



casa

Engineering Research Center for
Collaborative Adaptive Sensing of the Atmosphere

CASA DFW URBAN DEMONSTRATION NETWORK



University of
Massachusetts Amherst



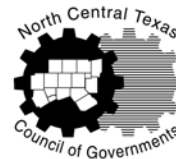
University of Oklahoma

**Colorado
State
University**

Colorado State University



University of
Puerto Rico Mayaguez



CASA is primarily supported by the Engineering Research Centers Program
of the National Science Foundation under NSF award number 0313747.



Goals of this Meeting

- ❑ Background on Regional CASA WX Project
- ❑ Explain the capabilities, structure of the Radar Network
- ❑ Present the CASA WX DFW Test Bed will be rolled out
- ❑ Describe the Community Benefits of CASA WX
- ❑ Describe Large Scale Public / Private Partnership Model



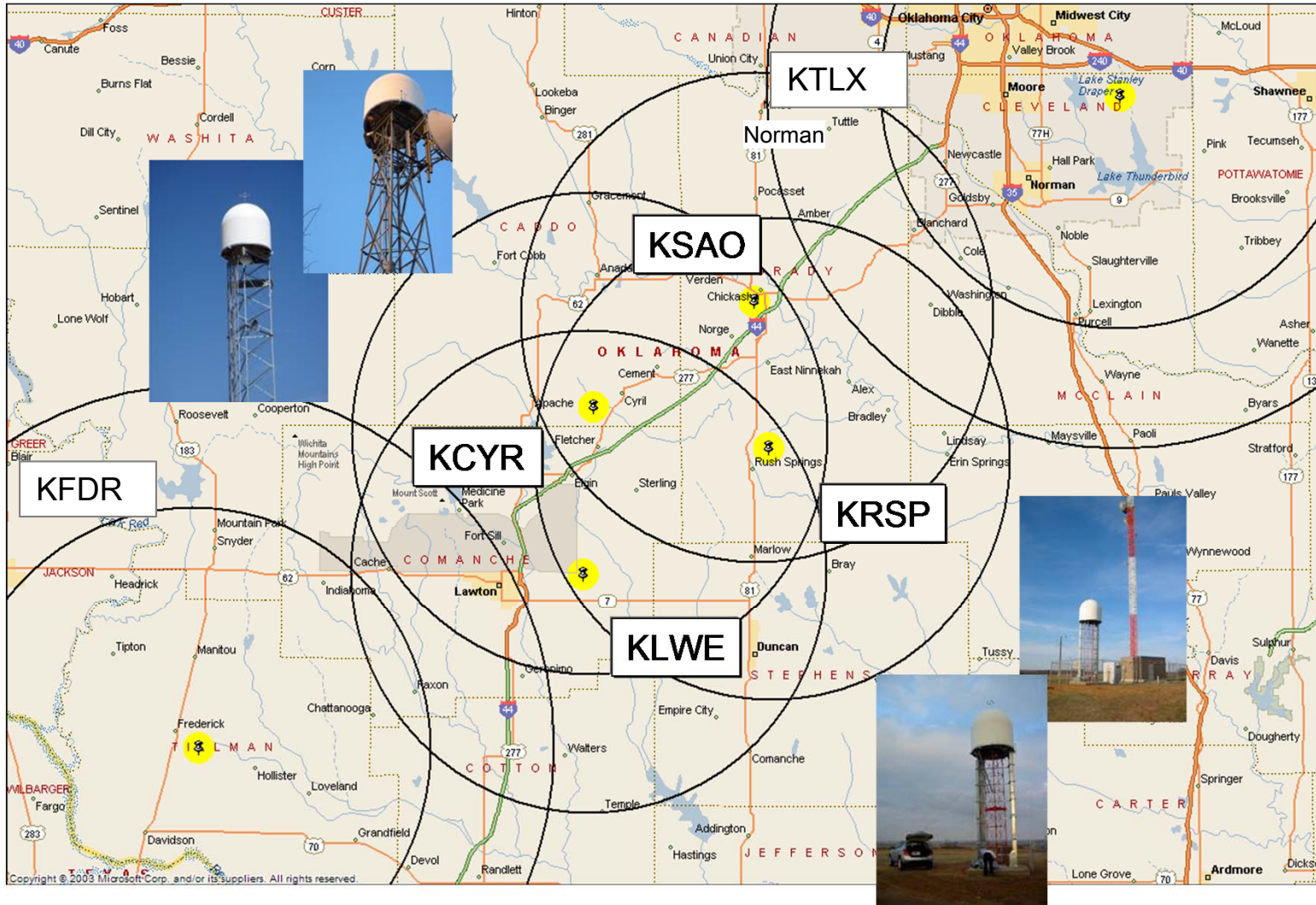
What is CASA?

Collaborative Adaptive Sensing of the Atmosphere

- ❑ National Science Foundation Engineering Research Center, 10 year, \$40 million grant
 - ❖ Academic, Government and Private Sector Partners
- ❑ Research to operations.
- ❑ Year 10 of a 10-year research project
- ❑ Test beds in Oklahoma and Puerto Rico
- ❑ Core Partners are: UMass, Colorado State U., U. of Oklahoma, U. of Puerto Rico, U of Delaware, U. of Virginia, U. Colorado Springs



Oklahoma Test Bed – Quasi-Operational Test bed: 2007 - 2011



Cutting edge radar system being deployed in DFW region

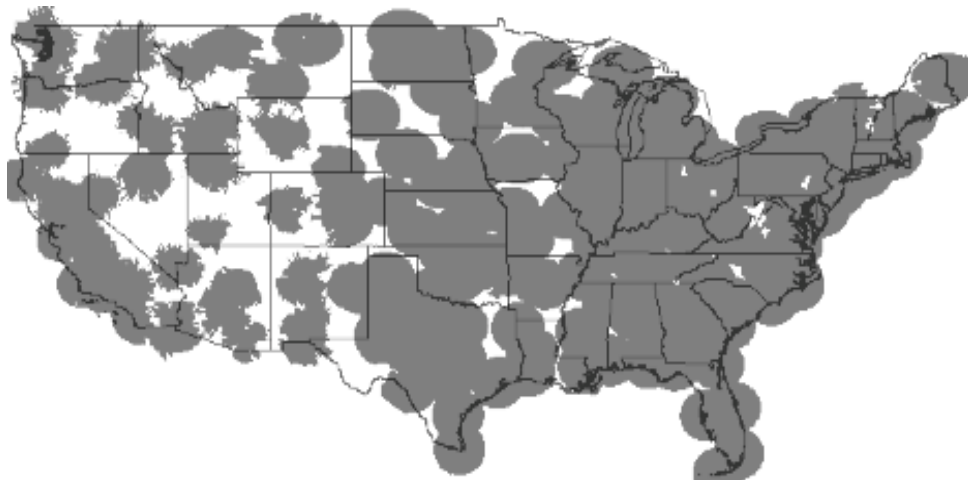
- ❑ New hazard warning system: weather, low flying targets.
- ❑ Increases public safety and economic benefits
- ❑ More accurate warnings
- ❑ DFW as a national model for future urban safety infrastructure



