TAMDAR MOISTURE/TEMPERATURE PROFILE AERIBAGO VALIDATION

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TAMDAR Workshop

University of Wisconsin CIMSS/SSEC

Overview

- AERIbago overview
- WVSS Validation Louisville Sept. 1999
- Current TAMDAR validation plans
- Feedback and Questions

AERIBAGO Instrumentation

AERIBAGO INSTRUMENTATION

- VAISALA GPS SOUNDING SYSTEM (new system capable of launched RS-92 Vaisala GPS sondes)
- ATMOSPHERIC EMITTED RADIANCE INTERFEROMETER (AERI)
- GLOBAL POSITIONING SYSTEM RECEIEVER
- VAISALA SURFACE WEATHER STATION
- VAISALA CEILOMETER
- OTHER ASSETS (Microwave Radiometer Profiler?,or Chilled mirror)

AERIBAGO INFO

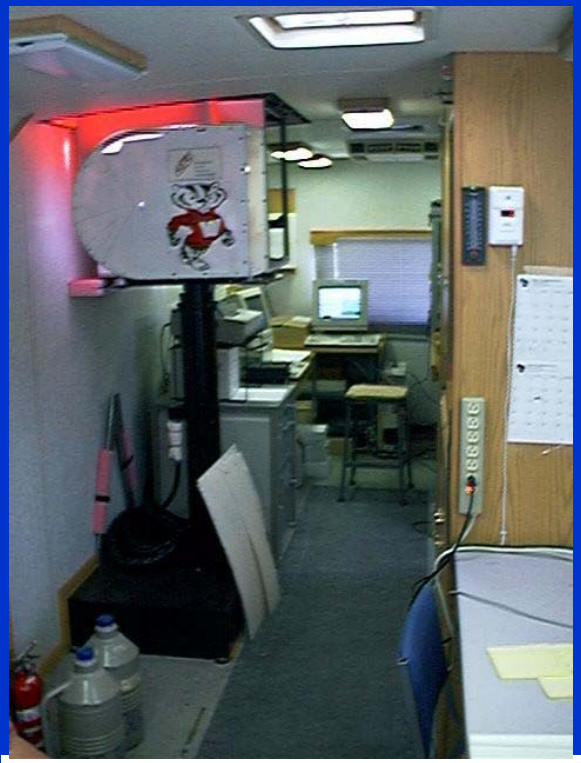
- SIZE: 28 Feet in length
- POWER: Full power, 3 phase, 60 Amp Hubble all weather connection, we need to contract electrician for wiring
- INTERNET ACCESS: LAN already installed, phone line need (voice/data), ethernet preferable but not necessary

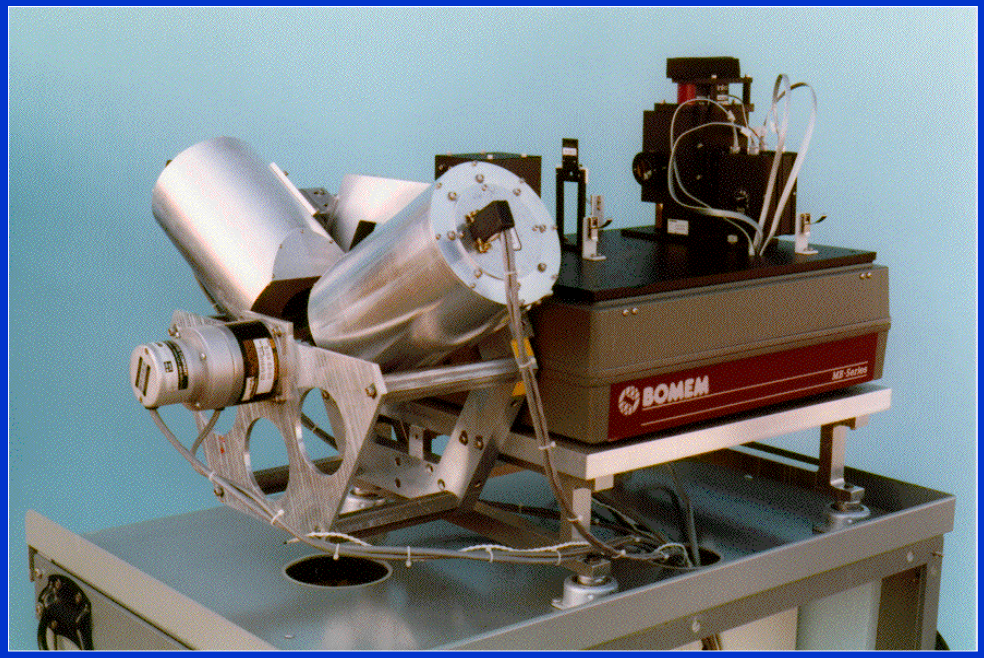
VAISALA RADISONDE LAUNCH SYSTEM (New Receiver on the way)

