Trimble

4D CONTROL SOFTWARE

Comprehensive Monitoring Solutions

A monitoring installation lets you detect displacement or movement in natural and manmade structures. It provides the data you need to understand the speed, direction and magnitude of any motion. The software is the core of your monitoring project. It controls the measurements, manages and analyzes the data, triggers alarms, and provides decision support.

Trimble® 4D Control™ brings the latest technology to installations for monitoring and analysis. Trimble 4D Control provides advanced, easy to use functionality that fits a wide range of monitoring needs. The software is built on the PIVOT™ (Progressive Infrastructure via Overlaid Technology) concept which allows for rapid deployment, simplified configuration, comprehensive reporting and real-time alarms.

- Attract new clients and new business by providing monitoring services.
- Create comprehensive monitoring systems using GNSS receivers, optical total stations and geotechnical sensors.
- Enhance and customize your monitoring capability to address a wide range of applications.
- Measure, analyze, visualize and report on your monitoring projects.
- Manage your system and view results from remote locations.

FLEXIBLE MONITORING SOLUTIONS FOR DEMANDING NEEDS

Trimble 4D Control lets you create monitoring solutions for a variety of projects. The flexible workflow makes it easy to put your monitoring system into action:

- Mining – Trimble monitoring solutions can be used in open pit and underground mines for monitoring highwalls, tunnels, subsidence and stockpiles.
- Construction – Monitor motion in buildings and structures adjacent to construction sites. You can monitor cut and fill slopes and incomplete structures.
- Engineering – Track the motion of dams, bridges, buildings and other man-made structures.
- Transportation – Monitor transportation structures, cut and fill slopes and railways. You can also monitor structures close to transportation corridors during construction and operation.
- Utilities – Monitor pipelines, transmission structures, production and storage facilities.
- Tunneling – Monitor new and existing tunnels for deformation. Monitor for surface subsidence above tunneling projects.
- Geotechnical – Monitor dams and levees, landslides, landfills, subsidence, faults and natural structures.

MODULAR SOFTWARE DELIVERS POWER AND EASE OF USE

Trimble 4D Control uses modern software architecture to create a solution that is robust, productive and easy to manage. Tightly integrated systems of sensors, communications and computations ensure consistent operation and seamless data flow.

Trimble 4D Control is designed to grow with your business. The scalable software allows you to add instruments, sensors and functionality as your needs change and expand.

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TRIMBLE 4D CONTROL SOFTWARE HANDLES THE WORK FOR YOU

With high-level functions for visualisation, analysis and alerting, Trimble 4D Control gives you the information when and where you need it. Fully automatic operation eliminates frequent site visits or operator interaction.

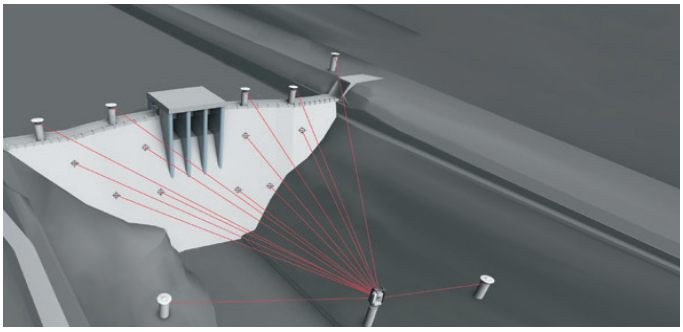
Complete Sensor Management

Trimble 4D Control manages all of your sensors. It measures and stores the data according to schedules that you define.

Trimble GNSS 	Trimble GNSS provides continuous high precision measurements and rapid updates to monitor over long distances. Compact and rugged, the Trimble NetR9 GNSS Reference Receiver is capable of tracking all existing and planned GNSS signals.
Trimble S8 Total Station 	Trimble 4D Control provides support for the Long-Range Trimble S8 for precise monitoring of points up to 2,500 meters away. You also can conduct scheduled, automated calibration of the compensator on the Trimble S8.
Trimble REF TEK Sensors 	Trimble 4D Control supports peak acceleration using REF TEK hardware, storing the data in the Monitoring database. Trimble 4D also supports a broad array of 3rd-party geotechnical and meteorological sensors.

Automated Measuring 24/7

With Trimble 4D Control you can define groups of points to be measured and schedules for observation. For optical measurements, you can simply 'train' the system by aiming the Trimble S8 Total Station to each point when setting up your project. The system then automatically measures to the points according to schedules that you have defined. For GNSS monitoring, you can control measurement intervals, cutoff angles and other parameters used in processing the GNSS data. For maximum flexibility, Trimble 4D Control lets you choose among different GNSS processing techniques to ensure the best results for your monitoring project. Trimble 4D Control collects and manages data from geotechnical sensors to provide complete monitoring functionality.



