

2023 NRAO Users Committee Report

May 23-25th 2023, Charlottesville, VA

Members of Users Committee

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- **Brett McGuire (Vice-Chair)**, *Massachusetts Institute of Technology* (2025) ANASAC
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- **Melodie Kao**, *University of California, Santa Cruz* (2025)
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- **Elisabeth (Betsy) A.C. Mills**, *University of Kansas* (2027)
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- **Daniel Perley**, *Liverpool John Moores University* (2026)
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- **Kazushi Sakamoto**, *Academia Sinica Institute of Astronomy & Astrophysics* (2024) ANASAC
- **Melissa Soriano**, *NASA Jet Propulsion Laboratory* (2025)
- **Tony Wong**, *University of Illinois Urbana-Champaign* (2027)

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Executive Summary

The NRAO Users Committee (UC) met at NRAO headquarters May 23-25th 2023. Seventeen committee members were in attendance, of whom ten joined remotely for the entire time, seven in person (four for the entire time; three joined in person for most of the time and remotely for the final half-day).

Feedback was solicited from wider users informally, and via a reminder about the online feedback form sent out through NRAO Mailing list in the week before meeting. This reminder resulted in two online submissions. The Committee discussed the need for more active effort in seeking broader user feedback, including potentially UC attendance at NRAO Townhalls and/or exhibit booth hours at AAS meetings.

We thank all speakers for their clear presentation style, for the most part leaving plenty of time for discussion, and including specific mention of reactions to our report from last year and a “next 120 days” slide, all of which *we appreciated and we recommend continue*. We also appreciate the format where the UC can request talks on special topics - this year we appreciated the talks on ALMA Time Domain Science, and Spectrum Management - and *recommend continuing that practice*.

The meeting was Chaired by Karen Masters with Brett McGuire as Vice Chair. Brett McGuire will be Chair in 2024 with Sean Andrews newly elected as Vice Chair for 2024.

NRAO Overview

In an era of challenging budget realities, the NRAO is commended for another successful year, with exciting science highlights from all facilities, including ALMA observations of a high redshift spiral galaxy and a directly imaged protoplanet, GBT work on imaging M87's supermassive black hole's accretion disc and jet together, VLBA tracking of the location of Sgr A*, and the many papers coming out of VLASS among many other results from JVLA.

While the worst of the Covid-19 emergency is over, we continue to appreciate running of the UC meeting with effective hybrid options, as well as a clear focus on accessible hybrid science meetings for the user community and remote working for staff.

The message about the need for budget belt-tightening we heard in 2022 was repeated. We continue to encourage the observatories to be *open with the users about choices which have to be made on prioritizing or de-prioritizing projects* due to budget constraints, or any other cuts which have to be made which might impact users.

Users remain concerned about high levels of open positions at NRAO (although at least it appears to be stable across this year at about 15% of all approved positions open in any given month) and the impact this has on user support and NRAO staff science time. The UC appreciates the continued support of remote working as a positive step. We also appreciate and continue to encourage the observatories to *continue their exemplary efforts on DEI* to broaden and increase the size of the potential work-force. We particularly note PROVOCA as a success story in this report. We appreciate efforts that are ongoing and ask for a continued emphasis on *work towards improving the diversity of people in tenured/tenure-track and leadership roles and building a more diverse candidate pool for such roles*.

Some users report that "user visits" (e.g. for training on observations, data reduction or other collaborative scientific work, which can happen both in person and online) have been negatively impacted by service demands on NRAO staff. This hampers essential user-facing services provided by the staff, including detailed mentoring and collaborative opportunities that transfer valuable skills and expertise from scientific and technical staff to users. We encourage *NRAO to expand the support of staff to support opportunities for remote and in person user visits*.

