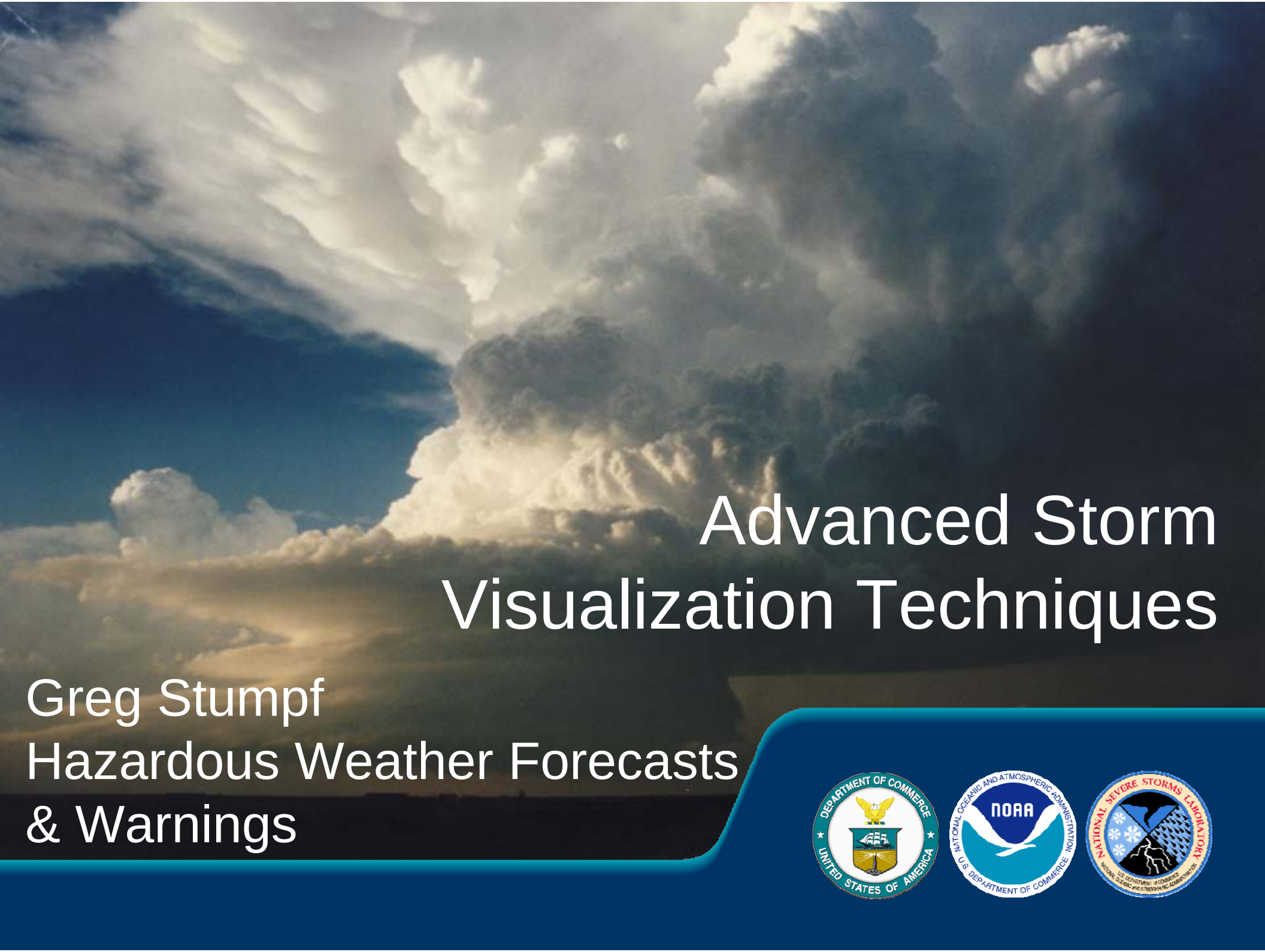


Advanced Storm Visualization Techniques

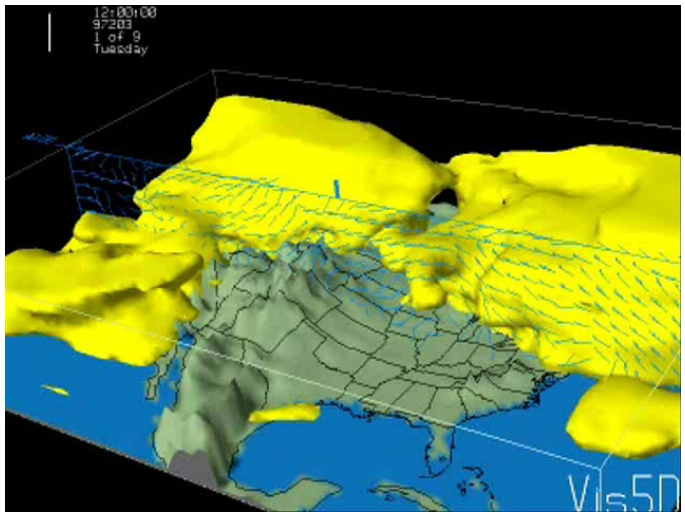
Greg Stumpf
Hazardous Weather Forecasts & Warnings

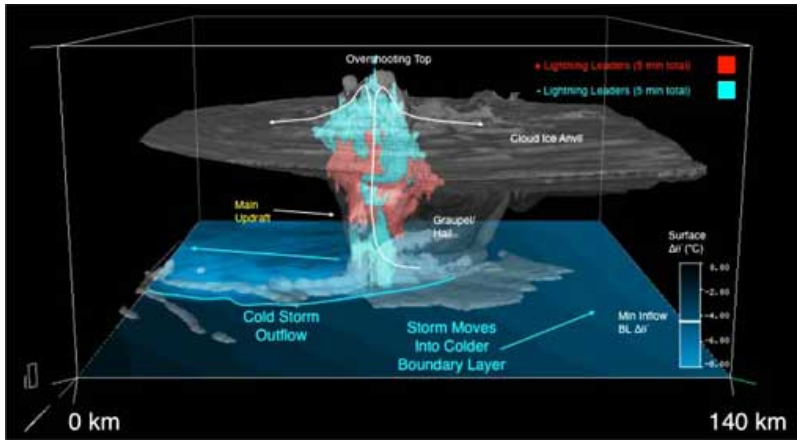
Why advanced visualization for warning operations?

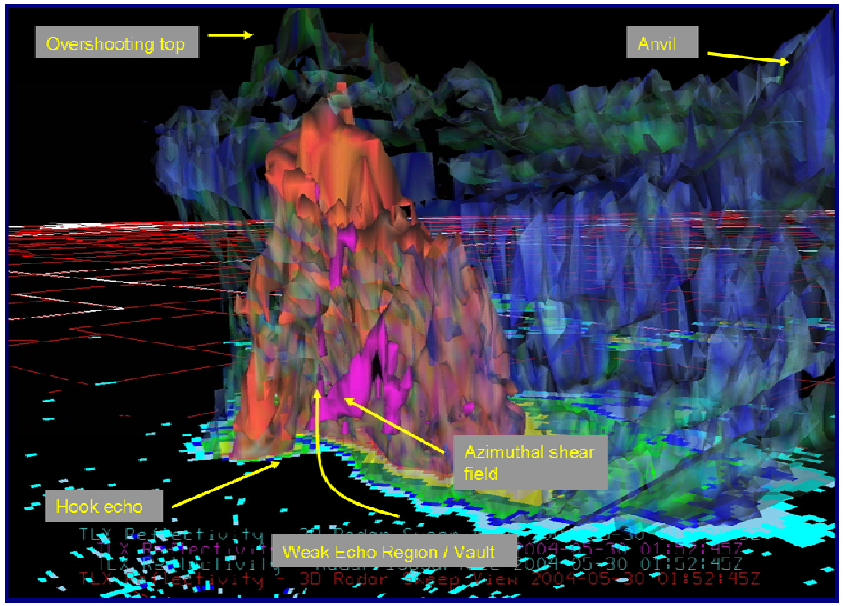
The atmosphere is four-dimensional.

Improves the rapid cognition of storm structure and evolution.

Opportunities for discovery.







