



25th IIPS Conference
AMS Annual Meeting
January 12, 2009
Phoenix, Arizona

NOAA's National Weather Service

IMPROVED SERVICES TO PROTECT AMERICA

Don Berchoff

Director, NWS Office of Science and Technology

Our Commitment To You

Provide weather, water, and climate services that:

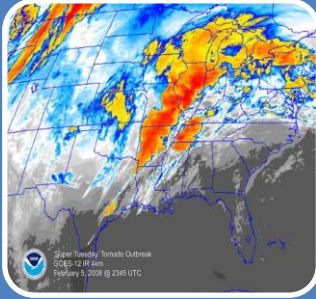
- *Protect Life & Property*
- *Enhance the National Economy*

Synchronize efforts across the Weather and Climate Enterprise to infuse scientific and technical solutions critical to improving the production and delivery of weather services

A Look Back at 2008



2008 U.S. Weather Water and Climate Highlights



Devastating Tornado Year

More Than 1,600 Tornadoes | 125 Fatalities

- February 5-6 “Super Tuesday” Tornado Outbreak
- 63 Tornadoes | 57 Fatalities
- Average warning lead time 17 min.



Record-Breaking Floods

Heavy Rainfall Across Central and Southern U.S.

- 36,000 people affected | Millions of acres of land submerged
- 20 Fatalities | Floods exceeded 500-year levels in some areas
- NWS issued accurate spring flood outlook



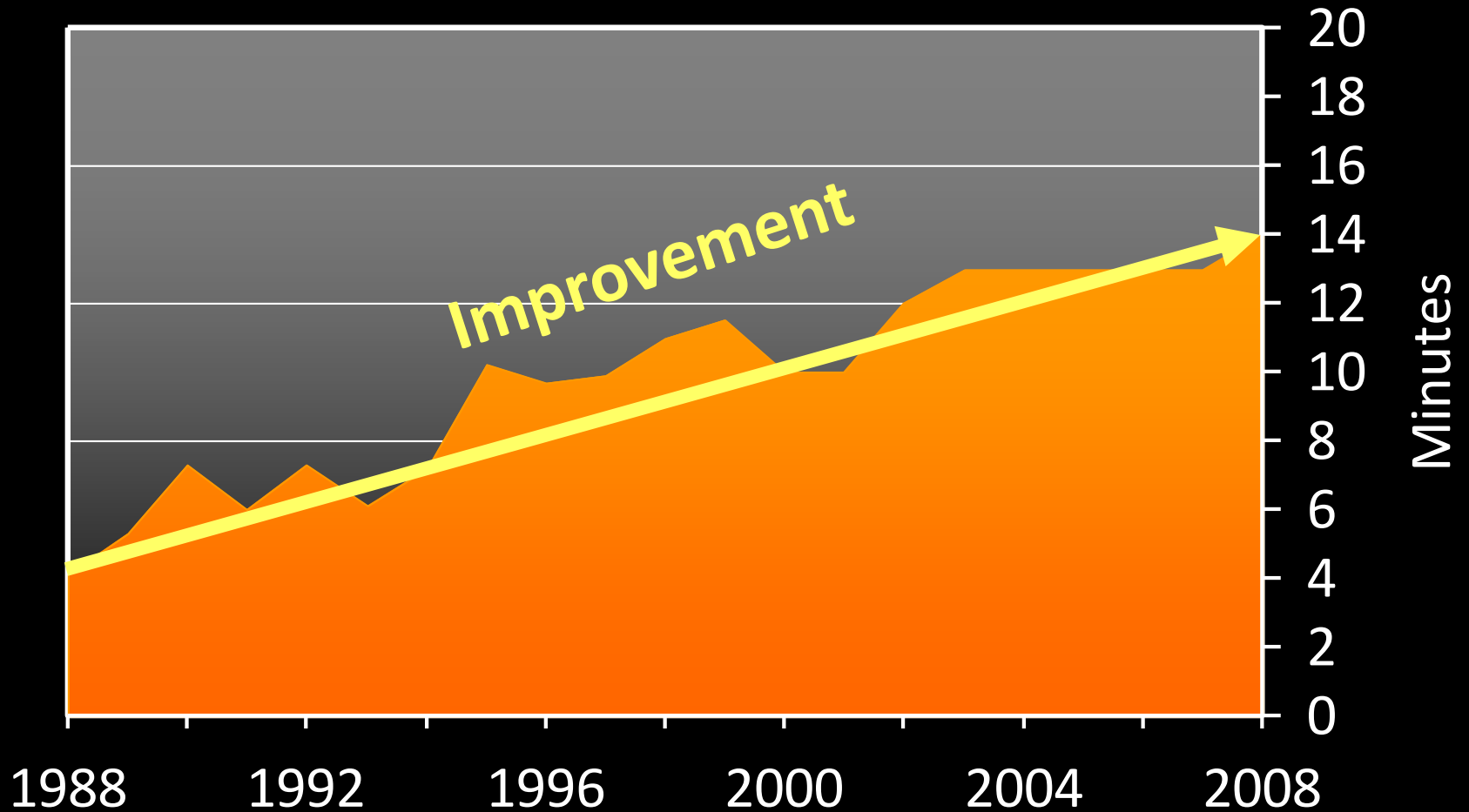
Record-Breaking Hurricane Season

16 Named Storms (incl. 8 Hurricanes) in Atlantic

- Fourth most active season on record
- Six consecutive named storms made landfall on U.S. mainland
- NWS issued accurate pre- and mid-season outlooks

