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Organisation Européenne pour des Recherches Astronomiques dans l'Hémisphère Austral

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LA SILLA OBSERVATORY

Science Operations

La Silla SciOps HANDBOOK

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1 Introduction

1.1 Purpose

This manual provides a concise summary and description of the most relevant day by day (night by night) activities and procedures inside LSO SciOps.

1.2 Scope

This manual is intended as a reference for staff recently joining ESO, in particular the La Silla SciOps structure. It is mainly focused for astronomers, but it should be also useful for others (e.g. TIOs) to help them to find all relevant information needed in their first months. Since SciOps is a structure evolving with time, this manual only gives general information and provides links to the ESO web pages for detailed and updated informations on specific topics. This is a living document. Send comments and suggestions to improve it to:

lmonaco@eso.org

1.3 Reference documents

The following documents are referenced in this document:

[1] LSO-PLA-ESO-9000-1 Re-Engineering Project: Structure and Operation

[2] VLT-MAN-ESO-103000-3530 Paranal Science Operations Handbook

They are accessible at:

http://www.ls.eso.org/lasilla/sciops/doc/sciOp_LSO-PLA-ESO-90000-1_v1.00_operation.html

<http://www.eso.org/paranal/sciops/team.only>

1.4 Abbreviations and acronyms

The following abbreviations and acronyms are used in this document:

DHA	Data Handling Administrator
ESO	European Southern Observatory
ISM	International Staff Member
LSO	La Silla Observatory
OpEng	Operation Engineer
OB	Observing Block
OT	Observing Tool
SciOps	Science Operations
SA	Support Astronomer
SM	Service Mode
TIO	Telescope Instrument Operator
IOT	Instrument Operation Team
ToO	Target of Opportunity
VA	Visiting Astronomer
WO	Weather Officer

2 Overview

SciOps is the department in charge of science operations in La Silla Observatory. The scope of SciOps is to provide all services related to plan, execute, support and improve the process of astronomical observations with ESO facilities. In order to reach such purpose a number of persons are involved and structured in SciOps.

In the following sections we summarise the SciOps structure and the procedures and activities which enable SciOps to provide an efficient attendance to the ESO astronomical community.

3 Guidelines for newcomers: the first days inside SciOps

The schedule of observations is organised on a quarterly basis. Before arriving in Santiago the schedule coordinator will prompt you about your constraints for the quartile in which you are supposed to join ESO. Refer to:

<http://www.ls.eso.org/lasilla/sciops/schedule/>

In your first days in Santiago arrange with the administration all the paper work needed to obtain a VISA and a RUT number (essential for a normal life in Chile). Having a RUT number you will be able to open a bank account and to sign contracts (phone, electricity, etc...). ESO will help you to find an apartment and in general to settle problems.

Your direct supervisors in La Silla and Santiago are the head of SciOps and the head of science in Vitacura, respectively. Try to arrange a meeting with them (separately) as soon as you can.

Refer to the schedule to check the period of your first run and which instrument you will support. You will spend the first turno(s) on training, so find out the astronomer who is supposed to train you. Try to get in touch with him before the run, in order to have an idea of the documentation which will be worth reading before the run (usually the instrument manual and the cookbook). Ask him all the informations you need not to get lost among people in La Silla.

Due to limited human resources the training program maybe short. Remember that self-training with the instruments is also quite important.

ESO trips are arranged by the Carlson Wagonlit Travel :

www.carlsonwagonlit.com

which has an agency located inside the ESO Vitacura office. Ask them for the pick-up times and travel procedures (cwststgo@eso.org). Essentially, you will have an electronic ticket. From the ESO office you will be brought to the Santiago Airport and in La Serena a transport will wait to bring you to La Silla. For a list of the phone numbers useful in case of troubles refer to §19.

You are supposed to check the correspondence between the flight reservations and your scheduled turnos. In order to do so and for several other purposes (some of them described in the following sections) you will need to access the *remedy* (see §16) tool. Ask for a *remedy* account sending an e-mail to the La Silla system administrators:

ls-opsunix@eso.org

or to Gaetano Andreoni:

gandreon@eso.org

To access both the Santiago offices and the Telescopes in La Silla as well as the RITZ (the control room common to the three ESO telescopes), ESO will provide you with a key-card. Check that the card will actually allow you to enter the telescopes, otherwise ask the La Silla front desk (lslogs@eso.org)

Table 1: Telescopes and Instrument currently operated by ESO in LaSilla

3.6m	HARPS	CES	EFOSC2	TIMMI2
NTT	EMMI	SOFI	SuSI2	(decommissioned with P78)
2.2m	WFI	FEROS	GROND	
			(coming in P78)	

people to solve that. They will also assign you a room in La Silla.

4 Telescopes and Instruments

La Silla SciOps is currently operating and supporting three telescopes in La Silla, which are equipped with a number of different instruments (see table 1).

The instruments named in Table 1 cover a wide range of scientific applications. Refer to the La Silla SciOps home page for a description of the instruments:

<http://www.ls.eso.org/lasilla/sciops/>

The DIMM, the telescope used for the site climate meteo monitoring, is also maintained and operated by ESO.

A number of other telescopes are currently being operated in LSO on a national basis, namely: The Danish 1.5m, the Swiss 1.5m and the REM Italian robotic telescope. A basic support for the these telescopes is provided by ESO according to specific agreements and resources.

5 Clients, Services and Processes (from [1])

5.1 Services Provided

SciOps provides astronomical data to its clients, as well as the information needed by the clients to obtain these data (e.g. instrument manuals, exposure time calculators, etc), and, to transform these astronomical data (i.e. measurements in ADU as a function of the x,y position on a CCD) into astrophysical data (i.e. measurements in flux units ($\text{erg/s/m}^2/\text{\AA}/\text{arcsec}^2$) as a function of other physical quantities (wavelengths, RA, Dec, ...)).

SciOps does not provide the scientific idea for which the data are needed, and does not interpret astrophysically the data, although the astronomers belonging to SciOps do it for their own projects, and are therefore experts whose experience is of great value when assisting the clients.

The data produced by SciOps (including those produced by Visiting Astronomers) must be of the best achievable technical quality (e.g. instrument always in focus), and must be calibrated -or, more specifically calibratable, i.e. they must be accompanied by a set of auxiliary data that allows the astronomer to fully remove the signature of the instrument (flat field, standard stars, etc.). These auxiliary data are defined in the calibration plan of each instrument.

