## 5.1.1.2 WAC FM SHUTTER OFFSET CALIBRATION RESULTS

*As reported in Reference 5.1.1.2-1*

### Reference 5.1.1.2-1 - IOM 388-PAG-CCA96-17, "WAC FM Calibration Results: Shutter Offset", C. Avis, December 9, 1996

#### 5.1.1.2.1 INTRODUCTION

The Wide-angle Flight Model thermal/vacuum testing included the acquisition of a set of images for determination of the Shutter-offset. This is the spatially-dependent correction between the commanded and the actual exposure times.

Three sets of image data were taken at Gain 3 in the 1x1 mode. These were at temperatures of -10° C, +5° C and +25° C. The sequences are designed to maintain a constant DN output by varying the illumination inversely with the exposure time. Three images were taken at each exposure level. At +5° C and +25° C, eleven exposure levels were obtained while increasing the exposure time from 5 msec to 100 msec and eleven levels were obtained while decreasing the exposure time from 100 msec to 5 msec. At -10° C, seven levels were obtained. In addition, images were obtained at +25° C with zero exposure time. The -10° C and +5° C tests used zero exposure time frames from other tests.

The -10° increasing exposure set and part of the decreasing set were affected by an unstable sensor head temperature. This gain state is sensitive to this temperature, so these data were excluded from this analysis.

#### 5.1.1.2.2 METHOD

The Shutter-offset is spatially-dependent, but for a given small area of the image it is constant and

$$S = VL(T - t_0)$$

where

- $S$ is the measured signal (in DN)
- $L$ is the measured radiance (in arbitrary radiance units)
- $T$ is the commanded exposure time (in milliseconds)
- $t_0$ is the shutter-offset (in milliseconds)
- $V$ is the system's sensitivity (in DN/radiance_unit-milliseconds)

This can be rearranged to

$$S/L = VT - Vt_0$$

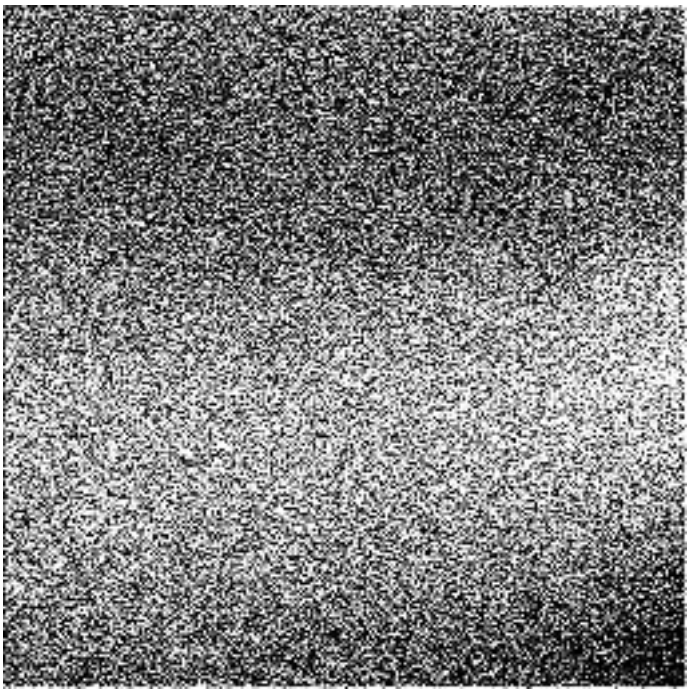
This linear equation (with $S$, $L$ and $T$ known) can then be solved by least-squares because of the many exposure levels available.

Images at the same exposure time are combined to produce signal values at 100 small areas (10 columns of 10 areas each) so that the values for $V$ and $t_0$ can be independently derived there. The 100 derived values are then compared and any areas giving values more than 2 sigma from the

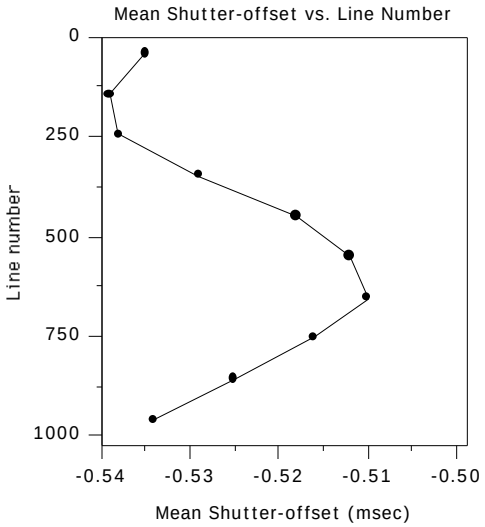
mean are flagged as bad. Global values for $V$ and $t_0$ are then derived by averaging the values at the remaining good areas.

#### 5.1.1.2.3 RESULTS

The analysis described here was performed using the top 250 lines of the image because of an unknown signal contaminating the lower part of the frames.



This signal resulted in large disagreement in Shutter-offset values within an image column (all points of which should give the same value). The values derived near the top and bottom of the image agreed pretty well, but near the middle there was a large deviation.



This is the result in spite of using appropriate bias (exposure=0) frames. The imperfect flatness of the flat-field images would not affect the Shutter-offset, only the Sensitivity. A limited investigation has not found the source of the extra signal. Further studies are needed to resolve this issue.

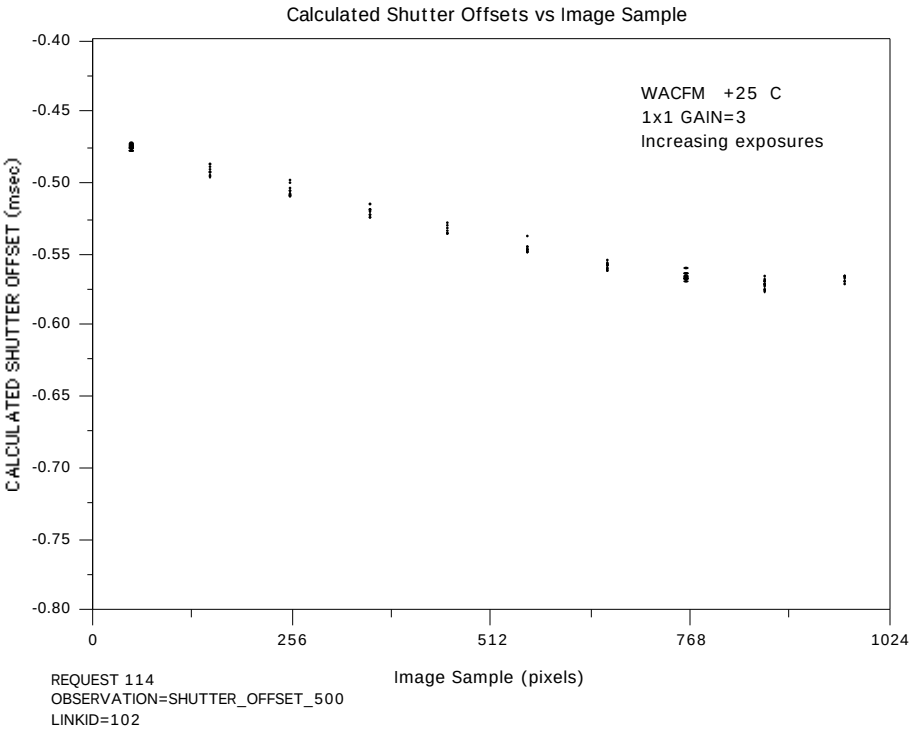
This Shutter-offset analysis shows:

- The observations of increasing and decreasing exposure times agree very well.
- Exposure times of 20 msec had to be ignored because those data did not fit the linear function described in the METHOD section above.
- The Shutter-offset is significantly dependent upon temperature, going from a mean value of -0.53 msec at +25° C to -0.66 at -10° C.
- The Shutter-offset is consistently negative, indicating that actual exposure time is longer than the commanded time. Also, the right side of the image receives more exposure than the left.

Ignoring the region of unexplained signal and the 20 msec data gives good results for this Shutter-offset analysis. In this calibration, the radiance was recorded in units of picoamps, giving Sensitivity the units of DN/picoamp-milliseconds.

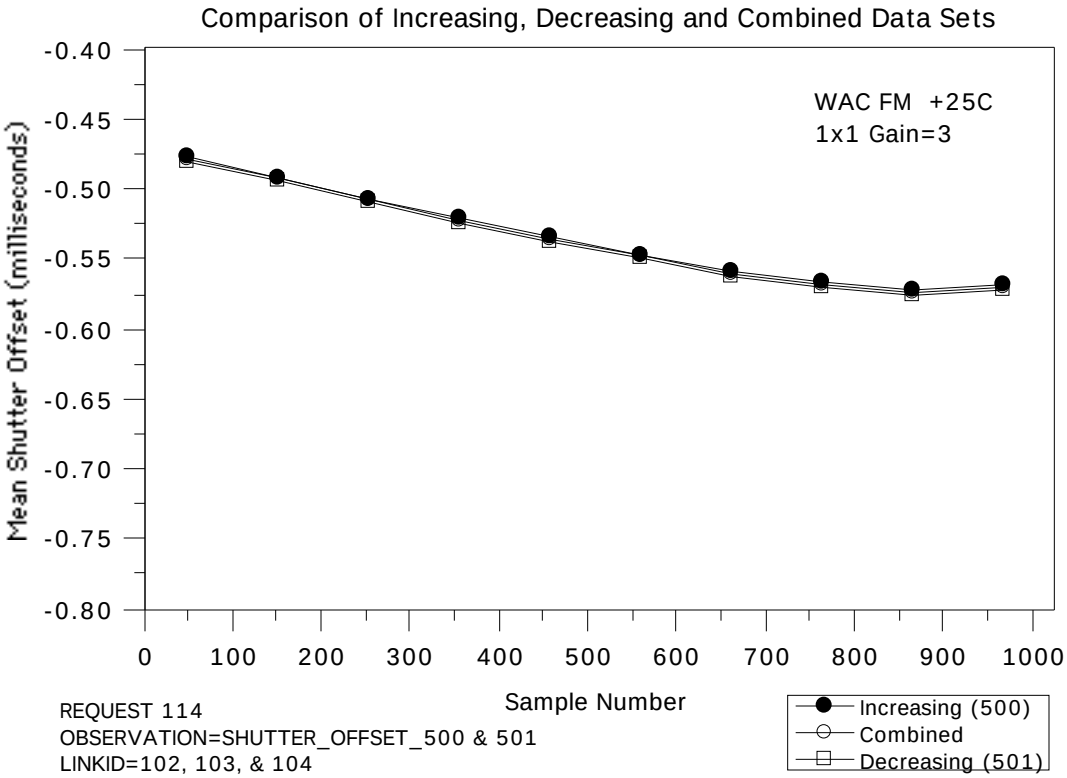
| | Mean Global Sensitivity | Mean Global Shutter Offset |
|---|---|---|
| +25 C increasing | 0.1785 ± 0.0018 | -0.5327 ± 0.0132 |
| +25 C decreasing | 0.1781 ± 0.0011 | -0.5360 ± 0.0075 |
| +25 C combined | 0.1783 ± 0.0011 | -0.5343 ± 0.0 76 |
| + 5 C increasing | 0.1827 ± 0.0020 | -0.5969 ± 0.0166 |
| + 5 C decreasing | 0.1825 ± 0.0018 | -0.6023 ± 0.0147 |
| + 5 C combined | 0.1826 ± 0.0015 | -0.5996 ± 0.0122 |
| -10 C decreasing | 0.1838 ± 0.0014 | -0.6607 ± 0.0046 |

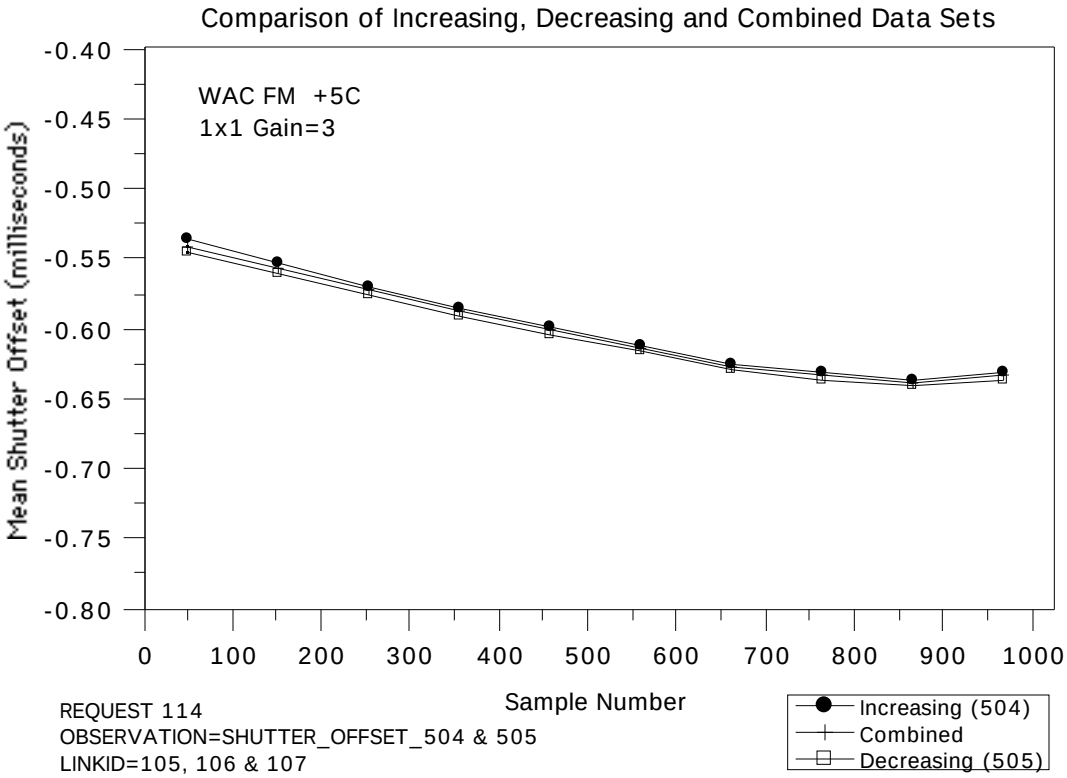
The mean value of $t_0$ is of little use because we require its functional dependence upon sample number (the shutter travels in the sample direction). The following graph plots the derived $t_0$ value vs. the sample number of each of the 100 small areas for one case (lines 1-250 only). It shows the degree of agreement between the 10 values derived at each image sample.

