Increased Satellite Reception and Utilization Capabilities in NWS Pacific Region

Satellite Testbeds and Proving Ground Activities
12th Annual Symposium on New Gen Operational Environmental Satellite Systems
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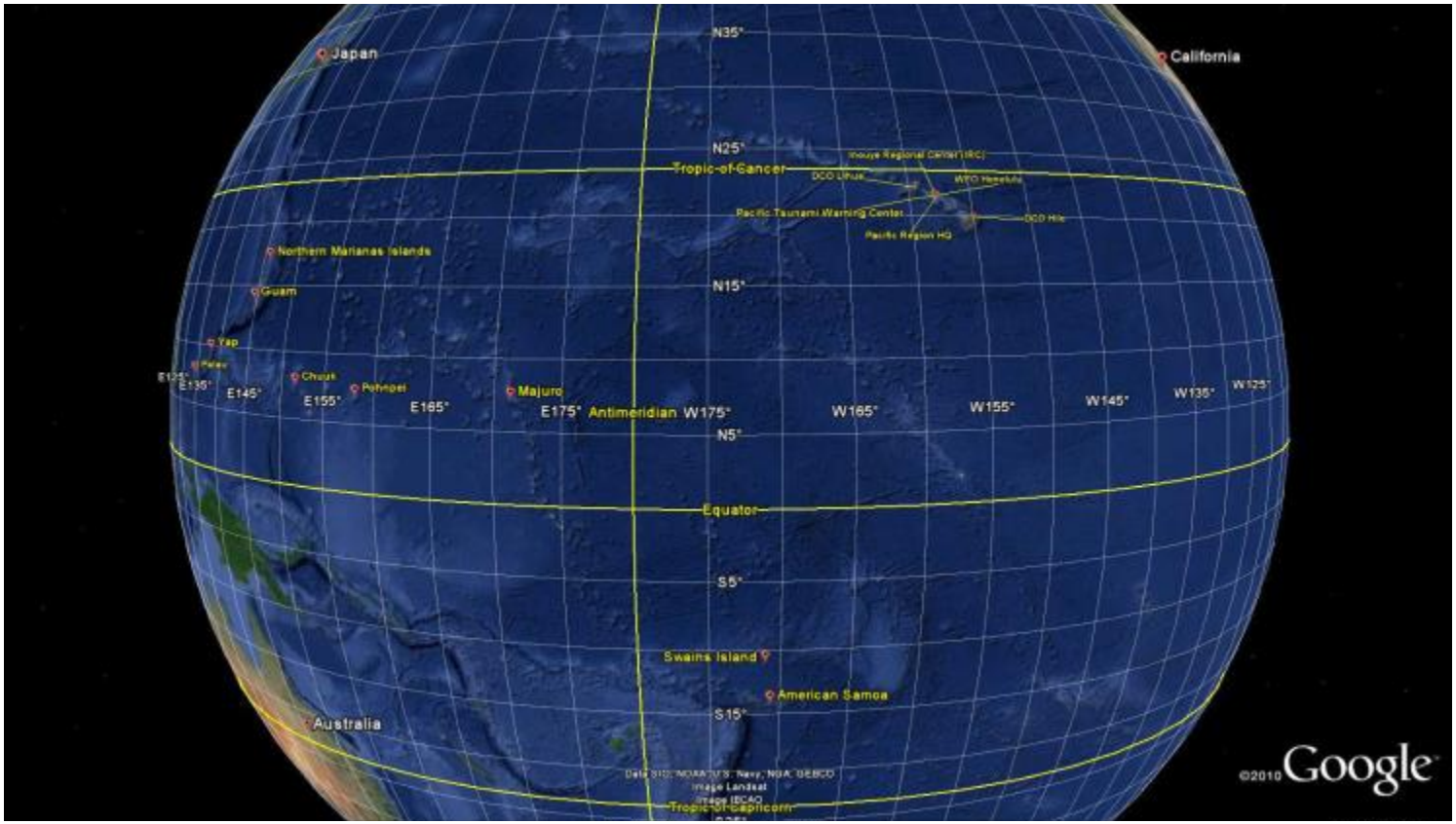
Includes contributions from colleagues

