16851 - COS LP6 FUV Target Acquisition Enabling and Verification

Cycle: 29, 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	(1) WDG-1 (11) WDG-1-OFFSET+1AD+1XD	COS/FUV COS/NUV	1	07-Jul-2022 14:00:19.0	yes
02	(1) WDG-1 (21) WDG-1-OFFSET+0.7AD (22) WDG-1-OFFSET+0.3AD	COS/FUV COS/NUV	1	07-Jul-2022 14:00:22.0	yes

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
03	(1) WDG-1 (31) WDG-1-OFFSET+0.7XD (32) WDG-1-OFFSET+0.3XD	COS/FUV COS/NUV	1	07-Jul-2022 14:00:25.0	yes
04	(1) WDG-1 (41) WDG-1-OFFSET+1AD+1XD-VISIT4 (42) WDG-1-OFFSET+1AD+1.8XD-VISIT4 (43) WDG-1-OFFSET+1.8AD+1.8XD-VISIT4	COS/FUV COS/NUV	1	07-Jul-2022 14:00:27.0	yes

4 Total Orbits Used

ABSTRACT

This program is designed to verify acquisition parameters at LP6 and to produce spectra at several regions on the detector that would normally be used for target acquisition, but for which data are not downlinked as part of the acquisition process. The idea is that if anything does go wrong with the acquisition tests we will have maps of the detector that we can then use for diagnostics. LP6 is at +6.5" from the on-axis detector position,
The program uses ficticious offset targets to nod the telescope away from a centered target and then test the re-acquisition. Because these displacements need to happen along the AD and XD detector direction and target offset coordinates must be entered in RA and DEC, the ORIENT angle for each visit must be restricted to +/- 0.5 degrees, which also means a date range restriction. The date ranges and ORIENT restrictions for each visit are described in the program description. The program is modeled after the LP5 version of this program: 16432. It uses the target WDG-1 (SK 191) and cenwave G160M/1577 for all exposures.

Prior to the execution of this program all LP6 SIAF, aperture mechnism positions, TA subarray, and foci must have been installed.

There is no special commanding in this program.

OBSERVING DESCRIPTION

This program is structured after the LP5 TA enabling program, 16432.
All exposures use cenwave G160M/1577

The general structure of each visit follows the following steps:

1- Acquire the target using NUV ACQ/IMAGE. It is assumed that NUV ACQ/IMAGE acquisitions are correctly centered because ACQ/IMAGE is routinely monitored for accuracy.

2 - Take a high SN spectrum to use as a baseline comparison after ACQ/IMAGE

3 - Use POSTARG to offset the telescope to the positions where the acquisition sequence (SEARCH, PEAKD, or PEAKXD) will take exposures and take a spectrum at each position.

4 - Run the acquisition sequence that was simulated in step 3 on the centered target.

5 - Take a spectrum to verify the centering done on step 4. Verification is done by comparing this spectrum to the one taken on step 2.

6 - Offset the telescope using a virtual target, and run the relevant acquisition. This step tests that the telescope can actually perform an acquisition and center an offset target. This step is repeated for a few different offsets, depending on the acquisition mode being tested. See visit level comments for details.

7 - Take a spectrum after the acquisition to verify centering.

We specify the exposures so that the signal-to-noise varies from about 7 in the blue end of cenwave 1577 to about 3 in the red end, unless otherwise noted in the exposure level comment. The signal to noise for all exposures were increased from the values used in the LP5 program 16432.

ACQ parameters on APT are specified explicitly in visits 1, 2, and 3 even when default values are being used. Visit 4 specifies the parameters as default to test that the correct defaults are being used. The visit level exposures describe the defaults and/or recommended parameters in each case, as per chapter 8 of the COS IHB.

The four visits should be spaced by at least 6 weeks to allow time for analysis and modification of the next visit if necessary. The following windows are tentative and will depend on the progress of the other enabling programs.

Visit 1 - Tests ACQ/SEARCH 2022 MAY 2 to 2022 MAY 7
Visit 2 - Tests ACQ/PEAKD TBD
Visit 3 - Tests ACQ/PEAKXD TBD
Visit 4 - Defaults verification 03 OCT 2022 to 05 OCT 2022 ORIENT=340 (TBD)

Visit 4 repeats the tests using cycle 30 values specified as DEF on APT, as opposed to specifying them explicitly. This is to verify that the defaults

are working properly. This visit should be run on the first day or so of cycle 30. The precise timing shound be revised when the SMS schedule is known. No FUV acquisitions should be scheduled until the results of this visit are verified.

The last exposure in visit 4, exposure 04.014, will test split-wavecal, which is not yet enabled in APT as of version 2021.3. We tested the schedulability using split-wavecals using the test version of APT, and the non-interrupt sequence fits in an orbit with schedulability=90. We enter exposure 04.014 with WAVECAL=NO, FLASH=NO in version 2021.3 of APT but we will change this to WAVECAL=YES once split-wavecals are enabled in APT. We already use schedulability=90 in version 2021.3 to ensure that the visit will schedule correctly.

The spacing of these visits is restricted in part by target observability, see visit planner.

The exposures are described in more detail at the visit level comments.

No special commanding is needed for this program.

----SUMMARY OF RECOMMENDED FUV ACQUISITION PARAMETERS, FROM IHB, CHAPTER 8 ----------

ACQ/SEARCH

SCAN-SIZE should be picked to match uncertainty, as per IHB Table 8.2. We test 2 and 3.
Default STEP-SIZE is 1.767 always
CENTER=FLUX-WT for SCAN-SIZE=2 and CENTER=FLUX-WT-FLR for SCAN-SIZE >2

ACQ/PEAKXD
Default is NUM-POS=3, CENTER=FLUX-WT, STEP-SIZE=1.3
If using NUM-POS=5 then CENTER=FLUX-WT-FLR, STEP-SIZE=0.9

ACQ/PEAKD
Default is NUM-POS=5, CENTER=FLUX-WT-FLR, STEP-SIZE=0.9
If using NUM-POS=3 then CENTER=FLUX-WT, STEP-SIZE=1.3

----SPECIAL REQUESTS:-----
Please turn off calibration for the COS/FUV exposures. These data should not be used for scientific purposes due to non-finalized pointing and focus values.
Please disassociate all exposures. All data that is not calibrated must be disassociated to make it into the archive.

SQL is used to meet the above requests.
In case 1 qexposure.control_id is modified. In case 2 qeassociation records are deleted. Contact G. Chapman/M. Reinhart for further information about this process.

Visit

Proposal 16851, ACQ/SEARCH TEST (01), completed Thu Jul 07 18:00:28 GMT 2022

Diagnostic Status: Warning

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: SCHED 80%; ORIENT 195.9D TO 196.1 D; BETWEEN 02-MAY-2022:00:00:00 AND 08-MAY-2022:00:00:00

Comments: The sequence of events is:
01.001 - NUV Acquisition
01.002 - centered baseline spectrum after NUV acquisition
01.003 through 01.010 - taking spectra to examine the 3x3 grid used in a 3x3 FUV acq/search - see note below about exposure times and buffer times
01.011 - perform 3x3 ACQ/SEARCH
01.012 - verification spectrum
01.013 - 3x3 ACQ/SEARCH on an offset target
01.014 - verification spectrum
01.015 - 2x2 ACQ/SEARCH on a centered target
01.016 - verification spectrum

For exposures 2 through 10:
*For the 3x3 offset pattern used to simulate ACQ/SEARCH, we use the same timing scheme that was used at LP5 (16432), but with a target that is about twice as bright. Throughput at a side position (e.g., 0.0, 1.1) is ~58%. Throughout at a corner position (1.1, 1.1) is ~28.6%. For the purpose of inspecting the detector we would like the sides and the corners to have the same count rate. Picking 22s for a side means the corner is 22s *(0.58/0.286) = 45s. that would make the center 12s. However we would like to have a high SN spectrum for verifying position, so make the center 30s because that's what fits in the orbit. Buffer times are also increased to account for the vignetted flux, such that the buffer time at a side is310s and 629s at a corner. Here we do not use the default STEP-SIZE=1.767 because doing so would not provide enough flux for detector mapping. Using a smalled STEP-SIZE illuminates the same regions of the detector, but with more light.*

SCAN-SIZE should be picked to match uncertainty, as per IHB Table 8.2. We test 2 and 3.
Default STEP-SIZE is 1.767 always
CENTER=FLUX-WT for SCAN-SIZE=2 and CENTER=FLUX-WT-FLR for SCAN-SIZE >2

Diagnostics

(ACQ/SEARCH TEST (01)) Warning (Form): For the best data quality, it is generally required to use all four FP-POS positions when observing at a given COS cenwave. See the COS Instrument Handbook for exceptions that may apply to observations with G130M/1291 or G160M.

(ACQ/SEARCH TEST (01)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE

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(ACQ/SEARCH TEST (01)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	WDG-1 Alt Name1: SK191	RA: 01 41 42.0729 (25.4253038d) Dec: -73 50 38.21 (-73.84395d) Equinox: J2000	Proper Motion RA: 2.6618321082955913E-4 sec of time/yr Proper Motion Dec: -0.0013640000361192506 arcsec/yr Epoch of Position: 2015.5	V=11.84	Reference Frame: ICRS

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Blue supergiant in periphery of SMC.
Has previous COS spectrum.

