

FM60-VSAT

with Integrated CommBox Modem (ICM)



User Guide

FM60-VSAT

User's Guide

This user's guide provides all of the basic information you need to operate, set up, troubleshoot, and maintain the FM60-VSAT system. For detailed installation information, please refer to the FM60-VSAT Installation Guide.

NOTE: Your antenna might have parts that differ from those pictured in this document. Such differences have no bearing on the instructions unless noted otherwise.





Trademark Information

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Disclaimer

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1. Introduction

This section provides important safety information you need to know before using the system. It also provides a basic overview of the system and satellite communications.

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About this Manual

This manual provides complete operation, configuration, and troubleshooting information for the FM60-VSAT system.

Who Should Use this Manual

The **user** should refer to this manual to learn how to operate the system, configure all aspects of the system, and identify the cause of any problem.

The **installer** should refer to this manual for information on setting up the system for the user's desired preferences.

The **servicing technician** should refer to this manual to help identify the cause of a system problem.

Icons Used in this Manual

This manual uses the following icon:

Icon	Description
	This is a danger, warning, or caution notice. Be sure to read these carefully to avoid injury!

Typographical Conventions

This manual uses the following typographical conventions:

Text Example	Description
Press MENUS to view the menu.	Name of ICM buttons
At the confirmation message, click Save .	Element of a graphical user interface
SELECT SATELLITES	Text as it appears on the ICM display
See " Using this Manual " on page 3.	Cross-reference to another chapter in the manual



Related Documentation

In addition to this User's Guide, the following documents are provided with your FM60-VSAT system:

Document	Description
Installation Guide	Complete installation instructions
Quick Start Guide	Handy quick reference guide with basic operating instructions
Antenna Mounting Template	Template that the installer uses to lay out the antenna mounting holes

Important Safety Information

For your own safety, and for the safety of your passengers and/or crew, be sure to read the following important notices.



WARNING

Risk of Electric Shock

Potentially lethal voltages are present within the ICM. To avoid electric shock, do not open the chassis enclosure.



WARNING

Risk of Electric Shock

If any component of the FM60-VSAT system becomes damaged and/or no longer functions normally, disconnect it from vessel power, secure it from unintended operation, and contact Technical Support. All repairs or modifications must be performed by a trained technician.



WARNING

Risk of Explosion

Do not operate the ICM (or any other electrical device) in an environment where flammable gases, vapors, or dusts are present.



WARNING

Risk of Electric Shock

Failure to ground the FM60-VSAT system properly to ship's ground will cause an unsafe floating ground condition, risking potentially lethal electric shock. Refer to the Installation Guide for details on the proper grounding of the equipment.



CAUTION

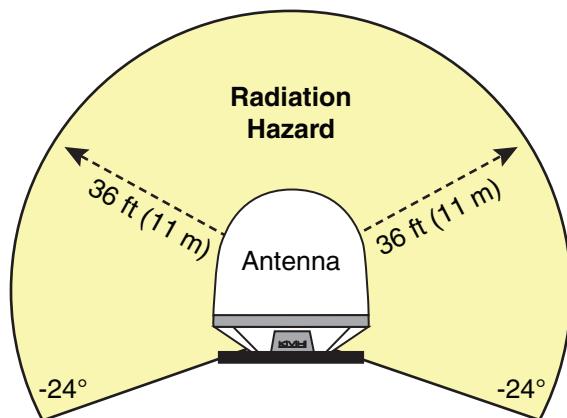
RF Radiation Hazard

The antenna transmits up to 4 watts of radio frequency (RF) energy that is potentially harmful. Whenever the system is powered on, make sure everyone stays more than 36 feet (11 m) away from the antenna. No hazard exists directly below the antenna.

RF Radiation Hazard Area

Since a person above deck may not know which direction the antenna is pointing, you should always observe the minimum safe distance to prevent RF radiation exposure. Within the antenna's elevation range, the minimum safe distance is 36 feet (11 m). No hazard exists directly below the antenna.

Figure 1-1 Minimum Safe Distance to Avoid Risk of RF Radiation Exposure



NOTE: You can set up no-transmit zones to inhibit transmissions within areas frequented by passengers and/or crew. See "[Establishing No-Transmit Zones](#)" on page 22 for details.

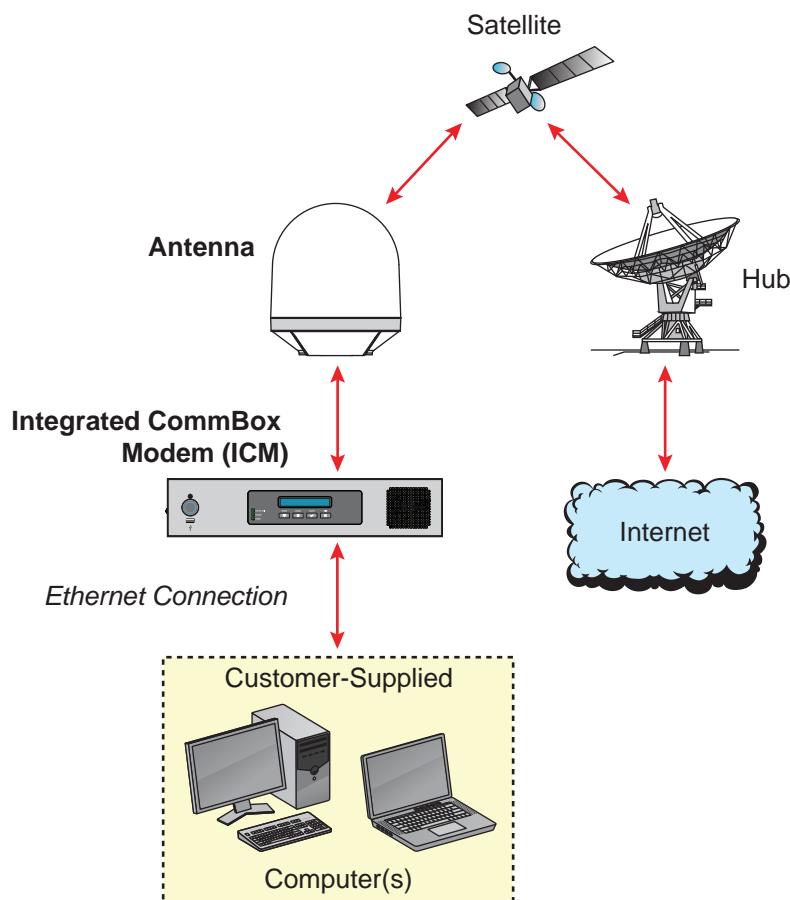
System Overview

Your FM60-VSAT is a complete communications system for mariners on the move, delivering a seamless and consistent Internet experience. And it all comes with an antenna that is smaller and lighter than traditional VSAT antennas.

The system consists of an antenna and Integrated Control Modem (ICM) that connect to a land-based hub via a Ku-band satellite. The hub, managed by a Network Operations Center (NOC), then provides the link to the Internet.

NOTE: A detailed wiring diagram is provided in “[Wiring Diagram](#)” on page 79.

Figure 1-2 FM60-VSAT Network Diagram





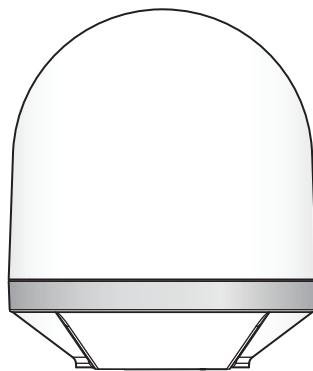
System Components

The FM60-VSAT system includes the following components:

Antenna Unit

The antenna unit provides the satellite link to the land-based hub. Using its integrated GPS, advanced reflector technology, and gyro stabilization, the antenna automatically locates and tracks the correct satellite, even while your vessel is on the move.

Figure 1-3 Antenna Unit



Integrated Control Modem (ICM)

The ICM is the transceiver and “brain” of the system. Its built-in modem processes all incoming and outgoing data traffic. Its built-in router provides the connection to your onboard local area network (LAN). And its easy-to-use web interface and front panel LCD allow you to operate and configure all aspects of the system.

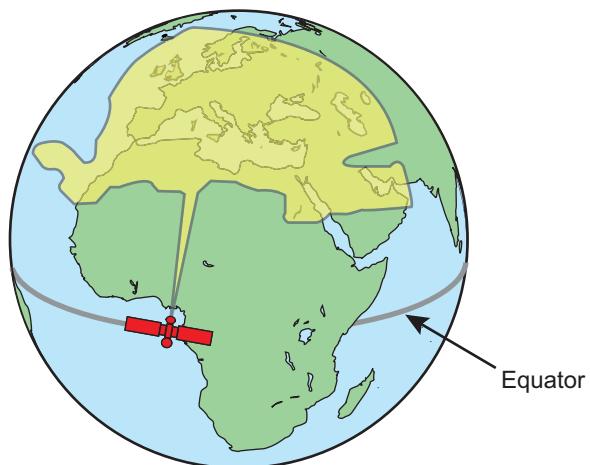
Figure 1-4 ICM



Satellite Communications

Communications satellites are located in fixed positions above the Earth's equator and relay data to/from the earth within the regions that they serve. Therefore, to communicate via a given satellite, you must be located within that satellite's unique coverage area, also known as its "footprint."

Figure 1-5 Example of a Satellite Footprint

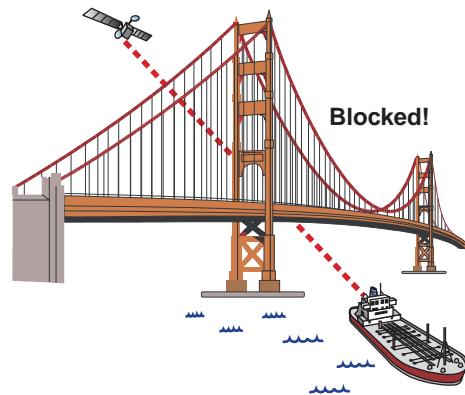




In addition, since satellites are located 22,300 miles (35,900 km) above the equator, the FM60-VSAT antenna must have a clear view of the sky to transmit and receive signals. Anything that stands between the antenna and the satellite can block signals, resulting in lost data. Common causes of blockage include the following:

- Trees, buildings, and bridges
- Other vessels docked alongside your vessel
- Onboard masts, antennas, or other structures
- Inclement weather conditions

Figure 1-6 Example of Satellite Blockage



2. Getting Started

This section provides you with the fundamental things you need to know to start using the system. It explains how to turn on the system for the first time and how to interpret the system's startup screens. It also introduces the FM60-VSAT web interface.

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Turning On the System

To turn on your FM60-VSAT system, follow these steps:

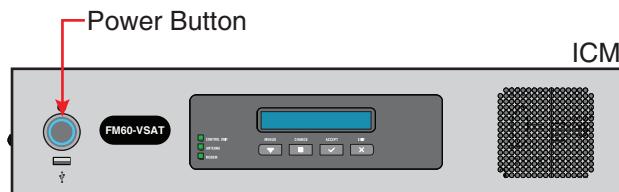


CAUTION

The antenna transmits RF energy that is potentially harmful. Make sure everyone stays more than 36 feet (11 m) away from the antenna while it is in use. The antenna transmits down to an elevation of -24°, so no hazard exists directly below the antenna.

1. Make sure the antenna has a clear, unobstructed view of the sky.
2. Make sure vessel AC power is applied to the ICM and your computer(s).
3. Press the power button on the front of the ICM. The button's light should illuminate blue.

Figure 2-1 Power Button



4. Wait at least five minutes for system startup. **Do not turn off the ICM during this time.**
5. Turn on your computer(s) that are connected to the network. Once the antenna finds the service satellite and the ICM's modem logs into the satellite service, all status lights on the ICM should be lit green. If any lights are not lit green, refer to "LED Indicators" on page 65.

System Startup

The ICM shows the following screens during startup. Similar messages will also appear on the web interface. If the display shows an error message, see “[Error and Warning Messages](#)” on page 52.

ICM Screen	Description
ICM INITIALIZING... 59	The system is running a self test routine
NO-TRANSMIT ZONE 1 AZ RANGE: 335-025	Displays the azimuth ranges of any user-configured no-transmit zones
ANTENNA READY WAITING FOR MODEM	The antenna is waiting for the ICM's modem to initialize
WAITING FOR GPS	The antenna is waiting for a GPS fix
GPS: ACQUIRED 41.5198N, 123.5817W	When GPS acquires a fix, momentarily displays your latitude/longitude
MODEM COMMS: OK	The ICM's modem is communicating OK
RECEIVING SATELLITE INFO FROM MODEM	The ICM's modem is providing satellite identification data to the antenna
ANTENNA STATE INITIALIZING	The antenna is initializing
SEARCHING FOR 105.0W SATELLITE	The antenna is searching for the satellite
RF RADIATION HAZARD! TRANSMIT INHIBITED	If the antenna is pointing within an enabled no-transmit zone, it will not transmit
OFFLINE TRACKING 105.0W	The antenna is now tracking the satellite
ONLINE TRACKING 105.0W	The ICM's modem has accessed the satellite service; the system is ready for use!



Accessing the Web Interface

The ICM offers a local web interface, which you can use to check system status, update software, and configure all aspects of the system. To access the web interface, simply open a web browser window on any computer connected to User Ethernet port 1 or the built-in Wi-Fi and enter the following default IP address:

192.168.5.1

NOTE: You can find this address on the ICM front panel LCD (go to Settings > Network Settings > IP Assignments).

As long as the ICM is turned on and functioning properly, the Home page will appear in your browser.

Figure 2-2 Web Interface Home Page

My VSAT Status			
Connection Status	Antenna State	Satellite	Beam
ONLINE SNR: 8.20dB	TRACKING	91.1W	Ku-BAND: 30

Real-time Vessel & VSAT Satellite Display

No Heading Available

Vessel Name

Antenna GPS
41.5216 N
71.2920 W

Understanding the Home Page

The Home page of the FM60-VSAT web interface provides essential system status information, including the status of the antenna, and the system's connection to the satellite service. It also displays the vessel's GPS position and true heading and provides a graphical representation of the antenna's pointing direction relative to the bow of the vessel.

Important!

If true heading is not displayed, the FM60-VSAT system does not have a valid connection to the vessel's NMEA 0183 talker.

Figure 2-3 Real-time Vessel & VSAT Satellite Display





3. Interface Preferences

This section explains how to customize the FM60-VSAT web interface by entering the name of the vessel. It also explains how to change the Administrator password and adjust the brightness of the ICM's front panel LCD.

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Changing the Administrator Password

You must be logged in as an Administrator to make any substantial changes to the system's configuration on the FM60-VSAT web interface. To prevent unauthorized user access, it is recommended that you change the Administrator password to something unique.

To change the Administrator password, follow these steps:

1. At the FM60-VSAT web interface, click the **Settings** tab. Then click **Account**.
2. In Security, click **Edit**.
3. Enter the current password. If the password has never been changed, enter the default password: “**password**”.

NOTE: The password must be between 4 and 20 characters in length, with at least one letter and one number, case-sensitive.

