MODIS DATA STUDY
TEAM PRESENTATION

May 17, 1991

AGENDA

1. Action Items
2. Input Data Survey Forms
3. MODIS Airborne Simulator (under separate cover)
4. Assumptions/Tracking List

ACTION ITEMS:

05/03/91 [Team]: Document plans for Level-1A and Level-1B processing, and indicate what information will be included in each product. Include a list of assumptions, brief rationale, scenarios, and trade-offs. The initial draft was presented on May 10th. Revisions and extensions will be included in the next edition. STATUS: Open

05/03/91 [Team]: Prepare an assumptions list, to be periodically included in the minutes with the changes highlighted. The list will be distributed as appropriate. STATUS: Open

05/10/91 [Team]: Check with Menzel about the status of the MAS. Notes from the MODIS Airborne Simulator Meeting on April 15, 1991 will be discussed. STATUS: Open.

05/10/91 [Lloyd Carpenter]: Check with Daesoo Han about the decision that SCA will schedule MODIS processors based upon requirement to process rather than availability of data. STATUS: Open

05/10/91 [Team]: Find out who takes GPS data and computes EOS orbit position and attitude. The Flight Dynamics Facility has this responsibility. STATUS: Closed

Input Data Survey

MODIS Facility Instrument

Team Leader: Salomonson

INPUT DATA PRODUCT NAME	DATA TYPE	TIME FRAME	SOURCE		COMMENTS
			INSTR	DATA CENTER	
Winds and Currents	Anc	PL	Other EOS		Abbott
Fluorescence Line Height (FLH)	Dev	BL	FLI/CASI	Borstad/Gower	Abbott
MERIS Data	Anc	PL	MERIS		Abbott (if MODIS-T is replaced by MERIS)
ATSR radiances for SST	Dev	PL	ATSR		Barton
AVHRR radiances for SST	Dev	PL	AVHRR		Barton (for comparison with ATSR SST fields)
AMSU supporting data for SST	Anc	PL	AMSU		Barton (may be required for SST refinement)
SCATT supporting data for SST	Anc	PL	SCATT		Barton (may be required for SST refinement)
AIRS supporting data for SST	Anc	PL	AIRS		Barton (may be required for SST refinement)
ALT supporting data for SST	Anc	PL	ALT		Barton (may be required for SST refinement)
Buoy and Ship SST Measurements	Cor	BL,PL	in-situ		Barton (for SST validation, ground truth)
Surface Wind Observations	Dev	BL	Adeos/NSCAT		Brown (for Glitter)
AVHRR Sensor Observations	Dev	BL	AVHRR	NOAA	Brown (prelaunch algorithm development)
ARGOS Drifting Buoy SST Observations	Dev,Cor	BL,PL	in-situ	NOAA/NMC or NOS	Brown
Ship of Opportunity Surface Observations	Dev,Cor	BL,PL	in-situ	NODC, NCC or NMC	Brown
CZCS Data	Dev	BL	CZCS		Carder (Level-1 and Level-1.5 : 50 scenes per year)
SeaWiFS Data	Dev	BL	SeaWiFS		Carder (Level-1 and Level-1.5 : 200 scenes per year)
Adeos/OCTS Data	Dev	BL	Adeos/OCTS		Carder (Level-1 and Level-1.5 : 200 scenes per year)
Optical and Constituent Data Sets	Dev	BL	in-situ		Carder (USF Derived)
Marine Optical Buoy System Data	Dev,Cor	BL,PL	in-situ		Clark (1/2 GByte/yr pre-launch and 1 GByte/yr post-launch)
CZCS Data	Dev	BL	CZCS		Esaias
SeaWiFS Data	Dev	BL	SeaWiFS		Esaias
Adeos/OCTS Data	Dev	BL	Adeos/OCTS		Esaias