Decimal degree coordinates: 025.4252866734441 -73.8439408698315

SIMBAD: http://simbad.u-strasbg.fr/simbad/sim-id?Ident=WDG+1&NbIdent=1&Radius=2&Radius.unit=arcmin&submit=submit+id

B 11.86 [~] E ~
V 11.84 [~] E ~
G 11.8193 [0.0015] C 2018yCat.1345....0G
J 11.904 [0.024] C 2003yCat.2246....0C
H 11.957 [0.025] C 2003yCat.2246....0C
K 11.906 [0.023] C 2003yCat.2246....0C
Category=STAR
Description=[B0-B2 III-I]
Extended=NO

(11)	WDG-1-OFFSET+1AD+1XD	Offset from WDG-1 RA Offset: 0.0013571 Degrees Dec Offset: -0.38981015 Arcsec		V=11.84	Offset Position (WDG-1-OFFSET+1AD+1XD)

Comments: From the geometry of COS, going from offsets in AD and XD to offsets in ra and dec:
*Delta(dec) = Delta(AD)*cos(ORIENT - 45) + Delta(XD)*cos(ORIENT - 135) will yield the result in arcseconds, which is what APT wants.*
*Delta(RA) = (Delta(AD)*sin(ORIENT - 45) + Delta(XD)*sin(ORIENT - 135))/(3600. * cos(dec)) will yield the result in decimal degrees of RA, which is what APT wants.*

ORIENT=196, valid from May 2 to May 7, 2022
Category=STAR
Description=[B0-B2 III-I]
Extended=NO

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	NUV ACQ/IMAGE (COS.ta.1540336)	(1) WDG-1	COS/NUV, ACQ/IMAGE, BOA	MIRRORB			Sequence 1-16 Non-Int in ACQ/SEARCH TEST (01)	32 Secs (32 Secs) *[==>]*	*[1]*
	Comments: ACQ/IMAGE to determine center. Used Castelli-Kurucz Models B0I 26000 normalized to B=11.86 because the exisiting spectrum does not cover the entire NUV range.								
2	G160M/1577 - BASELINE SPECTRUM (COS.sp.1540356)	(1) WDG-1	COS/FUV, TIME-TAG, PSA	G160M 1577 A	LIFETIME-POS=LP6; FLASH=NO; WAVECAL=NO; BUFFER-TIME=1800; FP-POS=3		Sequence 1-16 Non-Int in ACQ/SEARCH TEST (01)	24 Secs (22 Secs) *[==>22.0 Secs]*	*[1]*
	Comments: Take spectrum after ACQ/IMAGE centering to establish center position. *Planning on about 10% more flux than what the ETC says because the previous obseved spectrum used as template ends about 10% short in the long end. The 2/3 factor in the buffer time takes care of that.* *See visit level note about exposures 01.002 through 01.010.*								
3	G160M/1577- POSTARG + SPECTRUM1 (1.1, 0) (COS.sp.1540355)	(1) WDG-1	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=310; LIFETIME-POS=LP6; FLASH=NO; WAVECAL=NO; FP-POS=3	POS TARG 1.1,0	Sequence 1-16 Non-Int in ACQ/SEARCH TEST (01)	18 Secs (16 Secs) *[==>16.0 Secs]*	*[1]*
	Comments: (1.1, 0.0) POSTARG TO SIMULATE ACQ/SEARCH. At 1.1,0 throughput is ~58%. *See visit level note about exposures 01.002 through 01.010.*								
4	G160M/1577 - POSTARG + SPECTRUM2 (1.1, 1.1)(Corner) (COS.sp.1540355)	(1) WDG-1	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=629; FLASH=NO; LIFETIME-POS=LP6; FP-POS=3; WAVECAL=NO	POS TARG 1.1,1.1	Sequence 1-16 Non-Int in ACQ/SEARCH TEST (01)	41 Secs (39 Secs) *[==>39.0 Secs]*	*[1]*
	Comments: (1.1, 1.1) POSTARG TO SIMULATE ACQ/SEARCH. At 1.1, 1.1 (corner) throughput is ~28.6% *See visit level note about exposures 01.002 through 01.010.*								
5	G160M/1577- POSTARG + SPECTRUM3 (0,1.1) (COS.sp.1540355)	(1) WDG-1	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=310; FLASH=NO; FP-POS=3; LIFETIME-POS=LP6; WAVECAL=NO	POS TARG 0,1.1	Sequence 1-16 Non-Int in ACQ/SEARCH TEST (01)	18 Secs (16 Secs) *[==>16.0 Secs]*	*[1]*
	Comments: (0, 1.1) POSTARG TO SIMULATE ACQ/SEARCH this is a side, so see exporuse 01.003 for comments *See visit level note about exposures 01.002 through 01.010.*								

6	G160M/1577- POSTARG + SPECTRUM4 (-1.1, 1.1) (Corner) (COS.sp.1540355)	(1) WDG-1	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=629; FP-POS=3; FLASH=NO; LIFETIME-POS=LP6; WAVECAL=NO	POS TARG -1.1,1.1	Sequence 1-16 Non-Int in ACQ/SEARCH TEST (01)	41 Secs (39 Secs) *[==>39.0 Secs]*	***[1]***
Comments: (-1.1, 1.1) POSTARG TO SIMULATE ACQ/SEARCH this is a corner, so see exporuse 01.004 for comments. *See visit level note about exposures 01.002 through 01.010.*									
7	G160M/1577 - POSTARG + SPECTRUM5 (-1.1, 0) (COS.sp.1540355)	(1) WDG-1	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=310; FP-POS=3; FLASH=NO; LIFETIME-POS=LP6; WAVECAL=NO	POS TARG -1.1,0	Sequence 1-16 Non-Int in ACQ/SEARCH TEST (01)	18 Secs (16 Secs) *[==>16.0 Secs]*	***[1]***
Comments: POSTARG TO SIMULATE ACQ/SEARCH this is a side, so see exporuse 01.003 for comments. *See visit level note about exposures 01.002 through 01.010.*									
8	G160M/1577 - POSTARG + SPECTRUM6 (-1.1, -1.1) (Corner) (COS.sp.1540355)	(1) WDG-1	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=629; FP-POS=3; FLASH=NO; LIFETIME-POS=LP6; WAVECAL=NO	POS TARG -1.1,-1.1	Sequence 1-16 Non-Int in ACQ/SEARCH TEST (01)	41 Secs (39 Secs) *[==>39.0 Secs]*	***[1]***
Comments: POSTARG TO SIMULATE ACQ/SEARCH this is a corner, so see exporuse 01.004 for comments. *See visit level note about exposures 01.002 through 01.010.*									
9	G160M/1577 - POSTARG + SPECTRUM7 (0,-1.1) (COS.sp.1540355)	(1) WDG-1	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=310; FP-POS=3; FLASH=NO; LIFETIME-POS=LP6; WAVECAL=NO	POS TARG 0,-1.1	Sequence 1-16 Non-Int in ACQ/SEARCH TEST (01)	18 Secs (16 Secs) *[==>16.0 Secs]*	***[1]***
Comments: POSTARG TO SIMULATE ACQ/SEARCH this is a side, so see exporuse 01.003 for comments. *See visit level note about exposures 01.002 through 01.010.*									
10	G160M/1577 - POSTARG + SPECTRUM8 (+1.1,-1.1) (Corner) (COS.sp.1540355)	(1) WDG-1	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=629; FP-POS=3; FLASH=NO; LIFETIME-POS=LP6; WAVECAL=NO	POS TARG 1.1,-1.1	Sequence 1-16 Non-Int in ACQ/SEARCH TEST (01)	41 Secs (39 Secs) *[==>39.0 Secs]*	***[1]***
Comments: POSTARG TO SIMULATE ACQ/SEARCH this is a corner, so see exporuse 01.004 for comments. *See visit level note about exposures 01.002 through 01.010.*									

11	G160M/1577- ACQ/SEARCH (COS.sa.1540360)	(1) WDG-1	COS/FUV, ACQ/SEARCH, PSA	G160M 1577 A	SCAN-SIZE=3; STEP-SIZE=1.1; LIFETIME-POS=LP6; CENTER=FLUX-WT-FLR	Sequence 1-16 Non-Int in ACQ/SEARCH TEST (01)	2 Secs (2 Secs) *[==>]*	***[1]***

Comments: This actually performs the ACQ/SEARCH that was mapped in exposures 01.003 to 01.010. For this reason it is not using the default STEP-SIZE of 1.76". See visit level comment on exposures 01.002 to 01.010

Requested Signal/Noise Ratio = 40.000 for Segment A and Segment B combined gives: Time = 0.1885 seconds
Time Required for Requested SNR in Segment A only: 0.7998
Time Required for Requested SNR in Segment B only: 0.2466

12	G160M/1577 - Verification spectrum (COS.sp.1540356)	(1) WDG-1	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=180; FP-POS=3; FLASH=NO; LIFETIME-POS=LP6; WAVECAL=NO	Sequence 1-16 Non-Int in ACQ/SEARCH TEST (01)	26 Secs (24 Secs) *[==>24.0 Secs]*	***[1]***

Comments: This exposure is identical to 01.002. The result should be identical as well.

13	G160M/1577- 3x3 ACQ/SEARCH - OFFSET +1AD +1XD (COS.sa.1540360)	(11) WDG-1-OFFSET+1AD+1XD	COS/FUV, ACQ/SEARCH, PSA	G160M 1577 A	SCAN-SIZE=3; STEP-SIZE=1.767; LIFETIME-POS=LP6; CENTER=FLUX-WT-FLR	Sequence 1-16 Non-Int in ACQ/SEARCH TEST (01)	2 Secs (2 Secs) *[==>]*	***[1]***

Comments: Same as 01.011, but now it stars on an offset position with a virtual target at +1AD, +1XD. Note also that this one uses the default STEP-SIZE.

14	G160M/1577- Verification spectrum (COS.sp.1540356)	(11) WDG-1-OFFSET+1AD+1XD	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=180; FP-POS=3; FLASH=NO; LIFETIME-POS=LP6; WAVECAL=NO	Sequence 1-16 Non-Int in ACQ/SEARCH TEST (01)	26 Secs (24 Secs) *[==>24.0 Secs]*	***[1]***

Comments: Functionally the same as 01.012 and 01.002, but after centering from an offset position.

