NOAA-NCAR MoA

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Letter of Intent for collaboration between NCAR, NWS and OAR signed July 28, 2017

- “to develop a Memorandum of Agreement (MOA) that will describe how both organizations will work collaboratively toward the design and construction of a community unified modeling infrastructure. “
- Identified benefits include
  - Synergies
  - Common repositories
  - Access to NOAA operational models

Signatories
- Ming Ji (NWS, OSTI)
- John Cortinas (OAR, OWAQ)
- Jim Hurrell (NCAR)
NCAR – NOAA MoA

Team for writing MoA formed in November 2017
- Following shows progress so far, nothing is cast in stone yet.
- Goal is to have draft MoA available FY18 Q2 for legal review.

NWS
- Hendrik Tolman (lead), Fred Toepfer, Brian Gross (Bill Lapenta)

OAR
- Kevin Kelleher, Whit Anderson

NCAR
- Chris Davis, Bill Large, Louisa Nance, Mariana Vertenstein

STI Support
- Sherrie Morris, Steve Warren
Overall goal:
➤ “Making the operational US Environmental Modeling Enterprise the world leader through close collaboration between operations and research.”

Background
➤ Enable short “Time to Operations” and “Time to Research”

Scope
➤ Focus on infrastructure, not on component models.

Defining infrastructure
Roles and Responsibilities
Work plans and Governance
Signatories

Following slides
The team identified 7 key elements of infrastructure to be discussed for inclusion in the MoA:

1) Coupling between components: inter-component coupling
   - NOAA and NCAR using or moving to ESMF / NUOPC
   - EMC using NEMS mediator, NCAR moving to CMEPS
   - CMEPS started from NEMS, merging CESM, GFDL
     - Tentative merging path across organizations (“do no harm”)
     - Existing FY18Q4 milestone to prove feasibility

ESMF: Earth System Modeling Framework (architecture)
NUOPC: National Unified Operational Prediction Capability (standardization)
NEMS: NCEP Environmental Modeling System (mediator)
CMEPS: Community Mediator for Earth Predictive Systems (mediator)
Infrastructure

2) Coupling within a component: intra-component coupling

- Focus presently on atmosphere, separate dynamics and physics
- Moving FV3 into CESM under way
- Key focus on physics driver and management of physics
  - NOAA / DTC invested in IPD moving to CCPP (part of NGGPS)
  - NCAR / CGD not involved in CCPP development, planning requirements and design phase for CPD
  - NCAR / GCD can leverage CCPP effort in this
  - All organizations benefit from common approach
- Note CICE and WW3 following similar approach

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tr>
<td>IPD:</td>
<td>Interoperable Physics Driver (software)</td>
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<tr>
<td>CCPP:</td>
<td>Common Community Physics Package (software)</td>
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<tr>
<td>CPD:</td>
<td>Community Physics Driver (software)</td>
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3) Workflow: scripting and testing infrastructure

- NOAA / DTC is focusing on standardizing workflow between research and operations (CROW)
- NCAR has focused on version control / management of experiments (CIME)
- Both elements are critical for efficient research and R2O.
- Can CIME be encapsulated in CROW?

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<tr>
<th>CROW:</th>
<th>Common Research and Operations Workflow (new effort)</th>
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<td>CIME:</td>
<td>Common Infrastructure for Modeling the Earth (mature)</td>
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4) Quality assurance in model development

- Three types of testing have been identified
  - Regression testing for basic functionality (“do no harm”)
  - Hierarchical testing to document impact of software development.
  - Statistical testing of coupled models to address if model differences are acceptable (porting etc.) / significant

- This has not yet been discussed in detail (consider CCPP, CECT).

5) Software Repository Management

- NOAA intends to have infrastructure repositories for community at NCAR, tentatively using Github
- NOAA intends to use CESM approach for repository management
  - Align with SIP working groups?
Infrastructure

6) Forecast verification: comparison to observations
   ● NOAA moving to MET (NCAR/DTC)
     ➢ MET being expanded to include all NCEP operational metrics
     ➢ MET needs to be expanded with process metrics, and across all coupled model components.
   ● NCAR / CESM focusing on climate verification toolkits.
   ● Can all be merged into one toolkit?
   ● Has not been discussed in detail.
   ● Need for clear definition of what is required for model upgrades to be considered for implementation (including run times).

MET: Model Evaluation Toolkit
     (V&V toolkit)
7) User support

- Critical for creating true community
- Documentation, tools “up front” investment
- Real time support essential
  - CESM experience
  - DTC experience
  - Zero sum gain reassessment of roles of CESM, DTC and JCSDA required
  - Acknowledge separate governance of JCSDA and DTC

DTC: Developmental Testbed Center
JCSDA: Joint Center for Satellite Data Assimilation
(interagency)
Roles and Resp. / Governance

Roles and responsibilities:
- Organizations have “natural” roles
  - NWS operational aspects
  - NCAR community R&D
  - OAR “in the middle”
- Discussion still ongoing

Governance
- Short MoA signed once, IA / workplans updated annually
- New UFS Governance (SIP / NGGPS) is considered compatible with this MoA.
- Discussion still ongoing.
  - Merge MoA governance with UFS / SIP governance?
Thank You!