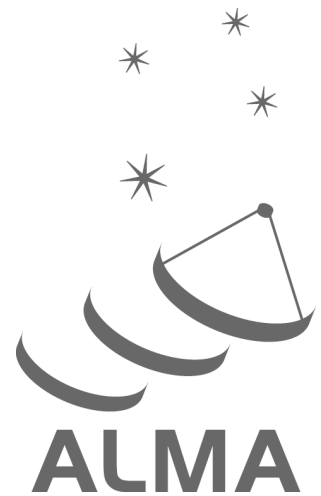


# User's Guide to the East Asian ALMA Regional Centre (EA-ARC, Mitaka)



[www.almascience.org](http://www.almascience.org)

## User Support:

For further information or to comment on this document, please contact your regional Helpdesk through the ALMA User Portal at [www.almascience.org](http://www.almascience.org). Helpdesk tickets will be directed to the appropriate ALMA Regional Center at ESO, NAOJ or NRAO.

## Revision History:

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## Contributors

East Asian ALMA Regional Center



In publications, please refer to this document as:

**User's Guide to the East Asian ALMA Regional Centre (EA ARC)**

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## Scope

This document explains the role, structure, duties and function of the East Asian Alma Regional Center based at NAOJ (National Astronomy Observatory of Japan) Chile Observatory, at the Mitaka Campus in Tokyo, Japan; and based also at the Taiwan node at the AISAA, in Taipei.

## Web Resources

ALMA Science portal;

<http://almascience.nao.ac.jp>

ALMA Helpdesk:

<https://help.almascience.org>

EA-ARC Webpage:

<http://alma.mtk.nao.ac.jp/j/forresearchers/ea-arc/> (Japanese)

<http://alma.mtk.nao.ac.jp/e/forresearchers/ea-arc/> (English)

<http://alma.asiaa.sinica.edu.tw> (Taiwan Node)

EA-ARC Tutorial & workshops information

<http://alma.mtk.nao.ac.jp/e/forresearchers/ea-arc/tutorials/>

Observing Tool (proposal preparation tool)

<http://almascience.nao.ac.jp/call-for-proposals/observing-tool/observing-tool>

CASA (Data reduction)

<http://casa.nrao.edu/>

## 1. ALMA and EA-ARC mission goals

The Atacama Large Millimeter/sub-millimeter Array (ALMA) is expected to be the leading observatory at millimeter and submillimeter wavelengths in the coming decades. ALMA is a global collaboration involving East Asia, Europe, North America and the host country Chile. ALMA will comprise at least 66 high precision antennas equipped with receiver and digital electronics system to observe the 30 GHz to 1 THz frequency range, and with angular resolutions as high as 5 milli-arcseconds. Using a fully dynamic scheduling system and innovative calibration strategies, the ALMA system will allow us to make the best use of the atmospheric conditions on the Chajnantor plateau, at 5000 m altitude in the Atacama desert.

The highest quality science produced with ALMA in the mm/submm band will emerge through competitive access over the widest possible user community. A key requirement for ALMA operations is that comprehensive user support be available to the entire global astronomical community. This effort is coordinated via the ALMA Regional Centers (ARCs), supporting users at each step of the proposal and observation preparation, archiving, distribution, data reduction as well as data analysis. We have created the East Asian ARC (EA ARC), based at the National Astronomical Observatory of Japan (NAOJ) and with the Taiwan EA-ARC node, to help users fully exploit the capabilities of ALMA and maximize ALMA's scientific return. ALMA will appeal to a much broader range of astronomers than the conventional mm/submm community, and ALMA users of all levels and backgrounds are invited to take advantage of the assistance and expertise available at the EA-ARC.

## 2. The East Asian ALMA Regional Center (EA-ARC)

The EA-ARC comprises a core office located at the NAOJ Mitaka campus in Japan, as well as the Taiwan Node, at the Academia Sinica Institute of Astronomy and Astrophysics (ASIAA). Both the Mitaka and Taipei offices are coordinated by close collaboration of their respective managers and user support services are distributed between both the Japan and Taiwan institutes. The Taiwanese ARC office operates in collaboration with both the EA-ARC and NA-ARC.

The organization of the EA-ARC is shown in Figure 1, and is generally comprised of Science Operations and Computing Operations. EA-ARC is coordinated by the EA-ARC and manager from the NAOJ Mitaka campus. This document focuses on the roles provided by the ARC astronomers, in the context of ALMA science and operations support.

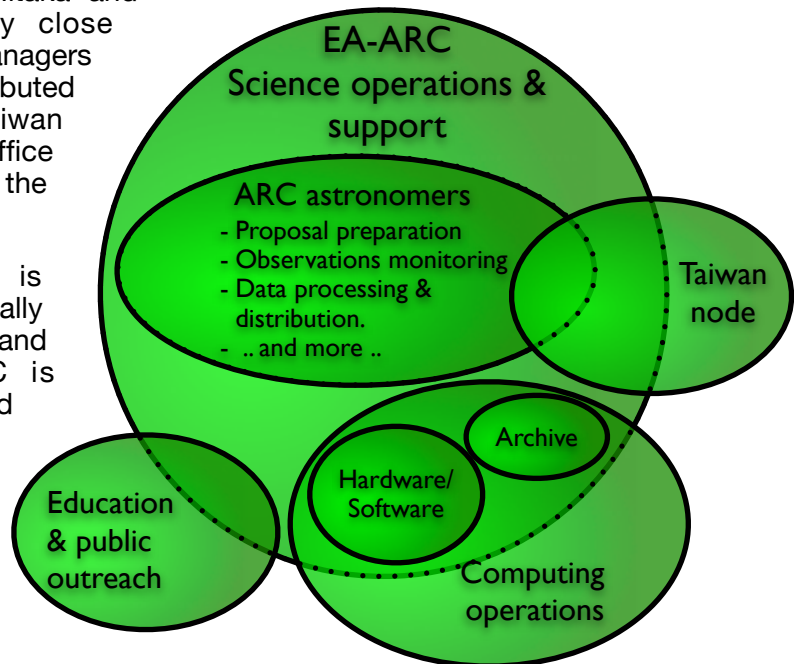


Figure 1: EA-ARC departments and nodes organization

## 2.1. The EA-ARC services.

1. EA-ARC staff roles: EA-ARC staff includes scientific support staff (both NAOJ and ASIAA), computer hardware and software support and archive maintenance, as well as education and outreach staff. The roles of the support staff in proposal preparation, observations preparation etc. are detailed in section 3.1. Information of the EA-ARC staff is maintained at:  
<http://alma.mtk.nao.ac.jp/j/forresearchers/ea-arc/> (Japanese)  
<http://alma.mtk.nao.ac.jp/e/forresearchers/ea-arc/> (English)  
<http://alma.asiaa.sinica.edu.tw> (Taiwan Node)
2. Tutorials and Workshops: The EA-ARC holds ALMA early science workshops, user's meetings, regional 'Town meetings', and provide up to date information in conferences, workshops and astronomical society meetings. At these workshops, information on current and proposed capabilities is discussed, tutorials and hands-on sessions using the Observing Tool and CASA for proposal preparation and data reduction are also run.

A list of tutorial and workshop events is maintained at:

<http://alma.mtk.nao.ac.jp/e/forresearchers/ea-arc/tutorials/> (NAOJ)  
[http://alma.asiaa.sinica.edu.tw/twarc\\_tutorials.php](http://alma.asiaa.sinica.edu.tw/twarc_tutorials.php) (ASIAA)

3. Face-to-face meeting: A small number visitors can be accommodated at NAOJ or at ASIAA, for "Face to face" support and data processing assistance with EA-ARC support staff and some funding is available for travel and accommodation. Requests for Face to face support should be submitted via the helpdesk system described in section 3.4.  
The Mitaka campus hosts a dedicated networked visitor's work room with rapid access to ALMA archives and to ALMA data reduction software support. Working disk space is also provided for raw and processed data, as laptop use may be impractical, considering the ~100 GB sizes of ALMA data files.

## 2.2. EA-ARC scientific staff roles

The EA-ARC (both Mitaka and Taiwan offices) is staffed by a number of active scientists and postdoctorates who together provide support for research scientists, at all stages of proposal preparation as well as data processing. The EA-ARC staff have wide experience in mm/submm astronomy with particular expertise in interferometer mosaicking, combination of interferometric data and single dish data, polarimetry and advanced data analysis. The EA-ARC scientific staff, their research interest and support roles are introduced at:

<http://alma.mtk.nao.ac.jp/e/forresearchers/ea-arc/members.html>. (NAOJ)

Core tasks of the EA-ARC scientific staff are;

- Contribute to the preparation and distribution of the Call for proposals and user documentation.
- Organize training material, tutorials, workshops, user's meetings, and visit institutions.
- Arrange staff and respond to ALMA Helpdesk queries.
- Allocate contact scientists to facilitate interaction of PIs with ALMA (see sec. 3.1)
- Assist Joint ALMA Observatory (JAO) in the Proposal Review Process.
- Originate, verify, correct and describe to PIs, observing scheduling blocks ('Phase 2').
- Allocate Astronomers-on-Duty (AoD) for observations monitoring.
- Undertake data reduction, data quality assurance (QA) and enable distribution of data to PIs.

### 2.3. EA-ARC Contact Scientists

Each successful ALMA observing project will be assigned to an ARC Contact Scientist from amongst the EA-ARC staff. Communication between the Contact Scientist and the PI will be made as far as possible, via the ARC Helpdesk. Contact Scientists will contact users *after* notification of the proposal submission outcome, primarily to discuss and finalize the observing process (called “phase 2”), and will remain through the observations until the end of the quality assurance process and final delivery of the data products to the user.

### 2.4. EA Users: Japan and Taiwan regions.

EA users supported principally by EA-ARC staff are all those carrying out research based in any Japanese or Taiwanese Research Institutions or Universities. However, Taiwan-based can select via the ALMA science portal, that their principal support be based in *either* the East-Asian, or North-American ARCs, to which their observing time will be allocated. Further information about the Taiwan office can be found at: <http://alma.asiaa.sinica.edu.tw>

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## 3. User Communication, Information, news and help

### 3.1. The ALMA Science Portal

The science portal serves as a self-contained information repository for all ALMA-related matters; documentation, guides, and help (and after cycle 2, the means to access both archived and proprietary ALMA data), information on Call for Proposals, proposal preparation information and FAQs (called “knowledgebase”). The science portal also contains links to the Observing Tool software (OT; important for proposal submission), an online Project Tracker, (to be available during Cycle 2) and additional information on post-processing of data.

The access portal is maintained by the Joint ALMA observatory (JAO) and the ARCs. The Science Portal is a “single sign-on system” and a password and user login must be registered before gaining access. The East Asia ALMA science portal website can be found at: <http://almascience.nao.ac.jp/>

Users are encouraged to access the ALMA **helpdesk** to submit any ALMA-related query to EA-ARC staff, via the link on the science portal page (see section 2.3). <https://help.almascience.org/>

### 3.2. East asia ARC and Node information

Regional East asia ARC information page contains similar information to the science portal site, but has a strong emphasis towards regional information: tutorials, meetings, local staff, etc.

<http://alma.mtk.nao.ac.jp/j/forresearchers/ea-arc/index.html> (Japanese)

<http://alma.mtk.nao.ac.jp/e/forresearchers/ea-arc/index.html> (English) and

<http://alma.asiaa.sinica.edu.tw> hosts information for the Taiwan node.

### 3.3. Documentation and Training

The documents and tools common across the entire ALMA community and necessary for preparing and submitting proposals are available from the ALMA Science Portal (<http://almascience.nao.ac.jp/document-and-tools>). We recommend reading about the capabilities of the instrument at the current cycle, the ‘Early Science Primer’, the ‘Proposer’s Guide’ and the ‘Technical Guide’ to design the observations.

### 3.4. The ALMA Helpdesk

The ALMA Helpdesk is the primary means for communication between users and ALMA. Interaction is via a “ticketing system”, which automatically tracks user-submissions (called “tickets”) and related communications across the entire global community. Access to the helpdesk is via the science portal, thus users are required to first register with ALMA before access to the helpdesk system: <https://help.almascience.org>.

In general, users should not contact the Operations staff directly; helpdesk-submitted tickets are triaged to on-hand staff (ensuring rapid response); further, operations staff are not able to personally allocate time resources to communicate with the users directly; and finally, maintaining a single, managed Helpdesk resource provides an efficient database on user issues and solutions, ultimately helping ALMA staff provide a more efficient service for the user.

The treatment of submitted helpdesk tickets is shown in figure 2, to the right. The first step for all users is to consult the knowledge base information repository (available in both Japanese and English).

Users can submit tickets regarding outstanding questions to the global Helpdesk. These tickets will be automatically redirected to the user’s respective ARC in the first instance, i.e. queries from East Asian users will be addressed by the East Asian ARC staff. Such tickets are “triaged”; assessed for the most rapid and timely response path; either by local ARC staff (“user support specialists” - USS), or redistributed back to the global helpdesk for the attention of other international experts.

Users can generally expect a response within 2 business days. Tickets submitted within a few days prior to the proposal deadline will be accessed by the international helpdesk pool to facilitate the most rapid response. The EA-ARC will support EA users in both English and Japanese, however to receive a prompt response within a few days of the deadline, we encourage users to use English, as doing so will enable any available ARC staff from anywhere in the world provide a speedy reply.

Once the ticket has been satisfactorily answered, EA-ARC staff will mark the ticket as ‘Resolved’, and if the user is satisfied with the response they should mark the ticket as ‘Closed’.

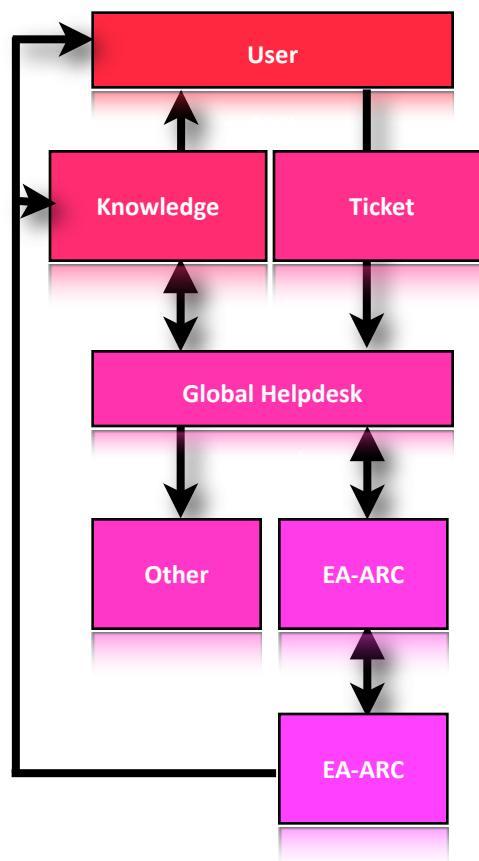


Figure 2: Helpdesk ticket processing



## 4. EA-ARC roles in proposal preparation, observations & data processing

### 4.1. Call for Proposal

A Call for Proposal (CfP) will be issued for each scheduling period. The EA ARC is responsible for distributing the CfP among the East Asian user community, along with any supporting material and software tools. The CfP will inform the community about the available capabilities and provide necessary information for the submission of proposals. The EA ARC staff identify areas of work prior to the call, update webpages, and issue announcements. The EA ARC contributes to the various stages in the entire process, “phase 1” and “phase 2”, data processing and delivery in the following ways.

### 4.2. “Phase 1”: Proposal preparation.

Phase 1 comprises simply proposal preparation and submission. Submitted proposals must be prepared with the Observing Tool (OT) (requiring registration in the Science Portal), and *must* include a scientific and technical justifications, targets and spectral settings, sensitivity and integration time estimation, atmospheric conditions requirements (e.g. transparency and atmospheric conditions).

### 4.3. Proposal assessment

ARC involvement of the proposal assessment is actually minimal, and restricted to assisting of “technical assessment” (see stage 2 below) and other proposal handling duties. The proposal assessment process is briefly described here for completeness, and shown also in figure 3, to the right.

The review and assessment process is as follows:

1. First-cut triage: As upwards of one thousand proposals are expected for cycle 2 observations, one “primary science assessor” is assigned to preliminarily review a submitted proposal, and provide a preliminary ranking, enabling a first-cut “triage” of submitted proposals.
2. Technical assessment: Remaining proposals are assessed for ‘technical feasibility’ by ARC and JAO staff. The technical assessment occurs over approximately a week and assesses the practicality of the proposal from a technical aspect, the scientific content of the proposal is not considered in depth. Only a very small number of proposals were regarded as entirely “unfeasible” during cycle 0, but this remains an important stage in the assessment process.
3. Panel review: Proposals submitted to any category is reviewed by one of two or three *panels*, comprising approximately ten field-experts and a “technical secretary” who is present only to answer technical questions from the review panel and take panel votes. Each proposal is reviewed by in detail by two panel members (the “primary science assessor” and also a “secondary science assessor”), and is described and discussed by the panel during the panel

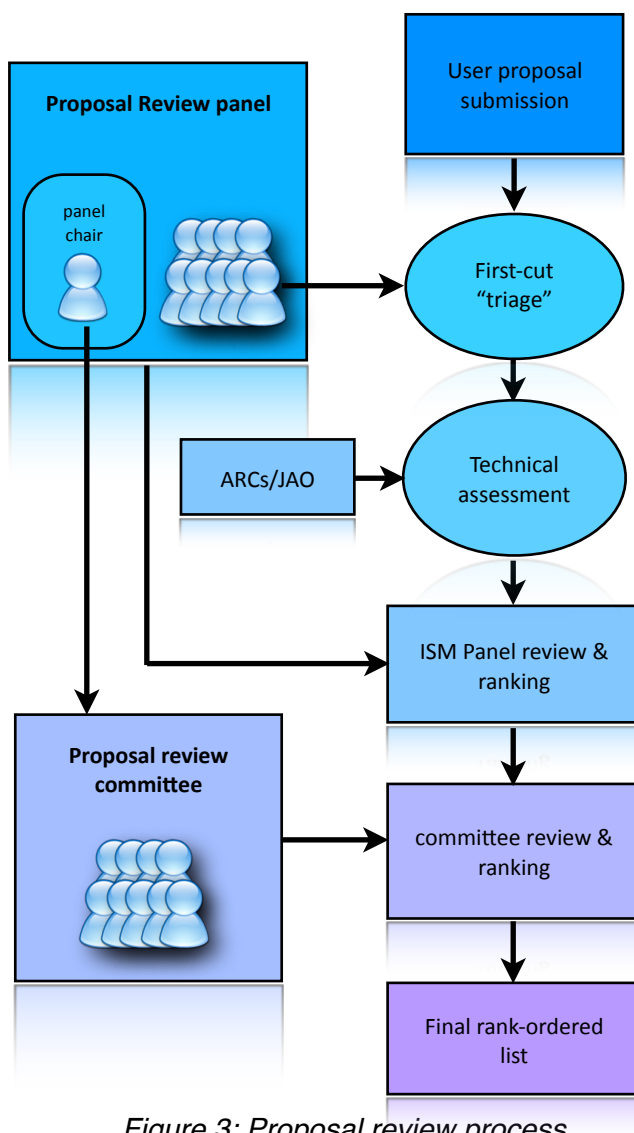


Figure 3: Proposal review process

meeting. The outcome of the proposal review panels is a single rank-ordered list of the proposals allocated to that panel. This process is expected to take three or four days.

