# ImageStation 2020

Product Description

8 February 2021

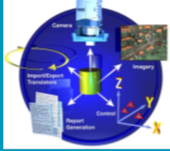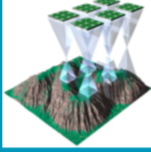# Contents

# Product Summary

The ImageStation® product family is the result of over 40 years of photogrammetric technology development, starting with analytical stereoplotters and progressing through the current full suite of digital softcopy applications. ImageStation has applications for your entire production workflow including project creation, orientation and triangulation, 3D feature collection and editing, interactive digital terrain model collection and editing, automatic terrain extraction (including dense surface model correlation with Semi-Global Matching), and orthophoto production and editing using aerial frame, ADS line scanner, UAV, and satellite imagery. ImageStation is designed with a high degree of automation for high-volume photogrammetry and production mapping customers who need to process large quantities of raw spatial information rapidly and accurately into an actionable format. The general photogrammetric production workflow is illustrated below:
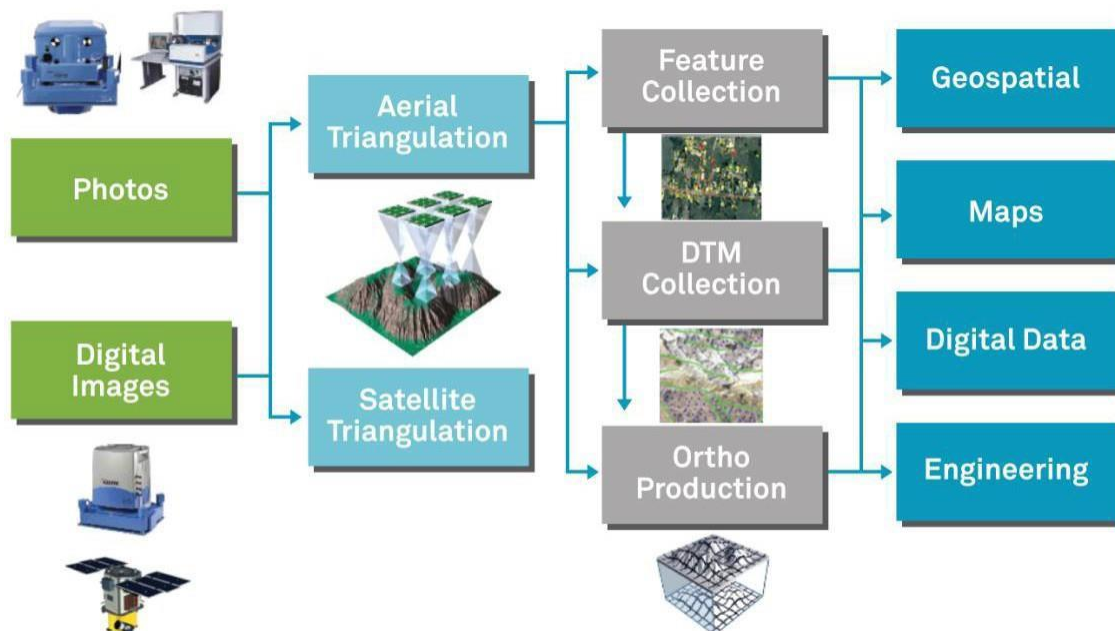


ImageStation comprises a set of integrated products that match the discrete steps of a photogrammetric workflow, as illustrated below. The modular nature of ImageStation products and concurrent licensing and subscription options give you maximum flexibility in selecting and configuring the products across your organization to meet your specific workflow needs.

| | | |
|---|---|---|
| **Project Setup & Management** | | ImageStation Photogrammetric Manager<br>ImageStation Image Formatter<br>HTCondor for Hexagon Geospatial |
| **Orientations** | | ImageStation Automatic Triangulation<br>ImageStation Satellite Triangulation |
| **Stereo Feature Collection** | | ImageStation Stereo for GeoMedia<br>ImageStation Stereo Display<br>ImageStation Feature Collection |
| **DTM Collection & Editing** | | ImageStation Automatic Elevations<br>ImageStation Automatic Elevations DSM<br>ImageStation DTM for GeoMedia<br>ImageStation DTM Collection<br>ImageStation DTMQue |
| **Orthomosaic Production & Editing** | | ImageStation OrthoPro<br>ImageStation PixelQue |

In addition to native Windows®-based products for project setup, automatic triangulation, automatic elevations, and DTM utilities, ImageStation provides both CAD-based and GIS-based interactive feature and DTM collection and editing products to meet customers' organizational and product delivery requirements.

