DTMaster

INPHO SOFTWARE

Effectively visualize, edit and classify point clouds and provide ultimate quality control for your digital terrain model (DTM)/LiDAR workflow.

DTMaster is a complete visualization and editing tool for digital terrain models and point clouds. It combines state of the art LiDAR/ point cloud editing and processing tools with photogrammetric vector digitizing and stereoscopic visualizations:

▶ Easily handle efficient checking, editing and classification of huge DTM and LiDAR projects consisting of billions of points using a tiled data structure

▶ Visualize and quality control data using excellent monoscopic or stereoscopic tools

▶ Underlay DTM data with thousands of orthophotos or complete blocks of aerial stereo photographs

▶ Extended batch capabilities for fast point cloud filtering, gap filling and mapping-grade contouring

DTMaster is optimized for efficient checking, editing and classification of DTM projects. Further, DTMaster allows DTM data to be superimposed over thousands of orthophotos or complete blocks of aerial photographs. Available as a monoscopic DTM editor or stereoscopic DTM editing station. Recommended add-on to MATCH-T or SCOP++

Feature Capabilities

With 64-bit architecture and high-performance point-cloud visualization, DTMaster efficiently handles massive volumes of point-cloud data. all data is managed in an efficient multi-layer and multifile data structure. Extremely fast and compact data handling is guaranteed through binary, tiled data storage. Sophisticated tile management and navigation make the tool effective independent of data volume:

▶ Optional automatic data thin-out for visualization according to zoom level

▶ Guided editing wizards with heads-up options display

▶ Definable shortcuts for frequently used actions

▶ DTMaster provides a comprehensive set of efficient tools for quality assurance of DTM data, including data visualization, numeric plausibility checking, as well as interactive data editing and 3D measurement

▶ Use internal project-wide or brush-type classification algorithms

▶ Effectively manage display settings for very complex editing projects with hundreds of files and layers using customizable sets for display settings

▶ Correlation-based and interpolation-based follow-terrain cursor for precise automatic 3D digitizing in 3Dstereo or monoscopic ortho scenes combined with height models (monoplotting)

▶ Point-offset and stereo-parallax evaluation with support for individual operator-specific height correction value

Key Features

▶ DTMaster is extremely powerful in visualization and editing of very dense point clouds:

▶ Visual data checking

▶ Colorized point clouds from orthophotos or aerial image blocks

▶ 3D visualization of building or embankment objects

▶ Automated plausibility checks and data modifications

▶ Multi-file and multi-layer based editing and basic CAD mapping functionality (3D stereo and monoplotting)

DTMaster INPHO SOFTWARE
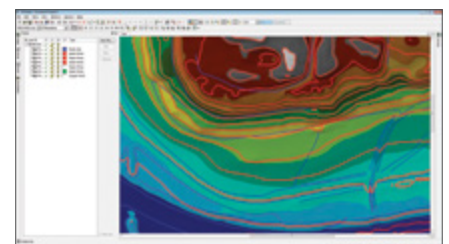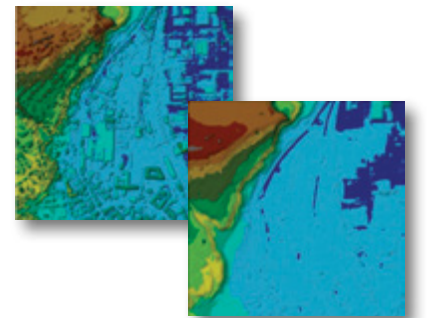
TECHNICAL SPECIFICATIONS

FEATURES OVERVIEW

- High performance project backdrop-image computation for most effective visualization of huge aerial image blocks as interpretation background for editing tasks
- Visual data checking:
  - Color superimposition: DTM data overlaying raster imagery, such as stereo imagery with automatic selection of best-fit stereo image pair
  - DTMaster works with all hardware supporting quad-buffered stereo If quad-buffered stereo is not supported, it automatically switches to anaglyph stereo.
  - Orthophotos
  - Digital maps
  - Realtime brightness and contrast adjustment for raster imagery
  - On-the-fly contour generation
  - Perspective view with online 3D panning and draping of geo-referenced raster imagery
  - Hill-shading
  - Z-coding
  - Hatching of excluded areas
  - Rotate the lateral view freely in a 3D space for a multi-perspective inspection
- Automated plausibility checks:
  - Detection of lines which are crossing. Point clusters showing a height monotony as well as larger point distances in XY or Z. Each can be semi-automatically corrected.
  - Detection of height outliers
  - Detection of very close or identical points
  - Detection of gaps in a point cloud
- Automated data modifications:
  - Local or project-wide filtering and classification of point clouds acquired with LiDAR scanners or from image matching (e.g. MATCH-T DSM) for refining quality, as well as for separating points on vegetation or buildings
  - Deletion of points close to lines
  - Thin-out algorithm
  - Deletion of identical points
  - Re-interpolation of selected points or along lines or within a fence according to surrounding areas and automatic gap filling
  - Extended batch filtering, gap-filling and mapping-grade contouring
- Data editing and measurement:
  - Editing in stereo, ortho, and lateral view, specific oblique mode
  - Broad range of powerful selection and 2D/3D snap modes
  - Efficient stereoscopic measurement and editing of points and lines
  - Interactive grid measurement
  - Various editing functions for polygon areas (classification, deletion, constant height setting and more)
  - Automatic correlation-based or interpolation-based terrain following mode for precise 3D digitizing

BENEFITS

- Integrates into any 3rd party DTM/DSM/point cloud workflow as visualization and editing tool
- Produces engineering quality DTM or DSM data:
- Comprehensive functionality with an efficient user interface for data viewing, checking and editing
- Large data volumes can be easily processed and visualized
- Data structures are optimized for very fast data handling
- Does not require a CAD or GIS
- Re-classify data between various files/layers, file-separated and combined vector data exports
- Seamless workflow within the complete Inpho software family. Benefit from project / DTM transformation tools, export and import into 3rd party workflows (e.g. Hexagon, BAE)
- Powerful mass-production functionality such as merging / tiling / format conversions / grid interpolation
- Suited for any amount of point data volumes through intelligent tile management and navigation

BUNDLES

LiDAR Box:
- DTMaster is part of the LiDAR processing workflow combined with SCOP++ LiDAR

DTM Box:
- DTMaster is part of the DTM / point cloud generation workflow from images with MATCH-T DSM

OPTIONS

- Hardware: Optionally, Inpho® provides all necessary hardware for DTMaster, including computers, monitors, stereo viewing systems and 3D cursors.
- Monthly rental and updates from previous versions
- Maintenance (1st year included in software price) includes support and version updates
- Network licensing available

SYSTEM REQUIREMENTS

- PC workstation
- 8 GB RAM
- High-End OpenGL graphics card supporting OpenGL 1.5 or higher
- Large hard disk
- Windows 7, 64 bit
- For stereoscopic viewing:
  - Stereo-capable graphics card(s) supporting OpenGL quad-buffered stereo (e.g. Nvidia Quadro series)
  - Stereo viewing system
  - 3D mouse

SUPPORTED SENSOR TYPES

- Imaging sensors:
  - Analogue and digital frame sensors
  - Panchromatic or multichannel
  - ADS Pushbroom sensors
  - satellite sensors (including SPOT 1-7, Plejades, Quickbird, IKONOS, ALOS, ASTER, CARTOSAT, IRS, GeoEye, Landsat, OrbView, RapidEye, WorldView, Resurs-P...)
- Point Clouds:
  - LiDAR derived point clouds
  - Image matching derived point clouds
  - Generic point cloud data or grid data

SUPPORTED FORMATS

- Supported image formats:
  - Georeferenced orthos: GeoTIFF, TiffWorld (tfw), ADS+tif/tfw
  - TIFF, JPG, BigTiff
  - JPEG2000, TIFFjpeg
  - EXIF
  - 8/12/16 bit
- Height model / morphology data formats
  - Grid-operations:
    ◇ *.dtm *.rdh *.bil *.fit *.tol *.grd *.tif *.tiff *.smti *.tpix.shp, BIL, BWNP, BXYZ, DTM, DXF, DXF_TIN, FLT , GRD, LAS, LASZip, SHP_TIN, TIFF16, TIFF32, VRML, VRML_TIN, WNP, XYZ
  - Point-cloud operations:
    ◇ LAS, LASZip, XYZ, BXYZ

For prices and distribution partner information please contact: sales@inpho.de

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Contact your local Trimble Authorized Distribution Partner for more information

MATCH-3DX

MATCH-3DX
## MATCH-3DX MESHING-ADD-ON

MATCH-3DX is a module in the software Inpho® for automatically generating three photogrammetry products: high quality dense point cloud based on Semi-Global-Matching algorithm, high quality true-orthophoto and high quality 3D meshes using Meshing-Add-On.

