GeoSpatial Office Software
11 April 2016

Release Notes for Inpho 7.0.3(Patch) and Inpho 7.1 incl. SATMaster / TRSS

Trimble announces a new major release for all the Inpho software main products.
- MATCH-AT automatic georeferencing (including inBLOCK)
- MATCH-T DSM automatic point cloud (DSM/DTM) generation
- DTMaster Stereo interactive and automated editing of point clouds, DTM/DSM and basic mapping, including Building-Add-on, Building-Generator
- OrthoMaster ortho image generation
- OrthoVista automatic ortho mosaicking
  SCOP++ DTM/LiDAR processing and database (Kernel, Analyzer, Visualizer, LiDAR, TopDM)
- LPMaster airborne LiDAR processing for AX airborne laser scanners
- SatMaster / TRSS satellite imagery workflows
- Summit Evolution digital stereoscopic mapping into CAD, GIS

For users that are having on-going projects and don't want to change to the new major version immediately, Trimble recommends to install the patch 7.0.3. This final patch for version 7.0.x is containing several important fixes that are also available through version 7.1. Release Notes for 7.0 are also part of this document.
SatMaster and the Trimble Remote Sensing Suite (TRSS) are including the above mentioned software modules as components or embedded technologies. Changes for those modules as far as they apply to satellite processing are also part of SatMaster and TRSS. Note that TRSS also includes eCognition tools, so eCognition release notes also apply.

Table of Contents

What is INPHO

INPHO is Trimble's traditional airborne photogrammetry / airborne LiDAR processing software suite. This modular software offering covers the complete workflow from georeferencing to high quality deliverables such as point clouds, DTM/DSM, orthomosaics and mapping products. While UASMaster or TBC APM have a clear focus on UAS acquired data, INPHO is having its focus on large traditional airborne sensors mounted to planes or helicopters or satellite data. Inpho modules are highly automated, providing an outstanding level of accuracy and confidence. Inpho is suited for massive data volumes in processing, refining and editing as well as for visualization of deliverables. Inpho deliverables create the basis for a manifold of vertical applications in different markets such as survey, energy and natural resources, environmental research, cities and buildings, (urban) planning, monitoring, agriculture, cadastre and many more.

What's new in INPHO 7.1

Inpho v7.1 is freely available to customers on maintenance and does not require a new license to be installed, provided that a valid 7.x license is available. Major releases typically contain fixes to ensure processing workflows without interruptions and to grant for high quality results. Additionally the major release contains new major features like support for new sensors or new tools and functionality.

