



Presented By:
Trimble Monitoring

Semi-automated Monitoring

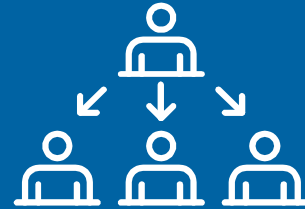
Trimble Access Monitoring & T4D Access



Workshop Goals



Technical understanding on
semi-automated monitoring



Clarification on the
Support process



Semi-automated monitoring

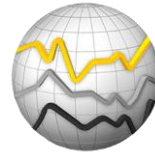
Software solutions



Trimble Access
Monitoring
(TAM)



TSM &
Trimble
Connect



T4D Access



TBC
Monitoring

Agenda

- 01** Monitoring Overview
- 02** Semi-automated monitoring overview
- 03** Trimble Access Monitoring
- 04** TA Monitoring Demonstration
- 05** T4D Access (T4D v6.4)



01

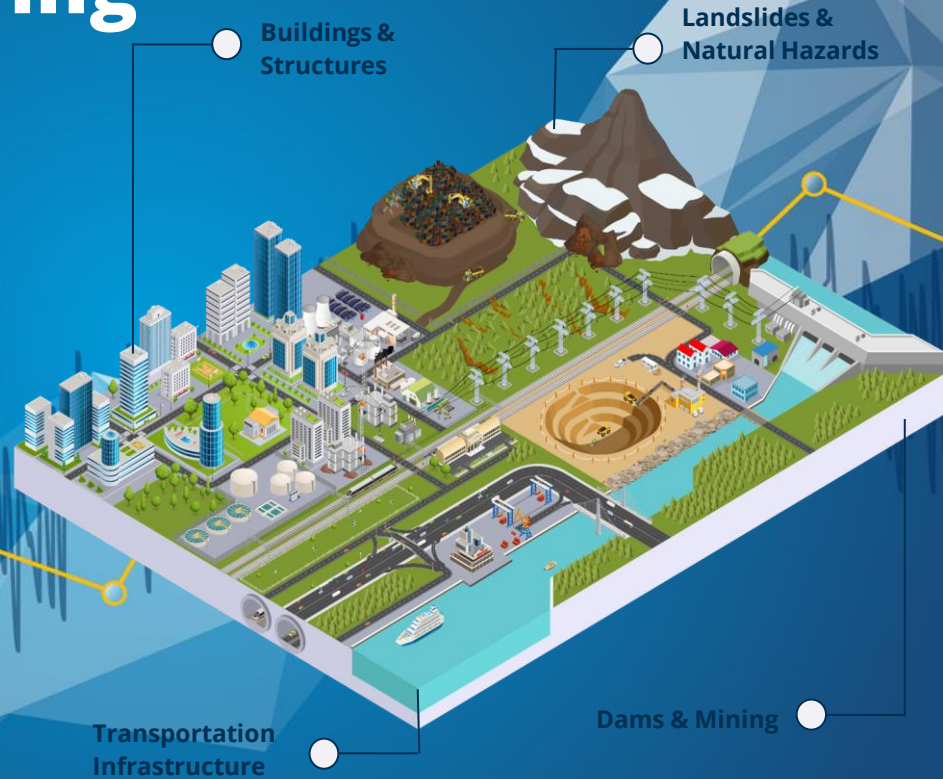
Monitoring Overview

Monitoring with
Confidence



Trimble Monitoring

Enabling **automated movement detection with confidence** for surveying and construction professionals supporting informed decisions about infrastructure.



Trimble Monitoring Family



02

Semi-automated Monitoring overview

Monitoring with Confidence



Semi-automated vs. Automated Monitoring



- Multiple visits to site are preferred
- Sensor is not fixed (e.g. tripod)
- Slow and low risk movement
- Small data sets/local storage



- Automated/remote collection and alarming
- Sensors permanently on site (e.g. pillar)
- Time sensitive movement detection
- Large datasets/local or virtual database

Increasing Project Requirements



Considerations for Monitoring System

Setup and Installation

Multiple total stations may be too expensive to have automated systems at each

Duration of the project

How long will the sensors be installed and required to collect data?

Measurement frequency

Situational monitoring i.e., after blasting operations every Wednesday

Project size

Big area vs small area i.e., Hydroelectric dam or small building construction

Survey costs

Accuracy level, labor costs, drive time to site, equipment

Workflow

What software(s) are you using to collect, process, and report on the displacement data?



Applications

Manual/Campaign-based monitoring in action



Short term construction ie. pile installation, deep excavations and shoring



Long term subsidence and trends
ie. low risk slopes, dam seasonal movement



Network control and verification



Semi-automated Monitoring ecosystem



Find the right Data Controller for you



Trimble Data Collectors for
Monitoring Applications

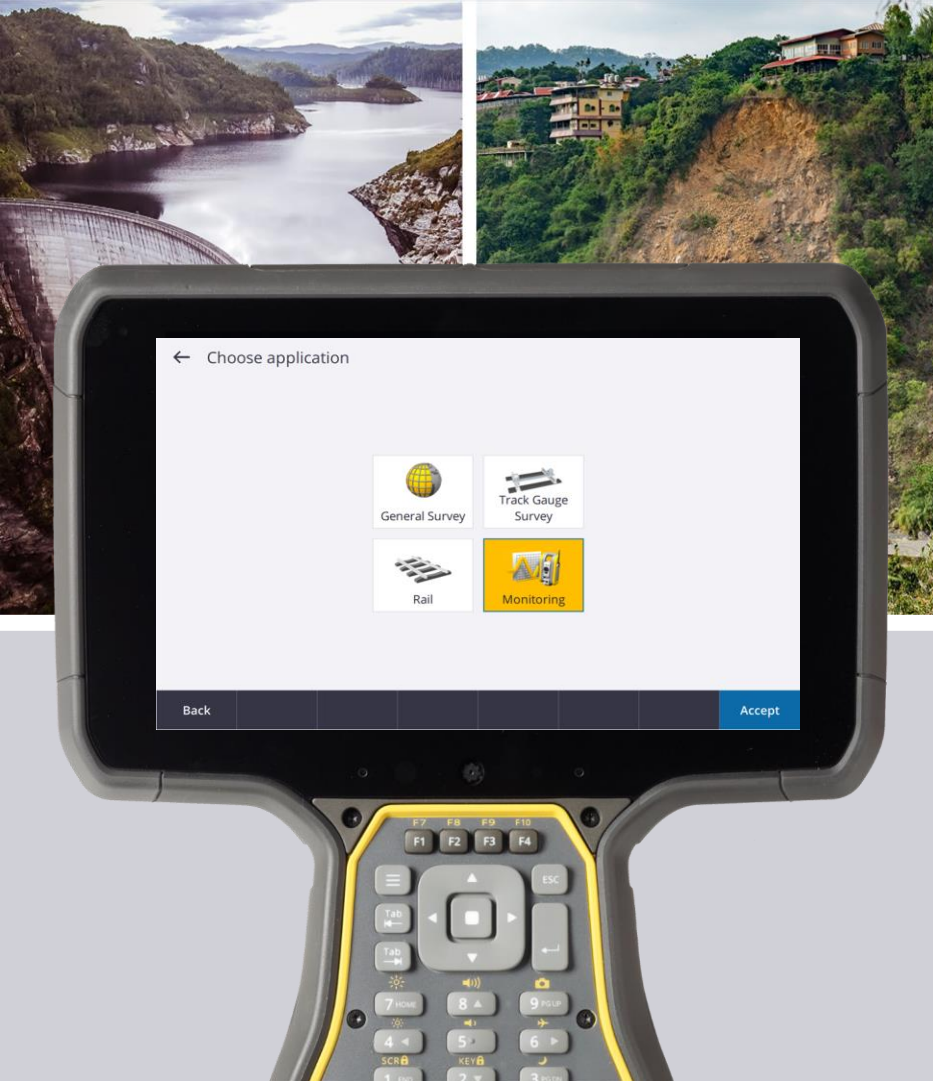


03

Trimble Access Monitoring

Monitoring with
Confidence





Trimble Access Monitoring

Field software for efficient data collection and monitoring site setup

Automated data collection

Efficiently collect monitoring measurements that are less error prone.

Set up a site for a fully automated system

Define your monitoring network and targets to prepare for a fully automated system with Settop M1 and Trimble 4D Control integration.

Incorporating Scans into monitoring

Monitor large areas faster and without needing to predict movement patterns to set out appropriate targets.

Reporting and analysis

Share in-field reports and integrate with Trimble Business Center or T4D Access for a comprehensive semi-automated package.