Outside Contiguous United States

- The “OCONUS” geographically includes:
  - Alaska
  - Hawaii
  - Puerto Rico, USVI, Guam, CNMI, American Samoa, Micronesia
  - Coastal Areas and Open Waters
- Challenges include:
  - In-situ data sparsity
  - Implementing and maintaining technical systems

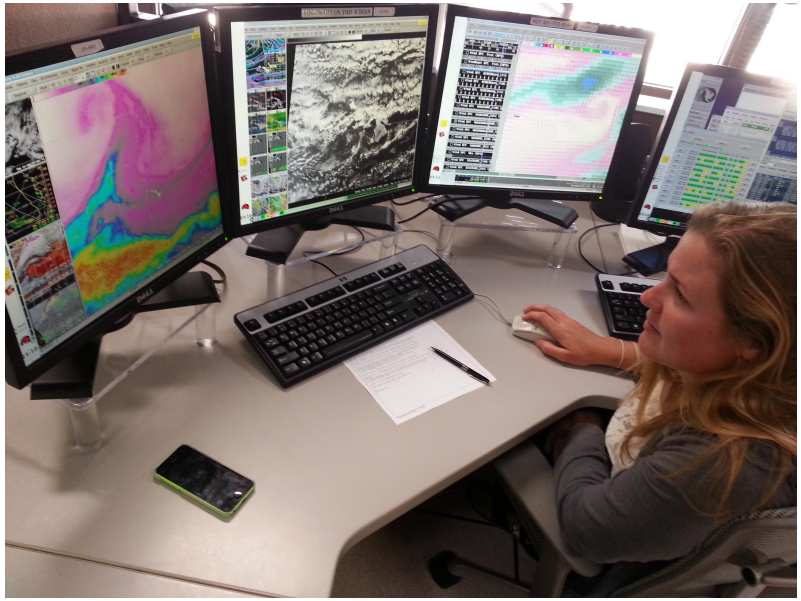
NWS Pacific Region



Credit: Eric Lau

Satellite Proving Ground

- The goal of the satellite proving ground is ultimately to achieve widespread readiness amongst field forecasters through early exposure to prospective capabilities, imagery, and products.



Satellite Proving Ground

- The proving ground also assures that these new capabilities, imagery, and products meet the long-term needs of the field in confronting forecast challenges, and
- that technical systems that provide satellite data to the field are adequate in enabling forecasters to sufficiently interrogate the imagery and products as part of their forecast and analysis decisions.