Input Data Survey

MODIS Facility Instrument

Team Leader: Salomonson

INPUT DATA PRODUCT NAME	DATA TYPE	TIME FRAME	SOURCE		COMMENTS
			INSTR	DATA CENTER	
Joint Global Ocean Flux Study (JGOFS) Data	Dev	BL	in-situ		Esaias
Marine Optical Mooring and Cruise Data	Cor	AL,PL	in-situ		Evans
Visible Light Polarization	Anc	AL,PL	EOSP		Evans (to compute aerosol radiance)
Surface Atmospheric Pressure	Anc	AL,PL	Models		Evans (to compute Rayleigh radiance)
Surface Wind Speed	Anc	AL,PL	Models		Evans (scatterometer or model derived for computing sun glitter)
Atmospheric Ozone Concentration	Anc	AL,PL	Models		Evans (low resolution (100 km) from GOMR, AIRS or AMSU)
Algorithm Validation Data	Dev	BL,AL			Evans (AVHRR, ATSR, ADEOS and CZCS data for algorithm validation)
Equatorial Coverage Data	Anc	AL,PL	MISR		Evans (MISR data for the region where MODIS-T changes tilt)
Visible Light Polarization		AL,PL	EOSP		Gordon
Surface Atmospheric Pressure	Anc	AL,PL	Models		Gordon
Surface Wind Speed	Anc	AL,PL	Models		Gordon
Atmospheric Ozone Concentration	Anc	AL,PL	Models		Gordon
Sea Surface Temperature Imagery	Anc	AL,PL	AVHRR		Hoge (mid-Atlantic test site)
Airborne Observations	Dev,Cor	BL,AL,PL	AOL		Hoge (mid-Atlantic test site)
Supporting Ship Observations	Dev,Cor	BL,AL,PL	in-situ		Hoge (mid-Atlantic test site)
Simulated MODIS Data	Dev	BL	Simulations		Hoge (for final development stages of algorithms)
In-situ Data Sets	Dev	BL	in-situ		Parslow (100 km areas on recurring daily basis)
In-situ Data Sets	Dev	BL	in-situ		Parslow (1000 km areas during weeks covering major cruises)
SeaWiFS Data	Dev	BL	SeaWiFS		Parslow (for testing algorithm performance)
Australian Ocean Color Scanner Data	Dev	BL	AOCS		Parslow (for testing algorithm performance)
Imaging Spectrometer Data	Dev	BL			Parslow (for testing algorithm performance)
WOCE Field Data	Dev	BL	WOCE		Parslow
Simulated EOSDIS Products	Dev	BL	Simulations		Parslow (later stages of algorithm development)

Assumptions/Tracking List
for the
MODIS Science Data Support Team
17 May 1991

This list of assumptions, tracking items and questions is intended to clarify issues and prevent misunderstanding. The list can be changed as necessary.

Coordinate System. Coordinates will be represented in the Latitude-Longitude coordinate system on the standard 1984 oblate spheroid.

Ground Navigation. For each scan, a set of ground control (anchor) points will be selected for interpolating the ground locations of pixels within the scan.

Anchor Point Parameters. The following parameters will be provided in the Level-1B data set for each anchor point: earth location (Latitude-Longitude); satellite azimuth, zenith distance and slant range; and solar azimuth and zenith distance.

Anchor Point Error Statistics. No measure of earth location accuracies based upon anchor points will be included in the Level-1B data product.

Level-1B Elevation Correction. There will be no terrain elevation correction to earth location at Level-1B.

Platform Position and Attitude Knowledge. Final satellite position and attitude knowledge will be available before Level-1B processing.

Atmospheric Correction. No atmospheric correction will be performed in the MODIS level-1B processor.

Land/Ocean Flags. Land/Ocean, Cloud, or other derived flags will not be included in the Level-1B data product.

Level-1A Browse. There will be no Level-1A browse product.

Level-1B Browse. Any required Level-1B browse products will be generated by a separate processor in order to allow for use of technology advances without affecting the Level-1B processing.

Required Ancillary Data. No information will be required for MODIS Level-1B processing other than MODIS Level-1A data.

Level-1 Data Quality Checks. There will be no Level-1 data quality checks other than the detection of problems which prevent the completion of Level-1 processing.

