



EUROPEAN SOUTHERN OBSERVATORY

La Silla



# La Silla Observatory

## Quality Manual

LSO-MAN-ESO-00000-002

Issue: 1.5

Date: April 15, 2005

38 pages

Keywords { ISO, Quality, Management, 9001 .2000 }

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### Change Record

<b>Issue</b>	<b>Date</b>	<b>Affected Paragraphs(s)</b>	<b>Reason/Initiation/Remarks</b>
1.0	July 25 <sup>th</sup> , 2001	All	First version
1.1	July 1 <sup>st</sup> , 2002	All	
1.3	November 15 <sup>th</sup> , 2003	All	Update/Completion
1.4	August 15	2.1.3, 3.2, 6.2, 6.4, 6.16, 6.17	Comments from certification audit
1.5	April 15, 2005	1.2, 2.1.1, 3.1.3, 3.2, 6.1, 6.4.1, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12., 6.13, 6.14, 6.17	New structure, process diagrams, and interfaces.

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## 1 Introduction

### 1.1 Purpose

The “*LSO Quality Manual*” provides a foundation for the implementation of a formal Quality Management System at La Silla Observatory. This manual serves as a general description of an effective, efficient, and economical quality management system based on the requirements of International Standard ISO 9001:2000, “*Quality Management System – Requirements*”. The structure of this manual follows the guidelines of the standard ISO/TR 10013: “*GUIDELINES FOR DEVELOPING QUALITY MANUALS*”.

### 1.2 Scope

The policies and procedures described here apply to all processes and procedures listed in point 6.8 and it is restricted to the La Silla site of the La Silla Paranal Observatory.

### 1.3 Exclusions


The quality policy described in this manual does not apply to the following activities:

1. Operation and maintenance of APEX (Atacama Pathfinder Experiment) that will begin operation during second half of 2005.
2. All processes and sub processes that are controlled by Administration. This includes the majority of the procurement activities. In the ESO structure the Administration is a separate division that does not report to Observatory Director. However, some administrative activities that are performed by La Silla staff, like direct purchases of items of limited cost, are within the scope of this manual.

### 1.4 Abbreviations and Acronyms

The terms and definitions used in this Manual are generally defined within ISO9001: 2000 Quality Systems. The following acronyms are also referenced:

BSC Balanced Score Card  
 B&L Board & Lodging  
 CLO Chief Learning Officer  
 CMM [Configuration Management Module](#)


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DICB	Data Interfaces Control Board
DMD	Data Management Division
EOM	End of Mission Report
EWR	ESO Wide Review
FC	Finance Committee
HQ	Head Quarter (located in Garching bei Muenchen)
HR	Human Resources (part of Administration)
SMD	Infrastructure Support Department
ISO	International Standards Organization
IT	Information Technology
LED	La Silla Engineering Department
LLO	La Silla Logistics
LSMM	La Silla Management Meeting
LSO	La Silla Observatory
LSU	La Silla University
OPC	Observing Program Committee
PAO	Paranal Observatory
QMS	Quality Management System
SciOps	La Silla Science Operation Department
STC	Scientific Technical Committee
SWC	Software and Communication Team
TBP	To be provided
TT	Telescope Team(s)
UC	User Committee
Visas	Visiting Astronomers Office
VLT	Very Large Telescope
WAN	Wide Area Network

## 1.5 Applicable Documents

The documents mentioned integrate the present document. Their contents are considered part of the current document and are applicable to its subject matter where quoted.

1. ISO/TC176,ASQ Q9001-2000: Quality Management System-Requirements 2000
2. ISO –9004:2000: “Quality Management System – Directives”
3. ISO 9000:2000: “Quality Management System – Vocabulary”
4. ISO 19011:2002: “Audit of Quality Management systems and/or environmental”
5. ISO/TR-10013:2003: “Guidelines for developing Quality manuals”.

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## 2 Responsibility and Authority

### 2.1 Specific responsibilities

Responsibilities of the people with managerial tasks are defined in LSO-SPE-ESO-00100-0004: “Job Descriptions – Team Leaders and Heads of Departments – January 2002”. Such a document is periodically updated. With reference to the implementation, maintenance, and improvement of the LSO Quality Management System the following specific responsibilities are assigned:

#### 2.1.1 Observatory Director


Being responsible for the effective accomplishment of the overall mission assigned to the Observatory the Director is specifically responsible for:

1. Leading the development and implementation of the Quality Management System.
2. Approval of the Quality Management System.
3. Provision of the resources needed for an effective implementation of QMS.
4. Management reviews of projects of any size.
5. Quarterly review of goals and objectives assigned to LSO Teams and Groups.
6. Review of observers’ appreciations in the EOM reports.
7. Review of remarks from internal auditing procedures.
8. Control and review of the safety procedures.
9. General review of LSO Quality Management System.

#### 2.1.2 Management Representative for QMS

The Quality Assurance Manager is specifically responsible for:

1. Internal Audit
2. Control and maintenance of the Quality Management System.
3. Documentation and Change Control limited to quality system documents.
4. Establishment, implementation, and maintenance of QMS processes.
5. Reporting to the top management of the performance of the QMS and any need for improvement.
6. Ensuring the promotion of awareness of customer requirements throughout the Organization

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### 2.1.3 Department Heads

Since Departments own complete processes, Departments Heads have the clear responsibility for the implementation of the policies later described. Their responsibilities are detailed in the document above mentioned.

In addition, in the frame of the QMS, they have the following responsibilities:

- ?? Definition and improvement of the process and process description with all corresponding documents. Interfaces with the previous and following processes have to be taken into account.
- ?? Definition of performance indicators and measuring the process.
- ?? Training of employees as process users.
- ?? Promote the awareness of process management.

### 2.1.4 QMS Executive Committee

The members of this Committee, appointed by the Observatory Director, have the responsibility of supporting the development and continuous improvement of the QMS at each and every level of the Organization.

### 2.1.5 Other staff


Each staff member has a job title. The job descriptions for each job title are periodically reviewed by the Department Heads/ Team Leaders and forwarded to HR.

## 2.2 Authority

Any given staff member is given the authority to perform his/her allocated responsibilities as they are above specified.

All staff shares the authority and responsibility of identifying noncompliance or possible improvements, and recording these instances using the appropriate tool such that corrective action can be taken, both to rectify the immediate situation and to prevent recurrence.

The Observatory Director periodically reviews the company's resources to ensure that adequate staff, equipment, and materials are available to meet customer requirements, and that the actions taken are properly recorded.

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### 3 ORGANIZATION DESCRIPTION

#### 3.1 General

##### 3.1.1 La Silla: one the sites of the La Silla Paranal Observatory, a Division of the European Southern Observatory (ESO)

[The La Silla Observatory](#) is located 600 km north of Santiago de Chile, at 2.400 m altitude, and consists of a series of optical telescopes with diameters up to 3.6 m. It is one of the Observatories that ESO operates in the Atacama Desert in Chile.

ESO, the European Southern Observatory, was created in 1962 to: "establish and operate an astronomical observatory in the southern hemisphere, equipped with powerful instruments, with the aim of furthering and organizing collaboration in astronomy".

ESO is supported by Belgium, Denmark, Finland, France, Germany, Italy, the Netherlands, Portugal, Sweden, Switzerland and United Kingdom. Other countries have expressed interest to become a member as well.

