NOAA-NCAR MoA

Hendrik Tolman

Office of Science and Technology Integration
National Weather Service / NOAA

Hendrik.Tolman@NOAA.gov

NCAR – NOAA MoA

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

MoA layout

Tentative contents

- Overall goal:
  - “Making the operational US Environmental Modeling Enterprise the world leader through close collaboration between operations and research.”
- Background
  - LOI of July 28, 2017.
  - 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

Infrastructure

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

IPD:	Interoperable Physics Driver (software)
CCPP:	Common Community Physics Package (software)
CPD:	Community Physics Driver (software)

Infrastructure

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?

CROW:	Common Research and Operations Workflow (new effort)
CIME:	Common Infrastructure for Modeling the Earth (mature)

Infrastructure

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)

Infrastructure

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!