TRIMBLE SURVEY CONTROLLER FIELD SOFTWARE TECHNICAL NOTES

For more than a decade, Trimble Survey Controller field software has provided land surveyors with a complete GNSS and optical data-collection solution that reduces rework and increases productivity. Advanced yet easy to use, Trimble Survey Controller helps you complete every job faster and more easily.

Trimble Survey Controller™ field software runs on advanced Trimble® controllers such as the Trimble CU and TSC2® controllers. The software runs from a real-time color map display on the latest Microsoft® Windows® operating systems, and provides an easy-to-use touch screen for rapid access to data.

Trimble Survey Controller integrates survey data from GNSS and optical surveying instruments, as well as 3D scanning data from selected Trimble systems[1].

VISUALIZE YOUR WORK, WHILE YOU WORK

Trimble Survey Controller provides full color maps and unique graphical support, making every job much easier.

Graphic color map displays are easy to read and use. An active map of a job site on-screen makes measuring points fast and efficient. To increase productivity further, feature codes can be assigned to measured points. This capability makes points easier to locate and identify in the field and office software.

Trimble Survey Controller also supports Trimble VISION™ technology in Trimble Spatial Imaging sensors, with real-time video display.

MULTI-TASK IN THE FIELD

Because Trimble Survey Controller runs on a Microsoft Windows operating system, the menus and controls are familiar and easy-to-use, plus you can work in the field the same way you do in the office:

- Keep multiple software applications open at once (for example, COGO, Stakeout, Point Manager).
- Quickly and easily switch between applications.
- Customize your options so that the applications you most frequently use are instantly accessible.

The ability to multi-task is an industry-unique feature of Trimble Survey Controller.

EXPERIENCE UNEQUALLED FIELD INTELLIGENCE FROM YOUR CONTROLLER

Trimble Survey Controller does more than simply collect data.

As the power behind Trimble's Integrated Surveying™ solution, Trimble Survey Controller allows you to collect GNSS and optical data in one Job file. It makes survey data management in the field and office easy and efficient.

Advanced communication technologies allow you to work very productively. Bluetooth® enables cable-free connection between Trimble controller and surveying sensor for fast set-up and convenience when working. Internet connection between field and office is also possible: When your work is done simply email your files to the office.

1 Trimble Survey Controller supports the Trimble® VX™ Spatial Station.

Trimble

TRIMBLE INTEGRATED SURVEYING: SEAMLESS CONVENTIONAL AND GNSS SURVEYING

Trimble's Integrated Surveying solution remains the industry standard for survey data management and transfer.

Trimble Survey Controller running on the controller of your choice—the Trimble CU or TSC2—allows you to use the same job and settings for total stations and GNSS receivers. If you need to switch from a GNSS system to a total station or vice versa, simply connect to a new sensor and keep working in the same job; avoid wasting time with data transfer between different field software. The same background maps and coordinate systems will apply.

Trimble I.S. Rover

Taking Integrated Surveying further, Trimble Survey Controller supports the Trimble I.S. Rover, so you can stay connected to a GNSS receiver and robotic total station at the same time.

The Trimble I.S. Rover enables you to:

- Use the most appropriate tool--GNSS or conventional--according to conditions on the job site: Maximize time in the field measuring.
- Increase productivity when establishing control: Establish control by measuring points with either technology, or both.
- Use one job for managing and recording all your data: Remove the need to transfer data.
- Improve data integrity: Measure points with both technologies for truly independent verification and confirmation of survey accuracy.
- Expedite target searches with the GPS Search function in Trimble Survey Controller: With GPS Search the Trimble I.S. Rover will typically turn directly to the prism within three seconds.

TRANSFER DATA BETWEEN FIELD AND OFFICE

Data transfer to and from Trimble Survey Controller is fast, easy, and flexible. Advanced communication options such as a mobile Internet connection using a Bluetooth connection to a mobile phone, or a WiFi connection to the Internet, enables you to transfer data wirelessly to your office.

You can seamlessly transfer data between Trimble Survey Controller in the field and Trimble office software such as Trimble Business Center, Trimble Geomatics Office™, RealWorks Survey™, Trimble Total Control™, and Terramodel®. These packages support many native data formats of popular survey, design, and GIS packages.