ImageStation platforms and prerequisites are illustrated below and detailed in the individual product descriptions that follow.
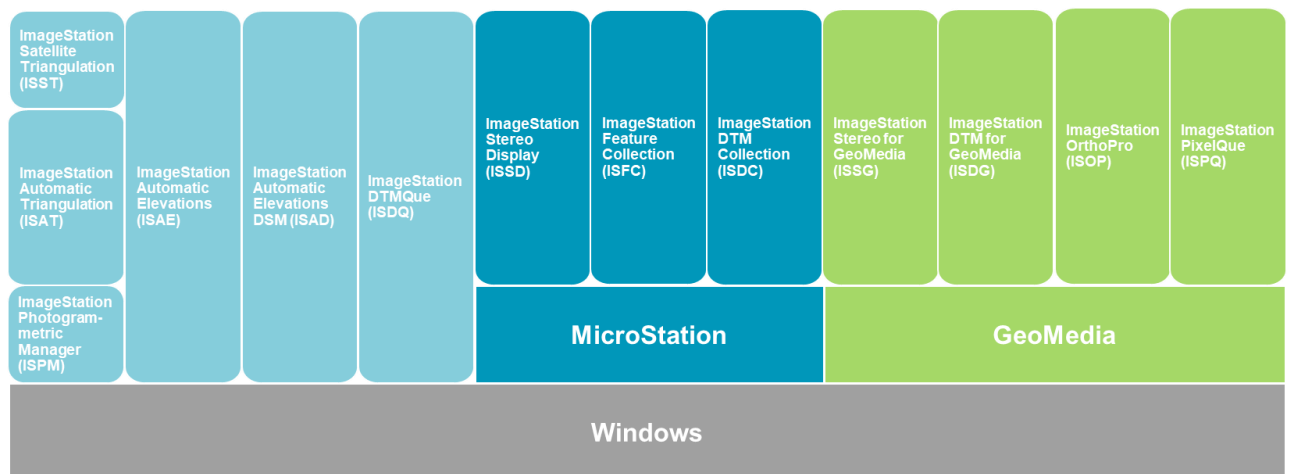
With ImageStation, Hexagon's Geospatial division demonstrates its commitment to providing an efficient, integrated photogrammetric platform for geospatial content producers such as commercial mapping firms, national mapping agencies, and other production mapping customers. Such organizations rely on

ImageStation's automation features and optimized tools for manual processing to quickly transform large volumes of incoming data into exploitable spatial information to drive smarter decisions.

# Project and Data Management

## ImageStation Photogrammetric Manager (ISPM)

ImageStation Photogrammetric Manager provides the project creation and management tools required for a photogrammetric production workflow. ISPM provides the interface between supported third-party triangulation packages and ImageStation products to support triangulation/orientation, 3D feature and DTM collection, and orthophoto workflows. Key features and capabilities include:

- Entry/edit menus and wizards to guide users through creating projects, cameras, photos, strips, and blocks
- Tools for importing ADS, satellite, and UAV data
- Bulk input/output of photogrammetric data
- Standard set of data reports
- Automatic interior orientation
- Relative orientation
- Absolute orientation
- Single-photo resection
- Archive/restore of projects
- Includes 4 processing licenses for local or distributed processing of ImageStation Image Formatter (ISIF)

Part Number: SFT00300 (NL), SFT11300 (CC)

Prerequisites: None

## ImageStation Image Formatter (ISIF)

ImageStation Image Formatter provides a tool for efficiently reformatting images for use within the ImageStation environment. The images can be reformatted on the user's local system, or the processes can be distributed to other systems on the network using the HTCondor distributed processing system. Key features and capabilities include:

- Efficiently reformat large numbers of images, generate overviews on the fly, and apply lookup tables (LUTs) through batching and distributed processing using HTCondor for Hexagon Geospatial
- Native 64-bit application for increased memory capacity and performance
- Multi-threaded to take advantage of systems that have multiple cores/CPUs to further enhance processing speeds
- Faster than the Many/Raw File Converter that is delivered with ImageStation Raster Utilities (ISRU) because it uses a different processing engine that generates the overviews while it reformats them, thus eliminating an extra read of the image file data

- Bundles of 4 processing licenses for local or distributed processing are included with ImageStation Photogrammetric Manager (ISPM), ImageStation OrthoPro (ISOP),and ImageStation PixelQue (ISPQ)

Part Number: n/a, licenses included with ISPM, ISOP, and ISPQ

Prerequisites: None

## HTCondor for Hexagon Geospatial

HTCondor is a free, open-source distributed processing engine and a product of the HTCondor Research Project at the University of Wisconsin-Madison (UW-Madison). HTCondor's unique mechanisms effectively harness wasted CPU power from otherwise idle desktop workstations and dedicated processing nodes. It is ideally suited for the High Throughput Computing (HTC) that ImageStation and ERDAS IMAGINE require. HTCondor for Hexagon Geospatial provides simplified installation and configuration of HTCondor. Key features and capabilities include:

- Maximize ImageStation Automatic Elevations (ISAE), ImageStation Automatic Elevations DSM (ISAD), and ImageStation Image Formatter (ISIF) throughput with HTCondor for Hexagon Geospatial
- Intelligently distribute jobs across multiple machines, ensuring jobs get submitted to machines that have the appropriate software
- Optimize large projects that require advanced and efficient process distribution with a job management utility

