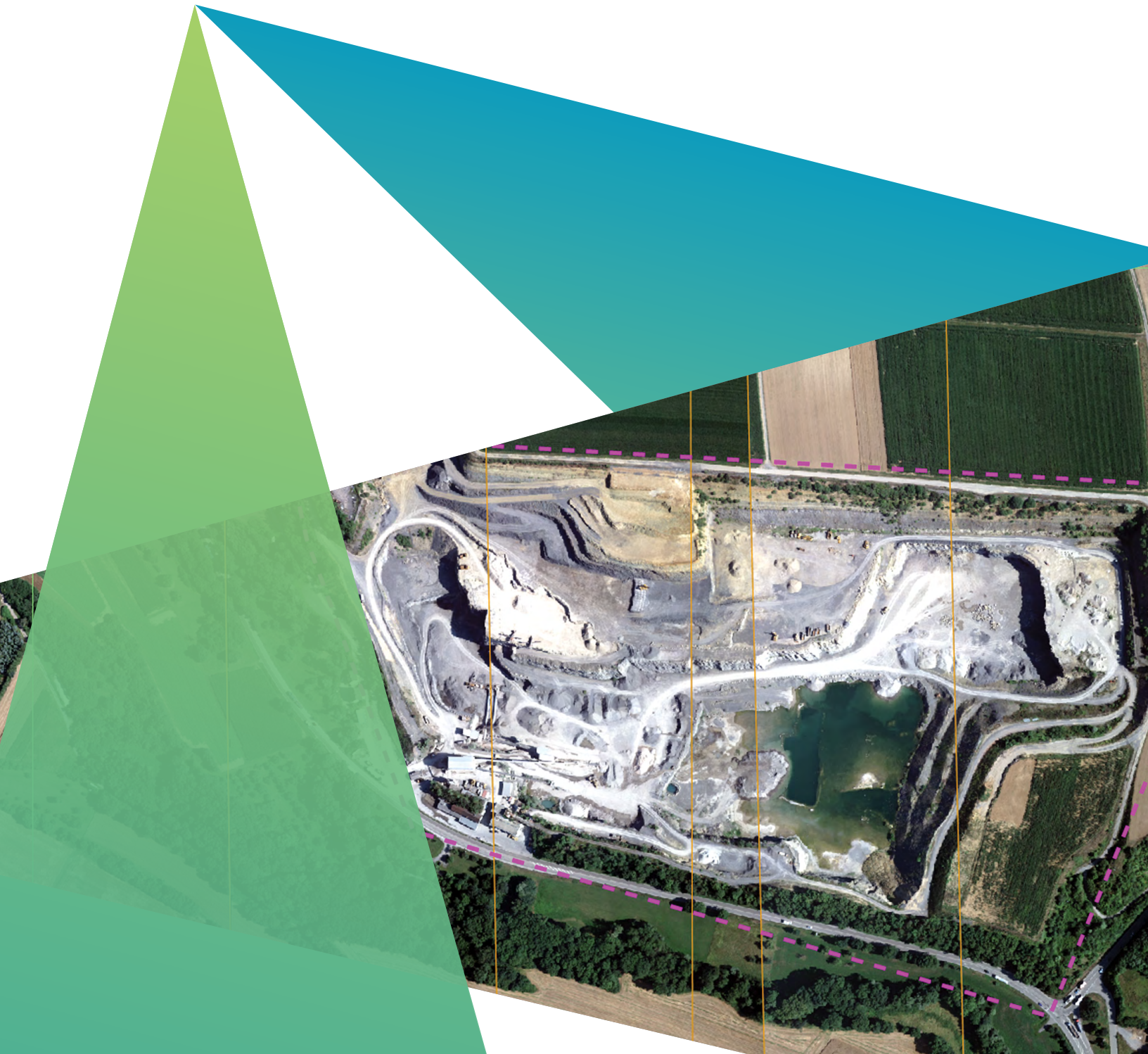


# IMAGINE Photogrammetry

Complete suite of photogrammetric production tools

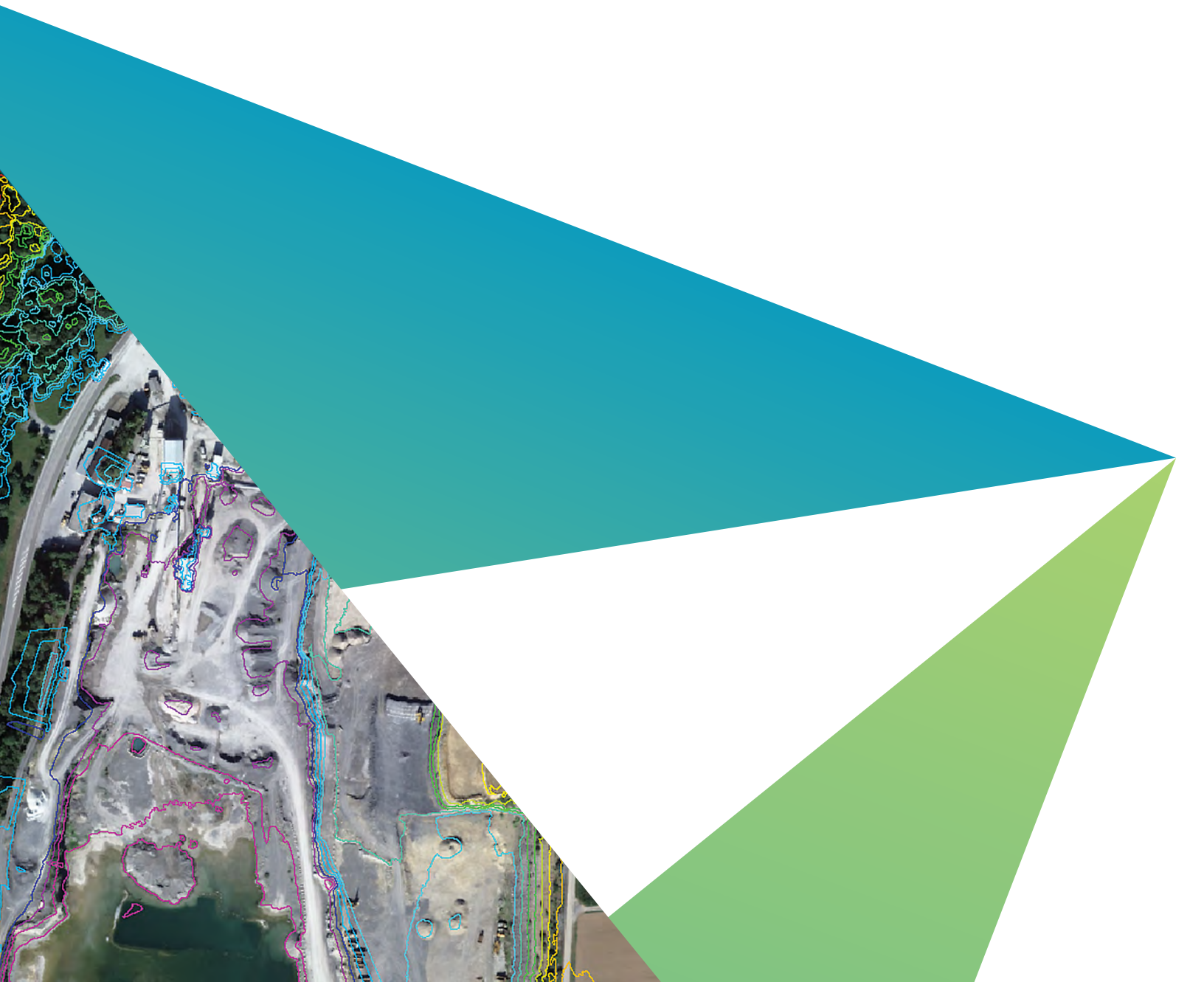


## State-of-the-art photogrammetric production tools

How do you consolidate multiple photogrammetry projects into a single, fast and manageable workflow? Is it possible to reach new levels of production throughput without compromising the detail and accuracy your customers expect or the functionality to which you have grown accustomed? How do you handle photogrammetric projects with a variety of different data types and formats?

Today, photogrammetry and production mapping experts are under pressure to produce more in less time, while maintaining a rigorous degree of accuracy. Hexagon understands this challenge, and builds the tools to help you accomplish your goals on time, in scope and to the preferred accuracy.

IMAGINE Photogrammetry, a seamlessly integrated collection of software tools, enables you to transform raw imagery into reliable data layers required for all digital mapping, raster processing, GIS raster analysis and 3D visualization needs.