In more details, the scope of SciOps is:

- Preventive maintenance of instruments, telescope and auxiliary equipment
- Calibration Plan

- Telescope and Instruments Statistical Process Control (Performance)
- Help desk for VAs (for pre- and post- observing run questions).
- Assistance to OBs preparation with the p2pp and during observations.
- Environment Monitoring (Weather safety)
- Reporting about all the activities related to science operations
- Keep Telescopes & Instruments, configuration control (Optic, Mechanic, Software, Electronic, Infrastructure ...)
- Provide full year coverage for all the above.

5.2 Clients

The “clients” of SciOps are the members of the international astronomical community at large, and in priority the astronomers of the ESO member states.

More specifically, these includes:

- Visiting Astronomers (VAs, who will come to La Silla to perform their observations) and Astronomers who don't come to La Silla, their observations being performed by SciOps staff, either in Service Mode (queue schedule) or as Delegated Observation Mode (on fixed dates).
- Potential astronomers: who may submit a project that would eventually get accepted, and who will then become VAs or will request service observations.
- The Archive: the data produced by SciOps are archived in the ESO Science Archive (cf. archive.eso.org) for use by future astronomers. The role of the archive is double:
 1. it constitutes a 100% reliable backup of the data
 2. it constitutes a mine of data that can potentially be re-used for other purposes than those of the original project.

It is therefore important that these data are always calibrated (calibratable) and the instruments characterized.

- Projects and Technical Astronomers: SciOps hosts some projects (new instruments, prototypes, experiments...). Some of the SciOps astronomers can be deeply involved in these projects (e.g. as project scientist or project manager). Their schedule and support load is adjusted in order to accommodate these duties. Additionally, external astronomers attached to project (e.g. an instrument scientist from Garching or other institute) can be at La Silla for a fairly long time. These astronomers will be integrated as guest to SciOps, in order to improve communication, training, info, and to give them better support.
- Guest/Visitor instruments (such as SHARP, LUCKY CAM,...): SciOps is not responsible for these instruments. It will provide support only to the telescope-related aspects of the operation, i.e. day plus night TIO, support astronomer for generic astronomical support (e.g. hints and tips on the telescope), but obviously no support for the instrument.

5.3 Processes

The processes that belong to SciOps are the following:

- **Production of Scientific Data:** the input is the scientific question, the output is the corresponding observations replying to this question. SciOps will deal with all aspects of this process, i.e. to help prepare a technically sound proposal that will get time (assuming of course that it is a “good” question), prepare observations so that they optimally reply to the question, help to perform the observations, or perform them ourselves (all flavours of Service Mode), and finally help in the data reduction (not by reducing the data but by providing adequate advice and recipes). Basically, all the technical aspects of a scientific question are our job: with our help, it should be trivial to reply to any astronomical question.
- **Operation of the instruments and telescopes:** the input is the tons of hardware and software constituting the telescopes and instruments, the output is the operation of a scientific instrument, fully understood, certified and characterised. Obviously, this is an internal process (i.e we provide the input and use the output during the first process).

6 Operation Staff

The SciOps Department is constituted of Astronomers, Telescope and Instrument Operators, Operation Engineers and Data Handling Administrators.

6.1 Astronomers: Staff, Fellows and Students

The telescope instrument operators and astronomers are at the coal face of telescope operations, attempting to make the best possible use of the available facilities and provide good-quality data to the ESO community.

Responsibilities of the astronomers:

- Daytime preparation for nighttime observations
- Creation of schedules for service observing nights
- Ensure (and check if in service mode) instrument calibration
- Support and interaction with visiting astronomers
- Interface with Engineering Dept. regarding instrument maintenance and configuration
- Ensure first level data quality
- Handling of Target of Opportunity observations
- Preparation of night report tool (together with TIOs, see also §15)
- During each proposal review period, astronomers perform feasibility assessments of proposals already passed through the scientific review phase
- Carry-out service mode observations

The astronomers in La Silla SciOps are Staff, Fellows and students. Staff astronomers and fellows perform essentially the same duties from an operational point of view. One major difference is that fellows have fewer nights per year on the mountain. Students spend even less time at the observatory and they are assisting in various projects of science operations after a training period.

6.1.1 Instrument Scientist

An Instrument Scientist (IS) is associated to each of the instruments mounted on the three ESO telescopes. In general, the IS is an astronomer.

The IS of each instrument is where the buck stops if an instrument fails to work or provides sub-standard performance. The IS is hence responsible for many different functions, some of which are listed below:

- Leading the IOT (see below)
- Defining and implementing (possibly with the support of EngDpt, SWC...) observing modes
- Developing calibration plan for instruments
- Writing and maintaining the relevant documentation (user's manual, instrument web pages, etc).
- Training other SciOps members on the use of the instrument (e.g. coaching other astronomers in view of them giving support to the clients, etc)
- Track pending problems and action points related to the instrument (e.g. give phone calls to make sure that things keep moving)
- Develop and maintain data processing recipes. Priority goes to recipes that aim a fairly automatic processing of calibration plan data to monitor the health of the instrument. Secondly, to process observations on-line easily (e.g. standard wavelength calibration for all fixed modes (grisms), standard solution for echelle gratings, etc.)
- Supervision of instrument calibrations
- Long-term trend analyses of instrument behaviour
- Scientific maintenance of instruments (alignment, etc.)
- Interface with Eng. Dept. on instrument hardware maintenance
- Development and maintenance of instrument-related user tools
- Check and approve/reject the OBs submitted for the service programs approved on the instrument. This should be done well in advance with respect to the scheduling requirements.
- Send e-mail to "welcome" the VAs. The emails are supposed to be sent out approximately *ONE-TWO MONTHS* in advance of the actual observing run. The idea is to establish a personal relation with observatory staff, announce some basic facts about the upcoming run, and also to remind him about a few procedures. A template can be found at:

<http://www.ls.eso.org/lasilla/sciops/esoonly/Your%20observing%20run%20with%20INSTRUMENT%20StartDate.txt>

It is important to note that the SciOps Operation Engineers are deeply involved in most of these points. Also note that it is not expected that the instrument scientist will perform all the support on his instrument.

