
Presenting LISA to Astro2020 (Decadal)

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Joint Meeting of the LISA Science Study Team (SST)

and the NASA LISA Study Team (NLST)

Johns Hopkins University

Baltimore, Maryland USA

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Talk Outline

- **Brief Summary of Decadal Process / Schedule**
- **Summary of Key Messages**
- **Proposed Strategy**

Decadal Summary

- [See full presentation from Tuck Stebbins on [NLST Google Drive](#)]
- **Schedule (as of now)** [See presentation at RA2020 from T. Brandt on [PCOS Website](#)]
 - Expect kickoff in early January (AAS Seattle)
 - Expect ~2 years to release of report: 6-9 months for input process, 6-18 months for writing, review, and release
 - Release late 2020?early 2021?
- **Components**
 - [Science Whitepaper call](#) out now (submissions Jan 7-18)
 - Town Halls?
 - Mission/Facility Whitepapers (RFI #1)
 - Expect open call in early 2019 with short deadline
 - ~20pages summarizing science, concept, schedule, cost, risk, etc.
 - Oral Presentations?
 - Expect invitation only
 - ~2 hours of presentations and questions
 - Follow-on written questions? (RFI #2)
 - Detailed questions
 - Short deadline

Based on 2010 Experience

Components of a LISA Submission

- **Science White Papers**
 - 9 Submitted in 2010 (available on NLST Google Drive)
 - Science-focused, not *explicitly* tied to mission
 - NLST is coordinating 12-13 papers so far
- **Mission Whitepaper**
 - ~20 pages including science summary, mission summary, assessments of cost, risk, etc. [based on Astro2010]
- **Other Decadal submissions (if requested)**
 - Written response to questions
 - Oral presentations
- **Supporting Documents**
 - Optional, but valuable
 - Can be hosted on website and referenced. Don't count towards page limits
 - E.g. technology status & plan, data analysis status & plan, management plan, etc.
- **Advocacy and Marketing**
 - Participation in Decadal Town Halls
 - Speakers Bureau, Colloquia, etc.
 - Social Media

Messages we want to deliver

- **Unparalleled Science Case**
 - Ground-based GW astronomy has shown the possibilities
 - LISA touches many areas of astronomy (see whitepapers)
- **Robust mission concept based on low-risk technologies**
 - Heritage from LPF and GRACE-FO
 - Funded, ongoing technology development for remaining items
- **Established program and partnership**
 - ESA has selected LISA and is moving forward
 - NASA is participating
- **Want Astro 2020 endorsement to protect against future threats**

Challenges

- **#1: NASA is a minority partner. Decadal is built to assess US-led activities.**
 - Expected size of US role is smaller than activities that are typically considered by Decadal
 - LISA won't be able to participate in a Cost and Technical Evaluation (CATE) for the full mission.
- **#2: NASA's role in LISA won't be finalized in the next 6 months**
 - Some contributions are likely, others are probable, still others possible
 - How will Decadal evaluate cost and risk?

Broad Strategies

- **Emphasize Science**

- LISA Science is flagship-level science
- minority partner can participate in all science (nature of LISA measurement)
- On science alone, LISA can be in the conversation with the big players

- **Highlight Progress**

- Emphasize active plans and agreements.
- Several core US contributions are “known”. Demonstrate that we are diligently working on those contributions and provide details of their expected cost and risks

- **Show Flexibility**

- Plans can change
- We are developing plans to mitigate risk in a number of areas.

Suggestions from NAS

- **Recent report from CAA: “[Mission Concept Studies](#)”**
 - Reviewed NASA’s work on large mission studies (LUVOIR, Lynx, HabEx, OST) and Probe Studies.
- **Finding 1: Trace mission requirements to science**
 - The LISA Proposal and ESA’s SciRD already do a decent job of that
 - Need to find a compact and compelling way to present this
- **Finding 2: Consider including descopes and upgrades (w/ cost and science impact)**
 - Consider descope/upgrade only in the context of level of NASA involvement
 - Assess cost of potential contributions beyond current expectations
- **Finding 6: Mission input will be “open”**
 - LISA should fully participate
- **Finding 7: Providing a range of performance and cost points is helpful**
 - May want to suggest options beyond current activity

Potential outline for Mission Whitepaper

- **Science Case (5 pages)**
 - Compelling summary of LISA science for broad astronomy community
 - Draw on whitepapers for technical details for experts
- **Mission Description**
 - Provide the basics of the measurement
 - Emphasize that it is a well-studied concept
 - Provide flow-down from science to requirements
- **Technical Readiness**
 - Many technologies are flight-proven (LPF + GRACE-FO)
 - Other technologies are on robust development tracks
- **Currently envisioned US contribution**
 - Payload contributions + Platform contributions + Science
 - Provide details and estimates of cost and risk
- **Management And Schedule**
 - Project structure and partnerships
 - Current Schedule
 - Management Plan

Other near-term actions (1 of 2)

- **Supporting Documents**

- Technology status document
 - Convince skeptical experts in astro technology that LISA can be built
- Long form science case?
 - Is science case in mission WP enough?
 - reference/leverage ESA SciRD to show realism
- Data analysis summary document
 - Convince skeptical experts that LISA data analysis technology is or will be in place
 - Ground-based IFO & PTA experience, (M)LDCs, etc.
- High-level description of LISA science output
 - how will astronomers interface with LISA? What kind of catalogs, alerts, etc. do we expect?
- FAQ

Other near-term actions (2 of 2)

- **Science Advocacy Preparation**
 - Develop "Professional" chart package
 - Develop Observer tools
 - Organize and solicit invitations for talks
 - Social Media campaign?

Proposed Schedule (for other-than-science docs)

- **Fall 2018**

- Sept. 15: Consolidate list of products, assign leads
- Oct. 30: first drafts due (available to discuss at Consortium meeting)
- Nov. 20: second drafts due
- December: red-team review

- **Spring 2019**

- ASAP: Post stand-alone documents on lisa.nasa.gov website
- Jan 2019: Wait for instructions from Decadal
- Feb-Mar 2019: Tailor, review, submit mission WP
- ...

Proposed Products

- ~~Sept. 15:~~ Aug. 28: Consolidate list of products, assign leads

Document (Working Title)	Coordinator
Technology Status	John Conklin
Data Analysis Strategy	Tyson Littenberg
Mission Whitepaper	Ira Thorpe
LISA for Multimessenger Astrophysics	John Baker ++
Mock Catalog???	...