16331 - Cycle 28 COS NUV Target Acquisition Monitor

Cycle: 28, Proposal Category: CAL/COS

(Availability Mode: RESTRICTED)

INVESTIGATORS

Name	*Institution*	*E-Mail*
Dr. David J. Sahnow (PI) (Contact)	**Space Telescope Science Institute**	**sahnow@stsci.edu**
Elaine M Frazer (CoI) (Contact)	Space Telescope Science Institute	efrazer@stsci.edu
Kate Rowlands (CoI) (Contact)	Space Telescope Science Institute	krowlands@stsci.edu

VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
PB	(1) 206W3	COS/NUV	1	16-Dec-2020 12:00:33.0	yes
BA	(2) WD-1657+343 WAVE	COS/NUV	1	16-Dec-2020 12:00:34.0	yes
BB	(3) HIP66578 WAVE	COS/NUV	1	16-Dec-2020 12:00:37.0	yes

3 Total Orbits Used

ABSTRACT

The COS Target Acquisition (TA) monitor is divided into two pieces, NUV and FUV. This program is the NUV portion. Visits BA and BB of this program verify all ACQ/IMAGE mode co-alignments by bootstrapping from PSA+MIRRORA. The assumption, which should be tested at some point, is that the PSA+MIRRORA WCA-to-PSA FSW offsets are still as accurate in defining the center of the PSA relative to the WCA as there were in SMOV. The details of the observations are given is the observing section.

Visit PB obtains the PSA/MIRRORA to PSA/MIRRORB ACQ/IMAGE alignment.

Visit BA takes back-to-back PSA/MIRRORB & BOA/MIRRORA ACQ/IMAGEs and images (with flashes) and also takes G230L, G285M as well as FUV LP3 G130M and G140L spectra to test the WCA-to-PSA offsets.

Visit BB takes back-to-back BOA/MIRRORA & BOA/MIRRORB ACQ/IMAGEs and images (with flashes) and also takes G225M, G185M, and FUV LP3 G160M spectra to test the WCA-to-PSA offsets.

In all visits, lamp+target images are taken before and after the TA imaging mode that is being co-aligned (the second ACQ/IMAGE of the program.)

OBSERVING DESCRIPTION

Each visit in this program begins with a comparison of the ACQ/IMAGE centering of two ACQ/IMAGE modes out of the possible four (PSA or BOA) x (MIRRORA or MIRRORRB). This will involve not only the ACQ/IMAGEs, but NUV detector images of the WCA lamp image and, if possible, coeval target images. These direct comparisons are only available for the PSA modes. For the BOA modes, the WCA lamp images and target images are taken consecutively. The assumption is that the PSA/MIRRORA ACQ/IMAGE centering has not changed since SMOV (questionable). Each of the other science aperture (SA) and MIRRORA/B ACO/IMAGE combinations were co-aligned during SMOV and rely upon the flight software (FSW) WCA-to-SA along-dispersion (AD) and cross-dispersion (XD) offsets.

This back-to-back ACQ/IMAGE process allows us to test that TA modes are centering the target to the same point in the aperture. The Lamp+target exposures are interleaved throughout the visit to measure and verify the imaging WCA-to-SA offsets are still accurate for the remainder of the current HST Cycle. Images will usually use the PtNe#2 (P2) lamp, as it is the primary TA lamp, but some images will use PtNe#1 (P1) to monitor the lamps in imaging mode.

Visit PB (PSA/MIRRORB) of this program takes back-to-back PSA/MIRRORA & PSA/MIRRORB ACQ/IMAGEs and images (with flashes)

Visit BA (Boa/mirrorA) of this program takes back-to-back PSA/MIRRORB & BOA/MIRRORA ACQ/IMAGEs and images (with flashes) and takes G230L & G285M spectra to test the WCA-to-PSA offsets.

Visit BB (Boa/mirrorB) of this program takes back-to-back BOA/MIRRORA & BOA/MIRRORB ACQ/IMAGEs and images (with flashes) and takes G225M & G185M spectra to test the WCA-to-PSA offsets. Visit BB of this program also takes a "family portrait" of all the P1/P2

MIRRORA/B WCA lamp images to track any drifting of the centroids, or changes in the lamps.

All lamp+target images use the QESIPARMS USECURRENT and CURRENT to specifically set the lamp and current values.

See the comment of the first exposure of Visit PB for a description of the expected count rates, exposure times, & buffer times (for the lamps).

--------- Additional Comments ----------

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

Visit

Proposal 16331, PSA/A & PSA/B (PB), implementation Wed Dec 16 17:00:37 GMT 2020

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/NUV

Special Requirements: SCHED 100%; BETWEEN 01-JAN-2021:00:00:00 AND 31-JAN-2021:00:00:00; GROUP PB,BA,BB WITHIN 30D

Comments: This visit (PB, for PSA/MIRRORBA) performs the PSA/A vs PSA/B comparison. The target is 206W3, a target that was used last cycle and in the previous FGS-to-SI programs. 100% Schedulability.

