

MIRAnet GNSS Network Management System

User's Manual

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V.2

Prepared by:



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1. Introduction

MIRAnet GNSS Network Management System is a web-based software platform designed for the management and operation of CORS (Continuously Operating Reference Station) networks. The system integrates data acquisition, processing, quality control, and service distribution functionalities within a centralized environment, supporting both operational monitoring and advanced geodetic analysis.

The platform enables the automated storage and processing of raw GNSS data, their conversion into RINEX format, and the application of quality control procedures to ensure data integrity and reliability. Processed data is made available to authorized users through a web interface, while real-time GNSS corrections can be distributed via an NTRIP Caster service. Additionally, MIRAnet includes advanced tools for coordinate transformation and GNSS station time series generation and visualization.

This manual provides a comprehensive description of the MIRAnet platform, covering its system architecture, public and administrative interfaces, data management workflows, and advanced modules. The document is organized into sections that guide the reader from general system concepts to detailed operational procedures, ensuring effective and correct use of the platform.

2. System Overview

MIRAnet is an integrated software suite and web-based platform that provides a set of advanced tools for GNSS data pre-processing, as well as the subsequent publication and availability of processed data to registered users through the online platform.

2.1 GNSS Data Flow

The received raw GNSS data are stored on the MIRAnet server and automatically placed in a processing queue, where they are converted into RINEX observation files. After conversion, the quality assurance component allows users to evaluate the quality and completeness of the processed data, for example by reviewing data availability, identifying missing or invalid observations, and verifying file validity before download. The processing workflow is illustrated in

in

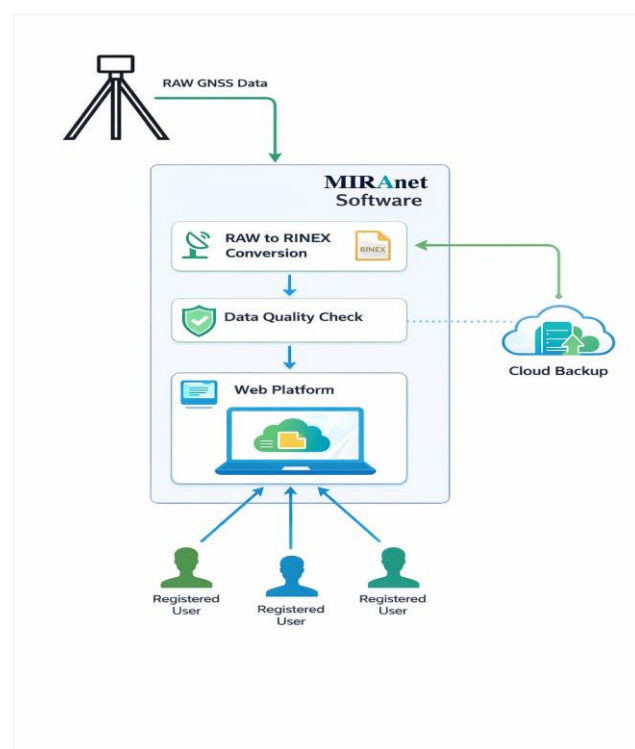


Figure 1. MIRAnet Software data flow.

3. Public Interface

The public interface is accessible to all users and corresponds to the first screen displayed when accessing the MIRAnet web platform. It provides a map showing the location of the CORS network, a brief description of the service, an option to request a new user account and a login form. (See Figure 2).

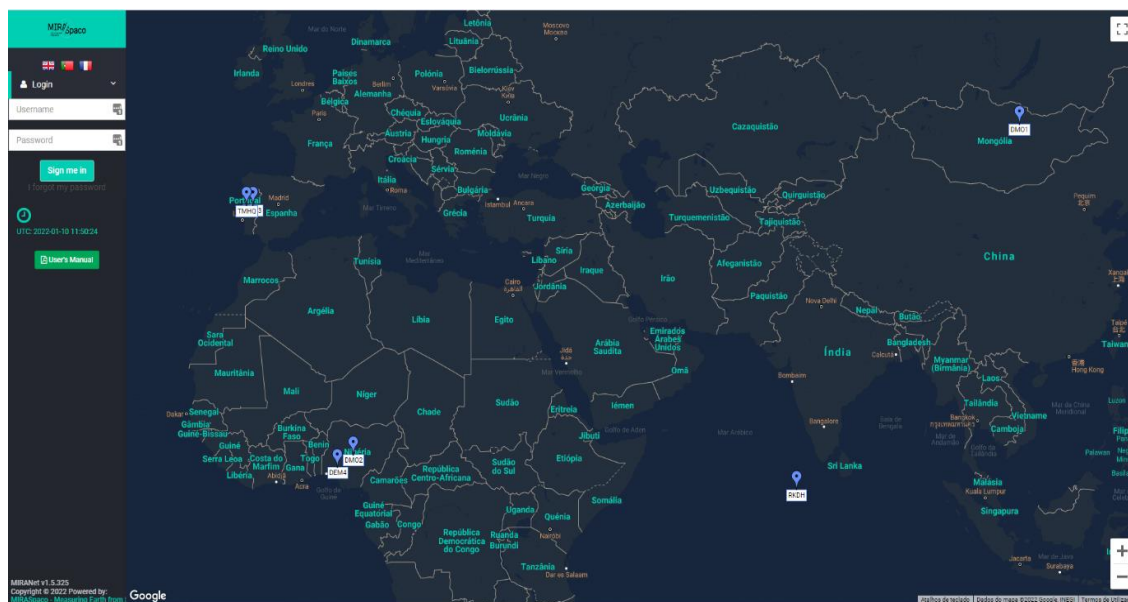


Figure 2. Welcome screen

3.1 New user account request

Interested users can request a new account using the “Sign Up” feature. The “Sign Up” button is in the upper-left corner of the page, next to “Login”. Once selected, the registration form displays the registration form (all fields are mandatory) (See Figure 3).

Users must complete the following information:

Personal data

- **Full name:** user’s full name
- **Email:** user’s email address
- **Organization:** user’s organization or institution
- **Telephone:** user’s phone contact
- **Preferred username:** desired username for the platform
- **Observations:** Additional notes or comments provided to help administrators understand the purpose of the request and decide whether to approve the account.

After filling the form, the user must select the validation checkbox and click **“Request New Account”** to submit the request. Depending on the platform configuration defined in the **settings section**, the request may require administrator approval, or the account may be created automatically. When approval is required, a notification email is automatically sent to the platform administrators for review.

Figure 3. Pre-registration form

Once the request is approved by the administrators, the new user receives an email containing the password to access the platform. This message is sent to the email address provided during registration, as shown in :(See Figure 4)

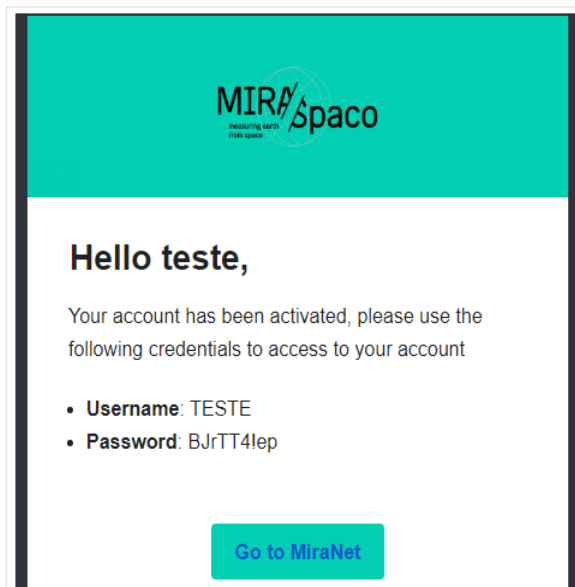


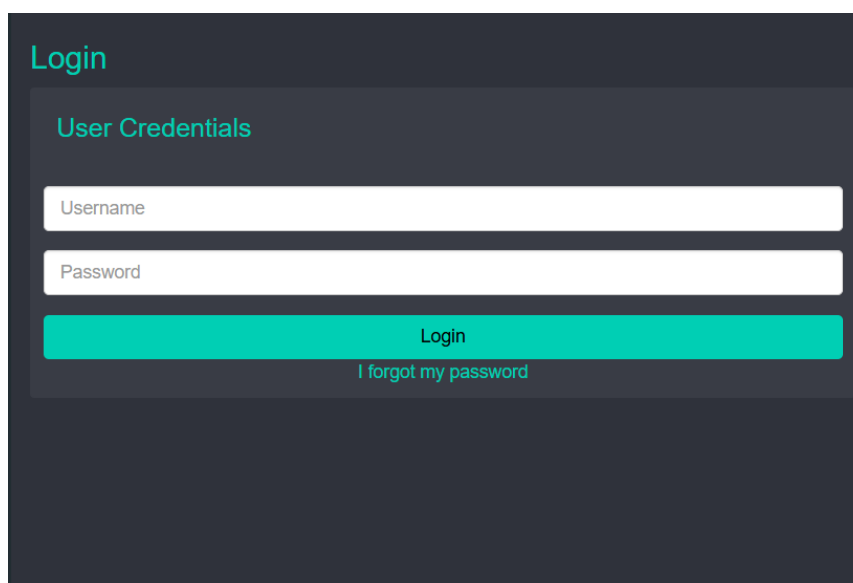
Figure 4. Welcome email

4. Registered User Interface (Front office)

The registered user interface is available only to users who have been previously approved by the administrator. Approved users can access detailed CORS information and download the available CORS data.

4.1 Login

To access the registered user interface, users must first log in to the platform. To do so, click the **“Login”** button located in the upper-left corner of the page and enter the username in the top field and the password in the lower field, Finally, click **“Sign me in”**.(See Figure 5).



The image shows a dark-themed login form. At the top left, the word "Login" is written in a light blue font. Below it, the text "User Credentials" is displayed in a light blue font. There are two white input fields: the top one is labeled "Username" and the bottom one is labeled "Password". Below these fields is a prominent blue button with the text "Login" in white. Underneath the button, there is a smaller, light blue link that reads "I forgot my password".

Figure 5.Login form

If a user forgets their password, a new one can be set. To do so, the user must click the **“I forgot my password”** option located below the **“Sign me in”** button.

After selecting this option, a new form is displayed :(See Figure 6), where the user must enter the email address used during registration. The platform will then send instructions to reset the password.

Password Recovery - Step 1

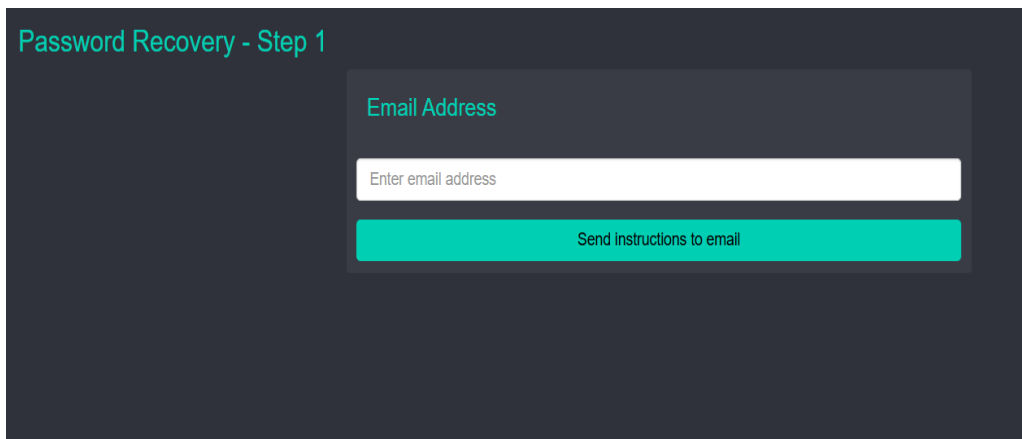


Figure 6. Password recovery first screen.

After receiving the password reset email with the corresponding instructions : (See Figure 7), the user should follow the URL provided in the message. This link redirects the user to a form (See Figure 8), where they must enter and confirm a new password by typing it twice. Once submitted, the new password replaces the previous one, allowing the user to log in again.

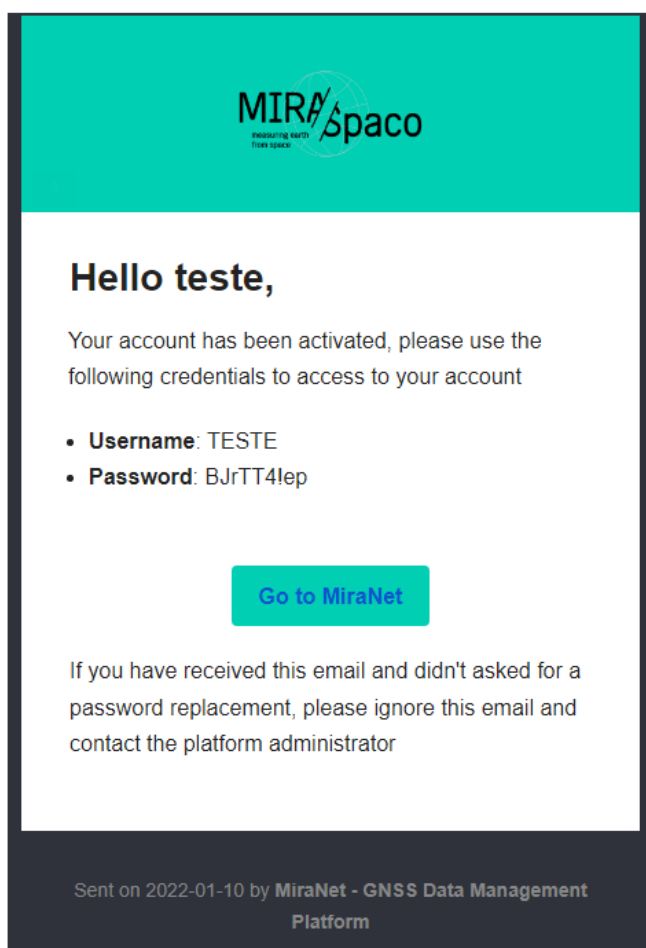


Figure 7. Password replacement instructions

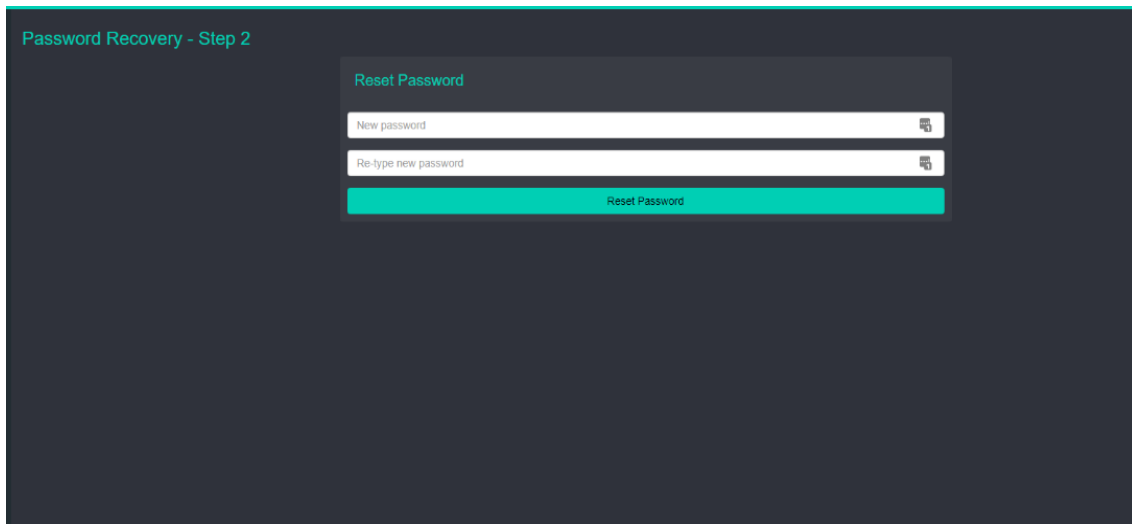


Figure 8. Password replacement form

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

4.2 User Portal Overview

After successful authentication, the registered user dashboard is displayed.

