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.
GOAT recommendations
First LISA Pathfinder in-orbit results
Call for L3 mission
High priority technology developments
ITT process (rolling over 1/month)
High priority TDA (for EM, 3 yr)
High priority TDA (for EM, 2 yr)
Medium priority TDA (for EM)
Lower priority/late developments
Payload pre-developments
AO for payload consortium
Engineering model
EM definition
EM development
EM integration and test
Space system development
Phase A ITT
Phase A
Technical assistance
Phase B1
Mission adoption review
Margin
SPC adoption & IPC approval
ITT and contractor selection
Phase B2/C/D (8.5 years)
Launch
launch
State of Play: LISA Pathfinder

- See Ira Thorpe’s talks.
- Outstanding ‘conditional’ in all major reviews/recommendations
- Launched December 3rd. [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.