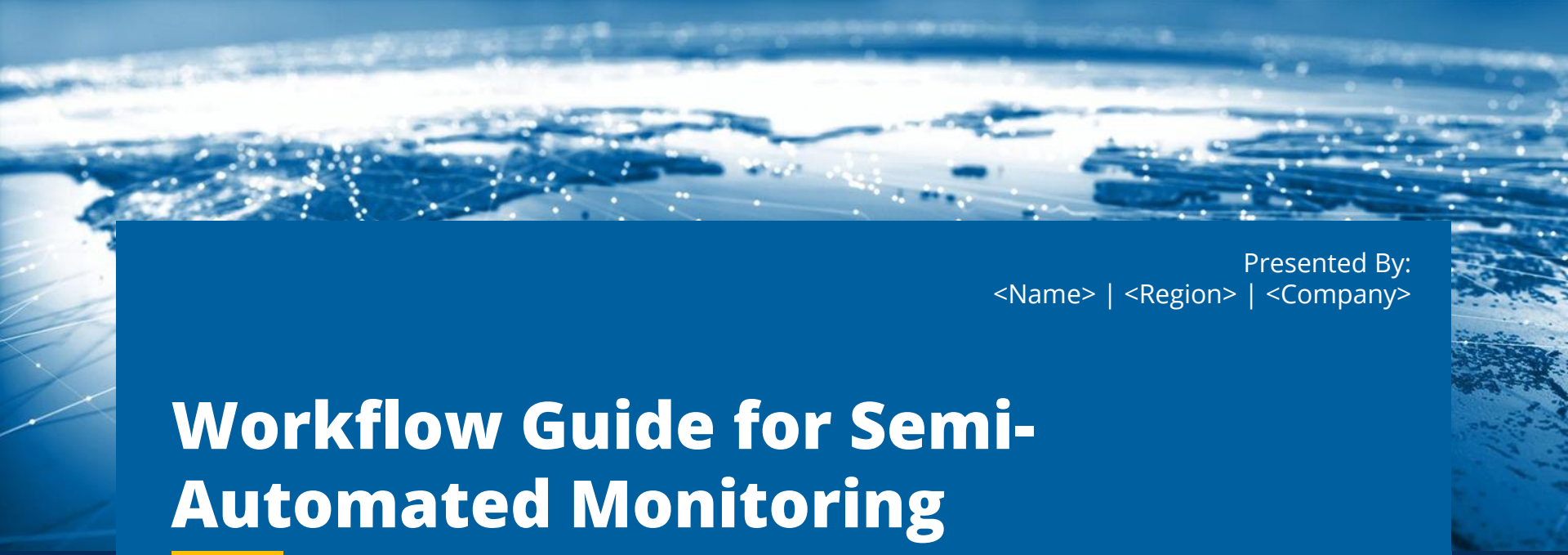


Presented By:
<Name> | <Region> | <Company>

Workflow Guide for Semi-Automated Monitoring

Trimble Access Monitoring App
Trimble Business Center Monitoring Edition

© 2021 Trimble, Inc - All Rights Reserved - Confidential and Proprietary Information

Trimble

Contents Overview

01 Applications for Semi-Automated Monitoring

02 The power of Trimble Access
- Trimble Access Applications
- Trimble Access Monitoring Workflow
- What's new in Trimble Access 2021.11

03 The power of Trimble Business Center
- Trimble Business Center Applications
- Trimble Business Center Monitoring Workflow
- What's new in Trimble Business Center 5.50

04 Subscription Offering
Overview for Trimble Access and Trimble Business Center

05 Resources
Monitoring Website| Monitoring Community | Resource Center | Power Hours | YouTube |Trimble Access Tech Tips

Applications for Semi-Automated Monitoring

- Short-term Construction
- Pile Installation
- Deep excavations/shoring

- Dam seasonal movement
- Long-term Subsidence and trends with low risk slopes

- Network control and verification
- Cost effective for short term and small projects

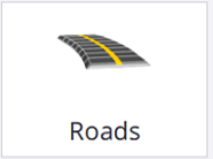
02

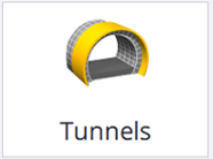
The power of Trimble Access

The power of Trimble Access

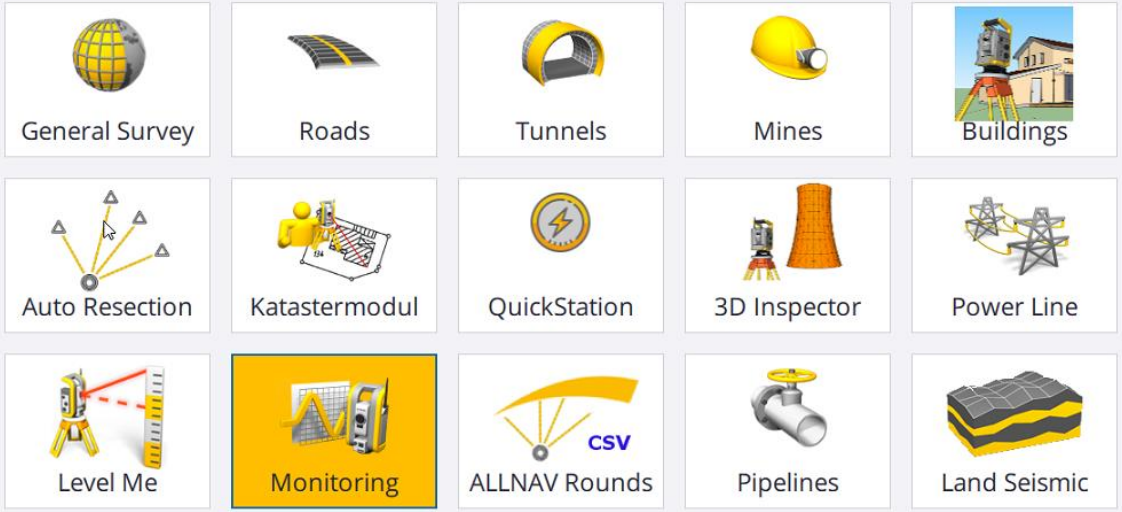
All day, every day. What professionals use to survey in the field

- The core functionality of Trimble Access is General Survey
  - Industry's most powerful and surveyor-optimized environment for measuring points, stake out points, lines, arcs and alignments, scanning, COGO and many other rounites
- Trimble Access Applications
  - There are a number of add-on applications to Trimble Access that expand its capability for specialized workflow such as Roads, Tunnels, Pipelines, Monitoring and many more...





Trimble Access Applications



- Trimble Access App availability
- Trimble Access Apps supported on Windows devices
- Trimble Access Apps supported on Android devices

Monitoring

The Trimble Monitoring application provides streamlined workflows to set up, monitor and report on regular control and deformation surveys.

Instruments and Controllers

Trimble Access 2021.11 Monitoring Module on **Windows** controllers Support all instruments

- Trimble SX-Series Scanning Total Stations
- Trimble S-Series Total Stations

Trimble Access 2017.00 Monitoring Module on **Windows Mobile/CE** controllers Support

- Trimble S6 Total Stations
- Trimble S8 Total Stations
- Trimble VX Spatial Stations

Supported **Android** controllers

- Trimble TSC5 controller
- Trimble TCU5 onboard controller
- Trimble TDC600 handheld

Apps supported on Android devices depend on the version of Trimble Access you are using:

Trimble Access Apps	Contact	2021.10 & later	2020.10	2020.00
Roads	Trimble	✓	✓	✓
Tunnels	Trimble	✓	✓	✗
Mines	Trimble	✓	✓	✗
Pipelines	Trimble	✓	✓	✗
Power Line	Trimble	✓	✗	✗
Katastermodul Deutschland	Trimble	✓	✗	✗
Monitoring	Trimble	✓	✓	✗
AutoResection	Allnav Ag	✓	✗	✓
AllNAV Rounds	AllNAV	✓	✗	✗

Supported **Windows** controllers

- TSC7 controller
- T10 Tablet
- T100 Tablet

Trimble Access Monitoring

Field software for efficient data collection and monitoring site setup

Automated data collection

Efficiently collect monitoring measurements with in-field reporting and alarms

Site setup and preparation

Define your monitoring network and targets to prepare for automated system with Settop M1 and T4D Integration

Reporting and analysis

Share reports from the field and integrate with Trimble Business Center for a comprehensive semi-automated package

Trimble Access Monitoring

Streamline the collection of total station rounds to reduce operator input and field time for semi-automated monitoring projects

Epoch list

Epochs: 10

Number	Start	End	Time between epochs
1	5:00:00 PM	5:01:00 PM	14.0 Minutes
2	5:15:00 PM	5:16:00 PM	14.0 Minutes
3	5:30:00 PM	5:31:00 PM	14.0 Minutes
4	5:45:00 PM	5:46:00 PM	14.0 Minutes
5	6:00:00 PM	6:01:00 PM	14.0 Minutes
6	6:15:00 PM	6:16:00 PM	14.0 Minutes
7	6:30:00 PM	6:31:00 PM	14.0 Minutes
8	6:45:00 PM	6:46:00 PM	14.0 Minutes
9	7:00:00 PM	7:01:00 PM	14.0 Minutes
10	7:15:00 PM	7:16:00 PM	

Back | Options | Next

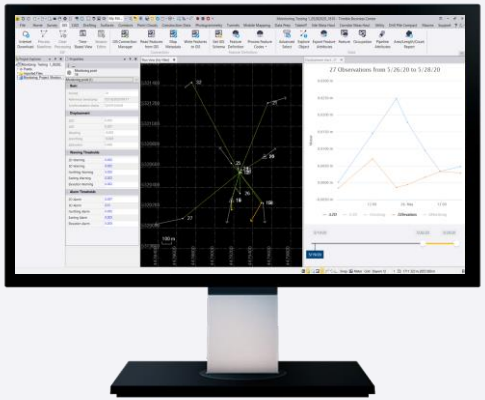
Semi-automated Monitoring

- Round configuration and scheduling
- Automatic and manual measurements
- Scatter plot and displacement charts
- Threshold definition and warnings

[Trimble Access Help Portal | Apps | Monitoring]

Workflow for Semi-automated Monitoring

Data Transfer
Trimble Sync Manager



Data Collection and Scheduling
Total station, GNSS, level
Trimble Access Monitoring field software

Data Management, Processing and Reporting
Trimble Business Center Monitoring

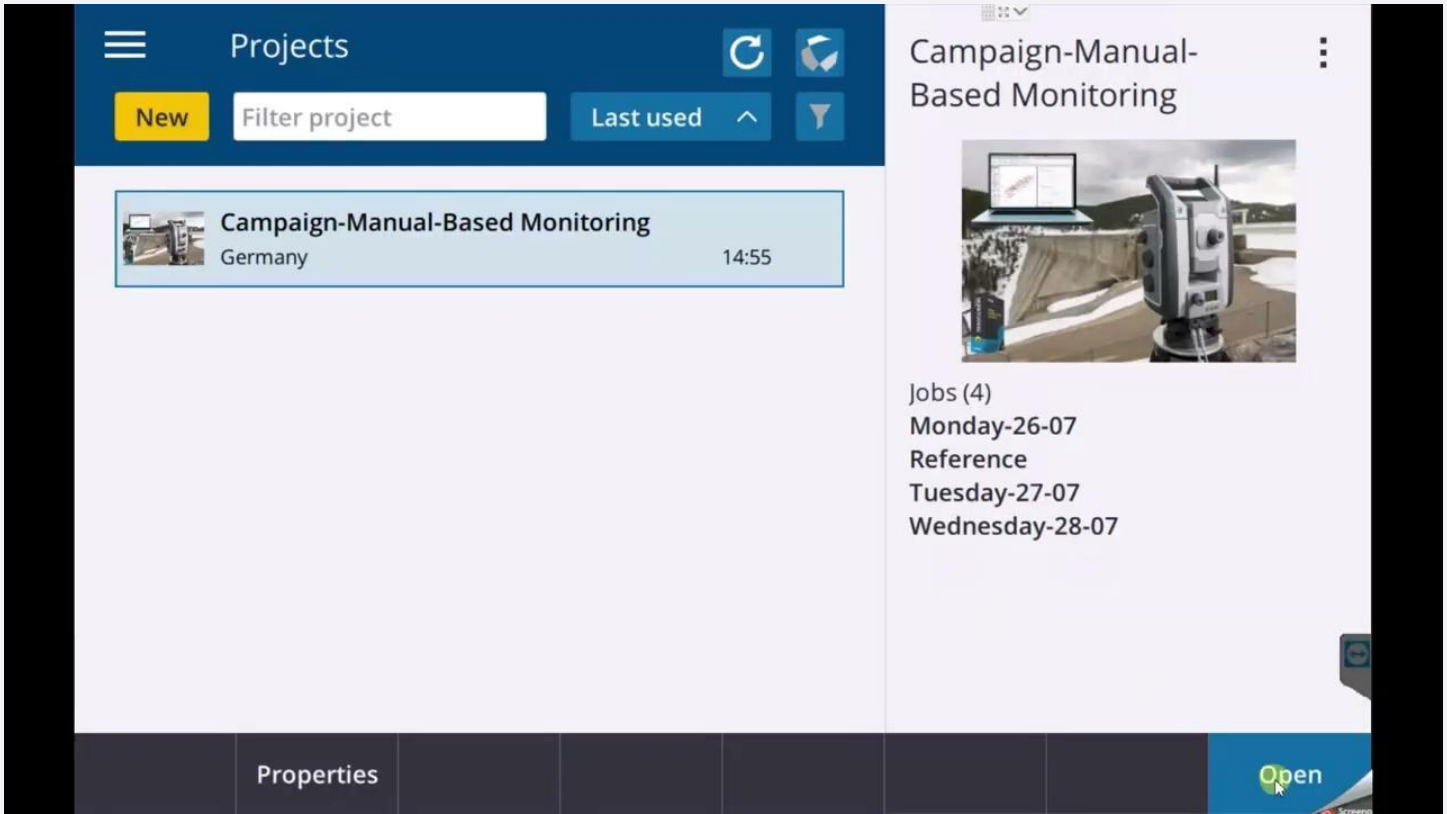
Trimble Access Monitoring Workflow

1. Define Station Setup Type
   a. Station Setup
   b. Station Setup plus
   c. Resection
2. Define Control Points
3. Define Monitored Points
4. Perform Reference Measurements
   a. Automate multiple or single epochs
5. Reporting
   a. Basic scatter plots and charts in the field
6. Export to
   a. TBC Monitoring (.job/.jxl)
   b. Trimble 4D Control (automated monitoring)

[Trimble Access Help Portal | Monitoring | Typical monitoring workflow]

