Field Service Spares Replacement Procedure – Balance Weight Kit

Approval:

Approving Authority	Signature	Date
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Revision History

Rev.	ECO	Description of Change	Date
A	10680	Initial release	05-22-2013

1. Brief Summary:

Instructional procedure for balancing a Sea Tel antenna.

2. Theory of Operation:

All 3 axis of a Sea Tel antenna pedestal are physically balanced, this means weights are installed either side of the pivot points so each side weighs the same amount. Inertia is responsible for over 75% of the antennas stability, having a balanced pedestal also means small motors can be used and that the antennas current draw is low.

Should the antenna be out of balance the pedestal won't point, target or stabilize as accurately as it should. The additional weight on the axis will mean the motor drive issued won't move the axis the desired amount, resulting in the PCU then issuing the command for further drive to be issued. This causes the motor to do additional work and will result in the pedestal generating a pedestal error.

Sea Tel antennas are factory balanced although changing components such as LNB's or radio packages will require the balance weights on the pedestal to be reconfigured

3. Troubleshooting:

If the antenna has braked motors which were fitted as standard to the 4006RZA, 6006-6006RZA, XX09, XX12 and 4010W-53, the pedestal will need to be powered and put into balance mode or have the No parameter removed to verify and configure the balance of the pedestal. Hold the antenna level in cross level and at 0 degrees of elevation and release it, if the balance is correct it should remain still if either of the axis's drift adjustments to the configuration of the balance weights will need to be made.

4. Balance Mode:

From a DAC-2202 press and hold the  and  arrow keys together until either "AUTO TRIM" or "EL TRIM" is displayed. Then using the  arrow, scroll through the options until "REMOTE BALANCE" is displayed. Now press the  arrow, you'll now see balance mode is displayed as "ON". This enables you to check the balance of the antenna and make any adjustments if necessary, once complete pressing the  button will exit balance mode, and the antenna will reinitialize.

If the DAC software version is 6.05p or earlier it won't support remote balance mode. Press and hold the  and  arrow keys together until either "AUTO TRIM" or "EL TRIM" is displayed. Then using the  arrow, scroll through the options until "REMOTE COMMAND" is displayed. Press the  arrow key to activate the window, then using the  and  arrow keys scroll the cursor along and use the  and  arrow keys set the remote command window to read "N0000" and press the  button. This has now set the PCU No parameter to 0, removing the motor gains enabling you to verify the balance of the pedestal and adjust if necessary.

*Note: Do not save this remote parameter to the PCU! Leave the pedestal on the remote command window while verifying the balance of the pedestal, then once complete reinitialize the antenna and cycle the power to the DAC.

For an XX12 series antenna log into the MXP, select the test tab & then press the "Balance Mode" button at the top of the page.

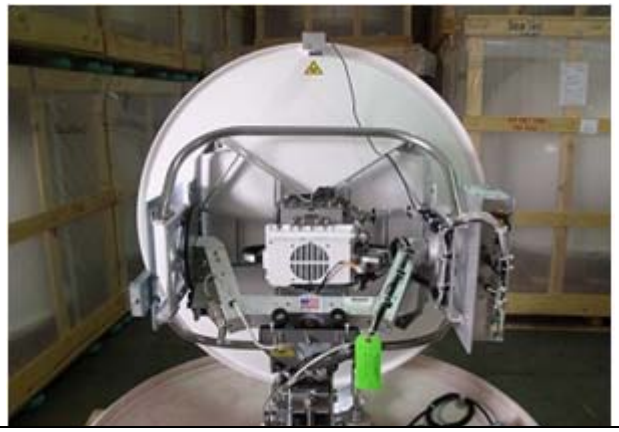
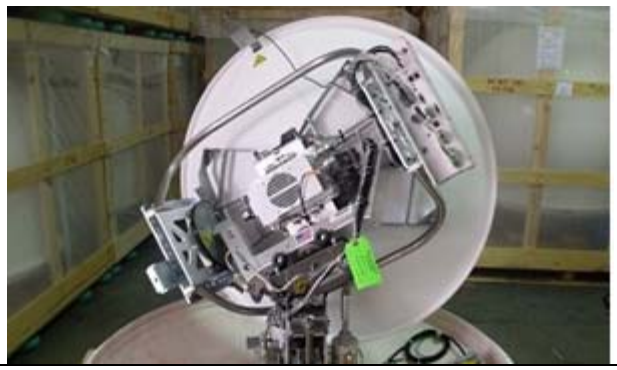
5. Balancing the Antenna:

