

**MEMORANDUM OF AGREEMENT**  
**for the**  
**INTER-AGENCY WORKING GROUP**  
**on**  
**EARTH SYSTEM PREDICTION CAPABILITY**

**A. Purpose**

WHEREAS, authority is granted for this agreement under the provisions of the following statutes:

- The National Oceanic and Atmospheric Administration enters into this agreement 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 agreement 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 agreement pursuant to its authority under 10 U.S.C. § 113 and § 5013.
- The National Aeronautics and Space Administration enters into this agreement pursuant to its authority under 51 U.S.C. §20113.
- The Department of Energy enters into this agreement pursuant to its authority under 42 U.S.C. § 7256.
- The National Science Foundation enters into this agreement pursuant to its authority under 42 U.S.C. § 1870.

The Parties enter into this memorandum of agreement (MOA) to establish an Inter-agency Working Group on Earth System Prediction Capability (IWG-ESPC) to improve global analysis and prediction capabilities for the physical environment and accelerate transition of research to operations.

The Nation's security and economic well-being relies 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 asking for more accurate and detailed environmental predictions beyond one to two weeks, particularly in the areas of commerce, defense, infrastructure and energy. The scope of the challenge necessitates broad participation from the U.S. environmental research and operational prediction communities.

The purpose of this agreement is to improve collaboration among U.S. Federal agencies and coordinate the Parties' efforts with Federal entities and the national laboratories, including research findings by the environmental research and operational prediction communities, for the development and implementation of a national earth system prediction capability for time scales out to a few decades. For the purposes of this agreement, Earth System Prediction in this context 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

components foremost, with the biosphere also 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. This agreement specifically focuses on improved medium range prediction, which leverages recent advances in the science of environmental predictability and addresses specific needs at the shorter scale of broader programs such as the U.S. Global Change Research Program (USGCRP). USGCRP is legally mandated under the Global Change Research Act of 1990 (P.L. 101-606) to coordinate and integrate federal research on changes in the global environment and their implications for society; in contrast, the IWG-ESPC effort is a research to operations activity, which also supports the “understand, assess, and predict” roles described in the USGCRP strategic plan, but not addressing policy level decisions nor societal and economic response to human-induced and natural processes of global change.

Building from the initial collaboration that resulted in the global atmospheric weather multi-model ensemble under the "National Unified Operational Prediction Capability" (NUOPC), the IWG-ESPC will continue collaborations to develop the basic architectural foundations (common requirements, architecture, and standards) such as the Earth System Modeling Framework (ESMF) while expanding the scope of collaborative model development and improved understanding of underlying physical, dynamical, and biogeochemical processes. The goal of this effort is to create a high-resolution, extended range, global earth system modeling capability that will produce more accurate intraseasonal predictions with projections out to a few decades for use in decisions affecting the economy and protection of the U.S. population. The pace at which this goal is reached will rely heavily on activities within the earth system research and modeling community and can only be accomplished by building stronger alliances between the Nation’s environmental research and operational prediction communities.

This MOA establishes the underlying basis for collaboration, goals, membership, roles and responsibilities, as well as a decision making oversight for the IWG-ESPC Project Office, which is located within and supported solely by NOAA. It also establishes an Executive Steering Group (ESG), an Agency Resource Coordination Board (ARCB), and a Science Steering Group (SSG) for achieving these goals. There are no agency membership fees or inter-agency budget transfers involved in support of the Project Office.

## **B. Goal**

The goal of the IWG-ESPC is to foster and maintain a multi-agency initiative that provides coordination among federal agencies to meet broad, but agency-specific, mission requirements and interests. This initiative will result in an earth system analysis and prediction/projection framework to support research to advance understanding and develop the capability to produce global predictions from hours to decades at appropriate horizontal and vertical resolutions. The IWG-ESPC effort will draw upon the expertise of national laboratories and findings from agency-sponsored research by, institutions of higher learning and other organizations, consistent with applicable law

and regulations. This project will 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 by focusing on transitioning of emerging science to the operational prediction centers and national laboratories.

The Earth System Prediction Capability will include:

1. A national approach to an earth system numerical prediction capability providing advanced data assimilation, improved numerical representation of the earth system, and increased computational efficiencies;
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; and
4. A cooperative set of demonstrations based on the state of earth system science to inform future research and development efforts encompassing Federal, private and academic organizations.

The IWG-ESPC will be a framework supported and managed by the Members as set forth below in the Membership section of this Agreement. This framework will include research, in-situ and remote observations, data management, and advanced numerical modeling and communications. The IWG-ESPC Members will promote basic and applied research to develop, test and deploy innovative technologies and coordinate the implementation of this capability within multiple federal operational centers.

### **C. Membership in the IWG-ESPC**

The IWG-ESPC will 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. Members will be those agencies/federal entities that substantially participate in IWG-ESPC related research, research management, development and/or operational implementation and maintenance under their current roles, missions, and authorities.

#### **IWG-ESPC 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)

e. National Science Foundation (NSF)

Each member agency's Principal, as identified below, will represent his or her agency's programmatic interests while serving on the Executive Steering Group (ESG). The Members will also engage and seek individual input from those broader agencies/federal entities and agency-sponsored research community that have an interest in the IWG-ESPC (Stakeholders).

## **D. Roles and Responsibilities**

### **1. Executive Steering Group**

Due to the expansive scope and duration of the ESPC development effort, IWG-ESPC 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 Command Technical Director; the Director of Air Force Weather; the Commander, Air Force Weather Agency; 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. 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 Resources Coordination Board**

The Agency Resources Coordination Board (ARCB) consists of a Chair and program officer working level members coordinated by the ESG. Individual ARCB members represent their agency's interests in planning and coordination efforts and execute their agency's resulting related initiatives. The Chair and Agency membership of the ARCB will be appointed by the ESG; Terms of Reference and nomination, selection, rotation plans for ARCB members will be developed separately as part of an IWG-ESPC Implementation Plan. The ARCB coordinates agency participation in IWG-ESPC initiatives with the Project Manager and Deputy Project Manager, facilitates execution of MOA responsibilities, and determines the appropriate make-up of the management architecture for the IWG-ESPC.

### **3. Science Steering Group**

Over the course of the IWG-ESPC development, it is expected that agency representation and required technical and scientific subject matter expertise (participation and membership) will vary. An initial Science Steering Group will be

composed of subject matter experts in Environmental Modeling and Earth Science representing the Department of Commerce (NOAA), the Department of Defense (Navy and Air Force), Department of Energy, the National Aeronautics and Space Administration and the National Science Foundation. The ARCB and IWG-ESPC staff will make recommendations concerning Science Steering Group (SSG) nominations and membership to the ESG which will review the size and expertise of the SSG at least biannually. The SSG will include subject matter expertise relevant to the core efforts as described in section B Goals.

#### **4. Project Manager**

The Project Manager is directly responsible to the ESG for management of the IWG-ESPC development, implementation and overall direction of the management architecture. The Project Manager develops appropriate project timelines that include phases of development, critical path, and milestone decision points towards the IWG-ESPC goals. The Project Manager also implements the IWG-ESPC collaborative research and investment strategies in coordination with the ARCB and under advisement by the SSG.

The Project Manager will be a Federal employee from one of the member agencies. The position will rotate every three years (extended tenure is allowed if approved by the ESG) with the Deputy Project Manager position. 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.

#### **5. Deputy Project Manager**

The Deputy Project Manager assists the Project Manager in all aspects of IWG-ESPC management. The Deputy Project Manager is a Federal permanent or special temporary employee hired and employed by one of the member agencies, but is not assigned to the same organization as the Project Manager. The Deputy Project Manager position rotates every three years with the Project Manager position (extended tenure is allowed and approved by the ESG).

#### **6. ESPC Project Office and Funding**

The IWG-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 on the IWG-ESPC 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).

#### **E. Termination Date**

This Agreement may be amended by unanimous written agreement of all Members. This Agreement 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 Agreement with 90 days written notice provided to the other Member.

## **F. General Provisions**

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

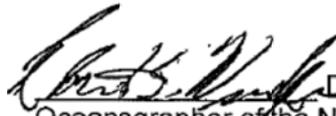
No participant in this process is specifically authorized to obligate funds on their agency's part unless otherwise approved or delegated by that agency separately from this Agreement and pursuant to applicable law and regulation.

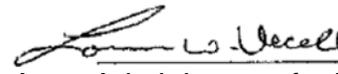
This Agreement in no way restricts any of the parties from participating in any activities with other public or private agencies, organizations or individuals.

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

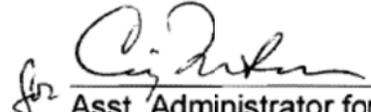
Effective Date: This Agreement is effective on the date of the last signature below and shall remain in effect for 5 years.

**G. Signatures**

 DATE: 10/1/12  
Oceanographer of the Navy

 DATE: 3/21/13  
Asst. Administrator for Weather Services,  
NOAA/NWS

 DATE: 9/26/12  
Head, Ocean Battlespace Sensing Office  
of Naval Research

 DATE: 3-26-13  
Asst. Administrator for Oceanic and  
Atmospheric Research, NOAA/OAR

 DATE: 11/26/12  
Commander, Naval Meteorology and  
Oceanography Command

 DATE: 6/4/13  
Director, Climate and Environmental  
Sciences Division, DOE BER

 DATE: 10 Oct 12  
Director, Air Force Weather

 DATE: 5/23/13  
Asst. Director for Geosciences  
National Science Foundation

 DATE: 4/30/13  
Assoc. Director for Research  
Earth Science Division, Science Mission  
Directorate, NASA

Note: these signatures were obtained via separately routed copies of this MoA, and collected together on this page.