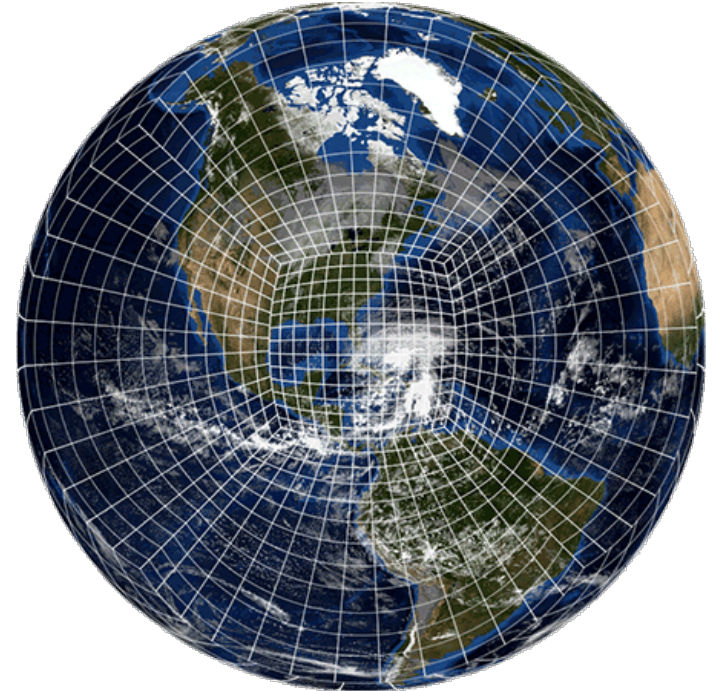




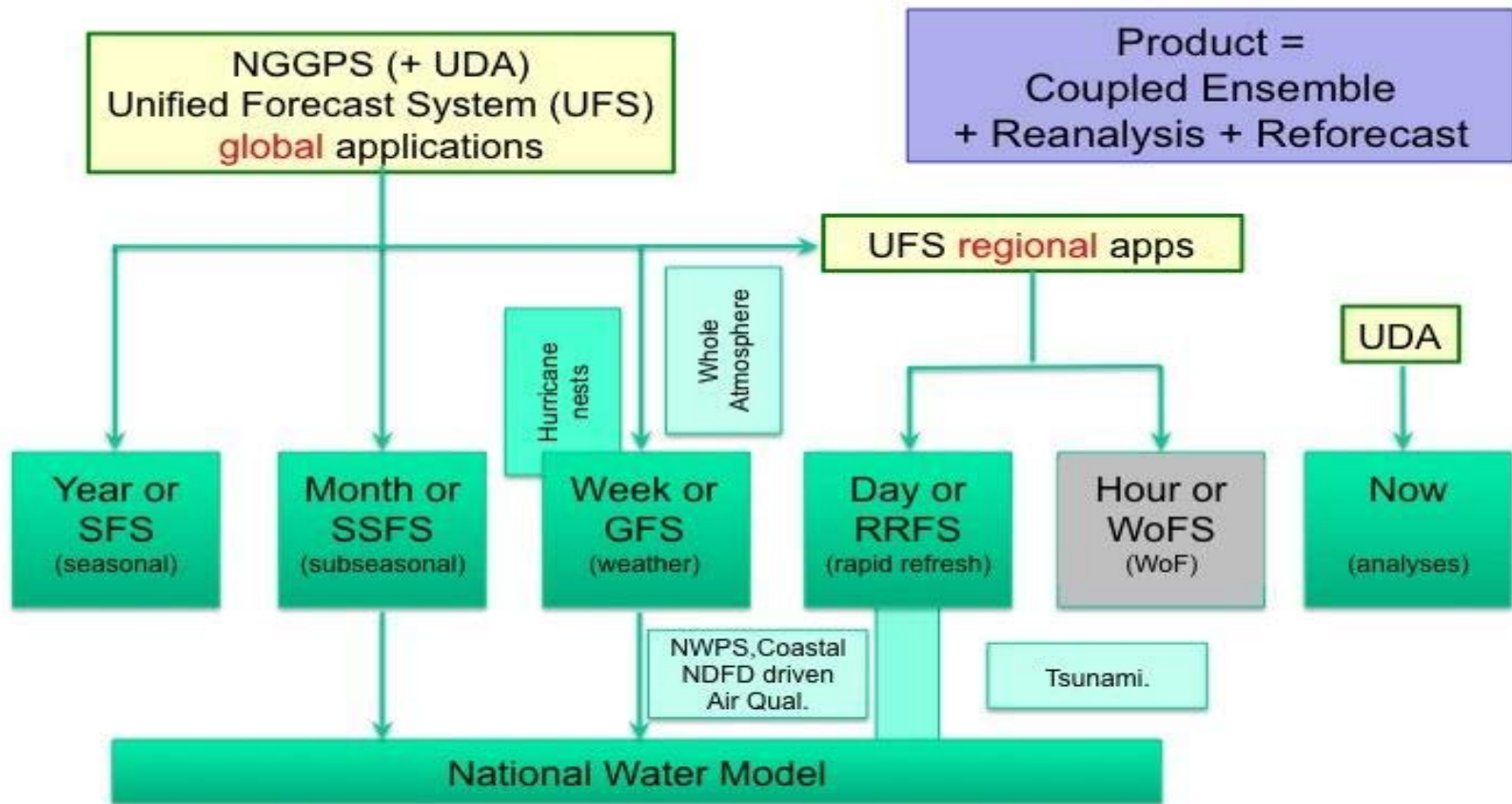
# **NOAA's Unified Forecast System (UFS) Next Generation Global Prediction System (NGGPS)**



