The NASA L3 Study

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Topics

• State of Play
• Purpose of the Study
• Study Timeline
• Study Organization
• Phase 1 Tasks
• Phase 2 Tasks
State of Play: L3

- The Astrophysics Implementation Plan calls for a minority role in L3, planned for launch in 2034.
- L3 – The third large mission in ESA’s Cosmic Visions 2015-2025 Programme
  - NASA and ESA have been discussing a collaboration for ~2 years
  - Gravitational Observatory Advisory Team (GOAT)
    - ESA study evaluating and recommend scientific performance trade-offs, detection technologies, technology development activities, data analysis capabilities, schedule and cost
    - US representatives: Guido Mueller, Mark Kasevich, Bill Klipstein, RTS
    - Started in October 2014, concluding with a final report in late March or early April 2016.
      - ESA solicited interest from ESA Member States in November 2015
  - NASA is continuing technology development support. ESA is restarting technology development activities.
State of Play: LISA Pathfinder

• See Ira Thorpe’s talks.
• Outstanding ‘conditional’ in all major reviews/recommendations
• Launched December 3\textsuperscript{rd}. [Applause!]
• Currently in route to operational orbit around L1.
• Commissioning will continue through February
• Baseline operations March-September, extended operations likely.
• ESA will review the success with a separate committee (not GOAT) in late summer or fall.
State of Play: NAS/NRC Reviews

• Midterm Assessment
  • Oct. ‘15 – First meeting in Washington, DC
  • Dec. ‘15 – Second meeting/symposium in Irvine, CA
  • Jan. ‘16 – Final meeting in Washington, DC
  • 1 May ’16 – Target delivery date for final report

• 2020 Decadal Survey
  • Likely to begin in late 2018, early 2019
  • Astrophysics Division is initiating a plan to study likely projects with the intention of having well-understood proposals

• This L3 Study is:
  • The realization of the study promised in the plan for the 2020 decadal survey.
  • The study endorsed by the GWSIG, the PhysPAG and the Astrophysics Subcommittee
Study Purposes

- Phase 1: To advise Paul Hertz in his negotiations with ESA on a NASA role in L3.
- Phase 2: To prepare a proposal to the 2020 decadal for NASA’s role in L3
Study Timeline

- Dear Colleague Letter soliciting nominations for Study Team member released Dec. 7th
- Charter released Dec. 7th
  - This draft is focused on the first of two phases
  - The charter will be revised/extended for the second phase.
- Deadline for nominations Dec. 21st.
- Selections announced soon after AAS.
- Phase 1 - FY16-17: Analyze the options for NASA participation in the L3 mission and work with the European L3 consortium on proposals to ESA.
- Phase 2 - FY17-18: Prepare a report to the 2020 decadal survey on NASA’s participation, including possible options, in the L3 mission as a minority partner.
L3ST Organization (1/2)

• NASA Headquarters
  • Dr. Paul Hertz, Director, Astrophysics Division
  • Dr. Rita Sambruna, L3 Program Scientist
  • L3 Deputy Program Scientist - Dr. Wilt Sanders
  • L3 Program Executive - Dr. Shahid Habib

• Physics of the Cosmos Program Office
  • PCOS Chief Scientist - Dr. Ann Hornschemeier-Cardiff (GSFC)
  • PCOS Deputy Chief Scientist - Dr. Peter Bertone (MSFC)
  • Study Manager - Steve Horowitz
  • Study Scientist - RTS
L3ST Organization (2/2)

- L3 Study Team (L3ST)
  - Received ~30 responses to DCL
  - Will select ~15 researchers
  - Ex-officio ESA observer
  - Mix of instrumentalists, astrophysicists and relativists/data analysts
  - Telecons and open meetings
- Supporting staff from PCOS and the Centers
- Supporting members of the community
  - Technology experts
  - Science performance analyses
Phase 1 Tasks

• Potential NASA hardware contributions
  • Initial candidates: telescopes, thrusters, phasemeters, lasers
  • Assessment of needed development, cost, schedule, risk
  • Assessment of science consequences

• Other US activities
  • US science team
  • Data analysis
  • Data distribution
  • Guest investigator program

• Participation in eLISA Consortium, e.g., concept proposal
Phase 2 Tasks

- Prepare for 2020 decadal
- Phase 2 task will be detailed further later.
- Prepare science case
- Prepare concept description and NASA’s role
- Information for technical readiness, cost and risk assessments
  - Flight segment contributions
  - US science activities
  - Updated technology development status and plans
  - LISA Pathfinder report
- Participation in eLISA Consortium, e.g., payload proposal
Summary

• Early activities for L3 are starting up.
• NASA’s L3 Study is being set up.
• The L3 Study organization and charter have been established.
• The L3 Study Team is being selected.
• The L3ST tasks have been identified.
• The L3 Study is the agency-supported preparation for the 2020 decadal.