

OrthoEngine Production Toolkit

ORTHOENGINE PRODUCTIVITY TOOLS

The OrthoEngine productivity tools are a collection of powerful automated tools for the orthorectification and mosaicking of aerial photos and satellite imagery.

The module includes tools for the automatic collection of airphoto fiducial marks and image-to-image tie-points, automatic collection of Ground Control Points (GCPs) for image registration, and automated mosaicking, including automatic color balancing and cutline selection.

MODULE PREREQUISITES

The OrthoEngine Production Toolkit requires Geomatica Core or Geomatica Prime, plus one of the associated sensor suites (Air Photo Ortho, Satellite Ortho, or Radar Ortho).

AUTO TIE POINT AND FIDUCIAL COLLECTION

The OrthoEngine Productivity Suite supports automatic fiducial-mark and automatic tie point collection.

Automatic Fiducial-Mark Collection

Once fiducials are manually collected for one image in your project, the fiducial marks for remaining images can be collected automatically using pattern matching.

Verify the accuracy of automatically collected fiducial marks through a GUI interface or automatically generated text report.

Algorithms Included

- AUTOFID – automatic collection of image coordinates of fiducial marks

Auto Tie-Point Collection

Tie points are collected using automated image-correlation techniques, which:

- Let you distribute evenly over an entire image or in overlapping image/photo regions only
- Use moving frames with a search radius (100 pixels default)
- Specify a matching threshold (a minimum correlation score is required for a match)
- Use a DEM to extract elevation values of tie points
- Collect tie points for the working image or all images

Algorithms Included

- AUTOTIE – automatic tie point collection
- TPREFN – tie point refinement

AUTO IMAGE REGISTRATION

The OrthoEngine Productivity Suite offers the following registration functionality.

Automatic Image-to-Image Registration

- Uses advanced image correlation to identify pixel and line locations in raw images that correspond to georeferenced image positions
- Allows for repeat mapping or compositing
- Lets you define the number of GCPs you want collected over each image
- Collects points in an evenly spaced pattern over an entire image
- Uses a DEM to automatically supply elevation values of GCPs
- Supports scripted or automated workflows
- Lets you accept or reject correlated matches displayed in table

Automatic GCP Collection from Chip Database

The chip database engine stores, updates, and retrieves image chips. Image chips are used to automate the collection of GCPs on raw imagery, which:

- Uses image correlation to identify pixel and line locations in raw image that

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correspond to georeferenced image chip positions

- Are useful when orthorectifying different images of the same geographic area
- Let you define search criteria, such as sensor, range of acquisition dates, and region of interest
- Let you accept or reject correlated matches displayed in table

Chip Database Creation

Chip databases are created using the powerful Geomatica Chip Manager interface.

- Allows you to insert, search/view, update, and delete image chips in an image chip database
- Automatic creation of image chips using a GCP segment and source image
- Attach sensor, date, projection and metadata of source image to image chips
- Enables the merging of two imagery chip database files
- Generates chip reports

Algorithms Included

- AUTOCHIP – automatic GCP collection from image chip database
- AUTOGCP – automatic GCP collection using image-to-image registration
- CHIPEXT – automatic image chip extraction
- FFTMPOLY – automatic GCP collection by matching image with polygons
- FFTMVEC – automatic GCP collection by matching image with vectors
- GCPREFN – automatic GCP refinement
- GCPREFN2 – improved automatic GCP refinement allowing elimination of rejected GCPs
- RAW2CHIP – automatic chip extraction from a raw image and its GCP segment

AUTO MOSAICKING

OrthoEngine automatic mosaicking includes automatic detection and removal of image brightness variations, radiometric color balancing between images and automatic cut-line determination to minimize visibility of seams in the mosaic.

- Allow for the following normalization:
 - Hot Spot removal
 - Across Image 1st Order
 - Across Image 2nd Order
 - Across Image 3rd Order
- Automatically collect cutlines using:
 - Minimum difference method
 - Minimum relative difference method
 - Edge features method
 - Entire image method
- Provide automatic color balancing using:
 - Entire image method
 - Overlap area method
- Offer a mosaic preview for checking color balancing and cutline seams
- Color balancing techniques:
 - Look-up table: color balances each input image based on pre-defined look-up tables that have been saved back to the image files
 - Neighborhood: Determines a set of coefficients that modify each image pixel based on the pixel values of the intersecting (neighboring) pixels
- Control reference image selection for increasing control over color balancing and cutline generation

Algorithms Included

- AUTOCUT – automatic cut-line generation
- AUTOMOS – automatic mosaicking
- HOTSPOT – hot spot correction
- RMOVERLAP – remove overlap from input polygons
- MOSDEF – mosaic definition preparation

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- MOSPREP – mosaic scene list preparation
- MOSPREVIEW – low-resolution mosaic preview
- MOSRUN – mosaic creation

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