

PROP: ESO's portal for reporting of operational problematics

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ABSTRACT

The ESO Portal for Reporting of Operational Problematics, aka PROP, allows members of the astronomical community to use a single access point to contact various operational groups at ESO. From the inside, operations staff can use the tool to communicate with their colleagues within the frame of problem resolution while keeping all the information in one place. It also opens the possibility to compile a knowledge base and to easily derive statistics on problem resolution, e.g. to monitor better the quality of service.

Keywords: user support, helpdesk, observatory operations, information flow, web application.

1. INTRODUCTION

Modern observatory operations can involve many groups each supporting a part of the overall data-flow. To ensure smooth operations and an efficient resolution of problems it is critical that all parties be able to communicate through common information channels. On the other hand, members of the astronomical community must be able to submit questions related to their observing programmes without having to know about the organization of the observatory "behind the scenes." The ESO Portal for Reporting of Operational Problematics, aka PROP, caters to all these needs via a single web application. By channeling their questions through a single support centre, users are automatically certain that they will get in touch with the operational group most suited to answer their request. From the inside, ESO operations staff can freely ask for the input of their colleagues or even external experts while keeping all the information in one place, thus allowing for complete traceability.

2. SUPPORT OF OPERATIONS AT ESO

2.1 Operational groups

Running an observatory such as ESO's Very Large Telescope (VLT) in the most efficient way possible is a task that requires various, specialized groups of people who cater to different parts of the data and information flow that surrounds the telescopes. From the handling of observing proposals down to the management of the data archive, we can identify about ten such entities that are each in charge of one part of this complex machinery.

Furthermore, ESO's implementation imposes that these groups be spread across two continents – Europe and South America, which by definition puts a natural obstacle in the way of free-flowing and efficient communication between them.

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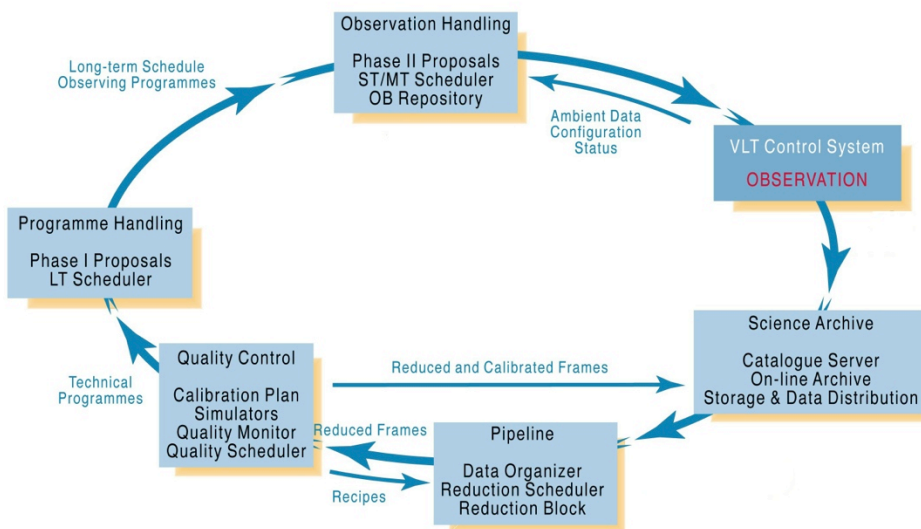


Figure.1. A simplified view of the data flow built around the Very Large Telescope of ESO. Operational groups and departments are sharing the tasks and responsibilities corresponding to the blocks represented in the above diagram.

2.2 Contacts with the scientific community

Because ESO is meant to serve the astronomical community, some of the operations-related groups are in direct contact with the astronomers using the facility. For example:

- The Observing Programmes Office, in charge of handling the time allocation process.
- The User Support Department, ensuring mostly support for our service mode users.
- Science Operations, welcoming the visiting astronomers at the telescope and also executing the service mode observations.
- The Archive Operations Group, helping users with their data retrieval and data mining tasks.