Anomaly Detection. The MODIS Level-1 processors will post problem and anomaly reports only to the MODIS data product log. A copy will be available to the MCST.

Instrument Command Comparison. The MODIS Level-1 processors will not check any instrument states against the instrument commands issued by the ICC.

Data Compression. No data compression will be performed within the MODIS Level-1 processors. Data compression is best performed in conjunction with the transfer of data to and from the mass storage devices.

MODIS-T Tilt-in-Progress. A 'Tilt-in-Progress' indicator will be provided in the telemetered data stream for MODIS-T to prevent errors in computing earth location.

Quick-Look Data. Quick-Look data will be generated using the same software as is used for the standard Level-1 product.

QUESTIONS AND ISSUES:

Where will the cloud/no-cloud flag come into the system?

Should browse products be created on demand?

Will the scheduler check to see that the required data is available before calling the MODIS processor?

NOTES FROM THE MODIS AIRBORNE SIMULATOR MEETING

April 15, 1991

Received from Chris Moeller

Cooperative Institute for Meteorological Satellite Studies

Space Science and Engineering Center

University of Wisconsin - Madison

SPACE SCIENCE AND ENGINEERING CENTER

UNIVERSITY of WISCONSIN - MADISON
1225 West Dayton Street
Madison, Wisconsin 53706

TELECOPIER TRANSMISSION

DATE: 5/13/91

COVER PAGE AND 5 PAGE(S) TO FOLLOW.

NAME OF RECEIVING PARTY: Liam Gumley / RDC

FAX NUMBER OF RECEIVING PARTY: 301-982-3749

NAME OF SENDING PARTY: Chris Moeller

TELEPHONE NUMBER OF SENDING PARTY: 608-263-9597

COMMENTS:

MATERIALS I HAD ON MAS

Cam

IF ANY PART OF THIS TRANSMISSION IS LOST OR GARBLED, PLEASE CALL THE FAX OPERATOR IMMEDIATELY AT (608)263-6750.

Executive Director (608) 262-0544 Personnel Director (608) 263-2348 Telecopier (608) 262-5974
Business Services (608) 263-3037 Public Information (608) 263-3373 Telex 265 452 UOFWISC MDS

MODIS Airborne Simulator Meeting
April 15, 1991

Mike King (NASA Goddard - Science)
Ken Brown (NASA Goddard - contract manager)
Jeff Myers (NASA Ames - Aircraft data systems manager)
Peter Abel (NASA Goddard - Science)
Fred Osterwisch (Daedalus - Lead engineer for contract)
Jim Brass (NASA Ames - Science)
Paul Menzel (NOAA/UW - Science)
Chris Moeller (CIMSS/UW - Science support)

Notes:

MAS data uses in foreseeable future:
1) FIRE flights in Nov 91
2) General Science flights to learn more about instrument
3) ASTEX flights in June 92 (low lev marine strato cu)
4) Brazilian Biomass Burning in Sept 92
5) TOGA/COARE in Dec 92 (high cirrus)

Jeff Myers says WILDFIRE data can be sent to CIMSS in MAMS intermediate format. Test flight planned around 4/20/91. When Exebyte recording system comes on line (cassette tape instead of 14 track tape) Jeff will continue to decom MAS data into MAMS intermediate format for UW, however Jeff also mentions that they would like their users to convert to the Exebyte cassette medium (i.e. send data on cassettes instead of 9 track tape). He says a machine to use the cassettes costs about $2K and can be hooked up to a UNIX based machine (such as a RISC?).

When a 50 channel digitizer comes on line (if ever), the format of MAS data sent out by ARC will change to a new format. This means code at UW will have to change in many ways.

Spectral bandpass and alignment tests can be done at ARC if they get a system which can measure the bandpass (such as Daedalus currently has). An effort to do this is under way by Arveson.

