Dallas Fort Worth Urban Demonstration Network
AMS Summer Community Meeting 2011

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DFW Urban Demonstration Network

1. **High spatial, temporal resolution, boundary layer** observations/forecasts of wind, tornados, floods, hail, ice.
   - Leveraging existing observation assets

1. **User-relevant, impacts-based weather information** for local stakeholders
   - Development of user-oriented metrics, value

2. **Multi-sector partnerships** to operate observing networks and fund research: local, federal, private.
CASA’s Quasi-Operational Test Bed in Oklahoma

Oklahoma Test Bed

X-band, multi-Doppler, Dual Pol
Sensor-based multi-Doppler Retrievals based on overlapping coverage

Redeployment of first responders based on CASA data on May 24

80 minute Warn-on-Forecast
Forecaster & EM decision-making

5 Week Experiment
4/12 - 5/17

EMs in Mobile EOC

EM in EOC

CASA/WXscope

Spotters

Distances (Miles)
- 0 - 2
- 2 - 5
- 5 - 10
- 10 - 15
- 15 - 20

Public Response Research
North Central Texas Council of Governments

- Emergency Preparedness
- Storm Water Management
- Transportation
- Aviation

“voluntary association of, by and for local governments, and was established to assist local governments in planning for common needs, cooperating for mutual benefit, and coordinating for sound regional development. “

MOU signed with COG
DFW: A Vibrant, Growing Metroplex

- 6.3 million people
- 4th largest metroplex
- Population growth 25%+
- 2nd highest per capita lane miles
- 6th largest gross metropolitan product

- North Central Texas Council of Governments
- Fort Worth WFO
- Emergency Management
- Storm water managers
- Surface transportation
- Arena Events
- Airports
- Interior Port (Ft. Worth)
- Utilities
- Media
- Corporate HQ’s
DFW Urban Demonstration Network

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High spatial, temporal resolution boundary layer observations

X-band radars

Avg. 270m AGL at lowest beam

100m gate spacing

Overlapping coverage

30 sec – 1 min updates

Dynamic, Flexible VCPs

Spring 2012 Start Date
High spatial, temporal resolution boundary layer observations

Data Fusion through models

- Data Assimilation: radars, wind/thermodynamic profile data, ACARS and TAMDAR take-off and landing data, low latency satellite data, and all surface data
- Analyses: 3DVAR
- Numerical Weather Prediction

Data Fusion through Targeted Observations

- Triggers
- Opportunistic (CASA and TDWR Multi-Doppler retrievals)

Alerting algorithms for users
User-relevant, impacts-based weather information

- How do geographically specific observations and forecasts translate to value?
- Requires close collaboration with public safety and private users.
User-relevant, impacts-based weather information

URBAN FLASH FLOODS
- Geographically specific, quick onset hazard.
- Precipitation rate and underlying hydrology are key determinants.
- Forecast office issues flash flood warnings over large areas due to uncertainty.

Fort Worth WFO 2008-2011
- Avg. Flash flood warning area: 3,822 sq. kms or ~1.5 counties
- False alarm rate: 41%
- Missed Events: 7%
- POD: 93%
- Lead Time: 73 min.

Source: FWD WFO
Identifying Risk with increased Geographic Specificity

Example Flash Flood Warning 9/12/2009
Warning Area = 3,146 sq. km
Pop. within warning = ~2.8 million
Pop. at the HUC 10 level = ~267,000
Pop. at the HUC 12 level = ~67,000
Pop. at the catchment level = ~22,000
- Actual storm report

What is the user relevant information for:

Road Transportation (Highway)
Railroads
Arena Events
Trade Logistics
NWS Forecasters
Storm Water Management
Emergency Managers
Multi-sector partnerships: $10 million, 5 year program

- CASA, Local DFW (private and public), and federal stakeholders fund project.
- CASA contributes NSF funding
- Local shareholders pay for operations ~$2.5 million
- Joint fundraising for applied research
- After 5 years, transition to subscriber model and local operations
Multi-sector partnerships

- Communities host a radar site
- Bandwidth, power, on-site provided by community
- Demos to weather sensitive industries
- COG
- Emergency Managers
- FWD-WFO
- Local Private Industry
- Sensor Manufacturers
- Value Added Resellers
- Social Media!