General workflow

- 1 Define station setup type**
 - Station setup/**station setup plus**/resection
- 2 Define monitored points**
 - Import, key-in or measure
 - Prism (Autolock, FineLock, Long Range FineLock) or DR
- 3 Monitoring and Scheduling**
 - Automate multiple or single epochs
 - Manually aim when necessary
- 4 Reporting and Analysis**
 - View displacements and statistics during survey
 - Scatter plots and displacement charts in the field
- 5 Data Exchange**
 - TBC Monitoring (.json)
 - Trimble 4D Control (.jxl)
 - Other (.csv/.jxl)



Station setup types



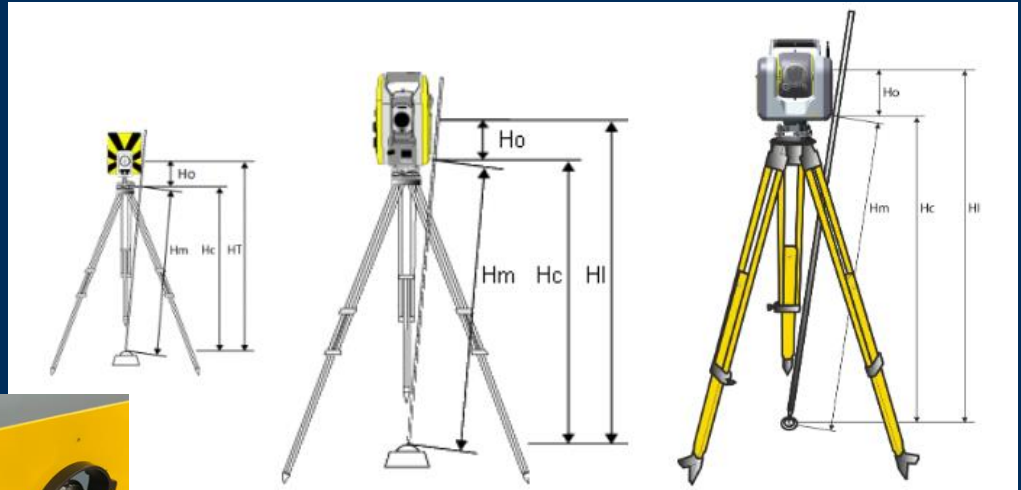
Station setup plus/resection

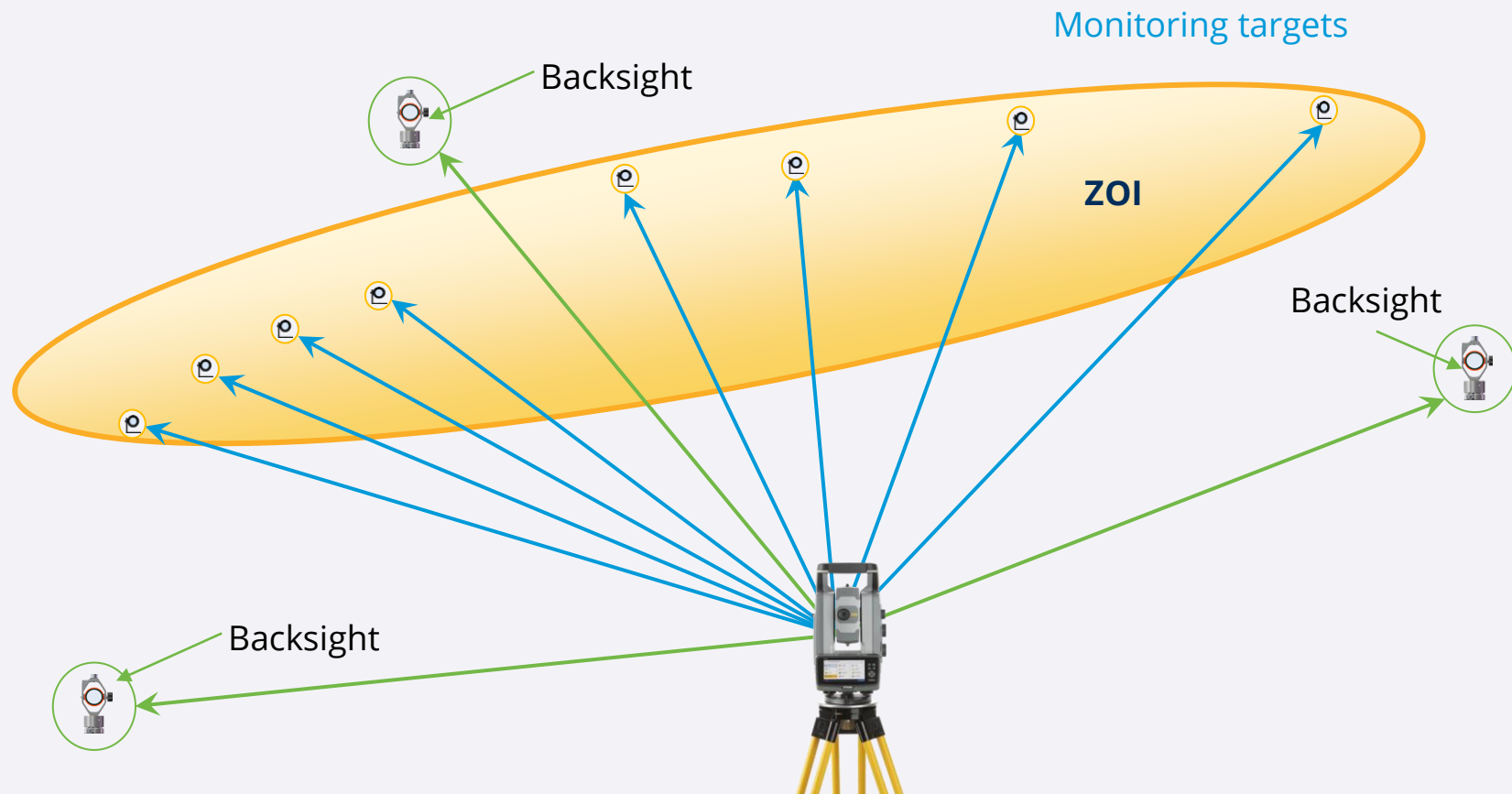
- **Station setup**
 - Station setup - **Station setup plus** - **Resection** - Use last
- **Site (from a reference job)**
 - Station from reference job (*.job) → station point and all related points observed from the station are copied into the job
 - Edit reference → Station setup type and instrument height
- **Orientation**
 - Reorient to the backsight when the existing job is reopened
 - Or in new job when Station from reference job
- It is encouraged to use the same **Job** for the next measurements (additional monitoring epochs)



Instrument and prism heights

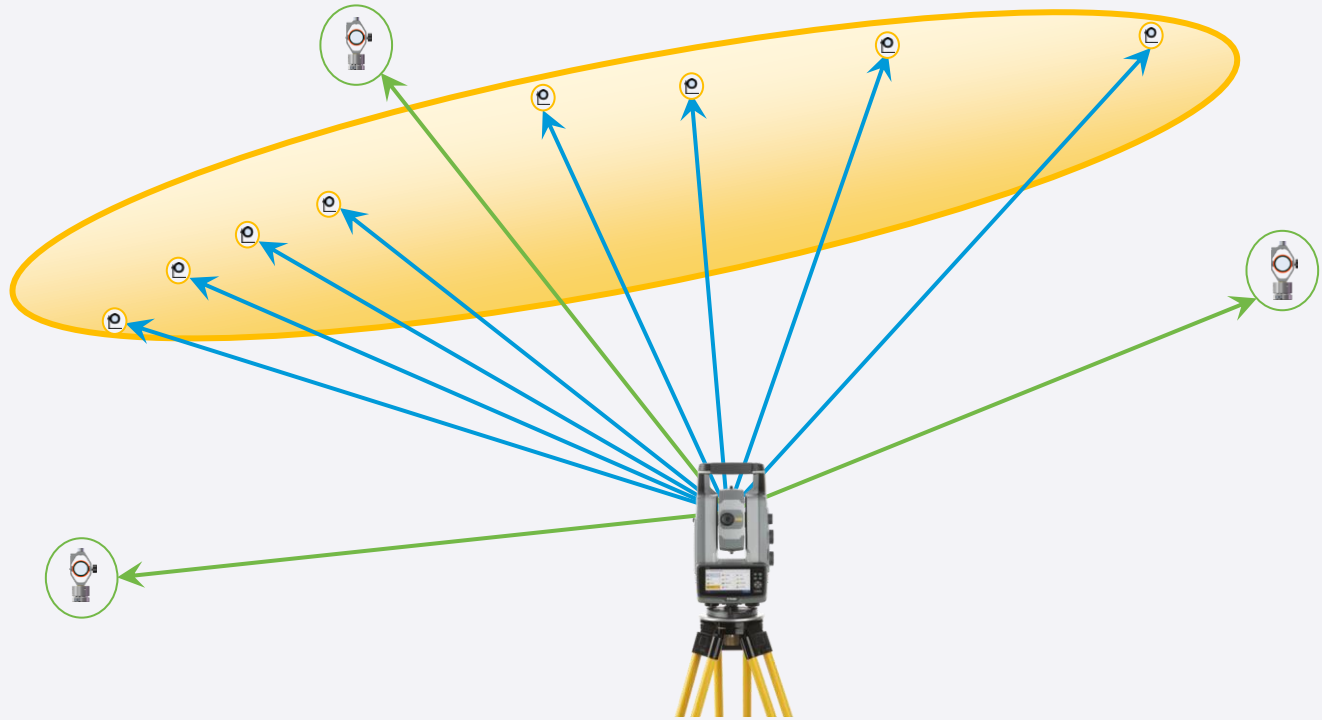
- Consistent with the method available in Trimble Access General Survey
- Target height → true height or S/SX notch
- Instrument height → true height or bottom notch S series/SX Series





