ImageStation Automatic Elevations

ImageStation Automatic Elevations (ISAE) from Hexagon automatically extracts digital terrain model (DTM) elevation points from aerial frame (including UAS/UAV), Leica ADS line scanner, and satellite stereo images. The software's hierarchical image data structures and image processing methods provide exceptional automation and accuracy. ISAE yields extremely reliable DTM points in an efficient manner due to high redundancy. The software also reduces collection time by defining collection areas and skipping excluded areas. ISAE offers a robust set of features that help increase your overall productivity.

Integral part of production workflow

ISAE produces higher-quality DTMs by combining digital image matching algorithms, automatic blunder detection, and a robust least squares by using finite element interpolation. The software can extract DTMs from stereo images resulting from scanning aerial photography, or images directly acquired in digital form by aerial frame, ADS, or satellite sensors.

Using ISAE, you can collect DTMs from raw non-epipolar stereo pairs as well as epipolar-resampled imagery from aerial frame, ADS, or satellite sensors such as WorldView, GeoEye, SPOT, Pleiades, Cartosat, and many more. ISAE is completely multi-threaded; it is a true symmetric multiprocessor (SMP) application, running on multiple CPUs in the hosting computer workstation.

ISAE also supports distributed processing over a network using the HTCondor distributed processing system.

ISAE key features

- Automatically generates high-quality elevation models

- Generates DTM points in the north direction

- Handles aerial frame (including UAS/UAV), satellite, and ADS line sensor data

- Supports 1-, 3-, and 4-band images with 8- to 16-bits per band

- Captures satellite DTMs using rational functions

- Performs epipolar resampling of stereo imagery on-the-fly

- Performs batch processing

- Supports film-based and digital aerial cameras, such as the Leica DMC, RCD30, and ADS.

- Posts the generated elevation data to a MicroStation design file (.dgn) automatically

- Writes elevation data into a DTM format

- Provides the raw elevation data (stored in an ASCII file) that is generated before interpolation is used to generate a grid

- Provides enhanced matching algorithm

- Optionally suppresses grid points near breaklines and obscure areas

- Offers separate class definitions and symbologies for points of different statistical qualities

- Uses existing geomorphic features to improve automatic DTM generation

- Uses a surface reconstruction module to capture DTM points in poor texture areas

- Explodes borderlines to avoid edge effects

- Supports adaptive parameter tuning and variation of grid spacing based on the terrain's relief characteristics

- Checks accuracy and bias of automatically generated points against an ASCII file of control/ check point coordinates (Delta Z)

- Provides blockwise DTM generation capability that allows users to digitize a polygon over the project area of interest to be automatically filled with DTM data

- Delivered with support for four local or distributed processing nodes

- Supports distributed processing over a network using the HTCondor distributed processing system

Integrated solutions

ISAE is a member of the ImageStation photogrammetric software product family. ISAE integrates with other ImageStation modules such as ImageStation DTM for GeoMedia (ISDG) and ImageStation Stereo for GeoMedia (ISSG) in a GIS environment; or ImageStation DTM Collection (ISDC), ImageStation Feature Collection (ISFC), and ImageStation Stereo Display (ISSD) in the MicroStation CAD environment to create and edit DTM files.

ISAE uses information such as breaklines, points, collection boundaries, and obscured collection areas to assist the matching process. These geomorphic and boundary features are stored in a triangulated irregular network (TIN) format surface file or MicroStation design file. ISDG together with ISSG, or ISDC together with ISSD, provides interactive stereo collection of the geomorphic features for the execution of ISAE. ISDG and ISSG, or ISDC and ISSD, are also used for stereo viewing and editing of DTM points extracted by ISAE.

ImageStation Automatic Elevations DSM (ISAD) is a superset of ISAE and adds production of dense digital surface models (DSMs) such as point clouds and raster files from stereo aerial frame and satellite source images using the Semi-Global Matching (SGM) correlation methodology.

ImageStation DTMQue (ISDQ) can be used to supplement workflows with elevation file format conversion, coordinate transformations, tiling, merging, basic 3D viewing, and QA/QC tools for assessing accuracy.