



# Trimble Business Center

## Release Notes

Version 5.60

[www.trimble.com](http://www.trimble.com)

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TRANSFORMING THE WAY THE WORLD WORKS



## Welcome to Trimble Business Center 5.60

Trimble Business Center (TBC) provides a complete office software solution for survey and construction professionals. Having the ability to work in a single software environment streamlines operational efficiency while minimizing the costs of data management, software maintenance, and training.

**Important Note!** This version of Trimble Business Center is available to:

- Perpetual license users whose current warranty expiration date is **November 1, 2021** or later. (If your perpetual license warranty expires prior to this date and you proceed with the installation, licensed features will not be available.)
- Subscription license users whose subscription is currently active.

If necessary, you can contact your distributor to purchase a warranty extension or renew your subscription. In the TBC ribbon, select Support > License Manager to view your warranty or subscription expiration date.

## New features

Following are the new features included in this version of Trimble Business Center. The features are organized by their related ribbon tabs. To view context-sensitive help at any time while using TBC, press F1.

### User Profile

- **User Profile** - The new User Profile command provides a single location to perform all tasks related to backing up and storing files on the Trimble cloud using your free Trimble Identity (TID) login. This includes backing up and restoring user option settings and customized ribbon layouts, and storing project templates so that they can all be accessed from any computer (with Internet access) on which TBC is running at any time using your TID login
  - **User options** - As an alternative to exporting settings specified in the "Options" dialog to an \*.options file that can be imported into TBC, you can now use the User Profile command to back up "Options" settings to your cloud-based User Profile. They can then be easily downloaded and restored in TBC on any computer with an internet connection at any time, even after TBC updates. (Note: External service profiles, passwords, and language settings specified in the "Options" dialog are not included in the backup.)
  - **Customized ribbon layouts** - As an alternative to exporting a customized ribbon layout to a \*.bin or \*.xml file that can be imported into TBC, you can use the User Profile command to back up a customized ribbon layout to your cloud-based User Profile. It can then be easily downloaded and restored in TBC on any computer with an internet connection at any time, even after TBC updates.

- **Project templates** - As an alternative to saving custom project templates (\*.vct) to a local or network drive using the "Save Project as Template" dialog, you can now use the User Profile command to save custom project templates to your cloud-based User Profile. They can then be easily downloaded and used to create new projects in TBC at any time (even after TBC updates) on any computer with an internet connection, with or without network connectivity.

*Note:* For TBC v5.60, you can also use the "Save Project as Template" dialog and the "New Project" pane to save and download project templates using your User Profile.

- **Save project templates to your cloud-based User Profile** - As an alternative to saving custom project templates to a local or network drive using the "Save Project as Template" dialog, you can now use the "Save Project as Template" dialog, the "New Project" pane, or the "User Profile Manager", along with your Trimble Identity account login, to save custom project templates to your cloud-based User Profile. They can then be easily downloaded and used to create new projects in TBC at any time (even after TBC updates) on any computer with an internet connection, with or without network connectivity.

## Survey

- **Measure Distance enhancements** - The Measure Distance command, which allows you to calculate and report values between points in your project, has been enhanced as follows:
  - The slope value is now included in a stored measurement (along with the azimuth and horizontal, vertical, and slope distances previously included).
  - The stored azimuth and slope value can be selected to display in the graphic views (along with the horizontal, vertical, and slope distances previously available to display).

- **Updates to Coordinate System and Time-Dependent Transformation databases -**

The newest Coordinate System Database installed with TBC includes the following enhancements:

- Added NTV2 Grid Transformation ETRS89 to MGI for Austria
- Added Singapore Geoid Model 2009 (SGEIOD09)

Note that the update and development process used to build the CSD has been upgraded. As a result, some users may see some of the following minor changes:

- Some changes in the null datum transformation direction, which will have no impact on coordinates, but will cause a notice message to be displayed during the database upgrade for Danish datum FEH2010 (from FBPS), Hungarian datum HTRS96, and Russian datum PZ-90.11
- Some fixes in datum and zones area of use
- Some fixes in EPSG IDs

The newest Time-Dependent Transformation Database installed with TBC, which is used to transform between ITRF 2014 at the epoch of measurement and the global reference frame, includes the following enhancements:

