

PACE Project Science monthly update for the PACE Science Team

April 2016

Executive summary

Since Feb, the Project has focused most of its energy on passing its Mission Concept Review (MCR), which was held at GSFC from Mar 8-10. The Project passed this review. The MCR panel put forward 9 formal Requests for Action (RFAs) and 7 advisories. Other than continuing their ongoing mission, instrument payload, spacecraft, and science studies, the Project has followed up with the Canadian Space Agency (CSA) and the Naval Research Laboratory (NRL) regarding their proposal for a contributed dedicated coastal imager and has been preparing for the annual NASA Planning, Programming, Budget, and Execution (PPBE) exercise. Details are presented below, with the purpose of providing new information since the past monthly update.

Details

Project milestones

- MCR: The Project passed MCR. None of the RFAs substantially impact either Project Science or the Science Data Segment (OBPG data processing). Most RFAs focus on topics associated with mission scheduling, risk assessments and mitigation, and interfaces with non-Project entities. The Project is currently preparing responses to the RFAs.
- Key Decision Point A (KDP-A), the gateway into Phase A (mission formulation), is scheduled for mid-June. Unlike MCR, which was a 3-day internal GSFC review with a 10-member non-Project panel, KDP-A is a 3-hour review to brief, and be blessed by, NASA HQ. The Project is starting to prepare presentation material for this event.
- The Acquisition Strategy Meeting (ASM) will be conducted approximately 30 days after KDP-A. This is the event where HQ will codify the method of procuring the PACE polarimeter and spacecraft (bus).
- The System Requirements Review (SRR) is tentatively scheduled for August. This is a major review, required to be completed before entering Phase B, that evaluates whether the proposed mission and systems architecture is credible and responsive to mission requirements, constraints, and resources.

Instruments

- The Project had several conversations with CSA and NRL to discuss their proposal for a contributed dedicated coastal imager. While still outside the proposed mission concept for fiscal reasons, the Project is defining, evaluating, and costing the necessary accommodations to host a coastal imager on its spacecraft.
- A Science Team subgroup for the coastal imager has been formed and will be shepherded by Antonio Mannino. If you haven't already, please contact him with your interest in participating (antonio.mannino@nasa.gov).

- The Ocean Color Instrument (OCI) Engineering Team began a study to evaluate SNR, technology, data rate, and cost impacts for OCI ground sample distances (GSDs) of 500, 750, 1000, and 1250 m. As a reminder, the threshold OCI concept is a hyperspectral scanner with 1000 m GSD. See SNR vs. GSD Science analysis below.

Science analyses

All science data analysis packages will be shared with the Science Team. All input from the Science Team on any of the analyses, before or after completion, is most welcome.

- SNR vs. GSD: Project Science is compiling scientific benefits for the various GSDs and evaluating the impact of the modeled SNRs (provided by Engineering) for the modified instrument concepts needed to achieve the various GSDs. ST suggestions for atmospheric benefits of finer GSD are welcome. The Project expects combined Science and Engineering results to be compiled by mid-May. Results will impact near-term decisions on long-lead procurements, such as instrument detectors.
- Hyperspectral SWIR: Project Science requested that Engineering evaluate the technical and cost impacts of replacing any/all of the SWIR diode arrays with a spectrograph(s). Project Science is currently compiling a list of the scientific benefits of additional SWIR bands. Recall the SWIR band suite is 940, 1240, 1380, 1640, 2150, and 2230 nm.
- Altitude reduced from 675 km to ~450 km: Per the request of HQ, the Project is exploring the technical and scientific impacts of lowering the PACE observatory altitude to ~450 km. Hypothetically, were a satellite constellation to be formed around PACE, this would benefit LIDAR and radar instruments. In addition, ST input on an Equatorial crossing time of 13:30 (versus the threshold 11:00 to 13:00) is welcome.
- Spectral super-sampling: Project Science is compiling and evaluating the utilities of collecting data of finer spectral resolution than 5 nm and spectral steps (e.g., 1.25 nm) of overlapping 5 nm bands (FWHM) for small spectral ranges (e.g., the chlorophyll fluorescence peak and NO₂ range as identified in the SDT). ST suggestions for additional (limited) spectral domains where such sampling would have significant benefits to the mission are welcome (near the O₂ peak?).
- Others in the queue (advance input welcome from the ST): Science utility of extending the spectral range to 315 nm; SWIR SNR requirements; and, science impacts of spatial aggregation to smaller pixels at the end-of-scan (something the current OCI concept can do for UV-NIR, but not SWIR).

Communications

The Ocean Ecology Lab and OBPB have been increasingly supporting the ocean color communications and outreach material coming out of GSFC. The list below represents the material related to PACE. Please let the Project know about related ocean color, clouds, and aerosols communications and outreach activities!

- NASA-wide Earth Expeditions communications campaign, focusing on PACE science themes without specific mention of PACE until KDP-A: The Project has been collaborating with HQ, LaRC, JPL, and other NASA centers. For example: March 10

presentation to Museum Alliance and Solar System Ambassadors, ‘NASA Earth Expeditions: an Overview of How NASA Studies Earth’; [KORUS-OC](#) – planning key messages, press releases, social media, multi-media; [NAAMES](#) – planning to support press releases, NASA Social from Woods Hole, multi-media coverage from Woods Hole in port, C-130 in flight; and, [CORAL](#) – planning to support social media, press releases.

- Social media: [@NASAOceans](#) is up to ~700 followers and top tweets are steadily gaining impressions (93K), engagements (~500), and retweets (>100).
- Upcoming public engagement events staffed by PACE/OBPG members include the [Science and Engineering Festival](#) – Apr 15-17 (Hyperwall talks on El Nino and ocean color; supporting Earth Expeditions CORAL booth), and [Earth Day](#) – Apr 21-22 (ocean color table next to Landsat table to coordinate hands-on spectrophotometer activity and spectral matching game).