

NESDIS Satellite Research to Operations (R2O)

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R2O Authorities

- **National Space Policy – June 28, 2010**
 - The Secretary of Commerce, through the National Oceanic and Atmospheric Administration (NOAA) Administrator, and in coordination with the NASA Administrator and other appropriate departments and agencies, shall, in support of operational requirements: Transition mature research and development Earth observation satellites to long-term operations.
- **NASA Authorization Act 2008**
 - It is the sense of the Congress that experimental NASA sensors and missions that have the potential to benefit society if transitioned into operational monitoring systems be transitioned into operational status whenever possible.
 - The Administrator and the Administrator of NOAA shall each designate an agency official who shall have the responsibility for and authority to lead NASA's and NOAA's transition activities and interagency coordination.
- **NASA Authorization Act 2005**
 - The Administrator, in conjunction with the Administrator of the National Oceanic and Atmospheric Administration and in consultation with other relevant agencies, shall evaluate relevant NASA science missions for their potential operational capabilities and shall prepare transition plans for the existing and future Earth observing systems found to have potential operational capabilities.
- **NAO 216-105**
- **NOAA 2007 Satellite Strategic Plan and 2010 Operational Satellite Continuity Plan**

A Vision for Improving the R2O Process

- **National Commitment**
 - U.S. must embrace operational continuation of NASA Earth measurements as called for by the National Space Policy
 - Includes Administration & Congress
- **Funding**
 - Stable funding sufficient to support R2O transitions will make NOAA a credible and viable NASA R2O partner
- **A NASA Strategic Imperative**
 - NOAA encourages NASA to formally embrace the goal of enhancing NOAA's observational technology
 - NOAA's long-term requirements should be considered in NASA's research portfolio – in a way which doesn't compromise NASA's research imperatives
 - Mission reviews should consider NOAA's operational applications
 - NASA's Extended Mission reviews do this
- **NASA and NOAA must employ transition-friendly procurement strategies**
 - Ex: NASA could procure two satellites enabling time for NOAA to add observation via budgeting process
 - Ex: NASA contract options which allow NOAA to procure follow-on instruments
 - Requires funding in the NOAA portfolio to support efforts (e.g. participating in long-term parts buys, funding in place to exercise options)

NESDIS R2O Goals

- 1. Advance NOAA's strategic goals**
- 2. Improve NOAA's cost-effectiveness by identifying non-NOAA technology which is:**
 - **Operationally-relevant**
 - **Observational or assimilation**
 - **Available for transfer to operations**
- 3. Develop a process to prioritize NESDIS R2O candidates**
- 4. Ensure NOAA is poised to smoothly and quickly introduce funded R2O capabilities**
- 5. Maximize collaboration with NOAA Line Offices and other partners; i.e., NASA, EUMETSAT, JAXA, etc.**

Transition Phases

- **Phase 0: Satellite Strategic Plan**
- **Phase 1: Transition Survey/Evaluation (base \$)**
 - Opportunity Identification – Create Transition Survey
 - Scientific Engagement with non-NOAA researchers
 - Transition Planning decision => Phase 2
- **Phase 2: Transition Planning (base \$)**
 - Engage across NESDIS, NOAA and outside
 - Develop Transition Plan
 - Facilitate Budget Decision Processes
- **Phase 3: Implementation (funded phase)**
 - For funded transition projects
 - Adds needed detail for execution and tracking

Background

- In 2007, a NOAA/NASA team developed an internal Satellite Strategic Plan
 - Examined NOAA's documented Earth observation requirements and means by which requirements were currently being met; outlined detailed strategy for addressing NOAA's requirements for the future
- The plan recommended that NOAA Pursue “Research to Operations” transitions
 - Pursue high priority measurement candidates for research to operations (R2O) transition and incorporate into budget submissions as they are ready
 - Ocean altimetry, solar wind, radio occultation measurements for atmospheric temperature and humidity profiles, ocean surface vector winds
 - Identify future measurement candidates and partnerships for R2O transitions
 - Continue work with commercial sector for possible purchase of satellite products and services

Background

- **NASA and other international partners are flying research satellites that are used by NOAA for operational purposes**
 - Planning for an operational follow-on satellite capability may require planning 10+ years in advance
 - Acquisition must begin 5-10 years prior to the end of the research satellite mission to ensure observation continuity
 - QuikSCAT is an example of the need for this process
 - NESDIS OSD/STAR/OSDPD/OSO and Data Centers will coordinate the approach to satellite transition planning
 - NESDIS will coordinate need with other NOAA organizations

