Status Antonio Cooled Feed Fab & Testing

2015-06-12, Matt Fleming

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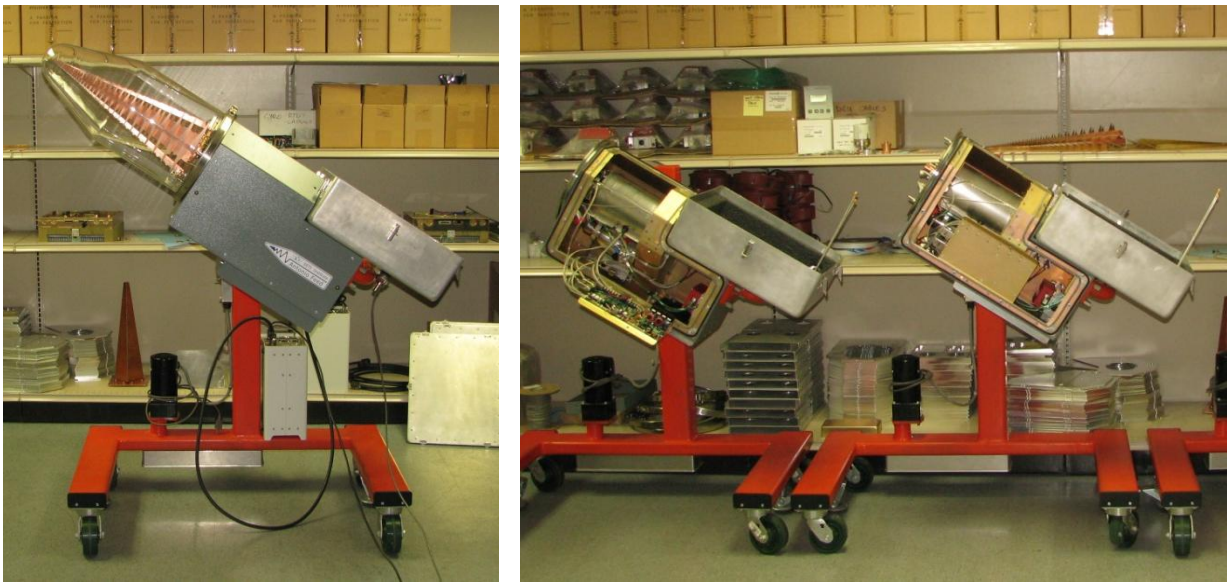
Summary:

This document will be prepared periodically to communicate progress on design, fabrication and testing of the Antonio Feed also called the ATA Cooled Feed. Although we have begun the production of 44 feeds we still have the some lingering design issues as well as continual testing of various features. Little progress in Feed production has been made since the last report of 2015-05-05. After noise temperature testing of Feed SN-001, the tip circuit showed fractures of the small traces used on the flex circuit board. A second attempt with minor changes also showed failed traces. Differential thermal expansion during cooldown and or vibration have been identified as the source of the trouble. Franklin Antonio has become engaged in assisting Minex with analysis and correction of the problem. Additional testing and experimentation is underway to find the cause and solution to the problem. A solution is expected within the next 3 weeks. Two additional glass domes have been received from H. S. Martin and they appear to be good quality. Inspection is not complete. Due to delays and continuing engineering development activity, Minex has no deliverables to bill against. Minex is approaching a period of insufficient cash flow. We have exhausted all other options and will need immediate collaboration from SETI Institute to avoid interruption of work.



Feed 001, 002, 003 on stands.

Status of Production, Grouped by Section:

Administrative Activities: (no changes in this section)

- Contract: Minex and SETI are operating under a contract, extending through Oct 31, 2015. This contract is an extension of Phase 2 production of the Antonio Feed.
- Staffing: Matt Fleming, Peter McMann & Rob Spencer are primary full time staff working on the feed. No other major subcontractors are engaged at this time. Chris Munson is providing project oversight and reviewing daily progress approximately 4 times a week.
- Schedule: The first 2 delivery dates have slipped. Technical problems must be solved in order to continue production. The effect on the remaining delivery dates is unclear at this time.
- Financial: SETI has one outstanding Minex invoice. Some sort of amendment will have to be made to the contract in order to correct total cost and cash flow problems.