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=14.53+/-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: J060855.46+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 here 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

From SIMBAD:

Basic data :
Cl NGC 2168 M 178 -- Star in Cluster*
*Other object types: *iC (Cl*), IR (2MASS)*
ICRS coord. (ep=J2000) : 06 08 55.46 +24 15 39.8 (Infrared) [70 60 0] B 2003yCat.2246....0C
FK5 coord. (ep=J2000 eq=2000) : 06 08 55.46 +24 15 39.8 [70 60 0]
FK4 coord. (ep=B1950 eq=1950) : 06 05 51.62 +24 16 12.1 [70 60 0]
Gal coord. (ep=J2000) : 186.6569 +02.1612 [70 60 0]
Fluxes (6) :
B 14.930 [~] D ~
V 14.481 [~] D ~
R 14.600 [~] E 2003yCat.2246....0C
J 13.441 [0.023] C 2003yCat.2246....0C
H 13.354 [0.022] C 2003yCat.2246....0C
K 13.227 [0.026] C 2003yCat.2246....0C
Category=STAR
Description=[G V-IV]
Extended=NO

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 (P2/LOW) (COS.ta.634846)	(1) 206W3	COS/NUV, ACQ/IMAGE, PSA	MIRRORA			Sequence 1-7 Non-Int in PSA/A & PSA/B (PB)	22 Secs (22 Secs) *[==>]*	***[1]***

Comments: The measured direct count rates for this target in Program 13171 are (S/N are just photon statistics of the lamp or target)
PSA/MIRRORA = 245 count/s (S/N = 40 in 7s, 60 in 15s)
PSA/MIRRORB = 15.6 count/s (S/N = 40 in 102s, 50 in 160, 60 in 230s)
A/B = 15.7 for this target

WCA/P2/MIRRORA@LOW = 7s produced 2900 counts(S/N = 54)
WCA/P2/MIRRORB@LOW = 30s produced 420 counts (S/N = 21)
WCA/P2/MIRRORB@MED = 10s is estimated to produce ~4000 counts (S/N = 52 in the primary spot)
WCA/P1/MIRRORB@LOW = 82 hz, so S/N =50 in 30s
WCA/A(LOW)/B(LOW) = 25-30
WCA/B(MED)/B(LOW) is estimated to be 15-20

To get everything at S/N = 50 we need at least the following exposure times
PSA(target)/A = 10s
PSA(target)/B = 160s
WCA/P2/LOW/A = 6s
WCA/P2/LOW/B = 180s (low current), S/N = 47 in 160s
WCA/P1/LOW/B is 5x brighter than lamp#2, so at least 36s
WCA/P2/MED/B is unknown, but we estimate it to be 15-20x the 2/LOW rate, so at least 12s

For each target image, we will use the 9x9 checkbox method, so the background for PSA exposures is 9x9(500/(50*300)/30s) based upon 500 counts in 30s in the WCA 50x300 box. This is 1 count in 10s, so we ignore this for the PSA.*

For the WCA images, we will be working a 50x300 box, so the rate here is 18 hz, but we are using a median to find the center, so it is not a straightforward S/N situation. We are interested in measuring the centroid in presence of the noise and 2500 lamp counts are sufficient for our needs for WCA/P2/LOW/B. Since, we are defining the WCA-to-PSA offset for WCA/P1/LOW/B and WCA/P2/MED/B, we will shoot for 3000 lamp counts.

*For the Buffer Time, we are shooting for S/N = 50. in both the target and the lamp. Lets overshoot to S/N of 60, that's 7200 counts -> BT = 2/3 * 326= 217. We'll be extra conservative and stay short of this.*

For PSA/MIRRORA: (COS.ta.634846) We Simulated in ETC as G5, V=13.5 (lit says 14.5), S/N = 60 gives: Time = 13 seconds.Target count rate = 275 cts/s Brightest Pixel 38 cps
PSA/MIRRORB: (COS.ta.634849) We Simulated in ETC as G5, V=13.5 (lit says 14.5), S/N = 50 gives: Time = 217 seconds. Target count rate = 11.6 cts/s Brightest Pixel 1.6 cps

This target was also previously observed in Visit A2 of 12781, with the following REAL count rates (imaging mode)

The PSA/A had 21,063 total counts in 60s (Target = 206W3), after background subtraction = 20,100 = 335 cts/s. PSA/A Brightest Pixel = 32.8 counts/s
The PSA/MIRRORB had 12,570 total counts in 300s, after background subtraction=7150 = 23.8 cts/s. PSA/B Brightest Pixel = 0.8 counts/s

PSA A/B = 14x (lbx1a2ffq/lbx1a2fhq) & PSA A/B (BP) = 41x

Remember that the SED of the target is important in this ratio as the two modes have different responses.

