Preliminary management plan for PACE SDT

What are the Goals of PACE?

The goals of the PACE mission are:
1-Extend key climate data records on ocean color radiometry, clouds, and aerosols. Reduce uncertainties.

2-Produce new and continuing global observations of ocean ecology, biology, and chemistry required to quantify carbon storage and ecosystem function in response to climate variability. These observations may improve climate models.

The NASA Climate Centric architecture doccument[1] states that: ***The PACE mission will serve to make these measurements until the readiness of the more advanced Aerosols Cloud-Ecosystem (ACE) Mission recommended by the NRC Decadal survey for its Tier 2 mission set.***

What are the SDT responsibilities?

The members of the PACE SDT will provide NASA with scientific assistance during preliminary concept definition (Pre-Phase A) activities by providing three key deliverables:

1- Provide a justification for conducting the PACE investigations from space and an assessment of how such investigations will complement existing and planned domestic and international missions will be included in the SDT's report.

2- Providing science requirements, investigation approaches, key mission properties, and any other scientific inputs or threshold and baseline instrument requirements needed to support the design of an optimized space mission concept satisfying the overall goals of the PACE mission as outlined by the NASA's Climate Initiative. *This includes sensor calibration and data validation plans and instrumentation, as needed (Vicarious calibration is part of the mission)*.

3- Provide a description of a Design Reference Mission (DRM) that describes a preliminary investigation approach for the PACE prime science mission, including the expected scientific impact of a representative set of proposed strawman investigations.

How will the PACE SDT operate?

The SDT will convene at least three times and will hold teleconferences (scheduled as required). The SDT will have programmatic and technical assistance from NASA HQ and NASA centers. The SDT will also seek information from industry and academic institutions through formal Request for Information.

Guiding principles:

1-The SDT will propose a whole mission concept (see proposed table of contents). For example, if the SDT concludes that a vicarious calibration system is necessary to provide continuity of climate data records, then such system will be considered an integral part of the mission.

2-The STD will not be agnostic about cost. PACE has a budget profile and **we will stay within this budget.** Therefore, the SDT will have to make cost benefit analysis.

3. The SDT will not replicate SeaWiFS, PARASOL, or ACE. PACE will be a unique instrument.

What would be the contents of the report?

Based on several SDT reports, I propose this table of contents

Preface
The Science Definition Team
Summary
I-Background and Program Rationale
- Introduction
- Study approach and organization of the report
- Programmatic background
- Historical background
- Scientific background

II-Scientific Objectives
- Introduction
- Cloud, Aerosols
- Ocean color radiometry

III-PACE Science-Driven Measurement Requirements
- Introduction
- Cloud, Aerosols
- Ocean color radiometry

IV-PACE Mission Requirements
- Orbital
- Instrumental
- Post-launch calibration requirements
- Data processing, re-processing, and archiving, and dissemination requirements

Continuation proposed table of content

V-PACE Implementation Plan
- Orbit selection
- Strawman instruments
- Spacecraft requirements
- Vicarious calibration system requirements
- Launch Vehicle
- Mission operation
- Data processing

VI-Relationship Between PACE and Other Programs
- Science
- Data management

ETC....

Appendices

A. A description of strawman instruments

B Topics for Phase A studies.

The polarimeter problem

Recommended Path Forward by SDT Chair/Deputy

1. Establish aerosol/cloud “Threshold Requirements” for two separate concepts:

(a) An augmented OES imager to support some additional aerosol/cloud capability (but no polarimeter).

HQ provides cost-cap constraints and technical support to guide the scope of a potential augmentation. Example: ~$10M augmentation cost from Aug. 2011 ORCA IDL study [see Lisa Callahan PACE instrument estimates].

(b) An augmented OES imager + a 3MI-like polarimeter.

Would involve reverse of the normal STM formulation in the sense that the SDT would be instructed to determine the aerosol/cloud science capability that can come from a 3MI instrument. Would also allow the SDT to suggest 3MI augmentations to the French/U. Lille team to the extent that such input would be deemed useful.

2. “Goal Requirements” for aerosol/clouds:

(a) If NASA cannot currently provide a polarimeter should the French be unable to do so, do not ask the SDT to address goal requirements.

(b) If NASA is able to add a polarimeter into the PACE budget profile, then:

If the SDT charge is to engage in science-driven requirements, provide details on what HQ needs beyond what has already been delivered in the ACE Aerosol White Paper.

If the SDT charge is to consider cost-cap driven requirements, provide the cost cap and technical support to guide the scope of the science requirements. Use the APS2 and/or ACE Aerosol White Paper as the starting point.

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