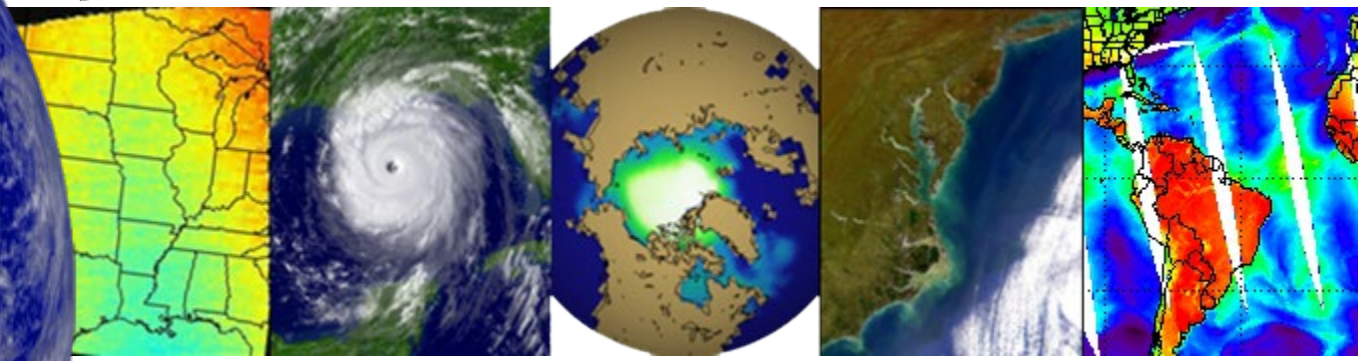
Cooperative Research Program (CoRP)

A Division of NESDIS' Center for Satellite Applications and Research (STAR)

