18182 - COS LP10 Initial Gain Map

Cycle: 33, 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	DARK DEUTERIUM NONE	COS COS/FUV S/C	1	30-Sep-2025 07:00:13.0	yes

1 Total Orbits Used

ABSTRACT

This program uses the deuterium lamp to illuminate the region of the detector being used to collect spectra at LP10 in order to obtain an initial gain map at that LP. The data obtained will be used to create gain maps of the detector. Because of the strongly varying intensity of the lamp as a function of wavelength, G130M/1309 data will be obtained for Segment A, and G160M/1600 will be used for Segment B.

OBSERVING DESCRIPTION

This program will obtain spectra from the deuterium lamp with enough counts to permit the construction of a gain map covering the region where the spectra fall. In order to efficiently illuminate the two segments, the G130M/1309 setting will be used for Segment A, and G160M/1600 will be used for Segment B. Both segments can safely remain on with either setting.

The procedure for collecting the gain map data is given below.

* Take an exposure at LP1 to set up the aperture position and HV. This can also be used to measure the gain at LP1. This exposures will use G130M/1309.

* Adjust the HV values

* Adjust the aperture in the cross dispersion direction so that the deuterium lamp will illuminate the appropriate region on Segment A when using G130M/1309.

* Take a 440 second deuterium lamp exposure using both detector segments.

* Adjust the aperture to a second cross-dispersion location to obtain additional coverage on Segment A and take another 440 second deuterium lamp exposure.

* Adjust the aperture in the cross dispersion direction so that the deuterium lamp will illuminate the appropriate region on Segment B when using G160M/1600.

* Take a 440 second deuterium lamp exposure using both detector segments.

* Adjust the aperture to a second cross-dispersion location to obtain additional coverage on Segment B and take another 440 second deuterium lamp exposure.

* Return the aperture to the HOME position

All G130M/1309 exposures use FP-POS=1, and all G160M/1600 exposures use FP-POS=4. These choices give slightly more counts than other FP-POS values.

Note that because TRANS resets its aperture zero point when FCA exposures are taken, the aperture is explicitly moved using "QESIPARM XSTEPS", as was done in Program 13970, 14439, 14519, 14941, 15534, 15772, etc.

For reference, the soft and hard stops for the apertures are listed below. All aperture moves are within these ranges.
MEB1:
SOFT STOPS = -275 to 275
HARD STOPS = -282 to 285

MEB2:
SOFT STOPS = -275 to 275
HARD STOPS = -284 to 283

The initial exposure of each visit uses the FCA_LP1 aperture position, LAPXSTP = -153. Thus all XAPER values are relative to that position.

Summary table:

Visit	LP	Grating/Segment	Y Position	LAPXSTP	XAPER	HV
01	10	G130M/A	1	-53	+100	178/175
01	10	G130M/A	2	-108	+45	178/175
01	10	G160M/B	1	-63	+90	178/175
01	10	G160M/B	2	-118	+35	178/175

Visit	**Proposal 18182, Initial LP10 Gain Map (01)** Tue Sep 30 11:00:14 GMT 2025 **Diagnostic Status: Warning** Scientific Instruments: S/C, COS, COS/FUV Special Requirements: PARALLEL *Comments: This visit collects data at LP10. It uses the HV values appropriate for LP10 (178/175).*
Diagnostics	(Initial LP10 Gain Map (01)) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR EARTH CALIB VISIT

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	G130M/1309 Deuterium Exposure - Set up at LP1	DEUTERIUM	COS/FUV, TIME-TAG, FCA	G130M 1309 A	CURRENT=MEDIUM; BUFFER-TIME=196; FP-POS=1; SEGMENT=BOTH; LIFETIME-POS=LP1			125 Secs (125 Secs) *[==>]*	***[1]***
	Comments: Short exposure to set aperture to LP1, which is near the center of the aperture range used in this program. It also sets the HV to the LP1 values.								
2	Adjust HV to LP10 values	DARK	S/C, DATA, NONE			SAA CONTOUR 31; SPEC COM INSTR ELHVADJPROP; QASISTATES COS FUV HVNOM HVNOM; QESIPARM ENDCTSA 178; QESIPARM ENDCTSB 175; QESIPARM SEGMENT AB		39 Secs (39 Secs) *[==>]*	***[1]***
	Comments: Adjust the HV to LP10 values. *Since the HV is not increasing, exposure time = 39 seconds*								
3	Aperture Adjustment 1 for Segment A	NONE	COS, ALIGN/APER		XAPER=100			0.0 Secs (0 Secs) *[==>]*	***[1]***
	Comments: Put the aperture in the appropriate position to illuminate a portion of the LP10 region of the detector when illuminating Segment A with G130M/1309. *FCA LAPXSTP value at LP1 is -153* *Desired LAPXSTP value for FCA to illuminate Segment A with G130M/1309 at Position 1 for LP10 is -53* *Therefore, XAPER is set to -53 - -153 = +100*								
4	G130M/1309 Deuterium Exposure 1	DEUTERIUM	COS/FUV, TIME-TAG, FCA	G130M 1309 A	CURRENT=MEDIUM; BUFFER-TIME=165; FP-POS=1; SEGMENT=BOTH; LIFETIME-POS=LP1			440 Secs (440 Secs) *[==>]*	***[1]***
	Comments: Deuterium exposure optimized for Segment A. FP-POS=1 was chosen because previous observations show that it has slightly more counts than the other FP-POS values.								
5	Aperture Adjustment 2 for Segment A	NONE	COS, ALIGN/APER		XAPER=45	QESIPARM XSTEPS -55		0.0 Secs (0 Secs) *[==>]*	***[1]***
	Comments: Put the aperture in the appropriate position to illuminate a portion of the LP10 region of the detector when illuminating Segment A with G130M/1309. *FCA LAPXSTP value at LP1 is -153* *Desired LAPXSTP value for FCA to illuminate Segment A with G130M/1309 at Position 2 for LP10 is -108* *Therefore, XAPER is set to -108 - -153 = +45. *HOWEVER*, because of the TRANS rules, the "QESIPARM XSTEPS -55" [(+45 - 100) = -55] Special Requirement is necessary to move the aperture to the correct location.*								

6	G130M/1309 Deuterium Exposure 2	DEUTERIUM	COS/FUV, TIME-TAG, FCA	G130M 1309 A	CURRENT=MEDIUM; BUFFER-TIME=165; FP-POS=1; SEGMENT=BOTH; LIFETIME-POS=LP1		440 Secs (440 Secs) *[==>]*	***[1]***

Comments: Deuterium exposure optimized for Segment A. FP-POS=1 was chosen because previous observations show that it has slightly more counts than the other FP-POS values.

7	Aperture Adjustment 1 for Segment B	NONE	COS, ALIGN/APER		XAPER=90	QESIPARM XSTEPS 45	0.0 Secs (0 Secs) *[==>]*	***[1]***

Comments: Put the aperture in the appropriate position to illuminate a portion of the LP10 region of the detector when illuminating Segment B with G160M/1600.

FCA LAPXSTP value at LP1 is -153
Desired LAPXSTP value for FCA to illuminate Segment B with G160M/1600 at Position 1 for LP10 is -63

*Therefore, XAPER is set to -63 - -153 = +90. *HOWEVER*, because of the TRANS rules, the "QESIPARM XSTEPS 45" [(+90 - +45) = +45] Special Requirement is necessary to move the aperture to the correct location.*

8	G160M/1600 Deuterium Exposure 1	DEUTERIUM	COS/FUV, TIME-TAG, FCA	G160M 1600 A	CURRENT=MEDIUM; BUFFER-TIME=165; FP-POS=4; SEGMENT=BOTH; LIFETIME-POS=LP1		440 Secs (440 Secs) *[==>]*	***[1]***

Comments: Deuterium exposure optimmized for Segment B. FP-POS=4 was chosen because previous observations show that it has slightly more counts than the other FP-POS values.

9	Aperture Adjustment 2 for Segment B	NONE	COS, ALIGN/APER		XAPER=35	QESIPARM XSTEPS -55	0.0 Secs (0 Secs) *[==>]*	***[1]***

Comments: Put the aperture in the appropriate position to illuminate a portion of the LP10 region of the detector when illuminating Segment B with G160M/1600.

FCA LAPXSTP value at LP1 is -153
Desired LAPXSTP value for FCA to illuminate Segment B with G160M/1600 at Position 2 for LP10 is -118.

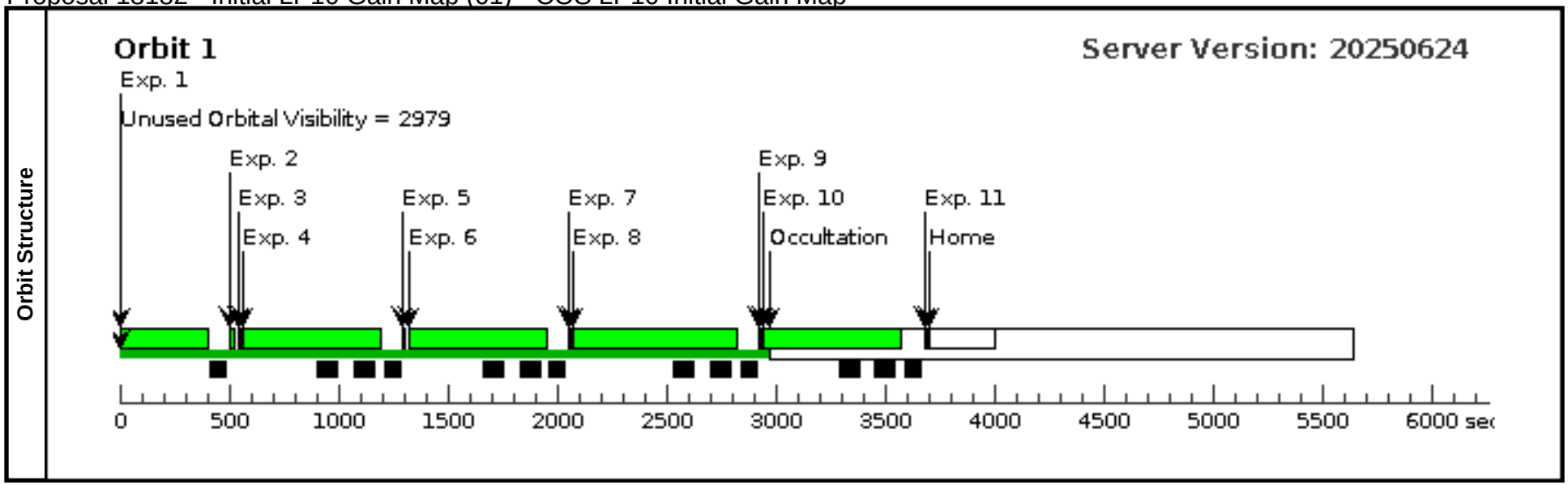
*Therefore, XAPER is set to -118 - -153 = +35. *HOWEVER*, because of the TRANS rules, the "QESIPARM XSTEPS -55" [(+35 - +90) = -55] Special Requirement is necessary to move the aperture to the correct location.*

10	G160M/1600 Deuterium Exposure 2	DEUTERIUM	COS/FUV, TIME-TAG, FCA	G160M 1600 A	CURRENT=MEDIUM; BUFFER-TIME=165; FP-POS=4; SEGMENT=BOTH; LIFETIME-POS=LP1		440 Secs (440 Secs) *[==>]*	***[1]***

Comments: Deuterium exposure optimized for Segment B. FP-POS=4 was chosen because previous observations show that it has slightly more counts than the other FP-POS values.

11	Return Aperture to Nominal Position	NONE	COS, ALIGN/APER		XAPER=0	QESIPARM XSTEPS -35	0 Secs (0 Secs) *[==>]*	***[1]***

Comments: Return aperture to nominal position by setting XAPER=0

**HOWEVER*, because of the TRANS rules, the "QESIPARM XSTEPS -35" [(0 - 35) = -35] Special Requirement is necessary to move the aperture to its correct location.*

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