

SAILOR 900 Viasat Ka

COBHAM

Installation and operation manual



SAILOR 900 Viasat Ka

Quick guide

Configuration tasks (minimum)

This quick guide aims at experienced service personnel who have installed the SAILOR 900 Viasat Ka system and connected power. It lists the minimum configuration tasks you have to make before the system can be used on-air on a satellite.

1. Switch on the pTRIA Interface Unit.
2. Switch on the Antenna Control Unit.
3. Connect a PC to the LAN2 connector at the rear of the pTRIA Interface Unit.
4. Open Mozilla Internet browser to access the web interface of the SAILOR 900 Viasat Ka using the IP address: <http://192.168.100.1>.
5. On the navigation bar, click **Antenna** to access the web interface of the antenna and proceed with tasks in the table below.

Configuration task	What to do and where to find more information
Heading input	Configure the heading input to External under SETTINGS > Navigation . For more information see <i>Select the desired heading input, see the following table.</i> on page 6-8. Connect the ship's heading (NMEA0183, RS-422/RS-232) to the NMEA 0183 multi-connector. For more information see <i>NET-H (NMEA 0183 connector, for future use)</i> on page 4-3.
Azimuth calibration	Make an azimuth calibration under SERVICE > Calibration to ensure that the antenna can point and receive a signal from the satellite. For more information see <i>Calibration</i> on page 6-11.

6. The system goes automatically into tracking mode. It is preconfigured from the factory with a modem profile and a satellite profile.
7. Verify that the SAILOR 900 Viasat Ka acquires the satellite. Check that the ACU display shows **ACQUISITION**.
8. Verify that the system is operational. Check that the status in the ACU display shows **TRACKING**.

SAILOR 900 Viasat Ka

Installation and operation manual

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Safety summary

The following general safety precautions must be observed during all phases of operation, service and repair of this equipment. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture and intended use of the equipment. Thrane & Thrane A/S assumes no liability for the customer's failure to comply with these requirements.

Microwave radiation hazards

During operation the Above Deck Unit (antenna) in this system radiates Microwave Power. This radiation may be hazardous to humans close to the Above Deck Unit. Make sure to turn off the power to the ADU before removing the radome and working on the antenna.



Distance to other equipment

Do not move the Above Deck Unit closer to radars than the minimum safe distance specified in section *Interference from radar, GPS, L-band and other transmitters* on page 3-12 – it may cause damage to the Above Deck Unit.

Compass Safe Distance:

SAILOR 900 Viasat Ka and Antenna (ADU): min. 140 cm (IEC 60945).

SAILOR 7016C Antenna Control Unit (ACU): min. 30 cm (IEC 60945).

SAILOR 7024A pTRIA Interface Unit (PIU): min. 40 cm (IEC 60945).

Service

User access to the interior of the ACU or the PIU is not allowed. Only a technician authorized by Cobham SATCOM may perform service - failure to comply with this rule will void the warranty. Access to the interior of the Above Deck Unit is allowed. Replacement of certain modules and general service may only be performed by a technician authorized by Cobham SATCOM.

Grounding, cables and connections

To minimize shock hazard and to protect against lightning, you must connect the equipment chassis and cabinet to an electrical ground. Ground the ACU and the PIU to the ship. For further details see Appendix B, *Ground and RF protection*.

Do not extend the cables beyond the lengths specified for the equipment. The cable between the PIU and Above Deck Unit can be extended if it complies with the specified data concerning cable losses etc.

Antenna cables for the SAILOR 900 Viasat Ka system are shielded and should not be affected by magnetic fields. However, try to avoid running cables parallel to high power and AC/RF wiring as this might cause malfunction of the equipment.

Power supply

SAILOR 7016C Antenna Control Unit: voltage range 100-240 VAC.

The ACU provides power for the Above Deck Unit and the pTRIA Interface Unit.

Do not operate in an explosive atmosphere

Do not operate the equipment in the presence of flammable gases or fumes. Operation of any electrical equipment in such an environment constitutes a definite safety hazard.

Keep away from live circuits

Operating personnel must not remove equipment covers. Component replacement and internal adjustment must be made by qualified maintenance personnel. Do not replace components with the power cable connected. Under certain conditions, dangerous voltages may exist even with the power cable removed. To avoid injuries, always disconnect power and discharge circuits before touching them.

Failure to comply with the rules above will void the warranty!

After installation make this manual available to the user for further reference.

Record of Revisions

Rev.	Description	Release Date	Initials
A	Original document	November 2019	UFO

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About this manual

1.1 Intended readers

This is an installation and service manual for the SAILOR 900 Viasat Ka system, intended for installers of the system and service personnel. Personnel installing or servicing the system must be properly trained and authorized by Cobham SATCOM. It is important that you observe all safety requirements listed in the beginning of this manual, and install the system according to the guidelines in this manual.

1.1.1 Supporting documents

Additional publications and information including most updated user guides, white papers, application notes, release notes, software updates, training schedules, and other technical information may be found on the ViaSat website, located at: maritime.viasat.com.

1.2 Manual overview

This manual has the following chapters:

- *Introduction*
- *Installation*
- *Interfaces*
- *Power and start up*
- *Configuration*
- *Installation check*
- *Service*

This manual has the following appendices:

- *Technical specifications*
- *Ground and RF protection*
- *System messages*
- *Command line interface*
- *Approvals*

1.3 Software version

This manual is intended for SAILOR 900 Viasat Ka with **software version 1.63 (ADU and ACU)**. The PIU software version is shown in the PIU web interface.

Manuals issued by Cobham SATCOM are periodically revised and updated. Anyone relying on this information should acquire the most current version e.g. from www.cobham.com/satcom, **Cobham SYNC Partner Portal**.

1.4 Typography

In this manual, typography is used as indicated below:

Bold is used for the following purposes:

- To emphasize words.
Example: “Do **not** touch the antenna”.
- To indicate what the user should select in the user interface.
Example: “Select **SETTINGS > LAN**”.

Italic is used to emphasize the paragraph title in cross-references.

Example: “For further information, see *To connect cables* on page...”.

1.5 Precautions

Text marked with “Warning”, “Caution”, “Note” or “Important” show the following type of data:

- **Warning:** A Warning is an operation or maintenance procedure that, if not obeyed, can cause injury or death.
- **Caution:** A Caution is an operation or maintenance procedure that, if not obeyed, can cause damage to the equipment.
- **Note:** A Note gives information to help the reader.
- **Important:** A text marked Important gives information that is important to the user, e.g. to make the system work properly. This text does not concern damage on equipment or personal safety.

All personnel who operate equipment or do maintenance as specified in this manual must know and follow the safety precautions. The warnings and cautions that follow apply to all parts of this manual.



WARNING! Before using any material, refer to the manufacturers’ material safety data sheets for safety information. Some materials can be dangerous.



CAUTION! Do not use materials that are not equivalent to materials specified by Thrane & Thrane A/S. Materials that are not equivalent can cause damage to the equipment.



CAUTION! The system contains items that are electrostatic discharge sensitive. Use approved industry precautions to keep the risk of damage to a minimum when you touch, remove or insert parts or assemblies.

Introduction

This chapter has the following sections:

- *SAILOR 900 Viasat Ka system*
- *Part numbers and options*

2.1 SAILOR 900 Viasat Ka system

2.1.1 Overview

The SAILOR 900 Viasat Ka is a unique stabilized maritime VSAT antenna system operating in the following Ka-band: Uplink: 27.5 – 30 GHz, Downlink: 17.7 – 20.2 GHz. The system provides a high-throughput, full-duplex IP data connections both on Viasat's quasi-global Ka-band satellite networks. The following figure shows the current and anticipated coverage maps of the Ka service as of this manual's publication date. For the latest information refer to maritime.viasat.com.

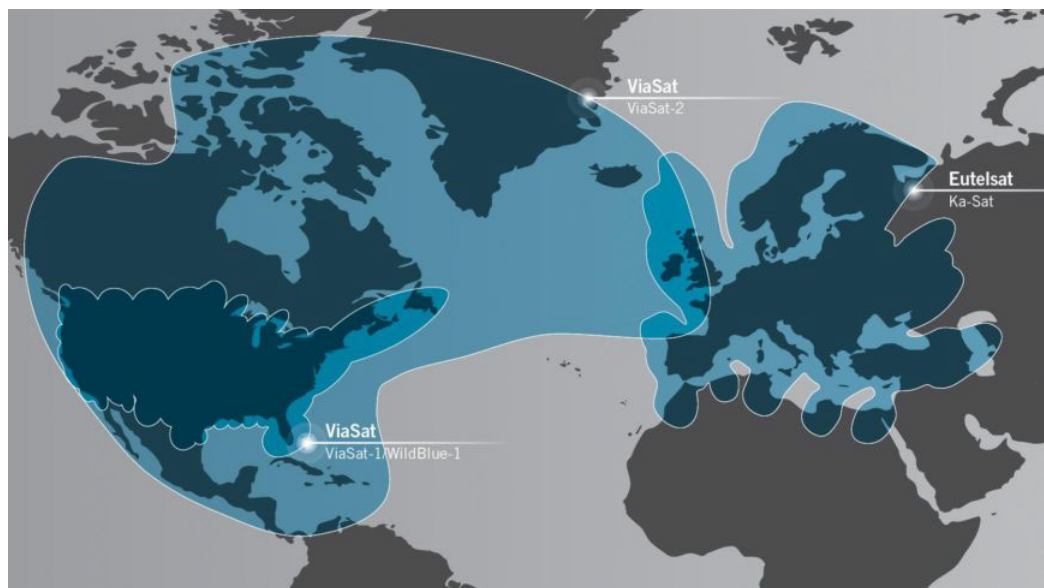


Figure 2-1: Coverage map, current

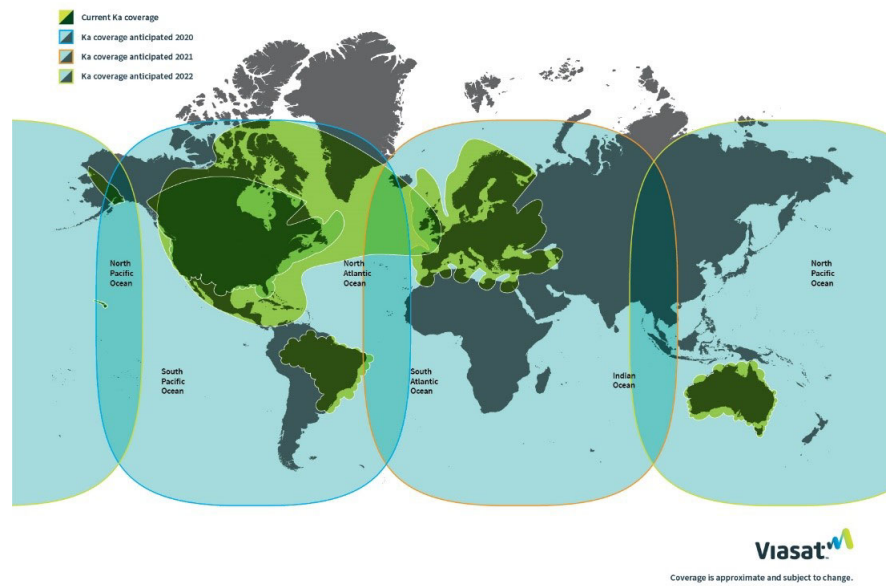


Figure 2-2: Coverage map, anticipated

The SAILOR 900 Viasat Ka system consists of the following units:

- SAILOR 7009F Above Deck Unit (ADU)
- SAILOR 7016C Antenna Control Unit (ACU)
- SAILOR 7024A pTRIA Interface Unit (PIU)

The system requires a single 50 Ohm coaxial cable to provide the Above Deck Unit (ADU) with both DC power, data and control information. The radome does not have to be removed neither before nor after the installation. To protect the ADU the built-in motors act as brakes during transport and when the ADU is not powered. You can access the SAILOR 900 Viasat Ka remotely and make in-depth performance analysis using the built-in web interface. The following figure shows the SAILOR 900 Viasat Ka system.



Figure 2-3: ADU, PIU and ACU

SAILOR 900 Viasat Ka features

- Single 50 Ohm coax cable connecting the ADU and PIU.
- Gyro-free operation.
- Secure connection, HTTPS (ACU and PIU) and SSH (ACU only).
- Remote or local simultaneous software update of the ADU and ACU using a PC and Internet browser.
- Full remote control and troubleshooting with built-in test equipment (BITE).
- ACU with LAN, NMEA 0183, RS-232 and RS-422.
- No scheduled maintenance.

2.1.2 Above Deck Unit (ADU)

The SAILOR 900 Viasat Ka ADU is a 103 cm stabilized tracking antenna, consisting of a suspended antenna with a standard global RF configuration. It is stabilized by heavy duty vibration dampers in 3-axis and can be used in environments with elevations of -25° to $+125^{\circ}$. The ADU weighs 126 kg and is powered by the ACU. The ADU is protected by a radome. All communication between the ADU and the ACU passes through the PIU via a single standard 50 Ohm cable (with N connector) through the rotary joint. No cable work is required inside the radome.



Figure 2-4: Above Deck Unit (ADU)

Modules in the SAILOR 900 Viasat Ka ADU

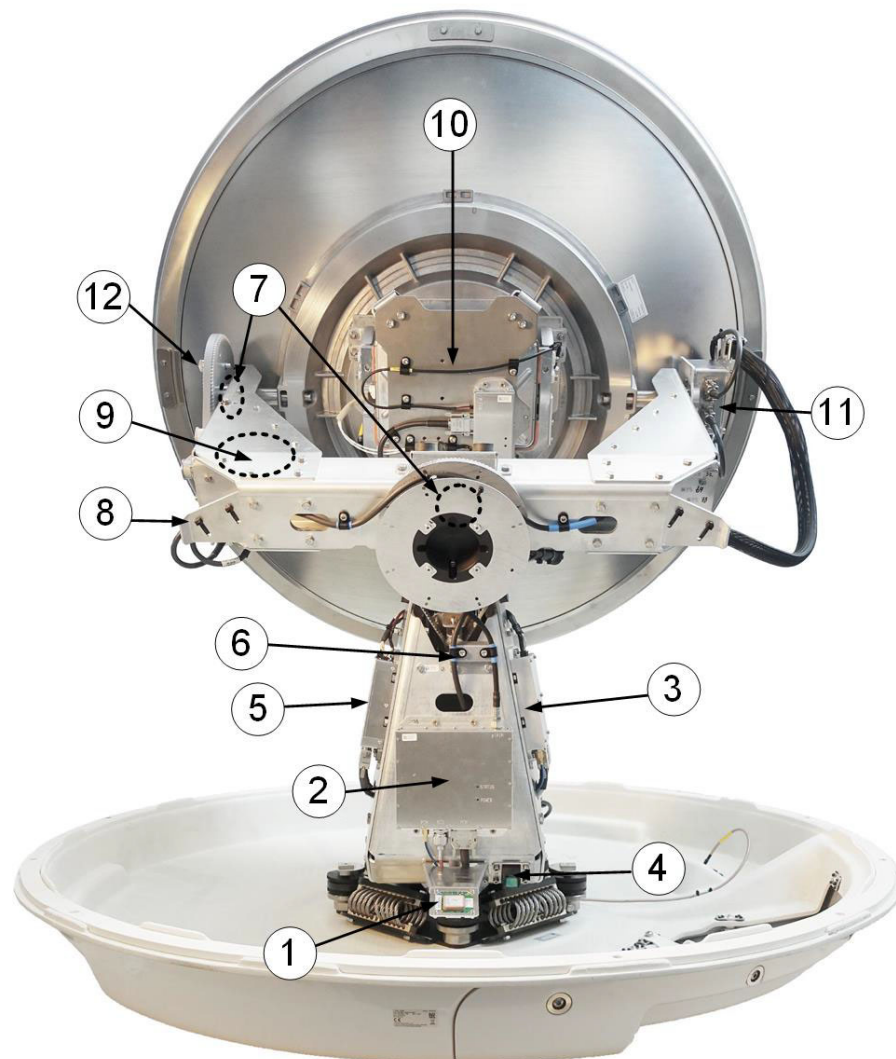


Figure 2-5: Above Deck Unit modules 1/2

1. GNSS module.
2. pTRIA Interface Module (PIM).
3. Pedestal Control Module (PCM).
4. Service switch.
In switch-off position the Motor Driver modules and the BUC are turned off for safe conditions during service and repair. The switch must be set to on for normal operation.
5. Motor Driver Module for cross elevation (DDM/SMD).
6. Cross elevation motor and encoder.
7. Zero Reference Module (x3) (ZRM) (not visible on photo), (2 in the figure above, 1 in the figure below).
8. Motor Driver Module for elevation (on the bottom) (DDM/SMD).
9. Elevation motor and encoder (not visible).

10. Integrated transceiver (pTRIA)
11. Inertial Sensor Module (ISM).
12. Elevation locking pin to lock the antenna dish in a fixed position.



Figure 2-6: Above Deck Unit modules 2/2

13. Motor Driver Module for Azimuth (DDM/SMD).
14. Azimuth motor.
15. Azimuth encoder.
16. Rotary joint.
17. Feed horn.

Four lifting brackets (included in the delivery) and reuse of packing material help getting the ADU safely into place. Satellite profile parameters are automatically loaded on to the ADU via the ACU. The system configuration is saved in two modules, there is no loss of data at repair. The large service hatch of the radome gives easy access to the ADU on site. The service switch in the ADU stops the Motor Driver modules and turns the transmission off.

All modules either have a service and power LED status indicator or support diagnostics via the web interface. Each module is encapsulated in a metal box with self-contained mounting bolts. If necessary, belts and modules can be exchanged on site. Software update of all components is done via a single bundle load.

2.1.3 Antenna Control Unit (ACU)

The ACU is the central control unit in the system. It manages all communication between the ADU and the PIU. The ACU has a display, status LEDs and a keypad. It provides a DHCP client. During configuration you can configure heading offset and save satellite setups. The user PC (user WAN) for Internet access etc. is connected to the PIU LAN2.

The ACU provides DC power to the ADU through the PIU via a single coaxial cable. The ACU and PIU each come in a 1RU 19" rack form factor.



Figure 2-7: Antenna Control Unit and pTRIA Interface Unit

You can do remote diagnostics and service with the ACU. Its built-in test equipment constantly checks the device for proper functioning. It performs POST (Power On Self Test) and you can request a PAST (Person Activated Self Test). Continuous Monitoring (CM) is also available. BITE error codes can be read out in the web interface and in the display of the ACU. You can access the ACU web interface by navigating to the **Antenna page** in the main web interface.

ACU interfaces

The ACU (SAILOR 7016C) has one LAN connector at the front (disabled) and the following interfaces at the rear panel:

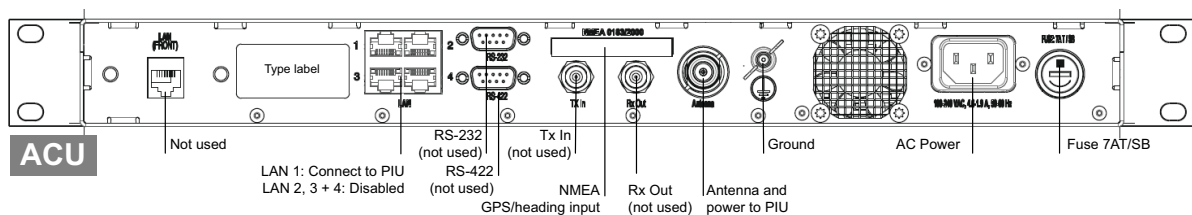


Figure 2-8: ACU (connector panel)

- N-connector for PIU cable (50 Ohm)
- 2 x F connectors (Tx In, Rx Out) (not used)
- Multi connector for NMEA interfaces (for input from GPS compass or Gyro compass)
- RS-422 interface (not used)
- RS-232 interface (not used)
- LAN 1 port for communication with the PIU
- LAN 2, 3 and 4 (not used)
- Ground wing nut
- AC power connector
- On/Off power switch for the ACU (at the front)

2.1.4 pTRIA Interface Unit (PIU)

The PIU contains a data processing card and a multiplexer that combines DC power, antenna communication and modem communication onto a single coaxial cable for interface between the ADU and below deck equipment. The PIU has the following interfaces and connectors:

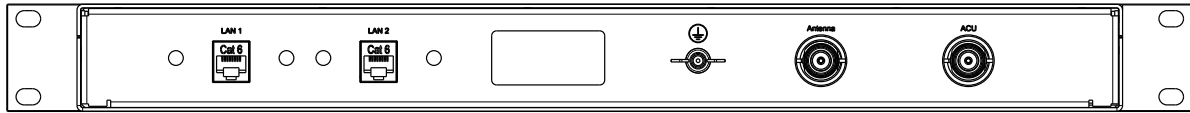


Figure 2-9: Connector panel of the PIU

- GND wing nut
- 2 x LAN ports, one for connecting to the ACU and one for user interface
- 2 x N-connectors, one for ACU and one for ADU (antenna)

2.1.5 Satellite type approvals

For a list of satellite type approvals see Appendix E, *Approvals*.

2.1.6 Service activation

Before you can start using the SAILOR 900 Viasat Ka, you need to activate the system for the Viasat Ka service. Contact your service provider for activation or visit the Viasat Maritime website (www.maritime.viasat.com).

2.2 Part numbers and options

The following model and part numbers are available for the SAILOR 900 Viasat Ka system:

Part number	Description
407009F-00500	Above Deck Unit (ADU)
407016C-00512	SAILOR ACU (Viasat pTRIA)
407024A-00500	pTRIA Interface Unit (PIU)

Table 2-1: Part numbers for the SAILOR 900 Viasat Ka system

The following options are available for the SAILOR 900 Viasat Ka system:

Part number	Description
407090A-950	Antenna cable 50 m N-Conn (not mounted), male/male
407090A-925	Pigtail Cable 1.25 m, N-Conn, female/male

Table 2-2: Part numbers for options of the SAILOR 900 Viasat Ka system

Installation

This chapter has the following sections:

- *What's in the box*
- *Site preparation*
- *Installation of the ADU*
- *Installation of the ACU*
- *Installation of the PIU*
- *Installation of the PIU*
- *To connect the ADU, ACU and PIU*

3.1 What's in the box

3.1.1 To unpack

Unpack the PIU ADU and ACU. Check that the following items are present:

- SAILOR 7009F ADU with 4 lifting brackets (already mounted)
- Accessory kit for SAILOR 7009F ADU:
 - Package with cable glands (2 sizes), bolts and washers
- SAILOR 7016C ACU
- Accessory kit for SAILOR 7016C ACU:
 - NMEA multi-connector
 - RJ45 patch cable (0.5 m)
 - RJ45 patch cable (2 m)
 - Power cable (1x230 VAC),
- SAILOR 7024A PIU
- Accessory kit for SAILOR 7024A:
 - Coax cable N-N, ACU to PIU
 - RJ45 patch cable (0.35 m)
 - Power cable (1x115 VAC)

3.1.2 Initial inspection

Inspect the shipping cartons immediately upon receipt for evidence of damage during transport. If the shipping material is severely damaged or water stained, request that the

carrier's agent be present when opening the cartons. Save all box packing material for future use.



WARNING! To avoid electric shock, do not apply power to the system if there is any sign of shipping damage to any part of the front or rear panel or the outer cover. Read the safety summary at the front of this manual before installing or operating the system.

After unpacking the system, i.e. opening the cartons, inspect it thoroughly for hidden damage and loose components or fittings. If the contents are incomplete, if there is mechanical damage or defect, or if the system does not work properly, notify your dealer.

3.1.3 Tools needed

- Torx TX 30 to open the service hatch
- Torque wrench to fasten the mounting bolts for the ADU
- Torque wrench to fasten the N connector at the ADU
- PC and Internet browser
- Crimping tools

3.1.4 Transport of the antenna

During transport the antenna must be able to move freely inside the radome. You must follow the instructions below to keep a valid warranty:



CAUTION!

Do not lock the antenna dish with the elevation locking pin during transport.

Do not strap parts of the antenna.

This might cause damage to the antenna.

Damage due to actions listed above will void the warranty.

3.2 Site preparation

The following topics have to be considered when installing the ADU:

- *General site considerations*
- *Obstructions (ADU shadowing)*
- *Blocking zones with azimuth and elevation*
- *Safe access to the ADU (radiation hazard)*
- *Ship motion and offset from the ship's motion centre*
- *ADU mast design: Mast foundation and height*
- *Interference from radar, GPS, L-band and other transmitters*
- *Condensation, water intrusion and deposits*

3.2.1 General site considerations

For optimum system performance, you must follow some guidelines on where to install or mount the different components of the SAILOR 900 Viasat Ka System.

Important

It is recommended to mount the ADU in a location with as much **360° free line of sight to the satellite** as possible while making sure that the support structure fulfills the requirements for the mast foundation.

1. Mount the ADU on stiffened structures with a minimum of exposure to vibrations.

You do not have to align the ADU with the bow-to-stern line of the ship. When configuring the SAILOR 900 Viasat Ka system, the azimuth calibration provides the correct azimuth of the ADU.

Painting the radome

Customers may wish to paint the radome in order to match the vessel's colour. Any paint used must be non-metallic based. Painting the radome may impact RF performance and may lead to over-heating, causing the antenna to go in safe mode (switch off).

Cobham SATCOM recommends that the radome should NOT be painted. Painting the radome will not void the general warranty regarding material and workmanship etc. It is only the performance that cannot be guaranteed.

Modifying the radome or using another radome

The SAILOR 900 Viasat Ka antenna comes with a type-approved radome fitted from the factory. This radome is specifically designed for a minimal loss of RF performance for this specific antenna. Insertion loss reduces the available signal and decreases the effective radiated power and G/T (the ability to receive a weak signal). Modifying the radome or using another radome may increase the antenna side lobes, resulting in interference with other communication systems and thereby void satellite operator approvals. Other electrical effects on antenna performance of another radome, or of modifying the radome, include a change in the antenna beam width and shifting of the antenna bore sight.

Cobham SATCOM recommends that the radome should NOT be modified or changed to another type. Exchanging or modifying the radome will not void the general warranty for material and workmanship etc. but the performance cannot be guaranteed, and the satellite operator approvals will not be valid.

3.2.2 Obstructions (ADU shadowing)

The ADU is stabilized in 3-axis (plus skew) and can be used in environments with elevations of to allow for continuous pointing even in heavy sea conditions. The ADU beam is approximately m in diameter for the first 30 m from the ADU. Beyond 30 m the beam gradually widens so that it is approximately 5 m in diameter at 100 m distance. This beam expansion continues with increasing distance. Any obstructions, such as masts, funnels, bridge house etc. within this field can cause signal degradation or signal loss.

Note | Note that due to the short wavelength at Ka band and the narrow beam width of the ADU even a **6 mm steel wire placed within 50 m** inside the beam can causes signal degradation.

For optimum performance adhere to the following guidelines:

1. Place the ADU so that it has as much free line-of-sight as possible without any structures in the beam through one full 360 degrees turn of the vessel.
2. Do not place the ADU close to large objects that may block the signal.
3. Elevate the ADU by mounting it on a mast or on a mounting pedestal on a deck or deck house top to avoid obstruction.

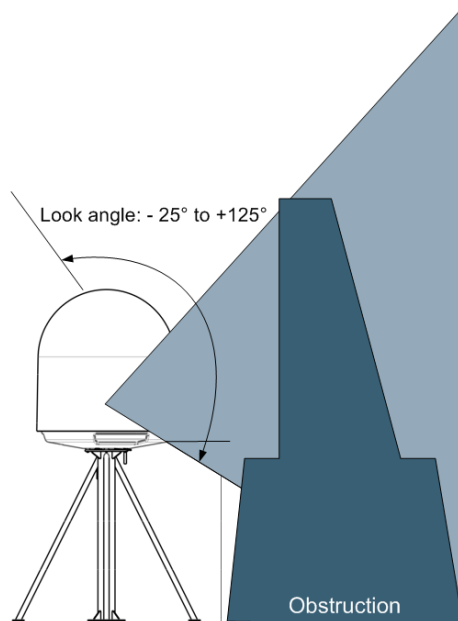


Figure 3-1: Signal degradation because of obstructing objects

3.2.3 Blocking zones with azimuth and elevation

Your installation may require that you set up blocking zones for the ADU, i.e. areas where the ADU will not transmit and areas where transmit power is potentially dangerous for persons frequently being in these zones. You can set up 8 blocking zones. Each blocking zone is set up with azimuth start and stop, and elevation angle. The blocking zones are set up in the built-in web interface of the ACU during configuration. For further information see *To set up blocking zones* on page 6-17.

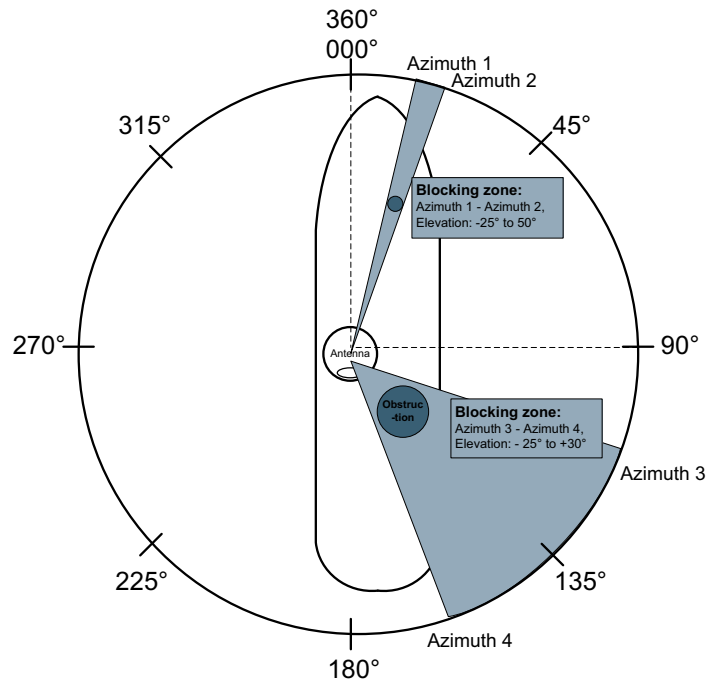


Figure 3-2: 2 blocking zones with no-transmit zones, azimuth (example)

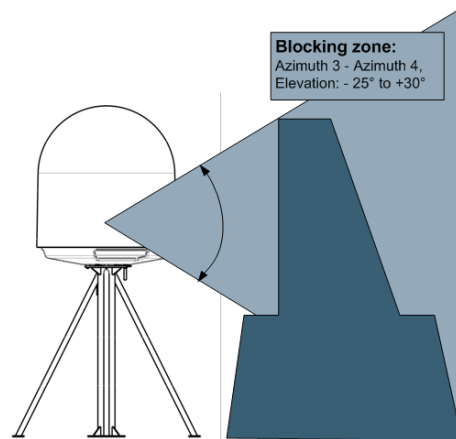


Figure 3-3: Blocking zone with no-transmit zones, elevation angle (example)

3.2.4 Safe access to the ADU (radiation hazard)

The ADU radiates radio frequency energy at a level below the United States FCC radio frequency exposure limits. Nevertheless, caution should be taken to minimize potential for RF exposure to human. Make sure to turn off power to the ADU before removing the radome and working on the antenna.