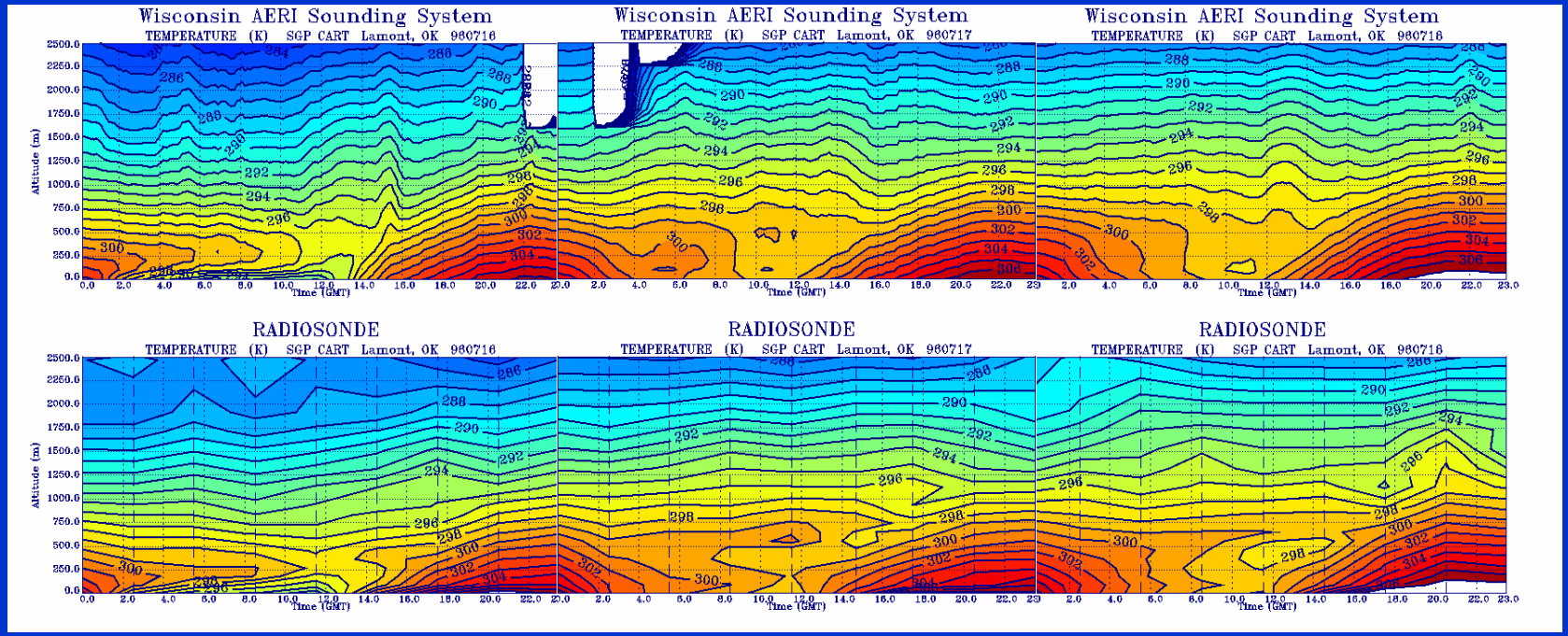
GPS RECEIVER

SURFACE STATION

AERI SYSTEM







Three Day Time Series of AERI Temperature Profiling in Oklahoma Compared to Interpolated Radiosondes

Instrument Measurement Summary

- Radiosondes - Vertical temperature and water vapor, Vaisala RS-80 or RS-92 radiosondes, 20 preparation time, 1 1/2 flight time, realtime monitoring capability
- Surface Station - Vaisala sensors, one minute, p, t, q, v, u, tested and calibrated for accuracy at SSEC
- AERI - Vertical temperature and water vapor profiles to three kilometers at ten minute resolution within PBL
- GPS - Integrated total water vapor at half hourly time resolution must be at a stationary location for at least ten days
- Vaisala Ceilometer - Cloud base heights every minute

Pre - 2003 BAGO DEPLOYMENTS

WVIOP96	Lamont, OK	Sep 1996
WINCE	Madison, WI	Jan-Feb 1997
WVIOP97	Lamont, OK	Sep-Oct 1997
SHEBA	Arctic Ice Pack	Sep 1997-Aug 1998
WALLOPS98	Wallops Island, VA	Jul 1998
CAMEX3	Andros Island	Aug-Sep 1998
WINTEX	Madison, WI	Mar-Apr 1999
WALLOPS99	Wallops Island, VA	Aug 1999
WISC-T2000	Madison, WI	Feb-Mar 2000
WVIOP2000	Lamont, OK	Sep-Oct 2000
AFWEX	Lamont, OK	Nov-Dec 2000
TX-2001	Lamont, OK	Mar-Apr 2001
CLAMS	Wallops Island, VA	Jun-Jul 2001
IHOP	OK Panhandle	May-Jun 2002
CRYSTAL-FACE	Everglades, Florida	Jul-Aug 2002
TX-2002	Lamont, OK	Nov-Dec 2002

Water Vapor Sensing System (WVSS) Validation Louisville, Kentucky September 1999

Water Vapor Sensing System (WVSS) Validation

Personnel: Wayne Feltz, Paul Menzel, and Ralph Petersen

Objective: Validation the accuracy moisture data from WVSS instrumentation mounted on commercial UPS airliners at the Louisville International airport using ground-based remote sensing and research grade radiosondes.

