1st NSF Observational Facilities Users' Workshop

September 24 - 26, 2007

Our Shared Vision: "Observations are essential to advance our understanding of the world we live in"

a laboratory of the
NCAR National Center for Atmospheric Research
sponsored by the
National Science Foundation


EXIT

Univ. of Wyoming, CSU, and EOL Goals

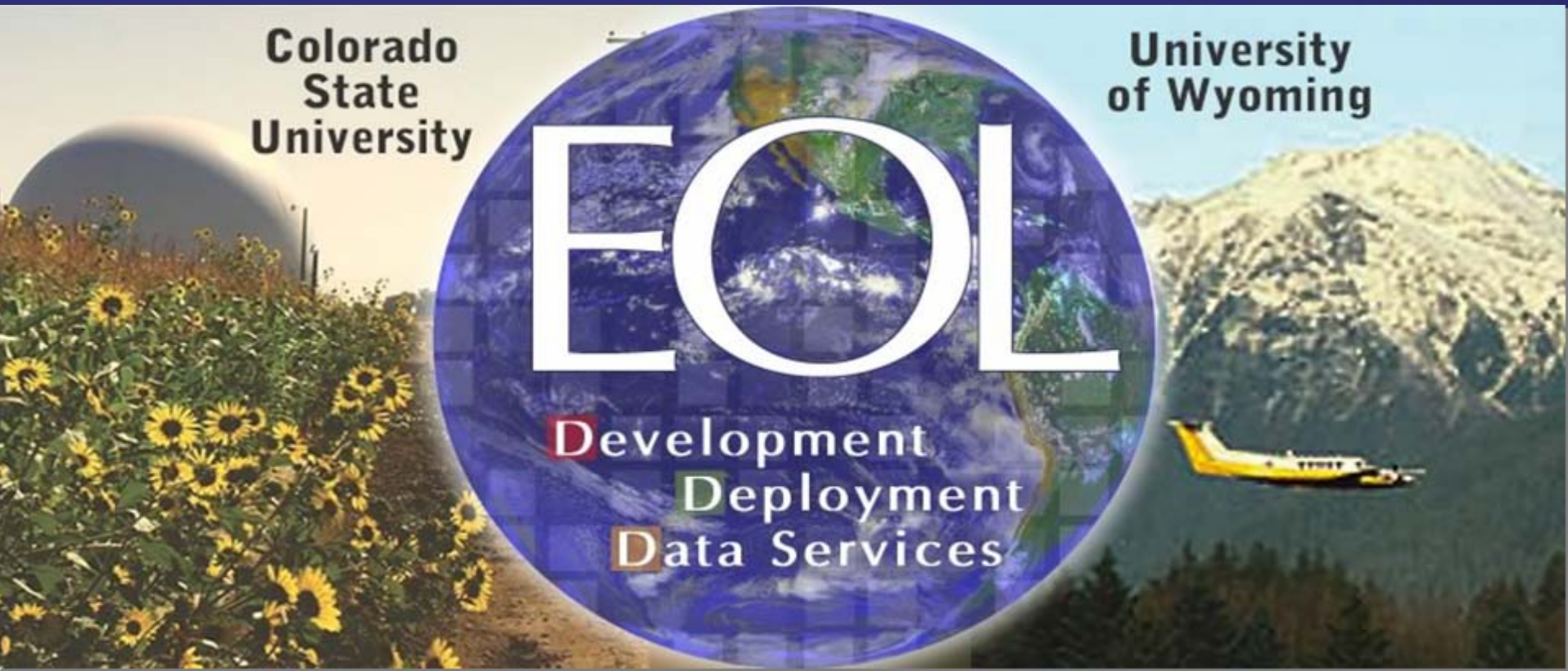
1. To lead and serve the community in the provision of observational facilities, infrastructure, and services needed by the atmospheric and related sciences.

2. To play a leadership role in the development community-inspired next generation instrumentation while providing existing instruments and infrastructure in support of science.

3. To coordinate many aspects of field deployment from pre-project planning through the field phase and subsequent data stewardship.

