APOLLO DIGITAL IMAGE ARCHIVE

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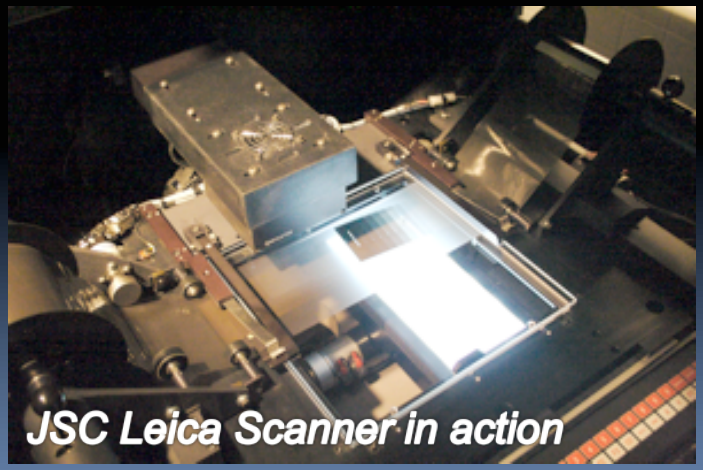
Apollo Flight Film Scanning Project

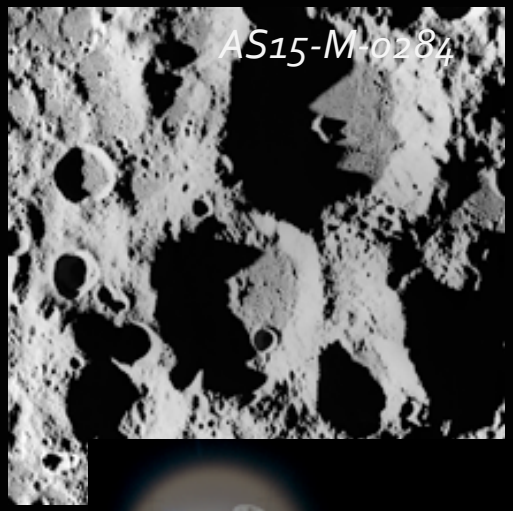
- Tens of thousands of photographs taken by the Mercury, Gemini, and Apollo astronauts
- Original flight films stored at JSC in freezers
- ASU, NASA Johnson Space Center, and LPI are systematically scanning these original flight films
  - **All** flight films will be scanned by 2010
- BW Scans have resolution of 200 microns/mm (5 microns pixel), color 100 microns mm (10 microns pixel)
- Typically 2nd and 3rd generation images seen by public - this is the first time that original flight film images will be available for everyone's viewing pleasure

