Scheduler and objects database

Short user guide

Most of the content of this web page is password-protected!

Object database

The first part is dedicated to managing the database with observing targets. There are two options to add the object to the DB:

1. Add object individually using a form. Underline parts are mandatory! Target names searchable in Simbad DB is preferable.
   Coordinates and object magnitude could be obtained from Simbad if available. Coordinates have to be in the format "D M S" or "D:M:S" (or "H M S"/"H:M:S" in case of RA).
   Magnitude should be in the V filter or the most similar to it.
   Linear ephemeris (period and epoch) is mandatory if specific orbital phases should be observed (see below). AAVSO VSX and NASA Exoplanet Archive could be use to obtain them.
   Specify the number of exposures (following one by one) or check "series" to observe longer series without the number specified. All exposure will have the same instrument settings (i.e. exposure time, usage of IC, simultaneous calibration and photometry). To observe with different settings, the other object has to be added to DB! For simultaneous photometry, specify its parameters (e.g. exposure time and used filter). Write other comments related to observations in the "remarks" part. Indicate the number of requested nights (repeating of the specified observation).
   Write the priority of the observations - lower number = higher priority. Priority "1" can be given only by DB admins on special requests. Standards (RV Standard and SpecPhot Standard) have priority lower than 1.
   Select a group of objects describing the target. Use group general enough. Preferably use one of the already available.
   Indicate individual constraints for scheduling the observations - max. Moon phase, range of orbital phases or date interval. Leave blank if any limit is not related. The orbital phase has to be in the range of 0 to 1. If the phase range has to extend this interval, the lower limit must be higher than the upper limit (e.g. for observing around phase 0 - use a range from 0.9 to 0.1). For more separate intervals, the additional object must be added to DB! Give other related constraints to the relevant block (e.g. number of observing nights per week).
   Write the name of the object's supervisor and contact to him/her. Give additional messages to DB admins if any.
2. For adding multiple objects, bulk import is available. Download the CSV template and fill it out according to the instructions. Give information about the objects supervisor.

After submission, the email to DB admins and supervisor is sent. Objects will be included in the DB after admins accept them.

Objects in DB can be view as table. DB is split into 2 parts - objects for observations and objects with already finished observations. Data can be downloaded as a CSV file (all objects together or split according to observations status).
Note: Values are rounded to a lower number of decimal digits to shrink the table. Full given precision is stored and used in all calculations.

Admins have the option to modify data in DB on separate page. There are two types of DB to edit. Newly added objects (waiting for acceptance) can be accepted or rejected (deleted). After acceptance, they will be moved to the final DB. In the final DB, objects could be deleted or marked as "done" (i.e. observations finished). All data can be modified in both parts. Follow the original format (as for adding a new object)!

Objects in the final DB (after being accepted by admins) and not marked as finished/done can be used for calculating the schedule in the next part.

Scheduling observations

Automatic scheduler based on astroplan package can be used. The schedule is calculated for the night beginning at a given local date. A shorter part of the night can be also scheduled - the date has to be always for the night's start (also if only morning is planned). Leaving the start (end) of observations empty means the usage of sunset (sunrise). Multi-night scheduling is possible without repeating already scheduled targets (standards are scheduled every night). A combination of scheduling the same parts of multiple nights is also possible. Objects are selected according to their group. Objects marked as finished are NOT scheduled! Objects with long series requested have to be included separately. All general and individual constraints are applied during the filtering of targets.
Two types of scheduling algorithms are available. Priority scheduler takes into account individual target's priority and handles better object altitude and airmass during observation. It also selects only one standard (from each std. category). However, it can have poor performance in the case of a small number of selected targets (comparable to the number of possibly observable ones) - making big gaps between observing slots.
The sequential scheduler places objects with the best conditions in each slot from the night's beginning ignoring any priorities.

It is a bit slower and can place objects also at unnecessary low altitudes. All objects from standard categories can be scheduled during one night.

In general, the priority scheduler is recommended.

After the scheduler calculation is finished, the schedule is shown in the form of a table and altitude and sky plots. **Scheduler is NOT saved on this step!** It is possible to save the generated schedule on the server or save and open it for manual modifications.

Saved schedule can be [manually modified](). After its loading, the targets can be re-arranged (moved up/down) or deleted. The number and duration of exposure can be changed. Observing notes can also be modified. The position of the telescope in east/west limits during the observation is calculated and can be plotted in the diagram. **Changes in the schedule are applied only after re-calculations! And running any other action (adding target, filtering objects, twilight calculations, etc.) will annul these changes!** Re-calculation calculates new objects' positions and times for the slewing of the telescope between them. Altitude and sky plots are also re-generated.

Adding other targets to the schedule is possible after selecting their objects' group and filtering observable objects. It is possible to disable individual constraints (Moon phase, orbital phase and date). General and individual constraints are applied only if the scheduling night is specified! In such cases, the times of observability are calculated and plotting individual time-altitude graphs is possible. **After adding targets, the re-calculation is needed!** The schedule can be created also in a completely manual way - created as a "New schedule" and filled by objects one by one.

After finishing any changes, saving the schedule is necessary to write it to the file on the server! Deleting old or wrong schedules is also possible. But, they are removed also automatically after two months after the last modification.

Moreover, there is an option to send a list of objects in the schedule to the automatic scheduling algorithm. The sequential scheduler is used for that purpose. However, it can often provide worse results than the input schedule.

During the observation, the generated schedule can be simply [displayed]() as a table and altitude and sky plots. The start and end of each observing slot are given. The position of the telescope in east/west limits during the observation is calculated and can be plotted in the diagram.

Filtering and scheduling user list of objects

The user can use opportunities of filtering and scheduling algorithms on their own objects list on dedicated [page](). **This part is available without any password for all users.** Objects list is uploaded as a CSV file following the rules and structure of a given template. Information about the observatory can be picked from available options (based on [astropy sites list]()) or added manually. After setting general observation constraints, camera readout time and telescope slew rate, objects can be filtered based on their observability during a given time interval. A list of observable targets is returned as a CSV file. The automatic scheduler (priority or sequential) can be used to schedule observation.

Note: Scheduling of user objects list is not available, yet!

Observing logs

After finishing of observation, the observing log is generated on the PlatoSpec observing computer at La Silla observatory and subsequently transferred to the server in Ondřejov. Based on them the statistics and tables of this section are created. All its parts are linked together - hyperlinks in one part can be used to display relevant content of the other part.

[Stastical part]() lists observed objects grouped by target name and exposure time. The number of observing nights (regardless of the number of exposures in one night) for each setup is given. The last observing night is also shown.

All generated [logs]() are listed and available to download as PDF or CSV file.

For [observed objects](), all observations can be displayed. The number of exposures and used exposure time for each night are shown.