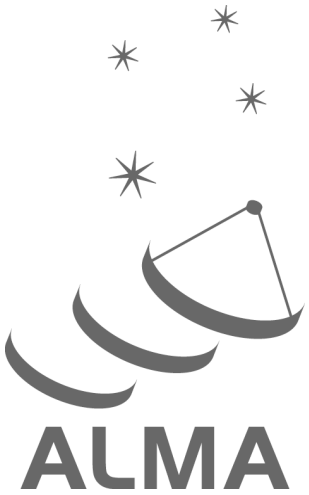
Document Title:

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

Daniel Espada on behalf of the East Asian ALMA Regional Center



www.almascience.org

ALMA, an international astronomy facility, is a partnership of Europe, North America and East Asia in cooperation with the Republic of Chile.

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**. Helpdesk tickets will be directed to the appropriate ALMA Regional Center at ESO, NAOJ or NRAO.

Revision History:

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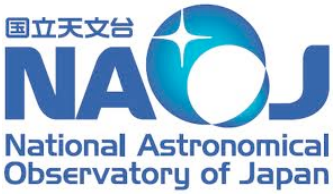
Contributors

East Asian ALMA Regional Center.



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Steps to get your ALMA data	How the EA-ARC can help you?
Register at the ALMA Science Portal (http://almascience.org/)	
Download, install ALMA software (OT) and make use of services	Bugs or unexpected behaviour in the software?
Phase 1 (Proposal submission)	Preparing a complicated proposal?
Phase 2 (Observation phase)	Help with scheduling block preparation
Track projects: Project Tracker tool	
Retrieve data: ALMA Science Archive (asa.alma.cl)	Support with the archive
Data reduction (CASA, pipeline)	Tutorials: check EA-ARC webpage Basic support: use the Helpdesk Advanced support: visit us

EA-ARC Help Desk

If you need help on any of the previous topics, contact the ALMA Helpdesk, via the ALMA user portal (http://almascience.org/)

If needed face to face support (proposal and scheduling block preparation, advanced data reduction), use the ARC Helpdesk to coordinate a visit.

Scope

This document explains the role of the East Asian Alma Regional Center within the ALMA project, what is its structure, and how it can help users at the different stages of their ALMA observing project.

1. One ALMA, three ARCs : One for All, All for one!

1.1 ALMA

The Atacama Large Millimetre/submillimetre Array (ALMA) is expected to be the leading observatory at millimetre and submillimetre 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 7 milliarcseconds. 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.

1.2 ALMA for all via the ARCs

The highest quality science produced with ALMA in the mm/submm window will emerge through competitive access over the widest possible user community. A key requirement is the provision of comprehensive user support available to the entire astronomical community. This effort is coordinated via the ALMA Regional Centers (ARC), supporting users at each step of the proposal and observation preparation, archiving, distribution, data reduction as well as data analysis.

The ARC priority is in helping users fully exploit the capabilities of ALMA. To help the astronomical community based in East Asia to maximize ALMA's scientific return we have created the East Asian ARC (EA-ARC).

1.3. ALMA Science Portal and ARC Helpdesk

The Joint ALMA observatory (JAO) maintain the ALMA Science Portal (see Sect. 3.2.8), a user support homepage that contains information on proposal preparation and submission, observing preparation tools, tracking and post-processing, user documentation, as well as known issues and “Frequently Asked Questions” (FAQs).

This portal also provides direct access to the ALMA Helpdesk (see Sect. 3.2.4), a ticketing system, where ALMA users can submit general user questions or more regionally-specific ARC questions such as face-to-face support or tutorials. Users can also submit questions regarding ALMA software, such as CASA, the Observing Tool (OT) and obtain advice regarding the ALMA data archive.

Requests (tickets) received at the Helpdesk will be distributed to each ARC. Queries from East Asian users will be primarily addressed by the East Asian ARC staff. Each ARC Helpdesk will use a triage system, whereby staff at the ARCs will actively monitor submitted tickets and answer them quickly or assign them to support specialists. Each submitted ticket will automatically be logged, receive a time-stamp, and be assigned a unique ID. Users will be provided with an electronic copy of their submitted tickets. The Helpdesk will have a

worklog area where all communications between the user and support personnel are kept. If a message can better be addressed by another ARC staff member, or more generally, by another ARC, the ticket can be re-assigned until satisfactorily answered.

