13617 - Characterization of COS/FUV modal gain at lifetime position 3 (LOP1)

Cycle: 21, 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	19-Dec-2013 16:05:34.0	yes
02	DARK DEUTERIUM NONE	COS COS/FUV S/C	1	21-Dec-2013 00:35:27.0	yes
03	DARK DEUTERIUM NONE	COS COS/FUV S/C	1	21-Dec-2013 00:35:35.0	yes
04	DARK DEUTERIUM NONE	COS COS/FUV S/C	1	21-Dec-2013 00:35:42.0	yes

4 Total Orbits Used

ABSTRACT

This program will characterize the COS/FUV modal gain at the detector locations and initial HV settings for LP3 operations. The deuterium lamp will be used to illuminate the detector region covering possible LP3 positions up to LP1. The data obtained will be used to create gain maps of the detector.

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 from LP1 down to LP3. This will be done at the lowest 2 high-voltage settings for each detector (167 and 171 for FUVA, 163 and 167 for FUVB). 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 this data is:

* Set HV levels on both segments
* Adjust the aperture in the cross dispersion direction so that the deuterium lamp will illuminate the appropriate region.
* Take a 400 second deuterium lamp exposure using both detector segments optimized for FUVA.
* Take a 400 second deuterium lamp exposure using both detector segments optimized for FUVB.
* Return to nominal

Repeat for each Y-location and HV setting.

CALIBRATION JUSTIFICATION

No up-to-date gainmaps exist (showing current usage) for the regions from LP1 to LP3 at the specified high-voltage levels. It is important to know the current gain situation over this detector region in order to optimize the placement of LP3. These maps will allow the spectra to be placed as close as possible to LP1, thus preserving resolution and extending operational lifetime, while retaining data quality.

ADDITIONAL COMMENTS

Since non-default FUV HV settings are being specified, the FUV cannot be allowed to transition out of HVNOM until the exposures requiring that setting have completed. The SEQ NON-INT special requirement on exposure 1 of each visit enforces this requirement.

Visit	**Proposal 13617, First HV, first position (01), implementation** Sat Dec 21 05:35:50 GMT 2013 **Diagnostic Status: Warning** Scientific Instruments: S/C, COS/FUV, COS Special Requirements: PARALLEL *Comments: Disallow FUV transitions out of HVNOM until end (exp AFTERs and/or SEQ NON-INTs should enforce this).*
Diagnostics	(Aperture Adjustment (01.002)) Warning (Form): This ALIGN/APER exposure should be preceded by a science exposure to define the starting position for the scan.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Set DETHV level	DARK	S/C, DATA, NONE			SAA CONTOUR 31; SPEC COM INSTR ELHLTHVF; QASISTATES COS FUV HVLOW HVNOM; QASISTATES COS SI OBSERVE OBSERVE; QESIPARM ENDCTSA 167; QESIPARM ENDCTSB 163	Sequence 1-4 Non-Int in First HV, first position (01)	256 Secs (256 Secs) *[==>]*	***[1]***

Comments: Setting DETHV to 167 for FUVA
Setting DETHV to 163 for FUVB

Disallow FUV transitions out of HVNOM until end (enforced by Seq Non-Int).

SQL required for qexposure to specify the si_used = "COS".

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
2	Aperture Adjustment	NONE	COS, ALIGN/APER		XAPER=-202	NEW ALIGNMENT; QASISTATES COS FUV HVNOM HVNOM	Sequence 1-4 Non-Int in First HV, first position (01)	0.0 Secs (0 Secs) *[==>]*	***[1]***

Comments: Put the aperture in the appropriate position to illuminate the correct region of the detector when illuminating Segment A with G130M/1309 and Segment B with G160M/1600.

PSA LAPXSTP value at LP2 is 52.1. Desired LAPXSTP value for FCA to illuminate Segment A with G130M/1309 is -150. Therefore, XAPER is set to -202.