MATCH-3DX includes the full capability of MATCH-T DSM.

Using the advantageous tile management export tool in MATCH-3DX the final true-orthophotos can be exported in arbitrary areas, tiles or pixel sizes.

Key Benefits

► Completely automatic workflow for true orthophoto production directly from the dense point cloud, without ortho-rectifying the aerial images

► Minimizing the user interaction in comparison to the traditional, time-consuming and expensive workflow for true-orthophoto production

► No need to consider pre-measured morphological data (breaklines, 2D and 3D exclusion areas, borderlines)

► Can be combined with the classical orthophoto generation workflow (MATCH-T DSM)

► Extracts colorized point clouds from aerial images

► Creates textured 3D-meshes from image-based point clouds to represent the surface geometry and provide realistic visual perception of the objects

► Tight integration into point-cloud editing workflows e.g. with DTMaster Stereo

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MATCH-3DX
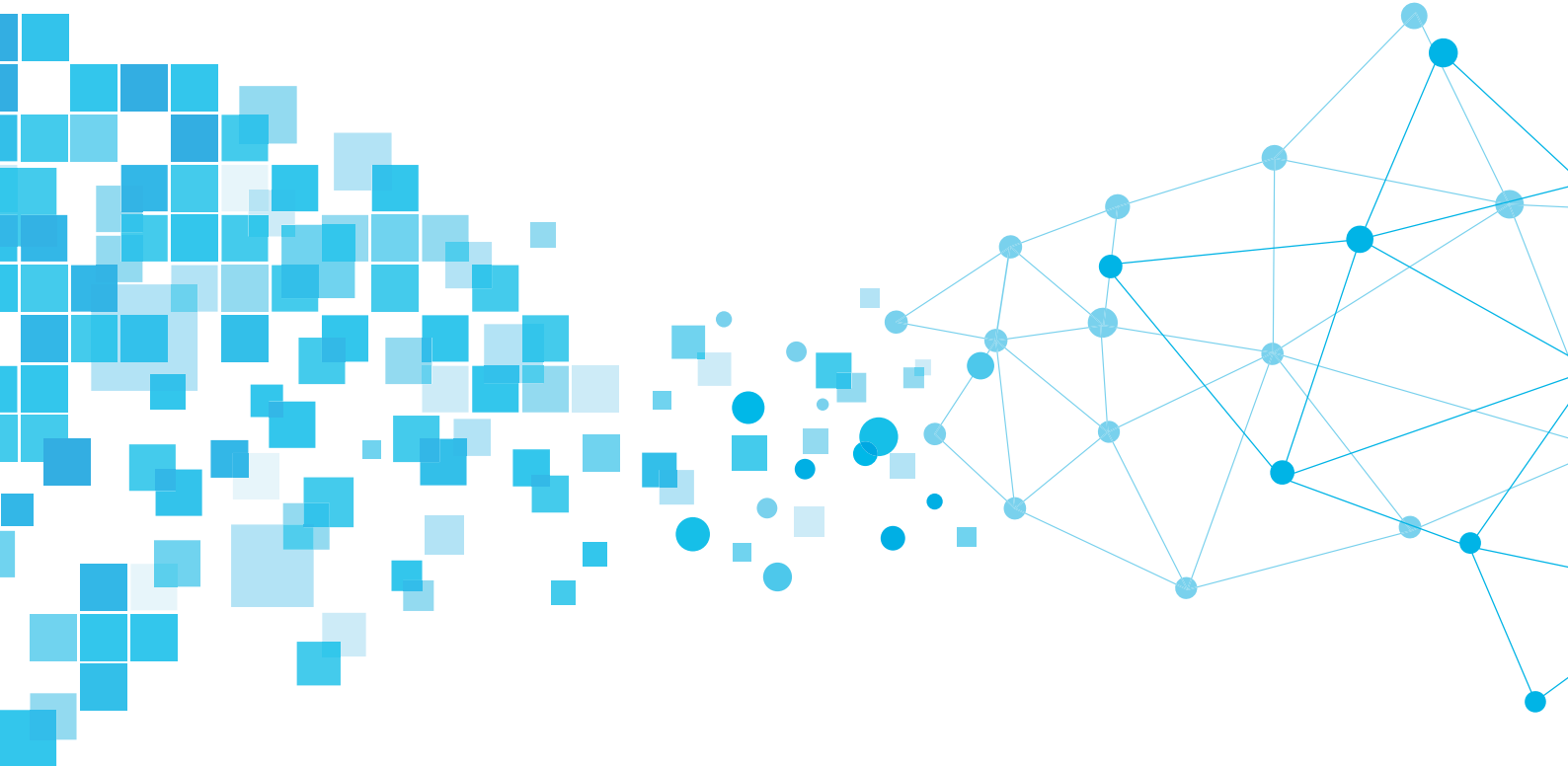
WORKSTATION RECOMMENDATION

- Up-to-date workstation with at least 64 GB RAM
- NVIDIA Graphic card is highly recommended
- Windows®

IMAGERY RECOMMENDATION

- Digital frame sensors
- Nadir, oblique or multi-head imagery
- Imagery with 80% length and 60% side overlap
- Panchromatic or multichannel sensor

PRODUCT PACKAGE

- MATCH-3DX Software
- MATCH-3DX Meshing add-on
- MATCH-3DX True-Orthophoto Tile Management Tool
- MATCH-3DX includes the full capability of MATCH-T DSM. Therefore, both workflows can be used if a MATCH-3DX license is available.
- **One year maintenance** for the first year to be extended yearly

RELATED MODULES

- MATCH-AT
- DTMaster
- DTMToolkit
- DPMaster

APPLICATIONS

- 3D City Modeling
- Real-estate
- Court-yard (mapping accident data scenes)
- Mining
- Forest management
- Construction
- Monitoring
- Heritage & archaeology
- Simulation projects (flight simulation and trainings)

PROJECT TECHNICAL CONSIDERATIONS

- Dense point clouds from nadir (SGM 2.5D) and oblique (SGM 3D) imagery
- True-orthophoto (SGM 2.5D), recommended for highly overlapped imagery (i.e. 80x80)
- Textured-meshes (SGM 3D or SGM 2.5D) in different formats

Input Data/Formats	
Project file	from MATCH-AT
Images	TIFF

Output Data/Formats	
Point Cloud	*.las, *.laz
LoD 3D-mesh	*.osgb, *.obj, *.i3s (SLPK), *.ply, *.cesium, *.dae, *.ive
True-Orthophoto	TIFF (GeoTIFF and TiffWorld)
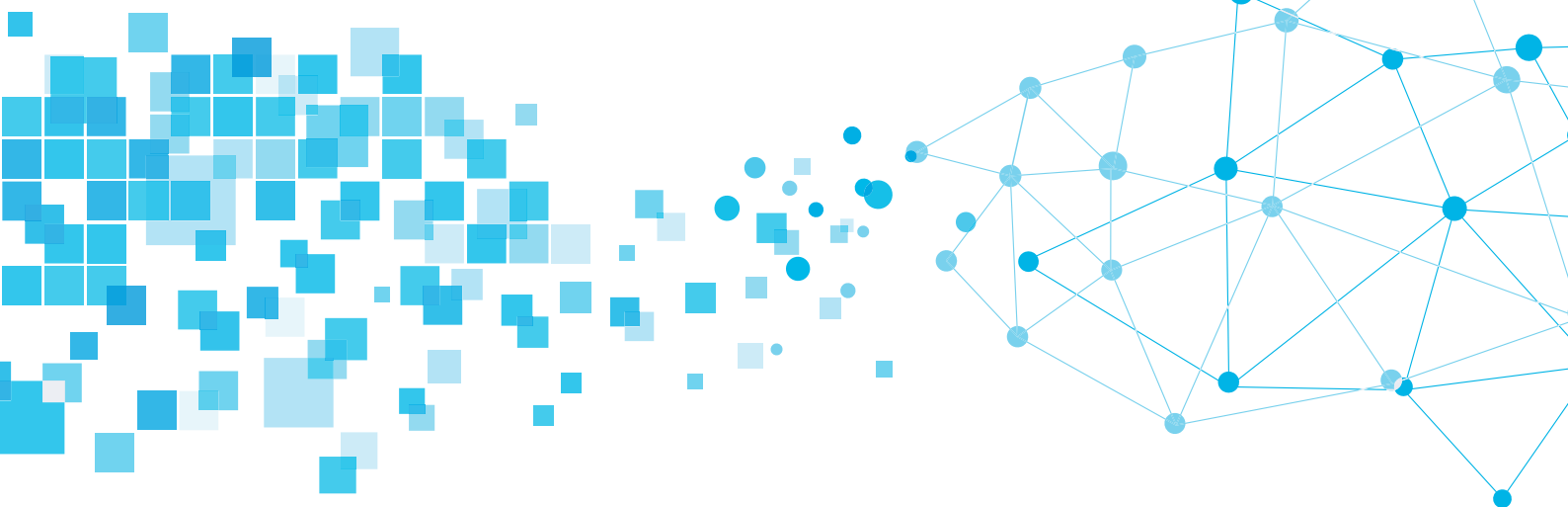
Contact your local Trimble Authorized Distribution Partner for more information

MATCH-AT

INPHO SOFTWARE

High throughput aerial triangulation with automated tie point selection, multi-ray point matching and bundle adjustment, GNSS and IMU support and calibration of camera and bore-sight misalignment. Processes frame sensors, satellite imagery and pushbroom data.