NGGPS PI meeting  
Ming Ji  
August 7, 2018



# Unified Forecast System NWS Operational Applications



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



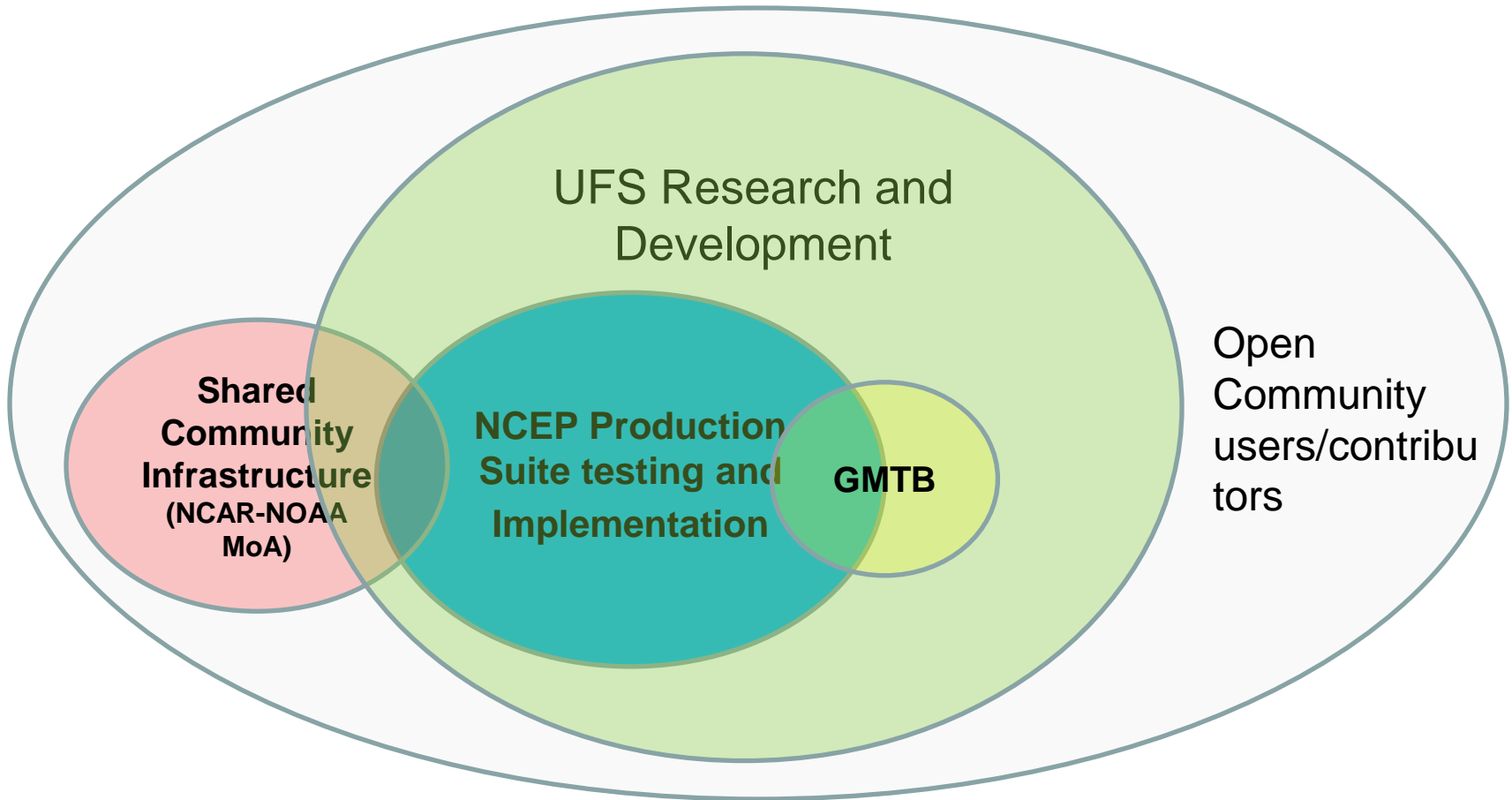
# Highlights since January



- FY2019 NGGPS/SIP Kick-off
- Unified Forecast System Steering Committee Established
- CAPP Version 1.0 Released to the Community
- Hurricane Supplemental Planning Meeting – April 2018
- Global FV3 released to the community
