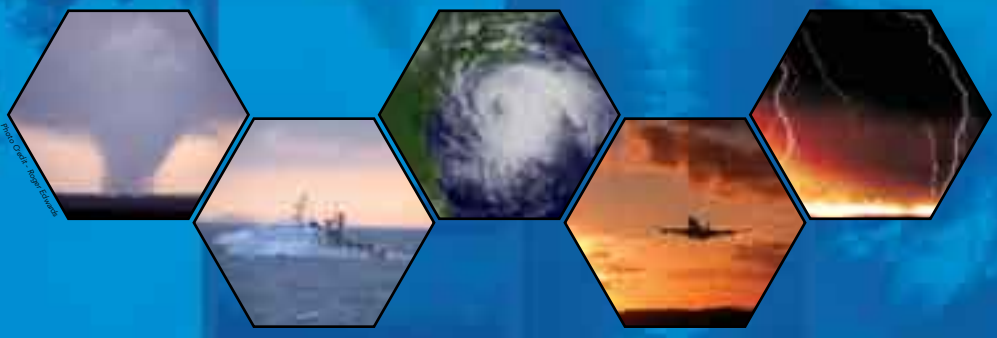
National Centers for Environmental Prediction

Strategic Plan 2009 - 2013

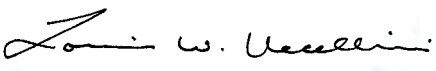
"From the Sun to the Sea…
Where America's
Climate, Weather, Ocean and
Space Weather Services Begin"



Director's Message

The National Centers for Environmental Prediction (NCEP) is a recognized global leader providing a seamless suite of operational environmental analysis, diagnostics and forecasts for a domain that now ranges from the sun to the sea, including weather, ocean, climate, water and space weather prediction services. NCEP's success depends on addressing user needs and the requirements of our world-class employees to enable NCEP to best meet the evolving NOAA mission. Furthermore, NCEP is at the forefront to capitalize and implement emerging scientific and technological advances. In that regard, NCEP must serve as a catalyst to coordinate, cooperate and collaborate through applied research, training, technology transfer and implementation of a common modeling infrastructure for global to regional applications. Partnerships with the entire community, and related operational and developmental test beds, will build off collaborations with the NWS, NOAA, other federal agencies, academia and the public sector to accelerate improvements in all NCEP products and services.

These are exciting times for the National Centers for Environmental Prediction (NCEP). We are moving to a state-of-the-art facility, the NOAA Center for Weather and Climate Prediction, collocated at the University of Maryland. This move will certainly provide a basis for accelerating product improvements and expanding prediction services envisioned for the next five to ten years. NOAA's prediction capability will include the entire earth system and continue to advance to address important environmental issues associated with air and water quality prediction. The numerical modeling suite is changing as the multi-model ensemble approach and coupled atmosphere, ocean, land and cryosphere models revolutionize the forecast process across the entire spectrum from mesoscale applications to climate predictions. Accordingly, this new strategic plan addresses expanding user needs for prediction-based services and maps out our commitment to position NCEP to address those needs in a cost-effective manner and in partnership with other NOAA and agency partners to provide valuable, timely and accurate products and services. Our new Strategic Plan is balanced – addressing both internal (employee) and external (stakeholder) input – and provides a solid foundation and path forward to address the Nation's critical emerging trends. I am excited about the strategic goals and wide-ranging partnerships offered through this planning exercise, am proud to lead a world-class group of professionals willing to embrace the challenge to better serve the public good and am confident of sustaining NCEP's success in addressing the challenges in environmental prediction.



Dr. Louis W. Uccellini

Director, NCEP

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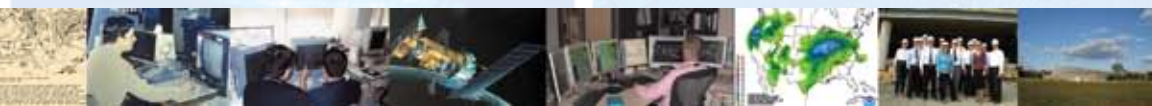


NCEP's Mission/Vision — Why Do We Exist?

Mission

NCEP delivers science-based environmental predictions to the Nation and the global community. We collaborate with partners and customers to produce reliable, timely, and accurate analyses, guidance, forecasts and warnings for the protection of life and property and the enhancement of the national economy.

Vision

The Nation's trusted source, first alert and preferred partner for environmental prediction services

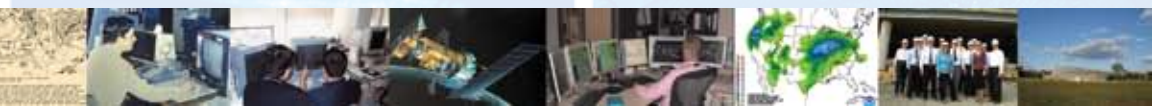
"From the Sun to the Sea… Where America's Climate, Weather, Ocean and Space Weather Services Begin"

How NCEP Plans to Serve the Nation's Needs

NCEP represents a critical national resource to operational and research communities affected by weather, water, climate and space weather.

