

PT Terravision - Navagasi Lighthouse Upgrade Installation Procedure

Main Installation Tasks

The following are the main tasks that must be performed when performing a Navagasi Lighthouse Upgrade installation.

Procedures to be Performed at Lighthouse

- Physical Installation of Lighthouse Components:
 - o Solar Panels.
 - o Batteries.
 - o Sabik Lantern.
 - o DMR-200D Satellite Terminal.
 - o Security Switch.
 - o Remote Monitoring Control System (RMCS).

- Connection of Lighthouse Components to the RMCS:
 - o Solar Panels.
 - o Batteries.
 - o Sabik Lantern.
 - o DMR-200D Satellite Terminal.
 - o Security Switch.

- Testing of Lighthouse Components:
 - o Verification of Solar Panel Open Circuit voltage.
 - o Verification of Solar Panel Short Circuit Current.
 - o Verification of SunSaver SS-20L Solar Panel Regulator Output Voltage.
 - o Verification of Battery Charge Current.
 - o Verification of Battery Load Current.
 - o Verification of Sabik Lantern Flash Character.
 - o Verification of Lantern Current Sensor Operation.
 - o Verification of DMR-200D Satellite Power Up.
 - o Verification of Security Sensor Contact Operation.

Procedures to be Performed at Operations Depot

- Adding a DMR-200D Satellite Terminal to the SkyNet Mobile System.
 - o Log in to the SkyNet Mobile SatLink Webpage.
 - o Add the New Device to the Database.
 - o Add the New Device to the List of Favourites.
 - o Verify Communications to the New Device.

- Verification of Email Updates Sent & Received From SkyNet Mobile.
 - o Verify Email Updates Are Received From SkyNet Mobile.
 - o Verify Update Requests Can Be Sent Via Email to SkyNet Mobile.

- Adding & Verifying a Site in the Sabik WebSCADA Server.
 - o Adding a Site.
 - o Verifying Data Updates.

Procedures to be Performed at Lighthouse

Physical Installation of Lighthouse Components

Solar Panels

1. The solar panels are supplied with 7 meters of 4mm², 2 core flexible cable that is pre-terminated with a 4 pin weather resistant connector. The location used to mount the solar panels and frames needs to be chosen to allow the cables to be run in a safe and unobtrusive way.
2. Visually inspect the solar panels for damage, shattered or broken glass, and report to your supervisor if damage is found. Ensure that the solar panels are clean.
3. Attached the solar panel frames to the lighthouse structure using the prescribed mounting hardware. The panels should be mounted at a 35 degree angle to the horizontal plane.
4. Attach the Australian Maritime Systems Roller Birdscarer following the installation guide directions (Appendix xx, "Australian Maritime Systems Limited Birdscarer Installation Guide").
5. Run the cable from each solar panel into the lighthouse enclosure to where the RMCS box will be located.
6. Attach the solar panel cable to the solar panel:
 - a. Open the solar panel junction box.
 - b. Fit one of the supplied 20mm cable glands into one of the junction box knock out holes.
 - c. Remove the outer insulation of the power cable as needed and insert it through the cable gland.
 - d. Bare the wires of the power cable, add conducting grease to prevent corrosion of each wire, and insert and tighten screw terminal. The "Brown" wire connects to the positive terminal and the "Blue" wire connects to the negative terminal.
 - e. Tighten the cable gland and close the junction box lid.

Batteries

1. Visually inspect the batteries for damage and report to your supervisor if any damage is found.
2. The batteries are supplied locally in Indonesia and should be connected as prescribed by the local authority.
3. 3 meters of 4mm², 2 core flexible cable has been supplied to connect the batteries to the RMCS box, and is pre-terminated with a 4 pin weather resistant connector. The cable should be run internally to the lighthouse enclosure from the battery compartment to the where the RMCS box will be located.

Sabik Lantern

1. Visually inspect the lantern, cable and connector for damage and report to your supervisor if damage is found.
2. The Sabik lanterns are supplied with 5 meters of cable that is pre-terminated for connection to the RMCS box with a 4 pin weather resistant connector. The location used to mount the lantern needs to be as prescribed by the local authority, and the cable run in a safe and unobtrusive way that conforms to local regulations.
3. Ensure that the lantern is level by adjusting the levelling bolts.

