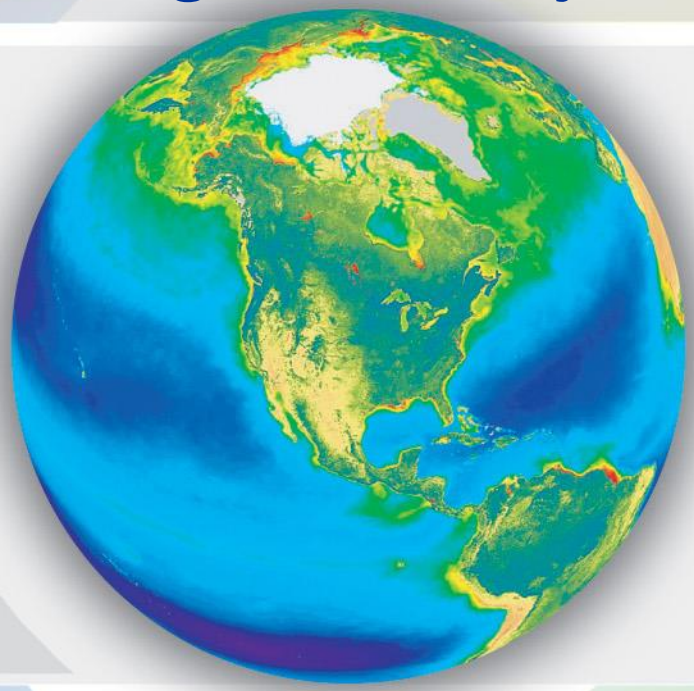
State of the Program: NASA Ocean Biology & Biogeochemistry



Paula Bontempi and Kathy Tedesco
NASA Headquarters
NASA Ocean Color Research Team Meeting
5-7 May 2014

Announcements

- **Speakers – talks will be posted on the ocean color website, so please submit a copy in the folder on the Desktop (NASA OCRT 2014). Please remember to remove any material you do not want posted.**

- **Dr. Kathy Tedesco rotator in the NASA Ocean Biology and Biogeochemistry program: kathy.a.tedesco@nasa.gov or 202.358.4578**

- **HICO Science Team Meeting 7-8 May**

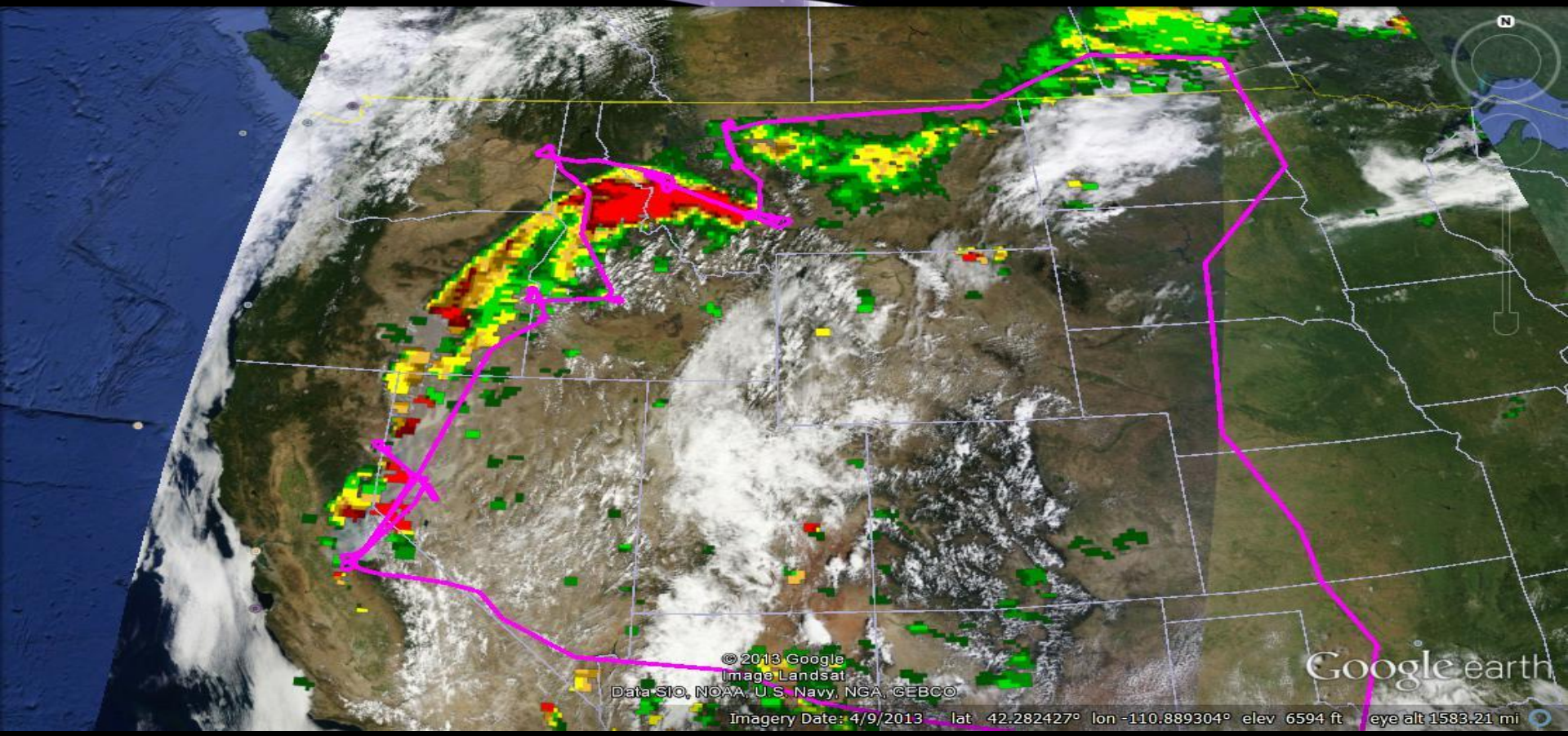
- **Biodiversity and Ecological Forecasting Team Meeting 7-9 May**