Note: For users that want to benefit from all the fixes, only, without updating to a new major version, we also offer a patch for Inpho version 7.0.3.
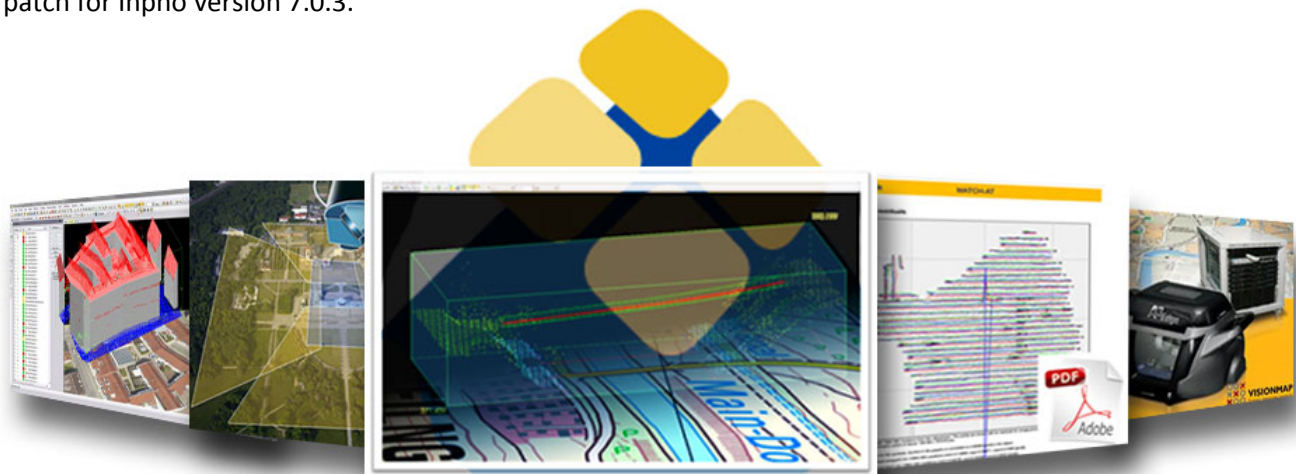
Broadening the Sensor Portfolio: Multi-head Sensors, Oblique Geometry, VisionMap A3
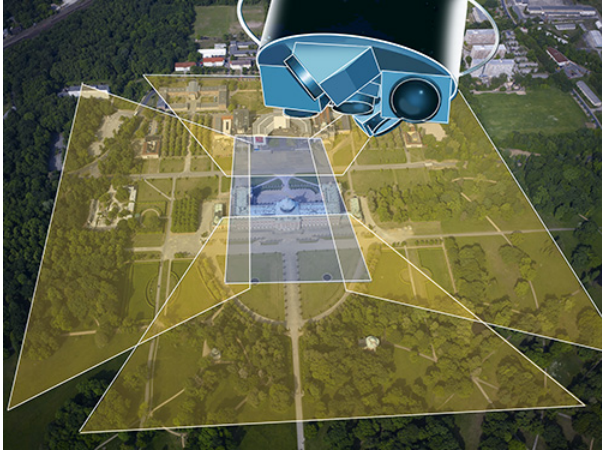
For a variety of reasons, there is an ever growing demand to create imagery with larger footprints/coverage. As sensor sizes are technically limited, more and more multi-head cameras are sold to photogrammetric professionals that conduct photo flights. Additionally more vertical applications like building modelling, power-line mapping etc. benefit from oblique looking cameras e.g. to create textures on facades, to monitor steep walls/terrain or actually to create true 3D models. In some cases there is still one camera used, mounted on a tilted gimbal mount, in other cases, again multi-head cameras (e.g. Microsoft Osprey) are used to capture imagery in nadir as well as four oblique directions simultaneously.

For INPHO 7.1 our software engineers created new workflows enabling optimized project setup and processing for multi-head and oblique sensors. Dedicated importers for specific camera brands have been added. Multi-head cameras are treated more like one unit built from individual cameras than being treated completely like independent cameras. As oblique viewing angles create a rather complex geometry with challenging overlap situations and perspective (and image content) differences, georeferencing, point-cloud matching as well as orthomosaic generation benefit from processing optimizations for this special kind of imagery. We want our users to be able to create deliverables with maximum quality and maximum confidence – in any situation, no matter how challenging the data might be. For more detailed information check-out the release notes for the specific Inpho modules.

In addition to multi-head support and oblique capabilities, INPHO 7.1 now also works with the VisionMap A3 photogrammetric camera. The A3 is a special pushbroom sensor camera that provides for excellent resolution and large footprints. The orientation/georeferencing format for the imagery is proprietary to VisionMap, therefore the entry point into the INPHO workflow is after having georeferences created with VisionMap software (*.slf format).

INPHO 7.1 now includes a dedicated importer for VisionMap A3 data which may be used within all INPHO modules for point-cloud matching (MATCH-T DSM), editing/refinement/mapping (DTMaster Stereo/Summit Evolution), and orthomosaic generation (OrthoMaster/OrthoVista).