We heard during several reports about many challenges driven by aging infrastructure (at GBO, VLA and VLBA sites). This has had a significant impact on GBT users this year. We commend the observatories for the proactive preventative maintenance schedule, and urge *continued efforts to support critical infrastructure maintenance*. Experience from GBO this year suggests that unplanned shutdowns are more disruptive to users (and presumably expensive) than planned ones needed for essential maintenance. We also request that users are given *clear communication with plenty of notice of planned maintenance shutdowns*.

We heard repeatedly about the challenges of increasing human radio emissions impacting radio astronomy. The news about increased funding and support for spectrum monitoring efforts and

testing of innovative spectrum sharing was very welcome. We encourage the *continued support of co-ordinated spectrum management efforts, and recommend an increase in user education on these issues.*

The UC shares a general concern around a lack of opportunity for exposure to telescope hardware for students and postdocs. There are many ways to address this concern, but two that came up during the meeting were (1) *continuing to hold the synthesis imaging summer school in Socorro at least every other year*, and (2) *building educational opportunities into the long-baseline facilities for the ngVLA* since they will be distributed broadly across the country. The decision to hold the synthesis imaging summer school in an off year also helped address the issue of oversubscription, and it may be worth considering opening up more slots or holding the workshop more frequently to increase opportunities for students and postdocs to interact with NRAO staff and facilities.

Finally, we commend the observatories for the efforts they are making to communicate to users about news, data archives, and data processing, however feedback from the UC and the user community more generally suggests current efforts are not yet working as well as they need to (e.g. lack of knowledge about AUDI, archive services, how to access specific data products etc). We encourage attention to the *use of new communication channels for user facing services*, alongside improving the coordination of emails, newsletters, and web pages for mutual reinforcement to maximize the awareness and impact of new capabilities. Many people do not read email newsletters carefully - sending a single email will never be enough.

Summary of our recommendations (for more details see main text):

- *be transparent with the users about choices which have to be made on prioritizing or de-prioritizing projects due to budget constraints*
- *continue the good work on DEI, and continue to pay attention to the pipeline to leadership roles*
- *expand the available support for NRAO staff to host in person and remote user visits*
- *continue efforts to fundraise to support critical infrastructure maintenance for aging facilities and users should be given clear communication with plenty of notice of planned maintenance shutdowns*
- *continue support of co-ordinated spectrum management efforts, and increase user education on these issues.*
- *continue to hold the synthesis imaging summer school in Socorro at least every other year, and build educational opportunities (for students to visit telescopes) into the long-baseline facilities for the ngVLA*
- *work on the use of new, multiple and mutually reinforcing communication methods to distribute information about user facing services (software, data access etc).*

ALMA Operations

The users committee commends the ALMA operations team on its continued excellent productivity, including the recovery from the October cyberattack. We recognize that recovering from the cyberattack and getting operations up and running again was an enormous challenge to the facility. We also appreciate the decision to push the proposal deadline back to May to avoid conflicting with the JWST proposal deadline. We are eagerly anticipating the Wideband Sensitivity Upgrade (WSU) and appreciate the clear description of the impact that it will have on the user community in terms of effective savings on observing time and bandwidth. We also commend the observatory on the current 34-day average gap between data acquisition and delivery to the PI, which is approaching the 30-day goal.

The UC also commends the ALMA operations team on their excellent community outreach. We strongly support the appointment of the new community programs staff member and are impressed with the efforts that the community programs staff have made in supporting the community, expanding the user base, and enhancing scientific productivity, including the support for user-led conferences and workshops. The ALMA ambassadors program continues to be a success and a benefit to our community. We also appreciate the work done by the Office of Chilean Affairs, including the collective bargaining agreement and the success of the PROVOCA campaign promoting science careers for girls.

