ORBIT

OceanTRx™

OceanTRx7™

Maritime Stabilized VSAT System

Technical Note

RF Feed's

Document: TEC32-1664-003,

September 2013

COMMUNICATION WITHOUT BOUNDARIES

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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 is designed to guide you through the procedures required for maintaining the `RF FEED` 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	`System Status`
	The name of a file or directory	
`<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™ Maritime Satellite Communication System.

For a description of the changes between ORBAND™ and OCEANTRX7™, 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 `RF FEED` and its cable.

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 RF Feed Description

The Tx/Rx RF FEED is mounted on the ANTENNA, and consists of the following components:

- FEED HORN – Performs impedance matching between the RF FRONT END and the SUBREFLECTOR
- RF FRONT END – Filters the signals, separates between Tx and Rx signals and performs polarization separation
- LOW NOISE BLOCK (LNB) – Down-converts and amplifies RF signals to L-Band signals
- Polarization skew servo sub-system – Consists of a polarization skew servo driver and motor and electrically switches the polarization of the RF FEED.

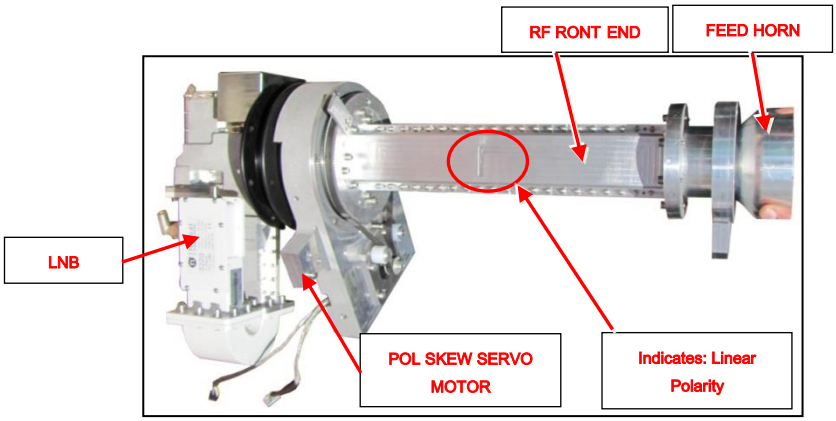


Figure 1-1: RF Feed (C band)

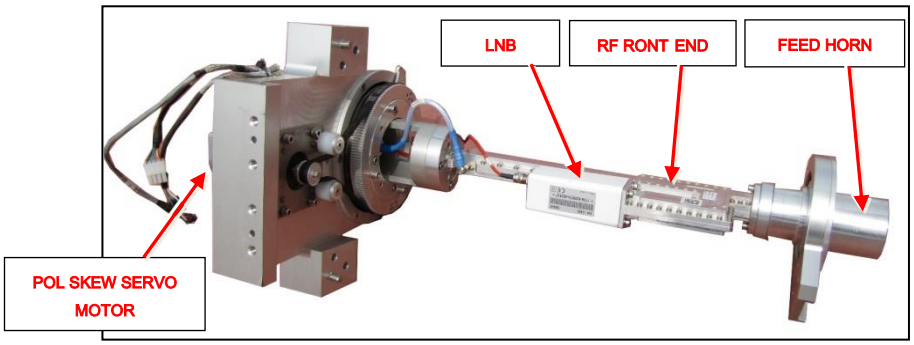


Figure 1-2: RF Feed (KU band)

1.4 Spare Kit Contents

The following table provides a list of the parts in the `RF FEED` spare kit.

Table 1-2: Spare Part Kit Contents (C Cable)

KIT32-1664-016-SP		
P/N	**Description**	**Quantity**
53N-50-0-4	N type to N type 90° adapter	1
E11000055	RF CABLE STR N-TYPE PLUG 2.1M 18GHz CF106P	1
TEC32-1664-003	TECH NOTE FOR OceanTRx7-300 FEEDs	1
TW-191	PKG BOX 505X380X160 AL7200-SDU	1

Table 1-3: Spare Part Kit Contents (C Feed Cir)

KIT32-1664-021-SP		
P/N	**Description**	**Quantity**
K01000023	PKG BOX FOR FEED C/Ku-Band LONG/SHORT AL-7107	1
L00727002	FEED C-BAND CIRCULAR W/LNB	1
TEC32-1664-003	TECH NOTE FOR OceanTRx7-300 FEEDs	1

Table 1-4: Spare Part Kit Contents (C Feed Lin)

KIT32-1664-022-SP		
P/N	**Description**	**Quantity**
K01000023	PKG BOX FOR FEED C/Ku-Band LONG/SHORT AL-7107	1
L00727003	FEED C-BAND LINEAR W/LNB	1
TEC32-1664-003	TECH NOTE FOR OceanTRx7-300 FEEDs	1

Table 1-5: Spare Part Kit Contents (KU Feed + Sub)

KIT32-1101-005-UG		
P/N	**Description**	**Quantity**
32-1421-4-1	KU FEED SUB REFLECTOR ASSY (7107)	1
K01000023	PKG BOX FOR FEED C/Ku-Band LONG/SHORT AL-7107	1
K01000061	PKG BOX 590x315x290 FOR FEED SUB REFL. Ku 7107	1
L00727008	FEED Ku-Band LINEAR X-POL W/O LNB	1
TEC32-1664-003	TECH NOTE FOR OceanTRx7-300 FEEDs	1

Table 1-6: Spare Part Kit Contents (KU Feed)

KIT32-1664-041-SP		
P/N	**Description**	**Quantity**
K01000023	PKG BOX FOR FEED C/Ku-Band LONG/SHORT AL-7107	1
L00727008	FEED Ku-Band LINEAR X-POL W/O LNB	1
TEC32-1664-003	TECH NOTE FOR OceanTRx7-300 FEEDs	1

Table 1-7: Spare Part Kit Contents (KU Cable)

KIT32-1664-017-SP		
P/N	**Description**	**Quantity**
E11000139	RF CABLE N-Type M-RA TO N-Type M-RA 120CM	1
TEC32-1664-003	TECH NOTE FOR OceanTRx7-300 FEEDs	1
TW-191	PKG BOX 505X380X160 AL7200-SDU	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 1-8: Required Tools and Parts

Tool/Part Name	Notes	Figure
Tie cutter		
Cable ties		
Allen keys: 3,4,5 and 6mm		
Pliers		

2 Preliminary Procedures

➢ **To Perform Preliminary Procedures:**

The following preliminary procedure must be performed before replacing the RF FEED:

1. This procedure must be performed by two technicians, a qualified technician and his assistant.
2. Perform System Shut-Down of the vessel's main power AC Voltage terminal outside the RADOME.
3. Open the RADOME hatch.
4. Switch off the ADE POWER BOX at the ANTENNA PEDESTAL base (located inside the RADOME).
5. 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 RF Feed (C band)

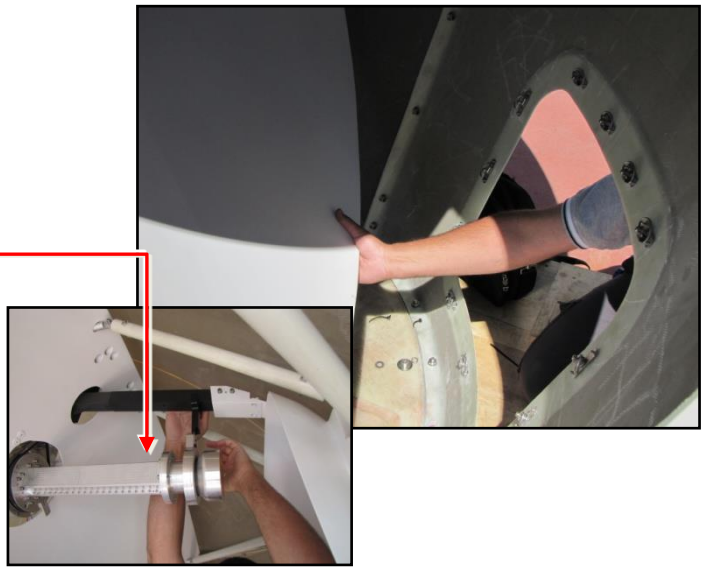
3.1 Removing the RF Feed (C band)

➢ **To Remove the RF Feed:**

Step 1

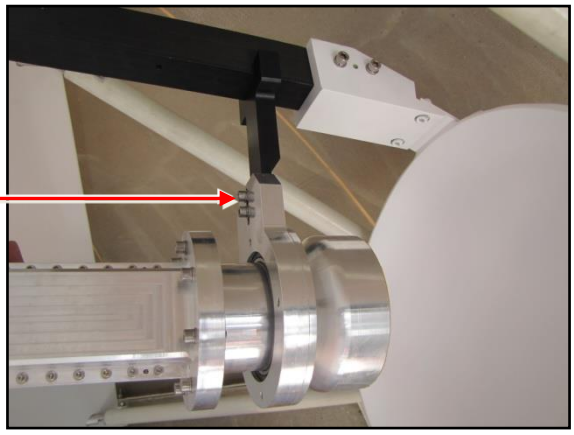
From outside the RADOME, turn the antennas plate to face the hatch so you have access to the antennas RF FEED.

Once plate's position is set properly, step into the RADOME.



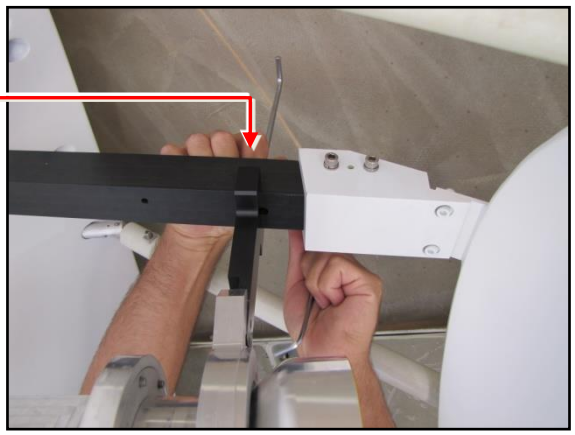
Step 2

Using a 4mm Allen key, remove the two screws securing the FEED HORN to its plate.



