The ALMA Project Tracker reference manual for Principal Investigators

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

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Contributors

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Contributors' Logos

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Table of contents

1 The ALMA Project Tracker

The Project Tracker is the software tool for Principal Investigators (PIs) to track the observational and processing status of their ALMA Science projects. This document is a summary of how PIs can view the relevant information regarding their projects and status history.

1.1 Tracking an ALMA project

Principal investigators and Co-Investigators (hereafter PIs) are only permitted to track their own projects. They will use the Project Tracker mostly as a 'monitoring tool'. If any help regarding the use of Project Tracker is needed, PIs should send their questions to the ALMA Helpdesk.

1.2 How to access the Project Tracker

The Project Tracker is accessible to registered ALMA users after logging into the ALMA Science Portal (http://almascience.org/). The Project Tracker is accessed by clicking the corresponding link under "Observing" in the pull-down menu on the left side of the portal webpage.

2 Contents

Once the tool is loaded in the browser, PIs see a window containing a list of their projects (see Fig. 1). This list includes the project code, the PI user account ID, their Executive, the name of the project, the state of the project, the time of creation of the project (i.e. the date when the phase 1 products were created) and, if applicable, a Timed Out entry (i.e., the date when the project stopped being eligible for additional observations, either because it met the user-specified goals or because the observing season ended), and the Project "unique identifier" or UID (see the Glossary at the end of the manual for details).

The menu bar at the top of the screen can be used to bring up the User Manual, go back to the ALMA Science Portal, or log out.

Figure 1: Main window for the Project Tracker. All projects available to the logged-in user are listed here.

2.1 Life Cycle Diagrams

An observing project is composed of a hierarchy of structures, with the project at the top level, followed by ObsUnitSets (Science Goal, Group and Member), and Scheduling Blocks (SchedBlocks or SBs) at the lowest level (see the glossary at the end of this document for a description of these components). At any moment in time, each of these project components has a well-defined state. All the possible states, and the transitions between them, are defined in a life cycle diagram for the specific project component. The life cycles for the project and ObsUnitSet components are given in the appendix of this document. In the following, we briefly describe the states that are listed in the various views of the project tracker, but recommend users refer to the life cycle diagrams for a more in-depth understanding of the states and possible transitions.

2.2 Detailed Views

Selecting a project from the main Project Tracker window (Fig. 1) brings up a detailed view of this project in the lower part of the screen. The project structure is visualised with the project "tree" (see Fig. 2), which is displayed along the left hand side of the detailed view. Each project component (Project, Proposal, Observing Program ObsUnitSet (OUS), Science Goal OUS, Group OUS, Member OUS and SB) is represented by a successively indented level or "leaf" in this tree and can be expanded/collapsed by clicking on the small triangle symbol

A detailed view of each component is displayed by clicking on the corresponding leaf as indicated in Fig. 2. The status of the component is displayed in the column to the right of the project tree (Fig. 3). The currently selected view is indicated by blue highlighting in the project tree (the Observing Program ObsUnitSet view in the case of Fig. 2).

Entity	Status
▲ 📁 2013.1.0___.S	Ready
📄 Proposal	
▲ 📁 ObsUnitSet	Ready
▲ 📑 SG OUS (Tuning 1/18)	Ready
▲ 📑 Group OUS	Ready
▲ 📑 Member OUS (IRAS16293-2422)	Ready
📄 IRAS1629_a_07_TE	Ready
▲ 📑 Member OUS (IRAS16293-2422)	Ready
📄 IRAS1629_a_07_7M	Ready
▲ 📑 SG OUS (Tuning 2/18)	Ready
▲ 📑 Group OUS	Ready
▲ 📑 Member OUS (IRAS16293-2422)	Ready
📄 IRAS1629_b_07_TE	Ready
▲ 📑 Member OUS (IRAS16293-2422)	Ready
📄 IRAS1629_b_07_7M	Ready

Figure 2: Project Tree and expanded leaves for each component. Clicking on the leaves as indicated provides a detailed view of the corresponding project component.

2.3 Project View

Selecting the Project view (top level in Fig. 2) will display basic information on the project (Fig. 3, top section), including the project name, project code, the details of the PI, the date of project creation, and the Project identification code (Project UID).

Within this top section is a "Project Report" button that provides access to a detailed observing report in either pdf or html formats. If any observations for the project were attempted, then clicking on this button will produce a document with all the information regarding its observational progress. The observing log entries contain the execution date, the start and end time of the execution, the SchedBlock name and ID, the Execblock ID, the correlator used, the observing frequency/band, all antennas used, and the zeroth-level Quality Assurance (QA0) pass/fail status. A QA0 pass grade means that the execution completed successfully and that all necessary calibrations were performed (see the Glossary for more information on the Quality Assurance criteria). The Project Report also contains a detailed weather report for each night on which observations were executed. Note that the final level QA report (QA2) is not available through the Project Tracker, but is instead retrieved through the ALMA Science Archive after data delivery to PIs.

Figure 3: The Project View. The top section contains basic information about the project and a button to bring up a detailed project report in pdf or html format, while the lower sections give details on the project status and execution history.

The APRC consensus report appears in the following section. This contains the report given by the ALMA's Proposal Review Committee (APRC). This report is also included in the email notification given by ALMA upon acceptance or rejection of a proposal.

The middle section of the Project View provides the "project status history" and shows the date and time when a given state was last updated. The possible states of a project are described in the project life cycle diagram (see appendix). Those displayed in the PI view are as follows:

- **Phase1Submitted**: Proposal has been submitted by PI via the OT
- **Reviewed:** Proposal has been reviewed by an international committee. Whether or not the proposal will be observed will depend on the proposal grade and science rank; see the Proposers Guide for details.
- **Phase2Submitted:** At least one SB in the project has been generated and submitted to the archive as part of the Phase 2 process
- **Ready:** Project is ready for execution at the telescope (this state is set by ALMA staff after PI approval, as part of the Phase 2 process)
- **InProgress:** Project has been partially observed
- **Broken:** There is a problem with the project, which needs to be corrected by ALMA staff (if necessary in cooperation with the PI)
- **Repaired:** A formerly broken project has been corrected and resubmitted
- **Completed:** All OUSs in the project have been delivered to the PI
- **Observing TimedOut:** Project is no longer eligible for additional observations, either because it met the user-specified goals or because the observing season ended

- **Cancelled:** The project has no valid data and will not be observed. This may occur e.g. for a time-critical project where the window of opportunity has passed without any data having been taken.

Finally, the lower section of the Project View pane gives the "project execution summary", a high-level summary of the project's progress towards completion (i.e. the total execution time; the number of OUS that were successfully completed[1]; the number of OUS that failed QA0; the number of SBs successfully completed; the number of SBs that failed QA0).

2.4 Proposal View

Selecting the "Proposal" leaf in the Project Tree (2nd level from the top in Fig. 2), will bring up information of relevance to the proposal review process, such as the Project Code, the title, the PI name, the Executive to whom the proposal is assigned (for time accounting purposes), any Co-I names, the scientific category, the abstract, the proposal cycle, and the proposal type. Also, it includes a "Download Proposal PDF" that provides access to the Proposal text in PDF format.

2.5 ObsUnitSet Views

The Project Tracker displays several ObsUnitSet (OUS) views. Selecting "ObsUnitSet" (3rd level from the top in Fig. 2) will bring up the Observing Programme level ObsUnitSet status history, with each state transition listed along with the corresponding timestamp (see Fig. 4). Similar information is displayed when selecting the Group and Member OUS leaves in the Project Tree.

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[1] Note that because of the hierarchical structure of the project, there will always be more OUSs than SBs – see Figure 2.

ObsUnitSet

Requested Array   TWELVE-M

ObsUnitSet status history	Timestamp	
Phase2Submitted	Wed, 29 Jun 2011 19:36:08 GMT	
Ready	Fri, 04 May 2012 20:33:48 GMT	
PartiallyObserved	Fri, 04 May 2012 20:47:27 GMT	
FullyObserved	Tue, 09 Apr 2013 20:41:29 GMT	
ReadyForProcessing	Tue, 09 Apr 2013 20:41:44 GMT	
PipelineProcessing	Tue, 09 Apr 2013 20:41:49 GMT	
Processed	Tue, 09 Apr 2013 20:42:36 GMT	
Verified	Tue, 09 Apr 2013 20:42:44 GMT	
ReadyToDeliver	Tue, 09 Apr 2013 20:42:48 GMT	
Delivered	Tue, 09 Apr 2013 20:42:52 GMT	

Figure 4: ObsUnitSet View of the Project Tracker. The ObsUnitSet status history is displayed.

