

Updated: 2022Jun08

1.3m Trouble Reports

Declination motion failure

Wednesday, May 4, 2022 5:06 AM

Problem(s) Encountered:

Telescope would not slew in declination. This was not due to the typical issue of cycling the dec motor controller.

Solution:

Noticed a red wire (+24Vdc IN) in the dec controller system that looked to be loosely connected in slot 5 of the bus by the dec motor controller in the doghouse at the base of the polar axis. It slipped free the moment I touched it. Curiously, I noticed that according to the schematics, this wire is listed as being in port 7, not 5. While confused, I went ahead and attached it into port 7, as listed on the drawings. This fixed the problem and the telescope is back in business. The only idea I have is that this wire came loose and jumped perfectly over to port 5 yesterday morning. This may have been due to the fact that this cable is routed through a similar path to part of the routing of the main network fiber. Perhaps it was jostled just right to cause the one wire to move perfectly from port 7 to the neighboring port 5.

Sounds implausible but I've got no other ideas!

In the meantime, I also noticed another discrepancy between the wiring and the drawing. A wire listed as ALARM COMMON is shown on the drawing to be in slot 38 on the same bus but in actuality is in slot 36. Since things appear to be working normally, I hesitate to move the wire over a slot. Instead, I've written to Dick Treffers to consult with him. If he wants me to move the wire to 38 I will do so. Until then, I just don't want to mess with a system that appears to be working.

Telescope limits activation issue

Wednesday, May 4, 2022 5:01 AM

Problem(s) Encountered:

TCS showed Telescope Tilt Sensor Interlock Engaged.

Solution:

Blown fuse in the TCS electronics related to the interlock circuit for the platform floor.

Network failure

Tuesday, May 3, 2022 4:53 AM

Problem(s) Encountered:

At approximately 8:30pm the remote connection to the 1.3m was dropped. I emailed the 2.4m observers and Eric to let them know we had lost connection with the telescope. The 2.4m operators were able to respond to email and close the 1.3m telescope. Connection was not restored for the entire night.

Solution:

Mouse chewed through the fiber to MDM's main network switch. Fortunately had ONE spare. Tony and I ran the new fiber this morning, restoring network.

Dome Shutter Close Issue

Thursday, April 28, 2022 4:37 AM

Problem(s) Encountered:

We have problem to close the dropleaf.

Solution:

How to cycle the breaker for dome power. This is in the breaker box directly north of the dome electronics box in the dome.

Lost (and found) pointing

Thursday, March 31, 2022 5:54 AM

Problem(s) Encountered:

We lost the pointing at the beginning of the night observation. The telescope position ('MDM1.3m Control panel') is not same as the target's position. I tested another target, and it still has RA_OFFSET~1m18s, DEC_OFFSET~7'0". Then I point the telescope to the zenith, without tracking and enter: zero ra=(LST) dec=31:57:12 equinox=2022 It still doesn't work. Finally, I found the value for tilt sensor motion cannot change when I move the hand paddle. It is always at [-491,+458] at zenith. Next, I tried the offset (in the telescope control panel). The value for motion still didn't change. We close the dome at 12:00 am LST.

Solution:

Firstly, thank you to Jules for getting the telescope back to zenith during the night. Somehow the pointing was way off. Note that the tilt sensors really only change when using the hand

paddle when the telescope is near zenith. Once the telescope is more than a couple degrees away from zenith, the tilt sensors become useless at helping verify telescope position. If this happens, it is recommended that the dome lights be illuminated so that the observer can get the telescope roughly to zenith by eye. Then positioning can be touched up using the tilt sensors and hand paddle and encoders can be zeroed to zenith values. After that, it is recommended to center on a bright star and once again zero coordinates to those of the star.

VNC interface issue - limited mouse response

Thursday, March 10, 2022 5:42 AM

Problem(s) Encountered:

While trying to take flats, I hit one of the hand paddle buttons twice in quick succession. This caused an error window to pop up, as a warning to let the telescope get to the offset before hitting the hand paddle buttons again. However, that wasn't the problem. The real issue was that when I tried to dismiss the error, I couldn't. The mdm computer could register that my mouse was hovering over the dismiss button but when I tried to dismiss it, nothing would happen. I tried to look for any other errors that I might have missed but there were none. This was not a unique problem to the error window—I had managed to close the error window just by clicking the window/menu and hitting close—None of the other buttons were responsive either. For instance, in the TCS Session log window, I tried to clear the output by hitting clear but it wouldn't respond. None of the buttons seemed to respond. I did contact Eric and I believe he restarted the mdm computer and had to drive up the mountain to reset the Owl windows/Jskycalc/tigervnc for MaximDL+Andor, etc. I am not so sure how it was solved exactly, but I was able to sign in roughly an hour later (thank you Eric!).

Solution:

This was a weird one. Via VNC connection, the mouse would move as directed. Button operations would work as far as pull-down menus went, but would not work for anything else (eg clicking OK or CANCEL, closing windows, etc). Only choice was to reboot mdm13ws1. Unfortunately, due to an issue with booting this machine, the user is required to strike the F1 key midway through the boot process (I don't recall offhand what the associated "error" is). This typically can be handled by the 2.4m observer, but there currently is no one on that telescope. So I headed to the mountain to get the telescope back in service. Once reboot, everything was successfully brought up and the rest of the night went smoothly.

Issue with communication to Owl software

Saturday, March 5, 2022 5:39 AM

Problem(s) Encountered:

OWL does not seem to be communicating properly. ds9 isn't automatically loading (and so multiple exposures isn't working), and clicking the ds9 icon in OWL resulted in an error. Of more concern is that the controller temperature reads 000.0. I tried restarting OWL but the result is the same. Humidity forced close tonight anyways.

Solution:

Restarted Owl and all seemed well. Temperature is well below -100 and a 1s Ne shows lines as expected.

Error: mirror mirror both opened and closed

Thursday, March 3, 2022 5:31 AM

Problem(s) Encountered:

When trying to close the mirror, I received an error: "ERROR mirror mirror both open and closed." Clicking the refresh button the control panel reset the mirror status, and clicking mirror

then reported that mirror was opened. However, trying to close the mirror again resulted in the same error. I called the 2.4 observer to check if the mirror covers are actually closed. They reported all good, and also at some point in the process the error disappeared and the control panel reported that the mirror was closed.

Solution:

This used to happen with more frequency in the past. It is an odd state where the mirror covers are indeed closed, but the limit is not actuated. Typically, this error can be ignored.

High connection latency, and general "things not working the way they are supposed to", but different

Tuesday, February 8, 2022 6:22 AM

Problem(s) Encountered:

While I was taking evening flats the VNC connection seemed very spotty, which I chalked up to our ISP having a bit of a slowdown, but in retrospect it may not have been.

Everything went normally for several hours, and I got a lot of useful data. Sometime before midnight, though, the VNC got very slow – in particular, Owl was updating intermittently, freezing for a minute or more and then suddenly catching up. The other windows were freezing a lot, too. Weirdly, there was a proliferation of little window-icon buttons in the

bottom bar (where the desktop cartoon and buttons to minimize windows live), all labeled Java and apparently not connected to any windows – I couldn't open those, or even delete them.

Owl is in Java, and I wondered if it might be that the script that reads the telescope was messing up – it does, about one time in every few hundred exposures – but the image headers almost all had correct telescope coordinates. Strangely, the data all seemed fine, so I soldiered on.

I tried several things – logging off and back on, and restarting Owl, each several times. This did clear up the plague of Java buttons. After I restarted Owl for the penultimate time, I took a few frames to set up a field, and then, when I went to up the exposure times and take multiple exposures, I could not get the text entry boxes in Owl to respond. So I exited Owl yet again. When I got back, I got error messages about not being connected to any devices. I tried the setup button and attempting to run the setup scripts led to more errors about not being connected to any device.

At this point I called the 2.4m, and Nicole came down to power cycle things and wiggle connectors, but nothing worked. The connection was still pretty slow and glitchy, oddly, but I was able to close up normally and, of course, call it a night. I still don't know what the root problem was.

Solution:

I remotely opened a connection (from my office) and found numerous “errors” associated with opening ds9. As you likely recall, this is a known non-issue with Owl that often occurs. Why, I have no idea, but I see it more often than not on mdmarc2 (interestingly it does not always happen, and never happens on mdmarc1). Even after I closed Owl, I had about 6 of these ds9-associated error pop-ups to close out. Once I closed them all, I opened Owl, performed a “Startup” and took a test frame without issue. I think that the latency associated with a rough network connection may have caused the issue to compound into something greater. I'll likely reboot mdmarc2 for good measure, but first need to pull CHaS from the 2.4m.

From Jules: I have also seen Owl and everything else seem to freeze for minutes, and ultimately found out that it continued to take data, or that it eventually stopped taking data several minutes after I appeared to lose the connection. Worse things happen to other windows, typically the "e" key, which I had been using in ds9 to examine the focus of a star, would repeat endlessly in the IRAF window, rendering it useless. Or a new IRAF window for Owl would try (and fail) to open when one was already running. Usually I could recover from this without having to reboot the computers, but once I had to go that far and do a complete setup of everything from scratch. Maybe that wouldn't have been necessary if I really knew what I was doing.

Given what Eric reported and what I have seen, I would advise that if you are going to kill

Owl, you should in addition make sure that its ds9 doesn't keep running. Kill the ds9 first if necessary, because if it is still running it will prevent Owl from initializing the next time.

High connection latency, and general "things not working the way they are supposed to"

Wednesday, February 2, 2022 6:09 AM

Problem(s) Encountered:

The TCS responded VERY slowly to commands to open the dome. Then the mirror cover would not open at all. I tried stopping and restarting the TCS, but the telescope server would not start.

Solution:

...determined that the TCS power needed to be recycled in the control room. Observer came down from the 2.4m and did that. This causes the telescope focus to go to zero and the telescope coordinates have to be zeroed using the tilt meters. (I'm not sure why the telescope had to be moved in this case because I had not moved it from zenith yet.) That took a while, but things have gone smoothly since.

Light not getting to the CCD

Saturday, January 29, 2022 5:54 AM

Problem(s) Encountered:

The problem we met is no target can be observed in the image.

Solution:

The Finder was not moving to the OUT position, even when demanded in xmis2. I noted that after pushing OUT in xmis2, the motor to move the finder was not turning. I touched it and it immediately sprang back to life. So ultimately, the finder was blocking sky light from getting to the detector. I was able to determine this by taking a flat with finder IN, then taking another with finder OUT. After doing so, the counts were extremely similar. Those for finder OUT should have been dramatically lower.

Echelle failure

Thursday, January 6, 2022 8:03 AM

Problem(s) Encountered:

...we met a problem at midnight: the readout time was too short when the fit file was written (~1.12sec). The output image looks wrong. Most of pixels are zero. I restarted Owl software and we lost the connection to Owl, it shows: 'ERROR - Driver PCI Device 0 failed to open ERROR - (CArcPCI::Open()): Failed to open device (/dev/astropci0) : (errno: 16) - Device or resource busy'. I tried an exposure. It shows an Error as: 'ERROR - Not connected to any controller!' Then, I followed the solution of Eric: click 'Setup' -> 'Apply'. Then it shows another Error as: 'ERROR - SetupThread error: java.lang.Exception: Not connected to any device!'

Justin rebooted the mdmarc2 and restarted Owl software. Then we tried an exposure. But the readout time is still not correct (too short, ~2 sec). Justin has tried reseating the fiber connections, rebooting mdmarc2, restarting owl, and power cycling the ccd electronics. They all didn't work.

Solution:

It appears that the issue stemmed from some debris in one of the fiber connector housings. After removal, things seem to be working again. More extensive tests are forthcoming...

Guiding issues

Wednesday, January 5, 2022 7:58 AM

Problem(s) Encountered:

We met a problem at the last exposure of the observing. The guider doesn't work. We try to restart the guider's software; but it still doesn't work. Last night the guider camera works. But when we selected the guide star (bight enough), it cannot have a good fit for the guide star. It shows 'star fade' or something like that

Solution:

'Star faded' usually means that the software cannot locate the star, usually due to some error in using the functions within the Guide tab. If the star first lands at some random position, you have to 'Expose' first within the Guide tab to locate it. The 'Expose' button also enters the X,Y position of the Guide star that you can see in the second row. It also sets up a virtual 64x64 box around the X,Y position that it will use to look for any future Guide star. Then you are ready to 'Track'.

If a future guide star does not land within the same box, you have to 'Expose' first to find it and reset the X,Y position. Otherwise, it thinks that there is no star, or that it must be cloudy.

Also, if the star is too close to the edge of the image so the 64x64 box is not contained within the image, it might not find it.

Guide camera connectivity failure

Sunday, December 12, 2021 7:21 AM

Problem(s) Encountered:

Error opening camera, camera settings incorrect. He then tried to restart MaximDL but the issue prevailed. There were more attempts on site at the 1.3m, but there seemed to be no solution.

Solution:

Initially attributed to a failed USB range extender but later found that the FLI camera power supply was starting to fail. On 12/22, when trying to power up the camera, it would not come on. Found that the power supply had completely died. Replaced it and on a hunch, tried out the old USB range extender. And it works.

OWL connection failure

Tuesday, November 30, 2021 6:36 AM

Problem(s) Encountered:

We encountered an OWL failure where it would not connect to the detector. We attempted to simply restart the OWL application but this did not solve the problem. We emailed Eric for help with rebooting mdmarc2 in hopes this would solve the connection issue, however this did

not work either. Rob Fesen came down from the 2.4m and power cycled the detector and re-seated the fiber cable. Re-seating the fiber cable fixed the problem. No further problems encountered after this fix.

Solution:

I've never understood exactly why reseating the fiber is often the fix for this problem. My only guess is that the spring-loaded connector may be getting weak and occasionally loses connectivity. As it happens, I already have a spare fiber pair run from the computer room to the telescope, so I have swapped in the spare pair. We'll see if the problem still occurs or not.

UPDATE: No failures after 8 nights.

Orphaned VNC processes

Friday, October 29, 2021 4:11 AM

Problem(s) Encountered:

We encountered a minor internet glitch when the mountain lost power. We initially could not get the VNC connection back but a `killall X11vnc` cleared the dead connections and we were able to get back to port 5900.

Solution:

If you need to clear up old VNC connections, from a terminal window, type

```
killall x11vnc
```

Caps Lock issue

Wednesday, October 27, 2021 4:03 AM

Problem(s) Encountered:

At some point I used the caps lock key, and somehow the workstation got stuck in caps lock, no matter what I did. Fortunately I wasn't typing on it much, and could work around using the shift key to type lowercase characters when needed. This also happened to Elisabeth Newton and I when I was helping her get started, but now I don't remember how we cured it! After I closing I tried disconnecting and reconnecting the VNC, but it that didn't fix it.

Solution:

I logged out of mdm13ws1 then logged back in. This corrected the caps lock issue. This solution should NOT be tried by the observer as one must log in as root to get back to mdm13ws1 allowing VNC connections as user obs13m. Once back in, all software was set back up and systems tested. Should be good to go.

Lesson here: don't use caps lock via VNC connections to linux boxes.

Dome slit/dropleaf failure

Tuesday, October 26, 2021 3:57 AM

Problem(s) Encountered:

At the very end I could not get the dropleaf or slit to operate. I tried re-homing the dome a couple times, on the theory the electrical contacts were a bit off, but no joy.

Solution:

Cleaned the skids on the dome contact box. Moved the dome CCW then homed it and dropleaf/slit commands worked. Then moved the dome CW, homed it and commands failed again. So at best, the "fix" was intermittent. Pulled apart the contact box on the dome and found a broken connector to one of the skids. Replaced the connector. Tested numerous times without further issue.

Computer room AC failure

Thursday, October 21, 2021 3:46 AM

Problem(s) Encountered:

We started to take skyflats with the 1.3m at 17:40. After a few successful exposures, we were unable to use Owl. It was reporting an error connecting to the telescope controller. We tried rebooting Owl, which was unsuccessful. Eric had tried rebooting mdmarc2, which was also unsuccessful as it appeared to not have started back up again. We physically went to the 1.3m to power cycle the controller, which we thought might have been the source of the problem. We powered down the electronics box on the North side of the mirror and turned the power back on again. We then went into the 1.3m computer room to check on mdmarc2. The computer room was very hot; the thermometer above the main monitor read that the room was at 120 degrees F. We tried to turn mdmarc2 back on, but we were unsuccessful. We investigated the AC unit. The AC remote incorrectly read that the room was at 70 degrees and the unit was not blowing out any cold air. We opened the door from the computer room to the control room and the control room to the dome to circulate some cool

air into the computer room. We left the dome open to help as well. Eric drove to the 1.3m and inspected the AC unit. He was able to turn the unit back on using the button on the inside front panel. The computers had started to cool and the room was down to 80 degrees F by 21:00. We were able to turn mdmarc2 back on and everything ran smoothly from there. We checked on the 1.3m computer room again at 06:00. The room temperature was down to 70 degrees F, but the computer fans were still running loudly. Eric has notified us that he will shut the computers down during the day, which should allow them to cool off so the fans don't need to work so hard once we start observing again the night of 10/22.

Solution:

No idea what caused the AC unit to power down. Once I figured out how to power it back up, it came up without hesitation and has continued to function since. The cooling fans on the two workstations continued to run at apparent maximum, even this morning, with the computer room back down to 70F. I powered them down for the morning today. Once I brought things back online, the fans returned to normal duty. All systems tested positive today. This problem has not occurred again since.

The thermometer for the computer room has been located above the tilt sensors. Remote observers can monitor the temperature by panning the camera UP (three clicks).

