



TEROMOVIGO

TeroNet Platform

GNSS Network Management System

Administrator's Manual



TeroNet Platform Administrator's Manual

Release date:
31 October 2019

TeroNet – GNSS Network Management System
is developed by TeroMovigo - Earth Innovation, Lda



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1 Introduction

1.1 Introduction to TeroNet

The TeroNet - GNSS network management system – software consists of a complex set of tools and a web platform for a CORS (Continuously Operating Reference Station) network management. This kind of platform and tools are useful to assist the following scenarios:

- Storage and pre-processing of GNSS data;
- Availability of pre-processed data to users registered in the web platform;
- CORS connection state monitoring;
- Received GNSS data quality assurance;
- Provide GNSS RTK corrections via NTRIP Caster to end users.

This manual was elaborated with the aim to help its reader to use TeroNet – GNSS network management system – effectively and correctly, by detailing each component of the web platform and its auxiliary tools.

1.2 Manual Structure

This manual is divided into 5 chapters:

Chapter 1 – The first chapter introduces the manual and gives a brief description of the purpose of the software;

Chapter 2 – The second chapter takes an overview of the software;

Chapter 3 – The third chapter describes in more detail the background processes that make TeroNet work;

Chapter 4 – The fourth chapter takes an overview of the web platform;

Chapter 5 – The fifth chapter explains in more detail how the public interface of the web platform works;

Chapter 6 – The sixth chapter explains in more detail how the registered users' interface of the web platform works;

Chapter 7 – The seventh chapter explains in more detail how the administration interface of the web platform works and all its features;

Chapter 8 – The eighth and last chapter addresses how users can get help and technical support on TeroNet software.

2 System Overview

The TeroNet software is an integrated set of complex tools and a web platform with multiple features related to pre-processing of GNSS data and later its availability to registered users in the web platform.

2.1 GNSS Data Flow

The received RAW GNSS data are stored in the TeroNet server and are automatically put in queue, for being processed into RINEX and ephemeris files. After this conversion the quality assurance component determines the quality of the data processed before. This action allows the users to know how much data they are downloading for a file, even before the download starts. After the quality check a backup is made in order to prevent any data loss, or a double backup, if the CLOUD package was the one purchased. An illustration of the flow can be seen in Figure 2.1.

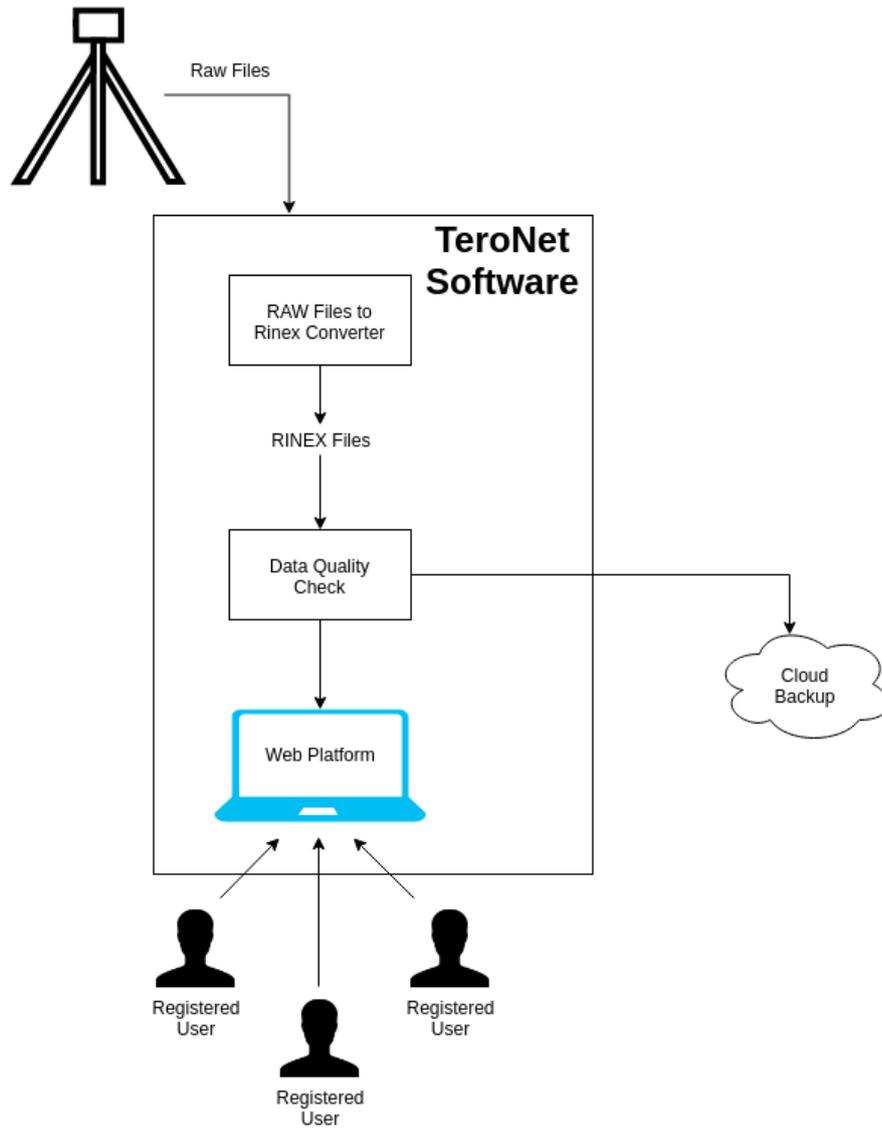


Figure 2.1- TeroNet Software data flow.

3 Background Tools

The TeroNet software is not only a web platform, before any data is made available to the registered users and administrators, the RAW GNSS data that has been downloaded from the stations has to get through a set of automated background tasks to be converted and indexed to be later presented to the users.

These background tools are described in the following points and illustrated in Figure 3.1:

- **Connectivity checker** – This task is executed every 10 minutes to check the connection status of the CORS;
- **Raw data converter** – This task is executed at minutes 24 and 54 of each hour and converts all the new RAW files into RINEX and Ephemeris;
- **External CORS downloader** – This task is executed at minute 1 of each hour and is responsible for downloading RINEX files of external networked CORS;
- **RINEX Mapper** – This task is executed at minutes 29 and 59 of each hour and grabs the previously converted/downloaded (by Raw2Store and WGET External) RINEX files and will check the quality of those files as well as to map them for them to be available for the end users;
- **Ephemeris Mapper** – This task is executed at minute 10 of each hour and will grab the Ephemeris files created by the RAW2Store tool in order to map them and make them available to the end users of the platform;
- **Orbits downloader** – This task is executed at 00:10 every day and will try to obtain the most recent orbits data from the IGS – International GNSS Service;
- **Orbits Mapper** – This task is executed at 00:20 every day and will grab the previously downloaded orbits files and map them in order to make them available in the platform;

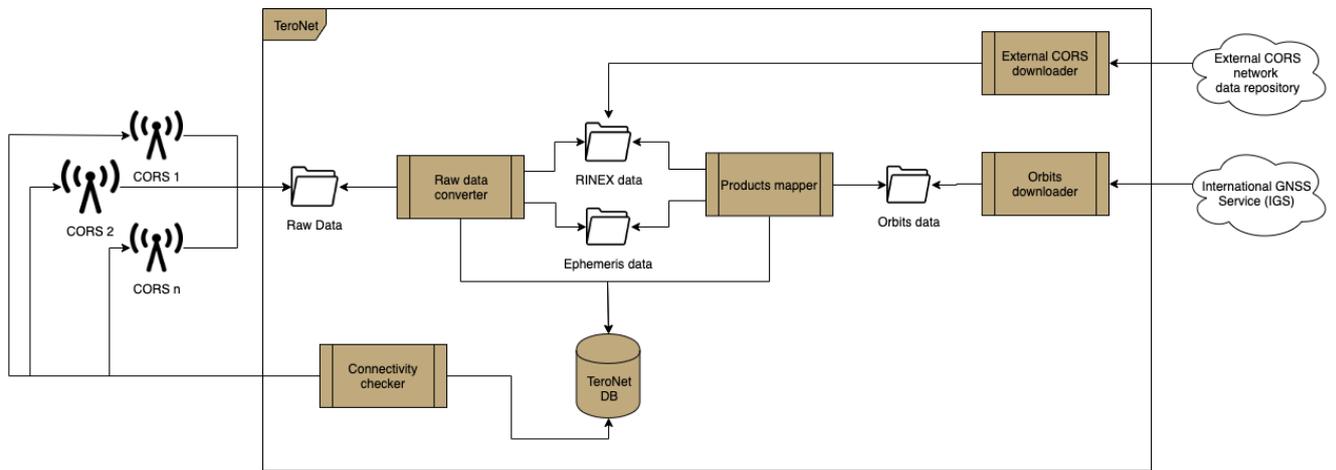


Figure 3.1- TeroNet Background Tools

4 Web Platform

The only accessible component of the TeroNet software is its web platform. It is in this platform that registered users can visualize and download data from the CORS and download the available orbits.

This platform is divided in three categories:

- **Public interface** – accessible for everyone and shows only the location of the different CORS, a presentation text and allows the users to request a new account;
- **Interface for registered users** – accessible only for registered users and allows them to consult CORS details and to download the available data;
- **Administration interface** – accessible only for the platform administrators. This level of permissions allows the users to manage CORS, CORS networks, users, user groups and to customize several definitions of the software itself.



5 Public Interface

The public interface is accessible for every user, but shows only the location of the network CORS, a presentation text and the possibility to request a new user account.

It consists in the first screen that is presented to the user once one accesses the TeroNet web platform. This screen can be seen in Figure 5.1. In this screen it is only visible a map with the network CORS and a brief description of the network.

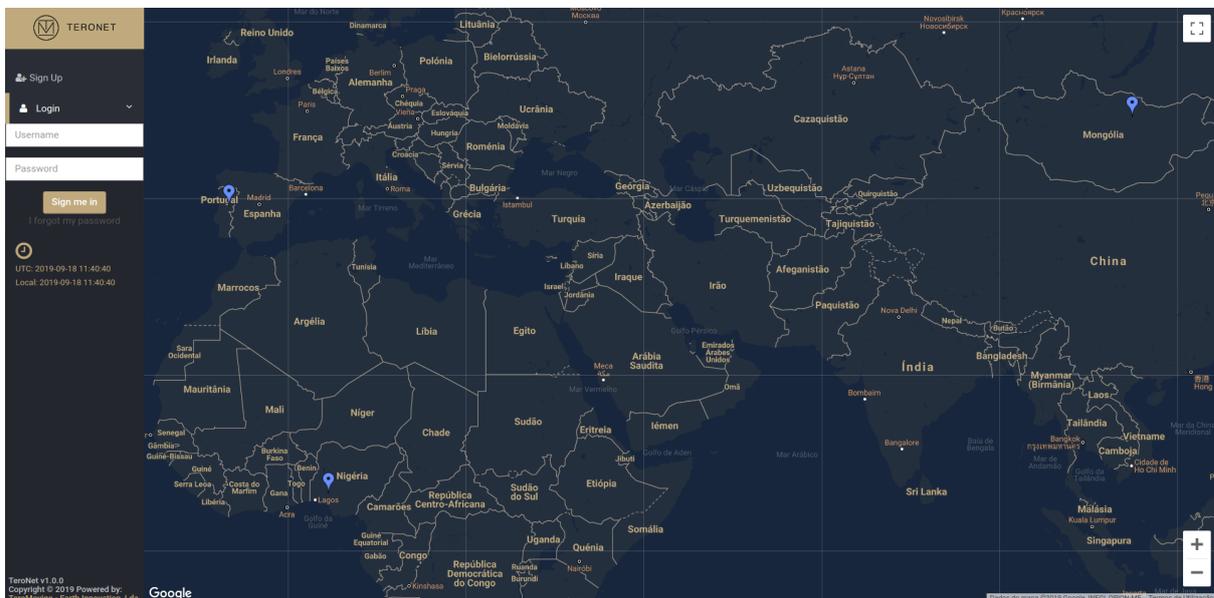


Figure 5.1 – Welcome screen.

5.1 New user account request

It is possible for interested users to request a new user account. In order to do that, the user should refer to the “Sign Up” feature, where a form is presented and should be filled. This filled form will inform the platform administrator so that the account may be approved or declined.

In order to request a new user account, the user should click in the “Sign Up” button, located in the left-top corner of the page right next to the “Login” button, below the TeroNet logo.

After clicking that button, a form is presented, as shown in Figure 5.2, which should be filled with the user's information.

The form consists in the following fields, being all fields mandatory:

- **Personal Data** – General user information
 - **Full Name** – User's full name;
 - **Email** – User's email;
 - **Organization** – User's organization;
 - **Telephone** – User's phone contact;
 - **Preferred Username** - User's preferred username;
- **Observations** – User's observations for the administrator.

After completing the form, the user needs to validate the validation box and click the “Request new account” button in order to move forward with the request. This request generates a notification email that is sent to the platform administrators.

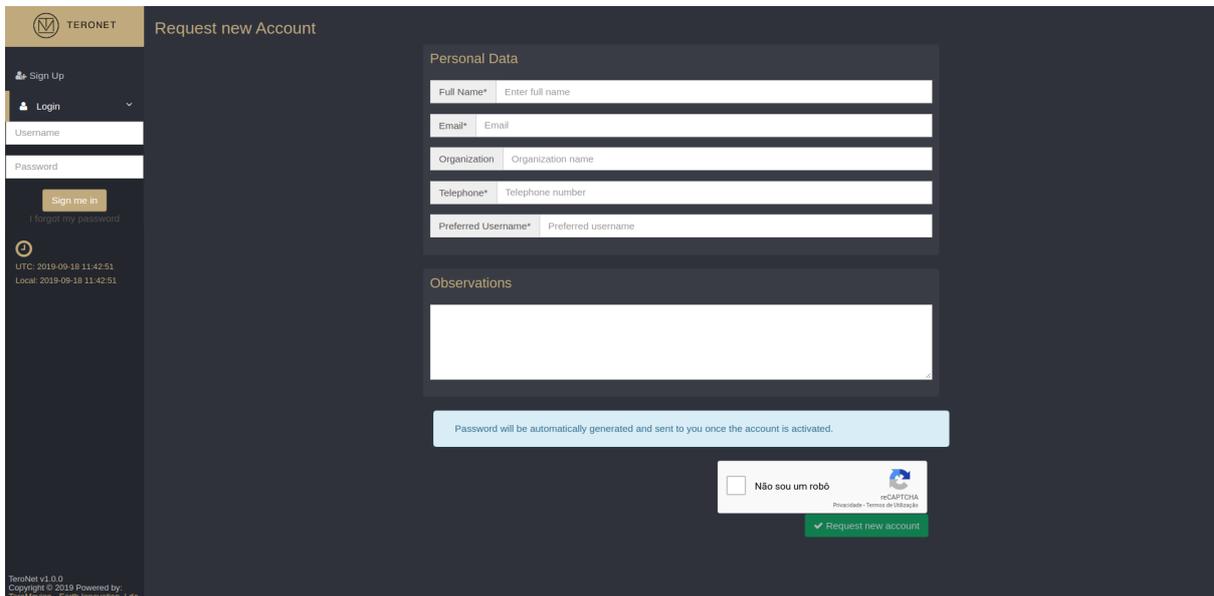


Figure 5.2 - Pre-registration form.

After the approval by the administrators, the new user will receive an email with the password to access the platform, on the email used to request an account, as shown in Figure 5.3.

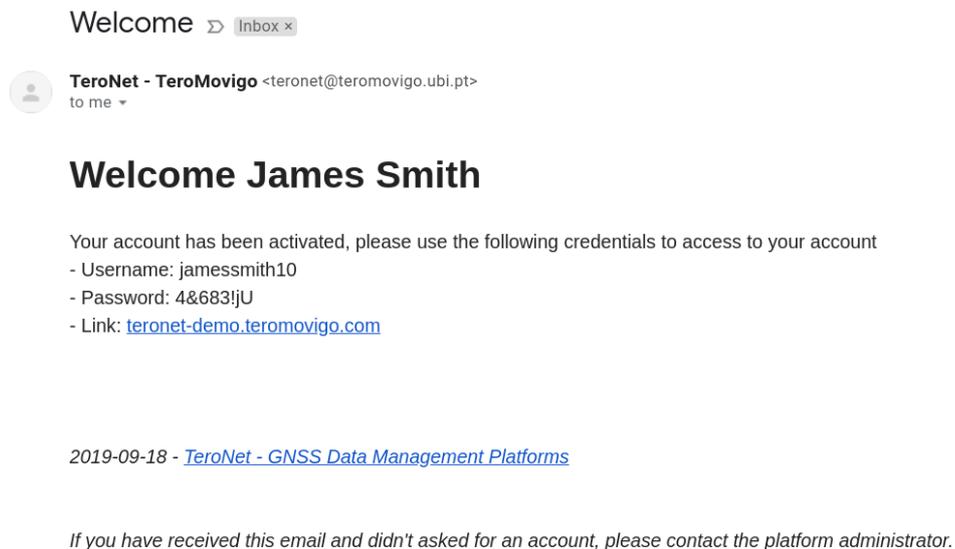


Figure 5.3 - Welcome email.



6 Registered User Interface

The registered user interface is accessible only to users who have been previously authorized by the administrator, and these users can consult CORS details and download available CORS data.

6.1 Login

In order to access the registered user interface, the user needs to initially login into the platform. In order to do so, the user needs to click the “Login” button, located in the upper left corner, and fill the form with his username in the top box and his password in the lower box, as seen in Figure 6.1, and, after that, click the button “Sign me in”.

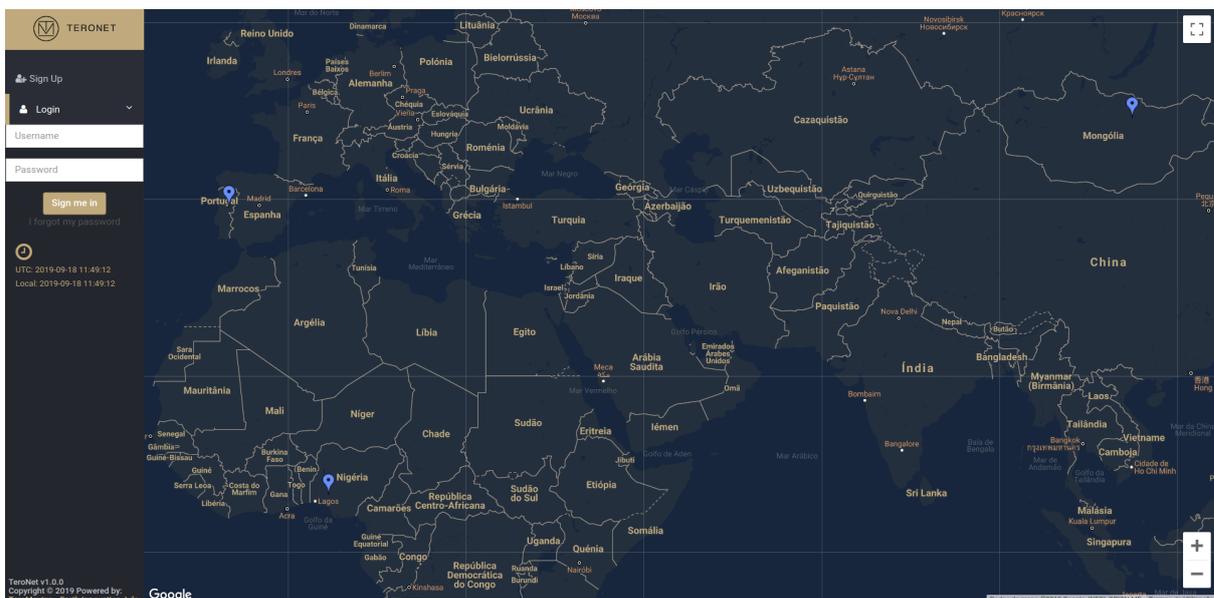


Figure 6.1 – Login form.

In the case, where the user may have forgotten his password a new password can be set. In order to do so, the user must click in the “I forgot my password” button, right

below the “Sign me in” button. After clicking that button, a new form will be shown (as seen in Figure 6.2) where the user must enter the email, he used in the registration process, in order to receive the instructions to restore his password.

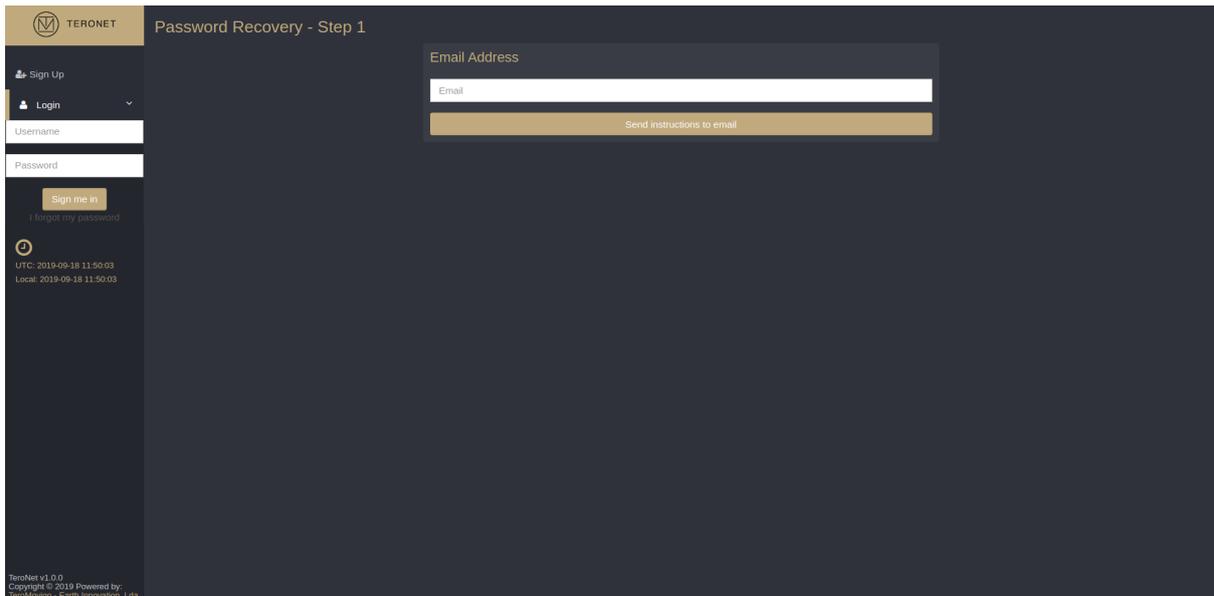


Figure 6.2 – Password recovery first screen.

After the reception of the password replacement email, with the password replacement instructions (Figure 6.3), the user should follow the URL given in the email, which will lead to a form (Figure 6.4) where the user is required to insert two identical password which will replace the old password, enabling the user to log in again.

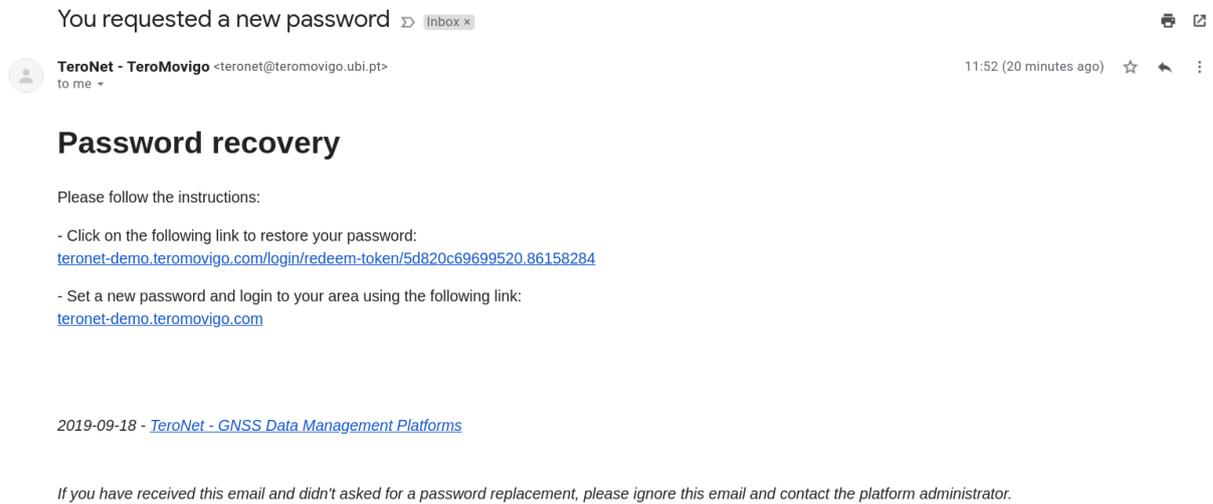
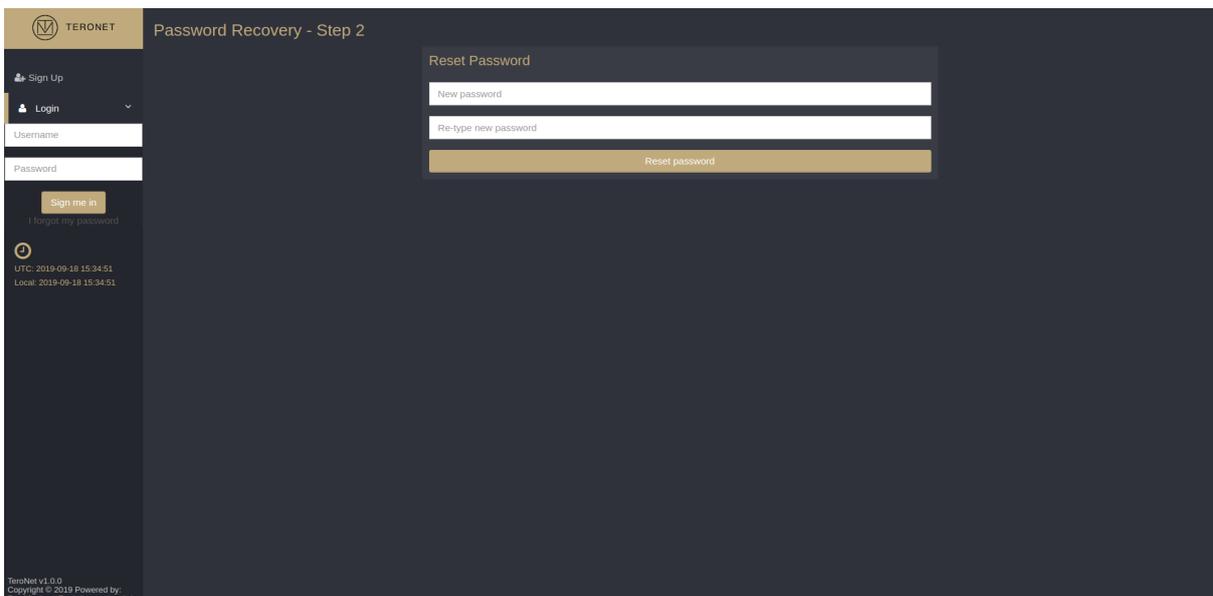


Figure 6.3 – Password replacement instructions.



TERONET Password Recovery - Step 2

Sign Up

Login

Username

Password

Sign me in

I forgot my password

UTC: 2019-09-18 15:34:51
Local: 2019-09-18 15:34:51

Reset Password

New password

Re-type new password

Reset password

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Figure 6.4 – Password replacement form.

Finally, the user may log into the platform and will be redirected to the registered user interface.

6.2 Registered users welcome screen

After successful authentication, the welcome screen for registered users is presented, as illustrated in Figure 6.5. In this screen, the user can visualize details for each CORS like general and technical information, RINEX data availability and Ephemeris data availability. The user can also create customized downloads, download orbits and send messages to platform administrators.

Once logged in, a form to create customized downloads is presented on the right-hand side as shown in Figure 6.5. In this form the user is able to create customized downloads by only having to specify a couple parameters like: a period of time (of which the user is interested to download data from), the data type that interests the user (daily or hourly data, in the last it is also necessary to specify the time period) and finally the CORS in which the user is interested to download data from. Before the users clicks the “Generate Download” button, the user should also evaluate if there is a need to also include the available ephemeris files for the selected CORS and period of time, by checking, or not, the “Include Ephemeris” box.

IMPORTANT NOTICE: a user can only transfer data from the CORS and for the period that has been defined by the platform administrator.

On the left-hand side, a table with all CORS is presented. Using this table, the user can access all general and technical information for each CORS by clicking on the names of the different CORS, and access to Daily, Hourly and Ephemeris data from each CORS by clicking on the respective data type.

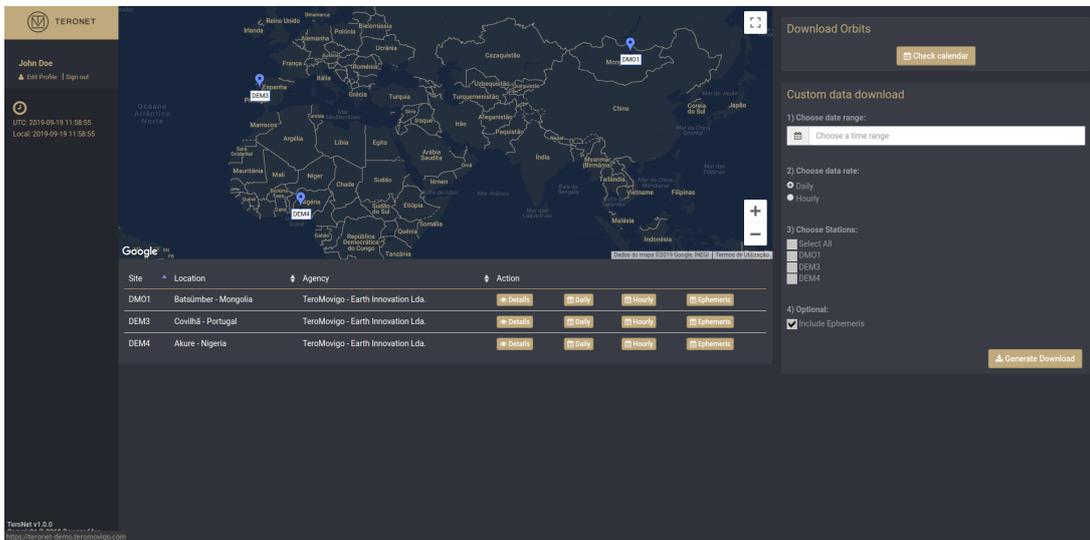


Figure 6.5 – Front office page.

6.3 CORS Details

By clicking in “Details”, in the table of the previously described screen, the user can access a detailed view of the selected CORS (Figure 6.6). In this page, it is possible to see general and technical information about the CORS.

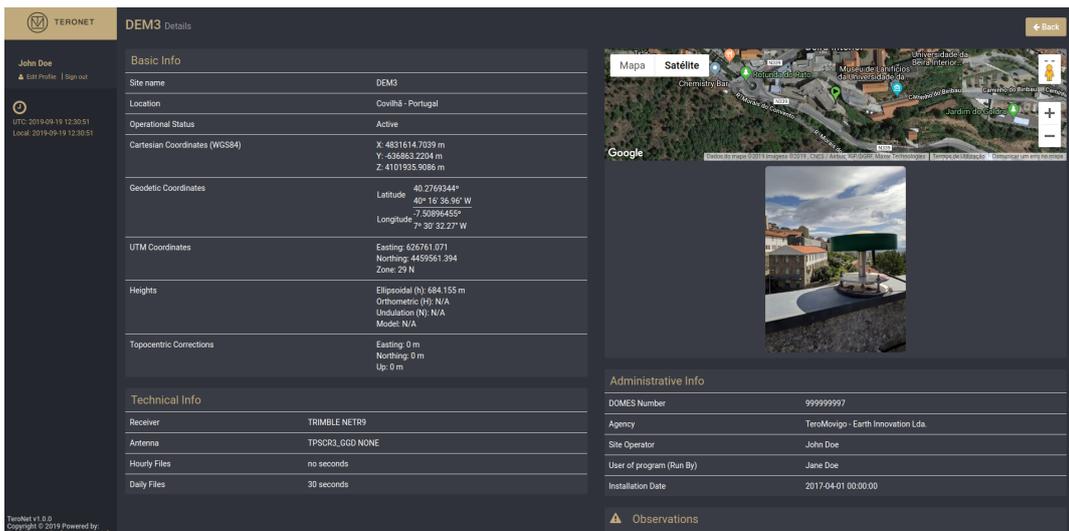


Figure 6.6 – CORS detailed view page.

6.4 Download CORS data

The last functionality for regular users is the download of CORS data, either Daily, Hourly or even Ephemeris data. To access this functionality, the user should click in the “Daily”, “Hourly” or “Ephemeris” button from the interested CORS, from the CORS table from Figure 6.5. By clicking on the previously mentioned options the user is presented with a calendar view with the available data for the CORS selected (Figure 6.7), showing for each day the quantity of data that is available. By clicking on a specific day, a pop-up is presented showing which files are available for that day as well as the quality of the data.

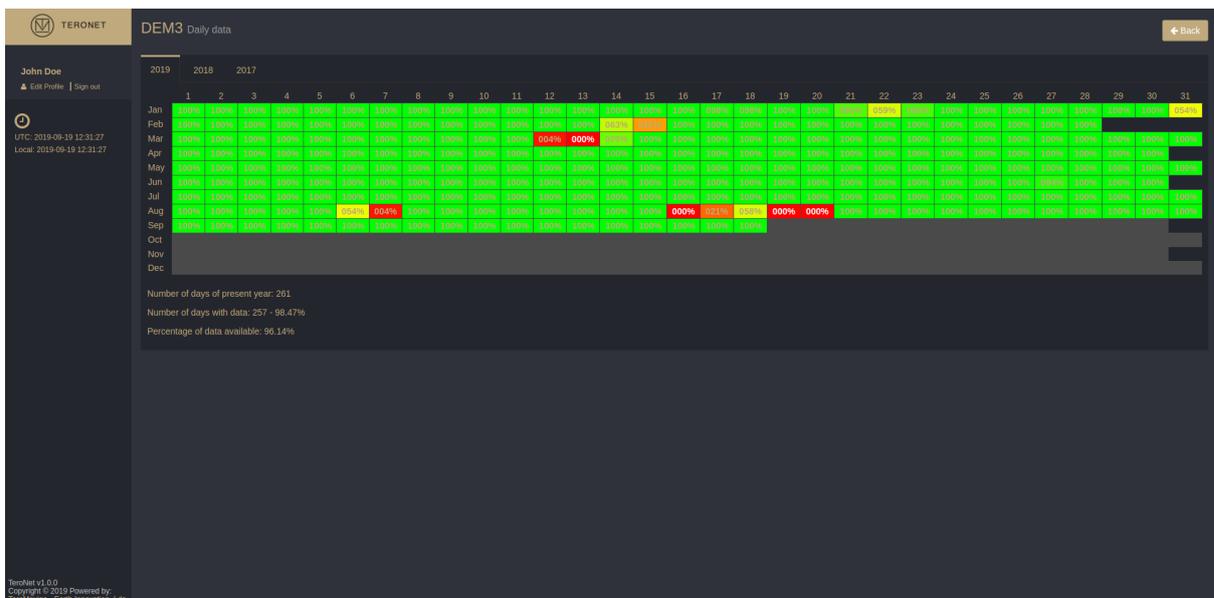


Figure 6.7 – CORS Available data calendar.