For the Science Goal OUS ("SG OUS" in Fig. 2), the science goal parameters entered by the PI are displayed in addition to the OUS status history. These include the requested noise level, the names of spectral lines, the peak flux, center frequency, line-width and whether the project will be observed with ACA, as shown in Fig. 5.

ObsUnitSet: SG OUS

Requested Array   TWELVE-M

Science Goal:

Notes

Performance Parameters

Desired noise level	0.012 Jy	Will be observed with ACA?	false
Name of the lines	DCO+ v=0 J=4-3	Center Frequency	288.144 GHz
Peak Flux	1.0 mJy	Linewidth	9.323182183450101E-4 GHz

ObsUnitSet status history	Timestamp
Phase2Submitted	Fri, 31 May 2013 04:57:56 GMT
Ready	Fri, 31 May 2013 10:00:36 GMT

Figure 5: Science Goal OUS view

The possible states for OUSs are the following;

- **Phase2Submitted:** At least one SB within the OUS has been generated and submitted
- **Ready:** All SBs within the OUS are ready for execution
- **PartiallyObserved:** One or more SBs within the OUS (but not all) have been observed and passed QA0
- **FullyObserved:** All the SBs within the OUS have been observed and passed QA0
- **ReadyForProcessing:** The data are marked as eligible for being processed
- **PipelineProcessing**: The data are being processed through the (manual or automated) Pipeline
- **Processed:** The data reduction process has been completed, but the data products have not yet been inspected
- **QA2InProgress:** The data products are undergoing the 2nd level of Quality Assurance (QA2 – see glossary)
- **Verified:** The data have passed QA2 (OUSs that fail QA2 are returned to the Ready state – see OUS life cycle diagram)
- **ReadyToDeliver:** The data products have been transferred to the corresponding ARC for delivery
- **Delivered:** The PI has been notified by an ARC that the data products are available for retrieval from the archive
- **QA3InProgress:** The PI reported a data issue that is under investigation.
- **Observing TimedOut:** The OUS is no longer eligible for additional observations, either because it met the user-specified goals or because the observing season ended.
- **Cancelled:** The OUS has no valid data and will not be observed.

2.6 SchedBlock View

Selecting the SchedBlock level of the Project Tree (represented by a yellow "clock face" in Fig. 2) brings up the SchedBlock View (see Fig. 6). The top part gives some general information on the SchedBlock (Array, UIDs and current state). The possible states for SBs are the following;

- **Phase2Submitted:** The phase 2 SB has been submitted
- **Ready:** The SB is ready for its first execution
- **PartiallyObserved:** The SB has been observed at least once
- **CalibratorCheck:** At least one of the standard calibrations is missing a suitable source in the ALMA calibrator source catalogue and one must be found by the observatory before the SB can be executed.
- **WaitingForPI:** The PI must provide feedback before the SB can be executed.
- **FullyObserved:** The SB has been observed and the desired number of valid executions has been reached

Sched Block:

Requested Array	TWELVE-M	Sched Block uid uid://A001/X6f/X3c
Description		
State	**FullyObserved**	SB Status UID uid://A001/X6f/X44

Field Source List	Source	RA (h:m:s)	Dec (d:m:s)	Bands	Comments
Primary:	ISO-Oph 102	16:27:06.600	-24:41:48.804	7	Integration times: 180 (s), 180 (s)
Amplitude2	Neptune	22:30:03.993	-10:08:21.844	7	Integration times: 180 (s), 180 (s)
Bandpass	J1924-292	19:24:51.055	-29:14:30.121	3, 7	Integration times: 180 (s), 180 (s), 180 (s)
Phase_near	J1625-254	16:25:46.891	-25:27:38.327	3, 7	Integration times: 180 (s), 180 (s), 180 (s)
Amplitude1	Titan	15:24:54.161	-16:12:54.129	7	Integration times: 180 (s), 180 (s)
Pointing for Neptune	3c446	22:25:47.259	-04:57:01.391	3	Integration time: 180 (s)
Pointing for Titan	J1337-129	00:20:54.185	-01:13:55.987	3	Integration time: 180 (s)
Bandpass2	3C279	12:56:11.166	-05:47:21.525	3, 7	Integration times: 180 (s), 180 (s), 180 (s)

create horizon plot

Preconditions and constraints

Representative Frequency	347.422	Dynamic range	1
Min angular resolution (arcsec)	0	Max angular resolution (arcsec)	0
Source Velocity (km/s)	0	Is mosaic?	false
Min hour angle (degrees)	0	Max hour angle (degrees)	360
Max Precipitable Water Content (mm)	1.200	Max wind velocity (m/s)	0
Phase stability (degrees)	0	Max seeing (arcsec)	0

Spectral Windows	Usable Bandwidth [MHz]	Usable Channels	Channel Spacing [MHz]	Filter Mode
Science setup - BB_1 - SW-1	1875	3840	0.488	UNKNOWN
Science setup - BB_2 - SW-1	1875	3840	0.488	UNKNOWN
Science setup - BB_3 - SW-1	1875	3840	0.488	UNKNOWN
Science setup - BB_4 - SW-1	1875	3840	0.488	UNKNOWN
Band 3 Pointing setup - BB_1 - SW-1	2000	128	15.625	TDM
Band 3 Pointing setup - BB_2 - SW-1	2000	128	15.625	TDM
Band 3 Pointing setup - BB_3 - SW-1	2000	128	15.625	TDM
Band 3 Pointing setup - BB_4 - SW-1	2000	128	15.625	TDM
TDM Atm Cal setup - BB_1 - SW-1	2000	128	15.625	TDM
TDM Atm Cal setup - BB_2 - SW-1	2000	128	15.625	TDM
TDM Atm Cal setup - BB_3 - SW-1	2000	128	15.625	TDM
TDM Atm Cal setup - BB_4 - SW-1	2000	128	15.625	TDM

Exec Status List	QA0 Status	Start Time (UTC)	End Time (UTC)	Start Time (LST)	End Time (LST)	ExecBlock ID
Broken	Fail	2011-10-01 22:49:12	2011-10-01 22:55:00	2011-10-01 18:59:25	2011-10-01 19:05:14	uid://A002/X2c9553/X453
Broken	Fail	2011-10-01 22:59:50	2011-10-01 23:03:02	2011-10-01 19:10:05	2011-10-01 19:13:17	uid://A002/X2c9553/X469
Broken	Fail	2011-10-01 23:10:40	2011-10-01 23:32:26	2011-10-01 19:20:56	2011-10-01 19:42:46	uid://A002/X2c9553/X479
Broken	Fail	2011-10-01 23:39:19	2011-10-01 23:46:08	2011-10-01 19:49:40	2011-10-01 19:56:30	uid://A002/X2c9553/X4e0
FullyObserved	Fail	2011-11-03 20:59:34	2011-11-03 21:29:08	2011-11-03 19:19:35	2011-11-03 19:49:14	uid://A002/X307fb7/X199
FullyObserved	Pass	2011-11-03 21:36:22	2011-11-03 22:05:51	2011-11-03 19:56:29	2011-11-03 20:26:03	uid://A002/X307fb7/X224
FullyObserved	Pass	2012-05-23 06:28:29	2012-05-23 07:09:02	2012-05-23 18:02:31	2012-05-23 18:43:11	uid://A002/X4122f3/X258

Figure 6: SchedBlock detailed view.

This is followed by the "field source list", which includes a section containing details on all science and calibration targets in the SB. The calibration sources will generally be specified as queries before the SB has been executed; after SB execution the calibrators selected at run-time can be viewed. It is also possible to create a horizon plot that displays the elevation of all field sources during the night.

Below this is a section detailing the pre-conditions and observing constraints based on the Phase 1 input of the Science Goal from which the SB was created. This includes for example the maximum Precipitable Water Content (PWV) at which the observations should be scheduled, which is based on the representative frequency of the observation.

The next section of the SchedBlock detailed view labeled "Spectral Windows" contains information on the spectral setups of the observation, both for the science and calibration observations.

