TECHNICAL NOTES

Trimble Business Center

Start in TBC. Stay in TBC.

TRIMBLE BUSINESS CENTER OFFICE SOFTWARE
v5.90 MAY 2023

Survey + construction field-to-finish workflows with confidence

Leverage the power of raw geospatial and construction data in a single, robust software environment to confidently deliver project after project with Trimble® Business Center (TBC) office software. Engage with powerful, streamlined workflows designed for you to take data further with survey, CAD, surface, corridor, point cloud, and photogrammetric deliverables. With your professional reputation, financial well-being, and requirements on the line, use TBC's unique capabilities to stand out from your competition and deliver superior results to your clients.

Find out more at:
www.trimble.com/tbc

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Data Integration

In a single software package, combine raw measurements from GNSS, total stations, and levels—then, add in data from unmanned aerial vehicles (UAVs), mobile mapping systems, and terrestrial laser scanners—all of which is scaled to your survey data. No need to import and export between multiple software packages. No need for training, renewals, or support for different applications from different providers. TBC provides the capabilities you need to deliver complete survey and construction deliverables.

Confidence-inspiring Results

Work with raw sensor data, not just X,Y,Z coordinates, view and edit rod heights, prism constants, vector timestamps, and more to achieve the most accurate horizontal and vertical results. Visualize your data in context with Google Earth™ or import background maps and imagery. Don't put up with fragmented data sets or disjointed workflows that cause costly mistakes and jeopardize your deliverables. Easily back up office and field data imported from Trimble and other third-party hardware, ensuring complete traceability throughout your project.

Robust Deliverables

When "good enough" is not acceptable, TBC ensures your ability to deliver the highest quality results, which can be displayed in a large variety of reports and spreadsheets, digital surface and site models, CAD plans, point clouds, aerial ortho photos, corridor and tunnel designs and as-builts, machine control models, station-based images, and much more. Easily work with other industry-leading software packages such as Autodesk®, Bentley®, and Esri with powerful import and export support for a variety of third-party file types. Store and share projects online using Trimble Connect™, Trimble Sync Manager™, Trimble Clarity™, Google Earth™, and Bentley ProjectWise®.

Licensing options for every customer

- With **perpetual** and **subscription** options, there's a TBC offering for every surveying and construction organization.
- Host your multi-seat license in the cloud or on-premise or use a single-seat USB dongle on your PC workstation.
- Utilize value-adds like Trimble Connect Business and Trimble Clarity Starter included in TBC's subscription offerings.

Use the cloud for real productivity

- Customize and store your settings, ribbon layouts, and templates to your Trimble Identity (TID) user profile to share across your organization or recall after version updates.
- Send project data back and forth to Trimble Access™ with Trimble Sync Manager.
- Store your data—including large files, images, and raw data—in Trimble Connect, then download to use in your TBC projects.

Publish and view in Trimble Clarity

- Visualize your rich point cloud and 3D model data on any device.
- Measure, mark-up, and annotate your models to share now or save for later.
- Securely share projects and progress updates with your team or clients without the need for third-party software.
- Start your free trial today: https://clarity.trimble.com

Customize your TBC with Macros

- Use Python scripts and access TBC's native objects and calls to write your own commands.
- Encrypt and publish your own macros for distribution online.
- Learn more and get help on the TBC Macros Community: https://community.trimble.com/groups/trimble-business-center-hce

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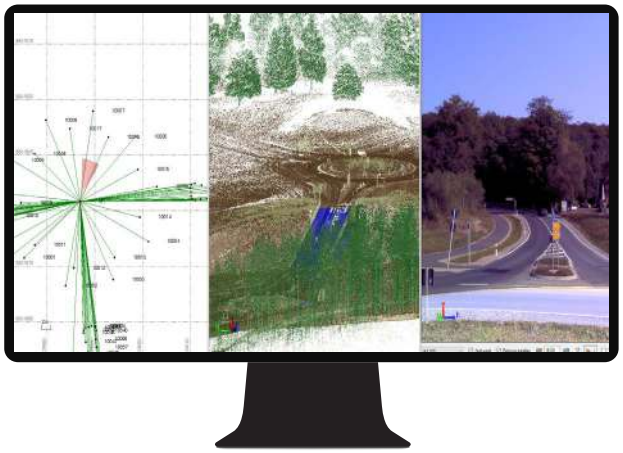
Supported Workflows

Field Data QA/QC

Import and interact with Trimble and third-party raw data.

- Visualize, interact, and measure your data across multiple views and reports.
- Check and edit raw data with spreadsheets, selection filters, and interactive property menus.
- Sync data with Trimble Access, Siteworks and machine control systems.
- Process feature codes from the field or keyed into TBC.
- Provide context with background maps, georeferenced images, and overlays in Google Earth.



Use multiple views to review and edit raw data

Adjustment and COGO

Efficiently reduce observations and perform cadastral survey workflows.

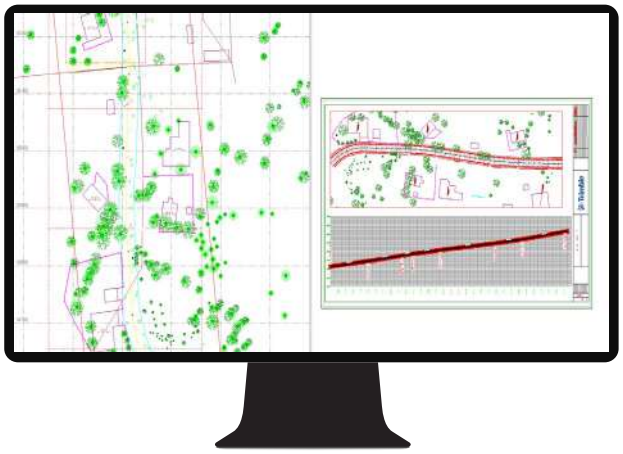
- Finish CAD deliverables with options like COGO collections from existing linework, support for nested parcels, and ease of use enhancements.
- Process static and kinematic GNSS observations and export GNSS vectors in National Geodetic Survey (NGS) *.gvx files consistent with varying third-party manufacturer hardware.
- Re-engineered Kinematic GNSS processor provides substantially more precise and accurate results.
- Compute and adjust traverse and level runs.
- Translate field book data and notes into the Level Editor and Total Station Editor.
- Complete least square corrections with mixed data observations and constraints in the Network Adjustment.
- Input survey plans, compose legal descriptions, and compute parcel misclosures intuitively with the Create COGO routine.

Apply a least-squares adjustment in a network adjustment

CAD and Drafting

Produce your final survey linework, construction models, and roadway design plots with ease.

- Quickly draft and edit points, 2D or 3D linework, and CAD geometry with the keystroke-based CAD Command Lines.
- Use Dynaviews to place your model space data into sheet plots.
- Add dynamic labels, line and curve tables, scale bars, and other map elements.
- Automatically plot profiles and cross-sections for alignment-based surfaces or corridors.
- Create digital deliverables such as *.dwg CAD files or print deliverables like plan sets or 3D PDFs for communication and collaboration.



Draft plan and profile sheets with dynaviews

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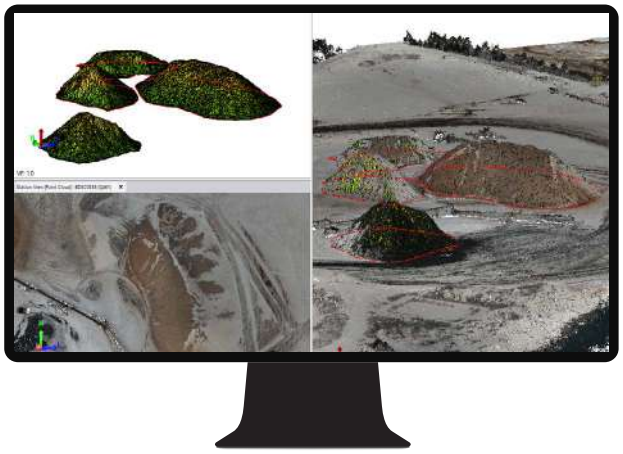
Surfaces and Volumes

Create, process, and deliver complex surface models for field devices, machine control systems, and third-party export.