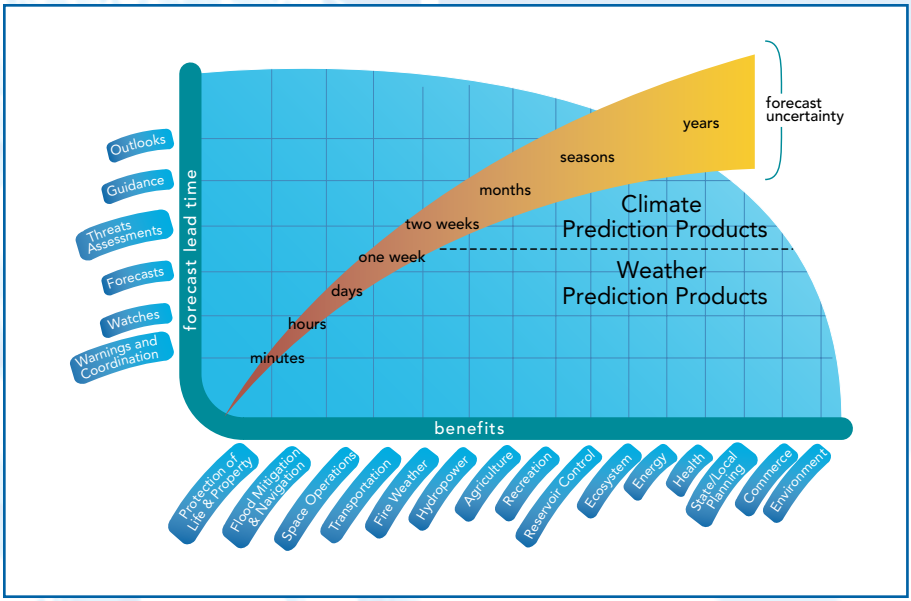
To meet the future needs of the ever-broadening user community and address the strategic climate-water-weather issues, NCEP continues to develop a *Seamless Suite of Products*. The "seamless suite" describes a set of related products that are integrated and consistent across time and space, as well as across forecast applications. It spans all environmental prediction services and benefits from the unprecedented and ongoing explosion of scientific and technological advances within the research community.

Using today's more powerful computers and sophisticated models, NCEP is able to establish the necessary linkages between environmental prediction services that are essential to a "seamless suite" of NWS products. Benefits of this effort will extend across all time scales. These include immediate tactical forecasts related to the protection of life and property, guidance required to lengthen weather and climate predictions from days to weeks to months, and long-range characterizations of climate change.



A Seamless Suite of Products

The "seamless suite" describes a set of related products which are integrated and consistent throughout time and space, as well as across forecast application and domain.

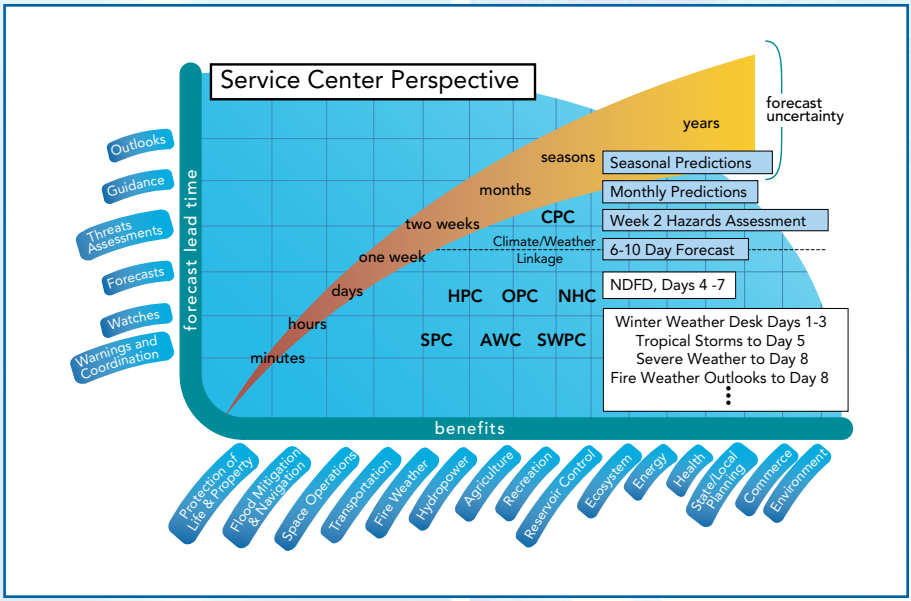


Historically, different user communities required distinct forecast products comprised of a wide range of time scales and areal extents. As a result of these varying demands, climate, water, weather and space weather were treated as separate disciplines, each with its own set of products and users.

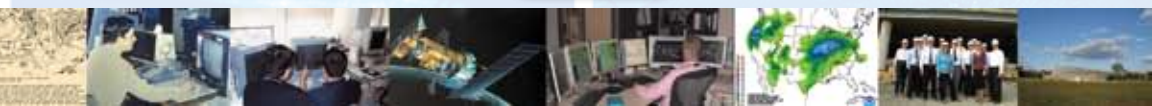
By melding all of these traditionally discrete products into a seamless suite, NCEP serves as the first alert to the nation for its climate, weather, ocean and space weather needs.

