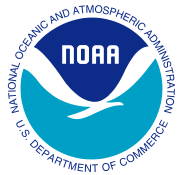# MADIS Airlines for America Briefing

Meteorological Assimilated Data Ingest System (MADIS)
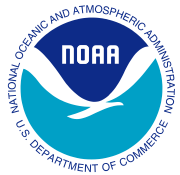
FPAW Briefing

Steve Pritchett

NWS Aircraft Based Observations Program Manager

MADIS Defined

- MADIS is a meteorological database and data delivery system that covers the globe. Jointly developed by the National Oceanic and Atmospheric Administration's (NOAA) National Weather Service (NWS) and the Office of Oceanic and Atmospheric Research (OAR) Earth System Research Laboratory (ESRL) Global Systems Division (GSD).
- MADIS started collecting data July 1, 2001 and provides access to all data sets collected since it's start.
  - Purpose:
    - To provide a finer resolution (temporal and spatial), higher quality, easy access observational data system for NOAA and the greater meteorological community.
    - To help improve weather forecasting, by providing support for data assimilation, numerical weather prediction, and other hydrometeorological applications.
  - How:
    - Leverage partnerships with international agencies; federal, state, and local agencies; universities; volunteer networks; and the private sector to integrate their stations with those of NOAA.

MADIS Operations/Processing
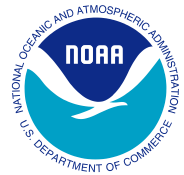
- On January 21, 2015 MADIS became fully operational at the NWS' National Centers for Environmental Prediction (NCEP) Central Operations (NCO) as part of the Integrated Dissemination Program (IDP).
  - Primary Operations at NCO College Park
  - NWS IDP Backup Operations Boulder (mid 2016).
  - Archive supported by National Climate Data Center

https://madis.ncep.noaa.gov/
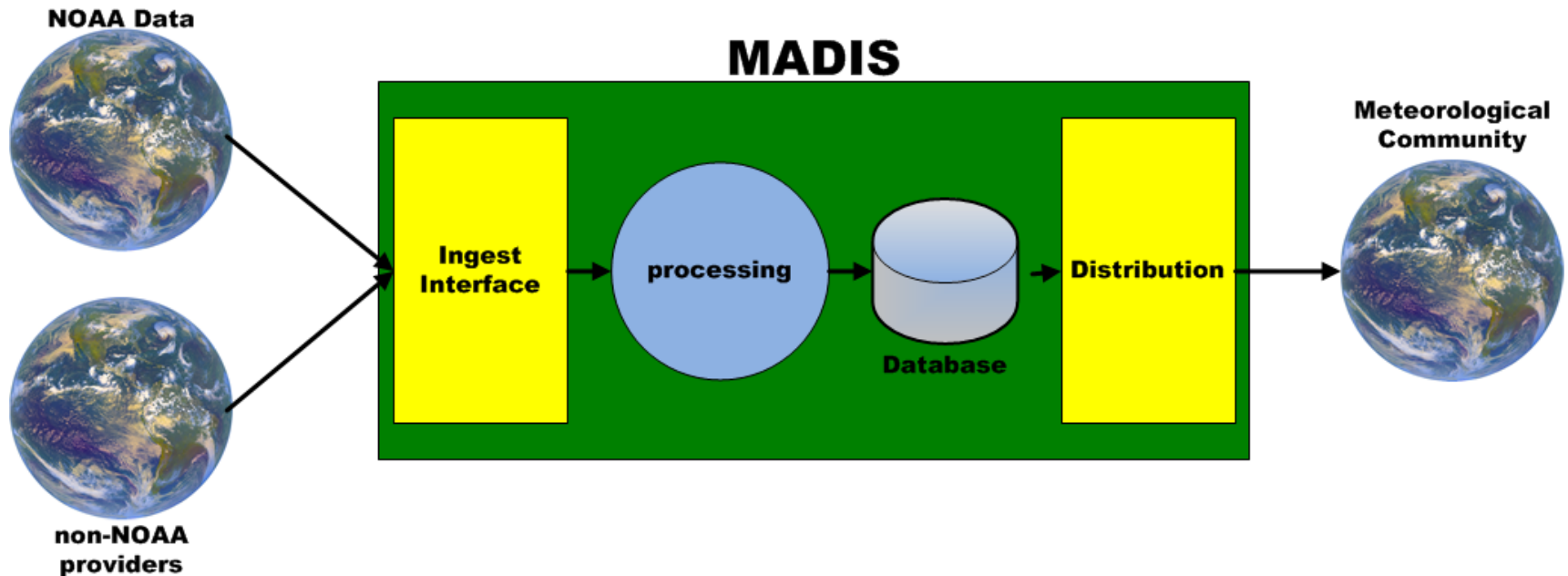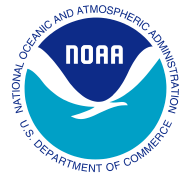
Current Data Capabilities

