Creating Plans (ACP Planner)

ACP planner is a small program that will allow you to build plans (small scripts) on your computer that automate much of the observing process. Instead of filling out the Single Image or Color Series form, you can upload a small text file that contains all the commands for what to observe and when. This method is appropriate when you may be observing more than one object. In the Google Drive folder we shared with you (where your images are saved to, the folder has your name) you will find the ACP Planner software installer as well as a small file (0.8m Schulman Telescope.xml) that contains information about the Schulman Telescope. After installing the software on your computer load the 0.8m Schulman Telescope.xml profile.

Next Right Click in the large white rectangular area and select "Add New Target." You can also add darks and biases using the "Add Cal Frames."

Add the target name and three values- RA, Dec, and PA (position angle). Figure 33 below shows the values determined above for the Bubble Nebula (Figure 30).

Fill in the sequence of exposures you would like to occur when you are observing with the Schulman Telescope. Adjust the exposure time, filter, and binning state. The "Num" field specifies the number of times an exposure occurs in the sequence. However, there is also an outer loop control with bottom "Repeat" option. This permits different strategies for acquiring data. For the program for the Bubble Nebula in the example below will result in RGBRGBRGB (3 sets of R,G,and B exposures).

Please do not check the dusk/dawn flats or the request to shutdown at the end of the run. Press the "Update" button and you will see the total estimated time required to acquire your data (Figure 35). Keep this time within the observing window you were allocated for your session. As this tool is generally used for creating a plan for multiple objects so another object is added. In this case the object is the bright planetary nebula NGC 7662. This time the object does not require a guide star because it is very bright. As it is a cataloged object (in the Messier, NGC, IC catalogs), it is not necessary to specify coordinates. Simply put in it name and select the "Deep Sky Catalog Lookup." You do not need to search, you already know this is a real object. Be certain to remember to put the space between the catalog name and the number. Note that any rotator angle (PA) could be chosen. There isn't a guide star for this object and it is small and round so the composition doesn't matter. The reason why the angle 328 was chosen is because it matches the previous target's PA. This means only one set of flat field images will be necessary to calibrate the data. Fill out the form for the filter and exposure information as shown in Figure 37 below.

This time the exposure sequence is different because the number of exposures is controlled by "Num" and is set to "5" here. This means the data will be acquired in the order of RRRRRGGGGGGBBBBBHaHaHaHaHa. Note the total time here refers to the second object. You need to add the total for the first target to this number to get the total plan time (roughly 02:30:00). Finally you need to save the plan as a text file on your computer to later be uploaded to the Schulman Telescope (Figure 38).

ACP Planner will show you the plan. The specific example from above generates a plan that looks like this:

```
; -----------------------------------------
; This plan was generated by ACP Planner 4.2.6
; -----------------------------------------
```

```
;
; NOTE:            Timing features are disabled
;
; Autofocus at start of run.
; Autofocus every 90 minutes.
;
; ----------------------------------------------
;
#autofocus
#afinterval 90
;
; === Target NGC 7635 ===
;
#dither     ; Automatic dithering
#repeat 3    ; Entire filter set will be repeated 3 times
#count 1,1,1
#filter Red,Green,Blue
#interval 600,600,600
#binning 1,1,1
#posang 328.0
NGC 7635    23:20:54.00    61° 12' 06.0"
#dither 0    ; Disable dithering
;
; === Target NGC 7662 ===
;
#autofocus     ; AF before target requested
#dither      ; Automatic dithering
#repeat 1
#count 5,5,5,5
#filter Red,Green,Blue,Ha
#interval 120,120,120,120
#binning 1,1,1,1
#posang 328.0
NGC 7662
#dither 0    ; Disable dithering
;
; -----------
; END OF PLAN
; -----------
```