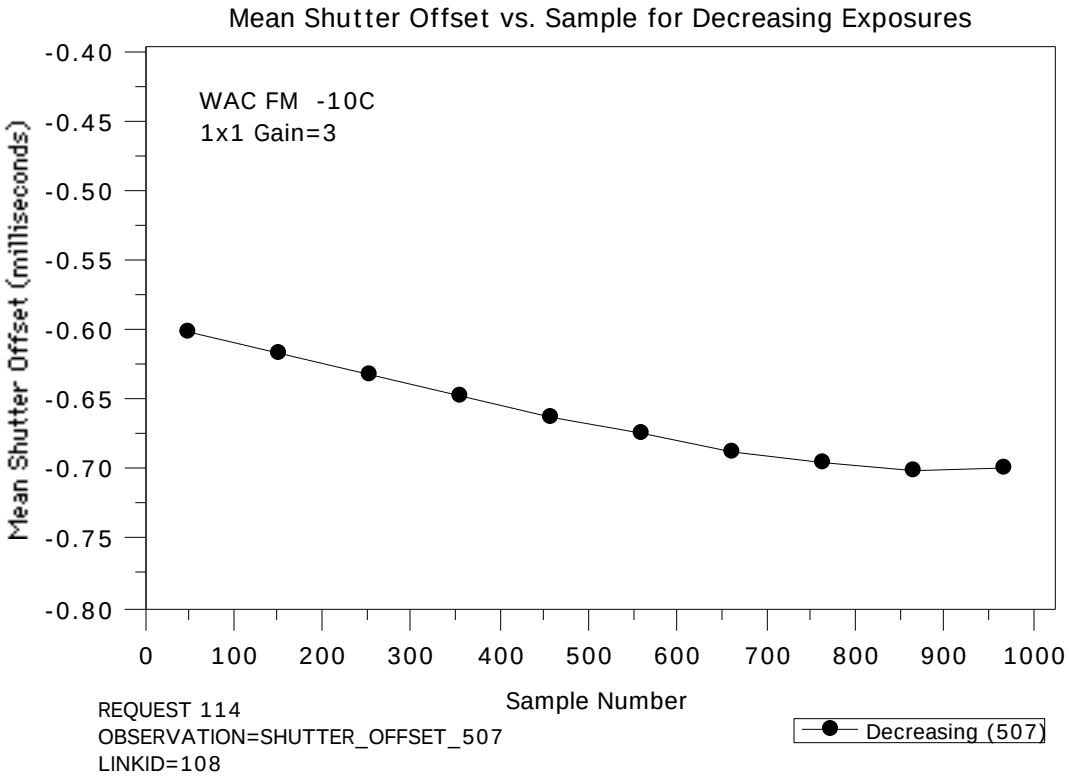



*5.1.1.2.3.1 MEAN SHUTTER-OFFSET vs. IMAGE SAMPLE NUMBER*

Using the upper portion of the images, the mean value of the Shutter-offset across the image area is shown below for the three temperatures. The observations with increasing exposure times, decreasing exposure times and the combination of the two are all plotted.

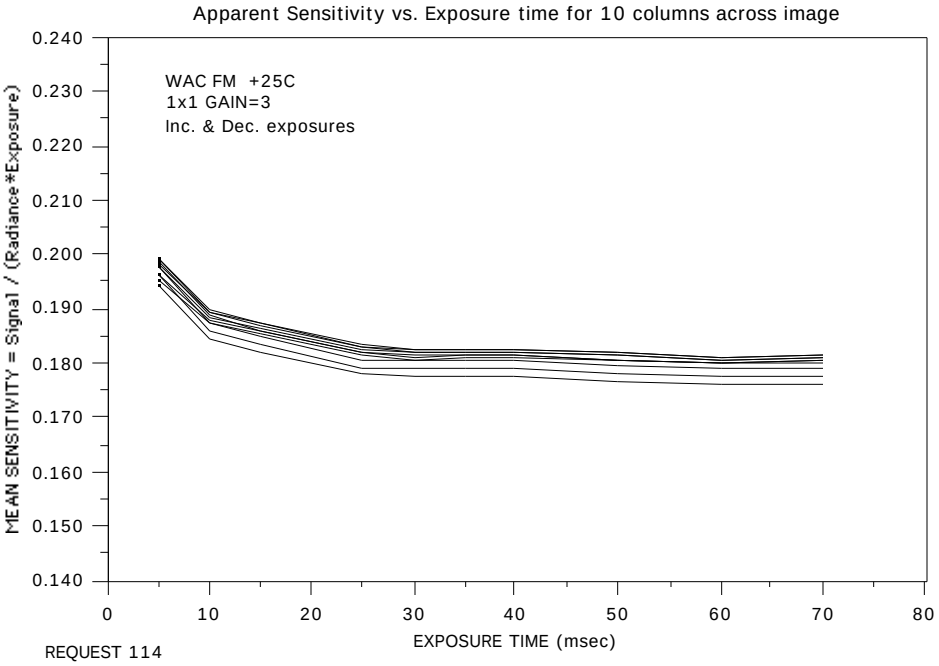

Comparison of Increasing, Decreasing and Combined Data Sets
WAC FM +25C
1x1 Gain=3
Mean Shutter Offset (milliseconds)
-0.40
-0.45
-0.50
-0.55
-0.60
-0.65
-0.70
-0.75
-0.80
0
100
200
300
400
500
600
700
800
900
1000
Sample Number
Increasing (500)
Combined
Decreasing (501)
REQUEST 114
OBSERVATION=SHUTTER_OFFSET_500 & 501
LINKID=102, 103, & 104