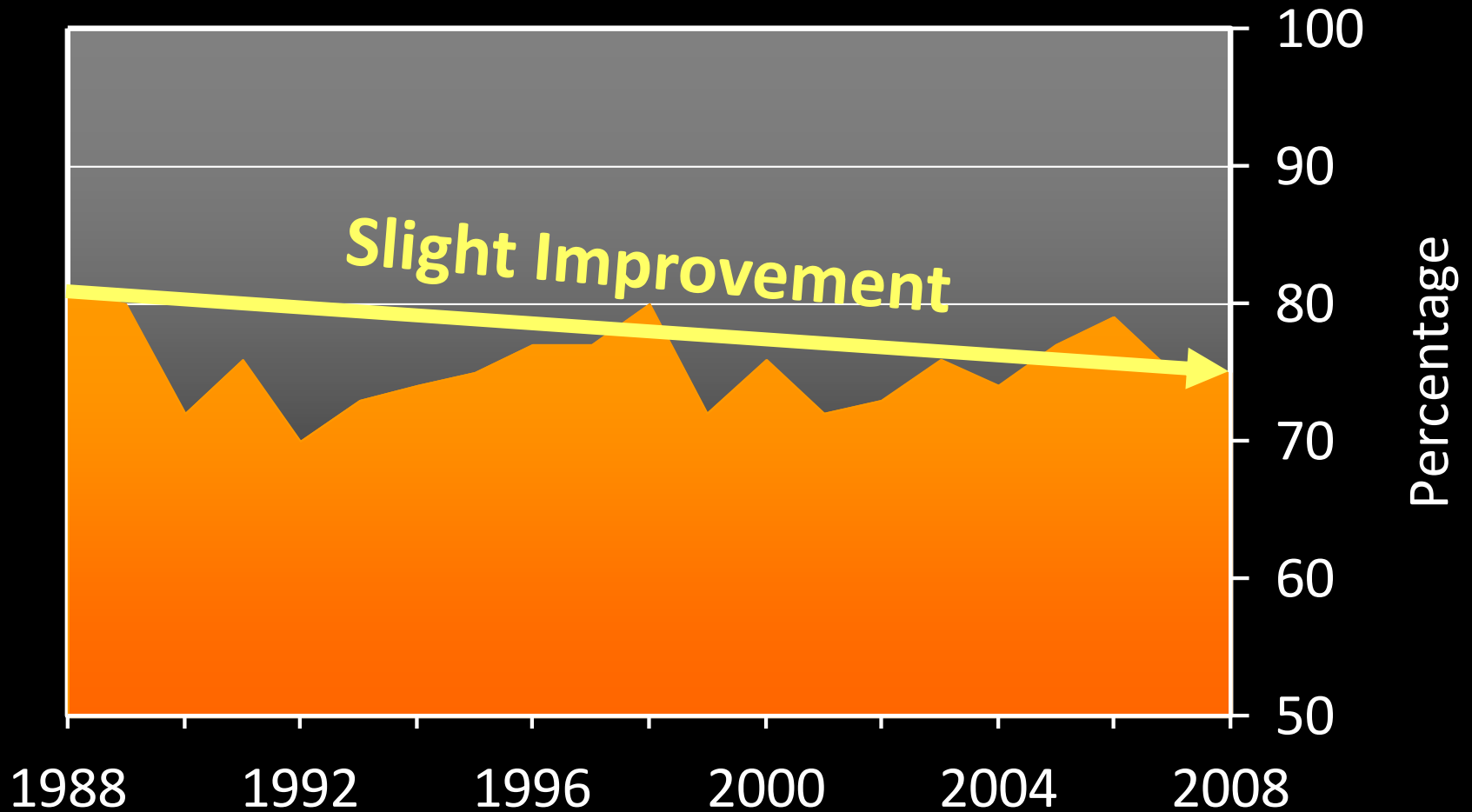
Improved Tornado Warnings

Greater Lead Times



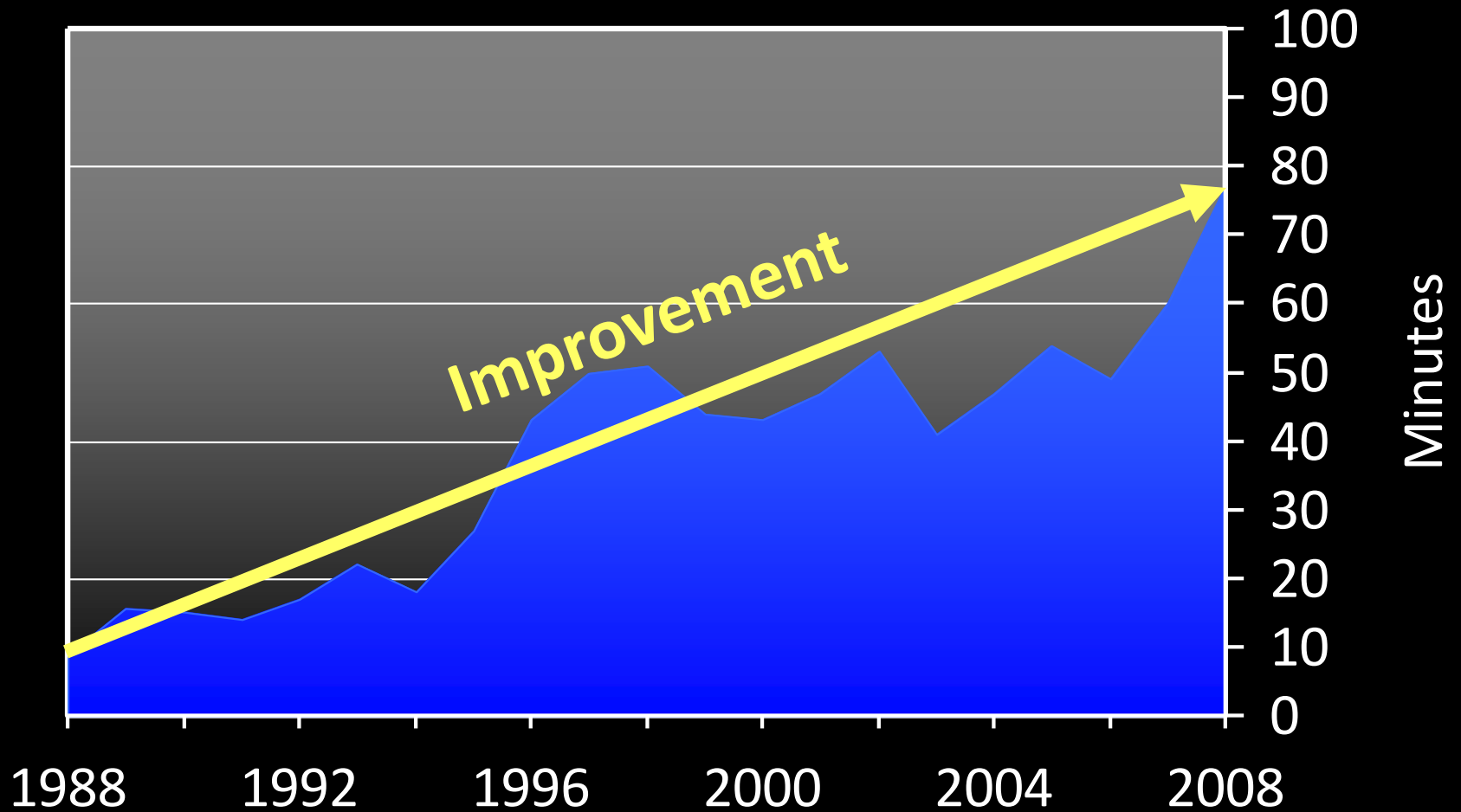
Improved Tornado Warnings

Lower False Alarm Rates



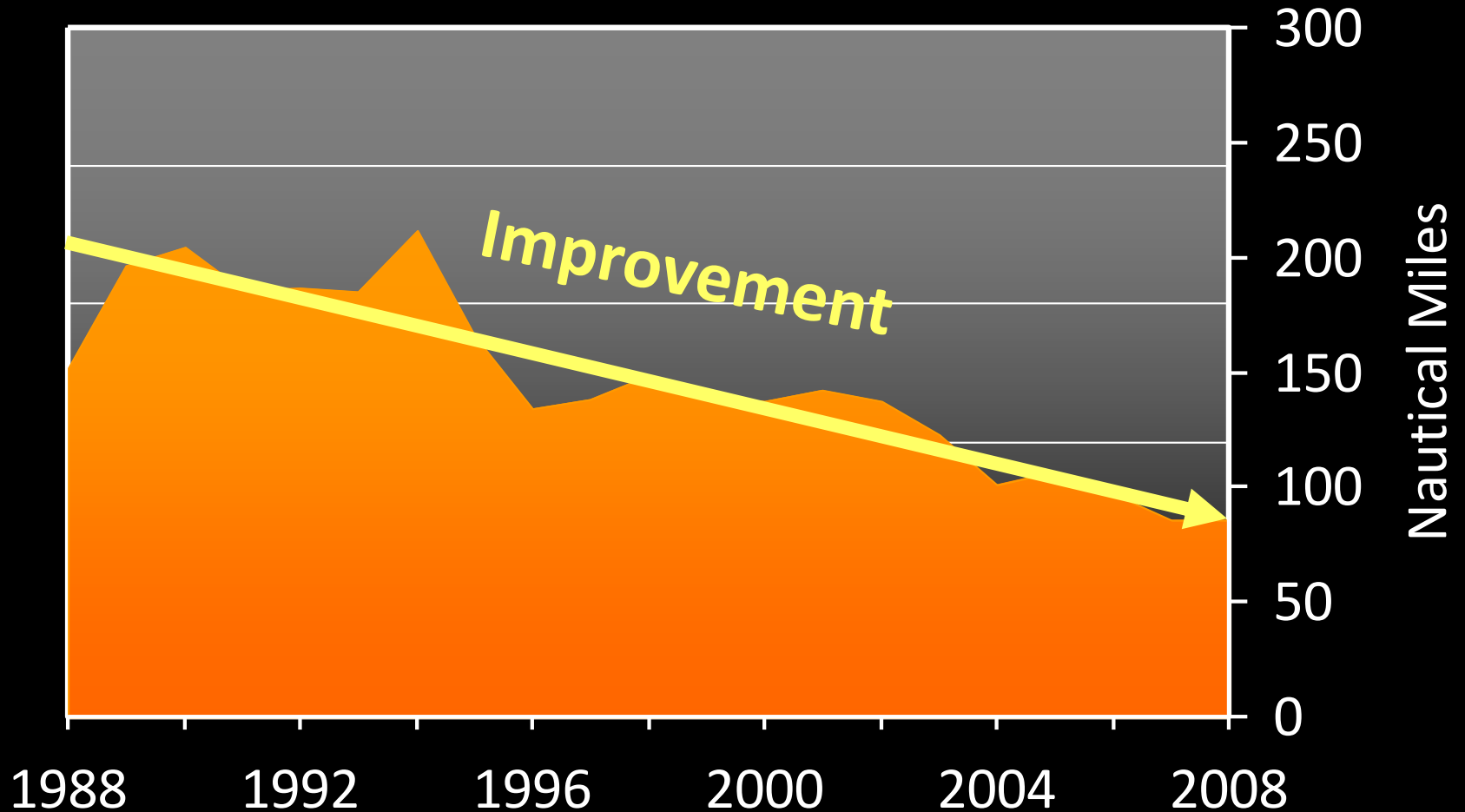