Part Number: n/a, included in ImageStation delivery

Prerequisites: None

# Orientations and Triangulation
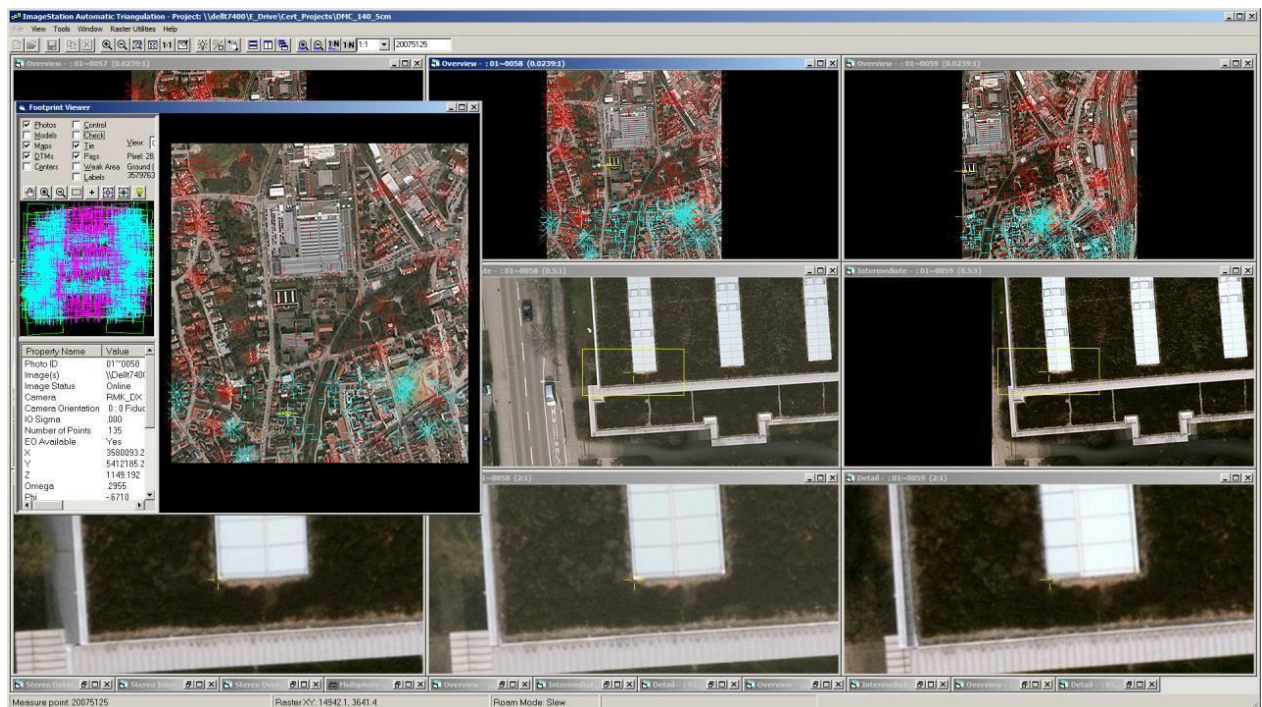
# ImageStation Automatic Triangulation (ISAT)

ImageStation Automatic Triangulation performs fully automated aerial triangulation – from interior orientation to the determination of tie points to the final block adjustment analysis with delivery of orientation parameters. It lets you graphically select footprints of photos/models/blocks, have unlimited project size, perform GNSS/INS data processing, camera calibration, automatic parameter selection and analysis for self-calibration, graphical vector analysis, and more. ISAT also contains tools that let you ingest and perform triangulation with satellite imagery that contain metadata in the form of Rational Polynomial Coefficient (RPC) or Generic Orbital Pushbroom (GOP) files. Also supports ingestion of Replacement Sensor Model (RSM) metadata. Purchase of the ImageStation Satellite Triangulation (ISST) product is not needed for these types of data. Key features and capabilities include:

- Semi-automatic and automatic tie/pass point generation from digital aerial images

- High degree of automation using hierarchical image data structures and image processing

- Simultaneous bundle adjustment computes exterior orientation parameters and ground point coordinates of matched tie/pass points

- 64-bit bundle adjustment used in matching process and also available outside the ISAT environment allows for unlimited block size and increased performance

- Includes manual point transfer and measurement in stereo or non-stereo mode

- Image point coordinates generated by ISAT can be used for aero triangulation or can be formatted for input into supported third-party triangulation packages

- Automatic tie/pass point matching of satellite RPC and GOP projects

- Includes bundle adjustment of satellite RPCs and GOP metadata based on control and pass points

- Supports the following sensors with RPC, RSM, and GOP metadata:

  - RPC: ALOS PRISM JAXA CEOS (VOL-ALPSM*)

  - RPC: CARTOSAT (*.tif) with external (decrypted) *_rpc.txt file

  - RPC: DEIMOS-2, DMC-3 NRGB (or PAN) TIFF (*.tif) with external RPC file (*_rpc.txt)

  - RPC: DigitalGlobe (GeoEye, QuickBird, WorldView) (*.TIL with *.RPB)

  - RPC: DPPDB (*[LF|RF].ntf) with IMRFCA embedded tag

  - RPC: DubaiSat-2 (D2_*.tif) with external *_rpc.txt file

  - RPC: Göktürk-2 with external RPC.txt file

  - RPC: IKONOS/GeoEye (*.ntf) or *.tif, *.jp2) with (*_rpc.txt); also works for UrtheCast sensor data

  - RPC: KazEOSat-1,2 DIMAP (*.dim)

  - RPC: KOMPSAT-2, KOMPSAT-3 (MSC_*.tif, K3_*.tif)

  - RPC: PeruSat-1 DIMAP (DIM_*.XML) with external RPC_*.XML file

  - RPC: Pleiades DIMAP v2 (DIM_PHR*.XML)

  - RPC: RapidEye (*_metadata.xml) with external *_rpc.xml file

  - RPC: SPOT 6,7 DIMAP (DIM_*.XML) with external RPC_*XML file

  - RPC: Standalone BGRN (or PAN) TIFF (*.tif) with external RPC file (*_rpc.txt, *.rpc); also works for Deimos-1, SkySat, PlanetScope (Dove satellite), ZY-3, TH01, and TeLEOS sensor data

  - RPC: Standalone NITF (*.ntf) with RPC00B embedded tag; also works for OrbView sensor data

  - RSM: Standalone NITF (*.ntf) with RSMPCA, RSMIDA embedded tags

  - GOP: ALOS AVNIR-2 JAXA CEOS (VOL-ALAV2*)

  - GOP: ALOS PRISM JAXA CEOS (VOL-ALPSM*)