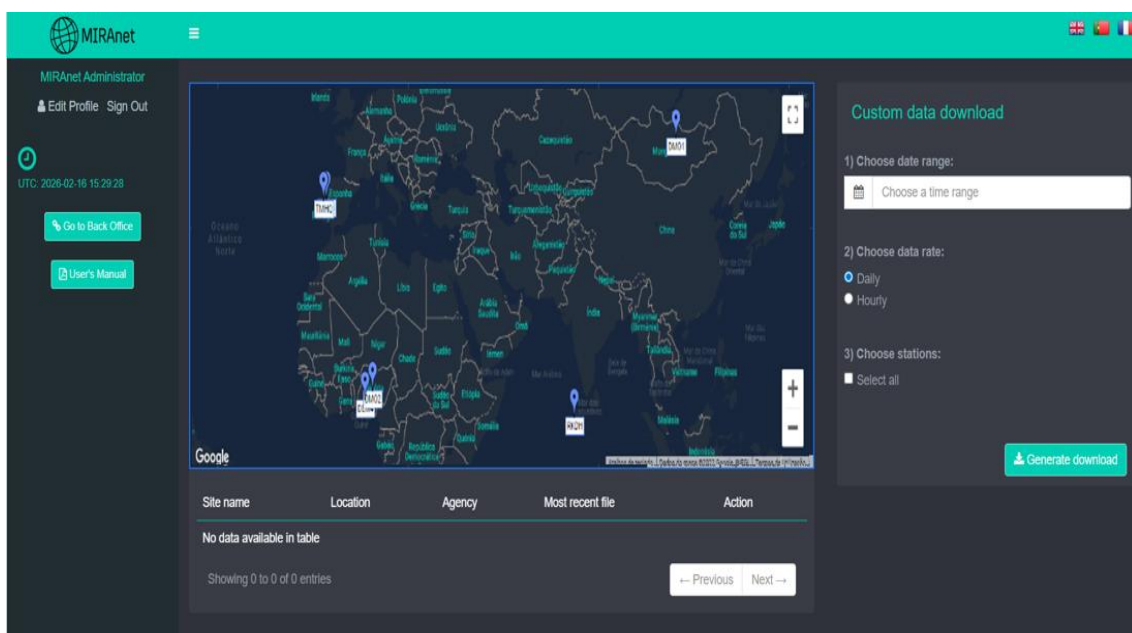


Figure 9. Front office page.

The central interface section provides access to CORS station details and includes the following information for each station (See Figure 10):

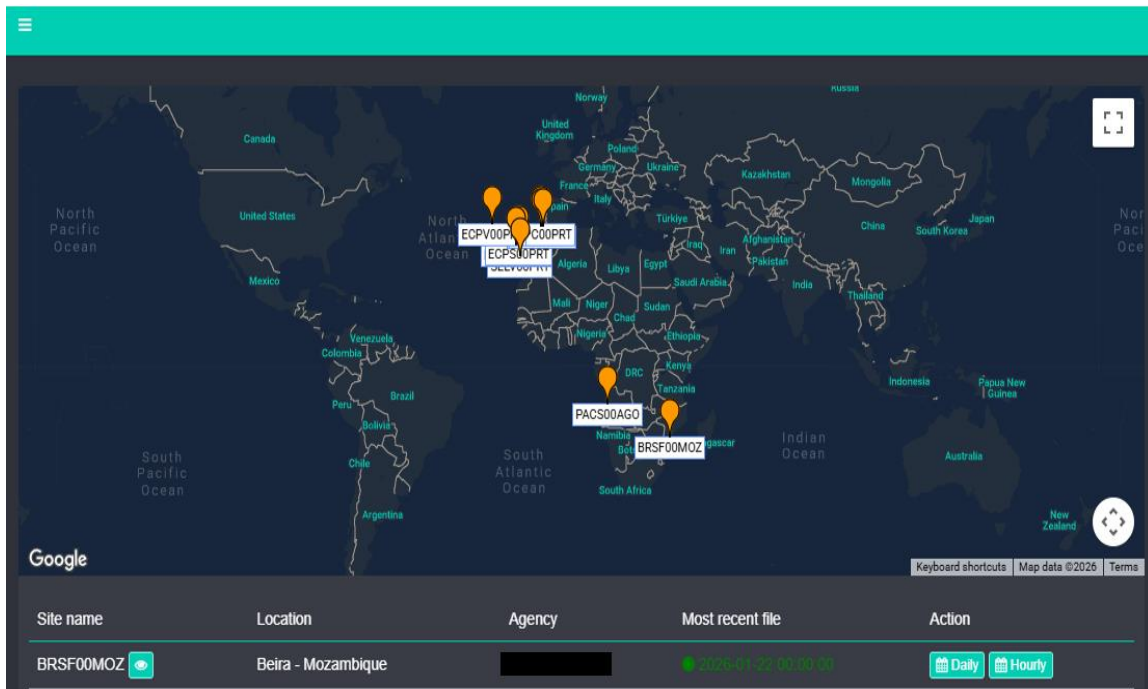


Figure 10. Frontend central interface

● **Site name**, including a “Station details” button; By clicking the button, users can view the station’s basic, technical and administrative Information (See Figure 11).

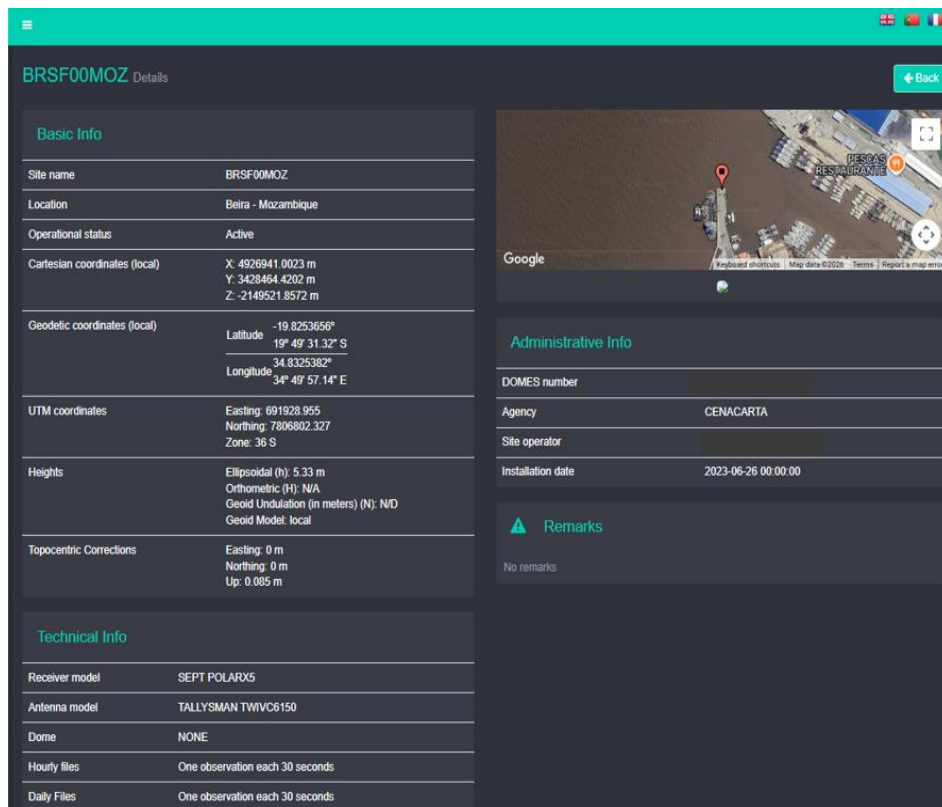


Figure 11. CORS detailed view page

- **Location**, indicating the geographic locality of the station
- **Agency**, identifying the organization responsible for the station
- **Most recent file processed date**
- **Data selection options (Actions)**: Regular users can view and download CORS data in daily or hourly formats. This functionality is accessed directly from the CORS table by selecting the corresponding “**Daily**” or “**Hourly**” option for the desired station.

After selecting an option, the platform displays a **calendar-based view** showing the available data for the selected CORS station (See Figure 12), including the amount of available data per day.



Figure 12. CORS Available data *calendar*

When a specific day is selected, a pop-up window displays the available RINEX files and their associated quality information. Each listed file includes a **download action**, allowing users to retrieve the selected Rinex files (See Figure 13). For **hourly data**, the pop-up also lists the available hours for the selected day along with their quality indicators (See Figure 14).

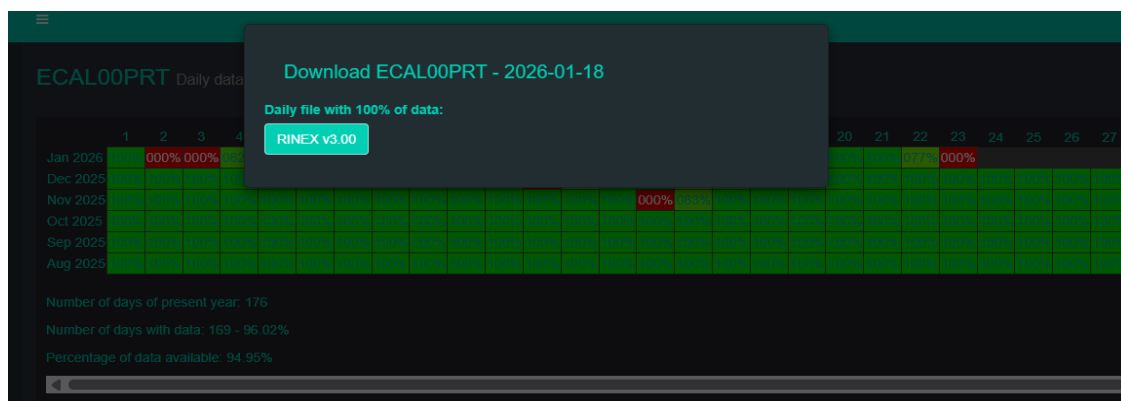


Figure 13. Daily data download

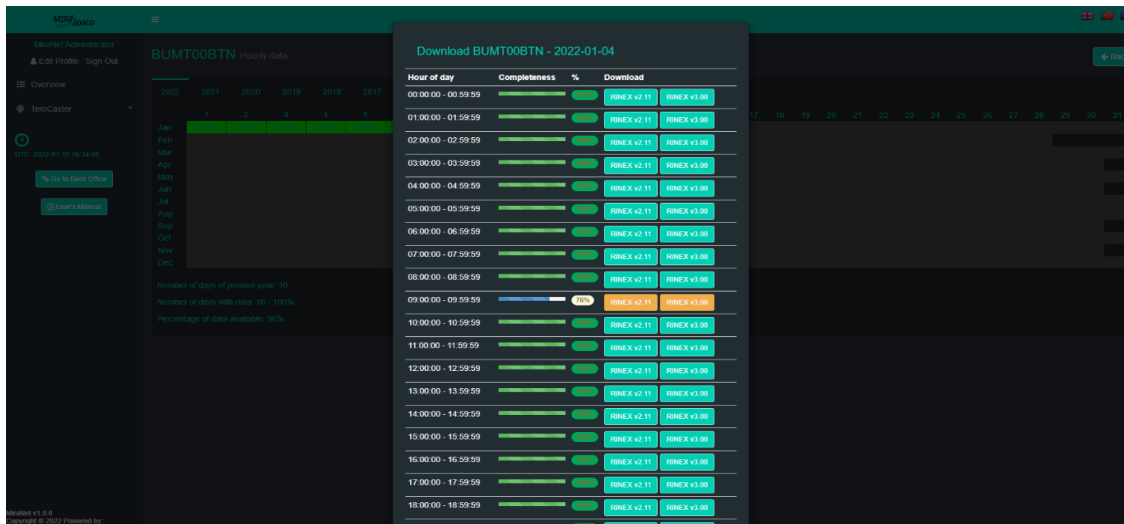


Figure 14. Hourly data download

4.3 Customized Download Form

A customized download form is available on the right-hand side of the overview interface (See Figure 15). This form is used to generate downloads for a custom time range from one or more stations at a selected data rate. To generate a download, users must define the following parameters:

Custom data download

1) Choose date range:

2) Choose data rate:
 Daily
 Hourly

3) Choose stations:
 Select all
 SELV00PRT
 ECPT00PRT
 ECPM00PRT
 ECPS00PRT
 ECAF00PRT
 ECAL00PRT
 ECPC00PRT
 PACS00AGO
 BRSF00MOZ
 ECPV00PRT

Figure 15. Custom data download module

- **Time period:** the date range of interest

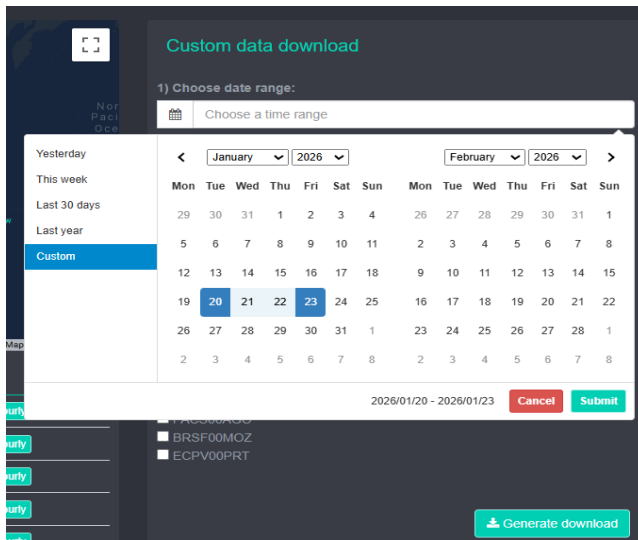


Figure 16. Time range selection

- **Data type:** daily or hourly data (for hourly data, the corresponding time interval must also be defined)
- **CORS station:** the station from which data will be downloaded

Once the parameters have been configured, the download request is confirmed on screen.

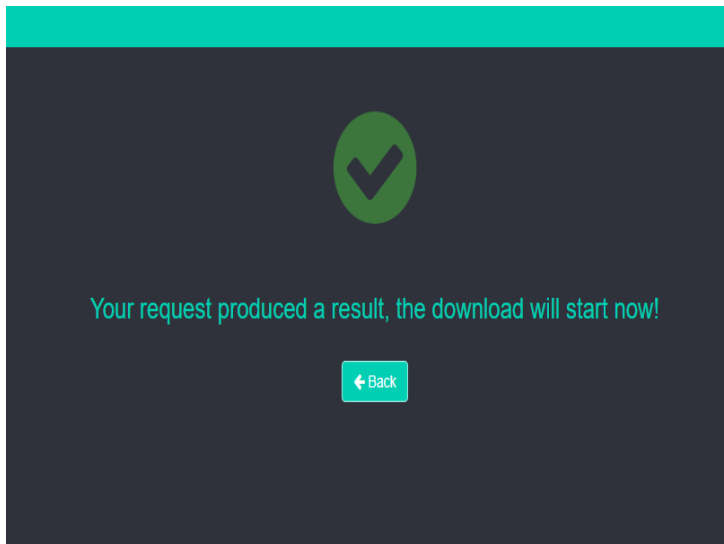


Figure 17. Successful download request message

IMPORTANT NOTICE: A user can only transfer data from the CORS stations and for the period defined by the platform administrator in the users profile (see the **Users** section, Platform Access and Data Access settings).