It is expected that the tickets will be addressed using a tiered level of support. The levels can be defined as: 1) general support (non-technical issues that can be addressed by any ARC staff member), 2) skilled support (general technical questions that can be addressed by any ARC astronomer and specialized scientists), and 3) expert support (specific technical questions of a detailed nature that should be addressed by specialized astronomers).

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

2.1. Definition of EA-ARC User

EA-ARC users are all those carrying out research based in any Japanese or Taiwanese Research Institutions or Universities. Users within Taiwan will select whether the requested observing time corresponds to either EA or NA. Register through the ALMA Science Portal using your affiliation and the ARC you belong to, for example EA. You may be eligible for support for face-to-face meetings, such as student programs, grants, etc. Updated information is available from the EA-ARC.

2.2. EA-ARC Organization

The organization of the EA-ARC is shown in Figure 1. The EA-ARC is composed of three teams: Science Operations, Engineering and Computing Operations, coordinated by the ARC manager, who is under the supervision of the ALMA-J director. The Education and Publich Outreach (EPO) team in ALMA-J cooperates to support ALMA services.

The Science Operations team and the Computing Operations team are responsible for the ARC tasks detailed in the following sections. The Computing Operations team is composed of three groups: Offsite Software Maintainance, Offsite Software Development and Data Archive.

Taiwan has an ARC office located at the Academia Sinica Institute of Astronomy and Astrophysics (ASIAA), coordinated by its own manager, who works in cooperation with the EA-ARC manager. The service support is distributed accordingly to both institutions.

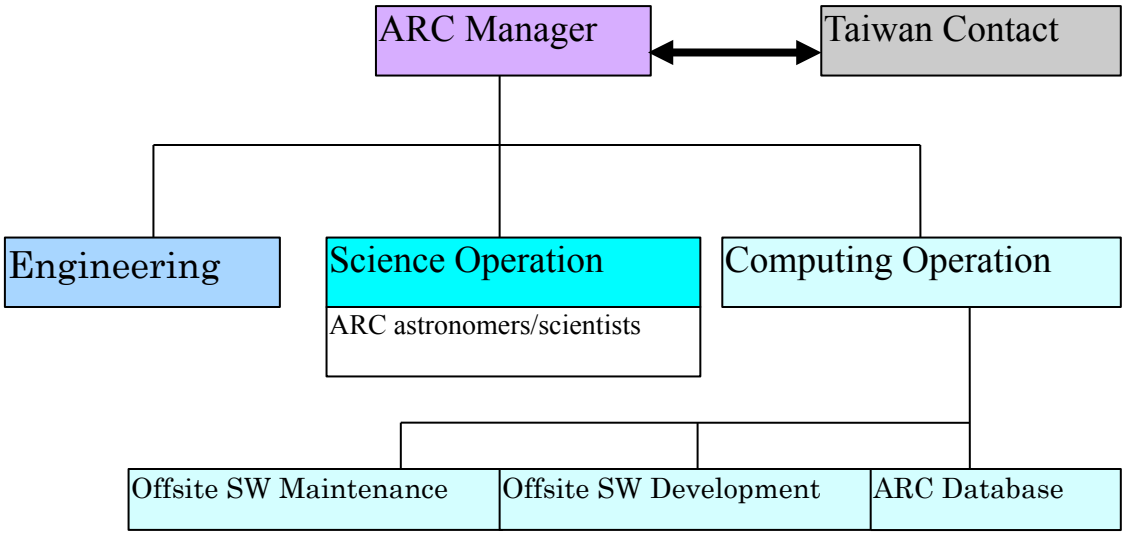

Figure 1: EA-ARC organization

2.3. The EA-ARC Headquarters (NAOJ, Mitaka)

http://alma.mtk.nao.ac.jp/j/forresearchers/arc (Japanese version)

http://alma.mtk.nao.ac.jp/e/forresearchers/arc (English version)

The EA-ARC Headquarters is located at the National Astronomical Observatory of Japan (NAOJ) in Mitaka. The core services of the EA-ARC at the NAOJ headquarters are providing user support to East Asian users, hosting and maintaining a complete mirror of the ALMA archive and providing duties at the OSF during observations. In ALMA full operations the ARC support is provided by at least eight staff/postdocs. User support includes the complete research path from proposal preparation (Phase 1) to observation preparation (Phase 2), and finally to the delivery of the calibrated science products to the users. Limited funding is available basically for travel and accommodation.