- NCAR-NOAA MOA negotiated – signatures immanent



# Community Modeling



**Green-Blue-Yellow:**  
**White-Pink:**

**HFIP paradigm**  
**Extended Community Modeling**

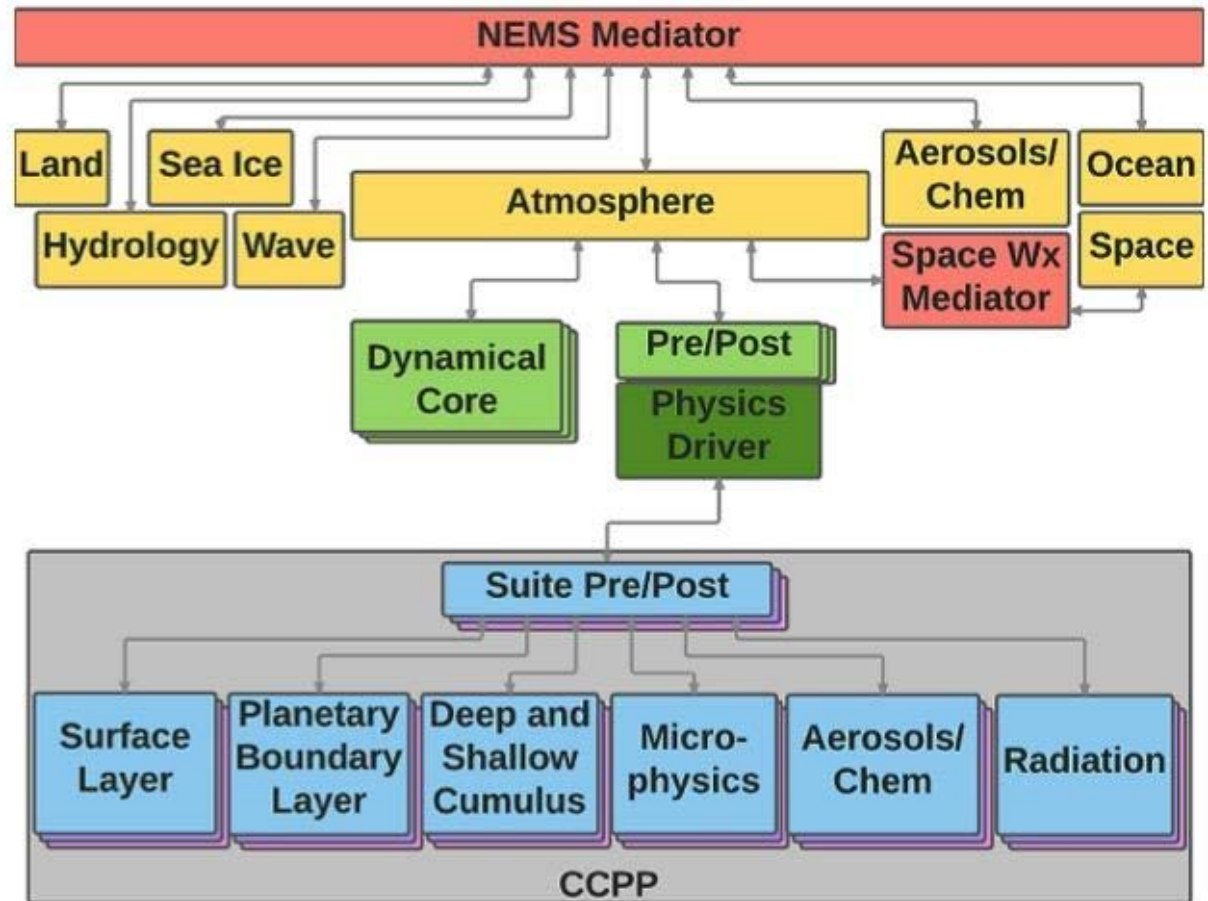


# Unified Forecast System for Operational Earth System Prediction (2018)



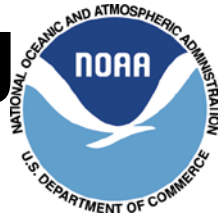
*ESMF/NUOPC/NEMS architecture enables unified global and regional coupled modeling and DA*

