

**National Radio Astronomy Observatory**  
Socorro, NM

VLBA Antenna Memo Series #36

**Pie Town Maintenance Visit**  
2001

Jim Ruff  
1/04/02

Attachments: Azimuth Rail Survey, Servo Trip Report, Electronics Trip Report, Task Schedule

The work was performed on maintenance days over a period of months. Contributing personnel included Ramon Gutierrez, Steve Aragon, Adrian Zamora, Steve Troy, the VLA Servo Techs, Doug Scott, Bob Broilo, and Jim Ruff. Site Techs Eric Carlowe, Kelly Gatlin and Nelson Atencio assisted throughout.



Kelly and Eric were treated to a training session on use of the Sellstrom system and general fall protection. They are using short nylon webs to attach the Sellstrom trolleys to their harnesses. These webs are lightweight and strong, and would facilitate rescue in event of a fall. But, they can not be left outside when not in use. This issue is being investigated.

The FRM INA bearing clearance measured 0.0025”.



Structural cracks found previously had not progressed. A backup structure tube with freeze cracking was found.

No metal was found in the elevation pillowblock grease.

The azimuth bearings were inspected. The outer races had been rotated previously, so we didn't re-do it.

<b>Az Bearing Grease Inspection</b>				
	Drive 1	Drive 2	I1	I2
Inner	small flakes	some flakes	flakes to 1/16”	OK
Outer	OK	replaced	OK	OK

The drive wheels are located within spec.

<b>Drive Wheel Alignment</b>			
Wheel #	Horizontal Error	Vertical Error	Radius Error
D1	0° 0' 14”	0° 1' 9” (flat)	0.02” (in)
D2	0° 0' 6”	0° 1' 1” (steep)	0.16” (out)



The dichroic panel is in good condition.



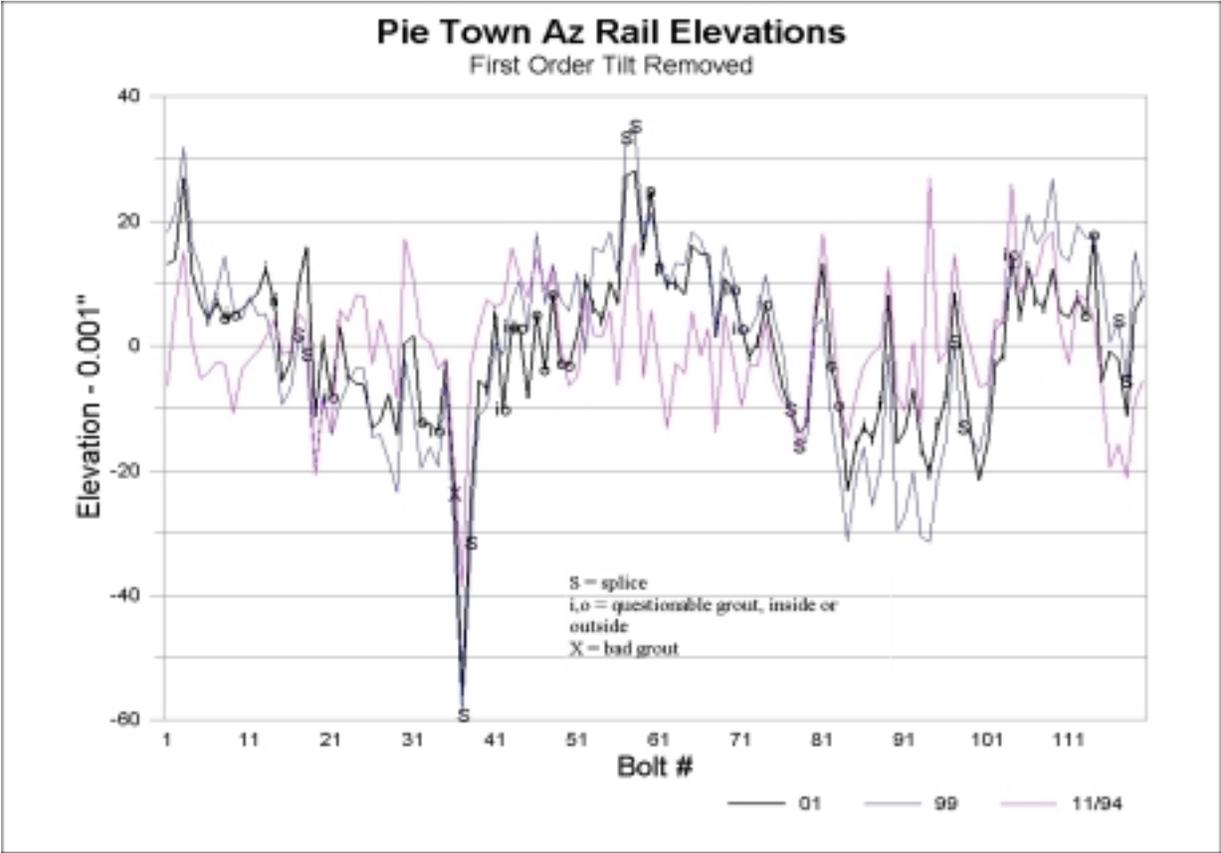
There is a dented panel near the main dish access hatch.



