

OceanTRx7™

Maritime Stabilized VSAT System



Technical Note

Inertial Measurement Unit (IMU)

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Revision History and Control

Revision History

Rev #	Modified by	Date	Comments
.	Albert	September 24, 2013	New Release

About this Manual

This manual contains the required maintenance procedures as well as detailed instructions on how to replace and configure an IMU Inertial Measurement Unit (IMU) used with the OceanTRx7™ Maritime Satellite Communication System.

Text Conventions

Style	Indicates	Example
Text	Normal descriptive text	Contents
Text	Words or figures that appear on the screen or that should be typed The name of a file or directory	System Status
<Text>	A key to be pressed	<ESC>
TEXT	The name of a hardware component	ANTENNA
Text	The name of a GUI element	Operation Screen
➤	The description of a procedure	➤ To configure...

Notations



Indicates important information that should be noted.



Indicates a potential hazard.



Indicates the safest method of installation or an operation that *must be adhered to*.



Effective Releases

This document is effective for both OrBand™ AL-7107 and OceanTRx7™ systems.

For a description of the changes between OrBand™ AL-7107 and OceanTRx7™, refer to the *OceanTRx7™ Maritime Satellite Communication System Release Notes*.



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1 Introduction

1.1 Purpose

The purpose of this Technical Note is to provide detailed instructions on how to replace and configure an IMU.

1.2 Principles

The following principles must be followed when performing the procedures in this Technical Note.

1.2.1 Torque Table

The following table provides the torque that should be used when tightening screws of the listed types, as relevant.

Table 1-1: Torque Values

Screw Type	Torque
M8	25 ^N / _m
M6	10.2 ^N / _m
M5	6 ^N / _m
M4	2.5 ^N / _m
M3	1.35 ^N / _m

1.3 IMU Description

A strap-down solid-state INERTIAL MEASUREMENT UNIT (IMU) is installed on the PEDESTAL and provides extremely accurate dynamic readings of the platform's sea movement to the ACU. The ACU stabilizes the ANTENNA accordingly in real-time via the SERVO SUBSYSTEM.

The IMU reports the following data:

- Pitch and roll – Short-term data measured by two RATE-GYRO SENSORS dynamically integrated by the ACU with long-term data measured by two INCLINOMETERS.
- Yaw variations – Short-term data measured by a RATE-GYRO SENSOR, dynamically integrated by the ACU with long-term yaw data received from the ship's gyrocompass.



Figure 1-1: Inertial Measurement Unit

1.4 Spare Kit Contents

The following table provides a list of the parts in the IMU spare kit.


Table 1-2: Spare Part Kit Contents

KIT32-1664-006-SP		
P/N	Description	Quantity
30-0713-9-1	CABLE PEDESTAL TO IMU PANEL AL-7107	1
30-0713-9-4	CABLE POWER BOX OCEANTRX7™ TO IMU ORBANDTM AL-7107 AL-7107-SYS2	1
H06016072001	SCKT CAP SCR M6X20 ST.ST.	4
H20216091072	FLAT RD WASHER M6 SS 316	4
H28216091072	HELIC SPR WASHER M6 SS 316	4
L01323001	INERTIAL MEASUREMENT UNIT (IMU)	1

1.5 Required Tools and Parts

The following table provides a list of tools and customer-supplied parts that are needed to perform the procedures in this Technical Note.

Table 1-3: Required Tools and Parts

Tool/Part Name	Notes	Figure
Allen key, 5mm		

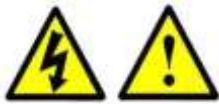
2 Preliminary Procedures

The preliminary procedure described below must be performed before replacing the IMU.

1. Perform System Shut-Down of the vessel's main power AC Voltage terminal outside the RADOME.
2. Open the RADOME hatch.
3. Switch off the ADE POWER BOX at the ANTENNA PEDESTAL base (located inside the RADOME).
4. Manually rotate the PEDESTAL AXES to gain convenient access to the serviced unit.



