



15452 - COS FUV Focus Sweep for G160M/1533

Cycle: 25, Proposal Category: CAL/COS

(Availability Mode: RESTRICTED)

INVESTIGATORS

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VISITS

<i>Visit</i>	<i>Targets used in Visit</i>	<i>Configurations used in Visit</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
01	(1) V-KL-UMA NONE	COS COS/FUV COS/NUV	4	06-Mar-2018 14:12:09.0	yes

4 Total Orbits Used

ABSTRACT

This program is designed to determine the best focus for the new COS FUV G160M/1533 cenwave setting at Lifetime Position 4 (LP4). This setting extends the coverage at the short wavelength end of G160M by 44A to overlap with the longest wavelengths covered by Segment A of cenwave 1222. This new cenwave will allow a broad range of wavelengths to be covered by just two M mode settings without placing Lya on the detector, avoiding a key contributor to gain sag.

Proposal 15452 (STScI Edit Number: 1, Created: Tuesday, March 6, 2018 2:12:11 PM EST) - Overview

The focus sweeps will scan at 200 focus step increments from -1000 to +1000 from the estimated focus at 1533 (extrapolated from the current G160M cenwave settings), a strategy designed to determine the best focus position to <1% accuracy. This strategy is based on previous focus sweep programs (IDs 14874 and 12505), which obtained sweeps for G160M/1600 at LP4 and the G130M/1222 cenwave when first implemented, respectively. Both these earlier programs executed successfully.

OBSERVING DESCRIPTION

This program performs a focus sweep at LP4 with newly proposed G160M/1533 cenwave. The target is Feige48.

The program is designed as follows:

1. Perform an ACQ/IMAGE to acquire target Feige48.
2. Initialization exposure to set up the correct instrument mode for the focus sweep, G160M/1577 (the closest instrument mode to G160M/1533).
3. ALIGN/OSM exposure:
 - i. Move the focus to -1000 steps from the G160M/1533 focus value ($f=-731$, determined from extrapolation from all G160M focus values as a function of cenwave). The FOCUS value supplied here is *relative* to the absolute focus value of G160M/1577 ($f=-108$). E.g. $\text{FOCUS} = -731 - 1000 - (-108) = -1623$)
 - ii. Set OSM1ROT=15, which is the OSM rotation position offset between c1533 and c1577 ($11218-11203=15$). This prevents it from defaulting to OSM1ROT=0 when we change the subsequent focus values.
4. Take a spectrum with S/N~30 at 1550A.
5. Repeat steps 3 and 4, sweeping over focus values of -1000 to +1000 relative to G160M/1533, in increments of 200 steps (apart from $-400 < f < +400$ when the increments are 100 in size). This equates to $\text{FOCUS}=-1623$ to $+377$.
6. Re-set the focus offset and OSM1ROT to 0 (this moves the focus back to the $f=-108$, the absolute position of G160M/1577).

----Notes on focus ranges----

The focus sweep ranging between +/-1000 relative to the estimated G160M/1533 focus value is designed to cover a broad-enough region determine the focus-curve minimum.

The *absolute* focus positions covered by the sweep were verified: at LP4, G160M/1577 has a focus of -108, as determined from the FSW table. Extrapolating all G160M cenwave focus values down to 1533A gives an estimated focus of -731 for G160M/1533. Sweeping from -1000 to +1000 around these central focus positions is within the allowed range.

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----Notes on the above program design compared to previous Focus Sweeps----

- Previous focus sweeps at new cenwaves that don't exist in APT (Program 12501 and 12505) were executed using the TEST row, where each time the TEST row was patched using the absolute value of the focus and rotations (STEP, RES1, RES2, FOCUS, CENTWAVE). This TEST row was then 'called' using the SQL comment qesilogsheet.minwave in the external exposures. Each TEST row patch was then followed by an FP-POS=ALL exposure. By doing this, TRANS would pad enough time to plan for the OSM move between FP-POS, thus giving enough time for the focus moves. However, in our program we are only taking data at a single FP-POS. This is constrained by the analysis. As a result, we do not have enough time for the focus to move as TRANS only sees the 1577 FP-POS=3 exposures. As such, it does not plan for the right amount of time needed for the focus moves between the different exposures.

- RES1 and RES2 are the resolver encoder positions against which the readback values are checked by the FSW. It should be noted that in the design presented here, there is no need to define the RES1 and RES2 values for each ALIGN/OSM because we are moving relative to the 1577 settings, and the readback resolver positions will not be checked against RES1 and RES2. Once executed, we will check the readback values obtained from the telemetry to check against the RES1 and RES2 values that we have supplied to Goddard for this new cenwave.

