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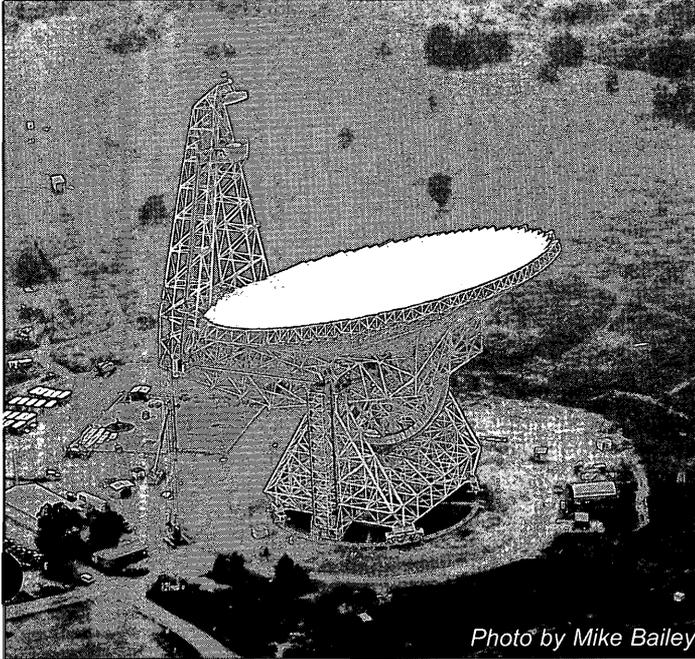


Photo by Mike Bailey

The GBT Dedication

The band played, the flags waved, the weather behaved, and it was a great day for the Observatory! After months of planning, the NRAO's newest telescope was dedicated on August 25 as the Robert C. Byrd Green Bank Telescope, in honor of Senator Byrd's contributions to funding its construction.

Friday, August 25, capped a landmark week in Green Bank. On the previous Tuesday, the 22nd, "first light" with the GBT was achieved with a 403 MHz observation of radio galaxy 1140+223 and pulsar PSR B1133+16. The observation utilized an NRAO-built receiver in the prime focus boom and the new fiber optic signal backbone of the telescope. The antenna servo was controlled by the GBT Monitor and Control System. The pulsar signal was recorded on a chart recorder in the antenna servo room.

The Dedication turned out to be a bigger affair than any of us expected. About 2,000 people attended the Dedication, when only a couple of weeks prior to the event we had been estimating 700 (which seemed a large number at the time!). Visitors came from around the country and around

the world, with a large turnout from local citizens. In addition to the Green Bank staff, Charlottesville staff arrived (literally) by the bus load. Several officials attended from the National Science Foundation, and there was a large turnout from the press.



The crowd began arriving early for the ceremony. Photo by Roy Norville

Senator Byrd delivered the keynote address at the ceremony. NSF Director Rita Colwell, NASA Administrator Dan Goldin, and AUI President Riccardo Giacconi also offered remarks. After the ceremony, the Bing Brothers Band treated the crowd to old time music. A ham radio special events station ran before and after the ceremony.

A highlight of the day was the observation of the "first light" pulsar PSR B1133+16 at the opening of the ceremony. The pulsar was detected and played over the public address system with a periodic thump, thump, thump. Senator Byrd said it best: "It works!" At the conclusion of the ceremony, the dish was rotated past the crowd—an impressive end to the event.

Preparations for the Dedication began months ago (see the article by Mike Holstine), and involved staff from three sites (Green Bank: Chuck Beverage, Shirley Curry, Sue Ann Heatherly, Mike Holstine, Phil Jewell, Jay Lockman, Mark McKinnon, Rusty Taylor, Becky Warner, and Carol Ziegler; Charlottesville: Tony Beasley, Rebecca Johnson, Helen Sim, and Patricia Smiley; and Socorro: Dave Finley). This was an

(continued page 2)

outstanding Observatory-wide team effort that produced an excellent result. We were extremely pleased and grateful for the work done by all.

We had hoped for a nice ceremony to recognize Senator Byrd and all the many people who have labored so hard to bring the GBT to completion, and to publicize the telescope to the astronomical community. The event met every expectation and was a great start for the GBT!

by Phil R. Jewell

GBT Dedication Ceremony Story

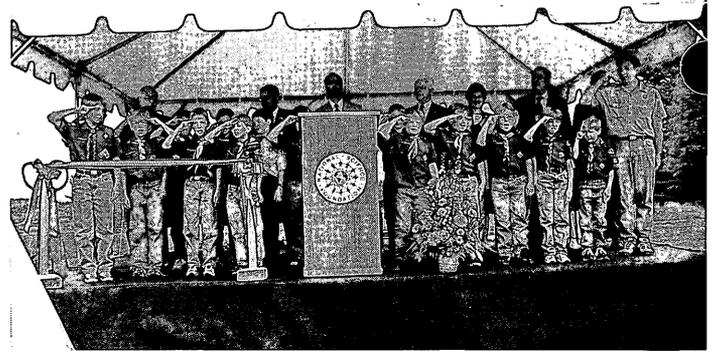
Sometimes it is hard to describe all of the things that go into making an event a success. Simply recognizing the factors that make up such a monumental day as the GBT dedication, which occurred on Friday, August 25, 2000, in Green Bank, WV, is a challenge all its own. I would like to try to describe to you some of the effort that went into this day, without causing you to swear off the written word for life. So bear with me.

The process started with the formation of an Organizing Committee. The list of committee members can be found in the lead article by Phil Jewell. Although the event took a total of about eight hours to fulfill, many iterations and several months of planning went into pulling the whole thing off. On dedication day many untold NRAO volunteers and others joined in to pull off this monumental undertaking.

In the end, the ceremony contained several aspects of public and media involvement and a set program of events. The day began with a charter bus leaving Washington, D.C., at 6:00 a.m. loaded with Senatorial and NSF staff members heading to Green Bank. At 9:30 a.m., a tour of the GBT was scheduled for Dr. Rita Colwell, Director of the NSF. At 10:00 a.m., a media tour of the site and GBT was scheduled. A lunch for invitees and NRAO employees started at approximately 11:00 a.m. A lunch for Senator Byrd and all special guests began at 11:30 a.m. in the cafeteria. Subsequently, a media interview opportunity with Colwell, Vanden Bout, Jewell, and Lockman occurred at 12:20 p.m.



Some of the members of the organizing committee meet to discuss strategies (clockwise): Phil Jewell, Mike Holstine, Shirley Curry, Rusty Taylor, Chuck Beverage, Carol Ziegler, Rebecca Johnson and Tony Beasley

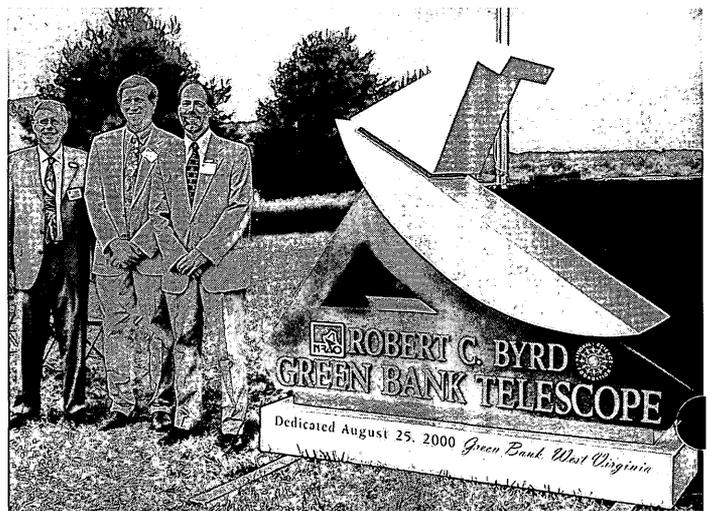


Local Cub Scout Pack 112 lead the Pledge of Allegiance. Photo by Sherry/Wesley Sizemore.

Pocahontas County High School was asked to provide nine students to aid in the distribution of "goody bags" of commemorative information and maps to the arriving public, and were stationed at critical junctions around the site to direct traffic and help park the vehicles. Although the ceremony didn't start until 1:00 p.m., the public started to arrive at 9:00 a.m., far sooner than planned, and quick adjustments were made to the students' schedule. Preparation of the bags days before was a major project in and of itself. It took a huge assembly line of NRAO staff including the committee, plus Sue Shears, Jody Bolyard, Bruce McKean, Jim Braatz, Bill Radcliff, Rob Taggart, and even Jim Desmond, as they spread out down the Jansky building hallway to stuff the hundreds of bags.

The official ceremony started at 1:00 p.m., and chairs and tents for 1,000 people were in place. More than 2,000 people attended the ceremony! Previous planning had allowed us to compensate so that those who had to stand could do so beneath two large canopies, out of the sun. The canopied stage accommodated the seven guest speakers.

The ceremony began with the sound of a pulsar emanating from the sound system. This was accomplished by placing a receiver on the GBT, pointing the telescope with the



Paul Vanden Bout, Jay Lockman, and Phil Jewell at new GBT dedication sign. Photo by Roy Norville



Ribbon cutting ceremony. (left to right) Dr. Riccardo Giacconi, Dr. Phillip Jewell, Senator Robert Byrd, Father Thomas Acker, Dr. Rita Colwell, and Dr. Paul Vanden Bout. Photo by Roy Norville.

Monitoring & Control software, and then tapping into the signal. A twisted pair cable was run from the telescope down through the cable wrap, then along the ground from the telescope site to the ceremony site to the sound system amplifier. Chuck Niday, Galen Watts, Bob Simon, and Jason Bauserman worked on the sound hookup. Roger Norrod, Mark McKinnon, Tim Weadon, Joe Brandt, and Rich Lacasse were on the telescope to ensure that the pulsar signal was a success.

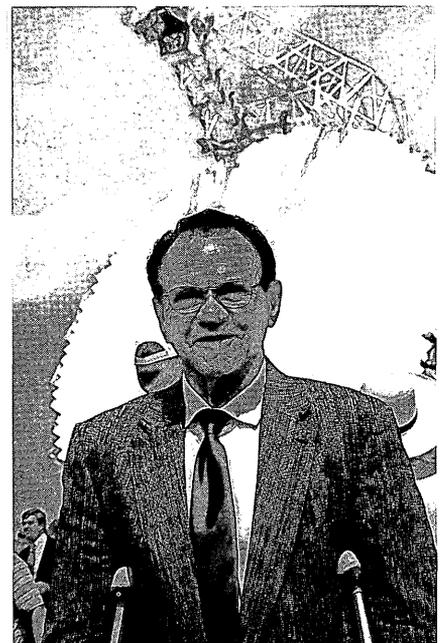
A new dedication sign for the GBT was in place in front of the stage, and was covered with a white "veil" printed with the AUI logo. Ceremonial scissors had been made in the shop specifically for the ribbon cutting. As the ceremonial ribbon was cut the very contemporary "Robert C. Byrd Green Bank Telescope" sign was unveiled to the public.

