

X-Ray Surveyor Kickoff Meeting

March 31, 2016

Participants on Skype (additional members on phone):

Abe Falcone, Alexey Vikhlinin, Andy Ptak, Catherine Grant, Chris Reynolds, Daniel Stern, Dave Burrows, Doug Swartz, Eliot Quataert, Eric Schwartz, Feryal Ozel, Gabe Karpati, Gabriel Pratt, Jessica Gaskin, Harvey Tanenbaum, Joel Bregman, Mark King, Laura Lopez, Lou Kaluzienski, Piero Madau, Marco Ajello, Mark Bautz, Mike Pivovarov, Peter Bertone, Rachel Osten, Ralf Heilmann, Ralph Kraft, Randall Smith, Ryan Hickox, Shahid Habib, Steve Allen, Susan Neff, Suzanne Romaine, Tesla Jeltema, Martin Weisskopf, Juna Kollmeier, David Pooley, Megan Donahue

Agenda:

1. **Welcome and set-up/establish meeting protocols**

- a. Most efficient practices for how to take turns speaking (Jessica)

2. **Study Team Introductions**

- a. Study Office (Jessica Gaskin)
- b. PCOS role (Mansoor [Mooni] Ahmed)
- c. NASA HQ role (Dan Evans)
- d. International members. One or two international members describe their interests (Jessica)

3. **Overview of HQ Deliverable Schedule, STDT Responsibilities, Study Office Resources**

- a. Near-term deliverables (Alexey)
- b. Study Office resources (Jessica for MSFC, Alexey for SAO)
- c. Working groups (Alexey)

4. **X-ray Surveyor in the NASA Astrophysics Roadmap and in the 2015 studies**

- a. Science case --- call for exchange of ideas from STDT members (Feryal)
- b. Discussion of possible modifications to the notional concept (Alexey)

5. **Schedule of telecons. Date/Location for first face-to-face meeting. Informal meeting at AAS HEAD conference.** (Jessica)

6. **Comments, suggestions, input from STDT members** (Jessica)

Study Team Introductions

Study Office (Jessica Gaskin): The Study Team is a partnership between MSFC and SAO. This team has a history (over 40 years) of supporting successful X-Ray missions and is committed to supporting the X-Ray Surveyor Mission as well. This team will provide the STDT with the resources that they need to complete the required Study deliverables.

NASA HQ role (Dan Evans): Dan Evans is the X-Ray Surveyor Program Manager at NASA HQ. His role is to help optimize a strategy for making the X-Ray Surveyor successful and to ensure that this is a collaborative process. NASA HQ's PM role for the large missions is not to lead or direct the study, but to support the STDTs as needed.

PCOS role (Mansoor [Mooni] Ahmed): PCOS has prepared a management plan (that will be sent out to the STDT along with CML definitions by the Study Team) that highlights the required deliverables and deadlines. PCOS will provide an integrated review team and will off-load some of the logistical burden for travel and workshops as needed. They will also provide support for costing from Aerospace Corp., and will pay for the CAIT for the final design.

International Members and ex-officio member introductions (Jessica): Daniel Evans (NASA HQ Program Scientist), Ann Hornschemeier (PCOS Program Office Chief Scientist), Rob Petre (GSFC), Randall Smith (SAO, Athena Liaison), Paul Nandra (MPE, DLR Appointee), Brian McNamara (Waterloo, CSA Appointee), Gabriel Pratt (CEA Saclay, CNES Appointed)

Overview of HQ Deliverable Schedule, STDT Responsibilities, Study Office Resources

All study deliverables are in the Study Management Plan (to be sent to the STDT by the Study Team). Near-term deliverables are described on slide 10 of the kickoff presentation and are:

M1-Comments on Study Requirements and Deliverables (due April 29, 2016)

O1-Deliver Initial Technology Gap Assessment (due June 30, 2016). Mooni commented that O1 is, essentially, equivalent to submitting the technology gap assessment to the PCOS Program Office for their annual updates of the technology needs document.

M2-Detailed Study Plan (due August 26, 2016)

Please look at the NASA Study Management Plan:
science.nasa.gov/media/medialibrary/2016/03/15/Decadal_Studies_Management_Plan-RevA1_2016_03_15.pdf

For each of these deliverables, we will start the discussion and exchange comments by email, and continue during the next telecom.

STDT Responsibilities include defining a science case, notional mission, design reference mission, technology assessment, cost assessment and top level schedule.

MSFC working in partnership with SAO will provide the STDT with the tools they need to deliver a high quality package to the Decadal Review Panel. Both MSFC and SAO have agreed to contribute significant resources to support all tasks in addition to funding from NASA HQ. This support includes, but is not limited to: science and technology assessment, concept development, schedule and costing, specialized engineering design support, workshop development, website, and document repository. Feryal will set up a Dropbox for the team to use while a better solution is found.

In addition, PCOS will provide logistical support for travel and other as needed. The PCOS/COR/ExEP Program Offices are offering the following recommend (yet optional) initial briefings to the Study Teams. These are funded through the program offices and do not require Study Team funds.

1. An initial cost/risk/CATE lesson-learned briefing (one hour) from Keith Warfield. Keith served as the Study Office manager for the two exoplanet probe mission studies. This user-view briefing will address what to expect from the preliminary and final CATE process, the key factors in the CATE process (data requested => cost and risk output), how much detail is good enough (Master Equipment List examples), and how best to engage the Aerospace CATE team for a quality estimate.
2. A CATE introduction from the Aerospace Corporation team itself. We suggest that you schedule the Warfield briefing on a prior telecon or meeting to provide for the best context and understanding of this Aerospace briefing.
3. Tentative (conditional upon confirmation of program office budgeting): An initial “first look” critical assessment by Aerospace of the cost/risk drivers for each mission architecture. As Keith will describe in (1), this early assessment can be helpful in focusing design trades in during the study. The Program offices are negotiating a task with the Aerospace Corporation to have costing experts/consultants available to all teams during early phases of your deliberations so that you can get some feedback on cost and risk impacts of your trade decisions.

X-ray Surveyor in the NASA Astrophysics Roadmap and in the 2015 studies

Feryal discussed how the NASA Roadmap was generated. It consisted of a panel of 20 or so individuals all with backgrounds in different areas of astrophysics. The Roadmap science goals were not technology driven, although a few desirable features were recommended. These included: large collecting area, high angular resolution, and high spectral resolution.

A 2015 study lead by MSFC, SAO, and an informal team from the community produced a “proof-of-principle concept” implementation of the Roadmap vision. There also was an “X-ray Vision” science workshop discussion science for such a mission: http://cxc.harvard.edu/cdo/xray_surveyor/ (presentations linked under Details -> Program, and then open an abstract for each presentation).

What the STDT needs to decide is whether or not these are features that we are interested in keeping, or if there are other properties that we should also consider - such as timing resolution, a different energy range, etc... Once the high-level science case/path is identified, a mission concept can be generated. We should define this path as soon as possible so that we can identify Technology Gaps, to be used to assess future SAT and APRA prioritizations. This does not mean the science case and

requirements are final; there will be a back-and-forth between the science and technology development needs for some time.

Discussion followed on how the X-ray Surveyor mission configuration should follow from science requirements, to be continued by email.

A clarification of the Roadmap was made, in that the Roadmap was developed prior to Athena being selected. As a result, the full implications of Athena have yet to be worked through. We need a science case that will be very distinct or go well beyond what Athena can accomplish. Perhaps the high angular resolution combined with other Surveyor attributes is more than enough to justify this. In either case, this should be explored further.

Randall Smith agreed to send slides around highlighting the Athena science case. Currently, a smaller mirror for Athena is being considered.

The Athena optics requirements should be set in the summer or before (maybe in May, 2016) when the Instrument AO comes out. The mission will be adopted in late 2019-early 2020, and then the requirements will be defined.

Working Groups (WGs) to help define the science and technology will be discussed via email and during the next telecom. We had almost 80 applicants from high quality scientists around the country. We should engage the community as much as possible.

The STDT needs to define what areas need to be covered by the WGs (both Science and Technical), whether or not the WGs are open or closed to the community, and what the mechanism should be to establish these groups.

Athena uses a similar structure to define the Science and Technology and the process work well. There may be components of their structure that we can use.

An email discussion will be started on this topic.

Schedule of telecons. Date/Location for first face-to-face meeting. Informal meeting at AAS HEAD conference

Teleconferences will be scheduled for every 2 weeks. A Doodle Poll will be sent around soon for our next meeting.

The Study Team will also send around some options (time and location) for our first face-to-face meeting as well.