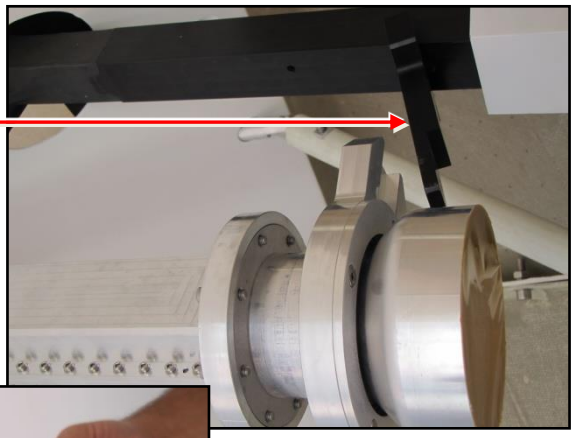
Step 3

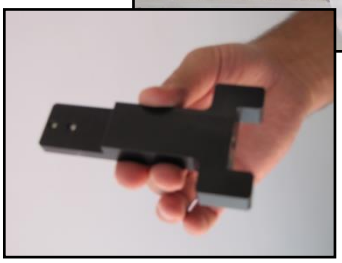
Using a 5mm Allen key, remove the hidden screw securing the FEED HORNS PLATE.



Step 4

Remove the FEED HORNS PLATE.

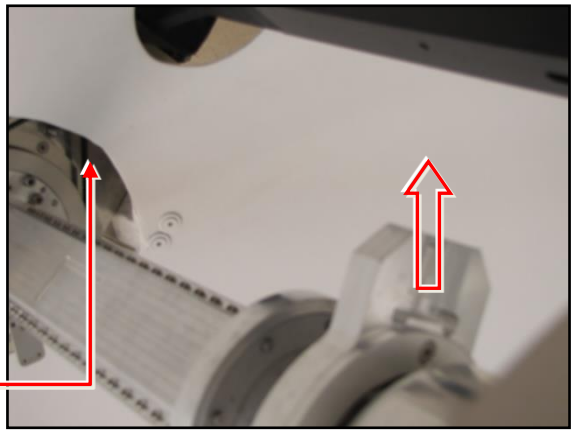




Step 5

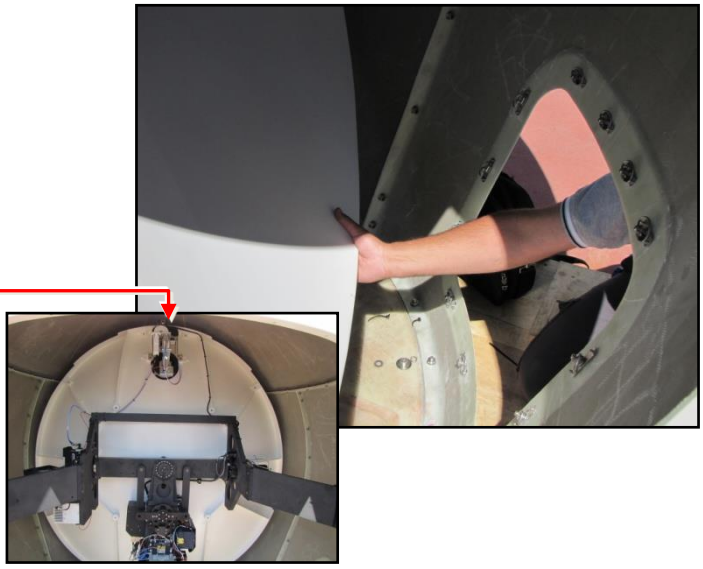
Position the FEED HORN'S ball bearing, to face up.

Reason: When pulling the RF FEED module out, it needs to safely pass through gap.



Step 6

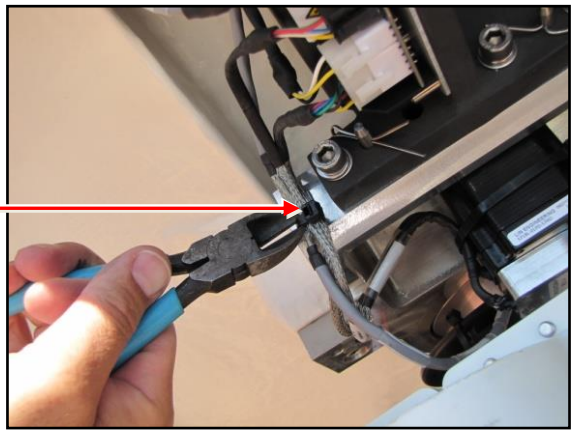
From outside the RADOME, turn the plate so, its back will face the hatch and you have access to the antennas RF FEED (C BAND) back.



Once plate's position is set properly, step into the RADOME.

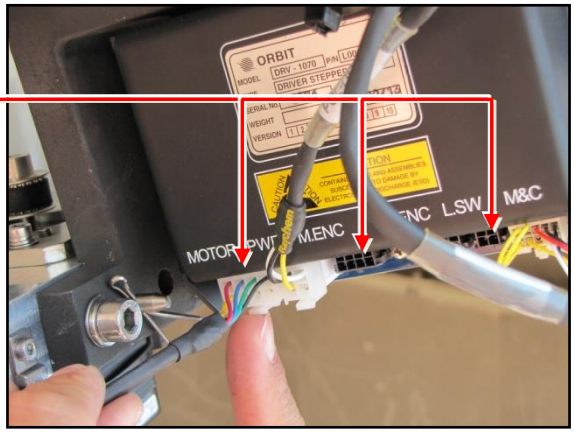
Step 7

Cut carefully the tie wrap binding the MOTOR and the ENCODERS cables.



Step 8

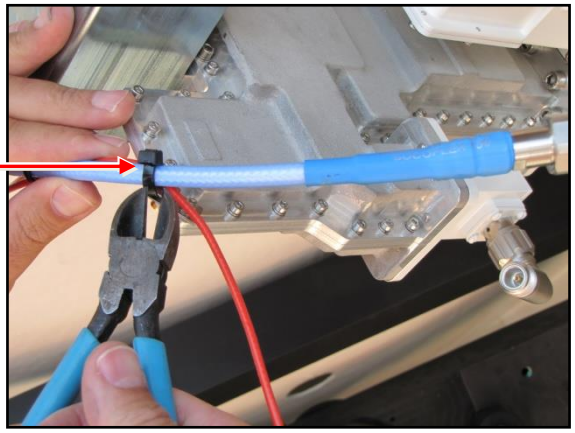
Disconnect the three RF FEEDS cables from its SERVO DRIVER.



Gently unlock plugs before pulling.

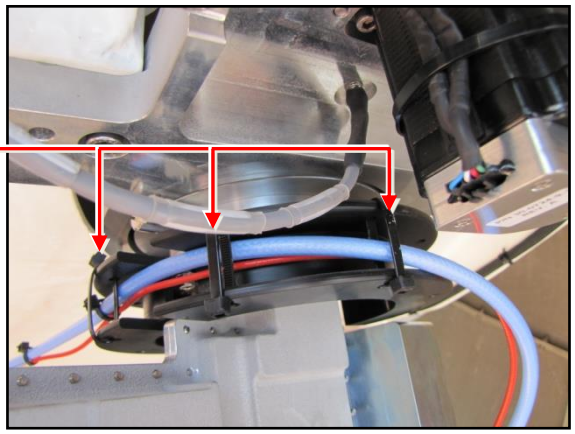
Step 9

Cut carefully the tie wrap binding the RF cables to the `RF FEED (C BAND)` surface.



Step 10

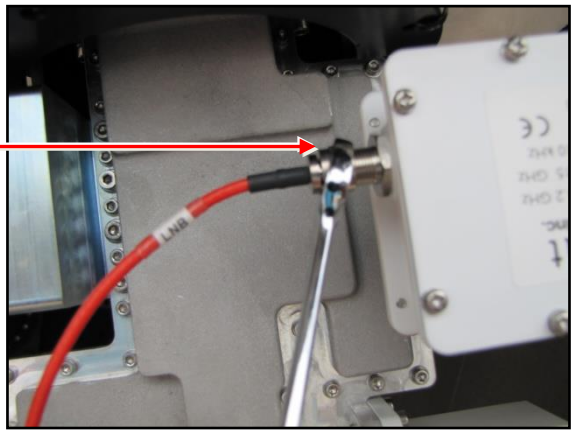
Cut carefully the three tie wraps from the RF cables rail.



Mind the cables direction on the rail, you will need to put them back the exact same way.

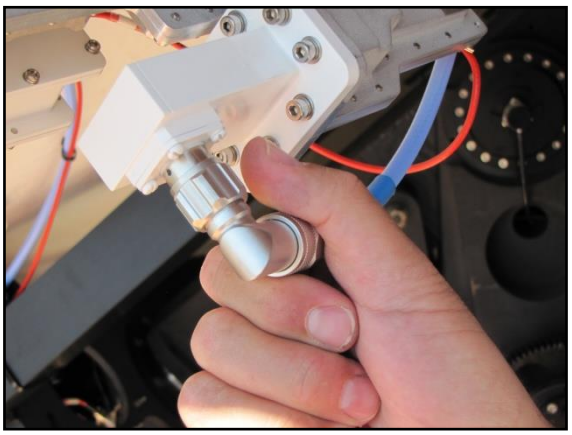
Step 11

Disconnect the F-Type cable from the `LNB` connector.



Step 12

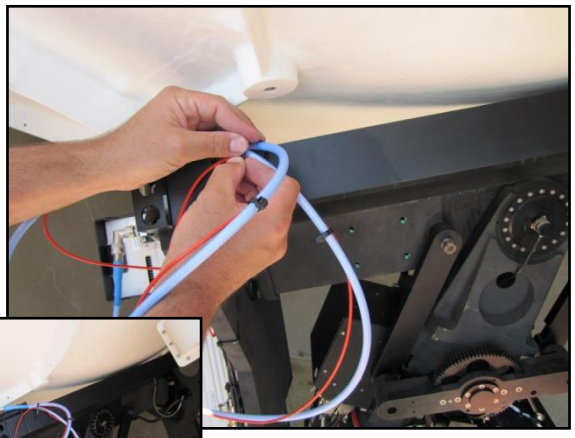
Manually disconnect the RF cable from the F FEED (C BAND).

