Agenda

• MSL Status

• NASA-ESA Partnership
  – Overall Joint Mars Exploration program (JMEP) Status
  – 2016 Update
  – 2018 Update
MSL Accomplishments Since January ‘10

• Actuators
  – All the actuators have successfully completed life testing!
  – All the flight actuators have been delivered!

• Avionics
  – Landing Radar Transmit-Receive Module re-work process has been qualified, including completed vibration and thermal-vacuum testing
  – All flight Field Programmable Gate Arrays (FPGA) have been burned and the associated avionics boards have completed rework.

• Descent stage propulsion rework completed and descent stage re-delivered to Assembly, Test and Launch Operations (ATLO)

• Cruise stage propulsion rework complete and cruise stage delivered to ATLO

• Instruments
  – CHEMCAM Thermoelectric Cooler (TEC) successfully integrated & instrument in environmental test
  – The fixed-focus MASTCAM was physically delivered to JPL
    • NASA has funded Zoom-capable MASTCAM that, if fully qualified, may be swapped with the fixed focus cameras.
ATLO system integration is in process—1st rover power-on achieved on February 22.

Flight Software R6.1 delivered to ATLO, and booted successfully at the beginning of March.

Western Titanium
- Completed Ti audit—127 parts out of ~1000 were classified as being from suspicious material
- Completed test campaign on residual material samples to quantify properties
- Completed 25% of 127 suspicious part analysis reviewed—no identified parts requiring rebuild
- Closeout expected April/May

MMRTG
- Investigation of root cause still underway, including tracking power loss and testing of spare flight thermocouples
- Potential operational impacts still under study—may be reduced ops in Martian winter.
• Top-level Objective
  – Review the plans and resources planned to conduct the project’s defined Verification and Validation program, and assess whether the V&V program will appropriately test the system.

• Standing Review Board Conclusions
  – Major risks are well understood and are being actively addressed.
  – The work flow has been well-defined with a strategy to use established schedule margins and reserves.
  – Execution of the V&V Plan is well underway since the restart of integration on February 1st.
  – The 2011 Opportunity remains viable with good schedule margin against the first launch opportunity.
  – No cost model updates yet available (no surprises expected)
Remaining Challenges in Phase C/D

• Remaining Challenges in Phase C/D
  – Complete the SAM development, wide-range pump, and V&V testing
    • Life Test Units with various preloads being assembled
    • Accelerated LTUs successful up to ~1.9x life
  – Complete rework of the TDS, and complete subsystem, V&V, and field testing,
  – Complete the mobility subsystem rework to provide adequate structural margin
  – Complete the remaining Sample Acquisition/Sample Processing and Handling (SA/SPaH) development, dirty testing and the remaining V&V testing,
  – Develop the surface science operations plan in accordance with current MMRTG power predictions

• Upcoming Significant Events
  – Selection of Type I or Type II launch trajectory (June/July)
  – Detailed analysis of Phase E operations (May thru September)
  – Rover environmental testing begins early CY11
NASA-ESA Partnership
NASA-ESA Joint Initiative Management Structure

Program Initiation and Mission Formulation

• Management structure in-place
  – Joint Mars Executive Board—meeting quarterly
  – Joint Engineering Working Group for future mission concepts (now 2018)

• 2016 mission project office established in Mars Program Office at JPL
  – Project Manager assigned and team being assembled (Phil Barella)
  – HQ Program Executive and Program Scientist assigned (Ramon DePaula/Phil Crane)
  – Orbiter/EDM still under ESA’s ExoMars Program Office

• Overall governance, documentation, review and approval processes, etc., maturing
  – Joint Program Plan, review processes, LOA, MOU, etc.

• MSR working group to be established—first meeting April ‘10
  – Missions beyond 2018, based on Planetary/Mars Decadal Survey and European member states technology priorities
Mission Overview— ESA Mission Lead

- Orbital science and refresh telecommunications infrastructure
  - Critical ESA secondary mission—Entry, Descent and Landing (EDL) demonstrator
- Primary Science—Trace gas detection and characterization, incl. methane
  - Potential Secondary Science—moderate resolution imaging (2-3m)
  - Tertiary science--<5kg battery-only landed science, e.g. seismology, meteorology, etc.
  - All instruments jointly selected through AOs for orbiter & lander
  - Orbiter AO released January 15, 2010, proposals due next week

- Key NASA roles/deliverables
  - Orbiter science payload
  - Launch vehicle – Atlas V 421-class
  - Proximity link/Ka-Band deep space-to-earth link
  - Science operation lead; aerobraking design/operation lead; relay lead

- Key Near-term Milestones
  - Mar ‘10: Mission/System Definition Review (øA -> øB)
  - Nov ‘10: Mission PDR
  - Jun ‘11: Mission/System Confirmation Review (øB -> øC)
Mission Overview— NASA Mission Lead

- Deliver NASA's and ESA's rovers to the surface of Mars
- Primary Science—astrobiology and caching samples
  - NASA: astrobiology and contact science, sample caching
  - ESA: critical technologies—roving and drilling
    - Exobiology science payload
- ISAG formed to help define complimentary science (out-brief at MEPAG)

Key NASA roles/deliverables
- Rover—science payload selected through AO
- Launch vehicle – Atlas V 531-class
- SkyCrane-based entry, descent and landing system
- Launch, cruise and EDL operations, operations for U.S. rover

Key Near-term Milestones
- Mar ‘10: Concept Feasibility Review
- Sept ‘11: ICD Version 1
- Dec ‘11: Mission Concept Review (leads to KDP-A)