

Jet Propulsion Laboratory  
California Institute of Technology

4800 Oak Grove Drive  
Pasadena, CA 91109-8099

(818) 354-4321



January 14, 2004

Refer to: 930-04-001:NL/ESB

TO: Distribution

FROM: Eugene S. Burke

SUBJECT: Minutes for the Joint Users Resource Allocation Planning Committee Meeting held November 20, 2003

**NEXT JURAP MEETING:**  
**Thursday, January 15, 2004**  
**JPL Bldg. 303, Room 411 1:00 p.m.**

***NOTE: Due to the 10 February RARB,  
a JURAP Meeting will not be held in February***

Attendees:

Andujo, A.	Hall, J.	Kehrbaum J	Morris, D.
Baldwin, J	Hampton, E.	Khanampornan, T.	Ryne, M.
Brymer, B.	Holmes, D.	Lacey, N.	Slade, M.
Doody, D.	Horttor, R.	Martinez, K.	Wert, M.

The Joint Users Resource Allocation Planning Committee meets monthly to review the status of Flight Projects, the requirements of other resource users, and to identify future requirements and outstanding conflicts. The last regular meeting was held on November 20, 2003, at the Jet Propulsion Laboratory.

***Introductory Remarks / Conflict Resolutions – D. Morris***

Mr. Morris welcomed the attendees to the JURAP meeting, and introduced Michael Wert, Supervisor of the Antenna Controls Group, CSOC Antenna/Facilities Engineering, who will give a special report on the Antenna Pointing Accuracy Problems. He also discussed the Asset Contention Period (ACP) activities (Mars Arrival and EDL operations) and the O & M Contract with ITT, which will come into effect on January 1, 2004.

## **Special Report**

### **Michael Wert – Antenna Controls Group**

#### **Problem:**

Pointing calibration accuracy has been degraded due to a combination of two effects.

- (a) NSP installation made conscan unreliable and use became infrequent. The problem is still present on the BWG subnet. The conscan failure rate of 1-in-20 scan enables is under investigation by the engineering / operations team. NSP 1.4 delivery repaired (100%) problem for 70m and HEF subnets.
- (b) Approximately 50% of required periodically-scheduled antenna calibration time blocks (ANTCAL) are taken for higher priorities. The DSN has appointed a real-time scheduler to work at restoring time taken for higher priority work to mitigate this situation.

Knowledge of changes to antenna pointing error “surface” at each site should be found by Operations’ ongoing analysis of conscan-derived and ANTICAL-derived pointing error data sets. With less of this data available, overall pointing accuracy has degraded to the point that several flight projects have “seen” the error – e.g. ISAs and DRs.

#### **Solution To-Date:**

Office 930 Operations and CSOC Program Services are working to restore 100% of conscan utilization on the 70m and HEF subnets. Antenna OE issued CAD-ANT-AMC-069 to Network (stations / NOPEs / MSEs) to inform of low-level of continued conscan problems on the BWG network. Advised conscan use, despite the 13-minute MTTR, 11-day MTBF possibility.

#### **Remaining Challenges:**

DSS-14 Pointing Shift: (a) larger than typical shift with summer/fall transition not yet modeled. (b) readiness for MER EDL and SDU Wild-2 TCM requires 16 hours, as yet unscheduled, ANTICAL addition and 8 hours new model validation.

BWG Subnets – Maintenance of pointing error will require combination of: (a) project tolerance of drive to 100% conscan utilization (b) addition of up to 8 hours / month of non-delectable ANTICAL per BWG site.

#### ***RARB Action Items –D. Morris***

RARB Action Item #4 was closed by Chris Jacobs, Reference Frame Calibration (RFC). Chris proposed that in lieu of the usual 34m HEF pair for CAT M&E, that during the contention time during the summer of 2006, that we replace the nominal CAT M&E request with a request for DSS 25 to DSS-55 to use simultaneous X and Ka-bands.

RARB Action Item #5 is the only Action Item that remains open with a “due date” of 01/15/2004. Action Item #5 was requested of DSMS Engineering to distribute plan for 26m subnet antenna hydraulic system refurbishment. This will then be worked by the Resource Analysis Team to coordinate DSS-16, 46 and 66 downtimes with Operations and Flight Projects.

***Resource Analysis Team – N. Lacey***

For a complete listing of Ongoing and Advanced Planning projects visit the following link for the RAPSO website: <http://rapweb.jpl.nasa.gov/tmodmiss.pdf>

The following is a list of changes to the DSN Resource Implementation Planning Matrix:

- DSS-55 became operational on November 1, 2003

For a complete listing of the DSN Resource Implementation visit the following link for the RAPSO website: <http://rapweb.jpl.nasa.gov/tmodplns.pdf>

The Mid-Range scheduling RAP Team has completed schedule negotiation 24 weeks ahead of real-time with 18 weeks of conflict-free schedules.

The Resource Analysis Team has started the preliminary requirements analysis and recommendations for the February 10, 2004 RARB.

***DSN Downtime Forecast – A. Andujo***

For a complete listing of Antenna Downtime Reports visit the following link for the RAPSO website: <http://rapweb.jpl.nasa.gov/planning.htm>

**Changes to 2005 Downtime Schedule:**

DSMS Engineering has requested that one month be added to the existing DSS-65 Relocation, Life Extension and Antenna Controller Replacement task scheduled from Week 05 – 21 of 2005. The additional month will be at the end. This request has been made as a weather contingency.

It has been requested by JPL DSMS management that the previously approved DSS-54, and DSS-55 USC (Microwave Switch Controller) task scheduled in Week 15 and 17 respectively, be moved to a later date outside of the DSS-65 downtime timeframe. It is proposed to move the DSS-55 USC task to Week 27 and DSS-54 to Week 28. The changes to the DSS-54 and DSS-55 USC tasks and the DSS-65 extension will be proposed for approval at the February 2004 RARB.

**Changes to 2006 Downtime Schedule:**

It has been requested that the previously approved DSS-45 ACR (Antenna Controller Replacement) task scheduled in Weeks 44 – 52 be moved to an earlier date. It is proposed to move the DSS-45 ACR task to Weeks 41 – 49. The change to the DSS-45 ACR task will be proposed for approval at the February 2004 RARB.

**Changes to 2007 Downtime Schedule:**

It has been requested by DSMS Engineering to add a downtime period at DSS-54 to add X/X-Ka Band capability to be performed in Weeks 23 – 30 of 2007. The change to the DSS-54 X/X-Ka Band capability will be proposed for approval at the February 2004 RARB.

### ***DSN Operations – J. Buckley***

There was no presentation given at this month's JURAP, though presentation material is included with the Minutes.

### ***Goldstone Solar System Radar – M. Slade***

On DOY's 298, 301, and 305 GSSR successfully carried out observations of Near-Earth Asteroid (NEA) 2003 TL4.

On DOY's 315, 316, and 317 GSSR support for NEA 1999 OS observations were successful.

On DOY's 308, 313, 315, and 316 GSSR observations of binary Near-Earth Asteroid 1937 UB (Hermes) were successful. Hermes was discovered to be a unique binary in the NEA population thus far, in that the two components are roughly the same size.

Observations of Near-Earth Asteroid 1996 GT were successful on DOY's 318 and 319. The first track on DOY 317 was turned over to the MER Project for their cold boot of MER-B (Opportunity).

### ***Radio Astronomy / Special Activities – G. Martinez***

In October the DSN performed two Clock Sync's. On October 16, DSS-65 reported PCFS problems and on October 31, DSS-65 reported an antenna problem. 83% of the data was utilized. The Space Geodesy Program (SGP) conducted two (2) activities:

IVS-T2022: The objective of the International VLBI Service (IVS) T2 sessions is to monitor the Terrestrial Reference Frame (TRF) via monthly sessions. All geodetic stations participate in at least three T2 sessions each year. These sessions replace the IRIS-S sessions observed in previous years. No problems were reported by DSS-15. Data tape were sent to the Haystack correlator for processing. 100% of data time utilized.

IVS-CRF022: The International VLBI (IVS) Celestial Reference Frame (CRF) experiments are astrometric observations designed to strengthen the ICRF in the Southern Hemisphere. No problems were reported by DSS-45. Data tape sent to the Washington correlator for processing. 100% of data time utilized.

## **FLIGHT PROJECTS REPORTS**

***MAP, ACE, IMAGE, and Genesis – S. Waldherr***

There was no presentation given at this month's JURAP.

***Mars Global Surveyor – E. Brower / P. Poon***

Mr. Brower presented the MGS Project Snapshot, the Upcoming Events, Phasing MGS for MER EDL, and the Proposed E3 Mission Timeline, indicating that: (a) spacecraft is in good health, (b) They expect to fulfill most extended mission objectives (complete MER site coverage may become E2 mission objective), (c) They expect to satisfy MER EDL requirements, (d) The chances of operation through 2008 are good.

***Space Infrared Telescope – J. Hunt***

There was no presentation given at this month's JURAP.

***Mars Odyssey – B. Mase / P. Poon***

There was no presentation given at this month's JURAP.

***Mars Exploration Rover – B. Compton / B. Toyoshima***

There was no presentation given at this month's JURAP.

***INTEGRAL – D. Holmes***

Integral is operating normally in the Routine Phase. The Spacecraft is operating normally with no known anomalies. As of today (11/20/03), Integral has completed 133 revolutions (each revolution is 72 hours). There have been some performance issues with Ground Segment Operations: (a) Significant data gaps during revolutions 128 – 131, (b) Principally at Goldstone, but have also occurred at REDU, (c) Data gaps are under analysis but suspicion is that they are caused by RFI at Goldstone. Mr. Holmes also noted that revolution 130 followed the height of Solar Flare activity, and the instruments on board Integral had been shut down reinitialized and calibrated. Rev 130 = 6 - 10 November.

***Ulysses – B. Brymer***

Nominal spacecraft operations continue. Spacecraft power and thermal reconfiguration are performed as required. Spacecraft Earth pointing maneuvers are being performed every 10 days. The DSN is providing good support.

***Stardust - R. Ryan***

There was no presentation given at this month's JURAP, though presentation material is included with the Minutes.

***Chandra - K. Gage***

There was no presentation given at this month's JURAP.

***Voyager – J. Hall***

Both Voyager spacecraft are healthy and all operations are nominal. Overall DSN support was reported as good.

***Cassini – D. Doody***

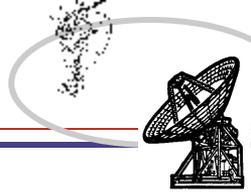
Mr. Doody reported that the Cassini spacecraft is doing well and the daily operations are performing well. Routine science observations continue. SOI External Risk Review completed October 30, with very positive results. GWE #3, 20 days of 24 x 7 DSN coverage near opposition, is in progress through DOY 334, November 30, 2003. Huygens preheat operations test results validated at ESOC, to be demonstrated on the spacecraft in December, over several DSN passes with extensive ground interaction. The Approach Science mission phase begins in January.

**SOHO, GEOTAIL, Cluster II – A. Chang**

There was no presentation given at this month's JURAP.

***Hayabusa – M. Ryne***

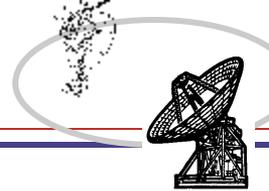
The Hayabusa Range Downlink Characterization Test was successfully completed on November 10, 2003. Operation of the Ion Engine was disrupted by large solar flares. Navigation support is planned for the following events: TCM-1 – April 20, 2004; TRIM-3 – May 12, 2004; TRIM-3c – May 18, 2004; Earth Swingby – May 20, 2004; TRIM-4 - May 26, 2004.



## Action Item Status From 12 August 2003 RARB (Resource Allocation Review Board)

David G. Morris  
November 20, 2003

**JPL**



## Action Item Summary

<i>AI#</i>	<i>Year</i>	<i>Month(s)</i>	<i>System</i>	<i>Responsible</i>	<i>Due Date</i>	<i>Status</i>
01	2003-2004	December-April	Mars Program	B. Arroyo	06/01/2003	Closed

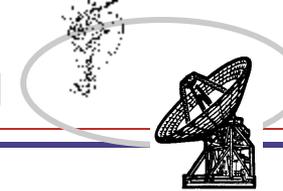
**ACTION:** (aka 8/13/02 RARB A.I. #7) Multi-mission DSN Allocation and Planning (MDAP) provide a Mars Program coordinated input to Resource Allocation (Mid-Range) Planning Team (RAPT) of at least one week per week at least 6 months prior to the schedule week. This action will use the result of Action Item 6 (of 8/13/02 RARB) to clarify the scope of resources in which to plan to.

**RESPONSE:** (10/06/2003) All weeks are delivered.

<i>AI#</i>	<i>Year</i>	<i>Month(s)</i>	<i>System</i>	<i>Responsible</i>	<i>Due Date</i>	<i>Status</i>
02	2004	June - July	Cassini	R. Gillette/ D. Seal	09/12/2003	Closed

**ACTION:** Prepare Risk Assessment for Cassini because of DSS-43 Rebalance Downtime planned in June 2004. Concern is that this occurs too close to the Cassini Saturn Orbit Insertion (SOI).

**RESPONSE:** (9/04/03) Office 930 states that this downtime is too close to this Class A event and has requested an alternative downtime plan. The Resource Analysis Team is tasked to do this.



## Action Item Summary

<i>AI#</i>	<i>Year</i>	<i>Month(s)</i>	<i>System</i>	<i>Responsible</i>	<i>Due Date</i>	<i>Status</i>
03	2006	July	MRO	R. Lock J. Hodder	11/09/2003	Closed

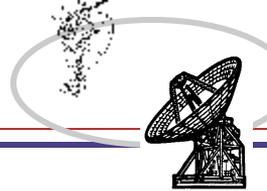
**ACTION:** Evaluate whether Mars Reconnaissance Orbiter (MRO) could utilize Multiple Spacecraft per Aperture (MSPA) while in orbit around Mars prior to achieving their final science orbit. What affects this is the MRO orbit apogee, transmitting frequency, antenna beamwidth (34m and 70m) and Mars range.

**RESPONSE:** (11/13/2003) There is no physical restriction to utilizing MSPA capability by MRO. Due to risk and flexibility concerns, MRO does not wish to use MSPA in the first month after MOI, the last part of aerobraking, and during the transition to primary science orbit.

<i>AI#</i>	<i>Year</i>	<i>Month(s)</i>	<i>System</i>	<i>Responsible</i>	<i>Due Date</i>	<i>Status</i>
04	2006	July & Sept.	RFC	C. Jacobs	09/12/2003	Pending

**ACTION:** Investigate and propose alternative support versus the recommended deletion of Reference Frame Calibration (RFC) Catalog Enhancement and Maintenance (Cat M&E) support.