Precise aerial image triangulation with exceptional performance:

▶ Geo-reference blocks of aerial imagery based on the advanced and unique image processing algorithms for both frame and with MATCH-AT Pushbroom, line sensor data

▶ Fully automated processing even for large projects

▶ Processing is independent of flight geometry and supports completely arbitrary flight patterns

▶ Automatically extract tie points in frame images at optimal locations using multi-ray image matching

▶ Measure or verify control and tie points, guided by graphical block analysis

▶ Orient image blocks using proven bundle block adjustment and quality control tools

▶ Rigorous GNSS and IMU data support, including calibration of boresight misalignment and shift and drift corrections

▶ Due to its flexible data exchange capability MATCH-AT easily integrates into the workflow of any third-party photogrammetric system.

Everything you need in one package

▶ Tie point measurement

▶ Robust bundle adjustment

▶ Thorough intuitive QA/QC

▶ Complete camera calibration

▶ Exports/Imports

▶ includes inBLOCK for most flexible parameters, correction strategies and analyzing capabilities

Product Highlights

▶ Single, automatic process for point selection, point transfer and measurement, along with an integrated and robust bundle block adjustment requires minimum user interaction

▶ Support of any film or digital frame sensor, satellite data and pushbroom sensors (MATCH-AT pushbroom)

▶ No block size, shape or overlap limitations; tested with projects at 90/80 percent overlap and block sizes of up to 40000 images (20000 images in one sub-block)

▶ Tie points are automatically collected in image areas best contributing to the block strength and quality; Von Gruber positions can be used, or other patterns in case of rectangular image formats or special image overlap situations

▶ High precision tie point correlation (0.1 pixel) is achieved using an advanced combination of feature-based and least-squares matching, with multi-threading support

▶ Effective tie point matching also in poorly textured, as well as mountainous areas

▶ Strong internal tie point quality control achieved by performing robust bundle block adjustment in each level of the image pyramid

▶ Flexible weighting schemes for all types of observations

▶ Multi-phase blunder detection

▶ Internal & external reliability measures

Key Features

▶ Fully automatic tie point matching and tie point transfer with a fully integrated robust bundle block adjustment allowing for iterative refinement of complex orientation tasks

▶ Multi-camera support with full calibration capability

▶ GNSS/IMU trajectory corrections

▶ Repeatable quality ensured by thorough, reliable and easy to understand graphical as well as statistical analysis

▶ Support for frame imagery, satellite imagery and pushbroom sensors (with MATCH-AT pushbroom)

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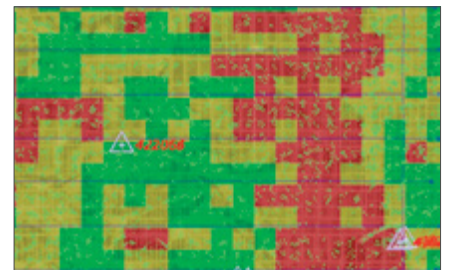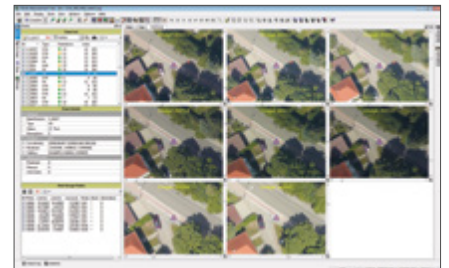
TECHNICAL SPECIFICATIONS

FEATURES OVERVIEW

Multi-camera support in one block and camera specific self-calibration
- Self-calibration results are made available as a dense correction grid for further use in any subsequent applications
- Full camera calibration with inBLOCK camera calibration mode (focal length, principal point, distortion, non-squared pixels) including calibration report. Physical (5), Brown (16) , Ebner (12) or 44 parameter distortion models.
- Powerful adjustment engine:
- Free block adjustment possible
- Flexible weighting schemes
- Sparse matrix technology
- Bandwidth minimization
- Reduced normal equations
- Fully automatic interior orientation for film cameras
- Project-wide photo display with correct topology, and auto image-selection for interactive, guided control point measurement.
- Multiple stereoscopic display for easiest stereoscopic manual point measurement
- Advanced sub-block handling
  – Sub-blocks enable easy administration, visualization and analysis of large blocks
  – Free block adjustment allow sub-blocks adjustment without control points
  – Sub-blocks as well as complete sub-projects can be merged
- GNSS data handling with shift and drift determination
- IMU data handling:
  – Preprocessed GNSS/IMU data from POS AV/POSEO by Applanix and AEROControl by IGI or similar
  – Attitude data are used as constraints in the integrated block adjustment
  – Boresight misalignment calibration (correction with up to 3rd polynom order)
- Calculation of ray intersections to check accuracy in specific stereo pairs
- Transform projects between different datums and projections, grid-based transformations, 7-parameters transformations and geoid application available
- Optionally the triangulation can be made in a local space rectangular coordinate system to avoid tensions caused by map projections
- Powerful intuitive graphical block analyzer:
  – Easy visual checking of large data sets
  – Visualizations: image footprints; overlaps; ground control and tie points; point and photo connections; residuals; error ellipses; geometric sector analysis for points and images; binning cell analysis for point density/connectivity; useful display filters, for example multi-strip connections and more; Statistical data tables directly linked to graphics
  – Internal and external reliability values for all observations and unknowns
  – Sensitivity analysis for undetectable gross errors, and their possible influence onto the block
- Specialized UAV/UAS mode for full automatic successful triangulation of challenging UAS projects
- Specialized satellite triangulation mode with automatic tie point matching and positioning refinement
- Smooth transfer of exterior orientation data to stereoplotters (e.g. Summit Evolution) and other photogrammetric applications, such as OrthoMaster or MATCH-T DSM
- High performance with multithreading

MATCH-AT for pushroom sensors
- MATCH-AT Pushbroom supports ADS line sensors
- Processing supports completely arbitrary flight patterns, including: arbitrary directions (non-cardinal flights), overlaps, crossings and elevations – even turns and changes in elevation during ongoing acquisition
- The sophisticated math model includes simultaneous rigorous photogrammetric sensor modeling and advanced vehicle/platform dynamics modeling of IPAS or Applanix navigation data
- 3rd party compatibility is provided through generation of adjusted Leica GPro compatible SUP- and ODF-files

BENEFITS
- Accurate and reliable results in just few seconds per image High degree of process automation
- Perfectly designed matching strategies lead to maximum ray connections for tie points

VERSIONS
- MATCH-AT:
  – Geo-referencing of frame images
  – Unrestricted number of images
  – Camera Calibration available
  – Including inBLOCK
  – Satellite triangulation
- MATCH-AT Pushbroom:
  – Geo-referencing of pushbroom sensor data
  – Unrestricted number of images
- MATCH-AT Box:
  – Combines MATCH-AT with MATCH-AT Pushbroom
- MATCH-AT Lite:
  – Geo-referencing of frame images
  – Block size restricted to 250 images
  – Handling and merging of sub-blocks is not available
  – Multithreading is not available

OPTIONS
- MATCH-AT pushbroom add-on: adds pushbroom adjustment capability to existing MATCH-AT software
- Monthly rental and upgrades for MATCH-AT versions available
- Maintenance (1st year included in software price) includes support and version updates
- Update of previous versions
- Upgrade from lite version
- Network licensing available

SYSTEM REQUIREMENTS
- Multicore PC workstation (1 license supports up to 16 cores)
- 8 GB RAM
- High-capacity disk system
- Windows 7, 64 bit
- Special hardware for state of the art stereoscopic point measurement:
  – Stereo-capable graphics card(s) supporting OpenGL quad-buffered stereo (e.g. Nvidia quadro series)
  – Stereo viewing system
  – Optional color anaglyphs for systems without stereoscopic hardware

SUPPORTED SENSOR TYPES
- Imaging sensors:
  – Analogue and digital frame sensors
  – Panchromatic or multichannel
  – ADS Pushbroom sensors (MATCH-AT pushbroom)
  – Thermal images
  – Satellite sensors (including SPOT 1-7, Plejades, Quickbird, IKONOS, ALOS, ASTER, CARTOSAT, IRS, GeoEye, Landsat, OrbView, RapidEye, WorldView, Resurs-P...)

