

Science Interest Group #1: Virtual Town Hall #2

July 14, 2015

Scott Gaudi

(SIG#1 Chair)

Meeting structure.

Tuesday July 14, 2015 (all times pm EDT)

- 1:00–1:30 Introduction and Summary of Current Status
- 1:30–2:30 Discussion of Remaining Issues
- 2:30–3:00 Discussion of Joint Executive Summary and Table
- 3:00–4:00 Report Outline, Path Forward, Writing Assignments

NASA's Charge to the PAGs.

“I am charging the Astrophysics PAGs to solicit community input for the purpose of commenting on the small set [of large mission concepts to study], including adding or subtracting large mission concepts.”

Detailed Charge, Part 1.

1. Each PAG, under the leadership of its Executive Committee, shall broadly solicit the astronomy and astrophysics community for input to the report in an open and inclusive manner.
 - To accomplish this, each PAG is empowered to envision and use its own process.
2. Each PAG will consider what set of mission concepts should be studied to advance astrophysics as a whole; there is no desire for mission concepts to be identified as “belonging” to a specific Program or PAG.
 - Each PAG shall keep the number of large mission concepts in the set as small as possible.
 - Each PAG is specifically charged to consider modifications and subtractions from the small set, and not just additions.
3. Each PAG shall produce a report, where it shall comment on all large mission concepts in its small set of large missions, including those in the initial small set and those added or subtracted.
 - The PAGs may choose to work together and submit coordinated or joint reports.
 - Where there is existing analysis to support it, PAGs are encouraged to comment on the cost range anticipated large mission concepts (>\$1B? Maximum?)

Detailed Charge, Part 2.

4. Each PAG may choose to have a face-to-face meeting or workshop in developing its report; said meeting may be scheduled in proximity to an existing community meeting or conference.
5. Although there is no page limit for the report, each PAG shall strive to be succinct.
6. Each PAG shall submit its report in writing no later than two weeks prior to the Fall 2015 meeting of the NAC Astrophysics Subcommittee (meeting schedule not yet known).

Suggested Report Format.

- Process followed by the PAG to solicit input.
- Brief description of the community response.
- Procedure and criteria used for PAG analysis of community response.
- Outcome of the analysis and final small set of mission concepts ... every mission concept that is retained, added or subtracted must be accompanied by a short rationale.
- And additional considerations for NASA.
 - If desired, information regarding potential probe-class missions, to inform any future process for considering probe-class mission studies.

Constraints.

- Missions are to follow JWST and WFIRST.
- NASA's plans for realizing a space-based GW observatory is focused on partnering with ESA's L3 (LISA)
 - Study participation.
 - Technology development.
- CMB Polarization Surveyor is a probe-class mission.
- Basically: assume 2010 Decadal Priorities as a constraint.

Initial list of missions.

Taken from NASA Roadmap (Surveyors)
and Decadal Survey (HabEx)

- Far IR Surveyor
- Habitable–Exoplanet Imaging Mission
- UV/Optical/IR Surveyor
- X–ray Surveyor

What is *not* in our charge.

1. Detailed science goals or requirements.
2. Detailed architectures or technology requirements.
3. Advocacy or Advice (rather: “Analysis”)
4. Prioritization of the suggested missions.
5. “Ownership” of any mission concept by any individual PAGs
6. Don’t attempt to prepopulate the STDTs (Note: these are likely to be competitively selected).

Charge of the STDTs.

- Define science objectives and a strawman payload concept.
- Identify technology development requirements
- Develop a design reference mission.
- Conduct a cost assessment, with the possibility of iteration.
- *Goal: to maximize the potential of all of these missions.*

Timeline for STDTs.

- 2015:
 - Identify a small set of candidate large missions to study
 - PAG reports due by October 2015 APS meeting.
- 2016–2019:
 - Initiate studies.
 - Conduct studies.
 - Identify technology requirements
 - Deliver results to decadal survey.

Timeline/Meetings for Hertz Charge (completed).

- *January 2014: Initial discussion at ExoPAG 9.
- March 2014: APS approves SIG #1.
- June 2014: Brainstorming session at ExoPAG 10.
- January 2015: Brainstorming session at ExoPAG 11, Paul's charge.
- February 2015: First dedicated SIG #1 Meeting, brainstorming & consensus building.
- March 10 COPAG Virtual Town Hall
- March 19, 2015: Joint PAG EC meeting.
- April 11–14 2015, Am. Phys. Soc. (Baltimore) – PhysPAG
 - SIGs and PCOS mini-symposium
- June 2, 2015: ExoPAG Virtual Meeting
- June 3–5, 2015: Far-IR Workshop (Caltech) – COPAG
- June 13–14, 2015: ExoPAG #12 (Chicago) – ExoPAG
 - Half to full day to be spent on charge (2nd day)
- June 25–26, 2015: UV/Vis SIG Meeting, Greenbelt, MD – COPAG
- July 1, 2015: panel discussion during the HEAD meeting (Chicago) – PhysPAG
- July 3, 2015: joint PAG EC Chair telecon.
- July 13, 2015: joint PAG EC Chair telecon with Paul Hertz

Timeline/Meetings for Hertz Charge (future).

- July 14, 2015 – ExoPAG Virtual Meeting
- August 2015 – COPAG Virtual Town Hall
- August 7, Joint PAG Splinter Session at IAU, 1–5pm
- August 18, 2015 – ExoPAG Virtual Meeting
- July–September 2015: writing, circulating, finalizing report(s?).
- October 2015: Deliver report to Hertz (two weeks before the APS)

ExoPAG Points of Consensus.

1. There was a general support for WFIRST with a coronagraph **and** a starshade.
2. There was a general consensus that a broad range of apertures and architectures for direct imaging missions should be studied, encompassing both the nominal concepts of the HabEx and LUVOIR missions.
3. There was a general consensus that there should be a common executive summary with the other PAG reports. It was agreed that the executive summary should include: a statement that we support these four missions being studied, a recommendation for probe studies, and suggestions for how STDTs should be organized (provided that the other PAGs are in agreement on these points).
4. There was a general consensus that a common table describing the nominal parameters of the four missions should be included in the PAG reports. These parameters are to be determined in future discussions with the ExoPAG and other PAGs.
5. There was a general consensus that we should neither add nor subtract from the four proposed mission concepts (HabEx, LUVOIR, X-ray Surveyor, and Far-IR Surveyor).

ExoPAG Points of Consensus, cont.

6. With regards to organization of the HabEx and LUVOIR STDTs, there was a general consensus on the following points:
 - There should be two separate science teams and two separate engineering and technology teams.
 - The science teams should have significant overlap (common members), and should include significant representation from the planetary science community.
 - We should express the following concerns in the report:
 - Exoplanets may get marginalized in the LUVOIR STDT if their representation is too small.
 - The general astronomical community may get fractured if the representation of disciplines is very different between the two STDTs.
 - Thus the members of the science teams should be carefully chosen to ameliorate these concerns.
 - The teams should meet periodically, including the kickoff meeting.
 - There should be a small, independent and unbiased team that is tasked to evaluate the science yield and technical readiness of both mission designs in a consistent and transparent manner.

ExoPAG Points of Consensus, cont.

7. There was a general consensus that probe-class (<~\$1B) missions should be studied in advance of the next decadal survey, and that the following missions should be presented in the report as examples of possibly compelling probe-class missions.
 - A starshade for WFIRST-AFTA.
 - A transit characterization mission.
 - An astrometry mission.

Results from Meetings.

- COPAG SIG2 UV/VIS Meeting
 - As to the question of the other UV-visible Flagship under consideration – that of the HabEx mission, or Habitable Exoplanet mission, the SIG struggled with material evaluation of the mission since only a very vague sense of what the mission concept is was given by ExoPAG representatives:”
 - "However since the definitions, requirements and capabilities [of HabEx] are all so undefined, as well as the necessary technological advances and investments, a similar recommendation at the level of the 10m+ class UVOIR mission was simply not possible.”
- HEAD Meeting
 - Primary differences are precisely how to respond with regards to probes.
- Joint PAG EC Chair Telecon/Hertz Telecon
 - SIG2 does not represent all of COPAG.
 - “Analysis” not “Advocacy”

Suggested Topics of Discussion.

- Representation on and structure of the STDTs.
 - Should we quote percentages?
 - Financial support?
 - International participation?
 - Independent and uniform cost analysis?
- How do HDST/ATLAST/THEIA fit in?
- Specificity of science goals for the various missions.
- Content of the table of mission parameters.
- Executive summary
- Paths forward and writing assignments.

Requests:

- Let's be careful to distinguish facts from opinions and speculations.
- Let's focus on possibilities and solutions, rather than shooting down other people's ideas.
- Participate!
- Be generous: to each other, to the process, to facilitator (me!)
- Have fun!

Reference Material.

- <http://cor.gsfc.nasa.gov/copag/rfi/>
- <https://exep.jpl.nasa.gov/exopag/decadal/>
- <http://pcos.gsfc.nasa.gov/physpag/>