A fully functional photogrammetry system packaged in a user-friendly environment, IMAGINE Photogrammetry provides results for everyone, from photogrammetry novices to advanced users. State-of-the-art photogrammetry technology, such as full analytical triangulation, digital terrain model generation, orthophoto production, producing orthomosaics and extracting 3D features, is included in the easy-to-use environment. By automating precision measurement and including flexible operations such as terrain editing and feature extraction, IMAGINE Photogrammetry increases productivity while ensuring high accuracy. IMAGINE Photogrammetry is the most flexible photogrammetry solution on the market, handling a variety of workflows, including:

- Triangulation and orthomosaic production
- Broad area mapping
- Transportation planning
- Engineering and facilities mapping
- Defense applications
- Close-range applications

Tight integration with ERDAS IMAGINE means this is the ideal photogrammetric package for projects involving varied types of data and further processing and analysis of airborne and satellite imagery. The added power of IMAGINE Advantage is included with every IMAGINE Photogrammetry license, enabling you to go beyond the standard photogrammetric outputs and deliver value-added products to your customers.

## **Increase your productivity**

IMAGINE Photogrammetry maximizes efficiency without compromising quality and accuracy. Designed specifically for ease of use, it frees users from the steep learning curve often associated with photogrammetric software.

The clean, intuitive interface makes it easy to learn and easy to use. The workflow-driven toolbar guides the process, giving you everything you need to execute a photogrammetric project from beginning to end. Data interoperability is never an issue with the extensive variety of input and output formats that are dynamically supported, including data from other leading photogrammetric software.

IMAGINE Photogrammetry helps you save time in other ways, too. A process-driven workflow that efficiently transforms imagery into reliable geospatial content is the key to increased productivity. From classic frame photography, large-format digital and pushbroom sensors to practically any satellite sensor, IMAGINE Photogrammetry supports numerous workflows.

## **Triangulation**

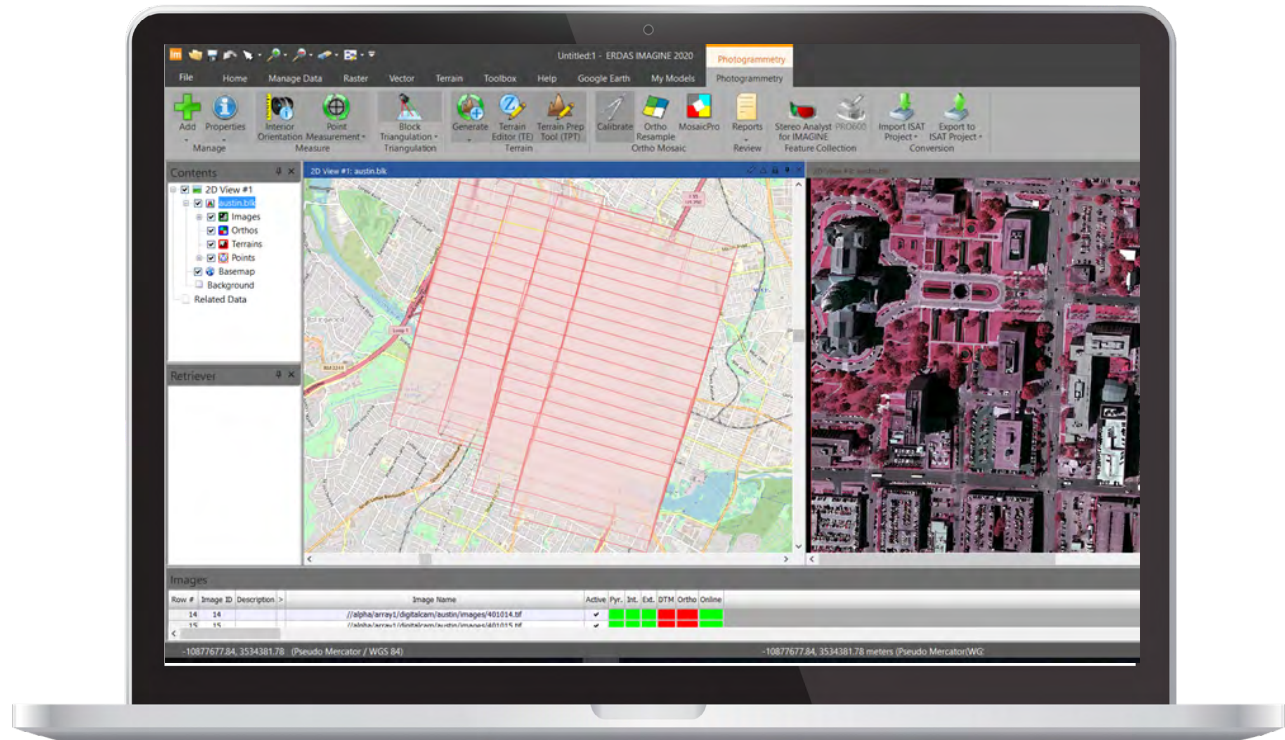
Tie imagery together and to ground reference points. Once images have been triangulated, additional data processing such as terrain extraction, terrain editing, orthorectification and feature collection can be performed.

