14089 - Far-UV observations of H, C, N and O in exocomets of Beta Pic

Cycle: 23, Proposal Category: GO

(UV Initiative)

(Availability Mode: SUPPORTED)

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	(1) BET-PIC-1ARCMIN-OFFSET (2) BETA-PIC	COS/FUV	2	01-Jan-2016 21:01:02.0	yes
02	(1) BET-PIC-1ARCMIN-OFFSET (2) BETA-PIC	COS/FUV	2	01-Jan-2016 21:01:06.0	yes
03	(1) BET-PIC-1ARCMIN-OFFSET (2) BETA-PIC	COS/FUV	2	01-Jan-2016 21:01:10.0	yes

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
04	(1) BET-PIC-1ARCMIN-OFFSET (2) BETA-PIC	COS/FUV STIS/CCD STIS/FUV-MAMA	3	01-Jan-2016 21:01:16.0	yes

9 Total Orbits Used

ABSTRACT

The Beta Pictoris system is a young planetary system embedded in a debris disk that is continually replenished by the collision and evaporation of planetesimals and exocomets. As a result of the edge-on inclination of the debris disk, the gas component of the disk and transiting exocomets can be observed in great detail using absorption spectroscopy. In February 2014, our COS observations yielded the first detection of exocomets in the far-UV. Several new exocometary species were detected for the first time including HI, CII, NI, OI and all the ionization states of Si. The measured radial velocities of these two exocomets are consistent with the two dynamically different exocomet populations known to exist in the Beta Pictoris system. We propose to determine the abundance of key species in a larger sample of exocomets and test the hypothesis that the two dynamically different exocomet populations have different compositions. This can be achieved by the acquisition of several spectra at different epochs. This will allow us to better distinguish the signatures of the interstellar medium, the gas disk and the transiting exocomets. Measuring the abundance of the key species H, C, N and O in a larger sample of evaporating exocomets will enable us to trace the condensation and evaporation processes present in the late stages of planetary formation. Notably, such abundance measurements are only possible via far-UV observations. These measurements will provide insight into the origins of the exocomets of the Beta Pictoris system.

OBSERVING DESCRIPTION

Airglow corrections for HI, OI and NI:

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The geocoronal line emission, known as airglow, inevitably affects the observations of the HI, OI and to a lesser extent the NI lines. The airglow from terrestrial hydrogen at high altitude produces a Lyman-Alpha emission line superimposed on the target spectrum. As a result off-target observations are required to be able to remove the airglow contamination.

With our most recent HST/COS observations of Beta Pictoris (using the same setup as proposed here) we demonstrated that the airglow contamination is very stable from one HST orbit to the other. Furthermore we found that the airglow produces variable but reproducible features as a

function of HST orbital position and can be corrected. Using real data we measured an increase in the residual noise of no more than 5 to 8% above the photon noise. Provided an off-target sky exposure after the science exposure is obtained, we can successfully remove the contaminating airglow emission which is essential to accurately perform measurements in the Lyman-Alpha and the airglow contaminated lines (NI and OI).

Development of a new airglow contamination correction procedure

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We will use the second orbit of the first visit (out of three visits) to develop a new Lyman-Alpha airglow contamination correction procedure, which we think will allow for an even better airglow correction whilst increasing the on-target time. We aim to do this by dividing the second orbit of the first visit into three equal parts. The first part will measure the airglow by observing 1 arcmin away from the target as done in cycle 21. The second part will consist of Beta Pictoris being placed 0.8 arcseconds along the dispersion axis such that the airglow will only cover the blue wing of the lines. In this configuration the red part of the lines will be totally clear of airglow contamination. During the third part, Beta Pictoris will be offset 0.8 arcseconds in the opposite direction along the dispersion axis to clear the blue part of the lines of airglow contamination. This will allow us to accurately measure most of the Lyman-Alpha line except for the very central part (~40 km/s) which is in any case of negligible interest because of the HI ISM absorption. This new technique, aimed at shifting the airglow away from the spectral lines of Beta Pictoris, will remove the need for a dedicated orbit for observing the airglow and will effectively double the on-target time. If shown to be successful, this technique will positively impact all future Lyman-Alpha observations of exoplanet atmospheres. We will observe Beta Pictoris using the same set-up and exposure time as in our observation of
program #13406.

Visit schedule description

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Each visit of the program requires 2 HST orbits of observation. The first orbit will be fully dedicated to obtain the best G130M spectrum of Beta Pictoris. The second orbit will be dedicated to obtain the airglow spectrum that will be used to correct the first orbit spectrum. Two thirds of this second orbit of the first of the three visits will be used to experiment a new procedure to overcome the airglow contamination by observing the target off-center, away from the center of the aperture as described in the above paragraph. The subsequent two visits will be put on hold until this new technique has been verified as more efficient. If successful this new approach will be applied during the second orbit of the two next visits. Should it not prove to be a viable observation technique, the observations will resume without the offsets.

Visit

Proposal 14089, Visit 1 (New Technique) (01), completed Sat Jan 02 02:01:18 GMT 2016

Diagnostic Status: Warning

Scientific Instruments: COS/FUV

Special Requirements: BETWEEN 01-OCT-2015:00:00:00 AND 31-DEC-2015:00:00:00

Comments: First orbit: Beta Pic is observed directly.

Second orbit: Divided into three equal parts.
1/3: Beta Pic will be placed 0.8 arcseconds along the dispersion axis (red side masked).
2/3: Beta Pic will be placed 0.8 arcseconds along the dispersion axis (blue side masked).
3/3: Airglow observed 1 arcmin away from target.

NOTE: It is essential that the Earth's airglow contamination is minimised.Please conduct all visists within the period 1st of October 2015 to 1st of March 2016. Our preferred time of observations is during the months November 2015 to January 2016.

Diagnostics

(Visit 1 (New Technique) (01)) Warning (Orbit Planner): INEFFICIENT ORDERING OF FP-POS POSITIONS

(Visit 1 (New Technique) (01)) Warning (Orbit Planner): INEFFICIENT ORDERING OF FP-POS POSITIONS

(Visit 1 (New Technique) (01)) Warning (Orbit Planner): INEFFICIENT ORDERING OF FP-POS POSITIONS

