LROC Polar Imaging Update

M. Robinson and the LRO and LROC Teams
LROC Instrument Overview

- Two Narrow Angle Cameras (NACs) provide 0.5 to 1.0 m/p with combined FOV 5-km. Three off nadir views per day.
- One Wide Angle Camera (WAC) can provide 75 m/p polar images every orbit.
LROC Polar Strategy

- NAC summer coverage 85° to pole 1-2 m/p (north and south)
- NAC repeat imaging to catch lighting changes
- NAC stereo observations of key targets (challenging)
- WAC synoptic coverage nearly every orbit
Commissioning Phase
NAC Coverage
Northern Fall, Southern Spring

North Pole, 2 m/p

South Pole, 0.6 m/p
Exploratory shadow imaging through summing (2x) and long line times (9x, 18x)

Highly dependent on serendipity of season (az, inc), local topography, Earth shine, and spacecraft orbit

Red indicates reconstruction started, white underway...

Many images taken early in “Spring”
Shackleton Tests

Catch as catch can attempts show shadow secondary lighting highly variable (not really a surprise)

Ideally use a high fidelity model to predict optimal lighting

We can see surface in some 2m images

Hiatus until SMD phase

Floor of Shackleton at 9 m/p
LROC LCROSS Support

- LROC systematic mapping provides context imaging (south polar mosaic)
- Oblique view two and half days after (11 Oct) LCROSS impact to show regional context and incredible relief!
- Shadow imaging (part of tests to prepare for shadow imaging in SMD phase)
Cabeus Oblique

Cabeus Flank to Peak
>5000 meters

Cabeus Floor to Peak
>9000 meters

Center of detail on previous slide

LCROSS Impacts - near bottom edge (X)

Scene approximately 75 km left to right, view SW to NE
Centaur impact indicated by Red circle
SSC impact indicated by Blue circle

Cabeus Crater
NAC images: C538,C539,C53a,C53b,C53c,C53d,C53e,
C53f,C540,C541,C542,C543,C544,C545,C547,C548,C549,
C54a,C54b,C54c,C54d,C54e,C54f,C550,C551,C552,C553
Centaur impact (red circle)
What does the regolith look like at the meter scale?

Rim of Shackleton, one meter pixel, 800 meters wide
This is the part where you switch to photoshop... and blow up to full res.