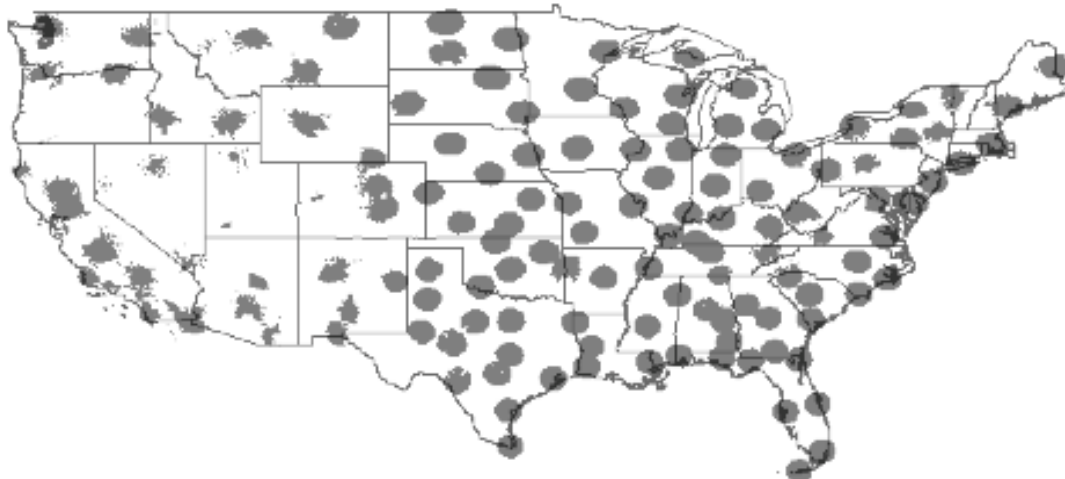
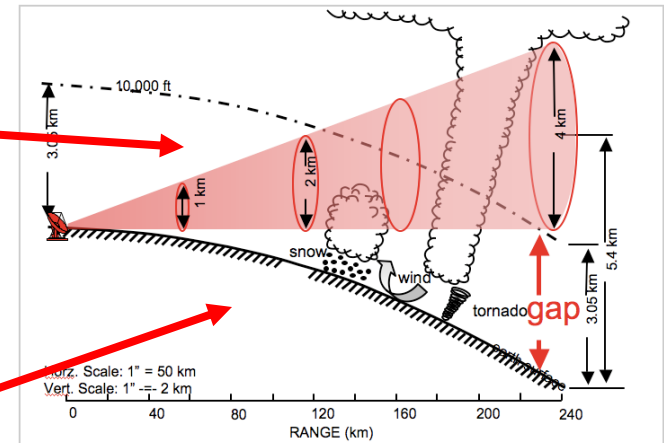
Low power, multi-Doppler, Dual Pol, X-band radars



What are the gaps in the current radar system, NEXRAD (88D)?

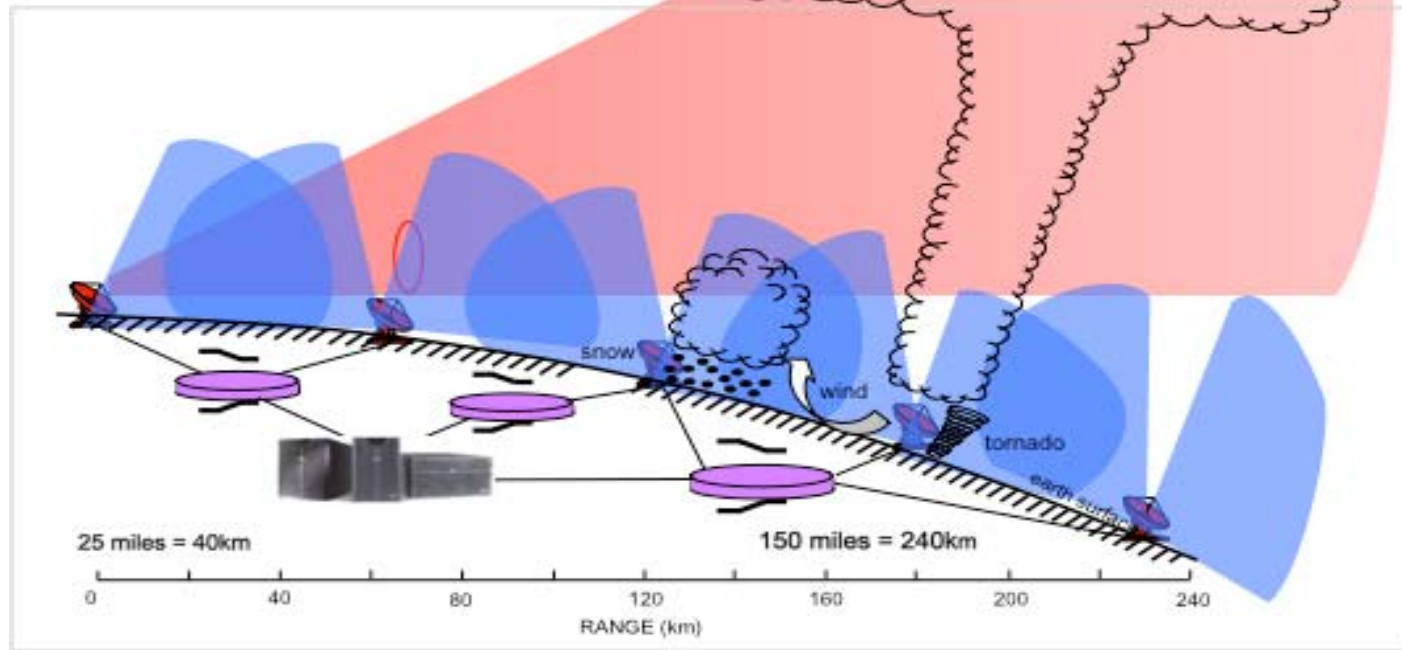


NEXRAD coverage at 3 km (10,000 ft).



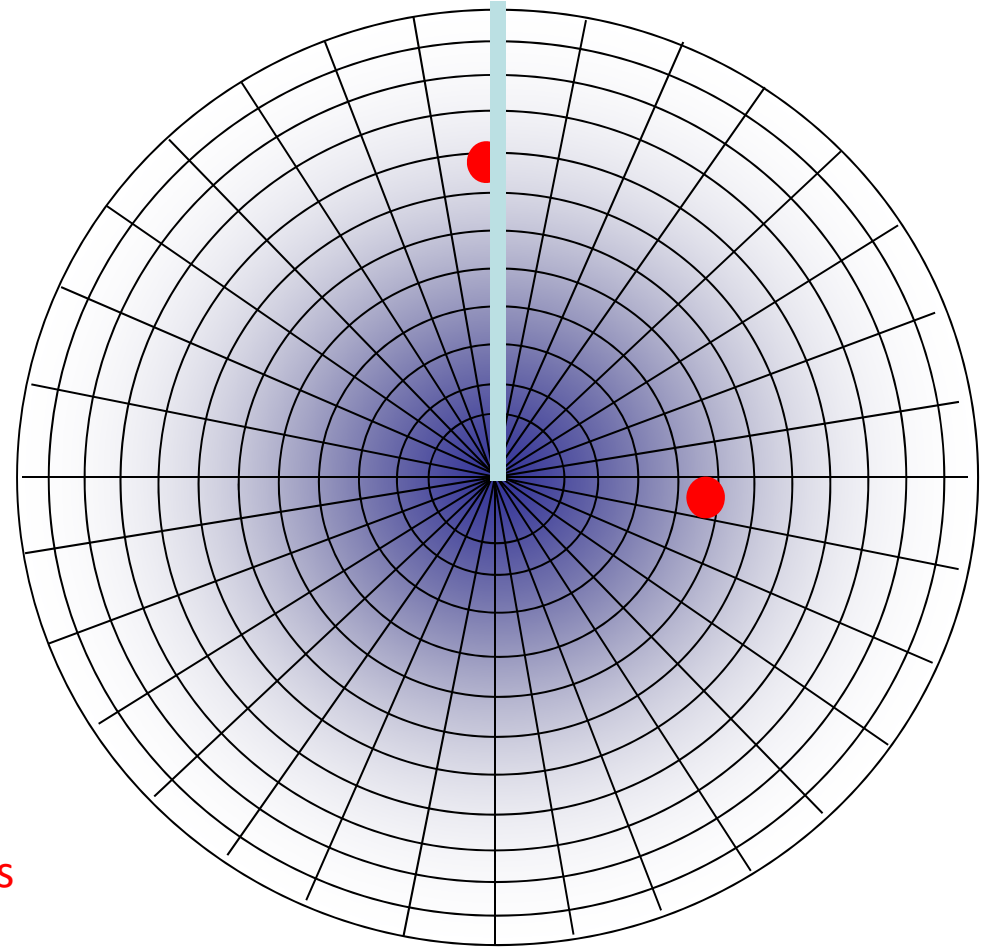
NEXRAD coverage at 1 km (~3200 ft) AGL.