PERFORMANCE
- Suited for massive data volumes: tested with projects up to 40000 images
- About 10 seconds computation time per frame
- Theoretical accuracy about 0.1 pixel

SUPPORTED FORMATS
- Supported image formats:
  – Georeferenced orthos: GeoTIFF, TiffWorld (tfw), ADS+tif/tfw
  – TIFF, JPG, BigTiff
  – JPEG2000, TIFFjpeg
  – EXIF
  – 8/12/16 bit
- Height model / morphology data formats
  – Grid-operations:
    ◊ *.dtm *.rdh *.bil *.fit *.tol *.grd *.tif *.tiff *.smti *.tpix.shp, BIL, BWNP, BXYZ, DTM, DXF, DXF_TIN, FLT , GRD, LAS, LASZip, SHP_TIN, TIFF16, TIFF32, VRML, VRML_TIN, WNP, XYZ
  – Point-cloud operations:
    ◊ LAS, LASZip, XYZ, BXYZ

NORTH AMERICA
Trimble Navigation Limited
10368 Westmoor Dr
Westminster CO 80021
USA

EUROPE
Trimble Germany GmbH
Am Prime Parc 11
65479 Raunheim
GERMANY

ASIA-PACIFIC
Trimble Navigation
Singapore Pty Limited
80 Marine Parade Road
#22-06, Parkway Parade
Singapore 449269
SINGAPORE

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MATCH-T DSM

INPHO SOFTWARE

Automatically generate dense point clouds and digital terrain and surface models (DTM/DSM) from aerial and satellite image blocks.

Create exact colorized surface models and terrain models from imagery:

▶ Acquire very dense point clouds and high quality surface models directly from stereo imagery using image matching techniques

▶ Advanced multi-image matching creates point clouds as dense as one point per pixel at a lower cost than aerial laser scanning

▶ Point clouds from image matching provide excellent results for orthophoto generation and city modeling applications

▶ Remove non-ground objects and achieve bare earth digital terrain models (DTMs) using robust filter methods

▶ Expand production capabilities using state-of-the-art multi-threading and distributed processing

Multi-layered matching takes all locally overlapping images into account, achieving dense point clouds – even in urban and forested areas.

In DSM mode, even narrow urban streets can be detected with image overlap of at least 60/60 percent. Surface models from MATCH-T DSM with their LiDAR-like characteristics are well-suited for applications like city modeling.

Feature Capabilities

▶ DTM and DSM generation from aerial images (frame and pushbroom sensors), and from various types of satellite imagery

▶ Seamless DTM or DSM generated for user definable areas, which can be any sub-block or polygon area, or the entire image block

▶ Dense matching technique produces point cloud density up to 1 point per pixel, providing rich detail and sharp edges with sub-pixel accuracy

▶ Specialized noise filtering strategies

▶ Different filter techniques for DTM and DSM extraction for obtaining optimized point clouds

▶ Automatic tiling for simultaneous grid and point-cloud output

▶ Tight integration into point-cloud editing workflows e.g. with DTMaster Stereo

Key Features

▶ MATCH-T DSM generates regular grids or extremely dense point clouds, and guarantees for reliable and accurate results:

▶ High speed batch processing and optimized hardware utilization for excellent productivity

▶ Extensive automation features for minimal user interaction

▶ Advanced dense matching techniques with internal quality control deliver a high standard of project quality

▶ Point cloud coloring from aerial image blocks or orthophotos

▶ Easy integration into any third-party workflow

MATCH-T DSM INPHO SOFTWARE
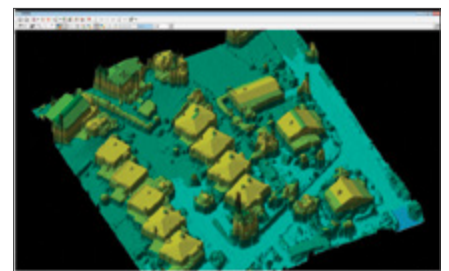
TECHNICAL SPECIFICATIONS

FEATURES OVERVIEW

- Consideration of pre-measured morphological data (breaklines, 2D and 3D exclusion areas, borderlines)
- DTM generation with elimination of outliers, e. g. trees, buildings, by robust finite element interpolation
- Subdivide the project area into polygonal areas with appropriate parameter settings for the terrain type and coverage
- Optimized point extraction using dynamic sensor noise filtering
- Regular point distribution in poorly textured image areas through auto-optimization of local parameters
- Adaptive parallax bound strategy for high quality terrain representation near breaklines
- Extensive internal quality control functions
- Integrated DTM Toolkit provides flexible DTM postprocessing with functions like merging, splitting or tiling of DTMs, batch-filtering/classification, gap-filling, grid interpolation, mapping-grade contour generation, datum transformations and format conversions
- Filtering methods to thin-out DTM or DSM data
- Output into grid files or irregular point clouds with automatic tiling
- Optional distributed processing in combination with DPMaster

OUTPUT FORMATS

- SCOP DTM
- LAS
- And others

VERSIONS

- MATCH-T DSM Lite:
  - Restricted to projects up to 250 images
  - No sub-block support
  - Only one output area per process
  - No multithreading
  - Restricted to12 satellite scenes
  - Restricted to 12 ADS images

OPTIONS

- MATCH-T DSM (DPL):
  - High-volume extension using distributed processing technology
  - Efficiency increase by using MATCH-T DSM in a multi-core and multi-computer setup
  - Requires DPMaster (included) for organizing the additional computer pool and one full license of MATCH-T DSM
- Monthly rental and upgrades from lite versions or updates from previous versions available
- Maintenance (1st year included in software price) includes support and version updates
- Network licensing available

SYSTEM REQUIREMENTS

- Multicore PC workstation (1 license supports up to 16 cores)
- 8 GB RAM
- High-capacity disk system
- Windows 7, 64 bit

BUNDLE

DTM Box:

- Bundle of MATCH-T DSM, DTMaster editing for a complete workflow from point cloud generation through visualization and editing to postprocessing (quick filtering, classification, gap-filling and mapping grade contour generation)

SUPPORTED SENSOR TYPES

- Imaging sensors:
  - Analogue and digital frame sensors
  - Panchromatic or multichannel
  - ADS Pushbroom sensors
  - satellite sensors (including SPOT 1-7, Plejades, Quickbird, IKONOS, ALOS, ASTER, CARTOSAT, IRS, GeoEye, Landsat, OrbView, RapidEye, WorldView, Resurs-P…)

SUPPORTED FORMATS

- Supported image formats:
  - Georeferenced orthos: GeoTIFF, TiffWorld (tfw), ADS+tif/tfw
  - TIFF, JPG, BigTiff
  - JPEG2000, TIFFjpeg
  - EXIF
  - 8/12/16 bit
- Height model / morphology data formats
  - Grid-operations:
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  - Point-cloud operations:
    ◊ LAS, LASZip, XYZ, BXYZ

For prices and distribution partner information please contact: sales@inpho.de

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NORTH AMERICA
Trimble Navigation Limited
10368 Westmoor Dr
Westminster CO 80021
USA

EUROPE
Trimble Germany GmbH
Am Prime Parc 11
65479 Raunheim
GERMANY

ASIA-PACIFIC
Trimble Navigation
Singapore Pty Limited
80 Marine Parade Road
#22-06, Parkway Parade
Singapore 449269
SINGAPORE

Trimble

OrthoMaster

INPHO SOFTWARE

Professional ortho rectification software with automated one-step processing of aerial blocks, intelligent true-ortho capabilities and built-in DTM Interpolation.