For PSA/A We get S/N = 60 in 3600/335 = 11s
For PSA/B, We get S/N = 60 in 3600/23.8 = 151s

In Oct 2016, this target was observed as part of 14452 Visit A2, with the following count rates:

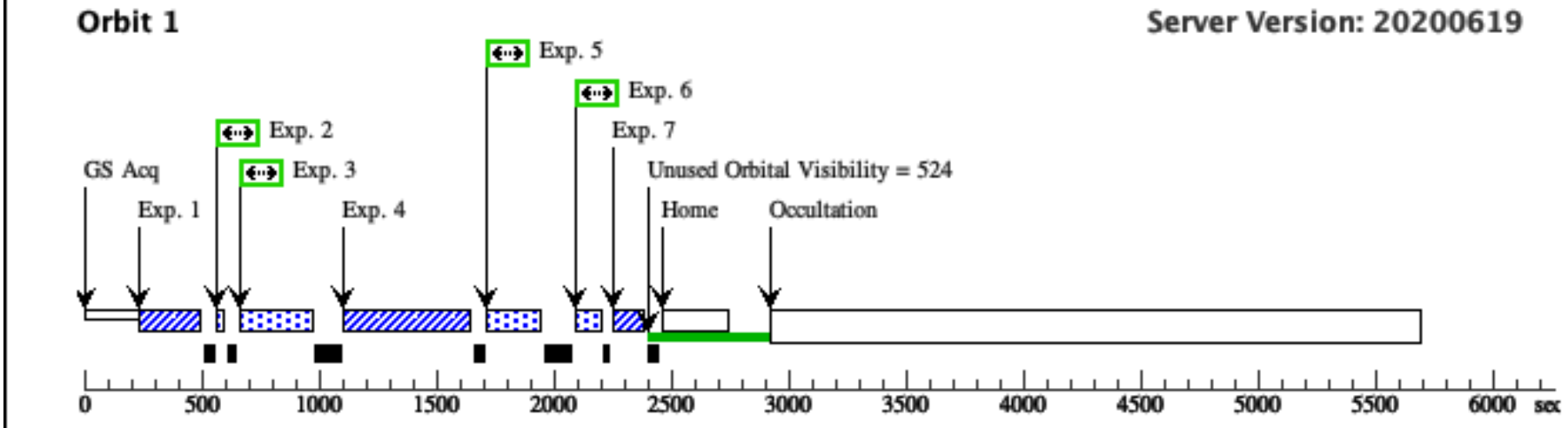
The PSA/A had 21,063 total counts in 60s (Target = 206W3), after background subtraction = 20,229 = 337 cts/s, Brightest Pixel = 23.1 counts/s
The PSA/B had 14,627 total counts in 300s, after background subtraction=7655 = 25.5 cts/s. PSA/B Brightest Pixel = 1.3 counts/s

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
2	PSA/MIRRORA IMAGE (P2/LOW) (COS.ta.634846)	(1) 206W3	COS/NUV, TIME-TAG, PSA	MIRRORA	BUFFER-TIME=150; FLASH=S0060D020; CURRENT=LOW	QESIPARM USELAMP LINE2; QESIPARM CURRENT LOW	Sequence 1-7 Non-Int in PSA/A & PSA/B (PB)	22 Secs (22 Secs) *[==>]*	***[1]***

Comments: Lamp and target image to measure the WCA-to-PSA offset for PSA/MIRRORA/P2/LOW current. Expect 416 counts/s from lamp, about the same from the target. We take 20s of each. Note that CURRENT= LOW and LAMP=LINE2 are set as QESIPARMs

	3	PSA/MIRRORB IMAGE (P2/MED) (OS.ta.634849)	(1) 206W3	COS/NUV, TIME-TAG, PSA	MIRRORB	BUFFER-TIME=200; FLASH=S0120D020; CURRENT=MEDIUM	QESIPARM USELAMP LINE2; QESIPARM CURRENT MEDIUM	Sequence 1-7 Non-Int in PSA/A & PSA/B (PB)	222 Secs (222 Secs) *[==>]*	***[1]***
	Comments: Lamp and target image to measure the WCA-to-PSA offset for PSA/MIRRORB/P2/MED current. Expect ~400 counts/s from the lamp. We need >k160s of target time, and at least 12s of lamp time. We'll get 200s of target and 2x20 to get a good measurement. Note that CURRENT=MED and LAMP=LINE2 are set as QESIPARMs									
	4	PSA/MIRRORB ACQ/IMAGE (P2/MED) (OS.ta.634849)	(1) 206W3	COS/NUV, ACQ/IMAGE, PSA	MIRRORB			Sequence 1-7 Non-Int in PSA/A & PSA/B (PB)	222 Secs (222 Secs) *[==>]*	***[1]***
	Comments: PSA/MIRRORB ACQ/Image using P2/MED current.									
	5	PSA/MIRRORB IMAGE2 (P2/MED) (OS.ta.634849)	(1) 206W3	COS/NUV, TIME-TAG, PSA	MIRRORB	BUFFER-TIME=200; FLASH=S0120D020; CURRENT=MEDIUM	QESIPARM USELAMP LINE2; QESIPARM CURRENT MEDIUM	Sequence 1-7 Non-Int in PSA/A & PSA/B (PB)	222 Secs (222 Secs) *[==>]*	***[1]***
	Comments: Lamp and target image to re-measure the WCA-to-PSA offset for PSA/MIRRORB/P2/MED current. Expect 225-400 counts/s from the lamp. We need > 160s of target time, and at least 12s of lamp time. We'll get 200s of target and 2x20 of lamp to get a good measurement. Note that CURRENT=MED and LAMP=LINE2 are set as QESIPARMs									
	6	PSA/MIRRORA IMAGE2 (P2/LOW) (COS.ta.634846)	(1) 206W3	COS/NUV, TIME-TAG, PSA	MIRRORA	BUFFER-TIME=200; FLASH=S0060D020; CURRENT=LOW	QESIPARM USELAMP LINE2; QESIPARM CURRENT LOW	Sequence 1-7 Non-Int in PSA/A & PSA/B (PB)	22 Secs (22 Secs) *[==>]*	***[1]***
	Comments: Lamp and target image to re-measure the WCA-to-PSA offset for PSA/MIRRORA/Lamp2/LOW current. Expect 416 counts/s from lamp, about the same from the target. We need at least >12s of each, we get 20s for a good measurement. Note that CURRENT=LOW and LAMP=LINE2 are set as QESIPARMs									
	7	PSA/MIRRORA ACQ/IMAGE2 (COS.ta.634846)	(1) 206W3	COS/NUV, ACQ/IMAGE, PSA	MIRRORA			Sequence 1-7 Non-Int in PSA/A & PSA/B (PB)	22 Secs (22 Secs) *[==>]*	***[1]***
	Comments: Confirmation PSA/A ACQ/image, see first exposure of this visit for complete comment.									

Orbit Structure



Proposal 16331 - PSA/B & BOA/A (BA) - Cycle 28 COS NUV Target Acquisition Monitor

Visit

Proposal 16331, PSA/B & BOA/A (BA), implementation Wed Dec 16 17:00:37 GMT 2020

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/NUV

Special Requirements: SCHED 100%; BETWEEN 01-JAN-2021:00:00:00 AND 31-JAN-2021:00:00:00; GROUP BA,BB,PB WITHIN 30D

Comments: Visit BA compares the centering of PSA/MIRRORB to BOA/MIRRORA. The target will be the standard star WD1657+343. 100% Schedubility. This Visit (BA) should be executed within 30 days of the other visits inthis program, but in no particular order. The closer in time that they can all be executed, the better. We also take some G230L & G285M spectra to test the WCA-to-PSA offsets.

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

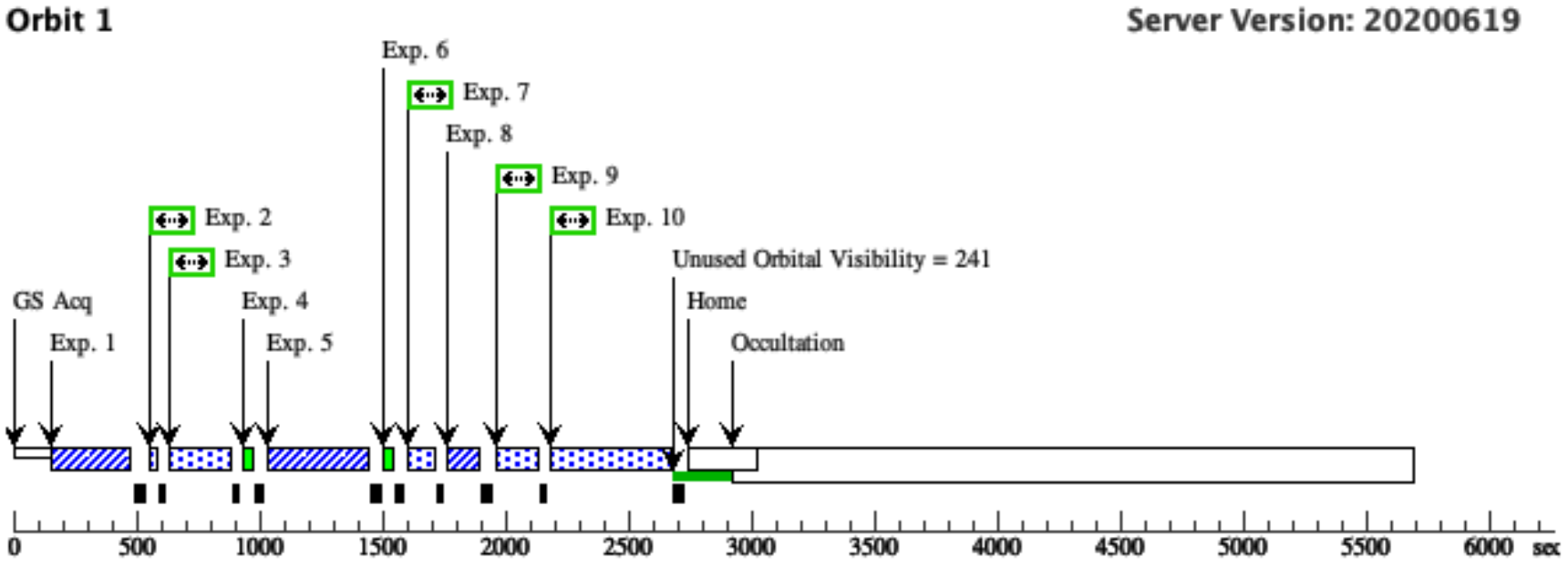
Comments: COS.ta.432603 indicates this is a good PSA/MIRB to BOA/MIRA target PSA/MIRB counts = S/N=60 in 11.6s (S/N = 40 in 5.2s); COS.ta.432604 gives S/N=60 in 150.7s for BOA/MIRA
Category=STAR
Description=[DA]
Extended=NO

