Trimble Business Center

Release Notes

Version 3.80

www.trimble.com

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Welcome to Trimble Business Center

Trimble® Business Center (TBC) is a geospatial office software that enables users to complete field-to-finish workflows efficiently and with confidence. In a single software package, users can edit, process, and analyze GNSS, total station, level, scanning, terrestrial, and aerial imaging data to achieve the most accurate horizontal and vertical results. Users can also create a variety of deliverables, from 2D topographic plans, to surface and contour maps, to complex alignment/corridor designs.

Installing or updating

For installation or update instructions, see the appropriate bullet below.

Notes:
- Trimble Business Center (TBC) licensing information is contained in a Sentinel HASP hardware or software key connected to or installed on your computer. If no key has been connected or installed, TBC allows you to import and view data only. It does not allow you to use any licensed features. To view your license after installation is complete, select View License Manager on the Start Page. For a description of the features available in each licensed configuration, see "Licensed Features" in the online Help.
- After installation, be sure to select Check for Updates on the Start Page to ensure you have the latest updates for Trimble Business Center.

- **New users installing TBC to use with a single-user license:**

  a. Before you insert the new Sentinel HASP hardware key you received in your installation package, install TBC from the TBC installation package downloaded from the Trimble website.

  b. Before running TBC for the first time, insert the new Sentinel HASP hardware key into an available USB port on your computer.

     All licensed features will be available when you run TBC. Your 1-year warranty begins the first time you open the software.

- **Existing users installing this version of TBC:**

  Install TBC from the installation package downloaded from the Trimble website.

  Important Note! This version is available to users whose current warranty expiration date is **1 November 2016 or later**. If your warranty expires prior to this date and you proceed with the installation, licensed features will not be available. Contact your distributor to purchase a warranty extension. In the TBC ribbon, select Support > License Manager to verify your warranty expiration date.

- **New users installing TBC to use with a multi-user license installed on a network:**

  a. Ensure the following:

     - Your computer can connect to the network server where the Sentinel HASP multi-user network license is installed.
     - There are no Sentinel HASP hardware keys connected to your computer.

  b. Install TBC from the TBC installation package downloaded from the Trimble website.

  c. Run TBC.

     The software automatically searches the network for a Sentinel HASP network key. If a Sentinel HASP network key is found and the multi-user license limit has not been exceeded, the license is available for use and all licensed features in TBC are available. If a Sentinel HASP network key is not found or the multi-user license limit has been exceeded, licensed features are not available and an appropriate message is displayed when you attempt to use them.

     Optionally, you can verify whether or not you have access to the multi-user license by selecting View License Manager on the Start Page. For more information on using the License Manager dialog, press F1 with the dialog open.

     Note that each time you run TBC, the software will need to automatically access the multi-user license installed on the network.

  Note to Administrators: For instructions on installing a Sentinel HASP network key (multi-user license) and viewing and managing license information, select Network Licensing Read Me on the Tools menu on the TBC Installation DVD.

New features

Following are the new features included in the various licensing options for this version of Trimble Business Center. See "Licensed Features" in the online Help to determine which of these new features are available with your license and to read more information about them. To view context-sensitive help at any time while using TBC, press F1.

Scanning module

This new optional module in TBC focuses on productivity with point clouds. When working with the new Trimble SX10, you can use this module to register scan station setups (station setups without backsight information). You can also use this module when working with other types of scan data you have imported into TBC. It provides a wide range of productivity commands enabling you to efficiently extract information from point clouds.

Following are the new features provided with the Scanning module:

- **Register, refine, and georeference point cloud scans** - Use the new Scan Registration command to do the following:
  - Use the pairwise registration feature to register overlapping scans imported from multiple scan stations (no backsight information) to ensure they are correctly aligned with each other. In case there is a mix of survey station setups (with backsights), this allows you to align the scan stations to your survey stations, resulting in a single, rigid point cloud. Start by simply selecting to perform the registration automatically. View the results both visually in a graphic view and statistically (with color success indicators) in the command pane to determine success. If optimal results are not obtained using the automatic method, you can manually select each overlapping scan that you want to register until all of the scans are part of the same registered station group. After either the automatic or manual pairwise registration, you can optimize the pair registration. Then, when you are satisfied with the results, you can add the moving scan to the reference.
  - Perform an overall refinement adjustment to ensure all of the stations in the registered station group are registered (aligned) correctly with each other.
  - Georeference a movable station group (that is, a station group that does not include scans from survey stations set up on known positions) to one or more known survey points to provide survey control. This allows you to align a point cloud with your project coordinates.
- **Georeference points clouds** – You can use the Georeference Point Cloud command to move the point cloud to match your project coordinates. This provides for more flexibility when working with point clouds.
- **Automatic ground extraction** - Create a new point cloud in your project that includes only scan points located at ground level. You can use the ground-level point cloud to create a new surface.

