

JPL Laser Remote Sensing Group

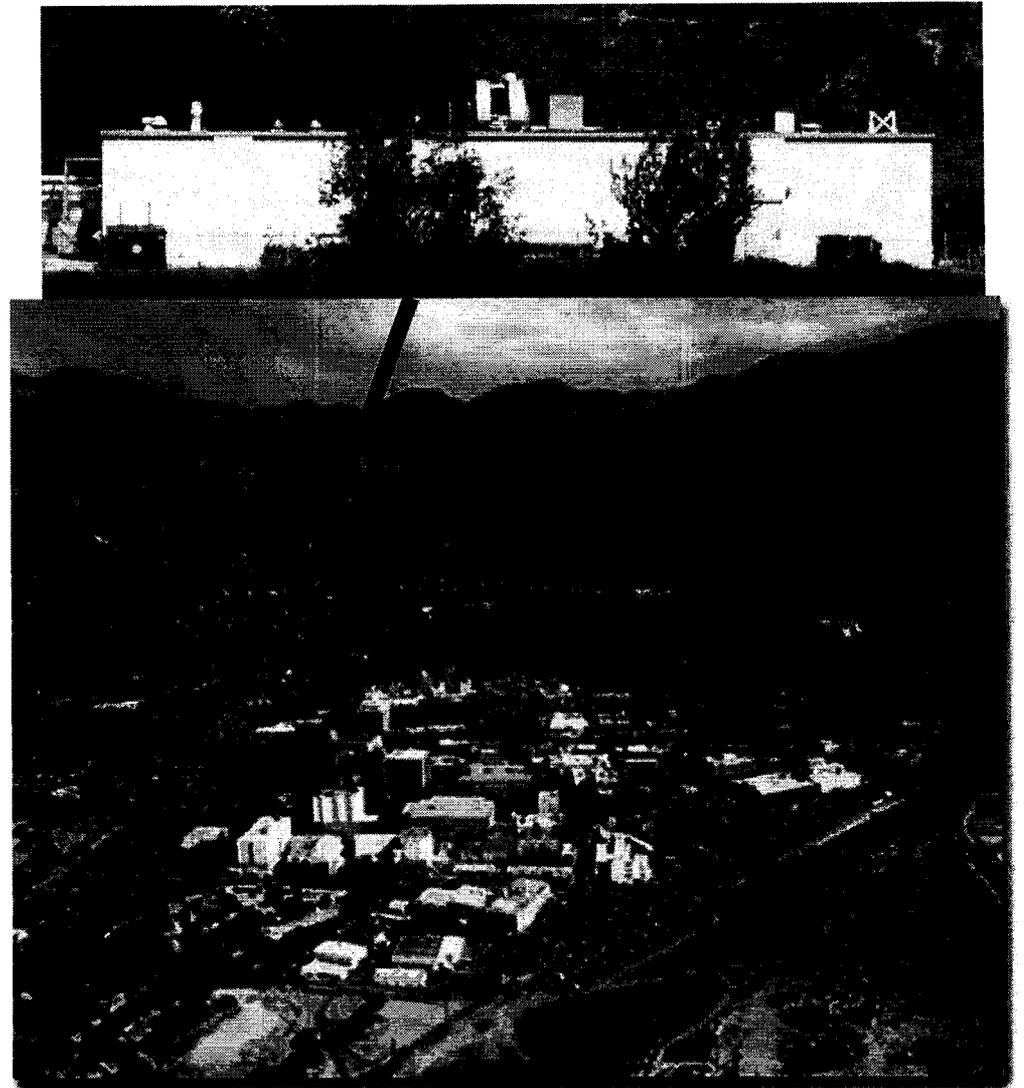


**A Presentation to the Working Group on Space Based Lidar Winds,
Key West, FL Jan 2002
by Gary D. Spiers, David M. Tratt**