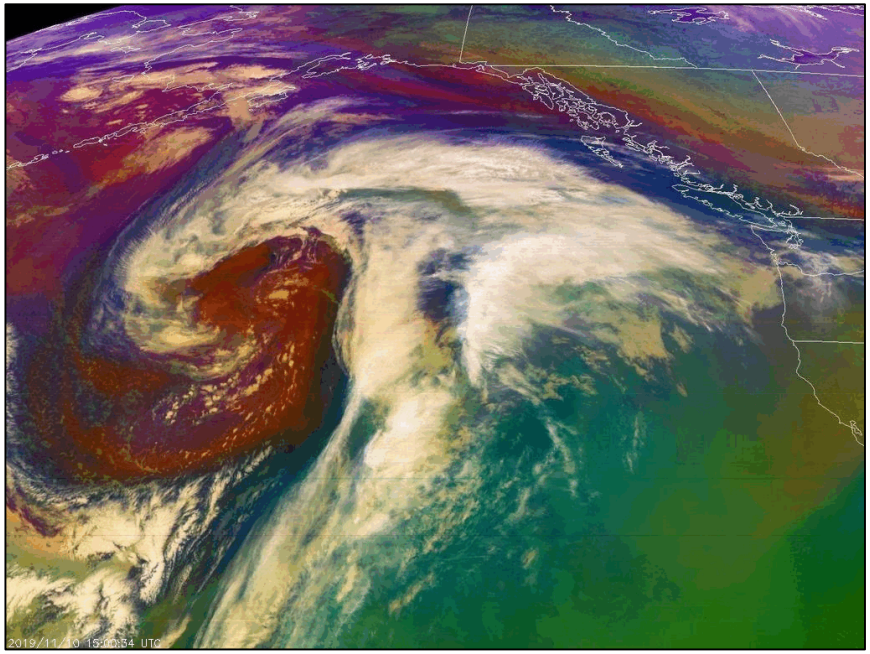
Christopher Brown Director, CoRP



CISESS Science Meeting, November 12-14, 2019

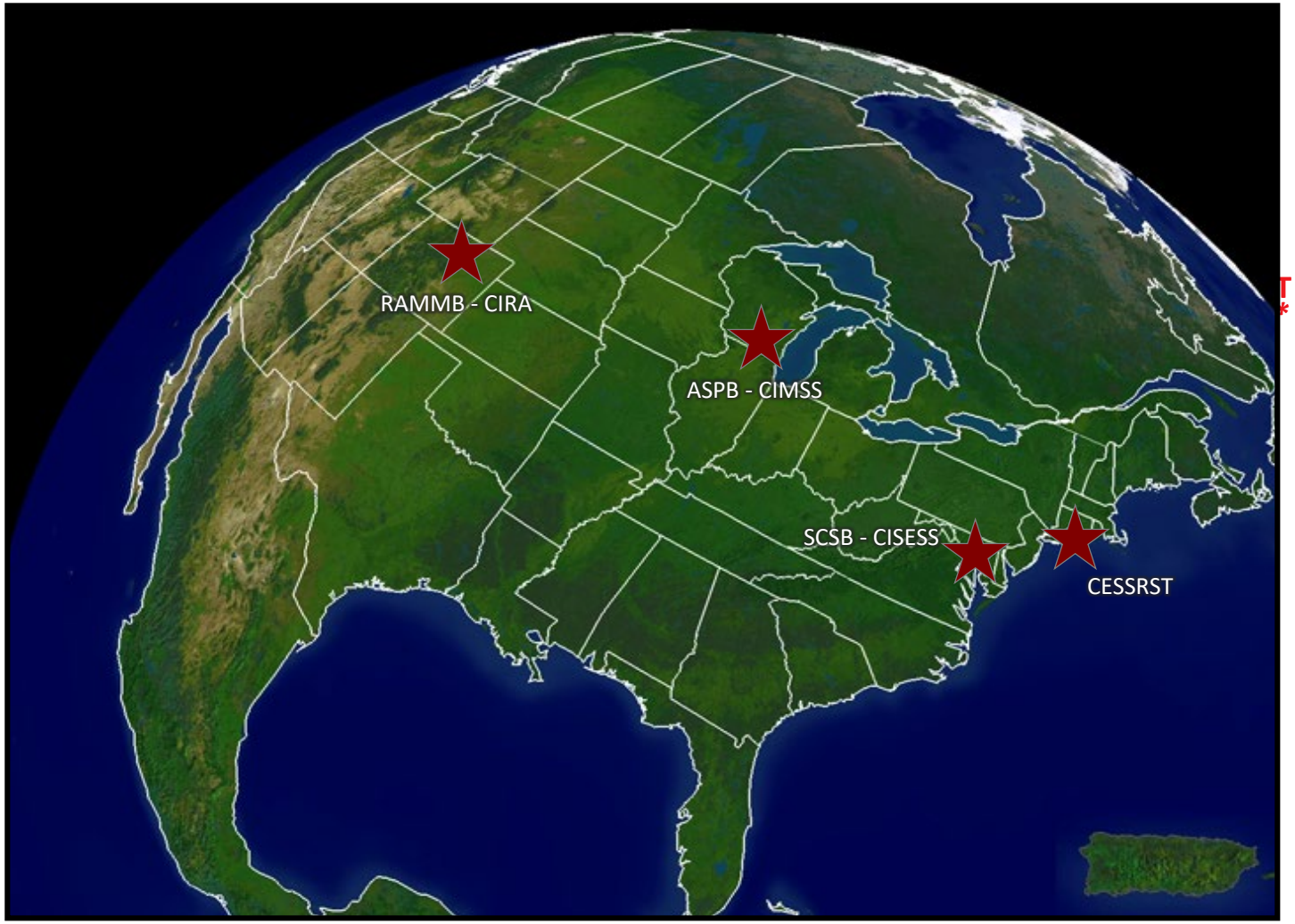
CoRP Activities

- Administers and manages cooperative institutes and cooperative science center
- Processes NESDIS Grants
- Supervises STAR branches collocated at CIs
- Leads scientific efforts
- Collaborates with CI scientists



Animation: A mid-latitude cyclone brings an atmospheric river to British Columbia - GOES-17 Airmass RGB - HTML5 Loop from November 11, 2019. (Courtesy of RAMMB/CIRA)

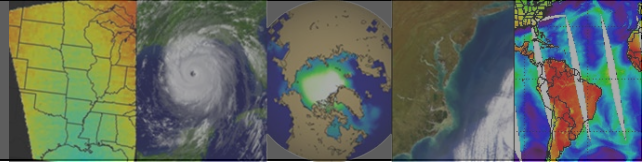
Geographical Locations of Collocated STAR Branches – CIs and CSC