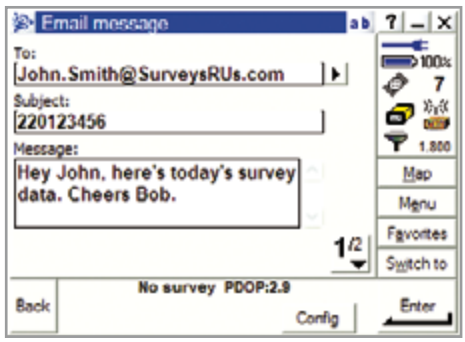
In addition, data from third-party survey, design or GIS software can be easily transferred into Trimble Survey Controller. For example, the embedded Trimble Link module allows direct data transfer between Trimble Survey Controller and Autodesk Land Desktop or CAiCE software. Trimble Survey Extension provides the same easy transfer mechanism for ESRI's ArcGIS Survey Analyst software.

Data can be imported/exported in the following file formats:

- DC files
- JobXML files
- CSV files
- DXF, SHP: Active map, features of these files can be directly accessed in the field.
- Roading files: Trimble Roads (rxl), Genio, LandXML
- Custom ASCII import and export to easily transfer data from/to third-party solutions

E-mail Data from the Field

For easy transfer from the field to the office Trimble Survey Controller lets you e-mail files directly from your controller. You can attach zipped files and a brief description and send to any e-mail address. Not only can you share work with your office without leaving the job; this function also provides a simple way to back up your work.



CONTROL SURVEYS

Station Setup and Station Elevation

Trimble Survey Controller provides several ways to establish a station:

- Simple station setup
- Using multiple backsights
- Resection
- Refline

When using the resection or multiple backsights functionality, advanced statistical reports show the station setup plus residuals.

Multiple rounds of observations can be collected automatically when using the Autolock® function in a Trimble total station. Simply identify the points when measuring the first face observations.

The station elevation function allows you to determine the height of your instrument by observing to one or more marks with known elevation.

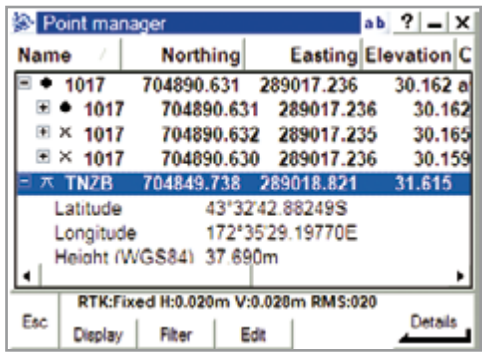
Refline is the process of establishing the position of an occupied point relative to a baseline. To perform a refline station establishment, take measurements to two known or unknown baseline definition points. Once this occupation point is defined, all subsequent points are stored in terms of the baseline using station and offset. This method is often used when setting out buildings parallel to other objects or boundaries.

Site Calibration

For GNSS surveys, you can apply a site calibration before staking out points or computing offset or intersection points. The solution adjusts the projected (grid) coordinates to fit the local control. And you are in complete control—you can either key in site calibration details or let the system compute the site calibration for you.

Duplicate Points and Averaging

Trimble Survey Controller also provides several ways to check your data. You can perform duplicate point tolerance checking. And if you have multiple GNSS or conventional measurements to one point, you can choose to average your measurements.



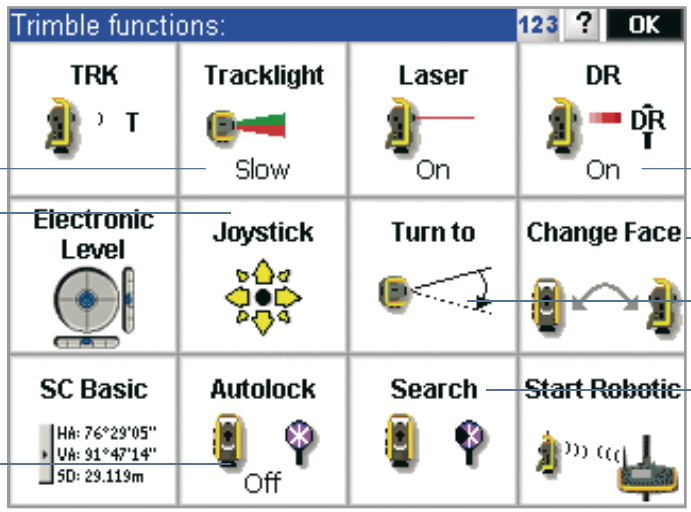
TRIMBLE FUNCTIONS FORM

The Trimble Functions Form allows you to quickly and easily control instrument functions and change instrument settings. For example, depending on the type of instrument you can:

*Turn on the **Tracklight***

***Joystick**—when at the instrument or working in Robotic mode, you can turn the instrument both horizontally and vertically and control the speed at which it turns*

***Autolock**—locks onto a remote target*



*Put the instrument into **DR (Direct Reflex)** reflectorless mode*

Change Face

***Turn to** a selected point*

***Search** controls—look for a target*

TOPOGRAPHIC SURVEYS

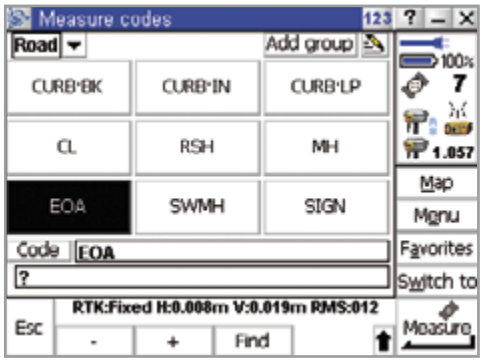
Trimble Survey Controller provides a complete set of topographic survey tools.

Quick Height/Width Measurement

The Remote Object function allows you to easily determine the height or width of remote objects that cannot be measured with a prism—it is ideal for power lines and radio masts, or for objects where safety is also an issue.

Feature Coding

The powerful feature coding capabilities of Measure Codes reduce or eliminate postprocessing, data-editing time, and errors in the office. You can continue to use familiar code names by customizing feature-code libraries. For high-accuracy GIS surveys, the data dictionaries you can create to suit your job/application simplify even demanding and complex field attribute collection.



Continuous Surveying

Survey without stopping. You can plot a continuous line, even a topo map, simply by walking or driving over the terrain and recording points at time and distance increments you define. Use stop-and-go to measure points exactly where you want them without pressing a single key. In RTK mode you can create up to two offsets—horizontal and vertical—with feature codes.

COGO

The Trimble Survey Controller software Coordinate Geometry (COGO) functionality allows you to calculate distances, azimuths and point positions by various methods. You can also rotate, translate, and scale a single point or a selection of points.

Surface Scan

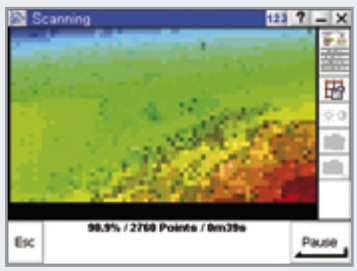
When used with a system such as the Trimble® S6 Total Station, the Trimble Survey Controller software can automatically measure points on a surface. There is no need to make time-consuming measurements to each point. Measuring building facades and stockpiles is quick and easy. You can scan using one of the following methods:

- Horizontal/vertical angle interval
- Rectangular plane
- Line and Offset

3D SCANNING WITH THE TRIMBLE VX SPATIAL STATION

When controlling the Trimble VX™ Spatial Station, Trimble Survey Controller offers many 3D scanning possibilities. Quickly define scan areas with predefined selection methods and then scan up to 15 points per second. Trimble Survey Controller gives easy access to scan parameters, where you can define the number of points to be scanned based on angle and distance intervals.

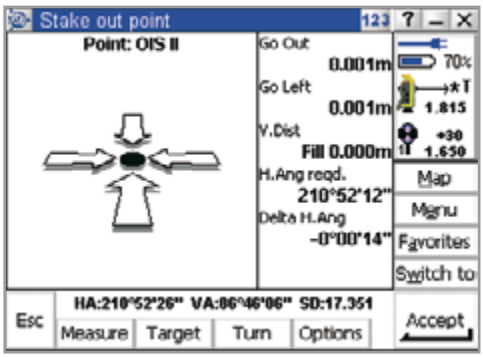
Alternatively, simply state the time allowed for the scan and Trimble Survey Controller will automatically calculate the number of points to be taken. You can store images with your scan area for QA and metadata, and/or export the scan data to RealWorks Survey office software for postprocessing.



STAKEOUT

The Trimble Survey Controller software offers unsurpassed stakeout capabilities. The graphical stakeout screens and the active map guide you to each point quickly and easily.

You can build stakeout lists from comma delimited (.CSV) files without importing the design points into the current job database—only measured points that you store are added to the job file, optimizing the job file's size and manageability.



Graphical stakeout

You can stake out directly from the active map: Just tap and hold on the point and select Stakeout from the drop-down list that appears. Other options include Review, Compute Inverse, Key in Line, Compute Area, Delete, and more. The powerful stakeout screen makes it fast and easy to stake out points, roads, lines, arcs, slopes, and surfaces. Use either the text on the right of the screen or the graphical display on the left to navigate to the point.

Staking out with a robotic total station has also never been easier. When the instrument has locked on to the target, the continuous stakeout tracking in the graphical screen updates your target position in real-time. When you are close to the point, the large arrows guide you to the stakeout point.