Comparison of Increasing, Decreasing and Combined Data Sets
WAC FM +5C
1x1 Gain=3
Mean Shutter Offset (milliseconds)
-0.40
-0.45
-0.50
-0.55
-0.60
-0.65
-0.70
-0.75
-0.80
0
100
200
300
400
500
600
700
800
900
1000
Sample Number
Increasing (504)
Combined
Decreasing (505)
REQUEST 114
OBSERVATION=SHUTTER_OFFSET_504 & 505
LINKID=105, 106 & 107

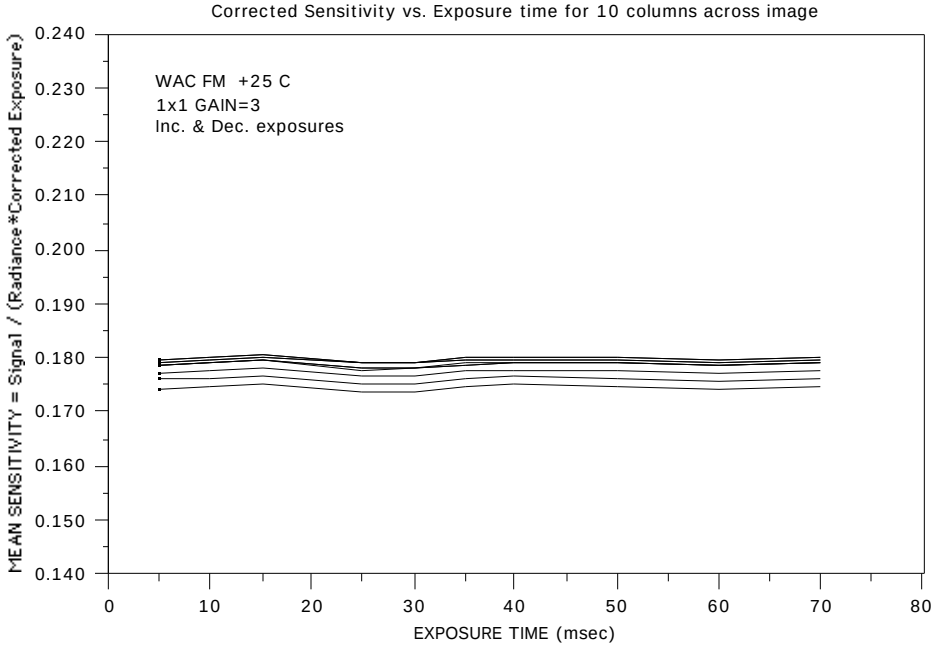



*5.1.1.2.3.2 APPARENT SENSITIVITY - UNCORRECTED AND CORRECTED*

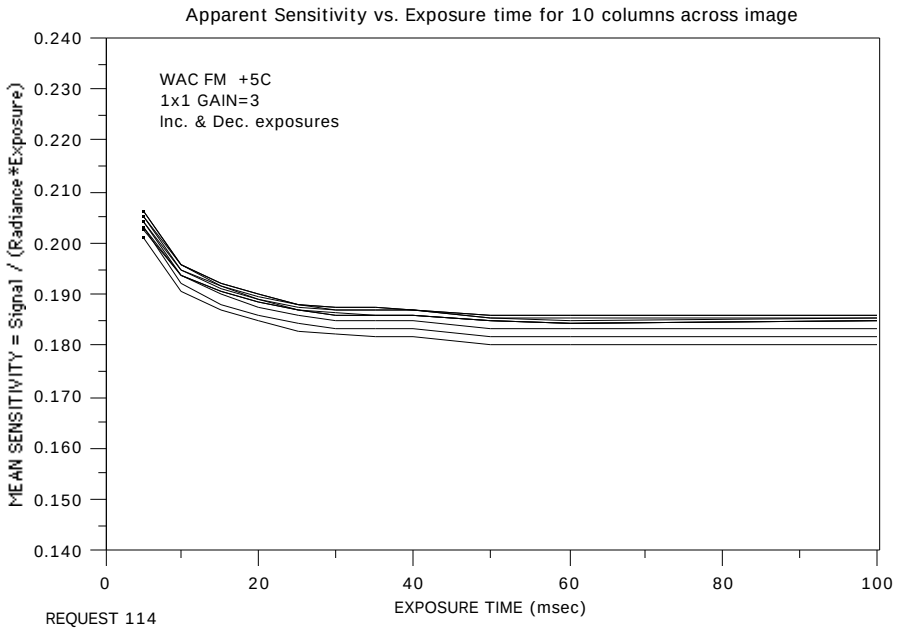
To illustrate the effect of the Shutter-offset, the following graphs plot Sensitivity vs. the commanded exposure time (both with and without the Shutter-offset correction). That is, $S/LT$ vs. $T$ and $S/L(T-t_0)$ vs. $T$. Of course, in the ideal case, Sensitivity should be a constant, and the use of the correction gets the plots closer to that case. The ten columns of data (each with a different Shutter-offset) are plotted in both uncorrected and corrected versions. The lines do not overly even in the corrected versions because of the imperfect flatness of the source (some areas receiving more light, i.e., appearing more sensitive).