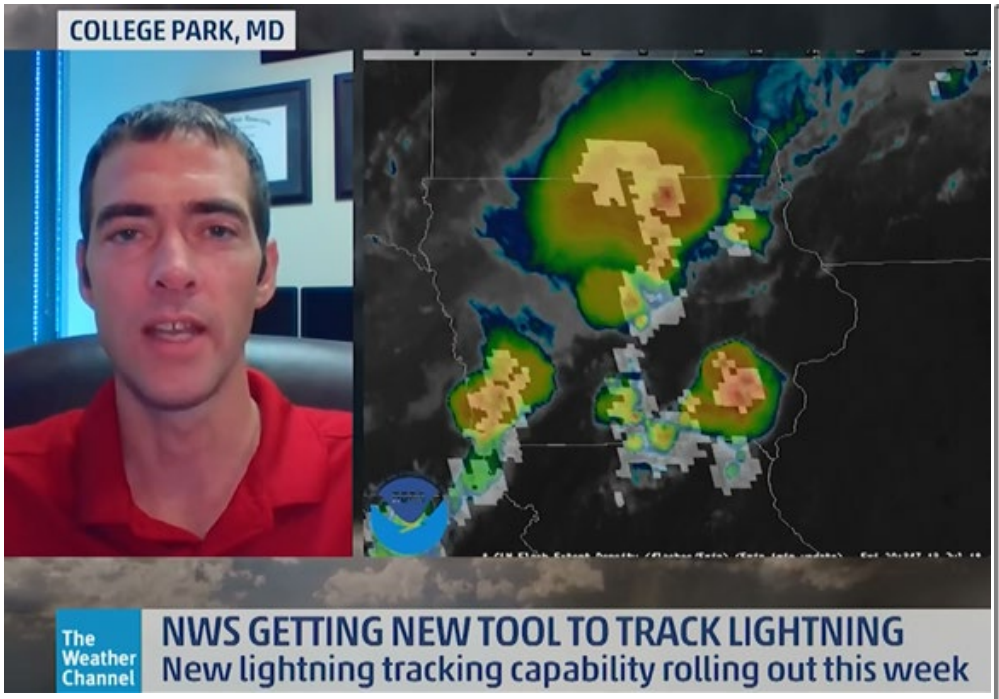
NOAA – CI Synergy

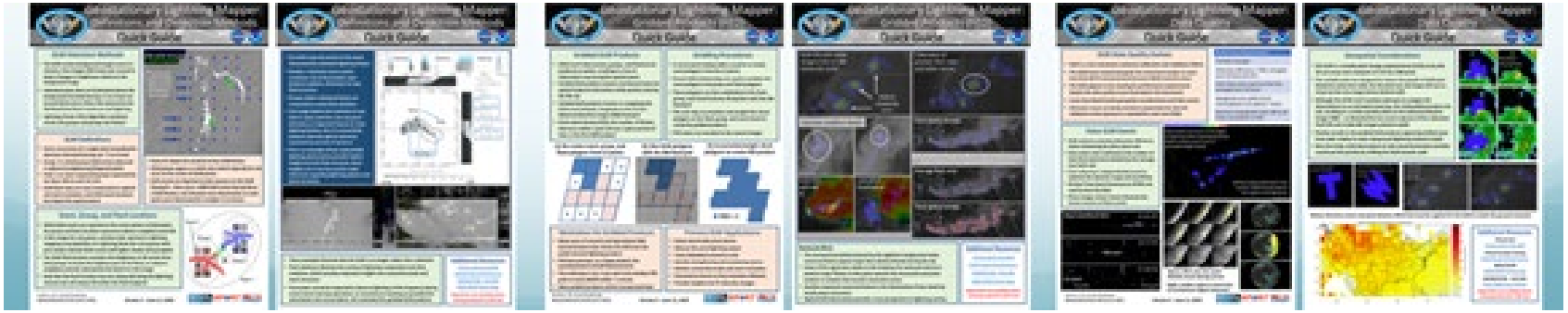
- CIs provides NOAA with a *rich, stable, and flexible research environment to help fulfill the NOAA mission*
- *NOAA scientists collaborate extensively with CI scientists* on applied research, experimental product development, and the transition of research products to operations
- *The university environment is conducive to education & outreach activities*. Graduate and undergraduate students are involved in NOAA-funded research
- Offer a mechanism for allowing external partners to address emerging needs and evolving NOAA research priorities