Group Changes

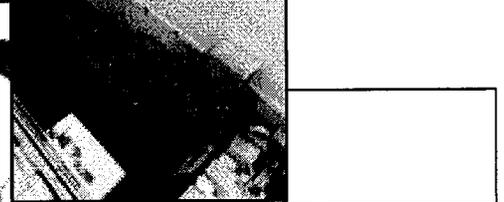
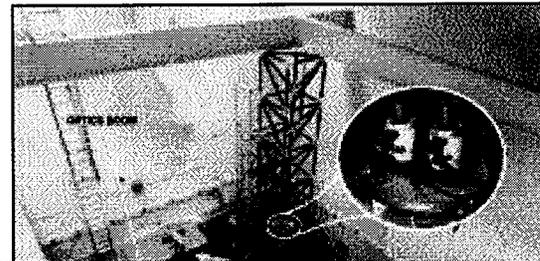
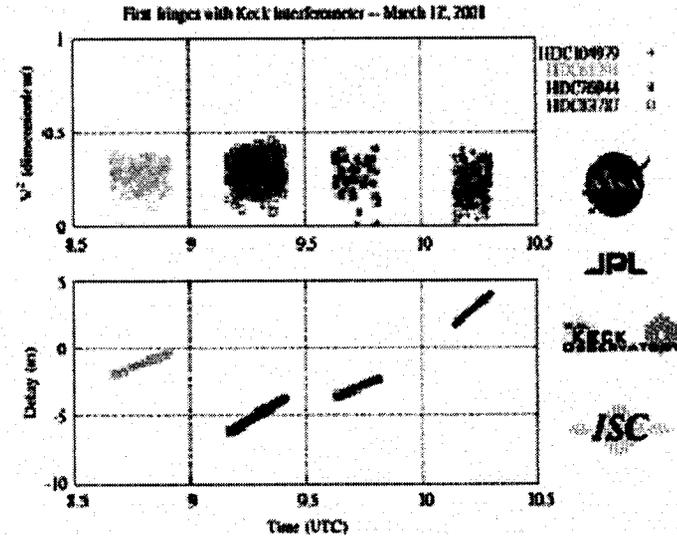
- Group has moved from the Microwave and Lidar Technology Section to the Interferometry and Large Optics Section as part of a lab-wide reorganisation.
 - Leverage technology and knowledge of the section and apply it to lidar
- Ground Breaking for doubling of available lidar lab space is scheduled for this spring.
 - Will include two new domes for additional atmospheric access

