

# The life of an ALMA project

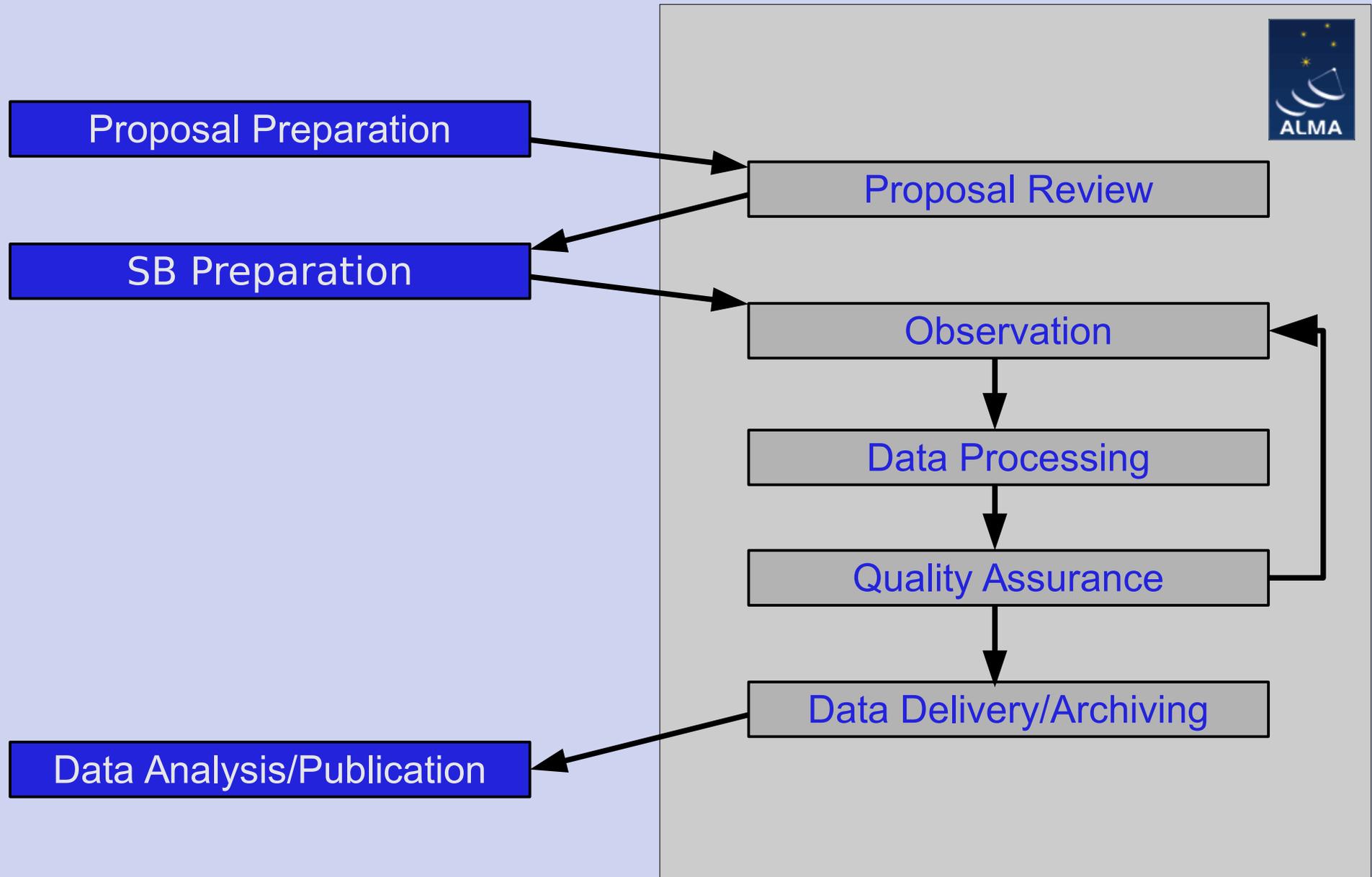
## From a proposal to delivered data

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Swiss ALMA Community Days 2017