Keys to Success

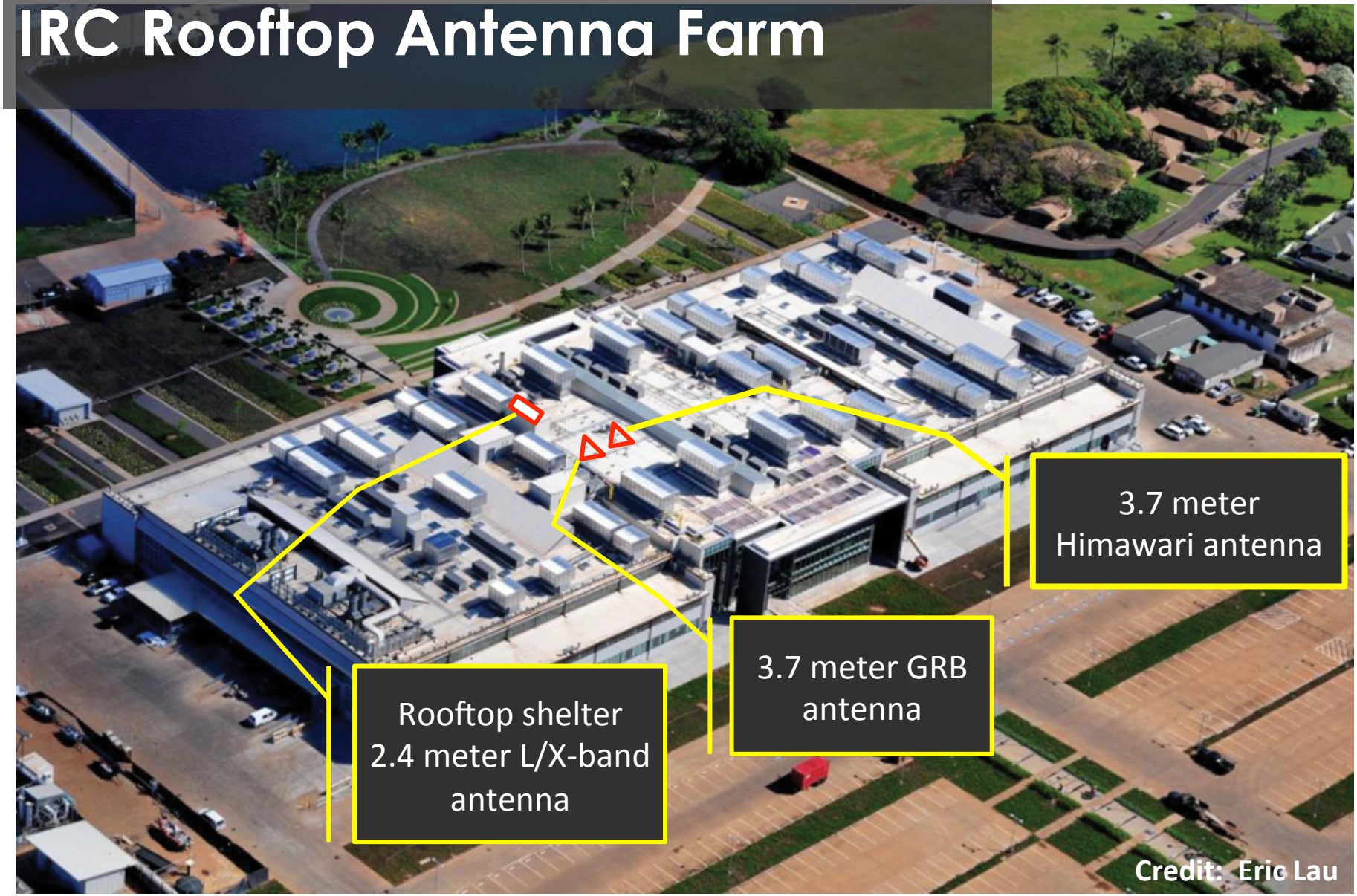
- Improved direct broadcast and rebroadcast capabilities
- Leverage Himawari imager as much as possible to provide regionally relevant examples in preparation for GOES-R Advanced Baseline Imager (ABI)
- Emphasize baseline and under-demonstrated products
- Redundant delivery paths and formats
  - Pacific Region: Where “big data” meets “big region”

Infrastructure to Support

- Terrestrial bandwidth upgrade
- New HimawariCast antennas in Hawaii and Guam
- New L/X-band antenna in Hawaii
- GOES-R GRB antenna in Hawaii
  - Installation in February 2016
- L/X-band antenna in Guam
  - Installation in summer 2016
- New satellite processing server