----SPECIAL REQUESTS:-----

1. Please turn off calibration for the COS/FUV exposures.
2. Please disassociate all exposures.

SQL is used to meet the above requests. In case 1 qexposure.control_id is modified. In case 2 qassociation records are deleted. Please see G. Chapman/M. Reinhart.

Proposal 15452 - G160M 1533 focus (01) - COS FUV Focus Sweep for G160M/1533

Visit	<p>Proposal 15452, G160M_1533_focus (01), scheduling Tue Mar 06 19:12:11 GMT 2018</p> <p>Diagnostic Status: Warning</p> <p>Scientific Instruments: COS, COS/FUV, COS/NUV</p> <p>Special Requirements: SCHED 80%; BEFORE 18-MAR-2018:00:00:00</p>																													
	Diagnostics	<p>(G160M_1533_focus (01)) Warning (Form): For the best data quality, it is strongly recommended that the maximum number of allowed FP-POS positions is used when observing at a given COS CENWAVE setting. See full description for details.</p>																												
Fixed Targets		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 5%;">#</th> <th style="width: 20%;">Name</th> <th style="width: 25%;">Target Coordinates</th> <th style="width: 20%;">Targ. Coord. Corrections</th> <th style="width: 10%;">Fluxes</th> <th style="width: 20%;">Miscellaneous</th> </tr> </thead> <tbody> <tr> <td>(1)</td> <td>V-KL-UMA</td> <td>RA: 11 47 14.4900 (176.8103750d)</td> <td>Proper Motion RA: 0.00333 sec of time/yr</td> <td>V=13.28</td> <td>Reference Frame: ICRS</td> </tr> <tr> <td></td> <td>Alt Name1: FEIGE48</td> <td>Dec: +61 15 31.80 (61.25883d)</td> <td>Proper Motion Dec: 0</td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td>Equinox: J2000</td> <td>Epoch of Position: 2000</td> <td></td> <td></td> </tr> </tbody> </table>	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous	(1)	V-KL-UMA	RA: 11 47 14.4900 (176.8103750d)	Proper Motion RA: 0.00333 sec of time/yr	V=13.28	Reference Frame: ICRS		Alt Name1: FEIGE48	Dec: +61 15 31.80 (61.25883d)	Proper Motion Dec: 0					Equinox: J2000	Epoch of Position: 2000			<p><i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i></p> <p>Category=EXT-STAR</p> <p>Description=[SDB]</p> <p>Extended=NO</p>			
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Proposal 15452 - G160M 1533 focus (01) - COS FUV Focus Sweep for G160M/1533