There are areas of eroded paint on some of the panels.



The azimuth rail grout is in need of spot patching. There are damp spots under the Vulkem that may promote further degradation.



First order tilt is 0.31 inch (3' 32").

The paint on this antenna is in need of touch-up.



# Memo

**To:** Distribution  
**From:** Servo Group  
**Date:** 10 APR 01  
**Subject:** VLBA PT SERVO TESTS

Day 1 Travel to PT and perform VLBA Servo Safety Tests  
Performed Servo Response Tests

Day 2 Travel to PT and performed VLBA Servo PM's

The PT VLBA Station's Servo System was in great shape, as is usual with this Site. The Station Technicians have obviously been keeping up with the Servo System PM procedures, and with the exception of AZ #2 motor, the armatures of the other 3 motors were spotless. AZ #2 motor's armature had a slight case of threading that was most likely precipitated by the use of the 'old style' brushes. These have since been replaced by the much softer 'new style' brushes.

While performing the Safety tests, the antenna inadvertently drove into the CW limit due to the failure of the CW/CCW switch in the upper pintle bearing room. A replacement switch was sent to the Site and has been replaced by the Techs. The brake torque tests revealed that both AZ brakes were only 50 ft-lbs instead of the specified 75 ft. lbs. The brakes were disassembled and adjusted to within tolerance.

On day 2 we traveled back to PT to perform the Servo PM procedures. During the course of the procedures, we discovered that the motor j-box modifications have not been done at this Site. We tightened some connections inside the Servo Drive Cabinet that were a little loose, and inspected the power distribution panels with an IR thermometer for loose/hot connections; none were found.

## Action Items:

- A. Replace lightning protection cable from EL axle to DGB platform.  
*Cable is on Site, waiting for install by Site Techs*
- B. Install motor j-box mods on AZ/EL motors to permit easier access to bushes.  
*Site Techs declined this mod, saying "We don't need this" to service our brushes*

From: Doug Scott  
To: Clint Janes  
Cc: J. Ruff  
P. Rhodes

Electronics Division Tiger Team Report  
For VLBA Pie Town, December 2001  
Site Manager: Nelson Atencio  
Site Technician: Kelly Gatlin  
Tiger Team Leader: Jim Ruff

January 5, 2002

General.

The VLBA Pie Town station is in transition. Our new station manager, Nelson Atencio, is sorting out the differences between Pie Town and Kitt Peak. A good portion of the differences between PT and other sites are old project components and associated cables. These are left on the antenna long after the people who requested them have gone. These should be removed or labeled and documented.

The former and most original VLBA PT site manager, Eric Carlowe, is to be congratulated for his effort in running PT. No other VLBA station manager has had the number of engineers, technicians and scientists go through his front door like Eric has. He suffered us with great results.

I wish both Nelson and Eric, the best on their new assignments.

Item List.

My inspections took me from the antenna apex to the bottom of the pintel bearing room. Listed below are the areas in which action was taken or still required. This is not in any order of priority.

1. Missing antenna warning signs were replaced.
2. Focus motor coupling was replaced (broken). Suspect focus motor needs to be replaced but currently is not available. Motor noise can be heard from the front of the control building when focus is driving down.
3. Reattached ground cable at elevation yoke, located on the opposite side of vertex access ladder.

Action Required:

4. Power cable, in pedestal room, needs replaced. The cable's outer protective insulation has broken down. It connects to J13 Input Power on FRM panel and to the isolation transformer, located in same room.
5. Replace protective glass on exterior light, above door to control building.
6. Weather proofing of FRM boxes at the apex, should be re-done. Cables and connectors will be taped and sealed with waterproof coating.
7. Antenna apex hatch strap is missing.

The cryo compressors are functioning fine. They should be cleaned out more and to do so would require they go off line. If a spare compressor is available it should be moved to VLBA PT for this purpose.

I would like to thank the rest of the tiger team for their assistance, cooperation and patience. As one of the junior members, I have growing respect for their talents and experience.