4. Enter and then re-enter your new password.
5. Click **Save Settings**.

Figure 3-1 Changing the Administrator Password

The screenshot shows a web-based configuration interface for the FM60-VSAT. The title bar says "Interface Preferences". The main window has a header "Security" and a sub-instruction "Change the administrator's login password." Below this, there are three input fields: "Enter the current password:" with a masked entry, "Enter the new password:" with a masked entry and a note "(between 4 and 20 characters long, with at least one letter and one number, case sensitive)" followed by a green "Strong" status indicator with a checkmark, and "Re-enter the new password:" with a masked entry. At the bottom are "Cancel" and "Save Settings" buttons.



Entering the Vessel Name

The vessel name is displayed on the Home page of the FM60-VSAT web interface.

To enter your vessel's name in the FM60-VSAT web interface, follow these steps:

1. At the FM60-VSAT web interface, click the **Settings** tab. Then click **Account**.
2. In Vessel Name, click **Edit**.
3. If the Login window appears, log in with the Administrator password.
4. Enter your vessel's name.
5. Click **Save Settings**.

Figure 3-2 Entering the Vessel Name

Vessel Name

Change the name displayed on the Home page and in support communications.

Vessel Name:

Cancel **Save Settings**

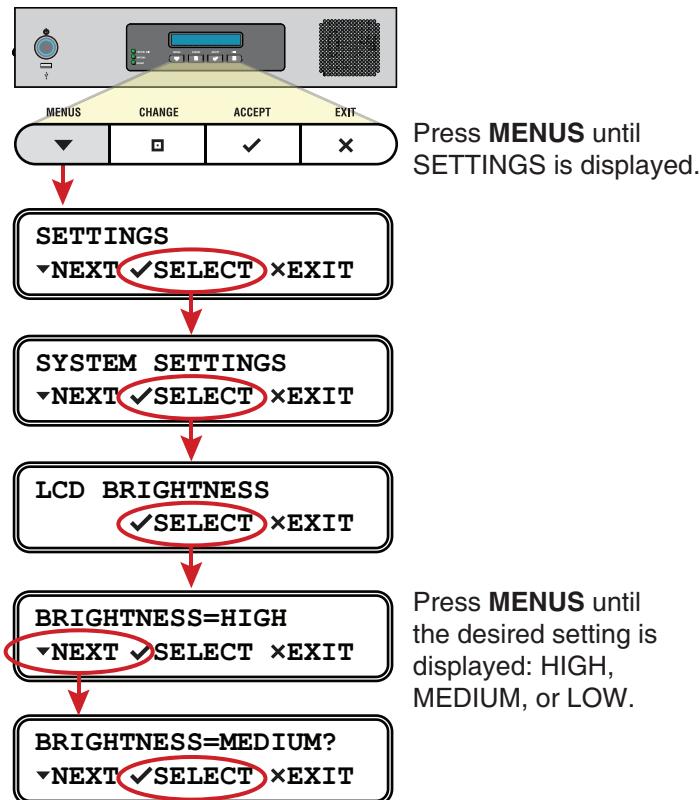
Adjusting the LCD Brightness

You can adjust the brightness of the ICM's front panel LCD to suit your preferences.

To adjust the brightness of the ICM's display, follow these steps:

1. At the ICM front panel, press **MENUS** until the display shows "SETTINGS."
2. Press **ACCEPT**.
3. At "SYSTEM SETTINGS," press **ACCEPT**.
4. At "LCD BRIGHTNESS," press **ACCEPT**.
5. Press **MENUS** until the display shows the desired brightness setting: HIGH, MEDIUM, or LOW.
6. Press **ACCEPT**.
7. Press **EXIT** to exit the menu.

Figure 3-3 LCD Brightness Setting





4. No-Transmit Zones

This section explains how to view, configure, temporarily disable, and clear no-transmit zones, which prohibit the antenna from transmitting within a certain azimuth/elevation range.

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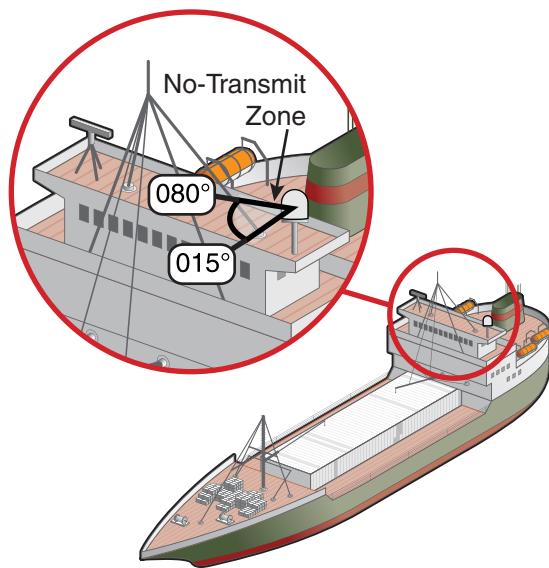
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No-Transmit Zones Overview

To prevent exposure to the antenna's radiated RF (radio frequency) energy, you can configure up to two no-transmit zones for areas where crew and passengers frequent. Whenever the antenna points within a no-transmit zone, the system disables the transmitter. Transmission capability is restored whenever the antenna points outside the zone.

NOTE: See "RF Radiation Hazard Area" on page 5 for details on the minimum safety distances.

Figure 4-1 Example of a No-Transmit Zone

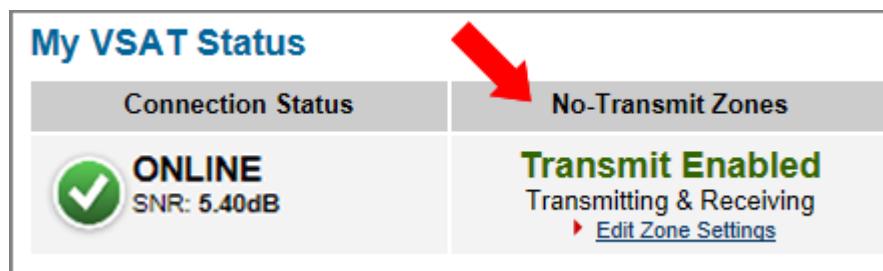




Status of No-Transmit Zones

You can view the current status of the system's no-transmit zones on the Home page of the FM60-VSAT web interface. If no-transmit zones have been set up, "My VSAT Status" includes a No-Transmit Zones column. If this column is missing, no transmit zones have not yet been set up or they have been cleared from memory. See "[Establishing No-Transmit Zones](#)" on page 22 for details on setting up no-transmit zones.

Figure 4-2 No-Transmit Zones Status Information on Home Page



The No-Transmit Zones column will display one of the following status indications:

- **Transmit Enabled (green)** – One or two no-transmit zones have been set up and are currently enforced. However, the antenna is not pointing within a no-transmit zone.
- **Transmit Disabled (orange)** – One or two no-transmit zones have been set up and are currently enforced. The antenna is pointing within a no-transmit zone and will not transmit.
- **Transmit Enabled (red)** – One or two no-transmit zones have been set up, but they are currently being ignored (see "[Disabling No-Transmit Zones](#)" on page 27). The antenna can transmit in any direction without restriction.

NOTE: You can also view the status of no-transmit zones on the ICM's front panel LCD (go to No-Transmit Zones).



Establishing No-Transmit Zones

To configure a no-transmit zone, follow these steps:

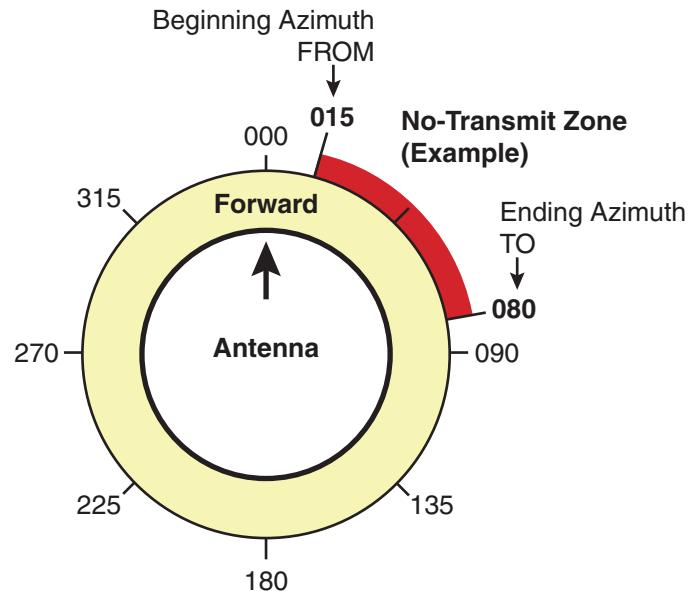
1. Identify the necessary azimuth range for the zone (see ["Identify the Azimuth Range"](#)).
2. Identify the necessary elevation range for the zone (see ["Identify the Elevation Range"](#)).
3. At the FM60-VSAT web interface, configure a no-transmit zone for that combination of azimuth and elevation ranges (see ["Configure the No-Transmit Zone\(s\) at the Web Interface"](#) on page 24).

Identify the Azimuth Range

First, you need to determine the necessary azimuth range for the no-transmit zone(s). You will need to enter, in clockwise order, the beginning and ending azimuths that define the outer boundaries of the zone, **relative to the antenna's forward arrow**, which should be pointing toward the bow.

NOTE: Each no-transmit zone must span at least 5°. Therefore, be sure to set beginning and ending azimuths at least 5° apart.

Figure 4-3 Beginning and Ending Azimuths Defining a No-Transmit Zone (Example)



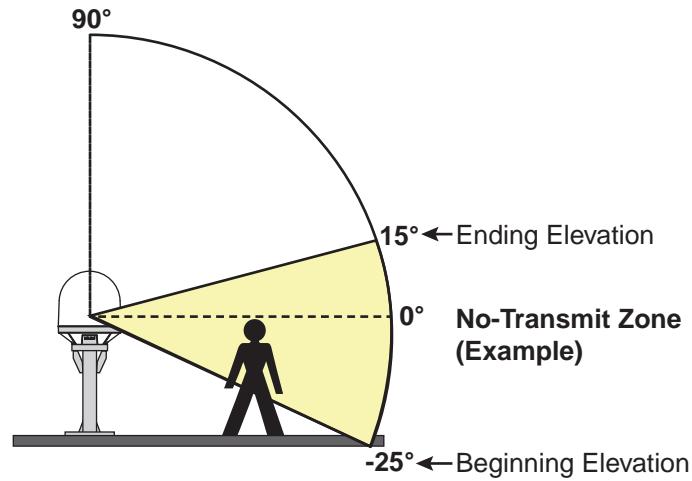


Identify the Elevation Range

Now you need to determine the necessary elevation range for the no-transmit zone(s). You will need to enter, in ascending order, the beginning and ending elevations that define the outer boundaries of the zone.

NOTE: Each no-transmit zone must span at least 5°. Therefore, be sure to set beginning and ending elevations at least 5° apart.

Figure 4-4 Beginning and Ending Elevations Defining a No-Transmit Zone (Example)



Configure the No-Transmit Zone(s) at the Web Interface

1. At the FM60-VSAT web interface, click the **Settings** tab. Then click **No-Transmit Zones**.
2. Click **Edit**.
3. If the Login window appears, log in with the Administrator password.
4. In No-Transmit Zone Ranges, make sure **Enforce Zones** is selected.

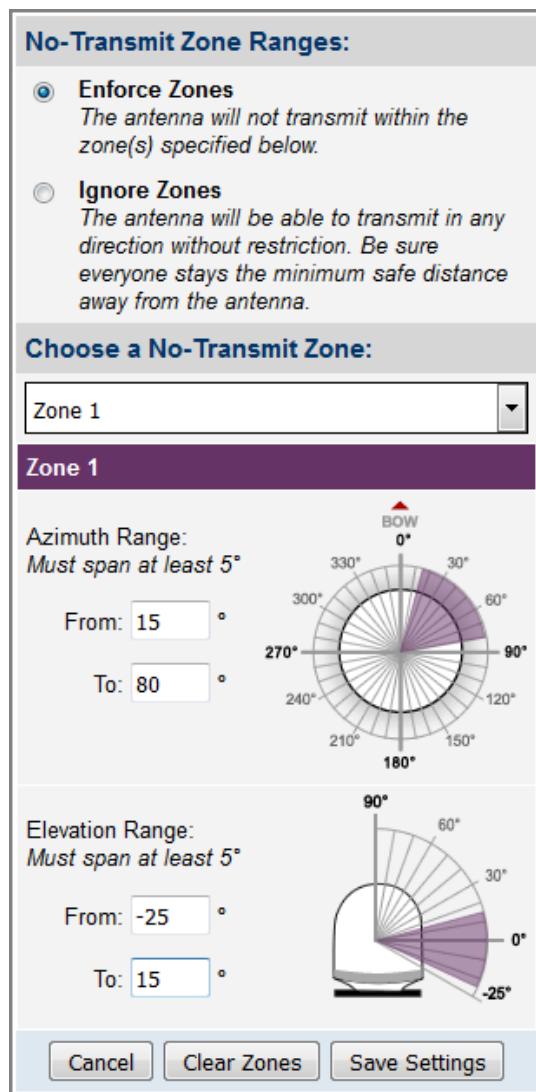
Important!

When “Enforce Zones” is selected, the antenna will not transmit whenever it points within one of your configured no-transmit zones. If “Ignore Zones” is selected instead, the zones are disabled, allowing the antenna to transmit in any direction without restriction.

5. Enter the azimuth and elevation ranges for Zone 1.
6. If you wish to set up a second no-transmit zone, select Zone 2 from the drop-down menu then enter the azimuth and elevation ranges for Zone 2.
7. Click **Save Settings**.
8. At the confirmation message, click **Save**.



Figure 4-5 Configuring No-Transmit Zones



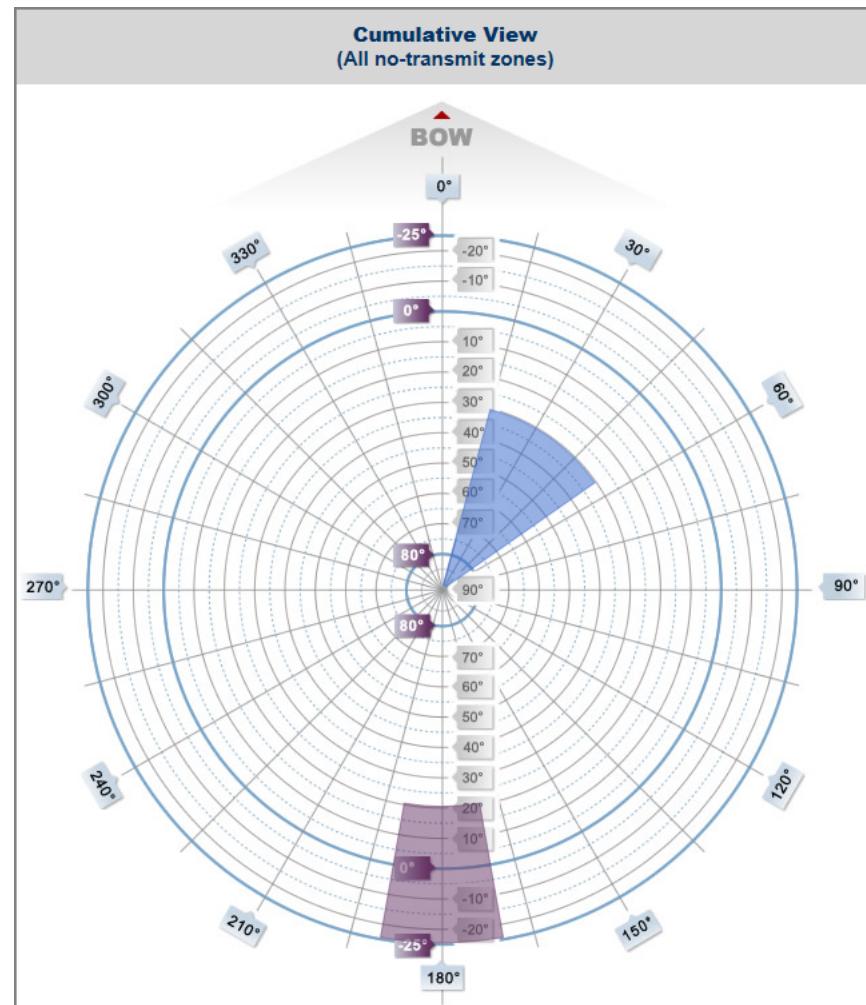
Understanding the Cumulative View

The No-Transmit Zones page displays a diagram that indicates the cumulative azimuth and elevation ranges of the no-transmit zones you set up. The circumference of the circle indicates azimuth, while the radius indicates elevation.