- **Extract classified point cloud regions** - Use the new Extract Classified Point Cloud Region command to automatically extract from an entire region (or a scan point selection) captured with a terrestrial-based scanning device any of the following LAS classes into individual point cloud regions: ground, buildings, and high vegetation. You can then select to show or hide (using the View Filter Manager) or export any point cloud region in your project, including classified point cloud regions. This allows you and your clients to easily focus only on the objects of interest, excluding unnecessary scan data. (Due to the algorithms used, this feature is not intended for use with UAS-based aerial scan data.)
- **Sample point cloud regions** - Perform either random or spatial sampling on a point cloud region in your project to create a new sampled region for creating surfaces, exporting data, and so on.
- **Create CAD points from scan points** - Use the Scan to CAD command to create discrete CAD points from scan data using either spatial sampling based on a specified point intervals or random sampling based on a specified total number of CAD points. This allows you to label the points and perform more advanced elevation-based queries. It also provides additional flexibility when working with surfaces, allowing you to edit surface members and their properties.
- **Virtual DR in Station View** - You can use the new Virtual DR feature in a Station View with scan points to make distance, angle, or inverse measurements, or create points and CAD objects. Simply use the Pixel Picker to select on a referenced photo image the location (pixel) where you want to create a point. TBC then projects a nearby scan point onto the epipolar line to help calculate the 3D position for the new point. This feature allows you to extract information from a combination of images and point clouds even in the case where there is no scan point exactly at the desired location.
- **Create scan stations** - This feature can be very useful when working with SX10 data, allowing you more flexibility in deciding whether to keep the adjustment of point clouds as determined by the traditional surveying techniques or by scanning techniques (Scan Registration, Refinement and Georeferencing). Use the Create Scan Station command to do either of the following:
  - Create a duplicate point cloud and panorama object.
  - Detach/transfer point clouds and images from survey stations.

  Using either option will allow you to have “free moving” scans that you can then register with your other scan data to get the best possible agreement between point cloud objects.

Data review and editing

- **Import third-party survey data using custom scripts** - TBC now provides predefined custom Python import scripts you can use as-is or modify as necessary to import third-party survey data stored in ASCII format from various non-Trimble software vendors (including Leica, Carlson, Sokkia, and more) in a variety of file formats (including HeXML, RW5, SDR, and FBK). Simply import the third-party data file as you would import any file and the appropriate Python script will be automatically employed. This provides the flexibility many users need to make TBC their first-choice survey office software package. Trimble will not be providing services at this time to modify the scripts, which accommodate a large number of existing formats available. If the predefined script does not fully support the data you are trying to import, you or a programming specialist can modify the script as necessary using the Python programming language.
- **Import Google Earth KML and KMZ files** - Import into your project points, lines, and polygons contained in Google Earth KML (.kml) and KMZ (.kmz) files. You can then leverage this data to better understand your survey project extents, prepare field data, and perform project management
- **Show background maps in TBC** - Using the Background Map command you can turn on and off background map tiles that are streamed to TBC from an external mapping service. Currently available services are Trimble Basemaps (worldwide availability), Topographic Maps (North America only), and Agricultural Maps (North America only).
- **Create custom reports using Microsoft® Word®** - Use the Create Custom Reports command to create a customized report matching your specific project needs. Using Microsoft Word with the new TBC custom report add-in, you can make modifications to the look and layout of the report as necessary (for example, add custom tables for data, measurement statistics, and media files). Selecting the data in TBC will automatically populate the associated template field in your Word document.
- **Trimble MX mobile mapping support** - Import and view data collected with the Trimble MX, a vehicle-mounted mobile spatial imaging system that captures fully synchronized, high-quality georeferenced point clouds and high-resolution imagery. Perform camera calibrations, correct the trajectory (if you have a post-processed trajectory available), and export the data to the Trimble MX software.
- **GNSS vertical offset** – Import GNSS vertical offset records available in Trimble Access v2016.00 to review and/or re-compute keyed-in offsets in the field. This new measurement method makes it easier for field users to, for example, include specified height distances from a manhole rim down to a flow line or from a sidewalk up to the top of a light pole, without changing the antenna height. You can make changes to the offset value in TBC if necessary.