Most of the time, contact with the users at ESO is done via e-mail communications. Specific contact addresses for each of the above groups are available to the members of our scientific community when they need to report an issue or ask for help. While this proves efficient enough in many cases, it is on the other hand quite frequent that answering a user's request imposes first to take advice, retrieve information or coordinate with another group. In the absence of a centralized communication channel, it is then difficult not to resort to one-on-one interactions such as e-mail exchanges, phone or face-to-face conversations inside the organization in order to get a given problem solved.

This has several drawbacks such as potentially losing the history of how the issue came to be answered, which ends up being trapped into several private e-mailboxes, if not inside a few people's memories. This means that using that information again to solve a future, similar case will be almost impossible. Having to contact individual staff members rather than whole groups also gets in the way of providing answers in a timely fashion. First, because one cannot always be sure that the person in the other group is actually available to provide a quick answer. Also, because the operational groups can be rather large and may have to re-organize their internal share of tasks, a person external to that group does not necessarily know who is the best suited colleague to deal with a specific question at any given time. For these reasons it is deemed that being able to contact the group as a whole would be a more efficient solution, leaving the targeted entity in charge of deciding how to best deal with the help request.

2.3 Internal problem reporting

In parallel, groups and departments involved in ESO operations have internal needs of logging their activities and problem reports. While some of these groups have been using a dedicated ticketing system for such a purpose, several of

these applications exist, all tailored to specific needs and not allowing easy collaboration between groups aimed at solving the issues at hand. Other parts of ESO operations would benefit from a problem reporting system but did not have one yet. Just like for the case of requests coming from members of our scientific community, collaborative problem solving imposed to resort to private conversations in various forms, leading to the same inconveniences as we just described.

3. A GLOBAL TICKETING SYSTEM

Based on these observations, it was thus proposed to create a common problem-solving platform for all relevant ESO groups involved in the support of operations. The said system would be used to support members of the ESO scientific community, as well as all ESO people involved in the observatory data-flow, hence the proposed name of Portal for Reporting of Operational Problematics, or PROP. This portal would aim at providing a single entry point for all categories of questions and problem reports. It would also solve the issue of forwarding questions from one group to another, while ensuring that all tickets remain stored in a central location, which is to become a knowledge database powered by the search engine of the portal. The name of the application was also chosen in reference to the following, English definition:

prop [prɒp], noun. *Figurative*: a person or thing that is a major source of support or assistance.

3.1 Main capabilities

The application is developed around two main aspects:

- A ‘helpdesk’ function, in order to fulfill the request by the ESO users’ community to have one central entry point for all questions users may have, as well as for questions submitted directly by one operational group to another (or several others!)
- A ‘knowledgeable and searchable database’ function for each of the clients of the tool.

The helpdesk aspect is visually summarized in the figure below. For the members of ESO’s scientific community, it must be easy to contact the operational groups without having to worry about which is the right one. It should also not matter whether one or several of these groups are required to provide a full answer to the question at hand. Thus the help request must be able to freely be passed from one of the groups to another without that information is lost on the way. Also note that this schema remains valid for all issues that are purely internal to ESO, i.e. when the leftmost part of the diagram is not part of the use case.