NESDIS Cooperative Research: What We Do



CISESS Collaboration with NOAA: GLM Example

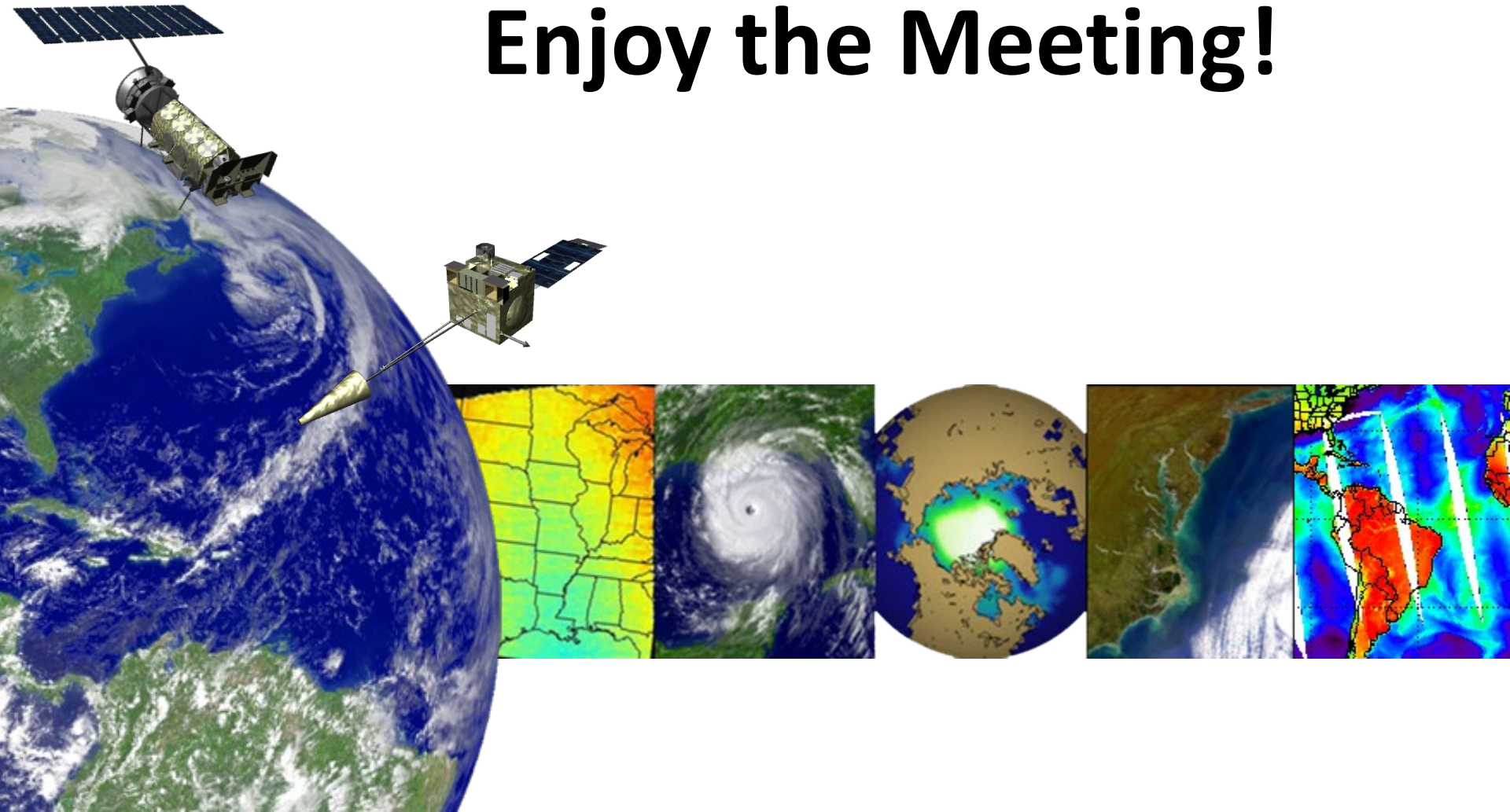




NESDIS' Aspiration

Provide a truly integrated digital understanding of our earth environment that can evolve quickly to meet changing user expectations by leveraging our own capabilities and partnerships

Enjoy the Meeting!



Additional Slides

Cooperative Research Program

Administers, manages or supervises:

- Three Cooperative Institutes
  - CI for Satellite Earth System Studies (CISESS)
  - CI for Meteorological Satellite Studies (CIMSS)
  - CI for Research in the Atmosphere (CIRA)
- One Cooperative Science Center
  - Center for Earth System Sciences & Remote Sensing Technologies (CESSRST)
- Three Branches collocated at CIs
  - Satellite Climate Studies Branch (CISESS)
  - Advanced Satellite Products Branch (CIMSS)
  - Regional and Mesoscale Meteorology Branch (CIRA)

NESDIS aspirations will be achieved by working towards five strategic objectives

1

Maintain observational leadership in geostationary orbit

2

Fully utilize all assets in LEO no matter who owns the asset

3

Develop agile, scalable ground capability to improve efficiency of service deliverables and ingest data from all sources

