

Interactions with the ESO Community During and After a Pandemic

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To accomplish its mission, ESO puts significant effort into supporting its scientific community to allow broad access to ESO's telescopes and to exploit its full technical and scientific capabilities. The pandemic-related challenges of the last few years have led to new ways of interacting with and providing support to the European ALMA and La Silla Paranal astronomical communities. Here we present some of the main events that have been organised in the last two years to achieve this goal, what

we have learned, and how we foresee this will impact the future of interactions with the ESO users community.

Science user support

ESO's ground-based observatories located in Chile serve a very diverse astronomical community. The La Silla Paranal Observatory (LPO) offers observations with a variety of telescopes, instruments and observing modes in the optical and infrared, including both Visitor Mode and Service Mode observations. The Atacama Large Millimeter/submillimeter Array (ALMA) allows observations to be carried out with the interferometer in service mode. To maximise the scientific output of these observatories and to make sure that the widest range of scientists can use these facilities, user support throughout the lifetime of a project, from proposal preparation all the way to data reduction and retrieval from the archive, is essential and is consequently a significant part of ESO's activities.

For the LPO the ESO User Support Department (USD) acts as the interface between the observatory and the astronomers in the community. Several ESO staff at the ESO Headquarters support the various instruments at Paranal and collaborate closely with colleagues in Chile. With the same goal, the European ALMA Regional Centre (ARC) is the interface between the ALMA observatory and the European scientific community. Most of the direct user support for ALMA is carried out by seven nodes distributed throughout Europe, under the coordination of the central ARC at ESO in Garching. Together, these eight coordinated entities form the European ARC network (Hatziminaoglou et al., 2015; and see Zwaan et al., 2021 for a description of the ALMA organisational structure).

This level of support relies on a complex machinery that, although appreciated by the community, may be daunting for our users. In a spirit of transparency and availability, we are continuously reaching out to them to present the various tools and services available, and at the same time to provide help with improving the technical side of their proposals, preparing the observations, and reducing the

data obtained with ESO telescopes and from the archive.

In the past, in-person meetings of various forms were regularly organised for the purposes of user support. These included, for example, visits by ESO staff to different Member States or community events (such as European Astronomical Society meetings) or events organised by the ARC nodes and face-to-face support at the nodes. Such meetings typically provided training on how to write proposals and information about the observational capabilities that are available or about to come into operation. Schools and workshops were organised on the Very Large Telescope Interferometer, Paranal instrument-related data reduction, ALMA data handling, and the exploitation of the ESO and ALMA archives. Most of these activities could not be continued during the 2020–2021 peak of the COVID pandemic.

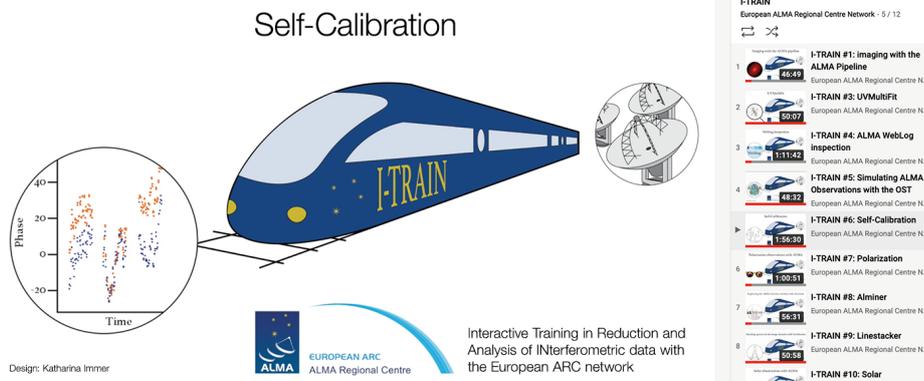
In what follows we describe how the support of the ESO astronomical community has continued despite being impacted by the pandemic.