In the example shown here, the following no-transmit zones are set up:

- Zone 1 (purple) = Azimuth: 170° to 190°, Elevation: -25° to 20°
- Zone 2 (blue) = Azimuth: 15° to 55°, Elevation: 30° to 90°

Figure 4-6 Cumulative View of All No-Transmit Zones





Disabling No-Transmit Zones

You can disable your programmed no-transmit zones to temporarily remove all restrictions on transmissions. This function permits the antenna to ignore the zones; it does not delete them from the system's memory.



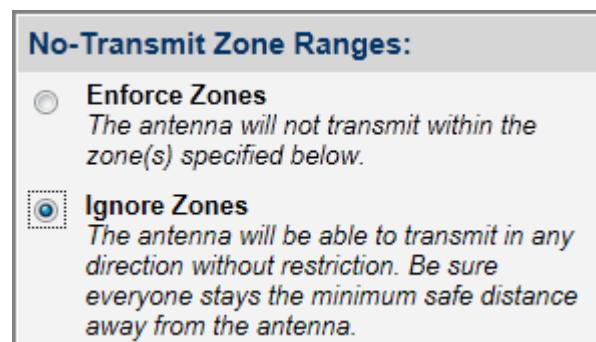
CAUTION

Disabling no-transmit zones allows the antenna to transmit in any direction, even if the antenna is pointing in an area accessible to passengers and crew. Make sure everyone stays the minimum safe distance away from the antenna while it is in use (see "[RF Radiation Hazard Area](#)" on page 5).

To disable the no-transmit zones, follow these steps:

1. At the FM60-VSAT web interface, click the **Settings** tab. Then click **No-Transmit Zones**.
2. Click **Edit**.
3. If the Login window appears, log in with the Administrator password.
4. In No-Transmit Zone Ranges, click **Ignore Zones**.
5. Click **Save Settings**.
6. At the confirmation message, click **Ignore Zones**.

Figure 4-7 Disabling No-Transmit Zones



Clearing No-Transmit Zones

You can clear all no-transmit zones from the system's memory. Unlike disabling zones, clearing zones permanently deletes them.



CAUTION

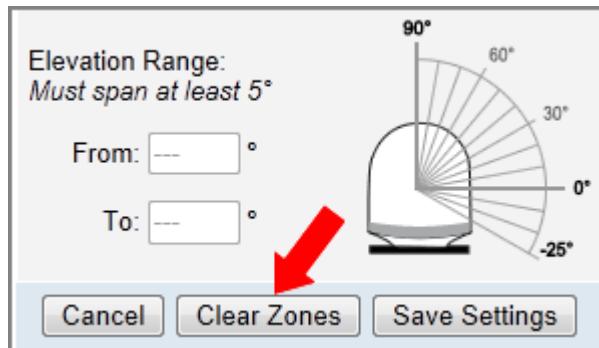
Clearing no-transmit zones allows the antenna to transmit in any direction without restriction. Make sure everyone stays the minimum safe distance away from the antenna while it is in use (see "[RF Radiation Hazard Area](#)" on page 5).

NOTE: This procedure explains how to clear no-transmit zones using the FM60-VSAT web interface. If you prefer, you may use the front panel LCD menu instead (go to Diagnostic Tools > Factory Reset).

To clear the no-transmit zones, follow these steps:

1. At the FM60-VSAT web interface, click the **Settings** tab. Then click **No-Transmit Zones**.
2. Click **Edit**.
3. If the Login window appears, log in with the Administrator password.
4. In No-Transmit Zone Ranges, click **Clear Zones**.
5. At the confirmation message, click **Clear Zones**.

Figure 4-8 Clearing No-Transmit Zones





5. Tracking Avoidance Zones

This section explains how to configure, temporarily disable, and clear tracking avoidance zones, which trigger the antenna to switch to another satellite when tracking in a marginal reception area.

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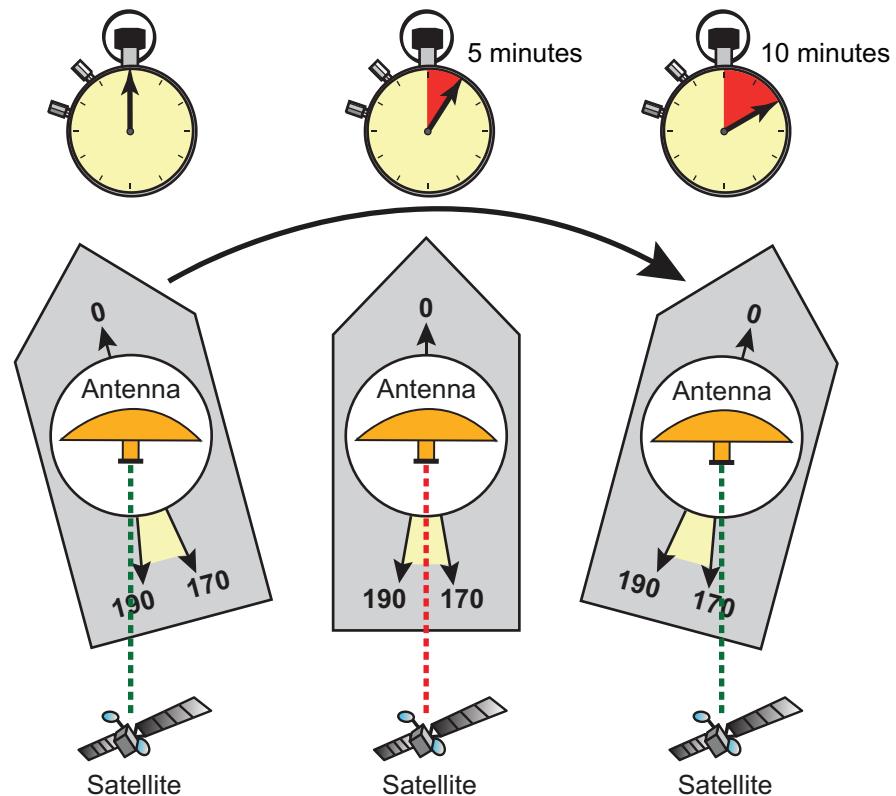
Tracking Avoidance Zones Overview

In an ideal installation, the antenna has a clear view of the sky in all directions and no other radiating equipment is nearby that can interfere with the satellite signal. However, such an ideal installation is not always achievable on a vessel, particularly on smaller yachts. Therefore, the system allows you to configure up to five tracking avoidance zones for areas where there may be blockage or RF interference causing marginal reception and intermittent antenna performance.

Whenever the antenna is tracking a satellite in the direction of a tracking avoidance zone, it will switch to a different satellite if one is available. An **allowance period** (1-60 minutes, selectable) precludes switching in cases when the antenna is simply passing through a zone while the vessel is turning. The system calculates how long the antenna will be pointing in the zone based on the vessel's rate of turn. If the calculated time exceeds the allowance period, the antenna will immediately switch satellites, as long as there is an alternate satellite available in your service region.



Figure 5-1 Passing Through a Tracking Avoidance Zone (Example)



*Tracking Avoidance Zone = 170° to 190° (azimuth)
Rate of Turn = 2° per minute*

Setting Up Tracking Avoidance Zones

To manually configure a tracking avoidance zone, follow these steps.

1. Identify the necessary azimuth range for the zone (see ["Identify the Azimuth Range" on page 33](#)).
2. Identify the necessary elevation range for the zone (see ["Identify the Elevation Range" on page 34](#)).
3. At the FM60-VSAT web interface, configure a tracking avoidance zone for that combination of azimuth and elevation ranges (see ["Configure the Tracking Avoidance Zone\(s\) at the Web Interface" on page 35](#)).

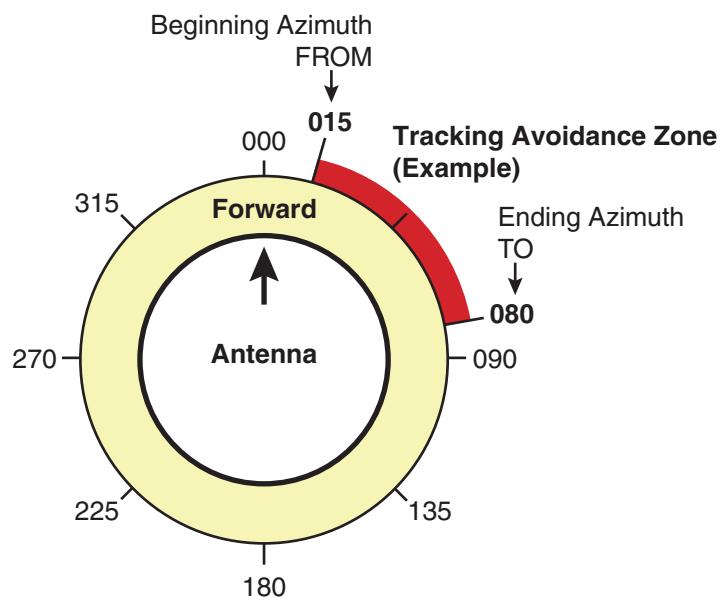


Identify the Azimuth Range

First, you need to determine the necessary azimuth range for the tracking avoidance zone(s). You will need to enter, in clockwise order, the beginning and ending azimuths that define the outer boundaries of the zone, **relative to the antenna's forward arrow**, which should be pointing toward the bow.

NOTE: Each tracking avoidance zone must span at least 5°. Therefore, be sure to set beginning and ending azimuths at least 5° apart.

Figure 5-2 Beginning and Ending Azimuths Defining a Zone (Example)

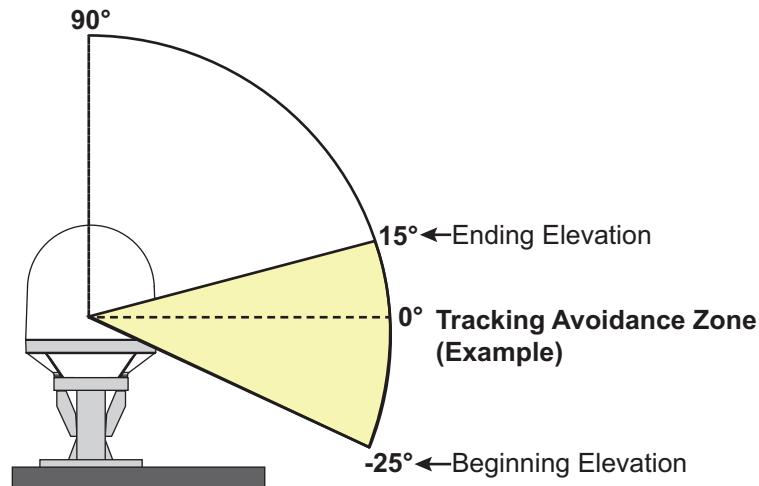


Identify the Elevation Range

Now you need to determine the necessary elevation range for the tracking avoidance zone(s). You will need to enter, in ascending order, the beginning and ending elevations that define the outer boundaries of the zone.

NOTE: Each tracking avoidance zone must span at least 5°. Therefore, be sure to set beginning and ending elevations at least 5° apart.

Figure 5-3 Beginning and Ending Elevations Defining a Zone (Example)

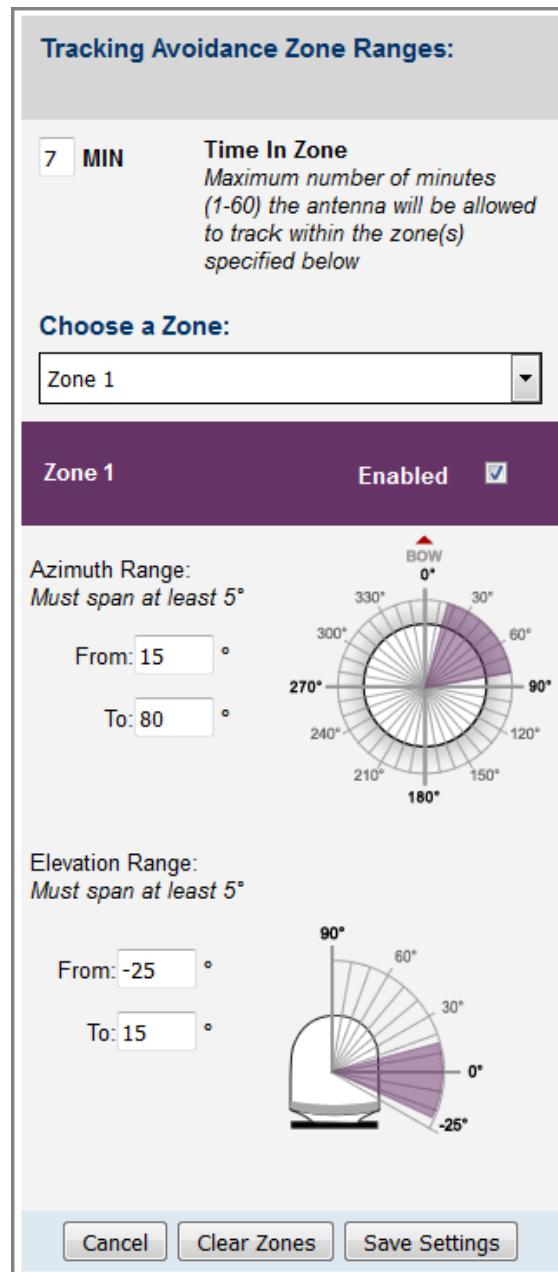




Configure the Tracking Avoidance Zone(s) at the Web Interface

1. At the FM60-VSAT web interface, click the **Settings** tab. Then click **Tracking Avoidance Zones**.
2. Click **Edit**.
3. If the Login window appears, log in with the Administrator password.
4. Enter the azimuth and elevation ranges for Zone 1. Then select the **Enabled** check box.
5. If you wish to set up another tracking avoidance zone, select a zone from the drop-down menu and repeat step 4 for the selected zone.
6. In the Time in Zone box, enter the maximum number of minutes (between 1 and 60) during which the antenna will be allowed to track within a tracking avoidance zone (see "[Tracking Avoidance Zones Overview](#)" on page 30 for details).
7. Click **Save Settings**.
8. At the confirmation message, click **Save**.

