



# ***Additional MSL Landing Site: Opportunities and Constraints from the Project Side***

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# Current Landing Site Selection Overview



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- **Earlier this year, based on improved analyses from trajectory design and telecom, we were able to merge the multiple target specs (each covering specific latitude bands) into a *single target spec covering 30N-30S* (single launch period but still multiple arrival dates)**
  - ***All 6 current (and 4 new) candidate sites reachable with retarget from central LV target (starts with TCM-1 and continues through TCM-2/3)***
  - Considerably simplified target specification and backup site strategy for primary launch period
    - No latitude band-specific targets needed which was major driver in launch vehicle target spec schedule and final site selection date (to coincide with final target spec round)
  - Allows final site selection to move from Fall 2008 to late Spring 2009
    - Reduces risk to mission (both engineering risk and scientifically) by giving additional time to gather site specific information
- **Revised schedule presented at April 2008 “Mid-Term Landing Site Assessment Workshop” and at System Integration Review.**



# Revised Landing Site Selection Road Map



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- **Mid Term Assessment Workshop 4/9/08**
  - Status data acq, early engineering analysis and products, plans
- **Third Community Workshop 9/15/08**
  - Heavily science focused
    - How do the sites support MSL goals, what hypotheses can be investigated and answered? More on this from John Grotzinger later...
  - Scientific pros and cons of sites assessed by community
  - Limit engineering discussion to fatal or near fatal problems as opposed to fine distinctions between sites
- **“Morning After Meeting II” ~9-10/08**
  - Project and PSG discuss status with input from Third Workshop
    - Discussion to include engineering and programmatic issues
      - Need date for high fidelity engineering analyses of all candidates to help insure informed downselection
    - Three sites selected for further study as final MSL landing site candidates



# ***Revised Landing Site Selection Road Map (cont'd)***



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- **Late Term Assessment Workshop ~1/09**
  - Status update, including actuator thermal characterization progress and status
  - Peer review final engineering implementation and analyses
- **Fourth Community Workshop ~4/15/09**
  - Additional detail on remaining candidates
    - Will also include traverse issues, trafficability
- **“Morning After Meeting III” ~4/30/09**
  - Project + PSG + 4<sup>th</sup> Community workshop “report”
  - Highest fidelity engineering analysis of landing safety and surface operability
  - Will produce project recommendation of prime site to HQ
- **Independent Site Certification Review ~5/09**
- **Brief HQ ~6/09**
  - Final site confirmed by HQ



# Project Summary Today



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- **Site Reconnaissance and Engineering Evaluation**
  - Although outstanding progress has been made in many areas, most of the site analysis sub-groups are maxed out (and even lagging a bit) with our current slate of site candidates
    - Trajectory analyses
    - MRO data acquisition
    - DTM generation and hazard map generation
    - Rock counting and hazard map generation
    - Atmospheric modelling
    - EDL site-dependent analyses
    - ...
  - Project feels that adding a *single* additional new site, to take advantage of the best of the new information in the last year, is manageable, given the workload and schedule
    - Science based decision regarding which site (within engineering constraints)



# A word about swapping sites



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- **In general, swapping a new site for an existing site results in a similar amount of engineering work as adding a new site**
  - Only trajectory work and atmosphere modelling are potentially saved with nearby sites, all other work remains. This cannot be underestimated, given current status and amount of work to go.
- **However, since the current N. Meridiani site was added largely at the Project request for a guaranteed safe site, and given that the new Meridiani site has very similar safety characteristics, the Project would be amenable to this substitution.**
  - Other site substitutions are sufficiently different from existing sites that the amount of new work required for safety certification should be considered as effectively the same as adding a new site
- ***Summary from Project side: Swap existing N.Meridiani site for new Meridiani site, if Steering Group recommends it, in addition to adding one new site from:***
  - Chloride
  - Gale
  - Nili carbonate