

CHARTER for the PARTNERSHIP on the NATIONAL EARTH SYSTEM PREDICTION CAPABILITY

A. Authorities

Authority is granted for this Charter under the provisions of the following statutes:

- The National Oceanic and Atmospheric Administration enters into this Charter pursuant to its authority under 15 U.S.C. § 313 and 49 U.S.C. §44720.
- The Department of the Air Force enters into this Charter pursuant to its authority under 10 U.S.C. § 8013 and Department of Defense Instruction 4000.19, “Interservice and Intragovernmental Support.”
- The Department of the Navy enters into this Charter pursuant to its authority under 10 U.S.C. § 113 and § 5013.
- The National Aeronautics and Space Administration enters into this Charter pursuant to its authority under 51 U.S.C. §20113.
- The Department of Energy enters into this Charter pursuant to its authority under 42 U.S.C. § 7256.
- The National Science Foundation enters into this Charter pursuant to its authority under 42 U.S.C. § 1870.

This Charter updates and supersedes both the 2013 Earth System Prediction Capability (ESPC) Memorandum of Agreement (MoA), and the 2008 Charter for the National Unified Operational Prediction Capability (NUOPC) Executive Steering Group (ESG).

B. Purpose

The Parties agree to:

- 1) establish an interagency research coordination office for the National Earth System Prediction Capability (National ESPC) across all signatories to improve understanding of processes leading to predictability, global coupled data analysis, and prediction capabilities for the physical environment,
- 2) accelerate transition of research to operations for the purpose of enhancing prediction capabilities of the three operational environmental prediction agencies, i.e., NCEP, Navy, and Air Force, and to
- 3) improve Federal decision support products and information at intermediate lead times from weeks to 30 years.

The Nation's security and economic well-being rely upon accurate global analysis and prediction capabilities for the physical environment over time scales of a few days to a few decades. Such need is amplified since both the U.S. government and the general public are increasingly seeking more accurate and detailed environmental predictions across time scales in order to protect life and property from extreme weather events and support decisions in the areas of commerce, defense, infrastructure and energy. The scope of this Grand Challenge¹ necessitates broad participation from the U.S. environmental research and operational prediction communities.

For the purposes of this Charter, the term “prediction capability” means numerical analysis and prediction of the physical earth system supporting actionable decision making, spanning the daily through decadal time scales. Thus the relevant numerical models include those operational models used for traditional operational forecast products through longer-range models supporting strategic decision making. Additionally for the purposes of this Charter, “Earth system prediction” refers to forecasts for timescales of days to at least seasons, as well as projections to a few decades but not at longer timescales. The Earth system is comprised of the coupled physical (air, ocean, land and ice) components, to the top of the thermosphere, with the biosphere included when needed for specific applications. Detailed interaction with the anthropogenic response and societal impacts for multi-decadal and longer projections is beyond the scope of this project as are mitigation and adaptation to climate variability and change.

The parties agree to coordinate their research agendas in order to more rapidly advance seamless prediction capabilities that span short term weather forecasting to extended range multi-decadal projections; those parties with mission responsibility to deliver operational forecasts will coordinate and collaborate with research agencies to achieve this goal.

This partnership leverages recent advances in the science of environmental predictability and addresses specific needs at the prediction time scales of relevance to broader programs such as the U.S. Global Change Research Program (USGCRP). USGCRP is legally mandated under the Global Change Research Act of 1990 (15 U.S.C. § 2921 et seq.) to coordinate and integrate federal research on changes in the global environment and their implications for society; in contrast, the National ESPC effort is a research through operations activity, which supports the “understand, assess, and predict” roles described in the USGCRP strategic plan, but does not address policy level decisions nor societal and economic response to human-induced and natural processes of global change. The overlap in efforts is intentional, as the USGCRP research coordination mission is confined to timescales spanning seasonal to multi-decadal; and the National ESPC’s customer decision needs for continuity across time scales from hourly to multi-decadal needs to draw from the research and development pipeline to establish and refine the capability. Coordination will be maintained by personnel participating in both activities.