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ACQ/IMAGE (PSA/MIRRORB/P2/MED) (COS.ta.433946)	(2) WD-1657+343	COS/NUV, ACQ/IMAGE, PSA	MIRRORB			Sequence 1-10 Non-Int in PSA/B & BOA/A (BA)	15 Secs (15 Secs) *[==>]*	***[1]***
	*Comments: COS.ta.433946 gives S/N=60 in 11.65s. BP = 43 cps. We observed this target in Program 13124 and the target count rate was 400 cts/s, total cts = 4800 total , BP=24 cts/s That's sqrt(2/3 * 4800) = 56 (S/N)*								
2	PSA/MIRRORB/P2/MED + Target (COS.ta.433946)	(2) WD-1657+343	COS/NUV, TIME-TAG, PSA	MIRRORB	FLASH=S0040D016; BUFFER-TIME=500	QESIPARM USELAMP LINE2; QESIPARM CURRENT MEDIUM	Sequence 1-10 Non-Int in PSA/B & BOA/A (BA)	18 Secs (18 Secs) *[==>]*	***[1]***
	Comments: COS.ta.433946 gives S/N=60 in 11.65s. BP = 42 cps. *A previous exposure of this target (lcgq01q7q) yielded a total (lamp+target+background) count rate of 24617 counts in 16s (1538 cps).* *So buffer time should be < 0.67 *(2.35E6/1538.) = 1024. Just be safe, we go with 500s.* *We insert a 16s lamp flash to make sure we get enough counts in the lamp image*								
3	BOA/MIRRORA/Target (no lamp) (COS.ta.433949)	(2) WD-1657+343	COS/NUV, TIME-TAG, BOA	MIRRORA	BUFFER-TIME=2000		Sequence 1-10 Non-Int in PSA/B & BOA/A (BA)	150 Secs (150 Secs) *[==>]*	***[1]***
	Comments: COS.ta.433949 gives S/N=60 in 150s, followed by a wavecal. The exposure time is driven by the target. We observed this target in 13124, the target count rate was 18.2 cps (2736 counts in 150s : ~312 background in 150s over a 50x50 box). This is a BOA image, so we need to add a WAVE image after this exposure. The WAVECAL=YES parameter does not trigger a separate lamp image. *Buffer should be < 0.67 * (2.35E6/20.) or < 7800. We use 2000 just to be safe.*								
4	WCA/MIRRORA/P2/LOW (no target)	WAVE	COS/NUV, TIME-TAG, WCA	MIRRORA		QESIPARM USELAMP LINE2; QESIPARM CURRENT LOW	Sequence 1-10 Non-Int in PSA/B & BOA/A (BA)	12 Secs (12 Secs) *[==>]*	***[1]***
	Comments: For P2/LOW/MIRRORA we get 2900 counts in 7s. Buffer Time is calculated automatically.								
5	ACQ/IMAGE (BOA/MIRRORA/P2/LOW) (COS.ta.433949)	(2) WD-1657+343	COS/NUV, ACQ/IMAGE, BOA	MIRRORA			Sequence 1-10 Non-Int in PSA/B & BOA/A (BA)	150 Secs (150 Secs) *[==>]*	***[1]***
	Comments: COS.ta.433949 gives S/N=60 in 150s								
6	WCA/MIRRORA/P2/LOW (no target)	WAVE	COS/NUV, TIME-TAG, WCA	MIRRORA		QESIPARM USELAMP LINE2; QESIPARM CURRENT LOW	Sequence 1-10 Non-Int in PSA/B & BOA/A (BA)	12 Secs (12 Secs) *[==>]*	***[1]***
	Comments: For P2/LOW/MIRRORA we get 2900 counts in 7s								
7	PSA/MIRRORB/P2/MED + Target (COS.ta.433946)	(2) WD-1657+343	COS/NUV, TIME-TAG, PSA	MIRRORB	FLASH=S0040D016; BUFFER-TIME=500	QESIPARM USELAMP LINE2; QESIPARM CURRENT MEDIUM	Sequence 1-10 Non-Int in PSA/B & BOA/A (BA)	18 Secs (18 Secs) *[==>]*	***[1]***
	Comments: COS.ta.433946 gives S/N=60 in 11.65s. BP = 42 cps. *A previous exposure of this target (lcgq01q7q) yielded a total (lamp+target+background) count rate of 24617 counts in 16s (1538 cps).* *So buffer time should be < 0.67 *(2.35E6/1538.) = 1024. Just be safe, we go with 500s.* *We insert a 16s lamp flash to make sure we get enough counts in the lamp image*								