OWL failure

Friday, October 8, 2021 11:58 AM

Problem(s) Encountered:

Shortly after 01:00, the CCD stopped taking data. Owl error messages included Not connected to any controller!

Various attempts to restart Owl or the controller were unsuccessful.

Solution:

Tried the usual button pushing on the Owl GUI from home before resigning myself to a morning trip to the mountain. Power cycled the CCD controller but problem persisted. Removed and reseated fiber connections (both at controller and PC). This corrected the problem.

Filter wheel comm issue

Tuesday, September 28, 2021 11:36 AM

Problem(s) Encountered:

Filter wheel did not work : Filter Wheel Is NOT connected error message.

Solution:

The 2.4m observer fixed it by recycling the power of the communication box, on the south top of the filter wheel assembly.

Pointing issues, dropleaf errors, etc...

Monday, September 27, 2021 11:01 AM

Problem(s) Encountered:

Got error 'error dropleaf slit busy' upon trying to re-open. I did telescope stop/start (although telescope status indicated everything was running) which fixed that. Completely lost pointing on re-opening, couldn't figure out how to offset the telescope to effect the left side tilt meter. Closed without solving this problem. On trying to close again, I ran 'tx dropleaf close' and got a log message of 'done dropleaf cantopen=rain'. I restarted tcs following the troubleshooting and that worked.

Solution:

Unfortunately, the tilt sensors only really give you pointing information very close to zenith.

This morning, I found the telescope more than 2 hours over to the west and almost 8 degrees north of zenith. If one finds themselves this lost, the best bet is to take a deep breath, turn on the dome lights (through the web-based power switch on workspace 4) and work the telescope back towards zenith. In this case, it would have been apparent that the telescope was well west of zenith. This can be verified by the fact that the tilt sensor's first value was positive. Since the TCS GUI erroneously indicated that the telescope was at zenith, one would have to issue a command to move the telescope in the proper direction (in this case, east) by demanding an HA value greater than 0. The same would go for declination.

In this case, one could verify that declination was above 32 degrees because the second tilt sensor value was positive. Therefore, one would have to issue a command demanding a declination less than 32. This would not correct the positioning readout, but would get the telescope closer to zenith, ultimately allowing the user to utilize the tilt sensors to dial in pointing. So for this case, the user would enter the following:

```
tx point ha=-2:18:39 dec=25:16:06
```

Since I have the benefit of writing this after correcting the pointing, I knew the exact values needed. In the moment however, you would have to iterate until you got tilt sensor values closer to zero (preferably within ± 0.50 of zero). After this, the virtual hand paddle could be

used to move the telescope by steps of 60" at a time until the nominal tilt sensor values was reached. Then, and only then, could the telescope coordinates be zeroed out as follows (with tracking OFF):

zero ra=LST dec=31:57:12 equinox=x

where LST is the local sidereal time at the moment the ENTER key is hit, and x is the current equinox, as noted on the TCS GUI.

OWL data writing permissions issue

Saturday, September 11, 2021 6:11 AM

Problem(s) Encountered:

Had troubles with OWL saving data at the beginning of the night as well but no time was lost because of the clouds.

Solution:

This was a permissions error for the directory structure. I su'ed into mdmarc2 and deleted the directory tree, then rebuilt it as user 'arc'. After this, Owl had no issue writing files.

OWL Header info incomplete

Wednesday, September 1, 2021 5:07 AM

Problem(s) Encountered:

OWL write incomplete FITS header. The fields of ra, dec, airmass, and telfocus are wrong. Date, time, filter fields are fine.

Solution:

Restarted Owl and reset telescope servers. All is well again.

Motion failure

Thursday, July 8, 2021 6:39 AM

Problem(s) Encountered:

At ~3am, slew error had occurred when I tried to move to Az~88, Alt~51. After that, TCS and JSkyCalc could not control the telescope.

Slew ERROR with tracking OFF

When I tried to move to Zenith, ERROR point not converging dist=39.875 dra=319.111
ddec=20.856

When I tried to close mirror cover, ERROR mirror mirror both open and closed

The 2.4m observer tried to solve the problem from 4:30, but failed.

Fortunately dome closed well, but we could not stow the telescope to Zenith.

Solution:

Found the dec controller indicating error. Reset that and all telescope motion returned. I did also note that system was left in an odd state where everything needed to be homed. So I homed everything and zeroed out errors.

Dome closure issue

Saturday, May 15, 2021 5:33 AM

Problem(s) Encountered:

When I went to close the dropleaf at the end, I got a slit busy error and it wouldn't budge. After a little thought I tried moving the dome to 60 degrees in the dome control panel window, and then homed it again, on the hunch that the contacts might be slightly off. Whether that was the case or not, the dome closed normally. (I inadvertently closed the slit first, being a bit flustered, and was obliged to open it back up before closing the dropout and finally closing the slit.)

Solution:

This likely was an early sign of a stronger problem that occurred some time later, where one of the contact terminals supplying power to the dome slit motor broke. The terminal wiring has been fixed now.

OWL controller failure concerning the VNC connection

Thursday, May 13, 2021 5:27 AM

Problem(s) Encountered:

For some reason Owl stopped responding to the `expose` command at the start of the night – I'd been power-cycling the controller, which might have confused it? I stopped Owl to restart it, but the windows did not go away – they went blank. Then I couldn't get input into other windows to work (though I did have the mouse). So, I tried exiting the vnc connection. But then I couldn't get the VNC to reconnect! I did still have my terminal connection.

I called Eric and he saved the situation by taking `mdm13ws1` down to clear any connections and setting me up on `mdm13ws2`, which worked fine for the rest of the night. `ws1` has an issue right now where it won't reboot without someone present to hit a key, so this was the easiest way to get going.

The telescope was open and tracking while I could not control it. Fortunately, the weather was excellent, but I got to thinking that it would be good to have a text-only command to run the closing sequence from a terminal in case of a vnc failure.

Solution:

Not really sure what happened, but things got screwy. I tend to warn people away from the software cycling of the camera controllers in Owl. I've seen weird unintended results from time to time that end up requiring hard reboots. Thankfully that was not necessary here. `mdm13ws1` requires the F1 key be struck at some point in the boot process. I was hoping this was due to the on-board battery being dead, so I switched it out today. No luck. Still have to hit F1 when rebooting this machine.

Templeton pattern noise

Tuesday, May 11, 2021 6:45 AM

Problem(s) Encountered:

Templeton's performance is degrading, in the form of pickup-like pattern noise with amplitude of several ADU, which is quite a few electrons. This stamps itself on faint spectra and makes it very hard to work on fainter objects – you never know if that 20-min exposure is going to be any good. It's as bad as Echelle was getting, and appears to be a very similar issue. I doubt if much can be done about it, and I may be able to filter some of it out with enough effort, but I'd appreciate it if it's possible to have a look at it to see if anything obvious is wrong. I will try to remember to turn the controller off at the end of the night to see if resting it might help.

Solution:

Power line filter was swapped out for a new unit. Per observer: "The pattern noise is much improved, often absent and when present much less intrusive."

Drop leaf fail to close

Thursday, April 22, 2021 6:33 AM

Problem(s) Encountered:

Attempts to close the dropleaf yield the error message
ERROR dropleaf slit busy

Restarting the TCS did not fix the problem.

Solution:

Not sure which iteration fixed the problem, but ultimately, typed:
tx dropleaf close dammit
and it worked. I went ahead and cycled everything today just to be safe.

High network latency and resetting pointing

Tuesday, April 20, 2021 6:27 AM

Problem(s) Encountered:

The telescope pointing is off, and we were unable to acquire any targets.

The obvious solution would be to point the telescope at the zenith and reset the coordinates. The response time for the remote desktop was, however, extremely slow tonight. It usually is not snappy, but often it took 15-20 seconds to refresh after a cursor move or a button push. It was especially bad if either of the two cameras were running (telescope view and tiltmeter view). Under these circumstances, it was extraordinarily slow and tedious to try to reset the coordinates and since clouds were coming in we decided to stop.

If possible, it would be very helpful if one of the staff could point the telescope during the day so the tilt meters are near the zenith position. That would save a lot of time in getting started.

I do not know what to do about the extremely long lag times for the VNC viewer.

Solution:

Pointing has been adjusted and re-zeroed. Not sure what to say about the network speed.

OWL image readout failure

Friday, April 16, 2021 6:23 AM

Problem(s) Encountered:

OWL image readout failure. OWL error message stated read image timed out. No image file saved .

Solution:

Restarting OWL and reinitializing the detector twice resolved the problem. The first reinitialization failed, possibly due to binning.

MIS failure

Friday, April 2, 2021 6:15 AM

Problem(s) Encountered:

From ~4:50AM, MIS did not work. I tried reopening MIS S/W, resetting MIS and Filter wheel. However, nothing has been changed.

Solution:

The power cord to the filter wheel controller came loose. Reseated.

mdm13ws1 woes (and potential issues with too many VNC connections)

Monday, March 29, 2021 6:20 AM

Problem(s) Encountered:

Was flipping between an IRAF terminal windows when we lost the ability to press buttons on all of the windows. Ended up shutting down the workstation. Was not able to boot it back up, so Eric switched us over the ws2.

A similar error occurred with ws2, but instead of not being able to press any buttons on any windows, was only unable to click the x in the corner of any window to close it. Also was unable to type in an IRAF terminal window without it being total gibberish. Ended up unplugging the mouse and plugging it back in which worked. Weird.

Solution:

This issue appears to be related to having too many VNC connections running simultaneously. However, it did also uncover an issue with mdm13ws1. If it ever needs a reboot now, the local keyboard must be used to strike F1 during the boot process. Therefore mdm13ws1 should never be rebooted remotely, as this will eliminate the ability to reconnect.

Guide probe motion failure

Sunday, March 14, 2021 6:10 AM

Problem(s) Encountered:

The guider focus did not budge when commanded. The guider does surprisingly well on not-too-grossly out-of-focus images and no time was lost.

Solution:

That problem had been intermittently occurring for some time prior to this. Finally had a day off-sky where we could open up the bottom of the MIS for closer inspection. Initially, all worked as expected. Guide probe motor mic travel, optical cart travel, etc. *But* a little shaking of the wires and power to the motor mic would interrupt. A little more shaking and one wire completely fell apart. Managed to splice in a new connection. All soldered and heat shrunk. Everything seems to be working again. Hopefully it stays that way.

Issues pointing far to the north

Thursday, February 4, 2021 4:59 AM

Problem(s) Encountered:

Telescope errors occurred pointing at DEC > 74 degrees. The telescope would not slew from JskyCalc even though the object was east of the meridian and away from the West limit. As a result of the slew error the telescope seemed to lose its encoder positions. Telescope was then pointed to the zenith and the tip/tilt sensors were used to zero the telescope. At a later

point in the night the telescope slewed to DEC +73 but was not pointing at the correct field, slewing the telescope to lower DEC found the correct field without needing to reset the telescope using the tip/tilt sensor.

Solution:

For lack of better explanation, error had built up in the home position registry for the dec drive encoder. Although the encoders are zeroed to the appropriate values at home (zenith) position, this incremental stack error appears to, somewhere low level, add error to where the telescope thinks it is. I don't quite understand this as it does not impact telemetry. But it does end up impacting how far north the system will allow the telescope to slew. Again, this only sort of makes sense to me, but working from a previous instance, I was able to zero out the error in the registry for the encoder and the telescope appears to once again go much farther north.

Templeton warming up

Tuesday, November 10, 2020 7:39 AM

Problem(s) Encountered:

CCD temperature was high ($> -50\text{C}$) during night. (cf. outside $T \sim 4\text{C}$, RH 20~30%) At ~2:20am, CCD temp. reached 0C.

LN2 filled at ~3am. however, CCD did not cooled below -50C until Guider/slit-viewer settings confusion

Thursday, November 19, 2020 4:42 AM

Problem(s) Encountered:

After taking a list of Xe lamp spectra, I clicked the finder out and the Xe button (to turn off the lamp) on the MIS xmis2 panel. This led to the wrong message finder mirror = Xe instead of finder mirror = out . Then I checked the status of finder by targeting a standard star with the telescope and moving the guider probe to a bright star, but neither guider camera nor slit viewer showed stars. I tried cycling finder in and out a few times, and restarted the MIS xmis2. Later the guider camera could see some stars but with possible obscuration. The slit viewer still

could not see stars. It seemed that the finder was not in the right place. I homed the telescope and closed the dome at mid-night.

Solution:

For some reason, slit-viewing camera was set to 2x2 binning, which was saturating the detector. Had to restart MaximDL (slit viewer) in order to see the slit with the flat lamp.

Same thing for the guide camera. Perhaps there is a reason why one would want to bin the guide camera, but I don't think this is common.

Checked today and verified that the finder is moving IN/OUT as demanded. morning.

Solution:

Firstly, it is worth noting that if a detector warms up to an abnormal temperature, MDM staff should be consulted before cooling it back down again. Thankfully in this case, nothing bad happened, but cooling like this can lead to issues such as ice forming on the chip.

This problem was a pain to diagnose but it ultimately appears that the screw holes for the collar where LN2 is added were weakened and not allowing a full seal which ultimately led to a persistent LN2 leak. I've changed out the fill cap/collar and implemented a new approach to removing this (as needed for certain instrument configurations). So far so good...

Tilt Sensor Unexpected Value

Monday, November 2, 2020 6:51 AM

Problem(s) Encountered:

Number of E-W tilt sensor is abnormal at zenith position. (Telescope pointing was correct in all target positions.)

Solution:

For some reason, it stowed to HA=00:12:00, which correlates to the stated tilt sensor value.

Moved the telescope around, stowed it and all is fine. This may actually be an issue with how JSkyCalc interfaces to the TCS as this "error" does not happen typically when using the TCS command line to perform motions.

Fail to Send "Errors"

Tuesday, February 25, 2020 7:35 AM

Problem(s) Encountered:

Slew error and Tracking turned off when telescope move to a target in wind direction.

Solution:

Something odd was certainly going on with the telescope, regardless of wind. I've gone ahead and reboot McGraw, which seemed to have helped with the tracking issues. That said, I am getting the following "error" popping up whenever I slew from point-to-point:

"Send failed for command track: Network operation timed out". This however appears to be a red herring, with no actual error occurring. The telescope and dome continue to move to the desired target, tracking stays ON and the "error" disappears after the slew is completed. Weird one—I'll ask Starman Industries (i.e. Treffers) about it.

The "Send failed for command track:" error happens a lot, if I recall, and seems to be benign. [Thorstensen]

This may actually be an issue with how JSkyCalc interfaces to the TCS as this "error" does not happen typically when using the TCS command line to perform motions.

Owl File-Saving Issue

Wednesday, February 19, 2020 7:19 AM

Problem(s) Encountered:

There was an OWL issue at ~8pm. Image could not saved.

Solution:

Reboot mdmarc2 PC.

Issues Closing the Dome

Saturday, November 2, 2019 6:17 AM

Problem(s) Encountered:

Trouble homing and closing the dome at the end of the night.

Solution:

Dome wasn't homed and would not home via the standard command. Switched home "direction" to left and tried again, getting the dome to move to home position.

Tried closing the drop-leaf at that point but got "ERROR: drop-leaf slit busy". Tried cycling TCS GUI, telescope servers and rebooting McGraw to no avail. Woke up Justin and had him first verify that the drop-leaf control compressor was not running open loop—it wasn't. Switched to local control of dome and he was able to successfully close the drop-leaf manually. Had him then switch to REMOTE control of the dome. Issued commands via TCS GUI (tx drop-leaf open then tx drop-leaf close) to successfully cycle the drop-leaf. With the drop-leaf closed, issued command to close dome (tx slit close) completely without issue.

Not sure what was going on but it now seems to be working ok.

Special thanks to Justin for leaving the comforts of slumber to run ground support on this one.

High Declination Pointing Issues

Saturday, October 12, 2019 8:57 AM

Problem(s) Encountered:

I was unable to point the telescope to a target near the meridian at Dec=+79. I saw this at positions both east and west and was never near the pointing limit. The JSkyCalc GUI gave a slew error and didn't move the telescope. I had definitely observed objects at similar declinations (including the same target) with this telescope in the past, so I did some

experiments. I restarted TCS, homed the Dec drive, and checked the Dec controller, but none of those things worked. As an example: after turning off tracking, the command point ha=-02:00:00 dec=+73:00:00 would work point ha=-02:00:00 dec=+74:00:00 would not work with an ERROR point illegal Dec 90 (trying it with dec=+75 would give a similar error, but would say Dec 91 instead). I tried creating some fake targets in my target list at various locations in the north and also used the point command, but both failed above dec 74. We left this unresolved and moved on to other targets.

Solution:

Tried moving north of dec=72 and failed with errors like *illegal dec 91* and *illegal dec 93*. Brought everything down, cycled McGraw and reset the TCS electronics. After this, the telescope would go to demanded positions >+72 again. Not sure what the deal was.

McGraw Fail to Boot

Wednesday, June 26, 2019 1:34 PM

Problem(s) Encountered:

McGraw would not boot in the afternoon, nor would its spare.

Solution:

Thanks to Pogge, and the fact that we did not have need for a Prospero-based system, things were set up to run off mdm13ws1 temporarily while another McGraw was shipped out from OSU. New machine has arrived and been installed. In fact, a spare is en route as I write this.