Agenda

- NASA Headquarters Update (Q&A)
- NASA Ocean Biology Processing Group Update/Field Office
- Field Project Updates (EXPORTS, etc.)
- Advanced Planning for Ocean Biology and Biogeochemistry, including the next Decadal Survey
- Project Updates

- Poster Sessions – Monday (evens) and Tuesday (odds) 530-630pm

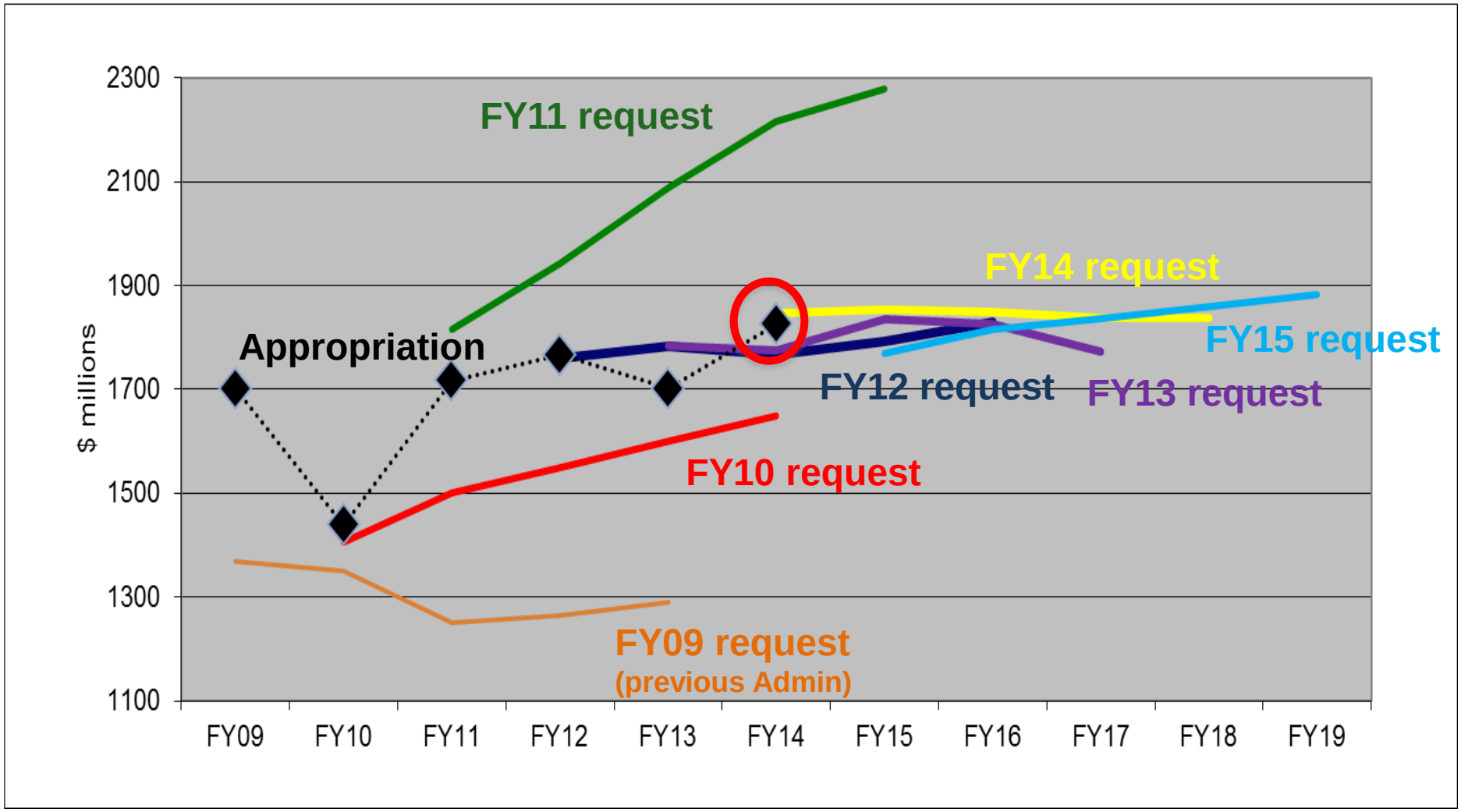
National Aeronautics and Space Administration



