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WRF

Development Test Center

A NOAA Perspective

WRF ExOB Meeting

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Fred Toepfer
NOAA Environmental Modeling
Program Manager



Outline

- Purpose
- WRF Overview – A NOAA Perspective
- NOAA Vision for WRF and DTC
- Challenges
 - Program Management
 - Development Test Center
- NOAA's Commitment



Purpose

- Present a NOAA perspective on the purpose and rationale for a WRF Development Test Center
- Begin substantive discussions toward a partnership agreement for viable, efficient, effective DTC meeting the needs of both the operational and research communities in the US



NOAA's Weather and Water Mission Goal

- **Serve the needs of its customers by becoming the nation's first choice for its Weather and Water Information**
- The growing need for improving NOAA's forecast and warning services to meet the national need is driving the need to improve our model forecast at an accelerated rate.
- With limited resources, NOAA must invest those resources to maximize the return on its investment by
 - Leveraging the broader US investment in science and technology
 - Focus its direct investment where the need is greatest



Strategy for meeting NOAA's future NWP needs

- Accelerate the pace of moving new science from research to operations.
- More effectively identify and harvest advancements emerging from the research community.
- Increase the total effort applied throughout the NWP community toward evaluating and improving operational models.
- Leverage efforts of other parts of the community, both in research and operations, to improve weather forecasts.

For NOAA, WRF and WRF DTC are key to implementing this strategy



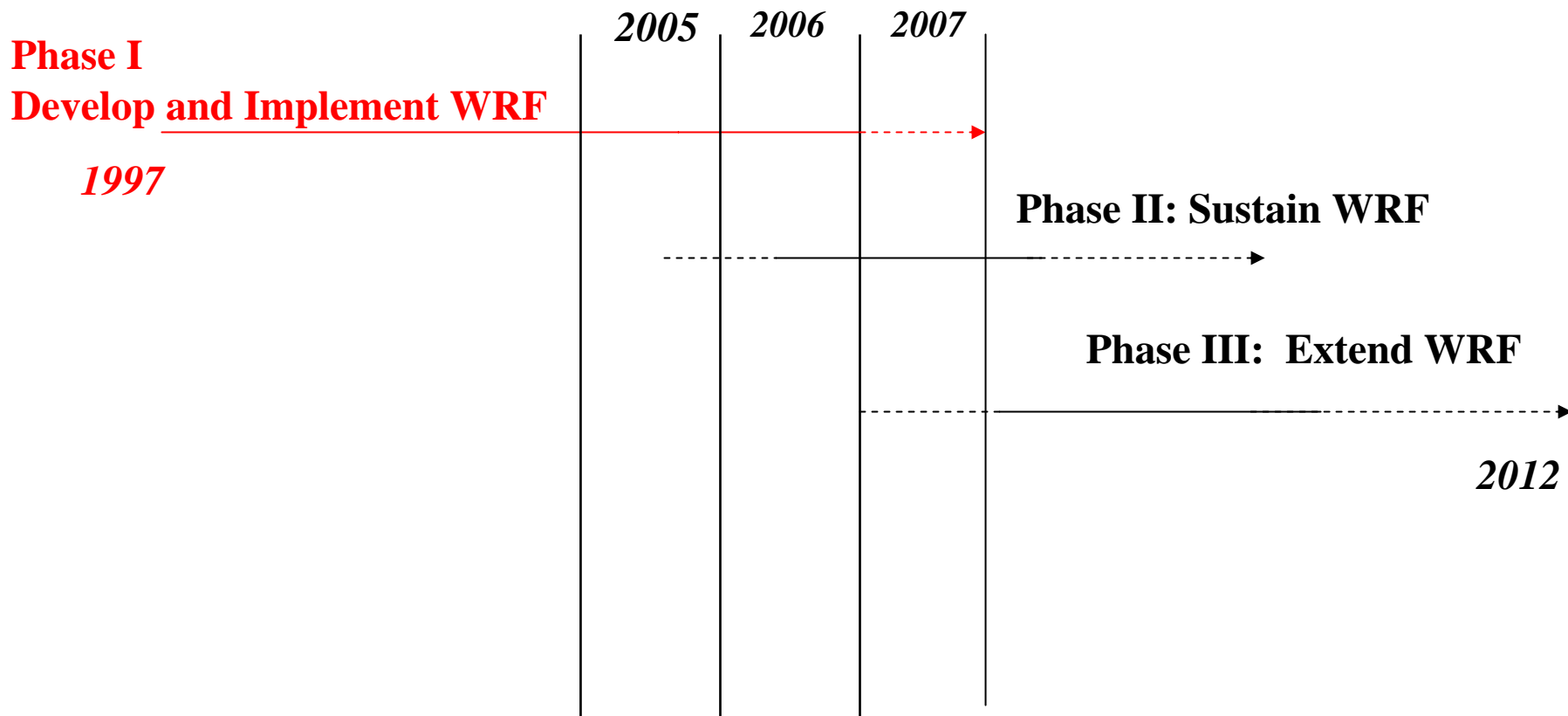
The WRF Vision

A science partnership to create and sustain...

