SPEC SHEET

Trimble R780

GNSS System

Highly accurate GNSS receiver built to handle the toughest construction environments.

Key Features

- Configurable receiver, scalable for future requirements.
- Available in base & rover, rover only, or base only configurations.
- Trimble® Inertial Platform™ technology for magnetically immune IMU-based tilt compensation.
- Trimble ProPoint™ GNSS positioning engine for improved accuracy and productivity in challenging GNSS conditions.
- Trimble Maxwell™ 7 GNSS ASIC.
- 9 GB internal memory.
- Trimble xFill® correction outage technology.
- Supports Trimble CenterPoint® RTX corrections for RTK level accuracy worldwide via satellite/IP.
- Military-grade ultra-rugged design, IP68 rating.
- Optimized for Trimble FieldLink™ field software.

Find out more at:
fieldtech.trimble.com

Trimble®

SPEC SHEET

Trimble R780

GNSS System

PERFORMANCE SPECIFICATIONS

GNSS TECHNOLOGY

	Constellation agnostic, flexible signal tracking, improved positioning in challenging environments1 and inertial measurement integration with Trimble ProPoint GNSS technology
	Increased measurement and stakeout productivity and traceability with Trimble TIP™ technology IMU-based tilt compensation
	Trimble RTX worldwide corrections
	Advanced Trimble Maxwell 7 technology
	Trimble EVEREST Plus™ multipath signal rejection
	Spectrum Analyzer to troubleshoot GNSS jamming
	Japanese LTE Filtering below 1510 MHz allows antennas to be used 100 m away from Japanese LTE cell tower
	Iridium Filtering above 1616 MHz allows the antenna to be used 20 m away from Iridium transfer

SATELLITE TRACKING

	GPS: L1C, L1 C/A, L2E (L2P), L2C, L5
	GLONASS: L1C/A, L1P. L2C/A, L2P, L3
	Galileo: E1, E5A, E5B and E5AltBOC, E6[2]
	BeiDou: B1, B2, B3, B1C, B2A
	QZSS: L1 C/A, L1C, L1S, L2C, L5, LEX/L6
	IRNSS: L5
	SBAS: L1 C/A (EGNOS/MSAS GAGAN/SDCM), L1 C/A and L5 (WAAS)
	L-Band: Trimble RTX

POSITIONING PERFORMANCE[3]

STATIC GNSS SURVEYING

High-Precision Static

	Horizontal	3 mm + 0.1 ppm RMS
	Vertical	3.5 mm + 0.4 ppm RMS

Static and Fast Static

	Horizontal	3 mm + 0.5 ppm RMS
	Vertical	5 mm + 0.5 ppm RMS

REAL TIME KINEMATIC SURVEYING

Single Baseline < 30 km

	Horizontal	8 mm + 1 ppm RMS
	Vertical	15 mm + 1 ppm RMS

Network RTK[4]

	Horizontal	8 mm + 0.5 ppm RMS
	Vertical	15 mm + 0.5 ppm RMS
	RTK start-up time for specified precisions[5]	2 to 8 seconds

TRIMBLE INERTIAL PLATFORM (TIP) TECHNOLOGY

TIP Compensated Surveying[6]

	Horizontal	RTK + 8 mm + 0.5 mm/° tilt (up to 30°) RMS
	Horizontal	RTX + 8 mm + 0.5 mm/° tilt (up to 30°) RMS
IMU Integrity Monitor	Bias monitoring	Temperature, age and shock