### ANTENNA MECHANICS

	<b>El Bearings</b>
<b>x</b> Apex Safety (nylon webs?)	<b>x</b> Inspect EL bearings lip seals
<b>x</b> Install new ladder & fall arrest system	<b>x</b> Clean off excess grease
<b>x</b> Install apex guardrail	<b>x</b> Install El bearing grease trays
<b>x</b> Fall Protection training (sign-in sheet)	<b>x</b> Grease
<b>FRM</b>	<b>El Bearing Grease Inspection</b>
<b>x</b> 2-year PM	<b>Encoder Side</b> <b>OK</b>
<b>x</b> INA bearing check	<b>Tach side</b> <b>OK</b>
<b>FRM INA Bearing Check</b>	<b>Az Bearings</b>
<b>50# pull on primary side</b>	<b>x</b> Open, clean & Inspect pillowblocks
<b>Pr'y Travel:+0.001    Sec'y Travel:-0.0015</b>	<b>Az Bearing Grease Inspection/Bearing Replacement</b>
<b>50# pull on secondary side</b>	
<b>Pr'y Travel:-0.001    Sec'y Travel:-0.0015</b>	
<b>Subrefector</b>	<b>D1</b> small flakes <b>OK</b>
<b>x</b> Check for peeling, delamination (stained)	<b>D2</b> some flakes, but OK <b>replaced</b>
<b>x</b> Check cover	<b>I1</b> flakes to 1/16" <b>OK</b>
<b>Quad Legs, Guy Wires Etc..</b>	<b>I2</b> OK <b>OK</b>
<b>x</b> Inspect guywires & turnbuckles	<b>Rotate outer races (done previously)</b>
<b>x</b> Inspect quadleg flange bolts	<b>x</b> Close pillowblocks and grease
<b>Anemometer</b>	<b>Az Wheels</b>
<b>x</b> Inspt mounts/chk operation	<b>x</b> Check wheel to struct clearances
<b>x</b> Install Baldwin bracket parts	<b>x</b> Check axle bolt tightness
<b>Feeds &amp; Dichroic</b>	<b>AZ wheel radii and alignment</b>
<b>x</b> Inspect feeds, mounts, heaters, etc.	
<b>x</b> Check dish tipper	<b>D1</b> <b>D2</b>
<b>x</b> Check Dichroic reflector (sealed panel)	<b>Horiz. Error</b> 0' 14"    0' 6" (!)
<b>x</b> Check feedcone exterior	<b>Vert. Error</b> 1' 9" flat    1' 1" steep
Replace hatch latches as req'd	<b>Radius</b> 0.02 in    0.16 out
<b>Dish Surface &amp; Panels</b>	<b>Az Motors &amp; Gearboxes</b>
<b>x</b> Inspect for damaged panels (1 - next to hatch)	<b>x</b> Inspect pumps, seals & couplings
<b>x</b> Spot check panel bolts-looseness	<b>x</b> Check gearbox heater enclosures
<b>Elevation/Hoist/Swing Platform</b>	<b>Paint &amp; Insulation Inspection</b>
<b>x</b> Instl hoist safety mods	<b>x</b> Inspect ant paint and report
<b>x</b> Checkout swinging platform	<b>x</b> Inspect & repair ant insulation as needed
<b>x</b> Instl condensor platform toe guard	<b>Pintle Bearing</b>
<b>Structural</b>	<b>x</b> Inspect seals
<b>x</b> Spot check structural bolts	<b>x</b> Check pocket level
<b>x</b> Inspect structural welds (cracks haven't progressed)	<b>x</b> Check for loose bolts
<b>x</b> Inspt ant backup/lower struct (1 freeze-cracked tube)	<b>x</b> Lubricate
<b>x</b> Inspect EL axle for cracks	<b>x</b> Close gap in grease catcher
<b>El Bull and Pinion Gears</b>	<b>Az Rail Inspection</b>
<b>x</b> Inspt bull/pinion gears (checked backlash: OK)	<b>x</b> Inspect ant foundation, grout and Vulkem
<b>x</b> Lub bull gear as req	<b>x</b> Inspect for excessive rail movement
<b>x</b> Check stow pin	<b>x</b> Inspect joint bars & clips
<b>El Motors &amp; Gearboxes</b>	<b>x</b> Rail level measurements
<b>x</b> Inspect pumps, seals & couplings	<b>x</b> Check for popping wheel
<b>x</b> Check gearbox heater enclosures	
<b>x</b> replaced FRM focus motor	<b>vulkem poor. grout needs repairs</b>

<b>ELECTRONICS</b>		
	Antenna Maintenance & Inspections	
	Apex/FRM inspections	
	Feedcone/Receiver system inspections	
	Activate & test feed heaters	
	Vertex Room/Racks & cable inspections	
	Vertex to pintle bearing inspection	
	Replace tie wraps on antenna cabling with metal type	
	Install cable wrap strain reliefs	
	Inspect pintle bearing rm bulkhead, cablewrap, etc.	
	Inspect pedroom UPS, FRM controller, dry air sys, etc.	
	Install breaker for air comp & hydraulic wrench	
	Station Building Inspections	
	100 - Check electrical, UPS and test operation	
	103 - Chatter/supervisory boxes, alarms, etc.	
	104 - Bulkhead, underfloor, maser, etc	
	Check tools, test equip, manuals, wtr sys, UIS, etc	
	Outside Building and Misc. Inspections	
	Run and inspect site generator	
	Inspect weather station	
	Check gates. fence, signs, grounds, etc	
	Inspect lightning protection for antenna & bldg	
	Check safety items/hazmat storage, etc.	
<b>FINAL INSPECTIONS</b>		
<b>x</b>	Spot check critical PM's	
<b>x</b>	Review problem areas with site tech's	
<b>x</b>	Site Inspections for Oversights	
<b>x</b>	Site clean-up	
	Contact VLBA Operations for Station Startup Verification Tests	