	8	ACQ/IMAGE (PSA/MIRRORB/P2/MED) (COS.ta.433946)	(2) WD-1657+343	COS/NUV, ACQ/IMAGE, PSA	MIRRORB			Sequence 1-10 Non-Int in PSA/B & BOA/A (BA)	15 Secs (15 Secs) *[==>]*	***[1]***
		*Comments: COS.ta.433946 gives S/N=60 in 11.65s. BP = 43 cps. We observed this target in 13124 and the target count rate was 400 cts/s, total cts = 4800, BP=24 cts/s That's sqrt(2/3 * 4800) = 56 (S/N)*								
	9	PSA/G230L/3000 (COS.sp.1030028)	(2) WD-1657+343	COS/NUV, TIME-TAG, PSA	G230L 3000 A	BUFFER-TIME=700; FP-POS=3; FLASH=S0100D030	QESIPARM USELAMP LINE2; QESIPARM CURRENT MEDIUM	Sequence 1-10 Non-Int in PSA/B & BOA/A (BA)	60 Secs (60 Secs) *[==>]*	***[1]***
		*Comments: COS.sp.1030028 gives S/N=10/RE in 40s, we go for 60s. BT=2/3*1300 < 800 (we use 700 just to be safe) Based upon the data from 13124, we expect 3800 counts in 30s in the B-stripe. We set the lamp to the exposure time to get more counts. Note that previous version of this program had a typo in the label (it said 2950 not 3000). G230L/3000 is one of the 'approved' NUV cenwaves for TA.*								
	10	PSA/G285M/2676 (COS.sa.1030031)	(2) WD-1657+343	COS/NUV, TIME-TAG, PSA	G285M 2676 A	BUFFER-TIME=1000; FP-POS=3; FLASH=S0090D030	QESIPARM USELAMP LINE2; QESIPARM CURRENT MEDIUM	Sequence 1-10 Non-Int in PSA/B & BOA/A (BA)	300 Secs (300 Secs) *[==>]*	***[1]***
		*Comments: COS.sa.1030031 gives S/N=20 in the XD (per stripe) in one million seconds, BT=2/3 * 2700 < 1800. Normal Tagflashing is not sufficient for our WCA needs, so we go for 30s ON, 60s OFF. A 300s exposure gets us lampflashes at 0-30s, 90-120s, 180-210s and 270-300s. (120s of lamp time). G285M/2676 is one of the 'approved' NUV cenwaves for TA, but even this may not work due to the extremen TDS of this grating.*								

Orbit Structure



Visit

Proposal 16331, BOA/A & BOA/B (BB), implementation Wed Dec 16 17:00:38 GMT 2020

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/NUV

Special Requirements: SCHED 100%; BETWEEN 01-JAN-2021:00:00:00 AND 31-JAN-2021:00:00:00; GROUP BB,BA,PB WITHIN 30D

Comments: Visit BB compares the centering of BOA/MIRRORA to BOA/MIRRORB. 100% Schedubility. This Visit (BB for BOA/MIRRORB) should be executed with 30 days of the other visits inthis program, in no particular order. The closer in time that they can all be executed, the better. We also take G185M & G225M spectra for the WCA-to-PSA offsets for NUV PEAKXD.