Trimble Access Monitoring Workflow

Monitoring Setup and Point List



Trimble Access Monitoring Workflow

Import CSV file format requirements

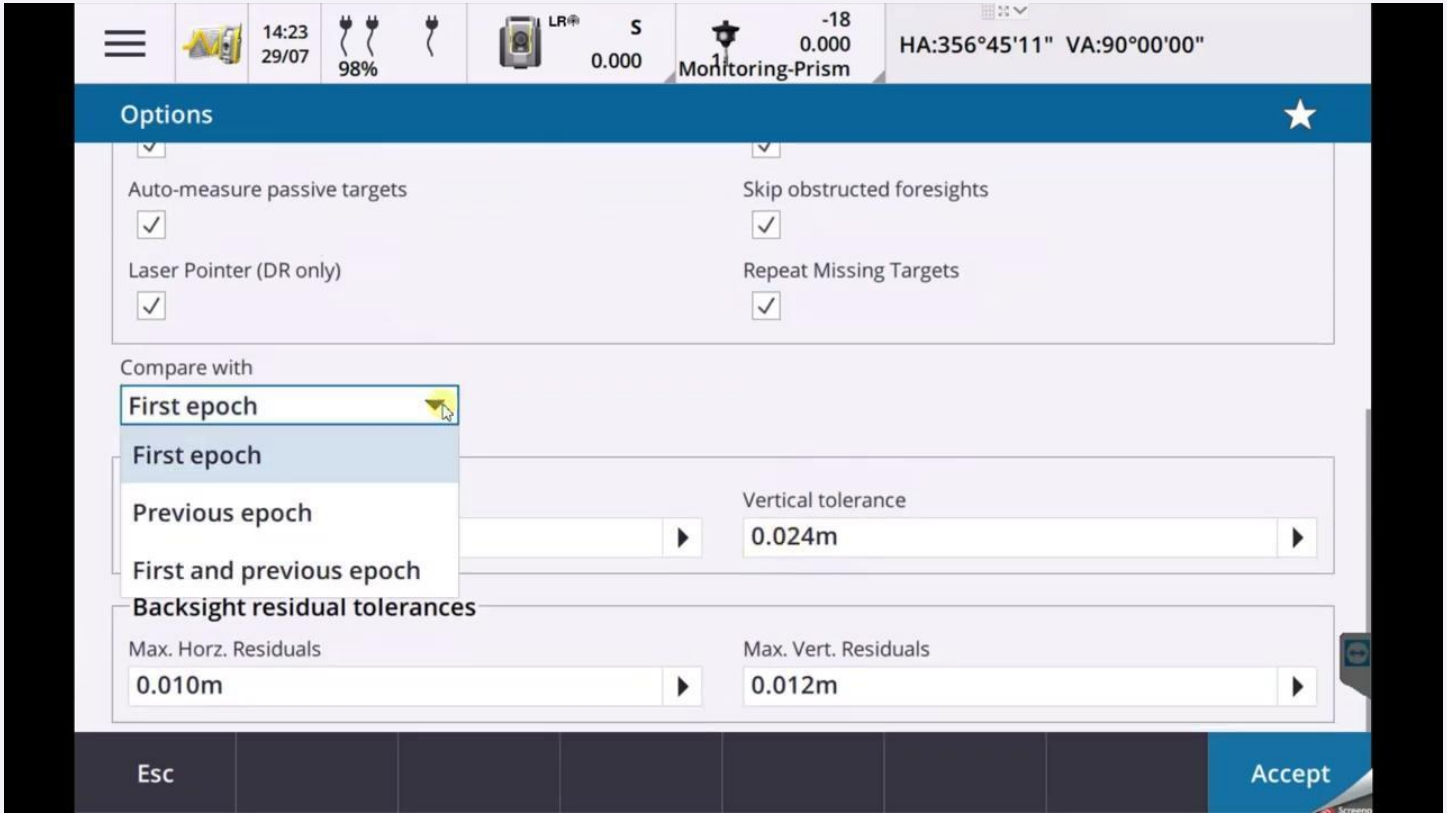
Field...	Contains...
1	Point Name
2	First ordinate (Northing)
3	Second ordinate (Easting)
4	Elevation
5	Code
6	Description 1
7	Description 2
8	Target height (true vertical)
9	Target type or Prism constant
10	Target mode

Imported CSV file format can contain

- First four fields **must** contain in the CSV file
  Point Name, Northing, Easting, Elevation - required
- All other fields are *optional*
- If fields 8 to 10 are null, file can be imported but the targets must be manually edited before continue. To do this select the point in the list and tap **Edit**.
- Field 9: Prism Type with Prism Constant
- Field 10: Target Mode

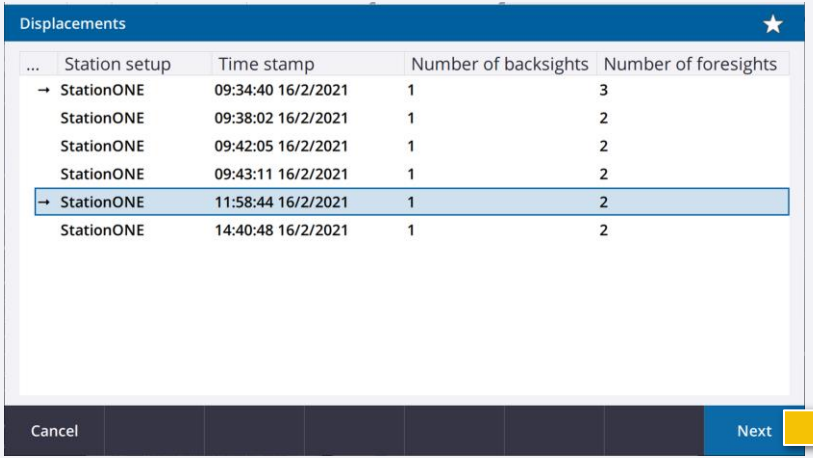
Trimble Access Monitoring Workflow

Options

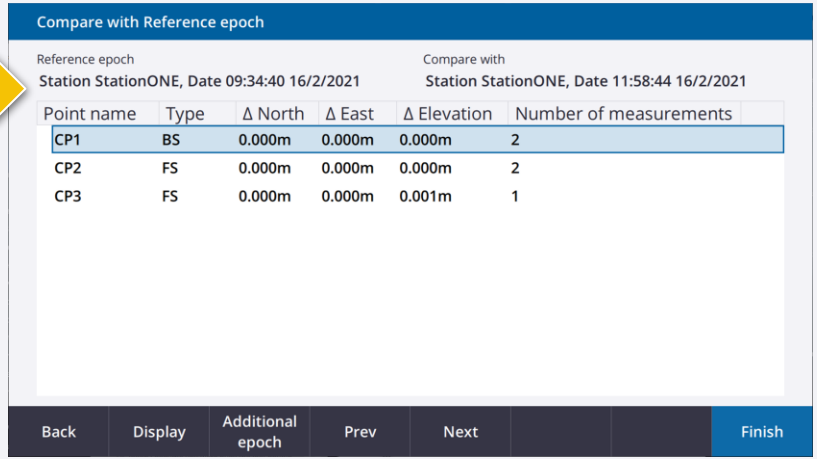


Trimble Access Monitoring Workflow

Displacements



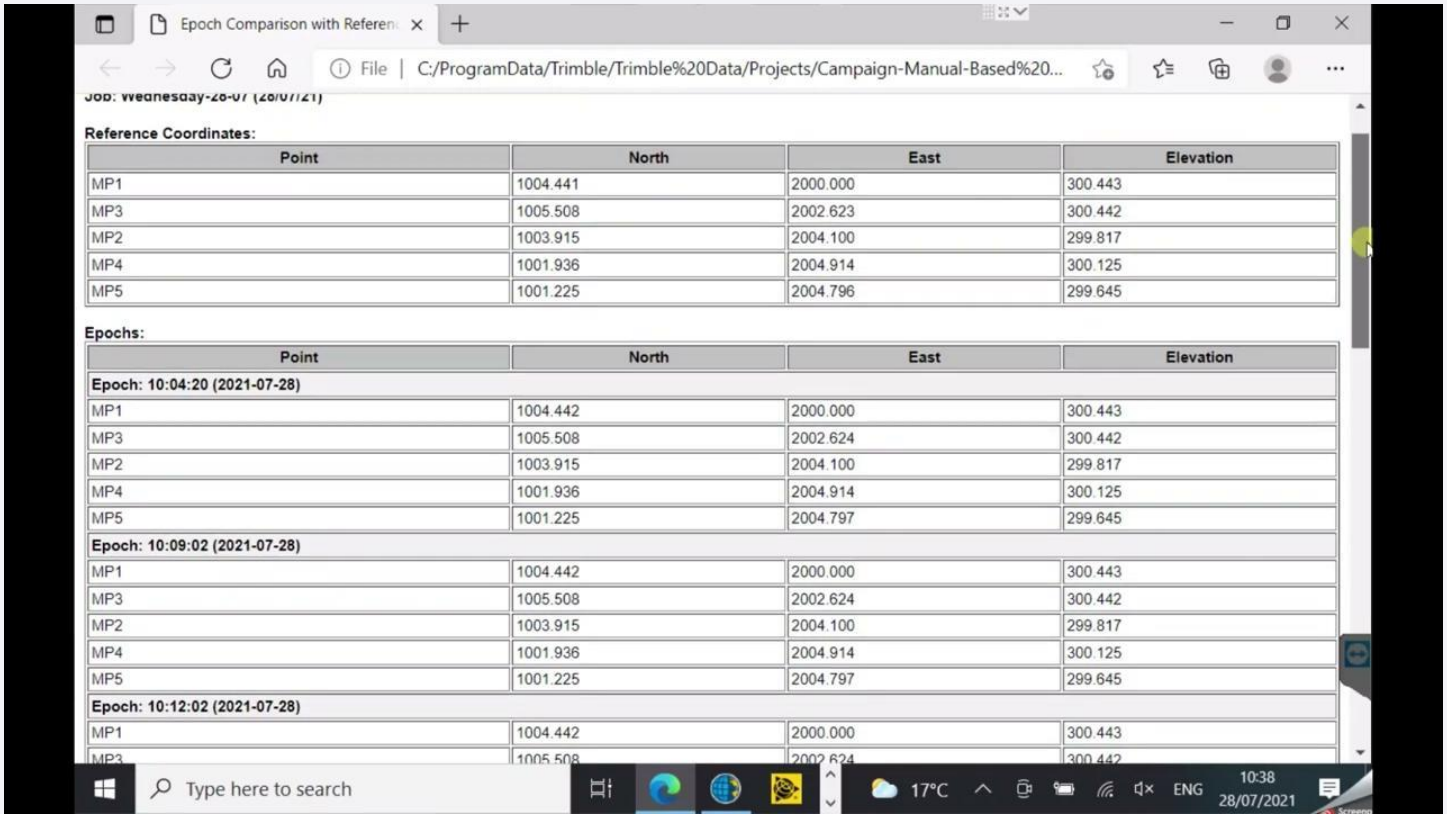
- Displacements – Check the data in the field
  - Displacements overview of all Epochs
  - Select **first** Station Setup (Reference Epoch)
  - Select **seconds** Station Setup (Compare Epoch)



- Compare with Reference epoch
  - *Display* – define column display
  - *Additional epoch* – measure a new epoch
  - *Prev* and *Next* – change the compare epoch