*Consistent with broader community (CESM) and US National ESPC*





# Approach for Unified Modeling Planning



- A concurrent, parallel planning approach
  - **High-level/broad Strategic Plan**
    - High-level Strategic Plan + accompanying detailed Roadmap document
  - **Short-term (0 to ~2-3 years) Strategic Implementation Plan (SIP)** combines implementation activities with near-term strategic actions
    - Led by NWS/NCEP/EMC with NOAA and external partners



# SIP Goals and Objectives for Unified Model



- Common Goal: Single integrated plan that coordinates activities of NOAA + external partners in common goal of building a national unified modeling system across temporal and spatial scales
  - NGGPS: foundation to build upon
  - Expand to include other STI development programs and EMC development efforts
  - Activities include R&D, testing/eval, V&V, R2O, shared infrastructure, etc.
- Approach for SIP development:
  - Began with existing core R&D partners to organize in functional area Working Groups (WGs) responsible for drafting respective functional SIP components
  - Add/Revise functional Working Groups and Scope as needed.



# SIP Working Groups



- Communications and Outreach
  - Common messaging strategy
- Convective Allowing Models (CAMs)
  - Intermediate steps to CAM ensembles, Warn on Forecast; test/evaluate with community
- System Architecture
  - NEMS evolution; community approach
- Infrastructure
  - Standards/doc; CM; code repository; etc.
- Testing and Testbeds
  - Role of testbeds; regression testing; etc.
- Verification & Validation (V&V)
  - V&V of ops forecasts vs. R&D testing/evaluate; unified/standard tools and data formats
- Dynamics and Nesting
  - FV3 transition on global wx/S2S/climate; moving nests for hurricanes
- Model Physics
  - Common Comm. Physics Package (CCPP); stochastic, scale-aware physics
- Data Assimilation
  - DA Science Strategy, FV3 integ. between NOAA, NASA; Joint Effort for DA Integ. (JEDI); coupled DA
- Ensembles
  - Strategy across scales; model uncertainty
- Post-Processing
  - Comm. PP infrastructure; std formats/tools
- Component Model sub-groups
  - Marine models + *NOS coastal/bay models*
  - Aerosols and Atmospheric Composition
  - Land Sfc Models (LSMs) + hydrology (OWP)





# How STI and OWAQ Use SIP



- Establish Funding Priorities
- Make Funding Determinations
- Use for Hurricane Supplemental Planning
  - Begin with SIP Modeling Research and Development Activities
  - Accelerate as appropriate!
  - Augment as appropriate!



# UFS Next Steps



- Implement FV3 dynamical core (Global, CAM, Hurricane Analysis and Forecasting System (HAFS), Supplemental Augment)
- Accelerate evolution of model physics (Supplemental augment)
- Advance overall data assimilation capability (supplemental augment for JEDI, Dropouts, Science Strategy!)
- Modernize Infrastructure (NCAR MOA, Supplemental Augment)
- Foster a community model environment, with GMTB, JCSDA, and community involved governance (FV3 (Global & CAM) and CCPP public releases); incorporate OWAQ funded activities into SIP.



# Meeting Objectives



## Goals:

- To assess progress of NGGPS projects from the 2016 funding opportunity for the development of the NCEP Unified Forecast System
- To enhance awareness at NCEP (specifically, EMC and CPC) of ongoing NGGPS projects advancing modeling and prediction



# Questions?

**STI Modeling Program Website:**

**<http://www.weather.gov/sti/stimodeling>**

**Information NGGPS:**

**[http://www.weather.gov/sti/stimodeling\\_nggps](http://www.weather.gov/sti/stimodeling_nggps)**

**Strategic Implementation Plan**

**[https://www.weather.gov/sti/stimodeling\\_nggps\\_implementation](https://www.weather.gov/sti/stimodeling_nggps_implementation)**

**Information on Grants:**

**<http://www.weather.gov/sti/stigrants>**