
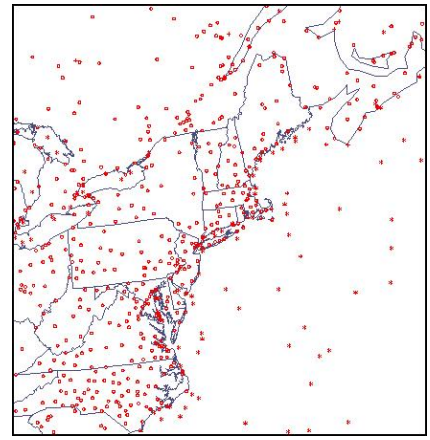

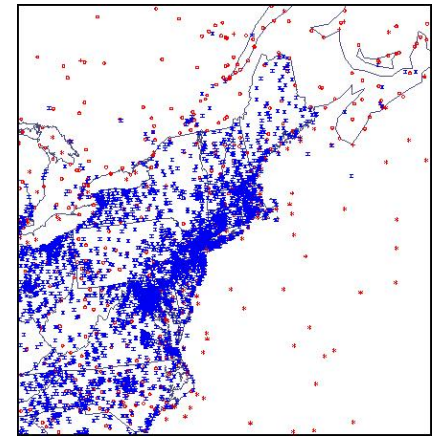

# The NOAA Meteorological Assimilation Data Ingest System (MADIS)

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# MADIS Background


## History

- MADIS was established in 2001 at the NOAA/OAR/Earth System Research Laboratory (ESRL)/Global Systems Division (GSD) to prototype new observation ingest, integration, quality control, and distribution techniques for real time and saved real-time data

## Goal

- To integrate and quality control NOAA and other-agency observations and make them easily accessible and usable for operations, research, and commercial purposes

# MADIS Background (continued)


## Overall Benefits

- A more usable, complete, accurate, timely, and higher density observational infrastructure for use in local weather warnings and products, model predictions, and hazardous situations

## NWS-Specific Benefits

- Improved observational functionality for…

1. enhancing forecaster situational awareness
2. reducing data access costs for Forecast Offices
3. supporting higher-resolution global and regional data assimilation systems
4. improving the National Digital Forecast Database (NDFD)

# MADIS Current Status


## System Capabilities

- Seamless access to real-time and saved datasets
- Continuous database updates triggered by arriving observations
- Uniform observation formats, units, and time stamps
- Quality control capabilities
- Station monitoring for network maintenance
- Authentication for proprietary data
- Multiple network-enabled data distribution mechanisms (ftp, http, ldm)
- Web-enabled distribution capabilities, with server-side subsetting capabilities
- On-the-fly data reformatting, variable transformation, and sounding generations
- Documentation and user support

# MADIS Current Status (continued)


## Observational Datasets

MADIS supports the collection, integration, quality control, and distribution of thousands of NOAA and non-NOAA observations, including over 64K surface stations from local, state, and federal agencies, and private networks, as well as upper-air datasets including multi-agency profiler, radiosonde, radiometer, selected satellite observations, and commercial aircraft observations.

- Profiler data includes NOAA Profiler Network and Cooperating Agency Profilers
- Aircraft data includes MDCRS, AMDAR, and TAMDAR
- Surface data includes METAR, maritime, snow, HCN-M, CRN, UrbaNet, and other mesonet