By clicking on a day, a pop-up is presented where the available data for that day is listed and its associated quality. For each available data, an associated download button is presented, for daily data as seen in Figure 6.8, for hourly data as seen in Figure 6.9 and for Ephemeris data as seen in Figure 6.10. In case of hourly data, the presented pop-up lists all the hours of the day with its associated data quality.

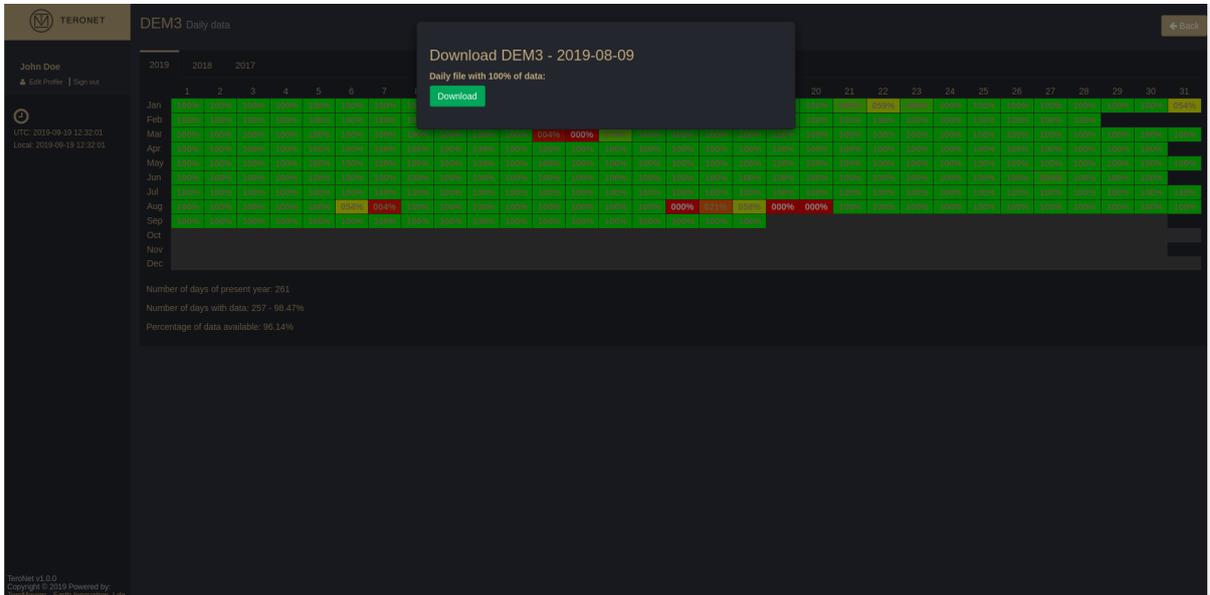


Figure 6.8 – Daily data download.

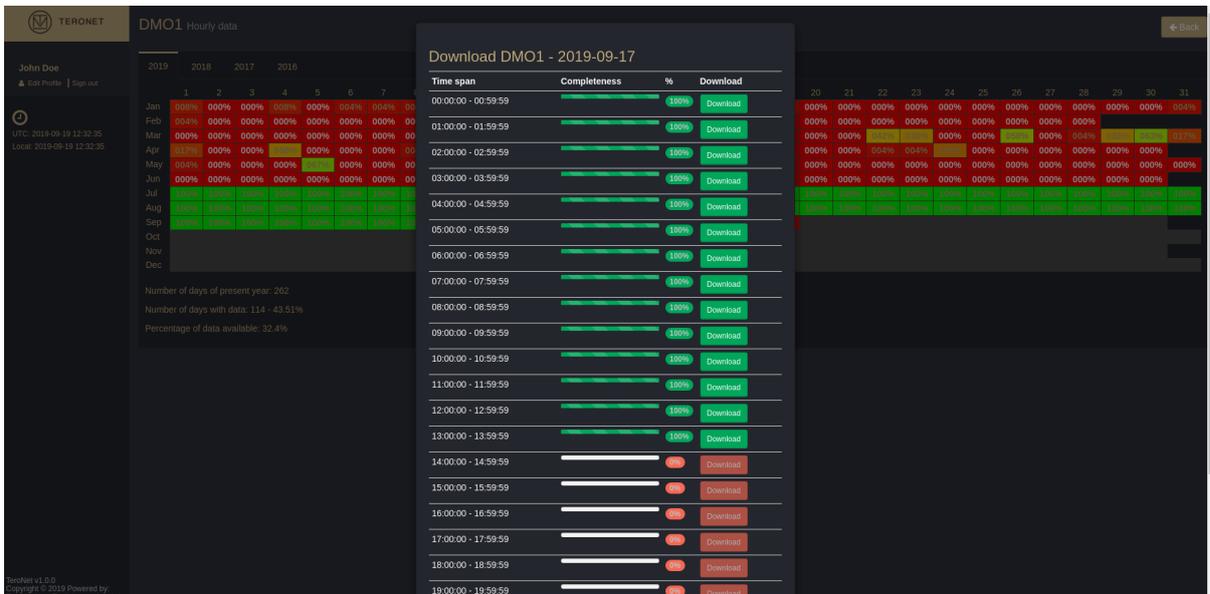


Figure 6.9- Hourly data download.

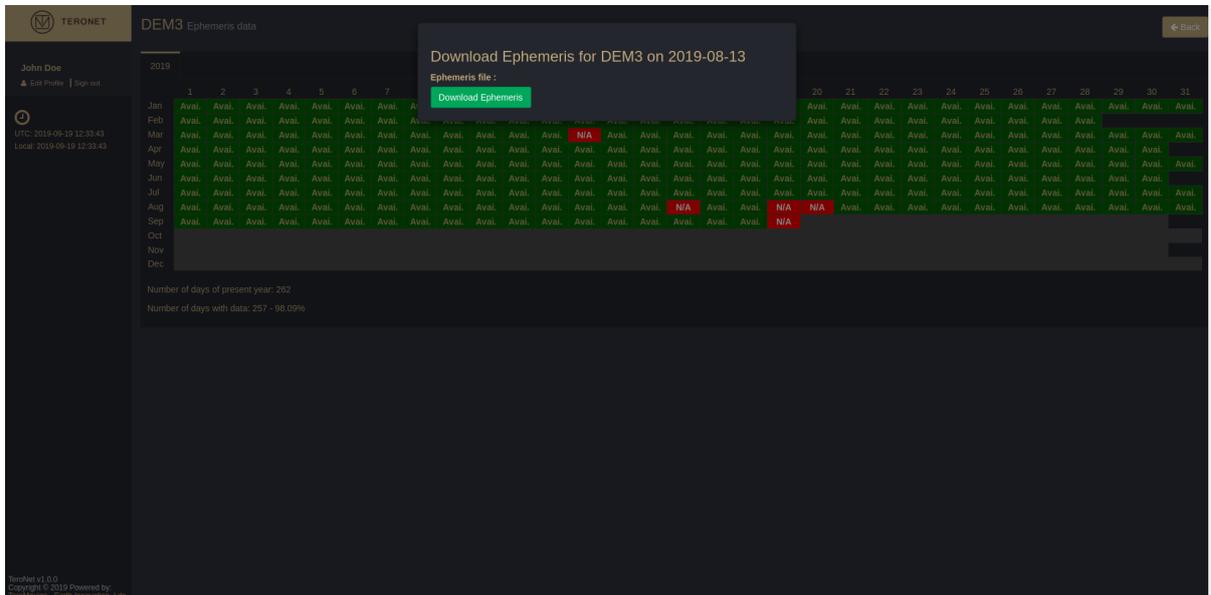


Figure 6.10 – Ephemeris data download.

6.5 Orbits download

The user may also download orbits data files that are made available through the platform. The orbits data are sourced by the IGS – International GNSS Service.

In order to have access to the orbits files, the user must click on the button “Check calendar” right below “Download Orbits”, on the upper right corner of the page, as shown in figure 6.6. After clicking, the user will find a calendar, as illustrated in Figure 6.11, like the CORS calendar for daily, hourly and ephemeris data.

The calendar legend reads as follows:

- **N/A** – No available data;
- **R** – Rapid orbits;
- **P** – Precise orbits.

By clicking in a day with data a pop-up is presented where the user can then download the available data for that day as shown in Figure 6.12.

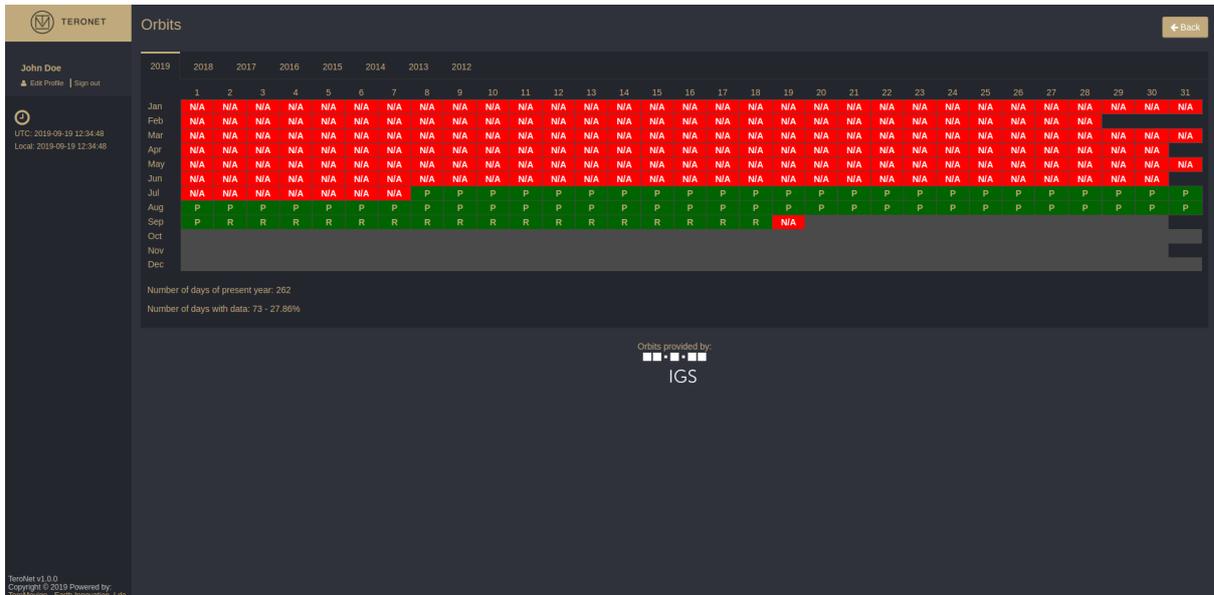


Figure 6.11 – Orbits download calendar.

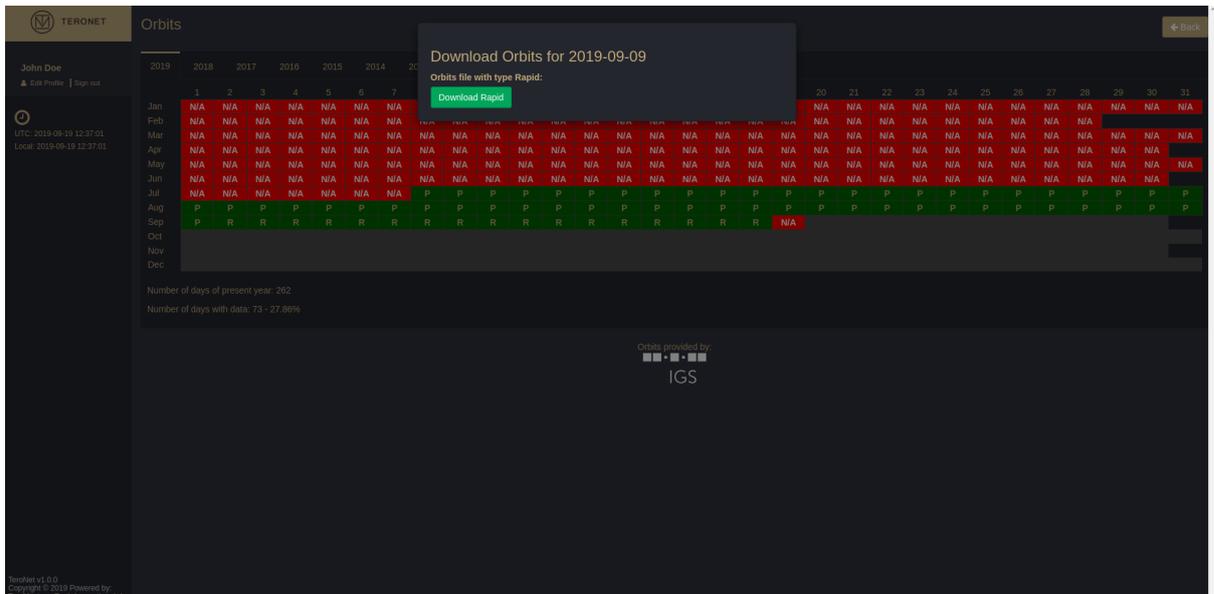


Figure 6.12 – Orbits download pop-up.

6.6 Profile Edition

The last functionality of the regular user is the fact that the user can edit their own profile, giving the ability to edit personal information like the email, organization, password, etc.

To access this functionality, the user must click in the upper left corner over the option “Edit Profile”. Immediately a pop-up will appear with a pre-filled form containing all the user data, as seen in Figure 6.13. The user may then change the data at will and then click in the option “Edit User” to persist changes.

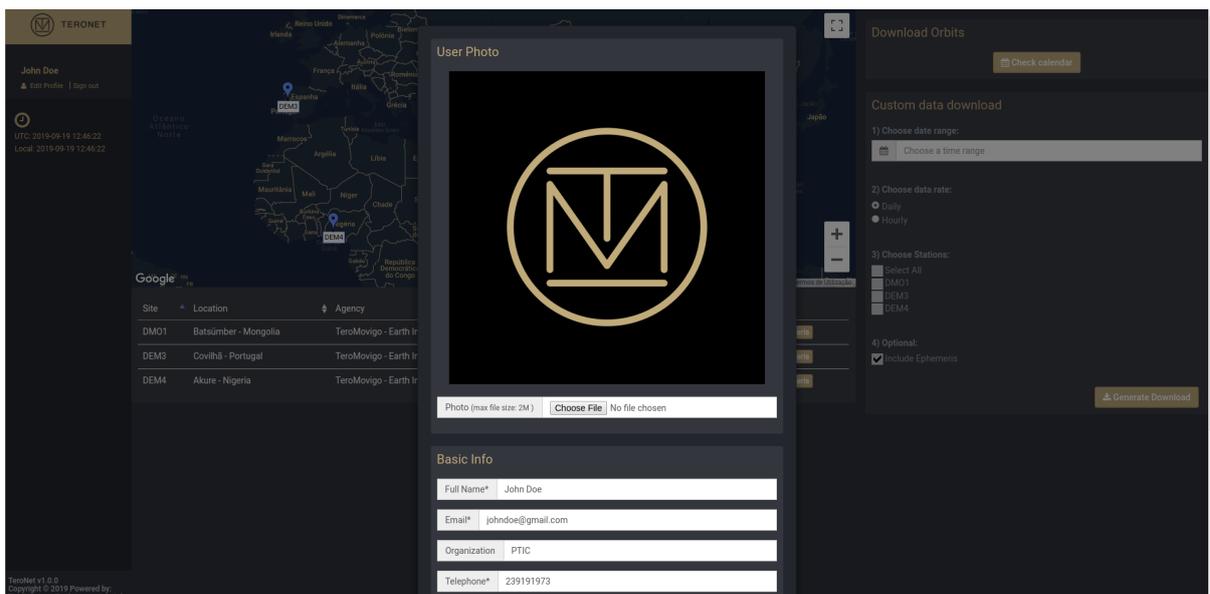


Figure 6.13 – Profile edition

7 Administration Interface

The administration interface is only accessible for platform administrators. This level of permissions allows users to manage CORS, CORS networks, users, user groups and to customize several software definitions.

IMPORTANT NOTICE: in case the user that has performed login in the platform having administration permissions, this user will be automatically redirected to the administration area.

7.1 Administration Area

After logging in as an administrator, the user is redirected to the administration panel, as illustrated in Figure 7.1. In this area the user can perform several administration tasks, which will be detailed in the following topics.