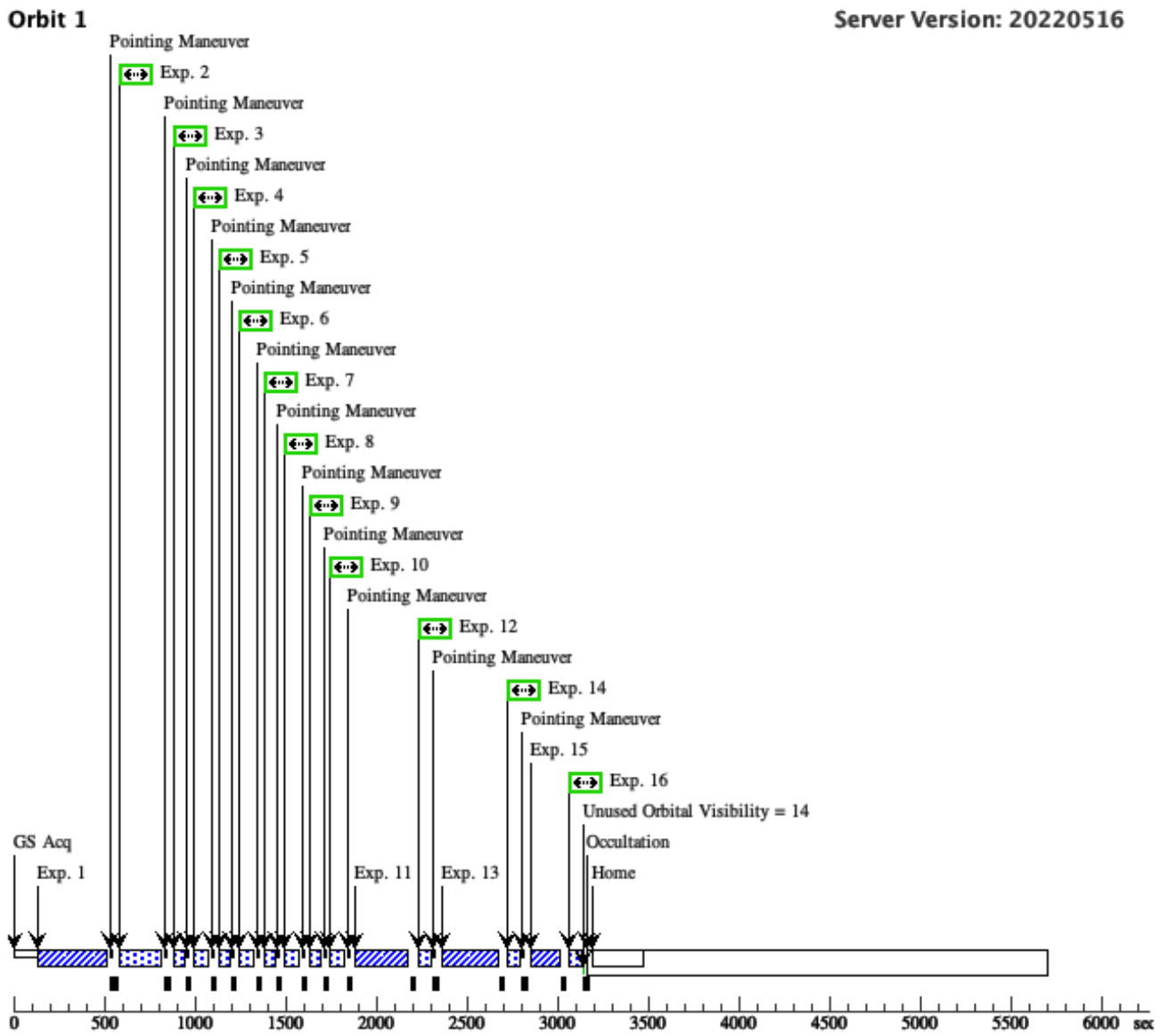
15	G160M/1577 - 2x2 ACQ/SEARCH (COS.sa.1540360)	(1) WDG-1	COS/FUV, ACQ/SEARCH, PSA	G160M 1577 A	SCAN-SIZE=2; STEP-SIZE=1.767; LIFETIME-POS=LP6; CENTER=FLUX-WT	Sequence 1-16 Non-Int in ACQ/SEARCH TEST (01)	2 Secs (2 Secs) *[==>]*	***[1]***

Comments: 2x2x1.767" ACQ/SEARCH, default settings explicitly selected. Starting from target offset by -1AD, -1XD.

16	G160M/1577- Verification spectrum (COS.sp.1540356)	(1) WDG-1	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=180; FP-POS=3; FLASH=NO; LIFETIME-POS=LP6; WAVECAL=NO	Sequence 1-16 Non-Int in ACQ/SEARCH TEST (01)	26 Secs (24 Secs) *[==>24.0 Secs]*	***[1]***

Comments: To verify the ACQ/SEARCH results. Identical to 01.002

Orbit Structure



Visit

Proposal 16851, ACQ/PEAKD TEST (02), implementation Thu Jul 07 18:00:28 GMT 2022

Diagnostic Status: Warning

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: SCHED 90%; ORIENT 279.9D TO 280.1 D; BETWEEN 25-JUL-2022:00:00:00 AND 08-AUG-2022:00:00:00

*Comments: ***********
The Between for this visit is 25 July to 08 August, two full SMSs. Please try to schedule in the first half of that window if possible.***
The virtual targets are set for orient=280. Any ORIENT is possible, but if the ORIENT changes then the PI will have to change the offsets for the virtual targets (not hard to do).
****

First we perform an ACQ/IMAGE and take a G160M/1577 high SN spectrum and use it as the baseline for comparing the position of the other spectra.

We simulate a 5x0.8" ACQ/PEAKD taking short spectra. We start with the centered (0) position then go to -1.6" in X and proceed in steps of 0.8" out to +1.6" X. These exposures serve two purposes. First, they inspect the detector for anomalies. Second, the flux weighted centroid of all 5 exposures should provide the same result as the acquisition.
We then perform an actual 5x0.8" (NUM-POS=5, STEP-SIZE=0.8") ACQ/PEAKD on the centered target and take a spectrum. The position of this spectrum should be centered to the same specifications as the flux weighted centroiding in the previous step.
We then use virtual targets to perform 5x0.9" ACQ/PEAKD starting from offsets of -0.7" and +0.7". We then repeat the process for a 3x1.3 ACQ/PEAKD for offsets of -0.3" and +0.3".

Default is NUM-POS=5, CENTER=FLUX-WT-FLR, STEP-SIZE=0.9
If using NUM-POS=3 then CENTER=FLUX-WT, STEP-SIZE=1.3

Diagnostics

(ACQ/PEAKD TEST (02)) Warning (Form): COS ACQ/PEAKD exposure should be preceded by an ACQ/PEAKXD exposure in the Visit.

(ACQ/PEAKD TEST (02)) Warning (Form): For the best data quality, it is generally required to use all four FP-POS positions when observing at a given COS cenwave. See the COS Instrument Handbook for exceptions that may apply to observations with G130M/1291 or G160M.

(ACQ/PEAKD TEST (02)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE

(ACQ/PEAKD TEST (02)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	WDG-1 Alt Name1: SK191	RA: 01 41 42.0729 (25.4253038d) Dec: -73 50 38.21 (-73.84395d) Equinox: J2000	Proper Motion RA: 2.6618321082955913E-4 sec of time/yr Proper Motion Dec: -0.0013640000361192506 arcsec/yr Epoch of Position: 2015.5	V=11.84	Reference Frame: ICRS
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. Blue supergiant in periphery of SMC. Has previous COS spectrum. Decimal degree coordinates: 025.4252866734441 -73.8439408698315 SIMBAD: http://simbad.u-strasbg.fr/simbad/sim-id?Ident=WDG+1&NbIdent=1&Radius=2&Radius.unit=arcmin&submit=submit+id B 11.86 [~] E ~ V 11.84 [~] E ~ G 11.8193 [0.0015] C 2018yCat.1345....0G J 11.904 [0.024] C 2003yCat.2246....0C H 11.957 [0.025] C 2003yCat.2246....0C K 11.906 [0.023] C 2003yCat.2246....0C Category=STAR Description=[B0-B2 III-I] Extended=NO				
(21)	WDG-1-OFFSET+0.7AD	Offset from WDG-1 RA Offset: 4.008145E-4 Degrees Dec Offset: -0.573406 Arcsec		V=11.84	Offset Position (WDG-1-OFFSET+0.7AD)
*Comments: From the geometry of COS, going from offsets in AD and XD to offsets in ra and dec: Delta(dec) = Delta(AD)*cos(ORIENT - 45) + Delta(XD)*cos(ORIENT - 135) will yield the result in arcseconds, which is what APT wants. Delta(RA) = (Delta(AD)*sin(ORIENT - 45) + Delta(XD)*sin(ORIENT - 135))/(3600. * cos(dec)) will yield the result in decimal degrees of RA, which is what APT wants. ORIENT =280 for July 25 to August 08 Category=STAR Description=[B0-B2 III-I] Extended=NO*				
(22)	WDG-1-OFFSET+0.3AD	Offset from WDG-1 RA Offset: 1.717776633E-4 Degrees Dec Offset: 0.2457456132 Arcsec		V=11.84	Offset Position (WDG-1-OFFSET+0.3AD)
*Comments: From the geometry of COS, going from offsets in AD and XD to offsets in ra and dec: Delta(dec) = Delta(AD)*cos(ORIENT - 45) + Delta(XD)*cos(ORIENT - 135) will yield the result in arcseconds, which is what APT wants. Delta(RA) = (Delta(AD)*sin(ORIENT - 45) + Delta(XD)*sin(ORIENT - 135))/(3600. * cos(dec)) will yield the result in decimal degrees of RA, which is what APT wants. ORIENT =280 for July 25 to August 08 Category=STAR Description=[B0-B2 III-I] Extended=NO*				

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	NUV ACQ/IMAGE (COS.ta.1540336)	(1) WDG-1	COS/NUV, ACQ/IMAGE, BOA	MIRRORB			Sequence 1-16 Non-Int in ACQ/PEAKD TEST (02)	32 Secs (32 Secs) *[==>]*	***[1]***
	Comments: ACQ/IMAGE to determine center. Identical to exposure 01.001. See comments there.								
2	Baseline spectrum (COS.sp.1541218)	(1) WDG-1	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=5000; FP-POS=3; FLASH=NO; WAVECAL=NO; LIFETIME-POS=LP6		Sequence 1-16 Non-Int in ACQ/PEAKD TEST (02)	25 Secs (25 Secs) *[==>]*	***[1]***
	Comments: Spectrum to determine location after ACQ/IMAGE centering. Need high SN for determining position of other spectra. exposure time 100s yields SN~7 per resel.								
3	ACQ/PEAKD (COS.sa.1541209)	(1) WDG-1	COS/FUV, ACQ/PEAKD, PSA	G160M 1577 A	NUM-POS=5; STEP-SIZE=0.8; LIFETIME-POS=LP6; CENTER=FLUX-WT-FLR		Sequence 1-16 Non-Int in ACQ/PEAKD TEST (02)	2 Secs (2 Secs) *[==>]*	***[1]***
	Comments: ACQ/PEAKD of a centered target on the same 5x0.8"" pattern. *This ACQ/PEAKD goes through the same positions that exposures 02.002 through 02.006 did. The flux weighted centroid of those exposures should yield the same center as this PEAKD. Here we do not use the default STEP-SIZE because we would like to replicate the mapping done in exposures 02.002 to 02.006. Using STEP-SIZE=0.9 there would have yielded too low a flux to inspect the detector.* *From COS.sa.1541209, we use 2 seconds.* *Requested Signal/Noise Ratio = 40.000 for Segment A and Segment B combined gives: Time = 0.1885 seconds* *Time Required for Requested SNR in Segment A only: 0.7998* *Time Required for Requested SNR in Segment B only: 0.2466*								
4	Verification spectrum (COS.sp.1541218)	(1) WDG-1	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=5000; FP-POS=3; FLASH=NO; WAVECAL=NO; LIFETIME-POS=LP6		Sequence 1-16 Non-Int in ACQ/PEAKD TEST (02)	26 Secs (26 Secs) *[==>]*	***[1]***
	Comments: Spectrum to determine location after ACQ/PEAKD.								
5	POSTARG + SPECTRUM1 (-1.6) (COS.sp.1541205)	(1) WDG-1	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=600; FP-POS=3; FLASH=NO; LIFETIME-POS=LP6; WAVECAL=NO	POS TARG -1.6,0	Sequence 1-16 Non-Int in ACQ/PEAKD TEST (02)	92 Secs (92 Secs) *[==>]*	***[1]***
	Comments: POSTARG to simulate 5x0.8" (NUM-POS=5, STEP-SIZE=0.8") ACQ/PEAKD. This is the x= -1.6 " position. Here we strive for SN~5.5 per resel. If the beam was not vignetted that would happen in a 25s exposure. But vignetting at x=-1.6" is 73%. 25s / (1-0.73)=92s. While the default STEP-SIZE for NUM-POS=5 is 0.9", that would not allow enough light through to inspect the detector, so we use STEP-SIZE=0.8"								

6	POSTARG + SPECTRUM3 (-0.8) (COS.sp.1541205)	(1) WDG-1	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=600; FP-POS=3; FLASH=NO; LIFETIME-POS=LP6; WAVECAL=NO	POS TARG -0.8,0	Sequence 1-16 Non-Int in ACQ/PEAKD TEST (02)	31 Secs (31 Secs) [==>]	[1]

Comments: POSTARG to simulate 5x0.8" (NUM-POS=5, STEP-SIZE=0.8") ACQ/PEAKD. This is the x= -0.8 " position. Here we strive for SN~5.5 per resel. If the beam was not vignetted that would happen in a 25s exposure. But vignetting at x=-0.8" is 20%. 25s/(1-0.20)=31s. While the default STEP-SIZE for NUM-POS=5 is 0.9", that would not allow enough light through to inspect the detector, so we use STEP-SIZE=0.8"

7	POSTARG + SPECTRUM3 (+0.8) (COS.sp.1541205)	(1) WDG-1	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=600; FP-POS=3; FLASH=NO; LIFETIME-POS=LP6; WAVECAL=NO	POS TARG 0.8,0	Sequence 1-16 Non-Int in ACQ/PEAKD TEST (02)	31 Secs (31 Secs) [==>]	[1]

Comments: POSTARG to simulate 5x0.8" (NUM-POS=5, STEP-SIZE=0.8") ACQ/PEAKD. This is the x= +0.8 " position. Here we strive for SN~5.5 per resel. If the beam was not vignetted that would happen in a 25s exposure. But vignetting at x=+0.8" is 20%. 25s/(1-0.20)=31s. While the default STEP-SIZE for NUM-POS=5 is 0.9", that would not allow enough light through to inspect the detector, so we use STEP-SIZE=0.8". This exposure is symmetric to 02.004

8	POSTARG + SPECTRUM1 (+1.6) (COS.sp.1541205)	(1) WDG-1	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=600; FP-POS=3; FLASH=NO; LIFETIME-POS=LP6; WAVECAL=NO	POS TARG 1.6,0	Sequence 1-16 Non-Int in ACQ/PEAKD TEST (02)	92 Secs (92 Secs) [==>]	[1]

Comments: POSTARG to simulate 5x0.8" (NUM-POS=5, STEP-SIZE=0.8") ACQ/PEAKD. This is the x= +1.6 " position. Here we strive for SN~5.5 per resel. If the beam was not vignetted that would happen in a 25s exposure. But vignetting at x=+1.6" is 73%. 25s / (1-0.73)=92s. While the default STEP-SIZE for NUM-POS=5 is 0.9", that would not allow enough light through to inspect the detector, so we use STEP-SIZE=0.8". This exposure is symmetric to 02.003

9	ACQ/PEAKD on offset -0.7 AD (COS.sa.1541209)	(21) WDG-1-OFFSET+0.7AD	COS/FUV, ACQ/PEAKD, PSA	G160M 1577 A	NUM-POS=5; STEP-SIZE=0.9; LIFETIME-POS=LP6; CENTER=FLUX-WT-FLR		Sequence 1-16 Non-Int in ACQ/PEAKD TEST (02)	2 Secs (2 Secs) [==>]	[1]

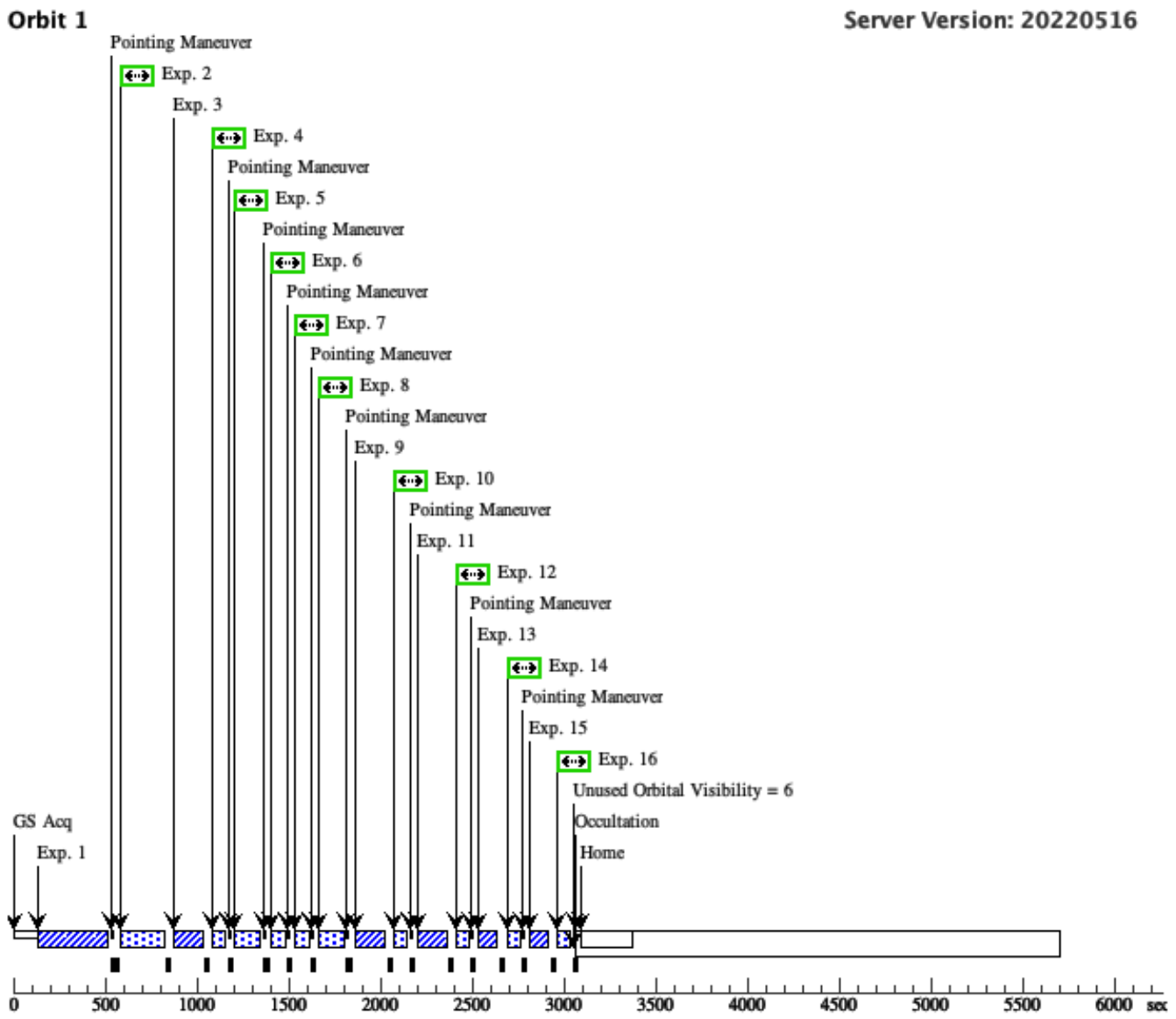
Comments: 5x0.9" ACQ/PEAKD on an off centered target. The virtual target is defined as being at a +0.7" offset from the real target. So at the beginning of acquisition the real target is offset -0.7" from the center of the field of view.

10	Verification spectrum (COS.sp.1541218)	(21) WDG-1-OFFSET+0.7AD	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=500; FP-POS=3; FLASH=NO; WAVECAL=NO; LIFETIME-POS=LP6		Sequence 1-16 Non-Int in ACQ/PEAKD TEST (02)	26 Secs (26 Secs) [==>]	[1]

Comments: Spectrum to determine location after ACQ/PEAKD. This exposure is identical to 02.008, except the telescope thinks that it's at target 21. But really it centered on the real target.

11	ACQ/PEAKD on offset +0.7 AD (COS.sa.154 1209)	(1) WDG-1	COS/FUV, ACQ/PEAKD, PSA	G160M 1577 A	NUM-POS=5; STEP-SIZE=0.9; LIFETIME-POS=LP6; CENTER=FLUX-WT-FLR	Sequence 1-16 Non-Int in ACQ/PEAKD TEST (02)	2 Secs (2 Secs) *[==>]*	***[1]***
Comments: 5x0.9" ACQ/PEAKD on an off centered target. From the previous acquisition, the telescope thinks it's at +0.7AD from the real target, but the real target is actually centered in the field of view. Now we ask the telescope to go back to the coordinates of the real target. That moves the telescope -0.7"AD. So now the real target is at +0.7"AD.								
12	Verification spectrum (COS.sp.154 1218)	(1) WDG-1	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=500; FP-POS=3; FLASH=NO; WAVECAL=NO; LIFETIME-POS=LP6	Sequence 1-16 Non-Int in ACQ/PEAKD TEST (02)	26 Secs (26 Secs) *[==>]*	***[1]***
Comments: Spectrum to determine location after ACQ/PEAKD. This exposure is identical to 02.008								
13	ACQ/PEAKD on offset -0.3 AD (COS.sa.154 1209)	(22) WDG-1-OFFSET+0.3AD	COS/FUV, ACQ/PEAKD, PSA	G160M 1577 A	NUM-POS=3; STEP-SIZE=1.3; LIFETIME-POS=LP6; CENTER=FLUX-WT	Sequence 1-16 Non-Int in ACQ/PEAKD TEST (02)	2 Secs (2 Secs) *[==>]*	***[1]***
Comments: 3x1.3" ACQ/PEAKD on an off centered target. From the previous acquisition, the telescope is centered on the real target and also thinks that it is centered on the real target. We now command the telescope to move to a virtual target at +0.3"AD from the real target. That places the real target at -0.3"AD in the filed of view.								
14	Verification spectrum (COS.sp.154 1218)	(22) WDG-1-OFFSET+0.3AD	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=500; FP-POS=3; FLASH=NO; WAVECAL=NO; LIFETIME-POS=LP6	Sequence 1-16 Non-Int in ACQ/PEAKD TEST (02)	26 Secs (26 Secs) *[==>]*	***[1]***
Comments: Spectrum to determine location after ACQ/PEAKD. This exposure is identical to 02.008, except the telescope thinks it's at target 22. It's actually centered on the real target.								
15	ACQ/PEAKD on offset +0.3 AD (COS.sa.154 1209)	(1) WDG-1	COS/FUV, ACQ/PEAKD, PSA	G160M 1577 A	NUM-POS=3; STEP-SIZE=1.3; LIFETIME-POS=LP6; CENTER=FLUX-WT	Sequence 1-16 Non-Int in ACQ/PEAKD TEST (02)	2 Secs (2 Secs) *[==>]*	***[1]***
Comments: 3x1.3" ACQ/PEAKD on an off centered target. From the previous acquisition, the telescope thinks it's at +0.3AD from the real target, but the real target is actually centered in the field of view. Now we ask the telescope to go back to the coordinates of the real target. That moves the telescope -0.3"AD. So now the real target is at +0.3"AD.								
16	Verification spectrum (COS.sp.154 1218)	(1) WDG-1	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=500; FP-POS=3; FLASH=NO; WAVECAL=NO; LIFETIME-POS=LP6	Sequence 1-16 Non-Int in ACQ/PEAKD TEST (02)	26 Secs (26 Secs) *[==>]*	***[1]***
Comments: Spectrum to determine location after ACQ/PEAKD. This exposure is identical to 02.008								

Orbit Structure



Proposal 16851 - ACQ/PEAKXD TEST (03) - COS LP6 FUV Target Acquisition Enabling and Verification

Visit

Proposal 16851, ACQ/PEAKXD TEST (03), completed Thu Jul 07 18:00:28 GMT 2022

Diagnostic Status: Warning

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: SCHED 90%; ORIENT 231.9D TO 232.1 D; BETWEEN 06-JUN-2022:00:00:00 AND 20-JUN-2022:00:00:00

Comments: This visit tests PEAKXD. It is a copy of vist 02, PEAKD test, with X and Y displacements inverted. The process is entirely symmetrical.

First we perform an ACQ/IMAGE and take a G160M/1577 high SN spectrum and use it as the baseline for comparing the position of the other spectra.
****
*The Between for this visit is June 06 to June 30, two full SMSs. Please try to schedule in the first half of that window if possible.****
The virtual targets are set for orient=232. Any ORIENT is possible, but if the ORIENT changes then the PI will have to change the offsets for the virtual targets (not hard to do).
****

We simulate a 5x0.8" ACQ/PEAXKD taking short spectra. We start with the centered (0) position then go to -1.6" in Y and proceed in steps of 0.8" out to +1.6" Y. These exposures serve two purposes. First, they inspect the detector for anomalies. Second, the flux weighted centroid of all 5 exposures should provide the same result as the acquisition.
We then perform an actual 5x0.8" (NUM-POS=5, STEP-SIZE=0.8") ACQ/PEAKXD on the centered target and take a spectrum. The position of this spectrum should be centered to the same specifications as the flux weighted centroiding in the previous step.
We then use virtual targets to perform 5x0.9" ACQ/PEAKXD starting from offsets of -0.7" XD and +0.7" XD. We then repeat the process for a 3x1.3 ACQ/PEAKD for offsets of -0.3" XD and +0.3" XD.

Default is NUM-POS=3, CENTER=FLUX-WT, STEP-SIZE=1.3
If using NUM-POS=5 then CENTER=FLUX-WT-FLR, STEP-SIZE=0.9

Diagnostics

(ACQ/PEAKXD TEST (03)) Warning (Form): COS ACQ/PEAKXD exposure should be followed by an ACQ/PEAKD exposure in the Visit.

(ACQ/PEAKXD TEST (03)) Warning (Form): For the best data quality, it is generally required to use all four FP-POS positions when observing at a given COS cenwave. See the COS Instrument Handbook for exceptions that may apply to observations with G130M/1291 or G160M.

(ACQ/PEAKXD TEST (03)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE

(ACQ/PEAKXD TEST (03)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	WDG-1 Alt Name1: SK191	RA: 01 41 42.0729 (25.4253038d) Dec: -73 50 38.21 (-73.84395d) Equinox: J2000	Proper Motion RA: 2.6618321082955913E-4 sec of time/yr Proper Motion Dec: -0.0013640000361192506 arcsec/yr Epoch of Position: 2015.5	V=11.84	Reference Frame: ICRS
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. Blue supergiant in periphery of SMC. Has previous COS spectrum. Decimal degree coordinates: 025.4252866734441 -73.8439408698315 SIMBAD: http://simbad.u-strasbg.fr/simbad/sim-id?Ident=WDG+1&NbIdent=1&Radius=2&Radius.unit=arcmin&submit=submit+id B 11.86 [~] E ~ V 11.84 [~] E ~ G 11.8193 [0.0015] C 2018yCat.1345....0G J 11.904 [0.024] C 2003yCat.2246....0C H 11.957 [0.025] C 2003yCat.2246....0C K 11.906 [0.023] C 2003yCat.2246....0C Category=STAR Description=[B0-B2 III-I] Extended=NO				
(31)	WDG-1-OFFSET+0.7XD	Offset from WDG-1 RA Offset: 2.1369203E-4 Degrees Dec Offset: -0.085308572 Arcsec		V=11.8	Offset Position (WDG-1-OFFSET+0.7XD)
*Comments: From the geometry of COS, going from offsets in AD and XD to offsets in ra and dec: Delta(dec) = Delta(AD)*cos(ORIENT - 45) + Delta(XD)*cos(ORIENT - 135) will yield the result in arcseconds, which is what APT wants. Delta(RA) = (Delta(AD)*sin(ORIENT - 45) + Delta(XD)*sin(ORIENT - 135))/(3600. * cos(dec)) will yield the result in decimal degrees of RA, which is what APT wants. 06 JUN to 20 JUN, ORIENT=232 Category=STAR Description=[B0-B2 III-I] Extended=NO*				
(32)	WDG-1-OFFSET+0.3XD	Offset from WDG-1 RA Offset: 9.1582302E-5 Degrees Dec Offset: -0.036560819 Arcsec		V=11.8	Offset Position (WDG-1-OFFSET+0.3XD)
*Comments: From the geometry of COS, going from offsets in AD and XD to offsets in ra and dec: Delta(dec) = Delta(AD)*cos(ORIENT - 45) + Delta(XD)*cos(ORIENT - 135) will yield the result in arcseconds, which is what APT wants. Delta(RA) = (Delta(AD)*sin(ORIENT - 45) + Delta(XD)*sin(ORIENT - 135))/(3600. * cos(dec)) will yield the result in decimal degrees of RA, which is what APT wants. 06 JUN to 20 JUN, ORIENT=232 Category=STAR Description=[B0-B2 III-I] Extended=NO*				

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	NUV ACQ/IMAGE (COS.ta.1540336)	(1) WDG-1	COS/NUV, ACQ/IMAGE, BOA	MIRRORB			Sequence 1-16 Non-Int in ACQ/PEAKXD TEST (03)	32 Secs (32 Secs) *[==>]*	***[1]***
	Comments: ACQ/IMAGE to determine center. Identical to exposure 01.001. See comments there.								
2	Baseline spectrum (COS.sp.1541218)	(1) WDG-1	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=5000; FP-POS=3; FLASH=NO; WAVECAL=NO; LIFETIME-POS=LP6		Sequence 1-16 Non-Int in ACQ/PEAKXD TEST (03)	25 Secs (25 Secs) *[==>]*	***[1]***
	Comments: Spectrum to determine location after ACQ/IMAGE centering. Need high SN for determining position of other spectra. exposure time 100s yields SN~7 per resel.								
3	ACQ/PEAKXD (COS.sa.1541209)	(1) WDG-1	COS/FUV, ACQ/PEAKXD, PSA	G160M 1577 A	LIFETIME-POS=LP6; NUM-POS=5; STEP-SIZE=0.8; CENTER=FLUX-WT-FLR		Sequence 1-16 Non-Int in ACQ/PEAKXD TEST (03)	2 Secs (2 Secs) *[==>]*	***[1]***
	Comments: ACQ/PEAKXD of a centered target on the same 5x0.8"" pattern. *This ACQ/PEAKXD goes through the same positions that exposures 03.002 through 03.006 did. The flux weighted centroid of those exposures should yield the same center as this PEAKXD. Here we do not use the default STEP-SIZE because we would like to replicate the mapping done in exposures 03.002 to 03.006. Using STEP-SIZE=0.9 there would have yielded too low a flux to inspect the detector.* *From COS.sa.1541209, we use 2 seconds.* *Requested Signal/Noise Ratio = 40.000 for Segment A and Segment B combined gives: Time = 0.1885 seconds* *Time Required for Requested SNR in Segment A only: 0.7998* *Time Required for Requested SNR in Segment B only: 0.2466*								
4	Verification spectrum (COS.sp.1541218)	(1) WDG-1	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=5000; FP-POS=3; FLASH=NO; WAVECAL=NO; LIFETIME-POS=LP6		Sequence 1-16 Non-Int in ACQ/PEAKXD TEST (03)	25 Secs (25 Secs) *[==>]*	***[1]***
	Comments: Spectrum to determine location after ACQ/PEAKXD.								
5	POSTARG + SPECTRUM1 (-1.6) (COS.sp.1541205)	(1) WDG-1	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=6000; FP-POS=3; FLASH=NO; LIFETIME-POS=LP6; WAVECAL=NO	POS TARG 0,-1.6	Sequence 1-16 Non-Int in ACQ/PEAKXD TEST (03)	92 Secs (92 Secs) *[==>]*	***[1]***
	Comments: POSTARG to simulate 5x0.8" (NUM-POS=5, STEP-SIZE=0.8") ACQ/PEAKXD. This is the y= -1.6 " position. Here we strive for SN~5.5 per resel. If the beam was not vignetted that would happen in a 25s exposure. But vignetting at y=-1.6" is 73%. 25s / (1-0.73)=92s. While the default STEP-SIZE for NUM-POS=5 is 0.9", that would not allow enough light through to inspect the detector, so we use STEP-SIZE=0.8"								

