



TERRAWEB

DATA MANAGEMENT SYSTEM

REAL TIME MONITORING DATA 24 x 7 AT FINGERTIPS
SINGLE PLATFORM FOR COMPREHENSIVE DATA | EARLY WARNING
MULTIPLE SITES/CHARTS ON SAME PAGE FOR EASY DECISION MAKING



INTRODUCTION

The heart of any online monitoring instrumentation system is effective and powerful data management. Encardio-rite offers TerraWeb, a web based real time automated monitoring system that collects data from multiple sensors used in geotechnical, geophysical, environmental, hydroelectric, structural, mining and landslide applications. It is an advanced data management system that can store data from different sources and process large amount of data to provide meaningful data for risk management at your fingertips, 24 x 7, with automated alarms.

FEATURES

- Save time and money by automatic processing of data
- Single data portal for project data
- Supports data from various dataloggers and sensors
- Data presentation in graphical as well as tabular form.
- Offers web service/cloud hosting that enables user to monitor project instrumentation data remotely from an internet connected computer
- Real time display. Users can view the data and alarm status in real time
- Data access to multiple authorized users at different locations simultaneously
- Can run on customer's server, giving full control of the system
- Automatically checks for alarms. Two alarm limits can be set by the site administrators
- Can be programmed to send SMS and email alert messages to selected users
- Intuitive and user friendly. Can be customized.



OVERVIEW

Advanced data-management platform for comprehensive data

Terraweb is a web based monitoring platform where we can see maps, charts and data of surveying points and geotechnical instruments of a monitoring project. It has powerful tools for retrieving data from remote data loggers (which can geographically spread over large area), archiving data in a SQL database, performing required calculations on data and presenting the processed data in tabular and most suitable graphical forms for easy interpretation and generating alarm messages.

Terraweb can accept input from a wide variety of dataloggers such that the user has an easy access to all the information on a single platform for risk management, evaluation, interpretation and decision-making. It also accepts manual monitored data, images, diagrams, drawings, etc.

Terraweb offers Google Map navigation, graphical navigation, expandable graphs giving a quick view of all the monitoring data.

Meaningful project information 24 x 7

Terraweb aims to give immediate view of the situation of any civil engineering project, asset, infrastructure, mine, high rise building, landslide area etc. It is a complete management solution for monitoring construction with topographical, geotechnical and environmental sensors.

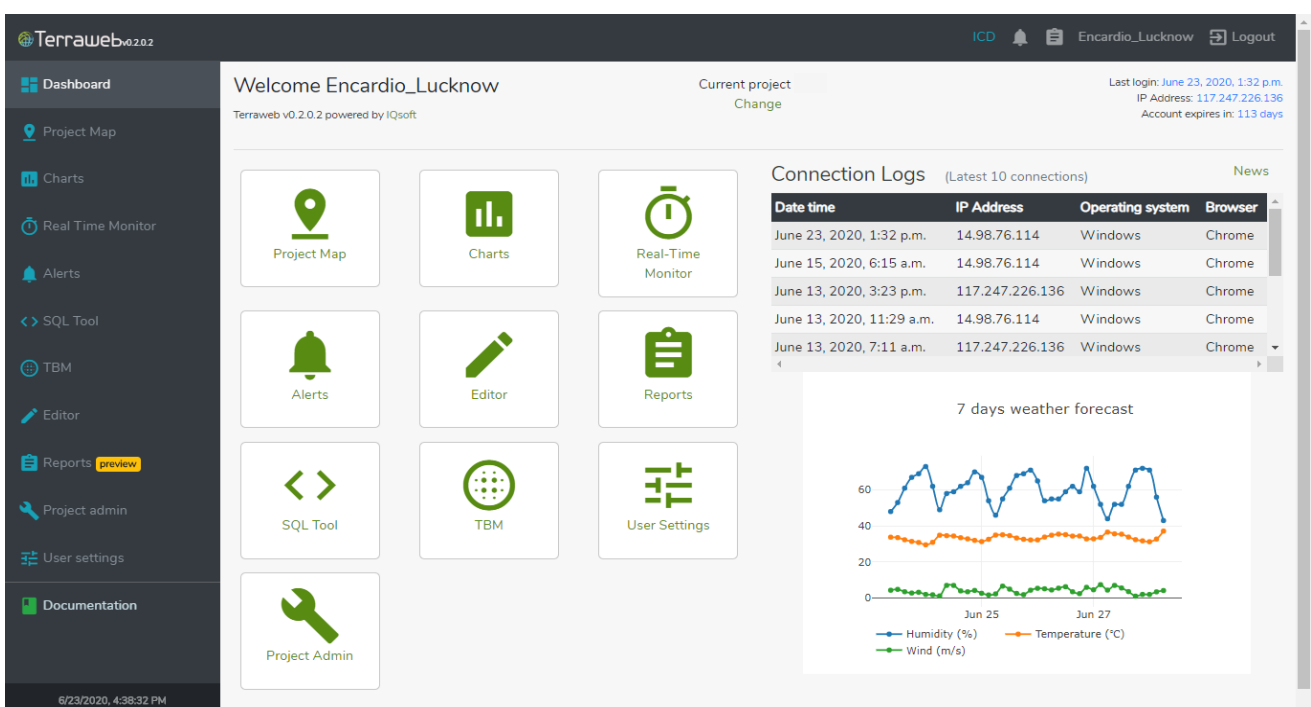
Site location, meaningful instrumentation data is available at a mouse click to monitor performance of project in real time, with instant warnings.

