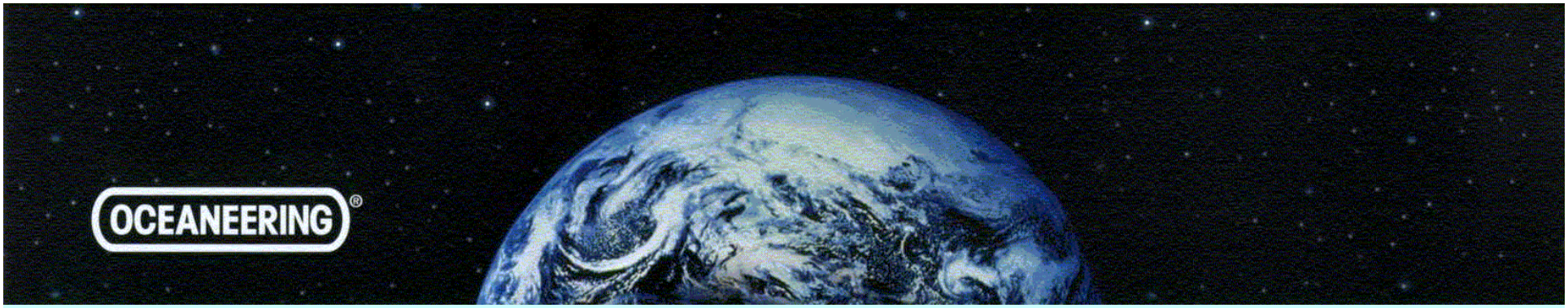

CRATERS AND CHANNELS ON MALAPERT MOUNTAIN IN THE LUNAR SOUTH POLE REGION:

CHALLENGES ASSOCIATED WITH HIGH-INCIDENCE-ANGLE IMAGERY.

Bonnie L. Cooper
Oceaneering Space Systems
16665 Space Center Blvd., Houston TX
bcooper@oceaneering.com.

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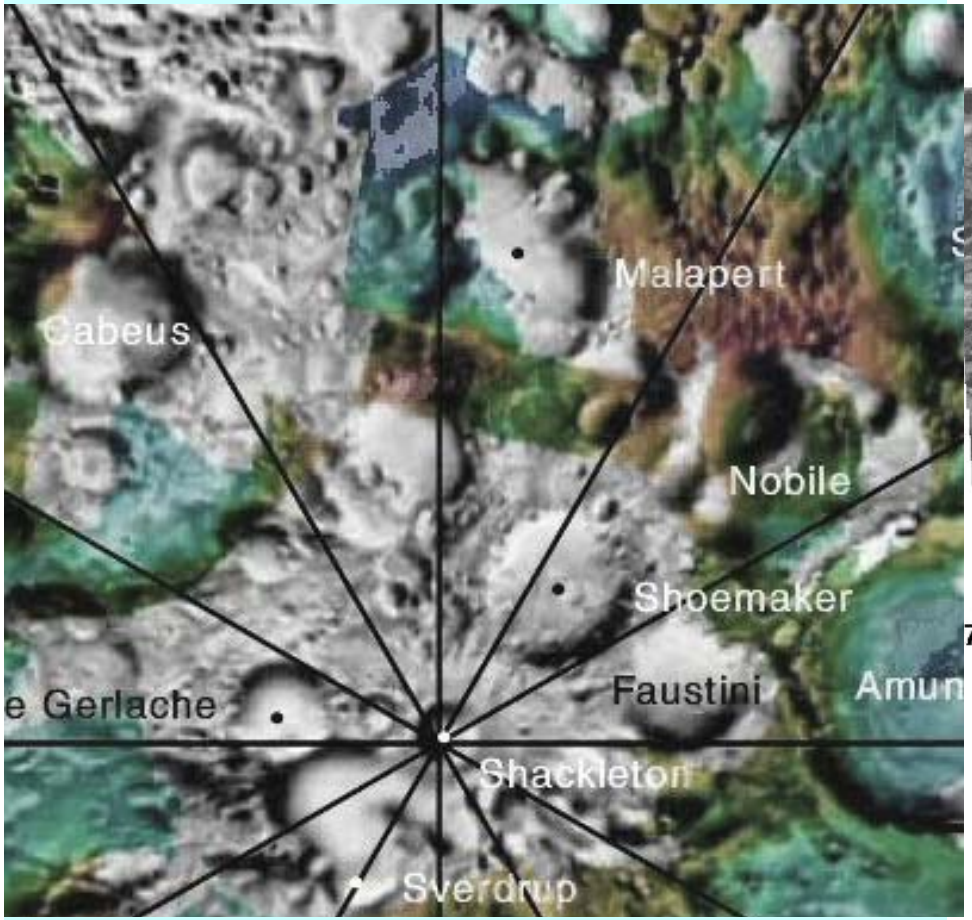
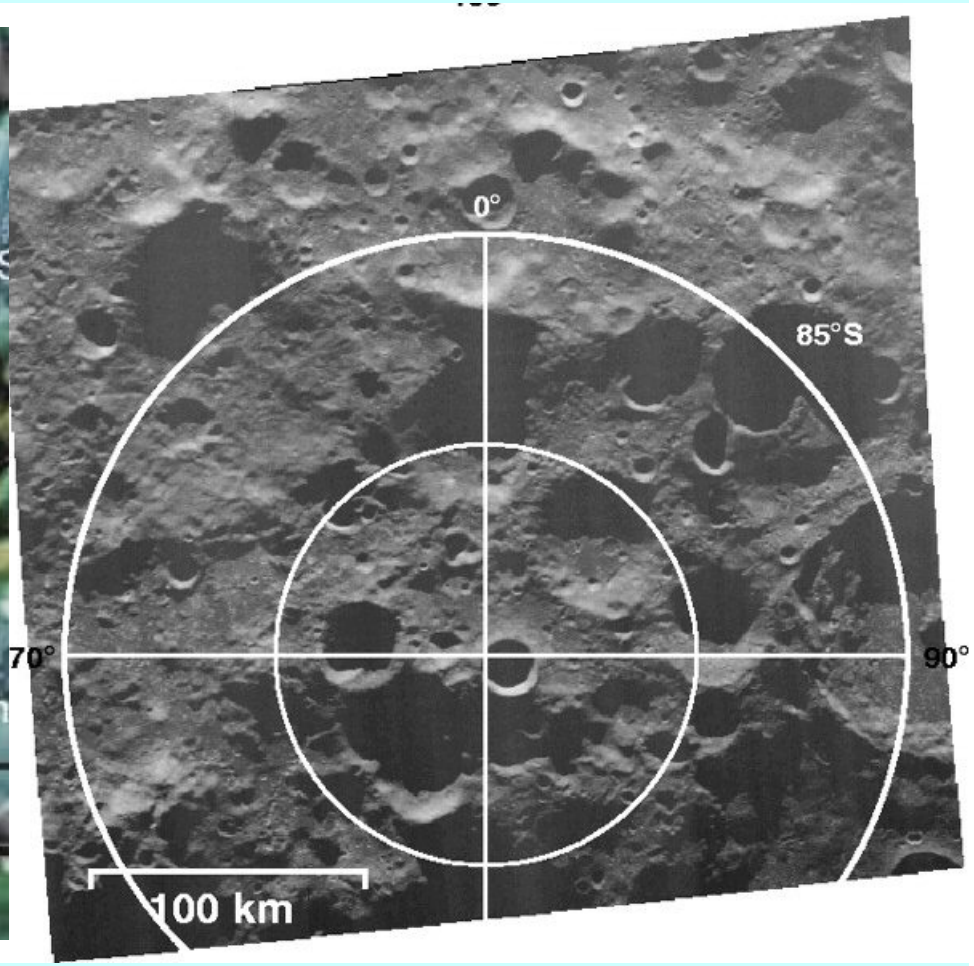
Regional View of Lunar South Pole



