MRO Data for MSL Landing Site Selection

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MSL Landing Site Workshop #1

May 31- June 2, 2006

Pasadena,CA

Overview

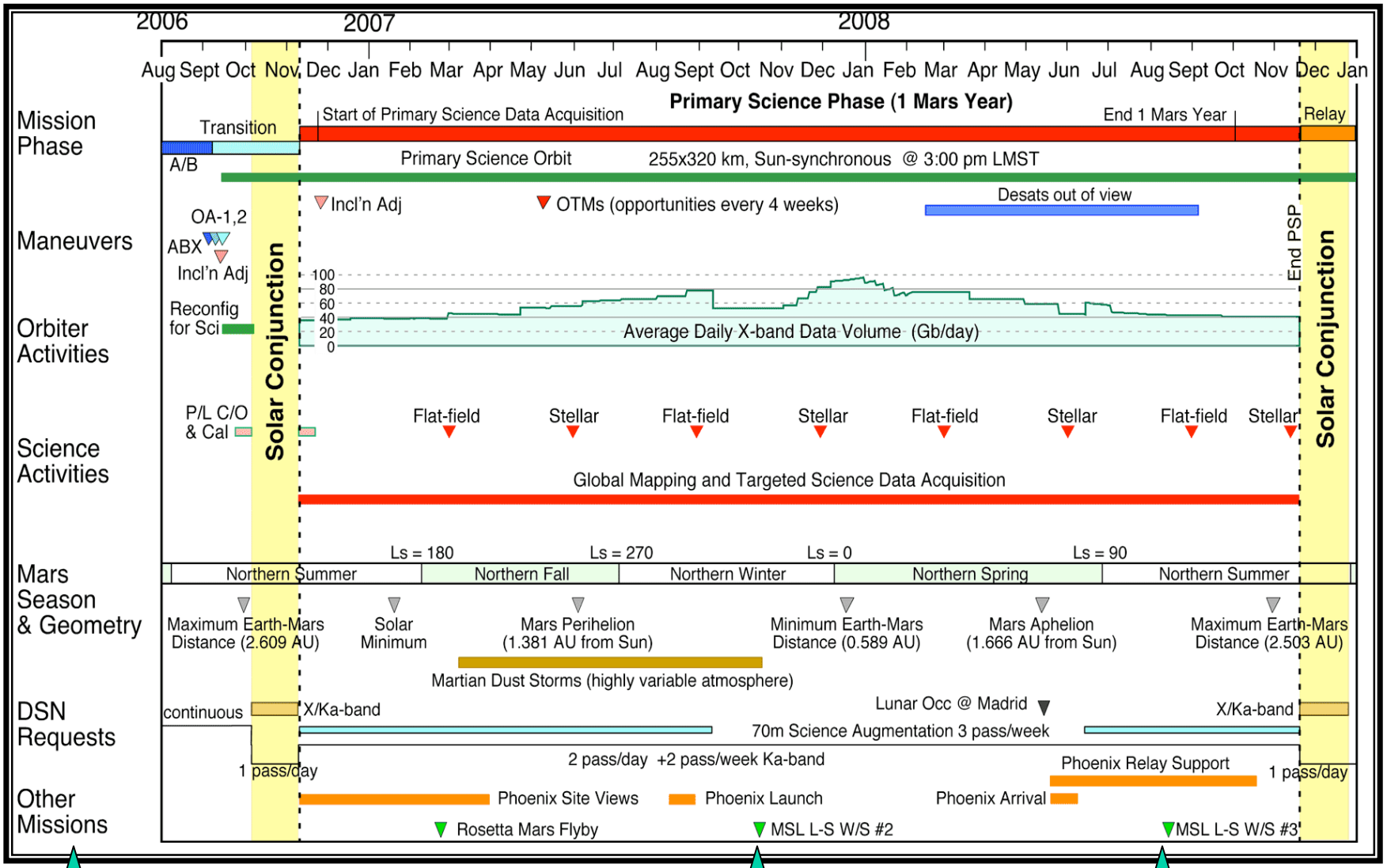
- MRO-MSL agreements and schedules
- MRO landing site imaging capability
- MRO process for defining and scheduling images

MRO Support for MSL Site Selection

Mars Reconnaissance Orbiter

- **Survey**: Support after 1st workshop (5/2006)
  - Each site imaged will consist of a single pass
  - Primary Science Phase begins November 8, 2006
  - Sites will be selected from the prioritized list, up to 100 sites
  - Duration of about 64 weeks (Note: 1st 6-8 weeks will focus on Phoenix)
- **Characterize:** Support after 2nd workshop (10/2007)
  - 12 High Priority sites plus 12 backup sites
  - Full coverage of all High Priority sites including stereo
  - More coverage of 8 backup sites on a best effort basis
- **Certify**: Support after 3rd workshop (8/2008)
  - MSL recommends a Primary and a Backup ellipse
  - Coverage by MRO after this workshop is subject to extended science funding beyond MRO's Primary Science Phase

Mars Reconnaissance Orbiter



MSL Wksp 1 MSL Wksp 2 MSL Wksp 3

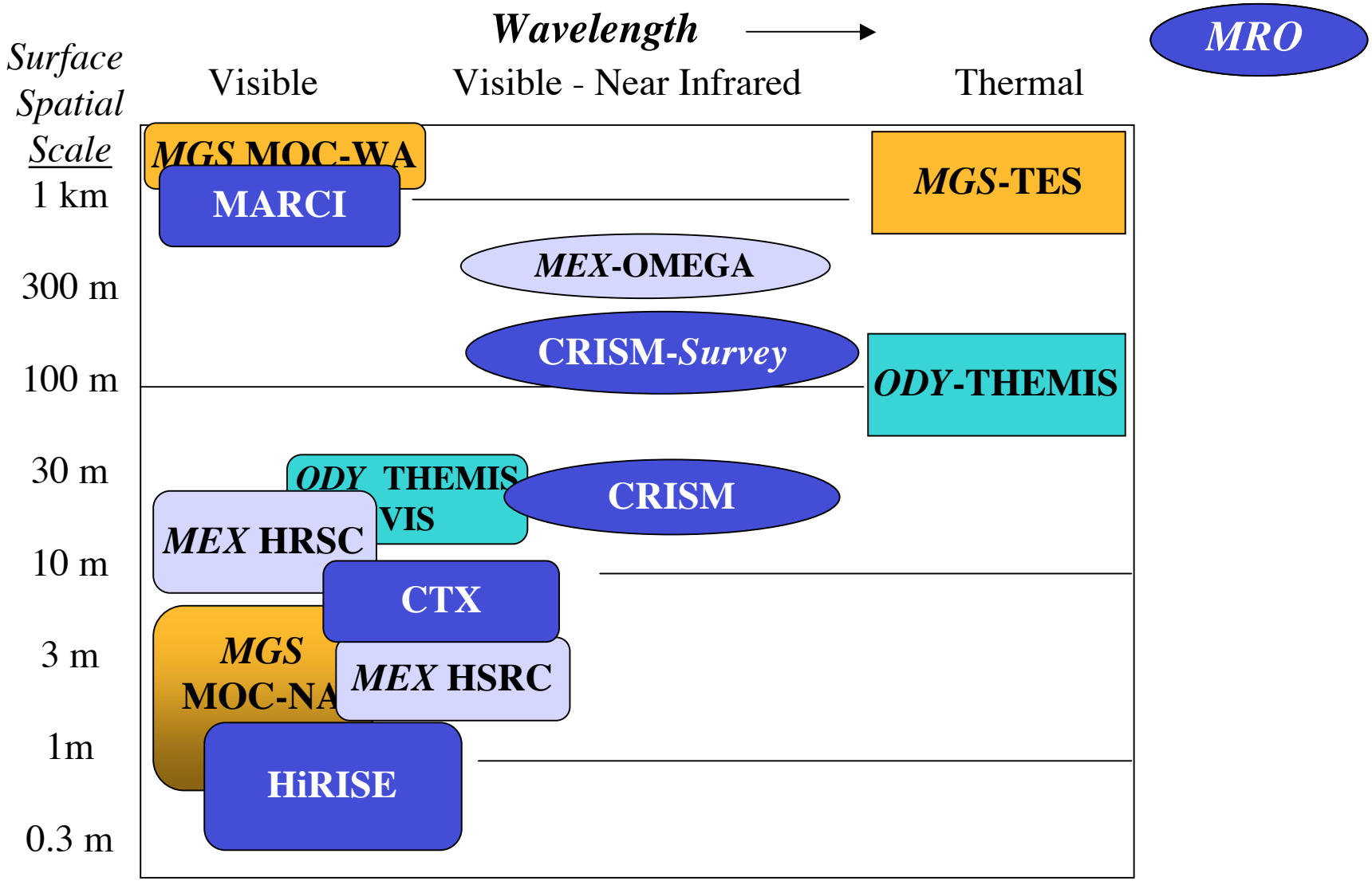
Instrument Specifications*

* JGR Planets papers on each instrument are in the works.

Instrument	Capabilities	Instrument	Capabilities
CRISM	18 m/pixel	**MARCI**	180˚ FOV
	10.8 km swath		7 bands from 0.28-0.8 μm
	6.5 nm 0.4 - 3.96 μm		Daily Global Mapping
CTX	6 m/pixel	**MCS**	Broadband Solar Channel & 8 Thermal IR Channels
	30 km swath		0 - 80 km; 5 km vert. resoln.
	Panchromatic (minus blue)		Globally Distributed, Daily Atmospheric Limb & On-Planet Observations
	SNR > 20		
HiRISE	0.3 m/pixel	**SHARAD**	20 MHz (fo, central frequency)
	Red (6 km swath) Blue-Green & NIR (1.2 km swath)		6 km x 1 km (SAR processing down-track)
	SNR ≥ 150		Profile to ~0.5 km with vertical resolution ~ 10 m (15 m in free space)
	Stereo: Revisit (within 17 days)		

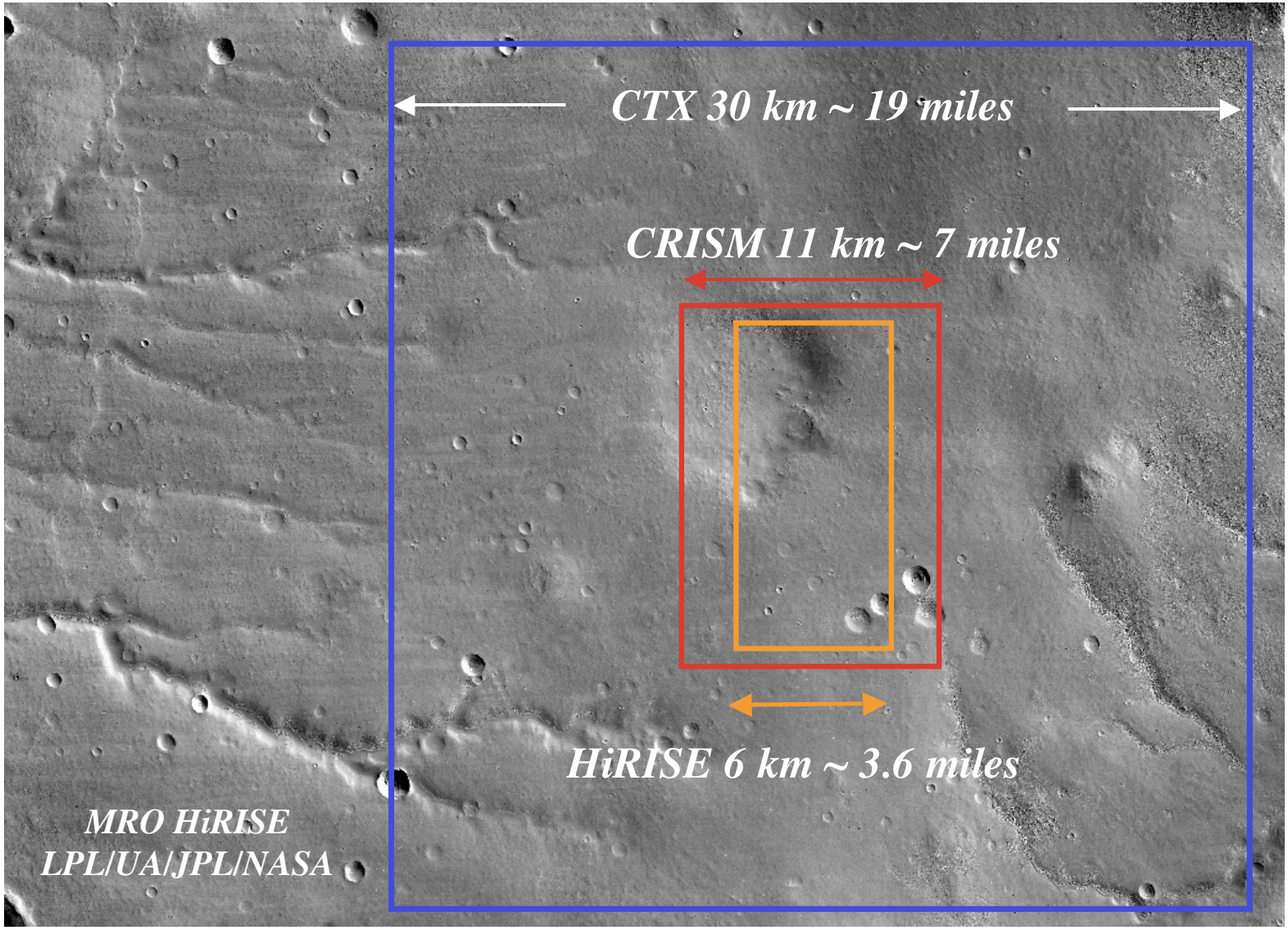
Comparison of Resolution with Current Mars Imagers

