

Automatic DEM Extraction

ORTHOENGINE AUTOMATIC DEM EXTRACTION

The Automatic DEM Extraction module allows you to create Digital Elevation Models (DEMs) from stereo airphotos, stereo images and RADAR data. Image correlation is used to extract matching pixels in two overlapping images and then use the sensor geometry from a computed math model to calculate x, y, and z positions. Automatic DEM extraction allows you to batch epipolar generation, batch the DEM extraction process, geocode DEMs, and create absolute or relative DEMs.

PCI MODULE PREREQUISITES

OrthoEngine Automatic DEM Extraction requires Geomatica Core or Geomatica Prime, plus one of the associated sensor suites (Air Photo Ortho, Satellite Ortho, or Radar Ortho).

SUPPORTED SENSOR TYPES

The Automatic DEM Extraction module supports the following airphoto, satellite and RADAR sensor types.

Airphoto Sensors

- All digital and video frame images
- All scanned standard aerial images

Satellite Sensors

- ALOS (PRISM)
- ASTER
- CBERS
- EROS
- FORMOSAT
- GEOEYE
- IKONOS
- IRS
- LANDSAT 5/7
- MERIS
- ORBVIEW
- QUICKBIRD
- SPOT 1-5
- WORLDVIEW 1/2

RADAR Sensors

- RADARSAT 1/2
- ASAR

EPIPOLAR PAIRS

Epipolar pairs increase the correlation process speed and reduce the possibility of incorrect matches. Stereo pairs are reprojected, ensuring that the left and right images have a common orientation, and matching features between the images appear along a common x-axis. Using epipolar pairs, you can:

- Choose from the following pairs:
 - User Select – selects a pair manually
 - Maximum Overlapping Pairs – selects the pair with the highest amount of overlap
 - Minimum Percentage Overlap – specifies the lowest percentage of acceptable overlap
 - All Overlapping Pairs – selects all pairs that overlap above a minimum percentage
- Limit the amount of memory used to generate epipolar pairs
- Define a Down-sample factor to reduce an epipolar image resolution
- Define a Down-sample filter
- Set up epipolar-pair start times

DEM EXTRACTION

Using DEM extraction, you can:

- Specify the minimum and maximum elevation to estimate a search-area correlation
- Specify a failure value to represent any failed (uncorrelated) pixel values in the resulting DEM
- Specify a background value to represent any 'no-data' pixel values
- Set the DEM detail to high, medium, or low for the needed level of detail
- Select an output DEM channel type to 16-bit signed or 32-bit real

Technical Specifications

- Specify a pixel sampling interval for the number of image pixels and lines used to extract one DEM pixel
- Use a clip region to process a specific area only
- Fill holes and filter interpolated failed values and filter elevation values automatically
- Create a score channel to represent the correlation score for each DEM pixel
- Delete an epipolar pair after use
- Create a Geocoded DEM by using geocoding stored in the project
- Set up DEM extraction start times

DEM EDITING

When editing a DEM, you can:

- Use a mask to identify specific areas to edit
- Apply noise filter
- Erode holes
- Apply a Median filter
- Smooth the DEM
- Interpolate failed values within the DEM

ALGORITHMS AVAILABLE

- AUTODEM - Generates a digital elevation model from stereo images
- ELEVRMS - Reads elevations from a digital elevation channel and compares the elevations with elevation values from a given GCP (ground control point) segment or from a vector segment
- EPIPOLAR - Generates epipolar images from stereo pairs or raw images
- GEOCODEDEM - geocodes epipolar digital elevation models by reprojecting to the ground coordinate system

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