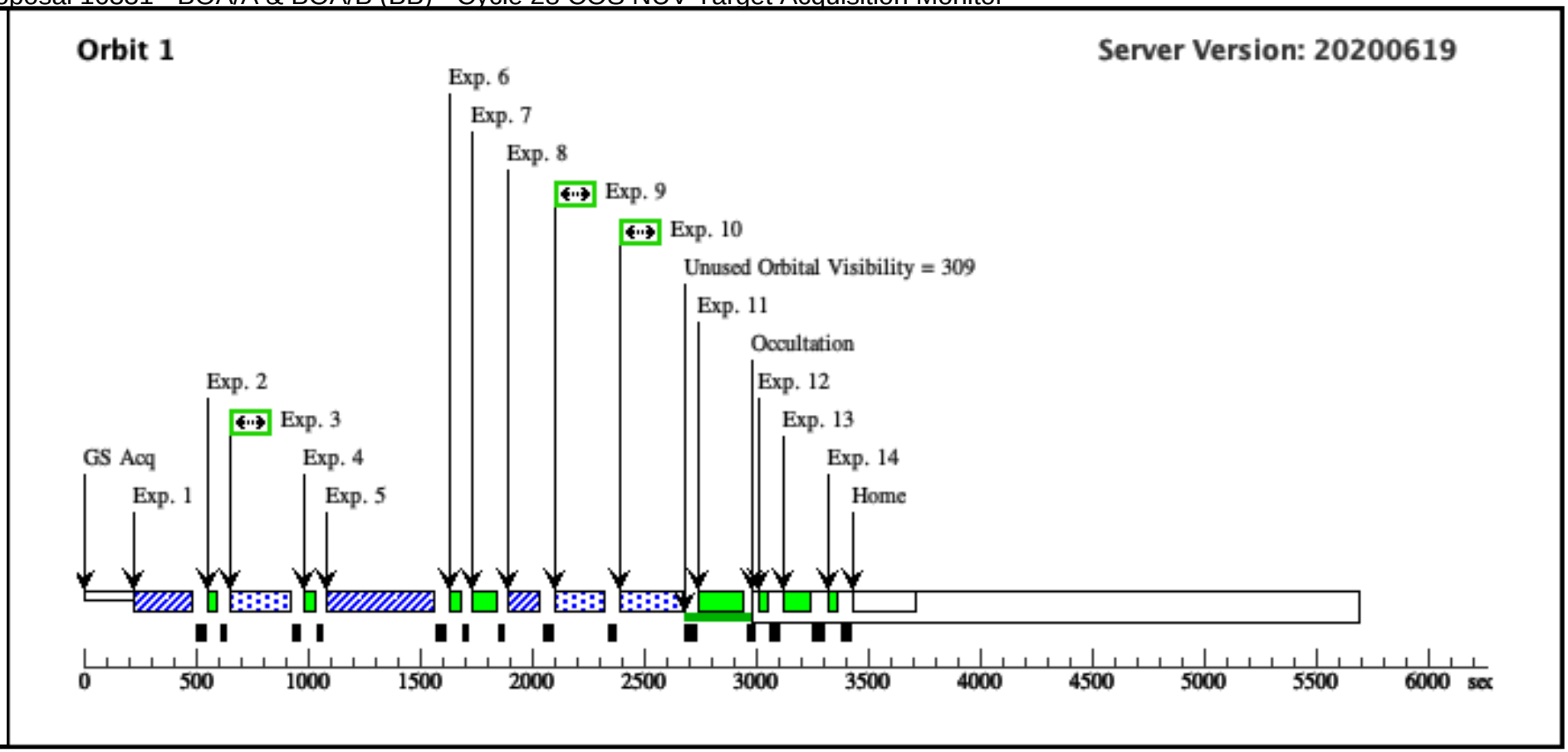
Fixed Targets

#	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: GRW+70.5824	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. This is an HST Standard Star (DA3)
Category=STAR
Description=[DA]
Extended=NO

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ACQ/IMAGE (BOA/MIRRORA/P2/LOW) (COS.ta.432623)	(3) HIP66578	COS/NUV, ACQ/IMAGE, BOA	MIRRORA			Sequence 1-10 Non-Int in BOA/A & BOA/B (BB)	18 Secs (18 Secs) *[==>]*	***[1]***
	Comments: Using the standard star HIP66578 to compare the centerings between the BOA/MIRRORA and BOA/MIRRORB ACQ/IMAGE centering options. The ETC gives 12 seconds to reach S/N=60 with this target in the BOA/MIRRORA mode. We observed this target in 13124, with 2961 counts in 12s (target +background in 50x50 box). We will need to follow this with a P2/LOW/WCA/A image.								
2	WCA/MIRRORA/P2/LOW (no target)	WAVE	COS/NUV, TIME-TAG, WCA	MIRRORA	BUFFER-TIME=270	QESIPARM USELAMP LINE2; QESIPARM CURRENT LOW	Sequence 1-10 Non-Int in BOA/A & BOA/B (BB)	16 Secs (16 Secs) *[==>]*	***[1]***
	Comments: For P2/LOW/MIRRORA we get 2900 counts in 7s. The BT for this must be < 0.37(2.35E6/4800) or < 270*								
3	BOA/MIRRORB/Target (no lamp) (COS.ta.432624)	(3) HIP66578	COS/NUV, TIME-TAG, BOA	MIRRORB	BUFFER-TIME=1000		Sequence 1-10 Non-Int in BOA/A & BOA/B (BB)	183 Secs (183 Secs) *[==>]*	***[1]***
	*Comments: Followup BOA/MIRRORB 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 ~ 0.67 *2.35E6/(1000) < 1575. as we are only getting about 20 cps from the source, most of the counts are noise. This is a BOA image, so we need to add a WAVE image after this exposure. The WAVECAL=YES parameter does not trigger a separate lamp image*								
4	WCA/MIRRORB/P2/MED (no target)	WAVE	COS/NUV, TIME-TAG, WCA	MIRRORB	BUFFER-TIME=2000	QESIPARM USELAMP LINE2; QESIPARM CURRENT MEDIUM	Sequence 1-10 Non-Int in BOA/A & BOA/B (BB)	24 Secs (24 Secs) *[==>]*	***[1]***
	Comments: For P2/MED, we expect 300-460 cps, with a Brightest Pixel = 9 cts/s. So BT < 0.67(2.35E6/460) < 3400.*								
5	ACQ/IMAGE (BOA/MIRRORB/P2/MED) (COS.ta.432624)	(3) HIP66578	COS/NUV, ACQ/IMAGE, BOA	MIRRORB			Sequence 1-10 Non-Int in BOA/A & BOA/B (BB)	183 Secs (183 Secs) *[==>]*	***[1]***
	Comments: Compare the centerings between the BOA/MIRRORA and BOA/MIRRORB ACQ/IMAGE centering options. The ETC gives 175 seconds to reach S/N=60 with this target in the BOA/MIRRORB mode.								
6	WCA/MIRRORB/P2/MED (no target)	WAVE	COS/NUV, TIME-TAG, WCA	MIRRORB	BUFFER-TIME=2000	QESIPARM USELAMP LINE2; QESIPARM CURRENT MEDIUM	Sequence 1-10 Non-Int in BOA/A & BOA/B (BB)	24 Secs (24 Secs) *[==>]*	***[1]***
	Comments: For P2/MED, we expect 300-460 cps, with a Brightest Pixel = 9 cts/s. So BT < 0.67(2.35E6/460) < 3400.*								
7	WCA/MIRRORA/P2/LOW (no target)	WAVE	COS/NUV, TIME-TAG, WCA	MIRRORA	BUFFER-TIME=270	QESIPARM USELAMP LINE2; QESIPARM CURRENT LOW	Sequence 1-10 Non-Int in BOA/A & BOA/B (BB)	16 Secs (16 Secs) *[==>]*	***[1]***
	Comments: For P2/LOW/MIRRORA we get 2900 counts in 7s. The BT for this must be < 0.37(2.35E6/4800) or < 270*								
8	ACQ/IMAGE (BOA/MIRRORA/P2/LOW) (COS.ta.432623)	(3) HIP66578	COS/NUV, ACQ/IMAGE, BOA	MIRRORA			Sequence 1-10 Non-Int in BOA/A & BOA/B (BB)	18 Secs (18 Secs) *[==>]*	***[1]***
	Comments: Using the standard star HIP66578 to compare the centerings between the BOA/MIRRORA and BOA/MIRRORB ACQ/IMAGE centering options. The ETC gives 12 seconds to reach S/N=60 with this target in the BOA/MIRRORA mode. We observed this target in 13124, with 2961 counts in 12s (target +background in 50x50 box). We will need to follow this with a P2/LOW/WCA/A image.								