** Current rules state that the aperture mechanism will not be moved for the science exposure that follows an ALIGN/APER, so ELNOAPMAIN special commanding is not needed.*

** Due to the broad coverage of the deuterium lamps and the wide range covered, the ~6pix y-offset between FUVA and FUVB is not a concern for these exposures. Therefore, no XSTEPS special commanding is included (see 13494 for example)*

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
3	G130M/1309 Deuterium Exposure	DEUTERIUM	COS/FUV, TIME-TAG, FCA	G130M 1309 A	CURRENT=MEDIUM; BUFFER-TIME=111; FP-POS=1		Sequence 1-4 Non-Int in First HV, first position (01)	400 Secs (400 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.

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
4	G160M/1600 Deuterium Exposure	DEUTERIUM	COS/FUV, TIME-TAG, FCA	G160M 1600 A	CURRENT=MEDIUM; BUFFER-TIME=111; FP-POS=4		Sequence 1-4 Non-Int in First HV, first position (01)	400 Secs (400 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.

	5	End with FU V in HVLow	DARK	S/C, DATA, NONE	NEW OBSET; QASISTATES COS FUV HVLOW HVLOW; QASISTATES COS SI OBSERVE OBSERVE	1 Secs (1 Secs) *[==>]*	***[1]***

Comments: Force the FUV to its nominal rest state (HVLow) to ensure appropriate HV settings will be used by any following COS FUV observation.

SQL required for qexposure to specify the si_used = "COS".

New obset SR necessary to force this exposure to be the very last exposure after Home.

Proposal 13617 - First HV, second position (02) - Characterization of COS/FUV modal gain at lifetime position 3 (LOP1)

Visit	**Proposal 13617, First HV, second position (02), implementation** Sat Dec 21 05:35:51 GMT 2013 **Diagnostic Status: Warning** Scientific Instruments: S/C, COS/FUV, COS Special Requirements: PARALLEL *Comments: Disallow FUV transitions out of HVNOM until end (exp AFTERs and/or SEQ NON-INTs should enforce this).*
Diagnostics	(First HV, second position (02)) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR EARTH CALIB SU (Aperture Adjustment (02.002)) Warning (Form): This ALIGN/APER exposure should be preceded by a science exposure to define the starting position for the scan.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Set DETHV level	DARK	S/C, DATA, NONE			SAA CONTOUR 31; SPEC COM INSTR ELHLTHVF; QASISTATES COS FUV HVLOW HVNOM; QASISTATES COS SI OBSERVE OBSERVE; QESIPARM ENDCTSA 167; QESIPARM ENDCTSB 163	Sequence 1-4 Non-Int in First HV, second position (02)	256 Secs (256 Secs) *[==>]*	***[1]***

Comments: Setting DETHV to 167 for FUVA
Setting DETHV to 163 for FUVB

Disallow FUV transitions out of HVNOM until end (enforced by Seq Non-Int).

SQL required for qexposure to specify the si_used = "COS".

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
2	Aperture Adjustment	NONE	COS, ALIGN/APER		XAPER=-152	NEW ALIGNMENT; QASISTATES COS FUV HVNOM HVNOM	Sequence 1-4 Non-Int in First HV, second position (02)	0.0 Secs (0 Secs) *[==>]*	***[1]***

Comments: Put the aperture in the appropriate position to illuminate the correct region of the detector when illuminating Segment A with G130M/1309 and Segment B with G160M/1600.

PSA LAPXSTP value at LP2 is 52.1. Desired LAPXSTP value for FCA to illuminate Segment A with G130M/1309 is -100. Therefore, XAPER is set to -152.

** Current rules state that the aperture mechanism will not be moved for the science exposure that follows an ALIGN/APER, so ELNOAPMAIN special commanding is not needed.*

** Due to the broad coverage of the deuterium lamps and the wide range covered, the ~6pix y-offset between FUVA and FUVB is not a concern for these exposures. Therefore, no XSTEPS special commanding is included (see 13494 for example)*

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
3	G130M/1309 Deuterium Exposure	DEUTERIUM	COS/FUV, TIME-TAG, FCA	G130M 1309 A	CURRENT=MEDIUM; BUFFER-TIME=111; FP-POS=1		Sequence 1-4 Non-Int in First HV, second position (02)	400 Secs (400 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.

