UNIDATA POLICY COMMITTEE MEETING

LeRoy Spayd
Chief, Meteorological Services Division
NWS/NOAA

October 9-10, 2003

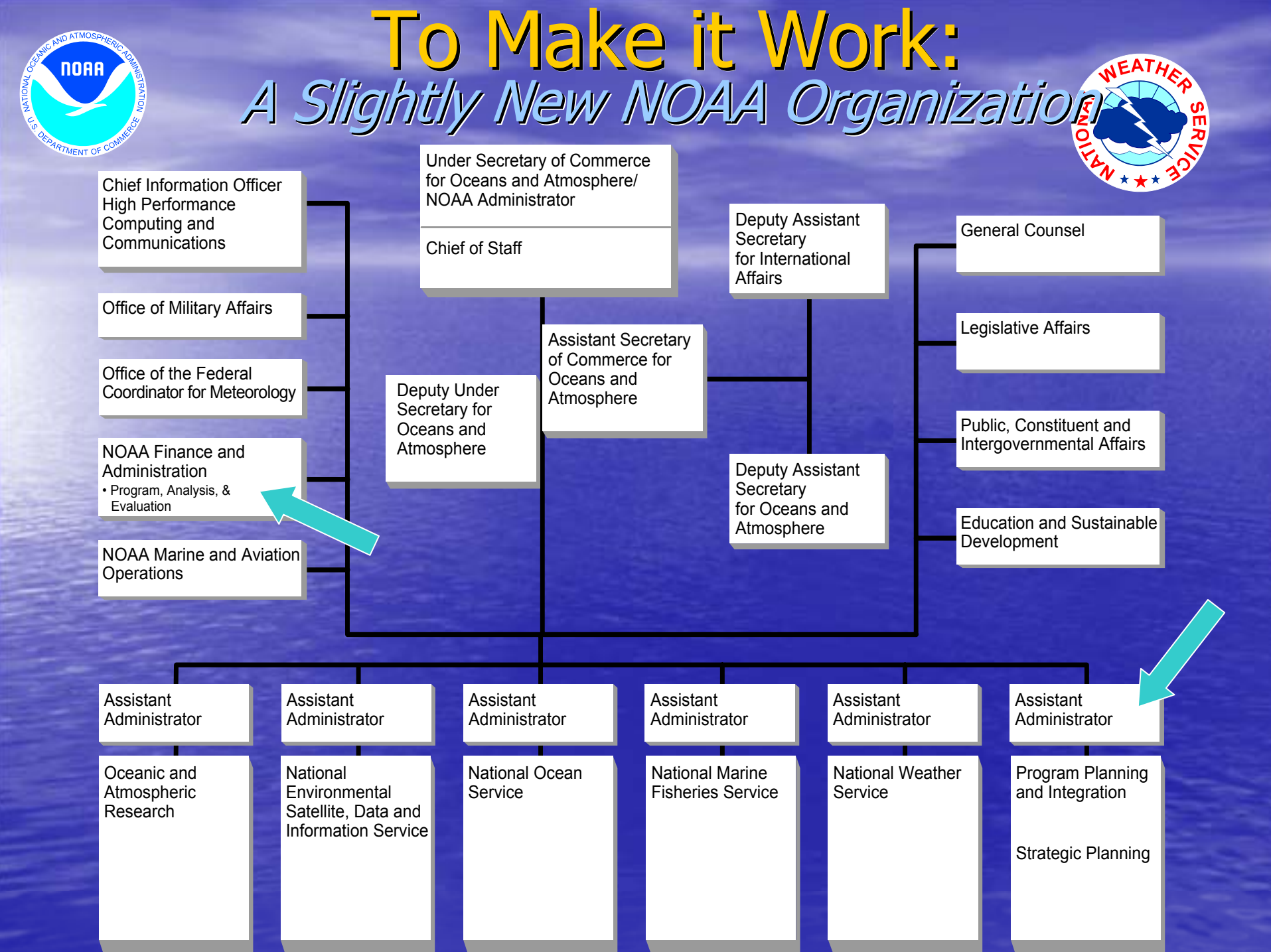
The NWS Strategic Plan

Outline

- NOAA
- NSIP
- CSI
- WES
- NDFD

To Make it Work:

A Slightly New NOAA Organization

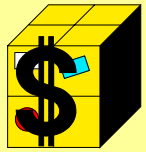


NOAA Planning Process

- New Process for FY 05 Budget Cycle
- Based on DOD Program Planning & Budgeting System (PPBS)
- Establishes 3 Key Phases
  - Planning, Programming & Budgeting
- More strategic and program oriented with key decisions points and objective analysis
- Relies on Goal Teams to Develop "Program Plans"
- NOAA Program Analysis and Evaluation (PA&E)

PPBS

Master Planning Calendar



FY/FY/FY/FY/FY

FY

PLANNING

Legal Mandates

Constituents

Congress

Mission

Policy

Mission Requirements

L/O Strategic Plans

STRATEGIC PLAN

Strategic Direction & Priorities

Annual Strategic Guidance Memorandum (AGM)

PROGRAMMING

Program Assessment

Program Plans

PA&E REVIEW

Program Decision Memorandum (PDM)

BUDGETING

BUDGET PREPARATION

DoC BUDGET Review

DECISIONS (Pass back)

OMB REVIEW

DECISIONS (Pass back)

PRES. BUDGET

CONGRESS

APPROPRIATION

EXECUTE

MARCH - SEPTEMBER

SEPTEMBER - JANUARY

FEB - DEC

JAN-SEPT

OCT

NOAA Strategic Plan

Four Mission Goals

- ***Serve Society's Needs for Weather and Water Information***
- ***Support the Nation's Commerce with Information for Safe and Efficient Transportation***
- ***Understand Climate Variability and Change to Enhance Society's Ability to Plan and Respond***
- ***Protect, Restore, and Manage the Use of Coastal and Ocean Resources through Ecosystem -based Management***

NOAA Strategic Plan

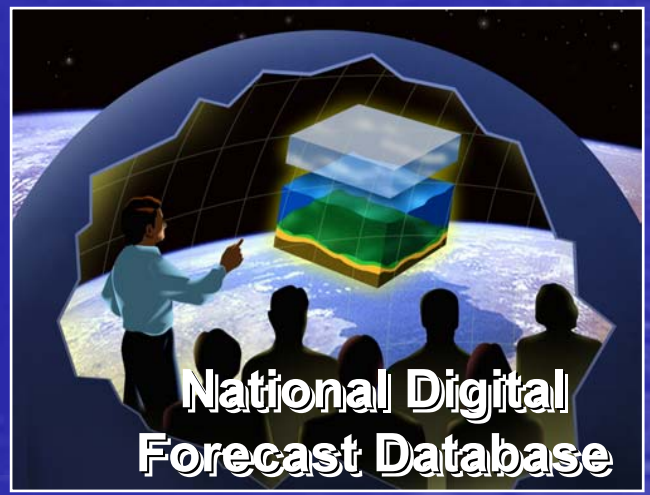
Cross-cutting Priorities

- ✓ Integrated Global Environmental Observation and Data Management System
- ✓ Environmental Literacy, Outreach, and Extension
- ✓ Sound, Reliable State-of-the-Art Research
- ✓ International Cooperation and Collaboration
- ✓ Homeland Security
- ✓ Organizational Excellence: Facilities, Infrastructure, Security, Human Capital and Administrative Services

NOAA Strategic Plan

Key Outcomes

- *Increased accuracy, lead time, and specificity of environmental forecasts and warnings.*
- *Increased use and effectiveness of environmental information for planning and decision making.*
- *Increased satisfaction with and benefits from NOAA environmental Information and warning services.*

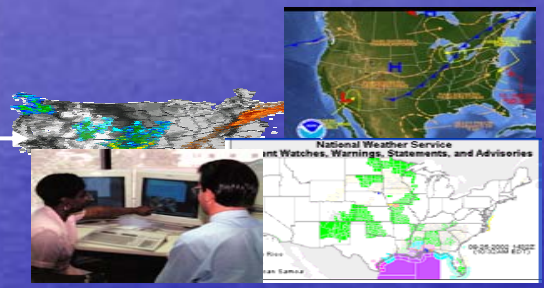


NOAA Strategic Plan

Common Strategies

Monitor and Observe

Assess and Predict



Engage, Advise, and Inform

Understand and Describe

Programming

Weather and Water Base Program Summary

Key Activities

- Monitor and Observe
  - Global Observations: Satellite
  - Regional Observations: Satellite, Atmosphere, Surface, Ocean
  - Solar & Space Environment Observations: Satellite & Ground Based
- Assess and Predict
  - Data Assimilation and Modeling
  - Central Guidance
  - Local Forecasts and Warnings
  - Field Information Technology

Programming

Weather and Water Base Program Summary, Key Activities, (cont.) (cont.)