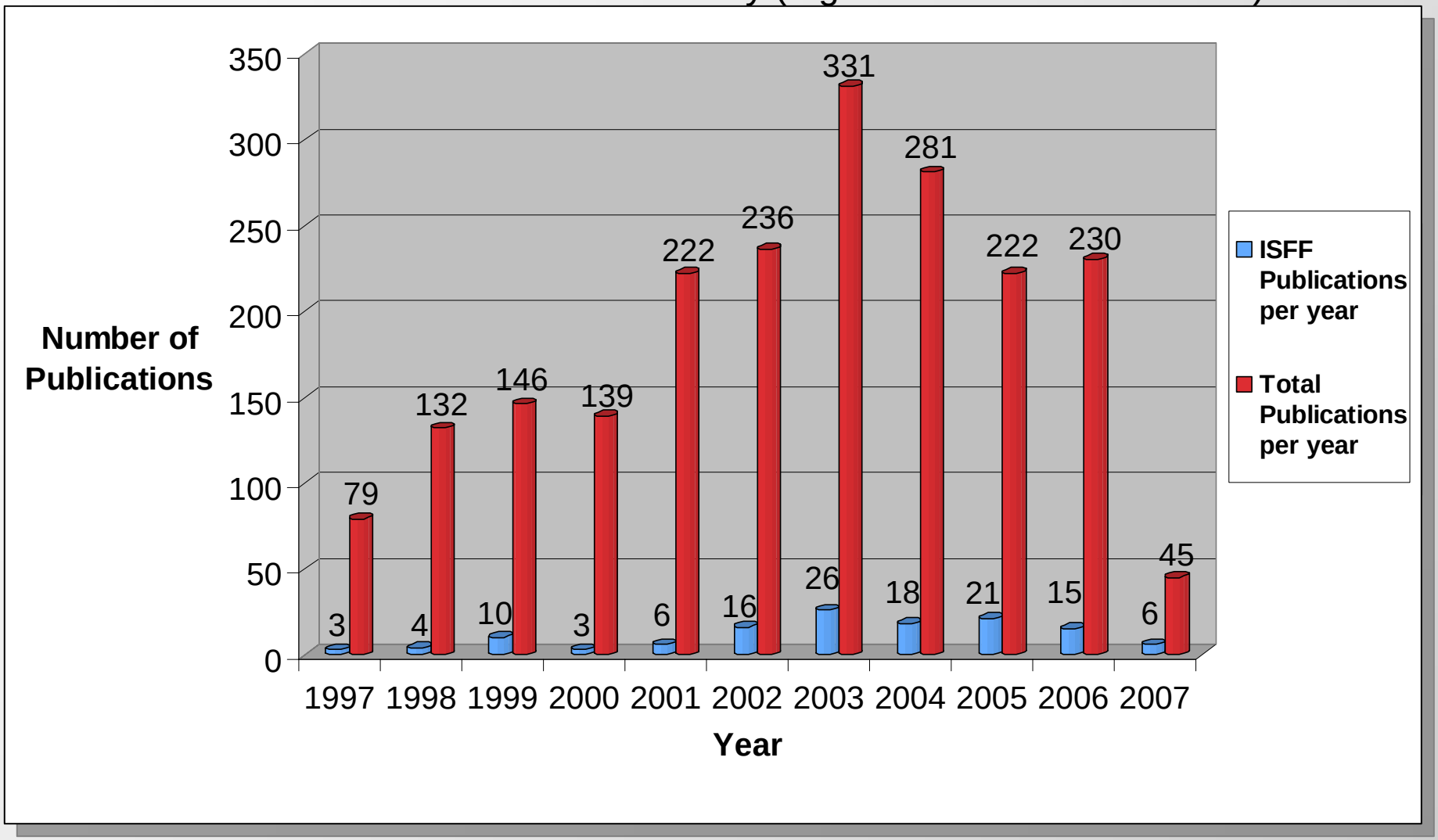
Motivation for the NSF Workshop:

- MUST interact with our user community on a regular basis
- Identify key scientific questions and hypotheses
- Ask whether these questions and hypotheses are well matched with CSU, U. of Wyoming and EOL facilities & services
- Future plans, including new developments
- Entrain new users and educate students



Community Publications

In the July 2005 UCAR Survey, **3.18%** of **1353** respondents identified themselves as a “user of an observational facility (e.g. NCAR aircraft or radars)”.

