

User Manual

SERIS

Solar Energy Research Institute Singapore



Cloud Based Realtime Analytical Monitoring of Photovoltaic Systems and Weather Parameters Project

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Team Name	SE25PT7
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Version History

Version	Author/Reviewer		Brief description of changes
Draft	Nay Lin Aung	18/01/ 2019	Initial Version.
1.1	Nay Lin Aung	02/02/2019	Edited and baselined the user manual.



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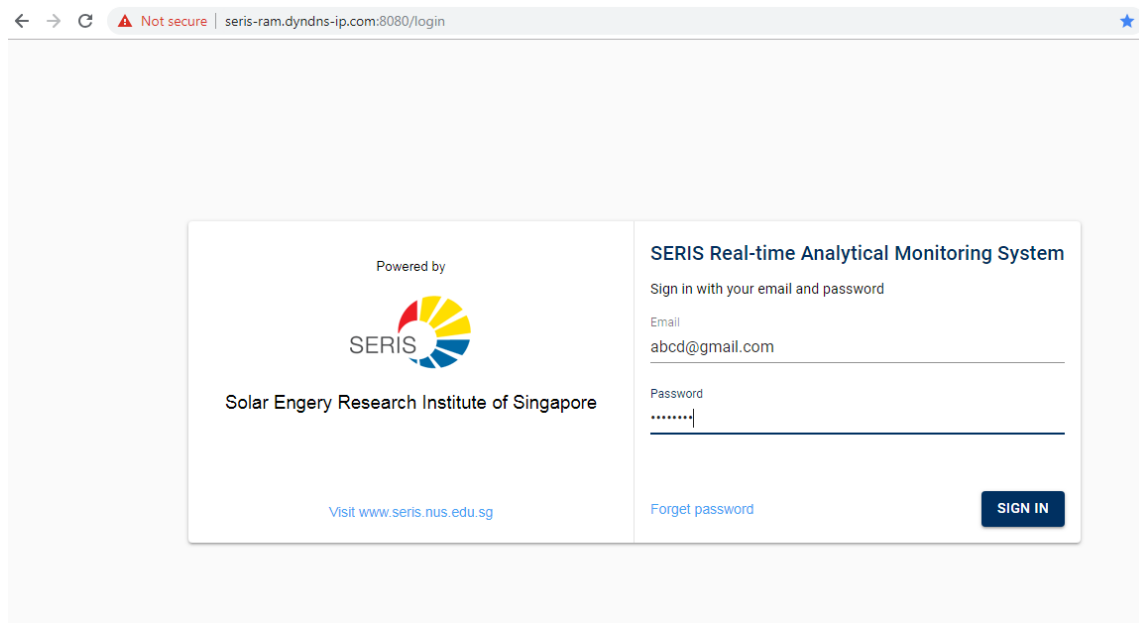
1. Overview

The Solar Energy Research Institute of Singapore (SERIS) conducts research, development testing and consulting on solar energy technologies and their integration into power systems and buildings. SERIS is globally active but focuses on technologies and services for tropical regions, in particular for Singapore and South-East Asia.

The aim of the project is to develop a cloud-based platform for integrating and managing real-time Analytical Monitoring of PV systems performance - from small rooftop systems to large ground-based PV power plants in the multi-MW range across different climate zones. Collected data will be used for extensive research programmes on yield projections, which are of vital importance to project developers as well as investors and degradation studies of PV modules & systems.


2. Login

Open the browser, and by entering URL < <http://seris-ram.dyndns-ip.com:8080/login> > of SERIS web application, login page will be shown. Keying in registered email and password will lead to login into the SERIS system and it will display the system's dashboard.



← → ↻ ⚠ Not secure | seris-ram.dyndns-ip.com:8080/login

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[Visit www.seris.nus.edu.sg](http://www.seris.nus.edu.sg)