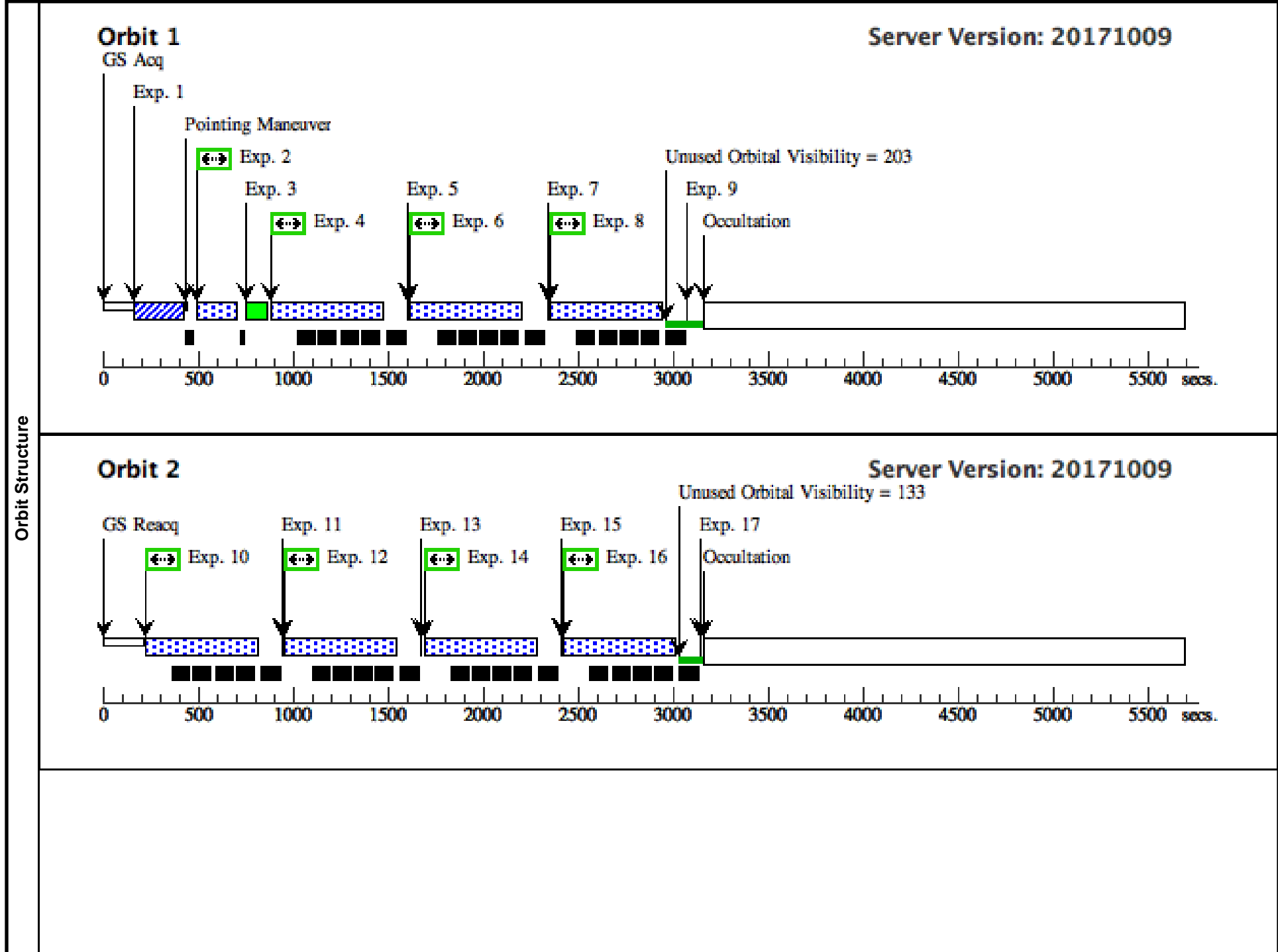
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ACQ/IMAG E (COS.ta.607 556)	(1) V-KL-UMA	COS/NUV, ACQ/IMAGE, BOA	MIRRORA				16 Secs (16 Secs) [==>]	[1]
<i>Comments: S/N=60 Exposure time and ETC calculation taken from LENA2 (Program 13635)</i>									
2	Initialize G1 60M/1577 at LP4 (COS.sp.608 219)	(1) V-KL-UMA	COS/FUV, TIME-TAG, PSA	G160M 1577 A	FP-POS=3; BUFFER-TIME=10 00; WAVECAL=NO; FLASH=NO; LIFETIME-POS=L P4			0.1 Secs (0.1 Secs) [==>]	[1]
<i>Comments: Initializing G160M/1577 at nominal aperture and focus position.</i>									
3	Move to -10 00 relative t o 1533 (= -1 623 relative to 1577 focu s)	NONE	COS, ALIGN/OSM		FOCUS=-1623; OSMIROT=15			0 Secs (0 Secs) [==>]	[1]
4	1533_f-1000 (COS.sp.104 7334)	(1) V-KL-UMA	COS/FUV, TIME-TAG, PSA	G160M 1577 A	FP-POS=3; BUFFER-TIME=11 1			545 Secs (545 Secs) [==>]	[1]
<i>Comments: S/N=30 expected at wavelength 1550 A</i>									
5	Move to -80 0 relative to 1533 (= -142 3 relative to 1577 focus)	NONE	COS, ALIGN/OSM		FOCUS=-1423; OSMIROT=15			0 Secs (0 Secs) [==>]	[1]
6	1533_f-800 (COS.sp.104 7334)	(1) V-KL-UMA	COS/FUV, TIME-TAG, PSA	G160M 1577 A	FP-POS=3; BUFFER-TIME=11 1			545 Secs (545 Secs) [==>]	[1]
<i>Comments: S/N=30 expected at wavelength 1550 A</i>									
7	Move to -60 0 relative to 1533 (= -122 3 relative to 1577 focus)	NONE	COS, ALIGN/OSM		FOCUS=-1223; OSMIROT=15			0 Secs (0 Secs) [==>]	[1]
8	1533_f-600 (COS.sp.104 7334)	(1) V-KL-UMA	COS/FUV, TIME-TAG, PSA	G160M 1577 A	FP-POS=3; BUFFER-TIME=11 1			545 Secs (545 Secs) [==>]	[1]
<i>Comments: S/N=30 expected at wavelength 1550 A</i>									
9	Move to -40 0 relative to 1533 (= -102 3 relative to 1577 focus)	NONE	COS, ALIGN/OSM		FOCUS=-1023; OSMIROT=15			0 Secs (0 Secs) [==>]	[1]
10	1533_f-400 (COS.sp.104 7334)	(1) V-KL-UMA	COS/FUV, TIME-TAG, PSA	G160M 1577 A	FP-POS=3; BUFFER-TIME=11 1			545 Secs (545 Secs) [==>]	[2]
<i>Comments: S/N=30 expected at wavelength 1550 A</i>									

Proposal 15452 - G160M 1533 focus (01) - COS FUV Focus Sweep for G160M/1533

11	Move to -30 0 relative to 1533 (= -923 relative to 1 577 focus)	NONE	COS, ALIGN/OSM		FOCUS=-923; OSMIROT=15	0 Secs (0 Secs) [==>]	[2]
12	1533_f-300 (COS.sp.104 7334)	(1) V-KL-UMA	COS/FUV, TIME-TAG, PSA	G160M 1577 A	FP-POS=3; BUFFER-TIME=11 1	545 Secs (545 Secs) [==>]	[2]
<i>Comments: S/N=30 expected at wavelength 1550 A</i>							
13	Move to -20 0 relative to 1533 (= -823 relative to 1 577 focus)	NONE	COS, ALIGN/OSM		FOCUS=-823; OSMIROT=15	0 Secs (0 Secs) [==>]	[2]
14	1533_f-200 (COS.sp.104 7334)	(1) V-KL-UMA	COS/FUV, TIME-TAG, PSA	G160M 1577 A	FP-POS=3; BUFFER-TIME=11 1	545 Secs (545 Secs) [==>]	[2]
<i>Comments: S/N=30 expected at wavelength 1550 A</i>							
15	Move to -10 0 relative to 1533 (= -723 relative to 1 577 focus)	NONE	COS, ALIGN/OSM		FOCUS=-723; OSMIROT=15	0 Secs (0 Secs) [==>]	[2]
16	1533_f-100 (COS.sp.104 7334)	(1) V-KL-UMA	COS/FUV, TIME-TAG, PSA	G160M 1577 A	FP-POS=3; BUFFER-TIME=11 1	545 Secs (545 Secs) [==>]	[2]
<i>Comments: S/N=30 expected at wavelength 1550 A</i>							
17	Move to 0 re lative to 153 3 (= -623 rel ative to 157 7 focus)	NONE	COS, ALIGN/OSM		FOCUS=-623; OSMIROT=15	0 Secs (0 Secs) [==>]	[2]
18	1533_f-0 (COS.sp.104 7334)	(1) V-KL-UMA	COS/FUV, TIME-TAG, PSA	G160M 1577 A	FP-POS=3; BUFFER-TIME=11 1	545 Secs (545 Secs) [==>]	[3]
<i>Comments: S/N=30 expected at wavelength 1550 A</i>							
19	Move to +10 0 relative to 1533 (= -523 relative to 1 577 focus)	NONE	COS, ALIGN/OSM		FOCUS=-523; OSMIROT=15	0 Secs (0 Secs) [==>]	[3]
20	1533_f+100 (COS.sp.104 7334)	(1) V-KL-UMA	COS/FUV, TIME-TAG, PSA	G160M 1577 A	FP-POS=3; BUFFER-TIME=11 1	545 Secs (545 Secs) [==>]	[3]
<i>Comments: S/N=30 expected at wavelength 1550 A</i>							
21	Move to +20 0 relative to 1533 (= -423 relative to 1 577 focus)	NONE	COS, ALIGN/OSM		FOCUS=-423; OSMIROT=15	0 Secs (0 Secs) [==>]	[3]
22	1533_f+200 (COS.sp.104 7334)	(1) V-KL-UMA	COS/FUV, TIME-TAG, PSA	G160M 1577 A	FP-POS=3; BUFFER-TIME=11 1	545 Secs (545 Secs) [==>]	[3]
<i>Comments: S/N=30 expected at wavelength 1550 A</i>							

Proposal 15452 - G160M 1533 focus (01) - COS FUV Focus Sweep for G160M/1533

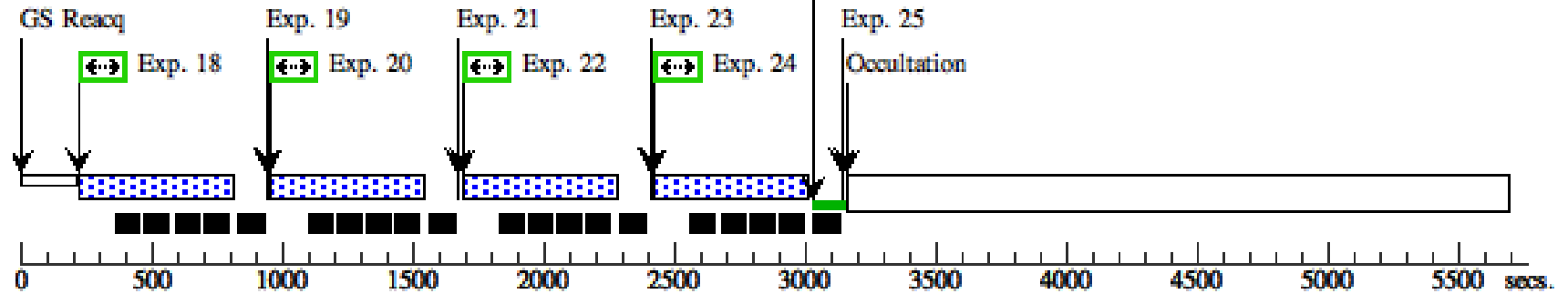
23	Move to +30 0 relative to 1533 (= -323 relative to 1 577 focus)	NONE	COS, ALIGN/OSM			FOCUS=-323; OSMIROT=15	0 Secs (0 Secs) [==>]	[3]
24	1533_f+300 (COS.sp.104 7334)	(1) V-KL-UMA	COS/FUV, TIME-TAG, PSA	G160M 1577 A		FP-POS=3; BUFFER-TIME=11 1	545 Secs (545 Secs) [==>]	[3]
<i>Comments: S/N=30 expected at wavelength 1550 A</i>								
25	Move to +40 0 relative to 1533 (= -223 relative to 1 577 focus)	NONE	COS, ALIGN/OSM			FOCUS=-223; OSMIROT=15	0 Secs (0 Secs) [==>]	[3]
26	1533_f+400 (COS.sp.104 7334)	(1) V-KL-UMA	COS/FUV, TIME-TAG, PSA	G160M 1577 A		FP-POS=3; BUFFER-TIME=11 1	545 Secs (545 Secs) [==>]	[4]
<i>Comments: S/N=30 expected at wavelength 1550 A</i>								
27	Move to +60 0 relative to 1533 (= -23 r relative to 15 77 focus)	NONE	COS, ALIGN/OSM			FOCUS=-23; OSMIROT=15	0 Secs (0 Secs) [==>]	[4]
28	1533_f+600 (COS.sp.104 7334)	(1) V-KL-UMA	COS/FUV, TIME-TAG, PSA	G160M 1577 A		FP-POS=3; BUFFER-TIME=11 1	545 Secs (545 Secs) [==>]	[4]
<i>Comments: S/N=30 expected at wavelength 1550 A</i>								
29	Move to +80 0 relative to 1533 (= +17 7 relative to 1577 focus)	NONE	COS, ALIGN/OSM			FOCUS=+177; OSMIROT=15	0 Secs (0 Secs) [==>]	[4]
30	1533_f+800 (COS.sp.104 7334)	(1) V-KL-UMA	COS/FUV, TIME-TAG, PSA	G160M 1577 A		FP-POS=3; BUFFER-TIME=11 1	545 Secs (545 Secs) [==>]	[4]
<i>Comments: S/N=30 expected at wavelength 1550 A</i>								
31	Move to +10 00 relative t o 1533 (= +3 77 relative t o 1577 focus)	NONE	COS, ALIGN/OSM			FOCUS=+377; OSMIROT=15	0 Secs (0 Secs) [==>]	[4]
32	1533_f+100 0 (COS.sp.104 7334)	(1) V-KL-UMA	COS/FUV, TIME-TAG, PSA	G160M 1577 A		FP-POS=3; BUFFER-TIME=11 1	545 Secs (545 Secs) [==>]	[4]
<i>Comments: S/N=30 expected at wavelength 1550 A</i>								
33	ALIGN/OS M back to 0 (relative to 1 577)	NONE	COS, ALIGN/OSM			FOCUS=0; OSMIROT=0.0	0 Secs (0 Secs) [==>]	[4]
<i>Comments: This command restores the focus and grating rotation to the value for G160M/1577 (-108 in absolute units)</i>								



Orbit 3

Server Version: 20171009

Unused Orbital Visibility = 133



Orbit 4

Server Version: 20171009

Unused Orbital Visibility = 127