The early warnings help in taking timely corrective actions to prevent damages/delays and in reducing operational costs.

Terraweb is hosted on a reliable secure cloud server. IT can also be hosted on user's server. Data is made available to multi users 24x7 with very low downtime in customer specific graphical and tabular form. User can view the logged data or report using any convenient web browser. They can monitor multiple projects and databases from their single account.



Geotechnical, Geodetic near real time data monitoring, in correlation with TBM data, for Gold Line, Doha Metro, Qatar



Dashboard view of Terraweb database system



Scalable & intuitive

Terraweb is scalable to meet any project size, small or large. It can support multiple dataloggers per project site, which spreads out over a wide geographical area.

Terraweb is well suited for long term monitoring requirements, even after construction is over.

Using an intuitive interface, it only takes a few mouse clicks to configure data storage, data visualization and alarm settings as per user's requirement.

Project map section

Map view was built on the principal of the quick peek on a live map. Sensors are placed exactly where there are in the field, so users are able to get an idea of the whole project in a single view, get an idea about what is happening in each sensor, get some quick access to the diagrams, etc.

From the Project map section the user can view the displacement vectors of the overall movement of the points as well as the deformation contours. The user can also view the features above in time series animation.

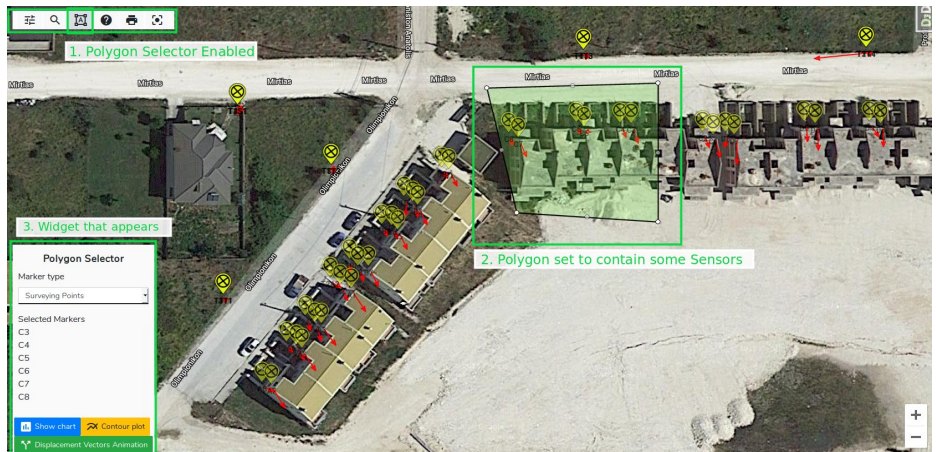
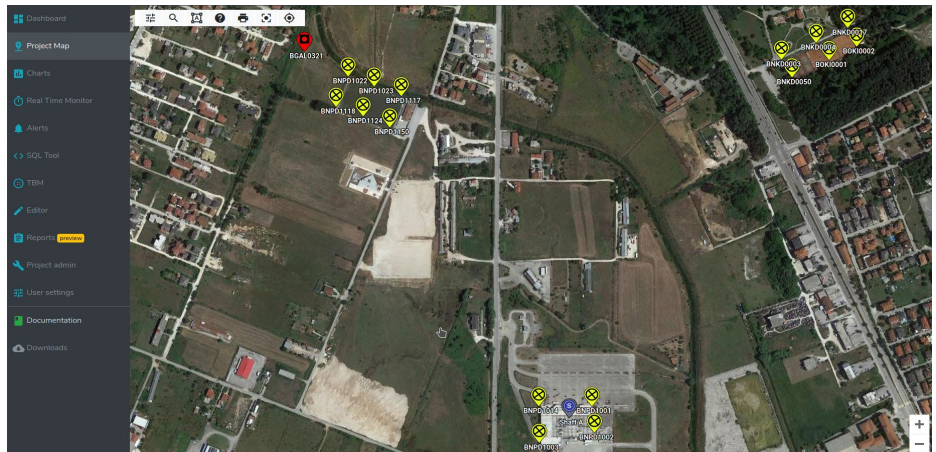
Editor