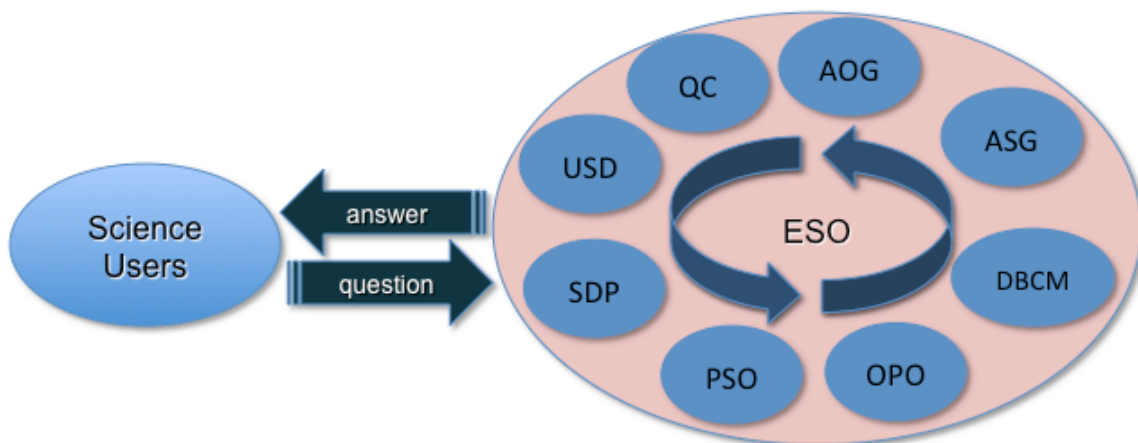


Figure.2. PROP helpdesk paradigm: science users can contact ESO operations as a whole without having to know about the details of the organization. The operational groups on the right-hand side are designated via their acronym inside ESO: User Support Department (USD), Quality Control (QC), Archive Operations Group (AOG), Archive Science Group (ASG), Database Content Management (DBCM), Observing Programmes Office (OPO), Paranal Science Operations (PSO), Science Data Products (SDP).

Because of the variety of users and places that the application needs to accommodate, the logical choice was to implement the tool as a web application. The said application is available both to ESO-internal and external customers, although in distinct forms – see section 4. Once a ticket is created inside the system, it can go through a series of statuses that can be set within the tool either manually or automatically depending on the situation – for example a ticket goes automatically from ‘fixed’ to ‘closed’ after 30 days if left untouched, allowing past problem cases to go into read-only mode.

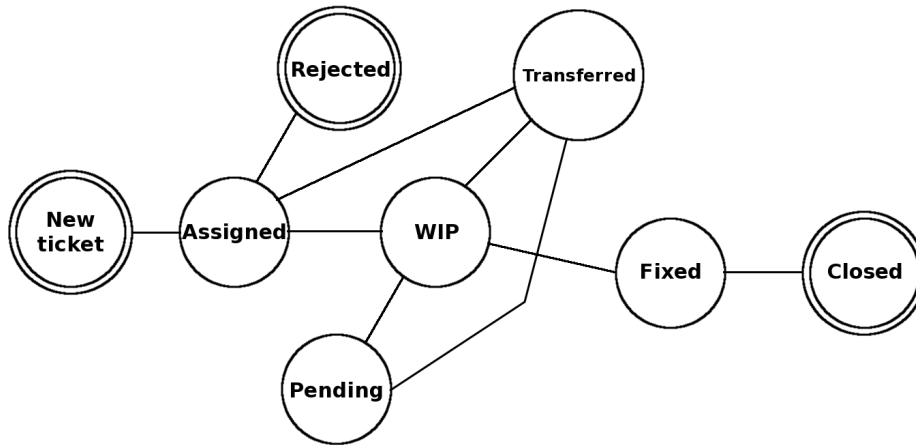


Figure.3. Example ticket lifecycle: final statuses of problem reports are depicted by the double-walled circles, so that a ‘new’ ticket always end up being either ‘closed’ or ‘rejected’. Transitions between other statuses are bi-directional. Not all possible transitions have been represented in the diagram. NB: ‘WIP’ stands for ‘work in progress’.

While the general workflow implied by the lifecycle of problem reports must of course be common to all functional groups using PROP to allow for collaborative solving of cases, each of the groups has the freedom to categorize the tickets according to their area of activity. A three-tier system of categories can be used to help sort tickets according to their topic. This allows ESO users of the system to later narrow down their searches inside the ticket database, and to draw statistics based on the concerned area of operations.

Other functionalities include the handling of file attachments: when managing a ticket the users can attach/detach files that are related to the problem at hand (log files, screenshots, etc.). If the ticket has been created via e-mail then the attached files are automatically transferred to the corresponding field inside PROP. As it is often the case that one wants to keep several people aware of a problem report or help request, a cc-list feature is available to provide their e-mail addresses. PROP will then take care of sending e-mail notifications to these addresses when applicable.

We have addressed the communication workflow between the submitter and the assignee of a ticket, but there are two more channels inside PROP. The first one is a purely internal work log that can be used to record any text relevant to a ticket inside a dedicated diary without that the original requester can access it (in the case of a ticket submitted from outside ESO). It is extremely practical to record progress information, and to pass on additional details when re-assigning a ticket from one person or group to another inside ESO. Still with the aim of keeping all the info in one place, the tool offers to contact third-party contacts having no access to PROP directly from inside the tool. The outgoing messages to these external experts are sent from PROP and recorded inside the ticket’s log. At the other end, the contacted expert only needs to reply to the message for his/her answer to appear inside the ticket as well.