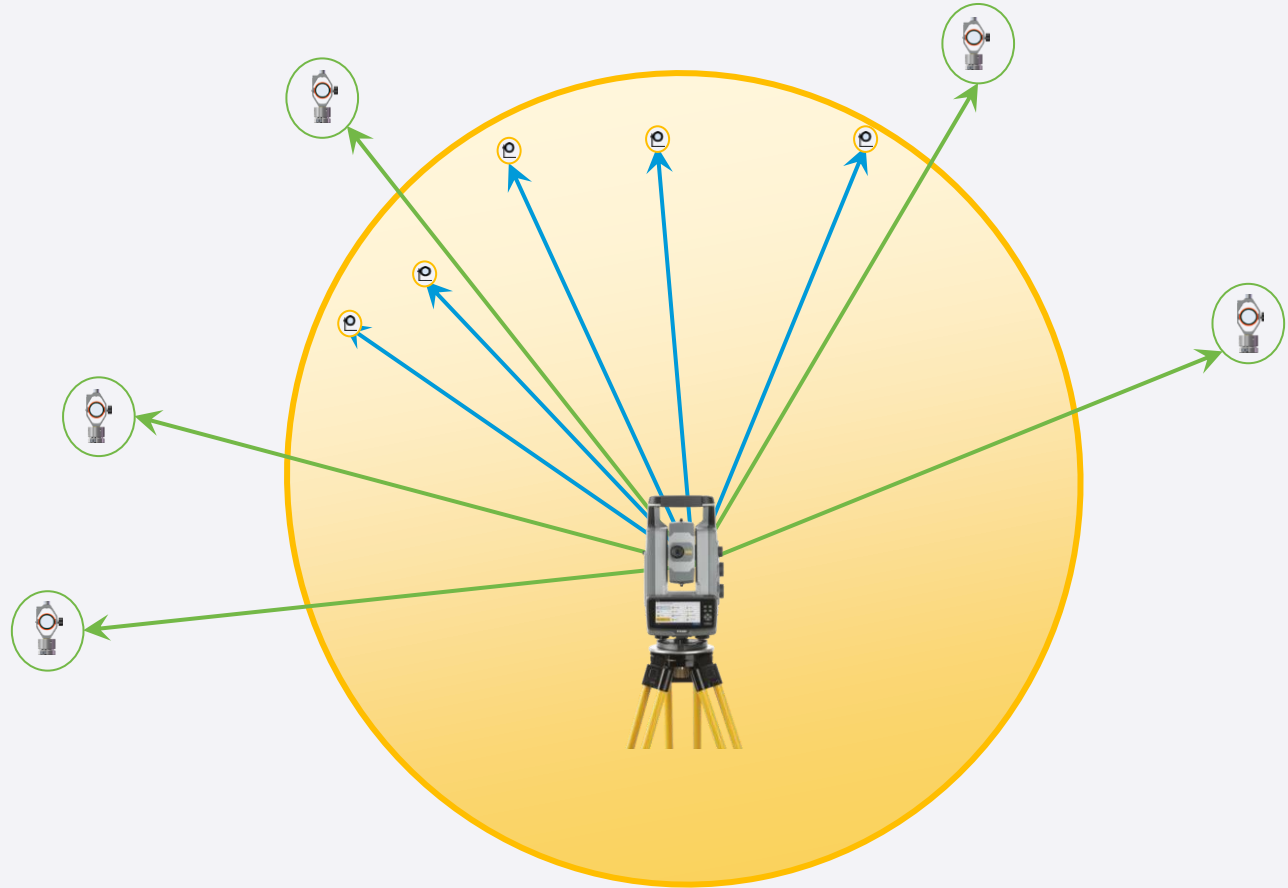
Good setup

- At least three backsights
- Backsights surround the monitoring area
- Backsights are at similar locations to monitoring targets



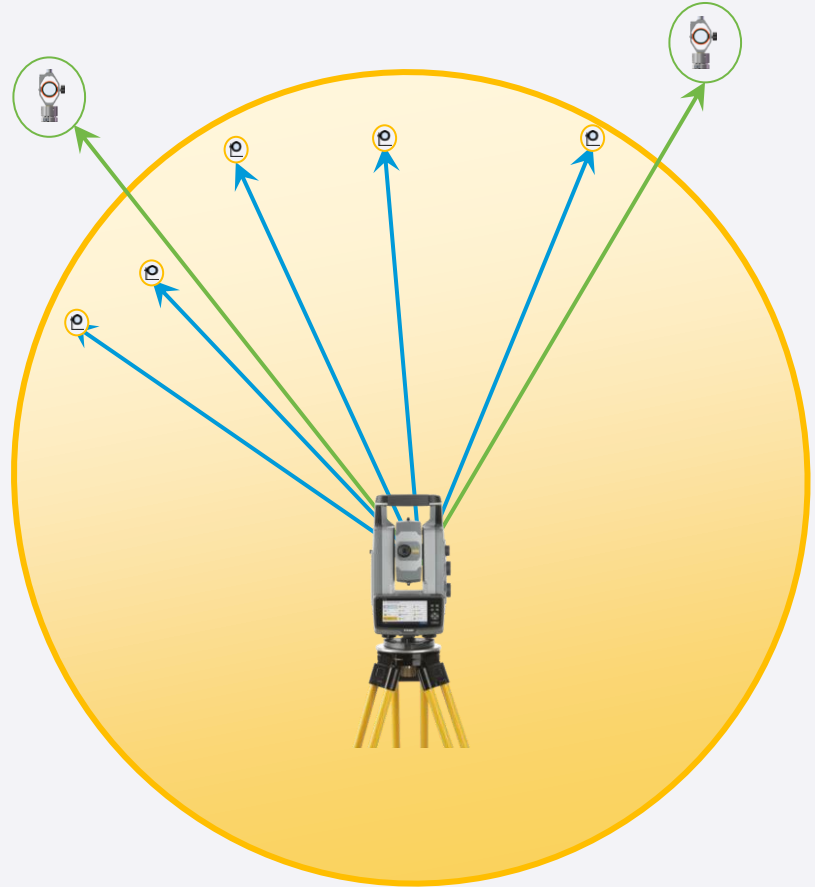
Good setup

- At least four backsights with the TS in the Zol
- Backsights surround the monitoring area
- Backsights are at similar locations to monitoring targets



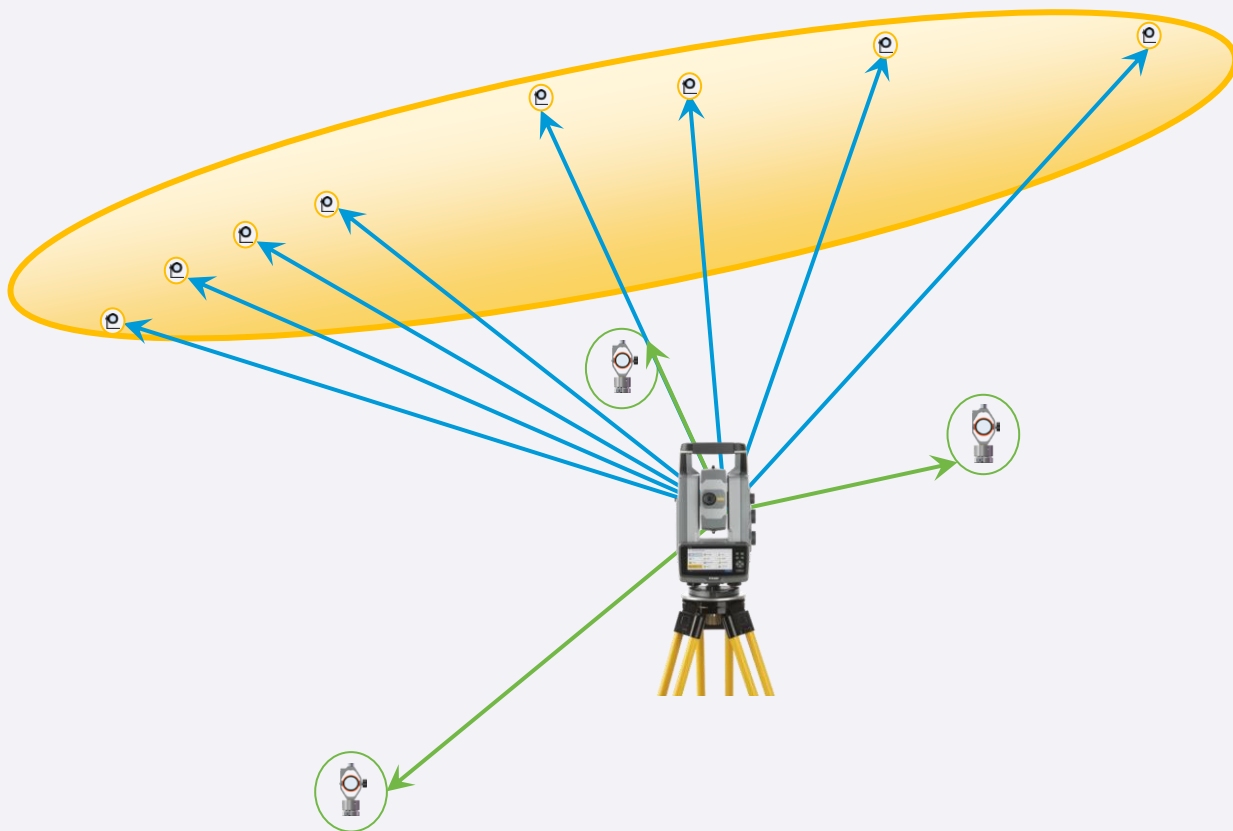
Bad setup

- ***Less than four*** backsights with the TS in the Zol
- Backsights surround the monitoring area
- Backsights are at similar locations to monitoring targets



