

WIYN Observatory Target of Opportunity Observations (ToO)
WIYN Science Steering Committee
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Overview

The general approach to target of opportunity (ToO) observations is one of voluntary cooperation by the entity that holds the scheduled observing time, which is: the scheduled observer for university partner time; the scheduled observer, subject to guidance from NN-EXPLORE management¹, for NOAO classically scheduled time; NN-EXPLORE management for NEID queue time (including any university partner time that may be part of the NEID queue). A request for access to scheduled observing time may be accompanied by an offer of compensation from the potential ToO observers. **A partner institution may consider compelled ToO observations using only their own scheduled time for this purpose.**

Two avenues exist for a ToO: 1) a proposed ToO observation that goes through the normal telescope allocation process for a class of objects that is likely to be useful to observe but for which the appropriate observing time cannot be predicted sufficiently far in advance (e.g., routine supernovae and gamma ray bursts); and 2) an unplanned ToO for objects that are particularly rare and of substantial scientific interest (e.g., a nearby supernova).

Observers are expected to respect proprietary information that they receive as part of a ToO request to the extent feasible. WIYN staff will need to know some technical details, for example when the observations would occur and instrument details, in order to assess feasibility of the ToO observations.

In all cases ToO observations are subject to the practical limits of technical and operational feasibility, as determined by WIYN staff.

Proposed ToO

Observers planning ToOs should submit proposals through the regular TAC process by established deadlines detailing the program, anticipated needs, a discussion of logistics (e.g., availability of the desired instrument, calibrations required, a list of qualified observers who will conduct the observations on site or remotely, anticipated lead time between a trigger and expected observations, etc.), and a request for the maximum observing time to be offered as compensation to affected scheduled observers, if any.

¹ Contact the Head of WIYN Operations, the Executive Director, and / or the WIYN Operations Coordinator for further details.

Observers submitting a ToO proposal should inform the WIYN Operations Coordinator of this fact as soon as the proposal is submitted to enable sufficient time for a feasibility review by WIYN staff. Officials responsible for telescope time allocation at each partner entity (e.g., TAC chairs at the university partners) also should inform the WIYN Operations Coordinator of all ToO proposals received as soon as possible following the submission deadline.

WIYN staff will conduct a brief review of the feasibility of each ToO proposal, informing the PI, the proposer's time allocation official, and the WIYN Operations Coordinator of the result, including any aspects of the proposed plan that cannot be accommodated. The review will consider operational feasibility and the availability of instruments and WIYN staff to execute the program on the time scale and in the manner requested. The responsibility to evaluate non-operational aspects of the proposed observations, including the amount of any compensatory observing time requested, remains with the appropriate TAC, as with other proposed observations.

The mechanism for triggering and compensating compelled ToO observations conducted only within a partner's already scheduled telescope time is left to the partners. However, any scheme must pass the same feasibility review and not unduly impact WIYN operations, personnel demands, or negatively affect the scheduled observations from another partner.

All partner time allocation officials should be informed of any ToO proposals approved for an upcoming semester by the WIYN telescope schedulers. This will include the instruments and times during the semester for which requests from the ToO PI are likely to come.

Multiple ToO proposals that are similar in scientific goals, likely targets, or other details submitted for the same observing semester will be adjudicated by a partner's TAC if the proposals fall under a single TAC's jurisdiction. Similar approved proposals arising from different partners will be active simultaneously, as there is no WIYN-wide merging TAC or other mechanism to adjudicate potentially conflicting proposals from different partners. The WIYN telescope schedulers may suggest coordination between these teams, but the teams are not obligated to do so.

A PI wishing to trigger an approved ToO observation should make the request, including any offer of authorized compensation (see the section on "Compensation" below) via the WIYN Operations Coordinator, or Head of WIYN Operations if the Operations Coordinator is unavailable, with as much lead time as possible. The Coordinator will approach the entity that holds the scheduled observing time (see the opening Overview section for details) to request observing time and attendant calibrations. The PI should contact the holder of scheduled time directly in special cases where the success of the ToO requires very short lead time and it is impractical to route the request through WIYN personnel first. When the scheduled observer is a student, the student's advisor also should be included in any communication related to the ToO.

ToO observations executed as the result of receiving privileged non-public information (e.g., a gravitational wave event that has not been publically released) must be handled appropriately. It is the responsibility of the provider of the information to state which elements being conveyed, if any, are proprietary. The non-public information must not be shared more widely than is necessary to execute the observation (e.g., WIYN staff and the observers taking the data) without permission from the provider(s) of that information. Any data obtained as a result of the privileged information must be shared with the information provider and no one else without the provider's permission. In the event that multiple teams request equivalent ToO observations (e.g., the same instrument, filter, substantially the same wavelength coverage, etc.) based on the same proprietary information, preference generally should be given to the first team to make the request, while informing other teams that an equivalent request superseded theirs without revealing the identity of any other requestors. Given the potential for conflict in this situation, the WIYN Executive Director and Head of Operations should be informed in such a situation and, when feasible, their advice solicited. The holder of the scheduled observing time is free to refuse any proprietary ToO request (unless the partner that has allocated the scheduled time elects to conduct a compelled ToO), but they may not then take the requested data and conduct the intended science on their own while excluding the provider of the privileged information.