For FIRE:
- FredO wil realign Port 4 so that WPM can get more CO_2 channels covered. This will move spectral coverage up about .5 microns.
- FredO will proceed with the easy adjustment of Ports 2 and 3 outlined in the original MAS proposal.
- FredO will look at spectral response using 2.5 and/or 5.0 milliradian apertures and give this info to MAS group. This will lend guidance into the utility of the 5.0 milliradian aperture as a permanent fixture on MAS.

- CIMSS will evaluate the utility of 10 bit data for the MAS/WILDFIRE IR channels by looking at WILDFIRE and preFIRE MAS modification data sent by Jeff Myers in intermediate format.
- FredO will look into increasing the number of variable gain/offset on MAS from 6 to 8.
- A WILDFIRE/MAS configuration will be generated by interested parties for the Nov FIRE flights

Final MAS adjustments:
- FredO will expand bandpasses in port 4 to about .6 microns (instead of .3) to improve signal to noise and extend range of port 4 spectral coverage to have 8 micron channel. Will allow 'gaps' in spectral coverage in port 4 to accomodate wide spectral coverage desired.
- A decision will be made as to whether to make the new port 1 and 4 arrays sized to the 2.5 or 5.0 milliradian aperture
- Final modifications will take place from Dec-March 1992 with completion by May 92 to allow test flights before ASTEX.

Table 1. Modis-N Airborne Simulator (MAS) Channels,
4-08-91 list with bandpass goals for #10 & 40

	No	band (um)	band size edges (um)	band size width (um)	radiance W/m-2-um-sr max	radiance W/m-2-um-sr typ
port 1	1	.555	.535-.575	.040	518	29.0
	2	.659	.634-.684	.040	685	21.8
	3	.705	.685-.725	.040		
	4	.745	.725-.765	.040		
	5	.785	.765-.805	.040		
	6	.825	.805-.845	.040		
	7	.865	.845-.895	.040	285	24.7
	8	.905	.890-.920	.030	185	10.0
	9	.940	.916-.965	.050	189	15.0
port 2	10	1.64	1.625-1.655	.030	105	10.9
	11	1.68	1.655-1.705	.050		
	12	1.73	1.705-1.755	.050		
	13	1.78	1.855-1.905	.050		
	14	1.93	1.905-1.955	.050		
	15	1.98	1.955-2.005	.050		
	16	2.03	2.005-2.055	.050		
	17	2.08	2.055-2.105	.050		
	18	2.13	2.105-2.155	.050	22	1.0
	19	2.18	2.155-2.205	.050		
	20	2.23	2.205-2.255	.050		
	21	2.28	2.255-2.305	.050		
	22	2.33	2.305-2.355	.050		
	23	2.38	2.355-2.405	.050		
port 3	24	3.00	2.925-3.075	.150		
	25	3.15	3.075-3.225	.150		
	26	3.30	3.225-3.375	.150		
	27	3.45	3.375-3.525	.150		
	28	3.60	3.525-3.675	.150		
	29	3.75	3.675-3.825	.150	1.71	0.45
	30	3.90	3.825-3.975	.150		
	31	4.05	3.975-4.125	.150		
	32	4.20	4.125-4.275	.150		
	33	4.35	4.275-4.325	.150		
	34	4.50	4.325-4.575	.150		
	35	4.65	4.575-4.725	.150		
	36	4.80	4.725-4.875	.150		
	37	4.95	4.875-5.025	.150		
	38	5.10	5.025-5.175	.150		
	39	5.25	5.175-5.325	.150		
port 4	40	9.73	9.580-9.880	.300	6.34	3.69
	41	10.03	9.78-10.28	.50		
	42	10.53	10.28-10.78	.50		
	43	11.03	10.78-11.28	.50	13.25	9.55
	44	12.02	11.77-12.27	.50	12.10	8.94
	45	13.34	13.19-13.49	.30	6.56	4.52
	46	13.63	13.49-13.79	.30	5.02	3.76
	47	13.93	13.79-14.09	.30	4.42	3.11
	48	14.23	14.09-14.39	.30	2.96	2.08