ESD: FY15 Budget Request Overview

March 11, 2014

Earth Science Budget: FY15 Request/Appropriation



FY 2015 Budget Request

				Notional			
	FY 2013 Op Plan*	FY 2014 Enacted**	FY2015	FY2016	FY2017	FY2018	FY2019
Science	4,781.6	5,151.2	4,972.0	5,021.7	5,071.9	5,122.6	5,173.9
Earth Science	1,659.2	1,826.0	1,770.3	1,815.5	1,837.6	1,861.9	1,886.3
Planetary Science	1,274.6	1,345.0	1,280.3	1,304.9	1,337.1	1,355.7	1,374.1
Astrophysics	617.0	668.0	607.3	633.7	651.2	696.8	993.0
James Webb Space Telescope	627.6	658.2	645.4	620.0	569.4	534.9	305.0
Heliophysics	603.2	654.0	668.9	647.6	676.6	673.3	675.5
Aeronautics	529.5	566.0	551.1	556.6	562.2	567.8	573.5
Space Technology	614.5	576.0	705.5	712.6	719.7	726.9	734.2
Exploration	3,705.5	4,113.2	3,976.0	4,079.9	4,061.2	4,119.5	3,673.4
Exploration Systems Development	2,883.8	3,115.2	2,784.4	2,863.3	2,917.7	2,993.9	3,106.6
Commercial Spaceflight	525.0	696.0	848.3	872.3	791.7	730.9	172.0
Exploration Research and Development	296.7	302.0	343.4	344.3	351.8	394.7	394.7
Space Operations	3,724.9	3,778.0	3,905.4	3,951.9	4,051.0	4,073.8	4,601.8
Space Shuttle	38.8		0.0	0.0	0.0	0.0	0.0
International Space Station	2,775.9		3,050.8	3,126.5	3,266.9	3,290.3	3,818.6
Space and Flight Support (SFS)	910.2		854.6	825.4	784.1	783.5	783.2
Education	116.3	116.6	88.9	89.8	90.7	91.6	92.6
Cross Agency Support	2,711.0	2,793.0	2,778.6	2,806.4	2,834.4	2,862.8	2,891.4
Center Management and Operations	1,991.6		2,038.8	2,059.2	2,079.7	2,100.5	2,121.6
Agency Management and Operations	719.4		739.8	747.2	754.7	762.3	769.8
Construction & Envrmtl Compl Restoration	646.6	515.0	446.1	379.0	382.7	386.6	390.4
Construction of Facilities	589.5		370.6	302.7	305.7	308.7	311.8
Environmental Compliance and Restoration	57.0		75.5	76.3	77.0	77.8	78.6
Inspector General	35.3	37.5	37.0	37.4	37.7	38.1	38.5
Grand Total	**16,865.2**	**17,646.5**	**17,460.6**	**17,635.3**	**17,811.5**	**17,989.7**	**18,169.7**

As reflected in the August 2013 Operating Plan, FY 2013 includes rescissions per P.L.113-6 Division G, Section 3001(b)(1)(B) and Division G, Section 3004(c)(1) and reductions due to sequestration per BBEDCA Section 215A.

****FY 2014 reflects funding amounts specified in P.L. 113-76, Consolidated Appropriations Act, 2014, including amounts noted in the Explanatory Statement. Where amounts were not specified, no amount is shown in the budget table.***

Note: Funds associated with out-year estimates for programmatic construction remain in programmatic accounts.

3 ESD-developed EO missions launch in CY 2014
2 ISS-developed EO instruments in 2014, 1 in 2016
9 more ESD EO launches before 2022

Earth Systematic Missions Program

- Phase E: GPM, TRMM, Terra, Aqua, Aura, EO-1, OSTM/Jason-2, S-NPP, [Landsat-7], Landsat-8
  - ACRIMSAT & QuikScat to be terminated, SORCE TBD
- Phase C/D: [DSCOVR (2015)], SMAP (2014), SAGE III (2015), GRACE FO (2017), ICESat-2 (~2018)
- Phase A/B: SWOT (2020), RBI (2019), OMPS-L (2019)
- Pre-Phase A:
  - Near term: PACE (~2020), NI-SAR (~2020/2021), TSIS (2021)
  - Sustainable Land Imaging – pending outcome of NASA/USGS study and Administration decision
  - Longer term (lower level): CLARREO, HyspIRI, ACE, ASCENDS, GEO-CAPE
- Multi-Mission Operations, including EOSDIS and DAACs

PACE Mission

The Fundamental PACE Science Drivers

WHY are ecosystems changing, **WHO** within an ecosystem are driving change, **WHAT** are the consequences & **HOW** will the future ocean look?

PACE will facilitate and advance research into:

- Plankton Stocks– Distinguish living phytoplankton from other constituents and identify nutrient stressors from turbid coastal waters to the bluest ocean
- Plankton Diversity – Characterize phytoplankton functional groups, particle size distributions, and dominant species
- Ocean Carbon – Assess changes in carbon concentrations, primary production, net community production and carbon export to the deep sea
- Human Impacts – Evaluate changes in land-ocean interactions, water quality, recreation, and other goods & services
- Understanding Change – Provide superior data precision and accuracy, advanced atmospheric correction, inter-mission synergies
- Forecasting Futures – Resolve mechanistic linkages between biology and physics that support of process-based modeling of future changes

PACE Mission

PACE will improve our understanding of ocean ecosystems and carbon cycling through its…

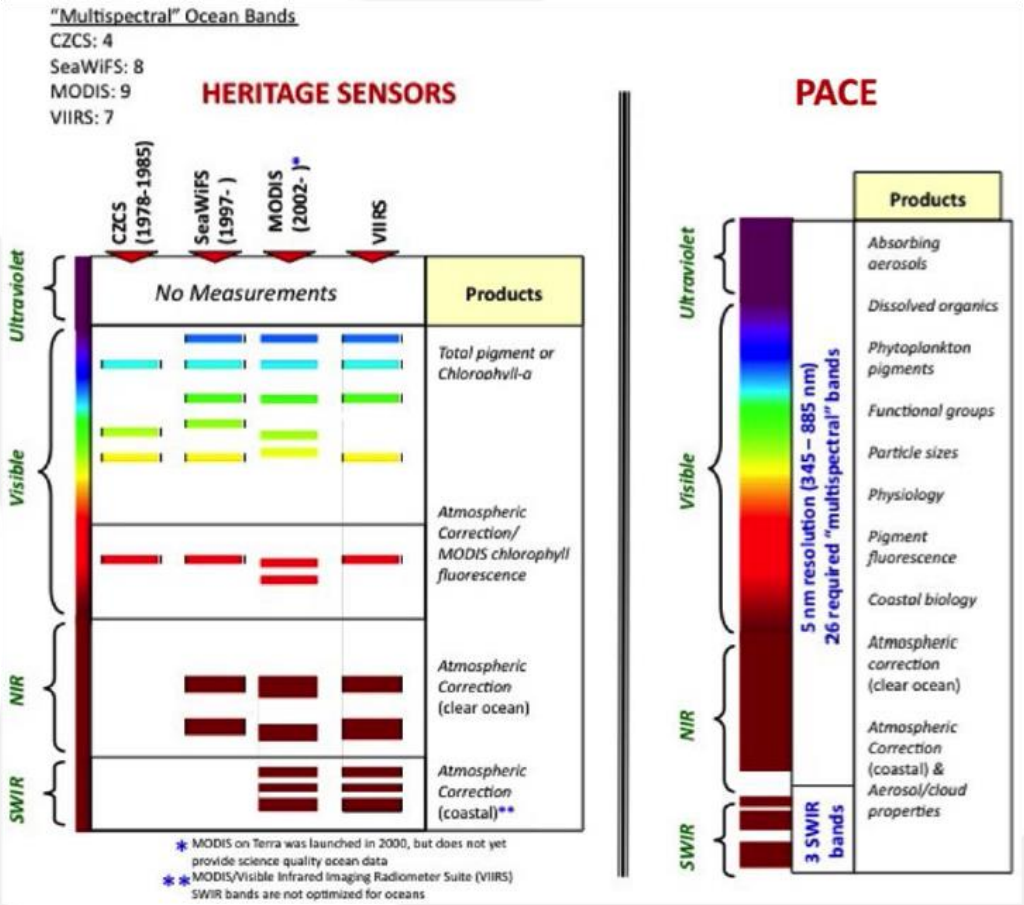
- Spectral Resolution – 5 nm resolution to separate constituents, characterize phytoplankton communities & nutrient stressors
- Spectral Range – Ultraviolet to Near Infrared covers key ocean spectral features
- Atmospheric Corrections – UV bands allow ‘spectral anchoring‘, SWIR for turbid coastal systems, *polarimeter option for advanced aerosol characterization is TBD*
- Strict Data Quality Requirements – Reliable detection of temporal trends and assessments of ecological rates
- PACE mission and operations concept will be similar to the successful SeaWiFS mission.

UV **VISIBLE** **NIR** **SWIR**

PACE Mission

The PACE Advantage:

- A mission architecture that includes continual post launch calibration (including lunar and vicarious calibration), algorithm development and maintenance, field validation and process studies.
- Unprecedented spectral and radiometric requirements



PACE Mission – ESD Path Forward

- Federal budget guidance urged NASA to work to a launch date as early as 2018
- NASA will complete and announce the agency implementation plan for PACE
  - Will include the approach for the mission, the instruments, the mission science, the calibration and validation elements
  - As a general rule within the SMD competition is preferred

- In FY2014 NASA will accomplish the following:
  - Risk reduction and formulation studies to support the **earliest possible launch date**
  - Release of an ocean color vicarious calibration approach and instrumentation competition through ROSES
  - Complete the PACE mission Science Team (ST) selection
  - Finalize the mission acquisition approach, including defining the baseline mission science objectives
  - Initiate the PACE project line, including release of all necessary solicitations

NASA PACE Opportunities in ROSES

- Research Opportunities in Space and Earth Sciences - http://nspires.nasaprs.com/ - Annual release mid-February
  - Ocean Biology and Biogeochemistry – generally an annual competition
  - Interdisciplinary Science
  - Carbon Cycle Science

  - ROSES 2013 A.25 PACE Science Team - $3M/yr for three years [31 March 2014]
    - IOPs
    - Atmospheric Correction
    - Science Team Leader
  - ROSES 2014 A.3 Ocean Biology and Biogeochemistry - Ocean color vicarious calibration approach and instrumentation competition

  - Future competitions might include
    - Pre-launch – Vicarious calibration system(s); science team for algorithms development
    - Post-launch – science team for new algorithms, science data analyses, vicarious calibration approaches, data validation, field campaigns

Hyperspectral Imager for the Coastal Ocean (HICO)

- Imaging spectrometer designed to sample the coastal ocean
- Coastal regions at 90 m with full spectral coverage (380 to 960 nm at 5.7 nm intervals) + a high signal-to-noise ratio
- Launched on the H-2 Transfer Vehicle (HTV) September 10, 2009
- Turned over to NASA in late 2012, approved data policy with ISS folks and partnerships with NRL-DC and OSU.
- HICO investigations included in SMD 2013 ROSES program element for the PACE mission Science Team
- Majority of HICO dataset now publically available through GSFC OceanColor web site
- HICO had an anomaly on 20 December, brought out of safehold successfully
- Talk by Bryan Franz this morning
- HICO Science Team Meeting 7-8 May at Sheraton

Missions in Formulation & Advance Planning

- Portable Remote Imaging SpectroMeter (PRISM) – a validated airborne instrument to identify constituents and quantify properties of complex coastal ocean waters using spectroscopic measurements with UV to SWIR channels
    - Talk by Heidi Dierssen on Wednesday morning, 7 May

- Aerosol, Cloud, ocean Ecosystem (ACE):
    - Science Working Group lead by Mike Behrenfeld - Full SWG Meeting for 9-11 June (Wash, DC)
    - 2013 Pre-Formulation Review Guidance - continue to concentrate on instrument capabilities, science sensitivity to measurement capabilities, associated algorithm development challenges.
    - Proceeding into FY14, the following guidance is given to the ACE team.
        1. Complete the Science Traceability Matrices for the separate scientific thrust areas;
        2. Complete the UV laser lifetime study, publish the results in a technical paper, if appropriate;
        3. Work with PACE team to explore options for how PACE and ACE ocean color instrument requirements may best be defined in a coordinated way, specifically to understand what evolution of measurement requirements can and should be from PACE to ACE;
        4. Complete processing of 2013 airborne campaigns, including PODEX campaign;
        5. Develop a rationale showing how the planning for FY15 and FY16 airborne campaigns support ACE atmospheric science requirements, especially in the light of upcoming 2nd Earth Science DS;
        6. Support the Earth Systematic Missions (ESM) Systems Engineering Working Group (SEWG) studies on TRL definition and instrument cost studies;
        7. Complete a comprehensive development report of ACE mission study activities - white paper summarizing results of the 5 years of pre-formulation work accomplished by SWGs

Missions in Formulation & Advance Planning

- GEO-CAPE (GEOstationary – Coastal and Air Pollution Events)
  - Science Working Group lead by Antonio Mannino and Joe Salisbury
  - 2013 Pre-Formulation Review Guidance - continue to focus on the individual measurement possibilities and the possibilities enabled by constellations of instruments on separate platforms
  - $850K of at-large funds for small proposals from ocean SWG
  - Proceeding into FY14, the following guidance is given to the GEO-CAPE team.
    1. Conduct Ocean Color instrument cost/capability sensitivity study;
    2. Deploy GEO-TASO during summer 2014 DISCOVER-AQ campaign, including possible extension to maximize overlap with the DISCOVER-AQ activities;
    3. Continue to liaise with ESSP to extend lessons learned from TEMPO and HoPS activities to GEO-CAPE planning;
    4. With the atmospheric SWG continue to define how TEMPO can be leveraged to complete GEO-CAPE science at minimum additional cost and advance readiness for use of TEMPO data within the global constellation;
    5. With the Ocean SWG apply available datasets to mitigate mission risk: constrain requirements, address geo-unique issues (atmospheric corrections, sun-sensor geometry, BRDF, etc.), novel products to retrieve diurnal rates.
    6. Work with the CLARREO study team in the exploration of combined low earth orbit and geostationary orbit observatory OSSE study, extending the work begun in 2013;
    7. Support the Earth Systematic Missions (ESM) Systems Engineering Working Group (SEWG) studies on TRL definition and instrument cost studies;
    8. Complete a comprehensive development report of GEO-CAPE mission study - white paper summarizing results of 5 years of pre-formulation work accomplished by SWGs

Hyperspectral Infrared Imager (HyspIRI) Aquatic Studies Group (HASG)

- HASG established Sept 2012 with ~20 members, now at 50.
- Chartered to compile community input regarding potential data products and applications for coastal and inland aquatic ecosystems.
- General areas of interest include :
  - Wetlands
  - Shoreline Processes
  - Water Surface Features
  - Water Column Constituents / Water Quality
  - Bathymetry
  - Benthic Cover
- Types of phenomena observed
  - Small scale – slowly changing.
  - Snap shots of events.