## **Automatic, classic point and stereo point measurement**

Measure ground points using a variety of methods. Automatically determine the corresponding image positions of ground points appearing on multiple overlapping images, measure ground and image points in monoscopic single or pair-wise view modes and measure ground and image points in single-image and multi-image monoscopic and stereo modes, supplemented by automatic point correlation.

## **Orthorectification**

Orthophotos are the ideal reference image backdrop necessary for the creation and maintenance of geographic information contained within a GIS database. IMAGINE Photogrammetry creates orthophotos by minimizing the distortion inherent in imagery caused by sensor orientation, topographic relief displacement and systematic errors associated with imagery, resulting in planimetrically correct images representing ground objects in their true, real-world X and Y positions.



The IMAGINE Photogrammetry workspace includes easy-to-use project and layers panels and linked viewers as part of its integration with ERDAS IMAGINE.

## Project setup and management

Set up and manage photogrammetric projects with ease, including input and output of ground control, GPS data, triangulation data, imagery, vector data, scanned paper maps and terrain files in a variety of popular formats. Comprehensive image viewing features such as drag and drop capabilities, reprojecting on-the-fly, opening multiple views and linking them and applying image enhancements are provided. Calibrated cameras and lenses can be defined and saved, as well as interior orientation parameters.

Integrating IMAGINE Photogrammetry with the capabilities of ERDAS IMAGINE enables multiple workflows, including:

- Color balancing, mosaic and compression
- Landcover mapping and terrain categorization
- Map composition, printing and report generation
- Data conversion
- Feature capture and update
- Image processing and unsupervised classification

## Streamlined and accurate

We know how important accuracy is in the photogrammetry industry. Because of this, IMAGINE Photogrammetry uses state-of-the-art photogrammetric and image processing technology to fine-tune your data and report results.

IMAGINE Photogrammetry includes the ability to edit terrain and collect points in stereo, which saves time and increases accuracy. With the ability to have multiple stereo views open in a variety of viewing options — stereo, split panel, mono and tri-view (stereo and split-screen) — and the ability to operate in either fixed-cursor or fixed-image mode, IMAGINE Photogrammetry is flexible enough to let you be your most productive.

IMAGINE Photogrammetry is loaded with time-saving features like the ability to drag-and-drop images into the stereo views. Read a terrain model or use image matching to automatically place the cursor at the correct Z location, speeding up the collection process. Fast graphics rendering with on-the-fly resampling for subpixel cursor positioning and measurement means you can work quickly and accurately.

## Expand capabilities with add-on modules

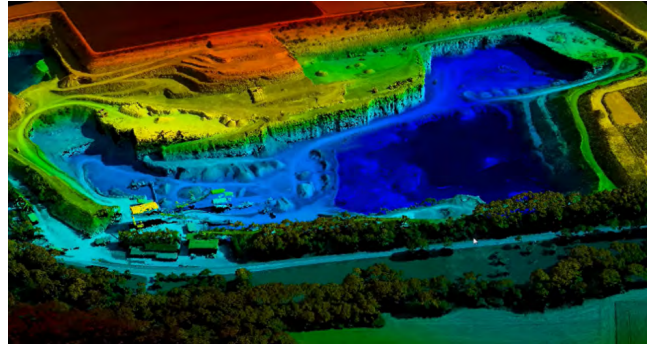
Hexagon offers an array of add-ons that expand the core functionality of IMAGINE Photogrammetry, making your photogrammetry investment more versatile and productive.

### IMAGINE DSM Extractor

The IMAGINE DSM Extractor add-on module comes with two different automated terrain extraction engines with varying levels of accuracy, resolution and speed. These are Sparse Matching and Semi-Global Matching.

Automatic Terrain Extraction (ATE), which is the sparse matching option, allows you to automatically extract terrain from projects made up of aerial frame, Leica ADS, digital, video and non-metric cameras, as well as satellite sensors with stereo capability (Pleiades, SPOT, QuickBird, WorldView, GeoEye and more). Customizable terrain extraction strategy parameters allow you to match the strategy to the terrain you are creating, maximizing the accuracy of your digital surface model (DSM). Embedded quality assurance, quality control and accuracy reporting tools enable you to quickly and easily assess the DSM for fine-tuning the parameters or pinpoint locations for terrain editing later. Terrains can be created in a wide variety of formats, including ERDAS raster formats, LTFs, 3D shapefiles or ASCII files.