3.2.5 Ship motion and offset from the ship’s motion centre

When installing the ADU you must consider the mounting height carefully. The higher up the ADU is mounted, the higher is the linear g force applied to the ADU. The g force also depends on the roll period of the ship, see Table 3-1. If the g force applied is too high, performance and ADU signal stabilization may be reduced and eventually the ADU may be damaged. See the following table for allowed mounting heights above the ship’s motion centre.

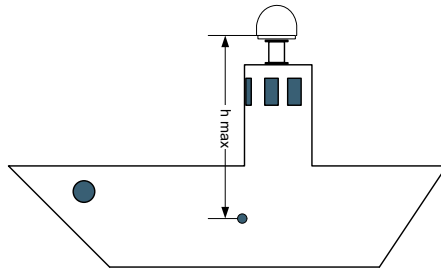


Figure 3-4: Maximum distance from the ship’s motion centre (h max)

Even though it is recommended to mount the ADU high, keep the distance between the ADU and the ship’s motion centre as short as possible.

Min. roll period	Maximum antenna mounting height (h max)	
	Full performance	Potential risk of damage
4 s	12 m (39 ft)	16 m (53 ft)
6 s	27 m (89 ft)	35 m (115 ft)
8 s	48 m (158 ft)	62 m (203 ft)
10 s	75 m (246 ft)	98 m (322 ft)

Table 3-1: Maximum distance from the ship’s motion center versus ship’s roll period

3.2.6 ADU mast design: Mast foundation and height

The antenna system is designed for harsh environmental conditions at sea, both in regards to vibration amplitude and speed. The antenna system performs optimally when mounted on a properly designed foundation. When mounting the antenna the overall goal is to establish a foundation which is as rigid as possible. However, in some scenarios establishing a very rigid foundation is difficult and inappropriate. This section aims at defining the minimum design criterion for the mast. In addition, some specific design suggestions are presented. In order to keep the presented designs to a manageable size only a sample of design suggestions is presented. Note that the design values given below depend on rigid interfaces between antenna and ship, the values are furthermore given based on a standard steel type (e.g. S235JR, S355JO).

The placement of the ADU must ensure a rigid structural connection to the hull or structure of the ship. Parts of the ship with heavy resonant vibrations are not suitable places for the ADU. A small platform or short mast shall provide rigid support for the ADU fastening bolts and a rigid interface to the ship.

If it is necessary to use a tall mast, you must stabilise the mast with bracing. Note that the design values given below depend on rigid ADU-to-ship interfaces. The cross-sectional properties and the corresponding maximum free length give a natural frequency close to 30 Hz. Shorten the mast length as much as possible to obtain higher frequencies. Preferably, mount stays or wires to stabilize the mast further.

Important

An antenna mounted on a less stiff structure might be functional, however, this could lead to a decrease in the operational lifetime of the antenna system and possibly a decreased performance under operation.

The ADU mast must be designed to carry the weight of the ADU (126 kg), plus the weight of the mast flange. The mast must also be able to withstand on-board vibrations and wind speeds up to 110 knots on the radome, even in icing conditions.

Follow the guidelines in the sections:

- *ADU mast flange*
- *Mast length and diameter*

ADU mast flange

For best performance provide a mast flange with a minimum of four gusset plates. To prepare the mast flange do as follows:

1. Fit the top of the ADU mast with a flange with clearance holes matching the bushings in the radome and with minimum 4 gusset plates. No center hole is necessary in the flange.
 - **Flange thickness:** Minimum 15 mm.
 - **4 gusset plates:** Minimum 15 mm thick, must be placed as close as possible to the holes in the mounting plate and evenly distributed.

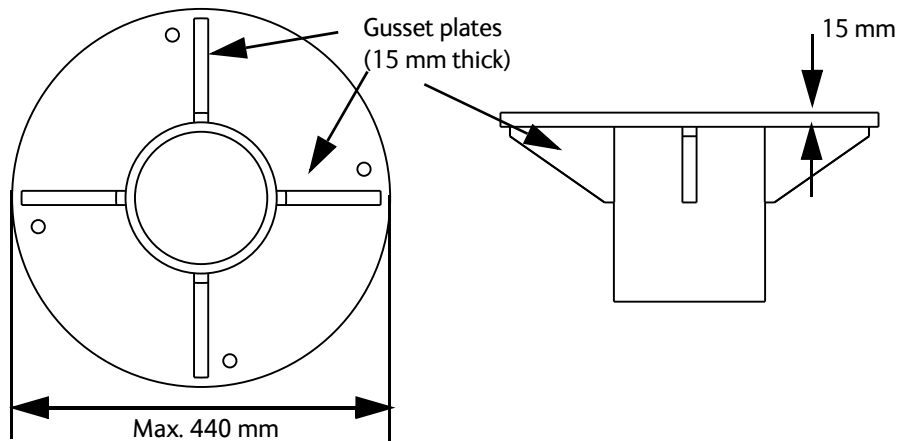


Figure 3-5: ADU mast flange, top and side view

2. Make sure that the recommended flatness on the mast mount plateau is below 3,0 mm.



Figure 3-6: ADU mast flange, recommended flatness on the mast mount plateau



CAUTION! Avoid sharp edges where the flange is in direct contact with the radome. Round all edges as much as possible to avoid damaging the surface of the radome.

3. Allow sufficient space so the nut is free of the welded seam and there is room for tools (min. 50 mm).
4. Use the dimensions in the following figure to prepare the mast flange for mounting of the ADU.

The following figure shows the bottom view of an antenna.

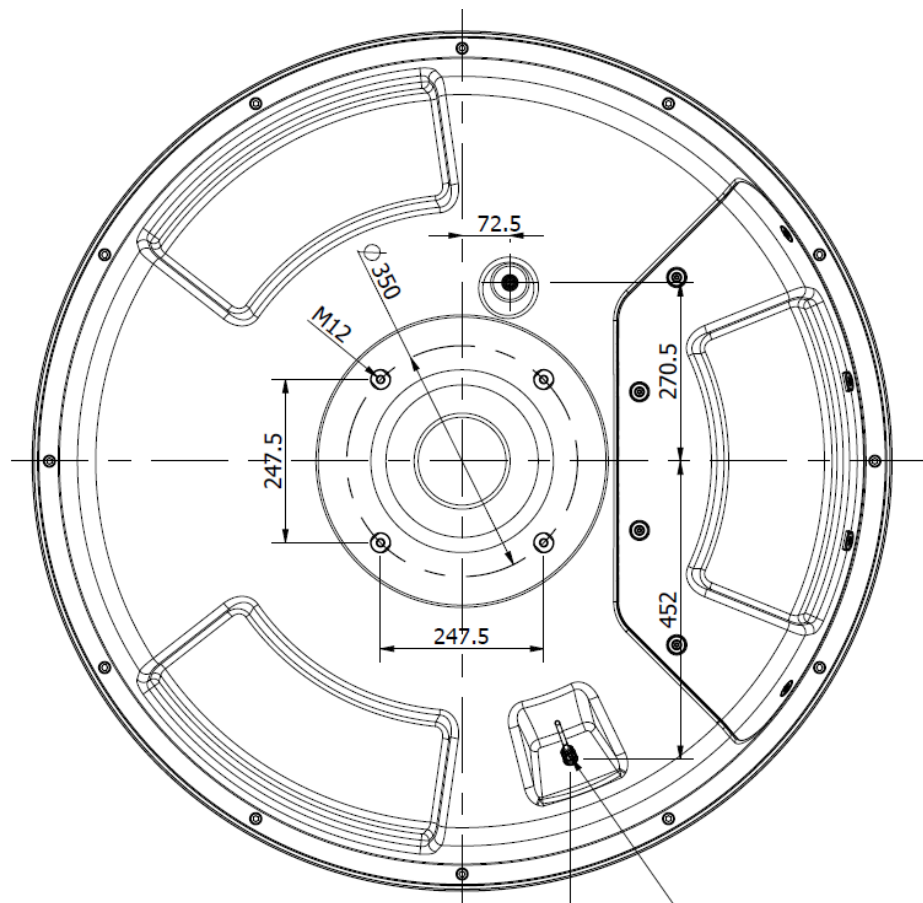


Figure 3-7: ADU, bottom view

Mast length and diameter

The mast wall thickness is in the following design examples set to 5 mm and the brace wall thickness to 4 mm. A larger wall thickness yields more stiffness (valid design) whereas a thinner wall thickness yields a weaker structure (not valid design).

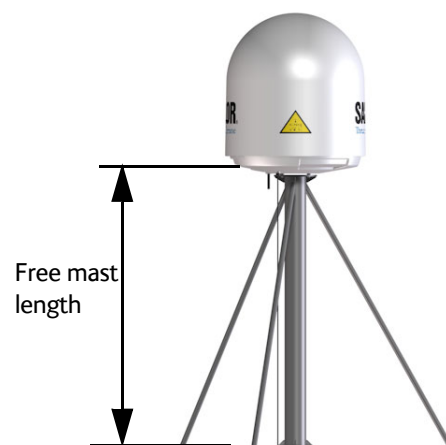


Figure 3-8: Free mast length and example bracing for a tall mast

Note Make sure that there is free space below the drain tube. See also *Condensation, water intrusion and deposits* on page 3-15.

The tables in the next sections give suggested design values for the free mast length.

Note The tables list the values for **steel masts**. For **aluminium masts**, the free mast length is reduced to 75% of the values for steel.

Note Bracing and rigid masts can still not prevent vertical vibration if the mast is attached to a deck plate that is not rigid. Make every effort to mount the mast on a surface that is well supported by ribs. If this is not possible, provide extra deck plate propping.

The following tables show the minimum dimensions for an ADU mast with and without stays or wires. Note that the values are only guidelines - always consider the environment and characteristics of the ship before deciding on the mast dimensions.


Mast without braces	Max. free mast length (steel)	Outer Diameter	Wall Thickness (mm)	Weight (kg/m)
	0.4 m (1.3 ft)	200 mm (8 in)	5 mm (0.2 in)	24.0
	0.6 m (2 ft)	220 mm (9 in)	5 mm (0.2 in)	26.5
	0.8 m (2.6 ft)	250 mm (10 in)	5 mm (0.2 in)	30.2
	1 m (3.3 ft)	270 mm (11 in)	5 mm (0.2 in)	32.7

Table 3-2: Mast dimensions without braces

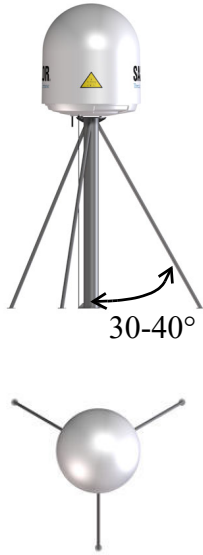
Mast with 3 braces	Max. free mast length (steel), (m)	Outer Diameter (mm)	Wall Thickness (mm)	Outer Diameter for brace (mm)	Thickness for brace (mm)
	1.2	140	10	50	5.0
	1.2	200	5	50	5.0
	1.6	140	10	70	5.0
	1.6	200	5	70	5.0
	2	160	10	70	5.0
	2	220	5	70	5.0
	2.5	180	10	80	5.0
	2.5	220	5	80	5.0

Table 3-3: Mast dimensions with 3 braces


Mast with 2 braces	Max. free mast length (steel), (m)	Outer Diameter (mm)	Wall Thickness (mm)	Outer Diameter for brace (mm)	Thickness for brace (mm)
	1.2	160	10	80	5.0
	1.2	200	5	80	5.0
	1.6	180	10	80	5.0
	1.6	220	5	80	5.0
	2	180	10	80	5.0
	2	240	5	80	5.0
	2.5	200	10	80	5.0
	2.5	260	5	80	5.0

Table 3-4: Mast dimensions with 2 braces

3.2.7 Interference from radar, GPS, L-band and other transmitters

Note Do not place the ADU close to interfering signal sources or receivers. We recommend to test the total system by operating all equipment simultaneously and verifying that there is no interference.

Mount the ADU as far away as possible from the ship's radar and high power radio transmitters, because they may compromise the ADU performance. RF emission from radars might actually damage the ADU.

The SAILOR 900 Viasat Ka ADU itself may also interfere with other radio systems.

Radar

It is difficult to give exact guidelines for the minimum distance between a radar and the ADU because radar power, radiation pattern, frequency and pulse length/shape vary from radar to radar. Further, the ADU is typically placed in the near field of the radar ADU and reflections from masts, decks and other items near the radar vary from ship to ship.

However, it is possible to give a few guidelines:

1. Since a radar radiates a fan beam with a horizontal beam width of a few degrees and a vertical beam width of up to $\pm 15^\circ$, you can avoid the worst interference by mounting the ADU at a different level – meaning that the ADU is installed minimum 15° above or below the radar antenna.
Due to near field effects the benefit of this vertical separation could be reduced at short distances (below approximately 10 m) between radar antenna and the SAILOR 900 Viasat Ka ADU.
2. Provide as much vertical separation as possible when the SAILOR 900 Viasat Ka ADU has to be placed close to a radar antenna.

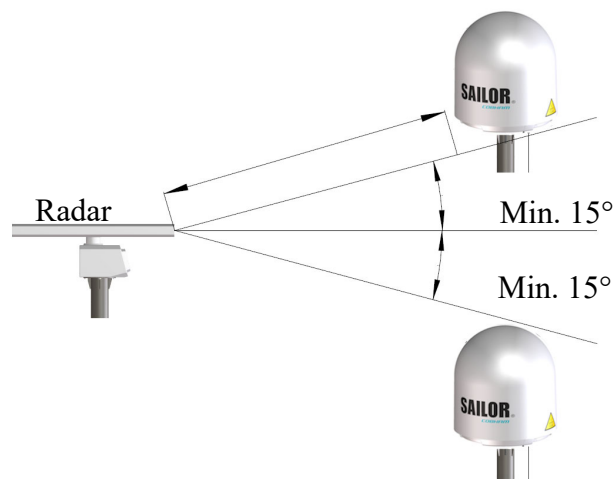


Figure 3-9: Interference with the vessel's radar

Radar distance

The minimum acceptable separation ($d_{min.}$) between a radar and the ADU is determined by the radar wavelength/frequency and the power emitted by the radar. The tables below show some “rule of thumb” minimum separation distances as a function of radar power at X and S band. If the $d_{min.}$ separation listed below is applied, antenna damage is normally avoided.

“ $d_{min.}$ ” is defined as the shortest distance between the radar antenna (in any position) and the surface of the SAILOR 900 Viasat Ka ADU.

X-band (~ 3 cm / 10 GHz) damage distance		
Radar power	SAILOR 900 Viasat Ka ADU	
	$d_{min.}$ at 15° vertical separation	$d_{min.}$ at 60° vertical separation
0 – 10 kW	1.0 m (3.3 ft)	1.0 m (3.3 ft)
30 kW	2.0 m (6.6 ft)	1.0 m (3.3 ft)
50 kW	3.3 m (10.8 ft)	1.7 m (5.6 ft)

Table 3-5: Minimum radar separation, X-band

S-band (~ 10 cm / 3 GHz) damage distance		
Radar power	SAILOR 900 Viasat Ka ADU	
	$d_{min.}$ at 15° vertical separation	$d_{min.}$ at 60° vertical separation
0 – 10 kW	2.0 m (6.6 ft)	1.0 m (3.3 ft)
30 kW	3.0 m (9.8 ft)	1.5 m (4.9 ft)
50 kW	5.0 m (16.4 ft)	2.5 m (8.2 ft)

Table 3-6: Minimum radar separation, S-band


The separation distance for C-band (4-8 GHz) radars should generally be the same as for SX-band radars.

Radar interference

Even at distances greater than “ $d_{min.}$ ” in the previous section the radar might still be able to degrade the performance of the SAILOR 900 Viasat Ka system. The presence of one or more S or X-band radars within a radius up to 100 m may cause a minor degradation of the Ka-band connection. The degradation will be most significant at high radar pulse repetition rates. As long as receiving conditions are favourable, this limited degradation is not important. However, if receiving conditions are poor – e.g. due to objects blocking the signal path, heavy rainfall or icing, low satellite elevation and violent ship movements – the small extra degradation due to the radar(s) could cause poor connection quality.

The presence of S-band radar(s) is unlikely to cause any performance degradation – as long as the minimum distances ($d_{min.}$) listed in the previous section are applied.

It is strongly recommended that interference-free operation is verified experimentally before the installation is finalized. If radar interference is suspected, or the antenna is placed inside the radar beam, configure the radar to have a blanking zone to avoid transmission towards the antenna.



CAUTION! The ADU must never be installed closer to a radar than “d min.” - even if experiments show that interference free operation can be obtained at shorter distances than “d min.” in the previous section.

GPS receivers

Good quality GPS receivers work properly very close to the ADU - typically down to one meter outside the main beam.

L-band antennas

If L-band antennas are installed on the same vessel, keep a minimum distance of 3 meters from the SAILOR 900 Viasat Ka ADU to the L-band antenna.

Other transmitters

See the following figure for minimum recommended distance to transmitters in the frequency range below 1000 MHz.

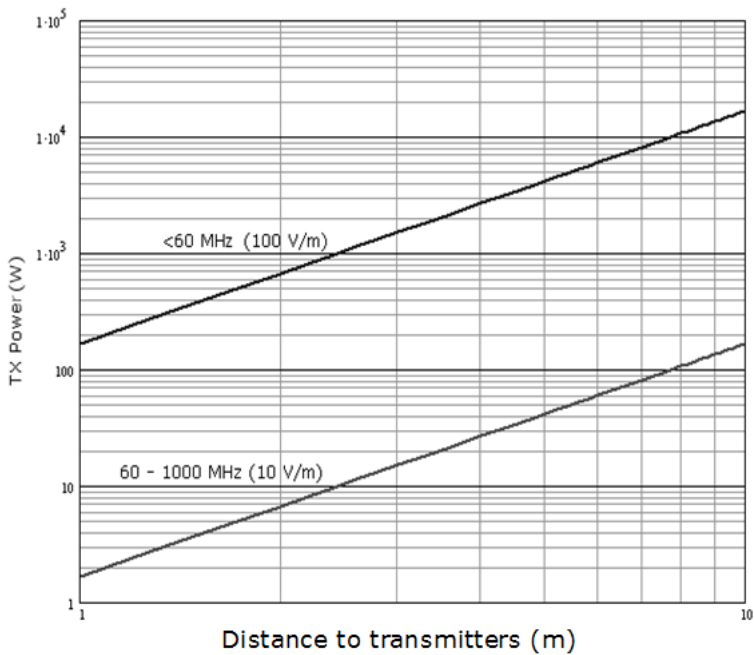


Figure 3-10: Recommended distance to transmitters (m) for frequencies below 1000 MHz

3.2.8 Condensation, water intrusion and deposits

In some weather conditions there may occur condensation inside the radome. The drain tube is designed to lead any water away from inside the radome.

Observe the following guidelines for condensation and water intrusion:

1. If possible, install the radome such that direct spray of seawater is avoided.
2. Make sure the ADU's drain tube is open and that there is free space between the drain tube and the mounting surface so water can escape and there is ventilation for the ADU.



Figure 3-11: Drain pipe with free space

3. Do not use pneumatic tools for cleaning the radome, especially at a short distance and directly at the split between top and bottom.
4. Do not place the ADU close to a funnel, as smoke deposits are corrosive. Furthermore, deposits on the radome can degrade performance.

3.3 Installation of the ADU

3.3.1 Prerequisites

- Ensure that the crane hook has a closing mechanism to prevent accidental slippage of the lifting straps.
- Check for potential interference, read more in *Interference from radar, GPS, L-band and other transmitters* on page 3-12.
- Install the ADU at a location where **vibrations are limited to a minimum**.

3.3.2 Overview

The ADU is shipped fully assembled. You have to install it on the mast and attach the ADU cable.



WARNING! Use a strong webbed sling with a belt to lift the ADU without damaging the radome. Make sure that the sling is approved for lifting of ADUs with a weight of up to 135 kg.



WARNING! The ADU may be subject to swaying motions in windy conditions. Always use tag lines to stabilise the ADU during hoisting. It is the crane operator's responsibility to determine whether the environmental conditions are suitable for a safe lift.

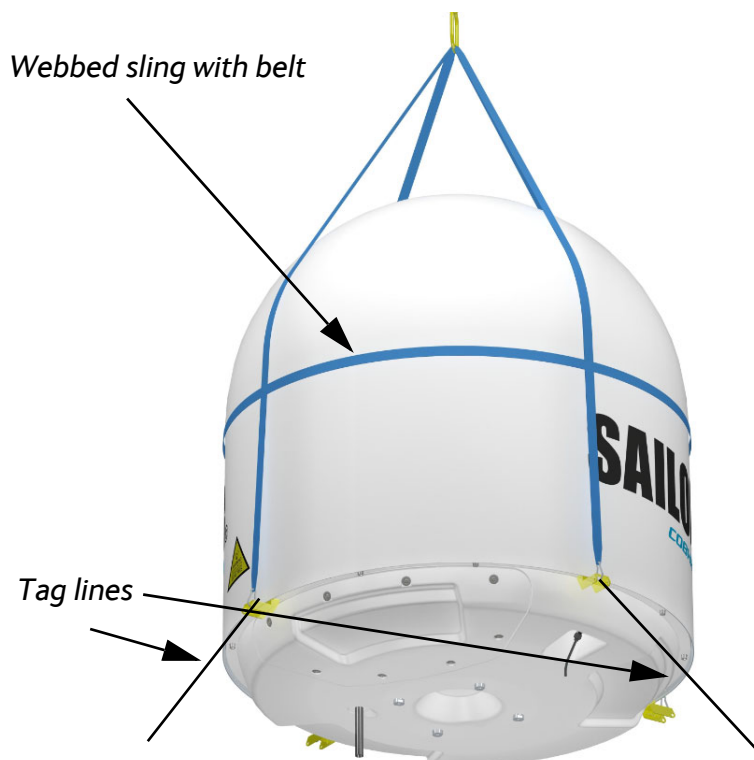


Figure 3-12: Use of strong sling with a belt and tag lines for safe hoisting

3.3.3 To install the ADU

Prerequisites

Make sure that there is sufficient space underneath the ADU to open the service hatch. Through this hatch you access the ADU modules for service and maintenance.



Figure 3-13: Free space for access to the service hatch

- It is important to maintain **vertical orientation of the ADU center line**.
- Maximum allowed cable loss ≤ 20 dB at 1675 MHz. This is to ensure optimum performance of the system.

Installation procedure

To install the ADU, do as follows:

1. Install the mast with the mast flange and have the 4 M12 bolts ready.
2. Undo all shipping buckles, take off the wooden top and remove the casing.
3. Remove the wooden platform.
4. Attach a webbed, four-part sling with a belt to all 4 lifting brackets.



Figure 3-14: ADU installation, webbed sling attached to the 4 lifting brackets

5. Attach two tag lines of suitable length to 2 lifting brackets and man them.
6. With a crane lift the ADU off the wooden platform and move it on top of the mast. Maintain **vertical orientation of the ADU center line**.
7. Install the ADU on the mast flange with 4 M12 bolts and washers.
Tightening torque value: 30 Nm.
Always use **all 4 bolts** when installing the ADU.
8. Read carefully and follow instructions given in the next section on grounding.



Figure 3-15: Mounting the ADU on the mast flange

9. Attach the N connector of the ADU cable to the ADU and fasten it with 2.5 Nm

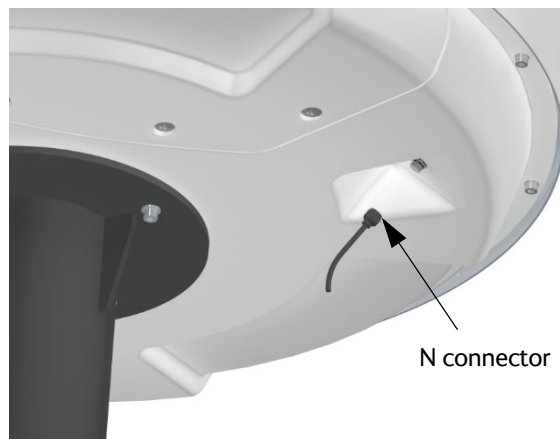


Figure 3-16: Connecting the ADU cable

10. Ensure that the connector is properly protected against seawater and corrosion. As a minimum, wrap it with self-amalgamating tape.
11. Where the cables are exposed to mechanical wear – on deck, through bulkheads, etc. – protect the cables with steel pipes. Otherwise, follow standard procedures for cabling in ship installations.

3.3.4 To open the service hatch

Through the service hatch you can access the antenna modules. You can remove the hatch for better mobility when servicing the antenna.



Figure 3-17: To open the service hatch

To open the service hatch in order to access the antenna modules do as follows :

1. With a Torx TX 30 screw driver loosen carefully the 8 screws that keep the hatch in place.
2. Lower the service hatch and let it hang in the 2 strips.

Pull the service hatch free. The service hatch weighs approx. 2.5 kg. Now you can access the pedestal through the hatch.

3.3.5 To ground the ADU

The ADU must be grounded using one of the mounting bolts.

To ground the ADU do as follows:

1. Clean the metal underneath the head of **at least** one bolt of insulating protective coating and use a serrated washer to obtain a good ground connection
2. Tighten the bolt. Use stainless steel bolts and washers.
Tightening torque value: 30 Nm.
3. Seal the area suitably to avoid corrosion of the grounding point (recommended).

For optimum grounding connect the ground wire to the bolt marked in the figure below.

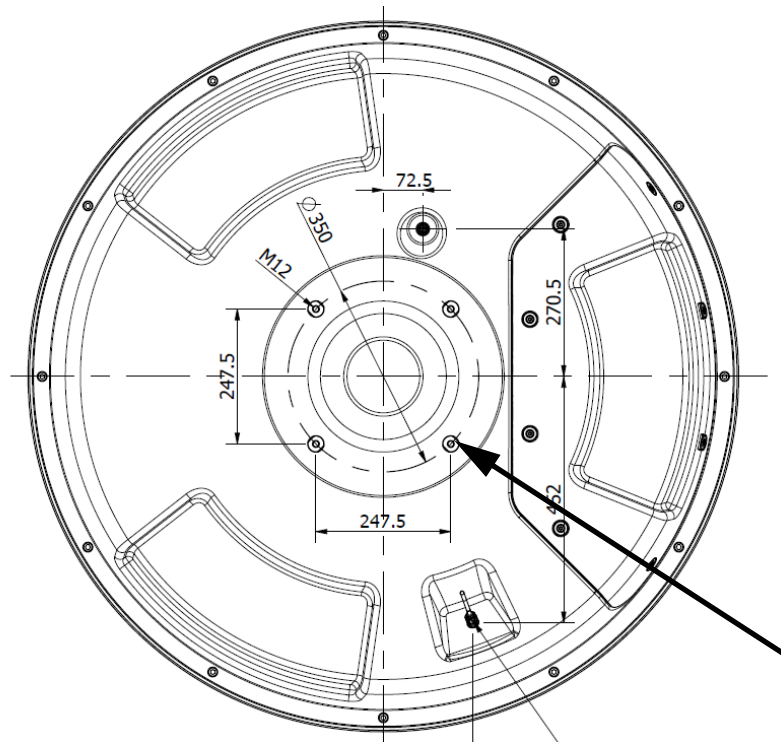


Figure 3-18: ADU, thread for optimum grounding

If the ADU cannot or should not be electrically connected directly to the mounting surface, you can use a separate grounding cable to make the connection between the ADU and the common ground to which the ACU is also connected. If grounding to the ship ground is impossible, for example if you have a fibre glass hull, see *Alternative ground for fibre glass hulls* on page B-7. For further information on grounding and RF protection see the appendix *Ground and RF protection* on page B-1.

3.3.6 Alternative ADU cable

In the ADU cable, the maximum allowed RF loss is 20 dB RF loss @ 1675 MHz.

You can verify the cable attenuation margin with the cable calibration, see on page 6-12 for more details.

The DC-resistance loop of the antenna cable must be maximum 0.9 Ohm. This is to ensure the power requirements from ACU to the antenna and to ensure the performance of the system. Preferably choose one of the cable types listed in the table below.

Cable type	Thickness	Absolute max. length (m)	Absolute max. length (ft)
RG214	3/8"	50 m	160 ft
LMR-400-DB	0.405"	85 m	280 ft

Table 3-7: ADU cable types and maximum lengths

Cable type	Thickness	Absolute max. length (m)	Absolute max. length (ft)
LMR-600-50	1/2"	150 m	490 ft
LDF4.5-50 Andrew	5/8"	270 m	810 ft

Table 3-7: ADU cable types and maximum lengths (Continued)

If you want to use an alternative ADU cable make sure that the following requirements are fulfilled:

1. Check the data sheet from the cable supplier to verify the values:
 The RF-attenuation and the DC-resistance are below the maximum values specified below:
 - ADU cable RF-attenuation at 1675 MHz: Max. 20 dB including connector.
 - ADU cable modem-attenuation at 36 and 54 MHz: Max. 4 dB
 - ADU cable loop DC-resistance max: 0.9 Ohm.
2. Respect the specified minimum bending radius, see the documentation from the cable supplier. If this is not the case, the loss in the cable will increase.

3.4 Installation of the ACU

The following sections describe the installation and grounding of the ACU.

3.4.1 To install the ACU

To install the ACU, do as follows:

1. Slide the ACU into a 1U space in a 19" rack.
2. Mount the screws in each side through the holes in the front and fasten the screws to the rack. Make sure that the unit is mounted securely according to the requirements for your 19" rack.

Important

Make sure that the ventilation grills at the sides of the unit are not blocked.

3. Connect all cables. See *Interfaces of the ACU* on page 4-1 for a description of the ACU connectors.

For information about power source and power cable requirements see *Power and start up* on page 5-1.