After the ceremony, a media interview opportunity was scheduled behind the stage with Senator Byrd and any other dignitaries. At 3:00 p.m. a media tour of the GBT was scheduled. A local bluegrass band played for a couple of hours after the ceremony with refreshments available to all. Now, that all sounds quick and easy, huh? It turned out that it all worked very well. It worked, however, because of all the unseen work that occurred behind the scenes.



Local bluegrass band, the Bing Brothers Band, performs after the ceremony. Photo by Sherry/Wesley Sizemore.

Robert D. "Bob" Hall, GBT Project Manager, is shown standing in front of the GBT, the latest state-of-the-art instrument in his construction portfolio. His design and construction experience is both extensive and international. Some of his well-known radio telescope accomplishments include the NASA 210-Foot DSN dishes, the 85-Foot Howard Tatel Telescope, the 300-Foot Telescope and the original Kitt Peak 36-Foot Telescope.



Phil Jewell and Mike Holstine spent many hours on the phone with the offices of Senator Robert C. Byrd and the National Science Foundation. Shirley Curry was charged with orchestrating an extensive invitation list, managing the RSVPs, and coordinating the protocol on dedication day. The Business Office, Becky, Carol, and Mike, spent countless hours involved in the logistics of food, shelter, and seating, which required contingency planning because it was outdoors.

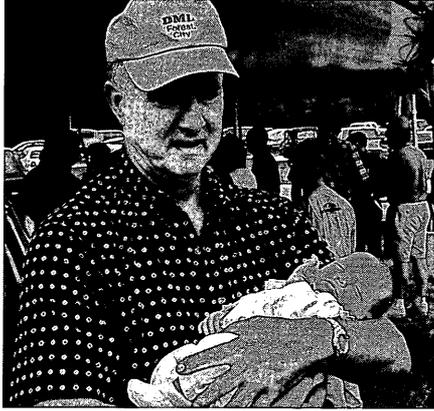
Realizing that many visitors would be new to the site, maps were drawn to illustrate the entire site, the location of all of the festivities on the site, and the layout of facilities at each particular site. Getting all of these people around the site also became a grand coordination issue. For those that could not drive themselves to the various ceremony locations, Dave Vandevender and Max Gum spent a major portion of their day driving buses filled with special guests from one dedication venue to another. Daryl Shinaberry missed much of the festivities in order to provide airport transportation for one of the day's special guests.

More than 700 people were fed at a special lunch before the ceremony. A caterer from Charleston, WV, was contracted to provide food and drink for 650 people at the lunch and for 1,000 at the ceremony. Additionally, a special

No - it's not the secret service. It's Mike Holstine and trumpeters watching the crowd before the ceremony begins. Photo by Sherry/Wesley Sizemore.



Ray Hanshew holding Cora at the dedication luncheon. She is the daughter of Mike Hedrick who works with Ray in the machine shop at Green Bank.



lunch was set up in the cafeteria, utilizing the food from the employee lunch, but served in a sit-down and buffet style for the dignitaries. The cafeteria personnel, including Louise Riley, Sylva Warner, Amy Thompson, Sue Roberts, and Barbara Taylor, set up the cafeteria for the special lunch, and then Shirley Riggsby, Phyllis Romine, Rosalie Slavin, and Mary Meeks joined them to serve the Senator and other patrons.

The caterer brought and served plenty of good food and snacks. Some of the people worked more than 24 hours straight to load, drive and setup for the event, utilizing a refrigerated truck, a box truck and a van. They used over \$200 in fuel for the grill to prepare the food on site. They brought 500 pounds of ice with them. They served 325 pounds of their famous ribs, 203 pounds of chicken, 40 pounds of chile for the hot dogs, 55 pounds of hot dogs, 165 pounds of baked beans, 40 pounds of slaw, 125 pounds of potato salad, 125 pounds of macaroni salad, 125 pounds of fruit salad, 180 dozen cookies, 48 pounds of potato chips, 40 pounds of party mix, 80 cases of sodas and bottled water and 130 gallons of lemonade and tea.

The NRAO media team, Tony, Helen, and Rebecca coordinated all media contacts' material and activities for the day. All media print material, video news releases, and hand-outs were coordinated by this subcommittee. A media table was set up at the lunch site for Dave Finley to coordinate the media activities during the dedication events. Three sets of radios, at three different frequencies, were distributed and used by various groups throughout the day. The Business Office was charged with central communications and the establishment of emergency phones for the Senator and visitors, the media committee for use in the media activities, and a set was used by the public safety and traffic direction group. Carol Ziegler was an interesting sight to see, as she wore one of each radio throughout the day, acting as our central communications station. The radios were also used to direct radio silence during the pulsar observation.

Looking back now on the successful events of the day, it is simply the hard work, effort and dedication of the people of NRAO and Green Bank that made this such an accomplishment. We pulled it off utilizing a full cast of characters, but the cast was chosen, or volunteered, because of their

love of the job and the work ethic that has made Green Bank such a special place. I, for one, am extremely proud of the performance of this group. Thank you all.

by Mike Holsting

VLA 20th Anniversary Ceremony

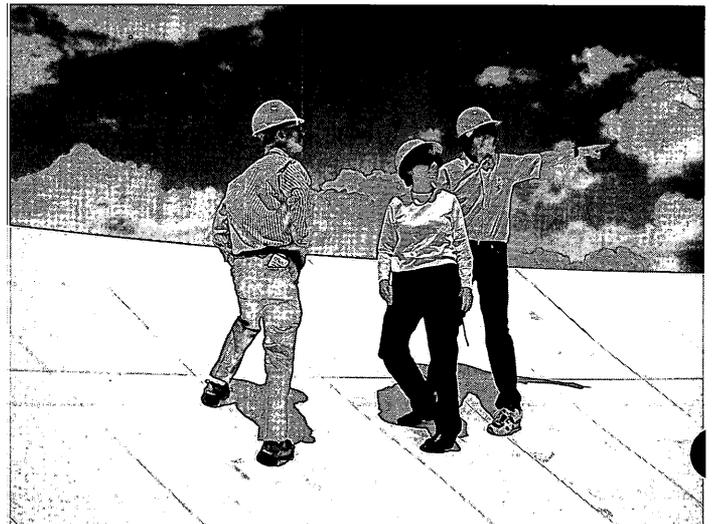
On August 23, NRAO officially celebrated the VLA's 20th anniversary, with a full day of activities highlighted by a ceremony attended by NSF Director Rita Colwell and U.S. Senator Pete Domenici.

The day began with a breakfast seminar in which Dr. Colwell heard NRAO students, postdocs, and new scientific staff members tell of their research. This session also included informal discussions with the NSF Director. Following this, Colwell was given a tour of the Array Operations Center (AOC).

The anniversary ceremony was emceed by NRAO Director Paul Vanden Bout, and opened with remarks by Anneila Sargent, president of the American Astronomical Society. AUI President Riccardo Giacconi then introduced Colwell, who, following her remarks, introduced Senator Domenici, the keynote speaker. AUI Board Chairman Paul Martin presided over the unveiling of a plaque commemorating 20 years of frontier science at the VLA. Miller Goss, VLA/VLBA operations director, closed the ceremony.

Following the ceremony, Dr. Colwell was treated to a red-carpet tour of the VLA itself, including a climb into one of the VLA antennas. Throughout her tour of the VLA and the AOC, she spoke with numerous NRAO employees and was enthusiastic about the work done at, and with, the VLA.

NRAO staff members were particularly pleased to hear the high praise given to the past achievements of the VLA from



Rita Colwell enjoys the view from one of the antenna dishes along with Dave Finley (left), and Jim Ulvestad (right).

Sargent, Colwell, and Domenici. In addition, we were happy to hear strong support from all for the VLA Expansion Project, which will keep the VLA at the cutting edge of astronomy for more decades to come.

by Dave Finley

Editor's note: NRAO experienced another first by providing a simulcast projection of the VLA dedication celebration. The celebration proceedings were transmitted to the other three major NRAO locations through the new teleconferencing system. Gene Runion, in Charlottesville, directed the telecast and controlled the camera during the ceremony. Telecast spectators were able to focus in on the dignitaries and Observatory leaders without the distraction of reporters and others moving around the AOC conference room. In a way, because the camera allowed the viewer to focus only on the speakers, you got the best of the ceremony without the price of the airfare.

The NRAO and "Contact": the Ham Radio Connection

Final article in a two-part series; the first part detailed the connection between radio astronomy pioneer Grote Reber, ham radio, Carl Sagan's book *Contact*, and the movie of that name.

It is very appropriate that the NRAO Amateur Radio Club has been awarded Grote Reber's ham radio call sign for use at special Observatory events. Radio amateurs were instrumental in building the first radio telescopes, such as Jodrell Bank, Mill's Cross, Arecibo, and NRAO Green Bank. As these first-generation radio telescopes were being built, much of the engineering depended on the ingenuity and resourcefulness of hams. After all, many hams in the early 1950s got "on the air" by building their own equipment, modifying surplus WW-II equipment, or whatever it took to make the thing work. These folks had just the talent needed to build the early radio telescopes. Some of the contributions made by these hams, who were observatory engineers and technicians, have been chronicled in two books (which can be found in the NRAO library system). They are *Serendipitous Discoveries in Radio Astronomy*, edited by K. Kellermann and B. Sheets, and *The Early Years of Radio Astronomy*, edited by W.T. Sullivan. Both are excellent books describing not only the involvement of hams, but the overall history, trials, and tribulations of building the world's first professional radio astronomy instruments.

At the NRAO, hams have been instrumental employees in the design and construction of all of our instruments as well, from the first antennas at Green Bank, through the VLA and VLBA construction, to the new ALMA development. At the AOC alone, there are about two dozen hams. While most are employees in the Electronics Department,

some aren't—folks such as Jon Spargo, KC5NTW; Gayle Rhodes, KC5HG; and Kevin Ryan, KC5LXH. Some of the AOC hams are quite active, and make contributions to the ham radio hobby.

Dave Finley, N1IRZ (Public Information Officer), carries his journalistic talents far beyond writing NRAO press releases to authoring articles for several ham radio magazines and journals, plus he authored the book *Morse Code: Breaking the Barrier*. His book is sold at many dealers across the country and remains a top seller. Dave is also a featured speaker at many ham radio conventions (called "hamfests") and is nationally known.

