



# Discussion on Training GLM, Total Lightning, Apps

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*National Weather Service/Training Division  
GOES-R Lightning Science Team Meeting*

**September 2012**



# GOES R Lightning Mapper

## Predict onset of tornadoes, hail, microbursts, flash floods

- Tornado lead time -13 min national average, improvement desired

## Track thunderstorms, warn of approaching lightning threats

- Lightning strikes responsible for >500 injuries per year
- 90% of victims suffer permanent disabilities, long term health problems, chiefly neurological
- Lightning responsible for 80 deaths per year (second leading source after flooding)

## Improve airline/airport safety

- routing around thunderstorms, saving fuel, reducing delays
- In-cloud lightning lead time of impending ground strikes, often 10 min or more

## Provide real-time hazard information, improving efficiency of emergency management

- Large venue public safety, HAZMAT safety, & outdoor/marine warnings

## NWP/Data Assimilation

## Locate lightning strikes known to cause forest fires, reduce response times

## Multi-sensor precipitation algorithms

## Assess role of thunderstorms and deep convection in global climate

## Seasonal to interannual (e.g. ENSO) variability of lightning and extreme weather (storms)

## Provide new data source to improve air quality / chemistry forecasts



# Lightning Fatalities - Update

Reference: <http://www.lightningsafety.noaa.gov/blog.htm>

- 1) 21 Lightning Fatalities for the Year 2012
- 2) 67 percent of victims were outside doing leisure activities
- 3) 62 percent of fatalities occurred Friday, Saturday, Sunday
- 4) 86 percent of the victims have been male
- 5) Large Venue Fatalities:
  - 1) Pocono Raceway (Pennsylvania)
  - 2) Beach Fatalities (Florida and Michigan)
  - 3) Adventure Island Water Park Employee (Tampa)



# Training 2012 - Review



- 1) HWT and SPC Demonstrations used SPoRT training module and AWIPS1 WES case
- 2) Training for the gridded PGLM data (new)
- 3) Several 2012 total lightning cases captured for review, validation efforts, training examples and journal articles



# AWG Meeting Discussion



## What you said:

- 1) Forecasters want Intermediate data/displays for GLM
- 2) High flash rates (5-12 per second) can be problematic for algos
- 3) Need GLM-compatible flash definition
- 4) 3D view can show flash initiation and ground strike location
- 5) Lightning info needs to be integrated with radar, vertical profile information
- 6) Lightning Jump Algorithm
- 7) Lightning Warning Algo
- 8) SCAMPER/QPE Algo

## What I heard:

Reduce “black box” for forecasters so they understand the processing

**Forecasters will see that it’s a significant storm, what is value-add ?**

LMA provides more detailed data needed to understand storm-scale lightning science/apply GLM flash grid

**This can be important information for forecasters to consider**

Optimal displays are ad-hoc. Need to build decision-making visualizations

**Thresholds sensitive to storm environment, type. Tornado signature ? Correlation with svrwx better. 1” hail\***

5-min Lightning Prob. Maps, merge LMA and CG point data. Output:CG lightning lead time given 1<sup>st</sup> IC.

**Calibrates IR predictors to MW RR**



# 2013 Training Needs/Outlook



The big immediate need is to understand the ENI/Weatherbug total lightning data. Specifically, the science, terminology, and reliability of application. What, if anything, does this data mean for usage of the GLM data set ?

## Additional issues:

- 1) Continue WES case study pairing with training modules
- 2) One-on-one training with SPC forecasters
- 3) New National Centers Total Lightning Module(s) for AWC, SPC
- 4) Training for National Lightning Jump Test, at least 2 algos.,  
Complex storm tracking algorithms
- 5) Boulder WFO Proving Ground Activity (Fire Weather, Total Lightning)



# Currently Available Training



- VISIT CONUS Lightning
- VISIT Lightning Meteorology I
- VISIT Lightning Meteorology II
- COMET Intro to Tropical Met
- COMET Fire Weather Climatology
- COMET GOES-R Benefits
- VISIT GOES-R 101
- SPoRT Lightning Mapping Array
- SPoRT PGLM Training
- VISIT Use of GOES/RSO Imagery w/Remote Sensor Data for Diagnosing Severe Weather
- COMET Weather and Health (Broadcasters)
- COMET Summer Faculty Satellite Class



# Currently Available Training



- Developed for 2011 & 2012 Spring Program
- Described three features
  - ✓ Total lightning
  - ✓ Geostationary Lightning Mapper (GLM)
  - ✓ Pseudo GLM product
- Included operational examples
- Intended for use before arrival
- Available on Learning Management System
- Available on SPoRT web page