Figure 5-4 Configuring Tracking Avoidance Zones



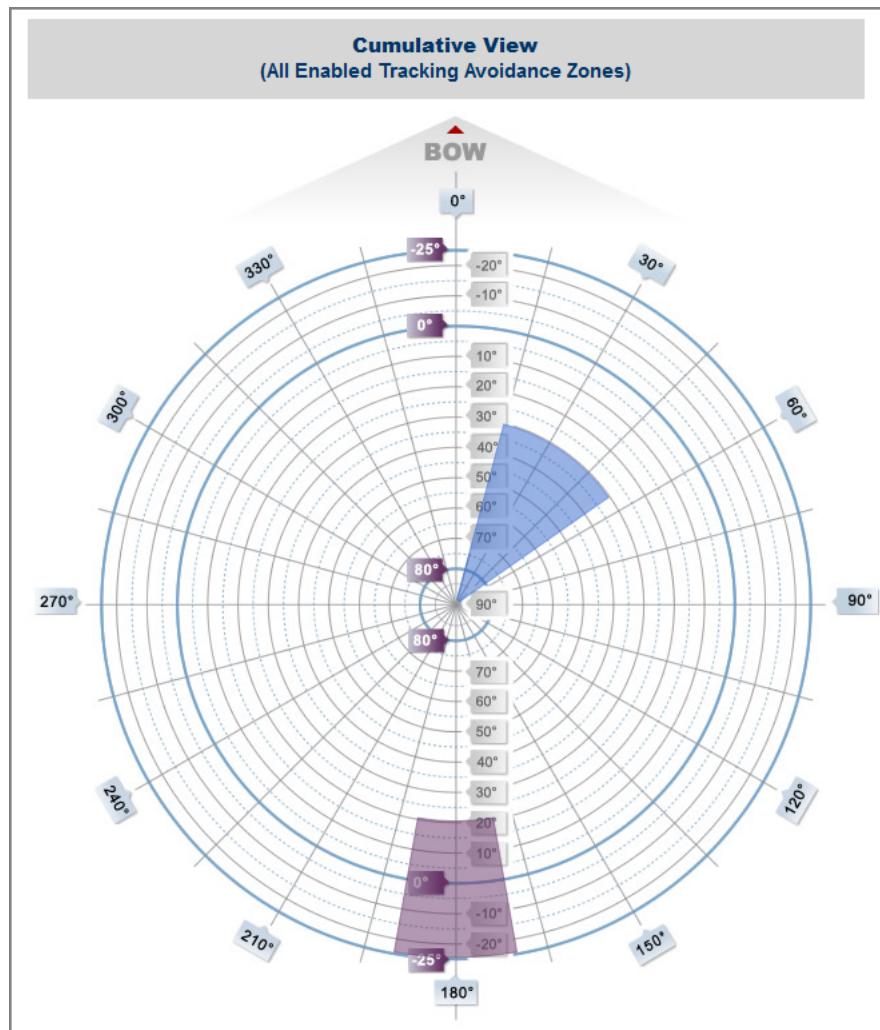


Understanding the Cumulative View

The Tracking Avoidance Zones page displays a diagram that indicates the cumulative azimuth and elevation ranges of the tracking avoidance zones that are currently enabled. The circumference of the circle indicates azimuth, while the radius indicates elevation. In the example shown here, the following tracking avoidance zones are enabled:

- Zone 1 (purple) = Azimuth: 170° to 190°, Elevation: -25° to 20°
- Zone 2 (blue) = Azimuth: 15° to 55°, Elevation: 30° to 90°

Figure 5-5 Cumulative View of All Enabled Tracking Avoidance Zones



Disabling Tracking Avoidance Zones

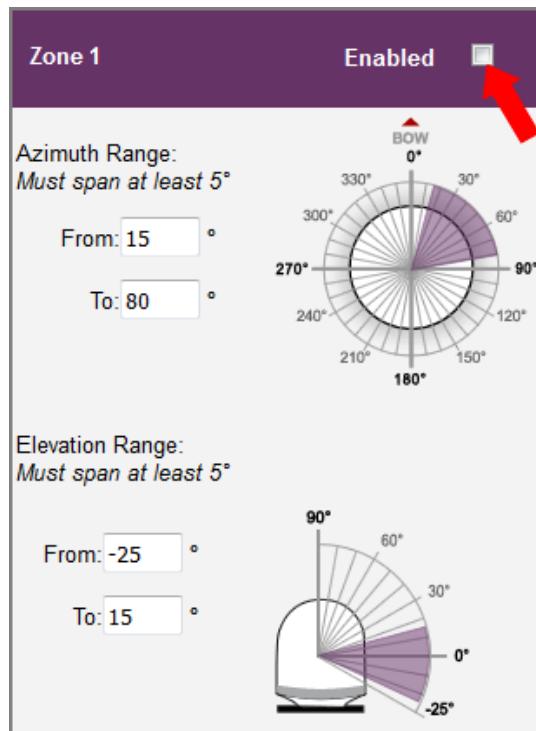
You can disable any of your programmed tracking avoidance zones to temporarily remove its restrictions on tracking. This function permits the antenna to ignore the zone(s); it does not delete them from the system's memory.

To disable a tracking avoidance zone, follow these steps:

1. At the FM60-VSAT web interface, click the **Settings** tab. Then click **Tracking Avoidance Zones**.
2. Click **Edit**.
3. If the Login window appears, log in with the Administrator password.
4. Select the zone you want to disable from the drop-down menu.
5. Clear the **Enabled** check box. The zone disappears from the Cumulative View.
6. Click **Save Settings**.
7. At the confirmation message, click **Save**.



Figure 5-6 Disabling Tracking Avoidance Zones



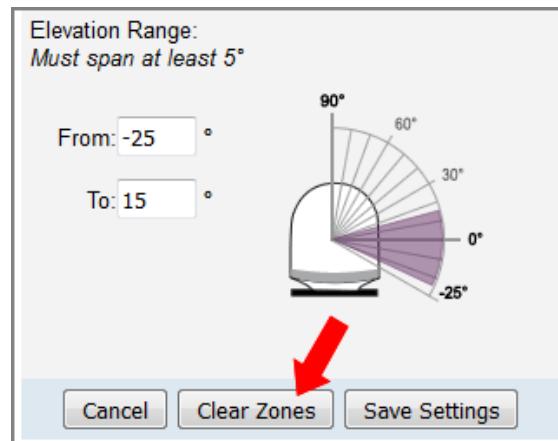
Clearing Tracking Avoidance Zones

You can clear all tracking avoidance zones from the system's memory. Unlike disabling zones, clearing zones permanently deletes them.

To clear the tracking avoidance zones, follow these steps:

1. At the FM60-VSAT web interface, click the **Settings** tab. Then click **Tracking Avoidance Zones**.
2. Click **Edit**.
3. If the Login window appears, log in with the Administrator password.
4. Click **Clear Zones**.
5. At the confirmation message, click **Clear Zones**.

Figure 5-7 Clearing Tracking Avoidance Zones





6. Network Configuration

This section explains the Flex HTS option for connecting your vessel's computers and other network devices to the FM60-VSAT system. It also provides an overview of the advanced network settings that are available.

Contents

Flex HTS Configuration	42
Wireless Settings.....	44
ACU Mgmt Settings.....	46
Reset to Factory Configuration	47



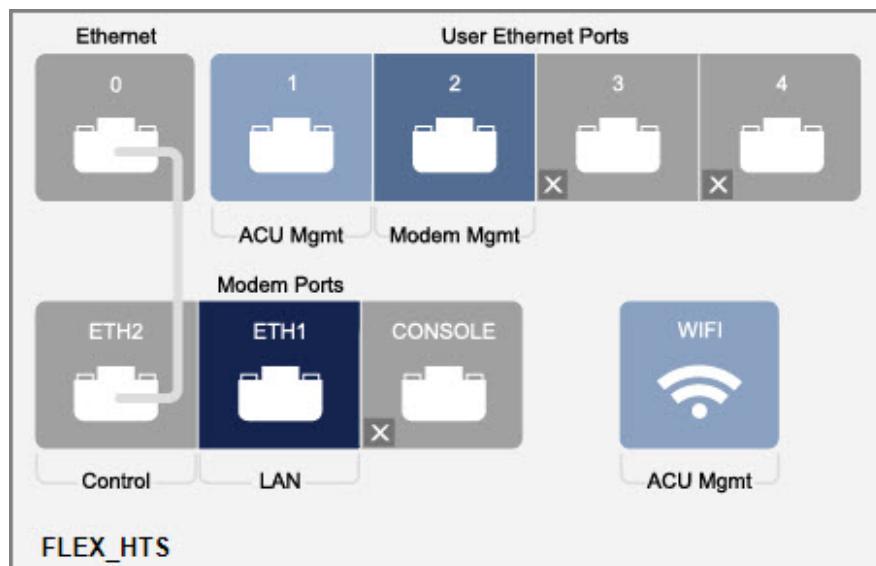
Flex HTS Configuration

In a default Flex HTS configuration, User Ethernet ports 1 and 2 and the built-in Wi-Fi provide access to the ICM's web interface. User Ethernet port 1 is configured with a DHCP server, and by default, any device connected to this port will be assigned an IP address in the range of 192.168.5.0/24. User Ethernet port 2 has a static IP address of 192.168.1.9/24 for the ICM and 192.168.1.1 for the modem. When connecting a device to this network, it is recommended to assign it a static IP address of 192.168.1.x/24. Additionally, the Modem ETH1 port provides user access to the Internet.

NOTE: DHCP simplifies network management by allowing the ICM to automatically assign IP addresses to devices. In contrast, static IP addresses enable manual configuration of devices with fixed IP addresses. These devices do not rely on the ICM for IP address assignment.

Option	Description
Flex HTS	User Ethernet 1: ACU Mgmt User Ethernet 2: Modem Mgmt User Ethernet 3-4: Disabled Wi-Fi: Disabled (ACU Mgmt) MODEM ETH1: LAN MODEM ETH2: Control Ethernet 0: Control

Figure 6-1 Flex HTS Configuration





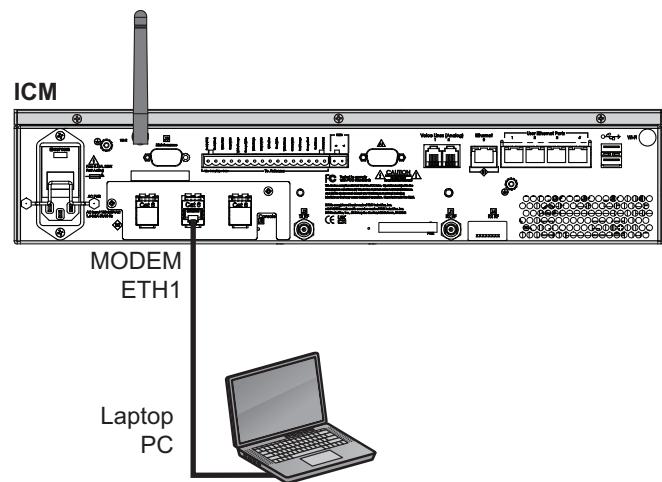
Connecting to the Internet

To connect to the Internet, follow these steps:

1. Make sure the FM60-VSAT system is online.
2. Connect your computers and/or other network devices to the ICM's MODEM ETH1 port.

NOTE: LAN IP settings are set up by your service provider.

Figure 6-2 Internet Access



Wireless Settings

With Wi-Fi enabled, vessel devices can connect to the ICM's web interface via its built-in wireless access point (WAP) via DHCP or by setting up static IP addresses.

Important!

The range of the ICM's WAP will depend on the layout and structure of the vessel. For example, wireless signals degrade when passing through bulkheads and near metal masses. If the system is installed on a steel vessel, you might need a special WAP and the services of a technician with advanced networking expertise.

To enable and configure the ICM's Wi-Fi connection, follow these steps:

1. At the FM60-VSAT web interface, click the **Settings** tab. Then click **Network Settings**.
2. In Wireless Settings, click **Edit**.
3. If the Login window appears, log in with the Administrator password.



4. Set the following wireless options:

State: Select On.

SSID: Enter a unique name for the vessel network.

Protocol: Select either 802.11b or 802.11g.

Security: Select either security type – WPA2 or WEP (128-bit).

Password/Passphrase: If you selected WPA2, enter a password (between 8-20 characters). If you selected WEP, enter a passphrase (must be 13 characters).

Channel: Keep the default, or select any channel for wireless communications. Click **Save**.

Important!

Failure to apply security settings will make your vessel's wireless network vulnerable to outside intrusion.

Figure 6-3 Wireless Settings

The dialog box is titled "Wi-Fi Settings". It contains the following fields:

State:	<input checked="" type="radio"/> On <input type="radio"/> Off (default)
SSID:	FlexHTS (Up to 32 characters)
IP Address:	192 . 168 . 5 . 1
Protocol:	802.11b
Security:	WPA2
Password: (between 8 to 20 characters)
Channel:	6

At the bottom right are two buttons: "Cancel" and "Save".

5. Click **Save**.
6. At the confirmation message, click **Save**.
7. Make sure your computers are configured for DHCP/static IP addressing, as required.

ACU Mgmt Settings

Important!

The default ACU Mgmt settings work well for most installations. Do not change these settings unless absolutely necessary.

To change the ICM's ACU Mgmt settings, follow these steps:

1. At the FM60-VSAT web interface, click the **Settings** tab. Then click **Network Settings**.
2. In ACU Mgmt Settings, click **Edit**.
3. If the Login window appears, log in with the Administrator password.
4. Modify the IP Address, Subnet Mask, and DHCP Mode settings as necessary.
5. Click **Save**.

Figure 6-4 ACU Mgmt Settings

The screenshot shows the 'ACU Mgmt Settings' configuration page. It includes fields for IP Address (192.168.5.1), Subnet Mask (255.255.255.0), and DHCP Mode (Enabled). The DHCP Start and End ranges are set to 192.168.5.50 and 192.168.5.150 respectively. Buttons for Reset to Defaults, Cancel, and Save are at the bottom.

ACU Mgmt Settings	
IP Address:	192 . 168 . 5 . 1
<i>Note: 192.168.0.1 is reserved for system use. Be sure to assign a different IP address.</i>	
Subnet Mask:	255 . 255 . 255 . 0
DHCP Mode:	<input checked="" type="radio"/> Enabled (default) <input type="radio"/> Disabled DHCP Start: 192 . 168 . 5 . 50 DHCP End: 192 . 168 . 5 . 150
Reset to Defaults Cancel Save	



Reset to Factory Configuration

If the system's network becomes corrupted such that you can no longer access the FM60-VSAT web interface, you can reset the system to its original factory settings.

Important!

Perform a factory reset only if directed by Technical Support. This function should only be used as a last resort when all other options fail.

The following settings are included in the reset:

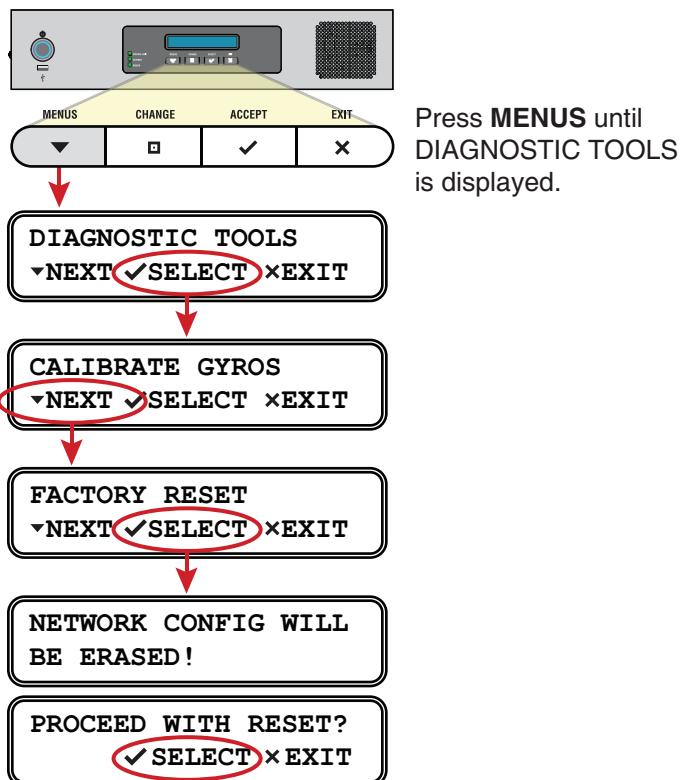
- Reverts to network configuration
- Clears any configured no-transmit zones
- Sets the ICM's LCD brightness to High

To reset the system to its factory settings, follow these steps:

1. At the ICM's front panel, press **MENUS** until the display shows "DIAGNOSTIC TOOLS."
2. Press **ACCEPT**.
3. At "CALIBRATE GYROS," press **NEXT**.
4. At "FACTORY RESET," press **ACCEPT**.
5. At "PROCEED WITH RESET?," press **ACCEPT**.

The system reverts to its original factory settings. Do not power off the system while this reset is in progress.

Figure 6-5 Factory Reset





7. Troubleshooting

This section identifies some basic problems along with their possible causes and solutions. It also explains what the error messages, status messages, and LED conditions indicate, and how to view and export the system logs.

Contents

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Error and Warning Messages	52
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Initial Steps for Any Problem

If you are experiencing a problem with your FM60-VSAT system, first follow these basic steps:

Step 1a: Check System Status Information on the Web Interface

Open a web browser window on any computer connected to the ICM's User Ethernet port 1 and enter the ICM's IP address (default is 192.161.5.1) to access the FM60-VSAT web interface. You can find this address on the ICM front panel LCD (go to Settings > Network Settings > IP Assignments).

The Home page provides system status information. Check the following:

- **Connection Status:** "Online" indicates the system is connected to the satellite service.
- **Antenna State:** "Tracking" indicates the antenna is tracking the satellite.

If a status message differs from the normal indications listed above, refer to "[Status Information](#)" on page 57. If an error message is displayed, refer to "[Error and Warning Messages](#)" on page 52.

Step 1b: Check System Status Information on the ICM Front Panel

If you are unable to connect to the web interface, you can find similar status information on the front of the ICM. Check the following:

- **ICM LCD:** "Online Tracking" indicates the system is connected to the satellite service and the antenna is tracking the satellite.
- **LEDs:** All LEDs should be lit green.

If a status message differs from the normal indication listed above, refer to "[Status Information](#)" on page 57. If an error or warning message is displayed, refer to "[Error and Warning Messages](#)" on page 52. If an LED is not lit green, refer to "[LED Indicators](#)" on page 65.



Step 2: Check for Blockage

If the antenna is continuously searching for the satellite, check the area around the antenna for blockage. The antenna needs an unobstructed view of the sky to receive satellite signals. Common causes of blockage include other onboard masts or structures, severe weather, and nearby buildings, bridges, trees, or other vessels.

NOTE: You can determine which direction the antenna is pointing by viewing the Home page on the web interface or the "CURRENT AZ/EL" status message on the ICM front panel LCD (go to Status > Antenna/ACU Status> Current Az/El).

If there is partial blockage causing intermittent antenna performance, you can set up a tracking avoidance zone to avoid tracking in that direction (see "[Setting Up Tracking Avoidance Zones](#)" on page 32).

Step 3: Check Power and Cables

Make sure power is applied to all system components. Also make sure all cables are connected tightly.

Step 4: Restart the System

Try restarting the system at the FM60-VSAT web interface (see "[Hardware Restart](#)" on page 78). If you cannot access the web interface, turn off the ICM at the front panel, then turn it back on.

Error and Warning Messages

This section lists the error and warning message codes that might appear on the FM60-VSAT web interface, front panel LCD, and/or system logs to indicate a system problem. Many of these faults should only be repaired by a technician; contact Technical Support for assistance.

No.	Description
100	Error: There is an open circuit in the antenna power/data cable. Check the cable.
101	Error: There is a short circuit in the antenna power/data cable. Check the cable.
102	Warning: The ICM is not providing the proper DC power to the antenna. Check the wires on the back of the ICM.
103	Warning: A software update file was not found on the USB device. Try these steps: <ul style="list-style-type: none">• Remove the USB device from the ICM, wait 10 seconds, then reinsert it.• Verify that a valid FM60-VSAT update file is present on the USB device in its root directory.• Replace the update file on the USB device with a new file.• Use a different USB device.
104	Warning: The software update file you selected is corrupt. Try a new update file.
105	Warning: The ICM is unable to read from or write to its internal memory (EEPROM). Contact Technical Support.
106	Error: The ICM has lost communications with the antenna. Try these steps: <ul style="list-style-type: none">• Check the wiring on the back of the ICM.• Check the antenna power/data cable.• Try turning the system off, then back on.



No.	Description
107	<p>Warning: The ICM's internal temperature exceeds acceptable limits. Try these steps:</p> <ul style="list-style-type: none">• Listen for the cooling fan inside the ICM. If you don't hear the fan, contact Technical Support.• If you hear the cooling fan, turn off the system and allow it to cool down. Then vacuum the ICM's vents (see "Preventative Maintenance" on page 73).• If the problem persists, you might need to relocate the unit to an area that provides better ventilation.
111	Warning: The ICM is unable to initialize its built-in wireless access point (WAP). Contact Technical Support.
112	Warning: There is an internal fault in the ICM. Contact Technical Support.
117	Error: There is an open circuit in the transmit (TX) RF cable. Check the cable. If the cable is OK, the BUC might be faulty – contact Technical Support.
118	Error: There is a short circuit in the transmit (TX) RF cable. Check the cable. If the cable is OK, disconnect the cable from the ICM and turn the ICM off, then back on. If the error persists, there is an internal fault in the ICM. If the error disappears, the BUC might be faulty. Contact Technical Support.
120	<p>Warning: The internal temperature of the ICM's built-in modem exceeds acceptable limits. Try these steps:</p> <ul style="list-style-type: none">• Listen for the cooling fan inside the ICM. If you don't hear the fan, contact Technical Support.• If you hear the cooling fan, turn off the system and allow it to cool down. Then vacuum the ICM's vents (see "Preventative Maintenance" on page 73).• If the problem persists, you might need to relocate the unit to an area that provides better ventilation.
121	Error: The ICM is not receiving satellite signal strength (RSSI) data from its built-in modem. Try these steps:
	<ul style="list-style-type: none">• Turn the ICM off, then back on.• Check the ICM jumper cable.• If the error persists, contact Technical Support.

No.	Description
122	Error: The ICM's built-in modem is not communicating. Try these steps: <ul style="list-style-type: none">• Check the ICM jumper cables.• Try turning the ICM off, then back on.• If the error persists, contact Technical Support.
123	Error: The ICM's built-in modem is not responding to status queries. Contact Technical Support.
124	Warning: The software update file you selected is not valid for the FM60-VSAT. Try a new update file.
127	Error: The antenna is not accepting the no-transmit zones setup from the ICM. Contact Technical Support.
128	Warning: The software update failed. Retry updating the software. If it fails again, check the power/data cable and the wires on the back of the ICM.
129	Error: The ICM has lost internal communications of satellite signal strength (RSSI) data. Contact Technical Support.
130	Error: The ICM is incompatible with the antenna's LNB. Either the ICM or the LNB is configured for HTS, while the other is not. Contact Technical Support.
131	Error: The antenna is running a version of software that does not work properly with the ICM. Update the software.
132	Error: The ICM has detected a SATADOM filesystem corruption and is operating in Rescue Mode. Contact Technical Support.
133	Warning: The software update failed due to a missing component on the ICM. Contact Technical Support.
134	Warning: The software update failed due to a file extraction error. Contact Technical Support.
135	Warning: The software update failed due to insufficient disk space. Contact Technical Support.
200	Warning: The antenna is not receiving adequate DC power from the ICM. Check the power/data cable and the wires on the back of the ICM.



No.	Description
204	Error: The antenna's main board has lost RF communications. Try updating the software (see " Software Updates " on page 74).
206	Error: The antenna's azimuth motor or limit switch failed. Contact Technical Support.
208	Error: The antenna's elevation motor or limit switch failed. Contact Technical Support.
216	Error: The antenna's cross-azimuth motor or limit switch failed. Contact Technical Support.
218	Error: The antenna's skew motor or limit switch failed. Contact Technical Support.
219	Error: One of the antenna's gyros is out of calibration. Contact Technical Support.
220	Warning: One of the antenna's gyros failed. Contact Technical Support.
221	Error: The system is not receiving any GPS data. Contact Technical Support.
222	Warning: The antenna's internal temperature exceeds acceptable limits. Turn off the system and allow it to cool. If the problem persists, contact Technical Support.
234	Error: The antenna is not receiving satellite signal strength (RSSI) data from the ICM. Try these steps: <ul style="list-style-type: none">• Turn the ICM off, then back on.• Check the wires on the back of the ICM.• Check the power/data cable.
235	Error: The antenna has lost RF communications. Contact Technical Support.
240	Error: The antenna's LNB is not receiving the proper power from the ICM's receive (RX) RF cable. Check the RX RF cable.
241	Error: The antenna's main board detects a power failure. Contact Technical Support.
265	Warning: The GPS is unable to acquire a fix. Check for blockage or RF interference around the antenna.

No.	Description
269	Error: The antenna cannot determine which type of LNB is installed. Either the LNB type was not programmed at the factory, or the antenna's memory (EEPROM) has been cleared or corrupted. Contact Technical Support.
270	Error: The ICM is running a version of software that does not work properly with the antenna. Update the software.
271	Error: The ICM is incompatible with the antenna's LNB. The LNB is configured for HTS, while the ICM is not. Contact Technical Support.
404	Warning: Antenna is unwrapping its coiled internal cable. Normal operation should resume within one minute.
410	Warning: The ICM has lost Ethernet communications with its built-in modem. Check the jumper cable connecting "B1" to "B2" on the back of the ICM.
411	Warning: The antenna cannot find an available service satellite. You are located outside the coverage area.
412	Warning: The ICM is not receiving the proper DC voltage from its power supply. Check the power cable, then contact Technical Support.
413	Warning: The antenna is waiting for GPS to acquire a fix.
414	Warning: The antenna is using position data from a backup GPS device and not its built-in GPS.
417	Warning: The antenna is pointing in a tracking avoidance zone. Performance might be degraded until the antenna can switch to an alternate satellite or move outside the zone.
418	Warning: The ICM is not receiving status information from the built-in modem. Check the jumper cable connecting "B1" to "B2" on the back of the ICM.



Status Information

You can find system status information on the FM60-VSAT web interface and front panel LCD. Similar information is available in both places. See the following for details:

- “[Status Information on the Web Interface](#)”
- “[Status Information on the ICM Front Panel LCD](#)” on page 62

Status Information on the Web Interface

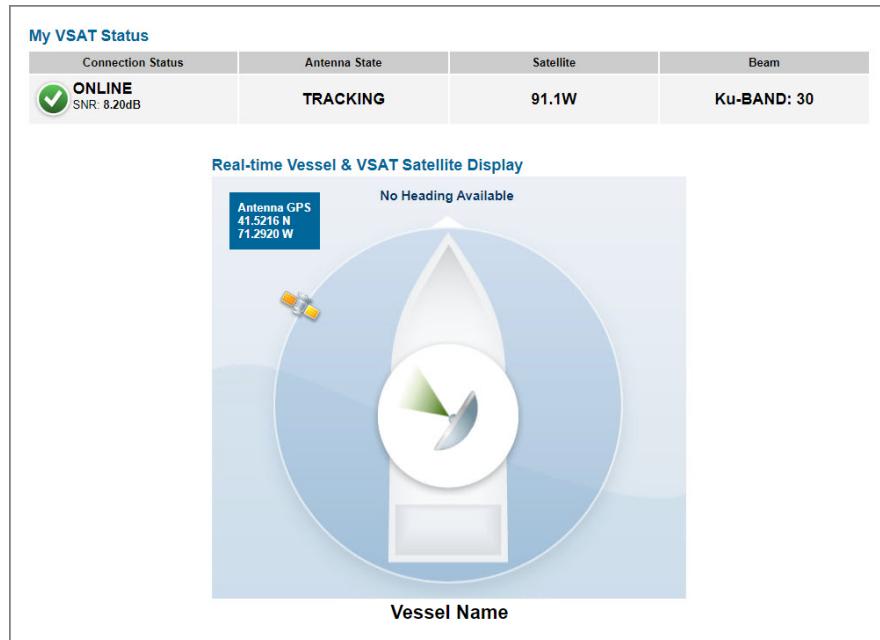
On the FM60-VSAT web interface, you can view status information on the following pages:

- Home page (see “[Home Page of the Web Interface](#)”)
- Support page (see “[Support Page of the Web Interface](#)” on page 59)

Home Page of the Web Interface

The Home page provides basic system status information.

Figure 7-1 Home Page



The tables below summarize the status information that is available on the Home page.

My VSAT Status

Message	Description
Connection Status	General status of the modem: <ul style="list-style-type: none">• Online – Modem is connected to the satellite service; the system is ready for use• Offline – Modem is not connected to the satellite service. SNR: Quality of the received satellite signal; SNR = Signal level/background noise in decibels
No-Transmit Zones <i>(if zones are set up)</i>	Status of the no-transmit zones: <ul style="list-style-type: none">• Transmit Enabled (green) – Antenna is not pointing within a no-transmit zone• Transmit Disabled (orange) – Antenna is pointing within a no-transmit zone; zones are being enforced• Transmit Enabled (red) – No-transmit zones are being ignored; antenna can transmit without restriction
Antenna State	General status of the antenna: <ul style="list-style-type: none">• Tracking• Initializing• Searching• Cable Unwrap – Unwrapping the internal cable; the cable can wrap up to 710°• Waiting for Modem• Idle• Error
Satellite	Satellite that the modem has currently selected for tracking
Beam	Which beam of the tracked satellite the antenna is currently using

For details on the Real-time Vessel & VSAT Satellite Display, refer to “[Understanding the Home Page](#)” on page 14.