4

Provide superior user engagement to ensure timely response to user needs

5

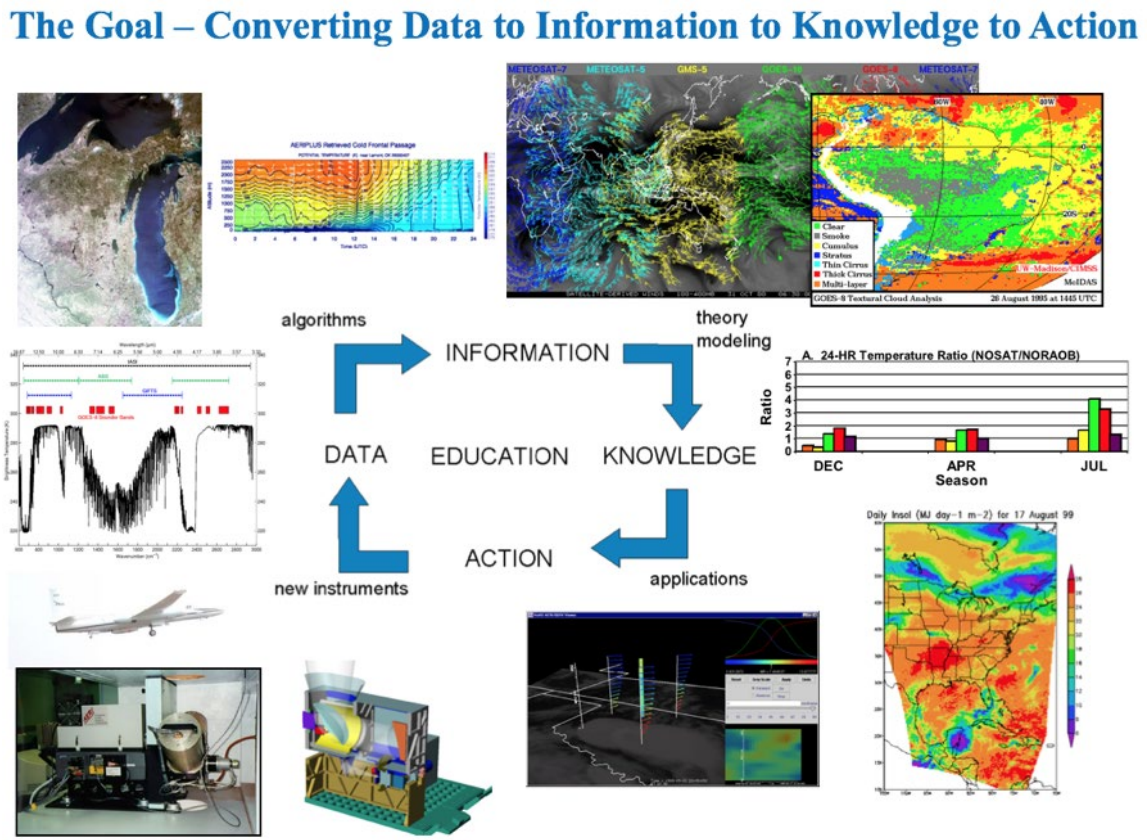
Deliver integrated program development to provide a suite of integrated products and services

CI Collaboration with NOAA

Examples of how the CI-NOAA collaborative effort works

The CIs are involved in the end-to-end process, from instruments to observations to products to information, dissemination and operations.

Some examples are on the following slides...

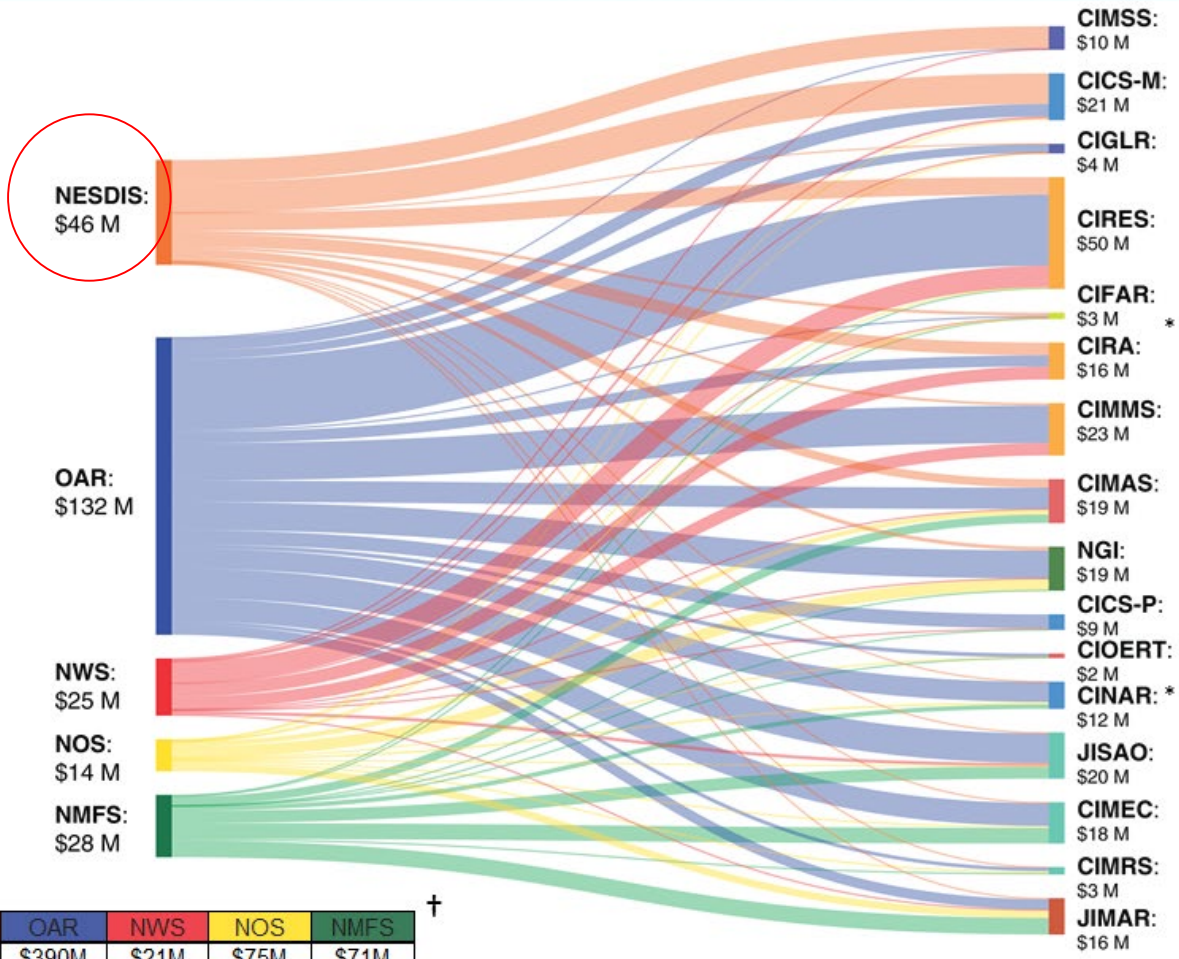


NOAA's Cooperative Institutes

- NOAA's Cooperative Institutes (CIs) are academic and non-profit research institutions that engage in research directly related to NOAA's long-term mission needs
- NOAA's CIs:
  - Provide a long-term institutional relationship between NOAA and external academic partners to support research directly linked to NOAA's mission, particularly where NOAA has insufficient internal capabilities or capacity.
  - Support graduate education and professional scientific training of a workforce well-versed in NOAA disciplines and provide opportunities for students to interact with NOAA scientists.
  - Promote strong collaborations between NOAA and academic scientists, particularly when groups of CI and NOAA scientists are needed.
  - Offer a mechanism for allowing external partners to address emerging needs and evolving NOAA research priorities.
  - Establish, at the highest level, long-term relationships between university administrators and NOAA leadership.

Utilization of Cooperative Institutions

FIGURE 1: All NOAA LOs Use CIs



NESDIS	OAR	NWS	NOS	NMFS
$31M	$390M	$21M	$75M	$71M

†

FY17 represents an anomalous year for CIFAR & CIOERT, funding is normally ~$1.5M.

† *Chart represents FY17 R&D budget for each LO.*

NESDIS Cooperative Institutes: Scientific Focus

	CI for Meteorological Satellite Studies (CIMSS)	CI for Climate Studies (CISESS)	CI for Research in the Atmosphere (CIRA)	Center Remote Sensing Science and Technology Center (CESSRST)
Satellite studies related to weather analysis*	**P**	s	S	s
Satellite oceanography	s	s	s	s
Satellite climatology	s	**P**	s	s
Satellite studies related to weather forecasting*	s	s	**P**	s
Succession planning, outreach and education	s	s	s	**P**

*Satellite weather analysis is defined here as a thorough examination of the different aspects that make up weather using satellite data. Satellite weather forecasting is defined here as generating expected meteorological conditions for a specific period and for a specific area using satellite data.

