



16908 - COS FUV LP6 Calibration: Dispersion Solutions

Cycle: 29, 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) EPSILON-ERI	COS/FUV COS/NUV	3	14-Feb-2022 16:00:14.0	yes
02	(1) EPSILON-ERI	COS/FUV COS/NUV	3	14-Feb-2022 16:00:16.0	yes

6 Total Orbits Used

ABSTRACT

This program determines the dispersion solutions for the FUV G160M grating at LP6. It observes the K2V emission-line star epsilon Eridani with all six G160M cenwaves. The G160M dispersion solutions are linear, so we will derive updated dispersion coefficients and zero points. Visit 01 observes with cenwaves 1533, 1577, and 1589. Visit 02 observes with cenwaves 1600, 1611, and 1623. Both visits start with a double ACQ/IMAGE for improved target centering, using the BOA and MirrorB.

The exposure times and the number of orbits requested are driven by the number of counts needed to achieve good cross-correlations using multiple

Proposal 16908 (STScI Edit Number: 0, Created: Monday, February 14, 2022 at 4:00:17 PM Eastern Standard Time) - Overview
chromospheric emission lines. We need to achieve at least $S/N \sim 5$ in the peaks of weaker emission lines. This is achieved with one orbit per cenwave. The dispersion coefficients of intermediate cenwaves can be constrained by those of shorter and longer ones, so these can accommodate the reduced exposure time that comes from sharing an orbit with the acquisition sequence.

OBSERVING DESCRIPTION

This proposal obtains spectra of eps Eri at all six G160M cenwaves with FP-POS=3 to determine the dispersion coefficients and zero points. It is essentially the same as the G160M exposures of program 15365 (LP4 wavelength calibration), except that cenwave 1533, which was introduced after the move to LP4, is included.

Double ACQ/IMAGE target acquisitions with the BOA and MirrorB will be performed to ensure the best possible target centering for the zero-point measurement. In an analysis of acquisitions in program 14909, double ACQ/IMAGEs were confirmed to center the target 2 to 3 times more accurately than single ACQ/IMAGEs.

The line at 1681.2 angstroms is used as the fiducial weak line for ETC calculations. We find that 2031 to 2369 sec are needed, depending on the cenwave.

For cenwaves 1533, 1577, 1600, and 1623, these exposure times were extended to 2400 sec to nearly fill the orbit. At LP6, exposure times longer than 2400 sec generate ETC warnings. Cenwaves 1589 and 1611 share their orbits with the acquisition sequence and get 1771 or 1777 sec, resulting in 90% of the requested S/N . This is acceptable because their dispersion solutions can be checked by interpolating from those of adjacent cenwaves in either direction.