- 16 Different Data Types

  - Surface
    - Hydro, Mesonet, Maritime, METAR, SAO, Climate, 1 Minute ASOS/AWOS, Mobile Platform Environmental Data (MoPED), and Snow

  - Upper Air
    - Profiler, RAOB, Automated Aircraft Observations, Radiometer, and Satellite (winds, sounding, and radiance)

    Green ---- Data available since 2001.
    Black ---- Data added after 2001.

- 400+ Observation Types

- 11 GB/Day (Uncompressed) – 823 MB/Day (Compressed)

Current Data Capabilities

+ - **Surface**

o - **Aircraft**

X - **Radiosonde**

P - **Profiler**

● - **GOES Satellite**

● - **POES Satellite**

R - **Radiometer**
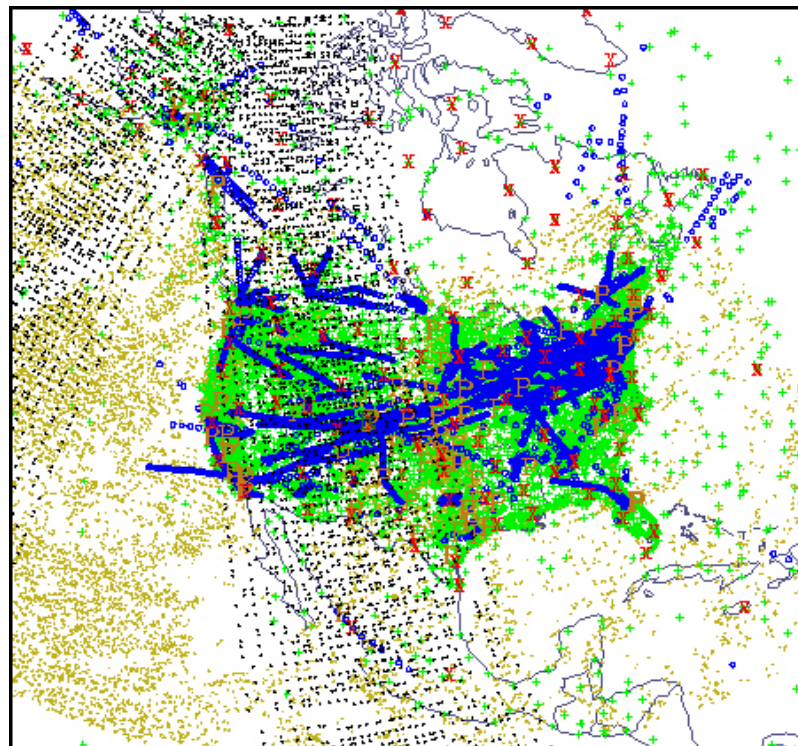
- 66,127 stations from over 160 surface networks producing nearly 13 million observations per day
- 154 Profiler sites (>200,000 observations per day)
- **>650,000 aircraft observations per day**
- Plus global radiosonde and satellite observations
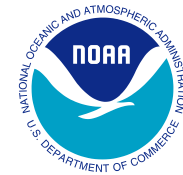
Average Number of Automated Aircraft Reports/Hour
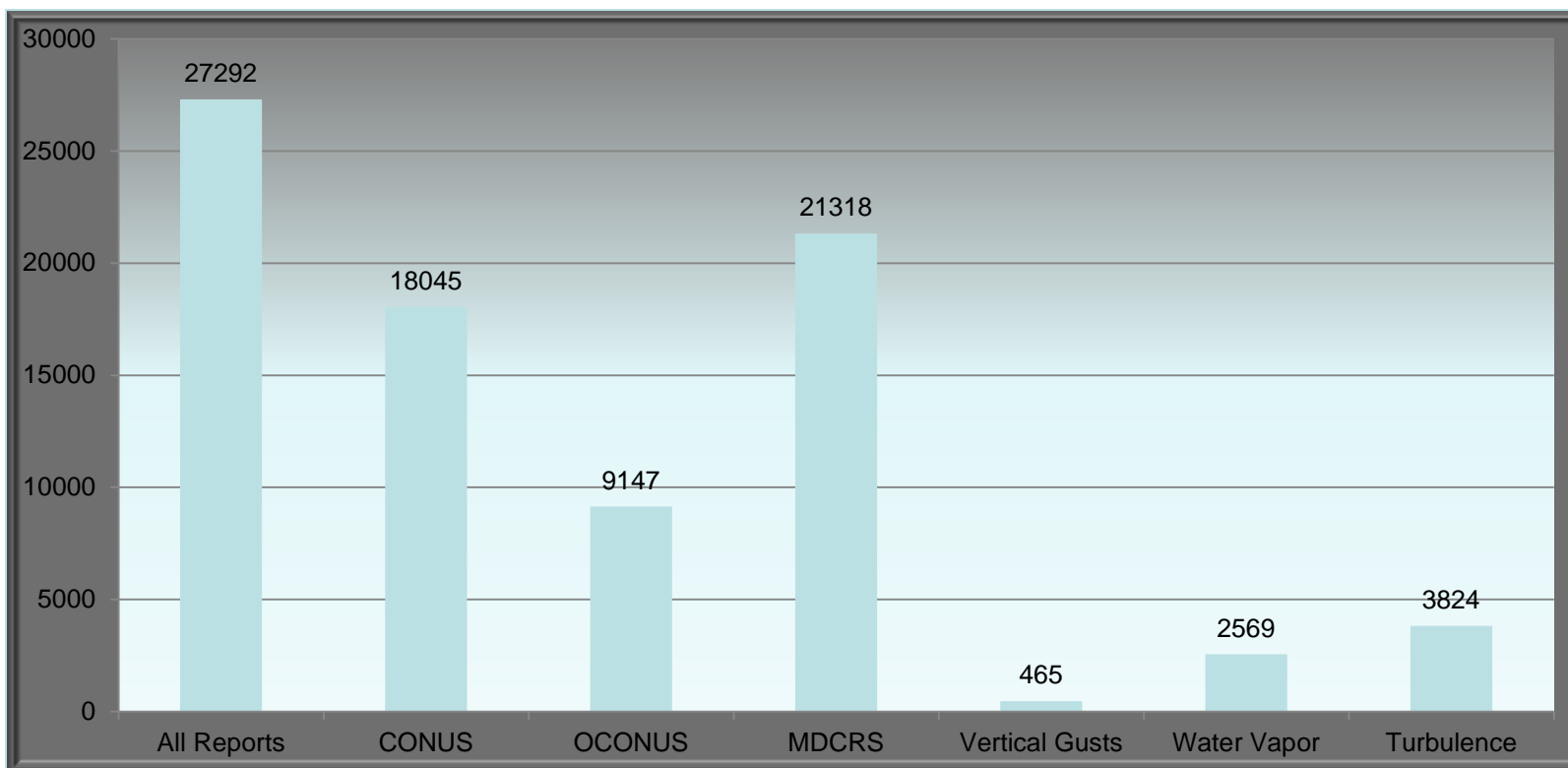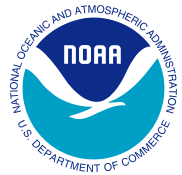
Operational AMDAR Data Flow
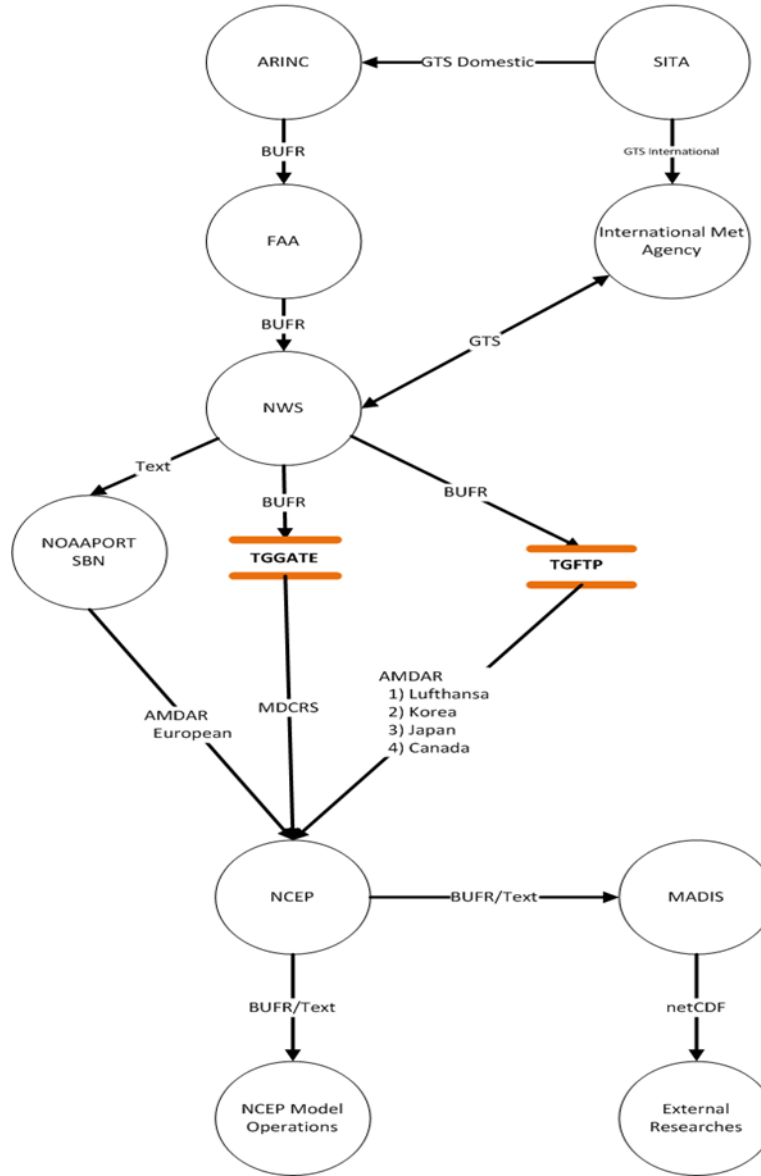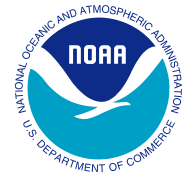
Aircraft Observations Distribution