Film storage freezer @ JSC


JSC Leica Scanner in action

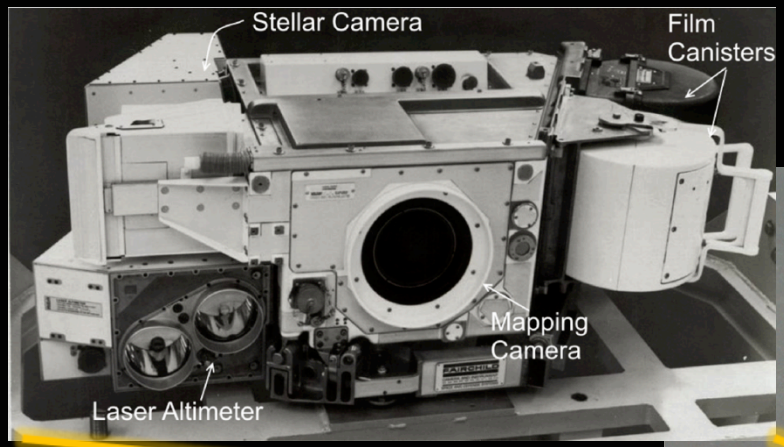
Merging the Past and Present

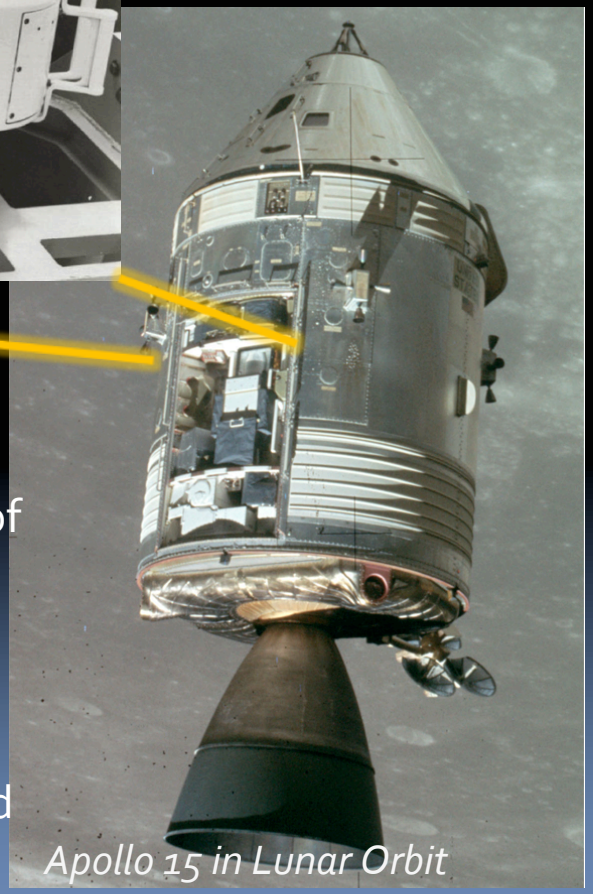
- Apollo-era flight films are important records of our shared heritage in space and have profound historical importance
- Apollo images incredibly useful for present-day lunar scientists
  - Comparing Apollo lunar images to present-day LROC images primary dataset for gauging lunar impact rate