Healthy Corel Reef (Courtesy of E. Hochberg). Decadal Survey strongly calls for the mapping world's valuable and vulnerable reef systems

- Ostensibly supporting the HyspIRI mission; may expand scope to provide input to PACE, ACE, or GEO-CAPE, as needed.
- Produced 96 pg draft report – Currently under internal review. Final release in June.
- HASG Forum/Telecon planned for 6 June at GSFC HyspIRI Symposium – to participate please contact kevin.r.turpie@nasa.gov
- Special session planned for Ocean Optics XXII Oct 2014 – Portland, Maine

Hyperspectral Infrared Imager (HyspIRI) – Mission Characteristics

	VSWIR	TIR
Spectral Range	380 to 2500 nm	3.98, 7.35, 8.28, 9.07,10.53, 11.33, and 12.05 μm
Spectral Bandwidth	10 nm, uniform over range	0.084, 0.32, 0.34, 0.35,0.36, 0.54, 0.54, and 0.52 μm
Radiometric Resolution	14-bit	14-bit
Angular Field of View	12°	51°
Altitude	700 km	700 km
Swath Width	145 km	600 km
Cross Track Samples	>2400	10,000
Spatial Resolution	60 m (Depth < 50m) 1 km (Depth > 50m)	60 m (Depth < 50m) 1 km (Depth > 50m)
Orbit	Polar Ascending	Polar Ascending
Equatorial Crossing	11:00 a.m.	11:00 a.m.
Equatorial Revisit	19 days	5 days
Rapid Response	3 days	3 days
Tilt	4° West	4° West

Field Campaign Planning/Field Project Updates (Monday, 5 May PM session)

- Ship-Aircraft Bio-Optical Research (SABOR) campaign – I. Cetinic/Univ. of Maine - Projects funded under ROSES 2012 A. 3 Ocean Biology and Biogeochemistry – July/August field season (aircraft and ship)
- Impacts of Climate on the Eco-Systems and Chemistry of the Arctic Pacific Environment (ICESCAPE) Synthesis – W. Balch/Bigelow Laboratory for Ocean Sciences – in synthesis phase, one special issue of DSR in press, another planned for this year
- EXport Processes in the Ocean from Remote Sensing (EXPORTS) - Introducing a Science Plan for a NASA Field Campaign on the Ocean's Biological Pump – D. Siegel/ Univ. of California – Santa Barbara– delivery of Strategic Plan in June, to be posted on the CC&E web site and open for public comments for 60d
- Two field campaign scoping proposals selected in ROSES 2013 A.3 OBB:
  - Scoping for Interdisciplinary Coordinated Experiment of the Southern Ocean Carbon Cycle (ICESOCC) – G. Mitchell/University of California – San Diego – SIO
  - Arctic COastal Land Ocean InteRactions Scoping Study (Arctic-COLORS) – J. Salisbury/Univ. of New Hampshire (led by Antonio Mannino, NASA GSFC)
- The characteristics of IOPs in the Arctic Ocean; Contribution of the Tara Polar Circle expedition – E. Boss/University of Maine

OBB Science Advanced Planning (Tuesday, 6 May)

- AM - Beyond PACE: Advanced Planning for Ocean Biology and Biogeochemistry (led by Carlos DelCastillo)
  - Evolution of the Science in the 2007 NASA OBB Advance Plan
  - Preparation for the next NRC Decadal Survey (to be delivered in 2017)

- PM - A Planning Workshop for an International Research Program on the Coupled North Atlantic-Arctic System / Evolution of IMBER and Future Earth – E. Hofmann/ Old Dominion University

- Surface Ocean Lower Atmosphere Study (SOLAS) Update – B. Miller/University of Georgia

- Arctic Productivity Round Robin – P. Matrai /Bigelow Laboratory for Ocean Sciences

- North American Carbon Program Coastal CARbon Synthesis (CCARS) Community Workshop – M. Friedrichs/VIMS

NASA OB&B Research – Research Opportunities in Space and Earth Sciences

- ROSES 2013 - http://nspires.nasaprs.com/ - Released 14 February 2013
  - NASA Data for Operation and Assessment – $2M/yr. – 44 proposals [15 May 2013]- 13 selected ($3.8M/2 years)
    - Operational short-term weather prediction
    - Joint Center for Satellite Data Assimilation
    - Data and Methodology for climate projection assessment
    - Ecological forecasting – two proposals received, one selected
  - The Science of Terra and Aqua ~$11.5M/yr – 210 Proposals [20 May 2013] – 56 selected (~ $35M/3 yrs) – front-loaded selection
    - Science Data Analysis
      - Multiplatform and sensor data fusion
    - Algorithms – New Data Products
    - Real- or Near-Real-Time Data Algorithms
  - Ocean Biology and Biogeochemistry ~ $500K/yr – 11 proposals [30 May 2013] – 2 selected ($835K/18 months)
    - Scoping proposals for field campaigns (e.g., ICESCAPE)
  - Terra and Aqua – Algorithms – Existing Data Products ~$2.5M/yr 38 proposals [1 July 2013] – 32 selected ($19.4M/4 yrs) – front-loaded selection

