

A satellite image of Earth, showing a large portion of the globe. The image is dominated by swirling white clouds over a blue ocean. Landmasses, including parts of North America, South America, and Africa, are visible in shades of brown and green. The perspective is from space, looking down at the planet.

Joint Center for Satellite Data Assimilation

Briefing to the Committee of Operational Processing Centers (COPC)

Jim Yoe, Chief Administrative Officer for the Joint Center for Satellite Data Assimilation (JCSDA)

Status Update



- Who We Are
- How We Relate to COPC
- What's New

Joint Center for Satellite Data Assimilation



Vision: An interagency partnership working to become a **world leader** in applying satellite data and research to operational goals in environmental analysis and prediction

JCSDA

NASA
ESD

NOAA
NWS

Research
Community,
Academia

NOAA
NESDIS

NOAA
OAR

U.S.
Navy

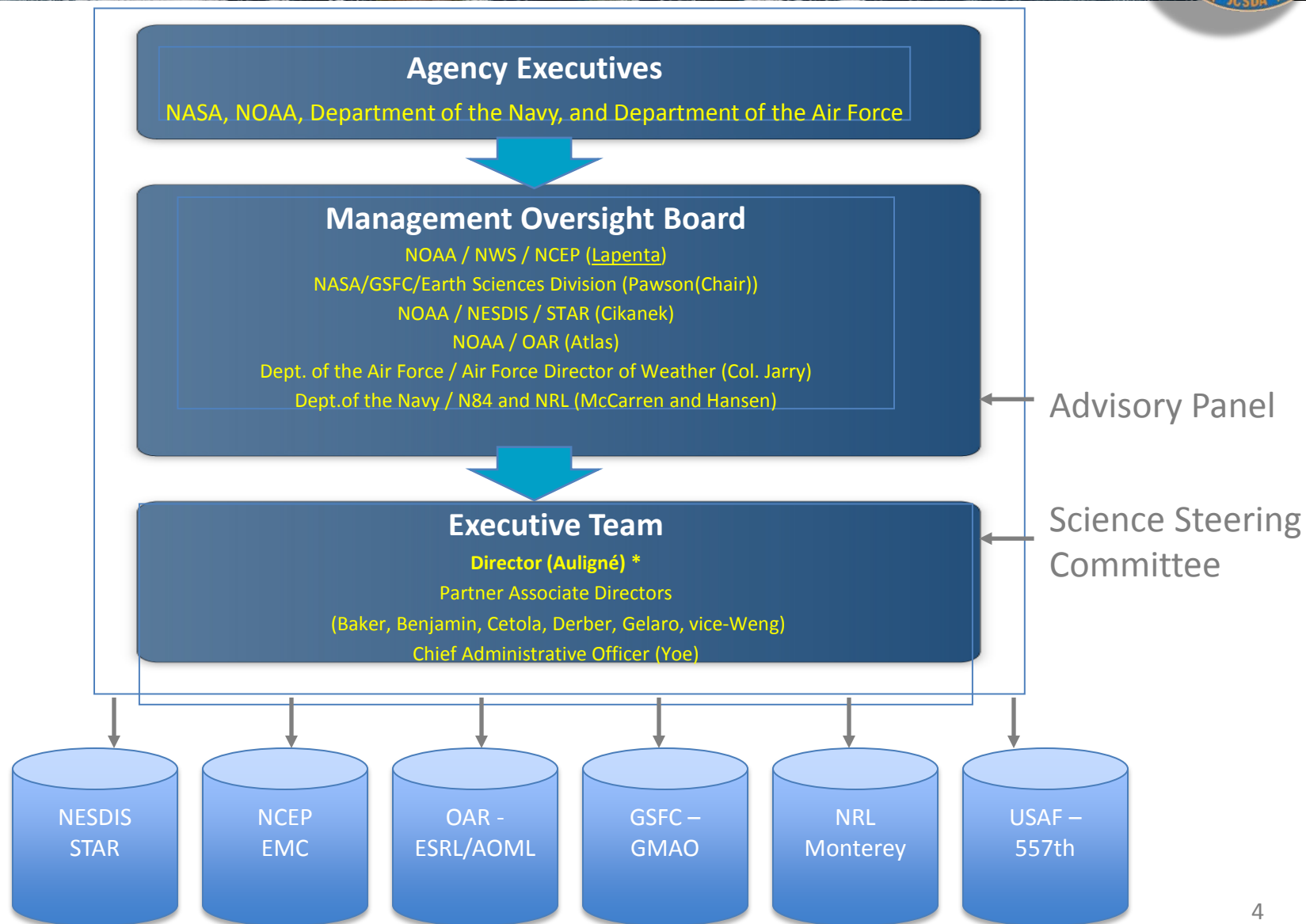
U.S. Air
Force

Google Earth

Science priorities: Radiative Transfer Modeling (CRTM), new instruments, clouds and precipitation, land surface, ocean, atmospheric composition.

Mission: to **accelerate** and **improve** the quantitative use of research and operational satellite data in weather, ocean, climate and environmental analysis and prediction models.

Management Structure



Relationship to COPC



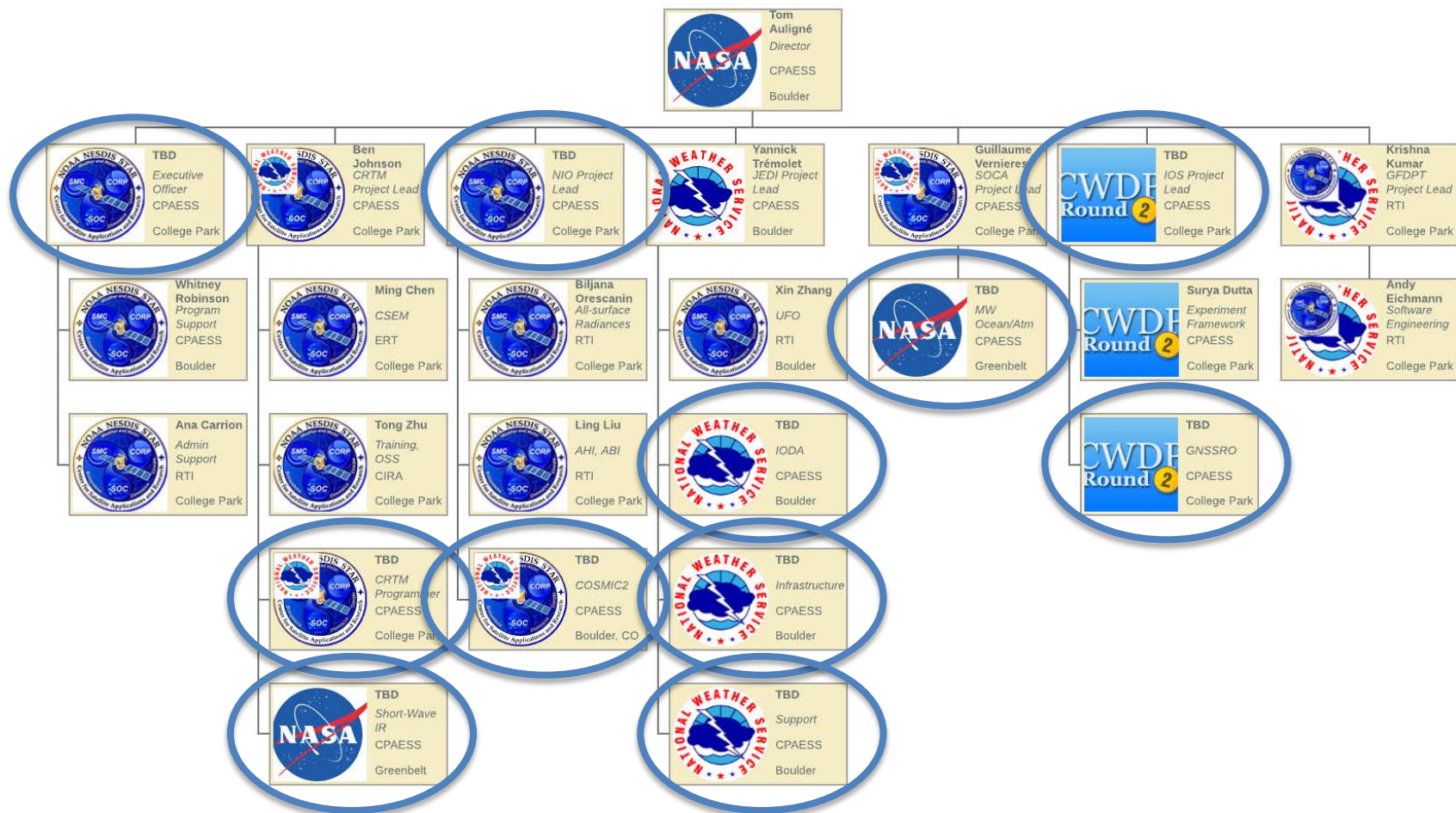
- Direct: Enhanced Data Access
 - JCSDA participates in WGDA
 - Data sources, formats, pipes, metadata, etc.
- Indirect
 - Shared science – DA, QC, assessments