- GTS - aircraft observations from commercial aircraft received by NOAA are distributed over to the Global Telecommunications Systems (GTS) to Meteorological Services to member states of the World Meteorological Organization (WMO) under Resolution 40 of the WMO – free exchange of AMDAR data with no redistribution allowed.

- MADIS and AMDAR Website - aircraft observations from commercial aircraft received by NOAA are made available real time on a restricted basis to:
  - NOAA and the FAA
  - Airlines participating in the US aircraft observations program
  - Academic research institutes with approved aviation projects

- Archived and 48 hour data can be accessed by all

New Developments in Aircraft Observation Distribution

- Beginning late in 2015 Aircraft Observations from Aircraft equipped with WVSS sensors will be publically available in real time:
  - MADIS restrictions will be removed by November for WVSS equipped Aircraft to allow public access to the MDCRS plus WVSS data sets from 132 aircraft
  - NOAA AMDAR Website (part of MADIS by Dec 31 2015) restrictions will be removed by February or March 2016
  - NOAAPort Satellite Broadcast Network (SBN) data encryptions to be removed for WMO header containing WVSS equipped aircraft.
- All other aircraft based observations to remain restricted access with encrypted files on the SBN
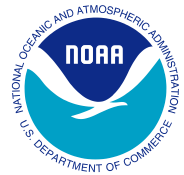
Automated Aircraft Specific Information

- Data
  - https://madis.ncep.noaa.gov/madis_acars.shtml - Description
  - https://madis.ncep.noaa.gov/acars_variable_list.shtml - Variables
  - https://madis.ncep.noaa.gov/madis_acars_qc.shtml - Quality Control on Observations
  - https://madis.ncep.noaa.gov/madis_acars.shtml#restrict - Restrictions

- User Resources
  - https://madis.ncep.noaa.gov/data_application.shtml - Data Application
  - Three Distribution Protocols supported
    - FTP (public/archive)
    - HTTPS
    - LDM
  - https://madis.ncep.noaa.gov/madis_api.shtml - Application Interface Information
  - https://madis-data.noaa.gov/AMDARDisplay/ - Development test site for AMDAR Display

Application Interface
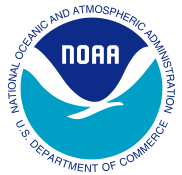
- The Application Interface has tools that allow users to:

  - FTP scripts to acquire real-time or archived data.

  - Dump programs for accessing the data of interest from the netCDF files model after the MADIS Surface Dump utility.
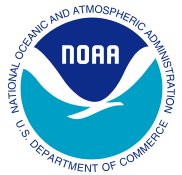
Surface Dump

Sample Text Surface Dump

- Java Displays ported post FOC to MADIS operational systems.

- NWS and GSD working to define home for components of amdar.noaa.gov site.

- http://amdar.noaa.gov capability demo:

Questions

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