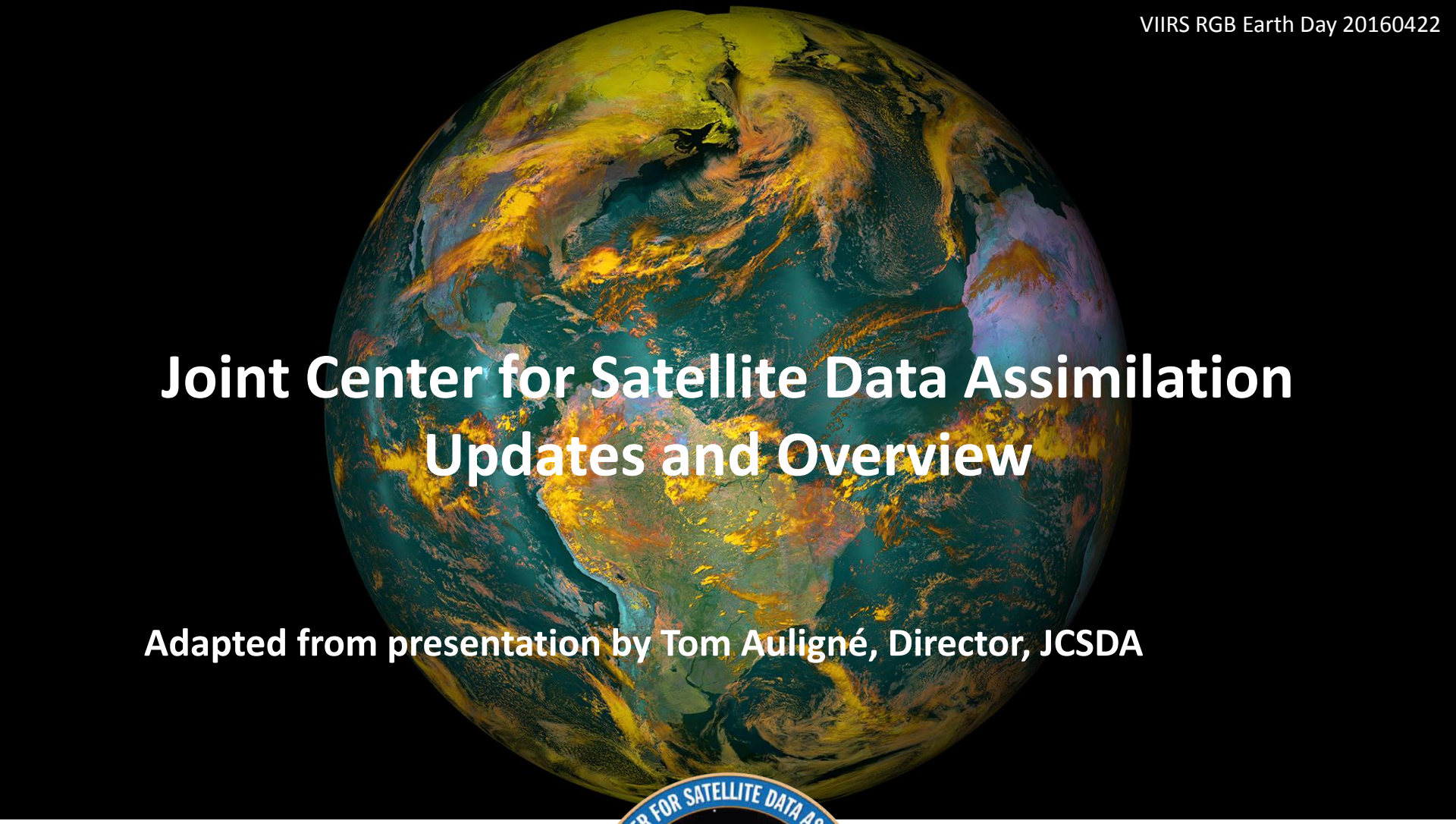
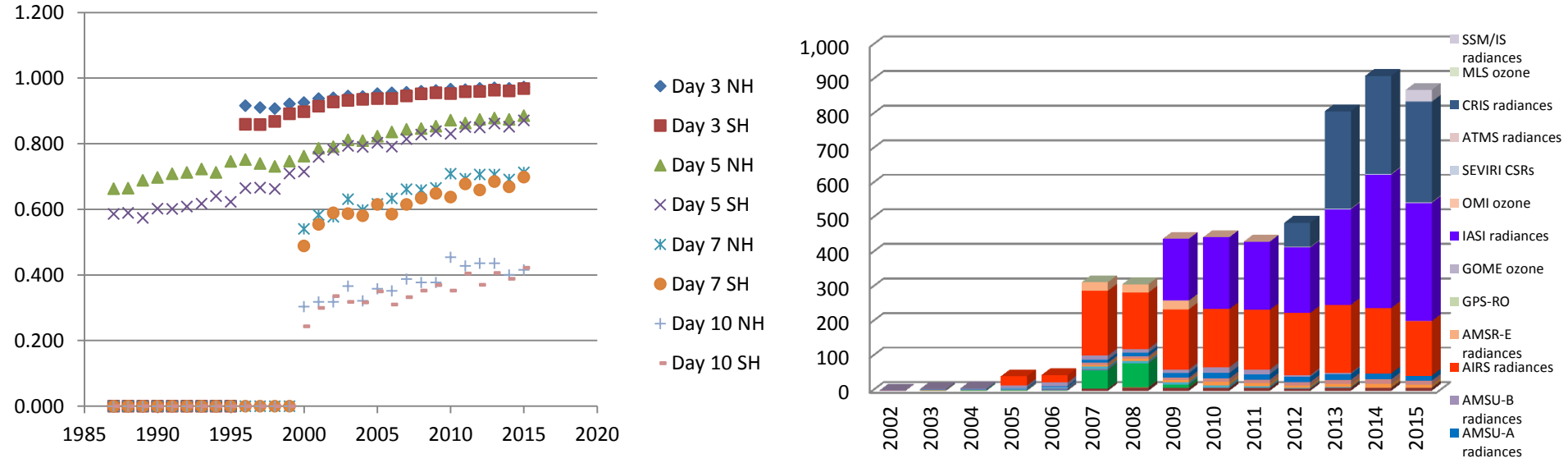


