

The ALMA Cycle 9 Proposal Process

The results of the Cycle 9 Call for Proposals were announced to the community on 26 July 2022. After considering the scientific rankings and operational considerations (e.g., configuration schedule, available time due to weather, regional balance), 286 high priority programs (Grade A+B) were selected. The titles and abstracts of the selected programs are available on the [ALMA Science Portal](#).

In Cycle 9, ALMA implemented distributed peer review for all proposals except Large Programs, which continued to be reviewed by a panel process. ALMA is once again indebted to the community for their participation of the proposal process. Many helpful suggestions on the process were submitted by the reviewers, and a survey of the Cycle 9 Principal Investigators is on-going to obtain their feedback. The Joint ALMA Observatory (JAO) will be conducting a detailed analysis of the Cycle 9 results and the surveys to further improve the review process for Cycle 10.

Distributed peer review

Proposals requesting less than 50 h on the 12-m Array or less than 150 h on the 7-m Array in stand-alone mode were reviewed using distributed peer review. A total of 1729 proposals went through the distributed review process, with 1087 individual reviewers. Most reviewers read either ten proposals (63% of the reviewers) or twenty proposals (24%). Stage 1 in the distributed peer review process is mandatory. In the optional Stage 2, reviewers had the opportunity to read the comments from other reviewers, and if needed, revise their ranks and reviews. A total of 528 reviewers completed the Stage 2 process, of which 323 made modifications to their ranks and/or their reviews. The proposals for three reviewers were cancelled by the JAO: one reviewer did not submit their Stage 1 reviews, and the JAO found that two other reviewers did not complete their reviews in good faith.

Large Programs review

The ALMA Proposal Review Committee (APRC) met June 13-17 to recommend which Large Programs should be scheduled. The virtual meeting was held 11-14 UTC on each day. The different time zones of the APRC members meant that some participants started the discussions as early as 4 am local time while others ended as late as 11 pm local time. We thank the APRC for their dedication and patience through the daily zoom meeting!

For the first time, Large Programs were also reviewed by external Science Assessors, who provided their expert assessment of individual Large Programs to the APRC but did not participate in the APRC meeting. Each external Science Assessor reviewed between 1 and 3 Large Programs in their area of expertise and wrote a scientific assessment for each assigned proposal. These assessments were sent to the APRC, who took this information into account during the discussion of the virtual face-to-face meeting and for the composition of the consensus reports.

Proposal statistics and results

The community submitted a total of 1769 proposals requesting close to 28,000 h of 12-m Array time, with an overall subscription rate on the 12-m Array of 6.5. The number of submitted proposals and the subscription rate in Cycle 9 is slightly higher than that in Cycle 8 (1735, 6.1). As a result, once again 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 1-3 show the time assigned to the Grade A and B proposals by region, science category, and receiver band. Overall, 16% of the proposals were accepted with priority Grade A or B.

Figure 4 shows the percentage of proposals assigned priority grade 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. The following 4 Large Programs are scheduled for Cycle 9 based on the recommendation from the APRC and scheduling considerations.

1. *The ALMA survey to Resolve exoKuiper belt Substructures* (2022.1.00338.L)
PI: Sebastian Marino (EU); coPIs: Meredith Hughes (NA), Luca Matra (EU)
2. *A Spectroscopic survey of biased halos in the Reionization Era (ASPIRE): A Quasar Legacy Redshift Survey* (2022.1.01077.L)
PI: Feige Wang (NA); coPIs: Junyi Yang (NA), Roberto Decarli (EU), Bram Venemans (EU), Xiaohui Fan (NA), Eduardo Bañados (EU)
3. *The ALMA Disk-Exoplanet C/Onnection* (2022.1.00875.L)
PI: Ilse Cleeves (NA); co-PIs: Anna Miotello (EU), Viviana Guzman (CL), Dana Anderson (NA), Yuri Aikawa (EA)
4. *COMPASS: Complex Organic Molecules in Protostars with ALMA Spectral Surveys* (2022.1.00316.L)
PI: Jes Jorgensen (EU); coPIs: Maria Drozdovskaya (EU), Audrey Countens (EU), Adele Plunkett (NA), Jeong-Eun Lee (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	87	401	686	535	61	1769
12-m Array time (hours)	1590	5652	11032	8939	699	27912
7-m Array time (hours)	605	4084	4822	5234	217	14962
Total Power Array time (hours)	637	3980	3869	7582	28	16096
Subscription rate						
12-m Array (4300 h offered)	3.7	5.8	7.6	6.2	N/A	6.5
7-m Array time (3000 h offered)	2	6	4.8	5.2	N/A	5
Total Power Array (3000 h offered)	2.1	5.9	3.8	7.5	N/A	5.4
Grade A & B projects						
Number of proposals	28	58	96	100	3	286
12-m Array time (hours)	461	943	1409	1421	25	4259
7-m Array time (hours)	118	652	830	988	0	2587
Total Power Array time (hours)	37	573	661	1491	0	2762
Grade C projects						
Number of proposals	15	66	99	79	3	262
12-m Array time (hours)	221	684	1173	1038	19	3136
7-m Array time (hours)	92	688	1283	989	133	3186
Total Power Array time (hours)	60	775	922	1110	0	2867

Regional distribution of all submitted proposals, and of 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	432	396	484	353	104	1769
12-m Array time (hours)	8321	6923	5756	5521	1392	27912
7-m Array time (hours)	2102	6057	5930	640	233	14962
Total Power Array time (hours)	356	7133	8394	34	180	16096
Grade A & B projects						
Number of proposals	71	70	79	54	12	286
12-m Array time (hours)	1230	843	1041	1008	136	4259
7-m Array time (hours)	357	767	1017	447	0	2587
Total Power Array time (hours)	0	813	1947	0	2	2762
Grade C projects						
Number of proposals	61	61	85	46	9	262
12-m Array time (hours)	920	799	821	516	79	3136
7-m Array time (hours)	851	1123	1075	93	44	3186
Total Power Array time (hours)	167	1336	1306	19	39	2867

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.

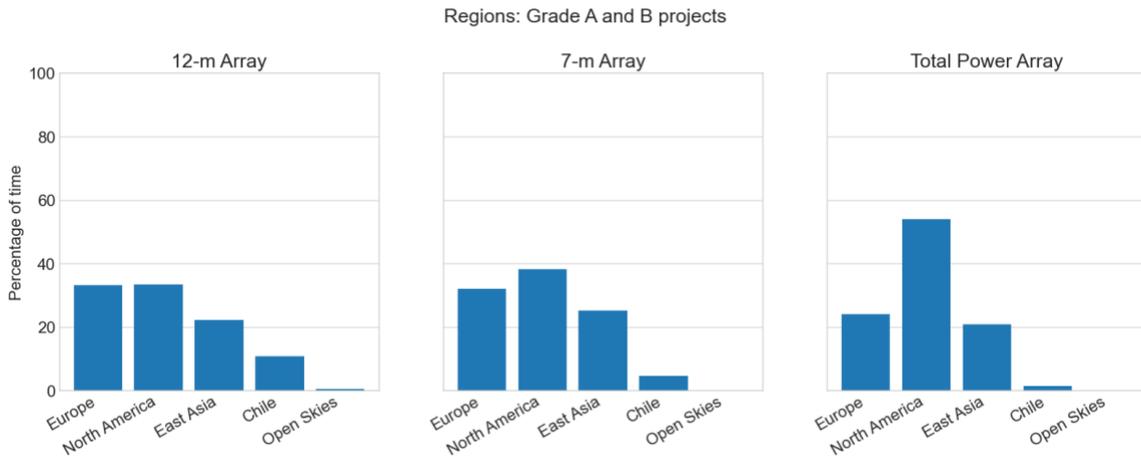


Figure 1: Distribution of execution time for Grade A and B projects by region for the r12-m (left), the 7-m (center), and the Total Power (right) arrays.

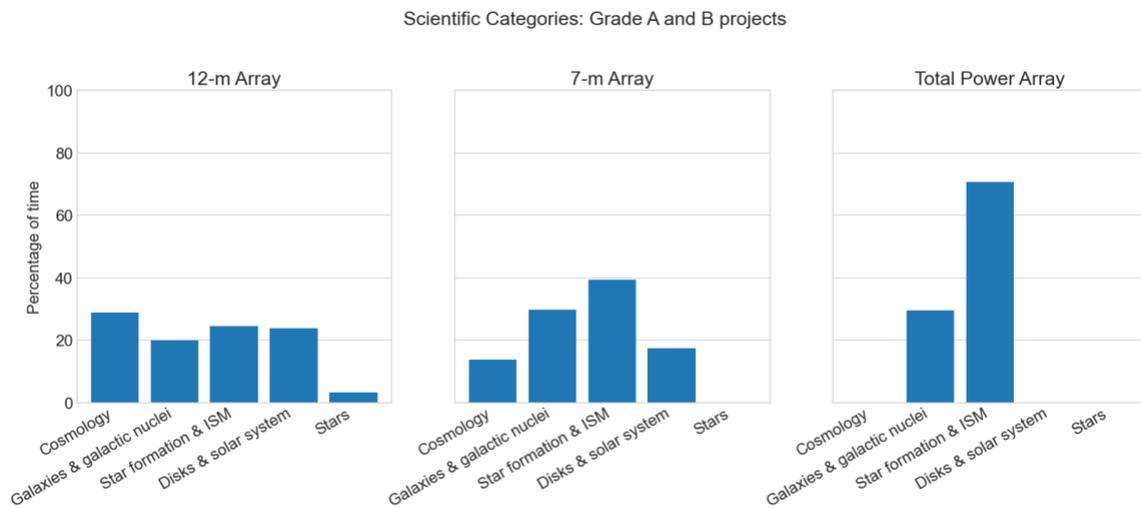


Figure 2: Distribution of execution time for Grade A and B projects by scientific category for the 12-m (left), the 7-m (center) and the Total Power (right) array.

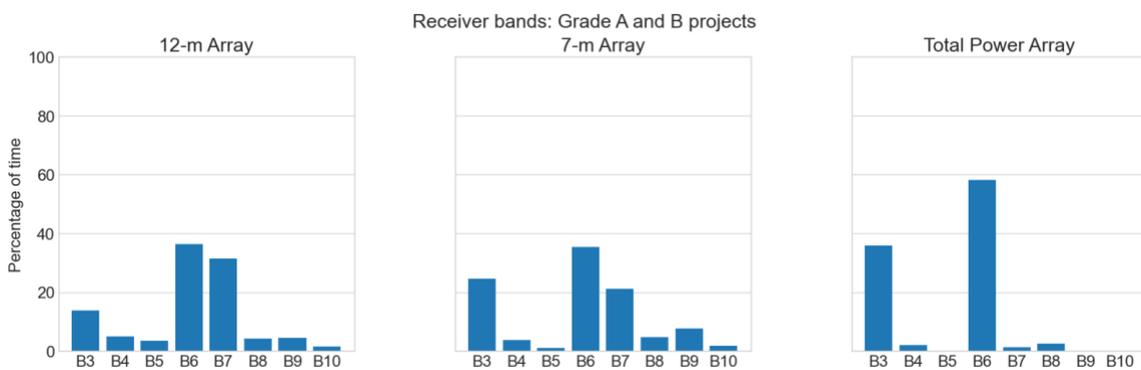


Figure 3: Distribution of execution time for Grade A and B projects by band for the 12-m (left), the 7-m (center) and the Total Power (right) array.

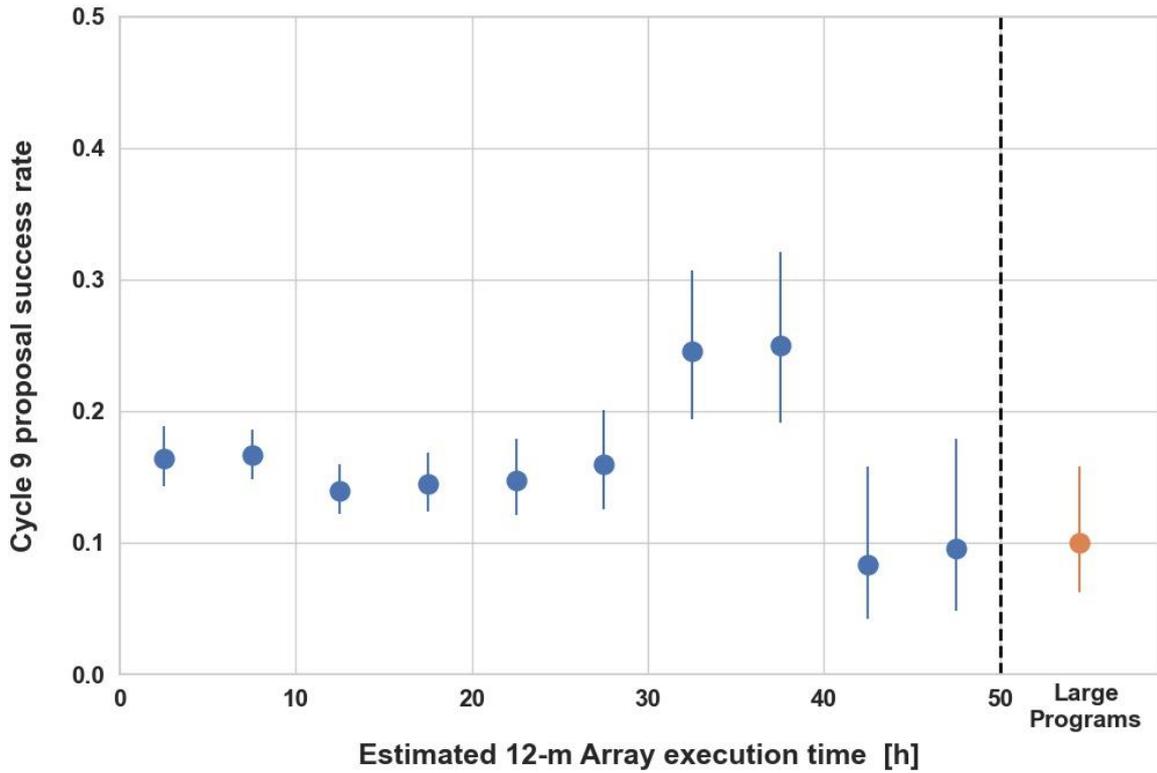


Figure 4: Fraction of proposals assigned Grade A and B as a function of the estimate execution time on the 12-m Array. The error bars are 1 sigma from Poisson statistics.

Figure 5 (left panel) shows the the mean and median time requested on the 12-m Array for Grade A+B proposals in each cycle. We can see that in Cycle 9 the mean and median time requested on the 12-m Array for Grade A+B proposals were slightly smaller than in Cycle 8, but still they were considerable larger than in previous cycles. As a result, the overall number of accepted proposals in Cycle 9 was slightly higher than the number of accepted proposals in Cycle 8 but smaller than in previous cycles (see Figure 5, right panel).

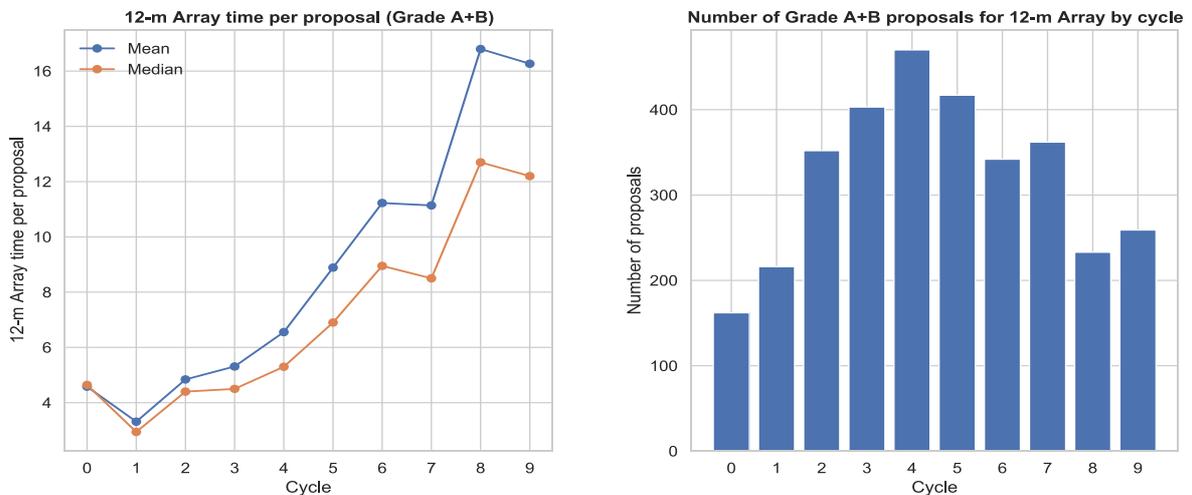


Figure 5: (Left) The requested 12-m Array time per proposal that has been assigned priority Grade A or B. (Right) The number of proposals assigned Grade A + B that requested the 12-m Array versus the proposal cycle.

Acknowledgements

We thank the 18 members of the ALMA Proposal Review Committee (APRC) and the 71 external Science Assessor for their participation in the review process of the Large Programs.

The APRC was chaired by Professor Raffaella Morganti, and included the following panel members:

Sean Andrews	Aya Higuchi	Christophe Pinte
Carlos De Breuck	Sheng-Yuan Liu	Cristina Ramos Almeida
Leen Decin	Elisabeth Mills	Nicolas Tejos
Kevin Flaherty	Ivelina Momcheva	John Tobin
Josep Girart	Kazuyuki Muraoka	Joaquin Vieira
Nanase Harada	Masamune Oguri	

We would also like to thank the over 1000 reviewers who took part of the distributed peer review process, whose participation was essential to the success of the Cycle 9 proposal call.