**RESPONSE:**



## Action Item Summary

<i>AI#</i>	<i>Year</i>	<i>Month(s)</i>	<i>System</i>	<i>Responsible</i>	<i>Due Date</i>	<i>Status</i>
05	2004-5		DSMS Engineering	J. Osman J. Cucchissi	01/15/2004	Open

**ACTION:** Distribute plan for 26m subnet antenna hydraulic system refurbishment. This will then be worked by the Resource Analysis Team to coordinate DSS-16, 46 and 66 downtimes with Operations and Flight Projects.

**RESPONSE:** (9/10/2003) Changed due date as it will take extended time to plan new implementation dates.

<i>AI#</i>	<i>Year</i>	<i>Month(s)</i>	<i>System</i>	<i>Responsible</i>	<i>Due Date</i>	<i>Status</i>
06	2005	October	Polar	N. Lacey	09/12/2003	Closed

**ACTION:** Update mission set to show that Polar will end their mission as of October 1, 2005.

**RESPONSE:** (9/10/2003) Mission Set reflects this new date.



- PROBLEM

- Pointing calibration accuracy has been degraded due to a combination of two effects
  - NSP installation made conscan unreliable and use became infrequent
    - Problem still present on BWG subnet
      - Conscan failure rate 1-in-20 scan enables
      - Problem under investigation by engineering / operations team
    - NSP 1.4 delivery repaired (100%) problem for 70m and HEF subnets
  - Approximately 50% of required, periodically-scheduled antenna pointing calibration time blocks (ANTCAL) are taken for higher priorities
    - DSN has appointed a real-time scheduler to work at restoring time taken for higher priority work to mitigate this situation
- Knowledge of changes to antenna pointing error "surface" at each site should be found by operations' ongoing analysis of conscan-derived and ANTICAL-derived pointing error data sets
  - With less of this data available, overall pointing accuracy has degraded to the point that several flight-projects have "seen" the error – e.g. ISAs, DRs



- SOLUTION TO-DATE

- Office 930 Operations and CSOC Program Services working to restore 100% conscan utilization on 70m and HEF subnets
- Antenna OE issued CAD-ANT-AMC-069 to network (stations / NOPEs / MSEs) to inform of low-level of continued conscan problems on BWG network
  - Advised conscan use, despite 13m MTTR, 11d MTBF possibility

- REMAINING CHALLENGES

- DSS14 Pointing Shift
  - larger than typical shift with summer → fall transition not yet modeled
  - readiness for MER EDL and SDU Wild-2 TCM requires 16 h, as yet unscheduled, ANTCAL addition and 8 h new model validation
- BWG Subnets
  - maintenance of pointing error will require combination of:
    - project tolerance of drive to 100% conscan utilization
    - addition of up to 8 h / month of non-deletable ANTCAL per BWG site

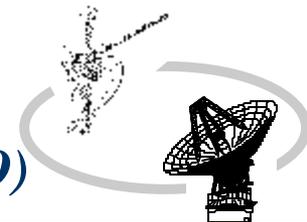
**JOINT USERS RESOURCE ALLOCATION PLANNING COMMITTEE**

**Resource  
Analysis  
Team**

**November 20, 2003**

**Napoleon Lacey**





*Resource Allocation Planning & Scheduling Office (RAPSO)*

**– Ongoing / Approved Projects –**

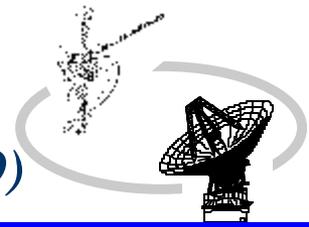
Project	Acronym	Launch or Start	EOPM	EOEM
DSN Antenna Calibration	DSN	--	--	--
DSS Maintenance	DSS	--	--	--
European VLBI Network	EVN	--	--	--
Ground Based Radio Astronomy	GBRA	--	--	--
Reference Frame Calibration	DSN	--	--	--
Space Geodesy	SGP	--	--	--
Voyager 2	VGR2	08/20/77	10/15/89	09/30/07
Voyager 1	VGR1	09/05/77	12/31/80	09/30/07
Goldstone Solar System Radar	GSSR	04/01/85	--	--
Ulysses	ULYS	10/06/90	09/11/95	03/31/08
Geotail	GTL	07/24/92	07/24/95	<u>12/31/08</u>
Wind	WIND	11/01/94	11/01/97	<u>12/31/08</u>
SOHO	SOHO	12/02/95	05/02/98	<u>12/31/08</u>
Polar	POLR	02/22/96	08/23/97	<u>12/31/08</u>
Gravity Probe B	GPB	06/01/96	05/30/05	TBD
Mars Global Surveyor	MGS	11/07/96	02/01/01	01/03/08
Advance Composition Explorer	ACE	08/25/97	02/01/01	09/30/07



*Resource Allocation Planning & Scheduling Office (RAPSO)*

**– Ongoing / Approved Projects (continued) –**

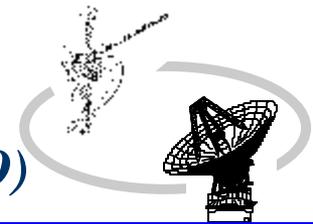
Project	Acronym	Launch or Start	EOPM	EOEM
Cassini	CAS	10/15/97	06/30/08	06/30/10
Nozomi (Planet-B)	NOZO	07/03/98	12/31/05	TBD
Stardust	SDU	02/07/99	01/14/06	---
Chandra X-ray Observatory	CHDR	07/23/99	07/24/09	07/24/14
Imager for Magnetopause-to-Aurora Global Exploration	IMAG	03/25/00	05/30/02	09/30/07
Cluster 2 - S/C #2 (Samba)	CLU2	07/16/00	02/15/03	09/30/07
Cluster 2 - S/C #3 (Rumba)	CLU3	07/16/00	02/15/03	09/30/07
Cluster 2 - S/C #1 (Salsa)	CLU1	08/09/00	02/15/03	09/30/07
Cluster 2 - S/C #4 (Tango)	CLU4	08/09/00	02/15/03	09/30/07
2001 Mars Odyssey	M01O	04/07/01	08/24/04	05/29/08
Wilkinson Microwave Anisotropy Probe	WMAP	06/30/01	10/01/03	10/01/06
Genesis	GNS	08/08/01	09/08/04	---
Mission Enhancement by Ground-based Astronomy	MEGA	02/01/02	12/31/08	---
International Gamma Ray Astrophysics Lab	INTG	10/17/02	12/18/04	<u>12/31/08</u>
Hayabusa (MUSES - C)	MUSC	05/09/03	06/05/07	---
Mars Express Orbiter	MEX	06/02/03	02/11/06	08/03/08
Spirit (Mars Exploration Rover - A)	MER2	06/10/03	04/06/04	05/11/04



*Resource Allocation Planning & Scheduling Office (RAPSO)*

**– Ongoing / Approved Projects (continued) –**

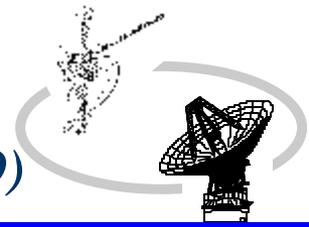
Project	Acronym	Launch or Start	EOPM	EOEM
Opportunity (Mars Exploration Rover - B)	MER1	07/07/03	04/27/04	06/15/04
Space Infrared Telescope Facility	STF	08/25/03	10/12/08	---
Rosetta	ROSE	02/26/04	12/31/15	---
Messenger	MSGR	05/11/04	04/06/10	---
Lunar - A	LUNA	08/30/04	04/11/05	---
Space Technology 5	ST5	11/19/04	02/27/05	TBD
Deep Impact	DIF	12/30/04	08/05/05	---
RadioAstron	RADA	03/15/05	06/15/10	TBD
Mars Reconnaissance Orbiter	MRO	08/10/05	12/31/10	12/31/15
Stereo Ahead	STA	11/15/05	02/15/08	---
Stereo Behind	STB	11/15/05	02/15/08	---



*Resource Allocation Planning & Scheduling Office (RAPSO)*

**– Advanced / Planning Projects –**

Project	Acronym	Launch or Start	EOPM	EOEM
New Horizons	NHPC	01/10/06	03/18/17	TBD
Dawn	DAWN	05/27/06	07/26/15	TBD
Phoenix Scout	M07S	08/09/07	11/04/08	TBD
Kepler	KPLR	10/01/07	09/26/11	TBD
Mars Telecommunications Orbiter 2009	M09T	09/07/09	09/07/16	09/07/20
Mars Science Laboratory 2009	M09L	10/25/09	03/04/12	TBD
Space Interferometry Mission	SIM	12/31/09	06/30/20	TBD
Advanced Radio Interferometry between Space and Earth (ARISE)	ARSE	06/15/10	06/15/15	---
VLBI Space Observatory Programme (VSOP-2)	VSP2	06/15/10	06/15/15	---
James Webb Space Telescope	JWST	08/01/11	07/31/16	TBD
Mars Placeholder 2011	M11S	10/30/11	09/10/14	TBD
Mars Placeholder 2013	M13O	11/28/13	08/21/16	TBD



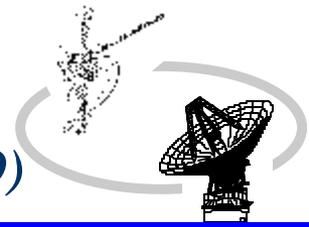
# Resource Allocation Planning & Scheduling Office (RAPSO)

Station	Subnet	Delivery Date	S-Band Down	S-Band Up	X-Band Down	X-Band Up	20 kW X-Band	Ka-Band Down	Ka-Band Up	NSP
DSS-14	70M	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	TBD	N/A	XXXX
DSS-15	34HEF	XXXX	XXXX	N/A	XXXX	XXXX	XXXX	TBD	N/A	XXXX
DSS-16	26M	XXXX	XXXX	XXXX	N/A	N/A	N/A	N/A	N/A	N/A
DSS-24	34BWG1	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	10/23/05	N/A	XXXX
DSS-25	34BWG2	XXXX	N/A	N/A	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
DSS-26	34BWG2	XXXX	N/A	N/A	XXXX	XXXX	XXXX	XXXX	N/A	XXXX
DSS-27	34HSB	XXXX	XXXX	XXXX	N/A	N/A	N/A	N/A	N/A	01/31/05
DSS-34	34BWG1	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	06/27/05	N/A	XXXX
DSS-43	70M	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	TBD	N/A	XXXX
DSS-45	34HEF	XXXX	XXXX	N/A	XXXX	XXXX	XXXX	TBD	N/A	XXXX
DSS-46	26M	XXXX	XXXX	XXXX	N/A	N/A	N/A	N/A	N/A	N/A
DSS-54	34BWG1	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	08/01/07	N/A	XXXX
DSS-55	34BWG2	11/01/03	N/A	N/A	11/01/03	11/01/03	11/01/03	11/01/03	N/A	11/01/03
DSS-63	70M	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	TBD	N/A	XXXX
DSS-65	34HEF	XXXX	XXXX	N/A	XXXX	XXXX	XXXX	TBD	N/A	XXXX
DSS-66	26M	XXXX	XXXX	XXXX	N/A	N/A	N/A	N/A	N/A	N/A

XXXX = Capability Currently Exists

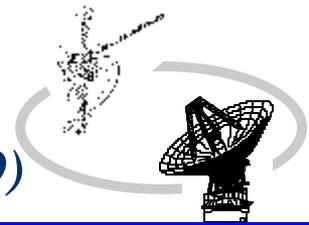
N/A = Capability Not Planned

09/17/03



## ◆ RESOURCE NEGOTIATION STATUS

- 2004 WEEKS 01 – 04 (THRU 01/25/2004) WERE RELEASED TO DSN SCHEDULING ON 11/07/2003.
  - 2004 WEEKS 05 – 08 (THRU 02/22/2004) ARE DUE TO BE RELEASED TO DSN SCHEDULING ON 12/05/2003.
  - PREVIEW FOR 2004 WEEKS 20 - 21 (THRU 05/23/2004) WILL BE POSTED ON RAPWEB 12/02/2003.
  - NEGOTIATIONS FOR 2004 WEEKS 20 – 21 (THRU 05/23/2004) WILL BEGIN 12/17/2003.
- ◆ The mid-range scheduling process has negotiated 24 weeks of schedules ahead of real-time. Currently, there are 18 weeks of conflict-free schedules.

