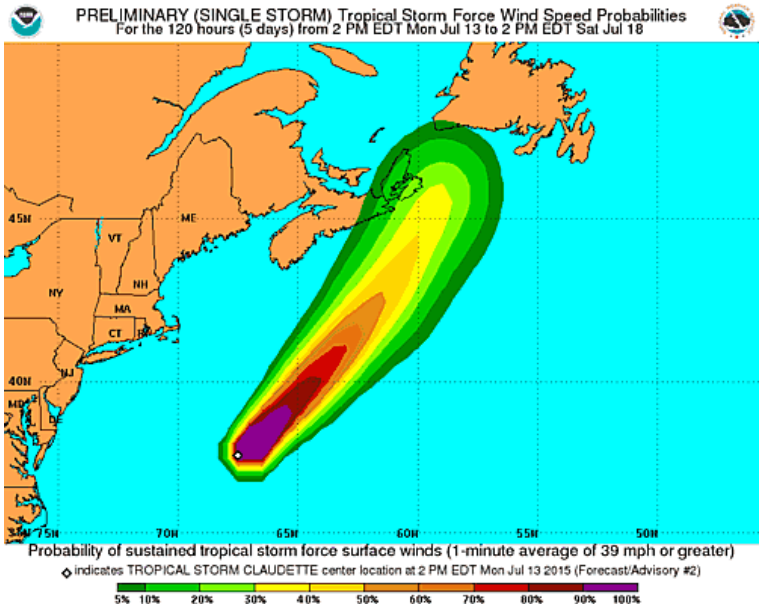
# Next Generation Global Prediction System (NGGPS)

## Annual Meeting

July 14-15 2015




## Welcome

Fred Toepfer, NGGPS Project Manager

# NGGPS Meeting Agenda

- Welcome
- EMC Welcome
- NGGPS Status
- Team Plan Presentations
- Team Breakout/Cross Team Discussions

# NWS R2O Initiative Overview

Multi-year effort to:

- Design Develop and Implement a Next-Generation Global Prediction System **(NGGPS)** for the NWS
- Position NWS for the next-generation High Performance Computing
- Continue Improvements in hurricane warning prediction (in conjunction with HFIP)

# NGGPS Over-Arching Objectives

- Re-establish US as the World leader in Global Weather Prediction
  - Extend forecast skill beyond 8 to 10 days
  - Improve hurricane track and intensity forecast
- Extend Weather Forecast to 30 days
  - Implement  a fully-coupled NWP System Atmosphere, Ocean, Sea Ice, Land Surface, Waves, Aerosols and Atmospheric Composition
  - Support development of products for weeks 3 and 4
- Support unification of the NWS Numerical Weather Prediction Suite
- 5-year Community Effort

# Over-Arching NGGPS Strategy

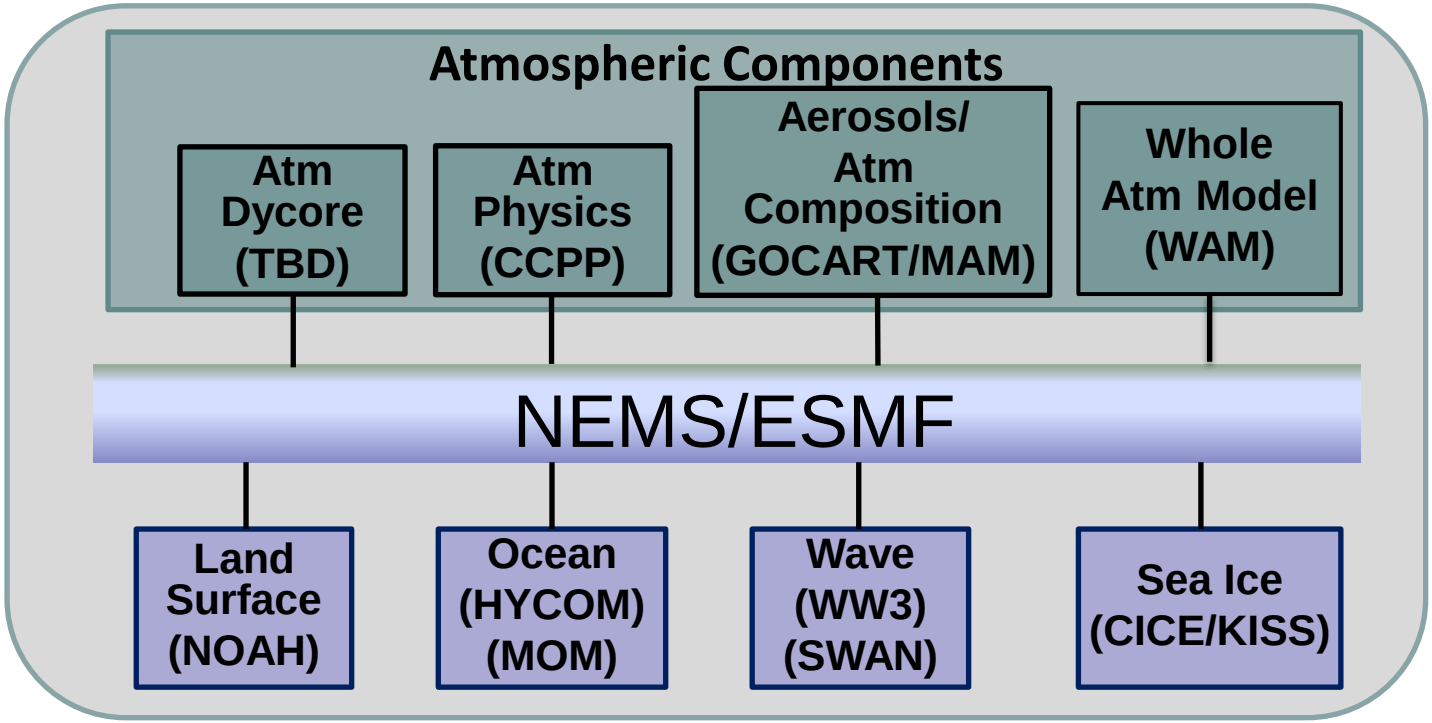
- Implement Multi-year NWS-led community effort to build and implement
  - Future global prediction system supporting multiple forecast applications at NCEP
  - Community codes
- Accelerate Forecast Performance Improvement through accelerated Research to Operations
  - Implement a Global Modeling Test Bed
  - Community Codes supporting both R&D and operations
- Overall system designed (re-architected) to take advantage of evolving HPC architectures (CPU/GPU Hybrid or Massively Integrated Cores (MIC))
  - Highly scalable
  - Adapt to continued evolution of HPC

