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Paul Feder Observatory Upgrades and Exoplanet and Variable Star Data

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Motivation

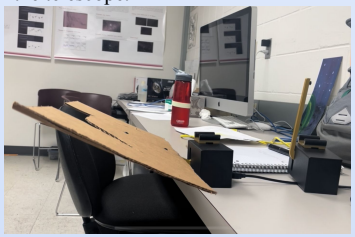
Before the upgrade to the dome and telescope, much of the work to use the telescope was done manually. One had to drive an hour round trip to the observatory at dusk and dawn to ensure that the telescope started up and shutdown properly. Proper startup included manually opening the lower dome flap via hand crank and briefly plugging in the top part of the dome to raise the upper slit. Shutting down the telescope during the summer required a person to be at the telescope by 5:00AM, before sunrise to make sure that the dome closed before the sun rose. Normally this prep work would take about 2 hours including driving time.

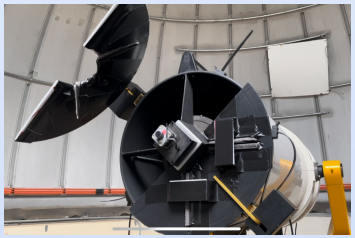
Changes

The changes we made are listed below. Information about vendors is in the "Vendors" section of the poster.

1. Dome Control
   a. Motorize lower dropout
   b. Power rails tagged to dome
   c. Add rain sensor and new controller
2. Internet-controlled power strip for camera/filter wheel/dome controller
3. Dust Flaps
4. Remote Desktop to Observatory
5. Flat Panel to be added at later date
6. Wrote custom ACP scripts to facilitate remote operation (need list)

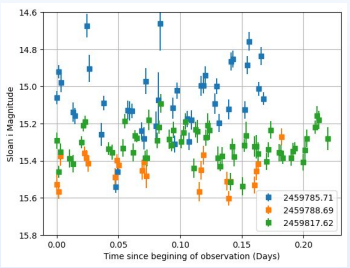
Figures 1, below: The flap cover on the left is the cardboard prototype and on the right is the corrugated plastic,which is the final version. The flap covers prevent dust from getting into the telescope.





Results

Figure 2, right: During the process of the telescope upgrades several nights of data were taken on two variable stars. Below is data from V0533 Her taken across 3 nights. Each night is represented by a different color.



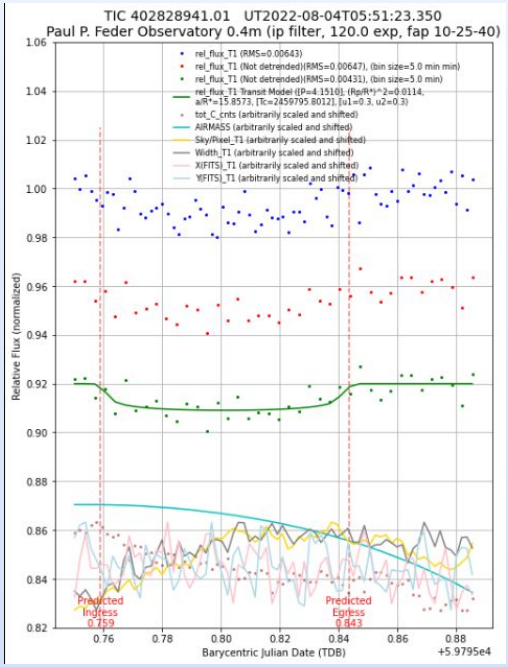


Figure 3, left: Measured transit of the candidate exoplanet TIC-402828941.01 after the observatory upgrades. The upgrade allowed us to observe more transits over the summer than in past summers.

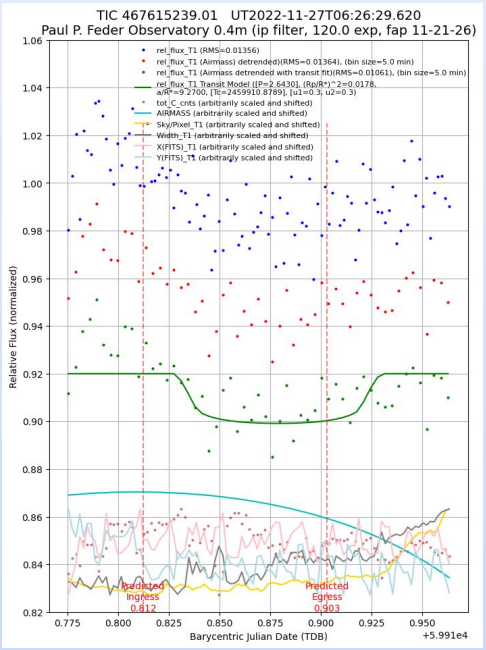


Figure 4, right: Candidate exoplanet TIC-467615239.01 is shown.

Vendors

1. Astronomical Consulting & Equipment (astronomical.com)
2. Digital Loggers Pro Switch https://dlidirect.com/
3. Optec Automated Dust Covers (16 inch ×2) (optecinc.us)
4. Campus IT set this up
5. Optec Flat-Man XL2 (24 inch)
6. ACP is at https://acpx.dc3.com/ For our scripts, see https://github.com/feder-observatory/acp-scripts

Acknowledgements

Daniel Van Noord from Optec, Inc provided a draft ACP script that we modified to control our dust flaps.

Bob Denny, Dick Berg, and Eric Dose provided valuable assistance in the ACP help forums.

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