The entity holding the scheduled observing time has broader discretion in deciding how to respond to ToO requests based on entirely public information, including similar requests from multiple teams at the same time. For example, they may choose to honor one request or offer to make the same data available to more than one team. In the latter case, there should be transparency among all parties, including negotiations for compensation. In general, holders of observing time who elect to engage in ToO data collection are asked to engage with ToO teams fairly and work toward collegial collaboration to the extent that it is practical and appropriate.

Unplanned ToO

Unplanned ToOs will operate in a similar manner, including voluntary collaboration and compelled ToOs within a partner's observing block if approved by the partner, albeit without a prior proposal and potentially on a faster time scale. The WIYN Operations Coordinator should be involved in the communication chain at all stages.

Similar ethical considerations as for proposed ToOs apply in this situation, including the treatment of proprietary information, with one potential variant: equivalent proprietary ToO requests may come from teams with an existing relevant proposal (proposed ToO) as well as those without such a proposal (i.e., an unplanned ToO). Requests from a team with an active proposal take precedence over an unplanned request, even if received later, up to the point that direct observations of the ToO targets, as opposed to calibrations, begin for the unplanned request. Proprietary

information from a team with an unplanned request should not be shared with any other teams, including those holding active proposals, without permission. For unplanned ToO requests that involve entirely public information, the holder of the scheduled observing time has broad discretion, as with proposed ToOs.

WIYN personnel must be consulted in advance for any instrument or telescope hardware changes, with the following limited exceptions:

- Configuration changes for the scheduled instrument that the observers would be authorized to make as part of routine observations in their own program (e.g., ODI or WHIRC filter changes; Hydra changes that can be safely accomplished from the control computer gui, but *not* including manual alterations in the Bench spectrograph room).
- A switch to a different instrument that is already mounted, cooled to operating temperature, and otherwise ready for operation, as long as the observer who will be operating that instrument has been certified to do so in advance of the ToO observation.
- The scheduled observer must not only be certified / authorized to make the change but also be comfortable doing so; this observer may delay ToO observations to consult with Observatory staff.

For a time-critical ToO, the PI should send the request to all of the following: WIYN Operations Coordinator; Head of WIYN Operations; Executive Director; and the appropriate instrument scientist.

PIs may not offer compensation that they are not authorized to provide (e.g., observing time without first getting approval from the relevant partner's telescope allocation official; the specific process for awarding unplanned ToO compensatory observing time is left to each partner).

Compensation

An offer of compensation to a scheduled observer is not required, and in fact may not be necessary in some cases where the observing time and effort needed for the ToO request is modest. However, some ToO requests may be more likely to succeed with the offer of appropriate compensation to the scheduled observer. The two standard forms of compensation are:

1. Scientific acknowledgement, potentially including co-authorship on any publications resulting from the data.
2. Observing time. Compensatory observing time need not exactly match the number of hours used for the ToO and in fact may be offered only in increments of 0.5 nights to any partner. Normally the compensatory time will be granted, up to the maximum authorized by the ToO observer's TAC, in the same lunar phase as the observations; arrangements for compensation at a brighter lunar phase need the approval of the scheduled

observer's telescope time allocation official. The WIYN Operations Coordinator and the partner time allocation officials (for both ToO PI and scheduled observer) need to be informed of any time transactions.

Compensatory observing time typically will be transferred from the ToO partner to the scheduled observer's partner organization within the following two semesters; the choice of semester is at the discretion of the time allocation official at the scheduled observer's partner organization. If either partner likely will leave the WIYN consortium before the time transfer would occur, some other arrangement may be made, subject to the approval of both parties and WIYN management. It is the scheduled observer's responsibility to make any arrangements with his or her TAC regarding the disposition of any transferred telescope time.

Any non-standard offer of compensation must be approved in advance by the time allocation official at the ToO PI's partner organization, the Head of WIYN Operations, and the Executive Director.

Large-Scale ToO Programs

Some ToO programs may be of sufficiently large scope to warrant multi-partner collaboration or are most naturally managed by WIYN Observatory scientific staff. The latter approach was used for past supernovae in relatively nearby galaxies. The parameters outlined above for proposed ToOs, unplanned ToOs, and compensation still apply. In this case management of the project may be more complex, and the need for coordination and communication with WIYN staff is all the more paramount. Interested parties are welcome to approach the WIYN Science Steering Committee via their partner representatives for help with coordination.

Any compensatory observing time should come from the partners whose members are directly involved in the ToO program and thereby stand to gain the most scientific benefit. The details will need to be negotiated collegially on a case-by-case basis. Note that the Observatory and staff have access to only modest amounts of observing time that is not already earmarked for testing and engineering (NOAO partner time is not Observatory staff time). An Observatory coordinated ToO effort does not imply that large quantities of compensatory observing time are automatically available. In this case, it is suggested that interested parties seek compensatory time via their partner time allocations, as described previously.

Contact Information

The names and contact information of current WIYN personnel involved in the ToO process (WIYN Operations Coordinator, Head of WIYN Operations, Executive Director, instrument scientists) are listed at <http://www.wiyn.org/contactus.html>.