COS orbits comprise 17.6% of all prime orbits in Cycle 19.

COS exposures comprise 5.7% of all prime exposures in Cycle 19.

Configuration/Mode	Prime Usage (All Instruments)	Prime Usage (COS Instrument)	SNAP Usage (All Instruments)	Snap Usage (COS Instrument)
FUV/Spectroscopy	5.1%	88.8%	3.2%	100.0%
NUV/Imaging	0.0%	0.0%	0.0%	0.0%
NUV/Spectroscopy	0.6%	11.2%	0.0%	0.0%

COS Cycle 19 Usage Statistics as a Function of Grating

Configuration	Grating	Percentage of COS Prime Exposures	Percentage of COS SNAP Exposures
COS/FUV	G140L	6.6%	0.0%
	G130M	52.5%	100.0%
	G160M	29.7%	0.0%
COS/NUV	G230L	1.4%	0.0%
	G185M	9.8%	0.0%
	G225M	0.0%	0.0%
	G285M	0.0%	0.0%

COS Cycle 19 Calibration and Monitor Orbits Request

COS Cycle 19 Usage: Note that any Cycle 19 supplemental proposals will include new FUV lifetime positions.

Prop. ID	Title	External	Internal	Frequency	Cycle 18 Allocation
	FUV Monitors				
12715	FUV Spectroscopic Sensitivity Monitor	34		12x1/G140L, 12x1/ G130M, 10x1/G160M	34
12716	FUV Detector Dark Monitor		130	130x1 (5/alt. wk)	130
12717	FUV Internal/External Wavelength Scale Monitor	2		1x1/M, 1x1/L	6
12718	FUV Detector Recovery After Anomalous Shutdown		(12)		(12)
	NUV Monitors				
12719	NUV Spectroscopic Sensitivity Monitor	8		4x1/L, 4x1/M	12
12720	NUV Detector Dark Monitor		52	52x1 (2/alt. wk)	52
12721	NUV Flat Monitor		10*	10x1	N/A
12722	NUV Internal/External Wavelength Scale Monitor	3		3x1	3
12723	NUV MAMA Fold Distribution		1*	1x1	1*
12724	NUV Detector Recovery After Anomalous Shutdown		(4)		(4)
Cycle 19 Requests		**47**	**209**		
	Outsourced Calibration and Monitoring				
12501	COS G140L CENWAV = 800, a gapless low astigmatism mode for observations to the Lyman Limit	3		3 orbits Sept. 2011	
12505	COS observations below 1150Å with R > 10, 000: Calibrations for a new G130M/1222 central wavelength	9		First orbit in Aug 2011 Rest of the orbits Oct – Dec 2011	

* Internal parallel orbits > 1800s.

() Indicates orbits if needed, number of orbits not included in Cycle 19 requests.

★Does not include new lifetime position programs.

COS Cycle 17:
20 programs
149 external orbits
446 internal orbits
615 total orbits

COS Cycle 18★:
11 programs
65 external orbits
5 parallel orbits
184 internal orbits
254 total orbits

COS Cycle 19:
10 programs
47 external orbits
209 internal orbits
256 total orbits

Number of COS Cycle 19 GO External Orbits = 458

FUV Spectroscopic Sensitivity Monitor
P.I. Rachel Osten

Purpose	Monitor sensitivity of each FUV grating mode to detect any change due to contamination or other causes. The FUV gratings are the most heavily used on COS, and have also experienced several changes in the time-dependent spectroscopic sensitivity since launch. Since these trends appear to be grating-, segment-, and wavelength-dependent, it is necessary to monitor them frequently to capture the changes.
Description	Obtain exposures in all FUV gratings every month. Every month there is 2-orbit visit of G140L+G130M, and a single orbit visit of G160M. The G140L exposures are in the 1105 and 1230 cenwaves, and the G130M and G160M exposures cover the bluest, middle, and reddest cenwaves of those gratings. The main goal is to track the time dependence of sensitivity as a function of wavelength.
Fraction GO/GTO Programs Supported	89% of COS total exposure time.
Resources Required: Observations	34 external orbits.
Resources Required: Analysis	6 FTE weeks
Products	ISR, Time-Dependent Sensitivity Reference File and a summary in the end of cycle ISR.
Accuracy Goals	SNR of 30 per resel at the central wavelength
Scheduling & Special Requirements	
Changes from Cycle 18	No changes.