OrthoMaster ensures high speed batch processing and optimized hardware utilization for excellent productivity:

- ► Create digital aerial or satellite imagery with ensured constant scale using orientation and digital terrain models (DTM) as source data

- ► Derive DTMs directly from arbitrarily distributed XYZ point cloud data and breaklines

- ► Effectively eliminate the relief displacements by intersecting morphological 3D object data with the basic DTM

- ► Fully automatic differential rectification, or alternatively rectification onto a definable plane when no DTM data is available

- ► Optimized for automated, high-performance orthophoto production using state-of-the-art multi-threading and distributed processing

- ► Batch mass rectification of standard or true ortho images – the perfect match for OrthoVista ortho-mosaicking software

Feature Capabilities

- ► Orthophoto generation from aerial images (frame and pushbroom sensors), and from various types of satellite imagery

- ► Automated one-step batch processing of complete aerial image blocks; also in batch mode:
    - Advanced batch mode for subsequent OrthoVista postprocessing (OrthoVista license required)
    - Complete ortho workflow with OrthoVista input file generation and OrthoVista pre-processing steps

- ► Orthophoto generation in pre-set polygonal area-of-interest:
    - Flexible definition/import of multiple geometry- and quality-optimized ortho areas per image
    - Automatic ortho area generation excluding edges from orthophotos for extracting the best quality image parts for optimized computation speed and storage requirement
    - Defined overlap percentage of adjacent orthophotos

- ► Unique true-ortho capability in combination with OrthoVista; advanced modelling of bridges, buildings and other man-made objects – masking of occluded areas

Key Features

- ► Effectively batch-create thousands of rectified orthophotos in one single process

- ► Automated one-step processing

- ► Unique true ortho capability and Orthophoto generation

- ► Flexible Height model support

- ► Multicore processing and multi-threading

- ► Effectively batch-create thousands of rectified orthophotos in one single process

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OrthoMaster INPHO SOFTWARE

TECHNICAL SPECIFICATIONS

FEATURES OVERVIEW

- Flexible Height model support:
  - Hybrid grid based SCOP DTMs and various other formats
  - Realtime generation of TIN models
  - Rigorous consideration of morphological data such as breaklines
  - Unlimited volumes of DTM data supported by TPIX tile management
- Transform complete projects including EO, DTM/point clouds and orthos, between different datums and projections:
  - Grid-based transformations
  - 7-parameter transformations
  - Custom geoid application
- Multicore processing and multi-threading for higher performance
- Optional distributed processing in combination with DPMaster high volume throughput

BENEFITS

- Optimized workflow for OrthoVista Mosaicking
- Geometric precision through integrated DTM generation with rigorous consideration of breaklines and man-made structures (buildings, bridges)
- Excellent radiometric quality through advanced processing algorithms
- Unique true-ortho capabilities
- Extensive automation features for minimal user interaction
- Powerful handling of very large DTMs
- Seamlessly integrates into the complete inpho software system or any 3rd-party photogrammetric workflow

OPTIONS

- Monthly rental and upgrades from lite versions
- Maintenance includes support and version updates
- Updates from previous versions
- OrthoMaster (DPL) (DPMaster computer pool organization required):
  - High-volume extension using Distributed Processing technology
  - Efficiency increase by using OrthoMaster in a multi-core and multicomputer setup. Prerequisite is one full license of OrthoMaster and DPMaster (free) for the pool administration
- OrthoMaster Lite:
  - Restricted to ortho-rectification of 250 aerial images or 12 satellite or pushbroom (ADS) images
  - No batch processing or multi-threading
  - No sub-block processing

SYSTEM REQUIREMENTS

- Multicore PC workstation (1 license supports up to 24 cores)
- 32+ GB recommended
- High capacity disk system
- Windows 10, 64 bit

BUNDLES

OrthoBox:
- Bundle of OrthoMaster and OrthoVista for maximum ortho performance

PERFORMANCE

- Suited for mass production of ortho projects. Process about 200 orthos per hour on a standard PC workstation

SUPPORTED SENSOR TYPES

- Imaging sensors:
  - Analogue and digital frame sensors
  - Panchromatic or multichannel
  - ADS Pushbroom sensors
  - Satellite sensors (including SPOT 1-7, Pléiades, Quickbird, IKONOS, GeoEye, OrbView, RapidEye, WorldView, Gaofen, Tianhui, Ziyuan and more)

FEATURES OVERVIEW

- Supported image formats:
  - Georeferenced orthos: GeoTIFF, TiffWorld (tfw), ADS+tif/tfw
  - TIFF, JPG, BigTiff
  - JPEG2000, TIFFjpeg
- Height model / morphology data formats available in the DTMToolkit for Grid interpolation, point cloud tiling and splitting, thin-out operations (classification and filtering, gap-filling, contour generation available with additional license, SCOP++ LiDAR module for classification and filtering)
  - Grid-operations:
    ◊ All supported formats (*.dtm *.rdh *.bil *.fit *.tol *.grd *.tif *.tiff *.smti *.tpix.shp)
  - Output Formats
    ◊ BIL, BWNP, BXYZ, DTM, DXF, DXF_TIN, FLT , GRD, LAS, SHP_TIN, TIFF16, TIFF32, VRML, VRML_TIN, WNP, XYZ
  - Point-cloud operations
    ◊ Input formats: LAS, XYZ, BXYZ
    ◊ Output formats:
      - For tiling, filtering and gap filling: LAS
      - For surface modeling: SCOP DTM
      - For contouring: DXF and TIF
- Project Conversion/Import/Export:
  - Project conversion to Inpho
  - Z/I, DAT /EM, BAE SocetSet
  - Project and EO exports:
    ◊ DAT /EM Summit Evolution, BAE Socet Set, Z/I project, Aviosoft Ori, ABC-PC, AP32, Phorex/Pex, PATB , Bluh, Bingo
  - EO imports: Generic ASCII, Phorex/Pex, PATB , Bluh, Bingo
- DTM data import:
  - SCOP DTM, Winput, XYZ mass points, break/form lines, DXF, ArcGIS Shapefile, ArcGIS ASCII Grid, LAS, NED Float
- Geocoded Raster files
- Tile Manager File (TPIX):
  - Import of multiple raw data files, merged with SCOP functionality

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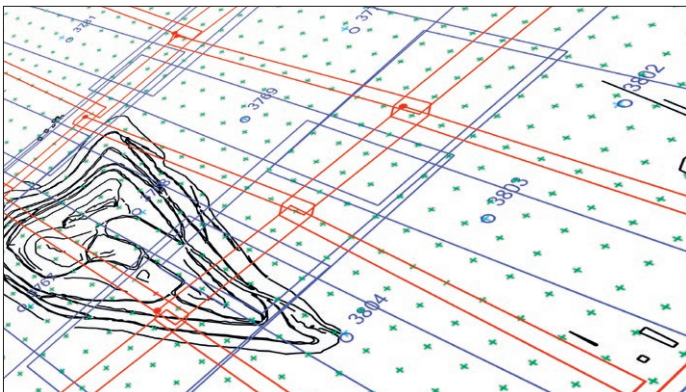
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OrthoVista

INPHO SOFTWARE

Automatically adjust and combine orthophotos from any source into one seamless, color-balanced geometrically perfect orthophoto mosaic map without any subdivision. Excellence in mosaicking, the market leader—OrthoVista the original exclusively available from Trimble.

OrthoVista performs a block-wide color balancing through adjusting adjacent images to match in color and brightness. Multiple orthophotos are combined into one seamless, color-balanced and geometrically perfect orthomosaic. Large blocks of thousands of orthophotos can be processed without any subdivision through Big-Tiff support. Alternative map-sheet tiling is also available.

The perfect ortho-mosaicking tool to complement for OrthoMaster ortho-rectification:

► Computing radiometric adjustments that compensate for a wide range of visual effects within individual images, such as intensity, hot spots, lens vignetting, brightness or color variations

► Automatic key ortho-mosaicking functions to improve the efficiency, quality and profitability of digital orthophoto mosaic production

► Automatic detection of seamlines and man-made objects without manual intervention, providing high-quality mosaics even in urban areas and reducing manual seamline editing. Should interactive seamline editing be necessary, a manual seam editor is provided

► Resampling capability to combine ortho imagery with differing resolution, differing origins or differing rotation

Feature Capabilities

► Increases the efficiency and quality of digital image mosaic production using a fully automated workflow

► Easy integration into any third-party workflow

► Easy-to-use 3 step workflow even for non-photogrammetrists

► Perfectly hidden seams through adaptive blending between overlapping images depending on image content

► Feature detection algorithms for seam detection lead to a perfect result requiring no, or only very little, editing

Key Features

► OrthoVista plays a leading role in automatic radiometric image adjustment and automatic seam detection

► Handles orthophotos from any source with differing origin and resolution

► Full automatic workflow

► Automatic texture-depending adaptive feathering

► Superior geometric and radiometric quality

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OrthoVista INPHO SOFTWARE

TECHNICAL SPECIFICATIONS

FEATURES OVERVIEW

- Full automatic workflow for perfect results:
  - Powerful intra-image tools for automatic reduction of lens vignetting, hot spot effects and radiometric variations
  - Block-wide balancing of color brightness and contrast (individual image characteristics preserved)
  - Automatic removal of sun reflections on water areas
  - Global color and contrast adjustment for correction of radiometric tilting
  - Mosaic space definition for resampling capabilities including irregular rotations of input orthos, origins or pixel sizes
- Professional radiometric image enhancement and editing tools:
  - Selective color correction option to apply changes for a small spectral range only
  - Interactive/automated adjustment of intensity, contrast, color and color saturation
  - Interactive modification of gradation curve for adjustment of brightness, contrast and color, selective color corrections for more natural colors
  - Automatic histogram adjustment
    ◊ Macro-recording for volume pre-editing
    ◊ Image enhancement with image reference to the complete block (image visualization)
- Versatile seamline functionality:
  - Fully automatic seamline detection with feature detection technology
  - Optional usage of exclusion polygons for seamline
  - Interactive seamline definition and editing
- Automatic feathering functionality:
  - Automatic adaptive blending width of the seamline with texture analysis
  - Narrow seam in "urban canyons"
  - Wide seam in open terrain
- Automatic tiling of the mosaic:
  - Mosaic is cut into map sheets
  - Easy definition of map sheets
  - Import of output tile definitions by file
  - Optional polygonal output area (as inclusion or exclusion)
- Support for area definitions for exclusion/inclusion/water areas/restricted areas for seams. Simple or complex ("islands") area definitions available.
- Flexible processing steps done independently or in combination with each other
- Excellent processing capacity handles very large orthophoto blocks
- Support for multi-channel imagery
- Unique true-ortho functionality in combination with OrthoMaster

