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
Rev. A	Edox		

About this Manual

This manual is designed to guide you through the procedures required for maintaining the Inertial Measurement Unit (IMU) for 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 Release 1 (R1) and Release 2 (R2) of the OceanTRx7™ Maritime Satellite Communication System.

For a description of the changes between R1 and R2, refer to the *OceanTRx7™ Maritime Satellite Communication System Release Notes*.

Table of Contents

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 R2 TO IMU R1 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
PKG-049	PKG BOX 240X150X130mm RSC	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.

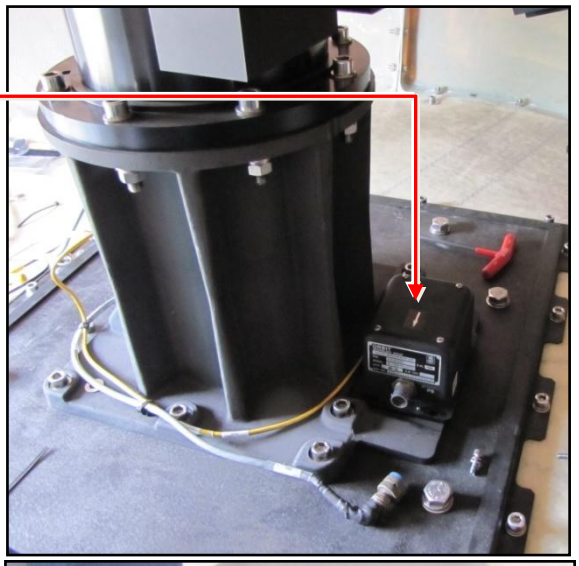
Only qualified and authorized personnel are allowed to carry out system service/maintenance procedures.

3 Replacing the IMU

3.1 Removing the IMU

Step 1

Locate the `IMU`.



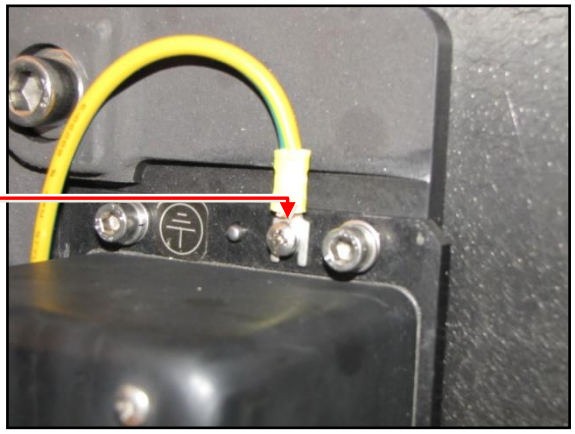
Step 2

Disconnect the `IMU's` connector.

Attention: When replacing an `IMU (ANTENA R1)` with an `IMU (ANTENA R2)` refer to Appendix A for a cable replacement description.

