



Upcoming Events

 [ALMA Long Baseline Workshop \(http://alma-intweb.mtk.nao.ac.jp/~diono/meetings/longBL2017/\)](http://alma-intweb.mtk.nao.ac.jp/~diono/meetings/longBL2017/)

Oct 3 - 5, 2017 | Mielparque Kyoto, Japan



[6th VLA Data Reduction Workshop \(http://go.nrao.edu/vla-drw\)](http://go.nrao.edu/vla-drw)

Oct 23 - 27, 2017 | Socorro, NM



[2017 Jansky Lecture \(https://science.nrao.edu/science/jansky-lecture/speakers/2017-jansky-lecturer-dr-bernard-fanaroff\)](https://science.nrao.edu/science/jansky-lecture/speakers/2017-jansky-lecturer-dr-bernard-fanaroff)

Oct 24, 2017 | Charlottesville, VA



[2017 Jansky Lecture \(https://science.nrao.edu/science/jansky-lecture/speakers/2017-jansky-lecturer-dr-bernard-fanaroff\)](https://science.nrao.edu/science/jansky-lecture/speakers/2017-jansky-lecturer-dr-bernard-fanaroff)

Oct 27, 2017 | Green Bank Observatory, WV



[2017 Jansky Lecture \(https://science.nrao.edu/science/jansky-lecture/speakers/2017-jansky-lecturer-dr-bernard-fanaroff\)](https://science.nrao.edu/science/jansky-lecture/speakers/2017-jansky-lecturer-dr-bernard-fanaroff)

Nov 3, 2017 | Socorro, NM



[NRAO Town Hall at the Jan 2018 AAS Meeting \(https://science.nrao.edu/science/meetings/2018/aas-231/town-hall\)](https://science.nrao.edu/science/meetings/2018/aas-231/town-hall)

Jan 11, 2018 | National Harbor, MD



[The Very Large Array Today and Tomorrow: First Molecules to Life on Exoplanets \(https://science.nrao.edu/science/meetings/2018/aas-231/vla\)](https://science.nrao.edu/science/meetings/2018/aas-231/vla)

Jan 11, 2018 | National Harbor, MD

The Very Large Array Today and Tomorrow: First Molecules to Life on Exoplanets

Eric Murphy



The NRAO will convene a Special Session entitled *The Very Large Array Today and Tomorrow: First Molecules to Life on Exoplanets* on 11 January 2018 in National Harbor, Maryland, near Washington, D.C. during the 231st Meeting of the American Astronomical Society (AAS).

The Very Large Array (VLA) has had a major impact on nearly every branch of astronomy, and the results of its research are abundant in the pages of scientific journals and textbooks. Five years after the completion of the Expanded Very Large Array Project, the VLA has strengthened its position as the most versatile, widely-used radio telescope in the world. Rededicated in 2012 as the Karl G. Jansky VLA, the array continues to make cutting-edge discoveries across a broad range of disciplines. This Special Session will showcase that cutting-edge research. It will also address future transformative scientific opportunities that could be enabled by new capabilities that would ensure the instrument's pre-eminence well into the 21st century.

This Special Session will involve a session with invited oral presentations, and an associated poster session with contributed presentations.

The confirmed oral presentations will include:

- Fabian Walter (MPIfA), *The Cold Side of Galaxy Formation: Dense Gas Through Cosmic Time*
- Brenda Matthews (NRC), *Terrestrial Zone Exoplanets and Life*
- Rachel Osten (STScI), *The Bursting Universe: New Tools for Cosmology and Physics*
- Mark McKinnon (NRAO), *The Very Large Array: Pioneering New Directions in Radio Astronomy*
- Eric Murphy (NRAO), *Radio Synergies with Current and Next-Generation Great Observatories*

The Observatory encourages you to consider contributing to the associated AAS meeting poster session, also scheduled for 11 January 2018. When submitting a contributed poster abstract to the AAS, you will have the option of requesting that your presentation be included in this Special Session. Eric Murphy is the organizer of this Special Session.