SPEC SHEET

Trimble R780

GNSS System

POSITIONING PERFORMANCE[3] Cont.		
TRIMBLE RTX CORRECTION SERVICES		
CenterPoint RTX[7]		
	Horizontal	2 cm RMS
	Vertical	5 cm RMS
	RTX convergence time for specified precisions in Trimble RTX Fast regions	< 1 min
	RTX convergence time for specified precisions in non RTX Fast regions	< 3 min
	RTX QuickStart convergence time for specified precisions	< 5 min
TRIMBLE xFILL[8]		
	Horizontal	RTK[9] + 10 mm/minute RMS
	Vertical	RTK[9] + 20 mm/minute RMS
TRIMBLE xPREMIUM[8]		
	Horizontal	3 cm RMS
	Vertical	7 cm RMS
CODE DIFFERENTIAL GNSS POSITIONING		
	Horizontal	0.25 m + 1 ppm RMS
	Vertical	0.50 m + 1 ppm RMS
	SBAS[10]	Typically < 5 m 3DRMS
HARDWARE		
PHYSICAL		
Dimensions (W×H)	13.9 cm x 13 cm (5.5 in x 5.1 in) including connectors	
Weight	1.55 kg (3.42 lb) receiver only including radio and battery	
Temperature[11]		
	Operating	-40 °C to +65 °C (-40 °F to +149 °F)
	Storage	-40 °C to +75 °C (-40 °F to +167 °F)
Humidity		100%, condensing
Ingress protection		IP68 Certified per IEC-60529: waterproof/dustproof (1 m submersion for 1 hour)
Shock and Vibration		
	Pole drop	Designed to survive a 2 m (6.6 ft) pole drop onto concrete
	Shock	Non-operating: 75 Gs at 6msec
	Shock	Operating: 40 Gs at 10msec
	Vibration	Mil-Std-810G, FIG 514.6E-1 Cat 24, Mil-Std-202G, FIG 214-1, Condition D

SPEC SHEET

Trimble R780

GNSS System

ELECTRICAL		
	Internal	Rechargeable, removeable Lithium-ion battery in internal battery compartment
		Internal battery operates as a UPS during an ext power source failure
		Internal battery will charge from external source as long as source can support the power drain and is more than 11.8 VDC
		Integrated charging circuitry
	External	External power input with over-voltage protection on Port 1 (7-pin Lemo 2-key) Minimum 10.8 V, Maximum 28 VDC, shutdown optimized for 12 V lead acid battery operation
		Power source supply (Internal/External) is hot-swap capable in the event of power source removal or cut off
		DC external power input with over-voltage protection on Port 1 (Lemo)
		Receiver automatically turns on when connected to external power
	Power consumption	3.2 W in rover mode with internal receive radio[12]
		5.2 W in base mode with internal 0.5 W transmit radio
Operating Times On Internal Battery[13]		
	Rover	5.5 hours; varies with temperature
	Base station	5.5 hours; varies with temperature
	450 MHz systems	Approximately 4 hours; varies with temperature
	900 MHz systems	Approximately 4 hours; varies with temperature

COMMUNICATIONS AND DATA STORAGE	
Lemo (Serial 1)	7-pin Lemo 2-key, Power Input, USB. Optional USB to RS232 serial cable. Receiver supports RNDIS communications over USB
Wi-Fi	Client or Access Point. Receive or transmit corrections. Wi-Fi b/g/n
Bluetooth® wireless technology	Fully-integrated sealed 2.4 GHz Bluetooth module
Integrated radios (optional)	Fully-integrated, fully-sealed internal 403-473 MHz; Internal 900 MHz; Rx/Tx
Channel spacing (450 MHz)	12.5 kHz or 25 kHz spacing available
Sensitivity (450 MHz)	-114 dBm (12 dB SINAD)
450 MHz output power	0.5 W, 2.0 W, depending on the local required licensing.
Frequency approvals (403–473 MHz)	Worldwide, depending on the local required licensing.
Positioning rates	1 Hz, 2 Hz, 5 Hz, 10 Hz, and 20 Hz
Data storage	9 GB internal data logging. Moving base and heading
Data format	CMR+, CMRx, RTCM 2.1, RTCM 2.3, RTCM 3.0, RTCM 3.1, RTCM 3.2 input and output 24 NMEA outputs, GSOF, RT17, and RT27 outputs

