Proposal Title: Mars Observer Laser Altimeter  
Principal Investigator: Maria T. Zuber  
Grant: NAG5-2222

Introduction  
The objective of this study was to support the rebuild and implementation  
of the Mars Orbiter Laser Altimeter (MOLA) investigation and to perform scientific  
analysis of current Mars data relevant to the future investigation. The instrument  
is part of the payload of the NASA Mars Global Surveyor (MGS) mission. The  
instrument is a rebuild of the Mars Observer Laser Altimeter that was originally  
flown on the ill-fated Mars Observer mission.

Work Completed  
The following tasks were accomplished as part of the investigation:

- Participated in initial planning of the Mars Global Surveyor mission after the loss  
of Mars Observer, including Instrument re-design and rebuild.

- Attended meetings and reviews in support of the MOLA investigation.

- Assisted in preparation of budgets, schedules and documentation.

- Participated in the development of a new gravitational field for Mars from re-
analysis of Mariner 9 and Viking Orbiter Doppler tracking data.

- Performed re-analysis of Mariner 9 and Viking Orbiter occultations to develop an  
new shape of Mars.

- Participated in simultaneous estimation of the masses of Mars and its natural  
satellites Phobos and Deimos.

- Determined a formalism to remove the attraction of the Tharsis bulge from the  
Mars gravity field.

Refereed Publications

Smith, D.E., F.J. Lerch, R.S. Nerem, M.T. Zuber, G.B. Patel, S.K. Fricke, and  
F.G. Lemoine, An improved gravity model for Mars: Goddard Mars Model- 

Smith, D.E., and M.T. Zuber, New gravity field for Mars fuels new research, EOS  

Smith, D.E., F.G. Lemoine, and M.T. Zuber, Simultaneous estimation of the  
masses of Mars, Phobos, and Deimos from spacecraft distant encounters,  


**Budget Summary**

To be provided by Johns Hopkins University, where most of the work was performed.