FUV Detector Dark Monitor
P.I. Colin Cox

Purpose	Perform routine monitoring of FUV XDL detector dark rate. The main purpose is to look for evidence of a change in the dark rate, both to track on-orbit time dependence and to check for a developing detector problem.
Description	Monitor the FUV detector dark rate by taking TIME-TAG science exposures with no light on the detector. Five times every other week a 22-min exposure is taken with the FUV detector with the shutter closed. The length of the exposures is chosen to make them fit in Earth occultations. All orbits < 1800s.
Fraction GO/GTO Programs Supported	89% of COS total exposure time.
Resources Required: Observations	130 internal orbits
Resources Required: Analysis	4 FTE weeks
Products	ETC updates, ISR, and a summary in the end of cycle ISR.
Accuracy Goals	Obtain a few counts per exposure (for nominal case). Build up decent S/N over time.
Scheduling & Special Requirements	
Changes from Cycle 18	No changes.

FUV Internal to External Wavelength Scale Monitor
P.I. Cristina Oliveira

Purpose	This program monitors the offsets between the wavelength scale set by the internal wavecal versus that defined by absorption lines in external targets.
Description	This program monitors the offset between the internal and external wavelength scales: this offset is referred to as "DELTA" in the wavelength dispersion reference file and corrects for the shift between the WCA and PSA in TV03 versus the shift between the WCA and PSA in orbit : (WCA-PSA)_TV03 - (WCA - PSA)_orbit. Analysis of TV data indicates that this DELTA (offset) is cenwave and FPPOS independent for a particular grating, but it is grating dependent. To verify and monitor this, this program observes some cenwaves at different FPPOS.
Fraction GO/GTO Programs Supported	89% of COS total exposure time.
Resources Required: Observations	6 external orbits.
Resources Required: Analysis	3 FTE weeks
Products	Possible update wavelength dispersion reference file and a summary in the end of cycle ISR.
Accuracy Goals	G140L 150km/s, 7.5-12.5 pixels G130M 15km/s, 5.7-7.5 pixels G160M 15km/s, 5.8-7.2 pixels
Scheduling & Special Requirements	
Changes from Cycle 18	No changes.

FUV Detector Recovery After Anomalous Shutdown
P.I. Tom Wheeler

Purpose	This proposal is designed to permit the conservative, safe, and orderly recovery of the COS/FUV detector after an anomalous HV shutdown.
Description	Anomalous shutdowns can occur because of bright object violations, which trigger the Count Rate Protection Monitor or the Global Software Monitor. Anomalous shutdowns can also occur because of hardware anomalies or failures. The cause of the shutdown should be thoroughly investigated and understood prior to recovery. Wait intervals are required after each test for data analysis. COS event Flag 3 is used to prevent inadvertent FUV usage.
Fraction GO/GTO Programs Supported	89% of COS total exposure time. This is a contingency procedure only.
Resources Required: Observations	This is a contingency proposal only. Up to12 orbits would be needed if activated.
Resources Required: Analysis	0.4 FTE weeks
Products	
Accuracy Goals	
Scheduling & Special Requirements	Special commanding is required.
Changes from Cycle 18	No changes.

NUV Spectroscopic Sensitivity Monitor
P.I. Rachel Osten

Purpose	Monitor sensitivity of each NUV grating mode to detect any change due to contamination or other causes. The bare-Aluminum gratings on COS are known to degrade with a rate which has been fairly steady since the start of on-orbit operations. Another goal is to track time dependence of sensitivity as a function of wavelength.
Description	Obtain exposures in all NUV gratings --- G230L, G185M, G225M, and G285M -- quarterly. The first two gratings have stable behavior, while the last two are experiencing sensitivity declines. However, they not used in cycle 19, and the quarterly cadence in Cycle 18 was sufficient to track the changes. Because of the low usage of these modes, and their fairly stable rate of decay, we have cut back on the number of central wavelengths covered in this program. The G230L monitoring observations will only cover the 2950 and 2635 central wavelengths. The G185M grating has only ever had the 1921 central wavelength monitored for spectroscopic sensitivity declines. Because it is the most heavily used NUV grating in Cycle 19, we will add in the bluest cenwave (1786) to monitor its behavior. The G225M grating shows stable behavior in terms of the sensitivity decline versus wavelength above 2100 A (consistent from cenwave to cenwave), with a slight lessening of the rate of sensitvity decline below 2100 A. In order to monitor this, only the G225M/2186 cenwave will be covered. The G285M grating does show some small wavelength dependence to the sensitivity decline (although this is not implemented in the TDS reference file), and so we keep 2 cenwaves of this grating (2617 and 3094). With the cuts described above, we will need 4 one orbit visits to monitor the G230L, and 4 one orbit visits to monitor the G185M, G225M, and G285M gratings, for a total of 8 orbits in Cycle 19.
Fraction GO/GTO Programs Supported	11% of COS total exposure time.
Resources Required: Observations	8 external orbits.
Resources Required: Analysis	3 FTE weeks
Products	ISR, Time-Dependent Sensitivity Reference File and a summary in the end of cycle ISR.
Accuracy Goals	SNR of 30 per resel at the central wavelength.
Scheduling & Special Requirements	
Changes from Cycle 18	Continuing status quo from Cycle 18 would necessitate 16 orbits. Reduced number of central wavelengths to reduce orbits to 8.

NUV Detector Dark Monitor
P.I. Colin Cox

Purpose	Perform routine monitoring of MAMA detector dark current. The main purpose is to look for evidence of a change in the dark, both to track on-orbit time dependence and to check for a developing detector problem.
Description	Monitor the NUV detector dark rate by taking TIME-TAG science exposures without illuminating the detector. Twice every other week a 22-min exposure is taken with the NUV (MAMA) detector with the shutter closed. The length of the exposures is chosen to make them fit in Earth occultations. All orbits < 1800s.
Fraction GO/GTO Programs Supported	11% of COS total exposure time.
Resources Required: Observations	52 internal orbits
Resources Required: Analysis	4 FTE weeks
Products	ETC updates, bad-pixel reference file, ISR, and a summary in the end of cycle ISR.
Accuracy Goals	5%
Scheduling & Special Requirements	
Changes from Cycle 18	No changes.

NUV Flat Monitor
P.I. Elena Mason

Purpose	This program aims at obtaining COS NUV-MAMA flat-field observations for monitoring purpose only. The time necessary to build a p-flat with sufficient SNR (e.g. 100), as it has been done from ground, would be too large (both in terms of orbits and lamp lifetime). We estimate that, for monitoring purpose, 13hr of total integration time and a SNR of~20-25 (see below), will be sufficient. A part from the reduced time request, the program is a continuation of SMOV4 program 11478 executed during cycle 17. However, while in program 11478 each visit was only 0.5hr long (for an easier scheduling during SMOV), the current program reduces the number of visits but increases the duration of each single visit. The 13hr exposure time will be distributed in 10 visits, each having an exposure of 4680s.
Description	During SMOV4, 18hr total integration time were taken with G185M (at 3 different central wavelengths), piling up ~1800 counts (and a SNR~42) per 3x3 pixels. During the 18hr execution the D1 lamp in use, had faded by ~25%. 14 more hr of lamp lifetime have been used by program 12676 (within the COS life time adjustment project) and therefore we assume a further ~ 20% flux loss. Aiming at a SNR~20-25 per 3x3 pixel (to limit the draining of the lamp lifetime), we would need between 11hr and 16hr total integration time. Hence 13hr to be spread in 10 visits is a reasonable compromise. Following past programs and experience each visit will consist of just 1 exposure with 1 setup. The grating in use will be G185M, cycling around the three central wavelengths 1835A, 1850A, and 1864A (this will ensure an overall uniform illumination across the detector). All exposures > 1800s.
Fraction GO/GTO Programs Supported	11% of COS total exposure time.
Resources Required: Observations	10 internal orbits and all orbits > 1800s.
Resources Required: Analysis	4 FTE weeks
Products	Time monitoring of COS NUV flats and potential reference file update.
Accuracy Goals	To achieve a SNR ~ 20 – 25 per 3x3 pixel element.
Scheduling & Special Requirements	
Changes from Cycle 18	New program, not in Cycle 18.