ESO also operates [the Very Large Telescope \(VLT\) on Paranal](#), located on a 2.600 m high mountain some 130 km south of Antofagasta. The VLT consists of four 8.2-meter and several 1.8-meter telescopes. These telescopes can also be used in combination as the VLT interferometer (VLTI). All four telescopes equipped with five large state-of-the-art multi-mode astronomical instruments are now in operation. The VLTI had "First Light" in March 2001.

The ESO Headquarters are located in Garching, near Munich, Germany. It is the scientific, technical and administrative center of ESO where technical development programmes are carried out to provide the observatories with the most advanced instruments. There are also extensive astronomical data archives and facilities.


In Europe ESO employs about 200 international Staff members, Fellows and Associates; in Chile about 50 and, in addition, about 130 local Staff members.

##### 3.1.2 Organizational structure of ESO

ESO is organized in seven divisions. The La Silla Paranal Observatory is one of them. The governing bodies are headed by a Council where are represented all member Countries.

The Council is supported by a number of other committees:

?? Finance Committee. It provides advice on budgetary issues and controls the application of financial rules by mean of annual external auditing.

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- ?? Scientific Technical Committee. It provides advises on the scientific drivers of the Organization.
- ?? Users Committee. It canalizes the requirements and complains of the user community of the member states.
- ?? Observing Programmes Committee. It approves the scientific programmes to be executed at the observatory after peer review of the proposal submitted by Astronomers.

The Council appoints the Director General (DG) and charges him/her with the responsibility of implementing the approved policy. The Council also appoints an Administrator and all Division Leaders following recommendation by the DG.

### 3.1.3 Internal Communication in ESO

Communications inside ESO are largely based on electronic means. Most of the written information is exchanged by use of an e-mail service based on the internal network. In addition to conventional meeting the videoconference system implemented in each site is also widely used.

Once per year key people spend a week at the Headquarter during the ESO Wide Review. This gathering is an important occasion for the improvement of communication among people with duty stations in different hemispheres.

### 3.1.4 LSO staff

There are two categories of ESO staff with duty station at La Silla:

- ?? International Staff (recruited outside Chile)
- ?? Local staff (recruited locally)


The total staff at La Silla is about 82 people ([Contact List](#)). However, due to the different schedules, the number of people simultaneously present on the mountain in usually well below this number. In addition to the staff recruited directly by ESO, a number of contractors are employed as described in 6.14.1.3.

### 3.1.5 Staff roles

A second distinction can be done according to the ir role at the La Silla Observatory:

- ?? Astronomers (This category includes Astronomers, Operational Astronomers, Fellows, Paid Associates). They are required to spend a number of nights at the Observatory, depending on the specific subcategory to which they belong.



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?? Technical and Administrative staff. They are required to work a number of hours every week, in a number of schedules defined according to their responsibilities. The most common schedule types are the Monday to Friday and the Tuesday to Tuesday.

### 3.2 LSO Structure

The hierarchical structure of LSO is currently the following:

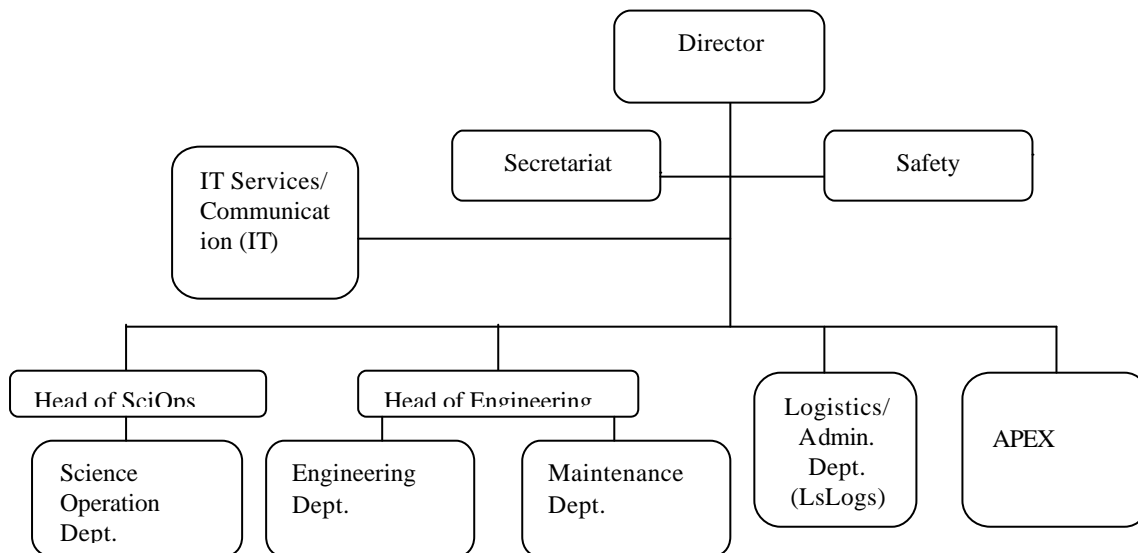



Figure 1.: LSO Structure .

### 3.3 La Silla activities

The major activity of La Silla Observatory is to provide all the services required to carryout the scientific experiments approved by OPC. The core process is therefore the operation of the three telescopes still directly operated by ESO. This includes scientific support.

The equipments operated directly by ESO and the ones operated by national Institutes have to be maintained in order to provide the required quality of service. This is therefore the second activity of the Observatory by significance.

Being located in a remote location other services are required to bring the Observers to LSO facilities and to lodge them. Finally, for the same reason, a complete infrastructure ranging from the access road,

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water, and electricity to voice and data communication services have to be maintained. In addition of offering our observing facilities for the observation La Silla also offers the infrastructure for the installation of facilities belonging to institutes of the member countries.

### 3.4 Clients

The direct clients of our services are:


- ?? Observers coming to La Silla to make use of our observing facilities.
- ?? Scientists for whom observations are carried out by LSO scientific staff in “service mode”
- ?? Institutes that make use of our infrastructure for the installation and maintenance of their own experiments.

However, since the governments of the member countries finance ESO, one could consider tax-payers as indirect clients. In a more general view, since the mission assigned to the Observatory is to foster the progress of Science and Science does not belong to anybody, the real beneficiary is the scientific community at large.

### 3.5 Products of LSO

La Silla is essentially a service organization. This is a list of the services provided to clients:

- ?? Observational facilities. The observer is introduced and supported during his observations. The data produced are archived and the observer receives a copy of them.
- ?? Service Observing. LSO scientific staff carries out requested observations according to requester specifications. Data are archived and delivered to the requester.
- ?? Logistic services. Scientists coming to La Silla are [transported](#) from our pick-up points (Santiago and La Serena) to the Observatory where they are lodged and fed.
- ?? Infrastructure services. The Visiting Observers are provided with communication (voice and data) as well as computer facilities.

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## 4 STRATEGIC BASIS OF THE ORGANIZATION

### 4.1 LSO Mission

The mission of La Silla has been established as:

*“Our mission is to foster the progress of Science by providing the environment for the successful execution of state of the art experiments in observational astrophysics using ESO instruments and telescopes and/or facilities from other institutions hosted by ESO on La Silla Observatory”*

### 4.2 LSO Vision

In the current, fast changing and competitive world the only way La Silla may survive is to continue to provide top-level services to the astronomical community. In order to be a place of excellence, a vision was developed with the purpose of focusing the effort of all staff toward this goal. The vision has been updated during 2003 and it reads now:

*“La Silla will be a magic place – a place where dreams come true”*

### 4.3 Guiding principles


The guiding principles applied by management to accomplish this mission are the following:

- ?? *Excellent user satisfaction*
- ?? *Excellent staff satisfaction*
- ?? *High cost effectiveness*

## 5 FOUNDATIONS OF THE QUALITY MANAGEMENT SYSTEM ACCORDING TO ISO-9001:2000

### 5.1 Quality Policy

In order to achieve the vision, impeccability has been identified as one of the critical success factors. Impeccability means that LSO staff assumes full responsibility for our products and services, and that LSO staff always fulfills his commitments.

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The Quality Management System implemented at LSO has the aim to improve the quality of every service provided to clients (observers and external institutions), reducing the anomalies that can be detected or anticipated in each process.

We are committed to comply with the requirements of the ISO 9001:2000 standard and to continuously improve our Quality Management System. In particular the continuous improvement of the professional and human capabilities of our staff at all levels is considered a critical component of this QMS.

## 5.2 Quality Objectives


The primary objective of LSO management is the improvement of the quality of the science produced by the experiments carried out at La Silla.

In order to achieve this goal a number of areas have been included in the Quality Management System:

- ?? User's satisfaction. A number of indicators have been defined and computed to continuously monitor the progresses (or problems) in this area.
- ?? Improve personnel competences. In the framework of La Silla University a training plan is designed and implemented.
- ?? Periodic internal audits of core processes to evaluate and improve the quality management system. In addition reviews by the top management of the status and possible improvements of the QMS.
- ?? External audits of the QMS of LSO followed by improvement of the system by elimination of detected anomalies.
- ?? Implementation of a balanced score card system to monitor key indicators of the quality of the services provided covering multiple aspects of the management
- ?? Control of the expenditures to keep them below the approved budget.

## 5.3 Quality Goals

The goals for each of the above mentioned areas have been defined in the same document where the BSC indicators are listed (ISO-SPE-ESO-00500-0001).

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## 6 QUALITY MANAGEMENT SYSTEM


### 6.1 General description

La Silla Observatory, during the restructuring that took place in 1995, was organized in Teams, each one fully responsible for one or more processes. Recently, Teams have been regrouped into Departments, shared with the Paranal Site but with local Heads.

In this structure, there are different kinds of processes:

1. Processes devoted to provide core services to LSO customers. SciOps Department is in charge of them.
2. Processes devoted to maintain the quality of the above-mentioned services. Engineering and Maintenance Departments, together with the Software and Communication Team, carry out most of them.
3. Processes devoted to provide secondary, although vital, services to the customers and to the staff, such as transport, board, and lodging. The Logistics Department is in charge of them.
4. Processes devoted to control the quality of the services. This manual specifically addresses these processes.
5. Processes devoted to improve the quality of the services and that have the main input from the internal audit procedures. They are further subdivided in three areas:
  - ?? Actions.
  - ?? Small projects.
  - ?? Full scale projects

Processes devoted to quality control were considered vital parts of the restructuring from the beginning. A suitable reporting tool (Remedy) has been chosen and installed. Currently most quality control processes have been implemented using Remedy. In this way a full history of the quality of the services provided to LSO customers is kept in the form of quality records in a searchable database.

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These records are analyzed in a number of occasions:

- ?? Daily (Night Logs, Problem Reports)
- ?? Weekly (Pending problems, Actions)
- ?? Roughly Bi-weekly ([EOM](#))
- ?? Bi-monthly (Performance report to D.G.; “Under the Rug” problem review)
- ?? Semiannual reports to UC/STC.
- ?? Yearly (LSO review and EWR).

Improvement actions required by the above mentioned analyses are also taken according to three level of complexity as described above (Action items, small projects, and large projects).

## 6.2 Responsibility in the QMS

The main responsible of the QMS is the Observatory Director. As a matter of fact the will of integrating the existing managerial tools into a formal Quality Management System was stated by the Observatory Director in the La Silla Management Meeting # 39 held on May 30, 2001. In the same meeting the LSO Assistant Director was appointed as Quality Manager, with the responsibilities currently allocated to the QMS Management Representative.

In order to support the Director in the implementation of the QMS and its improvement an Executive Committee has been set-up on May 13<sup>th</sup>, 2003. The members of the Executive Committee have been chosen in order to cover all the critical areas at LSO. In this Committee and in the day-by-day activities the Director has appointed a Representative that follows the activities of the QMS when the Director is unavailable. However, the responsibility to sustain the Quality Management System, in accordance with the ISO 9001 requirements, stays with the Director.


A number of auditors have been qualified with the aim of conducting periodical internal audits of the QMS.

## 6.3 Internal Audits

Internal QMS audits are carried out according to the standard ISO-19011. An audit planning is prepared every year. Audit records, working papers, and check lists used during the audit activities are archived by Department. The final audit report is the major input of the Management review.

Reviews from the management follow the presentation of the audit report and actions are taken in order to eliminate the non-conformances detected.

Audit activities are evaluated before, during, and after their execution, as described in the Audit process diagram. Remarks are documented in the report “Audit PDCA”. Purpose of this document is the

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improvement of the audit program and its execution. The Director and his representative do receive a copy of this report.

## 6.4 Management Reviews

### 6.4.1 Reviews of nonconforming events.

All nonconforming events are investigated. The Department Head or his delegate, in case of minor event, performs the investigation and takes remedial action involving any other team which support is deemed necessary. A minor event is defined as a problem that caused a loss of observing time smaller than thirty minutes, and that requires a repair work of less than four hours.

Outcome of the investigation is recorded in the reporting system that does not accept problems closed without a conclusion. Any other event is reported to the Management that carries out a formal investigation. The Management investigates periodically recurrent problems in order to take corrective action, if technically and financially feasible, according to the priority level of each one.


### 6.4.2 Audit reviews.

The Director chairs an Audit Review meeting that is called after each Audit. The participants to the Audit review meetings are the Director and his Deputy, the Heads of Departments, and the auditors. The main input is the audit report that is thoroughly analyzed. As a result of the analysis decision are taken and responsibilities assigned for the remedial actions, together with the needed resources. Decisions are recorded in minutes that are distributed and archived by the secretary.

### 6.4.3 QMS Mangement reviews

At least once per year the Director chairs a review meeting devoted to the improvement of the Quality Management System. The participants to this review are the Director and his Deputy, the Heads of Departments, and the members of the QMS Executive Committee. The follo wing aspects are covered:

- ?? Vision, mission, principles and quality policy in term of suitability and effectiveness.
- ?? Main results from and planning focus for the internal audits.
- ?? Overall results from the BSC, including customer satisfaction.
- ?? Achieved results with the continous improvement process.
- ?? Assesment of the objectives set for the review period.
- ?? Actions and objectives for the following period.
- ?? Definition of new target values for the BSC in order to keep them reasonably challenging.
- ?? Evaluation of the services provided by external contractors, when not explicitly included in the BSC.

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## 6.5 Relation between internal audits and management reviews.

The sequence of activities made up by:

- ?? QMS Audit
- ?? Audit report to Management
- ?? Review by Management
- ?? Improvements planning
- ?? Follow-up

Corresponds to a virtuous cycle for the continuous improvement of the Quality Management System of La Silla Observatory.

## 6.6 Documentation

The Quality Management System is documented and structured in 3 levels according to ISO/TR 10013 Standard:

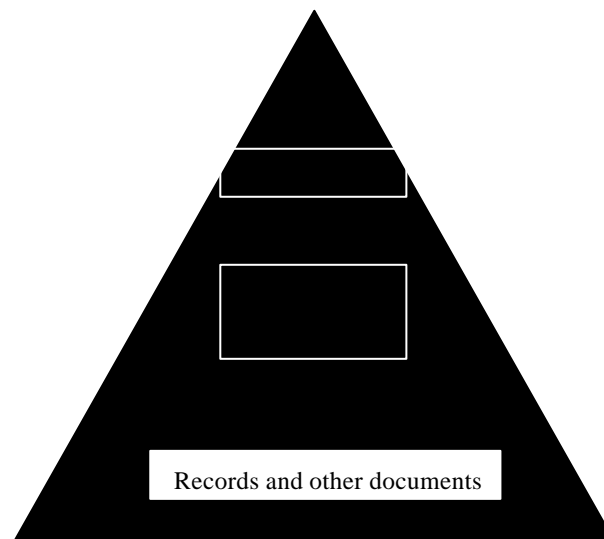



Figure 2.: Documentation of the QMS



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### 6.6.1 Level 1: Quality Manual

This document details the observatory quality policy and structure and it references the appropriate Operating Procedures.

The description of the core processes, together with references to the related procedures, is given in paragraph 6.8 of this Quality Manual.

### 6.6.2 Level 2: Operational Procedures

These documents describe the actual processes, and controls applied, to all activities concerned with the attainment of a quality assured service. Processes have one or more procedures related to them.

### 6.6.3 Level 3: Quality related records and other documents


Relevant quality related records are stored in the LSO reporting systems. Exceptionally some types of records are stored in paper form at the place of production (example: start-up check-lists). Reports periodically generated from the database (example: [weekly operation reports](#) for each telescope) are made available on the internal web either directly from Teams pages or through the documentation system.

## 6.7 Documentation management

With regards to the documentation itself, from the beginning of the re-engineering the formalization of the documentation system was deemed to be vital to an effective provision of services.

The following rules apply:

1. There is a documentation system (LSO-PLA-ESO-0000-0001) defined by a working group that later reviewed it. All documents relevant to QMS must adhere to its requirements.
2. All QMS documents should be identifiable from the document retrieval system implemented in the reporting system (Remedy) using its WEB interface.
3. The current version of any QMS documents is stored in the single repository in the WEB server. Any reference to a document should point to this repository.

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4. The version control is achieved through the use of a CMM system.

The handling of any document is described in the procedure LSO-INS-ESO-00500-0001: “*Guide for Document Preparation*”. In each Department one or more people have been designated as Document Officers with the responsibility of managing the documentation according to the referenced procedure.

### 6.7.1 Documentation Management Example

The following diagram describes the various steps to be followed before a document can be released to the public.

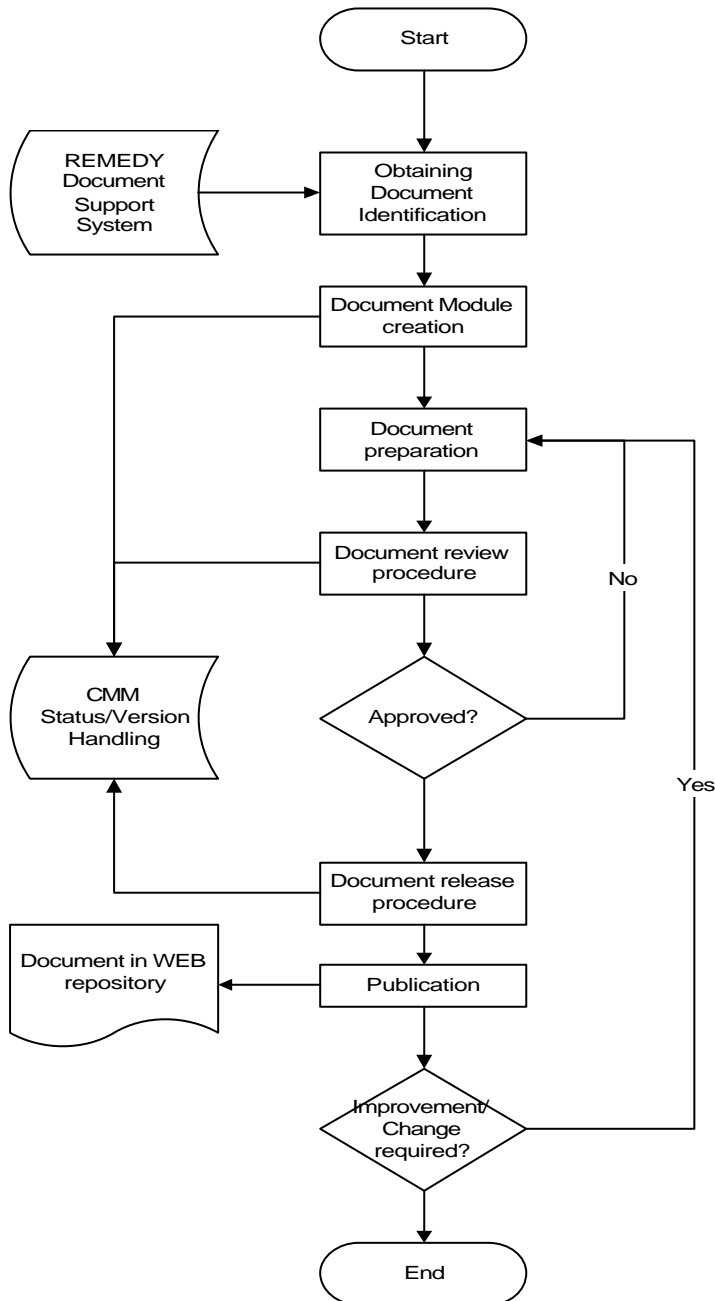



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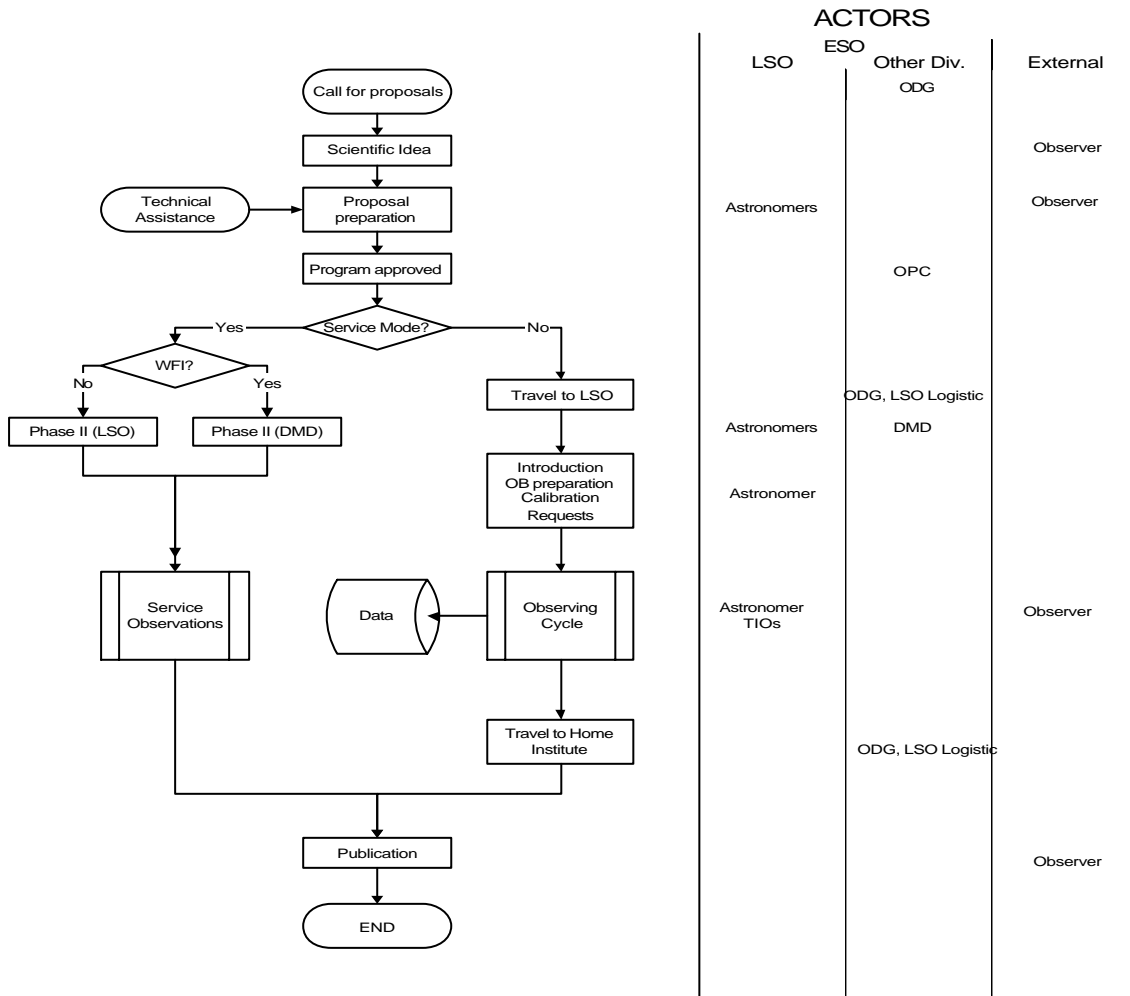
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## 6.8 Processes and Procedures

La Silla contributes to a general process set up with an end-to-end model for the execution of Scientific Programs. A simplified diagram is the following:




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The following is the list of core processes and sub-processes:

<b>Core Processes</b>	<b>Core subprocesses</b>	<b>Owner</b>
# Name	Name	
1 Observing Cycle		SciOps
2	Observations	SciOps
3	Service Observations	SciOps
4	Calibrations	SciOps
5	Config.Change and Set-up	SciOps
6 Maintenance		LSO
7	Corrective maintenance	LSO
8	Preventive maint. Planning	LSO
9	Preventive maint. Execution	LSO

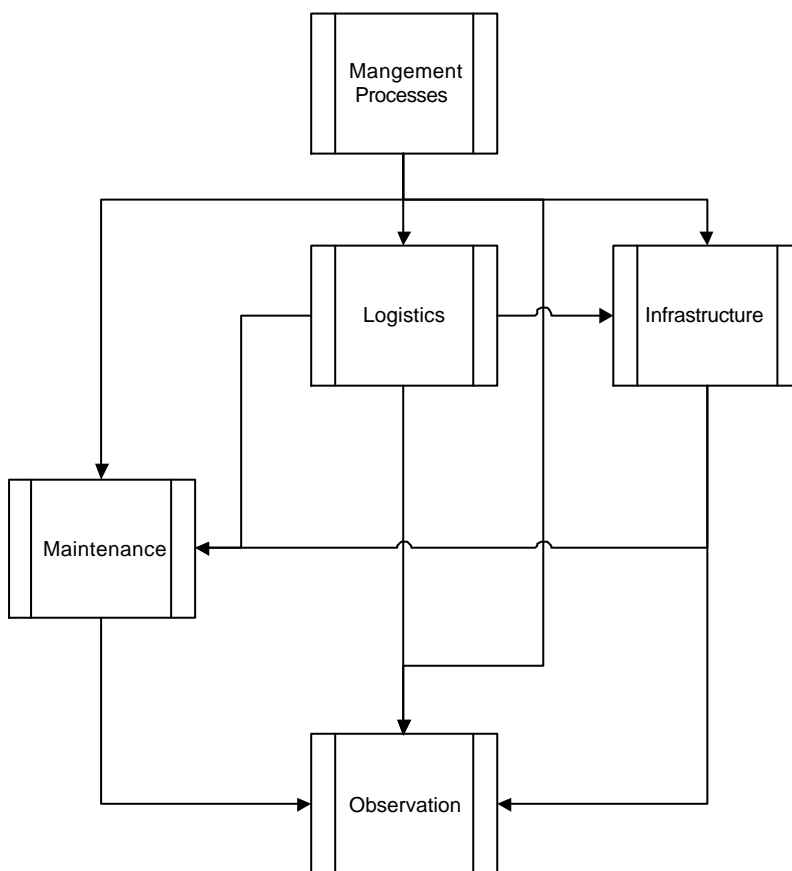
The successful execution of these processes requires a number of other processes:

#	<b>Other major processes</b>	<b>Owner</b>
	<b>Name</b>	
10	Long Term Planning	Management(QMS)
11	Yearly Planning	Management(QMS)
12	Internal Communication	Management(QMS)
13	Internal Review	Management(QMS)
14	Internal Audit	Management(QMS)
15	Product Conformance	Management(QMS)
16	Documents handling	Management (QMS)
17	Staff Hiring	Management
18	Staff Evaluation	Management
19	Staff training (LSU)	Management
20	Infrastructure Improvement	Management
21	Workspaces Improvement	Management
22	Project Management	Management
23	Project Execution	LED,SMD
24	Logistic	SMD
25	Purchases	LLO
26	Warehouse services	LLO
27	Commuting	LLO


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### Major processes interactions

The following is a simplified diagram that shows the interactions among the major processes. The most important core process (Observation) is supported by the maintenance, the infrastructure, and the logistic processes. The Management Processes ensure that adequate resources are assigned to each process and that continuous improvements are achieved, within configuration control constrains.



A detailed description of the interfaces is in document ISO-SPE-ESO-00500-0002 “Interfaces between Processes”.

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### 6.8.1 QMS procedures

- ?? Handling of documents procedure (Internal and external) including version control (LSO-INS-ESO-00500-0001: “Guide for Document Preparation”)
- ?? Records control procedure (ISO-PRO-ESO-00500-1)
- ?? Non conformant service procedure (LSO-MAN-ESO-00500-001: “End of Mission User manual”)
- ?? QMS internal audit procedure
- ?? Corrective action procedure (LSO-MAN-ESO-00306-0001: “Night Report User Manual”)
- ?? Preventive action procedure (LSO-MAN-ESO-00000-0001: “Maintenance Control System user manual”)

### 6.8.2 Most relevant operational procedures

- ?? Telescope Start-up
- ?? TBP

### 6.8.3 Personnel handling – Training

- ?? Training procedure
- ?? Training Plan

### 6.8.4 Management control

- ?? Balanced Score Card


### 6.8.5 Internal Communication

The WEB has been chosen as the most important tool for the internal communication when information has to be timely disseminated in the Observatory. From the main [La Silla page](#) both the users and the staff can reach the information relevant to their purposes.

## 6.9 Personnel management and training

### 6.9.1 Recruiting Personnel

The processes of selecting, hiring, and managing personnel are shared with the Personnel Department (HR) in the Administration. LSO procedures are designed in order to prevent, as far as possible, these processes from being negatively affected by activities beyond LSO control. Procedures differ slightly in the cases of Local Staff (recruited in Chile) and International Staff.

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The following procedure is followed in order to ensure the selection of the most qualified candidates for local staff vacancies at LSO:

1. The profile for the vacancy notice (based on the job description) is prepared by the supervisor and reviewed by the Head of Department (Observatory Director in case of Teams) before being sent to HR.
  
2. The Department Head performs the selection of candidates for interview from a list (prepared by HR) that excludes only the ones that most obviously do not fit the requirements.
  
3. The Department Head carries out the interviews in person, with the support of at least another senior Team Member (in addition to the HR people).
  
4. The most promising candidates are invited at LSO for further interviewing and possibly hand-on tests.
  
5. At the same time candidates undergo physical and psychological tests that ensure their suitability for life on the mountain.
  
6. The selection memorandum is submitted to the Observatory Director that instructs HR on the offer to be done to the best candidate.

All these steps are recorded and HR keeps the records.


For International Staff the advertisements are published in major newspapers in each member country. The board includes normally someone from the Headquarter, someone from the Paranal site, and the Observatory Director. Interviews are carried out either at the Headquarter or in Chile.

## **6.9.2 Training**

Personnel's training is a primary concern at LSO. All internal activities have been organized as La Silla University (LSU). Information on all LSU activities is timely published on the WEB. Every year a training program, tailored to the individual needs, is developed in the frame of LSU.

### *6.9.2.1 Newly hired staff*



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In addition to the training on the job, newly hired staffs must follow the mandatory courses indicated in the curricular mesh of the La Silla University (LSU). Their probation periods may be extended if they did not have the opportunity to successfully complete all required courses.

#### 6.9.2.2 *General staff*

The training requirements of each person are identified at the time of the yearly evaluation exercise and the successful completion of the courses must be listed among the goals for the following period. Department Heads/Team leaders prepare a training plan for all people reporting to them as one of their annual goal setting. This plan is the base for the LSU training plan.

#### 6.9.2.3 *Recording*

The attendance to the LSU courses is recorded in the same Remedy form used for inscription. The CLO will provide yearly reports to be included in the personal file of the staff. For courses and other instances of training outside LSU, the person involved must deliver copy of any certificate of profit/attendance for the inclusion into his personal file. He must also make a public presentation in the frame of LSU on the topics learned. CLO will store copy of the presentation material.

### 6.9.3 **Staff Evaluation**


Every year a staff evaluation process is carried out according to [procedures](#) established by the ESO Administration for all ESO Divisions.

The process is done in two steps:

- ?? An evaluation done by the direct supervisor including an interview with the staff member evaluated.
- ?? An advancement process during which proposals are made to DG on the promotions and awards to be granted.
- ?? There is a limited amount of steps to be granted within each Division.

The records of this process are kept by the Personnel Department in [ESO Vitacura](#).

## 6.10 Provide quality infrastructure

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## 6.10.1 Identify infrastructure Needs

### 6.10.1.1 Building

The Director, after quarterly visiting the Observatory premise, directly prepares a list of needed maintenances and improvements that are assigned as a goal to SMD Head. For premises occupied by staff, the B&L Leader circulates every year a questionnaire with the aim of getting feedback from the staff on the deficiencies to be corrected by SMD. A similar questionnaire is left in each room occupied by visitors. In addition, a judgment on the lodging quality is part of the mandatory EOM. Comments related to Hotel management are forwarded to its leader for answer and action.

### 6.10.1.2 Workspace

Department Heads must ensure that workspaces used by their team members are properly organized. They may request support from the Safety Engineer for issues related to ergonomics.

### 6.10.1.3 Equipments

The need for new equipments are identified at the time of budget preparation and forwarded to LSO management, together with a justification.

### 6.10.1.4 Computer Hardware

Every year the IT Group updates an official document containing an obsolescence plan in consultation with the IT Manager. The Director reviews and approves this plan.

### 6.10.1.5 Software


Users canalize their software needs throughout the IT Group. The requirements for software of general use are reviewed in the Management Meetings .

### 6.10.1.6 Utilities

Utilities are monitored either remotely (Electricity, Heating) or by daily visual inspection (water pumping stations, tanks). Actual readings are recorded either automatically or manually. Reports on the consumption are provided quarterly to the Management. Periodical analyses (physical, bacteriological) are carried out on the quality of the water. The Safety Engineer keeps the records.

### 6.10.1.7 Services: transportation

A person in the Logistics Department is in charge of the transport to and from LSO. In his task he is assisted by a computerized reporting system to ensure that only approved travels are carried out and that

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they are charged to the corresponding budgets. The system also detects any discrepancy from planned schedules and reports it by email to the transport officer and to the management.

Visiting astronomers evaluate the quality of the system in the EOM report and the corresponding statistics are analyzed annually.

#### *6.10.1.8 Services: communications*

Monthly reports are extracted from the PABX for the purpose of charging private calls. The Director reviews the charges for official calls. System administrators constantly monitor digital communications. An automatic network control system (HP Open view) permanently scans the LSO domain to detect anomalies and reports them to the system administrator.

Visiting astronomers are questioned about the quality of each system in the EOM report and the corresponding statistics are analyzed quarterly.

### **6.10.2 Provide needed infrastructure**

#### *6.10.2.1 Buildings*

The Director reviews the status of the work at least once per year. For minor modifications, they are requested, assigned to Logistics, and received by teams in the weekly action items meeting.

#### *6.10.2.2 Workspaces*


A provision is made in the budget for the purchase of office furniture. Regular purchases are dealt by Logistics on request by the interested group. Specific furniture and the first equipments of new buildings are foreseen in the related upgrade plan and budgeted correspondingly.

#### *6.10.2.3 Equipment*

New equipment is budgeted according to the restrictions given by the Long Range plan. In case of conflicting requests issues are analyzed in the LSO management meeting devoted to budget preparation and solved by the Director. Equipment that unexpectedly breaks down and requires replacement are acquired with contingency funds provided by the top management if no spare is available or no provision was done.

#### *6.10.2.4 Computer Hardware*

Computer hardware is acquired according to the obsolescence plan. The HQ IT Manager ESO wide organizes acquisitions while installation is done by IT according to a plan developed with the area involved.

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#### 6.10.2.5 Software

- ?? *Control software:* most of it is acquired centrally by the Telescope Division, distributed with the bi-yearly updates, and installed by IT.
- ?? *General purpose & data reduction (SciSoft):* it is distributed by a central location every six months and installed locally on the various platforms supported. A designated LSO astronomer acts as a coordinator for new LSO requests.
- ?? *MS Windows software:* it is acquired by HQ IT manager and handled by a local administrator that reports monthly on new installations to the IT manager.
- ?? *Specific packages:* acquired by individuals or Team previous approval from the people in charge of maintenance.

#### 6.10.2.6 Utilities

Acquisitions require usually large investment and they are therefore dealt with as project.

#### 6.10.2.7 Transportation

Cars are renewed according to their status and to the regulatory constrains for the disposal of imported vehicles. They must comply at any time the requirements of the ESO safety manual.

### 6.10.3 Maintain infrastructure

Infrastructure is maintained according to maintenance plans handled by the computerized control system.

#### 6.10.3.1 Buildings


Buildings are maintained by a dedicated group in Logistics constituted by contractors organized by an experienced ESO supervisor fully dedicated to this job.

#### 6.10.3.2 Workplaces

The respective groups maintain their workplaces.

#### 6.10.3.3 Equipment

Old equipment that requires replacement are acquired with contingency funds provided by the top management if no spare is available, or no provision was done.

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#### 6.10.3.4 Hardware

Computer hardware is maintained by IT with the support of the Engineering Department.

#### 6.10.3.5 Software

Unix based systems, as well as MS Windows based system devoted to official task (for administration, logistic, drawings, etc.), are maintained by system administrators in IT.

Application programmers in Engineering Software Group maintain control systems.

Owners maintain their own personal computers according to the applicable ESO policies.

#### 6.10.3.6 Utilities

The Maintenance group in Engineering is in charge of all utilities. Each major utility has its own work package that is checked every quarter by the Director or his delegate.

#### 6.10.3.7 Transportation services

Light vehicles are maintained on site by Logistics according to a customized maintenance plan. A maintenance record is kept using the maintenance control system. Heavy maintenance of special vehicles (bus, van, and carry-all) is contracted externally to an officially authorized service in La Serena or Santiago.


All vehicles undergo an annual technical revision according to Chilean traffic regulations. Records are kept in each vehicle and by the maintenance personnel. In case of damages due to road accidents or any other reasons, the vehicles are taken out of service until they are repaired. Only vehicles in good condition are allowed at LSO. The safety board investigates each accident and the conclusions are brought to the attention of the Director. The Safety Engineer keeps record of the whole procedure.

Private vehicles regularly circulating at La Silla require the special 3<sup>rd</sup> party liability coverage taken by ESO for its official vehicles according to the applicable safety regulation.

#### 6.10.3.8 Communication services: Connections with outside world.

The connections to outside world are provided by local providers external to LSO. In case of failure of links to Santiago the IT person on duty calls the provider of the corresponding service.

#### 6.10.3.9 Communication services: Internal connections.

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Internal voice communications are maintained by IT with support from maintenance group and the PABX provider that is called for remote troubleshooting. A full set of spare is available on the mountain and is kept in the PABX room.

Data communications are maintained by IT with the support of the cabling section in the Engineering Department. They have all the necessary tools for testing, repairing, and certifying any kind of connection used at LSO: multimode optic fibers, single-mode optic fibers, UTP5 cabling.

## 6.11 Provide Quality Environment

### 6.11.1 Identify needed work environment.

Control rooms for new instrument and telescope are designed with the involvement of the people that spend there (most of) their working time. Further improvements are channeled through the action point procedure, if minor, or they are requested directly to the Director. Requirements for workplaces are analyzed at least when a major restructuring of the premises is carried out.


### 6.11.2 Manage needed work environment.

Every time that one new equipment has been set up or an existing environment has been refurbished the Director spend some time operating in the new environment. Any deficiency detected is promptly corrected or the equipment is taken out of commissioning.

## 6.12 Management Control System

A number of critical managerial indexes have been located and are listed in (TBP). These indexes constitute the basis of a Balanced Score Card system that periodically generates reports for the Management. In addition to the BSC system there are a number of other activities that contribute to the continuous improvement of the Observatory:

- ?? Technical Action Items. Requirements for small improvements are handled during a weekly meeting where they gave origin to action items. The advances in the provision of these improvements are monitored during the same meeting. Records are distributed and stored in Remedy. A direct link from the Home Web page give access to all the records stored since the start of this initiative.
- ?? Operational Coordination meeting. Held daily, during these meeting the use of resources is planned and optimized.

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- ?? Projects. Small and large projects are carried out in order to improve the facilities available to the users.
- ?? Reviews. When a serious anomaly is detected the Management set-up a review panel to investigate the root cause of the non-conformity and to advise the Director on the possible remedial actions.
- ?? Review of recurrent nonconformities. Every three months a panel chaired by the Director reviews the mentioned nonconformities, identifying possible remedial actions. Normally the remedial action will require a small project otherwise it would have been solved by mean of an action item.
- ?? Non-conformances analysis. During the weekly meeting of Engineering and SciOps the nonconformities related respectively to operation and maintenance are reviewed. From these meetings requirements for action items may emerge.
- ?? QMS Executive Committee. During its periodical meeting it reviews the status of the QMS and trigger actions when needed. Conclusions are recorded in Minutes and Action Items list.
- ?? Management Meetings. During these bimonthly meetings the current status of the Observatory is analyzed and policy decisions are taken. Conclusions are recorded in Minutes and Action Items list.
- ?? Users Committee. Once per year the Director attends this meeting where the status of the services is analyzed with regards to reported problems and improvements done or planned.


## 6.13 Customers handling

The Observing process is the most important process of the Observatory and it is described in (TBP)

### 6.13.1 Identify customers' product requirements

Requirements from LSO customers come from:

1. Institutional governing bodies, namely the Users Committee and the Scientific Technical Committee.
2. Specific requirements of OPC approved programs.
3. Requirements forwarded through requests or comment records in Remedy
4. Comments in the EOM reports.

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### 6.13.2 Review customers' product requirements

The management reviews customers' requirements coming from items 1 and 4. Requirements coming from items 2 and 3 are dealt with directly by the Department involved with possible involvement of the management.

### 6.13.3 Communicate with LSO customers

The person in charge of a specific process must answer any complain or suggestion logged by customers and related to that process. The e-mail system is used for this purpose.

All EOM and related answers are forwarded also to Visas and to the members of the Users Committee. Highlights of activities at LSO are regularly published in the [Messenger](#).

Up to date descriptions of available LSO services are maintained in the [LSO website](#).

There is always a scientist designated La Silla Coordinator that can answer enquires coming via [e-mail](#).

## 6.14 Providers Handling

Since LSO is basically a service organization and we do not transform raw material into products, few materials have a direct impact on the quality of the service provided. The procurement procedure (see TBP) is defined by the ESO Administration. It is therefore outside the control of the Observatory and the scope of this manual.


Purchases within Chile and below a ceiling of 2500 EUC are managed locally by the purchase officer. The provider is selected by the user within a list of approved providers. New providers can be added to this list by the purchase officer, when justified.

For small purchases (below 1000 EUC) the final user can place a Direct Order without involving the purchase officer. Since this procedure is meant to reduce overheads and speed up delivery time, no major constraints are considered and the requester has complete freedom in his relation with the provider, once that the financial constraint are satisfied (funds availability, four eyes principle).

### 6.14.1.1 Computers

The largest components used in LSO core processes are computers (workstations and local control units). The purchase of these products is done according to an obsolescence plan that is updated at least every year in coordination with the IT Manager.



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#### 6.14.1.2 Other supplies

Other supplies are acquired through the ESO purchasing system (not part of LSO processes). The work package manager must sign the computerized purchase request. He also receives a notification of the relevant steps of the purchasing process. When goods are delivered to the warehouse at LSO, the WP manager or his delegate must perform a provisional acceptance in order to receive them.

Direct purchases with credit card are dealt with directly by a purchase officer at LSO.

#### 6.14.1.3 External services

The hiring of external services are limited to areas where it cannot affect directly the quality of the core services provided to customers and where remedial action can be quickly be undertaken in case of need.

They are currently used for:

- ?? Construction manpower.
- ?? Cooking and cleaning manpower.
- ?? Guarding services.
- ?? First Aid services.
- ?? Car workshop
- ?? Occasional transfer service to/from La Serena.
- ?? Maintenance of WAN.

These services (except First Aid, under the supervision of ESO medical consultant) are under the direct supervision of an ESO staff.


Personnel Office in Vitacura is responsible for the correctness of related contracts and for the application of relevant labor laws.

### 6.15 Control Operational Activities

#### 6.15.1 Control of service provision

Telescopes and instruments preparation are performed according to written procedures. Each operation (set-ups, start-ups, etc.) is recorded in a checklist form. For every set of observations at a given telescope lasting one night or less and belonging to a single OPC approved program, a report ("Night Report") is produced and stored in Remedy.

Non-conformant performances are recorded in a Problem Report record in Remedy. The observer affected determines the amount of time lost. Non-conformance records should be dealt with as soon as

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possible. Notifications are sent if problems are not dealt within the day. They should be revised every week by the team in charge when operations are handed over to the other turno.

Bimonthly statistics are computed and forwarded to ESO top management. LSO Director analyzes recurrent and long-standing problems during quarterly “under the rug” meeting.

## **6.15.2 Validate service provision.**

### *6.15.2.1 Observations*

Instruments directly operated by LSO must comply with the requirements set for the VLT instrumentation and they must support the standard Data Flow. All instruments currently in operation are periodically checked according to their respective calibration plans. Calibration activities are triggered by the Maintenance Control System and the outcome recorded in the corresponding Work Order. Outcome of the calibration activities is posted on the Web without manual manipulation whenever possible.

### *6.15.2.2 Other services*

Management performs random checks on all other services (transport, lodging, and communications) in the same conditions experienced by observers. Complains recorded in the EOM reports are also being investigated.

## **6.15.3 Identify and track LSO products**


All data produced at telescopes are also stored with DICB compliant headers. Observing logs of VLT compliant instruments are also stored in the archive.

## **6.15.4 Protect property supplied by customers**

National equipments installed at LSO and owned by external institutions are identified in the corresponding agreement. Copies of the latest version of all agreements are kept at LSO for consultation.

These equipments are insured against named perils if so required in the corresponding agreement. When equipments are not being operated, they are kept under lock whenever feasible. Keys are kept by the Observatory secretariat and handled over to a designated person only if specifically authorized by the owner. A record of these events is kept by the secretariat.

When LSO is in charge of the maintenance of these equipments, any failure that does not fall into the category of minor repairs is immediately communicated to the owner by e-mail, fax, or any suitable

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mean. Any configuration change (beside the ones documented and required by the normal operation of the instrument) is performed only with written approval of the owner.

### 6.15.5 Preserve LSO products and components.

#### 6.15.5.1 Equipments (Hardware and Software)

Telescopes and related instrumentations offered to the community are the one listed in the periodic call for proposals.

All telescopes and related instrumentation there identified are kept under strict configuration control. Maintenance is performed according to the Maintenance Control System in use at LSO. Maintenance task descriptions are stored in the same form used for generating work orders or as a pointer to a separate document depending on its complexity. If the actual task should be performed by a Department other than SciOps, it must receive its permission before performing the task.

Work Orders corresponding to each maintenance task performed are recorded in the Remedy system. The shift leader of Science Operation authorizes in advance any intervention that does not correspond to a maintenance task. Authorizations are recorded and the records are kept at the telescope. Telescope teams take all necessary steps (locking the dome, surveillance cameras) to ensure that no unauthorized intervention is carried out.


#### 6.15.5.2 Scientific Data

All data has are handled according to the procedures defined by DMD. Data consistency check and backup policy specific to LSO are described in a procedure and applied accordingly. Any other data produced during observations are stored in a safe way. At least two copies exist at any given time to prevent accidental loss. Consistency checks are performed once data are moved from one site to another (inside or outside LSO) to ensure that no corruption has occurred.

#### 6.15.5.3 Time reference

The time references distributed to telescopes and instruments comply with the requirements with respect to the following characteristics:

- ?? Continuity (no interruptions, no jitters)
- ?? Short term stability
- ?? Long term stability

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The quality of the time reference is maintained even in case that the primary reference currently in use goes out of service by a GPS-independent back-up system.

## 6.16 Control Monitoring Devices

### 6.16.1 Identification of monitoring and measuring needs

For an astronomical observatory one can consider that monitoring and measuring celestial objects and events are the core activities and therefore they will not be treated here.

In this subchapter only auxiliary monitoring and measuring devices are considered, such as:

- ?? Reflectometers.
- ?? DIMM
- ?? Filter transmission measurement.
- ?? Load cells used in mirror support.
- ?? Environmental sensors (Temperature, Humidity, Wind speed, Pressure)
- ?? Vacuum gauges.
- ?? Temperature sensors and related measuring networks.
- ?? Image quality analyzers.
- ?? Meteorological station.

### 6.16.2 Selection of monitoring and measuring devices


Selection of these devices is done according to the following constrains:

1. Written specifications from the intended user(s), normally other Teams at LSO.
2. Compatibility with ESO standards, above all the ones applied to the development and maintenance of VLT control system.

### 6.16.3 Calibration of monitoring and measuring devices

Each device is inventoried as soon as it is accepted at the end of the purchasing process. Together with other parameter the calibration requirements are specified in the same record. Only calibrated instruments can be used for the maintenance of telescopes and instruments.

Calibrations of monitoring devices are dealt with as maintenance tasks. The outcome of these tasks is recorded in the corresponding Work Order. The relative inventory record is also updated.

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#### 6.16.4 Protection of monitoring and measuring devices

The responsibility of each device is assigned to the Team that operates it, even if a different team owns the device itself. The name of the Team in charge is recorded in the Task Description record in Remedy. The person that actually performed the operation processes the Work Order and the inventory record.

#### 6.16.5 Validation of monitoring and measuring software

The related software is commissioned before the device can be put into operation. All necessary elements required to rebuild the software either are stored in the VLT software archive, when feasible, or they are stored in a support kept under lock by the person in charge. Anytime it is possible to reload the version of the software last commissioned.


#### 6.16.6 Use of monitoring and measuring devices

When the devices are not part of a more complex system (e.g.: load cells which are part of an active mirror support), a specific user manual is kept available following the specification on LSO Documentation.

### 6.17 Internal Communications

The internal communications are based on a number of meetings that are formally managed:

- ?? Management Meeting (see TBP). These meetings are the most important managerial tool. Major decisions and policies are discussed and approved here. The Director and the Department Heads meet approximately every two months. The conclusions are recorded in minutes.
- ?? QMS Executive Committee. This committee has been established during the implementation of the ISO 9001:2000 compliant QMS. The Director or (in his absence) the Management Representative for the LSO QMS chairs it. It currently meets every month, although in the future it is foreseen to have quarterly meetings. Formal minutes are also kept.
- ?? Review meeting. Chaired by the Director it is called to review both the outcome of the internal and external audit of the QMS and the non-conformances that cannot be properly handled by lower level review instances (weekly LED and SciOps meeting, technical action items meeting).

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?? Daily Coordination Meeting. This meeting is attended by qualified people with operational or managerial responsibility on the mountain. It takes place every day just after lunch in the Hotel Meeting Room.

?? Thematic Coffe. Once in a while thematic coffees are organized by Management. The purpose is to gather anybody interested on topics like managerial issues, report from Conferences, internal organization, QMS, etc. After a presentation from the speaker, an open discussion follows.

### 6.18 Corrective actions

The corrective actions decided during any of the meetings previously mentioned are assigned to the corresponding Department for executions. If the corrective actions cannot be founded with the resources assigned for the current year, it is the Director responsibility to request and obtain the additional resources from the upper level of management (Director General) where, according to good managerial practices, resources for contingencies are concentrated.

### 6.19 Preventive actions

The preventive actions decided during any of the meetings previously mentioned are assigned to the corresponding Department for executions. If the preventive action requires resources exceeding the ones assigned for the current year, it is entered into the planning for the following year (see TBP) or in the long range planning (see TBP) if the case.