Editor is the section where authorised users (with editing privileges) can import data manually, view the data, calculate, project or edit them.

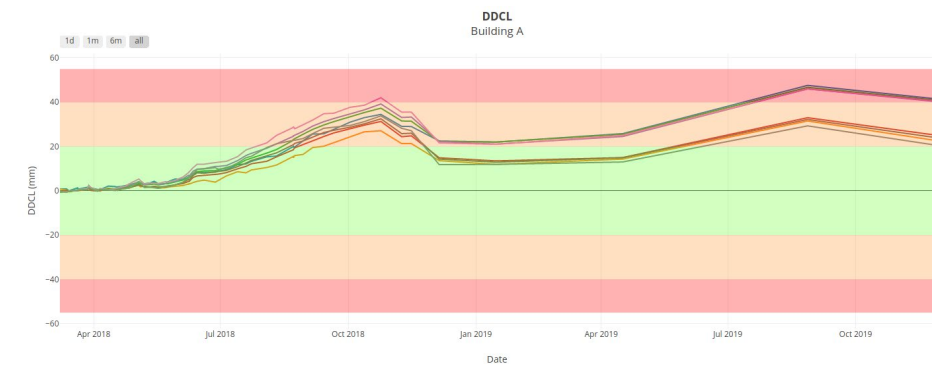
Alerts

Terraweb provides instant alerts. Specified users can receive real time alerts via e-mail or SMS for measurements that have exceeded reference/alert or alarm limits.

The alerts happen in two steps. Step 1 is when the project moderators receive the alert, decide whether it is an actual alert or just a false measurement.



By clicking on a point in the Project Map the user can see information about the instrument, as well as open the measurement chart



Charts (graphs)

Filter	Group by	Column Selector	Import	Export												
State	ID	Point ID	Point Name	Active	Date & Time	X	Y	Z	XTH	DCL	DH	Zero ID	Zero Date & Time	DX	DY	DZ
👁	2	1	A1	✓	2018-03-07 11:10:00	230858.6812	4390740.5651	481.1058	65.8591	16.95	1	2018-03-07T00:00:00	0.0002	-0.0009	0	
👁	3	2	A2	✓	2018-03-07 11:10:00	230858.5319	4390740.5441	475.3555	65.7452	16.8511	2	2018-03-07T00:00:00	-0.0001	-0.0009	0	
👁	4	3	A3	✓	2018-03-07 11:10:00	230851.929	4390732.7915	480.7697	55.5625	16.9591	3	2018-03-07T00:00:00	-0.0001	-0.0015	0	
👁	5	4	A4	✓	2018-03-07 11:10:00	230851.9385	4390732.9729	476.2089	55.7056	16.8473	4	2018-03-07T00:00:00	-0.0005	-0.0001	0	
👁	6	5	A5	✓	2018-03-07 11:10:00	230847.5231	4390727.7906	480.8251	48.8977	16.9182	5	2018-03-07T00:00:00	-0.0009	-0.0004	0	
👁	7	6	A6	✓	2018-03-07 11:10:00	230847.5683	4390727.9389	476.1095	49.0392	16.8549	6	2018-03-07T00:00:00	-0.0007	-0.0001	0	
👁	8	7	A7	✓	2018-03-07 11:10:00	230840.9605	4390720.1626	481.0273	38.8353	16.9748	7	2018-03-07T00:00:00	-0.0005	0.0006	0	
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👁	22	3	A3	✓	2018-03-12 12:45:00	230851.9291	4390732.7923	480.7679	55.5631	16.9587	3	2018-03-07T00:00:00	-0.0009	-0.0007	-	

Editor section



If it is an actual alert, project moderators redirect to the users interested (step 2). This helps in avoiding unnecessary alarms and panicking.

Real-Time

In the Real-Time section, the user has access to real time data. The viewing charts can be customised in order to host the desired visualization of the data to meet specific site or client's requirements.

Reports

The Reports option generates automated reports of specific elements based on a template that includes texts, charts, data tables and images. These reports are designed to be produced automatically on specific target dates set by a moderator of the project.

Site and parameters can be selected by user. Also, user can include the summary actions to be performed (average, max., min.), summaries update and alarm status. Reports can be exported as a delimited text file or in Microsoft excel format

Supported inputs

- Geotechnical sensors data
- Environmental sensors data
- Optical survey data- Level Points, 3D Points, Point Groups, Tunnel Points, Tunnel Sections, Deformation Groups, Vertical Shafts
- Input from 6 TBMs simultaneously
- Automatic as well as manual data
- Images, diagrams, layout drawings, manuals, calibration sheets in PDF, Word, Excel or jpeg/png formats.

Charts section

Charts view focuses on data visualization. The user can view charts (graphs) of the surveying points and the geotechnical sensors as well as the data table of each.

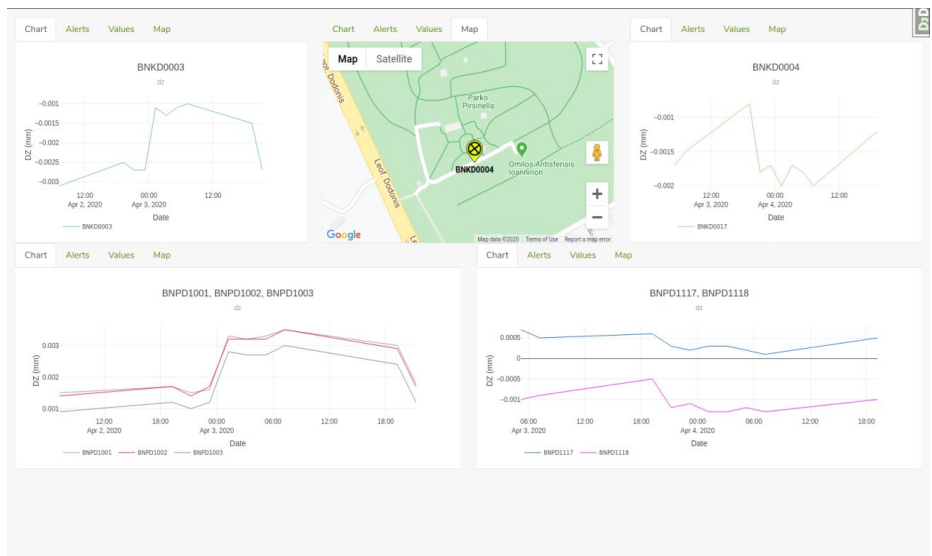
Alerts
From this page you can view and manage sensor alerts.

Alert Rules Refresh Alerts Auto update Reset filters

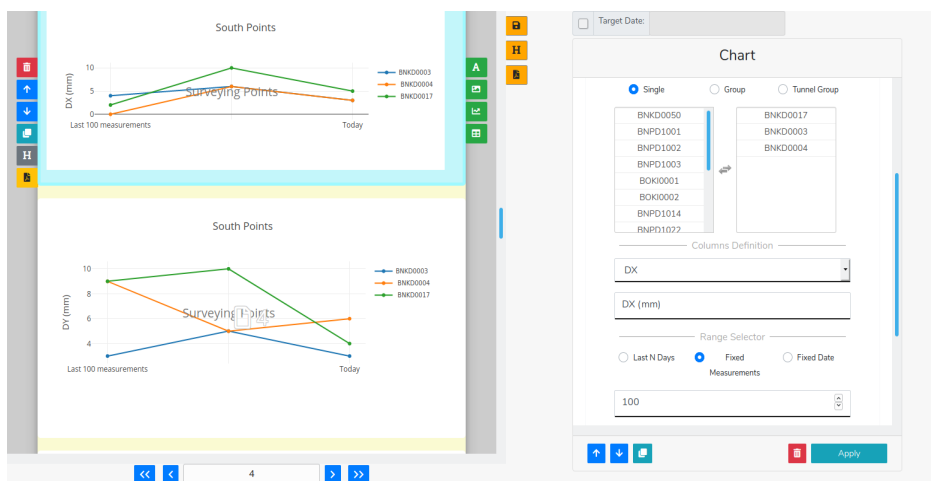
Date from 02/23/2018 Date to 03/24/2020 Alerts per page 100 Sort by Date Sort type Descending Page: 2

Type	Sensor	Field	Date	Value	Limit
REFERENCE	T1B6 Surveying Points	DY	2019-09-27 13:51:00 about 6 months ago	-0.0206	0.015
REFERENCE	T1B8 Surveying Points	DDCL	2019-09-27 13:51:00 about 6 months ago	0.0194	0.015
REFERENCE	T1B8 Surveying Points	DY	2019-09-27 13:51:00 about 6 months ago	-0.0234	0.015
REFERENCE	A4 Surveying Points	DX	2019-09-27 13:51:00 about 6 months ago	0.0216	0.015
REFERENCE	A4 Surveying Points	DZ	2019-09-27 13:51:00 about 6 months ago	-0.0216	0.015
ALARM	A5 Surveying Points	DDCL	2019-09-27 13:51:00 about 6 months ago	0.0501	0.035
ALERT	A5 Surveying Points	DX	2019-09-27 13:51:00 about 6 months ago	0.0313	0.025
ALARM	A5 Surveying Points	DY	2019-09-27 13:51:00 about 6 months ago	-0.0404	0.035
REFERENCE	A5 Surveying Points	DZ	2019-09-27 13:51:00 about 6 months ago	-0.0179	0.015
ALARM	A6 Surveying Points	DDCL	2019-09-27 13:51:00 about 6 months ago	0.0352	0.035
REFERENCE	A6 Surveying Points	DX	2019-09-27 13:51:00 about 6 months ago	0.0203	0.015
ALERT	A6 Surveying Points	DY	2019-09-27 13:51:00 about 6 months ago	-0.0303	0.025

Alerts section



Real-time data settings



Report preparation



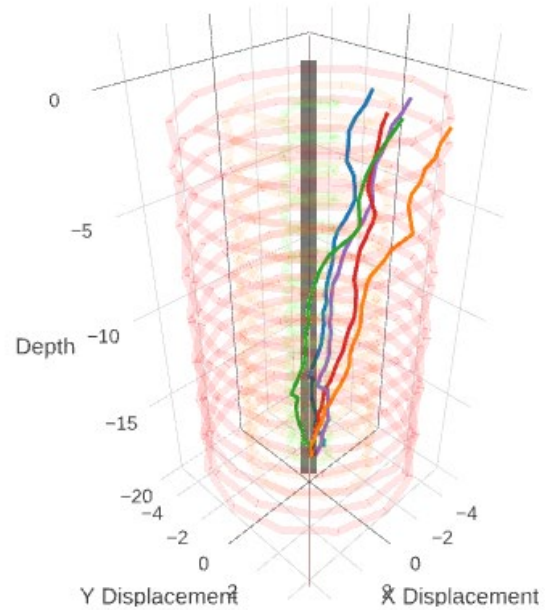
Inclinometer displacement charts can be viewed not only in conventional X and Y plots, but Terraweb also has option to view the change in inclinometer borehole profile in 3D (as shown in adjacent figure).

Combined charts

Terraweb can display combined charts/graphs of selected sensors. This features is very useful to analyze and correlate readings from two or more sensors within selected area, in case any variation is found.

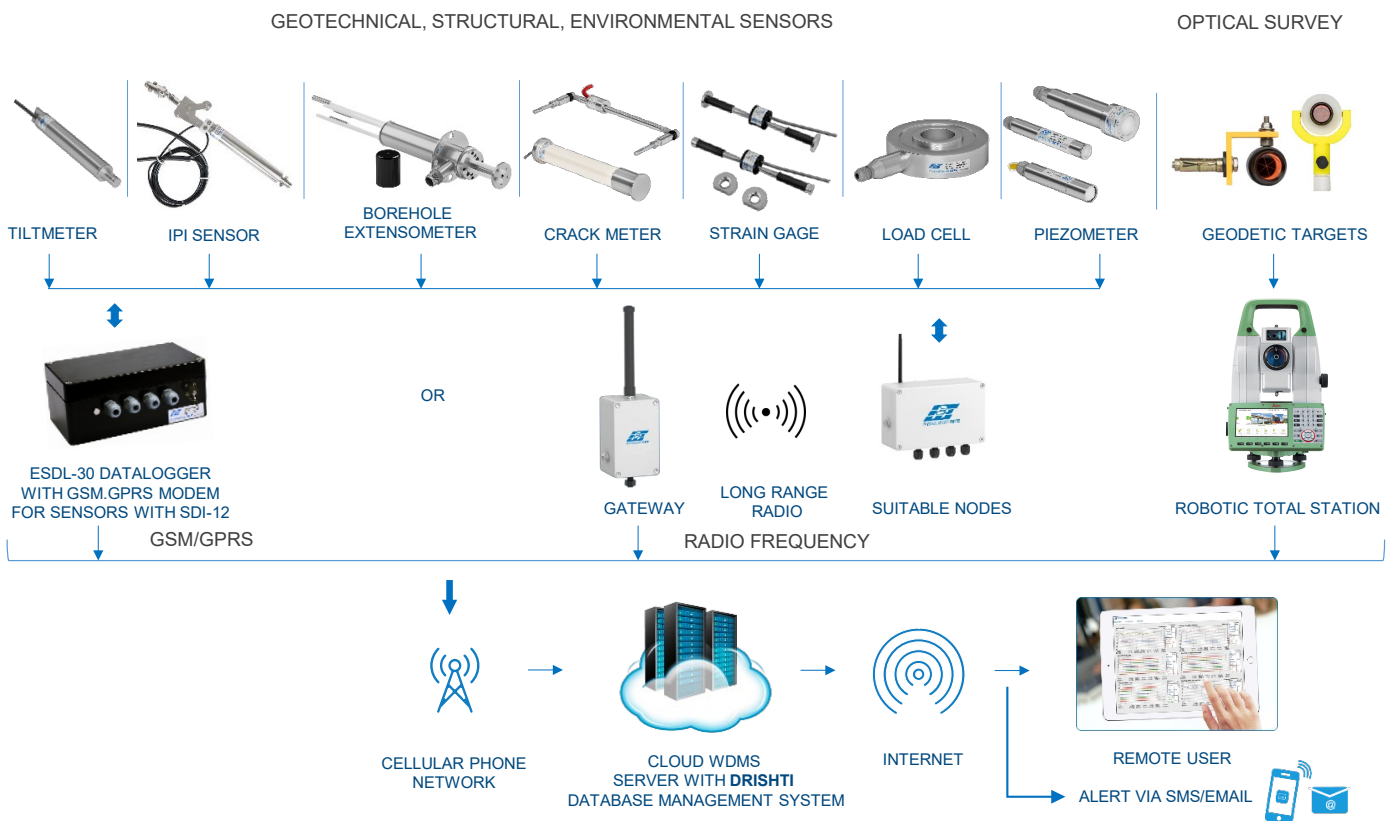
Access controls

Terraweb offers different user levels, so that specific users have access to specific aspects of the project. Any number of user profiles may be created with any combination of access rights - full access to stake holders, with limited access to other users.



- 2018-07-10 11:20:00
- 2018-07-13 12:23:00
- 2018-07-17 12:03:00
- 2018-07-19 11:11:00
- 2018-07-24 10:01:00

3D view of inclinometer borehole profile

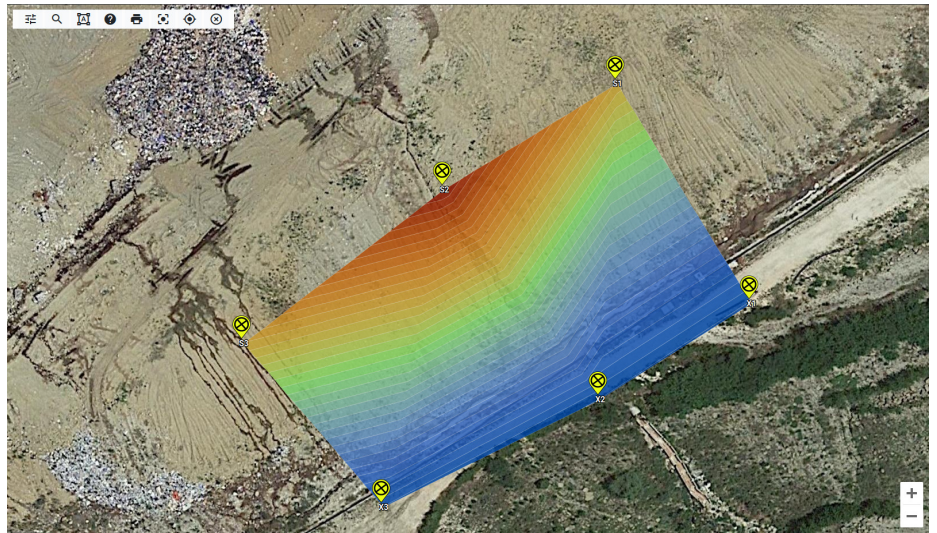
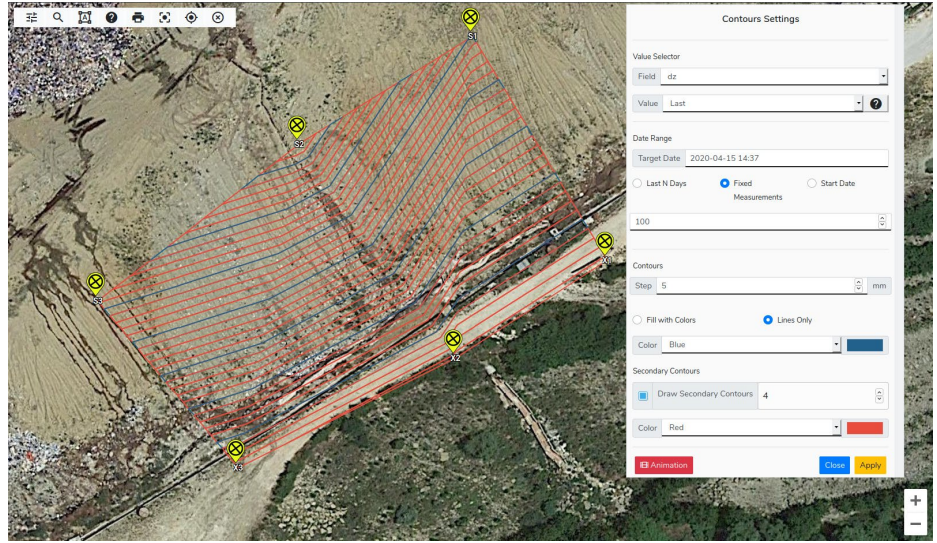


Typical schematic

BENEFITS

Advantages of the Terraweb data management software can be summarized as follows:

- User friendly interface with one click access to all instrument data in one platform
- Layout plan can be incorporated with locations of each monitoring sensor.
- Facility to import measurements from ATS (automatic total station) systems directly
- Supports up to 6 TBMs connected simultaneously and gives real time monitoring report for each TBM.
- Can access borehole data as well as building condition survey reports
- Additional feature for filtering raw data through moving average filter
- Instant automatic alerts via SsMS or email to authorized personnel
- User customizable graphs based on selection of active project areas
- Generate reports automatically for each sensor. Can generate daily, weekly or monthly report
- Provides combined graphs using profile, TBM parameters, settlements and piezometers.



