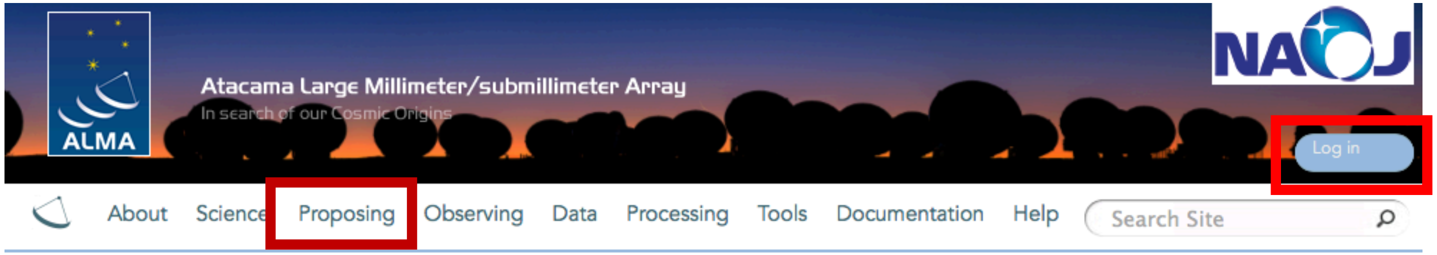
ALMA Cycle-6 Observing Tool (OT)

1. ALMA Science Portal

(http://www.almascience.org → http://almascience.nao.ac.jp)



Additional Information for Cycle 6 Proposals

Feb 01, 2018

As indicated in the Cycle 6 Pre-announcement, this announcement provides further information on Cycle 6 proposals, including:

1. Cycle 6 configuration schedule
2. Planning Large Programs
3. Circular polarization,

Complete details will be provided in the Call for Proposals, which will be released on the ALMA Science Portal on March 20, 2018.

1. Cycle 6 configuration schedule

Table 1 summarizes the anticipated configuration schedule for Cycle 6. The table includes the start date of the configuration, the longest baseline, and the LST range with the best atmospheric stability, which is approximately from 2 hours after sunset to 4 hours after sunrise. The configuration schedule may be modified based on the Cycle 6 proposal pressure. The Cycle 6 antenna configuration files needed for CASA simulations are available on the Science Portal.

Table 1: Cycle 6 configuration schedule

Start date	Configuration	Longest baseline	LST for best observing conditions
2018 October 1	C43-6	2.5 km	~ 22h – 10h

2. Proposing → Observing Tool

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Observing Tool

The ALMA Observing Tool (OT) is a Java application used for the preparation and submission of ALMA Phase 1 (observing proposal) and Phase 2 (telescope runfiles for accepted proposals) materials. It is also used for preparing and submitting Director's Discretionary Time (DDT) proposals. The current *Cycle 5* release of the OT is configured for the present capabilities of ALMA as described in the Cycle 5 Call For Proposals. Note that in order to submit proposals you will have to register with the ALMA Science Portal beforehand.

Note that preparation of Cycle 4 DDT proposals needs to be done using the Cycle 4 version of the Observing Tool. This version of the OT can be found in the DDT page, or the Phase 2 menu.

Download & Installation

The OT will run on most common operating systems, as long as a **64-bit version of Java 8** is installed (see the troubleshooting page if you are experiencing Java problems). The ALMA OT is available in two flavours: Web Start and tarball.

The **Web Start** application is the recommended way of using the OT. It has the advantage that the OT is automatically downloaded and installed on your computer and it will also automatically detect and install updates. There are some issues with Web Start, particularly that it does not work with the Open JDK versions of Java such as the "Iced Tea" flavour common on many modern Linux installations. The Oracle variant of Java should therefore be installed instead. If this is not possible, then the tarball installation of the OT is available.

The **tarball** version must be installed manually and will not automatically update itself, however there should be no installation issues. For Linux users, we also provide a download complete with a recommended version of the Java Runtime Environment. Please use this if you have any problems running the OT tarball with your default Java.

Webstart Tarball

Documentation

Extensive documentation is available to help you work with the OT and optimally prepare your proposal:

- If you are a novice OT user you should start with the **OT Quickstart Guide**, which takes you through the basic steps of ALMA proposal preparation.
- Audio-visual illustrations of different aspects of the OT can be found in the **OT video tutorials**. These are recommended for novices and advanced users alike.
- More in-depth information on the OT can be found in the **User Manual**, while concise explanations of all fields and menu items in the OT are given in the **Reference Manual**. These two documents are also available within the OT under the Help menu.