- Clear images of spacecraft and hardware taken on lunar surface useful for engineers designing next generation of human lunar spacecraft



Images:NASA/JSC/ASU

Apollo Mapping Camera Archive





Apollo 15 in Lunar Orbit

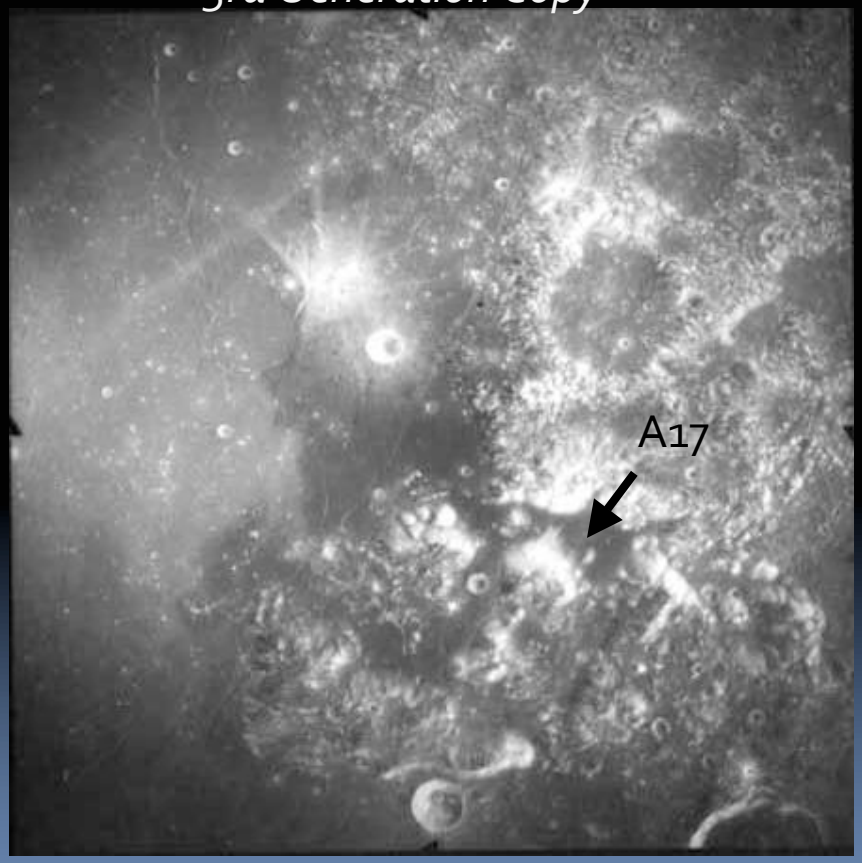
- Apollo Lunar mapping camera carried on Apollo Missions 15, 16, 17
- Took 10,000 medium- to high- resolution photographs of the lunar surface
- Coverage of ~20% with Sun varying from noon to terminator
- 8000 frames available **now** for download
- Every metric frame will be available for download by end of 2009