Step 3

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

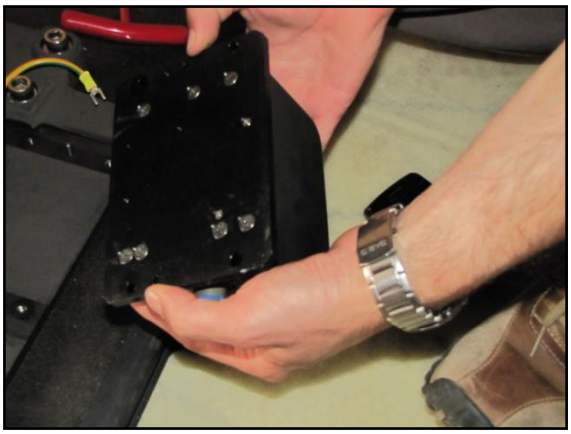


Step 4

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

Step 5

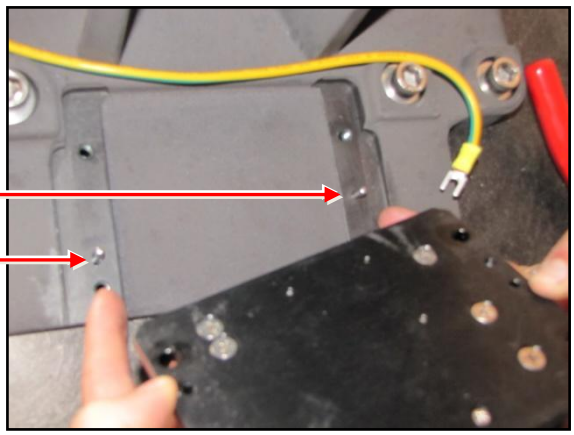
Remove the IMU from the BASE PLATE.



3.2 Installing an IMU

Step 1

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



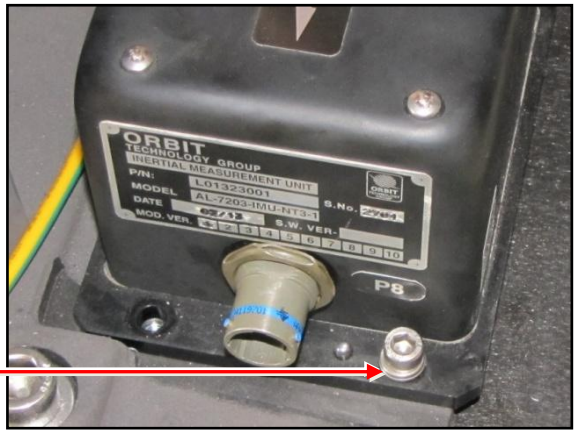
Step 2

Mount the IMU in its place on the BASE PLATE.

Note: The two LEAD PINS on the BASE PLATE.

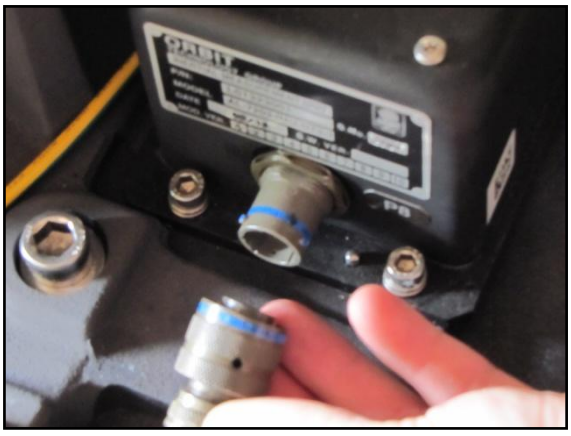
Step 3

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



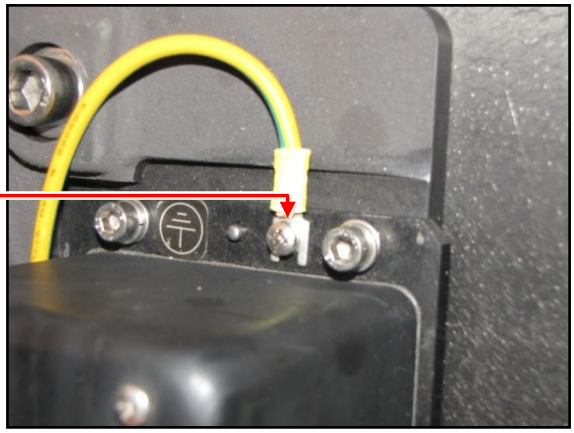
Step 4

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

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.

