October 2023, Version 14.0.0
November 2023, Version 14.0.2 / Version 14.0.3
April 2024, Version 14.1.0

Release Notes for Inpho 14

Trimble Inpho Version 14.1.0

Trimble announces the release version 14.1.0. The reason for this version are new features and bug fixes.
A new license is not necessary if version 14 is already running.

Trimble Inpho Version 14.0.3

Trimble announces the second patch release for version 14. The reason for this version is urgent bug fixes.
A new license is not necessary if version 14 is already running.

Trimble Inpho Version 14.0.2.

Trimble announces the first patch release for version 14. The reason for this version is bug fixes. Version 14.0.1 was an internal version and was not released.
A new license is not necessary if version 14 is already running.

Trimble Inpho Version 14.0

Trimble announces version 14 for all Inpho software products including UASMaster (separated release notes). Users can find the following products in Inpho 14 as modules in ApplicationsMaster:

MATCH-AT automatic georeferencing (including inBLOCK)

MATCH-3DX and **Meshing Add-On** for automatic generation of 3D point clouds, true ortho mosaics and 3D meshes

MATCH-T DSM automatic 2.5D point cloud (DSM/DTM) generation

DTMaster Stereo interactive and automated editing of point clouds, DTM/DSM and basic mapping

OrthoMaster ortho image generation

OrthoVista automatic ortho mosaicking, editing and color balancing

SATMaster complete satellite imagery workflow

This major release offers new features in addition to bug fixes.

A new license is required.

For more information, please visit our new website: https://geospatial.trimble.com/products-and-solutions/trimble-inpho

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What’s new in Inpho 14!

OrthoVista - a great tool just gets better and better!

Easy and simple system load

OrthoVista dynamically resizes the cache based on the system load. Additionally, it automatically adjusts the workload distribution, taking the hardware and the processing settings into consideration leading to a processing reduction of 25%!

Improved speed with large projects

OrthoVista enhancements result in a reduction of computation time by 20% when dealing with large orthophoto mosaic projects. This improvement is made possible through features like parallel processing for global tilting, automatic organization of parallel child processes, process handling, and enhanced tile collection for mosaicking.

User experience improvements with very large projects

OrthoVista expedites the processing display options to reduce wait times, improves memory handling to lower the computer hardware requirements, and adds filter options to simplify the selection, activation, interaction, and settings for groups to make loading and selecting projects much faster.

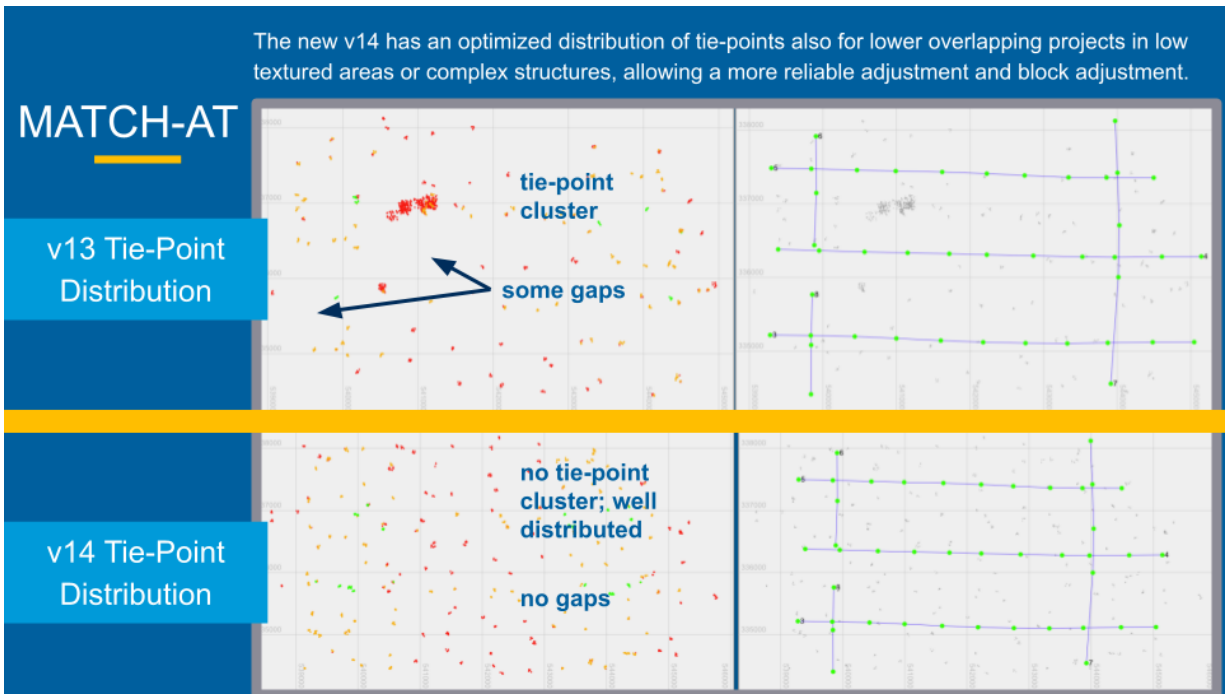
Better quality results

With enhanced blending algorithms for feature detection that reduce and avoid creating visually disturbing seam islands, OrthoVista creates the highest quality images from very large projects better than ever.

MATCH-AT - improved tie-point distribution

Continuous improvement of tie-point generation

MATCH-AT maintains its capabilities as the best tie-point generation tool for photogrammetry in the world through the newly added ability to extract in lower overlap areas with low texture or complex structure. Together, with the enhancements from previous versions of MATCH-AT that enabled the creation of any type of aerial block through intelligent tie-point generation, MATCH-AT supports any type of photogrammetric project.



MATCH-3DX - improvements for true-orthophoto and mesh

Better user experience for deliverable creation

MATCH-3DX introduces a new local non-OBJ mesh format, which can be handled better from 3rd party viewing software. The local mesh coordinates from the non-OBJ mesh format results in a coordinate system with its origin at the project centroid. MATCH-3DX also simplifies its mesh texture options to prevent user input errors and runs a texturing for all meshes.

For advanced users it is possible to switch off the texture using the "advanced options", allowing the user to remain the capability to produce a pure mesh without texture.

The advanced options file include new functionality allowing the user to clip the mesh result based on a SHP, DXF or WNP file giving now the option to create a mesh based on a boundary file, looking cleaner and fitting perfectly to the project extends. Additionally, area definition limiters for XY and/or Z have been added, including logical thresholds for the final deliverables, avoiding snippets of texture floating far above or below the project, creating a cleaner and more accurate result.

Improved performance

MATCH-3DX analyzes the area definition and selects a subset of images from the complete project to improve the pre-processing time. Processing times were reduced up to 10 percent for 3D Mesh and up to 20 percent for True Ortho projects.

New compressed point cloud storage lowers the disc space requirement. There are more features in this version that can be found in the Release Notes. As usual, the Inpho team has improved the stability and usability through bug fixes in version 14.

List of Changes

General notes and information:

Changes for SATMaster are aligning with changes in the Inpho components associated with satellite processing (ApplicationsMaster, MATCH-AT, MATCH-T DSM, DTMaster Stereo, OrthoMaster, and OrthoVista).

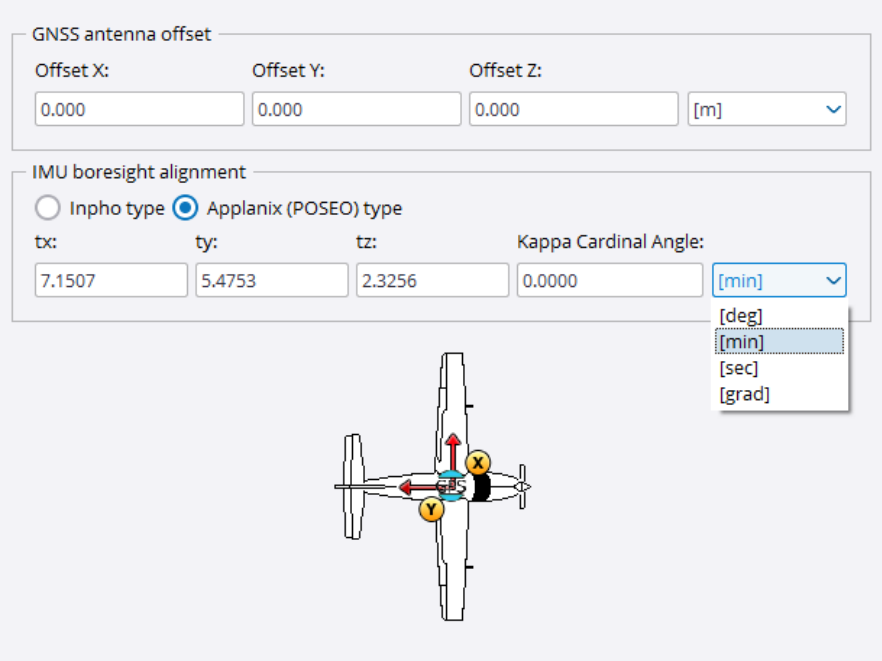
Version 14 needs a license update. Customers with maintenance automatically received the license update. A valid license for version 14 works for all versions down to 11.0.5. Older versions are not supported with the new license.