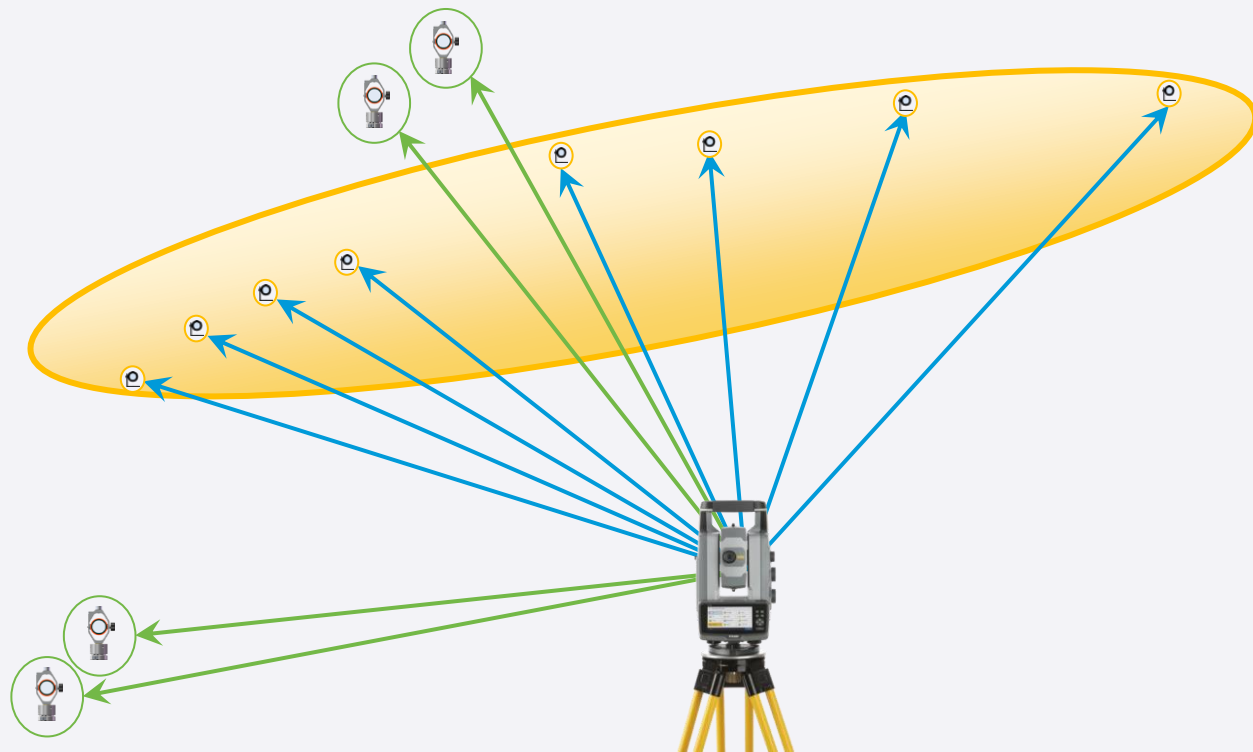
Bad setup

- At least three backsights
- Backsights **does not** surround the monitoring area
- Backsights **are not** at similar locations or distances to monitoring targets



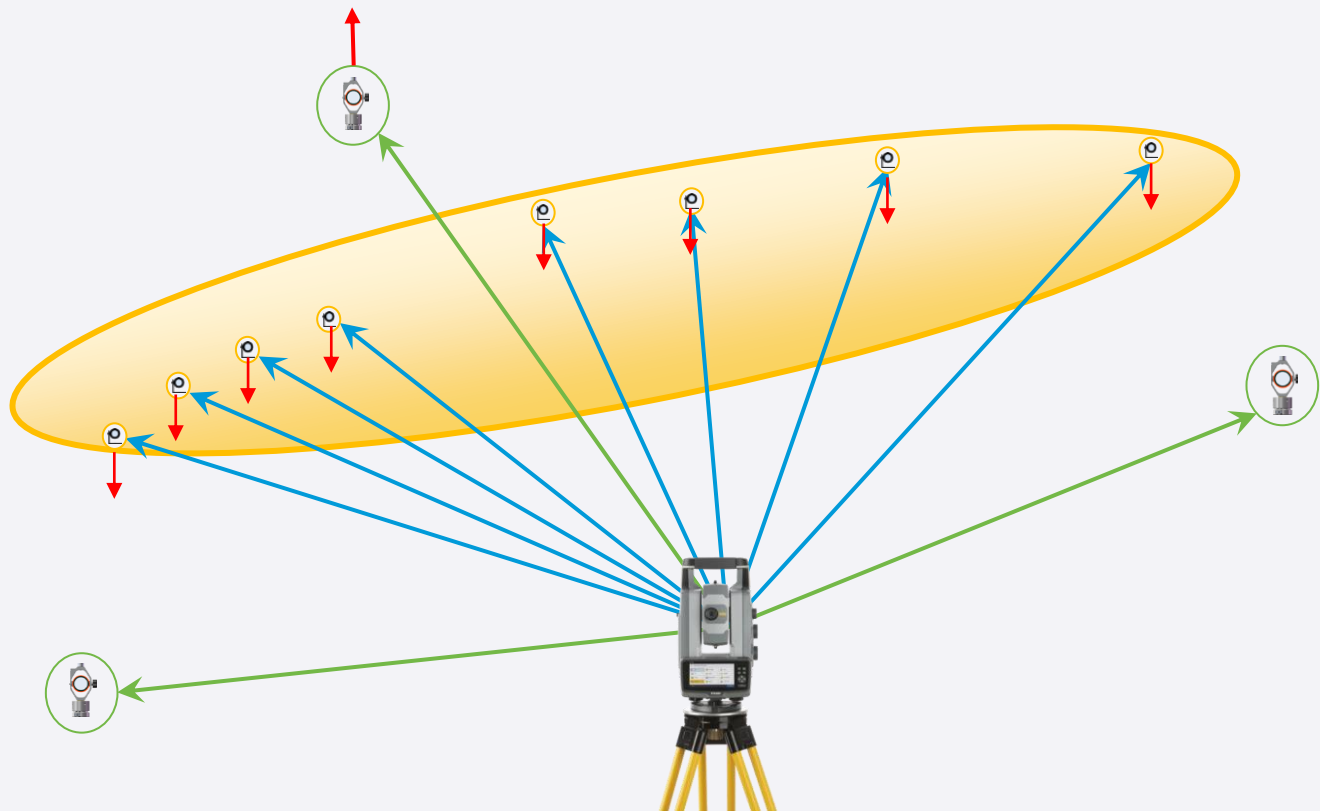
Bad setup

- Adding **multiple backsights in similar locations** does not improve results.



Bad setup

- Backsight moved



Best practices

Monitoring with confidence

- Determine the **zone of influence** and **position backsights accordingly**
- It's easy to add more prisms and better to have **extra backsights**
- Ensure **reliable line-of-sight** to the backsights. Changes in survey geometry can have an effect on results (reason why we have displacements reported on backsights)
- **Reliable and stable mounts for prisms** and total stations (any unwanted movement will skew the results)
- Monitoring with a total station follows the same principles as surveying! **Use good survey principles and techniques and the monitoring project will be successful.**

Invest time in planning now to save problems down the road. Two hours today can save days of effort later on.



Monitoring points



Import, key-in or measure

- **Monitoring (foresight) points**
 - Import from the reference job
 - Key in
 - Measure
 - Import from *Point list *.csv file*
 - After the attributes are defined in the options, point list can be exported
 - This can then be used for the next monitoring session if desired

Point name	Distance	Coordinates
BS1	0.000	HA:0°00'44" VA:93°05'59"
Rotbucher	0.000	HA:0°00'47" VA:93°06'01"

Edit

Point name
BS1

Prism type
Prism

Prism constant
-16.9mm

Backsight
☒

Target height
0.000m

Working mode
Autolock

Trimble SX10/SX12

Take image
☒

Zoom
Zoom level 1

Cancel OK



Working mode



- **Manual**
 - For manual measurements such as reflector targets or DR measurements
- **Autolock**
 - Automatic prism lock for standard conditions
- **FineLock**
 - Narrower autolock field of view in areas with congested prism setup such as tunnel convergence and rail track monitoring
- **Long range (LR) FineLock**
 - Automatic prism lock at distances over 700 m such as open pit mines and dam monitoring

The screenshot shows the 'Edit' screen of a surveying application. The top status bar displays icons for menu, graph, time (1:45), date (5/9), a plug icon, a yellow surveying instrument icon, distance (S 0.000), a star icon, and coordinates (-16.9, 0.000). The 'Small Monitoring' label is also present. The main form has the following fields:

- Point name:** BS2
- Prism type:** Prism (dropdown menu)
- Prism constant:** -16.9mm (dropdown menu)
- Trimble SX10/SX12:** (checkbox, currently unchecked)
- Take image:** No (checkbox, currently unchecked)
- Backsight:** ☒
- Target height:** 0.000m (dropdown menu)
- Working mode:** Autolock (dropdown menu, highlighted with a red box)