NOAA and NASA Coordination of R2O

- **NOAA NASA Earth Sciences Joint Working Group (JWG) on R2O**
 - NASA Earth Sciences Division Chief, and NOAA Assistant Administrator for Satellite and Information Services, co-chair
 - Quarterly face-to-face Meetings attended by senior staff
 - JWG provides a forum to maintain the status on ongoing R2O transitions
 - R2O Transition challenges are identified, addressed and resolved
- **Ongoing NOAA R2O planning**
 - NOAA prepares 2 page “surveys” of planned Earth-observation research satellites
 - Assesses potential operational value and limitation toward meeting NOAA requirements
 - Assesses maturity of technology
 - Supports transition planning decision process
 - Completed for SMAP and GPM – working on others
 - NOAA proactively plans possible transitions
 - Transition Plans consider how new assets could complement existing NOAA resources
 - Early and advance planning is designed to reduce historically long transition cycle
 - NOAA raising public awareness of R2O coordination through formal presentations at conferences
 - AMS meetings in Atlanta (Jan 2009); Annapolis (Sep 2010); and Seattle (Jan 2011)

NOAA R2O Transition Planning

- **NOAA R2O Transition Plan**
 - **What it is:** A 10-20 page document describing the NOAA consensus approach for planning operational continuity of a demonstrated research capability that has proven to be critical for meeting NOAA operational requirements for earth or space weather observations
 - **What it is not:** A budget planning document establishing NOAA priorities for investments in observing systems
- **NOAA Transition Survey**
 - **What it is:** A 2 page description of a research satellite capability used by scientists to inform users of potential operational benefit
 - **What it is not:** The only solution for meeting NOAA requirements for earth and space weather observations

NESDIS Research to Operations (R2O) Management Review Team

- OSD – John Pereira
 - STAR – Ralph Ferraro
 - NCDC – John Bates
 - NGDC – Bill Denig
 - OSO/OSDPD – Karl Hampton / Selina Nauman
 - R2O coordinator – Dan Mamula
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- **Weekly Status meetings - Wednesdays @ 1PM**

Transition Plans

- NOAA NAO 216-105, Policy on Transition of Research to Application, prescribes that “NOAA will maximize the application of NOAA sponsored research and capitalize on non-NOAA research”
 - NOAA shall maintain planning and oversight processes to include development of transition plans
- NESDIS has developed a Transition Plan process to provide NOAA leadership with the ability to capitalize on proven research satellite missions
 - Coordinated effort between NESDIS offices (OSD, STAR, OSDPD, OSO, Data Centers) and NOAA users
 - Transition documents are planned for public release
 - NOSC facilitates operational user review of documentation

Transition Plans Status

- **Completed**
 - Solar Wind
 - Signed by NESDIS and NWS AA's
- **Next**
 - GNSSRO
 - Coordinated among OSD, STAR, NCDC and NGDC
 - Comment under review and coordination
 - OSW
 - Edited and waiting for GNSSRO to be pass through managers
- **Draft**
 - GPM
 - Coordinating on scope of Plan with STAR and NWS hydrology office
 - Data Flow diagram being created to help clarify scope

Transition Surveys

- **2 page summaries of research satellite missions**
 - Primarily NASA but may be foreign satellites
- **Developed by Program Scientist (STAR) with help from OSD**
- **Four subject areas**
 - Background
 - NOAA benefits
 - Mission specifications
 - Limitations
- **Used to start dialog with the operational user community**

Transition Surveys

- **Completed Surveys**
 - Global Precipitation Mission
 - SMAP -- Soil Moisture
 - Aquarius – Sea-surface Salinity
- **Near term Surveys to be completed –launches through 2015**
 - Glory -- Total Solar Irradiance, Aerosol Polarimetry
 - OCO-2 – Carbon Dioxide
 - SAGE III – Aerosols, ozone, water vapor
 - ICESAT-2 – Ice Sheet Climatology
- **Surveys to be completed**
 - CLARREO – Absolute calibration standard, GPSRO
 - DesDynI – Ice Concentration
 - PACE – Pre-ACE Polar-orbiting atmospheric properties and ocean color
 - ASCENDS -- Carbon Dioxide
 - GeoCAPE – Geostationary Atmospheric Composition and Ocean Color
 - SWOT – Altimetry