3.4.2 To ground the ACU

To ground the ACU do as follows:

1. Make sure that the grounding requirements are met. See the appendix *Ground and RF protection* on page B-1 for details about grounding.
2. At the ACU end, connect the shield of the ADU cable to ship ground.
3. Make sure that the rack is connected to ship ground.
4. To ensure that the ACU is grounded – also if the ADU cable is disconnected from the ACU, connect an extra ground wire from the rack to the ground stud on the ACU. This ground wire must be a heavy wire or braid cable with a larger diameter than the coax cable.

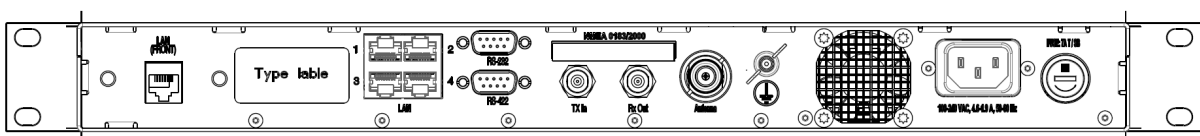


Figure 3-19: Ground stud, ACU

3.5 Installation of the PIU

The following sections describe the installation and grounding of the PIU.

3.5.1 To install the PIU

To install the PIU do as follows:

1. Slide the PIU into a 1U space in a 19" rack.
2. Mount the screws in each side through the holes in the front and fasten the screws to the rack.
3. Make sure that the unit is mounted securely according to the requirements for your 19" rack.
4. Connect cables as shown in the figure *Connection between ADU, ACU and PIU* in figure 3-21.

3.5.2 To ground the PIU

To ground the PIU do as follows:

1. Make sure that the grounding requirements are met. See the appendix *Ground and RF protection* on page B-1 for details about grounding.
2. You must ground the ADU cable (coax cable, with an N connector at both ends) at the PIU end. Use a short cable from the PIU to a grounding point in the rack and connect the short cable to the ADU cable at this grounding point.
3. Make sure that the shield of the connector is properly connected to the rack.
4. To ensure that the PIU is grounded – also if the ADU cable is disconnected from the ACU, connect an extra ground wire from the rack to the ground stud on the PIU. This ground wire must be a heavy wire or braid cable with a larger diameter than the coax cable.

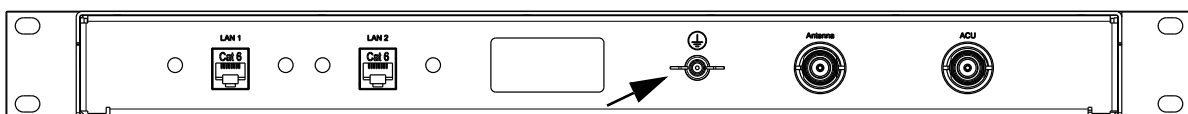


Figure 3-20: Ground stud, PIU

3.6 To connect the ADU, ACU and PIU

The following sections show how to connect the ADU, ACU and the PIU.

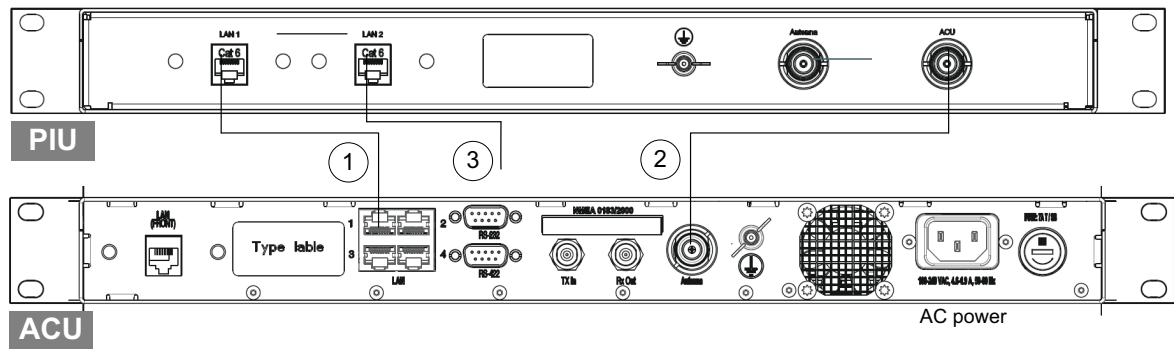


Figure 3-21: Connection between ADU, ACU and PIU

1. Connect **LAN1** at the ACU to LAN1 at the PIU.
2. Connect the antenna cable to the connector marked **Antenna** at the ACU and the connector marked **ACU** at the PIU.
3. Connect a PC at the **LAN2** interface of the PIU for access to the web interface for configuration or Internet (user data)

Interfaces

This chapter has the following section:

- *Interfaces of the ACU*
- *Interfaces of the PIU*

4.1 Interfaces of the ACU

4.1.1 LEDs, display, keypad and connectors

The following figure shows the LEDs, display and the keypad of the ACU. For an explanation of the texts in the display see *ACU display and keypad* on page 6-24.



Figure 4-1: ACU: LEDs, display and keypad (detailed, example)

The following figure shows the connector panel of the ACU.

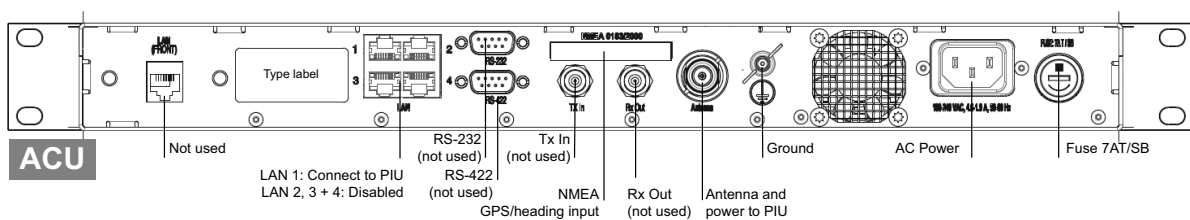


Figure 4-2: ACU (connector panel) with AC power

4.1.2 AC input connector

Connect the power cable to the AC power connector.

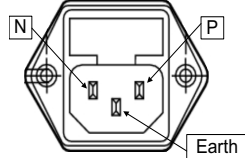
Outline (on the ACU)	Voltage range
	100–240 VAC

Table 4-1: AC power connector

4.1.3 ADU connector

The coax cable from the ACU to the PIU and ADU supplies DC power and handles all communication between ACU and ADU.

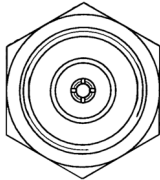
Outline (on the ACU)	Conductor	Pin function
	Inner	DC to ADU and the PIU reference clock to ADU ACU to ADU internal communication
	Outer	GND (Shield)

Table 4-2: N connector, outline and pin assignment

Important Do not use TNC connectors on the ACU, PIU and ADU antenna cable or on pigtailed. TNC connectors cannot carry the DC current for operating the ADU.

4.1.4 Rx In and Tx Out connectors

The ACU has an Rx Out and a Tx In connector.


Outline (on the ACU)	Pin number	Pin function
	1	Inner conductor
	2	Outer conductor: GND (Shield)

Table 4-3: F connector, Rx and Tx, outline and pin assignment

4.1.5 NET-H (NMEA 0183¹ connector, for future use)

The ACU has an NMEA 0183 connector for the ship's gyro.


Outline (on the ACU)	Pin	Pin function	Wire color
	1	Not connected	–
	2	NET-H (NMEA 2000)	White
	3	NET-L (NMEA 2000)	Blue
	4	NET-S (NMEA 2000)	Red
	5	NET-C (NMEA 2000)	Black
	6	Not connected	–
	7	RS-232 RX (NMEA 0183)	–
	8	RS-232 GND RS-422 shield, connect only one end.	
	9	RS-422 Line B (+) NMEA 0183	
	10	RS-422 Line A (-) NMEA 0183	
	11	Not connected	–

Table 4-4: NMEA 0183/2000 connector, outline and pin assignment

1. Connect the pins according to the table above.

NMEA 0183

The NMEA 0183 connection supports EN 61162-1 (baud rate 4800, format 8N1) and EN 61162-2 (baud rate 38400, format 8N1). The ACU detects the baud rate automatically, you cannot configure this interface.

Supported NMEA sentences, in order of priority:

- HEHDT (North seeking Gyro compass)
- GPHDT (GPS compass)
- HNHDT (Non-North seeking gyro compass)
- IIHDT (Integrated Instrument)
- HCHDT (Magnetic compass)

Note Any HDT sentence is supported as long as it complies with the following header format: "\$xxHDT", where xx can be two characters e.g. IN for \$INHDT

Recommended NMEA 0183 cable: Two-wire constructed with one enclosed shield

Network signal pair:

1. (Hardware prepared for NMEA 2000, for future use). NMEA 2000 power: 9-16 VDC. NMEA 2000 LEN (Load Equivalency Number): 2 (100mA)

- Size: No. 24 AWG (0.24 sq. mm) or heavier
- Characteristic impedance: 95 - 140 Ohm
- Propagation delay: 5 nanoseconds per meter, maximum
- 15 Twists (minimum) per meter

4.1.6 RS-232 and RS-422 connectors

The ACU has an RS-232 and RS-422 connector. The connectors are not used in normal operation.

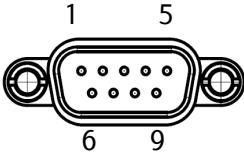
Outline (on the ACU)	Pin	Pin function
	1	Not connected
	2	RXD
	3	TXD
	4	DTR
	5	Ground
	6	DSR
	7	RTS
	8	CTS
	9	Receive Signal Strength Indicator

Table 4-5: RS-232 connector, male, outline and pin assignment, ACU

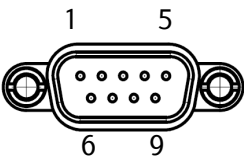
Outline (on the ACU)	Pin	Pin function
	1	Ground
	2	Line A RXD (+)
	3	Line B TXD (+)
	4	Ground
	5	Ground
	6	Not connected
	7	Line A RXD (-)
	8	Line B TXD (-)
	9	Not connected

Table 4-6: RS-422 connector, male, outline and pin assignment, ACU

4.1.7 LAN1 – 4 connectors

The ACU has four Ethernet connectors (type RJ45). The Ethernet interface is defined by IEEE802-3 for operation in 10Base-T and 100Base-TX modes with the exception of the connector type. Cabling for Ethernet connectivity must meet ANSI/TIA/EIA-568-A. The maximum cable length per connection is 100 m. The Ethernet cable type must be CAT5, shielded.

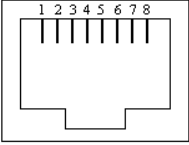
Outline	Pin	Pin function	Wire color
	1	Tx+	White/orange
	2	Tx-	Orange
	3	Rx+	White/green
	4	Not connected	Blue
	5	Not connected	White/blue
	6	Rx-	Green
	7	Not connected	White/brown
	8	Not connected	Brown

Table 4-7: Ethernet connector, outline and pin assignment

1. Connect an Ethernet cable to Port 1 at the ACU and to the LAN1 connector at the PIU. LAN2, LAN3 and LAN4 at the ACU are disabled.

4.2 Interfaces of the PIU

The following sections describe the connectors of the PIU.

4.2.1 Connector panel

The following figure shows the connector panel of the PIU.

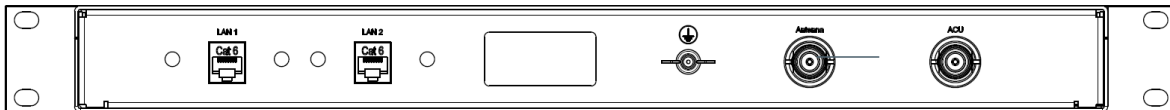


Figure 4-3: Connector panel of the PIU

4.2.2 Connectors to antenna and ACU

The PIU has an antenna connector and a connector to connect to the ACU. Both connectors are N Female type.


Outline (on the PIU)	Pin number	Pin function
	1	Inner conductor: Antenna communication, MoCA and DC power
	2	Outer conductor: GND (Shield)

Table 4-8: N connector, for antenna and ACU, outline and pin assignment

4.2.3 2 LAN connectors

The PIU has 2 Ethernet connectors (type RJ45). LAN 1 connects to the ACU on LAN port 1. LAN 2 is used to connect a user PC for configuration and Internet access. The maximum cable length per connection is 100 m. The Ethernet cable type must be CAT5, shielded. For outline and pin allocation see table 4-7 on page 4-5.

Power and start up

This chapter has the following section:

- *Power-up procedure*

5.1 Power-up procedure

1. Connect power to the ACU.
2. Switch on the ACU. The unit starts up and goes through an initialization procedure:
 - ACU POST
 - ADU Initializing
 - ADU POST
 - READY

This may take some time (up to a couple of minutes).

3. The SAILOR 900 Viasat Ka is ready to be calibrated (for first time power up) or receive data from the built-in Viasat PIU (when in normal operation).
The LEDs **Power** and **Fail/Pass** are **steady green**, the LED **Logon** is off. For further information on status indicators see *Status signalling with LEDs and status messages* on page 8-12.
Make sure there are no hardware failures or error codes shown in the display of the ACU. For more information on error codes and events see *System messages* on page C-1.
4. Make an azimuth and a cable loss calibration, see *Heading input and position system* on page 6-8.
For more detailed step-by-step instructions, see the chapter *Configuration* on page 6-1.

5.1.1 Initialisation steps in daily use

Once the system is configured and a satellite profile is active, the startup sequence is as follows:

- ACU POST
- ADU Initializing
- ADU SW upload (If the software versions in the ADU and ACU are not the same, a software update is done during startup.)
- ADU POST
- READY
- POINTING ANTENNA
- ACQUIRING SIGNAL
- TRACKING

5.1.2 SAILOR 900 Viasat Ka operational

When the display shows **TRACKING. MDM: NETOK** and the LED **Logon** is steady green the system is operational.



Figure 5-1: ACU: LEDs, display and keypad (detailed, example)

Configuration

This chapter has the following sections:

- *Introduction to the built-in web interface*
- *Heading input and position system*
- *Calibration*
- *Configuration with the web interface*
- *Keypad and menus of the ACU*

6.1 Introduction to the built-in web interface

6.1.1 Overview

For quick start instructions see *Heading input and position system* on page 6-8.

The built-in web interface of the SAILOR 900 Viasat Ka terminal provides operational and status information regarding the modem, antenna, and installation configuration. The web interface uses HTTPS protocol for connection with the platform interface devices. It may be accessed by using the latest released version of the Google Chrome™ or Firefox® browsers (state which will be supported). Installation of software is not necessary. Accessing the web interface is described below.

Important

The SAILOR 900 Viasat Ka system is not designed to be connected directly to the Internet. It must be located behind a dedicated network security device such as a fire wall.

If any ports of the SAILOR 900 Viasat Ka are exposed to the Internet you must change the default passwords as anyone with access and malicious intent can render the SAILOR 900 Viasat Ka inoperable.

6.1.2 Connecting to the terminal web interface

To connect to the web interface of the terminal do as follows:

1. Switch on the ACU.
2. Wait until the LEDs on the front plate of the ACU show that the system is ready to be configured.
 - Power LED: Green
 - Logon LED: Off
 - Fail/Pass LED: Flashing green during power-on self test, after that steady green.
3. Connect a PC to LAN port 2 of the PIU.

4. Configure a laptop for use on this same LAN as the PIU by setting the laptop's network settings for Dynamic Host Configuration Protocol (DHCP).
5. Launch the web browser Mozilla Firefox on the support PC.
6. At the web browser's address entry field, enter the modem's IP address (i.e., `http://192.168.100.1`) and press <Enter>.

When the **Home Page** is displayed you have verified that the connection to the SAILOR 900 Viasat Ka can be established. The web interface is ready for use.

The terminal web interface has the following tabs:

- Antenna
- Modem

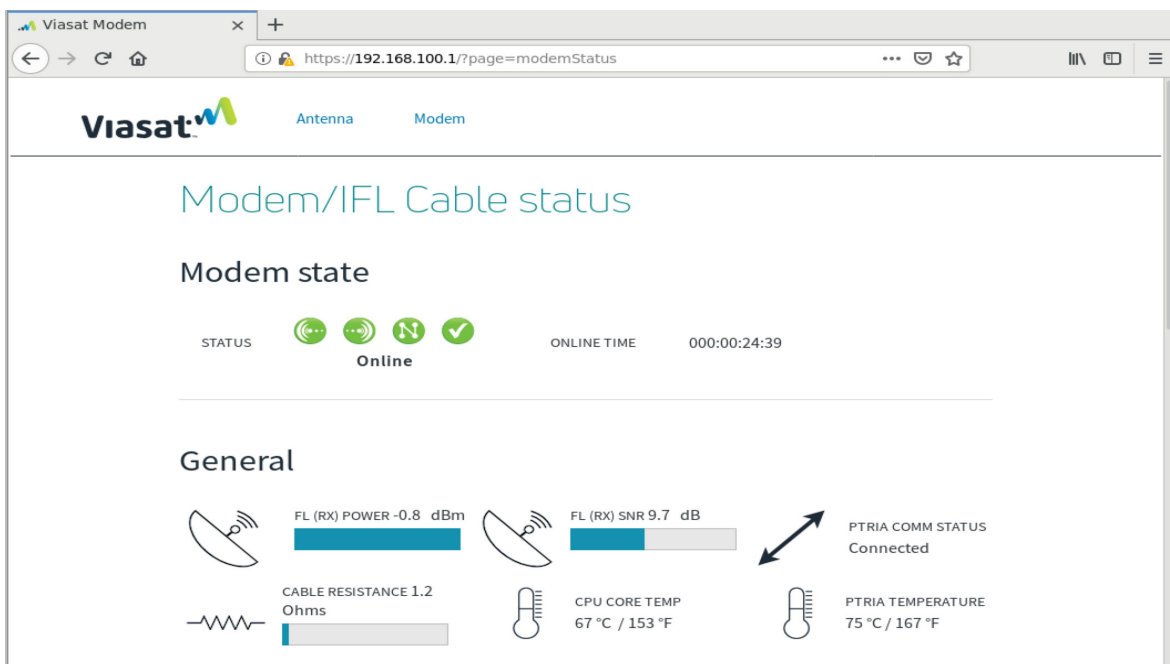


Figure 6-1: Terminal Modem/IFL Cable status 1/2

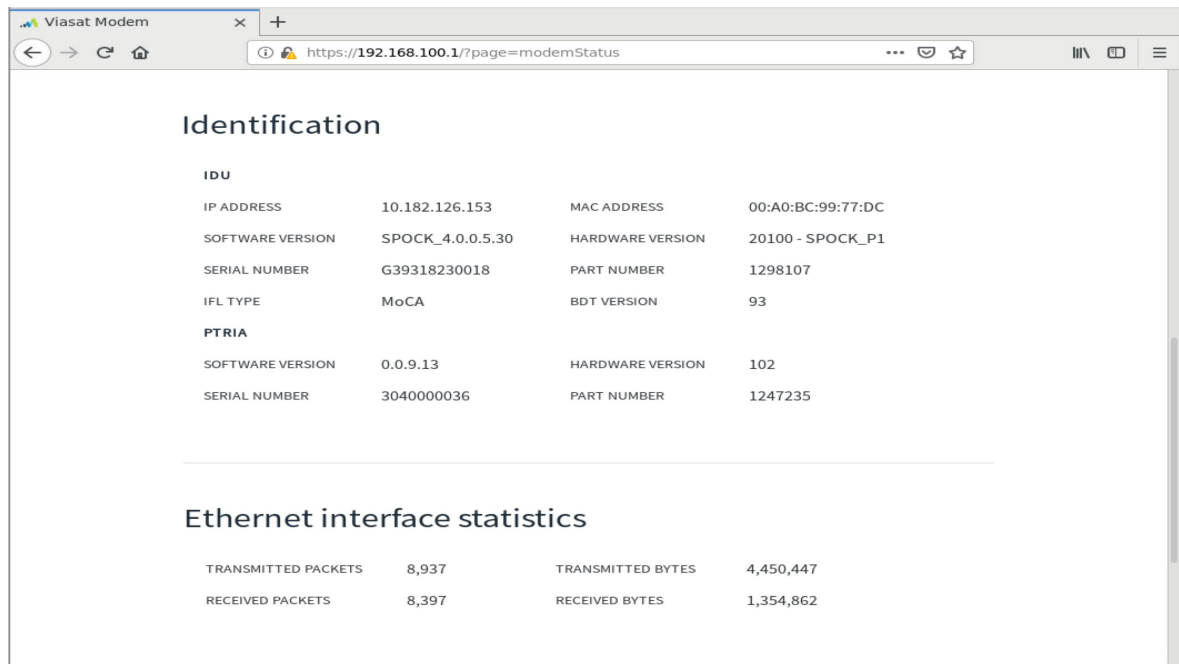


Figure 6-2: Terminal Modem/IFL Cable status 2/2

The modem page displays the modem's current operating state.

Modem State

Modem: Displays the status of the modem (see Table 6-1 on page 6-4 for icon details).

- Scanning: The modem is scanning or attempting to connect
- Syncing: The modem is syncing with the network and antenna
- Synched: The modem synched correctly
- Ranging / Ranged: The modem is configuring operating ranges
- Network Entry: The modem is gaining access to the ACU
- DHCP: The modem is configuring itself to connect with the network
- Online: The modem is connected to the network and online

Online Time: Displays the duration of time the modem has been online.

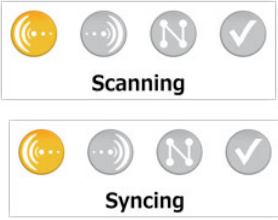
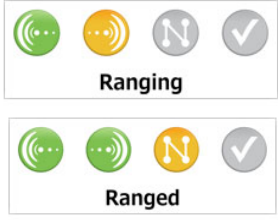


Modem Status Icons		
Function	Status	Description
Forward Link (First Icon)	 <p>The Scanning status shows a yellow icon with three dots and a gray icon with a checkmark. The Syncing status shows a yellow icon with three dots and a gray icon with a checkmark.</p>	<p>Yellow = Indicates the modem is initiating a Forward Link connection.</p> <ul style="list-style-type: none"> “Scanning” means that the process has just initiated “Syncing” means that the process is nearing completion <p>Green = Indicates the modem has established a Forward Link connection.</p>
Return Link (Second Icon)	 <p>The Ranging status shows a green icon with three dots and a yellow icon with a checkmark. The Ranged status shows a green icon with three dots and a yellow icon with a checkmark.</p>	<p>Gray = Indicates that there is no Forward Link or that the Return Link is disabled (several minute may pass before the icon changes color).</p> <p>Yellow = Indicates the modem is initiating a Return Link connection (several minute may pass before the icon changes color).</p> <p>Green = Indicates the modem has established a Return Link connection.</p>
Network (Third Icon)	 <p>The Network Entry status shows a green icon with three dots and a yellow icon with a checkmark.</p>	<p>Gray = Indicates that there is no Link connection or the Network Entry is disabled (several minute may pass before the icon changes color).</p> <p>Yellow = Indicates the modem is initiating a network connection (several minute may pass before the icon changes color).</p> <p>Green = Indicates the modem has established a network connection.</p>
DHCP (Fourth Icon)	 <p>The DHCP status shows a green icon with three dots and a yellow icon with a checkmark.</p>	<p>Gray = Indicates that there is no Link connection or the DHCP acquisition is disabled (several minute may pass before the icon changes color).</p> <p>Yellow = Indicates the modem is requesting an IP address from a Gateway DHCP (several minute may pass before the icon changes color).</p>

Table 6-1: Icons for Modem state



Modem Status Icons		
Function	Status	Description
Online (All Icons)		<p>Green = Indicates the modem is online and should connect to the internet; however, if the system cannot connect to the internet:</p> <ul style="list-style-type: none"> • Reboot the modem (may take multiple attempts) • Contact the NOC if the first several attempts did not correct the issue
Fault		<p>Red = Indicates a fault has been detected or there is no communication's link.</p>

Table 6-1: Icons for Modem state (Continued)

General

Item	Description
Rx Power (dBm)	Displays the modem's power level.
Rx SNR (dB)	Displays the Signal to Noise Ratio.
PTRIA Comm Status	Displays if the modem is collecting and transmitting data with the pTRIA.
Cable resistance (dB)	Displays round-trip resistance between the Modem and pTRIA.
Temperature (°C)	Displays the pTRIA's operation temperature.

Table 6-2: Items in the section **General**

Identification

Item	Description
IP Address	Displays the modem's IP address.
Software Version	Displays the modem's software version.
Serial Number	Displays the modem's serial number.
BDT Version	Displays the modem's Beam Data Table version.
MAC Address	Displays the modem's Media Access Control (MAC) address.
Hardware Version	Displays the modem's hardware version.
Part Number	Displays the modem's part number.

Table 6-3: Items in the section **Identification**

Ethernet Interface Statistics

Item	Description
Transmitted Packets	Displays the number of transmitted IP packets.
Received Packets	Displays the number of received IP packets.
Transmitted Bytes	Displays the number of bytes transmitted to the modem.
Received Bytes	Displays the number of bytes received by the modem.

Table 6-4: Items in the section Ethernet Interface Statistics

To access ACU configuration and status, click on the "Antenna" tab.

First time login as administrator

For a new installation you must set the ACU into local administration and set the admin password. This is also the case after a factory default. Do as follows:

1. On the ACU keypad, push and hold the left arrow key for 5 seconds.
2. Wait for the very short display of **Local administration**, followed by the event text: **0807F-0 WARNING Local administration enabled**. This will give you temporary administrator access **for 1 hour or until next restart**.
3. Open your browser and access the web interface.
4. Enter user name: **admin** (no password is required). The **DASHBOARD** is displayed.

Note

Accessing the ACU with the local administration function does not change the current administrator password.

5. To create or change the password select **ADMINISTRATION > User login** and locate the section **Change Login**.
6. Type in the new password (minimum 8 characters) and click **Change**. No old password is required.

After 1 hour or a restart the new administrator password is required.

If you cannot establish a connection there might be problems with the Proxy server settings of your PC. See *Proxy server settings in your browser* on page 8-5 for further information.

The web interface shows the antenna **DASHBOARD** page.

The screenshot shows the COBHAM web interface dashboard. At the top right is the COBHAM logo. Below it, the text 'SAILOR Viasat Ka' is displayed. The main content area is divided into a left sidebar with navigation options and a main content area with system data.

Navigation Sidebar:

- DASHBOARD (selected)
- SETTINGS
- SERVICE
- ADMINISTRATION
- HELPDESK
- SITE MAP

Main Content Area:

DASHBOARD

GNSs position	55.79° N, 12.52° E	ACU part name	TT-7016C-00
Vessel heading	90.1°	Antenna part name	TT-7009F
Satellite profile	Viasat mpTRIA	ACU serial number	80563630
Satellite position	9.0° E	Antenna serial number	70090002
		Engineering version	47.11 build ulrik.jensen-1422
		POINTING	
		Azimuth, elevation geo	184.3° 26.6°
		Azimuth, elevation rel	93.5° 24.7°
		TX	
		BUC TX	On

MODEM

Model	Viasat mpTRIA
RX locked status	Locked
Status ⓘ	ONLINE

Figure 6-3: Dashboard

For a detailed introduction to the web interface see *Overview and dashboard* on page 6-13.

6.2 Heading input and position system

Before the SAILOR 900 Viasat Ka can be used you must select the heading input and the positioning system.

Important You must be logged on as an administrator. See *Administration* on page 6-20.

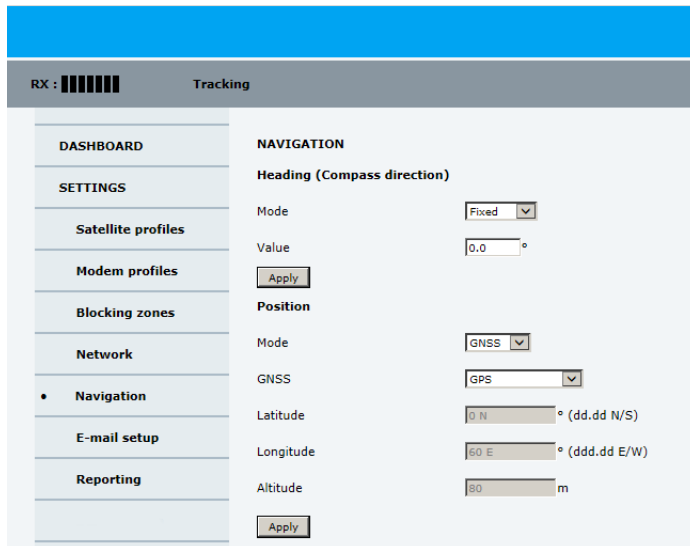


Figure 6-4: Web interface: SETTINGS, Navigation (example)

To set the heading input and the position system, do as follows:

1. Go to the page **SETTINGS > Navigation**.
2. Select the desired heading input, see the following table.

Heading input	Description
External	Heading input from the vessel's gyro compass (default). If there is no heading input due to failure, alarms are raised and the antenna continues in gyro-free mode. When heading input is available again and a new acquisition is made, alarms are cleared. See also <i>Operation in gyro-free mode</i> on page 6-12.
Fixed	Use this setting for making an azimuth if there is no input from the vessel's gyro compass and for permanent installations like remote areas or oil rigs, or during training and test. Important: Fixed heading is not allowed for sailing vessels! Enter the vessel heading in degrees.

Table 6-5: Heading input options

Heading input	Description
None	<p>Important: You must make an azimuth with Fixed before you can use this setting. This is required in order to be able to use blocking zones. After a successful azimuth and cable calibration you must change the heading input setting from Fixed to None.</p> <p>Select this setting after a successful azimuth calibration with Fixed heading if the system does not have input from the vessel's gyro compass. See also <i>Operation in gyro-free mode</i> on page 6-12.</p>

Table 6-5: Heading input options (Continued)

3. Click **Apply**.

Note If you change the heading settings from external to fixed or vice versa you must make a new azimuth calibration.

4. In the section **Position, Mode** select **GNSS System** or **Manual**. The **Manual** mode is used for fixed installations (fixed heading).

5. For **GNSS System**, select from **GPS, Beidou, GPS and Beidou, GPS and GLONASS**. The SAILOR 900 Viasat Ka uses GPS by default

6. For **Manual** enter the latitude, longitude and altitude.

7. Click **Apply**.

Note If you move outside coverage of the selected system, you will eventually lose connection to the satellite network. The **Position** field in the **Dashboard** of the web interface will show **Acquiring**.