3.2 Implementation: constraints and choices

In addition to these main capabilities, certain constraints had to be taken into account while developing PROP. First of all, in order to correctly identify science users submitting questions to ESO via the web interface and integrate the new service with the existing ones, it was imperative to rely on the authentication engine of the ESO User Portal^{1,2}. Once logged in, the astronomers can access PROP seamlessly, and their user account is automatically attached to the questions they submit through the dedicated interface.

But because e-mail communication is so deeply rooted into the daily work of the astronomers and of ESO staff, it was decided to keep an important e-mail component in PROP. First of all, the usual addresses advertised by ESO for

contacting several functional groups were kept, but their traffic was redirected to PROP. This ensured that the transition into the new ticketing system could be done fully transparently for our community of users. Additionally, a convenient notification system was included into the tool. Indeed, in order to make sure that tickets are attended to in a timely fashion, PROP will send out e-mail notifications in various cases. For example:

- An automatic acknowledgement is sent back to the creator of a ticket after submission.
- When a ticket gets assigned to a specific staff member, the new assignee is notified so that he can take action.
- When a staff member needs to communicate with the submitter, the tool sends out a feedback request to the originator of the ticket (the contents of the message are also kept inside PROP of course). The person working on a ticket can choose to also send out the message to the people mentioned in the cc list, if any.
- Upon resolution of the ticket, a message recalling the initial problem description and detailing the proposed solution is sent back to the submitter.

More notifications exist, including the ones for the “external experts” as explained in section 3.1. It has to be noted that in many cases, it is possible to reply directly to the notifications sent out by PROP and have the corresponding ticket be updated in the expected way, so that one does not necessarily have to login to the application to work on tickets. Only when tasks require modifying e.g. the ticket’s assignment, categorization or status is it mandatory to have a web browser available to access the PROP application.

We have not yet mentioned anything about the chosen platform for the development of this web application. Because of past history at ESO – existing problem reporting schemas, the availability of on-site development and maintenance resources, the obvious choice to develop PROP was early identified as being the Remedy Action Request System developed by BMC Software[†], or Remedy for short. This platform enables the development of workflows such as PROP and provides all the functionalities (and much more) described in this section. It also has extensive reporting and statistics capabilities that we wish to start exploiting in a future stage of deployment (see section 5).

4. DEPLOYMENT AND EARLY LESSONS LEARNED

PROP was introduced at ESO in March 2012 for eight functional groups implicated in observatory operations. In order to guarantee a smooth transition for the science users, the usual e-mail addresses (such as usd-help@eso.org or esoform@eso.org) were silently redirected to the new ticketing system. Because the e-mail notification scheme of PROP is merely an extension of the one existing for the legacy support systems, the interactions with the astronomers of ESO’s community went on undisturbed after PROP was put in production. At the time of writing, some of the operational groups in Europe are still to complete their transition into the new system: while they are already managing internal tickets with PROP, issues reported by science users are still handled through the legacy support system, sometimes a simple e-mailbox. As for the groups in Chile, the full transition is pending an evaluation of the actual performance and user experience from the concerned sites. If the fact that the server is located in Europe proves to be an obstacle to acceptable response times and interface behavior, the deployment of a second server in Chile may be envisaged to guarantee the availability of the tool at the observatory.

At the end of May 2012 the final component of the PROP was put in production, namely the ESO Operations Support Centre. This is the public face of the web application that allows the members of the scientific community to ask for help using a simple form. By selecting the general topic of their question from a predefined drop-down menu, users transparently choose to which of the operational groups it will first be directed. Naturally this never precludes the ticket from being re-assigned to one or several other groups if its resolution requires it. Once the topic is chosen the submission of the ticket only requires filling out a simple form, optionally attaching one or several files and adding the e-mail addresses of the people that one wishes to be kept in the loop. If applicable, it is also straightforward to specify to which observing run(s) the request is related, thereby ensuring a more precise categorization at the onset. The list of observing runs associated to the user is available from a drop-down menu. Upon submission of the ticket, it is automatically assigned to the operational group attached to the topic that was chosen.