Kit Parts Vacuum Chamber Section:

- Base Plates: About 15% complete. (up from 7%) Fabrication of twenty stainless base plate assemblies is in progress. The design was modified. Material for 23 more is in stock. This includes cooler and turbo mounting flanges.
- Flex Plates: About 65% complete. (no change) The Flex Plate Assy connects the end of the Cryo-cooler to the base of the pyramid. Each soldered unit has about 60 copper sheet components in the design. All parts are complete and cleaned and two fixtures for soldering the assemblies have been completed. The soldering process has been used 3 times now.
- Pyramid: About 75% complete. (no change) All Pyramid base and all pyramid wall parts have been completed. Pyramid soldering is 55% complete. Pyramid tip parts are 60 % complete and pyramid tip final soldering remains. All items require extensive cleaning.
- Arm Assemblies: About 55% complete (no change) All component parts are complete. Cleaning and deburring is 20% complete. Soldering is 4% complete with improvements to fixtures and techniques. This activity may be done in conjunction with Feed final assembly.
- LNA Mount Group: About 58% complete. (no change) About 95% of all component parts are complete. All parts have been cleaned. Only tip guide parts remain for fabrication. This activity may be done in conjunction with Feed final assembly.
- Dewar Glass Domes: About 6% complete. (up from 4%) Only 1 borosilicate glass dome vendor remains engaged; two have dropped out. Greatglas of Delaware, has delivered one remanufactured unit, but it did not meet the dimensional specs for the second time. They have been asked not to continue work. We received 2 more units from H. S. Martin of New Jersey for a total of 3 units. They appear to meet the dimensions well. We have not discussed the production cost or schedule for future units. The cost is expected to be higher than the original budgeted amount.
- Lens: About 5% complete. (no change) Jack completed the new lens design. Final drawings and vendor selection and fabrication remain to be done. Previous lens cannot be used.
- Foam & Fabric Covers: About 20% complete. (up from 15%) Foam has arrived, final design and prototype is complete. The vendor is fabricating units now. Minex has provided special tooling.

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Kit Parts Housing Chassis Section:

- Welded Housings: About 65% complete. (up from 62 %) Three aluminum chassis housings have been welded, pained and used. Four more are partially welded. All parts needed for housing fabrication have been completed and are ready for welding. Welding will continue for some time.
- Other Housing Parts: About 95% complete. (no change) Most all internal housing related parts have been fabricated. Some require anodizing. Tube covers, vent screens and dust filter parts are the only remaining parts needing attention.
- Vacuum System: About 90% complete. (no change) Low vacuum system parts are detailed some additional parts must be ordered.
- Cryo-Cooler System: About 85% complete. (no change) Modifications to the heat rejection disc is 10% complete and will be ongoing.
- Blower System: About 50% complete. (no change) All Mount plates are complete, About 60% of blowers are now in stock.
- Electronics Module: About 50% complete. (no change) All Control Boards are complete. Mounting plates, pins & bushings are 100% complete. Assembly remains.
- Wiring Harnesses: About 15% complete. (up from 10%) Harnesses have been prototyped and 3 completed. Some additional cable assemblies have been completed. Additional connectors and wiring components have been identified & 80% have been ordered. Assembly continures.
- Pax Case Modifications: About 5 % complete. (no change) Three units are modified. Others will be addressed during feed final assembly.

Feed Final Assembly & Testing:

- Feed 000: About 100% complete. (no changes) Installed on antenna 2e. Special fused quartz radome and preliminary housing. Testing at Minex and Hat Creek has been completed. Feed communication to the main lab is working. At some point this feed will need to return to Minex for an updated Housing and Base Plate and other parts. One pole does not seem to be working.
- Feed 001: About 96% complete. (no change) The remaining parts are Lens and Fabric Cover. Vacuum looks good and cooling looks good. Testing has revealed a problem with the tip circuit design. Fractures have been found on the flex circuit traces after cooldown and operation. We are searching for a solution to the problem. (quartz dome on this one)
- Feed 002: About 90% complete. (on hold) Unit is mounted on an assembly stand. Most major components are installed. The remaining parts are, feed arms, LNA group, improved tip circuit design, lens and fabric cover. (borosilicate glass on this one)
- Feed 003: About 90% complete. (on hold) Unit is mounted on an assembly stand. Most major components are installed. The remaining parts are, feed arms, LNA group, improved tip circuit design, lens and fabric cover. (borosilicate glass on this one)

Other Tasks:

- Correct Design of Tip Circuit for Durability: (new Task) Find an improved design which will prevent premature failure of the feed tip circuit when subjected to cooling and vibration.
- Improved Screen Room Test Facilities: (no change) Improved lighting is still needed. New coax cables have been identified but the cost is outside our current budget, waiting.
- Feed Tip Assembly Fixture & Testing: About 90% complete. (up from 30%) Tip design is now complete. Testing will determine if we have a successful design. Both capacitor board and flex boards are in stock. The assembly fixture is very useful, but a microscope vision system is needed.
- Coax Stripping Tool: (unclear) Purchased stripper was found to be inadequate. A new custom unit was built at Minex. It works fine.
- Software: Some improvements to software are needed. Rob Ackermann is working on it.

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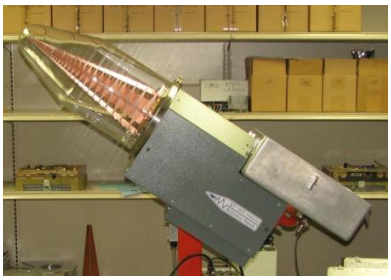
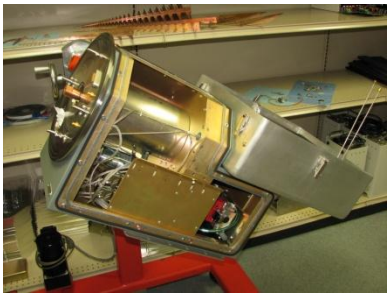
Photos of Production



Feed 001 on stand. (testing)



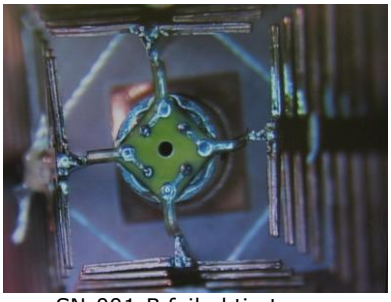
Feed 002 on stand. (hold)

Feed 003 on stand. (hold)

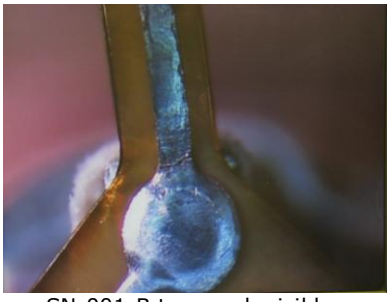
Glass dome Martin 001.

Glass domes Martin 002, 003.

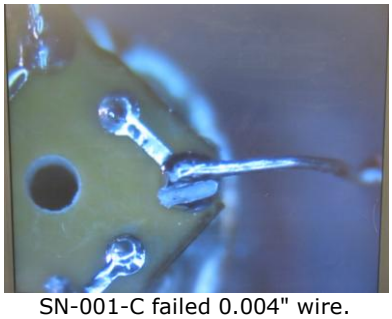
Bake out blanket.



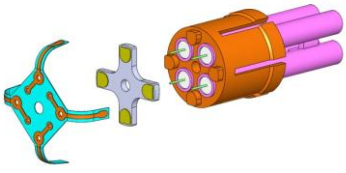
SN-001-B failed tip trace.



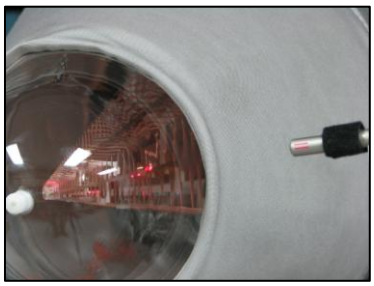
SN-001-B typ crack visible.



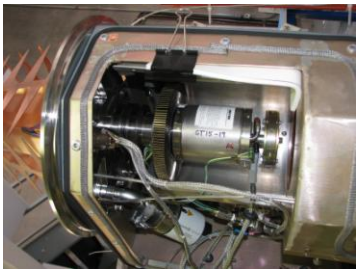
SN-001-C failed 0.004" wire.



Current Tip Design.



Reflected laser detects vibration.



Experimental bellows mount.

Ratio (3 x 4)(1.5 x 2.0) End.