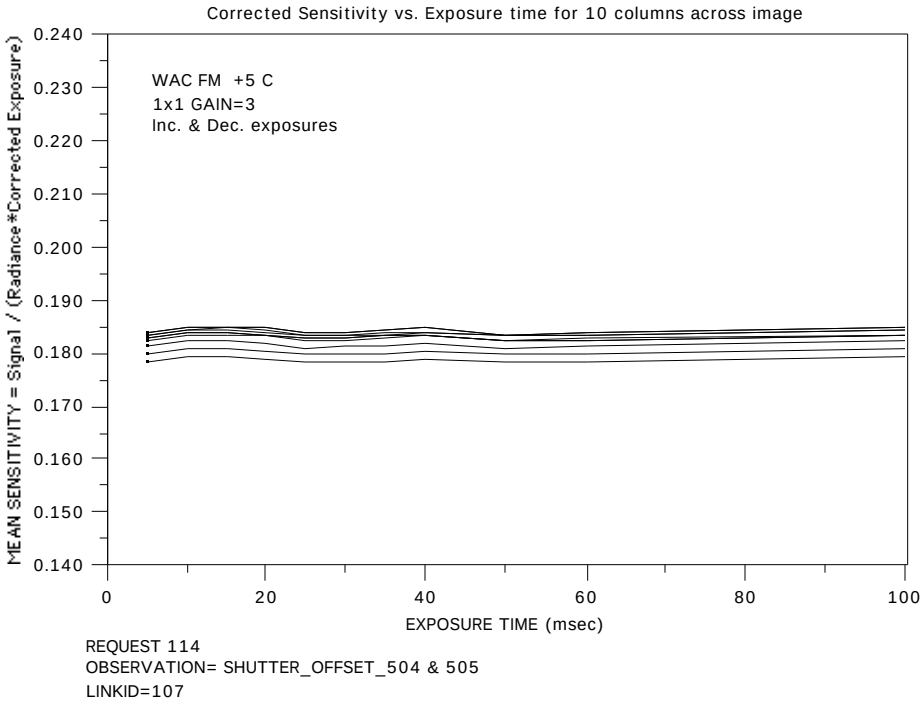


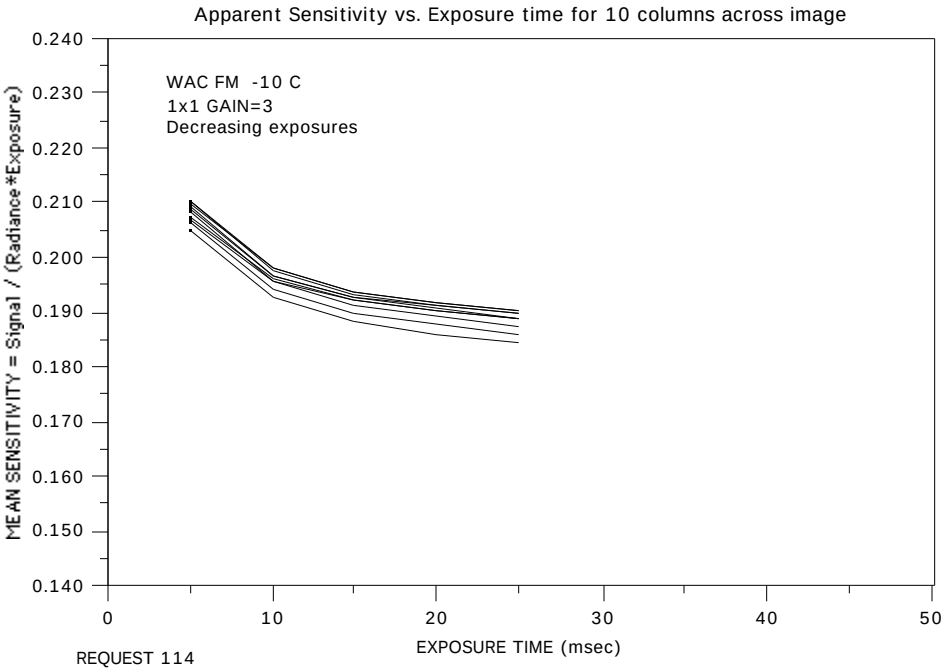

REQUEST 114
OBSERVATION= SHUTTER_OFFSET_500 & 501
LINKID=104



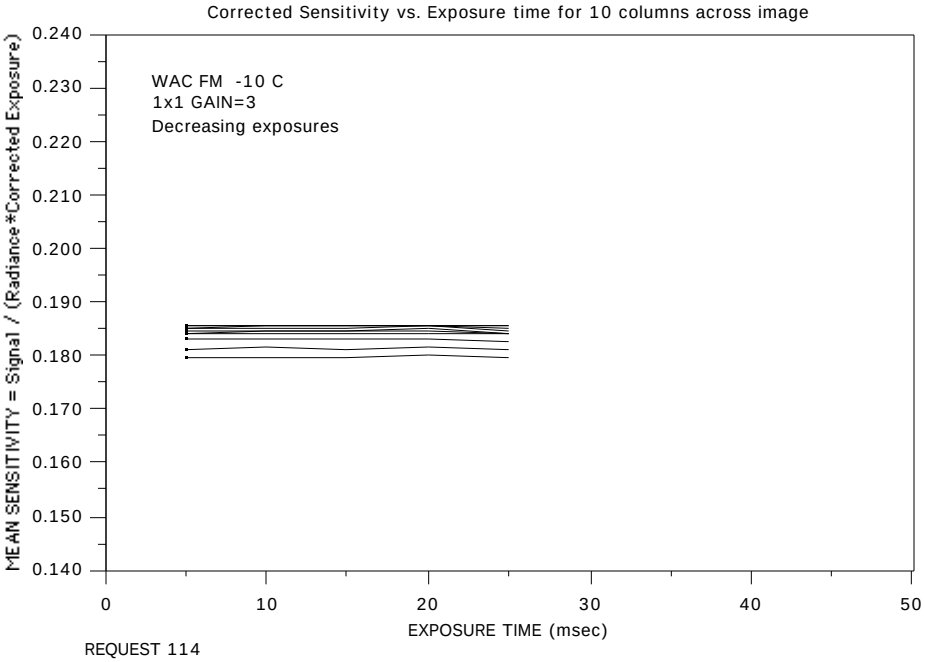

REQUEST 114
OBSERVATION= SHUTTER_OFFSET_500 & 501
LINKID=104


Apparent Sensitivity vs. Exposure time for 10 columns across image
WAC FM +5C
1x1 GAIN=3
Inc. & Dec. exposures
MEAN SENSITIVITY = Signal / (Radiance*Exposure)
0.240
0.230
0.220
0.210
0.200
0.190
0.180
0.170
0.160
0.150
0.140
0
20
40
60
80
100
EXPOSURE TIME (msec)
REQUEST 114
OBSERVATION= SHUTTER_OFFSET_504 & 505
LINKID=107


Corrected Sensitivity vs. Exposure time for 10 columns across image
WAC FM +5 C
1x1 GAIN=3
Inc. & Dec. exposures
MEAN SENSITIVITY = Signal / (Radiance*Corrected Exposure)
0.240
0.230
0.220
0.210
0.200
0.190
0.180
0.170
0.160
0.150
0.140
0
20
40
60
80
100
EXPOSURE TIME (msec)
REQUEST 114
OBSERVATION= SHUTTER_OFFSET_504 & 505
LINKID=107




REQUEST 114
OBSERVATION= SHUTTER_OFFSET_507
LINKID=108




REQUEST 114
OBSERVATION= SHUTTER_OFFSET_500 & 501
LINKID=108

### 5.1.1.2.4 IMAGES USED IN SHUTTER OFFSET ANALYSIS

+25°C (LINKID=102,103,104)