Accomplishments:

•Obtained a comprehensive validation data for comparison to aircraft WVSS instrumentation during ascent and descent through planetary boundary layer

• Demonstrated that the WVSS instrumentation has a wet bias during descent and ascent into the Louisville airport.

Water Vapor Sensing Systems (WVSS) are mounted on United Parcel Service aircraft based at the Louisville International airport. Validation of the water vapor measurements was conducted with the AERI and radiosonde launches.

WVSS Instrument and UPS aircraft

Radiosonde preparation by our humble Executive Director - Science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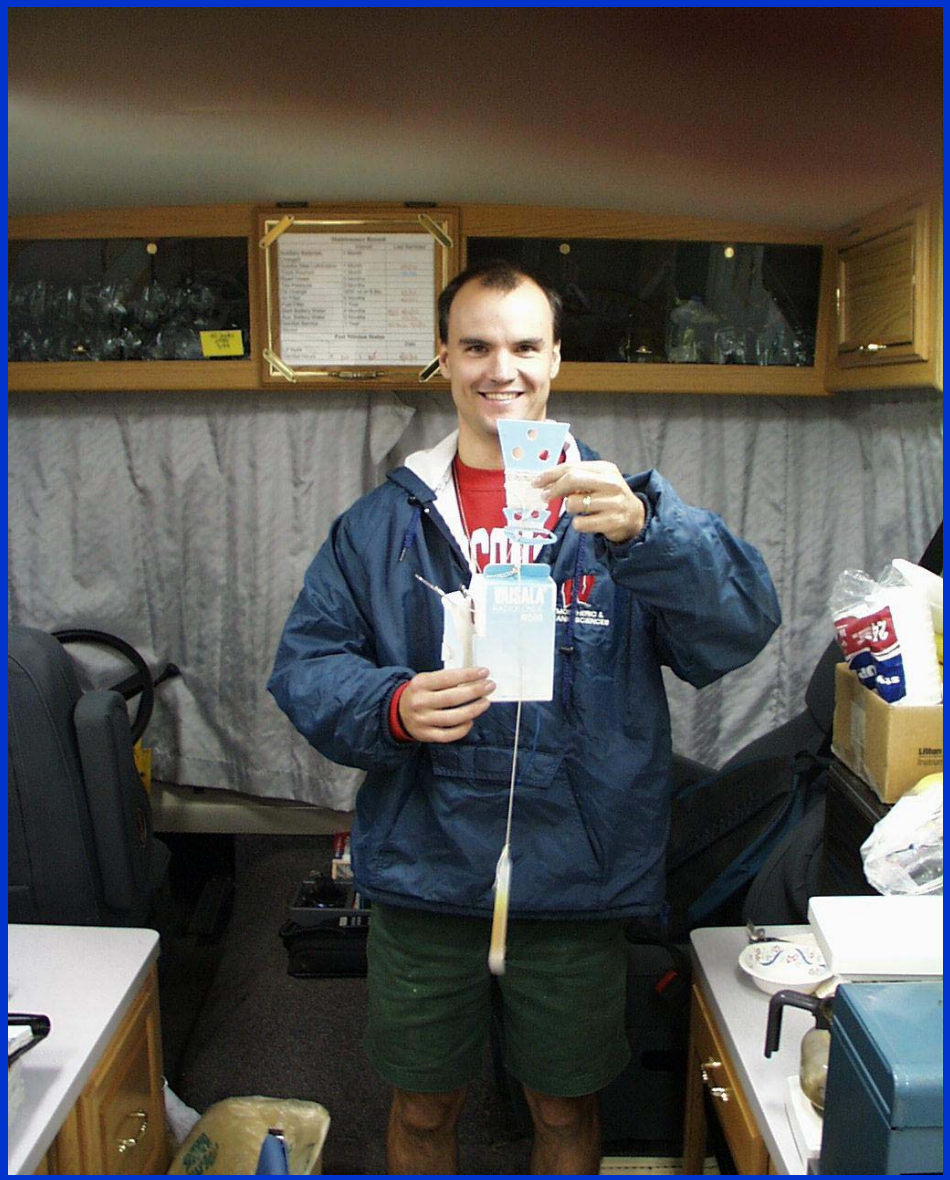
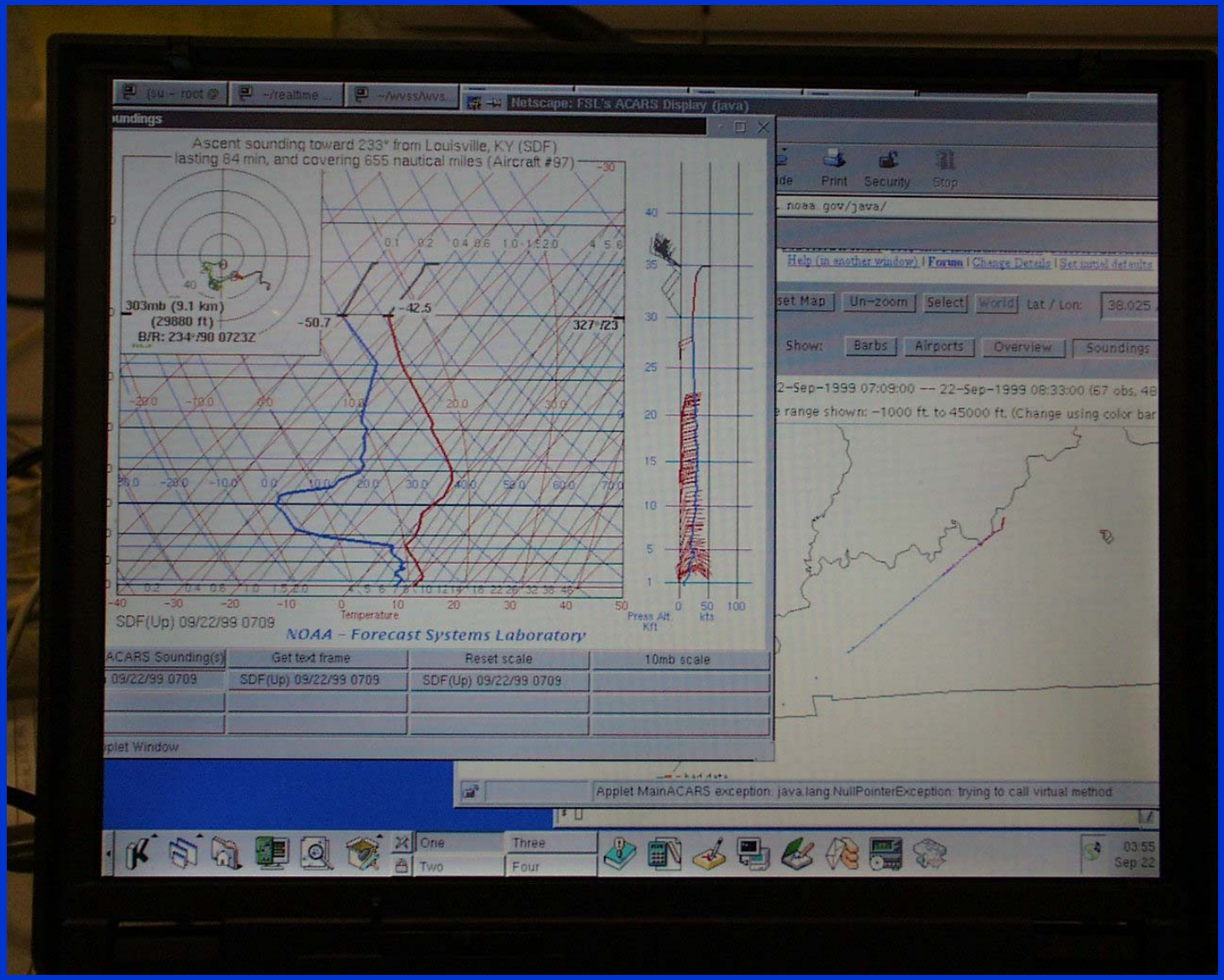
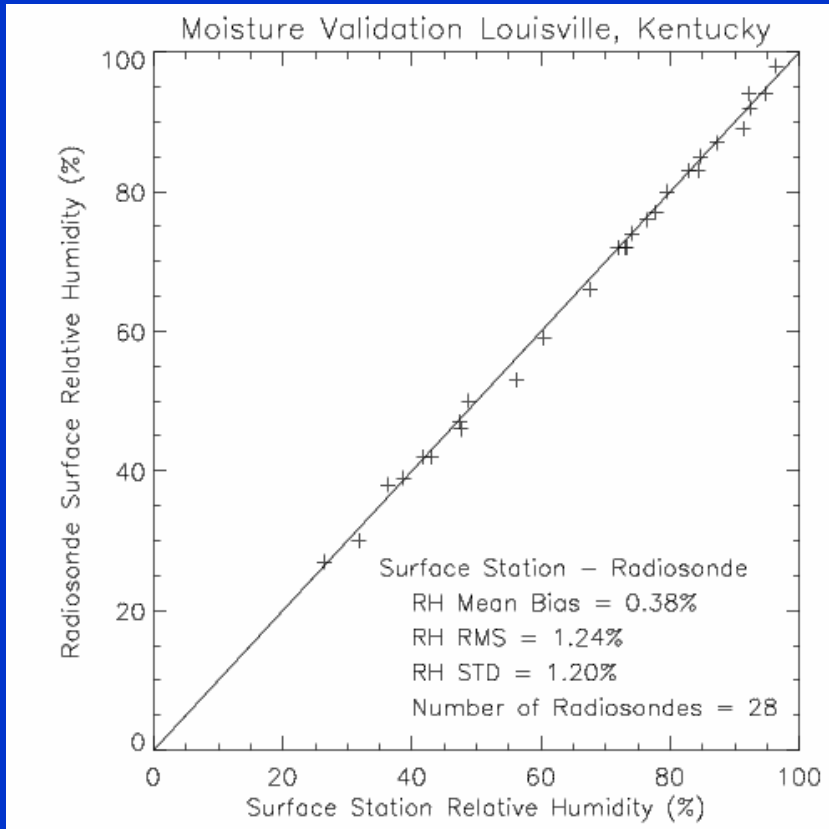
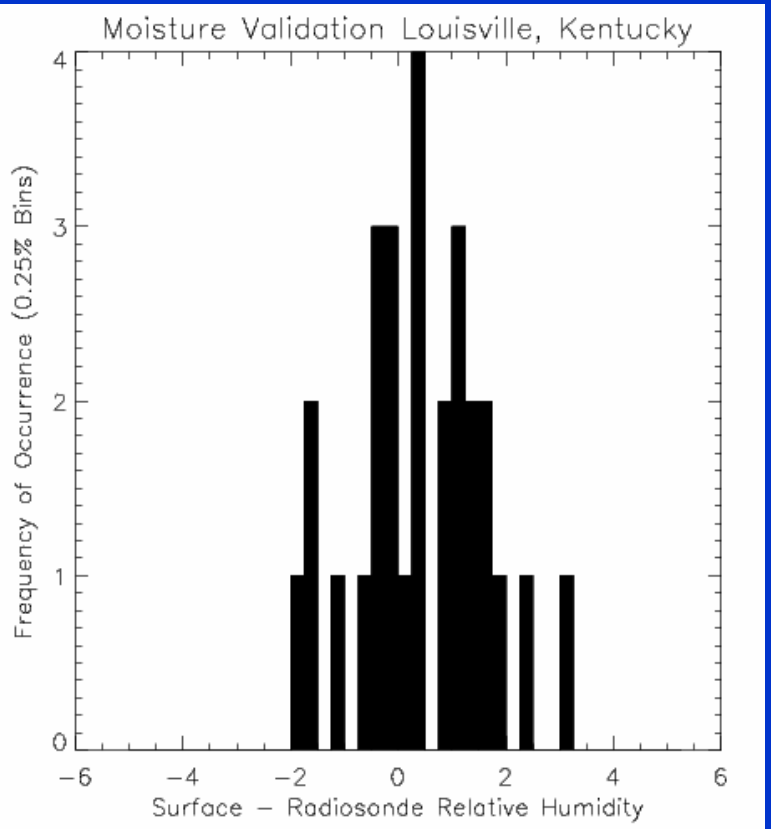
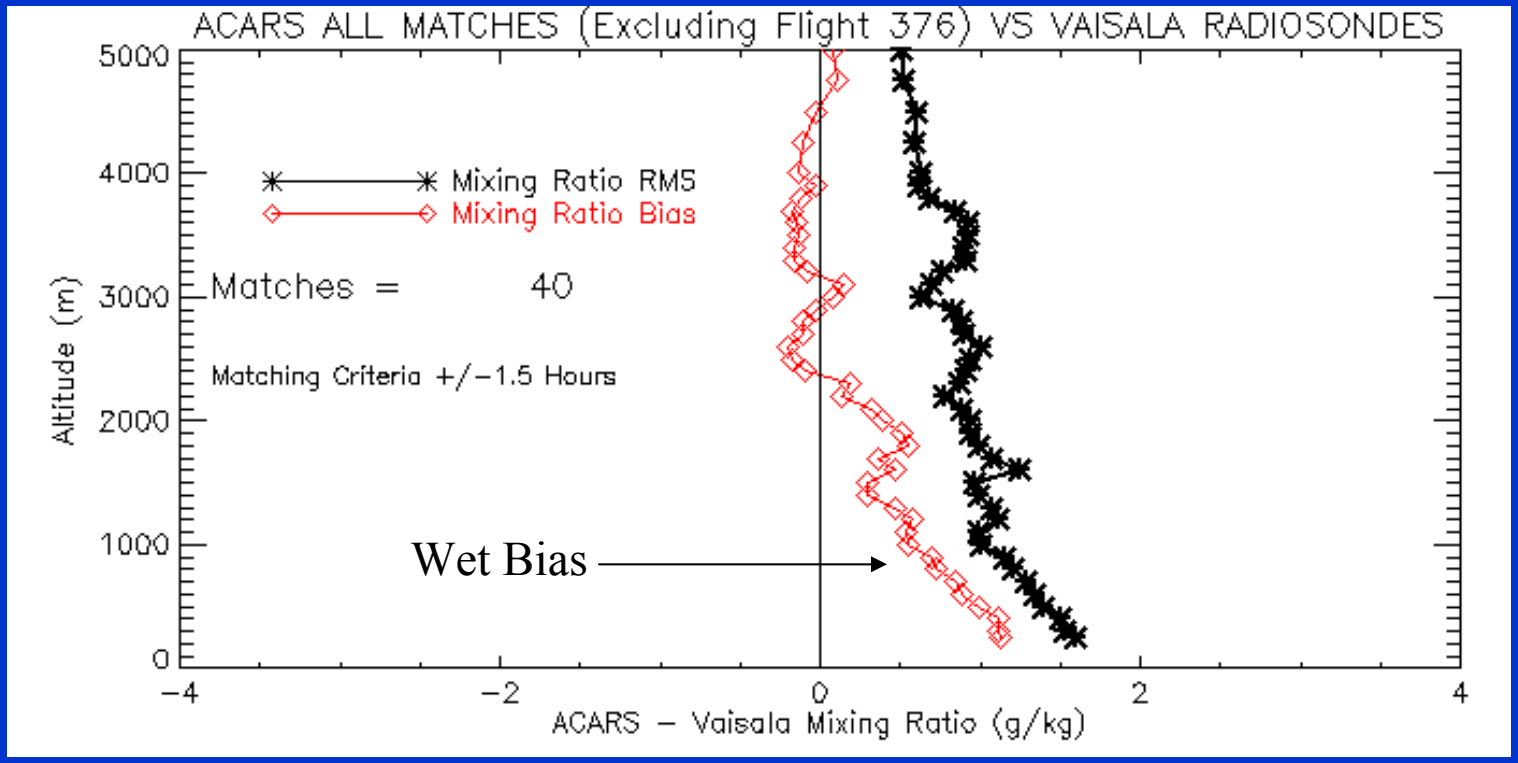