Clementine Color Topograhy



3.5 cm Radar Image

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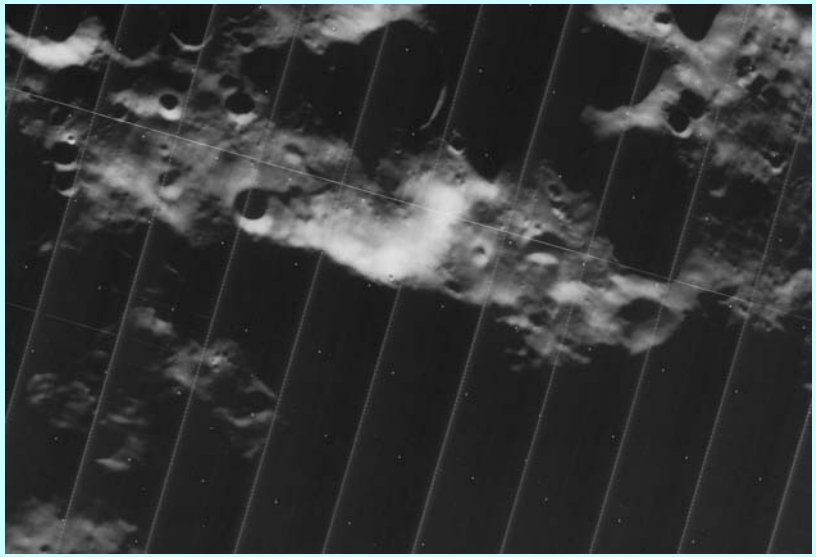
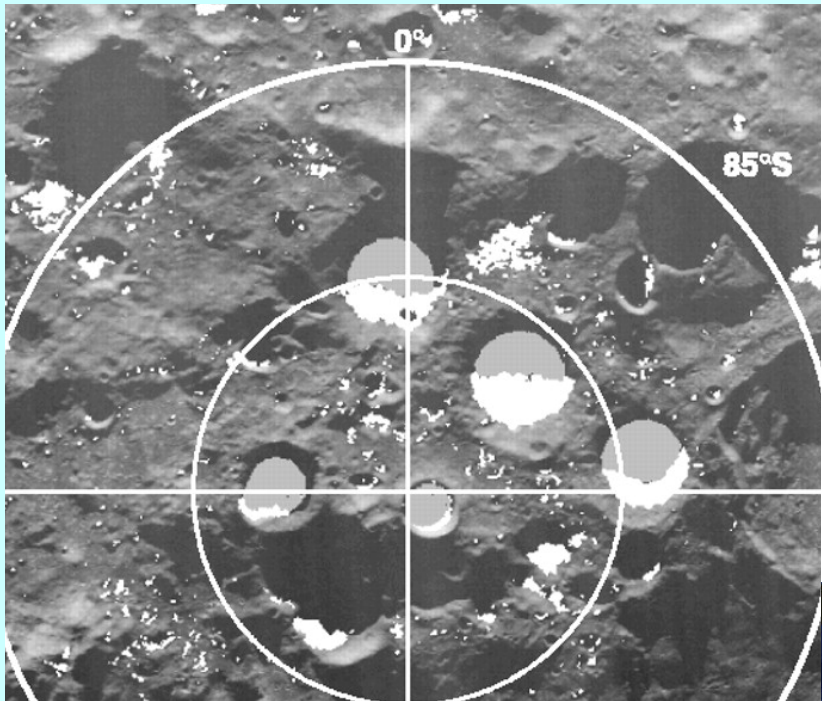
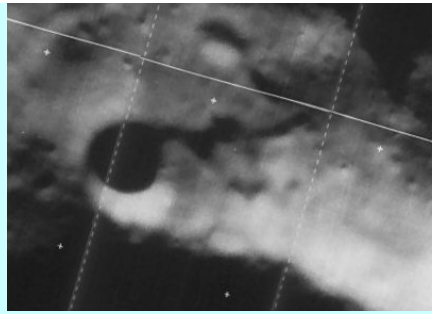
“Malapert Mountain”