Images:NASA/JSC/ASU

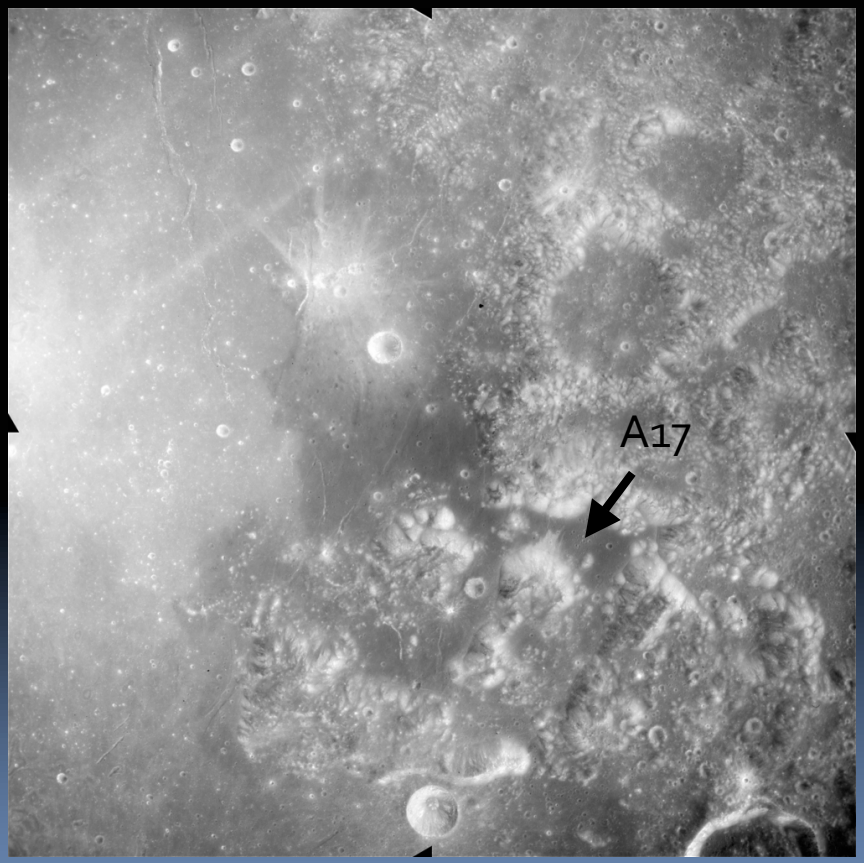
Before and After

- Taurus-Littrow: Apollo 17 Landing Site

Currently Available:
3rd Generation Copy



ASU High-Resolution Scan



Apollo 15 Landing Site

Tsiolkovskiy Crater

Reconstructed Apollo 15-17 Ephemeris

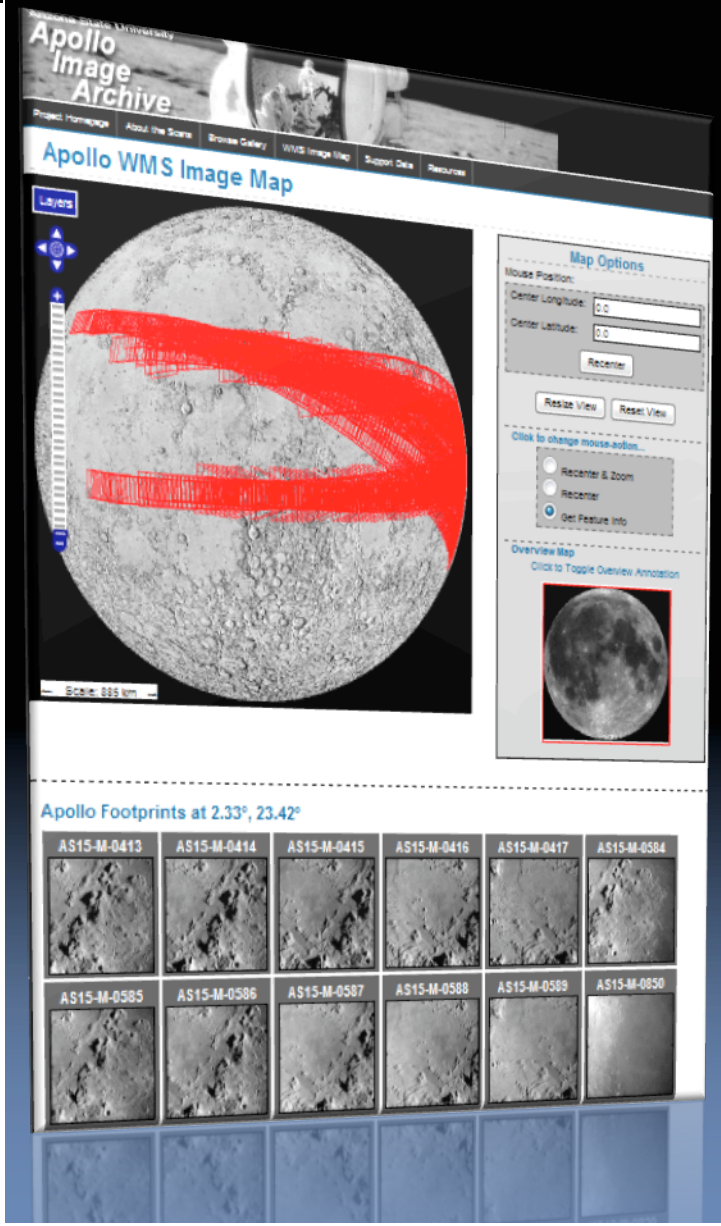
- NSSDC scanned microfilm SEDR records
- Commercial OCR packages failed
- Developed custom OCR software - still lots of hand correction
- Created SP Kernels and C kernels
- Will be delivered to NAIF when completed (2009)