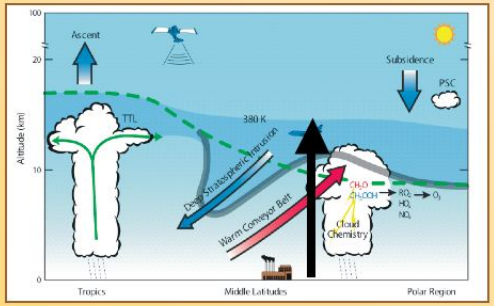


150 Total Peer Reviewed Publications using data collected by ISFF since 1997

2063 Total Peer Reviewed Publications using data collected by all EOL facilities since 1997

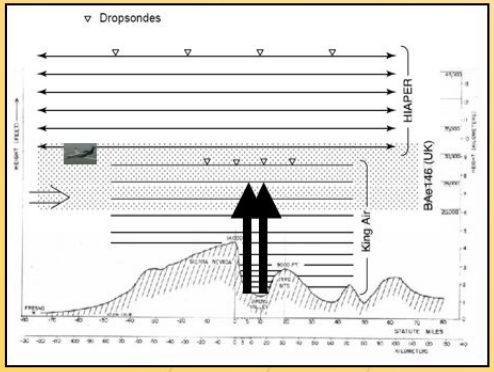
MPN: Modular Profiling Network

Phil Chilson, U. Oklahoma



One station that samples throughout the troposphere

or



Two stations that sample a deeper cross-section downwind of the mountain range

or

Six stations that sample the boundary layer of an urban basin

All this can be done with one system

MPN: Each Station

Integrated suite of instruments

Winds to 15 km

Temperature to 5 km

Aerosols and winds to 3 km and scan

Not to scale!

Radar dead zone

Sfc Fluxes -1 m to +10 m

449-MHz advanced wind profiler (with RASS for T_v)

Doppler lidar (scanning)