ADVANCED DATA ANALYSIS AND VISUALIZATION

Trimble 4D Control contains sophisticated tools to analyze your data. At the core are Trimble's cutting-edge algorithms for network deformation analysis. Trimble 4D Control provides detailed evaluation of your data and highlights points that are moving. You can identify random or systematic measurement errors and spot movement in your points. Trimble 4D Control helps you see cyclic movement as well as sudden or unexpected changes in your project.

Visualization tools in Trimble 4D Control provide a versatile overview of your monitoring network. Trimble's rigorous computations and powerful graphics let you conduct analyses of complex structures and motion.

PROFESSIONAL MONITORING MADE EASY WITH TRIMBLE 4D LITE

Many monitoring projects do not require continuous measurements. With Trimble 4D Lite, surveyors, engineers, scientists and others can visit projects periodically, collect data and display and analyze the data without the need for a complex real time monitoring system. T4D Lite is a cloud-based web application designed with the same advanced web interface and back-end stability that you have come to expect with Trimble 4D Control, with the advantage that this is available for the analysis of any form of data time series.

www.t4dlite.com

- Inspect the entire network at a glance and use color-coded information to highlight motion or changes.
- Select specific points for detailed inspection and see charts showing the displacement of the points over time.
- Use Trimble 4D Control analysis functions to combine data from multiple sensors in a single chart.

With Trimble 4D Control you can define the direction of movement expected for each point. The point's motion is computed along or across this axis as well as in the vertical plane. It's a powerful tool in understanding the behavior of your monitoring project.

RESULTS AND ALERTS TO KEEP YOU INFORMED

Trimble 4D Control routines for alarm management can send messages and alerts when necessary. You can set the tolerances and conditions for alarms and tell the system who should be alerted. Trimble 4D Control sends alerts via e-mail and text messages to specified recipients.

Advanced users can also use SQL to retrieve raw data directly from the database. They can then conduct custom analysis using information collected and stored by the system. And you can use remote access and Trimble 4D Control Web to get up-to-the-minute information at remote locations.

WEB ACCESS TO YOUR MONITORING PROJECTS

Trimble 4D Control Web provides access to your monitoring system via a fast, feature-rich Web interface. Whenever you connect to the Internet, you can connect to Trimble 4D Control and view your project in real time.

- Powerful map and custom views let you see your project and quickly identify sensors and measurement points. The system can display status and measured data updates for each sensor. You can use aerial photos or other imagery to provide detail background information.
- Fast and easy charting lets you plot the results of individual points or sensors.
- Use Trimble 4D Control analysis functions to visualize information from monitoring sensors in chart or tabular forms. Trimble's rigorous computations and powerful graphics let you conduct analyses of complex structures and motion.
- Trimble 4D Control lets you link to project webcams. You can see your project in real time and make visual inspection from any location.
- Keep a project log of events and reminders. You can post manual or automated updates to the log and manage postings to meet stakeholders' needs.
- Manage alerts and alarms in secure environment. Trimble 4D Control Web lets you set conditions for issuing alerts and messages. You can define individuals or groups of stakeholders to receive updates via email and text messages.
- Controlled access to specified stakeholders keeps your information secure. You can assign different access levels to ensure information is available only to those who need it.

HIGH RISE APP

The High Rise App is intended for monitoring of high-rise structures during construction using GNSS and inclination sensors. The app delivers precise and reliable coordinates on demand.

TRIMBLE 4D CONTROL SITE SETUP APP

The Trimble 4D Control software supports full integration in a site setup. A user can now do a site setup standing next to instrument utilizing all communication layers (USB, Bluetooth, radio, etc.) including the video capabilities in the vision instrument. This allows the user to create, enhance and modify a site setup and import the job into the software.

SEISMOGEODETIC APP

The SeismoGeodetic App in Trimble 4D Control allows for strong motion and high frequency data to be integrated into the software. This allows for the combined processing of accelerometer and GNSS data using a Kalman filter to deliver the below features:

- Data processing in Real-time and Postprocessing engines.
- REF TEK's MRF and PASSCAL integration for full support of all REF TEK products.
- Advanced alarming.
- ERYO version 2.21 data storage and data streaming.
- Peak detection and database storage.
- Web visualization of high frequency data.
- Integrated storage for high frequency data.

TECHNICAL NOTES

NORTH AMERICA
Trimble Navigation Limited
935 Stewart Drive
Sunnyvale
California 94085
USA
1-888-879-2207 (Toll Free)
+1 720-887-6100 Phone
+1 720-887-6101 Fax

EUROPE
Trimble Germany GmbH
Am Prime Parc 11
65479 Raunheim
GERMANY
+49-6142-2100-0 Phone
+49-6142-2100-550 Fax

ASIA-PACIFIC
Trimble Navigation
Singapore Pty Limited
80 Marine Parade Road
#22-06, Parkway Parade
Singapore 449269
SINGAPORE
+65-6348-2212 Phone
+65-6348-2232 Fax

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