

27 June 2003

Mars Exploration Program Advisory Group (MEPAG)

Dear Colleagues,

The arrival of the Mars Exploration Rovers (MER) at Mars, joining Mars Global Surveyor (MGS) and Odyssey, offers an unprecedented opportunity to carry out multiple-spacecraft collaborative science observations. The MGS, Odyssey and MER flight science teams are interested in your ideas for joint science goals and multi-spacecraft activities. The Project Science Groups for MGS, Odyssey and MER have discussed examples of what might be done and have all endorsed the concept of joint observations. The ideas they have come up with so far can be found in the email attachment.

As a member of the Mars science community, we would like to hear your suggestions for joint observations because we now have the potential to address science questions that were not part of the original science charter of these missions individually. Your ideas for a science theme or a specific set of observations that could be executed by the spacecraft are welcome. The proposed observations will be discussed by the relevant Project Science Groups for possible incorporation into the individual project plans. The MGS, Odyssey, and MER Project Science Groups will weigh the science benefits, technical and science risks, and ease of implementation, as well as impacts to other planned science observations. Project personnel will be assigned to work out the actual details and timing of the activities.

Examples of science goals that could be addressed with multiple spacecraft include: characterize atmospheric temperature, water vapor, dust content and opacity, and condensates on global, regional, and local scales; and characterize surface photometric and thermophysical properties. *We are interested in your inputs on how to use this scientific opportunity to its fullest potential.* Your inputs can be as high level or as detailed as you wish.

This is not a call for Participating Scientists or Guest Observers, it is just a request for ideas that might influence the data sets that are collected and then later made available to the entire science community when the data are archived in the Planetary Data System (PDS). Please note that we are not requesting suggestions that combine data sets, which are in hand or are planned to be collected independently. Note also that funding is not being offered via this email for data analysis of observations – that will be handled through the normal NASA Mars Data Analysis Program proposal process. Data will be released per the normal projects' PDS archiving schedule.

Please send your email responses to Candice.J.Hansen@jpl.nasa.gov, by the end of August 2003. Describe the science objective you would like to see addressed and your ideas for joint observations. Thank you for sharing your thoughts!

Sincerely,

Arden Albee (MGS Project Scientist)
Jeff Plaut (Odyssey Project Scientist)
Joy Crisp (MER Project Scientist)
Candice Hansen (MMO Science Operations Team Chief)

Coordinated Multi-Project Observations

Philip Christensen
Arizona State University
PSG Meeting
January 29, 2003

Coordinated Multi-Project Observations

- Four basic categories of coordination
 - Simultaneous observations
 - Coordinated observations
 - Observing campaigns
 - Long-term monitoring
- Pre-planning is essential given workload of Project teams

Coordinated Multi-Project Observations (con't)

- Simultaneous observations
 - TES - Mini-TES simultaneous line-of-site observations of atmosphere
 - Infrared spectral observations of exactly the same column of air
 - Combined detailed information on upper (TES) and lower (Mini-TES) atmosphere profiles
 - Emission phase angle studies
 - MOC - Pancam
 - Phase angle studies
 - Atmospheric scattering
 - Dust devil monitoring
 - Mini-TES - THEMIS
 - Surface characterization
 - Pancam/Mini-TES - Omega/PFS/SPICAM
 - Atmospheric characterization

Coordinated Multi-Project Observations (con't)

- Coordinated observations
 - Daily-Weekly Pancam/Mini-TES observations at time of MGS/Odyssey/Mars Express overflights
 - Mini-TES thermal inertia studies on day(s) of closest MGS-TES flyover
 - Pancam sky survey on day(s) of closest MGS-MOC flyover
- Atmospheric campaign
 - Orbiters - MGS-MOC/MGS-TES/MGS-RS/Mars Express (HRSC, Omega, PFS, SPICAM)
 - Earth-based telescopic - ground optical, HST, microwave
 - Rover - Mini-TES and Pancam
- Regional weather monitoring (MOC WA/ TES/RS/THEMIS/Earth-based)
- Dust opacity monitoring (TES/MOC/Omega)
- Cloud/Water vapor monitoring (TES/MOC)

Coordinated Multi-Project Observations (con't)

- Long-term monitoring
 - Monitoring of surface changes (MOC, THEMIS VIS/IR, TES VIS)
 - Rover localization (MOC)

Selected Science Questions

- Regional and global weather
 - Coordinated observing campaign using surface, orbital, and Earth-based visible, IR, near-IR, and microwave instruments
 - Characterization of atmospheric temperature, water vapor, dust content and opacity, and condensates on global, regional, and local scales
- Surface thermophysical properties - in-situ validation of global orbital maps
 - Coordinated observations by Mini-TES, THEMIS, and TES
 - Observe multiple locations on surface by Mini-TES on day when THEMIS (and TES soon thereafter) observe landing site
- Local dust activity
 - TES and MOC regional mapping
 - Coordinated observations and predictions of local storm and dust devil activity
 - Rapid response to observations
- Photometric properties of surface and atmosphere
 - Coordinated observation from surface and orbital visible, IR, and near-IR instruments

Science Questions (con't)

- Characterization of atmospheric state (temperature profile, dust, vapor, condensates) from surface to ~60 km altitude
 - Simultaneous observations by Mini-TES and TES
 - Coordinated observations by MGS Radio Science (if possible)
 - Coordinated Earth-based microwave observations (if possible)