Joint Center for Satellite Data Assimilation
Updates and Overview

Adapted from presentation by Tom Auligné, Director, JCSDA

On-Going JCSDA Successes

- Community Radiative Transfer Model (CRTM) (Rel 2.3.0 with cloud fraction)
- More unified Data Assimilation -> Support for operational/research community
- Accelerated use of research and operational satellites into operational models
  - AIRS -> IASI -> NPP -> preparation for JPSS and GOES-R
- Contributions to continuous improvement to NWP model performance



JCSDA Management Structure

Agency Executives

NASA, NOAA, Department of the Navy, and Department of the Air Force

Management Oversight Board

NOAA / NWS / NCEP (Lapenta (Chair))
NASA/GSFC/Earth Sciences Division (Pawson)
NOAA / NESDIS / STAR (Kalb)
NOAA / OAR (Atlas)
Dept. of the Air Force / Air Force Director of Weather (Col. Gremillion)
Dept.of the Navy / N84 and NRL (McCarren and Hansen)

Advisory Panel

Executive Team

Director (Auligne) *
Partner Associate Directors
(Baker, Gelaro, Zapotocny, Benjamin, Derber, Weng)
Chief Administrative Officer (Yoe)

Science Steering Committee

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

Strategic Goals

1. Expand capabilities in assimilating satellite sensors
2. Spearhead a community data assimilation initiative
3. Address scientific frontiers to optimize the use of satellite data
4. Deliver new and improved tools to support observing system impact assessments
5. Foster improved organizational management, interagency coordination and outreach strategies