Shareable PDF processing reports including graphical analysis views

For MATCH-AT automatic georeferencing of aerial imagery, a new PDF report is available. Users can now share all quality reports, graphs and statistics with their clients or sub-contractors. The included analysis graphics inform in a clear way about accuracy, reliability and confidence of the georeferencing process. Sophisticated views highlight standard deviations (error ellipses), residual vectors, tie-point distribution and connectivity. All relevant project parameters are displayed as well as all important numerical statistics. The PDF is easy to archive and also is
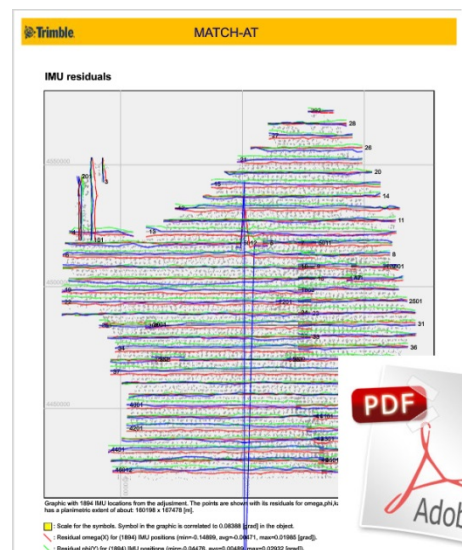
created in a printable format for full color-prints.

Extended mapping, CAD-drafting and building-modelling capability

DTMaster Stereo is the INPHO module for extensive refinement and editing and visualization of massive volumes of point-cloud data as well as for basic mapping (stereo-plotting and mono-plotting). The multi-file / multi-layer CAD drafting functionality is mainly used to digitize 3D vectors for morphology information such as e.g. break-line data. So far users could generate vector maps in DTMaster via mono-plotting (digitizing in xy e.g. on top of shaded reliefs or orthos and deriving the height from point-clouds) or via stereoscopic measurements (stereoscopic

3D visualization of photogrammetric imagery). New for 7.1 is the capability to use the mapping functions also within the 3D-profile view. All selected data is visualized in a rotatable 3D-box combined with height coded and shaded views or combined with contour lines. All vector functions, snaps, horizontal and vertical movements, selection, create and edit tools can now be performed also inside the profile box. Special keyboard assignments and auto-drape to terrain functionality is used to guide the user.
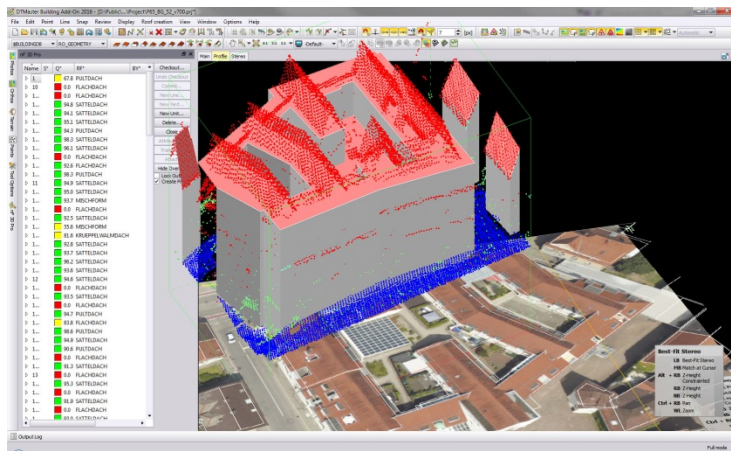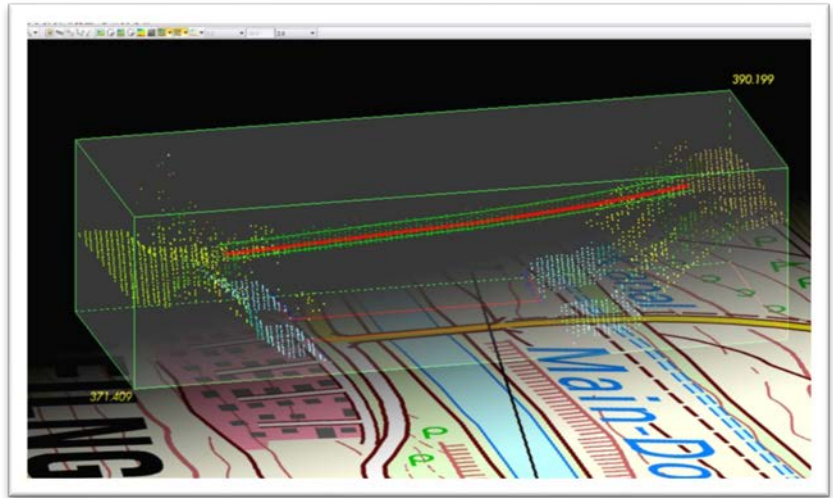
For building-modelling a special add-on to DTMaster Stereo called Building-Add-on is available. The building add-on is an easy-to-use tool to create LOD2 building objects. It leverages point-cloud data as well as stereoscopic imagery of existing building-shapes to model standard roof-typed buildings as well as complex roof types. Due to context-driven automated tools, building modelling is very simple and larger groups of building objects can be modeled in a very short timeframe. New to the Building-Add-on is the capability to split very complex building structures with multiple patios and many different roof structures into adjacent individual units.