Improved Flash Flood Warnings

Greater Lead Times



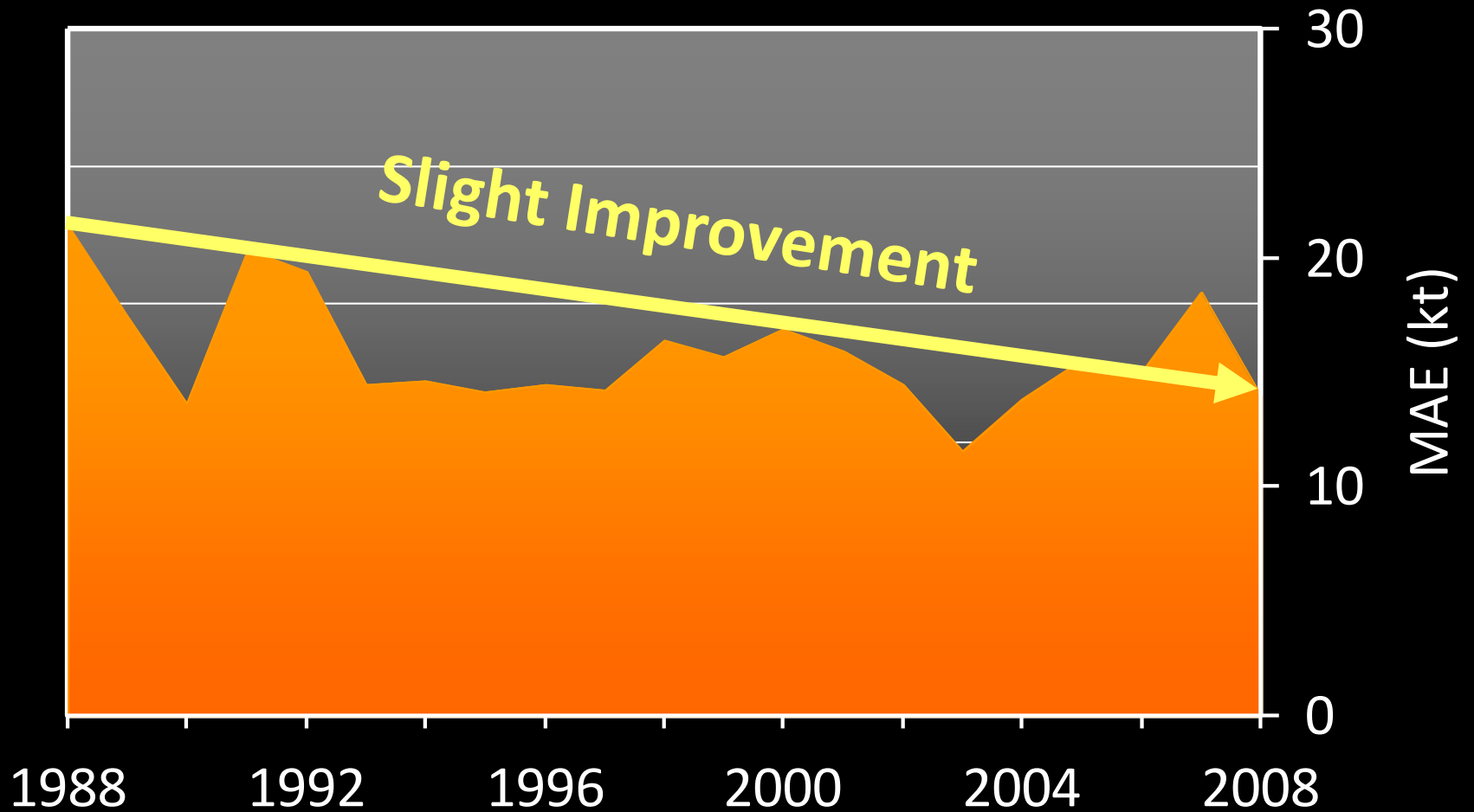
Improved Hurricane Forecasts

Reduced 48 hr Track Forecast Error



Improved Hurricane Forecasts

Reduced 48 hr Intensity Forecast Error



Looking Ahead