Telescope Motion Failure, Tracking Shuts Off

Monday, June 10, 2019 1:50 PM

Problem(s) Encountered:

At 20:15 I tried to observe target, but suddenly slew error occurred. And changed tracking off. I tried again at 20:45 but same error occurred. At 20:45, target was RA=09:36:08.7, dec=65:10:54.9

Second slew error occurred at 01:08:58. Target's RA= 13:23:49.52, dec=65:41:48.2

Solution:

Were these targets well off to the east? If so, this is likely a known issue that occasionally crops up when pointing in that region. Tested telescope motions today and all appears well currently.

Dome Rotation "Fugue" State

Friday, June 7, 2019 1:39 PM

Problem(s) Encountered:

When I sent the dome home to be able to raise the dropout, it didn't stop at the contact point but kept going around. It was not obvious what to do, since the TCS can generally do one thing at a time, and the dome motion was apparently not going to stop. Finally I got it to stop by asking for a particular position angle. But the dome menu button was still yellow, effectively hanging the TCS. At this point I believed that it was probably a hardware problem like yesterday's so I started thinking about how I was going to get the dome closed and the telescope stowed. After a couple of tries restarting the TCS and GUI, it was possible to home the telescope, close the mirror cover, and surprisingly, home the dome. But this all lost an hour, which included zeroing out the 12 minute RA error that appeared

again. However, inspection of the dome contacts using the zoomed web cam appeared to be normal. So I went ahead and started observing again. No other problems until I lost vnc connection in the morning. I need to learn more about how to fix that. However, everything appears to be okay now.

Solution:

Once restarting the TCS GUI, it might be possible to "Update" to clear the yellow-lit indicator. Not sure, but worth a try.

Dropleaf/Slit Control Failure (and revisiting 12 minutes in HA)

Thursday, June 6, 2019 1:34 PM

Problem(s) Encountered:

Dropleaf doesn't close at the end of the night. The TCS log behaves as if it did close, giving no error message. I restarted the telescope program and the TCS GUI, to no avail. The dome is in the home position. I didn't try to close the main slit, as I am not sure what else might happen if I do. The mirror cover is closed.

Another issue is that the telescope pointing is off by 12 minutes of time, a rare but recurrent problem, when I first sent it to zenith. When I send the telescope to zenith again, it is now pointing 3 degrees east, which is the same as 12 minutes of time.

Solution:

The bracket for the magnetic dome "home" arm (on rotating portion of dome) had come loose causing it to hang down and come into contact with the magnetic sensor (on static portion of dome) and its mount prematurely. This meant that the contacts weren't properly seating so there was no power to the dropleaf (or shutter) motors. Bracket has been tightened and reshaped. I think it had just come loose over time through vibrations as the dome turns. Still, ran the dome a full 360° to check for any obstructions. All looks well. Tony will fabricate an additional L-bracket to further support the arm in hopes of eliminating the possibility of this happening again.

The 12 minutes in HA is a mystery to me. It's been reported to Treffers, but I have gotten no response about it. The occurrence of this pointing offset, as far as I can tell, only happens when the telescope servers are reset (telescope stop/telescope start). Any time this hopefully at some point this will be resolved, but for now it is a mystery within software.

Slit/Dropleaf "Warnings"

Thursday, May 30, 2019 1:02 PM

Problem(s) Encountered:

As a side note/something noticed- when typing some commands i.e 'tx dropleaf/slit open', 'done mirror close/open' would sometimes pop up in the log/control panel first- not sure if this could be indicating anything

Solution:

These messages in the 1.3m TCS log are often not very useful. It will say "done" when the operation has only begun, and give nothing when it is finished. [Halpern]

Data Writing Issues with Prospero

Monday, May 13, 2019 12:46 PM

Problem(s) Encountered:

We are still encountering issues with saving the fits files. The data seems to read out fine, but then the system freezes while writing to file. The only solution has been to reboot from the Raritan keyboard in the computer room, and then reinitialize Caliban and restart prospero. The previous exposure is then lost.

I have no idea if there is any substance to my hypothesis (I've only consciously noticed it a couple times, while this issue has happened several times), but it may have something to do with changing coordinates in JSkyCalc (and/or starting a slew?) before the readout has completed. I am not sure though.

This issue has caused us to lose several calibration files in addition to some science exposures.

Solution:

There could be something to this. The 1.3m TCS is a very "dumb" system, in that it can't do two process simultaneously. As such, it may be possible that while trying to get telescope information for the header while the telescope is in motion, the data writing hangs. Likely worthwhile not slewing until the file is done reading out.

Backup Generator Alarm

Saturday, May 11, 2019 4:31 AM

Problem(s) Encountered:

There's a high-pitched alarm from a large white box outside the building labeled Generac. Noticed around 1 am after a couple rain storms. Power seems normal in building.

Solution:

This is the 1.3m facilities backup generator. I believe there is a missing or damaged tooth on the flywheel. This causes starting issues from time to time. To clear the alarm and reset the generator, open the first panel on the left when approaching the generator (side closest to the garage). Near the top-right, there is a 3-position dial. Turn it from AUTO to OFF and wait 20 seconds. Then turn it back to AUTO.

Slit/Dropleaf "Rain" Indication

Wednesday, May 1, 2019 10:41 AM

Problem(s) Encountered:

Slit and Dropleaf indicator on the MDM 1.3m Control Panel says 'rain' eventhough there's no rain on the site.

Solution:

This is typically a 'red-herring' artifact of the old Vaisala weather station equipment and interface that sometimes occurs when humidity levels increase, even if not to observational limits. If the all-sky display, weather widget and (if available) 2.4m observer all indicate favorable conditions, it can be ignored. Restarting the TCS control GUI clears the warning.

Septic System

Sunday, March 17, 2019 2:55 PM

Problem(s) Encountered:

All of the dorm showers are filled with/backed up with brown water. It appears to get higher when the toilets are flushed.

Solution:

Line was snaked out. Took some doing but finally broke through the clog. Septic tanks (at both facilities) were also drained about one week later.

It should be noted that this issue coincided with a large group visiting the telescopes. There were more heads than beds for this program. Our old plumbing is not well-equipped for such rigorous demand.

Mirror Cover Status Issue

Thursday, March 14, 2019 7:45 AM

Problem(s) Encountered:

While opening for the night, got to the mirror covers opening then the error mirror mirror timeout came up. Immediately after this another error I have not encountered nor could find in the archives repeatedly popped up on the TCS log 'error mirror mirror both open and closed'. I refreshed the 1.3m control panel, this had helped before with the first error, restarted JskyCalc etc but the same messages continuously appeared. Had to get help from Eric. He ssh'd into the system, tried similar things at first then eventually had to reboot McGraw, re-zero ra and dec etc. Once this was done, the error messages stopped appearing and things continued as normal.

Solution:

It appears that this issue was ultimately hardware-related. The original "closed" limit switch (Omron D5B-5021) was degrading and starting to fail. This limit has always been problematic in mechanical design and how it is used in this application. It is also quite expensive (~\$100 for a replacement). I devised a way to wire in and mount a standard contact limit switch (D44Y series) so that it functions equivalently to the old. This should be more robust, easier to replace, and far less expensive (~\$10 per switch). Also, I have spares on hand already.

Filter Wheel Communication Failure

Saturday, March 2, 2019 2:31 PM

Problem(s) Encountered:

I lost the filter wheel connection on the MIS control. I tried to reset the filter wheel and re-booting the MIS but all did not work. Eric and 2.4m observer Alejandro solved the problem but lost 1 hour.

Solution:

CAT-5 connection to the port server, located just above the south edge of the filter wheel was reseated, as was the line between the server and the filter wheel itself.

Mirror Cover Status

Thursday, February 7, 2019 11:14 AM

Problem(s) Encountered:

When I did 'tx dropleaf open', it started to do its thing and was opening on the camera view, the log gave a message "done interlocks estop=off floor=off pier=off tilt=off". I contacted Justin to see what it could be but not sure; those items show a green color by them on the control panel.

Also, I just opened the mirrors and once they were finishing opening up, "ERROR mirror mirror timeout" popped up on the log- I couldn't find any documentation for that one either... I am just hesitant to continue opening & wanted to see if it is okay to do so/what these messages mean.

Solution:

Most of these are simply status statements that occasionally come through. They can be ignored. The exception here is the mirror covers. Something strange was going on, likely with the "Closed" limit switch. It has been adjusted and appears to be working correctly now. However, this may be an early sign that the switch itself is starting to fail. We'll keep an eye on it.

Dome Status Indicates Rain

Thursday, January 31, 2019 11:06 AM

Problem(s) Encountered:

When using commands 'tx slit/dropleaf close', when it was done, would display 'done slit/dropleaf cantopen=rain'; double checked with the 2.4m operator that it was not raining at that time though. Rh at 80% by 12pm and has held steady from 87%+ since 12:52pm.

Solution:

This is typical when the humidity is up. If it causes issues with operating the dome shutter/slit, the TCS can be shut down and restarted to clear these flags.

Motion Failure and more...

Friday, January 25, 2019 11:09 AM

Problem(s) Encountered:

The initial symptom of the problem was that I could not slew to targets using JSkyCalc13m. It worked for my very first field, but failed after that.

I shut down and restarted both JSkyCalc and the TCS panel, but that didn't help. The TCS appeared to be running (the software was responsive, gave sensible outputs, and the telescope could move with the point command). However, JSkyCalc13m did not slew the telescope. I picked a target from my list and selected Slew Telescope and eventually I got an error Slew failed after no movement occurred.

I did a telescope stop and start and that did nothing.

Eventually, after some troubleshooting, the dec stopped responding altogether and I couldn't home it, so I went down to the 1.3m and checked out the Dec controller. It was displaying an error, so I cycled the power. After that, I could move.

Somehow in this process we lost good pointing, so I had to go to zenith, use the tiltmeters, and re-zero the pointing. After that, the telescope behaved normally.

Solution:

A slow fail like this is sort of new. Glad you were able to reset the controller and get on-sky. The pointing issue is a known mystery to me that occurs whenever the servers are cycled (and the TCS GUI is refreshed). For some reason, at zenith the encoders default to HA=00:00:12 and dec=48:00:00. I have no idea why this happens. A simple zero command can reset the encoders to known values.

Track & Slew Error

Thursday, January 24, 2019 3:12 PM

Problem(s) Encountered:

Telescope stopped tracking and Slew error occurred, for only one target which was positioned to HA=-4h~-3h, Dec~+77 deg.

Solution:

This issue seems to creep up occasionally when well over to the east.

Pointing/Encoder Errors

Problem(s) Encountered:

I slewed to the relatively starless field for flats; after a little while 'ERROR dome below dropout' popped up. I could not find any documentation for this and it seemed like the telescope should not have been at any directional limits, but it had somehow hit the West limit? To fix, used the paddle to move it away from that area of the sky and everything seemed to be in the clear.

I continued by getting the bright guide star centered and making sure the telescope was tracking with it. Things seemed to be going normally, then I noticed two errors that popped up in the TCS Session Log window consecutively:

```
ERROR where m_ha not homed      and  
ERROR track ACK not received
```

The first error was found in the trouble shooting archives, so I was able to follow what Katie had tried by putting the 1.3m telescope back to zenith and retry with guiding/tracking. The tip tilt sensors read correct amounts, so it had seemed like things were okay.

Any reference to the second error could not be found.

When we tried to track the guide star again, the same messages came up. Reinforcement was called in in the form of emailing Eric for help to see if he knew what needed to be done to properly fix the problem and save the night from being a failed run.

Solutions:

Eric took control of the telescope for a while to fix the issue- The encoders were grossly off, possibly indicating the telescope and JSkyCalc were confused/not properly communicating to each other. The axes had to be 'homed' (home ha , home dec in TCS Log) and the dome was homed as well once the axes were. Then the axes were zeroed to the tip tilt sensors, with a zero command (zero ra=h:m:s dec=d:m:s equinox=2019.011). Next, the telescope was stowed and JSkyCalc restarted and controls given back to me. Once this was done, no other problems were encountered for the rest of the night; all progressed as expected. (Thank you so much Eric!)

Saturday, January 5, 2019

Owl Connection Issue (Templeton)

Problem(s) Encountered:

Telescope is closed for clouds, but I tried taking bias frames and got the error: not connected to any controller. I tried restarting Owl but that didn't work, so I power cycled the CCD controller and that still didn't work. Owl setup button got the error: reset controller failed. I won't try anything else since it is unlikely that I will be able to observe tonight anyway due to weather. (Owl did take some exposures in the afternoon.)

Solutions:

Pulling the fiber connectors from the instrument controller electronics and reseating them corrected the issue. Don't ask me why!

UPDATE:

This issue occurred again on 1/6/2019.

Monday, December 10, 2018

Dome Shutter Remote Issues

Problem(s) Encountered:

Numerous issues were reported regarding failures with operating the dome shutter and dropleaf remotely. Below is a rather lengthy discussion of the issue and it's potential solution.

Solutions:

The system this morning was configured with the dome slit control connected to port 2 on a newly procured VLINX box. This was done to mirror the configuration on the old box, which had a dead port 3. Port 3 used to be used for the dome, but when it failed, we moved it to port 2. So this morning, I shut down the TCS electronics and swapped slit control back to port 3. When I brought things back online, the dome slit functions were unresponsive. That got me wondering about TCP port assignments. I checked TCP port assignments and decided to make some modifications so that the TCP port assigned to the physical port 3 was now the TCP port that was previously assigned to the physical port 2. I know this is confusing, so see below for the changes:

Initial Configuration this Morning		Failed Modification this Morning		Successful Modified Configuration	
Port	TCP Port	Port	TCP Port	Port	TCP Port
1	0	1	0	1	0
2*	1	2	1	2	2
3	2	3*	2	3*	1
4	3	4	3	4	3

*Port connected to slit functions (rslit)

So I went back into the configuration software (which I have on the administrative account for the 1.3m guider PC) and swapped TCP ports between physical ports 2 & 3. This is reflected in the last config shown above. And interestingly, remote dome control seems to once again work. Monitoring both ports 3 (connected to rslit) and port 2 (unconnected), I no longer get odd connections to 140.252.83.115 that fail to disconnect. In fact, I don't get connections at all. That said, once, and only once, I did get a connection to .115, interestingly, on *port 4*, which required me cycling the servers (telescope stop/start) to get things back online. That said, numerous tests were performed and the system only hung once, and again this time, associated oddly with port 4.

For tonight, I plan to leave the system ready for full remote use and see if there are any problems for the team running it remotely (from S. Korea). We'll see what happens. In the meantime, I'm hoping that this new information not only leads to a more stable system, but possibly also a revelation on what was going on over the past few weeks.

Lastly, it's worth mentioning that previously, port 2 was used for communication to the weather station, which has not been a part of the system since before I started at MDM, now over 6 years ago.

Took a look at the 13m.h file where the port assignments for the VLINX ESR904 unit are made for the TCS programs:

Port 1 (mdm13ps3,4000): PMAC
Port 2 (mdm13ps3,4001): WEATHER
Port 3 (mdm13ps3,4002): SLIT
Port 4 (mdm13ps3,4003): ADAM (Advantech ADAM-40xx analog I/O pucks)

Port 4 is invoked from the slit.C program (methods Slit::Taux(), ::SlitState(), and :: slitCommand()), and from digits.C and observatory.C.

Not sure if this gives Dick Treffers ideas as to what might be going on. [Pogge]

Slew Not Converging “Error”

Problem(s) Encountered:

When I was going to close at the end and issued the point command, the move halted partway through with a slew not converging error (tracking had been turned off so that wasn't the problem). I didn't check the position of the telescope by hand, but position readout indicated HA=0 and a dec of about 45. Repeating the command put the telescope in the zenith.

The command I was using was

```
point ha=0 dec=31:57:12 nodome
```

as usual.

Solutions:

These “converging errors” appear to happen from time to time. I believe something is timing out, but what I do not know. So far, resending the command seems to always resolve the issue.

Thursday, November 15, 2018

Motion Failure

Problem(s) Encountered:

Telescope motions failed.

Solutions:

This is Eric submitting a report for last night.

Telescope would not move in declination. Had the 2.4m observer cycle the dec controller but the problem remained.

This morning, I found that the +24V in the TCS box to run the motor was not there. Verified that the +24V was at the other end, in the RA drive enclosure. This pointed to an issue with the pin/cable. Pulled the wire for the signal at both ends and ran a singular wire from the dec controller TB to the connection in the TCS electronics.

Verified the presence of the +24 and verified telescope functionality. This is a robust enough (if also ugly) fix, but eventually a new connector will be pinned and installed.

Monday, November 12, 2018

Homing the Dome

Problem(s) Encountered:

At the end of the night, when we tried to home the dome we got the following errors, while the dome seemed to rotate without an end point:

ERROR home axis=m_az timeout

ERROR dome m_az not homed

Solutions:

From previous trouble reports, an observer suggested sending the dome to home using a direction LEFT rather than AUTO, this worked and the dome went home.

Friday, November 2, 2018

Pointing Issues 2

Problem(s) Encountered:

At the beginning of the night the telescope continued to have pointing problems. The telescope would point toward a target far in the EAST above HA=3, and had one of two problems: 1) the stars were elongated along the East/West Direction, 2) the stars were round, but tracking would be lost on the telescope within 2 minutes of slewing the telescope.

Solutions:

The problem was fixed when Eric told us to adjust the preload an 1/8th turn CCW.

No problems with elongated stars or lost tracking were encountered for the rest of the night.

Friday, November 2, 2018

Pointing Issues

Problem(s) Encountered:

Beginning of the night had problems pointing and accurately finding targets. In order to determine position, pointed to a bright star and uploaded the image to nova.astrometry.net to determine the center of the field coordinates. We then reset the telescope coordinates to reflect these coordinates.

The telescope then lost pointing within an hour and this procedure had to be repeated once more. After this point, the telescope pointed without incident for the remaining 8 hours of the night.