We look forward to seeing you at the January 2018 AAS!

Developing the ngVLA Science Program

Mark McKinnon, Eric Murphy, Rob Selina, Suzanne Gurton, & Christopher McLaughlin



Participants in the *Developing the ngVLA Science Program* workshop.

A workshop on *Developing the ngVLA Science Program* was held in Workman Center on the New Mexico Tech campus in Socorro, New Mexico, 26 – 29 June 2017. Registration exceeded the capacity of the venue; approximately 150 people participated in the workshop. The program consisted of contributed and invited talks highlighting recent results from existing instruments – such as the Karl G. Jansky Very Large Array (VLA) and the Atacama Large Millimeter/submillimeter Array (ALMA) – and discussed how these results inspire and influence planning for the next generation VLA (ngVLA). The synergies between the ngVLA and future major astronomical facilities were also discussed, including the James Webb Space Telescope, Large UV/Optical/Infrared Surveyor, Habitable Exoplanet Imaging Mission, Origins Space Telescope, Lynx, Large Synoptic Survey Telescope, Extremely Large Telescopes, and the Square Kilometre Array.

Status reports on the ngVLA community design studies were presented, with the first day of the workshop dedicated to reports on technical design studies and the following days to reports on science design studies. The

studies are nearing completion, with publications expected this fall.

On the final day of the workshop, the ngVLA Science Working Groups (SWGs) were asked to evaluate the relative importance of various design alternatives to their key science goals. The SWG co-chairs reported on their findings, which were in turn used to refine the ngVLA concept recently summarized in [ngVLA Memorandum 17 \(https://library.nrao.edu/public/memos/ngvla/NGVLA_17.pdf\)](https://library.nrao.edu/public/memos/ngvla/NGVLA_17.pdf). The workshop was independently praised for its high-quality talks, organization, and informative discussion sessions.

The NRAO Education and Public Outreach department hosted a workshop reception that featured professional artists specializing in artwork based on astronomy and space science themes. The artists attended the entire workshop with the goal that discussions during the meeting would inspire work that will convey the excitement of the ngVLA to a broader audience ([see related eNews article \(/enews/10.7/index.shtml#scicom_ngvla\)](/enews/10.7/index.shtml#scicom_ngvla)).

The ngVLA is envisioned to be an interferometric array with 10 times the sensitivity and 10 times higher spatial resolution than the current VLA and ALMA. It will be optimized for observations at wavelengths between the exquisite performance of ALMA in the submillimeter, and the future SKA-1 at decimeter to meter wavelengths, and will thus be highly complementary with these facilities. In doing so, the ngVLA will open a new window on the Universe through ultra-sensitive imaging of thermal line and continuum emission down to milliarcsecond resolution, as well as unprecedented broad band continuum polarimetric imaging of non-thermal processes.

ALMA Selects New Director



After a competitive selection process that began in January 2017, the international governing board of the Atacama Large Millimeter/submillimeter Array (ALMA) has selected Dr. Sean Dougherty as the new ALMA Director for a 5-year term beginning in April 2018.

Dougherty is currently the director of the Dominion Radio Astrophysical Observatory, Canada's national radio astronomy facility, run by NRC Herzberg Astronomy and Astrophysics. He has served as a member of the ALMA Board representing North America for four years and was the chair of the ALMA

Budget Committee for the last two years.

Dougherty received his bachelor's degree in mathematics and physics from the University of Nottingham, England, in 1983 and his Ph.D. in astrophysics from the University of Calgary, Canada, in 1993.

Dougherty has more than 20 years of science and engineering management experience in radio astrophysics. This includes Canada's contributions to international radio astronomy facilities and R&D projects as well as leadership of major science and engineering activities at the Dominion Radio Astrophysical Observatory. He also led the construction and delivery of the WIDAR correlator for the Karl G. Jansky Very Large Array and is currently leading the international consortium designing the correlator and beamformer for the Square Kilometer Array.

