Cycle 2 status
Cycle 3 Policies

Paola Andreani

ALMA Community days, Garching April 13-15 2015

The Science Portal: entry point to ALMA operations and users support

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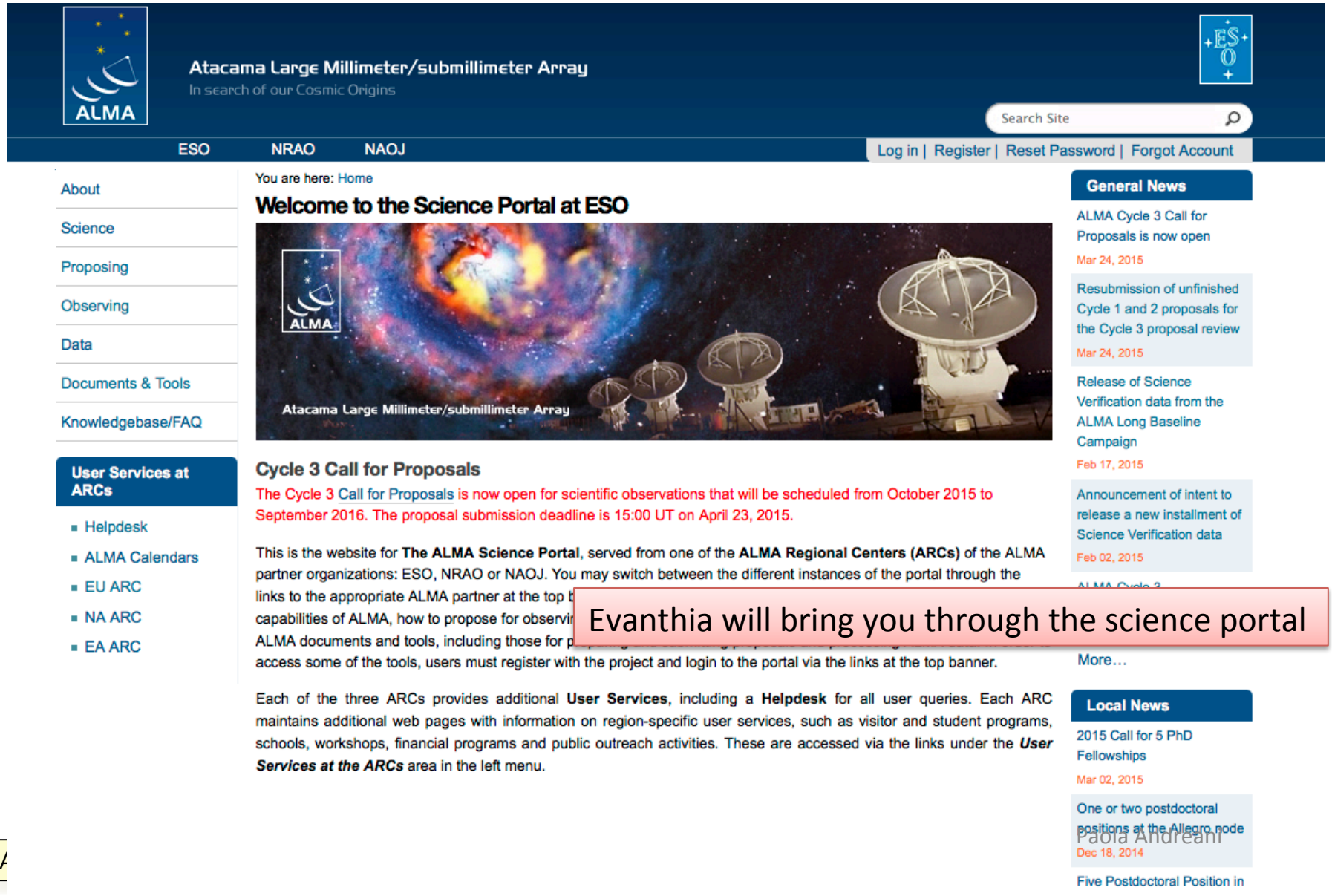

Evanthia will bring you through the science portal

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The SP contains all the information necessary to prepare and submit a proposal

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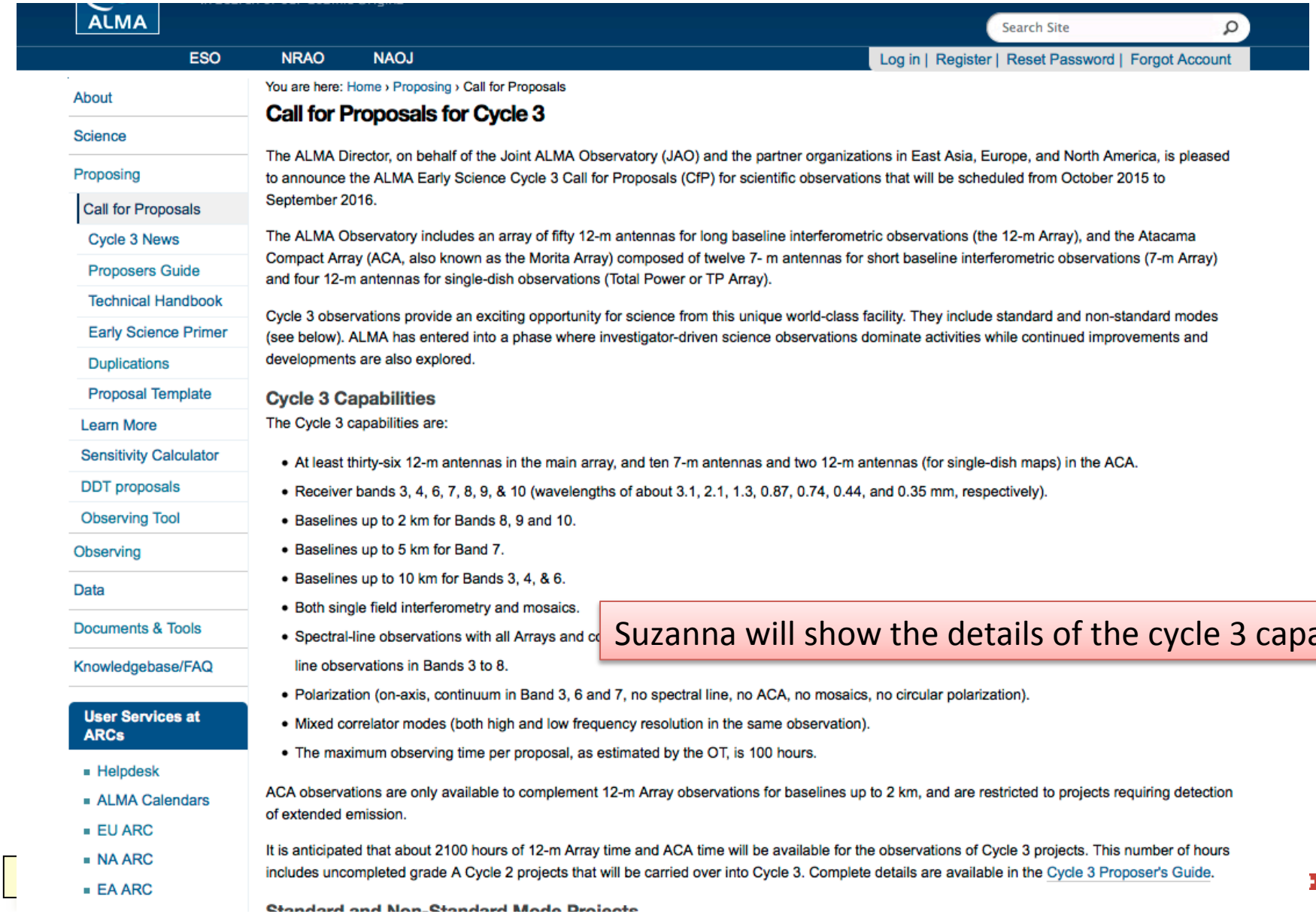

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Call for Proposals for Cycle 3

The ALMA Director, on behalf of the Joint ALMA Observatory (JAO) and the partner organizations in East Asia, Europe, and North America, is pleased to announce the ALMA Early Science Cycle 3 Call for Proposals (CfP) for scientific observations that will be scheduled from October 2015 to September 2016.

The ALMA Observatory includes an array of fifty 12-m antennas for long baseline interferometric observations (the 12-m Array), and the Atacama Compact Array (ACA, also known as the Morita Array) composed of twelve 7- m antennas for short baseline interferometric observations (7-m Array) and four 12-m antennas for single-dish observations (Total Power or TP Array).

Cycle 3 observations provide an exciting opportunity for science from this unique world-class facility. They include standard and non-standard modes (see below). ALMA has entered into a phase where investigator-driven science observations dominate activities while continued improvements and developments are also explored.

Cycle 3 Capabilities

The Cycle 3 capabilities are:

- At least thirty-six 12-m antennas in the main array, and ten 7-m antennas and two 12-m antennas (for single-dish maps) in the ACA.
- Receiver bands 3, 4, 6, 7, 8, 9, & 10 (wavelengths of about 3.1, 2.1, 1.3, 0.87, 0.74, 0.44, and 0.35 mm, respectively).
- Baselines up to 2 km for Bands 8, 9 and 10.
- Baselines up to 5 km for Band 7.
- Baselines up to 10 km for Bands 3, 4, & 6.
- Both single field interferometry and mosaics.
- Spectral-line observations with all Arrays and c
  line observations in Bands 3 to 8.
- Polarization (on-axis, continuum in Band 3, 6 and 7, no spectral line, no ACA, no mosaics, no circular polarization).
- Mixed correlator modes (both high and low frequency resolution in the same observation).
- The maximum observing time per proposal, as estimated by the OT, is 100 hours.

ACA observations are only available to complement 12-m Array observations for baselines up to 2 km, and are restricted to projects requiring detection of extended emission.

It is anticipated that about 2100 hours of 12-m Array time and ACA time will be available for the observations of Cycle 3 projects. This number of hours includes uncompleted grade A Cycle 2 projects that will be carried over into Cycle 3. Complete details are available in the Cycle 3 Proposer's Guide.

Standard and Non-Standard Mode Projects

Suzanna will show the details of the cycle 3 capabilities

Science Portal Updates

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- News items:
  - **Release of Science Verification data from the ALMA Long Baseline Campaign**
  - https://almascience.eso.org/news/release-of-science-verification-data-from-the-alma-long-baseline-campaign-2
  - **Resubmission of unfinished Cycle 1 and 2 proposals for the Cycle 3 proposal review**
  - https://almascience.eso.org/news/resubmission-of-unfinished-cycle-1-and-2-proposals-for-the-cycle-3-proposal-review-6
  - **First Release of the ALMA Science Pipeline**
  - http://almascience.eso.org/news/first-release-of-the-alma-science-pipeline

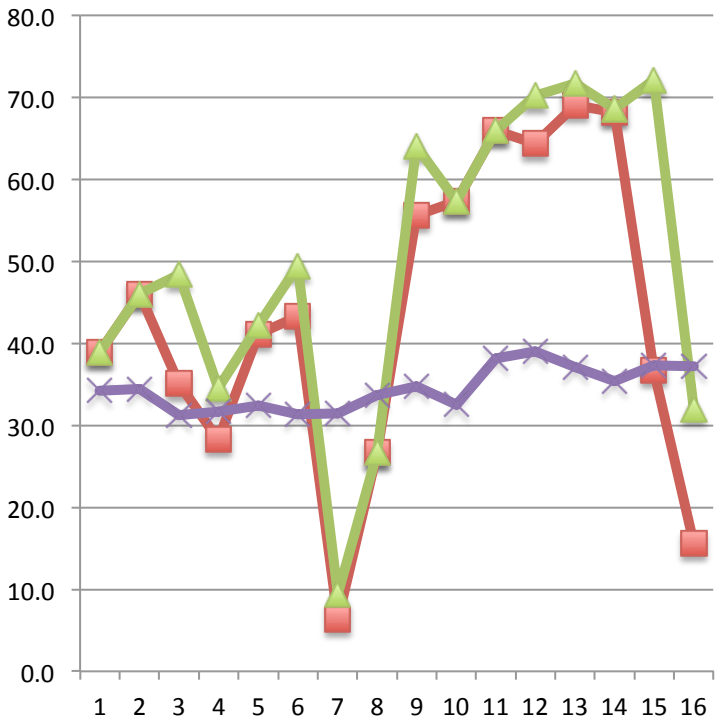
- **ALMA Cycle 3 Call for Proposals is now open**
  - https://almascience.eso.org/news/alma-cycle-3-call-for-proposals-is-now-open

Cycle 1 and 2 timeline

- Cycle 1 formally ended Jun 30 2014
  - 'officially' carried over 333 h
  - on top of ~1700 Cycle 2 allocated projects (A and B) for a total of 2033 hrs
- Scheduling priority
  - Cycle 2 "A" (~10% or 170 hrs estimated time)
  - Cycle 1 Transfers (~333 hrs)
  - Cycle 2 "B" (~1530 hrs)
  - Additional 800 hrs Cycle 2 "Filler" (grade=C) projects
  - No Cycle 1 Filler projects carried over into Cycle 2
- Sep---Nov: long baseline campaign
- ES starts again in Dec with a compact configuration
- Feb-Mar 2015: Engineer shutdown
- Apr – Sep: ES

Cycle 2 Observations

- 16 observing blocks done out of 34:
  - One block is one week: 16h/night + 24h on weekends = 128h of allocated time/block in theory
  - Total allocated time so far: 1901h
  - Time of successful executions so far: 825h



Execution efficiency:
= successful PI execution time/allocated time

Observing efficiency:
= successful PI execution time/(allocated time-weather downtime)

Total number and status of projects, member OUS and executions

Executions on the 12-m Array

	Cycle 1			Cycle 2		
Executions 12-m Array	Total	Done (passed QA0)	%	Total	Done (passed QA0)	%
Grade A+B	**983**	**642**	**65.3**	**1668**	**562**	**33.7**

ObsUnitSets (OUS) including ACA

	Cycle 1			Cycle 2	
OUS incl ACA	Total	Delivered	%	Total	Delivered
Grade A+B	734	352	48	1256	291
Grade C		63			18
DDT	11	7		2	1
Total	**745**	**422**		**1258**	**310**

Projects

	Cycle 1				Cycle 2		
Projects	Total	Delivered	Partially delivered		Total	Delivered	Partially delivered
Grade A+B	198	66	67		355	27	88
Grade C		19	13			1	5
DDT	5	5			2	1	
Total	**203**	**90**	**80**		**357**	**29**	**93**

ACA

- 7-m and TP array cannot be used simultaneously as expected (also not for Cycle 3)
- 7-m Array (Cycle 1 + 2):
  - Successful executions: 669 executions
  - Gridsurveys: flux surveys of flux calibrators done with the 7-m array)
- TP Array (Cycle 1 + 2):
  - Observations started in December
  - Successful executions: 283 executions
  - Data not yet delivered (details of data processing being sorted out)

Requested and Remaining Time

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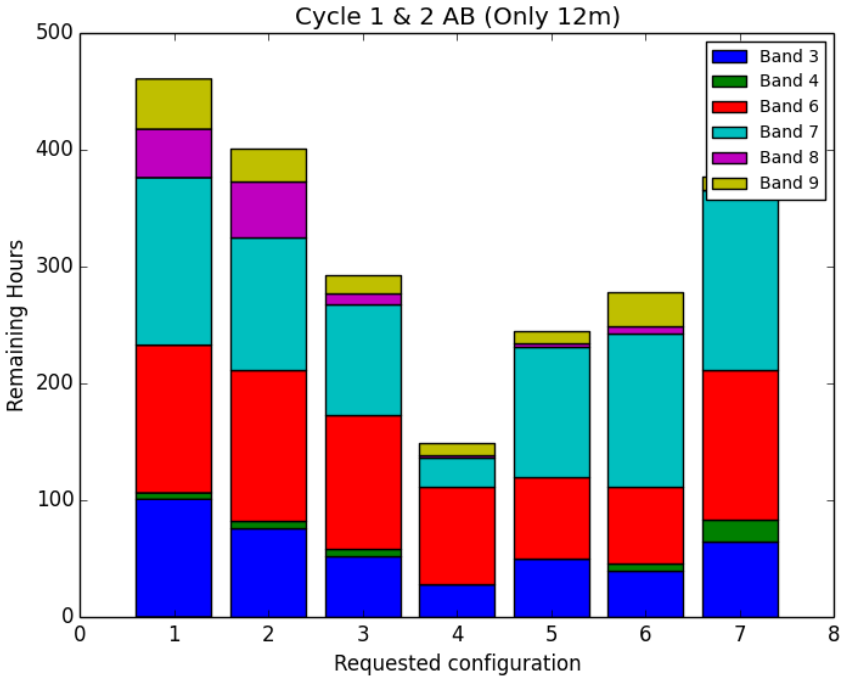
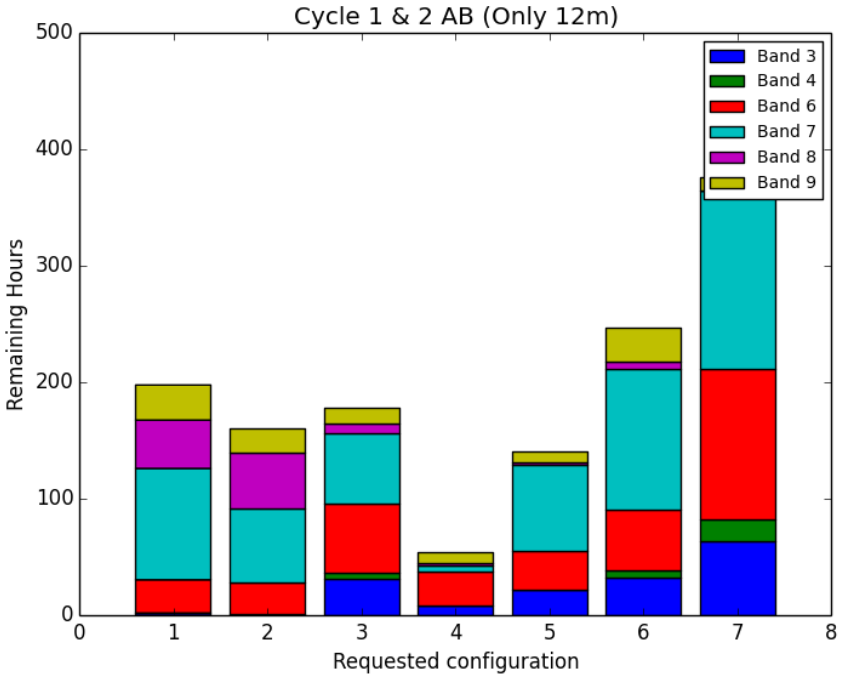
Total requested time (h)
Cycle 1 carryovers, Cycle 2 A+B



Configuration

Total remaining time (h)
Cycle 1 carryovers, Cycle 2 A+B



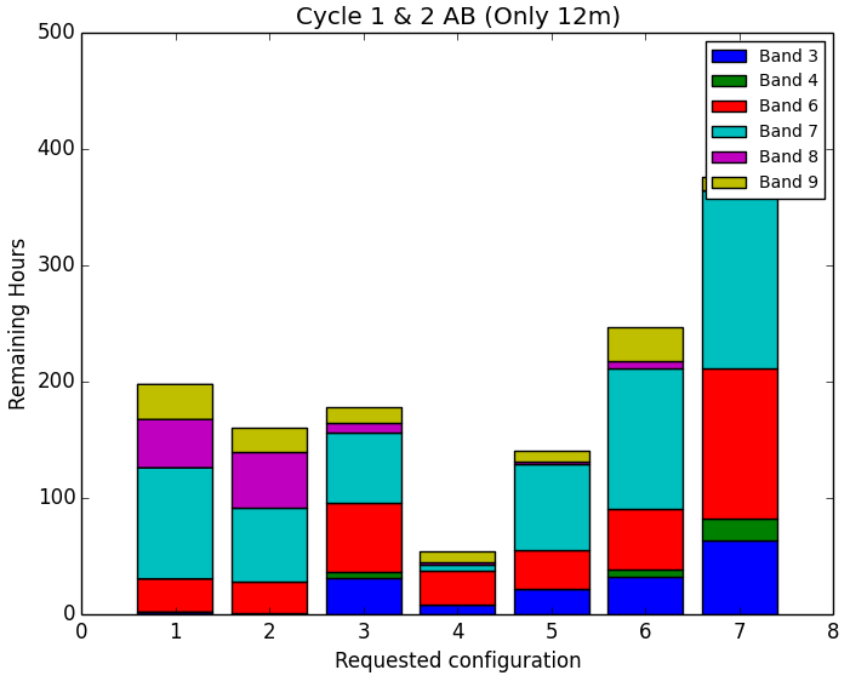
Configuration

Cycle 1 B (carryovers):
Remains 252h out of 532 hours (47%)
Cycle 2 AB:
Remains 1103h out of 1672 hours (66%)

Remaining Array Scheduling During Cycle 2

- April: C34-1 and 2
- May: C34-3 but with AEs possible to cover C34-3/4
- May/June: C34-5
- June: C34-7
- July-Aug: C34-6/7

Total remaining time 1355h
Cycle 1 carryovers, Cycle 2 A+B



Configuration

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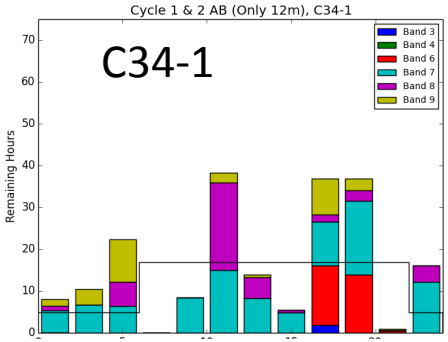
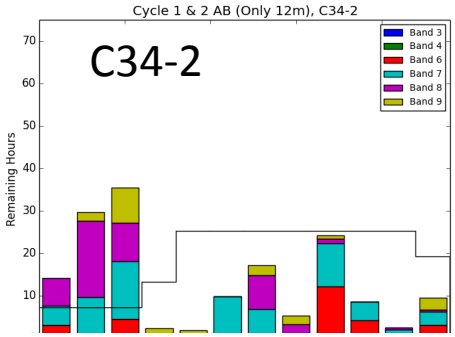
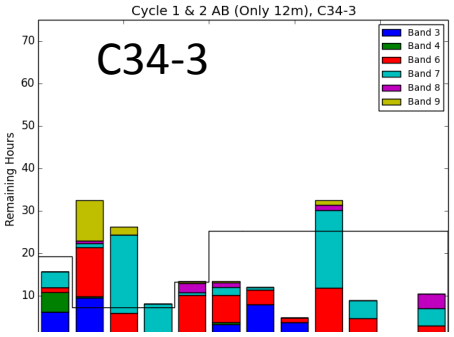
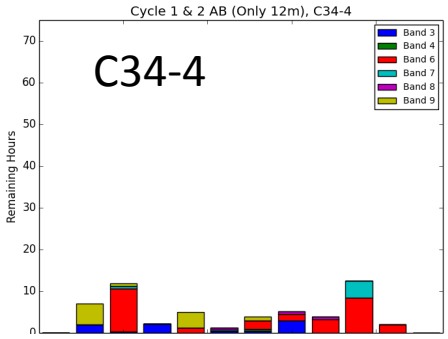
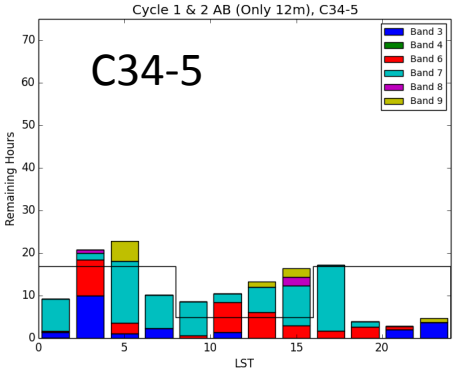
LST pressure per configuration

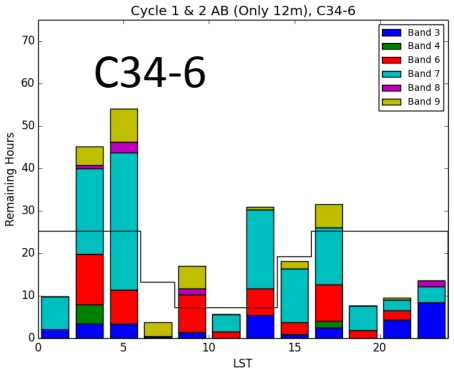


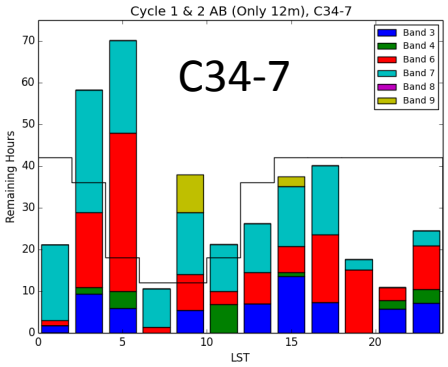












The black, horizontal lines in the figures indicate the distribution of available time according to the array configuration schedule in the previous slide

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Prediction of Completion

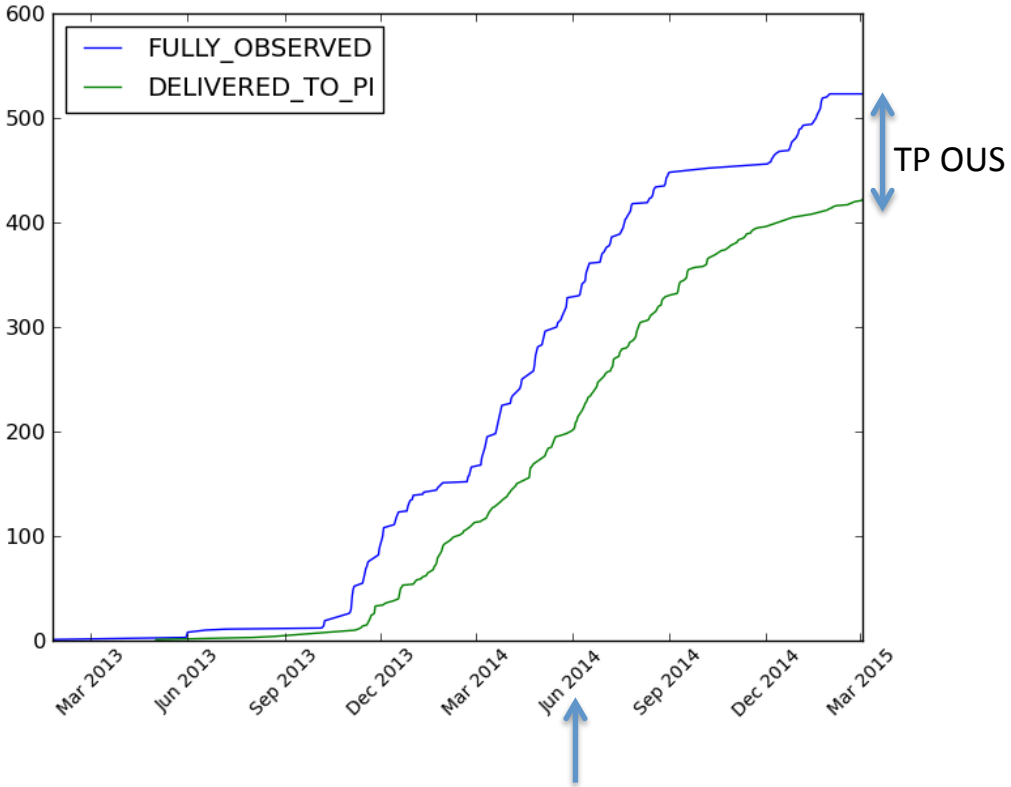
- Remaining Band 7, 8, 9 projects in configuration C34-1 to 3 that are up during daytime in April/May are unlikely to be observed
- Band 7, 8, 9 projects in configuration C34-6 and 7 that are up during daytime during June-September are unlikely to be observed
- Projects unlikely to be observed (grade A and B):
  - Cycle 1: 16 projects, 52 h: 92% completion rate (best case)
  - Cycle 2: 32 projects, 121 h: 91% completion rate (best case)
  - Total: 48 projects, 173 h: 91% completion rate (best case)
  - Most likely 4 Cycle 2 grade A projects will be transferred to Cycle 3
- Information on the Science Portal
- PIs of affected projects contacted by the Contact Scientist

Data Processing

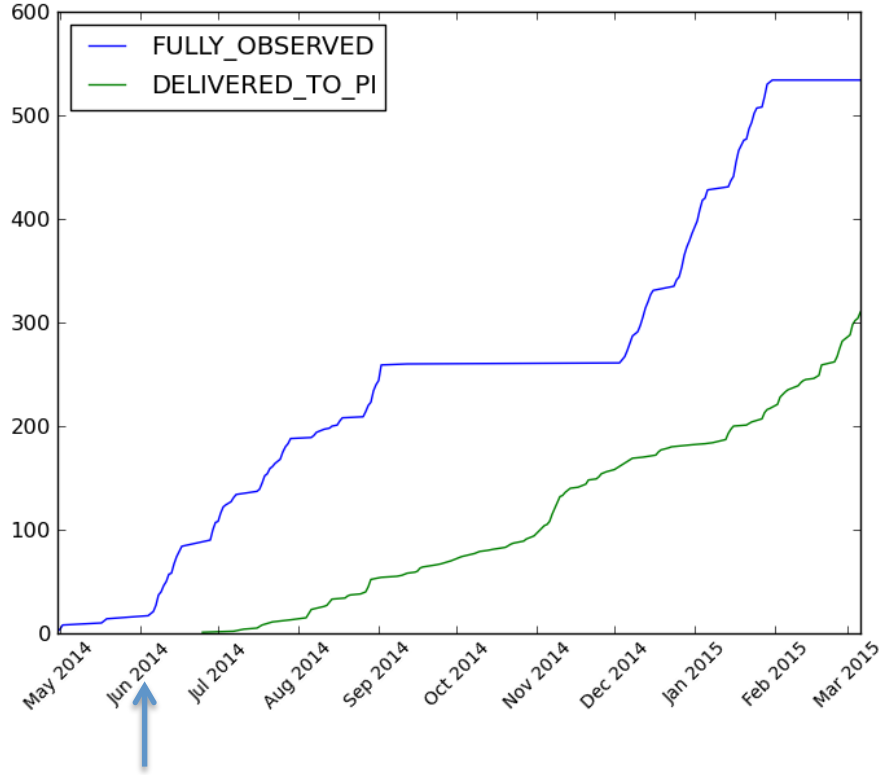
- The pipeline used for calibration/flagging of projects taken in observing modes the pipeline can process
- Imaging is done manually mainly by ARC staff
- Manual processing is being done by ARC and JAO staff for the data taken in the observing modes that the pipeline cannot process and OUSs that the pipeline failed to process

Data Processing

Cycle 1: fully observed and delivered OUSs



Cycle 2: fully observed and delivered OUSs



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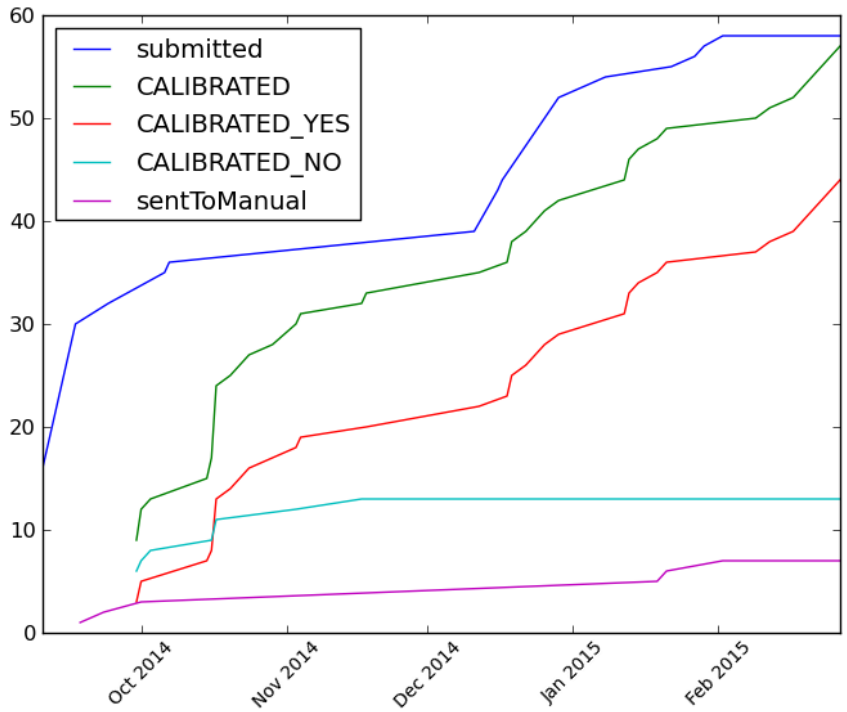
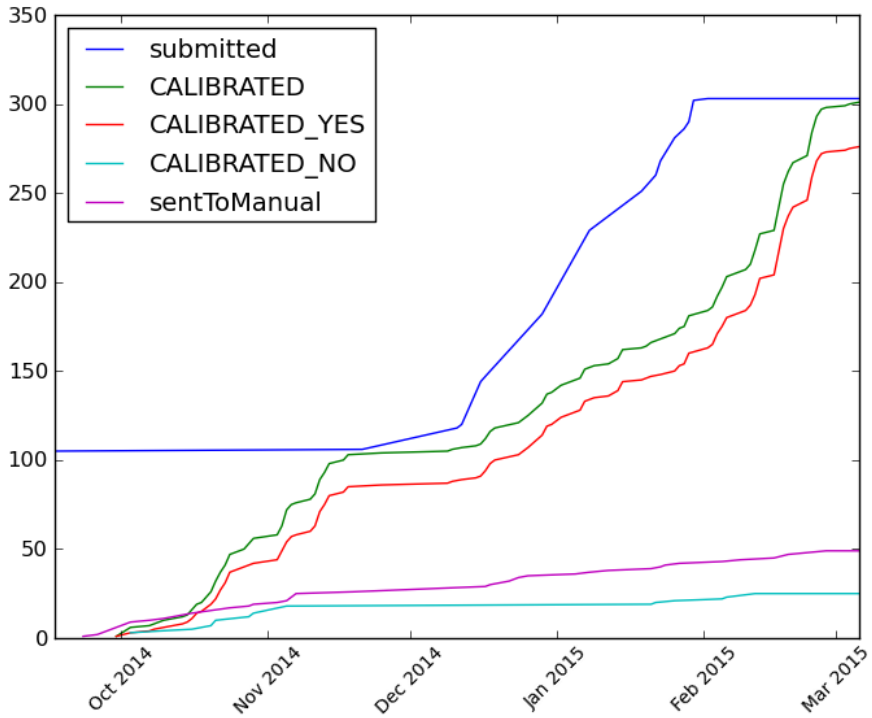
Pipeline Processing

Cycle 1



Cycle 2



Cycle 3 timeline

- March 24: Call for proposal and opening of the archive
- Apr 23: Proposal submission deadline 15UT
- May 2015: technical assessments
- June – July: science assessment
- June: Meeting of the science panels
- August: PI notification and start of Phase II
- Oct 1st: start of cycle 3 observations
- End September 2016: end of cycle 3
- 2100 hours of array time available for A and B projects
- Up to 20% of proposals may be assigned a grade of **A** (carry-over to Cycle 4) if not completed by end of Cycle 3.

Proposal review process

- The Proposal Review Committee will consist of:
  - 12 panels, 8 assessors each (one additional panel and one additional assessor/panel compared to previous Cycles following the advice from ASAC and the working group)
- Cycle 3 proposals will be assigned to one of five science categories:
  - Cosmology and the high redshift universe
  - Galaxies and galactic nuclei
  - ISM, star formation and astrochemistry
  - Circumstellar disks, exoplanets and the solar system
  - Stellar evolution and the Sun
- Venue will be in Osaka (Japan):
  - Venue has been selected; contractual agreement is being prepared
- Review meetings June 22-26, 2015

Grading system

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5.4 Grading system

One of the following grades will be assigned to each proposal.

- **Grade A**: The proposal is assigned the highest execution priority. If it is not completed by the end of the current cycle, it will be carried over to the next cycle.
- **Grade B:** The proposal is assigned a high execution priority. However, it will not be carried over to future cycles, even if it is not completed by the end of the current cycle.
- **Grade C:** The proposal is in the group of filler projects, which will be observed only if the conditions do not allow any higher priority project to be executed.
- **Grade U:** The proposal will not be scheduled, and Phase 2 products (see Section 6.1) will not be prepared.
- **Grade I:** The proposal is rejected because it is technically infeasible with the capabilities offered for the current cycle.
- **Grade O:** The proposal will not be observed because of duplication with archived data from a previous cycle or a higher-ranked project of the current cycle.

Grade A is assigned to proposals solely on the basis of scientific rank. Grades B and C are assigned to proposals solely on the basis of scientific rank and Executive balance. The maximum fraction of the available time that may be allocated to proposals of grades A, B, C is defined on a cycle-by-cycle basis, and announced in each Call for Proposals.

Users' policies

- All ALMA users should have a look at the users' policies:
  - https://almascience.eso.org/documents-and-tools/alma-user-policies
- Document contains:
  - Phase 1 and 2: proposal submission
  - Proposal eligibility
- Executive share (PI affiliation)
  - 22.5% for East Asia (EA);
  - 33.75% for Europe (EU);
  - 33.75% for North America (NA);
  - 10% for Chile (qualification to use the Chilean share of the time: http://www.das.uchile.cl/das_alma_crc.html)
- The proposal review process
- User support
- Data proprietary time, data delegation

Proposal types

- Standard, ToO, DDT (up to 5%) allowed
- No large programmes in cycle 3
- Standard observing modes:
  - used in previous Cycles
  - for which data reduced by the pipeline
  - Quality assured by the observatory
- Non-standard modes
  - less well characterized, up to 25%
  - data need to be processed by ALMA staff
  - `Best effort'

Duplication

- *ALMA policy forbids that identical data are taken twice unless scientifically necessary*
- *"duplication" refers to entire projects that may replicate the data or results obtained in another proposal or in the ALMA archive*
- If only part of a project duplicates existing data or another proposal, the duplicating portions may be descoped
- Potential proposal duplication may occur:
  - same targets in the same observing mode (frequency, angular resolution, area, depth, etc).
- *Duplication criteria are spelled out in the Users' policies*
- Duplications assessed at the SG, i.e., a SG considered a duplication of another SG only if the observations are scientifically equivalent.
- Duplication checks performed against archived data taken until the proposal submission deadline, or, for unexecuted grade A proposals, against proposal data
- Duplication checks are not performed against dynamically selected calibrators.
- Science assessors determine
  - if the considered duplicate proposals are mutually exclusive
  - if it would be scientifically meaningful for more than one to be approved
- If duplicated proposals that are mutually exclusive have a similar scientific rank, regional shares may be taken into consideration for discarding one of the proposals

- The ALMA Proposal Review Committee will render the final verdict.

Change requests

- Submitted proposals may not be changed prior to the completion of the review process.
- All changes made to projects after completion of the review process logged in the project by authorized ALMA science staff
- Changes to a project from the PRP or motivated by technical assessment (TA) implemented during Phase 2
- Changes to a project that are not mandated by the PRP or TA may only be made after the approval of a PI-initiated change request:
  - Changes to a project after Phase 2 and in the observing queue only be permitted in exceptional circumstances and only if the pertinent Scheduling Block has not been observed and had some data pass QA0
  - Exceptions are errors introduced by the Observatory in Phase 2.
  - A PI may request a change to a project – e.g. to correct a mistake in a field source list, or in response to information obtained later that may seriously affect a project's scientific case – via a standard change request via the Helpdesk.
  - Such change requests must include a clear description of the proposed change and a substantive justification for the change. A detailed description of the criteria followed by the Observatory to approve or reject a change request can be found in the Proposers' Guide.
- Change requests leading to duplications against current or past ALMA proposals are not allowed.

Scheduling

- Science observations executed by ALMA operations staff:
- With priority:
  - weather conditions
  - configuration of the array
  - target elevation and other practical constraints
  - the projects' assigned priority group
  - executive balance
- All other things being equal, projects with the highest scientific rank (A-grade cycle 2 projects priority over Cycle 3 grade B projects)
- Cycle 3 observations:
  - continuously scheduled during nighttime in 16h shifts
  - during part of the week also during day-time (for Bands 3-6),
  - interrupted by periods of engineering and optimization/development of the Array.

Scheduling

Table 2: Estimated maximum fraction of observing time suitable for observations in each band in Cycle 3

ALMA Band	Band 3	Band 4	Band 6	Band 7	Band 8	Band 9	Band 10
Fraction of time	100%	90%	70%	40%	20%	10%	10%

Notes for Table 2: Times exclude total weather shutdowns. These estimates are based on 1998-2011 atmospheric transmission statistics from the ALMA Site Characterization and Monitoring program and APEX radiometer in combination with the ALMA Cycle 0 experience from October 2011 to March 2012.

the 12-m Array arranged in 8 different configurations (Technical Handbook)
PIs request an angular resolution and largest angular scale for each science goal (SG)
Angular resolution mapped to one of the 12-m Array configurations
Scheduling software prioritizes scheduling of the SG when the array is in the best matching configuration

Scheduling

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Table 3: 12-m Array Configuration Schedule for Cycle 3

Start Dates	Configuration	Night LST	Not recommended
2015 October 1	C36-8	~17h - 9h	High frequency projects especially during day time (LST ~10h-16h)
2015 November 10	C36-7	~19h - 11h	High frequency projects especially during day time (LST ~12h-18h)
2015 December 29 (Maintenance in February)	C36-1	~00h - 16h	High frequency projects any time , specially during day time (LST ~17h-23h)
2016 March 22	C36-2	~04h - 20h	High frequency projects day time (LST ~21h-03h)
2016 April 19	C36-3	~07h - 23h	High frequency projects day time (LST ~00h-06h)
2016 May 10	C36-4	~08h - 00h	High frequency projects day time (LST ~01h-07h)
2016 May 31	C36-5	~10h - 02h	High frequency projects day time (LST ~03h-09h)
2016 July 5	C36-6	~13h - 05h	High frequency projects especially during day time (LST ~06h-12h)
2016 August 30	C36-7	~16h - 08h	High frequency projects especially during day time (LST ~09h-15h)

Notes for Table 3: Dates include relocation time at the end of every configuration

Data quality and delivery

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- ALMA staff conduct quality assurance on ALMA data
- Processed data products through the respective ARCs
- Experience in radio (in particular, millimeter) interferometry, not considered by the review panels but advantage for non-standard modes.
- PIs and observing teams should anticipate the need to invest their own time and expertise to assure the quality of the provided data products and to re-reduce the raw data if the quality of the data products is not satisfactory
- Visit the relevant ARC or ARC node to get help and to assist with quality assurance and potential data re-reduction.

Data quality: QA0 and QA2

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- *"The goal of ALMA Quality Assurance (QA) is to deliver to the PI a reliable final data product that has reached the desired control parameters outlined in the science goals, that is calibrated to the desired accuracy and free of calibration or imaging artifacts."*
- ALMA QA happens on 4 levels:
  - QA0: near-real time verification of weather and hardware issues carried out on each SB execution (execution block, EB) immediately after the observation.
  - QA1: verification of longer-term observatory health issues like absolute pointing and flux calibration.
  - QA2: offline calibration and imaging (using CASA) of a completely observed MOUS. Performed by expert analysts distributed at the JAO and the ARCs with the help of a semi-automatic CASA pipeline. Results are archived and given to the PI.
  - QA3: (optional) PIs may request rereduction, problem fixes, possibly reobservation

  - Only data which have passed QA0 will go to the QA2
  - If QA2 fails projects are put back in the queue.
  - At the end of the cycle all data from B and C projects which have passed QA0 are delivered even if QA2 has failed.

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Questions?