18179 - COS LP7 Initial Gain Map

Cycle: 33, Proposal Category: CAL/COS

(Availability Mode: RESTRICTED)

INVESTIGATORS

Name	*Institution*
Dr. Christian Johnson (PI) (Contact)	**Space Telescope Science Institute**
Dr. David J. Sahnow (CoI) (CoPI) (Contact)	Space Telescope Science Institute
Dr. Ravi Sankrit (CoI)	Space Telescope Science Institute
Dr. Anna Payne (CoI)	Space Telescope Science Institute
Dr. Svea S Hernandez (CoI) (ESA Member)	Space Telescope Science Institute - ESA - JWST

VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) WD0308-565 DARK NONE	COS COS/FUV COS/NUV S/C	1	22-Sep-2025 07:00:15.0	yes
02	(1) WD0308-565 NONE	COS COS/FUV COS/NUV	1	22-Sep-2025 07:00:16.0	yes

2 Total Orbits Used

ABSTRACT

This program builds on the techniques used in PID 16472, which obtained gain maps near the top of the detector using an external target. The program is split into two visits, with the first taking G160M/1623 observations at three offset locations, and the second taking G130M/1222

observations at two different offset locations. The combination of these two visits will provide sufficient counts covering the LP7 region to obtain an initial gain map of the region.

OBSERVING DESCRIPTION

This program borrows heavily from PID 16472, which used an external target to measure gain at various cross-dispersion positions on the FUV detector. NOTE for the PC: these data do not need to be calibrated and should be setup to bypass calibration. The data also do not need to be associated. This program uses special commanding for setting the HV and moving the aperture block. While a formal PIT meeting was not held, the PI presented the program to the LP7/10 calibration group on September 8, 2025, which acted as an informal PIT meeting. All of the special commands used in this program have been used in the past, and the aperture block positions and HV settings are within the range used for previous programs.

The general setup of the program is:
Visit 01
-acquire the target (WD 0308-565) with an NUV ACQ/IMAGE
-take a short "throwaway" G160M/1623 exposure at LP6 to initialize the HV, focus, aperture block, etc.
-adjust the HV to 163/163 (down from 178/175)
-move the aperture block to the LP7 position
-take two G160M/1623 exposures; one each at FP-POS = 2 & 4
-move the aperture block to a higher offset position
-take two G160M/1623 exposures; one each at FP-POS = 2 & 4
-move the aperture block to an even higher offset position
-take two G160M/1623 exposures; one each at FP-POS = 2 & 4
-return the aperture block to its initial (LP6) position

Visit 02
-a double NUV ACQ/IMAGE of WD 0308-565 (to mitigate acquisition failures...a double ACQ does not fit in Visit 01)
-take two standard G130M/1222 observatiosn at the nominal LP7 position using FP-POS = 1 & 3
-move the aperutre block to a higher offset position
-take two standard G130M/1222 observatiosn at the nominal LP7 position using FP-POS = 1 & 3

return the aperture block to its nominal (LP7) position

Visit

Proposal 18179, G160M Observations (01) Mon Sep 22 11:00:16 GMT 2025

Diagnostic Status: Warning

Scientific Instruments: S/C, COS, COS/FUV, COS/NUV

Special Requirements: BEFORE 12-DEC-2025:00:00:00

Comments: Set the observations to execute before Dec. 12. If it cannot execute before then a different target may need to be selected.

Diagnostics

(G160M Observations (01)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE
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Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	WD0308-565	RA: 03 09 47.9178 (47.4496575d)	Proper Motion RA: 149.261 mas/yr	V=14.14	Reference Frame: ICRS
	Alt Name1: WG-7	Dec: -56 23 49.41 (-56.39706d)	Proper Motion Dec: 66.806 mas/yr		
		Equinox: J2000	Parallax: 0.0201813"		
			Epoch of Position: 2000		

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

SIMBAD listed proper motion for this target. When retrieving targets with PM from SIMBAD, APT requests the coordinates be calculated with an epoch of the year 2000. Do not modify this epoch. Always review coordinates using the Target Confirmation tool, which graphically displays the PM.
Category=STAR
Description=[DB]
Extended=NO