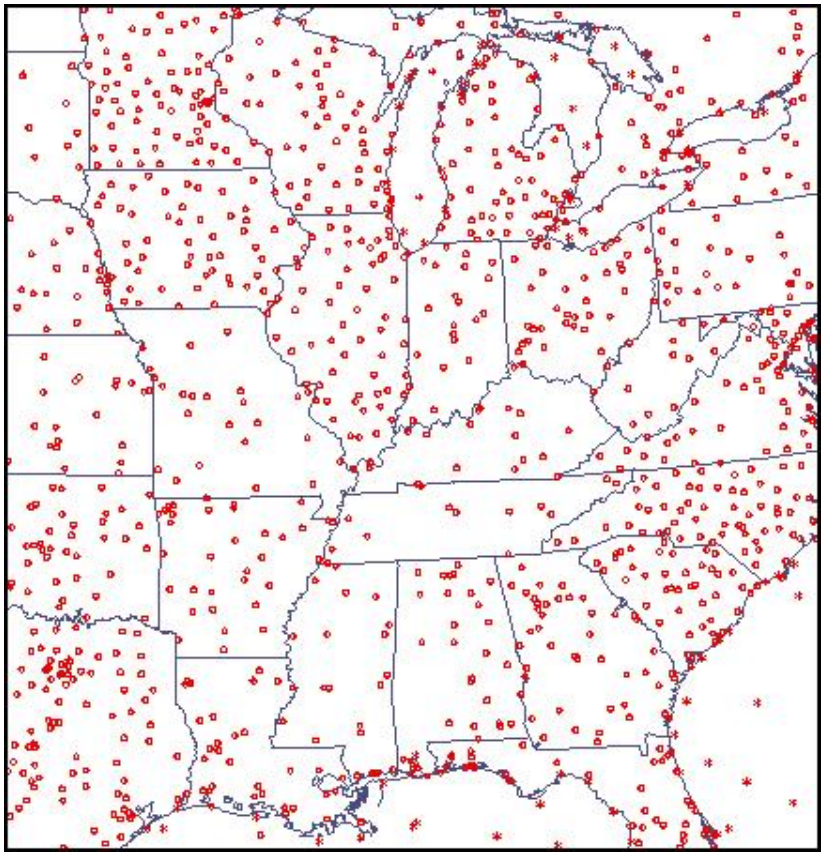
## Scope

- 64,833 Surface Stations from over 180 networks producing over 13,000,000 observations/day
- 154 Profiler Sites (> 200,000 obs/day)
- Over 450,000 aircraft observations/day
- Plus global radiosonde and satellite obs

## MADIS Users Include:

- NWS Forecast Offices and National Centers
- NOAA/OAR
- NESDIS
- NOS – other NOAA
- NCAR
- NASA
- DOE Laboratories
- FAA and EUROCONTROL
- International meteorological centers
- Over 200 universities
- Hundreds of private companies

# Central U.S. Domain Standard Surface Network

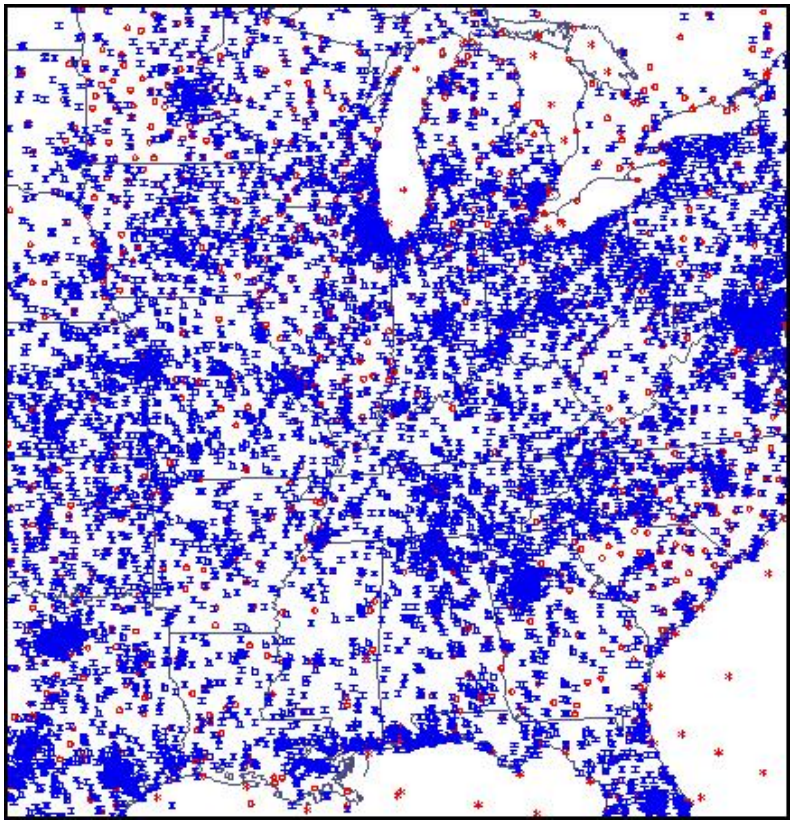


## Standard Surface Observations

Meteorological Aviation Reports (METARs)