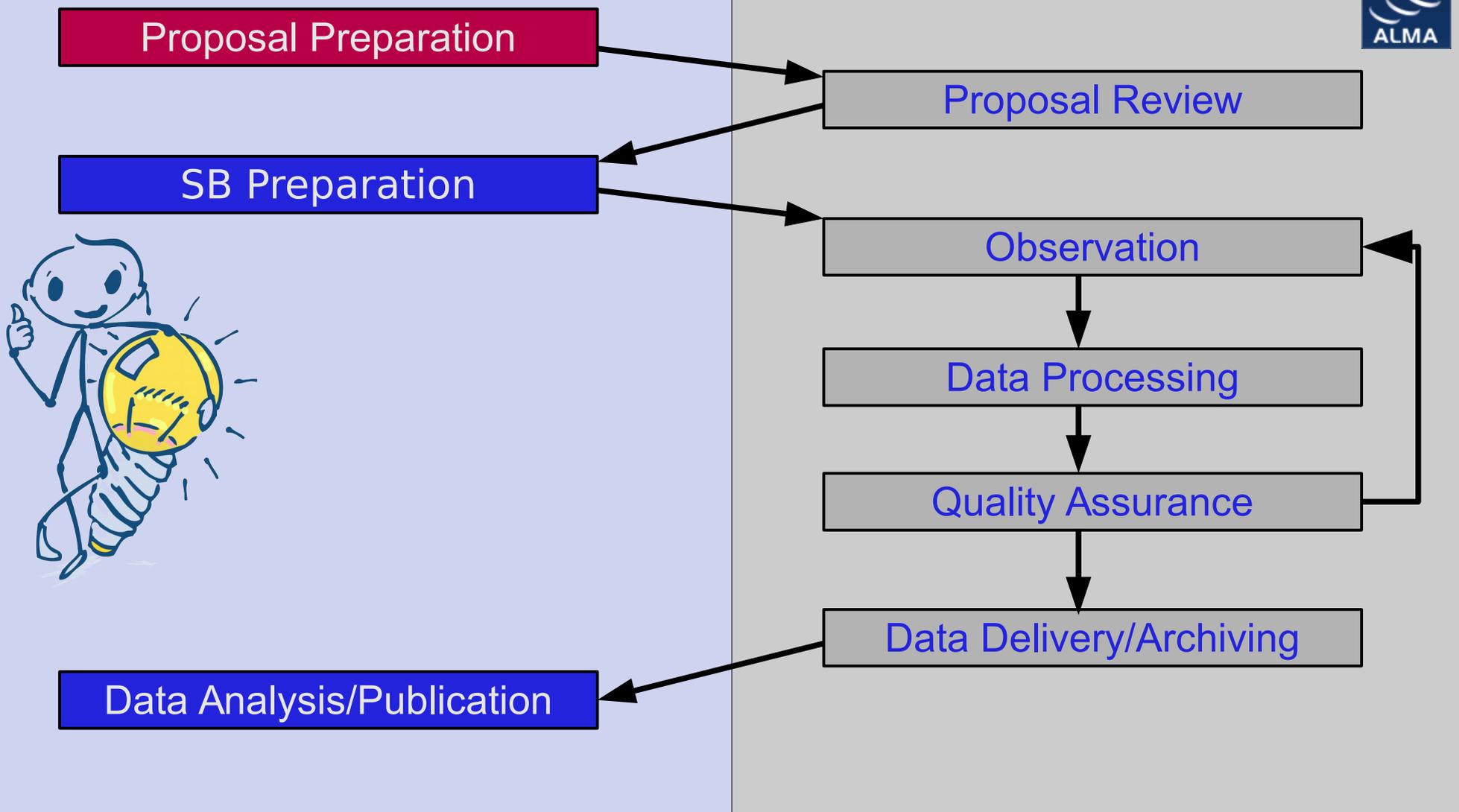
# The life of an ALMA project



# 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](http://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
- Any number of Co-Is
- Any number of Co-PIs:
  - Large Programs & mmVLBI only
  - Share overall responsibility in conducting the proposed science

# 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)

- 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
  - 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*

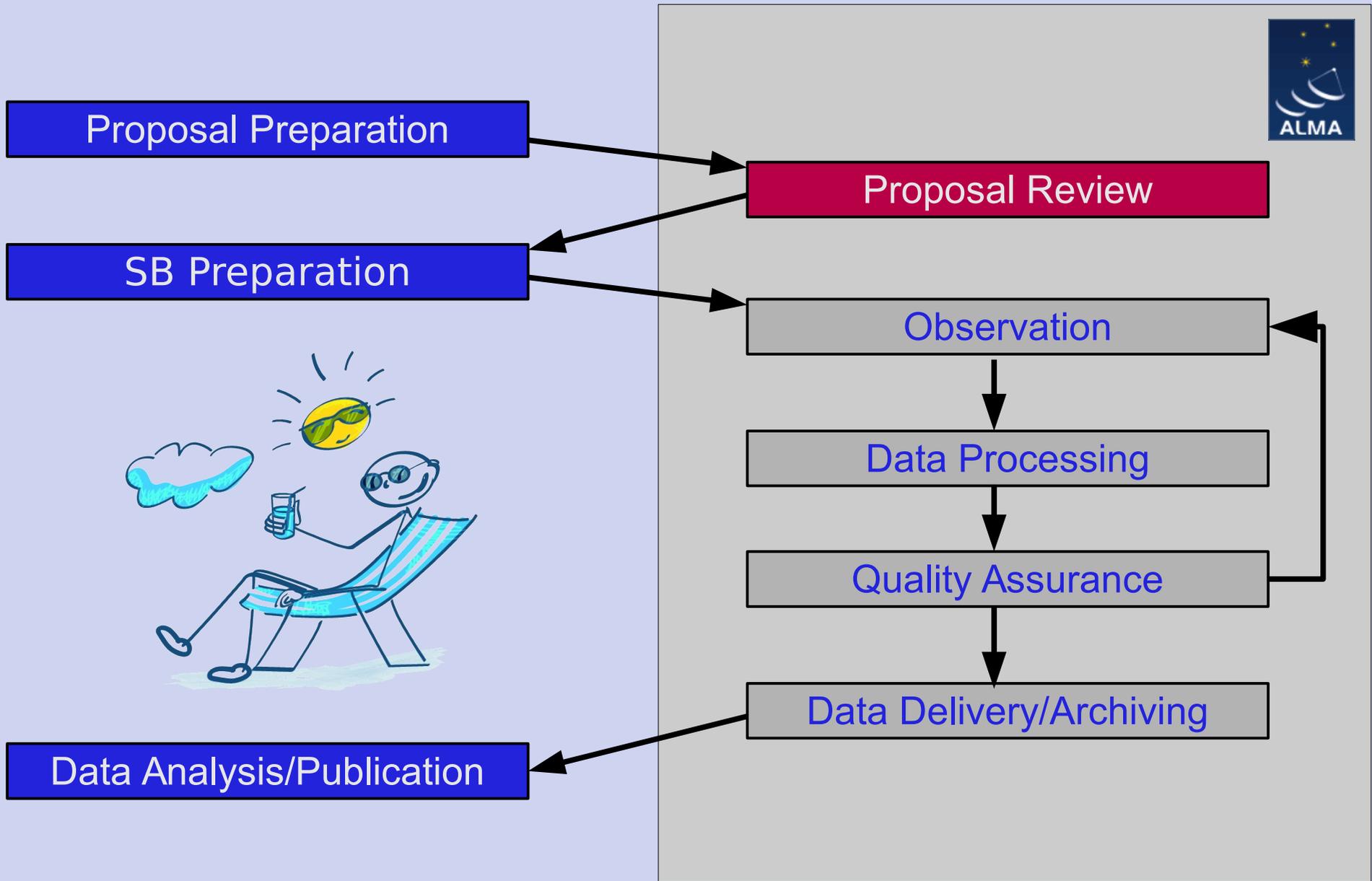
# Proposal Preparation (Phase 1)

- 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](http://help.almascience.org/index.php?/Knowledgebase/Article/View/378)

# 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

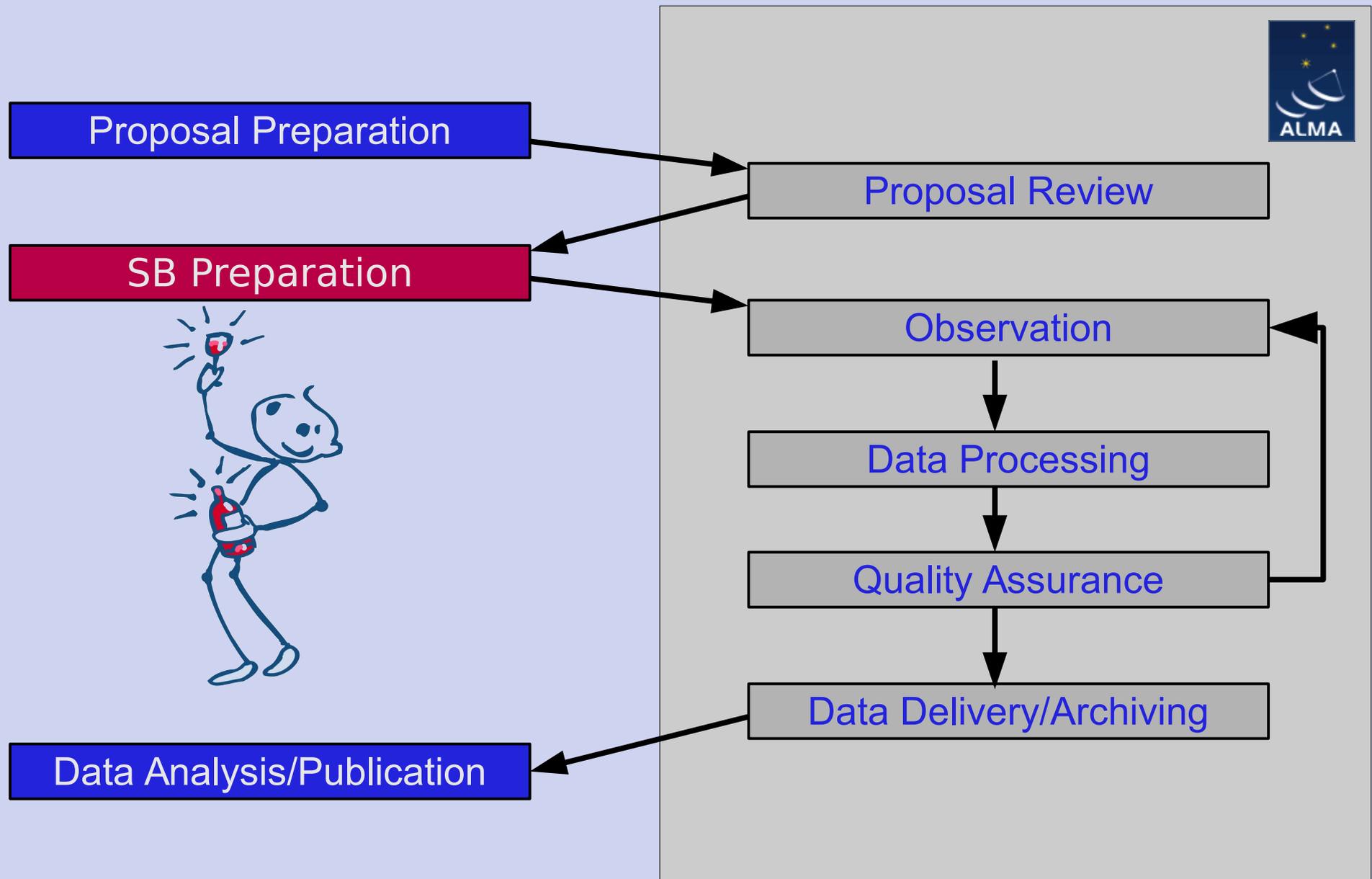
- PI will receive notification (July/August 2017)
  - Assigned grade
  - Report on scientific strengths and weaknesses
- Priority flags for accepted proposals:
  - **A:** Highest priority, carried over to Cycle 6 if not completed in Cycle 5
  - **B:** Highest priority, not carried over to Cycle 6
  -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

# Proposal Review

- Policies for
  - Duplications
  - Non-standard observing modes
  - Large Programs
  - De-scoping
  - Time shares (by grades, regions etc.)
  - Publication of proposal meta-data

*see Proposer's Guide and ALMA Users' Policies*

# SB Preparation (Phase 2)



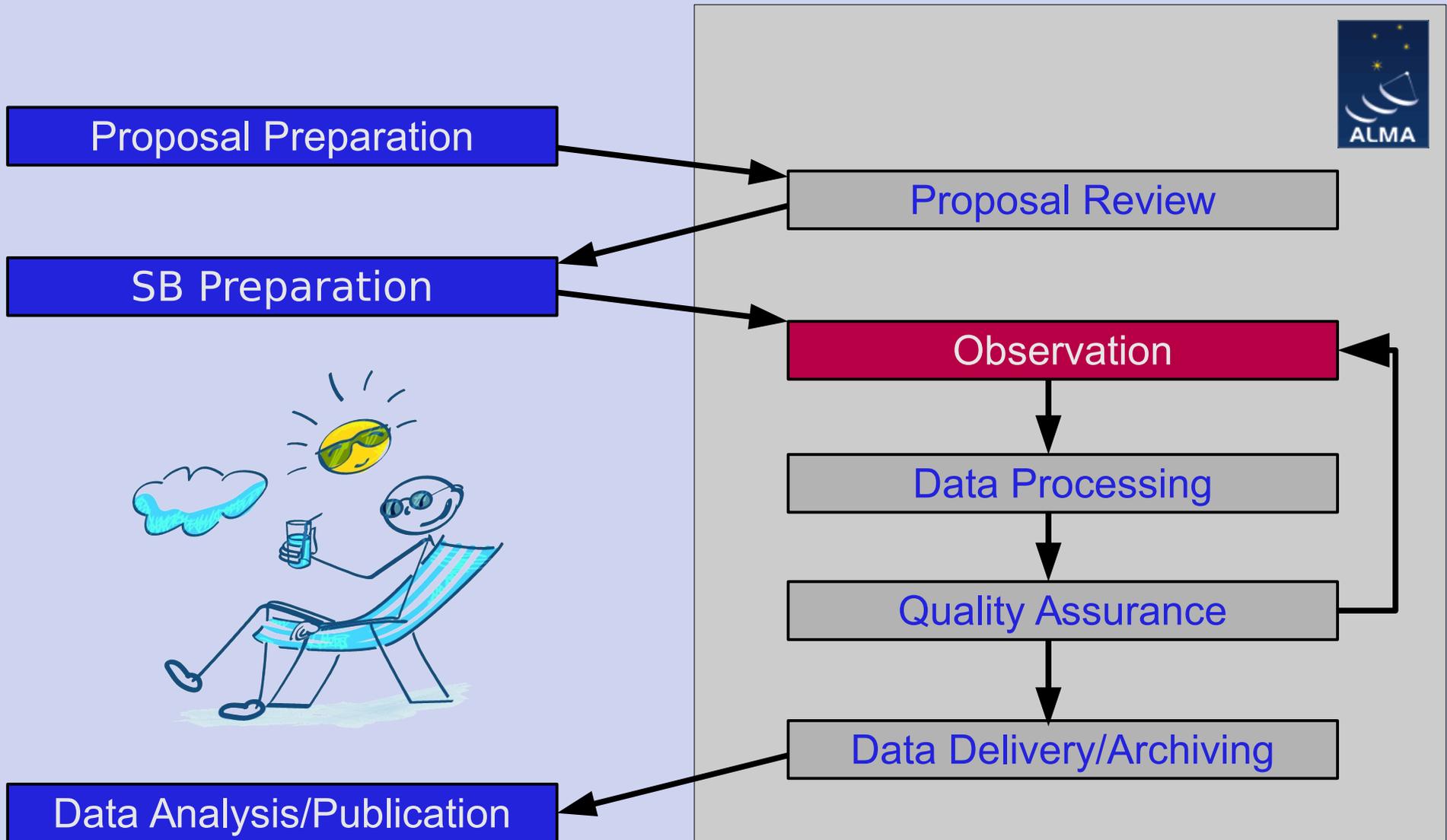
# SB Preparation (Phase 2)

- 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** with OT
  - 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)

- 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



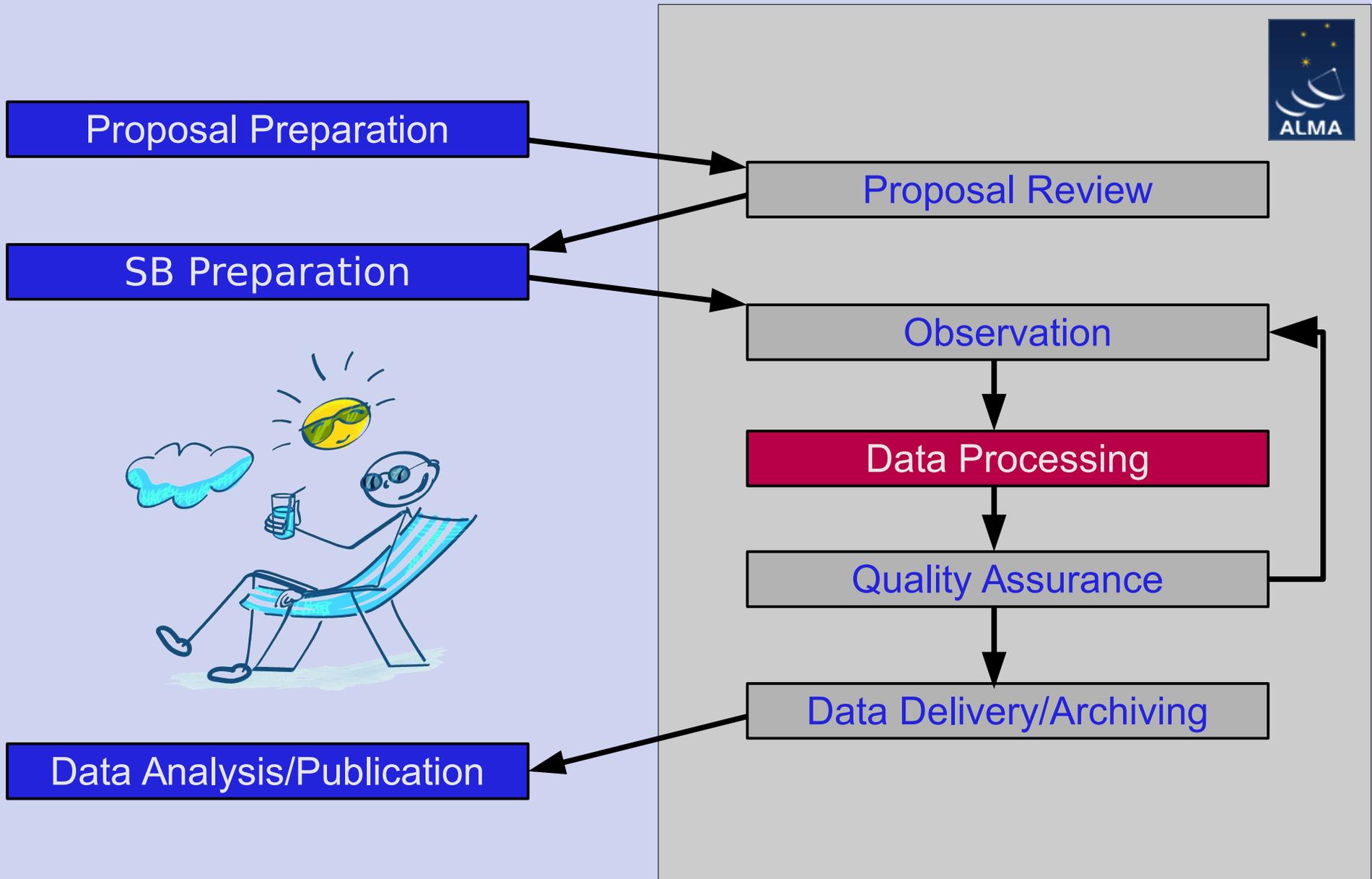
# Observation

- Observations require no interaction with PI
  - Exceptions: ToO, Solar, mmVLBI
- 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

# Observation

- SnooPI shows status of project
  - Overall execution status
  - Detailed reports down to individual executions of SBs
- ALMA Status page shows
  - Current status of weather, array etc.
  - Observing reports of finished observation blocks
  - Observing and configuration schedule for remaining part of cycle
- Both pages accessible through Science Portal

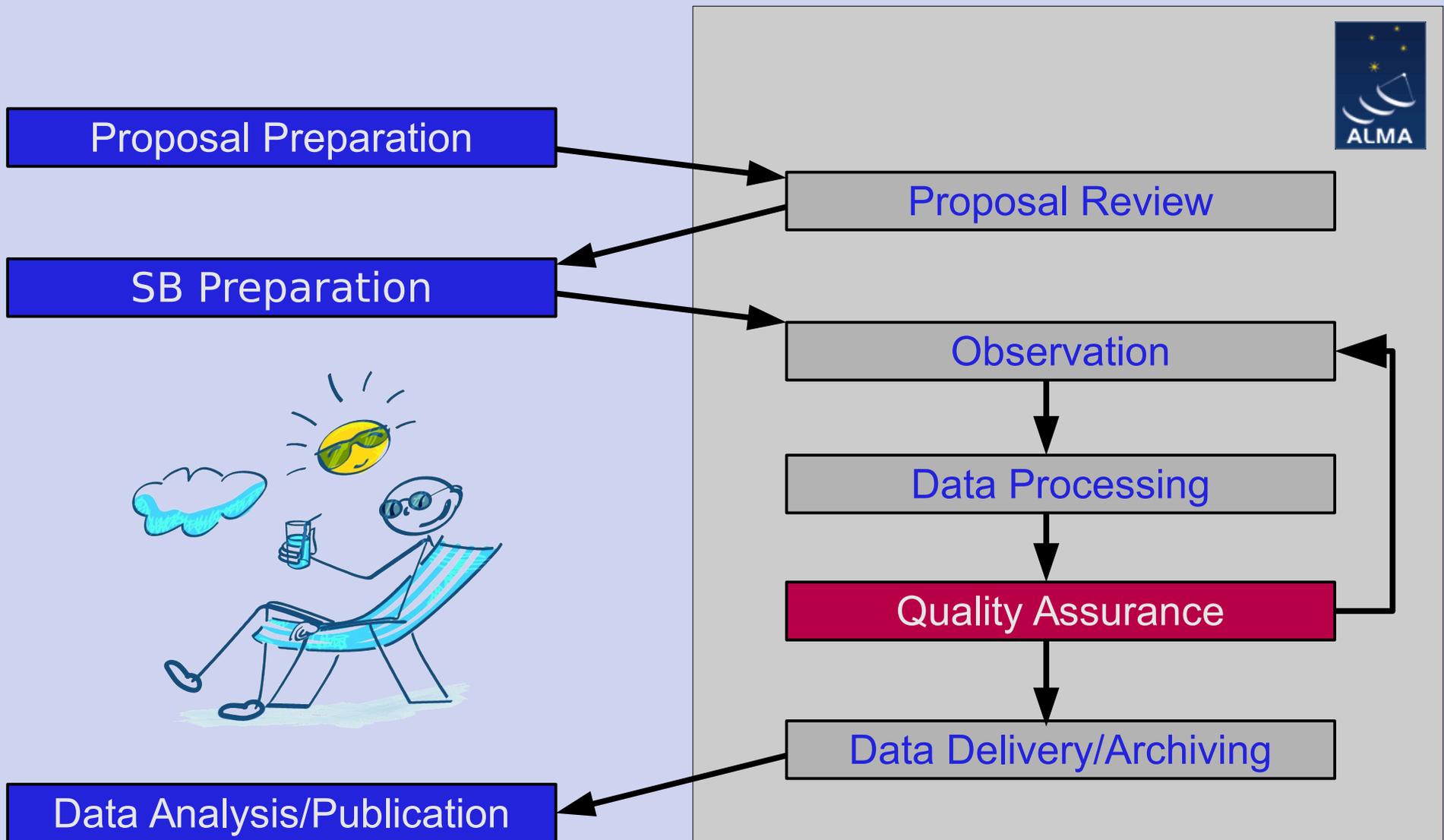
# Data Processing



# Data Processing

- Performed by ALMA with CASA
  - Standard modes: pipeline
  - Non-standard modes: manual
  - On a Science Goal level
- Involves calibration, flagging, imaging

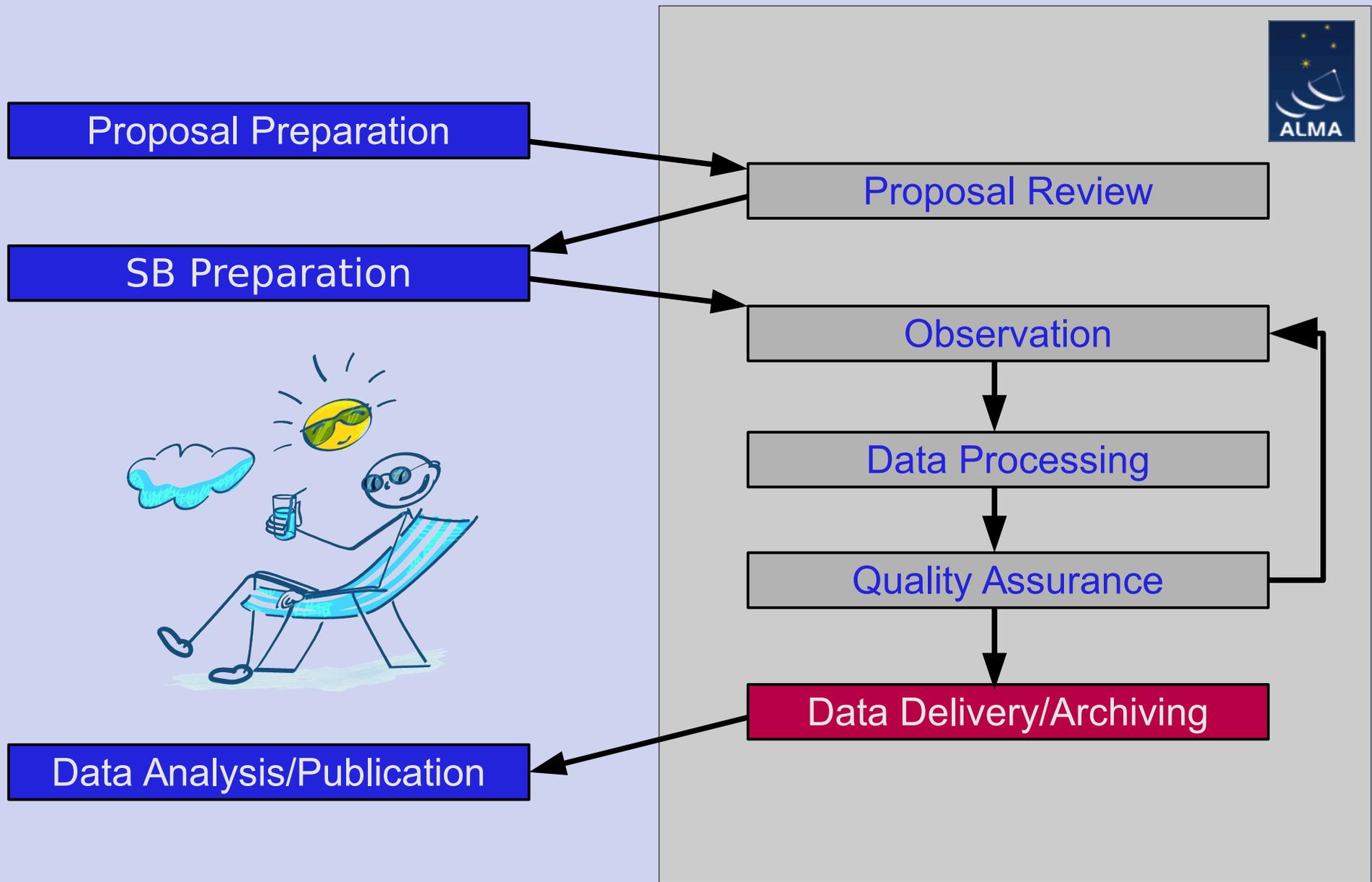
# Quality Assurance



# 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

- Data delivered after scientific goals were achieved
- All data that passes QA2 ingested into ALMA Archive
- Intermediate data delivery possible for “stale data”
  - > 25% complete
  - No new data expected for at least 90 days

# 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

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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
- Proprietary period **12 months**
  - Clock starts when PI is informed that data available for download
  - DDT proposals: 6 months

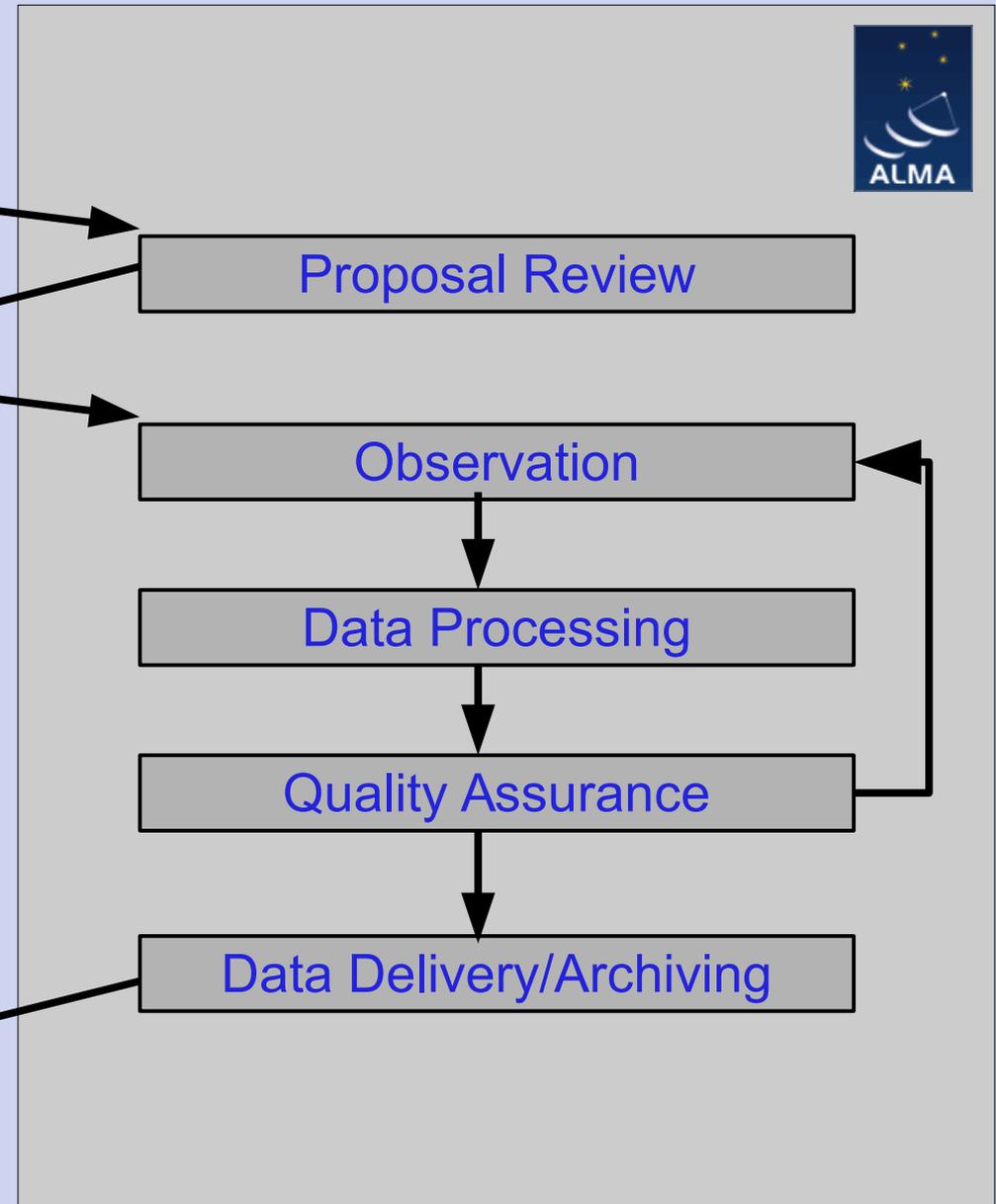
# Data Analysis/Publication

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!