ESO Programme update

Xavier Barcons

44th UC meeting, 29-30 Apr 2020

PUBLIC
Science enabled by ESO

ESO Publications 1996-2019

No. refereed papers

- VLT / VLTI
- La Silla
- Survey tel.
- APEX
- ALMA
- Total

ESO Programme update, 29-30.4.2020, PUBLIC
The role of the ESO Science Archive

Time evolution of VLT papers using archival data

Source: ESO Telbib (telbib.eso.org)
First image of a Black Hole (M87)

Gas filaments connecting galaxies and supermassive black holes in SSA22 proto-cluster core at $z = 3.1$

In proto-cluster core, Mpc-scale Ly $\alpha$ filaments reveal $>10^{12}$ $M_\odot$ fuel for growth of galaxies + SMBHs

Umehata et al. (2019, Science, 366, 97)
Relativistic precession of S2 around Sgr A*

Starting 18 Oct 2019

- Peaceful social protests shadowed by violent acts
  - Social demands focused on reducing inequality
- State of emergency (19 Oct-) & curfews (1 week) in place

ESO destaffed the sites to protect staff, and re-staffed after curfews were lifted

- Science observations continued
- Travel from Europe to Chile interrupted and restored afterwards with precautions
  - This affected installation of CRIRES+

New “normality” in Jan/Feb 2020 (vacation period in Chile), with normal observatory operations

- Until COVID-19 took over.
The majority of ESO staff are on mobile working

- A limited amount of people to come to work to the premises for operational needs in Garching & Vitacura
  - ALMA Santiago Central Office empty, other than IT interventions

Observatory sites in safe state as of last week of Mar

- No science operations, only minimal teams on site to monitor critical systems and to keep the site safe and secure
- Paranal: 21 people
- La Silla: 5 people
- APEX: 5 people
- ALMA/OSF destaffed, 4-6 people inspecting the sites daily
Coming back to a full operational state will be staggered

- Following national regulations, and thence not synchronised

External communication

- Inquiries to be forwarded to the ESO Department of Communication (information@eso.org)

ESO staff are doing the utmost to keep the pace with a lot of commitment and dedication

- But there will be impacts in the programme

At this point, ESO must:

- Make as much progress as possible within the current constraints
- Be ready to go back safely to a “normal” operational state when circumstances so allow
La Silla Paranal updates

- P105 (& P106) proposals successfully submitted through web-based Phase 1 tool

- NEAR experiment finished
  - Report on observations of Proxima Cen in *The Messenger*
  - Science demonstration run conducted in Dec 2019

- La Silla:
  - NIRPS AO/fiber system *installed and being commissioned*; spectrograph later in 2020 or early 2021

- Paranal
  - CRIRES+ in Paranal, *being commissioned*

- APEX
  - On-going discussion with partners about 2023-25 operation/agreement, cost-neutral to ESO
ALMA updates

■ Cycle 7
  - 1773 proposals submitted, 41% from the ESO region (34% of the time allocated).
  - Oversubscription (target 4300 hr): ESO 5.8, EA 4.1, NA 3.6, CL 2.4
  - Very efficient observations in late 2019 (400 hr/month)
  - COVID-19 science observations interrupted around March 20

■ ALMA development:
  - NA cancelled Correlator Upgrade project – way forward discussion on-going
  - Band 2 project (led by ESO) ongoing, with some delays
  - New generation Observing Tool about to start

■ 5-year Forward Look adopted by the ALMA Board
  - Includes upgrades and long-term repairs
ELT updates

- Generally very good progress, until the COVID-19 crisis materialised
  - Completion fraction: 30% time & approx. earned value

- Dome FDR meeting 18-20 Feb: closure shortly

- Instruments moving from PDR to FDR
  - MAORY: good understanding of optical design, heading towards PDR in mid 2021 (TBC)

- Phase 2 items approved by Council:
  - Power Conditioning System, including a PV plant
  - Second Pre-focal station

- ELT Total Cost exercise on-going in discussion with governing bodies
Aerial view of Cerro Armazones

ELT Technical Facility in Paranal
ELT progress in Europe - I
ELT progress in Europe - II
CTA updates