Photo Credit - Roger Edwards

A Seamless Suite of Products



An example of how today's product suite can be mapped into the Seamless Suite approach is shown above. The products range from seasonal, to monthly, to "week 2", to 6-10 day forecasts, to the NDFD-based 7-day weather forecast that NCEP produces through its climate and weather-related Service Centers in collaboration with the NWS Weather Forecast Offices. We now have the capability to provide extended-range outlooks for weather trends that verify as specific events unfold in the short time scales. Today, the potential for severe weather outbreaks and winter storms can now forecasted a week or two in advance. The goal remains to accomplish these forecast successes more often with greater accuracy and longer lead times, and with objective means of uncertainty that can be used by a diverse range of users and decision makers.



How NCEP Serves

NCEP produces and delivers products and services to a broad range of users and partners:

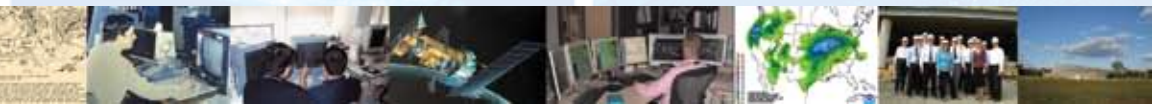
- Quality-controlled observations gathered from the nation and around the world
- Analyses extending from the ocean and the earth's surface into the stratosphere and to the sun
- Model forecasts, ranging from hours to seasons, for users and partners across the nation and around the world every day—on time, all the time
- Forecasts of solar activity, weather, climate and ocean conditions at the surface and below
- Products in probabilistic terms conveying levels of uncertainty
- Diagnostics and products derived from model output, including guidance on model performance
- Forecasts and guidance for specific hazardous solar, climate and weather events
- Digital national forecasts of weather and climate for public interests, marine activities, aviation and wildfires
- Discussions to explain forecast reasoning and impact, including climate variability assessments
- Scientific expertise and support of operational numerical analysis and forecast systems for NWS, community and international use, including enhanced test bed activities
- Collaboration on applied research efforts, decision support capability and the development of training material for models and forecast problems
- Outreach with a broad and diverse user community, including media briefings during critical weather, climate and space weather events
- Adaptable formats and dissemination methods for our customers' evolving requirements

These products result from the integrated efforts of nine Centers, each with distinct responsibilities:

The National Centers for Environmental Prediction provides primary support to the NWS mission by furnishing products designed to support National Weather Service field operations, our partners in the Private Sector, other government agencies and the American Public.

NCEP's computer modeling and operations infrastructure support the requirements of the broader user community, the specific needs of NCEP's seven Service Centers and the NWS field forecast structure.

- The **Environmental Modeling Center (EMC)** develops and improves numerical weather, climate, hydrological and ocean prediction through a broad program of applied research in data analysis, modeling and product development in partnership with the broader research community.
- The **NCEP Central Operations (NCO)** sustains and executes the operational suite of the numerical analyses and forecast model and prepares NCEP products for dissemination.



The seven NCEP Service Centers rely on their experts to forecast specific weather phenomena.

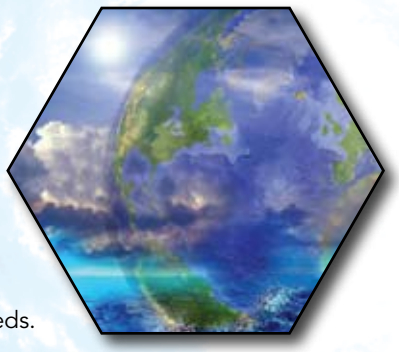
NCEP supports the field by staffing the Service Centers with highly trained forecasters focusing on hazards related to such areas as severe weather, tropical cyclones, heavy precipitation, marine and aviation weather, global climate and space weather. This ensures that NWS field offices, other government agencies and the nation's private sector have the necessary information to deal with specific hazardous weather occurrences and extreme climate events, whenever and wherever they occur.

- The **Aviation Weather Center (AWC)** provides aviation warnings and forecasts of hazardous flight conditions at all levels within domestic and international air space.
- The **Climate Prediction Center (CPC)** serves the public by assessing and forecasting the impacts of short-term climate variability, and emphasizing enhanced risks of weather-related extreme events for use in mitigating losses and maximizing economic gains.
- The **Hydrometeorological Prediction Center (HPC)** provides analysis and forecast products, specializing in quantitative precipitation forecasts (QPF) to five days, weather forecast guidance to seven days, real-time weather model diagnostics discussions, and surface pressure and frontal analyses.
- The **Ocean Prediction Center (OPC)** issues weather warnings and forecasts out to five days, in graphical, text and voice formats for the Atlantic and Pacific Oceans, north of 30 degrees North.
- The **Space Weather Prediction Center (SWPC)** provides space weather alerts and warnings for disturbances that can affect people and equipment working in space and on Earth.
- The **Storm Prediction Center (SPC)** provides accurate tornado and severe weather forecasts and watches for the contiguous United States along with a suite of hazardous weather and mesoscale products. The SPC continually monitors mesoscale atmospheric processes related to severe weather and tornado outbreaks, extreme winter weather events and critical fire weather conditions.
- The **National Hurricane Center (NHC)** provides official NWS forecasts of the movement and strength of tropical weather systems and issues the appropriate watches and warning for the U.S. and surrounding areas. The NHC also issues a suite of marine products covering the tropical Atlantic and eastern Pacific.