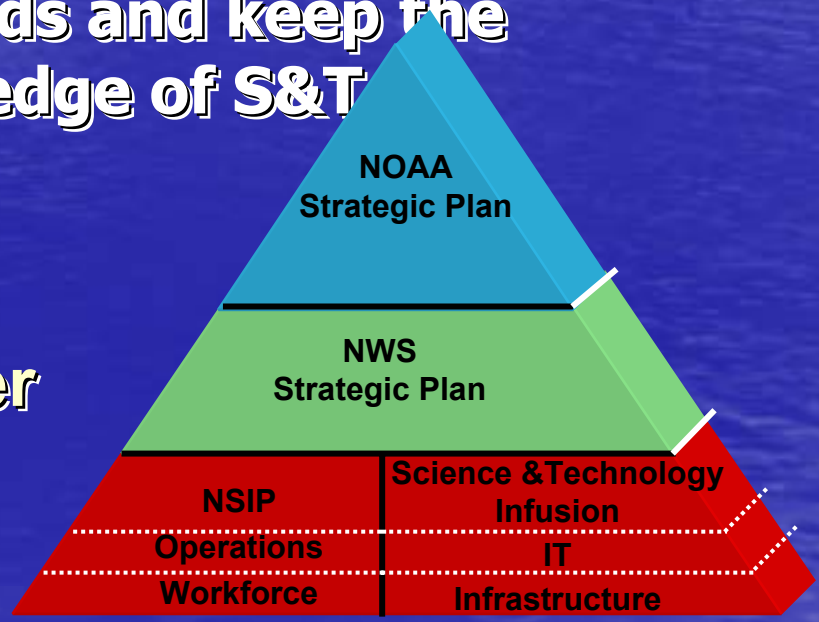
- Engage, Advise and Inform
  - Warning Ingest and Dissemination
  - Bulk Environmental Information Delivery
  - Education and Outreach
- Understand and Describe
  - Global and Regional Observing
  - Global and Regional Modeling
  - Technology Prototyping
  - Social-Cultural and Economic Analyses

NWS Science and Technology Infusion Plan (STIP)

Purpose: Support NOAA and NWS Strategic Plans by:

Defining S&T needs and strategies, objectives, and programs to meet these needs and keep the agency close to the cutting edge of S&T supporting its mission.

Needs Link to NISIIP and other "Sub"- Strategic Plans



Planning Outcome

Integrated Roadmaps

Services / Solutions	Aviation	Hydrology	Severe Wx.	Tropical	Marine	Winter Wx.	Climate	Fire Wx	Air Qual.
Observations	Integrated Solutions Across Service/Science Areas								
Numerical Prediction									
Forecast Applications									
Dissemination & Info. Access									
IT Architecture									

- ✓ **Performance-Measure Based**
- ✓ **"End-to-End"**
  - ***Research to operations***
  - ***Observations to delivering information to users***
- ✓ **Reflective of reasonable budget expectations**

e.g., Severe Weather

Summary

Vision

- ***Tornado Warning Lead Times Beyond Tornadic Lifetimes (≥ 30 min) at 1-km resolution***

R&D Needs

- **Tornadogenesis**
- **R&D on severe weather**
- **Objective verification**
- **Cloud-scale models**
- **Situational awareness tools and training**
- **R&D on total lightning data and radar polarimetry data**
- **Predictability Limits**
- **Improved Understanding on Socioeconomic Impact**

Increasing Performance

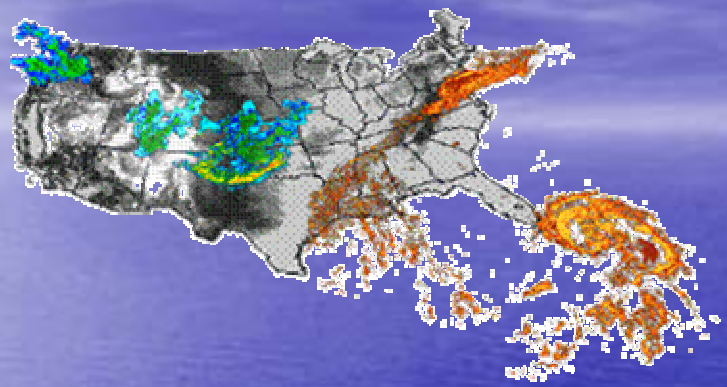
- WSR88D Radar Upgrades
- TDWR integration
- WES/Training
- MDCRS

- Implement WRF
- Deploy Advanced Ensemble Techniques
- Dual Polarization
- New Satellite Remote Sensing

On-going Training

2002 2007 2012 2020

Observations
Summary



Supporting NWS Service missions

Vision

Observations When and Where Needed

R&D Needs

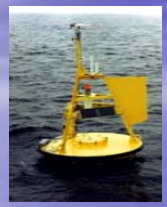
- **Boundary Layer Observations**
- **Improved RH & Cloud Observations**
- **Improved Adaptive Obs Strategies, Platforms, and Sensors**
- **Improved Vertical Profile Resolution**

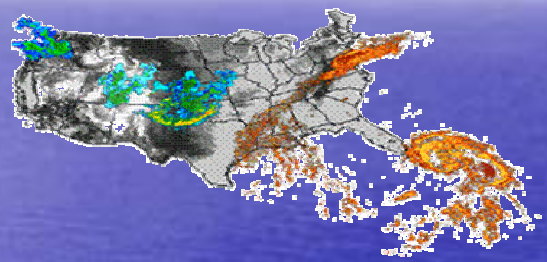
Increasing Performance

2002	2007	2012	2020
• Mature WSR-88D ORPG, ORDA	• WSR-88D Upgrades (Dual Pol, Phased Array)		
• Rapid Expansion of Mesonets	• Improved LEO and GEO Satellites; >> data volume!!!		
• Expansion of Aircraft Obs	• Expansion of Adaptive Obs		
• Development of Testbed Strategies	• Increasing Radiation Budget Observations		

Numerical Prediction

Summary





Vision

Common Model Framework

For Climate/Weather/Water

Increasing Performance

Supporting NWS Service missions

- Common Climate/ Global System
- More Realistic Cloud Physics
- Improve Use of Existing & New Observations
- WRF Framework

- Advanced Ensembling
- Cloud Analysis
- Adv. Small-scale Data Assimilation
- Adv. Physics/ Coupled AQ

R&D Needs

- **Assimilation of Increasing Volume of Remote Sensed Data**
- **Small-scale Assimilation Techniques**
- **Improved Representation of Non-Hydrostatic Scale Physics**
- **Probabilistic Approaches**
- **Mesoscale Verification Techniques**

2002 2007 2012 2020

NOAA SERVICE IMPROVEMENT PLAN (NSIP)

- A NWS plan for climate, Water, and Weather Services for the short-term future which is available to all NWS staff, partners and customers in a formal integrated plan.
- This plan is aligned with the mission and strategic goals of the NWS and reflects the needs of our partners and customers.

NOAA SERVICE IMPROVEMENT PLAN (NSIP)

- Web version of plan to be released by October 20, 2003.
- These improved services plans and milestones will guide the work of the NWS from our field offices, national centers and headquarters.
- A document for Service Improvements (changes) only, not repetitive of current services which are NOT changing!

Gauging Customer Satisfaction

- *NWS (2003) Contracted with Federal Consulting Group to Survey Prominent Customer Segments*
  - *Media*
  - *Emergency Managers*
  - *Aviation*
  - *Marine*
- *Each Survey Results in Customer Satisfaction Index*
- *NWS Results Compared to Other Federal Agencies*
- *Survey Results Suggest How to Maximize Customer Satisfaction*

American Customer Satisfaction Index (ACSI)

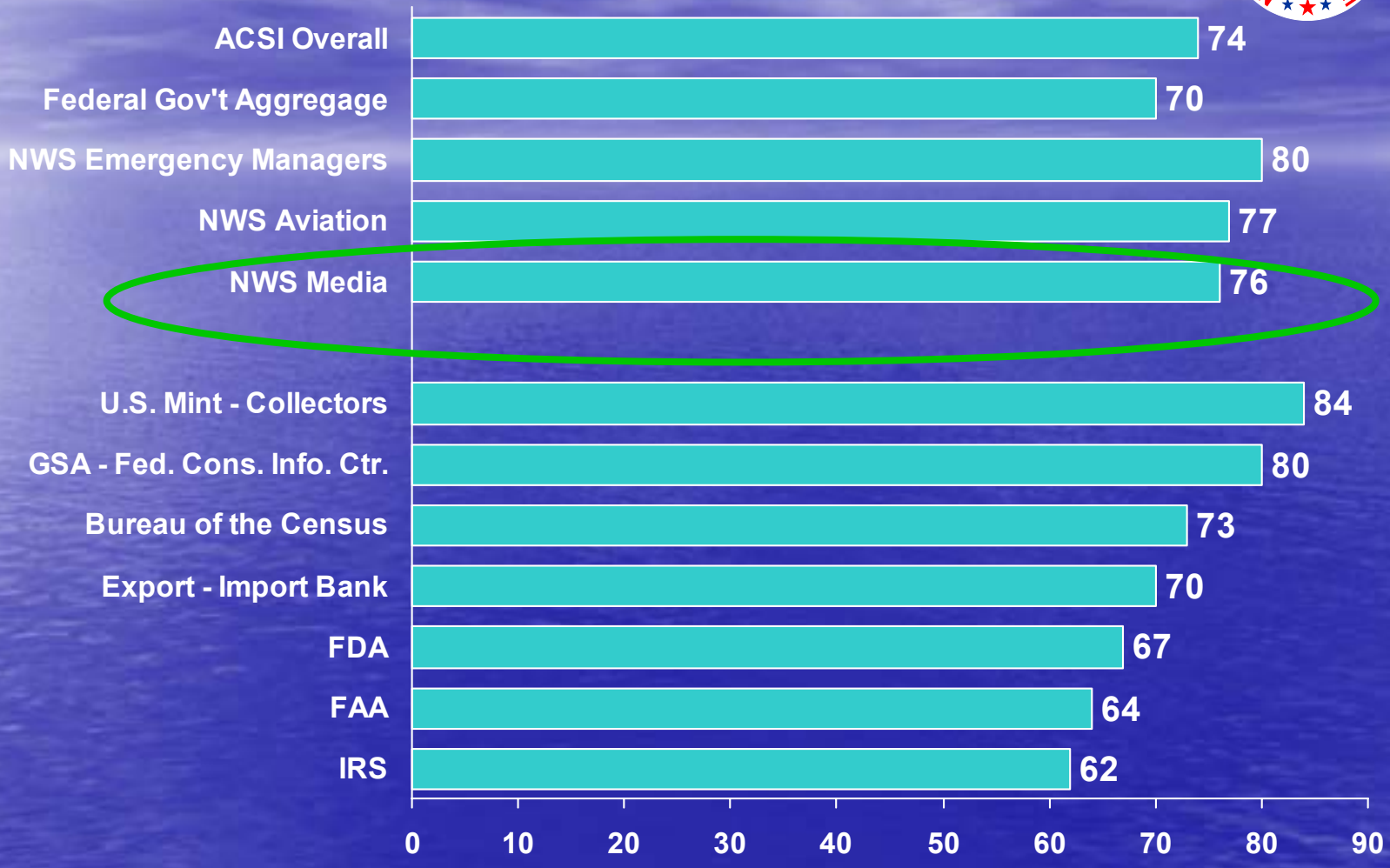
- *The #1 national economic indicator of customer satisfaction*
- *Measures 30 industries, 180+ organizations covering 75% of the U.S. economy*
- *-Over 70 U.S. Federal Government agencies have used ACSI to measure more than 120 programs/services*
- *Advanced methodology quantifiably measures and links satisfaction levels to performance and prioritizes actions for improvement*
- *Results from all surveys are published quarterly in* The Wall Street Journal

Why Measure Customer Satisfaction?

Customers are our most important asset

- *You can't manage without measurement*
- *What you measure determines what you do (resource allocation)*
- *The quality of your measurement has a significant effect on financial performance and management effectiveness*
- *Customer satisfaction can be measured and managed*

And the Survey Says…..



Customer Satisfaction Index (CSI) scores are based on three questions:

- ***Overall satisfaction with products and services***
- ***Products and services compared to expectations***
- ***Products and services compared to ideal***

Survey Responses

- *Approximately 80% of detailed customer responses came from the following question:*
- "How can the NWS improve its current services and/or add new services to help you achieve your mission?"

Survey Responses

- *Survey's highest rated response is positive:*
  - *Most common response is customer satisfaction with current procedures*
- *Recommendations resonating in multiple responses include:*
  - *Ensure future products can be used in decision assistance tools (e.g. GIS) and can be delivered to cell phone/ pager/wireless systems used by first responders*
  - *Increase communication with various emergency managers and media to ensure product formats, headers, and dissemination processes are coordinated*
  - *Conduct more customer outreach*

Survey Responses

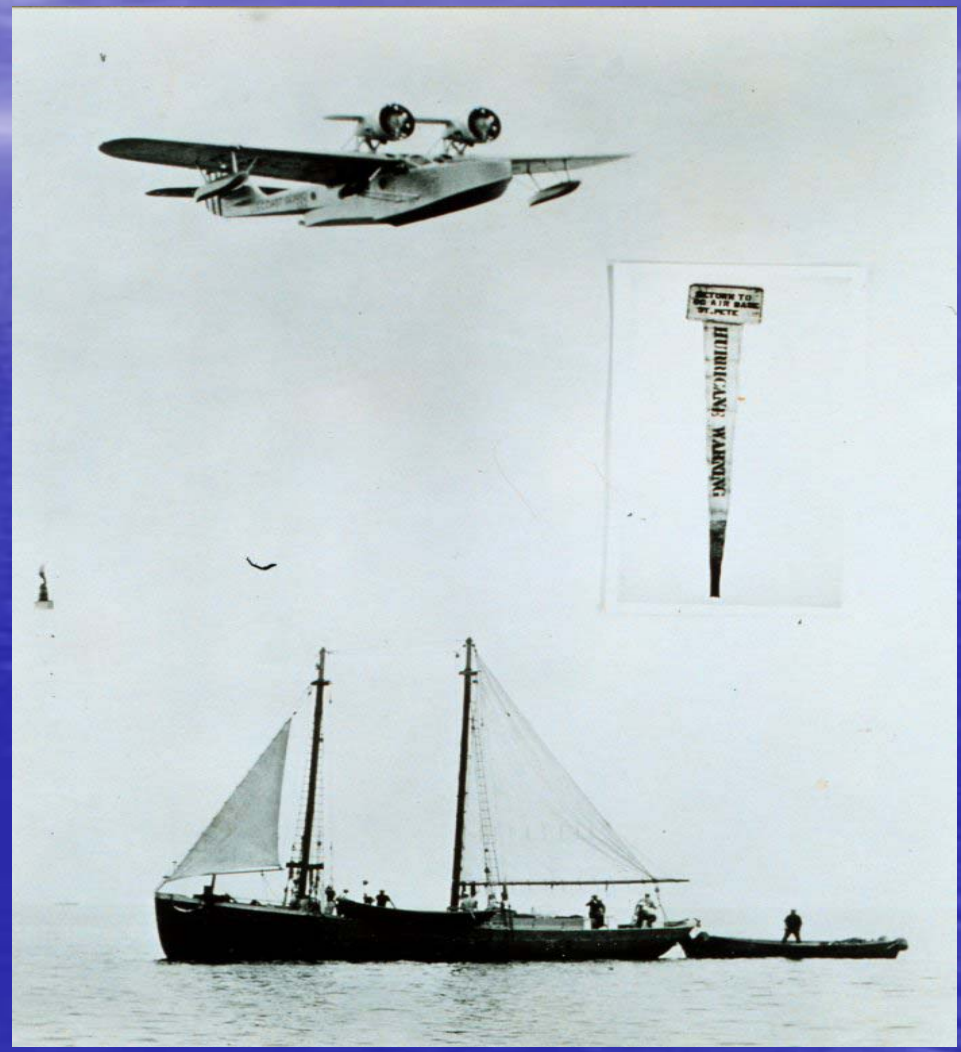
- *Emergency Managers specific needs:*
  - *Prevent overload of data during severe weather events by addressing products in a clear, concise manner.*
  - *Clarify product wording. Common response to survey: "I don't understand the jargon in your products"*
  - *Provide graphics along with text to facilitate customers' understanding of products.*

Survey Responses

- *Feedback from Media:*
  - *Public Zone Forecasts should be issued four scheduled times per day coinciding with news-release times (in areas not currently following this practice)*
  - *Reduce errors in short-duration warnings (e.g. content or dissemination codes)*
  - *Create Area Forecast Discussions using plain language and issue them more frequently*

Survey Responses

- Strong need expressed to improve communication of hazards information
  - Government to government,
  - Government to business, and
  - Government to citizen interfaces

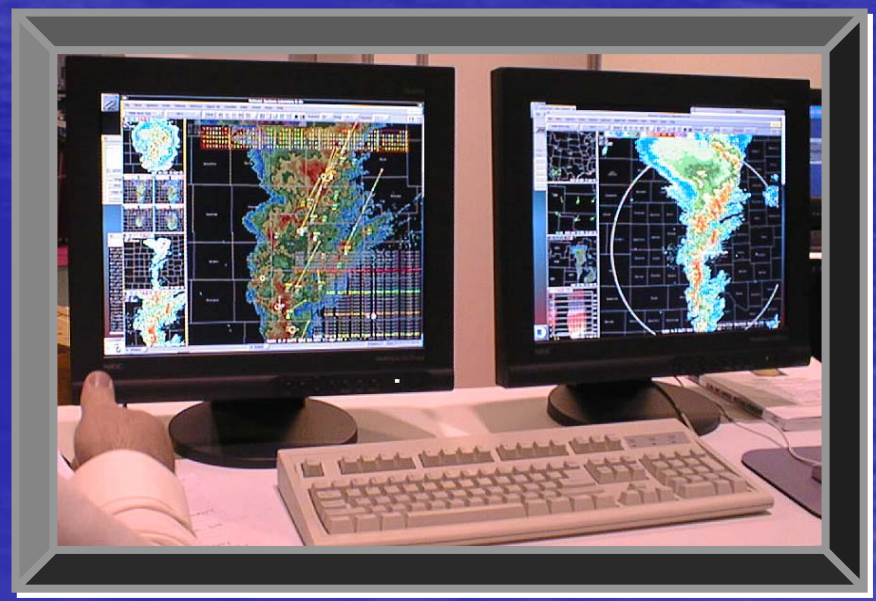


Survey Responses

- **Need for more Radar Stations, and NOAA Weather Radio transmitter locations creating better coverage for remote areas.**

WES Goals

- Improve NWS Products and Services
  - Provide an Operationally Representative Environment
    - Apply Science
    - Develop Decision Making Skills
  - "Train as You Fight"

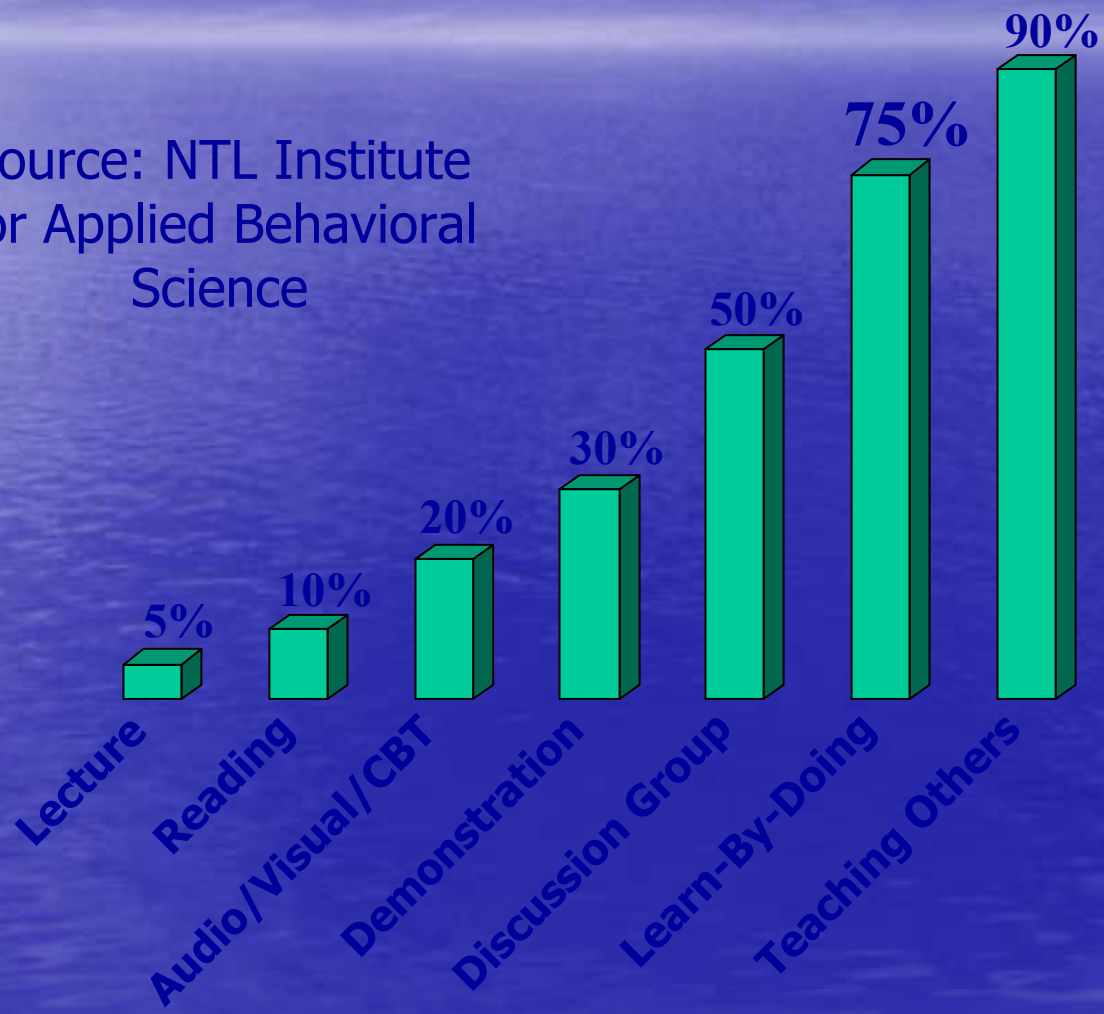


Simulations Improve Job Performance

- Flight Simulators
  - Department of Defense
  - NASA
  - All Major Airlines
  - Flight Schools

Simulations Deliver Better Understanding and Retention

Source: NTL Institute for Applied Behavioral Science



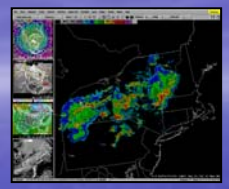
What Is the WES?


Offline Linux Workstation

+

Archived Case and Guide

+


OB1 Linux AWIPS

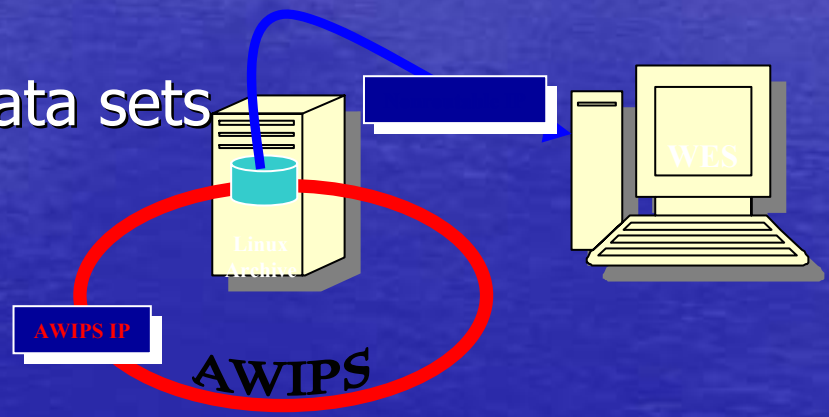
+

WES 1.2 Software

- WES is a Data Pump
  - Hides & Reveals Data using Time/Data Stamp
  - Radar Base Data Revealed Using Simulated VCP

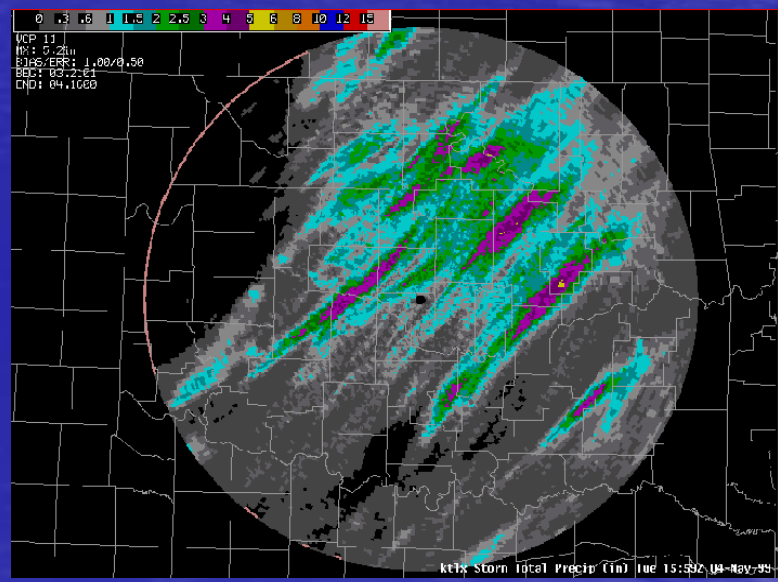
Archiving System

- Archive LINUX PC attached to AWIPS
  - Data saved on-site
  - Includes national and local data sets
  - Saved to CD-ROM or DVD
  - Transferred via non-routable network connection to WES
  - Overwritten every 4-7 days



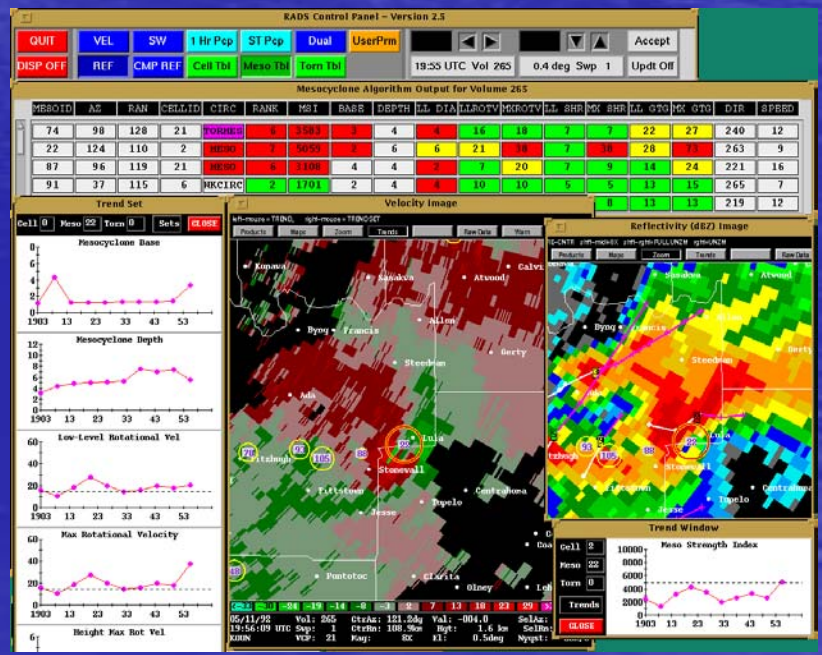
Post Event Assessments

- Use WES to playback recent events
- Re-create actions to review real-time issues and overall system performance
- Uncover critical aspects of an event that should be:
  - Duplicated
  - Avoided



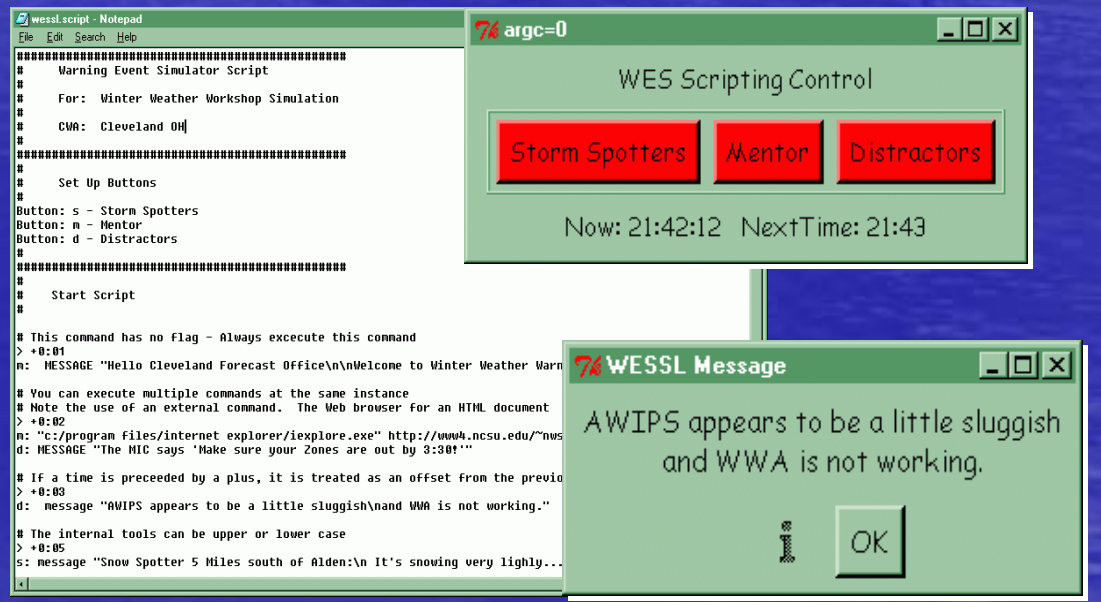
Research Using the WES

- Case study review mode to study applied science and technology issues
- Displaced real-time mode to research warning decision making processes
  - Event is controlled and predictable
  - Actions and outcomes can be compared and contrasted



