

A Virtual Operations Center (VOC) for field experiments in the Atmospheric Sciences

Mike Daniels

Computing, Data and Software Facility

NCAR/EOL

NCAR Earth Observing Laboratory Platforms



Currently, we deploy the Real-time Display and Coordination Center (RDCC): What is it?

- Real-time displays of data from NSF platforms, other instruments and operational networks
- Secure networks and professional computing systems support for project participants
- Advanced Internet communications infrastructure (such as satcom links, chatrooms, video conferencing, webcams) for major field project sites and global participants
- Funded on a per-project basis through NSF Special Funds proposals
- A critical component of today's Field Operations Centers

RDCC deployments to date:

- 1991**
Convection and Precipitation Experiment (CaPE)
- 1992**
STORM Fronts Experiment Systems Test (STORMFEST)
Tropical Ocean Global Atmosphere (TOGA/COARE)
- 1994**
Winter Icing and Storms Project (WISP94)
- 1995**
Verification of Origins of Rotation in Tornadoes (VORTEX)
Small Cumulus Microphysics Study (SCMS)
Aerosol Characterization Experiment (ACE-1)
- 1997**
Fronts and Atlantic Storms Experiment (FASTEX)
- 1998**
Precipitation Project (PRECIP98)
- 1999**
Tropical Rainfall Measurement Mission (TRMM-LBA)
Mesoscale Alpine Programme (MAP)
- 2002**
International H2O Project (IHOP 2002)
- 2003**
Bow Echo and Mesoscale Convective Vortex Experiment (BAMEX)
- 2004**
Rain in Cumulus over the Ocean (RICO)
- 2005**
Hurricane Rainband and Intensity Change Experiment (RAINEX)
- 2006**
Megacity Initiatives:
Local and Global Research Observations (MILAGRO)
Terrain-induced Rotor Experiment (T-REX)