NCEP's Strategic Goals and Objectives

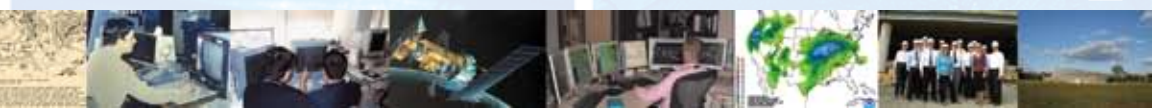
NOAA's Strategic Planning Goals

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



NCEP's Goals and Strategies

- **Customers and Partners**
  - Ensure the value, usability and relevance of NCEP products and services.
- **Products and Services**
  - Improve decision support capability to meet the widest spectrum of user and partner needs.
- **Information Systems**
  - Enhance the real-time, on-time, all the time access, display and delivery of NCEP products and services.
- **Science and Technology**
  - Accelerate science and technology infusion to enhance the value of NCEP guidance, analyses, forecasts and warnings over all spatial and temporal scales.
- **People and Organizational Culture**
  - Develop, value and sustain a highly skilled and flexible workforce that excels in service, teamwork and innovation.
- **Business Processes**
  - Strengthen and integrate business processes that encourage innovation, manage change, promote efficiency, and hold individuals accountable for results at all levels.



NCEP Strategic Plan 2009-2014

Customers and Partners

1.0 Ensure the value, usability and relevance of NCEP products and services.

- 1.1 Implement a customer-centered and partner-focused communications and operating practice.
  - 1.1.1 Formalize and implement a customer and partner requirements collection, validation and feedback process.
  - 1.1.2 Formalize a transparent and inclusive process throughout all phases of a product life cycle.
  - 1.1.3 Continuously improve product and service information and customer and partner training, outreach and communication.
  - 1.1.4 Use best practices from across NCEP to develop a standardized customer service and partnership approach.

- 1.2 Take advantage of the greater community's capabilities and resources to meet customer/partner requirements and promote NCEP continuous learning.
  - 1.2.1 External Partners
    - 1.2.1.1 Private sector
      - 1.2.1.1.1 Work with the private sector to augment or enhance NCEP products and services.
      - 1.2.1.1.2 Leverage the media's unique capability to reach the public.
      - 1.2.1.1.3 Utilize private sector observing systems.
      - 1.2.1.1.4 Leverage private sector technology innovations.
      - 1.2.1.1.5 Use industry standard display systems.
    - 1.2.1.2 Federal partners
      - 1.2.1.2.1 Assess, coordinate and share resources and capabilities.
      - 1.2.1.2.2 Pursue focused research and modeling activities.
      - 1.2.1.2.3 Utilize other partner observing systems.
      - 1.2.1.2.4 Partner in outreach, training and education activities.
    - 1.2.1.3 Academic partners and the research community
      - 1.2.1.3.1 Involve the larger research community to address existing or emerging NCEP challenges.
      - 1.2.1.3.2 Accelerate research advances to operations through test beds and other mechanisms.
      - 1.2.1.3.3 Engage the community on the ongoing development of earth system modeling and multi-model ensemble systems.
      - 1.2.1.3.4 Expand the visiting scientist program at NCEP to leverage from the external community.

1.2.1.4 International partners

1.2.1.4.1 Expand scientist exchange for community modeling, data assimilation and the exchange of forecast techniques.

1.2.1.4.2 Share data, observations and expertise.

1.2.1.4.3 Share research results and actively participate in international research programs.

1.2.1.4.4 Expand the forecast training desks to build upon the successes of ongoing activities at the International Training Desks.

1.2.2 Internal Partners

1.2.2.1 NOAA

1.2.2.1.1 Evaluate and integrate, where appropriate, advances across NOAA research and observations into NCEP operations.

1.2.2.1.2 Clarify roles and capitalize on areas of synergy with other NOAA offices.

1.2.2.1.3 Establish scientist exchanges between NCEP and NOAA programs and offices.

1.2.2.1.4 Participate in targeted NOAA training, education and outreach activities.

1.2.2.1.5 Utilize the NOAA Center for Weather and Climate Prediction to forge innovative strategic relationships through collocation and synergies via partnerships, especially for expanded environmental prediction capabilities.

1.2.2.2 NWS

1.2.2.2.1 Evaluate and integrate best practices from other NWS organizations.

1.2.2.2.2 Improve collaboration across the NWS in products and delivery of products and services.

1.2.2.2.3 Expand NCEP product suite for Alaska and Pacific Regions.

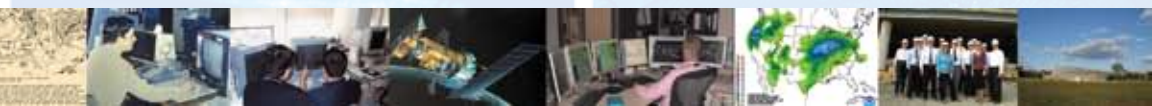
1.2.2.3 NWS Employees Organization (NWSEO)

1.2.2.3.1 Fully utilize the NWSEO by incorporating the value added of employee input to improve product and service usability and relevance.