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
4	G160M/1600 Deuterium Exposure	DEUTERIUM	COS/FUV, TIME-TAG, FCA	G160M 1600 A	CURRENT=MEDIUM; BUFFER-TIME=111; FP-POS=4		Sequence 1-4 Non-Int in First HV, second position (02)	400 Secs (400 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.

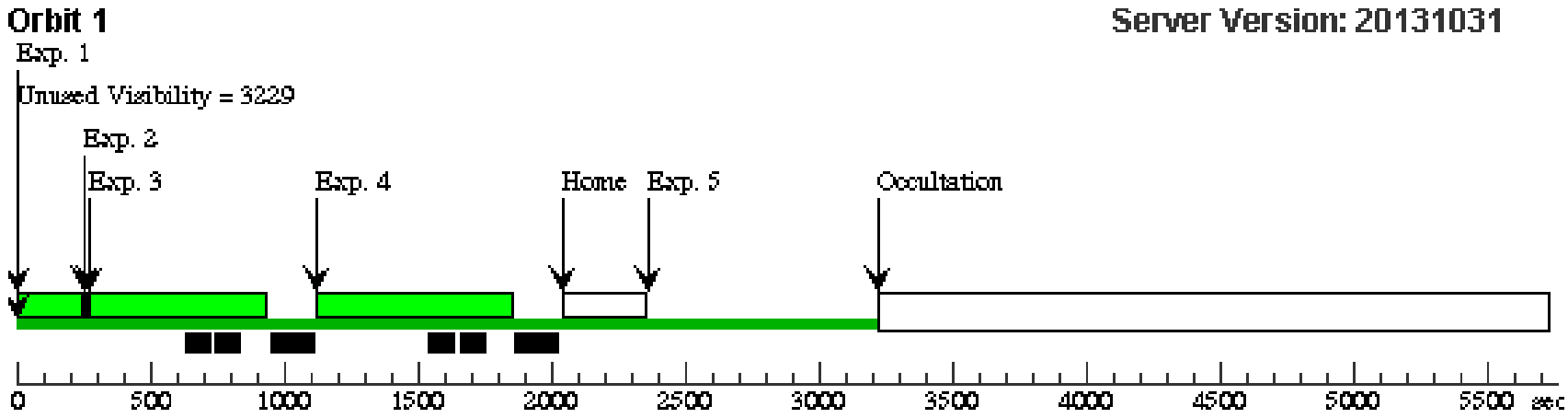
	5	End with FU V in HVLow	DARK	S/C, DATA, NONE	NEW OBSET; QASISTATES COS FUV HVLOW HVLOW; QASISTATES COS SI OBSERVE OBSERVE	1 Secs (1 Secs) *[==>]*	***[1]***

Comments: Force the FUV to its nominal rest state (HVLow) to ensure appropriate HV settings will be used by any following COS FUV observation.

SQL required for qexposure to specify the si_used = "COS".

New obset SR necessary to force this exposure to be the very last exposure after Home.

Orbit Structure



Proposal 13617 - Second HV, first position (03) - Characterization of COS/FUV modal gain at lifetime position 3 (LOP1)

Visit	**Proposal 13617, Second HV, first position (03), implementation** Sat Dec 21 05:35:53 GMT 2013 **Diagnostic Status: Warning** Scientific Instruments: S/C, COS/FUV, COS Special Requirements: PARALLEL *Comments: Disallow FUV transitions out of HVNOM until end (exp AFTERs and/or SEQ NON-INTs should enforce this).*
Diagnostics	(Second HV, first position (03)) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR EARTH CALIB SU (Aperture Adjustment (03.002)) Warning (Form): This ALIGN/APER exposure should be preceded by a science exposure to define the starting position for the scan.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Set DETHV level	DARK	S/C, DATA, NONE			SAA CONTOUR 31; SPEC COM INSTR ELHLTHVF; QASISTATES COS FUV HVLOW HVNOM; QASISTATES COS SI OBSERVE OBSERVE; QESIPARM ENDCTSA 171; QESIPARM ENDCTSB 167	Sequence 1-4 Non-Int in Second HV, first position (03)	268 Secs (268 Secs) *[==>]*	***[1]***

Comments: Setting DETHV to 171 for FUVA
Setting DETHV to 167 for FUVB

Disallow FUV transitions out of HVNOM until end (enforced by Seq Non-Int).