- Added Kinematic Datum SIRGAS-Chile 2016
- Added Kinematic Datum SIRGAS-AG = SIRGAS-CON at epoch 2016 for Ag
- Improve management of ETRS89 in Czech Republic & Poland
- **Interactive time-dependent transformation** - When you select to recompute project coordinates using a coordinate system based on a different global reference datum or epoch, TBC will now let you select whether to keep the global coordinates unchanged (for example, if the global reference datum was incorrect) or transform the global coordinates from the old datum and epoch to the new datum and epoch. This will allow:
  - Interactive time-dependent transformation in TBC
  - The correct conversion of a project to a modernized datum (like conversion from GDA94 to GDA2020 in Australia)
  - The ability to fix a job logged using "unknown" ("WGS84") or the wrong global reference frame
- **Coordinate system display enhancements** - The display of coordinate system data in TBC projects has been enhanced as follows to provide users clearer information about the selected coordinate system:
  - The Point Properties pane has been updated to display the following additional information for the different coordinate types based on the currently selected coordinate system:
    - Grid coordinate: zone name and geoid model name (when used)
    - Local coordinate: local datum name
    - Global coordinate: global reference datum and global reference epoch (when applicable)
  - The coordinate system description sections in various TBC reports have been updated to include the selected global datum.
  - The TBC Help has been updated to cross-reference TBC-specific terminology relating to coordinate systems to ISO-standard terminology to help clarify terminology usage for all users.
- **Measure Distance enhancements** - The Measure Distance command, which allows you to calculate and report values between points in your project, has been enhanced as follows:
  - The slope value is now included in a stored measurement (along with the azimuth and horizontal, vertical, and slope distances previously included).
  - The stored azimuth and slope value can be selected to display in the graphic views (along with the horizontal, vertical, and slope distances previously available to display).

- **Export GNSS vectors in GVX files** - GNSS users now have the option to export GNSS vectors from TBC in GVX (GNSS Vector Exchange) formatted-files. GVX provides a standard file format for exchanging GNSS vectors derived from varying GNSS survey methods and manufacturer hardware. The file format includes all of the necessary data for a GNSS vector for inclusion in a survey network for least squares adjustment, as well as crucial metadata. The format is meant for any type of GNSS vector, whether it was derived in a real-time kinematic (RTK) survey or from baseline post-processing. (GVX files can be used to upload vector data to NGS OPUS-Projects version 5 and later.)

## CAD

- **New CAD context menu edit commands** - When you select a CAD object and press Shift + right-click, the pop-up context menu includes additional editing commands not included in the context menu when you select the CAD object and right click without pressing the Shift key. These include copy, move, scale, rotate, and explore, making it faster and easier to select one of these edit types to edit the object.

## Drafting

- **Select feature attributes to include in labels** - This version of TBC includes the following labeling enhancements, which provide the customization necessary to precisely control the attribute information you include in any label or label table:
  - The Label Style Manager and Label Table Style Manager have both been enhanced to allow you to use the User Defined Attributes label type to specify the feature attributes you want to include in a point, line, and/or polygon label. You can include not only feature attributes resulting from feature code processing in TBC, but also feature attributes imported directly into the project. Using the User Defined Attributes label type, you can specify a prefix for a standalone label attribute (for example, "Height=") or a column heading for a label table (for example, "Height"). You can also specify whether to display included attributes horizontally or vertically in a standalone label, and, if vertically, the number of attributes to include on each line. See "Select Feature Attributes for a User Defined Attributes Label Type" and "Select Feature Attributes to Include in Label Tables" in the TBC Help.
  - When adding a Feature Codes Attribute label type to a Point Styles label style, you can now optionally specify just the feature attributes you want to include in the label, instead of including them all, which is the default for this label type. And, you can specify whether or not to include attribute prefixes, which automatically use the same name as the attribute. See "Select Feature Attributes to Include in Label Tables" in the TBC Help.

- The Label Properties pane has been enhanced to support feature attributes specified for the User Defined Attributes label type and the Feature Codes Attribute label type, including the ability to edit label text as necessary and view the results in real-time. See "Select Feature Attributes for a User Defined Attributes Label Type" and "Select Feature Attributes for a Feature Code Attributes Label Type" in the TBC Help.