| sclk | day | eventtime | observation | mode | gain | expos | radiance |
|---|---|---|---|---|---|---|---|
| 126750 | 179 | 19:44:41.0 | SHUTTER_OFFSET_500 | FULL | 3 (40K) | 0 | 0.00 |
| 126751 | 179 | 19:46:11.0 | SHUTTER_OFFSET_500 | FULL | 3 (40K) | 0 | 0.00 |
| 126752 | 179 | 19:47:40.0 | SHUTTER_OFFSET_500 | FULL | 3 (40K) | 0 | 0.00 |
| 126753 | 179 | 19:50:34.0 | SHUTTER_OFFSET_500 | FULL | 3 (40K) | 5 | 3200.00 |
| 126756 | 179 | 19:55:33.0 | SHUTTER_OFFSET_500 | FULL | 3 (40K) | 5 | 3200.00 |
| 126757 | 179 | 19:57:3.0 | SHUTTER_OFFSET_500 | FULL | 3 (40K) | 5 | 3200.00 |
| 126758 | 179 | 20:6:31.0 | SHUTTER_OFFSET_500 | FULL | 3 (40K) | 10 | 1600.00 |
| 126759 | 179 | 20:8:1.0 | SHUTTER_OFFSET_500 | FULL | 3 (40K) | 10 | 1600.00 |
| 126760 | 179 | 20:9:30.0 | SHUTTER_OFFSET_500 | FULL | 3 (40K) | 10 | 1600.00 |
| 126761 | 179 | 20:14:28.0 | SHUTTER_OFFSET_500 | FULL | 3 (40K) | 15 | 1070.00 |
| 126762 | 179 | 20:15:58.0 | SHUTTER_OFFSET_500 | FULL | 3 (40K) | 15 | 1070.00 |
| 126763 | 179 | 20:17:27.0 | SHUTTER_OFFSET_500 | FULL | 3 (40K) | 15 | 1070.00 |
| 126770 | 179 | 20:50:24.0 | SHUTTER_OFFSET_500 | FULL | 3 (40K) | 25 | 640.00 |
| 126771 | 179 | 20:51:54.0 | SHUTTER_OFFSET_500 | FULL | 3 (40K) | 25 | 640.00 |
| 126772 | 179 | 20:53:23.0 | SHUTTER_OFFSET_500 | FULL | 3 (40K) | 25 | 640.00 |
| 126773 | 179 | 21:0:9.0 | SHUTTER_OFFSET_500 | FULL | 3 (40K) | 30 | 533.00 |
| 126774 | 179 | 21:1:39.0 | SHUTTER_OFFSET_500 | FULL | 3 (40K) | 30 | 533.00 |
| 126775 | 179 | 21:3:8.0 | SHUTTER_OFFSET_500 | FULL | 3 (40K) | 30 | 533.00 |
| 126776 | 179 | 21:6:29.0 | SHUTTER_OFFSET_500 | FULL | 3 (40K) | 35 | 457.00 |
| 126777 | 179 | 21:7:59.0 | SHUTTER_OFFSET_500 | FULL | 3 (40K) | 35 | 457.00 |
| 126778 | 179 | 21:9:28.0 | SHUTTER_OFFSET_500 | FULL | 3 (40K) | 35 | 457.00 |
| 126779 | 179 | 21:13:1.0 | SHUTTER_OFFSET_500 | FULL | 3 (40K) | 40 | 400.00 |
| 126780 | 179 | 21:14:30.0 | SHUTTER_OFFSET_500 | FULL | 3 (40K) | 40 | 400.00 |
| 126781 | 179 | 21:15:59.0 | SHUTTER_OFFSET_500 | FULL | 3 (40K) | 40 | 400.00 |
| 126782 | 179 | 21:20:51.0 | SHUTTER_OFFSET_500 | FULL | 3 (40K) | 50 | 320.00 |
| 126783 | 179 | 21:22:21.0 | SHUTTER_OFFSET_500 | FULL | 3 (40K) | 50 | 320.00 |
| 126784 | 179 | 21:23:50.0 | SHUTTER_OFFSET_500 | FULL | 3 (40K) | 50 | 320.00 |
| 126785 | 179 | 21:28:39.0 | SHUTTER_OFFSET_500 | FULL | 3 (40K) | 60 | 266.00 |
| 126786 | 179 | 21:30:8.0 | SHUTTER_OFFSET_500 | FULL | 3 (40K) | 60 | 266.00 |
| 126788 | 179 | 21:33:34.0 | SHUTTER_OFFSET_500 | FULL | 3 (40K) | 60 | 266.00 |
| 126795 | 179 | 21:49:33.0 | SHUTTER_OFFSET_500 | FULL | 3 (40K) | 70 | 229.00 |
| 126796 | 179 | 21:51:2.0 | SHUTTER_OFFSET_500 | FULL | 3 (40K) | 70 | 229.00 |
| 126798 | 179 | 21:55:11.0 | SHUTTER_OFFSET_500 | FULL | 3 (40K) | 70 | 229.00 |
| 126799 | 179 | 22:54:1.0 | SHUTTER_OFFSET_501 | FULL | 3 (40K) | 70 | 229.00 |
| 126800 | 179 | 22:55:30.0 | SHUTTER_OFFSET_501 | FULL | 3 (40K) | 70 | 229.00 |
| 126801 | 179 | 22:56:59.0 | SHUTTER_OFFSET_501 | FULL | 3 (40K) | 70 | 229.00 |
| 126802 | 179 | 23:1:44.0 | SHUTTER_OFFSET_501 | FULL | 3 (40K) | 60 | 266.00 |
| 126803 | 179 | 23:3:13.0 | SHUTTER_OFFSET_501 | FULL | 3 (40K) | 60 | 266.00 |
| 126804 | 179 | 23:4:42.0 | SHUTTER_OFFSET_501 | FULL | 3 (40K) | 60 | 266.00 |
| 126805 | 179 | 23:8:8.0 | SHUTTER_OFFSET_501 | FULL | 3 (40K) | 50 | 320.00 |
| 126806 | 179 | 23:9:37.0 | SHUTTER_OFFSET_501 | FULL | 3 (40K) | 50 | 320.00 |
| 126807 | 179 | 23:11:6.0 | SHUTTER_OFFSET_501 | FULL | 3 (40K) | 50 | 320.00 |
| 126808 | 179 | 23:14:1.0 | SHUTTER_OFFSET_501 | FULL | 3 (40K) | 40 | 400.00 |
| 126809 | 179 | 23:15:30.0 | SHUTTER_OFFSET_501 | FULL | 3 (40K) | 40 | 400.00 |
| 126810 | 179 | 23:16:59.0 | SHUTTER_OFFSET_501 | FULL | 3 (40K) | 40 | 400.00 |
| 126811 | 179 | 23:20:22.0 | SHUTTER_OFFSET_501 | FULL | 3 (40K) | 35 | 457.00 |
| 126812 | 179 | 23:21:51.0 | SHUTTER_OFFSET_501 | FULL | 3 (40K) | 35 | 457.00 |
| 126813 | 179 | 23:23:20.0 | SHUTTER_OFFSET_501 | FULL | 3 (40K) | 35 | 457.00 |
| 126815 | 179 | 23:43:6.0 | SHUTTER_OFFSET_501 | FULL | 3 (40K) | 30 | 533.00 |
| 126816 | 179 | 23:44:35.0 | SHUTTER_OFFSET_501 | FULL | 3 (40K) | 30 | 533.00 |
| 126817 | 179 | 23:49:41.0 | SHUTTER_OFFSET_501 | FULL | 3 (40K) | 30 | 533.00 |
| 126818 | 179 | 23:54:24.0 | SHUTTER_OFFSET_501 | FULL | 3 (40K) | 25 | 640.00 |
| 126819 | 179 | 23:55:53.0 | SHUTTER_OFFSET_501 | FULL | 3 (40K) | 25 | 640.00 |
| 126820 | 179 | 23:57:22.0 | SHUTTER_OFFSET_501 | FULL | 3 (40K) | 25 | 640.00 |
| 126824 | 180 | 0:12:32.0 | SHUTTER_OFFSET_501 | FULL | 3 (40K) | 15 | 1070.00 |
| 126825 | 180 | 0:14:1.0 | SHUTTER_OFFSET_501 | FULL | 3 (40K) | 15 | 1070.00 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 126826 | 180 | 0:15:30.0 | SHUTTER_OFFSET_501 | FULL | 3 (40K) | 15 | 1070.00 |
| 126827 | 180 | 0:19:8.0 | SHUTTER_OFFSET_501 | FULL | 3 (40K) | 10 | 1600.00 |
| 126828 | 180 | 0:20:37.0 | SHUTTER_OFFSET_501 | FULL | 3 (40K) | 10 | 1600.00 |
| 126829 | 180 | 0:22:6.0 | SHUTTER_OFFSET_501 | FULL | 3 (40K) | 10 | 1600.00 |
| 126830 | 180 | 0:27:21.0 | SHUTTER_OFFSET_501 | FULL | 3 (40K) | 5 | 3200.00 |
| 126831 | 180 | 0:28:50.0 | SHUTTER_OFFSET_501 | FULL | 3 (40K) | 5 | 3200.00 |
| 126832 | 180 | 0:30:19.0 | SHUTTER_OFFSET_501 | FULL | 3 (40K) | 5 | 3200.00 |
| 126833 | 180 | 0:34:48.0 | SHUTTER_OFFSET_501 | FULL | 3 (40K) | 0 | 0.00 |
| 126834 | 180 | 0:36:17.0 | SHUTTER_OFFSET_501 | FULL | 3 (40K) | 0 | 0.00 |
| 126835 | 180 | 0:37:46.0 | SHUTTER_OFFSET_501 | FULL | 3 (40K) | 0 | 0.00 |