We appreciate the explicit responses to last year's recommendations that were integrated into the presentations, and have the following updates and recommendations for the coming year:

- *We thank the operations team for providing metrics on the impact of the Ambassadors program and encourage continuing to track metrics on expanding the user base, including statistics about the number and success rate of new PIs and whether or not they re-propose in subsequent years.*
- *The UC is aware of the approaching end-of-life of the ACA correlator and concurs with the urgency of migrating the ACA to the baseline correlator to avoid gaps in operations.*
- *The UC appreciates the efforts towards joint proposals with other facilities, and the strong response to this year's opportunities for joint proposals with JWST, VLT, and the VLA. We encourage the observatory to continue in this direction, including prioritizing wavelengths with a risk of facilities aging out in the near future (e.g., Chandra, XMM). We encourage the observatory staff to clarify issues around how joint proposals will be de-conflicted when one observatory's proposal deadline falls before allocations have been announced for another observatory.*
- *The UC continues to support efforts toward multi-cycle proposals to help enable time-domain science.*

ALMA Development

The Users Committee continues to be impressed and enthusiastic to hear about ALMA development and the Wideband Sensitivity Upgrade (WSU). We commend the staff for continuing to present information to the community about the technical aspects of the WSU, along with the illuminating, concrete examples of scientific benefits (particularly in the arXiv posting from last fall). The community looks forward to hearing more about risks, timelines, and progress as the project continues to develop over the coming year. The UC reminds the staff that *a solicitation to the community to help NRAO justify science drivers for meeting the WSU stretch goals would be welcome, if such opportunities arise.*

GBO Operations and Development

Significant progress was reported on various fronts at the Green Bank Observatory (GBO) by the two presentations to the UC. We summarize our response to the two separate reports, and other user comments in this single section.

The UC commends GBO for their quick action on the wheel and track maintenance that was necessary in short order this year. While current work on the GBT will continue over the summer with over \$5M support from the NSF so far, in the long-term, there is a concern that significantly more funds are required for painting and other maintenance over the next 6-8 yr.

The completion of the Data Center with 3 PB of space currently and room for up to 100 PB is a major development. Access of data products through the NRAO archive is now well underway with the RAMPS data already available. The UC looks forward to seeing further data sets becoming available in the coming year. *More specificity on which surveys are being added to the archive next, and the anticipated timescales would be appreciated.* Pulsar search mode data (not raw voltages) will also be included in the archive which is highly valuable. It has been suggested *more pulsar astronomers can be involved in the design of the data archiving system to maximize usefulness of the resources.* For data reduction, it was also encouraging to learn about the forthcoming migration from GBTIDL to the Python based Dysh package.

Among the new capabilities for GBT observing, the ultra-wide band (UWB) receiver which is now being commissioned will be in high demand from the low-frequency user community and the UC commends the GBO for bringing this important project to completion. The X-band receiver is also in its final stages of commissioning.

With the CHIME outrigger coming online this summer, *the UC recommends effort be put into growing more observatory staff participation with this project.* Is it possible, for example, for GBO to host a postdoc with some fraction of their time devoted to CHIME activities? Having this

connection could lead to further collaborations between CHIME and the broader GBO community which the UC believe would be a good thing.

The UC was excited to hear about the joint call for GBO/NICER proposals, as well as some progress with operator-driven observations. The user surveys and AAS special session this past year were also very positive developments.

In terms of future instruments on the GBT, ALPACA seems to be among the highest priority from the users, but there was also support for Mustang-3, Argus144, KPAF, and ngRADAR. The UC *encourages NRAO/GBO to make decisions in the coming year about which of these systems they aim to support.* The UC recommends that GBO *work with the community in this regard and, if there is demand, facilitate observing collaborations for large programs.* For example, if ALPACA goes forward, this will require a coordinated approach from a variety of user bases in order for it to be successful. This approach worked well for the ALFA instrument at Arecibo, and is currently being used to carry out commensal L-band surveys with FAST (the CRAFTS collaboration). The Science Advisory Council mentioned by GBO management in their ongoing discussions about ALPACA could be very useful in this regard.

The UC wants to underscore the following recommendations based on questions/comments it has received from the community over the past year:

- *We strongly recommend GBO/NRAO should post clear policies for purchasing GBO time on their website.*
- *The pulsar community remains concerned that follow-up observations for the timing of newly discovered pulsars is challenging to obtain and in particular many GBT discoveries are currently hard to follow-up. We recommend GBO explore collaborations with other facilities e.g. CHIME to share the workload on pulsar follow up.*
- *We recommend that more transparency in management decisions needs to be present for the cyclic spectroscopy backend. The community was only informally aware, for example, that the decision to forego real-time processing had been made.*

VLA/VLBA Operations

The committee commends both the VLA and VLBA for continued strong performance and smooth operations over the past year. In addition to the impressive science highlights from the different facilities, the committee was particularly pleased to see development and support of the commensal observing initiatives (VLITE, eLWA, COSMIC, realfast). The VLBA has shown excellent resiliency through several challenges, most notably the Contreras fire.

The community engagement activities that are run primarily through the VLA have also been strong with a series of excellent meetings and activities hosted throughout the year. The UC commends the VLA for active engagement efforts surrounding the Albuquerque AAS. While we

share concerns when the attendance at some of these activities has been lower than hoped, we strongly support and encourage continued community engagement. In particular, we welcome more creative efforts to make the Data Reduction workshop broadly accessible and engaged with early career scientists. Fostering connections between these junior community members and NRAO staff is a vital investment in the future of radio astronomy. The committee noted that coordinating with the university community academic schedule and potentially offering travel support could help with attendance.

The UC strongly commends both facilities for active monitoring of infrastructure and preventative maintenance. Since the timeline for the ngVLA remains uncertain, both facilities should continue an active maintenance and inspection regimen to ensure continuous operations of the infrastructure up through the ngVLA. This implies at least a 10 year horizon.

The committee supports the VLBA exploring user contributed hardware and creative use of antennas that are not participating in array observations. User contributed hardware seems like it can offer novel new capabilities and the committee looks forward to an update on the policy development, provided there is a concrete desire from external user groups to contribute hardware. The committee would specifically like to understand anticipated funding sources for this hardware and whether it would affect the amount of time available through the time allocation process.

The committee is excited about the possibilities of real time correlation but notes that the current limited bandwidth only enables some science cases. Expanding bandwidth will broaden the science utility and the VLBA should continue this initiative. While narrow bandwidth science (e.g., masers) does not necessarily benefit from the real time correlation, the observatory may want to seek science cases from this community as pilot users. Offering this capability through the high-commitment Resident Shared Risk Observing (RSRO) program may discourage pilot users.

The committee strongly supports more CASA documentation on using the VLBA and encourages continued creation of these resources.

Summary of recommendations:

- *The committee remains supportive of in person contact between NRAO staff and student trainees and encourages continued initiatives to maximize continued training and in-person attendance at sponsored events (e.g., the data reduction workshops).*
- *The committee strongly endorses a continued, proactive inspection and preventative maintenance regimen for both VLA and VLBA antennas. Users would benefit if the facilities could plan on >10 years of remaining service lifetime to ensure continuous operations up to the transition to the ngVLA.*
- *We recommend continued exploration of uses for VLBA antennas when they are not able to participate in combined array observations and developing a clear policy for user-contributed instrumentation.*

- *The committee endorses continued expansion of real-time correlation capabilities. The observatory should consider contacting the community of maser experts to encourage pilot users during the time when bandwidth is being expanded.*

Data Management and SRDP

The committee is pleased to learn of progress in automating self-calibration, testing distributed processing, and improving the data archive. These are important steps towards supporting users of the upgraded ALMA and (in the future) ngVLA. Providing calibrated VLA data across all bands, deploying the GREAT web interface for RFI monitoring, and covering more use cases for ALMA re-imaging should continue to be high priorities. Algorithm improvements such as adaptive scale pixel CLEAN and dynamic visibility weighting also look promising, although it would be useful to publicize quantitative metrics of the improvements they provide.