- **Enhanced data selection capabilities** - The Advanced Select command has been enhanced to make it easier than ever to perform searches using "starts with" characters or regular expressions. Objects matching you selection criteria are instantly displayed in a list from which you can select, making the selection process faster and more efficient.
- **Chinese Network Adjustment reports -** Detailed Network Adjustment reports installed with the Chinese version of TBC have been enhanced to comply with local regulations and standards.
- **Export Format Editor enhancements** - New fields have been added to support custom-format exports:
  - Level Observations – You can now export raw and adjusted elevations.
  - Total Station Observations – You can now export horizontal distances.

Survey computations and COGO

- **Streamlined entry/creation of CAD geometry using keyboard and macro-language and map check (closure) report** - Use the Create COGO command to streamline the creation of point and line geometry in <Product Abbrev>. You have the choice to use a newly created macro-language designed for streamlining the geometry input (point, lines, arcs, and sideshots) allowing you to completely rely on the keyboard entry and minimize the use of the mouse. This will significantly reduce the time needed to create geometry in TBC and increase your efficiency when calculating your boundary locations. After the parcel geometry is created, you can create parcels and compute closure reports.
- **Move survey point** - Use the new Move Survey Points command to move a survey point to a new location by inserting an office-entered coordinate. This will keep your original survey observations intact and provide traceability of your survey while allowing you to change grid position of the surveyed point. Your feature coding and linework will be updated accordingly, providing more efficiency when managing survey data and creating CAD and drafting deliverables.
- **Measure points** - Similar to the Measure Distance and Measure Angle commands, the new Measure Point command enables you to obtain the positional information of a picked position without having to create a CAD point object. When using this command with point clouds, you can also obtain point cloud region information. You have the option to save the measurement, which creates an object in the Project Explorer, providing you more efficient project review and management capabilities.
- **Coordinate System Manager (CSM)** - The following new features have been added:
  - Moved coordinate systems BW 9 and Bayern 12 from Germany/Bayern-Soldner to Germany/GK. Renamed coordinate system group Germany/Bayern-Soldner to Germany/Soldner.
  - Added ITRF2008 as a predefined datum in the Coordinate System Database.
  - Updated systems in Argentina to use datum POSGAR07.

- Updated EPSG IDs in Trimble database for all identified global datums.
- Added new geoid model New Zealand Geoid 2016.
- Added new shift grid OSTN15 and geoid model OSGM15 (United Kingdom).
- Added new geoid model Northern Ireland 2015.
- Created a new UTM group for UTM zones in Norway.
- Created new Northern Ireland and Republic of Ireland groups for Irish zones.
- Changed the name of the ellipsoid used in NGO48 (in Norway) from Bessels Utvidede to Modified Bessel.

Feature coding and attribution

- **Multiblock feature coding** - Define single-feature complex objects (for example, an image of a bicycle on the sidewalk) with two or three points in the field, enabling you to automatically scale and rotate blocks once you process codes in TBC. This allows you more flexibility in the field and more automation with completing drawings back in the office.

  Import CAD blocks created in TBC and other software programs into Feature Definition Manager and use them to create a new block feature definitions that can be used to insert block features based on one, two, or three insertion points to specify rotation and scaling. Optionally, create block control codes that can be used in conjunction with block feature definitions to rotate, scale, and specify insertion points for bock features.

- **Custom importer and exporter for Feature Definition Manager** - Import feature definitions (including names, codes, properties, and attributes) and line control codes contained in a CSV (.csv) file into an FXL (.fxl) file in just minutes. This allows you to set up your feature definition libraries for data collection in Trimble Access and feature code processing in TBC, resulting in a highly efficient field-to-finish workflows.

