# LARS* and PME

* Previously known as SRLIDAP, Sample Return Laboratory Analysis and Data Analysis Program

# Program Objectives/Purpose

- The Laboratory Analysis of Returned Samples (LARS) program is designed to maximize the science output of sample return missions by supporting both the development of new instruments and techniques and the actual analysis of returned samples.
  - Remember, we fly missions for science!
- The Planetary Major Equipment program allows laboratory researchers in many R&A programs to update their equipment.
  - It supports little new technology development, and won't be discussed further.

# Brief Summary of Program Content

- Develop new instruments and techniques for sample analysis.
  - Synchrotron X-ray fluorescence
  - Resonance Ionization Mass Spectroscopy
- Develop new ways to process samples—curation
  - “keystones” for Stardust samples in aerogel
  - Cleaning of “brown stain” for Genesis
  - Focused Ion Beam sample preparation
- Do the analysis of Genesis and Stardust samples

# Resource Summary and Utilization

- The SRLIDAP program has grown as its scope has been increased (e.g., taking over all Genesis analysis after the mission formally ended)
- For FY10, we are funding 40 awards totaling $7.5M

# Summary of Future Plans

- Continue to support Genesis and Stardust sample analysis.
- Develop new instruments
  - Advanced RIMS
- Expand to include new sample return missions as they are selected:
  - Asteroid (OSIRIS-REx?)
  - Moon (Moonrise?)
  - Cold comet?
    - This one really needs advance work—we don't know how to handle or analyze ices.
  - Mars (maybe someday….)

# Decision Making Processes Used

- Proposals go through a normal peer review panel which plays a major role in determining what gets funded and what does not.
  - Of course, the Program Manager and the Selecting Official put their spin on selections.

# Evolution of Program (1 of 2)

(and Major Contributing Factors)

- The solar wind sampling Genesis mission was planned and executed knowing that major technological breakthroughs were needed.
  - Genesis is probably the only mission in recent history to have budgeted for adequate science support, including analysis activities for 3+ years after the flight mission.
    - The mission funded development of the mega-SIMS at UCLA and the SARISA RIMS instrument at Argonne National Lab.
    - Also, SRLIDAP funded laser cutting technology for the collecting wafers and numerous efforts to improve analysis

# Evolution of Program (2 of 2)

- The comet sampling Stardust mission required even more from SRLIDAP/LARS.
  - Science and curation were woefully under-funded.
  - SRLIDAP provided most of the funding for:
    - the dedicated Stardust curation lab
    - development of sample handling equipment and techniques
    - development of a new generation Scanning Transmission Electron Microscope
    - analysis by synchrotron methods

# What Did and Did Not Work and Why

- SRLIDAP/LARS has made critical contributions to Genesis and Stardust science.
- The hard landing of Genesis made work on laser cutting moot—most samples were small enough already.
  - But the “brown stain” problems were much worse. It is not clear to me that the lessons of brown stain have been adequately learned.

# What has “Flown” and what enabled it to do so

- The instruments and techniques developed in SRLIDAP/LARS continue to be used for analysis of a variety of samples returned from space, with major efforts focused on Genesis and Stardust samples.