

# **CHARTER**

Between the

DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

and the

DEPARTMENT OF DEFENSE  
UNITED STATES AIR FORCE  
DIRECTORATE OF WEATHER

and the

NATIONAL CENTER FOR ATMOSPHERIC RESEARCH

for

**WEATHER RESEARCH & FORECAST (WRF) MODEL  
DEVELOPMENT TESTBED CENTER**

31 August 2009

## 1. PURPOSE

This document (hereafter the “Charter”) describes the responsibilities for the operation of the WRF Development Testbed Center (DTC). The Signatories to this document are hereafter referred to as the “Participants”.

Common mesoscale baseline Numerical Weather Prediction (NWP) software, shared by and supported to users in the research and operations communities, is necessary and essential to further the missions of the Participants. Since 1998 the WRF modeling system has been developed under the auspices of the U.S. Weather Research Program (USWRP). WRF meets the needs of the Participants for a common next-generation mesoscale NWP system for research and implementation into operations.

The Participants have determined that the WRF modeling system cannot be sustained as effectively without their mutual participation in a WRF DTC to provide common infrastructure for certain activities needed to perform and support their individual missions. These activities include facilitating research by enabling and maintaining scientific interoperability of diverse model codes managed and supported to users, facilitating operational and research collaborations, and accelerating the transfer of new science and technology from research into operations.

## 2. BACKGROUND

The WRF Program is a joint effort of the Department of Commerce/National Oceanic and Atmospheric Administration/National Weather Service (DoC/NOAA/NWS), the Department of Commerce/National Oceanic and Atmospheric Administration/Office of Oceanic and Atmospheric Research (DoC/NOAA/OAR), the Department of Defense/United States Air Force/Directorate of Weather (DoD/USAF/A3OW), the Department of Defense/United States Navy/Office of the Oceanographer of the Navy (DoD/USN/OON), the Department of Defense/United States Navy/Office of Naval Research (DoD/USN/ONR), the Department of Defense/United States Army/Army Research Laboratory (DoD/USA/ARL), Department of Transportation/Federal Aviation Agency (DoT/FAA) and the National Center for Atmospheric Research (NCAR), which is a federally funded research and development center. The WRF Program is established by the WRF Agreement in Principle (WRF AIP) signed by the above organizations. Under the WRF AIP, each partnering organization is committed to a good-faith best effort to participate in the WRF program, predicated on the assumption of improved capabilities, specific to each party’s unique mission, resulting from cooperative research and development of the WRF system. The WRF AIP provides for cooperative program management by the WRF Executive Oversight Board (WRF ExOB). The WRF ExOB consists of one executive-level voting member from each of the WRF AIP signatory organizations.

The WRF Development Testbed Center was initiated in 2004 as a distributed facility with participating centers (or, nodes) in Boulder, CO, at NCAR and the Global Systems

Division of the Earth System Research Laboratory at NOAA/OAR (NOAA/OAR/ESRL/GSD). The WRF DTC is a focal point where research and operations communities can join together as a diverse team of experts.

The mission of the WRF DTC is:

To test, evaluate, manage, and support common baseline software to users of numerical weather prediction (NWP) models

The objectives of the WRF DTC are to:

- Advance science research by providing the research community an environment that is *functionally similar* to that used in operations to test and evaluate the WRF modeling system, without interfering with actual day-to-day operations and providing that community with state-of-the-art numerical weather prediction systems;
- Reduce the average time required to implement promising codes emerging from the research community by performing the early steps of testing to demonstrate the potential of new science and technologies for possible use in operations;
- Sustain scientific interoperability of the WRF modeling system;
- Manage and support the common baseline of end-to-end WRF software to users, including dynamic cores, physics and data assimilation codes, pre- and post-processors and ensembling codes;
- Establish, maintain and support a community statistical verification and validation system for use by the broad NWP community.

Thus, the fundamental purpose of DTC is to serve as a coordinating mechanism that acts as a bridge between research and operations thereby facilitating the activities of both in pursuit of their own objectives. The DTC is not primarily for performing either research or operations, although its activities may at times contain elements of both. The DTC enables the Participants to better coordinate their respective WRF modeling system activities, thereby reducing duplication of effort and stretching available resources. Each Participant bears the expense of its own participation in the DTC.

### 3. DEVELOPMENT TESTBED CENTER MANAGEMENT PLAN

The WRF DTC management structure is schematically illustrated in Figure 1.

#### A. SUPERSESSION

This Charter supersedes all previous DTC agreements or understandings between the Participants, written or implied.

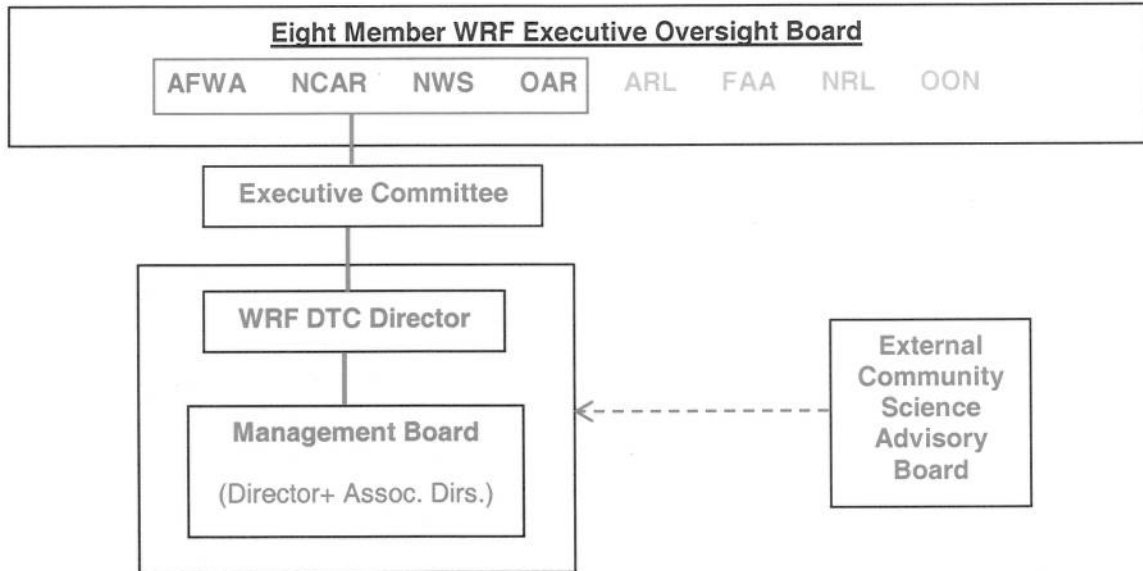


Figure 1. The WRF DTC Management Organization Chart. The shaded area indicates structure established by the Charter. The DTC Executive Committee (see Sec. 3B) represents those Participants also participating in the WRF Program through the WRF Executive Oversight Board (WRF ExOB). The WRF ExOB was established in 2004 by the WRF Agreement in Principle. AFWA denotes the Air Force Weather Agency.

#### B. DTC EXECUTIVE COMMITTEE

Executive oversight for the DTC is provided by the Executive Committee (EC) representing agencies and organizations from both the research and operations units of the modeling community. The EC provides the authority for operation of the WRF DTC on behalf of the Participants. The EC provides overall policy for DTC consistent with that of the WRF Executive Oversight Board (ExOB). It receives and approves the DTC Annual Operating Plan (AOP), the DTC Annual Report, and periodic reviews of the DTC. The EC will receive and approve a proposal for any testing and evaluation (T&E) project requiring more than one year, with annual components described in each successive year's AOP and Annual Report through the duration of the project (see Sec. 3E). The EC is the final approval authority for any unresolved management problems referred by the DTC Director, Deputy Director(s) or Management Board. The EC will meet at least annually to perform business either in person, by phone, and/or electronically. At its discretion, each member of the EC may appoint a Point of Contact (POC) to provide ongoing liaison with the DTC Director between meetings of the EC.

The DTC EC will be responsible for selection of the DTC Director. The initial appointment of the Director will be for a three year term and may be renewed for any number of subsequent three year periods. The Director can be removed at any time by the EC.

The Participants to this DTC Charter each will appoint one executive-level representative to be its voting member on the DTC EC. These individuals may also represent their agencies on the WRF ExOB, but they cannot serve concurrently as DTC Director, DTC Deputy Director(s) or as a member of the DTC Management Board or DTC Science Advisory Board. The WRF Program Coordinator serves as executive secretary for the DTC EC. DTC liaison to the DTC EC is provided by the DTC Director.

### C. RELATIONSHIP TO WRF PROGRAM

DTC is considered a central part of the WRF Program. Policy of the DTC EC is fully integrated into the WRF Program through DTC EC members, who also may sit on the WRF ExOB. The WRF Program Coordinator and DTC Director carry out the respective coordinated policies of the WRF ExOB and DTC EC.

### D. OPERATIONAL MANAGEMENT OF DTC ACTIVITIES

The operational management structure of the DTC includes the DTC Director, DTC Deputy Director(s), DTC Management Board, and DTC Science Advisory Board (AB). DTC activities are organized into four areas: (1) management of the end-to-end baseline WRF community software consisting of Contributed codes and Reference configurations, including all scientific and engineering codes in the WRF code repository, (2) support of the baseline WRF Reference configurations to the NWP community, (3) testing and evaluation of WRF Contributed codes, and (4) administration. WRF contributed codes are those developmental and experimental codes existing in the end-to-end WRF code repository. WRF reference configurations are a limited number of rigorously-tested code versions, drawn or adapted from WRF Contributed codes, of primary interest to research and operational applications and supported to the NWP community as the end-to-end WRF community mesoscale NWP modeling system. Responsibilities and procedures for managing and supporting the WRF code system to users will be documented in the WRF Code Management Plan. Contingent on availability of resources, the DTC may maintain a visiting scientist program whereby scientists in the research and operations communities will be encouraged to participate in the WRF code testing and evaluation activities of DTC.

### E. DTC DIRECTOR

The DTC Director is responsible to the DTC EC for management of the DTC and will be appointed by and accountable to the DTC EC. The Director has final authority on how DTC resources are used to meet DTC objectives. The Director will receive advice from the DTC Science Advisory Board, and the WRF Program Coordinator.

The DTC Director will prepare an Annual Operating Plan (AOP), progress reports and other reports documenting the results of the DTC work program and an Annual Report (AR) to the EC in accordance with EC policy and for EC approval. The AOP will

include a work plan for the coming year listing activities in each strategic area (see Sec. 3D) and an accompanying budget. The DTC Annual Report will document the past year's accomplishments. For code testing and evaluation projects requiring more than one year, the Director will submit a proposal for approval by the EC, with annual components described in each successive year's AOP and Annual Report through the duration of the project.

Administratively, the DTC Director reports to and is evaluated by the Director of his/her center or agency. The DTC EC will provide input to the Director of that center or agency for the annual evaluation of the DTC Director. The EC retains authority to remove the DTC Director.

#### F. DTC DEPUTY DIRECTOR(S) AND MANAGEMENT BOARD

In addition to the Director, each of the Participants may appoint a Deputy Director who will assist the Director with internal management of the DTC. The Director, Deputy Director(s) and an additional member appointed by each of the Participants, will constitute the DTC Management Board. The Management Board will assist the DTC Director in preparing the AOP, the DTC annual budget, the selection of codes for testing and proposals for multi-year code testing and evaluation projects. Management issues unresolved by the Director, Deputy Director(s) and Management Board can be elevated to the DTC EC for resolution.

The Management Board will meet regularly in person, by telecom or by e-mail to chart the direction of the WRF DTC, agree on operational priorities and assign tasks to staff in accordance with the policy of the DTC EC and subject to availability of funds. They also will recommend decisions to the Director on proposals received in response to announcements of opportunity for the DTC visitor program (see section 3.D). A quorum, defined as the Director plus at least one representative from each of the signatories, is required for the Management Board to conduct business.

#### G. DTC SCIENCE ADVISORY BOARD

A DTC Science Advisory Board (AB) will assist the Director in shaping the strategic direction and objectives of the DTC. Each appointment to the AB will be for a term of 3 years and will be subject to the concurrence of the EC. The AB provides advice to the Director on emerging NWP technologies, strategic computer resource issues, selection of code for testing and evaluation, selection of candidates for the visiting scientist program and acts as a sounding board to assist the Director.

The DTC AB will be nominated by the Management Board. Membership on the AB will be representative of the U.S. WRF modeling community. The EC will provide final approval of AB nominations. The AB will meet at least biannually to perform business, either in person, by phone, and/or electronically. The AB may elect one of its members as chairperson to facilitate its business.



#### 4. RESPONSIBILITIES OF THE PARTICIPANTS

The Participants to this Charter are committed to a good-faith best effort to participate in providing oversight for the WRF DTC and to sustain it at a level necessary to fulfill its purpose, contingent on availability of resources. Transfer of resources to support WRF DTC activities will be covered under separate agreements, as appropriate. The Participants retain budget execution authority for funds expended on WRF DTC activities within their respective agencies. Resources provided by each Participant in the form of assigned positions, computing, or funding may be directed at the discretion of that Participant to specific strategic activities (Sec. 3D) it deems consistent with its mission and objectives. Contingent upon availability of funds, all Participants are responsible for DTC administrative expenses arising from, or otherwise related to, their participation in WRF DTC activities.

The Participants are responsible to communicate their organization's environmental modeling policy and priorities to the DTC EC, who coordinate and establish overall DTC policy. In formulating the DTC AOP the Director will account for agency restrictions on resource allocations.

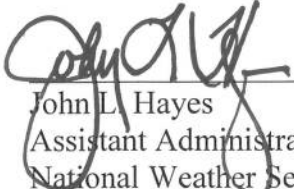
#### 5. PERIOD OF AGREEMENT AND MODIFICATION/TERMINATION


This DTC Governing Charter is effective on the date of the last approval signature. The DTC EC will review this DTC Charter at least once every five years to determine whether it should be revised, renewed, or cancelled. Additional reviews may be conducted as directed by the DTC EC. This Charter may be amended at any time by the DTC EC. The latest date of review or amendment constitutes the new effective date unless some later date is specified.


Any Participant may terminate their participation in this Charter by providing the other Participants notice in writing not less than six months in advance of such termination.

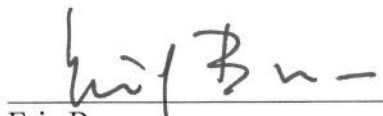
6. SIGNATORIES

Accepted:

 09.11.2009  
Date  
John L. Hayes  
Assistant Administrator for Weather Services  
National Weather Service  
National Oceanic and Atmospheric Administration  
Department of Commerce

 8/31/09  
Date  
Richard W. Spinrad  
Assistant Administrator for Office of Oceanic  
and Atmospheric Research  
National Oceanic and Atmospheric Administration  
Department of Commerce

 15 Sep 09  
Date  
Fred P. Lewis  
Director of Weather  
Directorate of Operations  
Deputy Chief of Staff, Operations, Plans and Requirements  
U.S. Air Force  
Department of Defense

 9-2-09  
Date  
Eric Barron  
Director, National Center for Atmospheric Research  
University Corporation for Atmospheric Research