  Also, you can easily export feature definitions (including names, codes, properties, and attributes) and line control codes to a CSV file that can be opened in a text editor or spreadsheet application and used to import feature data into a different FXL file or other software applications.

- **GIS metadata mapping enhancement** – The Map GIS Metadata command within the GIS Module allows you to map project metadata associated with RTK vectors and total station observations to the GIS database fields so that metadata can be uploaded to the GIS databases when you upload (write) features. The command, has been enhanced to allow you to map a single project property (for example, a point ID or an elevation) to multiple GIS fields, or to all fields with the same name simultaneously, streamlining the mapping workflow and reducing the chance of error.

- **Export pipeline attributes to GIS** – Export pipeline attributes in ESRI file geodatabases and Shapefiles. This allows you to use the Trimble Access Pipeline Module to import pipeline information into TBC and export this information to a GIS-ready format.
- **Improved management of coordinate systems with imported Esri files** - To make working with Esri files more efficient, the Esri shapefile and file geodatabase importers have been updated to allow the matching of a coordinate system specified in the file (typically in OGC WKT format) with a coordinate system in the project. If a coordinate system mismatch is detected (that is, a different coordinate system is specified in the import file and project), you can select whether to (1) change the project coordinate system to match the import coordinate system and not transform grid coordinates, (2) keep both coordinate systems and transform the grid coordinates, or (3) consider the project and import coordinate systems to be the same and not transform coordinates. If the file geodatabase includes multiple coordinate systems, you are prompted to either use the first one found or cancel the import.
- **Import/export data with GIS attributes using ADAC files** - As an Australian Trimble Business Center user, use the ADAC Settings command to import/export data with GIS attributes using ADAC files. This command is for a single user and is developed to provide support for the ADAC standard adopted by the Australian government.

CAD and drafting

- **Join points into a linestring** - Using the Connect Points command, you can now make a selection of points and generate a linestring that connects them. The points can be defined as coordinates (which are not going to be elements of the new linestring) or point IDs (members of the new linestring). If you are using the Point ID option, the linestring will update if the points are moved.
- **Best-fit line** - Use the new Best-Fit Line command to automatically create a straight or curved "best-fit" line based on the points you select. This can be helpful, for example, when working with point clouds to create topographic and structural features such as curb and gutter linework.
- **Quickly start new linestring objects** - Use the New button in the Create Linestring command to end the current linestring and start a new linestring using the current settings without having to start the command again. Select the New button in the Linestring Editor. This reduces time required to create new linestring objects with the same properties.
- **Streamlined layer creation process** - When working with any layer selection drop-down list, you can easily select to create a new layer by pressing the Space bar (or selecting <<New Layer>>) and then immediately type the new layer name in the Layer Manager dialog. This makes the process of creating a new layer significantly faster.

Surface and volume analysis

- **Surface creation enhancements** – When creating a new surface, you can now specify the display color as well as the surface creation date allowing you to have more visibility to when the surface was last updated.
- **Create a surface intersection** - Use the Create Surface Intersection command to create a point on a surface given a bearing and vertical angle from a point. Specify multiple bearings and vertical angles to create a series of surface intersection points connected by a linestring.
- **Create a subgrade surface** - After you assign site improvements to regions, use the Create Subgrade Surface command to create a surface that represents the top of the subgrade (below the site improvements).
- **Apply a site improvement to a surface** - Use the Apply Surface Site Improvement command to assign area-based site improvements to site regions (that are bounded by closed linestrings) so you can create subgrade and design surfaces, and calculate areas and volumes. Site regions are shaded as you apply site improvements, so you can confirm that the improvements fill the intended areas.