CASA's Solution: dense, X-band radar networks



	CASA	NEXRAD
Low level sensing	Coverage below 3200 ft	30% coverage below 3200ft
Radar Resolution	1- 2.5 football fields	10 – 40 football fields
Update rate	1 minute	5 minutes
Radar Scanning Strategies	Smart Scans at ground level, optimized each minute automatically	360 degree multi-level scans, changed manually

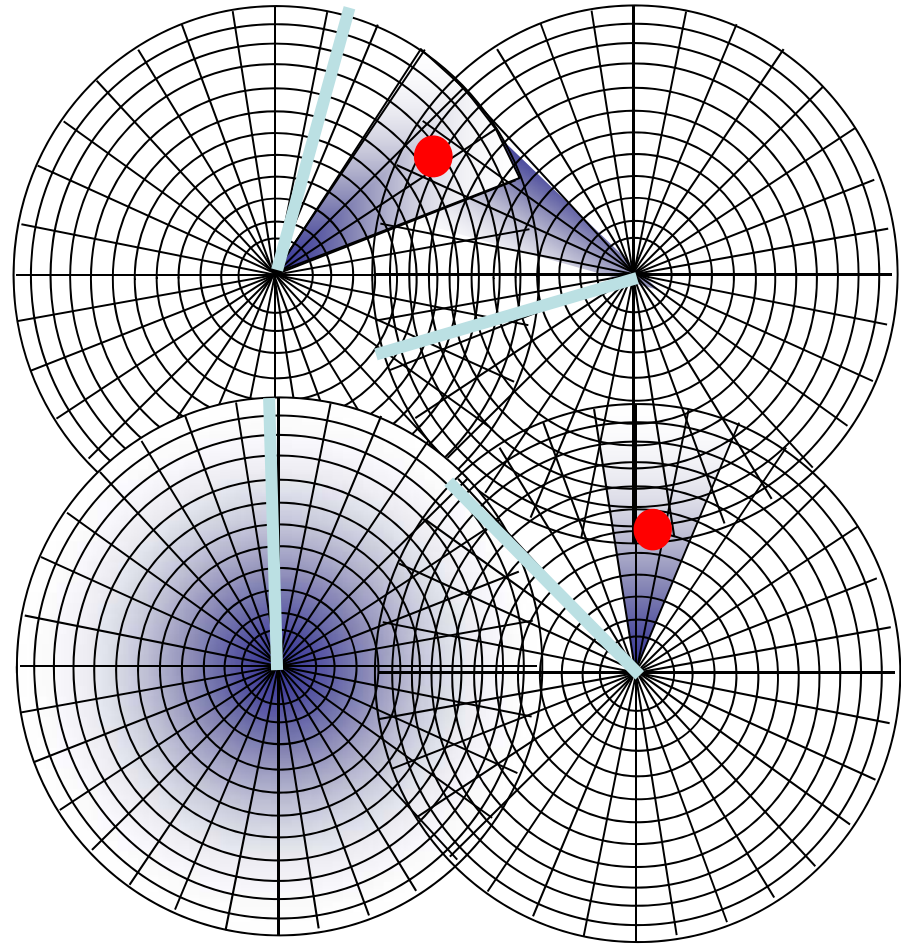
Current NEXRAD Radar Technology



NEXRAD= 5-6 min between updates



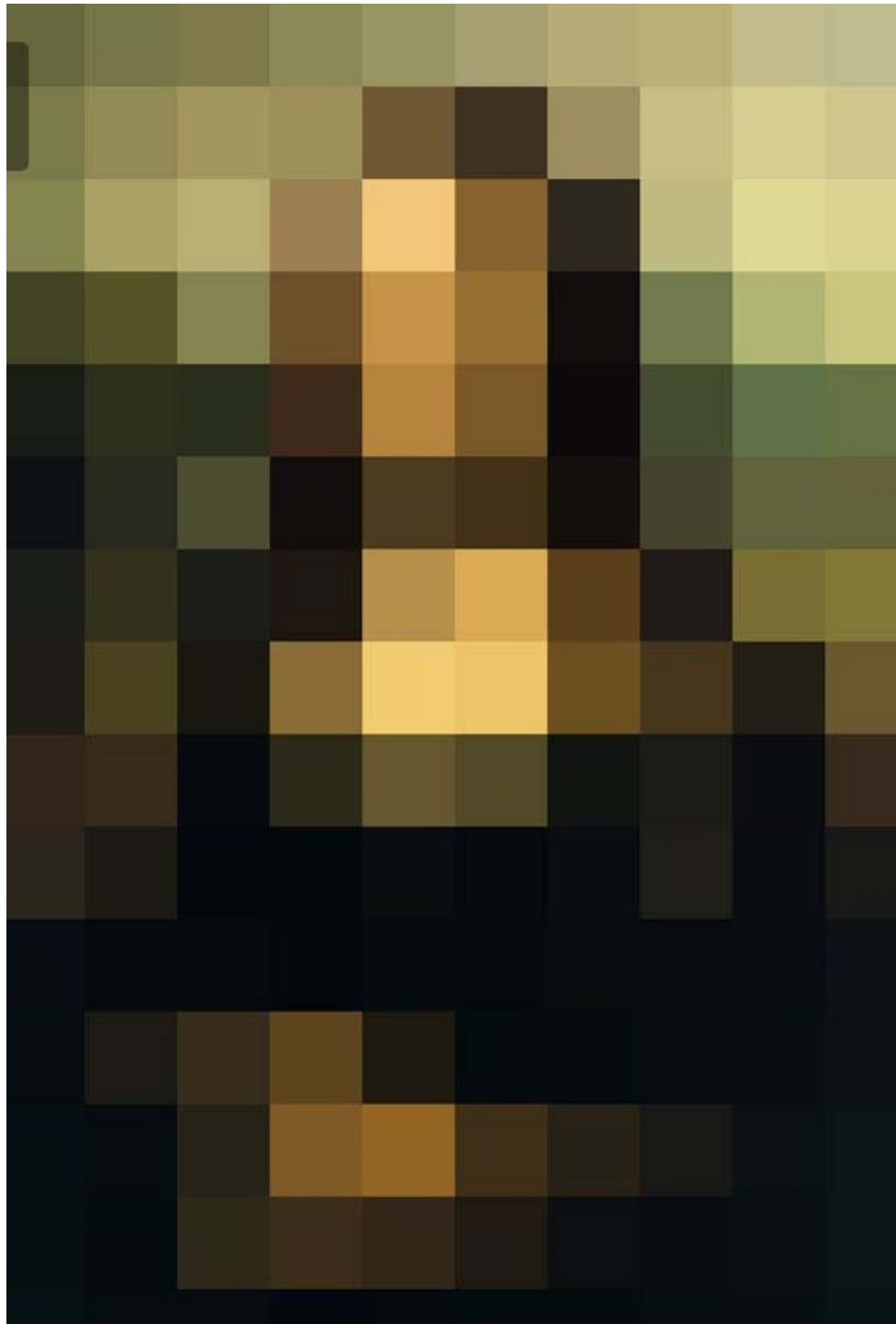
CASA Radar Smart Scan Technology



CASA = 1 min between updates

- Rapid, High Res. “smart” scans
 - Balance competing user needs for data
 - Adapt to changing weather
 - Dual Polarization
 - Automated sector scans
- Improved resolution, sensitivity, accuracy, timeliness and **ability to support multiple users and multiple applications.**