BENEFITS

- Increases the efficiency and quality of digital image mosaic production using a fully automated workflow
- Easy-to-use – even for non-photogrammetrists
- Professional image editing tools
- Total geometric flexibility for input data
- Easy integration into any third-party workflow:
  - Perfectly integrates into the inpho photogrammetric system – use pre-processed data and project files from OrthoMaster
  - Perfect input for Trimble eCognition feature detection software

OPTIONS

- OrthoVista Lite: Restricted to 250 frame images, 12 satellite or 12 pushbroom images. No parallel processing available
- Unlimited seam editing available with OrthoVista lite as well as OrthoVista's full version
- Monthly rental, upgrades from lite, updates from previous versions
- Maintenance (1st year included in software price) includes support and version updates
- Network licensing available

SYSTEM REQUIREMENTS

- High-end multicore PC workstation (one license supports 24 cores)
- 32+ GB recommended
- High-capacity disk system
- Windows 10, 64 bit

BUNDLES

OrthoBox:
- Bundle of OrthoMaster and OrthoVista for maximum performance and easiest workflow

SUPPORTED SENSOR TYPES

- Imaging sensors:
  - Analogue and digital frame sensors
  - Panchromatic or multichannel
  - ADS Pushbroom sensors
  - Satellite sensors

SUPPORTED FORMATS

- Supported image formats:
  - Georeferenced orthos: GeoTIFF, TiffWorld (tfw), ADS+tif/tfw, ERMapper ERS, ZEISS inp, Vision RPT
  - TIFF, JPG, BigTiff
  - JPEG2000, TIFFjpeg
  - EXIF
  - BIP, BIL, BSQ
  - 8/12/16 bit
- Morphology data formats:
  - DXF
  - SHP

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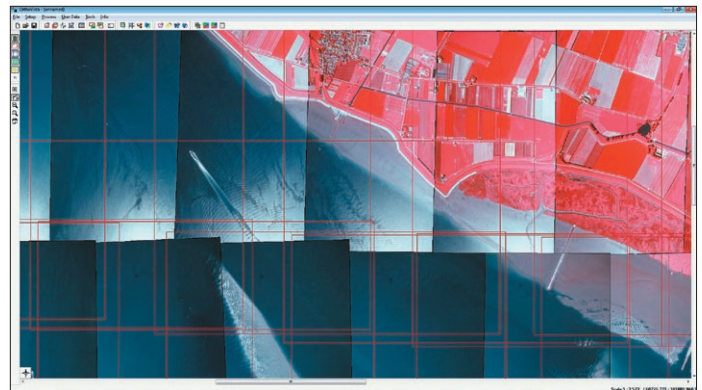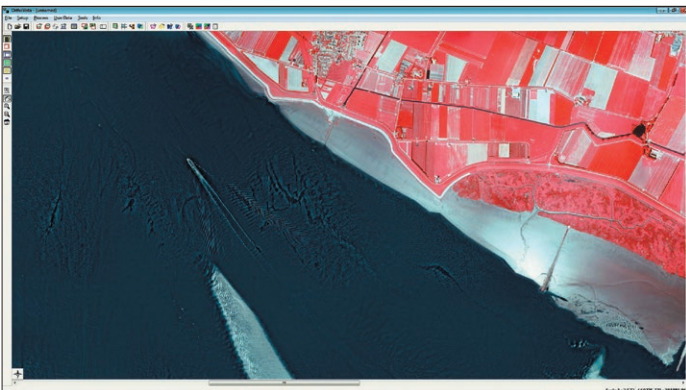
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SATMaster

INPHO SOFTWARE

inpho

A complete processing workflow for geospatial information collection in one product.

EXPERIENCE EXCEPTIONAL PERFORMANCE AND PRECISE SATELLITE IMAGE PROCESSING WITH INPHO SATMASTER

Satellite imagery offers a perfect alternative for geospatial data collection for very large areas or areas that are impossible to be surveyed with airborne sensors. Modern high-resolution imaging satellites provide input for a variety of applications like: environmental monitoring, cadastral surveying, urban planning, agriculture, oil/gas/mining and engineering applications.

Full Workflow Automation

Refine accuracy in geospatial positioning of satellite imagery by factors up to 10 times with the help of ground control points. Create point clouds from stereo coverage. Derive exact surface models or true ground DTM. Orthorectify, color-balance and mosaic all satellite imagery into homogeneous, seamless, colorgraded, orthophoto mosaics.

### Pointcloud Editing and Mapping

Use interactive and automated editing and mapping tools in order to refine precision and details of all deliverables. Benefit from powerful point cloud editing, filtering and classification workflows, monoscopic and stereoscopic visualization and create basic multi-layer GIS ready vector maps.

Everything Remote Sensing Professionals need in one Product

- ▶ User interfaces, specialized for satellite workflows
- ▶ Tools tailored to remote sensing workflows
- ▶ Seamless data exchange between workflow steps
- ▶ Robust quality assessment and data checks
- ▶ No need for 3rd party applications
- ▶ Support for 3rd party data imports (e.g. orientations, height models, orthophotos)
- ▶ Flexible workflows depending on entry point (e.g. using existing height models on geo-referenced imagery to generate ortho mosaics for later feature analysis).
- ▶ Fully automated processing with excellent interactive refinement tools
- ▶ Stereoscopic as well as monoscopic data support and visualization
- ▶ Seamless transition from SATMaster to eCognition available (Send results directly to eCognition)

Key Features

- ▶ Seamless complete satellite-specialized workflow from geo-referencing, point cloud matching, ortho mosaic generation and feature analysis with full automation.
- ▶ Monoscopic and stereoscopic editing, refinement and basic multi-layer/multi-file mapping.
- ▶ Support for different workflows on different input data – monoscopic/stereoscopic coverage, raw or rectified scenes, RPC or TFW/Geotiff, blocks or single scenes. Step into the complete workflow at any task level.
- ▶ High accuracy and reliability, refine absolute positioning by factors up to 10x.

Trimble

SATMaster INPHO SOFTWARE
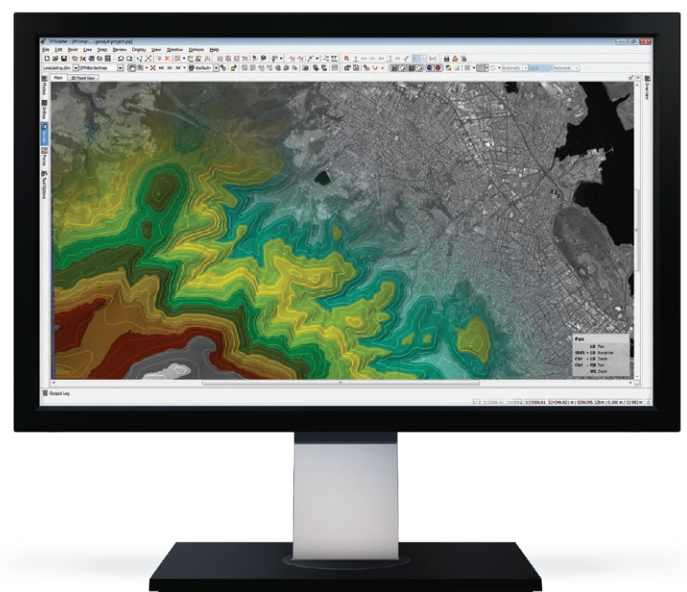
TECHNICAL SPECIFICATIONS

FEATURES OVERVIEW

Highly accurate geo-referencing for satellite scenes
- Satellite triangulation for automatic bulk-orientation including automatic tie point extraction
- Single image orientation tools for monoscopic scenes without overlap, optional referencing to ortho-imagery combined with height models
- Project-wide photo display with correct topology, and auto image-selection for interactive and automated, guided control point measurement.
- Multi-view stereoscopic display for easiest stereoscopic manual point measurement
- Rigorous quality assessment tools and visualizations as well as numerical statistics

Creation of dense point clouds for stereoscopic coverage
- Density up to 1 pixel
- Irregular colorized pointcloud or grid
- Surface model or bare earth DTM
- Speed-optimized parameter set
- Batch processing on multiple areas of interest
- Optional tiling of deliverables for huge volumes