Paul Harden, NA5N (IF/LO Lab), is another published author with his book *Data Book for Homebrewer's and QRP'ers*, also sold nationally. "QRP" is a segment of the hobby that specializes in low power (5 watts or less), often using home built (or "homebrew") equipment. Paul is also nationally known and a popular guest-speaker at hamfests across the country.

Walter Dail, KT4JA (Front End Engineer), is an accomplished designer and builder of ham radio equipment in the UHF and above frequencies, that is, from 432 MHz through the 10 GHz allocated ham bands. There is virtually no commercial ham equipment at these high frequencies, so Walter's work in this pioneer field is shared with others by giving talks at hamfests.

John Battle, N4OE (ALMA Engineer), has built equipment and antennas his whole life. He also finds hamming to be a good way to unwind after work and pass the time. You see, John lives in Los Lunas and spends his 45 minute commute each way talking to other hams using morse code while on the road. He also often does this while flying his plane. The skill it must take to drive (or fly!) while carrying on a conversation and working a morse code key must make John one of the most coordinated engineers at the NRAO!

Richard Rupp, N5OBA (IF/LO Lab), mostly enjoys building and experimenting with HF and VHF antennas. Everything from operating from atop mountain peaks to "loading up" cattle fences, there's not much Rich hasn't used as an antenna for his interest in low power, weak signal communications. Richard was first licensed in 1957, making him an old-timer by ham radio standards.

Another ham radio old-timer is Bill Brundage, K8HUH. Like Richard, Bill has been a ham since 1957. Bill's ham radio experience allowed him to restore and tune the replica of the Jansky antenna at Green Bank to its original directivity, making it a functional replica of the antenna that discovered radio astronomy.

Ham radio is also well-known for providing emergency communications. Ray Ferraro, N5WLV (Correlator Group), is very active in Search and Rescue, using ham radio for communications during searches between search parties, base camp, NM State Patrol, and the like. Paul Rhodes,

N5YGC (VLBA Field Group Leader), is quite active as a volunteer firefighter and donates much of his time providing communications via ham radio during emergencies and for public service events. This can be said for many of the NRAO hams. They always seem to make themselves available to the Socorro community, often involving ham radio.

Other NRAO hams range from Darrel Emerson, AA7FV (Deputy Assistant Director of NRAO Tucson), to Clint Janes, KC5HL (NRAO/NM Electronics Division Head). Several of the VLBA sites are manned by hams, and there are also many hams working in Green Bank and Charlottesville.

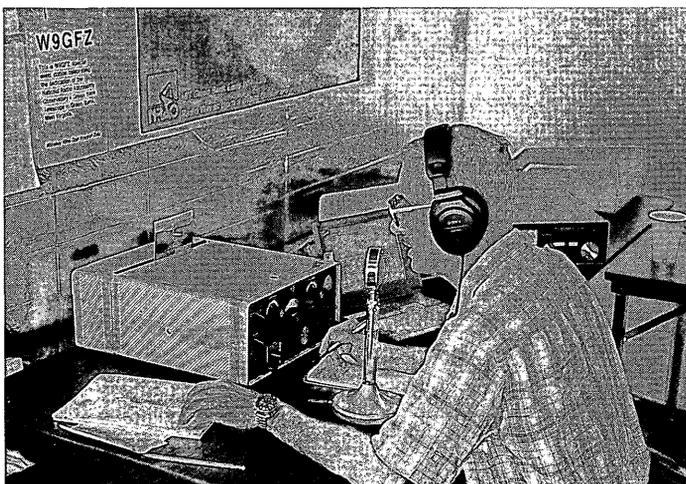
Both within and outside the NRAO, hams have always contributed to the continuing advancement of electronics and communications. Many hams enjoy electronics as both a hobby and a vocation. The equipment they build, the things they learn, and the parts they accumulate as hobbyists have been keen resources in performing their jobs.

by Paul Harden

This is W9GFZ, Special Events Station . . .

"This is Whiskey Nine Golf Foxtrot Zulu." With that call, Dave Finley activated Grote Reber's amateur radio call sign W9GFZ for the first time since the 1930's at a Special Events Station commemorating the dedication of the Green Bank Telescope. Over the next two days, six NRAO hams and ten others operated the station and were contacted by 1,922 hams from 52 countries.

The Ham Radio Operators at Green Bank decided to operate a Special Events Station for the Dedication Ceremony last December. Such a station works like this: we place a transmitter (or transmitters) on the air. Anyone making a contact with the station receives a special card commemo-



"This is Whiskey Nine Golf Foxtrot Zulu", broadcasts Dave Finley at the Special Events Station at the Green Bank Dedication Ceremony. This call formerly activated Grote Reber's call sign, W9GFZ, not used since the 1930s.

Photo by Sherry/Wesley Sizemore.



Ham operators at the three stations assembled for the GBT Dedication Ceremony. Clockwise: Mike Barts, Jim Condon and Dave Finley. Photo by Sherry/Wesley Sizemore.

rating both the event and having made contact with W9GFZ. From the earliest days of radio, both hams and professional radio operators have confirmed in writing either reception of a radio signal or two-way communications. Since the 1920's, these "confirmations" have usually looked like a post card and were called QSL Cards after a morse code abbreviation meaning "I confirm receipt of. . . ." Therefore, we made a special full-color QSL card based on a photograph of the GBT. This card would be filled out with the station call sign and signal report and would be issued to any ham who made contact with W9GFZ.

Grote Reber was a ham radio operator in the years prior to his pioneering research into radio astronomy. Sometime after beginning his research, he let his amateur license lapse. His call sign was unused and unissued by the FCC until 1997, when Dave Finley, N1IRZ, of Socorro obtained amateur call W9GFZ for the National Radio Astronomy Observatory Amateur Radio Club.

Our greatest publicity coup was an article written by Finley for the magazine *QST*, the major periodical for the amateur radio community. This was published as a feature article for the August 2000 issue and generated worldwide interest in W9GFZ and in the GBT.

August 25, 2000. The day of the dedication finally arrived. We assembled three amateur stations in the Green Bank warehouse from equipment lent by Jim Condon, AD4YM, of Charlottesville, Mike Barts, N4GU, of Blacksburg, VA, Gary Anderson, W8IVF, of Green Bank, and Galen Watts, KF0YJ, of Green Bank. In honor of his work in obtaining Grote Reber's call sign for NRAO's hams, we asked Dave Finley to leave his press duties for a few minutes to make the first call.

We kept calling for the next 54 hours. Among the most special moments:

- At the beginning of the event, an additional operator showed up . . . Nobel laureate Joe Taylor, K1JT, Princeton, NJ. He ran one of the stations until just before the dedication ceremony began.

• One ham announced that for weeks he had been looking forward to working W9GFZ *again*. He said that he went to the same school as Grote Reber and had talked to Grote on the air many times in the '30s. (We checked his FCC record . . . this ham was born in 1912 and lives in Illinois, which backs up his story.)

Everyone seemed to know who we were . . . from the U.S. to Australia. At whatever frequency we operated, after a few minutes 20 or 30 people would be calling us at the same time trying to make contact (hams call this a pile up). This writer made a special effort to give the Australian and New Zealand hams a chance to contact us and found that an Astronomical Society in Victoria had several hams looking for us. We found that kind of interest in the event throughout the weekend.

Operation ended at 4 p.m. on Sunday, August 27. The final results were 1,922 contacts made with hams in both the U.S. and 51 other countries.

We wish to thank everyone who helped us with encouragement, advice, or work.

by Gary Anderson, W8IVF

Ham Operators and Calls Received on Dedication Day!

NRAO Operators:

- Gary Anderson W8IVF Green Bank
- Jonah Bauserman KB8SLH Green Bank
- Jim Condon AD4YM Charlottesville
- Dave Finley N1IRZ Socorro
- Chuck Niday N8DBN Green Bank
- Galen Watts KF0YJ Green Bank

Additional Operators:

- Philip Balister K4EP Blacksburg, VA (son of Mike Balister)
- Mike Barts N4GU Blacksburg, VA
- Richard Dillon K8VE Buckhannon, WV
- Billie Ford KC8IUG Dailey, WV
- Jim Jipping W8MRR Holland, MI
- Lee Kramer N8TMF Arbovale, WV
- Mark Lynch KA8HAD Buckhannon, WV
- Pat Shea N8MIN Weston, WV
- Anthony Simons W8AF Weston, WV
- Joe Taylor K1JT Princeton, NJ

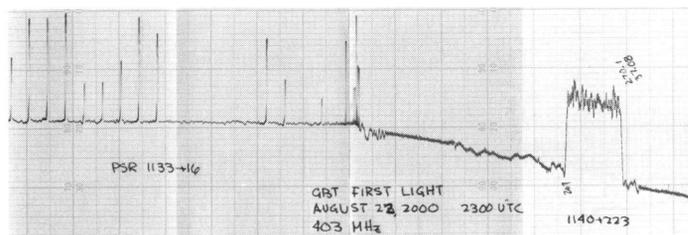
The call locations of origin:

Argentina	Canary Islands
Asiatic Russia	Czech Republic
Australia	Croatia
Austria	Cuba
Barbados	Denmark
Belgium	El Salvador
Bermuda	European Russia
Brazil	Finland
Bulgaria	France
Canada	Georgia

Calls Received (continued)

Germany	Netherlands
Great Britain	New Zealand
Greece	Norway
Haiti	Panama
Honduras	Poland
Hungary	Romania
Ireland	Scotland
Israel	South Africa
Italy	Spain
Jamaica	Sri Lanka
Japan	Sweden
Jordan	Thailand
Kaliningrad	Ukraine
Kazakhstan	Wales
Latvia	Yugoslavia
Mexico	

GBT Receives First Light



"First light" was detected with the GBT on August 22, 2000 at approximately 2300 UTC.

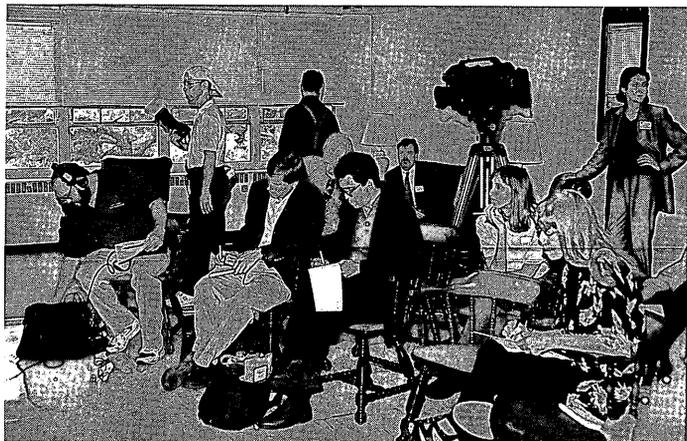
"First light" was detected with the Green Bank Telescope on August 22, 2000, at approximately 7:00 p.m. The telescope was used to observe a continuum source, 1140+223, and a pulsar, PSR B1133+16, at a frequency of 403 MHz. To the delight of the dedication ceremony crowd two days later, the thumping sound of pulsar PSR B0329+54 could be heard every 0.7 seconds.

