The ALMA Cycle 8 2021 Proposal Process

On August 6, 2021, the Joint ALMA Observatory (JAO) notified Principal Investigators (PIs) the results of the Cycle 8 2021 Call for Proposals, completing a process that began with the Cycle 8 pre-announcement last December. The proposal review process selected 253 high-priority programs (Grade A + B) that will be added to the observing queue when Cycle 8 observations start on October 1.

The ALMA Cycle 8 proposal call and review process was extraordinary in several aspects.
- Despite the challenging work conditions imposed by the pandemic, the community submitted 1735 proposals that requested over 26,000 hours on the 12-m Array, far exceeding the time requested in previous cycles. With 4300 hours available on the 12-m Array, Cycle 8 was one of the most competitive cycles for ALMA time to date.
- The proposal review process had unprecedented participation by the community. Between the introduction of distributed peer review and the continuation of panel reviews for the larger proposals, over 1000 people participated in the review process to help determine the observing program for Cycle 8.
- For the first time, ALMA required proposals be written in a dual-anonymous fashion, where the identity of the proposal team remains hidden to the reviewers.
- Because of the ongoing travel restrictions imposed by the pandemic, the panel reviews were held virtually.

Any proposal review process relies on the support and commitment of the community. This was especially true in Cycle 8 with distributed peer review and the need for virtual panel meetings. ALMA is indebted to the community for their enthusiasm and support for this new process.

Given the significant changes in the proposal review process implemented for Cycle 8, the JAO is conducting a detailed analysis of the results to identify any potential biases and is carefully considering the feedback from reviewers and PIs. In the coming months, a detailed analysis of the distributed peer review process will be made available. The summary below presents an overview of the review process and its outcomes.

Dual-anonymous proposal review
ALMA monitors the results of each proposal cycle to identify systematics in the proposal rankings. Dual-anonymous proposal review was instituted in Cycle 8 to further reduce biases and make the review process as fair as possible for all users. The vast majority of the community adapted readily to the guidelines and anonymized their proposals successfully. Only nine proposals were deemed to have significantly deviated from the guidelines and were rejected by the JAO. The feedback from reviewers has been overwhelmingly positive, where reviewers thought dual-anonymous made the process fairer and allowed them to focus the review on the science and not the proposal team.

Distributed peer review

Distributed peer review was used in the Cycle 8 main call for proposals requesting less than 25 hours on the 12-m Array or less than 150 hours on the Morita Array (aka. Atacama Compact Array, or ACA) in standalone mode. One thousand sixteen astronomers reviewed a total of 1497 proposals. Most reviewers read either ten proposals (67% of the reviewers) or twenty (23%). The process ran smoothly, and reviewers praised the ease of use of the software tools. Reviewers also provided many valuable suggestions on how to improve the process that will be considered for Cycle 9.

Stage 1 in the distributed peer review process is mandatory, and all but one of the reviewers successfully submitted their Stage 1 ranks and reviews. In the optional Stage 2, reviewers had the opportunity to read the comments from other reviewers and, if needed, revise their ranks and reviews. Five hundred ninety reviewers participated in the Stage 2 process, and 355 reviewers modified their ranks or reviews.

Panel reviews

The ALMA Review Panels (ARPs) met June 21-25 and the ALMA Proposal Review Committee (APRC) met June 29-July 1. The main outcomes of the ARP discussions are a ranked list of the proposals requesting between 25 and 50 hours on the 12-m Array and a down selection of the Large Programs. These Large Programs are then further discussed by the APRC, which consists of the panel chairs and at-large members.