## Data prep

- **Automatically Set Z-Values Where Lines Connect in a Vertical Design** - Within the Edit Vertical Design command, enable the Automatic Z Values option to automatically give lines the same elevations (z-values) where they connect. Doing this helps maintain the integrity of your vertical design.

## Data exchange

- **Change file types in batch when you import multiple items** - When you multi-select files in the Import command, you can set the File Type for all of them so they import as the same kind of file.
- **Control data exchange with Quadri**
  - **Use conversion when receiving data** - Enable this option to convert when receiving data if, for example, you want to map a certain feature type to a certain layer in TBC.
  - **Create alignments with network connection** - This option (only applicable for Quadri 2021), does not use TBC conversion templates, but rather the alignment template in Quadri, to create a LinearElement and associated network elements. In Quadri 2020 versions, enabling this option creates alignments without network elements and uses the TBC connector templates during conversion, which does not necessarily create a LinearElement.

## Surfaces

- **Reference file support** - Use the new Reference File Manager to select a VCE (.vce) project whose data (point clouds excluded) you want to display in your current project for referencing purposes. Due to dynamic linking, any changes made to the selected reference project will be reflected in your current (referencing) project any time you reopen it, or when you select to manually perform a reference update.

In conjunction with the Reference File Manager, you can use the new Create Surface from Reference File command to create a new reference surface in your project based on a surface included in a selected reference project. The dynamically linked reference surface can be used for comparison purposes and to, for example, create new CAD objects based on objects in the reference surface.

## Point clouds

- **Extract lane line marking features from point clouds** - The Extract Line Features command, already used to extract linestrings from overhead utility lines and curb and gutter features, has been enhanced to support the extraction of linestrings from solid, double-solid, and dashed lane line marking features on roads displayed in point clouds. Intuitive, interactive controls make it easy to change the cloud's intensity threshold and define scan point search intervals to provide optimal extraction results. And if TBC encounters a problem during the extraction process due to line feature irregularities or sparse scan points, you can, with the aid of several helpful tools, make manual point selections to continue the extraction process. Before saving the extracted linestrings, you can use the post-extraction QA/QC tools to verify and make changes to any of the lines as necessary (for example, ignore or mark the line, or apply smoothing options).
- **Extract pole and sign feature inclination attributes** - The Extract Point Feature command has been enhanced to extract inclination and inclination direction attributes for poles and sign features. The inclination is measured in vertical degrees while the direction is measured in degrees of azimuth or bearing, depending on your Project Settings. This allows you to identify pole and sign features whose inclination exceeds a specified threshold and may, for example, require repairs, without the need to make manual measurements. (The GlobalFeatures.fxl feature library file included with TBC now includes inclination attributes to support this enhancement.)

## Construction data

- **Import work orders from WorksManager** - Use the WorksManager Work Orders command to bring work order files (.spj) with crew instructions and map data into TBC so you do not have to manually export them from WorksManager and import them.

## Photogrammetry

- **Streamlined photogrammetry workflow** - The user interface in TBC has been enhanced to provide a more intuitive, easy-to-follow, left-to-right workflow (that should still look very familiar) when processing imported photogrammetry data and creating deliverables. Enhancements include:
  - The Adjust Photo Stations command has been streamlined to perform a relative station adjustment and, if RTK vectors, a processed trajectory, and/or control points with observations are included, perform an absolute station adjustment automatically with no additional input. A manually configured absolute adjustment with control points, if required, is no longer handled in this command but instead is handled in the new Adjust Photo Stations with GCPs command (see next bullet).

- The new Adjust Photo Stations with GCPs command allows you, after performing a relative station adjustment using the Adjust Photo Station command, to perform an absolute adjustment manually without the need for RTK vectors or a processed trajectory. Using this command, you select the GCPs you want to include in the station adjustment and then pick their corresponding photo pixels.
- The previous three Deliverables commands have been combined into a single Create Deliverables command that allows you to easily configure parameters and produce point clouds, elevation rasters, and/or orthomosaics from a single location. Note also that the Create Deliverables command allows you to select a new elevation type: Digital Surface Model (Highest Quality).
- The previous Advanced UAS command has been replaced by the Adjust Photo Stations, Adjust Photo Stations with GCPs, and Create Deliverables commands

See the TBC Help for more information.