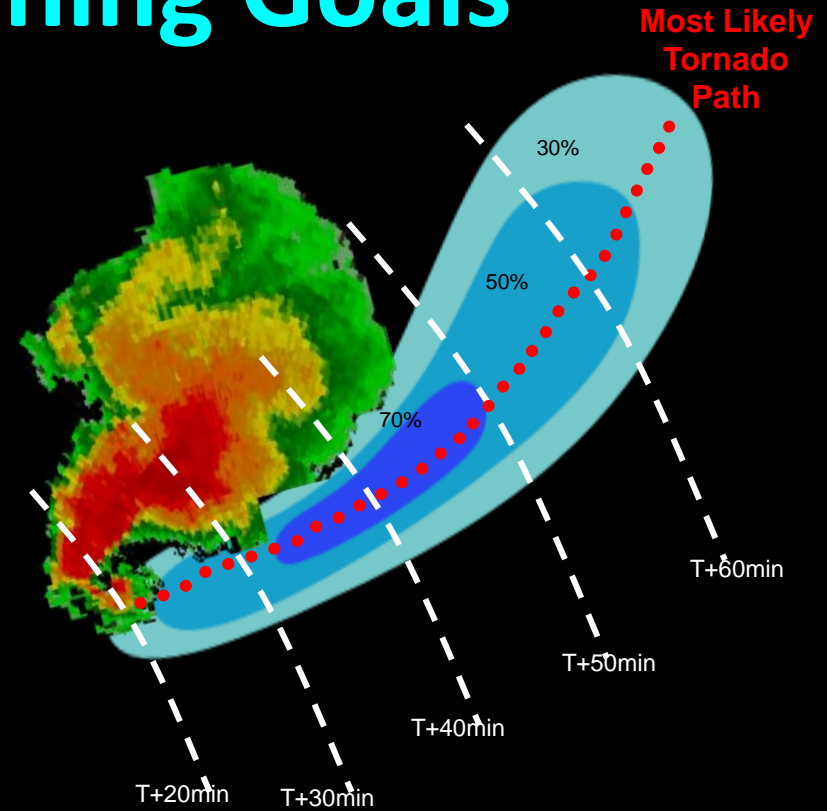
Our Future Direction

...to infuse **the best science and technology** into forecast operations in order to communicate the most accurate information that enables decision makers



Tornado Warning Goals

