13124 - COS Imaging TA and Spectroscopic WCA-PSA/BOA offset verifications

Cycle: 20, Proposal Category: CAL/COS

(Availability Mode: RESTRICTED)

INVESTIGATORS

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VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(2) WD-1657+343	COS/FUV COS/NUV	1	16-Sep-2013 21:05:21.0	yes
02	(3) HIP66578	COS/FUV COS/NUV	1	16-Sep-2013 21:05:39.0	yes
03	(1) 206W3	COS/NUV	1	16-Sep-2013 21:05:49.0	yes

3 Total Orbits Used

ABSTRACT

This program builds upon the monitoring and calibration of the FGSs. The list of proposals, cycles, and the order in which the alignment is checked is given below.

11878->12399->12781->13171

C17->C18->C19->C20

STIS->WFC3->ACS->COS

Visit 01 of the C20 SIAF verification program, 13171, executed on Mar 2, 2012, and Visit 02 is scheduled for Sep 1, 2103. This program performs a PSA/MIRRORA ACQ/IMAGE on a target that should already be centered in the aperture. This verifies the COS NUV PSA aperture position in the SIAF. After this PSA+MIRRORA ACQ/IMAGE, a PSA+MIRRORB ACQ/IMAGE is then performed. This exposure bootstraps the PSA+MIRRORB centering to the PSA+MIRROR SIAF verification. This allows us to monitor the properties of the PSA+MIRRORB image in a controlled way on a centered target. No spectra are taken in 13171 due to time constrains.

This program extends the SIAF verification of 13171 to the other two ACQ/IMAGE combinations (BOA+MIRRORA & BOA+MIRRORB) by bootstraping from the PSA+MIRRORB verification of 13171.

Visit 1 of this program begins with a PSA+MIRRORB NUV ACQ/IMAGE followed by a BOA+MIRRORA ACQ/IMAGE. Both observations are high S/N to get the most accurate centering information possible. The program then takes a PSA+MIRRORB IMAGE to ensure that we are still properly centered. We prefer that Visit 01 of this program executes after Visit 02 of 13171, but more than 17, but less than 45 days after to ensure that no long term instrument or telescope focus changes impart our results.

After the Imaging verification Visit 1 of this program will obtain a S/N > 60 NUV spectrum using the most popular NUV grating (G230L, G185M, & G285M), and FUV Spectra using G130M/1309 and G140L/1280. This allows the direct verification of the NUV and FUV WCA-to-PSA cross-dispersion offsets used by ACQ/PEAKXD.

Visit 02 of this program follows the style of Visit 01, but the initial ACQ/IMAGE is a BOA+MIRRORA and the second ACQ/IMAGE is BOA/MIRRORB. Visit 02 should occur after Visit 01 by between 0 to 45 days (the closer in time, the better). NUV Spectra will be taken with G185M and G285M, and FUV spectrum will be the G160M/1623 (PSA and BOA).

Visit 3 of this program is an on-hold, contingency, visit used to replace the 13171 Visit 02 information in case this program is, for whatever reason, not executed as planned. In this case the 1st ACQ/IMAGE is PSA/MIRRORA and the 2nd ACQ/Image is PSA/MIRRORB.

All visits in this program are single orbit visits.

OBSERVING DESCRIPTION

The process is to perform back-to-back ACQ/IMAGES in two different modes (e.g., PSA/MIRRORB then BOA/MIRRORA. This will allow test the cross-calibration to ensure that both TA modes are centering the target to the same point in the aperture.

Program 13171 Visit 01 executed on 3/2/13 and contained a back-to-back pair of observations on the target 206W3. The DOM/SUB FGs = F1/F3. Visit 02 of 13171 will be performed Sept 1, 2013. An FGS adjustment was made in July 2013, we would perfer to execute shortly after Visit 02 of 13171.

Here is the history of the results from recent FGS alignment tests

PID/visit Date Target AP MIRROR ET D_GS S_GS ORIENT Counts1 Counts2 BKG Fcnts1 Fcnts2 AD XD MIRRORA/MIRRORB
12399/a1 2011-03-12 427W3 PSA MIRRORA 60s N8CU000194F3 N8CV000724F1 -44.99 15128 15640 844 14284 14796 0.168 -0.426
12399/a1 2011-03-12 427W3 PSA MIRRORB 300s N8CU000194F3 N8CV000724F1 -44.99 9643 9566 3971 5672 5595 -0.033 0.031 13.2225

SIF UPDATED 2011.172 (6/21/11) NEW FGS Alignment

12399/a2 2011-09-13 206W3 PSA MIRRORA 60s N8CU000194F1 N8CV000724F3 134.997 21161 21000 981 20180 20019 -0.200 -0.019
12399/a2 2011-09-13 206W3 PSA MIRRORB 300s N8CU000194F1 N8CV000724F3 134.997 12798 12670 4824 7974 7846 -0.018 0.008 12.7575

SIAF UPDATED 2012.086 (3/26/12) Support multiple FUV LPs

12781/a1 2012-03-28 427W3 PSA MIRRORA 60s N8CU000194F3 N8CV000724F1 -44.992 15502 15345 831 14671 14514 0.128 -0.307
12781/a1 2012-03-28 427W3 PSA MIRRORB 300s N8CU000194F3 N8CV000724F1 -44.992 9204 9125 4261 4943 4864 0.001 -0.003 14.9198

12781/a2 2012-09-25 206W3 PSA MIRRORA 60s N8CU000194F1 N8CV000724F3 134.997 21204 21063 1008 20196 20055 -0.183 0.078
12781/a2 2012-09-25 206W3 PSA MIRRORB 300s N8CU000194F1 N8CV000724F3 134.997 12480 12570 5374 7106 7196 -0.028 -0.021 13.9348

13171/a1 2013-03-03 427W3 PSA MIRRORA 60s N8CU000194F3 N8CV000724F1 -44.99 15910 16218 1440 14470 14778 -0.075 -0.126
13171/a1 2013-03-03 427W3 PSA MIRRORB 300s N8CU000194F3 N8CV000724F1 -44.99 12441 12127 7139 5302 4988 -0.060 -0.010 14.8136

ADDITIONAL COMMENTS

Must be performed on 2 guidestar fine-lock and must not use FGS2. Guidestar pair must be reviewed by the PC.

Proposal 13124 - PSA/B & BOA/A (01) - COS Imaging TA and Spectroscopic WCA-PSA/BOA offset verifications

Visit

Proposal 13124, PSA/B & BOA/A (01), implementation Tue Sep 17 01:05:57 GMT 2013

Diagnostic Status: Warning

Scientific Instruments: COS/NUV, COS/FUV

Special Requirements: SCHED 100%; BETWEEN 17-SEP-2013:00:00:00 AND 15-NOV-2013:00:00:00

Comments: Test to compare the centering of PSA/MIRRORB to BOA/MIRRORA. The target will be the standard star WD1657+343. 100% Schedubility. This should be executed within 45 days of Visit 02 of 13171, but at least 17 days after.

Diagnostics

(PSA/B & BOA/A (01)) Warning (Form): If the target coordinates are not known to 0.4" (or better), an ACQ/SEARCH should precede the ACQ/IMAGE.

(PSA/B & BOA/A (01)) Warning (Form): For the best data quality, it is strongly recommended that all four FP-POS positions be used when observing at a given COS CENWAVE setting.

Fixed Targets

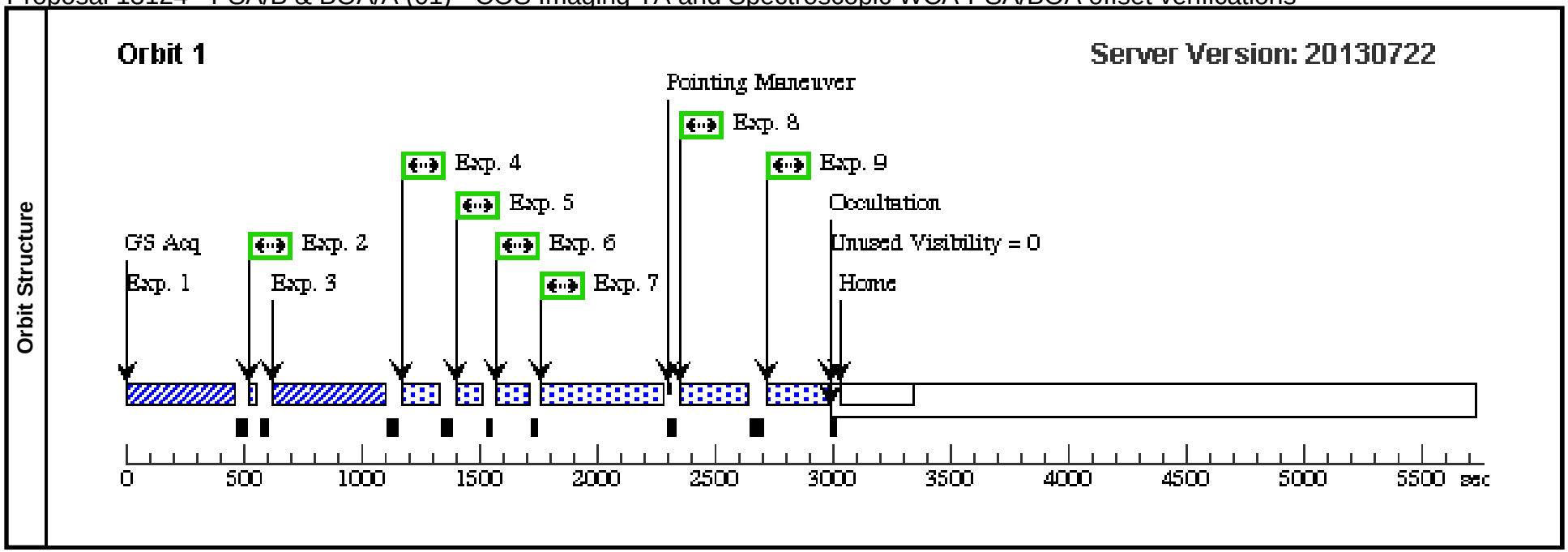
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	WD-1657+343	RA: 16 58 51.1200 (254.7130000d) Dec: +34 18 53.30 (34.31481d) Equinox: J2000		V=16.1	Reference Frame: ICRS

Comments: ETC COS.ta.432603 indicates this is a good PSA/MIRRORB to BOA/MIRRORA target
PSA/MIRRORB counts = S/N=40 in 5.2s

ETC COS.ta.432.604 gives S/N=60 in 150.7s

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	PSA/MIRRORB ACQ/IMAGE (COS.ta.433946)	(2) WD-1657+343	COS/NUV, ACQ/IMAGE, PSA	MIRRORB		GS ACQ SCENARIO BASE1B3		12 Secs (12 Secs) *[==>]*	***[1]***
	Comments: COS.ta.433946 gives S/N=60 in 11.65s. Brightest Pixel = 42 cps.								
2	PSA/MIRRORB IMAGE (COS.ta.433946)	(2) WD-1657+343	COS/NUV, TIME-TAG, PSA	MIRRORB	FLASH=S0040D020; BUFFER-TIME=120			20 Secs (20 Secs) *[==>]*	***[1]***
	Comments: COS.ta.433946 gives S/N=60 in 11.65s. Brightest Pixel = 42 cps. We insert a 20s lamp flash to make sure we get enough counts in the lamp image								
3	BOA/MIRRORA ACQ/IMAGE (COS.ta.433949)	(2) WD-1657+343	COS/NUV, ACQ/IMAGE, BOA	MIRRORA				150 Secs (150 Secs) *[==>]*	***[1]***
	Comments: COS.ta.433949 gives S/N=60 in 150s								
4	BOA/MIRRORA IMAGE (COS.ta.433949)	(2) WD-1657+343	COS/NUV, TIME-TAG, BOA	MIRRORA	BUFFER-TIME=600; WAVECAL=YES			150 Secs (150 Secs) *[==>]*	***[1]***
	Comments: COS.ta.433949 gives S/N=60 in 150s, wavecal included so that we can find the lamp.								
5	PSA/MIRRORB IMAGE (COS.ta.433946)	(2) WD-1657+343	COS/NUV, TIME-TAG, PSA	MIRRORB	FLASH=S0040D020; BUFFER-TIME=400			20 Secs (20 Secs) *[==>]*	***[1]***
	Comments: COS.ta.433946 gives S/N=60 in 11.65s. Brightest Pixel = 42 cps. We insert a 20s lamp flash to make sure we get enough counts in the lamp image								
6	PSA/G230L/2950 (COS.sa.433964)	(2) WD-1657+343	COS/NUV, TIME-TAG, PSA	G230L 3000 A	BUFFER-TIME=800; FP-POS=3			30 Secs (30 Secs) *[==>]*	***[1]***
	*Comments: COS.sa.4333964 gives S/N=40 in 2 s, we go for 30s to get a good lampflash. BT=2/3*1200*								
7	PSA/G285M/2850 (COS.sp.433971)	(2) WD-1657+343	COS/NUV, TIME-TAG, PSA	G285M 2850 A	BUFFER-TIME=1600; FP-POS=3; FLASH=YES			334 Secs (334 Secs) *[==>]*	***[1]***
	*Comments: COS.sp.433971 gives S/N=40 in the XD in 329 seconds. BT=2/3 * 2400 = 1600.* *Normal Tagflashing will be sufficient for our needs. In order to fit in all the spectra, this exposure has been shortened.*								
8	PSA/G130M/1309/3 (COS.sp.433966)	(2) WD-1657+343	COS/FUV, TIME-TAG, PSA	G130M 1309 A	FP-POS=3; BUFFER-TIME=295; FLASH=S0100D030			110 Secs (110 Secs) *[==>]*	***[1]***
	*Comments: COS.sp.433966, BT=2/3*442=295, 30s lampflash*								
9	PSA/G140L/1280/3 (COS.sp.433967)	(2) WD-1657+343	COS/FUV, TIME-TAG, PSA	G140L 1280 A	FP-POS=3; BUFFER-TIME=430; FLASH=YES			30 Secs (30 Secs) *[==>]*	***[1]***
	*Comments: COS.sp.433967, BT=2/3*647=430 ET=17s, Normal TAGFLASH should be good.*								


Orbit Structure
Orbit 1
Server Version: 20130722
Pointing Maneuver
Exp. 8
Exp. 4
Exp. 9
Exp. 5
Occultation
GS Acq
Exp. 2
Exp. 6
Unused Visibility = 0
Exp. 1
Exp. 3
Exp. 7
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 13124, BOA/A & BOA/B (02), implementation Tue Sep 17 01:05:59 GMT 2013

Diagnostic Status: Warning

Scientific Instruments: COS/NUV, COS/FUV

Special Requirements: SCHED 100%; ORIENT 120D TO 30 D; AFTER 01 BY 0 D TO 45 D

Comments: Test to compare the centering of BOA/MIRRORA to BOA/MIRRORB. Should be executed with 45 days of Visit 01.

Diagnostics

(BOA/A & BOA/B (02)) Warning (Form): For the best data quality, it is strongly recommended that all four FP-POS positions be used when observing at a given COS CENWAVE setting.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	HIP66578	RA: 13 38 50.4757 (204.7103154d)	Proper Motion RA: -403.65 mas/yr	V=12.773+/-0.024	Reference Frame: ICRS
	Alt Name1: PG1337+705	Dec: +70 17 7.66 (70.28546d)	Proper Motion Dec: -22.0 mas/yr	F(1300)=1.3E-12,	
	Alt Name2: WD1337+705	Equinox: J2000	Parallax: 0.03829"	F(1800)=5.2E-13	
			Epoch of Position: 2000		
			Radial Velocity: 26 km/sec		

Comments: COS.ta.432623 S/N=60 in 12s BOA/MIRRORA, BOA/MIRRROB (COS.ta.432624) in 175s