1.2.2.4 NCEP

1.2.2.4.1 Leverage the perspective and experience of the employees in product/service development and assessment.

1.2.2.4.2 Integrate focused efforts and teamwork among the NCEP Centers.



Improving Services for

Watches and Warnings

- Hurricanes and Tropical Storms
- Tornadoes and Severe Thunderstorms
- Aviation Hazards
- Marine Hazards
- Space Hazards
- Climate Extremes

Guidance

- Winter Weather and Heavy Precipitation
- Convective Storms Outlooks
- Mesoscale Weather Discussions
- Numerical Weather Prediction Out to 16 Days
- Numerical Climate Prediction Out to 9 Months in Advance
- Flash Flood
- 3 – 7 Day Temperature, Precipitation, and Weather Systems (Input for National Digital Forecast Database)
- Climate Probabilities for Seasonal to Interannual Timeframes
- Solar Cycle

PARTNERS

- NOAA Mission Goal Teams, Councils and Line Offices
- NWS Forecast Offices
- Academia
- International Organizations
- Military
- Other Federal Agencies
- Private Meteorologists
- Research Laboratories
- State and Local Emergency Managers
- Wild Fire Agencies (Federal/State)
- Technology Vendors
- Media

Existing High-Demand Needs

- Tropical cyclone forecast improvements
- Aviation weather
- Climate prediction
- Integrated NOAA ocean and coastal prediction
- Severe weather prediction
- Fire weather prediction
- Hydrometeorological prediction
- Space weather

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Our Partners and Users

USERS

- American Public
- Agriculture
- Air Quality
- Coastal Resource Managers
- Educational Communities
- Emergency Managers
- Energy Sector
- Federal, State, and Local Agencies
- Homeland Security
- Investment Community
- International Community
- Marine Sanctuaries
- Media (National/International)
- Military
- Ocean Community
- Public Health
- Recreation
- Retailers
- Satellite Operations
- Scientific Researchers
- Space Weather Industry
- Transportation: Air, Marine and Surface
- Water Resource Managers

Forecasts

- Precipitation Amount, Type and Probability
- Fire Weather Outlooks
- High Seas Wind/Wave (Tropical & Extratropical Regons)
- Offshore Waters
- Air Quality
- Aviation Icing, Ceilings, Visibilities, Convection and Turbulence
- Global Winds and Significant Weather at Flight Level
- Geomagnetic Storms/Space Radiation Events
- Monthly to Seasonal Climate Outlooks
- Extended Range Outlooks (6-10 Day/8-14 Day)
- ENSO Diagnostic Discussion
- U. S. Seasonal Drought Outlook
- Seasonal Hurricane Outlooks

Analyses and Assessments

- Unified NWS Surface Analysis
- Ocean, Atmosphere, Land Surface Analysis
- Sea State
- Hazards Assessment
- Drought Assessment
- National Tornado/Severe Storm Report Summaries
- Computer Model Performance Assessments
- Performance Verification

Technical Advice and Consultation

- Training
- Outreach
- International desks
- Satellite applications

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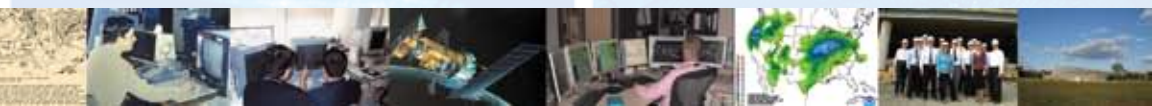


Products and Services

2.0 Improve decision support capability to meet the widest spectrum of user and partner needs.

2.1 Enhance the seamless product and service suite.
- 2.1.1 Conduct a baseline assessment of NCEP products and services.
- 2.1.2 Provide a reliable, timely and accurate product suite.
- 2.1.3 Participate in the development of a coordinated NOAA suite of products in collaboration with partners.
- 2.1.4 Improve the NCEP prediction capability through a collaborative forecast process and enhanced decision support system.
- 2.1.5 Increase probabilistic forecast information across all time scales related to weather, water and climate products and services.
- 2.1.6 Improve the communication of uncertainty prediction products.
- 2.1.7 Express products in geospatial advanced digital formats.
- 2.1.8 Build user capacity including training to improve the use of NCEP products and services.

2.2 Respond to existing high-demand needs in programmatic areas:
- 2.2.1 Tropical cyclone forecast improvements (through the Hurricane Forecast Improvement Project)
- 2.2.2 Aviation weather
- 2.2.3 Climate prediction
- 2.2.4 Integrated NOAA ocean and coastal prediction
- 2.2.5 Severe weather prediction
- 2.2.6 Fire weather prediction
- 2.2.7 Hydrometeorological prediction
- 2.2.8 Space weather

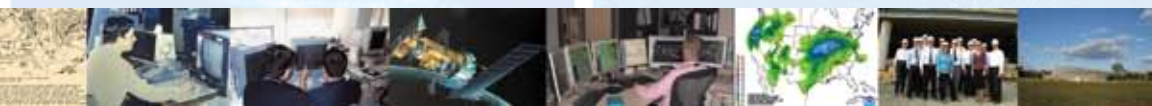
2.3 Anticipate emerging critical areas to ensure the product suite remains relevant and brings increased value to the Nation.
- 2.3.1 Ecosystem forecast support
- 2.3.2 NextGen aviation transportation system
- 2.3.3 National Climate Service
- 2.3.4 Public health
- 2.3.5 Surface transportation
- 2.3.6 Agriculture
- 2.3.7 Energy
- 2.3.8 Air and Water quality
- 2.3.9 Homeland security

2.4 Respond to increasing national and international requests and agreements for products and services, and related training, education and outreach.