About the acquisition process and search pattern

With heading input or fixed heading

1. The antenna starts the acquisition and searches for 10 seconds at the expected position. If RX lock is detected the antenna goes to Tracking.
2. If no RX lock is detected, a box search pattern is started and the positions where RF power can be received are stored.

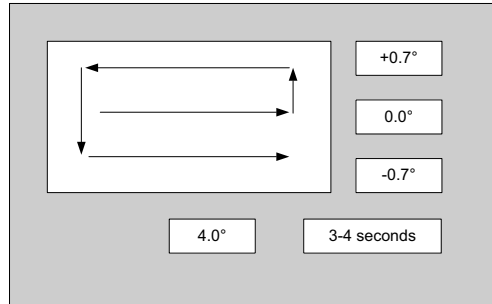


Figure 6-5: Acquisition, search pattern

3. The antenna checks each stored position for up to 10 seconds. If RX lock is detected for more than 20% of the time, the antenna goes to Tracking.

Without heading input and not fixed heading (Gyro-free)

1. A box search pattern is started and the positions with reception of RF power are checked for up to 10 seconds. If RX lock is detected for more than 20% of the time, the antenna goes to Tracking.

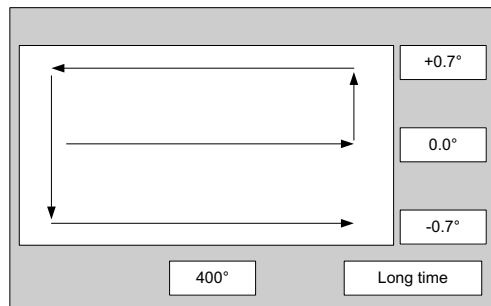


Figure 6-6: Acquisition, search pattern in gyro-free mode

6.3 Calibration

Before the SAILOR 900 Viasat Ka can be used you must make an azimuth calibration. The azimuth calibration is required in order to determine the offset of the ADU zero direction to the bow-to-stern line of the ship. This procedure is fully automatic. The satellite data for calibration can be entered directly on the calibration page or you can define a Service profile to be used for the azimuth calibration. After the calibration you can set up blocking zones for the specific installation.

Important

You must log on as an administrator to do a calibration. See *Administration* on page 6-20.

6.3.1 Azimuth calibration

Azimuth calibration is done toward a Viasat satellite. After finding the satellite, the system can calculate the azimuth offset of the ADU installation.

-

Automatic azimuth calibration with an active satellite profile

You can enable automatic azimuth calibration, even if there is no line of sight to an azimuth calibration satellite the place of installation. To be able to use this feature you must have made a valid satellite profile and activate it. When the vessel leaves the harbour and gets line of sight to the calibration satellite, the system automatically finds and tracks the satellite and makes the azimuth calibration. After a successful azimuth calibration the ACU will automatically disable the **Azimuth calibration (active satellite profile)** on the page **SERVICE > Calibration**.

1. Create a modem profile, see *VSAT modem profiles* on page 6-38.
2. Create a satellite profile, see *Satellite profiles* on page 6-37.
3. Click **SETTINGS** and **Activate** the satellite profile.

- Click **SERVICE > Calibration**.



Figure 6-7: Web interface: SERVICE, Calibration (example)

- Select **Enable** in the section **Azimuth calibration** (active satellite profile). To be able to use this feature there must be a valid satellite profile and you must activate it in **SETTINGS > Satellite profiles**.
- Click **Apply**.
- Switch on the PIU.

6.3.2 Operation in gyro-free mode

If input from a gyro compass is not available (Heading input: none), information from the GPS position is used when searching for a satellite. If the antenna does not have ship heading input from the vessel's gyro compass, the azimuth direction of the satellite is not known. In this case the antenna will start a 360 degrees sky scan and scan until it finds a satellite. The search time to find the satellite and start tracking is therefore increased considerably. If the ship is on a steady course and sails at a speed over ground above 5 kn, the system can use an estimated heading from the current GPS position. This will reduce the search time, but it will still be a longer search time than with heading input present.

If the system loses the signal from the satellite, for example due to blockage, and the duration of signal loss is longer than approximately 1 minute, the system without heading input must do a new sky scan to find the satellite when the antenna is out of blockage.

6.4 Configuration with the web interface

6.4.1 Overview and dashboard

Topics in the web interface

The site map gives an overview over the existing menus, submenus and topics. You can click on each menu in the site map to go directly to the page or display the respective submenu.

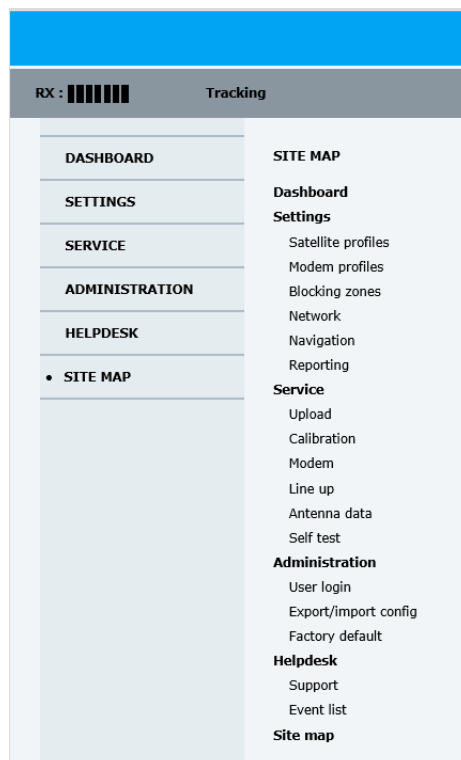


Figure 6-8: Topics in the antenna web interface (SITE MAP)

The **Dashboard** is the first screen that is displayed when the user or administrator enters the IP address of the web interface of the ACU and the user name and password. The Dashboard is used for viewing properties and status of the ACU and ADU.

The web interface has the following sections:

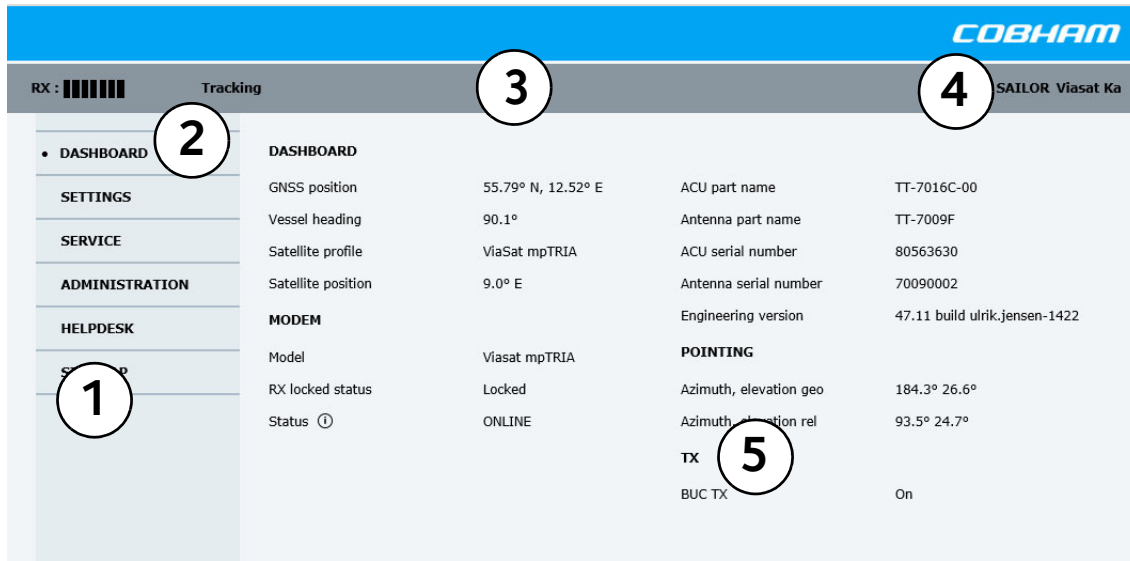


Figure 6-9: Antenna web interface: DASHBOARD of SAILOR 900 Ka

1. The navigation pane holds the main menu. Clicking an item in the menu opens a sub-menu in the navigation pane or a new page in the contents section.
2. The top bar shows the signal strength, current status and icons for events, if any, and the host name.
The signal status field shows the tracking signal strength of the antenna. The signal strength can vary during operation, depending on the current position relative to the satellite.
3. The icon bar shows icons for active events, when relevant. The host name is shown on every page of the web interface.
4. The host name is useful for identifying the system at remote login and when requesting reports from the system. The host name is recommended to contain the name of the vessel. To change the host name see *To configure the LAN network* on page 6-18.
5. The contents section shows the page selected in the navigation pane. This section is used for viewing or changing settings, or for performing actions.
For a description of the individual items in the contents section see *Sections on the Dashboard* on page 6-16.

The following icon may appear in the icon bar in the web interface:

Icon	Explanation
	An event is active. Click the icon to see a list of active events. For explanations of the event messages, see <i>Event messages – overview</i> on page C-1. Note that this icon will remain in the icon bar as long as the event is active.

Table 6-6: Web interface: Event icon

To navigate the antenna web interface

- **To expand a menu**, click the menu in the navigation pane.
- **To access status and settings**, click the relevant subject in the navigation pane or click the relevant icon in the icon bar. The status or settings are displayed in the contents section.
- **To get an overview over the submenus available**, click **SITE MAP** in the navigation pane. Click on items in the site map to go directly to the relevant location.

To access the antenna web interface

To access the antenna web interface do as follows:

1. Connect a PC to LAN interface 2 of the PIU.
2. Open your Internet browser and enter the IP address of the PIU (Default IP address: <http://192.168.100.1>).
3. Select/click the link to the ACU.

Status field in the icon bar

The top bar shows the current status of the antenna.

- **Antenna initializing**
- **Antenna SW upload**
- **Antenna POST error**
- **XIM data error**
- **Unrecoverable XIM data error**
- **System upgrade**
- **Antenna POST pending**
- **Antenna POST**
- **Safe Mode** (error, followed by an error description)
- **Ready** (waiting for data from the modem or no satellite profile selected)
- **Pointing antenna** (locating the satellite)
- **Acquiring signal** (acquiring the satellite signal)
- **Tracking** (tracks the current satellite)
- **Lineup** (line up is activated)
- **Azimuth calibration**
- **Test**
- **Not ready** (waiting for input from GNSS, e.g. GPS)
- **Not ready: Initializing**
- **Not ready: Need pos**
- **Blocking zone** (antenna is pointing into a blocking zone)

Sections on the Dashboard

DASHBOARD	Description
GNSS position	Current position of the vessel, reported by the GPS module
Vessel heading	Ship's heading in degrees with reference to North, provided by the ship's gyro.
Satellite profile	Name of the currently active satellite profile.
Satellite position	Position of the satellite selected in Satellite profile.
ACU part name, Antenna part name, ACU serial number, Antenna serial number, Software version	Part names, serial numbers for ACU and ADU, software version of the SAILOR 900 Viasat Ka.

Table 6-7: Web interface, DASHBOARD, first section

MODEM ^a	Description
Model	Modem name.
RX locked status	Terminal has acquired forward link signal.
TX allowed	Yes = Terminal is allowed to transmit No = Terminal is not allowed to send data over the satellite interface.

Table 6-8: Web interface, DASHBOARD, MODEM section

a. Items shown in this list may vary, they depend on the current modem.

POINTING	Description
Azimuth, elevation geo	Current value for azimuth, elevation, relative to the vessel heading.
Azimuth, elevation rel.	Current value for azimuth, elevation, relative to the vessel.

Table 6-9: Web interface, DASHBOARD, POINTING section

6.5 Satellite/modem profiles and blocking zones

A satellite profile is automatically loaded by the PIU. You may view the satellite profile by clicking on **Satellite profiles** or **Modem profiles**.

6.5.1 To set up blocking zones

You can define blocking zones by entering azimuth and elevation angles for each blocking zone. To enable a blocking zone you must select **Active**.

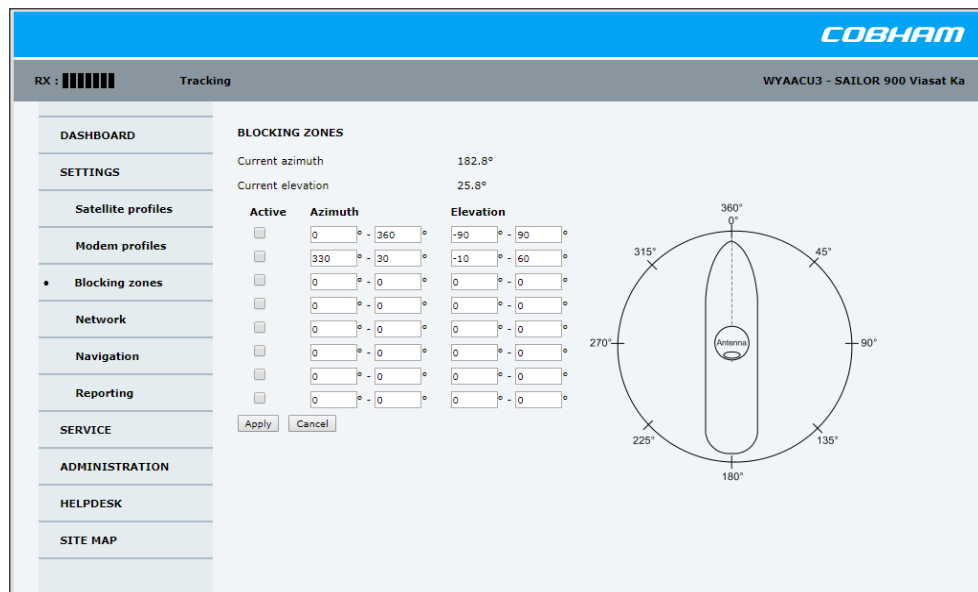


Figure 6-10: Web interface: SETTINGS, Blocking zones – azimuth, elevation

To define and set a blocking zone, do as follows:

1. Select **SETTINGS > Blocking zones**.
2. Select **Active** to enable the blocking zone.

3. Enter start and stop azimuth values in degrees for the blocking zone. Values allowed: 0 to 360 degrees. Enter clockwise.

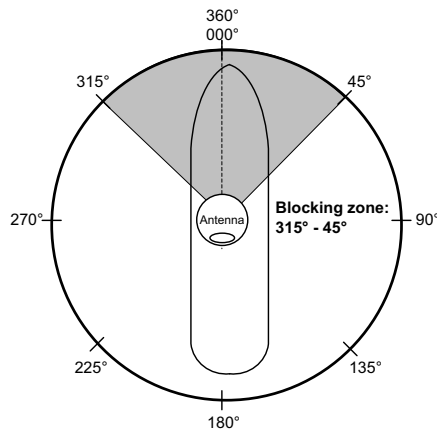


Figure 6-11: Blocking zone, example: 315 - 45 degrees

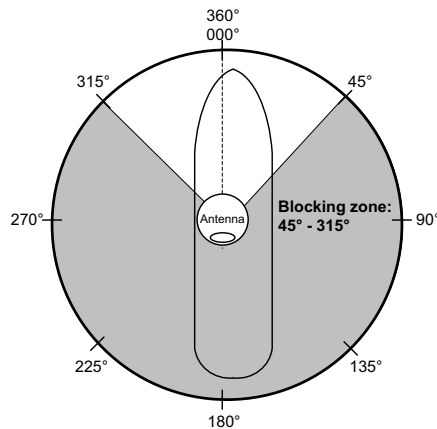


Figure 6-12: Blocking zone, example: 45 - 315 degrees

4. Enter the start and stop elevation angles for the blocking zone. If you enter nothing, there will be no blocking zone. Values allowed: -30 to 90 degrees.

Important You must enter 2 different elevation angles to have an active blocking zone.

5. Click **Apply** to save the blocking zones.

6.5.2 To configure the LAN network

On this page you can enter a host name. The host name helps identifying the SAILOR 900 Viasat Ka system.

Important The SAILOR 900 Viasat Ka system is not designed to be connected directly to the Internet. It must be located behind a dedicated network security device such as a fire wall.
If any ports of the SAILOR 900 Viasat Ka are exposed to the Internet you must change the default passwords as anyone with access and malicious intent can render the SAILOR 900 Viasat Ka inoperable.

To configure the LAN network go to **SETTINGS > Network**.

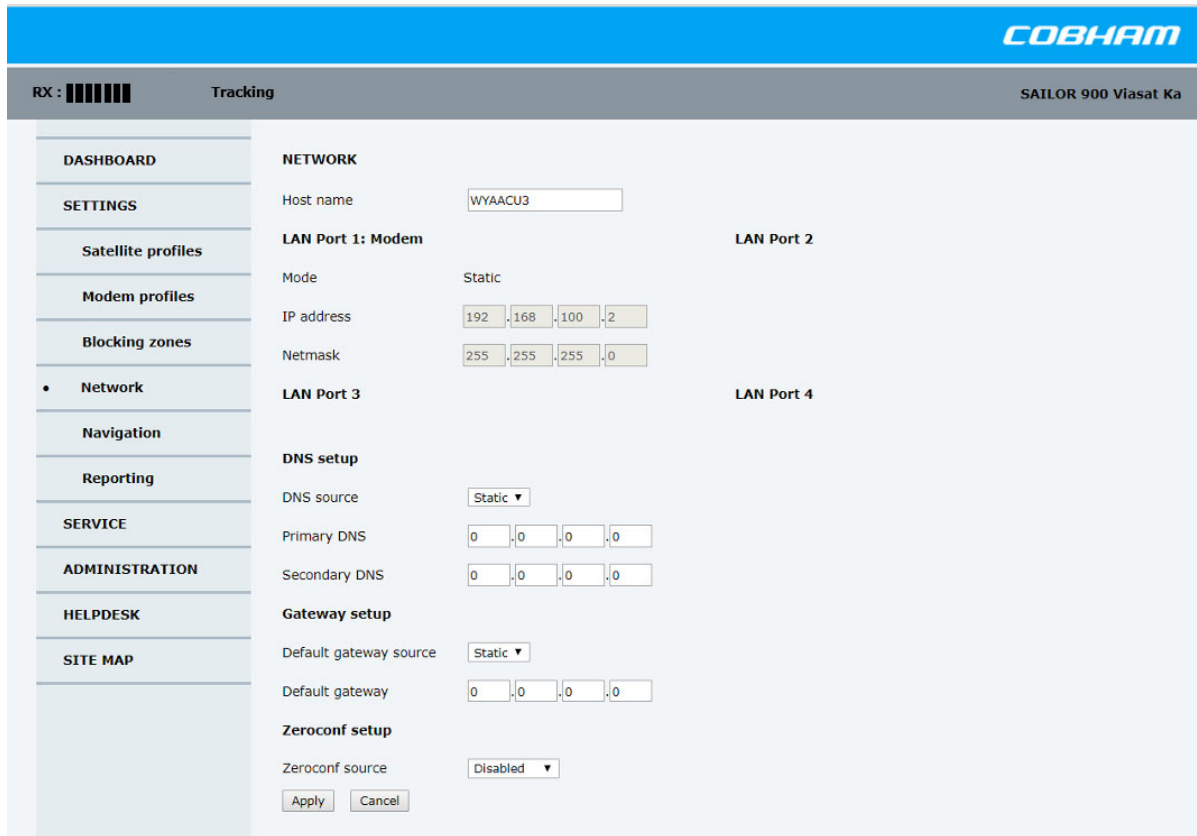


Figure 6-13: Web interface: SETTINGS, Network (default settings)

Sections	Preferred use
NETWORK Host name	The host name is used for identifying the ACU in local networks and in reports. The default host name is acu. You can change the name. Letters (a-z), digits (0-9) and hyphen (-) are allowed. Note: The host name must start with a letter.
LAN Port 1	This network is connected to the PIU. LAN port 1 mode is always Static (static IP address). IP address and Netmask cannot be changed.
LAN Port 2, 3 and 4	Disabled
DNS setup	Set the following: DNS source: Static Primary DNS: 192.168.100.1 Secondary DNS: 0.0.0.0

Table 6-10: Setup of LAN connectors

Sections	Preferred use
Gateway setup	Set the following: Default gateway source: Static Default gateway: 192.168.100.1
Zeroconf setup	Set the following: Zeroconf source: Disabled

Table 6-10: Setup of LAN connectors (Continued)

6.5.3 Setup of syslog

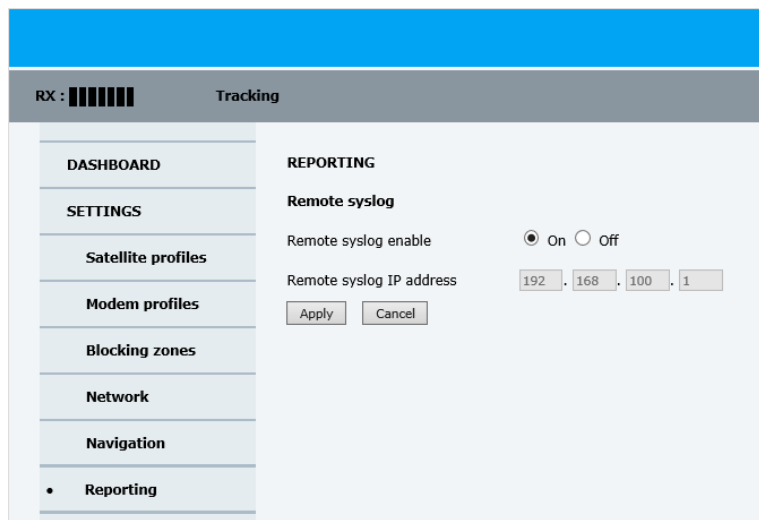


Figure 6-14: Web interface: SETTINGS, Reporting

Remote syslog

You can set up the antenna to send each syslog message to a syslog server to advise the system administrator of the current status of the antenna. To set up sending syslog messages to a syslog server, do as follows:

1. Select **SETTINGS > Reporting**.
2. In the section **Remote syslog** select **On** to enable remote syslog (default: **Off**).
3. Enter the IP address of the syslog server to which the syslog messages will be sent.
4. Click **Apply**.

6.5.4 Administration

In this section of the web interface you can configure the following administrative settings:

- *To change the password and log out*
- *To import and export a system configuration*
- *To reset to factory default settings*

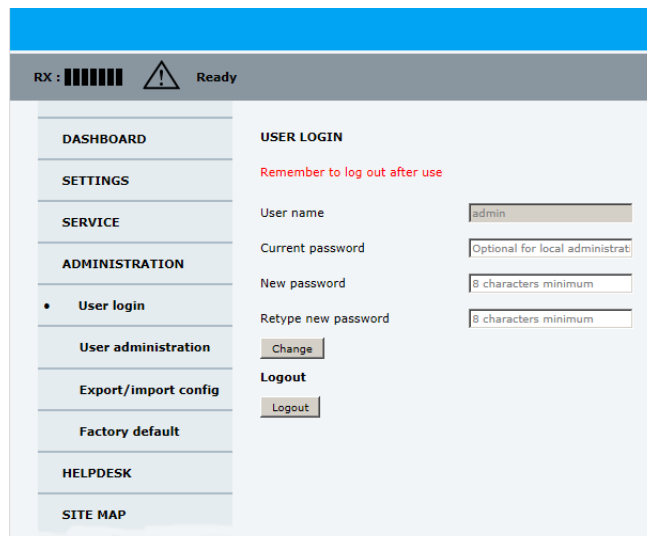


Figure 6-15: Web interface: Administration

To change the password and log out

On the page **ADMINISTRATION** and **User login** you can change the password for the currently logged in user (admin) or you can log out.

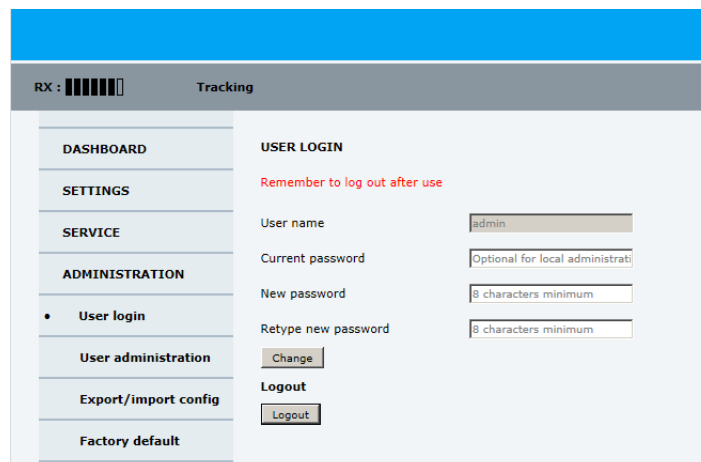


Figure 6-16: Web interface: ADMINISTRATION, change administrator logon and password

To change the current password, do as follows:

1. Enter the current password.
2. Enter the new password (minimum 8 characters) and retype it on the next line.
3. Click **Change**. At the next logon the new password is required.

4. Click **Logout** to log out of the web interface. If you have not entered anything for 30 minutes, you are logged off automatically.

If you have forgotten the administrator password, do as follows:

1. On the ACU keypad, push and hold the left arrow key for 5 seconds.
2. Wait for the very short display of **Local administration**, followed by the event text: **0807F-0 WARNING Local administration enabled**. This will give you temporary administrator access **for 1 hour or until next restart**.
3. Open your browser and access the web interface.
4. Enter user name: **admin** (no password is required). The **DASHBOARD** is displayed.

Note Accessing the ACU with the local administration function does not change the current administrator password.

5. To create or change the password select **ADMINISTRATION > User login** and locate the section **Change Login**.
6. Type in the new password (minimum 8 characters) and click **Change**. No old password is required.

After 1 hour or a restart the new administrator password is required.

- 1.

On the page **ADMINISTRATION** and **User administration** the administrator can change the password for the guest user

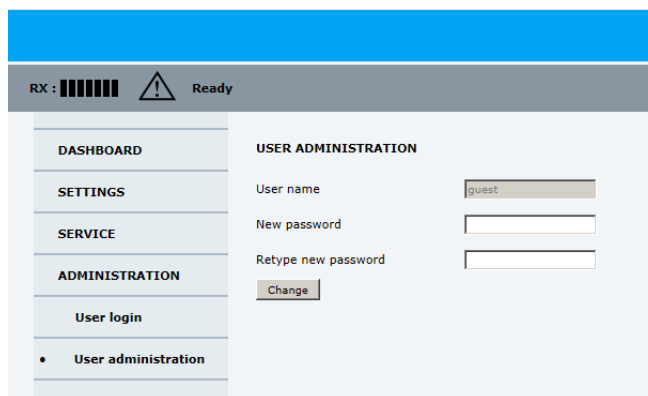


Figure 6-17: Web interface: ADMINISTRATION, change guest password

To change the current guest password, do as follows:

1. Enter the new password (minimum 8 characters) and retype it on the next line.
2. Click **Change**. At the next logon the new password is required.

To import and export a system configuration

If you need to reuse a configuration in another SAILOR 900 Viasat Ka system, you can save the current configuration to a configuration file. This file can then be loaded into another SAILOR 900 Viasat Ka or be used as backup. The configuration file contains all the settings you have entered during system setup: satellite profiles, modem profiles, LAN setup, blocking zones, etc.

Note | The antennas involved must have the same software version.

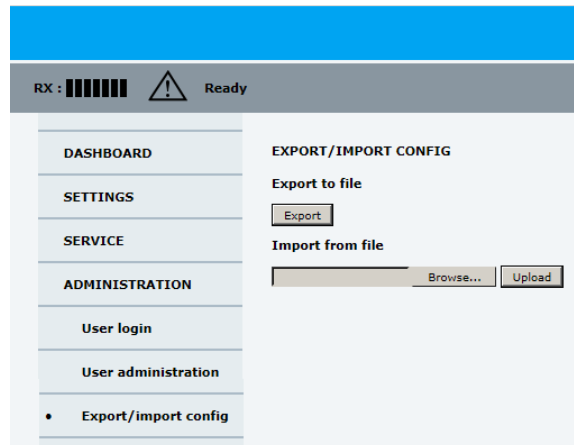


Figure 6-18: Web interface: ADMINISTRATION, Export/import configuration

To save a configuration to a file, do as follows:

1. Select **ADMINISTRATION > Export/import config**.
2. Click the button **Export**. Follow the download instructions on the screen.

To load a configuration from a file, do as follows:

1. Select **ADMINISTRATION > Export/import config**.
2. Click the button **Browse** and locate the configuration file (.cfg file) you want to upload
3. Click the button **Open**.
4. Click the button **Upload**.

To clone a system configuration, do as follows:

1. Reset to factory default, see *Reset to factory default and clear event history* on page 8-7.
2. Import a configuration from file, see section above.

To reset to factory default settings

Refer to *Reset to factory default and clear event history* on page 8-7.

6.6 Keypad and menus of the ACU

6.6.1 ACU display and keypad

In the ACU display you can see the current state of the system. You can also see events (warnings, errors and information) and how the system has been configured. Use the keypad to navigate through the menu tree.

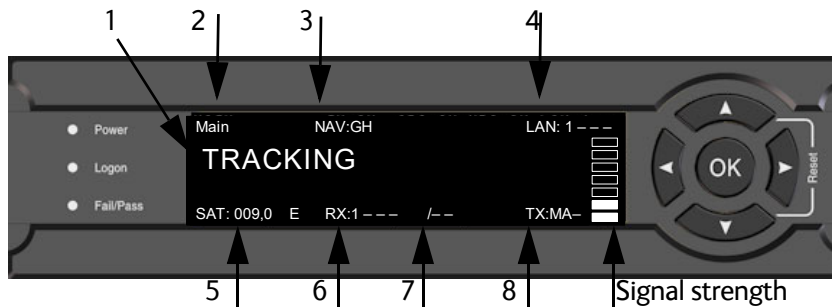


Figure 6-19: Display and keypad of the ACU (example)

1. Current status of the SAILOR 900 Viasat Ka:
 - NOT READY** (waiting for input from GNSS, e.g. GPS)
 - ANTENNA INITIALIZING**
 - ANTENNA SW UPLOAD**
 - ANTENNA POST ERROR**
 - XIM DATA ERROR** (PCM or VIM were serviced and may need further configuration)
 - UNRECOVERABLE XIM DATA ERROR**
 - SYSTEM UPGRADE**
 - ANTENNA POST PENDING**
 - ANTENNA POST**
 - SAFE MODE** (error, followed by an error description)
 - READY** (waiting for data from the modem or no satellite profile selected)
 - POINTING ANTENNA** (locating the satellite)
 - ACQUIRING SIGNAL** (acquiring the satellite signal)
 - TRACKING** (tracks the current satellite)
 - AZIMUTH CALIBRATION**
 - TEST**
 - NOT READY** (waiting for input from GNSS, e.g. GPS)
 - NOT READY: INITIALIZING**
 - NOT READY: NEED POS**
2. Current menu, see *The menu tree* on page 6-26.
3. **NAV:** Navigational information
 - First letter: **G** (Valid GPS signal received from the GPS module) or **g** (No valid GPS fix)
 - Second letter: **H** (Valid ship heading data received from the ship's gyro) or **h** (No valid heading data).
4. **LAN:** LAN connectors used, **1, 2, 3, 4, -**.
5. **SAT:** Longitude, satellite position of the currently active satellite profile.