1) Prioritized New Satellites and Sensor

- **New Sensors Data Assimilation:**

  (new QC, error optimization, impact assessment on NOAA forecast systems)

  - **JPSS1 – ATMS and CrIS** (Launch date NLT Q2 FY17)
  - **GOES-R – ABI (AMV winds and radiances)** (Launch date October 2016)
  - **COSMIC 2** (Launch date Q2 FY17)
  - HIMAWARI-8 AHI (Dry run for GOES-R ABI)
  - GPM /GMI
  - Megha-Tropiques SAPHIR (WV Sounder)
  - ISS-RAPIDSCAT (Scatterometer)
  - GCOMW AMSR2
  - SMAP
  - JASON 3

- **Existing Sensors optimization:**

  (QC, Surface-sensitive channels assimilation, pre-processing, dynamic emissivity, etc)

  - ATMS, SSMIS, AMSU, MHS

2) Joint Effort for Data assimilation Integration (JEDI)

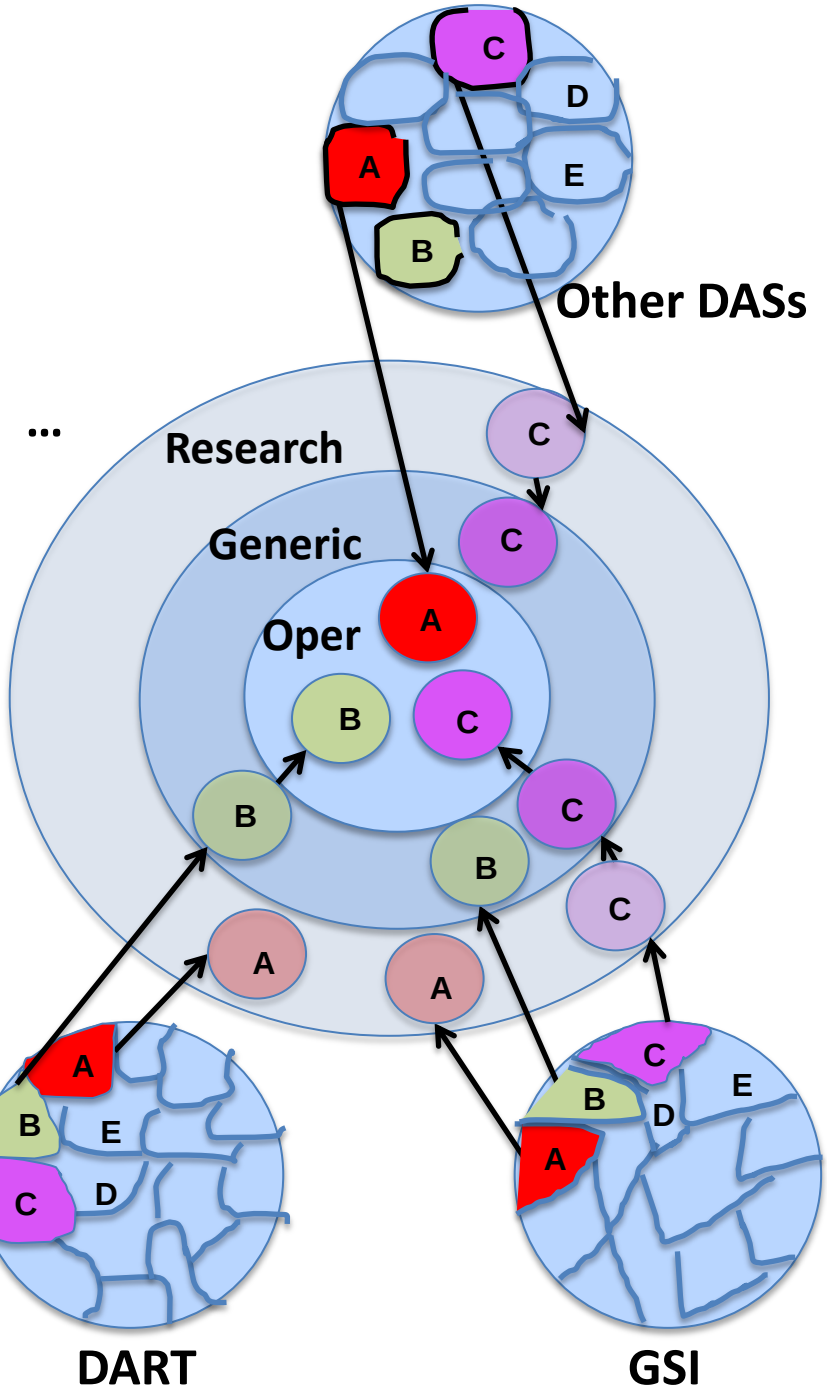
GOALS

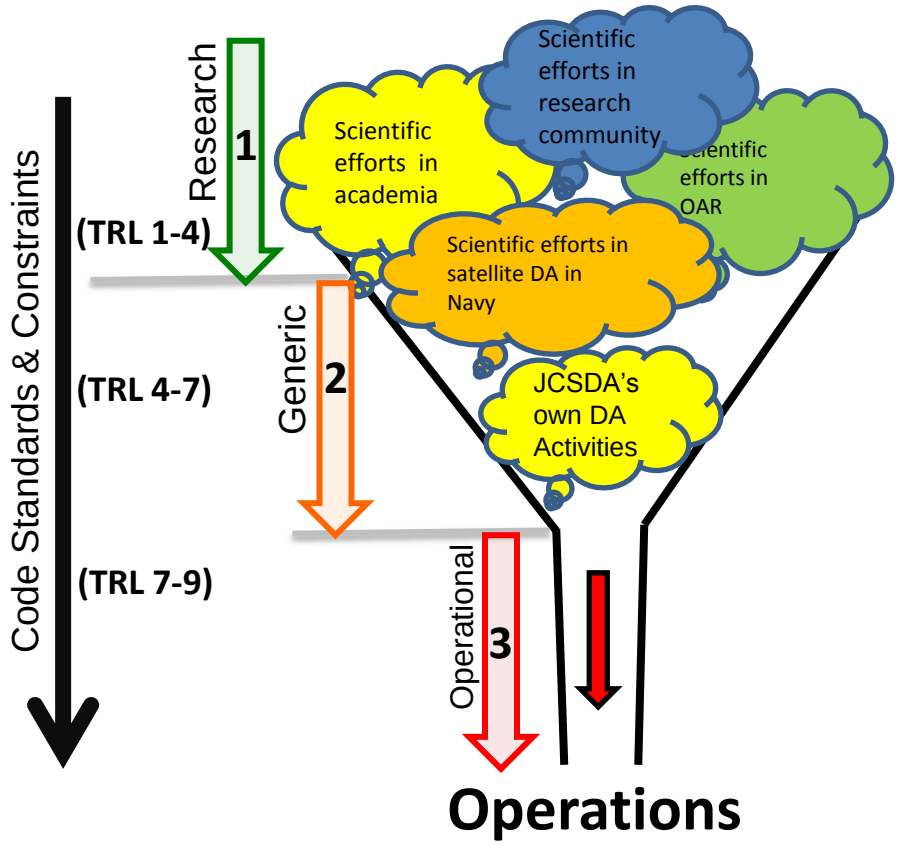
1. Nation **unified next-generation** Data Assimilation system
2. Increase **R2O** transition rate from academic community
3. Increase **science productivity** and **code performance**

STRATEGY

1. Modular code for flexibility, robustness and optimization
2. Mutualize **model-agnostic** components across
   - Applications (atmosphere, ocean, strongly coupled, etc.)
   - Models & Grids (operational/research, regional/global models)
   - Observations (past, current and future)
3. Collective reduction of entropy