Point cloud editing and basic mapping
- CAD-like multi-layer/multi-file environment
- Automated and interactive guided mapping and editing tools for vectors and points including project-wide or local brush-type filtering and classification.
- 3D stereo mapping tools as well as monoplotting capability (xyz from ortho & height model)
- Multi-view high performance visualizations (shadings, online-contouring, height coding, profiles...)
- Mapping-grade contour map generation and grid interpolation
- Sophisticated tile management

Rigorous true-ortho / classic ortho rectification
- Based on geo-referenced imagery and height model (SATMaster generated or imported)
- Homogeneous color-balanced mosaicking with feature-based automatic seam generation
- Combine, merge, resample, color-grade orthos
- Adaptive mosaic blending through image texture analysis
- Flexible mapsheet definition
- Intuitive mosaic (seam-)editing workflow

Flexible connections to 3rd party
- Exports to various 3rd party software packages
- Support for a manifold of data formats
- Transform projects between different datums and projections, grid-based transformations, 7-parameters transformations and geoid application available

BENEFITS
- Specialized workflows, tools, user interfaces and visualizations for satellite processing
- One seamless process from A to Z in one package, no loss of quality or information because of unnecessary data conversions and exports
- Reliable and proven technology from inpho
- Ease of use through full automation, repeatable quality
- Perfect mapping quality through stereoscopic measurements along with monoplotting capability (3D points/vectors derived from orthos & height models)
- Speed-optimized processing parameters without compromising quality
- Multichannel support for specific applications (e.g. RGBI)
- Exports, imports and file format flexibility provide seamless workflows into 3rd party tools

OPTIONS
- Monthly rental and upgrades for SATMaster versions available
- Maintenance (1st year included in software price) includes support and version updates
- Update of previous versions
- Network licensing available
- Optional connection to distributed processing licenses to MATCH-T DSM or OrthoMaster for high performance cluster computations

SYSTEM REQUIREMENTS
- Multicore PC workstation (1 license supports up to 24 cores)
- 8 GB RAM
- High-capacity disk system
- Windows® 10, 64 bit
- Recommended: hardware for state of the art stereoscopic point measurement:
  – Stereo-capable graphics card(s) supporting OpenGL quad-buffered stereo (e.g. Nvidia quadro series)
  – Stereo viewing system
  – Optional color anaglyphs for systems without stereoscopic hardware

SUPPORTED SENSOR TYPES
- Imaging sensors:
  – Satellite sensors (including SPOT, Plejades, Quickbird, IKONOS, ALOS, ASTER, CARTOSAT, IRS, GeoEye, Landsat, OrbView, RapidEye, WorldView, Resurs-P, Ziyuan...)
  – Multichannel and panchromatic

SUPPORTED FORMATS
- Supported image formats:
  – Geo-referenced orthos: GeoTIFF, TiffWorld (tfw), ADS+tif/tfw
  – TIFF, JPG, BigTiff
  – JPEG2000, TIFFjpeg
  – EXIF
  – 8/12/16 bit
- Height model / morphology data formats
  – Grid-operations:
    *.dtm *.rdh *.bil *.fit *.tol *.grd *.tif *.tiff *.smti *.tpix.shp, BIL, BWNP, BXYZ, DTM, DXF, DXF_TIN, FLT , GRD, LAS, LASZip, SHP_TIN, TIFF16, TIFF32, VRML, VRML_TIN, WNP, XYZ
  – Point-cloud operations:
    LAS, LASZip, XYZ, BXYZ

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SCOP++

INPHO SOFTWARE

Generate and manage very large digital terrain models (DTM) such as nation-wide DTMs with data coming from LiDAR, photogrammetry or any other source.

Efficiently process hundreds of millions of DTM points with unsurpassed quality of interpolation, filtering, management, application and visualization.

SCOP++ uses robust interpolation techniques with flexible adaptation to terrain type and terrain coverage to provide a complete solution for powerful filtering, classification, quality control and editing of LiDAR data:

- ▶ TopDM utilizes an integrated database system well-suited to managing very large DTM projects, up to nation-wide DTMs

- ▶ Efficient hybrid DTM data structure and flexible, advanced interpolation guarantees rigorous consideration of break-lines and qualified data filtering

- ▶ Numerous DTM applications are covered, such as contouring, hill-shading, profiling, volume calculations, or slope analysis, and many more

- ▶ Work with points from LiDAR, photogrammetry or other sources

- ▶ Automatically filter airborne laser scanning to classify raw point clouds into terrain and off-terrain points and effectively extract true ground points for further DTM processing

Product Highlights

- ▶ Proven DTM technology

- ▶ High-productivity through effective, high-capacity data and batch processing

- ▶ Suitable for management of nation-wide DTMs

- ▶ Precise interpolation and filtering for excellent DTM quality

- ▶ Scalable with additional SCOP modules available for pre- and postprocessing of DTM data

Key Features

- ▶ SCOP++'s flexible architecture allows for a variety of DTM operations and visualizations:

- ▶ Task-oriented modular structure, to easily adapt to customers needs

- ▶ Easy integration into any third-party workflows

SCOP++ INPHO SOFTWARE
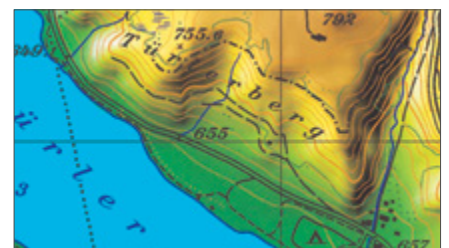
TECHNICAL SPECIFICATIONS

FEATURES OVERVIEW

SCOP++ Kernel
- Precise DTM interpolation with or without filtering
- Generation of DTMs consisting of up to one billion points
- Data densification and data reduction
- Contouring with cartographic quality
- Basic profiling
- Flexible Z-coding and hill-shading
- Integrated raster and vector graphics
- Combined visualization of geo-referenced raster graphics (e. g. digital map) with DTM views
- Interpolation of check point elevations

SCOP++ LIDAR
- Filtering of airborne laser scanning data for automatic classification of the raw point cloud into terrain and off-terrain points, to extract true ground points for further DTM processing
- Robust interpolation techniques with flexible adaption to terrain type and terrain coverage
- User-controlled hierarchical process using point cloud pyramids
- Elimination of gross errors in any DTM data

SCOP++ Analyzer
- DTM algebra (including difference DTMs)
- Volume computation
- Profiling, cross-sections
- Digital slope models and slope maps
- Mosaicking and feathering of overlapping DTMs

SCOP++ Visualizer
- Perspective DTM views in form of raster graphics generated by SCOP++ Kernel, or of wire-frame models
- Panoramic views with annotation of geographic names
- Silhouette views

SCOP++ TopDM
- Topographic Data Management designed for storing, managing and archiving nation-wide digital elevation information
- Geocoded relational data base
- Georeferencing (map projections and coordinate transformations, geodetic datum transformations)
- Management of DTM data: DTM selection and export; merging DTMs; extracting parts from DTMs; DTM resampling
- On request: interfacing with ORACLE databases:
- Management for LiDAR point clouds

OPTIONS
- Monthly rental and upgrades from competitive products available
- Maintenance includes support and version updates

SYSTEM REQUIREMENTS
- PC workstation
- 4 GB RAM
- Windows 7, 64 bit
- To complete the workflow of DTM processing, in addition to SCOP++, DTMaster is recommended for DTM quality control and editing

BUNDLES

LiDAR Box
- Bundle of SCOP++ LiDAR with DTMaster visualization and editing

SUPPORTED FORMATS

Data input
- SCOP Winput, BInary SCOP Winput, AutoCad DXF, ArcInfo Generate, XYZ, Binary XYZ, ASCII Text File, Kotenband, LAS, ESRI Shapefile

Model input
- SCOP RDH, ArcInfo ASCII Grid, Raw Binary, TIFF, USGS DEM Raster, USGS SDTS Raster, SRTM, DTED Level 0, DTED Level 1, DTED Level 2, ESRI .hdr, ENVI.hdr, ERMapper, Golden Software ASCII Grid, Golden Software Binary Grid, ERDAS Imagine, Intergraph Raster, NASA Planetary Data System

Image overlay input
- *.pyr, *.tif, *.jpg, *.pix

Data Export
- SCOP Winput, Binary SCOP Winput, AutoCad DXF, ArcInfo Generate, XYZ, Binary XYZ, Kotenband