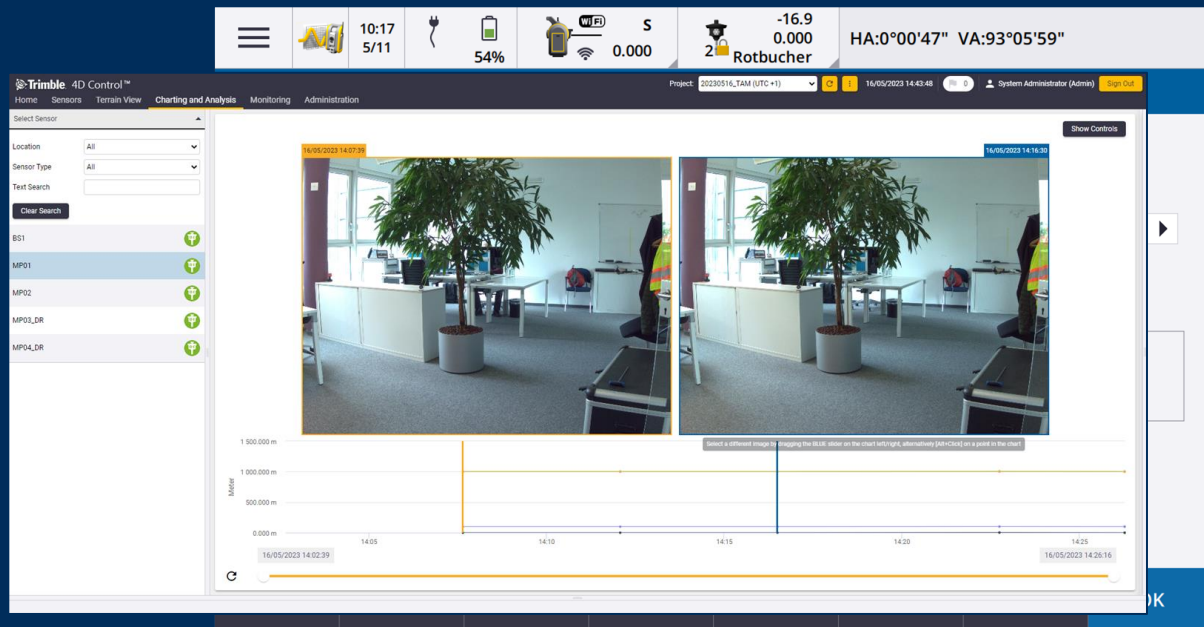
The 'Working mode' dropdown menu is open, showing the following options: Autolock, Manual, Autolock, FineLock, and LR FineLock. The bottom of the screen has a 'Cancel' button and an 'OK' button.



Images

Take image option

- When SX-instrument is being used, it is possible to take images during monitoring rounds
- These are exported as part of **Export Rounds** workflow and stored in the project folder
- Used in T4D Web for the **Visual inspection**

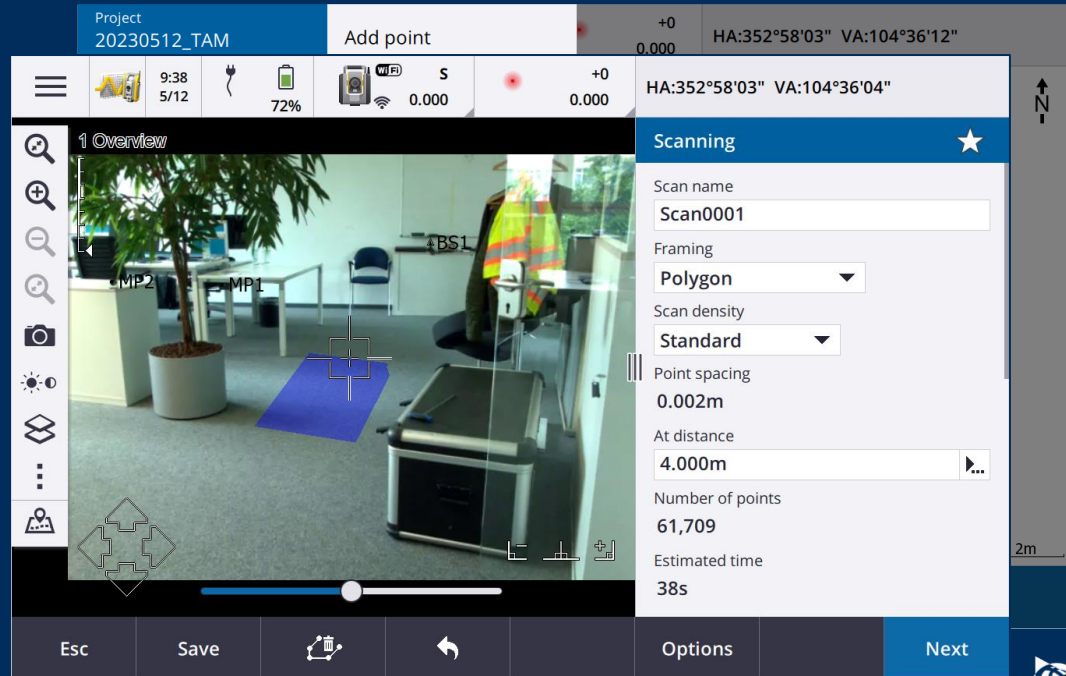


Scans

Adding scans

- Monitoring a large spatial area faster and without needing to set out targets (e.g. not possible to install)
- After the initial scan is performed, selected scan can be added into the monitoring round (after Point list definition)

****Horizontal band and Half dome scan types are not fully supported by this version*

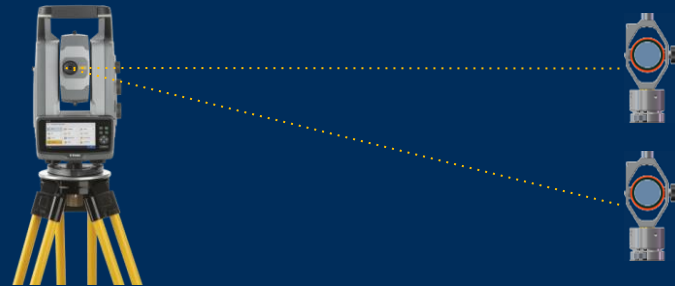
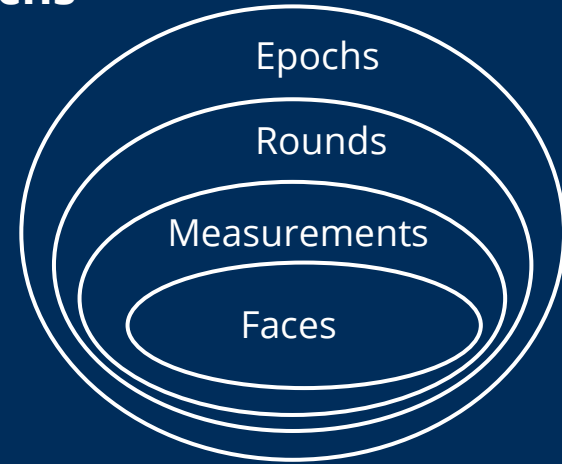


Monitoring and Scheduling



Automate multiple or measure single epochs

- Epoch is used to define how many monitoring rounds will be collected automatically
- 1 to 10 or perpetual
- **Epoch** is made of **rounds**
...which are made of **measurements**
 - F1/F2 (123...321 or 321...123)
 - F1...F2
 - F1 only → not recommended for T4D



Monitoring and Scheduling



Automate multiple or measure single epochs

- Epoch is used to define how many monitoring rounds will be collected automatically
- 1 to 10 or perpetual
- **Epoch** is made of **rounds**
...which are made of **measurements**
 - F1/F2 (123...321 or 321...123)
 - F1...F2
 - F1 only → not recommended for T4D

The screenshot displays the 'Options' screen of the Trimble SX10/SX12 monitoring interface. The top status bar shows two epochs: Epoch 1 (10:09, 5/11, 58% battery, 0.000 S, -16.9, 0.000, HA:0°00'46" VA:93°06'01") and Epoch 2 (10:37, 5/11, 41% battery, 0.000 S, -16.9, 0.000, HA:0°00'03" VA:135°00'08"). The 'Options' screen is divided into two columns. The left column contains 'Face order' (F1/F2), 'Number of measurements' (1), 'Adjust EDM settings for distance' (checked), 'Auto-measure passive targets' (checked), and 'Laser Pointer (DR only)' (unchecked). The right column contains 'Observation order' (123... 123), 'Number of rounds' (1), 'Set instrument mode for distance' (checked), 'Skip obstructed foresights' (checked), and 'Repeat Missing Targets' (unchecked). The bottom bar shows 'Esc' and 'Accept' buttons.



Options



Measuring time

- **Idle time**
 - How long the instrument waits between epochs
e.g. idle time=60 min; it takes 5 min for epoch to finish, 60 min after the epoch finished, the new one will start (total time 65 min)
- **Interval time**
 - Total duration of one epoch
e.g. interval time=60 min; it takes 5 min for epoch to finish; after 55 min the next epoch will start (total time 60 min)

A screenshot of a surveying instrument's user interface. The top status bar shows a menu icon, a yellow instrument icon, the time 10:26 on 5/11, a battery level of 48%, a Wi-Fi signal, a storage icon labeled 'S' with 0.000, a temperature of -16.9 and 0.000, and coordinates HA:0°00'04" VA:135°00'00". Below this is a blue header labeled 'Options'. The main area contains several settings: 'Epoch start' with 'Idle time (min)' set to 0 and 'Interval time (min)' set to 60 (highlighted with a red box); 'Face order' set to 'F1/F2'; 'Observation order' set to '123... 123'; 'Number of measurements' set to 1; and 'Number of rounds' set to 1. At the bottom, there are four checkboxes: 'Adjust EDM settings for distance' (checked), 'Set instrument mode for distance' (checked), 'Auto-measure passive targets' (checked), and 'Skip obstructed foresights' (checked). The bottom navigation bar has an 'Esc' button and an 'Accept' button.