"I am looking forward to this exciting opportunity of leading the most groundbreaking and challenging observatory in the world. Joining ALMA is a privilege of a lifetime," remarked Dougherty.

Upon making this selection, the ALMA Board also extended its appreciation to Dr. Stuartt Corder, who serves as the ALMA Acting Director during the transition process.

In making this announcement, the ALMA Board stated that, "... our past and future success has been and will be the result of the leadership and hard work of many very gifted, talented and dedicated individuals."

The Atacama Large Millimeter/submillimeter Array (ALMA), an international astronomy facility, is a partnership of the European Organisation for Astronomical Research in the Southern Hemisphere (ESO), the U.S. National Science Foundation (NSF) and the National Institutes of Natural Sciences (NINS) of Japan in cooperation with the Republic of Chile. ALMA is funded by ESO on behalf of its Member States, by NSF in cooperation with the National Research Council of Canada (NRC) and the National Science Council of Taiwan (NSC) and by NINS in cooperation with the Academia Sinica (AS) in Taiwan and the Korea Astronomy and Space Science Institute (KASI).

ALMA construction and operations are led by ESO on behalf of its Member States; by the National Radio Astronomy Observatory (NRAO), managed by Associated Universities, Inc. (AUI), on behalf of North America; and by the National Astronomical Observatory of Japan (NAOJ) on behalf of East Asia. The Joint ALMA Observatory (JAO) provides the unified leadership and management of the construction, commissioning and operation of ALMA.

ALMA Program News

Al Wootten



ALMA Cycle 5

Recovery continues from the effects of snowstorms at the Atacama Large Millimeter/submillimeter Array (ALMA) site in late May and early June. Science observations have continued through July. Antennas will be in configuration C40-7 (0.21 arcsec beam at 100 GHz, 81-3700m baselines) into August, and will move to the longest baselines of configuration C40-9 (0.066 arcsec beam at 100 GHz, 0.27-12.6 km baselines) for later observations when conditions on Chajnantor allow. Configuration files are included in the recent CASA releases.

ALMA long baseline observations have led to numerous publications and follow-up observational and theoretical studies continue in this third season of Principal Investigator (PI) high-resolution observations. The importance of the ALMA high-resolution imaging capabilities will be discussed at an ALMA Long Baseline Workshop in Kyoto, Jana, 3-5 October 2017. The abstract submission deadline was 1 August 2017, but registration will remain open to 1 September 2017, or when maximum capacity is reached. The workshop discussions are envisioned as providing guidelines for the future expansion of ALMA.

The proposal dispositions from the Cycle 5 Call for ALMA Proposals have been distributed. Four Large Programs will be scheduled in Cycle 5. The deadline for [Student Observing Support](https://science.nrao.edu/opportunities/student-programs/sos) (<https://science.nrao.edu/opportunities/student-programs/sos>) applications for ALMA Cycle 5 is 25 August 2017. In Cycle 5, PIs of approved ALMA Projects are responsible for submitting Phase 2 Science Goals. The Phase 2 submission deadline is 7 September 2017 at 15:00 UT. [Phase 2 Instructions](https://almascience.nrao.edu/observing/phase-2) (<https://almascience.nrao.edu/observing/phase-2>) are available online. A full report regarding the Cycle 5 proposal outcomes will be published soon at the [ALMA Science Portal](http://almascience.nrao.edu/) (<http://almascience.nrao.edu/>).

ALMA Development: A Science Sustainability Program

The Cycle 5 Fiscal Year 2018 ALMA Development Study program has reached the end of the award stage. On the basis of reviews by expert panels, and on the basis of available funding, recommendations were made to NRAO management and to National Science Foundation (NSF). The two Strategic and two General Studies selected for Cycle 5 funding, described below, totaled \$1,079,242 USD in FY2018.