- The **next-generation mesoscale NWP modeling system** for research and operations
- A **common modeling infrastructure** that facilitates operational NWP collaboration and interoperability, and accelerates transfer of new science from research into operations
- A **repeatable process** that continuously infuses innovative capabilities into the community mesoscale NWP model



WRF: Three-Phase Strategy





WRF Phase 1 Goals

- 1. Establish a common modeling (a.) software and (b.) organizational infrastructures** to facilitate inter-organizational collaboration for the development and transfer of new science into a common WRF modeling system for research and operations
- 2. Release and support WRF** as the next-generation mesoscale NWP modeling system **supported to the research community**
- 3. Implement WRF** model and infrastructure as the next-generation mesoscale NWP modeling system used **in operations**
- 4. Create a sustainable repeatable process** that facilitates inter-organizational collaboration to develop and transfer new science into the common mesoscale NWP modeling infrastructure
- 5. Develop a plan for Phases 2 and 3**

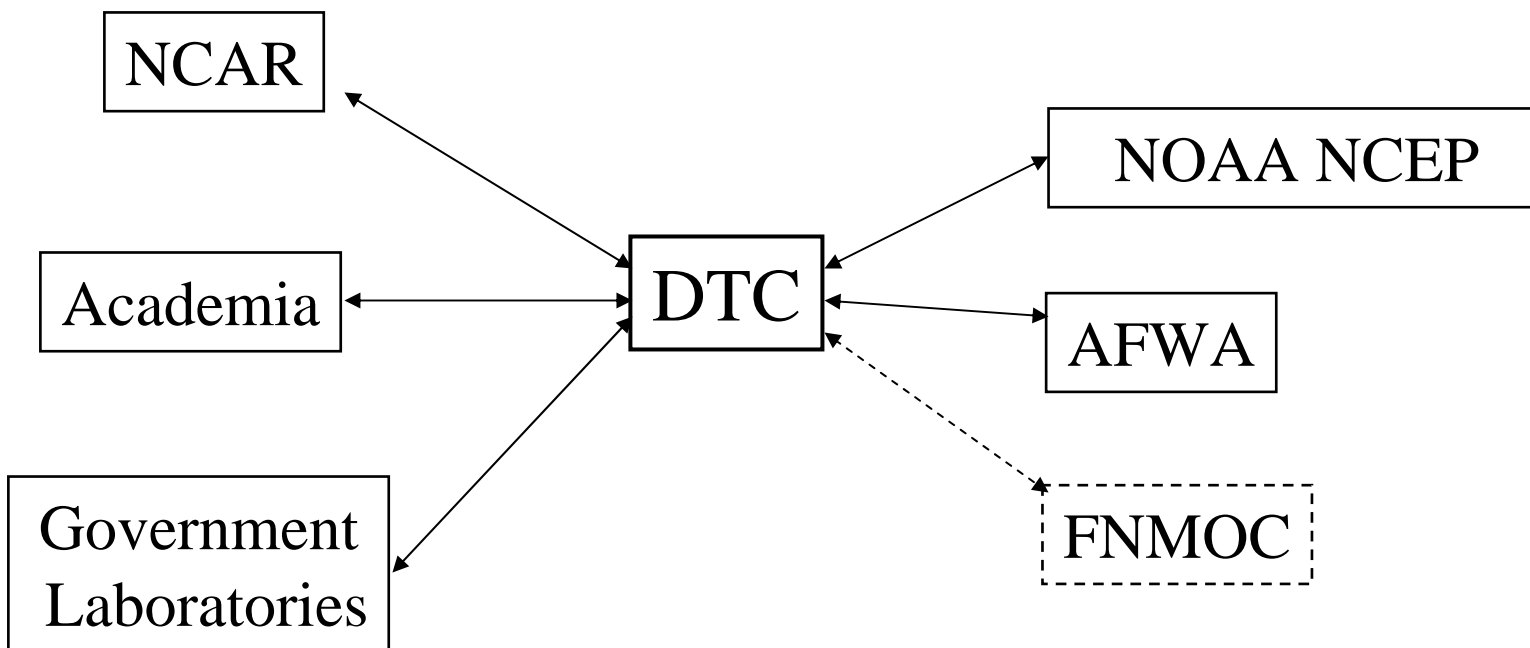
Are we ready to move to Phase 2?