The virtual meetings were held from 11 to 14 UTC each day. The different time zones of the reviewers, from UTC-7h to UTC+9h, meant that some participants started their panel discussions as early as 4 am local time while others ended the discussions as late as 11 pm local time. The reviewers exhibited extraordinary dedication and patience through the daily zoom meetings!
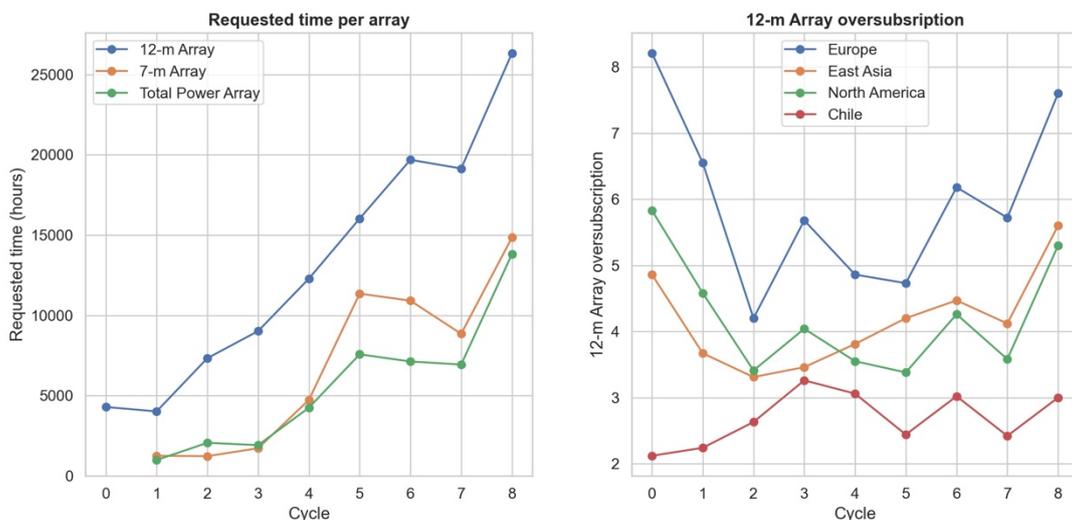

Figure 1: Requested time per array (left panel) and the oversubscription rate by region (right panel) per cycle. The requested time on all arrays increased significantly in Cycle 8, resulting in the highest oversubscription rates since Cycle 0.

Proposal statistics and results

Users submitted 1735 proposals for 26,325 hours of 12-m Array time in Cycle 8. While the number of Cycle 8 proposals is comparable to that in Cycle 7 (1773), the requested time is 37% higher (Figure 1, left panel). As a result, the oversubscription rate in Cycle 8 is the highest for ALMA since Cycle 0 (Figure 1, right panel). Unfortunately, many excellent proposals could not be scheduled because of the high oversubscription. Table 1 and Table 2 present the selection statistics grouped by regional affiliation and scientific category, respectively. Figures 2-4 show the time assigned to the Grade A and B proposals by region, science category, and receiver band. Overall, 15% of the proposals were accepted with priority Grade A or B.

Following advice from several committees, ALMA continues to encourage larger, more ambitious programs. In Cycle 8, the cap in the amount of time allocated to Large Programs (15%) was replaced with a floor (10%) that represents the minimum amount of time prioritized in the queue-building process for proposals requesting more than 25 hours on the 12-m Array. As shown in Figure 5, the community responded enthusiastically to these changes. The number of Large Programs submitted increased to 40 in Cycle 8 from 14 in Cycle 7, and the number of proposals submitted that request between 25 and 50 hours increased to 198 from 97.

Figure 6 shows the percentage of proposals assigned priority grades A or B as a function of the estimated execution time on the 12-m Array. The success rate, including Large Programs, is largely independent of execution time, although the shortest programs (0-5 h) had a lower success rate than 10-40 hours proposals. The following 6 Large Programs are scheduled for Cycle 8 based on the recommendation from the APRC, which represents the largest allocation to Large Programs in a given cycle by both the number of proposals and 12-m Array time.

1. *AGE-PRO: the ALMA survey of Gas Evolution in PROtoplanetary disks* (2021.1.00128.L)
   PI: Ke Zhang (NA); coPIs: Ilaria Pascucci (NA), Paola Pinilla (EU), and Laura Pérez (CL)

2. *ACES: The ALMA CMZ Exploration Survey* (2021.1.00172.L)
   PI: Steven Longmore (EU); co-PIs: Diederik Kruijssen (EU), Jonathan Henshaw (EU), Elisabeth Mills (NA), Paul Ho (EA), Cara Battersby (NA), Izaskun Jimenez-Serra (EU), Adam Ginsburg (NA), and John Bally (NA)