DMR-200D Satellite Terminal

1. Visually inspect the DMR-200D satellite terminal and connector for damage, and report to your supervisor if damage is found.
2. Record the serial number of the terminal before it is mounted as it will be needed for commissioning of the terminal in the satellite network. The serial number is the "DCC004" number followed by six hexadecimal digits, and is located on the bottom of the terminal as well as on the packaging box.
3. The mounting location chosen for the DMR-200D satellite terminal on the lighthouse structure is very important.
 - a. The terminal should be mounted so that it has an unobstructed view to within 20 degrees of the mounting surface. This means that the terminal should be located at least 2 meters from all objects taller than 0.5 meters.
 - b. The installation must be on a full horizontal surface and should not be in an area where standing water may occur. The drain holes in the slots on the bottom of the terminal should not be blocked.
 - c. The mounting location should allow enough space for the side entry connector and cable.
 - d. The mounting location must be physically capable of supporting the terminal in extreme weather conditions.
4. The DMR-200D is supplied with 10 meters of cable that is pre-terminated at each end with weather resistant connectors. One end is terminated with a small 8 pin female connector that is attached to the DMR-200D satellite terminal, and the other end is terminated with a 7 pin male connector for attaching to the RMCS box. The cable should be run in a safe and unobtrusive way that conforms to local regulations.
5. Before connecting the cable to the satellite terminal use the supplied silicon grease to protect the connector pins (refer to Appendix xx, "DMR-200D Satellite Terminal Hardware Guide", specific instructions).
6. Once connected wrap the connector in waterproof sealing tape.
7. When running the cable from the terminal ensure that it is done so that water will flow away from the connector/terminal and not into the back of the connector. If possible add a drip loop to the cable near the terminal.

Security Switch

1. The security switch is comprised of 2 sections, a magnet and magnet activated switch. It is supplied with 5 meters of cables and is pre-terminated for connection straight to the RMCS box with a 4 pin weather resistant connector. The location of the security switch needs to be chosen to allow the cable to be run in a safe and unobtrusive way.
2. The switch and magnet should be mounted inside the enclosure doorway, with the magnet fastened to the door and the switch fastened to the door frame. With the enclosure door shut, the magnet and switch should be in close proximity to each other and the arrows aligned. When the enclosure door is shut and the magnet is in close proximity and aligned to the switch, the switch contact will be a short circuit. When the enclosure door is opened and the magnet is then far away from the switch, the switch contact will be an open circuit.

Remote Monitoring Control System (RMCS)

1. The RMCS box can be mounted vertically or laid flat in the top shelf of the lighthouse enclosure.
2. To mount vertically use the holes at the corners of the box that are accessible after removing the clear plastic lid. Ensure that there is enough clearance between the RMCS box and lighthouse enclosure to allow the connectors and cables to be fitted.

Connection of Lighthouse Components to the RMCS

Note: All connectors are keyed such that it can only perform one function. If the connector thread cannot be tightened easily DO NOT force the connection.

Note: Remove the clear plastic lid of the RMCS box and ensure that the disconnect pins are removed from terminals 11, 12, 15 and 16 before connecting any of the cables.

Solar Panels

1. Connect each of the solar panel cables (with the yellow collars) to one of the solar panel connections (marked with a yellow dot) on the right hand side of the RMCS box (see picture).

Batteries

1. Connect the battery cable (with the red collar) to the battery connection (marked with a red dot) in the middle of the RMCS box (see picture).

Sabik Lantern

1. Connect the Sabik lantern cable to the main lantern connection in the middle of the RMCS box (see picture). The auxiliary lantern connection is supplied for future expansion. The RMCS box can control which lantern is active via an internal relay.

DMR-200D Satellite Terminal

1. Connect the DMR-200D cable (with the blue collar) to the satellite terminal connection (marked with a blue dot) on the left hand side of the RMCS box (see picture).

Security Switch

1. Connect the security switch cable (with the white collar) to the security connection (marked with a white dot) on the left hand side of the RMCS box (see picture).

RACON Failure

1. The RACON failure connection is marked with a green dot and is supplied for future expansion. It is a connection that detects a relay closure when a RACON fails its self test.

Testing of Lighthouse Components

Verification of Solar Panel Open Circuit Voltage

Note: **DO NOT** short circuit the solar panel array or load while connected to the solar panel regulator. This will **DAMAGE** the regulator.

1. Ensure that the disconnect pins are **removed** from terminals 15 and 16.
2. Using a digital multimeter set to measure **DC voltage**, place the positive probe on the isolated side of terminal 15 and the negative probe on terminal 17. The voltage measured should be between +15 and +20V DC.
3. Place the positive probe of the digital multimeter on the isolated side of terminal 16 and keep the negative probe on terminal 13. The voltage measured should be between +15 and +20V DC.

Verification of Solar Panel Short Circuit Current

Note: **DO NOT** short circuit the solar panel array or load while connected to the solar panel regulator. This will **DAMAGE** the regulator.

1. Ensure that the disconnect pins are **removed** from terminals 15 and 16.
2. Using a digital multimeter set to measure **DC current**, place the positive probe on the isolated side of terminal 15 and the negative probe on terminal 13. The current measured should be between +1 and +3 Amps DC.
3. Place the positive probe of the digital multimeter on the isolated side of terminal 16 and keep the negative probe on terminal 13. The current measured should be between +1 and +3 Amps DC.

Verification of SunSaver SS-20L Solar Panel Regulator Output Voltage

Note: **DO NOT** short circuit the solar panel array or load while connected to the solar panel regulator. This will **DAMAGE** the regulator.

1. Insert the disconnect pins into terminals 12, 15 and 16.
2. Using a digital multimeter set to measure **DC voltage**, place the positive probe on the "Battery +" terminal of the SunSaver SS-20L, and the negative probe on the "Battery –" terminal. The voltage measured should be between +14V and +14.5V DC.

Verification of Battery Charge Current

Note: **DO NOT** short circuit the solar panel array or load while connected to the solar panel regulator. This will **DAMAGE** the regulator.

1. Remove the disconnect pin from terminal 12.
2. Using a digital multimeter set to measure **DC current**, place the positive probe on the bridged side of terminals 12, and the negative probe on the isolated side of terminal 12. The current measured should be positive and the value will depend on the charge state of the batteries.

Verification of Battery Load Current

Note: **DO NOT** short circuit the solar panel array or load while connected to the solar panel regulator. This will **DAMAGE** the regulator.

1. Insert the disconnect pin into terminal 12.
2. Using a digital multimeter set to measure **DC current**, place the positive probe on the bridged side of terminals 11, and the negative probe on the isolated side of terminal 11.
3. Cover the Sabik lantern to simulate night time for the photo-electric (PE) sensor and wait for the lantern to begin flashing (approximately 30 seconds).
4. The current measured should be between 4 and 5 Amps DC when the light is ON.

Verification of Sabik Lantern Flash Character

1. Insert the disconnect pin into terminal 11.
2. Cover the Sabik lantern to simulate night time for the photo-electric (PE) sensor and wait for the lantern to begin flashing (approximately 30 seconds).
3. Monitor the flashing sequence and ensure that the timing matches that defined for the site.

Verification of Lantern Current Sensor Operation

1. Cover the Sabik lantern to simulate night time for the photo-electric (PE) sensor and wait for the lantern to begin flashing (approximately 30 seconds).
2. Using a digital multimeter set to measure **DC voltage**, place the positive probe on the "TOR" terminal of the current sensor circuit board (Green wire), and the negative probe on the "GND" terminal (Black wire).
3. When the light is OFF the voltage measured should be approximately 2.55V DC.
4. When the light is ON the voltage measured should be around 3V DC, depending on the current used by the lantern. (Sensor voltage will increase by +0.1V DC per Amp of lantern current)

Verification of DMR-200D Satellite Terminal Power Up

1. Disconnect and reconnect the DMR-200D satellite connection on the left hand side of the RMCS box.
2. Visually monitor the LEDs on the top side of the DMR-200D.
3. When the terminal is powered on, the ERR LED comes on for 5 seconds and the STAT LED flashes. This indicates that the DMR-200D is correctly executing its start-up self test sequence. After about 5 seconds the ERR LED will turn off and the STAT LED continues flashing at different rates. If the ERR LED remains on the DMR-200D is not functioning correctly.

Verification of Security Sensor Contact Operation

1. Using a digital multimeter set to measure DC voltage, place the positive probe onto terminal 3 (white wire) and the negative probe on terminal 4 (black wire).
2. With the door that has the security switch installed is open, the voltage measured should be between 10.5 and 11V DC.
3. With the door closed the voltage measured should be 0V DC.

Procedures to be Performed at Operations Depot

Adding a DMR-200D Satellite Terminal to the SkyNet Mobile System

Note: Refer to the SatLink User Guide for more details on using and configuring the SatLink webpage (Appendix xx).

Note: Please ensure that your Internet web browser is configured to allow popup windows. The actions below may not work if a popup blocking feature is enabled.

Log in to the SkyNet Mobile SatLink Webpage

1. Using your favourite internet browser, type in the following URL:

http://Skynet_mobile_URL_to_be_determined

2. Type in your user name and password. To perform administrative tasks you will need an account with sufficient access privileges.
3. If your log in is successful then you will see the main SatLink screen.

Add the New Device to the Database

1. After successfully logging in, click on the "Admin" tab at the top of the webpage. A new window will appear, titled the "SATLINK DATABASE ADMINISTRATION".
2. Click on "Add Device" on the left hand side of the webpage.
3. Fill in the fields "Device ID:" as per that supplied by SkyNet, and the "Device Name:" as per that defined by the local authority. If required select a primary or secondary group.
4. Select whether to activate the device or not, and click the "Add Device" button when ready.

Add the New Device to the List of Favourites

1. Return to the "SatLink Main Page" window.
2. Click on the "Search" button at the top left hand side of the webpage and a small window will popup.
3. Enter the device ID or device name that was just added and click "Search".
4. The new device should appear as the search result.
5. Click on the "Fav." check box on the right hand side and click the "Add Selected to Favourites" button on the bottom of the window.
6. If the favourite was added successfully close the popup window.
7. Refresh the browser window with the "SatLink Main Page" and the new site should now appear in the "Favourites" list on the right hand side of the webpage.

Verify Communications to the New Device

1. Select the new device from the list of favourites on the right hand side of the webpage.
2. Verify with the onsite technician that the device is powered on.
3. Click on the "Request Update" button for "Poll_C". This will request a poll from the satellite terminal reporting its GPS latitude and longitude. This is the most basic communication message to the device.

- a. A confirmation window will popup informing the user that requesting an update will incur a charge. Click on “Ok” to proceed, or “Cancel” to abort.
 - b. After clicking “Ok” another popup window will appear informing the user of the request status. If the request is successful, indicated by a tick beside “Message Sent to Device”, close the popup window.
4. The poll request may take up to 15 minutes. Return to the “SatLink Main Page” window and refresh the page every few minutes, or you can check the “Refresh:” box to automatically update the screen every few minutes.
5. Verify that the “Poll_C” “Last poll received at:” field is eventually updated with the current date and time.
6. Repeat the procedure from step 3 for the “SAT2BR1V2” type poll. This will request an update from the RMCS box with the battery voltage, lantern current and security door values.

The Operations Depot personnel should then work with the field technician at the lighthouse site to verify the operation of the RMCS, testing the reported battery voltage, the lantern current readings for when the lantern is on and off, and the operation of the security alarm mechanism.

Once these functions have been verified, the field technician should be able to leave the site providing all other installation tasks have been completed.

Verification of Email Updates Sent & Received From SkyNet Mobile

Verify that Email Updates Are Received from SkyNet Mobile

Note: It is recommended to have emails sent from SkyNet Mobile to the Sabik WebSCADA email account also sent to another account for testing and verification purposes.

1. Log in to the WebSCADA server and check the “C:\Program Files\Sabik\WebSCADA3\Bak” directory for email updates received from SkyNet Mobile for the terminal under test.
2. Check the timestamps and values in the files compared to the values in the SkyNet Mobile SatLink webpage to verify that they are the latest files.
3. Verify that the same messages are also received by other email recipients as recommended above.

Verify that Update Requests Can Be Sent Via Email to SkyNet Mobile

1. Send an email in the defined format (to be determined) to SkyNet Mobile.
2. Verify that an email update is received from SkyNet Mobile using the procedure described in “Verify that Email Updates Are Received from SkyNet Mobile”.

Adding & Verifying a Site in the Sabik WebSCADA Server

Adding a Site

Note: The following procedure assumes that a layout has been decided for all sites to use, and that at least one site has already been added to the database that can be used as a template for all others.

1. Log in to the Sabik WebSCADA server with a username and password that provides “SUPER USER” access privileges.

2. From the "MAINMAP" screen click on the "ADD STATION" button at the bottom right corner of the screen.
3. Type in a "STATIONNAME" obeying the naming convention if one exists, and select a site from the "COPY FROM EXISTING STATION" drop down list. This can save time if you choose an existing site that is very similar to the one you need to add.
4. Click on "SAVE" and you will be return to the "MAINMAP". Your new station should appear in the "STATION LIST".
5. Click on the little green square to the right of your new station name.
6. You will now see the "EDIT STATION" form. The available actions are listed on the left hand side.
7. The available "ACTIONS" are:
 - "Station data" – lets you edit the station name.
 - "Position" – for implementing maps (do not recommend).
 - "Station Info" – allows you to add headings, hypertext links, documents etc into reports.
 - "RTU Settings" – allows you to set the ID, email address, format/enable the channels that are displayed, configure commands and alarms (events).
 - "Reports" – allows you to choose and configure the reports that you want a regular user to see and interact with.
 - "Alarm" – allows you to enter up to 3 email addresses for alarm notification, as well as a watchdog feature.
 - "Goto Station" – provides a short cut to the station instead of going to "MAINMAP" and choosing the site from the station list.

Note: The information added in the actions listed above and the way it is displayed is to be finalised in consultation with the customer. Please refer to the Sabik WebSCADA documentation for more information and ideas.

Verifying Data Updates

1. Log in to the Sabik WebSCADA server using an available username and password.
2. Search for and select the desired site from the "STATION LIST".
3. Click on one of the "REPORTS" on the left hand side of the webpage and ensure that the "Last Poll Date" and "Last Poll Time" are as expected when compared to the emails received in the "C:\Program Files\Sabik\WebSCADA3\Bak" directory.
4. Click on "RTU LOG" on the lower left hand side of the webpage and verify that the "DATE" values are as expected.
5. Click on the latest "DATE" and verify that the information matches that in the received emails.