5. Administration Interface (Back Office)

The Back Office (Administrator View) is an interface available only to platform administrators. This area is configurable according to the needs of each client and provides the necessary tools to manage and monitor the platform's operation. Administrators can oversee stations and data availability, perform quality control tasks, manage user accounts (including approval and monitoring of registered users), and adjust system settings.

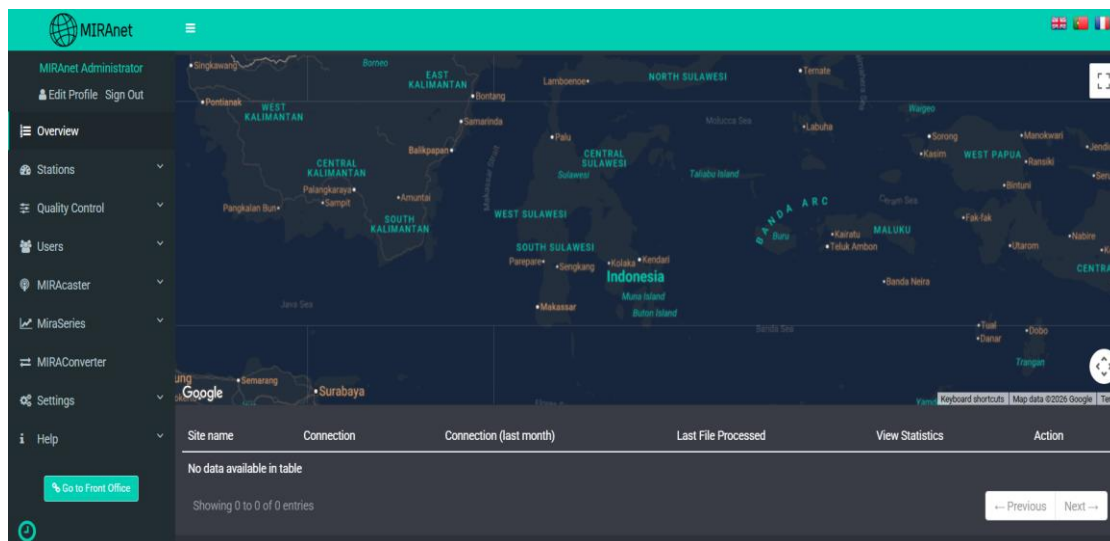


Figure 18. The Back Office Overview

The main Back Office menu includes the following sections:

5.1 Overview Section

The overview section differs from the Front Office overview previously described, as it corresponds to the administrative interface of the platform. In this section, the information related to each CORS station is expanded, allowing administrators to access detailed technical, operational, and management-related data (See Figure 19).

This interface provides a geographic visualization of the CORS networks and direct access to CORS station details. It displays key operational components, including:

- Connectivity status history
- Last month's real-time station
- The most recently processed files age
- Statistical summaries per station

Additionally, the section includes data selection and management tools through the **Action** panel.

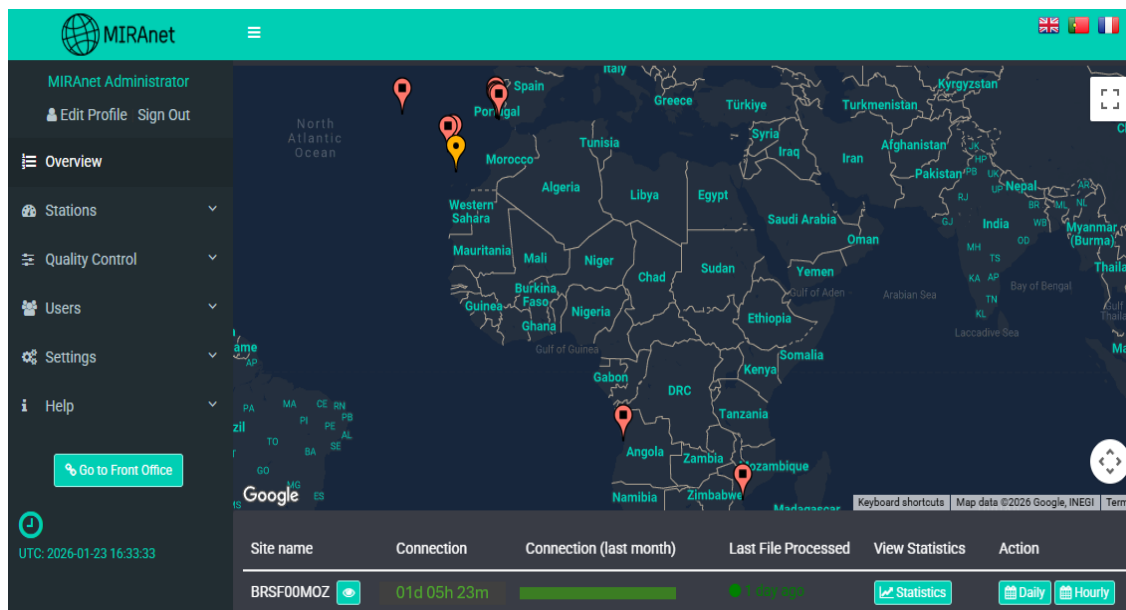


Figure 19. Overview section view

Site Name and Station Details. Each station is identified by its **Site Name**, which includes a “**Station details**” button, (See Figure 20).

By clicking this button, users can access comprehensive information about the selected CORS station, organized into the following categories:

- Basic information
- Technical details, including connection parameters such as IP address and receiver type
- Equipment information
- Administrative information related to the station

For more detailed information on each module, please refer to the **Station** section.

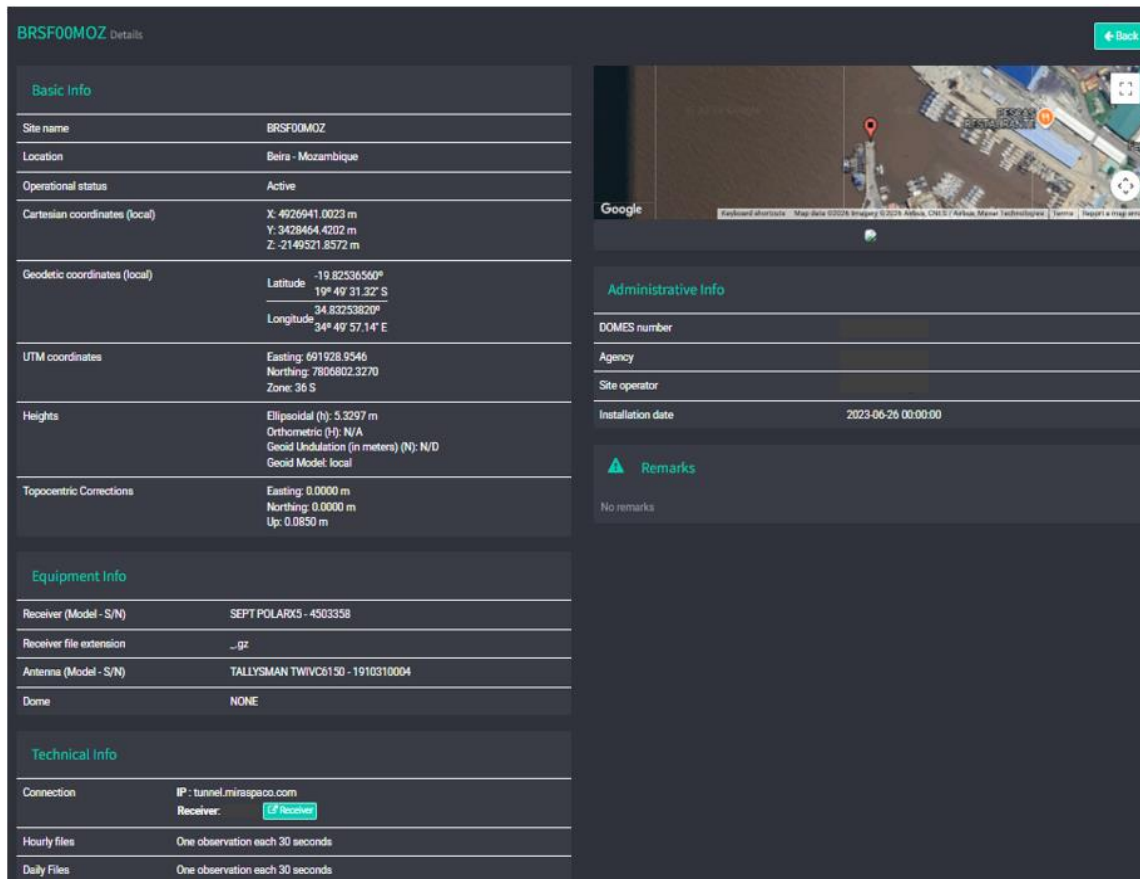


Figure 20. Station profile view

Connection Status. The Connection indicator represents the time elapsed since the last successful connection with the station. This value is displayed in the format (00d 00h 00m) and is visually classified using a color-coded system:

- **Green:** the station is online and operating under normal connection conditions.
- **Red:** the station is offline.

The **Connection Bar (Last Month)** provides a historical visualization of the station's connectivity over the previous month, using **green** to indicate online periods and **red** to indicate offline periods.

The **Last File Processed** field indicates the time elapsed since the most recent file from the station was successfully processed. It is displayed as a relative period and follows a color-coded scheme to quickly indicate data freshness: **green** for recent processing , **yellow** for moderate delays , and **red** for extended delays.

The “**View statistics**” option displays both statistical graphs related to processed data and a summary table presenting statistics for processed files associated with the selected CORS station. The graphs illustrate the percentage distribution of each processing metric (See Figure 21).



Figure 21. File processing statistics module

The table categorizes the last 30 processed files according to the following processing statuses:

- **Processed and QC passed:** Raw files have been converted to RINEX and have successfully passed all quality control (QC) filters.
- **Processed with QC warnings:** Files have been processed and have passed quality control validations with warnings. .
- **Quarantine:** Files present errors that prevent them from passing quality control checks. These files require **administrator review and intervention** before they can be validated or reprocessed.
- **Failed:** Raw data files resulted in processing errors and could not be successfully processed. These files are **rejected by the system**.

5.2 Station Section

The **Station section** allows administrators to maintain detailed control over the technical characteristics of the CORS stations and the information displayed in the main interface.

Through this module, administrators can configure, review, and update the technical parameters and operational attributes of each station, ensuring consistency between the station configuration and the information visualized across the platform.

The **Station section** is composed of subsections that allow administrators to manage and control the technical and operational information of the CORS stations (*See Figure 24*).

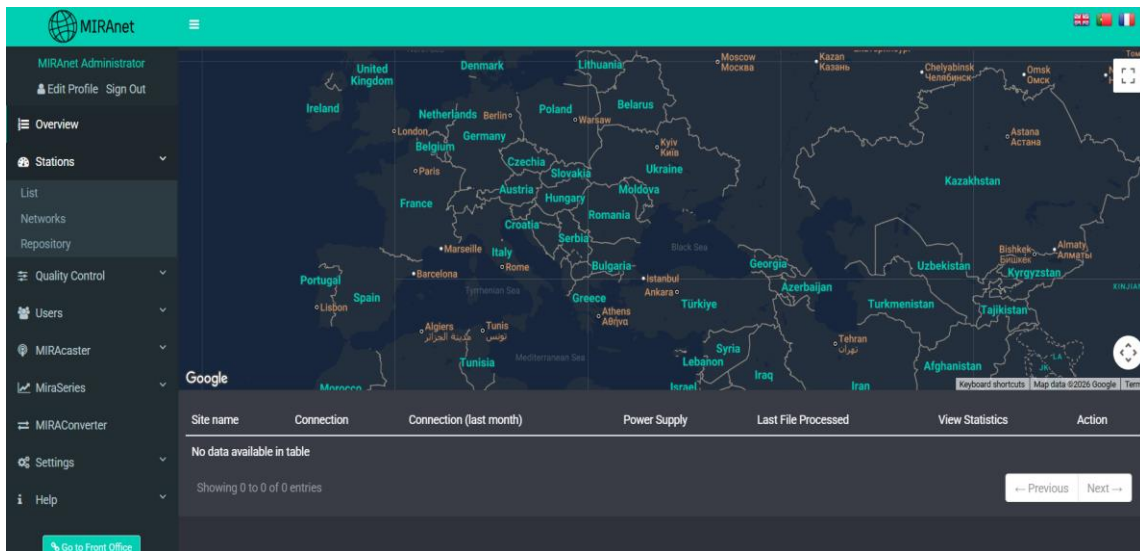


Figure 24. Stations section navigation interface

The List subsection functions as a control table displaying the stations associated with one or more networks configured. This interface allows administrators to visualize, manage, and access the technical and operational details of each station linked to the selected network(s)(*See*

Figure 25).

From this subsection, administrators can also create a new station using the **“Add Station”** button, located in the upper-right corner of the page.

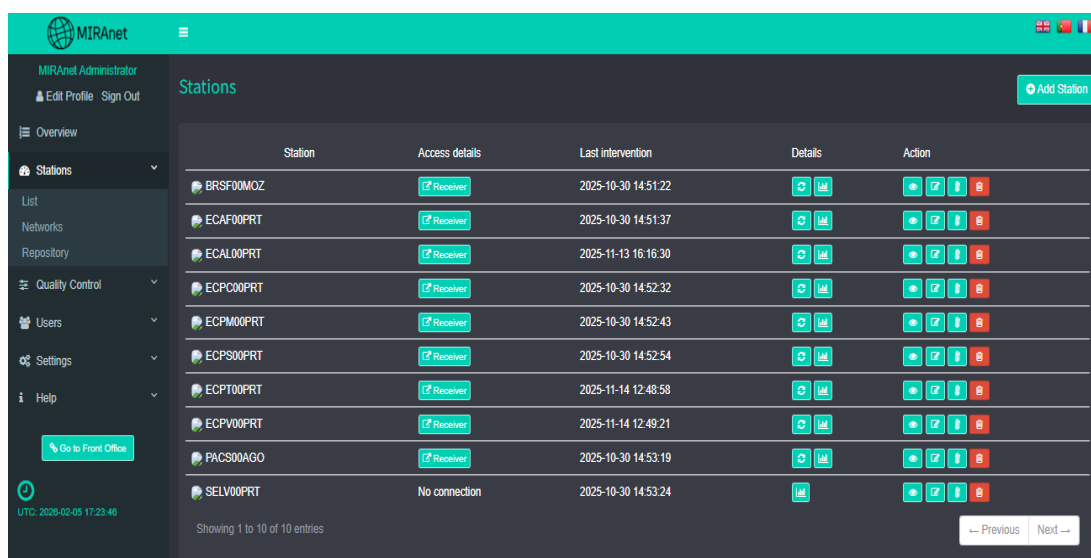


Figure 25. Stations section – Station list and creation interface

The following sections describe each of the **modules** that compose the **new station creation process**.

Basic Information. During the creation of a new station, the platform allows the upload of an IGS **station log file (.log)** containing standardized descriptive information about the GNSS station, such as receiver and antenna specifications, antenna height, monumentation, and station identification data. When provided, this file is used to automatically populate several station fields, improving data consistency and reducing manual input. The Basic Information module presents the core descriptive data that characterizes the station, including the station name, geographical location, and spatial definition through both planar and geodetic coordinates (See

Create new station

Upload a log file

Upload a file

Drop file here

Basic Info

Site name* Enter site name

Photo (max file size: 2M) Ningún archivo seleccionado

Cartesian Coordinates (in local Datum, in meters)*

X Enter X

Y Enter Y

Z Enter Z

Antenna topocentric correction (in meters)*

U Enter Up

E Enter East

N Enter North

Geoid Undulation (in meters)*

Enter Geoid Undulation

City* Enter City

Country* Enter Country

Figure 26).

