Jet Propulsion Laboratory
California Institute of Technology

HEND Workshop

Mars Odyssey Mission Status

Robert A. Mase
Odyssey Mission Manager

May 24, 2004

LOCKHEED MARTIN

Jet Propulsion Laboratory
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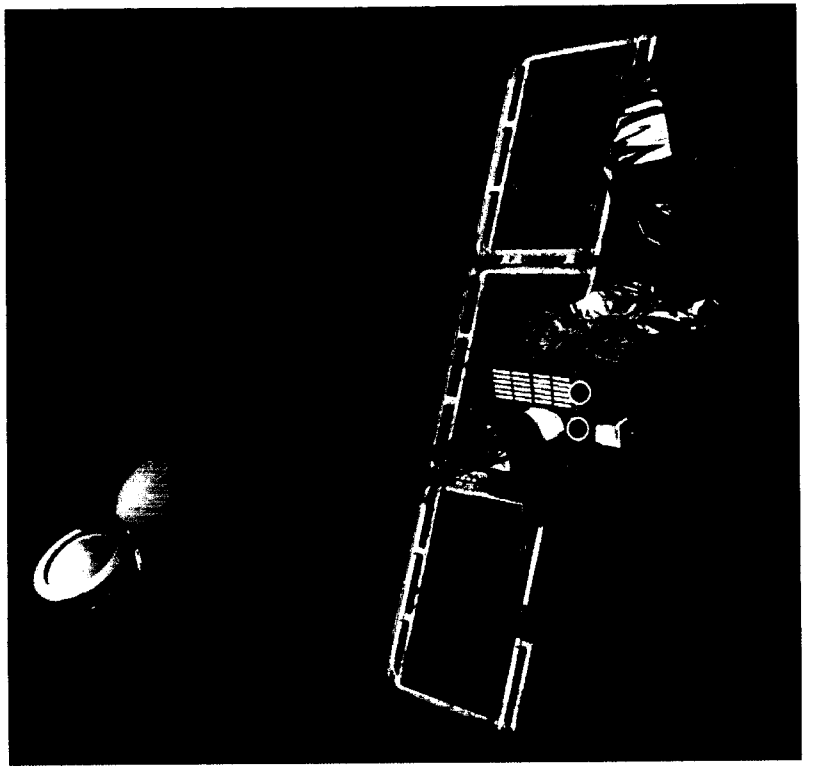
2001 Mars Odyssey



Salient Features

- Mars Orbiter Launched: April 7, 2001
- Science Mission Began: Feb 19, 2002
- Payload: GRS, HEND, MARIE, NS, THEMIS
- Primary Mission 917 days, ending Aug 24, 2004

Science

- Globally Map the Elemental Composition of the Surface.
- Acquire High Spatial and Spectral Resolution Mapping of Surface Mineralogy.
- Determine Abundance of Hydrogen in the Shallow Subsurface.
- Provide Information on the Morphology of the Martian Surface.
- Characterize Specific Aspects of the Martian Near-Space Radiation Environment.

Mars Odyssey
Mission Status

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Mission Statistics: (as of 24 May 2004)

- Day 825 of the 917-day science mission (90% complete)
- Day 720 since GRS Boom Deployment
  - Achieved more than one Mars-Year of operations with all instruments
- Total Mapping Orbits: 10,024
  - Achieved 10,000 Mapping Orbits on May 22, 2004
  - 10,840 since Mars Orbit Insertion
- 1143 days past Launch (93% of total mission complete)
  - Launch: April 7, 2001
  - End of Primary Mission: August 24, 2004