IFRAME = 876

	YEAR	MONTH	DAY	HOUR	MINUTE	SECOND
GMT	1972	12	12	23	2	.170+002
CTE			5	17	29	18.735

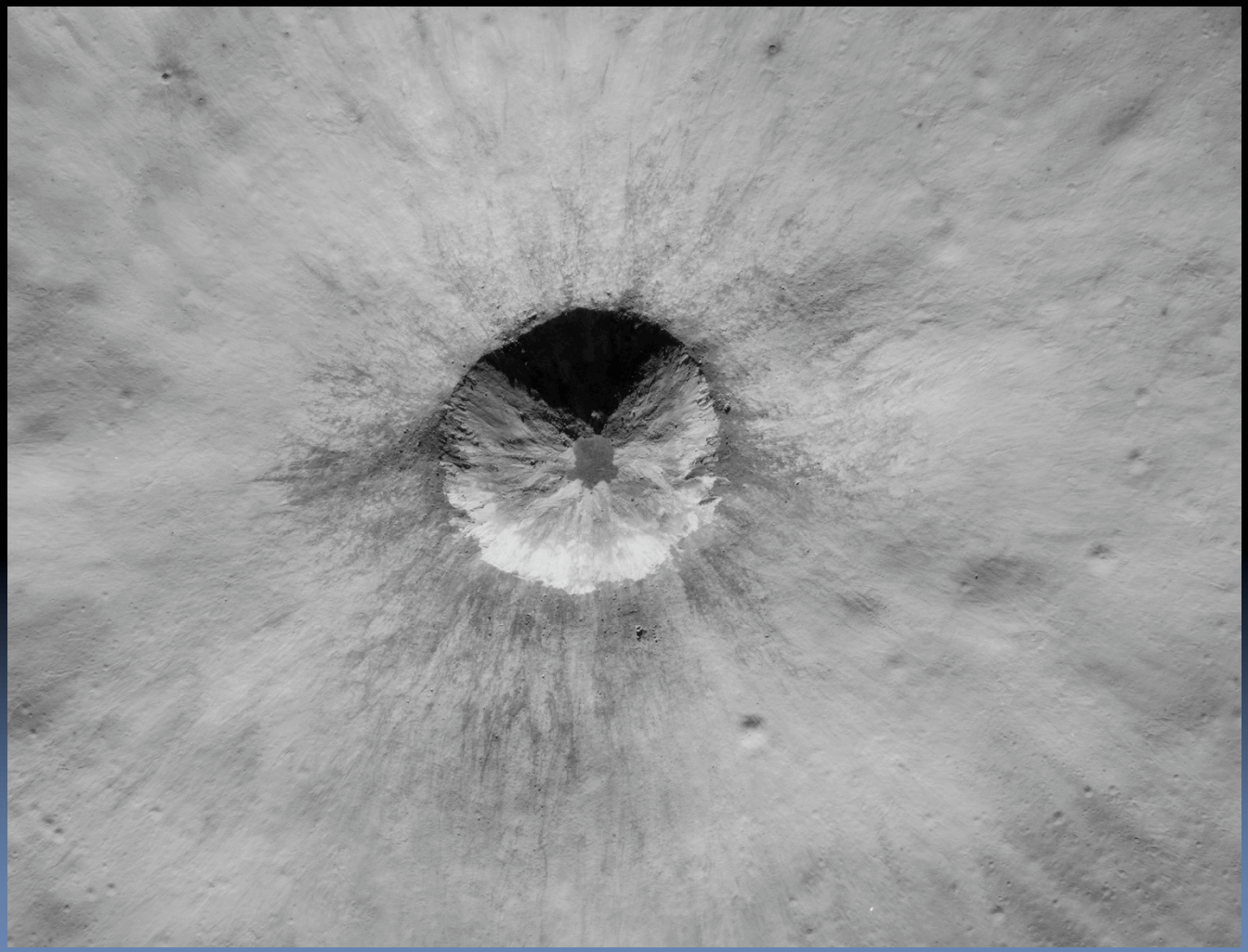
STATE VECTOR	X	Y	Z	X DOT	Y DOT	Z DOT
1950.0	.4287623+003	-.1629718+004	-.7987833+003	-.8747909+002	-.3441745+002	.2340537+002
SELENOGRAPHIC	-.7864090+003	.1688615+004	-.8951358+002	.8199535+002	.3985605+002	.3276005+002