4. Committee review and rank merging: The final stage of proposal assessment and ranking is the responsibility of a proposal review *committee*, comprised of the chair and deputy chair-persons of each proposal review panel. The outcome of the proposal review committee is a single, rank-ordered list of proposals, formed from merging the panel lists.
5. Forming the observing priority list: The final ranked list is used to form and prioritize the observing queue, contingent on the available executive time allocations, and PIs are advised on the *probability* of their proposal being observed.

#### 4.4. *“Phase 2”: Preparation for observations*

Observing projects often easily and naturally divided into one or more observing unit sets (ObsUnitSets), which in turn consist of sets of Scheduling Blocks (SBs), each of approximately 1 hour of observing time, including calibration observations. The construction of the Scheduling blocks is the jurisdiction of ARC and JAO staff, and they are tightly bound by the observations constraints compiled in the Observing tool, by the user during the submission of their proposal.

The PIs of successful proposals are required to check and *explicitly* confirm the Scheduling Blocks to ensure the technical details required to achieve the proposed science goals are correct. The allocated contact scientist will support the PI in confirming the schedules are complete and correct. The scheduling blocks are then committed to the observing queue. SBs cannot be committed to the observing queue without express approval from the PI.

Minor changes to the observations can be implemented easily during phase 2, however larger changes (modifying targets/frequencies, large position changes, etc.) require first the approval of the Change Request Standing Committee, and a helpdesk ticket should be submitted to the helpdesk outlining the changes and including a complete justification. Requests for significant changes may cause long delays in completion of phase 2 and delays in the SB's being committed to the observing queue.

#### 4.5. *Data reduction & data software and archive support.*

During and after observations are complete, JAO and the ARCs execute a series of quality assurance (QA) checks. During cycle 2, data reduction will typically be processed using semi-automatic scripts, and heading into automated '*pipeline*' processing. The complete data-product package (containing processed data, calibration tables, scripts, QA reports, logs, and data products, but not by default, raw data.) will be made available to the PI from the EA ARC archive through password-protected, web-based data distribution.

PIs can continue to request assistance or information from their contact scientist via the helpdesk system after data delivery by email, or a direct Face-to-face meeting request can be made, again via the helpdesk (see section 3.2). Where appropriate, the EA-ARC may collaborate or support the development of modified pipeline versions and advanced simulation tools.

The EA-ARC archive will hold not only ALMA data but also NRO 45m, NMA and ASTE data. The ALMA data archives are expected to become an increasingly important resource for ongoing research. However, this functionality will not be supported during Cycle 1. More information on the archive access and processing will become available in the future, as necessary.

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The Atacama Large Millimeter/submillimeter Array (ALMA), an international astronomy facility, is a partnership of Europe, North America and East Asia in cooperation with the Republic of Chile. ALMA is funded in Europe by the European Organization for Astronomical Research in the Southern Hemisphere (ESO), in North America by the U.S. National Science Foundation (NSF) in cooperation with the National Research Council of Canada (NRC) and the National Science Council of Taiwan (NSC) and in East Asia by the National Institutes of Natural Sciences (NINS) of Japan in cooperation with the Academia Sinica (AS) in Taiwan. ALMA construction and operations are led on behalf of Europe by ESO, on behalf of North America by the National Radio Astronomy Observatory (NRAO), which is managed by Associated Universities, Inc. (AUI) and on behalf of East Asia by the National Astronomical Observatory of Japan (NAOJ). The Joint ALMA Observatory (JAO) provides the unified leadership and management of the construction, commissioning and operation of ALMA.