P = primary attribute, s = secondary attribute

NESDIS Cooperative Institutes and Cooperative Research Center Research Themes

Cooperative Institute for Satellite Earth System Studies (CISESS)

University of Maryland

- Climate and Satellite Research and Applications
- Climate and Satellite Observations and Monitoring
- Climate Research and Modeling

Cooperative Remote Sensing Science & Technology Center (CREST)

City College New York

(Host NOAA Line Office is Office of Education)

- Climate
- Atmosphere and Weather
- Land Processes and Water Resources
- Coastal and Ocean Waters

Cooperative Institute for Meteorological Satellite Studies (CIMMS)

University of Wisconsin-Madison

- Environmental Models and Data Assimilation
- Satellite Meteorology Research and Applications
- Satellite Sensors and Techniques
- Education, training & outreach

Cooperative Institute for Research in the Atmosphere (CIRA)

Colorado State University

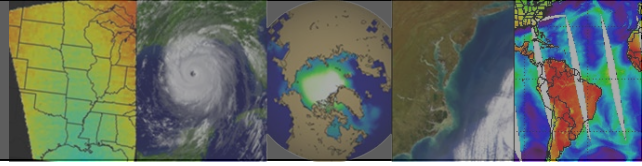
(Host NOAA Line Office is OAR)

- Satellite algorithm development, training and education
- Regional to Global Scale Modeling Systems
- Data Assimilation
- Climate-Weather Processes
- Data Distribution

NOAA NESDIS Cooperative Institutes Program: Focus on Research

- Important NOAA University/Non-Profit Research Institutions Partnership Program
- Focal point in facilitating and enhancing scientific research between the federal government, various universities, and non-profit research institutions
- Research collaborations of scientific research workers nationally and internationally

CoRP Branches & Support



Cooperative Research Program
Christopher Brown, Director

Program Support
Ericka Rosier, Brandi Franklin

Management Assistant
Allison Berger

Advanced Satellite Products Branch

Jeff Key—Branch Chief

Co-located with CIMSS
UW, Madison, WI

Tristan L'Ecuyer, Director

Regional & Mesoscale Meteorology Branch

Don Hillger — Branch Chief

Co-located with CIRA
CSU, Ft. Collins, CO

Christian Kummerow, Diretor

Satellite Climate Studies Branch

Ralph Ferraro—Branch Chief

Co-located with CISESS
UMD, College Park, MD

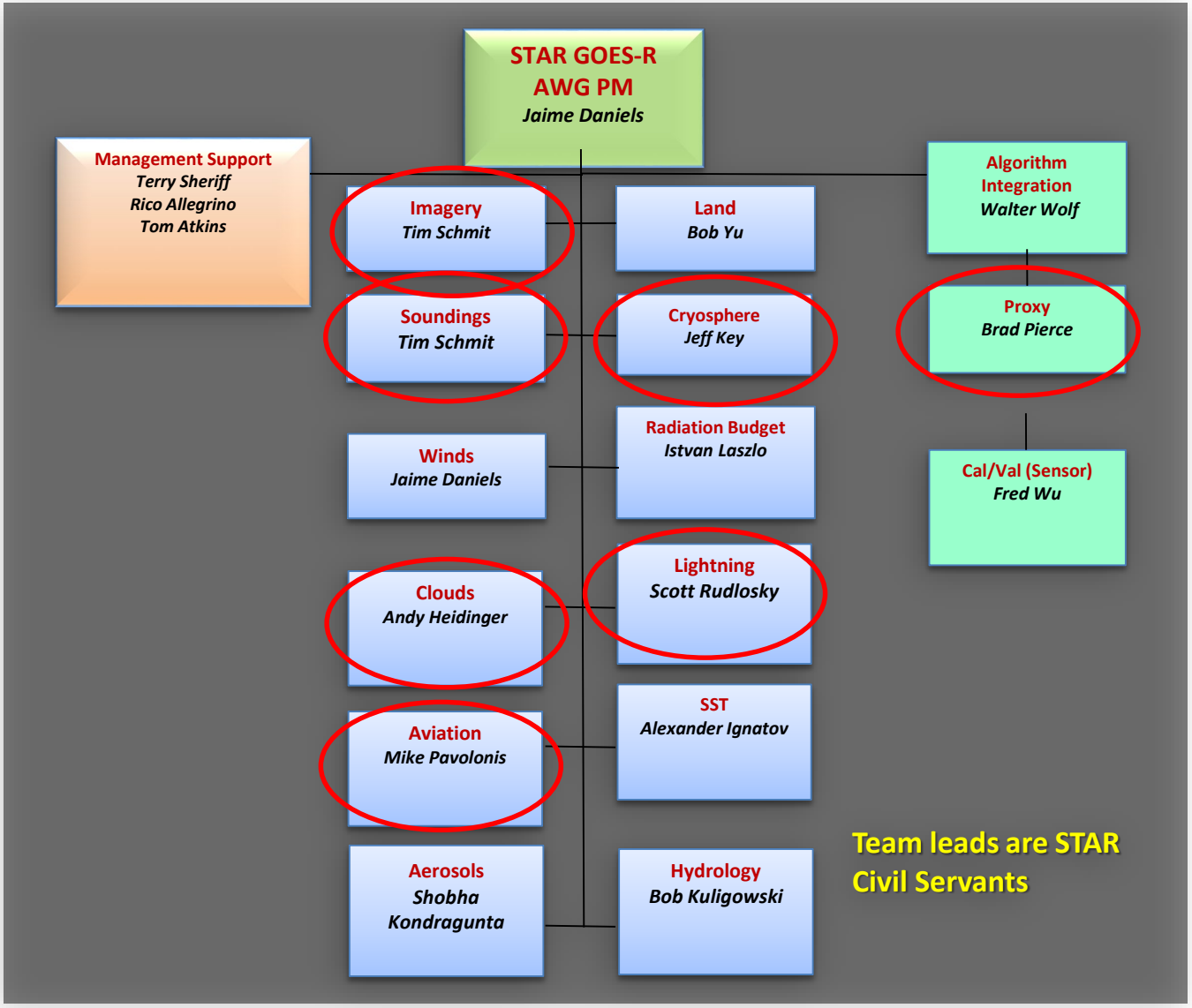
Fernando Miralles-Wilhelm, Director

Cooperative Remote Sensing Science and Technology Center

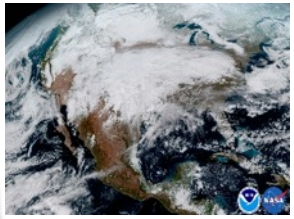
City College of NY
New York, NY

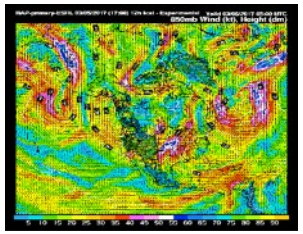
Reza Khanbilvard, **D**irector

CoRP Scientists Lead Many Algorithm Teams: GOES-R Example



Higher Information Content

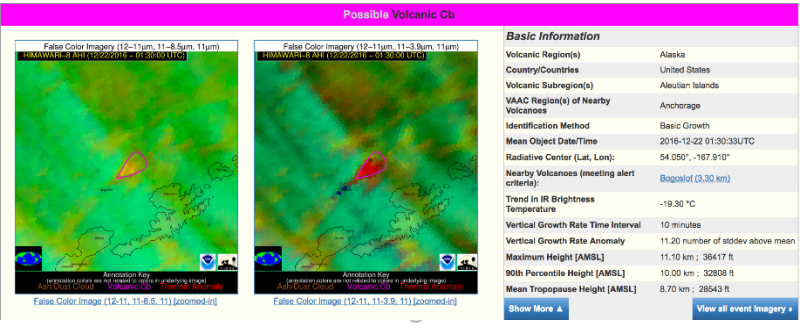


Operational applications require "Big Data" to be automatically transformed into information and insight for decision making

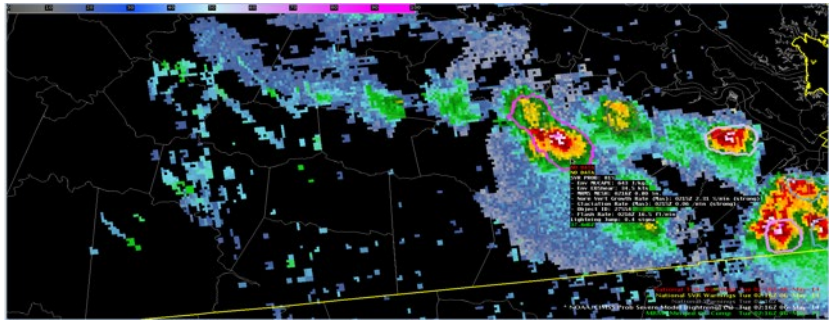
Volcat

Volcanic Eruption Detected!



Probsevere

Severe Weather Likely



High Performance Computing: S4 @CIMSS

Accommodates the requirements of the GSI/GFS model system at T1534/4DEnsVar.

S4 also supports assimilation experiments, OSSEs, and other science activities that it currently supports.

- 2,560 Intel Xeon Gold 6130 processing cores
- 15,360 GB RAM (80 systems with 192 GB each)
- 4,000 TB usable data storage (after formatting and redundancy)
- Funded by the NOAA & used by NOAA and UW researchers.
- The system was designed, installed, and is maintained by UW SSEC.