critical support for the NOAA mission

Research Progress

The Space Science and Engineering Center at the University of Wisconsin-Madison proposes to operate a network of direct broadcast satellite data reception stations to acquire and process infrared and microwave sounder data from polar orbiting meteorological satellites and deliver the resulting products to NOAA with low latency for assimilation in NCEP numerical weather prediction models.

General Direct Broadcast Antenna Progress

1. Ingest of SNPP sounder data from GINA at UAF is now operational.
2. Ingest of Aqua AIRS and AMSU data NRL Monterey is now operational

3. The equipment rack at HCC in Honolulu was moved to a new location with much better cooling and it quality. SSEC organized all the logistics for new electrical and network connections; server cleaning, and rack shutdown/move/powerup. The system is now running again in the new location.

4. Team continued to work on resolving BUFR format issues with NCEP, which uses non-standard internally developed BUFR tables. As of April 2015, all issues had been resolved and CrIS, ATMS, HIRS, AMSU, MHS, and AIRS products were being delivered to NCEP and decoded into the internal BUFR tank files for evaluation. Remaining issues with IASI BUFR formatting are being worked.

5. DBRTN team developed and tested a Docker container for distributing and running the AAPP and OPS-LRS processing stack.

6. DBRTN began ingest of SNPP sounder data from CCNY.

7. Met with EUMETSAT to discuss details of how DBRTN data will be delivered to EARS for retransmission. The data will be pushed to EUMETSAT in standard AAPP BUFR formats.

NOAA/Atlantic Oceanographic and Meteorological Laboratory (AOML), Miami FL

NOAA/Atlantic Oceanographic and Meteorological Laboratory
4301 Rickenbacker Causeway
Miami, FL 33149

Latitude: 25.734 N

Longitude: 80.162 W

Elevation in Feet: 4 m

Elevation Mask: TBD (depending on installation site)

1. DBRTN is now ingesting data from SNPP, Metop, NOAA, and Aqua sounders from the new antenna at AOML Miami

2. DBRTN team presented a workshop on SNPP satellite data and applications at AOML Miami, and it was attended by AOML, NWS, and NOAA Fisheries staff.

UPR-Mayaguez, Puerto Rico

Latitude: 18.201 N

Longitude 67.143 W

Elevation: 12 m

Elevation Mask: TBD

1. Engineering contractor visited UPR-Mayaguez to sort details of installation for new antenna. “The trip was successful and we were able to accomplish our goals. Rafael was very helpful and accommodating throughout the process. We were also able to meet with a potential contractor as well as our local engineering contact. We measured up the existing platform, roof, etc... The platform structural members are in decent shape but the platform itself will need some modifications for the new installation as we

anticipated. Below is a link to the photos we took. We are now working on the plans for the improvements.”