



Early Operational Successes of the University of Louisiana at Monroe’s S-band Polarimetric Doppler Radar

Todd A. Murphy¹, Chad Entremont², Brandi Hughes³, Daniel Lamb², and Marty Mayeaux³

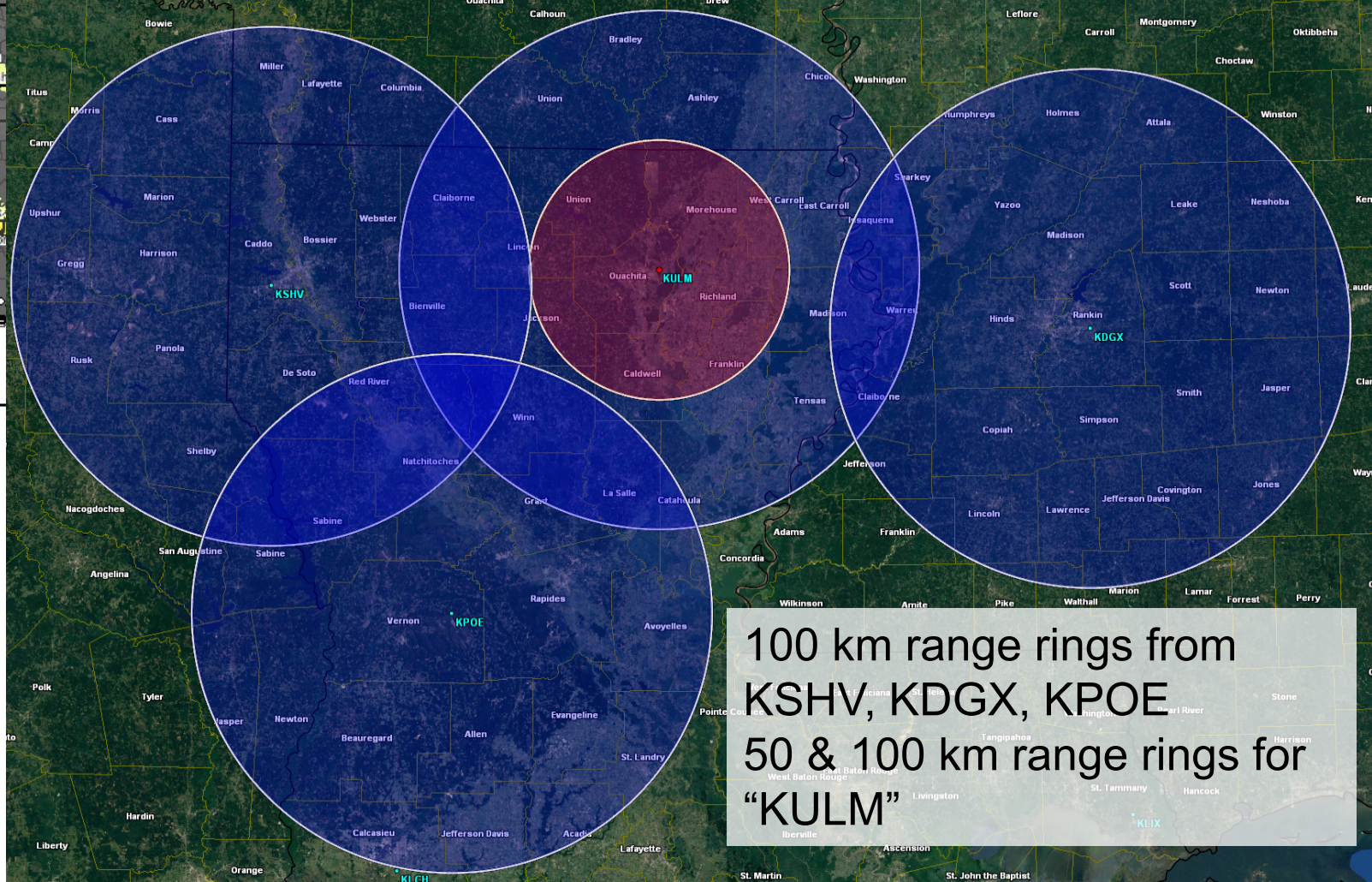
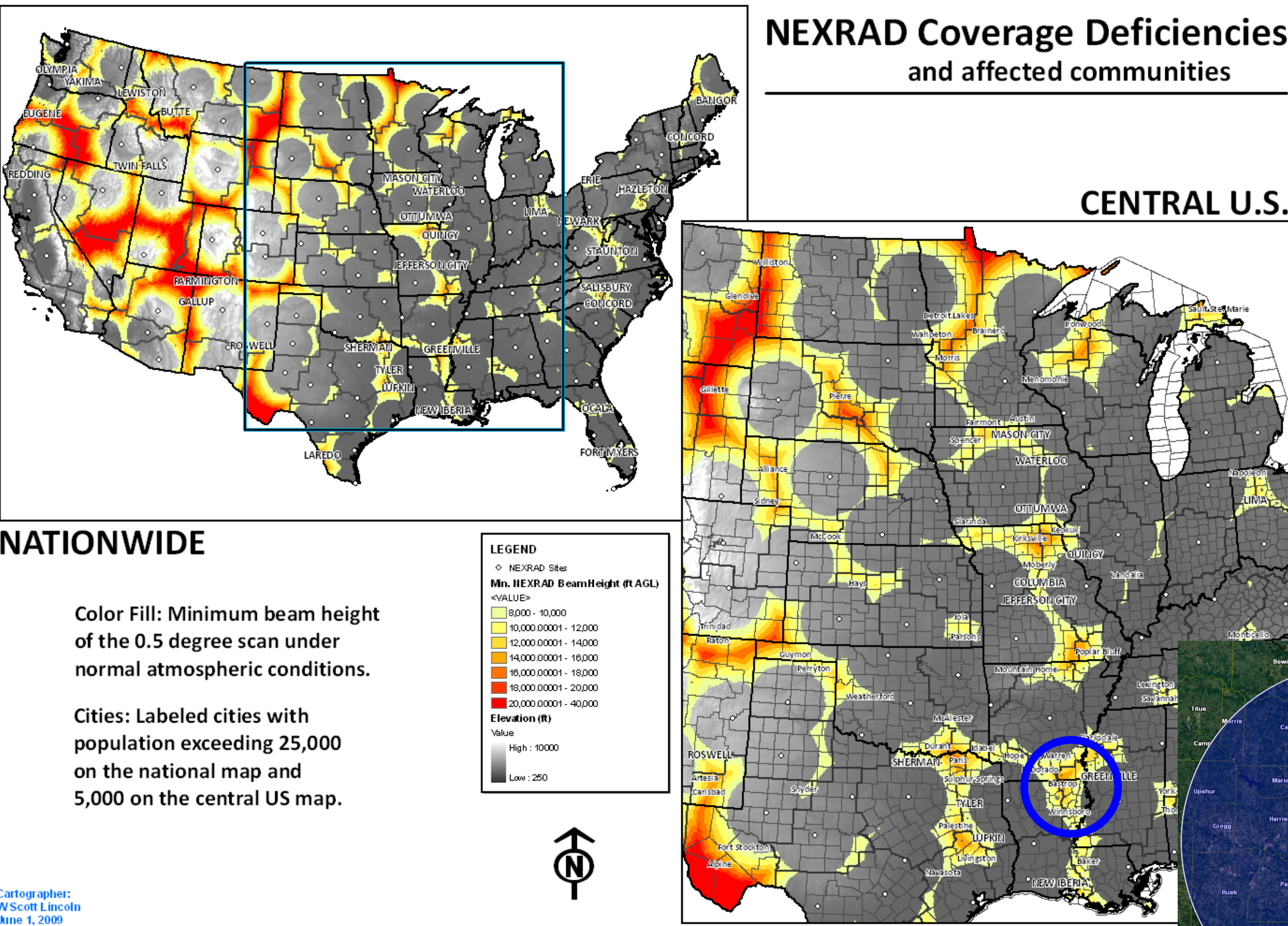
¹Department of Atmospheric Science, University of Louisiana at Monroe, Monroe, LA
National Weather Service, ²Jackson, MS and ³Shreveport, LA

Questions or Comments? Email murphy@ulm.edu | Twitter @ULMweather

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Background

- The ULM S-band polarimetric Doppler radar became operational in early October 2016
- Radar system supplied by Enterprise Electronics Corporation (EEC)
- Fills a low-level NEXRAD coverage gap in northeast Louisiana & southeast Arkansas.



