CHEMISTRY COOPERATIVE AGREEMENT STUDIES

Jim Adams

EOS Chemistry Observatory Manager

August 14, 1996

WELCOME

- Lockheed Martin Missiles & Space
- Space Systems/Loral
- TRW Space & Electronics
- Spectrum Astro
- Ball Aerospace Systems
- Hughes Space and Communications
- Orbital Sciences

LOGISTICS

- Jorge Scientific: Meeting Facilitators
- Non-Civil Servant Registration
- Our Web Site for Documentation
  - http://mtpe.gsfc.nasa.gov/csfp/coopdocs
  - Files are in PDF format

STUDY PURPOSE

- A Small Amount of History
- Examine Application of Existing Designs to EOS
- Specifically Use Chemistry as Instrument Suite
- Can EOS Chem be Flown on 3 MedSat's for Significantly Less Cost?

EOS Chemistry Baseline Remains the TRW Common Spacecraft

AGENDA

Wednesday, August 14th, 1996

8:30 Welcome/Logistics (Adams)

9:00 Introduction/Challenge (Hrastar/Peterson)

9:15 GSFC's Study Expectations and Approach (Adams)

10:15 Break

10:30 Metal Matrix Composites for Thermal Management Systems (Casto)

11:00 Advanced Command and Data Handling Resources (Ruffa)

11:30 Lunch

1:00 Data Compression (Miller)

1:30 Multi-Functional Guidance, Navigation and Control using GPS (Lightsey)

2:00 Multi-junction Solar Cells (Lyons)

2:30 Break

2:45 Taurus Launch Vehicle (Kraft)

3:15 EOS Data Information System (Nelson/DeVito)

AGENDA

8:30	Introductions/Instructions (Adams/Taylor)
9:00	High Resolution Dynamics Limb Sounder (HIRDLS)
0	[illegible]
0	[illegible]
11: 30	Questions
0	[illegible]
1	
	Microwave Limb Sounder (MLS)
0	[illegible]
0	[illegible]
4:00	Questions
4:30	Wrap-up (Adams)

REQUIREMENTS

- [redacted]
- [redacted]
- [redacted]
- [redacted]
- Data, Command and Control Through EOS [redacted]
- Everything is Negotiable, Some Things More Than Others

ORDER OF PRECEDENCE FOR DOCUMENTATION

Order of Precedence

Instrument Interface	Spacecraft	Launch Vehicle Interface	Ground Interface
Resource Allocation Document			
General Interface Requirements Document (GIRD)	Compendium of System Requirements	TAURUS XL Launch Vehicle Presentation	EOS Ground System (EGS) System and Operations Concept Document
Instrument Workshop Presentations		Commercial Taurus Launch Vehicle Payload Users Guide	Data Information System Presentation
Unique Instrument Interface Documents (UIDs)			
Instrument Description Documents (IDDs)			

- Documents in shadowed boxes can be found on the Chemistry Home Page (http://gsfc.nasa.gov/csfp/coopdocs)

Order of Precedence shown applies only to the Chemistry Cooperative Assessment

MASS, POWER, DATA RATE & POINTING

- For These Studies, In the Event of Conflict This Chart is to be Assumed Superior!

Instrument	Mass (kg)		Power (W)				Data Rate (kbps)		Data Storage (GB)	Pointing (arcsec)				Dimensions (mm)			Mounting Surface (Normal)	Instrument FOV (Relative to Nadir)	Unobstr. Thermal FOV
	Alloc.	w/25%	Alloc.	w/25%	Peak	w/25%	Average	Peak		Control	Knowledge	Stability	Jitter	X	Y	Z			
TES	290	363	275	344	290	363	4900	6200	28.9	108	108	36/sec	TBD	1300	1400	1000	Nadir	Track (+45º/ -71º) Cross (±45º)	(-Z) Face (±75º)
HIRDLS	130	163	155	195	230	288	50	100	TBD	900/all axes	120 pitch 120 roll 180 yaw	(Note 1)	(Note 2)	1420	1190	1370	Nadir	Track (+22.1º/+27.3º) Cross (-21º /+43º)	(+Y) Face (±85º)
MLS (GHz Channels)	TBD	TBD	TBD	TBD	TBD	TBD	115	115	TBD	1800 pitch 180 roll 1800 yaw	(Note 3)	TBD	50/s p/r 1800/s y 0.1 to 30s	1700	1100	2600	Nadir	Track (+60º/ +72º) Cross(±30º) (neg.offset)	TBD
MLS (THz Channel)	TBD	TBD	TBD	TBD	TBD	TBD	5	5	TBD	1800 pitch 180 roll 1800 yaw	(Note 3)	TBD	50/s p/r 1800/s y 0.1 to 30s	600	600	200	Nadir	Track (+60º/ +70º) Cross (±0.1º)	TBD
MLS (Total)	300	375	390	488	TBD	TBD	120	120	TBD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ODUS	40	50	50	63	70	88	50	100	TBD	1800 pitch 1800 roll 3600 yaw	900	TBD	360/ 200msec	400	300	500	Nadir	Track (±0.8º) Cross (±60º)	TBD

Note 1: Long term stability - 180 arcsec pitch/roll/yaw, short term stability - 60 arcsec pitch/roll/yaw, Rate - 30 arcsec/sec pitch/roll/yaw.
Note 2: Equivalent s/c angular accel. < 1.9 radian/sec ^{2} rms, equivalent s/c angular motion < 3.1 arcsec rms, equivalent s/c translational accel. < 0.19 g rms (Detail in HIRDLS EID)
Note 3: Pointing knowledge requirements (1 arcsec/sec pitch/roll, 10 arcsec/sec yaw) are achieved through instrument hardware (gyro/position encoder)
Note 4: 705km 98.2 degree inclination sun synchronous orbits for all spacecraft

STUDY SCHEDULE, POINTS OF CONTACT, CA SIGNATURES

- Contracting Officer: Linda Kelley 301/286-2094 linda.s.kelley.1@gsfc.nasa.gov
- Technical Officer: Jim Adams 301/286-1289 jim.adams@gsfc.nasa.gov
- Alternate Technical Officer: Peg Luce 301/286-8187 peg.luce@gsfc.nasa.gov

PLANNED MEETINGS

- **Initial Site Visits Start Next Week**
  - Technical officer will spend ~4 hrs at each site reviewing study plans
- **Spacecraft System Definition Reviews**
  - At GSFC in Bldg 16W Room N76/N80
  - Begin week of September 30th
  - Spacecraft System Concept to be Complete
  - Kick off for costing phase and

SHORT TERM SCHEDULE

	Initial Visit	SSCR
• Lockheed Martin Missiles & Space	Aug 29th	Oct 1st
• Space Systems/Loral	Aug 28th	Oct 3rd
• TRW Space & Electronics	Aug 26th AM	Oct 2nd
• Spectrum Astro	Aug 23rd	Oct 9th
• Ball Aerospace Systems	Aug 22nd	Oct 4th
• Hughes Space and Communications	Aug 26th PM	Oct 8th
• Orbital Sciences Corporation	Aug 20th PM	Oct 7th

Final Reviews have not yet been schedule