Examples: RICO's Real-time Display and Coordination Center



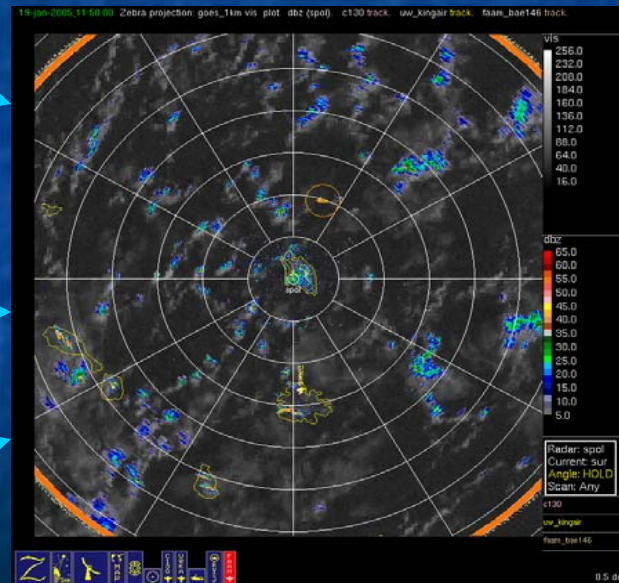
NSF C-130



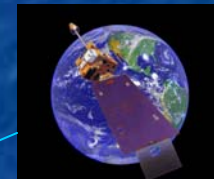
UK BAE-146



NSF KingAir



GOES 1Km vis



S-PolKa



Examples: RDCC integrated displays used in RAINEX - hurricane Rita

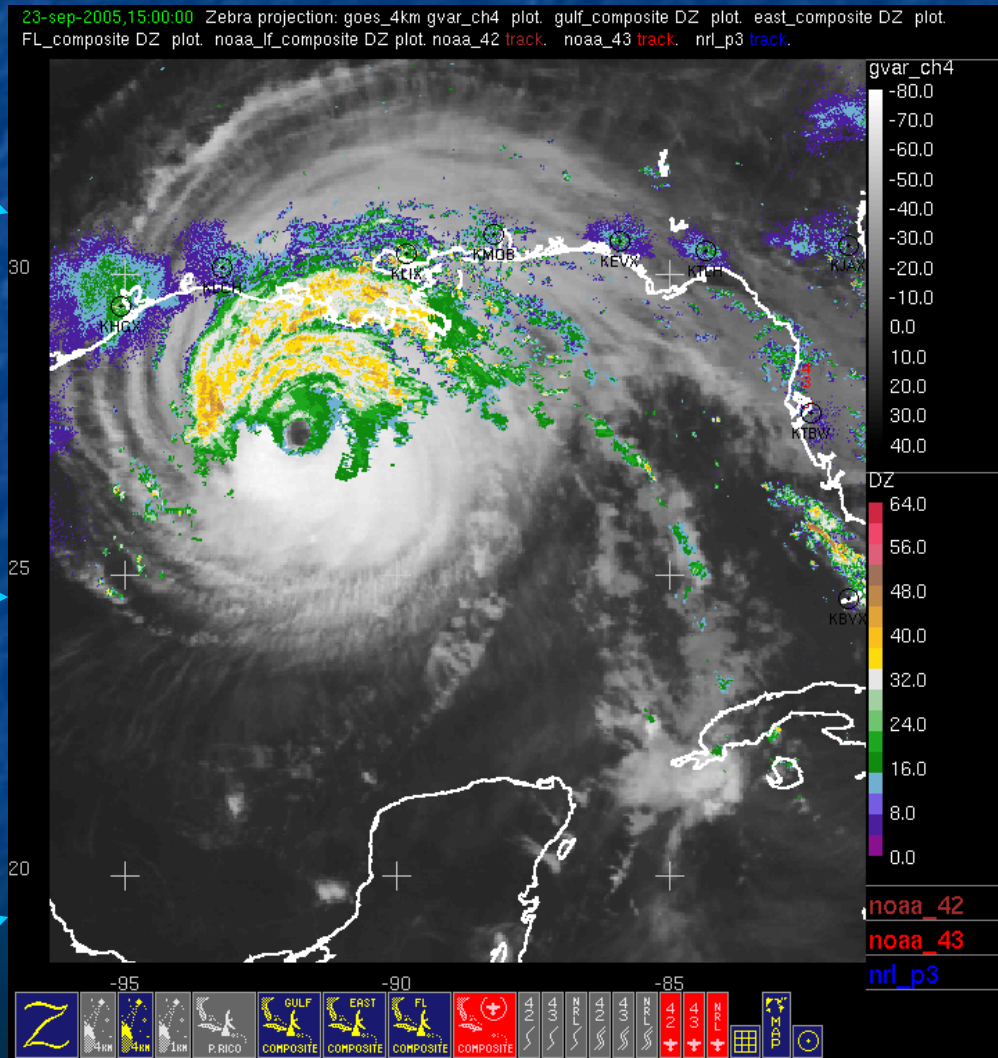
NRL 587



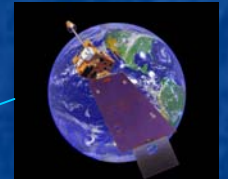
NOAA N42RF



NOAA N43RF



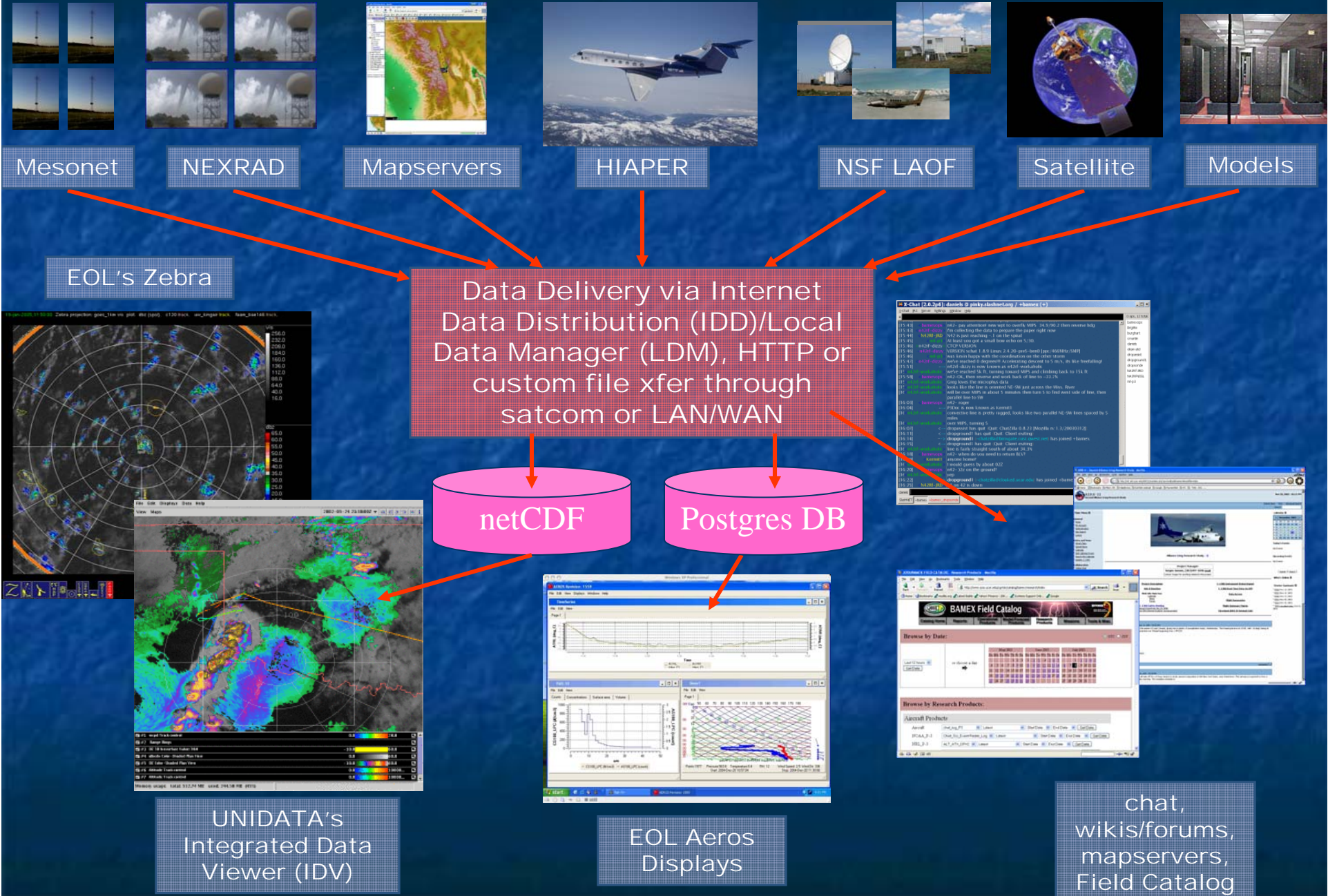
GOES 1Km vis



NEXRAD



Data and Information Flow



Mesonet

NEXRAD

Mapservers

HIAPER

NSF LAOF

Satellite

Models

EOL's Zebra

Data Delivery via Internet Data Distribution (IDD)/Local Data Manager (LDM), HTTP or custom file xfer through satcom or LAN/WAN

netCDF

Postgres DB

UNIDATA's Integrated Data Viewer (IDV)

EOL Aeros Displays

chat, wikis/forums, mapservers, Field Catalog

Some issues with the current RDCC

- Zebra software pre-1990's vintage, not practical to retrofit to new data streams and platform independence
- Reconfigured for each project, difficult/impossible to test beforehand
- No E&O component beyond happenstance
- Funding means there is no development, just deployment and per-project customizations
- A merger of JOSS & EOL field project infrastructure must occur
- Much cyberinfrastructure being built that we are not connecting to