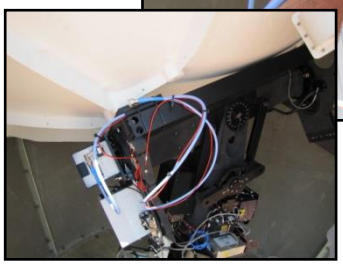


Step 13

Carefully roll the two RF cables.

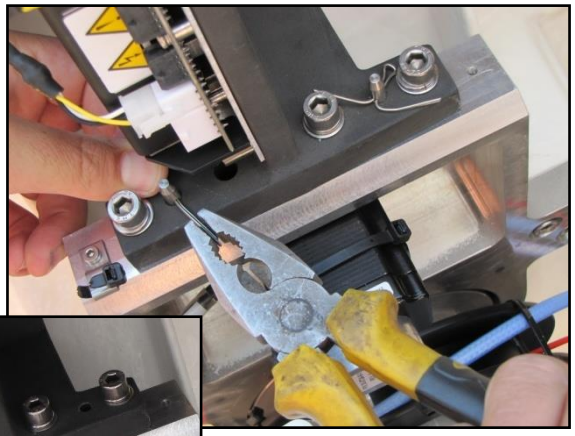
Use a tie wrap to temporarily secure them.

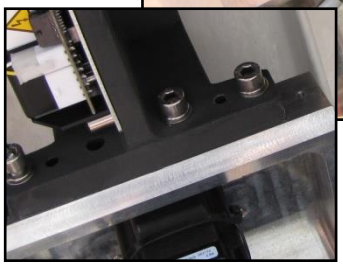




Step 14

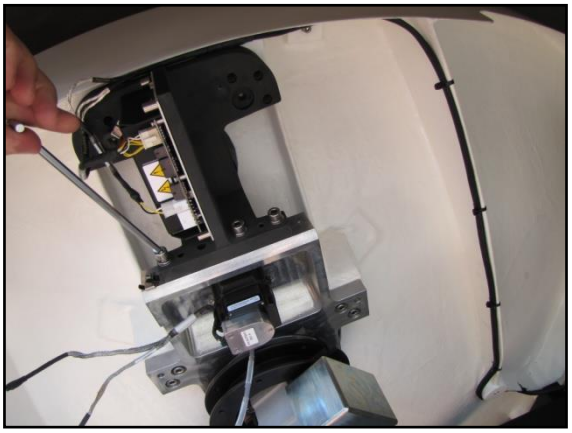
Remove the two safety pins from the FEED ASSEMBLY.





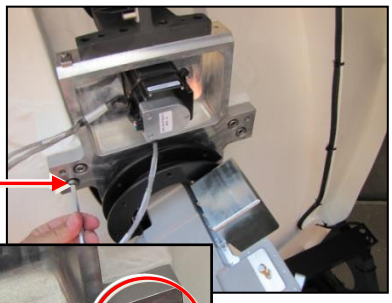
Remove the two SPLIT PINS securing the safety pins.

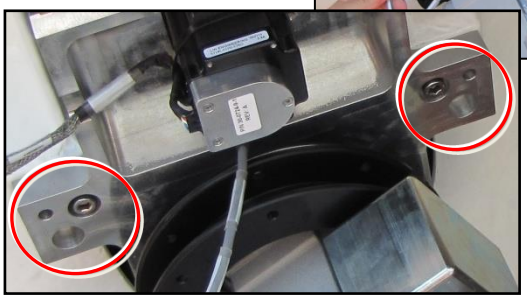
Step 15



Using a 6mm Allen key. remove three Allen screws securing the RF FEED ASSEMBLY to the DISH ASSEMBLY.

Step 16

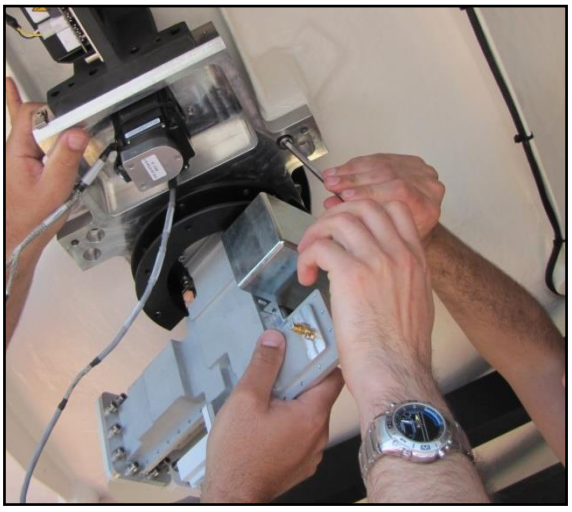




Using a 6mm Allen key, remove two Allen screws securing the RF FEED ASSEMBLY.

Leave one screw on each side!!

Step 17



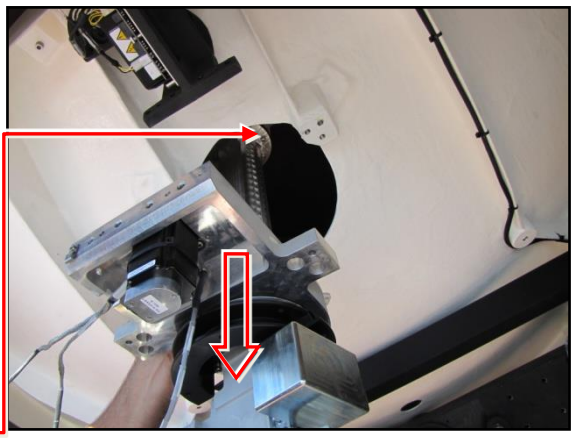
While your assistant firmly supports the RF FEED ASSEMBLY, use a 6mm Allen key, to remove the last two Allen screws securing it.

The RF FEED ASSEMBLY is heavy.

Its weight is: 17kgr!

Step 18

Carefully, remove the RF FEED ASSEMBLY from the DISH ASSEMBLY.



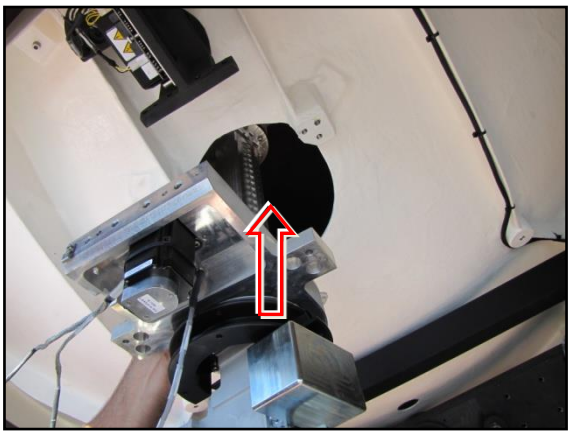
Mind the FEED HORN'S ball bearing, mentioned in **Step 5**.

3.2 Installing the RF Feed (C Band)

➢ **To Install the RF Feed (C Band):**

Step 1

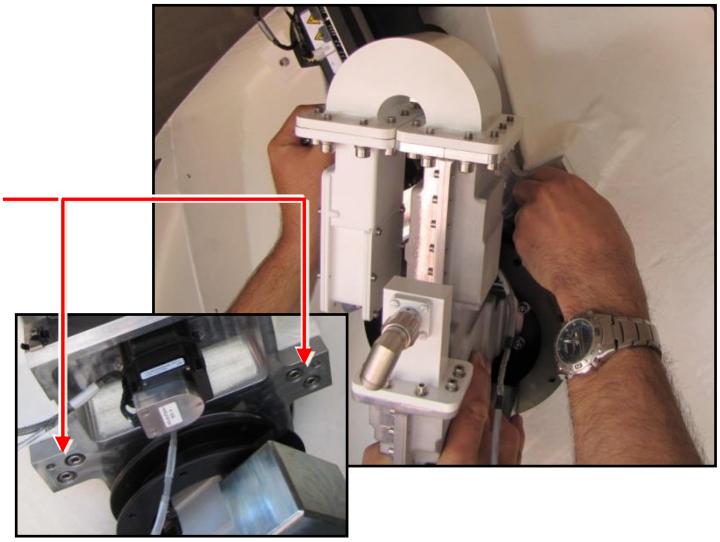
Carefully mount the new RF FEED ASSEMBLY in its place on the DISH ASSEMBLY.



Mind the FEED HORN'S ball bearing.

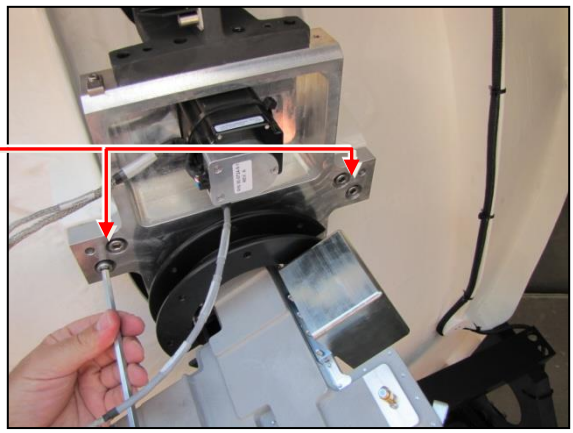
Step 2

While your assistant firmly supports the RF FEED ASSEMBLY, hand tight four of its Allen screws.



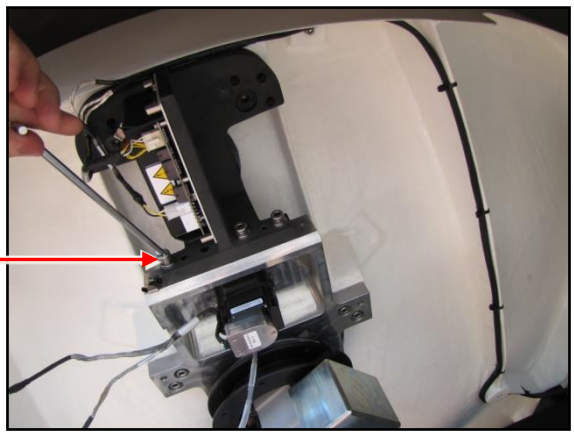
Step 3

Use a 6mm Allen key to tighten the four Allen screws.



Step 4

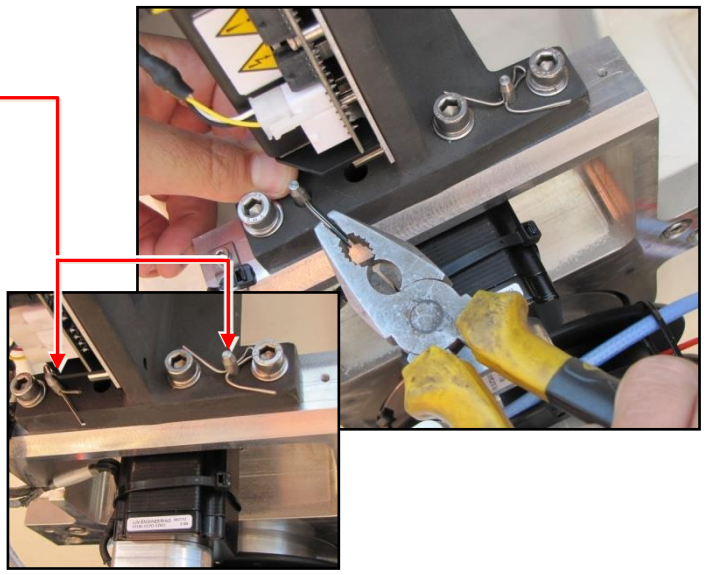
Use a 6mm Allen key to tighten the last three Allen screws securing the RF FEED ASSEMBLY.



Step 5

Replace the two safety pins to the RF FEED ASSEMBLY.

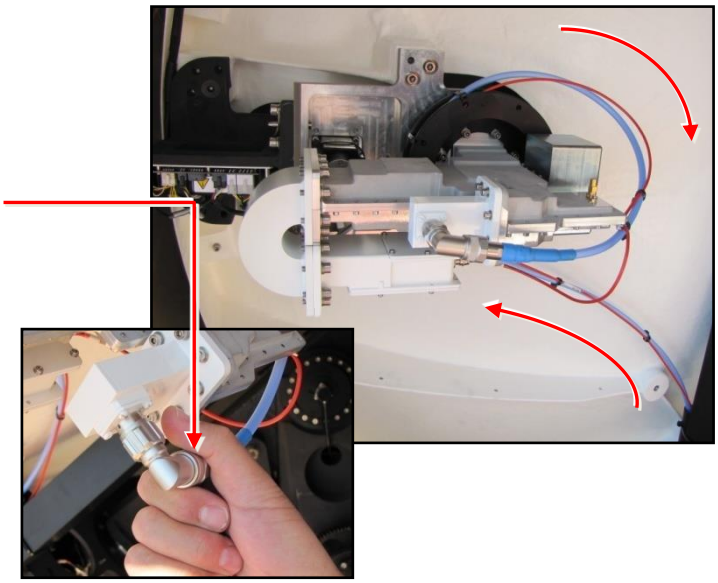
Relocate the two SPLIT PINS securing the safety pins.



Step 6

Rout the two RF cables as described in the picture and manually tighten the RF connector.

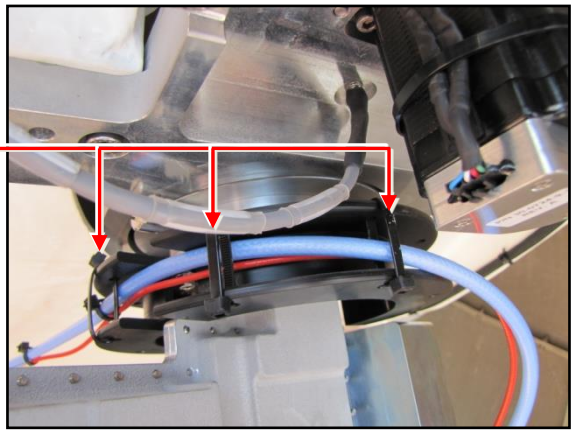
Mind the RF connectors pin.



Step 7

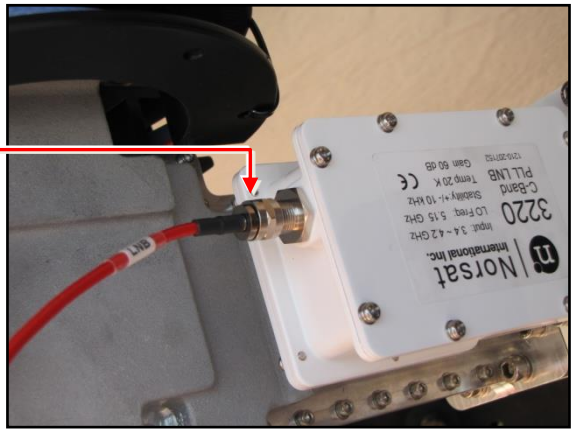
Atache the described three tie wraps to the rail.

Assuring the RF cables will move freely while staying on rail.



Step 8

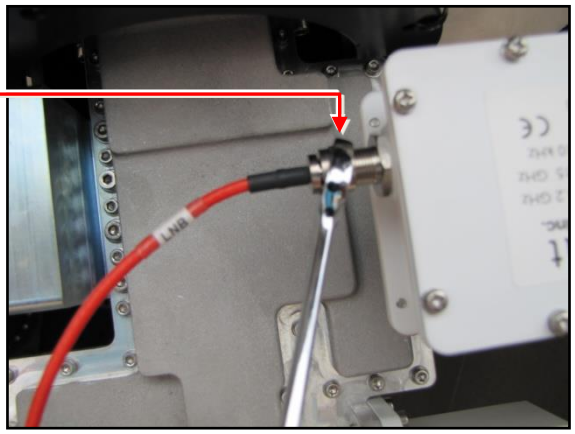
Manually connect the F-Type cable to the LNB connector.



Mind the connectors pin.

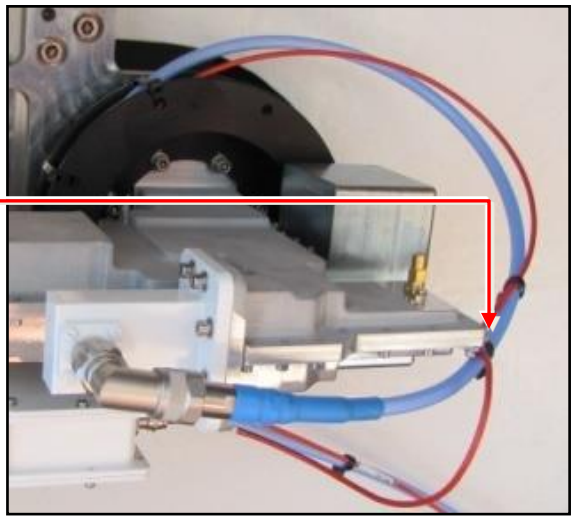
Step 8

Fasten the LNB connect.



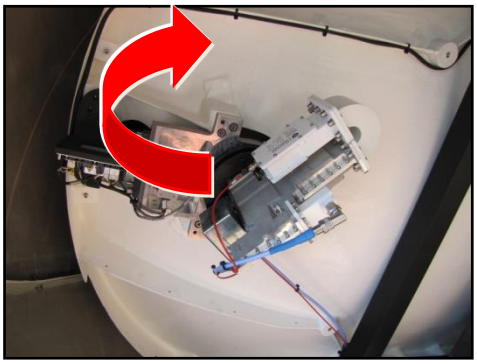
Step 9

Use one tie wrap to secure the RF cables to the RF FEED surface.

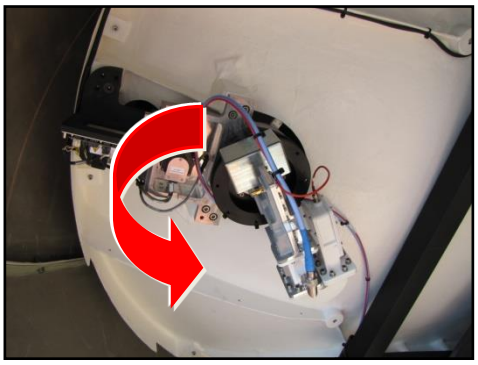


Step 10

Gently rotate the RF FEED all the way to the left and to the right.

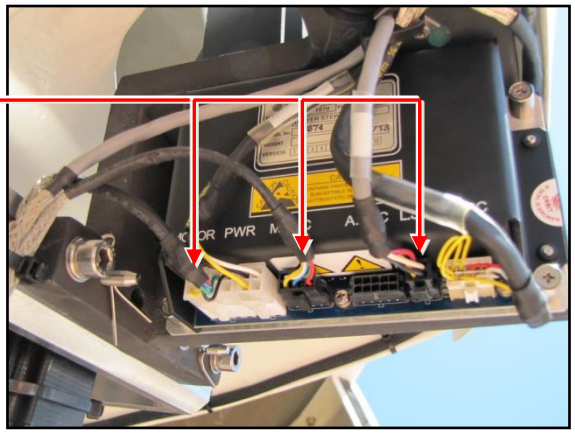


Make sure the RF cables are not limiting the movement of the RF FEED module by rotating the feed to it's limits.



Step 11

Connect the three RF FEEDS cables to its SERVO DRIVER.