Troubleshooting

If you have problems with the installation and/or startup of the OT, please see the troubleshooting page. A list of currently known bugs, their status and possible workarounds can be found on the regularly updated **known OT Issues** page. A further source of information is the OT section of the ALMA Helpdesk Knowledgebase - this contains a number of articles that deal with frequently-asked questions. After exploring these resources, if confusion over some aspect of the OT remains, or if a previously unidentified bug has been uncovered, please file a Helpdesk ticket.

3. Proposing → Proposal Template

- Scientific Justification (Latex template: including figures, tables and references)
  - 4 pages: Regular, DDT, ToO, Solar, mm-VLBI
  - 6 pages: Large Program only

- Other formats are also okay, like Word, as long as they can be turned into a pdf file and use at least 12pt characters

4. Duplication check ! (Proposal → Duplicate Observations)

- Same targets, frequency, angular resolution, coverage, sensitivity
- Check: ALMA archive, spreadsheet provided below to avoid duplicate observations

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Duplicate Observations

In order to ensure the most efficient use of ALMA, duplicate observations of the same location on the sky with similar observing parameters (frequency, angular resolution, coverage, and sensitivity) are not permitted unless scientifically justified. Details on the duplication policy are provided in Section 5.4 of the Cycle 5 Proposer's Guide and Section 5.2 of the Users' Policies. It is the responsibility of the Principal Investigator (PI) to check their proposed observations against *both* the ALMA Archive and the spreadsheet provided below to avoid duplicate observations.

The ALMA Archive contains an up-to-date list of the PI science observations obtained over all cycles. The "List of ongoing observations" contains the metadata for ongoing observations that have not been completed as of 2017 March 15, selected from (1) Cycle 3 and Cycle 4 Grade A projects and (2) Science Goals which have been started in Cycle 4 Grade B and C projects. The spreadsheet supplements the ALMA Archive in that it lists the sensitivity and angular resolution that are expected to be achieved assuming the observations are completed in full. Sources in Science Goals for Cycle 4 Grade B and C projects for which observations have not been started by 2017 March 15 are not listed in the spreadsheet and will not be used in the duplication checks conducted by ALMA even if observations are obtained later in Cycle 4.

The ongoing list of observations is provided in both Excel Workbook (xls) and Comma Separated Variable (CSV) text format. It includes one row for each target, rectangular mosaic, or each pointing in custom mosaics. The spreadsheet content is described at the beginning of the file, and includes target names, coordinates, properties of each spectral window, along with the resolution and sensitivity requested by the PI.

The "Metadata for Cycle 5 Grade A projects" is a spreadsheet that contains the metadata for all Grade A projects approved for Cycle 5.

A link is provided to a user-contributed python script, which contains functions to search, plot, and display source information contained in the list of ongoing observations. Instructions on how to run the script are provided in the script header. The script is made available on an "as-is" basis for convenience and is not supported by the ALMA Regional Centers (ARCs).

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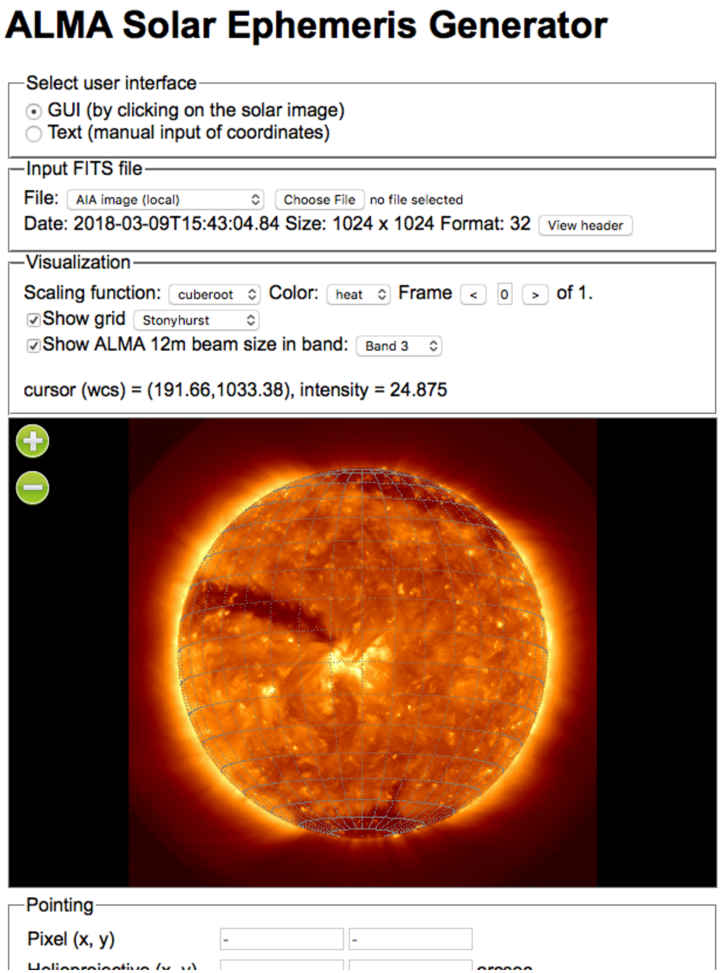
ALMA Science Archive Query | List of ongoing observations (Excel spreadsheet) | List of ongoing observations (CSV text file) | Metadata for Cycle 5 Grade A projects | Python Script

Tip 1. ALMA Solar Ephemeris Generator

(http://celestialscenes.com/alma/coords/CoordTool.html)



Tip 2. ASCII file: Field Setup

```
Name, RA(sex), Dec(sex), PMRA(mas/yr), PMDec(mas/yr), vel(km/s), Ref frame, Doppler type,
peak cont flux(mJy), peak line flux(mJy), cont pol(%), line pol(%), line width(km/s)
--   This signals end of the header

ngc253, 00:47:33.134, -25:17:19.68, 0.0, 0.0, 258.688, lsrk, RADIO, 200, 1000, 2, 0, 1500
ngc1068, 02:42:40.771, -00:00:47.84, 0.0, 0.0, 1142.075, topo, OPTICAL, 1100.0, 30, 0, 0, 20
```

Tip 3. Estimate the Peak flux density per beam using flux measurement from other observations

(https://help.almascience.org/index.php?/Knowledgebase/Article/View/286)

How can I estimate the Peak Flux Density per synthesised beam using flux measurements in Jy or K from other observatories?

Posted by Suzanna Randall, Last modified by Sarah Wood on 05 December 2017 08:38 PM

In the 'Expected Source Properties' section of the 'Field Setup' editor you are required to enter an estimate for the continuum and/or line peak flux density per synthesized beam for each source defined. These fluxes will guide your choice of requested sensitivity and are used by the OT to calculate the S/N achieved. Therefore, it is important that they are as reliable as possible.

In many cases, measurements of your sources will already exist based on data from other observatories. Here, we assume these measurements are peak fluxes/temperatures reported in Jy or K - for information on how to interpret line-integrated fluxes given in Jy km/s or K km/s, please see How do I convert flux measurements given in Jy km/s or K km/s into the peak flux density required by the OT?. You should first check the observing frequency of these observations and if necessary adjust the measurements to your ALMA observing frequency using a spectral index or more detailed spectral model of your source. You will then need to consider the angular size and spatial distribution of the source.

In the OT, the fluxes must be entered in Jy/beam, i.e. you must provide the peak flux density of the source estimated within one synthesised ALMA beam. This means that if the source is resolved with ALMA you will need to correct the previously measured peak flux (in Jy) of the source by the ratio of the area of the source to the area of the synthesised beam. A source is considered resolved if the angular resolution requested is smaller than the largest angular scale of the emission, and the synthesised beam should be assumed to be the angular resolution requested.

For example, suppose you have a JCMT observation of a sub-mm galaxy, and have measured a flux density of 32 mJy within the JCMT beam (where of course the galaxy is spatially unresolved). From other evidence you believe that the angular size of the galaxy is about 2”, and you’d like to observe it with ALMA at an angular resolution of 0.5". That 2” wide galaxy would be spread over $(2''/0.5'')^2=16$ ALMA beams in area. The expected flux density in the ALMA beam would thus be only 32 mJy/16 = 2 mJy/beam. It is this value that should be entered in the Expected Source Properties and be used to estimate the sensitivity required. In this example, a 5 sigma detection of the source would require a sensitivity of 0.4 mJy per pointing. Note that you may need to correct existing flux measurements even if they come from previous ALMA data, since the synthesised beam was quite likely different due to a different configuration and/or a different observing frequency.

The situation is more complex if your previous measurements are given in terms of brightness temperature in Kelvin, which is often the case of measurements from single dish telescopes. The simplest way to use an antenna temperature to estimate an ALMA flux density is to first convert the antenna temperature into a source flux density. The flux density S_v is then given by

$$S_v = 3514\, T_{SD} / (v_a * D^2) \text{ Jy},$$

where v_a is the aperture efficiency (you should be able to find this in the documentation for the single dish telescope in question), D is the diameter of the single dish telescope in m, and T_{SD} is the brightness temperature measured from the single dish telescope in Kelvins.

Tip 4. Splatalogue

(https://www.cv.nrao.edu/php/splat)