Inpho software offers multi-user support on Server Operating Systems.

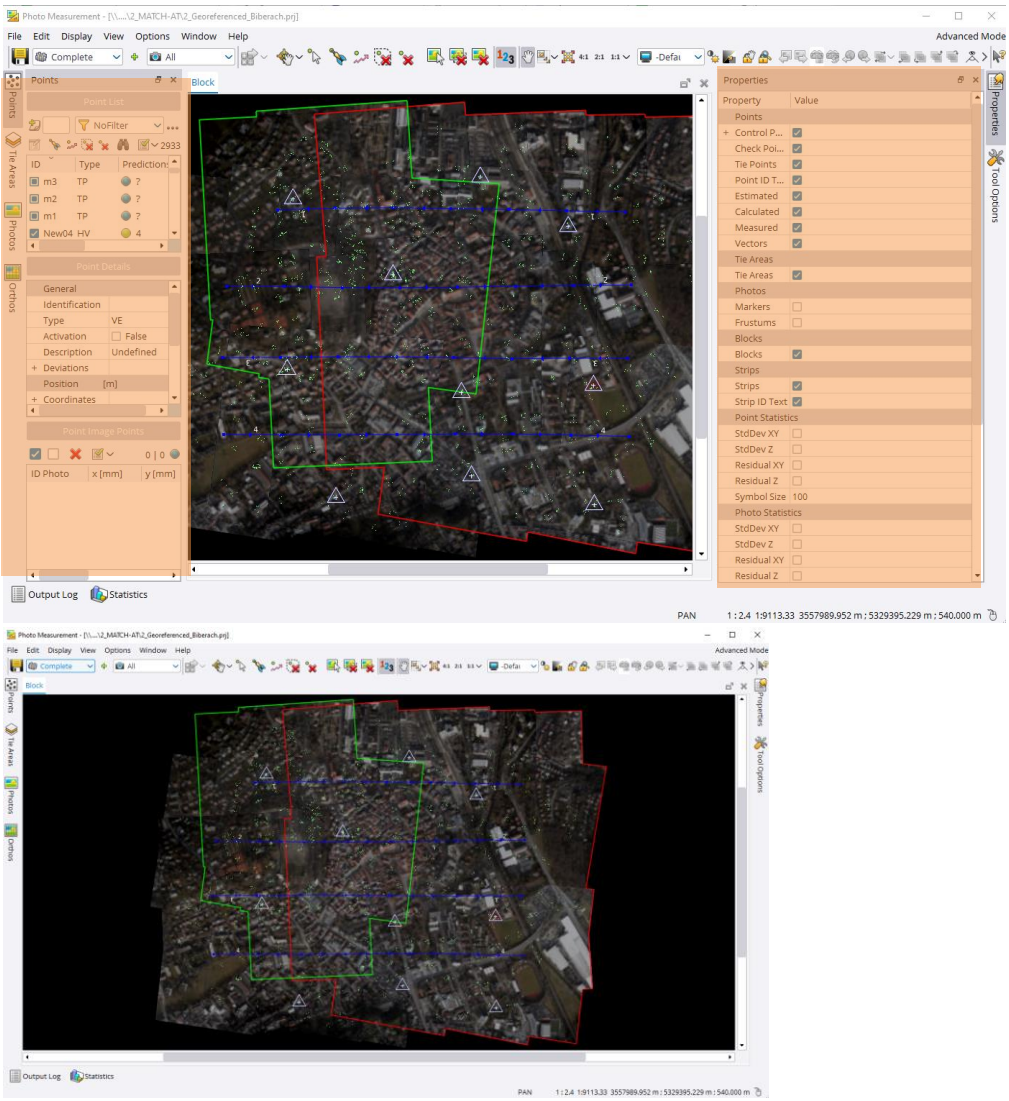
We recommend installing the latest available CodeMeter Runtime version. It is included in the Bundle installation and available on our download page under 3rd Party Products as well on the WIBU homepage (www.wibu.com).

We recommend installing the latest Coordinate System Manager version. It is included in the Bundle installation and available on our download page under Trimble Photogrammetry (Trimble Coordinate Systems (TCS)_<version>). A new coordinate system database is available too and can be updated when starting the Coordinate System Manager, e.g. new and updated Geoids were added.

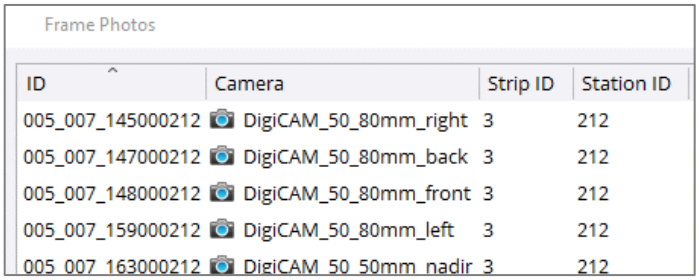
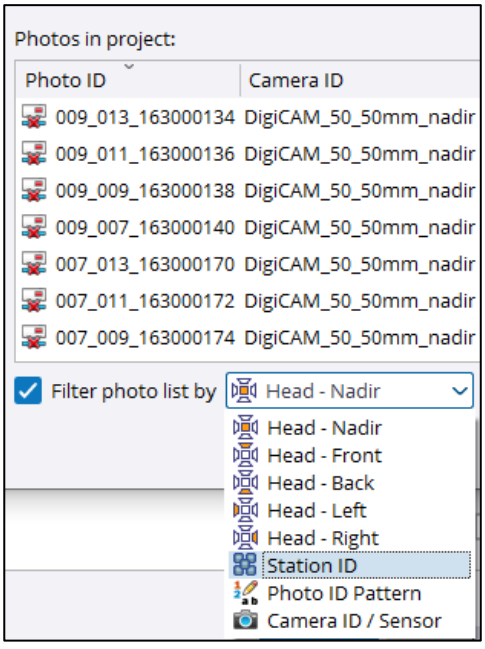
ApplicationsMaster

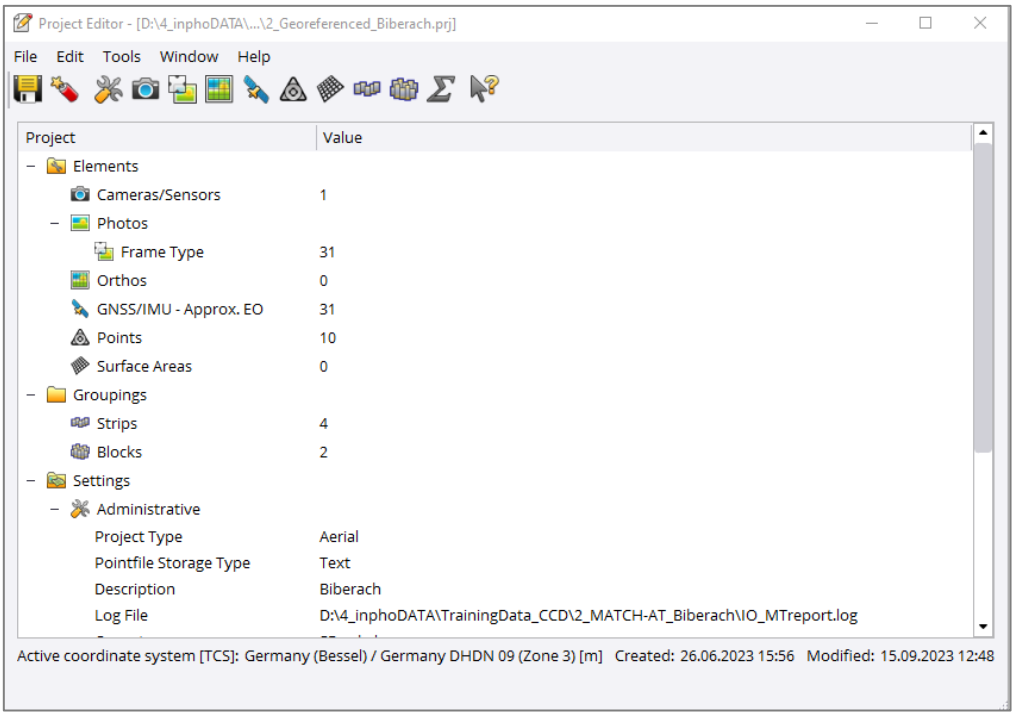
Change	Description
Improvement 14.1.0: Project loading time	The loading times of projects has been significantly improved. Example: Loading a project with 134 000 images now takes less than a minute, compared to 8 minutes in version 14.0.
New Feature 14.1.0: Remove ground control points outside project area	At the request of many customers whose ground control points are stored in one nationwide file covering huge areas, the Project Editor now offers the option of removing points that are not within the project area. The function “Remove orphans”, which already exists for the GNSS/IMU data has now also been implemented for “Points”. It works for Aerial and Multi-Head projects.
Improvement 14.1.0: Select by subdirectory in Image Commander	The Image Commander now offers the option of loading images from subdirectories. Previously only the directory could be selected.
Improvement 14.1.0: Added NAS Serializer for GID version 7	You can now choose whether you want to export data in GID version 6 or the new version 7.
Improvement 14.1: Unit definition for boresight misalignment angles and GNSS antenna offset	The units of boresight misalignment angles in inpho or Applanix style can now be defined in degrees, grads, arc minutes or arc seconds and changed on the fly. Reopening the camera entry, the value is always displayed in degrees. The antenna offset units can now be entered in meter or feet. 