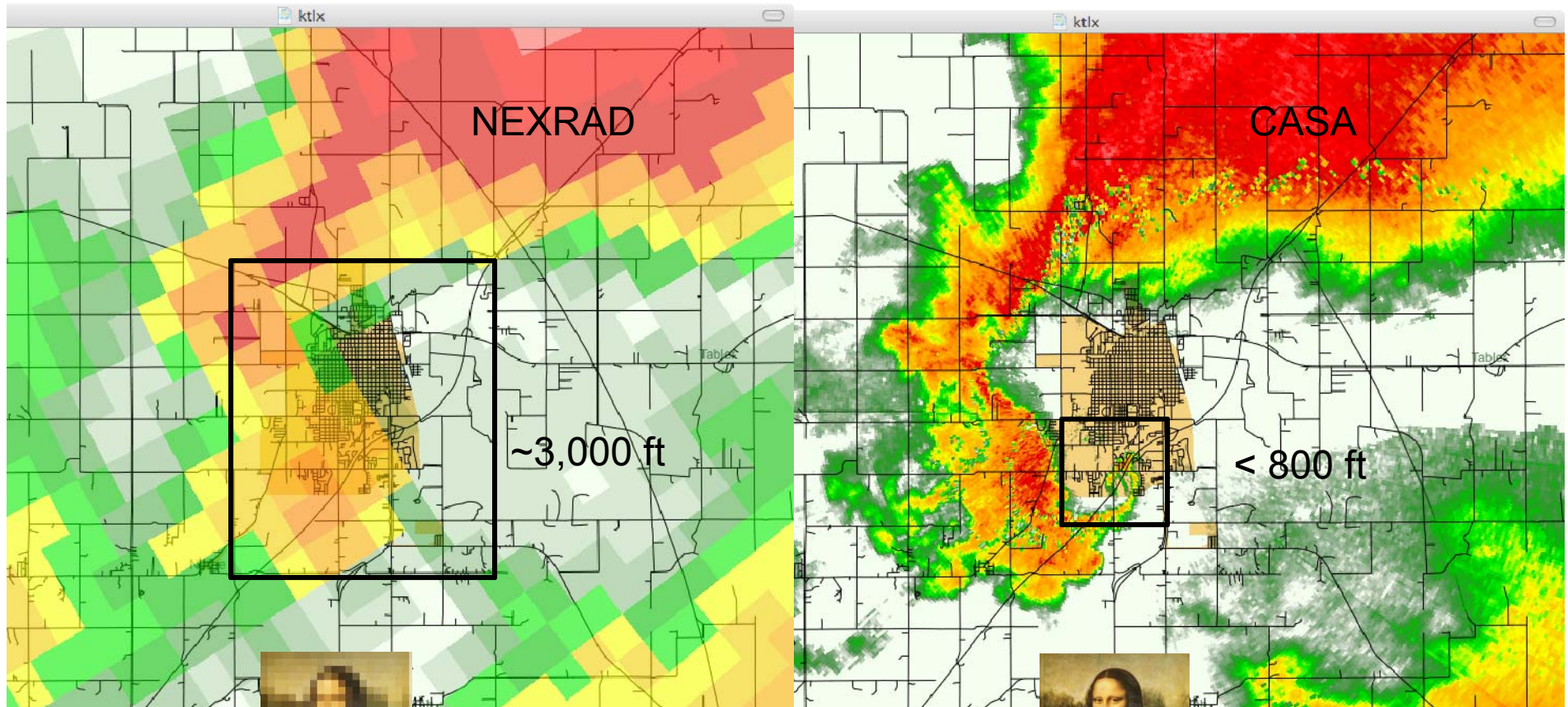




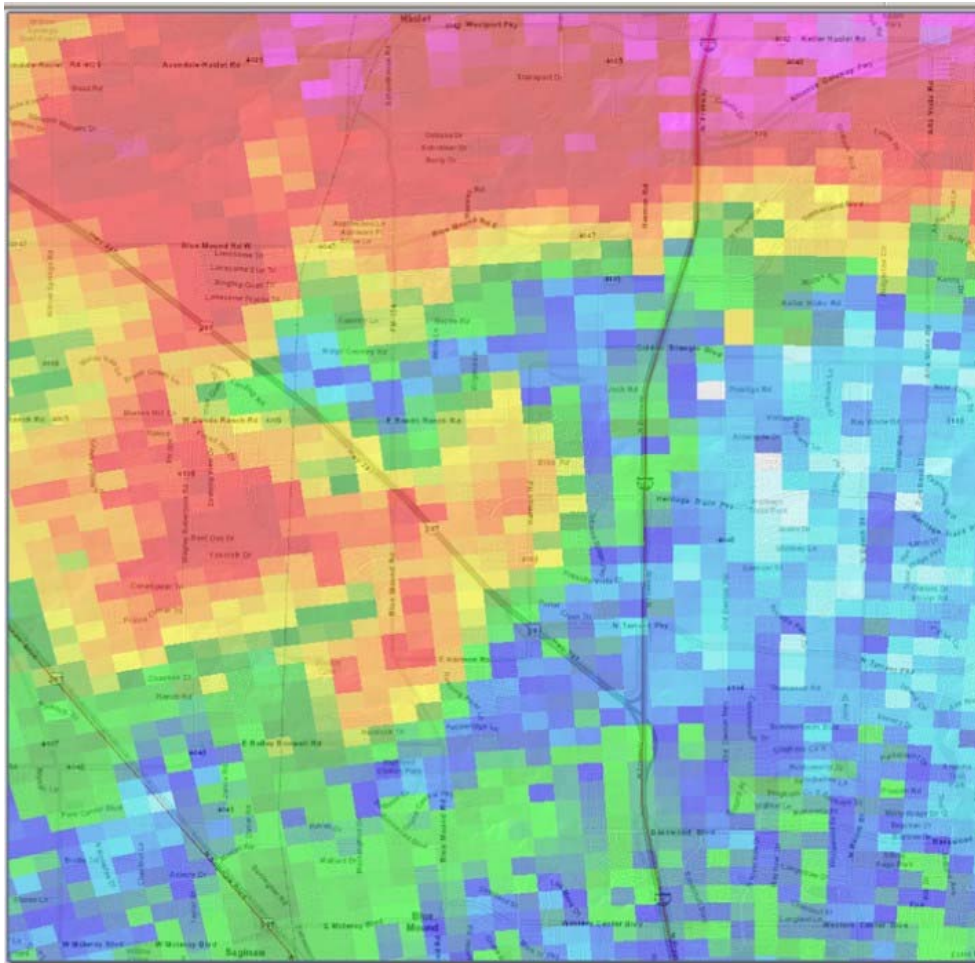




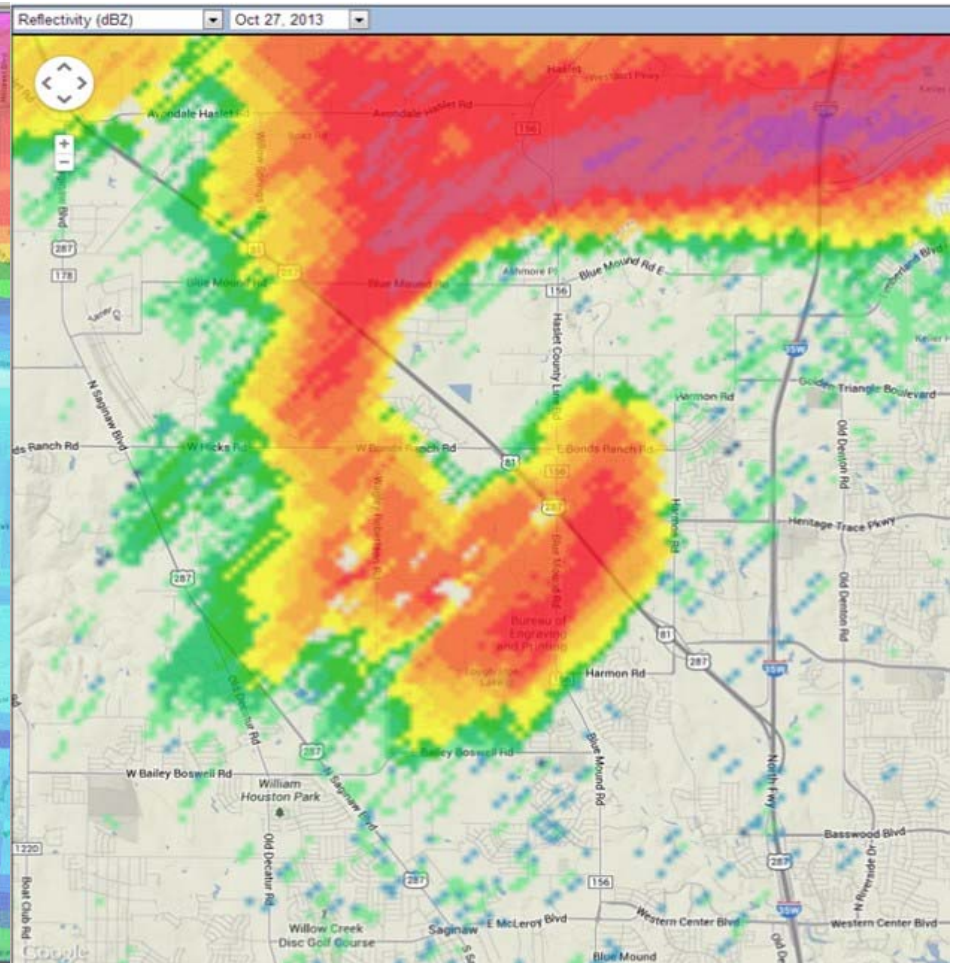
Benefits of low-level, fine-scale weather information