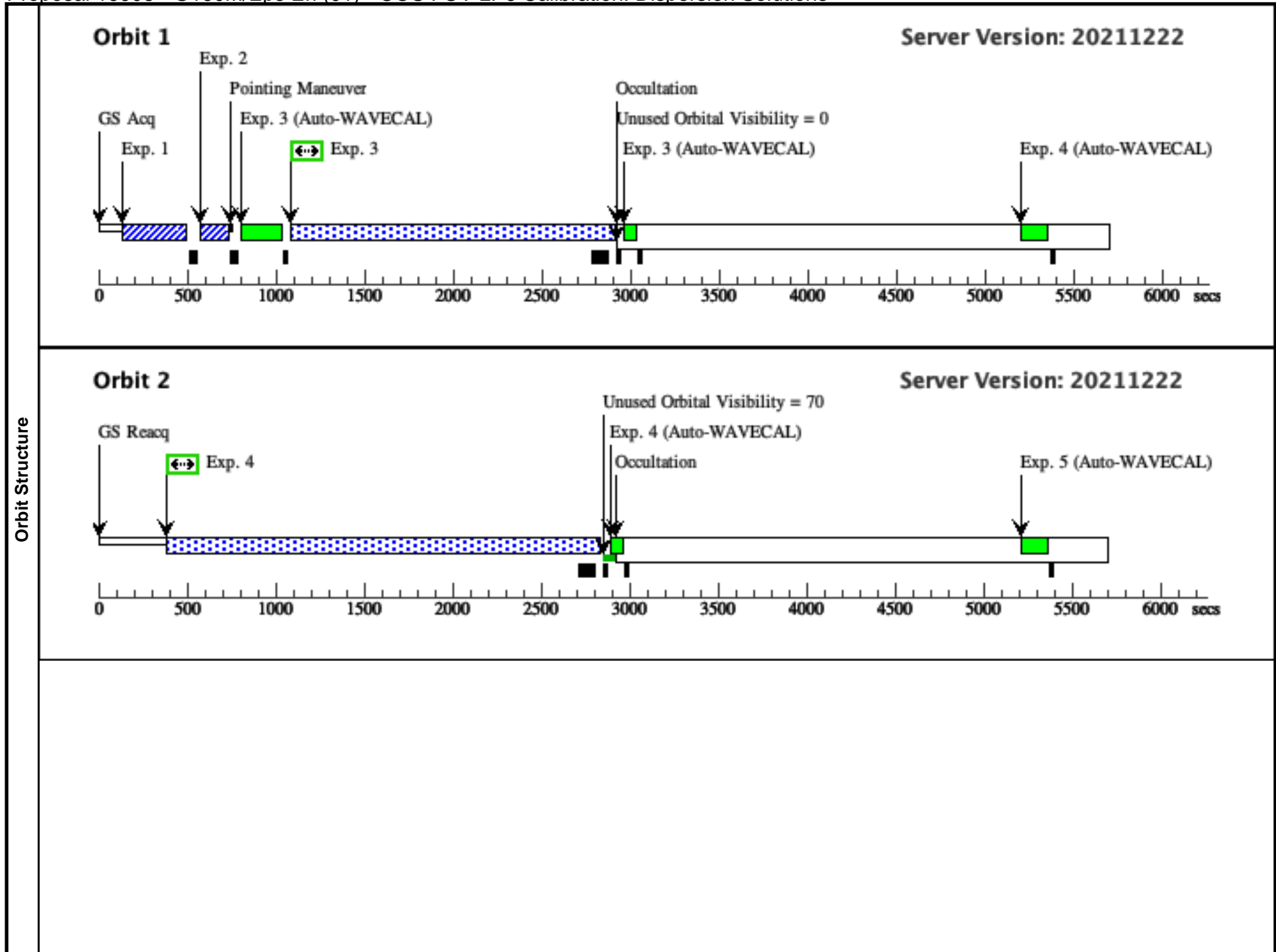
Proposal 16908 - G160M/Eps Eri (01) - COS FUV LP6 Calibration: Dispersion Solutions

