ESO/UC-86
Date: 04.04.2018

EUROPEAN ORGANISATION FOR ASTRONOMICAL RESEARCH IN THE SOUTHERN HEMISPHERE

Users' Committee 42nd Meeting, Garching April 26-27, 2018	For Review

ESO Responses to Recommendations

from

41st Users' Committee

This document is for **ESO INTERNAL USE**
Distribution to Users' Committee, their colleagues with a need-to-know, and their supervisors is authorised.

Users' Committee is invited to **review** this document.

UC41 RECOMMENDATIONS

The UC has collected the users' opinions about several topics and in general regarding their experience in interacting with ESO. The UC is glad to report a high level of satisfaction of the community. Based on the users' feedback, the UC recommends ESO:

High priority

(by order of priority)

UC41.R.01: to continue putting a high priority on the development, support, and improvement of **pipelines.** The ability of optimally exploiting data is a concern of ESO users. Some specific recommendations based on the UC poll are listed here:

- to improve documentation on pipelines, including on the recipe parameters in Reflex, and on the installation procedures;
- to explore how to make bug reports (issue tracker) on ESO pipelines available to the community;
- to provide information on the frequency of (future) pipeline upgrades, and to consider updating the pipelines faster following identified issues;
- to provide working optimal extraction for pipelines and all ADPs for all spectroscopic instruments (and XSHOOTER in particular), especially in the case of faint sources;
- to continue the on-going improvements of the SPHERE pipeline to bring it up to the same quality and usability as for the others as soon as possible;
- to use Gaia as a reference catalog when an astrometric solution is calculated.

Documentation and installation. The April 2018 releases will come with updated documentation, including Reflex parameters (see also **UC41.R.06** below). The recommended method of installation of ESO pipelines follows software engineering standards, which include RPMs for Linux and MacPorts for OS X. Any problems with installation procedures should be reported to usd-help@eso.org so that we can follow-up on the issues.

Public bug reports. This has been investigated. While it would be technically possible to expose the ticketing system to the world, we prefer not to. The reasons are *i)* the issue tracker system contains very technical information at the low-level of code implementation; the information in these tickets is extremely technical. In particular, it does not provide useful information to users; for instance typical user questions regarding pipeline recipes or problems with data reduction; *ii*) the tickets are an internal communication tool which can contain references to specific users and datasets (which can be confidential). ESO has made public the FAQs related to data processing and pipeline, which are available on the web (https://www.eso.org/sci/data-processing/faq.html).

In the context of the release of the new interfaces and services for the ESO Science Archive, we are experimenting with the UserEcho feedback platform (https://userecho.com). Among other features, it allows users to initiate public discussion threads to which both other users and ESO can, then, contribute to. It is meant to complement, not replace the ticketing system of usd-help@eso.org. Its performance and user acceptance will be assessed to evaluate whether to employ it further, including potentially expanding it to other tools/areas.

Frequency of pipeline releases. A software release entails a non-negligible effort, which needs to be tensioned against development activities. Pipelines for operational instruments are usually released once a year in April. More frequent releases are considered in case of major upgrades. Pipelines for instruments that just entered operations also often have additional releases throughout the year, depending on their development status. In order to optimize the use of resources, bug fixes and minor upgrades for any given pipeline are usually bundled together and made available in a single release, which may result in a longer release cycle. New pipeline releases are announced through a mailing list, which interested people can subscribe to by sending an email to eso-pipelines-announce-join@eso.org.

Spectral optimal extraction. An optimum extraction method has been implemented for the CRIRES+ pipeline. We plan to import the relevant routines into the High-level Data Reduction Library, and to upgrade other individual pipelines using these routines. Perspective release date for X-Shooter is 2018Q4.

SPHERE pipeline. The SPHERE pipeline version 0.31 has been released on December 22, 2017. It includes the determination of zeropoints and Strehl ratios for all IRDIS standard filters (J/H/Ks, no catalog data for Y available) and the V/N_R/N_I filters for ZIMPOL. For the IFS wavelength calibration, an error was fixed in the cube creation and improved parameter settings. In addition, the wavelength calibration recipe now provides a wavelength calibrated cube of the arc lamp calibration frame, that allows the user to verify the quality of the wavelength calibration. The IFS wavelength calibration is rather convoluted and there are still some remaining issues with QC.

Work is still in progress on the IRDIS distortion recipe and on the processing of ZIMPOL polarimetric standard stars. Target release is 2018Q2. As part of the work on the ZIMPOL polarimetric standard stars an error was fixed on the recipe that determines the modulation efficiency of ZIMPOL polarimetric data. The result was always negative, which - when applied to the science data - created wrong results (and not just wrong sign) for the Q and U frames and thus for the polarization angle.

A second batch of improvements was identified. It includes: provision of correct World Coordinate System (angle and scale, for arbitrary position angles and both _field- and pupil-stabilized observations); correct and robust determination and later application of object position from OBJECT,CENTER frames (also for 2-dimensional ZIMPOL raw data) in order to correctly stack individual frames; documentation of the algorithms used to determine QC parameters; addition of exact observing date and parallactic angles in individual products; addition of the central wavelength of each plane in the IFS science products as well as of IRDIS imaging science products in the header; provision of Strehl ratio for each individual frame of OBJECT,FLUX or other non-coronagraphic data; provision of contrast for each individual coronagraphic frame (IRDIS and ZIMPOL imaging data).
The impact that devoting to them the required level of resources would have on other activities is being evaluated. The expectation is that it will not be negligible, likely affecting the archive release of reduced data from other instruments, so the opportunity of doing so must be very carefully evaluated.
If executed, the outcome of this second batch would fix all bugs known to date. Additional further work would still be needed to bring the pipeline to full shape in terms of science data processing and quality control instrument monitoring.

Gaia as reference catalogue. Gaia provides coordinates in the ICRS reference system, while we are currently using the FK5 system. The use of ICRS is transparent to any application with accuracy requirements no more stringent than 0.1 arcsec: the distinctions between ICRS, FK5 and dynamical equator and equinox of J2000 are currently not significant. Still, an effort is ongoing to move to ICRS as a future-proof solution. The move has impact on a large number of sub-systems and needs to be planned and executed with extreme care. We are currently in the planning stage. When available, an appropriate Gaia catalogue will be used for pointing and guiding at the telescope. Contacts with the Gaia Team are ongoing.

UC41.R.02: to continue improving transparency by publicizing the following information:

- development roadmap for the Phase 1 & 2 tools;
- results of the study on the expected OB success rate vs. length (depending on seeing constraint);
- results of the study on the VM technical downtime;
- development of the eavesdropping mode (including as a means to assist less experienced visitor astronomers).

Development roadmap: A Messenger article with a description of the global roadmap (including P1, P2, ETC, and all the other projects considered) will be published in the next issue (March 2018). A series of articles will then present each of the main projects.

OB success rate vs. length: We are planning a Messenger article addressing in part also R.05 (promoting VM) and at the same time discussing the advantages and limitations of SM – one of the limitations is max OB length of 1h, that however has been shown to be a still valid assumption for the efficiency reasons.

VM technical downtime & Eavesdropping:
The two last items were publicised via the ESO newsletter. Eavesdropping is officially offered since P100 for designated visitor mode. Usage for ToO is under testing.

UC41.R.03: to accelerate the delivery of the new Phase 1 preparation tool.
There are constant and repetitive complaints from the users, and currently it is envisaged for delivery in 2020-21.

The P1 system includes several “modules”: Definition of the cycle, submission of a proposal, management of the OPC, handling of OPC meetings. The system being developed is a complete overhaul of the tools and of the underlying infrastructure. Consequently, it is not possible to release the modules one after the other: we need to deploy the whole package at once. For next phase of development, we are considering to increase the resources. It is however not possible to advance the release date by much.

UC41.R.04 (ALMA-specific):

- to allow the ARC contact scientist to edit the Scheduling Blocks during Phase 2, in particular the target coordinates;
- to speed up the ticketing process, and to better monitor the quality of the answers;
- to homogenize the level of data products distributed to the users, in particular for spectral line observations where the following should be provided for each SPW: (i) map of the whole band with continuum subtracted, (ii) map of the whole band with continuum+line, and (iii) map of the continuum;
- to ensure that ALMA polarization observations requiring 3 hours or more of parallactic angle coverage for proper calibration are performed in blocks of at least 3 hours.

