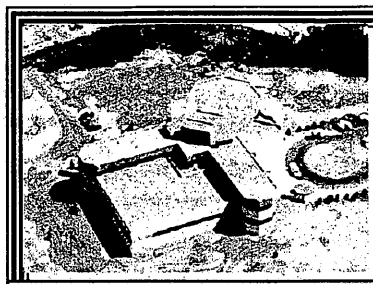

AOC NEWS

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Welcome Aboard

Electronics: Troy Jensen and Tazewell Reed. VLA Array Operations: Michael Bradford. Jansky Postdoc: Henrique Schmitt, and ALMA: Zach Barnes.

A Tale of Success

It was late 1997 when the NRAO won approval of a project. NSF and AUI funding, permited the linking of the VLA with the Pie Town VLBA antenna. This doubled the angular resolution of the VLA. The VLA-Pie Town link was funded as a three-year development project with completion planned for the end of 2000.

On October 22, 2000, the first science project for the operational implementation of the VLA-Pie Town link was observed. As of November 27, a total of 14 operational observing runs have been carried out using the link. The observed projects range from the sizes of stars in our own Galaxy, to mergers of relatively nearby galaxies, and observations of neutral hydrogen in distant galaxies. More than 10 additional science projects will be observed with the Pie Town link and the VLA A configuration through mid-January 2001.

So far, the link has worked very well, with only a few minor problems that have not greatly affected Observers' data. The Pie Town link results so far indicate that we have succeeded in achieving the goal of making the link operational three years after the start of funding. Besides the valuable scientific returns of the combined instrument, the VLA-Pie Town link has been a valuable opportunity to design, test, and use a long-line fiber-optic cable for transmission of the needed signals, and thus to gain much-needed experience in this area.

The technical expertise gained in this project has carried over into ALMA and will also be extremely valuable for the VLA Expansion project.

Special congratulations should go to Ron Beresford for the overall design of the link, Leon Abeyta for leading the electronics end of the project after Ron's return to Australia, Ken Sowinski for modifying the VLA's real-time software to accommodate the link, and Eric Carlowe and Kelly Gatlin for their many hours of help in bringing the Pie Town VLBA station into the VLA. Many others too numerous to mention, in every division of NRAO-Socorro, have contributed substantially to the VLA-Pie Town link project. Thanks to all of you for the extra effort you put forth to achieve our very visible and important goals.

M J Claussen and J S Ulvestad

Co-op Program

No one realized in 1994 when Bill Brundage initiated the Co-op program between New Mexico Tech and NRAO, what an important payback the program would bring. Now, six years later, three ex-coops are full time regular employees. Kerry Shores in the Correlator Group and Don Jenkins and Zach Barnes in the ALMA LO/IF/FO Division. All three worked on projects in the Interference Protection Group(IPG); Kerry initiated work on the satellite tracking system (STS), Don constructed and installed the "W8" RFI monitor at the VLA, and Zach initiated software for the environmental RFI monitoring system (EMS). The NRAO funded co-op program provides funding for one student per semester to work full time for NRAO. NRAO has decided to continue the program in 2001; a new student is slated to begin in IPG in January 2001. Any New Mexico Tech undergraduate, sophomore and up, in a technical major is invited to apply.

In 2000, our co-ops were Sam Field and Ryan Schmidt. The two engineering students brought both the STS and the EMS to an operational level under Raul Armendariz's direction. Sam hopes to return to NRAO next summer and Ryan has continued with a variety of IPG duties part time.

The Co-op program is only one of three undergraduate student programs with Tech. Currently, ten electrical engineering students are meeting requirements for the Senior Design project at NRAO. These students earn six academic credit hours but no compensation. NRAO has participated in the program for five years.

Part-time work is the third undergraduate student program. In this case, the student is paid by Tech , then Tech is reimbursed from M&S funds by the NRAO group receiving the service. If the student qualifies for "work-study," the NRAO is only billed for 25 percent of the student salary. Current part-time student employees are John Hughes (Mainsaver), Kris Haskins (API), and Ryan Schmidt (IPG) in the Electronics division, Joel Busch in the ALMA LO/IF/FO division, and David Fugate in the Computer division.

C Janes

Impact of Quality Assurance

Working in an environment where quality is paramount is rewarding for personnel and good for the observatory. Quality techniques reduce equipment downtime, increase work productivity, encourage feedback on performance and maintain overall telescope performance.

The Navy has an equipment repair policy that states "Leave No Trace". This means leaving no evidence that the equipment has been repaired. It should operate and look like original factory. NRAO is fortunate to have staff that understands the importance of "Leave No Trace," and also, to ensure that equipment operates like the original, "pass/fail Quality Assurance procedures," which have been implemented. To ensure the equipment continues to work as specified, preventive maintenance schedules have been developed and are presently in use. These tools, along with the proper replacement parts, have produced reliable telescopes that perform as specified. Typical downtime caused by hardware

failure is less than four percent annually for both VLA and VLBA. This indicates that most repairs are performed promptly and properly.

Repair Procedures: Two types of repair procedures are presently implemented, on-telescope repairs and component swaps. An example of an on-telescope repair is replacing a bad bearing. A new part is installed and the old part is recycled. One of a component swap is replacing a front-end receiver. The defective receiver is replaced with an operational spare. The defective receiver is then returned to the shop for repair. The success of component swaps is dependent upon many people. The process requires; 1) that the original problem to be accurately documented, 2) the unit be repaired using the "Leave No Trace" method and, 3) a complete quality check of the entire unit be performed and documented. The goal is to produce spares that operate to the complete specification and are identical to each other within the QA range. This reduces performance variations in the telescope.

Pass/Fail Quality Assurance Procedures: Providing quality-checked spares reduces on-telescope repair time. Less time is spent verifying the operation of the spare during the troubleshooting process if the repair person has total confidence in the spare. Quality procedures also removes the reliance on only select individuals to perform repairs. Any module with a green QA tag will work.

Good QA procedures provide pass or fail criteria for every checked item. These criteria and tolerances were initially developed from the design specifications and are modified as required to ensure performance and reliability. Proper QA can reveal other problems not apparent at first. Repeated component failures may indicate the need for upgrades and modifications.

Preventive Maintenance Procedures: The Navy bases their preventive maintenance procedures on several factors such as frequency of use and statistical methods such as mean time between failures. Preventive Maintenance (PM) checks can range from daily to annual. Each check is carried out in the precise manner described on the maintenance procedure card. These cards contains a list of materials required for the check and a procedure for carrying out the maintenance, including diagrams and additional references. QA is built-in, as failure of any part of the procedure results in a complete failure of the check. At that point, a repair order is generated and the PM is deferred until the failure is repaired. Periodically, a spot check is performed while the repair person performs the check to ensure compliance with the procedure. This is a quality check in itself, ensuring the repair person is performing the procedure properly. If the procedure is flawed or hard to use, a feedback system is in place where a specific problem/s are identified and correction/s are proposed. Most of these techniques are presently in use at NRAO and have produced preventative maintenance procedures that are effective at identifying problems before they result in telescope downtime.

Fortunately, NRAO attracts people who are dedicated and truly interested in their work. Looking forward, we owe it to the scientific community who use our instruments and the taxpayer to make the EVLA, ALMA and all projects as successful as the VLA and VLBA. To that end, QA in all aspects of our work will pay dividends for years to come in the form of reduced down time, increased morale and stellar telescope performance.

S Durand & J Muehlberg

MAINSAVER

Mainsaver is a commercial software package available in NRAO-NM for computerized maintenance management.

The Operations, Electronics, and Engineering Services divisions depend heavily on Mainsaver to track hardware problems affecting data quality on the VLAand VLBA.

Hardware problems are documented in Mainsaver by opening an appropriate work order. These work orders are reviewed in a daily maintenance meeting, chaired by Maintenance Coordinator, Dave VanHorn, or backup, Tom Baldwin. This daily review ensures that hardware problems are rapidly resolved by the appropriate staff. To maximize data quality on the VLA and VLBA, it is essential that ALL problems with hardware be documented in Mainsaver and discussed at the maintenance meeting. If you have discovered a hardware problem, but are not familiar enough with Mainsaver to use it to document the problem, we encourage you to email a description of the problem to:

<helpmain@aoc.nrao.edu>.

This new computer account is read regularly by the Maintenance Coordinator or his backup. The helpmain account should also be used for all messages to Dave Van Horn that pertain to maintenance coordination.

J Wrobel

AIPS++

The AIPS++ project recently issued its third public release (v1.4) on November 12, 2000. The release is distributed on CDROM for Solaris and Linux operating systems, and will be shipped initially to about 500 users. This release took place at the annual Astronomical Data Analysis, Software and Systems (ADASS) meeting held in Boston, November 12-15, 2000. News about the AIPS++ project can also found in our November newsletter at:

<http://aips2.nrao.edu/daily/docs/newsletters/nov00/nov00.html>

Athol Kemball

WELCOME BACK

We are thrilled that Gareth Hunt has agreed to temporarily lead the Array Support Group of the Computer division. The previous supervisor, Steve Blachman, left NRAO in August of this year.

Gareth spent many years at NRAO-NM. He left Socorro in 1991, for Charlottesville, and recently was Head of Computing in Green Bank. Gareth intends to spend an average of one week per month at the AOC

G van Moorsel

SHIPPING & RECEIVING

With the approaching holidays, employees may wonder if they can ship or receive personal packages at NRAO. While it is not encouraged, employees may have special packages shipped h (such as a computer), but PLEASE inform our shipping and receiving staff IN ADVANCE. NRAO receives many packages every day so it helps our staff to know which ones are company related and which ones are not! SORRY, shipping out personal packages is not possible

S Lagoyda

HOLIDAY PARTIES

.....Mark your calendar.....

Children's party - December 9

Adult party - December 16

R.S.V.P. on adult party to Patti Lindsey or Jo Cason at the VLA site, and Tami Hale at the AOC.

Congratulations to newly elected NM/PRA Board Directors: Joel Domschot and Tom Baldwin and those re-elected, Emma Rice and Ken Lakies. Remaining on the Board are Richard Murillo and Allen Lewis; and exiting are Clint Janes, Linda Major and Mary Ellen Chavez.

A big **Thank You** to all. Your efforts and hard work are certainly appreciated by everyone.