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Creating Targets Lists for SOAR

Target List

NOTE: Because of damage to the elevation encoder which happened during the January 2019 earthquake, SOAR has a reduced elevation limit of 79 deg. Make sure your targets remain **below** 79 deg elevation during your observations.

SOAR has the capability to guide sidereally or non-sidereally.

For sidereal guiding, target lists should be created as simple ASCII files with the following format:

```
[1]OBJECT_ID HH:MM:SS DD:MM:SS Epoch  
[2]OBJECT_ID HH:MM:SS DD:MM:SS Epoch  
[3]OBJECT_ID HH:MM:SS DD:MM:SS Epoch  
etc.
```

There should be no spaces in the OBJECT_ID field. Use spaces to separate fields. Also, **avoid special characters like "." or "*" in object names.**

Here is a sample target list in the SOAR format:

```
[1]IC418          05:27:28.20 -12:41:50.3  2000.0  V=13  
[2]IC2448        09:07:06.26 -69:56:30.6  2000.0  B=11.1  
[3]NGC3918       11:50:17.73 -57:10:56.9  2000.0  V=8.5
```

With this syntax, you can then just communicate to the Telescope Operator the running number of your next target.

Note that after the epoch field you can add more informational columns, which will be ignored by the Telescope Control System (TCS).

For non-sidereal guiding, our software is set up to read in ephemerides generated using horizons (<http://ssd.jpl.nasa.gov/?horizons> ^[1]). An example of this is given below:

#Date__(UT)__HR:MN R.A.__(ICRF/J2000.0)__DEC dRA*cosD d(DEC)/dt a-mass

2008-Apr-07 05:00	16 44 46.1498	-01 44 13.359	-2.87	2.01	1.793
2008-Apr-07 05:30	16 44 46.0540	-01 44 12.353	-2.88	2.01	1.560
2008-Apr-07 06:00	16 44 45.9578	-01 44 11.346	-2.89	2.01	1.402
2008-Apr-07 06:30	16 44 45.8614	-01 44 10.340	-2.90	2.01	1.292
2008-Apr-07 07:00	16 44 45.7646	-01 44 09.334	-2.91	2.01	1.217
2008-Apr-07 07:30	16 44 45.6677	-01 44 08.328	-2.91	2.01	1.169

In order to obtain the proper information for the non-sidereal guiding ephemerides, you will want to change the Table Settings on the Horizons webpage so that only "Astrometric RA & DEC", "Rates; RA & DEC", and "Airmass". You will also want to change the Display/Output on the Horizons webpage to "download/save". Rates should be in arcsec/hour.

Important Note - the maximum non-sidereal rates at which the telescope can track are determined by low-level software. The maximum rate in declination is ± 2700 arcsec/hour and the maximum rate in right ascension is ± 180 seconds of RA/hour. This specification for the RA rate limit means that the maximum RA rate in seconds of arc/hour on the sky is $2700 * \cos(\text{declination})$.

One can also determine which solar system objects are observable at SOAR for a given time using the JPL website (<http://ssd.jpl.nasa.gov/sbwobs.cgi> [2]). You only need to set the observation time, location (SOAR is I33), and a limiting magnitude. Press "search" and it will return a list of small bodies that are observable that night. Please note that all times are UT.

Source URL: <http://www.ctio.noirlab.edu/soar/content/creating-targets-lists-soar>

Links

[1] <http://ssd.jpl.nasa.gov/?horizons>

[2] <http://ssd.jpl.nasa.gov/sbwobs.cgi>