The committee makes the following recommendations:

1. For most ALMA users, the JAO website is the main gateway for obtaining data, and a widespread awareness of the AUDI system remains lacking. Moreover, AUDI has only a cursory web presence; a web page showcasing its functionality without needing to access specific data sets can help reinforce email and newsletter announcements. *The UC recommends that the availability of AUDI and other NRAO-generated data products be made apparent following ALMA archive search queries.* This may require coordination with the ALMA organization to decide what capabilities will be mirrored vs. portal specific. Ideally all of NRAO's ALMA services will be one click away from *almascience.nrao.edu*, since most users do not expect this site to be somehow separate from NRAO's website.
2. The committee appreciates that NRAO has been seeking feedback on the Archive Access Tool but nonetheless *reiterates its desire for a more intuitive process by which target-specific queries can proceed.* As an example, entering '30 Doradus' under the Source Name produces mostly incorrect results (probably matching any source with '30' in the name); instead one needs to click on the "Resolver" link near "Right Ascension" and enter '30 Doradus' in the pop-up field. One suggestion would be to have the Resolver called by default when a Source Name is entered, unless a "match on project source name" check box is ticked.
3. The committee recommends further efforts be made to *extend the automation of data quality assessment (QA)* to reduce the fraction of data sets requiring manual review and to prepare for a future of high data rates, growing demand for rapid response observations, and worsening RFI.
4. The committee sees the *potential for significant improvements to the SRDP web pages*, which are largely made up of bullet points aimed at a technical audience. In addition, because information is quickly outdated, *showing last modification dates* can help visitors to assess whether information is likely to be obsolete.

VCLASS Status

The VLA Sky Survey is a major NRAO legacy-oriented effort. Past reports by the committee have been positive on the science potential and ambition of the survey, but critical of its slow pacing in regards to the release of data products, including quicklook products. In this context, the committee was pleased to see the significant progress made over the past year in spite of continued staffing challenges. The CIRADA website appears to be a viable, functional interface for community access to quick look data products; science exploitation of the survey is growing and seems to cover a wide range of science topics.

The committee remains somewhat concerned about the long timeline for producing “final” data products from the survey (currently stretching into FY30 for single epochs and FY33 for cumulative products), and while recognizing the computational and personnel limitations of a faster timeline, continues to encourage the observatory to explore avenues for accelerating the rollout where possible to avoid potential scientific obsolescence of the data products in the interim. This could include further automation of the data quality checking and/or continued efforts to recruit and retain technical staff involved in the effort.

With the third epoch now in progress and the ngVLA transition several years away, NRAO is understandably thinking forward to an extension of the survey to a fourth epoch. While cautiously supportive of this possibility, *the committee strongly recommends that the observatory seek broad community input before making a formal decision on the go-ahead and nature of a VCLASS extension (frequency, timing, depth, Galactic/extragalactic balance, etc.).*

Additionally, the committee recommends that NRAO take more steps to simplify community access to the quick look data products. Given several committee members had challenges finding the CIRADA tools from the website, redesigning the Quicklook image pages and the survey front page to make data access more prominent may help. Linking to the current CIRADA catalogs in more locations will facilitate discovery.

Proposal/Observing/Data Reduction Software

The committee has the following commendations:

1. Overall, the committee continues to agree that design and implementation of the Telescope Time Allocation (TTA) tools remains the priority, despite the delays.
2. The committee is very happy to see real support for Apple (Mac) users, both in Operating System (OS) compatibility and also from a hardware (Apple Silicon

Processors) standpoint: this is critical for our community.

3. The committee is exceptionally pleased to see the ramping up of design efforts for Dysh, the Python replacement for GBTIDL.
4. The committee was very happy to hear of the success of the recent software trainee pilot program and hopes this effort continues.