SERIS Real-time Analytical Monitoring System

Sign in with your email and password

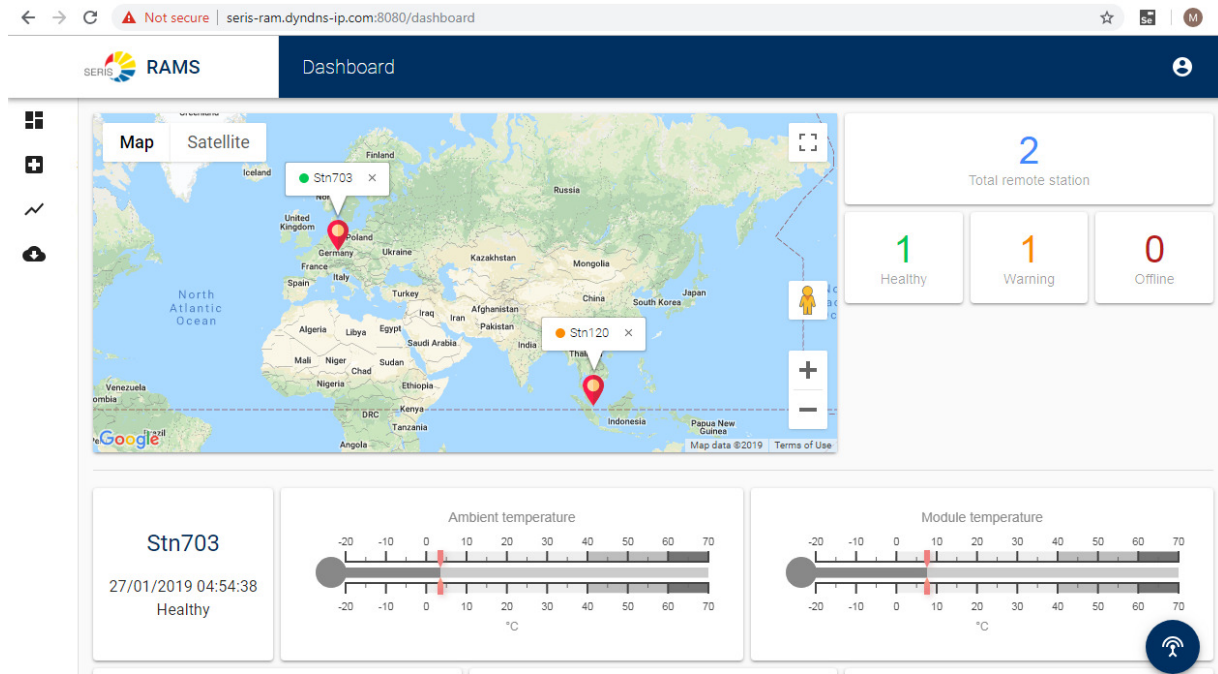
Email

Password

[Forget password](#)


SIGN IN

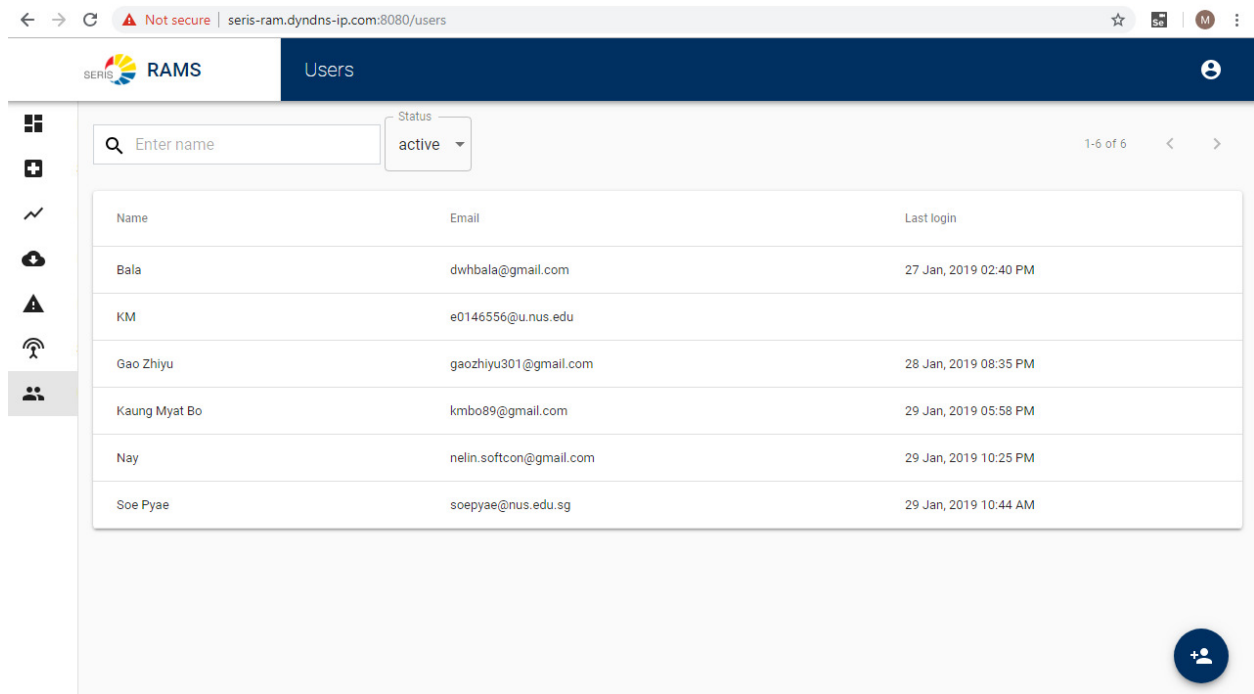




3. New User Registration

To create a new user, the system should be logged in with administrator right. System user without administrator right can not create/delete user.

With admin-right, press the button  located at the right-bottom corner for creating new user. It will display the page for adding/creating new user with respective information.