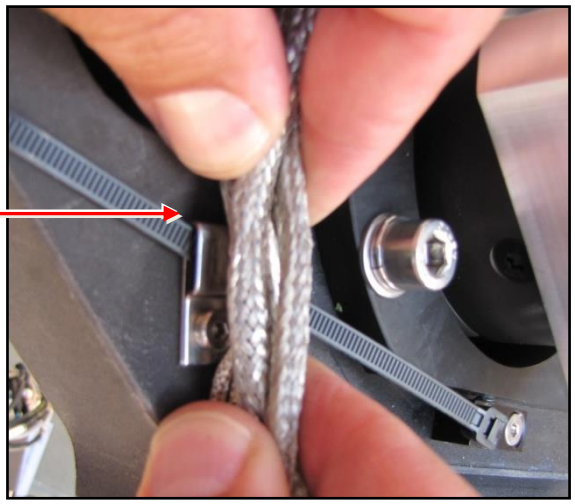


The cable wires are delicate – use caution.

Make sure the plugs lock.

Step 12

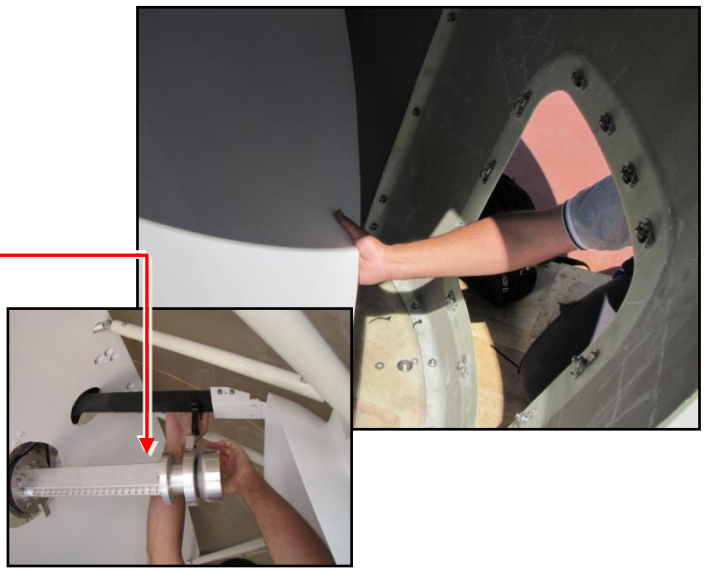
Use tie wraps to secure the RF FEEDS cables.



Ensure tight connectivity between cables shield and tie wrap holder.

Step 13

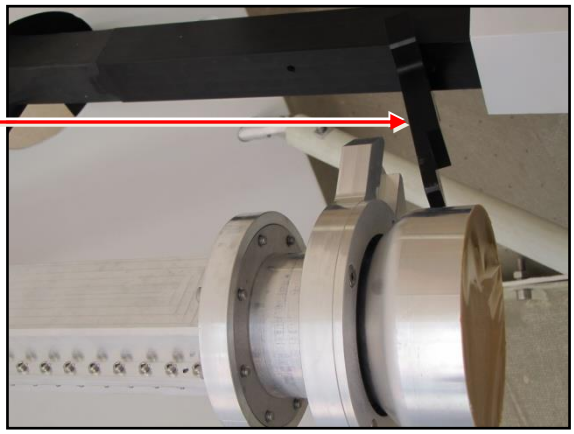
From outside the RADOME, turn the antennas plate to face the hatch so you have access to the antennas RF FEED.



Once plate's position is set properly, step into the RADOME.

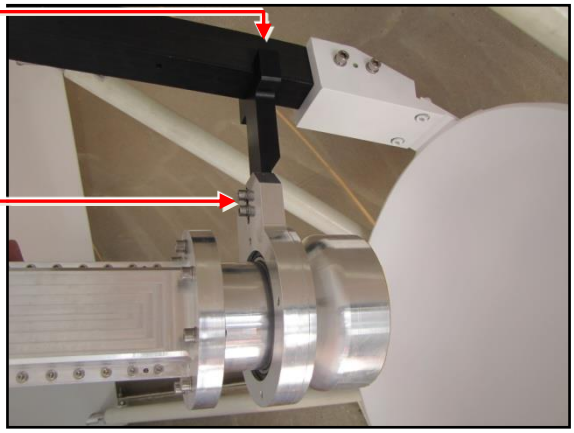
Step 14

Relocate the FEED HORNS PLATE in its place.



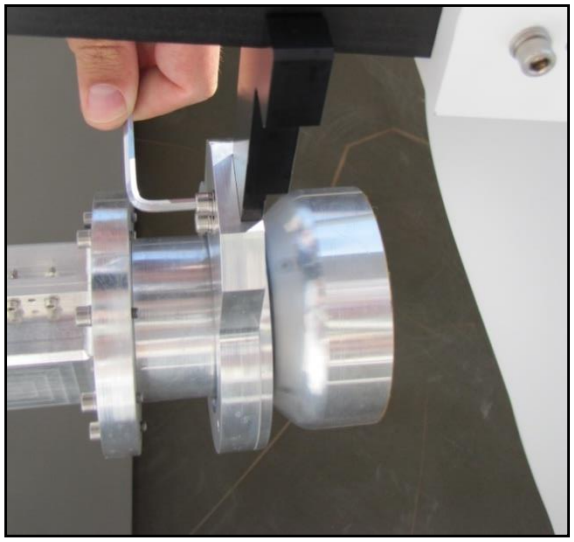
Step 15

Hand tight the FEED HORN three Allen screws.



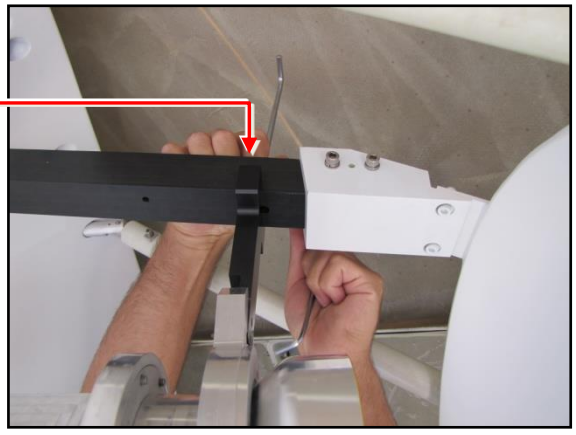
Step 16

Using a 4mm Allen key, tighten the two screws securing the FEED HORN to its plate.



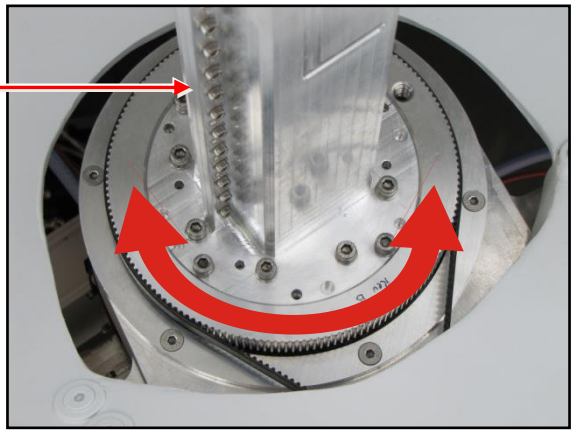
Step 17

Using a 5mm Allen key, tighten the hidden screw securing the FEED HORNS PLATE.



Step 18

Gently, hand rotate the RF FEED to make sure it rotates freely.



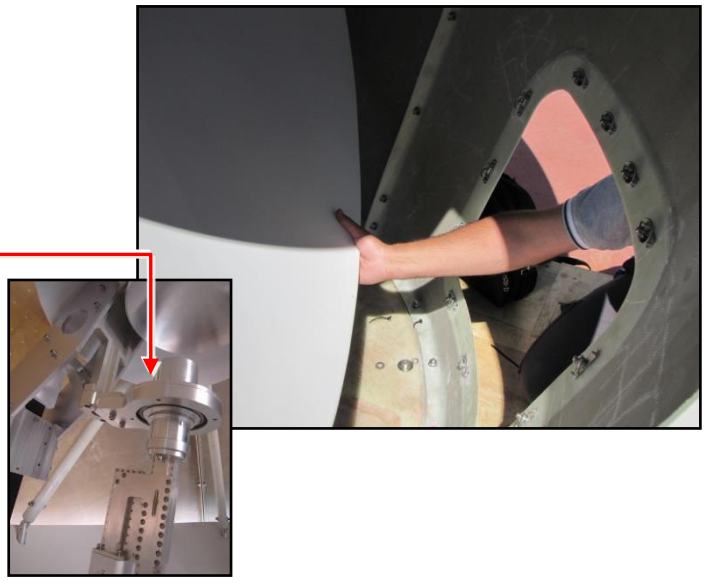
4 placing the RF Feed (KU Band)

4.1 Removing the RF Feed (KU Band)

➢ **To Remove the RF Feed (KU Band):**

Step 1

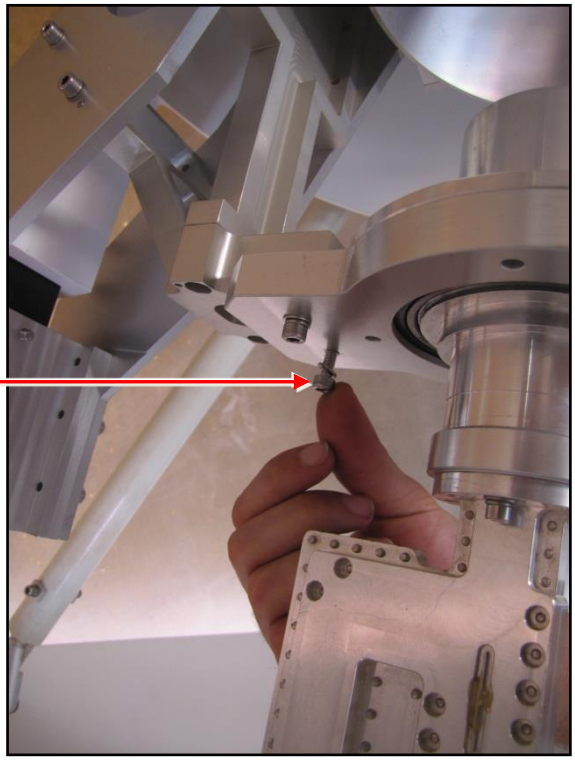
From outside the RADOME, turn the antennas plate to face the hatch so you have access to the antennas RF Feed.