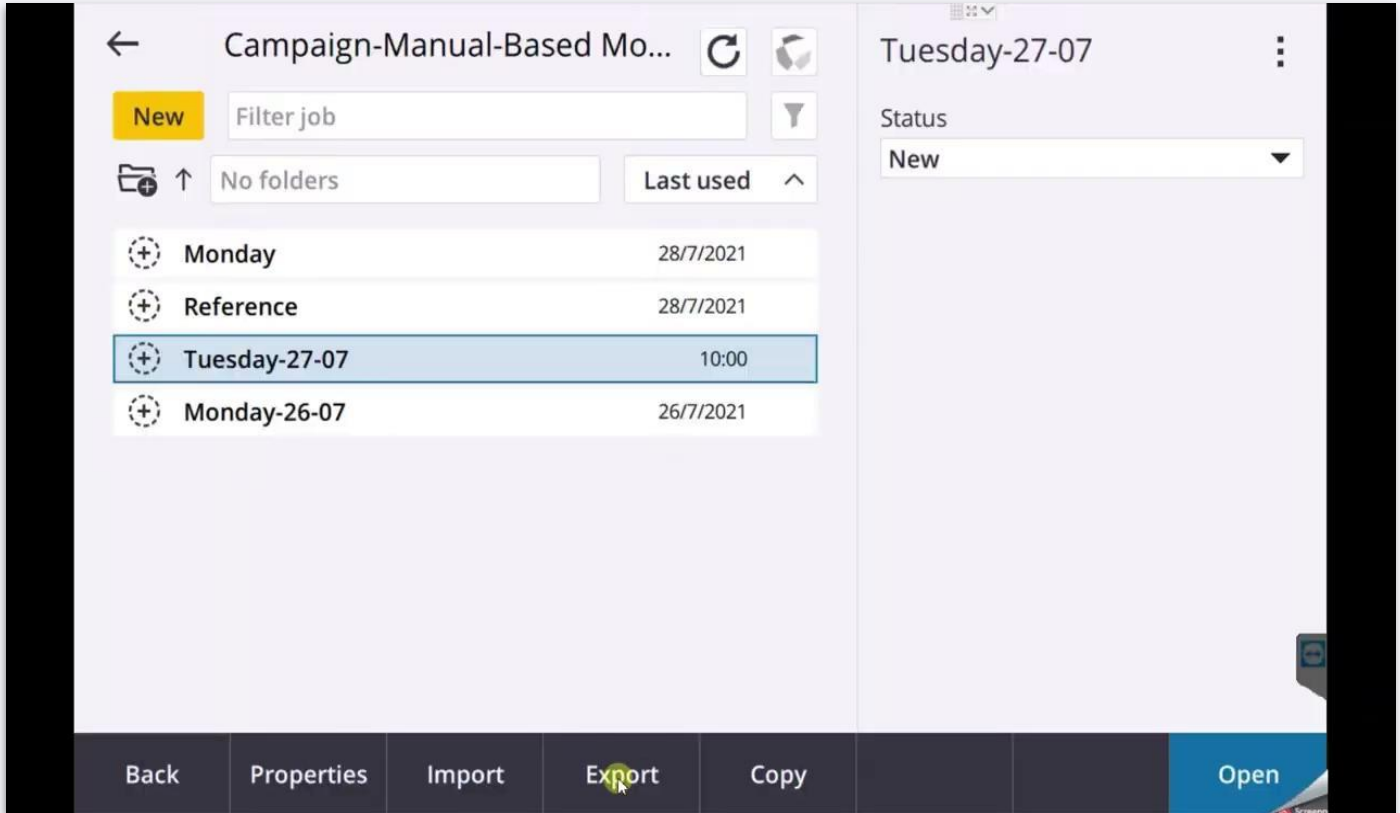
Trimble Access Monitoring Workflow

Monitoring Reports



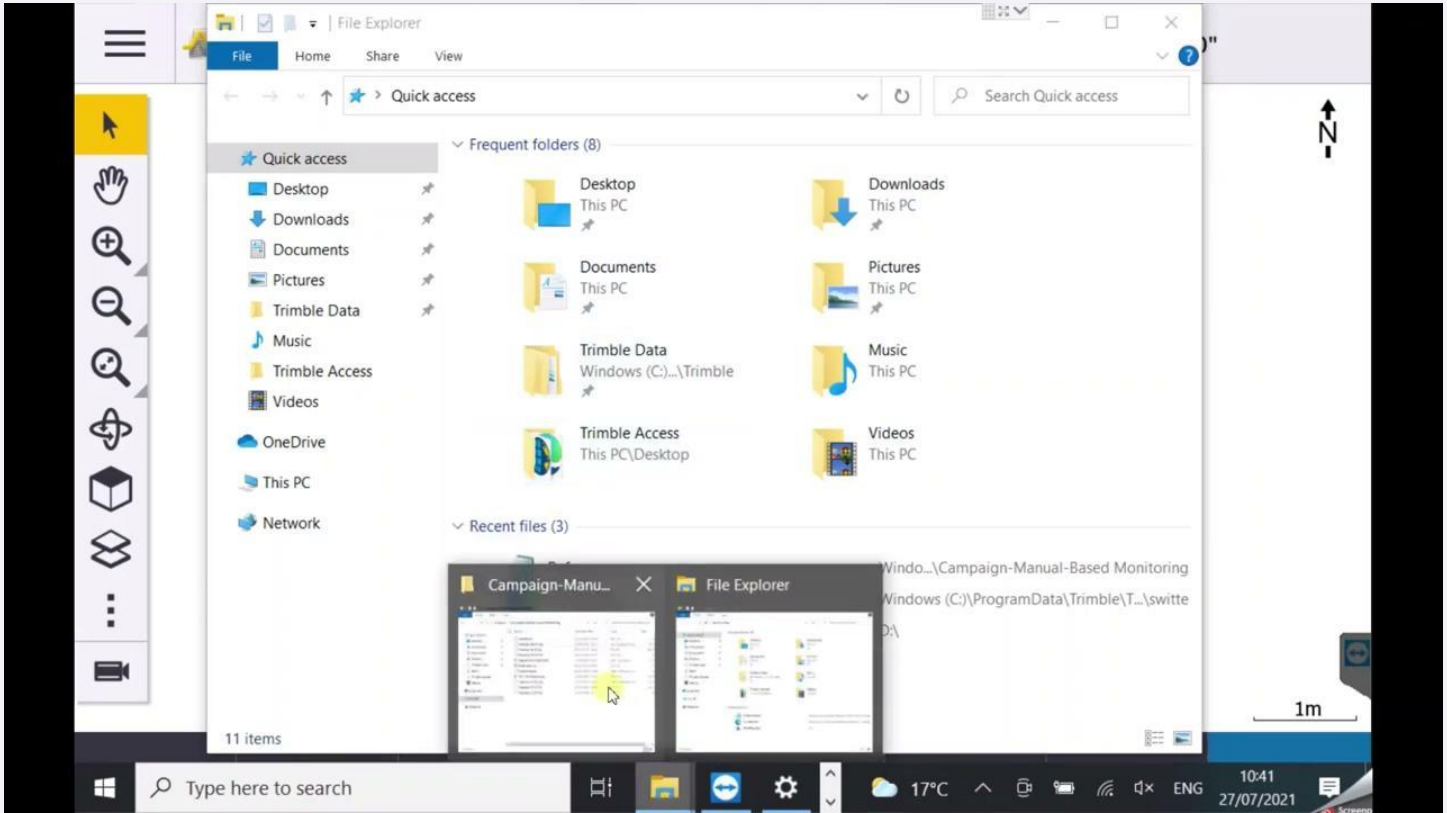
Trimble Access Monitoring Workflow

Monitoring Data Export



Trimble Access Monitoring Workflow

Monitoring Data Exchange



02

Trimble Access Monitoring

What's New in 2021.11

Trimble Access 2021.11 Monitoring 1.1.3

New Features

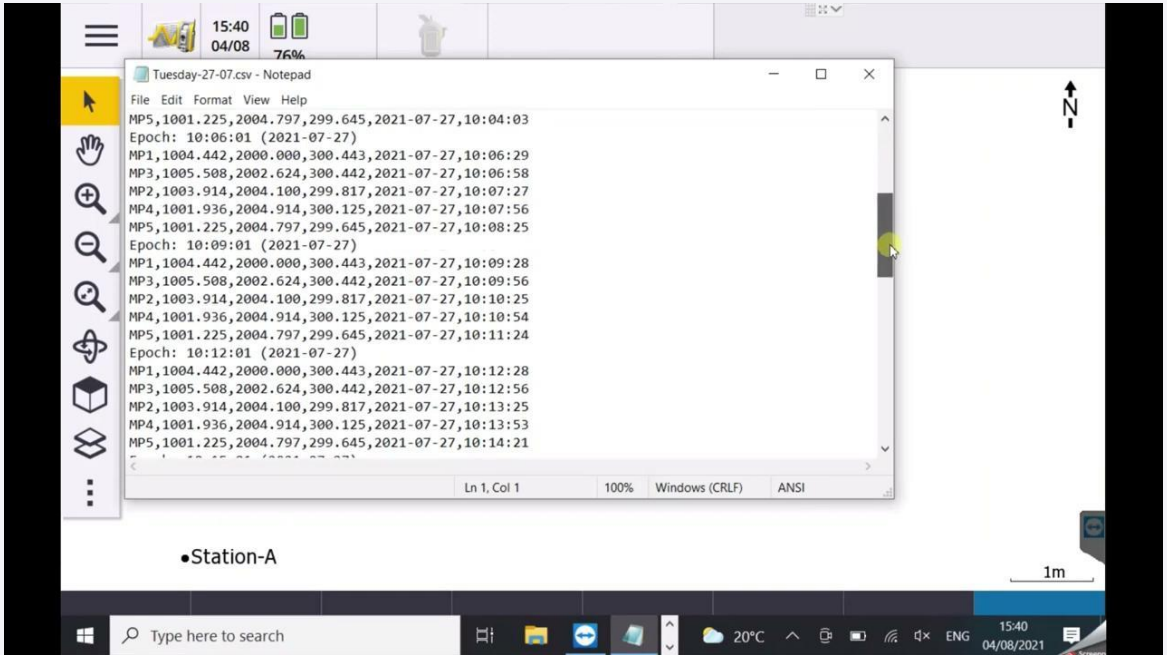
- **Export coordinates** of measured epochs in CSV file format
- Add option to **repeat missing targets**
- **Send** Trimble Access Monitoring **reports** to **Trimble Connect** project **VIDEO NEXT SLIDE**
- **Edit Monitoring target** information when Monitoring round is **paused**
- **Compare with previous epoch** to turn to previous measured position in Monitoring round
- **Add configuration page** when exporting to Settop M1 for automated monitoring setup

[Trimble Access Release Notes Portal - 2021.11 - Monitoring 1.1.3]

Trimble Access 2021.11 Monitoring 1.1.3

New Features

- **Send** Trimble Access Monitoring **reports** to **Trimble Connect** project

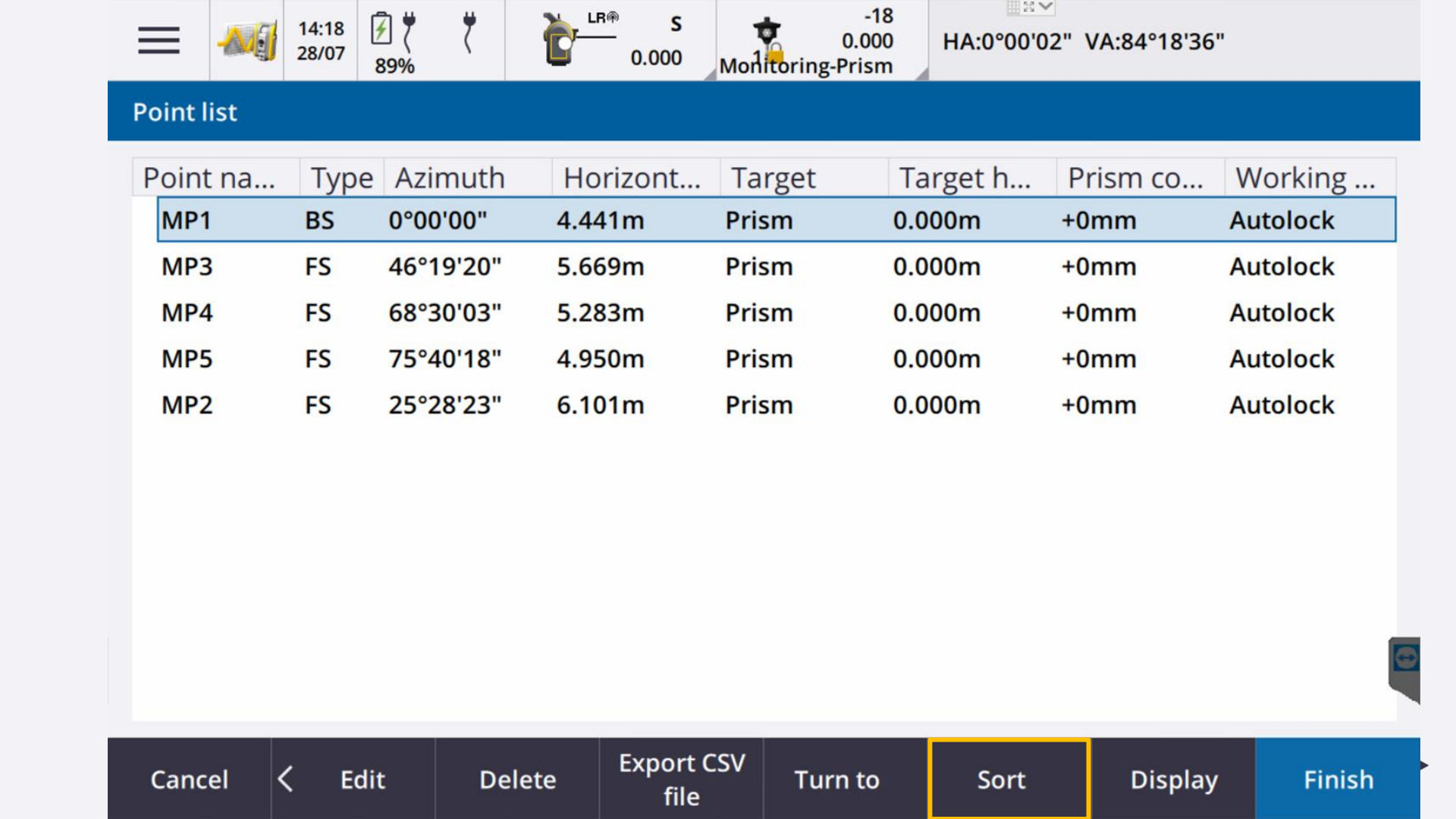


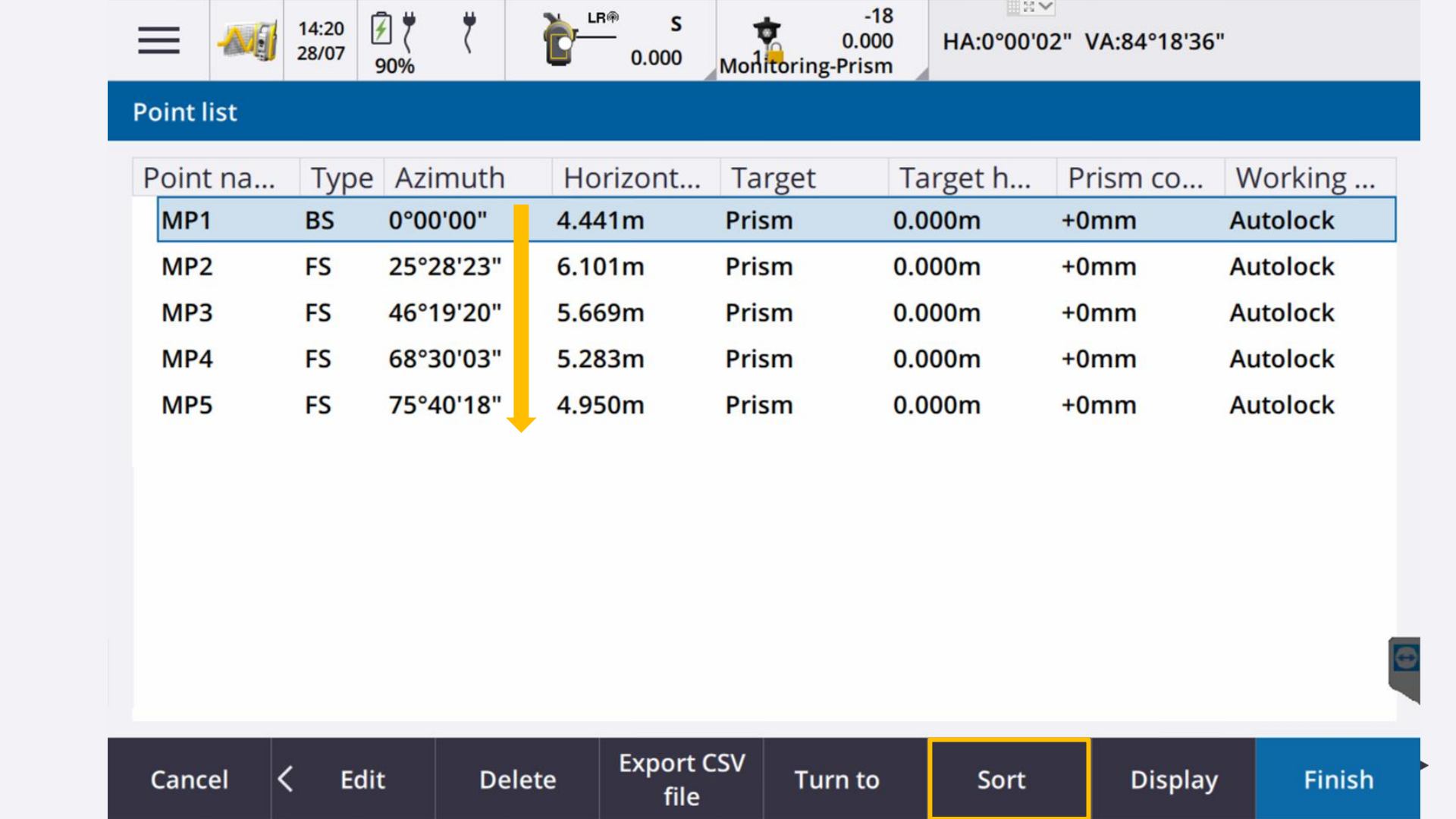
Trimble Access 2021.11 Monitoring 1.1.3

Enhancements

- **Sort Point List by clockwise azimuth direction**

  You can now sort the **Point list** by clockwise direction from reference (backsight) azimuth. This reduces the time to measure multiple targets in various directions by limiting the size of rotation the instrument turns in each measurement. To sort by this method, tap the **Sort** softkey below the **Point list** and select the required sorting method.