In the following procedures, be very careful when tightening and loosening the screws with which the parts are assembled and attached to the system. Some of these screws are delicate and can be damaged by excess force. When using an Allen key make sure to insert the key all the way into the screw head to avoid thread stripping.



WARNING!

The Utility Outlet is connected directly to the vessel's AC voltage input terminals (125 VAC / 250 VAC). Therefore, there still exists live voltage at the Utility Outlet after disconnecting the power supply to the ADE using the Mains Power On/Off Switch.

Only qualified and authorized personnel are allowed to carry out system service/maintenance procedures.

3 Replacing the IMU

3.1 Removing the IMU

➤ To Remove the IMU:

Step 1

Locate the IMU .



Step 2

Disconnect the IMU' S
connector.

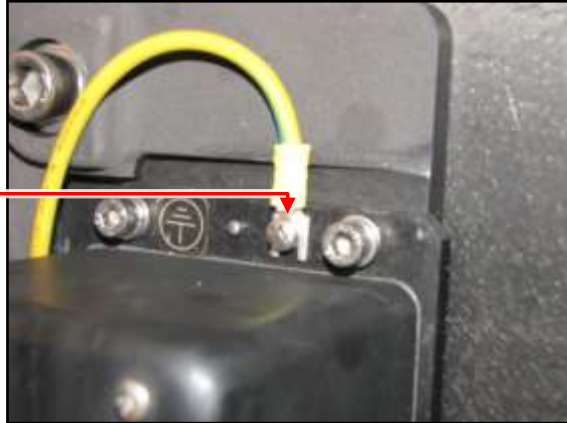


When replacing an IMU
(ANTENA ORBAND™ AL-
7107) with an IMU
(ANTENA OCEANTRX7™)
refer to Appendix A for a
cable replacement
description.



Step 3

Use a Philips screw driver to release and remove grounding cable.



Step 4

Remove four screws securing the IMU to the BASE PLATE, using a 5mm Allen key.



Step 5

Remove the IMU from the BASE PLATE.

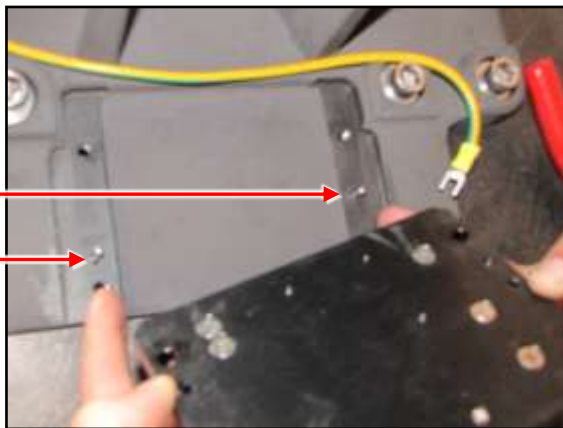


3.2 Installing an IMU

➤ To Install an IMU:

Step 1

Make sure the IMU and the BASE PLATE surfaces are clean of any debris.



Step 2

Install the IMU in its place on the BASE PLATE.



The two LEAD PINS on the BASE PLATE.

Step 3

Secure the IMU to the BASE PLATE using a 5mm Allen key.

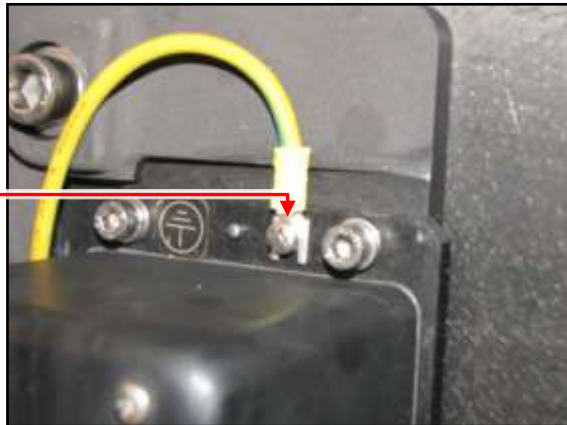


Step 4

Connect the IMU cable to the IMU connector.