The committee has the following recommendations:

1. The committee recognizes that there are hidden difficulties in implementing dual anonymous peer review in the current system. The committee wishes to continue to make NRAO aware that the *implementation of dual anonymous peer review as soon as possible is a desire of the community, even if this requires some level of manual intervention.*
2. The committee recognizes that the TTA tools development process has been encountering delays and the committee commends the DMS team for their acknowledgement of these issues and commitment to overcome them. The committee also wishes to highlight that while this is not yet a catastrophic problem, there has been a pattern of delays presented at the last several UC meetings, and recommends that *NRAO dedicate sufficient resources to identify and overcome the roadblock(s) in the short to mid-term.*
3. Given the delays to the TTA tools, and the apparent difficulties with implementing dual-anonymous peer-review as above, the committee *recommends a high level of community engagement moving forward.* This includes specifically working with the wider community to alpha and beta test the software, solicit feedback on pain points in the current system for users and opportunities to alleviate those using TTA tools.
4. The committee suggests that NRAO/GBO *explore expansions of automated or semi-automated calibrator-recommendation tools that exist or are being developed for the VLA to GBT observations.* This would be particularly useful for observers with triggered observations or other observations where the observing time or sky location is not known *a priori*, necessitating a (sometimes painful) calibrator selection process on short timescales. Specifically, given a center frequency for an observation and the location of the science target, the system should recommend appropriate calibrators considering factors such as brightness, long-term stability, slew time, elevation difference, and so forth.
5. The committee *continues to recommend “undo” functionality* be developed as a core component and capability of all current and future tools developed by NRAO.

The committee was asked specifically to comment on the possibility of merging and/or re-organizing the CASA Users Committee (CUC) to be a sub-committee (or other associated unit) of the Users Committee. The Committee strongly supports this proposal in principle, with details to be worked out in close consultation with the existing CUC. The UC expects it might take a few cycles to settle all details, so we encourage NRAO to be flexible and amenable to updates and changes going forward. In the near-term, we suggest the following:

1. The new sub-team, tentatively named here the “DMS Users Group” (DUG), will consist of stakeholders from each area of DMS responsibility, including CASA, TTA Tools, SRDP, Observing Tools, and Data Reduction Software.
2. The DUG should have at least two but not more than four members from the larger Users Committee, whose responsibility will be to report back to the larger UC.
3. The DUG should meet with DMS representatives for a one to two day, intense, and detail-oriented feedback and discussion meeting *no more than three months* prior to the UC meeting.
4. If this is to be done imminently (for the 2023-2024 “season”), the UC recommends that new members of the UC that would ordinarily be recruited to replace those rotating off be recruited specifically to fulfill these overlap roles. Some continuity with the current CUC seems advisable. The UC does not recommend expanding the total number of UC members as part of this process.

ngVLA

The committee congratulates the ngVLA team on the successful antenna Preliminary Design Review and beginning of construction of the prototype. We look forward to the prototype’s construction and testing with VLA antennas as key milestones for the project. We continue to appreciate the efforts in community engagement - including in person and virtual meetings before, through, and after the pandemic. We are happy to see the international engagement and plans for contributions from various international organizations. The team’s focus on identifying broader impact and participation is commendable. We encourage the project to continue to engage the broader radio community.

The committee has the following recommendations:

- We note that the “thermal imaging on milliarcsecond scales” tagline is not inclusive of all ngVLA science. *We recommend a new tagline be considered, as the current one may slow growth of interest in the non-thermal science community.*
- *We recommend that the project continue to be open to new science use cases.*
- *We encourage the ngVLA to ensure that the antenna sites are engaged with their local communities including universities and colleges.*