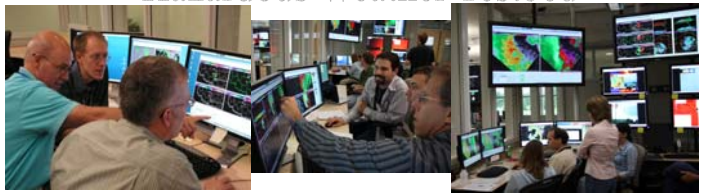
Collaboration and Partnership

Development

Integration

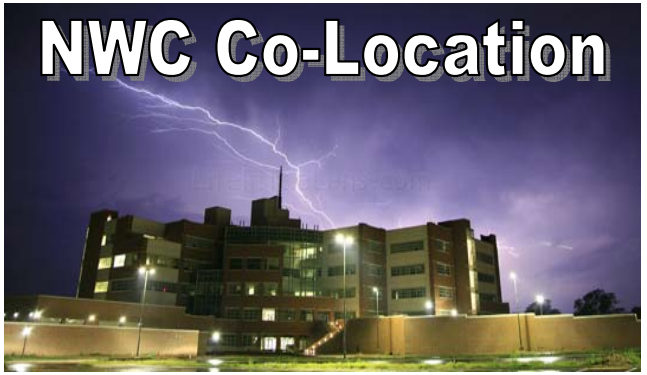
Testing

Hazardous Weather Testbed



Training

Operations



Alliance with NWS:

Embedded NWS HQ Personnel

OS&T/MDL (Stumpf)

OS&T/NPI (Cate, Hall)

OCWWS (Ferree, Scharfenberg)

Warning Technology Workshops

Email Lists, BB Forums, Surveys

Background

Storm Cell Identification and Tracking (SCIT) algorithm

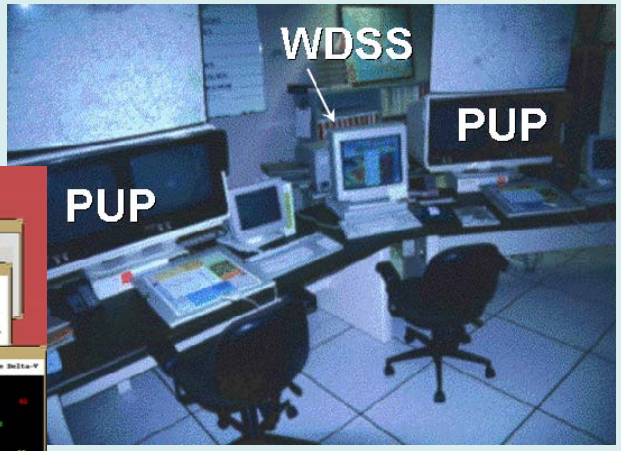
Hail Detection Algorithm (HDA)

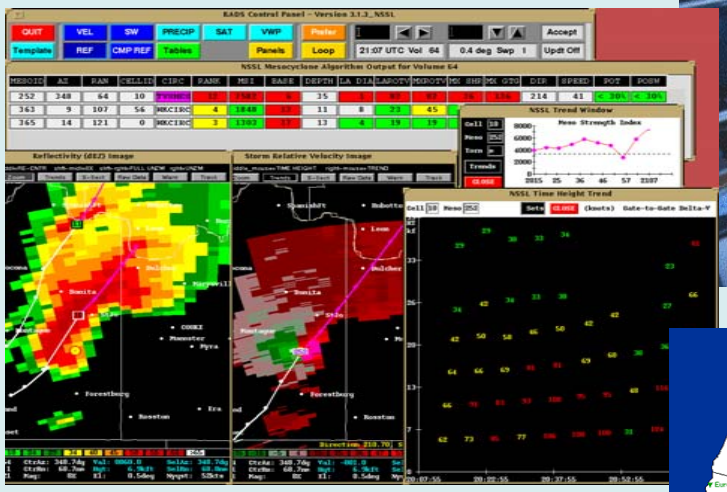
Mesocyclone Detection Algorithm (MDA)

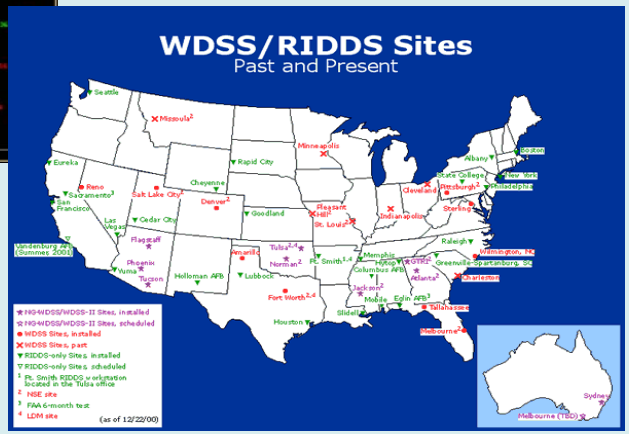
Tornado Detection Algorithm (TDA)