- South of Malapert Crater, at 85.75°S; 2°E
- Absolute elevation: 1,448 meters (4,750 feet)
- In sunlight ~90% of the lunar month
- Adjacent to a permanently-shadowed region (e.g, Margot et al., 1999)
- The entire disk of the Earth remains in constant view from the lunar peak
- Previously identified as a good option for a south-polar outpost (Sharpe & Schrunk, 2002)

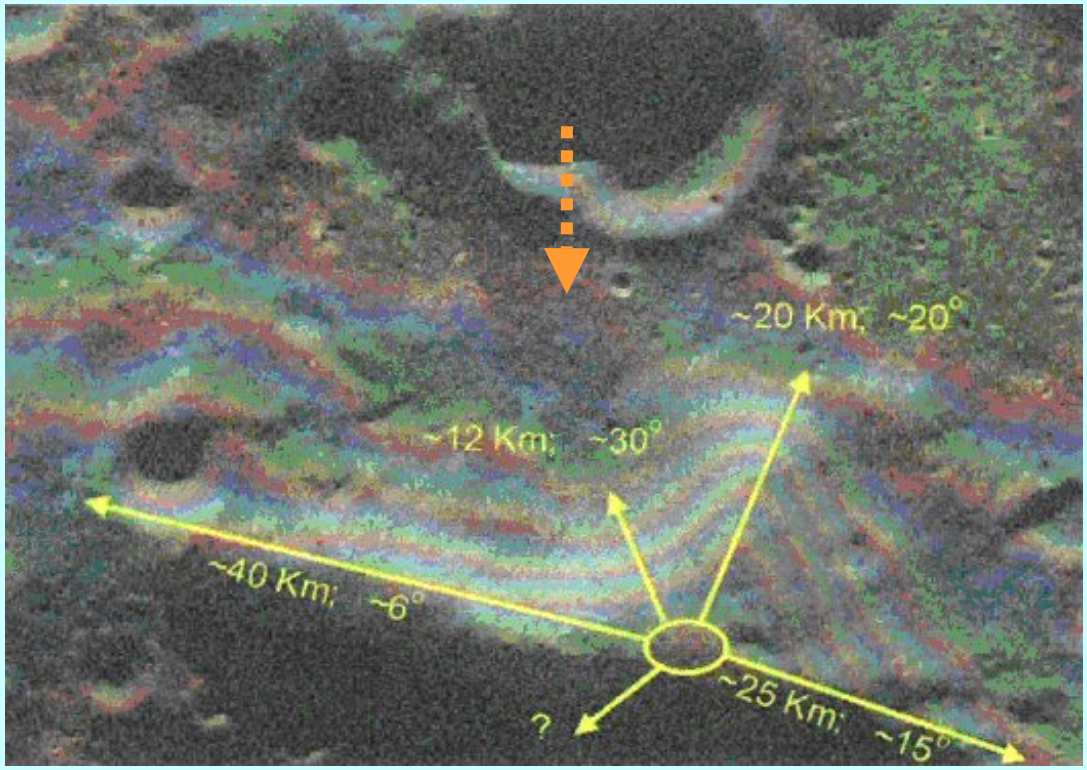




