MODIS Atmosphere Group

- Payload Discussion
  - MODIS-N *vs* VIRSR for clouds from afternoon orbit
  - Advantages of GLRS-A for cloud properties with MODIS-N
  - Orbit preferences
- MODIS-N Airborne Simulator (*MAS*)
  - Instrument and data processing status
- Atmospheric Aerosols
  - Advantages of MODIS-N with MISR
- Response to SBRC regarding MODIS-N specifications

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MODIS-N vs VIRSR

Advantages of MODIS-N

- Infrared sounding capability for cloud top pressure.
- Effective radius of cloud particles can more accurately be determined using 2.13 μm channel.
- 250-500 m pixels for accurate boundary layer cloud amount and for identifying clouds over snow and ice surfaces (texture analysis).
- Aerosol optical thickness over land, effective radius, mass loading
- Precipitable water over land and water.
- Atmospheric stability.

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MODIS-N vs VIRSR

Advantages of MODIS-N

- Careful attention to calibration.

Advantage of VIRSR

- 25-35% the cost of MODIS-N.

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EOS Payload Configuration

- Like MODIS-N and MISR together for atmospheric aerosol determination.
- Prefer MODIS-N to VIRSR for accurate determination of cloud radiative properties in afternoon orbit.
- Would like to see GLRS-A or LAWS in either morning or afternoon orbit along with MODIS-N and CERES for cloud top altitude, vertical distribution of complex clouds, and multi-layer cloud systems.
- Prefer afternoon orbit be ascending and morning orbit be descending, which is compatible with MODIS-N design and SAGE-III desires.

MODIS-N Airborne Simulator

Channels	50
Footprint	2.5 mrad
	45 m
Swath	±43°
	34 km
Spectral range	0.55-14.2 μm
Scan rate	6.25 scans/sec
Pixels in scan line	716
Data system	12 channels – 8 bit

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MODIS-N Airborne Simulator

- *MAS* will be delivered to Ames on October 15 where it will be integrated, calibrated, and flown in the FIRE Cirrus Experiment which begins November 12.
- After FIRE campaign, the *MAS* will be returned to Dædalus where it will be further modified to a full 50 channel spectrometer for use in ASTEX, Brazil, and later airborne field campaigns.
- Output Level-1B data will be produced by MODIS SDST and distributed in the netCDF format by 9-track tape or 8 mm (exabyte) cassette.

Airborne Field Campaigns (FY92-96)

- *FIRE Cirrus IFO (Coffeyville, KS) - November 1991*
- *MAS Science/Engineering Flights* (20 hrs/year)
- *Arctic Stratus, Haze and Sea Ice (Barrow) - April 1992*
- *ASTEX (Azores) - June 1992*
- *Biomass Burning (Brazil) - September 1992*
- *TOGA-COARE (Guam/Townsville) - December 1992*

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Atmospheric Aerosols

Advantages of MODIS-N

- Wide spectral range (0.415-2.13 μm) for spectral optical thickness and aerosol size determination.
- Small field of view (250-500 m) for all aerosol channels.
- Multiple algorithms possible, based largely on single view angle physics.

Advantage of MISR

- Multiple view angle helps determine aerosol by μ dependence (fixed τ).
- Local mode has small field of view (240 m) pixels.

MODIS-N Specifications

- Spectral band registration requirement.
  - Keep current requirements as goals, monitor carefully, but do not spend excessive resources if goal proves to be excessively difficult.
- NEΔT requirement for spectral band 21.
  - Acceptable, but would like to see log amp used to better meet T^9 dependence of radiance.
- Change the NEΔT fo Band 29 to 0.07 K.
  - Not acceptable.
  - Change T_{max} = 400 K to 335 K.
- Reduce the SNR of Band 6 to 275. Acceptable.