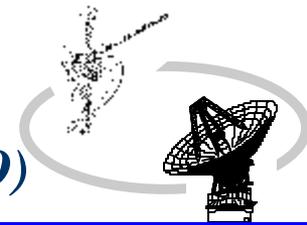


◆ **SPECIAL STUDIES/ACTIVITIES**

- MESSENGER SPECIAL STUDY – LAUNCH CHANGE

◆ **ON-GOING ACTIVITIES**

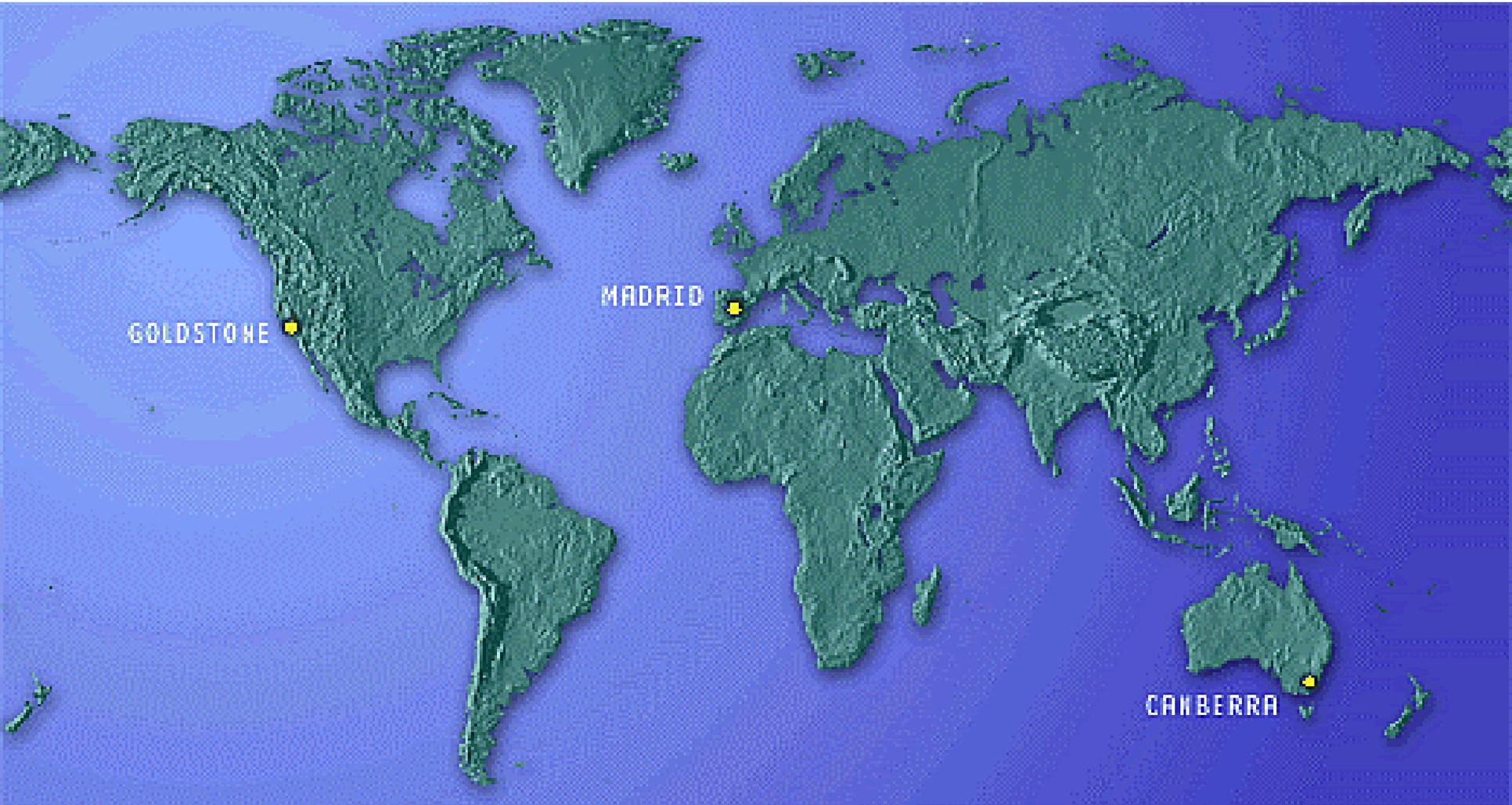
- MADB/TIGRAS TESTING AND TRAINING
- DOWNTIME PLANNING
- LUNAR-A LOAD STUDY – MISSION REPLAN
- PHOENIX LOAD STUDY
- ROSETTA LOAD STUDY – MISSION REPLAN
- ST-5 SPECIAL STUDY – LAUNCH CHANGE
- ULYSSES EXTENDED MISSION STUDY



## RARB Timeline – February 10, 2004

Calendar Date	Work Days Remaining	Milestones
10/13/2003	78 Days	Distribute Mission Set, Major Events and User Loading Profiles to Projects/Users for verification.
10/31/2003	64 Days	Deadline for Projects/Users responses to Mission Set, Major Events, and User Loading Profiles. Last day for Trajectory or Viewperiod updates and submissions.
11/07/2003	59 Days	Start preliminary requirements analysis and recommendations.
01/12/2004	20 days	Post preliminary Contentions/Recommendations to RAPWEB for Projects/Users review.
01/14/2004	18 days	NASA Headquarters Science Review.
01/29/2004	8 days	Complete Project/User Review
02/05/2004	3 Days	Post final Contentions and Recommendations on the RAPWEB
02/09/2004	1 Day	Distribute booklets to RARB Board Members
<b>02/10/2004</b>		<b>Resource Allocation Review Board Meeting</b>

# DSN Antenna Downtime Status and Forecast



<http://rapweb.jpl.nasa.gov/planning>

# Antenna Downtime Status and Forecast

## Changes to 2003 Downtime Schedule

- ❑ There are no outstanding downtime requests for 2003. All previous requests have been negotiated and approved, either through the RARB, JURAP or Mid-Range Scheduling processes. No new requests will be processed during the Antenna Contention Period (ACP) of November 2003 – March 2004, without approval from JPL/DSN Management.

# Antenna Downtime Status and Forecast

## Changes to 2004 Downtime Schedule

- ❑ There are no outstanding downtime requests for 2004. All previous requests have been negotiated and approved, either through the RARB, JURAP or Mid-Range Scheduling processes. No new requests will be processed during the Antenna Contention Period (ACP) of November 2003 – March 2004, without approval from JPL/DSN Management.

# Antenna Downtime Status and Forecast

## Changes to 2005 Downtime Schedule

- ❑ DSMS Engineering has requested that one month be added to the existing DSS-65 Relocation, Life Extension and Antenna Controller Replacement task scheduled from weeks 05 – 21 of 2005. The additional month will be at the end. This request has been made as a weather contingency.
- ❑ It has been requested by JPL DSMS management that the previously approved DSS-54, and DSS-55 USC (Microwave Switch Controller) task scheduled in week 15 and 17 respectively, be moved to a later date outside of the DSS-65 downtime timeframe. No new dates has been identified as of yet.

**The changes to the DSS-54 and 55 USC tasks and the DSS-65 extension will be proposed for approval at the February 2004 RARB.**

# Antenna Downtime Status and Forecast

## Changes to 2006 Downtime Schedule

- ❑ There are no outstanding downtime requests for 2006. All previous requests have been negotiated and approved, either through the RARB, JURAP or Mid-Range Scheduling processes.

# Antenna Downtime Status And Forecast Schedule

## DSN Antenna Downtime Report

Revised: October 24, 2003

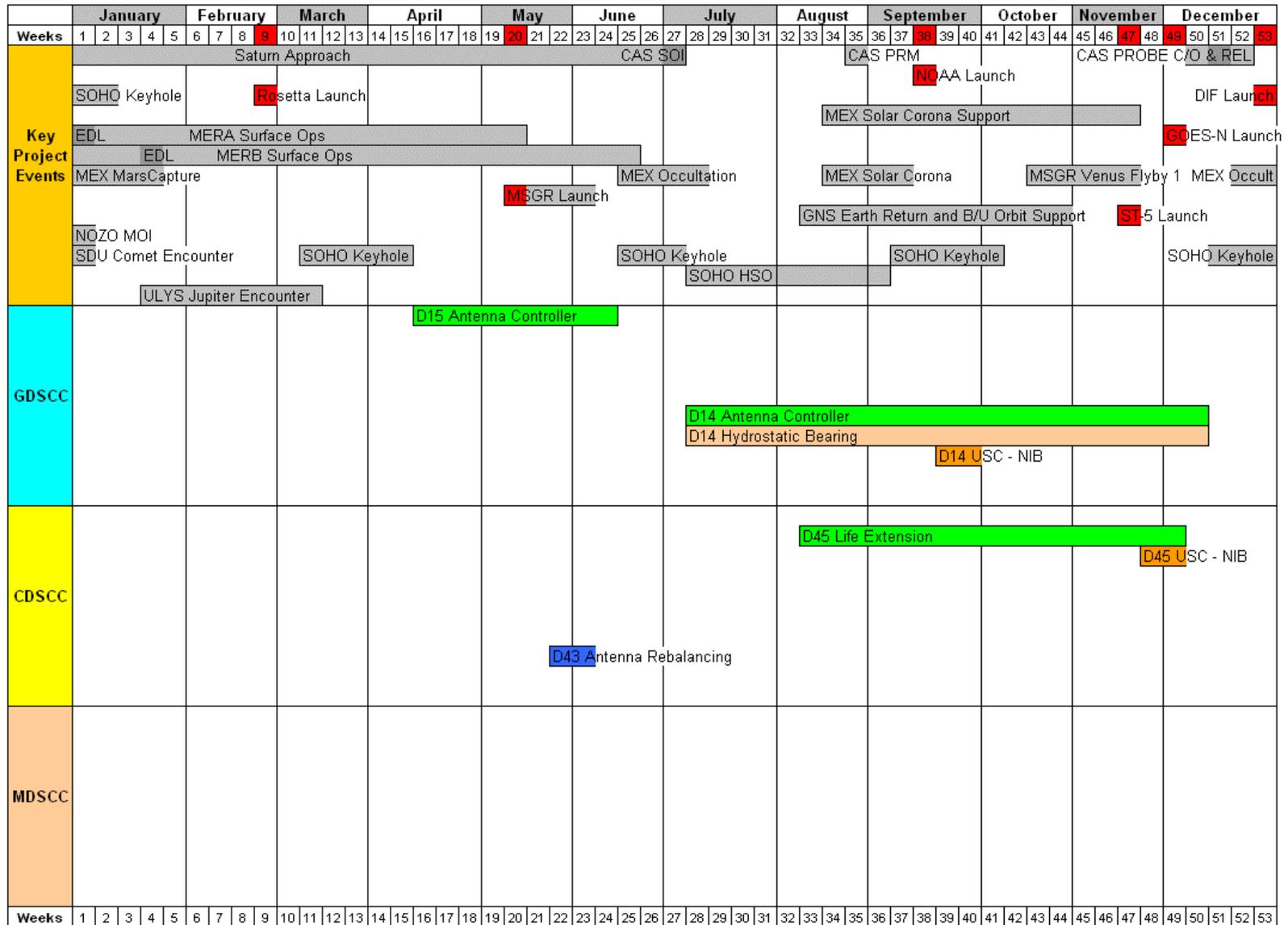
2004							
Site	Description	Start	End	Duration (Days)	Weeks	Start DOY	End DOY
DSS 15	Antenna Controller Replacement	04/12/2004 00:00	06/13/2004 23:59	63	16 - 24	103	165
DSS 43	Antenna Rebalance	05/29/2004 00:00	06/06/2004 23:59	9	22 - 23	150	158
DSS 14	Antenna Controller Replacement	07/07/2004 00:00	12/07/2004 23:59	154	28 - 50	189	342
DSS 14	Hydrostatic Bearing	07/07/2004 00:00	12/07/2004 23:59	154	28 - 50	189	342
DSS 45	Life Extension	08/09/2004 00:00	12/05/2004 23:59	119	33 - 49	222	340
DSS 14	NIB - USC Installation	09/20/2004 00:00	10/03/2004 23:59	14	39 - 40	264	277
DSS 45	NIB - USC Installation	11/22/2004 00:00	12/05/2004 23:59	14	48 - 49	327	340

2005							
Site	Description	Start	End	Duration (Days)	Weeks	Start DOY	End DOY
DSS 27	NSP Implementation	01/03/2005 00:00	01/30/2005 23:59	28	01 - 04	003	030
DSS 27	NIB - USC Installation	01/10/2005 00:00	01/23/2005 23:59	14	02 - 03	010	023
DSS 63	USC Installation	01/17/2005 00:00	01/30/2005 23:59	14	03 - 04	017	030
DSS 26	USC Installation	01/24/2005 00:00	02/06/2005 23:59	14	04 - 05	024	037
DSS 65	Antenna Controller Replacement	01/31/2005 00:00	05/29/2005 23:59	119	05 - 21	031	149
DSS 65	NIB - USC Installation	01/31/2005 00:00	02/06/2005 23:59	7	05 - 05	031	037
DSS 65	Relocation	01/31/2005 00:00	05/29/2005 23:59	119	05 - 21	031	149
DSS 65	Life Extension	01/31/2005 00:00	05/29/2005 23:59	119	05 - 21	031	149
DSS 25	USC Installation	02/21/2005 00:00	03/06/2005 23:59	14	08 - 09	052	065
DSS 15	USC Installation	04/11/2005 00:00	04/24/2005 23:59	14	15 - 16	101	114
DSS 54	USC Installation	04/11/2005 00:00	04/17/2005 23:59	7	15 - 15	101	107
DSS 55	USC Installation	04/25/2005 00:00	05/01/2005 23:59	7	17 - 17	115	121
DSS 34	X/X-Ka Band	05/02/2005 00:00	06/26/2005 23:59	56	18 - 25	122	177
DSS 34	NIB - USC Installation	06/13/2005 00:00	06/26/2005 23:59	14	24 - 25	164	177
DSS 24	USC Installation	06/27/2005 00:00	07/03/2005 23:59	7	26 - 26	178	184
DSS 43	Antenna Controller Replacement	07/18/2005 00:00	01/01/2006 23:59	168	29 - 52	199	001
DSS 43	NIB - USC Installation	07/18/2005 00:00	07/31/2005 23:59	14	29 - 30	199	212
DSS 43	Hydrostatic Bearing	07/18/2005 00:00	01/01/2006 23:59	168	29 - 52	199	001

2006							
Site	Description	Start	End	Duration (Days)	Weeks	Start DOY	End DOY
DSS 63	Antenna Controller Replacement	05/22/2006 00:00	09/03/2006 23:59	105	21 - 35	142	246
DSS 24	X/X-Ka Band	09/04/2006 00:00	10/22/2006 23:59	49	36 - 42	247	295
DSS 45	Antenna Controller Replacement	10/30/2006 00:00	12/31/2006 23:59	63	44 - 52	303	365