Radar Imagery



LO IV 179



3.5 cm radar wavelength

Subsolar Longitude ~0°

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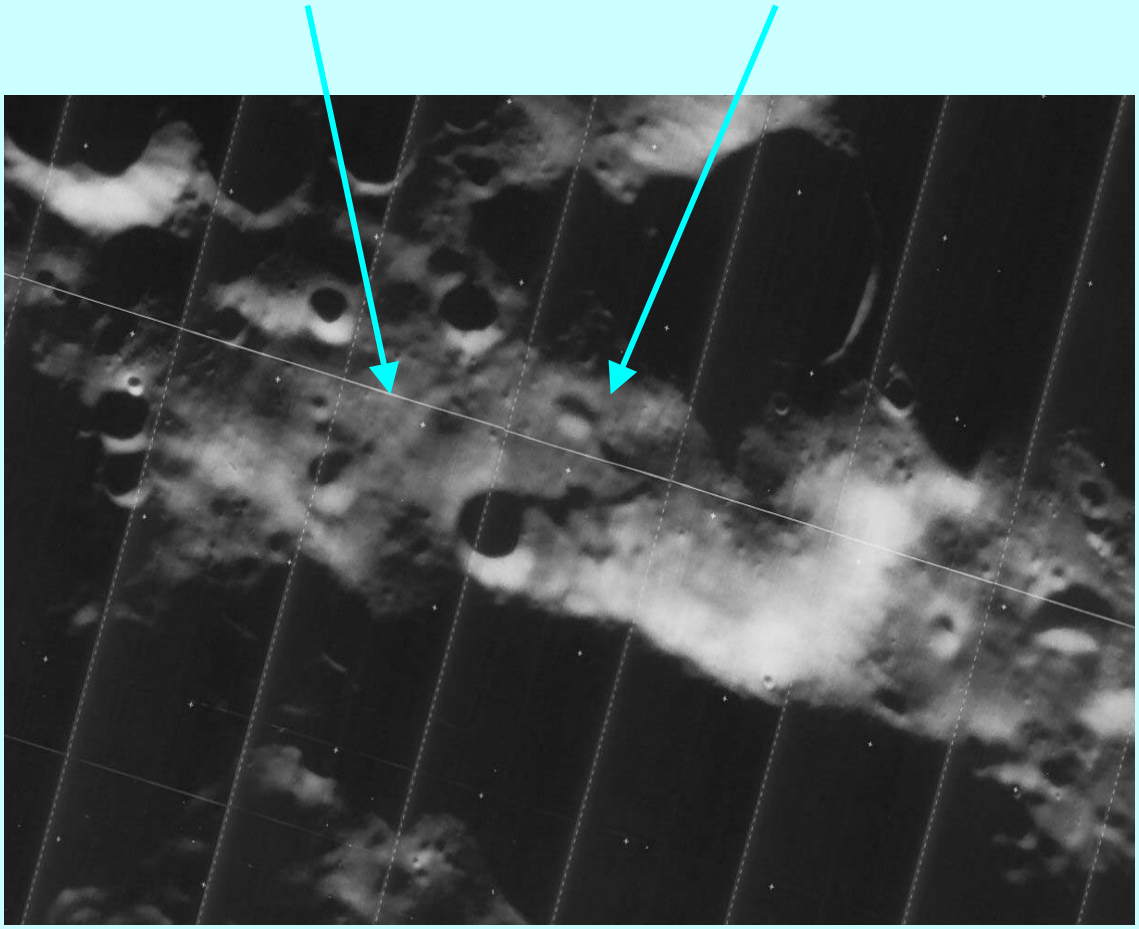
“Malapert Mountain”



Other Possible Outflow Channels?

LO IV 179

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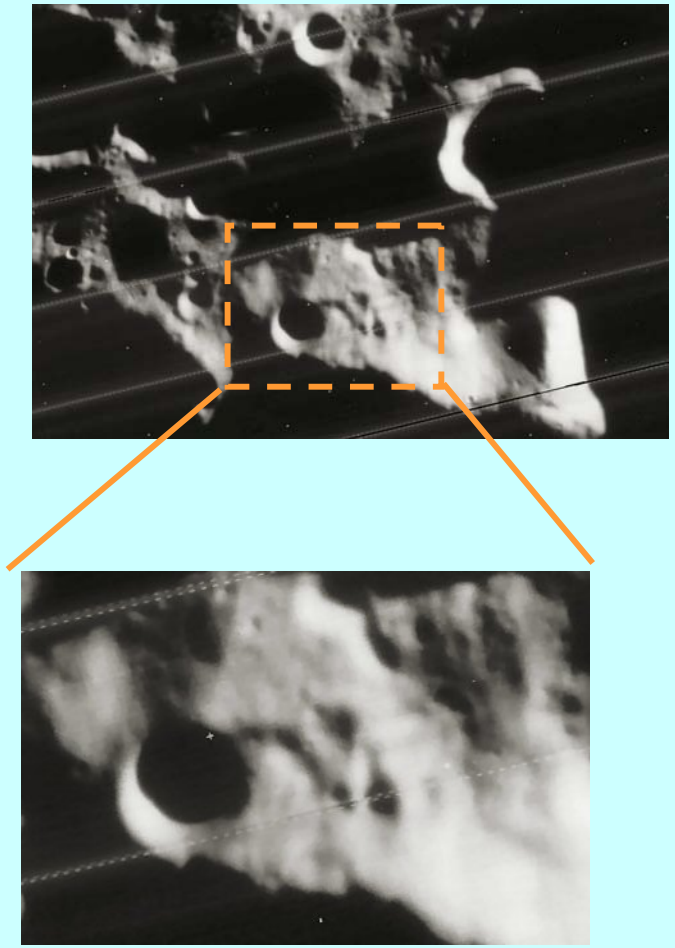
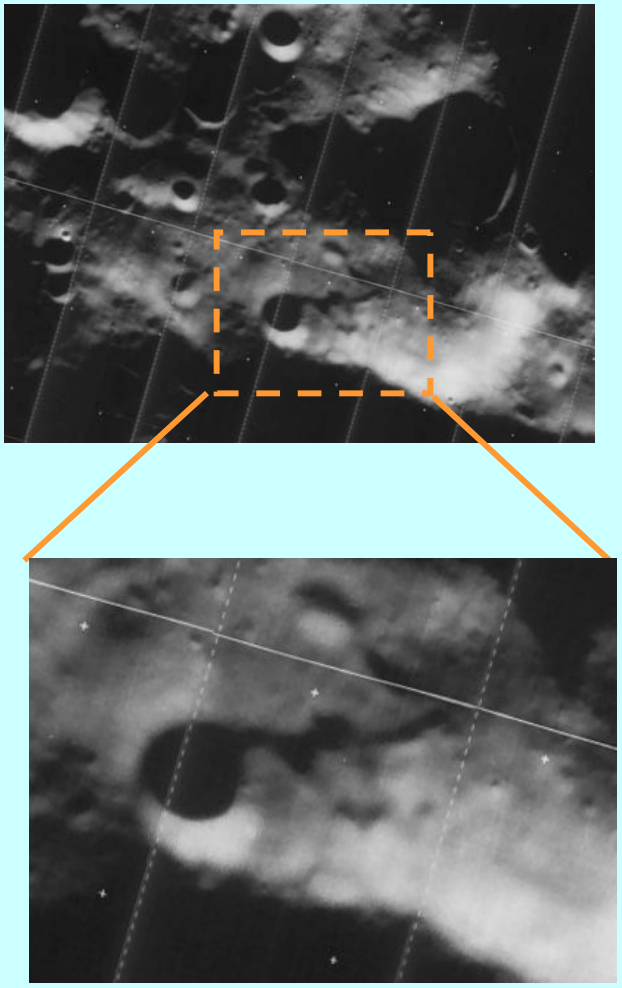
Lunar Orbiter Photography