List of Changes

Fixes for 7.0.3 are automatically included in 7.1. Changes for SatMaster and TRSS are aligning with changes in the Inpho components associated with satellite processing (ApplicationsMaster, MATCH-AT, MATCH-T DSM, DTMaster Stereo, OrthoMaster, OrthoVista).

ApplicationsMaster 7.0.3 / 7.1

Change	Description
Fix 7.0.3: Processing of Project Overview	Sometimes the process to generate the project overview image seemed not to complete although the image file already was successfully generated. Stopping the process did not work either. The new release correctly starts and stops the process.
Fix 7.0.3: Transformations between meters and usft	File importers in UASMaster automatically transform the data in the files (e.g. GNSS) into the specified project working coordinate system. In cases when data had to be converted from m to ft or vice versa, the transformations failed. The new version correctly performs those transformations now.
Change 7.1: absolute camera calibration parameters	Until now, self-calibration parameters from MATCH-AT / InBlock were considered being relative corrections from any already given calibration parameters – this is how they were stored in the Inpho project files. From version 7.1 on, only a single correction data set is allowed per calibration, so if the aerial triangulation computes self-calibration data e.g. using Pat-B-type polynomials, corrections are now stored as absolute values (given + self-calibration).
New Feature 7.1: Multi-head camera system and image Import	Inpho modules now also support multi-head and oblique camera systems. The support of multi-head systems required a re-design of the camera editor to be able to create a platform with several camera heads assigned to their viewing angles. Specialized importers for imagery and camera data are available for Microsoft Osprey, Leica and IGI. Refer to the documentation on more information how to work with (oblique-)multi-head systems. Note: for IMU data, multi-head systems require angles specified in omega/phi/kappa, only. Roll/pitch/heading import is not available for multi-head systems. The new camera system definition allows for multiple oblique facing camera-heads as well as for multiple nadir facing heads. Thus, e.g. IGI dual head cameras can be defined with two nadir facing camera heads.
New Feature 7.1: Support for Visionmap A3 data	Inpho modules (MATCH-T DSM, DTMaster, OrthoMaster, OrthoVista) now also support the VisionMap A3 image sensor. Georeferences are proprietary to Visionmap, so the A3 workflow starts after importing georeferences (*.slf). A special project format with specialized importers are made available for A3 processing.
New Feature 7.1: Photo-importer supporting JPEG	Previous versions of the image importer did only load TIFF images when selecting the import from a complete directory. The new versions now also load JPEG images. Same goes for image import into the image commander.
New Feature 7.1: New camera interface	The camera editor is completely re-designed to support multi-head systems. Also calibration variations are no longer stored as new cameras. A new calibration is stored within the same camera assignment but with an additional camera calibration version.
New Feature 7.1:	A new function is made available to consider given image areas, only, for processing. Especially with A3 imagery and satellite data, sometimes the TIFF

Generate region file from Tiff Images	image is larger than the real image content. A region file describes the image area that is useful. The file is automatically created, when defining a background color for the images.

