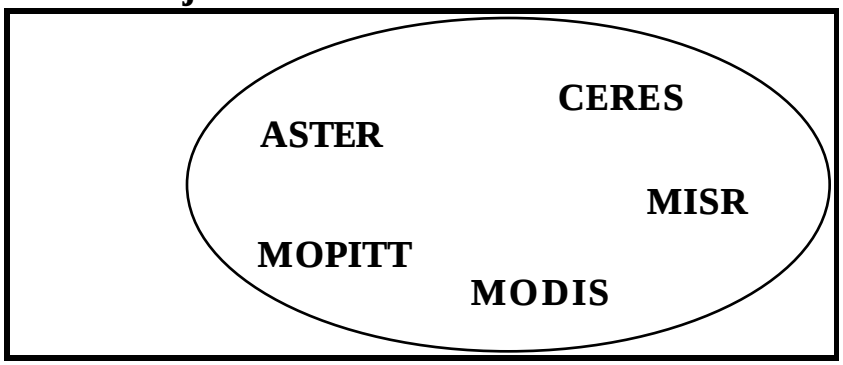
THE EOS-AM MISSION

Yoram Kaufman - AM Project Scientist
Jon Ranson - Deputy AM Project Scientist
Jim Collatz - Associate in relation to IDS investigations
Francesco Bordi - AM Project liaison



MAIN ACTIVITIES AS PROJECT SCIENTIST IN THE NEAR FUTURE:

TESTING:

- Testing in Valley Forge, what should be done for a final instrument test

CALIBRATION AND MANEUVERS:

- Maneuvers as part of the optimization of the whole calibration concept
- Minimize risk to the platform
- Prepare alternatives in case needed during the life of the mission

SCIENCE:

- Focus the science on the AM-1 mission as part of EOS 15year record and as an independent first EOS platform
- EOS AM-1 brochure that summarizes the mission and the science
- Emphasize the advantages to science of this integrated 5 instrument platform
- Interaction with EOSDIS

OUTREACH TO THE COMMUNITY:

Copy the Hubble Telescope experience:

- NAME THE PLATFORM:

EOS-ARRHENIUS

"**Is the mean temperature of the ground in any way influenced by the presence of the heat-absorbing gases in the atmosphere?**"

S. Arrhenius, Philosoph. magazine and J. of Sci., 1896.
The first to calculate the effects of doubling by CO_2

- Add to the present activities:
  - Center for EOS and EOS ARRHENIUS in the Air and Space Museum ? Others ?
  - Connection to education
  - Press releases

CALIBRATION AND MANEUVERS:

- Optimize the whole calibration concept
- Minimize risk to the platform
- Prepare alternatives in case needed during the life of the mission

MODIS:

internal calibrators	vicarious calibration	space maneuvers

1. MODIS characterization as a function of time by the internal calibrators

2. Vicarious calibration of the radiometric absolute calibration (reflectance units), stability, band to band, calibration as a function of scan angle using land sites, clouds, glint, molecular scattering. (Including sharp contrasts over land, glint polarization.)

3. Deep space full scan observation for thermal characterization of the scan mirror - MANEUVER. Lunar observations from deep space port at 11°, and at 50-55° by 20° ROLLS. This is an absolute and 2 point check of the variation in calibration with scan angle.

4. Use these for complete overlapping time dependence characterization of the calibration. Test the consistency to show relevance of each element.

5.Prepare the software for a full lunar scan at the end of the mission. However the maneuver should be ready to be used as early as 2 years after launch **if** previous calibration results show sever problems that cannot be solved otherwise.

- Butler and Sellers letter indicating maneuver options.
- New letter indicating this strategy for action by the project.

SCIENCE:

- Focus the science on the AM-1 mission as part of EOS and as an independent first platform:

The specific objectives of EOS-Arrhenius and time schedule:

1. **Provide the first state distribution of the main Earth-atmosphere coupled measurements** (1-2 yrs)**:**
   global bio-productivity (land and oceans),
   land use, land cover, snow and ice;
   global surface temperature - day and night;
   clouds (macrophysics, microphysics and radiative effects);
   radiative energy fluxes;
   aerosol properties and water vapor,
   fire occurrence and trace gases.

2. **Improve the knowledge of detection of human impact on climate, "fingerprints" and long term climate prediction** (1-2 yrs):
   By using the updated global distributions of land use change, aerosol, water vapor, clouds and radiation, trace gases and oceanic productivity in global climate models. Compare the relative importance of the different human impacts on climate.

3. **Provide observations that will improve forecasts of the timing and geographical extent of transient climatic anomalies.** Investigate the correlation between the regional and annual variations of clouds, aerosol, water vapor, biota in land and oceans, fires and trace gases, the radiation field and major impacts: El Nino, volcanic activity etc. (1-2 yrs).

4. **Improve the seasonal and inter-annual predictions** using the EOS-ARRHENIUS (and later EOS-altimeter/radar PM1) data set (1-6 yrs).

5. **Develop technologies for disaster prediction and characterization and risk reduction from wildfires, volcanoes, floods and droughts.** (1-2 yrs).

6. **Start the EOS monitoring of the change in climate and global environment** (1-15 years)**.**

Table 1: The contribution of EOS-ARRHENIUS to the MTPE 24 prioritized global environmental variables for a 15 year term

discipline	Measure	EOS-AM-1 instruments	fulfillment of the measure
ATMOSPHERE	Cloud Properties	MODIS, CERES, MISR, ASTER/Landsat	full
	Radiative Energy Fluxes	CERES	full
	Precipitation	---	---
	Tropospheric Chemistry	MOPITT	partial
	Stratospheric Chemistry	MOPITT	partial
	Aerosol Properties	MISR, MODIS	full
	Atmospheric Temperature	MODIS	partial
	Atmospheric Humidity	MODIS	partial
	Lightning	---	---
LAND	Land Cover And Land Use Change	MODIS, MISR, ASTER/Landsat	full
	Vegetation Dynamics	MODIS, MISR, ASTER/Landsat	full
	Surface Temperature	MODIS, ASTER	full
	Fire Occurrence	MODIS, ASTER	full
	Volcanic Effects	MODIS, ASTER	full
	Surface Wetness	MODIS ?	partial ?
OCEAN	Surface Temperature	MODIS, ASTER	full
	Phytoplankton & Dissolved Organic Matter	MODIS, MISR	full
	Surface Wind Fields	---	---
	Ocean surface Topography	---	---
CRYOSPHERE	Ice Sheet Topography & Ice Volume Change	---	---
	Sea Ice	MODIS, MISR, ASTER/ /Landsat	full
	Snow Cover	MODIS, MISR, ASTER/Landsat	full
SOLAR	Total Solar Irradiance	---	---
RADIATION	Ultraviolet Spectral Irradiance	---	---

- **Interaction with EOSDIS:**

There is a need to freeze the requirements for the Feb. 96 request.

Thus any new needs may require some scale backs

Can we use it for our scientific advantage ?

AEROSOL algorithm:

- **Instrument noise and cross talk (1.2, 1.65, 2.1 µm)**
- **other possible uncertainties with MODIS**

ACTION:We shall reduce the resolution to 50x50 km to improve pixel selection requirements and increase signal to noise.

- **Additional benefit - smaller volume of level 2 to analyze**

- **2 years after launch once we shall know MODIS and the algorithms better, consider increasing the spatial resolution**