LO IV 118 (1967/05/19)
Subsolar Longitude = 56.7°



LO IV 179 (1967/05/24)
Subsolar Longitude = 348.7 °

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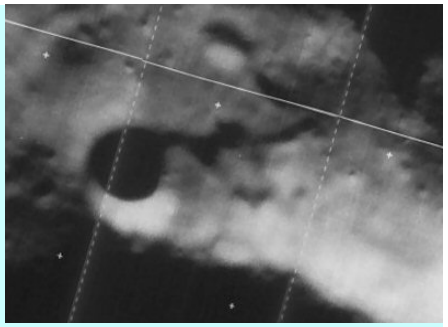
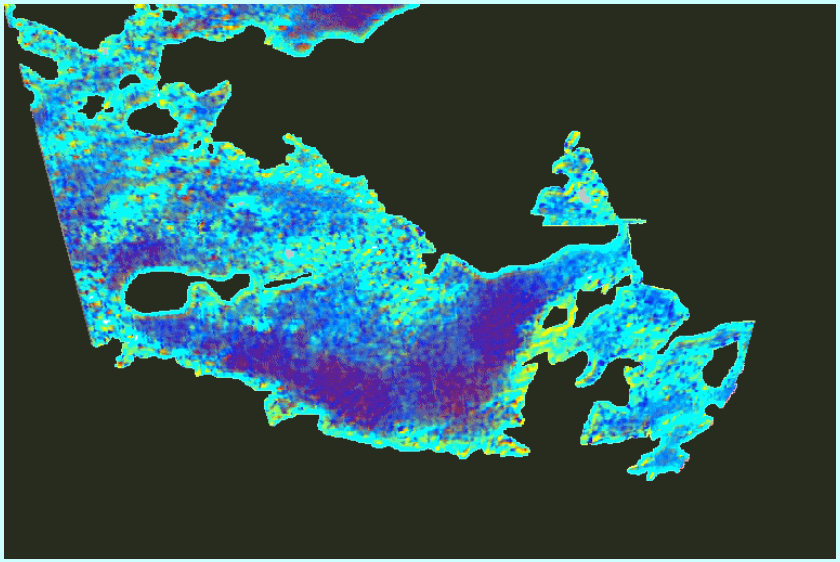
Clementine Mosaic Imagery



LO IV 179



Source: PDS Map-a-Planet at:

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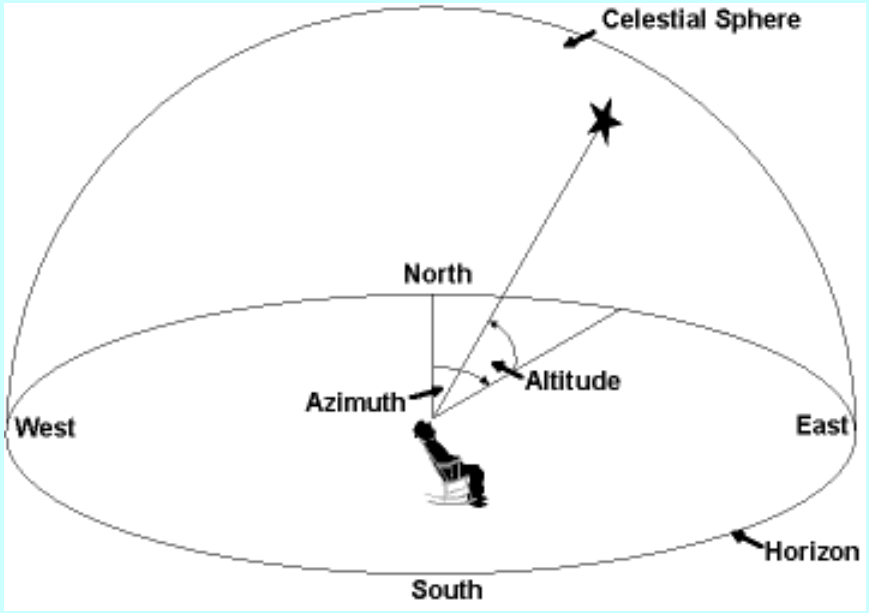
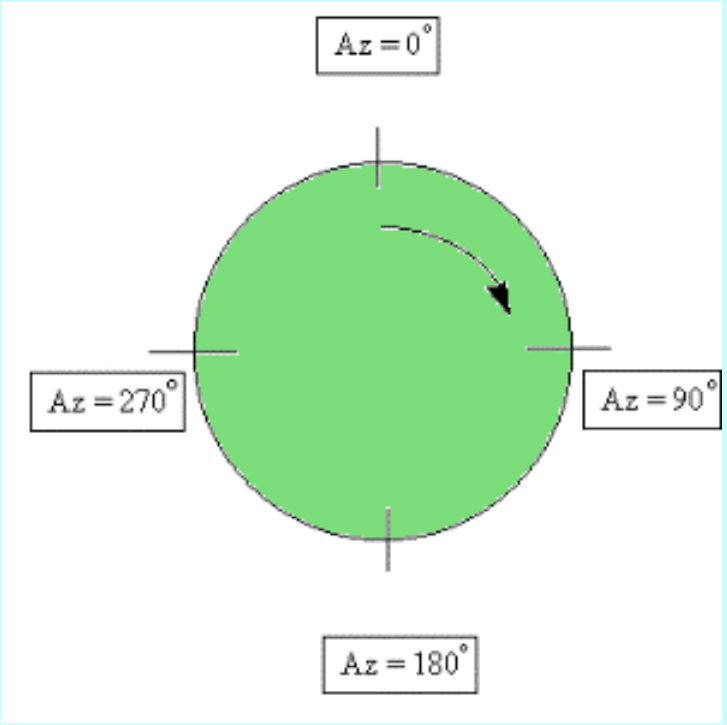
Modified Definition for “Azimuth”





At the south pole, all directions are NORTH

Clementine’s “Subsolar Longitude” provides an appropriate metric.

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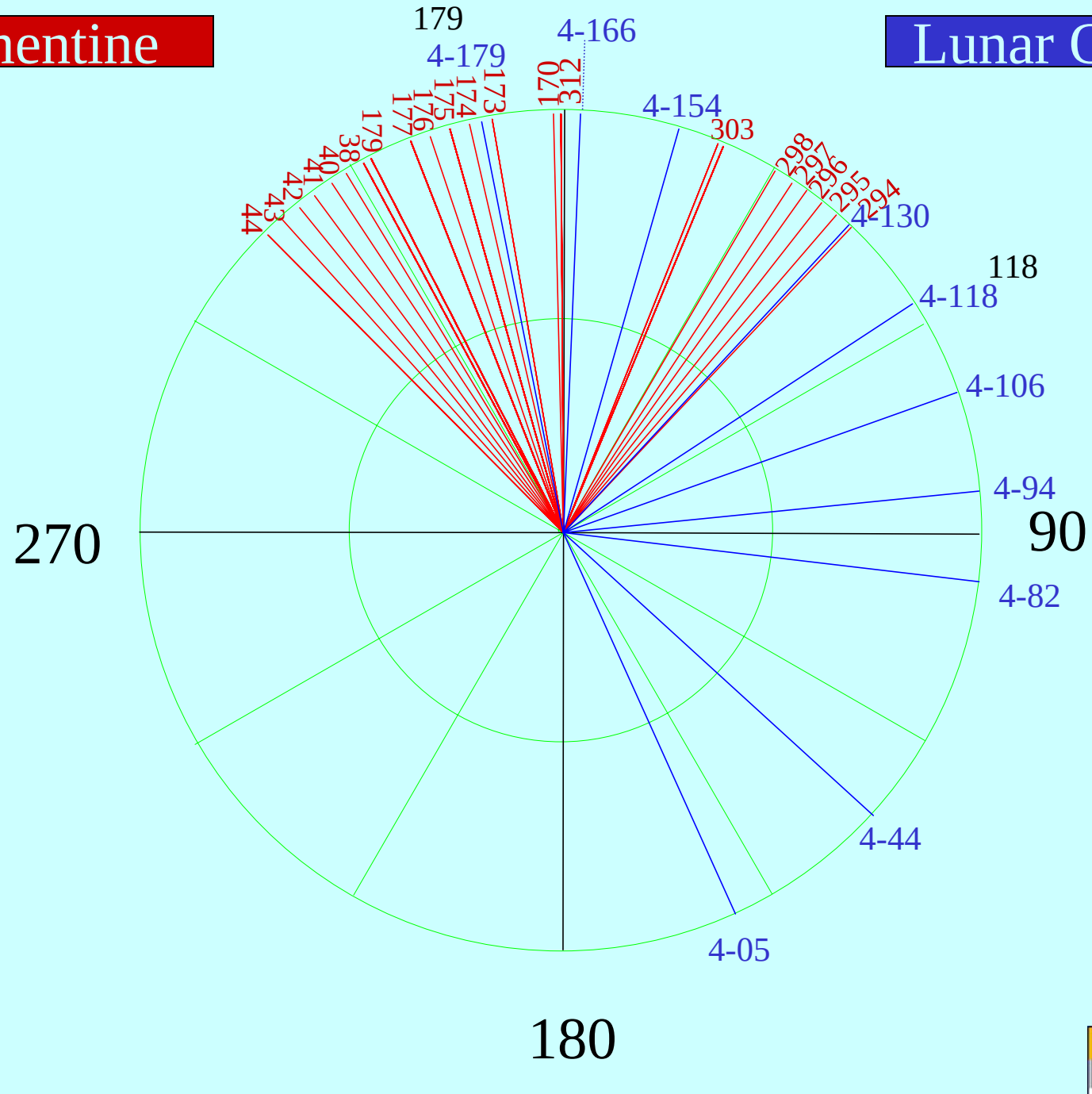
Clementine