¹ Shapiro and Coauthors, 2010: An Earth-System Prediction Initiative for the Twenty-first Century. Bull. Amer. Meteor. Soc. 91, 1377-1388. doi: <http://dx.doi.org/10.1175/2010BAMS2944.1>

C. Goal

The goal of the National ESPC partnership is to create an operational suite of numerical prediction systems, with coordinated developmental numerical prediction systems, which provides assured access to the best available information for current and predicted environmental conditions of the physical earth system to inform decisions involving resource investment, infrastructure risk, national security, and protection of life and property.

To provide this cross-time scale, interagency capability, this initiative will coordinate among federal agencies to produce an earth system analysis and prediction/projection capability encompassing existing operational prediction systems, and supporting research to advance understanding and to develop and improve the capability to produce global predictions from hours to decades at appropriate horizontal and vertical resolutions. The National ESPC effort will draw upon the expertise of federal laboratories (including federally funded research and development centers) and findings from agency-sponsored academic and industrial research, consistent with applicable law and regulations. This project will build on, support, and complement other collaborative efforts that exist within the research and operational communities, and will forge a link with ongoing efforts already underway in environmental science and predictability research by focusing on transitioning emerging science to centers engaged in model prediction research, and in turn to the operational prediction centers.

The coordination required includes scientific development, model interoperability, and output coordination; the topical committee structure created by NUOPC will facilitate coordination across agency lines, the research-to-operations continuum and operational-to-strategic-decision timescales. The National ESPC staff will forward committee recommendations and standards (software, hardware, and infrastructure) to the ESG. The National ESPC staff will develop, with inputs from the participating agencies, a consolidated, prioritized list of common operational and research needs. Pending ESG approval, these recommendations will be provided as a guide to the Research and Development (R&D) community.

The National Earth System Prediction Capability will include:

1. A National approach to a physical Earth system numerical prediction capability providing advanced data assimilation connected to the global observing systems, improved numerical representation of the earth system through a multi-model ensemble approach, and increased computational efficiencies exploiting advanced architectures;
2. A common set of requirements and standards that enable agencies to meet their own mission requirements while providing improved leverage and collaboration where these missions can be mutually supportive;
3. A mechanism to develop a national research agenda for a set of related research programs that will improve earth system predictions and projections from days to a few decades as well as a transition activity that incorporates advances in earth system science into the prediction and projection capability;

4. A cooperative set of focussed projects based on the state of Earth system science and targeted on phenomena covering these time scales. These projects will assess prediction skill and fidelity of physical processes in the models comprising the multi-model ensemble system, and will inform Federal, private, and academic research and development efforts to improve the ensemble system; and,
5. A defined cooperative global Earth system prediction capability with an initial goal of a global multi-model operational Earth system prediction ensemble in the 2019 timeframe.

To provide this capability, the National ESPC project will leverage and extend the NUOPC operational ensemble capability as well as other established interagency multi-model ensemble projects, with the preliminary priority placed on building a subseasonal to seasonal capability to support decision making.

The National ESPC will be supported and managed by the partners as set forth below in the Membership section of this Charter. This partnership will include operational modeling, research, supporting in-situ and remote observations, data management, and advanced numerical modeling and communications. The National ESPC participants will leverage their current and future projects to promote basic and applied research to develop, test and deploy innovative technologies and coordinate the implementation and exchange of these National ESPC capabilities within the federal operational centers.

D. Membership in the National ESPC partnership

The National ESPC office and participating personnel will enable an operational global atmosphere, ocean, land, and sea ice ensemble system, including the design standards, required research and development, operational implementation, dissemination, and evaluation.

National ESPC partnership members will be those agencies/federal entities that substantially participate in National ESPC related physical earth system numerical prediction research, research management, development and/or operational implementation and maintenance under their current roles, missions, and authorities. The National ESPC partnership will additionally assess development efforts from various sectors of the U.S. and international research community including federal, federally sponsored, and academic groups in a manner consistent with the Federal Advisory Committee Act.