14:18
28/07
89%
LR
S
0.000
-18
0.000
Monitoring-Prism
HA:0°00'02" VA:84°18'36"
Point list
Point na... Type Azimuth Horizont... Target Target h... Prism co... Working ...
MP1 BS 0°00'00" 4.441m Prism 0.000m +0mm Autolock
MP3 FS 46°19'20" 5.669m Prism 0.000m +0mm Autolock
MP4 FS 68°30'03" 5.283m Prism 0.000m +0mm Autolock
MP5 FS 75°40'18" 4.950m Prism 0.000m +0mm Autolock
MP2 FS 25°28'23" 6.101m Prism 0.000m +0mm Autolock
Cancel
Edit
Delete
Export CSV file
Turn to
Sort
Display
Finish


14:20
28/07
90%
LR
S
0.000
-18
0.000
Monitoring-Prism
HA:0°00'02" VA:84°18'36"
Point list
Point na... Type Azimuth Horizont... Target Target h... Prism co... Working ...
MP1 BS 0°00'00" 4.441m Prism 0.000m +0mm Autolock
MP2 FS 25°28'23" 6.101m Prism 0.000m +0mm Autolock
MP3 FS 46°19'20" 5.669m Prism 0.000m +0mm Autolock
MP4 FS 68°30'03" 5.283m Prism 0.000m +0mm Autolock
MP5 FS 75°40'18" 4.950m Prism 0.000m +0mm Autolock
Cancel
Edit
Delete
Export CSV file
Turn to
Sort
Display
Finish

Trimble Access 2021.11 Monitoring 1.1.3

Resolved issues

- **Units**

  We have fixed a units issue when importing or exporting a Monitoring targets CSV file

- **Duplicate points**

  Uploading a Monitoring Point List CSV that has duplicate point IDs now updates the existing points with the imported target information

- **Exporting F1-only measurements**

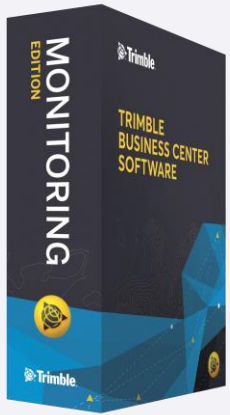
  Now if you try to export a site setup that contains F1-only measurements to Trimble 4D Control a message warns that only two-face measurements are supported by Trimble 4D Control

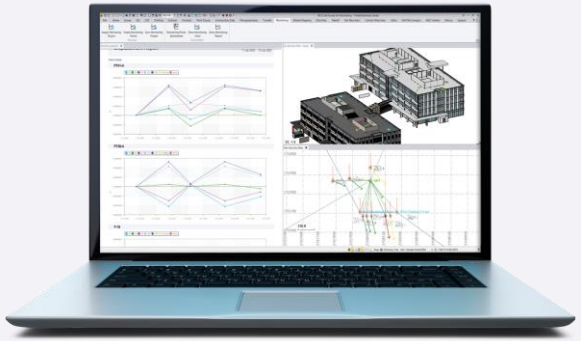
- **Application error**

  You will no longer see an application error when the laser pointer is active

03

The power of Trimble Business Center





The power of Trimble Business Center

Data Hub - Field to Finish with Confidence

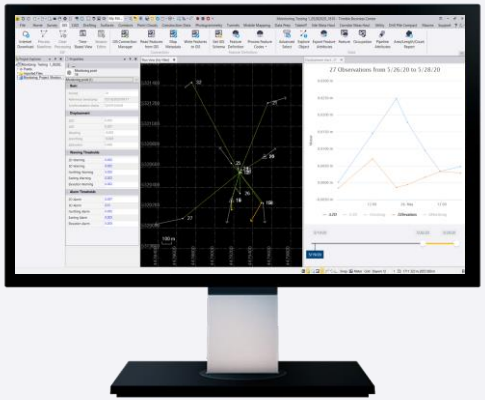
Trimble Business Center combine raw measurements from GNSS, Total Stations, and Levels. Then add in data from UAVs, Mobile Mapping Systems and Terrestrial Laser Scanner, all of which is scaled to your survey data

Supported Workflows

- Field Data QA/QC
- Adjustment and COGO
- CAD and Drafting
- Surfaces and Volumes
- Alignment and Coordiors
- Data Prep
- Takeoff and Mass Haul
- Trimble VISION and Aerial Photogrammetry
- Scanning and Point Clouds
- GIS
- Utility Modeling
- Tunneling
- Monitoring
- Mobile Mapping
- Drilling, Piling, Dynamic Compaction

Workflow for Semi-automated Monitoring

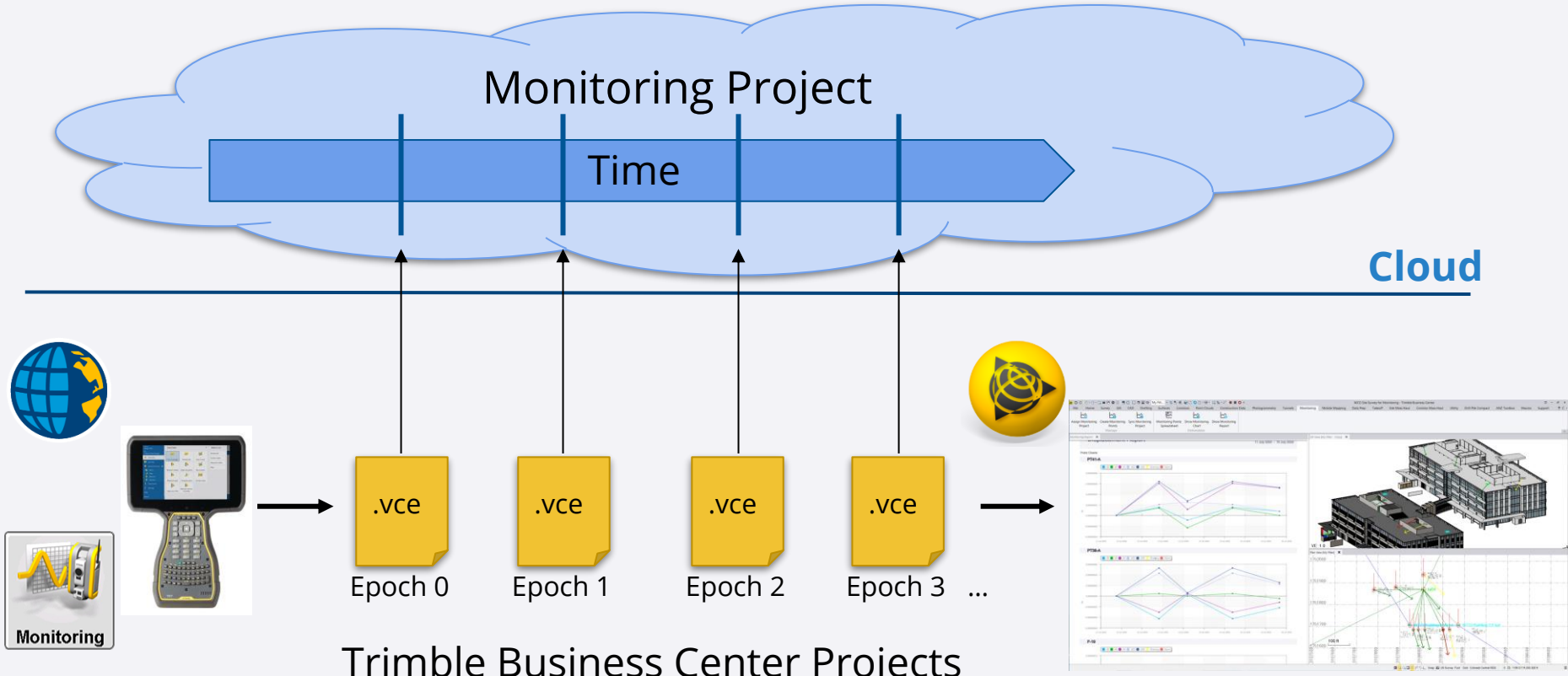
Data Transfer
Trimble Sync Manager



Data Collection and Scheduling
Total station, GNSS, level
Trimble Access Monitoring field software

Data Management, Processing and Reporting
Trimble Business Center Monitoring

How is the Monitoring Data managed in TBC?



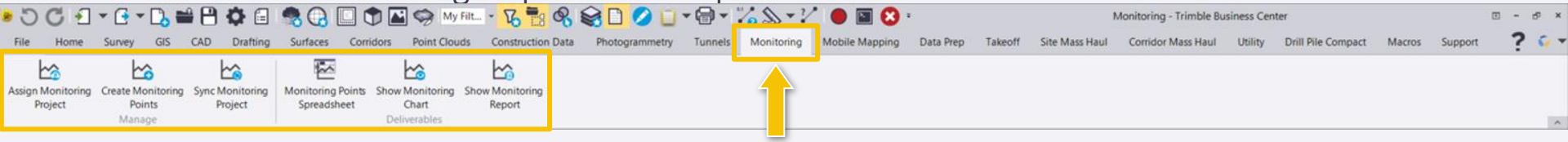
Trimble Business Center Monitoring Workflow

*Follow commands on **Monitoring** ribbon in order from left to right

1. Create new TBC project
2. Import Survey data into TBC
3. Perform Adjustments/Quality Control
4. Assign/Create Monitoring Project
5. Create Monitoring Points
6. Sync Monitoring Project

Repeat Steps 1-6 for each epoch of data

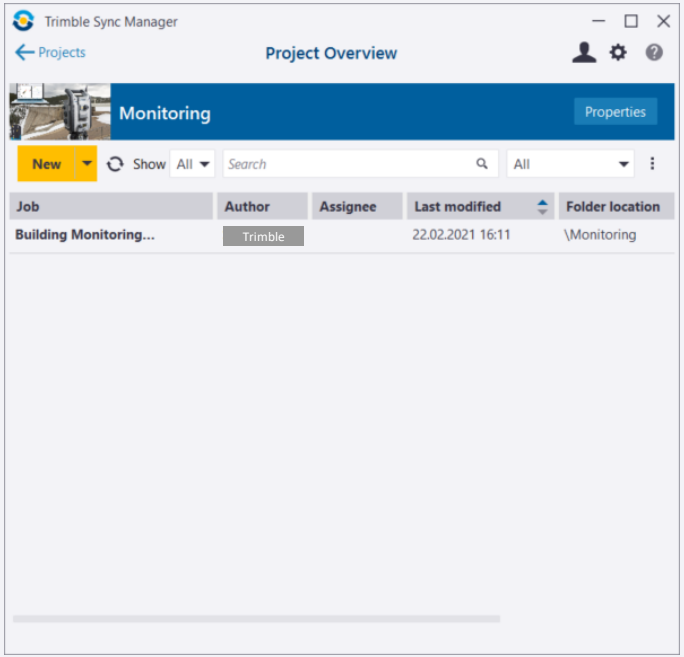
7. View Monitoring Point Displacement Vectors and Spreadsheet
8. View interactive Monitoring Displacement Chart
9. Create Monitoring Displacement Report

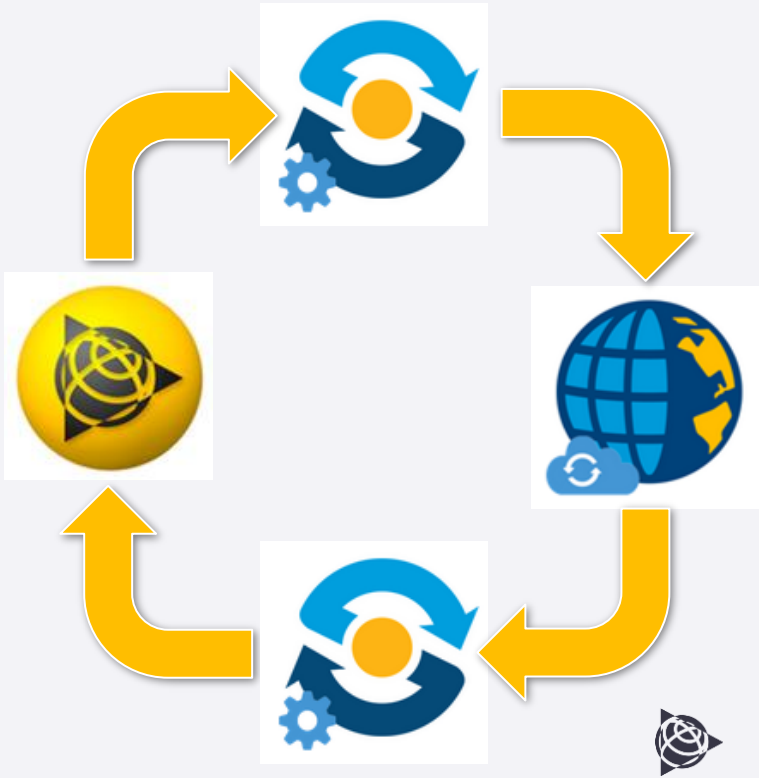


Trimble Business Center

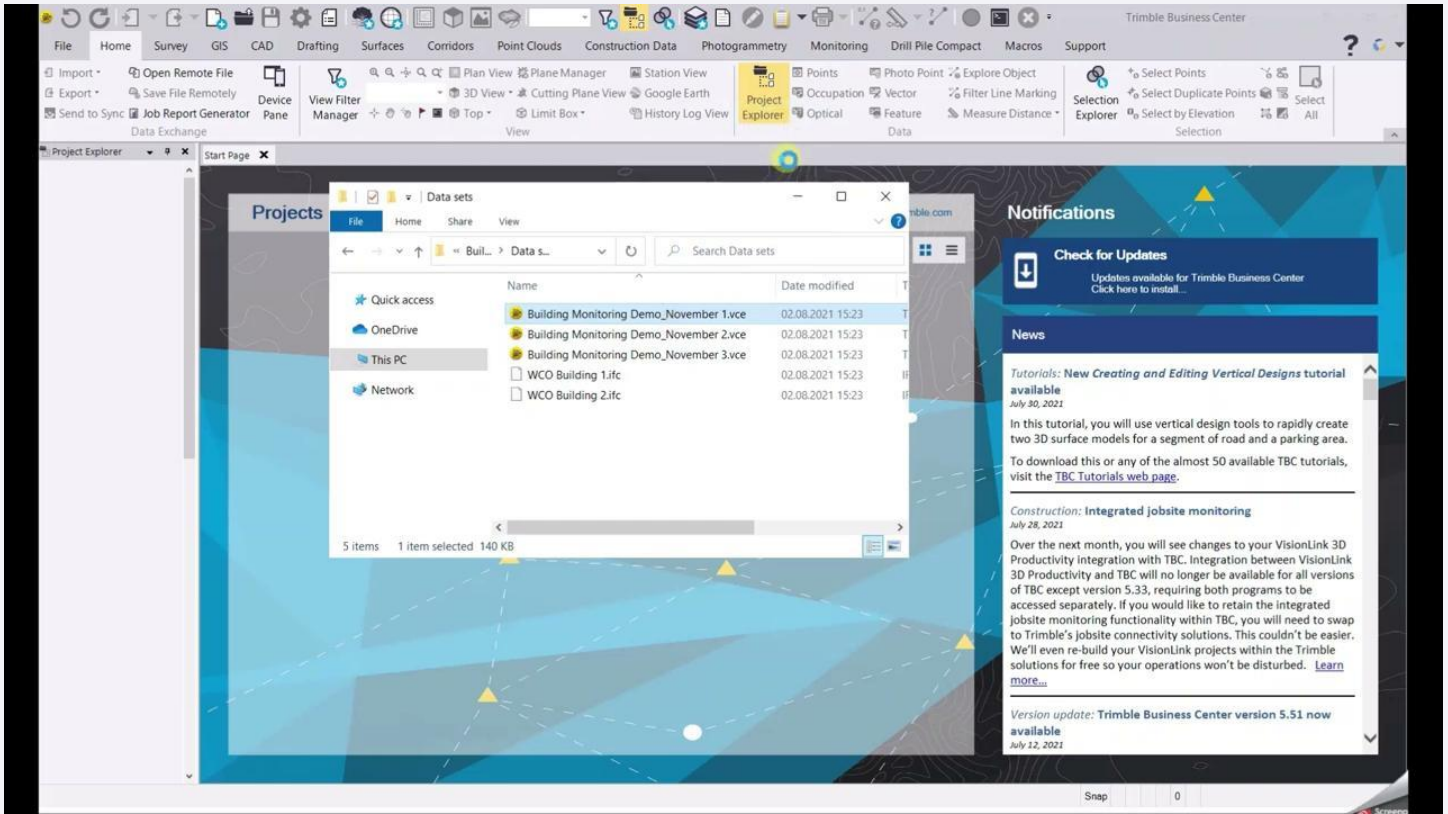
Importing Monitoring Data | Trimble Sync Manager

https://geospatial.trimble.com/sync-manager





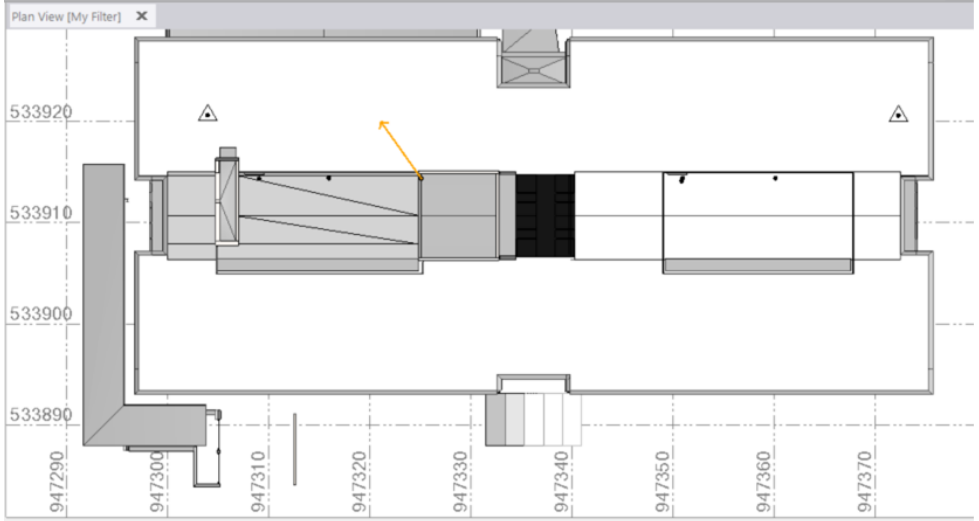
Trimble Business Center Monitoring Workflow

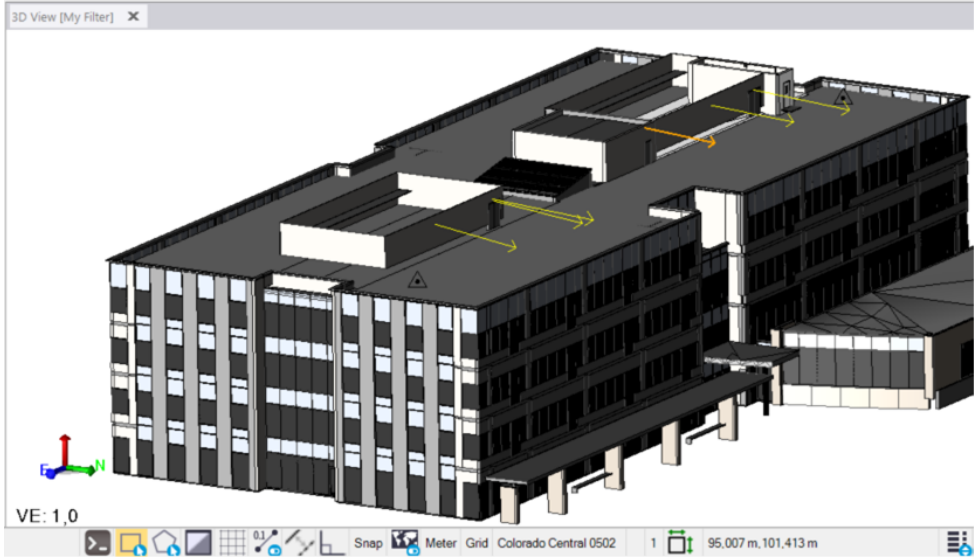


03

Trimble Business Center Monitoring

What's New in 5.50

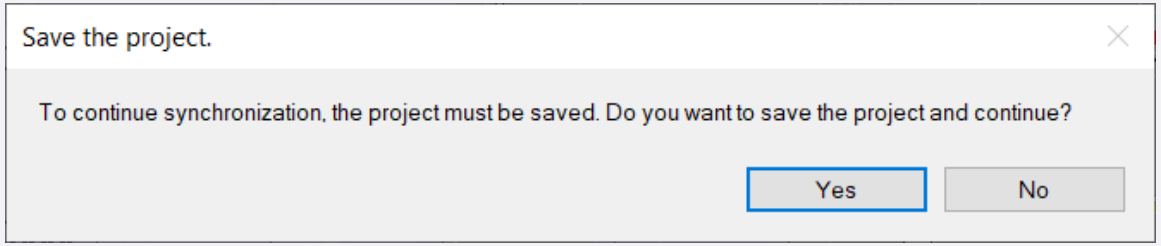




Trimble Business Center 5.50

Point monitoring enhancements

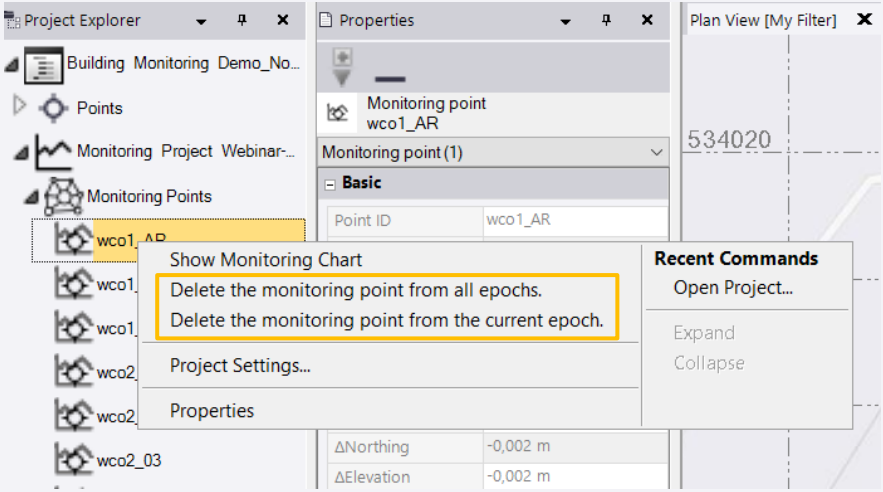
- After selecting points to monitor, the **automatic synchronization process** begins immediately (no need to first run the Sync Monitoring command as before). This eliminates the need for an additional command when adding new epochs to a monitoring project.



Trimble Business Center 5.50

Point monitoring enhancements

- You can **select any monitoring point** in the Project Explorer and select to **delete** it from the **current epoch** or from **all epochs**. This provides additional flexibility for managing monitoring projects in TBC.

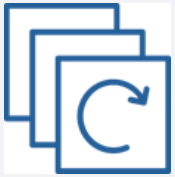


04

Subscription Offering

Trimble Access

Trimble Business Center



Trimble Access Subscription Base Plan

Good

GNSS Only

Survey field software for support of survey workflows with GNSS Receivers only

- Support for GNSS Receiver based workflows in surveying
- Feature coding, including measure codes for repetitive tasks
- Graphical COGO routines for calculating points and features
- Graphical staking of points, lines, arcs, and alignments

Best

General Survey

Survey field software for support of survey workflows with GNSS Receivers and Optical Instruments

- Feature coding, including measure codes for repetitive tasks
- Graphical COGO routines for calculating points and features
- Graphical staking of points, lines, arcs, and alignments
- Topo surveys and scan data
- Continuous display of maps or video and forms side by side
- Trimble VISION™ enabled sensor control for integrated surveying workflows
- Integrated Surveying™ technology combining optical, scanning, and GNSS data, plus images, in the same job

[Trimble Access Subscription Plans]

Trimble Access Choose your application

Roads
Define, survey, and report your road with a simplified easy to use graphical interface specific to standard roading operations.
How to Buy ›

Pipelines
Collect pipe attribute data, record joint relationships, and link survey data electronically for verification at every step in the process.
How to Buy ›

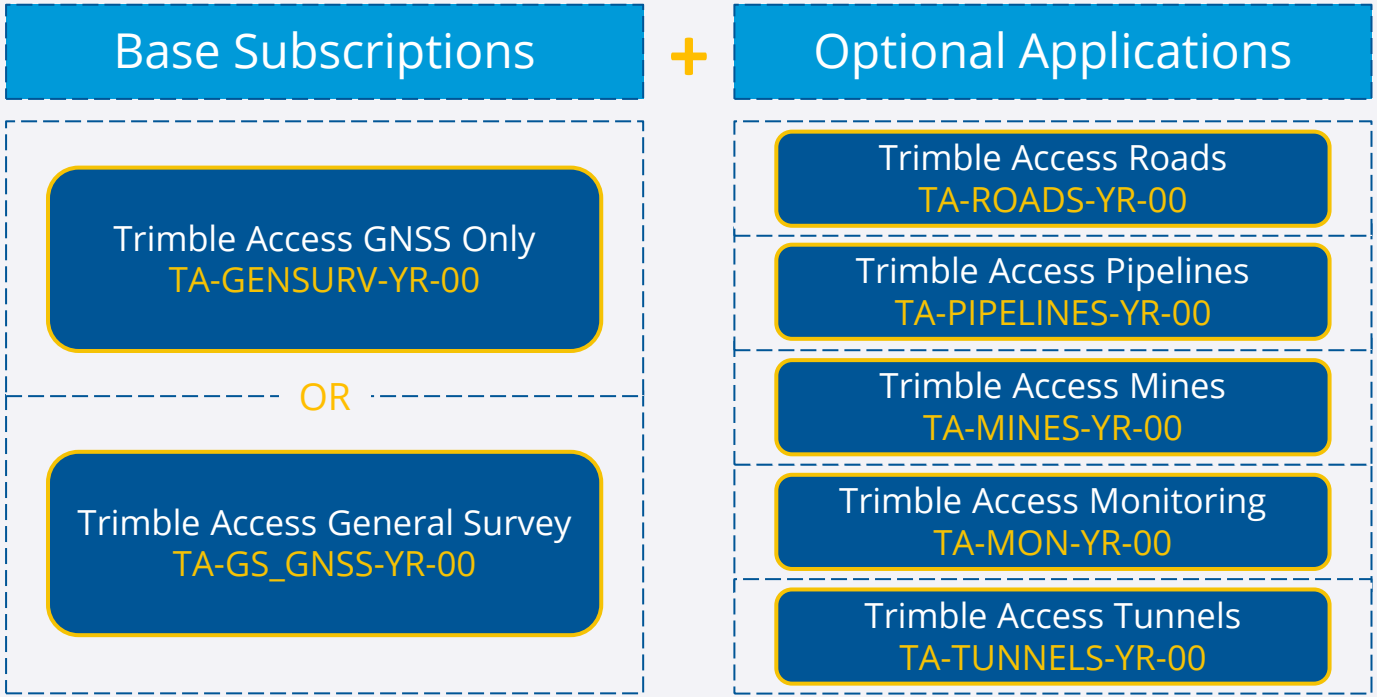
Mines
Survey and report on mine operations with workflows for specific tasks such as auto staking lines and positioning drilling rigs within a mine.
How to Buy ›

Tunnels
Define, survey, stakeout, and report on tunnel operations in an easy to use interface for tasks such as marking areas of underbreak and overbreak, and positioning machinery.
How to Buy ›

Monitoring
Set up, monitor and report on regular control and deformation surveys. The workflow is streamlined for regular, but not necessarily continuous, control and deformation surveys.
How to Buy ›

