

Charter for the X-ray Surveyor Science Working Groups

Version 2; 8/1/2016

Background

NASA has appointed the X-ray Surveyor Science and Technology Definition Team (STDT) to develop the scientific and technical rationale for the X-ray Surveyor mission concept. This concept and its supporting science and technical case will be presented to the 2020 Decadal Survey of Astronomy and Astrophysics. NASA has charged the STDT to produce the following deliverables as it performs its concept study:

1. A science case for the mission.
2. A notional mission and observatory, including a report on any tradeoff analysis.
3. A design reference mission, including strawman payload trade studies.
4. A technology assessment including: current status, roadmap for maturation and resources.
5. A cost assessment and listing of the top technical risks to delivering the science capabilities.
6. A top-level schedule including a notional launch date and top schedule risks.

Additionally, the STDT serves as the focal point for the X-ray Surveyor concept within the broader astronomy community, performing mission advocacy through presentations and workshops.

In order to achieve these goals, the STDT has decided to seek assistance from the broader community by organizing a set of Working Groups, populated by scientists from both the STDT and the broad community. This charter addresses the role and structure of the Science Working Groups. Note that in addition to the science working groups, the STDT is also establishing technical working groups, such as the optics working group and the instrument working group. Their structure and roles are not covered by this document.

Role and Responsibilities of the Science Working Groups

1. Each Science Working Group (SWG) will deal with a broad scientific area relevant to X-ray Surveyor, as decided by the STDT. The list of SWGs is contained in the Appendix.
2. The primary role of the SWGs is to help the STDT develop the science case for X-ray Surveyor. In this role, the SWGs shall:
 - a. Identify key science questions within their broad scientific area that could be addressed by X-ray Surveyor, in particular those that the mission could uniquely address in light of future ground and space observatories and the expected science return from them.

- b. Identify and quantify the driving technical capabilities (such as, but not limited to, angular, spectral and temporal resolution; sensitivity) needed by X-ray Surveyor to address the identified science questions.
- c. Demonstrate how an X-ray Surveyor concept with the stated capabilities addresses the science questions, via calculations, simulations, or other quantitative methods.
- d. Identify what multiwavelength complementary data will be required to allow X-ray Surveyor to do fulfil its scientific objectives.
- e. Assess the outcome of technical trades; e.g., how a specific modification of a capability affects the ability of X-ray Surveyor to address the identified science questions.
- f. Provide text, graphs, and images related to their science area for the interim and final study reports, and other reports as needed.
- g. As requested by the STDT, provide presentations or presentation material covering their broad scientific area.
- h. Promote X-ray Surveyor as a future astronomical observatory.

Membership

1. Each SWG shall be composed of a number of scientists from the community. The members are primarily identified through an open community call.
2. Needed but missing expertise can be added through direct recruitment by STDT discipline leads. After the initial deadline for applying for membership, members of the community can request to be included on an SWG at any time by contacting one of the discipline leads.
3. There is no limit to the number of members of a particular SWG, but the working groups or their sub-groups need to remain at a size conducive to promptly addressing rapid turnaround requests from the STDT. Should the size grow large enough, the discipline leads may form focussed topical sub-groups.
4. Every SWG shall have at least one discipline lead who is an STDT member.
 - a. The STDT discipline leads shall be the primary interface between the SWG and the STDT. They shall report to the STDT on the SWG activities and will be the regular transmission channel of the STDT requests to the SWGs.
 - b. The STDT discipline leads shall call for SWG meetings, lead the discussions, organise the SWG structure, trigger and follow up the activities and prepare reports to be delivered to the STDT.
 - c. If the STDT members leading a particular SWG believe that they need additional expertise, they can nominate non-STDT members as additional discipline leads. The STDT must concur with any non-STDT discipline leads of SWGs.
5. There is no official term to SWG membership. It is assumed that all members will participate throughout the duration of the X-ray Surveyor study. If an STDT member must relinquish a discipline lead position, the STDT will appoint a replacement.

Organization

6. Each SWG shall organise itself and develop processes best suited for efficient performance of its responsibilities. If it is thought to be useful for more thoroughly addressing its broad mandate, discipline leads can appoint standing sub-working groups to investigate more specific areas.
 - a. Coordinators of these sub-working groups do not have to be STDT members.
7. SWG discipline leads can at any time establish temporary activity groups tasked with specific charges.

Milestones

8. The STDT shall establish the due dates for the delivery of the SWG inputs listed in point 2 above and any other requested information.
 - a. The first milestone is an initial report from each SWG on key science questions and observatory requirements at the second STDT face-to-face meeting, nominally in Fall 2016.
 - b. Additional milestones will be identified as the study progresses.

Intellectual property

9. Intellectual property of all material produced within the SWGs remains with its authors. In particular, SWG members are free to present or publish any material produced for an SWG. SWG members are reminded to include correct attribution of efforts to acknowledge the work of individual members.
10. Any such publication or presentation, on behalf of X-ray Surveyor generated in a SWG, needs prior concurrence from the corresponding SWG discipline lead.
11. SWG members are expected to deliver all relevant material produced through their activity to the STDT for use as part of the X-ray Surveyor concept study. This material will be made publicly available.

Recognition

12. When delivering X-ray Surveyor related presentations or submitting X-ray Surveyor related papers, SWG members shall notify the discipline leads of such presentations or papers. As stipulated in point 8 above, speaking on behalf of X-ray Surveyor needs prior concurrence by the SWG discipline leads.

APPENDIX. List of X-ray Surveyor Science Working Groups

1. Cycles of Baryons in and out of Galaxies

(includes: Cosmic Web, IGM, CGM, MW halo, evolution of normal galaxies)

STDT discipline leads: Joel Bregman, Juna Kollmeier

2. First Accretion Light in the Universe

(includes: BH seed formation, X-rays from early BHs, X-ray binaries in early galaxies, reionization of the universe, cross-correlation of X-ray emission from high-z with other tracers)

STDT discipline leads: Niel Brandt, Piero Madau, Daniel Stern

3. Evolution of Structure and AGN populations

(includes: statistical studies of AGN populations, galaxy evolution, galaxy clusters)

STDT discipline leads: Steve Allen, Ryan Hickox, Tesla Jeltema, Daniel Stern

4. Physics of Plasmas

(includes: shocks, particle acceleration, interfaces, transport processes, turbulence, instabilities, etc. in various astrophysical systems)

STDT discipline leads: Eliot Quataert, Alexey Vikhlinin

5. Physics of High Density Matter, Compact Objects, and Accretion

(includes: physics of cold dense matter, BH spacetimes, GR tests, TDEs, Short bursts)

STDT discipline leads: Feryal Ozel, Frits Paerels, Chris Reynolds

6. Physics of Feedback

(includes: feedback on all scales from BHs to young stars to SNe to jets to galactic winds)

STDT discipline leads: Megan Donahue, Chris Reynolds

7. Stellar Lifecycles

(includes: stars, X-ray binaries, supernovae, SN remnants)

STDT discipline leads: Laura Lopez, Rachel Osten, Dave Pooley, Andy Ptak

8. X-rays in the Multi-wavelength, Multi-Messenger Era

(Synergies with gravitational waves, WFIRST, LSST, etc.)

STDT discipline leads: Rob Petre, Randall Smith