<http://weather.msfc.nasa.gov/sport/training/>

The slide is titled "What is the Pseudo GLM?". It features a central text box stating: "Pseudo GLM only uses ground-based VHF data". To the right, there are two satellite images: the top one is labeled "Pseudo-GLM with high-res Visible" and the bottom one is labeled "Pseudo-GLM from KSC LDAR II". A blue callout box on the left says "Pseudo GLM only uses ground-based VHF data". Another blue callout box on the right says "Future GLM proxy will be tuned by comparison with optical LIS data". The slide is part of a presentation in a Mozilla Firefox browser window titled "NASA SPoRT's Pseudo GLM Training Module". A sidebar on the left shows a table of contents with 14 items, including "Total Lightning: A Review", "Geostationary Lightning Mapper", and "What is the Pseudo GLM?".

The slide is titled "Operational Example: Lightning Safety". It shows two satellite images. The left image is a lightning map with a white circle and a blue box labeled "2207 UTC". The right image is a lightning map with a blue box labeled "First CG". The slide is part of a presentation in a Mozilla Firefox browser window titled "NASA SPoRT's Pseudo GLM Training Module". A sidebar on the left shows a table of contents with 14 items, including "Operational Example: Lightning Safety".

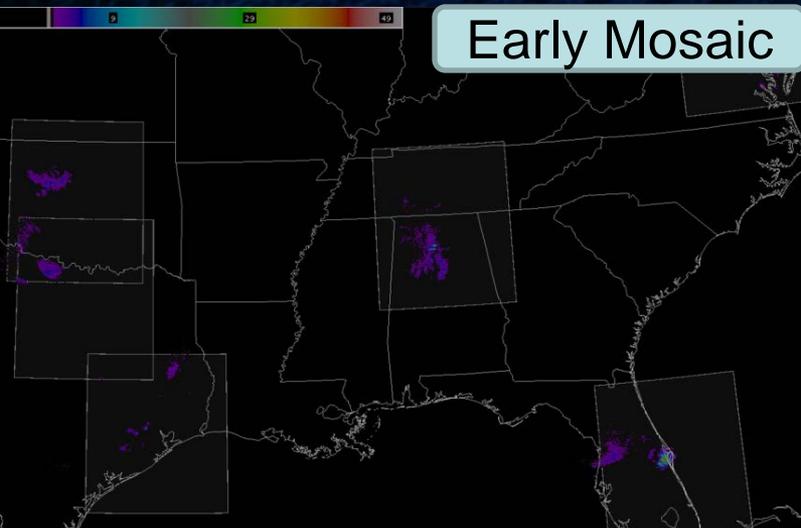
Courtesy Dr. Geoffrey Stano



# Future Training Activities



## Early Mosaic



## New activities

- Mosaic product (all networks product)
- New visualizations (maximum density)

## New training module

- ❖ Initial use for NWS forecasters
- ❖ Examples to be converted to PGLM

## New training has more operational focus

- ✓ Severe weather applications
- ✓ Airport Weather Warnings
- ✓ Lightning safety applications
- ✓ Aim for release before Spring 2012
- ✓ Update current PGLM training

## Spatial Extent: 16 August 2010



### Example 2: Kissimmee-Orlando, Florida

- Flash curved 40 miles
- Channeled through weak reflectivity

## Lightning Safety New Module

Courtesy Dr. Geoffrey Stano



# Common Themes for Next HWT



Training begins before arrival in Norman

- Complete learning path for NWS staff
- Conduct mix of GotoMeeting, VISIT, and Recorded training modules
- Time is precious, Monday to orient & spin-up
- Need improved rapid display procedures/bundles for complex displays/analysis

Need a comprehensive simulation case

- ✓ Facilitated, guided learning
- ✓ Need to fix issue with total lightning playback in case mode



# weather.gov/training



National Weather Service

## Training Portal

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### NWS Personnel

- Training Implementation Plan
- Residence & Virtual Courses
- Learning Center Topics
  - Web-based, D/L (requires login)
- Job Aids, Downloads, & Other References
- PDS Page
- IDP Guide
- Training Directives

### Partners & Volunteers

- NWS Cooperative Observer Program
- Educators
- Emergency Managers
- Weather Spotters
- Government Leaders (Leadership Academy)

### Partner Organizations

- FAA & DOD Personnel
- COMET/MetEd
- VISIT

### Additional NWS Training Resources

- NWS Learning Center
- FDTB
- NWSTC
- WDTB
- SOO/STRC
- NWS Education Page

## NWS Training Portal

Welcome to the NWS Training Portal! This portal is designed to provide access to all NWS training, including course listings, course descriptions, training schedules, and online materials. Our goal is to provide you with one stop shopping for training!