Deformation plotted for the selected site area, over time (line view - top and colour filled view – bottom)

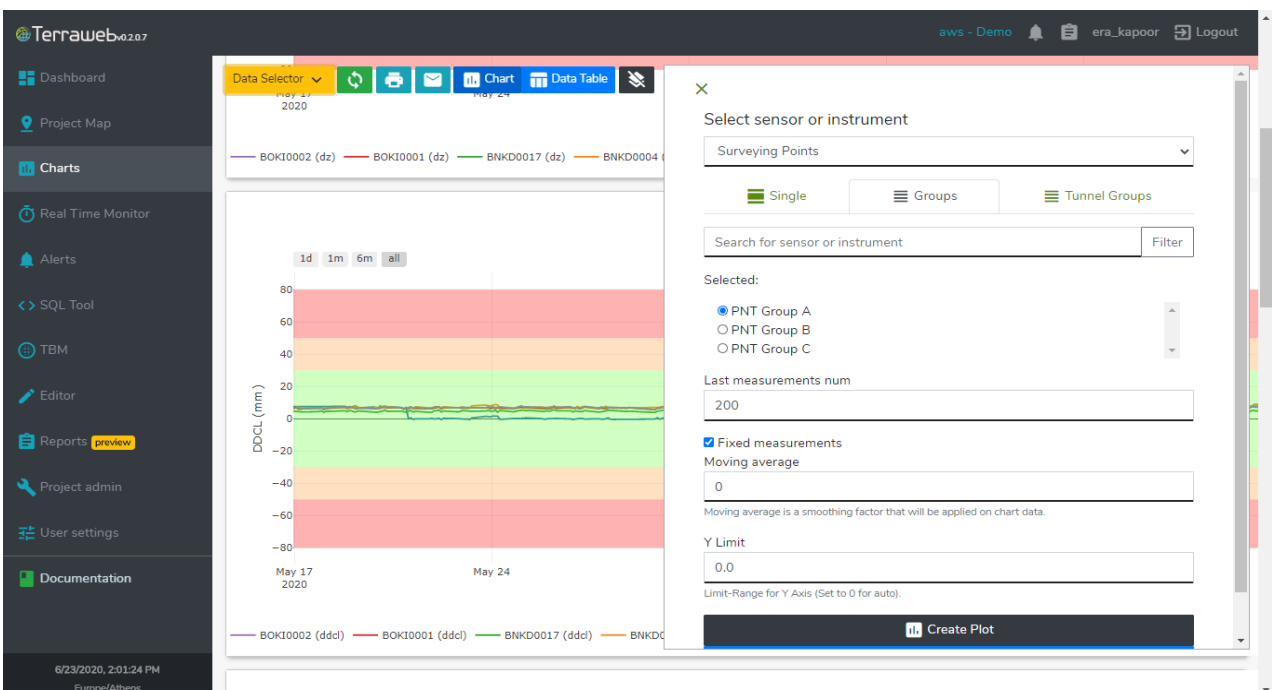


Chart plotting options (with moving average selection feature)

APPLICATIONS

- Critical applications where real time monitoring and early warning is required in order to protect life & valuable assets; minimize costs and delays
- Large civil engineering projects like a dam, barrage, tunnel – metro/rail/road/sewer, mine, structure, high rise building, landslide area, slope, bridge, nuclear power plant monitoring etc.
- Existing infrastructures, assets, monuments
- Deformation monitoring of embankment, retaining wall, etc.
- Groundwater level monitoring

TERRAWEB AS PART OF PUBLIC CLOUD BASED WDMS

As Terraweb is a server based software and has built in web service, it includes everything needed to publish monitored data in real time on internet. Users can interact with Terraweb using their web-browser, when connected to the internet, from any location in the world.

It allows multiple authorized users at different locations to view any data or report from the same project site simultaneously. The real time display, graphs & reports can be viewed using popular web browsers like Microsoft Internet Explorer or Mozilla Fire Fox amongst others.

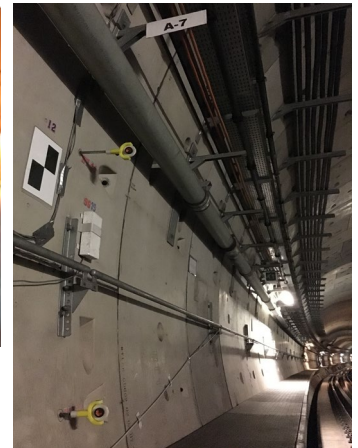
Data from Encardio-rite cloud based web monitoring service can be accessed from any type of device, like a desktop or laptop, tablet, smart phone, etc., that supports a standard web browser.



Online monitoring of existing bridge, deep excavation and new structure construction, with geotechnical and geodetic instruments



Online monitoring of existing dams, as well as dams during construction



Geotechnical and geodetic data from a road tunnel and rail tunnel in UAE