MODIS-N SIMULATOR

SENSOR/AIRCRAFT PARAMETERS:

SPECTRAL CHANNELS:	50
OUTPUT CHANNELS:	12 8-BIT (OPTIONAL 8 10-BIT PLUS 2 8-BIT) or 4 10 bit 7 8 bit
IFOV:	2.5 MRAD, 5.0 MRAD?
GROUND RESOLUTION:	163 FEET (50 METERS AT 65,000 FEET)
TOTAL SCAN ANGLE:	85.92°
SWATH WIDTH:	20 NMI (37 KM) AT 65,000 FT.
PIXELS/SCAN LINE:	716
SCAN RATE:	6.25 SCANS/SECOND oversampling 20%
ROLL CORRECTION:	± 3-1/2 DEGREES (APPROX.)

WPM

Current Port 4 configuration;

Ch	bandpass		FIRE
41	8.2 →	8.6	✓
42	8.6	9.0	
43	9.0	9.4	
44	9.4	9.8	✓
45	9.8	10.2	
46	10.2	10.7	
47	10.7	11.2	✓
48	11.2	11.7	
49	11.7	12.2	✓
50	12.2	12.7	✓

Realigned Port 4 configuration for FIRE;

Ch'			
41	8.6	9.0	✓
42	9.0	9.4	
43	9.4	9.8	✓
44	9.8	10.2	
45	10.2	10.7	
46	10.7	11.2	✓
47	11.2	11.7	
48	11.7	12.2	
49	12.2	12.7	✓
50	12.7	13.2	✓

check indicates desired channel for 12 output channels

MODIS-T Channel Parameters

Ban	Center Wavelength (micron)	Band Pass (micron)	IFOV (m)
1	0.410	0.015	1100
2	0.425	0.015	1100
3	0.440	0.015	1100
4	0.455	0.015	1100
5	0.470	0.015	1100
6	0.485	0.015	1100
7	0.500	0.015	1100
8	0.515	0.015	1100
9	0.530	0.015	1100
10	0.545	0.015	1100
11	0.560	0.015	1100
12	0.575	0.015	1100
13	0.590	0.015	1100
14	0.605	0.015	1100
15	0.620	0.015	1100
16	0.635	0.015	1100
17	0.650	0.015	1100
18	0.665	0.015	1100
19	0.680	0.015	1100
20	0.695	0.015	1100
21	0.710	0.015	1100
22	0.725	0.015	1100
23	0.740	0.015	1100
24	0.755	0.015	1100
25	0.770	0.015	1100
26	0.785	0.015	1100
27	0.800	0.015	1100
28	0.815	0.015	1100
29	0.830	0.015	1100
30	0.845	0.015	1100
31	0.860	0.015	1100
32	0.875	0.015	1100

MODIS-N Channel Parameters

Band	Center Wavelength (micron)	Band Pass (micron)	IFOV (m)
1	0.659	0.020	250
2	0.865	0.050	250
3	0.470	0.020	500
4	0.555	0.020	500
5	1.240	0.020	500
6	1.640	0.020	500
7	2.130	0.050	500
8	0.415	0.015	1000
9	0.443	0.010	1000
10	0.490	0.010	1000
11	0.531	0.010	1000
12	0.565	0.010	1000
13	0.653	0.015	1000
14	0.681	0.010	1000
15	0.745	0.010	1000
16	0.865	0.015	1000
17	0.908	0.030	1000
18	0.936	0.010	1000
19	0.950	0.050	1000
20	3.750	0.180	1000
21	3.750	0.180	1000
22	3.959	0.050	1000
23	4.050	0.050	1000
24	4.465	0.050	1000
25	4.515	0.050	1000
26	4.565	0.050	1000
27	6.715	0.360	1000
28	7.325	0.300	1000
29	8.550	0.300	1000
30	9.730	0.300	1000
31	11.030	0.500	1000
32	12.020	0.500	1000
33	13.335	0.300	1000
34	13.635	0.300	1000
35	13.935	0.300	1000
36	14.235	0.300	1000