Improvement 14.1.0: Updated Trimble Coordinate System data base version	This patch installs the latest version of the Trimble Coordinate System (TCS), which includes the following enhancements: > Modernized support for the Philippines > Updated US State Plane Zone extents > Updated Japanese State Plane Zone extents > Modernized support for Tanzania with datum TAREF11 and geoid EGM2008 > Added new geoids ROvT4.08 for Romania and Bucharest > Added support for Guatemala > Added support for Wisconsin Transverse Mercator > Added new geoid model RAC23 for Corsica > Added new geoid DVR90 2023 for Denmark > Added new ITRF2020 plate motion model > corrected wrong missing values in AusGEOID2020
Fix 14.1.0: User interface Sub-block definition time/crash	The sub-block definition dialog in the Project Editor took a very long time to open. Sometimes the dialog crashed or closed without notice. Now performance is optimized and an iterator conflict that caused the crash has been fixed.
Fix 14.1.0: Initialization of boresight not correct if multiple camera sets exist	In case multiple camera sets are available in the camera editor, the initialization did not take the correct set into account or generated some kind of mixture. This is fixed so that the initialization works correct.
Restriction 14.1.0: Compressed TIFF images using 16 bit JPEG will no longer be readable	The support for pseudo 16 bit JPEG compression in TIFF files was removed. This compression method was established by LH systems for the ADS40 camera around 2002. Sensor data was reduced from true 16 bit depth to 8 bit using a min/max search and subsequently compressing the reduced 8 bit data. On reading such compressed images, the 8 bit data was upscaled to 16 bit by applying the previously found min/max values. Compressed TIFF images using 16 bit JPEG will no longer be readable in this and future versions. As a workaround, such image files may be converted to 12 bit JPEG or uncompressed 16 bit using a previous version (up to 14.1.0) of the Image Commander or the command line tool “make_pyr.exe.
Fix 14.0.3: Project Editor - Missing strip/station ID update	If edits were made in the properties dialog, e.g., adding stations to strips or removing station from strips, the strip/station ID in the photo element was not updated.
Fix 14.0.3: Minimizing/Maximizing UI	Minimizing the interface and maximizing it again closed all open tab dialogs.

	
Improvement 14.0.2: Project loading speed when using Trimble Coordinate Systems	The loading speed was increased up to a factor 5 for projects based on a Trimble Coordinate System (TCS).
Fix 14.0.2: Issues with binary XPF file format	In version 14.0.0, when the point storage type was set to “binary” in the Project Editor, incorrect characters were written into it. The tie point extraction in MATCH-AT and the 3D Reconstruction in UASMaster took an unusually long time and ongoing runs should be cancelled. Opening such a project failed and the connection points were deleted.
Fix 14.0.2: Inpho Coordinate System (ICS) and NTV2 grid shift	No message was displayed when the defined NTV2 grid shift file cannot be opened. An error message now appears in the Project Validator of the Project Editor. Additionally, an error message appears when opening a project file with a project coordinate system that is missing NTV2.

We support Windows 11 now.
We are discontinuing the support of the Windows 7 operating system. Although Inpho software may still run on older Windows systems, we are no longer using the systems for testing. We recommend updating the operating system to a newer operating system.

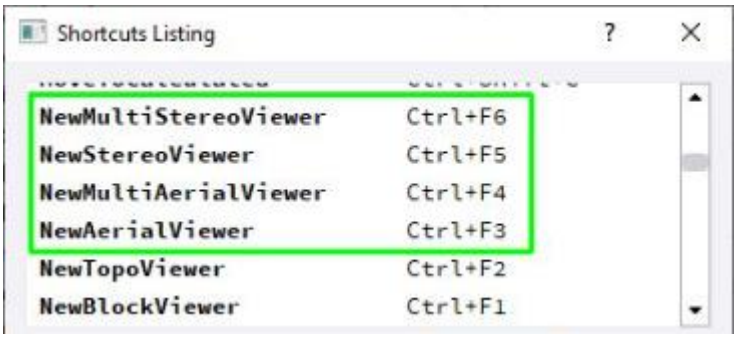
Information: Antivirus software interference	After an Inpho software update or antivirus software update, it can happen that previously used modules show malfunctions. The behavior differs from case to case and is therefore not listed in more detail here. A solution is to define exception rules for the corresponding executables and DLLs in the antivirus software. Please contact imaging_support@trimble.com for further information.
Information: WIBU Codemeter Version 7.60c	We strongly recommend installing the new driver version as this will close further security gaps. The current CodeMeter version 7.60c is added to the Bundle installation of version 14.0.0 and will be installed automatically.
Information: Coordinate System Manager Version 3.9.16.0	We strongly recommend installing the new Coordinate System Manager. The current version is added to the Bundle installation of version 14.0.0 and will be installed automatically. The version of the current coordinate system database is 107.
New Feature 14.0.0: New columns in the Project Editor > Frame Photos	The “Photos” dialog in the Project Editor is equipped with two new columns: Strip and Station ID. 
New Feature 14.0.0: Block definition for multi-head projects	The sub-block definition dialog of the “Project Editor > Blocks” now offers the “Station ID” for the listing in the “Filter photo list by” option. This not only supports sorting the listing, but also to searching for specific station IDs. 

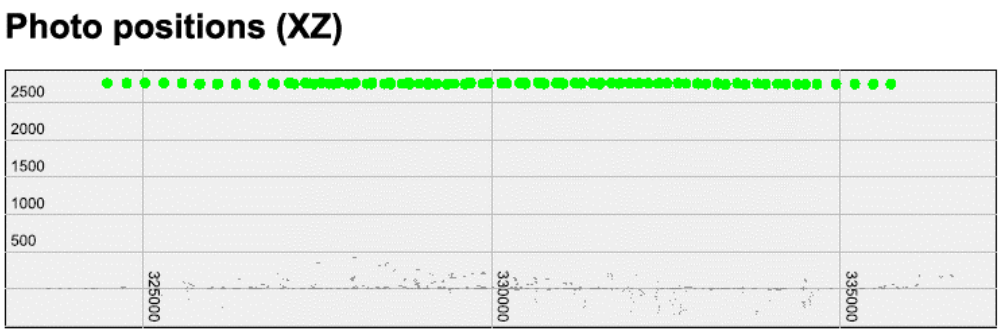
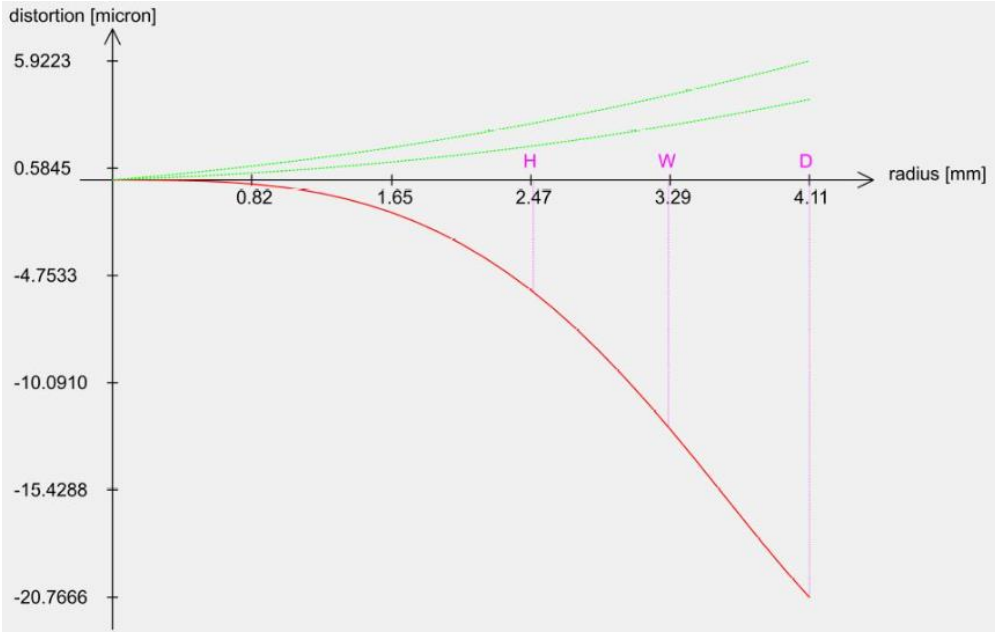
New Feature 14.0.0: Information about used coordinate system database	The Project Editor shows now if either the TCS or ICS coordinate system manager is used.  The “Single Point Transformation” also shows the used coordinate system and in case of TCS the used coordinate system database file. C:/ProgramData/Trimble/GeoData/current.csdx
Improvement 14.0.0: Update Trimble Coordinate Systems (TCS), Database 107	The Trimble Coordinate System Manager database is updated and equipped with new systems and geoids. **Austria** Updated: Datum Grid and Geoid Model for Austria: austria_mgi_gis_grid_2021_lat & lon.dgf and autgeo13.ggf **Canada** Added: NAD27 datum and zones for the city of Toronto: nad83_csrs_2010_to_nad27_toronto_lat & lon.dgf **Czechia; Slovakia** Support of S-JTSK / Krovak East North **Finland** Added: Alternative zones and EPSG aliases for Finland **Germany** Added: Geoid Model GCG2016 for Germany gcg2016_deu.ggf **Japan** Updated: Displacement Model for Japan jgd*20230401.xml & cmg

	New Zealand Added: EPSG codes for NZGD2000 projected coordinate systems **Romania** Updated Geoid Model for Romania ro_qgvt407.ggf **South Africa** For the time dependent transformation of South Africa are added new DGF files, new GML files and new XML&CMG files modelling the displacement model. **Switzerland** Added: EPSG Alias 2056 for “CH 1903+ (LV 95)”. In addition, a fix was made for the GGF file (chgeo04ht.ggf) and for the geoid "Swiss Geoid 2004 HTRANS”. **USA** Added: LDP Zones for Ohio DOT
Improvement 14.0.0: Improved performance of project I/O	The import/export for very large projects took a long time. With version 14.0.0 these times are improved so that importing and exporting data now takes about a fifth of the time and will be particularly noticeable in large projects.
Improvement 14.0.0: Pyramid generation checks size of resulting image	Pyramid generation now checks the size of the top level image. If this exceeds 3GByte, BigTIFF is enforced. Since the pyramid adds 1/3rd of the top level image size, it ensures that the total file size will not exceed 4GB. To account for JPEG compression, a compression factor of 3 is assumed for single-channel images (images with more than 3 channels per pixel). For RGB images, a compression factor of 6 is assumed when the number of bits per channel is 8. Since the actual compression factor is not known in advance, only the above estimates of 3 or 6 can be considered confident enough to estimate the size of the resulting image. This can result in BigTIFF being forced even though the actual compression factor is larger and the resulting file size is less than 4GB.
Improvement 14.0.0: Satellite project export to Summit EV	In the project export the possibility was added to transfer the point measurements of satellite projects to Summit EV. It needs to be considered that when exporting measurements in this way, it will lead to an automatic re-adjustment of the RPCs in Summit EV.
Fix 14.0.0: GNSS standard deviations for non-metric project coordinate systems	The GNSS standard deviations were not converted to feet for non-metric project coordinate systems.
Fix 14.0.0: Export to ZI, number format	The "camera" file created with the project export to ZI could show very small values for PPA/PPS instead of zero. Now the format is corrected and only shows 6 decimal places.
Fix 14.0.0: Project Editor – Station assignment	In the Project Editors Frames dialog, the Station assignment was not visible directly after the Stations were generated. This is fixed and it is not necessary anymore to restart the software to update the display.

Fix 14.0.0: Project Editor – XPF format	When changing the format of the xpf file (which includes the automatic images measurements) between binary and text, the xpf file no longer gets emptied. Now all automatic image measurements are transferred into the other format.
Fix 14.0.0: RPC reset when image path changed	By changing the image path in the Project Editor, the corrected RPCs of satellite imagery were reset to their original values. Now the RPCs are not affected by an image path change.

MATCH-AT / Satellite Georeferencing

Change	Description
New Feature 14.1.0: Report file in Japanese language	The PDF report can now also be output in Japanese. To do this, the appropriate language selection must be set under ApplicationsMaster > Preferences. However, the interface language remains in English.
New Feature 14.1.0: Added shortcut and button for "Aerial Viewer"	A shortcut is added for the "View in Aerial Viewer".  The Block viewer in the Multi-Photo Measurement Tool (PMT) now provides a button "View in Aerial Viewer"
Improvement 14.1.0: Loading time PMT	The loading times of the Multi-Photo-Measurement Tool are significantly improved. Example: For a project with 134000 images, the PMT in version 14.0 took 5 minutes and 24 seconds, in version 14.1 it took 57 seconds.
Improvement 14.1.0: Tie point distribution	The significantly worse tie point distribution for shore line project in version 14.0.3 in comparison with version 13.2.2 no longer exists with version 14.1. The matched points are now better distributed across the entire image area without clusters forming.

Improvement 14.1: Extended pixel range for "Minimum distance between points"	Version 14.1 now allows the maximum input of "500" pixels, instead of the previous "99" pixels, as the "Minimum distance between tie points". This input is applied in the last LSM step of the tie point extraction. Example for sample data set "Biberach": Using "0" as minimum distance between points resulted in 1648 tie points, entering "500" pixels resulted in 229 tie points
Improvement 14.1.0: Updated PDF report	In addition to the XY representation of the image positions, the PDF report now also shows their position in the XZ plane.  The distortion graphs are now labeled for better understanding. The dashed green lines show the magnitude of the decentering distortions (P coefficients) on the four sensor diagonals. This gives an idea of what is lost when only radial distortion components are used. The image dimensions are displayed as H (height), W (width) and D (diagonal) in millimeters.  The report now shows separate graphics for strips and image positions, instead of one graphic with strips and points as in previous version. Furthermore, at the end of the report you will now also find a list of the standard deviations of the ground control and check points to complete the previous graphic.

<table>
<tr><td>Improvement 14.1.0: Missing geoid data (grid shift values)</td><td>In case the geoid (grid shift file) for a country exists within the country's borders (e.g. VITEL 2014 for Hungary) only, but the project area extends beyond the country's borders, the RPCs cannot be corrected.
In this case version 14.0 announced that coordinates were incorrect. A meaningful error message is implemented for version 14.1:
<pre>RPCs could not be imported!
Probably the RPCs could not be transformed to the project coordinate system.</pre>
As workaround please use a global geoid file or a geoid file that covers a larger area.</td></tr>
<tr><td>Fix 14.1.0: Shortcuts not working</td><td>The defined shortcuts for "NewAerialViewer" and "NewMultiAerialViewer" were not working. This was referring to the default definition (Ctrl+F3 and Ctrl+F4) but also to manually defined ones. The same applied to the stereo views.</td></tr>
<tr><td>Fix 14.1.0: inBLOCK adds new camera unexpectedly</td><td>In rare cases it could happen that inBLOCK added a new camera set even though it was not needed.</td></tr>
<tr><td>Fix 14.1.0: Wrong reporting for analog projects</td><td>For analog projects, the PDF report showed incorrect information. Existing tie points were not displayed.</td></tr>
<tr><td>Fix 14.1.0: The K0 value is listed with wrong sign</td><td>In case the Camera Calibration mode (inBLOCK) was used, the K0 value was entered with wrong sign in the camera related PDF file. The project PDF included already the correct value.</td></tr>
<tr><td>Fix 14.1.0: Sub-block matching for MHS projects</td><td>For some configurations, the tie point extraction crashed for a generated sub-block of a Multi-Head project. The MATCH-AT log file already showed the results but missing the last lines of the files. When closing the AT the project was nearly empty, no camera, no frames, no GNSS/IMU and no tie points. That is fixed.</td></tr>
<tr><td>Fix 14.0.3: MATCH-AT and research license</td><td>Using a research license MATCH-AT stopped the adjustment with the error message (exit(-1)).</td></tr>
<tr><td>Improvement 14.0.2: New entries in PDF report</td><td>At the customer's request, the report file now contains expanded information about the statistical evaluation of all results (GNSS, IMU, ground control points).
GNSS residuals (given - adjusted) for 202 positions
<table><tr><td></td><td>X [m]</td><td>Y [m]</td><td>Z [m]</td></tr><tr><td>Maximum</td><td>0.1679</td><td>-0.2801</td><td>-0.1120</td></tr><tr><td>Mean</td><td>-0.0000</td><td>0.0000</td><td>-0.0000</td></tr><tr><td>Sigma</td><td>0.0543</td><td>0.0646</td><td>0.0311</td></tr><tr><td>RMSE(x,y,z)</td><td>0.0541</td><td>0.0644</td><td>0.0310</td></tr><tr><td>RMSE(H)</td><td>0.0841</td><td colspan="2">SQRT(RMSEx**2 + RMSEy**2)</td></tr><tr><td>RMSE(3D)</td><td>0.0897</td><td colspan="2">SQRT(RMSEx**2 + RMSEy**2 + RMSEz**2)</td></tr></table></td></tr>
</table>

