

Unified Forecast System (UFS)

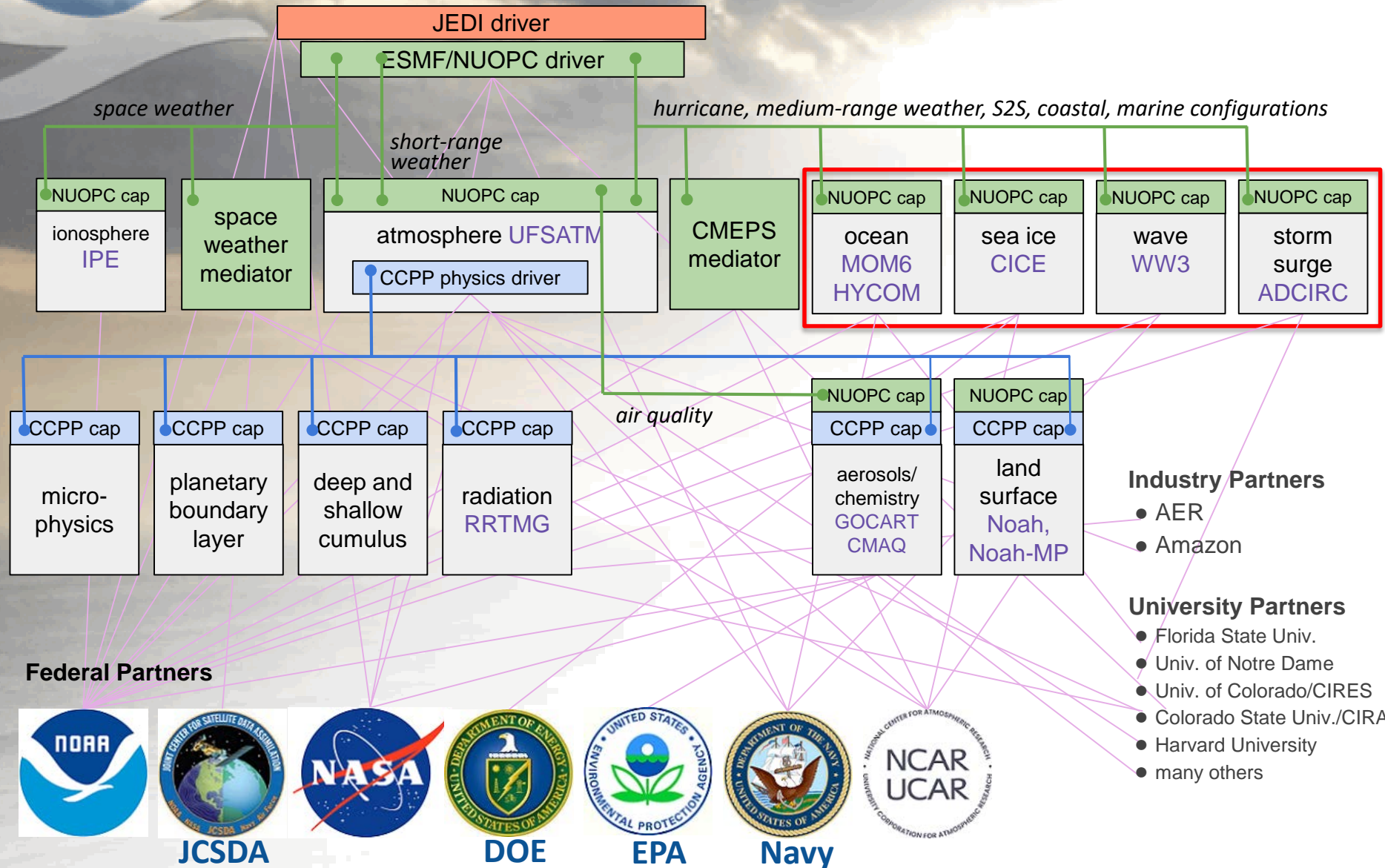
Overview Part II Progress !
Ricky Rood and Hendrik Tolman

<https://ufscommunity.org/>

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Team Effort



“Graduate Student Test”

- Evaluators get and run the S2S application for 5 days
- Modify the code to increase the SST provided by the ocean by 2 deg C
- Rerun the application for 5 days with the modification
- Visually compare results
- ... **all within 6 hours** - then fill out a short questionnaire

Testers used research (NCAR, NSF XSEDE) computers.

The test is described here:

<https://github.com/ESCOMP/UFSCOMP/wiki/Milestone:-CMEPS-0.5-Appendix-Graduate-Student-Test-Evaluation-SST-Experiment>

Release Strategy

- Incremental releases as new capabilities mature
- Initial release :
 - Medium Range Weather Application
 - ◆ FV3-atmosphere: 4 resolutions [C96 (~100km), C192 (~50km), C384 (~25km) and C768 (~13km)] & 64 vertical levels
 - ◆ Physics (using CCP): GFS v15 (operational) or GFS v16 (developmental)
 - ◆ Pre- and Post-Processing
 - ◆ Initialization: GFS analyses after Jan 1, 2018
 - ◆ Community workflow: CIME (NCAR CESM)
- Subsequent releases will make available standalone regional, coupling (ocean, waves, ice) and data assimilation capabilities

Support Strategy

- Computer platforms: Linux & Mac for Intel & GNU compilers (NOAA Hera, NCAR Cheyenne, NSF Stampede and Mac laptops)
- Documentation: information on components, how to set up & run, how to commit changes back
- Online forum support: forums.ufscommunity.org, w/ topical sections & a centralized location for posting questions and exchange
- Training: DTC is working on plans for a MRW application webinar & tutorials covering multiple applications

1st UFS User Workshop, ~~Virtual~~ Boulder, July 27-30.

