



SARA - RM OBSERVATORY DIRECTOR'S REPORT

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I. Summary

This report covers the time period from late March through early October 2020. During the first part of the reporting time period the Instituto de Astrofísica de Canarias (IAC) was forced to close down the Observatorio del Roque de los Muchachos (ORM) due to the surge in COVID-19 in Spain. By early May, as the COVID situation became somewhat under control, we were allowed to once again begin remote observing with the Jacobus Kapteyn Telescope (JKT). Though startup was relatively painless we did have one issue that seriously limited our imaging. The JKT appear to be severely out of collimation producing images with effective seeing near 3". After a week or so of trouble shooting with Peter Mack and the staff at ORM we figured out that the issue was with the mirror support system. The issue was that the air supply for the mirror support was turned off. Once corrected in late May the image quality was back to normal, down near 1". With that fix we were back to relatively normal observing with the JKT, other than a few other issues that will be addressed with Peter Mack's next visit to ORM.

II. Telescope Usage

Below are the observing statistics for the JKT in this reporting period (Thanks to Bill Keel for tabulating these numbers). The JKT observing statistics for the post pandemic shutdown were as follows:

74% (617 hrs) Observed
21% (177 hrs) Lost to weather
5% (41 hrs) Lost to technical losses.

At first impression all appears quite well. But I suspect the 5% down time due to technical issues may be a bit underestimated since often many observers don't report that they may have had to do a software reboot.

III. Observatory Issues

So let's go through the primary issues one by one. Luckily Tomomi Otani at ERAU has been keeping a running tabulation of issues with all of the SARA telescopes.

1. Dome Shutter – There have been a few occasions when the shutter of the dome won't close completely. This is a mechanical issue that often requires ORM staff to help out. Peter Mack has told me that we won't know what the solution to the issue is until his next visit and a detailed shutter inspection is made.
2. Mirror Petals – Per the last update the mirror petals are presently in an open position since they aren't operating properly. Because of this the telescope must be park at HA 0 hrs and Dec of -35. This is to prevent dust from collecting on the mirror surface. Peter Mack told me that the needed motors are at ORM. So during his next visit the mirror petals will be fixed.
3. Dome Cameras – At present we have no working dome cameras at the JKT. In fact the only way we can verify the dome is closed is using the outside allsky camera! This has become a serious issue in that we can't see the telescopes position relative to its mount and have to rely solely on the ACE software position window. Peter Mack's next visit will install new (and higher quality) dome cameras. We've discussed getting a camera that is steerable and has the ability to zoom in and out.
4. Tracking – In certain positions of the sky the tracking can be poor as has been noted by several observers. This often happens as the telescope crosses the Meridian. When to the East of the Meridian I've noticed that the images will drift to the West at a rate of roughly 0.5" per minute. Once the telescope is west of the Meridian, the images then drift back to the East. Peter and I discussed this recently and he concluded that it wasn't the software and likely is the mirror support system since it seems to coincide with the Meridian. Also there appears to be some periodic error on a time scale of 3 to 5 minutes. This is likely due to an imperfection in the worm on the RA axis. Peter Mack has mentioned that we can likely figure out exactly how much and how long this error period error is and then correct for it using the ACE software.
5. Autoguiding – In the early summer Bill Keel and I noticed that both the virtual handpaddle and autoguiding weren't responding as expected. They seem to be sending the telescope in opposite directions than were intended. After initially being told that that wasn't the case, Brian Brondel at ACE managed to make the proper corrections and we now have autoguiding on the JKT. Bill Keel was kind enough to write up a short document on how to use the autoguiding. I still have to put these instructions onto the JKT PCs.
6. Filter wheels –The filter wheel can occasionally get hung up or have latency issues. In all likelihood all that is needed is an adjustment of a belt. Peter Mack is planning on have someone at ORM take a look at the belts for both wheels.
7. Software bug – Over the last couple of months Bill Keel and I have run into an issue when observing in the NW (large azimuth) near the HA limit. When the HA limits are reached the telescope has had issues backing out of the position either with the hand paddle or just hitting the move to zenith button, "Z". What sometimes happens is the telescope seems to want to take a short cut and move under the pole. Obviously this is a serious issue! In both cases we've had to call in ACE to help solve the issue. This involved looking at the motor position on the MAXnet Status window and manually calculating the actual HA from the encoder position. Also both cases we've had to type commands into the MAXnet Console to carefully move the telescope out of this position. If any observers run into this issue it is important to look at the azimuth and altitude of the telescope in the position display window to make sure the telescope is going in the direction that is expected. If there are problems please contact me ASAP. If I'm not available then contact ACE. This

appears to be a software issue that ACE is presently looking into since it has occurred twice by experience observers.

8. Other issues – There are several other minor issues listed in Otani's list for ORM. The primary perennial complaint seems to be with the ACE software itself. In all likelihood going back to the old software will not happen for some time. This is partly due to the encoders being used on ORM. In the meantime I suggest that all observers restart both ACE node service and client prior to observing. I've noticed that multiple ACE Clients have been running on the PCs. This obviously can cause issues with the telescope performance. I also suggest that observers use camera-related windows only on the camera PC, and telescope-related items only on the telescope PC.

IV. Upcoming Visit by ACE

Many of the issues mentioned above will be addressed by Peter Mack during his next visit. Presently this can't occur due to COVID. Key items that will be addressed during the Peter Mack's next visit are

- Mirror petals
- Washing the mirror
- Install new dome cameras
- Detail inspection of the dome shutter

As soon as the pandemic subsides and travel is allowed to Spain and ORM Peter Mack plans on traveling to make the proper fixes.