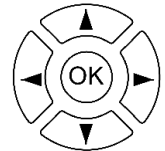
6. **RX:**
 - 1** (Rx1 Lock, - or **1**),
 - (Rx2 Lock, - or **2**),
 - L** (RX polarisation of currently active satellite profile: **H** (horizontal), **V** (vertical), **L** (left-hand) **R** (right-hand)).
7. RF tracking frequency in GHz and LNB LO Frequency.
8. **TX:** <Extern mute> <Modem TX> <ADU TX> <TX pol>
 Read the TX status as follows: Upper case: Ok, lower case: Not ok, -: unknown
 <Extern mute> = [U,u]
 <Modem TX> = [m,M]
 <ADU TX> = [a,A]
 <Tx pol>=[-,X,C,L,R]

After 1 hour the display is dimmed to lowest intensity. Press any key to light up the display.

6.6.2 Navigating the menus

Use the keypad to navigate the menus.

- Press **OK** or ► to select a menu item.
- Use the arrow keys ▲ and ▼ to go through the menu items or enter a number, digit by digit.
- Use the arrow keys ◀ and ▶ to go through the settings and move from one digit to the next.
- Press **OK** to select a setting.
- Press ◀ again to move one level up. If applicable, confirm to store the new setting by pressing **OK**.



6.6.3 The menu tree

In the menu tree you can see how the system has been configured. To enter satellite information directly, use a connected PC and the web interface.

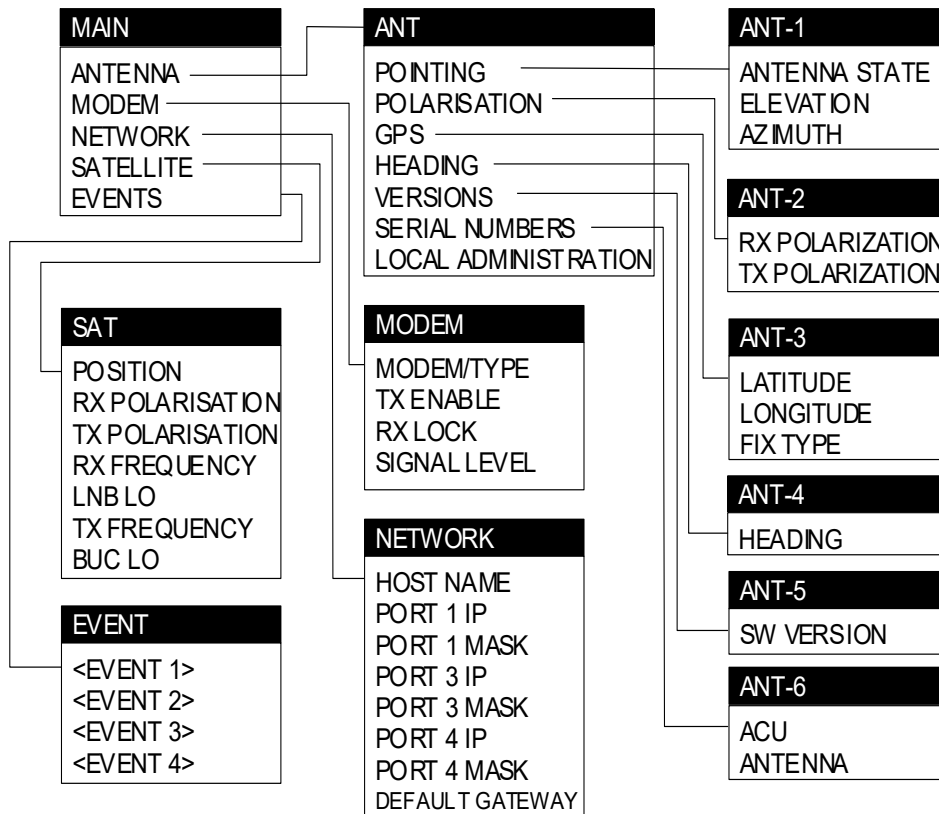


Figure 6-20: Antenna Control Unit, menu tree

Top-level menu

Top-level menu	Description
MAIN	<p>View with current status of the SAILOR 900 Viasat Ka. Example when logged on to the satellite:</p> <div style="text-align: center; border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <pre> Main NAV:GH LAN: 1 --- TRACKING SAT: 009.0 E RX:1 --- /-- TX:MA- </pre> </div> <p>This view is displayed after a time out of 10 minutes. Press any key (except left arrow) to enter the menu at MAIN. New events are shown in this display. If an event is displayed, press OK to jump directly to the menu EVENTS for viewing the currently active events.</p>

Table 6-11: Top-level menus of the ACU

Top-level menu	Description
ANTENNA	Current ADU parameters, position, software version and serial numbers of the ADU and ACU.
MODEM	Selected PIU type and setup, including signal level.
NETWORK	IP addresses and netmasks of the LAN connectors of the ACU and the management mask.
SATELLITE	Current satellite information. This information is selected using the web interface.
EVENTS	System events. Active events are shown as: X ACTIVE EVENTS in the MAIN display. Press OK to update the list.

Table 6-11: Top-level menus of the ACU (Continued)

Menu descriptions

ANTENNA menu	Description
POINTING	ANTENNA STATE: Current state of the antenna, e.g. TRACKING ELEVATION: Current elevation angle of the antenna AZIMUTH: Current azimuth of the antenna, with reference to North
POLARISATION	Not applicable.
GPS	LATITUDE: current latitude, read from GPS module. LONGITUDE: current longitude, read from GPS module. FIX TYPE: 2D or 3D or NONE
HEADING	Ship's heading in degrees with reference to North, provided by the ship's gyro
VERSIONS	Current software version
SERIAL NUMBERS	ACU: ACU serial number ADU: Serial number of the antenna
LOCAL ADMIN	Shows that the ACU is set into local administration mode. Only user name admin is needed and the ACU is in admin mode for 1 hour.

Table 6-12: ANTENNA menu of the ACU

MODEM menu	Description
MODEM TYPE	Connected modem type
TX ENABLE	On or off, information delivered by the connected PIU
RX LOCK	On or off, information delivered by the connected PIU
SIGNAL LEVEL	-

Table 6-13: MODEM menu of the ACU

NETWORK menu	Description
HOST NAME	Host name
PORT 1 IP	Current IP address for LAN 1 (192.168.100.2)
MASK 1	Current netmask for LAN 1
PORT 3 IP	Not applicable.
MASK 3	Not applicable.
PORT 4 IP	Not applicable.
MASK 4	Not applicable.
DEFAULT GATEWAY	Current default gateway

Table 6-14: NETWORK menu of the ACU

SATELLITE menu	Description
POSITION	Position of the current satellite
RX POLARISATION	Not applicable
TX POLARIZATION	Not applicable
RX FREQUENCY	Ka band receiving frequency of the active satellite, auto-selected by modem
LNB LO	Not applicable
BUC LO	Not applicable
TX FREQUENCY	Current TX frequency
LNB LO HIGH	Not applicable
LNB LO LOW	Not applicable

Table 6-15: SATELLITE menu of the ACU

EVENT menu	Description
<EVENT>	<p>In this menu all active events are listed. Use ▼ and ▲ to go through the active events.</p> <p>Events can be of the type WARNING or ERROR.</p> <p>If a new event occurs or there is a change in the event list while you are in the EVENTS menu, a * is shown in the upper left corner of the display, next to the menu name. Press OK to update the EVENTS list, the * will be removed.</p> <p>A > means the event text is longer than the display. Press > to see the remaining text.</p>

Table 6-16: EVENTS menu of the ACU

Example: **EVENT 1/4***: This is the first event out of a list of 4 and there has been a change in the list. EVENT 1/4 will always be shown, the * indicates that there has been a change.

6.6.4 Brightness of the display

To adjust the brightness do the following:

1. Press and hold **OK** for a short moment until BRIGHTNESS XXX% is displayed (XXX is the current brightness value).
2. Hold OK pressed + press ▲ for lighter or ▼ for darker display.
3. Release OK to leave the brightness menu.

6.6.5 Power-cycle of the ACU and ADU

To power cycle the ACU and ADU do the following:

1. Press and hold ▲ and ▼ until the ACU display shuts down and the ACU and ADU reboots.



Figure 6-21: Reset the system

2. Wait until the system has rebooted and is operational again. The last active satellite profile will be used.

Installation check

Now that you have installed the system, you can test it to verify it is ready for customer delivery. Follow the check lists below to test the system for proper operation.

- *Installation check list: Antenna*
- *Installation check list: ACU and PIU, connectors and wiring*
- *Installation check list: Functional test in harbor*

7.1 Installation check list: Antenna

Step	Task	Further information	Done
1.	Check that the antenna is free of obstructions.	See <i>Obstructions (ADU shadowing)</i> on page 3-4.	
2.	Make sure to maintain the vertical orientation of the ADU center line.	See <i>To install the ADU</i> on page 3-17.	
3.	Check that the ADU is installed where vibrations are limited to a minimum.	See <i>To install the ADU</i> on page 3-17.	
4.	Check that you programmed the blocking zones correctly.	See <i>Blocking zones with azimuth and elevation</i> on page 3-5 and <i>To set up blocking zones</i> on page 6-17.	
5.	Make sure that the safety distance for radiation hazard is kept.	See <i>Safe access to the ADU (radiation hazard)</i> on page 3-6.	
6.	Check that the mounting height of the antenna is in accordance with the ship's min. roll period.	See <i>Ship motion and offset from the ship's motion centre</i> on page 3-6.	
7.	Make sure that the requirements for mast foundation and height, including flatness, gusset plates and distance from welding seams are met.	See <i>ADU mast design: Mast foundation and height</i> on page 3-7.	
8.	Make sure that the distances to radar, Inmarsat systems, GPS receivers and other transmitters are as required.	See <i>Interference from radar, GPS, L-band and other transmitters</i> on page 3-12.	
9.	Make sure that the drain tube is open and risk for water intrusion is at a minimum.	See <i>Condensation, water intrusion and deposits</i> on page 3-15.	
10.	Check that the ADU is grounded correctly, using the mounting bolts.	See <i>To ground the ADU</i> on page 3-20 and <i>Ground and RF protection</i> on page B-1.	

Table 7-1: Installation check list: Antenna

7.2 Installation check list: ACU and PIU, connectors and wiring

Step	Task	Verification and further information	Done
1.	Check that the grounding of the ACU and PIU is correctly, using the mounting bolts and washers.	See <i>To ground the ACU</i> on page 3-23 and <i>Ground and RF protection</i> on page B-1.	
2.	Make sure that the PIU is mounted close to the ACU (preferably next to it).	Visual inspections.	
3.	Check that the ADU antenna N-connector is properly connected with the 50 Ohm RF cable.	Visual inspection of the bottom of the ADU.	
4.	Check that the ACU and PIU N-connectors are properly connected with the 50 Ohm RX cable.	Visual inspection of the connector panel of the ACU and the PIU.	
5.	Check that the ACU's NMEA 0183 connector is connected to the NMEA 0183 bus of the vessel using the included multi-connector.	Visual inspection of the connector panel of the ACU connector. See Table 4-4 on page 4-3.	
6.	Check that the power cable is plugged into the ACU and that AC power is available.	Visual inspection.	
7.	Check that the AC power cable is plugged into the PIU and that AC power is available.	Visual inspection.	

Table 7-2: Installation check list: ACU, connectors and wiring

7.3 Installation check list: Functional test in harbor

Step	Task	Further information	Done
1.	Check that the antenna is tracking the satellite	The logon LED in the ACU display must be steady green and the display must show: TRACKING . Check in the web interface: DASHBOARD: System status: Tracking (see <i>Connecting to the terminal web interface</i> on page 6-1).	
2.	Connect a user PC LAN to the Internet LAN connector 2 of the PIU.	The PIU needs no separate setup. See <i>To connect the ADU, ACU and PIU</i> on page 3-25.	
3.	Make sure that the computer has no access to the Internet through other means (Wifi, 3G, 4G etc.). Open a command line window and type: ping 4.2.2.2.	Check that you get a response.	
4.	Make sure that the computer has no access to the Internet through other means (Wifi, 3G, 4G etc.). Open a web browser and browse to e.g. www.google.com.	Check that the web page is downloaded.	
5.	If step 4 is successful and step 5 is not then it seems that the DNS is not configured correctly.	See the page SETTINGS > Network and check the DNS setup (see <i>To configure the LAN network</i> on page 6-18).	

Table 7-3: Installation check list: Functional test in harbour

Service

This chapter has the following sections:

- *To get support*
- *Software update*
- *Status signalling with LEDs and status messages, s*
- *Removal and replacement of the ACU*
- *Removal and replacement of ADU modules*
- *Troubleshooting basics*
- *To return units for repair*

8.1 To get support

If this manual does not provide the remedies to solve your problem or if you need help with ACU, PIU or ADU related issues call your service provider.

The section has the following subsections:

- *Options for support*
- *Reset to factory default and clear event history*

8.1.1 Options for support

In this section you can enter the support contact for this installation, download the MIB file and reports.

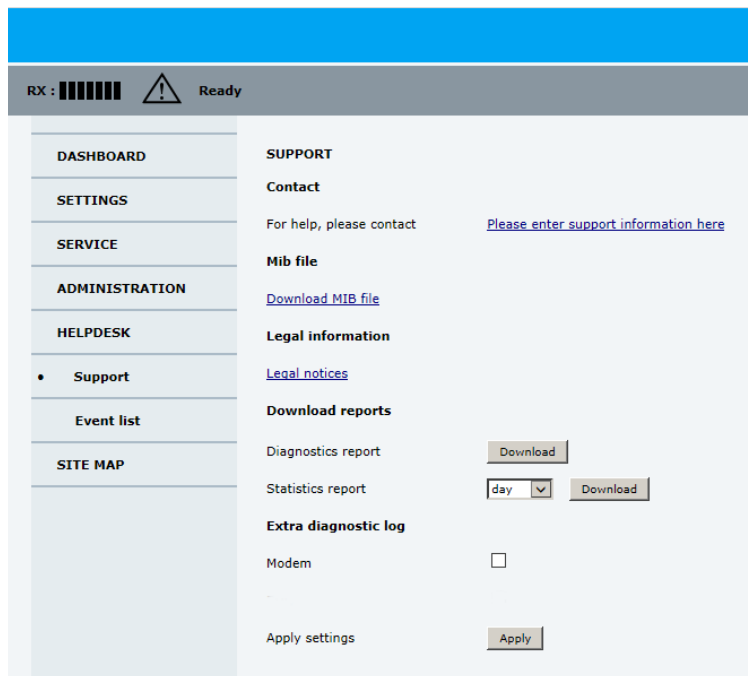


Figure 8-1: Web interface: HELPDESK

To enter contact information and view legal notices

1. Select **HELPDESK** from the left navigation pane.
2. Click the link to enter support contact information and click **Apply**.
3. Click the link **Legal notices** to see the licence text for the source code of the parts of the SAILOR 900 Viasat Ka software that falls under free and open source software.

To download diagnostics and statistics reports

You can download a diagnostics report. This report contains information relevant for the service personnel during troubleshooting situations. It is also useful documentation of the

current setup. The report contains all parameters set during configuration. You can add diagnostic log information from the modem and the BUC.

The main sections of the diagnostics report are:

- Software
- System
- Hardware
- Identifiers
- Setup - System data
- Calibration - Calibration Data
- Blocking zones - Blocking zone configuration
- Network - LAN Configuration
- Modems
- Satellites - Satellite profiles
- Operation - Current modem and navigation parameters.
- POST - results of the Power-On-Self-Test
- Active Events - lists the currently active events
- Events - List of all cleared events
- Statistics - including navigation data and logging of temperatures for the ACU and ADU. The temperature is measured every 5 minutes within an hour and is then averaged and incidents are logged in the diagnostic file.
- System log

You can download a statistics report. This report contains information relevant for the service personnel during troubleshooting. You can also configure the system to send statistics reports at defined time intervals.


To generate a report do as follows:

1. Select **HELPDESK** from the left navigation pane.
2. Select **Modem** to include modem and BUC information in the diagnostics report.

Note | The amount of modem data is usually large and may fill the log quickly.

3. Click **Apply**.
4. Click **Download** next to the text **Diagnostics report**.
5. Save the diagnostics report to your computer.
6. Next to the text **Statistics report** select the interval for the statistics report.
7. Click **Download** next to the text **Statistics report**.
8. Save the statistics report to your computer.

Event list

Events are registered. When an event is registered, the web interface shows an event icon  in the icon bar as long as the event is active. Active events are also displayed in the ACU display. To view the event list with active events, click the event icon from the icon bar at the top of the web interface, or select **HELPDESK > Event list** from the left navigation pane.

The **Event list** page shows a detailed list of active events and notifications including the time of the first occurrence, ID and severity of the event message, and a short text describing the error. Active events are cleared from the event list when the error is cleared. They are moved to the section **Notifications** and are displayed for 24 hours. All entries in the section **Notifications** are cleared automatically after 24 hours and after restart of the system. For a list of all events with description, error code (ID), explanation and remedy see *List of ADU events* on page C-2 and *List of ACU events* on page C-8. You can clear the event history in the diagnostic report, this will not change the configuration.

To clear the event history do as follows:

1. Click **Factory default** in the **ADMINISTRATION** page.
2. Click the button **Clear event history**.

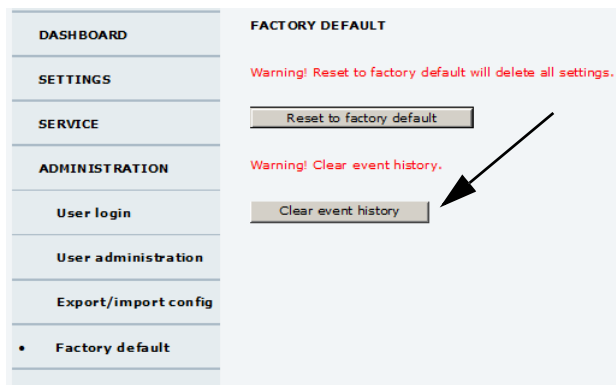


Figure 8-2: Web interface: Clear event history

Self test

You can start a self test of the SAILOR 900 Viasat Ka ADU and ACU. The self test checks all vital parts of the antenna and ACU. You can restart the antenna or the terminal (ADU and ACU). If a malfunction is detected, the unit provides system messages with a description of the failing test. This is indicated in the icon bar in the web interface and in the ACU display. You find all system messages in *System messages* on page C-1. An extended antenna POST is available, this test lasts longer and checks more components than the regular self test.

To make a self test, do as follows:

1. Click the menu item **SERVICE**.
2. Click the menu item **Self test**.

Important

Warning! The SAILOR 900 Viasat Ka will reboot to perform the self test. Rebooting the ACU will terminate all existing connections.

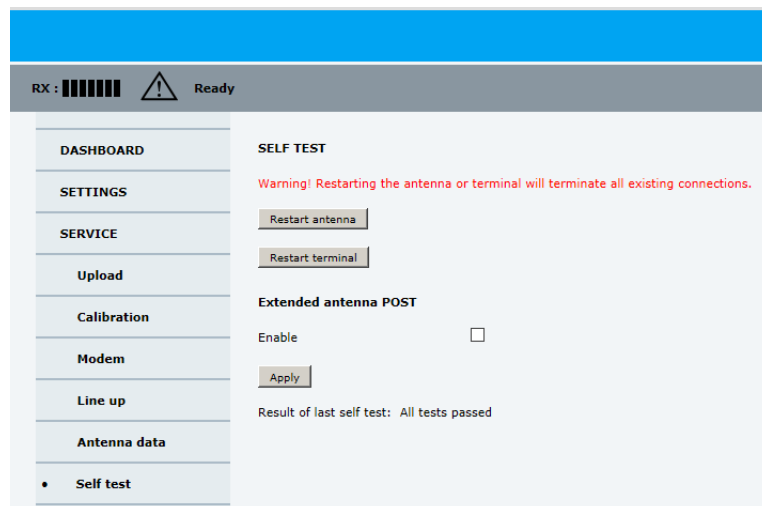


Figure 8-3: Web interface: SERVICE, Self test

3. Select **Enable** under **Extended antenna POST** for the longer self test, click **Apply**.
4. Click **Restart antenna** to restart the ADU and/or **Restart terminal** to restart the ADU and ACU.

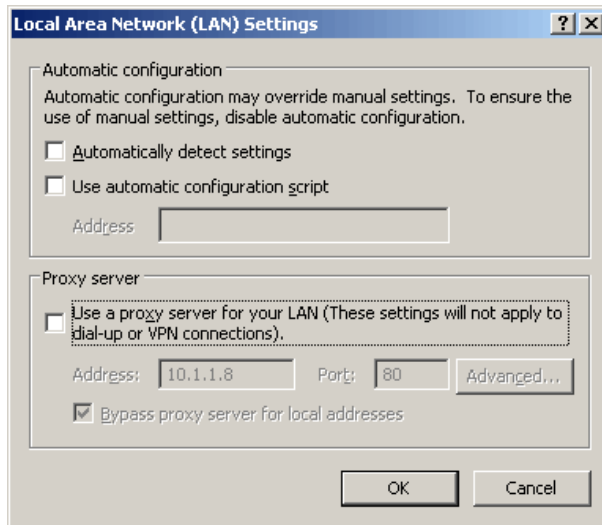
Proxy server settings in your browser

If you are connecting your computer using a LAN or WLAN interface, the **Proxy server** settings in your browser must be disabled before accessing the web interface. Most browsers support disabling of the Proxy server settings for one specific IP address, so you can disable Proxy server settings for the web interface only, if you wish. Consult your browser help for information.

To disable the use of a Proxy server completely, do as follows:

Note The following description is for **Microsoft Internet Explorer**. If you are using a different browser, the procedure may be different.

1. In Microsoft Internet Explorer, select **Tools > Internet Options > Connections > LAN Settings**.



2. Clear the box labelled **Use a proxy server for your LAN**.
3. Click **OK**.

When the proxy server settings are disabled, close and restart your browser. You may need to change this setting back on return to your Internet connection.

8.1.2 Reset to factory default and clear event history

You can reset the SAILOR 900 Viasat Ka ADU and ACU to factory default.

Important

A reset to factory default will delete all settings, including satellite and VSAT modem profiles, blocking zones, network setup, user permissions and ACU display brightness settings.

When resetting to factory default, the following settings are deleted:

- All satellite profiles
- All modem profiles
- Blocking zones
- Heading settings
- Azimuth adjustment
- Network setup
- User permissions
- ACU display: brightness setting

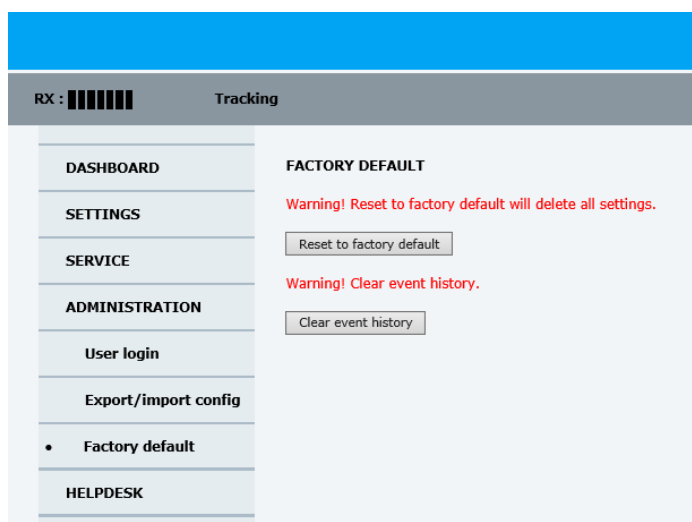


Figure 8-4: Web interface: ADMINISTRATION > Factory default, ADU and ACU

To reset to factory default settings, do as follows:

1. Click the menu item **ADMINISTRATION > Factory default**.
2. Click **Reset to factory default**.

Note

Calibration data for azimuth and cable calibration are not reset during factory default.

3. Click **Clear event history** to clear all registered events.
4. Click **Reset Modem**.

8.2 Software update

8.2.1 Prerequisites

The following items are required to make a software update:

- 1 computer with a standard Ethernet port available.
- Standard Internet browser.
- 1 straight LAN cable.
- Access to the file with the new software.

8.2.2 Software update (ADU, ACU)

Note | Software update should only be done by qualified service personnel.

The upload procedure takes a couple of minutes. When done, the ACU automatically restarts with the new software version. The start-up procedure after a software upload takes longer than the usual start-up time, as the software in the ADU must also be updated. This is shown in the ACU display as **ADU SW UPLOAD**.

To make a software update, do as follows:

1. Power up the SAILOR 900 Viasat Ka system, i.e. switch on the ACU. Wait until the ACU has finished initializing.
2. Connect a PC to LAN2 of the PIU.
3. Open your Internet browser and enter the IP address. The IP address of the PIU is <http://192.168.100.1>.
4. Type in the user name **admin** and the administrator password to access the web interface.
5. Click on the link to the ACU.
6. Click the menu item **SERVICE**. The **UPLOAD** page is displayed.

- Click **Browse...** and locate the new software file.

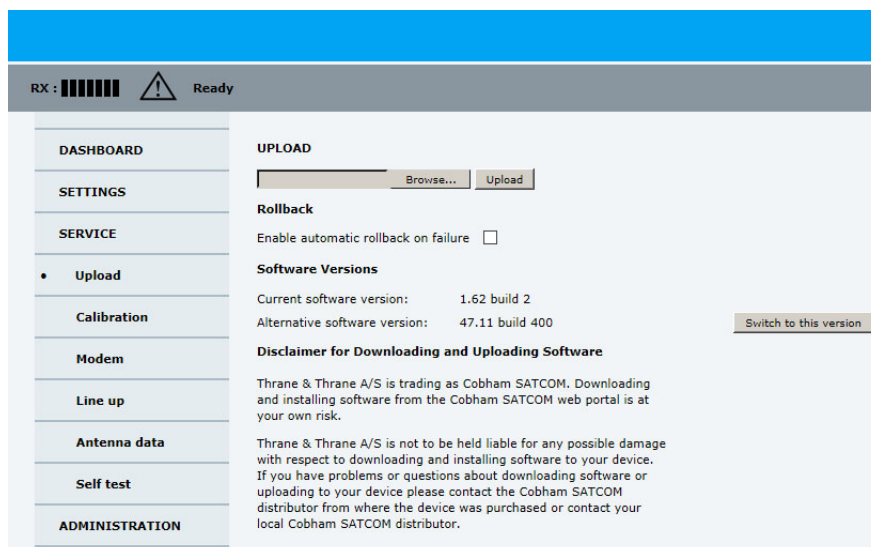


Figure 8-5: Software update with the web interface

- Click **Upload**.

Important

Do not browse away from the upload page. This will terminate the upload process. Wait for the browser to reload automatically.

- You can select **Enable automatic roll-back on failure**. Then the system returns to the previous software version if an error occurs during the POST.
- Click **Switch to this version** if you want to force the system to use the alternative software version stated in the display.

Software recovery procedure (SAFE MODE)

To recover from a failed software upload, turn off the ACU and turn it on again. Then repeat the upload procedure as described in *Software update* on page 8-8. If this does not help use the following recovery procedure:

1. Switch off the ACU.
2. Press and hold down the arrow keys ◀ and ▶ on the keypad.
3. Switch the ACU on and wait for the display to show with a small font size **SAFE MODE** in the top left corner.

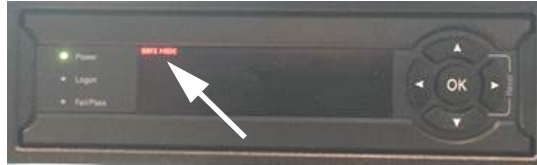


Figure 8-6: Recovery procedure after failed software upload

4. Release the arrow keys ◀ and ▶.
5. Connect a PC to LAN port 3 of the ACU.
6. Set the IP address of the PC to static: IP:192.168.0.2, Subnet: 255.255.255.0
7. Open an Internet browser and type http://192.168.0.1 (Default IP address of the ACU)

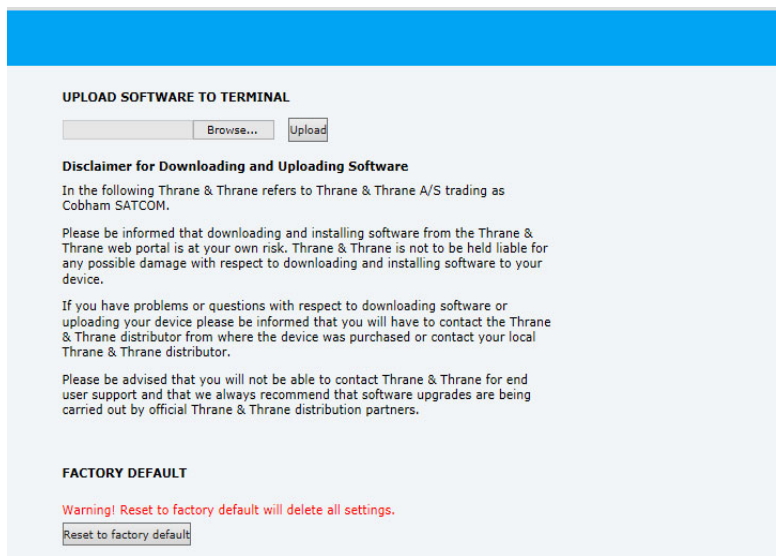


Figure 8-7: Upload software to terminal (Safe mode)

8. Click **Browse...** and locate the software file.
9. Click **Upload**.

The upload procedure takes a couple of minutes. When done, the ACU automatically restarts with the new software version.

Important

Do not browse away from the upload page. This will terminate the upload process. Wait for the browser to reload automatically.

To verify the software update (ADU and ACU)

After completing the software update procedure, the ACU will perform a POST (Power On Self Test). When the POST has finished, the green Pass/Fail LED on the front of the ACU must become steadily green.

To verify the software update do as follows:

1. Verify that the Pass/Fail LED is not red nor flashing orange once every 2 seconds.
2. Wait until the Pass/Fail LED is green.
3. Verify that the software update has been completed successfully. You find the software version number in the **DASHBOARD** window of the web interface.

The screenshot shows the COBHAM web interface for a SAILOR Viasat Ka tracking station. The 'DASHBOARD' window is active, displaying various system parameters. The 'Engineering version' field is circled in red, indicating the software version number.

Category	Parameter	Value
DASHBOARD	GNSS position	55.79° N, 12.52° E
	Vessel heading	90.1°
	Satellite profile	ViaSat mpTRIA
	Satellite position	9.0° E
MODEM	Model	Viasat mpTRIA
	RX locked status	Locked
STATUS	Status	ONLINE
	ACU part name	TT-7016C-00
ANTENNA	Antenna part name	TT-7009F
	ACU serial number	80563630
SERIALS	Antenna serial number	70090002
	Engineering version	47.11 build ulrik.jensen-1422
POINTING	Azimuth, elevation geo	184.3° 26.6°
	Azimuth, elevation rel	93.5° 24.7°
TX	BUC TX	On

Figure 8-8: Verifying software update

8.3 Status signalling with LEDs and status messages

Built-In Test Equipment

The ADU and the ACU have a Built-In Test Equipment (BITE) function in order to make fault diagnostics easy during installation and service. The BITE test is performed during:

- Power On Self Test (POST), which is automatically performed each time the system is powered on.
- Person Activated Self Test (PAST), which is initiated by starting a self test in the web interface **HELPDESK > Self test**.

For details on error messages after a POST or a self test see *Event list* on page 8-4.

Means of signalling

The SAILOR 900 Viasat Ka provides various methods for signalling the system status. **LEDs** on the front panel of the ACU are used to signal:

- Power on/off
- Logon
- Fail/Pass

The built-in web interface of the ACU shows any events (BITE error codes) with a short message describing each error. This is also displayed in the ACU.

In an error situation, one of the following system status messages may be shown:

- ACU POST error
- ADU POST error
- SAFE MODE (plus information about the specific error, see *System messages* on page C-1).

8.3.1 LEDs of the ADU modules

Each ADU module has two LEDs: a Power and a Service LED.

LED	Behaviour	Description
Power	Steady green	Power supply OK
	Off	No power
Service	Steady green	Module ok, application running.
	Flashing green	Waiting for upload
	Flashing red/green	Uploading software
	Steady red	Module error or loading error

Table 8-1: LEDs of the ADU modules

For a list of modules see *Removal and replacement of ADU modules* on page 8-14.

8.3.2 LEDs in the ACU

The ACU has 3 LEDs: on the front panel: Power, Logon and Fail/Pass LED.

LED	Behaviour	Description
Power	Steady green	Power supply OK
	Steady red	Power supply failure
	Off	No power
Logon	Flashing green	Current status is displayed: <ul style="list-style-type: none"> • Searching satellite • Identifying satellite • Carrier lock & TX enabled from modem
	Steady green	Satellite link established
	Off	No satellite link acquired
Fail/Pass LED	Steady red	A fault which prevents operation is present in the system (ACU, ADU, MODEM).
	Flashing green	A Power On Self Test (POST) or Person Activated Self Test (PAST) in progress. The current status is displayed.
	Flashing red	Active BITE failure or warning. The event is shown in the ACU display.
	Steady green	No faults.

Table 8-2: LEDs on the ACU

8.3.3 LEDs of the PIU

The PIU has one LED on its front plate.

LED behaviour	Description
Off	No power
Green	Ok
Orange	Fail

Table 8-3: LED behaviour of the PIU

8.4 Removal and replacement of the ACU

There are no parts in the ACU that you can remove or replace. Contact your Cobham SATCOM service partner for further repair or replacement.

8.5 Removal and replacement of ADU modules

All replacement of modules must be carried out by a Cobham SATCOM service partner. The figure below shows the modules and their position. Some modules are equipped with LEDs for status information and troubleshooting.

1. GNSS module.

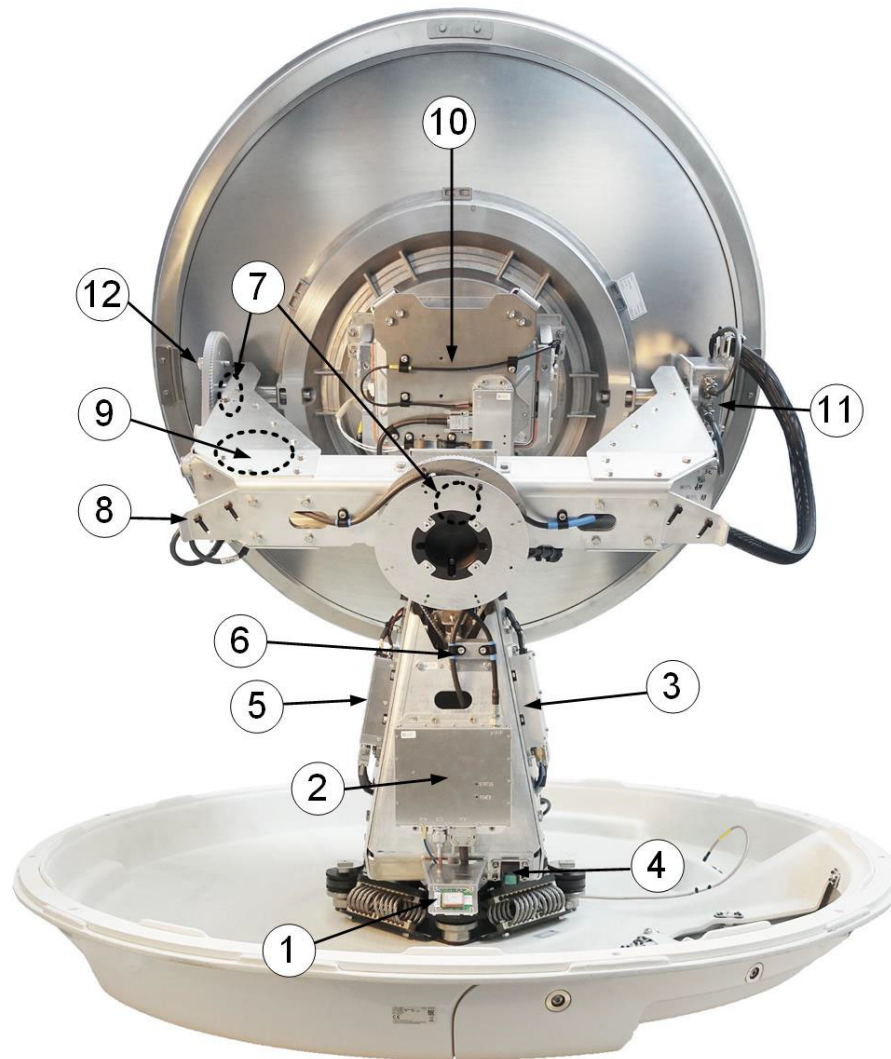


Figure 8-9: Above Deck Unit modules 1/2

2. pTRIA Interface Module (PIM).
3. Pedestal Control Module (PCM).
4. Service switch.
5. Motor Driver Module for cross elevation (DDM/SMD).
6. Cross elevation motor and encoder.
7. Zero Reference Module (x3) (ZRM) (not visible on photo). (2 pcs in the figure above, 1 pce in the figure below).
8. Motor Driver Module for elevation (on the bottom side) (DDM/SMD).

9. Elevation motor and encoder (not visible).
10. Integrated transceiver (pTRIA).
11. Inertial Sensor Module (ISM).
12. Elevation locking pin to lock the antenna dish in a fixed position (for safety during service) (not visible on photo).



Figure 8-10: Above Deck Unit modules 2/2

13. Motor Driver Module for Azimuth (DDM/SMD).
As in item 3 above.
14. Azimuth motor.
15. Azimuth encoder.
16. Rotary joint.
17. Feed horn.

Before contacting your service partner check the LEDs on all modules (PIM, PCM, PMM and ISM). See *LEDs of the ADU modules* on page 8-12 and *LEDs in the ACU* on page 8-13.

8.6 Troubleshooting basics

8.6.1 Overview

This section describes an initial check of the primary functions of the SAILOR 900 Viasat Ka system, and provides some guidelines for troubleshooting. Generally, if a fault occurs without any obvious reason, it is always recommended to observe the LEDs and the ACU display showing the active events. Possible failure states are shown in the web interface and the display of the ACU.

Possible failure states are:

- SAFE MODE (e.g. hardware error, missing communication link between the ADU and ACU, excessive ship motion) (see also *Software recovery procedure (SAFE MODE)* on page 8-10)
- Antenna data error (after exchange of modules, XIM)
- ADU POST error (hardware error)
- ACU POST error (hardware error)

For information on the function of the LEDs, see *Status signalling with LEDs and status messages* on page 8-12. For a list of all the error messages and warnings, see *Event messages – overview* on page H-1.

8.6.2 Event list for troubleshooting

You can use the event list for troubleshooting. For more information on the event list, see *Options for support* on page 8-2. You can download the event list as part of a diagnostics report.

8.6.3 Diagnostics report for troubleshooting

You can generate a diagnostics report containing results from the POST, all events and system log information since the last reset to factory default. For more information see *To download diagnostics and statistics reports* on page 8-2.

8.7 To return units for repair

Should your Cobham SATCOM product fail, please contact your dealer or installer, or the nearest Cobham SATCOM partner. You will find the partner details on www.cobham.com/satcom, **Technical Service Partner List**. You can also access the **Cobham SYNC Partner Portal** at <https://sync.cobham.com/satcom>, which may help you solve the problem. Your dealer, installer or Cobham SATCOM partner will assist you whether the need is user training, technical support, arranging on-site repair or sending the product for repair. Your dealer, installer or Cobham SATCOM partner will also take care of any warranty issue.

Technical specifications

This appendix has the following sections:

- *SAILOR 900 Viasat Ka system components*
- *Outline drawings*

A.1 SAILOR 900 Viasat Ka system components

A.1.1 General specifications

SAILOR® 900 Viasat Ka

Your 1m Ka-band system for Viasat®



SYSTEM SPECIFICATIONS

Frequency band	Ka-Band (Viasat)
Reflector size	103 cm / 40.6"
Type approvals	Viasat
Certification	Compliant with CE (Maritime), ETSI, FCC
System power supply range	100-240 VAC, 50-60 Hz
Total system power consumption	200W typical, 410W peak
Vibration, operational	Sine: EN60945 (8.7.2), DNV A, MIL-STD-167-1 (5.1.3.3.5). Random: Maritime
Vibration, survival	Sine: EN60945 (8.7.2) dwell, MIL-STD-167-1 (5.1.3.3.5) dwell. EN60721-3-6 M3
Shock	MIL-STD-810F 516.5 (Proc. II)
Temperature (ambient)	Operational: -25°C to 55°C Storage: -40°C to 85°C

FREQUENCY BAND

Rx	17.7 to 21.2 GHz
Tx	27.5 to 31.0 GHz

ANTENNA CABLE

PIU to ADU cable	Single 50 Ω coax for Moca, modem and power
------------------	--

ABOVE DECK UNIT (ADU)

ADU	Female N-Connector (50 Ω)
PIU	Female N-Connector (50 Ω)

ABOVE DECK UNIT (ADU)

Antenna type, pedestal	3-axis stabilised tracking antenna with integrated GNSS (GPS, GLONASS, Beidou)
Antenna type, reflector system	Reflector/sub-reflector, ring focus
Transmit Gain	47.0 dBi typ. @ 29.5 GHz (excl. radome)
Receive Gain	44.0 dBi typ. @ 19.7 GHz (excl. radome)
System G/T	16.8 dB/K typ. @ 19.45 GHz, at ≥10° elevation and clear sky (incl. radome)
BUC output power	Viasat mpTRIA (~3W)
EIRP	≥53.5 dBW (incl. radome) MAX. 36.0 dBW/40KHz
LNB	Viasat mpTRIA
Tracking Receiver	Viasat mpTRIA RSSI
Polarisation	Circular Cross-Pol (RHCP, LHCP)
Elevation Range	-25° to +125°
Cross Elevation	+/-42°
Azimuth Range	Unlimited (Rotary Joint)
Ship motion, angular	Roll +/-30°, Pitch +/-15°, Yaw +/-10°
Ship, turning rate and acceleration	15°/S and 15°/S²
ADU motion, linear	Linear accelerations +/-2.5 g max any direction
Satellite acquisition	Automatic - with or without Gyro/GPS Compass input
Humidity	100%, condensing
Rain / IP class	EN60945 Exposed / IP56
Wind	80 kt. operational 110 kt. survival
Ice, survival	25 mm / 1"
Solar radiation	1120 W/m² to MIL-STD-810F 505.4
Compass safe distance	1.4 m / 55.1" to EN60945
Maintenance, scheduled	None
Maintenance, unscheduled	All electronic, electromechanical modules and belts are replaceable through service hatch
Built In Test	Power On Self Test, Person Activated Self Test and Continuous Monitoring w. error log
Power OFF	Automatic safe mode
Dimensions (over all)	Height: H 150 cm / 58.9" Diameter: Ø 130 cm / 51.3"
Weight	125 Kgs. / 276 lbs.

ANTENNA CONTROL UNIT (ACU)

Dimensions, Rack Mount	1U 19" ACU HxWxD: 4.4 x 48 x 33 cm HxWxD: 1.75" x 19" x 13"
Weight, Rack Mount	4.5 kgs. / 10 lbs.
Humidity	EN60945 Protected, 95% (non-condensing)
IP class	IP30
Compass safe distance	0.3m / 12" to EN60945
Interfaces	1 x N-Connector for PIU RF Cable (50 Ω) w. automatic cable loss compensation 2 x F-Connectors (75 Ω) (Not used) 1 x RS-422 (Not used) 1 x RS-232 (Not used) 1 x NMEA 0183 (RS-422 or RS-232) for Gyro/GPS Compass input (future NMEA2000) 1 x RJ-45 Ethernet (PIU modem communication) 3 x RJ-45 Ethernet (Not used) 1 x AC Power Input 1 x Grounding bolt
Input power	100 - 240 VAC, 200W typical, 410W peak
Modem interface (control)	Generic, Custom protocol
Display	Web MMI, OLED (red) display, 5 pushbuttons, 3 discrete indicator LEDs and ON/OFF switch
No transmit zones	Programmable, 8 zones with azimuth and elevation

pTRIA INTERFACE UNIT (PIU) SPECIFICATION

PIU Dimensions	1U 19" Rack Mount HxWxD: 4.4 x 48 x 33 cm HxWxD: 1.75" x 19" x 13"
Weight, Rack Mount	2.5 kgs. / 5.5 lbs.
Humidity	EN60945 Protected, 95% (non-condensing)
IP class	IP30
Compass safe distance	0.3m / 12" to EN60945
Modem type	Viasat (built-in ADU)
Interfaces	1 x N-Connector (50 Ω) for antenna RF cable 1 x N-Connector (50 Ω) ACU Comm. and Power 1 x RJ-45 Ethernet (ACU modem communication) 1 x RJ-45 Ethernet WAN Connector (Internet access) 1 x Grounding bolt 1 x Reset toggle switch 1 x LED (Power and Status)
Temperature control	Built-in fan

For further information please contact:

satcom.ohc@cobham.com

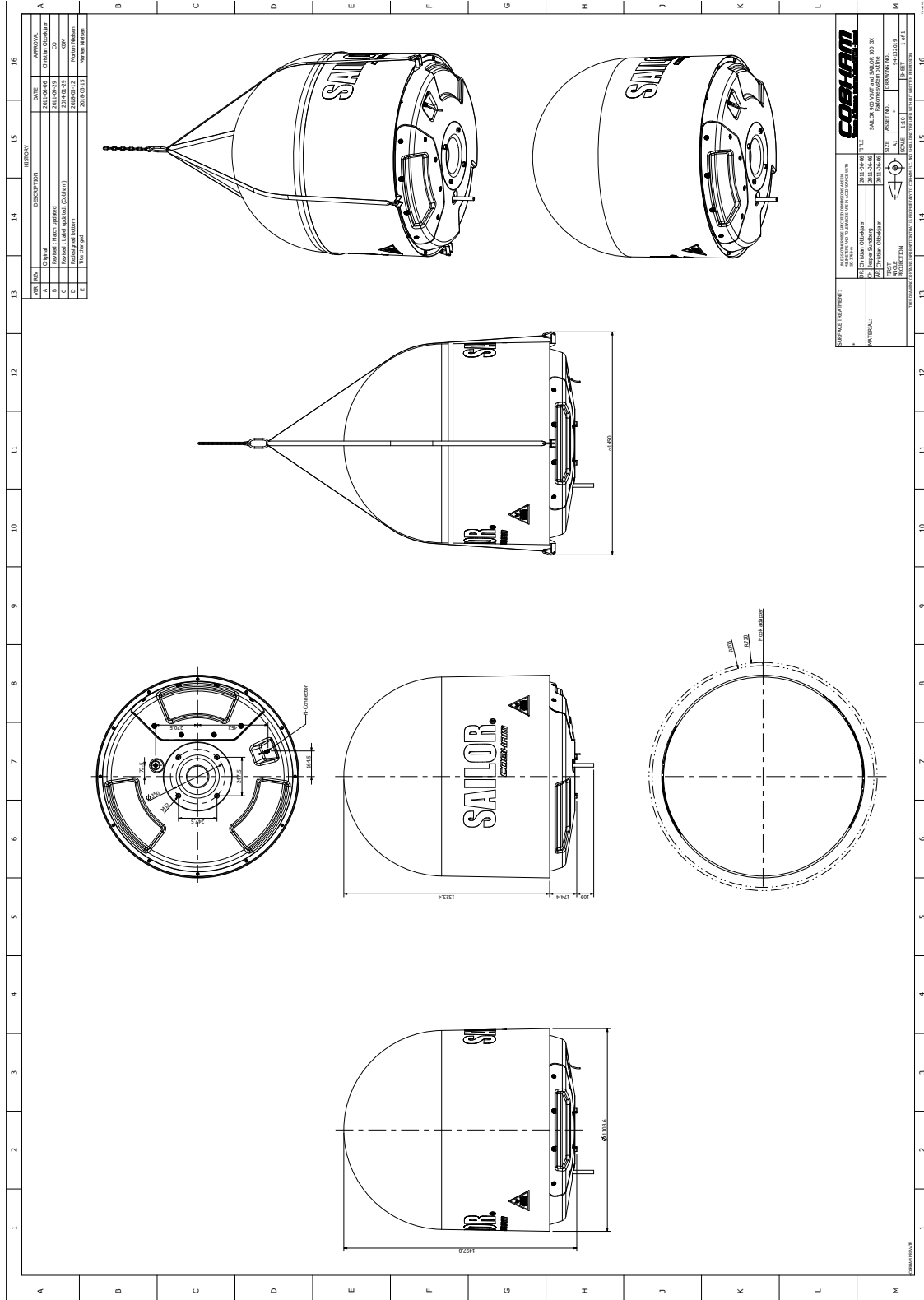
A.1.2 Patents

Patent application number	Description
11749202.5; 10-2013-7008607; 13/819,621	An assembly comprising a movable and brakable/dampable part and a method for braking a movable part
PCT/EP2012/063849	Combined antennas without switch
Currently applying	Reflector with enforcement ring

Table A-1: Patents

A.2 Outline drawings

A.2.1 ADU



A.2.2 ACU

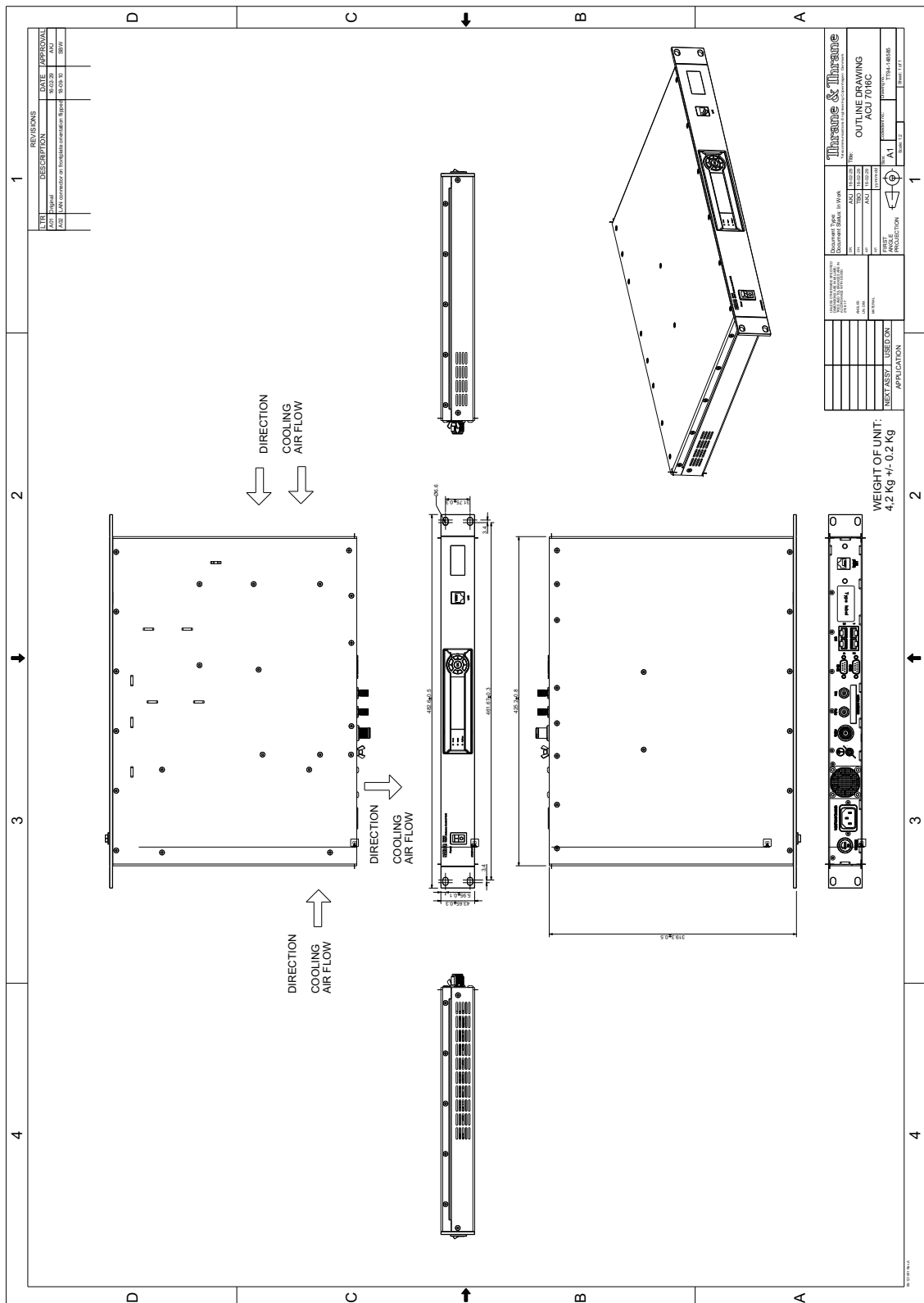


Figure A-2: Outline drawing: ACU, (SAILOR 7016C)

A.2.3 PIU

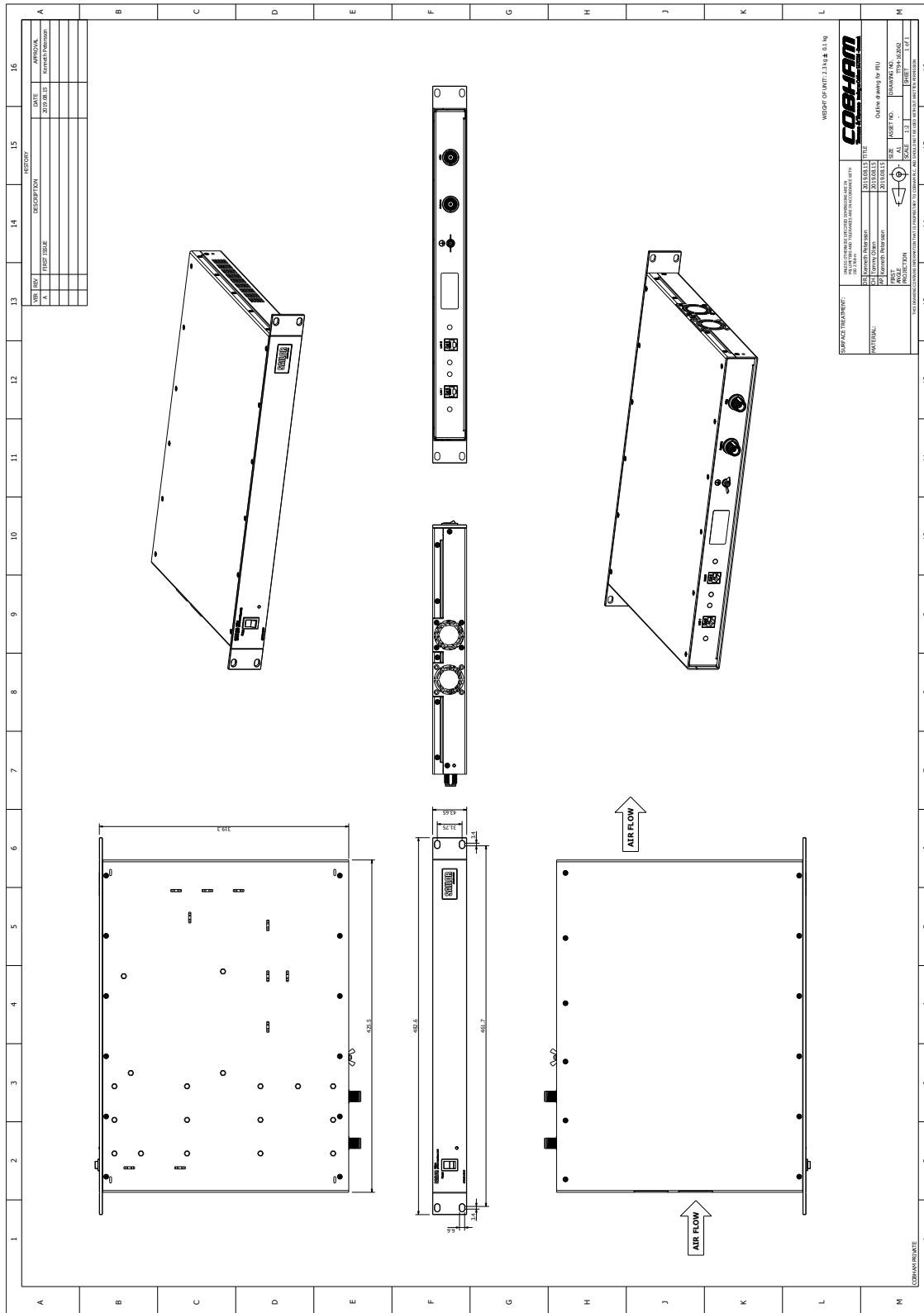


Figure A-3: Outline drawing: PIU

Ground and RF protection

This appendix has the following sections:

- *Why is a ground connection required?*
- *Recommendations*
- *Alternative ground for steel hulls*
- *Alternative ground for aluminum hulls*
- *Alternative ground for fibre glass hulls*
- *Separate ground cable*
- *RF interference*
- *Jumper cable for grounding*

B.1 Why is a ground connection required?

You must ground the SAILOR 900 Viasat Ka system for at least two reasons:

- Safety: Lightning protection of persons and equipment.
- Protection: ESD (Electro Static Discharge) protection of equipment.

B.1.1 Safety

A ground connection of the system is required for safety reasons. In the event of a lightning strike at the ADU a proper ground connection of the system will provide a low resistance path to divert the strike discharge to seawater.

B.1.2 ESD Protection

The ESD protection circuits in the PIU rely on proper grounding of the system in order to work properly. Otherwise sensitive circuits within the PIU might be damaged due to ESD when you are handling the equipment.

B.2 Recommendations

B.2.1 To ground the PIU

To ground the PIU do as follows:

1. Ground the PIU to the ship/hull. For this purpose you may use a short ADU cable and a grounding kit.
2. Further, the PIU must be grounded at its grounding stud in order to ensure proper grounding if the short ADU cable is disconnected. For further information, see *To ground the ACU* on page 3-23.

If you use the Extended cable support, make the ground connections through the cable support. You may need to extend the ground plane using copper foil, see the following section.

To extend the ground plane

In some cases it may not be possible to access the hull and at the same time place the PIU in a suitable place. A way to ensure good grounding and at the same time make it possible to ground the coax cable - is to extend the ship ground plane by means of copper foil. The maximum length of the foil is determined by the width of the foil:

- Copper foil 5 cm wide: Max 50 cm
- Copper foil 10 cm wide: Max 100 cm
- Copper foil 20 cm wide: Max 200 cm

Note | The foil must be at least 0.1 mm thick.

Do as follows:

1. Connect the foil to the hull by plenty of screws or hard-soldering.
2. Run the foil past the place where the short ADU cable is to be grounded and mount a grounding kit on top of the foil. For details on the jumper cable see *Jumper cable for grounding* on page B-11.

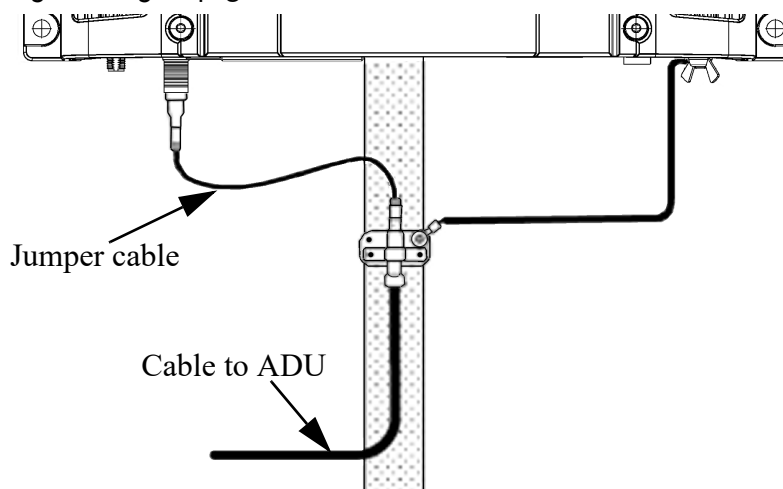


Figure B-1: Extending the ground plane

Per used jumper cable the maximum cable length of the cable to the antenna is reduced by:

- Enviroflex 400: 1.25 m
- SPUMA 400-FR: 6 m
- SUCOFEEED 1/2" FR: 10 m

B.2.2 To ground the ADU

To ground the ADU do as follows:

1. Ground the ADU to the ship/hull via one or more of its mounting bolts.
2. Make sure to remove painting, dirt, grease etc. at the mounting holes in order to make good electrical contact to the hull.
3. Use serrated washers when securing the mounting bolts and seal the joint with protective coating to avoid corrosion.