ALMA community events in the pandemic

In March 2020, in response to the pandemic, the ALMA observatory had to be shut down to guarantee the safety of its staff. In October of that year, the return towards full operations was initiated, science observations eventually resuming in March 2021. To inform the European community on the anticipated timeline of the return to operations, the implications for their science projects, and the possibilities of virtual user support in times of mobile working, the European ARC organised its first European ARC virtual community assembly in October 2020. Informative presentations by staff members from the central ARC at ESO and from the nodes in the European ARC network were followed by a question-and-answer session. This first community assembly was attended by over 150 scientists from the ESO Member States and beyond. The assembly was very much appreciated by the community, and in response the European ARC has since organised assemblies for every (pre-) announcement of a main call for

proposals (five assemblies in total so far). The assemblies included presentations on science operations, the upcoming call for proposals and user support by the network. The last assembly additionally highlighted activities related to ALMA development, with contributions from ESO colleagues based at the Joint ALMA Observatory in Vitacura. Despite the decreasing number of attendees since ALMA resumed operations, these assemblies have become a valuable way to inform the community about ongoing activities and developments, and to engage people in dialogue.

Some of the key activities carried out by the nodes in the European ARC network include providing training in the calibration, imaging, and analysis of ALMA data. The appreciation of such training, and the wish for it to continue, were reflected in community surveys about user experience and in recent interviews with ALMA users as part of the ALMA Redesign the User eXperience project (RedUX; Hatziminaoglou et al., 2022). To continuously provide such training, including during mobile working times, the European ARC network initiated the online Interactive Training in Reduction and Analysis of INterferometric data (I-TRAIN) series¹. The one-hour tutorial sessions cover a wide range of topics of interest to the ALMA user community with the aim of helping users gain expertise in working with interferometric data. Sessions take place once a month via Zoom and consist of an interactive tutorial or presentation usually given by European ARC network staff members followed by a question-and-answer session. Since December 2020 a total of 17 sessions have been organised and have provided training on a myriad of topics, such as the ALMA imaging pipeline, data analysis techniques including self-calibration, stacking and statistical continuum determination, the exploitation of the ALMA science archive, proposal writing, and polarisation and solar observations. Individual sessions have attracted up to 150 live participants from ESO Member States and other communities. All trainings are afterwards stored on the YouTube channel of the European ARC network² (Figure 1), where some of them have attracted over 500 views. The I-TRAIN sessions have proven to be an



effective means of structurally providing easily accessible training on a diverse range of topics to the community, while simultaneously developing an online repository of tutorials.

The nodes in the European ARC network play a key role in the preparations for the yearly ALMA deadline. In pre-pandemic times this usually consisted of in-person workshops at the local nodes, combined with node staff-members traveling to institutes and users seeking support either face-to-face at the nodes or via helpdesk interactions. The pandemic forced the nodes in the network to shift to fully online or hybrid workshops. The nodes within the network adopted a variety of approaches, including multi-day workshops on ALMA in general (Czech and UK node), multiple one-hour online sessions covering various aspects of proposing for ALMA (Nordic node), a (hybrid) proposal-preparation day via Zoom (Dutch node and Italian node) and a set of instructional YouTube videos discussing various aspects of proposing for ALMA combined with a one-hour question-and-answer virtual session (German node and Dutch node).

A key feature of ALMA support is the face-to-face support provided to users by the nodes in the European ARC network. In pre-pandemic times this support was usually in person but had to be moved entirely online. The nodes in the European ARC network quickly adapted by setting up efficient online communication platforms and remote access to the in-house servers for computing assistance. In 2021 at least 120 visits took place. Online visits have become a

Figure 1. Still from the YouTube recording of the I-TRAIN session on self-calibration, also showing the repository of trainings covering a wide range of topics related to interferometric and ALMA data handling.

valuable, time-efficient, and green alternative to providing direct support with the handling and analysis of ALMA (archival) data and proposal preparation. Online face-to-face visits have become a valuable and appreciated alternative to the previous standard of in-person face-to-face visits. Requests for face-to-face visits can be made through the ALMA helpdesk³. Funding opportunities for visits are available through the Opticon Radionet Pilot programme⁴.

To continuously support the European ALMA community the ARC network also organises scientific workshops. These activities continued in online format during the pandemic, for example with ALMA science days organised by the Dutch node Allegro for their community (Figure 2). Most notable was the recent Meeting for ALMA Young Astronomers. This three-day online conference attracted over 200 registered participants and gave early career ALMA users the chance to present their work and interact with each other (Muller et al., 2022).

La Silla Paranal Observatory community events in the pandemic

Following on from the positive experience of the LPO Users Workshop organised in 2018 (Boffin & Rejkuba, 2018), the demand for similar workshops has grown, including specific requests from the Users Committee. At the start of the pandemic, it was decided to organise a

Users Workshop with a new format: fully online, and divided into three events, each one focused on the three phases of the ESO Data Flow System (Hainaut et al., 2018). As the Call for Proposal for P107 was cancelled, the first meeting, a two-day event that took place in September 2020, focused on learning how to use the ESO Science Archive Facility and reduce ESO data. An online 'face-to-face' contact with ESO experts supporting different instruments and developing archive or instrument pipelines was provided according to individual requests. Later, in March 2021, a second online meeting helped users to learn how better to write competitive observing proposals and to use associated Phase 1 tools, such as the Exposure Time Calculator and the new p1 proposal submission tool. Finally, the third event dealt with the observing material preparation (Phase 2) process and the use of the main tools needed to prepare the observing material. This last workshop consisted of a series of talks, hands-on sessions, and 'face-to-face' meetings with ESO support astronomers.

These events took place on the Microsoft Teams platform (Figure 3) and were attended by up to 100 participants from several ESO Member States, and from other communities. The time slots were chosen to alternate between a better participation from either Chile or Australia, and the meetings were recorded, to also serve the whole community in the future. Indeed, most of the presentations and overview talks given by the ESO staff were prepared in a 'tutorial style' and form a valuable set of information composed to guide the general user at the time of proposal writing, or observation preparation or data reduction. These videos are available on YouTube⁵.

A further short event was organised when the Call for Proposal for P110 was released in March 2022. This event, presenting the main news and changes in the latest Call for Proposal, for example the introduction of the Distributed Peer Review procedure, could provide the format for future events of the LPO Users Workshop. Starting from the wealth of material collected from the in-person and online events, the new instances of this programme should focus on the recent news and on new capabilities offered to

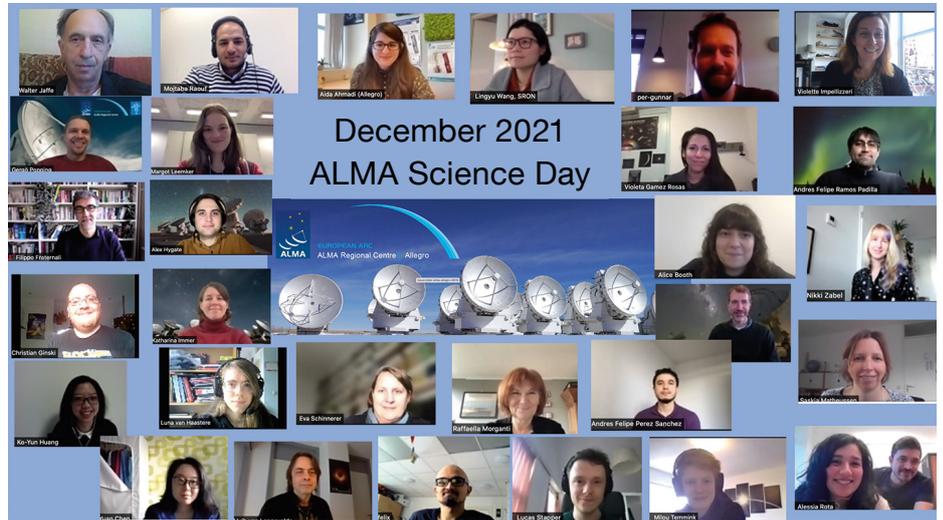


Figure 2. Participant photo from the ALMA Science Day organised by the Dutch European ARC network node Allegro for their community in December 2021.

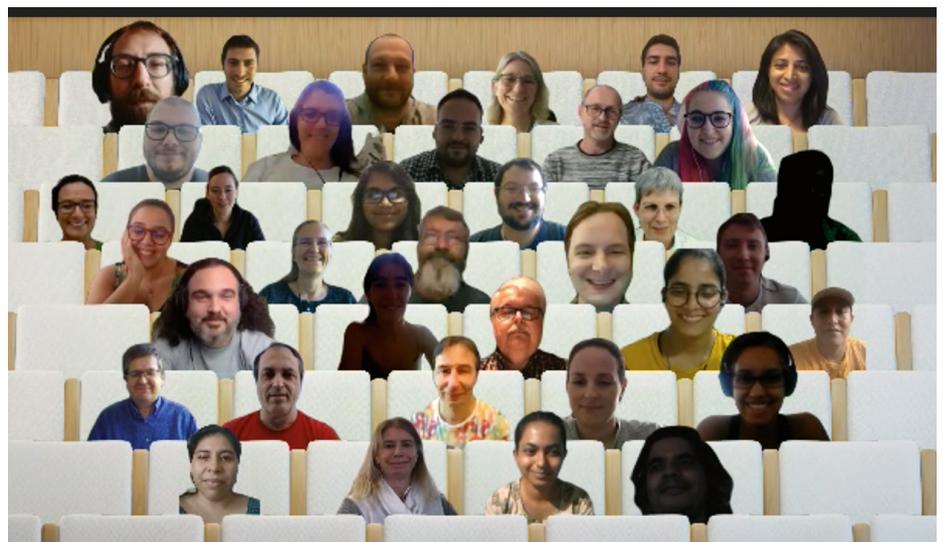


Figure 3. Screenshot from the Microsoft Teams meeting used for the LPO Users Workshop event in September 2020.

the community, allowing one-to-one interactions for specific requests. Individual sessions on specific LPO issues can be arranged; requests should be submitted to the ESO Operations Helpdesk⁶.

Lessons learned and the future of interaction with the ESO community

The events organised by the European ARC Network and the ESO User Support

Department were positively received and well attended, with a hundred or more attendees at several events. The diversity of the attendees, both in age, affiliation (Figure 4) and background, shows that online and hybrid events are very inclusive and appeal to attendees from both inside and outside the ESO Member-State astronomer community.

We are also particularly pleased with the interest towards the videos and presenta-