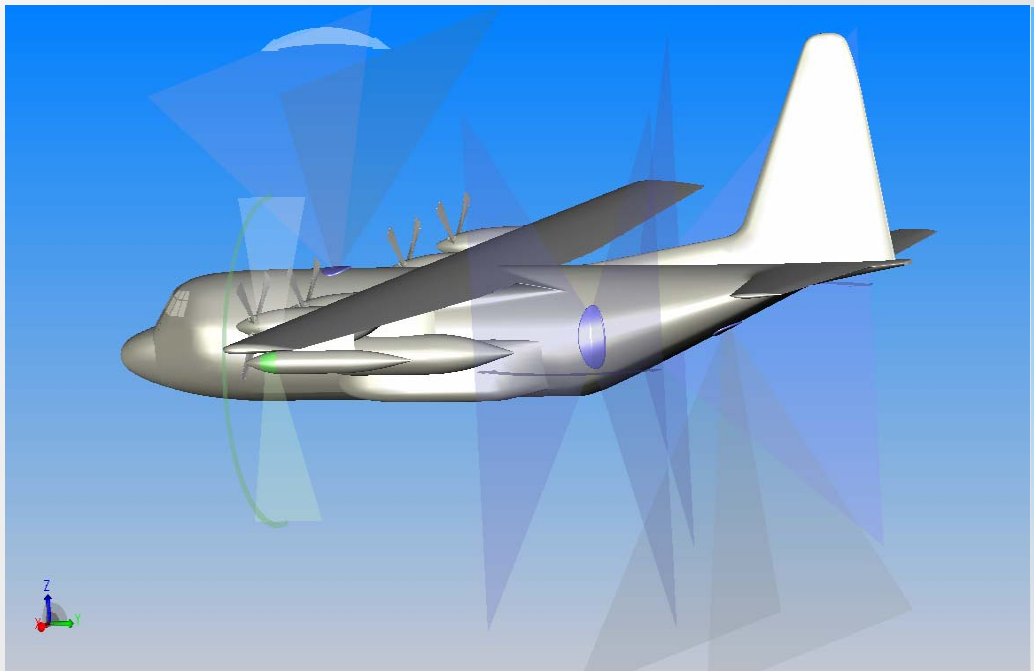
Flux-PAM sub-net

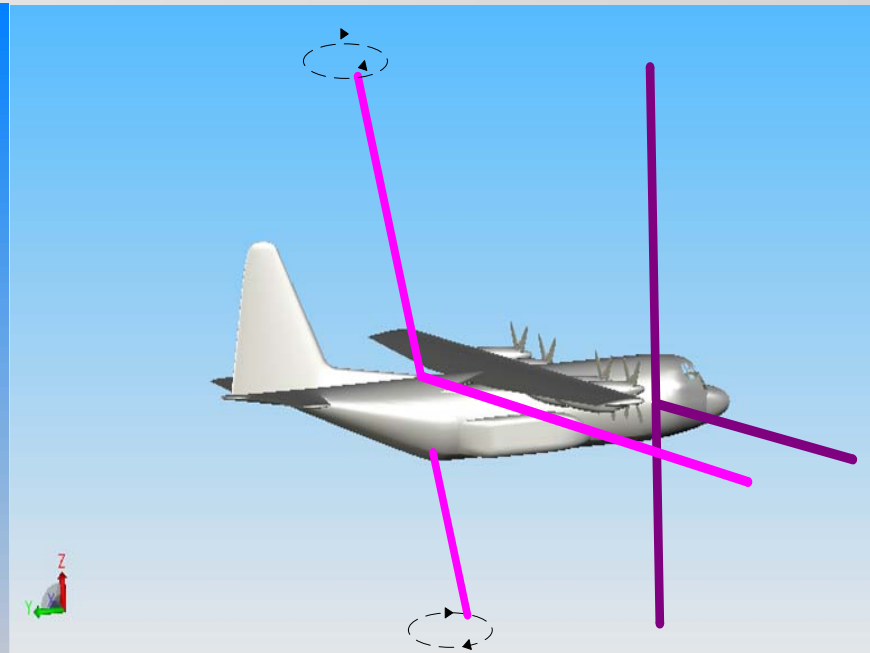
Development of a Community Airborne Platform Remote-sensing Interdisciplinary Suite (CAPRIS)

Bob Rauber U. Illinois

- **Phased array, conformal antenna, (cm-wavelength) Doppler radar**
- **mm-wavelength cloud radar**
- **Suite of lidars (e.g. H_2O, O_3, etc.)**

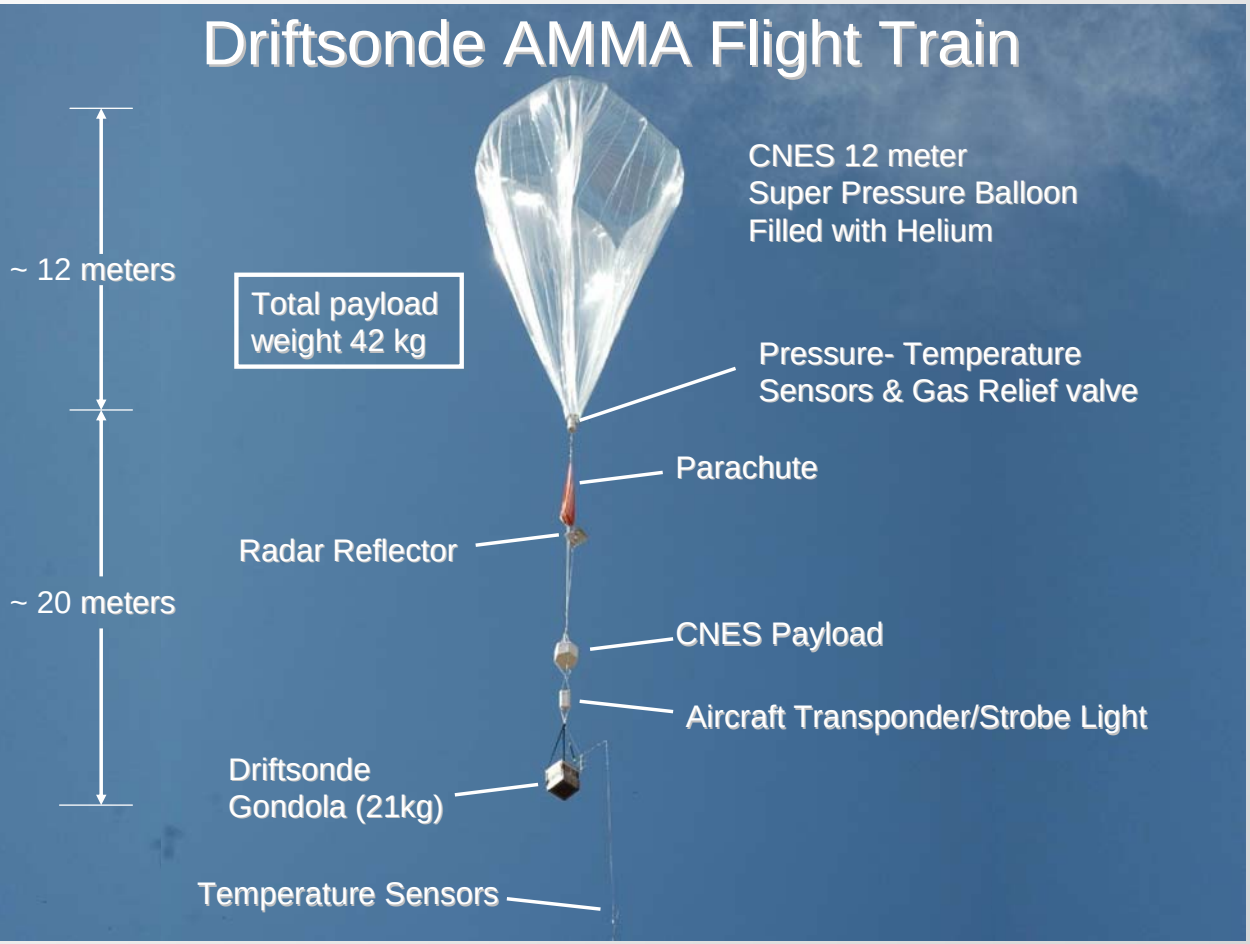
Addresses: Convection initiation, Hurricane intensity and structure, UTLS chemistry, Aerosol-cloud interaction





