Son of X-shooter (SOXS) Operations Policy

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Why the need for a special SOXS operations policy?

- ESO has several policies guiding the operations of its instruments and telescopes
- As SOXS is nearly fully operated by the consortium, it is mandatory that the consortium understands what both ESO and the community expect from them, and that the community understands what they can expect from SOXS operations

- La Silla data flow infrastructure supports only visitor mode, but SOXS operations is envisioned to resemble the ESO service mode. For this, a new operations model had to be designed.

Target-of-Opportunity (ToO) modes at ESO

Remember: SOXS is a ToO machine

ToO runs are defined as runs for which the target and/or observation epoch are not known at proposal submission, ...

Three different types of ToO runs are defined:

Rapid Response Mode (RRM), for observations to be triggered via the automated Rapid Response Mode system within 4 hours after an event;

Hard ToO runs, for manually triggered observations that must be carried out as soon as possible or at most within 48 hours of receipt of the trigger by the Observatory, or that involve a strict time constraint (i.e., that must be executed during a specific night);

Soft ToO runs, for manually triggered observations, which can be scheduled for execution within a time window of 7 days.

SOXS and ToOs

Remember: SOXS is running on La Silla

The implementation of ToO modes on SOXS has two issues:

Rapid Response Mode (RRM) is not supported by the La Silla data flow infrastructure.

Another implementation had to be found.

Hard ToO/Soft ToO cannot be administrated by an astronomer on site, given La Silla's operations model.

ToOs will be administrated by the consortium in the European afternoon.

NTT/SOXS Science Policies

Preamble

SOXS - the Son of XShooter - is a medium resolution spectrograph operating at visible and near-infrared wavelengths, installed at ESO's NTT on La Silla. As for other ESO instruments, the consortium that has invested funds and human resources into building the instrument is rewarded by the granting of 900 nights of Guaranteed Time Observations (GTO) over 5 years.

NTT time share

• 50% SOXS GTO	as per contract
• 3% visitor instruments	average over the last periods
• 7% technical time	standard allocation without mirror coating
• 40% SOXS and ULTRACAM	community access

NTT/SOXS Science Policies

Operations

ESO monitors the full proposal selection process and provides the data archive. While ESO is also supervising the overall operations, it is not involved in the daily operations. Therefore, like some other new instruments at ESO (NIRPS, 4MOST), SOXS is nearly completely operated by the consortium that built the instrument. While ESO is not involved in the daily operations of SOXS, ESO will inspect the operations metrics of SOXS after each observing period. ESO will perform a light-touch review after one year and a further review of the full process after the first two years of operations (and regularly after that), once the instrument and operation processes are stabilised, and re-evaluate the policies. The evaluation criteria will include access of the non-GTO community to the instrument, ToO distribution, and time to target. The policy may be updated based on the evaluation.

NTT/SOXS Science Policies

ToOs

One of SOXS' strong science cases is the observation of transient objects and as such a significant fraction of its operations is expected to be in a Target-of-Opportunity (ToO) mode. Targets that are unknown at the time of the proposal submission but can be observed more than 7 days after they have been identified can be observed as part of normal (non-ToO) runs. The nature of the transient targets puts constraints that guide this policy, since observations missed at a certain time often cannot be recovered later. Therefore, the main guiding principle for these policies is to maximise science outcome by ensuring that targets are observed without the need to make any prior decisions.

NTT/SOXS Science Policies

Rule

1 - GTO proposals (generic target description, trigger criteria) are submitted through normal ESO calls and reviewed by the OPC. The protected science cases are made public ahead of the call for proposal for open time. The SOXS consortium data will be public after a one-year proprietary period, as normal ESO data.

NTT/SOXS Science Policies

Rule

2 - ToOs can be triggered by any PI (or their delegate) by 16:00 CET/CEST for the coming night. In case of conflict between triggers of meaningful exposure time for the same object, a trigger from a GTO programme has priority over any non-GTO trigger. Community proposals will be allowed to request an overlap of science cases with GTO with the understanding that they would only be observed either if GTO did not trigger on that object or when the GTO time approved by the OPC based on the submitted proposals of the same category within the period is exhausted. Should there be a conflict between non-GTO triggers, the data will be shared between proposing teams and the observing time split proportionally / a first-come first-serve priority is applied. PIs will be informed that their triggers might be observed in the upcoming night. The consortium will ensure that the first-in team gets exclusive access for the follow-up of that target by keeping adequate logs made available to ESO.

NTT/SOXS Science Policies

Rule

3 - Hard-ToO and Soft-ToO (with reaction times of up to 48 hours and up to 7 days, respectively) are available to all users of SOXS. Within the first 5 years of operations, a mode equivalent to RRM (rapid response mode) is initially available only to the SOXS consortium because of the inherent difficulties for the consortium to commit to a reliable process for the community. Community observations interrupted by an RRM from the consortium will be automatically re-executed within 48 hours.

NTT/SOXS Science Policies

Rule

4 - The nightly schedule is defined before the start of the observing night. The consortium assesses which ToO (community or consortium) should be observed within the allocated times, technical feasibility, conditions, and in compliance with the trigger approved by the OPC. ToO (community or consortium) observations get priority over normal (non-ToO) runs until the allocation time has been reached. Community ToOs already scheduled within the afternoon deadline shall not be overruled by a consortium RRM trigger at a rate higher than 1 per night.

NTT/SOXS Science Policies

Rule

5 - In case of classification runs as described in the original proposal (GTO and non-GTO), the proposers are required to follow good scientific practice and announce the classification of the source as soon as possible after it was observed using appropriate channels such as the Transient Name Server, General Coordinates Network or other public channels. Classification spectra acquired will be made public within 3 days if not covered by any active proposal. Furthermore, data presented in papers published in international journals will be made public at the time of publication.

NTT/SOXS Science Policies

Rule

6 - Because of its special focus on transient science, which often requires fast reactions, SOXS is initially foreseen to be operated exclusively in Service Mode. The tools provided by the SOXS consortium to carry out the observations are similar, but not identical, to ESO's service mode. The Proposal and Observing Block (OB) preparation tools P1 and P2 will be available with support from the consortium.