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	BOA/A ACQ/SEARCH 2x2x1.767 (COS.ta.432623)	(3) HIP66578	COS/NUV, ACQ/SEARCH, BOA	MIRRORA	SCAN-SIZE=2; STEP-SIZE=1.767			12 Secs (12 Secs) *[==>]*	*[1]*
Comments: 2x2 ACQ/SEARCH to ensure target is in the aperture.									
2	BOA/MIRRORA ACQ/IMAGE (COS.ta.432623)	(3) HIP66578	COS/NUV, ACQ/IMAGE, BOA	MIRRORA		GS ACQ SCENARIO BASE1B3		12 Secs (12 Secs) *[==>]*	*[1]*
Comments: Using the standard star HIP66578 to compare the centerings between the BOA/MIRRORA and BOA/MIRRORB centering options. The ETC gives 12 seconds to reach S/N=60 with this target in the BOA/MIRRORA mode.									
3	BOA/MIRRORA IMAGE (COS.ta.432623)	(3) HIP66578	COS/NUV, TIME-TAG, BOA	MIRRORA	BUFFER-TIME=300; WAVECAL=YES			12 Secs (12 Secs) *[==>]*	*[1]*
Comments: Second calibration IMAGE with a wavecal to verify proper initial centering (The ETC gives 12 seconds to reach S/N=60 with this target in the BOA/MIRRORA mode.)									
4	BOA/MIRRORB ACQ/IMAGE (COS.ta.432624)	(3) HIP66578	COS/NUV, ACQ/IMAGE, BOA	MIRRORB				175 Secs (175 Secs) *[==>]*	*[1]*
Comments: Using the standard star HIP66578 to compare the centerings between the BOA/MIRRORA and BOA/MIRRORB centering options. The ETC gives 175 seconds to reach S/N=60 with this target in the BOA/MIRRORB mode.									
5	BOA/MIRRORB IMAGE (COS.ta.432624)	(3) HIP66578	COS/NUV, TIME-TAG, BOA	MIRRORB	BUFFER-TIME=600; WAVECAL=YES			175 Secs (175 Secs) *[==>]*	*[1]*
Comments: Followup BOA/MIRORB calibration IMAGE with a wavecal to verify proper initial centering (The ETC gives 175 seconds to reach S/N=60 with this target in the BOA/MIRRORA mode.) The BT is not critical as we are only getting about 20 cps from the source.									
6	BOA/MIRRORA IMAGE (COS.ta.432623)	(3) HIP66578	COS/NUV, TIME-TAG, BOA	MIRRORA	BUFFER-TIME=300; WAVECAL=YES			12 Secs (12 Secs) *[==>]*	*[1]*
Comments: Second calibration IMAGE with a wavecal to verify proper initial centering (The ETC gives 12 seconds to reach S/N=60 with this target in the BOA/MIRRORA mode.)									
7	PSA/G185M/1890 (COS.sp.433935)	(3) HIP66578	COS/NUV, TIME-TAG, PSA	G185M 1890 A	BUFFER-TIME=414; FLASH=S0070D030; FP-POS=3			35 Secs (35 Secs) *[==>]*	*[1]*
*Comments: COS.sp.433935 gives s/n/re =10 in 35 seconds. BT=2/3 * 623 =414. We want to get a good lamp flash, so 30s should be ok. FPPOS=3*									
8	PSA/G225M/2306 (COS.sp.433936)	(3) HIP66578	COS/NUV, TIME-TAG, PSA	G225M 2306 A	BUFFER-TIME=567; FLASH=S0200D030; FP-POS=3			53 Secs (53 Secs) *[==>]*	*[1]*
*Comments: COS.sp.433936 gives s/n/re =10 in 53 seconds. BT=2/3 * 851 =567. We want to get a good lamp flash, so 30s should be ok. FPPOS=3.*									