Support Page of the Web Interface

The Support page provides more detailed system status information, as reported by the ICM's built-in modem.

Figure 7-2 Support Page

Support Help

Restart Hardware Help System Logs

My VSAT Status

Connection Status

ONLINE SNR: 8.20dB Skew: 68.9°
Az: 303.9° El: 37.4°

Antenna State

TRACKING

Satellite 91.1W

Beam

Ku-BAND: 30

Frequency 11.2290GHz

General Statistics

Latitude	41.5216N
Longitude	71.2919W
Modem State	IN_NETWORK
Last Login	2024-10-08T19:27:57Z

RX Statistics

FL State	LOCKED
FL Carrier	QPSK 30000 3/4
Composite Power	-38.51

TX Statistics

RL State	ENABLED
RL Carrier	QPSK 4000 3/4
Power	29.00dBm
Initial Power	30.00dBm
Max Power	35.00dBm

Events 500 to 504

Event History

Events: 5 per page

2024-10-08T17:23:39.210Z ALARM RESOLVED 240
LNB POWER IS OUTSIDE THE NORMAL RANGE. CHECK RX CONNECTIONS.

2024-10-08T18:23:45.885Z ALARM 240
LNB POWER IS OUTSIDE THE NORMAL RANGE. CHECK RX CONNECTIONS.

2024-10-08T19:24:16.388Z ALARM RESOLVED 240
LNB POWER IS OUTSIDE THE NORMAL RANGE. CHECK RX CONNECTIONS.

2024-10-08T19:24:29.826Z ALARM 240
LNB POWER IS OUTSIDE THE NORMAL RANGE. CHECK RX CONNECTIONS.

2024-10-08T19:25:03.259Z ALARM RESOLVED 240
LNB POWER IS OUTSIDE THE NORMAL RANGE. CHECK RX CONNECTIONS.

System Details

Software Versions

Operating System	201
ICM/Antenna	1007205
Modem	3.5.2.1-12132

Hardware Information

Antenna S/N	160500563
ICM S/N	160901361
Modem S/N	13999
Modem DID	637548207

Position Backup Source

NMEA 0183

State	Not Connected
Latitude	...
Longitude	...

Custom Support

Somewhere in the world

Phone: 1-800-555-5555
E-mail: custom@support.com

The “My VSAT Status” provides the same basic status information as the Home page, with the addition of antenna pointing information: Azimuth (Az), Elevation (El), and Skew. More detailed status information is provided at the bottom of the page.

The tables below summarize the detailed status information that is available on the Support page.

General Statistics

Message	Description
Latitude	Vessel latitude reported by the GPS
Longitude	Vessel longitude reported by the GPS
Modem State	Status of the modem network connection: <ul style="list-style-type: none">• In Network – Normal bidirectional network operation; fully logged in• In Acquisition – Intermediate state• Waiting for Acquisition – Intermediate state• Detected – Intermediate state• Waiting for RX Lock – Satellite is not acquired• RX Only – For example: when in multicast mode• Wrong Network – Not configured / authorized for network• Recovery Stack - (<i>reason</i>) – Cannot enter network due to reason provided
Last Login	Date/time of the last successful login to the network

RX Statistics

Message	Description
FL State	State of the forward link; should be "Locked" while the modem is logged in
FL Carrier	Current satellite's forward link modulation, symbol rate (kilo-symbols/sec), and code rate
Composite Power	Measure in dBm of raw satellite signal received at the modem; typical range is -30 to -60 dBm



TX Statistics

Message	Description
RL State	<ul style="list-style-type: none">Enabled – Return link is tracking the satelliteDisabled – Return link is pointing within a configured no-transmit zone
RL Carrier	Current satellite's return link modulation, symbol rate (in kilo-symbols/sec), and code rate
Power	The instantaneous transmit power in dBm that the modem is using at the moment
Initial Power	The transmit power in dBm that the modem uses when starting the network login process
Max Power	The maximum power in dBm that the modem will use (calculated and stored in the modem when the P1dB test is performed)

Position Backup Source

Message	Description
State	State of the backup GPS: <ul style="list-style-type: none">ACQUIRED – Connected, has a valid fixACQUIRING – Connected, does not have a valid fixNOT CONNECTED
Latitude/ Longitude	Latitude and longitude reported by the backup GPS, if connected with a valid fix

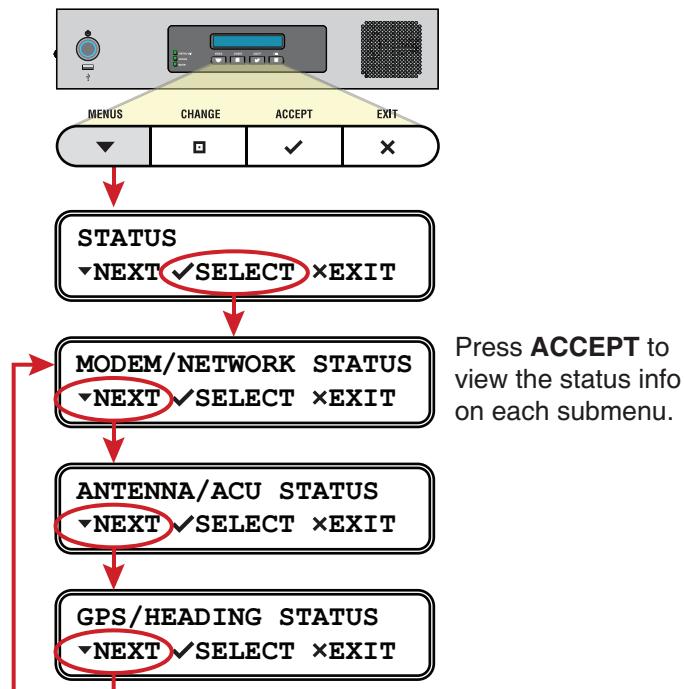
Status Information on the ICM Front Panel LCD

On the front panel of the ICM, you can view much of the same status information that's available on the web interface.

To view the status information, follow these steps:

1. Press **MENUS** on the ICM's front panel to bring up the Status menu.
2. Press **ACCEPT** to access the status menu. Then use the **MENUS** and **ACCEPT** buttons to scroll through the submenus.

Figure 7-3 Status Menu on ICM Front Panel





Modem/Network Status

Message	Description
MODEM STATE	General status of the modem; "In Network" indicates the modem is logged into the satellite service (see " General Statistics " on page 60)
LAN PORT STATUS	Status of the Ethernet local area network (LAN); "LINK" indicates a good connection
SNR	Quality of the received satellite signal; SNR = Signal level/background noise in decibels
SATELLITE	Satellite currently selected for satellite service
BEAM	Beam frequency in GHz of the satellite currently selected for satellite service
DOWNLINK FREQUENCY	Frequency of the satellite downlink
SKEW TO SATELLITE	Skew angle of the antenna's LNB that is required to receive signals from the current satellite

Antenna/ACU Status

Message	Description
ANTENNA STATE	General status of the antenna; must be "Tracking" to connect to satellite service
ANTENNA DC INPUT	DC voltage measured at the antenna's circuit board; should be between 38 VDC and 44 VDC
CURRENT AZ/EL	Azimuth and elevation at which the antenna is currently pointing; azimuth is relative to vessel heading if heading data is available, or the antenna's "Forward" arrow (bow) if heading data is not available
CURRENT SKEW	Current skew angle of the antenna's LNB
IPACU DC INPUT	DC voltage measured at the ICM's power input; should be between 23 VDC and 25 VDC
IPACU ENET MODEM PORT STATE	Status of the ICM's Ethernet connection to its built-in modem; "Link" indicates the jumper cable is connected between B1 and B2 on the ICM's rear panel

GPS/Heading Status

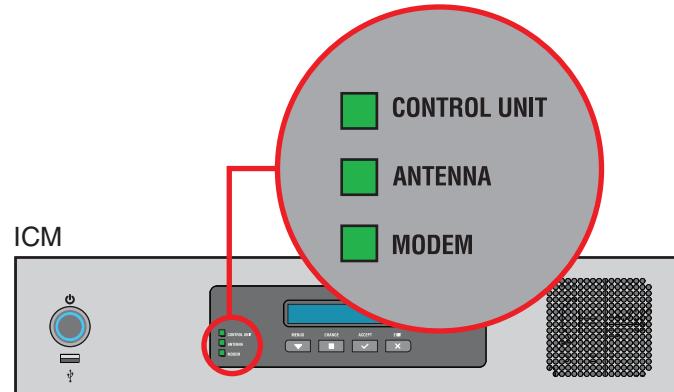
Message	Description
CURRENT GPS SOURCE	Source of the GPS data used by the system
SYSTEM GPS STATUS	Status of the GPS currently being used by the antenna; displays vessel latitude/longitude if GPS has a valid fix
NMEA TRUE HEADING	True heading reported by the vessel's NMEA 0183 talker; "No Compass Input" indicates the system is not receiving a compatible heading message from a NMEA 0183 talker



LED Indicators

Status lights on the front of the ICM indicate the current status of the system and can help you identify problems quickly.

Figure 7-4 Status Lights



During normal operation, all status lights should be lit green. The following tables explain what the different light conditions indicate.

CONTROL UNIT Light

The table below explains what the CONTROL UNIT light indicates.

Light is...	Indicates	Description
Off	Off	ICM is powered off or no power input
Green	OK	Good input power; ICM is operational
Green, flashing	Initializing	System is starting up
Orange	Warning	Check front panel LCD or web interface for warning message (see “Error and Warning Messages” on page 52 for details)
Red	Error	Check front panel LCD or web interface for error message (see “Error and Warning Messages” on page 52 for details)

ANTENNA Light

The table below explains what the ANTENNA light indicates.

Light is...	Indicates	Description
Off	Off	No power input to the antenna
Green	Tracking	Antenna is tracking a satellite
Green, flashing	Searching	Antenna is searching for a satellite, waiting for modem communications, or processing a software update
Orange	Warning	Check front panel LCD or web interface for warning message (see " Error and Warning Messages " on page 52 for details)
Red	Error	Check front panel LCD or web interface for error message (see " Error and Warning Messages " on page 52 for details)

MODEM Light

The table below explains what the MODEM light indicates.

Light is...	Indicates	Description
Off	Off	The ICM's built-in modem is powered off
Green	Online	Modem is logged into the satellite service
Green, flashing	Initializing	Modem is communicating with the antenna, but it is not yet online
Orange	Offline	Modem has logged out of the satellite service
Red	No comms	ICM lost communications with its built-in modem; check cable on ICM rear panel
Red, flashing	No internal comms	Modem is not communicating with the ICM, but wiring is OK



System Logs

The ICM offers two logs to capture historical antenna system data:

- Operational Log (see “[Operational Log](#)”)
- Event Log (see “[Event Log](#)” on page 68)

These logs are excellent diagnostic tools, so a technician or Technical Support may refer to them when troubleshooting a system problem.

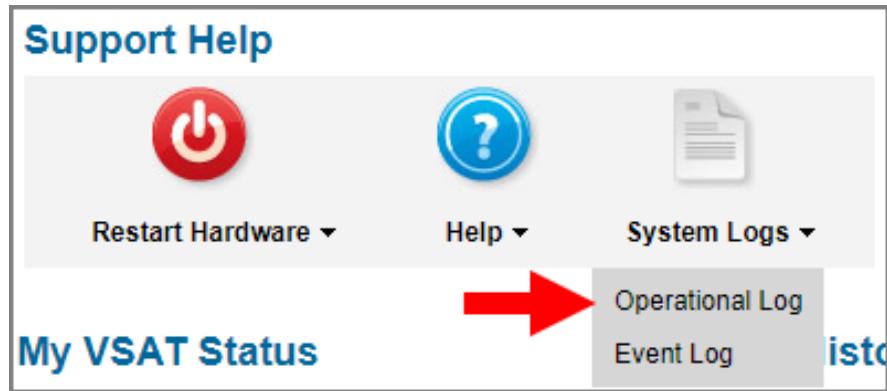
Operational Log

The Operational Log, when initiated, records all messages that the antenna system generates.

To start a new log or view the current log, follow these steps:

1. At the FM60-VSAT web interface, click the **Support** tab.
2. On the **System Logs** menu, click **Operational Log**.

Figure 7-5 Viewing the Operational Log



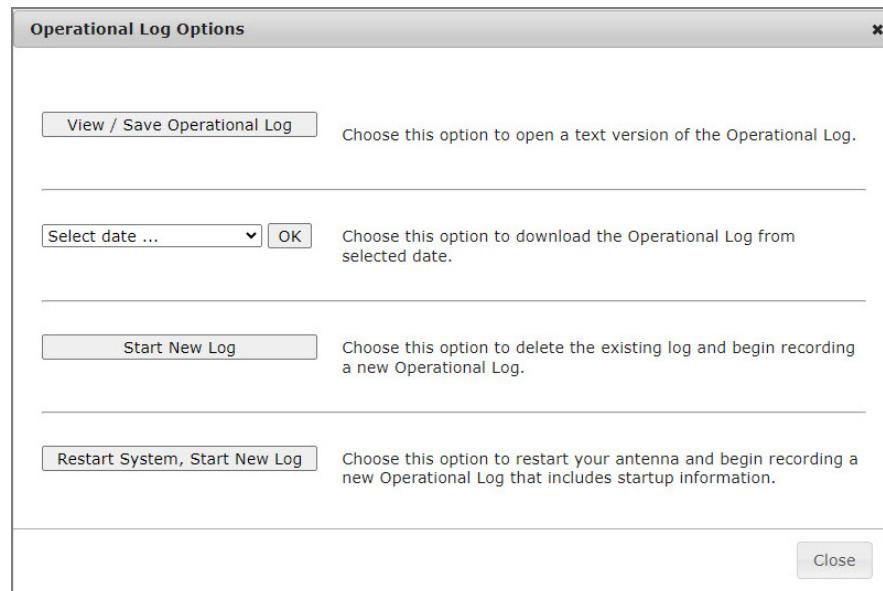
3. Click the button for your desired option:

- **View/Save Operational Log:** This option simply downloads the current Operational Log. You can save this log as a text file to send to a technician or Technical Support.
- **Select Date:** This option downloads the Operational Log for a selected date.



- **Start New Log:** This option deletes the current Operational Log and begins recording a new one.
- **Restart System, Start New Log:** This option deletes the current Operational Log, restarts the antenna, and begins recording a new Operational Log. This log will begin with the system's startup messages, which include the results of various self-test routines.

Figure 7-6 Operational Log Options



Event Log

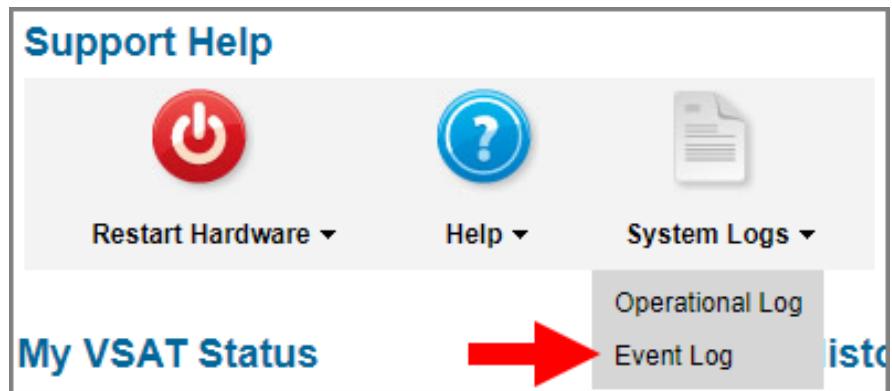
The Event Log keeps a historical record of the error and warning messages the antenna system generates. The most recent entries in this log are displayed on the Support page of the FM60-VSAT web interface.

