

Minutes
WRF Executive Oversight Board
Meeting 2
Silver Spring, MD
30 July 2004

1. **Attendees:** Robert Winokur, Gloria Kulesa, Louis Uccellini, , Jack Hayes, Eric Hartwig, Alexander MacDonald, Tim Killeen, John Lanicci, William Curry, Nelson Seaman, Robert Gall, Mark Surmeier, Karen Heffner, Fred Toepfer.

2. **Briefing 1: Welcoming Remarks and Introduction:**

- Jack Hayes reviewed the WRF vision and the rapid expansion of the WRF user community, workshops and training sessions. The brief listed several key accomplishments of the WRF program and collaboration, and summarized some areas requiring further work to meet established goals.

Action Item 2.1 for PC: Modify Slide 2.1.5: Add “creation of the DTC and the DoD Operational Testbed Center” as a **key accomplishment** of WRF.

- Navy N61 (R. Winokur) asked what the WRF initial operational capability (IOC) will be at NCEP and how it will differ from the current operational capability? L. Uccellini answered that WRF implementation would occur in stages over the next several years. The IOC, scheduled for 1 October 2004, will employ both existing dynamical cores of WRF running in NCEP’s High-Resolution Window domains. Future milestones include replacement of the 12-km Eta by a 10-12 km WRF, scheduled for 1 October 2005, followed by staged replacement of other NCEP regional models by WRF.

3. **Briefing 2: Overview of WRF Program Status**

- Nelson Seaman presented the WRF Program Status Briefing. The brief reviewed the WRF three-phase program and listed the goals of Phase 1, with threshold and objective measures of progress. The brief pointed out which threshold and objective tasks have been met over the past 6 months, which are on track for their anticipated completion dates, and which are pending or have a “to be determined” (TBD) status.
- Navy N61 (R. Winokur) asked whether specific timelines have been defined for the three phases of the WRF program, and whether or not they proceed sequentially? The answer, by J. Hayes and N. Seaman, was that definition of WRF as a three-phase program emerged gradually through several years of WRF

development efforts. The phases are not strictly sequential, but are mostly a matter of emphasis, with a good deal of overlap. Presently, we are executing primarily Phase 1 tasks, although some Phase 2 activities are already underway. L. Uccellini pointed out that planning for alignment of WRF with global modeling (a Phase 3 activity) needs to begin soon due to ESMF developments. T. Killeen asked whether the Phase 2 definition of sustaining WRF meant that nothing new would occur? N. Seaman replied that sustaining WRF refers to using the collaborations, the Development Testbed Center (DTC) and the Operational Testbed Centers (OTCs) to continually infuse new science and technologies into WRF and to address deficiencies in the Phase 1 system so that WRF can be maintained as a cutting-edge research model and a state-of-the-art operational model for many years.

- R. Winokur asked who is working full-time on WRF? At what point does WRF become a real program? Replies from L. Uccellini, N. Seaman, and T. Killeen indicated that NCEP, NCAR, FSL and others have been and are investing over \$8/year in WRF, with personnel representing most of that total. This led to a general discussion and a consensus that WRF already is a program, although it does not currently operate through pooled resources controlled by an interagency program office. T. Killeen said that, although coordination of resources and plans is good, the WRF partners need to become better organized and make a better case for increased funding needed to carry WRF forward, not just in Phase 1, but in Phases 2 and 3.
- N61 representative (R. Winokur) indicated that funds for establishing input/output interoperability and physics interoperability between WRF and COAMPS have been made available to NRL and the TBDs on Slide 2.2.5 need to be changed to specific FY05 dates. Assessment and planning for these tasks needs to be made to define dates for completion.

Action Item 2.2 for FNMOC and NRL-Monterey POCs:

Provide PC **FY05 dates by which I/O and physics interoperability will be established** between WRF and COAMPS. Define requirements for completion of these tasks and coordinate with partners, as needed.

Action Item 2.3 for PC: Modify slide 2.2.5: Physics interoperability should be listed as a *threshold* capability in Goal 1a of Phase 1, instead of an objective. Insert milestone dates for I/O and physics interoperability provided by FNMOC and NRL, as per Action Item 2.2.

- NCAR (Tim Killeen) asked who is responsible for getting NMM into WRF and releasing it to the community? N. Seaman replied that John Michalakes of NCAR has primary responsibility, supported by Tom Black, Gopal, and Matt Pyle of NCEP. T. Killeen asked does NCEP need to identify new funds to support its WRF goals? L. Uccellini replied yes, particularly for the NCEP OTC. Dr. Uccellini also said that NCEP must identify a leader for the OTC.

