



SARA-KP OBSERVATORY DIRECTOR'S REPORT

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by

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I. Introduction

The October 2019 – March 2020 observing period had similar statistics to the previous 6 month calendar. Observers typically lose about one third of nights to weather and average about 10% losses to technical issues although the technical losses tend to be dominated by isolated hardware failures with significant down time for just a few nights. The major issue of the chronic tracking failure was finally resolved, however the focus stability issue remains. There was a major failure of the telescope computer and control hardware in mid-March, but repairs have not been completed at the time of this report as the observatory and Kitt Peak were shutdown shortly after the failure occurred due to the Covid-19 pandemic.

II. Telescope Usage

Table 1 on the next page illustrates the statistics for use of the telescope compiled from the monthly summaries provided by Bill Keel and my own review of the observer log reports. The format mainly provides simple percentages from the nightly reports. I added a column to list the number of nights for which a report was not filed for each month. For the 6 month calendar, those numbers indicate 27% of scheduled nights did not have a report filed. The lack of complete reports continues to be a hindrance at all observatories in tracking our usage statistics. For those nights with observers reports, the semester average was 53% clear skies versus 35% lost to weather and 12% lost to technical issues. These percentages have been remarkably consistent within a few percent for the last several semesters but most notably indicate relatively poorer weather for Kitt Peak in recent years than historical reports indicate. The March statistics are skewed as the hardware failure occurred on March 14 with no observations possible following that date due to that failure and the pandemic shutdown.

Table 1: Telescope Usage Statistics for 01 October, 2019 to 31 March, 2020

Month	Hours Worked	Clear	Weather Losses	Tech Losses	Unreported Nights!
October	155	80.5%	12.0%	7.5%	10
November	99	53.1%	40.8%	6.2%	9
December	82.5	40.1%	49.4%	10.5%	10
January	121.5	63.3%	22.1%	14.6%	10
February	118.1	59.4%	37.7%	2.9%	4
March	15.5	20.0%	45.2%	34.8%	22

III. Observatory Issues

ACE finally resolved the tracking issue in early February, finding an unstable power supply problem was causing signal fluctuations in the hardware. It is not clear if this might also have affected the focus issue as all such signals go through the multi-axis control card which failed in mid-March. At the same time, the telescope control computer had a hardware failure requiring repairs or replacement for both it and the control card. At the writing of this report, ACE has been directed to proceed with the purchase of a new control card and repair of the computer, but cannot travel to the observatory due to the Kitt Peak shutdown. The time frame for repair to get the observatory back in operation is indefinite as it is not known when Kitt Peak will reopen.

Only the tracking and focus problems were major issues reported by observers for this semester. The ARC ccd and spectrograph have been working well although it was noted that condensation issues with the FLI ccd for the spectrograph were the main source of problems with that camera last year. Observers have been directed to leave that camera at a warm temperature above 0C and to only cool it to -40C while observing. A more detailed users guide for the spectrograph was produced and distributed to observers in January to reflect both the temperature control change and a more efficient guide method. No problems were reported with the dome operation and the annoying issue of timeouts for remote connections with the telescope computer was fixed by ACE simply resetting the local monitor controls at the observatory.

IV. Instrumentation

- **ARC Camera** - Main imaging camera has been working fine. High humidity conditions can still result in condensation on the dewar window but that is not typically a problem for the winter months. It is noted again that we do have the the old CT ARC system now on hand for backup should problems arise.
- **Autoguider** - Appears to be working Ok although oscillations in both axes do still occur for some telescope positions. Observers have been reminded (especially

spectrograph users) of the difference in settings between the QSI camera for guiding for the ARC ccd versus the QHY camera for guiding with spectra. Observers should check those settings before starting a night's run.

- **Spectrograph** – The spectrograph has been working well, the new QHY guide camera is working fine with control by Maxim. There remains a chronic issue of connection dropout to the QHY camera when some timing settings are changed. The connection can, however, be quickly re-established and this is documented in the new user's guide. The FLI camera temperature also needs to be adjusted as described earlier in this report which is also documented in the new guide.
- **Computing Facilities** - The telescope control computer failure was described previously. ACE will work to have a repaired computer ready to go once Kitt Peak is reopened to allow them to physically return to the observatory. The new Windows 10 operating system for that computer has not caused problems except for the remote timeout issue which was fixed. The remaining computers have no reported problems but still need to be upgraded to Windows 10 as well for internet security issues as the old operating systems are no longer being supported by Microsoft. Disk space is plentiful with the current large extra hard drives.
- **Weather Station** - No known current issues other than occasional need to restart the program/computer. Observers are encouraged to use mountain all-sky cameras and weather stations for additional weather monitoring.
- **Dome Cameras** - OWL DVR is working ok but it is best to view the software on a local observatory computer using the IE browser. There is still a need to replace some of the actual cameras in the dome as only the main camera viewing towards the east gives a good image.