ELEVATION MODELS

Software Packages

Ames Stereo Pipeline (ASP)
Surface Extraction with TIN-based Search-Space Minimization (SETSM)

2-meter resolution DEM output
± 10-meter vertical accuracy without ground control

Compute Intensive

ASP: one strip/pair averages 19 hours on 32-core node with shortcuts

CHALLENGES
Product Management
QA/QC
Metadata Standards
DEM Correction (edges) & Mosaicking
DEM Extraction From Stereo

Generic Process
1. Iterative image matching, pyramid-based approach
2. Mass point calculation
3. Filtering and interpolation
DEM from Stereoscopic Imagery

- Packages
  - Ames Stereo Pipeline (ASP)
  - Surface Extraction with TIN-based Search-space Minimization (SETSM)
- 2m resolution DEM output, +- 10m vertical accuracy without GCPs
- Compute Intensive
  - ASP: 1 strip pair avg 19 hours on a 32 core node with shortcuts
- Challenges
  - Product management/quality control and metadata standards
  - DEM correction/mosaicking
DEM Extraction From Stereo
Accuracy Assessment (ASP)

- GCP-Jul2010 Elev Diff:
  - Mean: -8.67
  - Median: -9.49
  - StdDev: 5.98

- GCP-Aug2010 Elev Diff:
  - Mean: 0.52
  - Median: -0.37
  - StdDev: 5.86

Analysis by David Shean
Sources of Error

Clouds
Lakes
Steep terrain
Edge artifacts
Point matching artifacts
Next steps: DEM Mosaicking
Next steps: DEM Mosaicking
ELEVATION MODELS

Advances in imagery processing

Shaded Relief: Jakobshavn Isbræ, Greenland
data preservation & improvement

Brad Herried
MAP ARCHIVE

In collaboration with the U.S. Geological Survey and UMN’s Borchert Map Library the PGC is actively

COLLECTING

SCANNING

GEOREFERENCING

CATALOGING

DISTRIBUTING

historic and contemporary polar maps from many authors/organizations
Map Authors:

United States
American Geographical Society
Department of Defense
National Geospatial-Intelligence Agency
National Geographic
NAVOCEANO
Polar Geospatial Center
Toolik LTER
U.S. Geological Survey
University of Texas
...

International
Asiaq (Greenland)
Australian Antarctic Division
Bulgaria (APCB)
British Antarctic Survey
GNS Science (New Zealand)
Land Information New Zealand
France (SHOM)
SAGA Maps (Greenland)
Scott Polar Research Institute
UK Hydrologic Office & Ordnance Survey
...

*additional organizations have not yet been added to public archive
USGS (and others) organize and ship maps to UMN Borchert Map Library.

Borchert scans (~25 microns) and delivers digital maps to PGC.

PGC staff & students archive, georeference, and catalog.

Public maps available as no-cost digital download from PGC website as TIF, JPEG, PDF, and/or GeoTIFF.

Private maps (non-distributable archive, maps with commercial imagery) available to researchers on request.
MAP ARCHIVE
MAP ARCHIVE

Status & Timeline

1. Currently offering over 1,000 maps

2. More to be scanned & cataloged (time-consuming)

3. Do we integrate with SCAR Map Catalogue?

4. Does the PGC website search work effectively?

5. How do we decide on public vs. private archives?
PGC, in accordance with the Advisory Committee on Antarctic Names (ACAN), is curating the Antarctic place names database

United States only from SCAR Composite Gazetteer of Antarctica (CGA)

Collaboration with international groups

Improved geographic placement of point features

Polygon digitization
ANTARCTIC PLACE NAMES

Status (April 2014):

Point Features
Total: 13,149
59.5% complete

Polygon Features
Total: 6,836 *
49.3% complete

* eventually, there will be a polygon for all features
ANTARCTIC PLACE NAMES
ANTARCTIC COASTLINE

Hut Point Peninsula digitized at 1:3,000

ACAN Accuracy Improvement
ADDv6
ANTARCTIC COASTLINE
Using historic, scanned flight line maps, PGC is digitizing flight lines and photo centers for TMA Aerial Photography in Antarctica.

- Historic maps have hand-drawn flight lines
- Ensure correct directionality and metadata
- Enables a spatial search for historic flight lines
mcmurdo dry valleys
lidar campaign

Paul Morin
TARGET AREAS

Planned LiDAR targets in McMurdo Dry Valleys & Ross Island

DRY VALLEYS LiDAR CAMPAIGN
2014-15
Dec 8 – Jan 13
PGC Antarctic Imagery Submissions
Google Earth & Maps

Antarctic submissions to Google Earth & Maps