Lunar Orbiter



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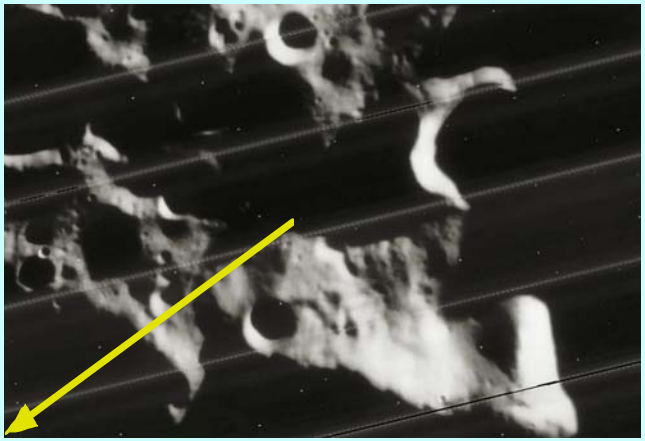
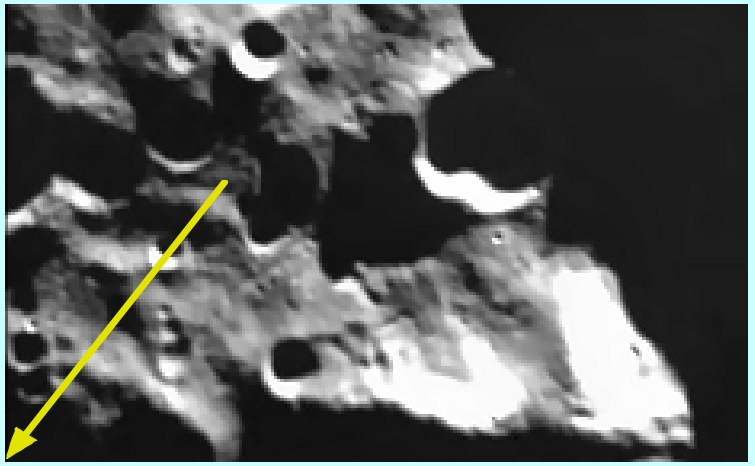
Comparison of LO-118 and Clementine Orbit 297





LO4-118
Subsolar Longitude = 56.7°

Clementine Orbit 297
Subsolar Longitude = 35.5°

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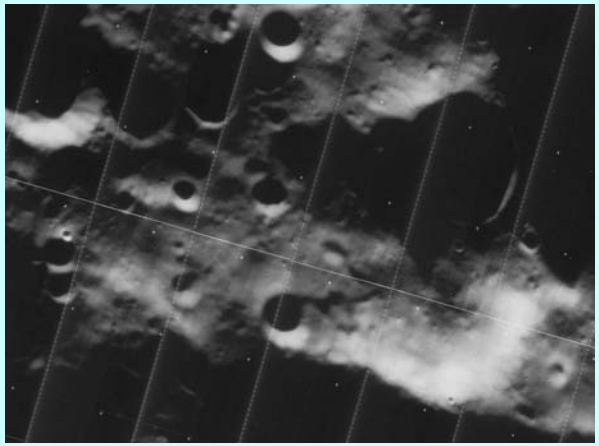
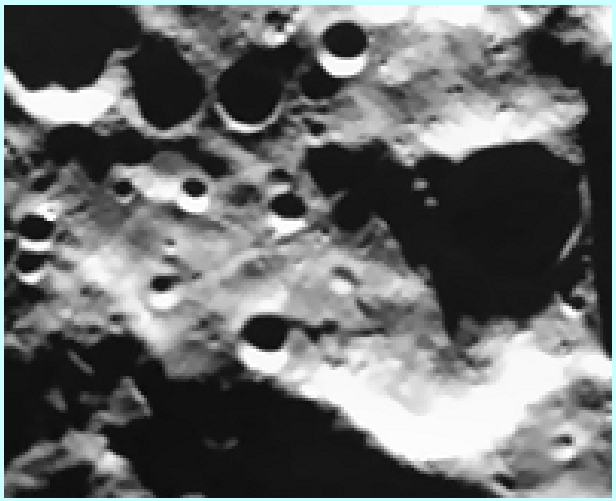
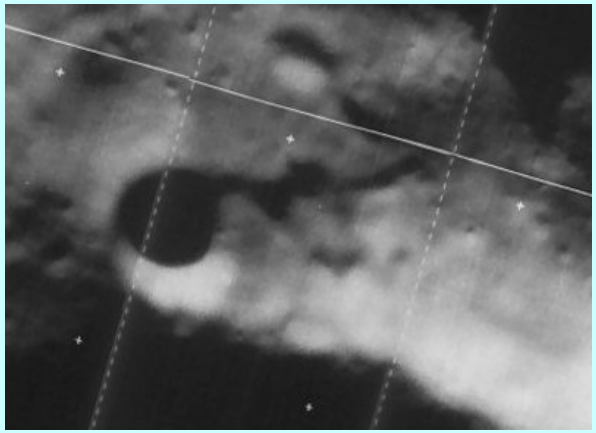
Comparison of LO-179 and Clementine Raw Data, Orbit 173