Specifications

	EEC DWSR-8501S SIDPOL
Transmitter Type	Magnetron
Frequency (Wavelength)	2.950 GHz (10.162 cm @ 2.950 GHz)
Transmitter Power	850 kW (peak power)
Pulse Width	0.5, 0.8, 1.0, & 2.0 μs
Antenna Diameter	8.5 m (28 ft)
Beamwidth	0.95°
Gate Spacing	≤ 250 m

- Considered “88D equivalent.”
- Standard (Z, VR, SW), polarimetric (ZDR, ϕdp, KDP, ϕhv), & additional radar derived products available.
- Data archived in the CFradial format & available in the NEXRAD Level-2 format upon request

Teaching, Research, & Operations

Teaching/Research

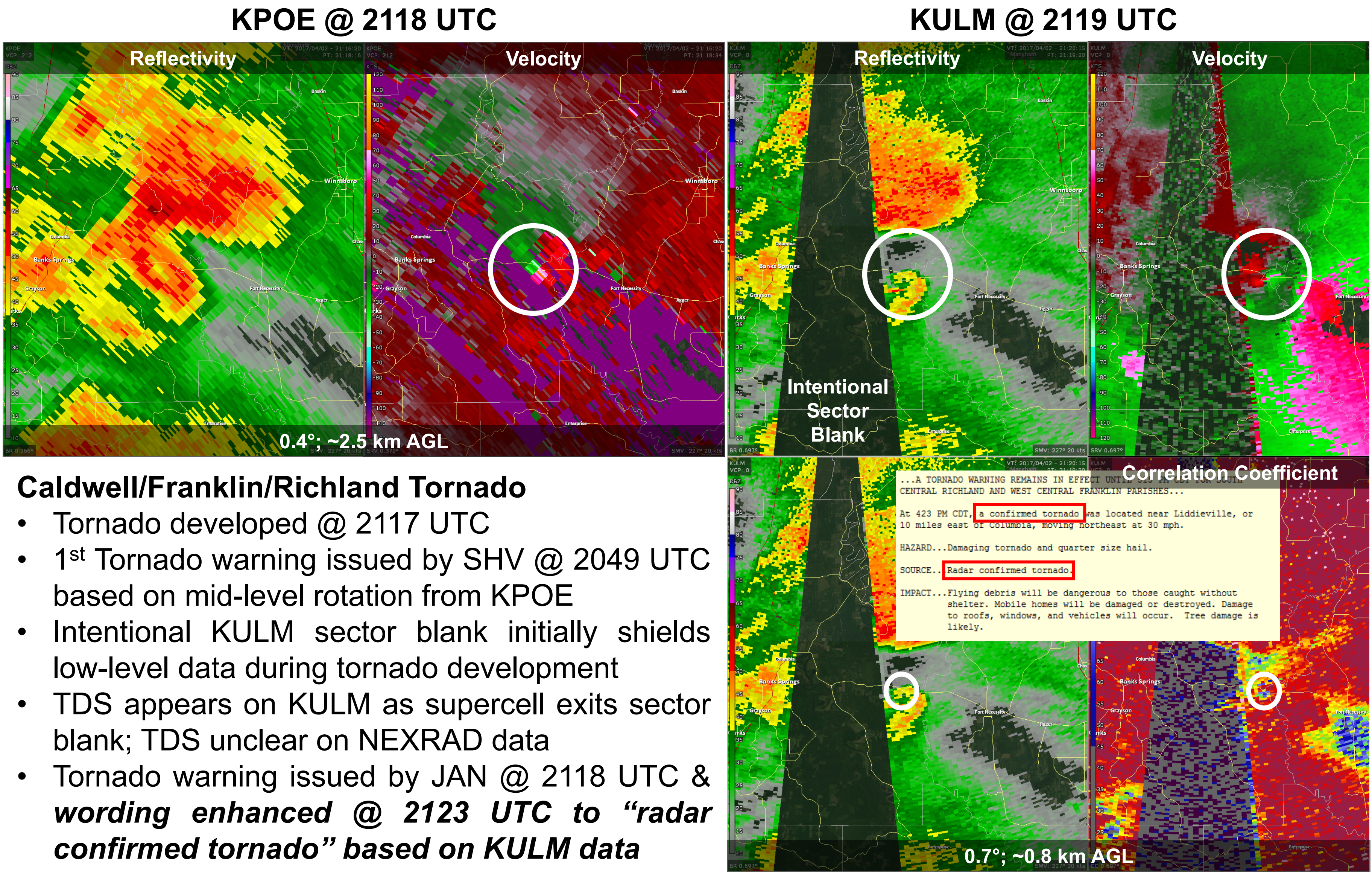
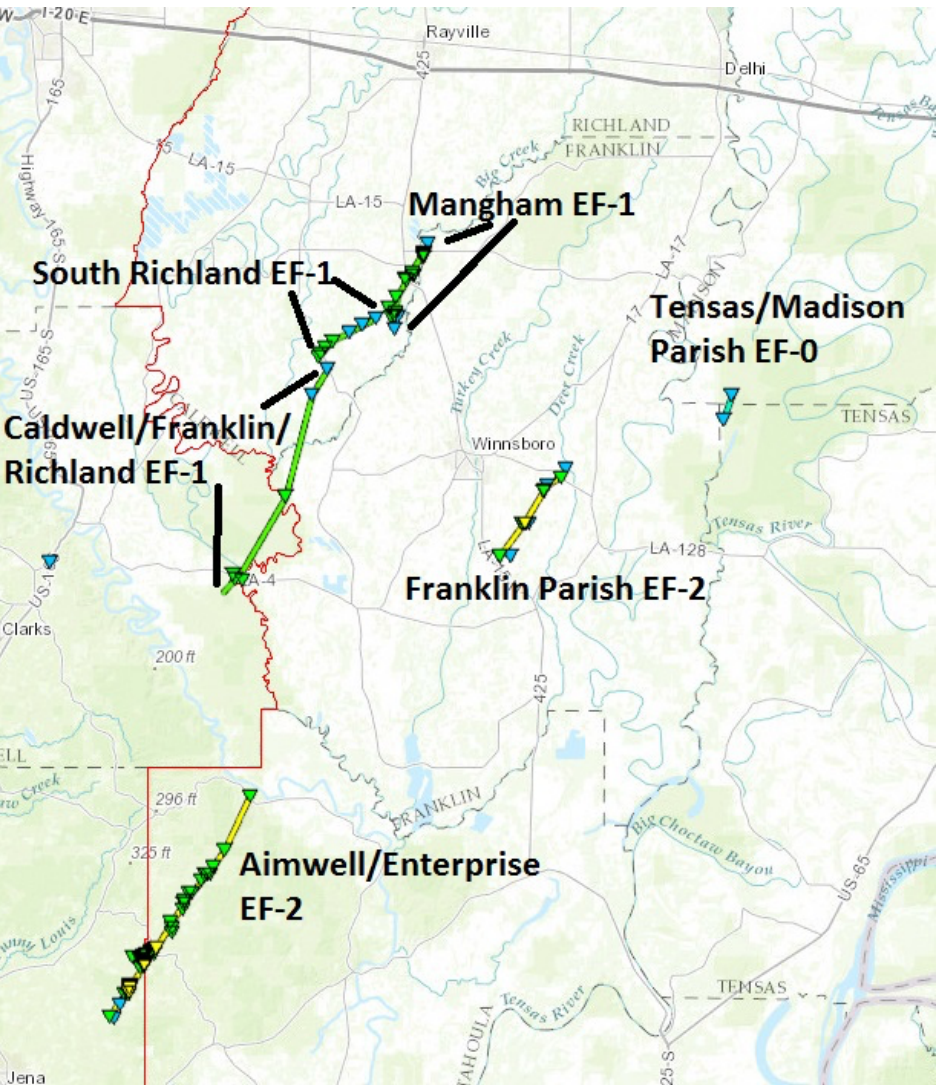
- ULM offers the only atmospheric science or meteorology undergraduate degree in LA
- Supports practical, hands-on learning in the undergraduate radar meteorology course @ ULM
- 5 student radar operating workstations added to the atmospheric science teaching laboratory
- Junior & senior students gain radar operating experience as part of standard coursework
- The radar enhances the research capability of the Atmospheric Science department
- Leverage for additional external funding opportunities & equipment acquisition; 4 active grant proposals in various stages of development or submission