At the end of the night when the telescope was pointed to the zenith the tip tilt sensors read: E/W -003 N/ S -014, although pointing previous to this had left targets centered in the field of view.

Solutions:

The pointing issue may not be fully unexpected as I re-zeroed coordinates after the work on the failed coupler in the dec drive system.

The E-W oscillation is likely the same as has been seen on occasion last month. It's worth noting that moving to the west appeared to correct this issue so a potential workaround may be to move east of an offending target, then return, approaching from the east, to see if that corrects the issue. I am also going to slightly adjust RA preload this afternoon (reduce gear lash) to see if that changes anything.

For more on the E-W oscillation, see below:

RE: Oscillations:

Treffers recalled this issue from the early days of the new TCS. He remedied the situation by implementing a "notch filter" in the PLC. He went into the code this morning and verified that those notch filter parameters are still in place (they are). He commented that this problem is not easy to diagnose or resolve as it is dependent on telescope position, balance and preload. He and I will run some further tests on Monday to see if we can isolate any potential trouble spots.

In the meantime, it might be worth pondering an upgrade of the HA motor to an Omron, equivalent to the one we now use for dec motion. It's a much more robust system that plays nicely with the existing PLC. Treffers has one "on shelf" and since we already ran the 220V for the other Omron, swapping over would be simplified compared to when we did the declination system.

Thursday, November 1, 2018

Problems in the East(?)

Problem(s) Encountered:

a) 18Oct2018: Trouble started when I slewed to HA=-6, dec=+53. The telescope almost got there, but stopped short a few minutes of time with an error. I waited for a while, and started observing at HA=-5.5. But many times the tracking stopped after a couple of minutes. The telescope apparently 'prefers not' to observe at such a position, even though it clearly can. After a while another problem appeared: a rapid E-W oscillation, much faster than the guide camera could resolve. This was seen many years ago, and was traced to a ~10 Hz oscillator in the system. Eventually this problem also went away, and the telescope behaved very well at small hour angles.

b)24Oct2018: RA direction tracking had a problem while trying to observe the targets in the eastern sky. It solved after rebooting the control, but we lost 30 minutes of observation time.

c) 01Nov2018: ...when pointing into the East at HA>3, the stars appeared elongated along the East/West direction. If the telescope was then pointed back slightly to the West even at HA>3, the stars no longer appeared elongated.

Solutions:

When this problem initially occurred many years ago, notch filter parameters were added to the PMAC to filter out this oscillation. Verified that those parameters still exist (they do). Will do further tests in the coming days to see if anything stands out.

Thursday, November 1, 2018

Lost Connection to Owl Software

Problem(s) Encountered:

OWL stopped taking data. We attempted to restart OWL and got the following error:

```
ERROR - Driver PCI Device 0 failed to open
ERROR - ( CArcPCI::Open() ): Failed to open device ( /dev/astropci0 ) : ( errno: 16 ) - Device or resource busy
```

Solutions:

Shut down Owl software and reboot *mdmarc2*.

Wednesday, October 31, 2018

Slew Errors

Problem(s) Encountered:

When we attempted to slew to a new target, the telescope repeatedly came back with a slew error. The error read:

```
ERROR point not converging dist=11.430 dra=8.641 ddec=7.483
```

(although the numbers at the end changed slightly each time.) After driving the telescope by hand toward the zenith and then slewing the telescope again, the telescope pointed without a slew error. The error repeated itself again 2 slews later, but was fixed by just telling the telescope to slew again.

At the end of the night we encountered more pointing errors with the error code:

```
ERROR dome axis=m_az timeout
```

This time we managed to get the telescope to point the zenith without a problem, but then when we attempted to point to a target again, the telescope continued not the slew. We opted to close the telescope at this point.

Solutions:

Telescope behaved like there was a preload issue in dec. Movement was choppy and seemed to bind frequently. This occurred most when changing the direction of travel. Adjustments to preload however did not resolve the issue. I also changed out the fluid in the preload's hydraulic cylinder but the problem persisted. At this point, I had Tony watch the system as I tried moving in dec. It was quickly discovered that the flex coupler between the dec drive train and the encoder had failed. This is a large coupler and we have no spares. No spares on the summit either. But we do have vinyl tape. Considering this connects the encoder (low torque), tape is worth a shot. Taped it up and all is well again. I also tightened all hardware mounting the encoder to the telescope, which was all quite loose (cause of the failure—motion and play over time??). A new coupler will be ordered and installed.

Wednesday, October 31, 2018

Dome Shutter/Dropleaf Procedures

Problem(s) Encountered:

Had minor issues with the slit not closing when the rslit task had stopped working. Restarted the rslit command and the dome was able to close.

When I went to reopen the slit would not open due to the rain command. Was able to simply override the slit open command with `tx slit open dammit`.

Solutions:

When restarting telescope servers (like rslit), it is not necessary to close the TCS GUI although you will need to "Refresh" it with the button located at the bottom-left of the GUI. JSkyCalc however, needs to be restarted as there is no easy refresh to reconnect (currently).

Thursday, October 4, 2018

Guide Probe Motion Failure

Problem(s) Encountered:

Guide probe never worked reliably. At start of night it was in the center position. Commanding it to go to origin did nothing. We fiddled with it and got it to work for our first target, but then we could not acquire guide stars after that. Motion in y seems to be problematic. So we decided to close up about 0100.

Solutions:

Close the xmis2 GUI, power cycle the MIS. Open the xmis2 GUI and reinitialize.

Monday, September 17, 2018

Dropleaf Control Failure (remote) x2

Problem(s) Encountered:

Dome slit and dropleaf controls are not responding. The error message is ERROR: Could not send command. Socket is not connected.

Solutions:

The rslit task had stopped. Quit the TCS GUI; in a terminal window type *telescope status* to see if any servers are stopped. Type *telescope stop* to stop all servers; type *telescope start* to restart them. Open the GUI, initialize and control of the dome shutter systems returned. It may be prudent to restart JSkyCalc and time the telescope servers are cycled.

Thursday, September 13, 2018

Dropleaf Control Failure (remote)

Problem(s) Encountered:

At the end of the night, the dropleaf would not close.

Solutions:

The rslit task had stopped. Quit the TCS GUI; in a terminal window type *telescope status* to see if any servers are stopped. Type *telescope stop* to stop all servers; type *telescope start* to restart them. Open the GUI, initialize and control of the dome shutter systems returned. It may be prudent to restart JSkyCalc and time the telescope servers are cycled.

Thursday, August 30, 2018

OWL Readout Failure, again

Problem(s) Encountered:

During the afternoon, the camera started reading out blank frames, i.e. frames that looked like biases, while it was taking flats. With Justin's help I verified the shutter was operating (or at least clacking). He cycled the ccd electronics, which didn't cure it; we then turned it all the way off and left it that way for a couple hours. After powering back up before sunset, it came back up OK and was fine for the rest of the night.

Might be a good idea to power down during the day.

Solutions:

This has happened a couple times. Not really sure what is going on with it. Doesn't seem temperature-related, but who knows. All I can do is watch and see... .

Thursday, August 30, 2018

Filter Wheel Command Failure

Problem(s) Encountered:

During 0:40~2:00, filter wheel did not work. Justin Rupert (queue observer) fixed it.

Solutions:

The RJ45 connection to the port on the filter wheel side had come loose. Thankfully he spotted this quickly and reseated the cable, correcting that issue.

Tuesday, August 28, 2018

Slit Control (Remote) Failure

Problem(s) Encountered:

Until ~20:50, dome and mirror cover were not opened. Eric came to the mountain and fixed it temporarily.

Solutions:

Looking through the drawings, I found what appeared to be a hung port associated with slit commands (rslit) on the ethernet-serial server (V-Linx ESR904). Consulting with Treffers, ran some tests that indicated that commands were being issued but responses were not being received. Further tests isolated the issue to this port (port 4) on the server. Thankfully a spare port (port 2) was available on the server. Coding for the *rslit* telescope server was modified to reflect the port change and with the help of Rick Pogge, the new code was linked on the new tcs server (to be determined whether the spare server auto-updates as well). All is now up and running again. I have a spare server of unknown state (I'll consult Bob Barr for any details remembered), but if it turns out to be questionable, I think a spare one is in order.

It's unknown what killed this port. Last time the telescope was operated was 2018Aug13.

Tuesday, August 28, 2018

Dec Motion Failure

Problem(s) Encountered:

Telescope did not slew along Dec Axis, as described in TCS System Control Failure 2 in may 10, 2017.

Problem first occurred while trying to home the telescope to zero the telescope, which failed with the error: ERROR point not converging dist=1.376 dra=1.338 ddec=0.046. These error occurred whenever I issued the telescope to move while *tracking was off*.

While tracking was on, different error message was shown: ERROR offset m_dec fatal following error

The slew could be completed if the slew command did not involve offset along dec direction.

Solutions:

I assumed this was likely caused by a hangup of the dec motor controller but it turned out to be a loose pin in the connection to the Omron motor within the TCS electronics chassis (C22, pin 1 (white wire)). The pin will need to be replaced, which I plan to do at some point this summer.

Tuesday, July 10, 2018

OWL Readout Failure

Problem(s) Encountered:

OWL was not able to readout and save image.

Solutions:

Tried correcting the issue remotely to no avail. See the two images below. It seems to be having issues reading out the chip format. At least that is what has caused similar issues in the past as far as I recall. I can intermittently get things to read out if in setup, I set rows=columns=800, but even that seems to fail after a few exposures. Nothing I tried corrected the issue. The next day on the mountain, things appeared to be much more stable. I did get a similar failure, but only once out of many dozens of test integrations. Since then, the issue has not occurred again. Perhaps thermal-induced? Perhaps a hiccup in the control software?

Thursday, May 24, 2018

OWL Fails to Open

Problem(s) Encountered:

At the end of the night I inadvertently hit the exit button in the Owl window -- I think -- and then could not get it restarted. Lost only a half-hour of time at most, in twilight. It would be good to get it going again before taking Echelle off to be sure there's nothing actually wrong with it.

Solutions:

Found a stranded process associated with Owl. Killed it and Owl returned to normal behavior.

Sunday, May 13, 2018

No Light to Camera (Andor)

Problem(s) Encountered:

Unfortunately, I didn't conduct any observations tonight. First, the DEC controller didn't respond and it had to be power cycled. I informed Eric and afterwards Don Terndrup, who observe on 2.4-m came and helped me with that issue.

The second problem turned out to be more complicated. The Andor camera didn't get any signal. I tried to change gain from 1x, to 2x and 4x (solution I found in manual and also Eric suggested that). However, it didn't solve the problem. Due to lack of ideas I closed the telescope.

Solutions:

Found that the shutter in the Buckeye filter wheel (FW) had closed for some reason. 3-position switch was set to "Open/Manual" but when I cycled it to "Close/Off" I did not hear the shutter close. Switching back to "Open" resulted in the clack of the shutter opening and the detector can see light again.

I'll speak with the 2.4m observer about how to solve this if the problem occurs again. Sorry for a lost night on a simple issue.

Wednesday, May 2, 2018

MkIII Setup Hiccups

Problem(s) Encountered:

The two main issues were that

1) the guider camera is far out of focus. We were pushing the top guider focus button and it stopped improving (spot getting smaller) when we hit the end of the range. From where we started, we probably had moved about 1/3 of the way towards best focus, but still saw a fairly large donut.

2) it seems that the slit viewing camera may have been loose and/or had a mechanical interference, possibly with guide probe movement.

We can see two slits, but as far as we can tell, neither is actually the entrance slit. We tried to position a very bright star over both, but no light showed up on image. We **think** this happened when the guide probe was moved towards a star near center of field, but it isn't clear whether that was a coincidence.

Solutions:

Guider focus was moved to the *inner* limit. I had adjusted the rough mechanics for the guide probe prior to setting up the MkIII as needed, but guess it was not adjusted as much as needed. I've moved the rough adjustment further *in* and centered the motor-mic again, allowing for travel in and out. Should be able to focus on a guide star now. It should be noted however that even on a donut, the system is robust enough that guiding is possible.

The issue with the slit-viewing camera boils down to setup error. The camera optics were pushed in and focused on a slit. The issue though is it was the wrong slit. Using the linear array of pinholes at the end of the slit plate, I aligned the Andor optics to look down at whichever slit is in the instrument path. I then verified that I was indeed looking at the smallest slit option (requested). Should be good to go.

Wednesday, April 25, 2018

Dec Motor Controller Trip

Problem(s) Encountered:

I got telescope slewing error. Then, I try to point the telescope to reset.. But, it cannot point either. I try to home Dec and Ra for the telescope,

Then got the error: ERROR where m_dec not homed . Moving the telescope using the Paddle also failed. I gave up the observation.

Solutions:

The dec motor controller had tripped. Resetting it and homing telescope axes corrected the issue. This is a “darned if you do, darned if you don’t situation”. In order to try to eliminate wind shake, I have to tighten dec-axis preload. But this causes added tension in the gear train, resulting in higher current draw, which results in the controller tripping. The key is to find the sweet spot somewhere in the middle. Be aware as well that I am currently working on setting up system to allow for the dec motor controller to be reset remotely. I’ve got cable run but still need to wire things and then interface to the controller. It’s a bit of a ways out, but on the horizon.

Tuesday, April 24, 2018

mdm13ws1 logged off

Problem(s) Encountered:

During early remote observing, in the beginning, MDM13WS1 may have either rebooted or had processes stopped. We could not start X11. Eric switched us to MDM13WS2, and everything worked.

Solutions:

It appears that somehow the machine was reboot at some point last night. While I could ssh to it, vnc was not capable as obs13m. I was able to vnc as root, getting to the login screen. Once I logged in and the remainder of startup processes completed, I could once again vnc as obs13m. It appears that X DISPLAY does not start prior to the login screen, disabling anyone except root from using vnc until the machine is logged into locally.

Wednesday, April 4, 2018

Filter Wheel Rotation Failure

Problem(s) Encountered:

The filter wheel got stuck when moving between filters at the beginning and at the end of the night. In neither case was the pointing angle extreme. One was at sec z = 1.25, and the other was at zenith. Reinitializing the MIS fixed it. But, since these were the only two times that I changed filters, it seems like it could be a persistent problem. It happened to me once a week ago, and also to another observer last weekend according to the reports.

Solutions:

A number of things were done to try to resolve this issue. The FW was disassembled and put back together; the controller was reseated, and filters were installed symmetrically around the wheel now. There have not been further issues for well over a week. Not sure why, but I’ll consider it fixed, at least for now.

Templeton Noisy Columns

Problem(s) Encountered:

At the beginning of the night I noticed a large number of noise columns in bias frames, but at a very low level of counts. This happened a few years ago, but I don't remember if there was a definite cure. Maybe something with the fiber optic? I put an example up on ds9 if you want to see it (image 63). At the end of the night I did a couple more bias frames and the effect had largely gone away (those are images 400-401 in the same directory).

Solutions:

This has been an issue that occurs from time to time. It typically goes away on its own. That said, I went ahead and shut down the control box for the majority of the morning (it had been on for a number of days by today) to allow the electronics to cool. I also cleaned both ends of the fiber running to the control PC. After bringing everything back online, everything looks good.

Thursday, March 15, 2018

Telescope Focus Failure

Problem(s) Encountered:

There was a problem with focus.

Since the first image observed with focus value of 837 was out of focus we tried to change the focus value.

Focus value on the TCS GUI changed appropriately when we send new focus. However the focus of image didn't change at all even we changed the focus value from 800 to 900.

Solutions:

Found that the coupler that connects the focus motor to the drive assembly had sheared. Had one spare left and installed it. I also added a small amount of grease to the worm gear on the drive. Drove from nominal to home a number of times and all seems to be functioning correctly. I suspect the high humidity and cold possibly had something to do with the failure of the component. Spares have been procured.

Tuesday, February 20, 2018

Templeton Bad Column

Problem(s) Encountered:

Seems like CCD got a trouble. There was a line which appeared on the almost every image I have taken.

Solutions:

Templeton has historically had a bad column (see image below). Also occasionally, some vertical lines (noise) appears, but this tends to go away after a number of integrations. Right now, everything appears as expected.

Motion Failures

Problem(s) Encountered:

When slewing to the next target I got an error: point not converging. So I tried to home the telescope but it would not move in either axis. Restarting the telescope program and TCS GUI, I saw that HA, Dec, and Equinox were not being displayed. Suspecting that the Dec motor power needed to be recycled, I asked Rob Fesen to do that. Then, I was able, through many attempts to get the telescope to HA zero and just a few degrees from home in Dec. But I still get Error where m_ha not homed, and the same error in Dec. The HA, Dec, and Equinox are still not displayed, although the TCS seems to know the time and the RA. Another thing I found is that when I tried to use the software paddle, the rtel program would cut out.

I closed the mirror cover and dome with no problem. The telescope is close to zenith.

Solutions:

Found the dec motor controller box indicating an error this morning. Cycled power to it, correcting the error. Found the TCS GUI as detailed by Jules. When I went to home HA, I noticed that the boxes for both HA & Dec were checked. Trying to home more than one item at a time can have unexpected and negative consequences (I wish the option wasn't even presented!). I unchecked the Dec box and home HA. I then homed Dec as it claimed to not be homed either. Once HA & Dec were homed, all values in the GUI (HA, Dec, equinox) were displayed properly again. I then drove the telescope around, focusing on dec motion to make sure everything looked ok. At zenith, I zeroed encoders relative to tilt sensors then drove around a bit more. Everything appears to be functioning properly.

Wednesday, January 17, 2018

ds9 Linking and Owl Freezing

Problem(s) Encountered:

1. Could not open observed image in ds9 for imexam.
(mdmarc2 may not linked)

2. At the end of observation, OWL3 stopped.

Solutions:

1. If ds9 is opened from the task bar at the top of mdm13ws1, IRAF commands will be linked to that process.

2. ssh obs13m@mdmarc2, use standard password.

sudo /sbin/reboot and again use the standard password.

Computer has been reboot and Owl is now functioning properly.

Monday, December 11, 2017

Virtual Hand Paddle Dec Motion Issues

Problem(s) Encountered:

At the end of the night the north-south buttons on the virtual paddle stopped working. EW buttons were fine, and the gross movement in dec was good also (slew worked). Tried restarting the GUI - didn't help - but didn't have time to pursue it further with dawn coming on.

Solutions:

This likely has to do with how the declination preload is tensioned. Using larger motions (setting the hand paddle to 10), I see that the telescope does indeed respond to demanded movement in declination. I think the issue being seen here stems from throttling back the preload and thusly adding a little extra gear lash. After installing modspec, I noticed severe 'moaning' from the telescope when moving in declination. Indeed the motor controller even tripped a couple times. I lessened the preload until the moaning got a bit better. It still moans, but I think it's in a tolerable threshold now. That said, I did increase the preload slightly this afternoon. It moans a bit more but not too badly. Moving the telescope around, I verified that the controller wouldn't trip. This will reduce the gear lash and hopefully make the hand paddle control slightly more responsive.

Tuesday, November 7, 2017

Point Not Converging Errors

Problem(s) Encountered:

Had issues with pointing. Encountered repeated point not converging errors. It seemed to point to the requested coordinates in RA but not in DEC. Reset telescope then closed and reinitialized TCS GUI. Neither had any effect. The 2.4 meter observers reset the dec motor controller and the pointing still did not respond.

Finally, Eric stopped and restarted all programs and manually zero'ed the telescope after which pointing was restored.

Solutions:

Stopped and restarted all programs and manually zero'ed the telescope pointing at zenith.

Sunday, November 5, 2017

More Tracking Woes

Problem(s) Encountered:

Telescope stopped tracking and could not be fixed for at least a couple of hours. Stop and start TCS didn't fix it. Then it spontaneously started working again.

Solutions:

This issue seems like it may be limited to a specific orientation on-sky. Specifically, it has happened with some repeatability around HA=-04:56/Dec=53. Of course, when trying to watch for anything odd on motor pulses/signals, the problem did not occur. It's a known issue that we are scratching our heads over currently.

Wednesday, November 1, 2017

Tracking Shut Off, Again

Problem(s) Encountered:

Tracking spontaneously shut off during exposure. It is similar to what has been reported on 16th Oct., but it recurred over and over several times.

It did not show any error message, as if it received tracking halt signal.

Tried re-issuing tracking and slewing again to object, which worked for some occasions, while sometimes it just kept recurring. Could not solve it till the morning.

Solutions:

This issue appears to be ongoing and potentially position-dependent. It has been seen with some consistency around HA -4:50/Dec +53. Of course when running tests, it worked fine. Current dynamics look steady and fine when plotted. Can't do much else currently but wait to see if failures continue.

Thursday, October 26, 2017

Tracking Shut Off

Problem(s) Encountered:

TCS changed tracking Off, so that there was an guiding failure.

Solutions:

This issue had been solved immediately by re-run JScaky calc and TCS S/W.

Monday, October 16, 2017

Telescope "Flop"

Problem(s) Encountered:

Multiple exposures were lost due to what seemed like the dewar shifting in position during the exposures. The guider was tracking perfectly fine but the images had double stars. Problem occurred 2 times during the night but then seemed to stop.

Solutions:

These jumps in 1.3m images are a legacy issue going back at least 20 years. We think they are due to guide probe mirror flops in the MIS. Once or twice a night is typical. I saw one a couple of nights ago in data from John T's run. If you were watching the guide camera tracking graph in real time you would probably have seen the jump. (Jules Halpern)

Saturday, October 14, 2017

Owl Failure

Problem(s) Encountered:

Owl stopped.

I found the solution ; reboot mdmarc2
But I could not reboot.

Solutions:

Login to mdmarc2 as obs13m (ssh obs13m) and perform `sudo /sbin/reboot`. Enter appropriate password and reboot will occur.

Monday, September 25, 2017

TCS Slit=Rain Workaround

Problem(s) Encountered:

The TCS says slit=rain even though the slit closed properly during a very rapid spike in the humidity.

Solutions:

If there is ever issue with opening the dome slit due to a reading of 'rain', a workaround (assuming it truly is safe to open!) is to try the following command:

```
tx slit open dammit
```

Tuesday, September 19, 2017

VNC Connection Issues

Problem(s) Encountered:

Lost the remote connection and couldn't get back in because x11vnc stopped working. It first offered port 5901 instead of 5900, but I didn't know how to use that, and eventually x11vnc didn't even get that far.

Solutions:

Some comments on x11vnc. If you see a new port number, you probably have another vnc service still running. A `killall x11vnc` and `killall Xvnc` might help (or reboot if feasible). In addition, it's always a good idea to reboot the client machine from where the ssh tunnels originate.

One last comment you can use x11vnc on other port numbers but the ssh tunnel used must be changed to match that port number (the right hand side number of the tunnel config must match what is reported by Vnc). (David Will)

Saturday, September 16, 2017

Guider Focus Motion Failure(?)

Problem(s) Encountered:

Spent about 10 minutes trying to focus the guider camera before realizing that I can't move it either way. Don't bother about this; it still guides okay on a donut.

Solutions:

Checked the voltages on the KMTronic USB Relay box used to gate voltages to the guide probe motor mic. Voltages are as expected ($\pm 12\text{Vdc}$). Pulled the detector and FW and opened access hatches.

Verified that the motor mic moves in and out as commanded via focus GUI (on guider PC). Then verified that the mechanics attached to the motor mic are also moving by placing my finger in front of the stage that the prism sits on and feeling the stage move in/out as focus in/out demands are made. Not sure what else could be going on to cause any issue as everything appears to be working. I did go ahead and move the rough position of the motor mic inwards a bit as I noticed that the motor mic was biased inwards. I then moved the fine focus outwards a bit to compensate.

Since the guider is robust enough to guide on an out-of-focus image, I think all that is left to try is to go back on-sky and see what things look like. Since the telescope is not scheduled for tonight, perhaps I can try running from home if time/weather permits. Otherwise, the current state of the system can be verified tomorrow night by the Gallo crew.

Incidentally, it should also be reported that when pulling the FW and installing it again, I ran into issues with 2 helicoils. The one east-of-center on the north end pulled out completely. This is not too much of an issue as the bolt hole is a pass-through. So I have simply utilized a longer bolt and a nut.

The second one is more concerning. It is east-of-center on the south end. It is holding, but I cannot tighten it completely as the bolt will then loosen again. So I can only tighten it to the 'sweet spot' where I feel the most tension on the bolt. The truly concerning part of this one is that the south-of-center helicoil on the east side has already failed badly enough that it is questionable whether or not a new one can be installed. If we lose both helicoils on this corner, there would be no bolts to support the SE corner of the FW.

It is certainly time to consider how to resolve the helicoil issue on this FW, and possibly time to consider fabricating a new top-plate for this FW.

Friday, September 1, 2017

Pointing Issue

Problem(s) Encountered:

Communication loss when attempting to slew to target. Telescope stop --> telescope start --> TCS restart (& re-initialize) --> jskycalc restart resumed communication.

Pointing error discovered immediately after this problem; the telescope slew-to-target missed the target, a miss later determined to be about (13.25, 0.5) arcmin in (RA, dec), or > 5 times the width of the field of view.

We were able to correct the pointing and resume science with a minor modification of the example `reset telescope coordinates` procedure in the `jskycalc13m` manual; instead of looking for a bright star, we used nova.astrometry.net to determine the current field center and then fed those coordinates into `jskycalc` in order to `reset telescope co-ordinates`.

Once this procedure was complete, the slew-to-target was close enough to correct that the science target fell within the field of view and could be centered using the paddle controls. At the end of the night, with the telescope at zenith, the encoders showed (-004, -009), which seems acceptably close to recommended rough values. This procedure requires the internet connection to work, but it does remove the need to hunt for a bright object and is reasonably quick.

Solutions:

Contained above.

Monday, August 21, 2017

Obstruction in Light Path

Problem(s) Encountered:

Mysterious large obscuring structure(s), partially in focus, that appears to move (at one point covering half the visible sky, this at 1x1 binning with the Andor), then vanishing. Visible in the science images. Later, an obscuration was seen again, this time with a more complicated structure. Finally, while attempting morning twilight flats, an obscuration was seen again, this time moving rapidly (about 1/3 the field of view per 10s exposure).

Observers not sure what these structures are. Visual inspection turned up nothing obvious on the primary or secondary mirror, and nothing obviously blocking the light path. Attempted closing and re-opening the MIS hatch cover had no effect on the obscuration.

Our best guess is that this might be wildlife of some sort, possibly crawled into the baffle in the middle of the primary mirror.

Solutions:

Pulled camera and looked up through optical path. Found nothing obstructing the light path, although that means little when it comes to transitory visitors (aka moths). Blew some air around inside and haven't seen any more issues since.

Friday, August 18, 2017

XMIS Guide Probe Motion Failure

Problem(s) Encountered:

While running through systems with the next scheduled observer in order to start bringing him up to speed on using the 1.3m, the x-stage failed on the guide probe assembly. Checking the log, it appeared that both limit switches were registering as tripped.

Solutions:

Pulled the instrument & FW and removed the MIS bottom plate. Found the lower-limit (0) limit switch to have essentially disintegrated. Not sure what happened but it was in many, many pieces. My best guess is that the switch failed and the guider stage squished the switch. Pulled the remaining pieces and found a spare to install. Installed and tested. All is well again. Put everything back together. Will order some spare switches (I currently have two) considering how many are in each MIS.

Friday, August 11, 2017

LN2 spillage from Detector (Templeton)

Problem(s) Encountered:

Cryo was filled about 30min before the problem occurred. When pointing near the zenith, it seemed to have no problem. While slewing toward lower altitude, substantial amount of liquid nitrogen leaked out of cryo as a continuous stream. Similar problem happened yesterday, after an hour filling up the cryo.

Solutions:

The leakage of liquid nitrogen, while alarming, is normal. The dewars will last nearly 24 hour if filled properly, and I've never had one run out during the night because of loss of LN2. (John Thorstensen)

Saturday, July 15, 2017

Remote Control of Dome Slit/Dropleaf Failure

Problem(s) Encountered:

When closing for the night, after entering `tx dropleaf close` to close the dropleaf, I received an error on the TCS log. Something about the `Y adam` not working correctly. I foolishly didn't save the error before restarting the software (I thought the log messages carries over between restarts, but that doesn't seem to be the case), so I don't have the exact text.

After the error, however, I couldn't raise or lower the dropleaf or slit. I could enter all of the commands I wanted to, but they did nothing: they threw no errors, but just sat there with nothing happening. I contacted the 2.4 m observers and they were able to manually close everything up, and that's where we stand right now.

Solutions:

Open a terminal on `mdm13ws1` and type `telescope stop`. Then type `telescope start`. Reopen or reinitialize TCS GUI and system once again talks to the dome.

Monday, June 26, 2017

JSkyCalc Pointing Error

Problem(s) Encountered:

The first slew failed with a yellow error message in JSkyCalc13mGS slew status field of 'unknown status'. This meant that the TCS responded with some string that JSkyCalc doesn't recognize - the code knows to look for an error and for a successful completion, but nothing else, so I don't know exactly what message the TCS was returning. The dome camera confirmed that the telescope had not moved appreciably.

I checked the dec controller and it did not show an error. I then realized that JSkyCalc was showing a wildly wrong telescope position below the horizon. I restarted the telescope server, and JSkyCalc, reset the pointing in the zenith on the tilt meters, found a bright star, and was good to go. I wish now I'd been a bit more incremental and observant in the process, but I wanted to get on sky

It was handy to be able to reset the paddle gain in this situation, but the documentation giving the command for this is a bit hard to find. This doesn't matter that much since the telescope is mostly used remotely, and the remote user can't reach over the interwebs and push the buttons on the hardware paddle.

Solutions:

See above.

Paddle gain adjustments are described here:

<http://mdm.kpno.noao.edu/td/Instructions/index.html>

Friday, June 23, 2017

Nodding???

Problem(s) Encountered:

The classic nodding problem returned while I was tracking a target around 2 hr west and a bit north of the horizon. It manifests as random north-south jerks of about 10-15 arcsec; in this case it always returned to the center position (it was not guided back -- the guider recenters things much more slowly than what I saw. The nodding occurred intermittently and whole minutes went by without it.

Solutions:

Wind perhaps? I hope...

Wednesday, June 21, 2017

TCS GUI Crashes

Problem(s) Encountered:

I forgot to mention that yesterday the TCS GUI crashed several times and had to be restarted. Not sure if this is a real problem yet.

Solutions:

I went ahead and closed GUIs and reboot McGraw just to see if it helped. No complaints of anything crashing over the weekend.

Friday, June 2, 2017

TCS Systems Control Failure 2

Problem(s) Encountered:

The telescope would not move in the Dec direction. Point or offset commands in the E/W direction moved the telescope, but any command involving N/S threw a 'point not converging' error; JSkyCalc also could not move the telescope. The hand paddle GUI was able to move the telescope in the E/W direction and did not throw errors for N/S offsets, but it was obvious from the tilt meter that the paddle would not move the telescope N/.

I restarted the tcs services and the control panel, but nothing changed. I homed the dome, moved the telescope to zenith, and used 'zero', following suggestions in the trouble report archive, but without success. Finally, I tried to home the Dec axis. This failed (ERROR home axis=m_dec fatal following error), and then the telescope would not move at all because it did not know where it was. Further attempts to move the telescope with the hand paddle led to ERROR in service ether=localhost,0x1341 and shut down the rtel service, which required a 'telescope stop' and 'telescope start' to fix.

I then used 'home force dec' to force the telescope to recognize its location, and then 'zero'ed it at zenith. This re-enabled pointing/offset, but Declination motion still failed. I stowed the telescope and gave up for the night.

Solutions:

Found the dec drive controller to be issuing an error (*err 131*) upon inspection. Cycled the 220V knife switch and all is well. Did not have to home any drives. Moved telescope and dome around via TCS command without issue. All servers continue to respond positively. This issue likely occurred when line power was restored (we'd been on generators for roughly 48 hours) last night. The changeover can be somewhat abrupt and I've seen the dec drive power system behave badly during such changeovers in the past.

For future reference, I'm including some images of where the driver system is located and what knife switch to cycle in the event this happens again.

Wednesday, May 10, 2017

TCS Command Issues, Various

Problem(s) Encountered:

Problem with dome centering, needed to set Az manually.

Needed to restart telescope to close dome slit at end of night, as it wouldn't move.

Also some trouble with pointing. Jskycalc didn't always take new coordinates, needed to hit button to slew twice, etc.

Solutions:

Since there is a change in observers tonight, I brought the telescope systems down. For good measure, I included a "telescope stop" command. Experienced errors when trying to do a "telescope start". tserver and rtel would not come back online. Power cycled the TCS box in the computer room then successfully performed "telescope start". Homed all telescope components and tested everything out. All appears to be working well.

Wednesday, April 26, 2017

Image Jump, RA

Problem(s) Encountered:

I followed one target far into the west and saw jumping in RA similar to the dec jumping we used to have -- amplitude the better part of an arcmin. I was integrating for 1 min so couldn't really follow the time history in detail. The telescope always returned to position, and regained the guide star. For reference, this happened within maybe a half-hour of the west limit at declination +23. No time was lost.

Solutions:

I wonder if this may have been caused by a gust of wind. The blurring seemed to settle in two states, effectively jumping from one position to another, before returning to the original state. Winds were strong from the west and this sounds like it could have been a gust.

Thursday, March 30, 2017

Dome Command Issues 3

Problem(s) Encountered:

After closing at midnight for high humidity, I tried to open 3 hours later using 'tx slit open', which gave

```
ERROR slit cantopen=rain
```

in the TCS Session log. I tried stopping and starting the telescope servers, and restarting the TCS gui, to no avail. I've seen this error in a trouble report before, on 2016 April 8. The 2.4m observers thought it could be due to ice, so they didn't open manually. But I doubt that's the problem. The humidity was 81%. Is this just a bug in the TCS?

Solutions:

If the humidity sensor believes that it is too wet to open, it will try to lock the observer out. This is, in theory, a useful feature, but in practice it has proven to be far too conservative on estimating humidity. If the conditions truly warrant bypassing this interlock, it can be done with the following commands:

```
tx slit open dammit  
tx dropleaf open dammit
```

This should only be performed if it truly is safe to open of course.

Sunday, February 26, 2017

Dome Command Issues 2

Problem(s) Encountered:

When I went to close at the end, the command

```
tx dropleaf close
```

elicited

```
error dropleaf slit busy
```

even after I did a telescope stop/telescope start and refreshed the GUI. I ended up closing the dome by going down to the 1.3m, switching slit control to local, and pushing the buttons.

Solutions:

This is an acceptable way to work around this issue. On the next morning, I found no issues in GUI-based commands being issued to the dome.

Wednesday, January 18, 2017

Dome Command Issues

Problem(s) Encountered:

I started with 1-1.5hour delay. During opening of the dome, the dropleaf stopped and in Control Panel an error appeared: ERROR dropleaf adam read digit errors 27F00 .

Solutions:

Failure was resolved by closing the xtcs GUI, then typing *telescope stop*, followed by *telescope start* (cycling the telescope servers) in a *mdm13ws1* terminal window.

Wednesday, December 14, 2016

Pointing Failure

Problem(s) Encountered:

From ~2am, telescope pointing had become completely wrong.

When I moved the telescope to zenith, the Dec. difference is about 20 degree. So, I manually moved the telescope near zenith, and then initialized position using 'zero' command.

However, the pointing error was still so large that I couldn't find any nearby bright stars and our targets in CCD field.

Solutions:

Came in to find the telescope pointed a fair ways south of zenith. Physical and stated positioning was certainly different. Brought telescope to zenith via tilt sensor display (-003/-008) and zeroed the telescope using the following command:

```
zero ra=xx:yy:zz (local sidereal time plus a few seconds) dec=31:57:12 equinox=2016.9
```

then hit <enter> when the sidereal time matched the entered ra time. Command took without issue.

Slwed telescope to a couple points on the sky and then returned it to zenith. All motions appeared to work as commanded.

Thursday, December 8, 2016

4x4 Binning Failure (Owl)

Problem(s) Encountered:

Every time i tried binning 4x4 and then take an exposure, I would get an error saying ERROR - read image timed out, ERROR - no image file saved. Use *buffer dump* to rescue image data then if I tried to re-expose, I would get another error ERROR- not connected to any controller!

I was able to get out of this error by resetting the connection via *setup* , but I wasn't able to properly bin 4x4. I just kept getting the same loop of errors.

Solutions:

I don't know what to make of the 4x4 binning. I tried on the system at the 2.4m and verified that this does appear to be a problem inherent to Owl. Why it fails on 4x4 but not 2x2 is beyond me. Anyone who has input is encouraged to chime in (no one has chimed in on this).

Thursday, December 1, 2016

TCS Systems Control Failure

Problem(s) Encountered:

When I was closing up for the night, when the dropleaf closed, TCS read out an error saying ERROR - dropleaf adam set digit error . After that, I was unable to control the dome. i tried closing the slit and opening the dropleaf, but none of my commands seem to be recognized by TCS (thetext on the session log was black, no blue text). I even tried tx slit close dammit , but that didn't work. I tried quitting and reopening TCS, but that had no impact. in the end, the 2.4m observers had to close the slit for me (the dropleaf wasstill closed)

Solutions:

Failure with closing the dome was resolved by closing the xtcs GUI, then typing *telescope stop*, followed by *telescope start* (cycling the telescope servers) in a mdm13ws1 terminal window. The first attempt at correcting the problem resulted in an error when attempting to close the dropleaf. The error stated something along the lines of a "digit error". It was an error I hadn't seen before. I did a second attempt of cycling telescope servers, which resulted in the system coming back to full functionality. I will however want to test it some more this afternoon before completely signing off on this one.

It is also worth noting that when this error occurs, the problem involves *all* commands issued from the tcs GUI. For example, attempting to move the telescope (*point ha=0 dec=60 nodome*) after the error results in no motion as well. Not sure why the command line becomes nonresponsive unfortunately.

Thursday, December 1, 2016

Andor Realtime Display Oddities

Problem(s) Encountered:

For the entire evening I was getting very weird static on the Andor PC active view screen, as if the Acquisition Autoscale had no idea what it was doing. Occasionally all would be well and I could see the sky and stars, but 98% of the time it looked like static on an old TV, preventing me from seeing anything.

In the instances that it was back to normal , or if I manually adjusted the scaling parameters to see, virtually all stars looked overexposed/unfocused, even though we were dealing with maybe 1000-2000 counts. This made focusing extremely difficult.

I don't think any of this can be attributed to weather - as I said, the night was almost perfectly clear. I'm not sure what's going on in the software, and it's a bit of a mystery to me after having spent hours troubleshooting. I look forward to Eric's inevitable Oh, just press this button.

It should be noted that all exposures look fine on ds9 after they've been taken, so it's clearly on the live end of the software.

Solutions:

Came across a "Palette Select" button that seems to correct the real-time display dynamics.

Unfortunately, it doesn't bring up a cute little selection wheel or anything, just cycles through about 6 or so display options. I did this selection when viewing (0.1s exposures) the Xe comp lamp, but also am including a shot of the flat lamp as well. See attachments for better clarification. Hopefully this makes getting data a bit easier tonight. Erek, it might be worthwhile to muck around a bit in the system prior to my departure today to see if there is anything else causing confusion.

Tuesday, October 25, 2016

Filter Wheel Motion Failure

Problem(s) Encountered:

Filter error occurred a few times in the MIS GUI. Filter could not be changed.

In the morning, when I took flats, it was OK...

Solutions:

Conversing with the observer via email last night, I suggested simple resets of things within the xmis2 GUI, but the problem persisted. I then suggested they rotate the filter wheel in the opposite direction.

This seems to have helped out.

This morning, testing verifies that the filter wheel has issues turning, I believe CW when looking downward. These problems appear to be limited to slot positions 2, 3, and maybe 4 (BV and maybe R).

The problem only occurs here, when trying to go upwards (eg U to V, slot 12 to slot 2, etc...).

Approaching the problematic positions from the other direction (eg slot 6 to slot 3) seems to always work correctly. When the problem occurs, there is a sound as if the motor is binding, or not providing enough torque to start turning.

I seem to recall this issue occurring years ago, although I believe it simply went away with time. This time, it could be related to the recent drop in temp. Also, this is the 2.4m filter wheel, mounted on the 1.3m. This wheel has always seemed to take more effort to turn when rotation is performed by hand.

My current plan, since the telescope is not scheduled to go back on-sky for a number of nights, is to pull the filter wheel and install the one typically used on the 1.3m (was out of service for a time due to a failed detent roller, which is now repaired) in the past. Staff will then have time to open up the one that is having issues and see if there is anything obvious going on in there. Interestingly, last time this filter wheel was opened, the wheel spun without issue, so the additional resistance to turning comes from somewhere other than the bearing or gear play.

Tuesday, October 4, 2016

Tracking/Timeout Errors

Problem(s) Encountered:

Occasionally (about 5 times throughout the night), TCS would show a red error in the status line that read "send failed for command track: network operation timed out." TCS would seem to stop updating, but we were able to solve the problem by turning tracking off and back on again. It was annoying, but it didn't end up being much of a problem. I can't think of any specific cause for the error, because it would go off somewhat randomly.

Once it went off in the middle of an exposure, and once it went off when we were slewing.

Solutions:

Ran the telescope, with dome to various positions and let it track. Did this for about 5 hours without any errors at all. After stowing everything, I did go ahead and close the TCS GUI. Then from a `mdm13ws1` terminal window, I reset the telescope servers by issuing `telescope stop` then `telescope start` commands. GUI was reopened and initialized. If the problem persists, I can go a little deeper.

Wednesday, August 24, 2016

Telescope Motion Failure

Problem(s) Encountered:

At the beginning, the telescope did not move.

Solutions:

Found that the dec motor showed Error sign. Cycled the power on the dec drives and it worked. This is a simple fix, but observers should be shown where to cycle power for the dec drive. It is located in the RA gear house, at the base of the telescope polar axis assembly and access through a port on the south side.

Monday, August 22, 2016

Andor Direct Gain Issue

Problem(s) Encountered:

The Andor camera failed abruptly from one frame to another -- the frames looked like white noise (not zeros). We had been using the 2x gain; switching to 1x gain solved the problem.

Solutions:

The two slit-viewing Andor CCDs have now been sent back to the vendor for repair (one has an issue with the 4x gain preamp and the other has a potential vacuum leak, limiting the cooldown range). This camera is set to be used next month and so cannot be returned to the vendor again (yes, this is the one that was sent back in February due to an issue with its 4x gain preamp) until at the earliest, 07/11. In the meantime, it should still be operational at the 1x and 4x settings.

Wednesday, June 15, 2016

Filter Wheel Noise/Clunk

Problem(s) Encountered:

About half way through the night we encountered a filter wheel problem. We were switching filters and the MIS reported a failed move and wouldn't allow other attempts. The failure was accompanied by a loud CLUNK, which we later verified was from the filter wheel.

Eventually, we found that reinitializing the MIS would give us control of the filter wheel again. Most times, we were able to move to a new filter after doing this, but not always. Invariably, a subsequent move would fail and we'd have to repeat. The loud clunks continued, whether a filter change worked or not. The noise and the failures happened no matter which direction or how many steps we were trying to go.

We sent the telescope to zenith and looked in through the door of the filter wheel. You can see what's making the noise (metal bar over to the right as you're looking through the door). One thing we noticed when shining a flashlight in through the door is that the filters look FILTHY. Can they be cleaned?

Solutions:

Filters were actually not excessively dirty. Still, they were pulled, brushed and blown off.

The noise heard was the sound of the thin flex-coupling on the detent roller arm assembly shearing (see image). It will be sent back to OSU, who is also making a spare (or two?) for MDM. In the meantime, the

COM electronics was pulled from the 1.3m FW and installed on the 2.4m FW which was then brought down and installed on the 1.3m telescope. Camera and electronics were installed and all filters inserted. All systems tested ok.

Since the FW isn't needed on the 2.4m, at least through shut down, we have some breathing room. Also incidentally, lost a helicoil on the 1.3m FW when removing it from the telescope.

Monday, June 6, 2016

Templeton images all appeared to be biases

Problem(s) Encountered:

From ~1AM, all the data just look like a bias image. We took several test images with dome light on, but didn't get any signal. We also tried to reopen the shutter and the mirror cover several times, but still no change.

Solutions:

BNC connector on the electronics box somehow broke in half. This BNC sends the signal for shutter control. Once broken, the shutter could not be controlled via the detector GUI, resulting in all images appearing to be biases. Connector was replaced and system tested. All appears to be well again.

Wednesday, May 25, 2016

Dome Home

Problem(s) Encountered:

After observation, I pointed the telescope to the zenith and homed dome. Then, there is an error message ERROR dome m_az not homed .

I don't know what happened. I tried homing dome several times more but it doesn't work. However, it is solved by homing dome with a direction LEFT not AUTO.

Solutions:

I tested returning the dome to the home position using both the "Dome..." button and the "Home..." button. For both, I left the direction as "Auto". With the dome left-of-home and right-of-home, I experienced no issues in demanding the dome return to the home position. Incidentally, I also experienced no issues with the dome slaving to telescope position for various slews either. If the "ERROR dome m_az not homed" error appears, it means that the TCS no longer knows where the dome is positioned. In this case, the error is typically cleared by clicking on the "Home..." button and choosing to home the *Dome* (direction=AUTO). Looking through the session logs, it appears that the observer tried this a number of times before it finally worked. Not sure why it would have failed so many times. Were you trying to home using the "Home..." button or the "Dome..." button? Regardless, there were no issues this morning with the dome so it falls under the category of *if it ain't broke*, at least for the time being.

Monday, May 9, 2016

TCS (and xmis2) Nonfunctioning

Problem(s) Encountered:

TCS and xmis2 GUIs were no longer present. Could not get them to open.

Solutions:

This occurs when McGraw crashes. Verification can be performed by trying to ssh to mcgraw. If this occurs, the only fix is to have the machine, labelled and found in the 1.3m computer room, hard cycled. After rebooting, GUIs can be opened and initialized. If this occurs, it is also worthwhile to shut down JSkyCalc and restart it so it can initialize as well.

Sunday, May 8, 2016

Remote Control of Dome Lamp

Problem(s) Encountered:

We tried to use the remote lamp control to turn on the dome lamp, and while the website said the dome lamp was turned on, we could tell via the webcam that it was not on. We ended up turning on the flat lamp to see inside the 1.3m dome, so it did not affect our night.

Solutions:

Workaround performed was the appropriate thing to do. I attempted to recreate this problem the next morning, but the system worked fine.

Thursday, May 5, 2016

OWL stops responding

Problem(s) Encountered:

We were unable to click on certain buttons on the Owl GUI, so we restarted it. However, upon restarting, we could no longer connect to the device.

With the assistance of John Thorstensen, we realized we needed to reboot the mdmarc2 computer, and Thorstensen was able to reboot it remotely w/o assistance from the 2.4m observer.

Solutions:

The control machine, mdmarc2 needed to be reboot. This can be performed remotely with the following command:

```
sudo /sbin/reboot
```

Monday, May 2, 2016

Zeroing Telescope Coordinates

Problem(s) Encountered:

How does one zero the coords on a target? The zero dialog does not work on the TCS and the 'zero' command does not appear to update the coords. I was forced to always do a 2.5 arcmin offset after slewing to a position.

Solutions:

To zero coordinates: *zero ra=ra dec=dec equinox=equinox*
So for instance, *zero ra=23:14:35 dec=-08:15:23 equinox=2000*

Alternatively, one can enter the coordinates that you know you are pointing at in the JSkyCalc main window, and update the pointing with the appropriate button in the JSkyCalc telescope control window. A confirmation dialog box appears to be sure you didn't hit the button by mistake.

The important thing is to be sure you've reset to the correct coordinates before you go off your target.

Friday, April 1, 2016

Error in Homing Telescope

Problem(s) Encountered:

When homing the telescope at the end of the night, the TCS got confused about where the telescope is in declination. The telescope is now pointed at zenith, but the TCS control panel reads +48 for the dec. I left it that way, and will deal with it tomorrow.

Solutions:

Cycled the telescope servers (*telescope stop*, then *telescope start*) from a *mdm13ws1* terminal window. Then homed HA and Dec. Problem may have originated from trying to home multiple tasks (ie HA & Dec) simultaneously. Homing tasks should always be performed in a singular manner. Also, it should be pointed out that homing the telescope does not necessarily mean stowing the telescope to zenith. If setting the telescope to zenith at the end of the night, with systems adequately homed already, I use the command "*point ha=0 dec=31:57:12 nodome*". Homing appears to simply correlate telescope positioning with the tilt sensor readouts.

Thursday, March 3, 2016

Guide Camera, repeated disconnects

Problem(s) Encountered:

At the beginning, the guide camera would not stay connected -- it would drop out after maybe 30 sec or less, but could be restarted by disconnecting and reconnecting using the setup buttons in Maxim DL. Eric suggested cycling the power on the USB extenders; I did this and the problem did not recur. (I also unplugged some connectors and replugged them, and removed power from the camera for a bit. Any of these might have done it in principle.

Solutions:

I believe the power cycling and reseating connections on the USB range extender was the solution. This problem used to be more typical with the Andor CCD at the 1.3m as well. I purchased a more robust range extender for that system and the problem has gone away completely. At >\$330 a pop, I wanted to verify the component before purchasing more, but it sounds like that time has come.

Incidentally, this problem seems to be more an issue at the 1.3m than at the 2.4m, likely because the cable run at the 2.4m is shorter than at the 1.3m.

Friday, February 12, 2016

Andor (direct) failure

Problem(s) Encountered:

Around 10p.m. I couldn't see any star on the frames made by CCD camera. I thought it was because the weather, but the weather was fine. It looked like a shutter closed. I reset both cameras, it didn't solve the problem. I decided to close the telescope. During this procedure, I saw communicate 'mirror both open and closed', I checked that visually, but mirror was closed. I put telescope to home position. I reset all computers. Then, I turned on computers and cameras again. Still, the exposures made by CCD camera looked like with the closed shutter. It was midnight, so I decided to stop observing.

Solutions:

It appears that one of the preamps (the one associated with 4x gain) has failed. Camera has been sent to the vendor for repair.

Saturday, February 6, 2016

Andor and Guide Camera Com Failure

Problem(s) Encountered:

At the beginning both CCD cameras didn't respond, turning them off and on again, solved the problem.

Andor camera after reset had problems with cooling down to -70C, it took more than hour and was possible only when I did it step by step i.e. first -10, then -15, then -20, until I reached -70.

Solutions:

I suspect the issue was with the plug strip that was in use on the telescope. Replaced the plug strip. Hopefully this will remedy the cuts in communication.

Wednesday, February 3, 2016

"Flop"

Problem(s) Encountered:

The old problem that we have diagnosed as a probable motion of the MIS guide probe mirror is recurring. It is manifest as a diagonal jump in the image by about 4 arcseconds. Tonight, it occurred three times in a span of 2.5 hours. In addition, there is a slow drift of the image in the same direction, but perhaps less than in previous years. Following discussions with Eric and Mark Wagner last summer, it seems that this can't be fixed without a major redesign of the guide probe mechanism.

Solutions:

This problem, if it is indeed the same problem, has taken on a new twist as far as I understand. "Flop" appears to be a misnomer as what was seen is a progression in one direction, occurring three times over the course of observing a single object (telescope was not set to a different object in between the reported occurrences). So from seeing the images, the telescope "flopped" in a non-cardinal direction by roughly 4" during a 5 minute exposure. This was at a positive declination, about an hour east of the meridian. Then again, about 20 minutes east of the meridian, the same "flop", in the same direction occurred again. Finally, at about an hour west of the meridian, a third "flop", again *in the same direction* occurred once more. Thusly, this seems less like a flop to me and more like a steady, somewhat quantized translation. A flop would be more of a gravity-vector issue where something sets between two states. This is not the case here. Not sure yet what to make of this but I'm giving it some thought.

Monday, January 11, 2016

Dec. Drive Motion Failure

Problem(s) Encountered:

At about 21:00 the telescope became unable to move in Dec. We tried restarting the TCS (telescope stop/start, restart/initialize the GUI) a few times, with no success. We verified that it would move in HA, and then moved it to HA=0.

We found a trouble report from Oct. 23 where a similar problem was encountered and solved by changing electrical connections in the TCS box. We did not mess around with the electronics, but we cycled the power to the TCS box in the computer room. Upon restarting the system, everything worked normally but the Dec drive could not be homed or talked to at all.

We did home the focus and dome, so the focus is now at a value of 0.

We then called Eric at 21:50 and he suggested power-cycling the Dec drive in the telescope mount. Previously we had looked at the status of the OMRON display and found it was normal, but we cycled the power and nothing changed. Eric suggested a visual inspection of the drive belt, which appeared fine to our untrained eyes.

Finally, we shut down/put the e-stop on and killed the TCS GUI and did 'telescope stop'. The telescope is close to zenith by coincidence (prior target had Dec ~ +30).

Solutions:

Found that the two set screws holding the motor shaft to the pulley were missing, allowing the motor to turn freely from the telescope. Installed a couple cap screws with toothed ends to grip the shaft a bit better and will place a drop of blue loctite on each screw to keep them from walking out again. Homed axes and needed to power cycle the TCS in order for the dec to properly home. What it was doing was returning an error that it timed out. Still, it also returned a value of ~40 degrees, even though it appeared to be pointing more or less to zenith. After power cycling, it seemed to home correctly. One last thing I noticed was that the four wires that had to be directly connected due to a broken connector (10/23 trouble report) appeared to be coming slightly loose. I reseated them and verified they are indeed tightly connected. I take this as well as a hint to send out a reminder to have a replacement of this "special" connector sent to us.

Saturday, November 28, 2015

mdmarc2 Permissions Issues

Problem(s) Encountered:

Our working directory is /data/mdmarc2/baldassare/ and the data were stored here during night.

After the observation, we tried to back-up our data making sub-directory in /data/mdmarc2/baldassare/ (e.g. /data/mdmarc2/baldassare/11_24/ and copying fits data there. However, we cannot create the directory due to the 'Permission denied'.

EHK note: OWL writes files with the 'users' id, whereas our id is 'obs13m' (unless we log into mdmarc2 directly), but previously we were able to write to directories created by OWL with the 'users' uid. Yesterday we created subdirectories to store data from different nights, but today we lack permissions. It is unclear when this changed during the night. It's not a serious problem for us because we still have read access, but it is somewhat inconvenient.

Solutions:

I'm not convinced things changed overnight as I have often noticed peculiarities in permissions when running the detectors that utilize Owl for data-taking. I've often encountered permissions issues when working with data files from the workstations (mdm13ws1, /data/mdmarc2) as opposed to locally on mdmarc2 (/home/data). I've always just gotten around it by ssh'ing into mdmarc2 (as arc).

Wednesday, November 25, 2015

Pointing/Setting Woes

Problem(s) Encountered:

Telescope seems to have a problem with pointing. Tried many ways to fix this, including pointing to bright sources, zeroing the zenith many times, etc. Finally had 2.4 meter observer come look at the tilt meter (I am observing remotely). Worked with 2.4 meter scientist for an hour fixing tilt meter readings, zeroing the zenith, and using the paddle to try to find where those guide stars could possibly be. JSkyCalc and TCS GUI have slightly different readings for positions, making my issues tonight sound very similar to the report filed on 10/10/2015. I have been unsuccessful in recognizing a single star field. System may need restart /reboot of some sort.

Solutions:

Found the TCS indicating that the telescope was at zenith (HA=0 Dec=31:57:12) but the tilt sensors were way off in declination. They read -002,-131 when they should nominally be at -003,-008 when at zenith.

Moving the telescope to the zenith by zeroing the deviations seen in the tilt sensors gave values around HA=00:00:8.0 Dec=32:59:02.7, more than a degree off in declination. I homed all axes, which brought the tilt sensors to reasonable values, but still the coordinates indicated that declination was closer to 33 than 32. Performing a "point ha=0 dec=31:57:12 nodome" brought the tilt sensors back to roughly -002,-130.

I then tried power-cycling the TCS and homing all motors, but I still got the deviation between coordinates and tilt sensors. It might be worth noting that I did not shutdown/restart any of the telescope servers.

Next I simply pointed the telescope to zenith by the tilt sensor values, then drove east a ways and started tracking. As I tracked through the nominal tilt sensor values (-003,-008), I used the **zero** command (zero ra=current sidereal time dec=31:57:12 equinox 2015.837) to tell the telescope it was at zenith. This brought the coordinates into correspondence with the tilt sensors.

Interestingly, after doing the **zero** command, I was able to home RA and Dec axes and get the values displayed for HA and Dec to correspond with the tilt sensors.

I am not sure what got the telescope into this state. It is one of the unfortunate possibilities that leads to an almost unsolvable issue for a remote observer as there is [currently] no way for them to see the tilt sensors. Hopefully tonight will go more smoothly. I'd recommend after finding a bright star, that a new **zero** command be issued on that star.

Incidentally, I can set up a webcam for monitoring the tilt sensors remotely, if requested.

Thursday, November 5, 2015

Dec. Drive Motion Failure

Problem(s) Encountered:

I got a fault when I tried to move to the first target - the telescope was not moving in dec so it shut off the tracking and refused to proceed.

Solutions:

On Eric's suggestion I cycled the dec drive power, but it made no difference. We brought the system down and cycled power to the big control box in the computer room, but even then the dec refused to home.

By coincidence, Dick Treffers is on the mountain, so I emailed him in hopes of catching him before he went to bed. He got the email and scooted down to take a look. After a couple of hours he'd fixed it -- a connector had gone bad on the bottom of the big control box in the computer room, so the dec motor driver was not getting the signal to move, even though the signal was appearing at the source. He removed the connector and wired the relevant wires right onto the terminals in the control box. This will have to be cleaned up later, but for now, it works fine.

Friday, October 23, 2015

Oscillations or Wind Shake?

Problem(s) Encountered:

Several mages showed oscillations in the N/S direction. Telescope was pointed at dec = -8, h.a. = +1. About half the images in this position displayed an oscillation. Most of the light was in the central image, but there were many excursions N/S. These images are not useable.

Solutions:

Checking the image left, it looks like some wind shake to me. This seems to coincide with the telescope pointed to the S/SW with breezy conditions coming out of the S/SW last night. Raised the vertical weights from 3125 to 3275 to bias balance slightly to the top. This should keep the secondary anchored a bit more in any gusts.

Monday, June 1, 2015

TCS and xmis2 GUI Failure

Problem(s) Encountered:

TCS and xmis gui's froze and crashed. We were unable to bring them back online. When trying to reopen them via Applications -> telescope control, nothing would happen. We attempted to bring them back online via the telescope stop/start commands, when that didn't work we restarted the workstation computer and tried again. Did not work.

We were able to control the telescope via JSkyCalc and get it to home, manually closed the mirror cover and homed/closed the dome. Engaged the Estop and closed the 1.3m for the night.

Solutions:

Could not connect to mcgraw. Was able to catch the observer before she went to bed and had her power cycle the machine. It came back up. I then re-established the telescope server connections, brought the tcs and xmis2 GUIs back online and initialized them without issue. Moved the guide probe to ensure communication. It appeared Owl had been shut down so I restarted that and ensured that it could talk with the detector successfully. All appears well again. McGraw had been doing well after having a couple crashes a couple months ago. Hopefully this is more a fluke than a sign of things to come as I do not have a spare mcgraw currently (or hill, or hiltner)

Saturday, April 18, 2015

TCS Control/Motion Failure

Problem(s) Encountered:

TCS failed. Telescope refused to slew, throwing an error and turning off the tracking. On-site observers power-cycle the main TCS box in the computer room at Eric's suggestion, but then the dome and the dec axis both refused to home (HA and focus both homed normally). The problem was intractable, so the night was lost.

Solutions:

Came in this morning and found the system to still be failing as it was last night. Long and short of it is that the dec motor electronics (driver?) had failed. The display was flashing 'err', which I took as a good sign that it was experiencing an error. I flipped the knife switch, killing power, waited, then brought it back online. The display went back to a somewhat more familiar 'r 0'. I then tried homing the dec axis, and the telescope moved in dec. But then I got an error that it had timed out. Display started indicating roughly HA of 0 and Dec of +43ish. I could see however that the telescope was pretty close to zenith, so... I tried homing dec again. Same thing. Figuring something in the TCS might need to initialize correctly now that the dec driver was back online, I once more power cycled the TCS. When that was done, I tried homing everything again. This time, the dec appeared to home properly, but I never saw the message that it was done homing. I know I didn't miss it because I saw the done homing message for HA still being displayed. Instead, I got some message about track rates for HA and dec being set to 0.00000.

I did however see that the display indicated HA of 0 and dec of +32. After a few minutes of waiting, I finally assumed it had in fact completed the home for dec, and so continued on, homing the dome, which worked fine. I then drove the telescope and dome around and made sure it was functioning as expected.

It was. The last test I performed was to turn on tracking, let it track for a short time, then slew to another position, then let it track some more. I was ensuring that tracking remained on (last night, the problems all started when John noticed that track would shut off when a slew was issued, even though the slew likely never happened). Once I verified that the tracking was stable, I stowed the telescope and for one last time, attempted to home the dec. This time it went through the procedure and ended by informing me that it had in fact homed the dec. So now, all appears to be working again.

This does not explain to me why the electronics interface failed in the first place. This hopefully was just a random failure. The other oddity was that the HOME button on the TCS GUI would almost immediately go red when trying to home the dome last night. Indeed, it did this to me as well this morning. The way I got around this was to instead click on the DOME button, and demand that it drive to the home position.

Ever since doing that, it has homed correctly.

Thursday, March 26, 2015

Finder OUT Motion Failure

Problem(s) Encountered:

At the start of the night I wasn't seeing starlight. At first I thought the dark hatch might have been left shut, but Laura Kay and a student came down from the 2.4m to check, and it was open. There was a racket coming from the find-guide mirror, though, and it proved to be stuck shut. By moving back to the zenith I was able to unstick the mirror -- I guess it had an unfavorable gravity vector on it -- and I left it opened for the rest of the night.

Solutions:

I checked the finder travel first thing this morning. I ran it first at zenith, IN then back OUT. No issues at all. I then went to the coordinates provided by John (HA+00:30:00, Dec+14) and cycled again. Once

more, no issues. I then went to more extreme angles (HA03:30:00) and still had no problems. A final test with the telescope to the east (HA-03:30:00) gave the slightest change of sound when moving the finder IN. Still nothing I would be concerned about, and likely wouldn't even typically notice if not listening for it directly. In summary, finder appears to be working normally.

I'm wondering if the finder carriage had slightly bound on the traveling rod. While this is pretty rare, I have seen it a couple times in the past. If this was the case, shifting the telescope's position might have changed the gravity vector enough to free it. Same with cycling IN/OUT a number of times. This shaft can be softly lubricated, but that will have to wait until the MIS is opened up. For now, I think the system should be considered ok for use at any appropriate telescope setting. But be mindful to see if the problem recurs.

Tuesday, March 24, 2015

Connectivity to Andor Failure

Problem(s) Encountered:

One problem at start

- Andor slit-viewer would not connect to computer. Rob and Christine waded the situation by coming down and wiggling cables, finally plugging the USB cable into a different port on the computer. The Andor camera connection appears to be the Achilles' heel of the operation, so far.

Solutions:

Corrected the situation by plugging the USB cable into a different port on the computer. The Andor camera connection appears to be the Achilles' heel of the operation, so far. We are looking at replacing the range extender with a better model shortly. Hopefully this will eliminate the occasional disconnects.

Sunday, March 22, 2015

Guide Probe dx/dy motions

Problem(s) Encountered:

No problems, except xmis refused to execute dx and dy commands for some reason, though it did execute changes in absolute position.

Solutions:

The apparent malfunction of the MIS guide probe dx and dy commands reported a few nights ago turned out to be due to the fact that requests for moves ≥ 1000 units are ignored, with no error message.

There is no good reason for this. When I tried 999 units, it worked!

Friday, March 20, 2015

Vertical bands on Templeton

Problem(s) Encountered:

After observing for about an hour, some dozens or hundreds of bright columns started to appear on the CCD, but not the same ones every time. There was some low-level horizontal banding as well. They are present in bias frames as well as sky exposures. It was very windy from the NW, and there is some suspicion that this change was related to a move to the SW. I couldn't reload the Owl software using the

setup function, as an error message appeared. I eventually tried every combination of restarting Owl, powering down the CCD controller, rebooting the mdmarc2 computer, and reseating the fiber optics at both the controller end and the computer end, all about 6-7 times. Waiting for Eric to call back, I decided to try one more reboot, and also reseated the bnc connector from the filter wheel to the CCD controller, and Owl finally loaded the software. However, when starting to observe again, the bright columns came back! This time, with some patience, I continued to take bias frames and other exposures until the bad columns gradually went away.

Solutions:

Found that the issue would crop up initially whenever the CCD was cycled or reset. After numerous frames were taken, the lines would either improve or disappear. One thing I did notice were that the fibers demonstrated far better loss numbers after [softly] cleaning them. Also, the spare fiber running from the computer room to the dome seems to be a fully functional fiber as well, with good loss numbers.

In fact, it is now swapped in and in use.

I was able to get the lines to appear with two of the CCD control boxes. When I set things back up with the silver box, the lines never recurred. After another night on sky, they still have not come back.

Perhaps the controller just was acting out. Perhaps it is a sign of some component in the CCD head electronics starting to go. Regardless, it looks better and we'll have to wait for a more persistent failure before we can stress test it any further.

Monday, December 22, 2014

Lost Connection to Guider and Andor

Problem(s) Encountered:

1) Guider hung up shortly after the start of the night. Restarting the Maxim DL software yields the following error message upon trying 'Connect':

Error initializing camera or filter wheel
Error opening camera
The camera settings are incorrect

2) About 10:45, Andor stopped responding. I tried a couple dozen times unplugging the USB cable and putting it back in, and every time I got:

USB Device Not Recognized
One of the USB devices attached to this computer has malfunctioned ... (etc.)

Solutions:

Found the Andor back up and running this morning, apparently after a reboot.

FLI guide cam took a little more effort. Back up and online now. Not sure exactly what corrected the issue, but I suspect cycling power to the camera and rebooting the PC.

Friday, December 19, 2014

Pier Safety Interlock Reset

Problem(s) Encountered:

While observing the telescope run into the pier interlock (my bad). A dedicated entry in the telescope manual on how to bring the telescope out of such a situation would be very welcome... I ended up moving the telescope out of the interlock with the help of the TCP virtual paddle.

Solutions:

An entry dedicated to this potential gotcha has been added to the website:
http://mdm.kpno.noao.edu/index/Pier_Reset.html

Sunday, October 26, 2014

TCS Connection to Telescope Lost

Problem(s) Encountered:

While observing, the telescope lost connection with the TCS.

Solutions:

Stopping and restarting the TCS restored the connection.

Tuesday, May 20, 2014

Erroneous Dec Encoder Readout

Problem(s) Encountered:

Telescope appears to be at zenith, but thinks it is at +48

Solutions:

Attempt made to rehome encoders but problem persisted. Stowed telescope, shut down servers and power-cycled the TCS box (not to be done without consent of MDM staff!). Once everything was brought back online, the problem was corrected.

Monday, April 21, 2014

MaximDL Guider Failure

Problem(s) Encountered:

At one point Maxim DL stopped being able to identify a guide star, even though there is a bright, isolated star in the field of view. When switching to the Guide Tab and trying to take a single exposure that would capture the guide star, it would alternately give one of four responses, in increasing order of absurdity:

1. Guide star not found.
2. The brightest pixel is less than 32 pixels from the edge.
3. Please enter a value between 0 and 22.
4. Please enter a value.

I can see that there is not a brighter pixel near the edge, and I can't imagine what parameter it expects a value of. It also would not allow the star to be selected manually.

I restarted the connection to the camera, restarted the Maxim DL software, rebooted the guider computer, and power cycled the camera itself, all to no avail. Which is very worrisome in that I can't imagine what to do to investigate the problem during the day, nor do I have any idea of what to try next night.

I rather suspect that this is some kind of user error, but I could not identify any one of the myriad adjustable parameters that might have been corrupted. I'm hoping that someone has seen this problem before and knows the obvious answer.

Solutions:

Problem was indeed a mis-set adjustable parameter, which ultimately limited the field over which the software was attempted to acquire and track a guide star. See image to the right. Values set to 512 were accidentally set to 22. Resetting the values corrected the issue.

Guider Failure

Problem(s) Encountered:

In the middle of the night the guider stopped working. It would simply drift off in the X direction.

Solutions:

It took me ~20 min to figure out that I must have accidentally clicked the Pier Flip button on the camera control. After I un-clicked it everything worked fine again. I write this in the log in case it effects anyone in the future so that they might stumble upon this.

Dome shutter noise

Problem(s) Encountered:

Noticed two technical issues: N-S guiding on telescope can be jumpy and inconsistent. Stars tend to be smeared out along N-S axis, regardless of focus. Did not greatly affect observations. The main shutter makes an unhealthy rattling noise when opening, during the very last moments before it is fully opened.

Solutions:

If the N-S issue is truly with the guider, then adjusting aggressiveness etc might have a positive influence. I'm wondering though if this is more likely caused by the intermittent nodding inherent to the TCS upgrade years ago. The track for the dome shutter has been lubricated where it can be reached. Full lubrication will be performed when we have use of the NOAO manlift. In the meantime, what has been done should help minimize the rattling upon opening.

TCS Network "Time Out Error"

Problem(s) Encountered:

During observation at UT 9:44, saw error message in the TCS GUI during observation: Send failed for command track: Network operation timed out. Don't think it affected anything, but reporting it just in case.