- Create traditional, projected/vertical, and radial surfaces that dynamically update when surface members are modified.
- Generate quick and accurate volume reports from surface comparisons, stockpile/depression, and corridor surfaces.
- Compute gridded Cut/Fill surfaces and reports with customizable color mapping.
- Specify contour lines and labels that update as a reference surface changes.
- Drape objects onto surface, run point-to-surface comparisons, and view site balance factors in volume grid properties for a surface.

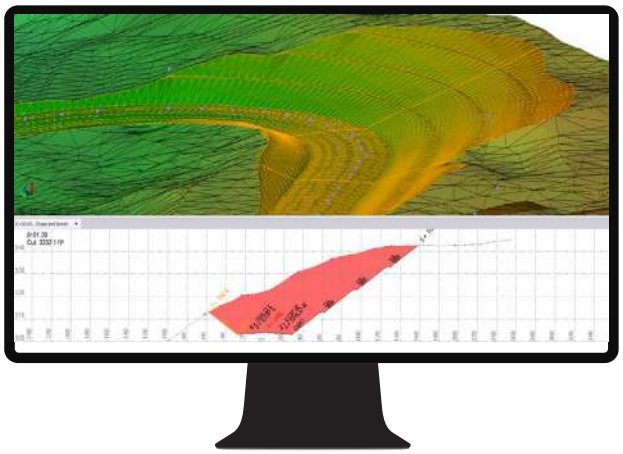


Compute precise surfaces and volume stockpile quantities

Alignments and Corridors

Model and manipulate alignments and parametrically-designed corridors.

- Define horizontal and vertical alignments from scratch or existing CAD linework with support for station equations and superelevations.
- Enter corridor template instructions with interactive, graphical feedback.
- Handle complex roadway designs with conditional instructions and slope and node tables.
- Design corridor features such as interchanges, ramps, and intersections with parameter prompts.
- Generate corridor earthwork reports, apply material properties, and create subgrade surfaces.

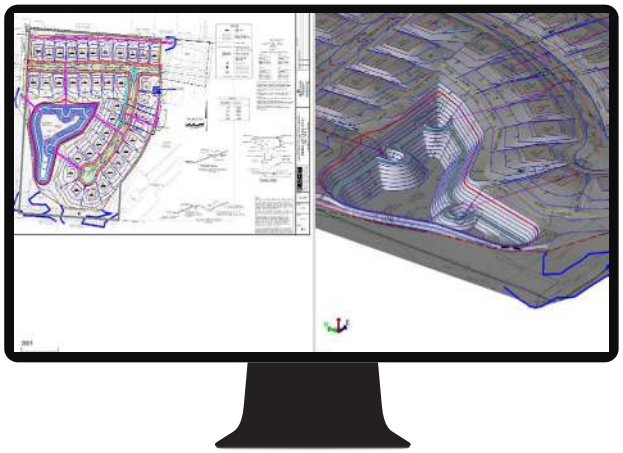


Model and visualize simple or complex alignments and corridors

Data Prep

Make sure your data is clean, up-to-date, and delivered in the right format to get the job done.

- Import, clean up, and organize CAD and PDF data with Project Cleanup and import field data from WorksManager.
- Extract and digitize data from vector PDFs.
- Elevate 2D contours, points, lines, and polygons into 3D models with parametric side slope and vertical design tools.
- Interact with site and corridor designs from third-party packages with support for a variety of CAD and BIM formats.
- Create linework, surfaces, global vertical designs and avoidance zones for machine control systems.
- New Over-Excavation Template Editor to simplify managing multiple Over-Excavation profiles in the Over-Excavation surface.



