

Greenhill Observatory Scheduler

The UTGO Scheduler is designed to take some of the difficult decisions out of organising an observing session. Input a list of targets and requirements (i.e filter, exposure time, etc) and out comes an optimised schedule for the observer to follow. This scheduler is built using the Astroplan package (<https://github.com/astropy/astroplan>) and Dash (<https://dash.plotly.com>), running an interactive dashboard on a server on your local machine.

The scheduling takes the following constraints and scores each target sequentially:

- Must be during astronomical evening.
- Must have an altitude greater than 20 degrees.
- An airmass greater than 3, with a lower value being better.
- If a repeat on a target is requested, then we require a minimum amount of time between each observation (defaults between 30 mins and 4 hours).

To use, open a terminal or Anaconda prompt (on Windows) and type:

```
conda activate obs
```

```
cd Desktop/UTGO_Scheduler
```

```
python scheduler.py
```

Then go to the URL listed in the command line in a web browser.

Currently, the list of targets is pulled from an editable Google Sheet, with each sheet labelled by the current date. You can also manually add targets through the dashboard using the 'Add Target' button (though this is slightly janky, so I recommend using the Google sheet and reloading the page). After clicking 'Generate Schedule', you will get an output that looks like Figure 1. The table contains the schedule, with start and end time (in UTC) and duration. It will also output a polar sky chart, showing the zenith angle and azimuth of each target at the corresponding start times listed.

Greenhill Observatory Target Scheduler

ID	RA	DEC	FILTERS	EXP. TIME [s]	IMAGES	REPEATS	PRIORITY
OB240040	17:30:07	-27:56:41	r,g	180	5	0	0.5
GRB231210B	6:23:05	-48:21:32	r,g	180	5	1	0.3
TOI3124	11:52:35	-77:25:02	r	120	10	-	1

Add TargetGenerate schedule

target	start time (UTC)	end time (UTC)	duration (minutes)	ra	dec	Filters
GRB231210B	2024-03-24 09:50:54.881	2024-03-24 10:06:44.881	15.8333	95.7708	-48.3589	r
GRB231210B	2024-03-24 10:07:14.881	2024-03-24 10:23:04.881	15.8333	95.7708	-48.3589	g
TOI3124	2024-03-24 10:23:40.073	2024-03-24 10:45:20.073	21.6667	178.1458	-77.4172	r
GRB231210B	2024-03-24 10:55:54.881	2024-03-24 11:11:44.881	15.8333	95.7708	-48.3589	r
GRB231210B	2024-03-24 11:12:14.881	2024-03-24 11:28:04.881	15.8333	95.7708	-48.3589	g
TOI3124	2024-03-24 11:28:40.073	2024-03-24 11:50:20.073	21.6667	178.1458	-77.4172	r
OB240040	2024-03-24 13:45:57.767	2024-03-24 14:01:47.767	15.8333	262.5292	-27.9447	g
OB240040	2024-03-24 14:02:17.767	2024-03-24 14:18:07.767	15.8333	262.5292	-27.9447	r

Send to Telescope

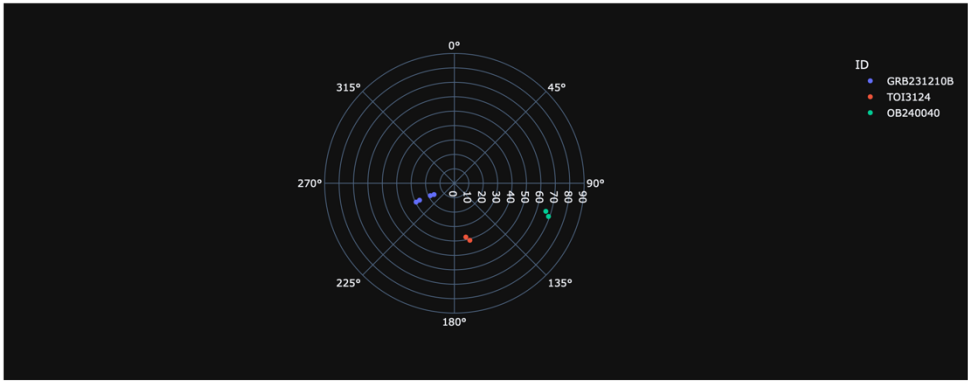


Figure 1. An example of the scheduler dashboard running on a local server.