Solutions:

This appears to be one of those benign messages--I've seen it many times without noticing anything else out of the ordinary (John Thorstensen).

Prospero Fails to Start an Exposure

Problem(s) Encountered:

At the beginning of the night we had an issue with prospero, i.e. prospero didn't start an exposure. After re-starting prospero, caliban and IC the problem was still present.

Solutions:

We called Rick Pogge who could diagnose the problem from Columbus and he found that the problem was most likely caused by the use of the 1k subframe which should be avoided.

MIS Finder making noise when moved "IN".

Problem(s) Encountered:

At around 12:30 the finder mirror stopped moving and is stuck in the middle of the optical path. Thus no more observing. We pulled the plug to keep the motor from running all night.

Solutions:

This problem should now be resolved by implementing a software timeout. However, if you hear an odd noise when moving the Finder, please report it.

Data Not Writing to Disk

Problem(s) Encountered:

Was doing a long series of exposures of an eclipsing binary. The first 134 of these were written to the disk properly (/data/mcgraw) but the last 15 were read out but were not transferred to the final destination. They might be written somewhere else, but I can't find them and I don't want to fiddle around when I am sleepy. The system now will not write images.

I noticed an error message 'BUS ERROR' on the IC screen that shows the image as it is read out. It appears momentarily, right before the status switches to 'IDLE'.

Solutions:

Data and system recovery for this problem is written up here:
<http://mdm.kpno.noao.edu/Manuals/LinuxCrashRecovery.pdf>

Guider Information

Problem(s) Encountered:

The guider seems to be having problems in what I think is the N/S (Dec)

direction. The problem is indicated on the X strip chart but I think it is actually the Y direction, if the orientation is the same as the display. Twice, the guide star clearly was displaced by several arc-seconds, and the guider was unable to bring it back. Based on the motion of the image when I move the telescope by the paddle I believe up/down (Y) corresponds to S/N. Perhaps this is related to the drift in the images we have noticed occur over the night, despite guiding? One small annoyance with the guider software is that the calibration routine does not actually bring the guidestar back to its original position, but leaves in N of where it found it, so you lose your place if you calibrate in the middle of a series of integrations.

Solutions:

With respect to calibrating the guider, it really should only be necessary to do this once at the beginning of the run if it is behaving correctly.

About the guider not being able to move in the N/S direction (X-direction on the graph). I have seen this before and I think it is related to the preload. There is a lot of backlash in the N/S direction, and when it gets out of adjustment, short guide pulses will not move the telescope at all. This problem was more obvious in the old days when you had to make fine adjustments with the physical hand paddle. But it should be possible to see the same effect if you try to make small motions with the software paddle. Try to move 1 arcsecond N/S/ with the software paddle and see what happens.

I don't believe that this is related to the slow drift of the images over a period of hours. We think that is some sort of flexure in the guide probe.

The Dark Hatch

Interesting factoid: It is possible to open the dark hatch but not have it well seated/latched. When I slewed the telescope to high airmass, I heard a thunk and discovered that the hatch had closed of its own accord. This is the first time this has happened to me.

Data Not Writing to Disk, revisited

Problem(s) Encountered:

I encountered a problem with Caliban again. At one point, the last image recorded according to the Prospero Status window was number 466, but by the time I saw that images past number 466 were not being saved, the next image was already supposed to be 522.

I did a rununit in Prospero, keeping the same root filename that I had been using and setting the starting image number to 522.

After initializing the run, I followed the Caliban window to make sure all the images between 466 and 522 were being retrieved.

Once I saw that all the missing images had been retrieved and were now located in /home/data, I proceeded taking exposures again. Luckily I was able to retrieve all the missing data.

Solutions:

Performing the following series of commands should clear all image counting buffers, allowing you to start clean:

```
quit caliban program
```

quit IC program
restart IC program
restart caliban program

Data Not Writing to Disk

Problem(s) Encountered:

Observations were proceeding smoothly, but at one point I noticed that the last image saved remained at #256 despite each new exposure corresponding to an incremented image number. By the time I noticed this, the last image saved was #256 but the next image was to be #277. After checking the data directory, I saw that indeed no fits images beyond #256 had been saved to the data directory. This amounted to > an hour and a half of data that was missing. I had seen no errors indicating any issues, but based on a previous trouble report from June 30, 2012, I figured there was an issue with Caliban (<http://140.252.83.20/Reports/Trouble/2012/MDM13.2012Jun30.txt>).

Solutions:

Following that trouble report, I did a `runinit` to reset prospero, with the images starting at #277. Doing this, I was able to retrieve images #257-276 successfully. I then took a single exposure to make sure that would be saved to the data directory successfully. That seemed to be saved with no problem, so I just continued to monitor the images during the rest of the night.

West Limit, Moving Back Out

Problem(s) Encountered:

Tracked into the west limit (not the tripwire, the 5h limit mounted on the worm gear).

Solutions:

Backed out with `point ha=` (etc) command, but I noticed that the coordinates and the POINT button on the TCS GUI stayed red for a while even though the condition had been cleared. A minor puzzle.

Printer Failure

Problem(s) Encountered:

Printer not working- virtual memory full? but we can't see jobs to cancel.

Solutions:

I cleared the queue, here's how

- 1) login to mdm as root
- 2) type `"lpstat -t"` to see if there are stuck jobs in the print queue (there were)
- 3) type `"cancel -a"` which clears the queue(s)

and then power cycle the printer, as the queue is likely stuck because the printer is confused.

Someone tossed a 41.5Mb print job at the printer, that's why it was unhappy.

OWL abort bug

Problem(s) Encountered:

OWL lost connection to controller.

Solutions:

Power cycled and restored. This happened after we used `ABORT`- coincidence? the lost connection the previous night might have been after an ABORT as well but we don't remember.

MDM CCD Noise and OWL Run Failure

Problem(s) Encountered:

Still have variable noise in bias.

OWL lost connection to controller, so we power cycled and restored..

This happened after we used `ABORT`- coincidence? the lost connection the previous night might have been after an ABORT as well but we don't remember.

Solutions:

In an attempt to mitigate the variable electronic noise yesterday, Tony and I swapped the electronics box from the gold box over to the silver box that I have normally used with these detectors. This was done as there is possibly some confusion over whether or not the gold box is suitable for detectors other than Wilbur (the silver box had previously been in use with Nellie at the 2.4m). Ran a couple bias frames after this switch and all looked well. Fast forward to last night's report:

Ran numerous bias frames this morning. I then powered down the CCD electronics and switched the power away from the filter box, connecting it instead by the mirror cover electronics. I then took more bias frames. I don't see any discernible differences between using the filter and not using it. The first frame after powering up the detector appears to be about 5 counts on average lower than subsequent frames. Not sure what causes this, just an observation.

While there does appear to be some electronic noise intermittently in these frames, showing up as horizontal swaths of varying size, the effect is subtle. Deltas in counts is very small, typically ~2-4 counts from what I can gather. Not sure if this is typically considered to be "lost in the noise".

As for the OWL failure, it appears that the observers were able to get the program back up and running although I am unsure as to whether or not they had to power cycle the electronics. Running frames today, I had no issue with OWL failing.

Filter Wheel Stuck

Problem(s) Encountered:

The filter wheel got stuck. The error asked us to check/reset filter wheel.

From experience, we went out to the telescope to see if the connection lights were on. They were.

Solutions:

We ended up restarting the filter wheel. Which after we Re-initialized Xmis as well, seemed to fix our problem. However, the BG38 and U filters remained red on Xmis window. I think pressing Reset filter wheel would have solved that problem, but since we were observing in V and gg420, we did not want to risk another stuck filter wheel, so we went on with out observations.

Dropout Would Not Close Completely

Problem(s) Encountered:

As we attempted to close the dropout, it got stuck about a foot from closed position. We attempted to open the shutter again and re-close it, but to no avail.

Solutions:

While motion was found to be possible during the next morning, one of the hydraulic rods was found to be sheared and bent. The cylinder had to be replaced. This must have made a pretty loud BANG when it went! Failure was likely due to the high winds and extreme cold.

Guide System Jumping Off Source

Problem(s) Encountered:

Maxim DL failed to connect to the guide camera, but a restart of mdmikon1 resolved this problem. After acquiring a guide star using JSkyCalc and exposing the frame in the Guide window of Maxim DL, we began tracking. After about 30 seconds, the telescope jumped off the star by precisely 1.5 arcmin in declination.

This behavior consistently repeated every time we attempted to set a guide star. Re-calibration of the guide camera and extensive (but responsible!) fiddling with the settings failed to resolve the problem. Without guiding, we were unable to resolve reliable data frames without trailing, so we attempted to close the dropout shutter to reduce the wind's impact on tracking.

Solutions:

This may have been due to the high winds, or it may have been due to gain to the motor being too high after setting for hard hand paddle use to previously slew the telescope by hand.

Telescope Motion Failure

Problem(s) Encountered:

The bulk of our trouble was associated with the extremely cold weather, pushing 10 degrees Fahrenheit. The declination drive of the telescope locked up while slewing, which rendered the automatic pointing function of the TCS completely unusable, resulting in a `point failed to converge` error message, in addition to a `point track rates incorrect` error.

After much fiddling, we figured out a viable system for pointing the telescope manually, using a combination of the GUI and physical paddles. After slewing the telescope with the physical paddle until it locked up, we increment in the same direction with the GUI paddle, then continue moving with the physical paddle until the telescope locks up again, then repeat the GUI paddle incrementation. Using this strategy, we were able to successfully point the telescope and track targets.

In the process of trying to resolve the pointing problem, we repeatedly tried to home the telescope. Due to its inability to slew, the telescope would also fail to home properly, resulting in a `ERROR where m_ha not homed` message on TCS (also an `ERROR where m_dec not homed` message). After eventually homing the telescope manually using our physical/GUI paddle routine, we reset the pointing of the telescope by zeroing the tilt sensors and setting `zero ra=xx:xx:xx dec=+31:57:12`, which convinced the telescope that it was in the home position and re-calibrated the HA and Dec readout on TCS.

Solutions:

This was a combination of the extreme cold and its impact on the Dec preload. It is bitter cold, and has not warmed above 0C for over a week now. Subtle preload adjustments got the system working more or less reliably.

Motions Failure at large HA

Problem(s) Encountered:

The telescope got stuck at 3h W and +6 deg. When attempting to slew back to the zenith the telescope moved several degrees in both axes. Then stopped with the error: 'ERROR where m_ha not homed . I could re-execute the point command and the telescope would move a few more degrees before hard stopping. The coordinates in the display were not updating during these moves. I used the paddle command that Eric used yesterday afternoon to move the telescope back to zenith. Interestingly, the home DEC command worked although the coordinates are wrong on the display. The interlock is currently engaged.

Solutions:

This is potentially a bug in the code that was recently discovered (2014). By moving the telescope back to zenith with the hard hand paddle, then homing all axes, functionality should be restored.

Random Clocked Motion in Dec.

Problem(s) Encountered:

I would like to report unauthorized or spurious motion of the 1.3 m telescope. As I summarized in the night report for this night, the LN2 fill line snapped while filling the dewar. I found that the telescope had moved about 3 deg north in declination while filling which caused the snap. This afternoon I filled the dewar with the interlock enabled and there was no problem. However, when I disabled the interlock the telescope started moving north in declination right away. The rate was about 2-3 arcmin per 10 seconds.

Observers should exercise caution and be aware of this problem. Also, all LN2 fills should be done with the interlock enabled.

Solutions:

This random motion appears to be something low level in the TCS code. Occasionally, when disengaging the E-stop, the telescope will start to clock slowly in declination. Placing a probe on the dec drive circuit shows sporadic dirty pulses being issued (HA shows a 0V trace when the system is brought up).

Attempts have been made to fine tune the servo loop but the adjustment is too subtle to zero. Barring any future fix, it is worthwhile to know that the clocking ceases if any command at all is issued within the TCS GUI.

Prospero>IC Comm Failure

Problem(s) Encountered:

Error message in the prospero window indicating communication was lost with the sequencer, IC, or the HE on the telescope. Could not find a description in any of the documents how to restore the communication from the IC alone. Restarted the IC but it hung every time.

Solutions:

Power-cycled the HE. IC started fine after that. Brought up the rest of the TCS and the data system.

GUI Hand Paddle Intermittent Functionality

Problem(s) Encountered:

The north and south directions on the software paddle (the little popup spawned by the OSU gui) work intermittently. I am holding the button down long enough to get an acknowledgment on the status line of the TCS gui, but the telescope doesn't move.

Solutions:

This seems to be a recurrent problem with the 1.3m. N-S guide motion sometimes suffers from too much backlash when trying to make small motions. When using the hardware paddle, it was possible to hold the button down for 10-20 seconds and finally get some motion. With the software paddle, try pressing the button many times.

This has been a problem for the guider as well, since it cannot correct N-S drift in its normal mode of operation if the telescope won't move.

To solve, preload adjustments must be performed.

Filter Wheel Motion Failure

Problem(s) Encountered:

At startup, xmis2 complained that the filter wheel wasn't setting correctly; tried a reset, but that didn't work.

Solutions:

Went down there and turned the unit off and on, and re-started xmis2. That cleared the problem.

Focus (M2) Motion Failure

Problem(s) Encountered:

Focus was supposed to be at 815 (or perhaps 850) after restart of TCS and homing of everything the previous day. However, image of bright star showed telescope very far from focus (very large image of primary instead)

Tried homing focus (home button, select focus drive, select apply). Instead of moving the focus, the focus setting reset from 815 to 0. There was no motion of the focus drive. Tried setting focus to 815. This moved the focus a long ways, but image was still far out of focus. Tried moving back to 700.

This command was ignored. Discovered that (1) all commands to set focus to a smaller setting are ignored and (2) the focus home command does not actually home the focus, but resets the focus display to 0 mils. The command it executes to do this is of the form `home sec_hit=-XXX focus` where XXX is some number like 460. This was repeatable. Could not find documentation on focus beyond instructions on commanding it to home using buttons, so out of concern, stopped experimenting and shutdown at 3:30 AM.

Solutions:

We found a broken coupling from the focus motor shaft to the focus drive mechanism. After talking to Richard Treffers and found that on a temporary basis that we could make and install a coupling we did. After the focus motor coupler was installed we tested the focus and it work as it should. The current observer was shown what the problem was and the fix so he should be able to get data. There have been couplers ordered which will replace the temp. unit and we will have backups encase this happens again.

Telescope Functionality Compromised--No Motion/Mirror Covers Failed...

Problem(s) Encountered:

At beginning of night (dome closed, telescope at zenith) mirror command sent from GUI, GUI reports that mirrors are moving but mirrors cover did not move, instead Dec drive motor appeared to be moving back and forth slightly, even though no Dec move was sent refresh GUI did not work nor did quitting GUI and bringing up a new one on McGraw: tcserver not running telescope stop and telescope start did not succeed in restarting tcserver so shutdown Hill and restarted telescope stop and telescope start did restart the tcserver bringing up and reinitializing TC GUI : some display not updating focus not homed error message in GUI homed focus, HA, and Dec in that order GUI now updating

Tried mirror opening command from GUI, GUI says mirror opening mirrors cover do not move opened mirrors manually using controls on side of telescope GUI still showing mirror opening and radio button for Mirrors yellow Tried moving telescope: move not executed and indicators turn yellow Refreshing GUI removes yellow but move never executed

Closed TCS GUI. On McGraw: telescope stop and telescope start tcserver briefly shows running, but within seconds stops Bringing up GUI and initializing: get error saying no connection to TCserver

Tried recycling power on TC system in computer room Same problem Tried rebooting Hill again. Same problem. tcserver stops running on Hill a few second after restarting. This is independent of whether one checks the status or not.

Solutions:

When investigated, found that the PMAC unit that controls the functions of the telescope was not clicked into it's rail properly and seems as though the unit was not making a good ground. Once the unit was snapped back into its rail system a power light (green in color) came on and then we were able to start tserver and run the telescope and dome through its paces. We of course had to home all axes and now things seem to be operating properly. (Not to be performed by observer!!)

Motion Hangs on Long Slew

Problem(s) Encountered:

In most slews, the telescope stalls partway there, and about half the time the tracking stops too. With patience one can hop the telescope over to the target, but this obviously isn't normal. This doesn't happen every time. Also, sometimes the telescope will stall repeatedly, and then on the last attempt execute a long slew flawlessly. This is, of course, pretty strange.

Solutions:

The Preload was loosened up a bit and we tested the telescope and had no problems. It appears that preload needs to be checked when there is a dramatic drop in temperature.

Motion Hangs on Long Slew

Problem(s) Encountered:

The telescope hung partway with an error message about where ha not initialized (NOT exact phrase). It wouldn't move, even though we tried rebooting hill and mcgraw, and multiple attempts at pointing it.

Solutions:

I finally got it out of its torpor by home force $ha=0$ or some such, which made the telescope think it was at the meridian even though it was 4h west; I then walked it back to the zenith, reset the pointing on the tilt meters, found a bright star, and we were back in business.

It is possible that homing HA via the TCS GUI might also correct the issue.

Backup Generator Run Fault Alarm

Problem(s) Encountered:

An alarm started going off on the backup generator, well after line power was back up and running.

Solutions:

Simonsen was back on-site this morning. They have replaced the suspected faulty starter in the generator.

CCDS Shutter Failure

Problem(s) Encountered:

Continue the problem with the CCDS spectrograph. Looks like that the shutter does not close well after an exposure time.

Solutions:

The solution to this issue involves modifications to a "return" voltage pot within the CCDS HE box.

Motion Stopped Functioning

Telescope motions stopped working during the night. Reset all telescope servers (rtel, etc), correcting the problem.