JET PROPULSION LABORATORY INTEROFFICE MEMORANDUM

March 10, 2003

TO: G. Burke

FROM: S. Lineaweaver

SUBJECT: Mars Global Surveyor Extended Mission

The Resource Allocation Planning and Scheduling Office (RAPSO) performed a loading study to determine the impacts of Mars Global Surveyor (MGS) extended mission tracking requirements on the Deep Space Network (DSN) and the ability to support those requests.

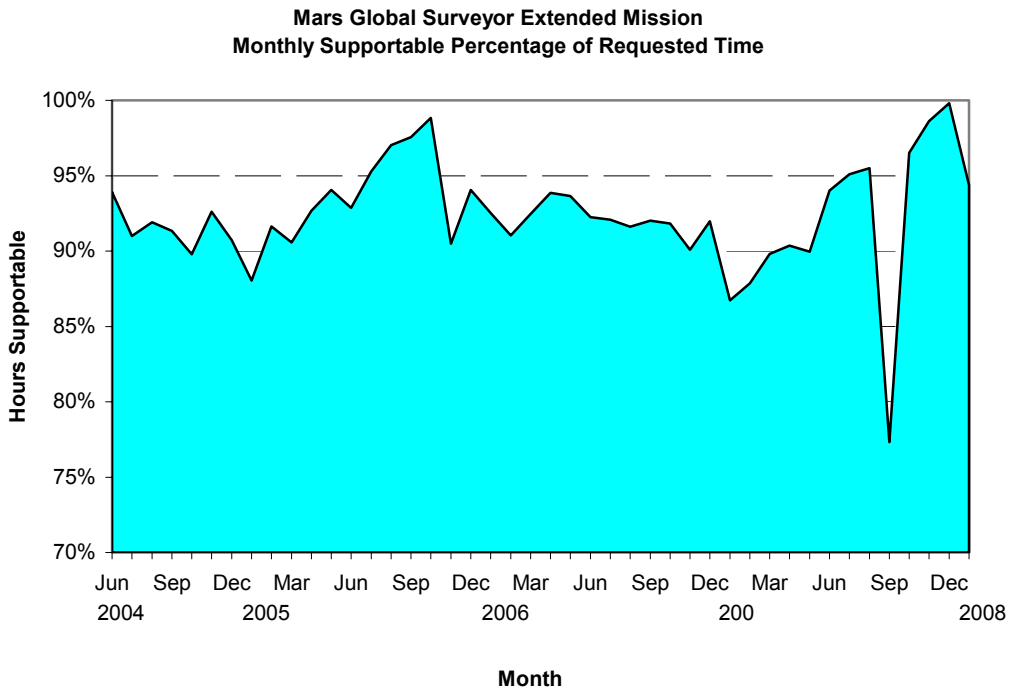
Analysis was accomplished using the FASTER (Forecasting And Scheduling Tool for Earth-based Resources) forecasting system, the Mars 6-degree-mask view period, and the updated mission set database from the February 2003 Resource Allocation Review Board (RARB).

This study addresses extended mission requirements from June 2, 2004 through January 3, 2008. During the 2 mapping phases defined below MGS requires nine to ten passes weekly that are 8 to 10 hours in duration. On a weekly basis during the 2 Mapping/Beta Supplement phases MGS requires 2-3 days of continuous support and 14 hours of contiguous tracking on the remaining 4-5 days. See the attached User Loading Profile for weekly requirement, multiple spacecraft per antenna (MSPA) usage, and DSN resource distribution.

Mapping	02 Jun 04 – 19 Jul 04
Mapping/Beta Supplement	20 Jul 04 – 01 Dec 05
Mapping	02 Dec 05 – 14 Oct 06
Mapping/Beta Supplement	15 Oct 06 – 03 Jan 08

Figure 1 shows the forecast monthly supportable percentage of requested time for the duration of the study interval. Mars Global Surveyor should expect to receive 85 to 90% of the time requested except in September 2007 when supportable time declines to below 80%.

Mars Global Surveyor has contention with several 34-meter users in September 2007. The Mars Competed Scout 2007 (M07S) launch is planned for September 4, 2007. M07S requires continuous support from launch to launch + 30 days. On a weekly basis Mars Global Surveyor requires seven 14-hour and two to three 10-hour passes, Mars Reconnaissance Orbiter requires sixteen 8-hour passes to support Ka-band demo and prime science objectives, MESSENGER requires three to seven 8-hour passes to support their deep space maneuvers, and STEREO Ahead requires seven 5-hour passes to support prime science objectives. Cassini, Dawn and Wind also require support for their respective tour and cruise phases.



In September the M07S, MRO, and STEREO view period overlap with the Mars Global Surveyor view period exceeds 80% and the Cassini, Dawn, MESSENGER, and Wind view period's overlap into the Mars view by more than 40%.

We believe that Mars Global Surveyor can achieve nearly all of the time requested with minimal impact to other users. In September 2007 capacity on the 70-meter subnet is moderate and offloading some support to the 70-meter antennas or combining MGS support with MRO or with Mars Odyssey may help to reduce contention with the Scout Mission.

Our preliminary estimates are that MGS should receive 85 to 90 % of the time requested and may exceed our estimates with careful scheduling and use of the MSPA capability during periods of high activity.

As always, the results of this study are preliminary in that network loading changes as requirements for planned missions are input and updated. We will continue to work with Mars Global Surveyor and other users of the DSN to maximize the time available for each individual user.

cc:
A. Andujo
B. Arroyo
R. Bartoo
E. Hampton
N. Lacey
D. Morris
J. Valencia

6-Mar-03

User Loading Profiles

Concurrence: _____
Project Manager Date

Mars Global Surveyor

VP Object	User	Resource	Durations Ave	Durations Min	Calibration Pre	Calibration Post	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
			January									February					March				April					May				June					July					August					September					October					November					December				
2004																																																													
M01O	M01O Map/MGS Map	70M	10.0	4.0	2.00	0.25																																																			2	2	3	2	2	3
MAR6	MGS Map/Beta Sup	70M,26	14.0	4.0	0.50	0.25																															6	7																						5	5
MAR6	MGS Map/Beta Sup	DSS-15,45,55	14.0	4.0	0.50	0.25																																										7	7											
MAR6	MGS Map/Beta Sup	34H	10.0	4.0	0.50	0.25																																3	2	2	3	2	2	3	2	2															
MAR6	MGS Map/Beta Sup	DSS-15,26,54,55	14.0	4.0	0.50	0.25																																										7	7	7	7	7	7	7						
MEXP	MEX Orb Sci/MGS	DSS-24,54	8.0	4.0	2.00	0.25														7	7	7	7	7	7	7	7	7																																	
MAR6	MGS Map/Beta Sup	34B1	10.0	4.0	0.50	0.25																															1	2									3	2	2	3	2	2	3						
MAR6	MGS Mapping	DSS-34,55	8.0	4.0	0.50	0.25		4																																																					
MAR6	MGS TCM	DSS-34	4.0	4.0	0.50	0.25		4	4																																																				
M01O	M01O Map/MGS Map	DSS-25,34,54	8.0	4.0	2.00	0.25	2																																																					2	2
MEXP	MEX Orb Sci/MGS	DSS-26,54,55	10.0	4.0	2.00	0.25																																																							
MAR6	MGS Map/Beta Sup	DSS-26,45,65	14.0	4.0	0.50	0.25																																																		7	7			
MAR6	MGS Map/Beta Sup	DSS-25,26,55	14.0	4.0	0.50	0.25																																7	7	7	7	7	7	7	7	7														
MAR6	MGS Map/Beta Sup	DSS-26,34,54,55	4.0	4.0	0.50	0.25																																																					2	2
MAR6	MGS Mapping	DSS-26,45,65	8.0	4.0	0.50	0.25																									10																														
MAR6	MGS Mapping	DSS-25,26,55	8.0	4.0	0.50	0.25																										9	9	10																											
MAR6	MGS Mapping	DSS-25,26,34,55	8.0	4.0	0.50	0.25																													9	2																									
MAR6	MGS Mapping	DSS-25	8.0	4.0	0.50	0.25			2																																																				
MAR6	MGS Mapping	DSS-25,26,45,65	8.0	4.0	0.50	0.25	14													9	9	9	9	9	9	7	7	7																																		
MAR6	MGS Mapping	DSS-25,26,45,65	6.0	4.0	0.50	0.25																				2																																			
MAR6	MGS Mapping	DSS-26,45,65	8.0	4.0	0.50	0.25				14	7	16	16	16	16	7		16	16										9	9																																
MAR6	MGS Mapping	DSS-25,26	8.0	4.0	0.50	0.25		2																																																					
MAR6	MGS Mapping	DSS-26,34,55	8.0	4.0	0.50	0.25					9																																																	
MAR6	MGS Mapping	DSS-26,45,65	6.0	4.0	0.50	0.25				1																																																			
MAR6	MGS Mapping	DSS-25,45,65	8.0	4.0	0.50	0.25											16																																											
MAR6	MGS Mapping	DSS-26,34,65	8.0	4.0	0.50	0.25										9																																												
MAR6	MGS TCM	DSS-26,55	8.0	4.0	0.50	0.25		6																																																					
MAR6	MGS TCM	DSS-25,45,65	8.0	4.0	0.50	0.25			6																																																				
2005																																																													
M01O	M01O Map/MGS Map	DSS-14,63	10.0	4.0	2.00	0.25																																				3																			
M01O	M01O Map/MGS Map	70M	10.0	4.0	2.00	0.25																																														1								
MAR6	MGS Map/Beta Sup	70M	10.0	4.0	0.50	0.25																																														1								