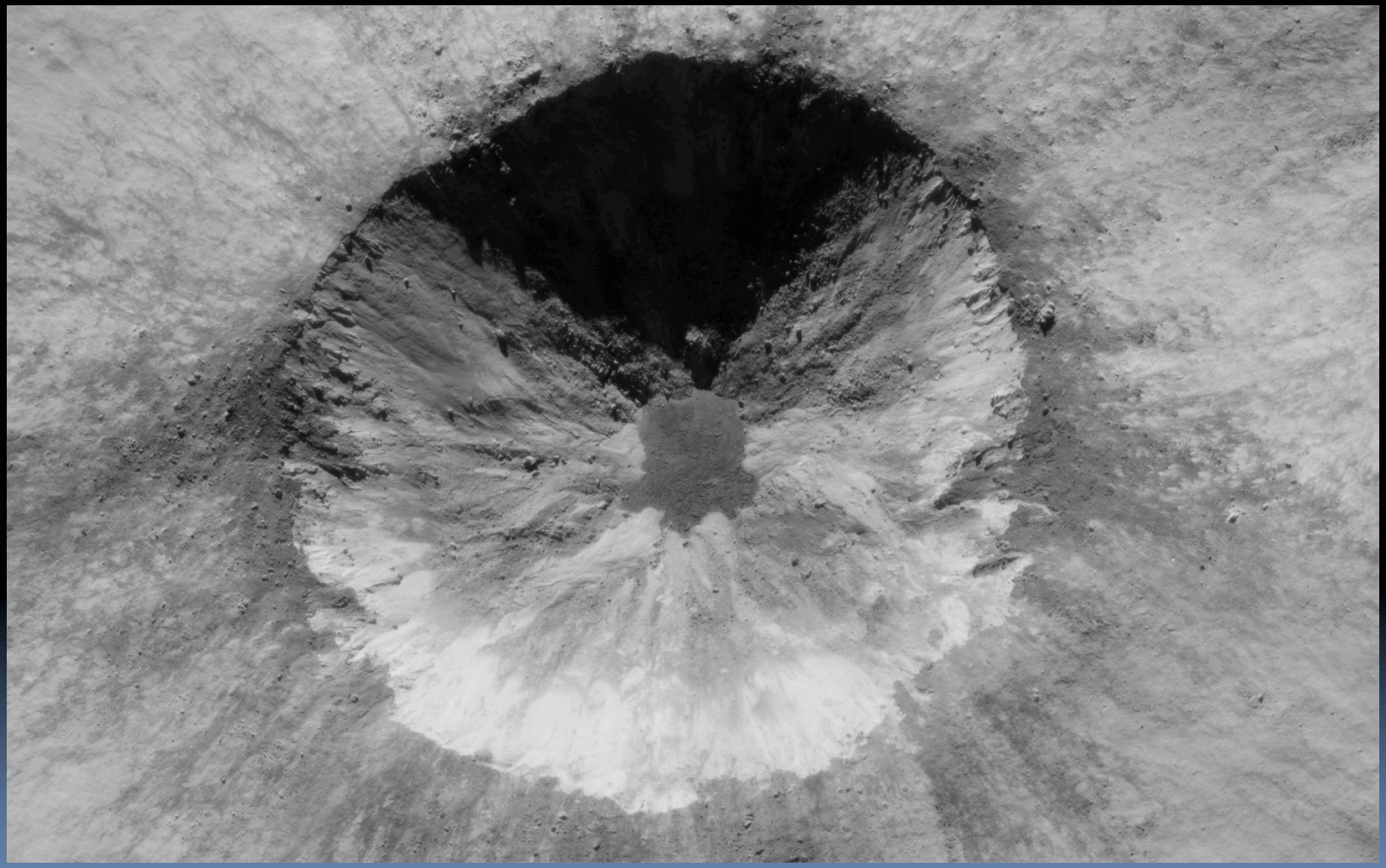
Web Interface



- Photos are available for download using a sophisticated, easy-to-use web interface
  - http://apollo.sese.asu.edu
- Releasing a Lunar Image of the Week every Tuesday
  - As seen in Google Earth!