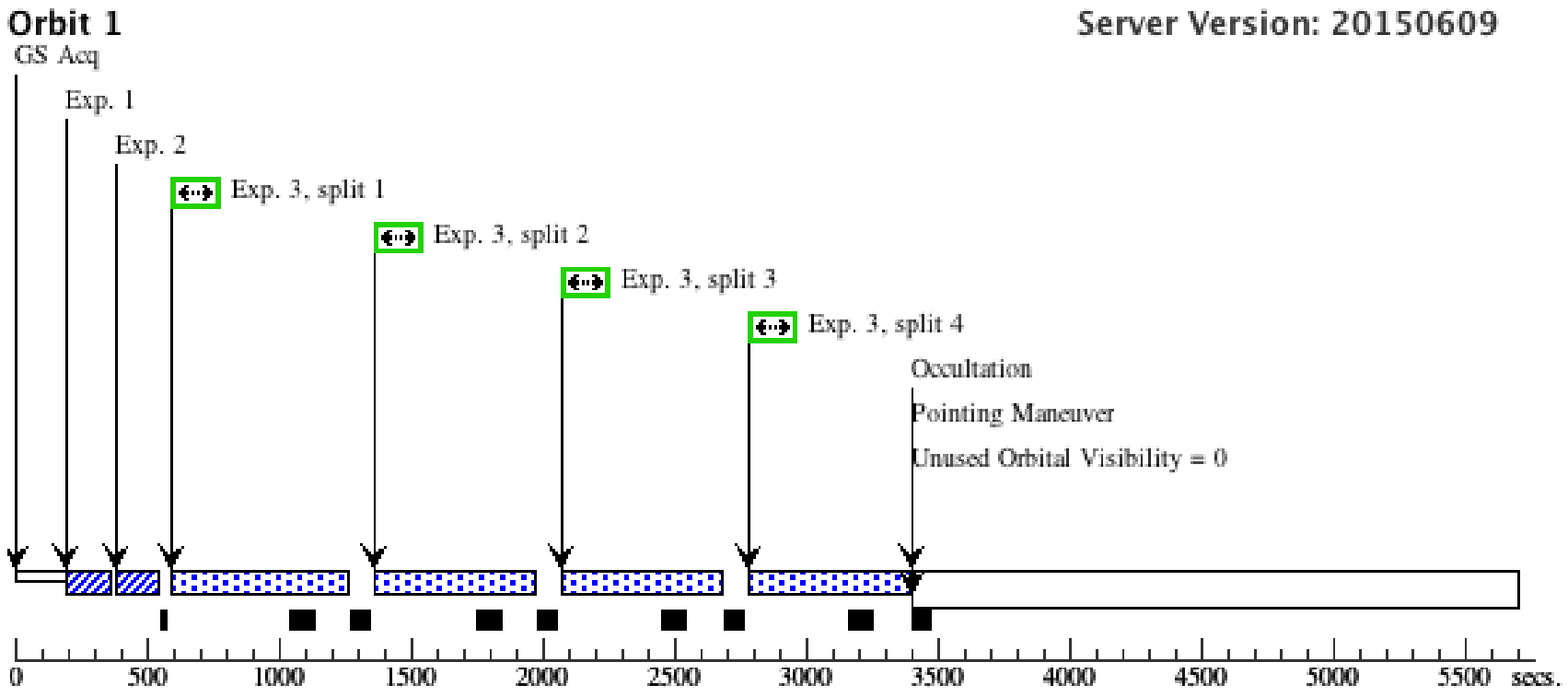
Fixed Targets

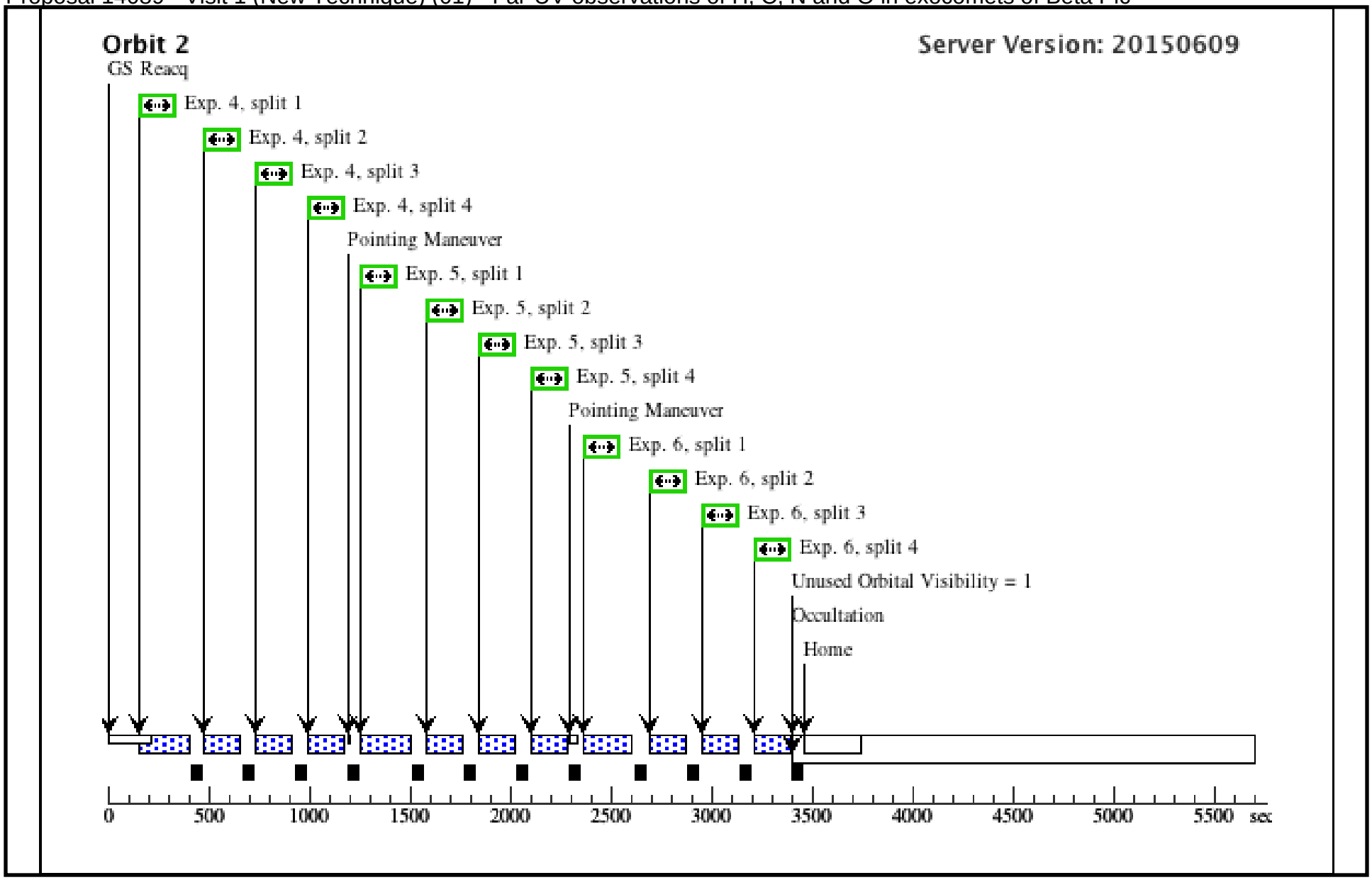
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	BET-PIC-1ARCMIN-OFFSET	Offset from BETA-PIC RA Offset: 0.0 Secs Dec Offset: 60.0 Arcsec		V=20 ~5e-13 erg /s/cm2/A at 1216A (Earth airglow at Lyman-alpha)	Offset Position (BET-PIC-1ARCMIN-OFFSET)
	Comments: The offset is designed to measure the geocoronal airglow in the direction of Beta Pic (thus an area 1 arcmin away is chosen). The V-magnitude is arbitrarily set to 20 to be compatible with "Bright Object Sensitive Detectors". Extended=NO				
(2)	BETA-PIC Alt Name1: BETA-PICTORIS	RA: 05 47 17.0877 (86.8211988d) Dec: -51 03 59.44 (-51.06651d) Equinox: J2000	Proper Motion RA: 4.65 mas/yr Proper Motion Dec: 83.10 mas/yr Parallax: 0.051" Epoch of Position: 2000	V=3.861	Reference Frame: ICRS
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. Extended=NO				