6.2 Telescope Instrument Operator: TIOs

The Telescope Instrument Operators (TIOs) is the SciOps personnel which deal with observations and calibrations from a technical point of view. They operate and ensure that the Telescope plus Instrument system is performing well. In case of any anomaly in the system they take the appropriate actions to solve the situation.

Currently in La Silla, the turno system is organised in order to have daytime and nighttime TIOs. The daily shift between them is discussed in §9. Two TIOs turnos, commonly referred as TIO-A and TIO-B, alternate in LSO on a weekly basis (cf. §8).

Detailed Responsibilities: see §12.1.2 and §12.2.1

6.3 Data Handling Administrator

DHAs normally work during the daytime, and ensure amongst other things that the huge amount of data produced by the telescopes is properly archived and delivered.

Responsibilities:

- Maintain La Silla data archive
- Ensure completeness of data archive
- Establish and maintain dataflow from instruments to archive (software)
- Ensure propagation of contents of La Silla archive to Garching
- Development and maintenance of the Problem Reporting System (Remedy System)
- Produce and deliver copies of data to visiting astronomers
- Procure and provide to the astronomers backup media

6.4 Operation Engineers: OpEngs

The Operation Engineers are in charge of all the engineering aspects of the operation. They act as a main interface to the engineering department in LSO.

Their responsibilities include:

- Configuration control officer: enforce and verify general configuration control. Some specific aspects of the configuration control are delegated to other department (namely SWC for VLT software and related, and Eng. for hardware), but the overall control stays with the OpEngs. This responsibility includes training of newcomers to the concept of configuration control, and continuous training on that topic to all staff.
- Development, testing, approval, implementation and maintenance of operation procedures and check lists. Some procedures can be developed by other SciOps members, but OpEngs have the final word for approval.
- Train TIOs and astronomers in all the aspects of the proper usage of operation and maintenance procedures and check lists, configuration control, etc, and the general philosophy of operation of VLT-like systems.
- Development, testing, approval, implementation of observations, calibration, set-up and maintenance templates. This tasks are performed by OpEngs in collaboration with the IS of the IOTs.

- Participation in maintenance and in general operation, upon requirement.

7 Instrument Operation Team: IOT

The idea of an IOT is to establish a dedicated network that monitors the instrument performance on a scientific and technical level, coordinates and follows-up potential problems, and pursues upgrades and improvements in a coherent way. Its core consists of a system engineer, a first and second instrument scientist (IS) and an instrument assistant (friend). The IS leads the IOT.

While the IS and assistants are typically astronomers and TIOs from SciOps, the system engineer is a senior engineer from our engineering department. The IOT may be augmented by software engineers, scientists from the User Support Department, or Data Flow Operations, Paranal or Garching engineers or scientists, and by the LaSilla-Paranal Instrumentation Scientist, upon requirements set by the specific instruments. The SciOps operation engineers are consultants of every IOT. Note that also telescopes are complex systems and “instruments” in that sense, and therefore possess their own IOTs.

One objective of the IS is to assess and monitor the scientific performance according to instrument specific metrics, typically defined in the instrument calibration plan. Performance anomalies or problems, as well as potential instrument improvements are then discussed in the IOT. While the final responsibility for the scientific data quality resides on the IS, the responsibility for the technical feasibility resides with the system engineer. It is therefore task of the instrument system engineer to coordinate and formalise all technical activities that are necessary to solve problems, and to act as external interface. In order to solve problems, the system engineer will to a large extent depend on the expertise of various members in the engineering group, such as detectors, optics, electronics, and software. The system engineer is expected to closely follow-up instrument and system related problems that are documented within REMEDY, and to prioritise corrective action that might be necessary. The IOT is supplemented by the instrument assistant who supports technical and scientific operations, and helps to execute specific test or calibration procedures.

The IOT reports the instrument status in a formalised way by issuing monthly instrument reports. The core IOT meets on a regular basis, depending on the actual requirements set by the instrument.

The current configuration of the IOTs can be found at:

http://www.ls.eso.org/lasilla/sciops/general/sciOp_iot.html

8 Turno System

The SciOps personnel usually works in a turno system:

8(La Silla)+6(Compensation) for TIO, DHA, OpENGs.

The usual shift change-over day is Tuesday.

Astronomers have a more flexible schedule and their schedule on the mountain is defined by operational requirements and is in-line with their respective contractual obligations. The typical working time of astronomers is midday to after midnight but this is handled fairly flexible according to requirements.

In order to allow for some knowledge-transfer from one shift to the next, when possible the astronomers may have one or more days of overlap at the same telescope. In this case, one of the two is considered working in “background”.

9 TIOs Shift System and SkyFlat policy

In each shift, up to three TIOs cover the day shift (i.e. up to one per telescope). In general, daytime TIOs are on duty from the 8:00 AM to 7:00 PM. It may happen that only 1-2 TIOs are available during daytime. One of the TIOs (or OpEngs) acts as SciOps Coordinator (see §12.2.2) and additional support during daytime is delivered from the engineering department on a case to case basis.

Each shift three night TIOs are always present to cover night operations of each telescope from sunset to sunrise (from July 2006 onward). Under exceptional circumstances, esp. at the 2.2m, it may happen that the astronomer has to cover the whole night, without TIO.

Important implications:

- during wintertime an almost complete coverage of the 24 hour is guaranteed by TIOs. While during summertime a variable amount of time before the sunset is not covered by TIOs. Astronomers are typically present to fill this gap.
- when required, *the night TIO do support both evening and morning SkyFlats* during twilight hours.

10 Training of new staff and Certification matrix

Personnel training is performed “on the job”. New astronomers are trained by experienced astronomers. Of course, it is important that trainees try and get information from as many sources as possible, and be proactive in their learning.

A Training Status / Certification Matrix is available at:

http://www.ls.eso.org/lasilla/sciops/doc/sciOp_LSO-LIS-ESO-90000-1_trainingStatus.html

New TIOs are trained by experienced TIOs for the corresponding instrument and telescopes. New DHAs and OpENGs are trained by experienced personnel of the corresponding groups.

11 Observing Modes

In order to maximise the scientific return for different types of programme, La Silla Observatory supports two operation modes: Visitor Mode (VM) and Service Mode (SM). Rarely, *delegated service mode* (DSM) is scheduled. It is similar in all the operational aspects to the SM but the fact that the nights in which some specific program(s) will be observed are fixed and only OBs belonging to that program(s) can be executed. The following sections detail the actions LSO must perform in support of both modes.