Benefits of low-level, fine-scale weather information



NEXRAD Data

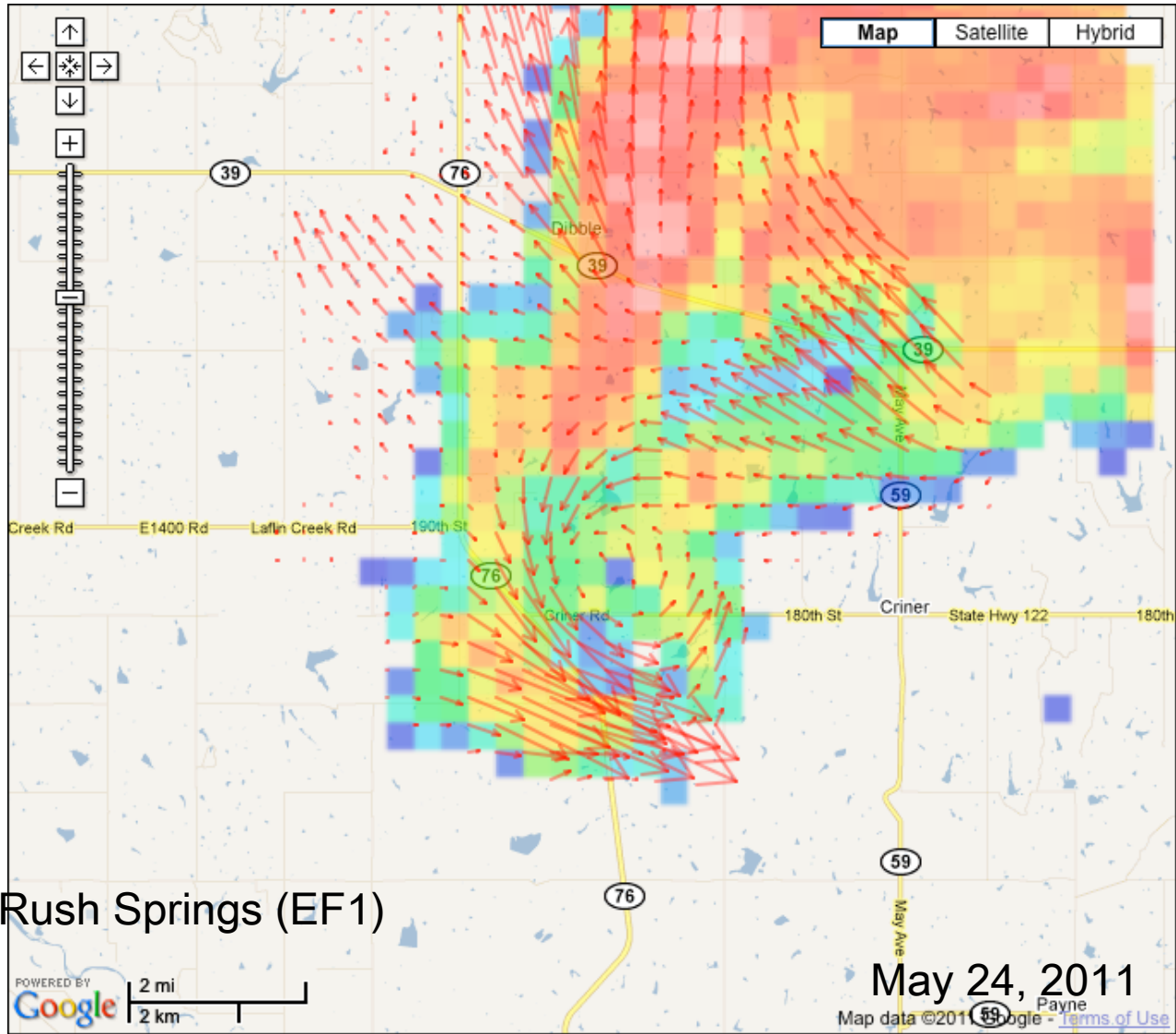


CASA Data

Comparison – Haslet, October 2013

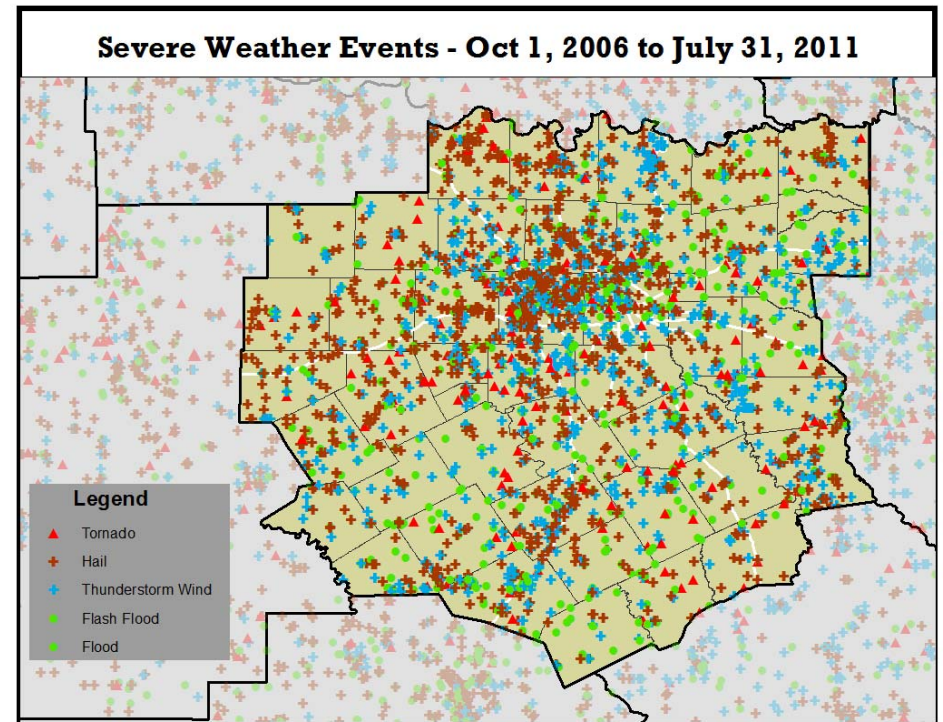


Benefits of Smart Scans: True Wind Data



North Texas Weather Threats

- Flash Floods/River Floods
- Tornadoes
- Damaging Winds
- Hail
- Lightning
- Winter Storms
- Fire Weather
- Inland Tropical Cyclone Effects



DFW Economic Losses – April-June 2012

April 2-4, 2012

- At least 21 tornadoes touched down
- More than 1,100 homes damaged
- 110 planes damages by hail at DFW Airport
- Total economic losses estimated at \$1billion

Source: AON Benfield (Reinsurance broker), April 2012 Global Catastrophe Recap

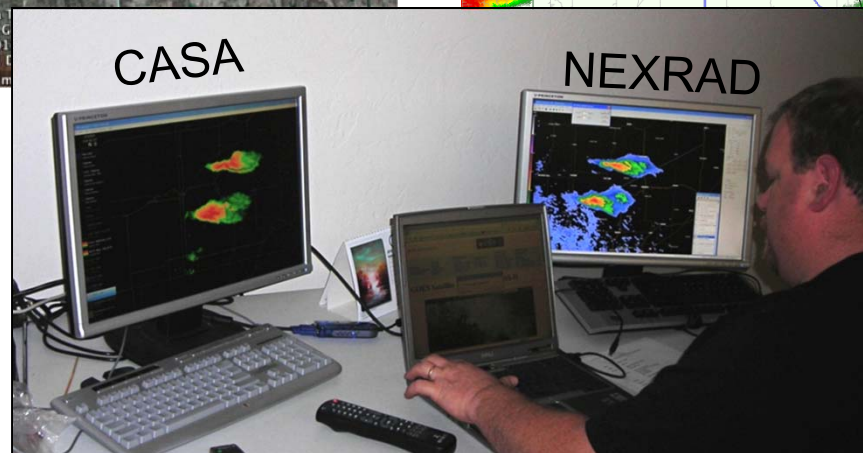
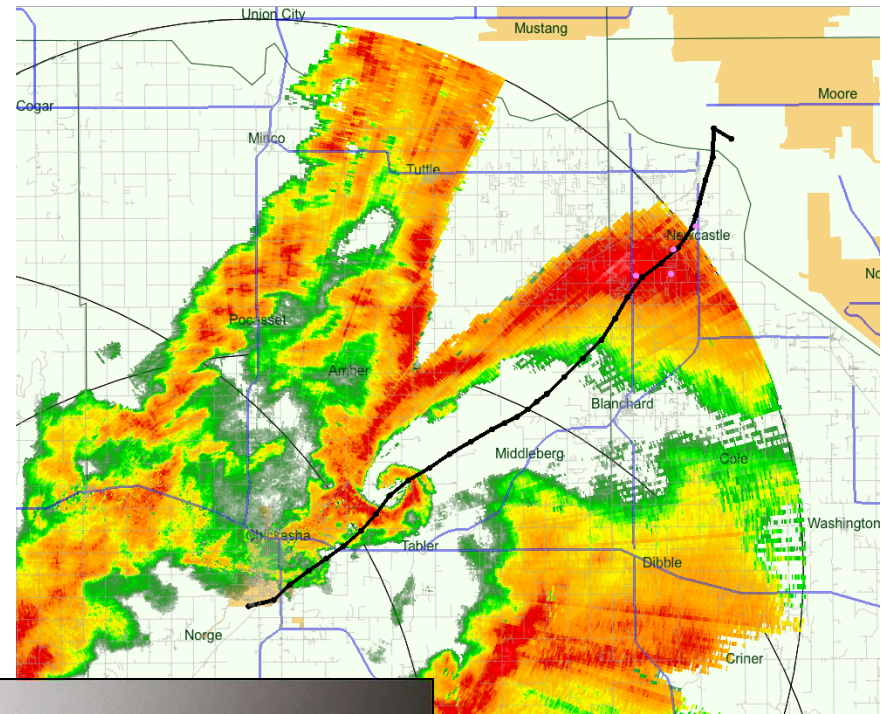
June 11-13, 2012

- Up to baseball sized hail reported in Dallas and Grand Prairie
- Golf ball sized hail reported throughout the region
- More than 100,000 insurance claims were filed
- Insured losses estimated to exceed \$1 billion in Texas

Source: AON Benfield (Reinsurance broker), June 2012 Global Catastrophe Recap



Fine grained, lower, faster: CASA used for life saving decisions by Newcastle EM



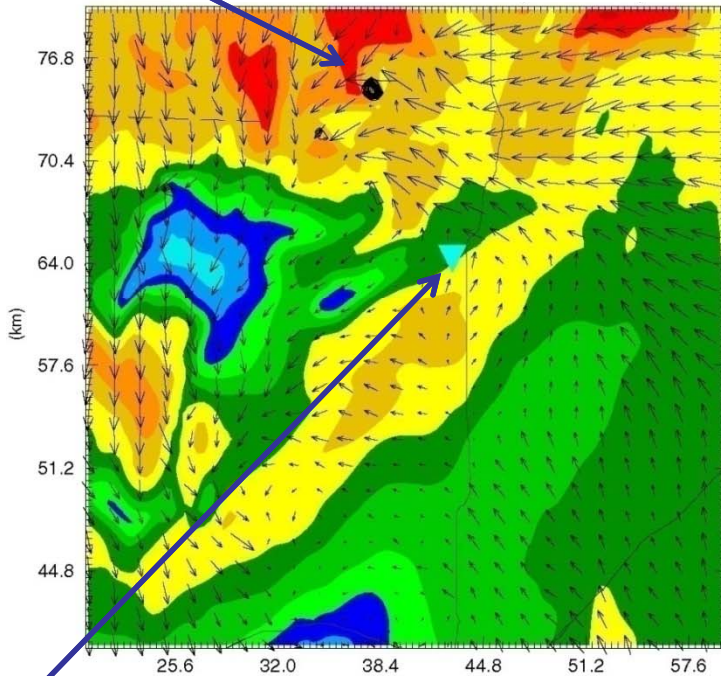
User-centered,
Multidisciplinary
approach