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Positioning (COS.sa.729672)	(2) BETA-PIC	COS/FUV, ACQ/PEAKXD, PSA	G130M 1291 A			Sequence 1-3 Non-Int in Visit 1 (New Technique) (01)	1.4 Secs (1.4 Secs) *[==>]*	***[1]***
2	Max-Light (COS.sa.729672)	(2) BETA-PIC	COS/FUV, ACQ/PEAKD, PSA	G130M 1291 A	CENTER=DEF; NUM-POS=5; STEP-SIZE=0.9		Sequence 1-3 Non-Int in Visit 1 (New Technique) (01)	1.4 Secs (1.4 Secs) *[==>]*	***[1]***
3	Exposures (COS.sp.729706)	(2) BETA-PIC	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=350; FLASH=YES; FP-POS=ALL		Sequence 1-3 Non-Int in Visit 1 (New Technique) (01)	534 Secs (2220 Secs) *[==>555.0 Secs (Split 1)]* *[==>555.0 Secs (Split 2)]* *[==>555.0 Secs (Split 3)]* *[==>555.0 Secs (Split 4)]*	***[1]***
Comments: In the ETC run, the strength of the Stellar Lyman-alpha line has been set to an extremely conservative upper limit to calculate the Buffer-time and check the Bright Objects Limit (FWHM=2 Angstrom, Flux =4e-12).									
4	Blueward-0.8arcsec (COS.sp.729937)	(2) BETA-PIC	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=350; FLASH=YES; FP-POS=ALL	POS TARG -0.8,null	Sequence 4-6 Non-Int in Visit 1 (New Technique) (01)	135 Secs (504 Secs) *[==>126.0 Secs (Split 1)]* *[==>126.0 Secs (Split 2)]* *[==>126.0 Secs (Split 3)]* *[==>126.0 Secs (Split 4)]*	***[2]***
5	Redward-0.8arcsec (COS.sp.729937)	(2) BETA-PIC	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=350; FLASH=YES; FP-POS=ALL	POS TARG 0.8,null	Sequence 4-6 Non-Int in Visit 1 (New Technique) (01)	135 Secs (504 Secs) *[==>126.0 Secs (Split 1)]* *[==>126.0 Secs (Split 2)]* *[==>126.0 Secs (Split 3)]* *[==>126.0 Secs (Split 4)]*	***[2]***
6	1arcmin-away (COS.sp.729957)	(1) BET-PIC-1ARCMIN-OFFSET	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=350; FLASH=YES; FP-POS=ALL		Sequence 4-6 Non-Int in Visit 1 (New Technique) (01)	134 Secs (500 Secs) *[==>125.0 Secs (Split 1)]* *[==>125.0 Secs (Split 2)]* *[==>125.0 Secs (Split 3)]* *[==>125.0 Secs (Split 4)]*	***[2]***

Orbit Structure




Orbit 2
Server Version: 20150609
GS Reacq
Exp. 4, split 1
Exp. 4, split 2
Exp. 4, split 3
Exp. 4, split 4
Pointing Maneuver
Exp. 5, split 1
Exp. 5, split 2
Exp. 5, split 3
Exp. 5, split 4
Pointing Maneuver
Exp. 6, split 1
Exp. 6, split 2
Exp. 6, split 3
Exp. 6, split 4
Unused Orbital Visibility = 1
Occultation
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 14089, Visit 2 (DO NOT EXECUTE THIS VISIT) (02), withdrawn Sat Jan 02 02:01:18 GMT 2016

Diagnostic Status: Warning

Scientific Instruments: COS/FUV

Special Requirements: AFTER 01 BY 14 D TO 30 D; ON HOLD

Comments: First orbit: Beta Pic is observed directly.
Second orbit: Airglow measurement is done 1 armin from target.

The results from Visit 1 will determine which version of Visit 2 will be executed. Either this visit will be done or Visit 2 (With POS TARGs. Visit on HOLD.).

On Hold Comments: In the accepted proposal we outline a new Lyman-alpha airglow contamination correction procedure which we will execute during the second orbit of the first visit. We aim to subsequently look at the visit 1 data and then make a decision on whether or not to continue this technique or instead to default to a standard and already tested technique. To allow enough time for us to asses the experimental technique we would like to put the subsequent two visits ON HOLD.

Diagnostics

(Visit 2 (DO NOT EXECUTE THIS VISIT) (02)) Warning (Orbit Planner): INEFFICIENT ORDERING OF FP-POS POSITIONS

(Visit 2 (DO NOT EXECUTE THIS VISIT) (02)) Warning (Orbit Planner): INEFFICIENT ORDERING OF FP-POS POSITIONS