The screenshot shows the 'Users' management interface in the SERIS RAMS system. The browser address bar indicates the URL is `seris-ram.dyndns-ip.com:8080/users`. The page header includes the SERIS RAMS logo and the title 'Users'. A sidebar on the left contains various system icons. The main content area features a search bar labeled 'Enter name' and a status filter set to 'active'. Below this is a table listing users:

Name	Email	Last login
Bala	dwhbala@gmail.com	27 Jan, 2019 02:40 PM
KM	e0146556@u.nus.edu	
Gao Zhiyu	gaozhiyu301@gmail.com	28 Jan, 2019 08:35 PM
Kaung Myat Bo	kmbo89@gmail.com	29 Jan, 2019 05:58 PM
Nay	nelin.softcon@gmail.com	29 Jan, 2019 10:25 PM
Soe Pyae	soepyaee@nus.edu.sg	29 Jan, 2019 10:44 AM

A '+ user' button is located in the bottom right corner of the interface.

Enter necessary information for new user, assign stations for that particular user, and save it. The system should have created new user and a url link will be sent to the new user's email. The user should check his email, and should have clicked the url link and activated the account. It is strongly advised to set new password.

← → ↻ Not secure | seris-ram.dyndns-ip.com:8080/users/new

SERIS RAMS New user

User information

Name * Email * Phone

Mobile * Persona + Role *

Stations

No station is selected at this moments.

SELECT

* Required

BACK SAVE

← → ↻ Not secure | seris-ram.dyndns-ip.com:8080/users/new

SERIS RAMS New user

User information

Name * Eric Email * eric@gmail.com Phone

Mobile * 98765432 Persona Researcher + Role * System user

Stations

No station is selected at this moments.

SELECT

* Required

BACK SAVE

← → ↻ Not secure | seris-ram.dyndns-ip.com:8080/users/new

Select stations

<input type="checkbox"/>	Stn110	CTO
<input type="checkbox"/>	Stn722	Vietnam
<input checked="" type="checkbox"/>	Stn160	Bintan Island, Riau Islands, Indonesia
<input type="checkbox"/>	Stn120	7 Engineering Drive 1, #06-01 Block E3A, Singapore 117574
<input checked="" type="checkbox"/>	Stn321	920 Tiong Bahru Rd, Singapore 158792
<input type="checkbox"/>	Stn719	Cebu City, Cebu, Philippines
<input type="checkbox"/>	Stn658	Jurong Island, Singapore
<input type="checkbox"/>	Stn715	Coca Cola Company, Phnom Penh, Cambodia
<input type="checkbox"/>	Stn304	60 Robertson Quay, Singapore 238252
<input type="checkbox"/>	Stn301	Punggol, Singapore

CLOSE

← → ↻ Not secure | seris-ram.dyndns-ip.com:8080/users/new

SERIS RAMS New user

User information

Name * Eric Email * eric@gmail.com Phone

Mobile * 98765432 Persona * Researcher + Role * System user

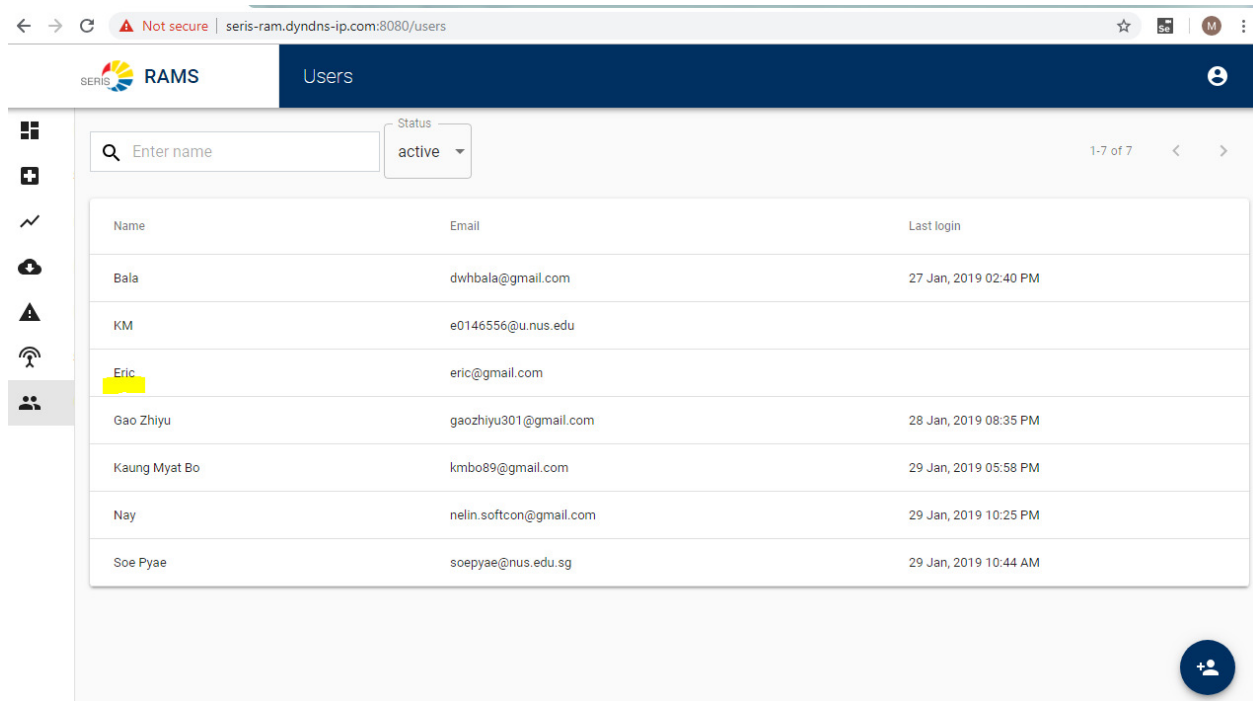
Stations

Stn160 Stn321

SELECT

* Required

BACK SAVE



The screenshot displays the 'Users' management interface within the SERIS RAMS system. The browser address bar shows 'seris-ram.dyndns-ip.com:8080/users'. The interface includes a search bar with the placeholder 'Enter name', a status dropdown menu currently set to 'active', and a pagination indicator '1-7 of 7'. A table lists the following users:

Name	Email	Last login
Bala	dwhbala@gmail.com	27 Jan, 2019 02:40 PM
KM	e0146556@u.nus.edu	
Eric	eric@gmail.com	
Gao Zhiyu	gaozhiyu301@gmail.com	28 Jan, 2019 08:35 PM
Kaung Myat Bo	kmbo89@gmail.com	29 Jan, 2019 05:58 PM
Nay	nelin.softcon@gmail.com	29 Jan, 2019 10:25 PM
Soe Pyae	soepya@nus.edu.sg	29 Jan, 2019 10:44 AM

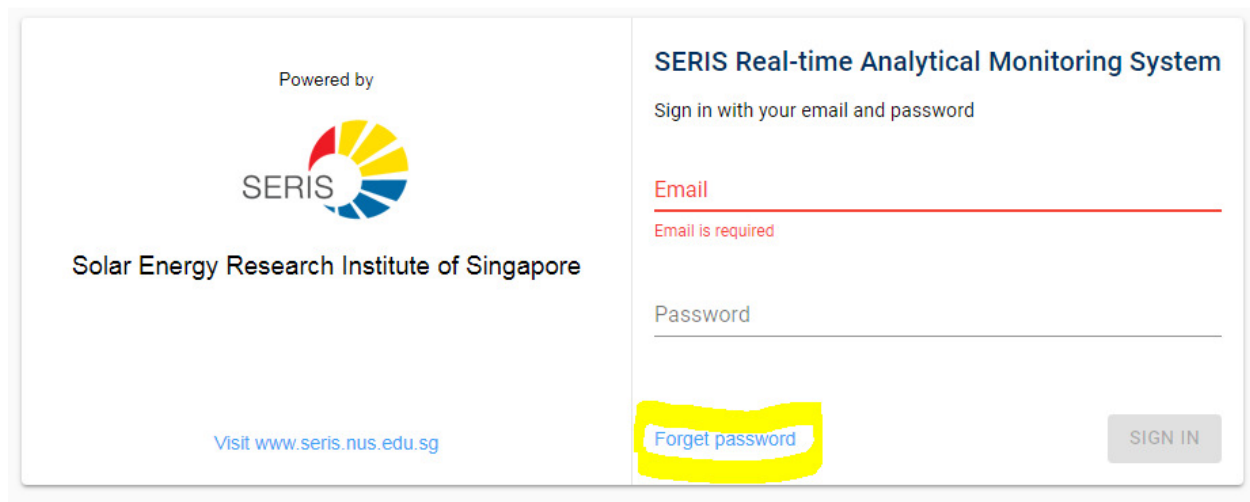
A sidebar on the left contains navigation icons, and a bottom right corner features a circular button with a plus sign and a user icon.



4. Forgot Password

This option allows an existing user to reset password, in case he/she is not able to recall his/her current password. A registered user can request for a password reset link to be sent to his/her registered email address. Using this link, the user will be able to choose and assign a new password.

The System allows the user with appropriate permission to browse list of all stations existing in the system.



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SERIS Real-time Analytical Monitoring System

Sign in with your email and password

Email

Email is required

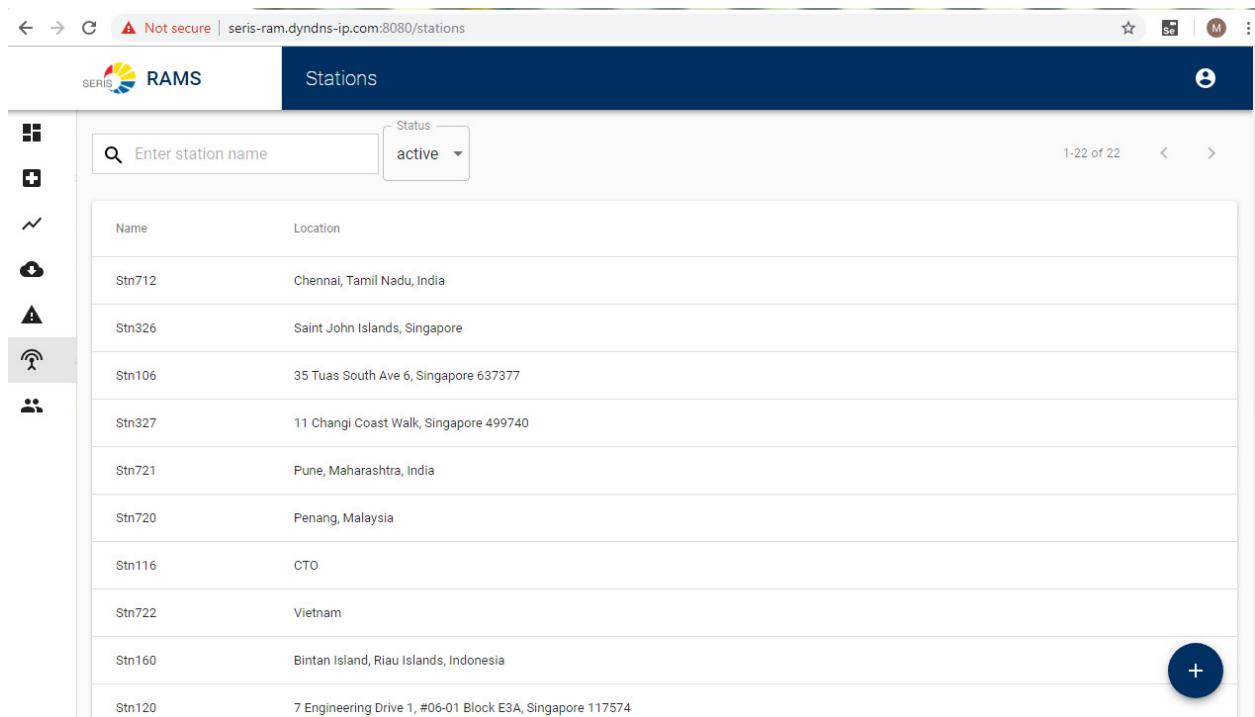
Password

Forgot password

SIGN IN

5. Station Management

A station is a site that has sets of IoT devices tagged to them. The station needs to be registered before it can send data to the system. The System should allow the admin user to create, edit, and delete stations to which the IoT devices are tagged to within the RAM application. The lowest level of granularity of devices/sensors has been revised to **stations**, instead of individual devices/sensors.



6. User and Station Mapping

The System allows the system's administrator to assign, edit and remove stations mapped to individual users. This is also part of the process while creating new user.

Select stations

1-22 of 22

active

#	Name	Location
<input type="checkbox"/>	Stn712	Chennai, Tamil Nadu, India
<input type="checkbox"/>	Stn326	Saint John Islands, Singapore
<input checked="" type="checkbox"/>	Stn106	35 Tuas South Ave 6, Singapore 637377
<input type="checkbox"/>	Stn327	11 Changi Coast Walk, Singapore 499740
<input checked="" type="checkbox"/>	Stn721	Pune, Maharashtra, India
<input type="checkbox"/>	Stn720	Penang, Malaysia
<input checked="" type="checkbox"/>	Stn116	CTO
<input type="checkbox"/>	Stn722	Vietnam
<input type="checkbox"/>	Stn160	Kp. Galang Batang, Gn. Kijang, Kabupaten Bintan, Kepulauan Riau 29153, Indonesia
<input type="checkbox"/>	Stn120	7 Engineering Drive 1, #06-01 Block E3A, Singapore 117574
<input type="checkbox"/>	Stn321	920 Tiong Bahru Rd, Singapore 158792
<input type="checkbox"/>	Stn719	Cebu City, Cebu, Philippines
<input type="checkbox"/>	Stn658	Jurong Island, Singapore

CLOSE

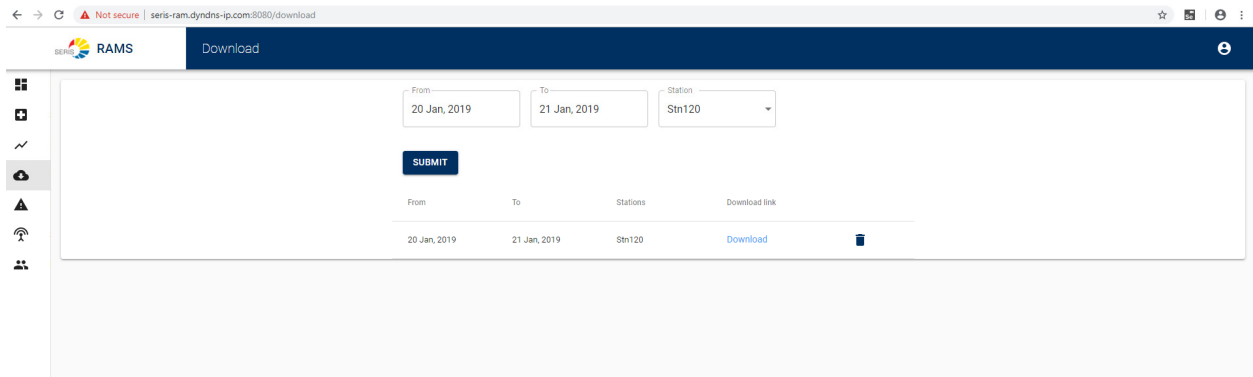
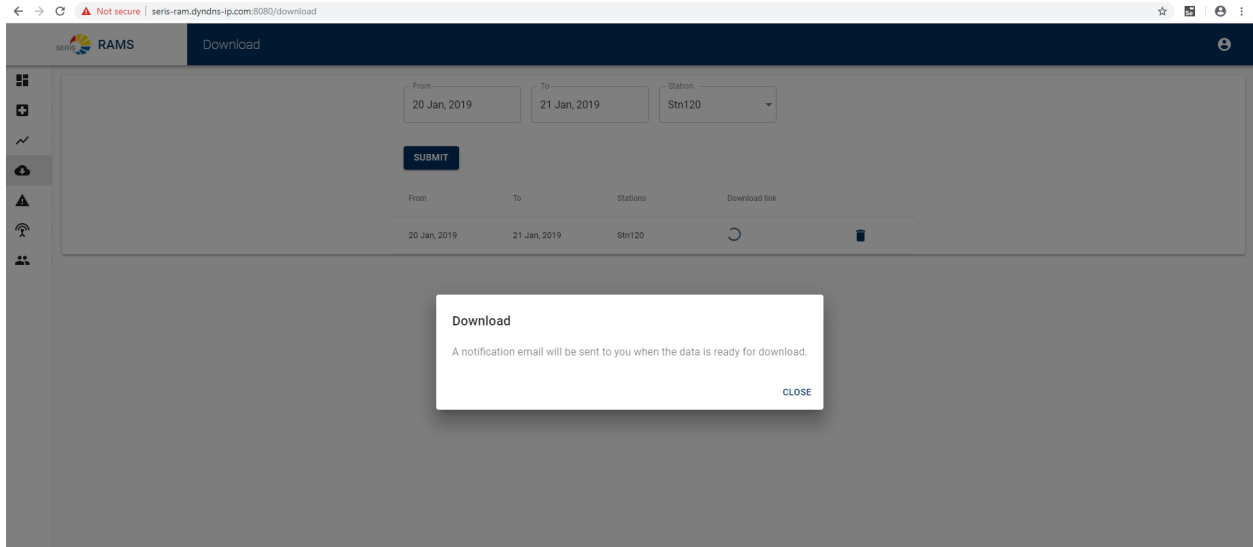


7. Data Download

Go to download page, and the System facilitates an easy way to download the data from the cloud into their local PC. The user can select a specific station tagged to that user. Select a particular station and period of data to be downloaded and press “SUBMIT” button. The data will be downloaded in zip file.

The user can customize the download further by specifying a specific month for the data download. The downloaded data will be in the form of “csv” file to facilitate further data analysis by the users with commonly available tools (for an example excel).

The screenshot shows a web browser window with the URL `seris-ram.dyndns-ip.com:8080/download`. The page has a dark blue header with the 'SERIS RAMS' logo and a 'Download' title. A sidebar on the left contains several icons. The main content area features a form with three input fields: 'From' (29 Jan, 2019), 'To' (30 Jan, 2019), and 'Station' (Stn120). Below these fields is a blue 'SUBMIT' button. At the bottom of the form, there is a table header with four columns: 'From', 'To', 'Stations', and 'Download link'.



8. Real-time Dashboard

User can easily access the dashboard in which real-time data will be displayed for assigned stations. User will have to select a particular station which is assigned to him. Ideally the dashboard is divided into 3 sections, the '**map**', '**health**' and '**sensor**'.

The '**map**' section displays the station(s) attached to the user on a map. The user can interactively navigate through the map that is presented. The user should be able to select a specific station on the map by a simple click of the mouse.

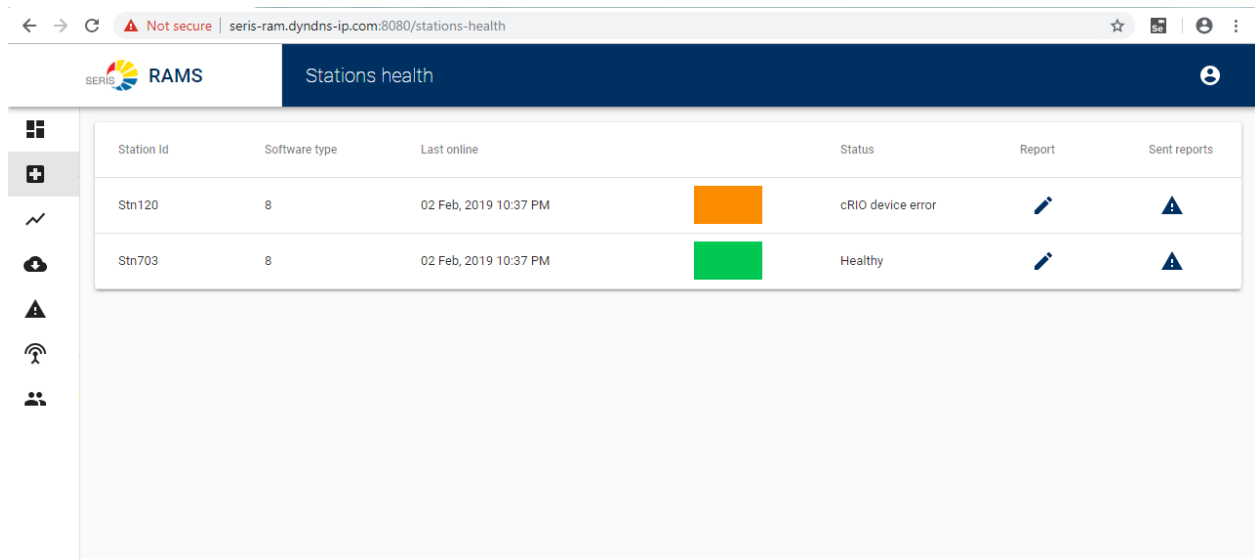
The '**health**' section displays a summary of health status of the stations attached to the user in real-time. Since the health data is sent to the RAM application on a per-minute basis, the health summary is to be refreshed with the same frequency of the incoming health data.





The '**sensor**' section displays the data sent from sensors attached to the station in real-time. This section should work in-sync with the 'map' section. The 'sensor' section displays the selected station's sensor data. Since the sensor data is sent to the RAM application on a per-second basis, this section is expected to be refreshed on a per-second basis.



9. Health Check

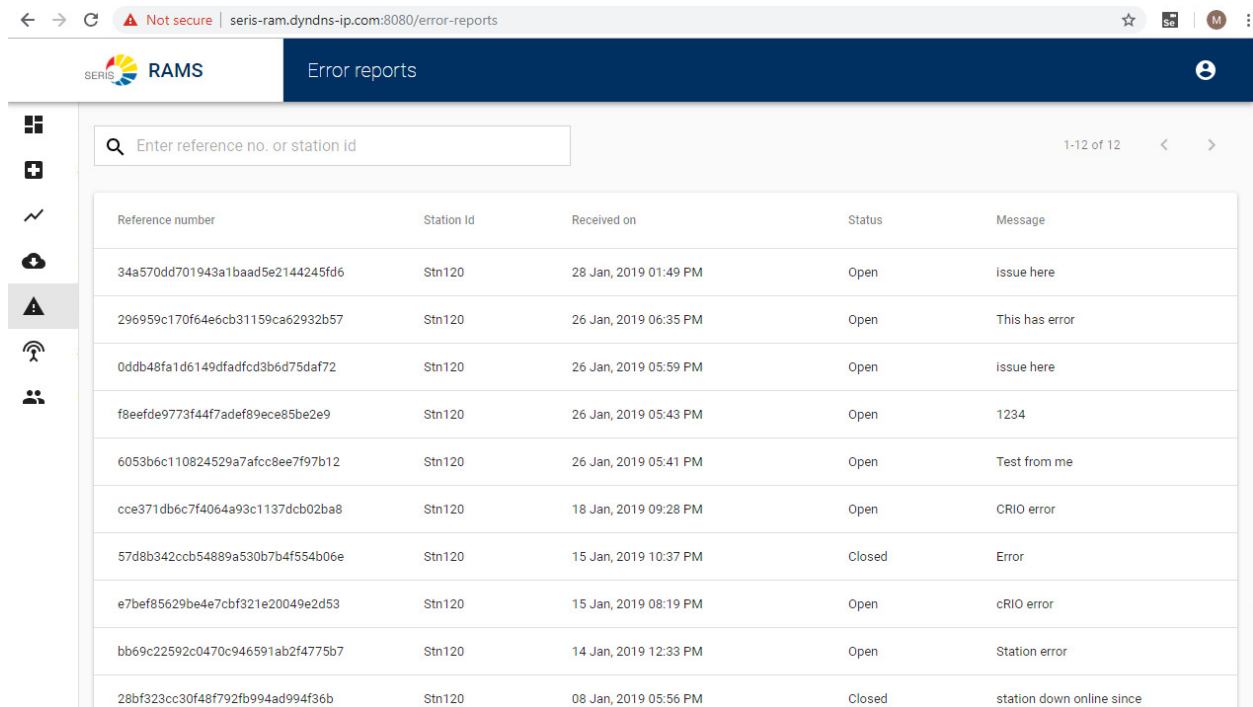
Go to stations health page, and the system will display a summary of health status of the stations attached to the user in real-time. The station's health data summary is refreshed at every one minute.



Station Id	Software type	Last online	Status	Report	Sent reports
Stn120	8	02 Feb, 2019 10:37 PM	 	cRIO device error	 
Stn703	8	02 Feb, 2019 10:37 PM	 	Healthy	 

10. Report

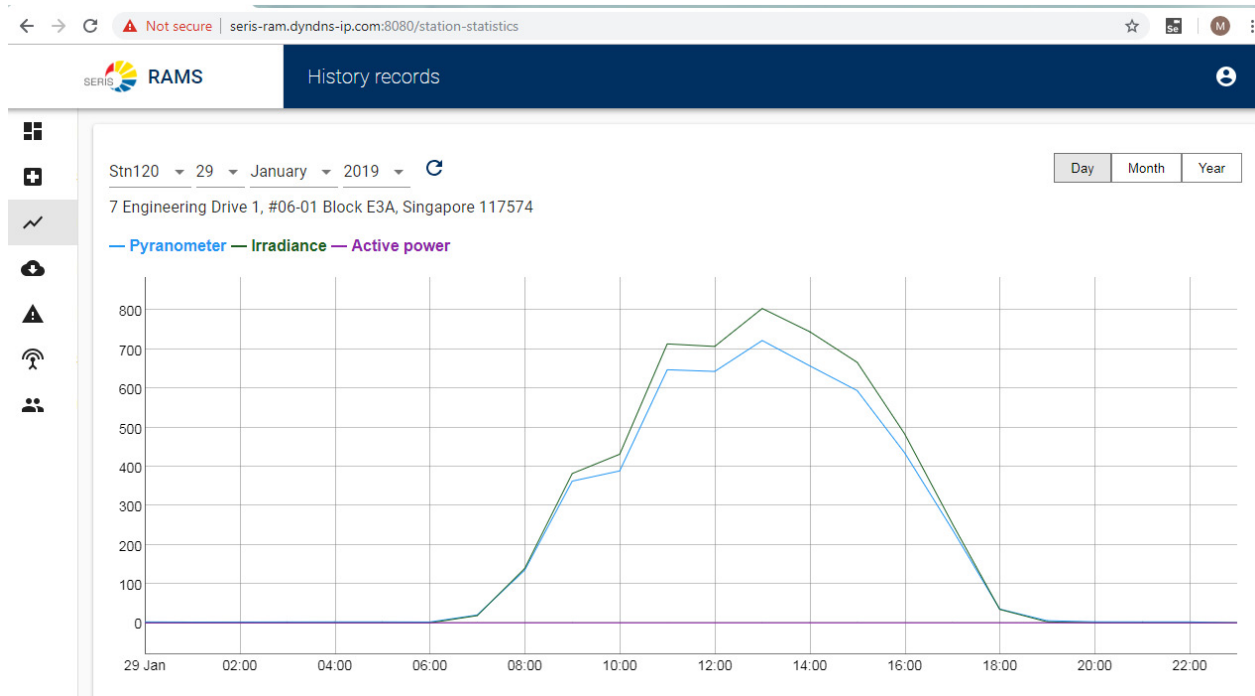
Go to report page. Relevant data for stations are available for download, and accessible by users in the form of reports, charts, and graphs. Users can customize these reports further.



Reference number	Station Id	Received on	Status	Message
34a570dd701943a1baad5e2144245fd6	Stn120	28 Jan, 2019 01:49 PM	Open	Issue here
296959c170f64e6cb31159ca62932b57	Stn120	26 Jan, 2019 06:35 PM	Open	This has error
0ddb48fa1d6149dfadfc3b6d75daf72	Stn120	26 Jan, 2019 05:59 PM	Open	Issue here
f8eefde9773f44f7adef89ece85be2e9	Stn120	26 Jan, 2019 05:43 PM	Open	1234
6053b6c110824529a7afcc8ee7f97b12	Stn120	26 Jan, 2019 05:41 PM	Open	Test from me
cce371db6c7f4064a93c1137dcb02ba8	Stn120	18 Jan, 2019 09:28 PM	Open	CRIO error
57d8b342ccb54889a530b7b4f554b06e	Stn120	15 Jan, 2019 10:37 PM	Closed	Error
e7bef85629be4e7cbf321e20049e2d53	Stn120	15 Jan, 2019 08:19 PM	Open	cRIO error
bb69c22592c0470c946591ab2f4775b7	Stn120	14 Jan, 2019 12:33 PM	Open	Station error
28bf323cc30f48f792fb994ad994f36b	Stn120	08 Jan, 2019 05:56 PM	Closed	station down online since

11. History Records

Go to history record page, and select a station and period for which user wants to see the history records. Relevant data for the selected station will be displayed in the graph.



12. Alerts and Notifications

The RAM application will record certain important or time-sensitive information, especially around station health status.

In case of station failures, the users have requested it to be recorded for their tracking and closure. The application will receive station failure information in real-time from an external station monitoring application managed by SERIS. The RAM application in turn will record this information in the notification table, to bring such station failures to user's attention.

The station health code sent by the station indicates the health status and error code. Ideally we should be receiving a '1' meaning station in good health and there are no errors. In case the value is not '1' then this needs to be captured and recorded in the notification table. This will help SERIS to intervene and take corrective action in a timely manner.



13. Auditing and Traceability

The RAM Application is expected to capture and record certain key events and activities performed within the system.

These include :

- User Login/Logout details (Session details)
- User Management details, specifically creation and deletion of user accounts
- Station Management details, specifically creation and deletion of stations

The audit data captured should be made available and accessible to SERIS administrators. They should be accessible interactively or through a download option for auditing the RAM application's critical functionalities.