New Concept of Operations



- The reaffirmation of the **central role** of the **Executive Team** to guide science activities and ensure high level of collaboration, and of the **Management Oversight Board** to provide management-level oversight and strategic decisions.
- The **transition of programmatic, administrative, and operational management** to a Non-Government Research Organization (NGRO), which will increase accountability to the JCSDA Director while maintaining close interaction with and oversight from the partner federal agencies.
- The clarification of the **scope of activities** and the associated decision process to determine what constitutes the purview of the JCSDA.
- The formation of a **project-based structure** with project management targeting science frontiers that are actually jointly pursued among partners.
- The establishment of a **formalized annual cycle** to coordinate the planning, budgeting, execution and reporting of JCSDA activities.

JCSDA 'Core Team' Org Chart



DOF

CRTM

NIO

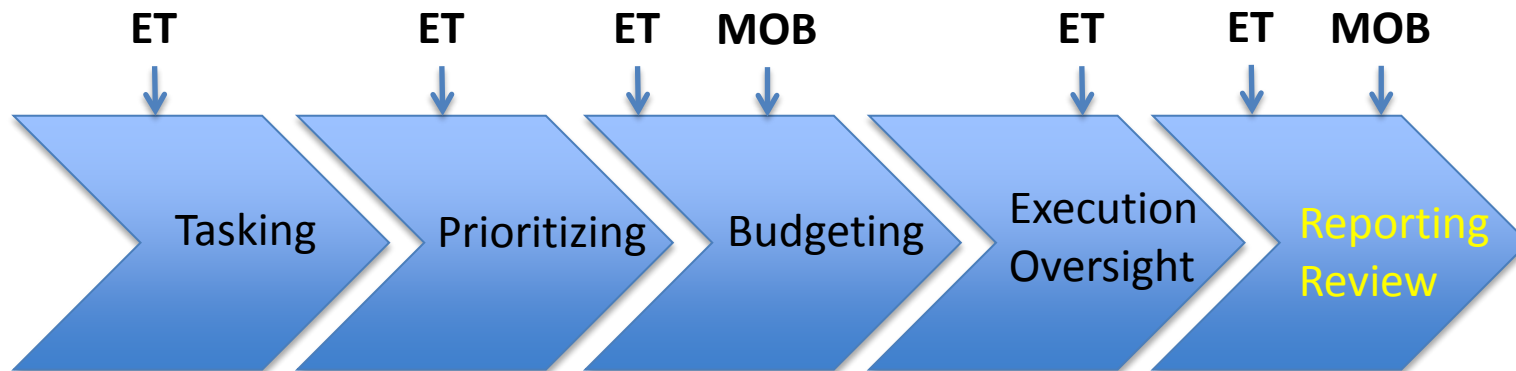
JEDI

SOCA

IOS

GFDPT

JCSDA Annual Cycle



Jan: Director drafts AOP

Feb: ET prioritizes tasks against resources

Mar: MOB approves AOP

April 1: Begin Execution AOP

May: Annual Science Workshop

Details regarding processes for planning contributions of staff, \$, and other resources, allocation to priorities and Projects, and Agency review and oversight captured in JCSDA Whitepaper.

