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# autoObserver - automatic generation of observing schedules

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**Abstract.** We present brief information about the autoObserver package, a web-based application for an automatic creation of observing schedules.

**Key words:** variable stars – exoplanets – observations

## 1. Intruduction

Small telescopes with diameter up to 0.5m, as well as telephoto lenses, equipped with relatively cheap CCD detectors are very useful instruments for a photometric monitoring and/or searching of different celestial objects, e.g. variable stars of different types, exoplanets transits, asteroids, comets. Such observational instrumentations are currently available for many advanced amateurs and small observatories. Control software packages like MaximDl[1], TheSkyX[2] or RTS2[3] allow, at large extent, to automate observations. Unfortunately, many users do not use these features. The biggest problem for automation of observations is how to select proper objects and how often and when to observe them, to make the best use of observing time and improve telescope usability. To solve this problem, we decided to develop the *autoObserver* package, whose brief description is given in next section.

## 2. Specification

*autoObserver* is a web-based application, so it means that you must have installed a LAMP Server[4] on any Linux distribution. The server can be installed locally on your computer for off-line use, or on any computer with a public IP address for on-line access. Main routine in background is running on the Python

[1] http://www.cyanogen.com/

[2] http://www.bisque.com/sc/pages/TheSkyX-Editions.aspx

[3] http://rts2.org/

[4] http://lamphowto.com/

scripting language and use a PyEphem[5] module. Access to the database is provided by MySQL-python module.

In the first step, the user has to add information about his observatory (coordinates, altitude, minimal altitude above horizon and minimal distance from the moon, when observation can be realized) and about his instrumentations (telescope type, diameter, mount type, slewing time, CCD camera dimension, downloading time, used filters, change time of filters, etc.)

In the next step, the user can define his own catalogs with basic parameters of objects, like a type of object (exoplanet, eclipsing binary, pulsating variable, etc.), celestial coordinates, ephemeris, if it is known, other parameters depending on the type of object (e.g. duration of transit), filters in which observations will be performed, exposure times for selected filters. Some of this information can be downloaded from on-line archives. An important parameter in the database is priority. It is number from 1 to 5, which controls how often the object is observed. If priority is set to 1, the object is observed always when it is visible (e.g. for searching of supernovae in galaxies), if priority is 5, it is observed only when nothing else is possible (e.g. monitoring of long-term variables). For eclipsing binaries and pulsating variables the user can select mode when only extrema times are observed (minima or maxima) or a mode for phase coverage.

After each observation and data reduction, it is necessary to add this observation (object, start and finish times) into the database of early observations. It could be done manually or by some script depending on a user data format.

*autoObserver* generates a list of suitable objects to observe at a defined date, based on the catalog of objects, the database of early observations and all defined limitations. *autoObserver* can also generate scripts for different control software packages, mentioned earlier. Using these scripts can automate observation with small photometric telescopes and improve their usability. In the next version we plan to add capability to coordinate observations in telescope networks. More information about the package can be found at our web page `http://astronomy.science.upjs.sk/autoobserver/`.

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[5]http://rhodesmill.org/pyephem/