- **[Strategic Studies]** *Wideband Low-Noise Balanced IF Amplifiers for ALMA Band 6, with Future Application to ALMA Bands 3-10*, PI Anthony Kerr (NRAO). The investigators will construct and test prototype balanced IF amplifiers for 4-12 GHz with emphasis on ALMA Band 6 (211-270 GHz). Balanced 4-12 GHz IF Low-Noise Amplifiers (LNAs) can benefit all ALMA bands, removing the need for lossy cryogenic isolators to improve noise and bandwidth performance. Furthermore, these are well matched with the proposed bandwidth increases for the ALMA correlator.
- **[Strategic Studies]** *Quantum-Limited Very-Wideband 4-Kelvin RF and IF Amplifiers for ALMA*, PI Omid Noroozian (NRAO). The authors propose to develop broadband traveling wave kinetic inductance parametric amplifiers for use as both RF (~100 GHz) and IF (4-12 GHz) amplifiers. The expectation is these amplifiers can achieve sufficiently low noise performance in the several hundreds of GHz regime to enable an amplifier first approach. This is a follow-up program to an earlier ALMA-funded study.
- **[General Studies]** *Neuroscope: Neural Machine Intelligence Tools for Discovery and Interpretation in Complex ALMA Data*, PI Erzsébet Merényi (Rice University). Diverse tools are needed for the analysis of rich ALMA image cubes. This proposal, though focused on the characterization of proto-planetary disks, implements neural network algorithms on datasets with a focus on characterizing similar clustered kinematic features in an ALMA data cube.
- **[General Studies]** *Full-Mueller Mosaic Imaging with ALMA*, PI Sanjay Bhatnagar (NRAO). ALMA employs four antenna designs; its field of view necessitates mosaic imaging for many astronomical targets. The characterization of the ALMA antennas' primary beams and direction dependent and independent polarization leakages can dramatically expand the types of polarization science that ALMA can address. Full-field primary beam models will be developed for use in imaging software, and to characterize the ALMA full-Stokes imaging performance.

Workshops & Conference

The [Centimetre/Millimetre/Submillimetre Q&U \(&V\) ESO Workshop 2017 \(QUESO2017\)](https://www.eso.org/sci/meetings/2017/QUESO2017.html) (<https://www.eso.org/sci/meetings/2017/QUESO2017.html>) will be held at ESO Headquarters in Garching 25 – 27 October 2017. The workshop will cover diverse topics spanning interferometric and single dish centimetre / millimetre / submillimetre polarization observations, instrumentation for polarization, calibration of the QUV components, as well as advanced analysis and modelling. Review talks will cover science topics including Active Galactic Nuclei, star-formation, and evolved stars. Talks about polarization observations of any scientific topics are welcome.

A [workshop](https://www.eso.org/sci/meetings/2018/AtLAST2018.html) (<https://www.eso.org/sci/meetings/2018/AtLAST2018.html>) to discuss science and technical aspects of the Atacama Large-Aperture Submm/mm Telescope (AtLAST) will take place at ESO Headquarters in Garching bei München, Germany, 17-19 January 2018.

A conference on the [Cosmic Cycle of Dust and Gas in the Galaxy: from Old to Young Stars](https://cosmiccycle2018.sciencesconf.org/) (<https://cosmiccycle2018.sciencesconf.org/>) will be held at the new International Center of Interdisciplinary Science Education (ICISE) in Quy Nhon, Vietnam, 9-13 July 2018.

CASA 5.0 Release

Juergen Ott & the CASA Team

We are pleased to announce the availability of a major new Common Astronomy Software Applications (CASA) package release, version 5.0.0.



Developed by the NRAO, the European Southern Observatory, the National Astronomical Observatory of Japan, and the Academia Sinica Institute of Astronomy and Astrophysics, CASA is used for the offline reduction and analysis of ALMA and VLA data and is fully scriptable. Full support is provided for ALMA and VLA but almost any data that can be written in uvfits format can be imported and reduced in CASA (e.g., the Combined Array for Research in Millimeter Astronomy, the Submillimeter Array, and the Australia Telescope Compact Array).

