

# SatNOGS: satnogs-auto-scheduler for PEGASUS

Link: <https://gitlab.com/librespacefoundation/satnogs/satnogs-auto-scheduler>

## Installation

- Execute following commands in the terminal:

```
sudo apt-get update
```

```
sudo apt-get install git virtualenv python3-virtualenv
```

- In `/home/pi/` execute following commands in the terminal:

```
mkdir satnogs-auto-scheduler
```

```
cd satnogs-auto-scheduler
```

```
virtualenv -p python3 env
```

```
source env/bin/activate
```

```
pip install
```

```
git+https://gitlab.com/librespacefoundation/satnogs/satnogs-auto-scheduler.git@0.2
```

## Check installed version

- In `/home/pi/satnogs-auto-scheduler/env/bin/` execute following command in the terminal:

```
./schedule_single_station.py --version
```

- This should give following output with the currently installed version:

```
satnogs-auto-scheduler 0.2
```

## Configuration

- Get SatNOGS Network API token from SatNOGS Network Dashboard
- Get SatNOGS DB API token from SatNOGS Database
- In the File Manager head to `/home/pi/satnogs-auto-scheduler/`
  - Create file `.env`
  - Open file with Geany Programmer's Editor and insert following text, where `<API>` needs to be replaced with the according API tokens:

```
# Your SatNOGS Network API token
```

```
SATNOGS_API_TOKEN = '<API>'
```

```
# Your SatNOGS DB API token
```

```
SATNOGS_DB_API_TOKEN = '<API>'
```

- Save and close

## Perform test run

- Get Ground Station ID from SatNOGS Network
- Perform test run to download orbital elements and transmitter priorities:
  - In `/home/pi/satnogs-auto-scheduler/env/bin/` execute following command in the terminal (this will take some minutes), where `<ground station ID>` needs to be replaced accordingly:

```
./schedule_single_station.py -s <ground station ID> -n
```

- Note: The `-n` option computes the passes but does not schedule them.

## Setup priority scheduling for PEGASUS

- Get PEGASUS NORAD ID (42784)
- Check if PEGASUS orbital elements and transmitter priorities are available:
  - Execute following command in the terminal, where `<NORAD ID>` and `<ground station ID>` needs to be replaced accordingly:

```
grep <NORAD ID> /tmp/cache/transmitters_<ground station ID>.txt
```

- This should give following output (in this case for PEGASUS):

```
42784 mdAtyjQmUGnkh6yqT2GPN4 26 1638 6127 GFSK
```

- In the File Manager head to `/home/pi/satnogs-auto-scheduler/env/bin/`
  - Create file `gen-priorities.py`
  - Open file with Geany Programmer's Editor and insert following text, where `<NORAD ID>` and `<ground station ID>` needs to be replaced accordingly:

```
STATION_ID=<ground station ID>
```

```
TRM_FILE="/tmp/cache/transmitters_${STATION_ID}.txt"
```

```
PRIO_FILE="priorities_${STATION_ID}.txt"
```

```
awk '{if ($3>=0) print $0 }' ${TRM_FILE} | grep -e "<NORAD ID>" |  
awk '{printf("%s 1.0 %s\n", $1, $2)}' > ${PRIO_FILE}
```

- Save and close
- Create file `priorities_<ground station ID>.txt`, where `<ground station ID>` needs to be replaced accordingly.
- In `/home/pi/satnogs-auto-scheduler/env/bin/` execute following command in the terminal:

```
bash ./gen-priorities.py
```

- Check if the following text was saved in `home/pi/satnogs-auto-scheduler/env/bin/priorities_<ground station ID>.txt` file (in this case for PEGASUS):

```
42784 1.0 mdAtyjQmUGnkh6yqT2GPN4
```

## Auto-Schedule PEGASUS observations (manually) by executing command

- In `/home/pi/satnogs-auto-scheduler/env/bin/` execute following command in the terminal, where `<ground station ID>` needs to be replaced accordingly:

```
./schedule_single_station.py -s <ground station ID> -T -d 24 -P  
./priorities_<ground station ID>.txt -f
```

- Selected options:
  - `-s <ground station ID>`: Ground Station ID
  - `-T`: Allows auto-scheduling for ground stations in testing mode
  - `-d <hours>`: Defines duration to schedule, e.g. 24 would schedule all passes for the next 24 hours
  - `-P ./priorities_<ground station ID>.txt`: Defines path to transmitter priorities file
  - `-f`: Schedules only priority satellites from `-P` file

## Auto-Schedule PEGASUS observations (automatically) by adding cron-job

- Execute following command in the terminal:

```
crontab -e
```

- Add following line in GNU nano editor, where `<ground station ID>` needs to be replaced accordingly:

```
0 11 * * * cd /home/pi/satnogs-auto-scheduler/env/bin/ &&  
./schedule_single_station.py -s <ground station ID> -T -d 25 -P  
./priorities_<ground station ID>.txt -f
```

- Save with CTRL + S and exit with CTRL + X
- This schedules all PEGASUS passes every day at 11 a.m. for the next 25 hours automatically

## Useful links for debugging

- Auto-Scheduler for one satellite: <https://community.libre.space/t/satnogs-auto-scheduler-priority-examples/9327/4>
- Malformed line error: <https://community.libre.space/t/auto-scheduler-log-output-errors/9435>