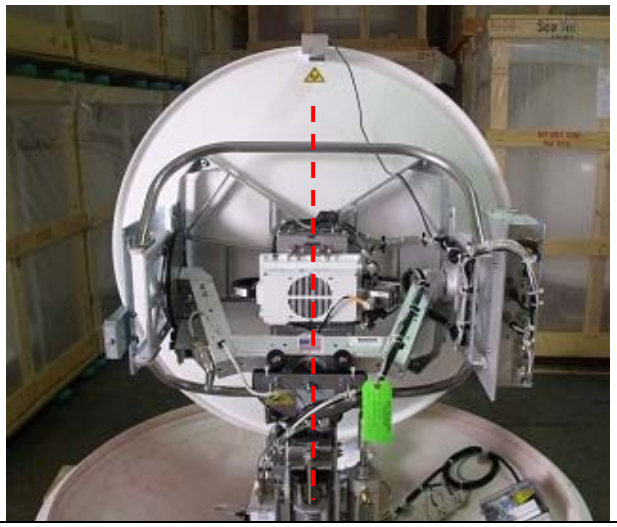
5.1. Tools.

- 7/16" Socket and Ratchet
- 7/16" Wrench/Spanner
- Loctite 2760

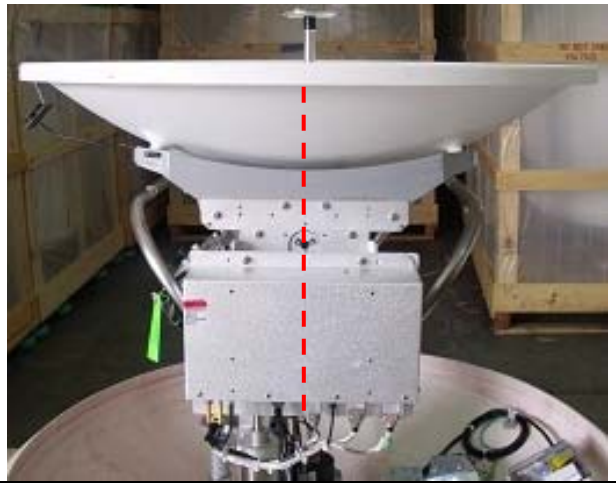
5.2. Procedure.

Procedure for balancing a Sea Tel antenna (based on a medium size pedestal however the principal is the same on all systems).

***Caution:** Uncouple the motor brakes (if applicable), or power down the pedestal before following this procedure. 1. Observe the balance of the pedestal. Stand behind the antenna, holding the cross level axis flat and position the elevation axis at 0 degrees (level with the horizon) and let go of it. ***Note:** If the antenna has a level cage, the level cage will need to be level with the horizon throughout the elevation range.	
2. Having let go of the pedestal if perfectly balanced it should remain still. If the cross level axis falls to one side or the elevation axis drifts (or both) then the balance will need to be adjusted.	

3. If the balance requires adjusting in both axis's start with cross level axis. Whichever side is heavier you can gradually remove weight from or gradually add weight to the lighter side. Another option would be to remove weight from the heavier side and add it to the lighter side which will have twice the effect on the balance of the pedestal. Re-check the balance after every alteration to the weight configuration and observe its effect. As the pedestal moves closer and closer to being balanced it should start falling to the side slower and slower. Repeat the above steps until the pedestal remains level with the horizon, therefore meaning the cross level axis is balanced.	
These are some of the mounting positions which can be used for adjusting the weight configurations (the thread sizes are 1/4"). Upper and lower reflector brackets VSAT: These brackets can be used for balancing cross level and elevation. They sit in front of the elevation bearings (pivot point) meaning adding weight here puts it to the front of the pedestal at 0 degrees of elevation.	
Upper and lower reflector brackets TVRO:	
Elevation Pan VSAT:	