CASA 5.0.0 is available from the CASA [homepage \(https://casa.nrao.edu/\)](https://casa.nrao.edu/). Please follow the links to *Obtaining CASA*.

Supported Operating Systems for CASA 5.0.0 are:

- Linux (64bit): RedHat 6 & 7
- MacOS: 10.11 & 10.12

The development of CASA 5.0 focused on internal refactoring, a new build and workflow process, and code and performance improvements. This includes a new way to access, store, and process visibilities that affects many tasks but should be invisible to the user. Updated ALMA and VLA pipelines are not included in CASA 5.0 but will be published with the upcoming CASA 5.1 release. Please use the pipelines in CASA 4.7.2 until CASA 5.1 is available.

We have implemented a completely new documentation system: [CASAdocs \(https://casa.nrao.edu/casadocs\)](https://casa.nrao.edu/casadocs). The CASAdocs system replaces the *Reference Manual and Cookbook* and contains other documentation previously available only in external documents. CASAdocs will also contain all current CASA inline help, but during a transition period only a limited number of task and tool descriptions are available. Previous documentation for versions up to CASA 4.7.2 – including the Cookbook, Task and Tool References – remains available on the CASA webpage.

New CASA features in release 5.0.0 include:

- In *plotms*, multiple data columns can be chosen for the same visibility axis (amp, phase, real, imag). This can be done for x- and y-axes, or via multiple y-axes.
- All calibration solving tasks are now using WEIGHT_SPECTRUM, if available.
- *tclean* is maturing and replaces and improves on more functionality of current *clean*. This includes an experimental, new automasking algorithm designed to work on a wide range of emission morphologies available in *tclean* via `usermask='auto-multithresh'`.
- Restructuring of single dish tasks.
- A crash reporter has been introduced.

A complete list of the CASA 5.0.0 improvements is available in the [release notes \(https://casa.nrao.edu/casadocs/casa-5.0.0/introduction/release-notes-50\)](https://casa.nrao.edu/casadocs/casa-5.0.0/introduction/release-notes-50).

We encourage you to subscribe to the following subscription lists:

- [Casa-announce \(https://listmgr.nrao.edu/mailman/listinfo/casa-announce\)](https://listmgr.nrao.edu/mailman/listinfo/casa-announce) for announcement of new releases, workshops, etc.; and

- [Casa-users \(https://listmgr.nrao.edu/mailman/listinfo/casa-users\)](https://listmgr.nrao.edu/mailman/listinfo/casa-users) for critical bugs and code updates.

If you have any questions, please consult the [NRAO helpdesk \(https://help.nrao.edu/\)](https://help.nrao.edu/) or the [ALMA helpdesk \(https://help.almascience.org/\)](https://help.almascience.org/). CASA also has an [online discussion forum \(https://science.nrao.edu/forums\)](https://science.nrao.edu/forums)

Arizona Radio Observatory Call for Proposals

Yancy Shirley (University of Arizona)



The Arizona Radio Observatory (ARO) solicits observing proposals for the ALMA Prototype 12-meter Telescope (12m) located on Kitt Peak, Arizona, and for the 10-meter Submillimeter Telescope (SMT) located on Mount Graham, Arizona, for the period 15 October 2017 – 15 February 2018. Proposal candidates should submit up to three pages of scientific and technical justification (including figures, tables, and references) in addition to their [Proposal Summary Sheet \(https://www.as.arizona.edu/sites/default/files/ARO_Proposal_Cover_Sheet.pdf\)](https://www.as.arizona.edu/sites/default/files/ARO_Proposal_Cover_Sheet.pdf).

All proposal candidates are required to list on the Proposal Summary Sheet their requested observing blocks (the exact LST ranges to be scheduled and number of times to be repeated), dates on which they are not available to observe, and dates in which sources in those observing blocks are within the Sun-avoidance zone (45 degrees at the SMT, 10 degrees at the 12m).