Create new station

Upload a log file

Upload a file

Drop file here

Basic Info

Site name* Photo (max file size: 2M) Ningún archivo seleccionado

Cartesian Coordinates (in local Datum, in meters)*

X Y Z

Antenna topocentric correction (in meters)*

U E N

Geoid Undulation (in meters)*

City* Country*

Figure 26. The Basic Information module

The **Administration Info** module contains administrative data related to the station, including the entity responsible, the operational status of the station, and dates associated with its installation (See Figure 27).

Administrative Info

DOMES number*

Agency* Site operator*

Installation date* Operational status*

Figure 27. Administrative Information module

Equipment Information. Most of the equipment-related parameters can be automatically populated from the **station log file (log)**, when available. If the file is not provided, the platform offers selectable menus that allow the operator to manually choose the appropriate options. The module is used to define the **hardware specifications** of the GNSS station. This section includes the configuration of the receiver and antenna parameters required for proper data identification and processing (See Figure 28).

The **receiver file extension** is configured by the operator and can be selected according to the GNSS receiver manufacturer and data format. The available options are:

- **.sbf** Septentrio uncompressed
- **.gz** Septentrio compressed
- **.t02** Trimble
- **.m00** Leica
- **.cnb** ComNav
- **.jps** Javad

The screenshot shows the 'Equipment Info' configuration module. It is divided into three main sections: Receiver, Antenna, and Power Supply. Each section contains several input fields and dropdown menus.

Receiver Info:

- Receiver brand*: 3SNAVIGATION
- Receiver model*: 3SNAV GNSS-300 - L1 C/A GPS/GLONASS, 12 channel
- Receiver serial number*: Enter receiver serial number
- Receiver file extension*: Enter receiver file extension
- Installation date (UTC)*: dd/mm/aaaa --:--
- Removal date (UTC)* (Ignore if not applicable): dd/mm/aaaa --:--
- + Add Receiver

Antenna Info:

- Antenna brand*: 3SNAVIGATION
- Antenna model*: 3S-02-1AERO-CR - L1 assembly with Aero antenna without chokerings
- Dome*: ARFC - Conical ABS radome with white UV resistant paint, diameter: 371
- Antenna serial number*: Enter antenna serial number
- Installation date (UTC)*: dd/mm/aaaa --:--
- Removal date (UTC)* (Ignore if not applicable): dd/mm/aaaa --:--
- + Add Antenna

Power Supply:

- Power Supply*: Electrical grid

Figure 28. Equipment Info module

The **Communication Info** module defines the parameters required to establish the connection between the GNSS station and the MIRAnet platform. This includes configuration of the connection type and port number used for station communication.

Additionally, the module allows the definition of the GNSS observation interval for both hourly and daily data, which determines the frequency at which observations are recorded and transmitted

Figure 29. Communication Info module

The **Logging Information** module allows the definition of the GNSS observation interval for both hourly and daily data, determining the frequency at which observations are recorded and transmitted. This configuration also controls whether hourly or daily data is available for the station. If **No Data** is selected, the corresponding hourly or daily options will not be available in the front and back office Overview interface (See Figure 30).

Figure 30. Logging Info module

The **Quality Control Information** module allows the configuration of **quality control thresholds** used to evaluate GNSS data files generated by the station. By expanding the **Header Parameters** and **Data Parameters** buttons, the corresponding configuration forms are displayed. These parameters define the criteria under which a data file is:

- **Accepted** (with or without warnings)
- **Placed in quarantine**
- **Rejected** by the system
- The forms are initially populated with default settings previously defined in the **Settings / QC Settings section**. However, during the creation of a station profile, it is also possible to specify station specific quality control parameters, which override the default configuration according to the client requirements.

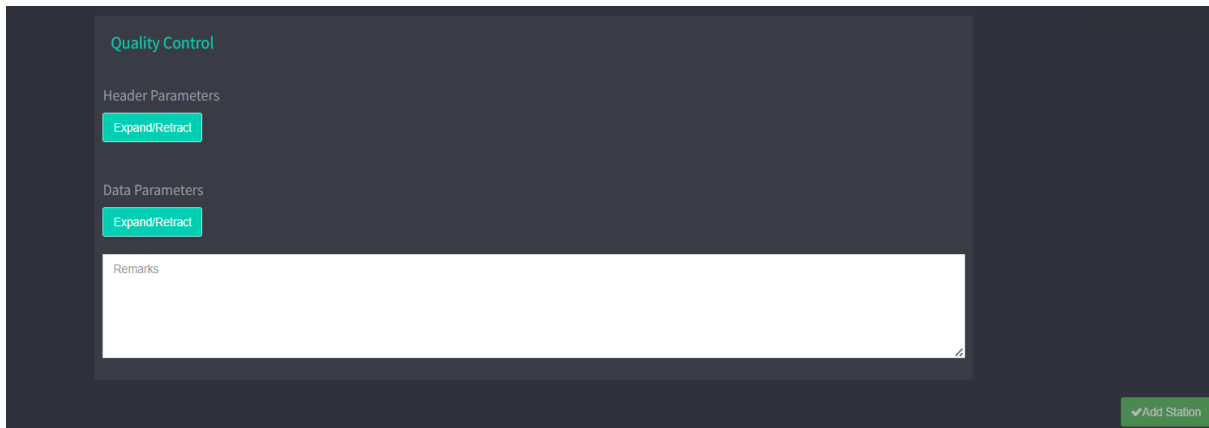


Figure 31. QC Parameters Configuration module

After filling all the required fields, click the **“Add Station”** button to create the station profile.

Back to the **List** main interface, the table includes the following elements:

Access details: This column provides direct access to the receiver connection interface, allowing visualization of the station’s connectivity status (See Figure 32).

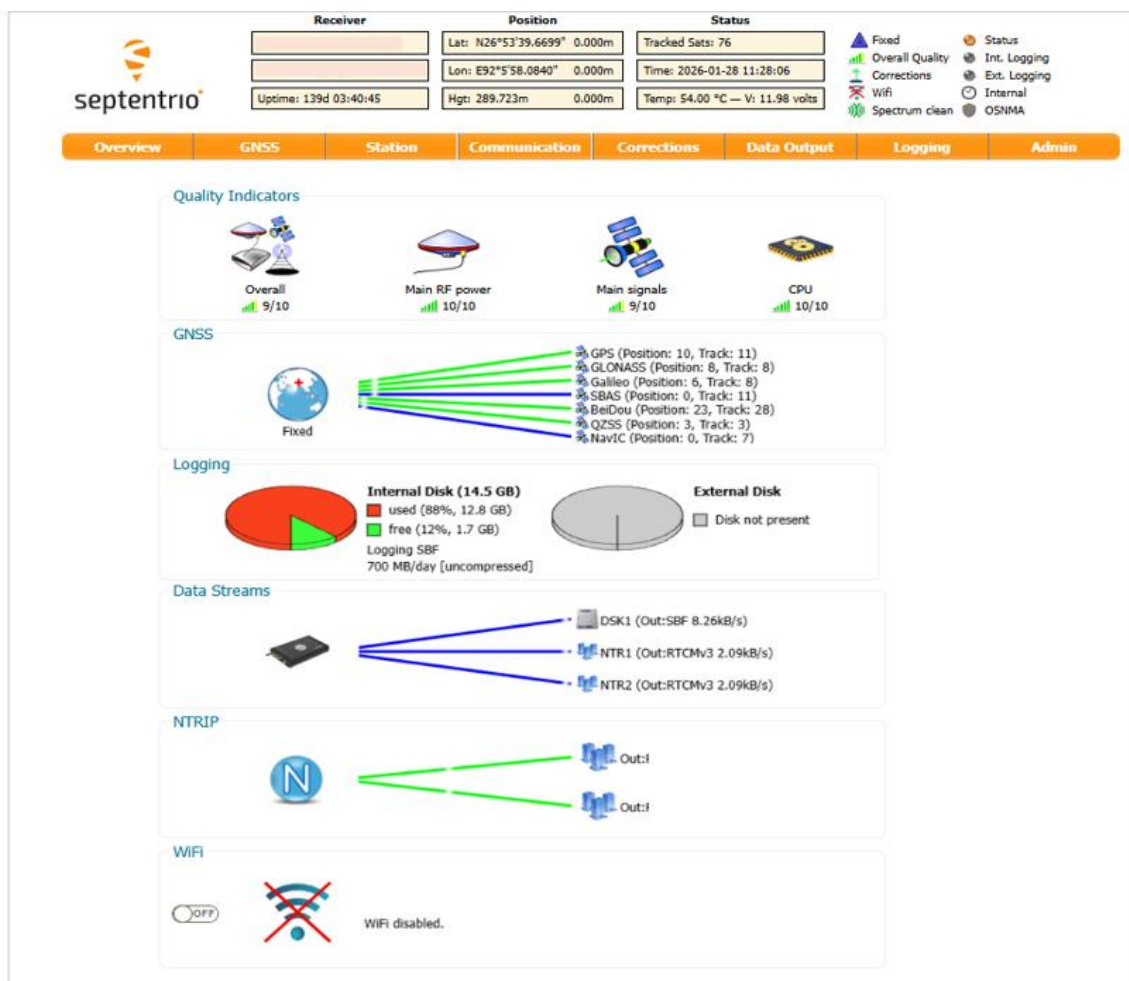


Figure 32. GNSS receiver web interface

Last intervention date: Displays the date of the most recent modification of the station parameters in the station details, including changes to technical, equipment, or administrative settings.

Details option includes two action buttons:

- **Refresh button** updates and reloads the station information.
- The **QC Plots** option displays a set of **quality control graphs** that provide an assessment of the GNSS data recorded by the selected CORS station. These plots are derived from the station's RINEX files and allow administrators to evaluate data integrity, continuity, and signal quality.

The displayed indicators include **observation ratio**, **missing epochs**, **cycle slips**, **code multipath**, and **signal-to-noise ratio (SNR)**. Together, these metrics support the identification of potential issues related to signal reception, environmental conditions, receiver performance, or data completeness (See Figure 33).



Figure 33. QC Plots Quality control graphs

The **Action** column contains three buttons that provide direct station management functions.

- The **Station View** option redirects the user to the **Station Details** interface previously described in the **Overview section**. This interface presents the station configuration through a set of structured modules, each displaying specific station parameters.
- Edit** Option opens the station profile form , allowing modifications to general, technical, equipment-related, or administrative information.
- Remove** option removes the station from the project menu.

The **Station Repository** subsection provides administrators with access to the platform’s data repository (filesystem), where processed RINEX files and related outputs are stored, such as time series plots and error logs.

5.3 Quality Control Section

The **Quality Control (QC)** section provides tools for configuring, monitoring, and reviewing the integrity of GNSS data processed within the platform. It enables administrators to define validation parameters, inspect processing results, and manage files according to their quality status.

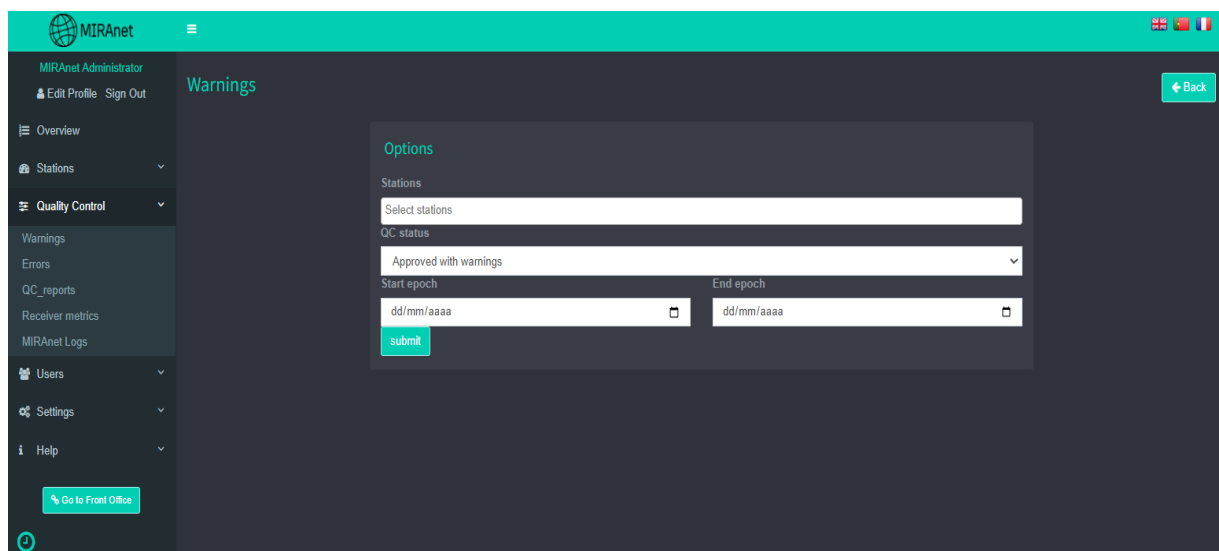


Figure 34. Quality control section interface

The **Warnings** subsection allows administrators to select files from a specific station according to a defined QC status and time interval to review their processing results. Users can select a station from the list, assign a QC status (Approved with Warning or Quarantine), and define the corresponding start and end epochs. When data is available for the selected station and time

interval, the corresponding RINEX files are displayed in the table together with their associated quality control warnings. These warnings allow administrators to understand why the quality control system assigned a specific QC status to each file.

Warnings associated with files classified as **Approved with warnings** are displayed in **yellow**, while warnings that resulted in a **Quarantine** status are displayed in **orange**.

Administrators can review the listed warnings to analyze the quality control results in detail. One or more files can then be selected and processed using the available administrative actions:

- **Review:** removes the selected file(s) from the warnings list, effectively validating the data and accepting the file despite the reported warnings. This action indicates that the administrator considers the file suitable for use.
- **Reprocess:** moves the original raw file back to the processing queue, triggering a new processing cycle. This option allows the file to be reprocessed, potentially using different quality control thresholds, so that it may be approved in a subsequent run.

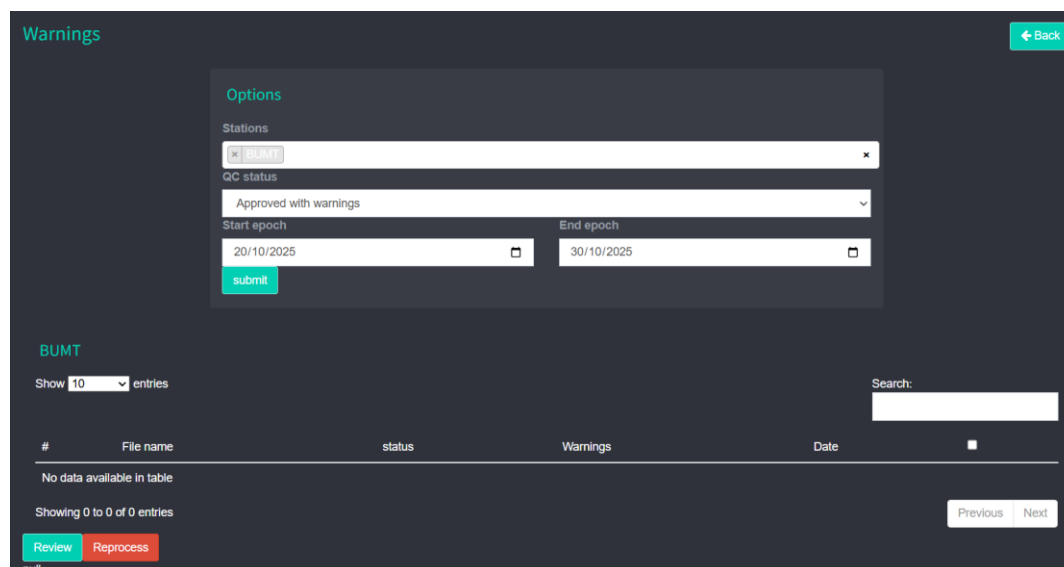


Figure 35. Quality Control Warnings interface

The **Errors** subsection allows administrators to select a station and define a time interval using start and end epochs. Once the selection is submitted, the platform displays the files that were rejected during processing, along with the corresponding error messages explaining why they were rejected. These error messages are highlighted in red.