Digitalize plan sets from *.pdf into 3D linework & models

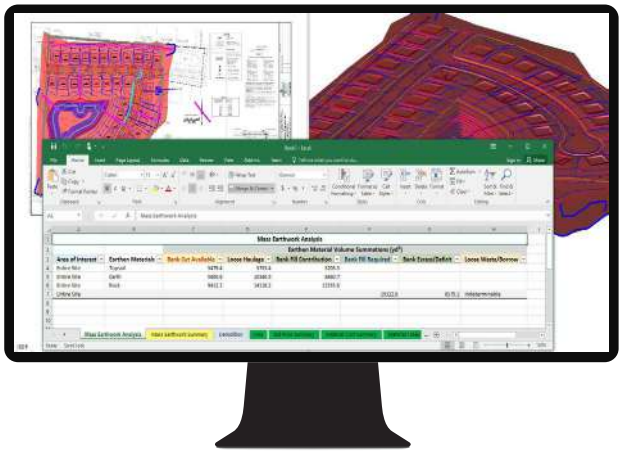
TECHNICAL NOTES.

Supported Workflows

Takeoff and Mass Haul

Calculate earthwork and material quantities of a construction project.

- Define site improvements in the Material and Site Improvement Manager for computations and reports.
- Generate takeoff reports for earthwork, materials and costs.
- Balance and optimize earthwork volumes to reduce borrow and waste.
- Create mass haul diagrams and reports to plan and monitor progress for sites and corridors.

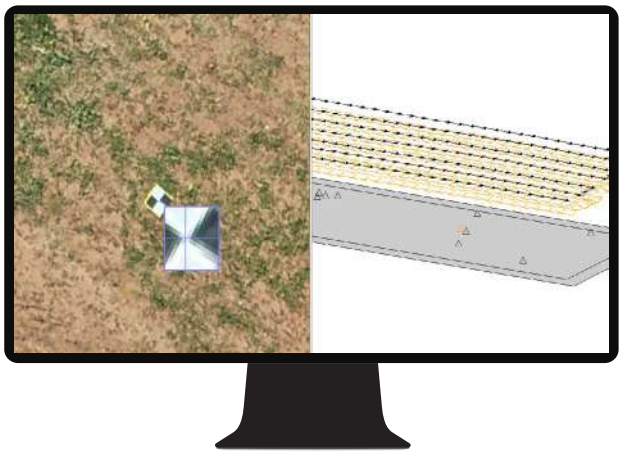


Calculate earthwork, material, and cost data

Trimble VISION & Aerial Photogrammetry

Adjust, measure, and model from Trimble VISION™ technology and leading UAV providers like DJI, senseFly, Wingtra, Delair, and more.

- Leverage streamlined aerial workflows by utilizing DJI M300 P1 trajectory post-processing and Wingtra drag + drop import.
- Extract points and geometry from station imagery, ortho images, and point cloud data using a variety of matching techniques.
- Generate photo tie-points automatically and match ground control points (GCPs).
- Create high-resolution point clouds, orthomosaics, and elevation raster digital surface models (DSMs) from Trimble or third-party UAVs.
- Use Inpho UASMaster for additional processing, deliverables creation, and QA/QC options.
- To learn more, see the TBC for Aerial Photogrammetry and LiDAR Technical Notes.

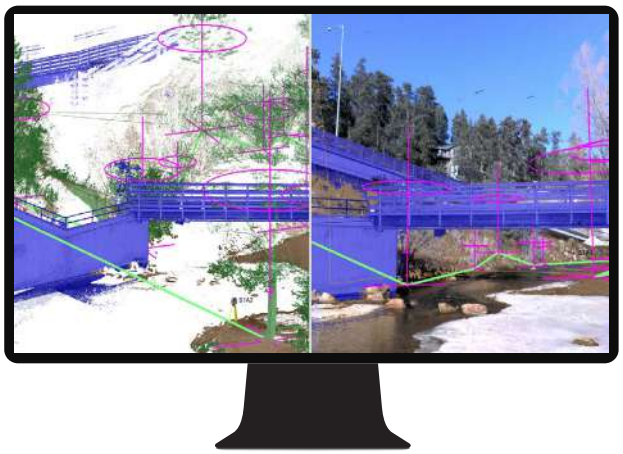


Adjust UAV data and create deliverables

Scanning and Point Clouds

View, manipulate, and extract information from terrestrial, mobile, and aerial point cloud data.

- Colorize, register, georeference, and adjust Trimble SX-series, Trimble TX-series, Trimble X-series and third-party scan data.
- Scale scan and point cloud data to survey data in an integrated project environment.
- Compare as-built reference point cloud regions to BIM objects, tunnel design meshes, surfaces, or other point cloud regions to create heat maps.
- Integrated Deep Learning technology improves results of the growing list of point cloud classification regions and feature extraction options.
- Extract point, line, and cross-section features using user-defined planes and automatic and semi-automatic feature extraction tools.
- Automate the stockpile extraction process from point clouds with just two or three clicks.



Extract features from scans and point cloud data

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GIS

Integrate GIS within survey data and provide deliverables to an Esri-based environment.

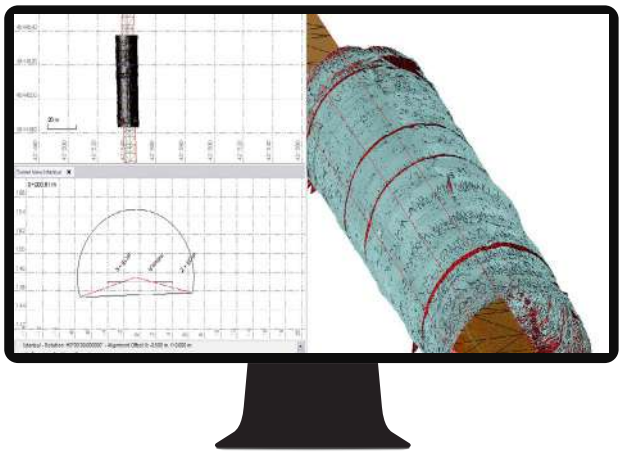
- Support Trimble Access rectangular feature code control.
- Extract schemas and convert from GIS sources with the same symbology to feature definition code libraries (*.fxl).
- Connect to different GIS data sources, including File Geodatabase, Shapefile, and Enterprise Geodatabase. (Support for ArcGIS Pro is now included!)
- Map metadata from data source connections.

Export feature and attribute data to ArcGIS Pro

Tunneling

Work with Trimble Access Tunnels and leverage TBC's point cloud and reporting tools for tunnel survey workflows and deliverables.

- Create CAD cross-section diagrams.
- Parametrically design tunnel shape templates with dynamic cross-section interface.
- Intuitively design set-out positions like blast holes, rock bolts, and more for in-field stake out via Trimble Access Tunnels.
- Analyze designed or as-built tunnel meshes to produce customized heat map comparisons and assign as-built points from point cloud data to create 3D as-built inspections.
- Generate comprehensive as-built reports to convey overbreak/underbreak estimates, as-built center points, and more.
- Perform as-built to design and as-built to as-built inspection using total station or point cloud data to verify shotcrete thickness, excavation shape, and final lining position.

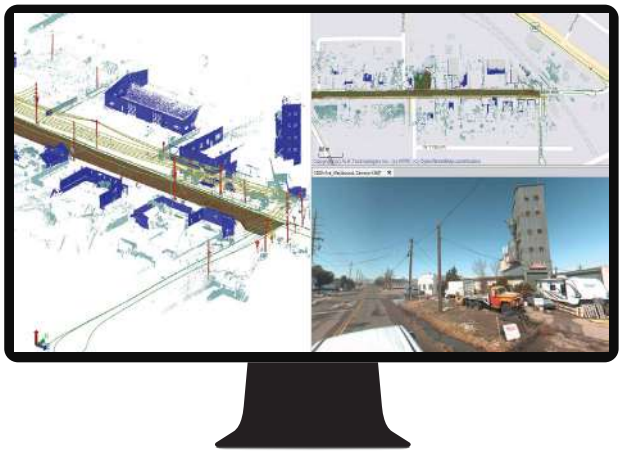


Use point cloud or total station data for tunnel survey deliverables

Mobile Mapping

Import and process data from Trimble's mobile mapping hardware platforms like the MX7, MX9, and MX50.

- Manage point cloud processing, classification, registration and deliverables of one or multiple projects with MM Batch Processing tools.
- Adjust, colorize, and register scan data with single run or multi-run options and precise target-picking tools.
- Calibrate scanner and camera alignments for the MX9 and MX50 mobile mapping systems.
- View mobile mapping runs, GNSS/IMU trajectories, and imagery.
- Post-process raw trajectory data against local base stations or CORS networks.
- Export data to third-party and Trimble software such as TMX, Mapillary, TopoDOT, Solv3D, and Horus. To learn more, see the TBC for Mobile Mapping Technical Notes.



Work with trajectory, registered point cloud, and imagery

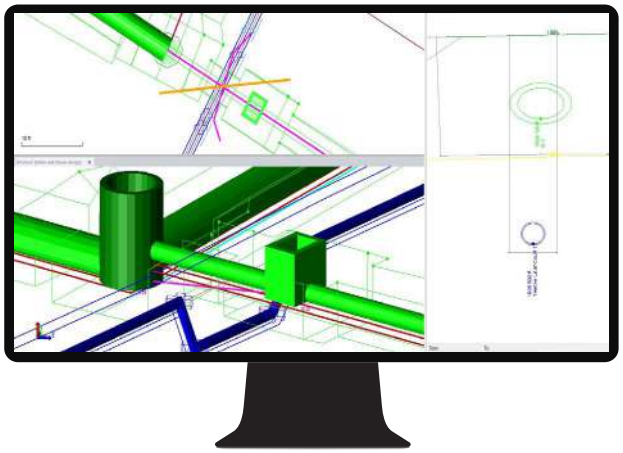
TECHNICAL NOTES.

Supported Workflows

Utility Modeling

Define gravity or pressure-based utility networks for takeoff and visualization applications.

- Create pipe and utility networks.
- Customize utility shapes, structures, and node types and objects.
- Design parametric trench templates and surfaces.
- Add utility models to existing sitework, CAD geometry, and surface context.
- Generate customized utility takeoff reports.



Model pipe networks, structures, and trenches in 3D

Monitoring

Utilize survey data collected using Trimble Access Monitoring or third-party field software to generate periodic or campaign-based monitoring deliverables.

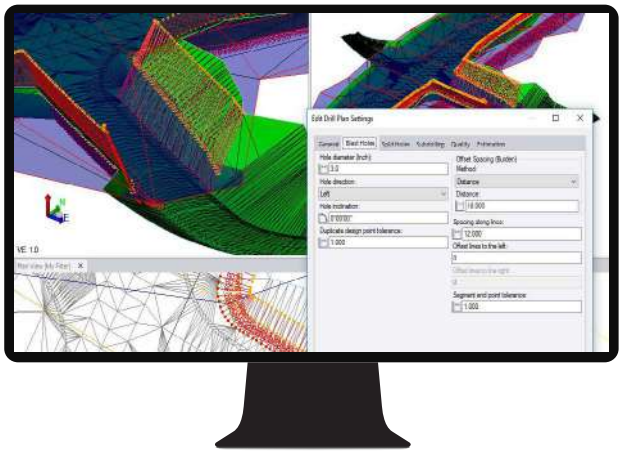
- Manage monitoring data utilizing tools for editing, deleting, and adding epochs from all survey data — total station, GNSS, level, or point cloud.
- Automatically process and report on multiple epochs using data contained in *.json files imported from the Trimble Access Monitoring application.
- Define warning and alarm thresholds to flag points with significant movement.
- Visualize movement patterns and magnitude using 3D displacement vectors and interactive charts showing movement level thresholds.
- Customize and create comprehensive monitoring reports showing displacements in various formats for client requirements.