The 12m ALMA Prototype antenna currently supports an ALMA Band 3 (84-116 GHz) dual-polarization SBS (sideband-separating) receiver. The 12m control system supports dual-polarization in the same sideband or single-polarization in each sideband ("2 IF mode"), position-switched, beam-switched, and OTF observations. A new spectrometer, AROWS, is being commissioned on the 12m telescope and is being made available on a best effort basis with 2 channels. The AROWS center IF frequency is fixed at 6.0 GHz for the full 4 GHz bandwidth mode, but is steerable within the 4 GHz IF bandwidth in the higher resolution/smaller bandwidth modes. The older MAC autocorrelator and filter banks will still be available as a backup. Possible backend modes may be found on the [ARO Equipment Summary and Status sheet \(https://www.as.arizona.edu/arizona-radio-observatory\)](https://www.as.arizona.edu/arizona-radio-observatory).

The 10m SMT currently supports a dual-polarization ALMA Band 6 (211-280 GHz) receiver with SBS mixers. A 0.4 mm (602-720 GHz) dual-polarization receiver with ALMA Band 9 mixers will be available on a best effort basis for the period of December – February; proposers for the 0.4 mm receiver are strongly encouraged to also submit a 1 mm proposal (low frequency backup project) at the same LST range. The Band 7 (320-370 GHz) receiver will not be available this semester. The SMT control system supports both dual polarization ("2 IF mode") and dual-polarization+dual-sideband observations ("4 IF mode") with tunable IF from 4.5-7.5 GHz, for position-switched, beam-switched, and OTF observations. Proposal candidates should consult the ARO Equipment Summary and Status sheet for additional technical specifications:
<https://www.as.arizona.edu/arizona-radio-observatory>

Remote observing is available. Observers who plan to observe remotely must supply fixed IP address(es) of the computer(s) that will be used during observing on their Proposal Summary Sheet. For further information about remote observing and other operational questions, please contact [Tom Folkers, Operations Manager \(mailto:tfolkers@email.arizona.edu\)](mailto:tfolkers@email.arizona.edu).

Proposals will be reviewed by the ARO TAC and scheduling of successful proposals will be done according to availability of the receivers requested. The telescopes are expected to be available to the General astronomical community for a minimum of 10% of the scheduled time. Graduate student participation is especially

encouraged. Institutions (or individuals) that wish to acquire longer commitments of time should contact [Buell Jannuzi, Director \(mailto:buelljannuzi@email.arizona.edu\)](mailto:buelljannuzi@email.arizona.edu).

Next deadline for proposals is 23:59 MST on 17 September 2017.
Proposals should be emailed in PDF format to:
[aroproposals@as.arizona.edu \(mailto:aroproposals@as.arizona.edu\)](mailto:aroproposals@as.arizona.edu)

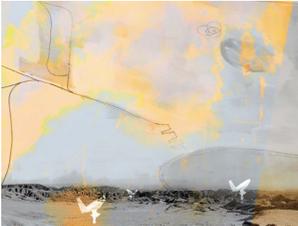
Science Communication for the ngVLA

Nan Janney



Credit: Aldo Spadoni

Imagine the challenge of crafting a comprehensive and compelling science case for a next-generation observatory, one that promises transformational discoveries but will require over a decade or more of planning and development. To succeed, this observatory will need strong support from the science community and the general public. Communicating the profound impacts of this project to the science community is challenging enough; communicating the project's profound value to the public requires capturing its imagination.



Credit: Eddie Edwards

The NRAO Education and Public Outreach (EPO) department has taken a unique approach to this seemingly daunting task when approaching a major upgrade to the Very Large Array (VLA) in New Mexico, the next-generation VLA (ngVLA). For the [ngVLA conference \(/enews/10.7/index.shtml#ngvla\)](/enews/10.7/index.shtml#ngvla) this past June, EPO commissioned artists with different styles and creative backgrounds to listen to the many scientific presentations and illustrate the ideas generated by the discussions. This unique collaboration between scientists and artists illustrates the vital role art can play in relaying complex ideas to the public.