3. *CRISTAL: a survey of gas, dust and stars on kiloparsec scales in star-forming galaxies at z ~ 4-5* (2021.1.00280.L)
   PI: Rodrigo Herrera-Camus (CL); co-PIs: Manuel Aravena (CL), Natascha Forster Schreiber (EU), Ilse De Looze (EU), Justin Spilker (NA), Ken-ichi Tadaki (EA), and Jorge González-López (NA)

4. *Bulge symmetry or not? The hidden dynamics of the Far Side* (2021.1.00869.L)
   PI: Lorant Sjouwerman (NA)

5. *exoALMA* (2021.1.01123.L)
   PI: Richard Teague (NA); coPIs: Myriam Benisty (EU), Stefano Facchini (EU), Misato Fukagawa (EA), and Christophe Pinte (EU)

6. *ALMA JELLY - Survey of Nearby Jellyfish and Ram Pressure Stripped Galaxies* (2021.1.01616.L)
   PI: Pavel Jachym (EU); co-PIs: Ming Sun (NA) and Masafumi Yagi (EA)

Table 1: Summary of submitted and accepted proposals

	Chile (CL)	East Asia (EA)	Europe (EU)	North America (NA)	Open Skies	Total
Submitted Proposals						
Number of proposals	76	389	721	484	65	1735
12-m Array time (hours)	1308	5445	11066	7668	838	26325
7-m Array time (hours)	862	4542	4447	4602	394	14846
Total Power Array time (hours)	420	4537	3918	4822	106	13802
Subscription rate						
12-m Array (4300 h offered)	3.0	5.6	7.6	5.3	N/A	6.1
7-m Array time (3000 h offered)	2.9	6.7	4.4	4.5	N/A	4.9
Total Power Array (3000 h offered)	1.4	6.7	3.9	4.8	N/A	4.6
Grade A & B projects						
Number of proposals	29	67	71	83	3	253
12-m Array time (hours)	383	870	1310	1321	30	3914
7-m Array time (hours)	385	677	518	1002	0	2581
Total Power Array time (hours)	126	486	462	852	0	1927
Grade C projects						
Number of proposals	13	52	94	67	7	233
12-m Array time (hours)	231	658	1047	982	126	3044
7-m Array time (hours)	49	238	494	156	0	936
Total Power Array time (hours)	0	286	0	37	0	323

Regional distribution of all submitted proposals and the proposals recommended for scheduling with grades A and B, and Grade C. Note: subscription rates do not apply for Open Skies since all regions contribute observing time for proposals from PIs who are not affiliated with any of the ALMA regions.

Table 2: Proposals by science category

	Category 1	Category 2	Category 3	Category 4	Category 5	Total
Submitted Proposals						
Number of proposals	434	386	465	320	130	1735
12-m Array time (hours)	8570	5940	5189	5292	1334	26325
7-m Array time (hours)	1272	5931	6037	971	635	14846
Total Power Array time (hours)	304	5058	8155	31	253	13802
Grade A & B projects						
Number of proposals	74	57	66	40	16	253
12-m Array time (hours)	1308	836	829	787	154	3914
7-m Array time (hours)	149	1126	1002	141	162	2581
Total Power Array time (hours)	0	335	1538	0	54	1927
Grade C projects						
Number of proposals	69	55	60	39	10	233
12-m Array time (hours)	1060	788	633	461	101	3044
7-m Array time (hours)	260	350	312	0	15	936
Total Power Array time (hours)	0	149	174	0	0	323