Damaging Downburst Prediction and Detection Algorithm (DDPDA)

Warning Decision Support System (WDSS)







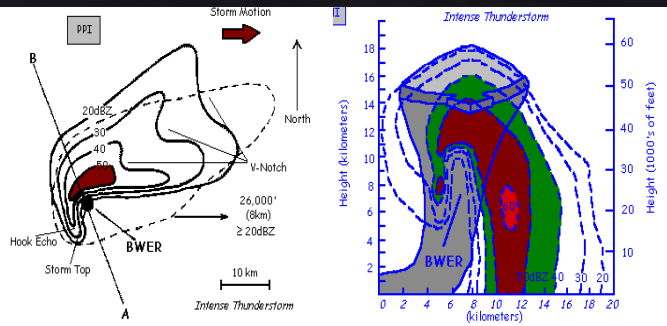
Developers gain understanding of operational requirements

NWS users exposed to latest R&D

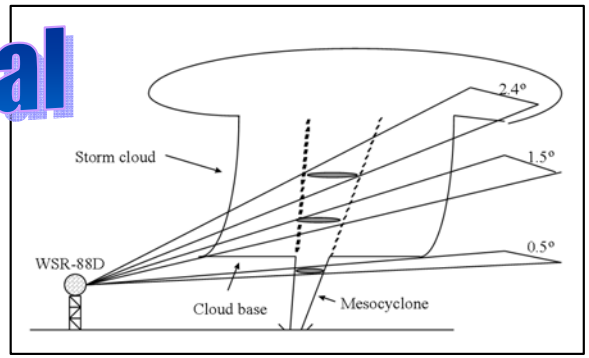
Feedback

Opportunities For Improvement

Base Radar Data Analysis



Legacy Operational Displays are 2D



Paradigm of "stacking" 2D images not meeting needs of users

Warning decision making demands rapid assessment of the 4D structure and evolution of storms