Operations:

- 24/7 operations with adaptable scan strategies; not bound by conventional NEXRAD VCPs
- Radar is monitored and/or operated by Dr. Murphy & ULM students
- NWS Shreveport, LA & Jackson, MS gained access to live data beginning late February 2017. Access is provided via a private data polling site for the GR2Analyst radar program.

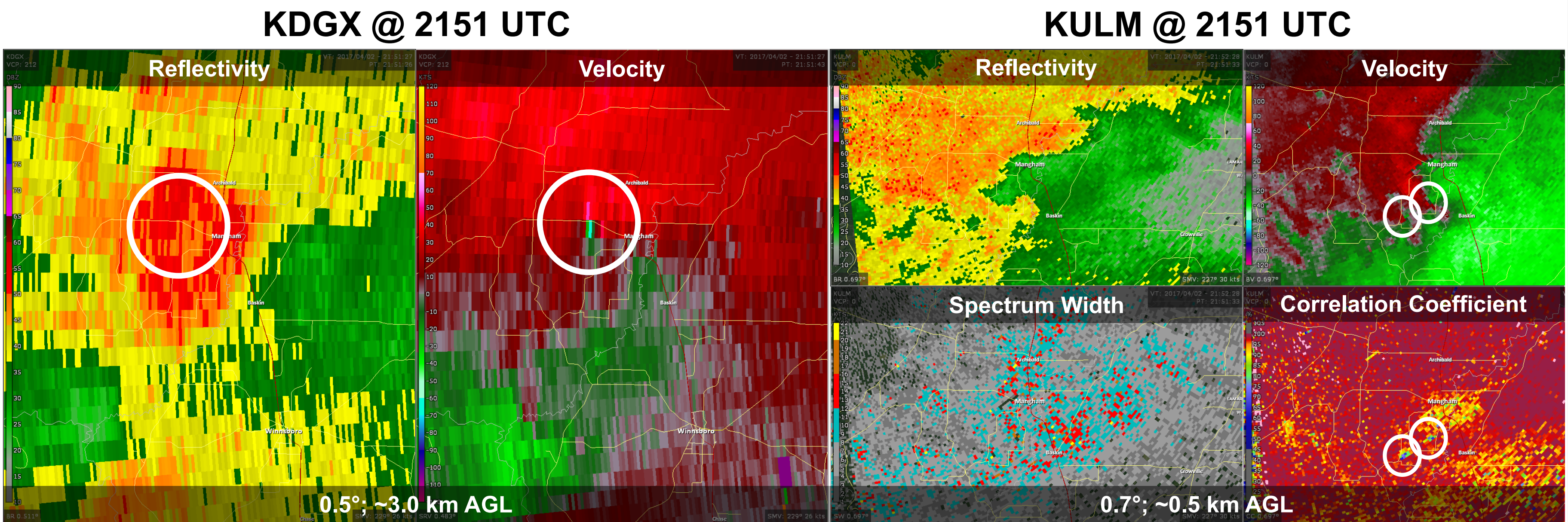
Operational Success: 2 April 2017

- Supercell thunderstorms developed during the afternoon hours across portions of northeast Louisiana
- 1 EF0, 3 EF1, & 2 EF2 tornadoes developed south & southeast of Monroe, LA
- The ULM radar was the **primary source** for warning decisions at NWS Jackson over a 2 hour period during the afternoon
- The radar was operating in 3-tilt volumes (0.7°, 1.8°, & 3.1°), providing new updates every 56 s