MULTI-LEVEL COMMUNITY REPOSITORY



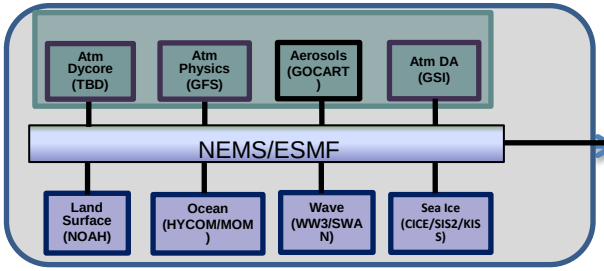


DATA ASSIMILATION COMPONENTS
for Atmosphere, Ocean, Waves, Sea-ice, Land, Aerosols, Chemistry, Hydrology, Ionosphere

Observations

Obs. Pre-processor
- Reading
- Data selection
- Basic QC

CODBMS: Community Observation Data Base Management System



Unified Forward Operator (UFO)

CODBMS *(obs + model equivalent)*

Solver
- Variational/EnKF
- Hybrid

Background & Obs Error

- Verification
- Model post-proc.
- Cal/Val, Monitoring
- Retrievals
- Simulated Obs.

Analysis Increments

- ***Model Initial Conditions***
- ***Observation Impact (OSE, OSSE)***
- ***Situational awareness***
- ***Reanalysis***

3) Scientific Frontiers for this year

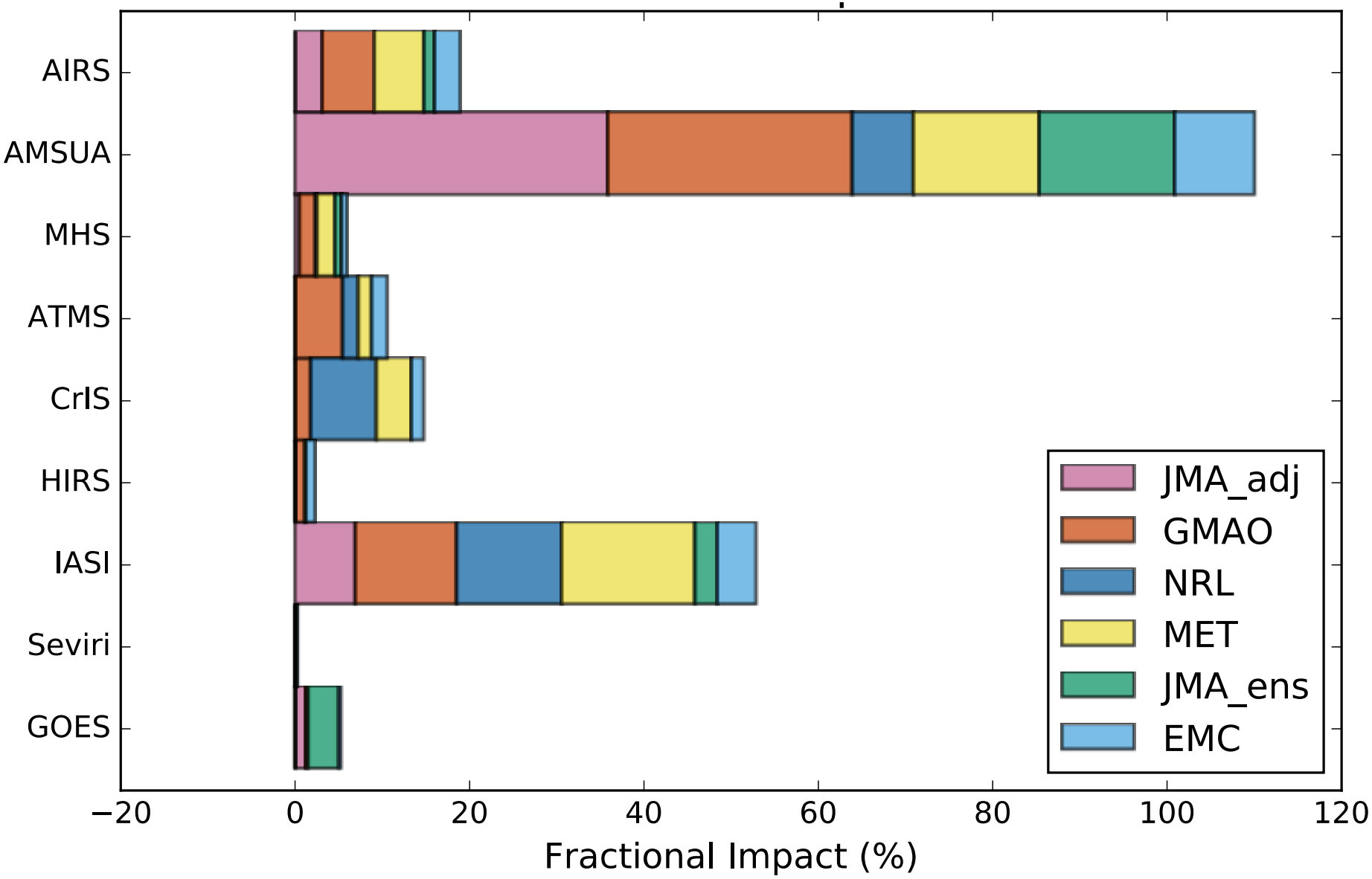
- Improve the Community Radiative Transfer Model (CRTM) transmittance calculation, cloud and aerosol optical properties, and software efficiency
- Assimilation of all-sky satellite radiances (esp. cloud-affected and over land)
- Improve balance in analysis (at all scales, better use of ensemble information)