Warn-On Forecasts:
One-Hour Tornado
Lead Times



requires

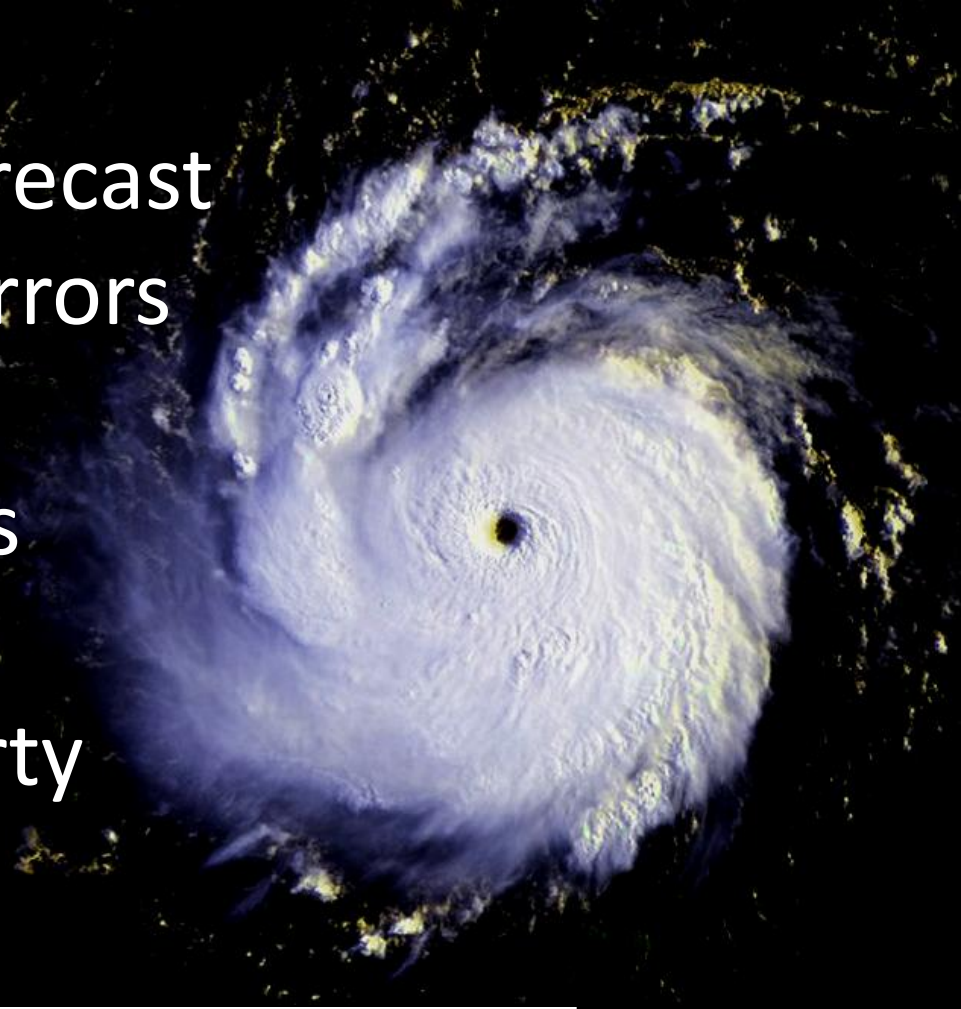
- » Better initiation of convection forecasts
- » Higher-resolution models
- » More timely data
- » Better assimilation systems

Hurricane Forecasts

50% Reduction in Forecast Track and Intensity Errors by 2020 enabling emergency managers and local officials to save lives and property

requires

- »Better sea surface observations
- »Better ocean-atmosphere coupled models



Climate Services

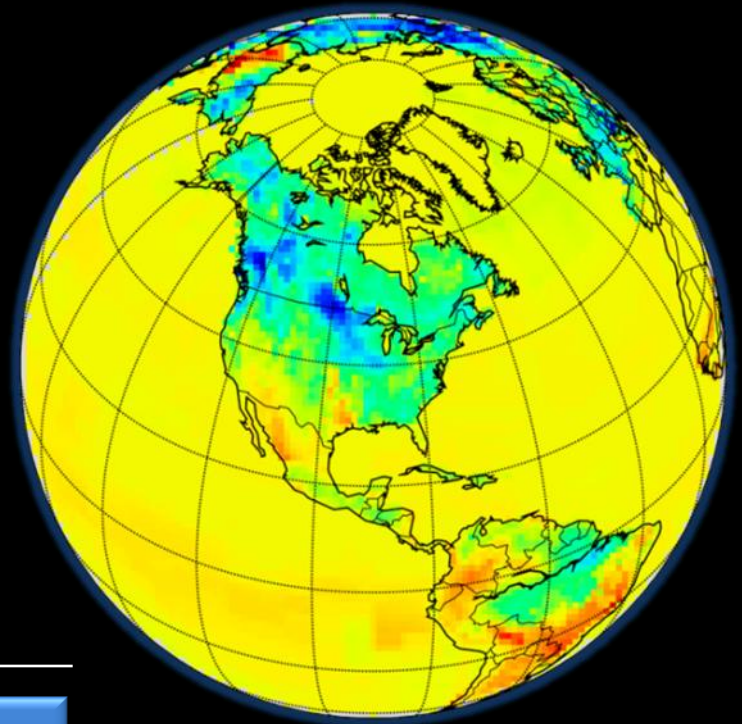
Improved Climate Forecasts on a Variety of Timescales

benefits

- »Energy
- »Agriculture
- »Water management
- »Health

requires

- »Multi-model ensembles
- »Reanalysis
- »Climate Testbed infrastructure



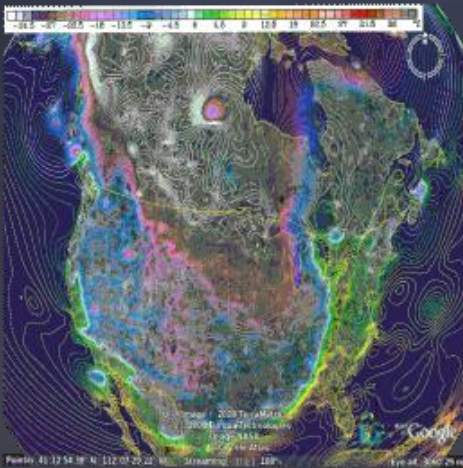
Fire Weather Services

Improve detection and fire movement forecasts by focusing research priorities on the needs of land management partners and Emergency Managers

requires

- » Better assimilation of local observations
- » Increase R&D of coupled fire weather modeling
- » Development of Fire Weather Testbed

Aviation Weather Services



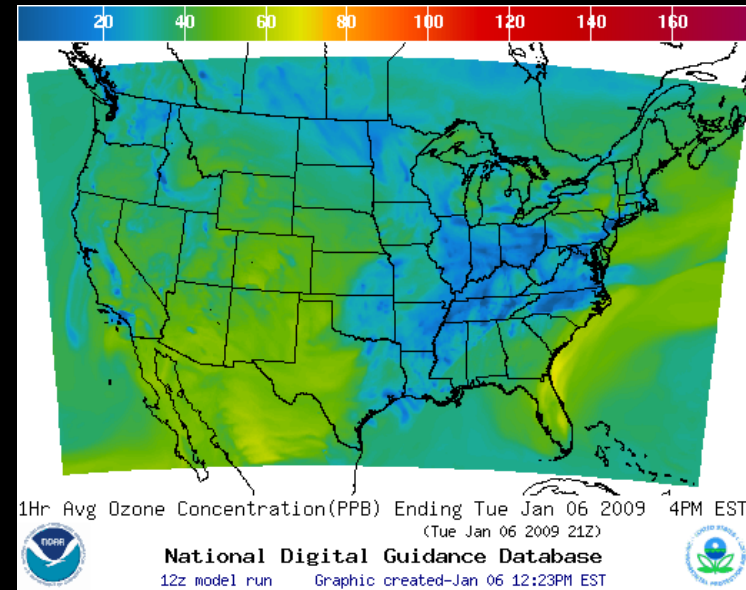
Better integration of weather data into air traffic management decision making to maximize efficiency of air traffic system

requires

- » Partnering with FAA
- » Moving beyond “cope and avoid” to “exploit and mitigate”
- » Development and implementation of 4D Weather Data Cube
- » Better initiation of convection forecasts