The Review option allows administrators to acknowledge the rejected files by removing them from the errors list. This action confirms that the administrator is aware of the issue and does not require the file to remain listed. Reviewed files are not automatically reprocessed; instead, the original data must be correctly reuploaded to be processed again by the system.

The screenshot shows a web interface for managing quality control errors. It features a dark background with light-colored text and buttons. The main content area is divided into sections: 'Options' for configuring search criteria and a table for displaying results. The 'Options' section includes a 'Stations' dropdown menu, two date pickers for 'Start epoch' and 'End epoch', and a 'submit' button. The table below has columns for '#', 'File name', 'Status', 'Errors', and 'Date', but it is currently empty. Navigation buttons for 'Previous' and 'Next' are located at the bottom right, and a 'Review' button is at the bottom left.

Figure 36. Quality Control Errors interface

The **QC Report** subsection allows users to generate quality control reports based on a selected set of parameters. This section provides a form in which users can define the station name, GNSS constellations, and a set of detailed constellation related parameters (such as *cs_sat* and *cs_epoch*), as well as general quality metrics (such as *ratio_obs* and *o_slps*). Users must also define the corresponding start and end epochs for the analysis period. Once the required parameters are selected, clicking the **“Create Report”** button generates a table displaying the requested quality control information. The resulting data can also be exported using the **“Download CSV”** option.

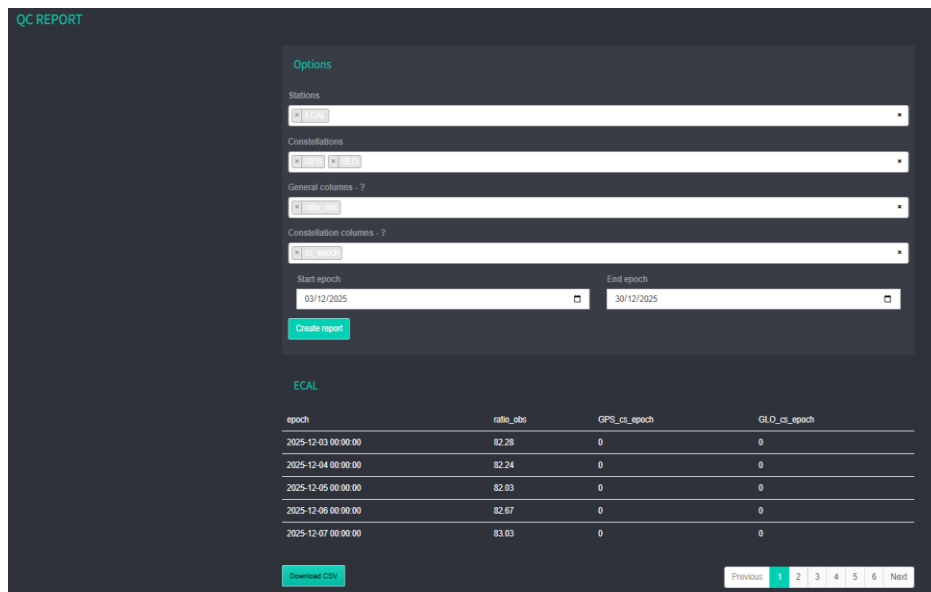


Figure 37. QC reports form Interface

The **QC Receivers** subsection allows users to monitor receiver-related performance metrics for a selected GNSS station. Users can select a station, choose a specific receiver metric (such as temperature, voltage, CPU usage, among others), and configure the reporting mode.

If the Historical option is selected, users may optionally define a start and end epoch to filter the period to be analyzed. If no time range is specified, all available historical metrics are displayed. In historical mode, the data are presented as daily aggregated values, with one entry per day.

If the historical option is not selected, the system displays detailed metric records for the most recent 30 days.

By clicking the **“Create Report”** button, the system generates a report consisting of a graph and a summary table showing the minimum, maximum, and average values of the selected metric. The report can also be downloaded in CSV format for further analysis (See

Figure 38).

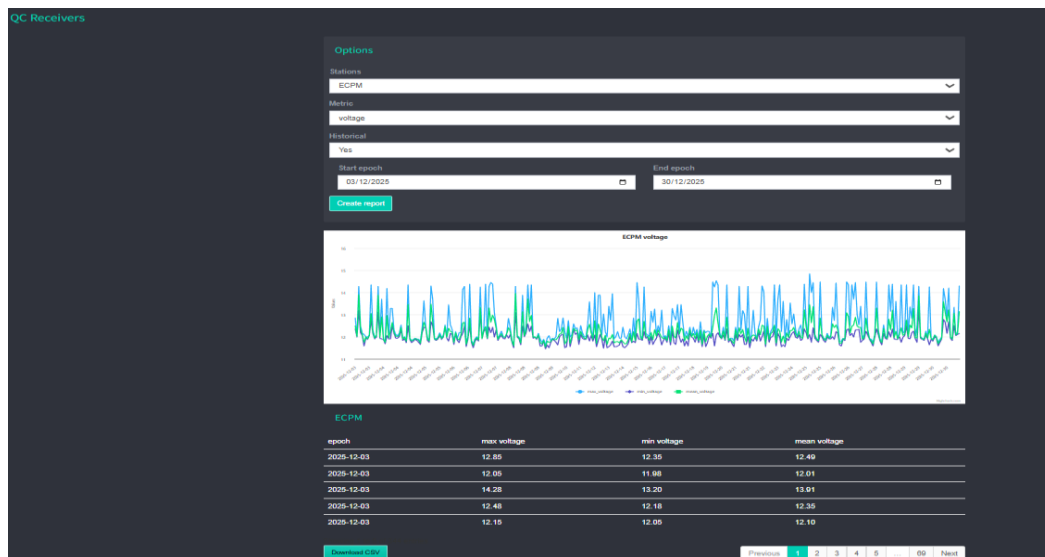


Figure 38. QC Receivers report interface

The **MIRAnet Logs** subsection provides access to system-generated log files related to the internal operation and processing workflows of the MIRAnet platform. These logs record the execution of automated processes associated with GNSS data handling, quality control, and station status management.

The interface displays a structured list of log folders and files, organized by functional categories (e.g. GNSS data processing, quality control, and station monitoring). Selecting a log file opens a log viewer, allowing users to inspect the recorded messages. Each log file can also be downloaded for external review or support purposes (See

Figure 39).

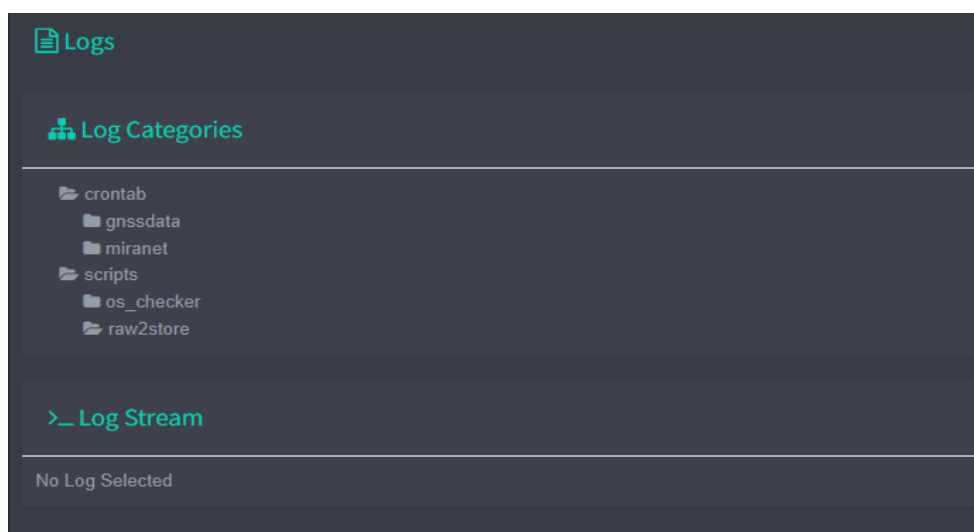


Figure 39. Access to system-generated log files

5.4 Users Section

The **Users** section allows administrators to manage registered users within the project through a dedicated **user registration form**. During the registration process, administrators can configure each user's **access rights and permissions** according to the platform's security and operational requirements.

The **Users List subsection** displays the list of registered users within the platform. This interface provides an overview of user information, including username, assigned group, and connection status, among other relevant details. The Action menu provides direct management options for each user, including:

- Accounting: access to monitoring and activity records for the selected user
- View Profile: visualization of the user's profile information
- Edit: modification of the user's profile settings
- Delete: removal of the user from the platform

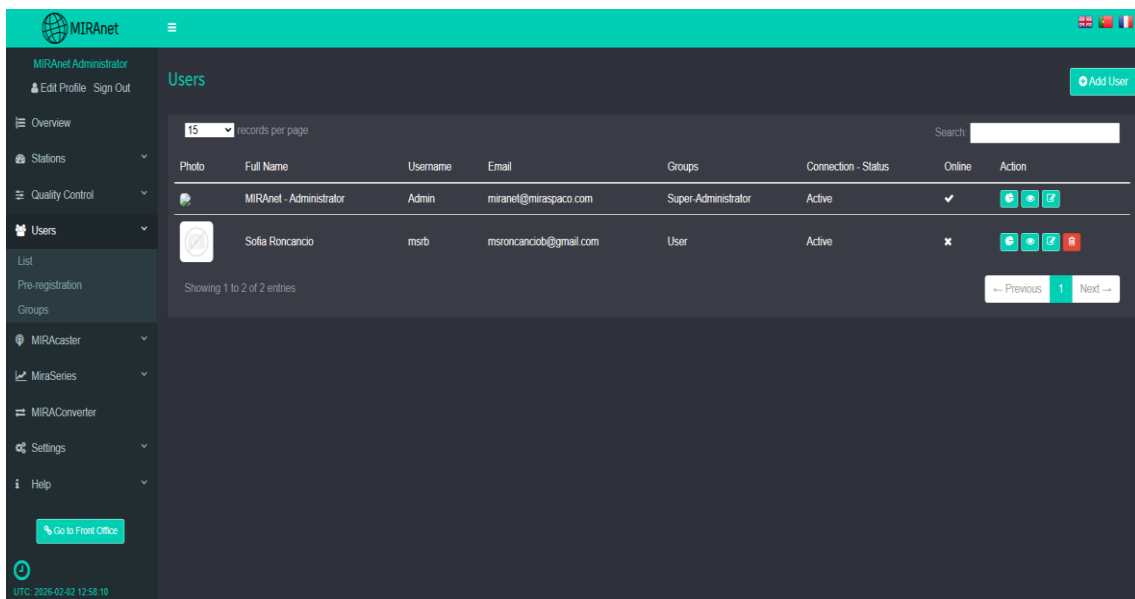


Figure 40 Users section interface

The interface allows administrators to manually create new users within the platform using the **“Add User”** button.

The form allows administrators to attach a **user photo**, enter **basic information**, and add **remarks**. Additionally, the administrator configures **platform access** by defining the **username**,

assigning the appropriate **user group**, and specifying the **valid access period** Finally, the **Data Access** section allows the selection of the **CORS stations** that the user is authorized to consult, as well as the corresponding **period of time** during which access is permitted. Finally, select the **“Add User”** button to create the new user(See

Figure 41).

Figure 41 Create new user interface.

The **Pre-Registration subsection** allows administrators to review and manage registration requests submitted by users. Through this control panel, administrators can list the submitted registration forms and evaluate each request to determine its approval or admission to the platform.

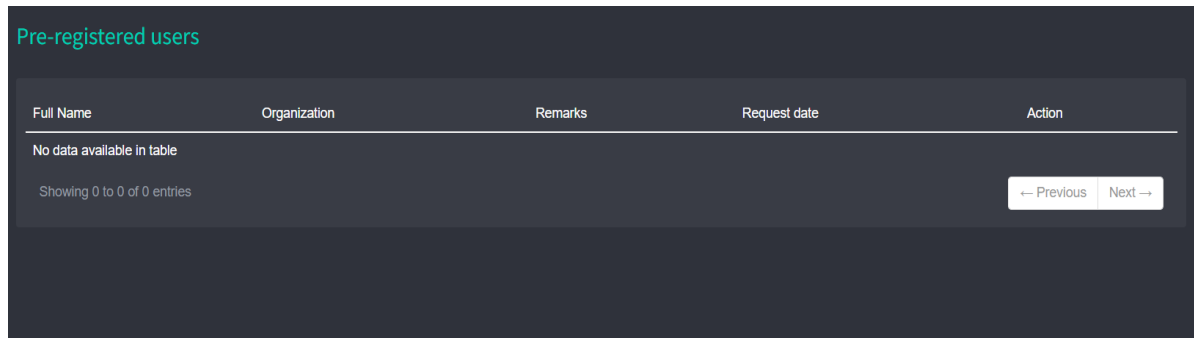


Figure 42. Pre-registered users' management interface

The **Groups** subsection provides a management panel where users can be organized into groups (e.g., administrator and user) according to the **permissions and access levels** defined by the administrator. This structure supports hierarchical access control and facilitates the assignment of roles within the platform. The interface also provides options to edit or remove existing groups (See Figure 43).

Figure 43

Figure 43 Groups management interface

Groups can be created through the **“Add Group”** option, where administrators can define the group name and configure the corresponding permissions and access levels (See Figure 44).

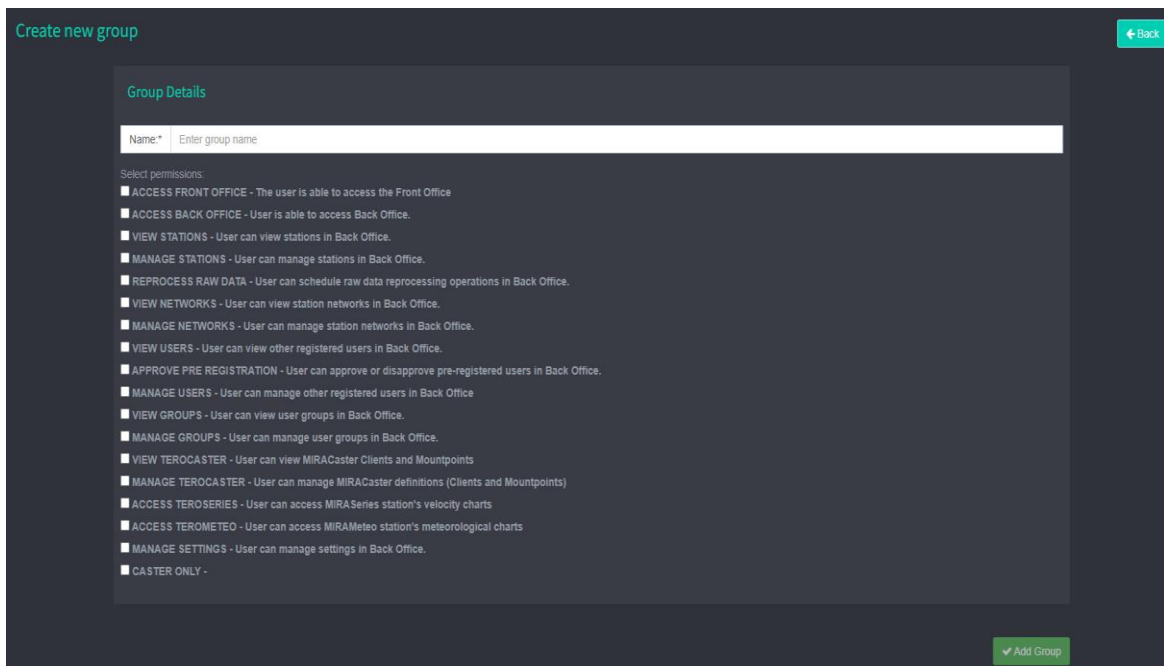


Figure 44. Group permissions configuration module

5.5 Settings Section

The **Settings section** allows defining general operational parameters and customizing the system behavior according to each clients requirements(See

Figure 45. General settings Interface.