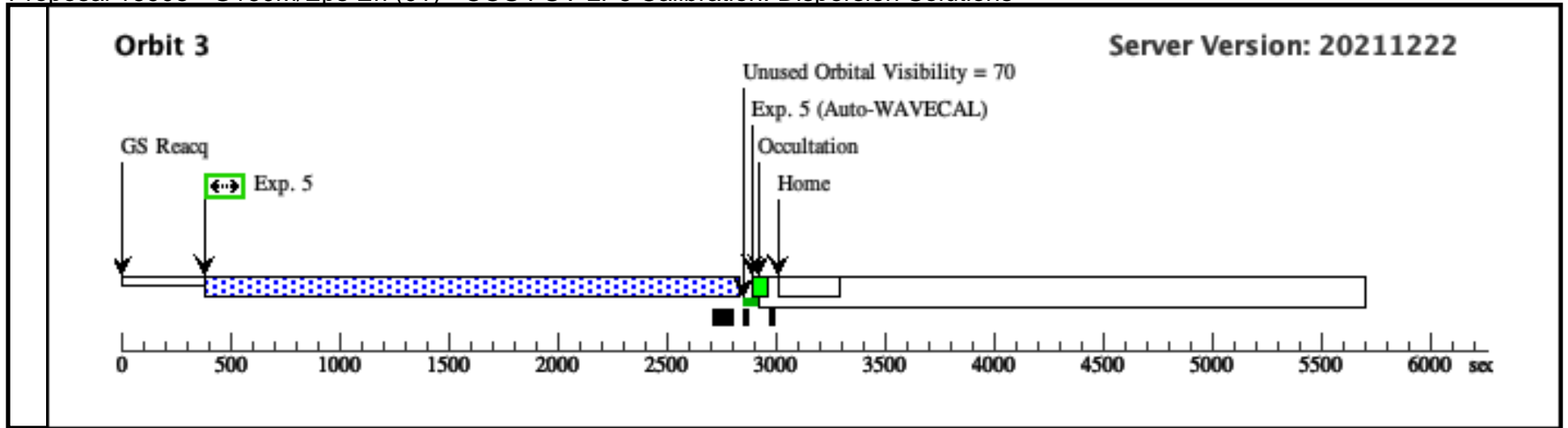
Mon Feb 14 21:00:17 GMT 2022

Visit	Proposal 16908, G160M/Eps Eri (01) Diagnostic Status: No Diagnostics Scientific Instruments: COS/FUV, COS/NUV Special Requirements: SCHED 100%					
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	EPSILON-ERI	RA: 03 32 55.8450 (53.2326875d)	Proper Motion RA: -975.17 mas/yr	V=3.73	Reference Frame: ICRS
		Alt Name1: HD22049	Dec: -09 27 29.73 (-9.45826d)	Proper Motion Dec: 19.49 mas/yr		
		Alt Name2: GJ144	Equinox: J2000	Parallax: 0.31094"		
				Epoch of Position: 2000		
				Radial Velocity: 16.43 km/sec		
	<i>Comments: This from SIMBAD: eps Eri -- Variable of BY Dra type</i>					
	<i>ICRS coord. (ep=J2000) : 03 32 55.84496 -09 27 29.7312 (Optical) [1.84 1.75 90] A 2007A&A...474..653V</i>					
	<i>Proper motions mas/yr : -975.17 19.49 [0.21 0.20 0] A 2007A&A...474..653V</i>					
	<i>Radial velocity : V(km/s) 16.43 [0.09] / z(~) 0.000055 [0.000000] / cz 16.43 [0.09]</i>					
	<i>Spectral type: K2Vk: C 2006AJ....132..161G</i>					
	<i>U 5.19 [~] C 2002yCat.2237....0D</i>					
	<i>B 4.61 [~] C 2002yCat.2237....0D</i>					
	<i>V 3.73 [~] C 2002yCat.2237....0D</i>					
	<i>R 3.00 [~] C 2002yCat.2237....0D</i>					
	<i>I 2.54 [~] C 2002yCat.2237....0D</i>					
	<i>J 2.23 [~] C 2002yCat.2237....0D</i>					
	<i>H 1.75 [~] C 2002yCat.2237....0D</i>					
	<i>K 1.67 [~] C 2002yCat.2237....0D</i>					
	<i>Category=EXT-STAR</i>					
	<i>Description=[K V-IV]</i>					
	<i>Extended=NO</i>					

Proposal 16908 - G160M/Eps Eri (01) - COS FUV LP6 Calibration: Dispersion Solutions