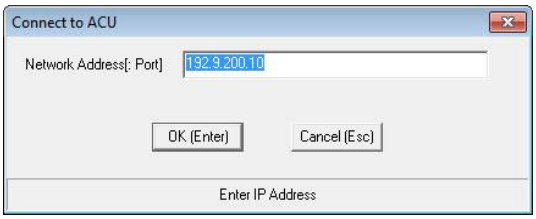


Figure 4-1: Connect to ACU Dialog Box

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. Insert the USB flash drive supplied with the IMU **IMUSAVE -> OK.**

4.2 Updating the system with General Software update module (GSU)

1. Request the latest GSU & MTSDOCK files (*GSUXXX.zip* and MtsDockCE.exe or MtsDock.exe) from Orbit.
2. Copy the zipped and the executable files to a USB flash drive.
3. Connect the flash drive to the USB port in the `CCU` front panel.
4. Run the `MTSDOCK` utility from the USB Flash drive or on external Laptop
5. Select **ThisHost** menu and chose **General Software Update...**
6. The **Select ZIP Archive with Software Updates** dialog box appears.

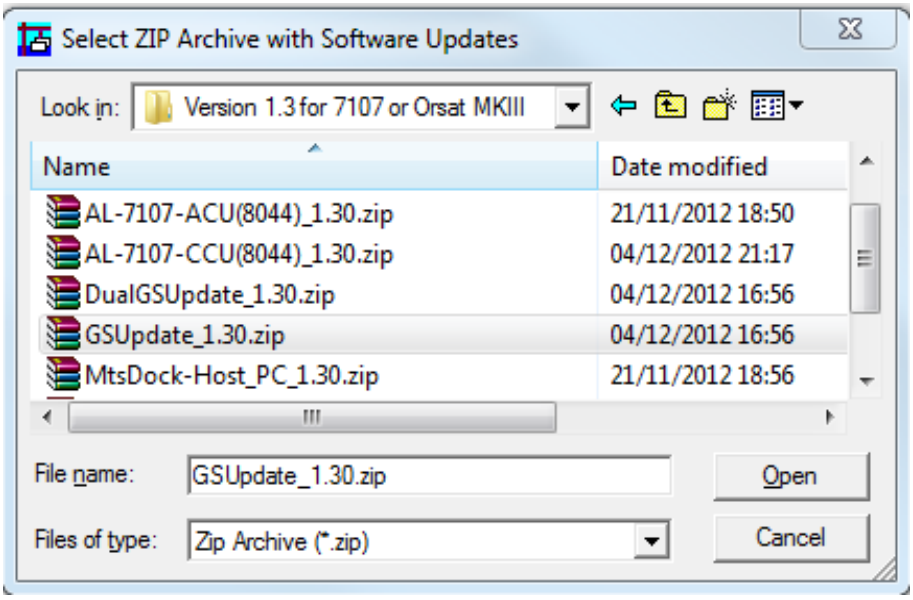


Figure 4-2: Select ZIP Archive with Software Updates **Dialog Box**

6. Select the `GSU` file from the USB Flash drive.

If you are using a Laptop to perform the upgrade you have to NIC IP address within range with the system IP subnet (default 192.9.200.xx .255.255.255.0)

7. Click **Open (Enter)**. New dialog box will pop up ask to enter the ACU and the `CCU` IP address, Enter the address previous found.