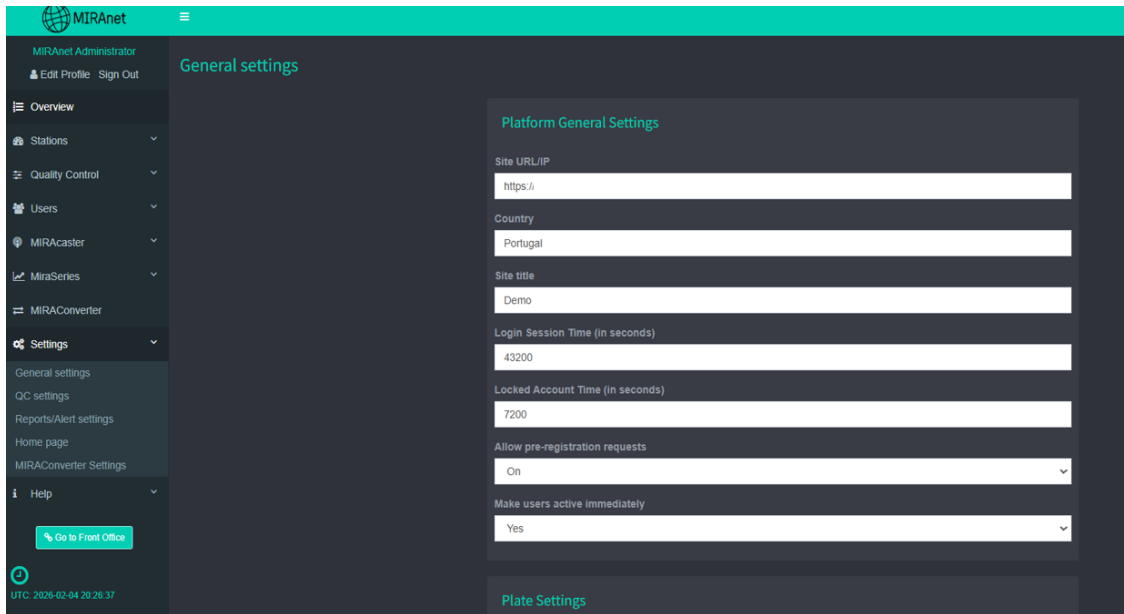


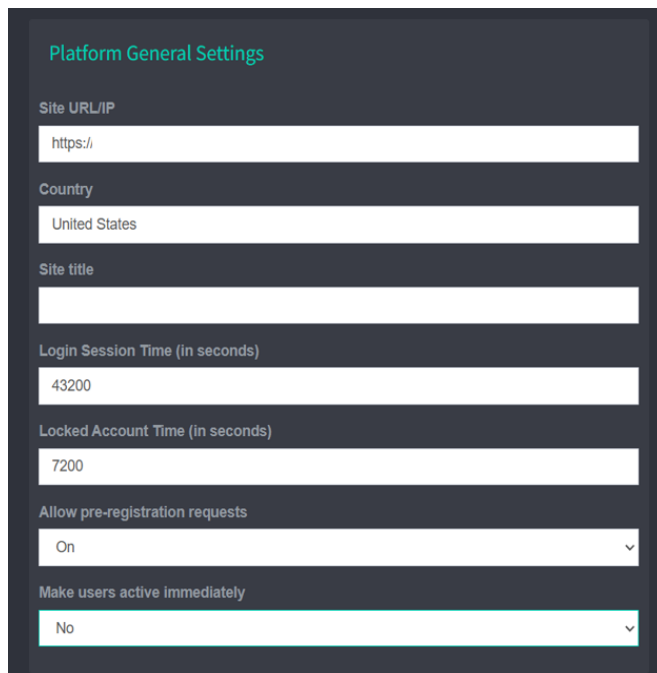
Figure 45. General settings Interface

The **General Settings subsection** is organized into five configuration modules:

The **Platform General Settings module** defines the overall access and behavior of the platform for each client.

Some of the most relevant parameters include:

- Allowing pre-registration requests enables or disable users to submit account requests through the registration form.
- Make users active immediately: determines whether newly registered users are automatically activated or require administrator approval.



Platform General Settings

Site URL/IP
https://

Country
United States

Site title

Login Session Time (in seconds)
43200

Locked Account Time (in seconds)
7200

Allow pre-registration requests
On

Make users active immediately
No

Figure 46. Platform general settings module

The Plate Settings module defines the tectonic plate reference parameters used for time series visualization (See **MiraSeries Module**). This section includes parameters such as **plate name**, **plate code**, and associated **velocity values**. Whenever these settings are modified, new time series graphs are automatically generated according to the updated reference parameters.

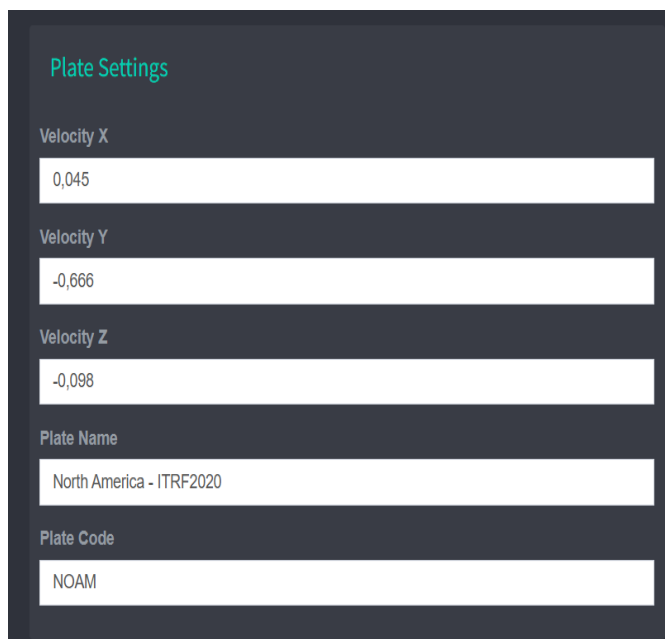


Plate Settings

Velocity X
0,045

Velocity Y
-0,666

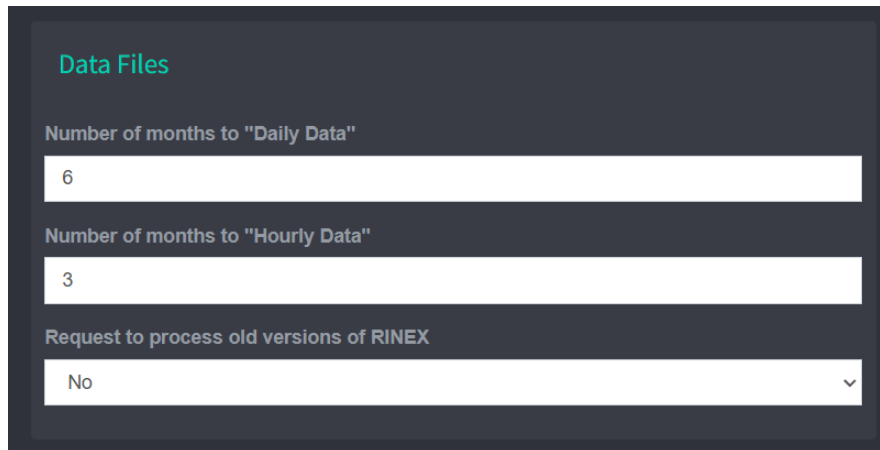
Velocity Z
-0,098

Plate Name
North America - ITRF2020

Plate Code
NOAM

Figure 47. Plate settings module

The Data Files module defines the data retention and availability policy for processed GNSS files. The configured number of months specifies the time window for which daily and hourly processed data remains in the overview section.



The screenshot shows a dark-themed configuration panel titled "Data Files". It contains three input fields: "Number of months to 'Daily Data'" with the value "6", "Number of months to 'Hourly Data'" with the value "3", and a dropdown menu for "Request to process old versions of RINEX" set to "No".

Figure 48. Data files module

The Repository Info module defines the optional connection settings used to access the platform data repository when it is hosted on an external server. By default, the repository is located on the MIRAnet machine; however, this module allows administrators to configure remote connection parameters if the repository is stored elsewhere.

The configurable parameters include:

- Tunnel URL: remote server address used to access the repository
- Remote user: authentication username for the remote system
- Remote password: authentication password for secure access



The screenshot shows a dark-themed configuration panel titled "Repository Info". It contains three input fields: "Tunnel URL" with a placeholder "--", "Remote User" with a placeholder "--", and "Remote Password" with a placeholder "..." and a small eye icon to toggle visibility.

Figure 49. Repository Info module

The **Maintenance Mode** setting allows administrators to temporarily restrict access to the platform for maintenance or system updates.



Figure 50. Maintenance mode module

The **QC Settings subsection** defines the default quality control configuration applied to GNSS data processing across the platform. These settings establish the validation rules, thresholds, and processing parameters used to evaluate the integrity and quality of RINEX files.

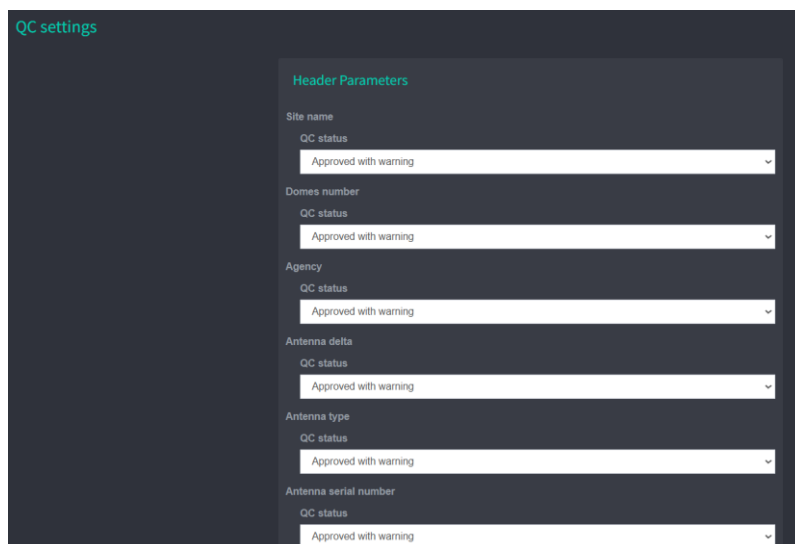


Figure 51 Quality Control Configuration Parameters

The configuration is organized into four parameter groups:

Header parameters: validation rules related to RINEX header information and station metadata, such as DOMES numbers, antenna and receiver types, and approximate station coordinates.

Data parameters: quality thresholds applied to observational data, including criteria such as minimum elevation angle, cycle slips, and data completeness.

Processing parameters: criteria and tolerances used during data handling and processing, for example duplicate file detection.

Plot parameters: visualization settings that define how quality control results are displayed, such as the time span or scale of the generated plots.

These forms are initially populated with default values defined in this section. During the **“Create New Station”** step in **(See Station section)** , users may optionally define station-specific QC parameters that override the global defaults to meet project requirements.

After modifying the parameters, changes must be **saved** to apply the updated configuration.

Note: Due to the number of configurable parameters, detailed descriptions are provided in the Annex section.

Home page subsection allows administrators to configure the popup message displayed when users open the MIRAnet platform. This customizable message appears automatically upon login and can be edited to include announcements, notifications, or any relevant information for users (See Figure 52)

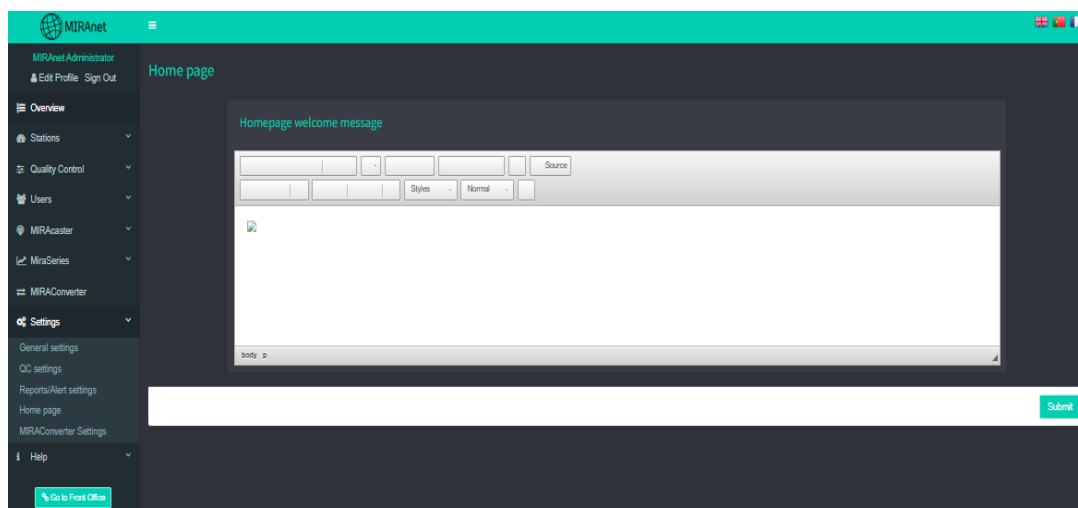


Figure 52 Configurable Home Page Popup Message

The **MIRACConverter Settings** subsection defines the default coordinate reference systems used for data transformations within the converter tool. These settings specify the source and target datums applied during coordinate conversions.

The **Source Datum** module defines the coordinate reference system for the input data. It can specify the appropriate **EPSG codes** corresponding to the supported coordinate formats (e.g., geographic or Cartesian systems).

The **Target Datum** module defines the coordinate reference system to which the data will be transformed. This configuration specifies the destination datum or reference system used for output coordinates. After configuring the parameters, the settings must be **saved** to apply the changes (See Figure 53)

The screenshot displays the 'MIRACONVERTER Settings' interface. It is divided into two main sections: 'Source Datum Settings' and 'Target Datum Settings'. Each section contains three input fields for different coordinate systems: Datum, EPSG (XYZ), and EPSG (LLH). The 'Source Datum Settings' section has the following values: Datum: DRUKREF03, EPSG (XYZ): EPSG:5262, and EPSG (LLH): EPSG:5263. The 'Target Datum Settings' section has the following values: Datum: DRUKREF23, EPSG (XYZ): +proj=geocent +ellps=GRS80 +units=m +no_defs +type=crs, EPSG (LLH): +proj=latlong +ellps=GRS80 +datum=WGS84 +no_defs +type=crs, and EPSG (ENU): +proj=tmmerc +lat_0=0 +lon_0=90 +k=1 +x_0=250000 +y_0=0 +ellps=GRS80 +towgs84=0,0,0,0,0,0,0 +units=m +no_defs +type=crs. A 'Save Changes' button is located at the bottom right of the interface.

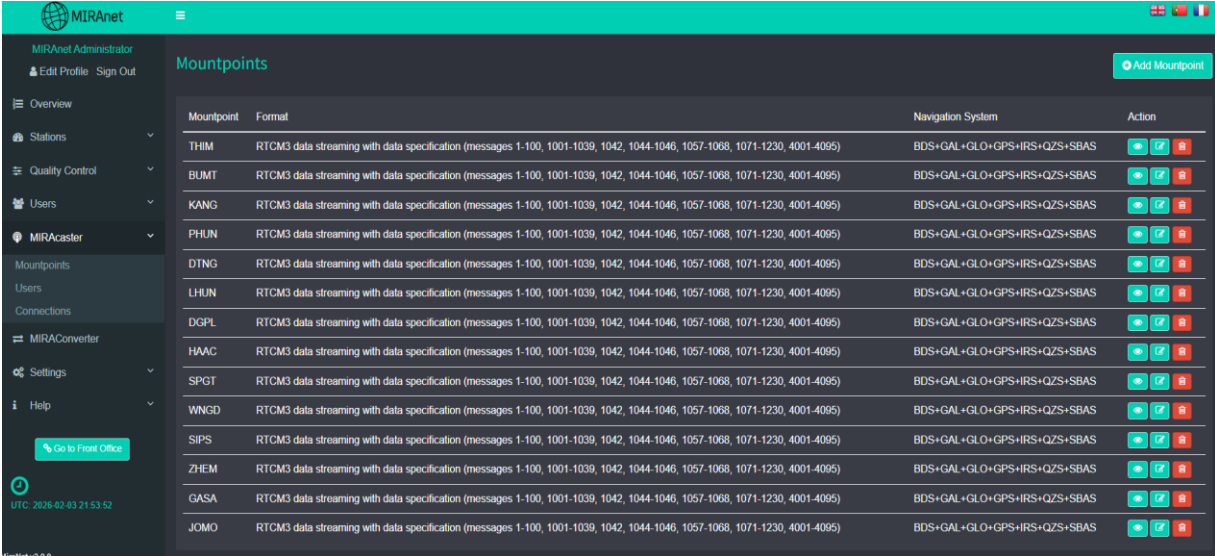
Figure 53. MIRACONVERTER Settings interface.

6. Advanced Tools

The **Advanced Tools** section includes specialized modules designed to extend the core functionalities of the MIRAnet platform.

6.1 MIRACaster Section

The **MIRACaster module** manages the real-time distribution of GNSS data streams through an NTRIP caster service. This section allows administrators to configure and maintain mountpoints, which represent the data streams available to clients (*See Figure 54*).













































Mountpoint	Format	Navigation System	Action
THIM	RTCM3 data streaming with data specification (messages 1-100, 1001-1039, 1042, 1044-1046, 1057-1068, 1071-1230, 4001-4095)	BDS+GAL+GLO+GPS+IRS+QZS+SBAS	  
BUMT	RTCM3 data streaming with data specification (messages 1-100, 1001-1039, 1042, 1044-1046, 1057-1068, 1071-1230, 4001-4095)	BDS+GAL+GLO+GPS+IRS+QZS+SBAS	  
KANG	RTCM3 data streaming with data specification (messages 1-100, 1001-1039, 1042, 1044-1046, 1057-1068, 1071-1230, 4001-4095)	BDS+GAL+GLO+GPS+IRS+QZS+SBAS	  
PHUN	RTCM3 data streaming with data specification (messages 1-100, 1001-1039, 1042, 1044-1046, 1057-1068, 1071-1230, 4001-4095)	BDS+GAL+GLO+GPS+IRS+QZS+SBAS	  
DTNG	RTCM3 data streaming with data specification (messages 1-100, 1001-1039, 1042, 1044-1046, 1057-1068, 1071-1230, 4001-4095)	BDS+GAL+GLO+GPS+IRS+QZS+SBAS	  
LHUN	RTCM3 data streaming with data specification (messages 1-100, 1001-1039, 1042, 1044-1046, 1057-1068, 1071-1230, 4001-4095)	BDS+GAL+GLO+GPS+IRS+QZS+SBAS	  
DGPL	RTCM3 data streaming with data specification (messages 1-100, 1001-1039, 1042, 1044-1046, 1057-1068, 1071-1230, 4001-4095)	BDS+GAL+GLO+GPS+IRS+QZS+SBAS	  
HAAC	RTCM3 data streaming with data specification (messages 1-100, 1001-1039, 1042, 1044-1046, 1057-1068, 1071-1230, 4001-4095)	BDS+GAL+GLO+GPS+IRS+QZS+SBAS	  
SPGT	RTCM3 data streaming with data specification (messages 1-100, 1001-1039, 1042, 1044-1046, 1057-1068, 1071-1230, 4001-4095)	BDS+GAL+GLO+GPS+IRS+QZS+SBAS	  
WNGD	RTCM3 data streaming with data specification (messages 1-100, 1001-1039, 1042, 1044-1046, 1057-1068, 1071-1230, 4001-4095)	BDS+GAL+GLO+GPS+IRS+QZS+SBAS	  
SIPS	RTCM3 data streaming with data specification (messages 1-100, 1001-1039, 1042, 1044-1046, 1057-1068, 1071-1230, 4001-4095)	BDS+GAL+GLO+GPS+IRS+QZS+SBAS	  
ZHEM	RTCM3 data streaming with data specification (messages 1-100, 1001-1039, 1042, 1044-1046, 1057-1068, 1071-1230, 4001-4095)	BDS+GAL+GLO+GPS+IRS+QZS+SBAS	  
GASA	RTCM3 data streaming with data specification (messages 1-100, 1001-1039, 1042, 1044-1046, 1057-1068, 1071-1230, 4001-4095)	BDS+GAL+GLO+GPS+IRS+QZS+SBAS	  
JOMO	RTCM3 data streaming with data specification (messages 1-100, 1001-1039, 1042, 1044-1046, 1057-1068, 1071-1230, 4001-4095)	BDS+GAL+GLO+GPS+IRS+QZS+SBAS	  

Figure 54. Mountpoints List Management Interface

Using the “**Add Mountpoint**” option, administrators can create new real-time data streams by completing the following configuration parameters:

- **Name and identifier:** unique mountpoint name used by clients to connect to the stream
- **Transmission format:** selection of the output data format (e.g., BINEX, RTCA, RTCM 3.2)
- **Carrier frequencies:** supported signal bands (e.g., L1, L2)
- **Navigation systems:** enabled GNSS constellations (e.g., GPS, GLONASS, Galileo, BeiDou)
- **Associated stations:** one or more CORS stations that provide the source data for the stream
- **Network and country:** organizational metadata
- **Coordinates:** mountpoint location displayed in the geographic viewer

Finally, select the stations associated with the mountpoint and click the **“Add Mountpoint”** button to create the stream (See Figure 55).

Create new mountpoint

Basic info

Mountpoint Name* Enter Name

Identifier* Enter Identifier

Format* BINEX - BINEX data format

Format Details Enter Format Details

Carrier* No phase information included

Navigation System*

- Chinese BeiDou (Compass)
- European Galileo
- Russian GLONASS
- US NAVSTAR GPS
- Indian IRNSS (NavIC)
- Japanese QZSS
- Augmented system SBAS (WAAS, EGNOS, GAGAN, MSAS, SBDM)

Network* Enter Network

Country* Afghanistan

Position Coordinates (China or Iraq)

Latitude* Enter Latitude Longitude* Enter Longitude

Miscellaneous information Enter miscellaneous or other information

Select the stations that should be associated with the mountpoint:

- Select all
- BURK001BN - Burkina (27.54470473°N, 50.72215480°E)
- KANG001BN - Kangung (27.28022127°N, 81.12277128°E)
- PHUN001BN - Phnom Penh (13.40013759°N, 103.31484100°E)
- THAI001BN - Thainote (27.48808612°N, 81.43032341°E)
- HWA0000BN - China (27.51166288°N, 115.97732028°E)
- EDG0000BN - Dushanbe (38.81325284°N, 68.58444823°E)
- EDG0000BN - Dushanbe (38.81325284°N, 68.58444823°E)
- UH00000BN - Chongqing (27.58229814°N, 101.10181763°E)
- HNA0010BN - Hui (27.38815797°N, 89.35456188°E)
- BPT0000BN - Sarawak (16.80162884°N, 102.25872129°E)
- BPT0000BN - Sarawak (16.80162884°N, 102.25872129°E)
- ZHE0000BN - Baika (26.94194883°N, 80.89121337°E)
- ZHE0000BN - Baika (26.94194883°N, 80.89121337°E)
- JOR0000BN - Gathara (28.89437913°N, 92.05944205°E)
- GAS0000BN - Gasa (27.92765229°N, 89.72025879°E)

Add Mountpoint

Figure 55. Mountpoint Creation Form

Back to the Mountpoint list interface , it displays all configured streams, including their associated CORS stations, supported data formats, and available navigation systems. Through the **Action** menu, administrators can edit the mountpoint profiles or remove existing mountpoints and view the mountpoint profile that also includes the users allowed to access the streams (See.Figure 56)

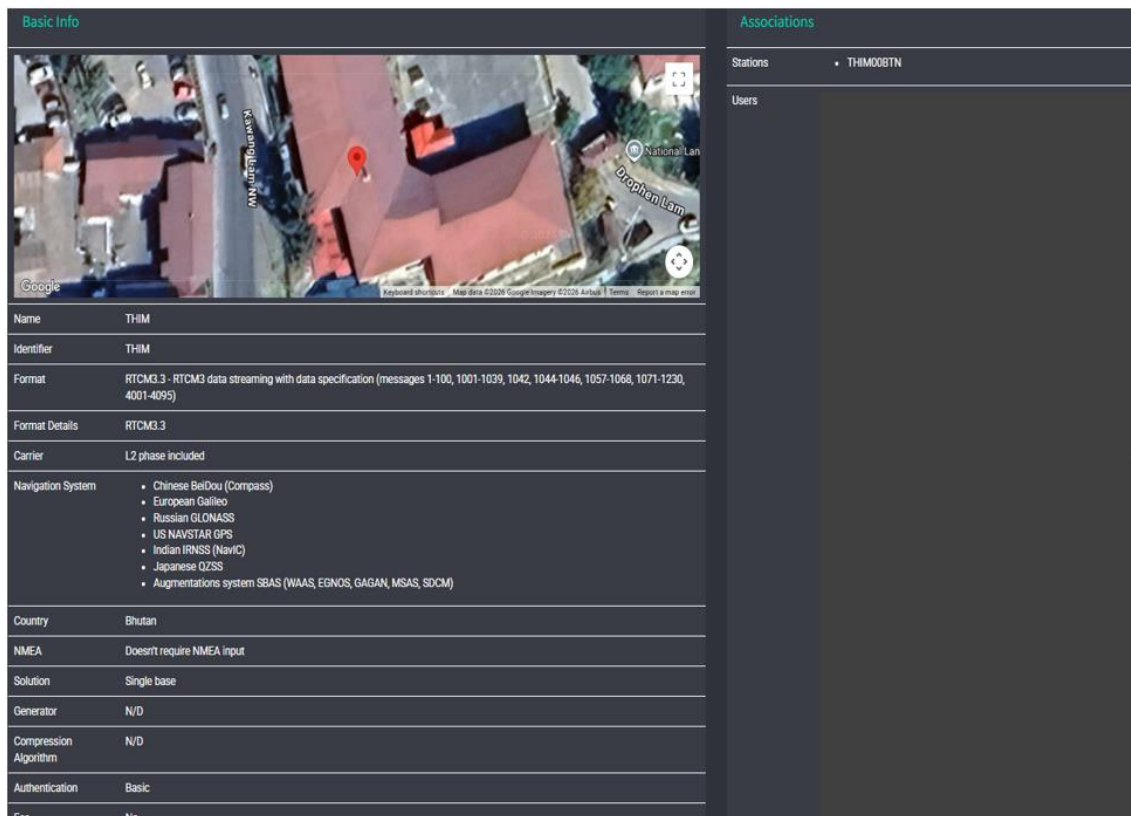


Figure 56. Mountpoint Profile Interface

The **Users** subsection displays the list of registered users associated with the **MIRACaster** service.

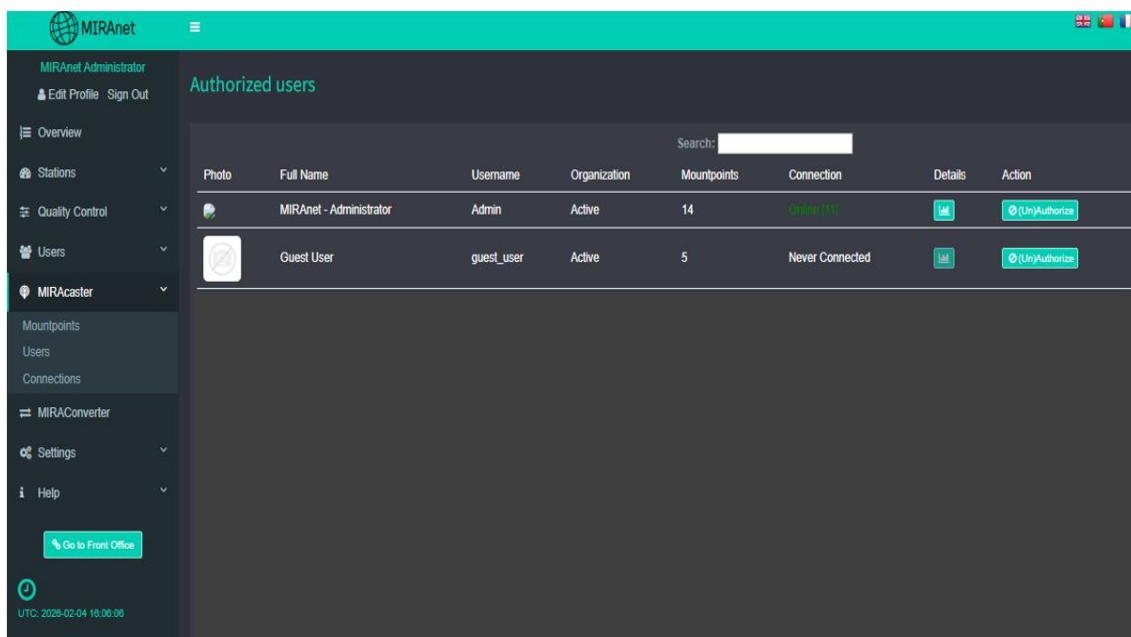


Figure 57 Authorized Users Management Interface

This module allows administrators to manage user access to the configured **mountpoints (data streams)**. The interface lists all users along with key information such as:

- **Username**
- **Organization**
- **Connection status** (e.g., online, never connected)
- **Number of assigned mountpoints** to each user
- The **Details** button provides access to the activity history of each user. This view displays the user's interactions with the associated streams, including graphical indicators of connection periods and the total number of connections per stream (See Figure 58).

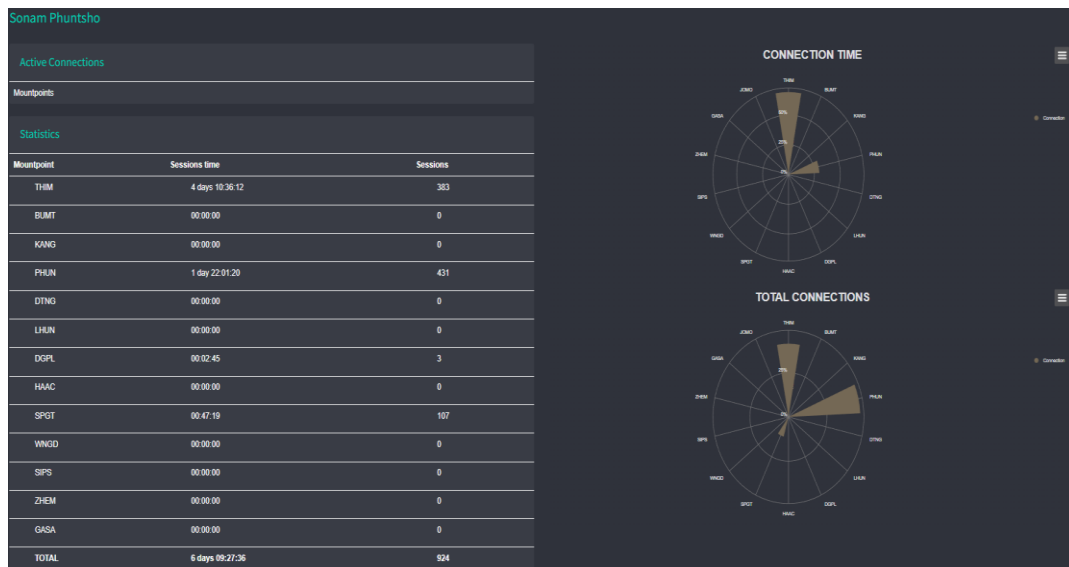


Figure 58. User Activity Details Interface

Through the **Action** menu, administrators can configure the streams that each user is authorized to access by selecting the corresponding mountpoints and defining the permitted access period for the caster service (See Figure 59).

