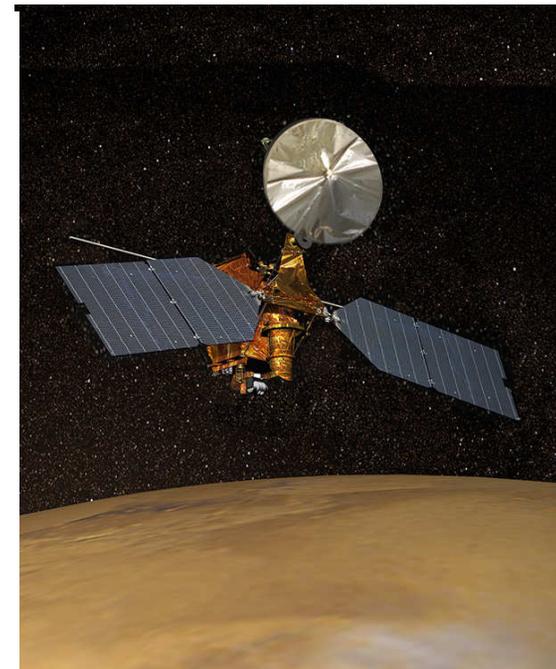




National Aeronautics and Space
Administration
Jet Propulsion Laboratory
California Institute of Technology

Mars Reconnaissance Orbiter Status

Richard Zurek
Feb. 29, 2012



THE UNIVERSITY OF ARIZONA





Operations Status

- Currently in second year of 1st Extended Mission (FY11-12), with MRO observations in a third Mars year
- 276 kg fuel remaining (12 kg/year => 23 more years); life-limiting factors may be telecom, which is essentially single-string now
- > 25,000 orbits, >155 Tbits (32Tbits in present extended mission) of science data returned, all instruments still operating
- Two-week planning cycles: #139 in progress
- Normally, CRISM crycooler is used to get NIR data with good SNR 1 in every 4 cycles (~2 weeks every other month)
- Extending spatial coverage of surface composition, stratigraphy & high-res imaging: HiRISE 1.4% (.25% stereo); CTX ~70%
- Extending temporal coverage of surface and atmospheric variability
- Preparing for coverage of MSL EDL and for (rolled) telecon relay for MSL operations: Science observations planned around relay tests
- Acquiring data for landing site identification, characterization and possible certification for future Mars missions

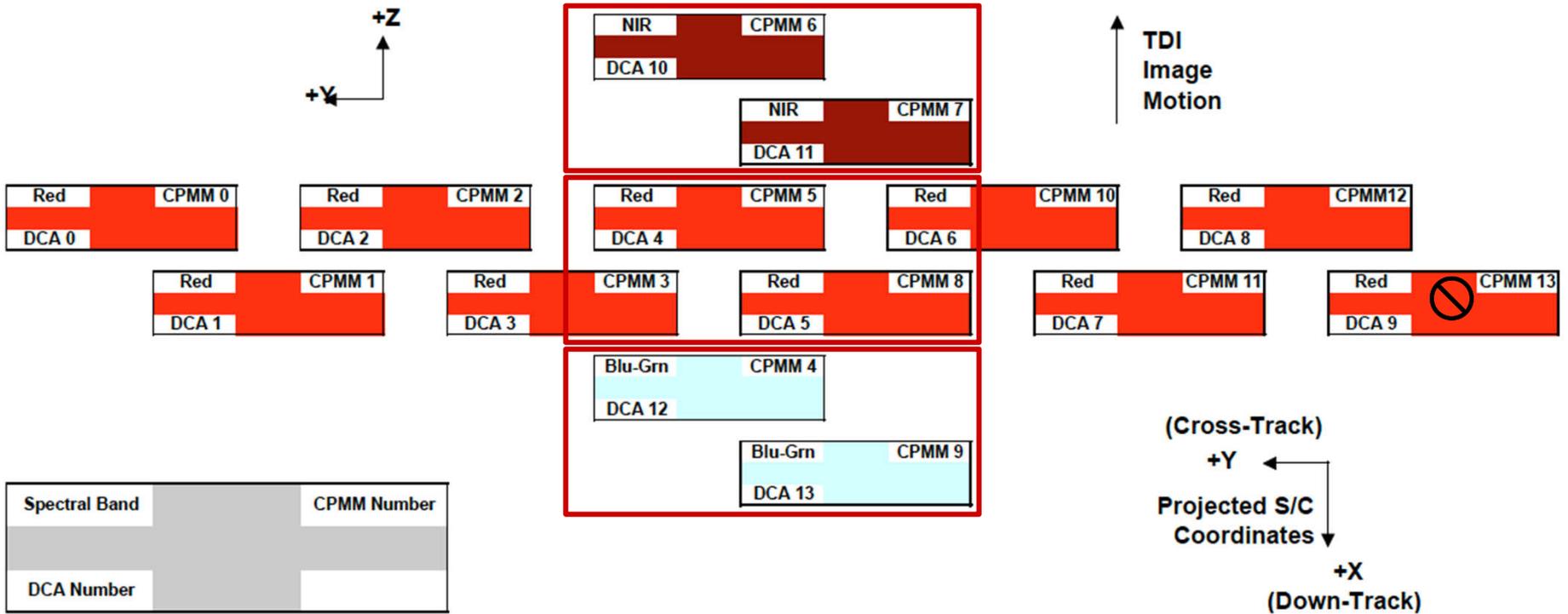


MRO Science Metrics

Investigation	Status	Observation Metrics
HiRISE	1 of 14 CPMMs failed, reducing swath by 10% (now 5.2 km from 300 km altitude) Bit-flip noise mitigated by warming instrument prior to (real) imaging	~ 1.42% of surface covered ~ 2,591 stereo pairs ~ 22,108 images
CRISM	2 of 3 coolers still working IR spectrometer use focused on 1 in 4 two-week cycle planning periods; Limb scan placed in "cold" cycle; Visible spectrometer used in all cycles	77% of sfc @200m in 72 chs 17% of sfc @ 200 m in 260 chs 19,118 targeted observations 2.8 Mars yrs monitored with column water vapor, CO, dust
CTX	No instrument issues	43,582 images 70.9% coverage of Mars stereo
SHARAD	No Instrument issues	10366 observing strips
MARCI	No instrument issues	97% of 2.8 Mars yrs monitored with Daily Global Maps
MCS	No new instrument issues Instrument stalls in restricted range of elevation gear—still able to scan limb and onto planet to retrieve T, dust, ice	87% of 2.8 Mars yrs monitored with 73.5 x10 ⁶ profiles
Gravity:	No issues	2.8 Mars years
Accelerometer/ONC	Completed	
Science Data Return	Science data (some compressed, not counting packetization bits)	~150.2 Tb



HiRISE Focal Plane



Note: Cross-track overlap between CCDs is greatly exaggerated

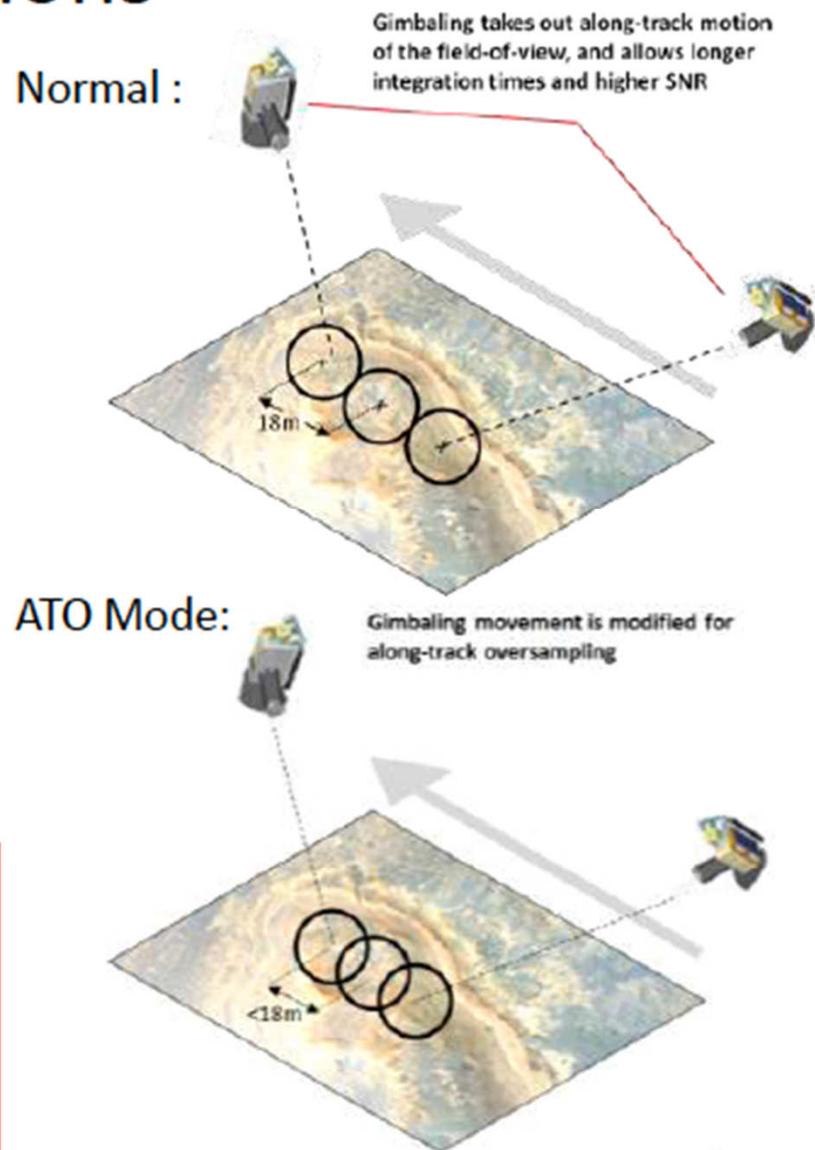
- Slight overlap in cross-track direction is deliberate and is used to take out spacecraft twisting motions
- Color is achieved with 3 center CCD pairs
- DCA9/CPMM13 is no longer working, shortening HiRISE swath from ~6 km to ~5.4 km; images are slightly elongated to match available image data volume

CRISM Along Track Oversampled (ATO) Observations

- Evolving observing scheme where pixels overlap in the along track direction (see figures)
- Allows detection of small scale features (<18 m/pixel) and/or improved S/N to detect subtle spectral features
- Needs formal pixel size and noise trades along track

From K. Seelos Updated ATO List 12/19/2011:

Total Images Acquired:	78
Total Targets Attempted:	55
Total Targets Attempted, not including VNIR-only:	46
Total Targets Acquired Successfully:	38
IR-cold Success Rate:	82.6



ATO irregular pixel spacing (ATO 1D86B)