  - GOP: EROS (*.1A.16bit.tif) and (*.1A) with *.pass and *.tqr files

- GOP: FORMOSAT-1,2 DIMAP (*.dim)
- GOP: Göktürk-1, GKT DIMAP (PM_*.XML)
- GOP: KazEOSat-1 DIMAP (*.dim)
- GOP: OrbView (*.tif) with *.eph, *.att, *.pvl files
- GOP: Pleiades DIMAP v2 (DIM_PHR*.XML)
- GOP: SPOT 5 DIMAP (*.dim)
- GOP: SPOT 6,7 DIMAP v2 (DIM_*.XML)
- GOP: THEOS-1 DIMAP (*.dim)
- GOP: VNREDSat-1 DIMAP (*.dim

Part Number: SFT00738 (NL), SFT11738 (CC)

Prerequisite: ISPM

## ImageStation Satellite Triangulation (ISST)

ImageStation Satellite Triangulation is integrated with ISAT, which provides a powerful multi-image point transfer and measurement environment. Ephemeris data and sophisticated orbital models are used to perform simultaneous bundle adjustment of images from select satellite sensors. Multiple sensor models for triangulation include:

- IRS-C and IRS-D
- Landsat 4, 5, and 7
- OrbView 3 and 4
- QuickBird
- SPOT 1-5
- WorldView 1-3
- GeoEye 1

Note: RPC-based satellite adjustment capability is included in ISAT.

Part Number: SFT00328 (NL), SFT11328 (CC)

Prerequisites: ISPM, ISAT

# Feature Collection

## ImageStation Feature Collection (ISFC)

ImageStation Feature Collection provides a low-cost, easy-to-use yet powerful application for collecting map feature data. Its tools let you interactively collect map feature geometry (2D and 3D) and attributes in a MicroStation® graphics environment. Key features and capabilities include:

- Interactively collect and edit map feature geometry (2D and 3D) and attributes in stereo or mono

- Completely integrated with the ImageStation Stereo Display (ISSD) system, allowing digitization of 3D map features from a photogrammetric stereo model

- Feature Table Editor lets you customize and control characteristics of map features — tailor each project to meet your specific needs by creating maps customized to your individual requirements

- Ensures that maps meet specific standards, even when they are created by multiple operators

Part Number: SFT00306 (NL), SFT11306 (CC)

Prerequisite: MicroStation V8i, Power InRoads V8i, or Power GEOPAK V8i (2020 release); or MicroStation CONNECT Edition or OpenRoads Designer CONNECT Edition (2020 Update 1 or later release)

Recommended for stereo display: ImageStation Stereo Display (ISSD)
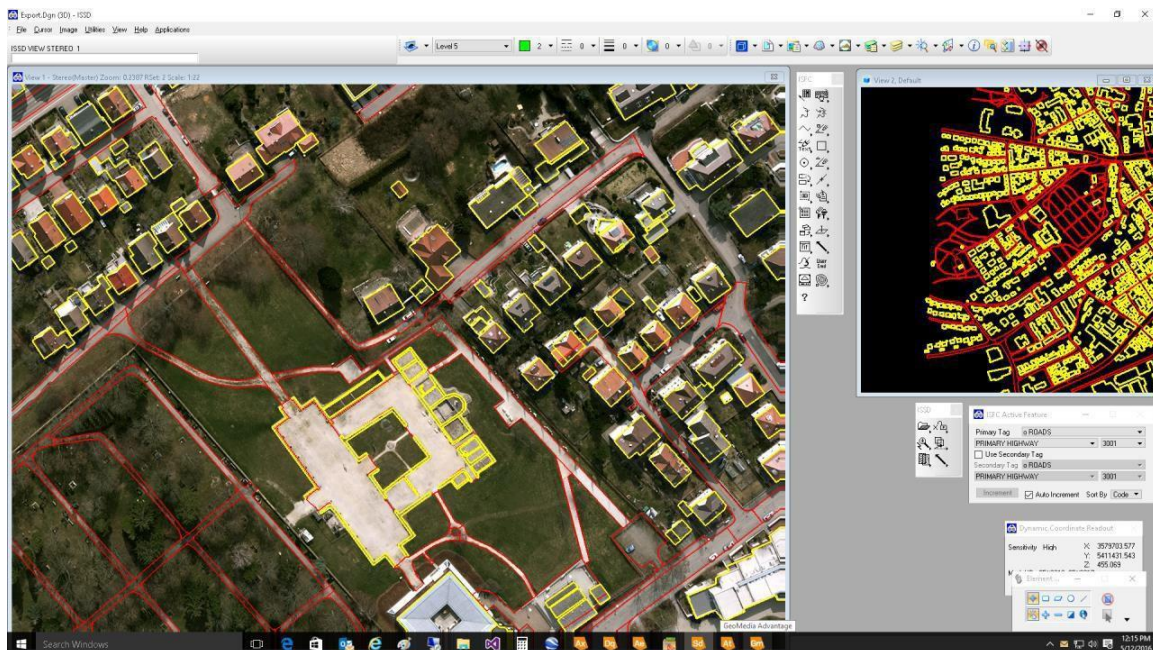


## ImageStation Stereo Display (ISSD)

ImageStation Stereo Display provides display and manipulation of aerial frame, ADS, and satellite stereo imagery with photogrammetrically accurate 3D cursor tracking, stereo vector superimposition, stereo roam, and image contrast and brightness adjustments within the MicroStation graphics environment. Key features and capabilities include:

- Photogrammetrically accurate 3D cursor tracking

- Smooth stereo roam and dynamic zoom within a MicroStation view

- Stereo vector superimposition

- On-the-fly image enhancement – gamma, contrast, brightness, sharpen, continuous auto stretch

- Includes one ImageStation Feature Collection (ISFC) license; maintenance for ISSD includes ISFC maintenance

Part Number: SBND00304 (NL), SBND11304 (CC)

Prerequisite: MicroStation V8i, Power InRoads V8i, or Power GEOPAK V8i (2020 release); or MicroStation CONNECT Edition or OpenRoads Designer CONNECT Edition (2020 Update 1 or later release)
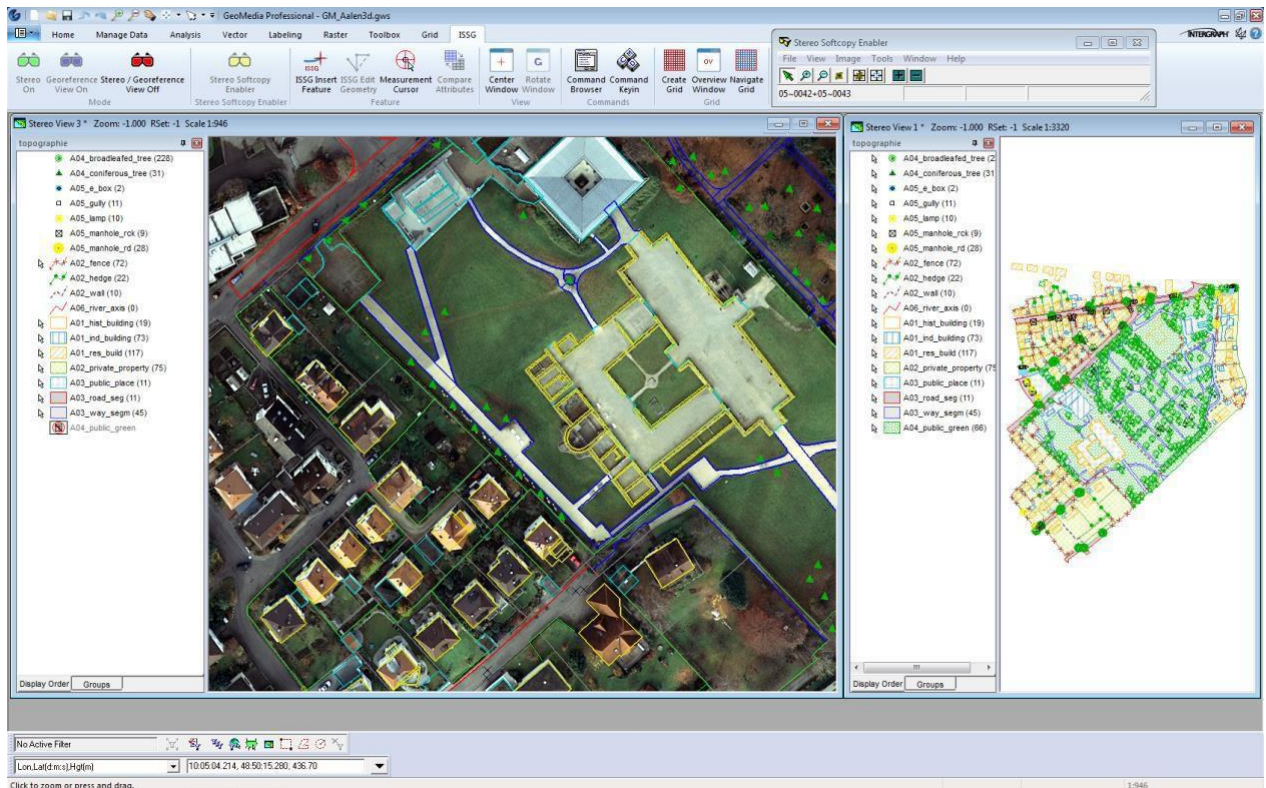


## ImageStation Stereo for GeoMedia (ISSG)

ImageStation Stereo for GeoMedia enhances the feature collection capabilities of GeoMedia by providing a stereo map window for the display of imagery and 3D feature data. Using ISSG within a photogrammetric workflow involves digitizing, editing, and displaying vector graphics to produce or update a map from aerial frame, ADS, or satellite stereo models. Key features and capabilities include:

- Collect and edit feature geometry and attributes in 2D and 3D using either mono or stereo source imagery

- Directly connect without import or conversion to multiple common database formats such as Oracle®, Microsoft® SQL Server®, PostGIS, OGC® GeoPackage, Esri® File Geodatabase, etc., through GeoMedia data server technology

- Smooth stereo roam and dynamic zoom within a GeoMedia map window

- On-the-fly image enhancement – gamma, contrast, brightness, sharpen, continuous auto stretch

- Z extraction from mono source data via an underlying surface model

- Tools for editing DTM points in 3D created by ImageStation Automatic Elevations (ISAE) and imported by ImageStation DTM for GeoMedia (ISDG)
- Tools for operator-assisted manual DTM point collection

Part Number: SFT00329 (NL), SFT11329 (CC)

Prerequisite: GeoMedia Advantage or GeoMedia Professional

## ImageStation Stereo Viewer GeoMedia (ISSV)

ImageStation Stereo Viewer for GeoMedia provides a subset of the full capabilities of ImageStation Stereo for GeoMedia (ISSG) for viewing stereo imagery and vectors in the GeoMedia environment without feature collection or editing. Key features and capabilities include:

- Smooth stereo roam and dynamic zoom within a separate (non-map) window
- On-the-fly image enhancement – gamma, contrast, brightness, sharpen, continuous auto stretch
- 3D linear and area measurements

Part Number: SFT11325 (CC)

Prerequisite: GeoMedia Essentials, GeoMedia Advantage, or GeoMedia Professional

# Digital Terrain Model Generation

## ImageStation DTM Collection (ISDC)

ImageStation DTM Collection provides an interactive method for collecting and editing terrain data in stereo models in a MicroStation environment. Key features and capabilities include:

- Collect digital terrain model (DTM) data, elevation points, breaklines, and other geomorphologic features
- Edit existing DTM data
- Real-time dynamic editing allows you to immediately see the effect the edits have on the contours or TIN surface
- Display and edit DTM points that have been automatically generated by the ImageStation Automatic Elevations (ISAE) product

Part Number: SFT00307 (NL), SFT11307 (CC)

Prerequisite: MicroStation V8i, Power InRoads V8i, or Power GEOPAK V8i (2020 release); or MicroStation CONNECT Edition or OpenRoads Designer CONNECT Edition (2020 Update 1 or later release)

Recommended for stereo display and editing: ImageStation Stereo Display (ISSD) and ImageStation Feature Collection (ISFC)
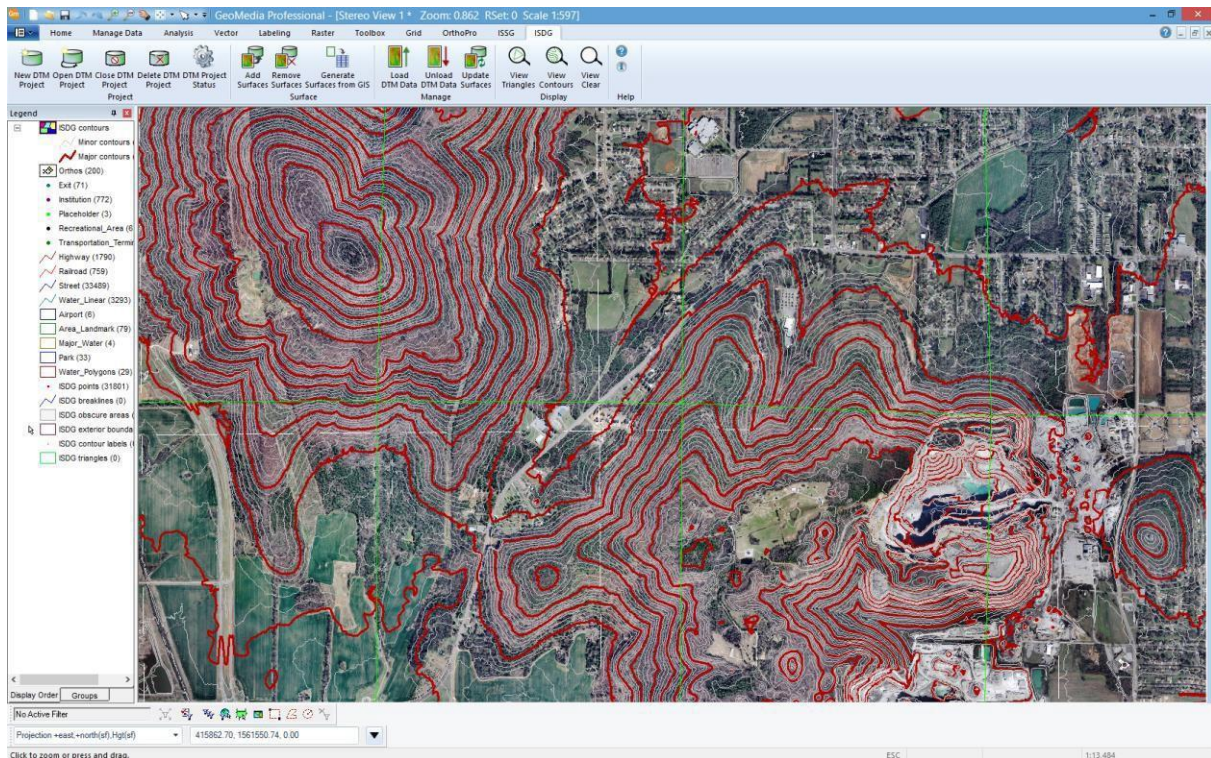
## ImageStation DTM for GeoMedia (ISDG)

ImageStation DTM for GeoMedia provides a set of tools for working in the GeoMedia environment and with ImageStation Stereo for GeoMedia (ISSG) to collect and edit terrain data to generate surface files for photogrammetric, mapping, and engineering workflows. Key features and capabilities include:

- Project management tools to create, open, close, and delete DTM projects consisting of a set of surface files over an area

- Generate new surface files from boundary features such as project area or stereo model boundaries created in GeoMedia or ISSG

- Add geomorphic data from GIS features to new surface files

- Add and remove surface files from the DTM project

- Load and unload DTM data from surface files in the DTM project into the GeoMedia environment for review and editing in stereo using ISSG

- Option when updating surface files to triangulate or not triangulate as needed

- Create surfaces for true ortho for use by ImageStation OrthoPro (ISOP)

- View triangles and contours from surface files in the GeoMedia environment and in stereo using ISSG

- Calculate the cut and/or fill volumes between two surfaces (or between multiple pairs of surfaces) by projecting the triangles from the compare surface onto the base surface

- Drape existing 2D and 3D features onto surfaces to create new features with updated Z values