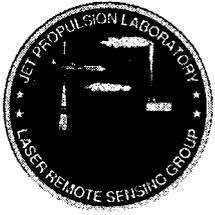




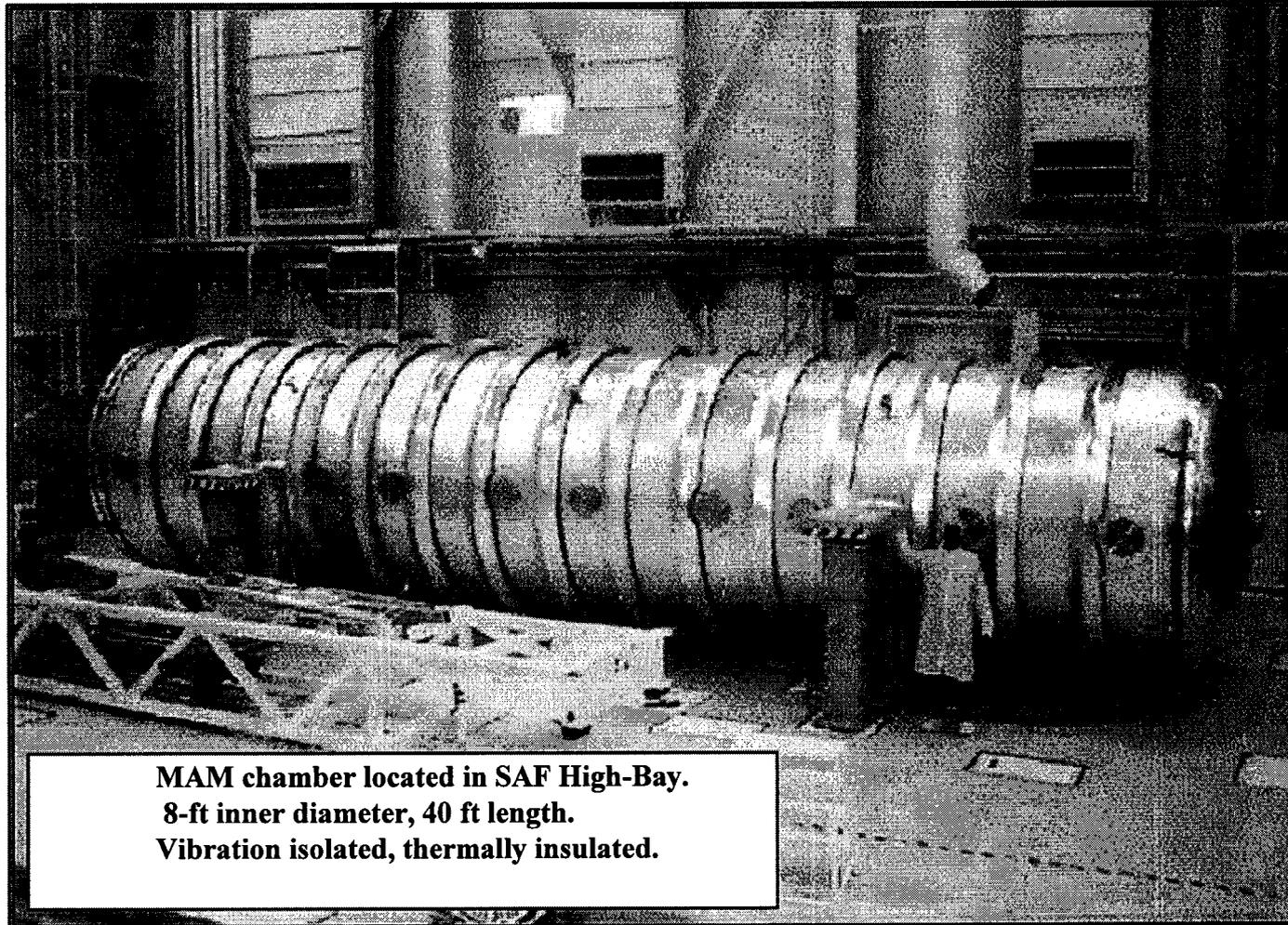
Section 383 Major Projects

Space Interferometry Mission,
Keck Observatory, Starlight,
GALEX, LISA, TPF,
NGST, Palomar Testbed
Interferometer





Micro-Arcsecond Metrology Testbed



**MAM chamber located in SAF High-Bay.
8-ft inner diameter, 40 ft length.
Vibration isolated, thermally insulated.**



Lidar Group Activities

- Lidars under development
 - Laser Absorption Spectrometer – IIP
 - LAMP Mars Landing and Rendezvous & Docking Lidar– Mars Program
 - Micro-Doppler Lidar – PIDDP
- Technology/Knowledge Development
 - 2 Micron diode laser sources - ATIP
 - ‘Intelligent Lidar’ - AIST
 - Hybrid Technology Evaluation – NPOESS
 - Line of Sight Velocity Bias – UCAR
 - CDDF

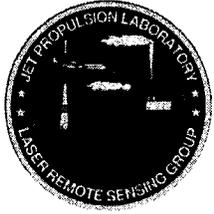


Laser Absorption Spectrometer

- PI is Bob Menzies.
- Co-Is Gary Spiers, David Tratt, Chris Webster (JPL)
- Mark Phillips (CTI), Graeme Stephens (Univ. Colorado),
- Develop and build a 2 micron coherent lidar capable of measuring atmospheric CO₂ concentrations at the ppm level. Fly a demonstration mission on the DC-8 in the final year. Assess scaling to space.
- 3 yr. program started Jan 1st 2002. Partners are CTI, University of Colorado, Caltech



Laser Absorption Spectrometer



LAMP



- A direct detection lidar for Mars landing/ hazard avoidance and sample rendezvous/ capture return.
- Project Manager is Bob Bunker, Project Engineer is Randy Bartman.
- Develop two breadboards and two engineering models for multiple mission use. First breadboard is undergoing testing.
- Lidar group involvement is with the optical design and performance analysis.



