



EUROPEAN SOUTHERN OBSERVATORY


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Guidelines for the Preparation of Survey Management Plans

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1. Scope: Guidelines for the Public Survey Management Plan

The Principal Investigators (PIs) whose Public Survey proposal has been reviewed by the Public Survey Panel (PSP) and recommended by the Observing Programme Committee (OPC) are now asked to submit the Survey Management Plan (SMP). The SMP is an integral part of ESO's appraisal of the proposal; it will be reviewed by the ESO Survey Team (EST), iterated on with the PIs, and then submitted to the chair of the PSP and to the ESO DG for approval.

Public surveys on VST and VISTA will use up to 75% of ESO available time on these survey telescopes and will be conducted in Service Mode (SM). Therefore with respect to the standard Phase 1, the SMP represents an additional form requested to the users, which aims at collecting the necessary information to carry out Public Surveys in SM, and allows for an efficient and timely planning of Phase 2 and telescope operations.

The SMP must illustrate the observing strategy, the survey data calibration needs, the data reduction process, the manpower and hardware capabilities, the data quality assessment process, and the data product delivery to the Virtual Observatory (VO).

2. List of Abbreviations & Acronyms

This document employs several abbreviations and acronyms to refer concisely to an item, after it has been introduced. The following list is aimed to help the reader in recalling the extended meaning of each short expression:

| | |
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| DEC | Declination |
| DG | Director General |
| EST | ESO Survey Team |
| EPS | ESO Public Surveys |
| ETC | Exposure Time Calculator |
| FoV | Field of View |
| FTE | Full Time Equivalent |
| g-lat | Galactic Latitude |
| g-long | Galactic Longitude |
| PI | Principal Investigator |
| P2PP | Phase 2 Proposal Preparation |
| PSF | Point Spread Function |
| PSP | ESO Public Survey Panel |
| OPC | Observing Programme Committee |
| ΩCAM | Omega Cam |
| RA | Right ascension |

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| SADT | Survey Area Definition Tool |
| SM | Service Mode |
| SMP | Survey Management Plan |
| SDSS | Sloan Digital Sky Survey |
| VISTA | Visible and Infrared Survey Telescope for Astronomy |
| VLT | Very Large Telescope |
| VST | VLT Survey Telescope |
| VO | Virtual Observatory |

3. List of Applicable and Referenced Documents

The ESO Public Surveys (EPS) selected by the PSP and recommended by the OPC are described at <http://www.eso.org/observing/webone.html>

The mechanisms that ESO has developed to manage EPS with VST and VISTA from proposal preparation to the acceptance of data products into the ESO archive are described at <http://www.eso.org/observing/AboutSurveys.html>

The protocol for accepting data products, their ingestion into the ESO archive and the development of the interface for harvesting data products are currently described at <http://eurovodev/internal/Vot/RegistryPlan/VOS-RRD.pdf>

Special tools to carry out the EPS Phase 2 developed to simplify the Phase 2 preparation for surveys are the Survey Area Definition Tool (SADT), which allows the user to efficiently tile a given survey area, and it is described at www.roe.ac.uk/~mfo/VISTA/SADT/sadt.html and the upgrade of the P2PP capabilities at www.eso.org/observing/p2pp/P2PP_future.html

The ETC for ΩCAM (prototype) is internally available and could be released to users.

Information on seeing and weather statistics on Paranal is available at <http://www.eso.org/gen-fac/pubs/astclim/paranal/index.html>

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4. Structure and contents of the SMP

The PI of an OPC-recommended EPS is asked to submit the SMP document, which consists of the following sections:

- Survey observing strategy;
- Survey data calibration needs;
- Data reduction process;
- Manpower and hardware capabilities devoted to data reduction and quality assessment;
- Data quality assessment process;
- Data products and VO compliance;
- Timeline delivery of data products to the ESO archive.

The description of the content and the required information for each Section are described below.

4.1 Survey Observing Strategy

The PI must provide the observing plan for the duration of the entire survey based on the relevant EPS review deadlines illustrated at <http://www.eso.org/observing/AboutSurveys.html>. The observing plan must take into account the time requested for the execution of the complete survey on a semester-by-semester basis, as well as realistic expectations concerning the execution of observing blocks on the basis of external conditions (e.g. observations with 0".4 seeing cannot be acquired in a sequence of contiguous 8 hrs exposures!). In the review by the EST these requests will be compared with those stated in the submitted proposal. Specifically, this section must describe:

a) Scheduling requirements:

- total number of semesters, as well as the time requested per semester;
- total number of targets (or pointings), their priorities and boundaries (either polygon or requested boundaries in RA, DEC, or g-long, g-lat);
- filters requested for each target, and requirements on the sequencing of observations. For example: are all targets to be imaged in a given filter before moving to the next, or differently? Priorities for the filters?;
- moon phase;
- time constraints.

b) Observing requirements:

- links and relative priorities among the scheduling requests;



- “dependencies” and relative priorities among seeing and transparency requirements (as a function of filter) ;
- depth/exposure times (as a function of filter);
- strategy for the coverage of survey area. This can be either via dithered pointings (for maximal sky coverage), jittered pointings (for a more homogeneous coverage) or a PI-specified optimised pointing pattern.

ESO reserves the rights to optimise the scheduling in the RA, DEC space, as the data for the different surveys are acquired.

The PIs must familiarise themselves with the tools being developed by ESO to carry out the EPS Phase 2, e.g. SADT and the upgrade of P2PP, and provide information in the SMP about whether they are developing or testing any tools for planning and supporting the Survey Phase 2, and the monitoring of the status of the SM observations.

4.2 Survey Data Calibration Needs

Following established procedures for instrument commissioning at Paranal, a detailed observatory calibration plan will be prepared only after commissioning of Ω CAM, on the basis of its actual on-sky performance. It is therefore not possible to provide, at the moment, a definitive assessment of the content of the calibrations to be supplied by the observatory or of the ultimate photometric accuracy to be expected. The observatory calibration plan is not intended to satisfy the needs of dedicated public surveys¹.

The SMP must include the survey data calibration needs. The PI must describe any survey calibration needs whose executions require telescope/instrument time and have implications on their operations.

- The goal for photometric accuracy and homogeneity, astrometric accuracy within each pointing, area or across different survey fields. Need for airmass standards. List of specific additional requirements and frequency of calibrations (e.g. every observing night, every week, etc.).
- Calibrations aimed at the survey data including sky concentration, illumination correction; any flat fielding additional requirements/strategies; correction for fringing in the i , z bands; masking of saturated stars, stellar spikes, satellite trails, ghosts, scattered light.

¹ This does not apply for normal observing programs, for which the VST calibration plan will apply.



4.3 Data reduction process

The PIs must submit a detailed description of the data reduction process as executed by the pipeline to be used. A block diagram synthesizing each step from the raw data to the calibrated product should be presented. The diagram must be accompanied by a detailed description indicating, for each step of the data reduction:

- the input science or calibration data to be used,
- the purpose of the step and the algorithms to be executed,
- the resulting intermediate products and their expected accuracy where applicable.

Applicable references to published descriptions of the adopted pipelines should be given, if existing.

4.4 Manpower and hardware capabilities devoted to data reduction and quality assessment

The PI must provide a description of:


- the detailed responsibilities of the members of the survey teams;
- committed FTE;
- by default, ESO will deliver the SM raw data to the Public Survey teams. The PI must describe the tools, procedures and available hardware to deal with the data flow from the ESO telescopes.

4.5 Data quality assessment process

Although each product or set of products from EPS will be delivered with a measurement of fundamental quality parameters and their errors, the SMP must contain a section describing in detail the quality control process to be applied to the data. Specifically, this section should describe:

- the quality control criteria and the samples of control data to be used for validation;
- any other procedures that the team intends to carry out for quality assurance purposes;
- software tools to be used;
- validation of tools, procedures, and products.

The PIs are reminded that they have the sole responsibility of the quality and accuracy of the data products delivered to ESO archive, even if ESO reserves the right to carry out independent validation of representative parts of the delivered datasets.

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4.6 Data products and VO compliance

Survey products will be delivered to the ESO archive and in a format fulfilling to the VO requirements. The following data products form part of the core delivery to the ESO archive:

- astrometrically and photometrically calibrated, co-added, re-gridded images, along with their respective weight maps, in all of the project-relevant filters;
- source catalogues based on individual, co-added bands. Associated source catalogues linking the parameters of individual objects across all of the observed filter bands;
- the survey products must be supported and characterized by additional information, i.e. meta-data, which provides a full description for their scientific exploitation. For a description and definition of meta-data we refer to:

<http://eurovodev/internal/Vot/RegistryPlan/VOS-RRD.pdf>


The precise content of the catalogs to be delivered will depend on the scientific goals and exploitation possibilities of each individual EPS. The SMP should contain a detailed description of the proposed catalog contents, in addition to the core items listed above. In coordination with the PSP, ESO reserves the right to request from the PIs the expansion of the catalog contents with additional items that could enhance the scientific value of the data products or their use by the community at large.

The SMP should detail whether ESO may have access to more advanced science products, such as PSF-matched images and/or matched-aperture photometry across all observed filters, photometric redshifts (etc.).

4.7 Timeline delivery of Data products

The PI must provide a time-plan which describes the data delivery to the ESO archive as the SM observations and the delivery of the raw data product progress. Following the PSP's recommendation, data products from the EPS team are expected to be delivered to the ESO archive within the semester following the one in which the raw data were sent to the EPS teams.

This timeline must include the milestones set by the progress reviews which will be conducted every 6 months, and the observing plan review every 4 semesters. These progress reviews will include status of data delivery from ESO to the EPS team, data delivery from the EPS teams to the ESO archive and VO, and delivery of data product from ESO archive to the community.

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5 Procedure for the Submission of the SMP

The relevant Guidelines for the SMP will be posted on the ESO web pages after the 20.02.06, and the form for the ESO SMP can be retrieved at:

<http://www.eso.org/observing/webone.html>

The submission, review process, iterations and final approval of the SMP will follow and proceed according to the following timeline:

- deadline for submission of SMP by PIs of the OPC recommended EPS on 01.04.06. SMP to be sent to team leader of EST (marnabol@eso.org);
- review of SMP by the EST ends on 01.05.06. Feedbacks to PIs so that synergies and optimisation between surveys can be implemented.
- Submission of final version of SMPs by 24.05.06. Report by EST team leader to the 78th OPC (29-31 of May 2006). Review by PSP, approval by PSP chair and ESO DG by 30.06.06.