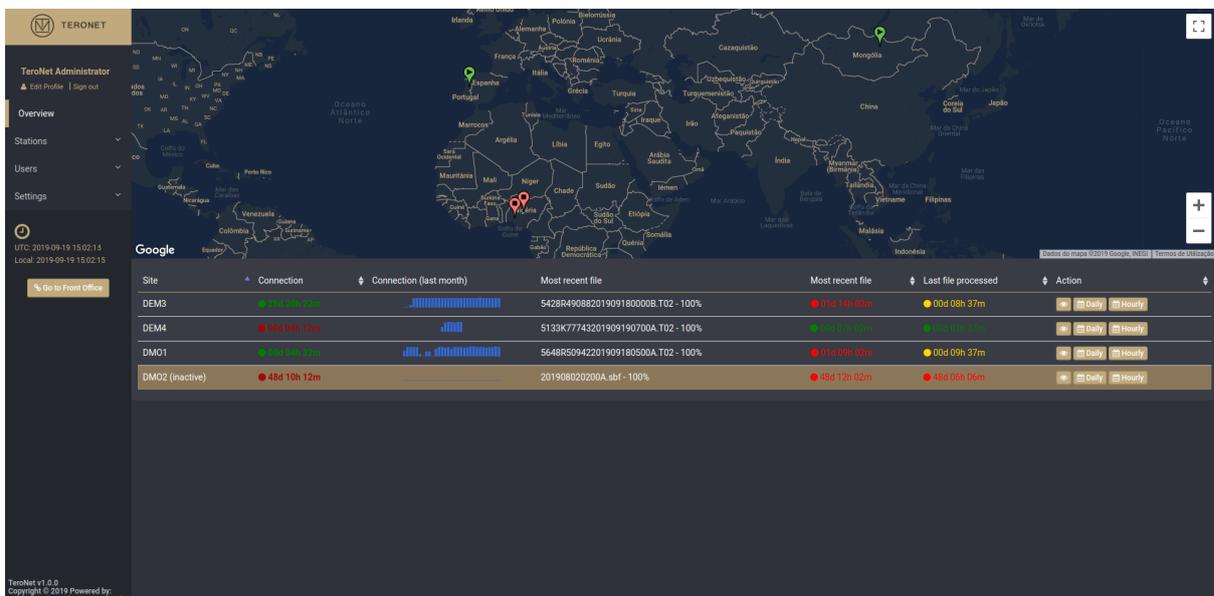


Figure 7.1 – Administration panel.

In the left-hand side, the administrator will find the button “Go to Front Office”, this button, when pressed, allows the administrator to access the regular users area. By clicking that button, the administrator will be redirected to the regular registered users area, will be presented with the same screen as for the regular users, but with a button that allows the administrator to go back to the administration panel, as illustrated in Figure 7.2.

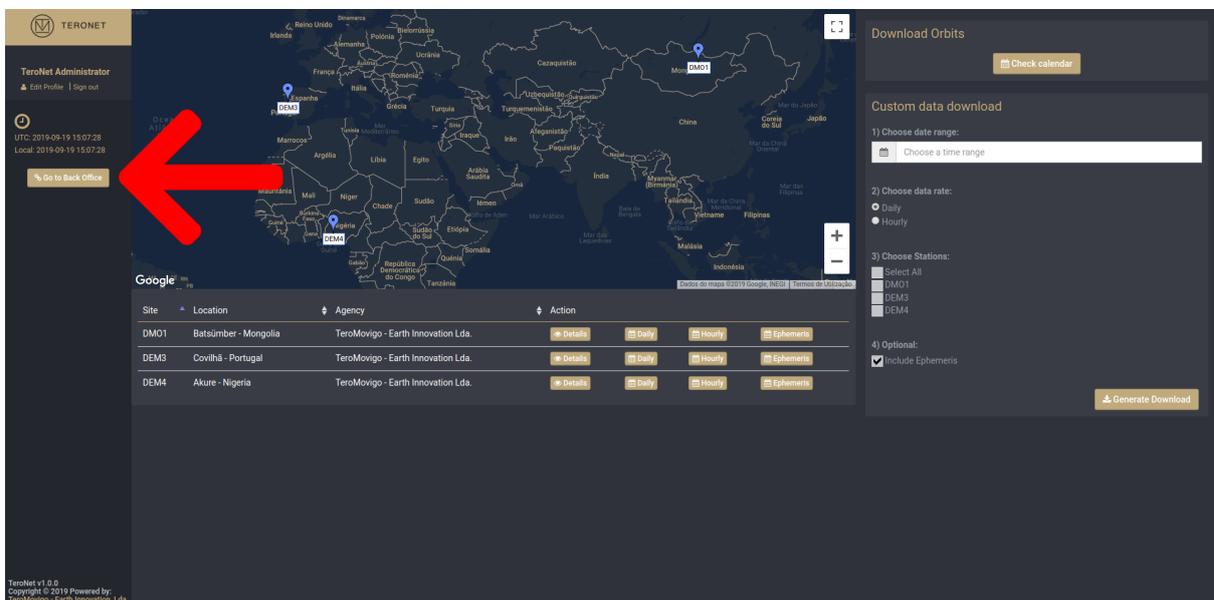


Figure 7.2 – Regular users area for administrators.

In the left side of Figure 7.1, the user is presented with a navigation menu, where he can access several functionalities like:

- **Edit Profile** – Access to profile edition form;
- **Sign Out** – End session;
- **Overview** – Access to initial screen;
- **Stations** – Access to CORS management;
 - **Station Networks** – Access to CORS networks management;

- **Users** – Access to users' management;
 - **Groups** – Access to user groups management;
- **Settings** – Access to TeroNet software settings management.
 - **Reports/Alerts** – Access to reports/alerts generators;

On the right, an interactive map is presented with all the CORS in the network. Once the user is an administrator and is in the administration panel, the user will be able to know the connectivity status of each CORS directly in the map, being the markers to be read as follows:



- The CORS is online;



- It is not possible to determine the connectivity status;



- The CORS is offline.

In the map, by clicking in any marker a pop-up with CORS related information is presented.

The connectivity status of each CORS is automatically updated once every minute.

In the middle of the page, a table with all CORS is presented. In this table it's possible to check CORS details, connectivity status for each CORS, statistics, the most recent connectivity status information as well as the data that has arrived from the CORS. The connectivity status information is generally at most 10 minutes late, once that when the TeroNet platform isn't being accessed there is an automatic background script that updates this information every 10 minutes.

7.2 Stations List

In CORS management it's possible to manage the network CORS as well as network external CORS, once they are correctly configured.

Once the user accesses the CORS management page, by clicking in "Stations" and then "List", is presented with a comprehensive list of all CORS, as illustrated in Figure 7.3. Starting from this page it is possible to create new CORS, visualize, edit and delete existing CORS.

In the CORS listing it is possible to check out some information about the CORS as well to perform various actions.

It's possible in the listing to see:

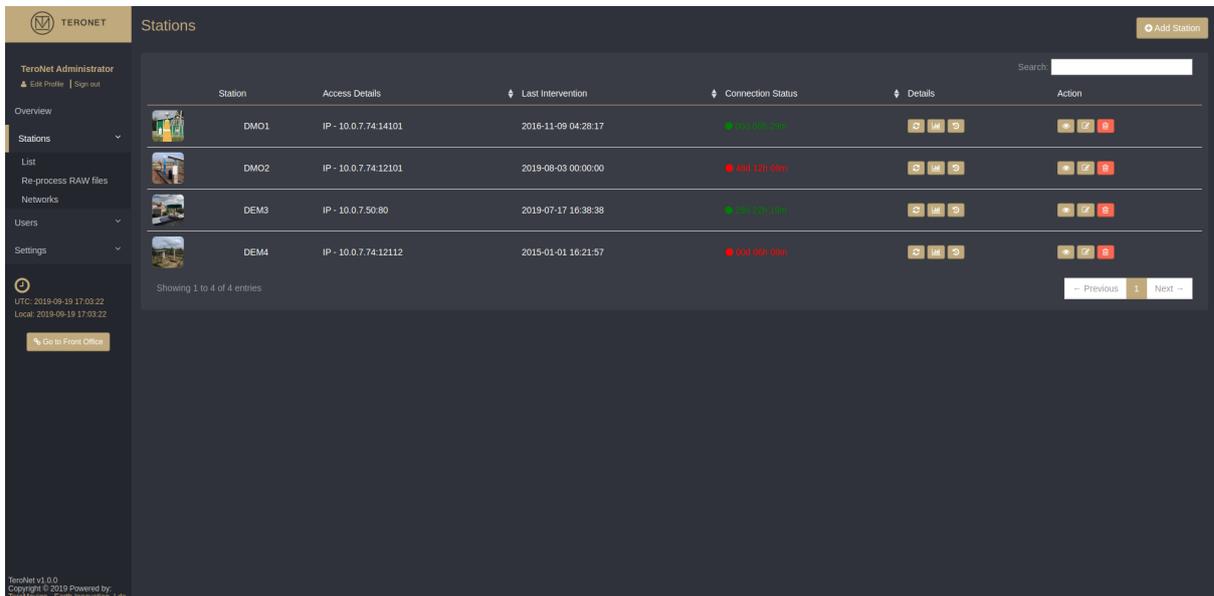
- CORS installation photo;
- CORS name;
- IP and Port, when applicable;
- Last setup date;
- Connection status.

In the Details buttons it's possible to:

- Refresh Status;
- Visualize statistics;
- Check revisions

In the Action buttons it's possible to:

- View CORS information;
- Edit CORS information;
- Delete CORS;



Station	Access Details	Last Intervention	Connection Status	Details	Action
DMO1	IP - 10.0.7.74:14101	2016-11-09 04:28:17	Connected	[Details] [Edit] [Delete]	[Add] [Edit] [Delete]
DMO2	IP - 10.0.7.74:12101	2019-08-03 00:00:00	400 120.00m	[Details] [Edit] [Delete]	[Add] [Edit] [Delete]
DEM3	IP - 10.0.7.50:80	2019-07-17 16:38:38	Connected	[Details] [Edit] [Delete]	[Add] [Edit] [Delete]
DEM4	IP - 10.0.7.74:12112	2015-01-01 16:21:57	500 000.00m	[Details] [Edit] [Delete]	[Add] [Edit] [Delete]

Figure 7.3 – CORS listing.

7.2.1 Adding a new CORS

By clicking “Add Station” from the “Stations” -> “List” menu, a form is presented to the user, as illustrated in Figure 7.4. This form allows the administrator to create new CORS.

The form requests the following fields, being all mandatory, except the IP and Port fields under special circumstances.

- **Basic Info** – General information about the CORS
 - **Site Name** – 4-character CORS name;
 - **Approximate geocentric position X/Y/Z** – Approximate geocentric position in Cartesian coordinates in the local reference frame (in meters);
 - **Antenna topocentric correction E/N/U** – Antenna topocentric correction (in meters);
 - **City** – CORS installation city;
 - **Country** – CORS installation country;

- **Photo** – CORS location photo.
- **Administration Info** – CORS administration information
 - **DOMES Number** – DOMES number;
 - **Agency** – CORS owner agency;
 - **Site Operator** – Agency's responsible fellow;
 - **User of Program** – CORS operation responsible fellow;
 - **Installation Date** – CORS installation date;
 - **Operational Status** – CORS operational status.
- **Technical Info** – CORS technical information
 - **Receiver Model** – Receiver model;
 - **Receiver Serial Number** – Receiver serial number;
 - **Antenna Model** – Antenna model;
 - **Antenna Serial Number** – Antenna serial number;
 - **Receiver File Extension** – Receiver files extension;
 - **IP/Port** – CORS connection IP and Port, if the connection type is FILE there's no need to fill out these fields;
 - **Connection Type** – CORS connection type;
 - **IP** – There's a direct connection to the CORS via IP and Port;
 - **FILE** – The CORS is responsible for sending data automatically to the TeroNet server.
 - **Network** – CORS network;
 - **Hourly and Daily data rate** – CORS hourly and daily data files rate;
 - **Additional comments** – Additional comments for the CORS.

After filling all the fields, it is then possible to save the new CORS. In order to do so, it is only needed to click the “Add Station” button. If the button is disabled, the administrator should review the form as something may be missing or wrongly filled.

After adding the new CORS, it will automatically appear in the CORS listing but without any information regarding connection status, since the mechanism that tests the connection status only runs once every ten minutes.

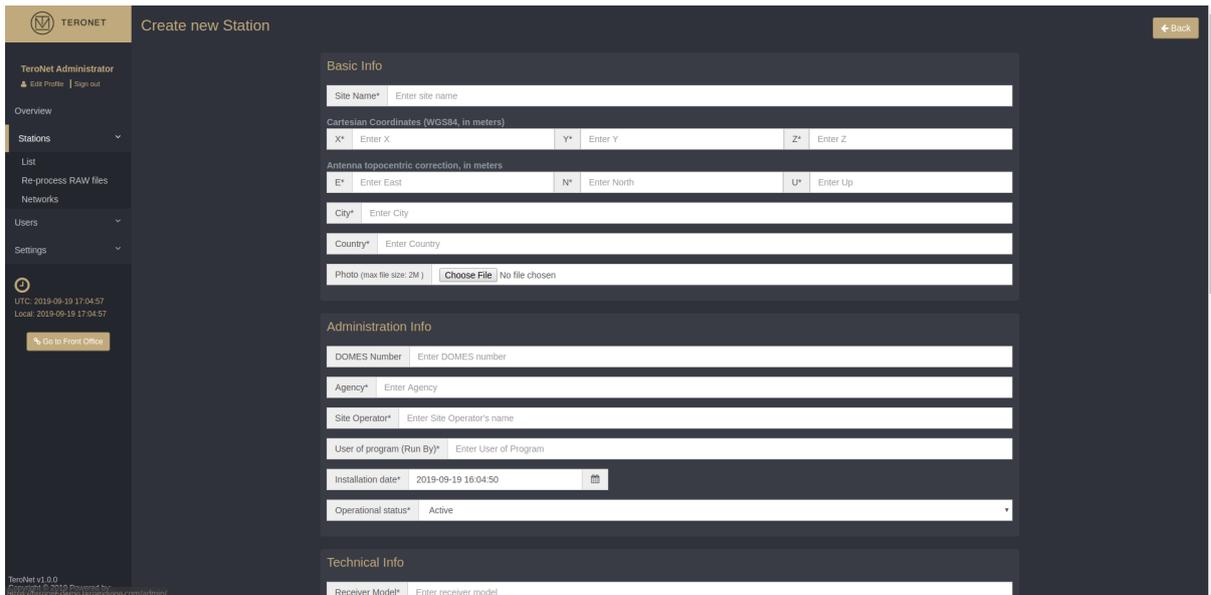


Figure 7.4 – New CORS form.

7.2.2 CORS editing

In order to edit a CORS, the administrator should click the “Edit” option which is accessible via the “Action” button, as illustrated in Figure 7.5. By clicking this button, a form is presented like the one presented when creating a new CORS, but this one is already filled with the current CORS information (Figure 7.6). This data can be edited as wish and, in the end, in order to save the changes, the user must click the “Save Changes” button.

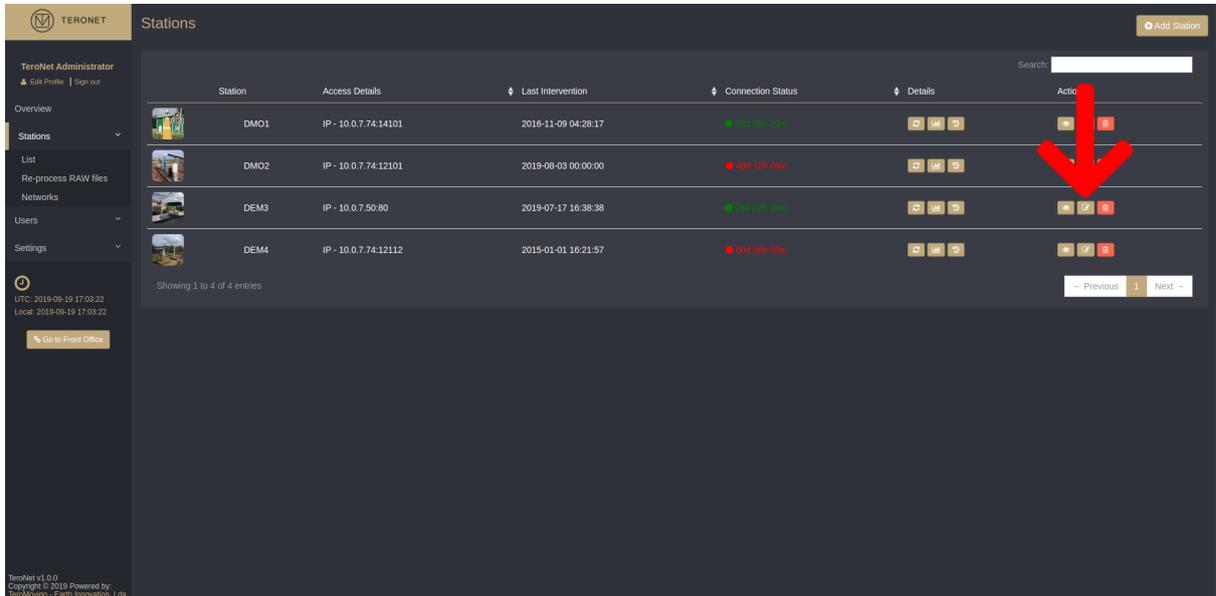


Figure 7.5 – CORS editing option.

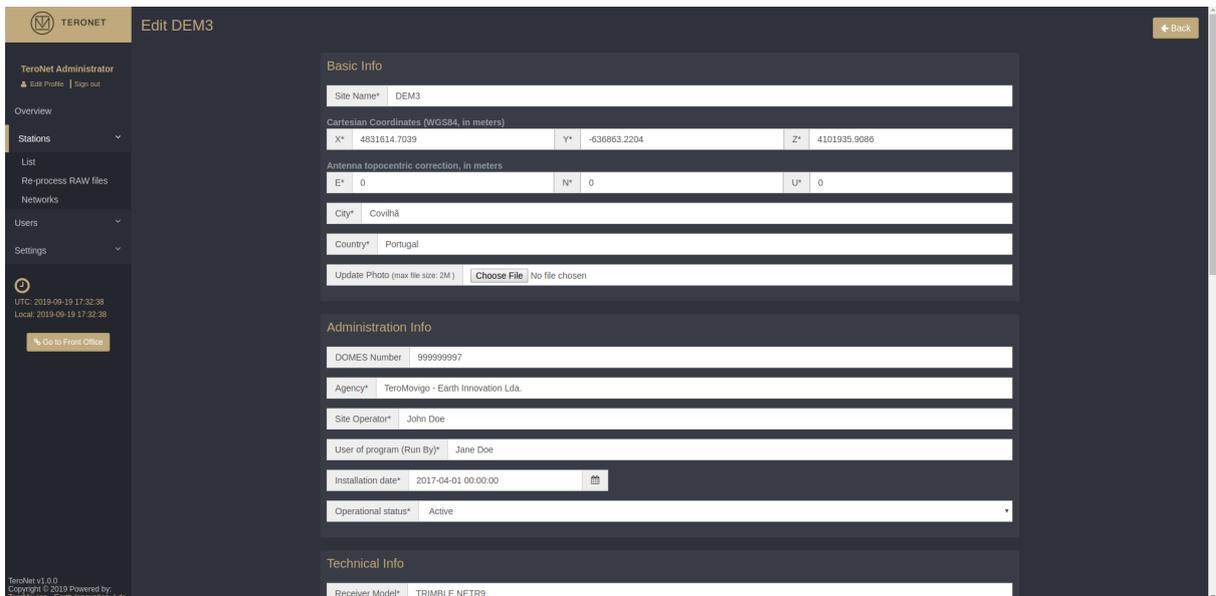


Figure 7.6 – CORS Editing Form

7.2.3 CORS elimination

In order to delete a CORS, the administrator must click the “Delete” option as shown in Figure 7.7.

IMPORTANT NOTICE: after deleting a CORS, it is not possible to recover the deleted data.

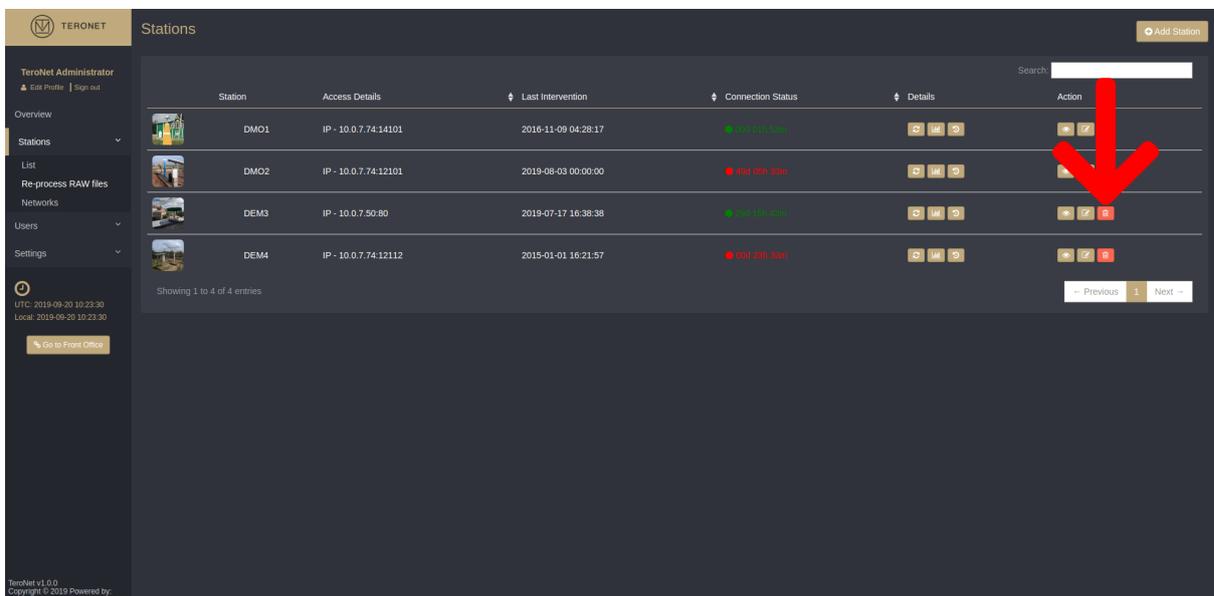


Figure 7.7 – CORS deleting

7.2.4 CORS details visualization

In order to visualize a CORS the user can click the “View” option that can be accessible from the “Stations” -> “List” menu (Figure 7.8).

By clicking in the previously described button, the user will be redirected to a view like the CORS details visualization from the registered users area, as illustrated in Figure 6.6.

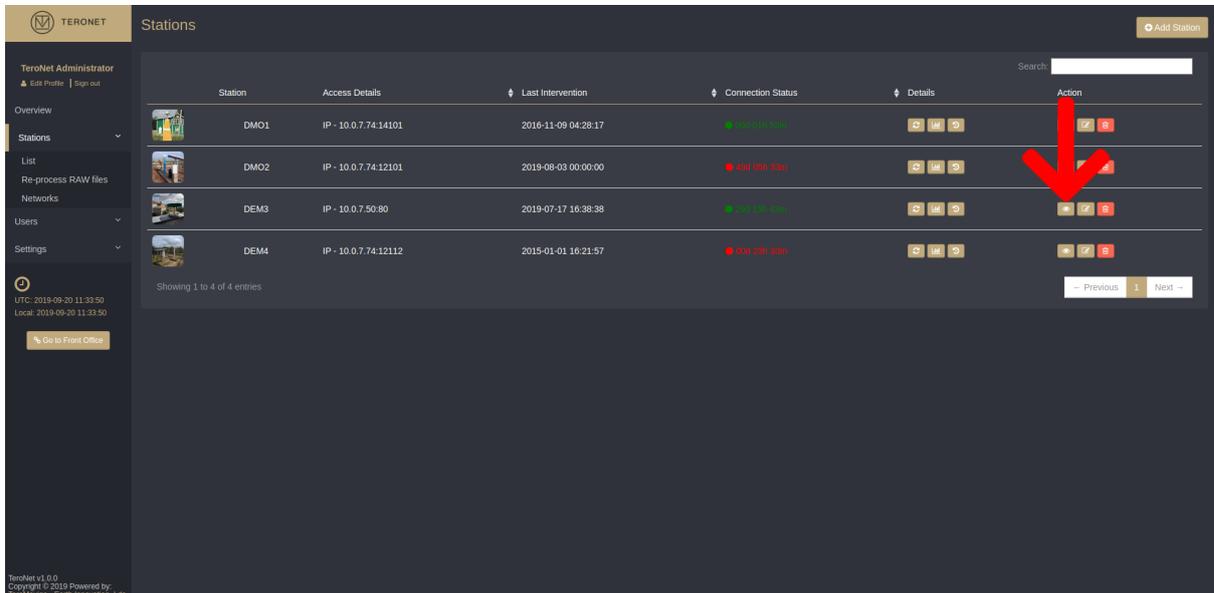


Figure 7.8 – View CORS details

7.2.5 CORS connection status statistics visualization

In order to visualize the connectivity status of a CORS, the administrator can click the “Statistics” button that can be accessible under the “Details” option in the CORS listing.

By clicking in the previously described button, the user will be redirected to a view where can be found various graphs representing different aspects regarding the connectivity status of the CORS.

These connectivity status measurements are determined regarding the connection between the TeroNet server and the CORS.

The statistics graphs are divided between two groups, each divided into various graphs:

- **Delay** – This group analyses the delay between the server and the CORS and has three graphs, as illustrated in Figure 7.9:
 - **Daily delay chart** – Daily delay chart with a 1-hour resolution;
 - **Weekly delay chart** – Weekly delay chart with a 1-day resolution;
 - **Monthly delay chart** – Monthly delay chart with a 1-day resolution.
- **Status** – This group analyses the percentage of time the CORS has been found online during the automated connectivity checks, as illustrated in Figure 7.10:
 - **Monthly status chart** – Chart with connectivity status percentages with a 1-day resolution;
 - **Yearly status chart** – Chart with connectivity status percentages with a 7-day resolution.

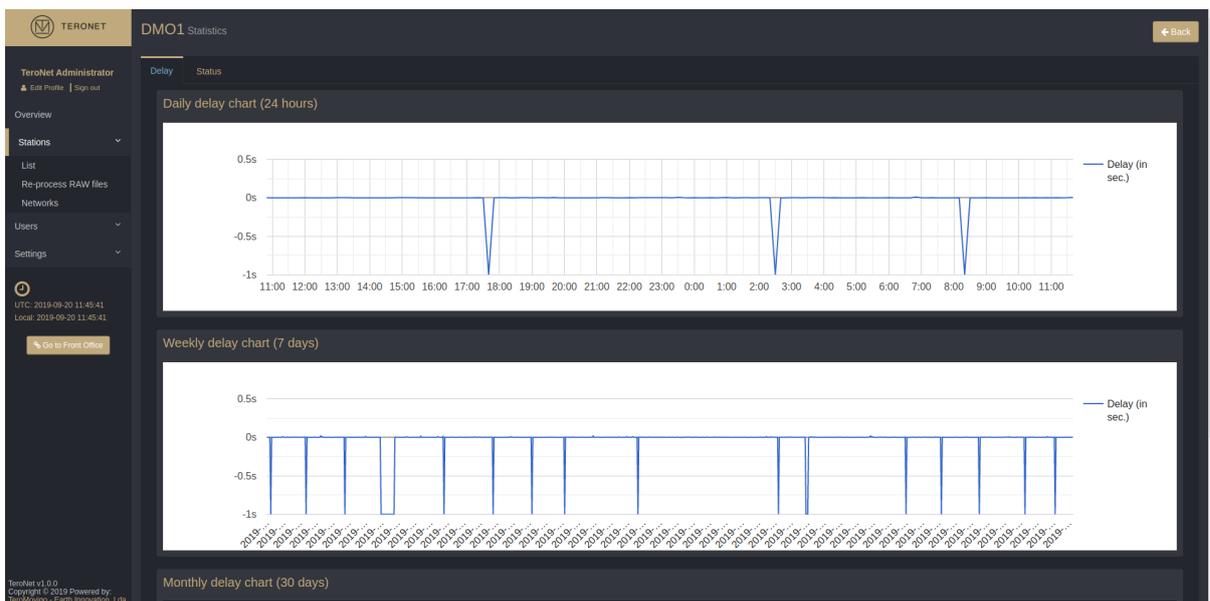


Figure 7.9 - CORS delay statistics.

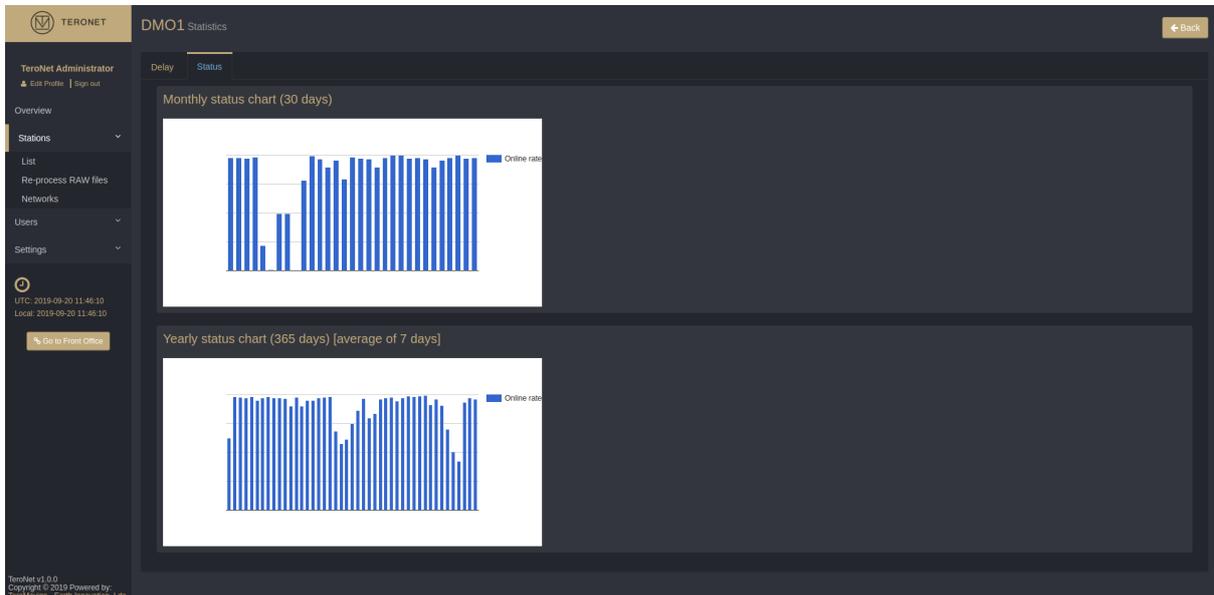


Figure 7.10 – CORS status statistics.

7.2.6 CORS reviews visualization

In order to visualize the revisions done to the CORS, the user should consult the CORS revisions area, which can be accessible by clicking the “Revisions” button from the “Details” option.

By clicking in the “Revisions” button, the user will be redirected to a view with all the information about all the changes made to the CORS in the platform, ordered by the date the changes were made in-situ and showing which information has been changed, as illustrated in Figure 7.12.

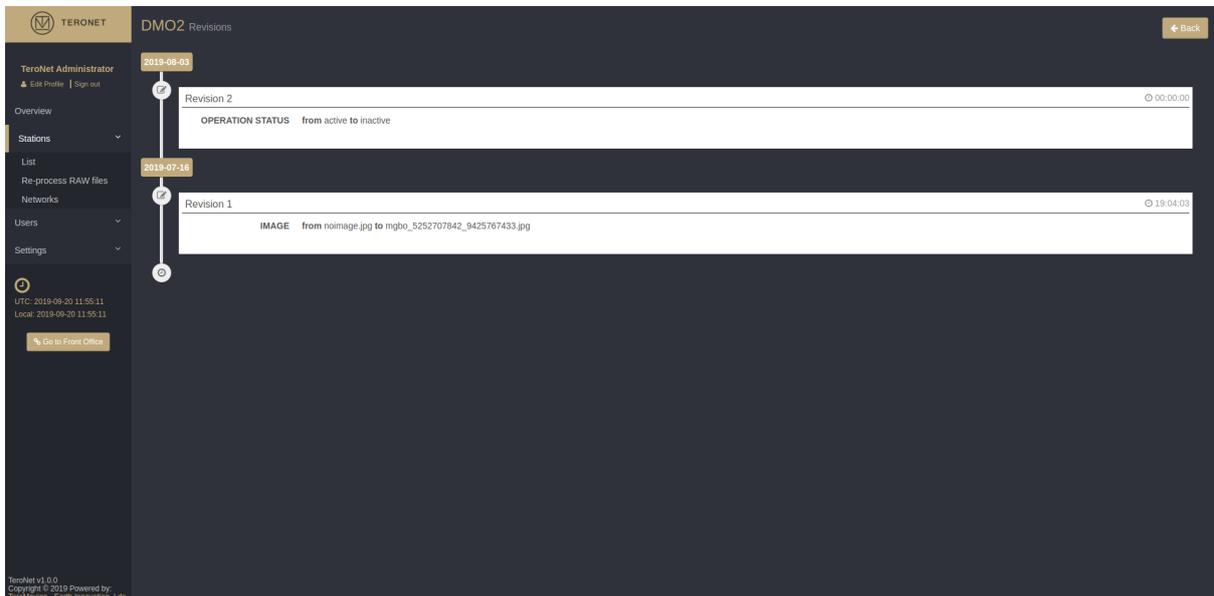


Figure 7.11 – CORS revisions view.

7.3 CORS Networks management

This functionality has the purpose to manage CORS networks. This kind of functionality is useful for networks who wish to include neighbor CORS from neighbor networks. It allows the TeroNet software to download RINEX data automatically from other CORS from other networks via an FTP connection with pre-defined parameters.

By accessing the CORS networks management, by choosing “Stations” -> “List”, the administrator is presented with a view of all the already configured networks, as illustrated in Figure 7.12.

By default, a “local” network is present which denominates the default network of the TeroNet software. This network cannot be changed neither be deleted, since it is used as the default network for the CORS.

IMPORTANT NOTICE: this functionality should be used with extreme care, since it allows the download of RINEX data from CORS that are not managed by the platform administrator. Before using this functionality, **please make sure that you have the necessary permissions to download external CORS data.**

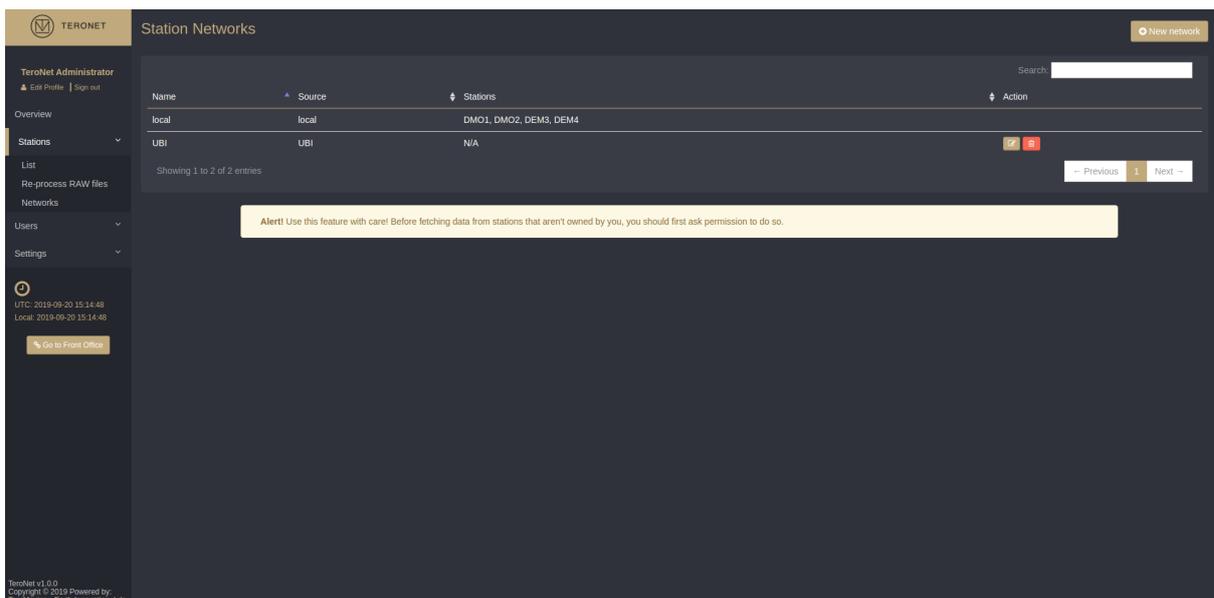


Figure 7.12 – CORS networks listing.

7.3.1 Adding a new CORS network

In the right upper corner of the page, the administrator will find the “New Network” button, by clicking that button the administrator will be able to create a new CORS network. A form is shown, enabling the administrator to create a new network, as illustrated in Figure 7.13.

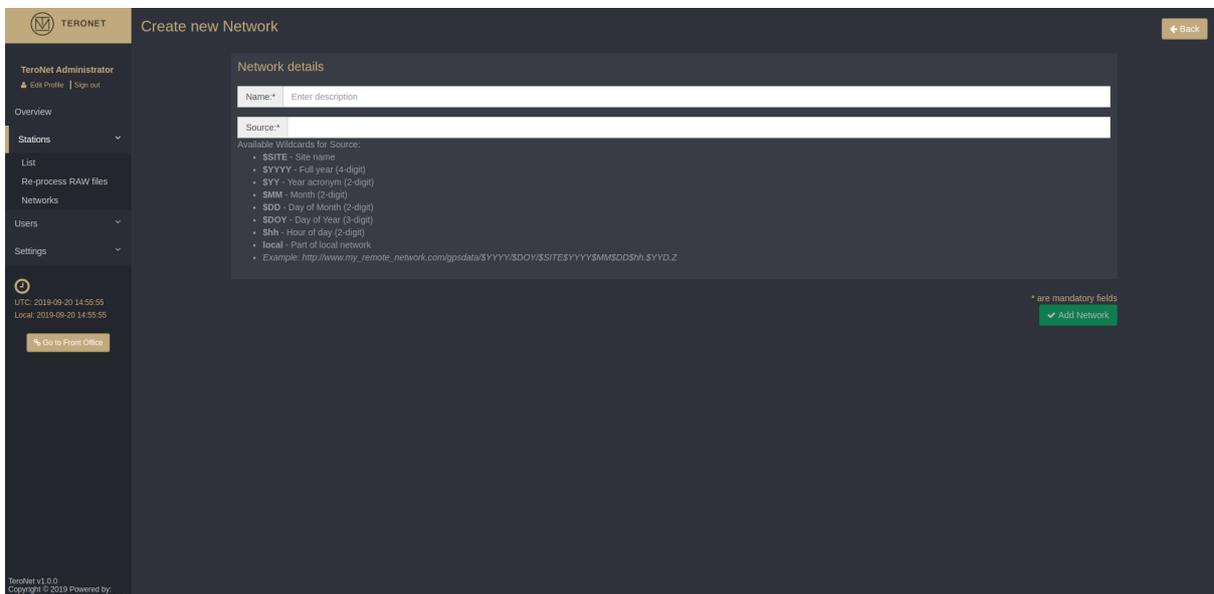
The form consists of two mandatory fields:

- **Name** - Name of the CORS network;

- **Source** – FTP server where the RINEX data is located. The FTP server should be defined using the following variables to compose the complete path to the files:
 - **\$SITE** - 4-character CORS name in big cap (e.g. STA1);
 - **\$site** - 4-character CORS name in small cap (e.g. Sta1);
 - **\$YYYY** – 4-digit year (e.g. 2019);
 - **\$YY** – 2-digit year (e.g. 19);
 - **\$MM** – 2-digit month (e.g. 09);
 - **\$DD** – 2-digit day of the month (e.g. 16);
 - **\$DOY** – 3-digit day of the year (e.g. 123);
 - **\$hh** – 2-digit hour of day (e.g. 09);

Source example:

ftp://example.com/RINEX/daily/\$YYYY/\$DOY/\$SITE\$YYYY\$MM\$DD0.\$YYD.Z



TERONET Create new Network ← Back

Network details

Name*

Source*

Available Wildcards for Source:

- \$SITE - Site name
- \$YYYY - Full year (4-digit)
- \$YY - Year acronym (2-digit)
- \$MM - Month (2-digit)
- \$DD - Day of Month (2-digit)
- \$DOY - Day of Year (3-digit)
- \$hh - Hour of day (2-digit)
- local - Part of local network
- Example: `http://www.my_remote_network.com/gpsdata/$YYYY/$DOY/$SITE$YYYYMMDD$hh.$YYD.Z`

* are mandatory fields

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Figure 7.13 – New CORS network form.

In order to save the new CORS network the administrator should click the “Add Network” button after the form is filled. Once a new network is saved the user can then add CORS to the network and the background mechanisms will then retrieve data from those external networked CORS.

7.3.2 Editing a CORS network

In order to edit a CORS network the user should click the “Edit” button which is accessible through the “Stations” -> “Networks” menu, like in the CORS editing procedure. By clicking that button, the user is presented with a form like the one shown when creating a new CORS network, but in this case the form is already filled with the current data from the CORS network that is being edited. This data can then be edited as wished and to save, the administrator should click the “Save Changes” button.

7.3.3 Eliminating a CORS network

In order to delete a CORS network the administrator should click the “Delete” button.

IMPORTANT NOTICE: after deleting a CORS Network, it isn't possible to recover the data deleted, however all the transferred data will remain in the server.

7.4 Platform User's Management

This functionality has the purpose to manage the users who have access to the TeroNet web platform. This functionality allows the administrator to add, edit or delete users, as well as to define the user's permissions, check user's activity profiles and to review the pre-registration accounts.

By accessing the user's management area, the user is presented with a list of all the registered users, as illustrated in Figure 7.14. From this view, the administrator can create, edit and delete users, consult a user's activity report, his permissions and review pre-registration accounts.

By default, there is at least one user with a maximum permissions level. This user cannot be deleted if there isn't any other user with the same maximum permissions level. It is also impossible to remove the user from its maximum permissions level if there isn't any other user with the same maximum permissions level.

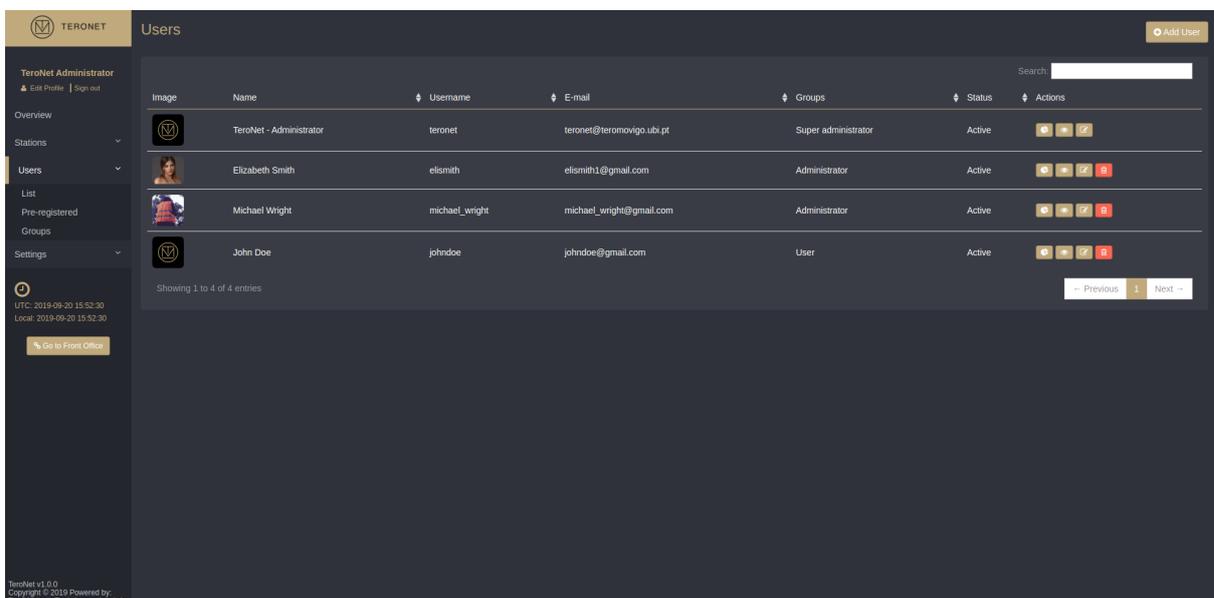


Image	Name	Username	E-mail	Groups	Status	Actions
	TeronNet - Administrator	teronet	teronet@teromovigo.ubi.pt	Super administrator	Active	  
	Elizabeth Smith	elismith	elismith1@gmail.com	Administrator	Active	  
	Michael Wright	michael_wright	michael_wright@gmail.com	Administrator	Active	  
	John Doe	johndoe	johndoe@gmail.com	User	Active	  

Showing 1 to 4 of 4 entries

Previous 1 Next

UTC: 2019-09-20 15:52:30
Local: 2019-09-20 15:52:30

[Go to Front Office](#)

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Figure 7.14 – Users listing.

7.4.1 Adding a new user

In the “User” -> “List” menu, the administrator may find a “Add User” button, by clicking that button, it is possible to create a new platform user. Once the administrator clicks the button, a new pop-up is shown with a form and the required fields for creating a new user, as illustrated in Figure 7.15.

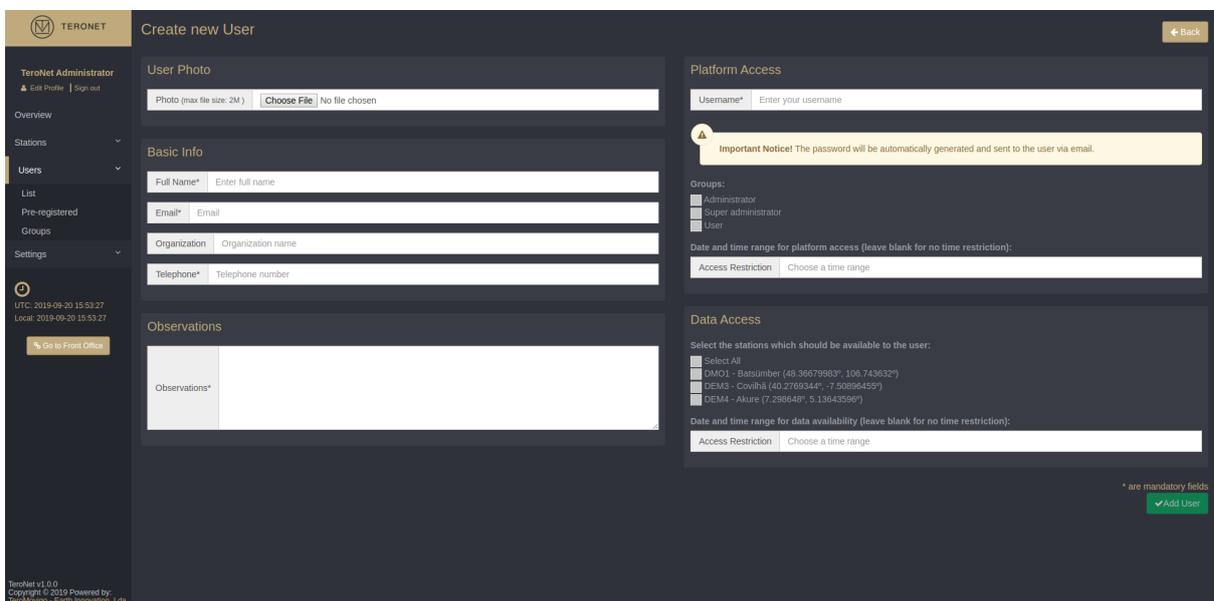


Figure 7.15 – New user form.

The form requires that all the fields marked with the symbol * are filled.

- **User Photo**
 - **Photo** – User avatar. If no photo is provided, a default avatar is set;
- **Basic Info**
 - **Full Name** – User’s real name
 - **Email** – Valid email address;

- **Organization** – User's organization;
- **Telephone** – User's phone;
- **Platform Access**
 - **Username** – Chosen username for login process;
 - **Groups** – Multiple groups with different permission levels.
 - **Date and Time Range** – Date range of which the user can login and use the platform. If no date range is specified, the user won't have any date range restriction.
-
- **Data Access**
 - **Stations** – Stations available to the user
 - **Date and Time Range** – Date range of which the user can access the data. If no date range is specified, the user won't have any date range restriction.

After filling the required fields, the user must click the “Add User” button to add a new user to the platform. By clicking that button, the new user will receive an email with the confirmation of the account creation and login details, as illustrated in Figure 7.16.

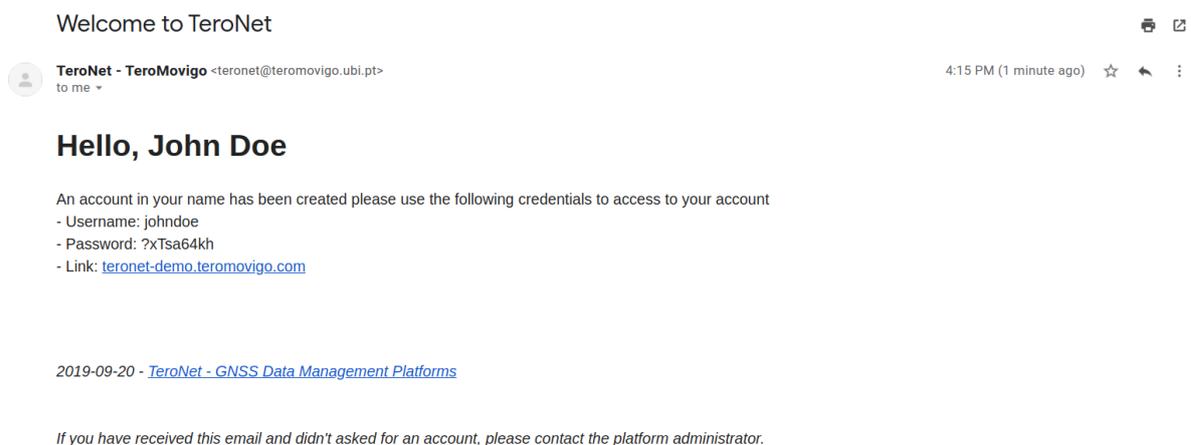


Figure 7.16. New account confirmation email

7.4.2 Editing a user

In order to edit a user, the administrator should click the “Edit” button (Figure 7.17). By clicking this button, a form is presented like the one presented when creating a new user, but this one is already filled with the current user information (Figure 7.18). This data can be edited as wish and, in order to save the changes, the user must click the “Edit User” button.

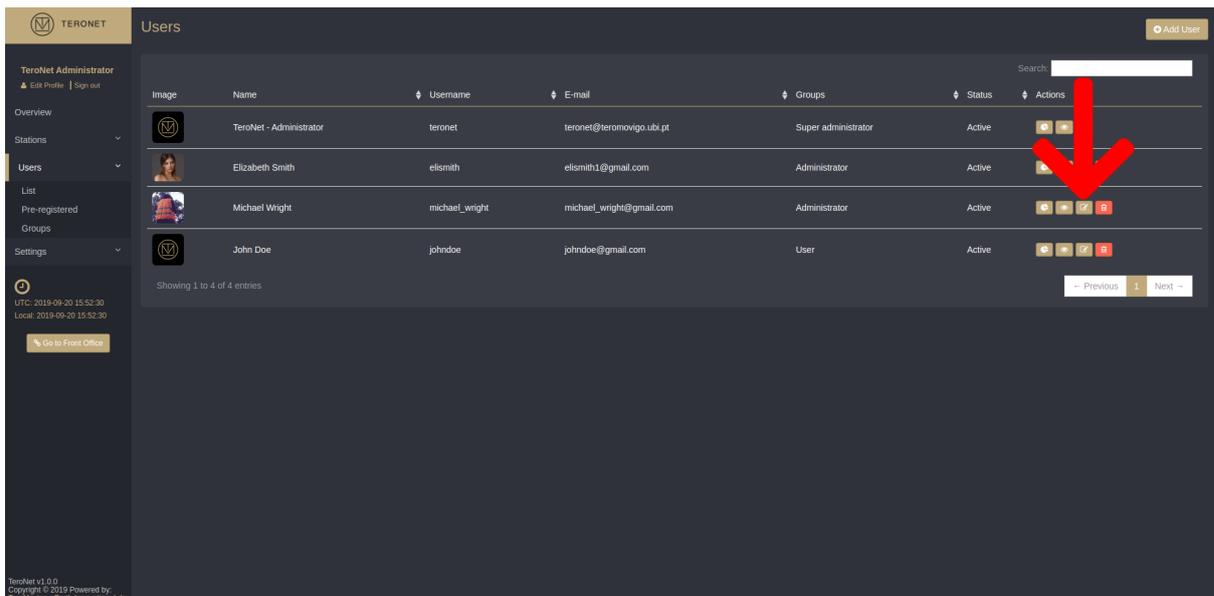
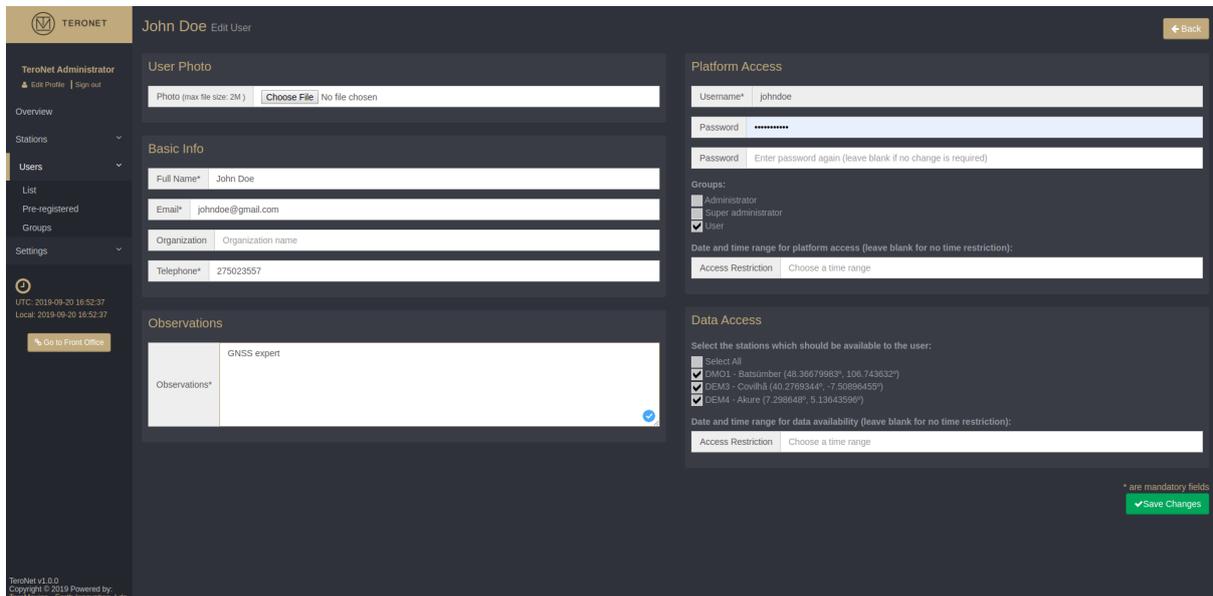


Figure 7.17. Edit button



The screenshot shows the 'John Doe Edit User' form in the Teronet administrator interface. The form is divided into several sections:

- User Photo:** A field for a profile picture with a 'Choose File' button and a note 'No file chosen'.
- Basic Info:** Fields for 'Full Name*' (John Doe), 'Email*' (johndoe@gmail.com), 'Organization', and 'Telephone*' (275023557).
- Observations:** A table with one entry: 'GNSS expert'.
- Platform Access:** Fields for 'Username*' (johndoe), 'Password', and 'Access Restriction' (Choose a time range).
- Data Access:** A section for selecting stations with checkboxes for 'Select All', 'DEM01 - Batsimber (40.36679983°; 106.743632°)', 'DEM03 - Covilhã (40.2769344°; -7.50996455°)', and 'DEM04 - Akure (7.298648°; 5.13643596°)'. It also includes a date range field and an 'Access Restriction' dropdown.

At the bottom right, there is a 'Save Changes' button and a note: '* are mandatory fields'.

Figure 7.18 - User editing form.

7.4.3 Assigning CORS to a user

In order to set permissions for users download CORS data, the administrator should click in the CORS that pretends to assign to a user. To do so, the administrator must edit a user as shown in the previous step and then choose the CORS in the “Data Access” box, as illustrated in Figure 7.19.

The CORS listing is presented with an associated checkbox on which the administrator can click in order to choose which CORS should the user be able to see and download data from. On the text field the administrator should choose the date range of which the user should be able to download data from.

This data can be changed as wish, requiring only a click in the “Save Changes” button at the end, in order to save the alterations.

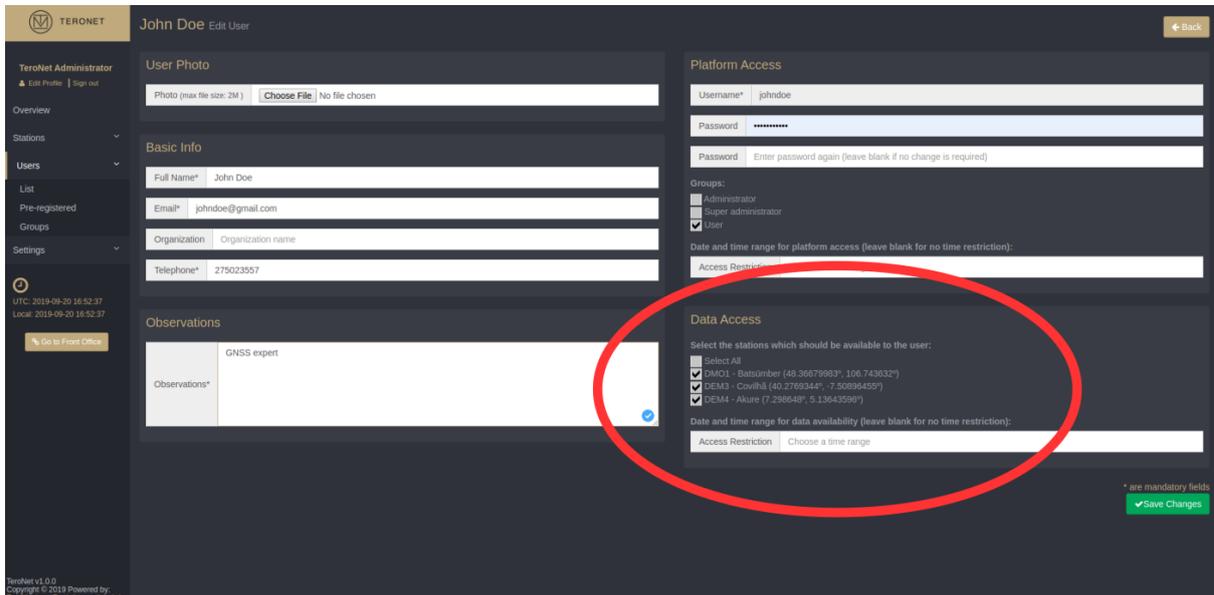


Figure 7.19 – User CORS assignment.

7.4.4 Deleting a user

In order to delete a user, the administrator should click the “Delete” button which is accessible through the “Users” -> “List” page.

IMPORTANT NOTICE: after deleting a user, it isn’t possible to recover the deleted data.

7.4.5 Review user’s activity

In order to review the user’s activity in the platform, the administrator should click the “Show Info” button from the “Accounting” column, in order to generate an individual report on the user’s activity while logged into the TeroNet web platform, as illustrated in Figure 7.20.

This report has multiple sections, which are related to the types of downloads the user made, its size, the favorite CORS, number of logins, date of last login and other important information.

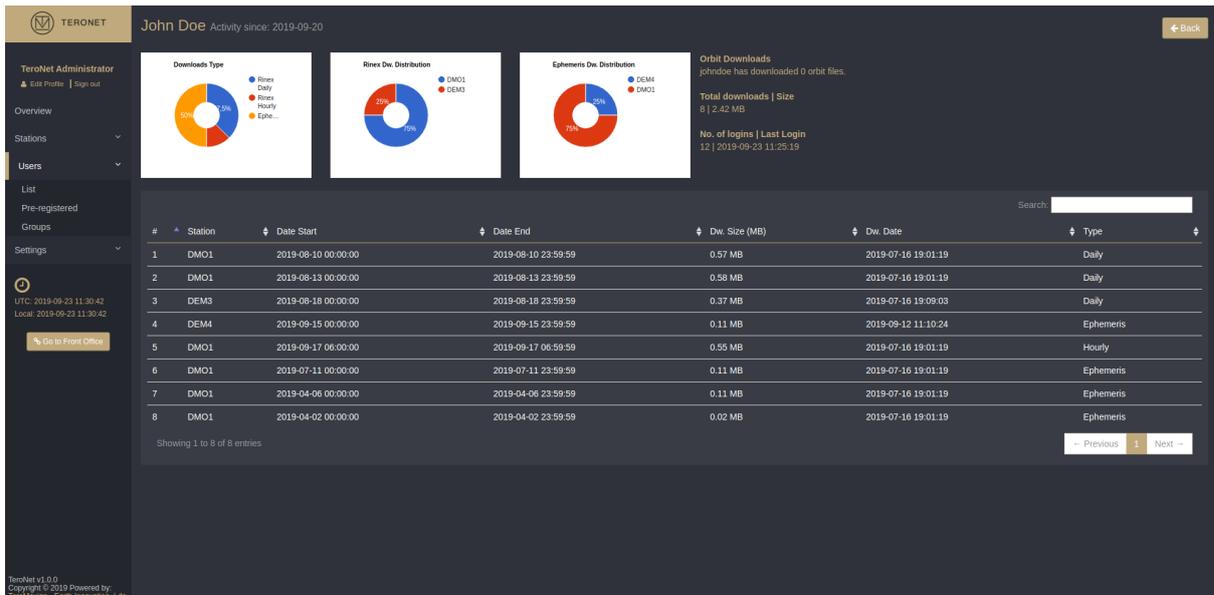


Figure 7.20 – User's activity report.

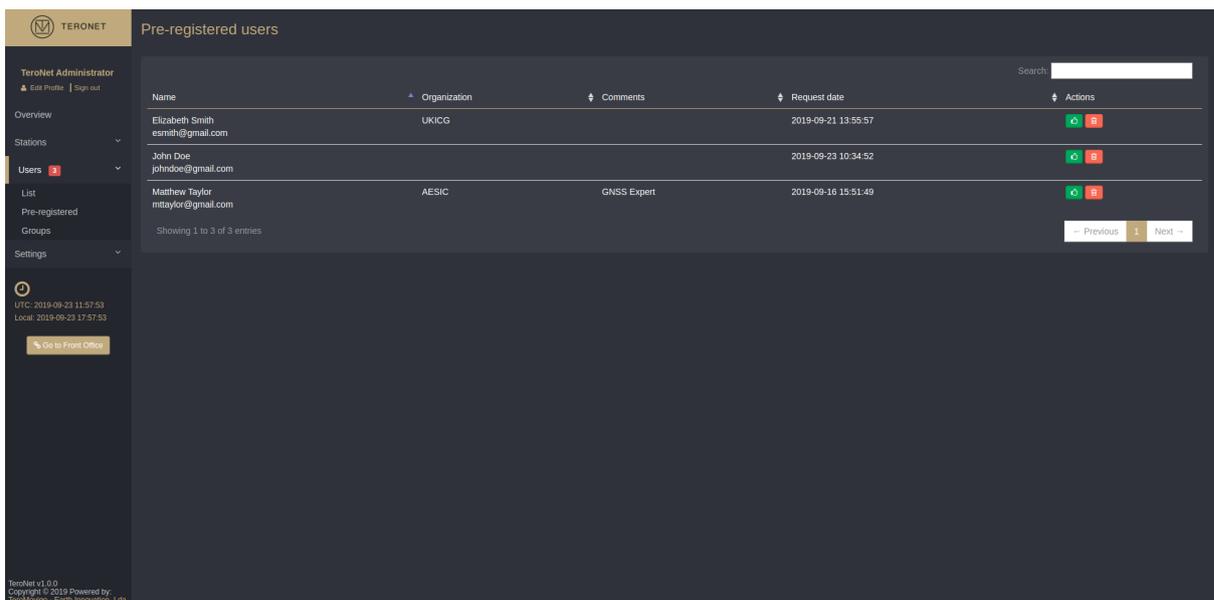
7.4.6 Review of pre-registration users request

Once anyone can request a new account, these requests get through a pre-registration and approval process. Every time a user requests a new account, the administrators will be warned via email of this request.

In order to access a listing of new user account requests, the administrator should click the "Pre-registered users" option of the Users menu on the navigation menu. By clicking in that option, a list with all the current request is shown, as illustrated in Figure 7.21, in this view, the administrator can see the new requests and act on them. In order to act, the user can choose two options from the "Actions" column, either he can choose

“Approve” and convert the pre-registration request into a user account, or “Delete” to delete the account request.

Whenever there are users awaiting approval, the administrator can see a notification icon in red, next to the “Users” menu, with the number of pre-registered users.



Name	Organization	Comments	Request date	Actions
Elizabeth Smith esmith@gmail.com	UKICG		2019-09-21 13:55:57	+ -
John Doe johndoe@gmail.com	GNSSEurope		2019-09-23 10:34:52	+ -
Matthew Taylor mattaylor@gmail.com	AESIC	GNSSEurope	2019-09-16 15:51:49	+ -

Showing 1 to 3 of 3 entries

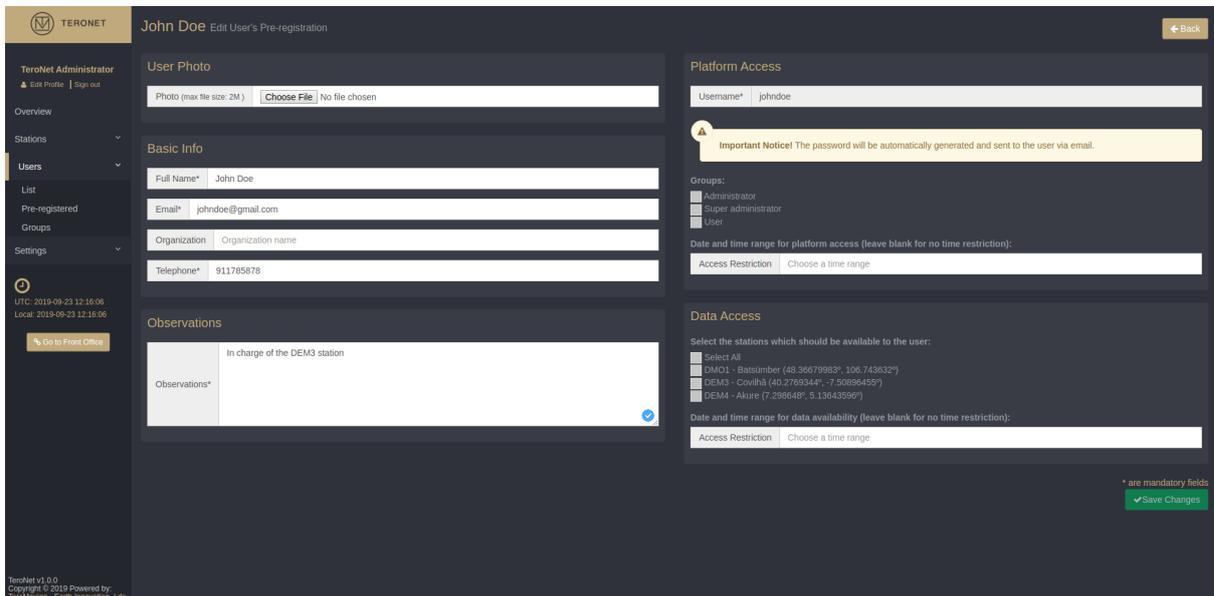
UTC: 2019-09-23 11:57:53
Local: 2019-09-23 17:57:53

Go to Front Office

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Figure 7.21 – Pre-registered users listing

In case the administrator wants to approve the request and convert the pre-registration request into a user account, the administrator should click the “Approve” button and a form like the one used to create and edit the platform users will appear. This form is already filled with the information provided by the user in the pre-registration request, as illustrated Figure 7.22. In this form the user may complete the user’s profile and then click the “Save Changes” button in order to save the changes and notify the user by email that the request has been approved.



The screenshot shows a web interface for editing a user's pre-registration. The user is identified as John Doe. The form is divided into several sections:

- User Photo:** A field for uploading a photo (max file size: 2M) with a 'Choose File' button. No file is currently chosen.
- Basic Info:** Fields for Full Name* (John Doe), Email* (johndoe@gmail.com), Organization (Organization name), and Telephone* (911785878).
- Observations:** A text area with the note 'In charge of the DEM3 station' and a 'Save' button.
- Platform Access:** Username* (johndoe), an important notice about password generation, a 'Groups' section with checkboxes for Administrator, Super administrator, and User, and a 'Date and time range for platform access' field.
- Data Access:** A section to 'Select the stations which should be available to the user' with checkboxes for 'Select All', 'DEM01 - Batsimber (48.35679983°, 106.743632°)', 'DEM3 - Coviñã (40.2769344°, -7.50896455°)', and 'DEM4 - Akure (7.298648°, 5.13643596°)'. It also includes a 'Date and time range for data availability' field.

At the bottom right, there is a 'Save Changes' button and a note that asterisks indicate mandatory fields.

Figure 7.22 – New user account conversion form.

In case the request has no interest, the administration can simply drop the request by clicking the “Delete” button.

IMPORTANT NOTICE: after deleted, a request cannot be recovered.

7.5 User groups management

This functionality has the purpose to manage user groups. These user groups are important because they define different permission levels inside the web platform which allows to distinguish the users from one another.

By accessing the user groups management, the administrator is presented with a listing of all the existing user groups, as illustrated in Figure 7.23. From this view, it is possible for the administrator to create new user groups, edit or delete existing user groups. By default, a group called “Admin” exists and cannot be edited or deleted, once it

represents the maximum level of permissions and if this group is deleted, there won't be no way that this level of permissions could be reached again.

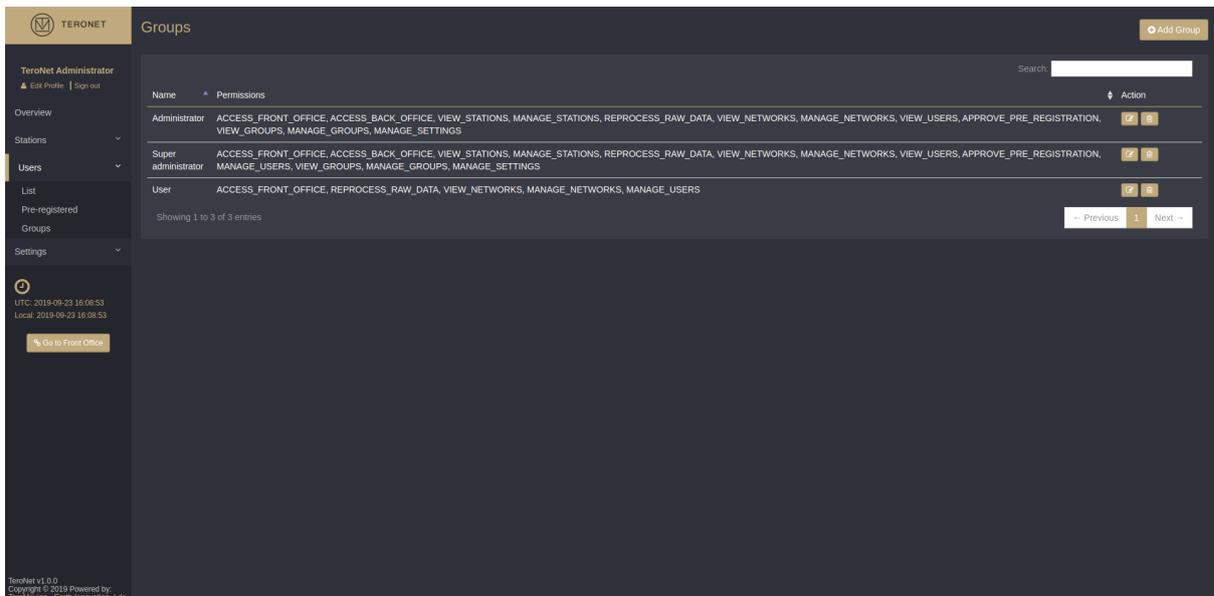


Figure 7.23 – User groups listing.

7.5.1 Adding a new user group

In the navigation menu, the administrator may find a “Add Group” button, by clicking that button, it is possible to create a new user group. Once the administrator clicks the button, a new form is shown with the required fields for creating a new group, as illustrated in Figure 7.24.



The screenshot shows the 'Create new Group' form in the TERONET Administrator interface. The form is titled 'Create new Group' and has a 'Back' button in the top right corner. On the left side, there is a navigation menu with options: 'TeroNet Administrator', 'Overview', 'Stations', 'Users', 'List', 'Pre-registered', 'Groups', and 'Settings'. The 'Users' menu item is selected. The main content area is titled 'Group details' and contains a 'Name*' input field with the placeholder text 'Enter name'. Below the input field is a 'Select permissions' section with 14 checkboxes and their descriptions:

- ACCESS FRONT OFFICE - The user is able to access the Front Office
- ACCESS BACK OFFICE - User is able to access Back Office.
- VIEW STATIONS - User can view stations in Back Office.
- MANAGE STATIONS - User can manage stations in Back Office.
- REPROCESS RAW DATA - User can schedule raw data reprocessing operations in Back Office.
- VIEW NETWORKS - User can view station networks in Back Office.
- MANAGE NETWORKS - User can manage station networks in Back Office.
- VIEW USERS - User can view other registered users in Back Office.
- APPROVE PRE REGISTRATION - User can approve or disapprove pre-registered users in Back Office.
- MANAGE USERS - User can manage other registered users in Back Office
- VIEW GROUPS - User can view user groups in Back Office.
- MANAGE GROUPS - User can manage user groups in Back Office.
- MANAGE SETTINGS - User can manage settings in Back Office.

At the bottom right of the form, there is a green 'Add Group' button. A small note indicates that fields with an asterisk (*) are mandatory. The footer of the page shows 'TeroNet v1.0.0 Copyright © 2019 Powered by: TEROMOVIGO, S.A. All Rights Reserved. Ltd.'

Figure 7.24 – New user's group form.

The form requires all fields below-

- **Name** – Group Name;
- **Various permissions** (Choose multiple)
 - **ACCESS FRONT OFFICE** - The user can access the Front Office;
 - **ACCESS BACK OFFICE** - User can access Back Office;
 - **VIEW STATIONS** - User can view stations in Back Office;
 - **MANAGE STATIONS** - User can manage stations in Back Office;
 - **REPROCESS RAW DATA** - User can schedule raw data reprocessing operations in Back Office;
 - **VIEW NETWORKS** - User can view station networks in Back Office;
 - **MANAGE NETWORKS** - User can manage station networks in Back Office;
 - **VIEW USERS** - User can view other registered users in Back Office;
 - **APPROVE PRE-REGISTRATION** - User can approve or disapprove pre-registered users in Back Office;



- **MANAGE USERS** - User can manage other registered users in Back Office;
- **VIEW GROUPS** - User can view user groups in Back Office;
- **MANAGE GROUPS** - User can manage user groups in Back Office;
- **MANAGE SETTINGS** - User can manage settings in Back Office.

After filling all fields, the administrator may click the “Add Group” button in order to save the new user’s group.

7.5.2 Editing user groups

In order to edit a group, the administrator should click the “Edit” button which is accessible in the “Action” column, as with other areas of the administration panel. By clicking this button, a form is presented like the one presented when creating a new group, but this one is already filled with the current user group information. This data can be edited as wish and to save the changes, the administrator must click the “Save Changes” button.

7.5.3 Deleting a user group

In order to delete a user’s group, the administrator should click the “Delete” button which is accessible in the “Action” column.

IMPORTANT NOTICE: it is only possible to delete a user group if there isn’t any user associated with this group.

IMPORTANT NOTICE 2: after deleting a user group, it isn't possible to recover the deleted group.

7.6 Settings

7.6.1 General Settings

By clicking in the “General Settings” option from the “Settings” menu it is possible to access the general settings of the TeroNet software, as illustrated in Figure 7.25. In this screen it is possible to customize fields such as:

- Platform General Settings
 - **Site URL** – TeroNet web platform URL;
 - **Country** – Main network country;
 - **Site Title** – Site title;
 - **Login Session Time** – Maximum time for an authenticated session;
 - **Locked Account Time** – Waiting time for a user to re-login after failing to login 5 times in a row;
 - **Allow Pre-registration Requests** – Allow registration of new users.
- Maintenance Mode
 - **Maintenance Mode** – This option allows the administrator to put the platform in maintenance mode so no one can access it;

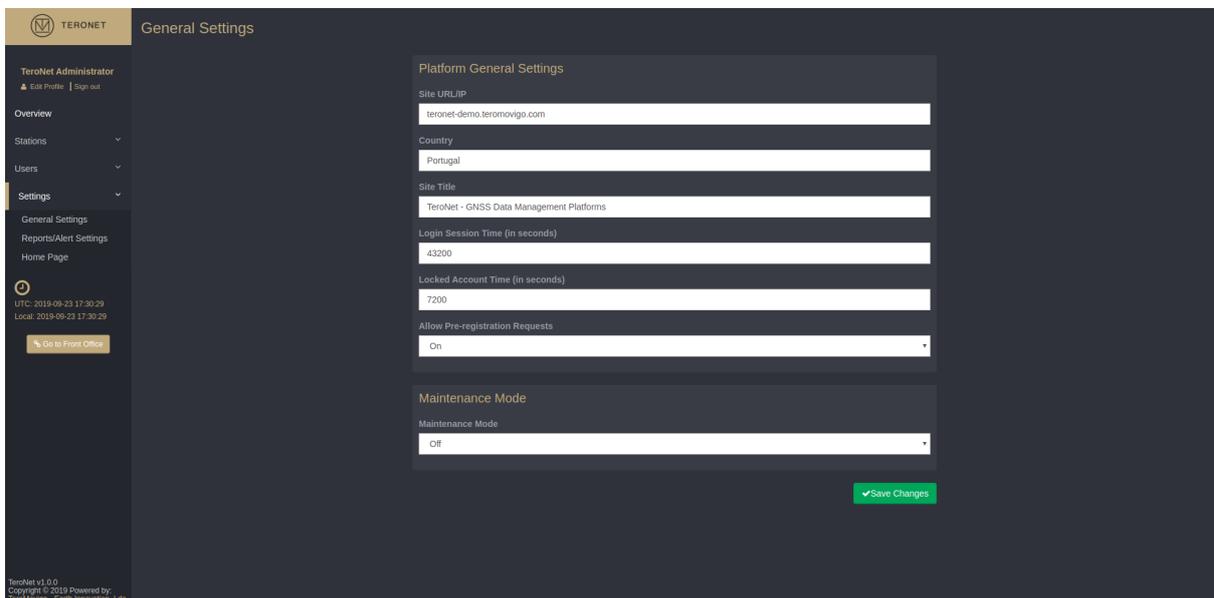


Figure 7.25 – General Settings.

7.6.2 Reports/Alert Settings

7.6.2.1 Reports

In the reports area, it is possible to generate activity reports of the TeroNet software itself (Figure 7.26). Here it is possible to find data related to the availability of RINEX data, received RAW files, downloads, etc.

The administrator can configure when and who will receive these reports in the email by filling the following fields:

- **Frequency** - Day(s) of the week when reports will be sent;
- **Recipients** - Allows the administrator to choose the recipients of the reports among the registered users;
- **Additional recipients emails** - Allows the administrator to send the reports to other users or emails not registered in the platform;
- **History size of reports** - Number of days considered in the report.

In order to save the reports settings, the administrator must click the “Submit” button.

7.6.2.2 Station Status Alerts

Here the administrator can configure alerts for when a station goes offline and/or online (Figure 7.26).

To do so, the administrator must fill the following fields for both online and offline status:

- **Online/Offline stations** - Allows the administrator to choose the stations of which will be generated reports;
- **Recipients** - Allows the administrator to choose the recipients of the reports among the registered users;
- **Additional recipients emails** - Allows the administrator to send the reports to other users or emails not registered in the platform.
-

In order to save the reports settings, the administrator must click the “Submit” button.

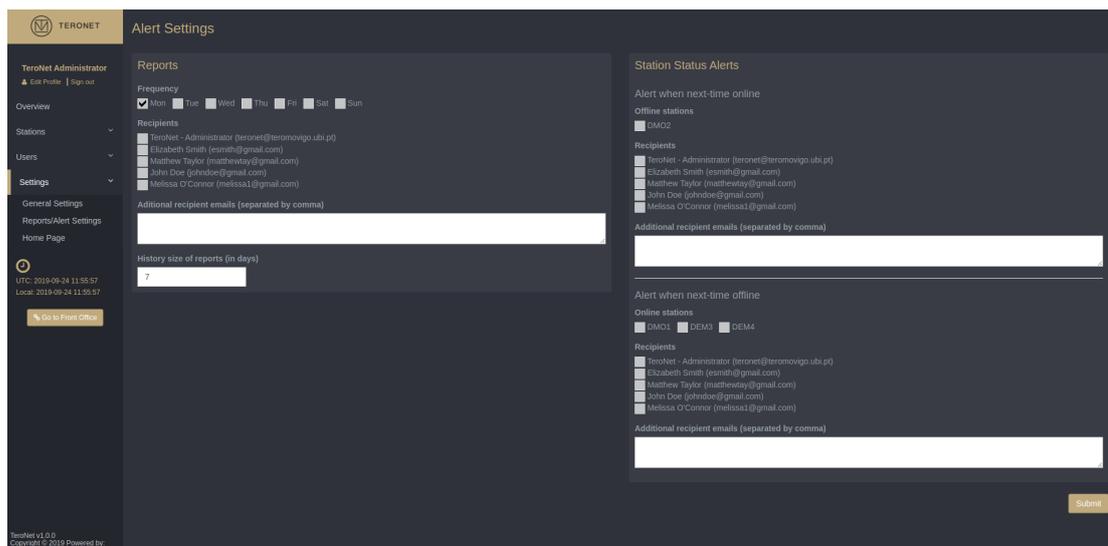


Figure 7.26 – Alert Settings

7.6.3 Home Page Settings

By clicking in “Home Page”, from the “Settings” menu it is possible to access and edit the text that is presented when the user first accesses the page without being logged in, as illustrated in Figure 7.27. In this screen it's possible to customize the text that is presented in the entry page.

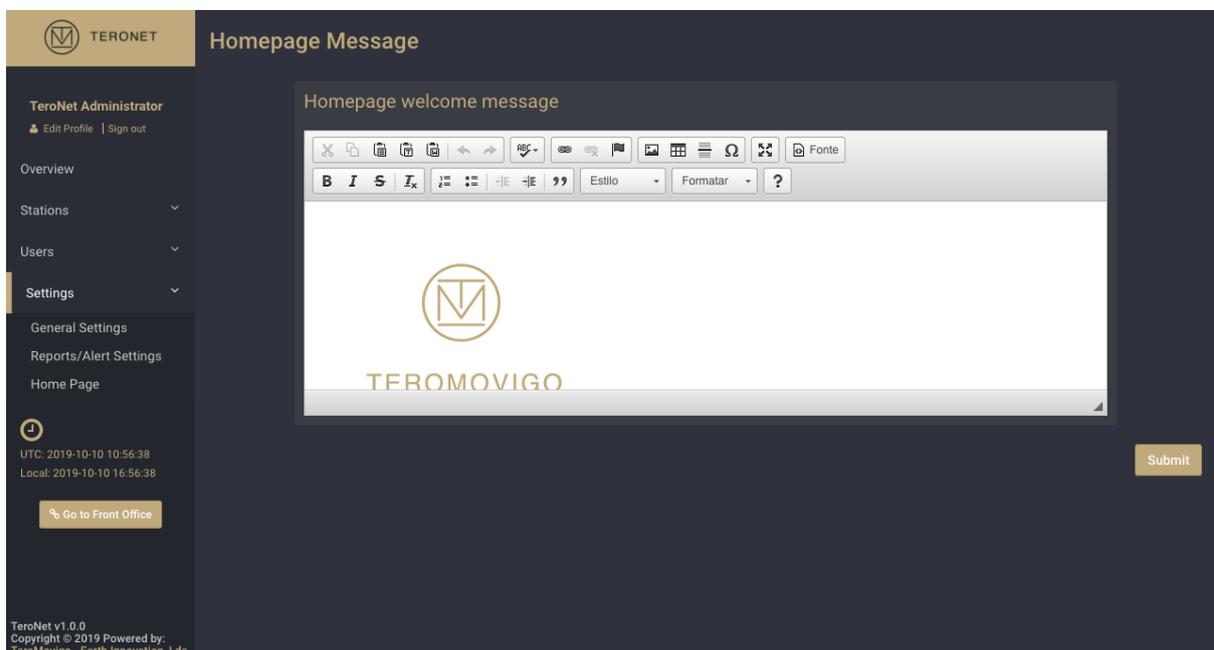


Figure 7.27 – Home Page settings form.

8 Technical Support

This manual describes the complete workflow of the TeroNet software and its components. A new TeroNet software administrator is highly recommended for a reading of this document in order to understand all the components and underlying workflow of the TeroNet software.

In order to get the most recent version of the TeroNet software manual, please check the following link:

<http://teromovigo.com/teronet-manual> (in development)

If you have any questions regarding the RINEX format, please refer the following link first:

<https://igscb.jpl.nasa.gov/igscb/data/format/rinex211.txt>

For more information about receivers and antennas, please refer to the listing provided by the IGS:

http://igscb.jpl.nasa.gov/igscb/station/general/rcvr_ant.tab

and for offset tables:

<http://igscb.jpl.nasa.gov/igscb/station/general/antenna.gra>

To communicate directly with the TeroNet software development team, please contact the following email: support@teromovigo.com

TeroNet Administrator's Manual, October 31, 2019

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