Real-time high resolution forecasts and nowcasts

Predicted

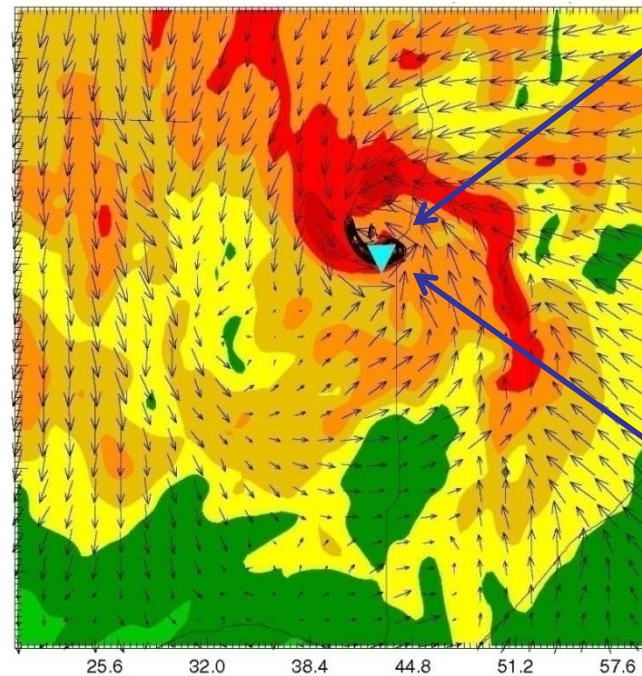
NEXRAD



Actual

80 minute tornado forecast

NEXRAD & CASA



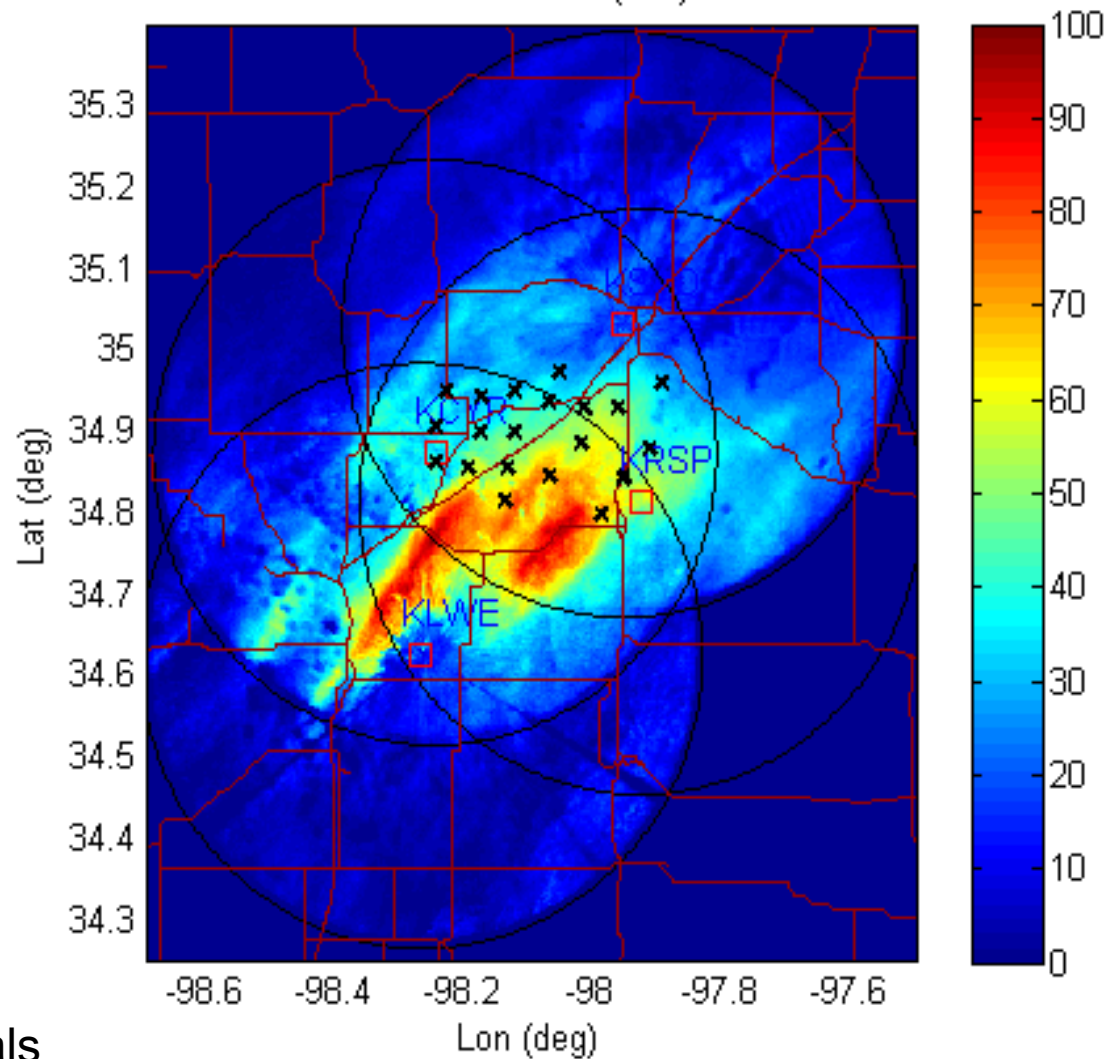
Predicted

Actual



Fine scale rainfall totals: Like a rain gauge every 800 feet

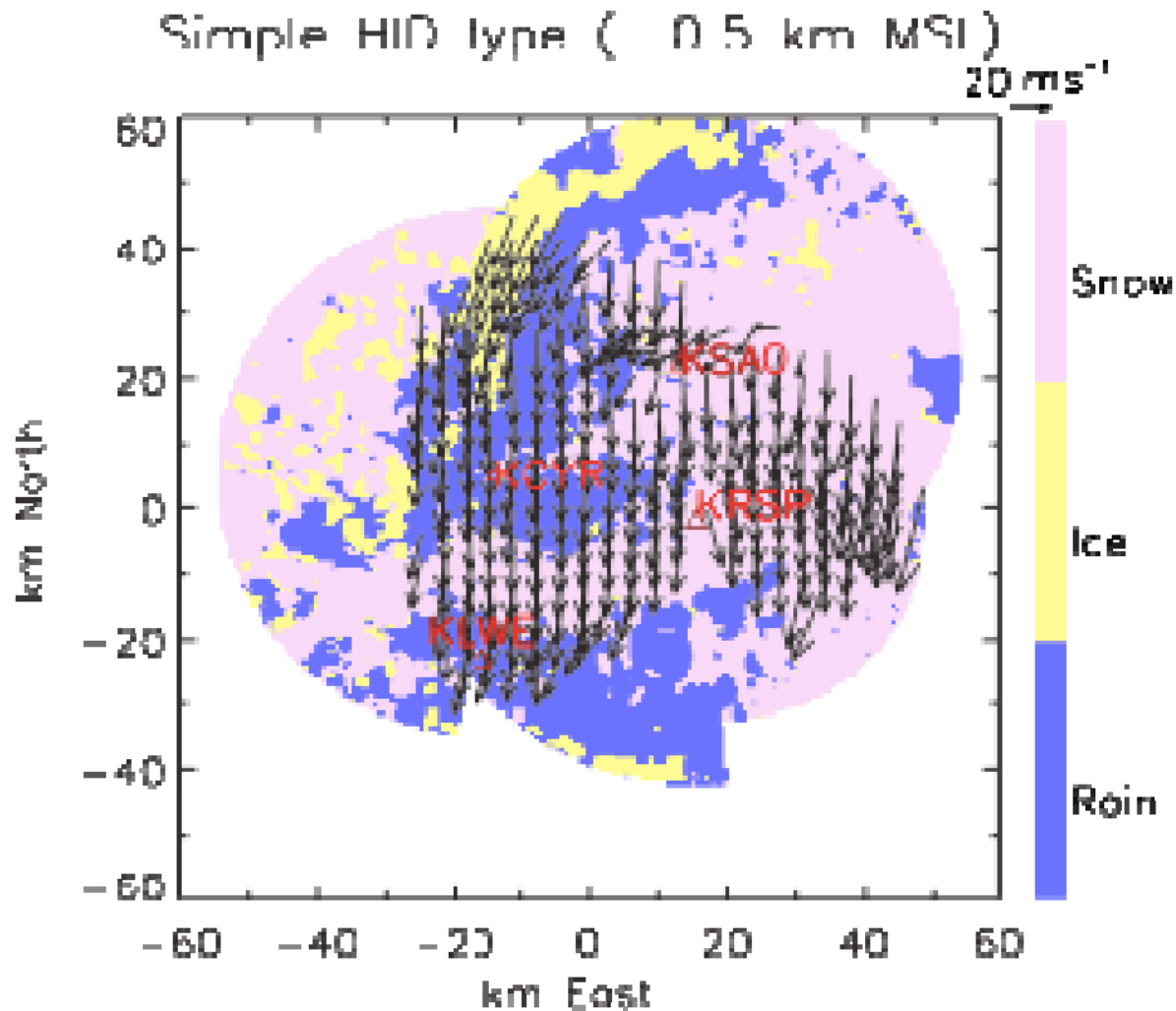
20100614 Total (mm)