Once plate's position is set properly, step into the RADOME .

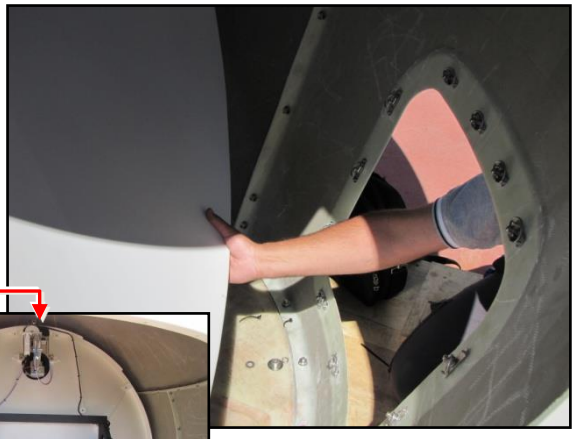
Step 2

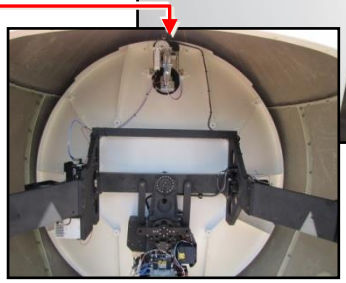
Using a 4mm Allen key, remove the two screws securing the FEED HORN to its plate.



Step 3

From outside the RADOME, turn the plate so, its back will face the hatch and you have access to the antennas RF FEED (KU BAND) back.

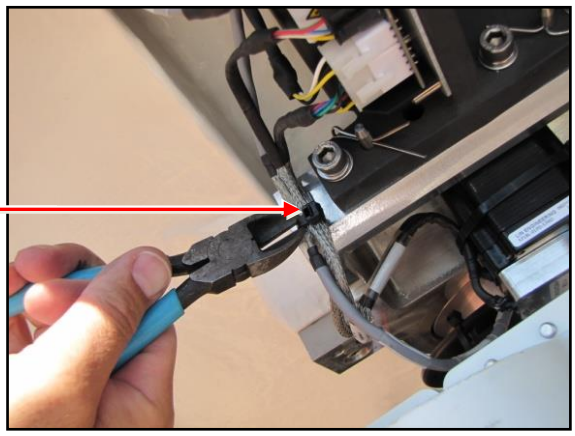




Once plate's position is set properly, step into the RADOME.

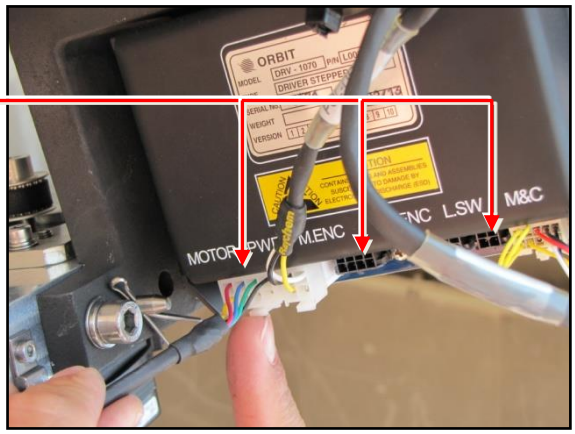
Step 4

Cut carefully the tie wrap binding the MOTOR and the ENCODERS cables.



Step 5

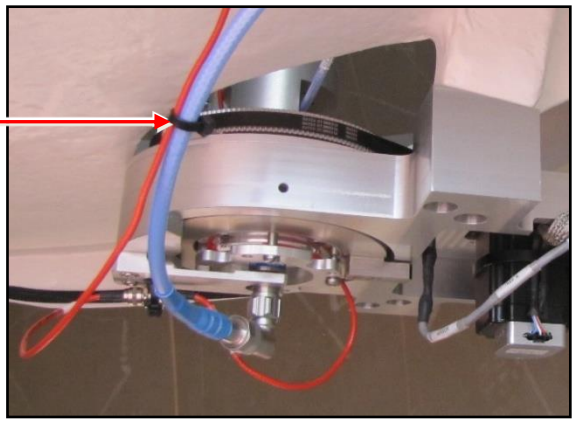
Disconnect the three RF FEEDS cables from its SERVO DRIVER.



Gently unlock plugs before pulling.

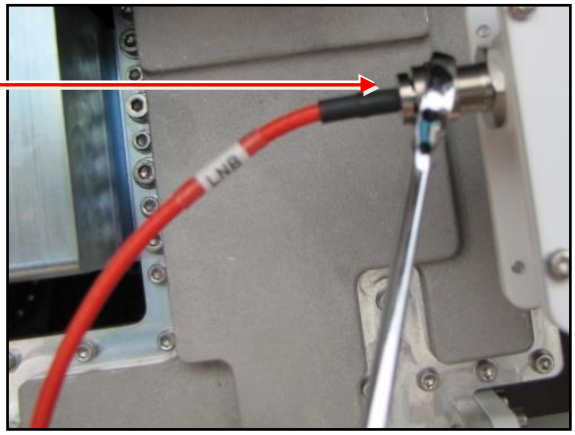
Step 6

Cut carefully the tie wrap binding the RF cables to the RF FRRD.



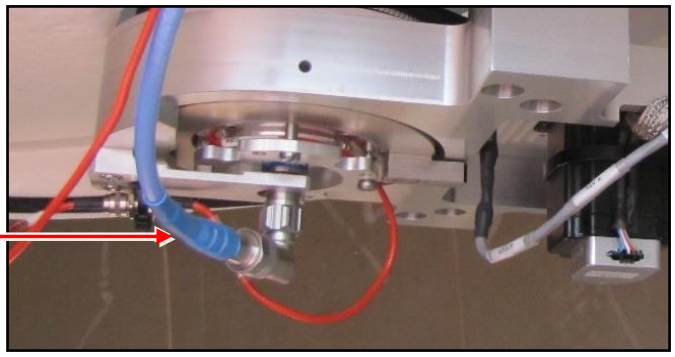
Step 7

Disconnect the F-Type cable from the LNB connector.



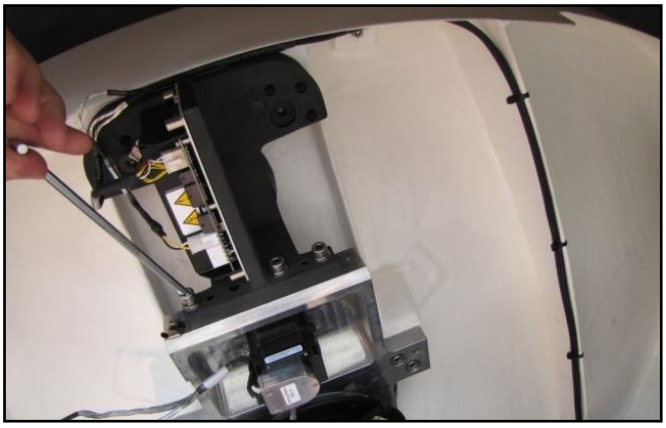
Step 8

Manually disconnect the blue RF cable from the RF FEED (KU BAND).



Step 9

Using a 6mm Allen key. remove three Allen screws securing the RF FEED ASSEMBLY to the DISH ASSEMBLY.



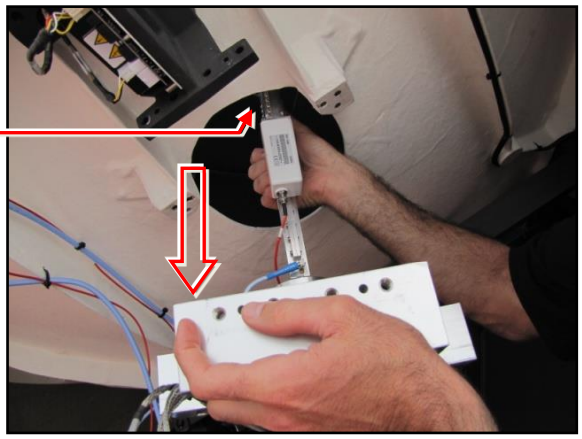
Step 10

While your assistant firmly supports the RF FEED ASSEMBLY, use a 6mm Allen key, to remove the four Allen screws securing it.

The RF FEED ASSEMBLY is heavy.

Step 11

Carefully, remove the RF FEED ASSEMBLY from the DISH ASSEMBLY.



Mind the FEED HORN.

4.2 Installing the RF Feed (KU Band)

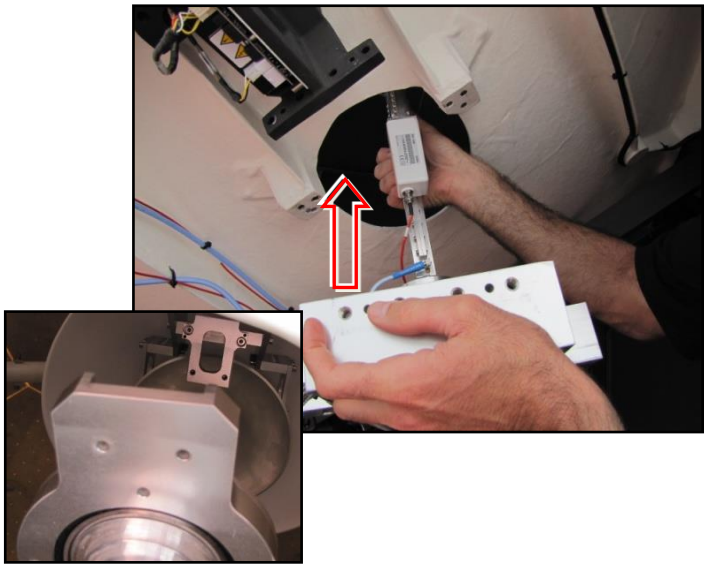
➢ **To Install the RF Feed (KU Band):**

When replacing C BAND RF FEED with a KU BAND RF FEED a KU SUB REFLECTOR installation is required. Use appendix A for instructions.