[†] <http://www.bmc.com/>

The system that was put in production was deliberately left with many degrees of freedom, meaning that not many automatisms were put in place. This may imply more manual actions from the staff, or even possibly minor mistakes, but given the number of stakeholders of the tool (more than 100 ESO staff members currently have an account) it was deemed better to allow the users to start using the tool in the way they prefer. By gathering their observations and requesting frequent feedback we prepare for future evolutions of the tool.

Adoption among the operational staff was made easier by giving early access to a development version of PROP and providing documentation both in written and multimedia form (video tutorials to demonstrate basic functions). Although the tool was thoroughly tested before being released, some unforeseen use cases did appear in the first few weeks of usage but this never led to any loss of information or notable repercussions on ESO observatory operations. Also, because there is an important e-mail workflow around the tool, it was discovered that the system is rather sensitive to unexpected variations of the format of incoming e-mails – the case of messages written in HTML still remains a case difficult to handle because of the apparent lack of standard across common e-mail programs, and the somewhat complex setup of mail servers at ESO. These issues are currently being worked on.

The screenshot shows the ESO Operations Support Centre web form. The header includes the ESO logo and 'ESO Operations Support Centre'. The navigation bar shows 'Hello Dr. [name]', 'You have 3 opened tickets, 0 fixed tickets, 0 closed tickets', and 'Use the "List recent tickets" option, to see more details.' The main content area is divided into several sections:

- Manage your tickets:** Includes 'List recent tickets' and 'Create a new ticket' buttons.
- Your request for support concerns the following topic:** A dropdown menu showing 'Retrieving data from the ESO Archive'.
- Please fill in the following fields accordingly. These fields are mandatory for ticket submission.**
 - Subject:** 'Access to data for run 063.B-0543(Z)'
 - Description:** 'Dear ESO helpdesk, I have had problem finding and retrieving the data of the ISAAC run 063.B-0543(Z). It seems that the data is not properly classified. See the snapshot attached to this ticket.'
- OPTIONAL FIELDS:**
 - Attachment table:

File Name	Size	Attach Label
ESO_sc1.png	135 KB	Attachment1
		Attachment2
		Attachment3
		Attachment4
		Attachment5
		Attachment6
		Attachment7
 - Buttons: 'Add file', 'Remove file', 'Display file'.
 - CC list: A text input field.
- Your login is associated with 11 observing runs.**
 - Text: 'If your ticket concerns some of these runs, please indicate which of them by choosing from the drop-down menu below.'
 - Form: 'Please choose from the list below' with a dropdown menu and 'List of runs' with a text input field.

A 'Submit ticket' button is located at the bottom center of the form.

Figure.4. The main web form of the ESO Operations Support Centre. After having logged in through the User Portal and selected the main topic from a predefined list, the user may specify the details of the help request. Ancillary files can be attached if needed, and the ticket can be tagged with one or several observing runs if applicable.

5. FUTURE IMPROVEMENTS

Apart from finalizing the deployment of the tool for all concerned functional groups inside ESO, and stabilizing the few issues encountered with the e-mail workflow, the next improvements of the PROP will probably focus on implementing escalation mechanisms and developing some dedicated reporting features. As was written above, the system was first deployed with few automatisms to let the users get used to the tool as freely as possible. However, the initial user requirements have identified the need for PROP to escalate problem reports in a semi-automatic way. For example, one could think of implementing a workflow that would trigger actions (e.g. extra notifications to assignee or manager) for tickets of a certain priority that do not get solved in a given amount of time. Other directions of development include the production and monitoring of statistics such as the mean-time-of-solving for problem cases. This can be particularly important for the groups who resort to outsourcing companies and want to assess the quality of service as part of a service-level agreement.

In terms of deployment we will need to make sure that functional groups located in Chile can use the server deployed in Europe routinely without being affected by a drop in the observed performance. We are also keeping an eye on the overall load of the system to define further needs in terms of licenses.

Finally, although Remedy sports a flexible and powerful search engine we may want to take further advantage of it by devising a way to build a knowledge base from the vast quantity of information present in our ticket database.

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