The success of the original observation was due to the hard work of a number of NRAO employees. Joe Brandt used his GBT Monitor and Control software to point the telescope during the observation. The receiver used during the observation was an uncooled, single polarization receiver designed by Roger Norrod. Richard Bradley at the Central Development Lab (CDL) tuned a low noise amplifier for the receiver. The receiver and its associated electronics were built by Lewis Beale, Brian Ellison, Bob Simon, and Chuck Niday. The feed for the receiver was borrowed from GBT Prime Focus Receiver 1. It was designed by S. Srikanth from the CDL and built by Ray Hanshaw in the Green Bank machine shop. Jerry Turner connected the optical fibers that carried the detected signal from the receiver to the telescope servo room. The receiver was installed on the afternoon of August 22 immediately after the prime focus servo system passed a series of rigorous tests. Rich Lacasse, Tim Weadon, and Joe Brandt endured a grueling work

schedule to complete these and other tests of the GBT servo system. The receiver was installed by Ron Gordon, Don Gordon, Preston Meadows, Bob Simon, and COMSAT employees in a matter of minutes thanks to Dennis Egan who designed an elegant box handler for the prime focus receivers on the telescope. Roger Dickenson and Pat Schaffner built the box handler in the Green Bank machine shop.

by Mark McKinnon

Reporters Converged on Green Bank for Telescope Dedication



The media was given the opportunity for interviews prior to the dedication ceremony. Photo by Sherry/Wesley Sizemore.

The dedication of the Robert C. Byrd Green Bank Telescope on August 25 was an exciting event for everyone at the NRAO, not the least of whom are the public information staff. We hoped that this event would garner a lot of media interest and many “column inches,” as they say in the newspaper world. And we have not been disappointed.

For several weeks preceding the dedication, we took calls from reporters around the country interested in the event. We sent out press releases by e-mail, by fax, and made many follow-up phone calls. We were fortunate to receive a lot of help from Senator Byrd’s press office in Washington, and the Office of Legislative and Public Affairs at NSF.

We shipped out “press kits” to interested reporters, and created a website with press information on the GBT (thanks to Carolyn White for her html wizardry). We also hired a production company in Charlottesville and produced a “video news release” about the GBT, which was broadcast on a satellite so TV stations could record it and, we hoped, use it in their news broadcasts. The video featured interviews with Nobel prize winner Joe Taylor (Princeton University), Green Bank Site Director Phil Jewell, and Deputy Site Director Mark McKinnon.

At the event itself, enough reporters attended (around 25, from West Virginia, Washington, and other places) to necessitate two tours of the telescope. Many thanks to

Jay Lockman and Mark McKinnon who guided these tours and provided great explanations of the telescope to the media. We also held a successful press conference that day, giving the media a chance to ask questions of Rita Colwell (Director of National Science Foundation), Daniel Goldin (NASA Administrator), and our own Paul Vanden Bout and Jay Lockman.

How much media coverage did NRAO receive for this event? The data is not all in yet. But, to date, we know that several large cities (including but not limited to Washington, San Francisco, St. Louis, and Miami) have aired parts of our video to a potential audience of approximately 12 million households. We also know that news wire services, like the Associated Press and Scripps-Howard, sent out stories that went into newspapers across the country. On the web, stories on the dedication could be found at CNN.com, MSNBC.com, space.com, and many other sites. MSNBC.com even put up our entire video news release, for people to watch on their computer screens.

Like the dedication event itself, we feel that the press events held there and our subsequent media coverage has been a great success. Thanks to everyone who helped make it happen.

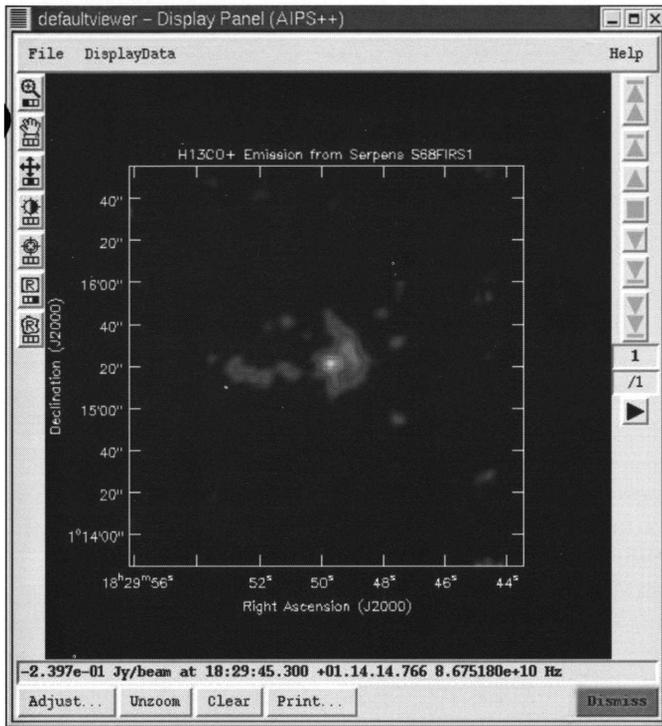
by Rebecca Johnson

AIPS++: Present Perfect Progressive

The AIPS++ software project celebrated its second public release in June 2000, and it continues to accelerate the development and diversity of its available applications.

AIPS++ is the scion of the successful and enduring AIPS project (Astronomical Image Processing System) developed by NRAO from 1978 to the present. While AIPS was designed for interactive calibration and analysis of radio interferometric data, AIPS++ ambitiously attempts to provide a general suite of tools for any type of analysis and for any instrument. Its enhanced generality and extensibility, achieved in part through object-oriented programming techniques (e.g., the use of C++), result in its cryptic moniker of AIPS++, where the “I” now stands for the more general, “Information.”

AIPS++ was conceived out of an initiative to modernize the data reduction facilities within NRAO in 1989. Over several years, its mission to unify the calibration, editing, formation, enhancement, and analysis of images and other data streams found consensus within the international community and a consortium was formed with NRAO as the lead partner. The mission was to deliver a working package (libraries, applications, user environment, documentation, and help) while allowing data to be completely visible and editable, and allowing the system to be expanded on all levels, either through compiled code or through user level scripting. These goals are implemented through the use of C++ as an underlying suite of libraries and functions made



AIPS++ imaging capabilities were used to analyze emissions from this young stellar object in Serpens (APJ, 2000, 536,845).

readily accessible to the user through a scripting language called Glish.

Today AIPS++ is used at many facilities beyond NRAO, including the Parkes Telescope (for data analysis of 21 cm multi-beam surveys), the Westerbork Synthesis Radio Telescope (for data storage and analysis for the new Telescope Management System), the Joint Institute for VLBI in Europe (for analysis and format conversion of data from the new JIVE VLBI correlator), and the James Clark Maxwell Telescope (for ACSIS focal plane array correlator calibration and gridding and for parallelized reduction). Today, the AIPS++ consortium has grown to include NRAO, Australia Telescope National Facility, Netherlands Foundation for Research in Astronomy, Berkeley-Illinois-Maryland Array, Jodrell Bank Observatory and MERLIN/VLBI, with general use at NAIC/Arecibo, JCMT, and U.S. Naval Observatory Navy Prototype Optical Interferometer. It now supports a range of platforms including Solaris, Linux, HP/UX, SGI/Irix, and Dec Alpha (Windows NT is in progress).

NRAO's GBT project adopted AIPS++ as its analysis software early in its development, finding the capability of handling distributed systems well matched to their planned software efforts (e.g., Monitor & Control). Its role has diversified however, and it now is used as a diagnostic toolkit by the engineers and as a quasi-realtime monitoring system, in addition to serving as the environment for the commissioning tests and general scientific analysis. Dana Balsler, a Green Bank scientist involved with GBT testing, comments, "The ability to write scripts which use other functions is very powerful. It allows me not only to analyze astronomy data

but also to process data on other projects such as metrology data with the GBT."

AIPS++ will be in the spotlight in the coming months as the GBT acceptance and commissioning begin in earnest. For more information on AIPS++ see: <http://aips2.nrao.edu/stable/docs/aips++.html>.

by Joe McMullin

RET Experience and Use of AIPS++

The H I luminosity-linewidth profile method is a valuable tool in radio astronomy. Among other things, it helps astronomers determine distances, rotation velocities, and hydrogen composition for distant galaxies. During my summer Research Experience for Teachers (RET), I worked with J. Richard Fisher at the National Radio Astronomy Observatory in Green Bank. This past October, Dr. Fisher used the Arecibo Radio Telescope to collect data for more than 500 galaxies; my job was to reduce this data. The data helps to support research completed with the Infrared Astronomical Satellite and provide a comparison of luminosity-linewidth and supernovae Ia distance scales. In order to complete the task, I had to first acquire a working knowledge of AIPS++ and Glish, the command and scripting language of AIPS++. Glish allows users easy access to all AIPS++ analysis routines and provides a means of writing customized applications by bundling together collections of commands into new functions. This past summer, Dr. Fisher and I wrote AIPS++ scripts that would implement data correction factors, display data scans, and assist in making precise measurements.

What happens next? As a volunteer researcher, I plan to continue my work with this project during the coming school year. I will be installing AIPS++ on a Linux machine at my school in Oil City, PA, using the latest version of AIPS++ on CD. Selected students will be trained to assist me in completing the data reduction process for these galaxies. In any science education program, whether it be in elementary school or college, it is crucial that students are provided the opportunity to experience science rather than to simply be told about it. If anything this summer, I've become even more convinced that science is active, not passive. Science is a vehicle by which humans contribute to their understanding of the universe around them. Thanks to my RET experience, my students will be going on a little "drive" this year.

by Tim Spuck

Editor's note: Tim was a member of the RET (Research Experience for Teachers) summer training program that the editor met at Green Bank this summer. His home is in Oil City, PA. Tim teaches 10-12th grade space and earth sciences, and supervises the Science Department at Oil City Area Senior High School.



Charlottesville library staff (left to right): Mary Jo Hendricks, Evelyn Braintwain, and Ellen Bouton. Photo by Roy Norville.

Your Library

"You have six libraries? In four states?" That's the amazed response I often get when I talk about the NRAO libraries. I explain that we are like a public or university library system, except that instead of being spread around a locality or across a campus, our libraries and the people they serve are strewn across the U.S.

In Charlottesville, we have both the central library in the Edgemont Road building and the library for the Central Development Lab (CDL) in the Ivy Road building. There are site libraries in Green Bank, Tucson, and Socorro, and a small reference library collection at the VLA site. Library staff members include me, Mary Jo Hendricks and Evelyn Braintwain in Charlottesville, Alesia Wayne in Green Bank, and Kathleen Le Febre in Socorro. In Tucson, Jennifer Neighbours takes care of the library (in addition to her many non-library tasks).

At the central library in Charlottesville, we do the ordering, processing, cataloging, and payment for all materials for all libraries. Journal subscriptions are mailed directly to the individual sites, but all books go first to the Charlottesville library where we catalog and label them before sending them on to the site libraries. Our web-based online catalog is maintained in Charlottesville, and includes the holdings of all site libraries.

Books and journals are not the only things in our libraries. In the Charlottesville library, we have an extensive collection of materials published by other institutions and observatories



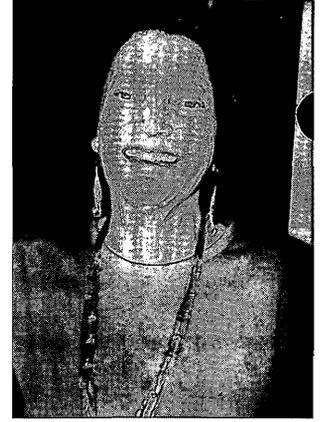
Alesia Wayne, Green Bank library staff member.

around the world, and there are smaller collections of these publications in Green Bank and at the AOC in Socorro. We get preprints, the pre-publication form of papers submitted to scientific journals or going in meeting proceedings, from astronomers and observatories around the world, track them through publication, and maintain a web-based database (including citations) of preprints received since 1986. We have CDs, primarily astronomical catalogs and data from space-based observatories. We have a diverse collection of videos that includes Jansky Lectures, in-house training sessions for VLBA operations staff, Voyager flyby footage, and footage on construction of the 300 foot and 140 foot telescopes, and even a PBS special on extraterrestrial life featuring Lily Tomlin. We manage the licensing for NRAO access to an increasing number of electronic journals.

Libraries have always organized information to make it easily accessible. In 2000, the web is just one of our many information sources. In addition to our online catalog and preprint databases on the web, we maintain web pages with links to NRAO-hosted meetings and conferences, NRAO internal memo series, full-text NRAO preprints, and NRAO staff and visitor publications. With the permission of the compilers, we also mount and maintain on the web the Bibliography of High-Altitude Medicine and Physiology, a list of approximately 6,100 references on high altitude physiology, mountain sickness, hypoxia, etc., compiled by Rob Roach, Charles Houston, Peter Hackett, and J. P. Richalet. This bibliography serves both the astronomy community and the high-altitude medicine community.

In Green Bank, the library is heavily used by participants in the summer teacher workshops and Chautauqua programs, and the Green Bank Middle School seventh grade science teacher and students use our library materials every year when they do their Apple Computer/Astronomy Grant projects.

Although it is certainly true that the largest part of our collection is in astronomy and astrophysics, the library expects to purchase titles to support all NRAO employees in their work. We have materials on computer hardware, software, and programming. We have a large electronics and engineering collection at each site, as well as books on structural engineering. Many



Kathleen LeFebre, Socorro, library staff member.



Jennifer Neighbours, Tucson library staff member.

square feet of NRAO telescope surface have been painted over the years: we have a volume on paint and painting techniques. Wire bonding, cryogenics, science museums and visitor centers, RFI, surface plating, concrete, climatology, health information for international travel, high altitude medicine and physiology, GPS—all are topics represented in our collection. We have atlases, secretarial handbooks and style manuals (including online style manuals, showing formats for citing web resources and online journals), and a wide variety of foreign language dictionaries. And we have a book on very complex origami techniques (in Japanese, but with detailed diagrams!), a gift from a visiting Japanese astronomer who is also an origami master.

Each library keeps a full set of NRAO policy and procedure manuals: Travel, Procurement, Salary and Wage, Property, Hazardous Materials, Supervisor's, etc.

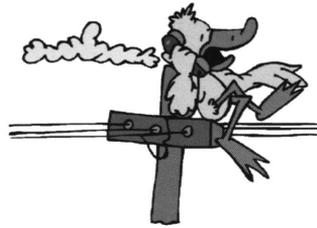
Looking for something we don't have in your local NRAO library? If it is in another NRAO library, you can borrow it from there. And we routinely borrow books or get photocopies of journal articles from other libraries on interlibrary loan. Kathleen handles interlibrary loan requests for Socorro staff, and all other requests are handled in the Charlottesville library.

Because our collection is unique and specialized, other libraries often ask to borrow materials from us on interlibrary loan, and we lend considerably more than we borrow. We serve as the 'library of last resort' for astronomers around the world, many of whom have either worked or visited at NRAO and know the breadth and depth of our collection; they contact us for information they can't find in their own local or departmental libraries, or for specific NRAO-related information. Once a local travel agent called me and asked for the date, 18 months in the future, of the full moon over the Taj Mahal (she was arranging a tour package).

Got a question? Need more information about something? Contact Kathleen in Socorro, ask me or Mary Jo if you are elsewhere. We can find all sorts of information: the source of John Quincy Adams quotation about the glories of astronomy, the speed of sound through concrete, elusive addresses and phone numbers, safety standards for lasers—even the date of the full moon over the Taj Mahal.

Prepared by Ellen Bouton and the Library Staff

Editor's note: If you or your coworkers would like to highlight your working group in an upcoming newsletter you are encouraged to contact the Charlottesville Personnel Office.

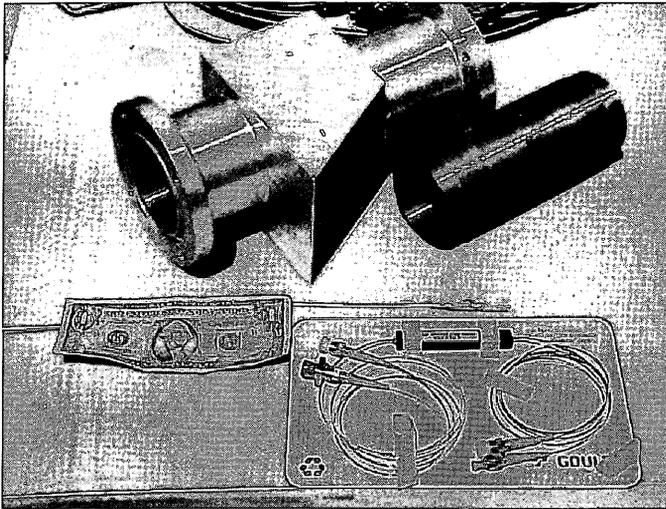


Could You Hand Me That Glass, I Need To Make a Phone Call

Alright, you caught me! I can't actually pick up a glass and make a person-to-person call, but chances are your long-distance phone conversations are actually being sent through a long, slender piece of glass called optical fiber. As we roll into the new millennium, greater demands are being placed on our communications systems as larger quantities of data travel to more and farther places. The advancements made in optical telecommunications for transferring data have far surpassed the abilities of wire, coax, or even waveguide systems, and have allowed (for the time being) technology to gain some ground on the demands of the public! A brief look at the history of communications systems will help in understanding the evolution of information transfer and provide some background information for directly comparing the VLA's current waveguide system to the proposed fiber optic systems in the ALMA and EVLA projects.

A communication system is designed to transmit information from one place to another and often over vast distances. The earliest systems consisted of fire and smoke signals spaced at line-of-sight type of intervals. As long as a source could be seen, it could be received and relayed on to the next point. Assuming there was no interference from things like trees or fog, data could be transferred at a blinding rate of several bits per minute! With the invention of flags, signal lamps, and other semaphore devices, the data transfer rate was brought up 3000% to 1 bit of data per second, (almost as fast as Windows!). As the demand for better communications grew, so did technology. In the 1830s, telegraphy was invented and up to 10 bits of data could be transferred every second. The era of electrical communications had begun.

As technology advanced, new coaxial cable and microwave systems emerged on the market. Using carrier frequencies in the 1-10 GHz range, data could be transferred at almost 300 million bits per second or 300 Mb/s. (I'd like to see a signalman move that quickly!) On the average though, most systems operated at a more modest 100 Mb/s due to the cost of equipment associated with relaying the data. At the VLA, a microwave system is used which uses a 60 mm circular waveguide to propagate the nine channels of data per waveguide from the antennas to the central electronics room. Each channel, occupying about 600 MHz of bandwidth, has the capability to send approximately 600 Mb/s of data. Unfortunately, due to electronics limitations, only about 200 Mb/s of data is actually used. Multiply this times nine, and each of the three waveguides carries approximately 1.8 Gb/s or 1.8 billion bits of data every second! This sounds impressive, but with today's technology, it is crawling along at a snail's pace.



The fiber optics system has small components and is virtually maintenance free.

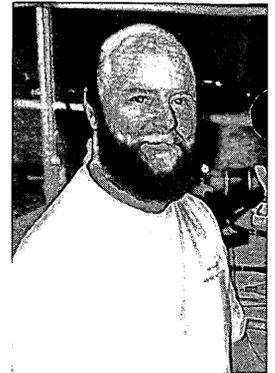
When we start to compare the physical and electrical differences between waveguide and fiber optics, fiber wins hands-down!

To start with, the VLA waveguide is extremely bulky. At about 70 mm outside diameter and several pounds per foot, laying 42 miles of waveguide, (the approximate amount at the VLA) is no simple task! The waveguide itself is extremely rigid and must be buried straight from end to end. This becomes even more complicated through uneven or rocky terrain! A leak-free and constant nitrogen pressurization system is also required to keep moisture and corrosion at bay, adding even more to the already long list of maintenance requirements. Compare this to the fiber optic system's small components (see photo) and add the fact that, once installed, it is virtually maintenance free, and the benefits of fiber start becoming evident.

The fiber itself is composed of specially formed ultra-pure glass, is 125 microns (125 millionths of an inch) in diameter, and can be spliced together to run for literally thousands of kilometers. The bare glass is typically run inside a protective jacket and, depending on the jacket, can be directly buried with no concerns for terrain. The fiber can be run around obstacles, up and down uneven ground, between floors of a building, or to and from antennas in an array to a central control point! The best part is, as long as the fiber is not physically broken, the fiber will quietly do its job for decades to come with absolutely no maintenance!

When we start to look at the electrical characteristics of fiber, its true benefits really stand out. As we saw earlier, most coaxial or microwave systems operate at a data transfer rate equal to about 1% of the carrier frequency. A 10 GHz carrier wave will be able to carry approximately 100 Mb/s of data. If we consider a fiber optic system using a LASER which operates at 193 THz (193 trillion cycles per second) and use the same 1% limiting factor, we now have a system capable of carrying almost 2 Tb/s or 2 trillion bits of data every second! This is an enormous potential for

system capability and is the driving force behind today's massive research and development in the field of fiber optics. At present, state-of-the-art systems run at bit rates of 10 Gb/s leaving LOTS of room for improvement. We also have to consider that a single strand of glass can carry up to 40 channels, each carrying 10 Gb/s. This now gives us a total of **400 billion bits of data every second on a single strand of glass!!** If you consider that a typical phone call using a digital system operates at 64 kb/s, this means that 6,250,000 people would be able to talk simultaneously on a single piece of fiber. Multiply this number times the actual number of glass fibers inside the protective jacket (usually in clusters of 8, 16, or even hundreds) and the amount of data being transferred is staggering! And remember, this is with technology available today! 50 Gb/s and even more channels are just around the corner, pushing us ever closer to that 2 Tb/s.



Rob Long

As you can see, communications systems have come a long way since the days of smoke signals! Messages or data that used to take minutes or hours to send can now be sent in fractions of a second. Fiber optics is a major reason that the commercial telecommunications industry is such a "red hot" market today. NRAO is now using this technology to dramatically increase the rate at which scientists can gather larger quantities of data at much higher resolutions than ever before. Now if you'll excuse me please, I have to go. My glass is ringing!

by Robert "Rob" Long

VLA Receivers on Display

During the site tour portion of the VLA Twentieth Anniversary celebrations, many visitors were treated to demonstrations of VLA receiver components, subsystems, and, in one case, even an operating VLA X-band (8.4 GHz) receiver. At the receiver exhibit, touring visitors had the opportunity to interactively control the change in receiver output power based on the temperature of the (human body) load placed in front of the strategically aimed receiver feed horn.

The interactive display, which demonstrated the relative difference in receiver output power generated by "blank sky" (15 deg Kelvin) vs. the human body (310 degrees Kelvin), was assembled and manned by members of the Cryogenics and Front End groups of the Socorro Electronics Division. The receiver used for the display was a standard VLA/VLBA "F103" "X-band" receiver with nominal receiver temperature of between 20 and 25 degrees Kelvin. The X-band receiver was chosen due to its relatively small feedhorn size, low noise temperature, and portability. The VLA and VLBA X-band receivers cover the



Dan Mertley is seen here fielding questions from tour participants. Photo by Kelly Gatlin.

1 GHz instantaneous bandwidth, from 7.9 GHz to 8.9 GHz, in both senses of circular polarization.

For the demonstration, an HP432A power meter with an HP8484A power head was connected directly to the RCP output of the receiver. The wide band power detector then converted and displayed the RF energy of the entire 1 GHz receiver passband on the power meter's analog display. As touring visitors passed in front of the receiver feedhorn, the power meter displayed the increase in power received at a wavelength of 4 cm due to the higher temperature of the human body compared to the background radiation of the earth's atmosphere and free space. Operating in this mode, without noise-calibration signal input or synchronous detection at the output, the receiver was acting as a single, wide-channel, total power radiometer, with an overall gain of about 50 dB (100,000), and a nominal power level equivalent to an operating temperature of under 25 degrees Kelvin (-435 degrees Fahrenheit).

During normal operation, our VLA and VLBA receivers are used in a synchronous detection mode, where the relative difference in output power is measured as a calibration noise source is turned on and off. An estimate of the absolute power level of the celestial object being observed is obtained by comparing the "cal-on vs. cal-off" power difference to the known, absolute power level of the calibration noise source. Overall system gain changes are also effectively canceled by this comparison technique.

On display, in addition to the operational X-band receiver, were numerous VLA and VLBA microwave components, including filters, feed horns, and a partially dismantled VLBA K-band (23 GHz, or 1.3 CM) receiver. Touring visitors were able to see the components mounted within the K-band receiver Dewar, and receive descriptions of the function of each receiver component. A 3 foot by 4 foot color poster which illustrated the path of cosmic radio sources from the universe to the VLA receiver front ends rounded out the display.

The celebration tour receiver exhibit provided visitors with the opportunity to see first-hand some of the microwave components and systems which have helped make the VLA the sensitive and versatile astronomical instrument that it has been during its short, but scientifically momentous 20 year history.

by Dan Mertely

NRAO Beekeepers

We all need a hobby to provide variety in our lives and to help us get our minds off work. For those of us at the NRAO who practice the art of apiculture, there's nothing like sticking one's head in a wooden box containing 30,000 to 50,000 honeybees to get one's mind off a bad day at the office! Practicing beekeepers in Green Bank include Jody Bolyard, Ray Hanshew, and myself. Ron Monk and Bill Shank have kept bees in the past, and I have benefitted from their advice over the past few years. Beekeepers in Charlottesville include Bill Porter and Paul Vanden Bout. I'm sure there are more beekeepers within the NRAO, particularly in Tucson and Socorro, but I'm just not aware of who they might be. Whether it be agriculture, biology, animal behavior, carpentry, candle-making, or simply an appreciation for honey, we all have different reasons for working with honeybees.



Caitlain McKinnon holds one of the wooden frames kept in a hive body. The bees build honeycomb within the frames to store pollen, honey and brood.

A beehive consists of one or two hive bodies and one or more honey supers. As many as ten wooden frames are kept in each hive body and super. The bees, with a little help from the beekeeper, build honeycomb within the frames to store pollen, honey, and brood. The queen lays eggs in the hive body frames. Pollen, the source of protein for growing larvae, is also stored in the frames of the hive body. As you might guess, honey is stored in the frames of the honey supers. Beekeepers leave enough honey on a

hive for the bees' winter food, but most of the honey is removed for human consumption.

Three types of bees live in a beehive: the queen, the workers, and the drones. The queen is an egg-laying machine. A good one can lay up to a thousand eggs per day during the spring and summer months. She has the remarkable capability of choosing to lay a fertilized egg, which grows into a female worker, or an unfertilized egg, which becomes a male drone. As their name implies, the workers do all the work around the hive, including foraging for nectar and pollen, feeding and cleaning the queen, guarding and cleaning the hive, and feeding the young larvae. The drones are quintessential couch potatoes. Their function in life is to hang out around the hive, eat honey, and attempt to mate with a virgin queen that might happen to fly by. However, the drones pay a heavy price for their leisurely lifestyle. Every fall, at the time of the first frost, they are evicted from the hive because the bee colony cannot afford to waste its limited winter stores on individuals who make no useful contribution to the colony. Drones can't sting for the simple reason that they don't have stingers. Since drones come from unfertilized eggs, they have a grandfather but not a father (how's that for a brainteaser!).

Beekeeping has its pitfalls and hazards. The original queens in Jody's two beehives didn't lay eggs this year. Jody managed to save one of the hives by purchasing a new queen. Paul and I lost hives to the dreaded varroa mite, a parasite that crippled the honey industry in the early 1990s and is thought to have eradicated all colonies of feral bees. A few years ago, Bill learned that a cow pasture is not a good place to keep bees. The cattle scratch themselves on the hives, tipping over the hives in the process. And, yes, we do get stung. Just like the office worker who gets an occasional paper cut, getting stung is one of the occupational hazards of the beekeeper.

Honey comes in a variety of wonderful flavors depending upon the floral source. The premium honeys in Virginia and West Virginia come from sourwood, tulip poplar, and black locust. Although I'm not familiar with western floral sources, I've heard that sage produces a honey that is similar in flavor and color to clover honey. To sample the variety of honey flavors, just buy honey that is locally produced or ask a local beekeeper for a sample. The flavor of the honey you buy at the supermarket is comparatively bland and monotonous because mass-produced honey has been

heated, press-filtered, and blended with honeys from China, Argentina, and who knows where else. Once you sample local honey, you'll never buy honey from the supermarket again!

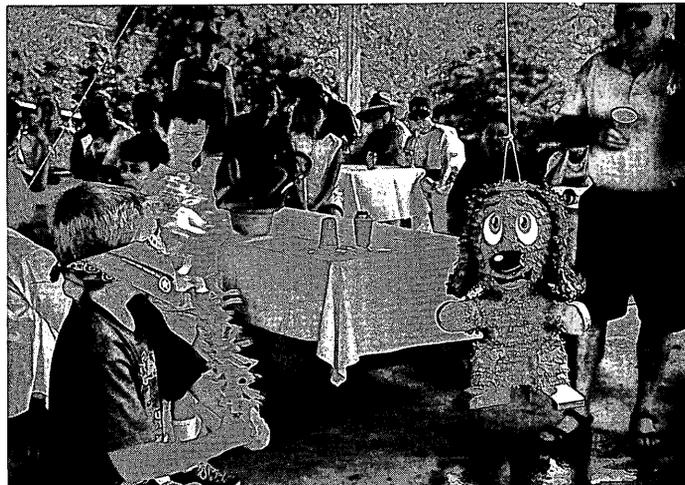
by Mark McKinnon



Scoping the Sites....

Summer is Picnic Season in:

Charlottesville



One of many kids stand ready to whack the piñata at the Charlottesville summer picnic. Photo by Roy Norville.

Everyone seemed to enjoy themselves at the annual NRAO Charlottesville picnic. It was held on June 24 at Heavenly Acres Campground in Greene County, VA. Great food, fun, and people made the picnic a complete success. Prizes were given out to winners of raffle drawings and the popular balloon toss provided the only rain drops! Kids got to splash around in the pool and take their turn whacking the candy-filled piñata. In the end, there were plenty of sweets to go around and no one left hungry.

Green Bank



Everybody gets into the act during the water baloon contest. Photo by Roy Norville

Saturday, July 22, is a day that will live in infamy for the NRAO. Well, not really, but I know a bunch of Green Bank/Charlottesville employees that had a great time! Green Bank held its annual summer picnic this past July with all the usual festivities—from the greased watermelon competition to the pie eating contest. The water bal-

loon competition dominated the afternoon with the most participants. After each game we treated the children to a "treasure chest" of toys. For the adult games, the adult competitors were after the green. A cornucopia of events for all ages and gender consisted of mini-golf, golf driving range, horseshoes, pie-eating, frisbee toss, balloon toss, and the three-legged race.