Apollo Panoramic Camera Scanning Underway





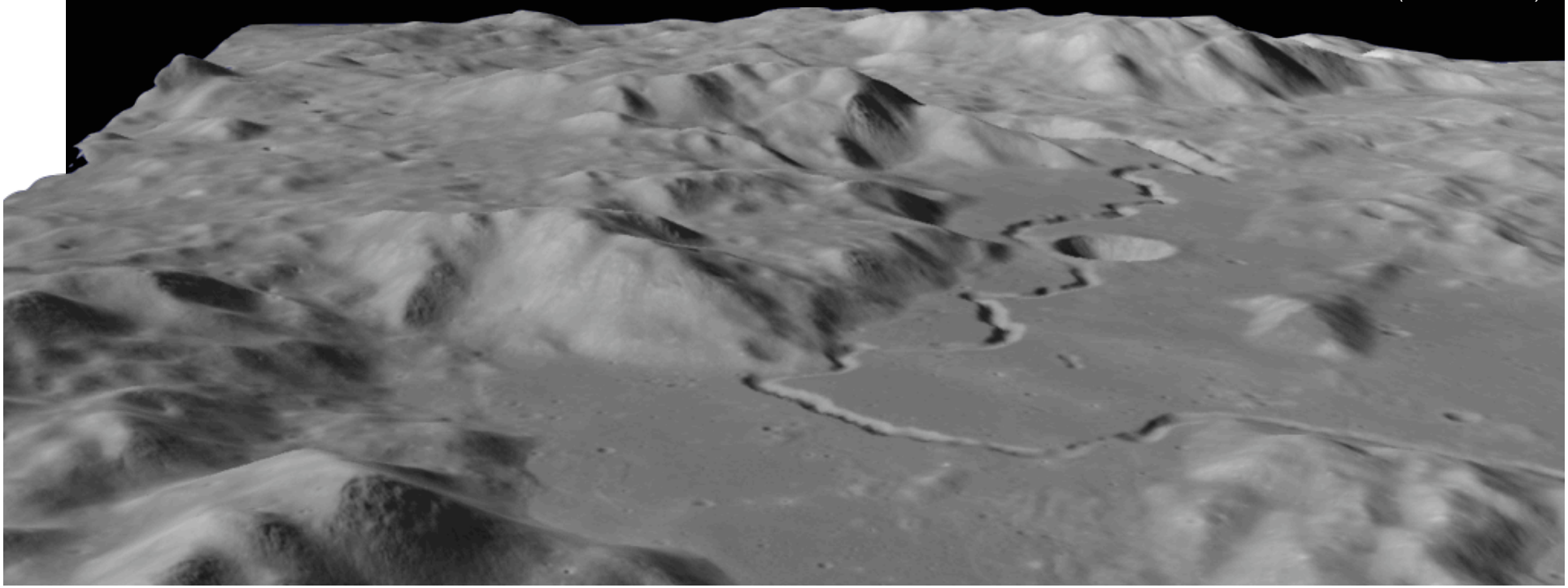
Please visit http://apollo.sese.asu.edu Thanks!

Stereo Reconstruction of Rev. 33

- Proof of concept that a large, systematic reconstruction of 3D terrain in the "Apollo Zone" is feasible.
- Carried out at Ames Research Center using the *NASA Ames Stereo Pipeline* and *USGS ISIS* software packages
- Work is funded by NASA's Lunar Mapping and Modeling Program (LMMP)
- Stay tuned for Michael Broxton's talk later this afternoon

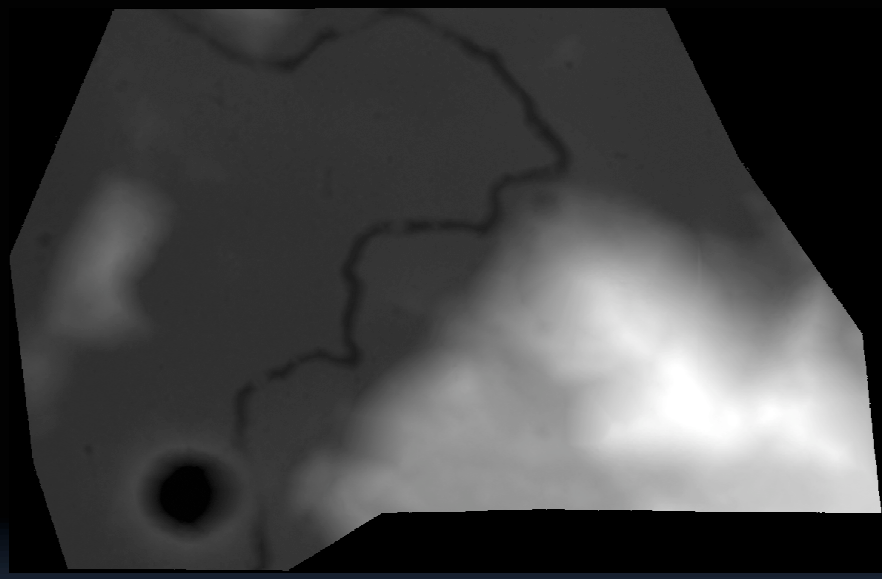
Source Data: *71 Images*
DEM Resolution: *40 m/pixel*
Orthoimage Resolution: *15 m/pixel*

Geo-registered to the Lunar Orbiter Mosaic (ULCN 2005)



Apollo 15 Metric

50 m/p DEM
Orthorectified Pan



USGS Flagstaff
LMMMMP
Others? Albania