Parameter Export
- SCOP setup file

Model Export and secondary model export
- Hybrid DTM
  - SCOP RDH, ArcInfo ASCII Grid, Raw Binary, AutoCad DXF, VRML, SCOP Winput, Binary SCOP Winput, XYZ, Binary XYZ, STL, REB, Unstructured Cell Data File, Surfacewater Modelling System 2DM File, CityGrid XML, DTED Level 0, DTED Level 1, DTED Level 2, DGM-Band, XYZ-Slope, VESTRA Winput, TIFF, USGS DEM Raster, SRTM, ESRI.hdr, ENVI.hdr, ERMApper, Golden Software ASCII Grid, Golden Software Binary Grid, ERDAS Imagine, Intergraph Raster
- Grid
  - ArcInfo ASCII Grid, Raw Binary, AutoCad DXF, VRML, XYZ, Binary XYZ, DTED Level 0, DTED Level 1, DTED Level 2, DGM-Band, XYZ-Slope, TIFF, USGS DEM Raster, SRTM, ESRI.hdr, ENVI.hdr, ERMApper, Golden Software ASCII Grid, Golden Software Binary Grid, ERDAS Imagine, Intergraph Raster, SCOP RDH, STL, REB, Unstructured Cell Data File, Surfacewater Modelling System 2DM File, CityGrid XML, SCOP Winput, Binary SCOP Winput, VESTRA Winput
- TIN
  - VRML, AutoCad DXF, STL, REB, Unstructured Cell Data File, Surfacewater Modelling System 2DM File, CityGrid XML, SCOP Winput, Binary SCOP Winput, SCOP RDH, ArcInfo ASCII Grid, Raw Binary, XYZ, Binary XYZ, DTED Level 0, DTED Level 1, DTED Level 2, DGM-Band, XYZ-Slope, TIFF, USGS DEM Raster, SRTM, ESRI.hdr, ENVI.hdr, ERMApper, Golden Software ASCII Grid, Golden Software Binary Grid, ERDAS Imagine, Intergraph Raster
- Vector
  - SCOP Winput, Binary SCOP Winput, XYZ, Binary XYZ, AutoCad DXF, VESTRA Winput, SCOP RDH, STL, REB, Unstructured Cell Data File, Surfacewater Modelling System 2DM File, CityGrid XML, ArcInfo ASCII Grid, Raw Binary, VRML, DTED Level 0, DTED Level 1, DTED Level 2, DGM-Band, XYZ-Slope, TIFF, USGS DEM Raster, SRTM, ESRI.hdr, ENVI.hdr, ERMApper, Golden Software ASCII Grid, Golden Software Binary Grid, ERDAS Imagine, Intergraph Raster

View Export
- Isolines
  - HPGL, SCOP, AutoCad DXF, HL-Band
- Shading and Z-Coding
  - TIFF, Tiled TIFF, TIFF LZW, Tiled TIFF LZW, JPEG, SCOP Pixel
- Profiles
  - Station, AutoCad DXF, SCOP Winput, Binary SCOP Winput, XYZ, Binary XYZ
- Image Overlay export
  - TIFF, SCOP Pixel, Tiled TIFF, TIFF LZW, Tiled TIFF LZW

For prices and distribution partner information please contact: sales@inpho.de

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Summit Evolution

INPHO SOFTWARE

Digital photogrammetric stereo workstation to collect 3D features directly into ArcGIS, AutoCAD or MicroStation.

Summit Evolution is not restricted to aerial frame and pushbroom imagery, it also offers feature collection from close-range, satellite, IFSAR, Lidar intensity and orthophoto imagery.

Summit Evolution works in a project-based environment, using triangulated photo blocks generated by MATCH-AT or other software packages. The user can roam seamlessly throughout an entire project of any size:

- ▶ A wide range of efficient feature collection functions is offered via DAT/EM* Capture and Stereo Capture for ArcGIS, which are integral parts of Summit Evolution

- ▶ Vector data collected by Summit Evolution, or imported from GIS or CAD systems, are superimposed directly onto the stereo models, making it an excellent solution for mapping, change detection, and updating GIS data

- ▶ Automatic batch map-editing of collected data can be applied for best mapping performance. Routines for data generalization, checking, and automatic line editing are included as well

Product Highlights

- ▶ Feature collection from aerial frame and pushbroom, close-range, satellite, IFSAR, LiDAR intensity and orthophoto imagery

- ▶ Superimpose collected or imported vector data directly onto stereo models for effective and efficient interactive mapping, change detection and GIS updates

- ▶ Improve result quality with routines for data generalization, checking and automatic line editing and batch map editing

- ▶ Map independently on a specific CAD or GIS (support for AutoCAD, Microstation, ArcGIS)

Key Features

- ▶ Summit Evolution® presents images in perfect 3D-stereo with overlay vector data for compiling directly into AutoCAD®, MicroStation®, or ArcGIS®:

- ▶ Production of geospatial mapping data with precision, power and user-friendliness

- ▶ Roam seamlessly through projects of any size using a project-based environment for oriented image blocks

* Summit Evolution is a trademark of DAT/EM Systems International.

Trimble

Summit Evolution INPHO SOFTWARE

TECHNICAL SPECIFICATIONS

FEATURES OVERVIEW

Summit Evolution comes with a variety of software components:
- Summit Evolution: digital photogrametric stereo plotter including orientation tools and project management
- DAT/EM Capture: data collection program for collecting 3D features directly into AutoCAD, MicroStation, or ArcGIS.
- MapEditor: software for automatic batch and vector editing in AutoCAD or MicroStation
- SuperImposition: stereoscopic 3D vector data viewing superimposed onto the stereo imagery
- Contour Creator: automatic contour generation based on file and CAD/GIS input

With its flexible orientation tools, Summit Evolution fits into any production workflow:
- Automatic or manual interior and relative orientation
- Absolute orientation
- Orientation data import from inBLOCK, PATB, Applanix, Albany, Bingo, AeroSys
- Project data import from MATCH-AT, BAE Socet Set, Z/I Image Station, Phorex, BLK, DiAP, DVP
- Project transformation from / into new coordinate systems

Advanced imaging features make Summit Evolution a precise and easy-to-use stereoplotter:
- Handling of 8-bit and 16-bit imagery
- Measurement with subpixel accuracy
- Quick frame sequential imaging
- Smooth real-time panning and zooming
- On-the-fly epipolar resampling
- OpenGL for image rendering
- User-definable cursors
- Customizable GUI elements

BENEFITS
- Produces digital topographic and engineering-quality maps and geospatial data directly into ArcGIS, AutoCAD or MicroStation.
- Easy API integration of other CAD or GIS packages.
- Sophisticated, yet straightforward mapping functionality.
- Developed for comfortable ease-of-use by photogrammetric professionals.
- Applies cutting-edge technology

VERSIONS
- Summit Evolution is available with three different functional extensions:
  - Summit Evolution "Professional"
    ◊ Unlimited functionality of Summit Evolution
  - Summit Evolution "Feature Collection"
    ◊ Full 3D feature collection, but no orientation capabilities, the perfect match in combination with MATCH-AT
  - Summit Evolution "Lite"
    ◊ Stereo viewer for Summit Evolution projects, simple measurement and basic drawing and editing tools

OPTIONS
- CAD/GIS interfaces:
  - DAT/EM Capture for AutoCAD
  - DAT/EM Capture for Microstation
  - DAT/EM Capture for ArcGIS
- Hardware:
  - Optionally, Trimble can provide all necessary hardware for Summit Evolution, including computers, monitors, stereo viewing systems and 3D cursors
  - Additional optional hardware components are:
    ◊ DAT/EM Kepad or Android tablet or touchscreen for quick access to mapping makros, handwheels and footdisk as additional input devices

SYSTEM REQUIREMENTS
- PC workstation
- Dual Intel Xeon processors
- 4 GB RAM
- High-capacity disk system
- Windows 7 64 bit Ultimate, Professional or Enterprise
- Hardware for 3D data capture:
  - Stereo-capable graphics card(s) supporting OpenGL quad-buffer stereo
  - Stereo viewing system (usually any 3D Vision-Ready Display with NVIDIA's 3D Vision Kit)
  - 3D cursor
  - DAT/EM Keypad or Android tablet
- Supported CAD and GIS:
  - AutoCAD 2004 through 2013, including AutoCAD, Map3D and Civil3D
  - MicroStation V8, V8i, V8i SS2 or SS3, Bentley Map SS2 or SS3
  - ArcGIS ArcView, ArcEditor or ArcInfo version 9.1, 9.1.1, 9.2 , ArGIS 10.0, or ArcGIS for Desktop 10.1, with all available service packs

SUPPORTED FORMATS
- Summit Evolution supports all types of source image:
  - Frame aerial images (TIFF, TIFF JPEG, BigTIFF, JP2, ECW, BMP and others)
  - ADS 40/80 digital aerial camera
  - VisionMap A3
  - DMC digital aerial camera
  - UltraCam digital aerial camera
  - RPC satellites, including ALOS
  - SPOT5 HRS
  - CORONA KH-4A/B historical satellite imagery
  - PCI ProPack satellite and other projects
  - ENVI epipolar satellite projects
  - IFSAR Stereo
  - LIDAR Stereo Images
  - Close-range imagery
  - Orthophoto images (GeoTIFF)

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