Photo credit: Liam Gumley

IRC Rooftop Antenna Farm

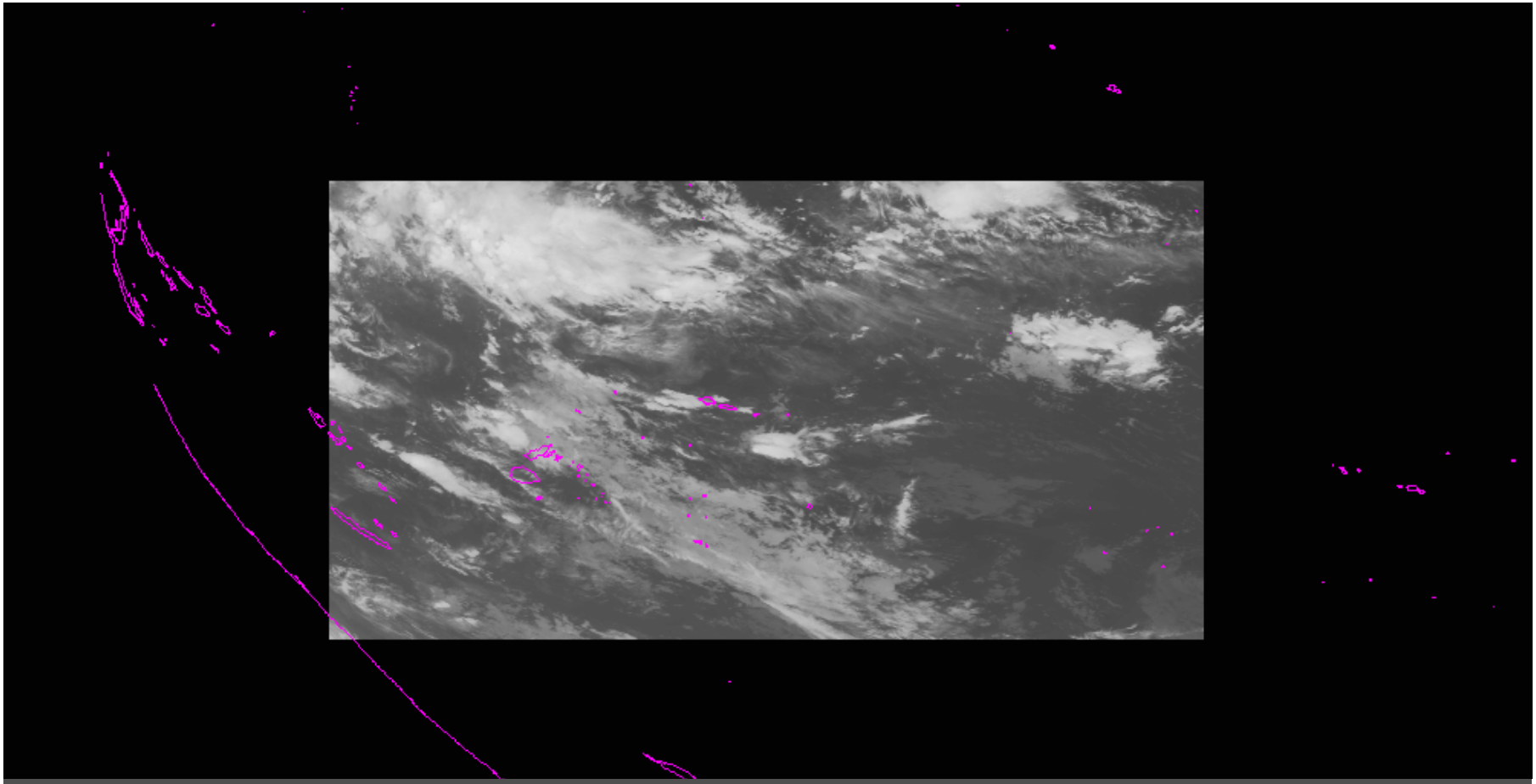


Honolulu Community College

- L/X-band antenna installed in 2012 to track NPP, EOS, FY, MetOp, and POES satellites
- VIIRS Day-Night Band (DNB) remains popular with Honolulu Forecast Office (HFO) meteorologists
  - Provided critical visible imagery of Tropical Storm Flossie that led meteorologists to reposition center and adjust track
- Raw data is freely available to download via HTTP
- Supports research at the University of Hawaii

Demonstrations to Date

- VIIRS Environmental Data Records (EDRs)
- Select bands and products from the Advanced Technology Microwave Sounder (ATMS)
- MODIS imagery and products
- Rainfall rate and quantitative precipitation estimate
- CIRA Orographic Rainfall Index (ORI)
- Rapid scan operations for OCONUS sectors