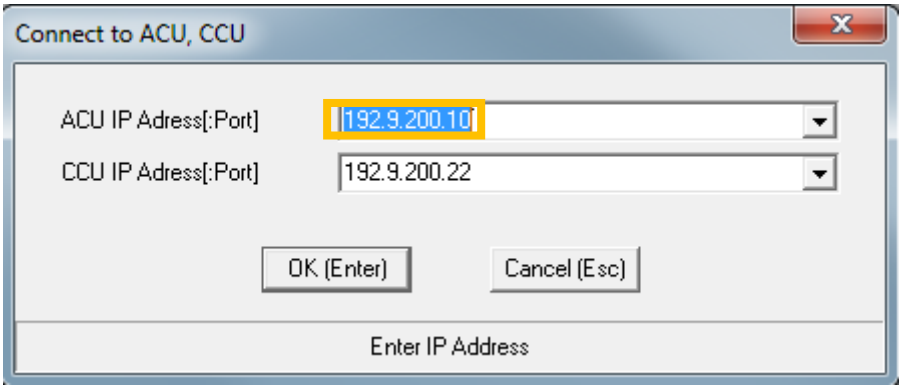


Figure 4-3: Connect ACU, CCU Message Box

4. Click **Open (Enter)**. The automated upgrade process will start. It will update the ACU (`VSATWORKS`) executable, CCUs `MTSVLINK` and also the Servo Drives `FIRMWARE` if applicable.

11. Reboot prompt will be issued at end of the process. Reboot by pressing **OK**.

CCU IP Address will be asked only if the MTSDOCK is running from laptop connected to the system network. Otherwise the CCU IP will not appear

4.2.1 Verify actual software version of the system units

1. When communication is reestablished between the SBC/ACU and the CCU,

Click the **Version** command on the MTSLINK Menu Bar and verify that the new version was successfully installed and matches the software version used by the CCU.

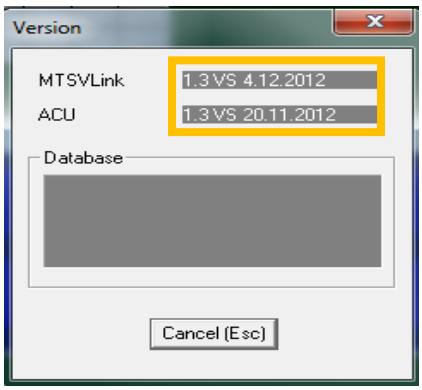


Figure 4-5: Version Message Box

Proceed to step 2 only for system equipped with Servo Drivers (OTRx X-XXX)

2. Open the **Config** on the **MtsLink** Menu Bar and select **Hardware ID** verify that the Servo drive version (000X-XXXXXXXX) was successfully installed on all SD and matches the firmware version in the release note.

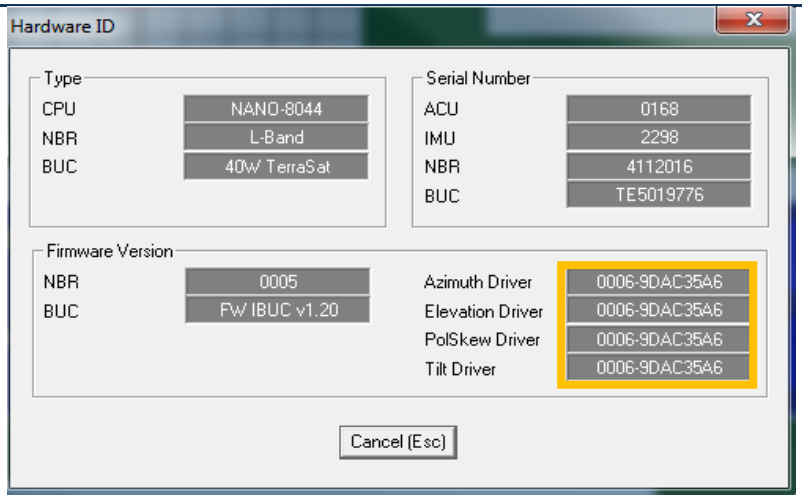
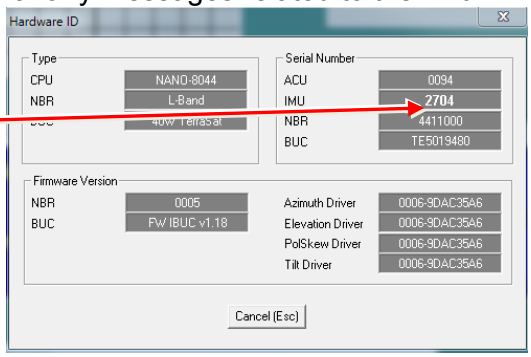


Figure 4-5: Hardware ID Message Box

4.3 Verifying System Function

1. Check the `MTSVLINK` **System Messages** window for any messages related to the `IMU`.
2. Go to: Config-> Hard ware ID ->

   Verify S.No. match.