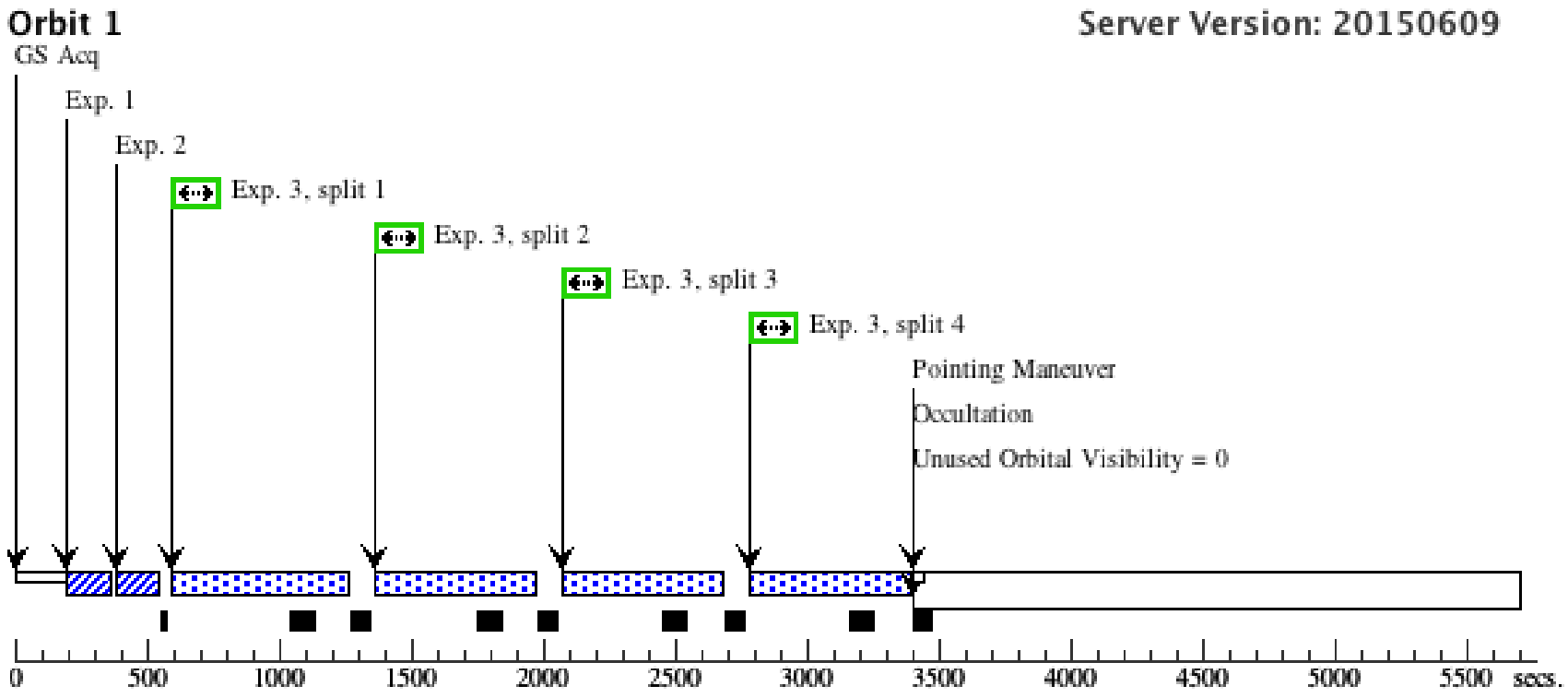
Fixed Targets

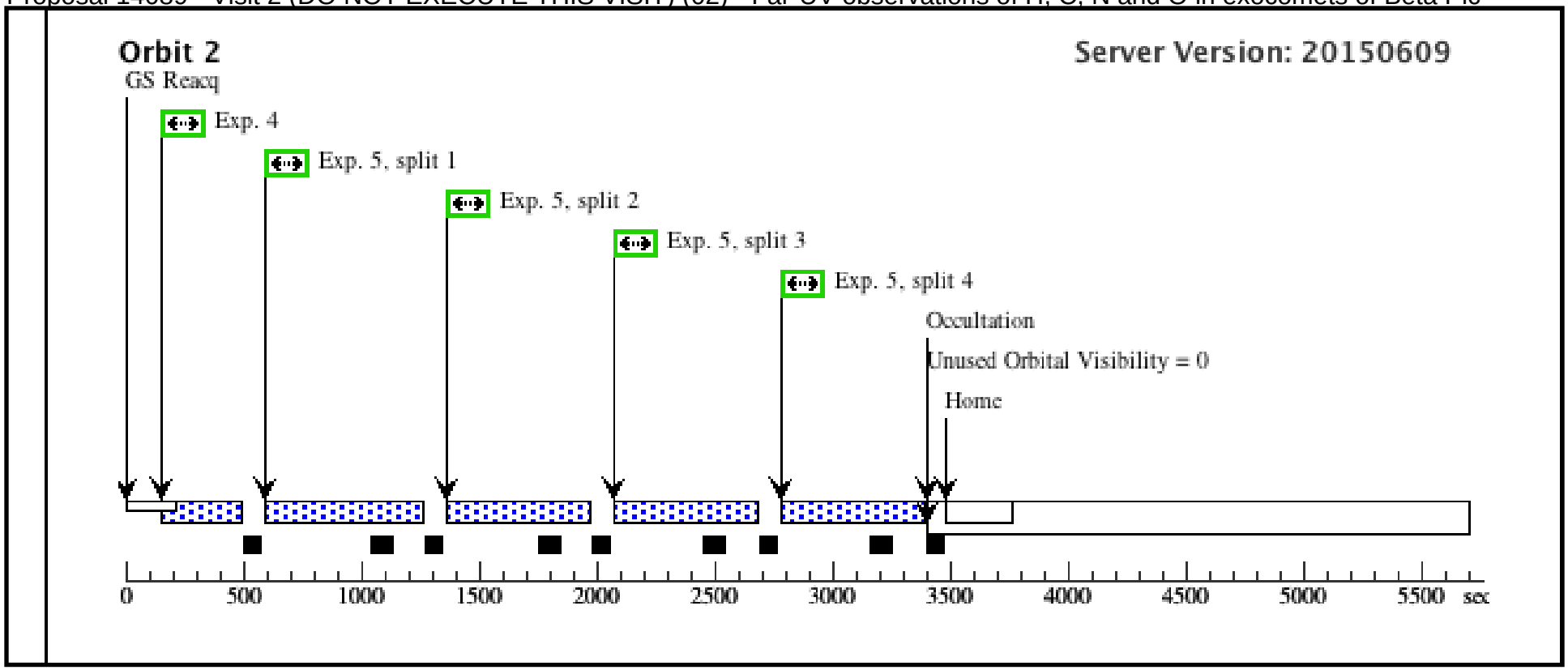
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	BET-PIC-1ARCMIN-OFFSET	Offset from BETA-PIC RA Offset: 0.0 Secs Dec Offset: 60.0 Arcsec		V=20 ~5e-13 erg /s/cm2/A at 1216A (Earth airglow at Lyman-alpha)	Offset Position (BET-PIC-1ARCMIN-OFFSET)
	Comments: The offset is designed to measure the geocoronal airglow in the direction of Beta Pic (thus an area 1 arcmin away is chosen). The V-magnitude is arbitrarily set to 20 to be compatible with "Bright Object Sensitive Detectors". Extended=NO				
(2)	BETA-PIC Alt Name1: BETA-PICTORIS	RA: 05 47 17.0877 (86.8211988d) Dec: -51 03 59.44 (-51.06651d) Equinox: J2000	Proper Motion RA: 4.65 mas/yr Proper Motion Dec: 83.10 mas/yr Parallax: 0.051" Epoch of Position: 2000	V=3.861	Reference Frame: ICRS
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. Extended=NO				

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Positioning (COS.sa.729672)	(2) BETA-PIC	COS/FUV, ACQ/PEAKXD, PSA	G130M 1291 A			Sequence 1-3 Non-Int in Visit 2 (DO NOT EXECUTE THIS VISIT) (02)	1.4 Secs (1.4 Secs) *[==>]*	***[1]***
2	Max-Light (COS.sa.729672)	(2) BETA-PIC	COS/FUV, ACQ/PEAKD, PSA	G130M 1291 A	CENTER=DEF; NUM-POS=5; STEP-SIZE=0.9		Sequence 1-3 Non-Int in Visit 2 (DO NOT EXECUTE THIS VISIT) (02)	1.4 Secs (1.4 Secs) *[==>]*	***[1]***
3	Exposures (COS.sp.729706)	(2) BETA-PIC	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=350; FLASH=YES; FP-POS=ALL		Sequence 1-3 Non-Int in Visit 2 (DO NOT EXECUTE THIS VISIT) (02)	534 Secs (2220 Secs) *[==>555.0 Secs (Split 1)]* *[==>555.0 Secs (Split 2)]* *[==>555.0 Secs (Split 3)]* *[==>555.0 Secs (Split 4)]*	***[1]***
4	sync (COS.sp.730003)	(1) BET-PIC-1ARCMIN-OFFSET	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=350; FLASH=YES; FP-POS=3		Sequence 4-5 Non-Int in Visit 2 (DO NOT EXECUTE THIS VISIT) (02)	237 Secs (218 Secs) *[==>218.0 Secs]*	***[2]***
5	1arcmin-away (COS.sp.730004)	(1) BET-PIC-1ARCMIN-OFFSET	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=350; FLASH=YES; FP-POS=ALL		Sequence 4-5 Non-Int in Visit 2 (DO NOT EXECUTE THIS VISIT) (02)	534 Secs (2220 Secs) *[==>555.0 Secs (Split 1)]* *[==>555.0 Secs (Split 2)]* *[==>555.0 Secs (Split 3)]* *[==>555.0 Secs (Split 4)]*	***[2]***

Orbit Structure




Orbit 2
Server Version: 20150609
GS Reacq
Exp. 4
Exp. 5, split 1
Exp. 5, split 2
Exp. 5, split 3
Exp. 5, split 4
Occultation
Unused Orbital Visibility = 0
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 14089, Visit 2 (With POS TARGs.) (03), completed Sat Jan 02 02:01:18 GMT 2016

Diagnostic Status: Warning

Scientific Instruments: COS/FUV

Special Requirements: AFTER 01 BY 7 D TO 30 D

Comments: First orbit: Beta Pic is observed directly.
Second orbit: Airglow measurement is done 1 armin from target.

Diagnostics

(Visit 2 (With POS TARGs.) (03)) Warning (Orbit Planner): INEFFICIENT ORDERING OF FP-POS POSITIONS

(Visit 2 (With POS TARGs.) (03)) Warning (Orbit Planner): INEFFICIENT ORDERING OF FP-POS POSITIONS

(Visit 2 (With POS TARGs.) (03)) Warning (Orbit Planner): INEFFICIENT ORDERING OF FP-POS POSITIONS

(Visit 2 (With POS TARGs.) (03)) Warning (Orbit Planner): INEFFICIENT ORDERING OF FP-POS POSITIONS

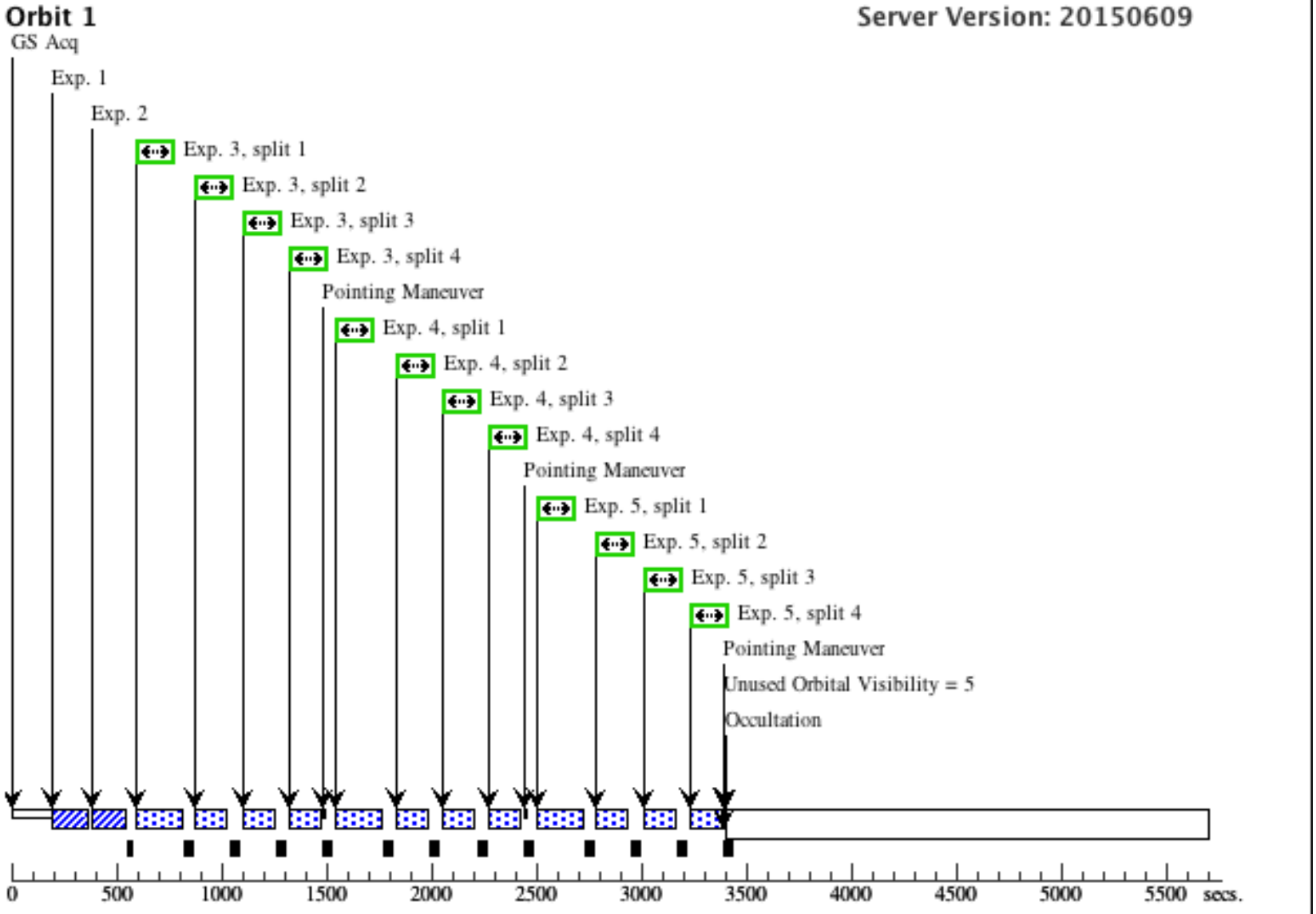
Fixed Targets

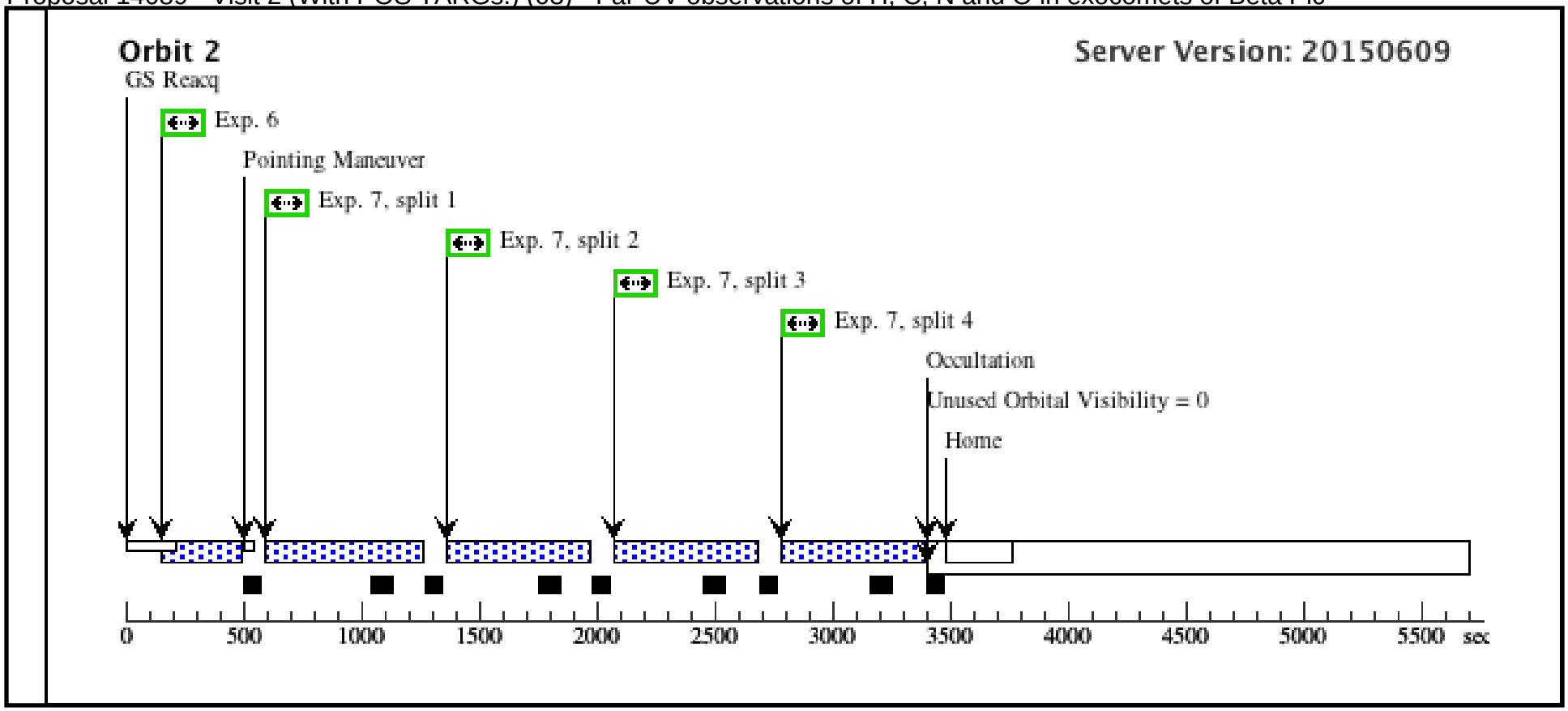
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	BET-PIC-1ARCMIN-OFFSET	Offset from BETA-PIC RA Offset: 0.0 Secs Dec Offset: 60.0 Arcsec		V=20 ~5e-13 erg /s/cm2/A at 1216A (Earth airglow at Lyman-alpha)	Offset Position (BET-PIC-1ARCMIN-OFFSET)
	Comments: The offset is designed to measure the geocoronal airglow in the direction of Beta Pic (thus an area 1 arcmin away is chosen). The V-magnitude is arbitrarily set to 20 to be compatible with "Bright Object Sensitive Detectors". Extended=NO				
(2)	BETA-PIC Alt Name1: BETA-PICTORIS	RA: 05 47 17.0877 (86.8211988d) Dec: -51 03 59.44 (-51.06651d) Equinox: J2000	Proper Motion RA: 4.65 mas/yr Proper Motion Dec: 83.10 mas/yr Parallax: 0.051" Epoch of Position: 2000	V=3.861	Reference Frame: ICRS
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. Extended=NO				

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Positioning (COS.sa.729672)	(2) BETA-PIC	COS/FUV, ACQ/PEAKXD, PSA	G130M 1291 A			Sequence 1-5 Non-Int in Visit 2 (With POS TARGs.) (03)	1.4 Secs (1.4 Secs) *[==>]*	***[1]***
2	Max-Light (COS.sa.729672)	(2) BETA-PIC	COS/FUV, ACQ/PEAKD, PSA	G130M 1291 A	CENTER=DEF; NUM-POS=5; STEP-SIZE=0.9		Sequence 1-5 Non-Int in Visit 2 (With POS TARGs.) (03)	1.4 Secs (1.4 Secs) *[==>]*	***[1]***
3	On Target (COS.sp.729706)	(2) BETA-PIC	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=350; FLASH=YES; FP-POS=ALL		Sequence 1-5 Non-Int in Visit 2 (With POS TARGs.) (03)	134 Secs (392 Secs) *[==>98.0 Secs (Split 1)]* *[==>98.0 Secs (Split 2)]* *[==>98.0 Secs (Split 3)]* *[==>98.0 Secs (Split 4)]*	***[1]***
4	Blueward-0.8arcsec (COS.sp.729706)	(2) BETA-PIC	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=350; FLASH=YES; FP-POS=ALL	POS TARG -0.8,null	Sequence 1-5 Non-Int in Visit 2 (With POS TARGs.) (03)	134 Secs (392 Secs) *[==>98.0 Secs (Split 1)]* *[==>98.0 Secs (Split 2)]* *[==>98.0 Secs (Split 3)]* *[==>98.0 Secs (Split 4)]*	***[1]***
5	Redward-0.8 arcsec (COS.sp.729706)	(2) BETA-PIC	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=350; FLASH=YES; FP-POS=ALL	POS TARG 0.8,null	Sequence 1-5 Non-Int in Visit 2 (With POS TARGs.) (03)	134 Secs (392 Secs) *[==>98.0 Secs (Split 1)]* *[==>98.0 Secs (Split 2)]* *[==>98.0 Secs (Split 3)]* *[==>98.0 Secs (Split 4)]*	***[1]***
6	On target (COS.sp.730003)	(2) BETA-PIC	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=350; FLASH=YES; FP-POS=3	POS TARG 1.1,null	Sequence 6-7 Non-Int in Visit 2 (With POS TARGs.) (03)	218 Secs (218 Secs) *[==>]*	***[2]***
7	1arcmin-away (COS.sp.730004)	(1) BET-PIC-1ARCMIN-OFFSET	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=350; FLASH=YES; FP-POS=ALL		Sequence 6-7 Non-Int in Visit 2 (With POS TARGs.) (03)	555 Secs (2220 Secs) *[==>(Split 1)]* *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]*	***[2]***

Orbit Structure




Orbit 2
Server Version: 20150609
GS Reacq
Exp. 6
Pointing Maneuver
Exp. 7, split 1
Exp. 7, split 2
Exp. 7, split 3
Exp. 7, split 4
Occultation
Unused Orbital Visibility = 0
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 14089, Visit 3 (With POS TARGs.) (04), implementation Sat Jan 02 02:01:18 GMT 2016

Diagnostic Status: Warning

Scientific Instruments: STIS/CCD, COS/FUV, STIS/FUV-MAMA

Special Requirements: AFTER 03 BY 7 D TO 40 D

Comments: First orbit: Beta Pic is observed directly.
Second orbit: Airglow measurement is done 1 armin from target.

Diagnostics

(Visit 3 (With POS TARGs.) (04)) Warning (Orbit Planner): INEFFICIENT ORDERING OF FP-POS POSITIONS

(Visit 3 (With POS TARGs.) (04)) Warning (Orbit Planner): INEFFICIENT ORDERING OF FP-POS POSITIONS

(Visit 3 (With POS TARGs.) (04)) Warning (Orbit Planner): INEFFICIENT ORDERING OF FP-POS POSITIONS

(Visit 3 (With POS TARGs.) (04)) Warning (Orbit Planner): INEFFICIENT ORDERING OF FP-POS POSITIONS

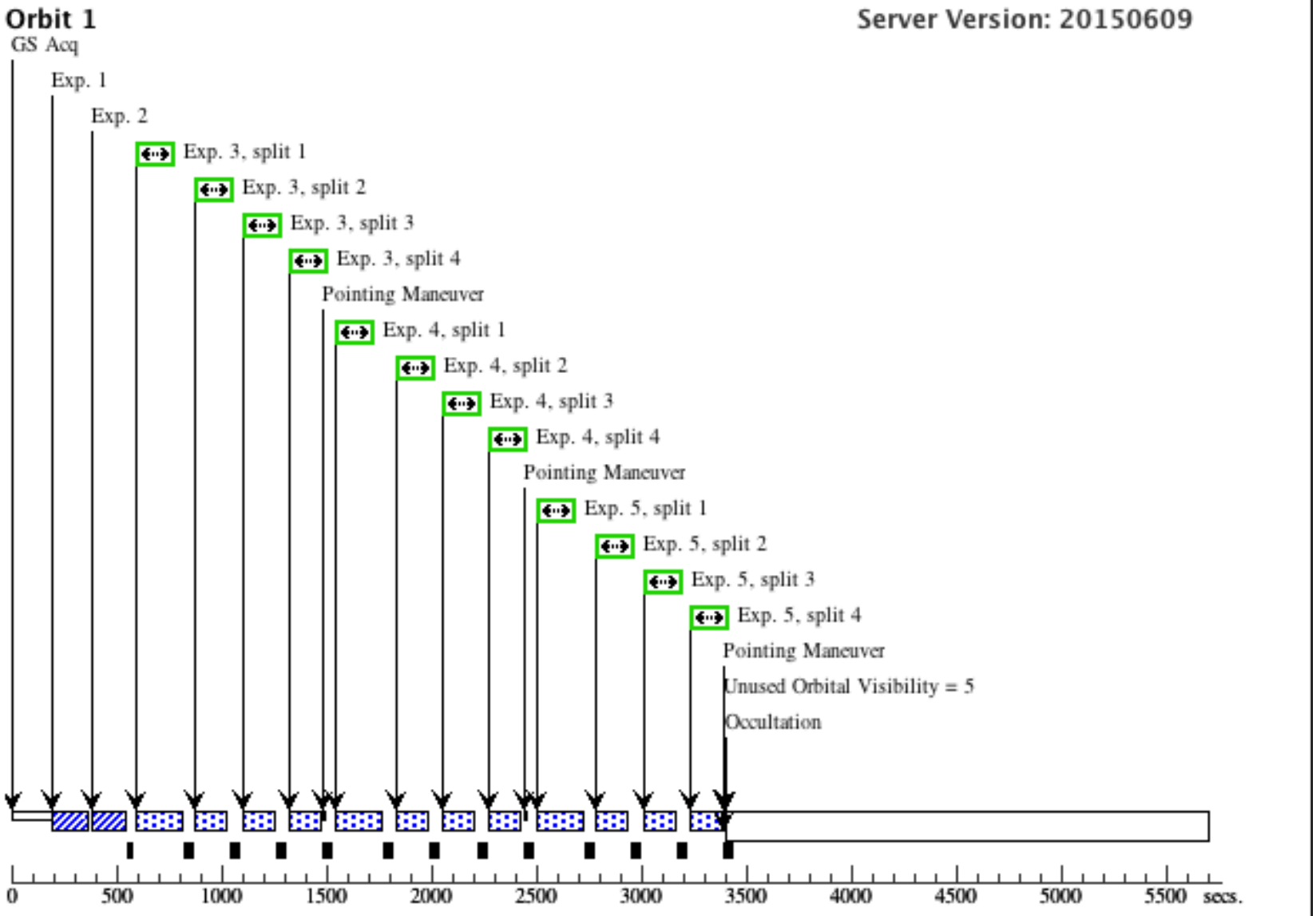
Fixed Targets

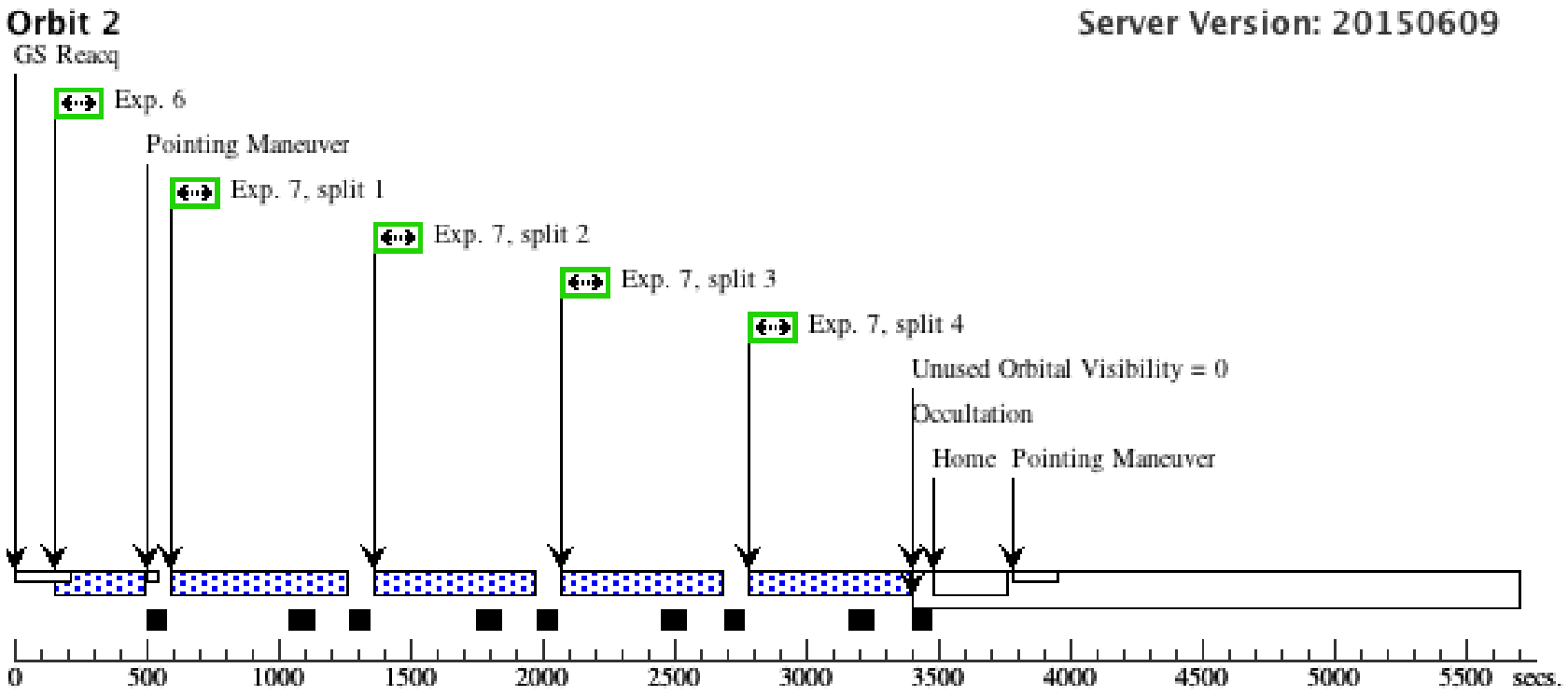
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	BET-PIC-1ARCMIN-OFFSET	Offset from BETA-PIC RA Offset: 0.0 Secs Dec Offset: 60.0 Arcsec		V=20 ~5e-13 erg /s/cm2/A at 1216A (Earth airglow at Lyman-alpha)	Offset Position (BET-PIC-1ARCMIN-OFFSET)
	Comments: The offset is designed to measure the geocoronal airglow in the direction of Beta Pic (thus an area 1 arcmin away is chosen). The V-magnitude is arbitrarily set to 20 to be compatible with "Bright Object Sensitive Detectors". Extended=NO				
(2)	BETA-PIC Alt Name1: BETA-PICTORIS	RA: 05 47 17.0877 (86.8211988d) Dec: -51 03 59.44 (-51.06651d) Equinox: J2000	Proper Motion RA: 4.65 mas/yr Proper Motion Dec: 83.10 mas/yr Parallax: 0.051" Epoch of Position: 2000	V=3.861	Reference Frame: ICRS
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. Extended=NO				