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
Exposures	1	ACQ/IMAG E 1 (1688523)	(1) EPSILON-ERI	COS/NUV, ACQ/IMAGE, BOA	MIRRORB			25 Secs (25 Secs) [==>]	[1]
	<p><i>Comments: Used the Pickles K2V model in the ETC normalized to SIMBAD U=5.19</i> <i>Only 4.1 sec are needed for required S/N = 30, but we retain the 25 sec used in previous successful wavecal programs</i> <i>BP = 31 cts/sec local; 1571 cts/sec global</i></p>								
	2	ACQ/IMAG E 2 (1688523)	(1) EPSILON-ERI	COS/NUV, ACQ/IMAGE, BOA	MIRRORB			25 Secs (25 Secs) [==>]	[1]
	<p><i>Comments: Used the Pickles K2V model in the ETC normalized to SIMBAD U=5.19</i> <i>Only 4.1 sec are needed for required S/N = 30, but we retain the 25 sec used in previous successful wavecal programs</i> <i>BP = 31 cts/sec local; 1571 cts/sec global</i></p>								
	3	G160M/158 9 (1688553)	(1) EPSILON-ERI	COS/FUV, TIME-TAG, PSA	G160M 1589 A	FP-POS=3; BUFFER-TIME=16 67; SEGMENT=BOTH; LIFETIME-POS=L P6			1777 Secs (1777 Secs) [==>]
<p><i>Comments: Used a spectrum of eps Eri created by splicing spectra from the LP4 wavecal program (15365)</i> <i>Exposure time is expected to give per-pixel S/N ~ 4.4 (per-resel S/N ~ 10.8) at the peak of the fiducial weak line at 1681.2 A (ETC 1688557)</i> <i>Target S/N is ~ 5 per pixel, but this will be acceptable for an intermediate cenwave</i> <i>BP = 0.20 cts/sec local; 365 cts/sec global</i> <i>ETC buffer fill time is 6476 sec; buffer time is set to exposure length - 110 sec to minimize delay before auto wavecal</i> <i>Only FP-POS 3 is needed for wavecal programs</i></p>									
4	G160M/153 3 (1688524)	(1) EPSILON-ERI	COS/FUV, TIME-TAG, PSA	G160M 1533 A	FP-POS=3; BUFFER-TIME=22 90; SEGMENT=BOTH; LIFETIME-POS=L P6			2400 Secs (2400 Secs) [==>]	[2]
<p><i>Comments: Used a spectrum of eps Eri created by splicing spectra from the LP4 wavecal program (15365)</i> <i>Exposure time of 2031 sec is expected to give per-pixel S/N ~ 5 (per-resel S/N ~ 12.2) at the peak of the fiducial weak line at 1681.2 A</i> <i>Actual time is extended to 2400 sec to fill the orbit as well as possible without generating LP6 exposure length warning</i> <i>BP = 0.18 cts/sec local; 388 cts/sec global</i> <i>ETC buffer fill time is 6088 sec; buffer time is set to exposure length - 110 sec to minimize delay before auto wavecal</i> <i>Only FP-POS 3 is needed for wavecal programs</i></p>									
5	G160M/157 7 (1688525)	(1) EPSILON-ERI	COS/FUV, TIME-TAG, PSA	G160M 1577 A	FP-POS=3; BUFFER-TIME=22 90; SEGMENT=BOTH; LIFETIME-POS=L P6			2400 Secs (2400 Secs) [==>]	[3]
<p><i>Comments: Used a spectrum of eps Eri created by splicing spectra from the LP4 wavecal program (15365)</i> <i>Exposure time of 2194 sec is expected to give per-pixel S/N ~ 5 (per-resel S/N ~ 12.2) at the peak of the fiducial weak line at 1681.2 A</i> <i>Actual time is extended to 2400 sec to fill the orbit as well as possible without generating LP6 exposure length warning</i> <i>BP = 0.20 cts/sec local; 379 cts/sec global</i> <i>ETC buffer fill time is 6238 sec; buffer time is set to exposure length - 110 sec to minimize delay before auto wavecal</i> <i>Only FP-POS 3 is needed for wavecal programs</i></p>									





Proposal 16908 - G160M/Eps Eri (02) - COS FUV LP6 Calibration: Dispersion Solutions

Mon Feb 14 21:00:17 GMT 2022

Visit	Proposal 16908, G160M/Eps Eri (02) Diagnostic Status: No Diagnostics Scientific Instruments: COS/FUV, COS/NUV Special Requirements: SCHED 100%					
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	EPSILON-ERI	RA: 03 32 55.8450 (53.2326875d)	Proper Motion RA: -975.17 mas/yr	V=3.73	Reference Frame: ICRS
		Alt Name1: HD22049	Dec: -09 27 29.73 (-9.45826d)	Proper Motion Dec: 19.49 mas/yr		
		Alt Name2: GJ144	Equinox: J2000	Parallax: 0.31094"		
				Epoch of Position: 2000		
				Radial Velocity: 16.43 km/sec		