Advantages of WRF Modeling System to NOAA

- **Better Science**
 - *Non-hydrostatic dynamics*
 - *Finer resolutions (< 12km) possible*
 - *Improved forecast guidance for applications where convection dominates (e.g. hurricane intensity)*
- **End-to-end interoperability** of WRF cores, physics, and Data Assimilation
 - *Enables model diverse ensembles*
- **Unify global and regional codes** for data assimilation and physical parameterizations
 - *Reduces future development and O&M costs*
- **Code consolidation** for all regional applications (replaces Eta, RSM, GFDL hurricane model and RUC)
 - *Reduces future development and O&M costs*
- **Accelerated flow of new science and technology** into operations
 - *Broader scientific community as a research and development team*

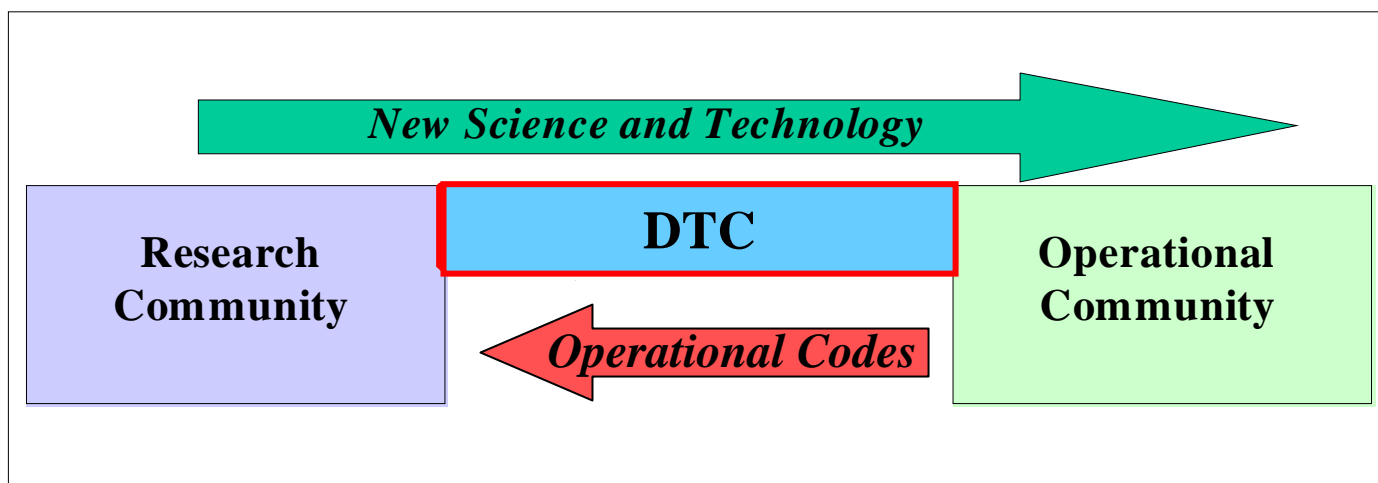
WRF Infrastructure



**DTC... supports WRF to the Research Community;
supports the acceleration of research into operational models**

Purpose of DTC

- The **fundamental purpose** of the DTC
 - is to serve as a **bridge** between research and operations
- DTC is not intended as a facility for performing
 - either research or operations,
 - although its activities may at times contain elements of both.





NOAA's Vision for a DTC

- Support WRF modeling system to Nation's research Community
- Manage WRF Community Code
- Assess research "harvest" for recommended improvements to operational models
- Evolve WRF system supported to community to incorporate
 - Operational improvements
 - Research Improvements



Challenge

Program Management

- Challenge: Develop effective Program Management Organization
- Discussion: Multiple Agencies, multiple agendas and multiple priorities have lead to increased development risk; Long-term resource commitment necessary for program success.
- Resolution:
Formal Program Agreement at Agency head level that can steer the partnership effectively that
 1. Establishes common baselines to support shared funding commitments
 2. Establishes role and authority of “program manager”
 3. Sets future direction of Program



Challenge DTC



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- Challenge: DTC is under-resourced and not well structured
 - Discussion: DTC is the critical link to reaping the benefits of the WRF Program. Without DTC – Advantages of WRF Program are significantly minimized
 - Response:
 1. Develop and execute Inter-agency Agreement that:
 1. Codifies role of DTC as WRF support facility, including transition to operations
 2. Ensures equitable support for WRF DTC among benefiting partners
 2. NOAA's Environmental Modeling Program is working to establish funding line for DTC



NOAA is Ready to Proceed!

- NOAA is ready to commit substantial support as part of a cost-sharing arrangement for the DTC
 - Funding
 - Computing Resources
- NOAA is ready to negotiate and enter into a partnership agreement with our WRF partners to:
 - Empower a WRF Program manager and DTC Director
 - Develop and implement an organized, viable, accountable DTC organization that meets both operational and research needs.



Back-up



WRF Three-phase Strategy

- **Phase 1**: Develop and implement WRF as the next-generation mesoscale **NWP modeling system, infrastructure and process by...**
 - Activating collaborations between research and operations
 - Streamlining transfer of new science into research and operations
- **Phase 2**: Use the WRF process and infrastructure to **sustain the flow of new science and technology** into the mesoscale WRF modeling system
- **Phase 3**: **Extend the WRF process** to other modeling areas of interest—e.g., Ocean modeling, Global modeling, Diagnostic and Statistical post-processing

Are we ready to move to Phase 2



NOAA's Investment Options

- **NOAA maximizes its long-term productivity by diversifying and balancing its R & D investments among the three options**
 - **In-house R & D**
 - **Targeted exterior R & D** to fill specific identified gaps
 - **Bridge-building activities to R&D Community**
 - that enable NOAA to efficiently harvest R & D investments, including those of other agencies. (E.g., **DTC**)