

National Radio Astronomy Observatory
Socorro, New Mexico

VLBA Antenna Memo # 46

Saint Croix, Virgin Islands Maintenance Visit March 15-25.

Team members consisted of Steve Aragon, Nelson Atencio, Eric Carlowe, Tom Frost and Ramon Gutierrez. VLBA Site Techs Pete Allen and Tazewell Reed assisted throughout. This report and its photos, documents antenna maintenance, repairs, problems. A task list is attached, and was completed.





Subreflector has some peeling paint on the outside perimeter, ~ 3" strip.



Subreflector drain holes are clear. The di-pole is in good condition but slightly corroded. 90/50cm FE cables are in good condition.



FRM motors to j-box cable connectors were replaced. As were the j-box to j-box connectors. The focus flex shaft and a bellows were also replaced.

FRM INA BEARING CHECK 50 LBS PULL ON PRIMARY SIDE

Primary Travel: +.001"	Secondary Side: -.001"
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FRM INA BEARING CHECK 50 LBS PULL ON SECONDARY SIDE

Primary Travel: -.001"	Secondary Side: +.00015"
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FRM cable strain reliefs were badly rusted and the cable trays were broken. Strain reliefs were replaced with aluminum brackets Ramon made. Cables are lashed to these brackets with ss ty-wraps. The broken cable trays were removed. FRM cables are bundled and looped together with ss ty-wraps.



The dichroic reflector is delaminating. View of feed cone and dish panels.



Feed cone insulation, ellipsoid reflector and dish panels are in good condition. Quad legs and guy wires have a little surface rust.



Elevation gearbox #1 pre-load inspection showed very little signs of wear. Both gearboxes oil was changed and several flow gauges were replaced.



Elevation motor # 1 was replaced. The elevation bull gear is well lubricated.



Azimuth #1 gearbox pre-load inspection.



Azimuth #2 gearbox pre-load inspection. Both gearboxes showed very little signs of wear. Both gearboxes oil was changed and several flow gauges were replaced. A gearbox oil seal was replaced on AZ #1.



Azimuth motor #2 was replaced.

Azimuth bearings were inspected.

AZIMUTH BEARING/GREASE INSPECTION

	INNER	OUTER
D1	OK	OK
D2	A FEW SMALL FLAKES	OK
I1	A FEW SMALL FLAKES	OK
I2	OK	OK

Idler #2 is making a popping sound. Several tests and a bearing inspection found the inside/outside bearings to be ok. No azimuth bearings needed changing, and all bearings were well lubricated.

ELEVATION BEARING/AXLE INSPECTION

EL. Grease inspection/Encoder side	OK
EL. Grease inspection/DGB side	LOTS OF SMALL METAL FLAKES

Elevation bearing seals are ok and there are no visual elevation axle cracks. The DGB side bearing needs replaced. Site techs will flush this EL bearing with grease every couple weeks and take samples for analysis. No metal flakes were found in the pintle bearing grease. Cable wrap and cables are in good condition.



The ACU power supply upgrade was completed. During the ACU retrofit 6 bad TB2 crimps were found and repaired. The AZ synchro was repaired.



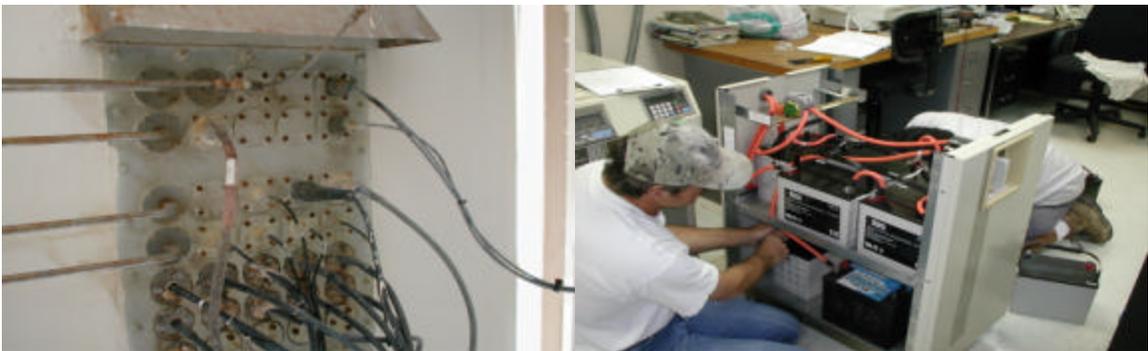
A new back up AC was installed in the pedestal room.