<table>
<tr><td></td><td>

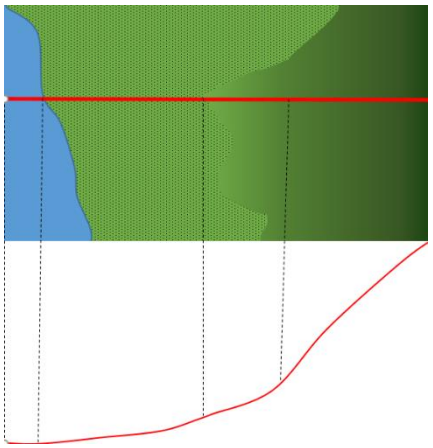
IMU residuals (given - adjusted) for 202 positions

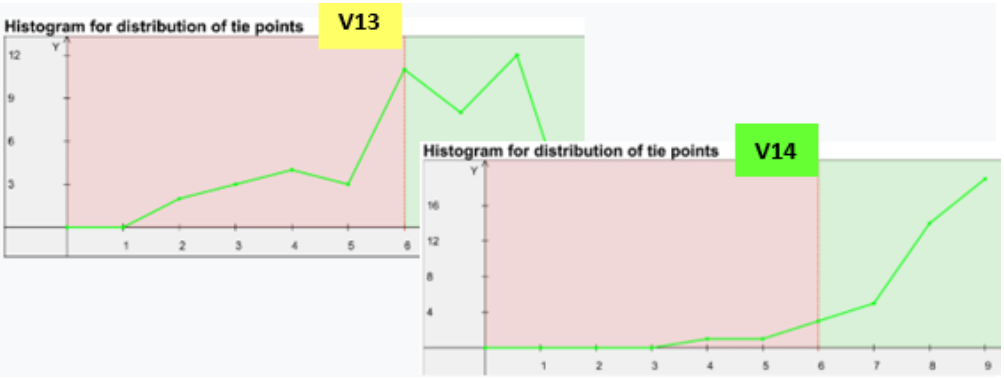
	Omega (X) [deg]	Phi (Y) [deg]	Kappa (Z) [deg]
Maximum	0.00661974	0.00935881	0.00450075
Mean	0.00005951	-0.00055075	0.00000017
Sigma	0.00214973	0.00219880	0.00195372
RMSE(o,p,k)	0.00214523	0.00226145	0.00194887
RMSE(3D)	0.00367618	SQRT(RMSEo**2 + RMSEp**2 + RMSEk**2)	

And for ground control points and check points

Maximum
Mean
Sigma
RMSE(x,y,z)
RMSE(H)
RMSE(3D)
ACC(H) (at 95% Confidence Level)
ACC(V) (at 95% Confidence Level)

</td></tr>
<tr><td>Improvement 14.0.2: Better modeling of distortion</td><td>A new algorithm has been implemented to better describe the distortion of the camera.</td></tr>
<tr><td>Fix 14.0.2: Missing 3D cursors in the Multi-Photo Measurement Tool</td><td>No user-selectable 3D cursors were displayed. That’s fixed.</td></tr>
<tr><td>Fix 14.0.2: SATMaster crashes</td><td>SATMaster crashed when measuring points in the PMT and during the RPC refinement process. That’s fixed.</td></tr>
<tr><td>Information 14.0.0: Aerial Triangulation for ADS Pushbroom discontinued</td><td>The support of the Aerial Triangulation for ADS Pushbroom project types is with the release version 14 discontinued. We are still supporting the ADS Pushbroom project type in general for a processing in e.g. MATCH-T DSM, OrthoMaster or OrthoVista.</td></tr>
<tr><td>Information: MHS antenna offsets</td><td>For multi-head projects, inBLOCK assumes that the manufacturer/provider delivers the measured/calculated GNSS/IMU values for each individual camera head. inBLOCK uses the GNSS/IMU of the images to compute relative rotations and offsets between cameras. The antenna offsets of the individual camera heads are not used. If the station’s images have the same GNSS/IMU values, the relative rotations and offsets are always zero.</td></tr>
<tr><td>New Feature 14.0.0: Scale limit parameter in .cnt file</td><td>Previously, the limit for the scale difference in an image was factor 2. This value could not be changed, but in some rare cases (Alps), this range needs to be extended. Therefore, a new parameter has been introduced in the .cnt file to adjust this parameter.
$CVM_NUM_SCALES 2 (default setting)</td></tr>
</table>

Improvement 14.0.0: Consider given DTM for footprint generation	A DTM loaded for tie point extraction is now used to improve the footprint computation before tie point extraction. This is particularly advantageous if the image has large difference in height from one side of the image to the other, as points outside the footprint are not assigned to the image. This could happen if no DTM is assigned. Then the footprints are calculated at a mean terrain height. 
Improvement 14.0.0: Enhanced tie point distribution	For projects with difficult textures, the software could eliminate too many of the generated tie points during the matching process. This resulted in poorly connected images and gaps between the tie point clusters. For version 14.0.0 the distribution of tie points has been optimized and point clusters have been reduced.

	
Fix 14.0.0: Missing/wrong information in Report file	For analog projects, the Report file contained incorrect entries for the “Coefficients distortion table” and the “Coefficients distortion graphic”, indicating that the principal point is outside the image format. It announced that there are no tie points matched although all images are connected. Therefore, the information on “Exterior orientation evaluation”, the histograms for analyzing the tie point, ground control point residuals and standard deviations were missing.
Fix 14.0.0: Report file crash	The Report file generation crashed when the project coordinate system was changed for a completed AT project that was calculated in a Local Space Rectangular (LSR) coordinate system.
Fix 14.0.0: Double entries in inBLOCK log file	When using MHS calibration mode, the inBLOCK log file showed duplicate entries of the first oblique sensor in "Used Multi-Head parameters (calculated from GNSS/IMU observations). relative sensor: iXM-RS150F_right_24 offset: 0.0464, -0.1398, 0.0082 [m] std.dev.: 0.10000, 0.10000, 0.10000 [m] rotation: 0.0613, -27.1687, 0.2111 [deg] std.dev.: 0.00800, 0.00800, 0.00800 [deg] **relative sensor: PhaseOne_WFC_correctedPP-GPS** **offset: 0.0902, -0.0507, 0.0029 [m] std.dev.: 0.10000, 0.10000, 0.10000 [m]** **rotation: -0.0621, 13.6200, -0.0891 [deg] std.dev.: 0.00800, 0.00800, 0.00800 [deg]** **relative sensor: PhaseOne_WFC_correctedPP-IMU** **offset: 0.0902, -0.0507, 0.0029 [m] std.dev.: 0.10000, 0.10000, 0.10000 [m]** **rotation: -0.0621, 13.6200, -0.0891 [deg] std.dev.: 0.00800, 0.00800, 0.00800 [deg]**...
Fix 14.0.0: Problem with identical strip definitions	When identical strip definitions with different IDs were generated by the user, MATCH-AT tie point extraction did not work. The error message “multiple ID” appeared. A check for double strip definitions should now prevent this.
Fix 14.0.0: Multi-Head & Calibration Set handling	Adding and removing new Calibration Sets in the project led to wrong assignment of the Multi-Head and Calibration Sets. This was fixed and the ID of the Multi-Head Set and the Calibration Set of each camera head is now always the same.

MATCH-3DX / Meshing add-on

Requirements/recommendations:
We recommend an up-to-date computer with at least 68 GB RAM (better more). Furthermore, we recommend an additional hard disk for processing purposes only. The required disk space should be about 2-5 times of the space that the input data requires.

Change	Description
Improvement 14.1.0: Automatic 3D area border	The footprint determination for defining the automatic 3D area border has been improved. In addition, the issue that caused the projection center for images to appear underground, has been resolved.
Improvement 14.1.0: Processing performance	The processing performance has been improved in case of network image directory on blob storage.
Improvement 14.1.0: Extended log file information	The log file now provides the result of the interpolation height of control, check and adjusted points.
Information 14.1.0: Graphics card driver	Please keep your graphics card driver up to date, otherwise the point cloud generation may crash without a message.
Fix 14.1.0: Corrupt images	An issue has been fixed that could lead to corrupt images during image preparation in case of a full disk.
Fix 14.1.0: SLPK mesh geometry	Fixed an issue that could lead to parts of the SLPK mesh geometry being rotated when zooming in closely.
Fix 14.1.0: Possible crash in the analysis step	The version fixed an issue that could lead to a crash in the analysis step for CPU-only runs.
Fix 14.1.0: Target ellipsoid was not respected	Fixed an issue where the flag for overimposing heights on the target ellipsoid was not respected in the mesh converter command line interface.
Fix 14.1.0: Stalling mesh texturing	Fixed an issue that could lead to stalling in the mesh texturing step.
Fix 14.1.0: Duplicate image file names	Fixed an issue that led to incorrect handling of duplicate image file names.
Fix 14.1.0: Corrupt images	Fixed an issue that could, in rare cases, result in corrupted images during image preparation.
Fix 14.1.0: Distributed processing	Fixed an issue that could lead to small gaps in the mesh when using distributed processing.

Fix 14.1.0: Logging statistics	Fixed the logging of the stereo model statistics.
Improvement 14.0.3: Strategy template for user-defined strategies, changed "Scenario"	For the definition of a new aerial strategy now the template "Aerial Nadir" is used, no longer "Default", which should only be used for UAV projects.
Fix 14.0.3: Application of earth curvature and refraction correction in SGM	The earth curvature and refraction corrections were not considered correctly for projects with high flying altitude. This could lead to a height shift of the SGM results.
Fix 14.0.3: The TPIX structure does not match the position of the data	In some cases, the resulting TPIX (Surface Area) was not defined correctly. The LAS tiles were not located within the TPIX tiles. The TPIX subfolders to store the True Orthos and metadata were missing, the orthophotos were not moved from the internal folder to the TPIX subfolders.
Fix 14.0.2: SLPK Mesh export	Because the geoid file was saved in the wrong folder, the export of the SLPK mesh failed. That's fixed.
Fix 14.0.2: SLPK Mesh export	Because the geoid file was saved in the wrong folder, the export of the SLPK mesh failed. That's fixed.
New Feature 14.0.0: Introduction of a new local non-LOD mesh format	Besides the already existing OBJ (double precision) solution, it is now possible to create a local OBJ in single precision. The new output has a non-LOD structure. local obj tiled obj single obj tiled dae single dae
New Feature 14.0.0: Mesh converter	Version 14 has implemented a mesh converter so that previously generated meshes (OSGB) can optionally be converted to other formats for specific areas.
Improvement 14.0.0: Ortho Exporter	In previous versions the Ortho Exporter generated 8-bit orthos even when the input images were 16-bit. Now the Ortho Exporter generates the bit depth of the input images.
Improvement 14.0.0: Simplification of the interface	As meshes should always be generated with texture, the additional checkbox to activate/deactivate texturing has been removed from the UI. For users who want to create meshes without texture, can appropriate entry can be made in the match.status file.
Improvement 14.0.0: More efficient handling of areas in large projects	The footprints are checked against the area border before the images are accessed and analyzed. Therefore, the analysis step is faster because only images within the specified range are used for preprocessing steps.

Improvement 14.0.0: Enhanced meshing algorithm	To further reduce the likelihood of unwanted effects such as isolated objects or holes, version 14 has integrated an improved 3D meshing algorithm.
Improvement 14.0.0: Runtime improvements for **> mesh generation** **> true ortho generation** **> retexturing of meshes**	The runtime is improved by up to 10% for the 3D mesh generation and up to 20% for true ortho generation. The retexturing of meshes containing edited tiles has become significantly faster. The streaming performance of SLPK and 3D Tiles meshes as well as the OBJ mesh conversion performance has been improved.
Fix 14.0.0: Wrong borderline generation	For datasets with oblique images, the generation of the automatic borderline could be incorrect. Then the processing did not start.
Fix 14.0.0: Renaming area ID	If the area ID was renamed, the Ortho Tiler could no longer find the orthophotos. The functionality of the Ortho Tiler now works more robustly. The output file names are updated after an area ID change. Therefore, the DTM file, the point cloud file and the TPIX file receive a new file name according to the changed area ID name.
Fix 14.0.0: Missing tiles in DSM mesh	Fixed an issue that could lead to missing tiles in the DSM mesh for completely flat areas, e.g. when using a waterbody shape file.
Fix 14.0.0: Missing information in DSM binary mask	The DSM binary mask now contains “0” for all points that are not generated from dense matching, e.g. points generated from a waterbody or correction shape file.
Fix 14.0.0: Problem with roughness layer cells	DSM roughness layer cells now use “NaN” values instead of “+inf” when no observation is available in the local neighborhood.
Fix 14.0.0: Corrupt DSM LAZ cloud, data gaps, incomplete subproject transfer and change of subproject size using distributed processing	Fixed an issue that could lead to corrupt DSM LAZ clouds or uncolored points when using distributed processing. Fixed an issue in distributed processing that could lead to data gaps in mesh results. Fixed an issue that could lead to small data gaps in coarser levels in the DSM Mesh when using distributed processing. Fixed an issue that could lead to an incomplete subproject transfer marked as imported when using distributed processing. Fixed an issue that could lead to the automatic subproject changing between two runs when using distributed processing.
Fix 14.0.0: Unrecognized vertical grid format	Fixed an issue that would trigger an error regarding an unrecognized vertical grid format when providing the grid file for DHHN2016 heights.
Fix 14.0.0: Search for corresponding pairs of images	The search for corresponding pairs of images and orientations was revisited and made more robust.
Fix 14.0.0: Visualization behavior of LOD meshes	Fixed the visualization behavior of LOD meshes in scenario “Default”, leading to sharper texture representations.

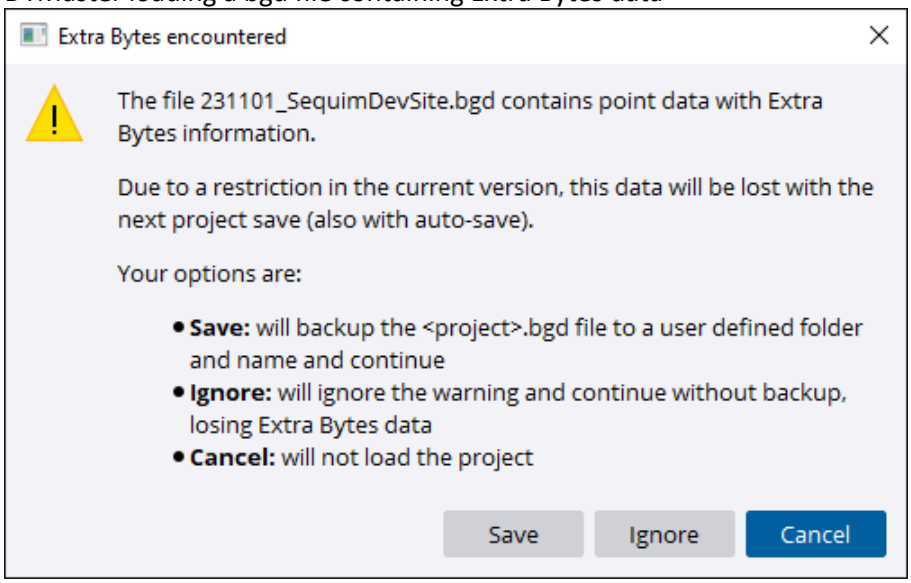
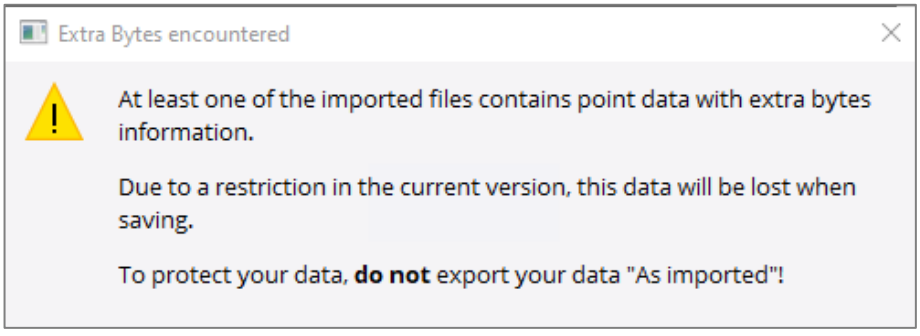
Fix 14.0.0: Clearer error handling	Version 14 has clearer error handling for the SLPK export in the project coordinate system functionality when passing parameters that do not conform to the “i3s” specification.
Fix 14.0.0: Out-of-memory	An issue is fixed that could lead to an out-of-memory in the DSM step. Fixed an issue where the color adjustment computation could run out-of-memory.
Fix 14.0.0: Local dependency	Fixed an issue where reading a control file was local-dependent.
Fix 14.0.0: Soup is not a mesh error	Fixed an issue that could lead to “Soup is not a mesh” error in the 3D mesh-postprocessing step.
Change 14.0.0: Handling of invalid polygons	If an area shape file with invalid polygons is provided, it will now throw and error instead of discarding the polygons.
Change 14.0.0: Number of stereo models entry in the las file	For point cloud results, the number of stereo models encoded in the LAS field “Number of returns / Return number” has been removed for compatibility with third-party applications.
Change 14.0.0: Optimization of distributed processing	To optimize the performance of distributed processing the subproject size for different scenarios has been adapted.

MATCH-T DSM

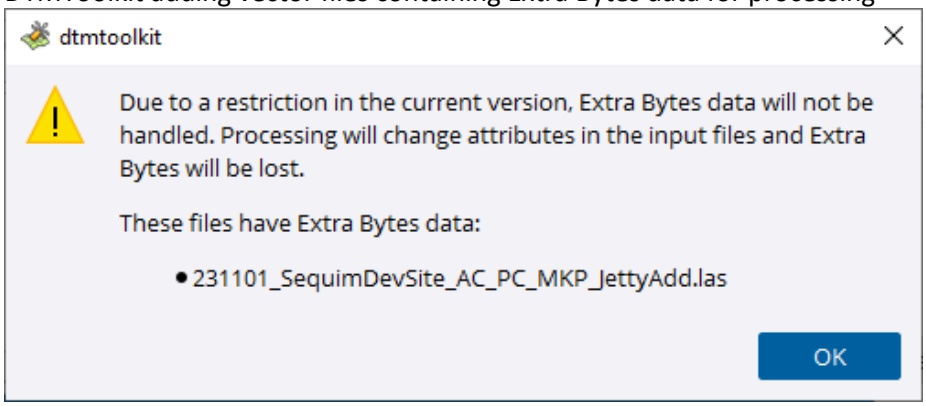
Change	Description
Improvement 14.1.0: Satellite point cloud resp. point cloud for images with poor image texture	The representation of buildings in the CBM point cloud of satellite images or images with poor image quality has been improved. Less smoothing is done for the image areas with poor texture. In addition, the optimization settings for “Balanced” have been improved.
Improvement 14.1.0: Clear output in the processing window	For better clarity, unnecessary information has been removed from the processing window.
Fix 14.1.0: Crash for satellite projects	MATCH-T DSM crashed if the RPCs were only original, i.e. not corrected using the satellite triangulation of SATMaster. This has been fixed so that RPCs with status “original” can also be used for image matching.

Fix 14.1.0: Demo mode	Using the default strategies in MATCH-T DSM demo mode immediately resulted in an error.
	`CNT_Write_Params`
	`==> Error[1] : Cannot open file: <C:\ProgramData\Trimble\Trimble Photogrammetry 14.0\Strategies\INPHO\SurfaceGeneration\DTM.cnt>`

DTMaster Stereo

Change	Description
Improvement 14.1.0: Update of layer point number	After using the brush filter (reclassify points), the number of points per layer is updated.
Improvement 14.1.0: Autosave caused a loss of points	The autosave function caused loss of line points during measurement. It now works without loss.
Fix 14.1.0: DTMaster crash when saving files with Extra Bytes after classifying data	DTMaster and other applications will no longer crash, but ignore Extra Bytes and Wave data, as this may lead to a loss of data if the original files are deleted. There are warnings at several places: • DTMaster loading a bgd file containing Extra Bytes data  • DTMaster importing LAS file containing Extra Bytes data 

- DTMToolkit adding vector files containing Extra Bytes data for processing



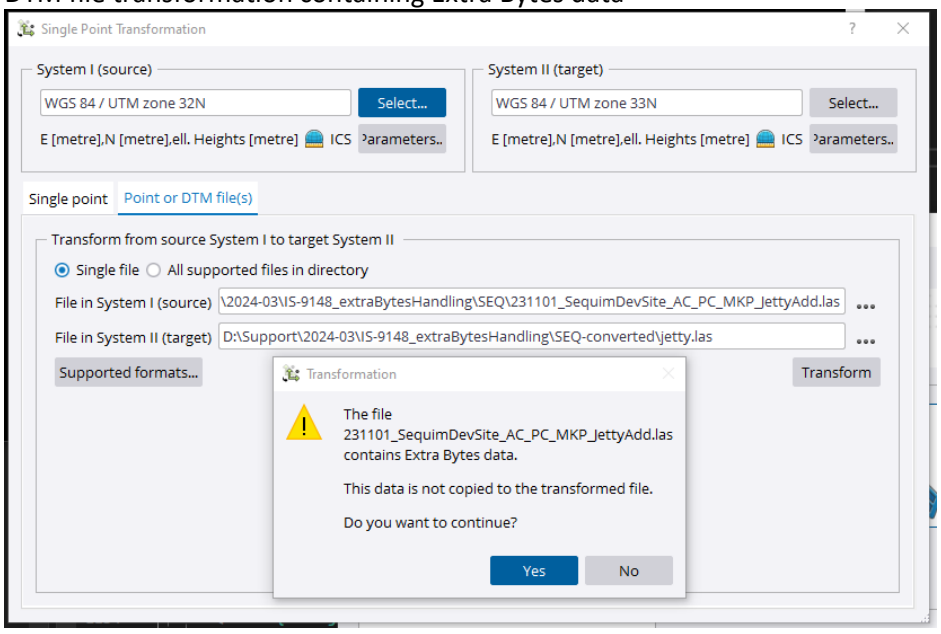
- Colorizer – message in output.log file

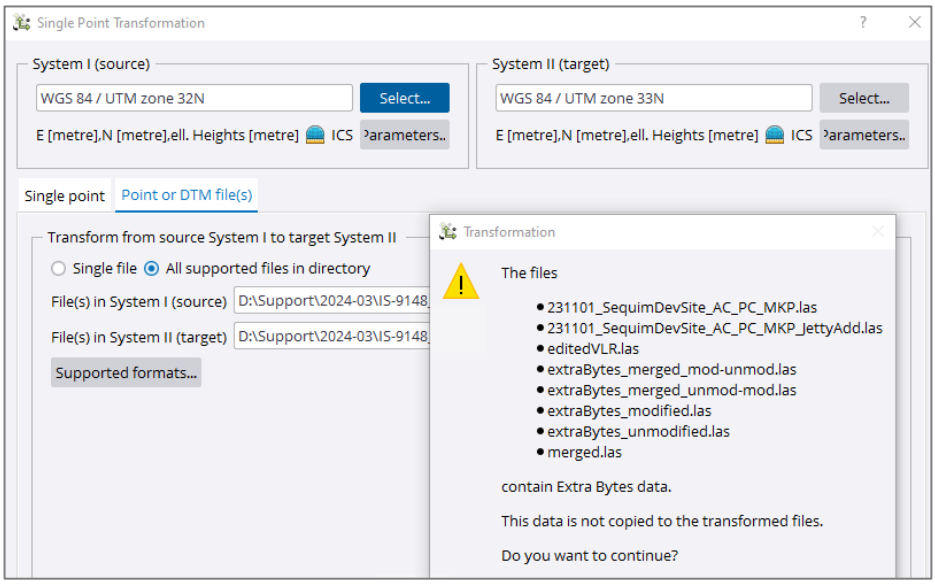
```
D:\IS-9148>colorize.exe -la col-in.las -ou col-in.las -pr x.prj
Codec:UTF-16LE
Using #0 for red, #1 for green, #2 for blue
Reading input data
Warning: LAS file col-in.las contains Extra Bytes data. This data will not be transfered to the output file.
Error: In addition, the output file is the same as the input file. Extra Bytes data will be lost.

D:\IS-9148>colorize.exe -la col-in.las -ou col-out.las -pr x.prj
Codec:UTF-16LE
Using #0 for red, #1 for green, #2 for blue
Reading input data
Warning: LAS file col-in.las contains Extra Bytes data. This data will not be transfered to the output file.
...

D:\IS-9148>
```

- DTM file transformation containing Extra Bytes data

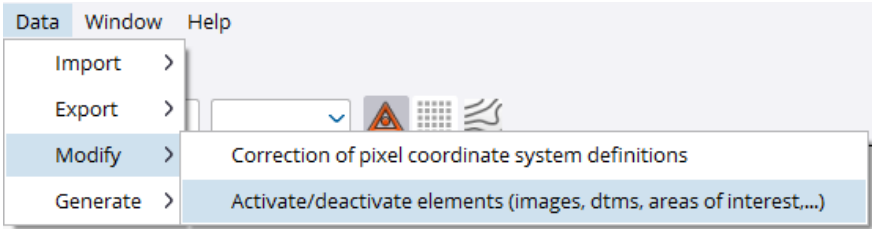


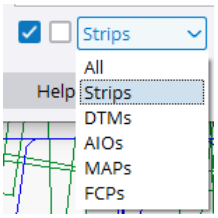
	
Fix 14.1.0: Problems reading LAS files with point data format 8	An alignment issue when reading LAS files with point data format 8 resulted in strange effects such as point elimination on import, “GPS entries false” messages, and wrong point to-layer assignment.
Fix 14.1.0: Attribute table of shape file	The problem that the layers in the shape file changed after the export from DTMaster is fixed. The layers of the shape file are now stored correctly in the attribute table during export.
Fix 14.0.2: Missing 3D cursors	No user-selectable 3D cursors were displayed. That’s fixed.
Fix 14.0.0: Drag and Drop files to DTMaster icon	Drag and Drop file to the DTMaster icon works again correctly. The import wizard starts only with file formats, which were opened the first time.
Fix 14.0.0: Export of SHP format added additional element	When exporting a file to format SHP, it could happen that an empty element was added into the *.dbf file.
Fix 14.0.0: Quickimport	The Quickimport is now working correctly.

DTMToolkit

Change	Description
Improvement 14.1.0: Import of huge XYZ data	Importing an XYZ file with more than 1.000.000.000 points, resulted in a wrong calculation of the area extend because only the first 1.000.000.000 points are used for the calculation. A warning now appears that only a subset of the points will be read for the computation of the area extend. The user can manually adjust the size of the extend so the process can run correctly.
Fix 14.0.0: Erroneous TIFF height model	In case the input DTM (.dtm) file included more than 2^32 grid points, the resulting TIFF file was corrupt.

OrthoMaster

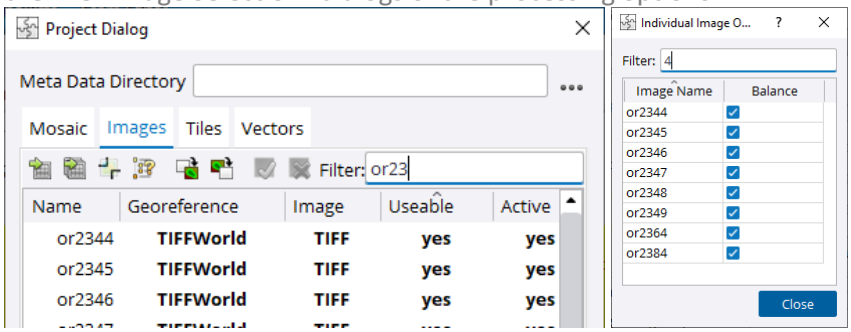
Change	Description
Fix 14.1.0: Background pixels in orthos	For projects where multiple overlapping SCOP DTM files with valid and invalid points were read in, it could happen that the orthophotos showed background pixels. Version 14.1 now checks whether there are multiple overlapping SCOP DTMs. In this case, a warning appears that DTMToolkit should be used to merge the DTM files before using them for OrthoMaster.
Fix 14.0.2: Different image extent	The image extent output was different for TIF and TIF JPG.
Fix 14.0.2: Height model was not saved	After loading a height model into OrthoMaster and saving the project file, the height model did not load when the project was reopened.
New Feature 14.0.0: Element ordering	The Modify > Activate/deactivate elements dialog showed until now the elements unsorted.  Version 14 provides sophisticated sorting of the entered elements. All element types can sorted numerically or even activated/deactivated separately.

	
Fix 14.0.0: Missing pixel line in output orthophoto	Due to non-ideal intersections of pixels and vertices of the area of interest, a missing pixel line in the output ortho was caused.
Enhancement 14.0.0: Faster validation of area of interest	The check for correctness of the AOI has been enhanced. The processing time for the validation of a polygon with 46000 points has been reduced from 600sec. to 10 sec.

OrthoVista

Change	Description
Improvement 14.1: Feature Detection performance enhancement	For version 14.1 the partitioning of the area for parallel processing was improved. This is particularly useful for non-rectangular blocks. Example: Non-rectangular project shape, 30 000 images • V14: Feature Detection was stopped after 11 days (38%) • V14.1: The Feature Detection part took 45 h Ergo: Significant increase in performance.
Improvement 14.1: Tutorial	The OrthoVista tutorial missing in version 13 is available again and updated.
Improvement 14.0.3: Reintroduce status of images	With the introduction of the filter settings in the Project Dialog, the status information about the images has been removed (number of images/active images). Now the Project Dialog shows again the complete number of images loaded to OrthoVista as well as the number of filtered images. 100 images, 100 filtered 100 images, 10 filtered
New Feature 14.0.0: Dynamic caching	OrthoVista now handles the caching for the complete process dynamically, resulting in a better performance and better usage of the hardware capabilities. The dynamic caching as well as the number of parallel processes also take care in case child processes are started and are having an impact to the processing performance.

	Project Details	Version	Overall Proc. Time [hh:mm:ss]	Improvement
	4505 images Classic Overlap Regions: Generated Global Tilting: Default Feature Detection: Mixed Mosaic: generated	V13.2	4:53:07	100%
		V14.0	4:27:46	91% Factor 1.1 faster
	2740 images (scanline) Classic Overlap Regions: Generated Global Tilting: Default Feature Detection: Default Mosaic: generated	V13.2	2:00:33	100%
		V14.0	1:31:00	76% Factor 1.3 faster
	70 000 miniature images High Overlap Regions: Generated Global Tilting: Default Feature Detection: Default Mosaic: generated	V13.2	11:39:54	100%
		V14.0	4:25:24	37% Factor 2.7 faster

New Feature 14.0.0: Search routine for image objects	The Project Dialog of OrthoVista and Seam Editor now includes the option to search for specific image names or strings. The keyed in characters will then limit the listing to the images including those characters. The same search routine is now available in the “Per-Image Selection” dialogs of the processing options. 
Improvement 14.0.0: Speed-up Global Tilting	For large and high overlapping projects the performance of the Global Tilting could now been improved during the "Inserting Image Equations" step.
Improvement 14.0.0: Open Processing interface	Based on the number of images, opening the interface to start the processing took a long time. The loading times of this dialog were increasing with the number of images. This has been solved, so that the dialog appears immediately.

<table>
<tr><td>Improvement 14.0.0: Enhanced per-image selection dialog</td><td>The "per image" dialog within the processing options has been updated so it appears much faster and allows a multiple entry selection and editing.</td></tr>
<tr><td>Improvement 14.0.0: Step for “Collecting Tiles" enhanced</td><td>There was a huge time difference when outputting data with several tiles compared to all input images in one tile.

Example: Project with 70 000 input images:

<table><tr><th>Tile Scheme</th><th>V13</th><th>V14</th></tr><tr><td>64 tiles</td><td>2 min</td><td>< 5 sec</td></tr><tr><td>One huge tile</td><td>15-17min.</td><td>< 1min</td></tr></table></td></tr>
<tr><td>Fix 14.0.0: Error in picking color</td><td>The dialog to pick a color (e.g. in OrthoVista Background color selection) worked erroneously. This has been fixed.</td></tr>
<tr><td>Fix 14.0.0: Color picker showed wrong RGB value due to non-squared pixels</td><td>In case images had non-squared pixels, the color picker showed incorrect RGB.</td></tr>
<tr><td>Fix 14.0.0: Generation of straight seamlines</td><td>OrthoVista generated in some areas straight seam lines. They were caused by the size and the texture of the image and the selected parameters. By improving the automatic parameter selection for seam generation and blending OrthoVista creates now better results.</td></tr>
<tr><td>Fix 14.0.0: Huge number of threads in image writer caused crash</td><td>When running a project that combined a huge number of images (~70 000) into one output tile using the parallel approach, OrthoVista crashed. This has been fixed.</td></tr>
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Information

For more information, please contact your Trimble Inpho Support Team at imaging_support@trimble.com.
The software is available for download on https://geospatial.trimble.com/de/products/software/trimble-inpho/download.