# NGGPS Development Strategy

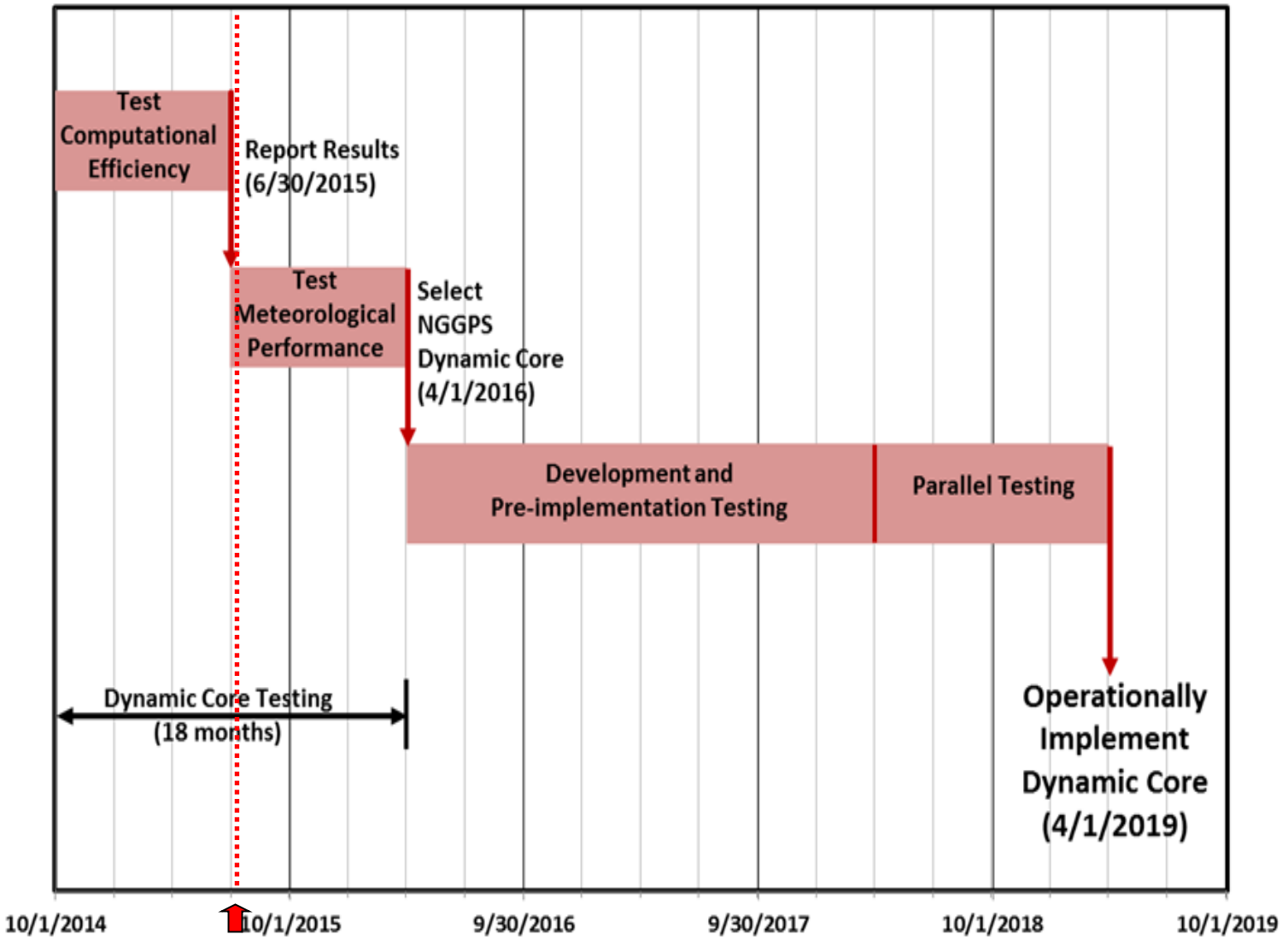
- Establish Planning and Implementation Teams
  - Community participation through external grants to universities, support to test beds, and broad laboratory participation
  - Establish software engineering and infrastructure support at EMC
- Select a future atmospheric dynamic core from existing research and operational models
- Define Community Code Baseline (where doesn't already exist) for NGGPS components, including NEMS
- Begin conversion of GFS Physics package into the Common Community Physics Package
- Establish Global Modeling Test Bed
- Extend NEMS infrastructure to include sea ice, ocean, wave, land surface, and aerosol and atmospheric composition model components
- Demonstration of a fully coupled system