You may now subscribe to our RSS feed [XML](#). For information on RSS you can visit the [NWS RSS Library](#).



Training Events Planning Calendar



Printable Schedules: Residence/Virtual Courses, Web-Based Training Release Dates

### News & Announcements

This is the new one-stop Training Portal for all NWS training resources. This represents Version 1 of this site with enhancements to follow in subsequent versions. If you have suggestions for improvements, or note any errors, please use the webmasters link at the bottom of the page to share them with the Portal team.

- COMET has announced the publication of an updated module titled [Forecasting Dust Storms, Version 2](#). (01/06/11)
- WDTB has released "CWSU Operations" for NWS forecasters and interns. This course is designed for anyone in this audience who collaborates with CWSUs (and their meteorologists) and/or provides aviation support. The course is delivered and tracked through the Commerce Learning Center (<https://doo.learn.com/noaa/nws>). You can find the module by searching for the title "CWSU Operations". (01/06/11)
- NWSTC announces the release of the "FAA Snow Measurement Training" module for FAA Weather Observers and NWS staff members who quality check and coordinate snow observations with FAA Weather Observers. See the FAA and

### Upcoming Training Events

- Today
- Armstrong Transmitter 2010 begin:
  - Armstrong Transmitter 2010 begin:
  - VISIT - UW NearCasting Product
  - Wednesday, January 12**
  - VISIT - POES and AVHRR Data in
  - Thursday, January 13**
  - VISIT - UW Convective Initiation I
  - Tuesday, January 18**
  - VISIT - CRAS Forecast Imagery in
  - Wednesday, January 19**
  - RRS Maintenance Residence Cou
  - VISIT - Basic Satellite Principles T
  - VISIT - Water Vapor Imagery and
  - Thursday, January 20**
  - VISIT - Interpreting Satellite Sinal
- Google Calendar

### Disclaimer

**NWS Training Division**

The mission of the NWS Training Program is to ensure training needs are met in a cost-effective manner by sustaining an efficient and effective workforce.

[More About Us](#)



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SPORT- <http://weather.msfc.nasa.gov/sport/>

VISIT - [rammb.cira.colostate.edu/visit](http://rammb.cira.colostate.edu/visit)

COMET METED - [meted.ucar.edu](http://meted.ucar.edu)

NOAA LMS – <https://doc.learn.com/noaa/nws>

Proving Ground – [cimss.ssec.wisc.edu/goes\\_r/proving-ground.html](http://cimss.ssec.wisc.edu/goes_r/proving-ground.html)

NWS FDTB – <http://www.fdtb.noaa.gov>

NWS Training Portal - <http://weather.gov/training>

**VISIT** Virtual Institute for Satellite Integration Training

VISIT Home

- VISIT Home
- Training Sessions
- Training Calendar
- Blog Sites
- The VISIT Program
- VISIT People
- VISIT FAQ
- Links / Tutorials
- RAMSDIS Online

**AVHRR Cloud Products Can Provide Additional Information About Cloud Features Of Interest**

VISIT is a joint effort involving NOAA-NESDIS Cooperative Institutes, the National Environmental Satellite Data and Information Service (NESDIS), and the National Weather Service (NWS). The primary mission of VISIT is to accelerate the transfer of research results based on atmospheric remote sensing data into NWS operations using distance education techniques.

Teletraining Calendar, Signup and Installation

What's New?

Partners: FDTB, SkyNet, CIRA, RAMMB, NESDIS, COMET, SPORT

**MetEd** Environmental Satellite Resource Center

What's New?

ESRC Environmental Satellite Resource Center

Search for information and training about environmental satellites from international resources, including MetEd.

Bilingual Updates

Receive quarterly updates about new materials in English and/or Spanish.