>> Project Leads present Quarterly Reviews (to ET), followed by Quarterly Reports (to MOB)

AOP 2017: Planned Tasks



Project DOF: Director's Office (Director: Tom Auligné)

- Task DOF1: JCSDA management and coordination
- Task DOF2: Communication, education, and outreach
- Task DOF3: JCSDA External Research Program
- Task DOF4: Visiting Scientist Program

Project CRTM: Community Radiative Transfer Model (Lead: Ben Johnson)

- Task CRTM1: Release of CRTM version 2.3.0 and future release support
- Task CRTM2: Acceleration of CRTM computations via software optimization
- Task CRTM3: Improved physical representation for aerosols, clouds, precipitation, and land surface

Project NIO: New and Improved Observations (Lead: TBD, Ben Johnson acting)

- Task NIO1: Assimilation of Radiance Data Over Land and Sea-Ice
- Task NIO2: Prepare for the assimilation of AHI, JPSS, GOES-16, COSMIC-2

Project JEDI: Joint Effort for Data assimilation Integration (Lead: Yannick Trémolet)

- Task JEDI1: Infrastructure
- Task JEDI2: Abstract Code Layer
- Task JEDI3: Encapsulated interpolations
- Task JEDI4: Encapsulated observation operator (link to GSI code)
- Task JEDI5: Interface for observation data access (IODA)
- Task JEDI6: Background and Observation Error Covariance matrices

Project SOCA: Sea-ice, Ocean, Coupled Assimilation (Lead: Guillaume Vernieres)

- Task SOCA1: Implementation of initial Sea-ice DA
- Task SOCA2: Develop plan for unified Ocean DA

Directed Project IOS: Impact of Observing System (Lead: TBD)

- Task IOS1: Standing capability to assess observation impact
- Task IOS2: Toward real-time FSOI intercomparison
- Task IOS3: Evaluation of Commercial Weather Data Pilot (CWDP)

Directed Project GFDPT: Global Forecast Dropout Prediction Tool (Lead: Krishna Kumar)

- Task GFDPT1: Transition to NCEP

DA Science Grand Challenges



Observations

- Big Data paradigm (volume, variety, velocity): most of total error reduction comes from a large number of observations with **small or moderate individual impacts**

Models

- Better value for society: forecast model for more components of Earth system (Ocean, Waves, Cryosphere, Land, Hydrology, Aerosols, Atmospheric composition, Ionosphere, etc.)
- Models are getting coupled to better account for interactions

Data Assimilation Algorithms

- DA systems becoming increasingly complex as science progresses: comparing algorithms almost impossible. Optimum may be application/machine dependent

Joint Effort for Data assimilation Integration (JEDI)



1. Collective path toward Nation Unified Next-Generation Data Assimilation
2. Modular, Object-Oriented code for flexibility, robustness and optimization
3. Mutualize **model-agnostic** components across
 - Applications, Models & Grids, Observations (past, current and future)

Roadmap

Stage 1: Unified Forward Operator (UFO). Interpolation from various model grids, comprehensive suite of observation operators, refactoring of operational Quality Control.

Interface for Observation Data Access (IODA). Standardized file format + API for observations in memory.

Stage 2: Covariance matrices, linearized UFO, 3D solvers, bias correction

Stage 3: Optimized components, 4D solvers

Stage 4: Multi-scale, coupled DA

Closing Remarks



JCSDA improving its operations

- AOP improving up-front coordination and accountability
- Targeting inter-dependent activities with clear added value
- Project-based structure focusing on measureable deliverables
- JCSDA staff committed to collaboration
- **Enhancing satellite DA to support the OCs**
- **Working to ensure, improve satellite data access via COPC WG**

Extra Slides Follow

Education and Outreach



15th JCSDA Tech Review and Science Workshop + 1st CRTM Users and Developers Workshop



Unified DA Planning Meeting



Joint DTC-EMC-JCSDA GSI/EnKF Tutorial



Joint Workshops with Partners

- JCSDA Symposium @AMS: Austin, TX

Summer Colloquium on Satellite DA

- Summer 2018: Bozeman, MT

JCSDA Newsletter and Web site

- Highlight achievements by scientists
- Promote collaboration

Visiting Scientist Program



'B Matrix' Bootcamp – 01-21 Aug 2017 – Boulder, CO

Participation: JCSDA, NCAR, GMAO, OAR, EMC, Météo-France, Met Office

Scope: Design, develop, and test a prototype software for modeling background error covariances in research and operations. The code needs to be self-contained, portable, accurate, efficient, scalable, readable, non-redundant, extensible, documented, tested, with the vision to integrate into the JEDI framework.