Back of the pedestal VSAT: Weight can be added towards the back of the VSAT pedestal, however it's only a fixed position so it can't be moved up and down to adjust the elevation balance at 90 degrees. Therefore the elevation pan is a preferable position.	
If the elevation axis requires balancing it will now be easier now the pedestal is a balanced in cross level. The red line denotes the elevation pivot point between the front and back of the antenna at 0 degree of elevation (running through the centre of the elevation bearings). ***Note:*** When balancing the elevation axis you must add or remove an equal amount of weight to or from each side of the antenna to prevent affecting the cross level balance. So if you want to add 4oz to the pedestal add 2oz to the left elevation pan and 2oz to the right (for example).	
TVRO: On a 4004, 5004 or 6004 antenna due to the design the reflector is heavier so it's common to need to add weight to the back of the pedestal. On the 3004 antenna the elevation pans of the pedestal are heavier. Do not add any weight to the back of the elevation pans on this pedestal. Only add weight to the reflector brackets (weight on the elevation pans will mean additional weight on the reflector brackets which is not required).	
VSAT: On an xx06, xx09 or xx12 antenna the back of the pedestal is heavier due to the weight of the elevation pans, electronics and RF equipment. There for it's common to have to add weight to the reflector brackets to balance the elevation.	

4. Hold the elevation axis at 0 degrees (level with the horizon) and release the antenna and observe how it responds. If the antenna drops down in elevation when held at 0 degrees the front of the pedestal is too heavy and weight will need to be removed from the front or added to the back until the pedestal is correctly balanced. If there are weights on the reflector brackets start by gradually removing them, if not start adding weight to the back of the elevation pans of the pedestal. Again do this gradually and observe the effect each adjustment makes to the balance of the pedestal.	
If the antenna rises up in elevation when held at 0 the back of the pedestal is too heavy and weight will need to be removed from the back or added to the front until the pedestal is correctly balanced. If there are weights on the back of the pedestal start by gradually removing them, if not start adding weight to the reflector brackets. Again do this gradually and observe the effect each adjustment makes to the balance of the pedestal. Repeat the above steps until the pedestal remains level with the horizon, therefore meaning the balance is correct at 0 degrees of elevation.	
Once the antenna is balanced at 0 degrees of elevation the next step is to balance it at 90 degrees. ***Note:*** From now on no addition weight should be added or removed from the antenna, the weight currently on the pedestal should be reconfigured. Adding or removing weight when trying to balance the pedestal at 90 degrees will affect the balance at 0 degrees. Looking at the image to the right you can see the pivot point of the elevation axis has now changed so we will now be moving weights between the upper and lower sections of the pedestal (meaning the system will still weigh the same at 0 degrees).	

5. Raise the antenna to 90 degrees of elevation and let go of it, if perfectly balanced it will stay there. If it drifts follow the next stages of this procedure. If the antenna falls down in elevation there is too much weight on the lower part of the pedestal which should be moved to the upper part of the pedestal. Do this gradually and observe the effect each adjustment makes to the balance of the pedestal. Repeat the above steps until the pedestal remains pointing at 90 degrees of elevation, therefore meaning the balance is correct.	
If it falls to a higher elevation position there is too much weight on the upper part of the pedestal which should be moved to the lower part. Do this gradually and observe the effect each adjustment makes to the balance of the pedestal. Repeat the above steps until the pedestal remains pointing at 90 degrees of elevation, therefore meaning the balance is correct.	
6. Move the pedestal back down to 0 degrees of elevation and verify the balance is still correct 7. Now move the pedestal to 45 degrees of elevation, if correctly balanced at 0 and 90 you'll find the system will also be balanced at 45 degrees. 8. Once the balance is correct undo any bolts which were removed during the balancing process and apply Loctite 2760 before reinstalling the hardware.