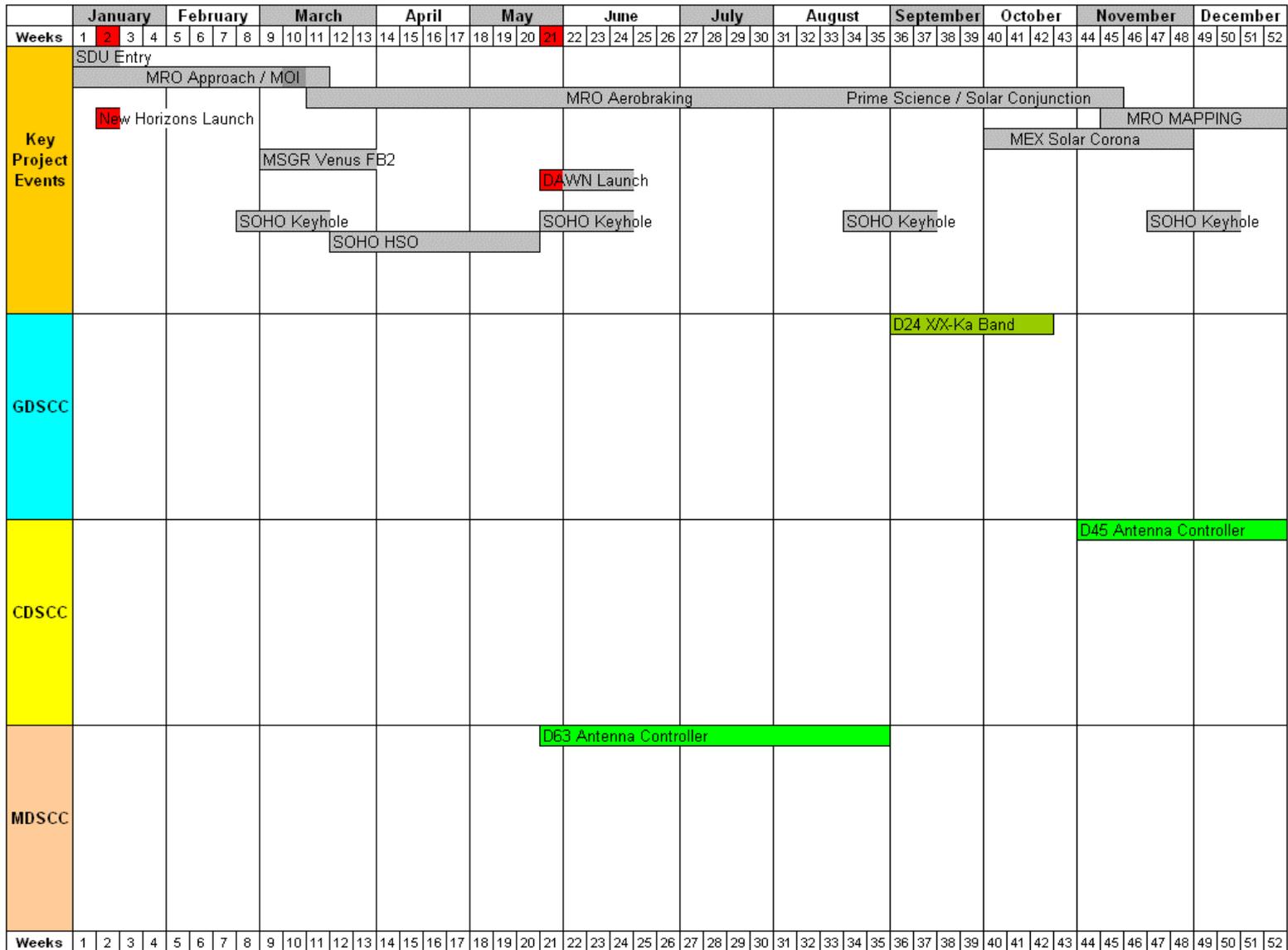
# Antenna Downtime Status And Forecast 2004



Revised: November 20, 2003



# Antenna Downtime Status And Forecast 2006



Revised: October 13, 2003

# ***Goldstone Solar System Radar***

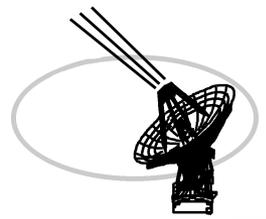


***Martin A. Slade***

***November 20, 2003***

***NASA Jet Propulsion Laboratory***

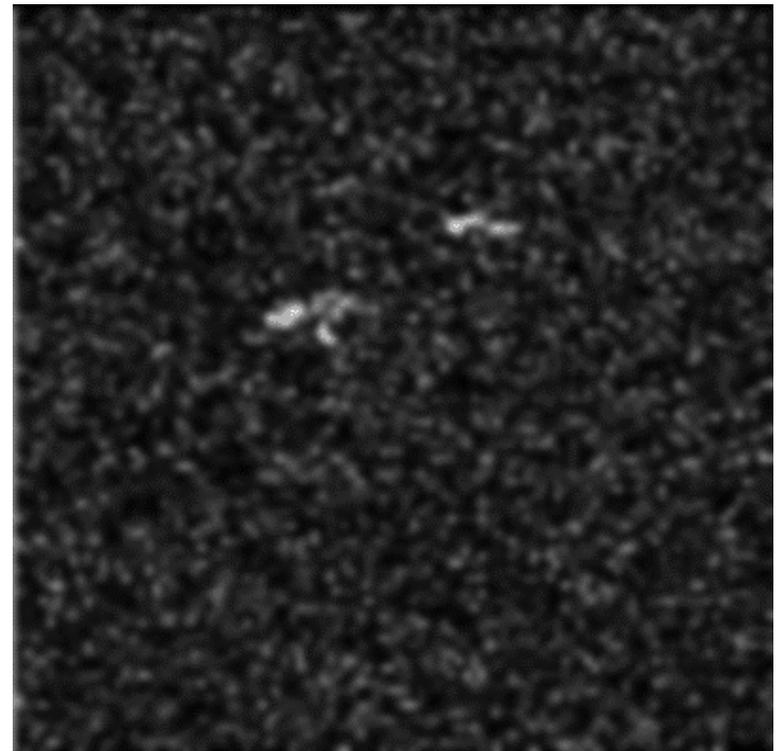
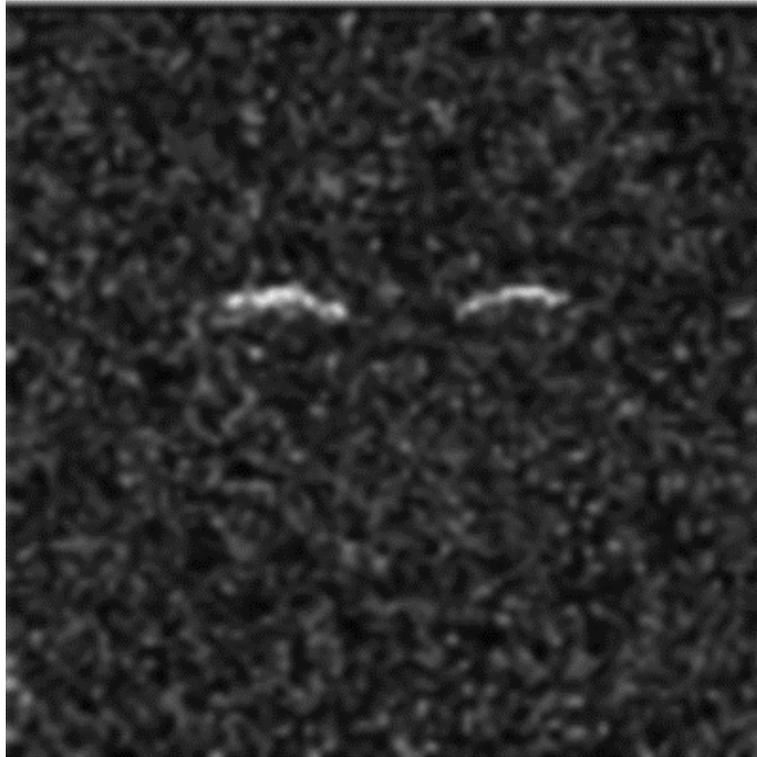
***Joint Users Resource Allocation Planning Committee Meeting***



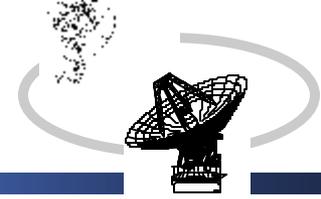
- On DOY's 298, 301, and 305, GSSR successfully carried out observations of Near-Earth Asteroid (NEA) 2003 TL4
- On DOY's 315, 316, and 317, GSSR support for NEA1999 OS observations were successful.
- On DOY's 308, 313, 315, and 316, GSSR observations of *binary* Near-Earth Asteroid 1937 UB (Hermes) were successful. Hermes was discovered to be a unique binary in the NEA population thus far, in that the two components are roughly the same size.
- Observations of Near-Earth Asteroid 1996 GT were successful on DOY's 318 and 319. The first track on DOY 317 was turned over to the MER Project for their cold boot of MER-B ("Opportunity").

# Radar images of binary NEA Hermes on Nov. 3, 2003

Delay (range) from Earth ->



Doppler Frequency -> on this axis



# Radio Astronomy & Special Activities

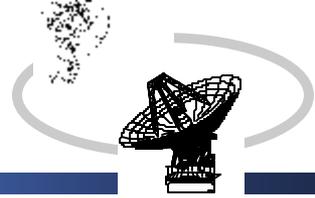
November 20, 2003

George Martinez



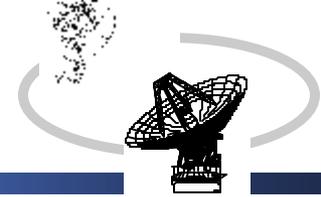
# TEMPO

(Time and Earth Motion Precision Observations)



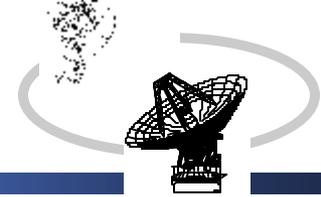
- **Clock Sync DOY 289.**
  - No problems were reported by DSS-15.
  - DSS-65 reported PCFS problems.
  - Data tape sent to the JPL correlator for processing.
  
- **Clock Sync DOY 304.**
  - No problems were reported by by either DSS-15.
  - DSS-65 reported an antenna problem.
  - Data tape sent to the JPL correlator for processing.
  
- **Metrics**
  - 83% of data time utilized





- **IVS-T2022**
  - The objective of the International VLBI Service (IVS) T2 sessions is to monitor the Terrestrial Reference Frame (TRF) via monthly sessions. All geodetic stations participate in at least three T2 sessions each year. These sessions replace the IRIS-S sessions observed in previous years.
  - No problems were reported by DSS-15.
  - Data tape sent to the Haystack correlator for processing.
- **IVS-CRF022**
  - The International VLBI Service (IVS) Celestial Reference Frame (CRF) experiments are astrometric observations designed to strengthen the ICRF in the Southern Hemisphere.
  - No problems were reported by DSS-45.
  - Data tape sent to the Washington correlator for processing.
- **Metrics**
  - 100% of data time utilized





- **Data obtained during spacecraft prelaunch testing showed electronic noise on an output channel associated with the No. 1 experiment gyro.**
  - **This could compromise the quality of data received from it.**
  - **The problem has been isolated to a component in the spacecraft's experiment control unit (ECU).**
  - **The repairs will restore full redundancy to the experiment and provide the greatest chance for success over the planned 16-month life of the mission.**
- **Launch delayed to no earlier than April 2004.**



*Mars Global Surveyor*  
**Flight Operations  
Status**

**E.E. Brower**  
*November 19, 2003*



# *Mars Global Surveyor*

## **AGENDA**

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- Project Snapshot
- Recent Events/Accomplishments
- Mission Assessment
- Comments

---

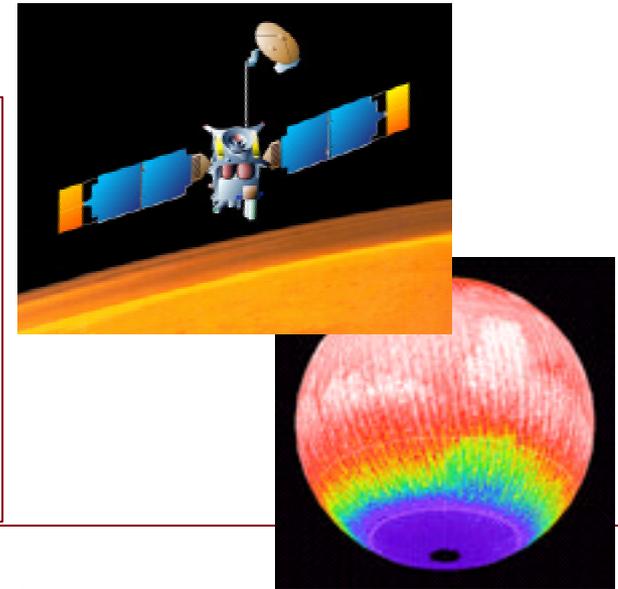
*MGS*



## Mars Global Surveyor

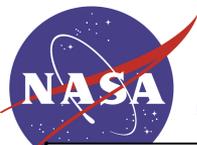
### Salient Features

- **Global mapping of Martian atmosphere, surface, magnetic field**
- **Nadir pointed spacecraft**
- **5 instruments (MOC imager, MOLA laser altimeter, TES - IR spectrometer, MAG magnetometer, RS radio science)**
- **Launch date: November 1996**
- **Mapping lifetime: One Mars year (687 days)**
- **Provides relay capability for surface assets (Relay lifetime: 5 years)**

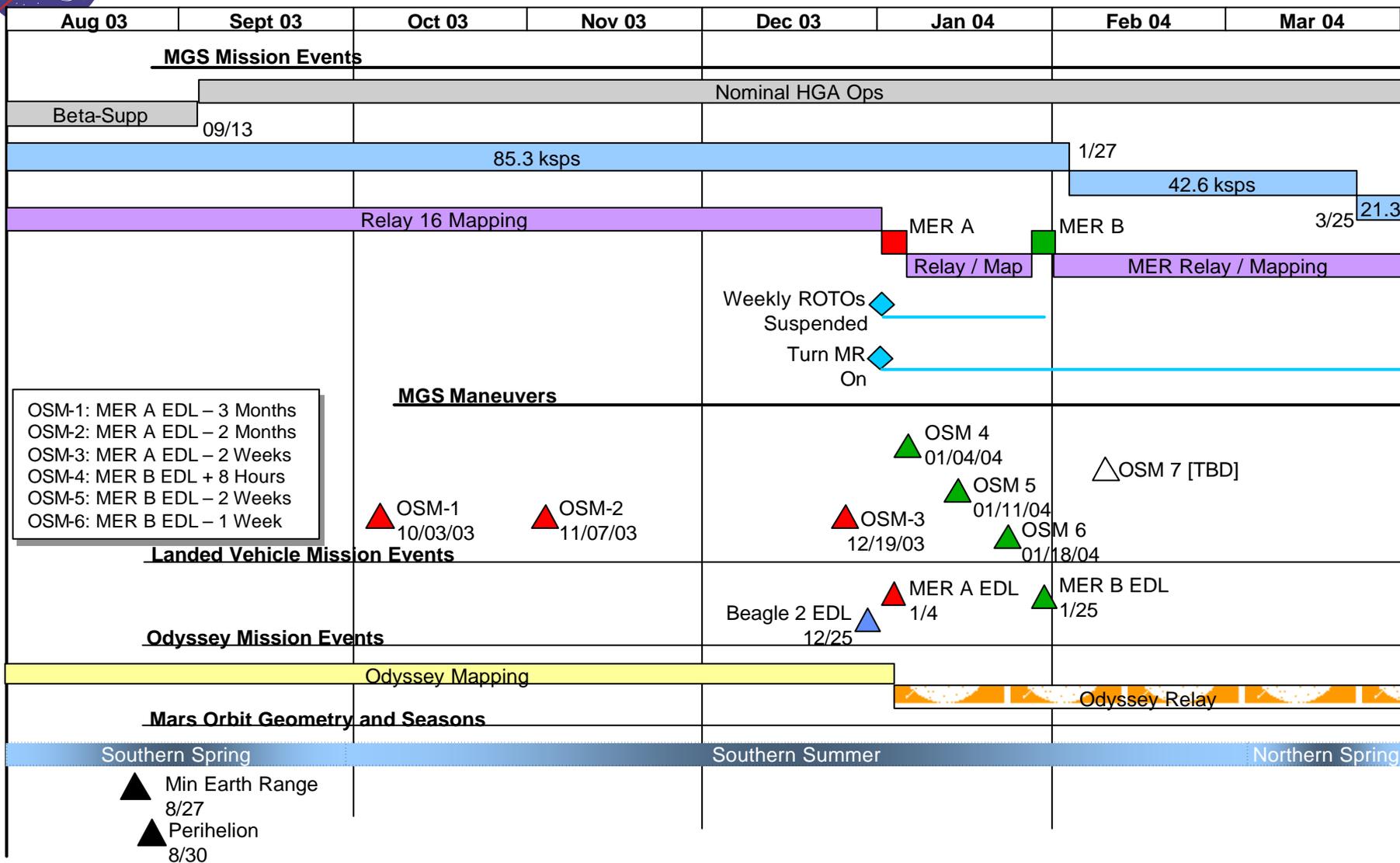


### Science

- **To characterize surface morphology at high spatial resolution to quantify surface characteristics and geological processes**
- **To determine the composition and map the distribution of surface minerals, rocks, and ices; measure the surface thermophysical properties;**
- **To determine globally the topography, geodetic figure, and gravitational field;**
- **To establish the nature of the magnetic field and map the crustal remnant field;**
- **To monitor global weather and thermal structure of the atmosphere;**
- **To study surface-atmosphere interaction by monitoring surface features, polar caps, atmospheric dust, and condensate clouds over a seasonal cycle.**



