Jessica A. Gaskin (Study Scientist, MSFC)
On Behalf of the X-Ray Surveyor Community

X-RAY SURVEYOR
– THE PATH FORWARD
X-ray Surveyor Goals

Scientifically Compelling
Frontier science from Solar system to first accretion light in Universe; revolution in understanding physics of astronomical systems

- Gather broad Science Community Support
- Maintain steadfast science requirements over Program lifetime

Leaps in Capability
Large area with high angular resolution with orders of magnitude gains in sensitivity, large field of view with subarcsec imaging, high resolution spectroscopy for point-like and extended sources, other?

- Allow for multiple technology paths
- Formulate a strong plan for achieving requirements
- Invest in technology development and proof-of-concept testing

Feasible
Chandra-like mission for cost and complexity

- Embrace Chandra Heritage and lessons learned
- Utilize previous studies when possible (IXO, Con-X, AXSIO, etc...)

Consistent with:
NASA Astrophysics Roadmap: Enduring Quests, Daring Visions

http://science.nasa.gov/media/medialibrary/2013/12/20/secure-Astrophysics_Roadmap_2013.pdf
Key topics that will be addressed include:

1) **The Origin and Growth of the First Supermassive Black Holes**
2) **The Physics of Feedback and Accretion in Galaxies and Clusters**
3) **Galaxy Evolution and the Growth of Cosmic Structure**
4) **The Physics of Matter in Extreme Environments**
5) **The Origin and Evolution of the Stars that make up our Universe.**
- Thirty Meter Telescope will have 144 times the collecting area of Hubble and more than 10x better spatial resolution at near-infrared and longer

- European Extremely Large Telescope will have images 16x sharper than Hubble

- Giant Magellan Telescope will have a resolving power 10 times greater than the Hubble
Scientifically Compelling – The Crab Nebula

Imagine a Universe without Chandra-Vision
New Discovery Space

We are now in the process of defining the successor to Chandra.

30 Doradus – The Tarantula Nebula


M87 Jet


We need your input!

AAS HEAD 2016, Naples, FL
STDT Members

Steve Allen, Stanford
Mark Bautz, MIT
Niel Brandt, Penn State
Joel Bregman, Michigan
Megan Donahue, MSU
Ryan Hickox, Dartmouth
Tesla Jeltema, UCSC
Juna Kollmeier, OCIW
Laura Lopez, Ohio State
Piero Madau, UCSC
Rachel Osten, STScI
Frits Paerels, Columbia

Alexey Vikhlinin, SAO
(Chair)
Mike Pivovaroff, LLNL
Dave Pooley, Trinity
Andy Ptak, GSFC

Feryal Özel, Arizona
(Chair)
Eliot Quataert, Berkeley
Chris Reynolds, UMD
Daniel Stern, JPL
Ex-Officio Non-Voting Members Of The STDT

Daniel Evans, NASA HQ (Program Scientist)

Ann Hornschemeier, PCOS Program Office Chief Scientist

Rob Petre, GSFC X-ray Lab Branch Chief

Randall Smith, Athena liaison

Paul Nandra, DLR-Appointed Observer

Brian McNamara, CSA-Appointed Observer

Gabriel Pratt, CNES-Appointed Observer
MSFC AND SAO STUDY TEAM LEADERSHIP

Jessica Gaskin, MSFC, Study Scientist
Alexey Vikhlinin, SAO, STDT Chair
Martin Weisskopf, MSFC Senior Scientist
Doug Swartz, USRA/MSFC Deputy Study Scientist
Gregg Gelmis, MSFC Study Manager
Harvey Tananbaum, SAO Senior Scientist

Smithsonian Astrophysical Observatory
NASA
Science Research Office
STDT Deliverables

Study output will provide the Decadal Survey Committee with:

1. A **science case** for the mission
2. A **notional mission** and observatory, including a report on any tradeoff analyses
3. A **design reference mission**, including strawman payload trade studies.
4. A **technology assessment** including: current status, roadmap for maturation & 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.

Concept Maturity Level 4 should be achieved by the end of the study
STDT And Management Structure

Science Working Groups

STDT [Community]

Design Trade and Analysis

STUDY TEAM [MSFC, SAO]

Optics Working Group

Focal Plane Working Group

OBSERVERS [HQ, PCOS, International Partners]

APD DD Decadal Studies Mgmt Team

Analysis

Integrated Review Team
STDT Near-Term Plan & Task Summary

STDT Kickoff Meeting was held March 30, 2016

Near-Term STDT tasks include:

1. Deciding on the structure and mechanics for the Working Groups
2. Sketching out high-level science prioritizations and a path forward
3. Determining potential technology gaps for input into SAT and APRA
4. Outlining a Study Plan for the next couple of years
Community Participation

Informal X-Ray Optics Working Group

• Workshop March 28-29, 2016, University of Maryland
• Participants included a mix of government, university, industry:
  • MSFC
  • GSFC
  • Harvard-SAIC
  • Ames
  • MIT
  • LLNL
  • Reflective X-Ray Optics
  • University of Maryland
  • Izentis, LLC
  • Northwestern University
  • Other

X-Ray Vision Science Workshop

• Workshop October 6-8, 2015, Washington DC
• Participants included ~100 participants from multiple universities and institutions
• http://cxc.harvard.edu/cdo/xray_surveyor/

Presentations and Brainstorming session white paper “X-ray Surveyor Discussion Session Results from the X-ray Vision Workshop” (Editors: G. Fabbiano, M. Elvis) are available on the website.
Community Participation

Your participation is fundamental to the X-Ray Surveyor mission top prioritization in the 2020 Decadal Survey

- Science Working Groups (formal and informal)
- Technology Working Groups (formal and informal)
- Workshops and Conferences
- Public Website (questions/suggestions-distribution list/newsletter)
- Requests for Information (RFIs) regarding relevant technologies
- Outreach (web-based Q&A, AAS "Future in Space" series of Hangouts-May 20)

Public Website: [https://science.msfc.nasa.gov/xrs](https://science.msfc.nasa.gov/xrs) (under construction)

Solicitation # NNM16ZPS002L

THANK YOU!