SPEC SHEET

Trimble R780

GNSS System

CERTIFICATIONS	
	FCC Part 15 Subpart B (Class B Device), Part 15.247, Part 90
	Canadian ICES-003 (Class B), RSS-GEN, RS-102, RSS-247
	IEC62368-1 2nd Edition
	CISPR 32, EN 55032, EN55035
	RCM mark, AS/CISPR 32, AS/NZS 4768
	Japan MIC
	CE mark, Radio Equipment Directive (RED 2014/53/EU)
	RoHS compliance
	WEEE compliance

TRIMBLE PROTECTED PROTECTION PLANS	
	Add a Trimble Protected protection plan for worry-free ownership over and above the standard Trimble product warranty. Added enhancements include coverage for wear & tear, environmental damage, and more. Accidental damage is covered with Premium plans, available only at point-of-sale in selected regions. For details, visit **trimbleprotected.com** or contact a local Trimble distributor.

1 Challenging GNSS environments are locations where the receiver has sufficient satellite availability to achieve minimum accuracy requirements, but where the signal may be partly obstructed by and/or reflected off of trees, buildings, and other objects. Actual results may vary based on user's geographic location and atmospheric activity, scintillation levels, GNSS constellation health and availability, and level of multipath and signal occlusion.
2 The current capability in the receivers is based on publicly available information. As such, Trimble cannot guarantee that these receivers will be fully compatible with a future generation of Galileo satellites or signals.
3 Precision and reliability may be subject to anomalies due to multipath, obstructions, satellite geometry, and atmospheric conditions. The specifications stated recommend the use of stable mounts in an open sky view, EMI and multipath clean environment, optimal GNSS constellation configurations, along with the use of survey practices that are generally accepted for performing the highest-order surveys for the applicable application including occupation times appropriate for baseline length. Baselines longer than 30 km require precise ephemeris and occupations up to 24 hours may be required to achieve the high precision static specification.
4 Network RTK PPM values are referenced to the closest physical base station.
5 May be affected by atmospheric conditions, signal multipath, obstructions and satellite geometry. Initialization reliability is continuously monitored to ensure highest quality.
6 TIP references the overall positioning error estimate at the tip of the surveying pole throughout the tilt compensation range. RTK refers to the estimated horizontal precision of the underlying GNSS position, which is dependent on factors that affect GNSS solution quality. The 8 mm constant error component accounts for residual misalignment between the vertical axes of the receiver and the built-in Inertial Measurement Unit (IMU) after factory calibration, assuming the receiver is mounted on a standard 2 m carbon fiber range pole which is properly calibrated and free from physical defects. The tilt-dependent error component is a function of the quality of the computed tilt azimuth, which is assumed here to be aligned using optimal GNSS conditions. For best IMU tilt compensated results, perform a pole bias adjustment.
7 RMS performance based on repeatable in field measurements. Achievable accuracy and initialization time may vary based on type and capability of receiver and antenna, user's geographic location and atmospheric activity, scintillation levels, GNSS constellation health and availability and level of multipath including obstructions such as large trees and buildings.
8 Accuracies are dependent on GNSS satellite availability. xFill positioning without an xFill Premium subscription ends after 5 minutes of radio downtime. xFill Premium will continue beyond 5 minutes providing the solution has converged, with typical precisions not exceeding 3 cm horizontal, 7 cm vertical. xFill is not available in all regions, check with your local sales representative for more information.
9 RTK refers to the last reported precision before the correction source was lost and xFill started.
10 Depends on SBAS system performance.
11 Receiver will operate normally to -40 °C, internal batteries are rated from -20 °C to +60 °C (ambient +50 °C).
12 Tracking GPS, GLONASS and SBAS satellites.
13 Varies with temperature and wireless data rate. When using a receiver and internal radio in the transmit mode, it is recommended that an external 6 Ah or higher battery is used.

Specifications subject to change without notice.

Contact your local dealer today

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Trimble TSC5

CONTROLLER

TOUGH AND CONNECTED FIELD COMPUTER

The Trimble® TSC5 Controller is the dependable, modern, next-generation survey controller that enables you and your team to get the job done efficiently and accurately, every day, all day. This Android™-based survey controller features a 5-inch screen and full keyboard that ensures fast, efficient operation, even while wearing gloves. Rugged yet lightweight, with all-day battery power, the TSC5 controller is easy to carry and easy to use for on-site tasks. When combined with Trimble Siteworks Software, the TSC5 offers the ideal blend of high performance and reliability you expect from Trimble.

Key Benefits

Designed as a workhorse for practical, everyday tasks, the TSC5 survey controller combines outstanding performance and dependability so you can complete your work efficiently and accurately.

Built for the Construction Site

The TSC5 controller is a wirelessly connected, rugged handheld controller for GNSS or total station operations. Designed for construction sites, the TSC5 offers a built-in camera and GNSS in a lightweight, shock, dust and water resistant package.

- Easy to grip and carry ergonomic design for less handling fatigue
- Bright, anti-glare touchscreen for finger, stylus, or gloves helps get more done in sunlight or low light conditions
- Easily enter data in the field using the backlit QWERTY keypad, featuring wide-key spacing

All-Day Operation

Have confidence that the TSC5 can get the job done. The long-lasting batteries enable you to power through the whole day.

Connected Construction

As part of the Trimble Connected Site®, the TSC5 comes standard with integrated Wi-Fi®, Bluetooth and cellular capability for instant network access.

- The TSC5 wirelessly connects to the internet to receive GNSS corrections
- Keep everyone in the office and field up to date by sending design and measurement data over the air, dramatically increasing productivity and reducing costs

Trimble TSC5 CONTROLLER

APPLICATIONS

Whether you're using a total station or GNSS, the TSC5 controller gives you total control over on-site tasks. It is especially useful for:

- Construction surveyors
- Grade checkers verifying grade and checking as-builts with a GNSS rover
- Utility locators

RUGGED BY DESIGN

The TSC5 is water and dust resistant to withstand the toughest weather and jobsite conditions. Built to military specs and with an IP65 rating, it can handle extreme environments and job site conditions for reliable operation wherever you need it.

TECHNICAL INFORMATION

Features and specifications include:

- High resolution 13 MP rear-facing camera
- 12 physical function keys plus the Shift and AGr key combinations, provide even more options to speed up common jobs
- Fast and powerful Qualcomm SDA660 processor
- 4 GB memory and 64 GB storage
- Worldwide WWAN with hot spot capability, AT&T and Verizon certified
- Google Mobile Services certified with access to Google Play™ store apps

FLEXIBILITY

The TSC5 controller is designed to operate with Trimble Site Positioning Systems hardware, including the Trimble SPS986 and SPS785 GNSS Smart Antennas, SPS855 GNSS Modular Receiver and SPS series total stations.

- Integrated Bluetooth® wireless technology delivers cable-free communication between the TSC5 and Trimble GNSS receivers
- Add additional functionality with an optional user-replaceable Trimble EMPOWER module, such as a long-range radio or sub-meter GNSS receiver

Bluetooth® FC CE

TRIMBLE EMPOWER ENABLED

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Trimble Siteworks

SOFTWARE FOR CONSTRUCTION SURVEYING

MORE PRODUCTIVE AND PRECISE POSITIONING

Trimble® Siteworks Software is easy-to-use field software that enables grade checkers, site engineers, site surveyors, supervisors and foremen to do their jobs more efficiently by taking the constructible model into the field. From initial site reconnaissance to finished as-built collection, Trimble Siteworks offers an efficient way to collect and distribute site measurements, perform stake out tasks, manage multiple work orders and job sites, monitor progress, and report the results.

