

# Some perspectives from EMC on the UFS and SIP Activities

UFS/SIP Coordination Meeting  
May 14, 2019

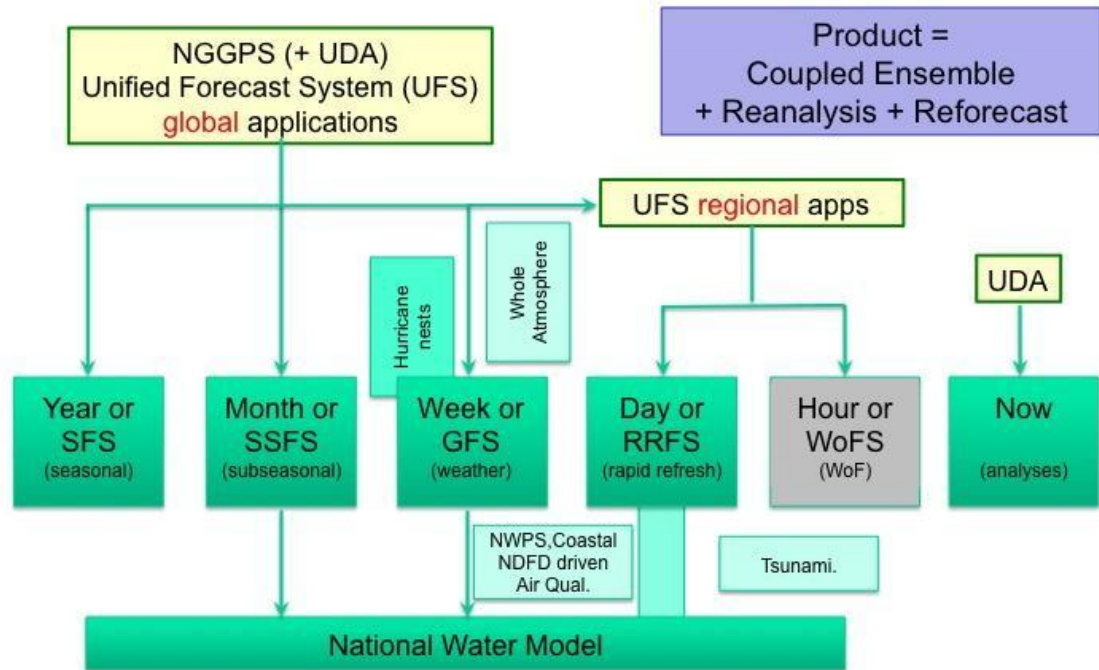
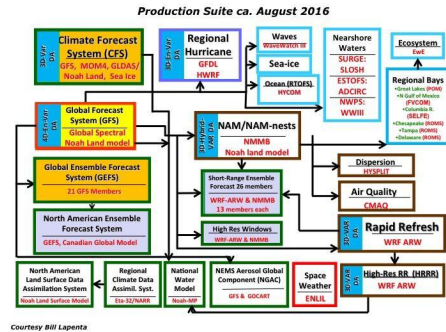
# Drivers: Weather Research and Forecasting Innovation Act of 2017

- Research and development, and transfer of knowledge, technologies, and applications to the NWS and other appropriate agencies and entities, including the U.S. weather industry and academic partners, related to:
  - advanced NWP systems and forecasting tools and techniques that improve the forecasting of timing, track, intensity, and severity of high impact weather, including through—
    - the development of more effective mesoscale models;
    - more effective use of existing, and the development of new, regional and national cloud-resolving models;
    - enhanced global weather models; and
    - integrated assessment models;
- A technology transfer initiative.....to ensure continuous development and transition of the latest scientific and technological advances into operations of the NWS and to establish a process to sunset outdated and expensive operational methods and tools to enable cost-effective transfer of new methods and tools into operations.