Part Number: SFT11528 (CC)

Prerequisite: GeoMedia Essentials, GeoMedia Advantage, or GeoMedia Professional

Recommended for stereo display and editing: GeoMedia Advantage or GeoMedia Professional, and ImageStation Stereo for GeoMedia (ISSG)

# ImageStation Automatic Elevations (ISAE)

ImageStation Automatic Elevations automatically extracts digital terrain model (DTM) elevation points from stereo imagery using a feature-based matching approach. Key features and capabilities include:

- Automatically generate digital terrain models (DTMs) from aerial frame, ADS, or satellite stereo imagery using a feature-based matching algorithm
- Highly automated through the use of hierarchical image data structures and image processing methods
- Eliminate preprocessing through epipolar resampling the stereo imagery on the fly
- Outputs ImageStation DTM, Que, Raw, and MicroStation DGN files
- Multi-threaded and distributed processing using HTCondor for Hexagon Geospatial for improved performance
- View and modify the generated data with ImageStation DTM Collection (ISDC) or ImageStation DTM for GeoMedia (ISDG), or use it directly in other ImageStation products, such as ImageStation OrthoPro (ISOP) for producing orthophotos
- Delivers 1 user interface license and 4 processing licenses for local or distributed processing

Part Number: SFT11308 (CC)

Prerequisite: If writing data to DGN format, then MicroStation is required and must be installed first

Recommended for stereo display and editing:

- MicroStation V8i, Power InRoads V8i, or Power GEOPAK V8i (2020 release); or MicroStation CONNECT Edition or OpenRoads Designer CONNECT Edition (2020 Update 1 or later release)
- ImageStation Stereo Display (ISSD), ImageStation Feature Collection (ISFC), and ImageStation DTM Collection (ISDC)

  -or-

- GeoMedia Advantage or GeoMedia Professional
- ImageStation Stereo for GeoMedia (ISSG) and ImageStation DTM for GeoMedia (ISDG)

## ImageStation Automatic Elevations DSM (ISAD)

ImageStation Automatic Elevations DSM is a superset of ImageStation Automatic Elevations (ISAE). In addition to the feature-based matching approach to create digital terrain models from stereo aerial frame, ADS, and satellite images found in ISAE, ISAD adds dense matching to create digital surface models from stereo aerial frame and satellite images using the Semi-Global Matching (SGM) methodology. Key features and capabilities of the feature-based matching component are the same as ISAE above. Key features and capabilities of the SGM component include:

- Automatically generate digital surface models (DSMs) from aerial frame and satellite stereo imagery using the SGM methodology
- Outputs full- or reduced-resolution point cloud files in LAS/LAZ format
- Option to create rasterized versions of the point clouds with a "true ortho" perspective that eliminates building lean and straightens bridges
- Native 64-bit application for increased memory capacity and performance
- Multi-threaded and distributed processing using HTCondor for Hexagon Geospatial for improved performance
- Delivers 1 user interface license and 4 processing licenses for local or distributed processing of feature-based matching
- Delivers 1 user interface license and 8 processing licenses for local or distributed processing of Semi-Global Matching

Part Number: SFT11317 (CC)

Prerequisite: If writing feature-based matching data to DGN format, then MicroStation is required and must be installed first.

Recommended for stereo display and editing:

MicroStation V8i, Power InRoads V8i, or Power GEOPAK V8i (2020 release); or MicroStation CONNECT Edition or OpenRoads Designer CONNECT Edition (2020 Update 1 or later release)

- ImageStation Stereo Display (ISSD), ImageStation Feature Collection (ISFC), and ImageStation DTM Collection (ISDC)

  -or-

- GeoMedia Advantage or GeoMedia Professional
- ImageStation Stereo for GeoMedia (ISSG) and ImageStation DTM for GeoMedia (ISDG)

## ImageStation DTMQue (ISDQ)

ImageStation DTMQue is a set of command line tools for DTM batch processing. Key features and capabilities include:

- Native 64-bit application for increased memory capacity and performance
- Assemble command line workflows
- Use graphical editor for creating and running different workflows
- Convert data from several elevation formats into ImageStation DTM format
- Convert LAS or LAZ format to Hexagon Point Cloud (HPC) format
- Perform coordinate transformations, tiling, merging, and triangulation
- Powerful workflow editor, simple 3D viewer, and DTM QA/QC tools for assessing the accuracy of the elevation data
- Supports parallel processing within workflows for increased throughput[1]
- Includes a simplified command panel interface for running a number of predefined workflows

Part Number: SFT11340 (CC)

Prerequisites: None

---

[1] Requires an ISDQ license for each parallel task within the workflow

# Orthophoto Generation



## ImageStation OrthoPro (ISOP)

ImageStation OrthoPro is a high-throughput ortho production system that includes ortho project planning, orthorectification, tone balancing, mosaicking, true ortho capability[2], automatic seamline generation, and quality assessment of aerial frame, ADS, and satellite imagery. Key features and capabilities include:

- Automatically input data from different projections and datums and integrate them into one mapping project

- Output TIFF, BigTIFF, JPEG 2000, ECW, and USGS DOQ image formats

- Dodging, dehaze, and Automatic Dynamic Range Adjustment (ADRA) algorithms work automatically by computing a calibration parameter from the overviews and applying it to the full resolution image

- Multi-threaded and parallel 64-bit rectification, including on-the-fly enhancements, and mosaicking leverage modern multi-core, high-memory machines to provide significant performance improvements