# NGGPS Description

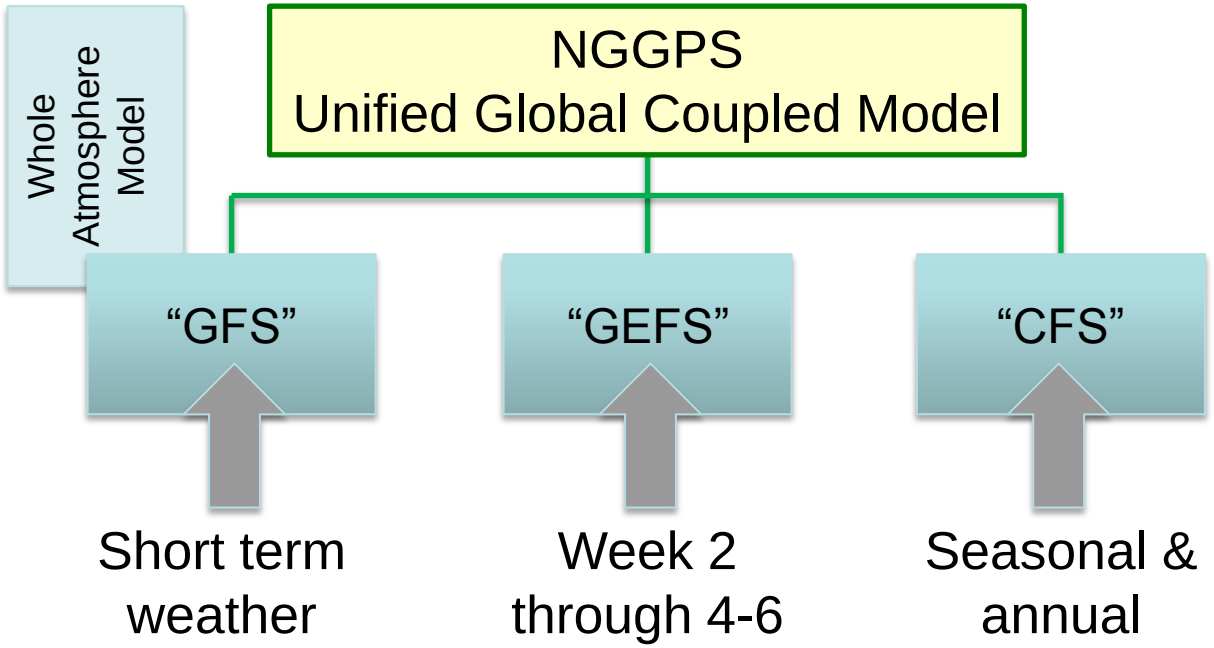
- Fully coupled (ocean, waves, sea ice, land surface, atmosphere, aerosols) system
- Built using NEMS/Earth System Modeling Framework
- Each component model will be community code



# Atmospheric Dynamic Core Development Schedule



# NGGPS
# Operational Application




Application
=
Ensemble
+
Reanalysis
+
Reforecast

| | | | |
|---|---|---|---|
| 1 y | 2 y | 4 y | **Update cycle** |
| 3 y | 20-25 y | 1979 - present | **Reanalysis** |
| 6h | 6-24h | ??? | **cycling** |
| WCOSS | WCOSS | WCOSS ? | **where** |

Research needs to fit into strategy

From Hendrik Tolman

# Meeting Objectives

- Review and Update 5-year Development Plans for NGGPS Components Codes
- Prioritize near term activities
- Initiate development of Annual Operating Plan for FY16
  - Objectives
  - Activities

# Summary

- Moving forward on NGGPS Implementation Plan revision, re-alignment of team plans, and identification of priorities
- Coordinating proposal driven scientific development by universities, federal labs, and testbeds (integrated in team plans)
  - Focus on accelerated development of model components
- Dynamic core testing underway with final decision anticipated spring 2016
- Physics development plan – developing GFS physics package/driver for both Phase 2 testing and community code

# Questions?

NGGPS Website:

http://www.nws.noaa.gov/ost/nggps