4) Experimental Design

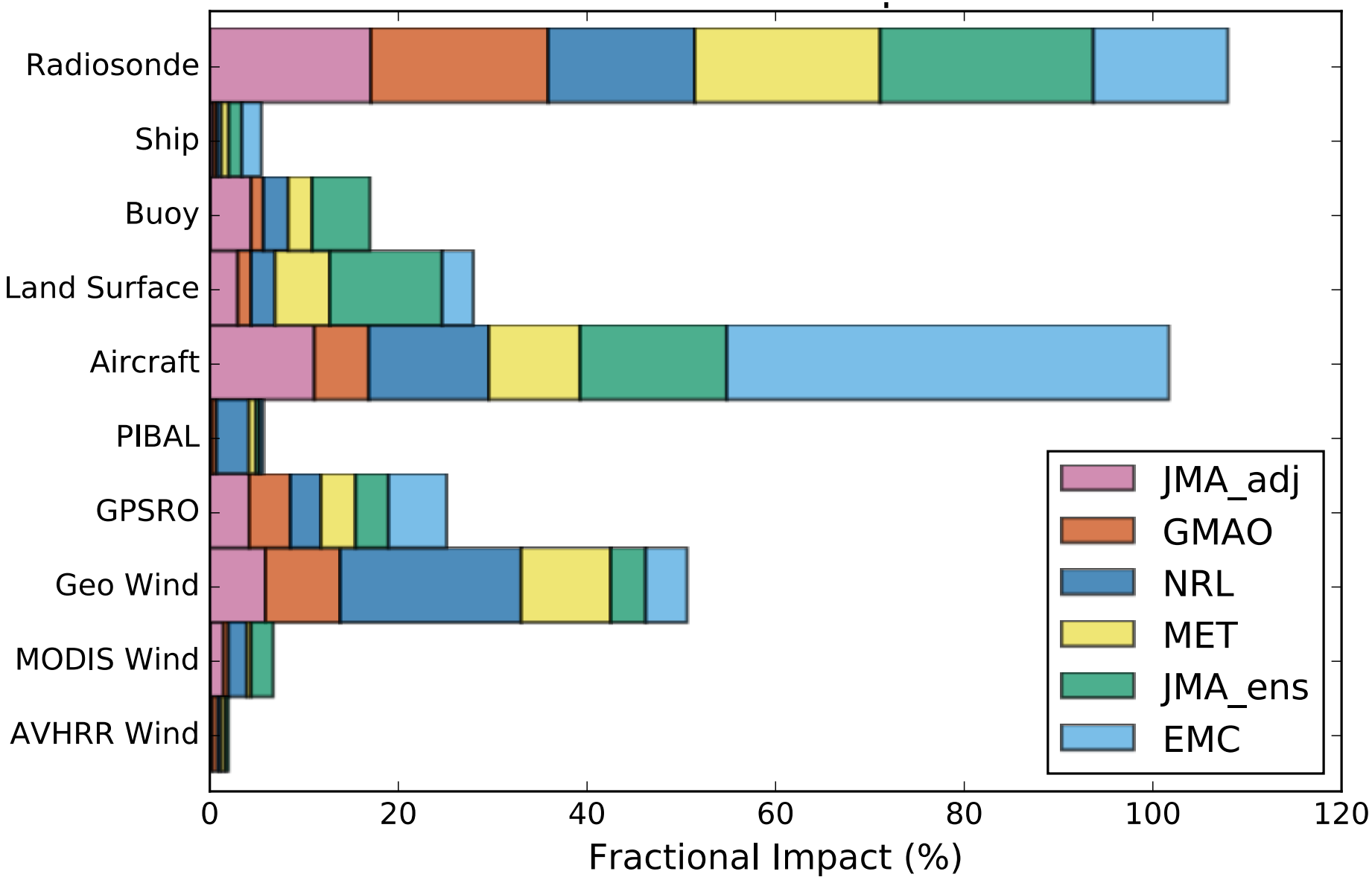
- **Time period**: 3-month DJF 2014-15 (planned JJA 2014)
  00UTC & 06UTC cycles
- **Verification**: 24h forecast against self analysis
- **Metric**: global total dry energy (surface-100hPa)
- **Adjoint**: dry plus moist physics, as available
- **Ensemble**: flow-following localization
- **Approach**: centrally collect data without aggregation
- **Participating Centers**: EMC, NRL, GMAO, Met Office, JMA