Category 1: Cosmology and the high redshift universe; Category 2: Galaxies and galactic nuclei; Category 3: Interstellar medium, star formation, and astrochemistry; Category 4: Circumstellar disks, exoplanets, and the solar system; Category 5: Stellar evolution and the Sun.
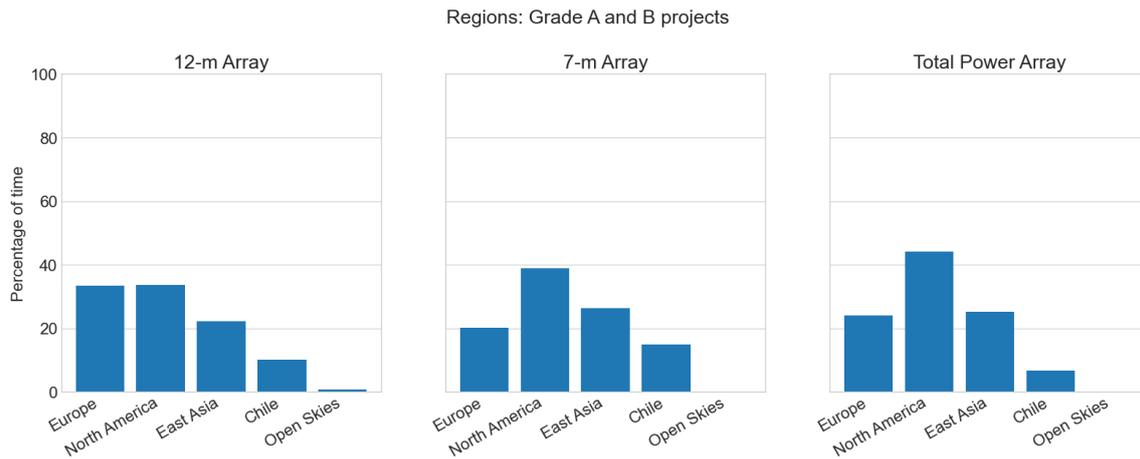
Figure 2: Distribution of execution time for Grade A and B projects by region for the 12-m (left), 7-m (center), and Total Power (right) arrays.
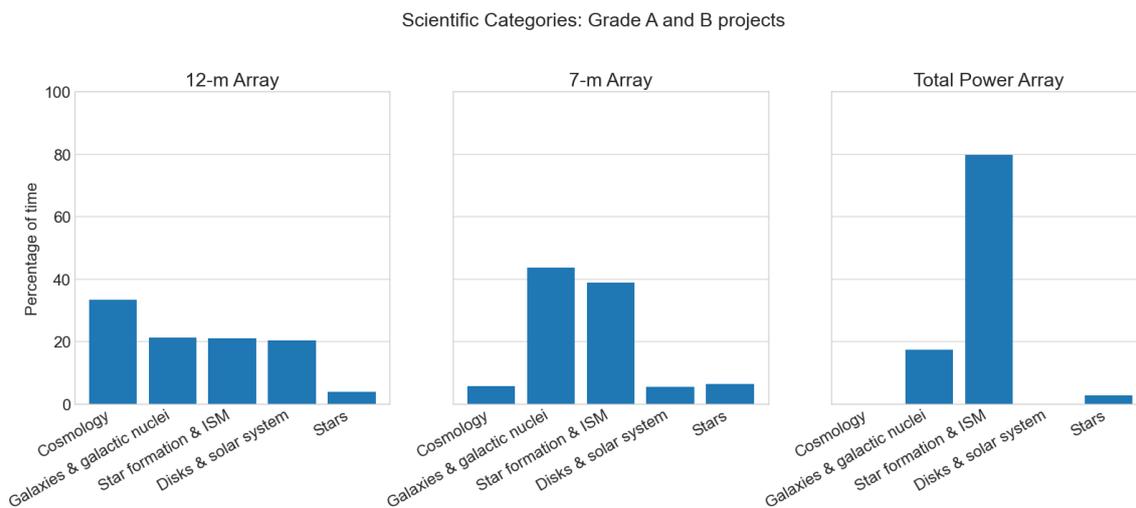

Figure 3: Distribution of execution time for Grade A and B projects by scientific category for the 12-m (left), 7-m (center), and Total Power (right) arrays.
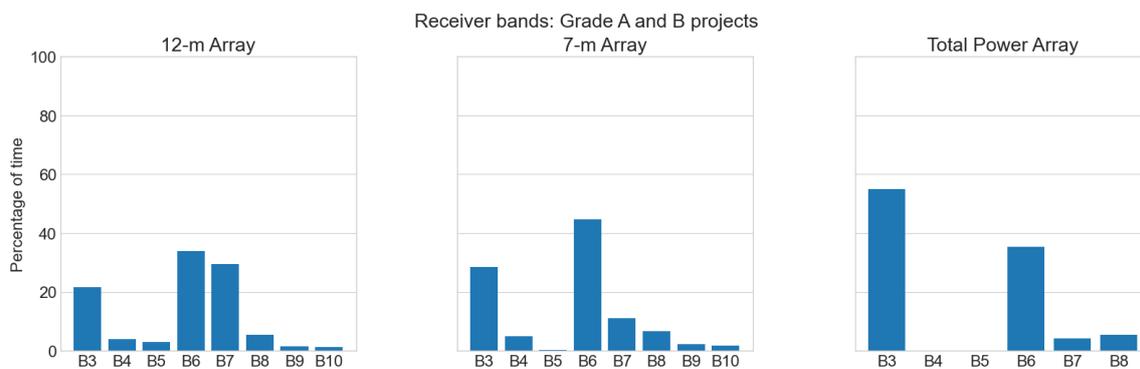