+5°C (LINKID=105,106,107)

| sclk | day | eventtime | observation | mode | gain | expos | radiance |
|---|---|---|---|---|---|---|---|
| 129873 | 194 | 13:37:20.0 | LTC_BLEM_GAIN_510 | FULL | 3 (40K) | 0 | 42.50 |
| 129874 | 194 | 13:38:49.0 | LTC_BLEM_GAIN_510 | FULL | 3 (40K) | 0 | 42.50 |
| 129875 | 194 | 13:40:18.0 | LTC_BLEM_GAIN_510 | FULL | 3 (40K) | 0 | 42.50 |
| 130387 | 196 | 1:19:25.0 | SHUTTER_OFFSET_504 | FULL | 3 (40K) | 5 | 3200.00 |
| 130388 | 196 | 1:20:54.0 | SHUTTER_OFFSET_504 | FULL | 3 (40K) | 5 | 3200.00 |
| 130389 | 196 | 1:22:23.0 | SHUTTER_OFFSET_504 | FULL | 3 (40K) | 5 | 3200.00 |
| 130390 | 196 | 1:28:22.0 | SHUTTER_OFFSET_504 | FULL | 3 (40K) | 10 | 1600.00 |
| 130391 | 196 | 1:29:51.0 | SHUTTER_OFFSET_504 | FULL | 3 (40K) | 10 | 1600.00 |
| 130392 | 196 | 1:31:20.0 | SHUTTER_OFFSET_504 | FULL | 3 (40K) | 10 | 1600.00 |
| 130393 | 196 | 1:40:39.0 | SHUTTER_OFFSET_504 | FULL | 3 (40K) | 15 | 1070.00 |
| 130394 | 196 | 1:42:8.0 | SHUTTER_OFFSET_504 | FULL | 3 (40K) | 15 | 1070.00 |
| 130396 | 196 | 1:45:58.0 | SHUTTER_OFFSET_504 | FULL | 3 (40K) | 15 | 1070.00 |
| 130401 | 196 | 2:5:33.0 | SHUTTER_OFFSET_504 | FULL | 3 (40K) | 25 | 640.00 |
| 130402 | 196 | 2:7:2.0 | SHUTTER_OFFSET_504 | FULL | 3 (40K) | 25 | 640.00 |
| 130403 | 196 | 2:8:31.0 | SHUTTER_OFFSET_504 | FULL | 3 (40K) | 25 | 640.00 |
| 130404 | 196 | 2:13:16.0 | SHUTTER_OFFSET_504 | FULL | 3 (40K) | 30 | 533.00 |
| 130405 | 196 | 2:14:45.0 | SHUTTER_OFFSET_504 | FULL | 3 (40K) | 30 | 533.00 |
| 130406 | 196 | 2:16:14.0 | SHUTTER_OFFSET_504 | FULL | 3 (40K) | 30 | 533.00 |
| 130407 | 196 | 2:23:15.0 | SHUTTER_OFFSET_504 | FULL | 3 (40K) | 35 | 457.00 |
| 130408 | 196 | 2:24:44.0 | SHUTTER_OFFSET_504 | FULL | 3 (40K) | 35 | 457.00 |
| 130409 | 196 | 2:26:13.0 | SHUTTER_OFFSET_504 | FULL | 3 (40K) | 35 | 457.00 |
| 130410 | 196 | 2:29:44.0 | SHUTTER_OFFSET_504 | FULL | 3 (40K) | 40 | 400.00 |
| 130411 | 196 | 2:31:13.0 | SHUTTER_OFFSET_504 | FULL | 3 (40K) | 40 | 400.00 |
| 130412 | 196 | 2:32:42.0 | SHUTTER_OFFSET_504 | FULL | 3 (40K) | 40 | 400.00 |
| 130413 | 196 | 2:36:24.0 | SHUTTER_OFFSET_504 | FULL | 3 (40K) | 50 | 320.00 |
| 130414 | 196 | 2:37:53.0 | SHUTTER_OFFSET_504 | FULL | 3 (40K) | 50 | 320.00 |
| 130415 | 196 | 2:39:22.0 | SHUTTER_OFFSET_504 | FULL | 3 (40K) | 50 | 320.00 |
| 130417 | 196 | 2:45:2.0 | SHUTTER_OFFSET_504 | FULL | 3 (40K) | 60 | 266.00 |
| 130418 | 196 | 2:46:31.0 | SHUTTER_OFFSET_504 | FULL | 3 (40K) | 60 | 266.00 |
| 130419 | 196 | 2:48:50.0 | SHUTTER_OFFSET_504 | FULL | 3 (40K) | 60 | 266.00 |
| 130420 | 196 | 2:53:22.0 | SHUTTER_OFFSET_504 | FULL | 3 (40K) | 100 | 160.00 |
| 130421 | 196 | 2:54:51.0 | SHUTTER_OFFSET_504 | FULL | 3 (40K) | 100 | 160.00 |
| 130422 | 196 | 2:56:20.0 | SHUTTER_OFFSET_504 | FULL | 3 (40K) | 100 | 160.00 |
| 130423 | 196 | 3:4:54.0 | SHUTTER_OFFSET_505 | FULL | 3 (40K) | 100 | 160.00 |
| 130424 | 196 | 3:6:23.0 | SHUTTER_OFFSET_505 | FULL | 3 (40K) | 100 | 160.00 |
| 130425 | 196 | 3:7:52.0 | SHUTTER_OFFSET_505 | FULL | 3 (40K) | 100 | 160.00 |
| 130426 | 196 | 3:11:42.0 | SHUTTER_OFFSET_505 | FULL | 3 (40K) | 60 | 266.00 |
| 130427 | 196 | 3:13:11.0 | SHUTTER_OFFSET_505 | FULL | 3 (40K) | 60 | 266.00 |
| 130428 | 196 | 3:14:40.0 | SHUTTER_OFFSET_505 | FULL | 3 (40K) | 60 | 266.00 |
| 130429 | 196 | 3:18:3.0 | SHUTTER_OFFSET_505 | FULL | 3 (40K) | 50 | 320.00 |
| 130430 | 196 | 3:19:32.0 | SHUTTER_OFFSET_505 | FULL | 3 (40K) | 50 | 320.00 |
| 130431 | 196 | 3:21:1.0 | SHUTTER_OFFSET_505 | FULL | 3 (40K) | 50 | 320.00 |
| 130432 | 196 | 3:30:58.0 | SHUTTER_OFFSET_505 | FULL | 3 (40K) | 40 | 400.00 |
| 130433 | 196 | 3:32:27.0 | SHUTTER_OFFSET_505 | FULL | 3 (40K) | 40 | 400.00 |
| 130434 | 196 | 3:33:56.0 | SHUTTER_OFFSET_505 | FULL | 3 (40K) | 40 | 400.00 |
| 130435 | 196 | 3:38:5.0 | SHUTTER_OFFSET_505 | FULL | 3 (40K) | 35 | 457.00 |
| 130436 | 196 | 3:39:34.0 | SHUTTER_OFFSET_505 | FULL | 3 (40K) | 35 | 457.00 |
| 130437 | 196 | 3:41:3.0 | SHUTTER_OFFSET_505 | FULL | 3 (40K) | 35 | 457.00 |

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130438 196 3:44:32.0    SHUTTER_OFFSET_505   FULL   3 (40K)   30    533.00
130439 196 3:46:1.0     SHUTTER_OFFSET_505   FULL   3 (40K)   30    533.00
130441 196 3:49:34.0    SHUTTER_OFFSET_505   FULL   3 (40K)   30    533.00
130442 196 4:1:10.0     SHUTTER_OFFSET_505   FULL   3 (40K)   25    640.00
130443 196 4:2:39.0     SHUTTER_OFFSET_505   FULL   3 (40K)   25    640.00
130444 196 4:4:8.0      SHUTTER_OFFSET_505   FULL   3 (40K)   25    640.00
130450 196 4:20:0.0     SHUTTER_OFFSET_505   FULL   3 (40K)   15   1070.00
130451 196 4:21:29.0    SHUTTER_OFFSET_505   FULL   3 (40K)   15   1070.00
130452 196 4:22:58.0    SHUTTER_OFFSET_505   FULL   3 (40K)   15   1070.00
130453 196 4:27:25.0    SHUTTER_OFFSET_505   FULL   3 (40K)   10   1600.00
130454 196 4:28:54.0    SHUTTER_OFFSET_505   FULL   3 (40K)   10   1600.00
130455 196 4:30:23.0    SHUTTER_OFFSET_505   FULL   3 (40K)   10   1600.00
130456 196 4:34:22.0    SHUTTER_OFFSET_505   FULL   3 (40K)   5    3200.00
130457 196 4:35:51.0    SHUTTER_OFFSET_505   FULL   3 (40K)   5    3200.00
130458 196 4:37:20.0    SHUTTER_OFFSET_505   FULL   3 (40K)   5    3200.00
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-10°C (LINKID=108)

| sclk | day | eventtime | observation | mode | gain | expos | radiance |
|---|---|---|---|---|---|---|---|
| 132226 | 201 | 5:54:8.0 | SHUTTER_OFFSET_507 | FULL | 3 (40K) | 25 | 640.00 |
| 132227 | 201 | 5:55:37.0 | SHUTTER_OFFSET_507 | FULL | 3 (40K) | 25 | 640.00 |
| 132228 | 201 | 5:57:6.0 | SHUTTER_OFFSET_507 | FULL | 3 (40K) | 25 | 640.00 |
| 132232 | 201 | 6:22:52.0 | SHUTTER_OFFSET_507 | FULL | 3 (40K) | 15 | 1070.00 |
| 132233 | 201 | 6:24:21.0 | SHUTTER_OFFSET_507 | FULL | 3 (40K) | 15 | 1070.00 |
| 132234 | 201 | 6:25:50.0 | SHUTTER_OFFSET_507 | FULL | 3 (40K) | 15 | 1070.00 |
| 132235 | 201 | 6:29:15.0 | SHUTTER_OFFSET_507 | FULL | 3 (40K) | 10 | 1600.00 |
| 132237 | 201 | 6:32:13.0 | SHUTTER_OFFSET_507 | FULL | 3 (40K) | 10 | 1600.00 |
| 132238 | 201 | 6:35:22.0 | SHUTTER_OFFSET_507 | FULL | 3 (40K) | 10 | 1600.00 |
| 132239 | 201 | 6:39:39.0 | SHUTTER_OFFSET_507 | FULL | 3 (40K) | 5 | 3200.00 |
| 132240 | 201 | 6:41:8.0 | SHUTTER_OFFSET_507 | FULL | 3 (40K) | 5 | 3200.00 |
| 132241 | 201 | 6:42:37.0 | SHUTTER_OFFSET_507 | FULL | 3 (40K) | 5 | 3200.00 |
| 132242 | 201 | 7:3:54.0 | ELECTRICAL_NOISE_528 | FULL | 3 (40K) | 0 | 58.80 |
| 132258 | 201 | 7:14:48.0 | ELECTRICAL_NOISE_532 | FULL | 3 (40K) | 0 | 58.80 |