Use of Gemini for Short, Quick Response or Time Critical Observations

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Scientific Classes

There are a number of scientific programs that have a temporal constraint, including those requiring rapid response to an unpredictable event or time sensitivity of the observation. These programs may broadly be classified as follows.

- Major targets-of-opportunity: these are unforeseen events of widespread interest to the Gemini community, such as a local group supernova.

- Secondary targets-of-opportunity: these are unforeseen events that are of interest to a subset of the community, such as a new comet or bright nova.

- Quick response observations: these are programs with well-defined scientific aims and whose targets cannot be specified in advance, but which require observations soon after a target is identified. An external trigger event is usually required to define the target e.g. distant supernova, gamma-ray burster, extreme microlens.

- Short and support programs: these comprise short observations which might not normally be considered for time during the routine allocation process, such as additional calibration sources for a completed observation or a proof of concept study in support of a future application.

- Programs with a specific time constraint: these include monitoring or periodic observations and those which must be near-synchronous or simultaneous with measurements at another observatory. The periodic programs may be further sub-divided into those with a large duty cycle, in which the integration time is a large fraction of the repetition period, or for which there are many targets, and those with a small duty cycle.

Telescope Access Routes

Observations on the Gemini telescopes may be executed in several modes: classical, classical service and queue observing, and via use of Director's discretionary time. Both classical and classical service programs occupy blocks of time in the telescopes schedules (in multiples of 0.5 nights), defined before the start of the semester, and carried out by visiting observers. Classical service time provides access to shorter periods than would normally be scheduled. The latter observations might be performed by a representative of the relevant partner National Gemini Office, for example.

Queue observations can be of arbitrary duration, are pre-defined by the applicants and executed by Gemini staff according to a set of rules that attempt to achieve the best match to observing conditions, scientific ranking, and other parameters. Note that programs with few observing condition constraints and a high scientific ranking have the highest likelihood of execution. Thus, a time critical program that required exquisite conditions and had a relatively low scientific ranking would be unlikely to be carried out. The TAC and International TAC may approve the flagging of particularly time-critical programs to override other observations of the same scientific ranking, thus giving preference over non-critical proposals which might be better matched to the conditions.

There are several routes by which programs might be submitted and awarded time. These are as:

- Conventional time allocation committee (TAC): meets once per semester to produce ranked lists of classical and queue programs, with recommended time allocations.

- Conventional TAC with assignment of trigger: time awarded as normal, but subject to some defined external trigger event approved by the TAC. If the program is not triggered then some other observation is scheduled (classical service mode) or executed (queue).

- Fast-decision TAC: if requested, partner TACs may reserve blocks of classical time (for specific nights) or periods of queue time (for specific conditions and scientific ranking) for programs to be defined at a later date. This reserved time would be (classically) scheduled or loaded into the queue in the normal way. The identification of programs to fill this time might then occur via a fast-decision TAC meeting more frequently than the conventional TAC.

- Appeal to the Director: the Gemini Director has the authority, granted by the Gemini Board, to allocate discretionary time.

Mapping of Scientific Classes onto Access Routes

The mapping between the scientific classes, possible telescope access routes and observing modes is summarised in the following table.

Class	Access route and observing mode
Major target of opportunity	Director’s discretionary time
Secondary target of opportunity	Fast-decision TAC Service or queue mode, depending on next availability
Quick response observation	TAC and trigger Service or queue mode, depending on next availability
Short programs	TAC or fast-decision TAC Service or queue, depending on conditions required and next availability
Periodic (large duty cycle)	TAC Classical (rarely queue) mode
Periodic (small duty cycle)	TAC Service or queue, depending on conditions required Needs high ranking if queue mode. TAC/ITAC-approved flag can override programs of same scientific ranking.
Time-sychronous	TAC (occasionally fast-decision TAC if late notice from other telescopes) Classical service or queue Needs high ranking if queue mode but (usually) not rare conditions. TAC/ITAC-approved flag can override programs of same scientific ranking.