Finally, the lowermost element of the SchedBlock view, the "Exec Status List", shows the execution history of the SB, including the Execution Block state, the QA0 status (see glossary for possible values), the start and end time of the observations in UTC and LST, and the unique ExecBlock ID of the SchedBlock execution. The possible states for Execution Blocks are:

- **FullyObserved:** The observation execution ended successfully
- **Broken**: The observation did not end successfully. Data obtained from a "Broken" execution can be used if its QA0 status is "Pass"

3 Glossary

ID / UID

ID and UID are used interchangeably in the Project Tracker. They refer to the database Unique Identifier of ALMA data entities. These entities could be a table, ExecBlock, Project, SchedBlock, OUS, Status, etc.

Execution Block / ExecBlock / EB

A single observational execution of a SchedBlock.

SchedBlock Execution State

It describes the state of a SB. "FullyObserved" means that the whole observation execution ended successfully, and "Broken" means that the observation did not end successfully due to a problem that requires attention (and possibly approval by the P.I.).

ExecBlock ID

The Unique IDentifier for an ExecBlock within the ALMA system.

ObsUnitSet / OUS

An ObsUnitSet or OUS is subset of an ALMA project that results in a dataset that meets (part of) a PI-specified science goal. For a more complete description of the ALMA project data structure, see Chapter 12 of the ALMA Technical Handbook. In the ALMA project model, OUSs are hierarchical structures with the following levels:

- The top-level ObsUnitSets are called 'Science Goal ObsUnitSets'; they correspond to the Science Goals of an ObsProject.

- Below these are 'Group ObsUnitSets' which only contain other ObsUnitSets.

- At the lowest level are the 'Member ObsUnitSets', which only contain SchedBlocks.

OUS UID

The Unique IDentifier of an ObsUnitSet within the ALMA system.

Project UID or ID

The unique identifier of a Project within the ALMA system.

QA0

Quality Assurance Level 0 is performed for each Execution Block by the Astronomer on Duty at the telescope after an SB is observed, with the goal of determining whether the resulting data sets are valid. The available QA0 statuses are Pass, QA0 semi-pass and Fail. Pass means that the Execblock contains useful scientific data and will be included in the generation of the final science data products. SemiPass means that the Execblock contains some useful data (e.g. on calibrators), but not enough to contribute usefully to the final science data products. These EBs will not be calibrated or used in the final data products, but can be obtained from the science archive. Fail means that the Execblock contains no useful data. These EBs are not available from the science archive. See Chapter 11 of the ALMA Technical Handbook for more on quality assurance process and pass/fail criteria.

QA2

Quality Assurance Level 2 is performed for each ObsUnitSet after it has undergone Pipeline Processing, to determine whether the resulting data products meet the quality standards required by the PI. See Chapter 11 of the ALMA Technical Handbook for more on quality assurance process and pass/fail criteria.

QA3

Quality Assurance Level 3 is only performed if the PI reports issues with the QA2-pass data that was delivered. It involves the investigation of specific problems resulting either from the observations themselves or the data processing and can be extremely useful for uncovering often subtle issues affecting many datasets.

Scheduling Block / SchedBlock / SB

A Scheduling Block is the smallest observing unit in ALMA that can be scheduled independently, and contains a full description of how the science and the calibration targets have to be observed.

SB UID

Unique identifier of a SchedBlock within ALMA.

Status ID

The Unique Identifier in the ALMA archive of a Status entity, such as a ProjectStatus, OUSStatus or SBStatus. The Status entity is an ALMA internal system document that works together with the corresponding ScheBlock/ObsUnitSet/Project and describes not only its state, but also more details related to the execution of the observations.

Timestamp

This is defined as the time when a given event happened.

Creation Date

The time when an project was submitted into the ALMA archive from the ALMA-OT

Time-out

An ALMA project is in time-out when it is no longer eligible for additional observations, either because it met the user-specified goals or because the observing season ended
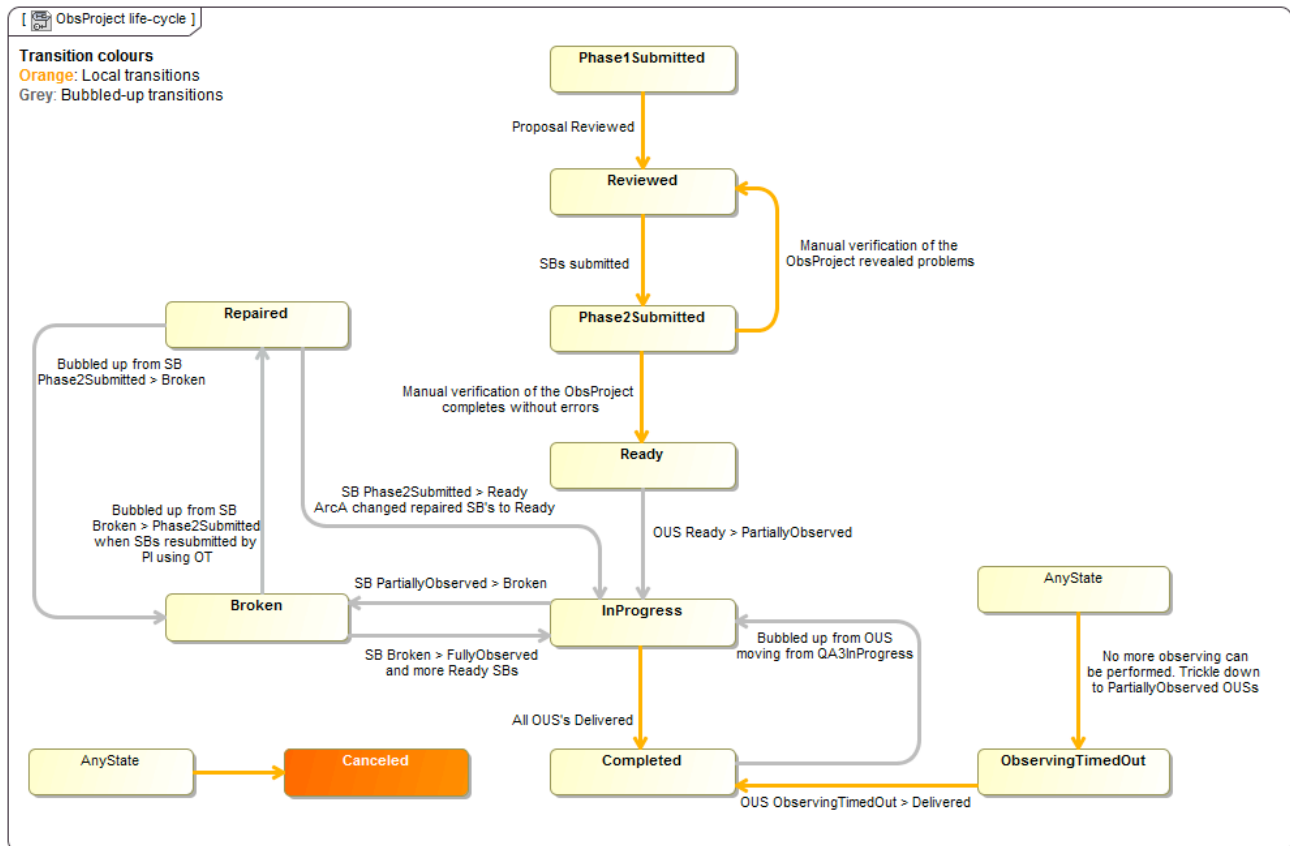
Version of a project

This is the latest Phase 2 version of the project submitted into the ALMA archive.
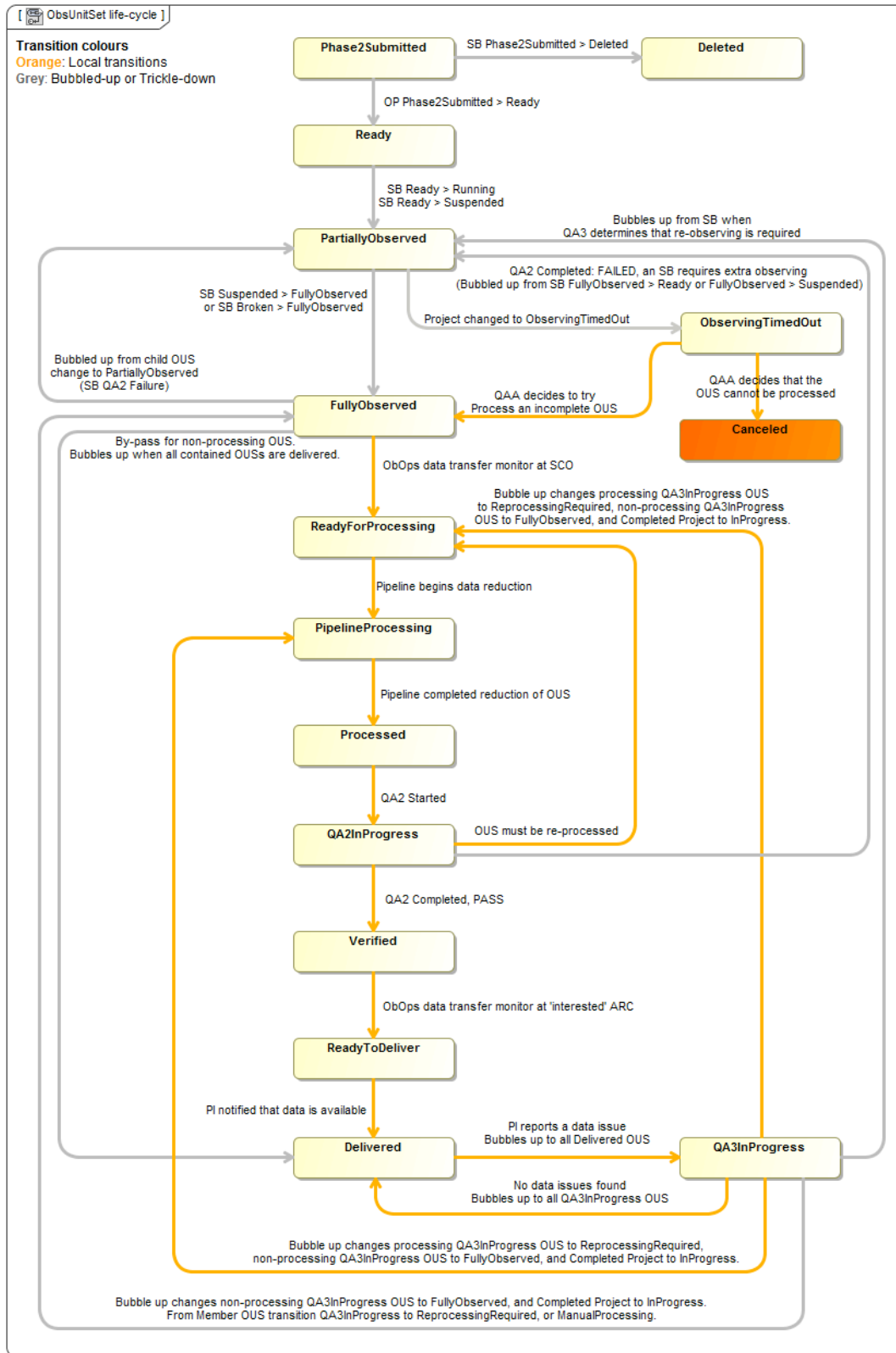
4 Appendix: ALMA Data Structure Life Cycle Diagrams

4.1 Project Life Cycle

[ObsProject life-cycle]

Transition colours
Orange: Local transitions
Grey: Bubbled-up transitions

Phase1Submitted

Proposal Reviewed

Reviewed

Manual verification of the ObsProject revealed problems

SBs submitted

Phase2Submitted

Repaired

Bubbled up from SB Phase2Submitted > Broken

Manual verification of the ObsProject completes without errors

Ready

Bubbled up from SB Broken > Phase2Submitted when SBs resubmitted by PI using OT

SB Phase2Submitted > Ready ArcA changed repaired SB's to Ready

OUS Ready > PartiallyObserved

AnyState

SB PartiallyObserved > Broken

Broken

InProgress

No more observing can be performed. Trickle down to PartiallyObserved OUSs

Bubbled up from OUS moving from QA3InProgress

SB Broken > FullyObserved and more Ready SBs

All OUS's Delivered

AnyState

Canceled

Completed

ObservingTimedOut

OUS ObservingTimedOut > Delivered

4.2 ObsUnitSet Life Cycle

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.