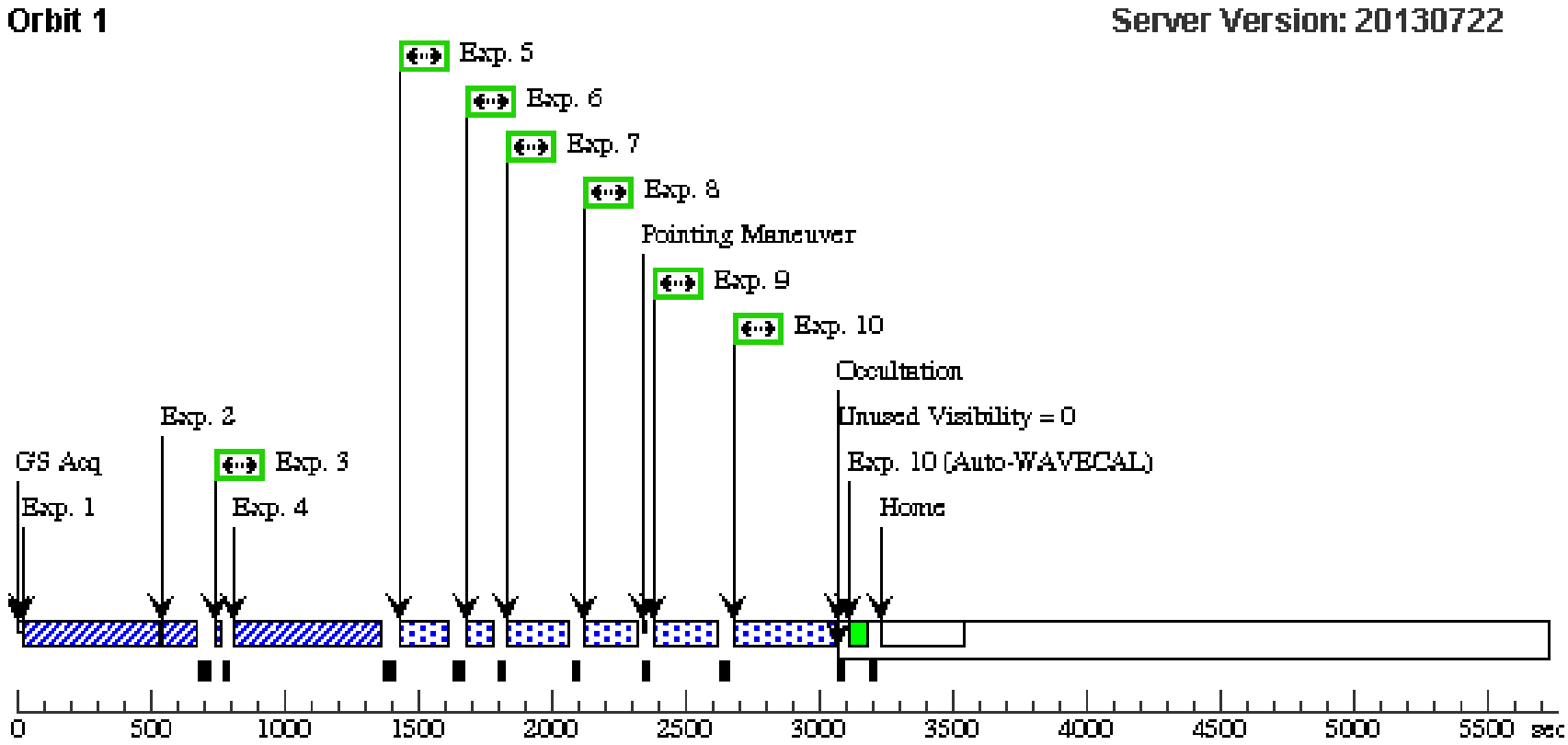
9	PSA/G160M/1623/3 (COS.sp.433940)	(3) HIP66578	COS/FUV, TIME-TAG, PSA	G160M 1623 A	FP-POS=3; BUFFER-TIME=111; FLASH=S0100D020	20 Secs (20 Secs) [==>]	[1]	

Comments: COS.sp.433940 gives S/N/RE = 5 in 11 seconds. This is just slightly higher than the variable source limit, but this is a stable, standard, star. BT=2/3 of 138s. We make the exposure 20s to obtain a decent lamp spectrum.