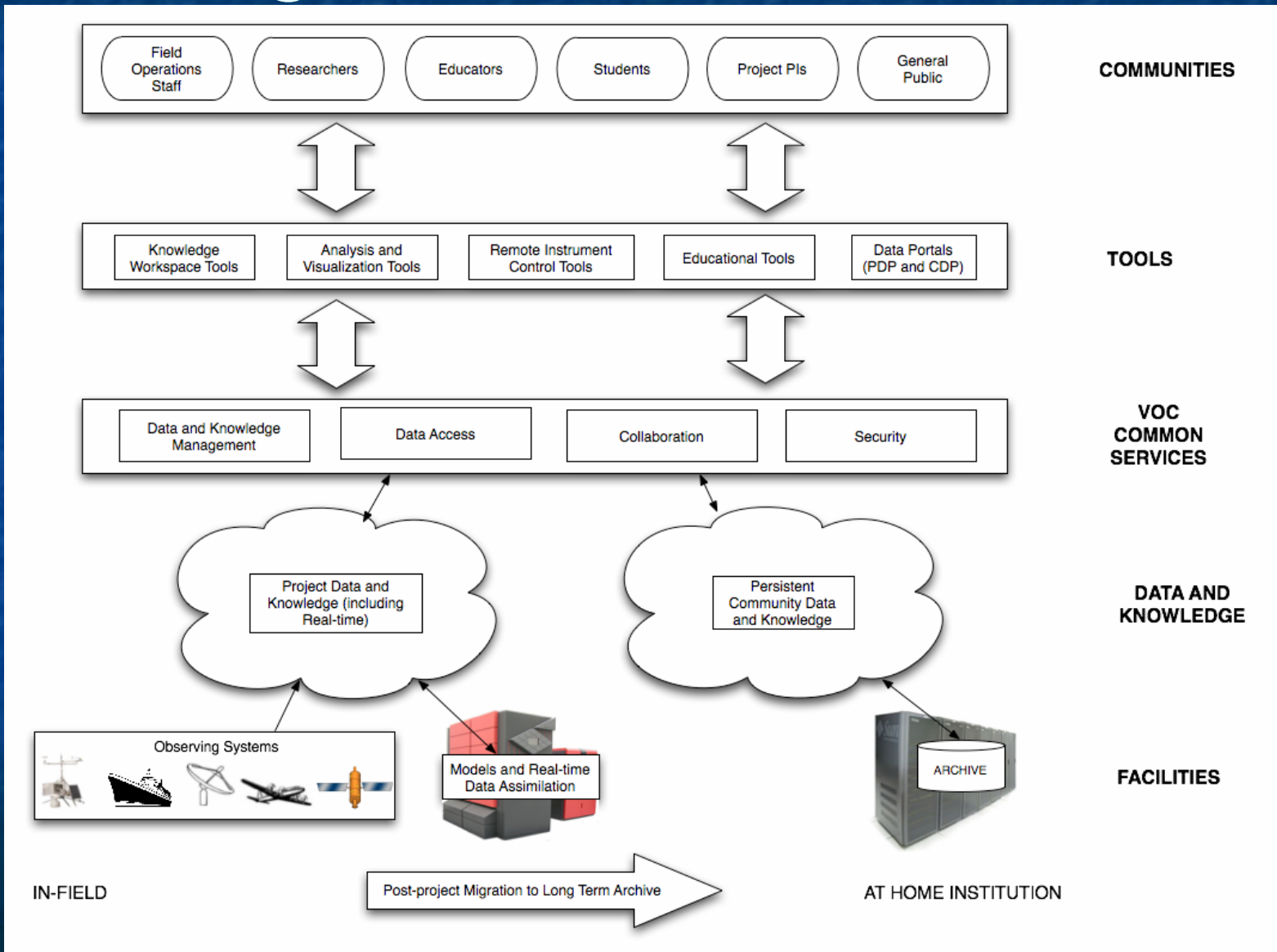
Therefore, another of Mike's questionable
acronyms bites the dust...



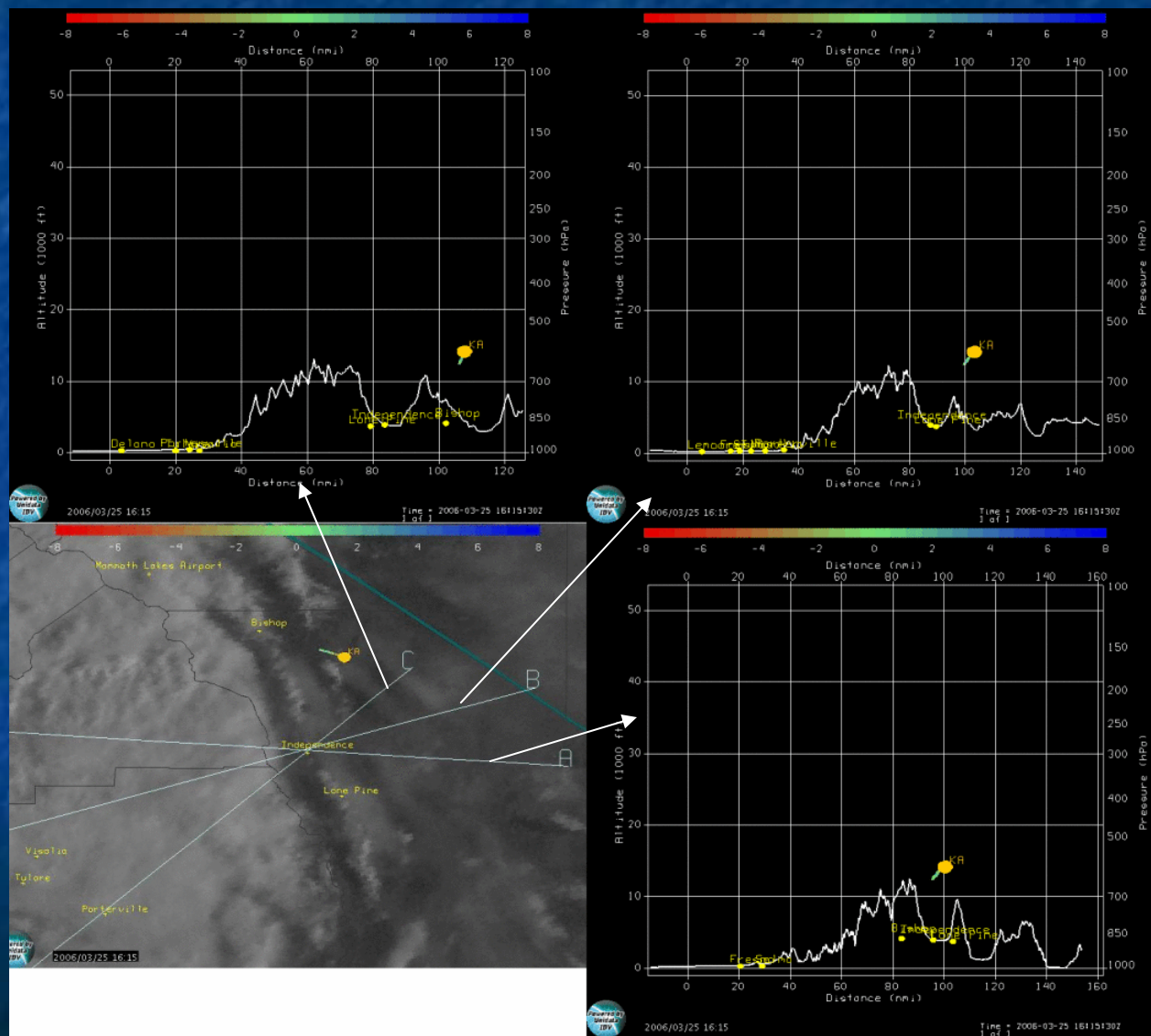
...but a new one emerges

An NSF proposal: The
Virtual Operations Center
(VOC)

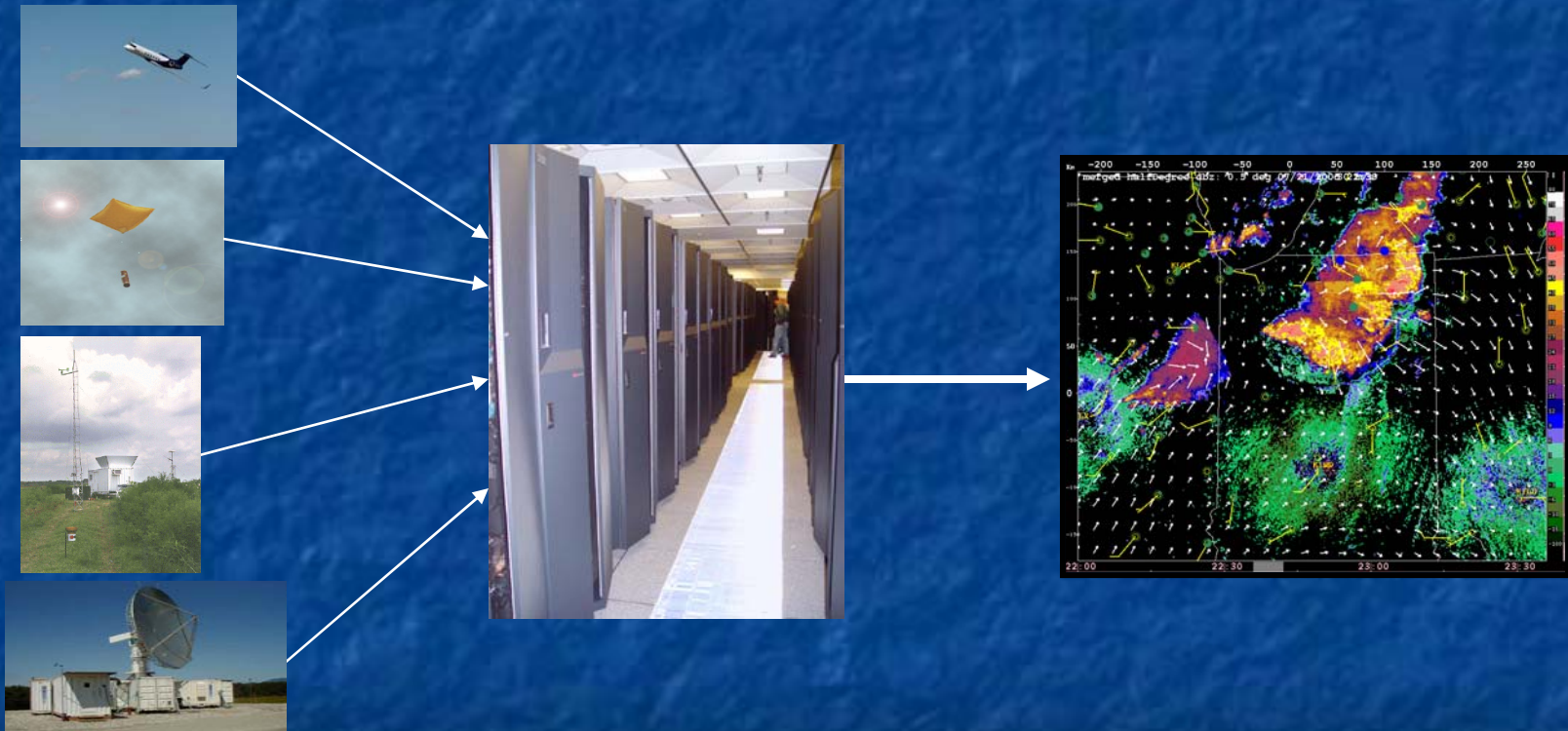
Virtual Operations Center (VOC): High-level Architecture



VOC components: New integrated visualization tools



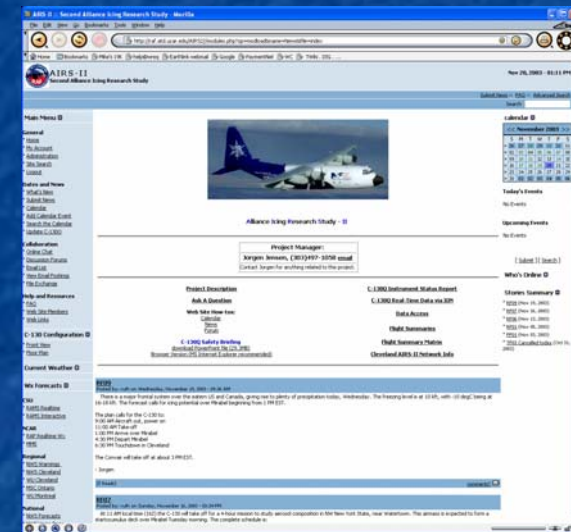
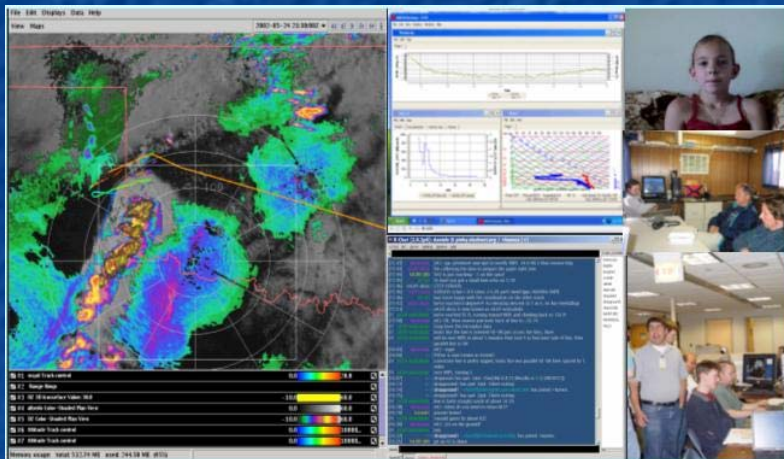
VOC components: Near real-time forecast model assimilation



Using NCAR's Weather Research and Forecasting (WRF) model in near real-time...

VOC components: New communications and collaboration technologies

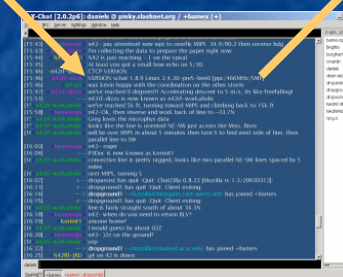
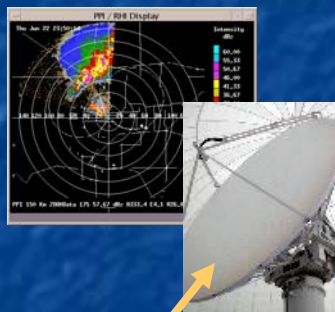
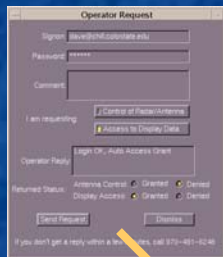
AccessGrid, web conferencing, webcams, RSS feeds, podcasts, chat/instant messaging



Wikis, forums and digital whiteboards

VOC components: Control of instruments from the Internet

VCHILL:

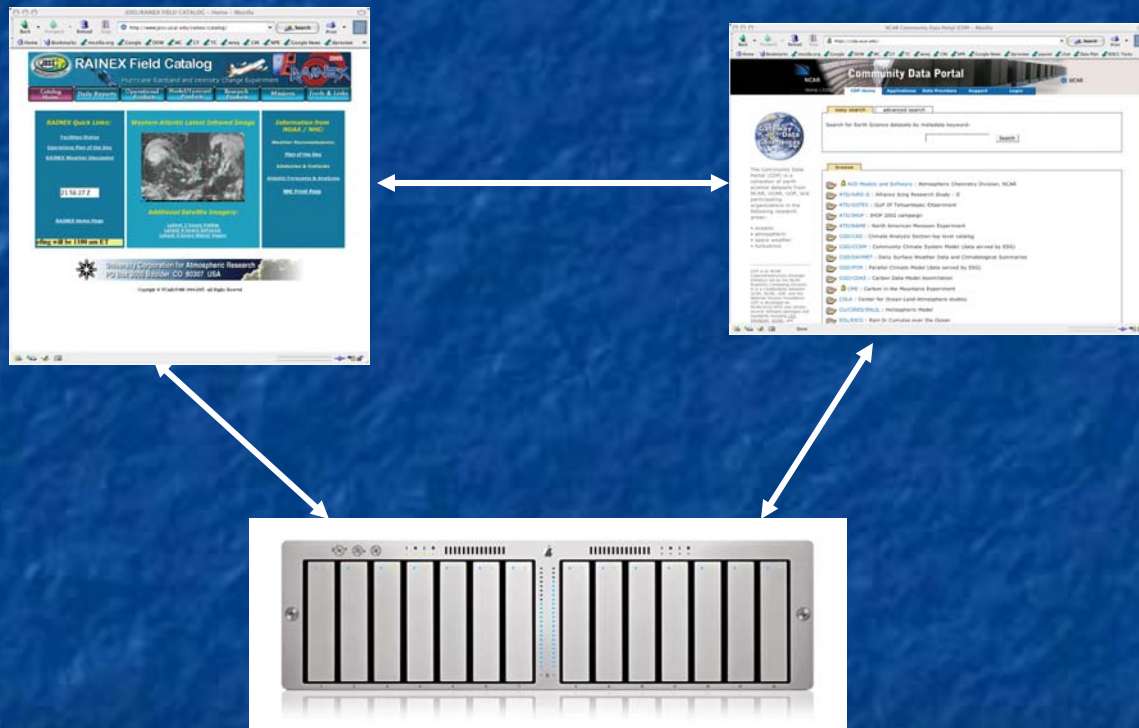


IRC chat (for humans *and instruments*):

VOC components: Field Project Simulation Laboratory

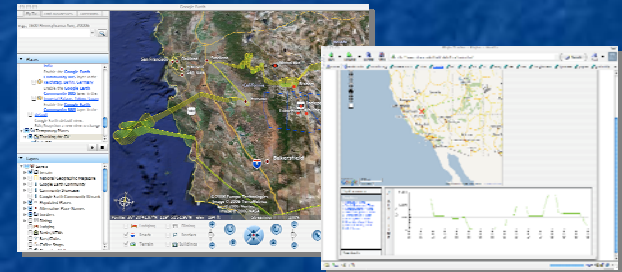
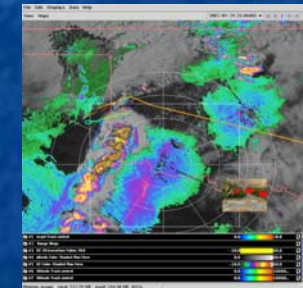
- Modeled after labs currently in place for major EOL platforms
- PI Training
- Used for pre-deployment scenarios
- Education in the use of field instrumentation
- Tests the Real-time Data Store (RDS) functionality

VOC components: New field catalog which links to data, portals (e.g. NCAR's Community Data Portal) and online holdings from in the field

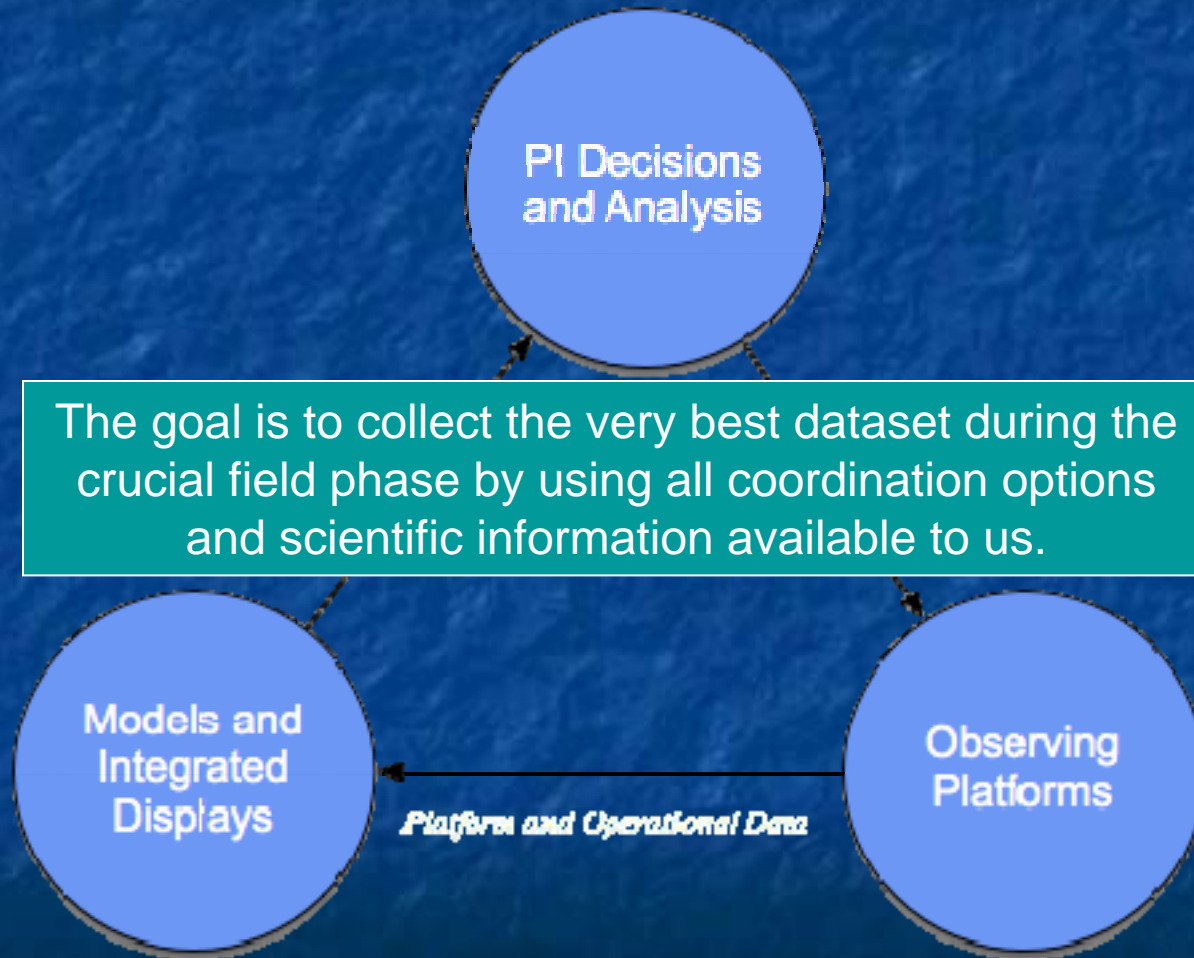


VOC components: Expanded Education and Outreach

- Cellphone participation
- Case studies
- “Lightweight” clients
- Field participation (virtual or on site)



The VOC enabled “Feedback Loop”:



Pursuing funding to build the VOC over three years

- Partnership with: NCAR/MMM, NCAR/RAL, NCAR/SCD, UOP/UNIDATA, CSU/CHILL
 - Jenny Sun, Don Murray, Don Middleton and Chandra are Co-Is and other senior staff are involved
- Offer the VOC as a deployable NSF facility

A Proposed Timeline for the VOC

- Year 1: Kickoff Workshop, Build Prototypes
- Year 2: Engage Community & Modify
- Year 3: Incorporate New Technologies and Deploy Components
- Year 4: Establish Permanent Advisory Bodies and Feedback Loops

end

Mike Daniels, Manager
Computing, Data and Software Facility (CDS)
NCAR/EOL
daniels@ucar.edu