The ARC provides a dedicated networked visitor's room with rapid access to the proprietary data and software for ALMA data reduction, as well as help with proposals and ALMA archive research. Disk space is also provided for raw and processed data. A dedicated system manager is present at the ARC to solve any computer/software-related problems. One or two visitors can be accommodated simultaneously.

Apart from general face-to-face help, the EA-ARC staff have experience on mm/submm astronomy and collaborate closely with Nobeyama Radioastronomy Observatory (NRO) staff, and in particular with experts on the NRO-45m antenna and the already decommissioned Nobeyama Millimeter Array (NMA).

In addition the EA-ARC can provide general support for mm-submm astronomy, with particular expertise in the following specialized areas: mosaicking, combining interferometric data with single dish data, polarimetry and advanced data analysis. The EA-ARC has ongoing cooperation with the Japanese Virtual Observatory (JVO) team of the NAOJ Data Center for the Virtual Observatory (VO) system.

2.4. The Taiwanese ARC (ASIAA, Taipei)

http://alma.asiaa.sinica.edu.tw

The Taiwanese ARC office is located at the Institute of Astronomy and Astrophysics in Academia Sinica (ASIAA) in Taipei. In collaboration with EA-ARC and NA-ARC, it serves all the ALMA user community in Taiwan, and offers support for the ALMA proposal and observational preparation, data reduction and data analysis. Six staff members are expected to be maintained in the ALMA full operation mode. As for user support, there is also coordination with the University Consortium of ALMA-Taiwan (UCAT).

The ARC office provides a visitor room with workstations and ALMA software installed. This visitor room can accommodate two ALMA visitors at the same time. The workstations can be used for proposal and observational preparation, and for accessing all the necessary data and software for ALMA data reduction and analysis. Disk space is also provided for raw and processed data.

In addition to the general face-to-face support, based on the experience with the Submillimeter Array (SMA), the Taiwanese ARC office plans to offers support for two specialized areas of observations: wide-field imaging including zero spacing and polarimetry.

2.5. Who works at the EA-ARC? Your contact at the ARC

The EA-ARC is composed of a mix of astronomers and scientists with a deep interest in astronomical research and with close links to the mm/submm community. They understand the realities of conducting research programs so that they can optimally assist ALMA users.

One of the core tasks of the ARC staff is to regularly travel to the Operations Support Facility (OSF) to serve as Astronomer-on-Duty (AoD) as well as to the Santiago Central Office (SCO). This helps ARC astronomers to keep up to date on the realities of ALMA operations and to mantain close collaborations with their colleagues in North America and Europe, so that specific knowledge on all support activities is optimally shared between the ARCs and the JAO.

Each ALMA observing project will be assigned to an ARC contact astronomer/scientist. The initial contact in each phase of the project will always be made through the ARC Helpdesk, and not directly to the contact scientist. This ensures that all contacts are logged automatically, and avoids a situation that an attempt is made to a contact scientist who is unavailable. For non-ALMA member affiliations, the PI will choose an ARC contact. This connection will be made during the observation preparation (Phase 2) and will remain through the actual performation of the observations, and eventually until the delivery of the data to the user.

Although every ARC staff member can in principle perform all basic ARC support tasks, most staff will have certain expertise areas in which they can support most efficiently. Note that in general, many observing projects cover several expertise areas (e.g., high frequency - high dynamic range imaging). The contact will be assigned accordingly to the characteristics of the proposed observations.

ALMA will appeal to a much broader range of astronomers than the conventional mm/submm community, and these will require additional help. If you are in this situation, you might want to contact the EA-ARC for advanced science support, especially if you are interested in a large program (note that large programs are not available in Cycle 0).

3. How the EA-ARC can help you?

3.1 Summary of EA-ARC tasks

The priority tasks of the EA-ARC are dependant on the development stages of the ALMA project. During the Early Pre-Operation Stage (prior to the operation of a three-element interferometer at the AOS) the main activity of the ARC was to test the main user software system; the Observing Tool (OT), the Common Astronomical Software Applications (CASA) offline system (data reduction and simulations), the pipeline (automatic data reduction) and the Archive interface. After the three-element interferometer at the AOS, the major task of EA-ARC personnel was the participation in Commissioning and Science Verification (CSV). ARC staff traveled to Chile for extended periods to help with CSV and to train other ARC astronomers in ALMA operations, and software testing intensified. In addition, based on the experience gained during extensive software testing, ARC staff reviewed and refined user documents for the Phase 1 and Phase 2 tools, as well as for the offline data reduction system.

The EA-ARC issues calls for proposal, provides documentation and help on proposal preparation and submission, as well as coordinates the refereeing process. At a technical level, the ARC provides support on the basic user interface, basic archive, software and hardware maintenance and development. Advanced science support for non-standard or complex projects is provided.

The core tasks of the EA-ARC during the current operations stage are summarized below:

For the prospective ALMA user:

- Issuing calls for EA proposals.
- Maintenance of the EA-ARC Helpdesk (Web-based access problem resolution)**:** Phase I (Proposal preparation) and Phase II (Observation preparation), as well as post-processing questions. Helpdesk is in English and Japanese. Note that all initial help requests between the user and the ARC are managed through the ALMA Helpdesk.
- Developing an user friendly web page containing relevant information such as software documentation. The EA-ARC contributes to the ALMA Science Portal.
- Assisting JAO in the Proposal Review Process.
- Verifying and correcting observing scheduling blocks.
- Carrying out Quality Assurance (QA); Raw data passed through multi-tiered quality assurance, in particular from the on-site duty astronomer to the EA-ARC staff.
- Archiving, distribution of data and processed images: Pipeline products (images and calibrated uv data), raw data and off-line data processing data made available to PIs by the EA-ARC. The ALMA pipeline will produce science-ready images for basic ALMA observing modes (available from late 2012).
- Face to face expert assistance with observation preparation and post-processing.
- Expert hands-on data reduction help.
- Organizing observing and data reduction tutorials, workshops, user community, etc.
- Training the next generation of ALMA users (master/PhD students).

For ALMA:

- Reviewing, evaluating, and exercising ALMA software: proposal tool, observing tool, data reduction and pipeline processing functionality.
- Maintenance and development of EA-ARC software deliverables, such as pipeline and off line data

reduction packages.

- Contributing to the ALMA Commissioning and Science Verification (CSV).
- Observational support, including Astronomy on Duty (AoD) and QA. ARC staff astronomers/scientists will travel to the OSF on a regular basis to serve as AoD. This is important in order for ARC staff to maintain ALMA operation's proficiency.

Additional science support for the ALMA user:

- Simulations in order to help users better plan their observations.
- Research/develop new approaches/algorithms for calibration, imaging, single dish.
- Development and maintenance of scientific analysis tools and Virtual Observatory (VO) support.
- Support for special observing projects, such as legacy projects (not available for cycle 0).

Training and science for the community:

- Holding public outreach talks, videos, news.
- Issuing press releases.

3.2. Description of EA-ARC operations from the user's point of view

3.2.1. Call for Proposal

A Call for Proposal (CfP) for the JAO will be issued (initially once a year) 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 electronic proposals. The EA-ARC staff identify areas of work prior to the call, update webpages, and issue announcements.

3.2.2. Phase 1: Proposal support

The Phase 1 material of the proposals must be prepared with the Observing Tool (OT), which requires the users to provide a scientific and technical justification, target specification, time-on-target plus overhead specification, sensitivity and integration time estimation, atmospheric conditions requirements (e.g. transparency and atmospheric conditions), etc.

As the EA-ARC staff will form the primary interface between the East Asian community and the ALMA observatory, they will assist users with the preparation of their Phase 1 material. This assistance will cover technical help with the OT, help with the ALMA exposure time calculator, but will also involve consultation regarding observing strategy. Communications with the users will be managed primarily via the Helpdesk system.

The EA-ARC will accept tickets not only from East Asian users, but also from those from other regions. For example, users from EU or NA preparing a proposal requiring specific expertise at the NAOJ will receive assistance from the EA-ARC. In this case, close collaboration with the partner ARCs is required to track which ARC is supporting which user and project.

The EA-ARC staff may consult with the ALMA Operations staff on issues regarding observing strategies. Although local ARC staff will contribute to AoD shift in Chile in order to maintain ALMA operations proficiency, expertise in some specific areas may exist in Chile and not in the ARCs. If this expertise is required for Phase 1 preparation, the ARC staff will seek the information at the ALMA Operations staff. Users shall not contact the Operations staff directly. The reason for this is twofold: firstly, Operations staff will not personally allocate time resources to communicate with the users directly, and secondly, maintaining a single, managed Helpdesk resource provides an efficient database on user issues and solutions, ultimately helping EA-ARC staff provide a more efficient service for the user.

A single Proposal Review Committee (PRC) will be run by the JAO. Prior to the scientific-merit based ranking, the Observatory will conduct a 'technical feasibility' review process. The EA-ARC staff will help with the technical assessment feasibility of the proposal (for example, checks of the sensitivity calculation, spectral configuration, array configuration, mapping and calibration strategy, as well as for any existing ALMA data). Proposals will be divided among the ARCs for technical assessment, according to PI affiliation.

For any enquiry in this stage, contact the EA-ARC via the Helpdesk (see Sect. 3.2.4).

3.2.3 Phase 2 operations: Scheduling Block Validation Support

The PIs of proposals successfully passing the technical and scientific evaluation are invited to use the OT to specify the technical details required to schedule and execute the proposed observations. The ARC staff will provide support during this phase and will validate all material prepared by the users. The ARC staff are the primary interface between the users and the JAO during this observation preparation phase and will consult the ALMA Operations staff as necessary.

The EA-ARC staff writes a Support Abstract for each observing project, which summarizes the main features of the program, and further details are written into a Support History Log. These items are stored immediately in the ALMA central archive and are available to the OSF. Each observing project is splited into one or more observing unit sets (ObsUnitSets), which in turn consist of sets of Scheduling Blocks (SBs), each of approximately 45 min of scientific observing. The ARC staff must validate all submitted SBs. After verification of the SBs by the EA-ARC staff, the SBs will be submitted to the ALMA central archive and mirrored to the ARCs, including material used for validating the SBs (Support Abstract, Support History Log).

If any problems with user-submitted observing sets are identified, the users will be asked to revise their material. Observations will not be scheduled for execution until outstanding problems are solved. Note that the problems can be technical (i.e. user used the OT incorrectly or the OT produced wrong results) or operational (i.e. the ARC review reveals a better way to execute the program). Once all Phase 2 material is found to be correct, it will be certified by changing the SBs status from "Defined" to "Ready" and released to ALMA operations in Chile for scheduling and possible execution. Users shall be allowed to modify their observing projects after this point only after seeking and receiving approval from the EA-ARC. A Phase 2 completion deadline shall be established for each scheduling cycle. All projects with incomplete Phase 2 submission at the deadline will not be executed.

Released SBs can be executed at any time without further intervention from users or ARC staff. If a problem is found at run-time, execution of the SB and all associated SBs is halted and their status is changed to "Error", a "problem report" is opened and assigned to the relevant ARC. The EA-ARC will then work with the user and/or the OT development team to fix the problem. When solved, the problem report is closed and the SB(s) is/are re-released for scheduling. The "Ready/Error/Ready" cycle is handled by status flags attached to each SB. ARC staff have access to the project status through the Project Tracker.

For any enquiry in this stage, contact the EA-ARC via the Helpdesk (see Sect. 3.2.4).

3.2.4 Helpdesk

Through the Helpdesk system, East Asian users can submit queries regarding specific observing programs (as explained in subsections 3.2.3 and 3.2.4), as well as other topics; the capabilities of ALMA, the availability of certain observing modes, software bugs, etc.

The ARC staff manage and improve the knowledge-base system database in the Helpdesk system, including a Frequently Asked Questions (FAQ) section. The EA-ARC will review incoming Helpdesk messages on a regular basis. If possible, the assigned EA-ARC member will answer the message and close the event. Otherwise, the help request will be re-assigned to an appropriate ARC staff member in the EA-ARC or a partner ARC, or to the JAO.

The EA-ARC will share necessary information with the JAO and the other ARCs. The EA-ARC will support scientists in EA in both English and Japanese. Namely, ticketing and FAQ pages will be provided both in English and in Japanese.

3.2.5 Data product support: pipeline and data reduction

After the observations are complete, and the data have passed through a series of quality assurance checks, the data will be processed automatically by the science data pipeline. This pipeline will run on dedicated machines at SCO and uses a heuristics system to automatically edit, calibrate and image data taken with the standard observing modes. The pipeline heuristics incorporates into the data reduction scheme the knowledge of experienced radio interferometer users. ARC staff contributes to improve the heuristics used in the ALMA science pipeline. For basic observing modes, this pipeline should produce high quality, fully calibrated science products for most standard observing modes. A computer cluster will be deployed in the EA-ARC Headquarters to optimize the data reduction parameters for specific projects, which will enable to obtain better quality images than those obtained with the SCO pipeline. The EA-ARC staff will support such optimization. Note however that the pipeline heuristics will not be provided in Cycle 0, so data reduction will need to be processed manually.

The Project Tracker can be used to query the development stage of your observing program. The output of the data reduction pipeline is stored in the ALMA Science Archive and is subject to a final Quality Assurance test before the reduced data is made available to the user.

The ARC staff will provide technical user support in case of more complicated observing settings. The EA-ARC's responsibility is to assure that the reduced data meet the requirements as set by the approved observing proposal.

Initial contact with users is always via the ALMA Helpdesk system. If users require face-to-face help, advanced user support for special projects, or support in refinement of the data reduction process, a request for communications or visit to the EA-ARC can be submitted via the Helpdesk system.

3.2.6. Archive Operations

The EA-ARC will hold complete synchronized copies of the ALMA archive. Data taken at the AOS are transported via a dedicated fiber network link to the OSF. From this site, the data are transported via network to the SCO, which operates as ALMA's main archive hub. The science data pipeline runs in SCO and reduced data is also stored into the ALMA main archive. The SCO archive is replicated at the EA-ARC, including both raw and reduced data. Specialized EA-ARC staff will be responsible for maintaining the archive database (the database administrator) and hardware, maintaining the archive webpage, distributing archive data to users, and will provide basic archive user technical support.

The EA-ARC will contain all raw and calibration data, monitoring data (i.e. the shift logs of each observing run), all data products produced by the standard pipeline (i.e., calibrated data cubes and data reduction and imaging scripts), logs of all operations carried out by the array, environmental and site-condition data, and QA parameters. It will also contain copies of all accepted observing proposals along with observing scripts as submitted and as run.

The archive technicians install new archive software and maintain the archive hardware and software, maintain the archive webpages, and help with more complicated technical user queries. Archive operators load data onto the archive, stage data for delivery to users, and handle basic archive use queries. The health check of the system and data integrity check are also done by both technicians and operators.

3.2.7. Face-to-face Support

Based on current facilities we anticipate that (at least in the early years) many users will wish to visit the EA-ARC for one-on-one support for observation planning or data reduction help.

The EA-ARC provides on-site facilities and support for visitors wishing face-to-face help/support. Budget for travel support is also provided. Tutorials for proposal preparation, observing tools, and offline data reduction will be held once per year at least, hosted by the collaboration between EA-ARC headquarters and the Taiwanese ARC.

3.2.8. The EA-ARC web site and the ALMA Science Portal

The EA-ARC is responsible for managing the web pages and the ALMA Science Portal that serves as the main access portal to ALMA for East Asian users. These web pages will provide all material to support Phase 1 and Phase 2 submission. Information about tutorial courses for the users of various fields and levels to make an observation plan (proposal) and to use the ALMA archive is also available on the EA-ARC web page. These are likely to be an useful resource to communicate with on-site operations and we encourage users to make use of them.

The ALMA Science Portal displays dynamically generated web pages containing links to dynamically created program summaries, raw data, and pipeline products. The Science Portal run on multiple servers, although only the EA-ARC site is maintained at NAOJ servers. The ALMA Science Operations defines the basic elements of the Science Portal and the EA-ARC replicate these elements. The Science Portal is a “single sign-on system”, meaning no further passwords are required for any other applications within the portal and will provide access to the ALMA archive located at NAOJ via an interactive query form (VO compliant). Some pages will be displayed both in English and in Japanese.