Driftsonde/MIST Sonde

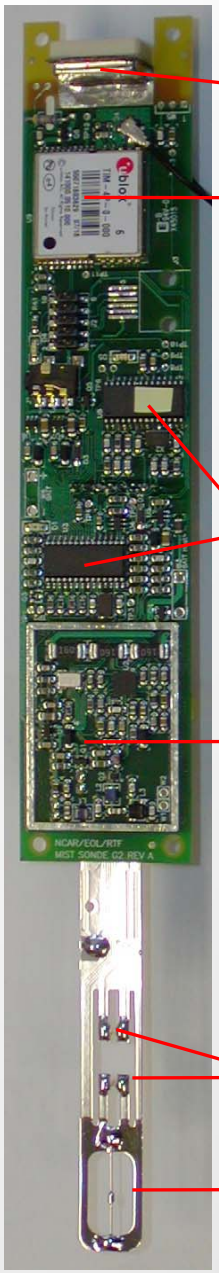
Terry Hock, NCAR EOL



System Capabilities:

- Flight duration of days (Zero pressure balloon) to weeks (Super pressure balloon)
- Balloon flight altitudes 100mb to 10mb
- Payload up to 50 miniature Dropsonde
- WEB based operation control center

Miniature In-situ Sounding Technology
(MIST Sonde)