This process must be performed by two technicians. One on each side of the DISH.

Step 1

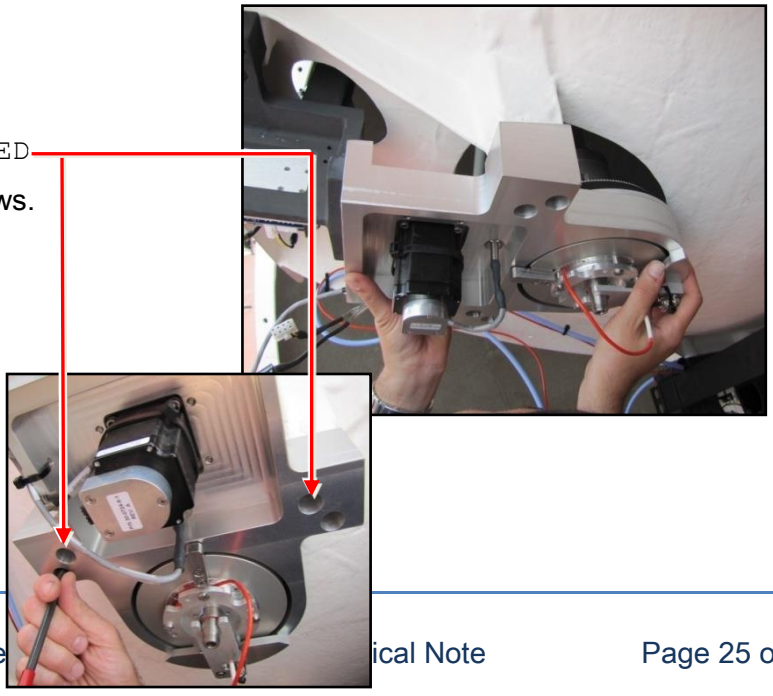
Carefully insert the new RF FEED ASSEMBLY as described, while the technician on the other side of the DISH helps mounting the RF FEED HORN to its proper position.



Mind the RF FEED'S HORN.

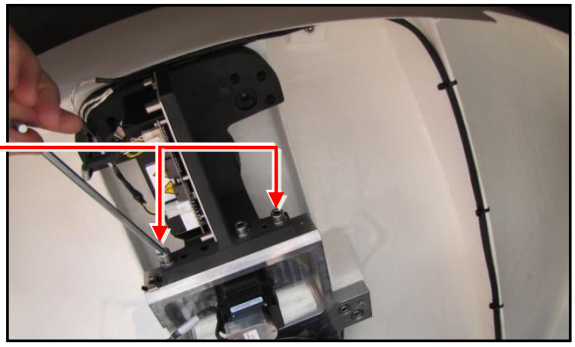
Step 2

Using a 4mm Allen key, tighten four of the RF FEED ASSEMBLY'S, Allen screws.



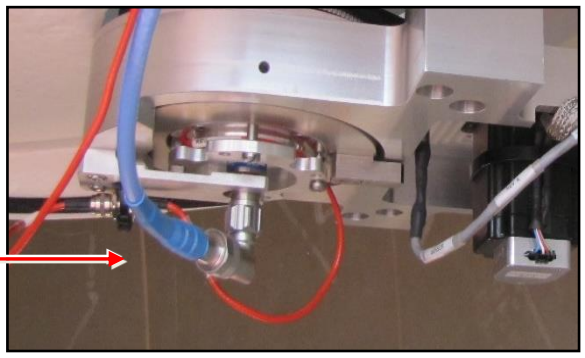
Step 3

Use a 6mm Allen key to tighten the additional three Allen screws securing the RF FEED ASSEMBLY.



Step 4

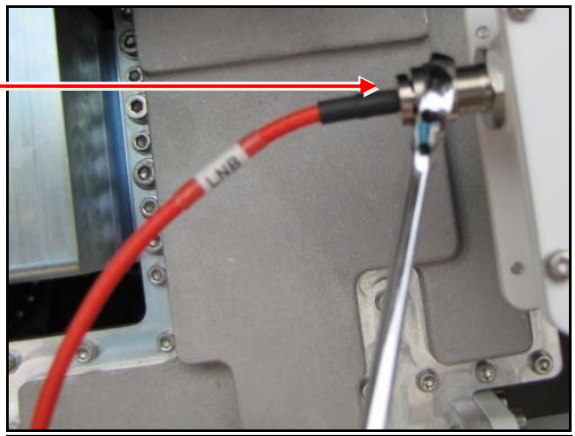
Manually connect the RF cable to the RF FEED (KU BAND.



Mind the RF connectors pin.

Step 5

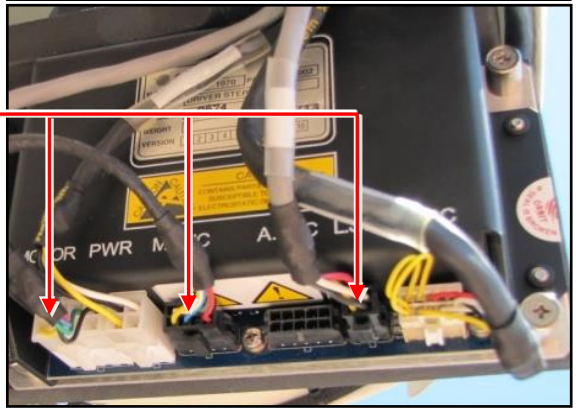
Connect the F-Type cable to the LNB.



Mind the RF connectors pin.

Step 6

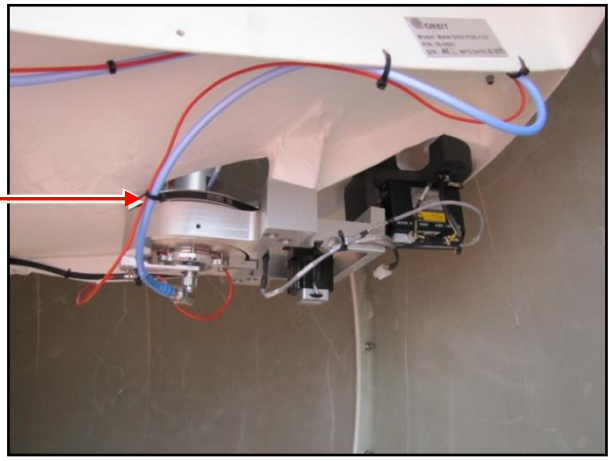
Connect the three RF FEEDS cables to its SERVO DRIVER.



Make sure plugs locked.

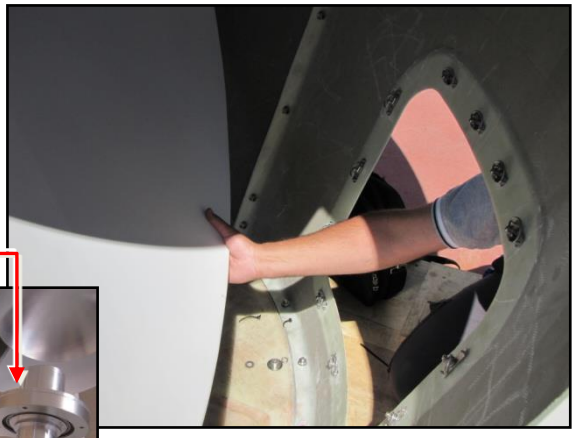
Step 7

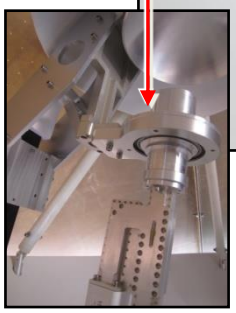
Use a tie wrap to secure the RF cables to the `RF FEED`.



Step 8

From outside the `RADOME`, turn the antennas plate to face the hatch so you have access to the antennas `RF FEED`.

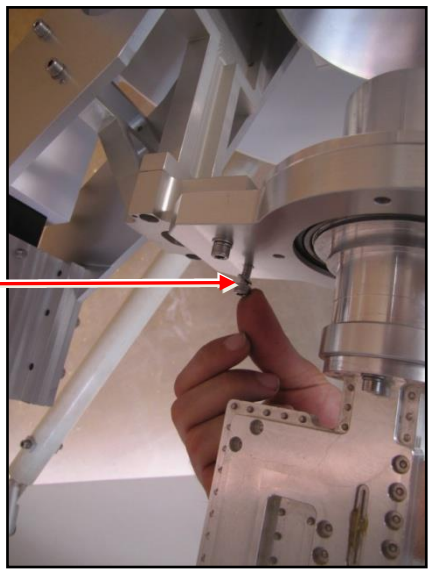




Once plate's position is set properly, step into the `RADOME`.

Step 9

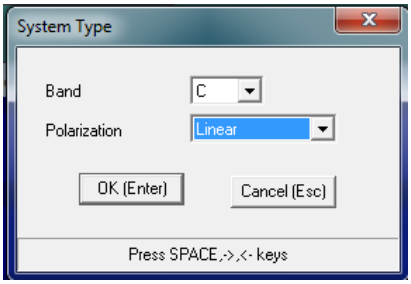
Using a 4mm Allen key, tighten the two screws securing the `FEED HORN` to its plate.



5 Configuration

➢ **To Configure the System:**

1. Start up the system (see the *OceanTRx7™ Installation and Operation Manual* for instructions).
2. Activate the `MTSLINK` application.
3. Open the **Config** menu and select **System type**. The following menu will open, select:



   a) C for C-Band Feed.
   b) KU for Ku-Band Feed.

Select as follows:

   a) Linear for Linear C-Band.
   b) Circular for Circular C-Band.

If circular feed is installed make sure the Pol-Skew offset is set to zero!!