The National ESPC will engage other stakeholder agencies through established channels such as the Office of the Federal Coordinator for Meteorology (OFCM) Interdepartmental Committee for Meteorological Services and Supporting Research (ICMSSR) and directly on a case-by-case basis as warranted.

National ESPC Partnership Members

- a. Department of Commerce
 - National Oceanic and Atmospheric Administration (NOAA)
- b. Department of Defense
 - U.S. Navy
 - U.S. Air Force
- c. Department of Energy (DOE) Office of Science

- Office of Biological and Environmental Research (BER)
- d. National Aeronautics and Space Administration (NASA)
 - Earth Science Division
- e. National Science Foundation (NSF)
 - Directorate for Geosciences

Each partner agency's Principal, as identified below, will represent his or her agency's programmatic interests while serving on the Executive Steering Group (ESG). The partner agencies will also engage and seek individual input from those broader agencies/federal entities and agency-sponsored research communities with an interest in the National ESPC project (the stakeholders).

E. Roles and Responsibilities

1. Executive Steering Group

Due to the expansive scope and duration of the National ESPC development effort, National ESPC project management will require direct involvement of multiple organizations with broad oversight by member agency Principals. An Executive Steering Group (ESG) of member agency Principals to provide oversight and guidance to the Project Office and working level representatives will initially consist of the NOAA Assistant Administrator for Weather Services (NWS) and the NOAA Assistant Administrator for Oceanic and Atmospheric Research (OAR); the Office of Naval Research Head of Ocean Battlespace Sensing Science and Technology (S&T) Department; the Oceanographer of the Navy; the Naval Meteorology and Oceanography Commander; the Director of Air Force Weather; the Director, Climate and Environmental Sciences Division, DOE Office of Biological and Environmental Research; the NASA Associate Director for Research, Earth Science Division, Science Mission Directorate, and the NSF Assistant Director for Geosciences.

The ESG will be chaired by an agency Principal from one of the agencies having an operational numerical weather prediction mission, and will rotate among those Principals every three years or as determined by the ESG. The office of the ESG chair will designate a Secretariat to coordinate ESG meetings and functions. While several Agencies have multiple representatives on the Executive Steering Group due to unique organizational aspects of each entity, each agency will only have one voice on ESG decisions.

2. Agency Liaisons

The Agency Liaisons are the representatives of their Principals to coordinate agency participation in National ESPC project initiatives with the Project Manager, Deputy Project Manager, and Associate Project Manager for Research. The Agency Liaisons represent their agency's interests in planning and coordination efforts and track execution of their agency's resulting related initiatives, and are responsible for reaching out to other agency program and project managers as needed for scientific disciplines to support the partnership efforts. Agency Liaisons will provide updates to their agency Principals and the Project Manager.

3. Project Manager

The Project Manager is the agent of the ESG and is directly responsible to the ESG for the management of National ESPC vision, goals, and performance objectives, and coordinates interagency requirements. The Project Manager is responsible for the overall conduct of the interagency planning and transition effort including development of project timelines that include phases of development, critical path, and milestone decision points leading to implementation. The Project Manager monitors and reports the overall execution of plans toward National ESPC goals. The Project Manager advocates for resources to achieve existing goals both to ESG members as well as oversight organizations. The Project Manager is a member of the USGCRP Interagency Working Group on Integrated Modeling (IGIM) and ensures research coordination between the USGCRP members and the National ESPC.

The Project Manager will be a Federal employee from one of the member agencies having an operational prediction mission. The position will rotate every three years (extended tenure is allowed if approved by the ESG). Appointees under member agency's authority through the Intergovernmental Personnel Act (IPA) or other temporary federal appointment processes may be approved for the Project Manager position by the ESG in the future.

4. Deputy Project Manager

The Deputy Project Manager assists the Project Manager in all aspects of National ESPC management, with special focus on development and maintenance of the interagency operational ensemble suite. The Deputy Project Manager is a Federal permanent or special temporary employee hired and employed by one of the member agencies with an operational prediction mission, but is not assigned to the same organization as the Project Manager. The Deputy Project Manager position rotates every three years (extended tenure is allowed if approved by the ESG).

