

The life of an ALMA project

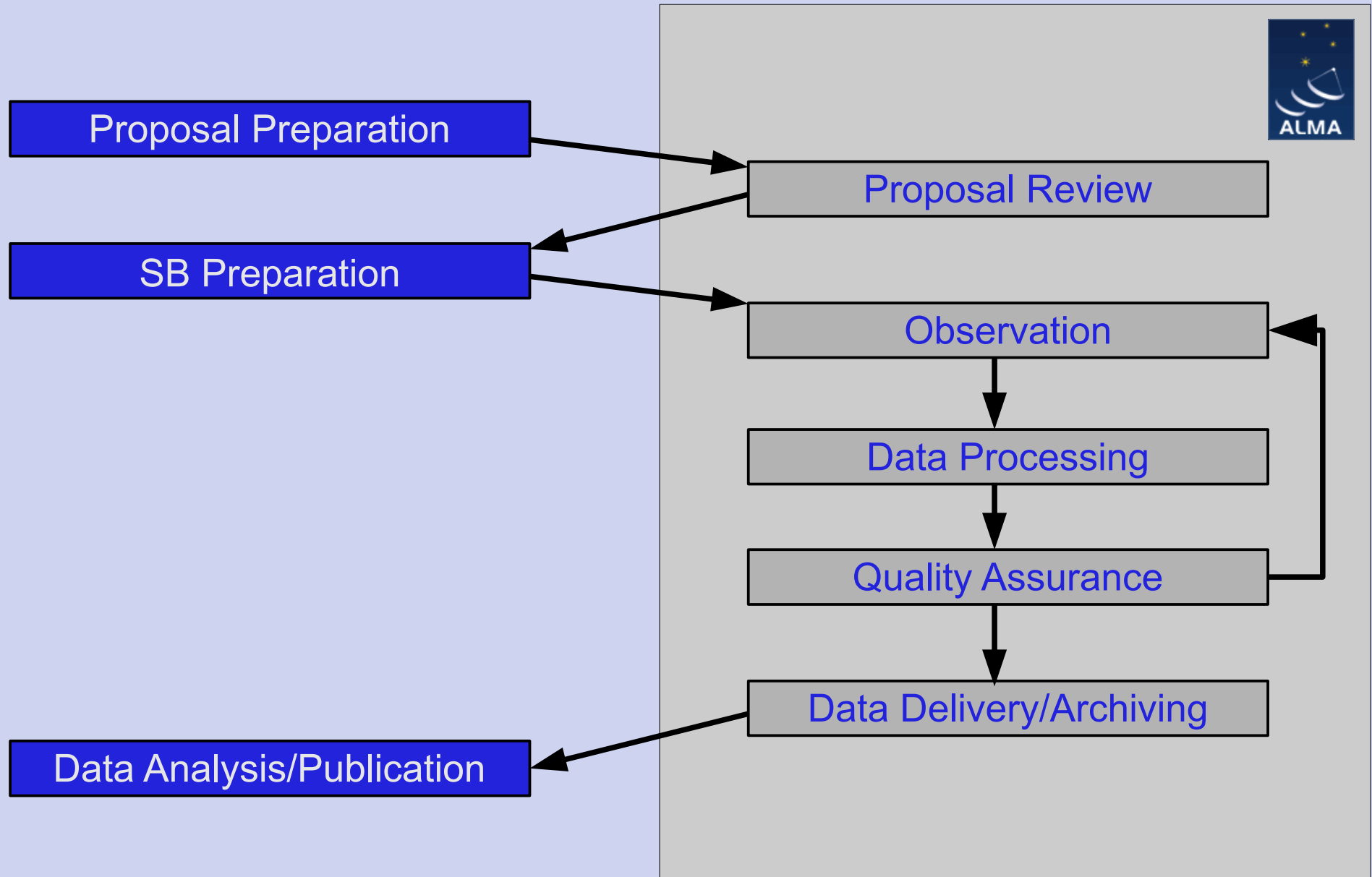
From a proposal to delivered data

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German ALMA Community Days 2017

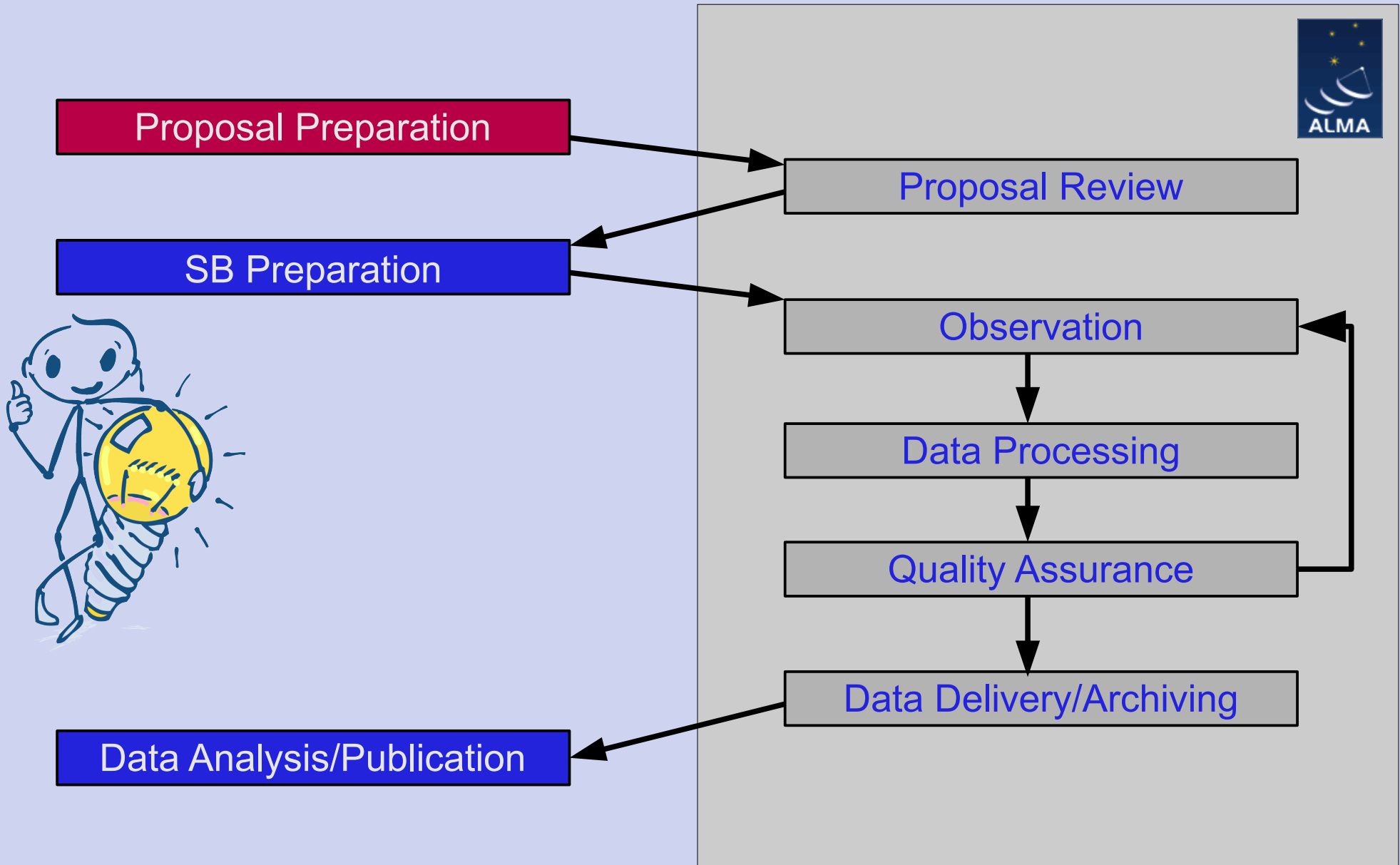
The life of an ALMA project



The life of an ALMA project

- Proposal types:
 - Regular proposals
 - Target of Opportunity (ToO) proposals
 - Target and time not known in advance
 - Large Programs
 - More than 50 hrs 12-m array or 150 hrs stand-alone ACA
 - mm-VLBI proposals
 - Additional proposal at VLBI network required
 - Director Discretionary Time (DDT) proposals
 - Proposals may be submitted at any time

Proposal Preparation (Phase 1)



Proposal Preparation (Phase 1)

- First stop: ALMA Science Portal
almascience.eso.org
- Get ALMA Account (PI, co-PIs, co-Is)
 - Use institutional email address
 - Mails from ALMA may go into your SPAM folder!
 - Check und update user information

Proposal Preparation (Phase 1)

The screenshot shows the ALMA Science Portal website in a Mozilla Firefox browser. The browser's address bar displays <https://almascience.eso.org>. The website header features the ALMA logo and the text "Atacama Large Millimeter/submillimeter Array" and "In search of our Cosmic Origins". A navigation menu includes links for "About", "Science", "Proposing", "Observing", "Data", "Processing", "Tools", "Documentation", and "Help". A search bar is located on the right side of the navigation menu. A dropdown menu is open, showing options: "Login", "Register", "Reset Password", and "Forgot Account". The "Register" option is circled in red. Below the navigation menu, there are three columns of news: "Observatory News", "EU ARC News", and "Status". The "Observatory News" column includes articles such as "ALMA Cycle 5 Call for Proposals is Now OPEN!" (Mar 21, 2017), "Additional Information for Cycle 5 Proposals" (Feb 01, 2017), and "Release of a New Installment of Science Verification Data" (Jan 18, 2017). The "EU ARC News" column includes "Italian ALMA proposal preparation day 2017" (Mar 14, 2017), "German and Swiss ALMA Community Days 2017" (Feb 24, 2017), and "Radio Interferometry: Methods and Science" (Feb 24, 2017). The "Status" column includes "ALMA Cycle 5 Call for Proposals", "Refereed publications: 620", "Last observed source: HD131835", and "Current configuration: C40-1". Below the news columns, there is a "Science Highlights" section titled "Possible Disk Truncation in Ophiuchus Brown Dwarfs". This section includes a scatter plot showing the relationship between the radius of the dust disk ($r_{\text{dust}}/M_{\oplus}$) and the mass (M_{\oplus}). The plot shows a dashed line representing a $10\% M_{\oplus}$ threshold. The text below the plot states: "The sensitivity, resolution and the wavelength coverage of ALMA makes it an ideal tool for studying the properties of the cold outer disks of young stars and low mass objects. Such observations can aid in understanding the formation of their central objects and their..." The footer of the website includes links for "Accessibility", "Contact", "Privacy Statement", "ESO", "NRAO", and "NAOJ". The browser's address bar shows the URL <https://almascience.eso.org/caslogin>.

Proposal Preparation (Phase 1)

- One PI:
 - Responsible for proposal
 - Official contact between ALMA and proposing team
 - Submits proposal
 - Submits Phase 2 SBs
 - Gets notified when data is accessible
 - Can download data
 - May grant others access to data

Proposal Preparation (Phase 1)

- Any number of Co-PIs:
 - Large Programs & mmVLBI only
 - Share overall responsibility in conducting the proposed science
 - Influence accounting of time to regional time-shares
- Any number of Co-Is:
 - Any other individual actively involved

Proposal Preparation (Phase 1)

- Get latest version of OT
 - Webstart version recommended
 - Requires Java 8
- Get Cycle 5 documentation
 - *Proposer's Guide*
 - *ALMA Users' Policy*
 - *ALMA Primer*
 - *Technical Handbook*
 - *OT documentation*
 - ...

Proposal Preparation (Phase 1)

The image shows a screenshot of the ALMA Science Portal website in a Mozilla Firefox browser. The browser's address bar displays the URL <https://almascience.eso.org>. The website header features the ALMA logo and the text "Atacama Large Millimeter/submillimeter Array" with the tagline "In search of our Cosmic Origins". A "Log In" button is visible in the top right corner.

The main navigation menu includes: About, Science, **Proposing**, Observing, Data, Processing, Tools, Documentation, and Help. A search bar labeled "Search Site" is located to the right of the navigation menu.

The "Proposing" dropdown menu is open, listing the following options: Call for Proposals, Proposing Guidance, Proposer's Guide, Cycle 5 Capabilities, **Observing Tool**, Sensitivity Calculator, Proposal Template, Duplicate Observations, ALMA Primer, Technical Handbook, and DDT proposals. The "Observing Tool" option is highlighted with a red circle.

The page content is divided into several sections:

- Observatory News:** Includes articles such as "ALMA Cycle 5 Call for Proposals" (Mar 21, 2017), "Additional Information for Cycle 5" (Feb 01, 2017), and "Release of a New Installer" (Jan 18, 2017).
- ALMA News:** Includes "ALMA proposal preparation day 2017" and "German and Swiss ALMA Community Days".
- Status:** Displays "ALMA Cycle 5 Call for Proposals", "Refereed publications: 620", "Last observed source: HD131835", and "Current configuration: C40-1".
- Science Highlights - P:** Features a scatter plot showing the relationship between dust mass and stellar mass, with a dashed line indicating a $10\% M_{\oplus}$ threshold.

The footer contains links for Accessibility, Contact, and Privacy Statement, along with logos for ESO, NRAO, and NAOJ.

Proposal Preparation (Phase 1)

- OT allows in Phase 1
 - Preparation & validation of proposal
 - New proposals for Cycle 5
 - Re-submission of Cycle 4 proposals
 - Proposals that are not completely observed
 - Re-submissions automatically detected, no need to indicate manually
 - Local storage of proposals
 - Submission and multiple re-submissions until deadline

20 April 2017, 15:00 UT

Proposal Preparation (Phase 1)

- Only PI can submit and re-submit
 - Co-PIs and Co-Is can retrieve
 - When sharing locally stored proposals, be careful not to create new proposals by accident (s. *Proposer's Guide* 6.4.1)
- Proposals for mmVLBI must be made in concert with GMVA or EHT – see *Proposer's Guide*

Proposal Preparation (Phase 1)

- ALMA highly over-subscribed, so proposals must be strong
 - Science case (beware of duplications: s. *Users' Policies Appendix* for definition)
 - Technical justification (s. *Proposer's Guide Appendix B* for guidelines)
 - Possibly simulations (s. talk by L.Moser)
 - For detailed considerations that may influence probability of acceptance s. *Proposer's Guide*

Proposal Preparation (Phase 1)

- Support (s. talk by S.Mühle):
 - OT documentation
 - Knowledge base
 - ALMA Helpdesk
 - ARC nodes
- Make sure to watch Knowledgebase Article on last-minute changes, clarifications or bug reports:
help.almascience.org/index.php?Knowledgebase/Article/View/378

Proposal Preparation (Phase 1)

Welcome to the Science Portal at ESO - Mozilla Firefox

Welcome to the Sc... x +

https://almascience.eso.org

Suchen

ALMA

Atacama Large Millimeter/submillimeter Array

In search of our Cosmic Origins

Log In

About Science Proposing Observing Data Processing Tools Documentation Help

Search Site

Observatory News

- ALMA Cycle 5 Call for Proposals is Now OPEN!
Mar 21, 2017
- Additional Information for Cycle 5 Proposals
Feb 01, 2017
- Release of a New Installment of Science Verification Data
Jan 18, 2017
- More...

EU ARC News

- Italian ALMA proposal preparation day 2017
Mar 14, 2017
- German and Swiss ALMA Community Days 2017
Feb 24, 2017
- Radio Interferometry: Methods and Science
Feb 24, 2017
- More...

Knowledgebase/FAQ

Helpdesk

EA ARC

EU ARC

NA ARC

Last observed source: HD 131635

Current configuration: C40-1

More...

Science Highlights - Possible Disk Truncation in Ophiuchus Brown Dwarfs

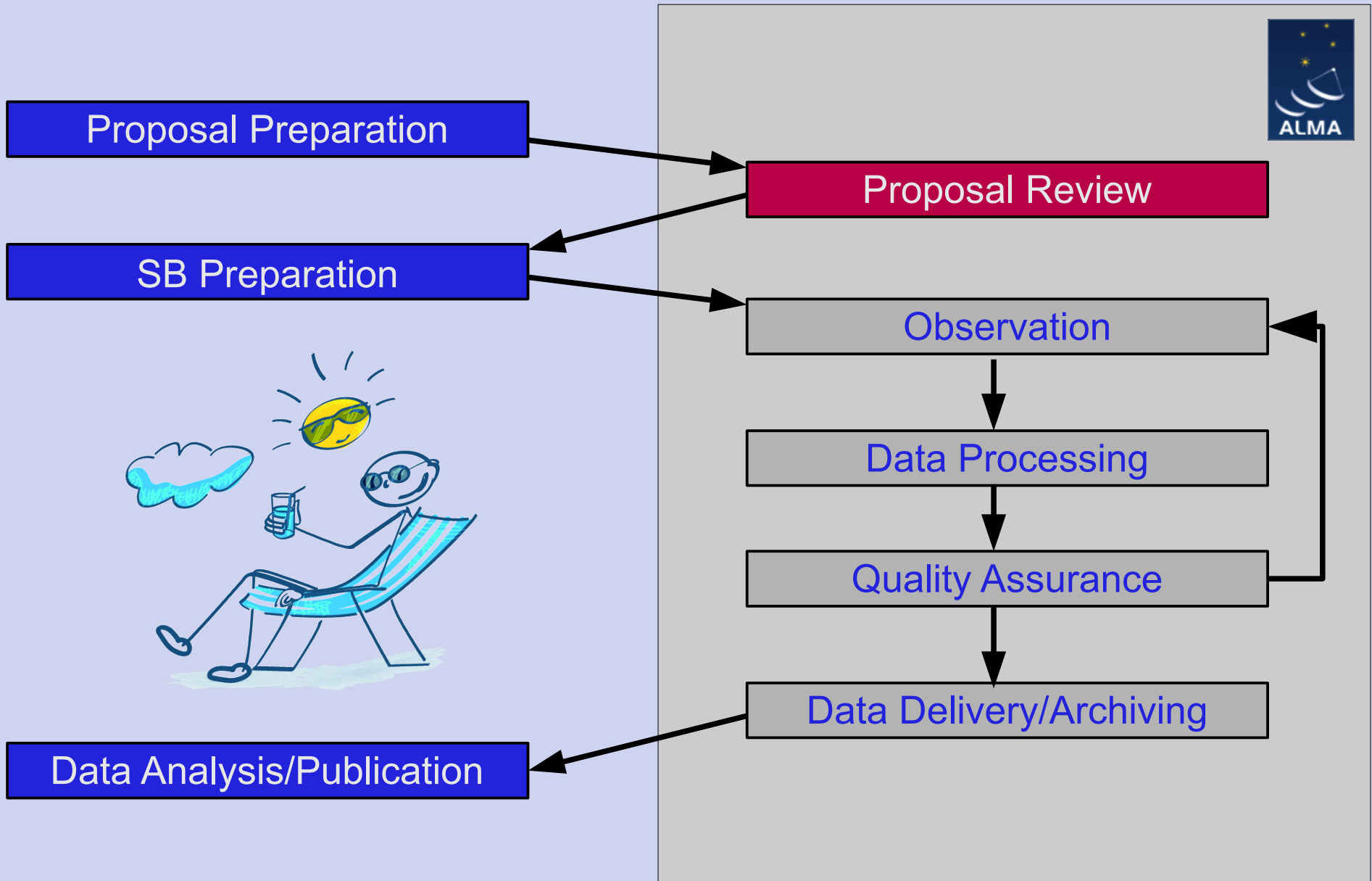
The sensitivity, resolution and the wavelength coverage of ALMA makes it an ideal tool for studying the properties of the cold outer disks of young stars and low mass objects. Such observations can aid in understanding the formation of their protoplanets and their...

Map Accessibility Contact Privacy Statement

ESO NRAO NAOJ

https://almascience.eso.org/help

Proposal Review



Proposal Review

- Every proposal will be assessed scientifically (at least one review panel per science category)
 - Subset will be assessed technically by ALMA experts
 - Proposals may be declared technically infeasible during Phase 2 as well!
 - See *Principles of the ALMA Proposal Review Process* and *Proposer's Guide* for details

Proposal Review

- PI will receive notification (July/August 2017)
 - Assigned grade
 - Report on scientific strengths and weaknesses
- Priority flags for accepted proposals:
 - **A:** Highest priority, carried over to Cycle 6 if not completed in Cycle 5
 - **B:** Highest priority, not carried over to Cycle 6
 - **C:** Filler project, executed if conditions allow no higher priority project
- Proposals may be descoped for technical or scientific reasons

Proposal Review

- Time shares of nominal time (4000 hrs + 3000 hrs ACA):
 - A: up to 33%
 - A + B: 100%
 - C: up to additional 50%
- Regional shares:
 - Europe: 33.75%
 - North America: 33.75%
 - East Asia: 22.5%
 - Chile: 10%
 - Open Sky: up to 5%

Proposal Review

- Shares by proposal types:
 - Large programs: up to 15%
 - Non-standard observing modes: up to 20%
 - Definition of non-standard modes s. *Proposer's Guide* section 5.2
 - mmVLBI: up to 5%
 - Included in 20% share of non-standard modes
 - DDT Proposals: up to 5%

Proposal Review

- For A and B projects, the following data will be made public immediately:
 - Project code
 - Proposal title and abstract
 - Name and region of PI
 - Names of co-Is and co-PIs
- For C projects this data is made public as soon as first data is taken

Proposal Review

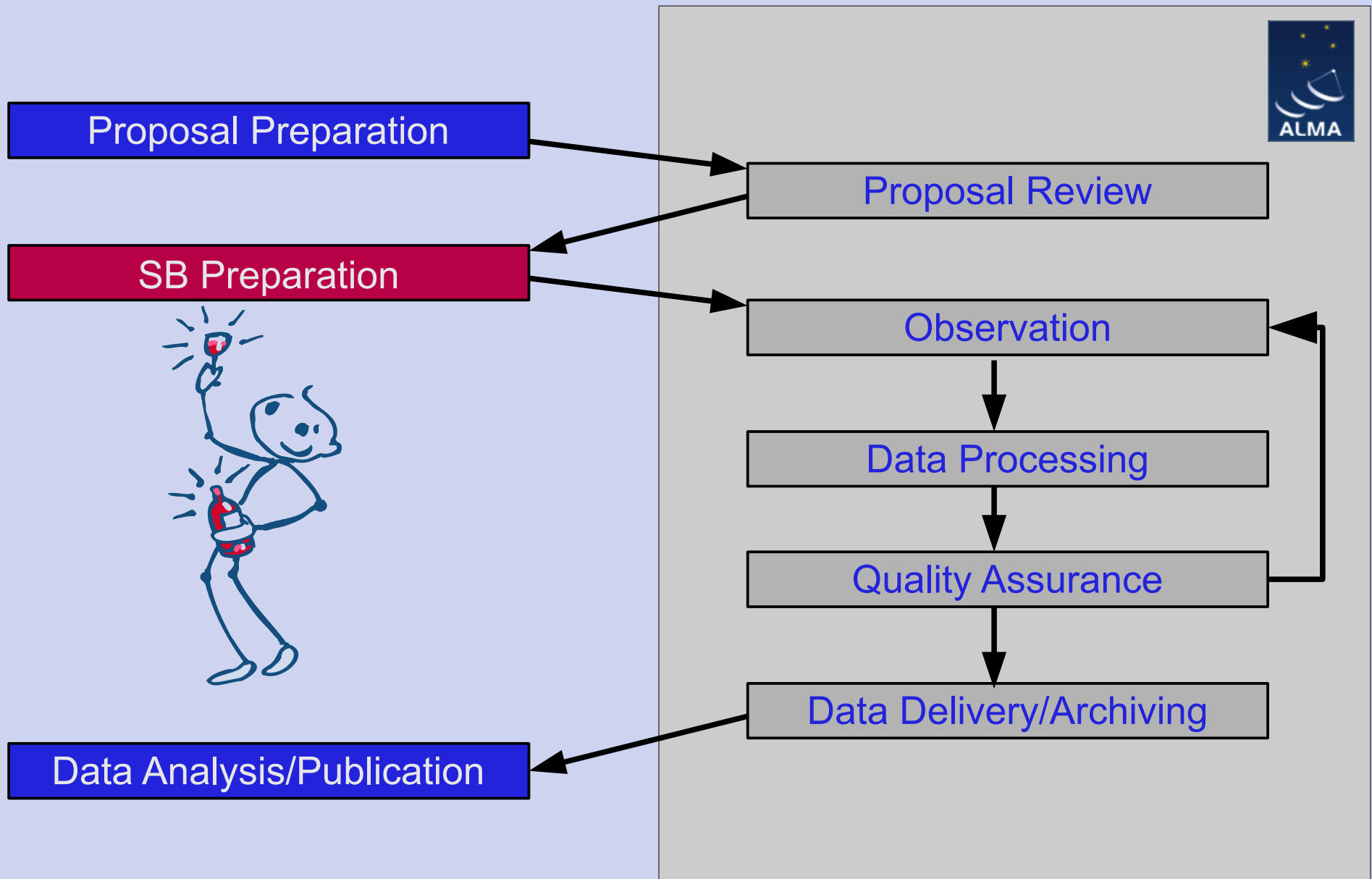
- More proposal metadata will be made public as soon as first data is archived:
 - e.g. sources positions, observation frequencies, integration times
- No metadata made public for unaccepted or unobserved proposals
- Scientific and technical justifications remain confidential
 - except for 1mm VLBI projects for EHT review

Proposal Review

- Policies for
 - Duplications
 - Non-standard observing modes
 - Large Programs
 - De-scoping

see Proposer's Guide and ALMA Users' Policies

SB Preparation (Phase 2)



SB Preparation (Phase 2)

- Scheduling Blocks (SBs) are smallest observable units
- SB Preparation (aka Phase 2): Make proposal actually executable
- PI must review and approve Phase 2 material in **August 2017**
 - PI can delegate this only in the case of an emergency (**vacations no emergency**)!
 - **Delay may result in downgrade of project!** (*s. Users' Policies*)

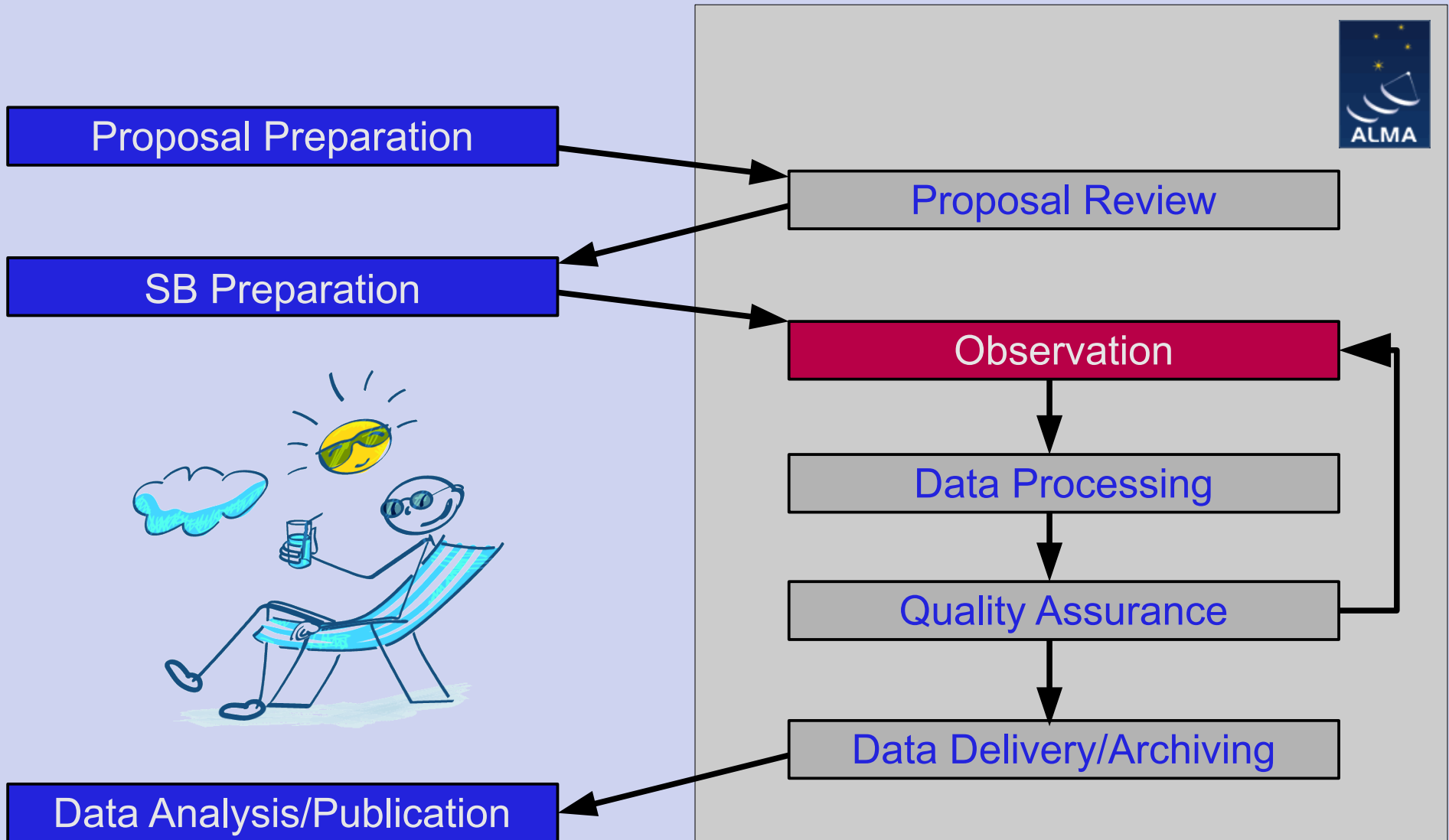
SB Preparation (Phase 2)

- ALMA
 - Implements necessary changes (due to reviews of technical considerations)
 - Assigns a Contact Scientist (CS) at an ARC node
 - Assigns the project back to PI
- SBs are reviewed and edited with OT
 - PI reviews SBs, discusses issues with CS, and may make **minor** changes
 - PI approves SBs for execution by submitting them with OT

SB Preparation (Phase 2)

- Minor changes are possible:
 - Change in target position no more than half a primary beam width
 - Change in target frequency no more than 20% of width of original spectral window
 - Change of velocity reference frame
- All non-minor changes require formal change request and are strongly discouraged

Observation



Observation

- Observations require no interaction with PI
 - Exceptions: ToO, Solar, mmVLBI
- Quality Assurance (QA0 and QA1) is performed during observations
 - Failure of QA0 or QA1 triggers automatic re-observation

Observation

- Individual SBs are executed repeatedly until
 - scientific goals as defined in proposal are achieved or
 - scheduling period has ended or
 - no more fitting array configurations in scheduling period
- Actual observation times may differ from time estimates in proposal

Observation

- SnooPI gives PI, co-PIs and co-Is status of project
 - Overall execution status
 - Detailed reports down to individual executions of SBs
- User Profile at Science Portal has option for email notifications on observation progress

Observation

The screenshot shows the SnooPI web interface in a Mozilla Firefox browser. The browser address bar displays the URL: `https://asa.alma.cl/snoopi/#cs/project-tree/uid://A001|X5ac|`. The interface is divided into a left sidebar with a navigation menu and a main content area. The sidebar shows a hierarchical tree structure under the heading "2016:001818". The selected item is "S14_a_06_TM1". The main content area displays the following details:

Scheduling Block Name: S14_a_06_TM1 ✓
Scientific Goal Name: Science Goal
Member ObsUnitSet: uid://A001/X879/XaOf
Array: 12m
Nominal configuration: C40-2
Band: 6
RA: [redacted]
Dec: [redacted]
Representative Frequency, GHz: 220.44
Successful Executions: 1 / 1
QA2: ✓ [Report](#)

End time	Duration [min]	Execution Block UID	QA0
2016-12-29 11:52:46	73.32	uid://A002/Xbc4a22/X1dcd	✓ Report

Execution block

Temperatures [°K]		Array	
Average T_{sys}	112.52	Number of antennas	45
σ	14.24	Shortest baseline	15.100 m
$T_{\text{sys,min}}$	90.83	Longest baseline	459.996 m
$T_{\text{sys,max}}$	231.68	Angular resolution	0.69 arcsec
		Maximum Recoverable Scale	6.049 arcsec

Observation

- ALMA Status page gives information about
 - Current status of weather, array etc.
 - Observing reports of finished observation blocks
 - Observing and configuration schedule for remaining part of cycle

Observation

Welcome to the Science Portal at ESO - Mozilla Firefox

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https://almascience.eso.org/observing/alma-status-pag

Suchen

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In search of our Cosmic Origins

Log In

About Science Proposing **Observing** Data Processing Tools Documentation Help

Search Site

ALMA Status Page

Weather Conditions at AOS

Current Date	Current Time	Loc	Temperature	Dewpoint	Wind Direction	Wind Speed	Pressure
2017/03/24	15:41:04 UTC	Cen	3.11 ° C	-15.30 ° C	293.00 °	6.40 m/s	557.04 hPA

[More...](#)

Recent observations (QA0 Pass)

Project	Source	PI
Origin and evolution of atomic gas in debris discs - A new way of studying planetary systems		
2016.1.01253.S	HD131835	Kral, Quentin
The role of OH outflows in the high redshift Universe		
2016.1.00284.S	J142413.9+022303	Bernard-Salas, Jeronimo
Probing the chromospheric heating regions of the solar analogue alpha Centauri with ALMA		

Public observations

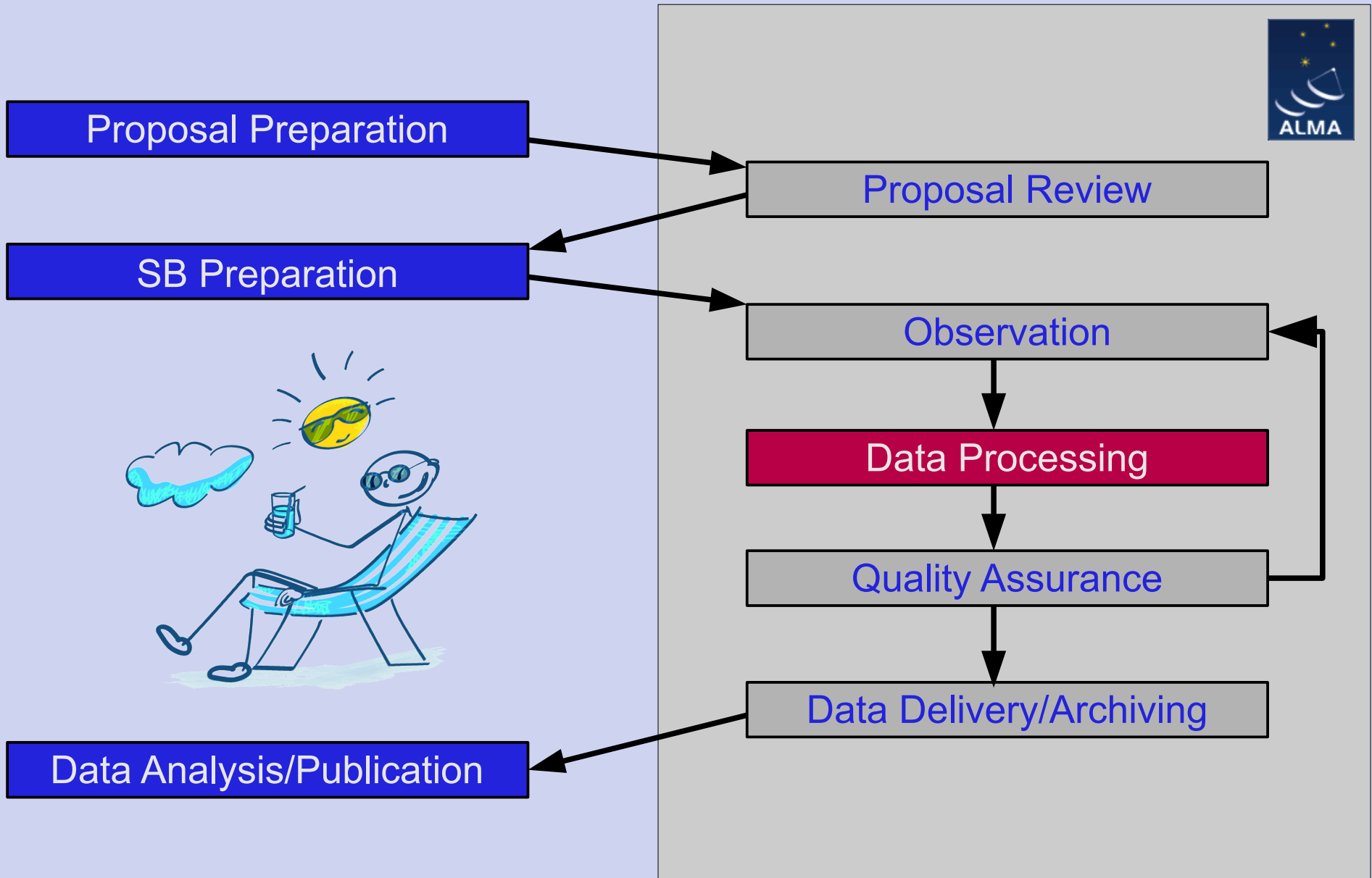
Project	Source	PI
Bulge Asymmetries and Dynamical Evolution (BAaDE) II		
2015.1.01289.S	ad3a-07606	Sjouerman, Lorant
Bulge Asymmetries and Dynamical Evolution (BAaDE) II		
2015.1.01289.S	ad3a-07616	Sjouerman, Lorant
Bulge Asymmetries and Dynamical Evolution (BAaDE) II		
2015.1.01289.S	ad3a-07622	Sjouerman, Lorant

https://almascience.eso.org/observing/alma-status-pag

Contact Privacy Statement

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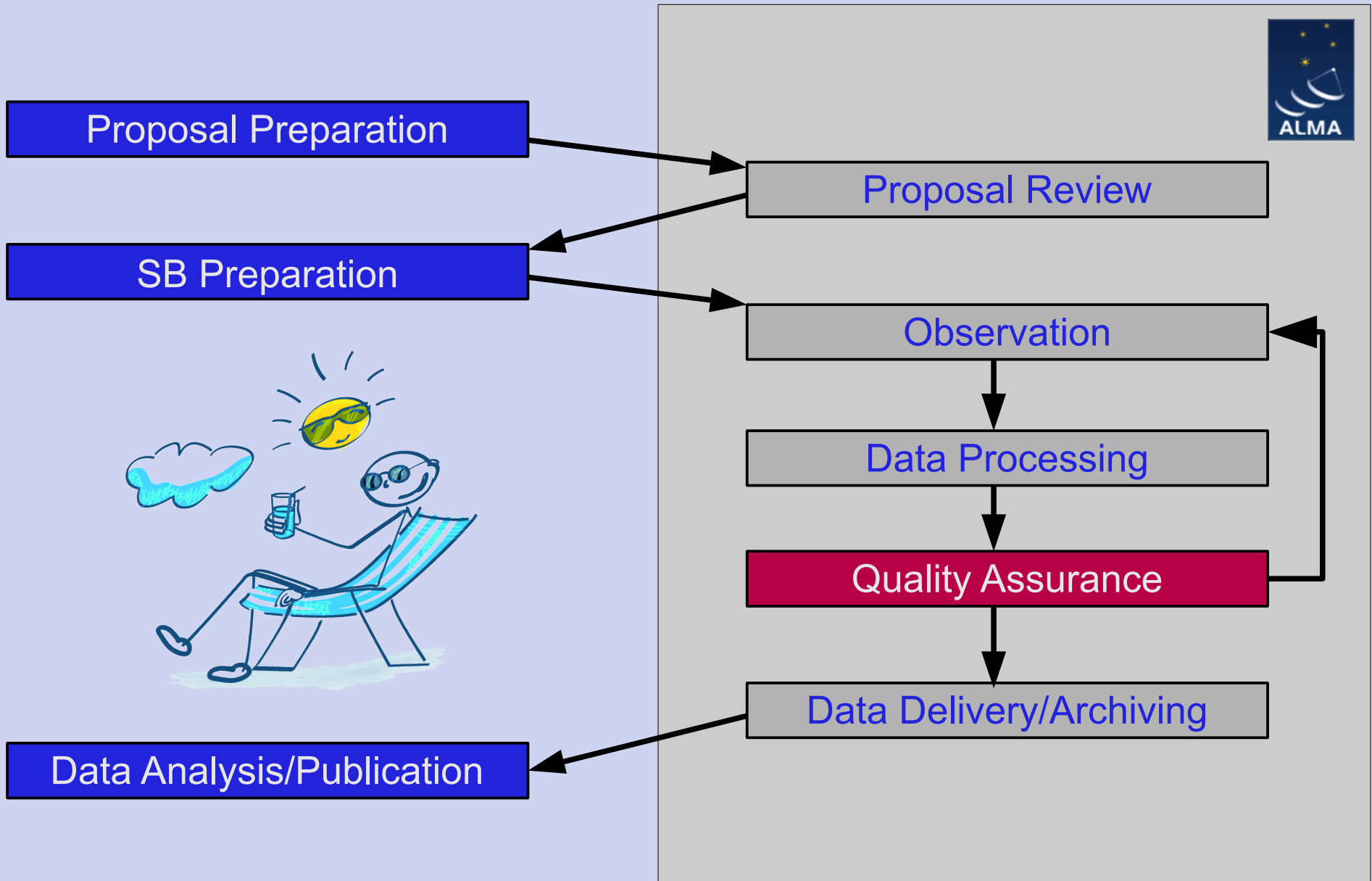
Data Processing



Data Processing

- Performed by ALMA with CASA
 - Standard modes: pipeline
 - Non-standard modes: manual
 - On a Science Goal level
- Involves calibration, flagging, imaging
- Quality Assurance (QA2) performed

Quality Assurance



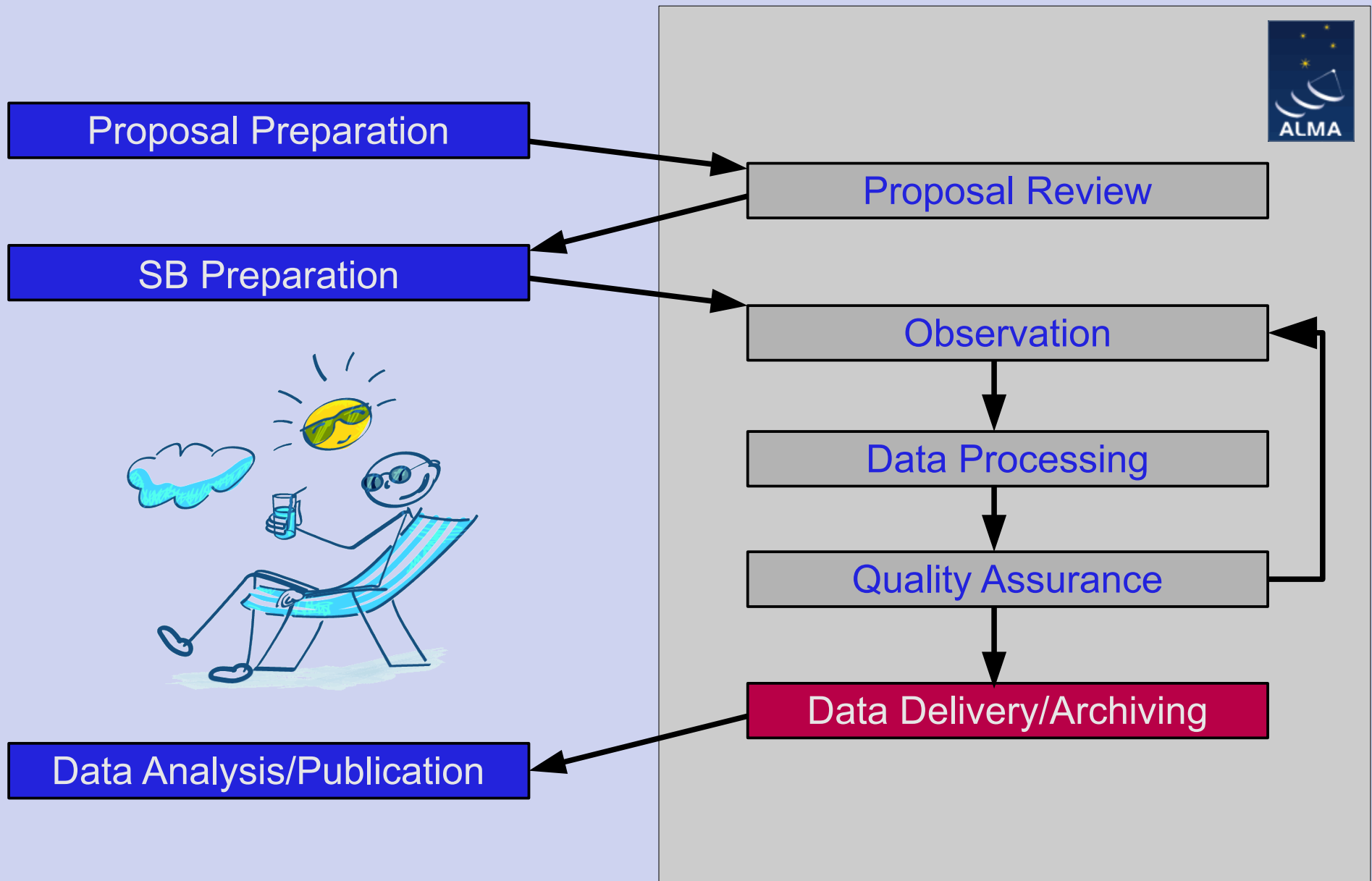
Quality Assurance

- *Technical Handbook*: “The goal of ALMA Quality Assurance (QA) is to ensure that a reliable final data product is delivered to the PI, that is, the product has reached the desired control parameters outlined in the science goals, it is calibrated to the desired accuracy and it is free of calibration or imaging artefacts.”

Quality Assurance

- QA0 and QA1 during data taking
- QA2 during data processing
 - Failure to meet pass criteria leads automatically to re-observation of affected SBs if scheduling is possible
- QA3 after data delivery
 - Feedback from PI through helpdesk
 - ASAP, since re-observation may be necessary and proprietary period may be affected (s. *Users' Policies* for details)

Data Delivery/Archiving



Data Delivery/Archiving

- All data that passes QA2 ingested into ALMA Archive
 - Located in Santiago
 - Mirrors at each ARC
 - European mirror at ESO Garching
- Data delivered after scientific goals were achieved
 - Exception: No chance to achieve goals due to end of cycle or scheduling restrictions
- Intermediate data delivery possible for “stale data”:
 - > 25% complete
 - No new data expected for at least 90 days
 - Must be triggered by PI
 - No QA2, no support from ARCs

Data Delivery/Archiving

- PI informed via email that data is available for download from Science Archive
- Only PI can download data
 - Data delegation (grant access to project data to other ALMA users) possible via Science Portal

Data Delivery/Archiving

The screenshot shows the ALMA Science Portal website in a Mozilla Firefox browser. The address bar displays the URL <https://almascience.eso.org/alma-data/archive>. The page header features the ALMA logo and the text "Atacama Large Millimeter/submillimeter Array" with the tagline "In search of our Cosmic Origins". A navigation menu includes "About", "Science", "Proposing", "Observing", "Data", "Processing", "Tools", "Documentation", and "Help". The "Data" menu is open, showing options: "Archive", "Calibrator Catalogue", "Science Verification", "Publication", and "Acknowledgement". The "Archive" option is highlighted. Below the navigation menu, there are sections for "Archive" (with an "Archive Query" button), "Documentation" (with a link to the "ALMA Science Archive Manual"), "Data delegation" (circled in red, containing text about granting access to projects), and "Cycle 0 content" (with a link to see Cycle 0 deliveries). The footer contains links for "Contact" and "Privacy Statement", and logos for "ESO", "NRAO", and "NAOJ".

Welcome to the Science Portal at ESO - Mozilla Firefox

Welcome to the Sc... x ALMA Central Aut... x +

https://almascience.eso.org/alma-data/archive

Suchen

ALMA

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

Log In

About Science Proposing Observing **Data** Processing Tools Documentation Help

Search Site

Archive

Archive Query

Documentation

We provide a comprehensive [ALMA Science Archive Manual](#).

Data delegation

Pls can grant access to one of their projects to a registered ALMA user by logging into the Science Portal, going to the user profile page in the top right corner and then adding delegees in the "Project delegation" tab.

Cycle 0 content

Please [go here](#) to see the content of the Cycle 0 deliveries.

https://almascience.eso.org/alma-data/archive

Contact Privacy Statement

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Data Delivery/Archiving

- Data package includes
 - Raw Data
 - Calibration & imaging products
 - Fits images & cubes
 - QA2 report
 - Data processing script
 - Processing log files

Data Delivery/Archiving

- Proprietary period 12 months
 - Clock starts when PI is informed that data available for download
 - DDT proposals: 6 months
 - Intermediate data delivery of stale data does not initiate proprietary period

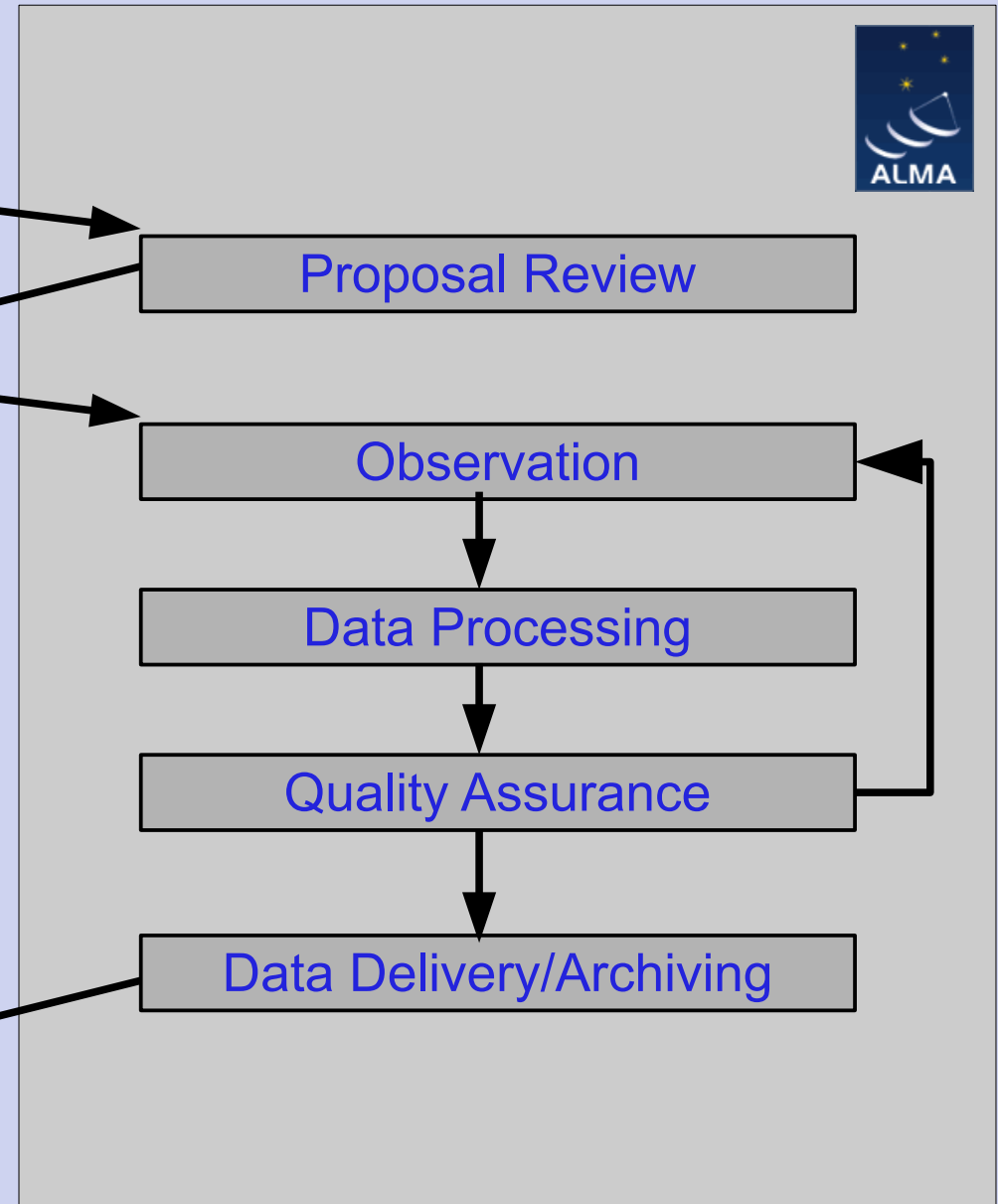
Data Analysis/Publication

Proposal Preparation

SB Preparation



Data Analysis/Publication



Data Analysis/Publication

- CASA
- You are not on your own! Your ARC node provides help
 - Expert advice for data analysis questions
 - Face-to-face support on request through ALMA helpdesk
- Don't forget the standard ALMA acknowledgement (s. *Users' Policies*) in publications!