# Mars Global Surveyor Upcoming Events



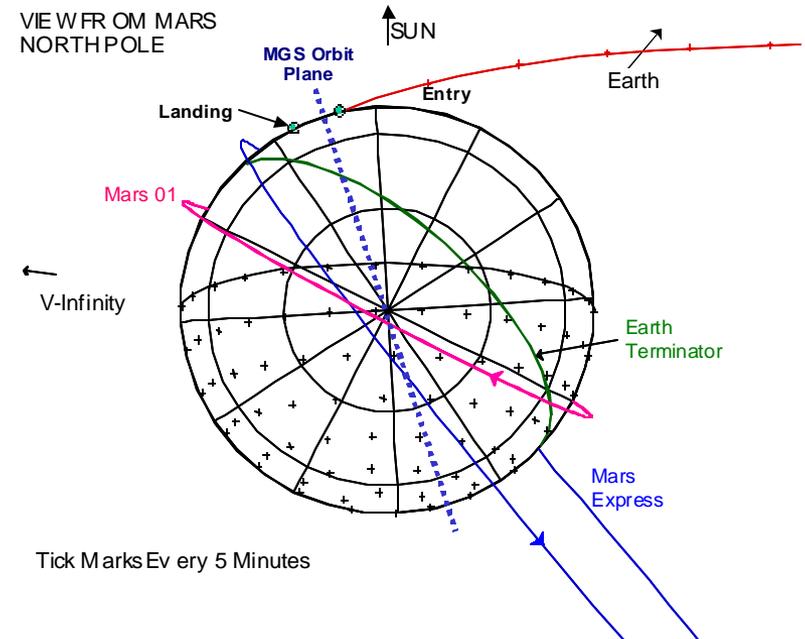
MGS



# Mars Global Surveyor Phasing MGS for MER EDL



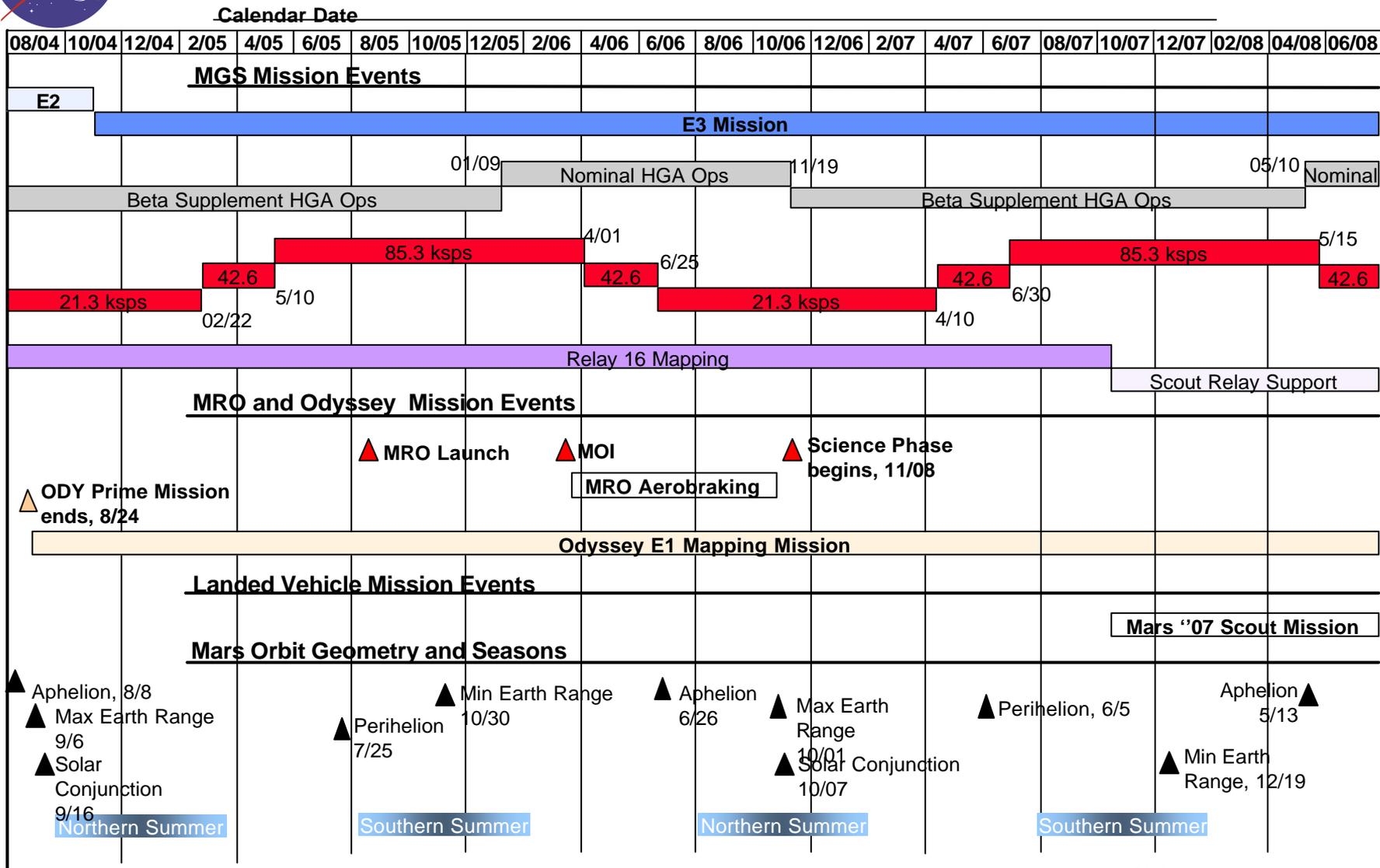
- 6 Maneuvers are planned (3 per MER), enabling MGS to have the most accurate over-flight times for each EDL
- OSM-1 occurs 3 months before A-EDL
  - After the MGS transition to Nominal HGA Mapping (Sept. 10)
  - Due to orbit perturbations, navigation predictions > 3 months out degrade
- OSM 2 and 3 are placed between OSM-1 and A-EDL
- OSM-4, 5, & 6 are placed in the 21 day interval between A-EDL and B-EDL
- OSM-4 is planned for MER-A EDL + ~10 hours to stay within the 4 m/s Delta V allocation



MGS



# Mars Global Surveyor Proposed E3 Mission Timeline



**MGS**



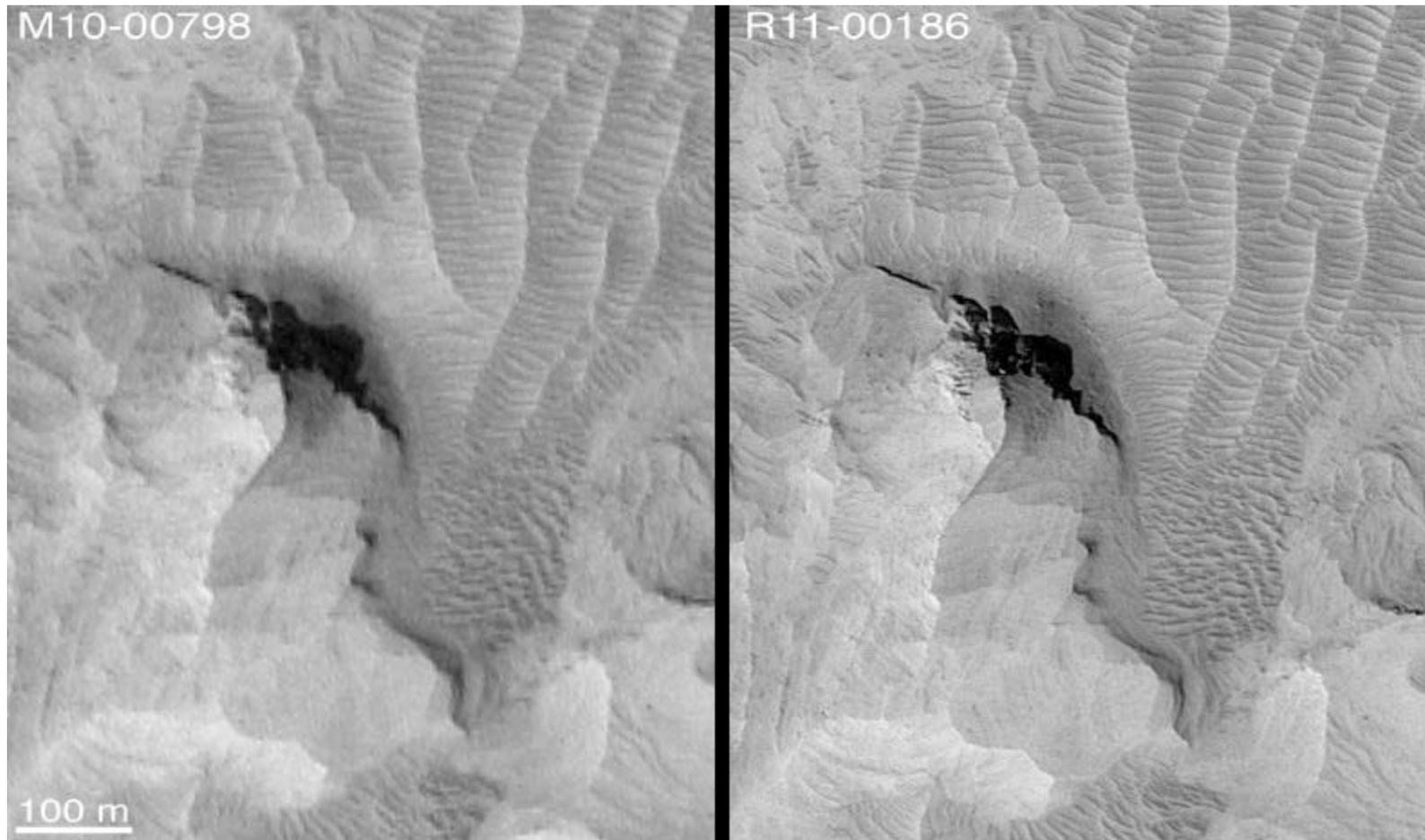
- Last 3 Months:
  - **Stanford test #2** **AUG 28**
  - **Transition to mapping configuration** **SEP 10**
  - **OSM1/Plume Imaging Review** **SEP 17**
  - **OSM1** **OCT 3**
  - **CPROTOs** **NOV. 1-3**
  
- Next 12 Months:
  - **OSM2 Decision** **NOV 20**
  - **MGS OSM#2,3** **DEC 4, DEC 19**
  - **MGS MER EDL relay** **JAN 4, 2004**
  - **MGS OSM#4,5,6** **JAN 5, 12, 19**
  - **MGS MER EDL relay** **JAN 25**
  - **MGS MER ROVER Science relay** **JAN-MAY**