5. Associate Project Manager for Research

The Associate Project Manager for Research is responsible to the Project Manager and to the ESG for development and promulgation of the interagency research coordination needed to meet program objectives and requirements. The Associate Project Manager for Research will monitor the progress of the scientific agenda and the continued alignment with agency scientific agendas; the Associate Project Manager for Research will coordinate with interagency research Program Managers on common goals and will report on the progress of mutual projects and continued plan alignment to the Project Manager and ESG members. The Associate Project Manager for Research advocates for resources to achieve existing goals to ESG members, oversight organizations, and between and within agencies. The Associate Project Manager for Research acts as the alternate for the Project Manager on the USGCRP (IGIM). The Associate Project Manager for Research is a Federal permanent or special temporary employee hired and employed by one of the member agencies with a research mission, typically for a three-year term (extended tenure is allowed if approved by the ESG).

6. National ESPC Project Office and Funding

The National ESPC Project Office is the agent of the agency principals on the ESG to develop and coordinate interagency plans needed to define, research, demonstrate, develop, implement, and operate both the operational and decision support efforts within National ESPC. The Project Office will

work to align agency plans with the developed interagency plans, and will monitor execution of both agency and interagency plans. The Project Office will report progress of agency contributions to interagency plans to the ESG.

The National ESPC Project Office is located within NOAA in Silver Spring, MD and office space, support staff, internet/ IT services and other administrative functions will be provided solely by NOAA. Otherwise each agency will fund its own participation in the National ESPC Project and ensure that all activities comply with restrictions on interagency direct support of boards or commissions, as found in annual appropriations acts. See, for example, Pub. L. No. 112-74, Div. C. § 708 (as extended by Pub. L. No.112-175).

F. Termination Date

This Charter may be amended by unanimous written agreement of all Members. This Charter will remain in effect for five years from the date of final signature at which time the Executive Steering Group will meet and decide if it should be extended. Any Member may withdraw from this Charter with 90 days written notice provided to the other Members.

G. General Provisions

This Charter is neither a fiscal nor a funds obligation document. Nothing in this Charter authorizes or is intended to obligate the parties to exchange, or reimburse funds, services, or supplies, or transfer or receive anything of value.

No participant in this process is specifically authorized to obligate funds on their agency's part unless otherwise approved or delegated by that agency separately from this Charter and pursuant to applicable law and regulation.


This Charter in no way restricts any of the parties from participating in any activities with other public or private agencies, organizations or individuals.

This Charter is not legally enforceable and shall not be construed to create any legal obligation on the part of any party.

Effective Date: This Charter is effective on the date of the last signature below and shall remain in effect for 5 years unless superseded or cancelled.

**CHARTER
for the
PARTNERSHIP
on the
NATIONAL EARTH SYSTEM PREDICTION CAPABILITY**

H. Signatures




Date: 4/7/16
Oceanographer of the Navy




Date: 4/18/16
Asst. Administrator for Weather Services,
NOAA/NWS



Date: 20 APR 16
Head, Ocean Battlespace Sensing, Office of Naval
Research



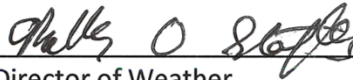
Date: 4-18-2016
Asst. Administrator for Oceanic and Atmospheric
Research, NOAA/OAR



Date: 4/7/16
Commander, Naval Meteorology and
Oceanography Command



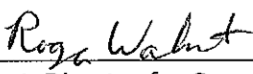
Date: 4/18/16
Director, Climate and Environmental Sciences
Division, DOE BER



Date: 4/18/16
Director of Weather
Deputy Chief of Staff, Operations
Headquarters U.S. Air Force



Date: 5/20/16
Assoc. Director for Research
Earth Science Division, Science Mission
Directorate, NASA



Date: 6/6/16
Asst. Director for Geosciences
National Science Foundation

Note: These signatures were obtained via separately routed copies of this charter and collected together on this page.