ALMA has very precise policies that define how much coordinates can be changed by the PI during Phase 2. For larger coordinate changes, change requests need to be submitted. Contact scientists have never been able to edit SBs and it is not foreseen that this will happen. This is the responsibility of the PI.

We have been monitoring the statistics of ALMA Helpdesk tickets more closely over the last year. Out of 637 tickets that were handled during the last year, 20 were open for more than three months, 14 of which were waiting for user feedback.

Regarding the data products: since we are moving toward more pipeline-produced imaging products, the images and cubes delivered to the users will indeed become more homogeneous. Making cubes of the full spectral coverage is happening now in the imaging pipeline, apart from those cases where ‘mitigation’ is applied. This mitigation causes the imaging pipeline to make smaller cubes for those cases where full imaging would be too computationally expensive. Long baseline projects are most affected by this.

Finally, efforts are ongoing to improve efficiency in full polarization calibration, and also to ensure the robust collection of PI data. We note that full polarisation observing is deferred to Cycle 7.

UC41.R.05: to promote the use and highlight the benefits of VM; to consider funding a 2nd visitor astronomer if (s)he is a student.

Funding a student as second observer is unfortunately beyond the available budget. Instead, it is encouraged to consider having students be the first observer and have experienced colleagues connecting via the eavesdropping mode (POEM) remotely in case funding for the second observer is limited.

Medium priority

(by order of priority)

UC41.R.06: to continue

- participating in country-led workshops on how to prepare ESO proposals;
- holding regular workshops/schools on data reduction, and providing **remote** connection as well as access to the tutorial sessions in online videos;
- developing video tutorials, cookbooks, etc.

ESO provides, upon request, seminars and training sessions on proposal writing best practices. The interested countries should contact OPO. A two-day workshop was held in Finland in Feb 2018.
In 2017 ESO delivered a series of presentations on ESO proposal preparation traveling to 5 Australian cities upon invitation by the Australian community. Further ESO participation is foreseen in the upcoming "SO-AAO/MQ Observational Techniques Workshop" to be held in Sydney in May 2018.

In March 2018 ESO hosted a LPO users workshop with a programme tailored partially according to preferences of the participants (https://www.eso.org/sci/meetings/2018/Users-Workshop.html). A NEON observing school was held on La Silla in February (https://www.eso.org/sci/meetings/2018/lasilla_school2018.html).

Online video tutorials and cookbooks development is an ongoing activity.

UC41.R.07: to improve the reproducibility and transparency of observations stored in the archive by making OBs public after the observations are publicly available; to explore how to make example OBs available for various science cases that beginners can grab to prepare their own.

The Phase 2 tutorials have step-by-step description how to prepare typical OBs for every instrument and most used observing modes. The User Support Department plans to update and further expand the tutorials as the new web-based p2 tool is released for support of Service Mode in 2018.
The headers of fits files contain all the information that is present in the OBs, and the headers are publicly available for all data in the archive. Data reduction pipelines use the header information.

UC41.R.08: to allow for multi-cycle ToO proposals, and to consider allowing Large programs to include ToO targets.

The first request is contained in the Time Allocation Working Group report, and will most likely be implemented. As for the second, ESO offered ToO runs in LPs in Call for Proposals for P102.

UC41.R.09: to clarify the timing and scheduling of the decision process for carrying-over A-ranked proposals; to clarify the fact that **all** non-completed A-ranked proposals are carried over **by default**.