Options



- **Adjust EDM settings for distance** → automatically adjust the EDM setting depending on the measured distance and instrument capabilities
- **Auto-measure passive targets** → this forces the total station to automatically measure the DR targets
- **Laser pointer** → enables the laser pointer to be turned on during epoch measurement
- **Set instrument mode for distance** → automatically changes to the working best mode based on the measured distance - *Long range vs. speed*
- **Skip obstructed foresights** → foresights are automatically skipped, if measurement is not possible, such as when the prism is obstructed
- **Activate take image by default** → SX-instrument takes images of the targets no matter how it is individually defined when creating the monitoring points

Options

Face order: F1... F2... Observation order: 123... 321

Number of measurements: 1 Number of rounds: 1

Adjust EDM settings for distance ☒ Set instrument mode for distance ☒

Auto-measure passive targets ☒ Skip obstructed foresights ☒

Laser Pointer (DR only) ☐ Repeat Missing Targets ☐

Trimble SX10/SX12

Activate take image by default ☒ Set zoom level automatically ☐

Esc Enter



Options

Live infield results settings



- **Compare with** → how the displacements are calculated
 - First epoch
 - Previous epoch
 - First and previous epoch
- **Displacements and backsight residual tolerances**
 - can be set to trigger warnings while performing the monitoring

A screenshot of a software interface titled 'Options'. The top status bar shows a menu icon, a graph icon, time '10:47 5/11', battery '37%', signal strength, 'S' mode, '0.000', 'Small Monitoring', elevation '-16.9', and coordinates 'HA:357°30'54" VA:90°00'03"'. The 'Options' menu is open, showing several settings. A red rectangle highlights the 'Compare with' dropdown (set to 'First epoch'), 'Displacement tolerances' (Horizontal and Vertical both at '0.002m'), and 'Backsight residual tolerances' (Max. Horz. Residuals at '0.010m' and Max. Vert. Residuals at '0.010m'). The bottom of the screen has a dark bar with 'Esc' and 'Enter' buttons.

Options

Trimble SX10/SX12

Activate take image by default ☒ Set zoom level automatically ☐

Compare with
First epoch

Displacement tolerances

Horizontal tolerance 0.002m Vertical tolerance 0.002m

Backsight residual tolerances

Max. Horz. Residuals 0.010m Max. Vert. Residuals 0.010m

Esc Enter



Reporting and Analysis



... during survey

- Live deltas while measuring
 - Displacements in horizontal distance
 - Elevation difference
- After all epochs are measured comparison with the first epoch is displayed
 - ΔE , ΔN , Δel

The screenshot displays a surveying software interface. At the top, there's a status bar with icons for menu, surveying, time (9:51), battery (60%), WiFi, and station ID (S). It also shows coordinates: -16.9 0.000 HA:0°00'44" VA:93°05'57". Below this, a sub-header reads "Compare with First epoch" with a star icon. The main content area is titled "Compare with Station ST01, Date 9:51:49 AM". It contains a table with the following data:

Point name	T...	Δ North	Δ East	Δ Elevation	Number of me...
BS1	BS	-0.004m	0.002m	0.001m	2
BS3	BS	0.000m	-0.002m	0.001m	2
BS2	BS	0.000m	-0.002m	0.000m	2
MP4_DR	FS...	0.000m	-0.003m	0.001m	2
MP3_DR	FS	-0.001m	0.001m	0.000m	2
MP2	FS...	-0.002m	-0.001m	0.000m	2
MP1	FS	-0.001m	0.000m	-0.001m	2
MP2_DR	FS...	-0.003m	0.000m	0.000m	2

At the bottom of the interface, there are navigation buttons: "Display", "Additional epoch", "Prev", "Next", and a blue "Finish" button.



Reporting and Analysis



... after the survey has been completed

- Reports → Displacements
 - Compare desired epochs straight after all the epochs are measured
 - Add additional epoch
- Change between displayed results

The screenshot shows a software window titled 'Compare with Reference epoch'. It has a header bar with icons and a status bar at the bottom with buttons: Back, Display, Additional epoch, Prev, Next, and Finish. The main content area is divided into two sections: 'Reference epoch' and 'Compare with'. The 'Reference epoch' section shows 'Station ST01, Date 9:47:31 AM'. The 'Compare with' section shows 'Station ST01, Date 9:58:01 AM'. Below these sections is a table with the following data:

Point name	T...	Δ North	Δ East	Δ Elevation	Number of me...
BS1	BS	0.000m	0.000m	0.000m	2/2
BS3	BS	0.000m	0.000m	0.000m	2/2
BS2	BS	0.000m	0.000m	0.000m	2/2
MP4_DR	FS	0.000m	0.000m	0.000m	2/2
MP3_DR	FS	0.000m	0.000m	0.000m	2/2
MP2	FS	0.000m	0.000m	0.000m	2/2
MP1	FS	0.000m	0.000m	0.000m	2/2
MP2_DR	FS	0.000m	0.000m	0.000m	2/2



Reporting and Analysis



... after the survey has been completed

- **Alignment report (CSV)**
 - RXL, Polyline, TXL, LandXML
- **RXL**
 - Trimble Access Roads alignment file type
 - contains a horizontal and vertical component (can also include superelevation and widening records, and additional points and strings that define geometry elements)
- **TXL**
 - Trimble Access Tunnels file type
 - contains a horizontal and vertical alignment along with templates that define the shape of the tunnel
- **Polyline**
 - continuous line composed of one or more line segments
- **LandXML**
 - file format for civil engineering design data

The screenshot shows the Trimble Access software interface. On the left, the 'Reports' menu is open, showing options for 'File format' (Alignment Report (CSV)), 'View created file' (checked), and 'Include Incomplete Rounds' (No). The main window displays a data table with columns A through G. The table contains survey data for Job: TAM_1 (11/05/23), including Reference Coordinates, Point Name, Station, Offset, Elevation, Date, and Time. The data is organized into epochs: Epoch: 09:42:55 (2023-05-11) and Epoch: 09:47:31 (2023-05-11). The table also includes data for Epoch: 09:51:49 (2023-05-11).

	A	B	C	D	E	F	G
1	Job: TAM_1 (11/05/23)						
2	Reference Coordinates:						
3	Point Name	Station	Offset	Elevation	Date	Time	
4	ST01	3.256	3.743	-0.065	5/11/2023	9:26:06	
5	BS1	8.666	-1.667	-0.588	5/11/2023	9:26:23	
6	BS2	3.316	-1.784	-0.475	5/11/2023	9:27:01	
7	BS3	1.811	-1.375	-0.231	5/11/2023	9:27:15	
8	MP4_DR	0	0	0.933	5/11/2023	9:34:21	
9	MP3_DR	3.087	-1.742	0.812	5/11/2023	9:34:21	
10	MP2	4.291	-0.099	-0.562	5/11/2023	9:34:21	
11	MP1	5.533	-1.201	-0.801	5/11/2023	9:34:21	
12	MP2_DR	8.46	-1.905	0.595	5/11/2023	9:34:21	
13	Temp000	8.663	-1.664	-0.587	5/11/2023	10:12:47	
14							
15	Epochs:						
16	Epoch: 09:42:55 (2023-05-11)						
17	MP3_DR	3.087	-1.741	0.812	5/11/2023	9:44:37	
18	MP2	4.289	-0.098	-0.562	5/11/2023	9:45:00	
19	MP1	5.532	-1.2	-0.801	5/11/2023	9:45:20	
20	Epoch: 09:47:31 (2023-05-11)						
21	MP3_DR	3.087	-1.741	0.812	5/11/2023	9:49:04	
22	MP2	4.289	-0.098	-0.562	5/11/2023	9:49:28	
23	MP1	5.532	-1.2	-0.801	5/11/2023	9:49:47	
24	MP2_DR	8.458	-1.903	0.595	5/11/2023	9:50:07	
25	Epoch: 09:51:49 (2023-05-11)						
26	MP3_DR	3.087	-1.741	0.812	5/11/2023	9:53:20	
27	MP2	4.289	-0.098	-0.562	5/11/2023	9:53:43	
28	MP1	5.532	-1.2	-0.801	5/11/2023	9:54:02	
29	MP2_DR	8.458	-1.903	0.595	5/11/2023	9:54:22	

Reporting and Analysis

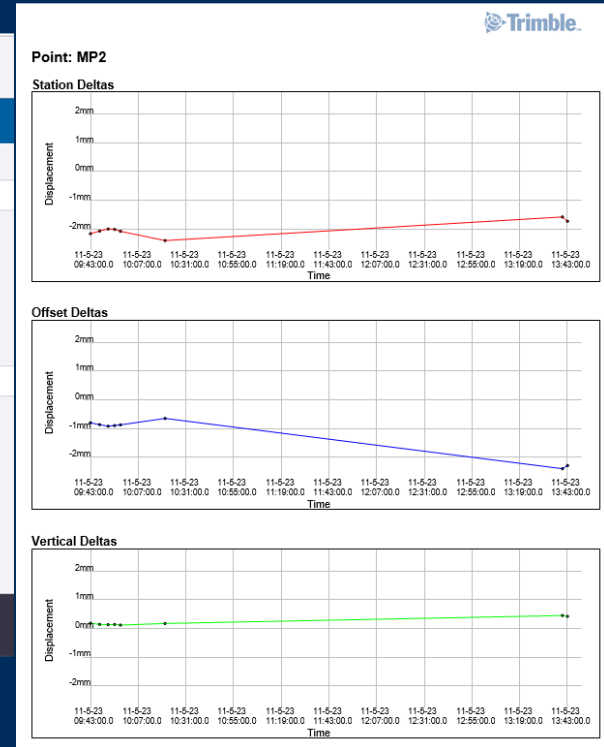


... after the survey has been completed

- **Alignment Word Report**

- RXL, Polyline, TXL, LandXML
- Containing
 - point scatter plots
 - trend graphs
 - both

The screenshot shows the Trimble Reports interface. At the top, there is a menu icon, a small image of a surveying instrument, and a clock showing 2:05 on 5/11. Below this is a 'Reports' section with a 'File format' dropdown set to 'Alignment Word Report'. There is a 'View created file' checkbox which is checked. Below that is an 'Alignment Type' dropdown set to 'TXL'. At the bottom, there is an 'Input File' field with a question mark icon. A dark bar at the very bottom contains the text 'Esc'.



