

STATUS AND ACTIVITIES OF THE  
NORTH ALABAMA AND DC  
LIGHTNING MAPPING ARRAYS  
(LMA'S)  
&  
INTRODUCTION AND STATUS OF  
THE CAMP BLANDING LMA

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with a host of partners:

NASA, NOAA, NMT, UAH, UF, UMD, GATech

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Southern Thunder (ST11) Workshop

Norman, OK

# Providers and Users for NALMA and DCLMA

- ▣ Providers (Partners/Collaborators)
  - NASA, UAHuntsville, New Mexico Tech, Georgia Tech
- ▣ LMA Operations and Maintenance
  - John Hall, Jeff Bailey, Terryn Fredrickson
  - NMT Consultants (P. Krehbiel, B. Rison, H. Edens, G. Aulich)
- ▣ Users (Scientific/Operational/Informational)
  - NASA, NWS WFOs, EMAs, NOAA, Science Research Community, Public

# NALMA History and Status

- ▣ November 2001: First data collected.
- ▣ May 2003: Started ingesting LMA data into AWIPS, and first case used to warn (May 6).
- ▣ August 2003: First case (August 27) used not to issue a warning.
- ▣ April 2008: Expanded network to 11 stations.
- ▣ May 2009: Atlanta stations added.

*No significant changes since 2009. Operations remain stable but ...*

# NALMA Hardware

## *1<sup>st</sup> Generation Stations*

- LMA Sensor Sites
  - VHS ground plane antenna
  - Sensor electronics / site computer (famous "green" box)
  - Communications (mostly 2.4 GHz wireless network link)
  
- Relay Sites and Central Station
  - PC router (up to 4 network links)
  - Communications (multiple antennas require great care in channel selection)
  - NMT processing software now used

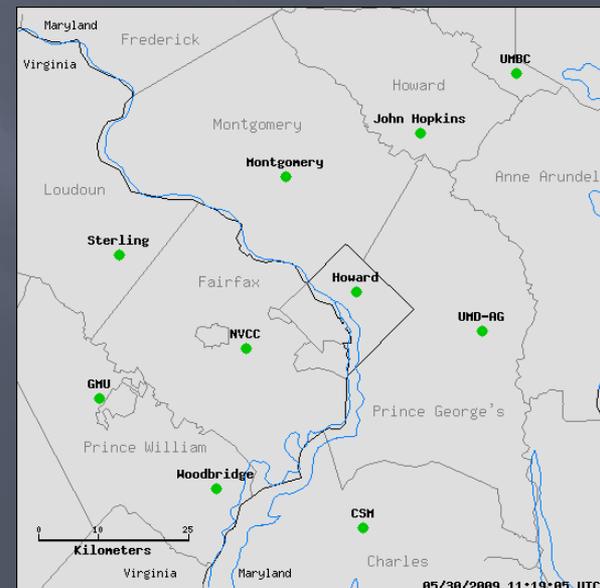
*Plan to migrate to cell phone modems, DLS, or direct internet to improve network communications & robustness (phase in new station hardware as needed)*



# DCLMA Approach and Status

- ▣ Deployed in Summer 2006 using the 2<sup>nd</sup> generation “Portable LMA.”
  - This hardware both simplified and accelerated the deployment process.
- ▣ Partners at universities, community colleges, government provide space and network connectivity.
  - In exchange, they receive access to data and educational opportunities for students.
  - We receive robust, real time network operations that can be managed remotely.

*Like NALMA, no significant changes since 2009. Operations are stable but... the Alabama Tornado outbreak showed that we need back up for data processing.*



DCLMA Site Map

# Activities and Applications

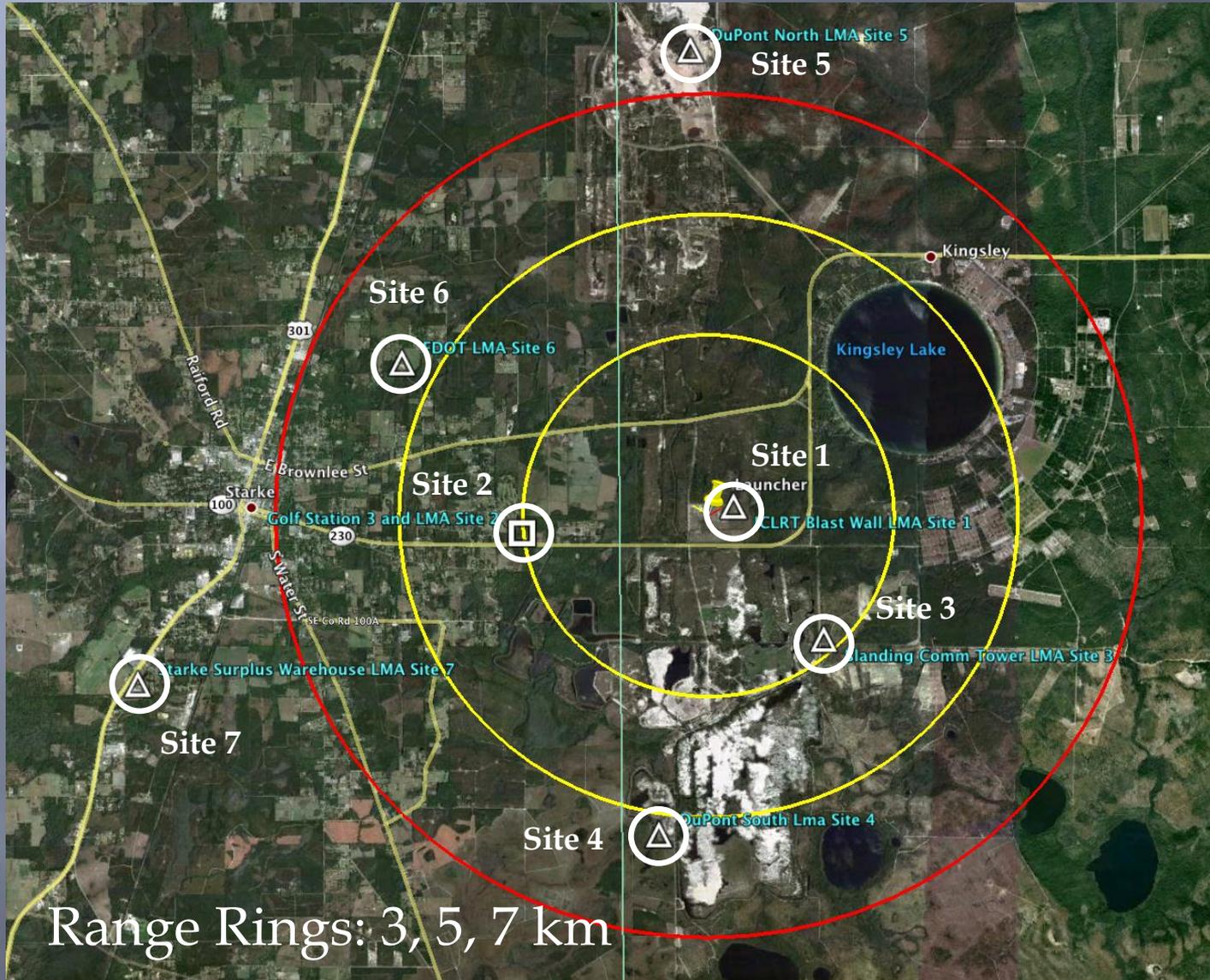
- ▣ Data supplied to several WFOs for nowcasting and warning.
- ▣ Supports satellite validation (TRMM/LIS) and a variety of weather research activities.
- ▣ Important proxy data source for GOES-R pre-mission activities (AWG, risk reduction, proving ground, validation).
  - Much interest in Lightning Jump (breakout session topic)
  - Interest in multi-sensor products
- ▣ Supports lightning forecast activities (WRF model)
- ▣ Provide information to public via public Web access. (North Alabama, DC and KSC data available)

*A number of talks, especially in Session 3, related to these activities and applications.*

# Camp Blanding LMA

- ▣ This is a 7 research network deployed in May at the International Center for Lightning Research and Testing.
- ▣ Sponsored by DARPA, its operation is via a collaboration by UAHuntsville, Univ. of FL, NASA and New Mexico Tech.
- ▣ Facts:
  - Short Baseline (~18km diameter)
  - Portable LMA hardware
  - First data June 6, 2011
  - At this point, not real time
  - Optimized for close-in (i.e., rocket-triggered) events

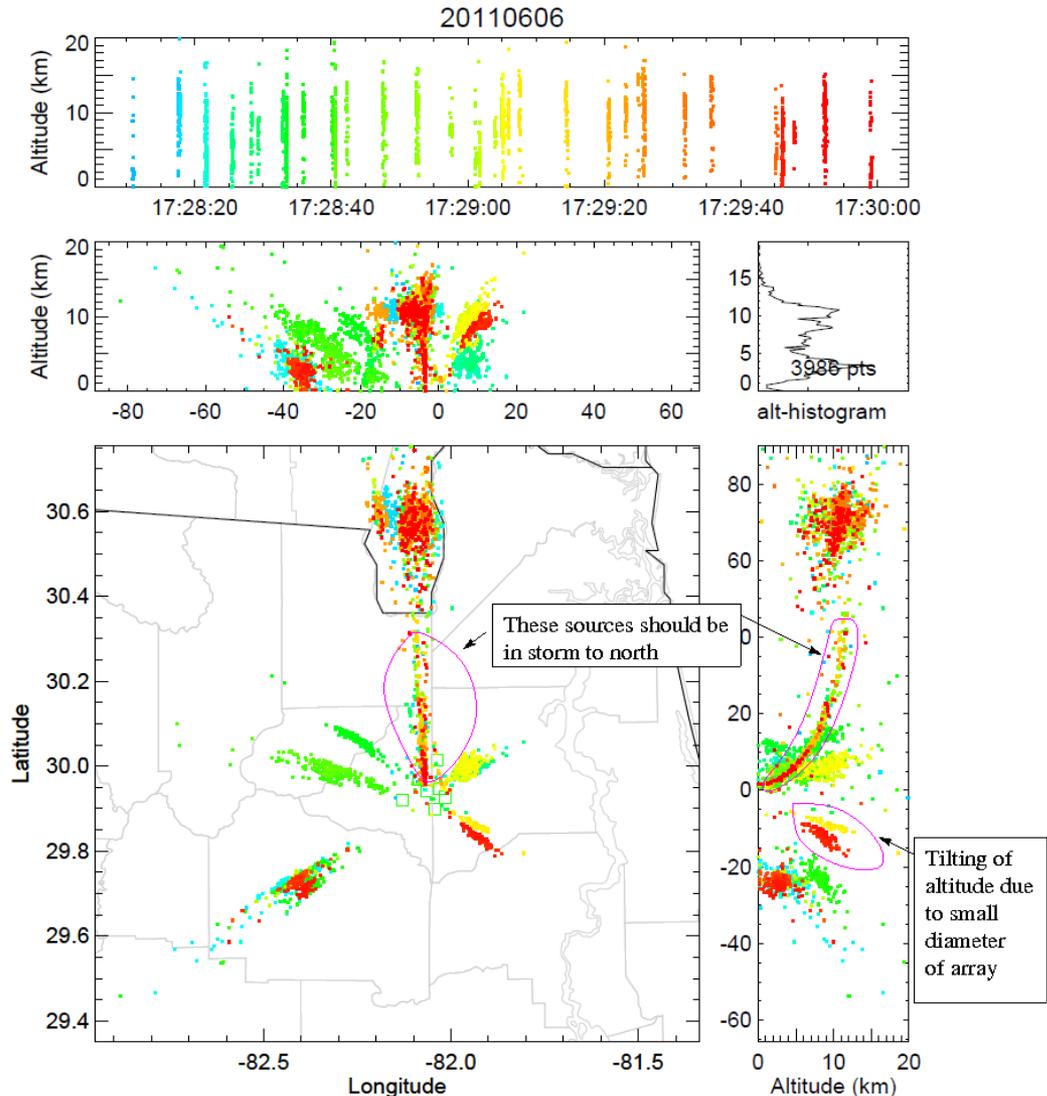
# Camp Blanding Site Map



# First Data from Network

## *XLMA analysis by Bill Rison.*

- Plot shows one problem and one “feature” due to the small array diameter.
- Problem: some sources in storm to north mislocated closer to network.
  - traced to northern-most site (goes away if this site removed from analysis).
  - need to verify position of GPS and VHF antenna
- “Feature”: high-altitude sources strongly tilted due to elongated error ellipse.
  - error in elevation angle being proportional to  $r/D$
  - error in radial distance is proportional to  $(r/D)^2$



Questions?

Thank You!