# Drivers: National Integrated Drought Information System Reauthorization Act of 2018

- Advancing weather modeling skill, reclaiming and maintaining international leadership in the area of NWP, and improving R2O by:
  - leveraging the weather enterprise to provide expertise on removing barriers to improving NWP;
  - enabling scientists and engineers to effectively collaborate in areas important **for improving operational global NWP skill**, including model development, data assimilation techniques, systems architecture integration, and computational efficiencies;
  - strengthening NOAA's ability to undertake research projects in pursuit of substantial advancements in weather forecast skill;
  - utilizing and leverage existing resources across NOAA's enterprise; and
  - creating a community global weather research modeling system that—
    - is accessible by the public;
    - meets basic end-user requirements for running on public computers and networks located outside of secure NOAA information and technology systems; and;
    - utilizes, whenever appropriate and cost-effective, innovative strategies and methods, including cloud-based computing capabilities, for hosting and management of part or all of the system described in this subsection.

# Target: Simplifying the NCEP Production Suite



UDA: Unified Data assimilation  
SFS: Seasonal Forecast System  
SSFS: Subseasonal Forecast System

GFS: Weather Forecast System  
RRFS: Rapid Refresh Forecast System  
WoFS; Warn on Forecast System

# Accomplishments

- UFS Governance (TOB)
- Development and implementation of GFSv15 as the first instantiation of a UFS application
- Development of the coupled model for GEFSv13 and S2S
- FV3-based CAM and DA under development
- FV3-based GFS made available to the community
- Marine DA incorporating JEDI (SOCA - Sea Ice/Ocean Couple Assimilation)
- MET expanded to include new features for Verification and Validation, becoming more useful to the Community and Operations
- Physics Tests completed for determining the physics suite for GFSv16

# The SIP

- SIP FY 2018 - 2020: A comprehensive first pass
- SIP FY 2019 - 2021: “Let’s be a little more realistic....”
- SIP FY 2020 - 2022: Focus on advancing applications strategically
  - Balance short-term goals across TRLs by identifying operational forecast goals and the science needed to reach them, along with implementation plans
  - Demonstrate enhancements in R2O2R
    - Breakouts this week to address these
  - Drive toward coupled applications

# SIP Priorities 2020 - 2022 (EMC perspective)

- Support the simplification of the NCEP Production Suite, producing fewer applications to develop and support (e.g., see Vijay's HAFS talk)
- Tie SIP projects to operational goals and articulate specific actions needed to meet the performance targets; point to a specific application in the 5-year NCEP implementation plan (a work in progress) that it will improve
- Identify SIP activities at lower Readiness Levels (i.e., R&D) that must commence in the short-term for operational gains in the long-term
- Prioritize which UFS applications to target in the short-term
- Implement GFSv16 and GEFSv12
- Release of GFSv15 model code in github and building the repositories for the other UFS applications
- Continue community development of coupled systems and completing benchmark activities for future implementations of weather and S2S applications.
- Revise the WG structure to support application development and refine their rules of the road
- Execute the NCAR-NOAA MoA

# Hot Topics

- Defining R2O. There is a [document](#) that the UFS milieu is writing that describes the transition of research to operations (R2O) within the context of the Unified Forecast System (UFS). There are other activities (e.g., the JCSDA, EPIC, JTTI, the NCAR-NOAA MoA) that are striving for the same thing. All of these activities must coalesce into a common paradigm of R2O that ends with innovations effectively implemented into Operations.
- Building the Community. There needs to be a common understanding of roles and responsibilities among all of the development efforts, including how EPIC will help (rather than replace) these development efforts.
- Ensuring operational orientation of SIP/EPIC activities.
- Balancing the rate of innovation with the rate of implementation. Right now, there are more innovations than NWS has the capacity to implement.
- Removing models from the NCEP Production Suite.
- Balancing collaboration with competition.
- Leveraging the Cloud to ameliorate the lack of HPC capacity for community development.
- Lack of Operational HPC (and human) capacity.