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Mauna Loa Solar Observatory Observer's Log  
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Tue Sep 29 16:47:29 GMT 2020

Year: 20 Doy: 273

Observer: mlso

WEATHER COMMENT: mcotter: Tue Sep 29 16:48:38 GMT 2020

Temp: 44.2f, Humidity: 10%, Pressure: 28.678in, Wind: 6mph from 157degs, Skies: Beautiful clear blue skies.

\_\_\_end\_\_\_

GONG COMMENT BY mcotter: Tue Sep 29 16:49:12 GMT 2020

GONG shack door open.

\_\_\_end\_\_\_

GENERAL COMMENT BY mcotter: Tue Sep 29 17:05:12 GMT 2020

Opened windows upstairs

\_\_\_end\_\_\_

GENERAL COMMENT BY mcotter: Tue Sep 29 17:06:35 GMT 2020

PM Blew off Kcor O1. Multiple dust artifacts present that would not blow off. Some appeared to be on the reverse side of lenses.

\_\_\_end\_\_\_

Tue Sep 29 17:50:42 GMT 2020 Kcor Focus/alignment program exited

Tue Sep 29 19:46:40 GMT 2020 Kcor Focus/alignment program exited

Tue Sep 29 20:41:17 GMT 2020 KCOR Start Calibration script: c:\kcor\mlso-calibration22deg-20171025.ini

Tue Sep 29 20:56:32 GMT 2020 KCOR End Calibration Script

GPS COMMENT by MLSO: Tue Sep 29 21:45:09 GMT 2020

Successfully logged in to system

Good disk mount

GPS software running

Last 5 GPS data files are:

/mnt/usb/dataoutiq\_2020\_268\_2145.bin 2147483647

/mnt/usb/dataoutiq\_2020\_269\_2145.bin 2147483647

/mnt/usb/dataoutiq\_2020\_270\_2145.bin 2147483647

/mnt/usb/dataoutiq\_2020\_271\_2145.bin 2147483647

/mnt/usb/dataoutiq\_2020\_272\_2145.bin 2147483647

\_\_\_end\_\_\_

\*\*GENERAL PROBLEM COMMENT BY mcotter\*\* : Tue Sep 29 23:06:20 GMT 2020

\*\*\*SPAR TRACKING PROBLEM\*\*\*

Yesterday I had notice an anomaly with the 'Pointing Error Estimate' GUI image. The image appeared in a somewhat straight line line up and down, rather than the spherical image as it normally appears.

Today when I came in the 'Home' position LED was not illuminated so I did a 'Home Dec' command prior to starting. I went to the dome and began my routine of opening everything up and aligning the telescope. When I was done I saw that the 'Home' LED was still not illuminated. I hit the 'Home Dec' button again. Several minutes went by and the 'Home LED still did not illuminate, so aligned the telescope again, hit 'Close Loop' and went back to the control room. When I tried to run the Focus routine I could see a 'Crescent' shape in the image which I had not observed before. I tried adjusting the X&Y offsets to see if it would make a difference but it did not. I called Ben and he instructed me to try making large offsets (> +/- 400) but it made no difference. Ben instructed me to restart the SGS computer. After restarting we tried re-Homing the SPAR but it could not find Home. Ben told me to physically look at the position of the SPAR Offset Pointing Arm (SOPA) within the SPAR to see where it was in relation to the Hall Effect Sensors that monitor the position of the SPAR. The SOPA had traveled past the sensors and hit the physical end of travel (SOPA travel had reached its limit to the right end of its

travel, as looking at the mechanism from the adjacent SPAR access port) and was stuck in a spot where the sensors could not detect the SPAR position. I tricked the last sensor that the SOPA traveled past into an 'ON' status, allowing the SGS computer to think that the SPAR was in position over this sensor. Ben gave the SGS computer a 'Home Dec' command and the SOPA began to slew to the center and found its home position.

\*\*\*ROOT PROBLEM\*\*\*

The SGS computer lost track of where the SPAR was located because the 'SPAR Offset Pointing Arm' (SOPA) had traveled past the last 'Position Sensor' and ran to the physical end of its travel. Because that sensor was no longer in the 'ON' state, the SGS computer continued to try to drive, in the same direction it was originally going, when it lost track of its position as it tried to find 'Home'.

\*\*\*CORRECTIVE ACTION\*\*\*

There are different modifications that can be done to prevent this problem from happening again. Here are two:

- 1) Installing an 'Absolute Encoder' would allow the SGS computer to know where the SOPA is at all times as referenced from an assigned 'Home Position' value on the encoder.
- 2) Install a sensor at the end of travel that changes state when contact is made (mount to the right, as looking at the mechanism from the access port). The motor power drops off when it reaches the sensor in that direction. An LED, or other reference item, comes on and lets you know that the physical end of travel has been reached. The opposite side of the mechanism has a sensor at the end of travel, indicating that the SGS computer must know when the SOPA has gone to the end of travel in the opposite direction.

\_\_\_\_end\_\_\_\_

GENERAL COMMENT BY mcotter: Tue Sep 29 23:07:31 GMT 2020

K-cor started approx 10:15am HST.

\_\_\_\_end\_\_\_\_

GENERAL COMMENT BY mcotter: Tue Sep 29 23:08:35 GMT 2020

Orographic clouds forming around and over summit. Stopping K-cor.

\_\_\_\_end\_\_\_\_

GENERAL COMMENT BY mcotter: Tue Sep 29 23:27:40 GMT 2020

\*\*\*NOTE\*\*\*

The 'SPAR TRACKING PROBLEM' log previously entered contained errors in the description of some items. What was identified as the 'SPAR Offset Pointing Arm' (SOPA), should have been identified as the 'Dec Arm'. The 'Hall Effect Sensors', should have been identified as the 'Proximity Sensors'.

\_\_\_\_end\_\_\_\_

WEATHER COMMENT: mcotter: Wed Sep 30 00:52:06 GMT 2020

Temp: 48.3f, Humidity: 92%, Pressure: 28.564in, Wind: 5mph from 12degs, Skies: Overcast clouds covering summit.

\_\_\_\_end\_\_\_\_

GENERAL COMMENT BY mcotter: Wed Sep 30 00:52:37 GMT 2020

Closed dome shutter doors and windows.

\_\_\_\_end\_\_\_\_

GONG COMMENT BY mcotter: Wed Sep 30 00:53:22 GMT 2020

GONG shack door closed.

\_\_\_\_end\_\_\_\_

GENERAL COMMENT BY mcotter: Wed Sep 30 00:55:32 GMT 2020

Skies were clear in the morning, but unfortunately problems with SPAR guiding prevented observing until approx 10:15am HST. Good data collected until clouds covered summit in the early afternoon.

\_\_\_\_end\_\_\_\_

ONSITE STAFF: mcotter