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	WD0308 ACQ/IMAGE (COS.ta.2070078)	(1) WD0308-565	COS/NUV, ACQ/IMAGE, BOA	MIRRORA				20 Secs (20 Secs) *[==>]*	***[1]***
Comments: Initial target acquisition.									
2	G160M Initialization Exposure (123456789)	(1) WD0308-565	COS/FUV, TIME-TAG, PSA	G160M 1623 A	LIFETIME-POS=LP6; FLASH=NO; WAVECAL=NO; FP-POS=2; BUFFER-TIME=80			10 Secs (10 Secs) *[==>]*	***[1]***
Comments: A quick LP6 exposure to initialize the spectrograph for G160M/1623 observations. This also raises the HV to the maximum values for both segments. HV will need to be lowered in a separate exposure.									
3	Adjust HV to LP7 values (163/163)	DARK	S/C, DATA, NONE			SAA CONTOUR 31; SPEC COM INSTR ELHVADJPROP; QASISTATES COS FUV HVNOM HVNOM; QESIPARM ENDCTSA 163; QESIPARM ENDCTSB 163; QESIPARM SEGMENT AB		39 Secs (39 Secs) *[==>]*	***[1]***
Comments: Adjusting the HV values from the LP6 to LP7 values. *Since the HV is not increasing, exposure time = 39 seconds.*									
4	Move Aperture to LP7 Position	NONE	COS, ALIGN/APER		XAPER=-54; YAPER=0			0 Secs (0 Secs) *[==>]*	***[1]***
Comments: Need to move the LP6 G160M/1623 spectrum up by ~ 30 pixels. *-1.806 steps/pixel * 30 pixels = -54 steps*									
5	G160M/1623; FP-POS = 2; Nominal LP7 position (COS.sp.2070080)	(1) WD0308-565	COS/FUV, TIME-TAG, PSA	G160M 1623 A	BUFFER-TIME=506; FLASH=NO; WAVECAL=NO; LIFETIME-POS=LP6; FP-POS=2	POS TARG null,2.58		200 Secs (200 Secs) *[==>]*	***[1]***
6	G160M/1623; FP-POS = 4; Nominal LP7 position (COS.sp.2070080)	(1) WD0308-565	COS/FUV, TIME-TAG, PSA	G160M 1623 A	BUFFER-TIME=506; FLASH=NO; WAVECAL=NO; LIFETIME-POS=LP6; FP-POS=4	POS TARG null,2.58		200 Secs (200 Secs) *[==>]*	***[1]***

7	Move Aperture to LP7 Position + 0.76 arc sec	NONE	COS, ALIGN/APER		XAPER=-70; YAPER=0	QESIPARM XSTEPS -16	0 Secs (0 Secs) *[==>]*	***[1]***

Comments: Aperture was previously moved +30 pixels in the cross dispersion direction. Now need to move the aperture up an additional 0.76".

*-21 steps/" * 0.76" = -16 steps*

However, XAPER needs to move -54 + -16 steps = -70 steps (i.e., 70 steps from the initial LP6 position)
XSTEPS = -16 in Qesiparms.

8	G160M/1623; FP-POS = 2; LP7 + 0.76 arc sec (COS.sp.2070080)	(1) WD0308-565	COS/FUV, TIME-TAG, PSA	G160M 1623 A	BUFFER-TIME=506; FLASH=NO; WAVECAL=NO; LIFETIME-POS=LP6; FP-POS=2	POS TARG null,3.34	200 Secs (200 Secs) *[==>]*	***[1]***
9	G160M/1623; FP-POS = 4; LP7 + 0.76 arc sec (COS.sp.2070080)	(1) WD0308-565	COS/FUV, TIME-TAG, PSA	G160M 1623 A	BUFFER-TIME=506; FLASH=NO; WAVECAL=NO; LIFETIME-POS=LP6; FP-POS=4	POS TARG null,3.34	200 Secs (200 Secs) *[==>]*	***[1]***
10	Move Aperture to LP7 Position + 1.52 arc sec	NONE	COS, ALIGN/APER		XAPER=-86; YAPER=0	QESIPARM XSTEPS -16	0 Secs (0 Secs) *[==>]*	***[1]***

Comments: Moving the aperture an additional -16 steps to be +1.52" above the nominal LP7 position.

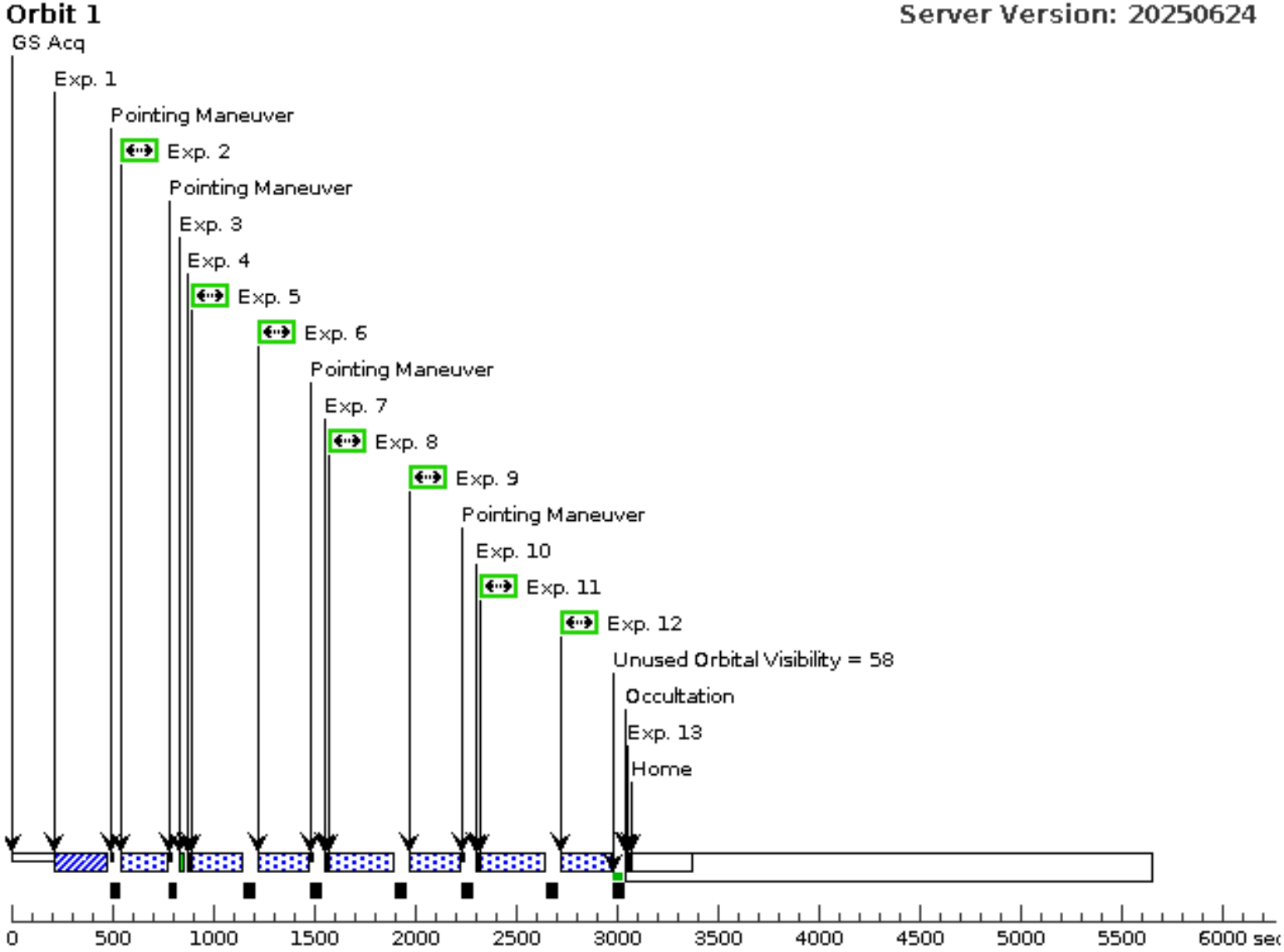
Moving from +0.76" to +1.52" requires -16 steps.

However, XAPER needs to move -54 (LP6 --> LP7) + -16 (LP7 --> LP7 + 0.76") + -16 (LP7 + 0.76" --> LP7 + 1.52") steps = -86 steps (i.e., 86 steps from the initial LP6 position)
XSTEPS = -16 in Qesiparms.

11	G160M/1623; FP-POS = 2; LP7 + 1.52 arc sec (COS.sp.2070080)	(1) WD0308-565	COS/FUV, TIME-TAG, PSA	G160M 1623 A	BUFFER-TIME=506; FLASH=NO; WAVECAL=NO; LIFETIME-POS=LP6; FP-POS=2	POS TARG null,4.10	200 Secs (200 Secs) *[==>]*	***[1]***
12	G160M/1623; FP-POS = 4; LP7 + 1.52 arc sec (COS.sp.2070080)	(1) WD0308-565	COS/FUV, TIME-TAG, PSA	G160M 1623 A	BUFFER-TIME=506; FLASH=NO; WAVECAL=NO; LIFETIME-POS=LP6; FP-POS=4	POS TARG null,4.10	200 Secs (200 Secs) *[==>]*	***[1]***
13	Return Aperture to Nominal Position	NONE	COS, ALIGN/APER		XAPER=0	QESIPARM XSTEPS 86	0 Secs (0 Secs) *[==>]*	***[1]***

Comments: Return the aperture block to its nominal starting point (LP6). Since the aperture block moved a total of -86 steps, Qesiparms XSTEPS = +86 steps

Orbit Structure



Proposal 18179 - G30M Observations (02) - COS LP7 Initial Gain Map

Visit

Proposal 18179, G30M Observations (02) Mon Sep 22 11:00:17 GMT 2025

Diagnostic Status: No Diagnostics

Scientific Instruments: COS, COS/FUV, COS/NUV

Special Requirements: BEFORE 12-DEC-2025:00:00:00

Comments: Set the observations to execute before Dec. 12. If it cannot execute before then a different target may need to be selected.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	WD0308-565	RA: 03 09 47.9178 (47.4496575d)	Proper Motion RA: 149.261 mas/yr	V=14.14	Reference Frame: ICRS
	Alt Name1: WG-7	Dec: -56 23 49.41 (-56.39706d)	Proper Motion Dec: 66.806 mas/yr		
		Equinox: J2000	Parallax: 0.0201813"		
			Epoch of Position: 2000		

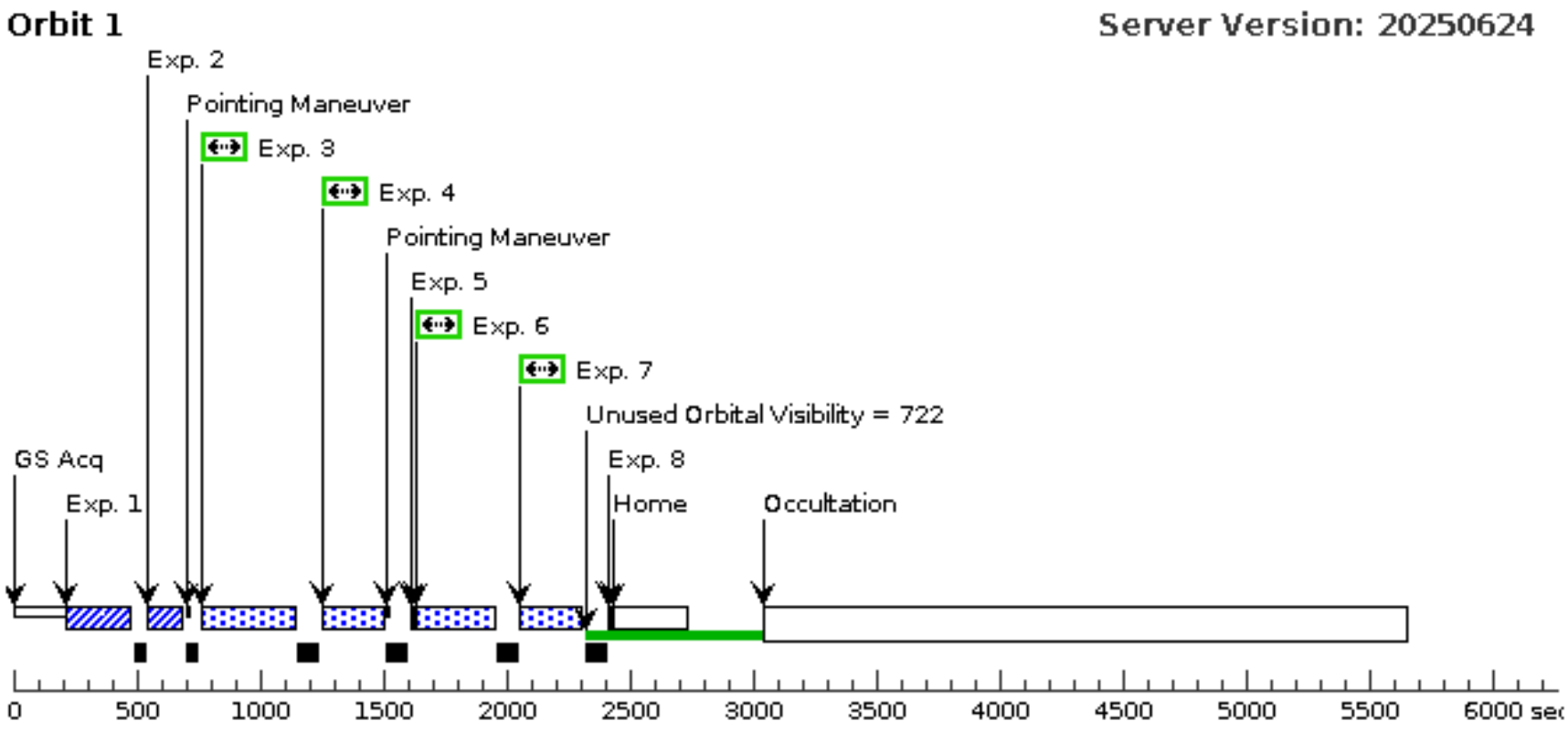
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

SIMBAD listed proper motion for this target. When retrieving targets with PM from SIMBAD, APT requests the coordinates be calculated with an epoch of the year 2000. Do not modify this epoch. Always review coordinates using the Target Confirmation tool, which graphically displays the PM.
Category=STAR
Description=[DB]
Extended=NO

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	WD0308 ACQ/IMAGE (1st acq) (COS.ta.2070078)	(1) WD0308-565	COS/NUV, ACQ/IMAGE, BOA	MIRRORA				20 Secs (20 Secs) *[==>]*	***[1]***
Comments: Initial target acquisition.									
2	WD0308 ACQ/IMAGE (2nd acq) (COS.ta.2070078)	(1) WD0308-565	COS/NUV, ACQ/IMAGE, BOA	MIRRORA				20 Secs (20 Secs) *[==>]*	***[1]***
Comments: Second target acquisition to guard against an acquisition failure.									
3	G130M/1222 FP-POS = 1; Nominal LP7 position (COS.sp.2070081)	(1) WD0308-565	COS/FUV, TIME-TAG, PSA	G130M 1222 A	BUFFER-TIME=261; LIFETIME-POS=LP7; FP-POS=1; FLASH=NO; WAVECAL=NO			200 Secs (200 Secs) *[==>]*	***[1]***
4	G130M/1222 FP-POS = 3; Nominal LP7 position (COS.sp.2070081)	(1) WD0308-565	COS/FUV, TIME-TAG, PSA	G130M 1222 A	BUFFER-TIME=261; LIFETIME-POS=LP7; FP-POS=3; FLASH=NO; WAVECAL=NO			200 Secs (200 Secs) *[==>]*	***[1]***
5	Move aperture +0.76 arc sec	NONE	COS, ALIGN/APER		XAPER=-16; YAPER=0			0.0 Secs (0 Secs) *[==>]*	***[1]***
Comments: Aperture is moved +0.76" from the nominal LP7 position. *-21 steps/" * 0.76" = -16 steps* *XAPER = -16*									
6	G130M/1222 FP-POS = 1; LP7 position + 0.76 arc sec (COS.sp.2070081)	(1) WD0308-565	COS/FUV, TIME-TAG, PSA	G130M 1222 A	BUFFER-TIME=261; LIFETIME-POS=LP7; FP-POS=1; FLASH=NO; WAVECAL=NO	POS TARG null,0.76		200 Secs (200 Secs) *[==>]*	***[1]***
7	G130M/1222 FP-POS = 3; LP7 position + 0.76 arc sec (COS.sp.2070081)	(1) WD0308-565	COS/FUV, TIME-TAG, PSA	G130M 1222 A	BUFFER-TIME=261; LIFETIME-POS=LP7; FP-POS=3; FLASH=NO; WAVECAL=NO	POS TARG null,0.76		200 Secs (200 Secs) *[==>]*	***[1]***

	8	Return Aperture to Nominal Position	NONE	COS, ALIGN/APER	XAPER=0	QESIPARM XSTEP S 16	0 Secs (0 Secs) [==>]	 [1]

Comments: Return the aperture block to its nominal starting point (LP6). Since the aperture block moved a total of -16 steps, Qesiparms XSTEPS = +16 steps

Orbit Structure