MAR6	MGS Map/Beta Sup	70M	14.0	4.0	0.50	0.25	4	4	4	4																																																			
MAR6	MGS Map/Beta Sup	34H	14.0	4.0	0.50	0.25					7	7	7								7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7							7	7	7	7	7	7	7			7	7	4						
MAR6	MGS Map/Beta Sup	DSS-15,45,63	14.0	4.0	0.50	0.25								7	7	7	7	7	7	7																																										
MAR6	MGS Map/Beta Sup	34H	14.0	4.0	0.50	0.25																																																							
MAR6	MGS Mapping	34H	10.0	4.0	0.50	0.25																																																4	9	10	9	9	
MAR6	MGS Map/Beta Sup	34B1	10.0	4.0	0.50	0.25	2	2	3	2	2	3	2	2	3	2	2	3	2	2		2	2									2	3	2	2	3	2							2	2	3	2	2	3	2				2	2					
MAR6	MGS Map/Beta Sup	DSS-24,34,55	10.0	4.0	0.50	0.25															3																																									
MAR6	MGS Map/Beta Sup	DSS-24,45,54	10.0	4.0	0.50	0.25																		3	2	2	3	2	2	3	2																																
MAR6	MGS Map/Beta Sup	DSS-34	9.4	4.0	0.50	0.25																																2	3	2	2																					
MAR6	MGS Map/Beta Sup	DSS-34,45	9.3	4.0	0.50	0.25																																											2	3										
MAR6	MGS Map/Beta Sup	34B1	14.0	4.0	0.50	0.25																																																							
MAR6	MGS Map/Beta Sup	34B2	14.0	4.0	0.50	0.25																																7	7	7	7	7								7	7										
MAR6	MGS Map/Beta Sup	DSS-25,34,55	14.0	4.0	0.50	0.25	3	3	3	3																																																		
2006																																																													
M01O	M01O Map/MGS Map	70M	10.0	4.0	2.00	0.25	3	3		3						3	3						3					4			3	3					3	3	3	3	3	3	3		3											3	3	3	3	
MAR6	MGS Mapping	70M	10.0	4.0	0.50	0.25	7	6	9	7																																																			
MAR6	MGS Mapping	70M,34B1	10.0	4.0	0.50	0.25									9	7	6	9	10	9	9	10	6	9	10	9	9	2	9	9	7	6	9	10	9	9	5	4	4	6	4																						
MAR6	MGS Mapping	70M,34B2	10.0	4.0	0.50	0.25					9	9	10	9																									2																						
MAR6	MGS Mapping	70M,DSS-54	5.0	4.0	0.50	0.25																																				3	4	3	3																	
MAR6	MGS Map/Beta Sup	34H	14.0	4.0	0.50	0.25																																									1	7	7		4	4	4	4					
MAR6	MGS Map/Beta Sup	34H,34B1,34B2	14.0	4.0	0.50	0.25																																											7					4	4	4	4	
MAR6	MGS Map/MRO PrSci	34H	10.0	4.0	0.50	0.25																																												3	3	3	3					
MAR6	MGS Mapping	34H,34B2	5.0	4.0	0.50	0.25																																				6	7	6	3																
MAR6	MGS Mapping	34H	10.0	4.0	0.50	0.25																																							3		7													
MAR6	MGS Mapping	34H	5.0	4.0	0.50	0.25																																				3	3	3																	
MAR6	MGS Mapping	34H,34B2,34B1	10.0	4.0	0.50	0.25																																								10													
MAR6	MGS Map/Beta Sup	34B1	10.0	4.0	0.50	0.25																																										3	2	2	3	2	2					
MAR6	MGS Map/Beta Sup	DSS-34,54	10.0	4.0	0.50	0.25																																									2												
MAR6	MGS Map/Beta Sup	54,34H,34B2	10.0	4.0	0.50	0.25																																								1													
MAR6	MGS Mapping	34B1	10.0	4.0	0.50	0.25																						4									2	2			2																			
MRO	MRO PrSci/MGS Beta	34B1	8.0	4.0	0.50	0.25																																																	3	2	2	3	
MAR6	MGS Map/Beta Sup	34B2,34B1	4.0	4.0	0.50	0.25																																												3	3	3	3	6	5	5	6	
2007																																																													
MAR6	MGS Map/Beta Sup	34H	10.0	4.0	0.50	0.25	2																	2	3			3	2																																	
MAR6	MGS Map/Beta Sup	34B1	14.0	4.0	0.50	0.25	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4				4	4				4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
MAR6	MGS Map/Beta Sup	34B1	10.0	4.0	0.50	0.25		2	3	2	2	3	2	2	3	2	2	3	2	2	3	2				2	2				2	3	2	2	3	2	2	3	2	2	3	2	2	3	2	2	3	2	2	3	2	2	3	2	2	3	2	2	3	2
MAR6	MGS Map/Beta Sup	DSS-25,26,55	14.0	4.0	0.50	0.25	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
MAR6	MGS Map/Beta Sup	DSS-26,34,55	14.0	4.0	0.50	0.25																	4	4				4	4																																	
2008																																																												
MAR6	MGS Map/Beta Sup	34H	10.0	4.0	0.50	0.25	1																																																						
MAR6	MGS Map/Beta Sup	DSS-26,34,54	14.0	4.0	0.50	0.25	4																																																						