- **Highly compressed aerial overview images** - The algorithm used to compress aerial overview images created on import from individual aerial JPEG images has been enhanced to provide a much higher compression ratio, resulting in a large reduction in disk space required to store and transfer the overview images. For example, with a moderately large UAV data set of 150 GB (1,000 images), this results in the reduction of hundreds of GB's of overview image data. (Note: An *aerial overview image* file contains down-sampled versions of the original aerial JPEG images and is used to provide efficient rendering of the images in graphic views across various zoom levels.)
- **DJI Zenmuse L1 UAV support** - Use the Import DJI UAV Data command to import aerial survey data collected by the new DJI Zenmuse L1 system attached to a DJI UAV. Then, process the data and create point cloud, elevation raster, and/or orthomosaic deliverables in TBC, or pass the data through to UASMaster for processing. (Note that TBC does not support post-processing of raw lidar data collected with the L1.)

## Tunnels

- **Assign Tunnel As-Built Points status display** - When using the Assign Tunnel As-built Points command to assign as-built points to a tunnel in your project, the progress of the extraction is now displayed in a progress bar in a separate pop-up window instead of in the TBC Status Bar as before, allowing you to more accurately monitor the progress and cancel the process if necessary.
- **Tunnel As-Built Report enhancements** - The *Tunnel As-Built Report* has been enhanced as follows to provide greater flexibility and detail for construction reporting:

The *Tunnel As-Built Report* command now allows you to:

- Select to run a report using the new *Tunnel As-Built Report (with best-fit circle)* template, which includes a best-fit calculation and comparison for circular tunnel profiles, a key metric for verifying the final placement of ring positions for TBM (tunnel boring machine) tunnels.
- Select the color to apply to points that exceed the specified station tolerance and points that are within all specified tolerances to verify as-built data conforms to specifications.
- Select to omit outlier points from the report based on the outlier tolerance you specify to remove unwanted data from the report.

The *Tunnel As-Built Report* now includes:

- The tunnel shape name in each station section to verify which construction stage is being reported on.
- Overbreak and underbreak volumes in each station section to determine sections requiring significant construction rework and quantities.
- Maximum overbreak and underbreak delta distances in each station section and in the summary section to flag critical construction verification spots.
- All shapes associated with the tunnel design in the cross-section views, providing greater detail for construction verification.

The new *Tunnel As-Built Report (with best-fit circle)* also includes in each cross-section view two points that specify the location of the tunnel alignment and the calculated center of a best-fit circle (based on the as-built-points). Delta values are displayed in a table beneath the cross-section view. Additionally, there is an option to create 3D points in TBC from the calculated best-fit circle points allowing for the creation of a best-fit, as-built alignment.

- **Tunnel inspection enhancement** - Tunnel Inspection Maps can now be shown as open meshes when created from open tunnel as-built meshes, resulting in more accurate results when generating Tunnel Inspection Reports. (Tunnel Inspection Maps created from two closed meshes (design or as-built) will remain as closed meshes.)
- **Create multiple tunnel set outs** - The Set Outs tab in the Tunnel View now includes a Create Multiple Set Outs button that opens a dialog allowing you to create a range of multiple set out points for a tunnel corridor design automatically, instead of creating each one individually using the Set Outs table. The new dialog, which is easy and quick to use, allows you to specify all of the properties included in the Set Outs table for the multiple set out points, along with the ability to do the following:
  - Radial set out - Specify the starting and ending radial path length and the interval or fixed number of radial set out points to create along that path. These points are commonly used to define pipe umbrellas and rock bolt locations.
  - Horizontal set out - Specify the vertical height range and the interval or fixed number of horizontal set out points to create within that range. These points are commonly used to define set out locations for anchors, rock bolts, and features on the tunnel wall.

- Vertical - Specify the horizontal offset range and the interval or fixed number of vertical set out points to create within that range. These points are commonly used to define locations for anchors, rock bolts, and features on the tunnel ceiling/crown.
- Blast hole - Specify the grid origin and the horizontal and vertical interval at which to create blast hole set out points. These points are used to define locations for drilling jumbo positioning and blasting locations.

## Monitoring

- **Monitoring Epochs Manager** - The new Monitoring Epochs Manager simplifies monitoring data management by enabling you to perform any of the following tasks in a single, easy-to-use dialog when working with a monitoring project in TBC:
  - Change the reference epoch.
  - Change the timestamp of an existing epoch.
  - Delete an epoch.
  - Delete a point from an epoch.
- **Import and process point monitoring epochs from Trimble Access** - You can import a JSON (.json) file containing point positions for multiple epochs measured in the field using Trimble Access Monitoring application. You can then assign the data to a monitoring cloud project using your Trimble Identity account, process the data, and view point displacement from epoch to epoch in graphic views, spreadsheets, and reports. As necessary, you can import additional JSON files containing subsequent epochs into the same monitoring cloud project and view point displacement in TBC. This reduces the processing time for monitoring data and streamlines the workflow from field data collection using Trimble Access Monitoring to deliverable creation in TBC.
- **Customizable Monitoring Report** - The Monitoring Report, which contains monitoring project displacement information in a variety of formats, can now be customized as follows:
  - Optionally, select the monitoring points to include in the report. (Otherwise, all monitoring points are included.)
  - Optionally, select a date range that specifies the epochs to include in the report. (Otherwise, all epochs are included.)
  - Select to include any or all of the following elements in the report:
    - Scatterplots
    - Component Charts
    - Point Charts
    - Thresholds
    - Readings

- Optionally, select a custom logo to include in the report header.

These enhancements provide the full control you need to ensure your reports best fit the needs of your targeted audiences.

## Mobile Mapping

- **User interface clean-up** – The Mobile Mapping user interface has been cleaned up to provide a clearer experience to the users. Resources and files no longer needed have been removed or hidden from the Project Explorer and from the View Filter Manager. Following is a list of some of the new enhancements:
  - Control from the Project Explorer the visibility of entities in the Plan View and 3D View with a check box
  - Removal of scans and trajectory entities from the View Filter Manager
  - Construction points for cameras and scan sections hidden
  - Raw Data folders metadata moved inside run properties
  - New naming conventions
- **Project cleanup and archive** – Once the preprocessing phase is terminated, users can, if needed, remove all unneeded original data to produce a clean project for the production phase. The cleaned-up project can be stored as a lighter mission archive.
- **Trimble Business Center Viewer** – The Trimble Business Center 5.6 Viewer offers the option to display LAS files and camera images collected by a Trimble Mobile Mapping system.

## Alignments and Corridors

- **Create a Profile Proxy** - If you have an alignment with one or more reference lines/linestrings alongside it, use the Create Profile Proxy command to see what those lines look like in the Profile View in relation to the alignment's profile. As you make changes to a reference line's vertical geometry, those changes are reflected in the proxy line's geometry in the Profile View.

## Third-party tools

**New ANZ Toolbox commands** - These commands have been added to the toolbox:

- **Point Conformance Report** – The Point Conformance Report command is for reporting as-built points against a design points such as piles, columns, boreholes, etc. The command gives reporting method options, such as tolerance mode, and allows text detailing the tolerances to be created using the visualize function.

- **Utilities Auto Draft** – The Utilities Auto Draft command allows you, based on a feature codes and attributes, to create utility pipes automatically from as-built or design 3d data. You create a mapping rule set and by selecting a group of lines using all or part of a line name (using the wildcard asterisk “\*”) and attributes, apply rules to those objects simultaneously. In addition, you can import mapping rule sets into your project or export the ones you create using \*.utilitiesautodraft files.
- **Unlink Linestrings** – The Unlink Linestrings command allows you to convert a linestring that is using Point IDs for location to become a coordinate based linestring.
- **Points from Chainage Offset** - The Points from Chainage Offset command allows you to create points using Chainage, offset, and elevation along an alignment, or alternatively a .csv file can be imported and the columns containing the point ID, chainage, offset, elevation, and code defined.
- **Annotate Objects** – The Annotate Objects command allows you to write text to screen for selected objects using multiple options to extract information. There is a Basic option for one-off work and a Batch option that uses rule sets for repeatable work on large data sets.
- **Set Vertex Text** - The Set Vertex Text command allows you to set vertex text on lines and points to be used in 12d and to edit existing vertex text.
- **Plan View Rotate** - The Plan View Rotate command allows you to rotate the current plan view using the direction of text objects and lines or manually entered bearing.

## Miscellaneous features

- **Sort Imported Files in the Project Explorer** - You can right-click on the Imported Files node in the Project Explorer and select to sort the imported files either by their name or by the order in which they were imported, providing two options to more easily locate any imported file.
- **Freely move and duplicate materials and site improvements** - In the Material and Site Improvement Manager, you can move and copy categories and individual materials and site improvements freely within or between your project library and external library, as long as the items have the same types of properties. These actions can be performed using toolbar, menu, and context menu commands. In addition, you can drag-and-drop items between compatible categories within a library or between libraries.

## Resolved issues

The following major issues **have been fixed** in this version of TBC:

- Processing time for extracting scan points from a point cloud and assigning them as as-built tunnel points increased substantially in TBC v5.5x when compared to earlier versions of TBC.

- The Edit Corridor Template and Insert Corridor Template buttons at top of the Edit Corridor Template command pane did not work if you had a non-corridor object selected.
- Excavation and embankment volumes were different by 1.5% (using the same sampling distance and settings) when you calculated volumes for corridor projects using the Corridor Earthworks Report and the Material Volumes Report (in REB Tools).
- Elevation labels did not appear on a cut/fill map as specified. The number of labels (based on gridlines) exceeded the limit, so the limit has been raised.
- Cross Slope and Cross DZ rules did not work in the same vertical design if the design included multiple CAD lines at the target location; only one of the lines was used in the calculation.
- Multi-selecting files in the Import command and then choosing Select in the context menu deselected everything.
- The Takeoff Report was missing strata volumes if one strata had a thickness of 0.0.
- In the Surface Info Report, you could not set an elevation range if no surface was selected.
- You encountered an error running the Area/Length/Count Report when you had Display Data in Report View selected and Show All Details enabled.
- You encountered an "unexpected network failure" error when publishing a boundary created from a linestring to WorksManager.
- When splitting plan and profile data into multiple views in a sheet set, the Profile View data did not match the Plan View data.
- You encountered an export error when publishing data to WorksManager; this was due to the combination of enabling the Cleanup VCL property (to cull dependent objects from the VCL file) and including a vertical design.
- Mobile Mapping:
  - TBC registration scan updates resulted in errors. This bug was blocking the generation or update of scans in some specific conditions.
  - When using Batch Register Run To Run, left and right scans were bent after registration. Registration sometimes generated distorted point clouds.
  - Export to TopoDot did not work. Exporting runs in TopoDot format generated an error when runs were selected from the Plan View.
  - Toggle runs option does not work. If no spherical image was loaded on a Trimble Business Center project, it was not possible to activate the run segments on the map.

## Important notes and known issues

See the TBC Help for a complete, up-to-date list of important notes and known issues related to TBC.

## System requirements

<b>Operating system:</b>	Microsoft Windows® 10 (64-bit version) Microsoft Windows 8 (64-bit version) <b>Note:</b> Starting with TBC v5.21, Microsoft Windows 7 is no longer supported.
<b>Processor:</b>	Dual-core 1.80 GHz or better recommended  Quad-core 2.80 GHz or better (additional cores with hyper-threading support highly recommended for Aerial Photogrammetry, Mobile Mapping, and Scanning modules)  <b>Important!</b> Because components of TBC make use of Intel-only multi-thread processing, <b>AMD Ryzen processors are not supported.</b>
<b>Random access memory (RAM):</b>	4 GB or more recommended  32 GB or more recommended for Aerial Photogrammetry, Mobile Mapping, and Scanning modules
<b>Hard disk space available:</b>	10 GB or more recommended  100 GB or more on solid-state drive required for Aerial Photogrammetry, Mobile Mapping, and Scanning modules  The recommended SSD overall hard drive capacity is 500GB or more for Aerial Photogrammetry, Mobile Mapping, and Scanning modules
<b>Monitor:</b>	1280 x 1024 or higher resolution with 256 or more colors (at 96 DPI)
<b>I/O Ports:</b>	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)

8 GB graphics card or higher (for example, NVIDIA Quadro P4000) required when working with Aerial Photogrammetry, Mobile Mapping, and Scanning modules

**Note:** If you are using a laptop computer with both an integrated (on-board) graphics card and a discrete NVIDIA graphics card enabled via Optimus technology, your computer must allow you to select to disable the integrated graphics card and use only the discrete graphics card when working with point cloud data. See "Disabling a laptop integrated graphics card" in the "Miscellaneous notes" section earlier in this document.

***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.)