Proposal 16908 - G160M/Eps Eri (02) - COS FUV LP6 Calibration: Dispersion Solutions

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
Exposures	1	ACQ/IMAG E 1 (1688523)	(1) EPSILON-ERI	COS/NUV, ACQ/IMAGE, BOA	MIRRORB			25 Secs (25 Secs) [==>]	[1]
	<p><i>Comments: Used the Pickles K2V model in the ETC normalized to SIMBAD U=5.19 Only 4.1 sec are needed for required S/N = 30, but we retain the 25 sec used in previous successful wavecal programs BP = 31 cts/sec local; 1571 cts/sec global</i></p>								
	2	ACQ/IMAG E 2 (1688523)	(1) EPSILON-ERI	COS/NUV, ACQ/IMAGE, BOA	MIRRORB			25 Secs (25 Secs) [==>]	[1]
	<p><i>Comments: Used the Pickles K2V model in the ETC normalized to SIMBAD U=5.19 Only 4.1 sec are needed for required S/N = 30, but we retain the 25 sec used in previous successful wavecal programs BP = 31 cts/sec local; 1571 cts/sec global</i></p>								
	3	G160M/161 1 (1688555)	(1) EPSILON-ERI	COS/FUV, TIME-TAG, PSA	G160M 1611 A	FP-POS=3; BUFFER-TIME=16 61; SEGMENT=BOTH; LIFETIME-POS=L P6			1771 Secs (1771 Secs) [==>]
<p><i>Comments: Used a spectrum of eps Eri created by splicing spectra from the LP4 wavecal program (15365) Exposure time is expected to give per-pixel S/N ~ 4.4 (per-resel S/N ~ 10.8) at the peak of the fiducial weak line at 1681.2 A (ETC 1688558) Target S/N is ~ 5 per pixel, but this will be acceptable for an intermediate cenwave BP = 0.20 cts/sec local; 348 cts/sec global ETC buffer fill time is 6796 sec; buffer time is set to exposure length - 110 sec to minimize delay before auto wavecal Only FP-POS 3 is needed for wavecal programs</i></p>									
4	G160M/160 0 (1688554)	(1) EPSILON-ERI	COS/FUV, TIME-TAG, PSA	G160M 1600 A	FP-POS=3; BUFFER-TIME=22 90; SEGMENT=BOTH; LIFETIME-POS=L P6			2400 Secs (2400 Secs) [==>]	[2]
<p><i>Comments: Used a spectrum of eps Eri created by splicing spectra from the LP4 wavecal program (15365) Exposure time of 2276 sec is expected to give per-pixel S/N ~ 5 (per-resel S/N ~ 12.2) at the peak of the fiducial weak line at 1681.2 A Actual time is extended to 2400 sec to fill the orbit as well as possible without generating LP6 exposure length warning BP = 0.20 cts/sec local; 346 cts/sec global ETC buffer fill time is 6837 sec; buffer time is set to exposure length - 110 sec to minimize delay before auto wavecal Only FP-POS 3 is needed for wavecal programs</i></p>									
5	G160M/162 3 (1688556)	(1) EPSILON-ERI	COS/FUV, TIME-TAG, PSA	G160M 1623 A	FP-POS=3; BUFFER-TIME=22 90; SEGMENT=BOTH; LIFETIME-POS=L P6			2400 Secs (2400 Secs) [==>]	[3]
<p><i>Comments: Used a spectrum of eps Eri created by splicing spectra from the LP4 wavecal program (15365) Exposure time of 2369 sec is expected to give per-pixel S/N ~ 5 (per-resel S/N ~ 12.2) at the peak of the fiducial weak line at 1681.2 A Actual time is extended to 2400 sec to fill the orbit as well as possible without generating LP6 exposure length warning BP = 0.20 cts/sec local; 340 cts/sec global ETC buffer fill time is 6943 sec; buffer time is set to exposure length - 110 sec to minimize delay before auto wavecal Only FP-POS 3 is needed for wavecal programs</i></p>									