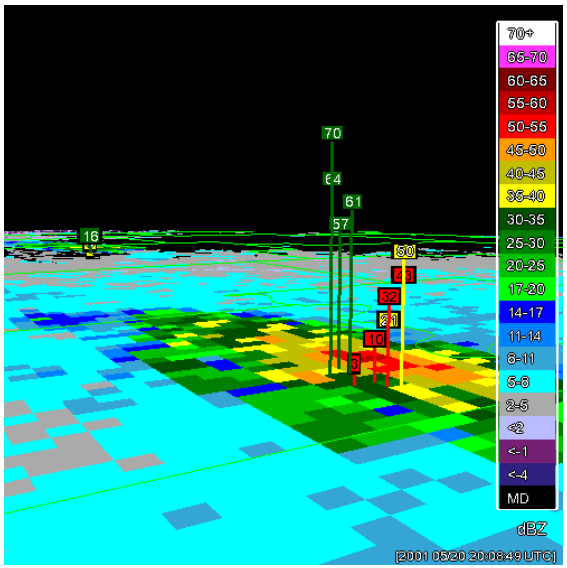
WDSS to WDSSII

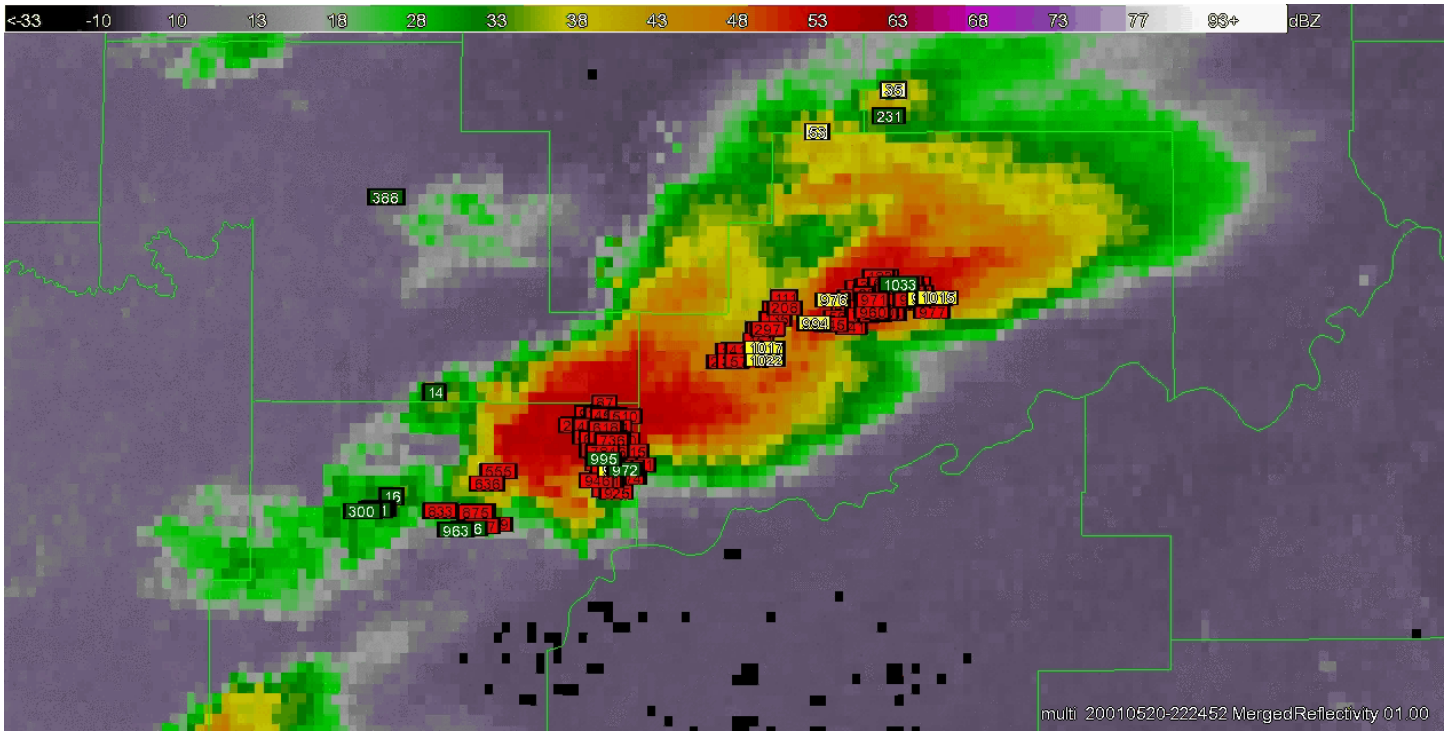
WDSS-II

Multi-Radar/Sensor Framework

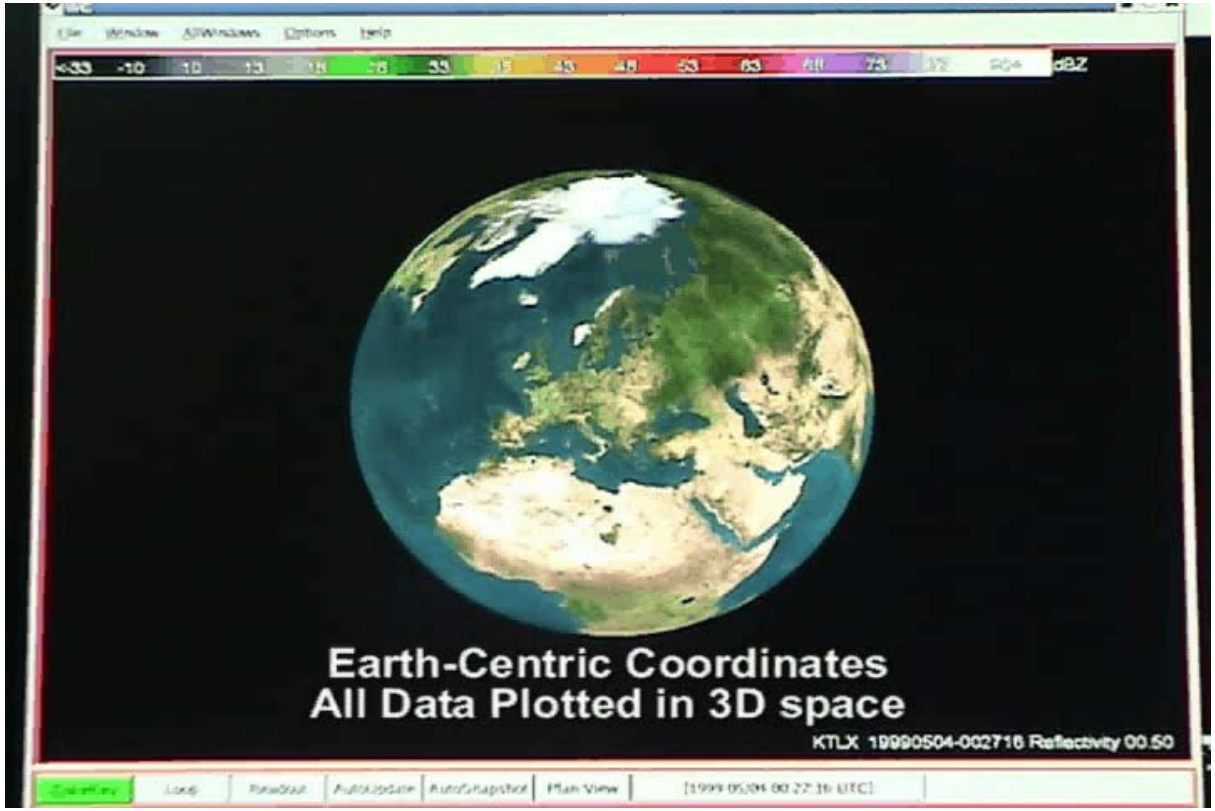
Legacy algorithm development limited by inferior 2D visualization tools