- Delivers 1 user interface license and 16 processing licenses for local parallel processing (additional processing licenses available in bundles of 4 [ISOPDP – SFT11319] )

- Includes 4 processing licenses for local or distributed processing of ImageStation Image Formatter (ISIF)

- Includes 1 ImageStation Photogrammetric Manager (ISPM) and 1 ImageStation PixelQue (ISPQ) license (maintenance for ISOP includes ISPM and ISPQ maintenance)

Part Number: SFT11314 (CC)

Prerequisite: GeoMedia Essentials, GeoMedia Advantage, or GeoMedia Professional

---

[2] Supports aerial frame imagery
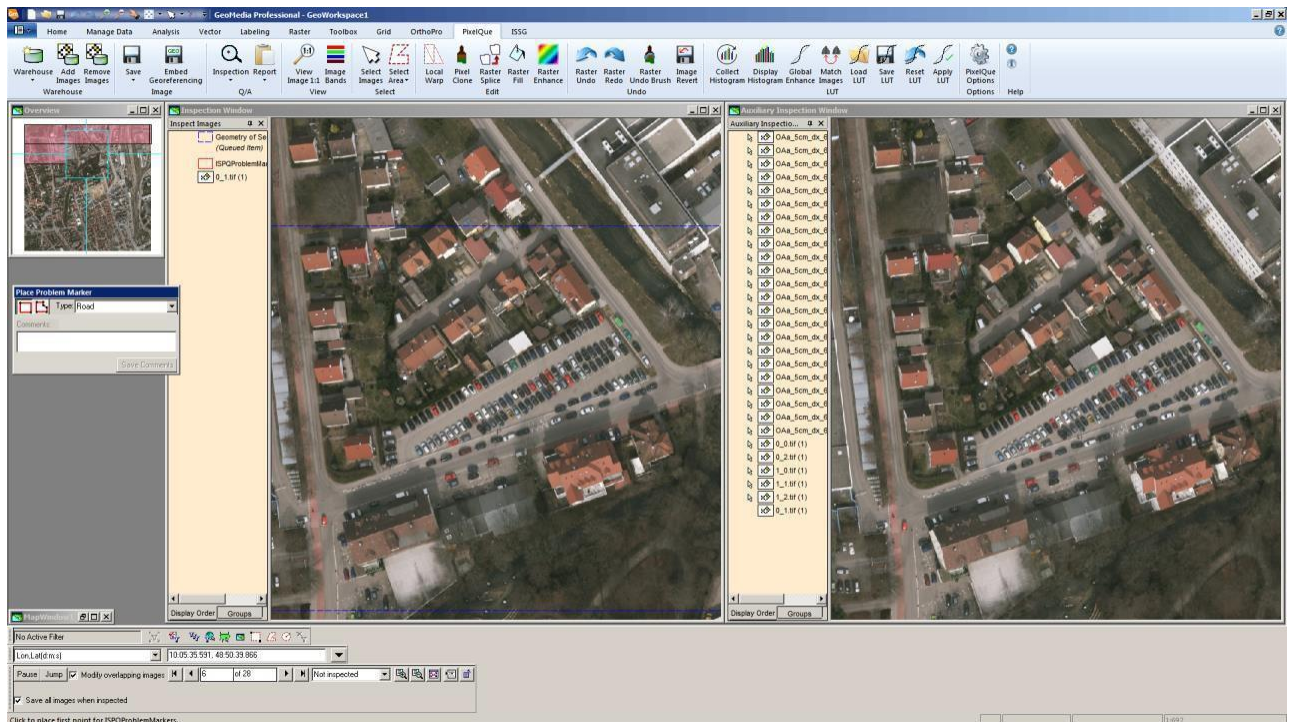
# ImageStation PixelQue (ISPQ)

ImageStation PixelQue is designed to provide tools for checking and enhancing the quality of orthophotos and mosaics. It allows users to systematically review and mark up errors, fix errors, and complete image enhancements on an individual or project-wide basis. ISPQ is part of an orthophoto production solution that includes ImageStation OrthoPro (ISOP). ISPQ and ISOP were created to address the needs of producers of large volumes of orthophotos. Together they meet user requirements to increase the throughput and efficiency of orthophoto production through a high degree of automation and efficient, semi-automatic Quality Assurance/Quality Control (QA/QC) review and editing, thus reducing the time and costs associated with a project. Key features and capabilities include:

- Structured review and editing capability to QA/QC images, orthophotos, or mosaics
- Find and correct problems created in the production process
- General image cleanup and enhancement tools, including look-up table definition
- Burn vector data such as text, contours, and features into images
- Includes 4 processing licenses for local or distributed processing of ImageStation Image Formatter (ISIF)

Part Number: SFT11336 (CC)

Prerequisite: GeoMedia Essentials, GeoMedia Advantage, or GeoMedia Professional

# Contact Us

🌐      https://go.hexagongeospatial.com/contact-us-today

# About Hexagon

Hexagon is a global leader in sensor, software and autonomous solutions. We are putting data to work to boost efficiency, productivity, and quality across industrial, manufacturing, infrastructure, safety, and mobility applications.

Our technologies are shaping urban and production ecosystems to become increasingly connected and autonomous — ensuring a scalable, sustainable future.

Hexagon's Geospatial division creates solutions that deliver a 5D smart digital reality with insight into what was, what is, what could be, what should be, and ultimately, what will be.

Hexagon (Nasdaq Stockholm: HEXA B) has approximately 21,000 employees in 50 countries and net sales of approximately 4.4bn USD. Learn more at hexagon.com and follow us @HexagonAB.