Audible voice prompts

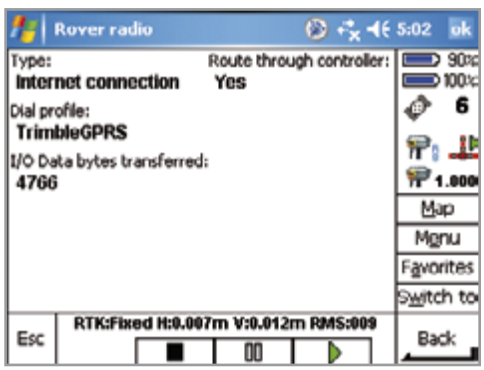
In conventional stakeout, pre-recorded sound messages in your language of choice tell you to "Go Left", "Go Right", "Go In", or "Go Out" to guide you to the point easily. "Stake point" indicates when you have reached the point.

Stakeout from Active Maps

With the use of the active map capabilities in Trimble Survey Controller you can stake out points, lines, and arcs from a .dxf or .shp (shape) file directly in the field. Just copy the file to your Trimble data directory and select the features of interest graphically from the map screen.

TRIMBLE SURVEY CONTROLLER FOR GNSS INFRASTRUCTURE

On GNSS surveys there's no need for a base station when working in a Trimble VRS™ (Virtual Reference Station) network. You can be up and running as soon as you get to the field. Trimble Survey Controller fully supports Trimble's GNSS infrastructure solutions. Trimble Survey Controller is also WAAS and EGNOS capable, so that all your infrastructure options are covered.



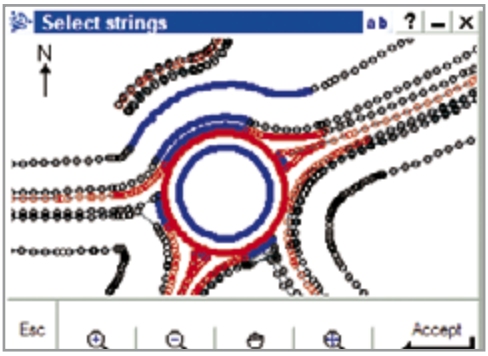
RTK-on-Demand (Patented)

When using Trimble Survey Controller as part of a GNSS infrastructure solution, you can use Trimble RTK-on-Demand to ensure efficient and cost-effective Internet connection. RTK-on-Demand is a unique feature of Trimble GPSNet™ infrastructure software. It works by allowing a user to pause the data stream from the Internet as necessary, for instance, data is only streamed when a point is being measured or if initialization is lost. Trimble Survey Controller automatically prompts the GPSNet software to stream and pause data.

ROAD STAKEOUT

The Trimble Survey Controller software accepts uploaded road definitions from many third-party sources. You can also key in a complete road definition including horizontal and vertical alignments, templates and superelevation, and widening records. And if you work with LandXML or GENIO road files, Trimble Survey Controller reads these files directly.

The unique cross-section view provides a comprehensive graphical view of the road at the selected station. Your position and the target are clearly indicated and you have all the information necessary to mark up the stakes.



Construction Offsets

During stakeout you can stake out an offset from your point. You can apply a horizontal offset either horizontally or by the slope of the previous template element. You can also apply a vertical offset. Construction offsets are shown in the cross-section view.

Slope Staking

Now you can find and stake the points where the design surface and the existing surface intersect much more easily and accurately. This is done on site in real time using unique cross-section graphics.

Real-Time Redesign

Often a job design does not take into consideration situations arising in the actual field. For example, design elevations may need altering to better suit existing structures, or side slopes may require adjusting due to ground conditions. Trimble Survey Controller provides full in-field capabilities of all aspects of the design.

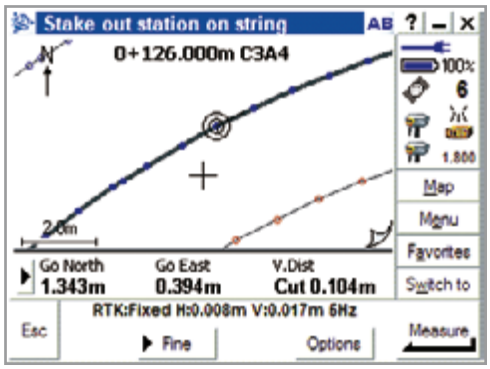
Cross Slope

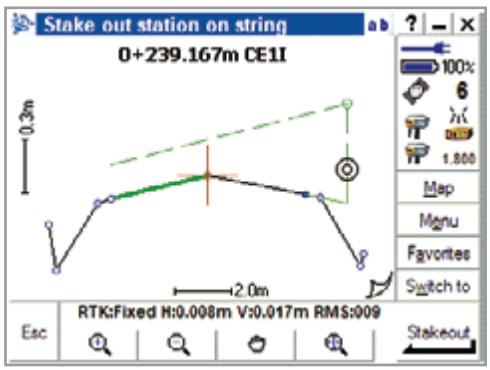
Graphical selection makes cross slope application as easy as tapping the template element that defines the cross slope. Trimble Survey Controller will navigate you to the position and provide you with the resultant cross slope delta value.