Maritime

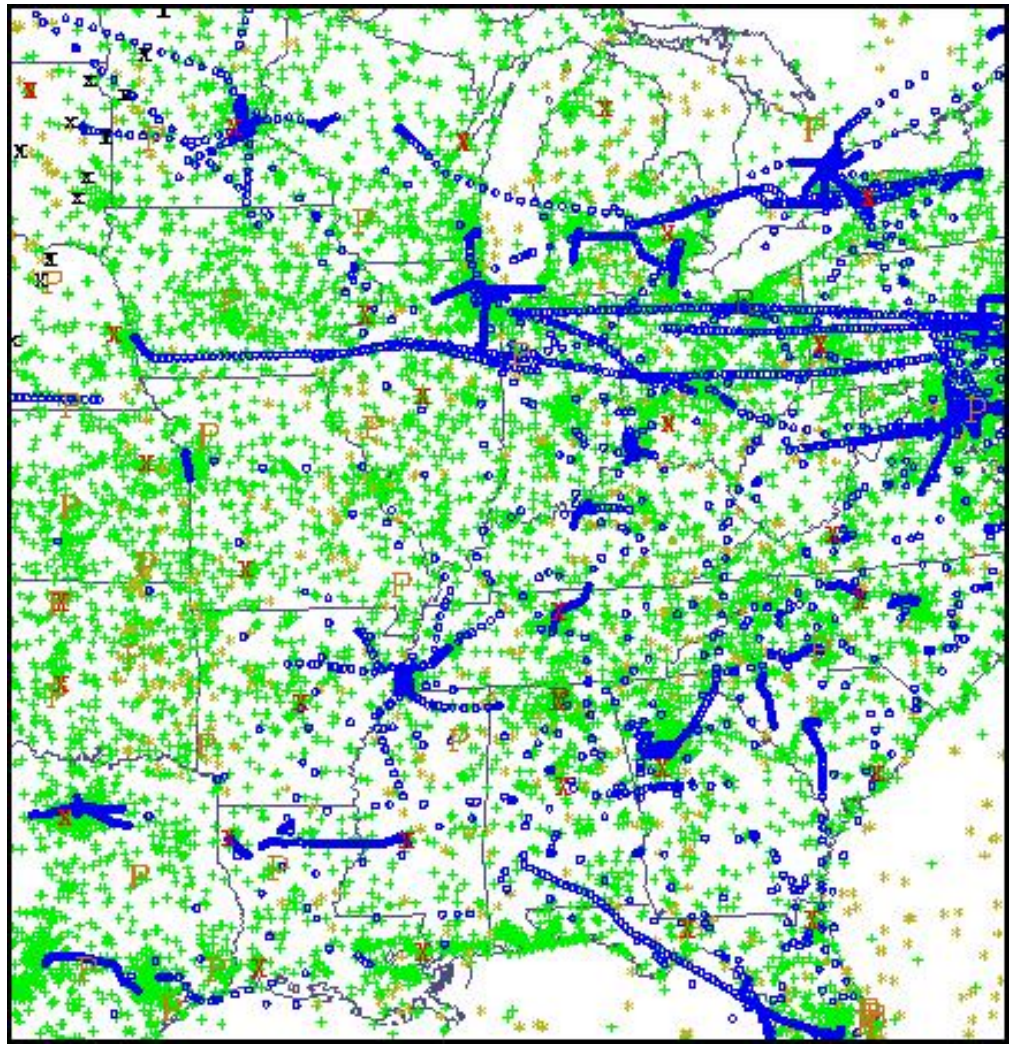
# Central U.S. Domain
# MADIS Surface Network



## Additional Surface Observations

- Modernized ASOS
- AWS Convergence Technologies, Inc.
- Citizen Weather Observer Program
- Remote Automated Weather Stations
- ESRL Ground-Based GPS Meteorology
- Weather for You.com
- Anything Weather
- Soil Climate Analysis Network (SCAN)
- National Ocean Service Physical Oceanographic Real-Time System (PORTS) and National Water Level Observation Network (NWLON)
- UrbaNet
- Oklahoma Mesonet
- DoTs: GA, IA, IN, KS, KY, MD, MN, ND, OH, VA, WI
- Marquette Mesonet
- Union Pacific Railroad
- Non-Federal AWOS
- NERRS (National Estuarine Research Reserve System)
- CoCoRaHS