6	POSTARG + SPECTRUM3 (-0.8) (COS.sp.1541205)	(1) WDG-1	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=600; FP-POS=3; FLASH=NO; LIFETIME-POS=LP6; WAVECAL=NO	POS TARG 0,-0.8	Sequence 1-16 Non-Int in ACQ/PEAKXD TEST (03)	31 Secs (31 Secs) [==>]		[1]

Comments: POSTARG to simulate 5x0.8" (NUM-POS=5, STEP-SIZE=0.8") ACQ/PEAKXD. This is the y= -0.8 " position. Here we strive for SN~5.5 per resel. If the beam was not vignetted that would happen in a 25s exposure. But vignetting at y=-0.8" is 20%. 25s/(1-0.20)=31s. While the default STEP-SIZE for NUM-POS=5 is 0.9", that would not allow enough light through to inspect the detector, so we use STEP-SIZE=0.8"

7	POSTARG + SPECTRUM3 (+0.8) (COS.sp.1541205)	(1) WDG-1	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=600; FP-POS=3; FLASH=NO; LIFETIME-POS=LP6; WAVECAL=NO	POS TARG 0,0.8	Sequence 1-16 Non-Int in ACQ/PEAKXD TEST (03)	31 Secs (31 Secs) [==>]		[1]

Comments: POSTARG to simulate 5x0.8" (NUM-POS=5, STEP-SIZE=0.8") ACQ/PEAKXD. This is the y= +0.8 " position. Here we strive for SN~5.5 per resel. If the beam was not vignetted that would happen in a 25 s exposure. But vignetting at y=+0.8" is 20%. 25s/(1-0.20)=31s. While the default STEP-SIZE for NUM-POS=5 is 0.9", that would not allow enough light through to inspect the detector, so we use STEP-SIZE=0.8". This exposure is symmetric to 02.004

8	POSTARG + SPECTRUM1 (+1.6) (COS.sp.1541205)	(1) WDG-1	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=600; FP-POS=3; FLASH=NO; LIFETIME-POS=LP6; WAVECAL=NO	POS TARG 0,1.6	Sequence 1-16 Non-Int in ACQ/PEAKXD TEST (03)	92 Secs (92 Secs) [==>]		[1]

Comments: POSTARG to simulate 5x0.8" (NUM-POS=5, STEP-SIZE=0.8") ACQ/PEAKXD. This is the y= +1.6 " position. Here we strive for SN~5.5 per resel. If the beam was not vignetted that would happen in a 25 s exposure. But vignetting at y=+1.6" is 73%. 25s / (1-0.73)=92s. While the default STEP-SIZE for NUM-POS=5 is 0.9", that would not allow enough light through to inspect the detector, so we use STEP-SIZE=0.8". This exposure is symmetric to 02.003

9	ACQ/PEAKXD on offset -0.7 XD (COS.sa.1541209)	(31) WDG-1-OFFSET+0.7XD	COS/FUV, ACQ/PEAKXD, PSA	G160M 1577 A	LIFETIME-POS=LP6; CENTER=FLUX-WT-FLR; NUM-POS=5; STEP-SIZE=0.9		Sequence 1-16 Non-Int in ACQ/PEAKXD TEST (03)	2 Secs (2 Secs) [==>]		[1]

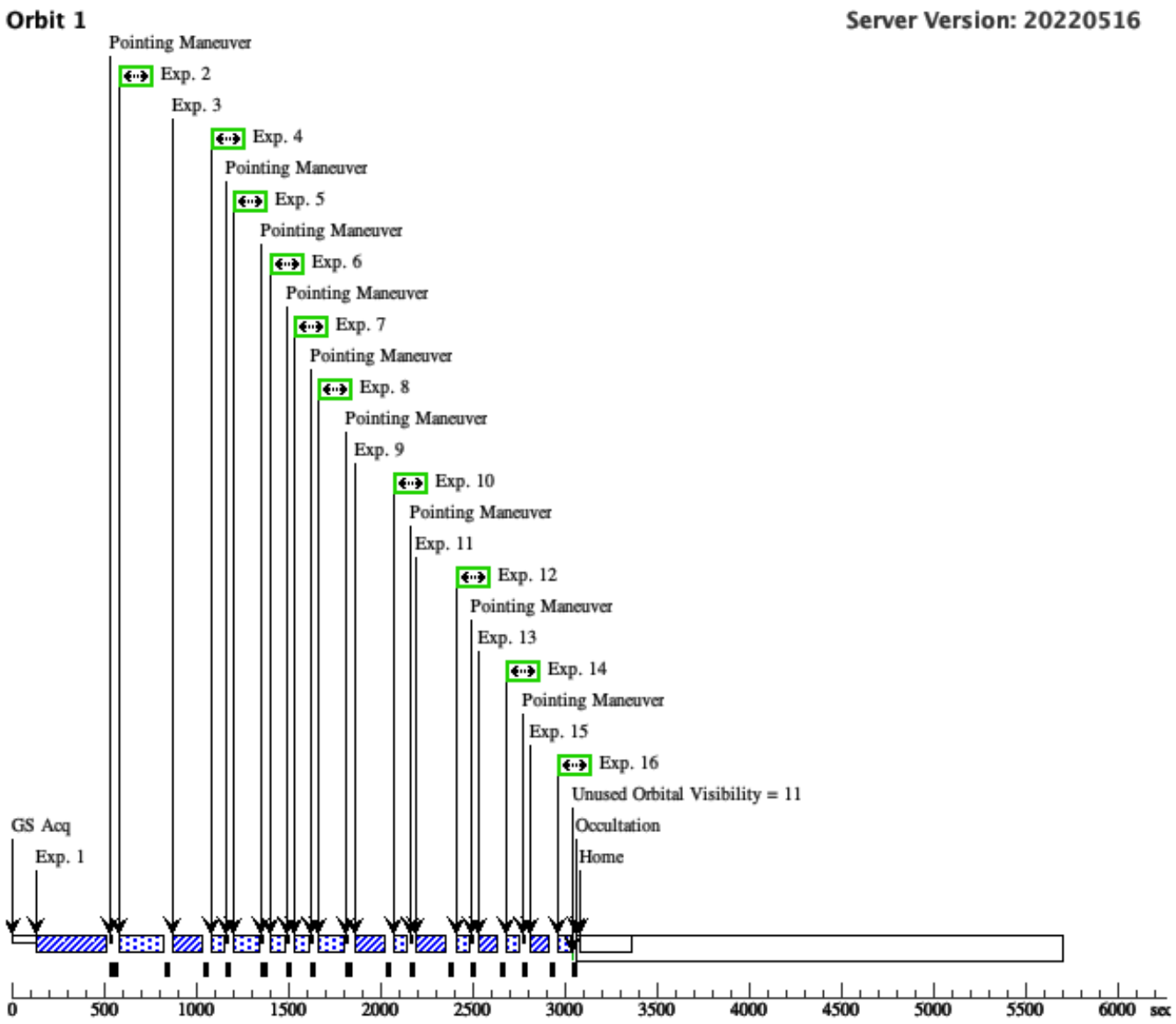
Comments: 5x0.9" ACQ/PEAKXD on an off centered target. The virtual target is defined as being at a +0.7" offset from the real target. So at the beginning of acquisition the real target is offset -0.7" from the center of the field of view.

10	Verification spectrum (COS.sp.1541218)	(31) WDG-1-OFFSET+0.7XD	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=500; FP-POS=3; FLASH=NO; WAVECAL=NO; LIFETIME-POS=LP6		Sequence 1-16 Non-Int in ACQ/PEAKXD TEST (03)	25 Secs (25 Secs) [==>]		[1]

Comments: Spectrum to determine location after ACQ/PEAKD. This exposure is identical to 03.008, except the telescope thinks that it's at target 31. But really it centered on the real target.

11	ACQ/PEAKXD on offset +0.7 AD (COS.sa.1541209)	(1) WDG-1	COS/FUV, ACQ/PEAKXD, PSA	G160M 1577 A	LIFETIME-POS=LP6; CENTER=FLUX-WT-FLR; NUM-POS=5; STEP-SIZE=0.9	Sequence 1-16 Non-Int in ACQ/PEAKXD TEST (03)	2 Secs (2 Secs) *[==>]*	***[1]***
	Comments: 5x0.9" ACQ/PEAKXD on an off centered target. From the previous acquisition, the telescope thinks it's at +0.7XD from the real target, but the real target is actually centered in the field of view. Now we ask the telescope to go back to the coordinates of the real target. That moves the telescope -0.7"XD. So now the real target is at +0.7"XD.							
12	Verification spectrum (COS.sp.1541218)	(1) WDG-1	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=500; FP-POS=3; FLASH=NO; WAVECAL=NO; LIFETIME-POS=LP6	Sequence 1-16 Non-Int in ACQ/PEAKXD TEST (03)	25 Secs (25 Secs) *[==>]*	***[1]***
	Comments: Spectrum to determine location after ACQ/PEAKXD. This exposure is identical to 03.008							
13	ACQ/PEAKXD on offset -0.3 AD (COS.sa.1541209)	(32) WDG-1-OFFSET+0.3XD	COS/FUV, ACQ/PEAKXD, PSA	G160M 1577 A	LIFETIME-POS=LP6; CENTER=FLUX-WT; NUM-POS=3; STEP-SIZE=1.3	Sequence 1-16 Non-Int in ACQ/PEAKXD TEST (03)	2 Secs (2 Secs) *[==>]*	***[1]***
	Comments: 3x1.3" ACQ/PEAKXD on an off centered target. From the previous acquisition, the telescope is centered on the real target and also thinks that it is centered on the real target. We now command the telescope to move to a virtual target at +0.3"XD from the real target. That places the real target at -0.3"XD in the filed of view.							
14	Verification spectrum (COS.sp.1541218)	(32) WDG-1-OFFSET+0.3XD	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=500; FP-POS=3; FLASH=NO; WAVECAL=NO; LIFETIME-POS=LP6	Sequence 1-16 Non-Int in ACQ/PEAKXD TEST (03)	25 Secs (25 Secs) *[==>]*	***[1]***
	Comments: Spectrum to determine location after ACQ/PEAKXD. This exposure is identical to 03.008, except the telescope thinks it's at target 32. It's actually centered on the real target.							
15	ACQ/PEAKXD on offset +0.3 AD (COS.sa.1541209)	(1) WDG-1	COS/FUV, ACQ/PEAKXD, PSA	G160M 1577 A	LIFETIME-POS=LP6; CENTER=FLUX-WT; NUM-POS=3; STEP-SIZE=1.3	Sequence 1-16 Non-Int in ACQ/PEAKXD TEST (03)	2 Secs (2 Secs) *[==>]*	***[1]***
	Comments: 3x1.3" ACQ/PEAXKD on an off centered target. From the previous acquisition, the telescope thinks it's at +0.3XD from the real target, but the real target is actually centered in the field of view. Now we ask the telescope to go back to the coordinates of the real target. That moves the telescope -0.3"XD. So now the real target is at +0.3"XD.							
16	Verification spectrum (COS.sp.1541218)	(1) WDG-1	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=500; FP-POS=3; FLASH=NO; WAVECAL=NO; LIFETIME-POS=LP6	Sequence 1-16 Non-Int in ACQ/PEAKXD TEST (03)	25 Secs (25 Secs) *[==>]*	***[1]***
	Comments: Spectrum to determine location after ACQ/PEAKXD. This exposure is identical to 03.008							

Orbit Structure



Visit

Proposal 16851, LP6 Defaults verification test (04), implementation Thu Jul 07 18:00:28 GMT 2022

Diagnostic Status: Warning

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: SCHED 90%; ORIENT 340D TO 341 D; BETWEEN 03-OCT-2022:00:00:00 AND 05-OCT-2022:00:00:00

Comments: This visit should run on the first days of cycle 30. It tests that the intended Cycle 30 values are now the defaults.
It does an ACQ/IMAGE, ACQ/PEAKXD, and ACQ/PEAKD, all from offset positions. There is time in this orbit for more tests if needed for other enabling issues.

The last exposure in this visit, exposure 04.014, will test split-wavecal, which is not yet enabled in APT as of version 2021.3. We tested the schedulability using split-wavecals using the test version of APT, and the non-interrupt sequence fits in an orbit with schedulability=90. We enter exposure 04.014 with WAVECAL=NO, FLASH=NO in version 2021.3 of APT but we will change this to WAVECAL=YES once split-wavecals are enabled in APT. We already use schedulability=90 in version 2021.3 to ensure that the visit will schedule correctly.

Diagnostics

(LP6 Defaults verification test (04)) Warning (Form): For the best data quality, it is generally required to use all four FP-POS positions when observing at a given COS cenwave. See the COS Instrument Handbook for exceptions that may apply to observations with G130M/1291 or G160M.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	WDG-1 Alt Name1: SK191	RA: 01 41 42.0729 (25.4253038d) Dec: -73 50 38.21 (-73.84395d) Equinox: J2000	Proper Motion RA: 2.6618321082955913E-4 sec of time/yr Proper Motion Dec: -0.0013640000361192506 arcsec/yr Epoch of Position: 2015.5	V=11.84	Reference Frame: ICRS
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. *Blue supergiant in periphery of SMC.* *Has previous COS spectrum.* *Decimal degree coordinates: 025.4252866734441 -73.8439408698315* *SIMBAD: http://simbad.u-strasbg.fr/simbad/sim-id?Ident=WDG+1&NbIdent=1&Radius=2&Radius.unit=arcmin&submit=submit+id* *B 11.86 [~] E ~* *V 11.84 [~] E ~* *G 11.8193 [0.0015] C 2018yCat.1345....0G* *J 11.904 [0.024] C 2003yCat.2246....0C* *H 11.957 [0.025] C 2003yCat.2246....0C* *K 11.906 [0.023] C 2003yCat.2246....0C* *Category=STAR* *Description=[B0-B2 III-I]* *Extended=NO*			
(41)	WDG-1-OFFSET+1AD+1XD-VISIT4	Offset from WDG-1 RA Offset: -0.001327 Degrees Dec Offset: -0.48369 Arcsec		V=11.84	Offset Position (WDG-1-OFFSET+1AD+1XD-VISIT4)
	Comments: From the geometry of COS, going from offsets in AD and XD to offsets in ra and dec: *Delta(dec) = Delta(AD)*cos(ORIENT - 45) + Delta(XD)*cos(ORIENT - 135) will yield the result in arcseconds, which is what APT wants.* *Delta(RA) = (Delta(AD)*sin(ORIENT - 45) + Delta(XD)*sin(ORIENT - 135))/(3600. * cos(dec)) will yield the result in decimal degrees of RA, which is what APT wants.* *03 OCT 2022 to 05 OCT 2022 ORIENT=340* *Category=STAR* *Description=[B0-B2 III-I]* *Extended=NO*			
(42)	WDG-1-OFFSET+1AD+1.8XD-VISIT4	Offset from WDG-1 RA Offset: -0.001664 Degrees Dec Offset: -1.20874 Arcsec		V=11.84	Offset Position (WDG-1-OFFSET+1AD+1.8XD-VISIT4)
	Comments: From the geometry of COS, going from offsets in AD and XD to offsets in ra and dec: *Delta(dec) = Delta(AD)*cos(ORIENT - 45) + Delta(XD)*cos(ORIENT - 135) will yield the result in arcseconds, which is what APT wants.* *Delta(RA) = (Delta(AD)*sin(ORIENT - 45) + Delta(XD)*sin(ORIENT - 135))/(3600. * cos(dec)) will yield the result in decimal degrees of RA, which is what APT wants.* *03 OCT 2022 to 05 OCT 2022 ORIENT=340* *Category=STAR* *Description=[B0-B2 III-I]* *Extended=NO*			
(43)	WDG-1-OFFSET+1.8AD+1.8XD-VISIT4	Offset from WDG-1 RA Offset: -0.002388 Degrees Dec Offset: -0.870641 Arcsec		V=11.84	Offset Position (WDG-1-OFFSET+1.8AD+1.8XD-VISIT4)
	Comments: From the geometry of COS, going from offsets in AD and XD to offsets in ra and dec: *Delta(dec) = Delta(AD)*cos(ORIENT - 45) + Delta(XD)*cos(ORIENT - 135) will yield the result in arcseconds, which is what APT wants.* *Delta(RA) = (Delta(AD)*sin(ORIENT - 45) + Delta(XD)*sin(ORIENT - 135))/(3600. * cos(dec)) will yield the result in decimal degrees of RA, which is what APT wants.* *03 OCT 2022 to 05 OCT 2022 ORIENT=340* *Category=STAR* *Description=[B0-B2 III-I]* *Extended=NO*			

Exposures

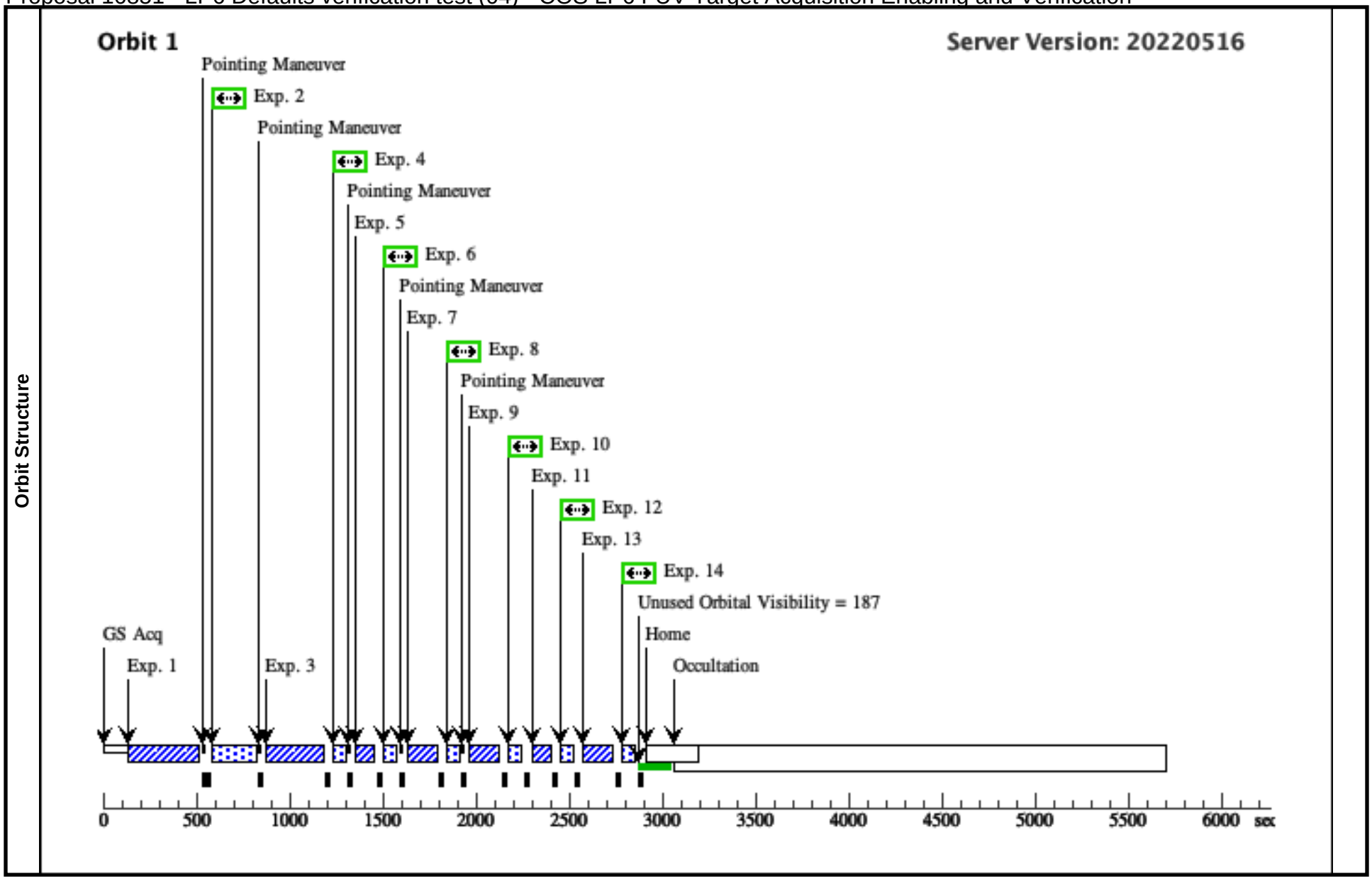
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	NUV ACQ/IMAGE (COS.ta.1540336)	(1) WDG-1	COS/NUV, ACQ/IMAGE, BOA	MIRRORB			Sequence 1-14 Non-Int in LP6 Defaults verification test (04)	32 Secs (32 Secs) *[==>]*	***[1]***
	Comments: ACQ/IMAGE to determine center. Used Castelli-Kurucz Models B0I 26000 normalized to B=11.86 because the exisiting spectrum does not cover the entire NUV range.								
2	Baseline spectrum (COS.sp.1541218)	(1) WDG-1	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=5000; FP-POS=3; LIFETIME-POS=DEF; FLASH=NO; WAVECAL=NO		Sequence 1-14 Non-Int in LP6 Defaults verification test (04)	25 Secs (25 Secs) *[==>]*	***[1]***
	Comments: Spectrum to determine location after ACQ/IMAGE centering. Need high SN for determining position of other spectra. exposure time 100s yields SN~7 per resel.								
3	3x3 ACQ/SEARCH - OFFSET +1AD +1XD (COS.sa.1540360)	(41) WDG-1-OFFSET+1AD+1XD-VISIT4	COS/FUV, ACQ/SEARCH, PSA	G160M 1577 A	LIFETIME-POS=DEF; SCAN-SIZE=3		Sequence 1-14 Non-Int in LP6 Defaults verification test (04)	2 Secs (2 Secs) *[==>]*	***[1]***
	Comments: 3x3 FUV ACQ/SEARCH starting at position +0.1 AD, +0.1 XD								
4	Verification spectrum (COS.sp.1540356)	(41) WDG-1-OFFSET+1AD+1XD-VISIT4	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=2300; FP-POS=3; LIFETIME-POS=DEF; FLASH=NO; WAVECAL=NO		Sequence 1-14 Non-Int in LP6 Defaults verification test (04)	25 Secs (25 Secs) *[==>]*	***[1]***
	Comments: Functionally the same as and 04.002, but after centering from an offset position.								
5	ACQ/PEAKXD from offset -0.8 in XD (COS.sa.1541209)	(42) WDG-1-OFFSET+1AD+1.8XD-VISIT4	COS/FUV, ACQ/PEAKXD, PSA	G160M 1577 A	LIFETIME-POS=DEF		Sequence 1-14 Non-Int in LP6 Defaults verification test (04)	2 Secs (2 Secs) *[==>]*	***[1]***
	Comments: Performing a PEAKXD from -0.8" offset in XD. From the previous acquisition, the telescope thinks it's at +1AD, +1XD, but really it's centered on the real target. To place the target at 0.0 AD, -0.8 XD, define a virtual target at +1.0AD, +1.8XD.								
6	Verification spectrum (COS.sp.1540356)	(42) WDG-1-OFFSET+1AD+1.8XD-VISIT4	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=2300; FP-POS=3; LIFETIME-POS=DEF; FLASH=NO; WAVECAL=NO		Sequence 1-14 Non-Int in LP6 Defaults verification test (04)	25 Secs (25 Secs) *[==>]*	***[1]***
	Comments: Functionally the same as and 04.002, but after centering from an offset position.								
7	ACQ/PEAKD from offset -0.8 in AD (COS.sa.1541209)	(43) WDG-1-OFFSET+1.8AD+1.8XD-VISIT4	COS/FUV, ACQ/PEAKD, PSA	G160M 1577 A	LIFETIME-POS=DEF; STEP-SIZE=0.9		Sequence 1-14 Non-Int in LP6 Defaults verification test (04)	2 Secs (2 Secs) *[==>]*	***[1]***
	Comments: Performing a PEAKD from -0.8" offset in AD. From the previous acquisition, the telescope thinks it's at +1AD, +1.8XD, but really it's centered on the real target. To place the target at -0.8 AD, 0.0 XD, define a virtual target at +1.8AD, +1.8XD.								

8	Verification spectrum (COS.sp.1540356)	(43) WDG-1-OFFSET+1.8AD+1.8XD-VISIT4	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=230; FP-POS=3; LIFETIME-POS=DEF; FLASH=NO; WAVECAL=NO	Sequence 1-14 Non-Int in LP6 Defaults verification test (04)	25 Secs (25 Secs) *[==>]*	***[1]***
Comments: Functionally the same as and 04.002, but after centering from an offset position.								
9	2x2 ACQ/SEARCH - offset -0.8AD, -0.8XD (COS.sa.1540360)	(41) WDG-1-OFFSET+1AD+1XD-VISIT4	COS/FUV, ACQ/SEARCH, PSA	G160M 1577 A	CENTER=DEF; LIFETIME-POS=DEF; SCAN-SIZE=2	Sequence 1-14 Non-Int in LP6 Defaults verification test (04)	2 Secs (2 Secs) *[==>]*	***[1]***
Comments: Testing 2x2 acq/search with defaults. The telescope thinks it was at +1.8AD, +1.8XD, but really it was centered. Now we command it to go to +1.0AD, +1.0XD, which means that the real target will be offset to -0.8AD, -0.8XD.								
10	Verification spectrum (COS.sp.1540356)	(41) WDG-1-OFFSET+1AD+1XD-VISIT4	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=230; FP-POS=3; LIFETIME-POS=DEF; FLASH=NO; WAVECAL=NO	Sequence 1-14 Non-Int in LP6 Defaults verification test (04)	25 Secs (25 Secs) *[==>]*	***[1]***
Comments: Functionally the same as and 04.002, but after centering from an offset position.								
11	ACQ/PEAKXD after ACQ/SEARCH centering (COS.sa.1541209)	(41) WDG-1-OFFSET+1AD+1XD-VISIT4	COS/FUV, ACQ/PEAKXD, PSA	G160M 1577 A	LIFETIME-POS=DEF; STEP-SIZE=1.3; CENTER=DEF; NUM-POS=3	Sequence 1-14 Non-Int in LP6 Defaults verification test (04)	2 Secs (2 Secs) *[==>]*	***[1]***
Comments: Performing a PEAKXD from -0.8" offset in XD. From the previous acquisition, the telescope thinks it's at +1AD, +1XD, but really it's centered on the real target. To place the target at 0.0 AD, -0.8 XD, define a virtual target at +1.0AD, +1.8XD.								
12	Verification spectrum (COS.sp.1540356)	(41) WDG-1-OFFSET+1AD+1XD-VISIT4	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=230; FP-POS=3; LIFETIME-POS=DEF; FLASH=NO; WAVECAL=NO	Sequence 1-14 Non-Int in LP6 Defaults verification test (04)	25 Secs (25 Secs) *[==>]*	***[1]***
Comments: Functionally the same as and 04.002, but after centering from an offset position.								
13	ACQ/PEAKD after ACQ/SEARCH centering (COS.sa.1541209)	(41) WDG-1-OFFSET+1AD+1XD-VISIT4	COS/FUV, ACQ/PEAKD, PSA	G160M 1577 A	LIFETIME-POS=DEF; CENTER=DEF; NUM-POS=5; STEP-SIZE=0.9	Sequence 1-14 Non-Int in LP6 Defaults verification test (04)	2 Secs (2 Secs) *[==>]*	***[1]***
Comments: Performing a PEAKD from -0.8" offset in AD. From the previous acquisition, the telescope thinks it's at +1AD, +1.8XD, but really it's centered on the real target. To place the target at -0.8 AD, 0.0 XD, define a virtual target at +1.8AD, +1.8XD.								

	14	Verification spectrum (COS.sp.1540356)	(41) WDG-1-OFFSET+1AD+1XD-VISIT 4	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=230; FP-POS=3; LIFETIME-POS=DEF; FLASH=NO; WAVECAL=NO	Sequence 1-14 Non-Int in LP6 Defaults verification test (04)	25 Secs (25 Secs) *[==>]*	***[1]***

Comments: Functionally the same as and 04.002, but after centering from an offset position, and with split-wavecal

This exposure tests split-wavecal, which is not yet enabled in APT as of version 2021.3. We tested the schedulability using split-wavecals using the test version of APT, and the non-interrupt sequence fits in an orbit with schedulability=90. We enter exposure 04.014 with WAVECAL=NO, FLASH=NO in version 2021.3 of APT but we will change this to WAVECAL=YES once split-wavecals are enabled in APT. We already use schedulability=90 in version 2021.3 to ensure that the visit will schedule correctly.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Server Version: 20220516
Pointing Maneuver
Exp. 2
Pointing Maneuver
Exp. 4
Pointing Maneuver
Exp. 5
Exp. 6
Pointing Maneuver
Exp. 7
Exp. 8
Pointing Maneuver
Exp. 9
Exp. 10
Exp. 11
Exp. 12
Exp. 13
Exp. 14
Unused Orbital Visibility = 187
Home
Occultation
GS Acq
Exp. 1
Exp. 3
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
sec