To view the complete Event Log, follow these steps:

1. At the FM60-VSAT web interface, click the **Support** tab.
2. On the **System Logs** menu, click **Event Log**.



Figure 7-7 Viewing the Event Log





Equipment ID Numbers

On the Support page of the FM60-VSAT web interface, you can find the following important equipment identification numbers:

- Antenna serial number
- ICM serial number
- Modem serial number
- Modem Device ID number

NOTE: The modem is built into the ICM.

Figure 7-8 Viewing Equipment Identification Numbers

System Details	
Software Versions	
Operating System	201
ICM/Antenna	1007205
Modem	3.5.2.1-12132
Hardware Information	
Antenna S/N	160500563
ICM S/N	160901361
Modem S/N	13999
Modem DID	637548207

NOTE: You can also view these equipment ID numbers on the front panel LCD (go to System Info > Hardware Information).



Software Versions

On the Support page of the FM60-VSAT web interface, you can view the currently installed versions of the following software:

- Operating system (resides on ICM)
- ICM/Antenna – *you can update this software through the ICM (see “Software Updates” on page 74)*
- Modem

Figure 7-9 Viewing the Software Versions

System Details	
Software Versions	
Operating System	201
ICM/Antenna	1007205
Modem	3.5.2.1-12132
Hardware Information	
Antenna S/N	160500563
ICM S/N	160901361
Modem S/N	13999
Modem DID	637548207

NOTE: You can also view these software versions on the ICM’s front panel LCD (go to System Info > Software Versions).

8. Maintenance

This section explains how to perform preventative maintenance to keep the system in tip-top shape. It also explains how to update the software and restart system components.

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Preventative Maintenance	73
Software Updates	74
Corrective Maintenance.....	77
Hardware Restart	78



Preventative Maintenance

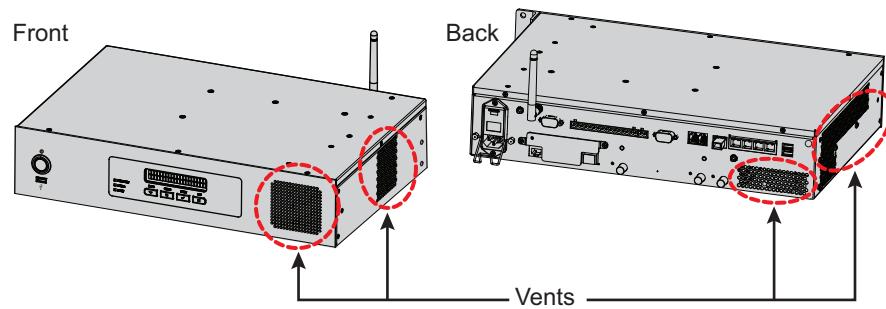
Your FM60-VSAT system is likely subjected to heavy use and exposed to harsh marine environmental conditions. Therefore, like any sophisticated electronic equipment installed on the vessel, it needs to be cleaned, inspected, and updated on a regular basis to maintain its peak performance and reliable service.

Routine Care

It is recommended that you perform the following tasks periodically to help keep the system running smoothly.

- Vacuum the vents on the ICM. Air needs to flow through these vents to cool the electronic components and prevent overheating.

Figure 8-1 Vents on ICM and Modem



- Clean the outside of the antenna with fresh water to remove grime. Dirt buildup can affect communications. You may use mild detergent, but avoid abrasive cleansers and high-pressure water.
- Inspect cable connections at the ICM for any wear and tear. Repair any damaged cables.
- Ensure the latest software version is installed. Refer to “[Software Updates](#)” on page [74](#) for details.

Software Updates

New versions of software are periodically released to enhance the performance and capabilities of the system. Contact your service provider for details about downloading the latest software update file. When you update the software, the new version simply overwrites the previously installed version.

A single software package includes updates to all system components in the antenna and ICM, with the exception of the modem. When a modem update is in progress, the FM60-VSAT web interface shows “Updating” under Connection Status, and the ICM front panel display shows “Do not power down - Updating” for up to 30 minutes.

There are two methods to choose from to update the software:

- [“Using Your Computer to Update Software” on page 75](#)
- [“Using a USB Flash Drive to Update Software” on page 76](#)

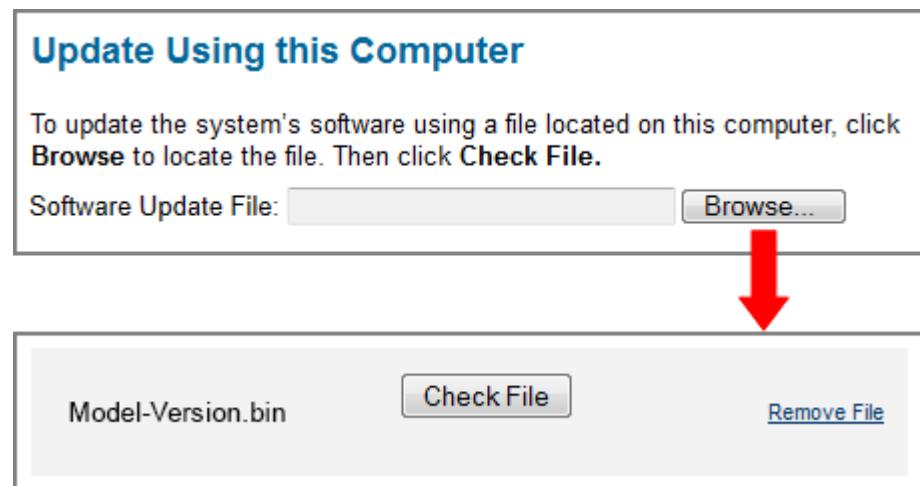


Using Your Computer to Update Software

To update the software using your local computer, follow these steps:

1. First, you need to save the latest software update file to your computer. Customers can get this file from their service provider.
2. Connect your computer to the ICM's network.
3. At the FM60-VSAT web interface, click the **Updates** tab.
4. If a Choose File button appears under Update Using this Computer, click **Choose File** then log in with the Administrator password.
5. Under Update Using this Computer, click **Browse**.
6. Navigate to and select the update file saved on your computer.
7. Click **Check File**.
8. At the confirmation message, click **Update**.

Figure 8-2 Updating Software Using Your Computer (Example)

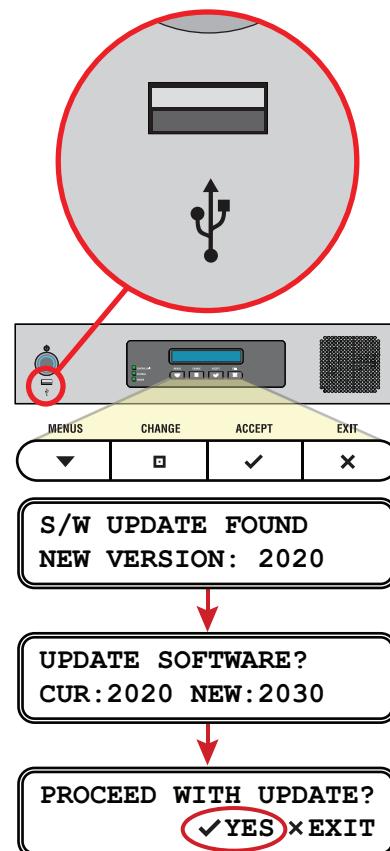


Using a USB Flash Drive to Update Software

To update the software using a USB flash drive, follow these steps:

1. First, you need to save the latest software update file to the root directory of your USB flash drive. Customers can get this file from their service provider.
2. Make sure the FM60-VSAT system is turned on and initialized (the ICM front panel LCD shows "Searching" or "Tracking").
3. Connect your USB flash drive to the USB port on the front of the ICM.
4. The ICM display shows the currently installed software version ("CUR") and the software version found on the USB flash drive ("NEW"). Make sure the "NEW" version is a higher number than the "CUR" version.
5. At "PROCEED WITH UPDATE?," press **ACCEPT**.

Figure 8-3 Software Update Process on ICM Front Panel





Corrective Maintenance

If a system component fails, it will need to be replaced by a certified technician. The system is a sophisticated electronic device; only specially trained certified technicians have the tools and expertise necessary to diagnose and repair a system fault.

Important!

Field replaceable units should only be replaced by a trained, certified technician. To find a technician near you, contact Technical Support. Instructions are provided with the replacement part.

Hardware Restart

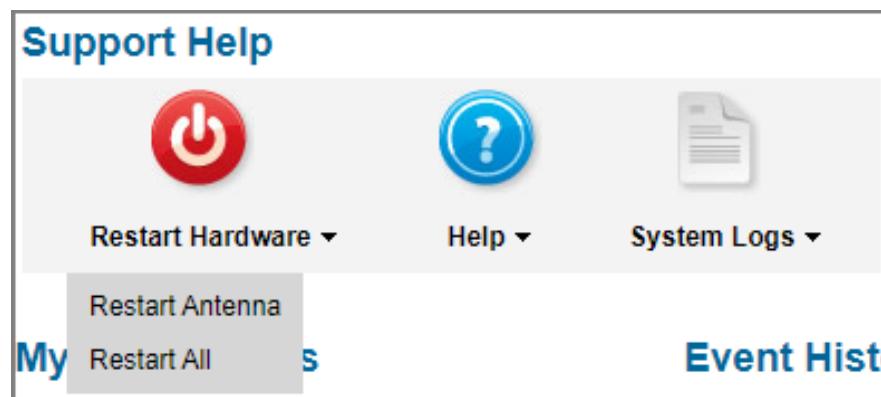
If you experience a problem with the system, you may need to restart the hardware. You can restart the following system components from the FM60-VSAT web interface:

- **Restart Antenna** – Restarts the FM60-VSAT antenna. Choose this option whenever the antenna is unable to find the satellite.
- **Restart All** – Restarts the entire system. Choose this option if the problem cannot be isolated to an antenna issue.

To restart a system component, follow these steps:

1. At the FM60-VSAT web interface, click the **Support** tab.
2. On the **Restart Hardware** menu, click the desired option.

Figure 8-4 Restart Hardware Menu



3. At the confirmation message, click **Restart Antenna**, or **Restart ALL**.



A. Wiring Diagram

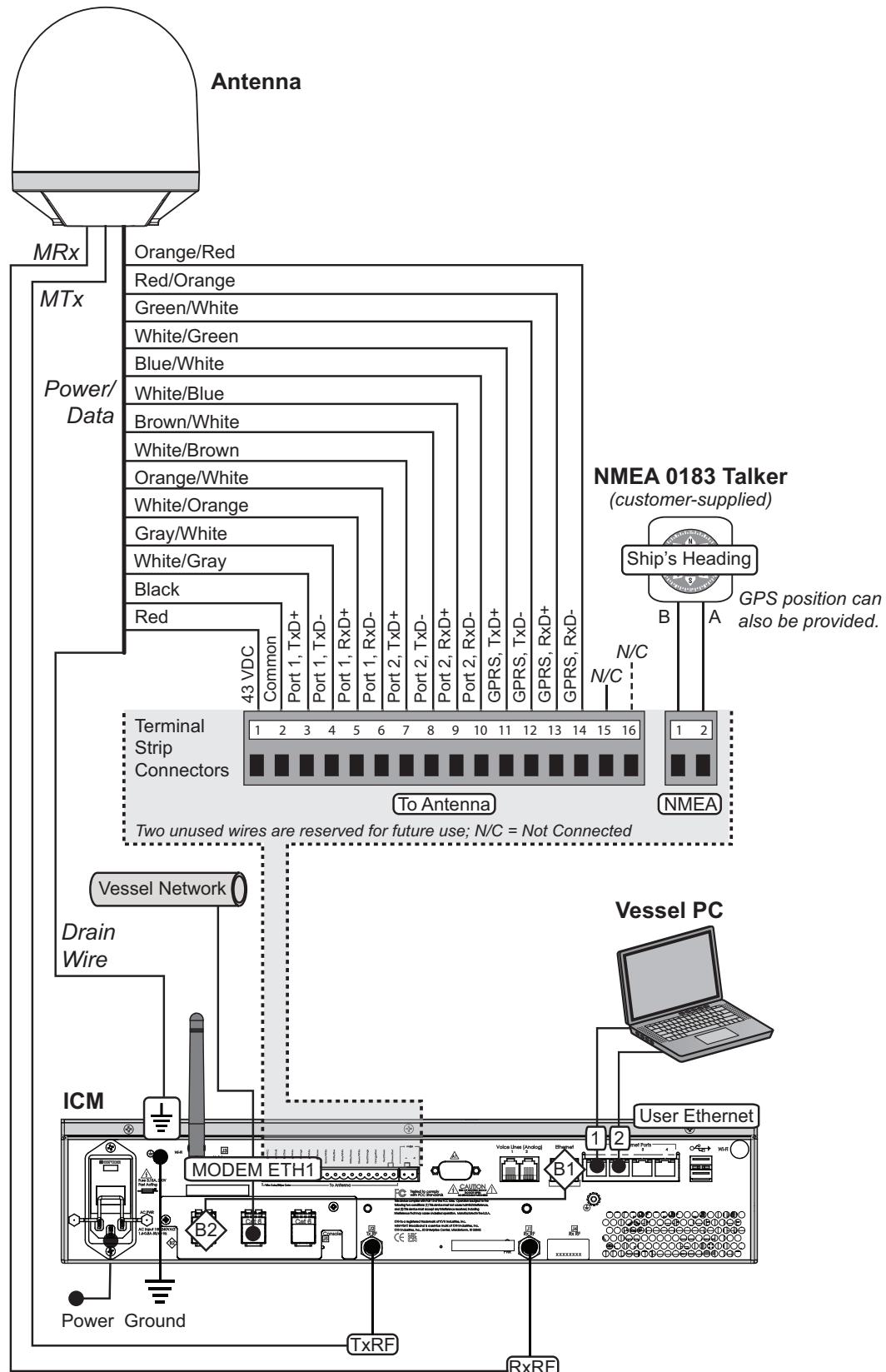
This section provides a system wiring diagram. For detailed installation instructions, refer to the Installation Guide.

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Wiring Diagram

The wiring diagram below shows the basic system connections. For detailed installation instructions, refer to the Installation Guide.