The weather was spectacular, lots of sunshine and a cool breeze. Everyone enjoyed the day playing games, eating hotdogs for lunch followed by a delicious picnic buffet dinner, and talking with friends. Evening entertainment included the Little Big Swinging Blues Band, featuring our own Greg Morgan on the bass guitar. During band breaks Rob Taggart drew quite a following with the Scottish bagpipes, Irish flute, fife, and pennywhistle. Thanks to all of those that helped to make our picnic a success.

by Amy Shelton

Socorro



Sometimes you win, sometimes you lose at the Socorro family picnic.

This year's NRAO-NM picnic was held on June 17 at Sedillo Park in Socorro. The picnic was well-attended by NRAO employees and their families. There was a southwest 'twist' this year with a piñata, a Mexican tradition in which children, while blindfolded, attempt to break a swinging candy-filled paper maché sculpture with a stick. Attendees enjoyed a nice mix of DJ music and emceeing by the PRA Prez and other board members. Other attrac-



Everyone lines up for the beginning of the sack race.



Entertainment events at the Socorro picnic included a jumping gym.

tions included a jumping gym, a pie eating contest, sno-cones, balloon toss, egg toss, tug of war, gunny sack race, horse shoes, and volley ball. The picnic was catered by K-Bobs, with all-you-can eat hamburgers, chicken, and trimmings. The beer booth was catered by local entrepreneur and former NRAO employee, Jess Landers. Several door prizes were given away at this year's picnic ranging from a car duster to water cannons, which helped keep things cool! The annual event was sponsored by the NM Personnel Recreation Association (PRA). The current PRA board in Socorro consists of Richard Murillo (President), Mary Ellen Chavez (Vice President), Clint Janes (Secretary), Emma Rice (Treasurer), Ken Lakies (Board Member), Linda Major (Board Member), and Allen Lewis (Board Member).

by Allen Lewis

12 Meter on Loan

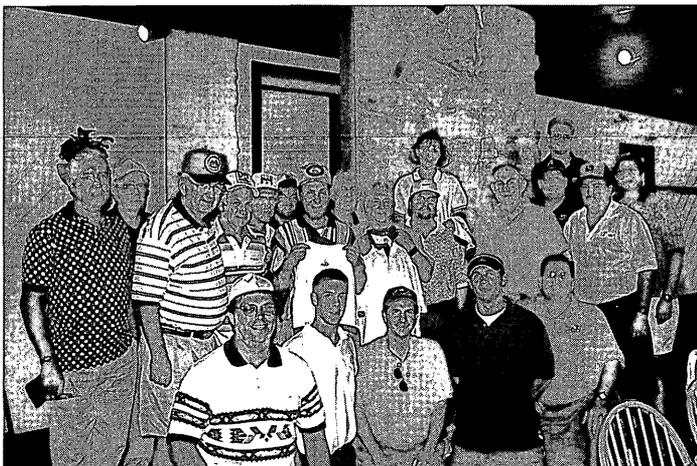
Tucson

The National Radio Astronomy Observatory is pleased to announce that it has loaned its 12 Meter Telescope and associated equipment, located on Arizona's Kitt Peak, to the University of Arizona for a period of six months. We understand that a consortium led by the University of Arizona will be preparing a proposal to submit to the National Science Foundation, the telescope's owner, for the eventual takeover of the telescope. Observers interested in using the 12 Meter should contact Dr. Lucy Ziurys.

The 12 Meter data archive will be maintained by the Tucson office. Observers needing access to archived data should contact Jeff Mangum. We will continue to offer data analysis services through our downtown Tucson computer system by request. If you would like information on our former 12 Meter Telescope system, see the links under the former 12 Meter Telescope web page.

Charlottesville Hosts Green Bank for Golf Tourney

The Charlottesville group hosted the early summer GB/CV golf tourney at Massanutten Village, Massanutten, VA. The first time tournament site for many of the aspiring golf pros. The outing was well attended with many of the regulars and a few new faces to boot. The course was in excellent condition. The course part of a Virginia four season resort is well renown for two characteristics, extremely steep banks with tightly tucked timeshare buildings and narrow fairways with tightly tucked timeshares--perfect ingredients for collisions with a slicing golf ball. More than one of our players tagged a timeshare unit off the first tee. This year's tournament also had three father-son teams participate. First place honors went to the team of Steve White, Ray Hanshew, Jim Gibb and Scott Gibb.



Top: Ray Hanshew, Ted Riffe, Jim Gibb, Russ Poling, Wendell Monk, Mike Hedrick, John Ralston, Bob Vance, Sid Smith, Brian Ellison, Jane Hunter, Monroe Petty, Tony Minter, Dave Krisnitski, Scott Gibb, Bill Porter. Bottom: Greg Monk, Timothy Norville, Steve White, Ben Porter, Roy Norville

AUI/Hjellming Memorial Scholarship Fund

Associated Universities, Inc., has established a memorial scholarship fund in honor of Robert M. Hjellming (1938-2000), a distinguished member of the National Radio Astronomy Observatory's scientific staff for 32 years. This scholarship fund has been established in cooperation with the Hjellming family and the Alamo Navajo School Board in New Mexico. This fund will provide scholarships to support higher education for graduates of the Alamo Navajo Community School in Socorro County, New Mexico.

Prior to joining the Observatory, Bob Hjellming was an assistant professor of astronomy at Case Western Reserve University, and during his tenure with NRAO, served as an adjunct professor at the University of Virginia and later at New Mexico Tech in Socorro. He also served on the board of the San Miguel School in Socorro. Both the Observatory

and the Hjellming family feel that a scholarship fund is a fitting tribute to a man whose support of education was as strong as Bob's.

Donations may be mailed to NRAO in Socorro, to the attention of Skip Lagoyda. Checks should be made payable to "AUI/Hjellming Memorial Scholarship Fund." We cannot accept cash donations. All donations to this fund are tax deductible.



Robert M. Hjellming



Safety-Ergonomics Computer Glasses

Computer work can result in several ergonomic ailments including carpal tunnel syndrome from repetitive motions, headaches from improperly adjusted workstations, and eyestrain from improper focal length of prescription glasses. The NRAO Safety Department has developed an eyewear program to provide computer glasses to employees whose work requires frequent use of computer monitor. 'Computer glasses' are actually prescribed glasses to improve the eyesight of individuals working at a computer terminal where ordinary corrective glasses are not adequate.

If you suspect you are having a work-related computer eyesight problem, don't rush out and buy a pair of glasses. Before purchasing computer glasses under this program, it is important to make an evaluation of your workstation. The ergonomic evaluation may suggest simple workstation modifications that lead to an overall improvement of your work place and the problem may be solved. Consult your safety officer for a work place assessment. If the measures taken do not help, and you still have problems 3-5 weeks after the workstation changes have been made, you should consider obtaining computer glasses.

As with the original safety glasses program, your Division Head must approve the request before the purchase of your computer glasses. This program is not a reimbursement program but, rather, the glasses frame will be selected from the NRAO vendors to ensure they are "safety glasses." Expenses for computer glasses will be covered out of the division's budget. It is your responsibility to finance the examination and to furnish the prescription to the NRAO. It is also your responsibility to pay for any adjustments made by your eye doctor. Of course, when provided with computer glasses you need to wear them at work whenever using at a computer terminal.

When you have the examination conducted, notify the doctor of the intended use as computer glasses. Computer glasses are not standard bifocals. The lens is constructed so that the upper part of the lens is for the computer screen while the bifocal segment is for normal reading. After your exam, provide the approved authorization form, prescription, and frame measurements to the NRAO safety eyewear administrator or safety officer. Choose a frame style with the NRAO safety eyewear administrator from the frame selection with the current NRAO providers.

Your Division Head should have a copy of the program for your use and review. Be sure you understand the limitations of the program and follow the appropriate procedures in obtaining your lenses.

May you keep your eyes healthy and pain free.

by Jody Bolyard

Personnel News

AUI Scholarship Programs Increases Annual Contribution

Beginning with the next school year, the Trustees of Associated Universities, Inc., have approved a two-phase increase in scholarships provided to children of NRAO/AUI employees. Current and future scholarship recipients will benefit from this decision.

Scholarships awarded to incumbents and new recipients for the 2001-2002 school year will receive \$3,000 a year for the balance of their scholarship. For the 2002-2003 school year, incumbents and new recipients will receive \$3,500 per year for the life of the scholarship. The current \$2,500 scholarship award has been in effect since 1991. Applications for the 2001-2002 AUI Trustee Scholarship competition are now available from the Personnel Office. Applications must be submitted no later than November 15, 2000.

“Military Veteran” NRAO Employees Surveyed

The Congress of the United States, by adoption of the Veterans Employment Opportunity Act, requires federal contractors such as NRAO to report the number of actively employed military veterans that participated in specific campaigns or expeditions. In 1995, we canvassed all employees to identify veterans with Vietnam Era status. Now, a recent amendment to the Act requires a listing of various other campaigns and expeditions. During the month of September, all active employees received a questionnaire by e-mail or other means regarding their military experience. A list of pertinent military campaigns and expeditions was included with the memo.

The veteran responses that are received by the Personnel Office will be entered into the new human resources employee database currently being installed with the ADP payroll system upgrade. If you are a veteran that served in the U.S. military and have not yet been contacted, please call your Personnel Office for a list of the campaigns and expeditions.

Benefits - Open Enrollment Periods

Health Care and Dependent Care Flexible Spending Accounts

The open enrollment period for the Health Care and Dependent Care “Flex Plans” begins October 16 and runs through November 10, 2000. This plan allows employees to deposit a portion of their salary into an account which can be used to cover out-of-pocket health care or dependent care expenses. A savings is realized by avoiding both income and social security taxes on salary amounts set aside for such purposes.

You may contribute any amount ranging from \$300 to \$2,500 to your Health Care Reimbursement Account and from \$300 to \$5,000 to the Dependent Care Reimbursement Account. For more information about these flexible spending accounts, contact your local Personnel Office. You can now download and complete the flexible spending account enrollment form on the NRAO Personnel Office web page at http://www.nrao.edu/administration/personnel_office/docs/flexform.pdf.

Medical Insurance Open Enrollment

The bi-annual Dental Insurance open enrollment and the annual Medical Insurance open enrollment periods will run for 30 days during the month of December 2000. If you are not presently enrolled in the program or if you have an eligible dependent who is not enrolled, you may apply during this 30-day period. Coverage will become effective January 1, 2001. Employees or dependents who do not join the plan during the open enrollment period will be ineligible to enroll until the next open enrollment period. There will not be a change in the cost of dental insurance for 2001.