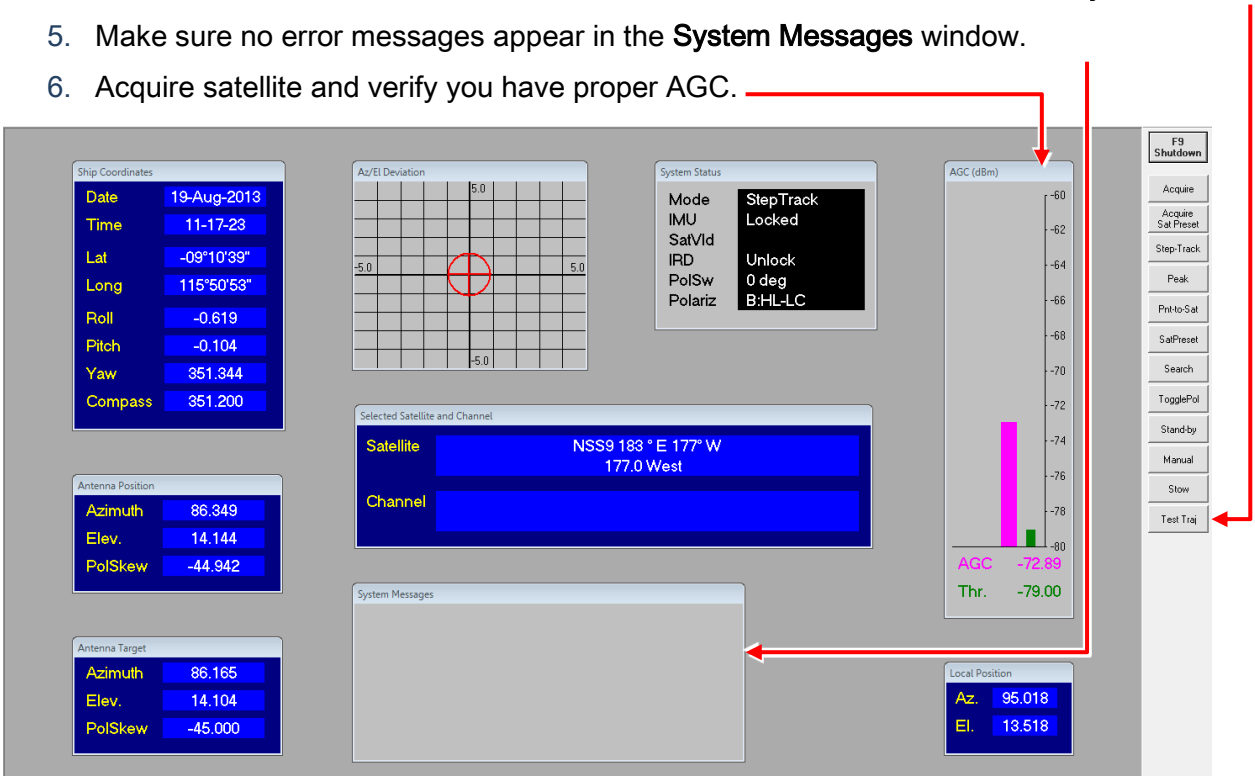
Ku-Band Feed supports only linear polarization.

4. Open the Commands menu and select Save Configuration and OK when prompted.
5. Perform cross polarization isolation test with the satellite operator.
6. If necessary, update `pol-skew offset`, refer to Ocean TRx 7 manual.

6 Performing Verification Test

➢ **To Perform Verification Test:**

1. Verify the cable routing is correct and properly secured.
2. Manually move all pedestal's axis' and confirm smooth movement.
3. Power up the system and confirm system initializes properly.
4. To make sure the technical process completed successfully click on **Test Traj**
5. Make sure no error messages appear in the **System Messages** window.
6. Acquire satellite and verify you have proper AGC.



7. Verify the Modem Rx EbNo and TX power with NOC.

7 Appendixes

7.1 Appendix A- KU Sub-reflector Installation

➢ **To Install the KU Sub-reflector:**

This installation will take place only when KU BAND RF FEED replaces C BAND RF FEED.

Step 1

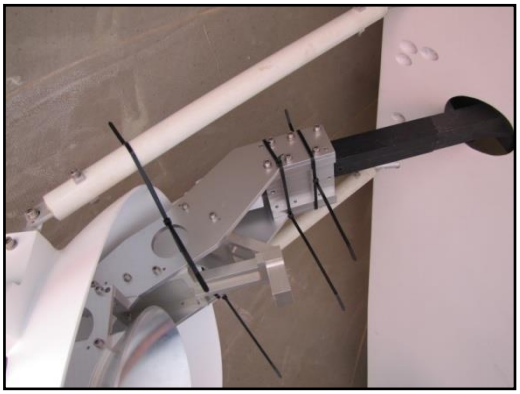
From outside the RADOME, turn the antennas dish to face the hatch so you can step in and comfortably access the RF Feed.

Step 2

Step into the RADOME and mount the KU SUB REFLECTOR to its place.

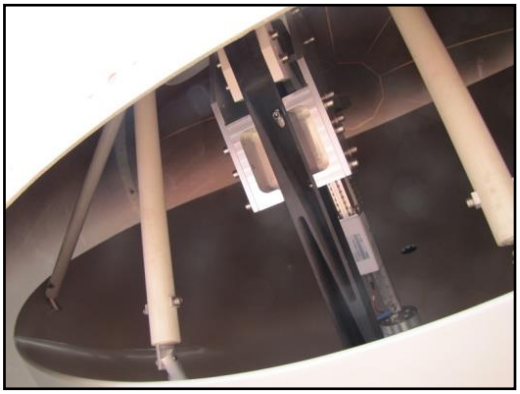
Step 3

Temporarily, secure the KU SUB REFLECTOR using four tie warps.



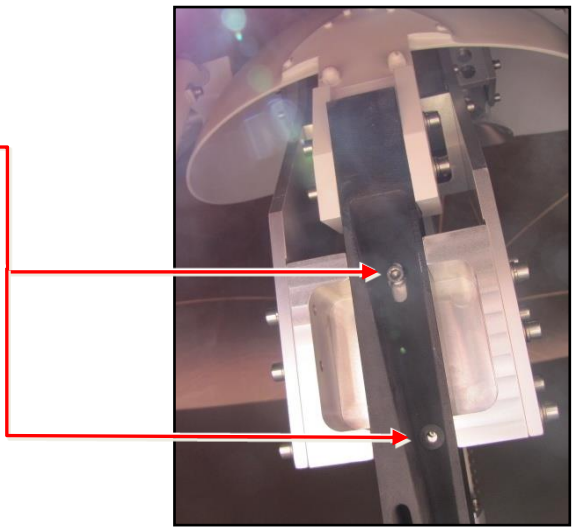
Step 4

Step outside the RADOME **and turn the antennas** DISH **so you have access to the antennas** RF FEED **from outside**.



Step 5

Use an Allen key to tighten the two described Allen screws securing the KU SUB REFLECTOR.



Step 6

Cut the four temporary tie warps used in **Step 3**.

7.2 Appendix B- KU Sub-reflector Removal

➢ **To Remove the KU Sub-reflector:**

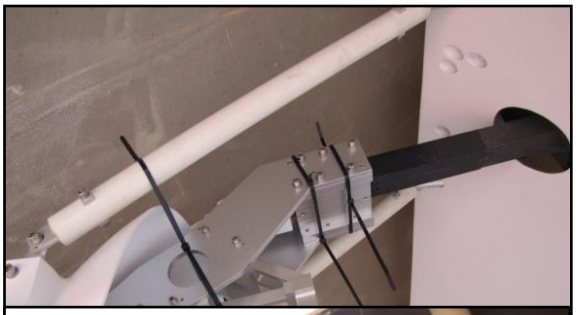
This removal will take place only when C BAND RF FEED replaces KU BAND RF FEED.

Step 1

From outside the RADOME, turn the antennas dish to face the hatch so you can step in and comfortably access the RF Feed.

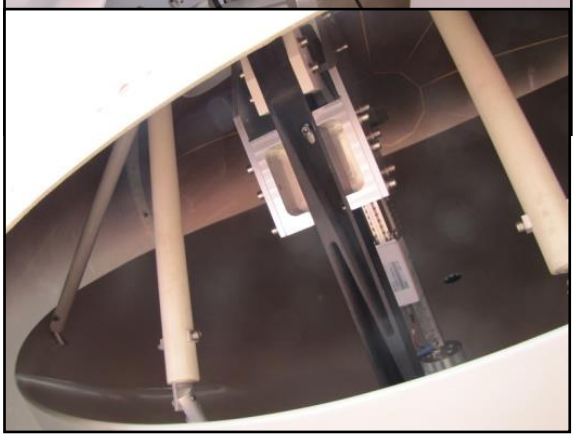
Step 2

Step into the RADOME and temporarily, secure the KU SUB REFLECTOR using four tie warps.



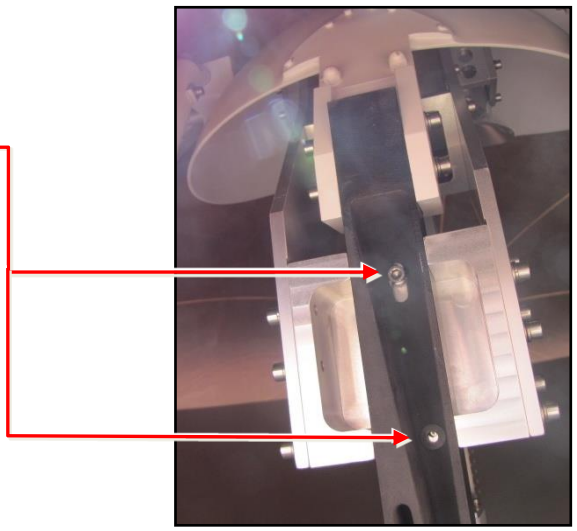
Step 3

Step outside the RADOME and turn the antennas DISH so you have access to the antennas RF FEED from outside.



Step 4

Use an Allen key to remove the two described Allen screws securing the KU SUB REFLECTOR.



Step 5

From outside the RADOME, turn the antennas DISH to face the hatch so you can step in and comfortably access the RF FEED.

Step 6

Step into the RADUME, while your assistant is firmly supporting the KU SUB REFLECTOR, cut the four temporary tie warps used in **Step 2** and remove the KU SUB REFLECTOR.

The KU SUB REFLECTOR is heavy.