OK



Reporting and Analysis



... after the survey has been completed

- **Epoch Reference Compare Report (Coordinates)**
 - HTML report showing reference coordinates and coordinates of the monitoring points
 - *.html file is saved in the folder (*previous file gets overwritten*)
- **Epoch Reference Compare Report**
 - HTML report showing reference coordinates and displacement information
 - *.html file is saved in the folder (*previous file gets overwritten*)

Epoch Comparison with Reference				
Job: TAM_1 (11/05/23)				
Reference Coordinates:				
Point	North	East	Elevation	
BS1	1007.651	1000.000	99.585	
BS3	1002.597	995.359	99.805	
BS2	1003.950	996.134	99.591	
MP2	1003.448	998.015	99.524	
MP1	1005.106	998.114	99.310	
MP4_DR	1000.344	995.048	100.834	
MP3_DR	1003.758	996.003	100.874	
MP2_DR	1007.871	999.686	100.784	

Epochs:				
Point	Δ North	Δ East	Δ Elev	
Epoch: 09:42:55 (2023-05-11)				
BS1	-0.004	0.002	0.001	
BS3	-0.000	-0.002	0.001	
BS2	-0.000	-0.001	0.000	
MP4_DR	0.000	0.000	0.000	
MP3_DR	0.000	0.000	0.000	
MP2	-0.002	-0.001	0.000	
MP1	-0.002	-0.000	-0.001	
Epoch: 09:47:31 (2023-05-11)				
BS1	-0.004	0.002	0.001	
BS3	-0.000	-0.002	0.001	
BS2	-0.000	-0.001	0.000	
MP4_DR	0.000	-0.000	-0.000	
MP3_DR	-0.000	-0.000	0.000	
MP2	-0.002	-0.001	0.000	
MP1	-0.002	-0.000	-0.001	
MP2_DR	0.000	0.000	0.000	
Epoch: 09:51:48 (2023-05-11)				
BS1	-0.004	0.002	0.001	
BS3	-0.000	-0.002	0.001	



Reporting and Analysis



... after the survey has been completed

- **Point report**

- displacement information for a single monitoring point
- *.html file is saved in the folder (*previous file gets overwritten*)

Monitoring Point

Point name: MP1

North	East	Elevation
1005.106	998.114	99.310

Epoch	Δ North	Δ East	Δ Elev
Date: 11/05/2023			
09:42:55	-0.002	-0.000	-0.001
09:47:31	-0.002	-0.000	-0.001
09:51:49	-0.001	-0.000	-0.001
09:55:04	-0.001	-0.000	-0.001
09:58:01	-0.002	-0.000	-0.001
10:20:29	-0.002	-0.000	-0.001
13:40:30	-0.001	-0.001	-0.000
13:45:03	-0.001	-0.001	-0.000

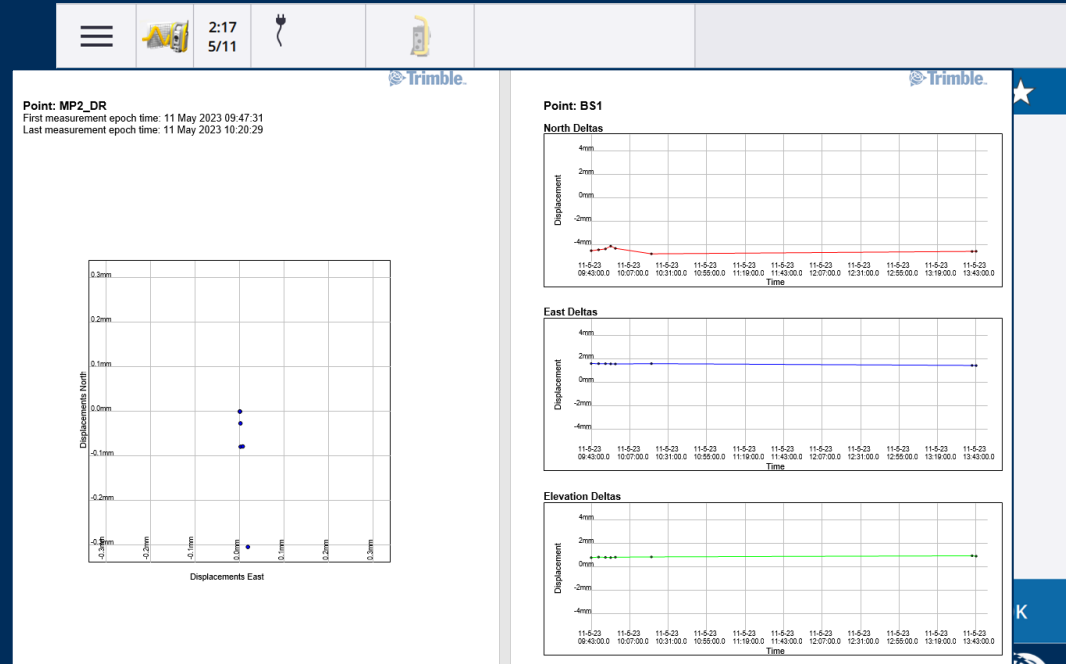
Reporting and Analysis



... after the survey has been completed

- **Word report**

- Displacement information about every monitoring and control point
- Containing
 - point scatter plots
 - trend graphs
 - both



Data Exchange

Trimble 4D Control

- **Export Rounds**
 - *.jxl files
 - for further post processing in T4D
- **Export Site Setup** → *.tamsetup file
 - Can be imported in T4D for switching to automated monitoring
- **Import Site Setup** → import the *.jxl file from T4D Server containing the stations setup information



Data Exchange

Settop M1

- Disable instrument control
 - Disabling instrument control by Settop M1
- Send Site Setup
 - Going from semi-automated to automated monitoring
 - TA Monitoring UX > Settop M1 UX



Data Exchange

Trimble Business Center (*.json)

TRIMBLE ACCESS MONITORING

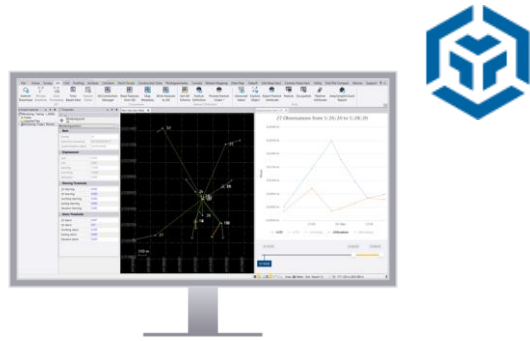


The image shows a Trimble GNSS receiver on a tripod, a handheld rugged device, and icons representing a signal graph, a GNSS receiver, and a globe.

Data Collection and Scheduling
Trimble Access Monitoring



TRIMBLE BUSINESS CENTER MONITORING



The image shows a computer monitor displaying the Trimble Business Center software interface with various graphs and data tables, and the Trimble logo.

Data Management, Processing,
and Reporting
Trimble Business Center Monitoring



04

TA Monitoring Demonstration

Monitoring with
Confidence



05

T4D Access (T4D v6.4)

Monitoring with
Confidence



T4D Control Access vs. TBC Monitoring



T4D Control Access

- Entry point into the T4D ecosystem
- **Automated and comprehensive** reporting and analysis
- **Sharing data** with stakeholders
- **Easy transition** between semi-automated and automated



TA Monitoring

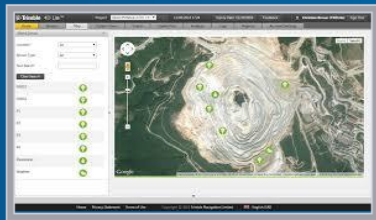


TBC Monitoring

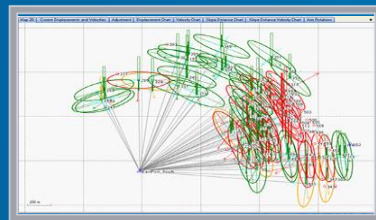
- **Existing TBC customers** (it's just an additional module)
- **Low barrier to entry** into semi-automated monitoring
- **Monitoring alongside other workflows** like CAD, surfaces, scanning, photogrammetry



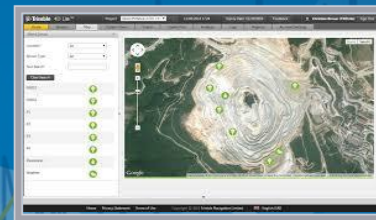
T4D Control software enables **automated movement detection with confidence** for surveying and construction professionals supporting informed decisions about infrastructure.



**Sensor Management
and Data Integration**



**Geodetic Processing
and Adjustment**



**Comprehensive
Analysis and
Visualization**



**Conditional Alarming
and Reporting**

Semi-automated Monitoring

System overview

TRIMBLE ACCESS MONITORING



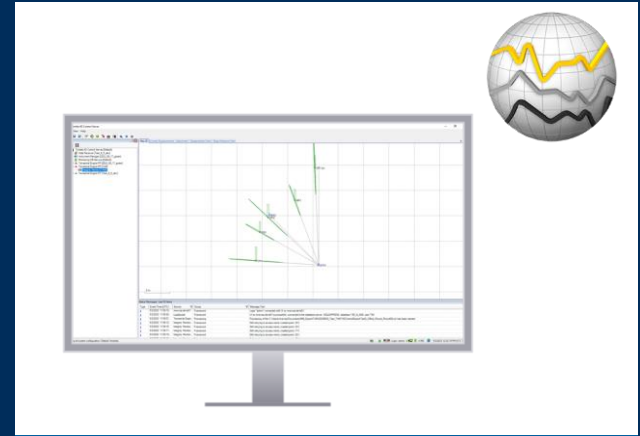
Data Collection and Scheduling
Total station, GNSS, DiNi

Trimble Access Monitoring field software

Data Transfer



TRIMBLE 4D CONTROL






Data Management, Processing,
and Reporting

Trimble 4D Control



Workflow

1. Set up control points and monitoring targets in Trimble Access 
 2. Configure round and take measurements 
 3. Export data from Trimble Access 
-
1. Import data into T4D using Terrestrial Engine
 2. Add sensors in T4D Web
 3. Start creating reports, alarms, and charts in T4D Web!



4. T4D Server - Import Data

The screenshot displays the Trimble 4D Control Server software interface. The main window is titled 'Properties - Terrestrial Engine PP [20230516_TAM]'. It features a 'File Import' dialog box with the following settings:

- Mission name: 20230516_TAM
- Method of file import: Scan folder
- Folder to scan: C:\ProgramData\Trimble\Trimble
- Prefix to scan:
- Scan interval: 10 min

Below the 'File Import' dialog, the 'Point Information' section shows:

- Point list: Collection of points: 8 entries
- Disabled points: 0 points disabled

The 'Method of file import' section at the bottom of the dialog states: 'If "Manually" is selected, you can choose each file manually. If "Scan folder" is selected, you can enter a folder to be scanned.' There are 'Apply' and 'Close' buttons at the bottom of the dialog.

The background shows a 'Map 2D' view with a grid. Several points are plotted on the map, labeled as follows:

- MP03_DR
- MP01
- MP02
- MP04_DR
- BS3
- BS3
- TS_1

A scale bar at the bottom left of the map indicates 2 m.

The bottom status bar shows the following information:

- Status Messages: Last 20 items
- Table with columns: Type, Event Time [UTC], Source, Group, Message Text
- Log messages include: 'Still retrying to access newly created point (51)', 'Processing of file C:\ProgramData\Trimble\Trimble Access Emulator 2023.00\Trimble Data\Projects\20230516_TAM_workflowT4DControlExport\workshop_data_RoundS93_2023-05-16.xml has been started.', 'Processing of file C:\ProgramData\Trimble\Trimble Access Emulator 2023.00\Trimble Data\Projects\20230516_TAM_workflowT4DControlExport\workshop_data_RoundS94_2023-05-16.xml has been started.', 'Processing of file C:\ProgramData\Trimble\Trimble Access Emulator 2023.00\Trimble Data\Projects\20230516_TAM_workflowT4DControlExport\workshop_data_RoundS95_2023-05-16.xml has been started.', 'Processing of file C:\ProgramData\Trimble\Trimble Access Emulator 2023.00\Trimble Data\Projects\20230516_TAM_workflowT4DControlExport\workshop_data_RoundS96_2023-05-16.xml has been started.', 'Loading of system configuration "Default" finished.'
- System tray: Login: admin, 7 MB, 5/16/2023 2:09:55 PM [UTC Time]



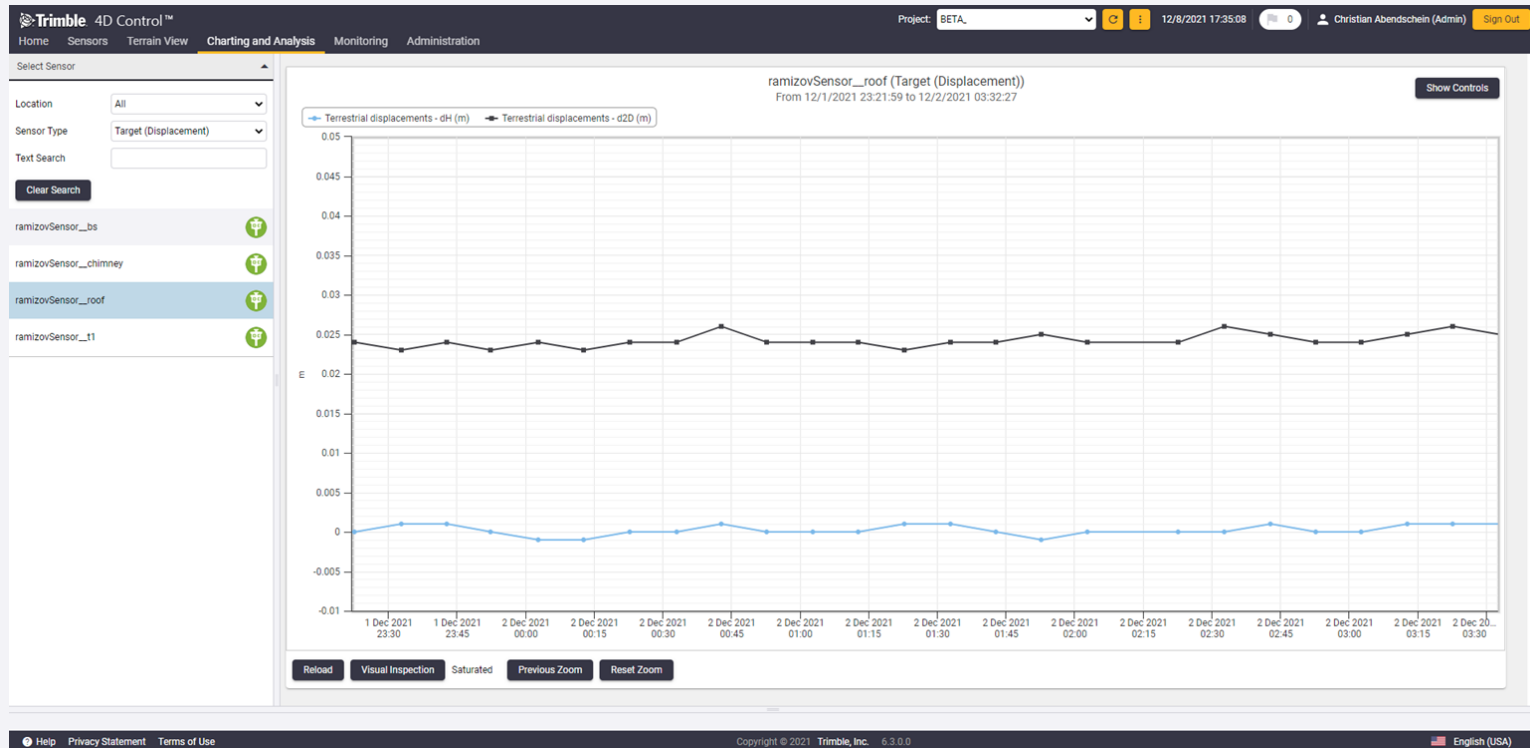
5. T4D Web - Add (multiple) sensors

The screenshot displays the Trimble 4D Control web application interface. At the top, the header includes the Trimble logo, '4D Control' text, and user information: 'English', 'System Administrator', and '20230516_TAM'. Below the header, a navigation bar shows 'Home', 'Project Manager' (selected), 'Geotech Gateways', and 'Vibration Gateways'. The main content area is titled 'Project Manager' and features a search bar with the text 'Search Projects'. A dropdown menu is open under 'Project Manager', listing 'Projects', 'Sensors', 'Add Sensor', 'Add Multiple Sensors' (highlighted), 'Project Types', 'Geotechnical Sensor Types', and 'Alignments'. Below the dropdown, a table displays project data. The table has columns for 'Project Name', 'Coordinate System', and 'Sensors'. The first row shows '20230516_TAM' as the project name, '0) Amsterdam, Berlin, Bern, Rome, Vienna' as the coordinate system, and '7' as the number of sensors. To the right of the table, there are icons for adding, deleting, and refreshing data. The footer of the page shows the URL 'localhost/T4DWeb.Admin/#/ProjectManager/Sensors/Import' and the copyright notice 'Copyright © 2023 Trimble, Inc.'.

Project Name	Coordinate System	Sensors
20230516_TAM	0) Amsterdam, Berlin, Bern, Rome, Vienna	7



6. T4D Web - Visualize data and more



[illegible]