Mars Odyssey
One Year Rolling Schedule

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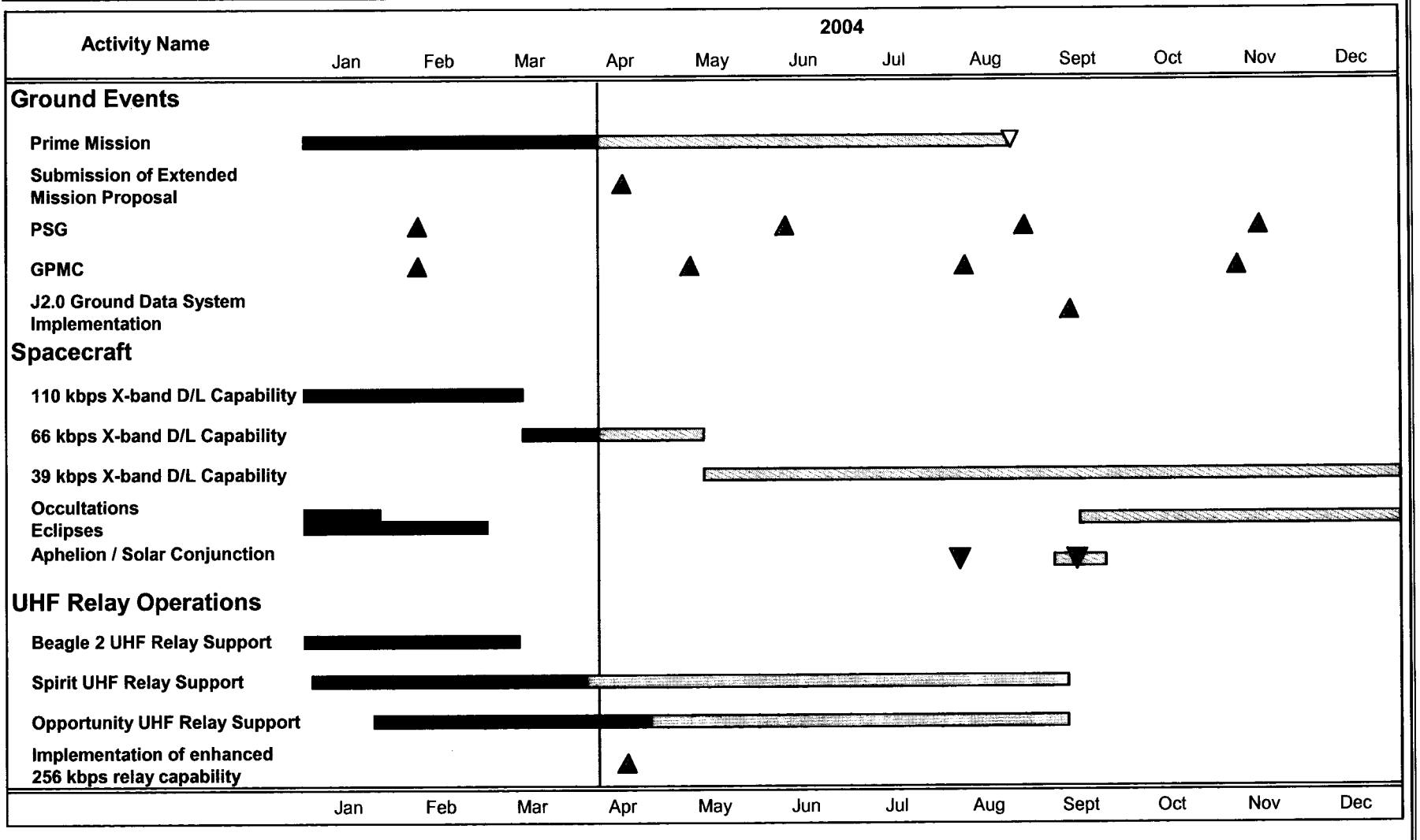

Mars Odyssey Spacecraft Activity

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In the past year:

- May 2003 Network Simplification upgrade to DSN stations
- Aug 2003 ODY UHF Tests with Stanford Antenna
- Sept 2003 Sun-Synchronous Maneuver
- Oct 2003 MARIE anomaly
- Oct 2003 Safe-mode entry
- Oct 2003 MEEB anomaly - cold reboot
- Nov 2003 GRS Anneal
- Nov 2003 MER Phasing Maneuver
- Dec 2003 Beagle2 UHF Relay Support
- Dec 2003 Mass Memory Card anomaly
- Jan 2004 MER UHF Relay Support - ongoing