11.1 Visitor Mode

In Visitor Mode, astronomers travel to La Silla and execute OBs that they either have prepared beforehand, or finished on the mountain. SciOps members help visitors in the following ways:

- Manpower:
 - Support Astronomers for introduction, observation preparation and guided tour of a telescope for Visiting Astronomer; SA also support the VA in the preparation of the masks in case of multi-object spectroscopy observations.

- SA for support during observations
- DHA for production of raw and reduced data (when applicable) copy and delivery
- Hardware:
 - PC for observation preparation (generally in the library)
 - Offline workstation for observer’s data analysis in the control room
- Software:
 - p2pp (for OBs preparation)
 - gasgano (for quick look at the data fits header)
 - skycat, midas, iraf, idl, ds9 (for general data quick look and analysis)

Upon leaving La Silla, Visiting Astronomers are provided with the copy of raw data at the time of departure and all the calibrations taken since the first day of the run. If for some reason the data is not delivered to the VA, then it will be send to the address declared in the data backup request.

Quick-look tools are available for some of the LSO instruments either accessible on the offline machines or from the individual instruments webpage. Such quick look tools are not thought to provide science quality products. SciOps support these tools only on a best effort basis.

In case of problems an email can be send to the contact person who will take the appropriate actions.

Data products obtained using the quicklook tools available for EMMI and SOFI (@NTT) and the FEROS (@2.2m) pipeline are delivered to the observers (or PIs of service programs) together with the raw data while data products produced by the VAs using his own tools should be backedup by the VAs himself. Other quick look tools are available for other instruments (e.g. for EFOSC2@3.6m and CES@3.6m) but the data products obtained should, again, be backedup by the VAs.

Note that the FEROS pipeline is a MIDAS¹ context packed with each MIDAS distribution. So, the FEROS raw data could be re-analysed at home using exactly the same pipeline.

A somewhat peculiar case is HARPS. The HARPS pipeline is installed in La Silla and NOT publicly available. It provides science quality products which are delivered to the Visitors together with the raw data (or to the PIs of service programs). Note, however, that the pipeline products up to now are not made publicly available in the ESO archive.

11.1.1 SA introduction to VAs

- Start **reading the proposal** of the projects:
 - Check on the schedule the program number As lasilla@kila go to **observations/proposals**. Search for the documents corresponding to the program numbers and read them with `acoread`. Keep in mind that proposals are confidential. Take a quick look at the general observability of the proposed target for the allocated nights. If the targets are not observable all the night, check for the presence of any previous correspondence with the PI of the project assessing this point and/or discuss with him a possible backup program. Remind that targets are binding. The procedure for submitting backup target should be outlined to the VAs well in advance in the “welcome e-mail” sent by the IS.
 - In general, try to meet the VA as early as possible in order to clarify what he wants to achieve and how the setup should be.

¹ ESO-MIDAS is the acronym for the European Southern Observatory Munich Image Data Analysis System which is developed and maintained by the European Southern Observatory: <http://www.eso.org/projects/esomidas/>

- **Go through the proposed observations**

Make recommendations and clarify the setup and the observation plan. Remind to fill in the set-up request (available at the individual instruments web pages) if needed. Check for the need of special/peculiar kind of calibration. Discuss eventual problems, features, workarounds for the instruments. Remind that any peculiar science observation should be submitted and authorised well in advance by the head of SciOps.

- **Remind pointing restrictions**

Stress pointing limitations and closing conditions. Opening and closing is responsibility of the TIO, but repeat the limits. Show the meteo-monitor page and the closing down policy page:

<http://www.ls.eso.org/lasilla/dimm/>
<http://www.ls.eso.org/lasilla/dimm/dimm.html#H.Restrict>

Support the TIO as the person who takes the decision to close.

- **Introduce to p2pp**

If the VA has not already made the OBs, then meet him, preferably in the computer room, and show him how to do it. Help him in preparing both calibration and science OBs. Explain what not to do: long OBs, complicated OBs, etc. Help to download OBs if necessary. Ask him to log into his ls-usr account on any DRL machine. The account is noted on a paper given to the VA as he arrives in La Silla. Then start p2pp and log in with the user name and password that he was given when he was awarded the time (came in an e-mail). If he forgot it, it can be found on kila in **P2PP_PID**. Remember “Export” before exiting!

- **Offline reduction machines**

- Show the directory structure, where the images arrive, and where they can be reduced.
- Show the relevant quick look tools and/or pipelines.
- Show the facilities available: iraf, midas, idl, ds9, gasgano, skycat
- Personal backup of reduced data

- **Inform about cars**

A car is reserved for the VA between 16:00 and 08:00:

<http://www.ls.eso.org/lasilla/sciops/esoonly/sciInt.cars.html>

It should always be left unlocked and with the keys in. The SA shall take care of the refuelling of both “his” and the VA cars. The speed limit on La Silla is 40 km/h during day and 20 km/h during night, in order to not be a risk to others (walking astronomers) and oneself (donkeys on the road). At night only position lights plus the little switch to the left of the wheel must be used.

- **Introduction at the RITZ**

Officially, the VA can access the RITZ from 16:00 in the afternoon. Arrange to meet him there at 16:00 the afternoon, to get a general tour of the facilities and to prepare for the observations. Give him a tour of the facilities: control room, toilet(s), water/soft-drinks, tea/coffee.

- **Inform about risk of ToO**

A Target of Opportunity request may be triggered during his run, which will then be communicated and executed by the staff. It is not very likely to happen but, just in case, point the VA to the SciOps web-pages for more information (see §18).

- **Remind of “End of Mission” report**

Remind the observer to submit a End of Mission report. This can be done once the VA is home and have better time to do it. The web-form can be accessed from the La Silla web-pages.

- **Show how to control the instrument**

Explain how the p2pp interface to BOB works and how the data are saved. Explain that he has to request his data using the Backup Request form accessible through the Night Log (see §17).

- **Introduce the people**

- The day TIO: name, beeper, and duties: set-ups, calibrations
- The night TIO: name, beeper, and duties: observations, in charge of security of telescope and instrument.

For beeper and phone numbers refer to:

http://www.ls.eso.org/lasilla/sciops/general/sciOp_beeppers.html

Make it clear to the VA that he is responsible for taking all the calibrations he wants (supported by SA and day TIO). In general, telescopes and instruments are ready for afternoon calibrations after the 4:30PM. If he/her doesn't show-up, then no calibrations are taken.

- **Introduce the telescope and instrument**

Tour of the relevant places showing the telescope and instrument.

- See also on the web the **Checklist for visiting astronomer introduction:**

http://www.ls.eso.org/lasilla/sciops/esoonly/operations/sciInt_VAIntroductionProcedure.html

11.1.2 Observations kickoff

If both the telescope and instrument are ready, just after the sunset skyflats can be taken. Then the telescope focus can be searched for.

In case of visitor mode observations after the begin of the astronomical twilight (-12°) and according to his needs, the VAs can start observing (usually to observe bright standards and calibrators) and continue until the end of the morning astronomical twilight (-12°). Then morning skyflats can be taken.

The time between the begin and the end of both the evening and morning twilight ($-12^\circ \div -18^\circ$ and $-18^\circ \div -12^\circ$, respectively) is not counted as useful science time by ESO. Hence, no time loss is considered between these time intervals. Furthermore, sometimes ESO staff can ask to perform test necessary for instrument and/or telescope health during the evening twilight.

In case of service mode, observations should be taken after the end of the evening twilight and before the begin of the morning twilight (and, of course, respecting all the other constraints) unless differently specified by the PI of the project.

Observations at any other times, specifically at day time, require prior approval of the head of SciOps.

11.1.3 Visiting Astronomer related forms and special requirement

It follows a list of the most commonly used form related to a normal visiting mode observing run.

- **Instrument Setup Form**

Some instruments are offered in several different modes. An Instrument Set-Up form should

be filled at least one day in advance with respect to the observing run. See the individual instruments web pages.

- **Data Backup Request** (through LSNL2 or Remedy, see §16,17)
A Data Backup Request should be filled by the VA with the assistance of the SA in order to provide DHA with the relevant information to prepare the VA data backup before the VA leaves LSO.
- **End of Mission Report**
Accessible from the La Silla web page (<http://www.ls.eso.org/index.html>), this form allows the observer to give an evaluation of the general service provided by ESO. It should be filled at the end of the run by the VA, but it could be filled also once the VA has come back home.
- **VA special observations requirements**
Any kind of special science observations not explicitly mentioned on the manuals of each instrument should be authorised well in advance of the observing nights by the head SciOps upon a scientifically motivated email request from the PI of the project. This also applies to special calibrations in case of service observations.

11.1.4 LaSilla SciOps support during Max-Planck and Brazilian time at the 2.2m telescope

As of P79 (April 2007) all the Max-Planck and Brazilian time slots are allocated for visitor mode runs.

SciOps is responsible, and provides:

- coordination with engineering and technical teams all maintenance and troubleshooting tasks
- start-up of telescope and instruments, made ready for calibrations, and night observations in visitor mode. Handover usually until 16:00.
- night TIO support (sunset to sunrise).

SciOps generally does **not** provide any support astronomer at daytime (startup and calibrations) or night time. In exceptional cases, astronomer support for the 2.2m is explicitly indicated in the support schedule for the 2p2.

The SciOps coordinator and Shift leader are supposed to provide the necessary communication links in case of technical or scientific problems. Potential uncertainties or conflicts should be solved by them, or escalated to the head of department.

11.2 Service Mode

Just as in VM, SciOps provides support and deliverables to provide off-site visitors with the best possible data products;

- Manpower:
 - SA for preparation of nighttime observations
 - SA/TIO for execution of observations
 - DHA for archiving of data

- Hardware: PCs, offline and online workstations
- Software:
 - Observing tool (ot), p2pp and BOB for managing the OBs.
 - skycat, gasgano, midas. iraf, idl, ds9
- Data Products:
 - observing data delivered to archive and PIs
 - standard calibration data delivered to archive and PI

Note that during service nights, OBs are browsed from the *La Silla database* (LSD). This local database is just a copy of the Garching database and not yet approved OBs may be missing in the LSD. Keep in mind also that people in Garching are not on duty during the week-end.

Specific instructions about service mode operations are available at:

<http://www.ls.eso.org/lasilla/sciops/esoonly/service/GUS.html>

<http://www.ls.eso.org/lasilla/sciops/esoonly/2p2/S0guide/>

12 Operations

12.1 Night Operations

Generally, a night TIO and a Support Astronomer will pursue night operations whether in service or visitor mode.

12.1.1 Weather Officer

In each of the two turnos one of the TIOs, usually the most experienced one, covers also the functions of weather officer.

The weather officer monitors and documents weather conditions and in coordination with the night TIOs decides whether to open or close domes depending on weather conditions.

12.1.2 Night TIO responsibilities

The TIO is in charge of the night operations. He has *FULL RESPONSIBILITY* on the telescopes, its instruments, and its use. This includes:

- Decision to close the telescope because of weather conditions (in collaboration with the WO)
- Decision to re-open
- Decision to call standby SciOps or Support Teams (LED, SWC...). Head of SciOps will approve overtime or handle other administrative issues related to emergency night call.
- Decision to shut-down the telescope because of unrecoverable problem, etc.
- Operate telescopes and instruments
- Ensure telescope safety

- Monitor and document telescope problems during nighttime operations
- Control access of personnel to the domes
- Issue the Night Report using the Night Log tool at the end of the night (together with the SA in case of SM)

Of course, the night TIO can always call whoever he thinks can help in his decision, or whoever he thinks can help make his decision enforced (i.e. if the Visiting Astronomer wants to get explanation on the humidity rules by an astronomer, get the Support Astronomer, Shift Leader (see below) or Head of SciOps to come to help).

12.1.3 Support Astronomer

The Support Astronomer will assist the TIO and the Visiting Astronomer for all astronomical aspects of the observations. The Support Astronomer is supposed to give an extended introduction to the Visitor (i.e. hold his hand at least till the first successful science exposure is read out, see §11.1.1), and is supposed to be on “stand-by” (available in the control room, in his office, or anywhere else until approximately midnight. Later in the night he can be called with the beeper or phone. The Support Astronomer must be “certified” (cf SciOp Internal Training Plan, §10) for the telescope and instrument he supports, meaning that he will be able to perform some troubleshooting (e.g. diagnose and fix or work-around a crashed template).

In case of service mode observations the SA is in charge to verify that the observations are taken in compliance to all the constraints defined in the observing blocks (weather, air mass, seeing, fractional lunar illumination - FLI, lunar distance) as well as to ensure the general validity of the observations taken and, together with the TIO, to fill-in and issue the Night Report at the end of the night.

12.1.4 Midnight Snack agreement

The kitchen is open during the night at LSO between midnight and 2:00 AM. After midnight and according to the needs of the observations, the SA may take over the responsibility to operate the telescope and Instrument for a 0:40 minutes period (usually friendly extended up to 1h). This is done in order to allow the night TIO to have a snack at about half of the night.

If the SA is not trained to operate the telescope, the TIOs have to split their break in order to leave one TIOs to help operating the telescope.

In any case, no matter what, *the telescopes MUST NEVER be left alone*, or with the VA only.

12.2 Day Operations

12.2.1 Day TIO Responsibilities

As maintenance will be mostly performed by non-SciOps department members (i.e. from Engineering Dpt and SWC), coordination is of critical importance.

For each telescope, the day TIO perform the following tasks:

- Coordinate with Eng.Dept and SWC the maintenance actions
- Coordinate with outsiders and insiders the various actions to be taken

- Accept (or not) the work performed on the telescope by other teams or internal teams
- Allow access to the telescope
- Coordinate with the support astronomer/visiting astronomer the time of start-up and the time of the hand-over.
- Keep a log of the actions taken
- Finally, deliver the telescope in perfect condition to the Night TIO.
- 13:30 attend the daily meeting in the hotel conference room
 - track the problems and actions from day to day
 - coordinate actions for the rest of the day (incl. startup time)
- Keep track of the Remedy reports:
 - check problems, tickets and actions (i.e. 3 items)
 - assign unassigned tasks
 - track assigned tasks
- Issue the internal weekly report (“news of the week”), and send it to the SciOps coordinator
- Telescope email: read and process email received at ls-ntt, ls-360, ls-220.
- On Monday he attends the weekly SciOps meeting where the pending / closed / new problems concerning the instruments and the telescopes are discussed.
- On Tuesdays, he checks the pending problems and action points, and calls the responsible person (or have them called) for a status report and he attends the weekly operation meeting during which the problems and action points are discussed.

The day TIO supports the daytime scientific calibrations together with the SA. He is in charge of the daily telescope and instrument startup. He also checks the space available on the various computers involved in the operations and, when needed, deletes old and/or useless data and files or asks DHA people to do that.

12.2.2 SciOps coordinator

One SciOps Coordinator (SC) is assigned to organize and manage all activities related to day operations for all three telescopes. The position is manned and announced for every day of the year, and his schedule is available at:

<http://www.ls.eso.org/lasilla/sciops/schedule/>

The SciOps coordinator is member of the SciOps department and email moderator of the ls-coord account that channels all technical and operational information within SciOps.

The SC acts as interface to internal and external service providers, and as such, serves as a central communication and coordination hub of SciOps. The SC is always (day and night) reachable, by beeper 43 or radio. The main service providers of SciOps for daily operations are the maintenance and engineering teams. He is in charge to coordinate preventive and corrective maintenance activities requested by these teams. Formally he requests, verifies and accepts actions within the REMEDY workflow scheme. He is responsible for the execution and verification of all daily operational tasks (including day calibrations and data handling) that are formalized in checklists and available for each

telescope and each instrument. Daily coordination with the support teams, specifically requesting and confirming support for each day, is performed in a daily meeting (currently at 13:30 in the hotel). He ensures that telescopes and instruments are prepared and ready for night operations (start-up). In summary, the SC controls and ensures that all engineering activities are executed and accepted according to the standards that have been defined in formalized SciOps procedures.

The SC is (typically) the operations engineer, or the most senior day TIO. He chairs the daily operations meeting, and submits the SciOps weekly operations report. He distributes daily tasks to day TIOs, and external service providers.

The SC is aware of the main activities ongoing on the Observatory and participates in the weekly action meetings held to coordinate the technical activities of the different departments and groups on the La Silla observatory site level.

The SC determines the priorities of critical operational tasks, oversees all major maintenance, is required to be in place during critical maneuvering operations, and is in charge of the operation during emergency situations.

During night-time problems, the SC is called by the TIOs, and he is in charge of first-level troubleshooting. The SC must be aware who to call in any specific engineering field, when the problem cannot be solved by him alone. He has the authority to ask for overtime.

12.2.3 Support Astronomers

During the day (starting at a decent time considering the time he went to bed the night before), the Support Astronomer will:

- Get informed about the end of the previous night, if relevant. In particular, if not on all night schedule, he attends the 13:30 coordination meeting
- Check that the day calibrations taken were successful and that all required calibrations were obtained
- Give off-line (p2pp and Co) intro if required
- Background work

12.2.4 Shift Leader

One of the support astronomer (most senior) is the Astronomer Shift Leader. He is in charge of taking astronomy-related decisions, as to schedule ToO requests (checking that they are approved/pre-approved), approve ToO Requests in case of emergency, etc. He is also in charge of formally “closing” ToO tickets in the Remedy system (cf §15). The Shift Leader can also enforce the authority of the TIOs for weather and safety related matters (e.g. in case of recalcitrant Visitor).

The Shift Leader reads and processes email on lasilla@eso.org. Detailed instructions for handling that account are available at:

<http://www.ls.eso.org/lasilla/sciops/esoonly/operations/astro/lasilla.html>

The Shift Leader assists to the Action Point meeting in coordination with the Operation Engineers.

At the end of his shift, the Shift Leader sends a “hand-over” report to the next Shift Leader using the online form (cf. §15)

The SL is in charge of checking the Night Reports issued by the 3 telescope TIOs/SAs.

12.2.5 Operation Engineer

They participate in operations and maintenance tasks. Most of their time should be devoted to configuration control and operation developments.

12.2.6 Daily Operation Schedule

- 08:00 Telescope Coordinators get the reports of the night and assign the new problems/requests to the relevant departments. In case of urgent items, make sure that the corresponding people get the info and act. Adjust the operation plan of the day to cope with these emergencies (note that this should be an exception).
- 08:00–12:00 Troubleshooting of previous night pending problems, calibrations and set-up for night, maintenance plan, in that order of priority.
- 13:30–14:00 Daily Coordination meeting: Attendance compulsory for the Shift Leader (unless on night shift), the 3 telescope coordinators, OpEng, a coordinator from Eng and a coordinator from SWC. In order to improve the coordination, attendance is compulsory also for a representative of each team if there is a specific work to be performed that day or the following days by his/her team. Coordinators can also “invite” specific specialists (e.g. instrumentation, mechanics, detectors) or other departments (ISG, Hotel...). Support astronomers attend the meeting on a good will basis or on specific request from the SL, if on full night schedule.

It must be noted that this is an open meeting, everybody is welcome. This meeting will also be the base for the Coordinators to prepare the weekly report on a day-by-day basis:

- Brief report of the night, its problems and what is being done to solve them.
- Brief report of actions underway
- Coordination of the next 24h, esp.
 - * actions to be taken in the afternoon
 - * time of the startup for each telescope, and time of start of observations. Here should come a very brief summary of the observing program and of its technical implication.
 - * scheduled maintenance actions for the next morning.
- 14:00–16:30: Operations: complete what is left from the morning, telescope and instrument start-ups.
- Monday only: 16:30-17:30: Weekly SciOps coordination meeting. All the pending problems connected to telescopes and instruments are reviewed. At the end of this meeting, the Coordinators should enter the final comments in the Remedy system, and prepare the weekly reports, both the external one (generated by Remedy) and the internal one, which includes the summary of the week for the next turno.
- Tuesdays only: 14:00-15:00: Action point meeting. All the pending action points are reviewed and new action points are discussed. It is important to note that this coordination meeting must be prepared in advance. The Coordinators should contact the provider for each problems for feedback (unless that feedback appears in the problem report).
- ~ 16:30: Telescope plus instrument handover to VA (time to be adjusted depending on the season and the needs). Usually earlier at the 2.2m. All maintenance actions stop. Start of afternoon calibrations, then observations.
- Just before twilight: “hand over” from the day TIO to the night TIO

13 Meetings

A few meetings are part of the normal coordination activities among SciOps. They were already described above. The following list should just be considered as a reminder.

- Daily meeting: every day 13:30
- SciOps weekly meeting: Monday 16:30
- Action point meeting: Tuesday 14:00

14 SciOps passwords and P2PP technical accounts

Lists of the accounts to be used to access the various computers as well as of the p2pp technical accounts are available through the La Silla Operation procedures page:

<http://www.ls.eso.org/lasilla/sciops/esonly/operations/sciOpsAccounts.html>

<http://www.ls.eso.org/lasilla/sciops/esonly/operations/astro/p2ppEng.html>

15 Operation Reports

LSO SciOps produces many different operation reports, which enable the dissemination of information throughout the whole of SciOps:

- **Night Report: Nightlog 2.0²**
Responsible: SL (but actually filled-in by SA & TIO)
Frequency: 1 / day (end of night)
This report accounts for all nighttime observations and daytime calibration taken. It also contains an account of various action requests, problem reports and weather conditions as reported by the WO. Night reports for each of the 3 ESO telescopes are emailed daily to many people including all the members of SciOps.
- **Weekly Telescope Operation Report**
Responsible: TIO
Frequency: 1 / week (change of turnos)
A summary of the problems with telescopes and instruments during the working week of the TIO team departing from the mountain. This is emailed weekly to many people including all members of SciOps.
- **Shift Leader Handover Report**
Responsible: SL
Frequency: variable (change of SL turno)
An account of all important issues, given to the following SL, to ensure continuity in the planning and execution of observation during the nights. It also contains the latest communications from EngDept.
- **2.2-m Service observing handover report**
Responsible: SA
Frequency: variable (change of SA turno)

²See also §17

This handover report is thought to pass the service observing duty informations to the next astronomer.

- **Telescope Statistics**

Responsible: Head of SciOps

Frequency: 1 / 2 month

Every two months, telescope statistics are compiled for each of the three ESO telescopes by the Head of SciOps. They contain information such as shutter open time, service and visitor-mode usage, and weather and technical losses for each instrument, calculated according to the following precepts, and use the information contained in the Night Log tool.

- **Team/Instrument Monthly report**

Responsible: IS & team responsible

Frequency: 1 / month

- Instrument Report:

It summarises the general behaviour and performances of each instrument, the usage of the technical/calibration plan nights, the amount of time spent in service or visitor mode for each instrument. It also reports about the status of the projects and the training of people on the different facilities.

- TIO-A & TIO-B:

It accounts for the status of personnel with the telescopes and instruments and the status of the projects. It also reports about accident and/or personnel sickness and schedule changes needed.

- OpEngs:

It accounts for the status of the various projects, problems and solutions which affect the various telescopes and instruments.

- **Bimonthly Reports**

Responsible: Head of SciOps & Director of La Silla Paranal Observatory

Frequency: 1 / 2 months

Head of SciOps produces a general report of SciOps activities for the Director of La Silla Paranal Observatory

Director of La Silla Paranal Observatory produces a general report of La Silla activities for the Director General.

- **AstroNews**

Responsible: SL

Frequency: 1 / day

Each day the SL, before 13:30, sends to antu@eso.org (cc lasilla@eso.org) a short summary of the scientific and technical activity done the previous night and foreseen for the next one. Since the e-mail is thought to reach people not familiar with astronomy, a few scientific concepts may briefly be explained.

Most of these reports should be sent via Remedy only. For some of them, template are available at:

<http://www.ls.eso.org/lasilla/sciops/esoonly/>

http://www.ls.eso.org/lasilla/sciops/esoonly/sciInt_lasilla.txt

http://www.ls.eso.org/lasilla/sciops/esoonly/sciInt_weekRep.txt

http://www.ls.eso.org/lasilla/sciops/esoonly/sciInt_monthRep.txt

http://www.ls.eso.org/lasilla/sciops/esoonly/sciInt_service2p2.txt

16 The Remedy system

It is inevitable that problems will occur and errors be made. What is important is that these problems are logged and investigated; both to predict and fix problems before and as they occur, and also to prevent such occurrences happening again.