# MADIS Central U.S. Domain Observations



October 29, 2010

# MADIS Research to Operations


The NOAA MADIS Independent Review Team unanimously selected a joint OAR/NWS distributed processing solution

## Transition Goals

- Expedite the transition of current GSD capabilities to operations
- Maintain the continuity of MADIS data streams and services before, during, and after the transition
- Pre-plan for product improvements and technology infusion

## Summary Statement

*"The partnership between OAR and NWS led to a solid technical solution and provided a smoother transition from research to operations."*

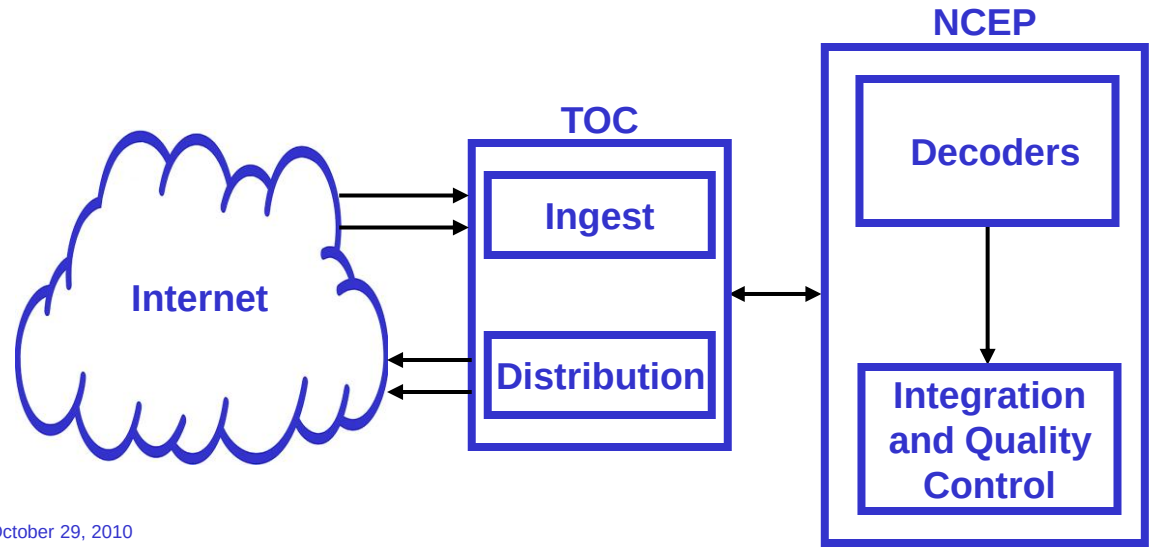
# MADIS Research to Operations (continued)