Caldwell/Franklin/Richland Tornado

- Tornado developed @ 2117 UTC
- 1st Tornado warning issued by SHV @ 2049 UTC based on mid-level rotation from KPOE
- Intentional KULM sector blank initially shields low-level data during tornado development
- TDS appears on KULM as supercell exits sector blank; TDS unclear on NEXRAD data
- Tornado warning issued by JAN @ 2118 UTC & **wording enhanced @ 2123 UTC to “radar confirmed tornado” based on KULM data**

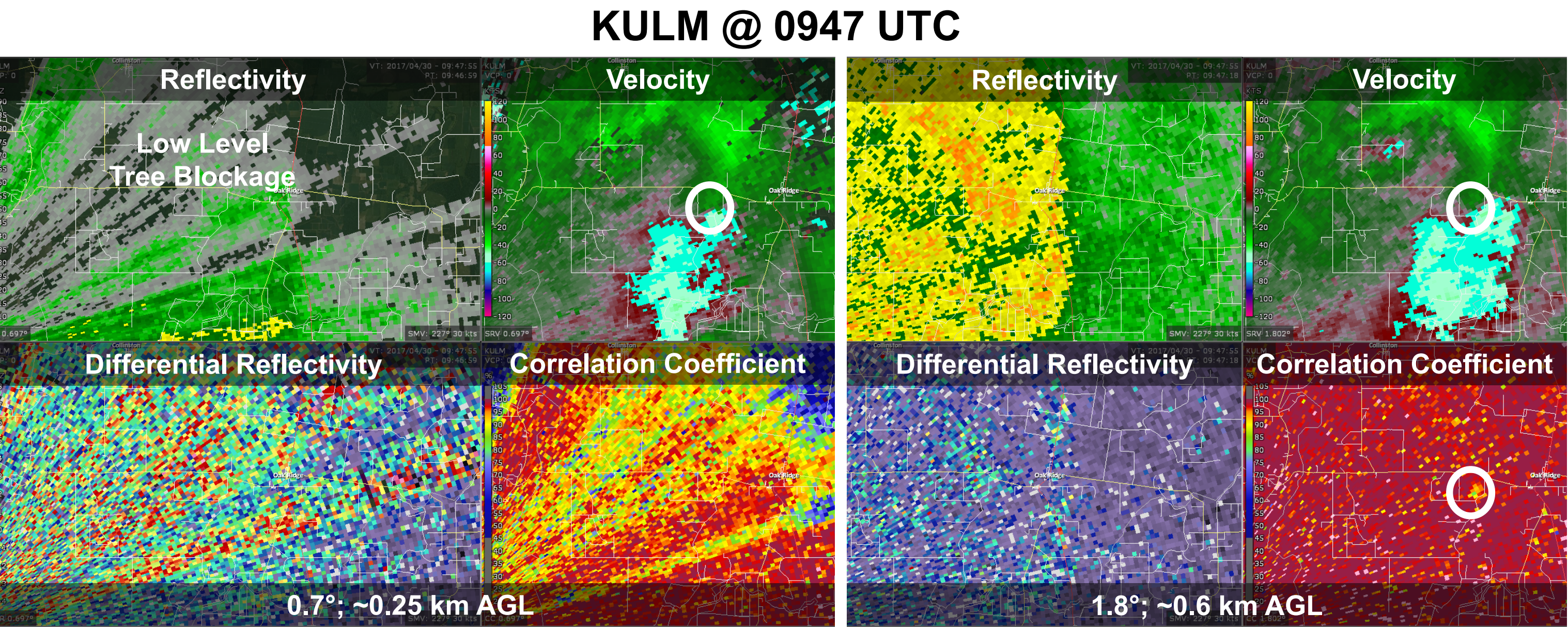