Air Quality Predictions

Expand hour-by-hour predictions of air pollutant concentrations from CONUS to nationwide, in state of the art formats



requires

- »Improved capabilities for predicting emission, secondary aerosol formation, reactive transport, and deposition of particulate matter
- »Leveraging EPA's air quality monitoring networks
- »Partnering with local, state, and Federal agencies

Integrated Water Services

Develop a seamless suite of information from the “Summit to the Sea” to address growing demands for water forecasts

requires

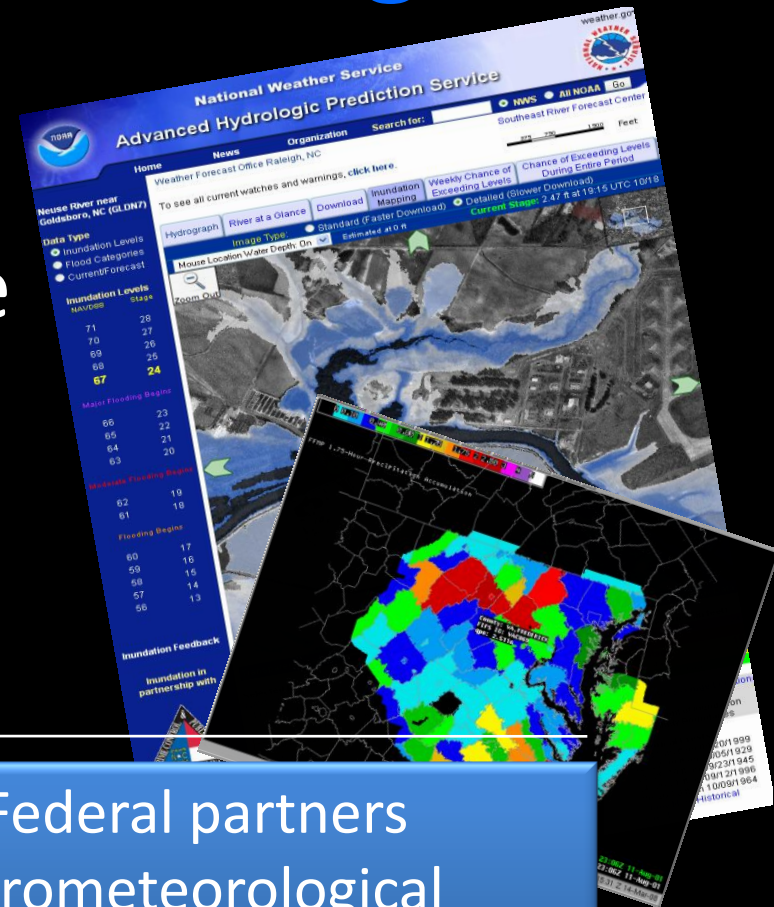
- »Forecasts for the entire watershed
- »Higher resolution water quantity, quality, and soil moisture forecasts
- »Improved resource protection capabilities for rivers, estuaries, and coasts



Coastal Inundation and River and Flash Flooding

Create new forecast tools and capabilities to provide finer-scale warnings to decision makers

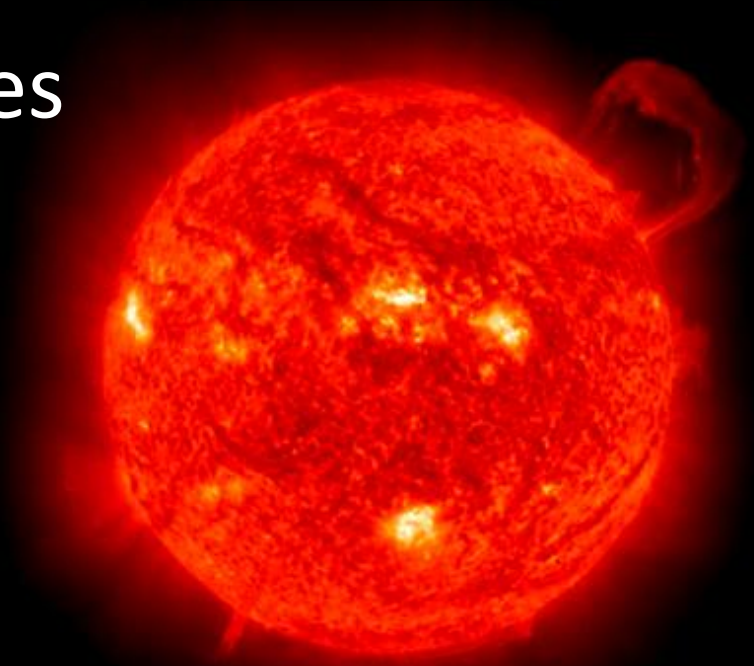
requires



- »Partnering with local, state, and Federal partners
- »Transfer of key findings from Hydrometeorological Testbed into NWS operations