Mars Reconnaissance Orbiter



Coordinated Images

Mars Reconnaissance Orbiter



Standard Landing Site Selection Image Set

Goal:

Collect a data set that provides a baseline for evaluating different candidate sites.

Standard MSL Landing Site Image Set

- HiRISE: 6 km swath width, 10 km down track (30 cm/pixel)
- CRISM: 10 km swath width, 10 km down track (18 m/pixel, 512 bands)
- CTX: 30 km by 30 km image size (6m/pixel)

The standard image size provides a minimum image size for CTX, HiRISE, and CRISM images. Teams might choose to take longer images.

Images are nominally full resolution, though weather or other conditions might lead to reduced resolution.

Scheduling of Landing Site Observations

MRO receives landing site targets from the MSL Landing Site Committee.

The imaging teams will work from a prioritized list (high, medium, low) of up to 100 targets from the landing site committee.

New targets may be added based on MRO data; process TBD.

The MSL Landing Site Committee may choose to update the list, pulling or adding targets,requesting stereo but cannot exceed the 100 targets prior to workshop 2.

The imaging teams will work through the list, attempting to get high priority targets first.

MSL Participation in MRO Science Planning

Mars Reconnaissance Orbiter

- Landing sites will be submitted to MRO via the landing site committee as Regions of Interest (ROIs)

ROI file Field #	ROI Field Name
1	Site ID
2	Site name
3	Instrument
4	Priority
5	LsubS min
6	LsubS max
7	Incidence min
8	Incidence max
9	Emission min
10	Emission max
11	Roll min
12	Roll max
13	Comment
14	Polygon

The following restrictions apply:
>All polygons are closed.
> Duplicate polygon vertices are prohibited.
> Polygons may not be self intersecting.
> The longitudes of a polygon must span less than 180 degrees.

> There is a document (SIS) that describes the details.

More on ROI Definition

If the ROI is much larger than a HiRISE swath (6km x 10 km) then the HiRISE image can fall anywhere within the ROI. That image will be counted towards the 100 sites.

Will need to consider the balance if your site has both a ‘to go science’ section and a ‘safe landing’ section.

Stereo will not be acquired as part of the MEP request until after the first round of selections (workshop 2).

Coordinated Images

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