- Referring to Slide 2.2.8, Eric Hartwig asked what is the definition of “WRF-based COAMPS” and “WRF-COAMPS”? N. Seaman replied that, based on discussions with NRL-Monterey and FNMOC, these interchangeable terms will refer minimally to a configuration of the WRF modeling software that runs COAMPS physics, performs WRF-driven I/O that is either in standard WRF or COAMPS formats, and uses a WRF core, all of which are run under the WRF engineering infrastructure. By “WRF core” is meant either of the two existing dynamical cores in the WRF infrastructure, or in the future, may include the COAMPS core migrated inside that infrastructure. Since the COAMPS core is not expected to be necessary to produce forecasts that are essentially COAMPS-like in their content, migration of the core into the WRF infrastructure is not a requirement for a model to be “WRF-COAMPS.” It is expected that much testing will be needed to confirm that a WRF-COAMPS solution generated with another WRF core does produce forecasts that are essentially similar to the current stand-alone COAMPS.
- Nelson Seaman summarized steps underway to overcome the critical deficiency related to complexity and supportability of the WRF software engineering infrastructure, referring to Slides 2.2.11-17. E. Hartwig expressed concern that the cost associated with support of the current infrastructure might prove too great. The ExOB discussed the potential advantages of a second streamlined infrastructure. N. Seaman explained that the first steps would require an interagency team to define the requirements for a streamlined infrastructure and then have a qualified software engineer prepare a design. Once the design was reviewed, it would be possible to estimate the resources and time necessary to produce the streamlined infrastructure. At that point a decision would have to be made whether to commit those resources or seek an alternative solution. Meanwhile, collaborative work by several partner organizations and two universities to document the software engineering infrastructure is continuing. A draft copy of the documentation is expected to be by early October and a final version by the beginning of January 2005.

Action Item 2.4 for PC: Convene an interagency team to **define requirements for a streamlined WRF software engineering infrastructure** meeting the goals of reduced complexity, low computational overhead, and less-expensive supportability, compared to the current infrastructure. **Produce a design** for meeting the established requirements, **estimate time and resources** needed to implement, and report results to the ExOB.

4. Briefing 3: Status of Action Items

- In the interest of time N. Seaman suggested that a detailed review of the action-item briefing slides was not necessary. Most action items from ExOB Meeting 1, 1 Dec 2004, have been closed. Those remaining open are either being worked

according to an established plan and/or will be discussed in more detail here in Meeting 2. ExOB agreed to dispense with formal review of old action items.

5. Briefing 4: Draft Charters

- N. Seaman introduced the WRF Management charters, indicating that all have been reviewed by the Program Office, several ExOB members, and Heads of DTC, WRF Research Applications Board and Operations Requirements Board. Charters for most of the Boards are in good shape, but discussions centered on the charter for Working Groups. E. Hartwig was concerned that the WG structure was unmanageable due to large number of groups and individuals. It was explained that the WGs are primarily advisory panels, some working well, others not.
- The charters were approved by the ExOB.
- Several action items emerged from the discussion.

Action Item 2.5 for PC: Modify WRF Management Slide 2.4.9: Add a box directly above the DTC box to indicate the DTC Advisory Board. In the Program Office box, change “OON” to “FNMOC”.

Action Item 2.6 for PC: For all future WRF ExOB meetings, PC shall **invite, as non-voting participants, the Heads of the DTC, OTCs, WRAB and WORB.**

Action Item 2.7 for PC: The **charter** for the WRF ExOB will be amended to say, “In addition, the **ExOB can agree to invite additional individuals** as it may deem suitable.”

Action Item 2.8 for PC: All **positions** on the WRF Boards, Development Teams and Working Groups **will be filled** in accordance with the Charters.

Action Item 2.9 for PC: Modify the **WG charter** to indicate **Co-chairs** will be appointed to lead the groups, one from the signatory organizations and one from academic institutions to provide leadership opportunities for junior faculty.

Action Item 2.10 for PC: Prepare for the ExOB a proposal for **reorganizing the WGs**, creating new ones and consolidating or eliminating others, as necessary.

6. Briefing 5: Overview of DTC Status and Annual Operating Plan

- Robert Gall presented a briefing on the vision, goals and organization of the DTC. This was followed by an annual operating plan that summarized the main projects to be undertaken in FY05. The briefing concluded with a long-term plan for phased implementation of the DTC and an estimate of eventual staffing and budget at maturity.

Action Item 2.11 for Eric Hartwig, NRL: Modify Slide 5.8:

Propose modifications for this slide to better capture the concept of the DTC as it is envisioned.

- A Terms of Reference document has been drafted and is being negotiated between NCAR, NOAA/OAR and NRL, as hosts of the distributed DTC components.

Action Item 2.12 for DTC Director: Finalize the wording of the **DTC TOR** and secure the signatures of the WRF ExOB members or another suitable executive on behalf of the AIP signatory agencies and institutions.