Figure 4: Distribution of execution time for Grade A and B projects by receiver band for the 12-m (left), 7-m (center), and Total Power (right) arrays.
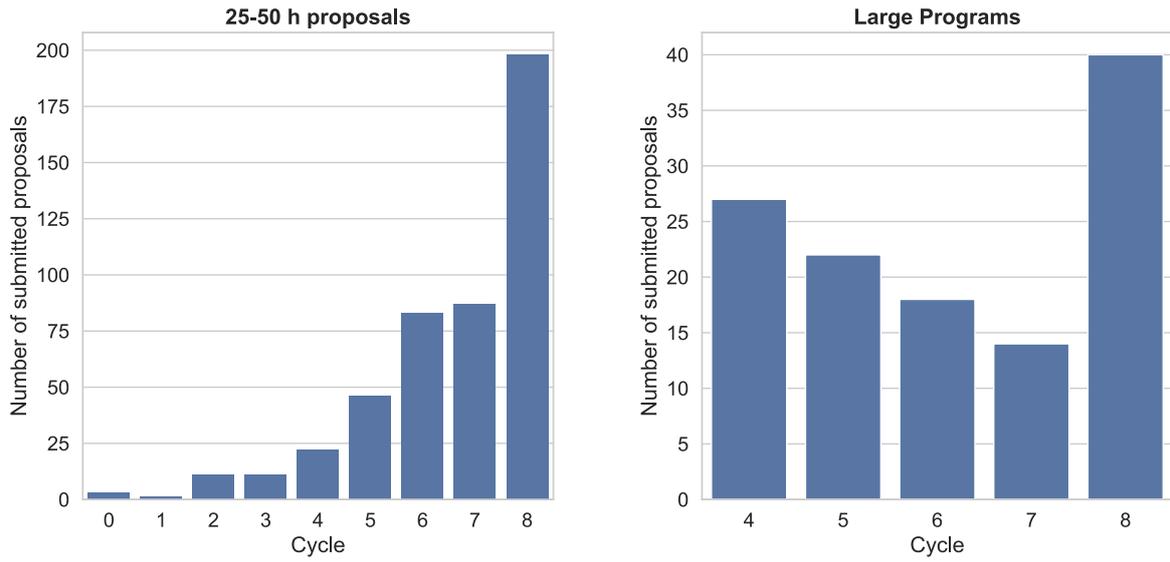
Figure 5: Number of submitted 25-50 hours proposals (left) and Large Programs (right) by cycle.
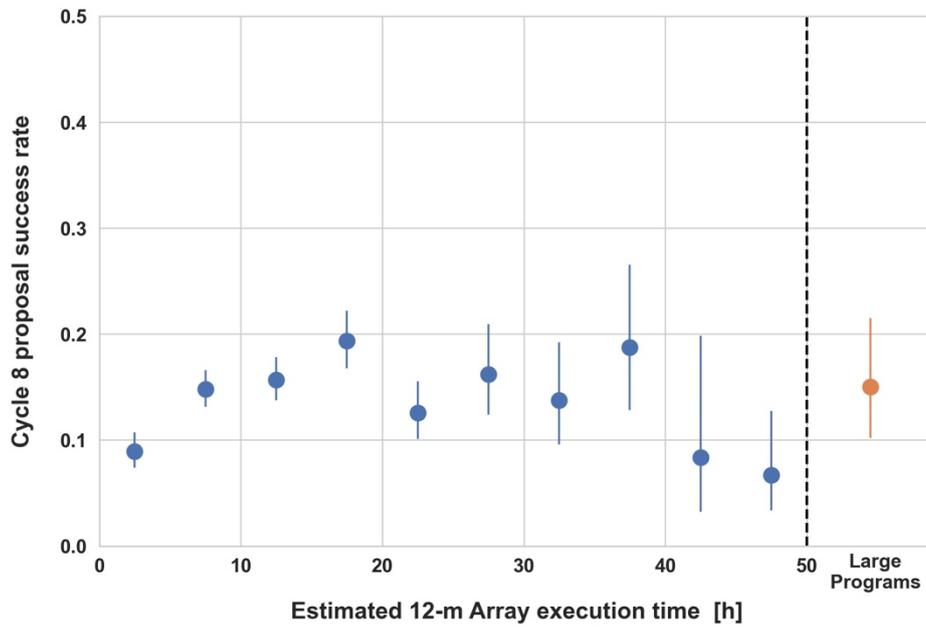
Figure 6: Fraction of submitted proposals assigned Grade A and B as a function of the estimated execution time on the 12-m Array. The error bars are 1 sigma from Poisson statistics.

As ALMA has encouraged and accepted larger programs, the overall number of accepted proposals will decrease naturally given the limited observing time. Figure 7 (left panel) shows the mean and median time requested on the 12-m Array for Grade A+B proposals in each cycle. The typical accepted proposal now needs about 12 hours on the 12-m Array, which is a 49% increase over Cycle 7. As a result of this increase, 234 Grade A+B proposals were accepted in Cycle 8 that require the 12-m Array, compared to 470 such proposals in Cycle 4 (see Figure 7, right panel). Relative to Cycle 7, the number of accepted high priority 12-m Array proposals declined by 35%.
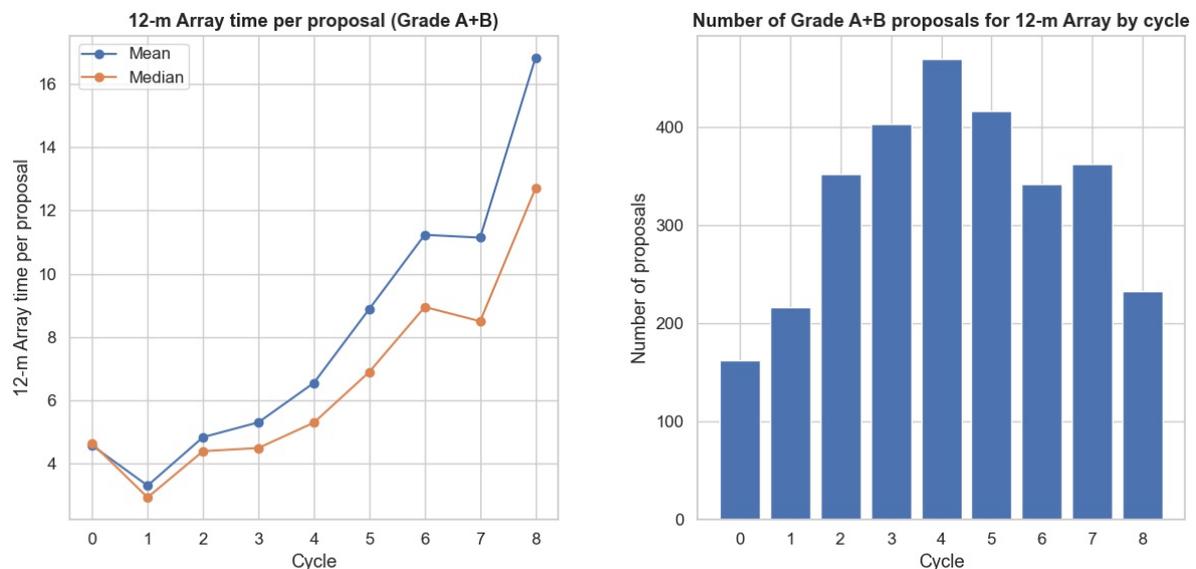
Figure 7: (Left) The requested 12-m Array time per proposal that has been assigned priority Grade A or B. (Right) The number of proposals assigned Grade A + B that request the 12-m Array versus proposal cycle.

Acknowledgements