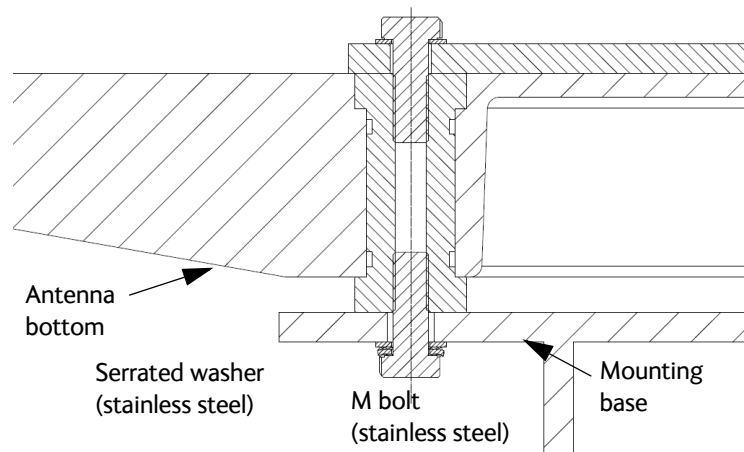


Figure B-2: Grounding the ADU

Note For optimum grounding use the mounting bolt located closest to the ADU cable plate, see *To ground the ADU* on page 3-20.

It is always recommended to establish the shortest possible grounding path e.g. on steel hulls the ADU should be grounded directly to the hull². However, due to the fact that this is not possible on e.g. fibreglass hulls (nor is it preferable on aluminium hulls) a number of alternative grounding methods are suggested in the following paragraphs.

2. Note that the ADU ground connection is made at the same electrical ground potential as the PIU.

B.3 Alternative ground for steel hulls

The following guidelines assume a two-wire, isolated grounding arrangement; that is no part of the circuit, in particular the battery negative, is connected to any ground potential or equipment.

B.3.1 To ground the PIU

To ground the PIU do as follows:

1. Ground the PIU preferably to the ship with the short cable.
2. Further, ground the PIU at its grounding stud in order to ensure a proper grounding if the short ADU cable is disconnected.
3. Establish the ground connection either at the hull (recommended) or at a dedicated RF ground if available (alternative).

Important

However, bear in mind that the ADU ground connection must be made at the **same electrical ground potential as the PIU** (see *To ground the ADU* on page B-4).

The PIU provides galvanic isolation (as required) from its input power terminals to the chassis/grounding stud. This way the isolated grounding arrangement is maintained.

B.3.2 To ground the ADU

Note

For optimum grounding use the mounting bolt located closest to the ADU cable plate, see *To ground the ADU* on page 3-20.

Terminal grounded at the hull (recommended)

In this case the ADU is grounded to the ship via one (or more) of its mounting bolts.

1. Make sure to remove painting, dirt, grease etc. at the mounting holes in order to make good electrical contact to the hull.
2. Use serrated washers when securing the mounting bolts and seal the joint with protective coating to avoid corrosion.

Terminal grounded at a dedicated RF ground (alternative)

In this case the ADU is grounded with a separate ground cable.

1. Route the ground cable parallel and close to the shielded coax cable connecting the ADU to the PIU grounding kit.
2. You can use a heavy gauge wire with tinned strands (min. 6 mm²) for this purpose.

Note The ADU must be electrically isolated at its mounting bolts by means of shoulder bushings and washers ensuring the isolated RF ground - see *Isolation of the ADU from the mounting base* on page B-9.

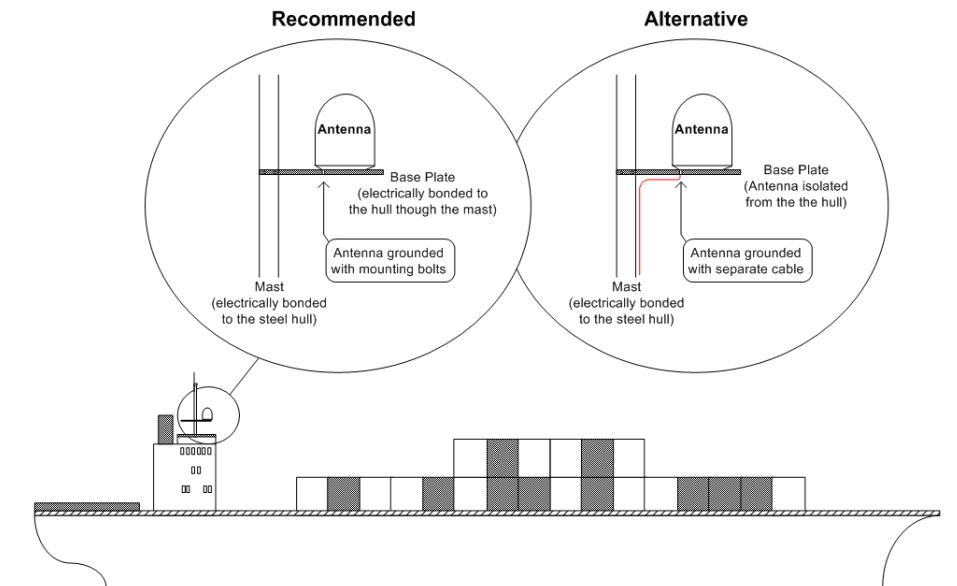


Figure B-3: Grounding at a dedicated RF ground (alternative)

B.4 Alternative ground for aluminum hulls

The following guidelines assume a two-wire, isolated grounding arrangement; that is no part of the circuit, in particular the battery negative, is connected to any ground potential or equipment.

B.4.1 To ground the PIU

To ground the PIU do as follows:

1. Ground the PIU preferably with the short cable.
2. Ground the PIU at its grounding stud to ensure a proper grounding if the short ADU cable is disconnected.
3. Establish the ground connection at a dedicated RF ground (either capacitively or electrically coupled).

Important

Remember to make the ADU ground connection at the **same electrical ground potential** as the PIU (see *To ground the ADU*).

The PIU provides galvanic isolation (as required) from its input power terminals to the chassis/grounding stud. This way the isolated grounding arrangement is maintained.

B.4.2 To ground the ADU

To ground the ADU do as follows:

1. If the mounting base of the ADU is electrically connected to the hull (or any other ground potential than the PIU), isolate the ADU at its mounting bolts by means of shoulder bushings and washers, see B.6.3. This is done in order to prevent DC currents flowing in the hull thus causing electrolytic corrosion.
2. However, you must establish a ground connection via one of the mounting bolts and a separate ground cable.
3. Route the ground cable parallel and in close proximity to the shielded coax cable hence connecting the ADU to the PIU Grounding kit. Use a heavy gauge wire with tinned strands (min. 6 mm²) for this purpose.

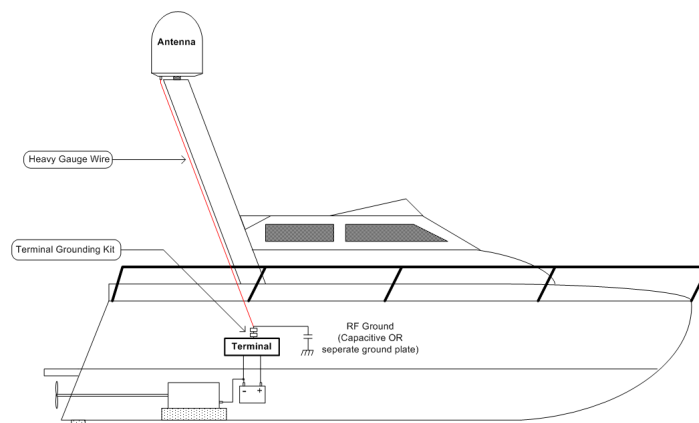


Figure B-4: Alternative grounding for aluminium hulls

B.5 Alternative ground for fibre glass hulls

B.5.1 To ground the PIU

To ground the ACU do as follows:

1. Preferably ground the PIU with the short ADU cable and a grounding kit (available from Thrane & Thrane A/S).
2. Ground the PIU at its grounding stud in order to ensure a proper grounding if the short ADU cable is disconnected.
3. You must establish the ground connection at a dedicated RF ground (either capacitive or electrical coupled).

Important

Bear in mind that the ADU ground connection is to be made at the **same electrical ground potential** as the PIU (see *To ground the ADU*).

B.5.2 To ground the ADU

To ground the ADU do as follows:

1. If the mounting base of the ADU is electrically connected to any other ground potential than the PIU (e.g. Lightning Ground), you must isolate the ADU at its mounting bolts with shoulder bushings and washers - see section B.6.3.
2. However, you must establish a ground connection via one of the mounting bolts with a separate ground cable.
3. You must route the ground cable in parallel and in close proximity to the shielded coax cable hence connecting the ADU to the PIU Grounding kit. Use a heavy gauge wire with tinned strands (min. 6 mm²) for this purpose.

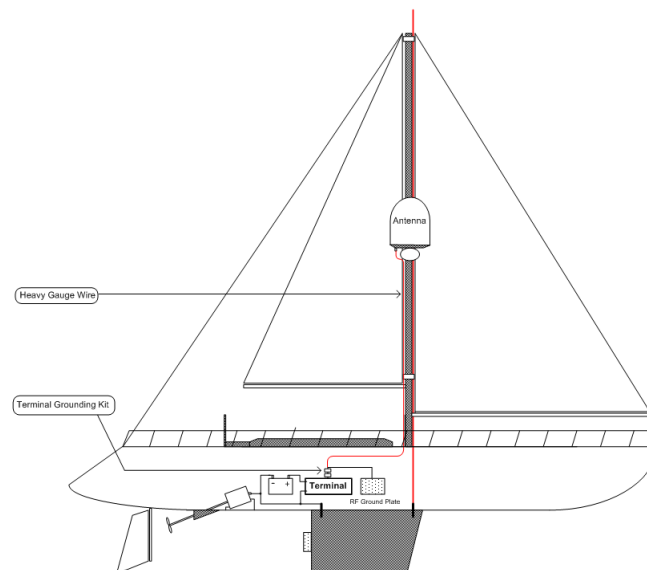


Figure B-5: Alternative grounding for fibreglass hulls

B.6 Separate ground cable

B.6.1 To make a ground cable

When dealing with electrical installations in a marine environment, all wiring must be done with double insulated, tinned strands, high quality and if exposed also UV resistant cables. This shall also apply to the separate ground cable mentioned in the previous paragraphs.

The ground cable is made using an appropriate cable with a cross section area of at least 6 mm² (AWG10) and terminated with insulated ring crimp terminals, see the illustration below. The crimp terminals must be a marine approved type e.g. the DuraSeal series from Raychem.

B.6.2 Ground cable - connection

To mount the ground cable do as follows:

1. Mount the ground cable close to and parallel to the shielded coax cable thus minimizing ground loop problems. If possible, route the coax cable and the ground cable in metal conduits bonded to the hull or within a mast (depending on the actual installation).
2. Connect the ground cable at one of the mounting/grounding bolts on the ADU.
3. Use bolts and washers of stainless steel and seal the joint with protective coating to avoid corrosion.
4. If the ADU is to be isolated from the mounting base, use shoulder bushings and washer, see figure B-6, *Isolation of the ADU from the mounting base* on page B-9.
5. At the other end, connect the ground cable as described in *To ground the PIU* on page B-2.

B.6.3 Isolation of the ADU from the mounting base

In cases where the ADU is to be isolated from the mounting base, do as follows:

1. Use shoulder bushings and washers (accessories) as illustrated below. Note that the isolation must be implemented on all four mounting bolts (including the bolt securing the ground cable).

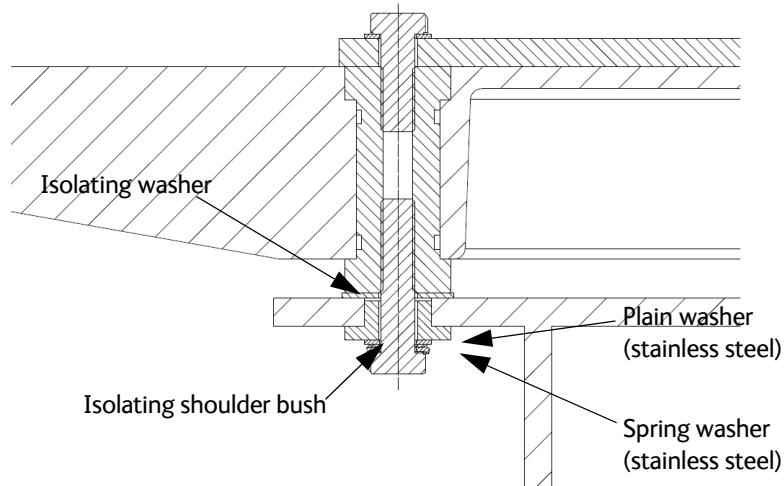


Figure B-6: Isolation of the ADU from the mounting base

2. Connect the ground cable at one of the mounting/grounding bolts on the ADU as illustrated below.
3. Seal the joint with protective coating to avoid corrosion.

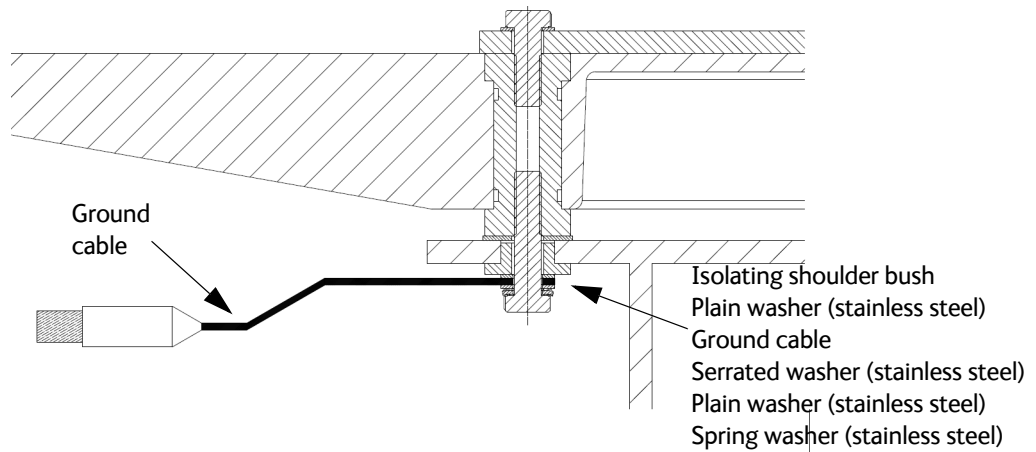


Figure B-7: ADU isolation and grounding cable

B.7 RF interference

Interference induced from nearby high-power RF transmitters might cause system failures and in extreme cases permanent damage to the SAILOR 900 Viasat Ka equipment.

If there are problems with interference from HF transmitters, do as follows:

1. Mount ferrite clamps on the coax cable in order to provide suppression of induced RF. The ferrites will have no effect on the differential-mode signals but increases the impedance in relation to common-mode RFI.
2. Use 1-5 pcs. hinged clamp cores (e.g. the RFC or SFC series from Kitagawa) mounted on the ADU cable near the ADU.

B.8 Jumper cable for grounding

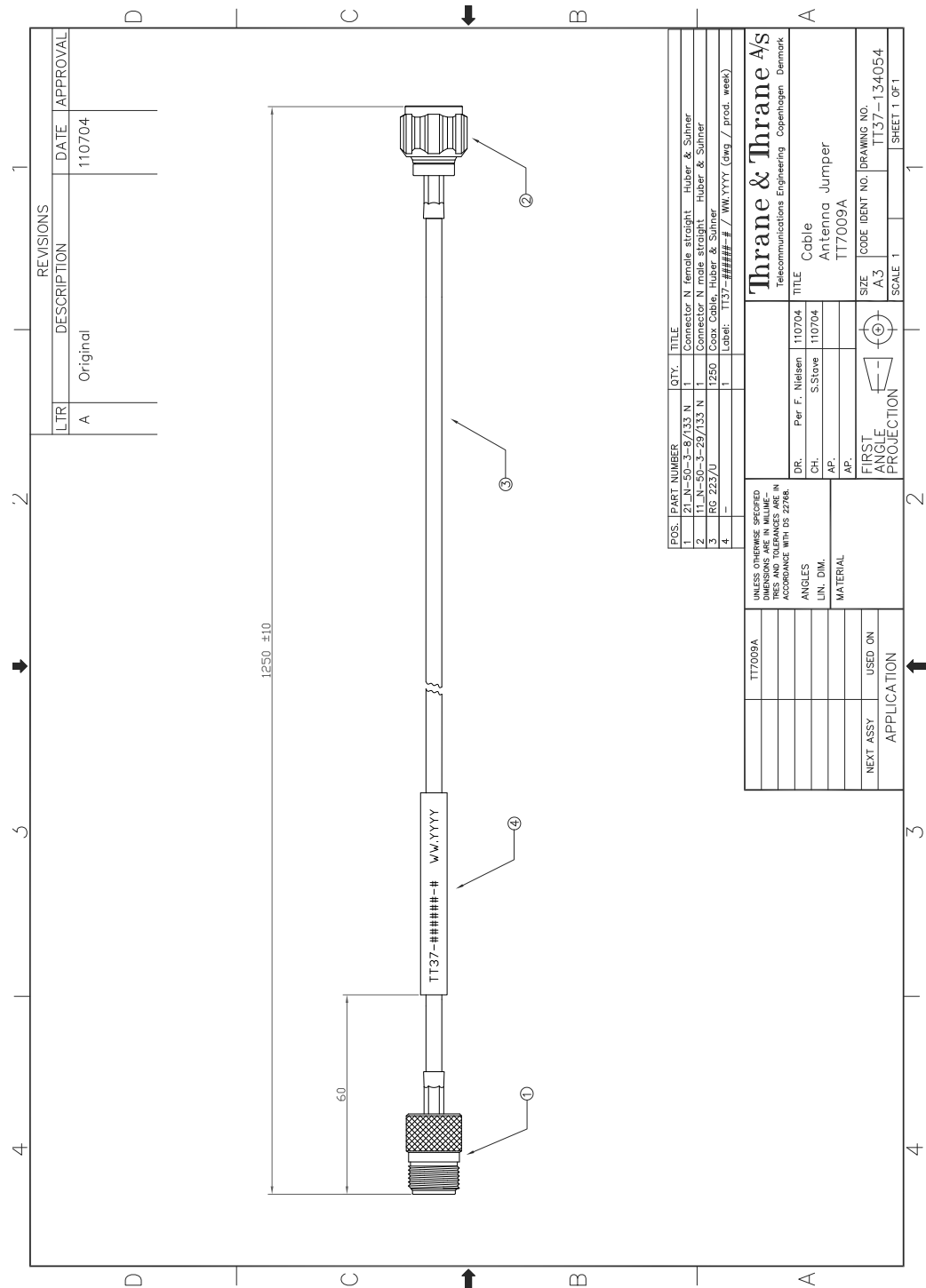


Figure B-8: Jumper cable for grounding (specifications)

System messages

This appendix has the following sections:

- *Event messages – overview*
- *List of ADU events*
- *List of ACU events*

C.1 Event messages – overview

The SAILOR 900 Viasat Ka detects events during

- POST (Power On Self Test) – a self test performed at every power-up.
- PAST (Person Activated Self test) – started in the web interface
- CM (Continuous Monitoring) – automatically performed while the system is in operation.

When the SAILOR 900 Viasat Ka detects an event that requires your action, it issues an event message and the red Fail/Pass LED in the LED panel of the ACU is lit. As long as an event is active, it is shown in the ACU display, the Control Panel and the web interface (in HELPDESK > Event list or click the event icon on the DASHBOARD).

Note

Active events and notifications are shown. As soon as the event is cleared, it is not displayed any longer. It is then moved to the Notifications section. Notifications are cleared after 24 hours.

State the Event ID when contacting your service partner.

The event description might contain a number of digits in brackets, e.g. (00000005). This is supplemental information and used for service and diagnostics purposes.

Note that the following sections cover the system messages for all SAILOR VSAT antennas. Some of the events may not be relevant for the antenna described in this manual.

C.2 List of ADU events

List of 29-10-2019

Error code (ID)	Unit	Severity	Description	Explanation
0A001-0	Antenna	ERROR	Production data	Production data is invalid.
0A002-0	Antenna	ERROR	XIM internal	Antenna configuration data stored in the PCM module is invalid.
0A003-0	Antenna	ERROR	XIM external	Antenna configuration data stored in the VIM module is invalid.
0A004-0	Antenna	ERROR	XIM I/X match	Antenna configuration data stored in the PCM module does not match the configuration data stored in the VIM module.
0A005-0	Antenna	ERROR	Antenna type	The configured antenna type is not supported or unknown.
0A006-0	Antenna	ERROR	PCM FPGA load	The PCM FPGA cannot be initialised and loaded correctly.
0A007-0	Antenna	ERROR	XIM FPGA load	The VIM FPGA cannot be initialised and loaded correctly.
0A008-0	Antenna	ERROR	XIM production	Production/calibration data stored in the VIM module is invalid.
0A00A-0	Antenna	ERROR	GNSS initialisation	The GNSS device cannot be initialised. Check cable and GNSS device.
0A014-0	Antenna	ERROR	AMB device discovery	Missing one or more of the following devices: ISM, DDM/DMD/FDM and PMM. Check cables.
0A015-0	Antenna	ERROR	Azi DDM ABS device	Cannot initialise the azimuth DDM/DMD/FDM. Info: 0x00000000: Device not found (possible cabling problem) 0x0000bbaa: Device internal error (replace device) aa=status, bb=state.
0A016-0	Antenna	ERROR	Xel DDM ABS device	Cannot initialise the cross-elevation DDM/DMD/FDM. Info: See 0A015-0.
0A017-0	Antenna	ERROR	Ele DDM ABS device	Cannot initialise the elevation DDM/DMD/FDM. Info: See 0A015-0.
0A018-0	Antenna	ERROR	ISM ABS device	Cannot initialise the ISM Info: 0x00000000: Device not found (possible cabling problem) 0x000cbbaa: Device internal error (replace device) aa=status, bb=state, c=calibration data error.

Table C-1: ADU event messages

Error code (ID)	Unit	Severity	Description	Explanation
0A019-0	Antenna	ERROR	PMM ABS device	Cannot initialise the PMM. Info: See 0A015-0.
0A01A-0	Antenna	ERROR	BCM ABS device	Cannot initialise the BCM. Info: See 0A015-0.
0A01E-0	Antenna	ERROR	Sensor sanity	Too many invalid values measured by the ISM during initialisation. Check for vibrations or malfunctioning ISM.
0A021-0	Antenna	ERROR	Azi axis calibration	Azimuth axis zero reference not found. Check belt and zero reference module. Info: 0x00000001: Timeout (operation did not complete in time) 0x00000010: Encoder or mechanical problem 0x00000020: Zero reference not found 0x00000040: End stop not found.
0A022-0	Antenna	ERROR	Xel axis calibration	Cross-elevation axis zero reference or end stops not found at expected locations. Check belt, zero reference module, and end stops. Info: See 0A021-0.
0A023-0	Antenna	ERROR	Ele axis calibration	Elevation axis zero reference or end stops not found at expected locations. Check belt, zero reference module, and end stops. Info: See 0A021-0.
0A025-0	Antenna	ERROR	Antenna calibration	One or more errors occurred during antenna start-up Info: 0x00000001: Timeout (calibration did not complete in time) 0x00000010: Azimuth axis 0x00000020: Cross-elevation axis 0x00000040: Elevation axis 0x00000080: Polarisation axis
0A028-0	Antenna	ERROR	Demodulator load	The second receiver demodulator cannot be initialised and loaded correctly.
0A029-0	Antenna	ERROR	XIM PLL lock	The PLL on the VIM does not lock.
0A02B-0	Antenna	ERROR	ABS software version	The ABS software version in the antenna is too old to match the hardware requirements. Upload new software via the web interface.
0A02D-0	Antenna	ERROR	BUC reference switch	The BUC reference switches do not work. Check PCM-VIM cable and replace cable, VIM or PCM.
0A034-0	Antenna	WARNING	ACU communication	The communication link between ACU and antenna is not working.
0A035-0	Antenna	WARNING	ISM data valid	Sensor measurements from the ISM are invalid. This indicates a malfunctioning ISM.
0A036-0	Antenna	WARNING	ISM data range	Sensor measurements from the ISM are out of range.
0A037-0	Antenna	WARNING	GNSS communication	Lost connection to the GNSS device.

Table C-1: ADU event messages (Continued)

Error code (ID)	Unit	Severity	Description	Explanation
0A038-0	Antenna	WARNING	GNSS data range	Received information from the GNSS device which is out of range.
0A039-0	Antenna	WARNING	GNSS device warning	Local GNSS device warning.
0A03A-0	Antenna	WARNING	GNSS device error	Local GNSS device error.
0A03B-0	Antenna	ERROR	Azi DDM shutdown	The azimuth motor control has detected one of the following situations: Extreme temperature, voltage, current or velocity. The motor was then shut down. This is usually a temporary situation and is probably fixed by a restart of the system.
0A03C-0	Antenna	ERROR	Xel DDM shutdown	As Azi DDM/DMD/FDM shutdown but detected by the cross-elevation motor control.
0A03D-0	Antenna	ERROR	Ele DDM shutdown	As Azi DDM/DMD/FDM shutdown but detected by the elevation motor control.
0A03E-0	Antenna	ERROR	PMM shutdown	As Azi DDM/DMD/FDM shutdown but detected by the polarisation motor control.
0A03F-0	Antenna	WARNING	AMB timing	This indicates a busy situation. It may occur during installation procedures. No user interaction is required unless it occurs repeatedly.
0A040-0	Antenna	WARNING	VIM cable attn	The output power cannot be controlled correctly. Check the Tx chain.
0A043-0	Antenna	WARNING	LNB voltage low	The voltage for the LNB is too low probably caused by a malfunctioning VIM or LNB.
0A044-0	Antenna	WARNING	LNB voltage high	The voltage for the LNB is too high probably caused by a malfunctioning VIM.
0A047-0	Antenna	ERROR	VIM PLL lock	The PLL of the VIM is out of lock. Check the 10 MHz reference signal.
0A048-0	Antenna	WARNING	VIM tuner lock	The PLL of the second receiver (DVB) is out of lock. Check the 10 MHz reference signal.
0A049-0	Antenna	WARNING	Azi encoder slip	A slip of the azimuth encoder has been detected. If this event is not resolved by itself after some time, check the belt and encoder of the azimuth axis.
0A04A-0	Antenna	WARNING	Xel encoder slip	A slip of the cross-elevation encoder has been detected. If this event is not resolved by itself after some time, check the belt and encoder of the cross-elevation axis.
0A04B-0	Antenna	WARNING	Ele encoder slip	A slip of the elevation encoder has been detected. If this event is not resolved by itself after some time, check the belt and encoder of the elevation axis.

Table C-1: ADU event messages (Continued)

Error code (ID)	Unit	Severity	Description	Explanation
0A04D-0	Antenna	WARNING	GNSS position	No position available from the GNSS device or position too old.
0A04E-0	Antenna	WARNING	GNSS velocity	No velocity available from the GNSS device.
0A04F-0	Antenna	WARNING	Heading data	Heading information is missing in the antenna.
0A050-0	Antenna	ERROR	Azi DDM communication	Communication error between PCM and azimuth DDM/DMD/FDM. Check SUB-D connectors and cables.
0A051-0	Antenna	ERROR	Xel DDM communication	Communication error between PCM and cross-elevation DDM/DMD/FDM. Check SUB-D connectors and cables.
0A052-0	Antenna	ERROR	Ele DDM communication	Communication error between PCM and elevation DDM/DMD/FDM. Check SUB-D connectors and cables.
0A053-0	Antenna	ERROR	ISM communication	Communication error between PCM and ISM. Check SUB-D connectors and cables.
0A054-0	Antenna	ERROR	PMM communication	Communication error between PCM and PMM. Check SUB-D connectors and cables.
0A055-0	Antenna	WARNING	Azi DDM warning	The azimuth motor controller has temporarily observed an unusual situation for temperature, voltage, current or velocity. No user interaction required.
0A056-0	Antenna	WARNING	Xel DDM warning	The cross-elevation motor controller has temporarily observed an unusual situation for temperature, voltage, current or velocity. No user interaction required.
0A057-0	Antenna	WARNING	Ele DDM warning	The elevation motor controller has temporarily observed an unusual situation for temperature, voltage, current or velocity. No user interaction required.
0A058-0	Antenna	WARNING	PMM warning	The polarisation motor controller has temporarily observed an unusual situation with regards to temperature, voltage, current or velocity. No user interaction required.

Table C-1: ADU event messages (Continued)

Error code (ID)	Unit	Severity	Description	Explanation
0A059-0	Antenna	WARNING	Azi cal. limits	Check limits of the calibration result for the azimuth axis are exceeded. Pointing performance may be degraded. Info: 0x00000040: End stop detected before expected limit 0x00000100: Zero width is low 0x00000200: Zero width is high 0x00000400: Zero slack is high 0x00001000: Friction average is high 0x00002000: Friction peak is high 0x00004000: Friction asymmetry is high Zero width low/high: Zero reference module placement may be incorrect. Zero slack high: Mechanical slack may be too high. Friction average/peak high: Mechanical friction is higher than expected. Friction asymmetry high: Mechanical imbalance may be too high.
0A05A-0	Antenna	WARNING	Xel cal. limits	Check limits of the calibration result for the cross-elevation axis are exceeded. Pointing performance may be degraded. Info: See 0A059-0.
0A05B-0	Antenna	WARNING	Ele cal. limits	Check limits of the calibration result for the elevation axis are exceeded. Pointing performance may be degraded. Info: See 0A059-0.
0A05D-0	Antenna	WARNING	ISM warning	The ISM has temporarily observed an unusual situation for temperature or voltage. No user interaction required. If repeated after cooldown and reboot, check if the ISM or cables around it are defective.
0A05E-0	Antenna	WARNING	Low elevation	The antenna is not allowed to transmit because the elevation is too low.
0A05F-0	Antenna	WARNING	Heading range	Heading data range error. External heading unit supplies unreliable data.
0A062-0	Antenna	WARNING	High elevation	The antenna cannot perform acquisition in gyro-free mode because the elevation is too high.
0A063-0	Antenna	WARNING	BCM warning	The BCM has observed an unusual situation with regards to the PLL. If the situation persists, check the BCM.
0A064-0	Antenna	ERROR	BCM communication	Communication error between PCM and BCM. Check SUB-D connectors and cables.
0A065-0	Antenna	ERROR	Deploy/Stow	Deploy/stow error. The antenna did not properly unlock (deploy), or the stow switch never closed (stow).

Table C-1: ADU event messages (Continued)

Error code (ID)	Unit	Severity	Description	Explanation
0A066-0	Antenna	ERROR	OMT error	Problem with OMT. Temperature out of range or OMT cable may be broken.
0A067-0	Antenna	WARNING	Automatic stow	The antenna automatically stowed because it detected significant movement.
0A068-0	Antenna	WARNING	Polarisation tuning	Polarisation tuning was not successful. Polarisation may be incorrect.
0A069-0	Antenna	ERROR	BCM error	The BCM PLL failed to initialize.
0A06A-0	Antenna	WARNING	Missing BUC response	No response received from the BUC.
0A06C-0	Antenna	FATAL	Antenna base tilt	Antenna base tilted beyond limit.
0A06D-0	Antenna	WARNING	VMU reference distribution	VMU reference signal not present at BCM, but is present at ACU. Check coax cable between VIM and BCM.
0A06E-0	Antenna	WARNING	Antenna orientation	The terminal is oriented in a way that prevents it from pointing to the selected satellite.

Table C-1: ADU event messages (Continued)

C.3 List of ACU events

List of 29-10-2019

Error code (ID)	Unit	Severity	Description	Explanation
08073-0	ADM	WARNING	Slave connection	The system is configured as a dual antenna master, but no dual antenna slave is connected to it. Either disable the dual antenna master in the web interface or configure a another system as a dual antenna slave.
08074-0	ADM	WARNING	Master connection	The system is configured as a dual antenna slave, but it was not possible to connect to the dual antenna master. Check that the IP address entered in the modem profile is correct and check that the master and slave systems are physically connected as described in the manual.
08075-0	ADM	WARNING	Rx cable calibration	The calibration of the ACU-antenna cable failed. The cable could be defective, too long, of too poor quality, not properly connected, or the VIM or ACU hardware could be defective.
08076-0	ADM	WARNING	Dual mode configuration	The system is configured as a dual antenna system, but the system setup is invalid. The dual mode function may not work properly or performance could be degraded. Info code: xxxxxxx1 = Antenna types are different, they must be identical xxxxxxx2 = Master or Slave hardware does not support dual mode operation. xxxxxxx3 = Software version on master and slave are different, they must be identical.
08078-0	ADM	WARNING	VMU TX frequency invalid	The satellite modem did not provide a Tx frequency, or it is invalid. A default Tx frequency is assumed, but this may degrade Tx performance. To remove this warning re-configure the modem to provide the correct Tx frequency.
08079-0	ADM	WARNING	ACU Fan	Internal fan is malfunctioning.
0807A-0	ADM	WARNING	Automatic azimuth calibration pending	Automatic azimuth calibration mode is enabled. The system tries to perform an azimuth calibration using the target satellite whenever satellite data is received from the modem. After successful calibration the feature is automatically disabled and the system returns to normal operation. WARNING: If a system has not completed azimuth calibration after the installation, the blocking zones may appear to be at wrong angles.
0807B-0	ADM	WARNING	OTC required (Calibration outdated)	BUC calibration is outdated. Rerun it from the Core Module by using the One Touch Commissioning in the web interface.

Table C-2: ACU event messages

Error code (ID)	Unit	Severity	Description	Explanation
0807C-0	ADM	ERROR	System configuration	Invalid ACU / antenna combination.
0807E-0	ADM	WARNING	Keyline signal	The keyline signal on the dual antenna master does not match the keyline signal on the slave. Check that the keyline splitter cable is connected to the RS422 connectors. When fixed, the ACU's needs to be rebooted to clear the event.
0807F-0	ADM	WARNING	Local administration enabled	Local administration mode is currently enabled. This allows login without providing the admin password. Will be disabled after 1 hour or next reboot.
08080-0	ADM	WARNING	Satellite info mismatch	Currently selected manual satellite information does not match information from the modem. Please select another satellite for manual pointing.
08081-0	ADM	WARNING	BUC communication	Missing communication between VMU and BUC. Info: 0x00000001: From VMU to BUC Info: 0x00000002: From BUC to VMU
08083-0	ADM	WARNING	Friction test timeout	Friction test timeout. Info code format: 0xaaaaat, where aaaa = axis under test (0=Azi, 1=XEL, 2=EL) and tttt = timeout type. Info: 0xaaaa0001: Axis aaaa did not get ready for test in time Info: 0xaaaa0002: Axis aaaa test did not finish in time
08100-0	ADM	ERROR	PSM low voltage (22 V)	The ADM measures a different antenna voltage than expected. If the problem is not solved by a restart, and the PSM is not reporting any errors, the ADM is probably defective.
08101-0	ADM	ERROR	PSM high voltage (48 V)	The ADM measures a different antenna voltage than expected. Check for short circuit of the antenna coax connector. If the problem is not solved by a restart, and the PSM is not reporting any errors, the ADM is probably defective.
08102-0	ADM	ERROR	PSM 5 V power	Internal voltage supply error of the ADM.
08103-0	ADM	ERROR	ADM hotswap	The ACU is not able to supply the correct voltage to the antenna. Check for short circuits in coax cable and the antenna
08104-0	ADM	ERROR	Antenna communication	The ACU cannot communicate with the antenna. Check cable and antenna.
08107-0	ADM	ERROR	ADM FPGA load	The ADM FPGA cannot be initialised and loaded.
08108-0	ADM	ERROR	TX Power Detector calibration	The power detector calibration is not valid.

Table C-2: ACU event messages (Continued)

Error code (ID)	Unit	Severity	Description	Explanation
08109-0	ADM	ERROR	Antenna XIM data	There is a mismatch in the antenna configuration data. Either the PCM or the VIM in the antenna are malfunctioning or one of them has been replaced. In the latter case, select which is the original device in the web interface and restart the system.
0810A-0	ADM	ERROR	ADM production data	Production data has been corrupted.
0810B-0	ADM	ERROR	Antenna software version	An error has occurred during upload of software to the antenna, the antenna software version is not as expected. Either the software in the ACU does not meet the minimum version required by the antenna, the software image in the ACU is corrupted or the upload procedure failed because of a communication error.
0810C-0	ADM	ERROR	File system integrity	One or more file system partitions are corrupt. You may have lost your settings and collected statistics. If restarting the system does not help, contact your service partner.
0810E-0	ADM	ERROR	RF calibration	The RF calibration is not valid.
08800-0	ADM	ERROR	Internal power supply	An internal power supply voltage is outside its allowed range.
08801-0	ADM	ERROR	Input voltage too low	The input voltage to the power supply is too low. If running on battery, charge battery for correct operation.
08802-0	ADM	ERROR	Input voltage too high	The input voltage to the power supply is too high. If running on generator or inverter, check for correct operation.
08840-0	ADM	WARNING	Master PLL lock	The master PLL has lost lock. Check the input reference signal.
08841-0	ADM	ERROR	Tuner lock	The internal tuner PLL was unable to lock.
08842-0	ADM	WARNING	GSC demodulator	The GSC demodulator has reported an error.
08843-0	ADM	WARNING	DVBS demodulator	The DVBS demodulator cannot be initialised and loaded correctly.
08844-0	ADM	WARNING	BUC voltage	The BUC voltage is out of range.
08845-0	ADM	WARNING	LNB voltage	The LNB voltage is out of range. The LNB might be switched off to protect the power supply circuitry. Reactivate satellite profile to try again, check LNB cable and surroundings if the problem persists.
08880-0	ADM	ERROR	WLAN configuration error	Configuration of WLAN module failed.
08A00-0	ADM	WARNING	GX Core Module fan	There is a problem with the Core Module fan. Check/clean and replace if necessary.

Table C-2: ACU event messages (Continued)

Error code (ID)	Unit	Severity	Description	Explanation
08A01-0	ADM	WARNING	GX Core Module heater	There is a problem with the Core Module heater. Check and replace if necessary.
08A02-0	ADM	WARNING	GX Core Module temperature	The Core Module temperature is out of range. This may affect performance, and the Core Module will be shut down if the situation gets worse. If the "GX core module heating" event is also present, the internal heater is currently warming up the unit to its operational temperature.
08A03-0	ADM	ERROR	GX Core Module power	The Power Good signal from the Core Module is low. The issue can either be: - Internal Core Module or internal cable failure - Temperature of Core Module is too high and it has been turned off (*) - GMU has been manually switched off on the front panel (*) (*) = Only on systems with GMU.
08A04-0	ADM	WARNING	iDirect modem	The ACU detected a warning/error in the iDirect modem. Log into the modem for more information. Info: 0x00000001: Temperature error 0x00000002: Test error 0x00000004: Fan error
08A05-0	ADM	WARNING	GX Core Module heating	The GX core module heater is active. It will automatically be cleared when the core module reaches the operational temperature level.
09000-0	KDM	ERROR	KDM 3V3 supply	Internal 3V3 voltage supply error in the KDM.
09001-0	KDM	ERROR	KDM 12V supply	Internal 12V voltage supply error in the KDM.
09002-0	KDM	ERROR	KDM display	Display hardware error in the KDM.
09010-0	KDM	ERROR	KDM link/SW version	Link to the KDM module could not be established. Either the KDM board is malfunctioning, or - if the system software has just been updated - the software is too old and is not compatible with the KDM hardware.
0B000-0	PSM	ERROR	PSM production data	Missing or invalid production data in the PSM. Replace it.
0B001-0	PSM	ERROR	NMEA 2000 identifier	Missing or invalid production data in the PSM. Replace it.
0B010-0	PSM	ERROR	PSM link/SW version	Link to the PSM module could not be established. Either the PSM board is malfunctioning, or - if the system software has just been updated - the software is too old and is not compatible with the PSM hardware.

Table C-2: ACU event messages (Continued)

Error code (ID)	Unit	Severity	Description	Explanation
0B060-0	PSM	WARNING	NMEA 0183 parse error	Parse errors detected on the NMEA 0183 interface. Check NMEA 0183 cable, signal levels etc.
0B061-0	PSM	WARNING	Power supply temperature	ACU Power supply temperature is high. Improve ventilation or move to a cooler area. Info: 00000000 = Temperature warning, system still operational, but will shut down eventually if temperature keeps rising. 00000001 = Temperature critical, system has shut down to protect the hardware from overheating.

Table C-2: ACU event messages (Continued)

Command line interface

D.1 Introduction

After you have done the initial configuration and connected the SAILOR VSAT system to your network, you can use Telnet to configure the SAILOR VSAT system. You can also set up VSAT modem parameters. Note that the following sections cover the command line interface for all SAILOR VSAT antennas.

Some of the commands may not be relevant for the antenna described in this manual.

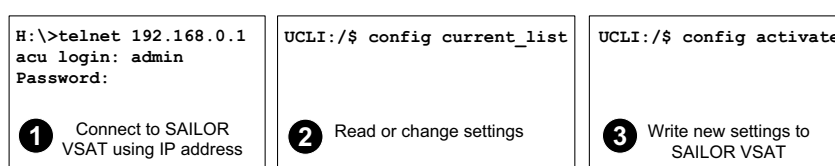


Figure D-1: How to use the command line interface (example for telnet)

After successful login you can read and change settings. Use the command **config activate** to activate the new settings in the ACU. You will need to refresh the browser window before the changed settings become visible.

Note Every change is performed on the active satellite profile or the active VSAT modem profile. Parameter identifiers are case sensitive.

D.1.1 Telnet connection

You can access the command line interface via Telnet.

Access to the SAILOR VSAT system system is protected by a user name and password. This is the same user name and password that is used in the web interface under **ADMINISTRATION**.

The interface is on the standard Telnet port 23 or SSH port 22. Use any LAN port and corresponding IP address of the ACU (except LAN 2 on GX/Ka ACU). To start telnet session do as follows:

1. Open a Telnet client of your choice.
2. At the prompt, enter the IP address of the ACU, login **admin** and password.

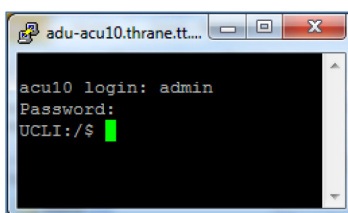


Figure D-2: Command line interface, login

D.1.2 Help

If you enter **help** directly at the prompt **UCLI : /\$** all available commands are listed. Additionally any command will take **help** as first argument and display detailed information of the specific command.

D.1.3 Conventions

The command description below uses the following special typography:

Convention	Description
Courier font	Information that is displayed on the screen.
Courier font	Text the user must enter.
<argument>	Required argument
[argument]	Optional argument

Table D-1: Command typography

Example: `satellite lon [longitude]
zone <id> active <yes | no>`

D.2 Supported commands

The following commands are described in detail. They are listed in alphabetical order.

- *config*
- *demo*
- *dual_antenna*
- *exit*
- *help*
- *modem*
- *satellite*
- *status*
- *system*
- *track*
- *zone*

D.2.1 config

Command	Description
<code>config</code>	Shows the sub commands available, including a short description.
<code>config pending_list</code>	Shows the number of pending changes.
<code>config current_list</code>	Shows the values for the current satellite profile, antenna and some tracking information.
<code>config discard</code>	Discards all pending changes.
<code>config activate</code>	Use this command to save and activate the pending changes in the SAILOR VSAT system.

Table D-2: UCLI command: `config`

D.2.2 demo

Command	Description
<code>demo start</code>	Starts a demo pattern where the antenna will turn azimuth, elevation and cross elevation until it receives the command <code>demo stop</code> .
<code>demo stop</code>	Stops the antenna demo pattern.
<code>demo reset</code>	Resets the antenna to angle 0.

Table D-3: UCLI command: `demo`

D.2.3 dual_antenna

Command	Description
<code>dual_antenna mode</code>	Shows the current dual antenna mode <ul style="list-style-type: none"> • single • master • slave
<code>dual_antenna status</code>	<ul style="list-style-type: none"> • Shows the current dual-antenna mode status • active • inactive

Table D-4: UCLI command: `dual_antenna`

D.2.4 exit

Command	Description
<code>exit</code>	Exits the connection to the SAILOR VSAT system.

Table D-5: UCLI command: `exit`

D.2.5 help

Command	Description
<code>help</code>	Shows a list of commands available, including a short description.
<code>help satellite</code>	Shows the sub commands and description for the command <code>satellite</code> .
<code>help modem</code>	Shows the sub commands and a short description for the command <code>modem</code> .
<code>help track</code>	Shows the sub commands and description for the command <code>track</code> .
<code>help status</code>	Shows the sub commands and description for the command <code>status</code> .
<code>help system</code>	Shows the sub commands and a short description for the command <code>system</code> .
<code>help config</code>	Shows the sub commands, unit and description for the command <code>config</code> .
<code>help zone</code>	Shows the sub commands, unit and description for the command <code>zone</code> .
<code>help demo</code>	Shows the sub commands, unit and description for the command <code>demo</code> .
<code>help dual antenna</code>	Shows the sub commands, unit and description for the command <code>dual antenna</code> .
<code>help exit</code>	Shows the sub commands, unit and description for the command <code>exit</code> .

Table D-6: UCLI command: `help`

D.2.6 modem

Command	Description
<code>modem</code>	Shows a list of sub commands available, including a short description.
<code>modem name</code>	Shows the VSAT modem name of the currently active satellite profile (entered in the web interface).
<code>modem model</code>	Shows the currently active VSAT modem model (selected in the web interface).
<code>modem gps_fix</code>	Shows the current GPS position
<code>modem gps_lat</code>	Shows the latitude value of the current position.
<code>modem gps_lon</code>	Shows the longitude value of the current position.

Table D-7: UCLI command: `modem`

D.2.7 satellite

Command	Description
<code>satellite name</code>	Shows the name of the currently active satellite profile.
<code>satellite lon</code> <code>satellite lon 1W</code>	Shows or sets the longitude position of the satellite, in degrees. <ul style="list-style-type: none"> 1.0W or 1.0E or -1.0 for west and 1.0 for east
<code>satellite skew</code> <code>satellite skew 3.7</code>	Shows or sets an additional skew offset of the satellite ^a . Some satellites have additional skew because they have been placed different in the orbit. E.g. Optus satellites in Australia are offset -45 degrees. Most satellites have 0 degree skew offset. <ul style="list-style-type: none"> Skew of the satellite: -90° to +90°.
<code>satellite max_inc</code> <code>satellite max_inc 2.5</code>	Shows or sets the maximum inclination of the used satellite. Some satellites are old and are therefore moving in larger circles in space. Setting the maximum inclination will add this to the SAILOR VSAT system acquisition window size used to find the satellite. <ul style="list-style-type: none"> Maximum inclination of satellite 0.0° to 90°

Table D-8: UCLI command: `satellite`

Command	Description
<pre>satellite rx_pol satellite rx_pol v</pre>	<p>Shows or sets the current RX polarization:</p> <ul style="list-style-type: none"> • v (vertical) • h (horizontal) • l (left) • r (right)
<pre>satellite tx_pol satellite tx_pol v</pre>	<p>Shows or sets the current TX polarization:</p> <ul style="list-style-type: none"> • v (vertical) • h (horizontal) • l (left) • r (right)
<pre>satellite ele_cut_off satellite ele_cut_off 5</pre>	<p>Shows or sets the elevation referenced to earth where the SAILOR VSAT system must shut off for transmission. This is an FCC requirement. The elevation cut off depends on how much power is transmitted and which coding is used.</p> <ul style="list-style-type: none"> • Valid range: 0° to 90°
<pre>satellite rx_lo</pre>	<p>Shows the Rx LO / LNB LO. Range: 9.6 GHz to 11.3 GHz. GX: 18.25 GHz</p>
<pre>satellite rx_rf_freq satellite rx_rf_freq 12.123456 9.75</pre>	<p>Shows or sets the Rx frequency and LNB Lo frequency.</p> <ul style="list-style-type: none"> • Ku band: RF frequency: 10.7 – 12.75 GHz. LNB Lo frequency: 9.6 GHz – 11.3 GHz. The SAILOR VSAT system supports any LNB Lo. • Ka band: RF frequency: 19.2 – 20.2 GHz. LNB Lo frequency: 18.25 GHz. <p>Note: Setting the Ku-band Rx frequency and LNB Lo automatically configures the L-band rx frequency: Rx L-band freq = rx_rf_freq – LNB Lo</p> <p>Example: 1567.890 MHz = 11.567890 GHz – 10 GHz</p>

Table D-8: UCLI command: `satellite` (Continued)

Command	Description
<pre>satellite rx_if_freq satellite rx_if_freq 1200.123 9.75</pre>	<p>Shows or sets the IF Rx frequency together with the LNB Lo frequency.</p> <ul style="list-style-type: none"> • Ku band: IF frequency within 950 MHz – 2150 MHz. LNB Lo frequency within 9.6 GHz – 11.3 GHz. The SAILOR VSAT system supports any LNB Lo. • Ka band: IF frequency within 950 MHz – 1950 MHz. LNB Lo frequency: 18.25 GHz. <p>Note: Setting the L-band Rx frequency and LNB Lo automatically configures the Ku-band Rx frequency: Rx Ku-band frequency = LNB Lo + rx_if_frequency</p> <p>Example: 11.567890 GHz = 10 GHz + 1567.890000 MHz</p>
<pre>satellite tx_lo</pre>	<p>Shows the current TX LO frequency, fixed at Ku band: 12.8 GHz Ka band: 28.05 GHz</p>
<pre>satellite tx_rf_freq satellite tx_rf_freq 14.123456</pre>	<p>Shows or sets the RF frequency used for tx.</p> <ul style="list-style-type: none"> • Valid range: Ku band: 13.75 GHz to 14.5 GHz. Ka band: 29 GHz to 30 GHz. <p>Note: Configuring the Ku-band tx frequency automatically configures the L-band frequency: L-band frequency = Ku-band tx frequency – 12.8 GHz (BUC Lo)</p> <p>Example: 1308.300000 MHz = 14.108300 GHz – 12.8 GHz</p>
<pre>satellite tx_if_freq satellite tx_if_freq 1200.123</pre>	<p>Shows or sets the IF frequency for tx.</p> <ul style="list-style-type: none"> • Valid range: Ku band: 950 MHz to 1700 MHz. Ka band: 950 MHz to 1950 MHz <p>Note: Configuring the L-band tx frequency automatically configures the Ku-band frequency: Ku-band frequency = 12.8 GHz (BUC Lo) + L-band frequency</p> <p>Example: 14.108300 GHz = 12.8 GHz + 1308.300000 MHz</p>

Table D-8: UCLI command: `satellite` (Continued)

a. Relevant for Ku band.

D.2.8 status

Command	Description
status	Shows the sub commands available, including a short description.
status system	Shows the current status of the SAILOR 900 Viasat Ka.
status track_all	Shows the current values for all tracking parameters: <ul style="list-style-type: none"> • vessel heading • azimuth relative • elevation relative • polarization skew • GPS latitude and longitude
status event_list	Shows a list of active events.

Table D-9: UCLI command: **status**

D.2.9 system

Command	Description
system	Shows the sub commands available, including a short description.
system restart	Sends a command to the ACU to restart the system instantaneously. It makes a power-on self test and then points to the last used satellite.
system info	Shows the software version, part names and serial numbers of the SAILOR 900 Viasat Ka.
system oem <OEM ID>	Set system OEM ID. 0: Cobham 1: Inmarsat 2: Furuno
bpo [on off]	Set Bearing performance optimization On or Off.

Table D-10: UCLI command: **system**

D.2.10 track

Command	Description
<code>track</code>	Shows the sub commands available, including a short description.
<code>track mode</code> <code>track mode dvb</code>	Shows or sets the receiver bandwidth or mode, the way the SAILOR 900 Viasat Ka tracks the satellite: <ul style="list-style-type: none"> • narrow (recommended, uses the built-in 300 kHz filter of the SAILOR 900 Viasat Ka) • rssi (uses the RSSI signal from the VSAT modem) • wide (uses the wide-band filter to track the satellite) • dvb (uses the built-in DVB-S2 receiver of the SAILOR 900 Viasat Ka to track the satellite. You must configure <code>dvb_sym</code> and <code>dvb_nid</code>.) • GSC (uses Inmarsat Global Signalling Channel) • GSCpwr (uses power of Inmarsat Global Signalling Channel)
<code>track dvb_sym</code> <code>track dvb_sym 22</code>	Shows or sets the current mega symbols rate for the DVB-S2 receiver when in dvb mode. The symbol rate used to verify and track a transponder. <ul style="list-style-type: none"> • Valid range: 0.1 — 99
<code>track dvb_nid</code> <code>track dvb_nid 0</code>	Shows or sets the DVB NID to be verified by the built-in DVB-S2 tracking receiver, when using tracking mode DVB. It configures the NID used to verify and track a transponder. <ul style="list-style-type: none"> • Valid range: 0 — 65535 A NID of '0' disables the NID check. Then the NID will be omitted in the verification of the transponder.
<code>track rx_rf_freq</code>	The frequency for the receiver to tune to. Verify that the frequency is in the same range as the modem <code>rx_rf_frequency</code> , above or below 11.7 GHz. If <code>rx_rf_freq</code> is set to 0, the tracking frequency is the same as the RX frequency provided by the modem <ul style="list-style-type: none"> • Valid range: Ku band: 10.7 GHz to 12.75 GHz Ka band: 19.2 GHz to 20.2 GHz

Table D-11: UCLI command: `track`

D.2.11 zone

Command	Description
<code>zone</code>	Shows the sub commands, unit and description for the command <code>zone</code> .
<code>zone <id> azimuth <start angle> <end angle></code>	Sets the azimuth angles of the blocking zone for one zone. <ul style="list-style-type: none">• Valid zones: 0 to 7• Valid angles: 0 to 360
<code>zone <id> elevation <start angle> <end angle></code>	Sets the elevation angles for a blocking zone. <ul style="list-style-type: none">• Valid zones: 0 to 7• Valid angles: 0 to 360
<code>zone <id> tx_off <yes no></code>	Enables or disables TX inside the blocking zone.
<code>zone <id> active <yes no></code>	Enables or disables the blocking zone.
<code>zone <id></code>	Shows the setting for the blocking zone.

Table D-12: UCLI command: `zone`

Approvals

This appendix lists the approvals for SAILOR 900 Viasat Ka:

- *CE (RED)*

E.1 CE (RED)

The SAILOR 900 Viasat Ka is CE certified (RED directive) as stated in the “Declaration of Conformity with RED Directive”, enclosed in copy on the next page.



EU Declaration of Conformity

Hereby Thrane & Thrane A/S trading as Cobham SATCOM declares that the following equipment complies with the specifications of:

RED directive 2014/53/EU concerning Radio Equipment

Equipment included in this declaration

Ku Models	Description	Part no.
7060C	SAILOR 600 VSAT Ku	
7080A	SAILOR 800 VSAT Ku	
7080B	SAILOR 800 VSAT Ku High Power	
7090B	SAILOR 900 VSAT Ku	
7090E	SAILOR 900 VSAT High Power	
Consists of		
7006C	SAILOR 600 VSAT Above Deck Unit (ADU)	407006C-xxx
7008A	SAILOR 800 VSAT Above Deck Unit (ADU)	407008A-xxx-01
7008B	SAILOR 800 VSAT Ku HP ADU	407008B-xxx
7009B	SAILOR 900 VSAT Above Deck Unit (ADU)	407009B-xxx-01
7009E	SAILOR 900 VSAT HP Above Deck Unit (ADU)	407009E-xxx
7016C	SAILOR Antenna Control Unit (ACU)	407016C-xxx

GX Models	Description	Part no.
7060A	SAILOR 60 GX	
7060F	SAILOR 60 GX High Power	
7090C	SAILOR 100 GX	
7090G	SAILOR 100 GX High Power	
Consists of		
7006A	SAILOR 60 GX Above Deck Unit (ADU)	407006A-xxx-01
7006F	SAILOR 60 GX High Power Antenna	407006F-xxx
7009C	SAILOR 100 GX Above Deck Unit (ADU)	407009C-xxx-01
7009G	SAILOR 100 GX HP Above Deck Unit (ADU)	407009G-xxx
7016C	SAILOR Antenna Control Unit (ACU)	407016C-xxx
7023A	SAILOR GX Modem Unit	407023A-xxx

Ka Models	Description	Part no.
7060B	SAILOR 600 VSAT Ka	
7090D	SAILOR 900 VSAT Ka	
Consists of		
7006B	SAILOR 600 VSAT Ka Above Deck Unit (ADU)	407006B-xxx-01
7009D	SAILOR 900 VSAT Ka Above Deck Unit (ADU)	407009D-xxx-01
7016C	SAILOR Antenna Control Unit (ACU)	407016C-xxx

Viasat Ka Models	Description	Part no.
7060D	SAILOR 600 Viasat Ka	
7090F	SAILOR 900 Viasat Ka	
Consists of		
7006D	SAILOR 600 Viasat Ka Antenna	407006B-xxx
7009F	SAILOR 900 Viasat Ka Antenna	407009D-xxx
7016C	SAILOR Antenna Control Unit (ACU)	407016C-xxx-001
7024A	SAILOR pTRIA Interface Unit	407024A-xxx

“xxx” is 3 characters, that determine the product branding, where only labels, logo and user interface varies.

The full text of the EU declaration of conformity is available at the following internet address:

<http://sync.cobham.com/satcom/support/downloads>

Document no.: 99-157422-E

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A

ABS	ADU Bus Slave
ACU	Antenna Control Unit
ADM	ACU Digital Module. A main processor board in the ACU.
AMB	Antenna Module Bus

C

CM	Continuous Monitoring
----	-----------------------

D

DDM	DC-Motor Driver Module
DHCP	Dynamic Host Configuration Protocol. A protocol for assigning dynamic IP addresses to devices on a network. With dynamic addressing, a device can have a different IP address every time it connects to the network.

E

ESD	ElectroStatic Discharge
-----	-------------------------

F

FBB	FleetBroadband
FPGA	Field Programmable Gate Array

G

GPL	General Public License, Software license, which guarantees individuals, organizations and companies the freedom to use, study, share (copy), and modify the software.
-----	---

H

HDT	HeaDing True, NMEA sentence.
HTTPS	HyperText Transfer Protocol Secure.

I

ISM	Inertial Sensor Module
-----	------------------------

K

KDM	Keyboard and Display Module of the ACU
-----	--

L

LAN	Local Area Network
LEN	Load Equivalent Number
LGPL	Lesser General Public License

N

NMEA National Marine Electronics Association (standard). A combined electrical and data specification for communication between marine electronic devices such as echo sounder, sonars, anemometer (wind speed and direction), gyrocompass, autopilot, GPS receivers and many other types of instruments. It has been defined by, and is controlled by, the U.S.-based National Marine Electronics Association.

P

PAST Person Activated Self Test

PCM Pedestal Control Module

PIM pTRIA Interface Module

POST Power On Self Test. A system test that is activated each time the system is powered on.

PSM Power Supply Module

R

RF Radio Frequency. Electromagnetic wave frequencies between about 3 kilohertz and about 300 gigahertz including the frequencies used for communications signals (radio, television, cell-phone and satellite transmissions) or radar signals.

RFI Radio Frequency Interference. A non-desired radio signal which creates noise or dropouts in the wireless system or noise in a sound system.

ROSS Roaming Oceanic Satellite Server

S

SMD Single Motor Driver Module

SSH Secure Shell. A network protocol for secure data communication, remote shell services or command execution and other secure network services between two networked computers that it connects via a secure channel over an insecure network. ,

U

UCLI User Command Line Interface

X

XIM Xim Interface Module, term for the module that connects the PCM and the ACU. X stands for one of various interface modules.

Z

ZRM Zero Reference Module

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