IMAGINE DSM Extractor creates very dense Red-Green-Blue (RGB) or False-Color-Infrared (FCIR) encoded point cloud outputs using Semi-Global Matching (SGM). SGM is an algorithm that uses pixelwise, mutual information (MI)-based matching cost and a smoothness constraint to generate dense disparity maps, from which surface models are generated. It supports all sensor and raster formats supported by IMAGINE Photogrammetry. Using this SGM algorithm not only creates an accurate dense point cloud with high-definition hard edges on rooftops, but it also RGB encodes or FCIR encodes the point cloud output, combining for an image-like quality dataset. The method features a straight-forward, user-friendly interface to facilitate image pair selection, specify processing parameters and define your output options.



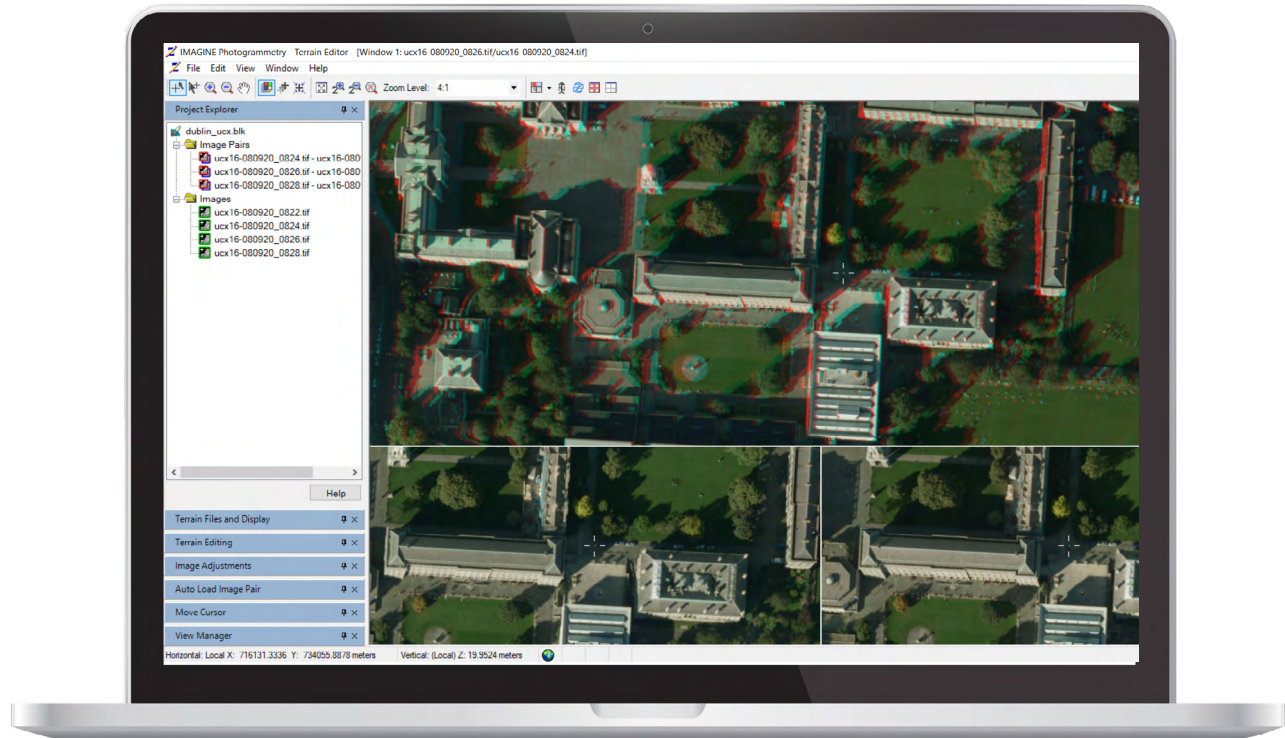
Extract 3D point clouds with IMAGINE DSM Extractor.



Produce accurate data using triangulation.

### Batching and distributed processing

Increase throughput efficiency by running in multicore processing mode on a single computer system using ERDAS IMAGINE's batch tool or by distributed processing across a network of computer systems using HTCondor.