Netscape: FSL's ACARS Display (java)
Ascent sounding toward 233° from Louisville, KY (SDF)
lasting 84 min, and covering 655 nautical miles (Aircraft #97)
303mb (9.1 km)
(29880 ft)
B/R: 234°/90 0723Z
-50.7
-42.5
327°/23
Temperature
Press Alt. Kft
kts
SDF(Up) 09/22/99 0709
NOAA – Forecast Systems Laboratory
ACARS Sounding(s)
Get text frame
Reset scale
10mb scale
SDF(Up) 09/22/99 0709
Applet Window
Applet MainACARS exception: java.lang.NullPointerException: trying to call virtual method
Print
Security
Stop
Help (in another window) | Forum | Change Details | Set initial defaults
Un-zoom
Select
World
Lat / Lon:
Show:
Barbs
Airports
Overview
Soundings
range shown: -1000 ft. to 45000 ft. (Change using color bar
One
Two
Three
Four
03:55
Sep 22


Moisture Validation Louisville, Kentucky
Radiosonde Surface Relative Humidity (%)
Surface Station Relative Humidity (%)
Surface Station – Radiosonde
RH Mean Bias = 0.38%
RH RMS = 1.24%
RH STD = 1.20%
Number of Radiosondes = 28
0
20
40
60
80
100


Moisture Validation Louisville, Kentucky
Frequency of Occurrence (0.25% Bins)
Surface – Radiosonde Relative Humidity
0
1
2
3
4
−6
−4
−2
0
2
4
6

Statistics between radiosonde and WVSS water vapor profiles during the September/October 1999 WVSS validation experiment. The descent/ascent WVSS moisture measurement bias is readily apparent in the first two kilometers.