Proposal Outcomes and Statistics

The proposal review system for ALMA significantly changed from Cycle 8 (2021). A shift was made from panel reviews to distributed peer review (DPR) and from sending only a consensus report and a final quartile grade to sharing comments and rankings out of 10 from all individual reviewers. Following this, **DPR has become the biggest concern many members of the UC hear about with regard to NRAO proposals from the broader user community.** Concerns that have been shared with the UC tend to be about poor reviews with conflicting or incorrect feedback, lack of ‘visible’ actions for poor reviewers, and mostly just the confidence in the process. Not all UC members share these views, but many of us have heard them frequently. During the meeting we appreciated being able to spend a significant amount of time on discussion of various concerns about this shift in the way ALMA proposals are assessed. We commend the ALMA staff for the significant work done on understanding the impact of this shift, and recognize the unfortunate coincidence that the introduction in DPR happened at the same time as an increase in oversubscription rates. *We recommend as much messaging as possible about efforts underway to mitigate concerns about DPR* (e.g. efforts to support better reviews for smaller science fields). Even among the UC we found it hard to come to consensus about the level of dislike in the community, and what exactly is the root cause of the problem.

Specific suggestions from the UC include:

- *Continued attention to surveys of users to assess the level of unhappiness with the process across all users (those who got time and those who didn't).*
- *Requiring reviewers to engage in Phase 2, at least at the level of assessing if the other peer reviews are reasonable.*
- *Consider some kind of minor recognition of exceptional reviewers (i.e. ones who get a lot of “helpful” responses from PIs, including PIs who didn't get time).*
- *Consider removing or coarsening the rankings of reviewers or replacing them with a suitable alternative (e.g. quartiles) in dissemination emails. Some UC members were strongly in favor of this idea, others strongly disagreed.*
- *Considering more formal reviewer training requirements for proposers, similar to the advice former review panels got to emphasize both strengths and weaknesses and respond in a professional manner (e.g.) reviewing the proposal not the proposer.*

We appreciate the efforts on tracking gender bias in the non-anonymous reviews currently submitted for each proposal call. We support the removal of socially engineered genders, and we are glad to hear this work will be published. It is disappointing that only 1% of PIs updated their info by 2022, so the sample is smaller than it could be. *NRAO could consider making this a required step to at least acknowledge (even with an option to decline to update info) before proposal submission.*

We reiterate that gender is not the only possible bias introduced by non-anonymous reviews. In fact, gender parity is on track to be the new normal, but there are still strong systematic biases for first time proposers and scientists from smaller, less privileged institutions, and URM and/or

BIPOC scientists. The user community continues to believe dual-anonymous is important, which is reflected in the consistent recommendations in the UC reports of the last few years. *The UC understands most of this will be addressed in the new TTA tools, however, strongly encourages NRAO to consider other means to distribute anonymous proposals to the SRPs and TAC.*

It was encouraging to see reports that gender parity has been reached in the makeup of time allocation committee (TAC) and scientific review panels (SRP), and we appreciate the recognition that due to imbalance in the user community this actually means women are over-represented in these service roles. *We request that future reports compare the gender balance of TAC and SRP with the gender balance of proposers/observers as much as possible.*

We appreciated the introduction of more options for joint proposals, and the discussion we were able to have about how joint proposals are dealt with in practice, with technical review from both observatories. *The UC continues to be supportive and excited for options of joint proposals, and encourages monitoring of the outcomes to assess how time obtained on NRAO facilities via other observatory TACs is used scientifically. Additionally, we strongly encourage consideration for more joint proposals at other facilities, namely capabilities offered by aging facilities (e.g. Chandra).*

Recommendations:

- *Continue to monitor and improve Distributed Peer Review challenges and mitigate community concerns. Suggestions for consideration include: requiring Phase 2 reviewer assessments of other reviews, awarding exceptional reviewers, removing the rankings of reviewers, formal reviewer training.*
- *We appreciate new efforts for tracking gender bias, and encourage tracking of other systematic biases for all proposals.*
- *Dual Anonymous Peer Review is widely accepted and appreciated for users and the UC strongly encourages consideration for implementation of this for all proposals, even prior to the release of the new TTA tools.*

Spectrum Management

The UC commends NRAO for their multifaceted approach to spectrum management and RFI mitigation. Noted highlights include the Advanced Spectrum Monitor (ASM) development, ongoing coordinated GBT-SpaceX testing, and educational efforts via the [Superknova](#) initiative. NRAO also presented some of their current challenges in this area, including management of public safety concerns in the NRQZ and the myriad of ongoing regulatory proceedings regarding satellite transmissions.