IMAGINE Terrain Editor provides powerful tools for stereo visualization and editing of terrain models.

## Photogrammetry automation with Spatial Modeler

Spatial Modeler is a dynamic, graphical, spatial data modeling environment that provides real-time feedback and previews. The modern interface includes extended analysis operators as well as support for Python scripting.

Spatial Modeler includes a suite of photogrammetry operators that perform project setup, automatic point measurement, triangulation and mosaicing for scanned frame/digital frame cameras, RPC models as well as satellite sensors.

Spatial Modeler lets users define their own photogrammetric workflows, as well as enables users to add support for new sensors using Python scripting.

## IMAGINE Terrain Editor

Once you have extracted the terrain, make editing the output fast, easy and accurate using IMAGINE Terrain Editor. Displaying the terrain graphics as dynamic contours, TINs, breaklines and points superimposed on stereo imagery provides an excellent baseline for editing. Visualize the ground control points from your block file to provide even more quality control. Improve the accuracy of your terrain by importing shapefiles that define breaklines and geomorphic paths. Add, delete or modify individual terrain points, or save time by utilizing the linear and polygon selection tools to modify large numbers of points at once.

Rapidly smooth, thin, bias, flatten, fit to surface and interpolate selected areas in your data. To accelerate your editing, IMAGINE Terrain Editor also supports customizable motion devices for precise interactive cursor control and point collection.

## Stereo Analyst for ERDAS IMAGINE

Collect, interpret and visualize 3D geographic information from imagery using Stereo Analyst for ERDAS IMAGINE. It also serves as a feature capture environment when added to IMAGINE Photogrammetry. Providing support for collecting both planimetric and volumetric features with textures, in 3D, Stereo Analyst for ERDAS IMAGINE also serves as an excellent quality assurance and quality control tool for photogrammetric data.

## ORIMA

ORIMA provides sophisticated production photogrammetry software for block triangulation and analysis. Perform production-focused aerial triangulation for analog, digital frame and Leica Geosystems ADS40 and ADS80 imagery with outstanding intuitive graphical diagnostic tools, support for GPS/IMU corrections, self-calibration and boresighting.

## Interoperable photogrammetric modules

**PRO600** is a set of cartographic presentation tools to use within a Bentley MicroStation environment for large-scale digital mapping using stereo imagery, including signs, symbols, colors, line thickness, user-defined line types and forms. PRO600 also includes terrain-oriented tools for projects that require both feature and terrain data. Based on the same stereo viewing technology as the IMAGINE Photogrammetry platform, you can expect the same seamless, accurate stereo environment in PRO600.

**Stereo Analyst for ArcGIS:** Tightly integrated with ArcGIS®, Stereo Analyst for ArcGIS enables stereo collection inside your GIS environment to which you are already accustomed. IMAGINE Photogrammetry can be used to produce oriented imagery and terrain data for use in Stereo Analyst for ArcGIS. Collect features and add or update attributions, as well as update existing feature datasets with 2D to 3D feature conversion tools.

### Product and interaction

Open or create your photogrammetry project directly in ERDAS IMAGINE using IMAGINE Photogrammetry.

Enhance imagery in ERDAS IMAGINE before or after processing your images in IMAGINE Photogrammetry.

Import third-party projects into IMAGINE Photogrammetry.

Extract DSM as LAS/LAZ using IMAGINE DSM Extractor add-on module.

Perform any final edits using IMAGINE Terrain Editor in a stereo viewing environment.

Extend the capabilities of your project into a MicroStation environment using PRO600.

Orthorectified imagery created in IMAGINE Photogrammetry may be published to ERDAS APOLLO for managing and cataloging.

Raster backdrops can be streamed, using the ultra-fast ECWP streaming protocol, by ERDAS APOLLO.



Hexagon is a global leader in digital reality solutions, combining sensor, software and autonomous technologies. We are putting data to work to boost efficiency, productivity, quality and safety across industrial, manufacturing, infrastructure, public sector, and mobility applications. Our technologies are shaping production and people-related ecosystems to become increasingly connected and autonomous – ensuring a scalable, sustainable future.

Hexagon's Safety, Infrastructure & Geospatial division improves the resilience and sustainability of the world's critical services and infrastructure. Our solutions turn complex data about people, places and assets into meaningful information and capabilities for better, faster decision-making in public safety, utilities, defense, transportation and government. Learn more at [hexagon.com](https://hexagon.com) and follow us [@HexagonAB](https://twitter.com/HexagonAB).