The cryo compressors are in good condition. Shown here with fresh paint.



The vertex room catwalk was nearly rusted away and had to be rebuilt.



The ellipsoid reflector signal/power cable connectors on the vertex room baulk head were replaced. The station 12.5kva UPS batteries were replaced.



Brush is cut back ~30 feet around perimeter of the VLBA site. The area inside the fence is weed free and orderly.



These photos show the worst areas of rust on the antenna. Painters and site techs are doing an effective job keeping up. Steve points to a repair completed during our last maintenance visit in April 2002.



A typical rail clip with vulkem scraped off. Grout is in good condition. Site techs will follow up with chem prime paint on clips and splices as needed.

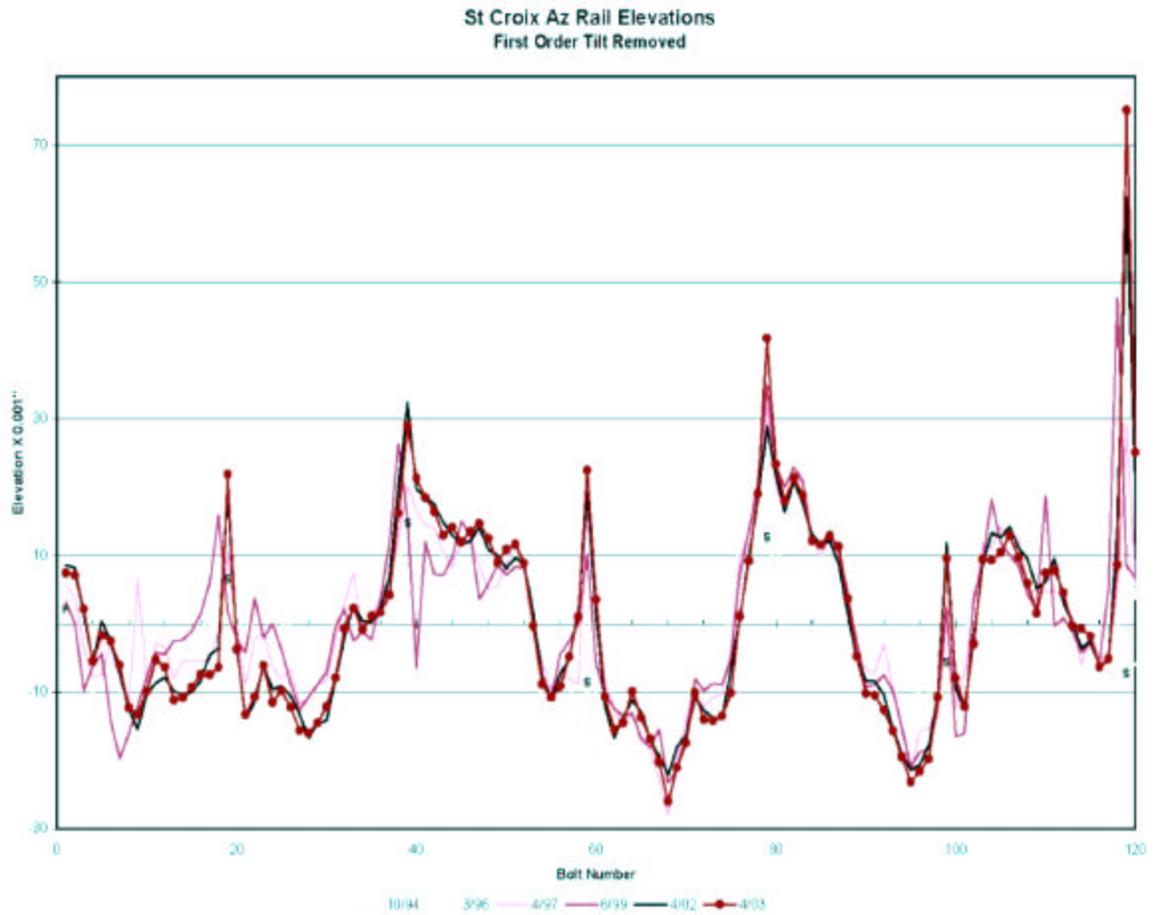


Rail splice with vulkem scraped off. The maintenance team and site techs were able to remove most of the vulkem from the rail during the visit. The rail, clips, and splices are in good condition.



Removing vulkem from the rail.

Ramon measuring the rail.



ANTENNA MECHANICAL MAINTENANCE SCVLBA 3/15-25/03

APEX INSPECTION:

FRM 2-YEAR INSPECTION PM?

Install INA zirks.

FRM INA BEARING CHECK 50 LBS PULL ON PRIMARY SIDE

Primary Travel:

Secondary Side:

FRM INA BEARING CHECK 50 LBS PULL ON SECONDARY SIDE

Primary Travel:

Secondary Side:

SUBREFLECTOR INSPECTION:

Mounting Hardware?

Dipole?

Peeling paint/delaminating?

QUAD LEGS INPECTION:

Guy wires?

Turn buckles?

Cotter pins?

Quad leg flange bolts?

DISH INSPECTION:

Anemometer mounts/operation ok?

Panel surfaces?

Spot check panel bolts?

FEED CONE INSPECTION:

Feed cone surface/insulation?

FE feed windows?

FE feed mounting hardware?

FE feed heaters?

Dichroic reflector cracking/delaminating?

Ellipsoid dish/mount?
FC hatch latches replace as needed?

ANTENNA MECHANICAL MAINTENANCE SCVLBA

3/15-25/03

ELEVATION BEARING/AXLE INSPECTION:

EL. Grease inspection/Encoder side

EL. Grease inspection/DGB side

Elevation bearing seals?
Grease elevation bearings?
Check elevation axle for cracks?
Listen for popping or grinding?

ELEVATION BULL/PINION GEAR INSPECTION:

Bull gear?
Bull gear welds/hardware?
Pinion gears?
Lube bull/pinion gears as needed?
Check stow pin?

ELEVATION MOTOR AND GEARBOX INSPECTION:

EL.#1 seals/coupling/internal gears?
EL.#2 seals/coupling/internal gears?
Gearbox heaters/lube pumps?
Flow gauges/fish eyes?
Change gearbox oil as needed?
Listen for popping or grinding?

ELEVATION PLATFORM INSPECTION:

Swinging catwalk?
Hoist?
Install VTX condenser toe guard?

ANTENNA STRUCTURAL INSPECTION:

Spot-check structural bolts?
 VTX walk way?
 Antenna structural welds?
 Antenna backup/lower structure?

ANTENNA MECHANICAL MAINTENANCE SCVLBA 3/15-25/03**AZIMUTH BEARING/GREASE INSPECTION**

	INNER	OUTER
D1		
D2		
I1		
I2		
Bearing races? Close pillow blocks & grease?		

AZIMUTH WHEEL INSPECTIONS:

Wheel to structure clearances?
 Wheel/Axle bolt tightness?
 Listen for popping or grinding?

AZIMUTH WHEEL RADIUS/ALIGNMENT

	D1	D2
Horizontal error		
Vertical error		
Radius		

AZIMUTH MOTOR AND GEARBOX INSPECTION:

AZ#1 seals/coupling/internal gears?
 AZ#2 seals/coupling/internal gears?
 Gearbox heaters/lube pumps?
 Flow gauges/fish eyes?

Change gearbox oil as needed?
Listen for popping or grinding?

PINTLE BEARING INSPECTION:

Cable wrap & cables?
Check pocket level?
Check for loose bolts?
Check bearing grease/grease as needed?

ANTENNA MECHANICAL MAINTENANCE SCVLBA 3/15-25/03

AZIMUTH RAIL INSPECTION:

Rail level measurements?
Excessive rail movement?
Joint bars and clips?
Antenna foundation/grout/vulkem?
Re-torque fish plates as needed?

ANTENNA PAINT/INSULATION INPECTION:

Antenna paint condition?
Repair antenna insulation as needed?

MECHANICAL MAINTENANCE ITEMS TO BE COMPLETED:

1. Replace AZ I1 inside bearing.
2. Rebiuld rusted VTX catwalk.
3. Construct PED room AC condenser platform.

ANTENNA MECHANICS NOTES:

ANTENNA SERVO MAINTENANCE SCVLBA 3/15-25/03

ANTENNA SAFETY TESTS:

Tests ok?

BRAKE HOLDING-TORQUE TESTS (FT-LBS)

AZ #1

AZ #2

EL #1

EL #2

MOTOR INSPECTIONS:

Elevation motor/tach couplings?

Elevation brush/commutator?

Azimuth motor/tach couplings?

Azimuth brush/commutator?

ANTENNA GROUNDING INSPECTION:

Elevation ground cable?

Elevation platform to pintle turret?

Pedestal room?
Azimuth wheel contacts?
Pintle room/cable wrap?

SERVO RECORDINGS:

Elevation response test?
Azimuth response test?
Elevation position loop test?
Azimuth position loop test?

ACU AUTO MODE TESTS:

System/axis faults?
AZ/EL motor fault status?
Stow commands?
Sychro feedback?
AUI communication? (comm. dead)
Restore ACU parameters?

ANTENNA SERVO MAINTENANCE SCVLBA 3/15-25/03

SERVO MAINTENANCE ITEMS TO BE COMPLETED:

1. Replace EL motor #1.
2. Replace AZ motor #2.
3. Install ACU power supply mod.
4. Install azimuth synchro.

SERVO TECHNICIAN NOTES:

ANTENNA ELECTRONIC MAINTENANCE SCVLBA 3/15-25/03

APEX/FRM INSPECTION:

FRM cable/j-box condition?
FRM motor/encoder?
90/50cm FE/dipole/cables?
Replace tie-wraps w/metal as needed.

FEEDCONE IN/OUT INPECTION:

Ellipsoid operation?
Feed heater operation?
All FE cables?
CRYO systems?
FE dry air?
Replace tie-wrap as needed.

VTX ROOM IN/OUT INSPECTION:

IF/PWR cable/connector bulkhead?

Power bulkhead/rfi filters?

A/B racks?

ANTENNA CABLE INSPECTION:

Elevation cable wraps?

All cable trays?

Elevation platform/limit switches?

Replace tie-wraps with metal as needed.

PINTLE BEARING INSPECTION:

Cable wrap/bulkhead?

Limit switches?

Cable strain relief?

PEDESTAL ROOM INSPECTION:

ACU/FRM logic on UPS?

UPS operation/by-pass switch?

Breakers labeled correctly?

Dry air compressor?

ANTENNA ELECTRONIC MAINTENANCE SCVLBA 3/15-25/03

STATION BUILDING INSPECTION:

Room 100?

UPS operation?

Electrical panels?

Onan x/switch?

Room 102?

Contempo 1&2 operation?

Room 103?

VME/comm. rack?

Recorders 1&2?

Fire alarm operation?
Chatter box/phone operation?
Under floor cables/bulk head?
Room 104
Maser/C&D rack?
Under floor cables/bulk head?

WEATHER STATION INSPECTION:

Check operation/test alarms?
Cabinet/tower?

VLBA SITE/STATION GROUNDS INSPECTION:

Test generator?
Contempo condensers?
Station building?
Fence/gate/signs/grounds/storage?

ELECTRONIC MAINTENANCE ITEMS TO BE COMPLETED:

1. Install FRM focus motor encoder/coupling.
2. Install ACU power supply mod.
3. Install new PED room AC.
4. Replace FRM cables at APEX.
5. Replace VTX bulkhead connectors as needed.

ANTENNA ELECTRONIC MAINTENANCE SCVLBA 3/15-25/03

FINAL ANTENNA/SITE INSPECTIONS:

Spot-check critical PM's?
Any TT oversights?
Site cleanup.
Review TT list/problems with site techs?
VLBA operations startup tests.

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VLBA ELECTRONICS TECHNICIAN NOTES: