



Atacama Large Millimeter/submillimeter Array
In search of our Cosmic Origins



NAOJ
National Astronomical
Observatory of Japan



EUROPEAN ARC
ALMA Regional Centre

ALMA Astronomer on Duty (AoD) Shifts

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European ALMA Regional Centre

MAYA, March 2023



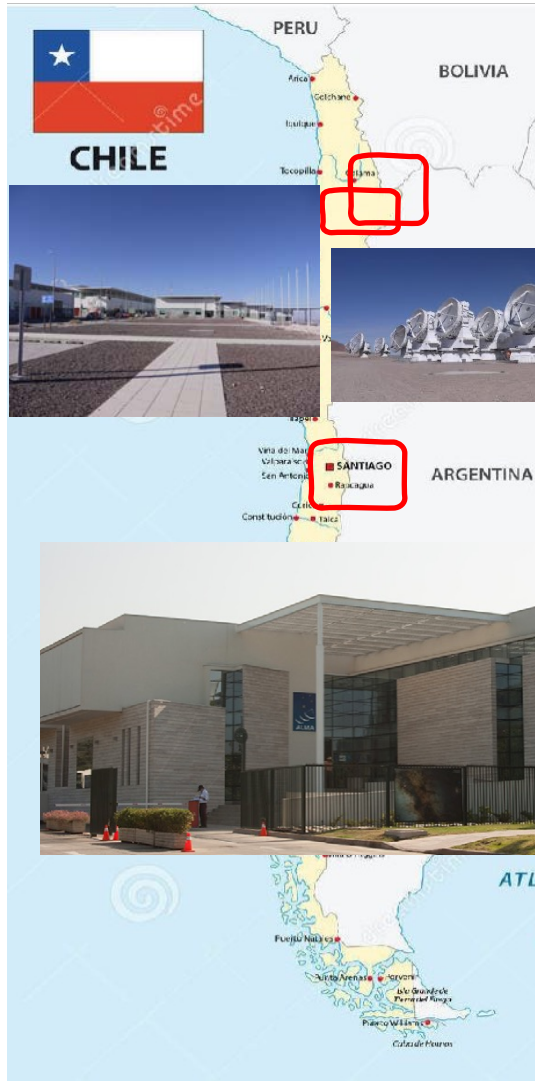
ALMA: A truly distributed projects



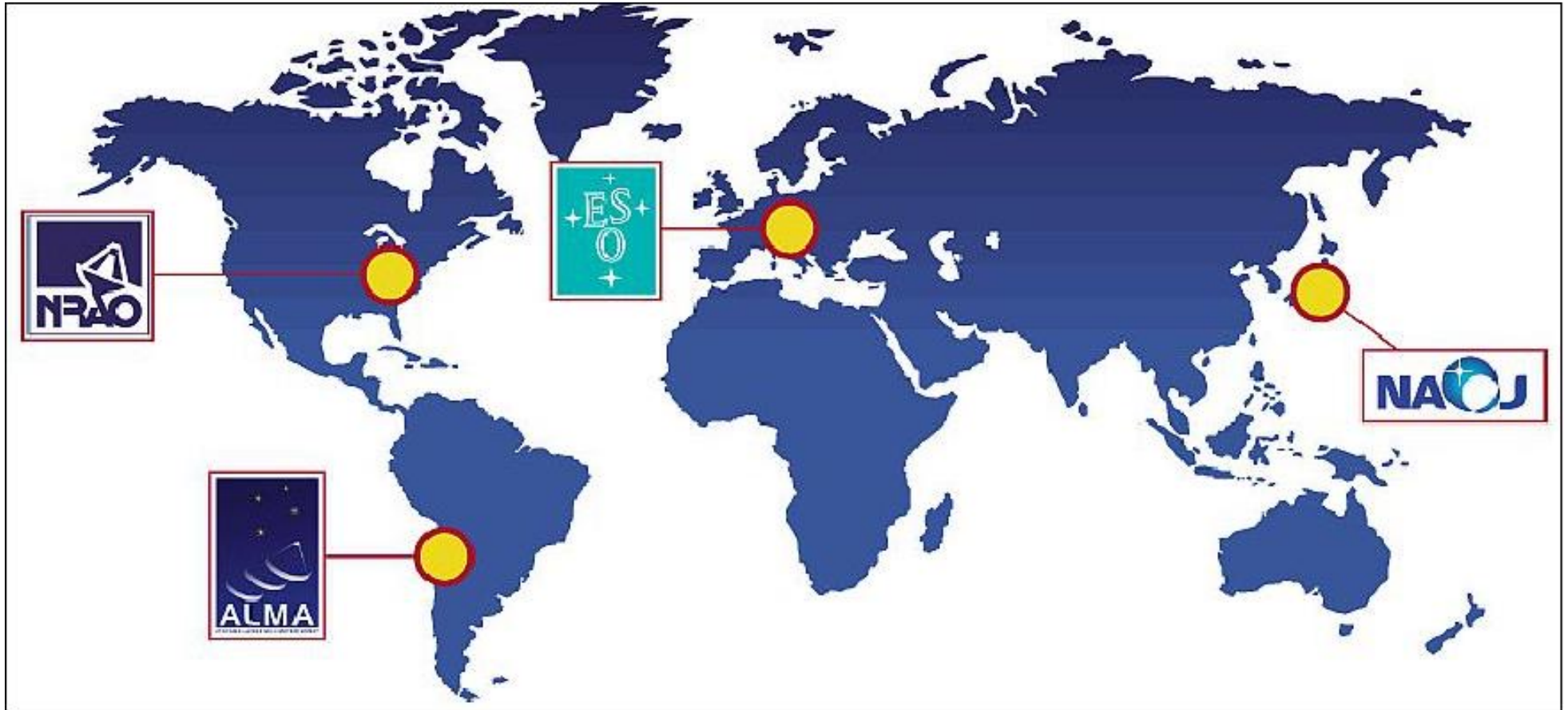
PERU
BOLIVIA
PARAGUAY
CHILE
SANTIAGO
ARGENTINA
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ALMA: A truly distributed projects



ALMA: A truly distributed projects



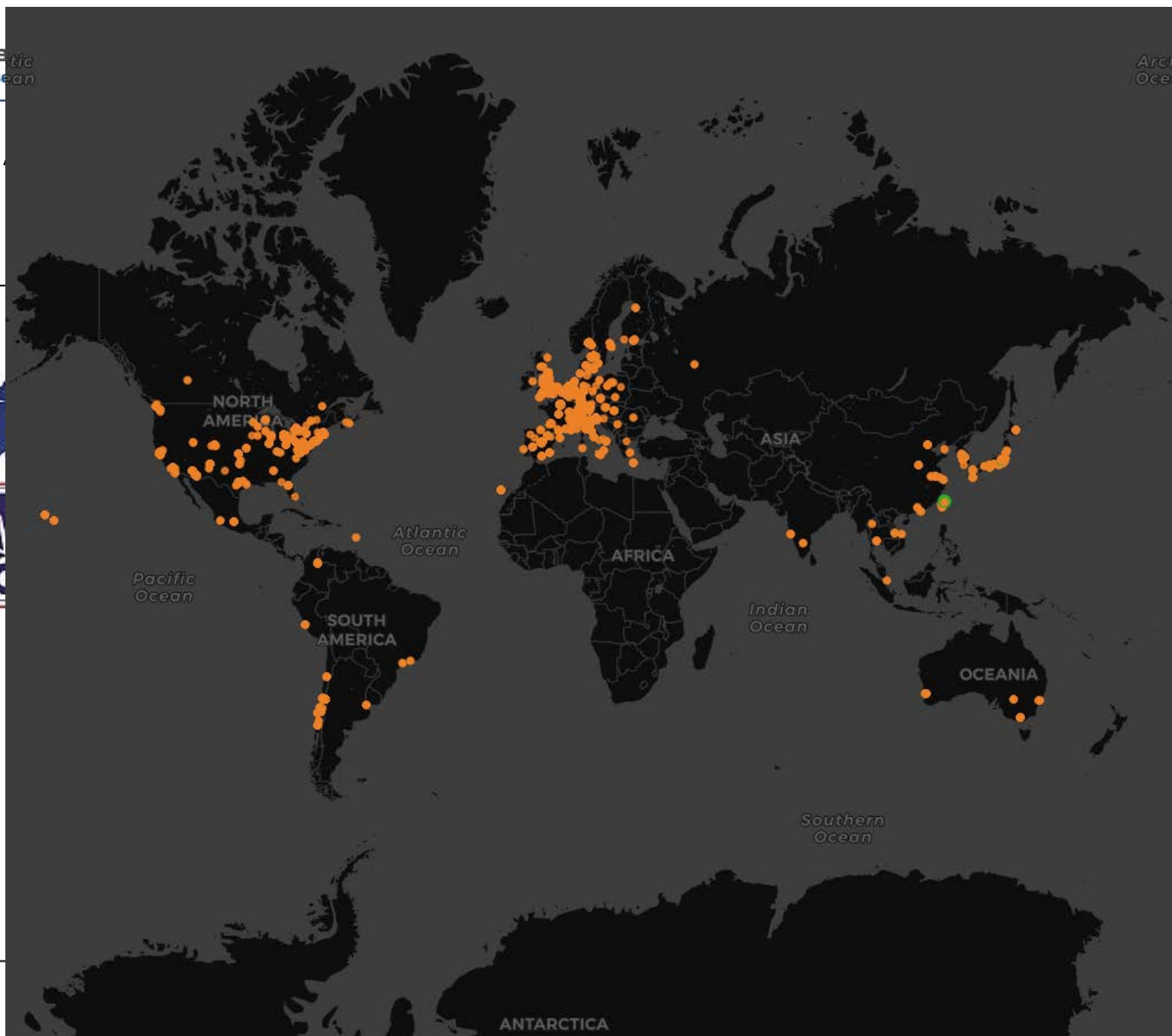


Atlantic
In sea

Arctic
Ocean



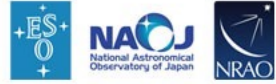
ALMA



High-level concepts for ALMA science operations

- Observations only in **service mode, carried out** by ALMA astronomers
- Observations 24h/day interrupted by maintenance periods
- Observations executed in form of Scheduling Blocks (SBs)
- Science-ready calibrated measurement sets, informative imaging
- Science and raw data available via the ALMA archive

ALMA: An instrument for everyone – not just the experts



ALMA Astronomer on Duty (AoD) shifts



- Organisation
- Preparation
- At the telescope
- After the shift



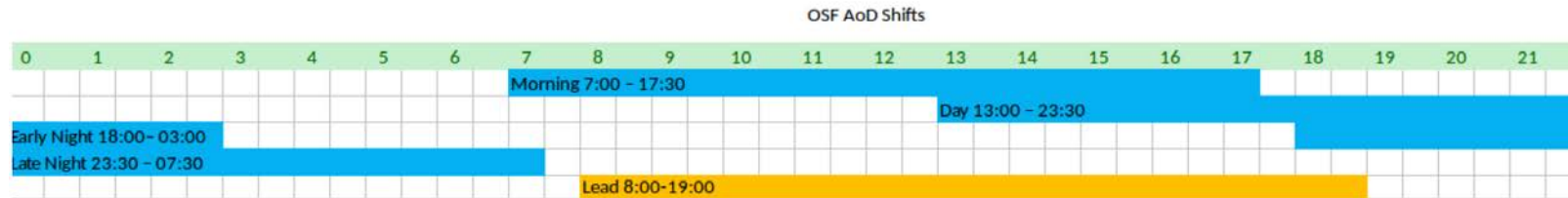
AoD shifts - Organisation

- Calendar filed for three months at the start of previous trimester
- Coordination between JAO and the three ARCs
- In Europe, ARC and nodes staff contribute to AoD shifts
- Flight booking to Chile – ARCs
- Flight booking to the OSF, taxis – JAO
- Accommodation booking (OSF, ESO guesthouse)
- Coordination



AoD shifts - Organisation

➤ Coordination at the observatory



AoDs assigned to Night shift will transition from Early Night to Late Night shifts according to the following table depending on their arrival/departure shift.

Shift/Weekday	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
Monday-Monday	EARLY	EARLY	LATE	LATE	LATE	EARLY	EARLY
Wednesday-Wednesday	LATE	LATE	EARLY	EARLY	EARLY	LATE	LATE
Start of shift							

Coordination with Engineering and Computing

Time is shared with Engineering and computing during the week is summarized in this chart.



AoD shifts - Preparation

➤ Documentation

AoD Documentation

Created by Juan Cortes on May 16, 2022

Here in this page, we include the updated Astronomer-on-Duty Documentation

- AoD Cycle 9 Documentation
- AIV Integrator
- AoD Documentation: In-coming Cycles Drafts
- AOS Monitor
- Solar Observations
- VLBI Observations
- AoD Staff Scheduling
- AoD Trainings
- Old Documentation
- Number in the Calibrations

← Updated every cycle

← Special modes



AoD shifts - Preparation

➤ Training

AOD + AO -> AoD Training March 2022

Created by Juan Cortes, last modified on Apr 27, 2022

- Training Purpose
- Dates, location and connection information
- Recorded CRE training sessions
 - March 16th - Session 1: Preparation, Data Acquisition, Roles and Array Operations
 - March 17th - Session 2: AoD Scheduling, Antenna Configurations, Antenna dashboard and P2G
 - March 23rd - Session 3: AoD tools, DSA and QA
 - March 24th - Session 4: Shiftlog tool, Antenna Integration and Verification
 - March 30th - Session 5: Weather, Polarization, Solar and Calibration

Training Purpose

These sessions aim at reviewing the AoD/AO procedures with the aim of:

- Serve as deeper training to newly arrived AoDs
- Update on procedures and align the knowledge of all acting AoDs
- Gather input on AoD procedures from the shared experience during the ongoing observing cycle
- Update of instructions in [AoD Documentation \(Old\)](#) if considered needed.

Serve of cross training between AO and AoD

This training does not aim to replace the current [AoD Documentation \(Old\)](#), which is assumed to be known by all participants, or to be tutorials as previous trainings (<https://wikis.alma.cl/bin/view/DSO/Cycle6/Cycle6AoDTrainingSessions>), but rather will try to highlight the main aspects the AoD should take into account or those more generally having issues.

The session are targeting also ARC Astronomers, and given the time difference, recordings will be added to this page, and input will be gathered before and after the sessions from parties not being able to attend.

Dates, location and connection information

Dates/Time:

- March 16th, 2022 10:00 - 13:00 (CLT)
- March 17th, 2022 10:00 - 12:30 (CLT)
- March 23rd, 2022 10:00 - 12:40 (CLT)



AoD shifts - Preparation

- Remote training



- In person training prior to the 1st shift

AoD shifts – At the telescope

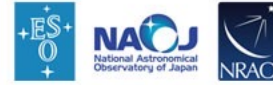
- The role of the array operators
 - Array creation
 - Communications in case of problems
- The role of the Astronomers on Duty
 - Bands to power up
 - SBs to execute
 - Go/NoGo
 - QA0
 - Daily report
- 3pm meeting to set priorities
- Hand over to / from engineering
- Campaigns (VLBI)



AoD shifts – At the telescope

- Three arrays (12-m, 7-m, TP), each with its own scheduling
- Array operator(s)
- Pre-pandemic: 2-3 AoDs at any given moment, 2 array operators
- Post-pandemic: 1 AoD, 1 array operator





AoD shifts – At the telescope



Configuration: Updated at 2023-02-07 10:05:18

Compact Collapse table Clear filters Matches: 66 DwnLd Pad .Cfg file

Antenna	Pad	AE	AS	EE	ACD	FE	B1	B3	B4	B5	B6	B7	B8	B9	B10	BL	ACA	P	F	I	C	J	Search ADE...	Search DSO...	Search Remarks...
CM01	N602	O	O	O	O	27	NA	O	O	O	O	O	O	O	O	17	04	N	N	R		13	PRTSPR-62046 ACA 7m: CM01: L...	NA	Membrane: FEP\in...
CM02	J502	O	O	O	O	14	NA	O	O	O	O	O	O	O	O	07	05	N	N	R		19	NA	PRTSPR-52865 B5 BB3 Bandpa...	Membrane: GORE...
CM03	J503	O	O	O	O	40	C	O	O	O	O	O	O	O	O	13	06	N	N	R		15	PRTSPR-62338 :IFProc1 in Stop	Bands 5 and 6 are affected by PR...	Membrane:FEP\in...
CM04	N605	O	O	O	O	23	C	O	O	O	O	O	O	C	C	56	07	N	N	R		5	NA	Not integrated after RTO	Membrane: GORE...
CM05	J506	O	O	O	O	15	NA	O	O	O	O	O	O	O	O	44	08	N	N	R		20	PRTSPR-62624 APE2: ACA: 7m : ...	NA	Membrane: GORE...
CM06	N606	O	O	O	O	63	NA	O	O	O	O	O	O	O	O	39	09	N	N	R		14	PRTSPR-61838 : El both axes failed...	NA	Membrane: FEP\in...
CM07	N601	O	O	O	O	56	NA	O	O	O	O	O	O	O	O	32	10	N	N	R		25	NA	B7 has high delays.	Membrane: FEP (R...
CM08	J505	O	O	O	O	12	NA	O	O	O	O	O	O	O	C	21	11	N	N	R		21	PRTSPR-61836 : El both encoders f...	NA	Membrane: FEP (r...
CM09	TF02	NA	O	O	O	13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	12	N	N	I		13	To Overhaul PRTSPR-62271 :Ifproc...	NA	Membrane: FEP, S...
CM10	J501	O	O	O	O	41	NA	O	O	O	O	O	O	O	O	63	13	N	N	R		16	PRTSPR-62199 : EL encoder alarm	NA	Membrane: FEP\in...
CM11	N604	E	O	O	O	66	C	C	C	C	C	C	C	E	C	31	14	N	N	I		31	PRTSPR-58936 ATM and Phase ca...	NA	Membrane: GORE...
CM12	J504	O	O	O	O	46	E	O	O	O	O	O	C	C	E	NA	15	N	N	R		25	PRTSPR-61723 -- AZ LF/LR need a...	NA	Membrane: GORE...
DA41	A083	O	O	O	O	03	NA	O	O	O	O	O	O	O	O	22	NA	N	N	R	P2	30	PRTSPR-62500 SAS/LLC issue	Antennas is in C because it needs p...	Membrane: FEP, S...
DA42	A047	O	O	O	O	62	NA	O	O	O	O	O	O	O	C	08	NA	M	M	R		15	PRTSPR-58492 :axis unexpected in...	Band 5 successfully integrated, but ...	Membrane: FEP, S...
DA43	A091	O	O	O	O	67	NA	O	O	O	O	O	O	O	O	05	NA	N	N	R	P7	19	PRTSPR-62500 SAS/LLC issue P...	Integration issue PRTSPR-56022 ...	Membrane: FEP S...
DA44	A044	S	O	O	O	26	NA	O	O	O	O	O	O	O	O	29	NA	N	N	R		26	PRTSPR-62378 ACU not respondin...	NA	Membrane: GORE...
DA45	A040	O	O	O	O	49	C	O	O	O	O	O	O	O	O	19	NA	N	N	R		16	RTSPR-61724 -- EL stop-pins issue	NA	Band-1: Integrated i...
DA46	A001	O	O	O	O	30	C	O	O	O	O	O	O	O	C	27	NA	N	N	R		35	PRTSPR-60869 AZ Enc head #2 / #...	Band 5 successfully integrated, but ...	Membrane: GORE...
DA47	A049	O	O	O	O	58	NA	O	O	O	O	O	O	O	O	45	NA	N	N	R		20	PRTSPR-62653 -- AZ Motor power ...	NA	Membrane: FEP, S...
DA48	A082	O	O	O	O	18	C	O	O	O	O	O	O	O	O	41	NA	N	N	R	P8	38	PRTSPR-62527 Mount go to stop; ...	NA	Membrane: FEP, S...
DA49	A050	O	O	O	O	35	C	O	O	O	O	O	O	O	O	28	NA	N	N	R		18	PRTSPR-62769 DA49: ACU: Acces...	Not locking B9	Membrane: FEP, S...
DA50	A089	O	O	O	O	29	E	O	O	O	O	O	O	O	C	06	NA	N	N	R	P10	25	PRTSIR-19956 : DTXBBpr0 250 M...	Band 5 successfully integrated, but ...	Membrane: FEP (r...
DA51	TF04	NA	O	O	O	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	00	NA	N	N	I		15	ANTENNA OUT OF SERVICE - COLLI...	NA	Membrane: FEP (r...
DA52	A008	O	O	O	O	17	E	O	O	O	O	O	O	C	C	46	NA	N	B	R		14	NA	NA	Membrane: FEP S...
0:20							C	C	C							23	NA	N	N	R	P6	20	On behalfs SCastillo antenna O - PR...	Antennas is in C because it needs p...	Membrane: FEP S...

AoD shifts – At the telescope

➤ QA0

ALMA Quality Assurance (AQUA)

QA0 — ExecBlock uid://A002/Xe2eefc/X11a7d

Project	SB Name	Duration	Start Time	QA0 State	EB UID
2019.1.01056.S	WRAY_17-a_06_TP	17.1min	20191105-16:55	Unset	uid://A002/Xe2eefc/X122ee
2019.1.00763.L	NGC_4299_a_06_TP	1.4h	20191105-15:29	Unset	uid://A002/Xe2eefc/X11b43
2019.1.00195.L	743353_a_06_7M	1.6h	20191105-15:22	Unset	uid://A002/Xe2eefc/X11a7d
2019.1.01730.S	ngc3627_b_07_TP	1.1h	20191105-13:59	Unset	uid://A002/Xe2eefc/X11067
2019.1.00195.L	724566_a_06_7M	1.2h	20191105-13:56	Unset	uid://A002/Xe2eefc/X10f7
2019.1.01730.S	ngc3627_b_07_TP	1.1h	20191105-12:52	Unset	uid://A002/Xe2eefc/X107a8
2019.1.00147.S	J1104+21_a_03_TM1	57.2min	20191105-12:48	Unset	uid://A002/Xe2eefc/X10742
2019.1.01730.S	ngc3627_b_07_TP	1.1h	20191105-11:27	Unset	uid://A002/Xe2eefc/Xfaec

EB Search Advanced EB Search

Correlator BL ACA (1) Search Reset

Project Type Science Calibration

QA0 States Unset Pending Pass Fail SemiPass

From To Last 8 hr

ExecBlock Summary Atmosphere Phase Sources Pointing Baselines Antennas Calibrators Amplitude Bandpass QA0 Flags (2)

2019.1.00195.L 743353_a_06_7M

ExecBlock uid://A002/Xe2eefc/X11a7d [In WebSLT](#) [In Protrack](#)

ExecBlock Status SUCCESS Antennas: 11 total (110.0 % for Cycle 7) Array: 7 [m] Correlator: ACA

Representative frequency 217.955 [GHz] (Sky)

Weather Phase rms: 67.688 (microns)
PWV 0.00 mm; Wind 8.21 m/s; Humidity 17.18 %; Pressure 463.68 hPa

QA0 Status ⚠ Unset (6) Do QA0 [QA0 Status history](#) [AOS check json data](#)

Antennas: 11 effective, 11 usable, 11 unflagged, 11 total. Expected for Cycle 7 : 10, minimum acceptable: N/A

Band observed: 6. Highest recommended: 10-10

Execution fraction 0.0

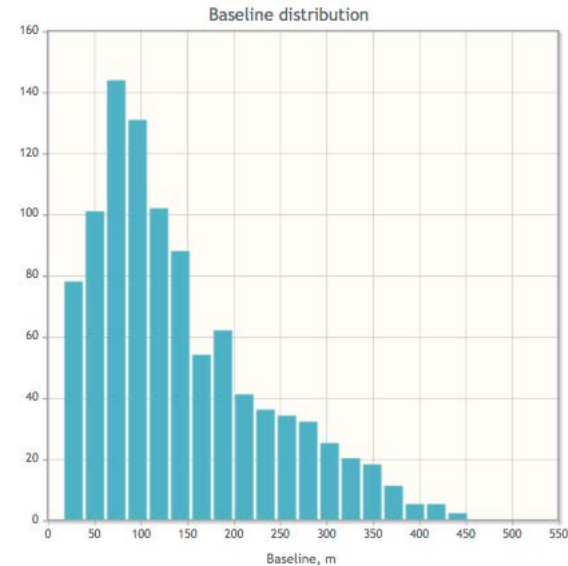
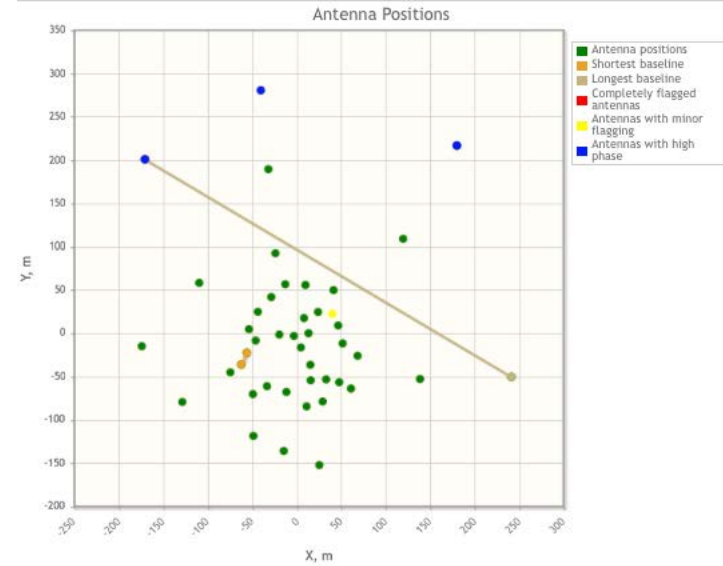
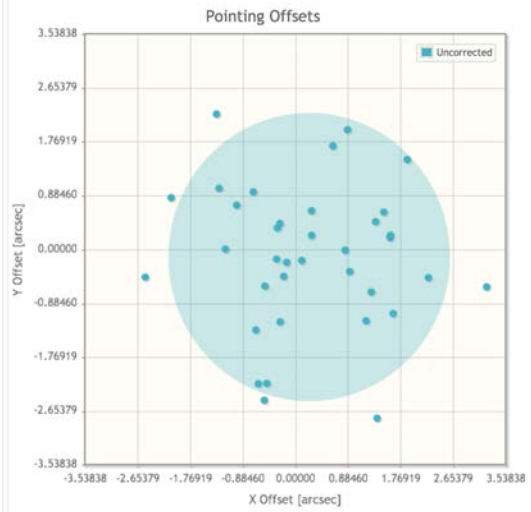
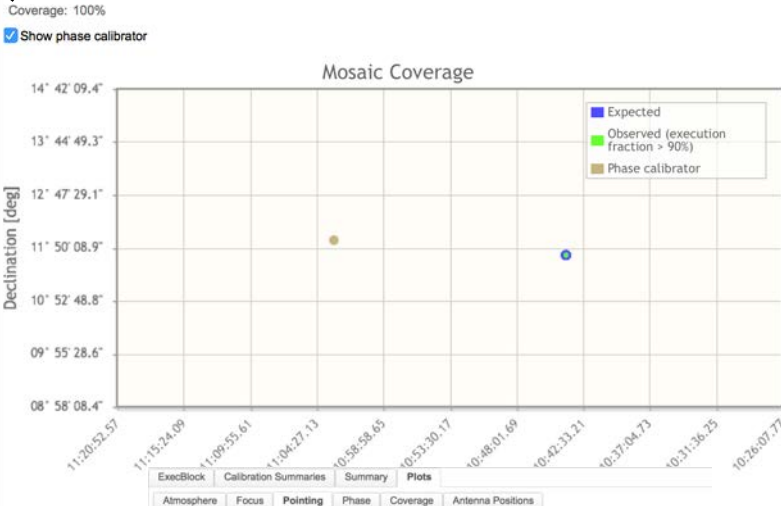
Final QA0 Comment aoscheck qa0_report: (4)
2019-11-05T15:22:34 uid://A002/Xe2eefc/X11a7d Band6 Freq 220.873612152 GHz standard observation
Mean Zenith PWV: 0.58 +/- 0.00 mm Representative Tsys: 73.5 K
11/11 antennas are working in band [6] on the ACA
Antenna-based phase differences on phaseCal: 17.9 degrees (67.7 microns)
No antennas exceed rms limit Warning: rms in Antenna-based phase scans is 51.9 degrees
WVR-uncorrected baseline-based phase rms: 61.4 degrees (231.8 microns) on 50m baselines
HIGHEST RECOMMENDED OBSERVING BANDS: 10 - 10
Baseline limit with good phase (80%): 38m. L80 resolution: 7.294 arcsec
Bandpass cal: J1256-0547 Approx. flux: 8.46 Jy SNR: 1873.41 Possible channels with SNR>30: 342
Phase cal: J1524-5903 Approx. flux: 0.375 Jy SNR :93.09 Sky separation: 5.98 degrees Resolution slope : 0.00
8 completed cycles of science/phaseCal
Percentage of all cal data to be flagged: 13.64% Binary size: 4.01TB
Band observed: 6 Highest recommended: 10-10
QA0 PASS

aoscheck recommendation: PASS

[PDF QA0 Report](#) [HTML QA0 Report](#) [Antenna flags](#)

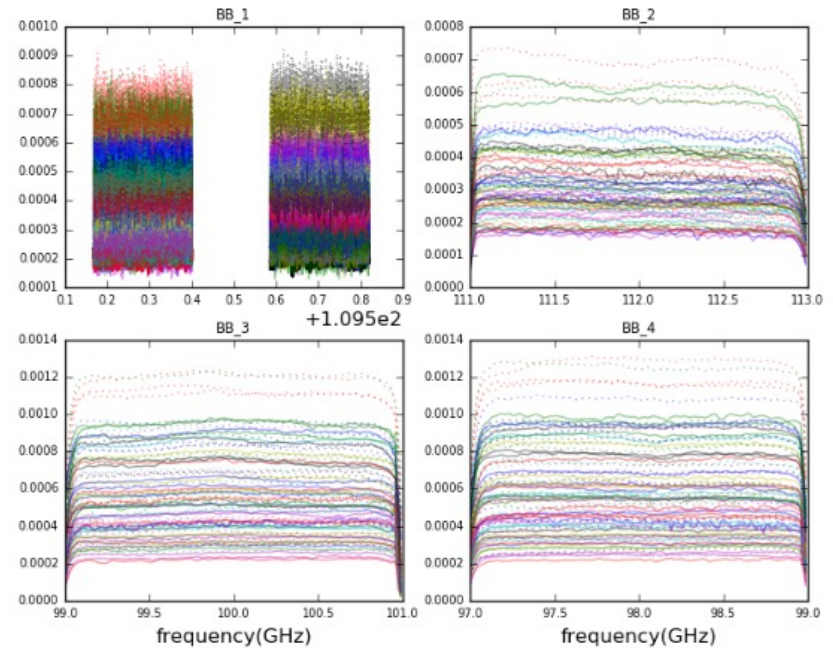
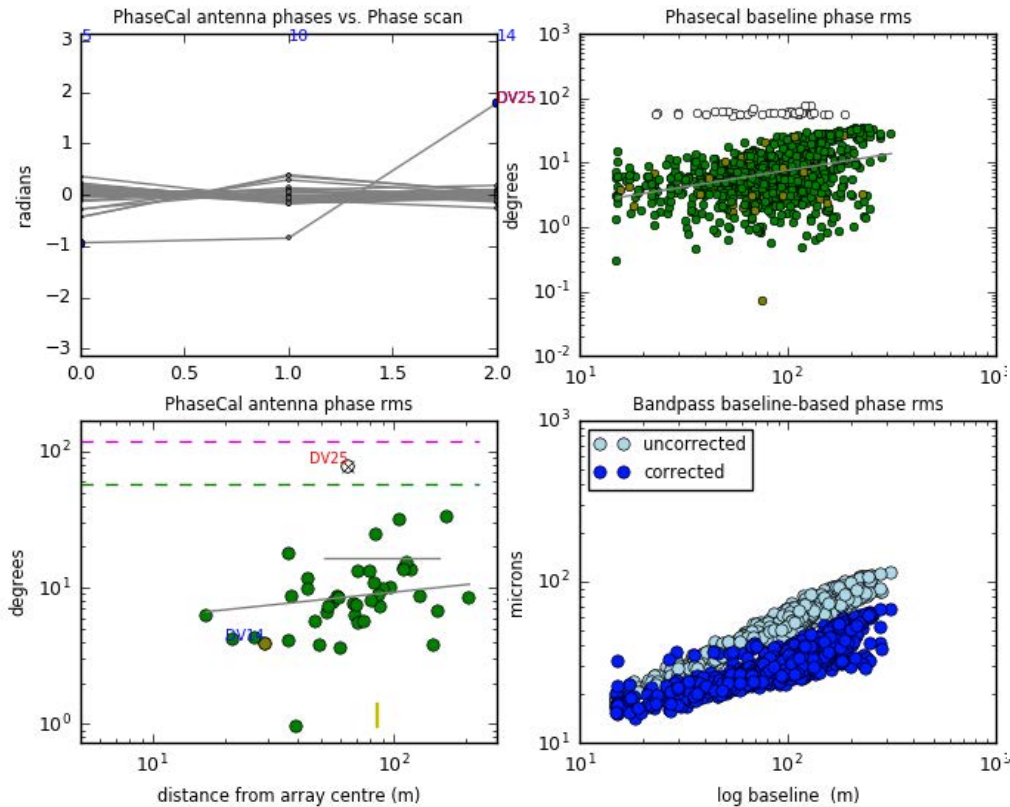
AoD shifts – At the telescope

➤ QA0



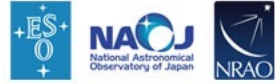
AoD shifts – At the telescope

➤ QA0



➤ QA0 decision





AoD shifts – After the shift



- Feedback
- Visit to the JAO to see colleagues



Pre-pandemic



Pre-pandemic





Atacama Large Millimeter/submillimeter Array

In search of our Cosmic Origins



Pre-



Pre-pandemic



**SOLMAFORO
UV Rays Indicator**

Alert	Maximum time of exposure (Minutes)		Suggestion
	White tone skin	Matte tone Skin	
Extreme	11 - 22	20 - 33	Avoid the sun, use protection
Dangerous	15 - 30	27 - 45	Avoid the shade, wear dark clothes, clothing and a hat
High	21 - 40	38 - 60	Use sun block and wear a hat
Medium	30 - 80	54 - 120	You might stay outside with protection
Low	75 - 240	135 - 360	You might stay outside with minimal protection

**SOLMAFORO
INDICADOR DE RAYOS ULTRAVIOLETA**

Alerta	Tiempo máximo de exposición (minutos)		Sugerencia
	Piel Blanca	Piel Mate	
EXTREMO	11 - 22	20 - 33	Evitar el sol, usar protección
PELIGROSO	15 - 30	27 - 45	Evitar la sombra, usar ropa oscura y sombrero
ALTO	21 - 40	38 - 60	Usar bloqueador y gorro
MEDIO	30 - 80	54 - 120	Puede tomar sol con precaución
BAJO	75 - 240	135 - 360	Puede tomar sol con precaución

Pre-pandemic

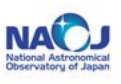


Pre-panden



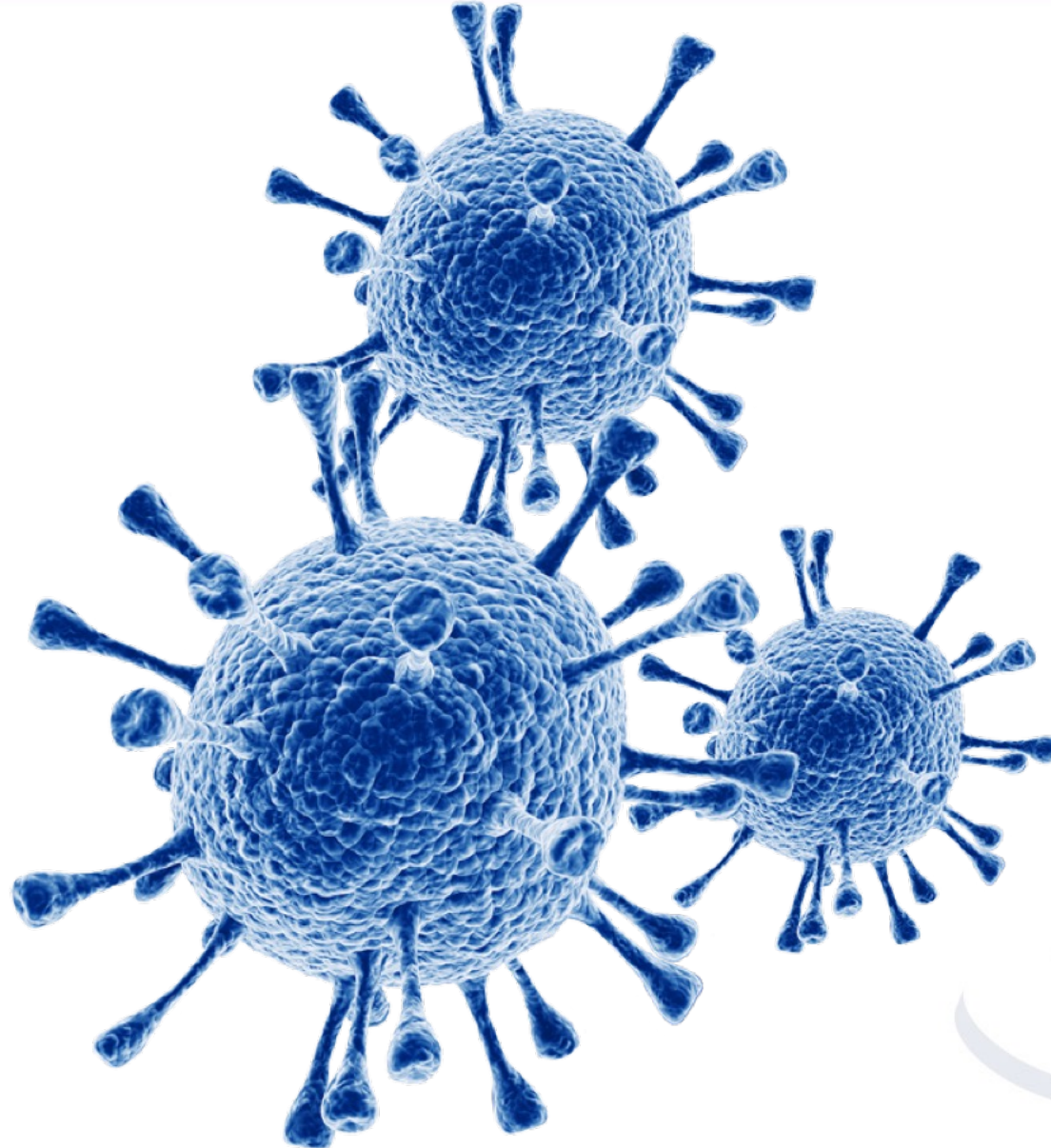


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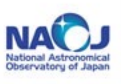
Pre-pandemic







Atacama Large Millimeter/submillimeter Array
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Post-pandemic



EUROPEAN ARC
ALMA Regional Centre



ALMA Astronomer on Duty (AoD) shifts

➤ Post-pandemic