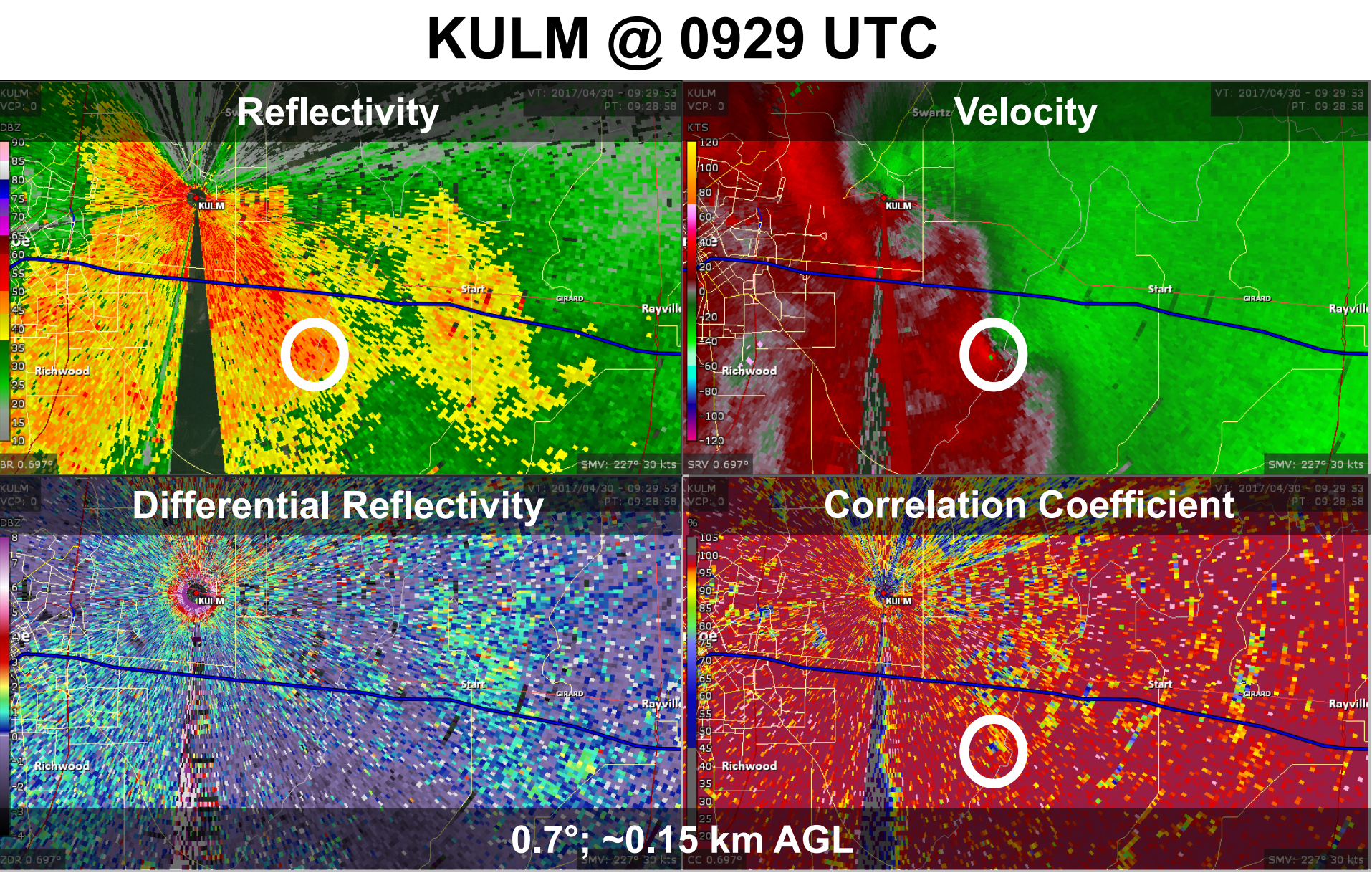


South Richland and Mangham Tornadoes

- Same initial cell as first example; produced two additional tornadoes in Richland Parish and near Mangham, LA
- KULM indicated two concurrent TDSs for ~2 minutes; confirmed by JAN damage survey
- Mid-level rotation present on KDGX, but displaced north of actual low-level TDSs from KULM
- No TDS present on KDGX
- **KULM data allowed JAN to extend tornado warnings with greater confidence than KDGX would’ve allowed**