Prototypes

Each of these is a working coupled application which is actively being tested

FV3 – WW3

Effects of waves on atmospheric stress at ocean surface

FV3 – CHEM

Atmosphere, aerosols interaction

ADCIRC – WW3

Wind wave and surge coupling
(COASTAL ACT)

MOM6 – CICE5

Ocean ice coupled model to look at polar dynamics and for developing a marine DA system

FV3 – MOM6 – CICE5

Coupled system for S2S scales (25 km atm, 1/4 deg ocean and ice)

FV3 – MOM6 – CICE5 – WW3

S2S scales including Langmuir mixing (25 km atm, 1/4 deg ocean and ice, 1/2 deg waves)

Simplify the Production Suite

| NPS Modeling System | Current Version | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3FY21 - Q2FY22 MORATORIUM | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | UFS Application | |
|------------------------------------|----------------------|-------|-------|-------|-------|-------|-------|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------------------------|---|
| | | FY 20 | FY 20 | FY 20 | FY 20 | FY 21 | FY 21 | | FY 22 | FY 22 | FY 23 | FY 23 | FY 23 | FY 23 | FY 23 | FY 24 | FY 24 | FY 24 | | FY 24 |
| Global Weather & Global Analysis | GFS/ GDASv15 | | | | | | | | | | | | | | | | | | UFS Medium Range & Sub-Seasonal | |
| Global Waves | GWMv3 | | | | | | | | | | | | | | | | | | | |
| Global Weather Ensembles | GEFSv11 | | | | | | | | | | | | | | | | | | | |
| Global Wave Ensembles | GWESv3 | | | | | | | | | | | | | | | | | | | |
| Global Aerosols | NGAC v2 | | | | | | | | | | | | | | | | | | | UFS Marine & Cryosphere |
| Short-Range Regional Ensembles | SREFv7 | | | | | | | | | | | | | | | | | | | |
| Global Ocean & Sea-Ice | RTOFSv1.2 | | | | | | | | | | | | | | | | | | | |
| Global Ocean Analysis | GODASv2 | | | | | | | | | | | | | | | | | | | |
| Seasonal Climate | CDAS/CFSv2 | | | | | | | | | | | | | | | | | | | UFS Seasonal |
| Regional Hurricane 1 | HWRfv12 | | | | | | | | | | | | | | | | | | | UFS Hurricane |
| Regional Hurricane 2 | HMONv2 | | | | | | | | | | | | | | | | | | | |
| Regional High Resolution CAM 1 | HiRes Window v7 | | | | | | | | | | | | | | | | | | | UFS Short-Range Regional HiRes CAM & Regional Air Quality |
| Regional High Resolution CAM 2 | NAM nests/ Fire Wxv4 | | | | | | | | | | | | | | | | | | | |
| Regional High Resolution CAM 3 | RAPv4/ HRRRv3 | | | | | | | | | | | | | | | | | | | |
| Regional HiRes CAM Ensemble | HREFv2 | | | | | | | | | | | | | | | | | | | |
| Regional Mesoscale Weather | NAMv4 | | | | | | | | | | | | | | | | | | | |
| Regional Air Quality | CMAQv5 | | | | | | | | | | | | | | | | | | | |
| Regional Surface Weather Analysis | RTMA/ URMA v2.7 | | | | | | | | | | | | | | | | | | | |
| Atmospheric Transport & Dispersion | HySPLITv7 | | | | | | | | | | | | | | | | | | | UFS Air Quality & Dispersion |
| Coastal & Regional Waves | NWPSv1.2 | | | | | | | | | | | | | | | | | | | UFS Coastal |
| Great Lakes | GLWUv3.4 | | | | | | | | | | | | | | | | | | UFS Lakes | |
| Regional Hydrology | NWMv2 | | | | | | | | | | | | | | | | | | UFS Hydrology | |
| Space Weather 1 | WAM/IPEv1 | | | | | | | | | | | | | | | | | | UFS Space Weather | |
| Space Weather 2 | ENLILv1 | | | | | | | | | | | | | | | | | | | |



Recognition ...

x Silver Sherman Award.

- Creating group Award by combining awards from Stan Benjamin (OAR) and Hendrik Tolman (NWS)
- Recognizing cross-LO collaboration
- Showcase culture change needed for UFS



Recognition ...



Order of Sherman's Lagoon **Jacob Carley**

For leadership and exceptional cross Line Office collaboration in development, improvement and operational implementation of NOAA convection-allowing weather models and nowcasting capabilities.

2020

Hendrik Tolman, Senior Advisor for Advanced Modeling Systems, NWS

Neil A. Jacobs, Ph.D.
Assistant Secretary of Commerce for Environmental Observation and Prediction
Performing the duties of Under Secretary of Commerce for Oceans and Atmosphere



Order of Sherman's Lagoon **Curtis Alexander**

For leadership and exceptional cross Line Office collaboration in development, improvement and operational implementation of NOAA convection-allowing weather models and nowcasting capabilities.

2020

Stan Benjamin, Senior Scientist for Advanced Modeling Systems, OAR

Neil A. Jacobs, Ph.D.
Assistant Secretary of Commerce for Environmental Observation and Prediction
Performing the duties of Under Secretary of Commerce for Oceans and Atmosphere



Questions