LO4-179
Subsolar Longitude =

Clem Orbit 173
Subsolar Longitude =

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Conclusions

- “Subsolar longitude” is a useful alternative to traditional azimuth in the lunar polar regions.
- Clementine and Lunar Orbiter images show similar variations with changing subsolar longitudes
- Images in the polar regions should be examined at as many different lighting conditions as possible to determine the amount of variation that can be expected when planning a lunar outpost

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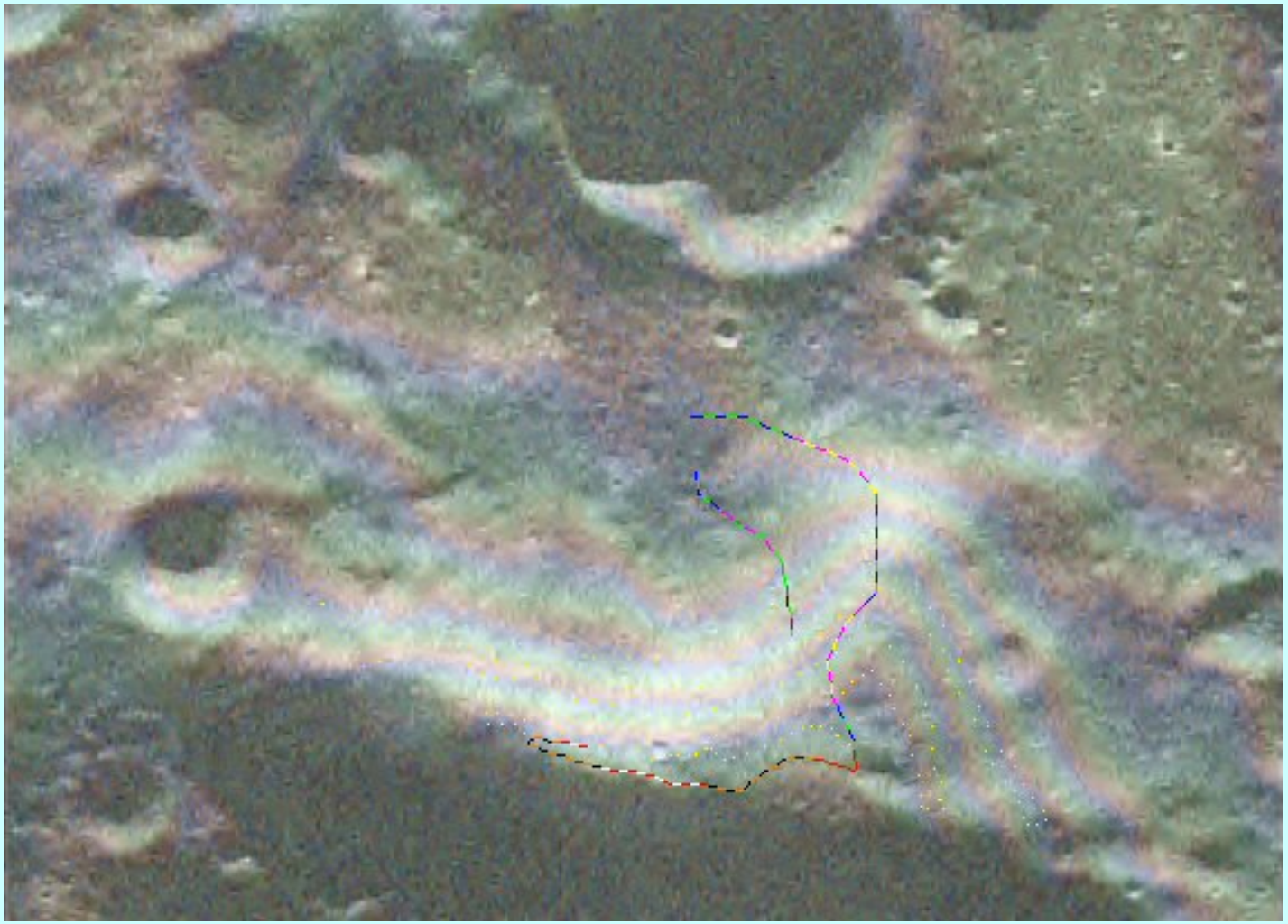
For Alex



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