MATCH-AT 7.0.3 / 7.1

Change	Description
Fix 7.0.3: Display of residuals in satellite triangulations	In the georeferencing process for satellite imagery, often residuals were not displayed in the adjustment report. This has been fixed for Inpho 7.0.3 and TRSS (SatMaster)
Fix 7.0.3: Visualization of statistics	The fix corrects displaying statistics information with point ID's containing special characters like "."
Fix 7.0.3: Change/delete ground control point types from within photomeasurement tool	It is now possible to edit the control point type and to delete ground control points as well as photo assignments from within the photo measurement tool.
Fix 7.0.3: image access over network	In some network configuration it might have happened that image access is lost for very short moments, thus, tie point matching especially for large projects that take long to process might not have run successfully. The fix provides a solution that is tolerating short network instabilities.
Fix 7.0.3: mirrored image display in stereo comparator view	The stereo comparator tool to stereoscopically pick control points in non-oriented images displayed images in a mirrored style. This has been fixed.
Fix 7.0.3: opening the statistics viewer	For larger projects (e.g. several thousands of images) it takes long to load all the observations into the statistics viewer tool. For about 8000 images this may take about 5 minutes and the loading process cannot easily be stopped. For large projects, the program now shows a warning, that launching the statistics viewer takes long and lets the user decide whether to proceed or not.
New Feature 7.1: Support for station strips	With the new support for multi-head cameras, the exposure-"station" concept has been established. A "station" groups all camera heads into one exposure event. For MATCH-AT, multi-head systems create strips always from stations. For tie-point matching and triangulation, from the station strips automatically individual strips per camera head are created.
New Feature 7.1: Selection for LSM reference image	Constant improvement of the automatic image matching routines required a revision of the strategy for reference image selection. The new criteria provides for a more complete set of measurements for all overlapping images
New Feature 7.1: Automatic matching with large principal point	Oblique and multi-head camera systems often are designed with a very large principal point offset. As an approximation like PPA being exactly in the center of an image is no longer suitable for successful automatic point extraction, the correct values are now considered also for the matching process.

offsets	

MATCH-T DSM 7.0.3 / 7.1

Change	Description
Fix 7.0.3: Performance of point cloud generation	Constant improvement of performance of automatic matching routines required an update of the image selection strategies for point cloud matching. The new strategy results in a much faster computation.
Fix 7.0.3: LAS format selection (1.2/1.4)	MATCH-T DSM automatically writes LAS 1.4 formats when necessary. For users that are not able to use LAS 1.4, there is an option in the matcht.STATUS file (see MATCH-T documentation) to force MATCH-T to write LAS 1.2 in every case. Trimble however recommends to update user workflows to LAS 1.4 as LAS 1.4 is able to work with much larger point clouds than LAS 1.2 without problems.
New Feature 7.1: More homogeneous point clouds	Ever growing demand for more precise point clouds with less noise and of homogeneous quality made it necessary to revise the point cloud generation strategy. The new strategy creates a much more homogeneous point cloud that much better represents the terrain according to data from the aerial triangulation.
New Feature 7.1: Build models from station information	Multi-head camera systems require special treatment in automatic point extraction. As the camera heads are mounted close to one another providing for some image overlap, common automatically extracted points could be matched between the different camera heads. These points, geometrically would have an extremely bad intersection angle and therefore they are very risky to be used in computations. The new "station" concept defines one central position for all camera heads that are triggered for an exposure at the same time. The "station" concept avoids that points are extracted between camera heads belonging to the same "station" / exposure.
New Feature 7.1: output option for extended exclusion areas	For the DTM / WNP output of MATCH-T DSM, also expanded exclusion areas can be saved. This might be used to flag void points inside an expanded exclusion area for later use.

DTMaster Stereo 7.0.3 / 7.1

Change	Description
Fix 7.0.3: Contour lines display	In some cases it might have happened that elements like contour lines could not be hidden from the display any more once they were activated. The new release provides a fix.
Fix 7.0.3: LAS import	The import of LAS files in some cases was not working properly. The problems with these specific LAS files have been identified and DTMaster now successfully imports the data.
Fix 7.0.3: Grid spacing for	The "Create Point Cloud" function inside DTMaster and UASMaster Point Cloud Editor now correctly reads the tool option settings for generating a regular grid.

Change	Description
DTMaster point cloud generation	
New Feature 7.1: Digitize / edit vectors in 3D profile view	The line measurement and edit functions have been added to the 3D profile view. The 3D profile is rotatable and can be used to easily measure e.g. break-lines. In order to be able to drape the cursor to the terrain, users have to activate the shading.
New Feature 7.1: Display lines on top of the shaded display	In association with the new function to be able to digitize and edit lines in the profile view, it was required to display lines on top of the shading. The recommended setting for digitizing in the profile view is to have the shading activated in order to interpolate any measurement into a virtually computed mesh.

OrthoMaster 7.0.3 / 7.1

Change	Description
Fix 7.0.3: Window Resize	In some situations, resizing the OrthoMaster window resulted in OrthoMaster to freeze or to crash. This bug has been fixed.
Fix 7.0.3: Reaction to loss of license access	In cases, that OrthoMaster is losing access to the license (e.g. With a broken network connection), the generation of orthos stops immediately with an according message. Previous versions just continued to generate orthos in DEMO mode.
New Feature 7.1: Consider nadir imagery, only in Orthomaster	The new support for oblique multi-head cameras required a change in the consideration of specific images for the ortho rectification. In the camera definition dialogue for a project, camera heads can now be flagged e.g. for being mounted in nadir direction. To get the best quality of the ortho rectification process, OrthoMaster only uses the camera heads flagged being mounted in nadir direction. Note that e.g. for multi-head cameras with small oblique angles (e.g. IGI dual head cameras) the camera heads will be defined as nadir looking.
New Feature 7.1: Consider "Stations" for multi-head imagery for post-processing with OrthoVista	In OrthoMaster multi-head systems need special attention when creating ortho areas or when assigning parameters for further post-processing with OrthoVista. Formerly multi-head systems were automatically assumed when photo-centers were located within a very short distance and the associated processing option was selected. Now the assigned stations are used to group the camera heads into one unit. Note that only images from camera heads defined being nadir facing are rectified, so the multi-head option is applicable whenever a multi-head system incorporates multiple nadir camera heads. Multi-head post-processing with OrthoVista helps to save a lot of processing time in the mosaicking process as between orthos from nadir heads belonging to the same station, no seams have to be searched for.

OrthoVista 7.0.3 / 7.1

Change	Description

Change	Description
Fix 7.0.3: Processing JPEG imagery	In some cases, especially in multithreaded environments, OrthoVista crashed without notice when image data volumes become too large (due to JPEG libraries the de-compressed data for JPEG imagery must not exceed 154.5MB) . Improved error handling now displays a warning to avoid program crashes.

LPMaster 7.0.3 / 7.1

Change	Description
Fix 7.0.3: Conversion of old ALS files	The function to convert older ALS file version has been updated to now work consistently.
Fix 7.0.3: Memory problems with WDP export	This fix corrects a memory problem when exporting WDP files.
Fix 7.0.3: Rotation equations in point cloud processing	LPMaster's point cloud processing routines are now aligned with the rotation computation equations from Riegl to avoid possible follow-up errors.
Fix 7.0.3: Strip Level computation and display	For larger projects it may have happened that the strip level computation or display freezes. The patch provides the necessary fix.
New Feature 7.1: Fast computation of point density map from cov.sdc data	With LPMaster it is now possible to visualize the coverage result for detection of gaps directly after a flight session. The point density is directly determined from cov.sdc data. Changes associated with that were: - include the laser scan rate into the boot import dialog - include the thin out rate to the cov.sdc processing, the rate is stored in the history string of the cov-pat file - the thin out rate is considered by the pc2tile density processing - add the point return select box into the density dialog - a new dialog to view the statistic information of the boot / density information is integrated in the edit->density map->density report menu

For more information

For more information contact your Trimble Inpho Support Team at imaging_support@trimble.com and register at https://community.trimble.com in order to track all news on Inpho.

Note: the 7.1 release does not require a new license to be installed. Users with a valid license for 7.0.x are entitled to download and use the new release.
Also note that inpho's WiBU licensing system also is updating their libraries constantly. To guarantee for stable license access, Trimble strongly recommends to update the WiBU libraries (available for download on above mentioned site