10	BOA/G160M/1623/3 (COS.sp.433945)	(3) HIP66578	COS/FUV, TIME-TAG, BOA	G160M 1623 A	FP-POS=3; BUFFER-TIME=6400; WAVECAL=YES	323 Secs (323 Secs) [==>]	[1]	

Comments: COS.sp.433941 gives S/N/RE = 5 in 400 seconds. BT=2/23 of 9600 = 6400
*An exposure time of 420 seconds should get us 5 counts/RE a total of 94*420 = ~4000 SegA counts, plenty of signal to accurately measure the XD profile.*

Orbit Structure



Visit

Proposal 13124, PSA/A & PSA/B - Contingency (03), implementation Tue Sep 17 01:06:01 GMT 2013

Diagnostic Status: Warning

Scientific Instruments: COS/NUV

Special Requirements: SCHED 100%; ON HOLD

Comments: Test to compare the centering of PSA/MIRRORA to PSA/MIRRORB. This target was previously observed in Visit 2 of 12781, with the following count rates (imaging mode)

The PSA/MIRRORA had 21,063 counts in 60s
The PSA/MIRRORB had 12,570 counts in 300s = 257 cts/s

On Hold Comments: This is a placeholder for a PSA/A & PSA/B test, which would nominally execute as Visit 02 of 13171.

Diagnostics

(PSA/A & PSA/B - Contingency (03)) Warning (Form): If the target coordinates are not known to 0.4" (or better), an ACQ/SEARCH should precede the ACQ/IMAGE.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	206W3	RA: 06 08 55.4600 (92.2310833d)	Proper Motion RA: 0.5 mas/yr	V=14.481+/-0.1	Reference Frame: ICRS
	Alt Name1: MCNAM209	Dec: +24 15 39.59 (24.26100d)	Proper Motion Dec: -2.2 mas/yr	J=13.441,	
	Alt Name2: J060855.45+241539.7	Equinox: J2000	Epoch of Position: 2012.7	B=14.930	

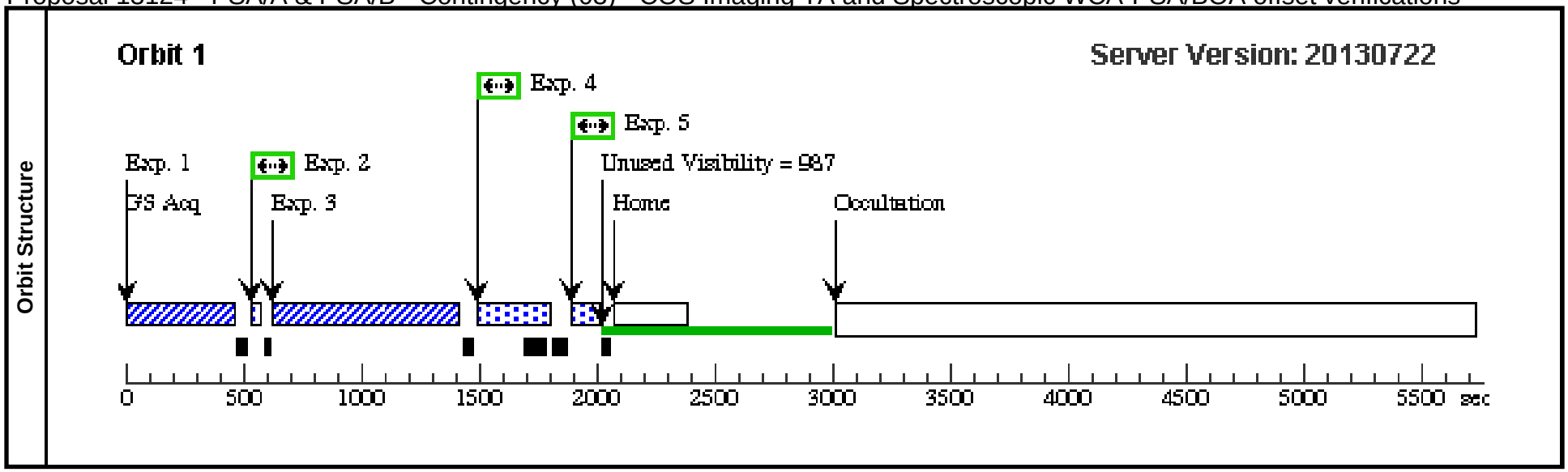
Comments: Target previously observed in Visit 2 of 12781. According to Colin, the target coordinates given her have been adjusted to ~2012.7. I include the UCAC3 PM in case this visit is used again at a later date.