NASA OB&B Research – Research Opportunities in Space and Earth Sciences

- ROSES 2013 - http://nspires.nasaprs.com/ - Released 14 February 2013
  - Carbon Cycle Science - 4 federal agencies, $12M/yr – 386 Step 1 proposals [1 July 2013]
    - 381 were compliant, 308 encouraged for Step 2, 235 compliant Step 2's received
      - NASA recommended 24 for funding ($21.9M/3 years), 17 Selectables identified by DOE, NOAA, USDA
    - Carbon Research in Critical Regions (NASA, DOE, USDA)
      - Carbon Dynamics in Tropical Terrestrial Ecosystems (moist forests and woodlands/savannas)
      - Carbon Dynamics in Arctic/Boreal Terrestrial Ecosystems
      - Carbon Cycling and Ecosystem Dynamics in High Latitude Oceans
    - Carbon Dynamics along Terrestrial-Aquatic Interfaces (NASA, DOE, USDA)
    - Belowground Carbon Processes and Soil Carbon (USDA, DOE)
    - Carbon Dynamics within Urban-Suburban-Forested-Agricultural Landscapes (NOAA, USDA, DOE, NASA)
    - The Impact of Rising CO2 on Aquatic Ecology (NASA)
    - Carbon Cycle Science Synthesis Research (NASA, USDA, DOE)

NASA OB&B Research – Research Opportunities in Space and Earth Sciences

- ROSES 2013 - http://nspires.nasaprs.com/ - Released 14 February 2013
  - Suomi National Polar-orbiting Partnership (NPP) Science Team and Science Investigator-led Processing Systems for Earth System Data Records From Suomi NPP Products ~ $8M/yr for the Science Team; SIPS are $2.3M in first 4 months, increasing to $9.4M in FY2018 – 119 proposals [10 March 2014] – review underway (July/Aug decisions)
    - Science Team
      - Development of science quality standard data products using Suomi NPP measurements that will enable continuity of key standard Earth system data records from NASA's EOS Terra, Aqua, and/or Aura satellites;
      - Development and demonstration of innovative and practical applications of NPP measurements;
      - Development of other new science data products from Suomi NPP measurements that will meet high-priority Earth science needs (a secondary priority); and
      - A Suomi NPP ST Leader and Discipline Leads.
    - SIPS
  - Pre-Aerosol, Cloud, ocean Ecosystem Science Team – ~$3.0M/yr – 49 proposals [31 March 2014] – review underway (target June/July decisions) – likely to start w/FY15 funds
    - IOPs
    - Atmospheric Correction (including Aerosols, Clouds / polarimetry)
    - Science Team Leader

NASA OB&B Research – Research Opportunities in Space and Earth Sciences

- ROSES 2014 - http://nspires.nasaprs.com/ - Released 19 February 2014
  - A.3 Ocean Biology and Biogeochemistry Ocean Color Remote Sensing Vicarious (*In Situ*) Calibration Instruments - $5.0M/yr for YR1, $5M/Yrs 2+3 combined
    - NOIs STRONGLY ENCOURAGED – due 5.16.2014, [19 June 2014] (target August decisions) – FY14 funds to start – front-loaded selection
    - Developed by ESTO, OBB, and based a few international consensus documents/ workshops on vicarious calibration requirements
  - New (Early Career) Investigator Program In Earth Science (NIP) - ~$1.0M/yr for three years [every 1-2 yrs, not in ROSES 2014]
    - Outstanding scientific research and career development of scientists and engineers at the early stage of their professional careers (no longer an E/PO requirement)
    - In ROSES 2013, 121 proposals received (25% increase from prior years), 21 selected
  - NASA EARTH AND SPACE SCIENCE FELLOWSHIP (NESSF) PROGRAM 2014/2015 ACADEMIC YEAR – each fellowship ~$30K/yr [try to do annually]
    - accredited U.S. Universities - Masters or Doctoral degrees in Earth and space sciences
    - Financial support from the Science Mission Directorate's divisions: Earth Science, Heliophysics, Planetary Science, Astrophysics.
    - For the 2013/2014 academic year - 50 new graduate fellowships in Earth Science.
    - Students admitted to, or already enrolled in, a full-time Masters and/or Ph.D. program at accredited U.S. universities eligible (non-US citizens welcome)
    - Students may enter the fellowship program at any time during their graduate work