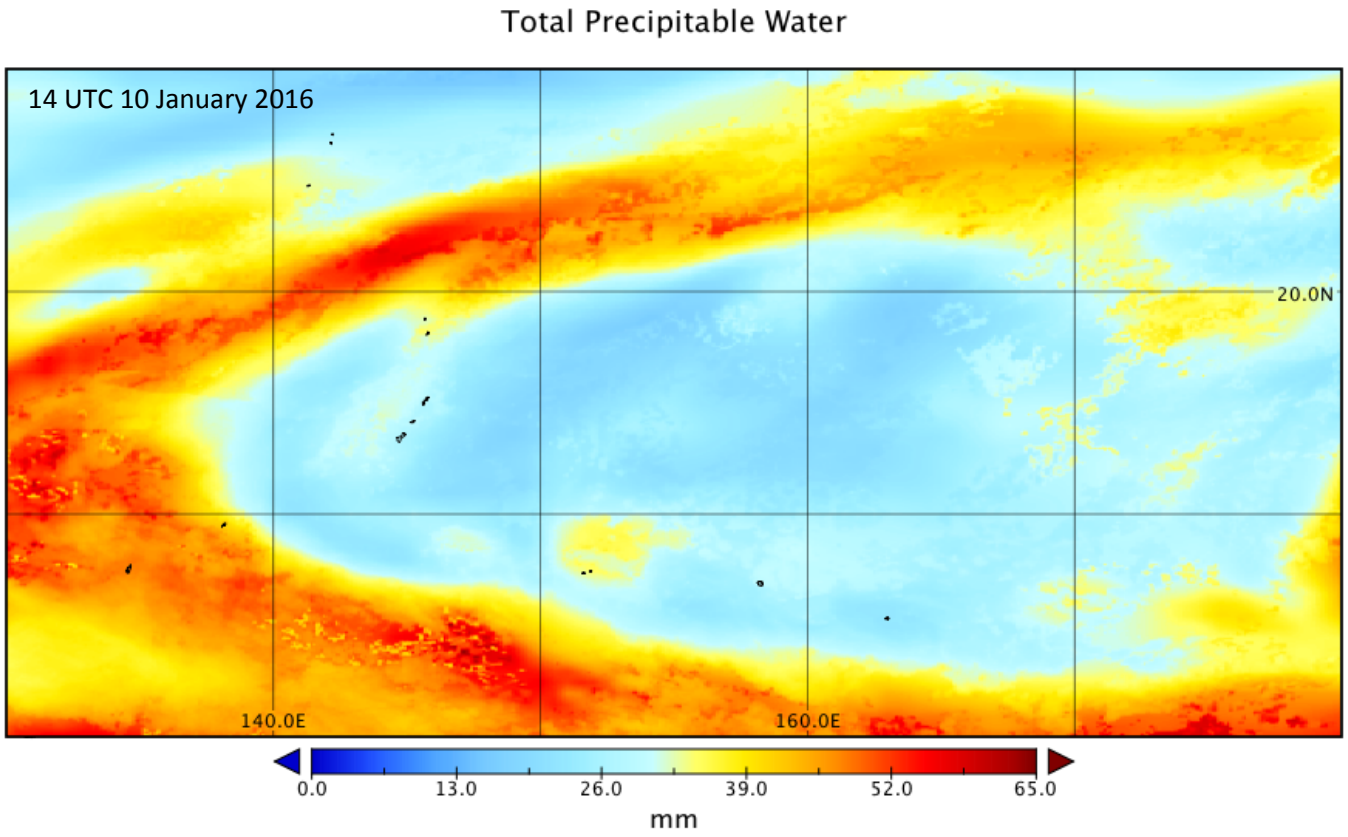
New American Samoa Rapid Scan Sector

Tested on 15 December 2015

Two other previous GOES-15 rapid scan sectors re-implemented for Alaska earlier

Upcoming Product Demonstrations

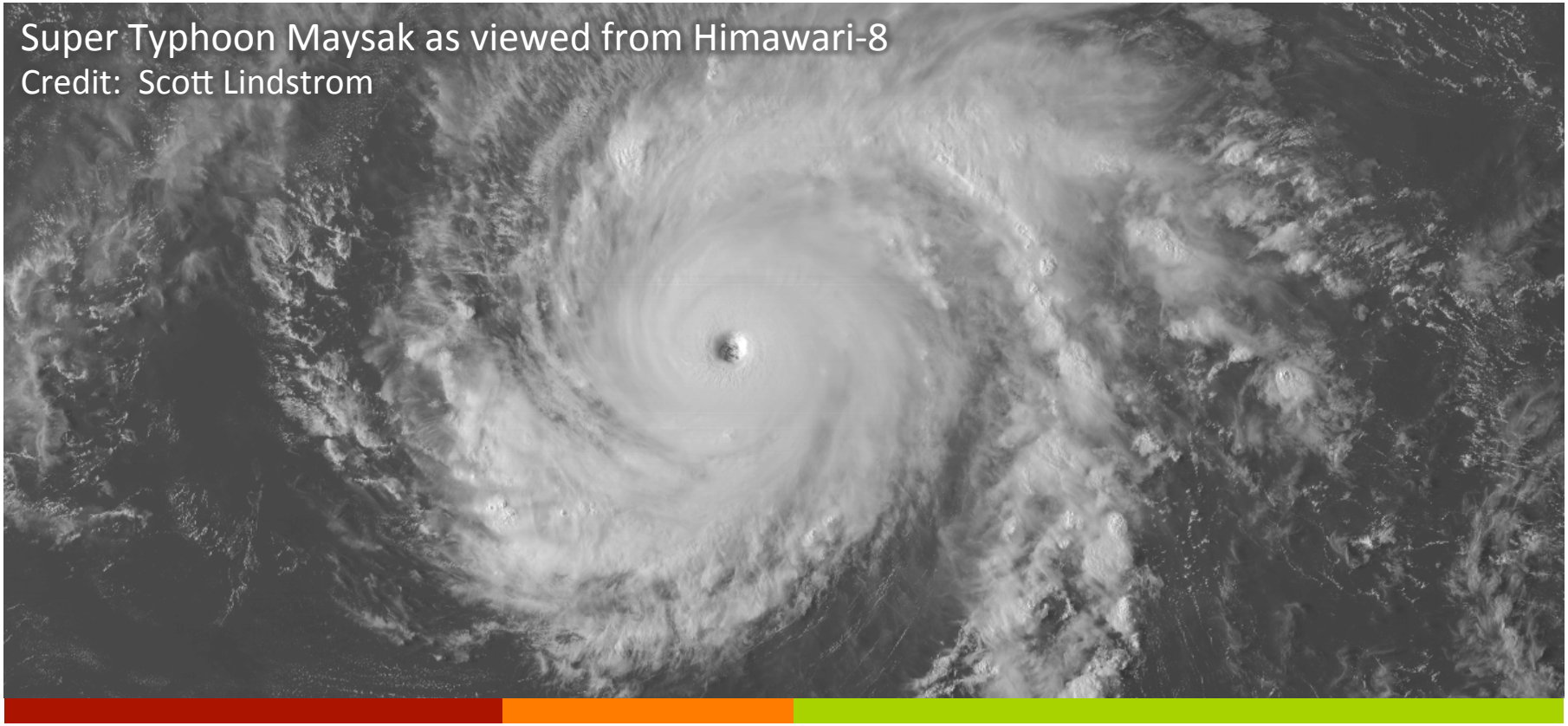
- From geostationary imagers
  - Products that improve aviation services, such as
    - Tropopause folding detection
    - Total precipitable water
    - Cloud layers and heights
    - Enhanced “V” and overshooting top detection
- From microwave sounders
  - Precipitation rate
  - Sea surface temperature



All Weather Total Precipitable Water from Himawari

For more information: **8.1 Real Time All-weather Precipitable Water Product Development from Geostationary Infrared Radiances and Applications in Weather Forecasts**, Thursday, 14 January 2016: 8:30 AM, Room 245

Jun Li, CIMSS/Univ. of Wisconsin, Madison, WI; and J. Gerth, Z. Li, Y. K. Lee, T. J. Schmit, and S. Bachmeier



Himawari Imagery

via SSEC's RealEarth Web Map Service in near real-time:

http://realearth.ssec.wisc.edu/

Training Paradigm

Core/Foundation

General

Specialized

“Himawari” in Japanese translates to “sunflower” in English.

Instructor-led Himawari Training

- Three instructors on-site with four, four-hour learning blocks over two days (course run twice in one week)
- Approximately 25% lecture, 75% interactive labs
- For Guam, training focused on:
  - Introduction to the AHI and remote sensing concepts
  - Band composites and Red-Green-Blue (RGB) composites
  - Satellite applications for aviation forecasting
  - Identifying weather systems and meteorological features
  - Tropical cyclones
- Course delivered in November 2015, with a mini workshop in Hawaii in December 2015

HFO Meteorologist Training

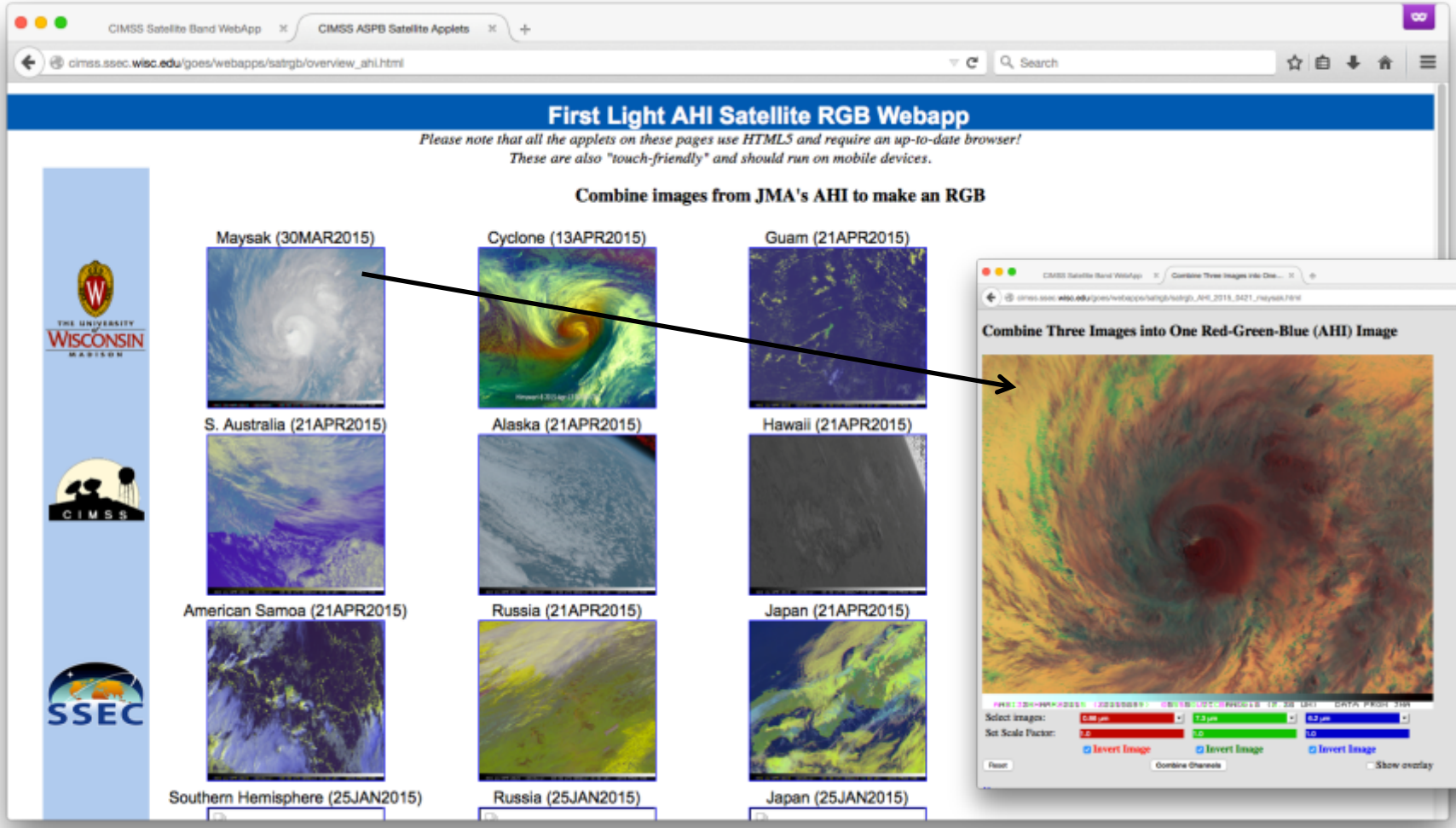
Photo credit: Jay Breidenbach

Web Applications as Learning Tools

- CIMSS hosts web applications ("webapps") to assist users with learning about the spatial, spectral, and temporal improvements of the ABI, as well as image composites (e.g., RGBs)
  - The use of "webapps" is incorporated into new training course content
  - A number of cases from the Advanced Himawari Imager (AHI) are included
  - Work with modern browsers and usable on newer mobile devices (smartphones, tablets, etc.)