Storm Totals

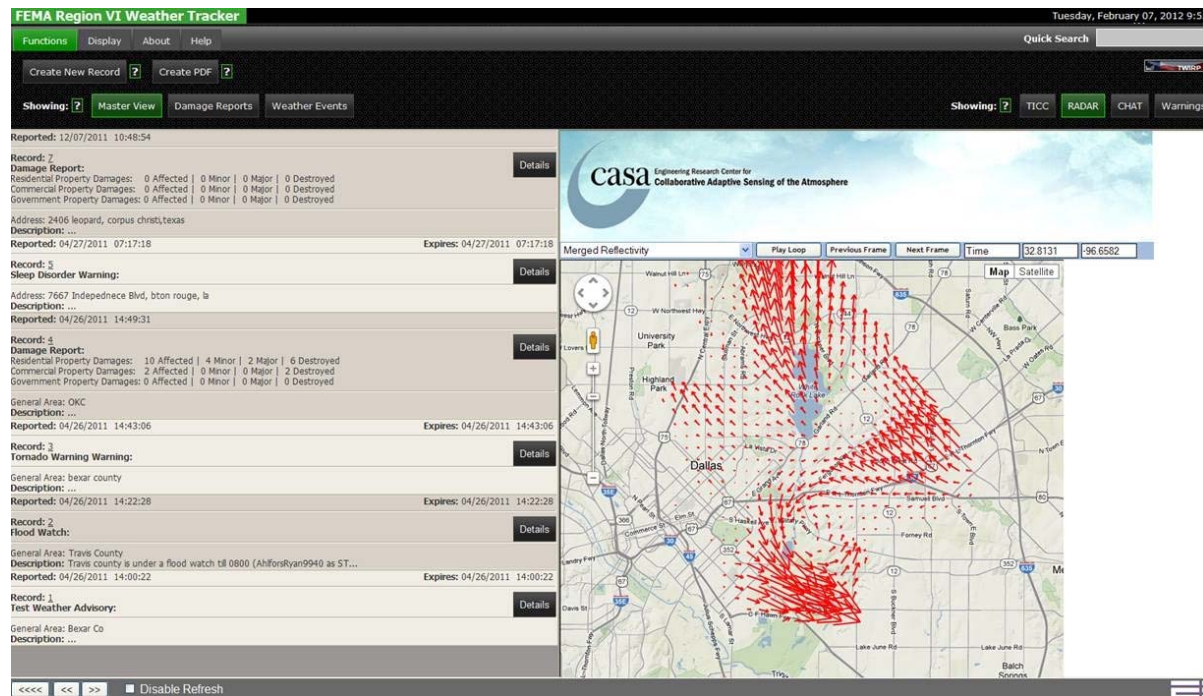


Benefits for Winter Weather (research stage) water ice transition



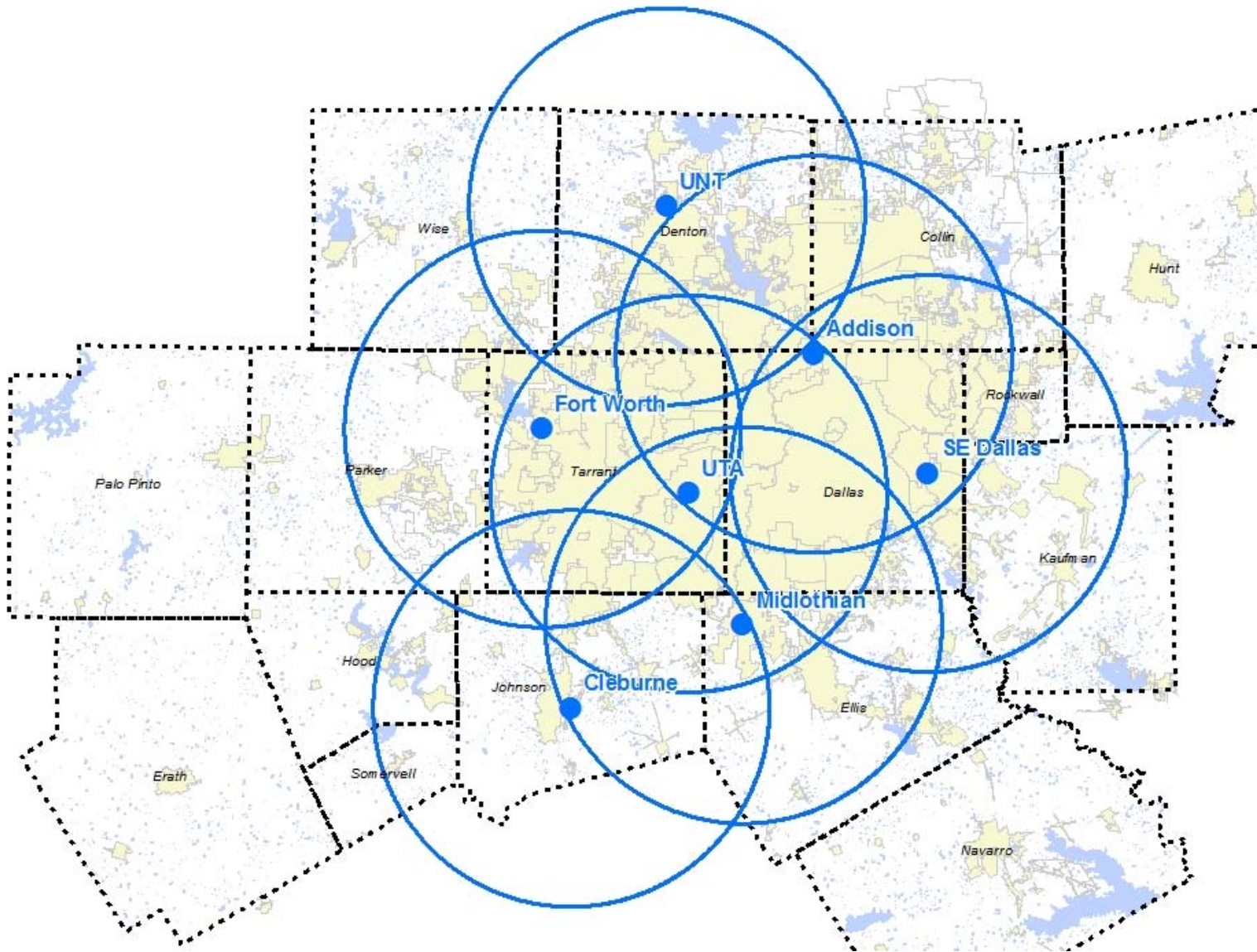
CASA data integrated into decision support platforms

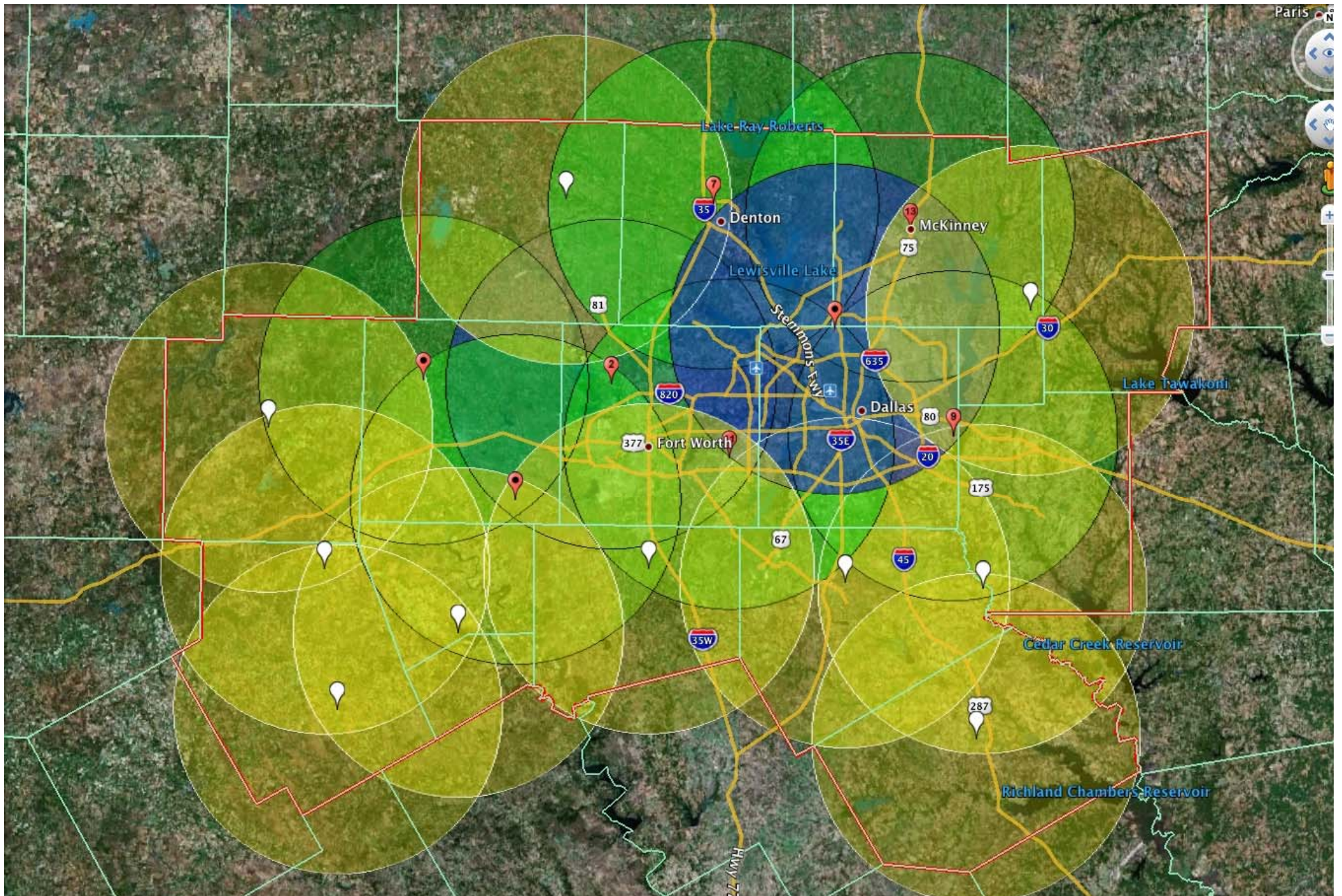
Mock-up of CASA data on WeBEOC Platform



PROPOSED RADAR LAYOUT







Plan for Covering the Whole COG Area
TOTAL NETWORK SIZE = 16-22 RADARS

Become A Partner

□ Network Operations \$600K per year

❖ Partnership includes:

- Access to CASA WX radar data on a secure website
- Access to archived radar data
- Training on how to read and interpret data
- And more!



Public / Private Partnership Model

- ❑ Create model for public/private partnerships
 - ❖ Operational funding model to be replicated nationally
 - ❖ Customization of data presentation based on user needs
- ❑ Not entirely dependent on governmental development priorities
 - ❖ Infuse governmental research and development with private sector solutions



Potential Funding Models

- ❑ Application Developers
- ❑ Private Sector Partnerships
- ❑ Research and Academic Data Use
- ❑ NWS Research
- ❑ Private Grants
- ❑ Endowments or Fellowships
- ❑ Public Entities



CASA WX Executive Council

- Addison
- Dallas
- Fort Worth
- Grapevine
- McKinney
- Midlothian
- Collin County
- Johnson County
- Tarrant County
- National Weather Service
- DFW Airport
- Local Broadcast Meteorologists
- University of Texas Arlington
- University of North Texas
- North Central Texas Council of Governments



More Information:

- ❑ <http://nctcog.org/CASAWX>

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