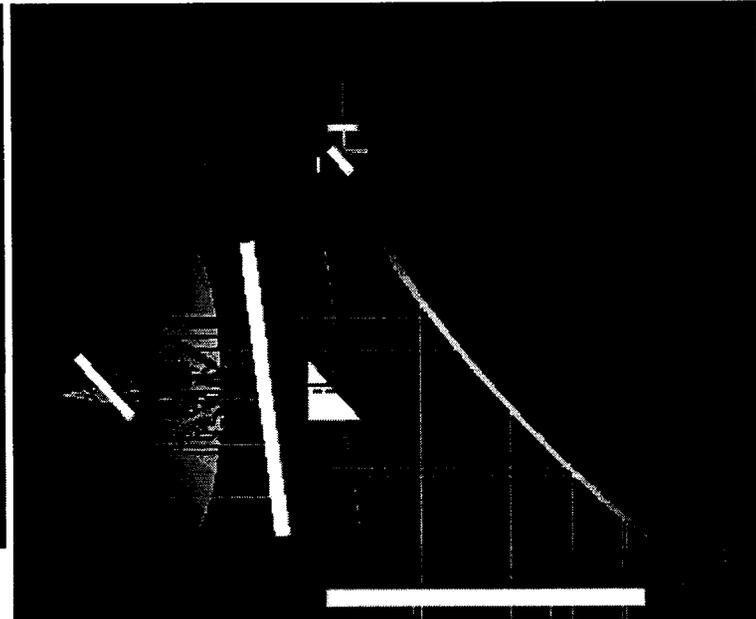
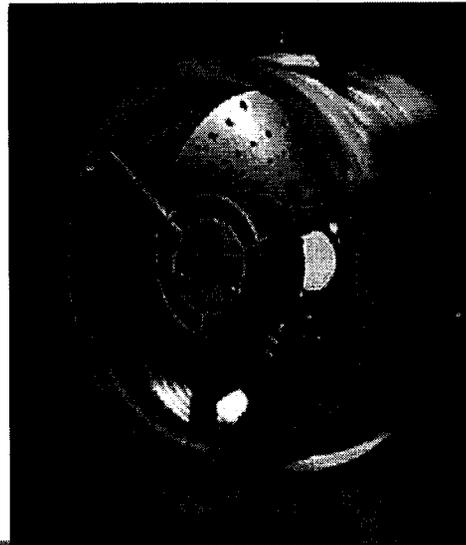
LAMP scan mirror assembly
(courtesy of Alex Abramovici)



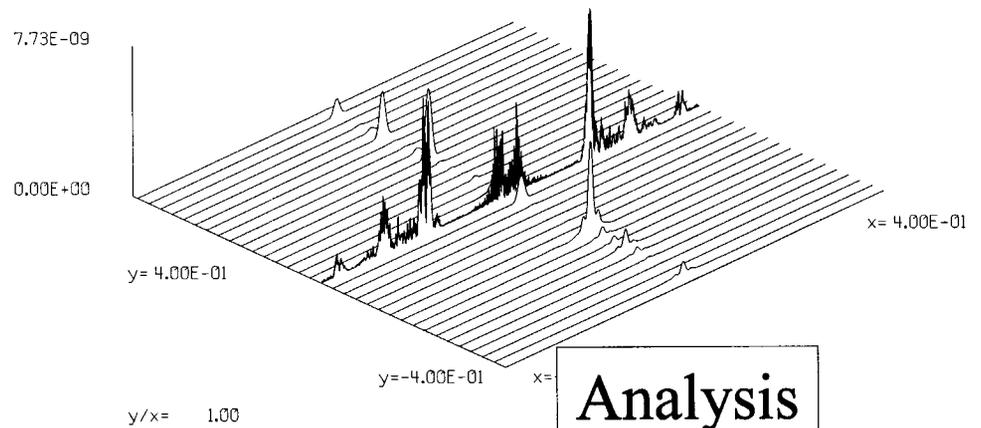
LAMP Optics



- Lidar group involvement is with the optical design and performance analysis.



Diamond turned primary and secondary mirrors with integral mounting structure



Analysis



Hybrid Doppler Lidar

- Funded by NPOESS
- A hybrid lidar design provided by GSFC/LaRC will be put through Team I sometime in February
- Goal is to assess:
 - Technology readiness level
 - Cost estimate to prepare technology for space



“Intelligent Lidar”

- AIST program, technology PI is Brad Hines, (software development) science PI is Gary Spiers.
- Goal of the program is to demonstrate infusion of interferometry real time software techniques into earth remote sensing –(Keck example has over 400 degrees of freedom)
- Lidar is one of two remote sensing technologies selected
 - demonstrate real time bandwidth limitation – application to LAS and Winds
 - demonstrate effective cloud hole identification



UCAR

- Databuy activity
- line of sight velocity errors
 - Provide independent validation of the ETL instrument model results
 - Specifically validate
- Close out Jan 03



DRDF

(Director's Research Discretionary Fund)

- A number of small research and development tasks are under development.

Opportunities

- The group and the section has employment opportunities for lidar researchers, lidar engineers, optical designers and opto-electronic engineers.
- JPL actively encourages collaboration with other parties on both scientific and technology development activities.