The PSA/MIRRORA had 21,063 counts in 60s (351 ct/s). Max pixel = 1965/60 = 32.75 ct/s
The PSA/MIRRORB had 12,570 counts in 300s (41.9 cts/s). Max pixel = 238/300 = 0.8 ct/s
So, PSA MirrorA/MirrorB = 351.0/41.9 = 8.4 (for this target)

This target is N8CV022007 in GSC2.3.2

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	PSA/MIRRORA ACQ/IMAGE (COS.ta.429888)	(1) 206W3	COS/NUV, ACQ/IMAGE, PSA	MIRRORA		GS ACQ SCENARIO BASE1B3		30.0 Secs (30 Secs) *[==>]*	***[1]***
	Comments: This target has previously been observed in 12781. Simulated in ETC as G5, V=14, which gives Requested Signal/Noise Ratio = 60.000 gives: Time = 24.1574 seconds Target count rate = 149 cts/s Brightest Pixel 20.698 cps *The PSA/MIRRORA had 21,063 counts in 60s (351 ct/s). Max pixel = 1965/60 = 32.75 ct/s* *The PSA/MIRRORB had 12,570 counts in 300s (41.9 cts/s). Max pixel = 238/300 = 0.8 ct/s* *So, MirrorA/MirrorB = 351.0/41.9 = 8.4 (at least for PSA)* *(1/40.9)= 1/8.4 * 1/4.9*								
2	PSA/MIRRORA IMAGE (COS.ta.429888)	(1) 206W3	COS/NUV, TIME-TAG, PSA	MIRRORA	BUFFER-TIME=300; FLASH=S0060D030			30.0 Secs (30 Secs) *[==>]*	***[1]***
	Comments: This target has previously been observed in 12781. Simulated in ETC as G5, V=14, which gives Requested Signal/Noise Ratio = 60.000 gives: Time = 24.1574 seconds Target count rate = 149 cts/s Brightest Pixel 20.698 cp								
3	PSA/MIRRORB ACQ/IMAGE (COS.ta.429888)	(1) 206W3	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				300.0 Secs (300 Secs) *[==>]*	***[1]***
	Comments: This target has previously been observed in 12781. Simulated in ETC as G5, V=14, which gives Requested Signal/Noise Ratio = 60.000 gives: Time = 24.1574 seconds Target count rate = 149 cts/s Brightest Pixel 20.698 cps *The PSA/MIRRORA had 21,063 counts in 60s (351 ct/s). Max pixel = 1965/60 = 32.75 ct/s* *The PSA/MIRRORB had 12,570 counts in 300s (41.9 cts/s). Max pixel = 238/300 = 0.8 ct/s*								
4	PSA/MIRRORB IMAGE (COS.ta.429888)	(1) 206W3	COS/NUV, TIME-TAG, PSA	MIRRORB	BUFFER-TIME=200; FLASH=S0200D060			300.0 Secs (300 Secs) *[==>]*	***[1]***
	Comments: This target has previously been observed in 12781. Simulated in ETC as G5, V=14, which gives Requested Signal/Noise Ratio = 60.000 gives: Time = 24.1574 seconds Target count rate = 149 cts/s Brightest Pixel 20.698 cps *The PSA/MIRRORA had 21,063 counts in 60s (351 ct/s). Max pixel = 1965/60 = 32.75 ct/s* *The PSA/MIRRORB had 12,570 counts in 300s (41.9 cts/s). Max pixel = 238/300 = 0.8 ct/s*								
5	PSA/MIRRORA IMAGE#2 (COS.ta.429888)	(1) 206W3	COS/NUV, TIME-TAG, PSA	MIRRORA	BUFFER-TIME=200; FLASH=S0060D055			30.0 Secs (30 Secs) *[==>]*	***[1]***
	Comments: This target has previously been observed in 12781. Simulated in ETC as G5, V=14, which gives Requested Signal/Noise Ratio = 60.000 gives: Time = 24.1574 seconds Target count rate = 149 cts/s Brightest Pixel 20.698 cps								


Orbit Structure
Orbit 1
Server Version: 20130722
Exp. 4
Exp. 5
Exp. 1
Exp. 2
Unused Visibility = 987
FS Acq
Exp. 3
Home
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec