



Astronomía en Chile

El Observatorio ALMA

Jorge Ibsen

Director del Departamento de Computación ALMA
Joint ALMA Observatory



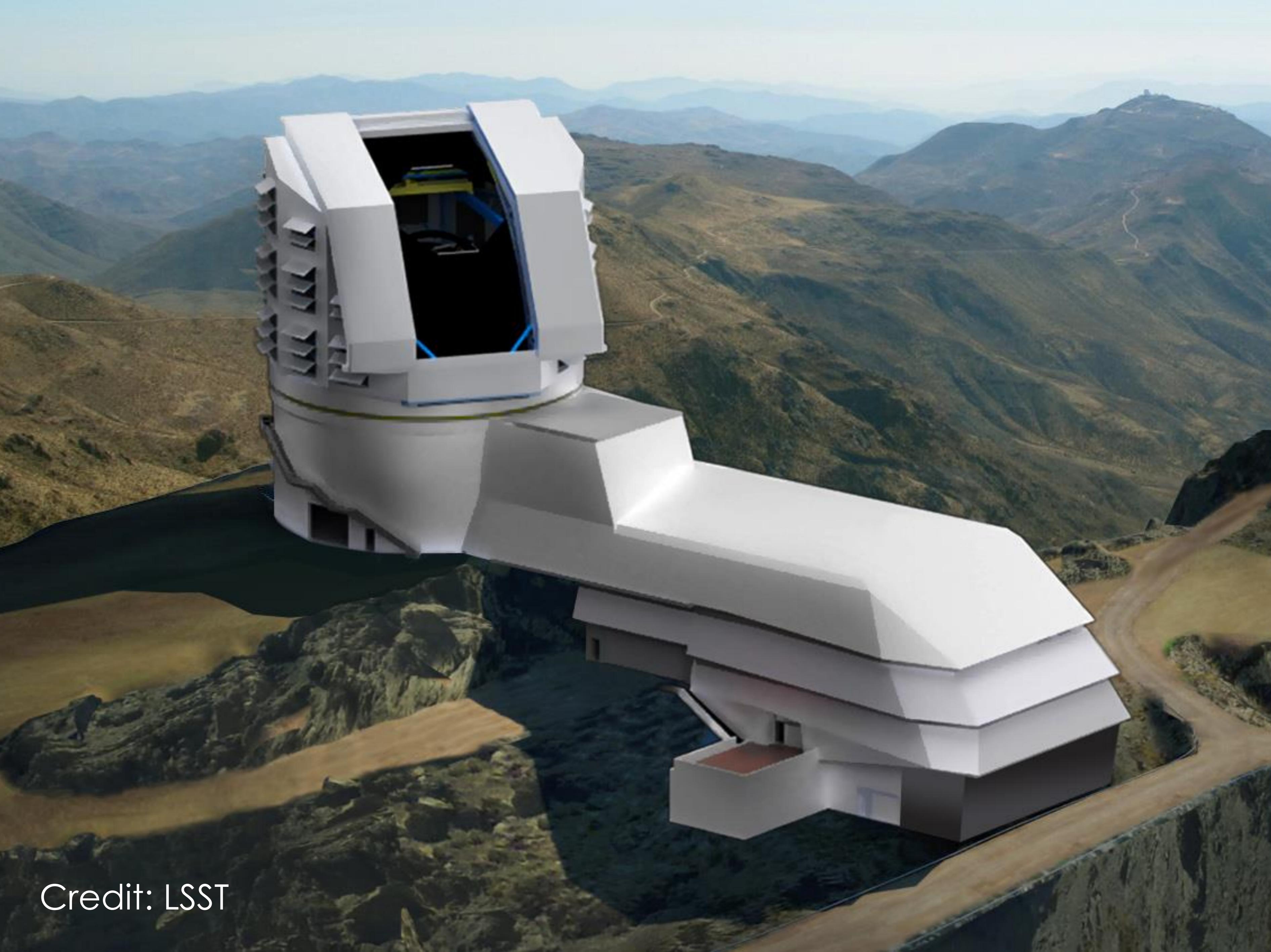


1. Los primeros 25 años del s. XXI



Telescopes and Instruments (1999-2025)

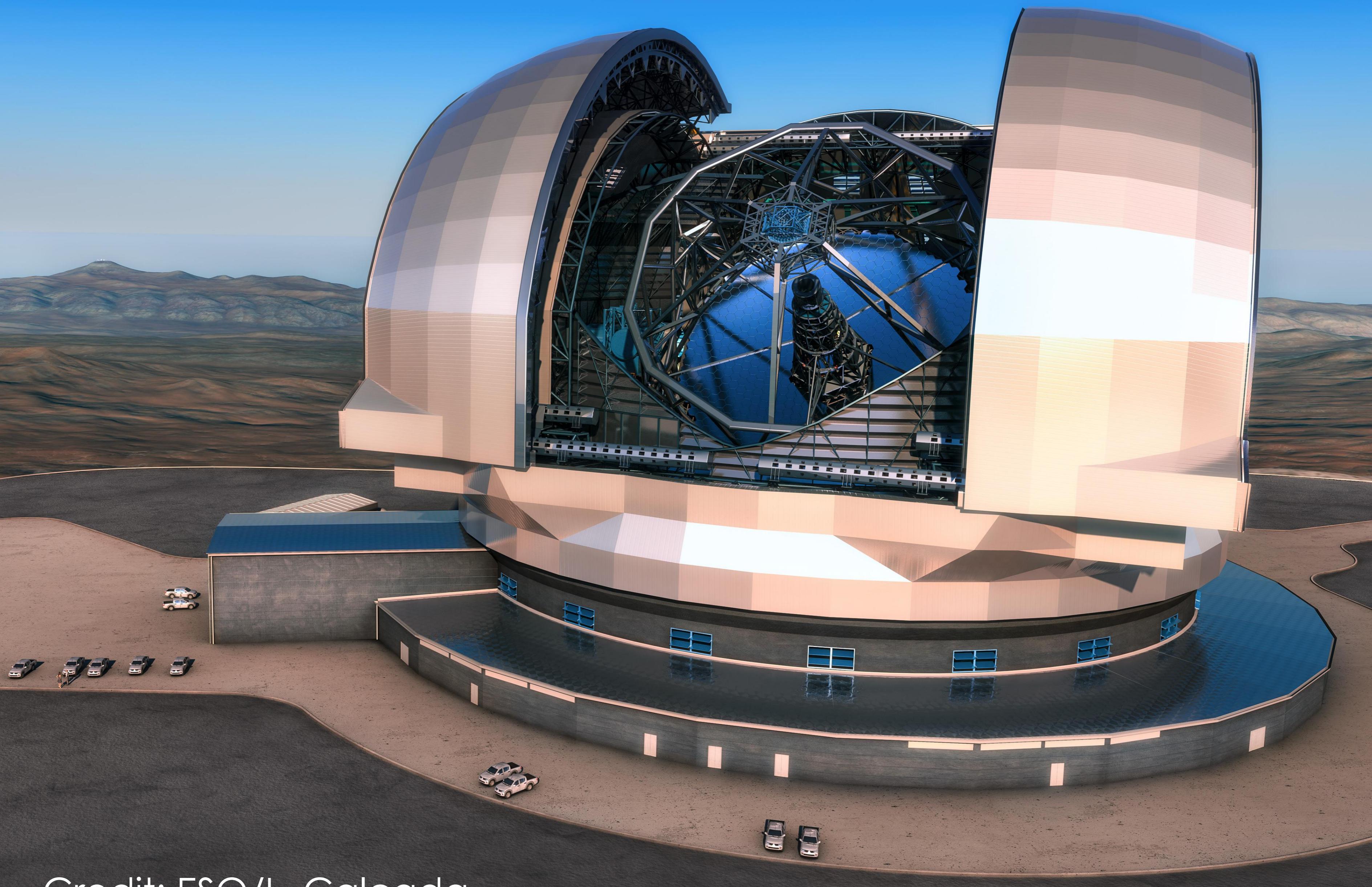




Credit: LSST



Credit: Giant Magellan Telescope, GMTO Corporation



Credit: ESO/L. Calçada



Data Production Comparison



DATA PER YEAR



2. ALMA

Credit: ALMA (ESO, NAOJ, NRAO), C. Padilla





Credit: ALMA (ESO, NAOJ, NRAO), C. Padilla



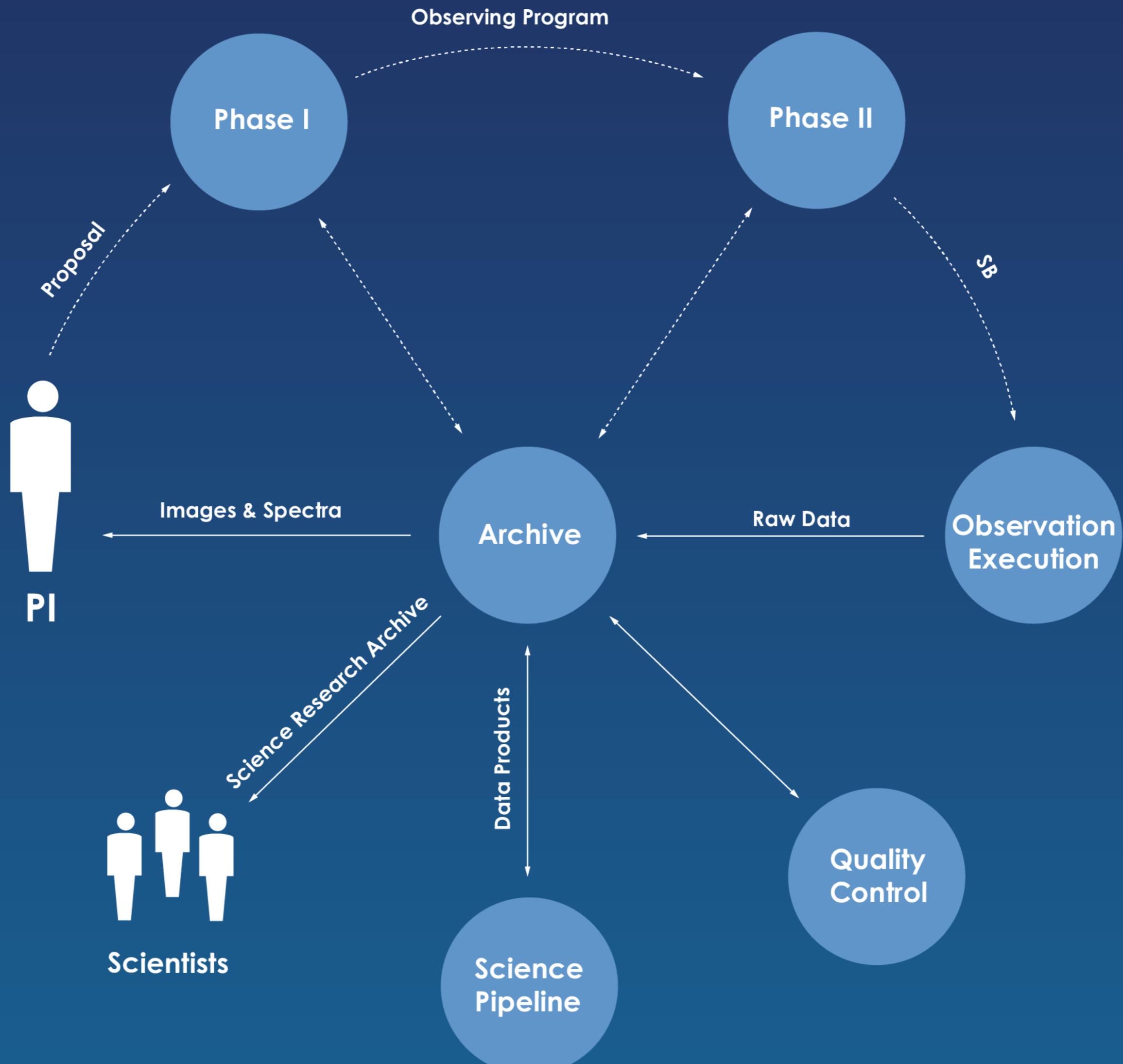
ALMA Mission

ALMA collects and delivers high-quality data sets to the scientific community by operating, maintaining and further developing a state-of-the-art observatory to explore the universe in the millimeter/sub-millimeter wavelength range.

To this effect, ALMA will:

- Provide a stable operating interferometer
- Maximize the availability of the array
- Make the operations user-friendly to facilitate science by the broad community

ALMA Core Processes

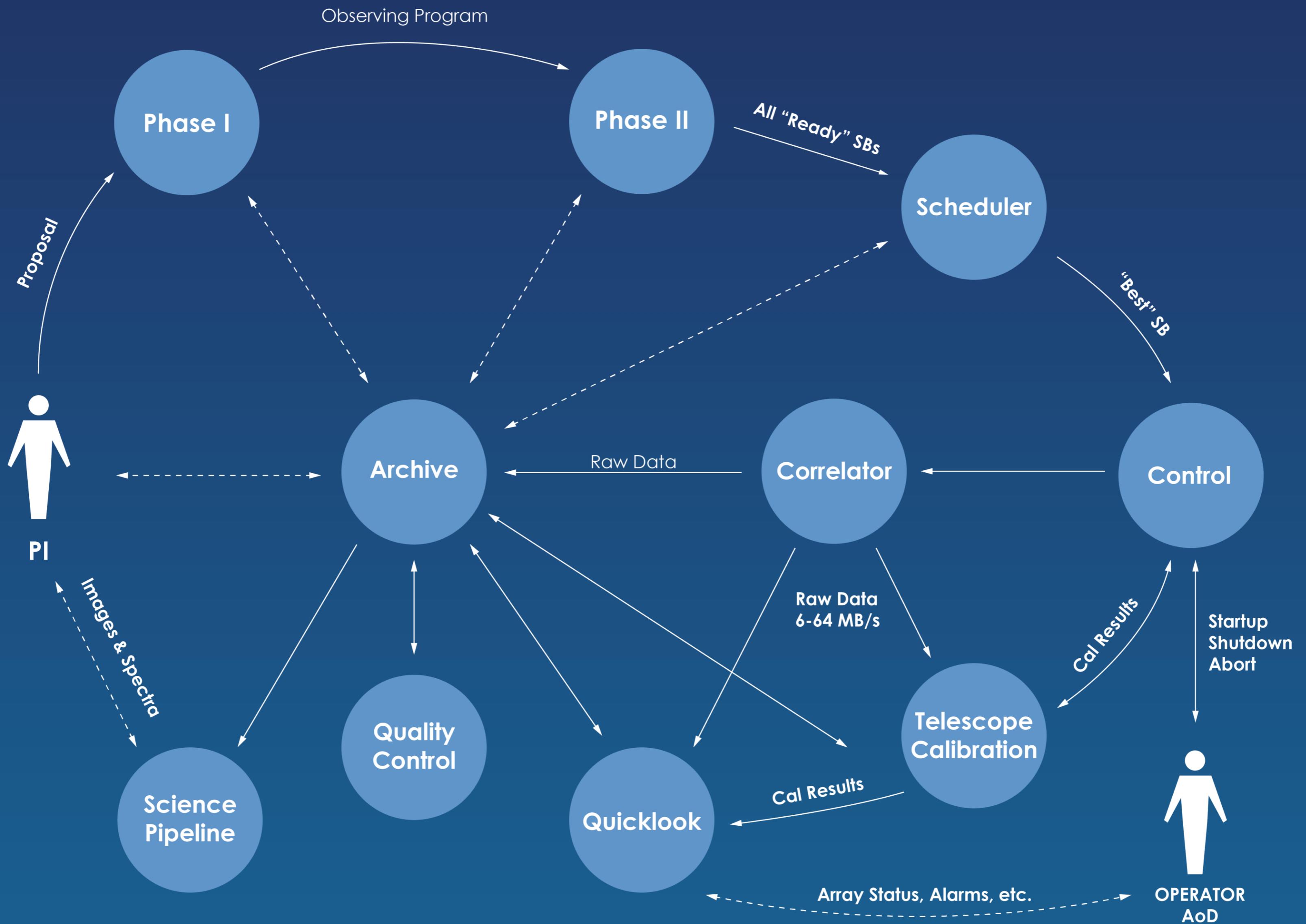




ALMA Core Processes

- **Phase 1 Proposal Generation:** Call for Proposals; Proposal Submission, Review & Scheduling, User Support & Notification;
- **Phase 2 Program Generation:** User Support, Scheduling Block creation, Submission & Validation;
- **Observation Execution:** System Calibration, Site Conditions Monitoring, Quick-Look Quality Assurance, Dynamic Scheduling and Scheduling Block Execution;
- **Maintenance:** Preventive & Corrective Maintenance, Performance Trending, Fault Correction, Array Re-Configuration;
- **Archive and Pipeline Operations:** Archive Maintenance (Science & Engineering Data), Detailed Quality Assurance, Data Product generation & Delivery;
- **Science Research Archive:** Web-Based, Virtual Observatory Compliant Interface to Public Data, Project-Independent search & Retrieve Tools.

ALMA Core Processes (Computing)



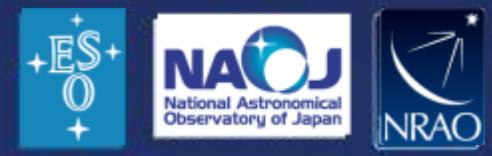


ALMA Operations





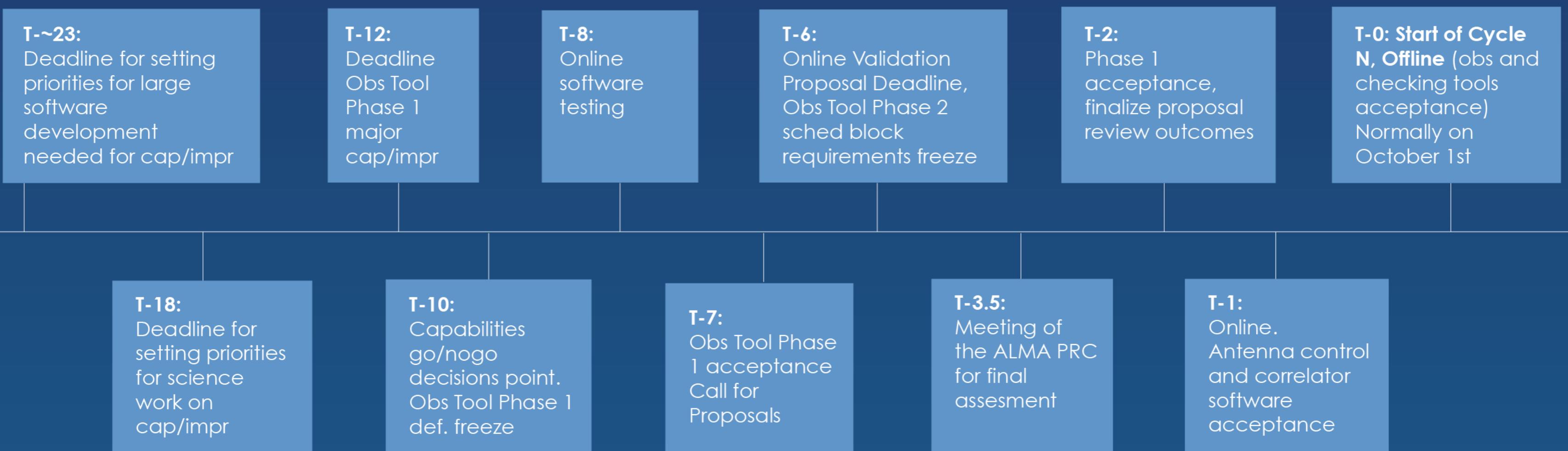
ALMA Operations





Cycle Timeline

Cylce Timeline (in ~ months)





Joint ALMA Observatory



AOS



OSF

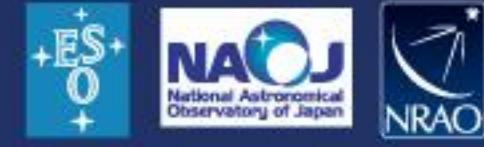


SCO





Getting time on ALMA



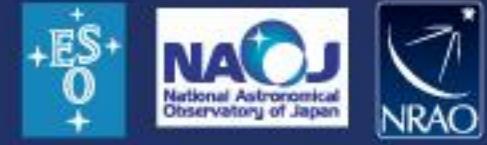
Phase I. Every year there is a call for proposals where everyone (scientist or not, in principle) can propose something to be observed.

Phase II. A scientific committee will then judge the quality of the proposal and will select those that potentially have the largest scientific impact for observation

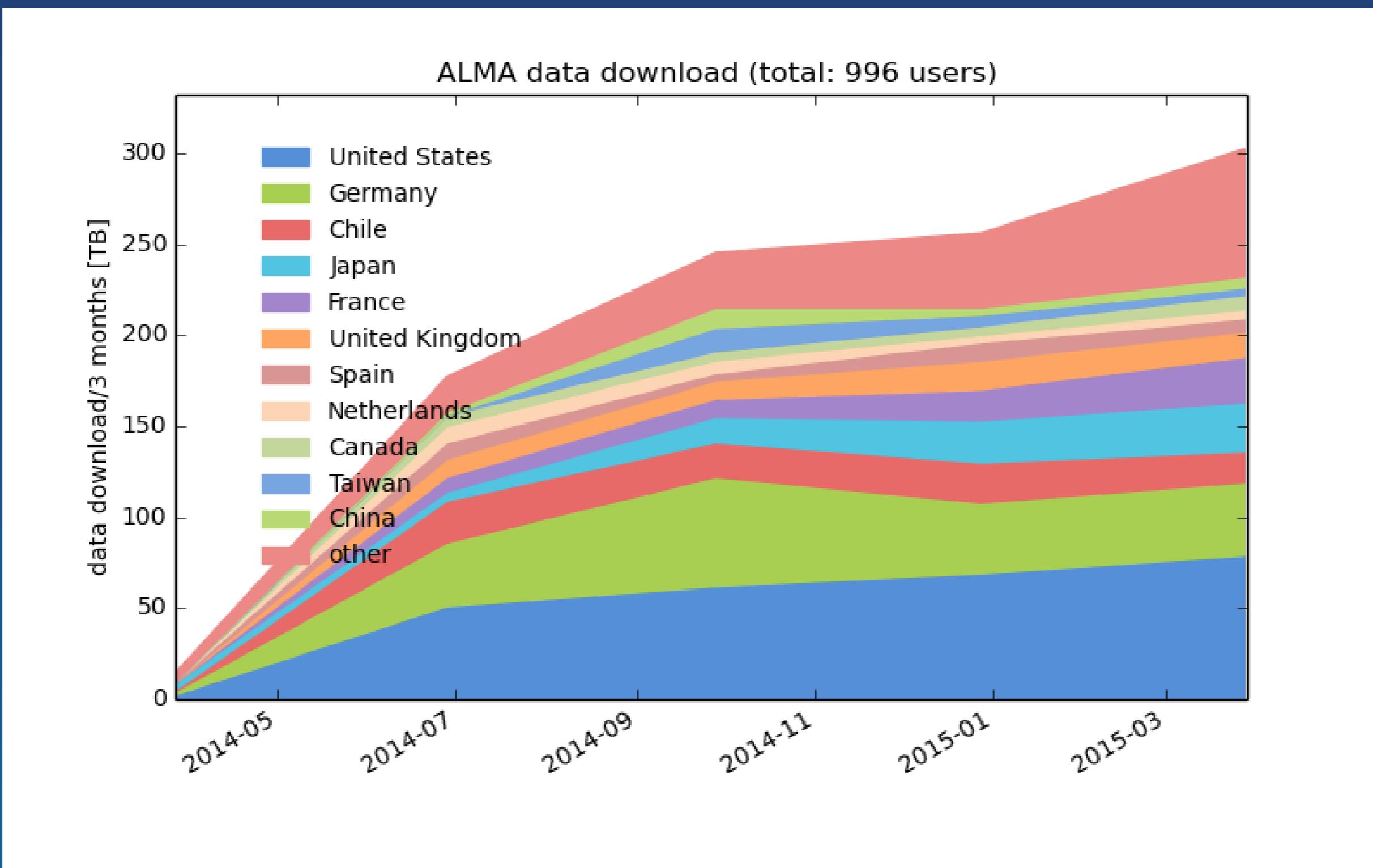
Relevant URL: <https://almascience.eso.org/proposing>



Principal Investigator (PI) Country Distribution



PIs do come from all over the world. The plot shows the country distribution for users of the ALMA archive (proprietary and non-proprietary data).

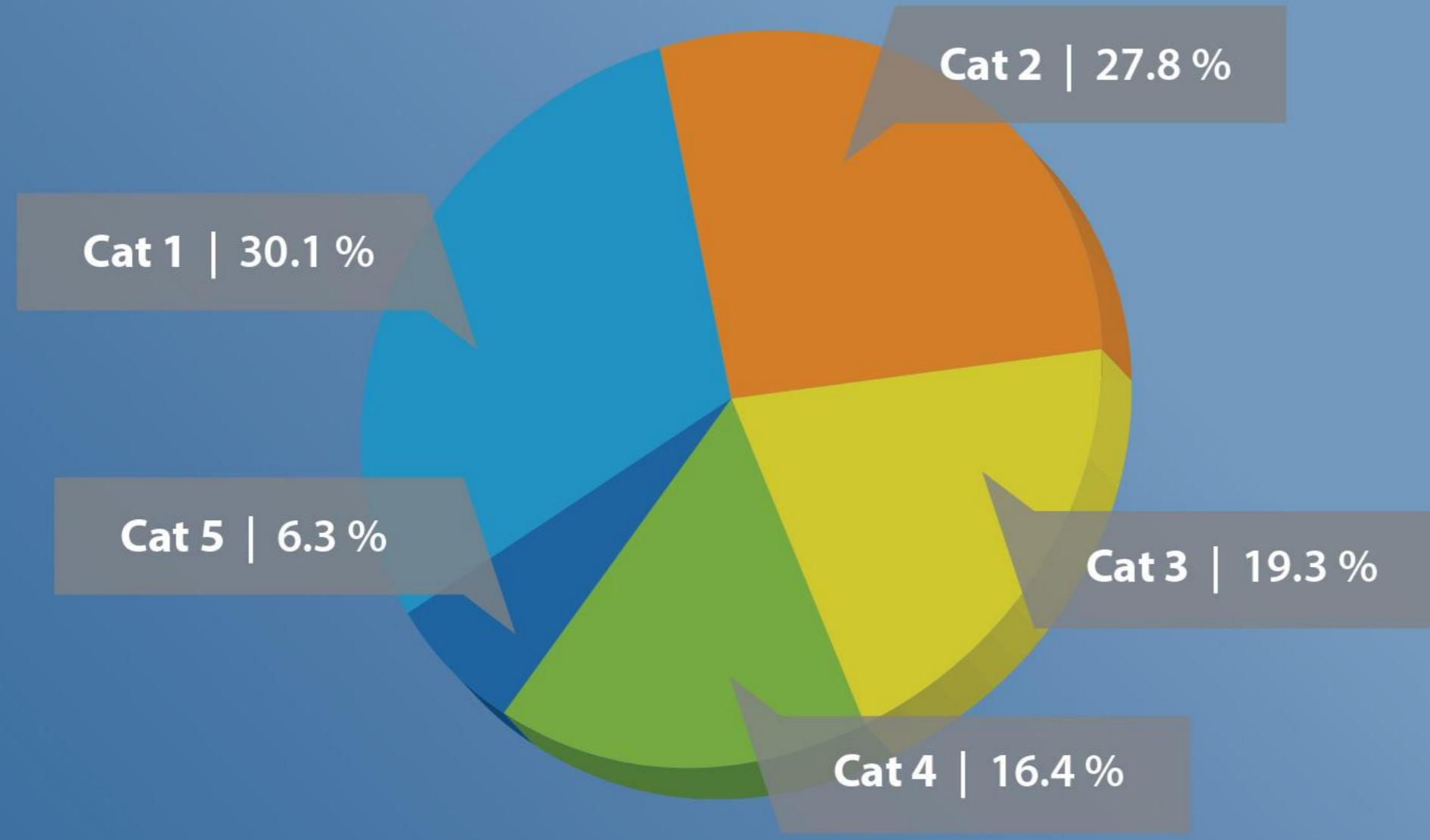




PI Country Distribution: Cycle 3 Proposal Submission



Cycle 3 Highly Ranked Projects



Proposals per Science Category

-  Cosmology and the High Redshift Universe
-  Galaxies and Galactic Nuclei
-  Interstellar Medium (ISM), Star Formation, and Astrochemistry
-  Circumstellar Disks, Exoplanets and the Solar System
-  Stellar Evolution and the Sun category represents

Proposals
submitted: 1581

Projects selected for
observing in Cycle 3:
401

Proposal Review
Panel: 97 scientific
assessors





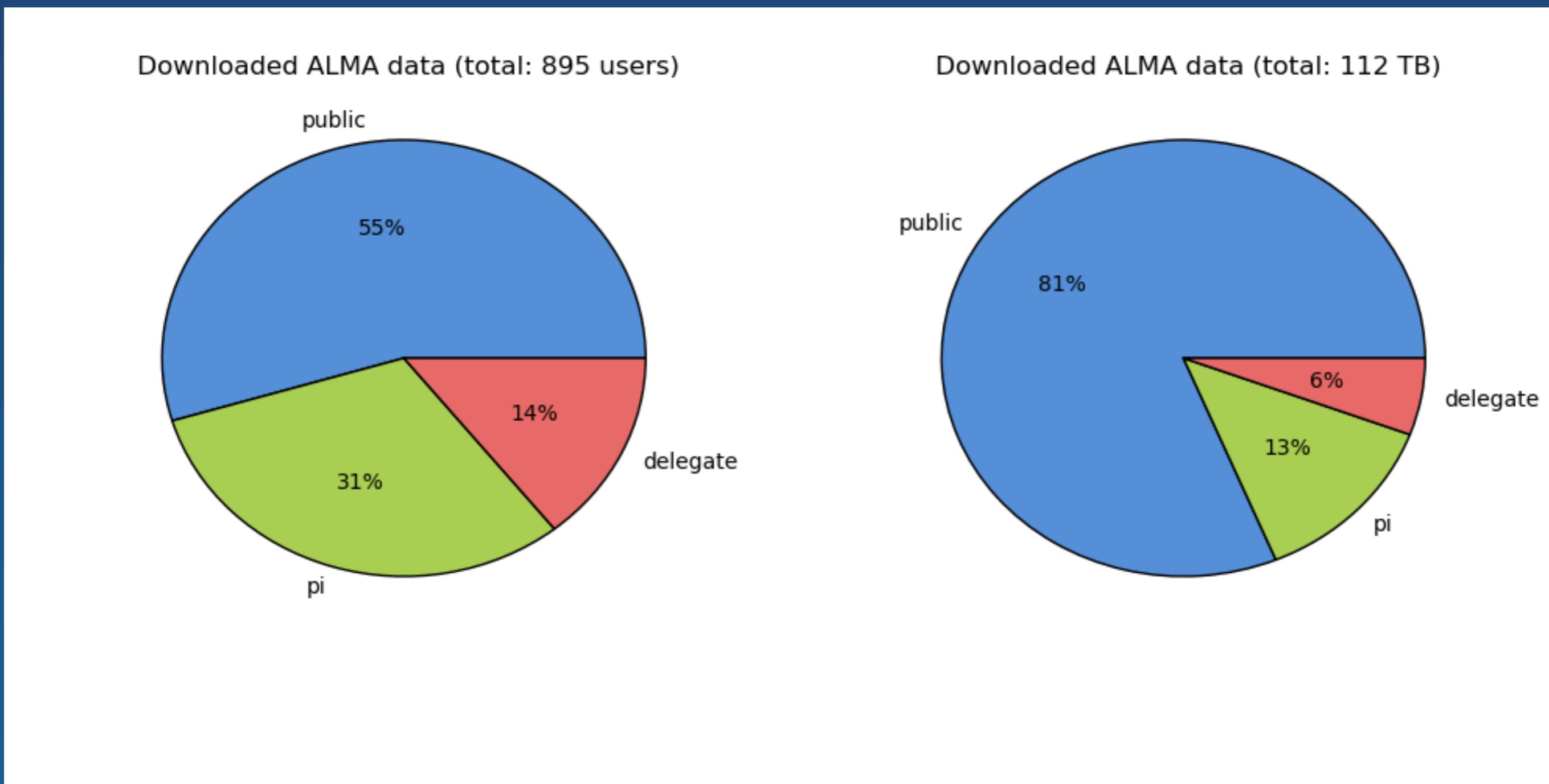
Data Availability

Once the data is public (12 months after the PI gets the data) everyone can download the exact same data the PI got. Scientists or not. No registration is required. Everything is free. Users can go to the science archive page

<https://almascience.eso.org/aq/>

and search for the data they are interested in. We do not know if the user who downloads data is a scientist or not, but we know if the user was a PI (or delegated by the PI) or not.

The two plots show the fraction of users that use the archive and are not PIs (55%). And they do download much more data than the PIs (81% of the data is downloaded when the data is already out of the proprietary time).





3. Impacto en la Sociedad



Strengthening the Chilean Infrastructure





Collaboration with Chilean Institutions



- ❖ Long term (formal and informal) collaborations with Chilean universities since 2006:
 - ❖ U. Técnica Federico Santa María, U. Chile, U. Católica del Norte, U. Bío-Bío, U. Católica, U. La Frontera, ...
- ❖ (A number of) Summer internships since 2006
- ❖ (A number of) Undergraduate and Master Thesis since 2007
- ❖ Participation on (a number of) CONICYT projects between 2006 and 2010
- ❖ Member of Directors Board of successfully completed FONDEF Project D11I1060 that developed the first Chilean Virtual Observatory (Chivo)
- ❖ Visible presence in Chilean (and International) Conferences: Astro-Engineering workshops, Astroinformatics 2014, SPIE, ADASS, ICATEPS



12th ACS Workshop, U. La Frontera

UNIVERSIDAD DE LA FRONTERA
FACULTAD DE INGENIERÍA Y CIENCIAS

CHARLAS MAGISTRALES ALMA COMMON SOFTWARE

12TH ACS WORKSHOP - UFRO, TEMUCO 2015

TEMÁTICAS

- Descripción del Observatorio ALMA
- Descripción y áreas del Departamento de Computación
- Software de ALMA
- ACS: ALMA Common Software

RELATORES DE ALMA DEPARTMENT OF COMPUTING

Dr. Jorge Ibsen HEAD OF ALMA DEPARTMENT OF COMPUTING	Rubén Soto SOFTWARE GROUP MANAGER	Arturo Hoffstad SOFTWARE ENGINEER	Tzu-Chiang Shen SOFTWARE GROUP MANAGER
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DIRIGIDO A ACADÉMICOS Y ESTUDIANTES DE LA FACULTAD DE INGENIERÍA Y CIENCIAS DE LA UNIVERSIDAD Y A PERSONAS INTERESADAS EN EL ÁREA

ACCEDE A LA INSCRIPCIÓN
ESCANEANDO ESTE CÓDIGO QR CON TU SMARTPHONE

INSCRIPCIONES HASTA EL 30 DE JULIO
CHARLAS EL LUNES 3 DE AGOSTO
DE 15:00 A 18:00 HORAS EN EL AUDITORIUM ALBERTO LEVY

Más información en www.fica.ufro.cl
www.almaobservatory.org
vincfica@ufrontera.cl

COORDINA Y ORGANIZA:

UNIVERSIDAD DE LA FRONTERA
FACULTAD DE INGENIERÍA Y CIENCIAS
DIRECCIÓN DE VINCULACIÓN CON EL MEDIO

UNIVERSIDAD DE LA FRONTERA
FACULTAD DE INGENIERÍA Y CIENCIAS

TALLER ACS ALMA COMMON SOFTWARE

12TH ACS WORKSHOP - UFRO, TEMUCO 2015

INSTRUCTORES

Dr. Jorge Ibsen HEAD OF ALMA DEPARTMENT OF COMPUTING	Rubén Soto SOFTWARE GROUP MANAGER
Arturo Hoffstad SOFTWARE ENGINEER	Tzu-Chiang Shen SOFTWARE GROUP MANAGER

DIRIGIDO A ESTUDIANTES DESDE 3^{ER} AÑO DE INGENIERÍA INFORMÁTICA, INGENIERÍA CIVIL INFORMÁTICA, ELÉCTRICA, ELECTRÓNICA, TELEMÁTICA, INGENIERÍA MATEMÁTICA, INGENIERÍA CIVIL INDUSTRIAL MENCIÓN INFORMÁTICA Y OTRAS CARRERAS AFINES

REQUISITOS: CONOCIMIENTOS DE PROGRAMACIÓN EN C++ Y/O JAVA

ACCEDE A LA INSCRIPCIÓN
ESCANEANDO ESTE CÓDIGO QR CON TU SMARTPHONE

INSCRIPCIONES HASTA EL 13 DE JULIO
TALLER DESDE EL 3 AL 6 DE AGOSTO
A PARTIR DE LAS 09:00 HORAS EN EL DEPARTAMENTO DE INGENIERÍA DE SISTEMAS LABORATORIO 316 • CUPOS: 25 ALUMNOS

Más información en www.almaobservatory.org
y también en www.fica.ufro.cl
vincfica@ufrontera.cl

COORDINA Y ORGANIZA:

UNIVERSIDAD DE LA FRONTERA
FACULTAD DE INGENIERÍA Y CIENCIAS
DIRECCIÓN DE VINCULACIÓN CON EL MEDIO



ASTRO INGENIERÍA
III TALLER 2015
24-26 NOVIEMBRE
SANTIAGO, CHILE

MARTES Y MIERCOLES:
HOTEL ATTON, VITACURA
JUEVES:
CENTRO DE CONFERENCIAS SOFOFA

INSCRIPCIONES WWW.TALLERASTROINGENIERIA2015.COM

ORGANIZAN:



SOFOFA
innova

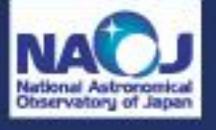


Organized jointly by Chilean governmental ministries, SOFOFA, ALMA, ESO, AURA, and the Advanced Centre for Electrical and Electronics Engineering in UTFSM.

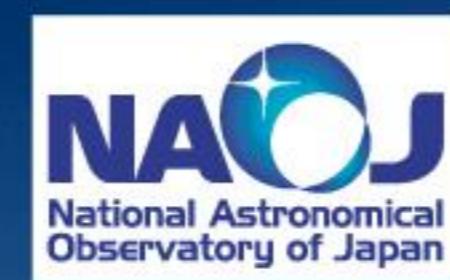
More than 200 participants are expected.



In Summary



Muchas Gracias!



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.