3. Check the **Ship Coordinates** window and verify that the **Roll** and **Pitch** values are within normal range (±1°) and the **Yaw** value is consecutive to that of the compass readout.

5 Appendix A: Replacing IMU's cable (R1 with R2).

5.1 Removing IMU's Cable (ANTENA R1).

Step 1

Disconnect the IMU'S connector.

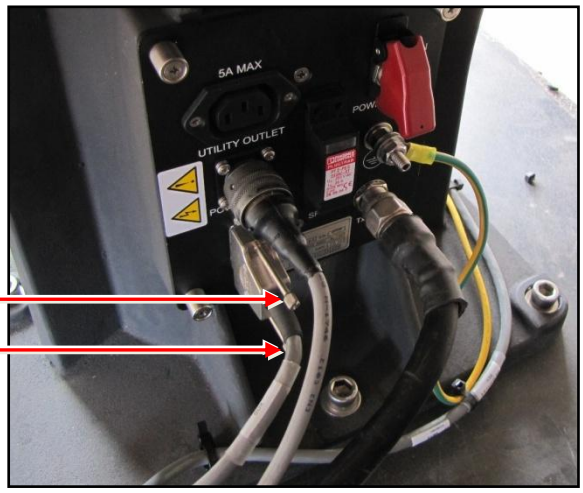
Step 2

Cut all tie wraps binding the IMU'S cable.

Step 3

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

And remove the IMU'S plug.



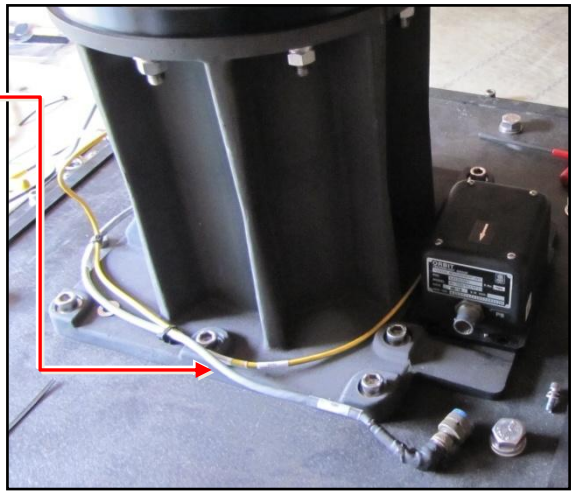
Step 4

Remove IMU'S cable.

5.2 Installing IMU's (R2) Cable.

Step 1

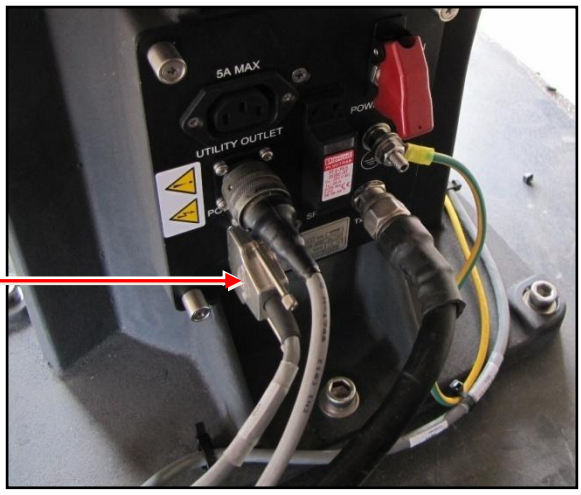
Rout IMU'S new cable.



Step 2

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

Hand tight the plugs screws.



Step 4

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

Step 5

Use tie wraps to secure IMU'S cable.