NUV Internal to External Wavelength Scale Monitor
P.I. Cristina Oliveira

Purpose	This program monitors the offsets between the wavelength scale set by the internal wavecal versus that defined by absorption lines in external targets.
Description	This program monitors the offsets between the internal and external wavelength scales: this offset is referred to as "DELTA" in the wavelength dispersion reference file and corrects for the shift between the WCA and PSA in TV03 versus the shift between the WCA and PSA in orbit: (WCA-PSA)_TV03 - (WCA-PSA)_orbit. Analysis of TV data indicates that this DELTA is cenwave and FP-POS independent for a particular grating, but it is grating and stripe dependent. To verify and monitor this, this program observes some cenwaves at different FP-POS.
Fraction GO/GTO Programs Supported	11% of COS total exposure time.
Resources Required: Observations	3 external orbits.
Resources Required: Analysis	3 FTE weeks
Products	Possible update wavelength dispersion reference file and a summary in the end of cycle ISR.
Accuracy Goals	G230L 175km/s, 8.3-15.5 pixels G185M 15km/s, 7.2-10.0 pixels G225M 15km/s, 9.7-13.3 pixels G285M 15km/s, 9.7-14.7 pixels
Scheduling & Special Requirements	
Changes from Cycle 18	No changes.

NUV MAMA Fold Distribution
P.I. Tom Wheeler

Purpose	The performance of the MAMA microchannel plates can be monitored using a MAMA fold analysis procedure that provides a measurement of the distribution of charge cloud sizes incident upon the anode giving some measure of change in the pulse-height distribution of the MCP, and therefore, MCP gain.
Description	While illuminating the detector with a flat field, the valid event (VE) rate counter is monitored while various combinations of row and column folds are selected. The process is implemented using a time-tag exposure and special commanding. This proposal executes the same steps as Cycle 18 proposal 12419 and is described in COS TIR 2010-01. All orbits > 1800s.
Fraction GO/GTO Programs Supported	11% of COS total exposure time.
Resources Required: Observations	1 internal orbit and all orbits > 1800s.
Resources Required: Analysis	0.1 FTE weeks
Products	The fold analysis findings are reported to the COS Science Team and V. Argabright of Ball Aerospace after completion of the analysis, typically one-two weeks after execution of the test. A summary in the end of cycle ISR.
Accuracy Goals	Position of the peak in the fold distribution can be measured to about 5% accuracy from this procedure.
Scheduling & Special Requirements	Special commanding is required.
Changes from Cycle 18	No changes.

NUV Detector Recovery After Anomalous Shutdown
P.I. Tom Wheeler

Purpose	This proposal is designed to permit the safe and orderly recovery of the COS/NUV MAMA detector after an anomalous shutdown. This is accomplished by using slower-than-normal MCP and PC high-voltage ramp-ups and diagnostics.
Description	Anomalous shutdowns can occur because of bright object violations, which trigger the Global Hardware Monitor or the Global Software Monitor. Anomalous shutdowns can also occur because of MAMA hardware anomalies or failures. The cause of the shutdown should be thoroughly investigated and understood prior to recovery. Twenty-four hour wait intervals are required after each test for MCP gas desorption and data analysis. COS event flag 2 is used to prevent inadvertent MAMA usage.
Fraction GO/GTO Programs Supported	11% of COS total exposure time. This is a contingency procedure only.
Resources Required: Observations	This is a contingency proposal only. Up to 4 orbits would be needed if activated.
Resources Required: Analysis	0.4 FTE weeks
Products	
Accuracy Goals	
Scheduling & Special Requirements	Special commanding is required.
Changes from Cycle 18	No changes.