Information Systems

3.0 Enhance the *real-time, on-time, all the time* access, display and delivery of NCEP products and services.

- 3.1 Implement a process for the acquisition, utilization and dissemination of on-demand data, products and services which leverages emerging technologies.
- 3.2 Deploy a strategy to ensure a secure and reliable NCEP web process aligned with NOAA.
  - 3.2.1 Continuously improve web page content, organization and information access.
  - 3.2.2 Provide 24x7 support for all web infrastructure.
  - 3.2.3 Leverage best practices from NCEP community web sites.
  - 3.2.4 Provide one-stop shopping, ensuring ease of use by our customers.
- 3.3 Assess and select formats and dissemination methods for NCEP data and products adaptable to changing requirements.
  - 3.3.1 Enhance the use of geographical information system (GIS) technology.
  - 3.3.2 Promote innovative delivery methods to include the use of personal digital assistant (PDA) and Google Earth technology.
- 3.4 Create a catalog for all internal and external datasets.
- 3.5 Leverage existing NOAA data management, archival, mining and stewardship.
- 3.6 Advance IT architecture to support emerging NWS-wide data, display and process requirements to include networks, servers, workstations, supercomputers, software and security (e.g. NPOESS, GOES-R and dual polarization radar).
- 3.7 Support the transition to AWIPS2 to achieve a unified system to meet NCEP forecaster needs and promote collaboration among NWS forecasters.
- 3.8 Integrate and balance cyber security policies and implementation to ensure confidentiality and integrity with NOAA and partner agencies.
  - 3.8.1 Establish documented security procedure for codes and scripts.
  - 3.8.2 Align communications protocols across partner agencies.
- 3.9 Implement a process to include NCEP Service Centers in IT infrastructure decisions.



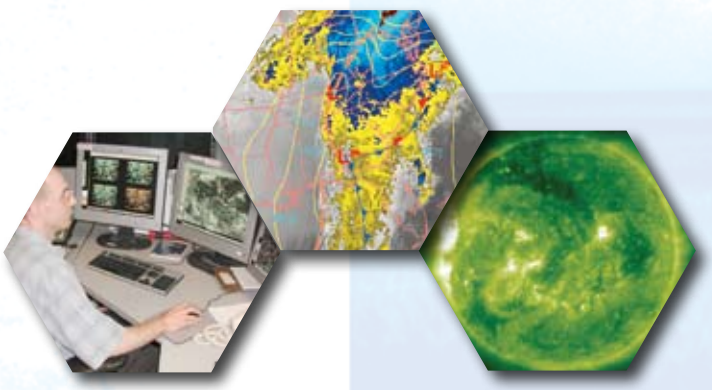
Science and Technology

4.0 Accelerate science and technology infusion to enhance the value of NCEP guidance, analyses, forecasts and warnings over all spatial and temporal scales.

4.1 Develop and implement the next generation unified numerical forecast system based on a community modeling approach to serve both the operational and applied research needs of NOAA, and the research and application needs of the broader science community in accordance with NOAA's research strategy, related priorities, and Planning Programming Budgeting and Execution System (PPBES) process.

4.2 Strengthen the ability to infuse science and research into operational systems by solidifying partnerships, knowledge transfer and NCEP outreach to the scientific community. (O2R)

- 4.2.1 Document NCEP's forecast systems to facilitate use by the larger research community as part of the "O2R" process.
- 4.2.2 Support use of NCEP's forecast systems by the science community.
- 4.2.3 Engage the science community on NCEP's mission goals and the earth system model system that includes atmosphere, ocean, land and cryosphere model components.
- 4.2.4 Conduct community forums to collaborate on multi-model ensembles and leverage developments from outside of NCEP.
- 4.2.5 Utilize community workshops on specific mission areas through test beds.

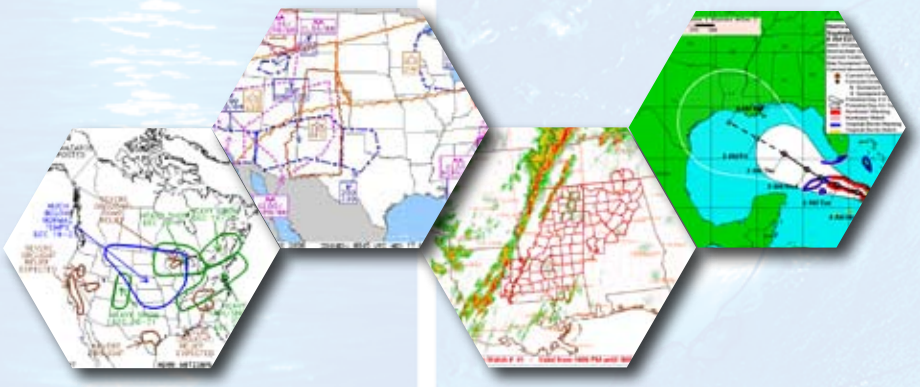


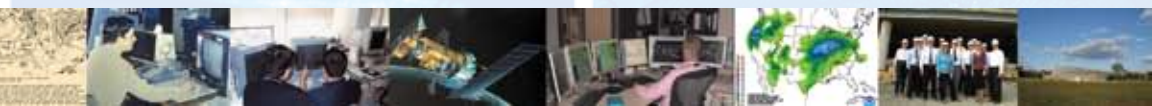
4.3 Enhance, accelerate and harvest research to operations for improving numerical forecast systems and the NCEP product suite. (R2O)

- 4.3.1 Determine best mix of near-term (1-3 year) and longer-term (4-5 year) research products for transition to operations. (R2O)
- 4.3.2 Enhance R2O efficiency by aligning strategy with NCEP expertise.
- 4.3.3 Document, assess need and prioritize R2O areas.
- 4.3.4 Strengthen test beds for enabling use of NCEP and other models as community models.