http://cimss.ssec.wisc.edu/education/goesr/

SatRGB Web Application



http://cimss.ssec.wisc.edu/goes/webapps/satrgb/overview_ahi.html

ABI and AHI Band Fact Sheets

http://www.goes-r.gov/

Visiting Scientist Program

- The program targets scientists with legitimate interest in working with the NWS in the Central Pacific and establishing a long-term relationship.
  - Scientists travel to Honolulu to work alongside forecasters.
- High priority is given to scientists developing and seeking to demonstrate baseline products, or new risk reduction products that solve tropical or subtropical forecast challenges or reduce workload.
  - Decrease stovepipes

Final Thoughts

- In the United States, NWS Pacific Region is on the frontier of new generation weather satellites and leading the forecaster training effort and technical implementation out of necessity.
- We can continue to improve how we tailor imagery and develop research products to support the NWS operational weather mission through the proving ground and visiting scientist program.
- Managing “big data” is about confining and conveying when, where, and how to users.

Tropical Cyclone Ula

Questions?
Comments?

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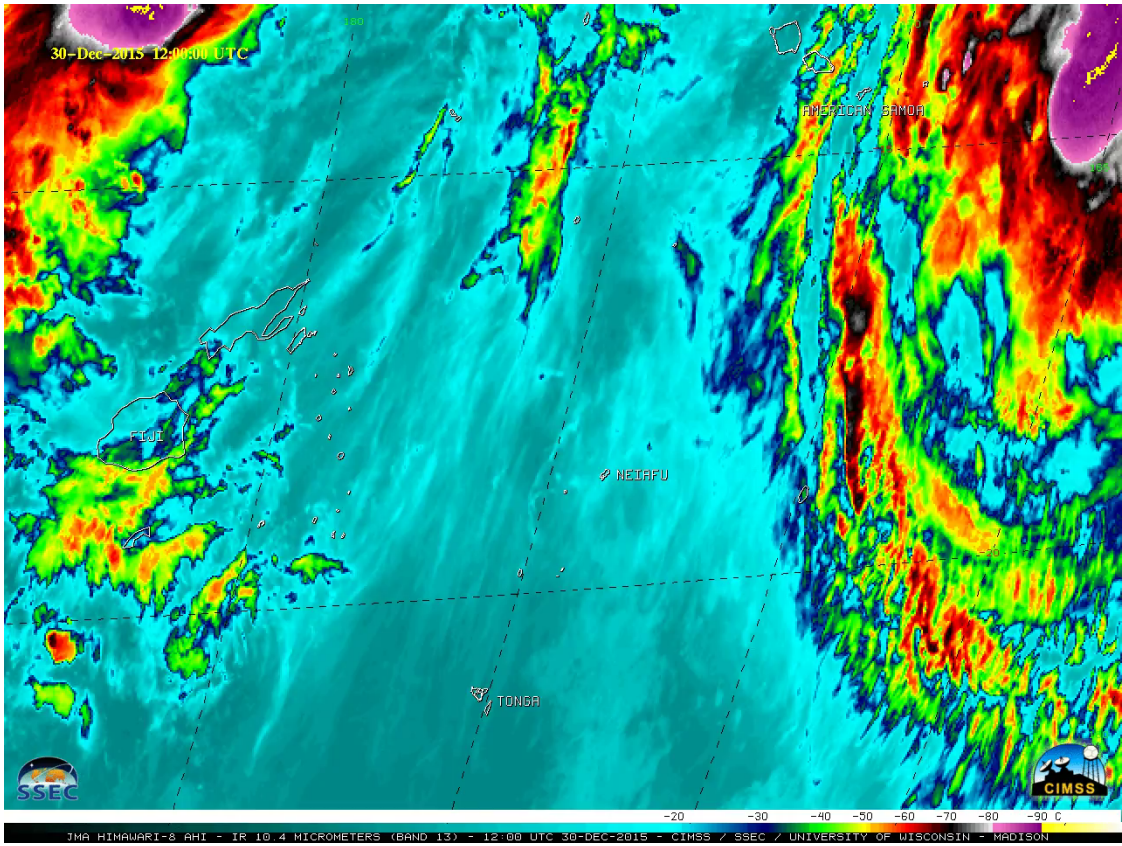

Animation credit: Scott Bachmeier