9	PSA/G225M/2306 (COS.sp.1030027)	(3) HIP66578	COS/NUV, TIME-TAG, PSA	G225M 2306 A	BUFFER-TIME=540; FLASH=S0200D035; FP-POS=3	QESIPARM USELAMP LINE2; QESIPARM CURRENT MEDIUM	Sequence 1-10 Non-Int in BOA/A & BOA/B (BB)	90 Secs (90 Secs)	[==>]	[1]
*Comments: COS.sp.1030027 gives s/n/re =10 in 70 seconds. BT=2/3 *1000 < 666. We want to get a good lamp flash, so 35s should be ok. FPPOS=3. G225M/2306 is one of the 'approved' NUV cenwaves for TA. We request 90s to account for further TDS*										
10	PSA/G185M/1913 (COS.sp.1030026)	(3) HIP66578	COS/NUV, TIME-TAG, PSA	G185M 1913 A	BUFFER-TIME=300; FLASH=S0070D035; FP-POS=3	QESIPARM USELAMP LINE2; QESIPARM CURRENT MEDIUM	Sequence 1-10 Non-Int in BOA/A & BOA/B (BB)	120 Secs (120 Secs)	[==>]	[1]
*Comments: COS.sp.1030026 gives s/n/re =10.7 in ~40 seconds. BT=2/3 * 638 < 400. We want to get a good lamp flash, so 35s should be ok. FPPOS=3. G2185M/1913 is one of the 'approved' NUV cenwaves for TA. Due to concerns over grating TDS, I have trippled the exposure time to 120 seconds*										
11	WCA/MIRRORA/P1/LOW (no target)	WAVE	COS/NUV, TIME-TAG, WCA	MIRRORA		QESIPARM USELAMP LINE1; QESIPARM CURRENT LOW	Sequence 11-14 Non-Int in BOA/A & BOA/B (BB)	16 Secs (16 Secs)	[==>]	[1]
Comments: For P1/LOW/A, we expect 2620 counts/s. BP = 45 cp/s. This is derived from data in program 13124.										
12	WCA/MIRRORA/P2/LOW (no target)	WAVE	COS/NUV, TIME-TAG, WCA	MIRRORA		QESIPARM USELAMP LINE2; QESIPARM CURRENT LOW	Sequence 11-14 Non-Int in BOA/A & BOA/B (BB)	26 Secs (26 Secs)	[==>]	[1]
Comments: For P2/LOW/MIRRORA we get 2900 counts in 7s										
13	WCA/MIRRORB/P1/LOW (no target)	WAVE	COS/NUV, TIME-TAG, WCA	MIRRORB		QESIPARM USELAMP LINE1; QESIPARM CURRENT LOW	Sequence 11-14 Non-Int in BOA/A & BOA/B (BB)	32 Secs (32 Secs)	[==>]	[1]
Comments: For P1/LOW, we expect 82 cts/s, to get 1600 counts in the primary spot, we need 2400 counts. 2400./82 = 30 seconds										
14	WCA/MIRRORB/P2/MED (no target)	WAVE	COS/NUV, TIME-TAG, WCA	MIRRORB		QESIPARM USELAMP LINE2; QESIPARM CURRENT MEDIUM	Sequence 11-14 Non-Int in BOA/A & BOA/B (BB)	26 Secs (26 Secs)	[==>]	[1]
Comments: For P2/MED, we expect 300-460 cps, with a Brightest Pixel = 9 cts/s										

Orbit Structure