

## **4. Draft Charters**

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WRF Executive Oversight Board Meeting 2  
30 July 2004

**Charter**  
**WRF Executive Oversight Board**  
**3 August 2004**

**The WRF Executive Oversight Board (ExOB) is the highest level of direct WRF program management and operates in accordance with the WRF Agreement in Principle (AIP). The AIP signatory organizations shall each designate one senior/executive-level voting member.**

**Executive level members are to provide funding and policy authority on behalf of their organizations, while retaining the independence of those organizations' prerogatives. Voting membership of the ExOB may be expanded to include new signatories, as provided for in the AIP. ExOB members may have one non-voting staff assistant, at their invitation, with them at any meeting. In addition, the ExOB can agree to invite additional individuals as it may deem suitable. ExOB members may designate someone to represent and vote for them when they cannot attend a meeting. ExOB meeting deliberations will be "not-for-attribution and privileged information" except as documented in the approved minutes of the ExOB.**

**The ExOB shall have the prerogative to appoint additional non-voting members from non-AIP organizations representing the atmospheric sciences. Such non-voting members may participate at ExOB meetings, but the total shall not exceed one-half of the voting members.**

**The ExOB shall review, modify and approve a coordinated WRF annual operating plan (AOP) and five-year plan (WFYP) and shall commit resources to carry them out. It shall work collaboratively to bring about budget alignment among the participants to meet the joint objectives of the WRF program. The ExOB will also develop or approve an overall management structure for the WRF program that is consistent with efficient management practices. The ExOB shall alter the management structure when necessary to sustain the scope and goals of the WRF program as they may evolve.**

**The ExOB will appoint a Program Coordinator (PC) and the members of the WRF Program Office to assist the PC. The Program Office shall report to the ExOB through the PC. All other WRF-related bodies shall report to the ExOB through the WRF Program Coordinator. In addition, the ExOB will appoint the Chairs and members of the WRF Research Applications Board and WRF Operational Requirements Board.**

**It is the policy of the ExOB that targeted external announced opportunities for WRF research and development activities are open to qualified investigators and organizations with no favor given to persons and organizations participating in WRF planning or management. PIs that propose or are engaged in WRF related research and development are encouraged to be aware of WRF planning and development activities as a resource for current information.**

**It is the policy of the ExOB that service to WRF Boards, committees, etc. shall be for no remuneration, except as expressly approved by the ExOB.**

**Charter  
WRF Program Office**

**12 July 2004**

**The WRF Program Office (PO) consists of the Program Coordinator (PC) and the WRF Institutional Points of Contact (POCs).**

**WRF Program Coordinator (PC)**

**The WRF Program Coordinator (PC) is appointed by and reports to the WRF Executive Oversight Board (ExOB). The WRF PC will continuously oversee the WRF program on behalf of the ExOB. The PC also serves as the executive secretary for the ExOB. The WRF Research Applications Board (WRAB) and the WRF Operational Requirements Board (WORB) report to the PC through their Chairs. In addition, the Development Testbed Center (DTC) reports to the PC through its Director. The WRF PC serves as the Chair of the WRF Program Office (WPO). The PC is appointed for a three-year term by the ExOB and may be reappointed for additional terms at the discretion of the ExOB.**

**The primary function of the PC, working with the POCs, the DTC, the WRAB, the WORB and the various **Development Teams and Working Groups**, is to develop a comprehensive and integrated WRF Five-Year Plan (WFYP) and a WRF Annual Operating Plan (AOP) meeting the needs of the research and government operations communities for submission to the WRF ExOB. The WRF Five-Year Plan will include goals, tasks, resources required to accomplish tasks, and milestones. The WRF Annual Operating Plan will be consistent with the Five-Year Plan, and will include a Plan of Action that specifies organizations and/or individuals responsible for carrying out those elements. It is anticipated that the Five-Year Plan will be updated at least every two years.**

**The PC coordinates continuously among the ExOB, POCs, DTC, WRAB, WORB and other bodies as needed. The PC shall compile WRF research and operational requirements and priorities as documented by the DTC, WRAB and WORB. Once the ExOB has reviewed, modified and approved the WFYP and AOP, the PC shall modify the requirements, priorities and tasks, if necessary, to bring them into balance with the resources committed by the ExOB. The PC coordinates the execution of the Five-Year Plan and the Annual Operating Plan through the WRF POCs. In addition the PC maintains the Annual Operating Plan and milestones for reaching WRF goals and objectives and reports periodically to the ExOB on WRF program status. The PC also maintains the visibility of the WRF program before the atmospheric science community and such other organizations as necessary.**

**Charter  
WRF Program Office  
(CONTINUED)**

**12 July 2004**

**WRF Institutional Points of Contact**

**Each ExOB member may appoint one managerial standing member as its institutional POC in the WRF PO. The appointee for each institution is an integral part of the PO and will serve as the primary point of contact for reporting to the WRF PC regarding implementation of those elements of the WRF Five-Year Plan and Annual Operating Plan for which that institution is chiefly responsible. The POCs will provide reports periodically to the PC on execution of the WRF Five-Year Plan and Annual Operating Plan, including a summary of expenditures relative to budgeted totals and identification of problem areas that could seriously impact the quality of results or timeliness in achieving milestones. The POCs also will be consulted by and will assist and advise the PC on all WRF matters. These include, but are not limited to, review and comment on inputs from the DTC, WRAB and WORB; developing the **AOP and WFYP**; and recommendations for nominations and positions on WRF Boards and Working Groups. The PC shall be the Chair of the PO.**

**Charter**  
**WRF Research Applications Board (WRAB)**

**13 July 2004**

**The Head of the WRAB, nominated by the WRF Program Coordinator (PC), will be a senior scientist recognized for leadership in mesoscale numerical weather prediction research. In addition to the Head, the WRAB membership will consist of the Team Leaders of the research-oriented WRF Development Teams, plus up to six additional members nominated by the Head. WRAB members will be selected for their research expertise and will span a broad cross section of the atmospheric sciences to provide the vision and leadership necessary to sustain WRF as a modeling system for the research community. The Head and members of the WRAB will be appointed by the WRF Executive Oversight Board (ExOB) for three-year terms and may be reappointed. In total, WRAB membership should represent the major U.S. atmospheric science constituencies engaged in peer-reviewed research. The PC, the DTC Director and the Head of the WRF Operations Requirements Board (WORB) are *ex officio* members of the WRAB. The Head of the WRAB is an *ex officio* member of the WORB. Approved minutes of the WRAB will be provided to the WRF Program Office.**

**The primary function of the WRAB is to review trends and emerging science and technologies and to identify and prioritize those elements representing the greatest opportunities for advancing the capabilities of the WRF modeling system for use by the research community. The WRAB will compile its findings biannually by writing a draft report for the Advanced Science and Technologies (AS&T) section of the WRF Five-Year Plan. The AS&T report will focus primarily on forward-looking research that has the potential for enhancing WRF five years or more in the future. A purpose of the AS&T report is to ensure that the WRF system is prepared to exploit future opportunities, should they become practical for model applications. Additionally, the AS&T report can be used by scientists and supporting agencies to help guide atmospheric modeling research that could contribute to the WRF system. For each priority area identified in the AS&T report, the WRAB will describe the potential benefits to WRF system accuracy and capability, the principal development milestones leading to possible entry into the WRF system, an estimate of the level of effort required, and an assessment of the major risks to the development path. The WRAB will solicit input from the WRF Working Groups, through the respective Development Team leaders, to utilize their expertise in addressing future priority directions. Through its Head, the WRAB will assist the PC to integrate the AS&T report into a unified WRF five-year plan.**

**The WRAB reports to the PO through its Head. It is anticipated that the Heads of the WRAB and WORB will interact effectively to prevent duplication of effort, maintain efficient operation of the two bodies, and ensure that both bodies are aware of developments in the other.**

**Charter  
WRF Operations Requirements Board**

**13 July 2004**

**The Head of the WORB, nominated by the WRF Program Coordinator, will be an atmospheric scientist recognized for leadership and significant experience in operational mesoscale numerical weather prediction. The WRF AIP Signatories representing the three U.S. operational centers can each appoint one member to the WORB. The Head of the WORB will nominate at least three additional members, who will be appointed by the WRF Executive Oversight Board (ExOB). In addition, the Team Leader of the WRF Operational Implementation Development Team is a member of the WORB. The Head and members of the WORB will *serve* for three-year terms and may be reappointed. In total, WORB membership should represent the major U.S. atmospheric science constituencies engaged in real time and/or operational forecasting. The PC, the DTC Director, and the Head of the WRF Research Applications Board (WRAB) are *ex officio* members of the WORB. The Head of the WORB is an *ex officio* member of the WRAB. Approved minutes of the WORB will be provided to the WRF Program Office.**

**The primary function of the WORB is to define WRF program requirements necessary for the WRF modeling system to sustain its function as a model for operations and other real-time applications. Requirements are those scientific and technical attributes or standards without which WRF will be unable to function as a viable tool for the operational and real-time forecasting communities. The WORB will review WRF coding and documentation standards developed by the appropriate Working Group(s) and, in concert with the Development Testbed Center (DTC) and Operations Testbed Centers (OTCs), ensure that they are suitable for sustaining WRF as an operational modeling system also used for research applications. The WORB will recommend any changes to those standards for approval by the WRF PC/PO. It shall be the responsibility of the DTC and OTCs to ensure that WRF Reference and Operational codes are compliant with the approved WRF coding and documentation standards.**

**The WORB will identify promising areas of modeling research and technological developments that appear ready or are approaching readiness to be considered for operations. These science codes, algorithms and technologies will be prioritized according to their potential to provide opportunities for advancing the capabilities and accuracy of WRF as a high-fidelity mesoscale, operational modeling system, or by offering improved research opportunities without degrading operational performance.**

**Charter  
WRF Operations Requirements Board**

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**13 July 2004**

**The WORB will compile its findings biannually by writing a draft report for the Requirements and Transitions (R&T) sections of the WRF Five-Year Plan. The R&T report will focus primarily on applied research that has a potential of leading to code suitable for operational implementation in WRF in less than 5 years. It is anticipated that the WORB will work closely with the WRAB, DTC and OTCs in developing the R&T report. The WORB will also solicit input from the WRF Working Groups, as appropriate, through the respective Development Team leaders, to utilize their expertise to identify applied research that potentially can be transitioned for operational implementation.**

**For each priority area identified in the report, the WORB will describe potential benefits to WRF system accuracy and capability, principal development milestones, an assessment of major risks on the development path leading to possible entry into operational systems, and an estimate of the level of effort required up to submission for operational testing. Through its Head, the WORB will assist the PC to integrate the R&T report into a unified WRF five-year plan.**

**The WORB reports to the PO through its Head. It is anticipated that the Heads of the WORB and WRAB will interact effectively to prevent duplication of effort, maintain efficient operation of the two bodies, and ensure that both bodies are aware of developments in the other.**

**Charter**  
**WRF Development Teams/Working Groups**

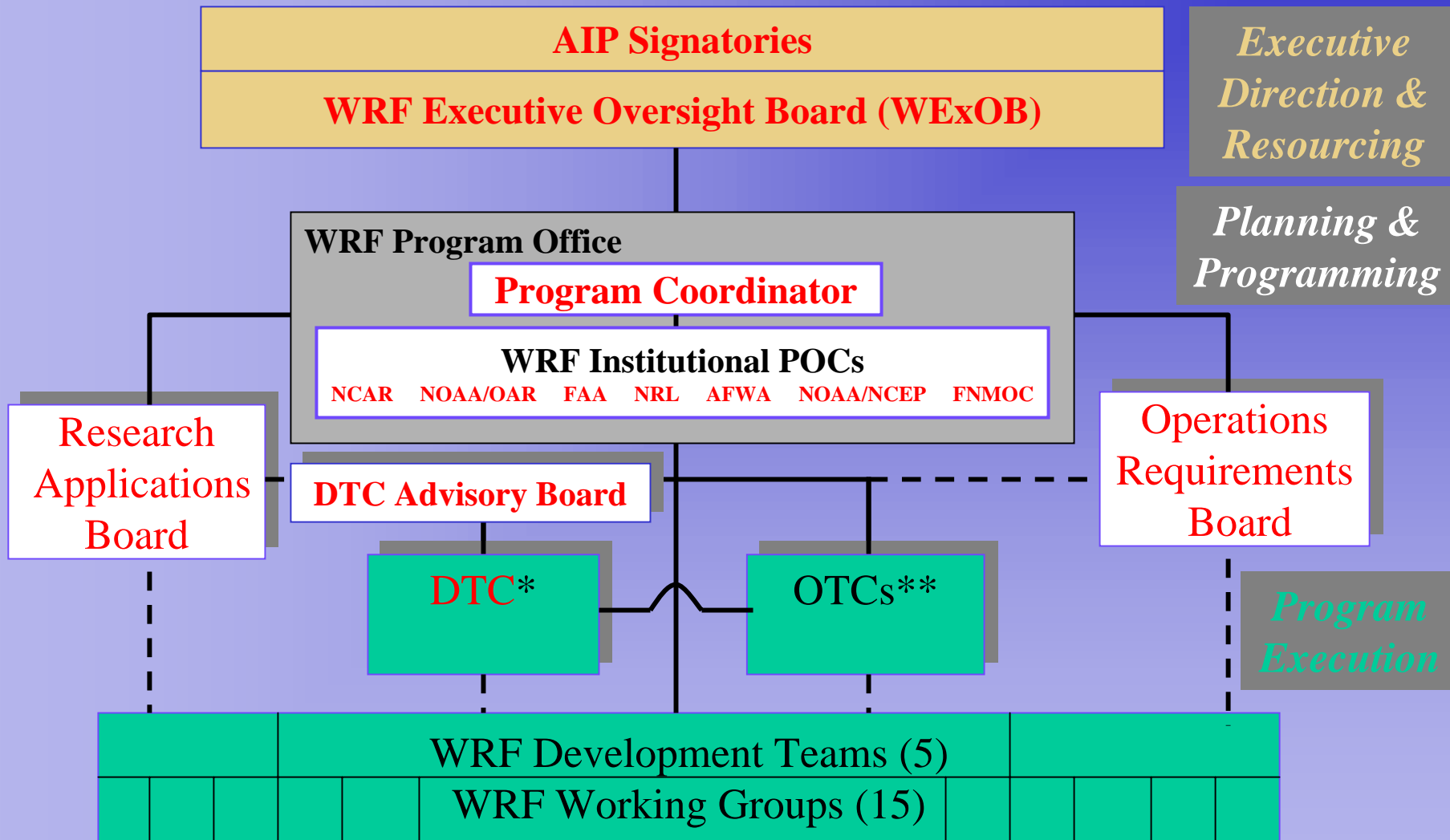
**3 August 2004**

The WRF Working Groups (WGs) will consist of experts representing principal elements of the end-to-end WRF system, and will provide guidance to the broader WRF effort on technical aspects of model development and testing in their respective areas of expertise. The WGs will facilitate development activities in their specialty areas by soliciting input from their segment (or related segments) of the atmospheric science community, disseminating information to promote interactions among developers and coordinating contributions from community researchers. The WGs will also assist the PC and the Chairs of the WRAB and WORB in the planning and guidance of emerging WRF development projects within their respective areas. In this capacity, they may identify priority directions for future development, recommend design strategies, and estimate resource requirements for significant development tasks. WGs may also provide guidance to the DTC for the testing and evaluation of contributed codes.

To help coordinate activities among the WGs, the individual WGs are organized into Development Teams representing (currently five) major project areas. **WRF WGs will be led by co-chairs, including one from the university community.** WRF Development Team Leaders are **nominated by the appropriate Head of either the WRAB or WORB and are** appointed by the PC to organize, coordinate, and oversee the activities of the Working Groups within their team. Team Leaders have responsibility for nominating the membership and **co-chairs** of working groups within that team, who will be appointed by a majority (2 of 3) of the PC and Chairs of the WRAB and WORB. The WG **co-chairs** may recommend changes in the WG membership to the Development Team leaders, as appropriate. New WGs will be created and older ones dissolved as needed to represent emerging areas of science, technology and operations that the WRF system must be able to address. Creation and dissolution of WRF WGs will be proposed by Development Team Leaders, and confirmed by a majority (2 of 3) of the PC and Chairs of the WRAB and WORB.

The size of the individual WGs shall be sufficient to represent a cross section of available expertise from the research and operational communities as appropriate. WG members will be appointed for three-year terms, and can be re-appointed for subsequent terms. WG **co-chairs** will be appointed for three-year terms that are renewable at the discretion of the Team Leader. The WGs will provide input to the WRAB and/or WORB through the PC or Team Leaders, as appropriate. Development Team Leaders will be appointed for three-year terms and can be re-appointed.

# WRF Management Structure



\* Note – The DTC is a distributed capability, centered in Boulder, CO

\*\* Note – separate OTC functions exist for each OPC

# WRF Development Teams and Working Groups

Numerics and Software (J. Klemp)	Data Assimilation (C. Bishop)	Analysis and Validation (K. Droegemeier)	Community Involvement (W. Kuo)	Operational Implementation (G. DiMego)
Dynamic Model Numerics (W. Skamarock) WG1	Standard Initialization (W. Wang) WG3	Analysis and Visualization (M. Stoelinga) WG6	Workshops, Distribution, and Support (J. Dudhia) WG8	Data Handling and Archive (G. DiMego) WG12
			Model Physics (J. Brown) WG5	
Software Architecture, Standards, and Implementation (J. Michalakes) WG2	3-D Var (J. Derber) WG4	Model Testing and Verification (C. Davis) WG7	Atmospheric Chemistry (G. Grell) WG11	Operational Requirements (G. DiMego) WG9
			Land Surface Models (J. Wegiel) WG14	Operational Forecaster Training (T. Spangler) WG15
	Advanced Techniques (D. Barker) WG10	Ensemble Forecasting (D. Stensrud) WG13	Regional Climate Modeling (R. Leung) WG16	

# Summary of WRF Appointments

<u>Position</u>	<u>...is/are nominated by</u>	<u>...is/are appointed by</u>
ExOB members		parent signatory org.
PC		ExOB
PO		ExOB members
WRAB Head	PC	ExOB
WORB Head	PC	ExOB
WRAB members	WRAB Head	ExOB
WORB members (A) (B)	3 by WORB Head	ExOB 3 by OPC signatories
Dev. Team Leaders	WRAB or WORB Head	PC
WG Heads & members	Dev. Team Leaders	2/3 of PC, WRAB Head, & WORB Head