Credit: Jon Ramer

Each artist works in different media, from a Hollywood film consultant for the movie *Apollo 13* to an illustrator who uses collage to interpret complex concepts. The results are both spectacular and compelling, and EPO is pleased to share these preliminary sketches created during the conference. Over the next few months, each artist will develop additional ideas and concepts to help us visually explain to the public the importance of such a large-scale project.

Recent Media Releases



[ALMA Confirms Complex Chemistry in Titan's Atmosphere](https://public.nrao.edu/news/2017-alma-chemistry-titan/)

[\(https://public.nrao.edu/news/2017-alma-chemistry-titan/\)](https://public.nrao.edu/news/2017-alma-chemistry-titan/)

28 July 2017



[NSF Funds Partnership to Advance Minority Participation in STEM Research](https://public.nrao.edu/news/nsf-funds-partnership-to-advance-minority-participation-in-stem-research/)

[\(https://public.nrao.edu/news/nsf-funds-partnership-to-advance-minority-participation-in-stem-research/\)](https://public.nrao.edu/news/nsf-funds-partnership-to-advance-minority-participation-in-stem-research/)

18 July 2017



[Heart of an Exploded Star Observed in 3-D \(https://public.nrao.edu/news/2017-alma-dust-sn1987a/\)](https://public.nrao.edu/news/2017-alma-dust-sn1987a/)

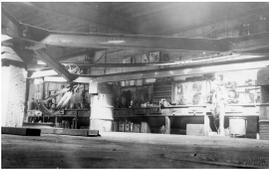
10 July 2017

Career Opportunities

Post Doc (<http://jobs.jobvite.com/nrao/job/ozxG5fwB>): The Green Bank Observatory is actively seeking candidates for the Green Bank Post Doc position. The successful applicant will be working with observers and instruments for the 100-m Robert C. Byrd Green Bank Telescope, the world's largest, fully steerable telescope. Job duties can range from aiding observers on the telescope, providing support for GBT observers, reviewing GBT proposals for technical details, aiding scientists and engineers in improving the overall performance of the GBT, and helping test or commission new and refurbished instruments on the GBT.

From the Archives

Ellen Bouton



About this month's photo: Eighty years ago, in the summer of 1937, Grote Reber was the first person to design and build a parabolic antenna for radio astronomy observations. He was surprised that no one had followed up on Jansky's 1933 detection of cosmic radio emission, so he decided to do it himself. He built the antenna in a vacant lot next to his mother's house in Wheaton, Illinois, a suburb of Chicago. Although he had the metal parts fabricated, Reber did much of the construction himself with the help of occasional hired labor. He kept careful records of costs for materials and labor, all of which he paid for himself. In 1937-1939 his expenditures were \$5854.25, and the total costs associated with his antenna over its Wheaton lifetime, 1937-1947, were \$18,413.26 (\$206,769.78 in 2017 dollars).

In this photo – or foto, according to Reber's usual spelling – we see the metal support structure being fabricated. Although the wooden parts had rotted by the time the antenna was moved to Green Bank, West Virginia in 1958, Reber still had his original drawings (now in the NRAO/AUI Archives) and did a new set of drawings (also in the NRAO/AUI Archives) for the wooden replacement parts which were made in Green Bank. Now standing near the entrance of the Green Bank Observatory, the antenna is a National Historic Landmark, and still has the original 1937 metal backup structure.

From the Archives is an ongoing series illustrating NRAO and U.S. radio astronomy history via images selected from our collections of individuals' and institutional papers. If readers have images they believe would be of interest to the Archives, please contact [Ellen Bouton \(#\)](#).

Contact the Editor ([mailto:mtadams@nrao.edu?subject=NRAO eNews Editor](mailto:mtadams@nrao.edu?subject=NRAO%20eNews%20Editor))



The National Radio Astronomy Observatory is a facility of the National Science Foundation operated under cooperative agreement by Associated Universities, Inc.