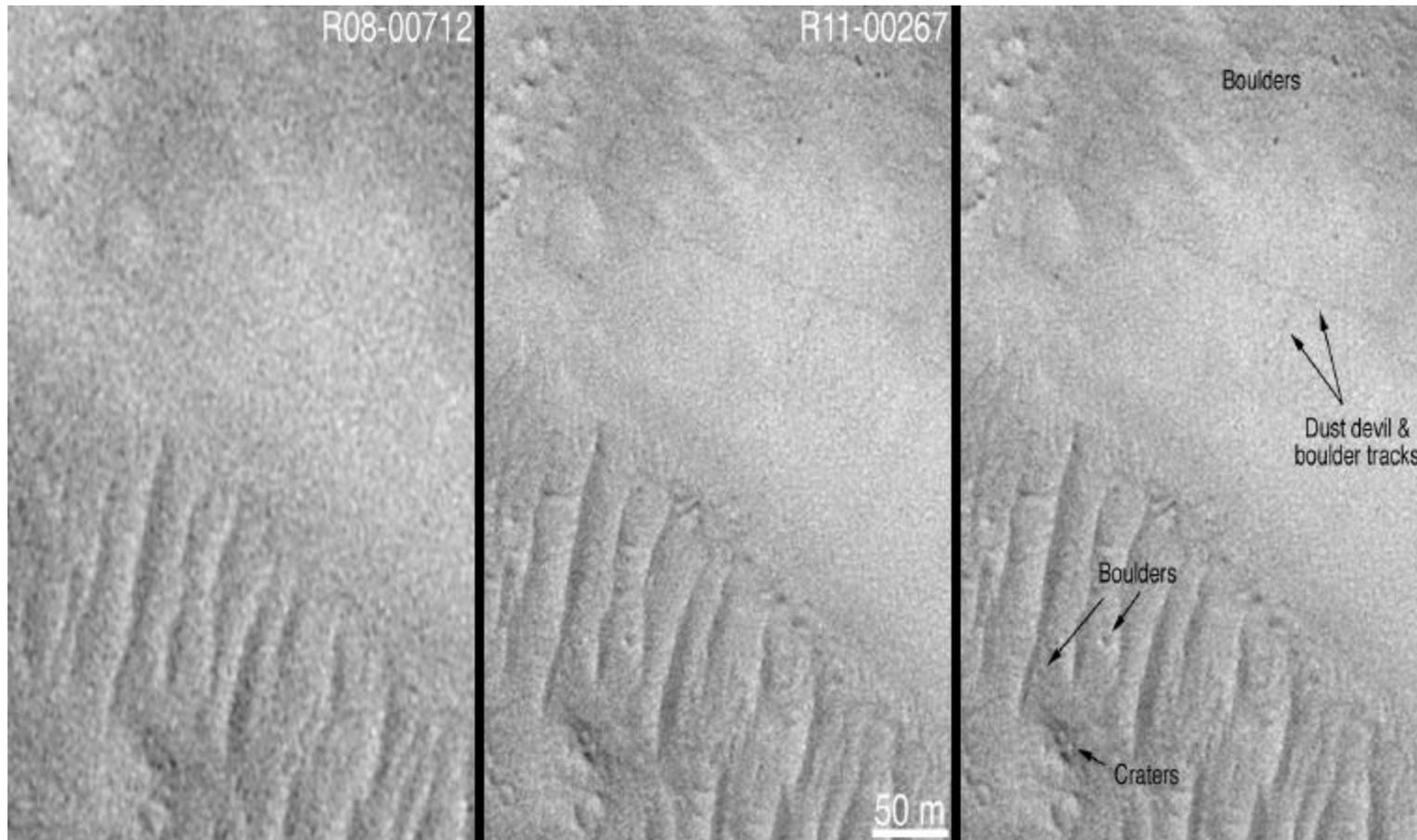
- **Spacecraft is in good health.**
- **Expect to fulfill most extended mission objectives (complete MER site coverage may become E2 mission objective).**
- **Expect to satisfy MER EDL Requirements.**
- **Chances of operation through 2008 are good.**



*Mars Global Surveyor*  
CPROTO Gusev Image Comparison

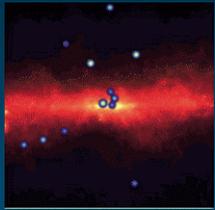


*MGS*





- **None**



# *INTEGRAL*



<http://sci.esa.int/home/integral/index.cfm>

## **Joint Users Resource Allocation Planning (JURAP) Committee Meeting**

**Dwight P. Holmes  
November 20, 2003**

***NASA / Jet Propulsion Laboratory***



# **INTEGRAL**



## **OPERATIONS**

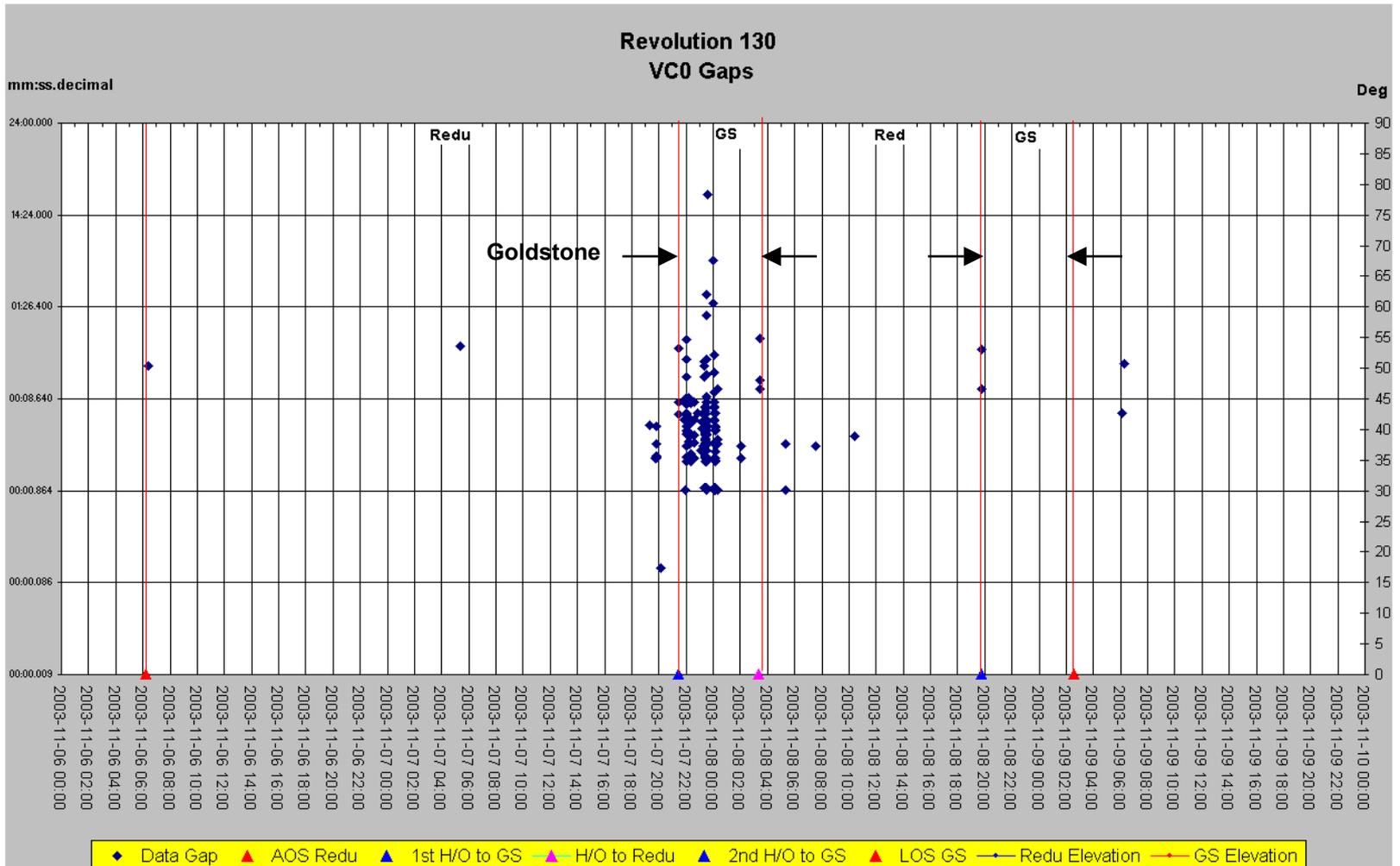
- **DSN Status**
  - Integral is operating normally in Routine Phase
  - Spacecraft is operating normally with no known anomalies
    - Result of Solar Flares at the end of October, beginning of November
      - Degradation of Solar array by .2 to .3 amps
  - As of today, Integral has completed 133 revolutions (each revolution is 72 hours)
  - There have been some performance issues with Ground Segment Operations
    - Significant data gaps during revolutions 128 – 131
    - Principally at Goldstone, but have also occurred at REDU
    - Data Gaps are under analysis but suspicion is they are caused by RFI at Goldstone.
  - Also note that revolution 130 followed the height of Solar Flare activity, and the instruments onboard Integral had been shut down reinitialized and calibrated. Rev 130 = 6 -10 November



# INTEGRAL



## Data Gaps

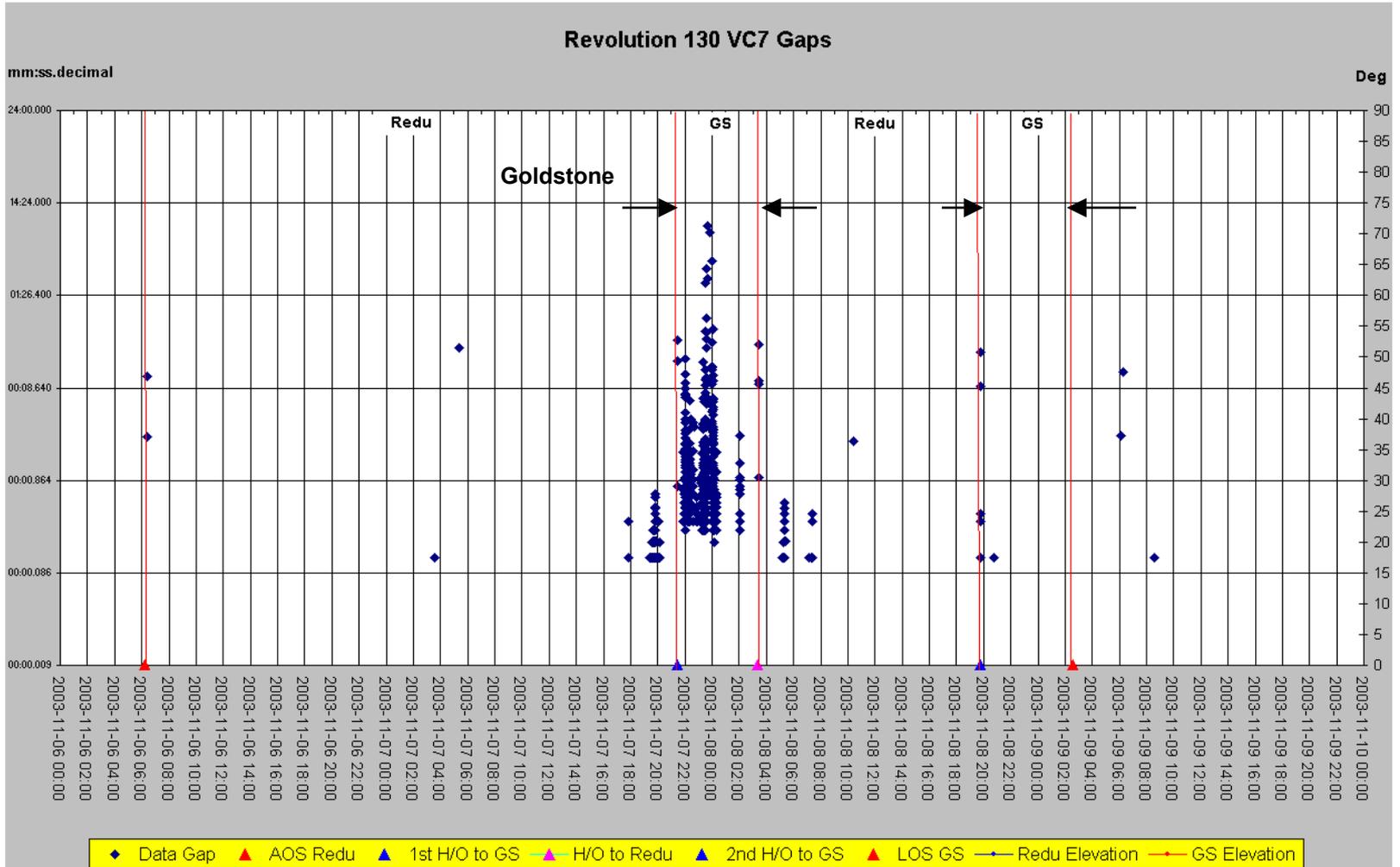




# INTEGRAL



## Data Gaps

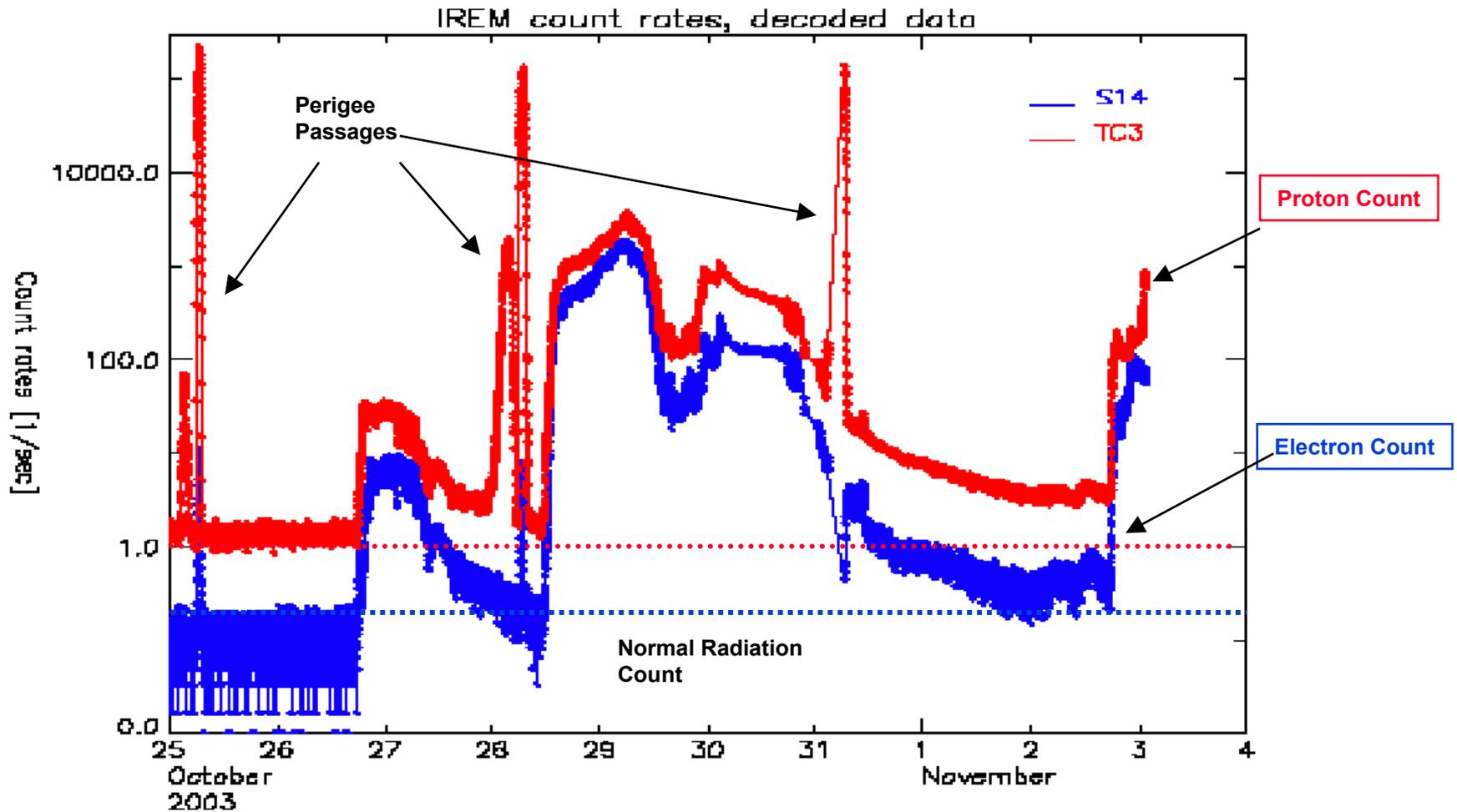




# INTEGRAL

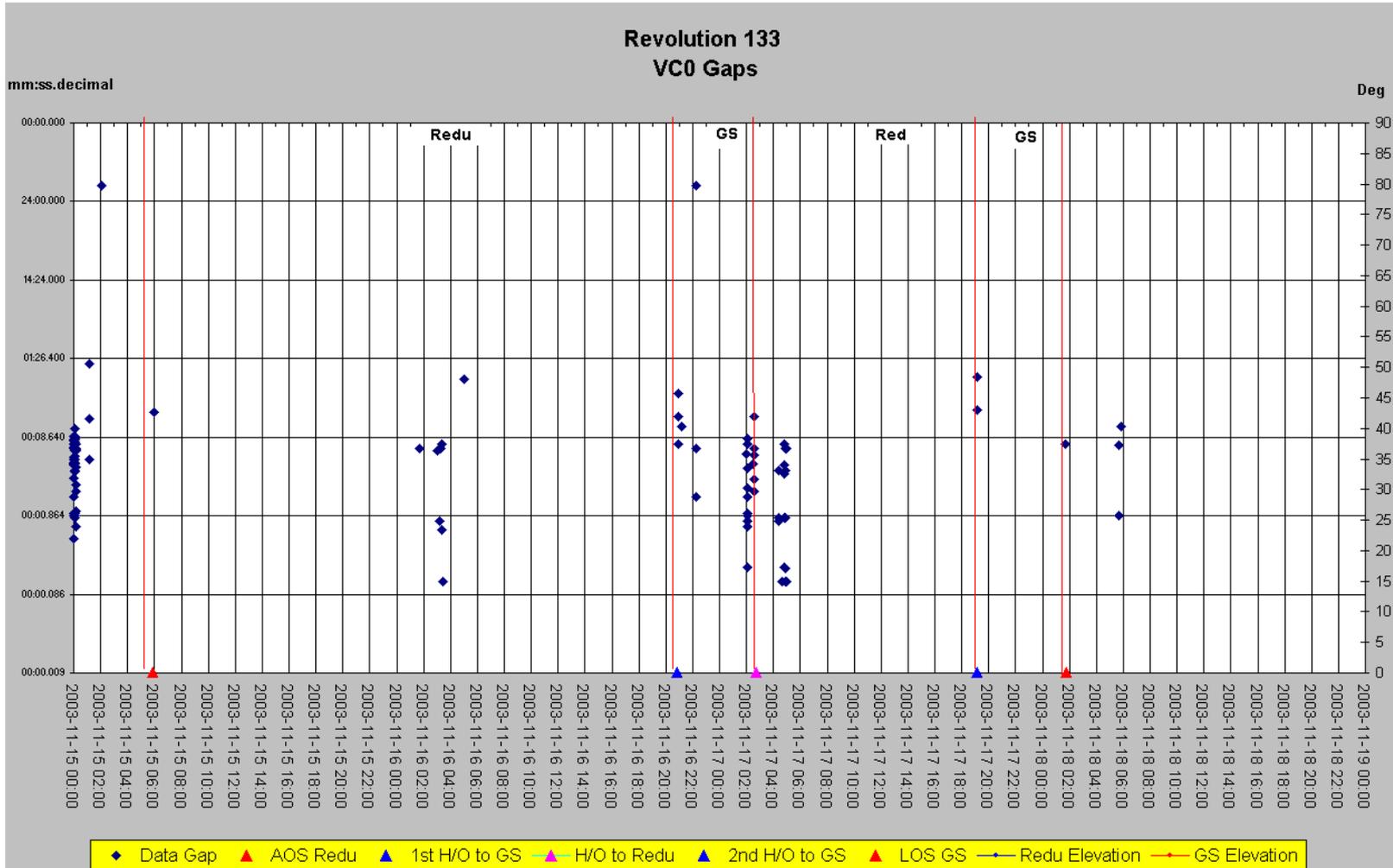


## INTEGRAL Science Radiation Monitor (IREM) During Solar Flares



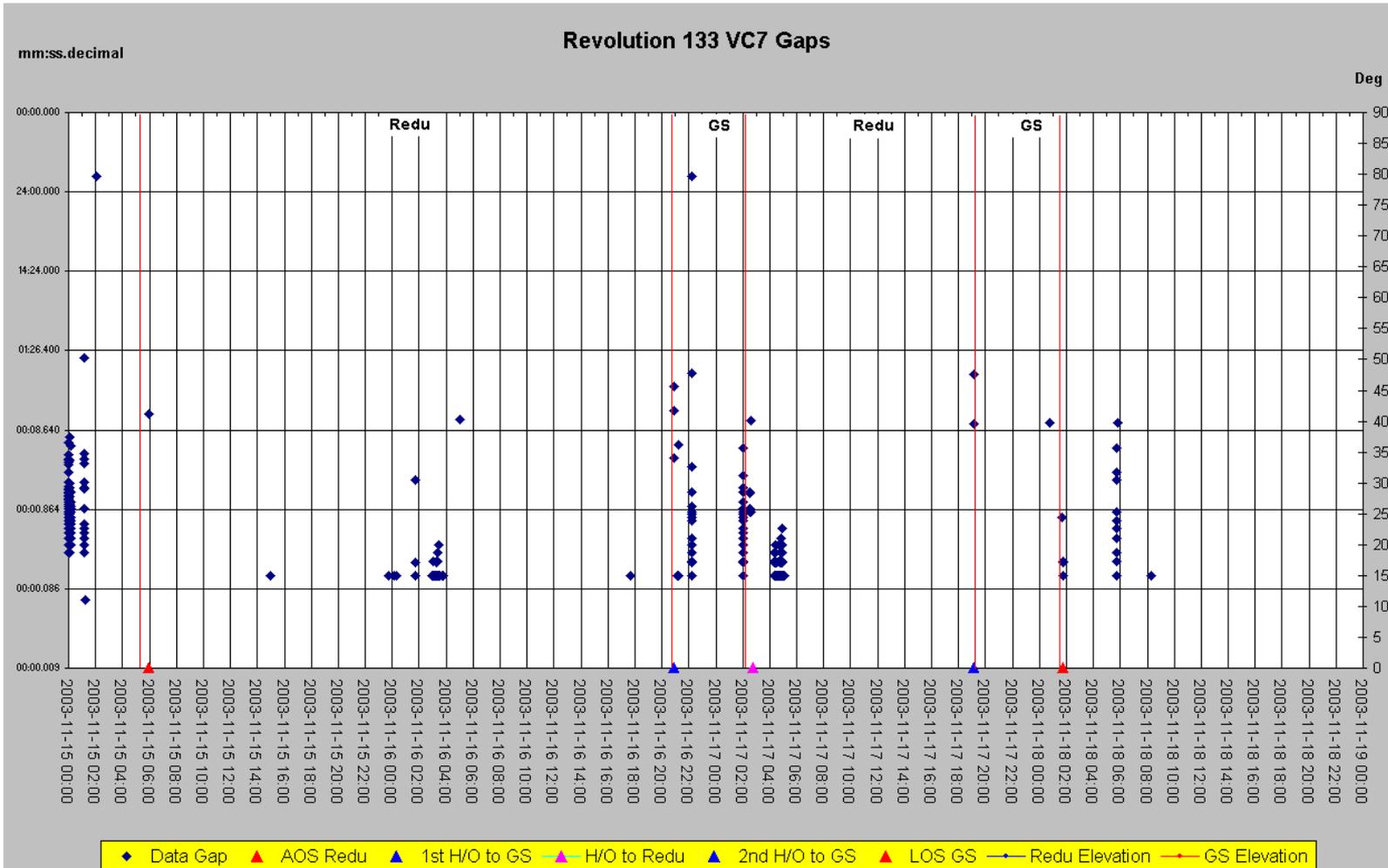


# INTEGRAL





# INTEGRAL





# ulysses

## **JOINT USERS RESOURCE ALLOCATION PLANNING COMMITTEE**

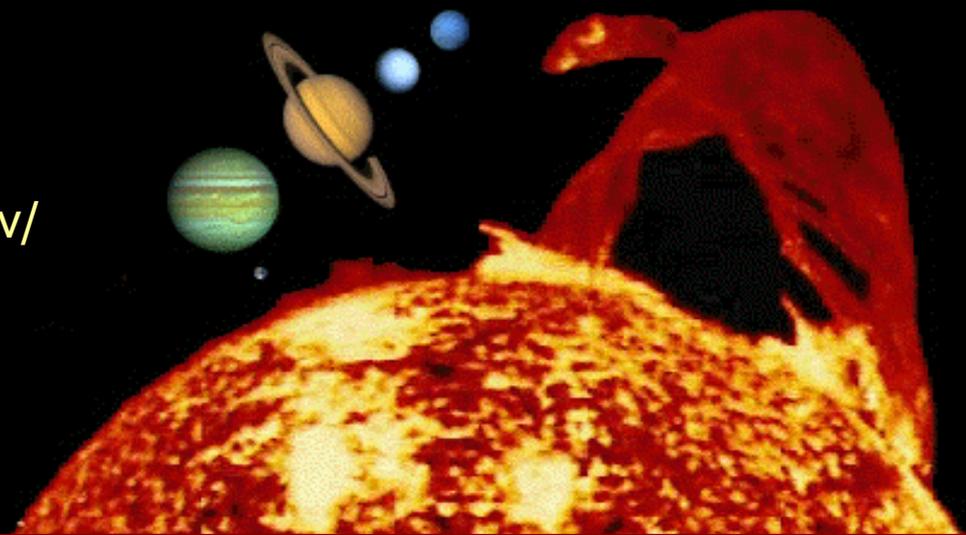
**B. Brymer**

**November 20, 2003**

*NASA Jet Propulsion Laboratory*



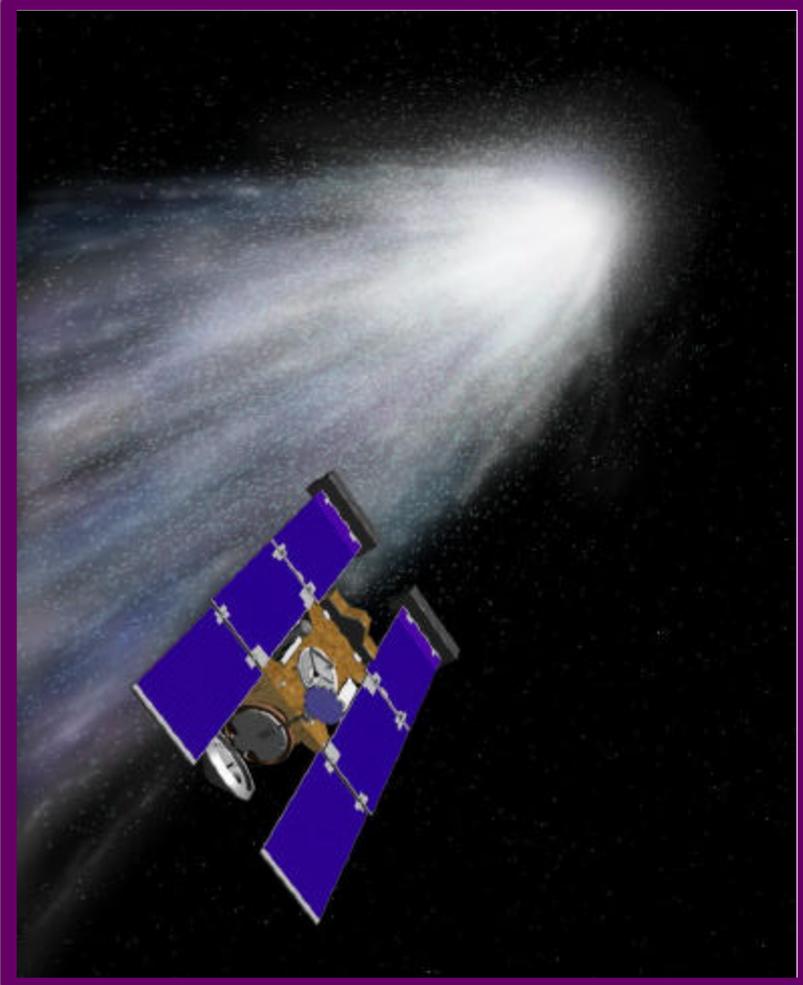
<http://ulysses.jpl.nasa.gov/>



# ULYSSES

JOINT USERS RESOURCE ALLOCATION PLANNING COMMITTEE

- NOMINAL SPACECRAFT OPERATIONS CONTINUE
- SPACECRAFT POWER AND THERMAN RECONFIGURATIONS AND INSTRUMENT CALIBRATIONS ARE PERFORMED AS REQUIRED
- SPACECRAFT EARTH POINTING MANEUVERS ARE BEING PERFORMED EVERY 10 DAYS
- DSN PROVIDING GOOD SUPPORT



# STARDUST

**JOINT USERS**

**RESOURCE ALLOCATION**

**PLANNING COMMITTEE**

**R. E. Ryan**

**NOVEMBER 20, 2003**

NASA Jet Propulsion Laboratory

*<http://stardust.jpl.nasa.gov>*

### STATUS

**SPACECRAFT IS HEALTHY (11/20/03)**

**PRESENTLY 2.5 AU from EARTH**

**00:42:06 RTL**

**1.6 AU from SUN**

- **COMET WILD-2 DETECTED DURING FIRST OP-NAV ON NOVEMBER 14**
- **OBSERVATION CONFIRMED IN 2ND OP-NAV ON NOVEMBER 18**

### **DSMS SUPPORT SATISFACTORY THIS PAST PERIOD**

- **GOOD SUPPORT FOR START OF ENCOUNTER PHASE**
  - **ENCOUNTER COVERAGE IS ALL NEGOTIATED**

## CURRENT ACTIVITIES

- **WILD-2 ENCOUNTER PHASE UNDERWAY**
  - NAVCAM CONTAMINATION RETURNED, SEEN IN CALIBRATION ON OCTOBER 8
  - CCD HEATERS TURNED ON FOR ONE WEEK SHOWED SOME IMPROVEMENT
  - BAKE MANEUVER ATTEMPTED ON OCTOBER 22
    - SHORTLY AFTER THE SPACECRAFT ENTERED SAFE-MODE
      - CAUSE STILL UNDER INVESTIGATION, BUT SUSPECTED SOLAR ACTIVITY
      - SAFE-MODE EXIT ON OCTOBER 23
  - BAKE MANEUVER REPEATED ON OCTOBER 29 GOT EXPECTED IMPROVEMENT
  - AT E-49 DAYS, WILD-2 WAS DETECTED IN THE OP-NAV IMAGES
  - SIGHTING WAS CONFIRMED IN 2ND OP-NAV IMAGES FROM NOVEMBER 17
  - OP-NAVS CONTINUE AT TWO PER WEEK



**JPL**

November 20, 2003



UNIVERSITY OF  
WASHINGTON



<http://stardust.jpl.nasa.gov>

### **UPCOMING EVENTS**

**TODAY IS WILD-2 ENCOUNTER MINUS 43 DAYS  
CRITICAL EVENTS READINESS REVIEW TODAY 11/20**

**TCM - 10 ON DECEMBER 3**

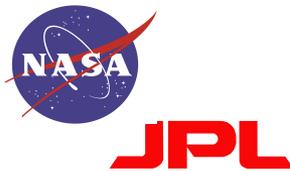
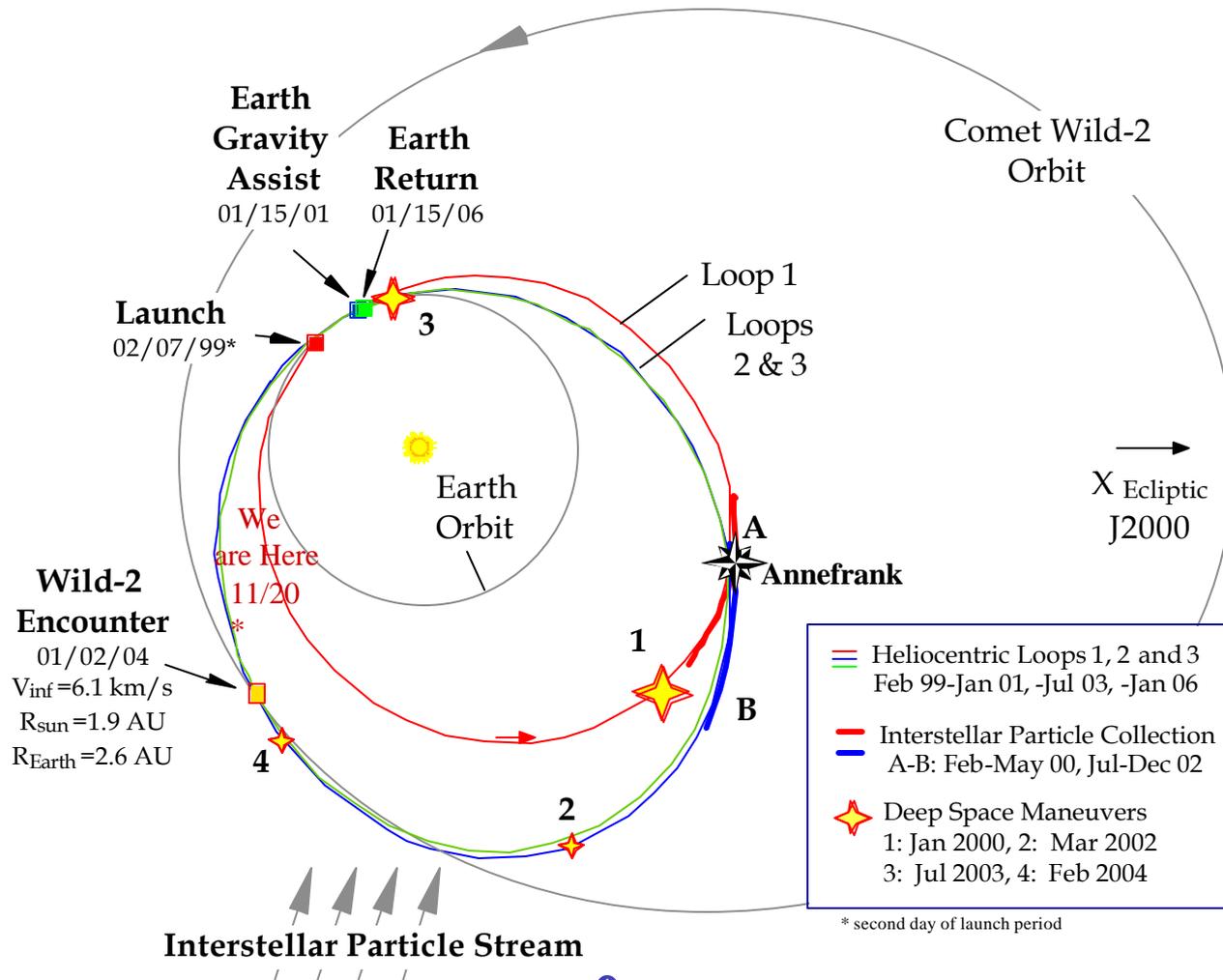
**CAMERA GEOMETRIC CALIBRATION ON 12/6**

**ENCOUNTER IS 1920 UT ON JANUARY 2**

**OVERLAP OF DSS 14 AND 43**

# STARDUST

## Report to JURAP



November 20, 2003





# VOYAGER

## FLIGHT OPERATIONS

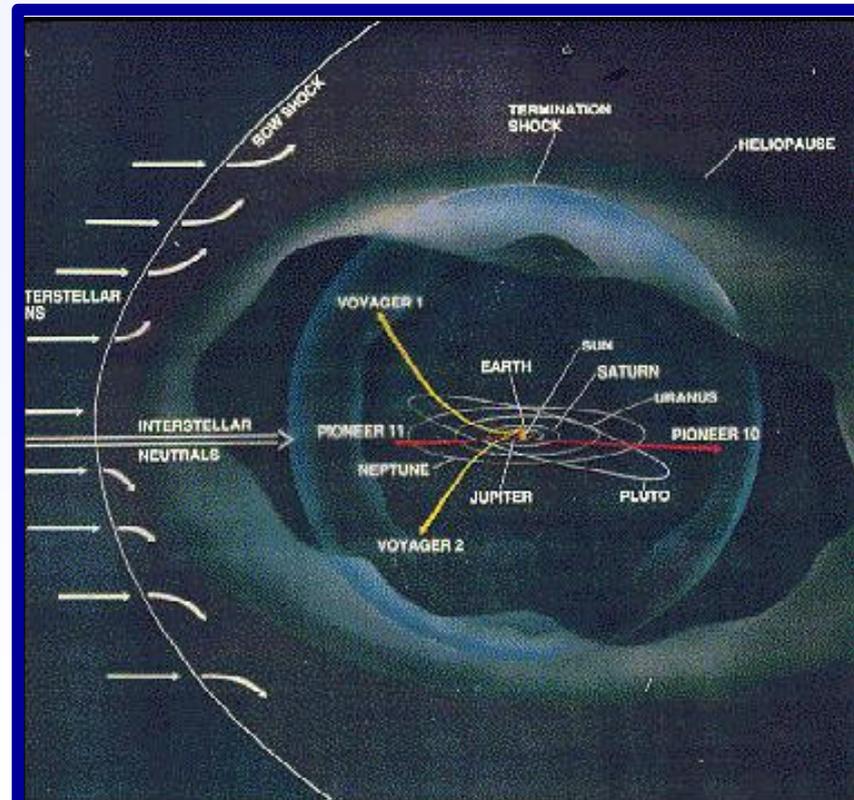
### JOINT USERS RESOURCE ALLOCATION PLANNING COMMITTEE

Jefferson Hall  
November 20, 2003

*NASA Jet Propulsion Laboratory*



<http://voyager.jpl.nasa.gov>





# VOYAGER

## FLIGHT OPERATIONS



### FLIGHT SYSTEM STATUS

#### MISSION STATUS

#### VOYAGER 1

- \* HELIOCENTRIC DISTANCE – 90.1 AU, RTLT – 25h11m30s
- \* SPACECRAFT REMAINS HEALTHY
- \* MAJOR ACTIVITY: ASCAL AND PMPCAL

#### VOYAGER 2

- \* HELIOCENTRIC DISTANCE – 71.7 AU, RTLT – 20h02m04s
- \* SPACECRAFT REMAINS HEALTHY
- \* MAJOR ACTIVITY: ASCAL, MAGROL, & PMPCAL



# VOYAGER

## FLIGHT OPERATIONS



### GROUND SYSTEM STATUS

(OCTOBER 11, 2003 - NOVEMBER 14, 2003)

- DSN - OVERALL SUPPORT – GOOD
- NUMEROUS OUTAGES ON VOYAGER 1 DUE TO ANTENNA POINTING PROBLEMS AT DSS-54, PREDICT AND RCVR PROBLEMS AND POOR PERFORMANCE AT DSS-55; RNS AND ANTENNA PROBLEMS AT DSS-26; RAIN AT DSS-63, DSS-65 AND DSS-45 [all documented on DRs]. OUTAGE ON VOYAGER 2 WERE DUE TO A RED ANTENNA AND TCT PROBLEMS AT DSS-43; RCVR PROBLEMS AT DSS-49; AND ANTENNA POINTING PROBLEMS AT DSS-45.
- PROJECT WILL ROUTINELY REQUEST HIGH POWER TRANSMITTER [75KW] FOR ALL FUTURE UPLINK PASSES ON VOYAGER 2 WHERE NON-BRACKETED COMMANDS ARE UPLINKED.
- SUBSTITUTED 3.4 HOURS OF DSS-34 SUPPORT IN PLACE OF DSS-45 WHICH WAS RELEASED TO SUPPORT SIRTF ON 10/25 [DOY 298]



# VOYAGER

## FLIGHT OPERATIONS



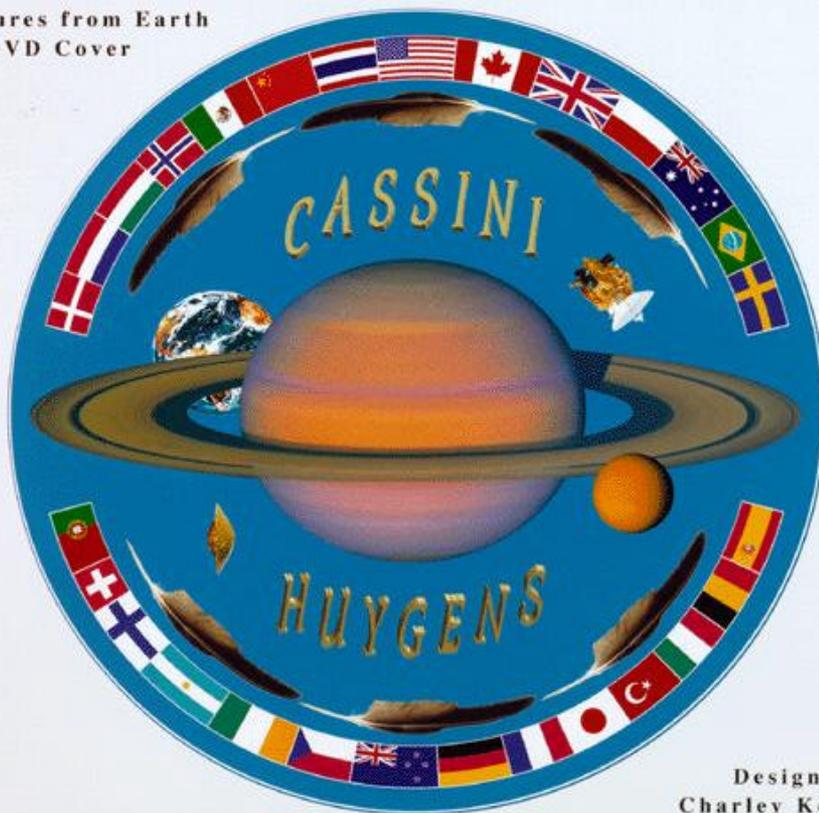
### TOTAL SUPPORT TIME, OUTAGE TIME, % OF OUTAGE TIME

S/C	SCHED. SUPPORT	ACTUAL SUPPORT	70M TIME	SIGNIFICANT OUTAGE TIME	% OF OUTAGE TIME
31	425.9	425.9	118.9	18.9(2.2)	5.0
32	362.8	362.5	196.6*	4.4(2.0)	2.0

**VOYAGER HOMEPAGE - <http://voyager.jpl.nasa.gov>**

\* DSS-49 support accounted for 44.3 hours of this total

Signatures from Earth  
DVD Cover



Design by  
Charley Kohlhase

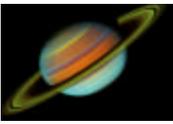
# CASSINI

<http://saturn.jpl.nasa.gov/cassini/index.shtml>

## Joint Users Resource Allocation Planning (JURAP) Committee Meeting

Dave Doody  
November 20, 2003

*NASA / Jet Propulsion Laboratory*



# Cassini / Huygens

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- **Space Science Phase**
  - Routine science observations continue
  - SOI External Risk Review completed October 30, with very positive results.
  - GWE#3, 20 days of 24X7 DSN coverage near opposition, in progress through DOY 334
    - Continuous coherent X-band link
    - Ka-band (Ka-1) downlink over DSS-25 and DSS-55, coherent with X-U/L is the prime Ka link.
  - Huygens preheat operations test results validated at ESOC, to be demonstrated on S/C in December, over several DSN passes with extensive ground interaction.
  - Saturn images acquired and downlinked, publication TBD.
  - RPWS displayed graphics and sound resulting from radio reception of solar flare activity October 28.
  - Approach Science mission phase begins in January
  - Tour advanced science planning continues, as well as Huygens Playback data delivery planning
- **Daily ops going well**
  - DSN and NOPE support:
    - Network Operations Plan has been delivered.
      - Some changes identified for an upcoming PCN.
    - High-rate TLM Lockup problem (on carrier-subcarrier change) is being watched closely in Cassini and DSMS
  - Exercising continuing FSPA Array supports as they can be scheduled
  - Exercised ECC DOY 296
    - DSN Tracking was successful.
    - Ground communications problems encountered.
      - Resolved and re-tested communications the following week.
  - Working various minor S/C instrument adjustments, cals, and anomalies near real time.
  - Uplinking and installing the occasional flight software updates for instruments
  - DSMS expanded statement of requirements for replacement of NOCC-R/T display system have been basically accepted.
    - Project's visibility into DSN is currently problematic, risking degraded realtime support. It may be possible to mitigate for Approach Science Phase, and for Saturn Tour.
  - Cassini's DSN Scheduler Tibi Iovu moving to MSSO Flight Operations, to begin training as Cassini Ace December 1.