Corridor design

- **Improved RXL template export to Trimble Access Roads** – Some of the major challenges with getting the corridors from TBC to Trimble Access have been resolved, resulting primarily in much smaller RXL (.rxl) exports. TBC now exports the exact number of templates expected by the user. Also, dependency on using the surface has been removed, as well as the large number of export options, in order to streamline the workflow.
- **String-based road export to Trimble Access Roads** - Export corridor data (including alignment, station, and slope data) using the new Trimble Access road strings (.crd) exporter, which replaces the older GENIO (.crd) exporter. The enhanced exporter allows you to specify the begin/end stations and right/left side slopes for the exported corridor, giving you additional control over the data that will be displayed in Trimble Access. Trimble Access users will need to use the graphical stakeout interface instead of the more traditional table-based stakeout approach. The graphical interface provides increased flexibility in the field and helpful visual representation of road elements.
- **Profile Viewer enhancements** - The Profile Viewer now provides enhanced visual feedback when entering the slopes and distances for vertical alignments. It now displays the following on each VAL:
  - VPI station and elevation
  - Slope in to VPI
  - Slope out from VPI
  - Length of curve
  - K factor of curve

  - Station and elevation of VPC/VPT
  - Station and elevation of high and low points
- **Create more object types in profile view** - Create polylines, linestrings, and text in the profile view.
- **Enhance editing in profile view** - Edit objects in profile view using grips and snaps.
- **Append a VAL with a line from profile view** - Create a line in the profile view and then use it to create a new VAL or append an existing VAL. The station of a new VAL will be the same as the line being appended.
- **Plot objects from profile view** - By creating a frame in the profile view, a dynaview referencing the frame can be placed in sheet view to plot objects from the profile view.

Point clouds

- **Colorize point cloud scans** - When you import a point cloud that includes one or more scans with matching panoramas, the colorable scans are automatically colorized during import based on the colors in the matching panorama photo images, resulting in true-color point clouds in your project. Because the colorization process can take a long period of time to complete, you can opt to cancel the process on import and perform it later using the Colorize Point Clouds command. This provides the flexibility you need to work with scan data more efficiently and minimize processing down-time. It is recommended that you use the Process Panoramas command to balance the exposure and blend the edges to produce better results.
- **Support for scale factor in point clouds** - A scale factor is now applied to point cloud scans, in addition to the traditional survey data in a project, ensuring that the scans and survey data align correctly.
- **Scans corrected for atmospheric conditions** - If the scale for a point cloud scan is not corrected for atmospheric conditions in the field prior to import of a JXL file, TBC now performs the correction on import. After import you can, if necessary, manually change the pressure, temperature, and/or PPM precision values used to perform the scale correction to automatically apply a new correction. This helps ensure the highest accuracy for your point cloud data. (Note: Scans previously imported from pre-SX10 Trimble scanning devices were not corrected automatically on import. To perform the scale correction for any scan in an existing project, simply make a minor change to the pressure, temperature, or PPM precision value for the scan to trigger an automatic rescaling.)
- **Toggle the Z axis direction in 3D view** - When rotating in 3D View, you can toggle between the Z axis always pointing up (useful in keeping the horizon horizontal) and free rotation in which the Z axis can point in any direction (useful, for example, in verifying scan registration results).

- **Exchange data with Trimble RealWorks using TDX format** - Export scan, station, and image data from your project into a TDX file that can be imported into Trimble RealWorks (TRW). If you are using TRW, you can export the TDX file for import into TBC, allowing you to use a richer set of tools to register and manage point clouds in TRW and then export to TBC. This allows both TBC and TRW users to efficiently exchange information by minimizing the time spent on data conversion and streamlining data management and deliverable creation.
  Note: When you export a TDX file from TBC to TRW, both point clouds and panoramas are included in the export. When you export a TDX file from TRW to TBC, only point clouds are included in the export.
- **Point cloud region management enhancements** - TBC includes two new point cloud region commands that provide the additional speed and flexibility you need to efficiently manage point cloud regions and their members.
  - Use the new Merge Point Cloud Regions command merge two or more point cloud regions into a single point cloud.
  - Use the new Add to Point Cloud Region command to associate selected scan points with a different region.
- **Limit box enhancements** - The limit box, a customizable planar box (in the Plan View) or 3D box in (in the 3D View), is focused on improving the efficiency with point cloud related operations. It allows you to select scan points you want to view while hiding everything outside the box, and it has been enhanced in this release to provide even more flexibility, focusing on productivity and ease of use.
  - Display a different limit box in the Plan View and one or more 3D views at the same time.
  - Create and save custom limit boxes and reuse them as applicable.
  - Activate a new limit box that automatically sizes to fit the current view.
  - Use enhanced grips that provide additional editing capabilities and are easy and intuitive to use.
- **Export Bentley Pointools files (.pod)** - Streamline workflows by registering and editing point clouds in TBC and exporting point cloud data in POD file format for use in Bentley Pointools.
- **Export Autodesk Recap files (.rcp)** - Streamline workflows by registering and editing point clouds in TBC and exporting point cloud data in RCP file format for use in Autodesk.