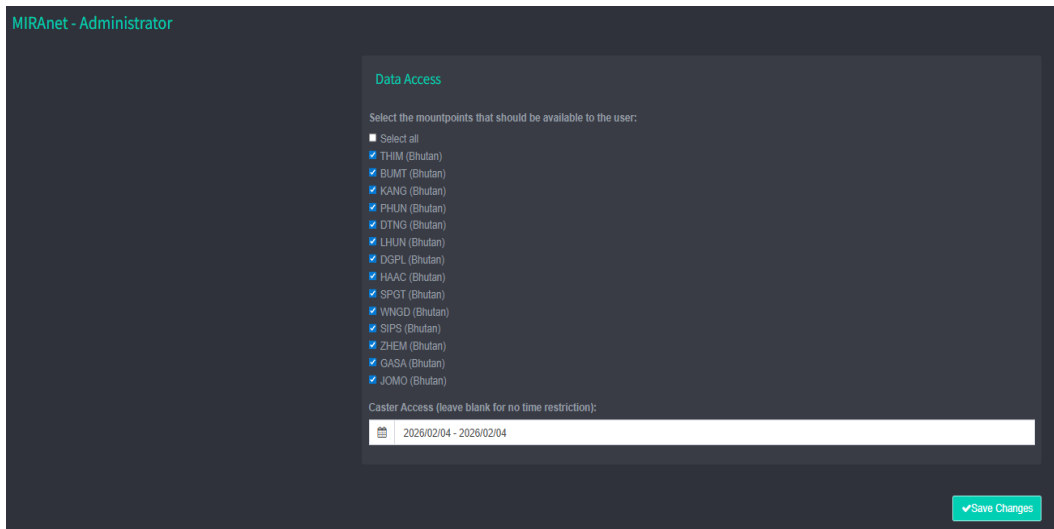


Figure 59. Access Configuration Interface

The **Connections** subsection displays the most recent connection records per user within the MIRACaster service. This view allows administrators to review the latest user activity related to mountpoint access (See.

Figure 60).

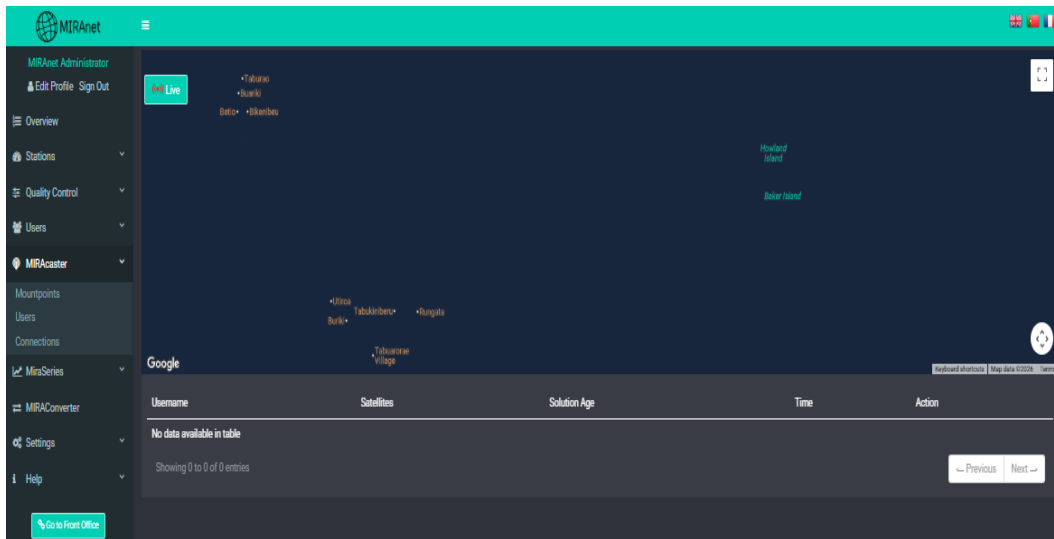


Figure 60. MIRACaster – Latest User Connections

6.2 MiraSeries Section

The **MiraSeries** provides tools for the processing and visualization of GNSS station position time series. This section displays position estimates derived from processed GNSS data and allows users to review the temporal behavior of station coordinates. The interface presents a list of available stations, including **the most recently processed file** and a **latest values panel** showing the current Easting, Northing, and Up components (See Figure 61).

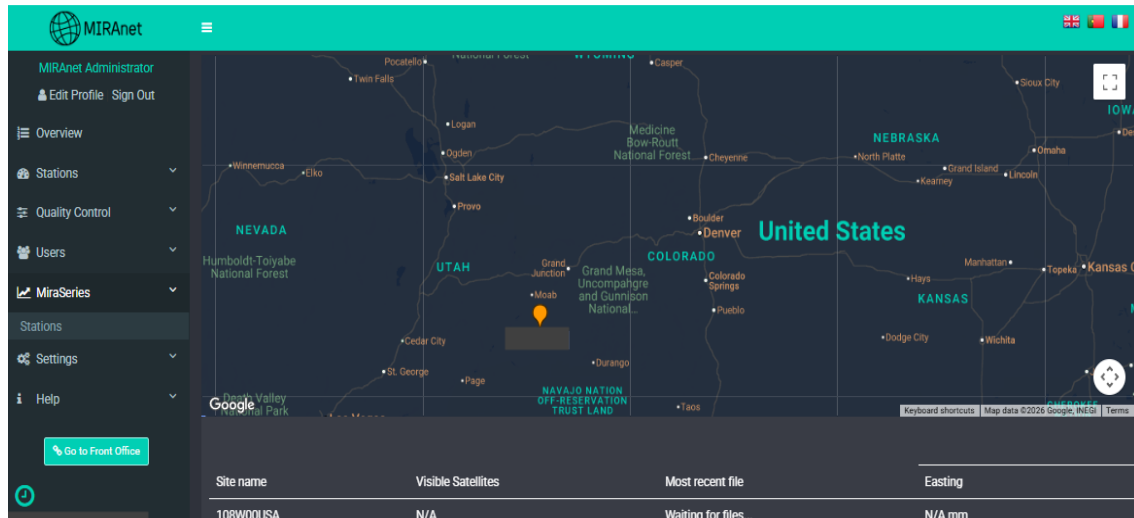


Figure 61. Access Configuration Interface

Through the **Chart** option, users can view graphical representations of the station position time series in different formats, including **Position**, **Detrended**, and **North America ITRF2020** reference frames. The module also supports exporting the generated data in multiple formats, including CSV, XML, JSON, PBO, or as images for reporting purposes (See Figure 62).

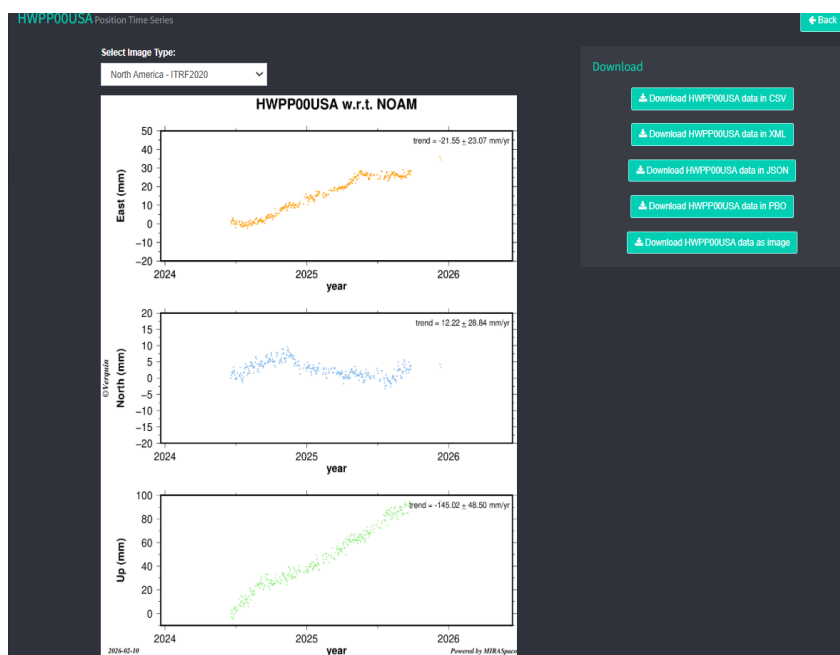


Figure 62. MiraSeries Chart Interface

6.3 MIRACONVERTER SECTION

The **MIRACONVERTER** module enables the conversion between different coordinate formats and the transformation between predefined datums, according to project or client requirements. Users can select both the input and output coordinate systems before performing the transformation.

When the selected transformation method requires an additional support file (e.g., NTV2 Grid file), the interface provides a dedicated section for uploading or selecting the corresponding file (See Figure 63).

Regarding the dataset to be transformed, the tool supports both single-point and batch processing modes. Users may manually enter individual coordinates or upload a file containing multiple points for bulk conversion. In batch mode, each line of the file represents a single point, including its identifier and coordinate values, formatted according to the selected coordinate system.

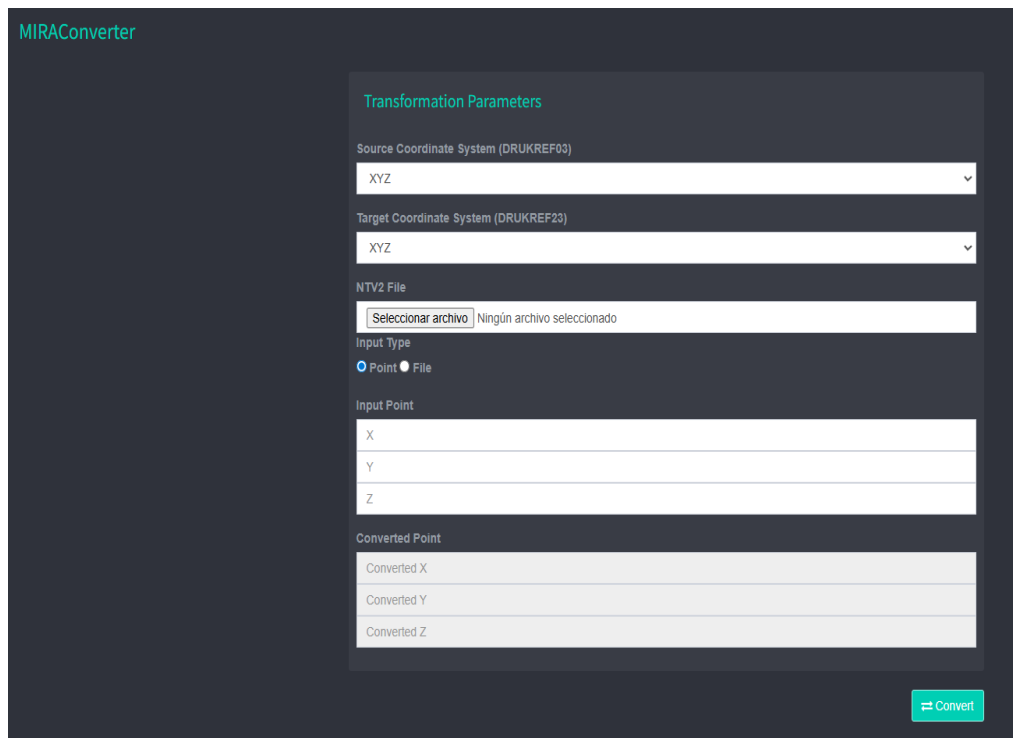


Figure 63. MIRA Converter Parameters Interface

For example:

point_name1 x1 y1 z1

point_name2 x2 y2 z2

point_name3 x3 y3 z3

...

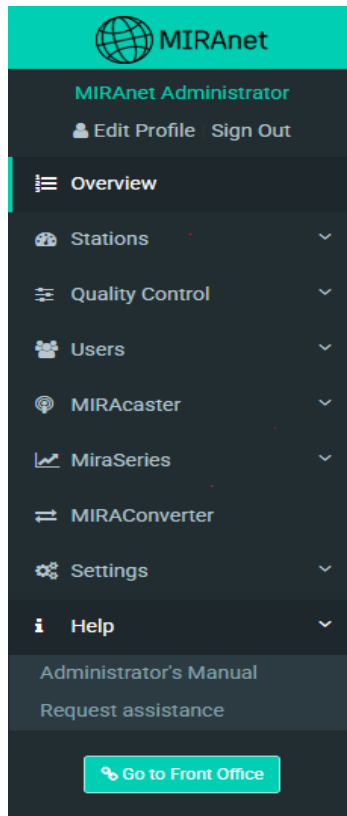
The coordinate components depend on the chosen system. For geographic coordinates (LLH), the format corresponds to longitude, latitude, and height. For ENU coordinates, the values represent east, north, and up components.

After configuring the transformation parameters, clicking **“Convert”** generates the transformed results. In single-point mode, the converted coordinates are displayed directly in the interface. In batch mode, a new file containing the transformed points is generated and made available for download.

7. Help Section

The help section provides access to documentation and support resources for platform users.

It includes the following subsections:



Administrator Manual subsection redirects users to the official documentation, which describes the platform's configuration, management and advanced modules.

Request Assistance subsection intended to provide a support request channel for contacting the system manager or technical support team.

Appendix

Appendix A. QC Configuration Parameters

Header Parameters

Site name

QC status
Approved with warning ▼

Domes number

QC status
Approved with warning ▼

Agency

QC status
Approved with warning ▼

Antenna delta

QC status
Approved with warning ▼

Antenna type

QC status
Approved with warning ▼

Antenna serial number

QC status
Approved with warning ▼

Receiver type

QC status
Approved with warning ▼

Receiver serial number

QC status
Approved with warning ▼

Approximate position (meters)

Value
5

QC status
Approved with warning ▼

Maximum approximate position (meters)

Value
10

QC status
Quarantine ▼

Data Parameters

Minimum observation ratio (percentage)

Value

30

QC status

Rejected



Observation ratio (percentage)

Value

50

QC status

Approved with warning



Minimum observed elevation (meters)

Value

10

QC status

Approved with warning



Cycle slips for GPS

Value

300

QC status

Approved with warning



Maximum cycle slips for GPS

Value

10000

QC status

Rejected



Cycle slips for GLO

Value

300

QC status

Approved with warning



Maximum cycle slips for GLO

Value

10000

QC status

Rejected



Cycle slips for GAL

Value

300

Cycle slips for GAL

Value
300

QC status
Approved with warning

Maximum cycle slips for GAL

Value
10000

QC status
Rejected

Cycle slips for BDS

Value
300

QC status
Approved with warning

Maximum cycle slips for BDS

Value
10000

QC status
Rejected

Cycle slips for NVS

Value
300

QC status
Approved with warning

Maximum cycle slips for NVS

Value
10000

QC status
Rejected

Cycle slips for QZS

Value
300

QC status
Approved with warning

Maximum cycle slips for QZS

Value
10000

QC status
Rejected

Cycle slips for SBS

Value
300

QC status
Approved with warning

Maximum cycle slips for SBS

Value
10000

QC status
Rejected

Processing parameter

Duplicate Files

QC status

Approved with warning

Plot Parameters

Data span for plots (months)

Value

4