**Step 5**

Use a Philips screw driver to tighten the grounding cable to the IMU.



4 Software

After the IMU has been replaced, perform the software procedures in this chapter.

4.1 Configuring the IMU Calibration File

➤ **To Configure the IMU Calibration File:**

1. Start up the system (see the *OceanTRx7™ Installation and Operation Manual* for instructions).
2. Activate the MTSDOCK application on the CCU.
3. Open the **ACU** menu and select **Connect**. The **Connect to ACU** dialog box appears.



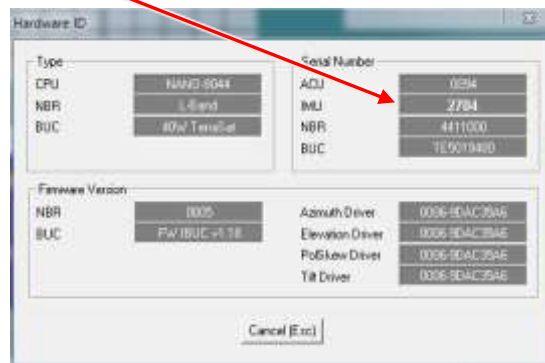
Figure 4-1: Connect to ACU Dialog Box

4. Verify that the correct ACU IP address appears in the **Network Address** field and click **OK (Enter)**. When the connection is established between the CCU and the ACU, a message box appears confirming the connection.
5. Open the ACU menu, select **Calibration**, then **Put IMU Calibration**.
6. Load the IMU calibration file from the USB drive.
7. Reboot the ACU.

4.2 Verifying System Function

➤ To Verify the System Function:

1. Check the MTSVLINK **System Messages** window for any messages related to the IMU.
2. In MTSVLINK **Config** menu then select **Hardware ID**. Check if the IMU serial number matching the SN of the installed IMU



3. Check the **Ship Coordinates** window and verify that the **Roll** and **Pitch** values are correct compared with ship navigation system. The **Yaw** value is consecutive to that of the compass readout. Verify no drift develops on **Roll, Pitch and Yaw** is tracking the **Compass** closely after at least 1 hour of operation

5 Appendix A: Replacing IMU's cable (OrBand™ AL-7107 with OceanTRX7™).

5.1 Removing IMU's Cable (Antenna ORBAND™ AL-7107)

➤ To Remove the IMU's Cable:

Step 1

Disconnect the IMU'S connector.

Step 2

Cut all tie wraps binding the IMU'S cable.

Step 3

Release the IMU'S plug from the POWER CONNECTION BOX.

Remove the IMU'S plug.



Step 4

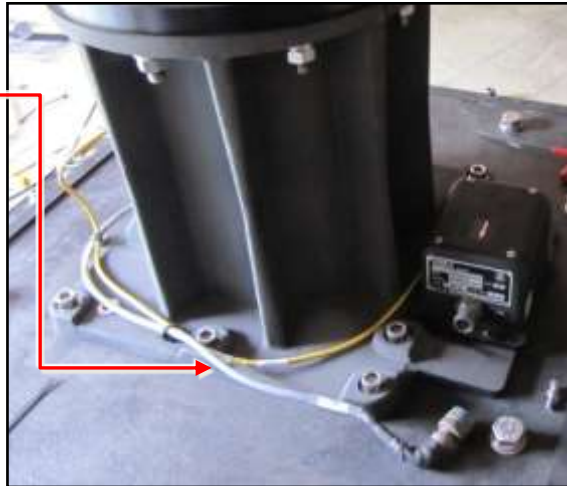
Remove IMU'S cable.

5.2 Installing IMU's (OceanTRX7™) Cable

➤ To Install the IMU's Cable:

Step 1

Route IMU'S new cable.



Step 2

Connect the IMU'S plug to
the POWER CONNECTION
BOX.



Hand tighten the plug
screws.

Step 4

Connect the IMU'S cable to
the IMU'S connector.



Step 5

Use tie wraps to secure
IMU'S cable.