## The NOAA MADIS Independent Review Team

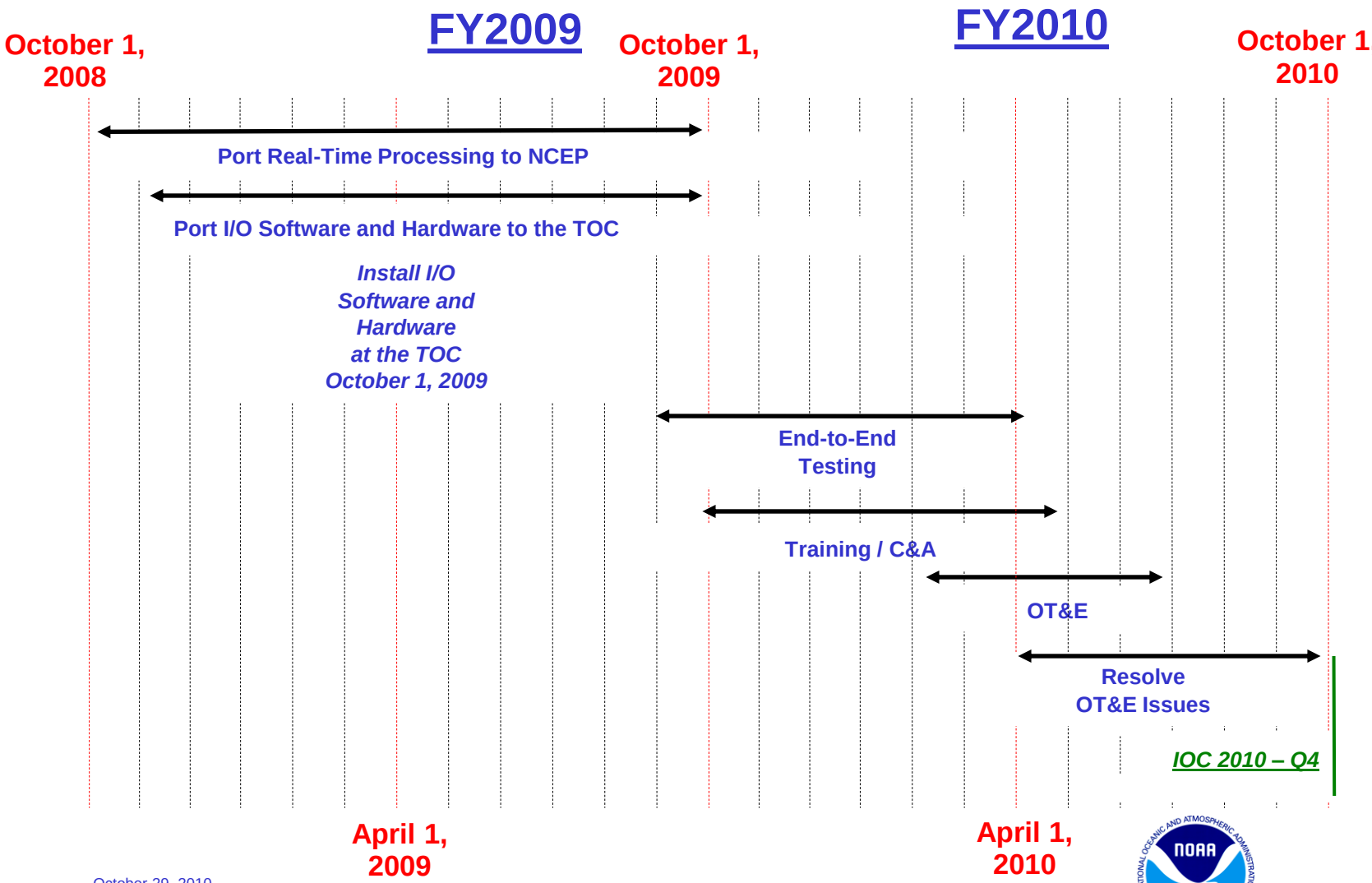
### Technical Recommendation – IT Architecture

Port the existing GSD MADIS software to an integrated NWS Telecommunications Operations Center (TOC) and NCEP Central Operations (NCO) distributed environment, with a supporting backup and research-to-operation test environment at GSD

**MADIS Compute Environment**



# Initial Operational Capability (IOC) Timeline

# Planned Product Improvement


Product improvements such as: 1) advanced data query and web services; 2) expanded metadata fields; 3) additional datasets; and 4) improved and expanded observation QC and station monitoring will serve:

## NWS Operations

- NextGen – Weather Information Database (WIDB)/FAA support
- National Surface Weather Observing System (NSWOS)/FHWA support
- Next Generation NOAA Profiler Network (NGNPN)
- Historic Climate Network – Modernized (HCN-M)
- UrbaNet, National Mesonet
- Improved web-based product generation/MesoWest partnership

## NOAA Research

- Hydrometeorological and Severe Weather Testbeds
- Fire weather, renewable energy, and DHS research support

# MADIS National Mesonet Plans


- Accelerate Mesonet Ingest
- Add Mobile Vehicle Observations
- Extend and Enhance Metadata Infrastructure

# Summary


- MADIS supports a large community of multi-agency data providers and data users
- Current capabilities include extensive (and growing) net-enabled data services for observations
- Transition to NOAA operations has reached Initial Operating Capability
- Development of future product improvements underway

# Future MADIS Activities


- Continuously infuse new product improvements into NWS operations
- Work with NESDIS to transition the MADIS Archive System into operations at the National Climatic Data Center