WDSSII GUI (wg) developed





WDSSII GUI (wg)



1999

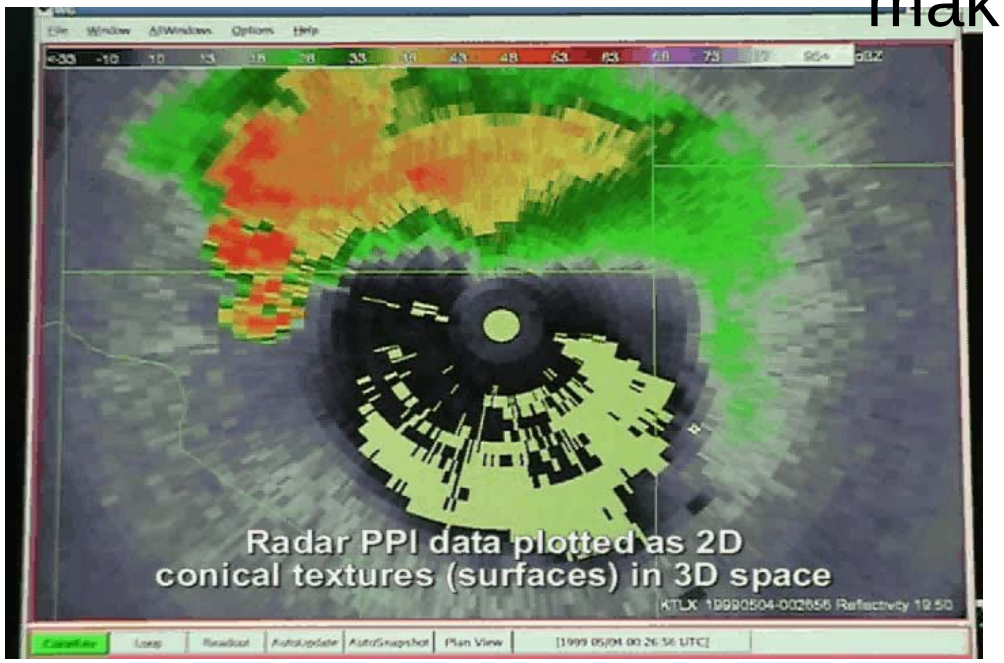
Virtual Globe

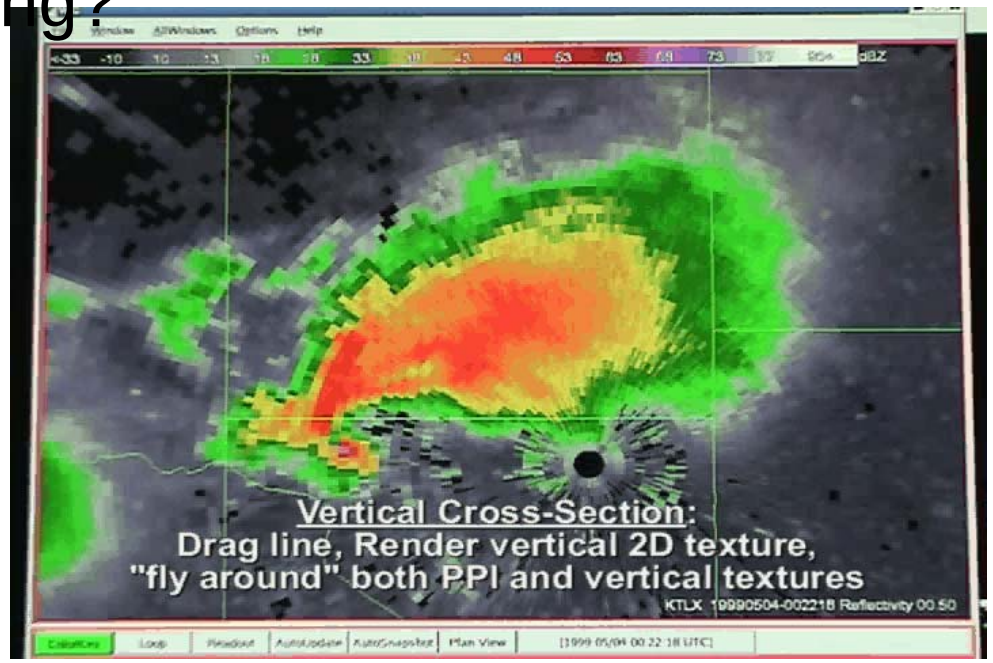
By Comparison: Earth Viewer/Google Earth

2004

WDSSII GUI (wg)

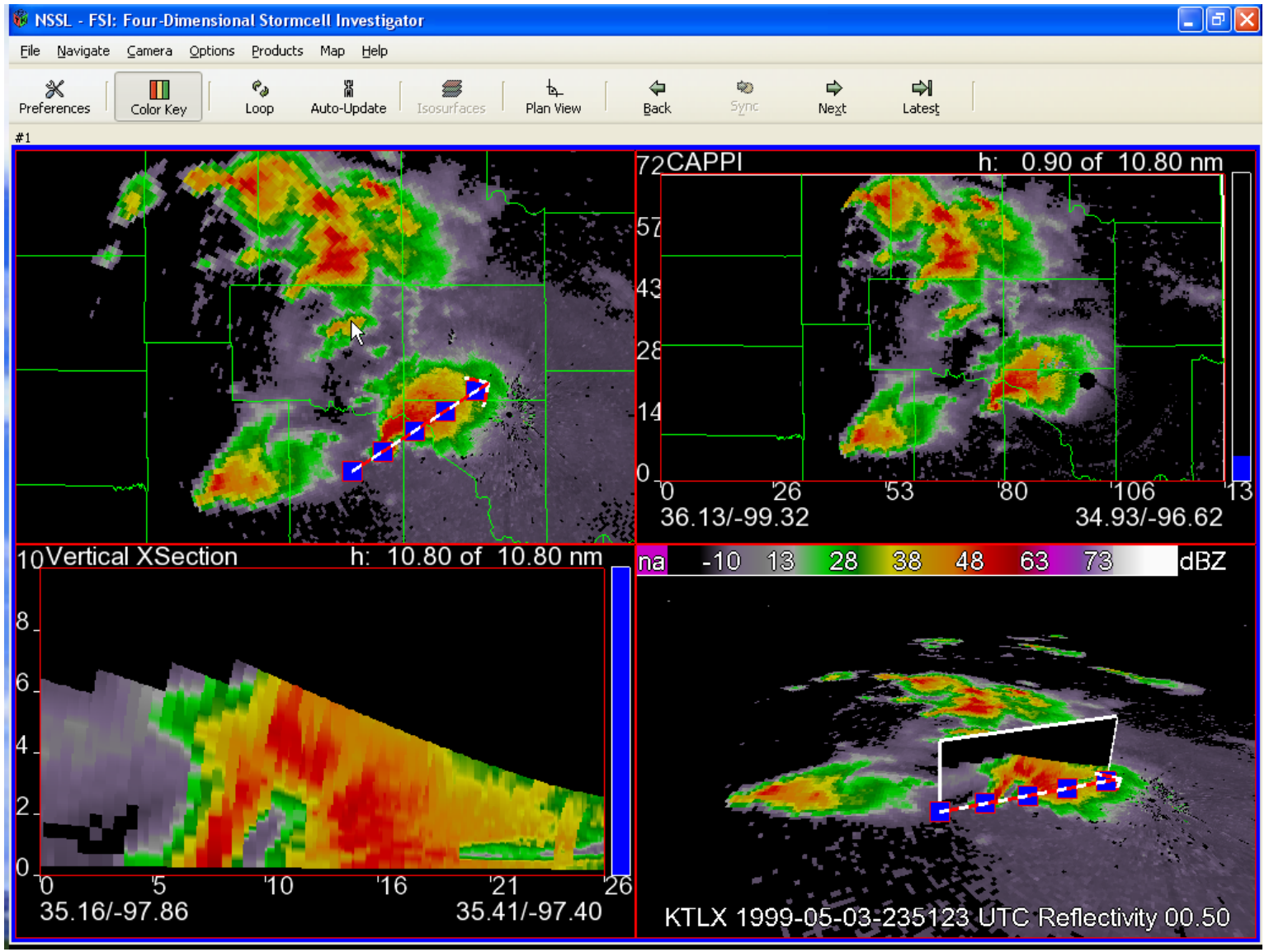
How can we leverage/adapt 4D visualization techniques used in R&D to improve NWS operational warning decision making?





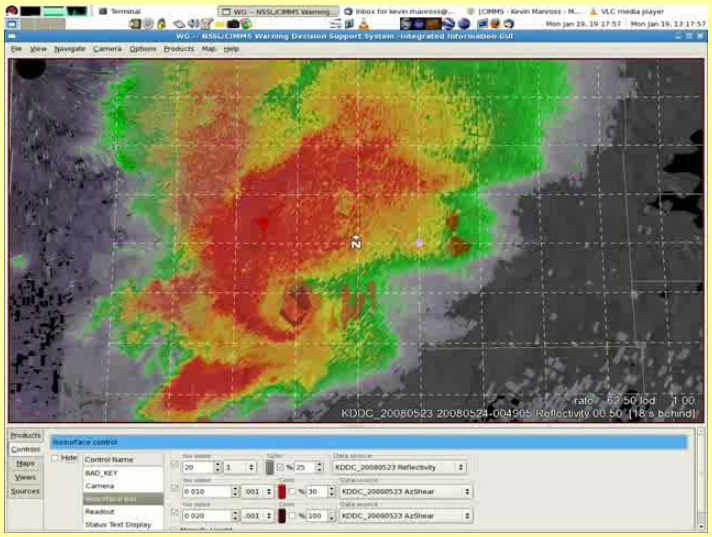
2002-2003: Field testing at NWS forecast offices

Transition to NWS Operations (2008)

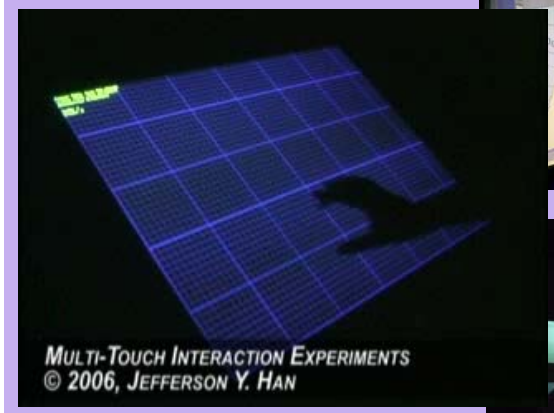


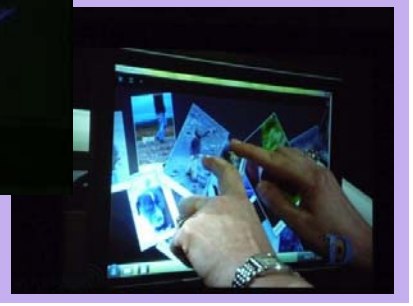
Future R&D Strategies and Challenges

Multi-parameter iso-surfaces and integrated dynamic cross-sections in the WDSSII GUI



Geo-Wall





Challenges:

Operational Technology

Early and Adult Education

Human Factors