Recent Publications

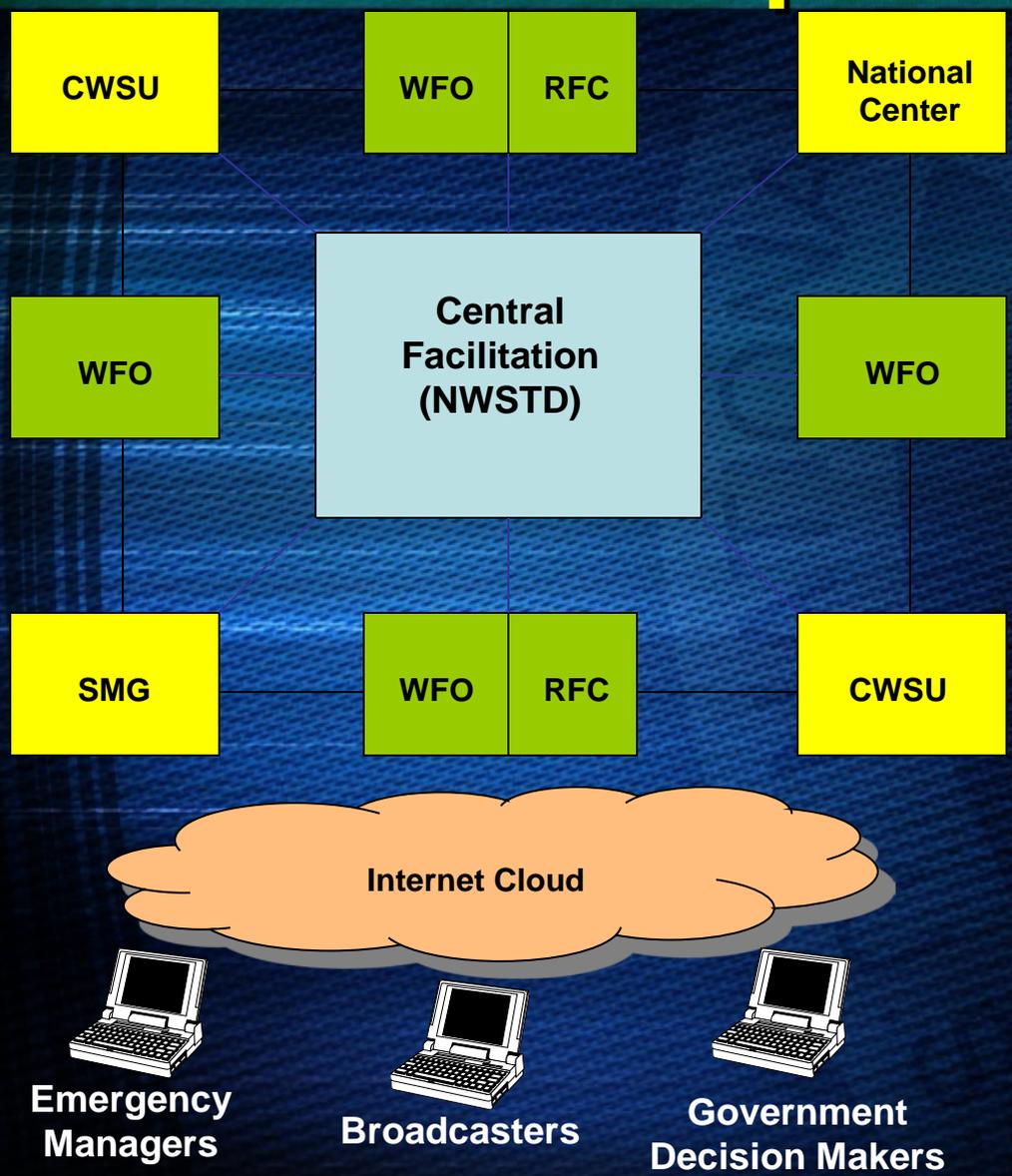
GOES-R: Results of Next-Generation Environmental Monitoring

Topics in Tropical Meteorology

GOES-R: Results of Next-Generation Environmental Monitoring



# Enhanced Simulation Capabilities



- FY14 completion
- FTEs required
- 2+ Networked Simulators per WFO with Situation Awareness Capability
- Thin Clients
  - Leverage AWIPS II Thin Client Capabilities
- Decision Support Services (DSS)
  - Partnerships with Stakeholders
  - Simulation Development
  - Simulation Facilitator
  - Synchronous Instruction



# Vision 2014: Distributed and Collaborative Simulations Focused on Human Factors and Decision-Support



- Collaborative simulations and interagency exercises: partnerships, teamwork and decision support
- Intraoffice and interoffice simulations (like FEMA, NASA/SMG, DOD)

..... Internet  
 ——— WAN/NOAA net/VRF



A new one-stop source for all GOES-R information.

<http://www.GOES-R.gov>

A joint web site of NOAA and NASA