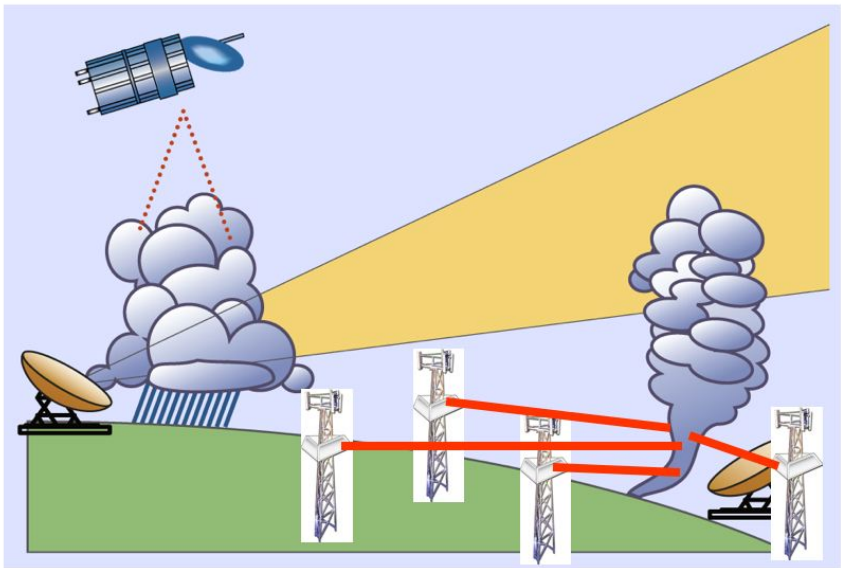
MIST Design Criteria & Motivation

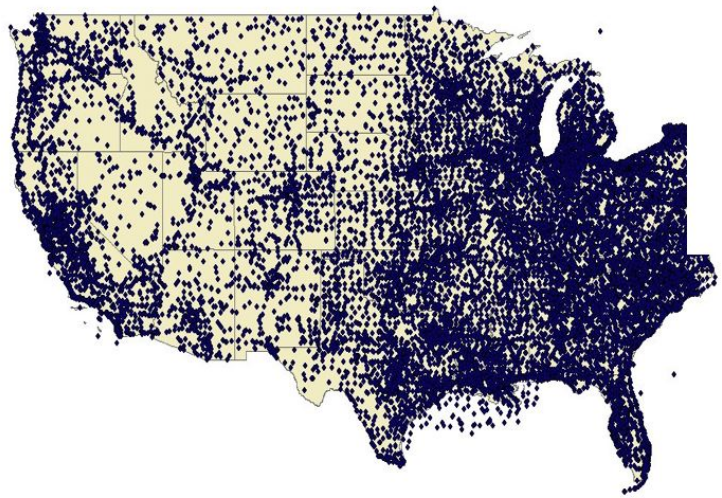
- Low cost (current aircraft dropsondes cost >$700)
- Lightweight (Gondola to carry 50 sondes)
- Size: 4.62 cm diameter, length 30.48 cm
- Weight: 170 grams
- Fall rate ~10 m/s at surface, cone parachute

New NSF Engineering Research Center for Collaborative Adaptive Sensing of the Atmosphere (CASA)

Engineering Research Center for CASA

- UMass/Amherst, OU, CSU, UPRM
- Concept: inexpensive, phased array Doppler radars on cell towers and buildings
- Dynamically adaptive dynamic sensing of multiple targets while simultaneously meeting multiple end-user needs



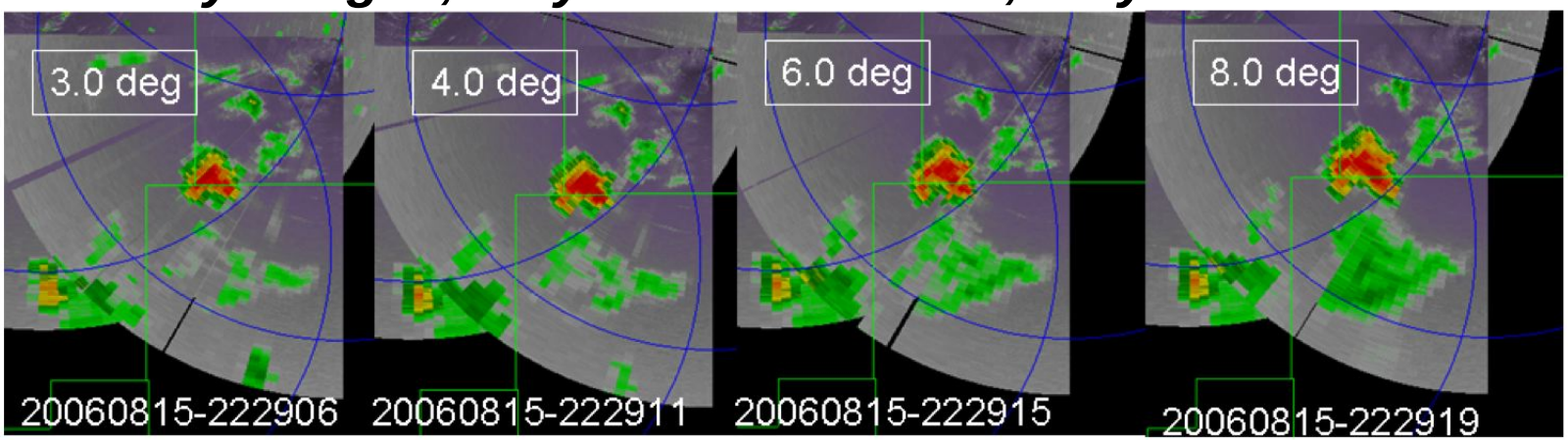


Fred Carr, U. Oklahoma

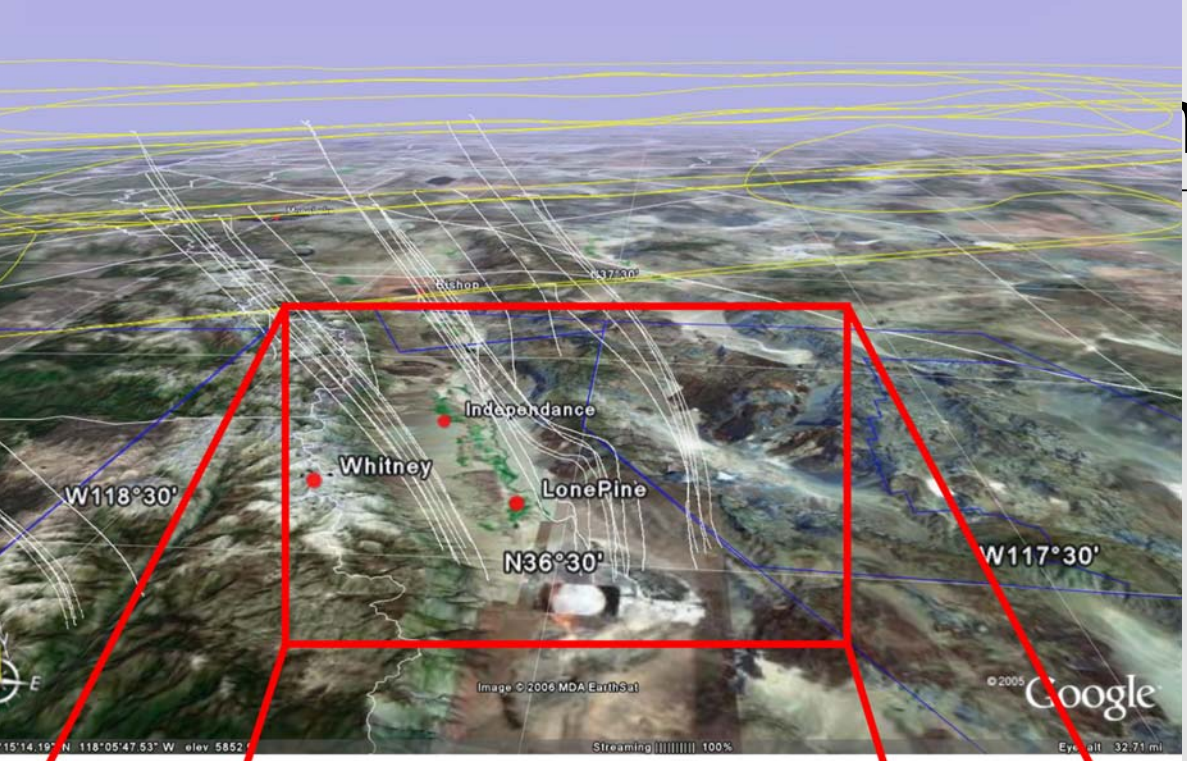
Radar Scanning Strategy

CASA	WSR-88D
Adaptive 1 minute updates (heart beat): •20 sec, ***360 degree surveillance*** scan executed each minute at a 2 degree elevation by each radar •40 sec., ***multi-radar targeted sector scans*** re-configured and executed each minute. Sector sizes range from 60 to 270 degrees, depending on weather feature detected. Elevation angles range from 1 to 14 degrees, depending on sector size. (See image below)	**"Sit and Spin"** 4- 5 minute updates (heart beat) •360 degree ***single radar volume scans***. Elevations depend on the Volume Coverage Pattern (VCP) which is changed on the order of every 4 or 5 hours (but varies considerably.)

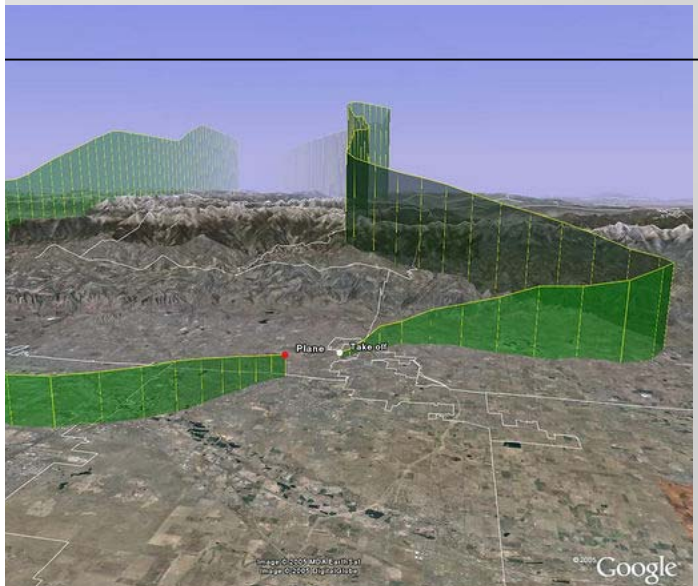
…"They're agile, they're collaborative, they're smart"…



nd displays


Independance
Whitney
LonePine
W118°30'
N36°30'
W117°30'
Image © 2006 MDA EarthSat
© 2005 Google


Independance
Whitney
LonePine
N36°30'