Real-Time Quality Control

You can place your measurement equipment anywhere on site and instantly see a grid position, station, offset, and cut/fill report.

This excellent tool lets you check stakes in record time, and make spot checks on points, grades, and earthworks progress.





IN-FIELD CHECKS AND QUALITY ASSURANCE

Job Review and Point Manager

The Review Current Job feature gives you a complete and detailed record of everything that happened in the field—it is a a real electronic field book. Alternatively use the Point Manager feature to manage your data.

Easily review:

- Coordinates and observations
- The best point and all duplicate points
- Target and antenna heights
- Codes and notes

Quickly and easily edit:

- Target and antenna heights (single or multiple)
- Codes and notes

QC Graph

The QC Graph screen displays quality indicators available from data in a job. Use this tool to quickly identify an erroneous measurement or an incorrect target height.

View a graph of:

- Horizontal and vertical precision
- Satellites
- PDOP, RMS and standard errors for HA, VA and Slope distance
- Elevation
- Target height

Custom Reports

Trimble Survey Controller exports data in many different formats. The flexibility to create different files is invaluable for checking data in the field, and for producing reports to e-mail to the office or your client. Use the default styles provided with Trimble Survey Controller or create your own XML style sheet to set up a custom format.

STREAMING VIDEO WITH THE TRIMBLE VX SPATIAL STATION

Trimble VISION technology in the Trimble VX Spatial Station offers digital image streaming and capture. It enables you to view digital images of a job site through Trimble Survey Controller.

Measure Faster

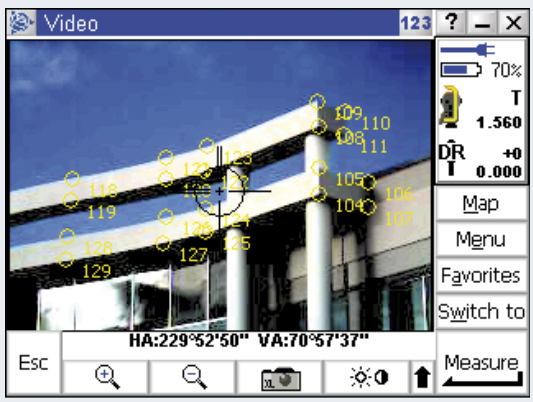
VISION technology saves time when measuring: Instead of looking through the telescope, simply use the controller touch screen to select the point you want to measure. You can easily identify your target point in the video stream.

Take Pictures for Quality Control and Simple Data Handover

Trimble Survey Controller lets you capture images from the digital stream. This digital camera capability is easily accessed through software softkeys. The still images can be stored for quality control.

3D Data Overlay

Superimpose measured points and linework onto the digital image of the job site. Reduce your rework by checking which measurements have been completed, and never leave the field with unfinished work.



CONCLUSION

Trimble Survey Controller software is a key component of Trimble's Connected Site model. It provides the seamless data flow that supports Integrated Surveying, and brings all the parts of your job together.

Trimble Survey Controller is a field-proven solution with advanced features and benefits that will revolutionize the way you work. It provides:

- Bluetooth wireless communication for cable-free operation.
- Internet and email capabilities in the field for keeping in touch with the office wherever you are.
- Map-centric touch screen display and sound prompts for maximum convenience and ease of use in all aspects of your work.
- Integrated Surveying with Trimble GNSS and conventional sensors, and most major optical and robotic surveying instruments and laser rangefinders.
- Seamless data flow between a variety of instruments to office software systems, using a choice of transfer methods from serial cable to Internet to infrared.
- Powerful features in your preferred language to reduce rework and increase productivity.

Trimble Survey Controller is the total surveying software solution.

SUPPORTED SURVEYING SENSORS

The Trimble Survey Controller software communicates with almost every field instrument you use for the original field-proven Integrated Surveying system:

- Trimble GNSS solutions including the Trimble R8 GNSS, Trimble R6, 5800, Trimble R7 and 5700
- Trimble optical families including the Trimble S6, 5600, 5500, 3600, 3300, and 600M
- Trimble VX Spatial Station for spatial imaging
- Other Trimble controllers
- Laser rangefinders—several leading models
- Third-party optical total stations

Bluetooth™

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