Future WES Plans

- Incorporate simulations into curriculum
  - Advanced Warning Operations Course - 2004
- Additional Functionality
  - Scripting Language
  - Warning Applications
    - FFMP & SCAN
- Open WES - 2003
  - Informix Free



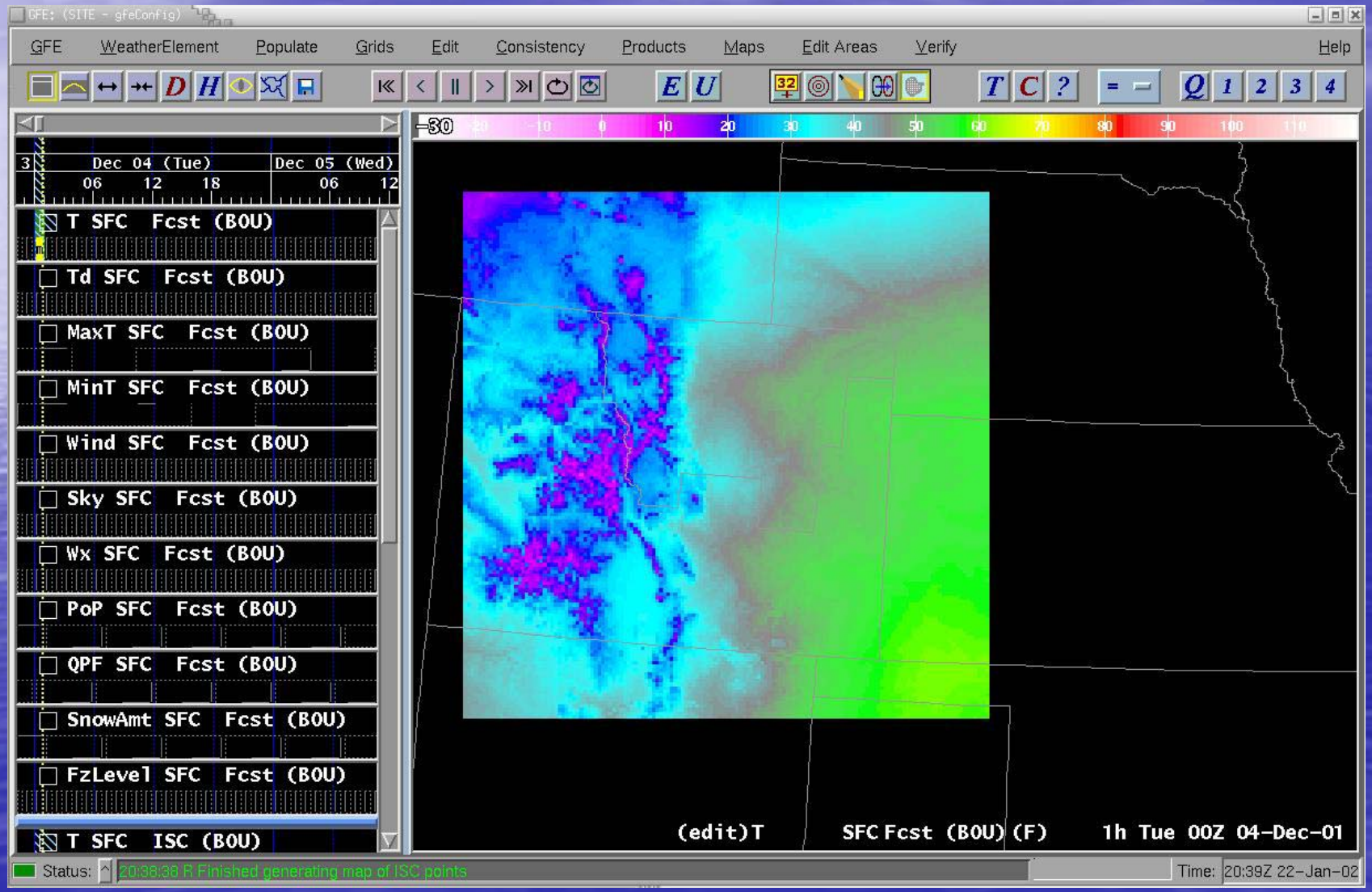
Benefits of Interactive Forecast Preparation (IFP)

- Provides more ***forecast detail*** in time and space
- Enables ***more effective communication*** with users (e.g., graphics)
- ***Increases the usefulness*** of NWS forecasts to customers and partners
- Maximizes ***human contribution*** to forecast process

How Does IFP Work?

- A 7-day digital forecast database is established at each WFO
- Forecasters continuously interactively modify the contents of the database using the latest observations and model guidance
- NWS text, tabular, voice, and graphic products are generated from the database
- The database itself is provided as an NWS product to customers and partners

IFPS Grid Editor

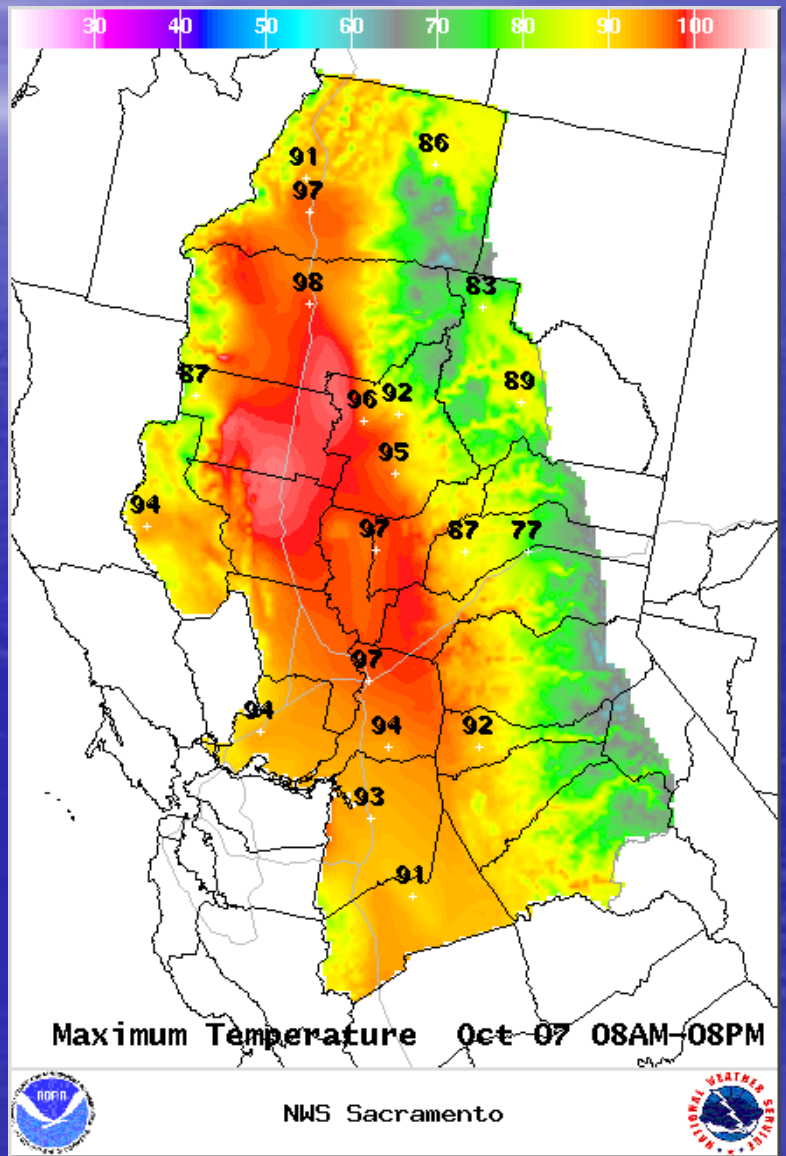


Digital Forecast Matrix

WVZ033-034-VAZ003-004-131124-
BUCHANAN VA-DICKENSON VA-MCDOWELL WV-WYOMING WV-
INCLUDING THE CITIES OF...CLINTWOOD VA...GRUNDY VA...PINEVILLE WV...
WELCH WV
324 PM EST SAT JAN 12 2002

	SUN 01/13/02												MON 01/14/02											
EST	15	18	21	00	03	06	09	12	15	18	21	00	03	06	09	12	15	18	21	00	03	06		
POP 12HR				40				20				10				30						40		
QPF 12HR				.01-.10				0				0				.01-.10					.01-.10			
MAX QPF				.01-.10				0				0				.01-.10								
SNOW 12HR				00-00				00-00				00-00												
MN/MX				27	31	32		36	40	42		22	28	30		36	40	41			30	32	34	
TEMP	45	41	37	32	33	36	39	39	36	33	30	28	30	34	38	39								
DEWPT	31	31	30	30	29	29	28	28	26	26	26	25	25	26	28	30								
RH	58	67	76	92	85	75	64	64	67	75	85	88	81	72	67	70								
WIND DIR	SW	W	W	W	NW	NW	NW	NW	W	W	W	SW	S	S	SW	SW								
WIND SPD	10	12	15	15	15	15	15	12	10	8	8	8	12	15	15	10	10	10	5	5				
CLOUDS	SC	B1	B2	B2	B1	B1	B1	SC	SC	SC	SC	SC	B1	B1	B1	B1	B2	B2	B2	B2				
RAIN																C	C	C						
SNOW				C	C											C	C	C	C	C				
WIND CHILL			26	18	11	13	17	21	24	23	23	19	17	12	14	19	27							

Experimental Web Product



NDFD Forecast Elements

- *The NDFD will contain:*
- Weather, water, and climate forecasts from WFOs, RFCs, and NCEP Service Centers
- Elements that support generation of **current WFO products**
- **Digital** watch, warning, and advisory information
- Elements that would attract user development of graphics and decision tools
- The **official** NWS forecast for each element

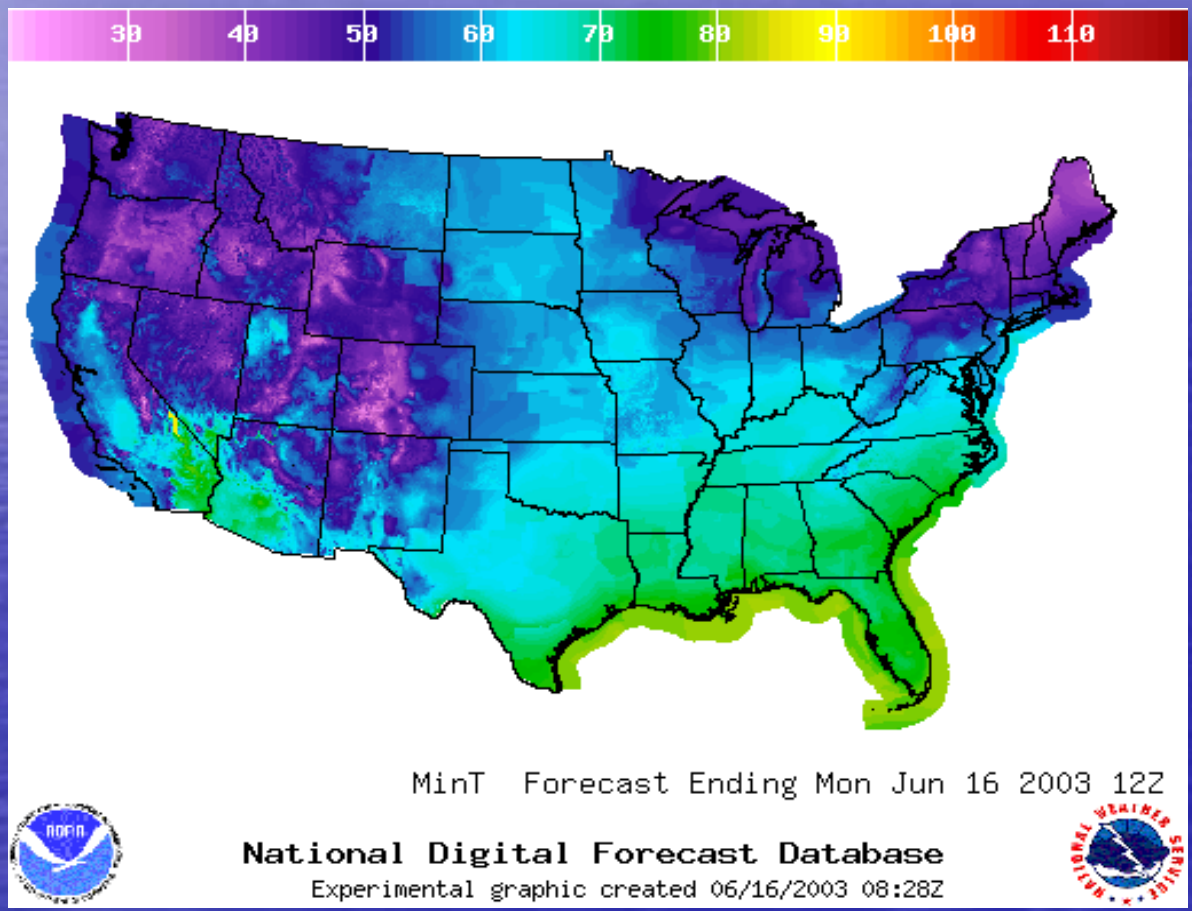
Current NDFD Experimental Elements

- *Daytime maximum and nighttime minimum temperature*
- *Probability of Precipitation (12 hour)*
- *Significant weather*
- *Sky cover*
- *Temperature*
- *Dewpoint temperature*
- *Wind direction and speed*
- *Precipitation amount (QPF)*
- *Snow amount*
- *Wave height*

NDFD Resolution

- *Spatial resolution:*
  - *5 km grids for now*
- *- 2.5 km grids when AWIPS upgraded*
- *Temporal resolution:*
- *- 3 hourly for days 1-3*
- *- 6 hourly for days 4-7*
- *- as available from CPC beyond day 7*
- *Update frequency: every hour*

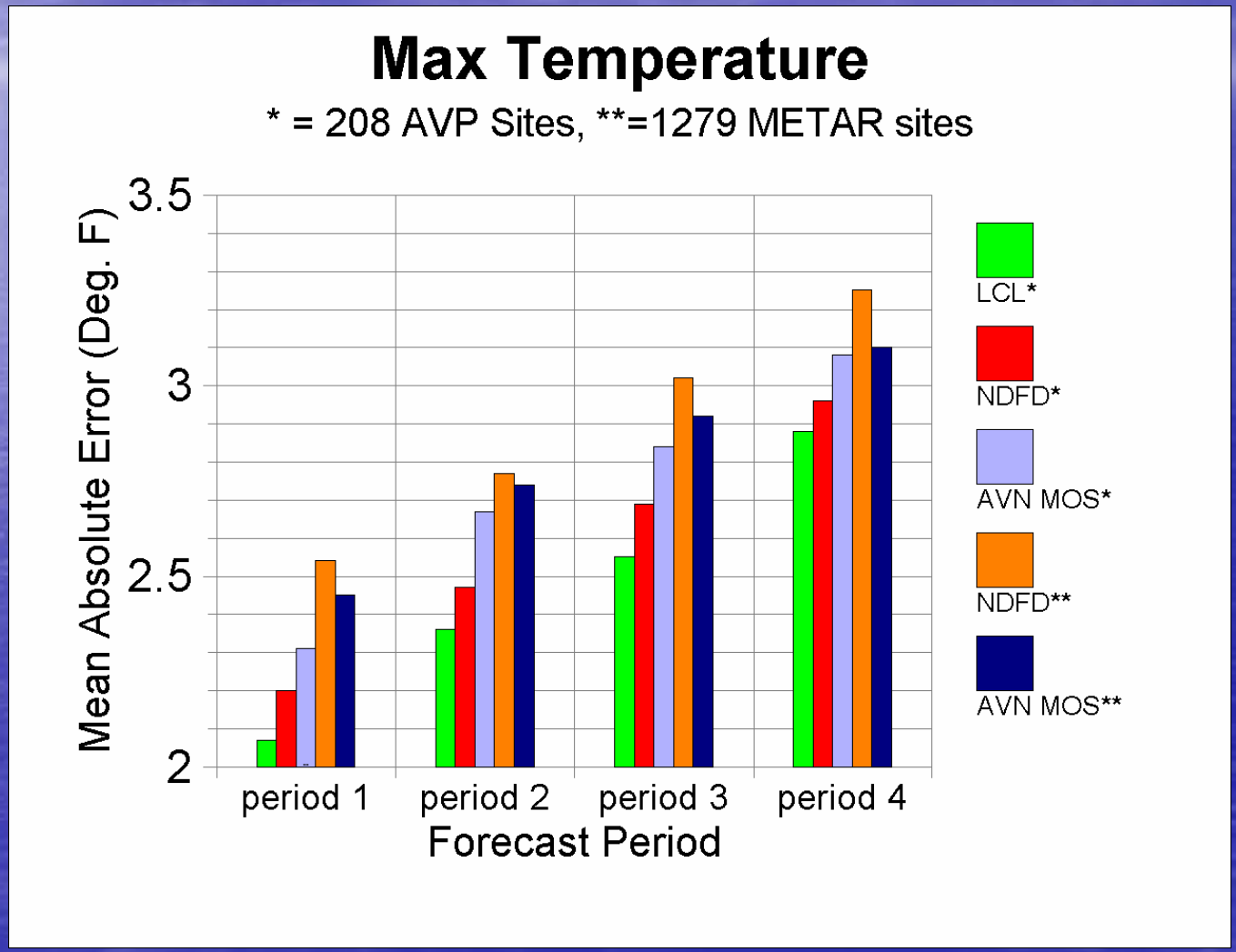
IFP Operational Readiness Demonstration – Summer 03



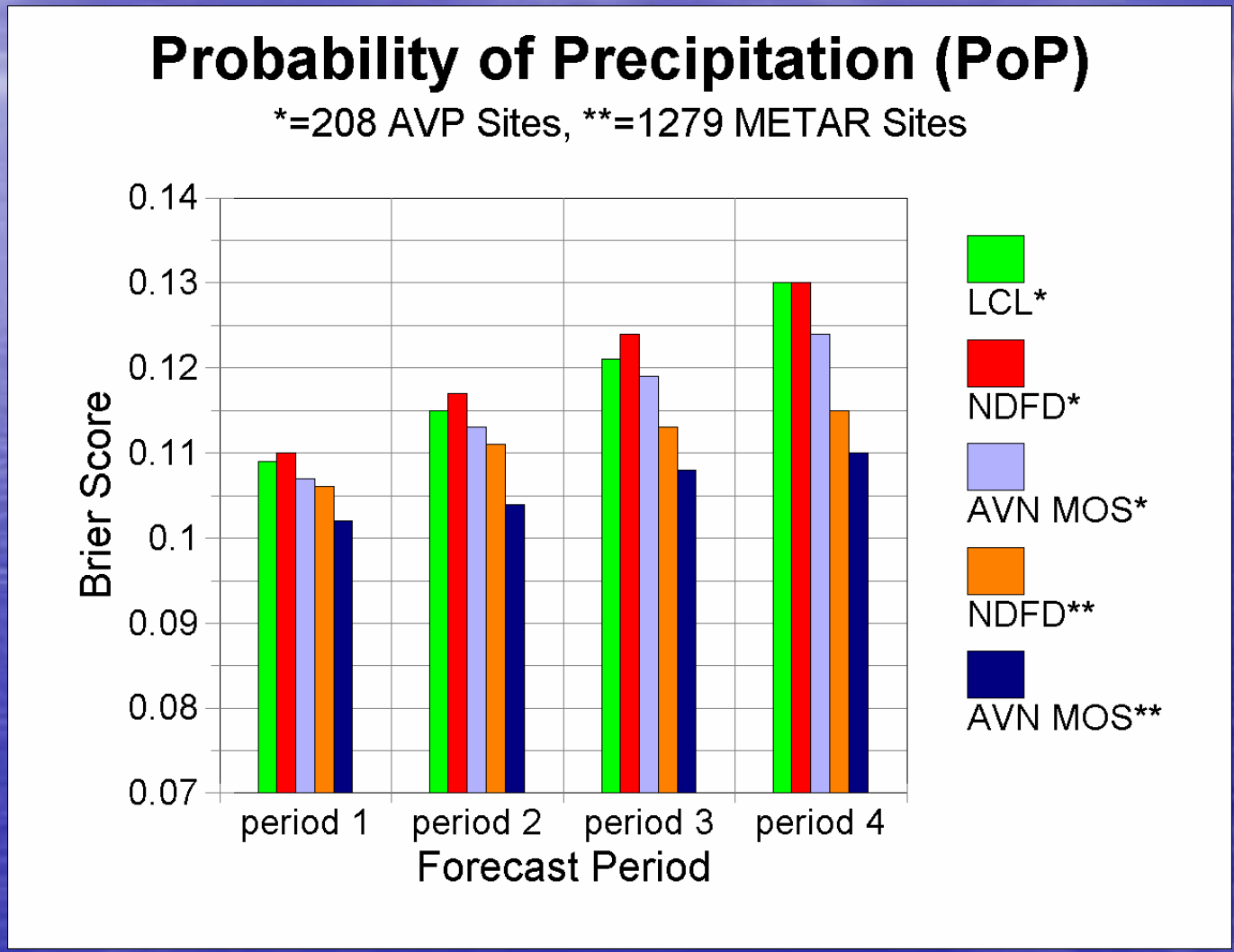
IFP ORD Success Criteria

- Timeliness: New Day 7 grids are available by 1800 UTC each day 95 percent of the time
- Availability: Grids available 95 percent of the time
- Consistency: Meteorological consistency of all transmitted grids along WFO boundaries within prescribed thresholds 90 percent of the time
- Quality: Point verification for maximum and minimum temperature and PoP within natural variability bounds as compared with past years for same dates

IFP/NDFD ORD Verification



IFP/NDFD ORD Verification



NDFD Technical workshop

- Key Participant Recommendations:
  - Explore providing Grids in NetCDF format
  - Provide grid product update information
  - Provide "change only" access
  - Ensure conformity with digital data standards
  - Expand NDFD domain to aviation and oceans
  - Continue efforts to add probabilistic information
  - Find a way to get expanded NDFD information out to partners/users