TAMDAR Thermodynamic Validation

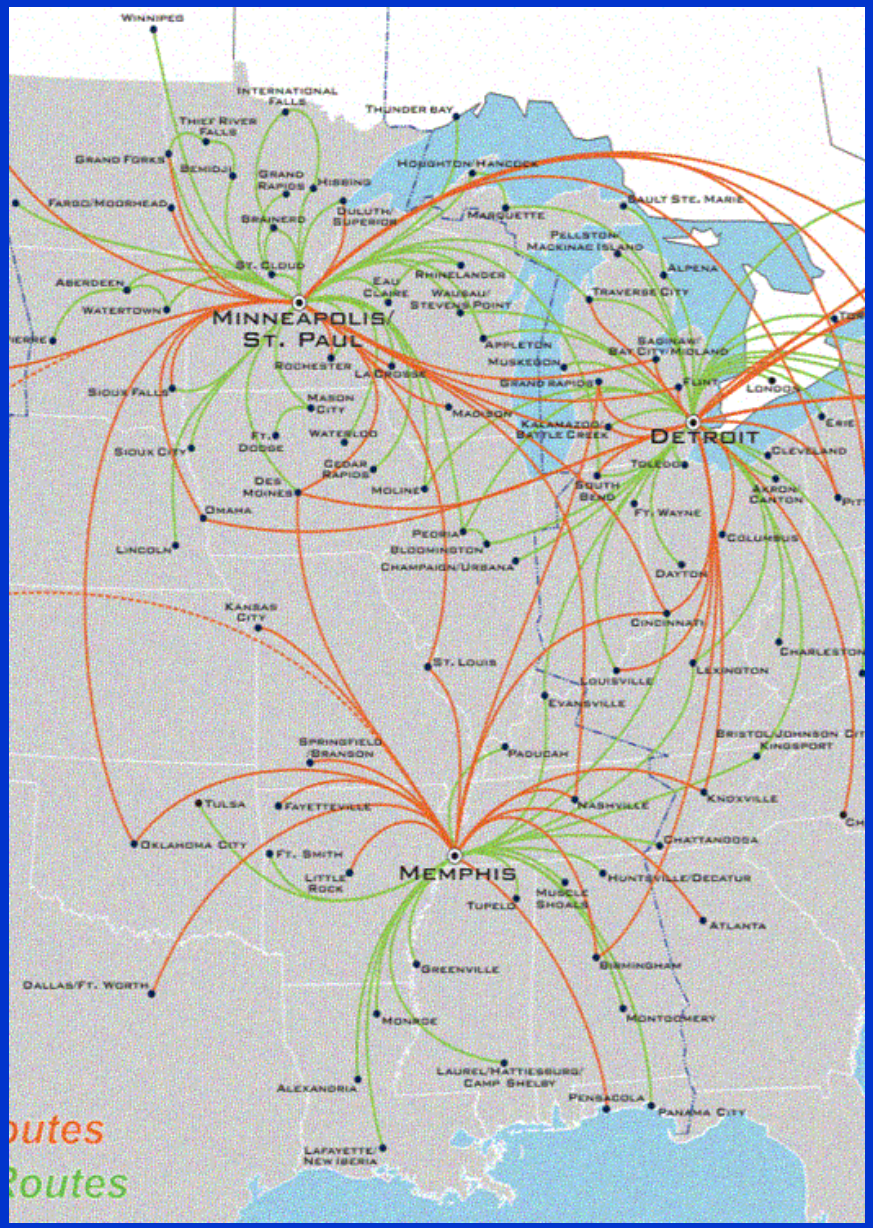
TAMDAR VALIDATION LOGISTICS

- **Location:** Minneapolis airport (other possibilities include Chanhassen NWS office or Memphis) at Air National Guard on airport facilities (contacts with Brian Williams and Air National Guard already initiated)

- **Dates/Timing:** Depending on funding availability, need at least 60 days to order radiosondes, then deployment can occur October 2004, March - October 2005 (WVSS-II Validation at Louisville in May 2005)

- **Weather of interest:** Convection, variable water vapor gradients (thus no winter deployment) for two - three week period (or two/three seasonal deployments)

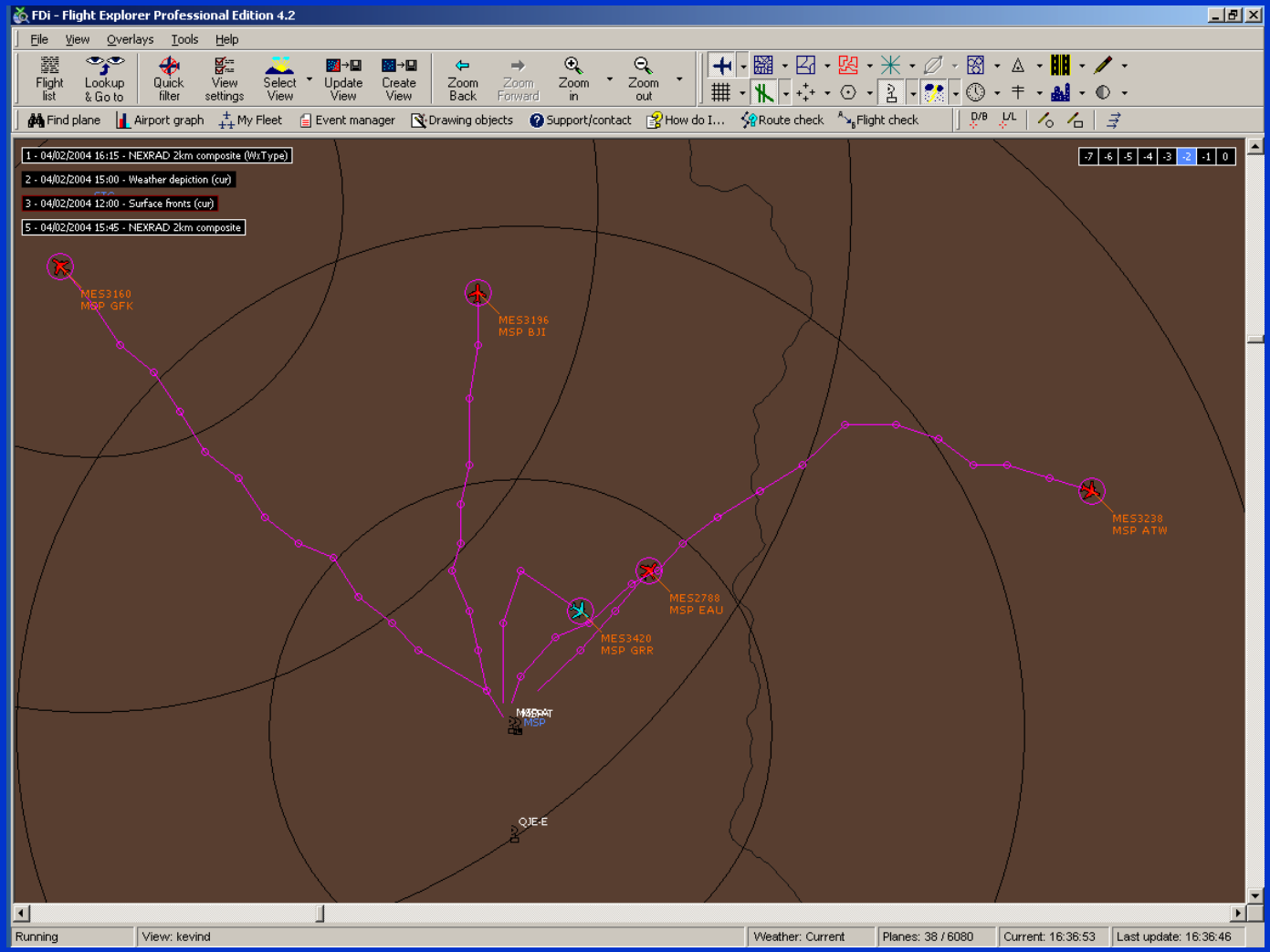
- **Data:** Made available in near real-time, netcdf format from anonymous ftp server (60 radiosondes in budget)