- The ExOB noted the powerful message that results from the successful collaborations that have emerged from the WRF program and which are now being invigorated by creation of an active DTC working in conjunction with research and operational centers. It was agreed that this message must be articulated to top agency officials in order to build support for the WRF program and expand resourcing.

Action Item 2.13 for PC and DTC Director: Create a briefing for the ExOB demonstrating the **successes of the DTC and WRF** program, aimed at high-level administrators not currently well informed about WRF. Highlight expectation of accelerated implementation of unprecedented high-resolution, more accurate numerical predictions for service to the nation.

Action Item 2.14 for DTC Director: Invite Pete Manousos (301-763-8000, Ext 7307, peter.manousos@noaa.gov) to participate in telecons involving the DTC's Winter Experiment in order to coordinate with NCEP's planned Winter Experiment.

7. Briefing 6: Integrated WRF Annual Operating Plan for FY05

- Nelson Seaman presented a preliminary FY05 Annual Operating Plan for the interagency WRF program. The tasks and milestones, listed according to the Phase 1 goals of the program, are those that the signatory agencies have already agreed to. At this point, the AOP lacks specificity regarding FTE commitments

and funding levels. The Program Office POCs will be contacted for this information.

- Starting from the AOP brief, the ExOB discussed how best to expand beyond the year-to-year issues to develop WRF as a long-range program. Currently, many of the agencies do not have dedicated WRF funding, making long-range planning difficult. J. Hayes said his goal at the Office of Sci. & Tech. is to raise WRF to become a budgeted line item in the NWS appropriations for FY07. Other agencies were encouraged to follow suit. R. Winokur said the ExOB needs to prepare a plan for transitioning WRF into a more ideal full-scale program that includes resourcing and an interagency program office. The ExOB consensus was in agreement that the concept of establishing an interagency WRF program should be studied and a proposal developed. Creating a formal WRF program would likely be on the basis of a new memorandum of understanding or another suitable documented agreement.

Action Item 2.15 for PO: POCs provide the PC with necessary information on FY05 **WRF-related tasks, FTE commitments, funding levels**, and milestones to complete the Integrated WRF AOP for FY05.

Action Item 2.16 for PC: **Remove fine-scale detail** in the FY05 AOP that does not relate directly to the identified threshold and objective criteria for established program goals. **Add 3D-VAR** activity and missing components from Action Item 2.15. **Submit the revised plan** to the ExOB for approval.

Action Item 2.17 for PC, PO and ExOB: Draft and submit to ExOB a **plan for transitioning WRF to a full-scale interagency program** by FY08, including dedicated common resourcing. The plan may require developing a memorandum of agreement to replace the current WRF AIP as the defining document for the WRF partnership.

Action Item 2.18 for ExOB: **Review and provide feedback** on draft plan for transitioning WRF to a full interagency program by FY08, including dedicated common resourcing.

8. Brief 7: Other Action Items for ExOB

- The PC explained that inclusion of university scientists on the WRF Research Applications Board (WRAB) necessitates travel support for up to 2 meetings per year. The ExOB was asked to share, on an approximately equal basis, the travel costs for WRAB members without other means of participating in meetings. The annual cost is estimated to be no more than \$12-14 K, or ~\$2 K per agency. The ExOB agreed to provide this supplementary **travel support for university**

WRAB members. NOAA/NWS/OST and NCEP agreed to be the supporter of last resort in order to expedite the arrangements.

Action Item 2.19 for PC: Arrange for **logistics** to support travel to meetings by university members of the WRAB.

- The PC asked for approval of a plan to provide the ExOB with **monthly reports**, in concise “bullet” format, on the status and activities of the WRF program. The ExOB agreed. This closes Action Item 1.4 from the previous meeting.

Action Item 2.20 for PC: Provide **brief monthly reports** on WRF program activities in bullet format.

- The PC explained that the WRF name currently has no trademark and is therefore vulnerable to being trademarked by anyone. This could force WRF to change its name or else pay (possibly hundreds of thousands of dollars) to buy back the rights to the name. The proposed solution is to have one of the signatories trademark the name, and then have that agency formally provide the other signatories with an equal share of the trademark rights. This will protect WRF from future threats related to the name rights.

Action Item 2.21 for NCAR POC: The NCAR POC, as its technical and managerial representative, will take the necessary steps to **secure the trademark rights to the WRF name.**

Action Item 2.22 for PC: Arrange for **ExOB meetings every 4 months.**

Action Item 2.23 for NRL & AFWA: NRL-DC will host **next ExOB meeting** (nominally in Nov or Dec), with the following meeting to be hosted by AFWA (nominally in Mar or Apr).