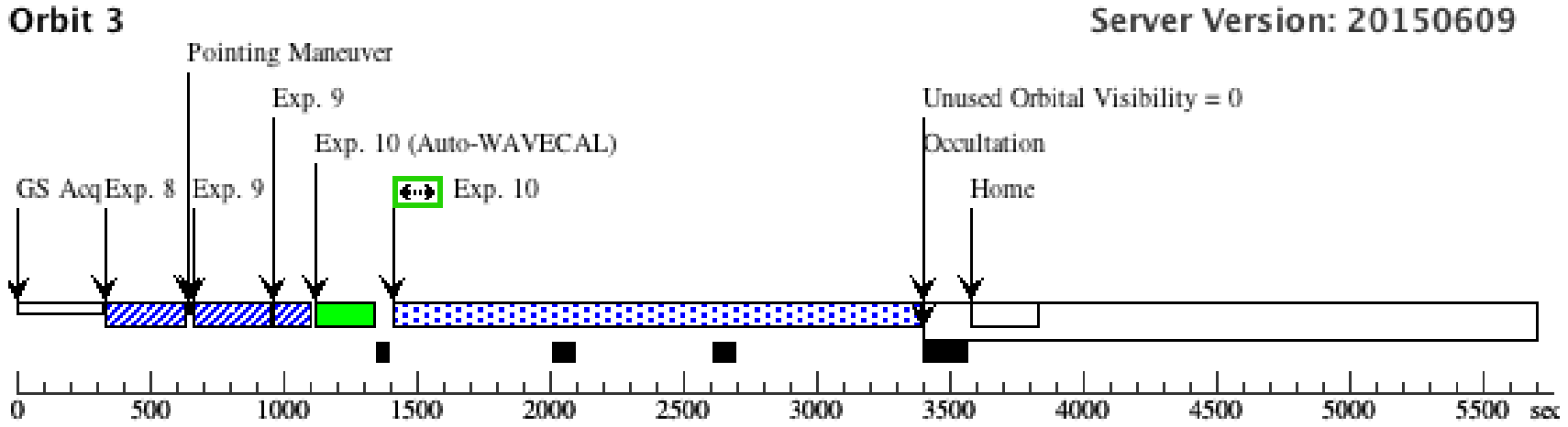
Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Positioning (COS.sa.729672)	(2) BETA-PIC	COS/FUV, ACQ/PEAKXD, PSA	G130M 1291 A			Sequence 1-5 Non-Int in Visit 3 (With POS TARGs.) (04)	1.4 Secs (1.4 Secs) *[==>]*	***[1]***
2	Max-Light (COS.sa.729672)	(2) BETA-PIC	COS/FUV, ACQ/PEAKD, PSA	G130M 1291 A	CENTER=DEF; NUM-POS=5; STEP-SIZE=0.9		Sequence 1-5 Non-Int in Visit 3 (With POS TARGs.) (04)	1.4 Secs (1.4 Secs) *[==>]*	***[1]***
3	On Target (COS.sp.729706)	(2) BETA-PIC	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=350; FLASH=YES; FP-POS=ALL		Sequence 1-5 Non-Int in Visit 3 (With POS TARGs.) (04)	134 Secs (392 Secs) *[==>98.0 Secs (Split 1)]* *[==>98.0 Secs (Split 2)]* *[==>98.0 Secs (Split 3)]* *[==>98.0 Secs (Split 4)]*	***[1]***
4	Blueward-0.8arcsec (COS.sp.729706)	(2) BETA-PIC	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=350; FLASH=YES; FP-POS=ALL	POS TARG -0.8,null	Sequence 1-5 Non-Int in Visit 3 (With POS TARGs.) (04)	134 Secs (392 Secs) *[==>98.0 Secs (Split 1)]* *[==>98.0 Secs (Split 2)]* *[==>98.0 Secs (Split 3)]* *[==>98.0 Secs (Split 4)]*	***[1]***
5	Redward-0.8 arcsec (COS.sp.729706)	(2) BETA-PIC	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=350; FLASH=YES; FP-POS=ALL	POS TARG 0.8,null	Sequence 1-5 Non-Int in Visit 3 (With POS TARGs.) (04)	134 Secs (392 Secs) *[==>98.0 Secs (Split 1)]* *[==>98.0 Secs (Split 2)]* *[==>98.0 Secs (Split 3)]* *[==>98.0 Secs (Split 4)]*	***[1]***
6	On target (COS.sp.730003)	(2) BETA-PIC	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=350; FLASH=YES; FP-POS=3	POS TARG 1.1,null	Sequence 6-7 Non-Int in Visit 3 (With POS TARGs.) (04)	218 Secs (218 Secs) *[==>]*	***[2]***
7	1arcmin-away (COS.sp.730004)	(1) BET-PIC-1ARCMIN-OFFSET	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=350; FLASH=YES; FP-POS=ALL		Sequence 6-7 Non-Int in Visit 3 (With POS TARGs.) (04)	555 Secs (2220 Secs) *[==>(Split 1)]* *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]*	***[2]***
8	Positioning	(2) BETA-PIC	STIS/CCD, ACQ, F25ND5	MIRROR			Sequence 8-10 Non-Int in Visit 3 (With POS TARGs.) (04)	1 Secs (1 Secs) *[==>]*	***[3]***
9	Centering	(2) BETA-PIC	STIS/CCD, ACQ/PEAK, 0.2X0.09	G430M 4194 A			Sequence 8-10 Non-Int in Visit 3 (With POS TARGs.) (04)	1 Secs (1 Secs) *[==>]*	***[3]***
10	Exposure (STIS.sp.756893)	(2) BETA-PIC	STIS/FUV-MAMA, TIME-TAG, 0.2X0.09	E140H 1453 A	BUFFER-TIME=600		Sequence 8-10 Non-Int in Visit 3 (With POS TARGs.) (04)	2000 Secs (1961 Secs) *[==>1961.0 Secs]*	***[3]***

Orbit Structure




Orbit 2
Server Version: 20150609
GS Reacq
Exp. 6
Pointing Maneuver
Exp. 7, split 1
Exp. 7, split 2
Exp. 7, split 3
Exp. 7, split 4
Unused Orbital Visibility = 0
Occultation
Home Pointing Maneuver
0 500 1000 1500 2000 2500 3000 3500 4000 4500 5000 5500 secs.


Orbit 3
Server Version: 20150609
Pointing Maneuver
Exp. 9
Exp. 10 (Auto-WAVECAL)
Unused Orbital Visibility = 0
Occultation
GS Acq Exp. 8 Exp. 9
Exp. 10
Home
0 500 1000 1500 2000 2500 3000 3500 4000 4500 5000 5500 sec