SQL required for qexposure to specify the si_used = "COS".

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
2	Aperture Adjustment	NONE	COS, ALIGN/APER		XAPER=-202	NEW ALIGNMENT; QASISTATES COS FUV HVNOM HVNOM	Sequence 1-4 Non-Int in Second HV, first position (03)	0.0 Secs (0 Secs) *[==>]*	***[1]***

Comments: Put the aperture in the appropriate position to illuminate the correct region of the detector when illuminating Segment A with G130M/1309 and Segment B with G160M/1600.

PSA LAPXSTP value at LP2 is 52.1. Desired LAPXSTP value for FCA to illuminate Segment A with G130M/1309 is -150. Therefore, XAPER is set to -202.

** Current rules state that the aperture mechanism will not be moved for the science exposure that follows an ALIGN/APER, so ELNOAPMAIN special commanding is not needed.*

** Due to the broad coverage of the deuterium lamps and the wide range covered, the ~6pix y-offset between FUVA and FUVB is not a concern for these exposures. Therefore, no XSTEPS special commanding is included (see 13494 for example)*

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
3	G130M/1309 Deuterium Exposure	DEUTERIUM	COS/FUV, TIME-TAG, FCA	G130M 1309 A	CURRENT=MEDIUM; BUFFER-TIME=111; FP-POS=1		Sequence 1-4 Non-Int in Second HV, first position (03)	400 Secs (400 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.

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
4	G160M/1600 Deuterium Exposure	DEUTERIUM	COS/FUV, TIME-TAG, FCA	G160M 1600 A	CURRENT=MEDIUM; BUFFER-TIME=111; FP-POS=4		Sequence 1-4 Non-Int in Second HV, first position (03)	400 Secs (400 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.

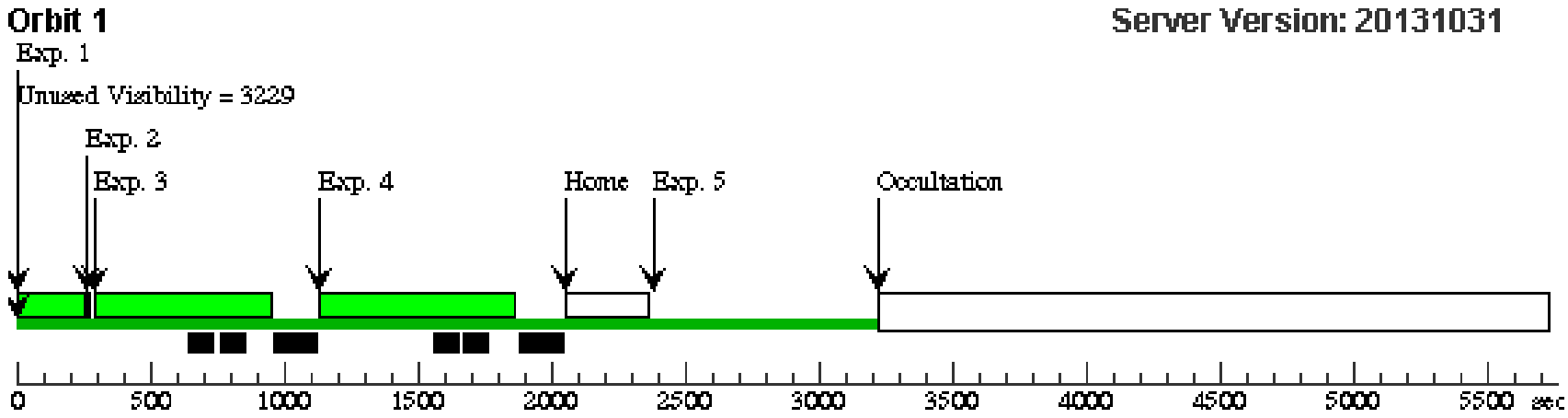
5	End with FU V in HVLow	S/C, DATA, NONE	NEW OBSET; QASISTATES COS FUV HVLOW HVLOW; QASISTATES COS SI OBSERVE OBSERVE	1 Secs (1 Secs) *[==>]*	*[1]*

Comments: Force the FUV to its nominal rest state (HVLow) to ensure appropriate HV settings will be used by any following COS FUV observation.

SQL required for qexposure to specify the si_used = "COS".

New obset SR necessary to force this exposure to be the very last exposure after Home.

Orbit Structure



Proposal 13617 - Second HV, second position (04) - Characterization of COS/FUV modal gain at lifetime position 3 (LOP1)

Visit	**Proposal 13617, Second HV, second position (04), implementation** Sat Dec 21 05:35:54 GMT 2013 **Diagnostic Status: Warning** Scientific Instruments: S/C, COS/FUV, COS Special Requirements: PARALLEL *Comments: Disallow FUV transitions out of HVNOM until end (exp AFTERs and/or SEQ NON-INTs should enforce this).*
Diagnostics	(Second HV, second position (04)) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR EARTH CALIB SU (Aperture Adjustment (04.002)) Warning (Form): This ALIGN/APER exposure should be preceded by a science exposure to define the starting position for the scan.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Set DETHV level	DARK	S/C, DATA, NONE			SAA CONTOUR 31; SPEC COM INSTR ELHLTHVF; QASISTATES COS FUV HVLOW HVNOM; QASISTATES COS SI OBSERVE OBSERVE; QESIPARM ENDCTSA 171; QESIPARM ENDCTSB 167	Sequence 1-4 Non-Int in Second HV, second position (04)	268 Secs (268 Secs) *[==>]*	***[1]***

Comments: Setting DETHV to 171 for FUVA
Setting DETHV to 167 for FUVB

Disallow FUV transitions out of HVNOM until end (enforced by Seq Non-Int).

SQL required for qexposure to specify the si_used = "COS".

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
2	Aperture Adjustment	NONE	COS, ALIGN/APER		XAPER=-152	NEW ALIGNMENT; QASISTATES COS FUV HVNOM HVNOM	Sequence 1-4 Non-Int in Second HV, second position (04)	0.0 Secs (0 Secs) *[==>]*	***[1]***

Comments: Put the aperture in the appropriate position to illuminate the correct region of the detector when illuminating Segment A with G130M/1309 and Segment B with G160M/1600.

PSA LAPXSTP value at LP2 is 52.1. Desired LAPXSTP value for FCA to illuminate Segment A with G130M/1309 is -100. Therefore, XAPER is set to -152.

** Current rules state that the aperture mechanism will not be moved for the science exposure that follows an ALIGN/APER, so ELNOAPMAIN special commanding is not needed.*

** Due to the broad coverage of the deuterium lamps and the wide range covered, the ~6pix y-offset between FUVA and FUVB is not a concern for these exposures. Therefore, no XSTEPS special commanding is included (see 13494 for example)*

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
3	G130M/1309 Deuterium Exposure	DEUTERIUM	COS/FUV, TIME-TAG, FCA	G130M 1309 A	CURRENT=MEDIUM; BUFFER-TIME=111; FP-POS=1		Sequence 1-4 Non-Int in Second HV, second position (04)	400 Secs (400 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.

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
4	G160M/1600 Deuterium Exposure	DEUTERIUM	COS/FUV, TIME-TAG, FCA	G160M 1600 A	CURRENT=MEDIUM; BUFFER-TIME=111; FP-POS=4		Sequence 1-4 Non-Int in Second HV, second position (04)	400 Secs (400 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.

	5	End with FUV in HVLow	S/C, DATA, NONE	NEW OBSET; QASISTATES COS FUV HVLOW HVLOW; QASISTATES COS SI OBSERVE OBSERVE	1 Secs (1 Secs) *[==>]*	***[1]***

Comments: Force the FUV to its nominal rest state (HVLow) to ensure appropriate HV settings will be used by any following COS FUV observation.

SQL required for qexposure to specify the si_used = "COS".

New obset SR necessary to force this exposure to be the very last exposure after Home.

Orbit Structure