The policy for carryover decisions is part of the VLT/VLTI Science Operations Policy:
http://www.eso.org/sci/observing/policies/cou996-rev.pdf
It specifies that for category A programmes, ESO retains the right to declare a programme "substantially completed" or to carry it over to at most the next useful period.
In practice, all A-ranked proposals are considered for carryover, and unless there are special reasons that caused delays in execution or affected scheduling (e.g. late OB submission or changes with respect to proposed programme), the carryover is granted for one useful visibility period (that is typically 1 yr depending on the target visibility). All PIs are informed by e-mail by the head of USD at the time the next Call for Proposals is issued (approx. 4 weeks before the CfP deadline). This is specified in the Call for Proposals (page 31 of CfP for P101). The following sentence:
"All PIs of programmes in this group are informed about one month prior to the next Call for Proposal deadline about the carryover eligibility of their programme."
has been added to the Phase 2 page that explains the Programme Priority Groups:
http://www.eso.org/sci/observing/phase2/SMPhilosophy/ProgrammePriority.html

UC41.R.10: to calibrate the Z and Y bands of VIRCAM independently of 2MASS; to characterize all near-infrared imaging filters across ESO instruments and provide color terms for them.

The request as phrased by the UC is very broad and it is not clear which specific action is required. We note that CASU is self-calibrating the on-going surveys to self-consistent internal Z and Y mags, so they can be transferred later to any standard system by shifting the entire data set by certain offsets. If the UC feels that more action is needed, a more specific recommendation should be formulated towards ESO.

UC41.R.11: **Miscellaneous**

- to provide the UC with a list of all active ESO users (from member states) to enlarge the poll participation;
- to send email notifications by default to PIs about the observation of their run(s);
- to provide suggestions to users about improving the technical side of their proposals, once they prepare Phase 2;
- to provide a wired connection for laptops at Paranal: to easily get large data sets on observers machines for analysis and bringing home;
- to offer FORS2 with the blue CCD in service mode;
- to make it an option with FPOSS fibre priorities that some targets **must** be assigned a fibre;
- to offer direct trips to the mountain if users request it, and if it is possible within the current ESO transport scheduling;
- to clarify/publicize the policy regarding charging users using the bus to go to La Silla for technical work on PI instruments/telescopes.

Active ESO users: A list of active ESO users (both LPO and ALMA), where active is defined as users who either submitted a ESO or ALMA proposal or downloaded ESO archive data over the last 2 years, has been provided upon request to the UC, and a similar list can be provided upon request also in the future. Please note that for now downloading data from the ESO Science Archive requires authentication via User Portal. This is scheduled to change with the release, planned at the end of 2018Q1, of the new archive services. In order to allow anonymous download of non-proprietary data as was requested, we will lose the ability to exhaustively identify active archive users. This was considered as an acceptable trade-off between enhancing the ease of use of the science archive and the need to characterise its use.
Notification about observations: ESO Service Mode users get automatic message when they prepare their observations. This message has been revised and includes now information how to subscribe to receive e-mail notification whenever their OBs are executed. Given that some PIs delegate the handling of their observations to their data or Phase 2 delegate, we prefer to provide the information how to follow-up the observations progress, but not push it by default. It is a responsibility of each individual user and there are different preferences depending on the run size. This is in line with the UC recommendation from several years ago.
Technical improvements suggestions: During the Phase 2 review, the USD support astronomers advise on the improvements of technical side of the observations and suggesting how to optimize the observing material. It is unclear what further feedback on the proposals is requested.
Wired connections for laptops: A configuration change is in preparation to implement such a connection for visitors, while maintaining the security of the network.
FORS2 with blue CCD in Service Mode: given the fact that the CCD exchange takes a full day plus verification on sky, having both CCDs in service mode is at the moment not considered operationally feasible. The problem of CCD exchange will be removed when a CCD upgrade for FORS is made. A respective project is currently planned, and its timeline will depend on the available resources.
FPOSS: The useful suggestion regarding the FPOSS fibre priorities will be taken into account in case of a future upgrade of FPOSS. Please note however that FLAMES is a “frozen” instrument, meaning that no resources for its upgrade, or upgrade of its software are currently foreseen.
Trips to the mountain: direct trips to the mountain have been accommodated in the past as exceptions. After the evaluation of the logistical implications it has been decided to offer this on a more regular basis starting from April 2018.
Policy about bus charges to La Silla: The policy is stated on the page with instructions for visiting astronomers:
http://www.eso.org/sci/observing/travel/visas-instruc.html#fincond

hosted projects have the rates included in the agreement they sign with ESO, with a link to the page above to check for updates.