- Progress is being generally slow
- CTA cost book drafted & reviewed by appointed committee
  - Planning for approval by CTAO Council in Jun 2020; may be challenging
- With regard to site infrastructure, CTA-S will operate in “Island mode” in Paranal, as foreseen in the hosting agreement.
- On-going preparations for Phase 2 of ERIC application
  - After Cost Book is approved
  - CTA-ERIC may be in place in 2021
COVID-19 and observing time

**La Silla Paranal Observatory**

- P104 observations largely finished (thanks to LPO staff!)
- P105: COVID-19 effect considered as “bad weather”.
  - Some Priority A runs may be carried over
- P106 (> 1000 proposals received): should be ready to start observations approx. on time, if conditions allow
- No requests received for extension of proprietary time, but willing to consider cases individually based on COVID-19

**ALMA**

- Cycle 8 delayed for 1 year
- Cycle 7 observations will be resumed when feasible, all projects carried over
  - the JAO will develop a plan, in collaboration with the Executives, to be agreed by the ALMA Board in the next coming weeks, to fill the observing time available from the restart of observations until September 2021,
- 3-month blanket extension of proprietary period
ESO Supernova Planetarium & Visitor Centre (Garching, DE)

- Opened 28 April 2018
  - 85,000 visitors to the Planetarium in 1st year

- Permanent exhibit on Astronomy & ESO
  - Plus temporary exhibits

- Comprehensive education programme
  - More than 12,000 students engaged in education activities from a number of ESO Member States
  - Teacher trainings
Total Solar Eclipse (2 Jul 2019)
La Silla
Overall ESO position (VLT/I, ALMA, ELT) really at the forefront of world-wide astronomy
- ALMA 2030 science vision & development roadmap in place
- VLT 2030 and ESO science prioritization exercise in progress

The international ELT landscape:
- GMT and TMT currently project first light around 2030;
- Funding issues & Astro2020 decadal survey;
- TMT site issues;
- ESO’s ELT well into construction, fully backed by MS and the community.

Astronomy from space
- ESA just approved a 10% increase in the science programme, way forward for next space observatories (eg Athena, LISA)
- JWST launch in 2021, plenty of opportunities for synergy
- ESO-ESA DG coordination meeting early Jan 2020 (Garching)
Carbon footprint audit received

- 28 ktCO$_2$/yr (<0.2 tCO$_2$/USD/yr)
- Energy (41%), procurements (30%), travel (10%)
- Updates needed

Proposals to reduce Carbon footprint being prepared by ESO Environment Committee

Signature of contract with SAESA to provide power-conditioned & greener electricity to ELT
MoU with UN Women signed on 28.01.2020 in Santiago

- Promote young girls’ interest in STEM in Chile
- “Second chance” support in Chile (esp the Regions)
- Work towards adopting the WEP

A large number of activities organized around UN’s Women in Science day
UC43 Recommendations

- **Agenda item 10; written Replies in ESO/UC-104**

- **Science Operations Policy and CfP related**
  - UC43.R01: clarify proprietary period & how to extend
    - Now in the CfP and in ESO Data Access Policy [web page].
  - UC43.R02: inform UC about Distributed Peer Review
    - ALMA implemented DPR for Cycle 7 supplementary call
    - ESO to adopt after completion of p1 system, likely for fast-track

- **UC43.R03: To promote VLTI**
  - VLTI summer schools; VLTI special session@EWASS
  - VLTI Expertise Centres started operation
UC43 Recommendations

- Archive, data and data access related
  - UC43.R04: ALMA calibrated measurement sets
    - Users informed, ALMA Science Newsletter
  - UC43.R05: archive enhancements for raw/Phase 3 data
    - Archive Science Portal v2 release
  - UC43.R06: colour transformations for NIR instruments
    - Published for VIRCAM, HAWK-I, ISAAC and SOFI on Data Reduction FAQ web page
    - Messenger article in preparation
  - UC43.R09: Priority access to visitor mode data
    - dVM data transfer has priority like ToO

Agenda item 10, also ESO/UC-104 detailed Replies
UC43 Recommendations

- **UC43.R07: Software tools compatibility & support**
  - Yearly coordinated operational pipeline releases
  - WIP on a web portal that collects information relevant to handling ESO data

- **UC43.R08: provide a dedicated python environment**
  - Overarching strategy to use web-based applications
  - Exploration of possible improvements for Linux support for python related to pipelines

*Agenda item 10, also ESO/UC-104 detailed Reply*