B. LCD Menus

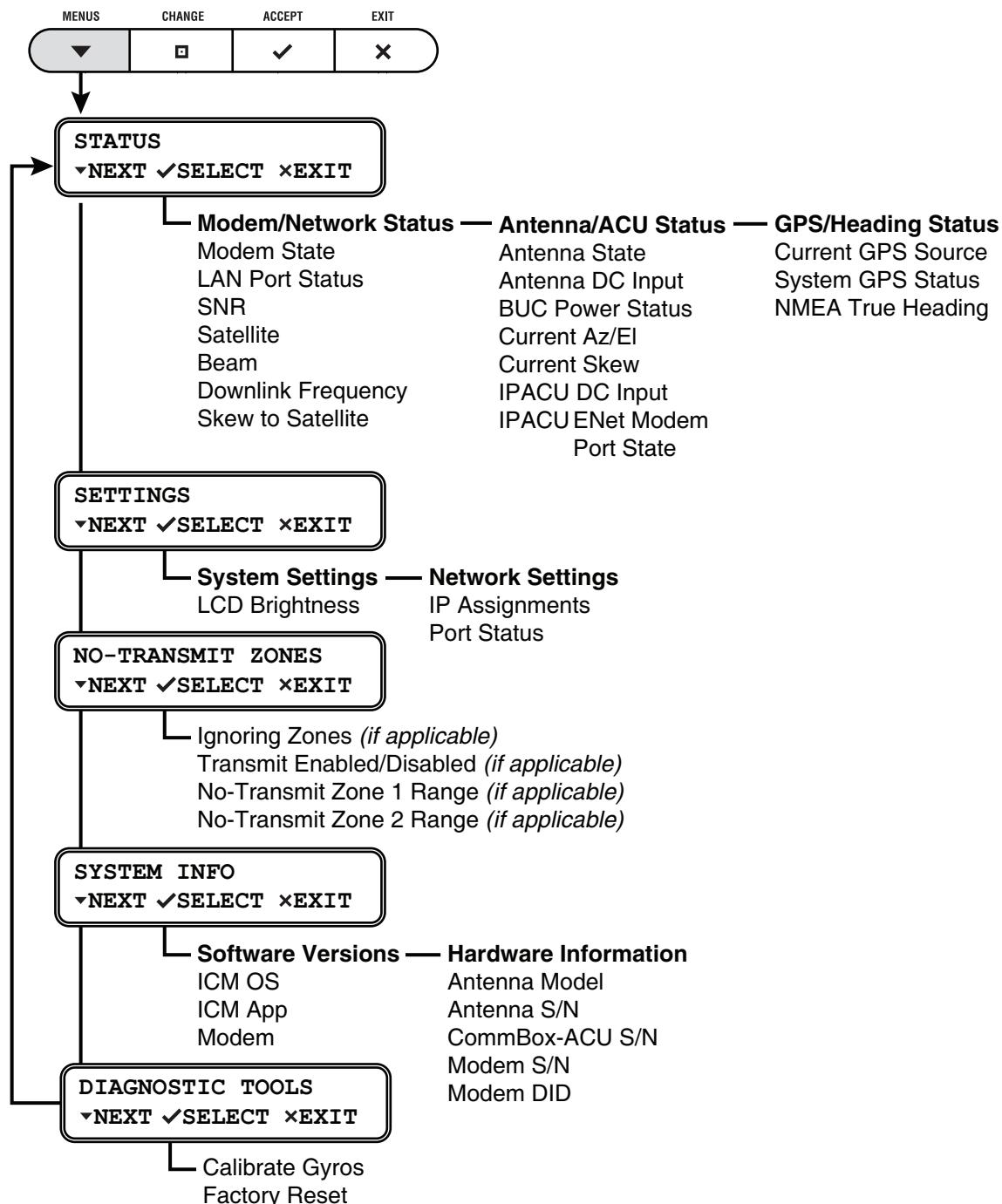
This section provides a quick reference guide to the LCD menus on the ICM's front panel.

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LCD Menus Quick Reference Guide

The chart below shows the menu structure of the ICM front panel LCD interface.





C. Specifications

This section provides the technical specifications of the FM60-VSAT system's components.

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System Specifications

Antenna Specifications

Attribute	Rating
	Meets Inmarsat operational, survival, and shock specifications
RX receive/TX transmit frequency band	10.95-12.75 GHz/14.0-14.5 GHz
Antenna gain	35.6 dBi (RX-band, min)
Transmit power (BUC)	4 W max
Elevation range	-24° to +119° (<i>with heading input</i>)
Azimuth range	710° rotation
Temperature	Operational: -22° F to +131° F (-30° C to +55° C) Survival: -22° F to +158° F (-30° C to +70° C)
Humidity	IEC 60945; 104° F (40° C), 95% humidity (non-condensing)
Rain	100-knot wind with 1.7 mm/min (4"/hr) rain, with droplet size between 0.5 and 4.5 mm
Outside dimensions	26.2" (66.6 cm) OD x 31.2" (79.2 cm) H
Weight	57.6 lbs (26.1 kg)

* Specifications are subject to change without notice.



ICM Specifications

Attribute	Rating
NMEA input	NMEA 0183, 4800 baud, accurate within 2°, compatible sentences: <i>Heading</i> : \$--HDG, \$--HDM, \$--HDT, \$--OSD, \$--THS, \$--VHW, <i>GPS</i> : \$--RMC
Input voltage	100-240 VAC, 50-60 Hz
Temperature	Operational: 5° F to 131° F (-15° C to +55° C) Survival: 5° F to 158° F (-15° C to +70° C)
Humidity	IEC 60945; 104° F (40° C), 95% humidity (non-condensing)
Interfaces	User Ethernet: RJ45, IEEE 802.3, 10BASE-T/100BASE-TX, 100 Mbps Wireless access point: 802.11b, 802.11g, 802.11n USB (Front Panel): USB 2.0 (for software updates only) USB (Rear Panel): Not Used
Dimensions	16.75" (42.55 cm) W x 11.17" (28.37 cm) D without strain-relief bracket, 16.31" (41.43 cm) D with strain-relief bracket x 3.49" (8.85 cm) H (2U)
Weight	10.71 lbs (4.85 kg)

* Specifications are subject to change without notice.

D. Glossary

This section provides a glossary of technical terms used throughout the documentation.

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Glossary

10BaseT

Ethernet standard using twisted pair cabling (such as CAT5). Supports a maximum data rate of 10 Mbps.

100BaseT

Fast Ethernet standard using twisted pair cabling (such as CAT5). Supports a maximum data rate of 100 Mbps.

802.11

Wireless network communications standard commonly used in LANs.

ACU

Antenna Control Unit.

AGC

Automatic Gain Control. Function that automatically boosts the gain of a received signal, as required, to maintain a constant output level. Indicates RF level.

AZ

Azimuth angle. Horizontal direction in which the antenna points.

bps

Bits per second.

BUC

Block Up-Converter. Device that converts the intermediate frequency signal from the modem to a Ku-band frequency and amplifies it for transmission.

Bulletin Board

Communications from the hub to all terminals within its network.

CAT5

Category of twisted pair cable with a maximum data rate of 1,000 Mbps.



Channel

Frequency (between 2.4-2.5 GHz) used for Wi-Fi communications. To communicate via a wireless connection, both router and host must be set to the same channel. There are 11 channels to choose from, allowing users to prevent interference between multiple wireless networks.

Chassis

The outside enclosure of an electronic device.

Client

A computer application that accesses resources held by a server.

Cloud

“The cloud” refers to the accessibility of software applications and data storage services through a web browser.

Crossover Cable

Cable in which the pins are reversed from one end to the other. Used for connecting two computers back-to-back without using an Ethernet hub.

Data Rate

Speed at which a communications path can transfer information, normally measured in bits per second (bps).

dB

Decibel. Ratio of one power level to another.

DHCP

Dynamic Host Configuration Protocol. IP protocol that allows a server to automatically assign IP addressing information to a computer or device on the network.

DNS

Domain Name Service. IP service that translates domain names (such as “www.google.com”) into IP addresses (such as “63.105.58.10”).



Downlink

Communication path from the satellite to the antenna.

DVB

Digital Video Broadcasting project. Global standard of digital broadcasts.

EIRP

Effective Isotropic Radiated Power, measured in dBW.

EL

Elevation angle. Vertical direction in which the antenna points.

Encryption

As it applies to Wi-Fi, encoding of a wireless signal to protect it from unauthorized reception.

Ethernet

Network communications standard adopted by most LANs. Communicates via twisted pair cable at one of three maximum data rates: (1) Standard - 10 Mbps, (2) Fast - 100 Mbps, and (3) Gigabit - 1 Gbps (1,000 Mbps).

Firewall

Security mechanism that protects a network from unauthorized access.

Floating Ground

Dangerous condition in which the chassis ground of an electrical device differs from ship's ground. This difference can measure well over 100 volts, risking damage to the equipment and electric shock, potentially resulting in death. A floating ground can be prevented by ensuring proper grounding of the device to ship's ground.

Footprint

Coverage area of a satellite.

Forward Link

Communication path from the satellite hub to the user terminal.
Another term for "Downlink."



Frequency

Number of cycles per second of a radio wave, measured in Hertz (Hz).

GPS

Global Positioning System. Network of satellites that allow anyone with a GPS device to accurately fix their position on Earth.

Gyro

A device that precisely senses and measures motion in a single axis, such as elevation or azimuth.

Host

Any computer connected to a network.

HTS

High-throughput Satellite Network. The satellite network is comprised of spot beams (for high capacity, fast speeds, and enhanced reception) and wide beams (for continued service when outside spot beam coverage).

HTTP

HyperText Transfer Protocol. The primary protocol for the World Wide Web.

Hub

Earth station that links the satellite network to the terrestrial network.

ICM

Integrated Control Modem.

IF

Intermediate Frequency. As it applies to FM60-VSAT, L-band output of an LNB, or input to a BUC.

Internet

Global network connecting a vast number of networks and computers.



IP Address

Unique network identifier assigned to a single computer or device on a network. Consists of four eight-bit numbers, each between 0 and 255 (for example, "195.172.7.2").

Kbps

Kilobits (1,000 bits) per second.

Ku-band

Range of frequencies from 10.7 GHz to 18 GHz.

LAN

Local Area Network. A relatively small group of computers and devices linked together within close proximity to each other and usually on the same IP network.

L-band

Range of frequencies from 950 MHz to 2150 MHz.

LNB

Low Noise Block down-converter. Device that converts and amplifies a Ku-band satellite signal into an intermediate frequency (IF) L-band signal.

Mbps

Megabits (1,000,000 bits) per second.

Modem

Modulator-demodulator. Translates digital signals into analog signals and vice-versa.

Network

A group of computers and devices (such as printers) linked together.

Network Operations Center (NOC)

Station that maintains and manages a telecommunications network.



NIC

Network Interface Card. Expansion or built-in circuit card that provides a computer with network communication capabilities.

NMEA 0183 Talker

Marine electronic device, such as a gyrocompass, that transmits data messages that comply with the NMEA 0183 standard. Data is transmitted serially at 4800 baud over a pair of wires (A and B).

Orbital Slot

The longitude of the satellite that the modem has currently selected for tracking.

Packet

Part of a data message transmitted over a network. Also contains the address of the destination for routing purposes. (Data messages are divided into packets, sent over a network, then reassembled in the correct order at the destination.)

PCI

Peripheral Component Interconnect. Bus standard that supports high-speed connections between computers and peripheral devices.

Ping

Software utility used to check a network connection. Sends a test packet to the designated address and reports how long it takes to receive a response.

Polarization

Orientation of a satellite signal. Circular polarization, which has a "corkscrew" propagation path, consists of left-hand (LHCP) and right-hand (RHCP) signals. Linear polarization consists of vertical and horizontal signals offset by 90 degrees.

Protocol

Standard that establishes strict rules for how data is communicated over a network.

Proxy

A server that controls client access to another server.



Return Link

Communication path from the antenna to the satellite. Another term for "Uplink."

RF

Radio Frequency.

RJ45

Registered Jack 45. Eight-wire network cable connector for LANs. Similar to a telephone jack.

Router

Device that connects multiple IP networks. For each data packet it receives that is destined for another IP network, determines the best path to reach its destination.

RSSI

Receive Signal Strength Indicator. Indicates the strength of the received satellite signal.

RX

Receive.

Skew

Adjustment angle to orient an LNB with a linearly polarized satellite signal.

SNR

Ratio of signal-level to background-noise in decibels, indicating the general quality of a received signal.

SSID

Service Set Identifier. Unique identifier shared by all computers and devices on a single wireless network.

Straight-through Cable

Cable in which the pins at one end match the pins at the other end.



Subnet

Subdivision of a network based on IP address. For example, with a subnet mask of "255.255.255.0," all computers and devices assigned an IP address starting with "195.172.8" belong to one subnet (there are 255 possible). An IP address starting with "195.172.9" designates a different subnet.

Subnet Mask

Divides the latter portion of an IP address into subnet and host designations. For example, in a regular class B network, the first two numbers in an IP address define the network ID while the last two numbers define the host ID (the individual computer or device on that network). A subnet mask changes the format of these last two numbers by designating the third number as the subnet ID and designating the last number as the host ID (the computer or device within that subnet).

SW

Software.

Switch

Device that connects two segments of a LAN. Routes data from one segment to another based on the MAC address of the destination.

TCP/IP

Transmission Control Protocol/Internet Protocol. Two communications protocols for the Internet. IP handles the delivery of data packets over the Internet; TCP ensures that all data packets are successfully delivered and assembled in the proper order.

Transponder

Component of a satellite that receives radio transmissions from Earth, amplifies them, and retransmits them back to Earth on a different frequency.

Twisted Pair

Cable type consisting of multiple pairs of cable in which two wires are spiraled together to reduce electromagnetic noise. Can be either shielded (STP) or unshielded (UTP). Used extensively in LANs and telephone networks.



TX

Transmit.

URL

Uniform Resource Locator. Address of a web page or file on the World Wide Web. Consists of three parts: (1) protocol (such as "http"), (2) IP address or domain name (such as "www.google.com"), and (3) name of the web page or file to be retrieved from that address (such as "index.html").

USB

Universal Serial Bus. Bus standard for connecting peripheral devices to a computer. Supports a data rate of 12 Mbps.

UTP

Unshielded Twisted Pair. Cable consisting of four twisted pairs (8 wires), usually terminated by RJ45 connectors. Commonly used in LANs.

VSAT

Very Small Aperture (< 3 m) Terminal. Communications system in which multiple users connect via satellite to a single land-based hub, which handles the routing of all network traffic.

WAN

Wide Area Network. A group of computers, devices, and possibly LANs, linked together over a large geographic area.

WAP

Wireless Access Point. Device that links computers wirelessly to a LAN. To communicate with the WAP, each computer needs a properly configured wireless network card.

WEP

Wired Equivalent Privacy. Security mechanism for wireless networks. Encrypts data to protect it from unauthorized interception.

Wi-Fi

Wireless Fidelity. Refers to an 802.11 wireless network.

WINS Resolution

Windows Internet Naming Service Resolution. Organizes the names of all Windows computers in a network with their respective IP addresses. Similar function to DNS.

Wireless Network Card

PCI or PCMCIA card that provides a computer with wireless access to a LAN via a WAP.

WPA2

Wi-Fi Protected Access. Security mechanism for wireless networks. Encrypts data to protect it from unauthorized interception. More secure than WEP.

XAZ

Cross-azimuth angle. Angle at which the antenna's RF feed assembly rotates to maintain the proper skew angle while tracking the satellite.