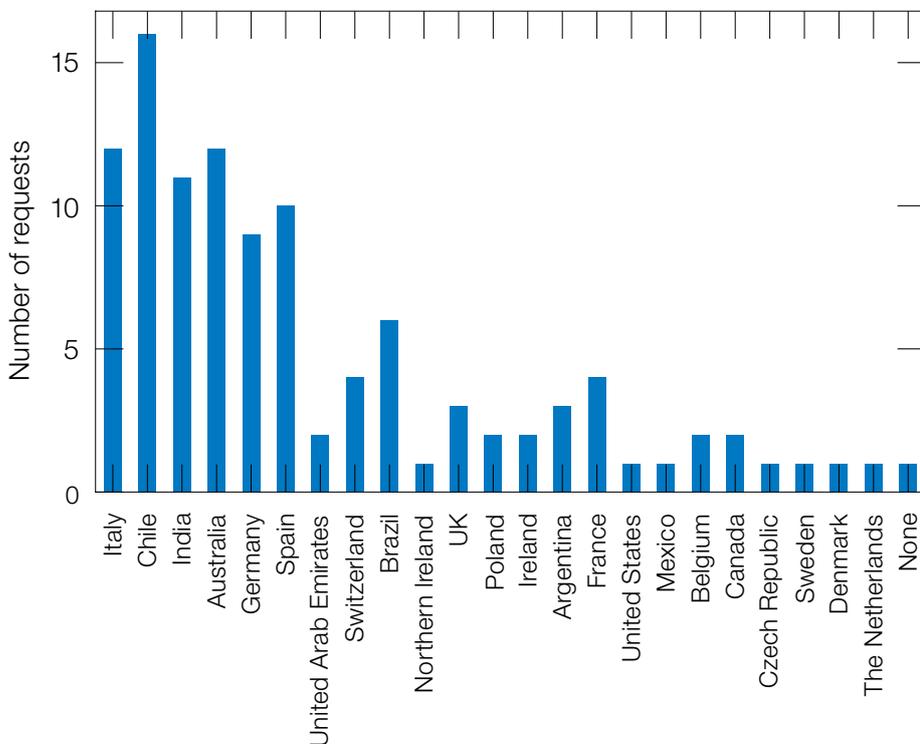


Figure 4. Country of institution for the participants of the LPO Users Workshop event held online in March 2021.

tions collected during these events, that provide a valuable repository of online tutorials on a wide diversity of topics. Videos of the sessions organised by the USD department and the sessions organised as part of I-TRAIN are all available on YouTube^{2,5}. These videos can be used for training at the user's own pace, offering a solid base of material for the community, and can also act as the basis for future interactions. The value of the online repositories is demonstrated by the high number of views, sometimes over 500, for some of the online recordings.

On the other hand, in-person interactions are needed and should be resumed, when possible, to strengthen the connection between the observatory and the community and to provide support at a personal level. Virtual events are appropriate for focused sessions to provide information or discuss specific topics, whereas in-person events are more appropriate for broader training and discussions and building new connections.

The experience gained during the pandemic has provided us a forward look towards user support in the coming

years. With awareness of the carbon footprint of astronomy, and with people increasingly comfortable with attending meetings remotely, this is the right opportunity to reconsider the form in which training is provided to the ESO community. Fully online and hybrid events have the potential to continue to reach new members of the community. On the other hand, online attendance at meetings may not always result in the optimal transfer of knowledge between the observatory and user and vice versa.

A fruitful way forward may be to alternate short online meetings, focused on specific topics and accessible to everyone, with in-person events (recorded for future reference) to engage the community with the broader ESO and ALMA support and training. As many members of the ESO astronomer community use both LPO instruments and ALMA for their science, joint LPO and ALMA community assemblies, trainings and workshops are an exciting prospect to work towards. While starting to plan future events, we hope the community will engage with us to help shape future interactions. Input on topics for the various series and work-

shops discussed herein and suggestions for new events, formats and collaborations are always highly appreciated. These suggestions may be channelled through the ESO and ALMA helpdesks or can be discussed with your local ARC node or local Users Committee member.

The pandemic has brought new perspectives to our lives, including the way we interact with the ESO community. The lessons learned in these years will allow us to better engage the community with new forms of interaction, which could be more flexible and frequent, aiming to combine the best aspects of online and in-person interactions.

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- Muller, S. et al. 2022, *The Messenger*, 187, 36
- Zwaan, M. et al. 2021, *The Messenger*, 184, 16

Links

- ¹ I-TRAIN website: <https://almascience.eso.org/tools/eu-arc-network/i-train>
- ² European ARC network YouTube channel: https://www.youtube.com/channel/UCXsYQxxTSF-o23UP7HU_jYQ
- ³ ALMA helpdesk: <https://help.almascience.org>
- ⁴ Opticon Radionet Pilot: <https://www.orp-h2020.eu/>
- ⁵ LPO Users Workshop videos: https://www.youtube.com/channel/UCiEvZBP_q3X6c30fvcppGA
- ⁶ ESO Operations Helpdesk: <https://support.eso.org>