Mars Odyssey
Science Data Return

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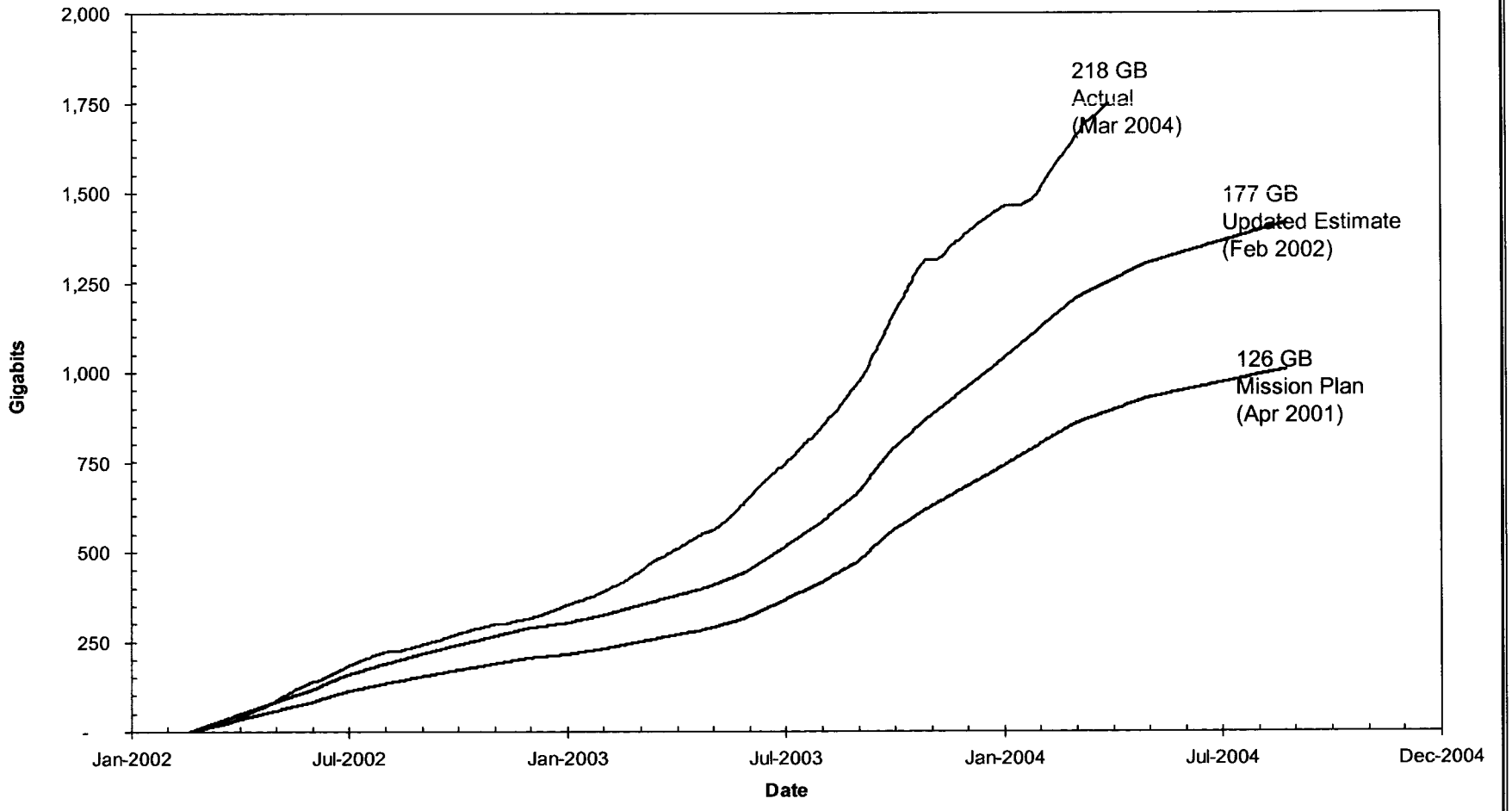
Expected vs Actual



Mars Odyssey Propellant Status

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Total Fuel in the Tanks (Feb 19, 2002): **46.2 kg ± 3 kg**

Unusable **2.4 kg**

Total Fuel Available for Mapping (Feb 19, 2002): **43.8 kg**

	Allocation*	Expected Usage to Date	Actual Usage (1 Feb 2004)
Contingency	8.2 kg	4.3 kg	0.1 kg
Safe Mode	5.0 kg	2.6 kg	1.7 kg
Momentum Mgmt	11.5 kg	6.1 kg	2.4 kg
Orbit Maintenance	3.7 kg	1.9 kg	0.0 kg
Extended Science	1.9 kg	1.9 kg	1.8 kg
PQ Orbit Raise	3.4 kg	-	0.0 kg
Unallocated	10.1 kg	-	0.0 kg
Total	43.8 kg	16.8 kg	6.0 kg