4.4 Strengthen service center test beds to energize infusion of new science and technology into NCEP operational forecasting.

- 4.4.1 Create a robust foundation for sustaining and enhancing test beds in each Service Center, the Joint Center for Satellite Data Assimilation and the Developmental Test Bed Center associated with the Environmental Modeling Center and NCEP Central Operations.
- 4.4.2 Share best practices to enhance test bed efficiency and optimize the effectiveness of community involvement throughout the assessment and implementation process.
- 4.4.3 Leverage test beds, forecasters and technical staff to support a rapid transition process following established implementation criteria.
- 4.4.4 Capitalize on forecaster science, technology and applied research to advance mission goals





4.5 Enhance the use of multi-model ensembles and probabilistic forecasting to quantify uncertainty at all time scales related to weather, water and climate products and services.

- 4.5.1 Develop a multi-model ensemble prediction system and related products in collaboration with national and international partners.
- 4.5.2 Engage the community in post-processing technologies.
- 4.5.3 Use a National Earth Modeling System to construct diverse model solutions using a common framework.
- 4.5.4 Adopt new statistical techniques to drive probabilistic guidance and user-specific products.

4.6 Improve the use of observations in operational forecasting and planning for future systems.

- 4.6.1 Prepare for the next generation of observing systems.
  - 4.6.1.1 NPOESS and GOES-R
  - 4.6.1.2 Dual Polarization Radar
- 4.6.2 Utilize the NASA-NOAA-DoD Joint Center for Satellite Data Assimilation to accelerate the use of new satellite observing systems.
- 4.6.3 Strengthen data quality and assessment, quality control and data assimilation technology development, working in partnership with the larger observational and modeling community.
- 4.6.4 Enhance diagnostic procedures to identify model problems.
- 4.6.5 Improve data assimilation with advanced techniques.
- 4.6.6 Improve focus of new instrument design and deployment across mission areas by using data assimilation to design and plan for new observing systems.
- 4.6.7 Enhance collaboration with research partners on data assimilation infrastructure.

4.7 Augment operational, backup and applied research computer capacity to provide fully coupled systems for all applications related to the prediction of the total earth system.

- 4.7.1 Seek a factor of three increase in operational and back-up computing to meet requirements for new mission areas, increased product quality and concurrent product systems.
- 4.7.2 Increase ratio of applied research computing to operational (and backup) to 4:1.
- 4.7.3 Tie benefits of increased mission requirements to computing capacity.
- 4.7.4 Leverage capacity from academia and other organizations for applied research and improved forecast systems.

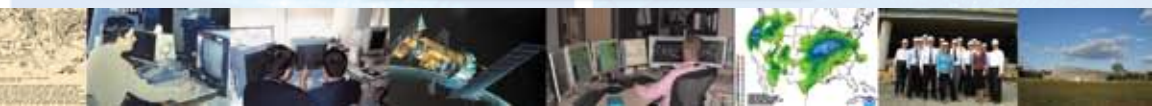
4.8 Revolutionize the NCEP Production Suite to meet emerging requirements.

- 4.8.1 Align model execution times to deliver concurrent high resolution and ensemble, global and regional products across all service areas from climate to weather and water domains.
- 4.8.2 Deliver the model products earlier in response to changing observation delivery times and user needs.

4.9 Enhance forecaster tools to optimize use of model output and observing systems to develop new product areas.

- 4.9.1 Implement a real-time, 4-dimensional, Level-2 radar mosaic in support of aviation, numerical modeling and high impact weather forecasting.
- 4.9.2 Develop and deliver software tools for forecaster analysis of emerging data sets (TAMDAR, Wind Profiler, Dual Polarization radar, GOES-R instrumentation).
- 4.9.3 Develop and deliver tools to exploit ensemble numerical model forecast data.

4.10 Explore and optimize new forecast processes to meet emerging area needs (e.g., forecaster over the loop vs. forecaster in the loop).



People and Organizational Culture

5.0 Develop, value and sustain a highly skilled and flexible workforce that excels in service, teamwork and innovation.

- 5.1 Adopt a culture of collaboration, teamwork, empowerment and mutual respect.
  - 5.1.1 Enhance communication on the status of all NCEP programs, services and products.
  - 5.1.2 Communicate agency goals, deliverables and accomplishments to all NCEP employees.
  - 5.1.3 Instill a culture of learning, innovation and flexibility.
  - 5.1.4 Provide training and tools to support employees adapting to change.
  - 5.1.5 Reward results-based performance and innovation.

- 5.2 Establish a clear process that enhances employee input into NCEP decision processes, including those that relate to adopting new techniques, products and services.
  - 5.2.1 Each NCEP Center will establish a process that will ensure employee input for new ideas and related improvements in all aspects of the planning process.
  - 5.2.2 Each NCEP Center will ensure that employee's new ideas are brought forward expeditiously for consideration in the Annual Operating Plan and related budget processes.

