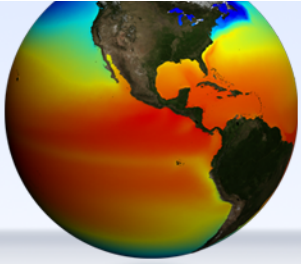


NOAA

The National Mesonet

Curtis H. Marshall
National Mesonet Program Manager
NWS/Office of Science and Technology

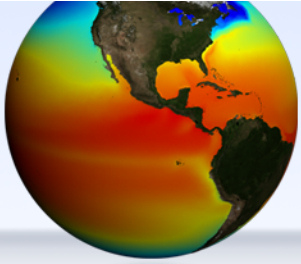
April 15, 2010



Background



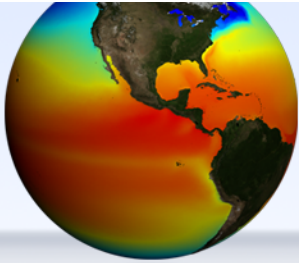
- National Academy of Sciences (2008) released *Observing Weather and Climate From the Ground Up: A Nationwide Network of Networks*
- An overarching vision for an integrated, flexible, adaptive, and multi-purpose mesoscale meteorological observation network
- Provides specific steps to help develop a network that meets multiple national needs in a cost-effective manner.
- Focus on mesoscale observational requirements over the United States and adjacent coastal zones
- Emphasis on characterizing the planetary boundary layer (defined as extending from approximately 2 meters below the surface to 2-3 kilometers above)



Background

- NAS Report:

- *“The committee envisions a distributed adaptive Network of Networks (NoN) serving multiple environmental applications near the Earth’s surface. Jointly provided and used by government, industry, and the public, such observations are essential to enable the vital services and facilities associated with health, safety, and the economic well being of our nation.”*
- The breadth of the enterprise extends well beyond the combined mission space of the federal agencies
- Challenge: preserving and enhancing the diversity of investment while introducing an appropriate degree of centralization
- A centralized authority should be identified to provide or to enable “essential core services” for the network of networks
- The centralized authority should require metadata of every component in an integrated, multi-use observing system.



Background

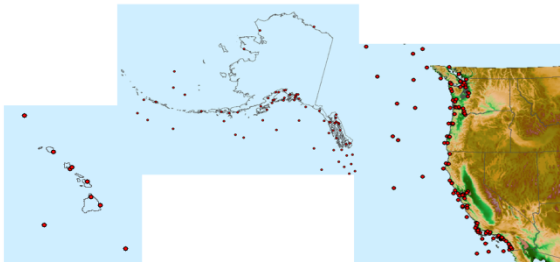


CONWAY, MO US Lat:37.52 Lon:-92.7 Elev:390m
 WindSpeedDirection Mode:500m,310m | Res:50min | QC:good only
 NOAA PROFILER NETWORK

Coastal Networks in the Pacific Coast Region

Pacific Coast – Also has C-MAN and NDBC Moored Buoys, but also has NWLON, PORTS, DART and local networks such as MBARI, SCCOOS and OrCOOS.

14 total networks and ~200 stations.



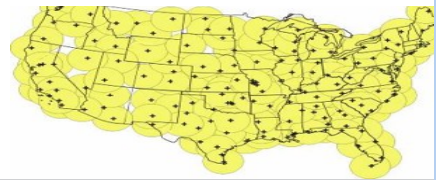
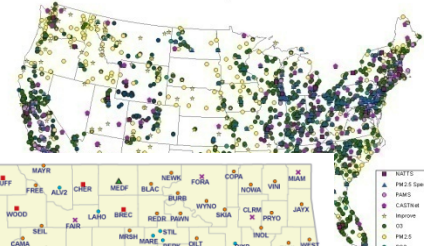
Beltsville Campus Instrumentation

Aerosol-Cloud-Radiation

Atmosphere-Surface

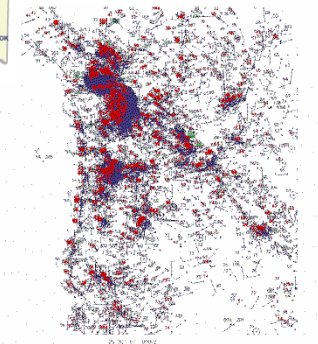
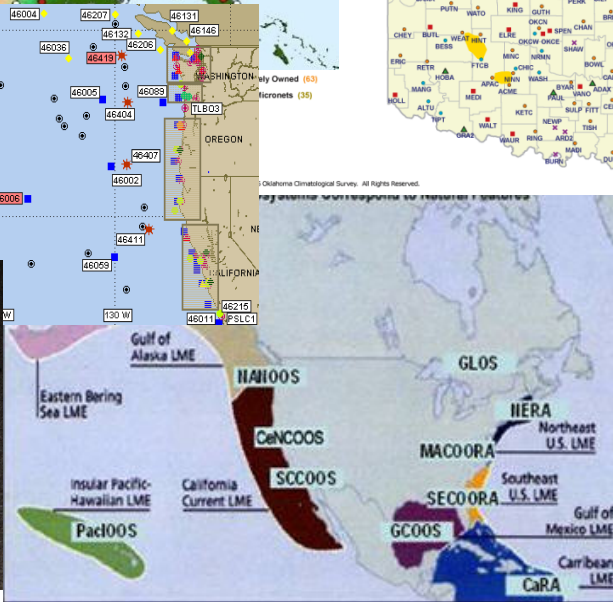
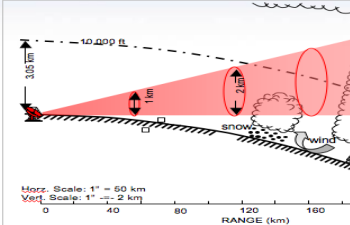


Ambient Air Monitoring Stations in the US



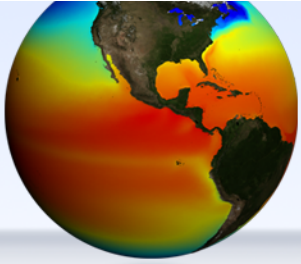
- Station Legend
- NDBC Moored Buoys
- NOSC C-MAN Stations
- NOS Stations
- CORIE Stations
- MBARI Stations
- SCRIPPS Stations

DEFINITION: Vehicle to Infrastructure (V-I) and Vehicle to Vehicle (V-V) communication through Dedicated Short Range Communications (DSRC-wireless radio comm. 5.9 GHz)



“The Diversity of Investment”

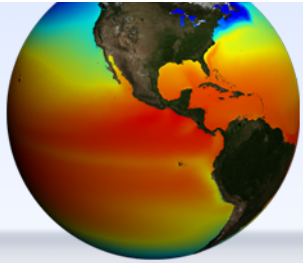




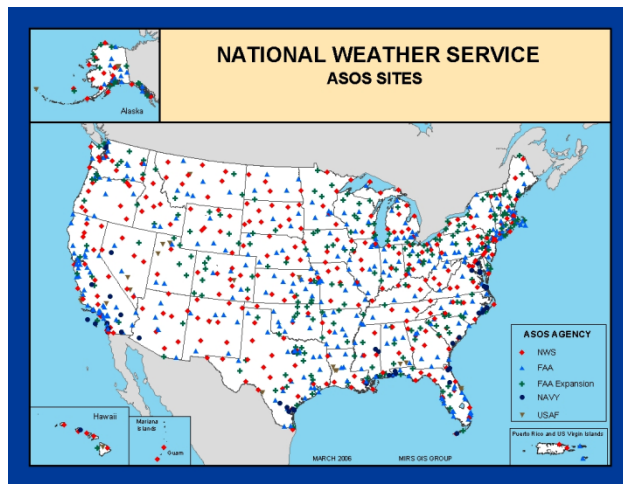
NWS Approach

- Develop robust network of networks—leverage what we have FIRST
 - NAS report: *Increased coordination among existing surface networks would provide a significant step forward and serve to achieve improved quality checking, more complete metadata, increased access to observations, and broader usage of data serving multiple locally driven needs*
 - Accelerate the integration of data from federal agencies, academic, local and state mesonets
 - Engage partners to make it happen:
 - OFCM Committee for Integrated Observing Systems (CIOS)
 - AMS Ad Hoc Committee and Working Groups
- Expand Existing Surface Network
 - Close most glaring surface gaps
 - Severe weather belts, coastal, mountain, soil conditions
 - Collect and assess data from mobile platforms

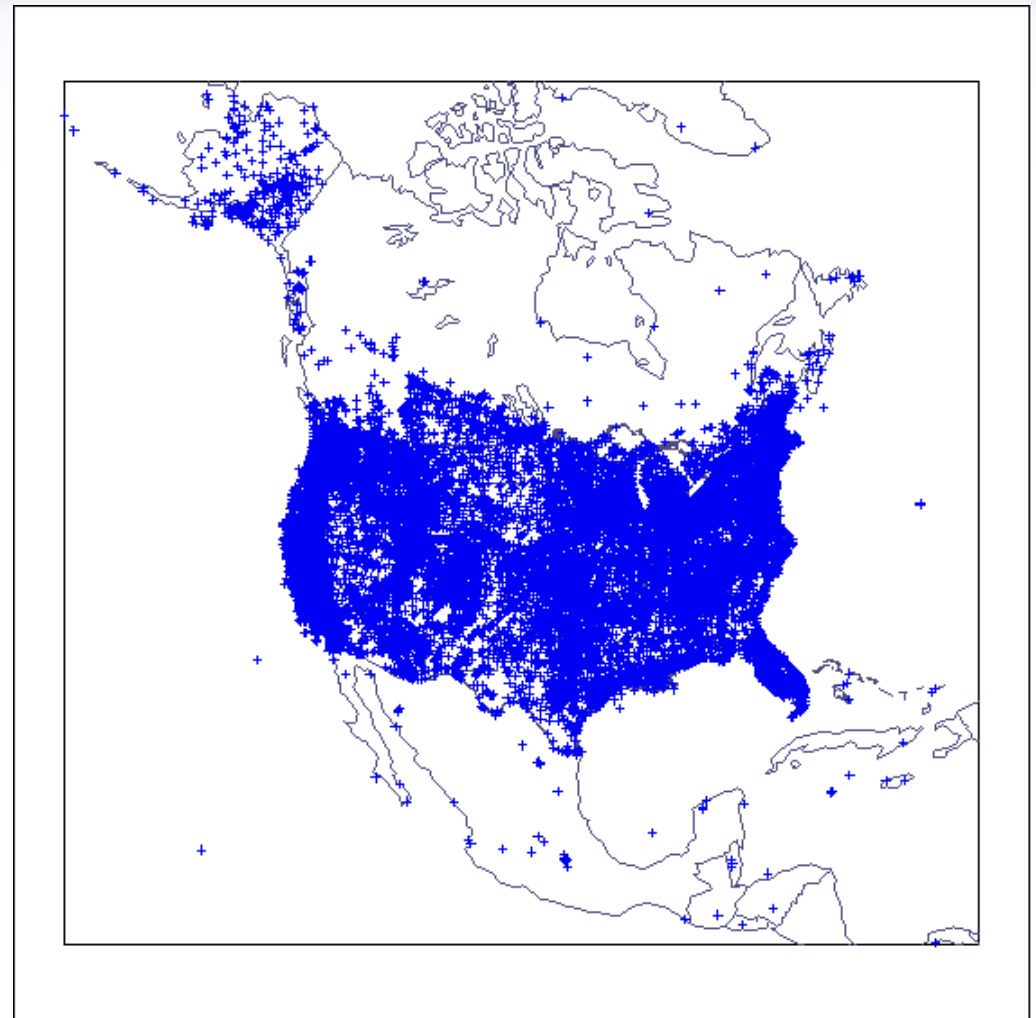




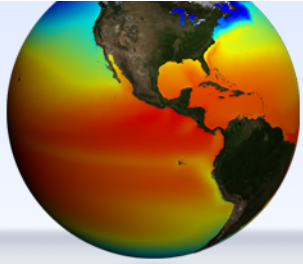
NWS Approach



NOAA Surface Observing Systems (~900)



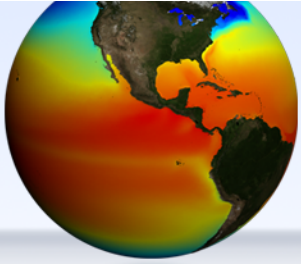
Non-NOAA Surface Observing Stations (~20000)



FY09 Omnibus

Following the November 2008 release of the National Research Council's "From the Ground Up" report, Congress directs NOAA/NWS to establish a National Mesonet:

- Maintain operations for existing mesonet network observation agreements
- Procure competitively a national mesonet, which will provide the critical information needed to improve short- and medium term weather forecasting
- Examine the use of real time mobile data collected from commercial trucking operators
- Total Appropriation: \$11M

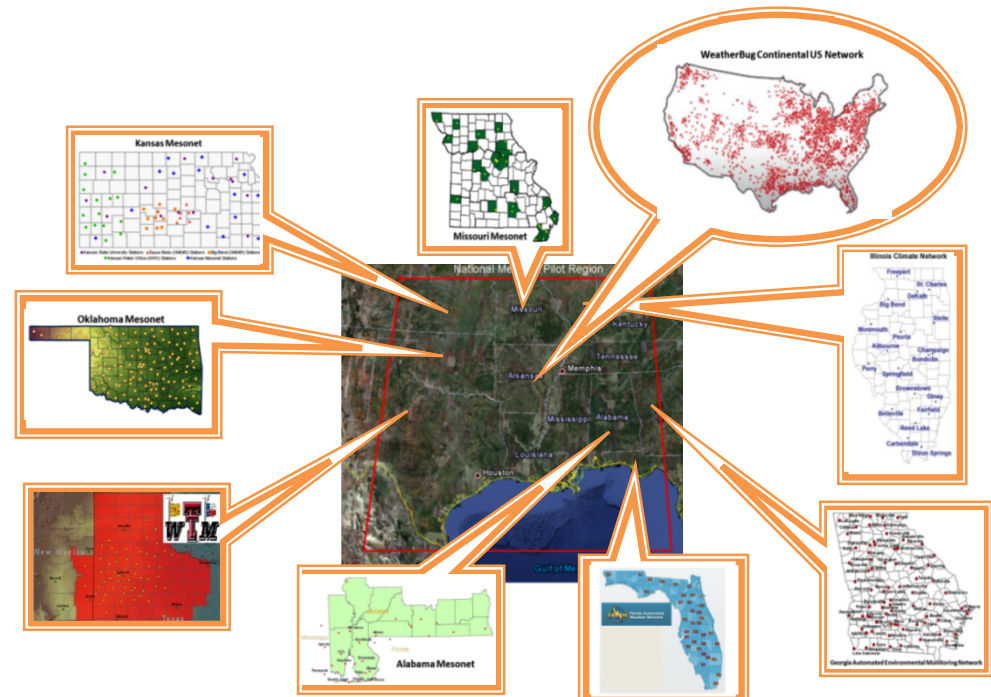


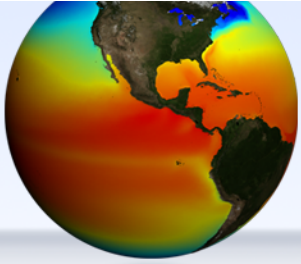
FY09 Omnibus: Response

- Global Science and Technology (GST) awarded contract for “National Mesonet Pilot Project”
 - Develop prototype capability (‘plumbing’) to provide surface atmospheric and soil moisture/temperature data with focus on enhanced metadata tool
 - Support metadata exchange between data providers and applications developers, operate central archive
 - Focus on documenting metadata for wind, temperature, and soil moisture

NATIONAL MESONET CONSORTIUM

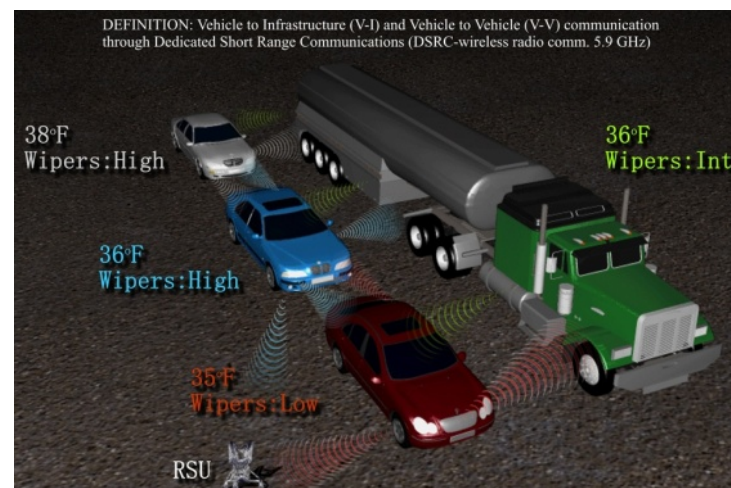
Oklahoma	Illinois	Missouri
Texas	Georgia	Alabama
Kansas	Indiana	Florida

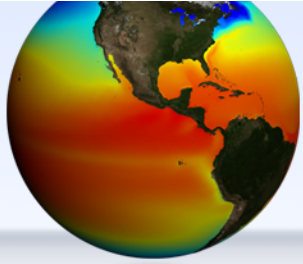




FY09 Omnibus: Response

- MOBILE Platform Environmental Data (MOPED) observation network (GST Contract)
 - Collect 10,000 data points from vehicle fleets operating in the northeast U.S.
 - Demonstrate capability to collect and disseminate basic meteorological observations from vehicles
 - Develop algorithms to monitor data quality as compared to nearby Road Weather Information System (RWIS) and other reference data.

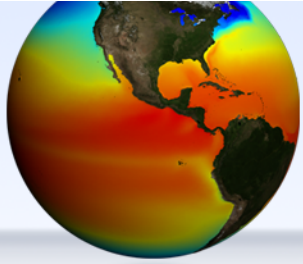




Data Utilization

- NOAA Development Team:
 - NWS NCEP (Data Assimilation/NWP)
 - NWS OST (Statistical Forecasting)
 - OAR ERS� (Mesoscale Analysis)
 - OAR ARL (Dispersion modeling)

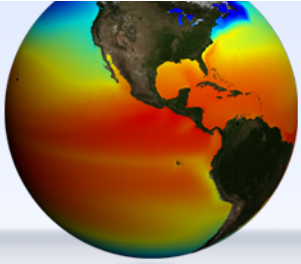
- Purpose: Integrate enhanced metadata into the operational application environment
- Understand and document the benefits (service outcomes) of enhanced metadata
- NWS goal is to execute very high resolution mesoscale models on very fast high performance computing platforms for forecasting short-term, high-impact weather
- Meeting this goal will require the types of observations provided by a National Mesonet



FY10 Omnibus

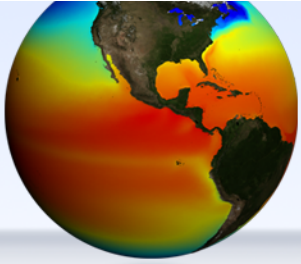
The FY10 Omnibus Appropriation provides \$19M for NOAA/NWS to:

- Maintain data procurements from existing surface in-situ mesonet observations, including those added as a result of FY09 expansion
- Competitively expand the National Mesonet ...to include integration of existing networks...75% urban... 25% non-urban areas
- Establish National Mesonet Program Office for program oversight and data utilization initiatives
- Expansion of the Meteorological Analysis and Data Ingest System (MADIS)
- MADIS: The IT glue for a National Mesonet

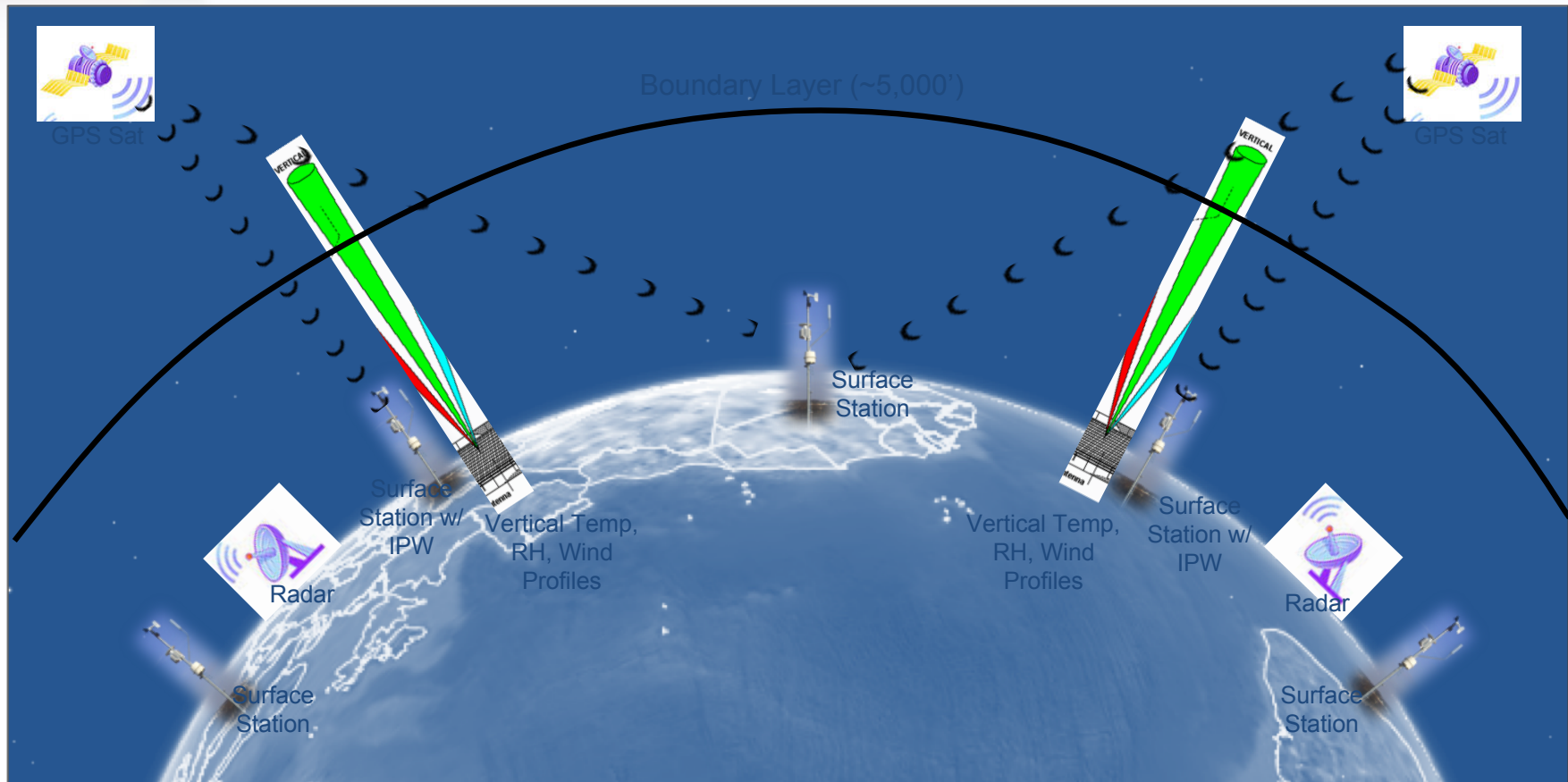


Next Steps: Continue Pilot Project

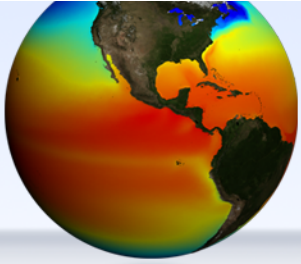
- FY10 Q2-Q3: NWS/OST will formalize the National Mesonet Program Office, include management, review bodies, program plan(s)
- Define SOWs and acquisition strategy for FY10 National Mesonet expansion
- Extend metadata effort to humidity, precipitation, pressure, solar radiation, and data from “tall towers”
- Defining and initiating expanded data utilization efforts
- MADIS IOC (Q3 FY10) and FOC (Q3-4 FY11)
- Leverage observing systems of federal partners
 - Extend Pilot Project beyond surface data to include “tall towers” and ground-based remote sensing systems (PBL profiles)
 - Via operational MADIS
 - Via newly developed metadata capability to be provided by National Mesonet Pilot Project



Longer Term Vision



- Leverage National Mesonet into *Network of Networks* for PBL Profiles



Thanks!

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