NASA OB&B Research – Research Opportunities in Space and Earth Sciences

- **ROSES 2014 - http://nspires.nasaprs.com/ - Released 19 February 2014**
  - **Rapid Response and Novel Research in Earth Science – A.26 – (Diane Wickland, POC 2013, Tom Wagner POC 2014) [rolling deadline] - ROSES 2013, 17 proposals received, 4 selected; ROSES 2014 - 5 received, 1 selected - No budget for this –funded out of Core**
    - **immediate research activity to take advantage of a target of opportunity due to an unforeseen event in the Earth system, and**
    - **exceptionally novel and innovative ideas to advance Earth remote sensing that do not fit within ESD's current slate of solicitations and or programs.**
    - **2.1 Targets of Opportunity: Rapid Response to Earth System Events and Opportunities to Collaborate (Rapid Response) - Research proposals having great urgency for action 1) involving quick-response research on natural or anthropogenic extreme events, disasters, and/or similar unanticipated or unpredictable events, and 2) requiring a quick funding decision to take advantage of an opportunity for research collaboration that is only available for a short time.**
    - **2.2 First-Time Development of Innovative, Novel Ideas in Earth Remote Sensing (Novel Earth Science) - proposals to conduct highly novel scientific research that cannot be considered as relevant under any other NASA solicitations. Research that is new and different: initial exploration of a novel idea or a first demonstration of new scientific use of remote sensing data or technology**
    - **If there was an opportunity in the last three years that your work could have fit, do not bother submitting**
    - **MUST talk with RRNES POC and program officer ahead of submission**

NASA OB&B Research – Research Opportunities in Space and Earth Sciences

- ROSES 2014 - http://nspires.nasaprs.com/ - Released 19 February 2014
  - Topical Workshops, Symposia, Conferences – E.2 – (Max Bernstein, POC) – [rolling deadline]
    - Proposals for topical workshops, symposia, conferences, other scientific/technical meetings that advance the goals and objectives of only the following SMD Divisions: Earth Science, Heliophysics, and Planetary Science.
    - up to three year duration, can be multiple workshops in one proposal
    - cannot fund non-US participants unless in a direct support role (speaking, etc.)

  - Remote Sensing Theory for Earth Science – A.30 – ~$2.0M/yr– [3 November 2014]
    - Theoretical algorithm advances
    - Data Fusion
    - Advanced Corrections

    - NOTE: the federal government furlough in October significantly impacted many of these solicitations (panels, decisions, etc.)

OB&B Program Challenges

- **Uncosted carryover** – Carryover of funds from one fiscal year to next
  - Budget Control Act of 2010 – assessment of agency uncosted carryover and a rescission applied to the current agency budget as a result. Funds taken from each program were based on their uncosted carryover amounts.
  - Obligation and costing problem for NASA linked to invoicing from institutions, POP
  - Currently in your awards there is uncosted FY12-13 carryover.
  - PIs/Institutions need to invoice the agency for 100% of FY12 funds ASAP, and FY13 by the end of calendar 2014
  - Every year the government will look at each agency's uncosted again, and calculate a budget reduction accordingly.
  - Please check with your ORSP or equivalent, and please check with the NSSC to ensure your invoices have been received
  - Can exchange fiscal year funds in spring

- **E/PO** – FY13 guidance read that grants/cooperative agreements not affected, only NASA center staff and projects (can apply for a waiver). FY14 and out is the same – many budges zeroed out

International Ocean Color Science Team Meeting 2015

- Lessons learned from IOCST 2013 - http://iocs.ioccg.org/
  - Format?
  - Topics?
  - Splinter Sessions:
    - NASA Ocean Colour Research Team (OCRT) Meeting
    - Advances in Atmospheric Correction of Satellite Ocean-Color Imagery
    - Geostationary Ocean Colour Radiometry
    - Multi-Agency Data Sharing (Satellite and In Situ Data)
    - Operational Ocean Colour Data in Support of Research, Applications and Services
    - *In situ* Measurement Protocol Revision for Cal/Val
    - International Training and Outreach
    - System Vicarious Calibration
    - Climate Variables and Long Term Trends
    - Phytoplankton Community Structure from Ocean Colour
    - Satellite Data File Formats and Tools for Easy Science Exploitation
    - Satellite Instrument Pre-and Post-Launch Calibration
  - Reports and recommendations useful?
  - Workshops to come out of the splinter session reports?
  - CC&E Focus Area Meeting 20-24 April – DC area, venue search underway

Programmatic Last Thoughts

- Costing and Obligation – timely obligation and costing of funded projects (we lose funds due to uncosted carryover!)
- Reporting our accomplishments both within and outside the agency.
  - Copies of publications, ideally with an accompanying ppt slide(s) and narrative explaining the result(s) and scientific/societal significance
- Thank you to all who participate in science requirement development on missions (Decadal Survey and Climate Initiative)
  - ACE - SWG workshop 9-11 June in Washington, DC
- Next OCRT Meeting will be with IOCST – 2015 in US April timeframe
- Feedback on IOCST is needed and welcome
- PACE AO
- Future field campaigns and solicitations – look for posting of EXPORTS plan on CC&E web site, open public comment period