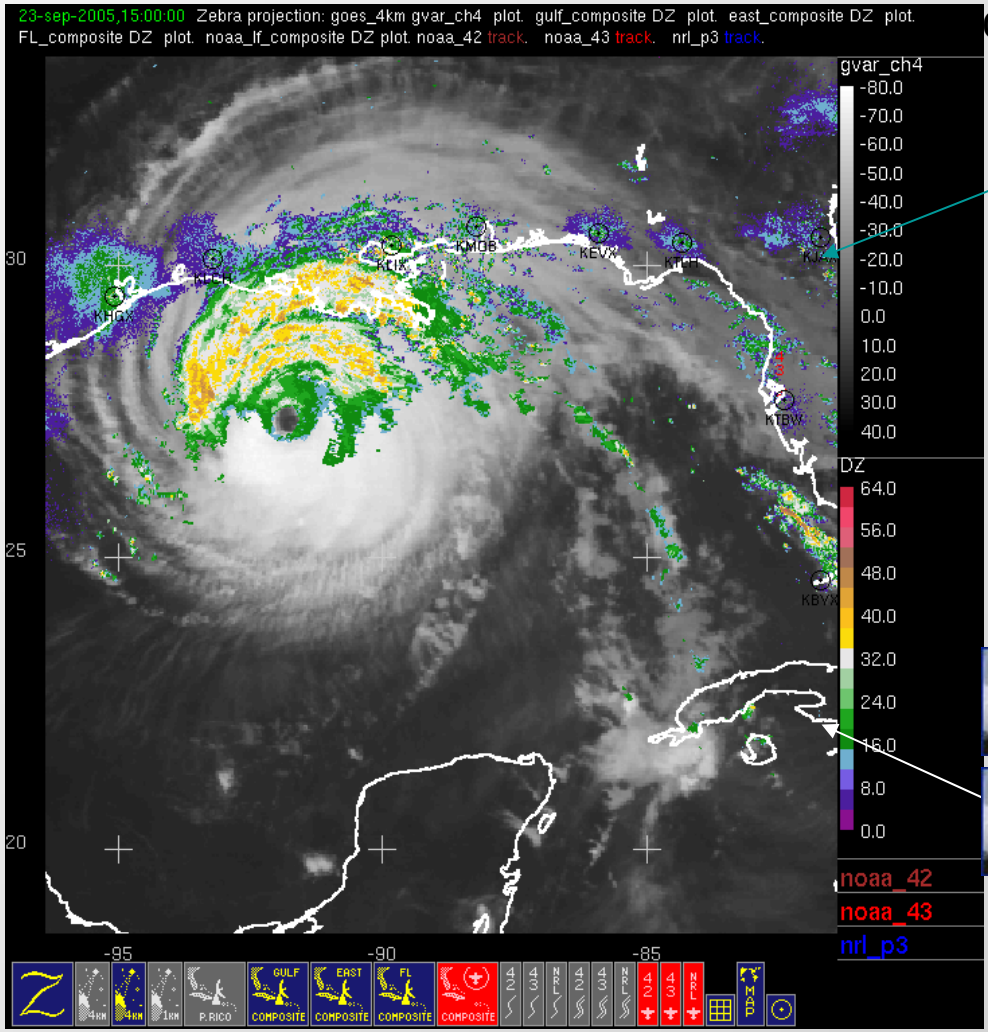

Plane
Take off
Google

Real-Time Display and Coordination Center as used in RAINEX during hurricane Rita

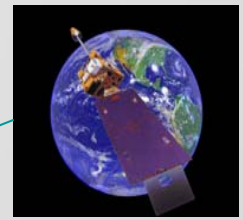
NRL 587

NOAA N42RF

NOAA N43RF



GOES 1Km vis



NEXRAD

Visualization & Analysis Tools Overview and Discussion

Don Murray & Chris Burghart

NSF Facility Users' Workshop

September 26, 2007

Questions

- Are our visualization and analysis tools used during field projects and beyond meeting the needs of the science community?
- What software should EOL/UCAR support?
- Should UCAR maintain a repository for third-party software libraries?

Replies

- Radar analysis tools are important
  - Statistical analysis, format conversions, browse capabilities
  - Tools that are used (e.g. CEDRIC, SOLO) are no longer supported by UCAR, but the need is still there.
- Many use IDL/MatLab/S+ for analysis now
- Intercomparison of different data sets (e.g. model/radar) is important
- Remote display of real-time data is needed – virtually dropping in to a project.
- Need a browse capability for project data (e.g. SDSMT browser) – maybe a model for UCAR efforts
- Community repository idea was supported, but has overhead and some drawbacks. Central support (ala Unidata) might be a better model do reduce duplication of efforts