UFS Steering Committee at MRW Training Event

http://ufscommunity.org/

UFS

UNIFIED FORECAST SYSTEM

This presentation is

Planning from a UFS Steering Committee co-Chair Point of View.

Strategic Plan 2021 - 2025

Tilted towards those with interest in Medium-range Weather Application

An important purpose of the document is to develop common language and definitions, write them down, and to adhere to them. Develop community policies and practices to support UFS Goals

Goals: Improved forecast based on solid science. Simplified forecast suite. Better use of resources.

What is in Strategic Plan 2021 - 2025?

Chapter 1: Introduction

Chapter 2: Forecast Skill Priorities, Science Goals, Systems Goals

Chapter 3: Organizational and Management Priorities

Chapter 4: Notional Schedule

UFS Application

The UFS is a unified system because its applications share a set of agreed-upon scientific components and a set of agreed-upon infrastructures. The scientific components and infrastructures are integrated into a consistent system architecture. Conforming to these UFS principles is central to UFS planning and success.

Forecast Skill Priorities

We collected, generated, and presented Forecast Skill Priorities for all 7 applications.

- These should be viewed as Version 0
- As an organization, we will be updating and improving these
- Strive to integrate with upcoming V&V workshop

Science Goals

2.3.1 Reduce surface and near-surface biases:

2.3.2 Incorporate new data types to target specific Forecast Skill Priorities:

2.3.3 Test and implement a coupled component capacity for UFS applications:

2.3.4 Increase physical consistency of global atmospheric dynamics and the coupling of atmospheric physics and dynamics:

2.3.5 Establish ensemble-based methods to describe uncertainty and improve usability by forecasters:

2.3.6 Develop an FV3-based Whole Atmosphere Model (WAM) with Deep Atmosphere Dynamics (DAD):

Expand one of these for MRW

2.3.4 Increase physical consistency of global atmospheric dynamics and the coupling of atmospheric physics and dynamics:

2.3.4.1 Establish a cross-application approach to representation of atmospheric physics:

2.3.4.2 Improve representation of global-to-regional atmospheric dynamics and physics:

2.3.4.3 Improve event-based forecast skill:

UFS-R2O Project:

Focused on 2 year implementation of key features.

- Medium-range and Subseasonal to Seasonal being addressed in an integrated way.
  - **Data assimilation** - Improved use of observations (JEDI release)
  - **Coupled data assimilation, reanalysis and reforecasts** - coupled data assimilation system
  - **Coupled model development** - coupled ensemble prediction system
  - **Model components** -
  - **Atmospheric physics** - Improved tropical variability and reduction of model biases
  - **Atmospheric composition** - aerosols and radiation

Systems Goals

2.4.1 Improve the interfaces and engagement of the UFS with the community:

Persist with, Support, and Expand the “Graduate Student Test.”

2.4.2 Simplify the Short-range Weather/Convective Allowing Model (SRW/CAM) production suite:

2.4.3 Develop a systematic approach to applications’ workflow:

2.4.4 Develop capacity to support hierarchical systems development (HSD):

Organizational Goals

3.2.1 Continue to develop community engagement and improve cohesion of the UFS organization:

3.2.2 Improve quantification of UFS Forecast Skill Priorities and update UFS Science Goals:

3.2.3 Integration of data assimilation into the UFS architecture, applications, and releases:

3.2.4 Develop end-to-end test plans for UFS applications:

3.2.5 Define the stages and gates of the research-operations interface:

3.2.6 Define and publish policy, protocols, and practices for UFS releases:

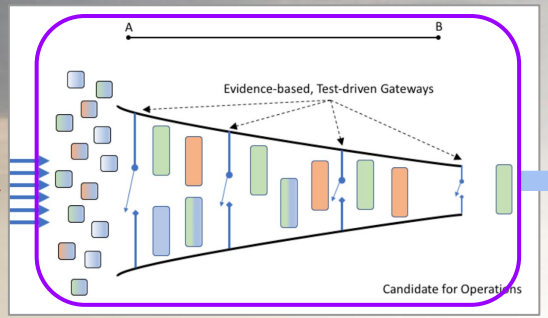
UFS-SC: Current Priorities

3.2.4 Develop end-to-end test plans for UFS applications:

3.2.5 Define the stages and gates of the research-operations interface:

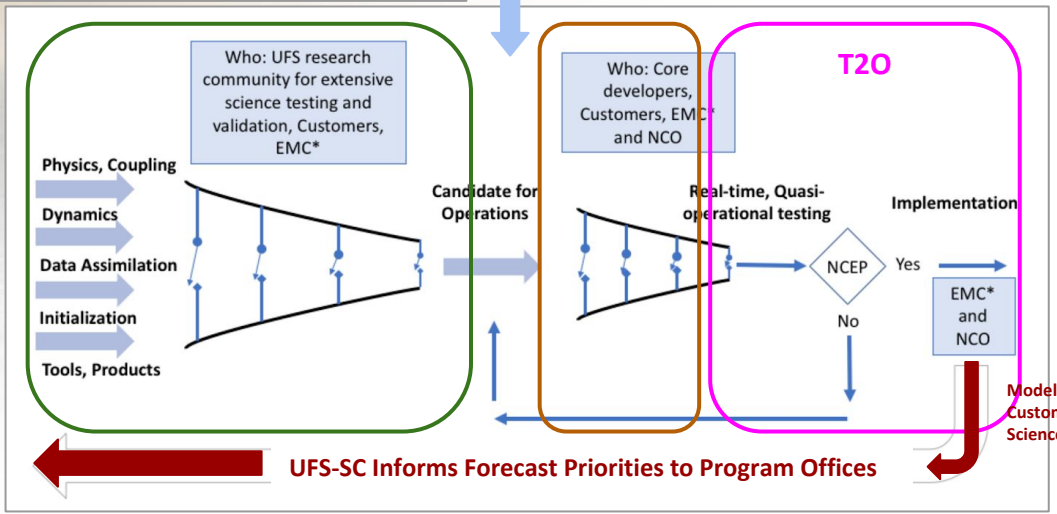
Types of R2O Transitions:
As outlined by UFS SC and SIP WGs

Forecast Priorities



Systems level transitions - A major aspect of the UFS is selected from a community-based model repository. Relatively infrequent event - Occurs when a new application is brought in - or as part of a long-term strategy to address a basic model shortcoming. E.g., Introduction of FV3 dynamical core. Timeline for transition - ~5 years

Application level transitions - Significant changes to a model component - E.g., advancing Atmospheric model Physics. Timeline - months to 2 years



Incremental level transitions - More frequent. Target narrow changes to an existing operational system. Can be scientific, technical, and/or engineering improvements. E.g., Investigation of sensitivity of the forecast to grid-scale mixing parameterizations. Relatively less time consuming.

Schematic adapted from 'Describing R2O Interface' by UFS-SC, SIP WGs

2.2.3: Forecast Skill Priorities: Tables