Terrestrial photogrammetry

- **Faster exposure balancing for panoramas** - The process for balancing the exposure in photo images used in panoramas is almost five times faster, minimizing downtime and increasing your efficiency. Exposure balancing ensures that images are darkened or lightened as necessary to achieve a more uniform look in your panorama.

Aerial photogrammetry

- **Aerial Photogrammetry Module enhancements** - The UAS processing engine used for aerial photogrammetry in TBC has been enhanced to provide increased accuracy in generating point clouds that are more homogeneous and better represent the terrain.
- **Process UAS data using UASMaster** - Use the Send to UASMaster command to quickly and easily export flight mission and ground control point data to Trimble's Inpho UASMaster to perform adjustments and create deliverables that can be exported back into TBC and other applications. UASMaster provides powerful features photogrammetrists can use to obtain the highest quality aerial photogrammetry deliverables as efficiently as possible. UASMaster is distributed with TBC and will be available to users with the Aerial Photogrammetry license. ***Note:*** For this release, you are restricted to working in meters in UASMaster. (This does not affect your ability to work in feet in TBC.) UASMaster will be enhanced at a later date to support feet as well as meters.

General software enhancements

- **Improved selection by grouping observations** - If you try to select an object within a cluster of multiple survey observations, the observations will be grouped in the selection window, allowing for easier selection of stations, points, media files, and other objects in the view.

Resolved issues

Following are issues that have been fixed in this version of TBC:

- **Coordinate System Manager (CSM) -** The following issues have been resolved:
  - An error no longer occurs when upgrading an old Coordinate System Database.
  - CSM is no longer over-restrictive when using the parameter False Easting.
  - Fixed parameters and EPSG IDs in French territories, Denmark, Estonia, and Malaysia.
  - Fixed United States/State Plane 1983/Hawaii Zone 1-5 using wrong datum.
- **Chinese Network Adjustment reports -** Detailed Network Adjustment reports installed with the Chinese version of TBC have been enhanced to comply with local regulations and standards.

Known issues

Following are known issues in this version of TBC:

- **View refresh** - If you change focus from TBC to another application window on your desktop and then return focus to TBC, it is possible that the tab view will be black. In addition, if you "float" your cursor on the view, a string of cursor icons will be drawn. This is a graphic view refresh issue and can be resolved simply by panning or zooming on the view.
- **Cannot check in detachable HASP license early** - A HASP network key can be configured to allow users to check out a "detachable" instance of the multi-user license for a limited period of time, allowing the user to run the software without being connected to the network. In earlier versions of TBC, a detachable license could be checked back in (canceled) early, prior to the expiration date and time, making it available for other users. However, at this time, a detachable license cannot be checked in early (a system-time error message is displayed) and is checked in only on the expiration date and time. Then it is available for use by other users.
- **Windows 10's Anniversary Update** - Upgrading to Windows 10's Anniversary Update (version 1607) with the HASP drivers installed can cause the HASP license system to stop working for TBC. To resolve the problem, you must reinstall the HASP drivers. See the *HASP Troubleshooting Guide* for instructions.
- **Microsoft Edge web browser** - When TBC reports are displayed in a Microsoft Edge web browser, the links to objects within the application no longer work. It is recommended that you use a different browser to view TBC reports.
- **KMZ panoramas** - KMZ (.kmz) panorama files created in TBC do not display in Google Earth version 7.0 and later. For them to display correctly, it is recommended that you use an earlier version of Google Earth. Or, use the option to generate Google Earth KML Powered by InSphere.
- **HASP license key and Intel C602 chipset** - The HASP license key required to run TBC is not compatible with the Intel C602 chipset used in some server/workstation environments. The use of the HASP license key in combination with the C602 chipset will cause the application to crash.
- **SitePulse** - SitePulse has not been updated to support the newer VCL format created in this version of TBC. If you are using SitePulse, do not upgrade until you have installed an updated version of SitePulse.