The UC has the following recommendations or comments:

- *To engage the community in RFI mitigation efforts, we encourage NRAO to form an external working group and/or facilitate a community workshop on RFI mitigation.*

- *We suggest an increase in the availability of training for observers on how to identify and report RFI if they find it in their data in protected regions of the spectrum (or when observing in the NRQZ). It was noted that existing CASA or other software flagging routines could be used to check if detected RFI is in a protected band.*
- *While we recognize that policy change is slow and are encouraged by current collaboration with SpaceX, the UC raised the concern that long term agreement with satellite constellation operators is a potential issue without regulatory measures and encourages continued support for NRAO staff to engage with regulatory processes.*
- *We also encourage NRAO to recognize spectrum management efforts among staff outside of the formal spectrum management group to increase involvement in and understanding of this area.*

ALMA Time Domain Astronomy

At the request of the UC, who recognise the growing field of time domain astronomy, ALMA staff presented some highlights from ALMA's time domain work. The presentation showcased what the current capabilities are, alongside the operational challenges that are imposed by rapid turnaround work, particularly at the highest frequencies. The effort to allow raw data releases was greatly appreciated.

The committee found some of the replies to last year's comments about time domain work failed to address key issues. For example, the Rubin AGN conference does not address the recommendation of seeking advice about ALMA time domain science from a broad cross-section of the community. ALMA does not seem well-poised to deal with the likely increased rate of millimeter-selected transients that will come from CMB surveys, nor the follow-ups of Rubin-selected transients that will start soon. Both will dramatically expand the number of triggers. The CMB surveys, in particular, will generate large numbers of bright millimeter-transients with poor localizations, which could be well-handled with sub-array observations, but for which full ALMA sensitivity is not needed.

The committee re-emphasizes that *ALMA-NA should conduct a broad based survey of community interests in variable source/time domain science with ALMA. This should happen via some combination of processes like the NRAO Townhall at AAS, or a webform asking for input. Surveys should specifically ask about scientific applications that cannot be done now with ALMA, but that could be done if it could be more flexibly scheduled.*

It was reported that ToO proposals have a higher success rate for ALMA time than non-ToO programs. This settled the concern from the community of time domain astronomy that their proposals are disadvantaged by not having an ALMA proposal category for time-domain science. It could also indicate that many ALMA ToO programs are viewed by reviewers as having high scientific return, and the *committee recommends that this be taken as an impetus for continuing to invest resources in improving capabilities for time domain science, including subarrays and large time domain programs.*

It was noted that it can be difficult to coordinate schedules with other observatories. *The committee recommends that ALMA start this process by working with the external observatories that are easiest for joint scheduling like Swift and NICER and graduate to more challenging cases as experience grows.*

JVLA/VLBA to ngVLA Transition

NRAO reported on the status of the process for the transition from JVLA/VLBA to ngVLA. There is serious consideration being given to a particular array configuration that would be a hybrid of all the current configurations, and hence would not require any antenna moves. Simulations will be done to ensure that there is sensitivity to all angular scales currently covered. No draft plan is currently formalized. There will be a comment period, probably of 90 days, before any plan is finalized.

The committee finds the process currently being followed to be quite sensible and awaits the final recommendations.

The committee is interested in seeing the results of simulations of the F configuration's impact on different classes of science. The committee notes that the current system, with array configuration changes, has some negative impacts on long-term monitoring programs, which the F configuration wouldn't have, so that if the impact on extended object science is manageable, it may make sense for scientific reasons to make the transition before it is strictly necessary.