Trimble Access Subscription

Annual Subscription Part Numbers



Trimble Access Annual Subscription Pricing and PNs | All Regions

Trimble Access Subscription Resources

PARTNER CONFIDENTIAL - DO NOT SHOW OR USE WITH CUSTOMERS

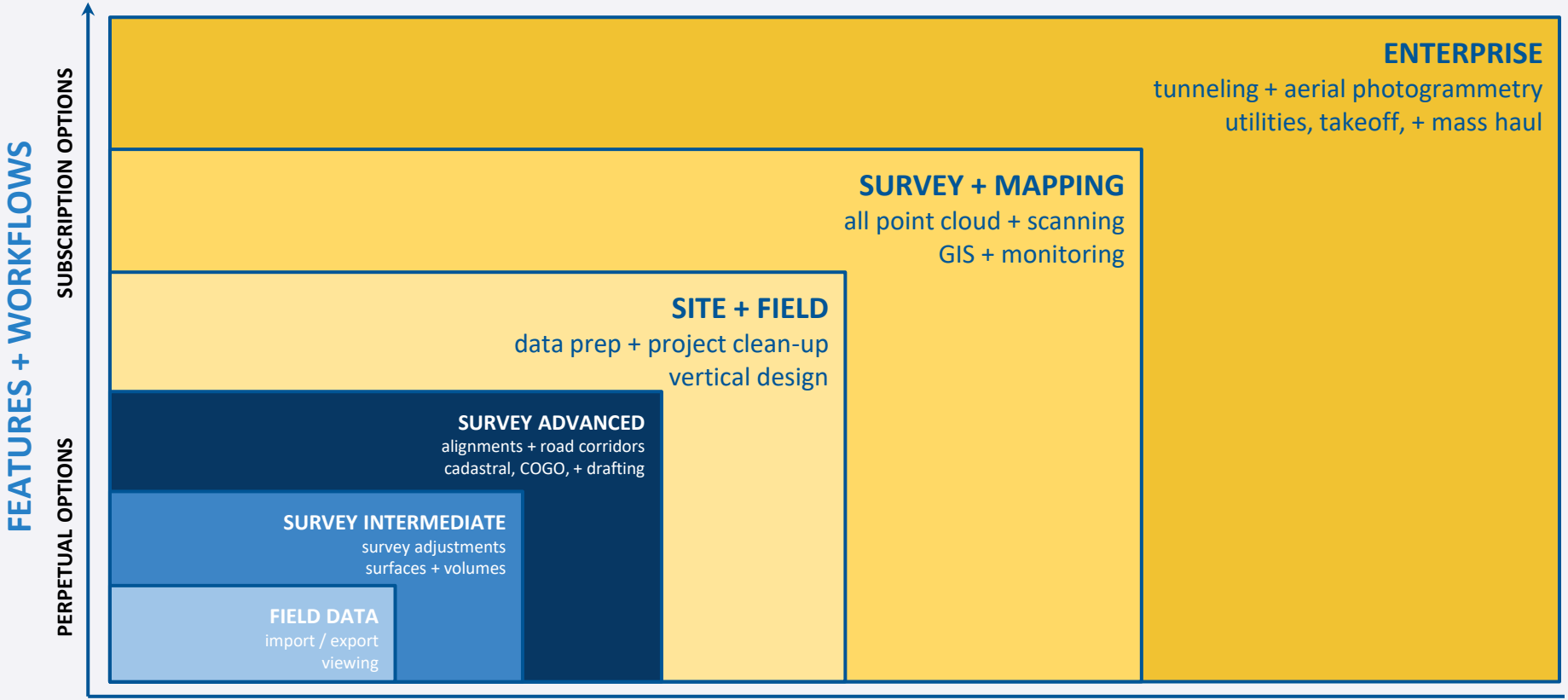
- TBC + Trimble Access Partner FAQs **BULLETIN**
- TBC + Trimble Access Subscriptions for Existing Customers **BULLETIN**
- TBC + Trimble Access Subscriptions Renewals **BULLETIN**
- Trimble Access Annual Subscription Part Numbers Effective for 2020.20

PUBLIC

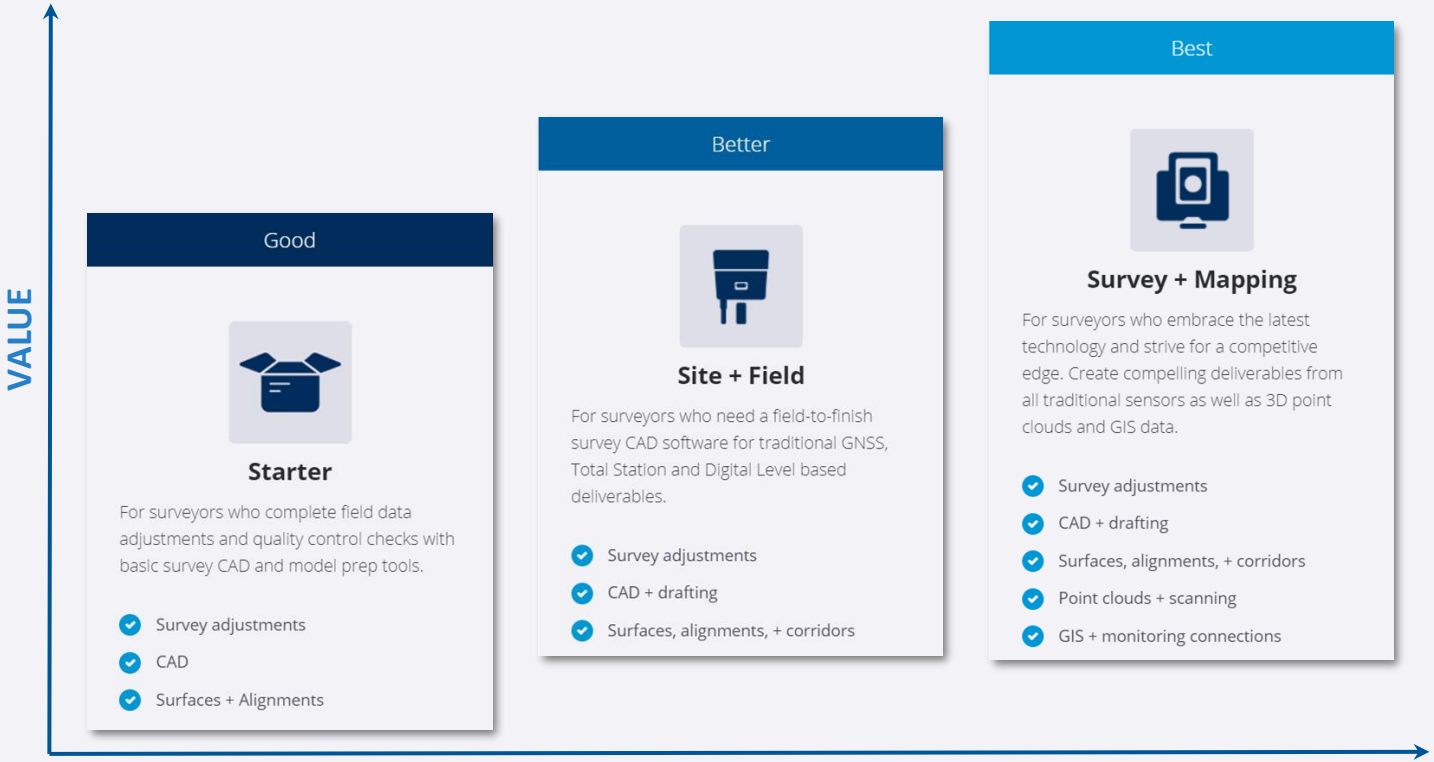
- Trimble Access Customer End-User License Agreement (EULA)
- TBC + Trimble Access Customer FAQs **BULLETIN**

Trimble Business Center

Subscription + Perpetual Equivalencies



Trimble Business Center Core Offerings



[Trimble Business Center | Subscription Plans]

Site + Field Subscription Edition

CHOOSE FOR:

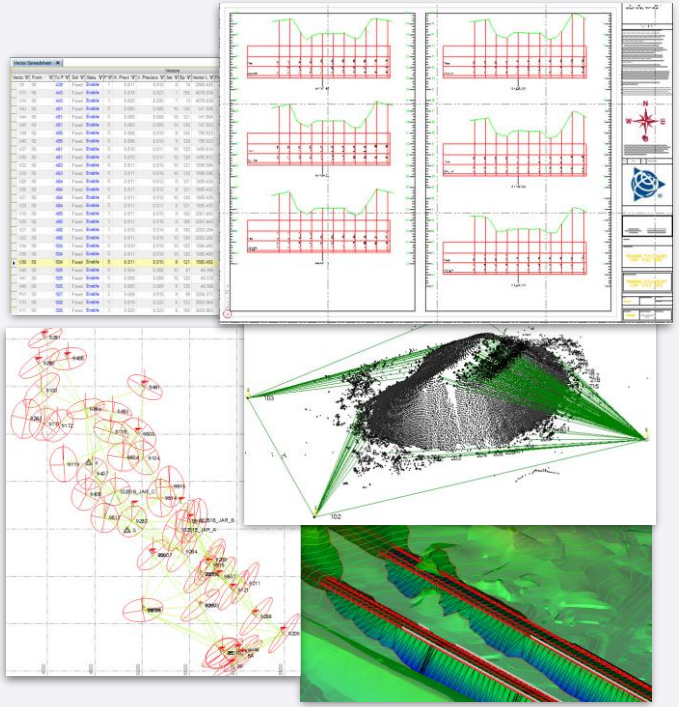
- Survey adjustments
- CAD + drafting
- Surfaces, alignments, + corridors

TARGETED CUSTOMER:

- Small + medium-sized survey firms

PERPETUAL EQUIVALENT:

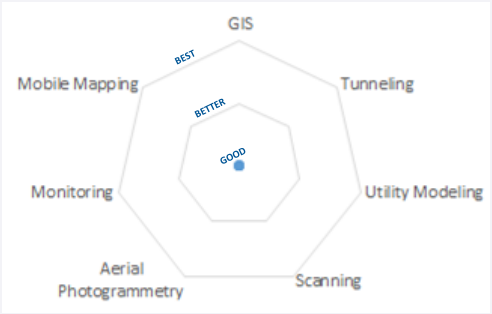
HIGHLIGHTS:



CORE FEATURES:

triangulated surfaces
digital cross-sections
CAD COMMAND LINE
gnss baseline processor
tolerance flags
feature coding
PLAN SETS
least-squares adjustment
dxf export
cadastral

SPECIALTY FEATURES:



Survey + Mapping Subscription Edition

CHOOSE FOR:

- Survey adjustments
- CAD + drafting
- Surfaces, alignments, + corridors
- Point clouds + scanning
- GIS + monitoring connections

TARGETED CUSTOMER:

- medium + large-sized multi-disciplinary survey firms

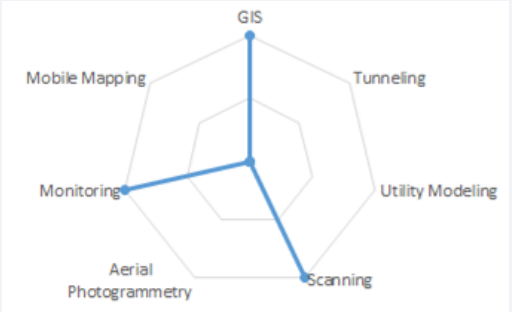
PERPETUAL EQUIVALENT:

HIGHLIGHTS:

CORE FEATURES:

field-to-finish
survey adjustments
monitoring workflows
point + linear feature extraction
SCAN REGISTRATION + GEOREFERENCING
PUBLISH TO ESRI
cutting plane
projected surfaces
point cloud classification
use gis schema

SPECIALTY FEATURES:



Enterprise Subscription Edition

CHOOSE FOR:

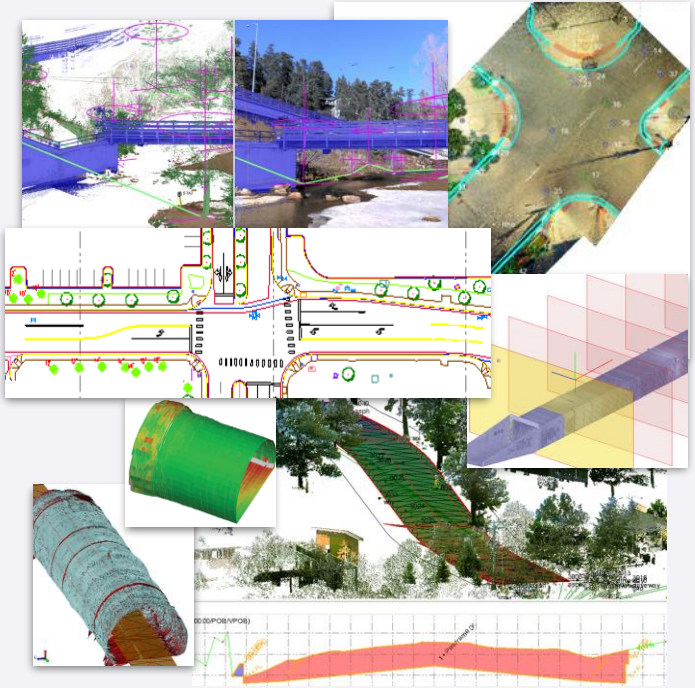
- Survey adjustments
- CAD + drafting
- Surfaces, alignments, + corridors
- Point clouds + scanning
- GIS + monitoring connections
- Tunneling + utility workflows
- UAV data processing

TARGETED CUSTOMER:

- medium + large-sized multi-disciplinary survey + construction firms

PERPETUAL EQUIVALENT:

HIGHLIGHTS:



CORE FEATURES:

3D data + ifc models
survey vertical applications
point + linear feature extraction
earthwork summary reports
survey adjustments **CORRIDORS**
comprehensive data integration
tunnel meshes SINGLE SOFTWARE
monitoring workflows

SPECIALTY FEATURES:

Trimble Business Center
Speciality Offerings

Aerial Photogrammetry

For surveyors and remote pilots who create deliverables from unmanned aerial vehicles (UAVs).

- Survey adjustments
- CAD + drafting
- Surfaces, alignments, + corridors
- UAV data processing

Construction

For civil construction and earthworks professionals who generate machine control models, accurate quantity takeoff reports, digitized PDFs, and roadway cross-sections.

- CAD + drafting
- Surfaces, alignments, + corridors
- Data prep + machine control
- Quantity takeoffs + mass haul analysis
- Parametric roadway + utility modeling

Mobile Mapping

For surveyors and mapping specialists who process data and generate deliverables from Trimble mobile mapping solutions to integrate with traditional survey sensors.

- Survey adjustments
- CAD + drafting
- Surfaces, alignments, + corridors
- Point clouds + scanning
- GIS + monitoring connections
- Trimble MX9 processing

Aerial Survey Subscription Edition

CHOOSE FOR:

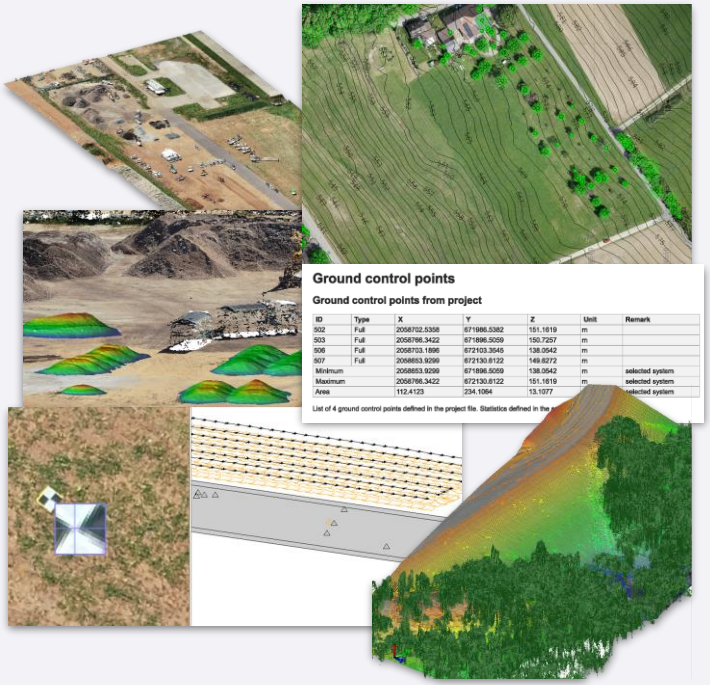
- Survey adjustments
- CAD + drafting
- Surfaces, alignments, + corridors
- Point clouds + scanning
- UAV data processing

TARGETED CUSTOMER:

- UAV survey + remote pilots

PERPETUAL EQUIVALENT:

HIGHLIGHTS:



CORE FEATURES:

tie-point adjustments

uasmaster

UAV + survey data integration

digital surface model rasters

ADJUSTMENT REPORTS

point cloud generation

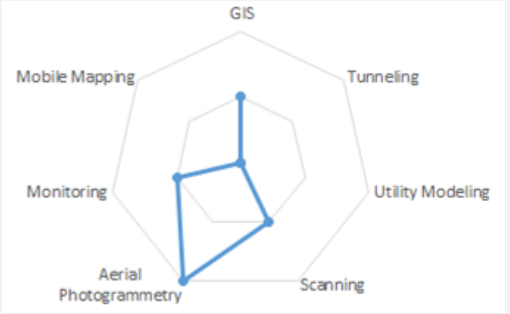
survey-grade with GCPs

ground extraction

ORTHOMOSAICS

DJI, delair, sensefly, wingtra

SPECIALTY FEATURES:



Construction Subscription Edition

CHOOSE FOR:

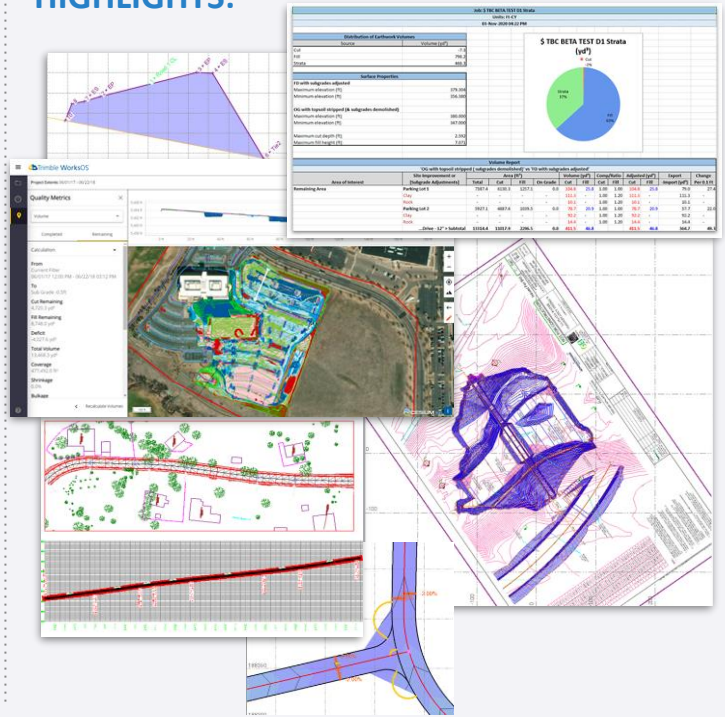
- CAD + drafting
- Surfaces, alignments, + corridors
- Data prep + machine control
- Quantity takeoffs + mass haul analysis
- Parametric roadway + utility modeling

TARGETED CUSTOMER:

- Civil construction + earthwork professionals

PERPETUAL EQUIVALENT:

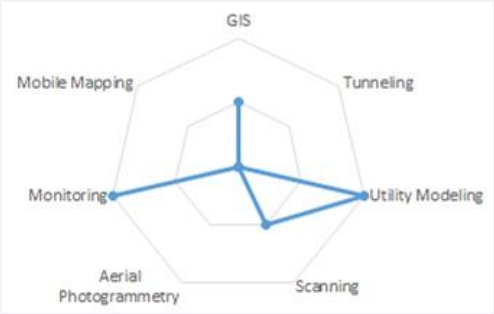
HIGHLIGHTS:



CORE FEATURES:

machine control
worksOS
CUSTOM TAKE-OFF REPORTS
PARAMETRIC INTERCHANGES + INTERSECTIONS
material + strata layers
site improvements
vertical design + side slopes
data prep + site modeling
digitize cross-sections
pipe + trench modeling

SPECIALTY FEATURES:



Mobile Mapping Subscription Edition

CHOOSE FOR:

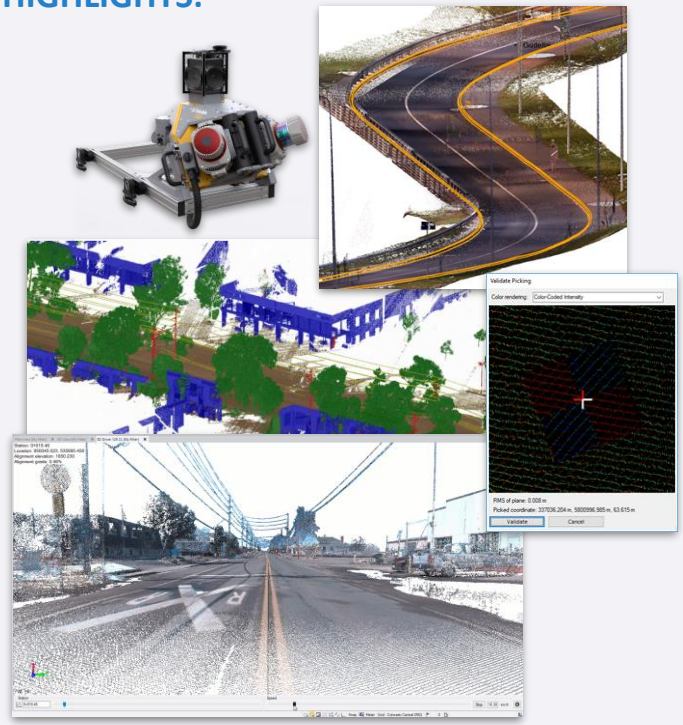
- Survey adjustments
- CAD + drafting
- Surfaces, alignments, + corridors
- Point clouds + scanning
- GIS + monitoring connections
- Trimble MX9/MX50 processing

TARGETED CUSTOMER:

- MX9/MX50 + mapping specialists

PERPETUAL EQUIVALENT:

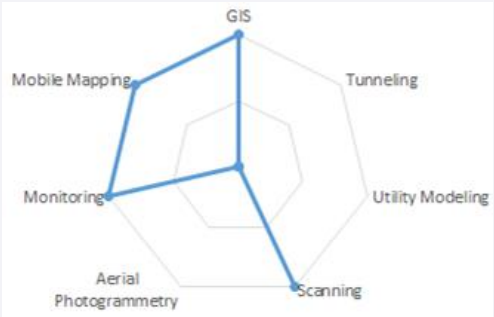
HIGHLIGHTS:



CORE FEATURES:

batch registration
feature extraction
generate PFIX
PROCESS MX9/MX50 DATA
smart pick registration
export to topoDOT
IMPORT SBET
export to TMX
MTA adjustment
split runs

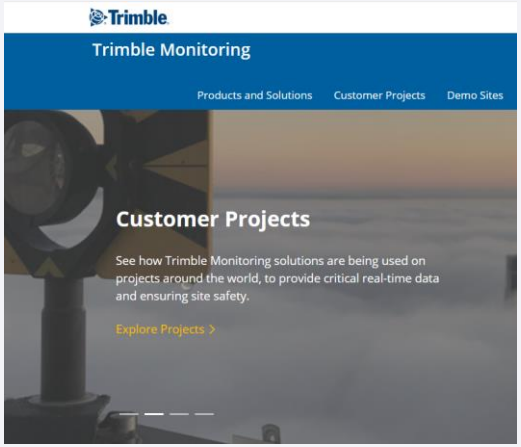
SPECIALTY FEATURES:

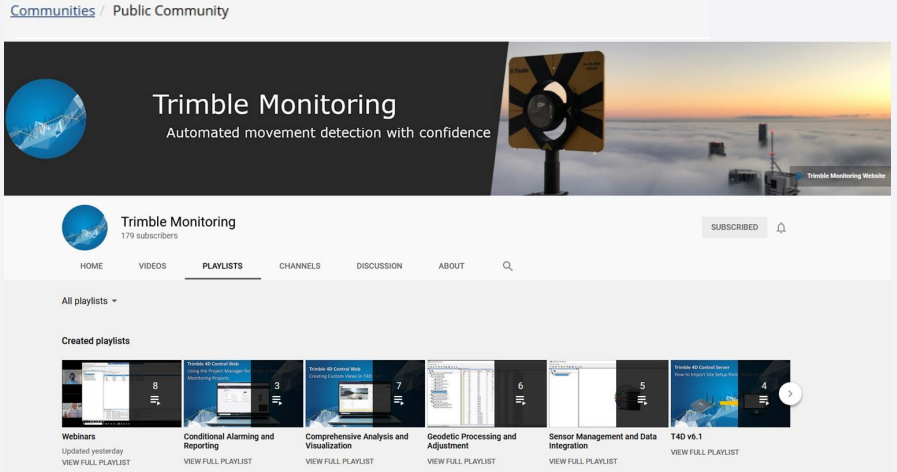


05

Resources

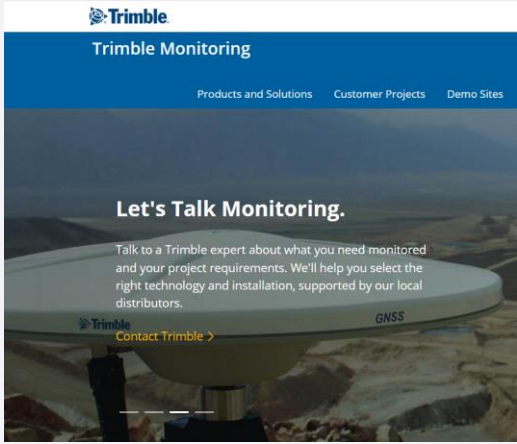
- Monitoring Website
- Monitoring Community
- Resource Center
- Power Hours
- Trimble Access Tech Tips
- YouTube Channel

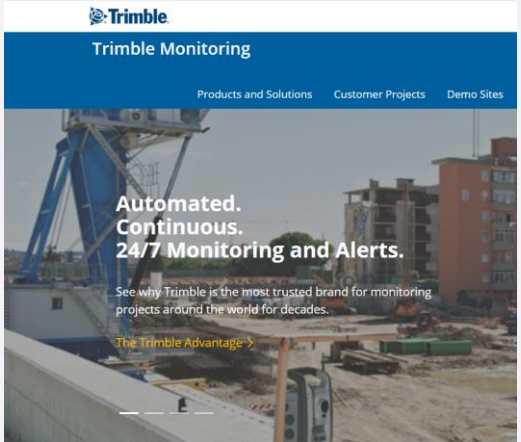


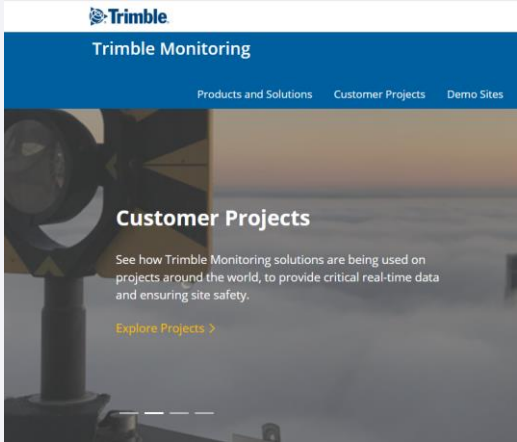


Monitoring Website

- Monitoring.Trimble.com
  One dedicated website for Trimble Monitoring
- Project examples and success stories
- Live automated monitoring demo sites in action
  - Useful for Sales Demos and customer presentations