The form “LSO - LaSilla Science Operations” available in the AR (Action Remedy) server is the standard way how information, reports and requests are passed within SciOps. The same ticket system is also used by Paranal Science Operation. To learn about its scope and usage have a look at:

http://www.eso.org/paranal/sciops/team_only/documents/pso_ars_info.html

Actually, however, the Remedy system provides access to many more services. Through the emission of “tickets” assigned to the various departments and persons, Remedy spreads and handles informations and requests among LSO. The most frequently used among the accessible services are:

- LSO (La Silla Science Operation) - Action Remedy system (new/search)
- LPRS - La Silla Problem Reporting (new/search)
- LSNL2 - Night Log
- LTOO - Target of Opportunity (ToO)

Other useful services accessible through Remedy are:

- Check the trips to and from La Silla
- Setup request/search
- Data action request/search
- Technical Action request/search
- End of mission report (new/search)

Note that some of the services just mentioned are also accessible through the LSNL2 system (e.g. Data action request).

The Remedy system allows to search among the various tickets emitted over the years. Remind to check the pending tickets before emitting a new one.

The Remedy system is accessible:

- through the web at the following pages³:

<http://wlsremdy.ls.eso.org:8080>

<http://remedy.ls.eso.org:8080>

Have also a look at:

<http://remedy.pl.eso.org:8080/arsys/shared/mt63browserconfig.html>

for informations about how to properly configure your web browser. Pay attention in particular at the Browser compatibility matrix.

³ You should access **EXACTLY** the mentioned web addresses. Then you will be redirected to /arsys/shared/login.jsp. **DO NOT** try to access directly: <http://wlsremdy.ls.eso.org:8080/arsys/shared/login.jsp>

- starting the client on the wlsremcl machine. The login account is different for the three telescopes (ls-ntt, ls-360, ls-220). All have the same (usual) password. Note that the LTOO and LSNL2 form have to be launched from a UNIX client (wlsremcl) to get all the functionality. All the others will work from the web and/or with Remedy User (Windows). Refer to:

<http://remedy.ls.eso.org:8080/arsys/shared/mt63faq.html>

for instructions about how to setup the Remedy client (windows, Mac, UNIX) properly.

17 Night Log: LSNL2

The La Silla Night Log Tool (vers 2.0; LSNL2) is currently installed at all three telescopes (NTT, 2p2, 3p6). A Night report is issued for each telescope at the end of the night using the LSNL2. This nightlog tool is a clone/adaptation of the Paranal NightLog Tool (PANL2.0). A guideline of the operation basics is presented at:

http://www.ls.eso.org/lasilla/sciops/esoonly/operations/sciInt_LSNL.html

while a full description of the PANL2.0 can be found at:

http://www.ls.eso.org/lasilla/sciops/esoonly/operations/VLT-MAN-ESO-10300-3531_v2.pdf

The LSNL2 is a user interface designed to record information related to the execution of science observations, their related calibrations, and ancillary data on the OBs executed and on the general conditions and events of the observing session. The LSNL2 is also intended as an essential vehicle of day-to-day communications between LSO and the groups and individuals with which it interfaces (e.g. the engineering department, the visiting astronomers). The LSNL2 responds to the primary need of storing the information distributed in the night logs in a structured, easily searchable database usable in a number of different ways by the involved parties.

The goals of the LSNL2 are:

- Providing easy access to pre-execution information on OBs.
- Systematising the information provided for each OB executed.
- Allowing the automated retrieval of information contained in the FITS headers of the files produced by the execution of individual OBs
- Identifying the degree of fulfilment of user-specified constraints on each OB in service mode.
- Providing easy access to different blocks of information such as general conditions of the night, tables of daytime calibrations, tables of nighttime observations, or problems encountered.
- Producing a searchable database recording individual OB information, quality assessment, comments, environmental conditions, and detailed use of the available time.
- Producing a formatted, printable output for internal archival and for distribution to both service and visitor mode users.
- Integrating in the tool the communication with operations-related groups, by enabling the automated production of tickets in other Remedy-based problem reporting systems.

Basic features of the LSNL2 are:

- It is a Remedy-based tool.

- It is usable in visitor mode, service mode, and technical time, as well as in nights in which time is divided among several of these modes.
- The information produced earlier in a given session is easy to locate and can be modified if needed.
- The information produced in other sessions and/or with other telescopes can also be accessed and modified if needed with the same tool.

18 Handling Target of Opportunity (ToO)

Target of Opportunity Observations (ToOs) are needed to follow-up transient phenomena of great scientific interest. There are basically two types of events that trigger ToO:

- Unpredictable sudden astronomical events which require urgent or immediate observations. Those should be submitted as Director Discretionary Time (DDT) proposals, following the procedure described in the DDT Proposal web page:
http://www.eso.org/observing/visas/ddt/ddt_policy.html
- Events predictable in a generic sense only. This is typically (but not limited to) transient phenomena, and follow-up or co-ordinated observations of targets of special interest. Telescope time to observe these events is obtained using the normal proposals for observing time that go through the OPC review.

The basic ToO workflow is implemented in a REMEDY scheme “Target of Opportunity”. Detailed instruction about the ESO policy and procedures to manage ToO are available at:

http://www.eso.org/paranal/sciops/doc/ToO_policies.html

http://www.ls.eso.org/lasilla/sciops/esoonly/ToO_Procedures.html

19 Mailing lists, email account and ESO premises

The various working groups structured inside SciOps are reachable using proper mailing lists and emails accounts (e.g. `ls-emmi@eso.org` to get in touch with the emmi IOT). A detailed list of the various addresses is available at:

http://www.ls.eso.org/lasilla/sciops/esoonly/sciInt_mailingList.html

Use the the following mailing lists:

ls-opsunix

lslogs

mailing lists to reach the LaSilla System Administrators and front desk, respectively.

A list of all the ESO premises (emails, phone, office numbers) is available at:

<http://www.eso.org/bin/getphone?list=all>

20 Useful Links

A huge amount of information and tricks are available in the ESO webpages and in the SciOps internal webpages in particular. It follows a list of some documents wrote to help in handling with

the basic operations at the telescopes:

- NTT Midnight survival guide:
http://www.ls.eso.org/lasilla/sciops/esonly/operations/sguide_midnight.html
- 2.2 Survival Guide:
<http://www.ls.eso.org/docs/LSO-MAN-ESO-90100-0008/LSO-MAN-ESO-90100-0008.pdf>
- HARPS-CES survival guide (not yet released)
- A night-time survival guide for the SofI Pipeline Operation:
http://www.ls.eso.org/lasilla/sciops/esonly/operations/sciInt_SofI_pipeline.html

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