Scoping Out LISA Data Analysis

Workshop at the AEI, 22-24 March 2004

http://www.aei.mpg.de/research/grawave/lisa-meeting/

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Background

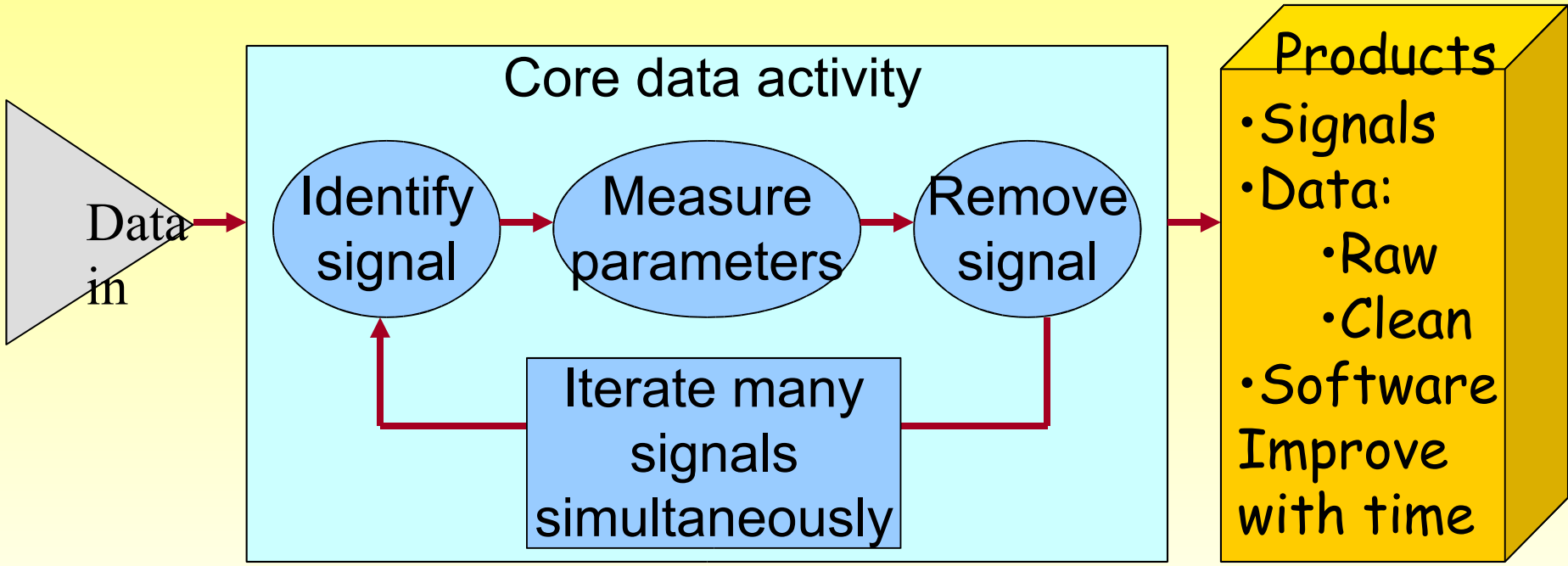
- Considerable work in community on data analysis methods for LISA, plus experience with LIGO/GEO/VIRGO/TAMA data analysis
- LIST has drawn on this to define LISA mission requirements and objectives – a definition of performance expectations for the LISA hardware
- Plan for organizing data analysis needed as part of mission specification.
- LIST meeting December 2003: BFS, with Phinney and Cutler, presented discussion paper: “Planning for data analysis for LISA”
- LIST charged WG1 to consult community and develop a proposal to the agencies, NASA and ESA
- Workshop at AEI 22-24 March with wide participation, white paper under development, interim report to LIST tomorrow.

Report on LISA-DA Workshop

- 2 days of talks on data analysis, experience in ground-based projects. Partial list of speakers: Thorne, Tinto, Hughes, Vinet, Cutler, Cornish, Vecchio, Papa, Brady, Allen …
- Presentation from Perryman about Hipparcos/GAIA organization
- One day of moderated discussions:
  - Unfinished research (Schutz/Thorne)
  - Data products (Vecchio)
  - Data analysis pipeline (Brady)
  - Software standards (Wiseman)
  - Centralization/Distribution of work (Allen/J Creighton)

Features of LISA data analysis

- LISA data analysis differs from ground-based because LISA is a high S/N instrument limited by source confusion as much as by instrumental noise.



Conclusions of Workshop

General agreement on a number of points:

- Core data analysis cannot be distributed among independent teams or guest observers; must be organized in coordinated way.
- Core data analysis is a project responsibility: agencies should organize and fund it adequately and ensure that it is managed properly during entire lifetime of mission.
- Data analysis activity should be divided between data analysis centers and the LISA community, coordinated by centers. Centers have other jobs, too, such as outreach, archiving, community-building
- Software development a key issue, must start early enough.
- Data analysis must be fully functional and tested by the beginning of the mission: many sources are transients.
- Data products must include full data release as well as specific (and time-critical) measurements.
- Key start-up activities should be funded by agencies soon:
  - Further research into sources and algorithms
  - DA team should be formed in time to advise Phase-B design

Future

- Report to LIST tomorrow.
- White paper on LISA-DA release later this year.
- Further studies of data analysis models from other ground and space projects: Hipparcos, WMAP, Planck, Auger, HST (for software development).
- Recommendation from LIST to NASA and ESA on structuring of data analysis, hopefully by December this year.
- Coordinated ESA-NASA response during 2005 should give adequate time to start activities. A significant delay beyond that would risk (a) errors in Phase B detailed design, (b) insufficient preparation of software and community team-building before launch.

Recommend: community should begin thinking about how to respond to any ESA-NASA initiative, eg LISA-France or Finn et al white paper.