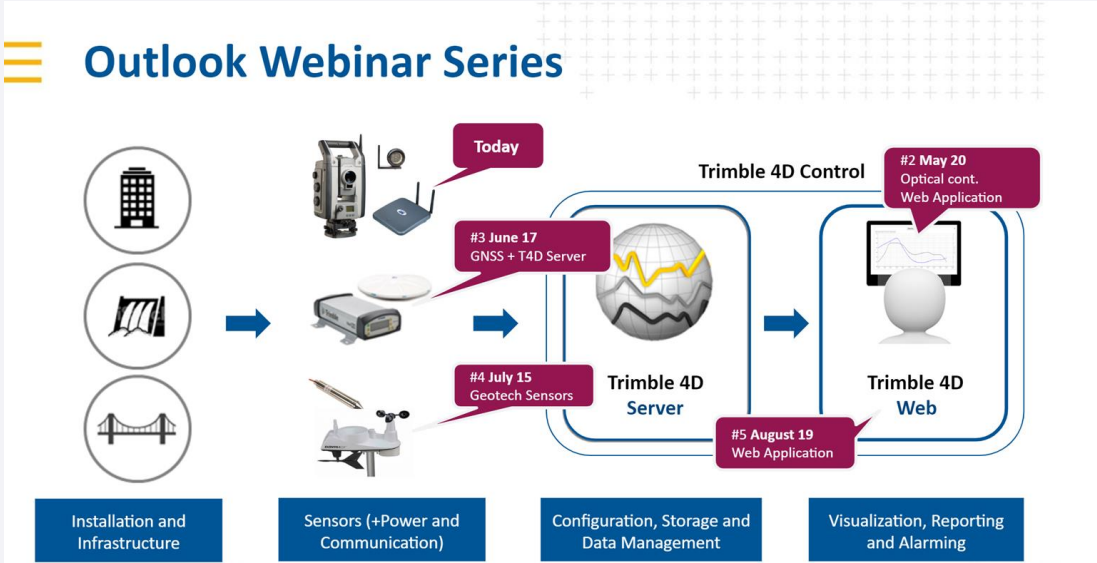






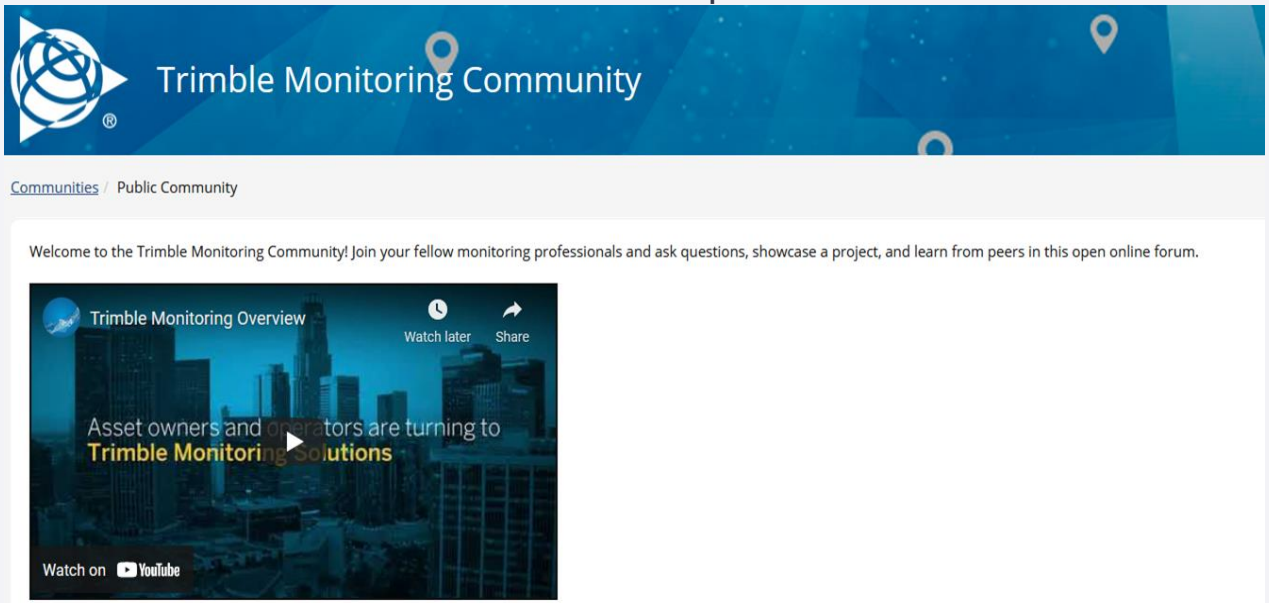
Monitoring Power Hour Webinar Series

- Moving to Project/Customer specific webinars
- Every 3rd Wednesday of the month
- Recordings available on [Geospatial website]
- Professional and Industry
- Technical and How-To



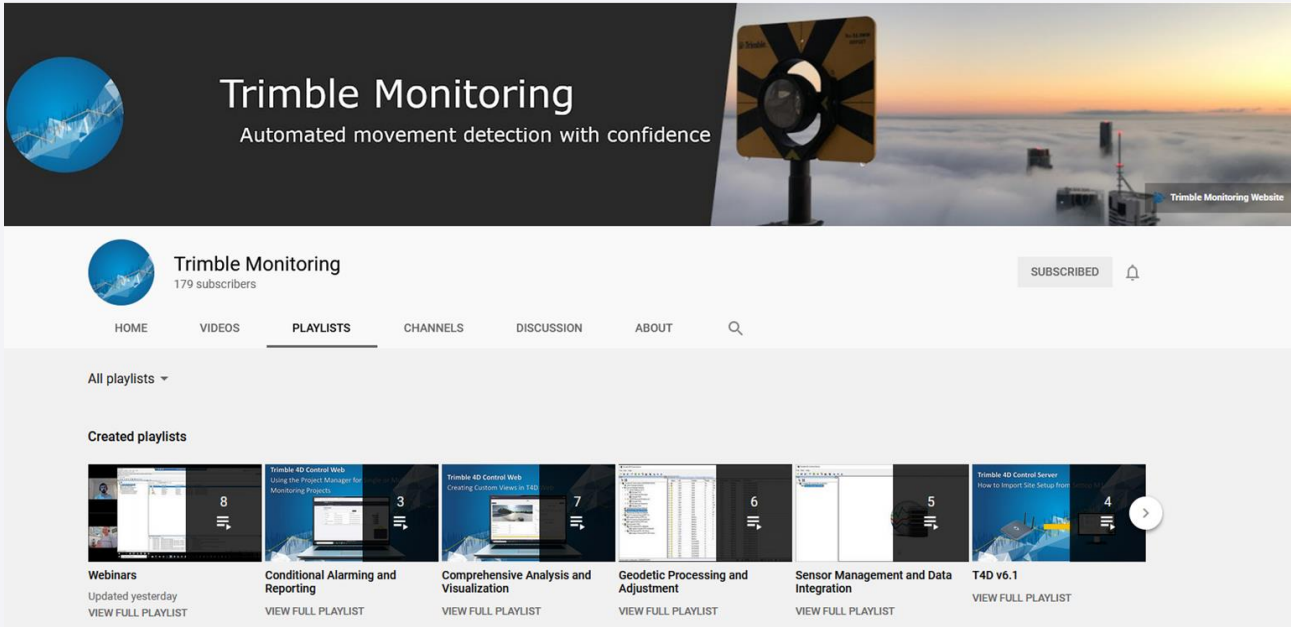
Monitoring Trimble Community

- Monitoring Trimble Community
  - Customer resource and engagement
  - Trimble Team monitors questions



Monitoring YouTube Channel

- YouTube Channel **Subscribe Now!**
  - Tutorials and How-To
  - 53 videos



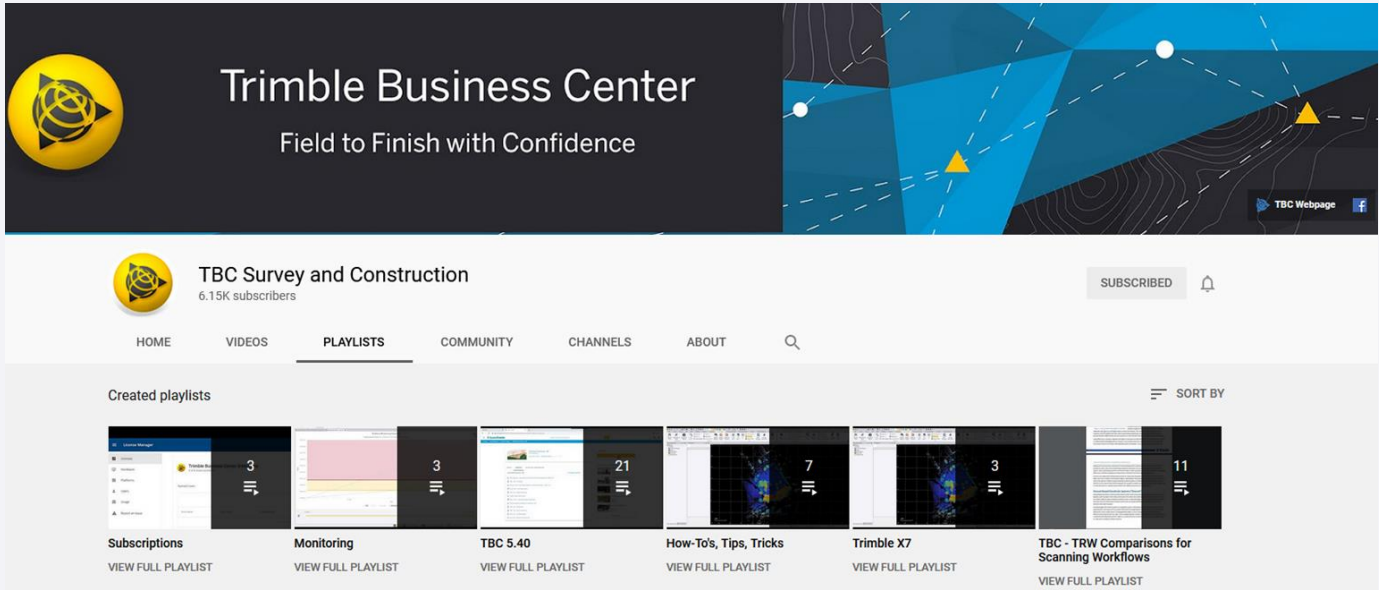
Trimble Access YouTube Channel

- YouTube Channel **Subscribe Now!**
- Trimble Access Tech Tips

Trimble® Access™ Tech Tips

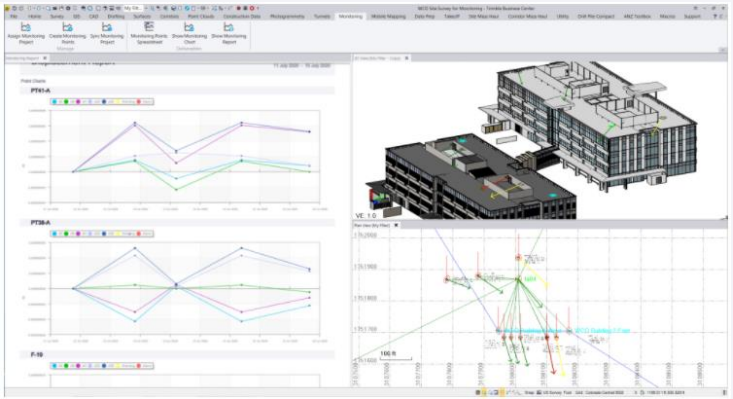
Trimble Business Center YouTube Channel

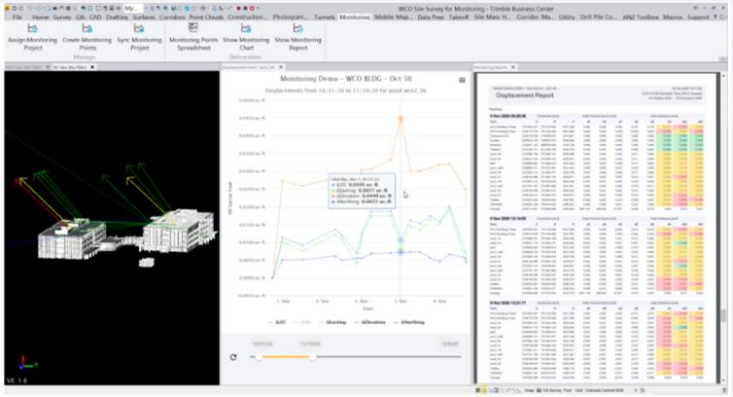
- YouTube Channel **Subscribe Now!**
  - Tutorials and How-To
  - 300+ videos



Building Deformation Monitoring using Integrated Survey

- Resource Center - Sample Datasets
  - Utilizing the new Trimble Business Center Monitoring module, the same points were collected at three different epochs to monitor building deformation.
  - Users will learn how to process and manage deformation monitoring data, and to generate comprehensive reporting.

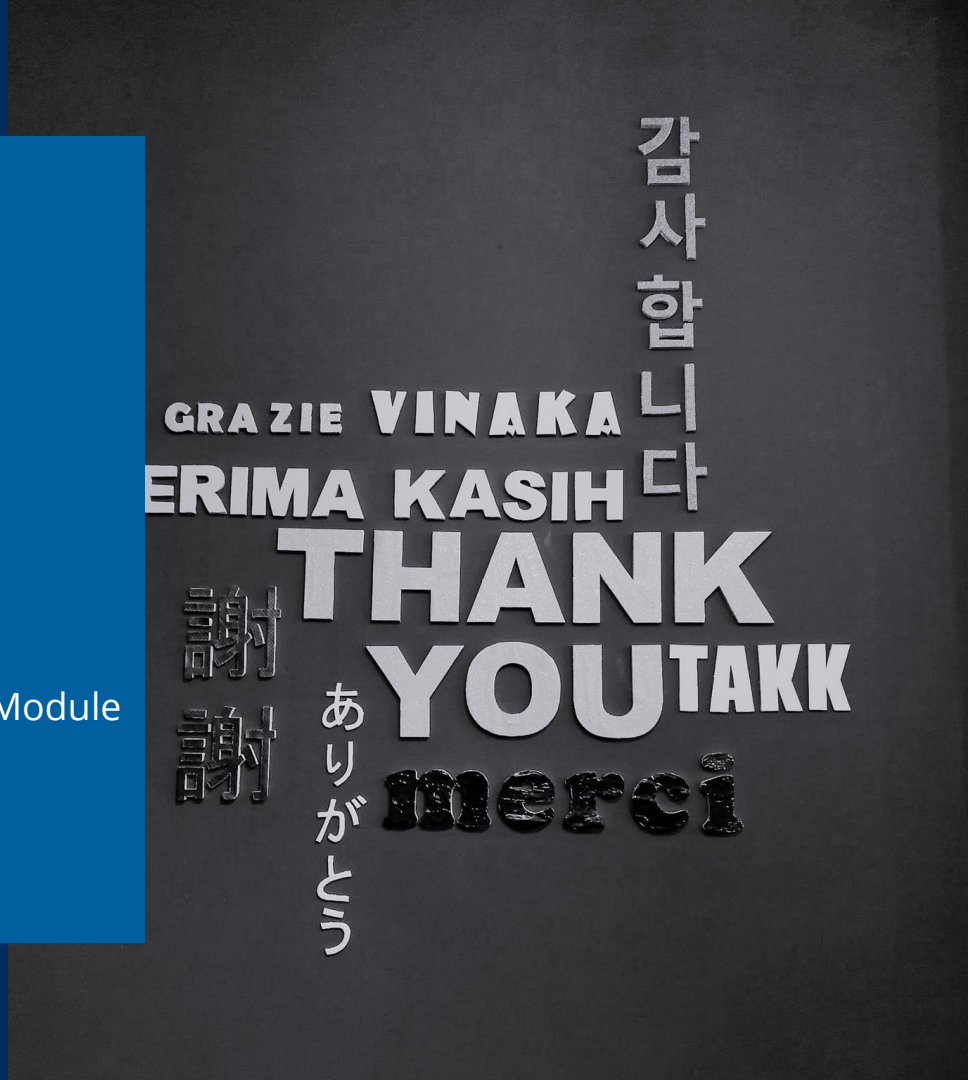




Thank You

Semi-automated Monitoring

- ✓ Trimble Access Monitoring App
- ✓ Trimble Business Center Monitoring Module



© 2021 Trimble, Inc - All Rights Reserved - Confidential and Proprietary Information