The premiums for the medical program, effective January 1, are as follows:

COVERED INDIVIDUALS	BI-WEEKLY	MONTHLY
Employee Only	\$ 19.60	\$ 39.20
One Dependent	34.30	68.60
Family (2 or more deps.)	49.40	98.80

Personnel Changes

6/1/2000 thru
8/31/2000

Promotions

Nelson Atencio to Senior Technician, SO
Dana Balsler to Associate Scientist, GB
Bryan Butler to Associate Scientist, SO
Christopher Carilli to Scientist, SO
Ramon Creager to Scientific Programming Analyst, GB
Brian Glendenning to Scientist/Hd Computing, SO
Marie Glendenning to Systems Support Analyst, SO
Athol Kemball to Scientist-Dep Asst. Dir/AIPS ++, SO
Kevin Long to Junior Systems Analyst, TU
Mark McKinnon to Scientist-Dep Asst Dir, GB
Joseph McMullin to Associate Scientist, Res Support, CV
Carl Oler to Laborer, SO
Simon Radford to Scientist, TU
Adrian Rascon to Technical Specialist III, SO
Sheila Reasner to Purchasing Supervisor, SO
Sherry Sizemore to Receptionist, GB
Jim Pisano to Scientific Programming Analyst, CV
Carolyn White to Systems Support Analyst, CV
Carol Ziegler to Administrative Assistant, GB

New Employees

Charlottesville

Megan Kohring, Summer Student
Michael Meek, Staff Shop Technician I

Green Bank

Thomas Bania, Visiting Scientist
Cecilia Barnbaum, Visiting Scientist
Timothy Boyd, Research Assistant
Justin Elza, Maintenance Trainee
John Ford, Research Assistant
Remy Furre, Research Assistant
Charles Fulton, Research Assistant
Christina Holstine, Maintenance Trainee
Ardis Maciolek, Research Assistant
Valarie McLaughlin, Maintenance Trainee
Melanie Roberts, Housekeeper/Foodhandler
Jennifer Simmons, Maintenance Trainee
Timothy Spuck, Research Assistant
Robert Welsh, Research Assistant

Socorro

Jack Busboom, Intermediate Technician
Collen Gino, Array Operator III
Don Jenkins, Technical Specialist II
Alan Kerr, Correlator Operator
David King, Scientific Programming Analyst
Carl Oler, Janitor
Patrick Palmer, Visiting Scientist
Andrea Petric, Research Assistant

Tucson

Jamie Highberger, Junior Research Associate

Departures

Charlottesville

Jack Gallimore
Adrienne Gauthier
Caylin Mendelowitz
Jeremiah Murphy
Ronak Shah
Michelle Thornley
Dimitri Veras

Green Bank

Cecilia Barnbaum
Byron Bertrand
Melanie Blackburn
Joshua Bonner
Timothy Boyd
Margaret Clark
Justin Elza
Clint Ervine
John Ford
Remy Furre
Charles Fulton
Bertha Galford
Ardis Maciolek
Emily Mercer
Emily Morton
Eric Ricottilli
Goran Sandell
Timothy Spuck
Michael Sumner
Vincent Urick
Robert Welsh
Amanda Wright
Scott Zastoupil

Socorro

Steven Ball
Kathryn Becker
Edo Berger
Geoffrey Bower
Melanie Clarke
Murray Dail
Christopher Flatters
Robert Greschke
Andrew Hale
Ian Hoffman
Mark Krieger
Richard Lively
Richard Mellon
William Morris
Therese Ostrowski
Patrick Palmer
Andreea Petric
Stacy Teng
Timothy Woodruff
Min Yun
Bevin Zauderer
Robert Zavala

Tucson

Duane Clark
Jeffrey Clarke
Jeffrey Hagen
William Hale
Paul Hart
Tom Morin
James Schroeder
George Tietz

Retirees

Tucson

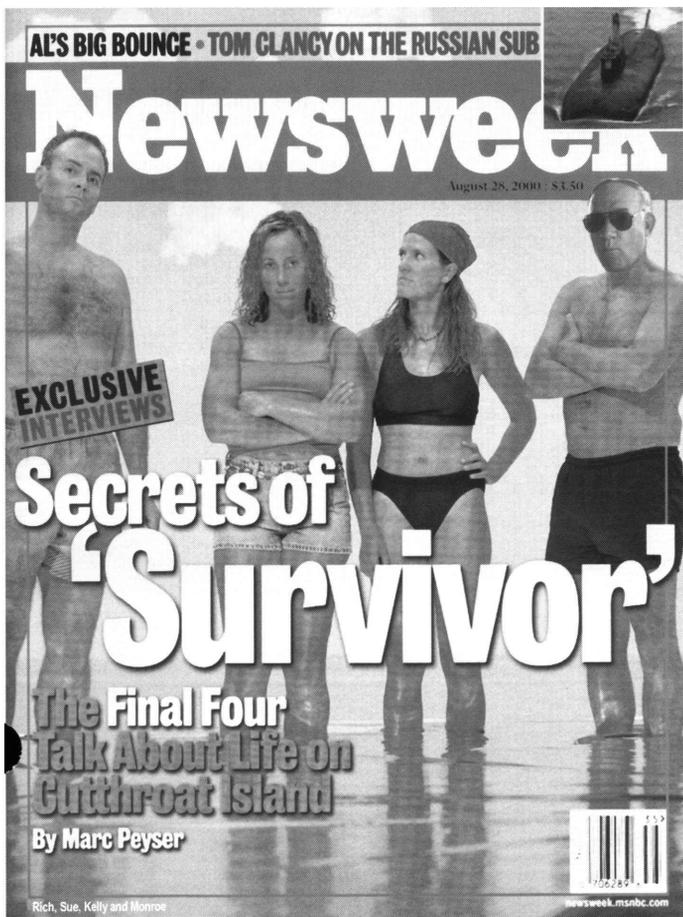
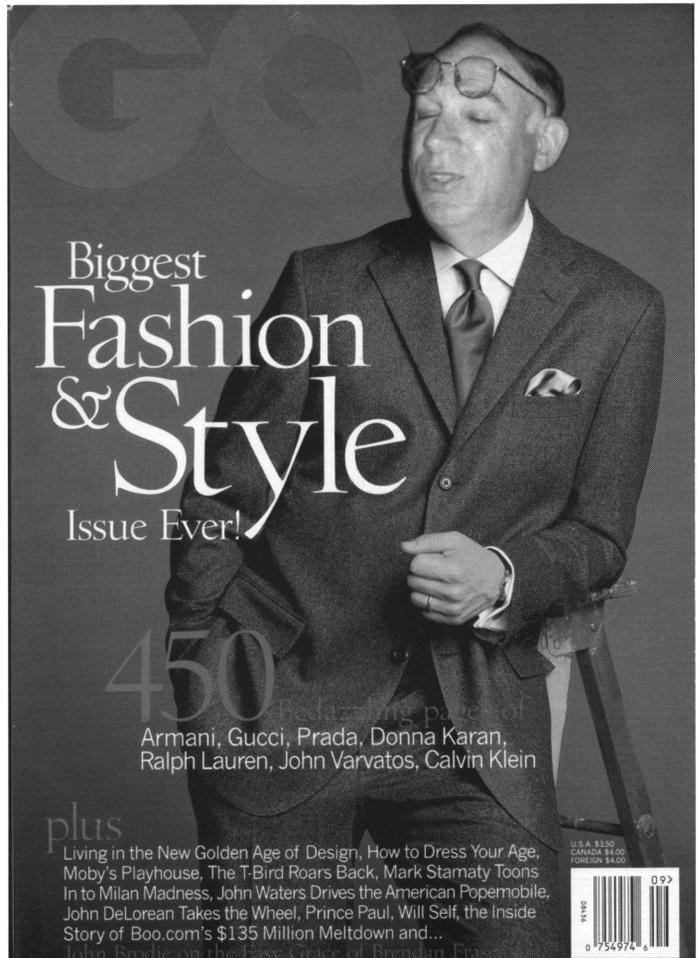
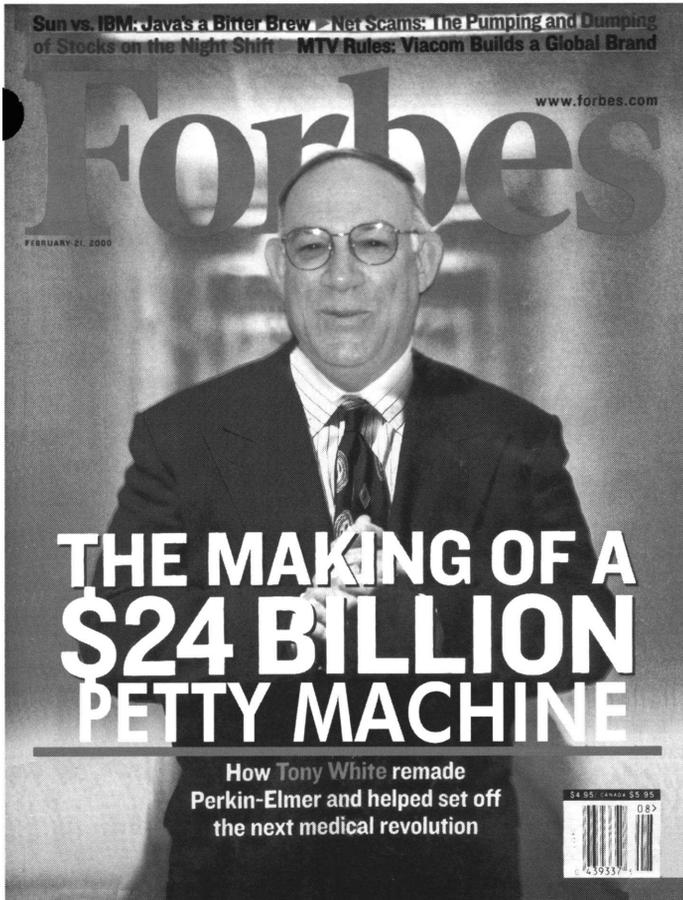
Jackie Cochran
Harry Stahl

Transfers

Tim Bastian, SO to CV
Richard Prestage, TU to GB

In Remembrance

Robert Hjellming, 1938-2000
George Kessler, 1934-2000



Here are a few of the impressionist slides created by Patricia Smiley for Bill Porter's presentation at Monroe Petty's retirement party in Charlottesville. Monroe was Personnel Manager at NRAO for twenty-seven years.

A Note from the Editor:

Articles or ideas for the Point Source newsletter are welcomed. If you would like to submit an article, please contact the editor at phone (804) 296-0265 or by email to: norvill@nrao.edu.

Deadline for article submission for the upcoming Summer Issue is August 10, 2000.

NRAO is an Equal Opportunity - Affirmative Action Employer.

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