Phoenix Landing Site Topomapping Update

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Outline

- The Old Plan
- HiRISE Stereo Mapping: First Results
- Available Data
- The New Plan
The Old Plan

- **Mapping results**
  - Latitude zone fairly homogeneous
  - Benign at MOC resolution and larger

- **Site selection—and imaging strategy**
  - Down-selected to Region B, 3 boxes therein

- **USGS CDP deliverables**
  - 6 MOC DTMs by 1/07
  - 4 partial HiRISE DTMs (best effort 1/07)
  - 3 full HiRISE DTMs by 6/07
HiRISE Images of Region B

Yikes!!!
HiRISE Stereo Methodology

- What’s the same as for MOC, HRSC?
  - Ingest in ISIS, stereomap in SOCET SET

- What’s new?
  - ISIS 3 not ISIS 2
  - Geometric characteristics
    - Multiple offset & rotated detectors
    - Detectors offset from center of distortion
    - Jitter potentially greater (in pixels)
  - Pre-correct images for these effects by resampling with ISIS program noproj

Optical distortion of lines on Mars’ surface. Curvature highly magnified.
1st Stereopair Mapped: Victoria
MOC, HiRISE DTM's Compared

Contour Interval 3 m

MOC: 5 m/post
Manually edited

HiRISE: 1 m/post Auto-matching, limited editing
Perspective Views

Relief shading
No exaggeration

Absolute slopes
0°–60°

PHX LS WS #5
First Reactions

- HiRISE stereopairs support production of 1 m/post DTMs by automatic matching with minimal editing.
- DTM “noise” of 0.2–0.3 m indicates 0.2–0.3 pixel RMS matching error (as for most other datasets).
- Cross-track jitter induces ~1 m height errors; along-track jitter does not prevent matching.
- DTM is not visibly “warped” by optical distortion.
- Matching succeeds even in bland areas (using DoG filter) but not in bland steep areas.
- Matching succeeds in deep shadows, but moving shadow edges cause mismatches.
- Most other terrains will be easier to map.
HiRISE Stereopairs (to date)
Thanks to Shane Byrne for adjusted MOC footprints and stereopair identifications.
Summary of Available Data

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The New Plan

- Full stereo DTMs from existing HiRISE pairs ("ST")
  - A3 pair may be problematic because of clouds
- Additional full/partial HiRISE stereo DTMs from any pairs acquired before season ends
- Look for HiRISE images where photoclinometry can be calibrated against MOLA ("M-PC") or against rock shadows if possible
- MOC ST in A+D
- MOC M-PC in A+D
- MOC ST elsewhere in zone
- MOC M-PC elsewhere in zone
- If all images are used and customer is satisfied before funding runs out, start HiRISE ST of MSL sites