Results shown here are VERY preliminary
(only global summary plots of impact at 00UTC will be shown)

Fractional Impact at 00UTC: **Satellite Radiances**



Fractional Impact at 00UTC: **Other Observations**



5) JCSDA: Looking ahead

- Metrics of success = *added* value (faster, better, cheaper, safer) of doing work *jointly* via the JCSDA
- Scope of activities and role of JCSDA
  - Collaborative, inter-dependent activities
  - Annual Operating Plan
- Toward new Terms of Operations
  - Annual timeline

  - Project structure

Planned Project Structure

- **Project #1: CRTM**
  - Science Project Manager and Software Engineer
  - Draft work plan under construction
- **Project #2: New and Improved Observations**
  - Prioritized list of new sensors + Readiness action plans
  - Cloud-and-precipitation-affected radiances
  - Radiances over land
- **Project #3: JEDI**
  - Science Project Manager and Software Engineer
  - Unified Forward Operator (atmosphere, ocean, sea-ice, *etc*)
  - JCSDA member of GSI/EnKF DA Review Committee
- **Project #4: Observing System Impact Assessment**
  - JCSDA Observing System Assessment Standing Capability (JOSASC)
  - Commercial Weather Data Pilot (CWDP) project

Conclusion

- JCSDA = multi-agency, distributed center enabling partners to share efforts and results to accelerate, enhance, and expand use of satellite data in operational prediction systems
- Keys to Success Include
  - Development and adoption of Common Tools (CRTM)
  - R2O supported by O2R infrastructure (R2O2R2….)
  - Effective communication b/w partners, R&O communities
- Future Outlook
  - Exploring means to be more collaborative in planning and execution
  - Plan to hire JCSDA Executive Officer
  - Starting July 2016, JCSDA Director in Boulder, CO


Questions?