Space Weather Services

New products and services
to mitigate effects to
national security,
communication, and
economic systems



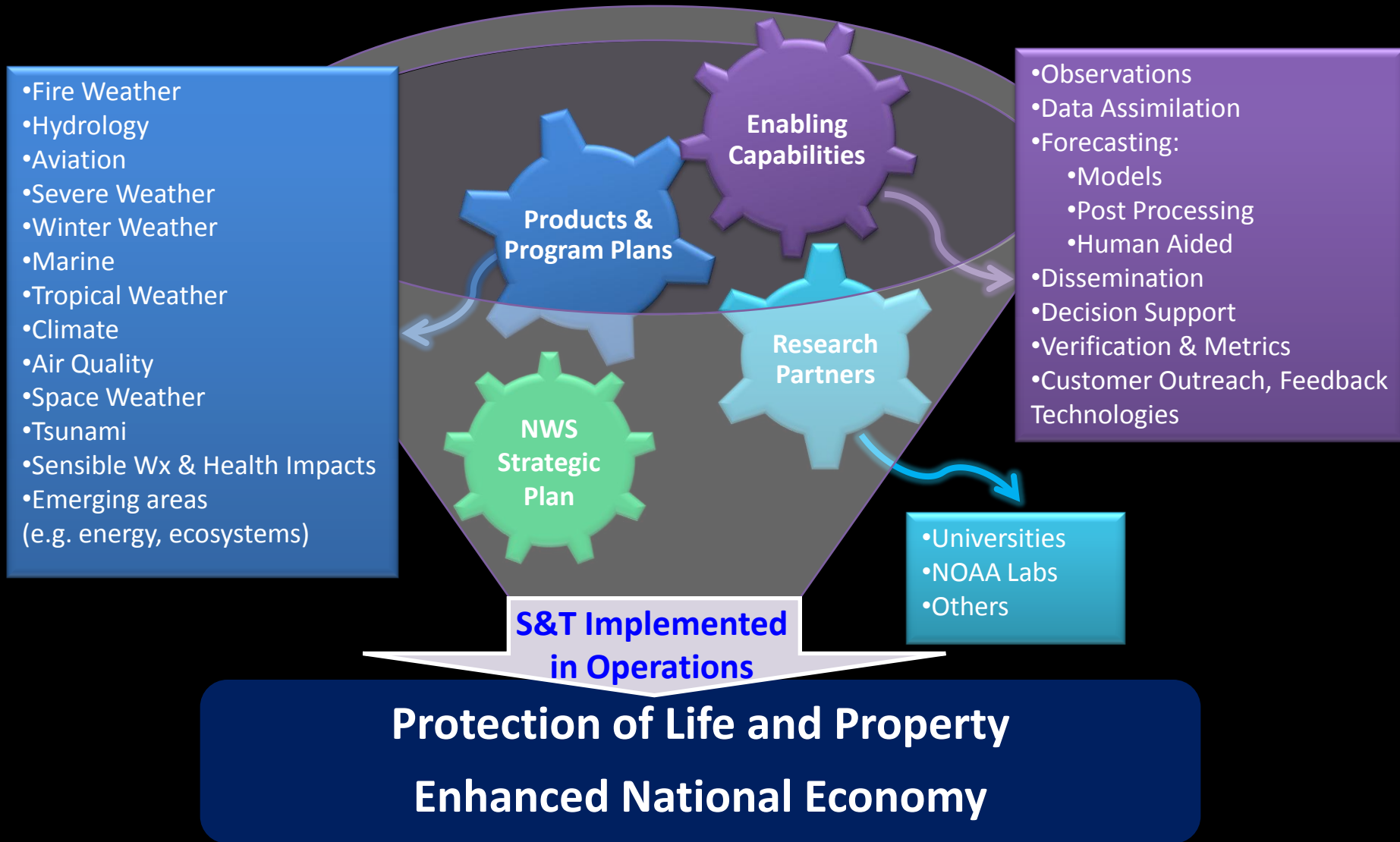
requires


- »Improved access to observations, research, and modeling
- »Integration of space weather into resource protection decision making
- »Partnerships and international collaboration



We're building a
**Science and Technology
Road Map**
that will look 15-20
years into the future


Science and Technology Road Map





We Are Striving to Achieve:

- Integrated Observing Strategy
 - ✓ Greater Satellite Latency Information
 - ✓ Next Generation Radar Strategy
 - ✓ Higher Resolution Upper Air Observations
- Finer Scale Models
- Robust Ensemble and Post-Processing Capabilities
- Higher Performance Computing
- Better Microwave Sounding Capabilities
- 4D Weather Data Cube With:
 - ✓ Open, Services-Oriented Architecture
 - ✓ State-of-the-Art Data Transfer



**We Are Dedicated
to Providing:**

- Better Communication of Forecast Uncertainty
- Better Integration of Social Sciences into Operational Concepts
- Improved Dissemination Technologies and Delivery Applications
- Robust, Consultative Service for Our Government Partners

Looking Beyond Tomorrow



Big Questions Remain:

- How do we find the right mix of forecaster and automation when dealing with increased volumes of data?
- How do forecasters deal with and communicate probabilistic information in a way that is useful to decision makers?
- What can we afford and how do we prioritize?

Building a Road to the Future

Partnerships are
an essential part of
reaching our goals