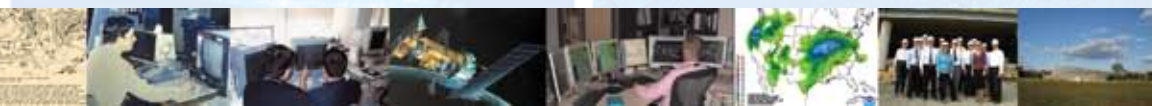
- 5.3 Assess future needs and implement a comprehensive training and development program to strengthen or change employee skills and abilities.
  - 5.3.1 Capitalize on existing learning programs.
  - 5.3.2 Commit 1.5% of total budget for the growth and development of the NCEP workforce.
  - 5.3.3 Strengthen cross-training across all Centers.
  - 5.3.4 Provide training opportunities to improve knowledge, skills and abilities.
  - 5.3.5 Leverage technology in training and development, especially as it relates to distributed training sessions and distant learning capabilities.

5.4 Enhance management and leadership capabilities.
- 5.4.1 Establish an NCEP-wide leadership development pilot program.
- 5.4.2 Utilize a feedback assessment tool to evaluate capabilities and determine improvement targets for all managers and supervisors.
- 5.4.3 Leverage best government and industry practices.
- 5.4.4 Require management and leadership training for all supervisory levels.
- 5.4.5 Enhance cross-Center and program interaction through a service-oriented feedback action process.
- 5.4.6 Hold management accountable for service, performance, conduct and work environment.

5.5 Recruit and retain a multi-disciplinary and diverse workforce, skilled in teamwork, customer service and adaptive to changing needs.
- 5.5.1 Partner with external organizations to enhance recruitment and conduct outreach.
- 5.5.2 Enhance and support NWS diversity management goals.
- 5.5.3 Increase under-represented groups throughout NCEP.
- 5.5.4 Leverage intern programs.
- 5.5.5 Assess and develop employee skill sets for emerging needs.

5.6 Formalize a system for knowledge transfer, succession planning and continuous learning.
- 5.6.1 Assess impacts of future employee turnover on NCEP.
- 5.6.2 Document standardized business and operational processes including lessons learned.
- 5.6.3 Assign mentors for new employees and managers.
- 5.6.4 Create liaison opportunities with the NCEP Office of the Director.
- 5.6.5 Expand student opportunities at NCEP through existing and new programs.

5.7 Improve quality of work life and environment.
- 5.7.1 Foster a family-friendly workplace.
- 5.7.2 Explore and implement more flexible work schedule options, such as shift work, AWS, tele-work, etc.
- 5.7.3 Create an environment of trust, respect and openness.
- 5.7.4 Provide a safe environment for the workforce.



Business Processes

6.0 Strengthen and integrate business processes that encourage innovation, manage change, promote efficiency and hold individuals accountable for results at all levels.

- 6.1 Formalize a routine review process to ensure the operational and administrative effectiveness of NCEP.
- 6.2 Align NCEP business processes with NOAA and NWS business models.
  - 6.2.1 Integrate NCEP activities into the NOAA Planning, Programming, Budgeting and Execution System (PPBES).
  - 6.2.2 Participate in NOAA and NWS Councils, Boards and Matrix Teams when needed.
- 6.3 Strengthen NCEP planning processes to link to high priority goals and deliverables of the Strategic Plan to Annual Operating Plans (AOP) and NCEP Technical Operating Plans (NTOP) to individual performance plans.
  - 6.3.1 Align NCEP priorities with requirements of customers and partners and integrate into planning and budgeting process.
  - 6.3.2 Continuously improve the AOP and NTOP process to map agency resources to agency goals and deliverables.
  - 6.3.3 Work with NWS Employees Organization to create an operating practice of communicating and connecting agency strategic and annual priorities to all employees.
  - 6.3.4 Ensure accountability by linking individual performance plans to Strategic and Annual Operating Plans.
  - 6.3.5 Review and assess performance measures annually.
- 6.4 Streamline business processes to ensure efficiencies and delegation of authority at the lowest levels possible.
- 6.5 Demonstrate and document a transparent decision-making process for all business processes.
  - 6.5.1 Improve decision-making capabilities by applying advanced risk management techniques across all NCEP centers.
  - 6.5.2 Enhance project management capabilities to routinely monitor schedule, cost, and performance of major projects.
  - 6.5.3 Implement a process to manage O2R and R2O more effectively.
  - 6.5.4 Develop integrated information technology strategies to reduce costs, improve productivity and enhance service delivery.
  - 6.5.5 Ensure science and technological advances influence procurement and acquisition decisions.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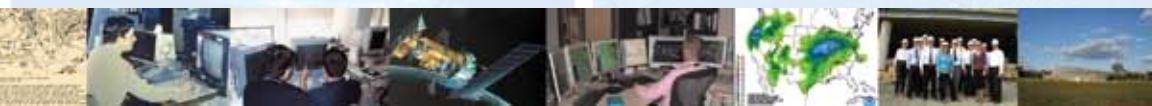

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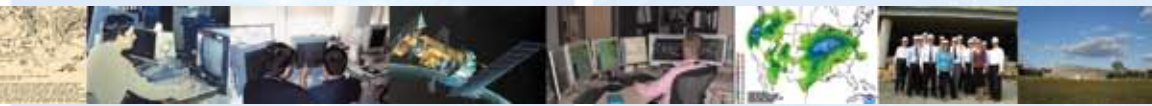

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