Create monitoring deliverables from any survey data

Drilling, Piling, and Dynamic Compaction

Prepare work plans and connect to DPS900 systems.

- Create boring and drilling plans and work reports.
- Create foundation and infastructure piling plans and work reports.
- Create dynamic compaction plans and work reports.
- Customize pile types and drill quality reports.
- Import and export to Trimble DPS900 systems.



Set and edit drill, piling, and dynamic compaction plans

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System Requirements

Operating system

- Microsoft® Windows® 11 (64-bit version)
- Microsoft® Windows® 10 (64-bit version)
- Windows Server 2016, 2019, and 2022 Standard and Datacenter
- Starting with TBC v5.21, Microsoft® Windows® 7 is no longer supported

Processor

- Dual-core Intel 1.80 GHz or better recommended
- Quad-core Intel 2.80 GHz or better recommended (additional cores with hyper-threading support highly recommended for Aerial Photogrammetry, Mobile Mapping, and Scanning modules)
- AMD Ryzen processors are not supported

Random-access memory (RAM)

- 4 GB or more recommended
- 32 GB or more recommended for Aerial Photogrammetry, Mobile Mapping, and Scanning modules

Hard Drive

- 10 GB free or more recommended
- 100 GB free or more on solid-state drive (SSD) required with overall capacity of 500 GB or more recommended for Aerial Photogrammetry, Mobile Mapping, and Scanning modules

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 (NVIDIA Quadro P4000 or similar) required for Aerial Photogrammetry, Mobile Mapping, and Scanning modules

Monitor

- 1280 x 1024 or higher resolution with 256 or more colors (at 96 DPI)

I/O Ports

- USB 2.0 port required if HASP hardware key is used

Supported Languages

- Chinese (Simplified)
- Czech
- Danish
- Dutch
- English US
- English UK
- Finnish
- French
- German
- Italian
- Japanese
- Korean
- Norwegian
- Polish
- Portuguese
- Russian
- Spanish
- Swedish

Learning Resources

Interested in TBC but wondering where to start? Want to learn more? We offer a variety of helpful resources to make you productive quickly. Learning TBC has never been easier.

TBC Online Help:

Press F1 at any time when using TBC to view step-by-step instructions, workflow strategies, and detailed descriptions related to the task you are performing. Or perform a simple search to find out more about any TBC topic.

Website:

Your home for everything TBC — downloads, support information and bulletins, as well as customer testimonials and videos:
www.trimble.com/tbc

Learn Platform:

Complete free self-paced workflow-based courses with hands-on guided software experiences:
learn.trimble.com/pages/422/trimble-business-center-tbc

Trimble Community Page:

Join your fellow TBC users and ask questions, showcase a project, and learn from peers in this open online forum:
community.trimble.com/groups/tbc-group

Power Hours:

A live monthly session where a Trimble or industry expert showcases a workflow in TBC. All sessions available afterwards and on-demand, for free:
geospatial.trimble.com/webinars/trimble-business-center

Tutorials:

Follow along with sample data and PDF instructions as we explain and illustrate specific workflows and introductions to TBC:
geospatial.trimble.com/trimble-business-center-tutorials

YouTube Channel:

Watch and learn as our team explains how a specific function works or what's new in our latest release:
www.youtube.com/user/TBCSurvey

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