Now available in a subscription model with flexible terms to keep your systems upgraded to the latest version with no large upfront cost.

Key Features

Siteworks features a modern interface optimized for ease-of-use and productivity. Colorful graphics, natural interactions and gestures make Siteworks intuitive and easy to learn at all skill levels. Configure views to suit your needs and personalize the interface to match your workflow.

Siteworks software is tailored for construction workflows, enabling construction surveyors to work with complex 3D models, collect large data sets faster, visualize complex 3D models more easily and work day or night efficiently.

- Create PDF reports
- Apply background images
- Microsoft® Windows® and Android™ compatibility

Connected Site Integration

With office-to-field connectivity using Trimble WorksManager Software, keep everyone up to date by sending design and measurement data over the air, dramatically increasing productivity and reducing costs.

- Have confidence that the correct design is being used in the field
- Keep track of your survey crews
- Share common VCL design files with the Trimble Earthworks Grade Control Platform

Hardware Compatibility

Siteworks software is compatible with a range of rugged devices:

- Trimble TSC5 and TSC7 Controllers
- Trimble T7 and T100 Tablets
- Trimble TDC600 Handheld
- Panasonic Toughpad FZ-M1
- BYOD (Android)

Trimble Siteworks

SOFTWARE FOR CONSTRUCTION SURVEYING

FLEXIBLE FOR THE WAY YOU WORK

Siteworks is a comprehensive solution for construction surveying, with options based on the tools that you need.

Roading Module

Siteworks supports road and highway projects by incorporating full alignment geometry, station equations, width transitions and multiple roadways within a selected road job. The Roading Module provides a single solution to all road staking needs—from roadway features to catch points to custom subgrades. In addition, the grade checking functions allow contractors to easily perform as-built checks and quality control.

Advanced Measurement Module

Improve "field to finish" as-built workflows with time-saving features such as point and line offsets, line closure, curved line measurement and continuing existing lines. The Advanced Measurement Module enhances Siteworks functionality with streaming data outputs, total station traverse measurements, and the ability to connect to utility locators. Improve informed decision-making by capturing additional information with each measured point; photos, dimensions, conditions and material type add valuable information about a feature in addition to its position.

Siteworks SE Starter Edition

Siteworks SE Starter Edition Software is a simplified version of Siteworks, intended for users who do not require a full feature set and are interested in a lower-cost version to connect to GNSS only. Similar to the standard version, Siteworks SE supports PDF reporting, tilt compensation and vehicle mode measurements. Featuring full compatibility, seamlessly upgrade to Siteworks as soon as your needs expand.

Features and Functionality*	Siteworks SE Starter Edition	Siteworks
Fine navigation bullseye within 2m of selected stakeout/ navigation point	∨	∨
Background raster images with world file	∨	∨
Stakeout (detailed navigation to point or station/offset, stake tolerance indicator, record staked point, stake writer tool)		∨
Measure site calibration		∨
Total station support		∨
GNSS base station setup		∨
Live line info bar during line/area measurement	∨	
Export to Trimble Earthworks Grade Control Platform and Trimble GCS900 Grade Control System		∨
Walking mode measurements: fixed time, fixed distance, measure when level		∨
.PRO and .VCL corridor cross-section view	∨	
Load corridor data from .PRO and .VCL	∨	

**For a complete feature comparison, contact your Trimble Authorized Dealer*

UPLOAD
DEALER LOGO

UPLOAD
TRIMBLE AUTHORIZED DEALER LOGO

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DATASHEET

Trimble Business Center

Increase efficiency in the office and on the job site

Out-bid and out-perform

Trimble® Business Center is your complete office software solution to out-bid and out-perform your competition. Manage data and accomplish tasks throughout the project lifecycle for civil construction job sites, highways and marine applications in a single software package. Make better decisions, decrease costly mistakes, and increase efficiency in the office and on the job site.

With Trimble Business Center you can efficiently calculate earthwork and material quantities for bids, prepare data for construction stakeout, build 3D models to optimize machine operation, track productivity and understand how profitable you are on any given project.

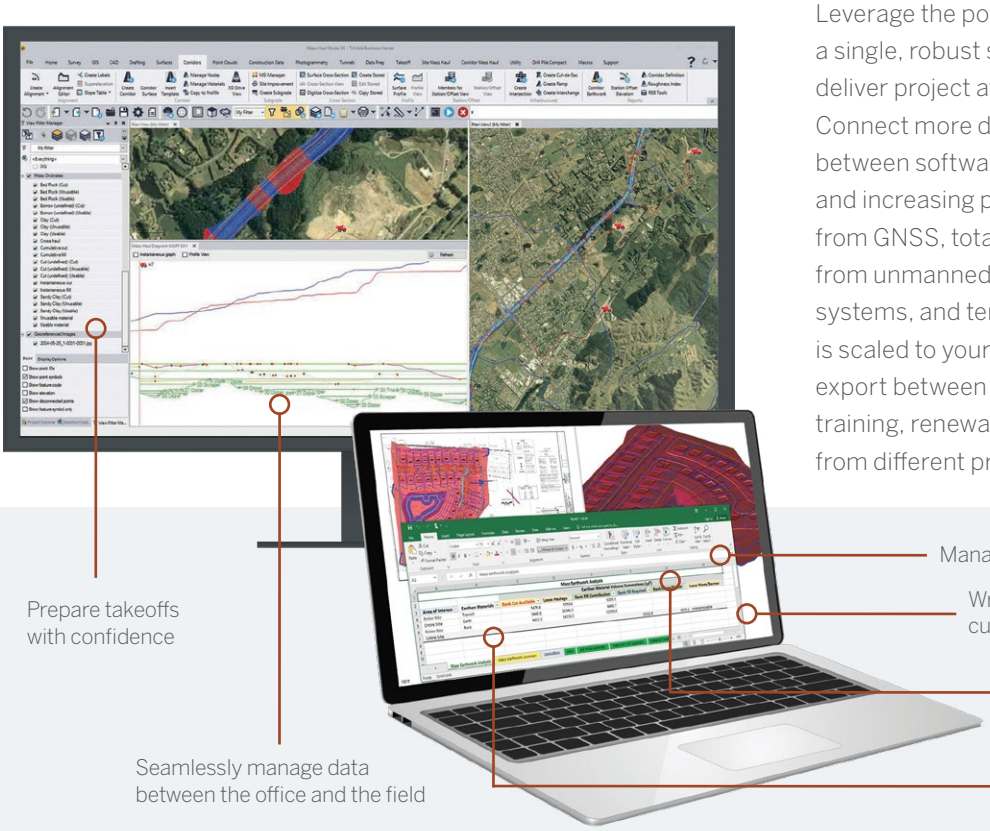
From bid to build

Win more bids by preparing 3D earthwork and construction takeoffs quickly and accurately with enhanced levels of detail. Use Trimble Business Center's CAD tools, surface to surface comparisons and material management to accurately estimate projects and take full control over data throughout the project lifecycle.

Easily prepare data for field devices and seamlessly manage the data flow between the office and the field. Reduce rework by ensuring data is clean, up-to-date and delivered in the right format to get the job done. Deliver the highest quality results which can be displayed in a variety of reports and models.

Connect more data

Leverage the power of survey and construction data in a single, robust software environment to confidently deliver project after project with Trimble Business Center. Connect more data without the hassle of switching between software platforms, lowering operational costs and increasing productivity. 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.



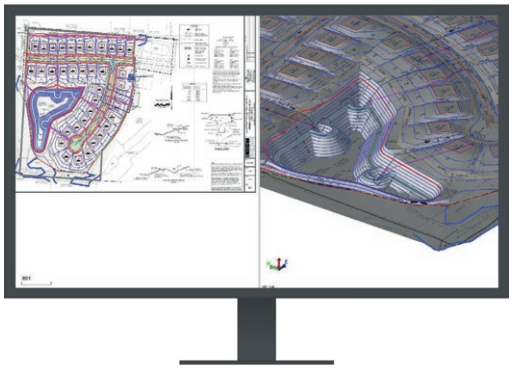
civilconstruction.trimble.com

Trimble®

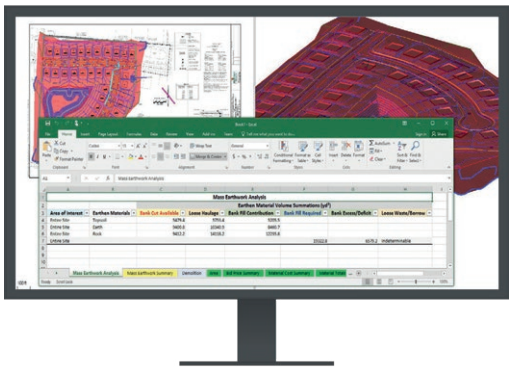
DATASHEET

Trimble Business Center

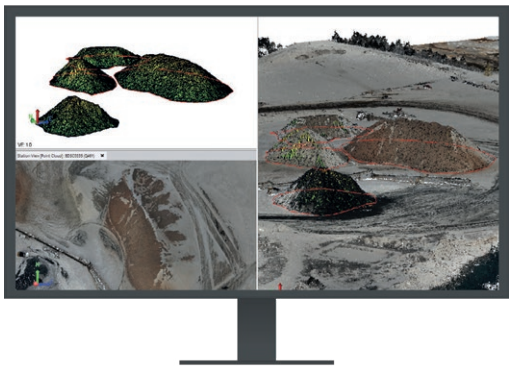
Complete office software solution



Digitize plan sets from PDF into 3D linework and models



Calculate earthwork, material and cost data



Compute precise surfaces and volume stockpile quantities

Supported workflows

Data prep

Make sure your data is clean, up-to-date, and delivered in the right format to get the job done. With Trimble Business Center you can easily organize all your data and digitize plans into 3D models, saving time and allowing you to focus on getting the job done.

Takeoff and mass haul

Calculate earthwork and material quantities of a construction project and generate takeoff mass haul reports. Optimize site and corridor earthworks to increase profits.

Surfaces and volumes

Create, process, and deliver complex surface models for field devices, machine control systems, and third-party export. Generate quick and accurate volume reports from surface comparisons, stockpile/depression, and corridor surfaces to quantify progress on your projects and see how much work is left to do.

Alignments and corridors

Model and manipulate alignments and parametrically-designed corridors. Handle complex roadway projects, design corridor features and generate reports in minutes.

CAD and drafting

CAD tools to produce your final survey linework, construction models, and roadway design plots with ease.

Aerial photogrammetry

Fly virtually any UAV to obtain data that you can adjust, measure and model. Simply drag and drop your drone data to import and then create industry leading, highly accurate deliverables in an easy-to-use three step workflow.

Scanning and point clouds

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

Utility modeling

Create pipe and utility networks for takeoff and visualization applications.

Drilling, piling and dynamic compaction

Prepare work plans and reports for boring and drilling, foundation and infrastructure piling, dynamic compaction and connect to the Trimble Groundworks Machine Control System.

Future-proof subscription

Get all the latest features with regular updates for civil construction customers. Trimble Business Center works seamlessly with Trimble Siteworks Software, Trimble SCS900 Site Controller Software, Trimble Earthworks Grade Control Platform, Trimble GCS900 Grade Control System, Trimble PCS900 Paving Control System, Trimble CCS900 Compaction Control System, Cat® AccuGrade™ and Cat GRADE Grade Control Systems.

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