MESABA SAAB 340 ROUTES (Green)

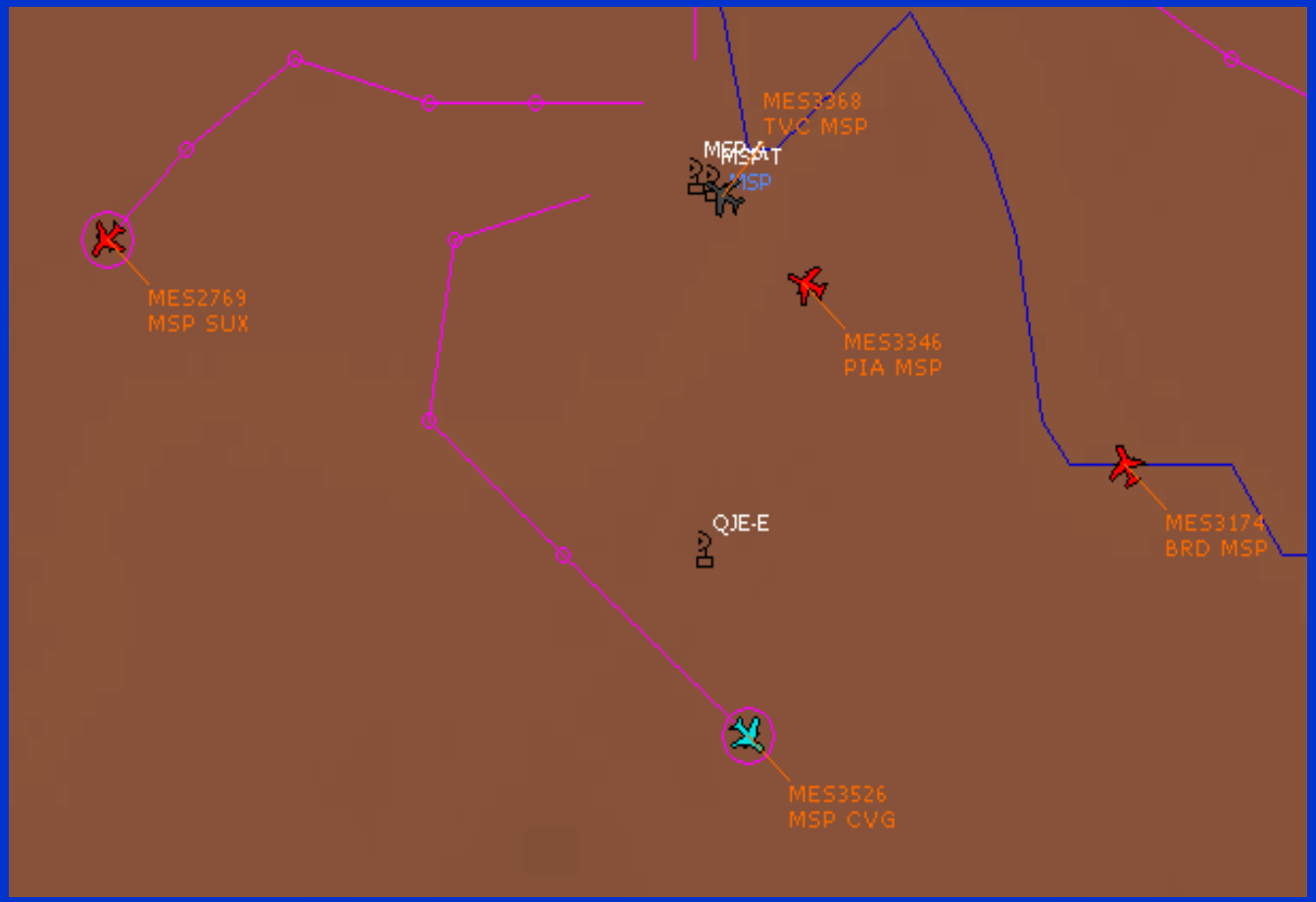
High Density Takeoff/Landings at Minneapolis Memphis And Detroit

MSP Aircraft Tracks



MSP Aircraft Tracks

60% of Takeoffs Use Westward Runways (Comm. Brian Williams)



LOGISTICAL CONCERNS

- Radiosonde launch permission at MSP airport?? This is a big concern and will affect the placement of the AERIbago for deployment. We need good points of contact and communication to make this happen from several parties of concern (FAA, Military, NOAA etc)

- FAA/Airport logistical issues (i.e. glow sticks attached to radiosondes), launch time windows and methodology (UPS landed in groups at night)

- Power/internet access (this is usually straight forward to address)

- Seasonal deployments????