Miscellaneous notes

- **ArcGIS versions and Windows operating systems** - When using TBC to connect or write data to an ArcGIS Enterprise Geodatabase provider, see your ArcGIS user documentation to determine which versions of the ArcGIS products are supported on the various versions of the Windows operating system.
- **OpenCL Runtime driver** - OpenCL Runtime is a graphics accelerator driver required when TBC is performing automatic tie point matching or dense point cloud creation. If the driver is not installed, an error message is displayed indicating OpenCL Runtime cannot be found. In this case, you must download OpenCL Runtime from https://software.intel.com/en-us/articles/opencl-drivers#phiwin and install it on your computer using the instructions provided.
- **VCE compatibility** - As a general rule, you cannot open a VCE project file created in a newer version of TBC in an older version of TBC.
- **Windows 8 users** – Some components in TBC require Microsoft .NET Framework 3.5 to operate. If the .NET Framework 3.5 is not installed, you are prompted to install it when you install TBC. If your computer is connected to a domain that does not allow you to directly connect to Windows Updates on the Internet to enable and install .NET 3.5, you may need to change your group policy settings. See your system administrator for assistance.

  For more information, see http://technet.microsoft.com/en-us/library/dn482065.aspx
- **Windows XP users** – Some components in TBC require Microsoft .NET Framework 4.5, which is not supported by the Windows XP operating system. To run this version of TBC, you must install a different operating system. See "System requirements" for complete operating system requirements.
- **TabletSync transfers -** If you use TabletSync to transfer large files (for example, panoramas) into TBC, it can take a long time for the upload to complete. As an alternative, you can shorten the transfer time by copying the files from the tablet onto a USB memory stick and copying the files from the stick into TBC.
- **TSPX file format -** TBC no longer supports the creation of TSPX (.tspx) files used to open TBC project data in Trimble RealWorks. As a workaround, you can export whole point clouds (not scans) to an .e57 or .las file format, which can be imported into RealWorks. You can export other types of data to an appropriate format (for example, points to .jxl, linework to .dxf, and images to.jpg) that also can be imported into RealWorks.
- **Proxy server settings** - If you receive an error when trying to access an external server to process data (for example, export KML graphic files to Trimble InSphere for use in panoramas displayed in Google Earth), you may need to specify a proxy server for your LAN using Internet Properties > Connections > LAN settings > Proxy Server.

System requirements

Operating system:	Microsoft Windows® 10 (64-bit version)
	Microsoft Windows 8 (64-bit version)
	Microsoft Windows 7 (64-bit version with Service Pack 1)
Processor:	Dual-core 1.80 GHz or better recommended
	Quad-core 2.80 GHz or better (for example Intel i7-860 2.8 GHz) recommended for Aerial Photogrammetry Module and Scanning Module
Random access memory (RAM):	2 GB or more recommended
	32 GB or more recommended for Aerial Photogrammetry Module and Scanning Module
Hard disk space available:	5 GB or more recommended
	100 GB or more on solid-state drive required for Aerial Photogrammetry Module and Scanning Module
Monitor:	1280 x 1024 or higher resolution with 256 or more colors (at 96 DPI)
	Note: TBC may not display correctly on a 4K monitor using a high resolution display setting. Try reducing the monitor's resolution to 1920 x 1080.
I/O Ports:	USB 2.0 port required if HASP hardware key is used
Graphics:	DirectX 11 compatible graphics card with 512 MB memory or more
	OpenGL version 3.2 or later required when working with point cloud data (latest version recommended)
	2 GB graphics card (for example, NVIDIA GTX 670) required when working with UAS data (Aerial Photogrammetry) and/or point cloud data

Important!

It is critical that you keep your graphics driver(s) updated if you are working with point cloud data.

Whether your computer has one or multiple graphics cards installed, you must ensure each has been updated with the latest driver provided by the card's manufacturer. The best way to determine if your driver needs to be updated and, if so, perform the update is to visit the card manufacturer's website. For more information, see "Update and Configure Your Graphics/Video Driver" in the online Help.

(If instead you decide to update your driver using the Windows Device Manager and the "Search automatically" option, the program may suggest using a Microsoft-approved WHQL version of the driver. However, to ensure you have the latest bug fixes and new features for your graphics card, it is recommended that you use the latest manufacturer version instead.)