Region-specific information is also made available via the EA-ARC web pages. Important in this respect is a detailed directory of skills and expertise areas of all ARC staff, as well as a listing of the different topics of expertise that exist in the ARC. The EA-ARC web site does not duplicate information maintained at the central ALMA Science Portal, but provides links to the relevant information.

The ALMA Science Portal provides links to general system information and status, including proposal application deadlines and submission, general documentation, information about using the ALMA archive, user software tools and manuals, generic descriptions for ALMA deliverables, as well as off-line data processing modules.

3.2.9. Documentation Preparation and Revision

The initial documentation of the Observing Tool and the offline system will be provided within their respective development projects. The ARCs will coordinate the maintenance and updating of these documents. All such documents and tools common across the entire ALMA community are available from the ALMA Science

Portal, with the exception of the ALMA archive services. The EA-ARC maintains its own web site to provide region-specific information. This website will point to all ALMA documentation, without duplicating information maintained centrally at SCO.

3.2.10 Additional Support

In addition to the core tasks already described, the EA-ARC will provide the following additional services as the two primary stations of NAOJ and ASIAA take the initiative.

Archive research support:

Archive research greatly amplifies the scientific return of an instrument. Assistance for archive research enables broader approaches to scientific investigations. Scientists in the ARC provide one-on-one support for astronomers accessing the ALMA science archive, many of whom may be experts at longer or shorter wavelengths. Time permitting, higher order archive products, queries, and connections to other on-line astronomical archives may also be processed.

Enhanced archive and data reduction operations:

This includes face-to-face data processing support at dedicated physical locations, re-processing of large and/or complex datasets, and help with archival research projects. The EA-ARC archive will hold not only ALMA data but also NRO 45m, NMA and ASTE data. EA-ARC and NRO is responsible developing a data filler used for making 45m and ASTE data for CASA data red uction.

Development of new software and techniques:

Where appropriate, the EA-ARC may collaborate or support the development of modified pipeline versions and advanced simulation tools.

4. Organizing a face-to-face meeting

While all initial support requests are made via the ALMA Helpdesk, users may request face-to-face support, or an ARC scientist may suggest that face-to-face is desirable. Requests for face-to-face support should always be made through the Helpdesk. The Helpdesk ticket should contain as much information as possible for the purpose of the visit and the proposed ARC location and dates. The most beneficial dates as well as the type of face-to-face meeting (visit, phone, videoconference, skype, etc.) will be discussed and confirmed through further communications. Support staff are responsible for arranging the details of the communication or visit. Each visitor is assigned a single staff member for support purposes who will be able to respond the requests as quickly as possible.

Prior to a visit, the user's data is downloaded from the archive and made ready for their arrival, and computer facilities at the EA-ARC are made available. If users have any special needs or plan to work on their private laptop computer, this should be discussed with the ARC before arrival. Single laptop use is not encouraged in principle considering the expected sizes of the ALMA data files. The EA-ARC provide facilities for the user to copy data onto their preferred device; hard disk drive or DVD. Before a user travels to the EA-ARC, they should discuss with the EA-ARC staff which media are supported, and whether the user should bring appropriate storage devices.

Following the face-to-face visit, the EA-ARC will maintain a copy of the processed data for a certain period after the end of the user's visit to facilitate questions that might arise after the visit. The user is encouraged to submit feedback on the service received and whether the goals of the visit were met, in order to help improve this service for future users.

It is foreseen that most users apply for funding to their local institutions for travel support to the EA-ARC. Note that the EA-ARC might have access to funds for visiting scientists as well.

5. Acronyms

ALMA	Atacama Large Millimeter Array
AoD	Astronomer-on-Duty
AOS	Array Operations Site
ARC	ALMA Regional Center
CSV	Commissioning & Science Verification
EA	East Asia
ES	Early Science
ESO	European Southern Observatory
EU	Europe
JAO	Joint ALMA Office
NA	North America
OSF	Operations Support Facility
OT	Observing Tool
PRC	Program Review Committee
QA	Quality Assurance
SB	Scheduling Block
SCO	Santiago Central Office
SV	Science Verification
SP	Science Portal
VO	Virtual Observatory

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.