Total Usable Propellant Remaining: **37.8 kg ± 3 kg**

* Allocations for 1374-day mission

Mars Odyssey
Orbit Timeline and Geometry

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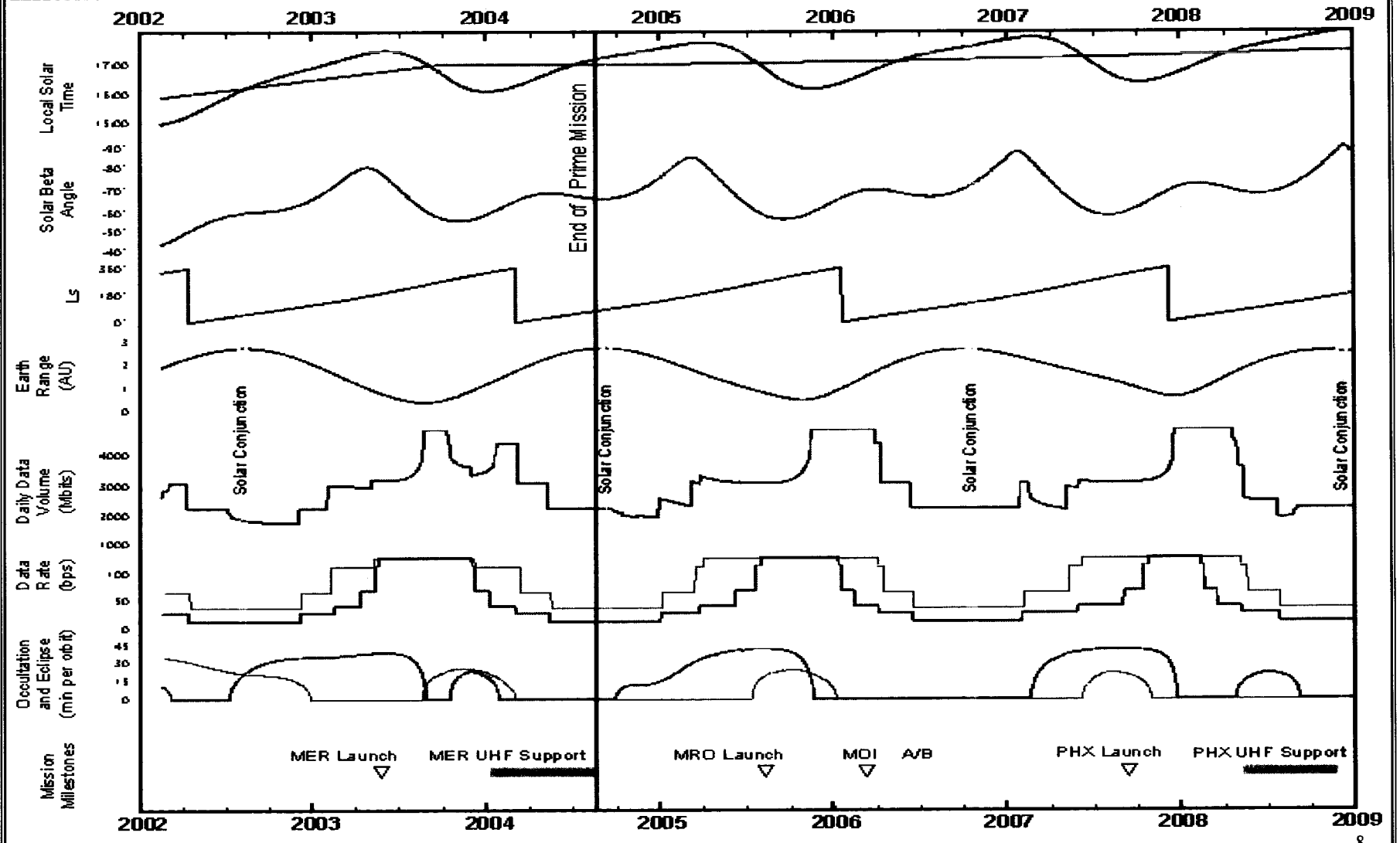

Mars Odyssey
UHF Relay Support

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UHF Relay campaign is proceeding exceptionally well

- Odyssey returning nearly 3/4 of all MER data
- Original commitment was 50 Mbit per SOL average per rover
- MER mission extended to Sept 2004, may last even longer

Spirit

- ODY has accomplished ~190 UHF contacts since landing, returning 12,700 Mbits, averaging 120 Mbits per SOL

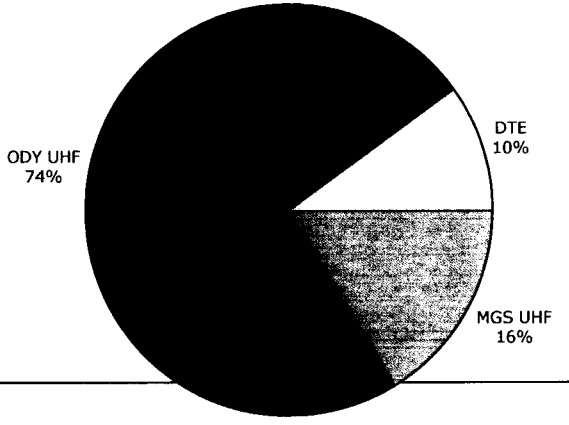
Opportunity

- ODY has accomplished ~160 UHF contacts since landing, returning 10,900 Mbits, averaging 130 Mbits per SOL

Beagle2 - ODY attempted ~250 contacts in total

- No signal ever detected
- Concluded search efforts on March 11, 2004

Mars Odyssey
MER Data Return



Data Return Path:

Red - ODY UHF

Blue - MGS UHF

Green - Direct to Earth

Mars Odyssey
Mission Summary

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- Spacecraft health continues to be nominal
  - Expect long lifetime, consumables available for another decade
- MARIE anomaly still unresolved
  - MARIE damaged by solar flares in Oct 2003
- Extended Mission Proposal submitted to NASA HQ April 2004
  - Expect to be funded at least through FY 2006 (one Mars-year)
- Mars Program support continues
  - Expect to support Phoenix in 2008