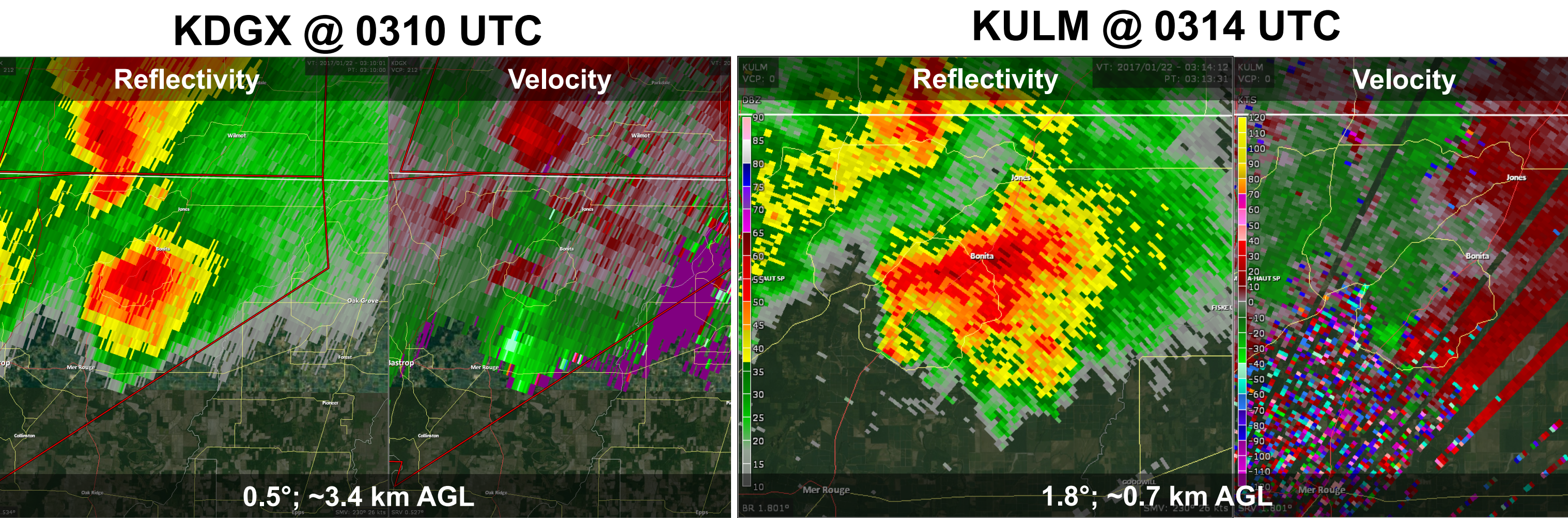
Operational Success: 30 April 2017

- 29 tornadoes occurred in the JAN CWA associated with an early morning QLCS; most were > 100 km distance from KULM
- **Right:** Brief TDS on KULM at far eastern edge of SHV CWA within Russell Sage Wildlife Management Area; no public damage reports and no official survey



- Another tornado occurred about 20 min later – EF1 near Oak Ridge, LA
- Would’ve been unwarned and likely not surveyed (no public damage reports) without KULM data

Operational Success: 21 January 2017



- Live data not available, however, KULM data provided after the event prompted a damage survey which confirmed an EF-1 tornado in Morehouse Parish

Summary

- The polarimetric S-band Doppler weather radar at ULM has been incorporated into operations at NWS Shreveport and Jackson
- Its value was proved during an active Spring 2017 severe weather season in the ArkLaMiss, where it was used extensively to protect lives and property
- At least 5 “extra” tornadoes surveyed by NWS Jackson that may not have otherwise been surveyed (no damage reports; no tornado indication on NEXRAD; TDS on KULM)
- Future research will include testing novel scan strategies with NWS meteorologists and improved precipitation estimation
- Outstanding issues: Data availability in AWIPS-II and inclusion in MRMS