13008 - Probing Weak Intergalactic Absorption with Flaring Blazar Spectra 2

Cycle: 20, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	*Institution*	*E-Mail*
Prof. John T. Stocke (PI) (Contact)	**University of Colorado at Boulder**	**stocke@casa.colorado.edu**
Dr. Charles W. Danforth (CoI) (Contact)	University of Colorado at Boulder	danforth@origins.colorado.edu
Prof. Claudia Megan Urry (CoI)	Yale University	meg.urry@yale.edu
Dr. Erin Wells Bonning (CoI)	Yale University	erin.bonning@yale.edu
Ms. Jedidah Isler (CoI)	Yale University	jedidah.isler@yale.edu
Dr. Luigi Costamante (CoI)	Stanford University	luigi.costamante@stanford.edu
Prof. Roger Romani (CoI)	Stanford University	rwr@astro.stanford.edu
Prof. Alex V. Filippenko (CoI)	University of California - Berkeley	alex@astro.berkeley.edu
Dr. Stephen Bradley Cenko (CoI)	NASA Goddard Space Flight Center	brad.cenko@nasa.gov
Dr. Kevin M. McLin (CoI)	Sonoma State University	mclin@universe.sonoma.edu

VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) BZBJ1001+2911	COS/FUV	5	12-Dec-2013 21:01:50.0	yes
02	(2) PMNJ2345-1555	COS/FUV COS/NUV	5	12-Dec-2013 21:02:14.0	yes
03	(3) PG1222+216	COS/FUV	5	12-Dec-2013 21:02:38.0	yes

15 Total Orbits Used

ABSTRACT

We propose to exploit the flaring states of high- and unknown-redshift blazars to obtain very high S/N > 25 COS spectra in order to study details of the local intergalactic medium (IGM) not accessible for study using the plethora of lower S/N data being obtained. Only with very high S/N spectra is it possible to detect the weakest Ly alpha and metal lines wherein may lie a substantial portion of the cosmic baryons. The numbers of weak OVI absorbers can discriminate between collisionally ionized and photoionized models, as well as determine which of several galactic outflow models best matches the IGM metal enrichment. Most importantly, high S/N spectra plus the featureless UV power-law continuum of blazars facilitates the detection of broad, shallow absorbers ["broad Ly alpha" (BLA) and broad OVI-only absorbers] which uniquely probe the T = 3 x 10^5 - 3 x 10^6 K range in the IGM where many cosmic baryons are predicted to be "hiding."

In addition, these same spectra will be used to obtain lower limits on, or estimates of, the redshift for any featureless blazars observed using the foreground Ly-alpha forest absorbers. In some cases weak Lyman alpha emission may also be detected, as was recently discovered for a few well-known low-redshift BL Lac objects using COS spectra. We request up to three *non-disruptive ToOs* to carry out this program in Cycle 19. Ground-based monitoring will select objects flaring to V ~ 13.5 mag for HST observations, out of a set of about 200 monitored blazars.

OBSERVING DESCRIPTION

We have selected our targets from several pools of known blazars. The First group (12) are objects with known or suggested emission redshifts > 0.3 to maximize the pathlength for weak intergalactic Lya, O VI, and other important diagnostic lines. The second group (6) are objects known to be simultaneously bright in TeV gamma-rays and with nominal UV |*|uxes above ~1e-15 erg cm-2 s-1 Ang-1. All targets have measured GALEX NUV and FUV |*|uxes and are in regions of moderate to low Galactic extinction.

We assume the unreddened continuum in the optical-UV range follows a power-law behavior of the form f(nu)=nu^-alpha and determine the slope alpha from published GALEX NUV/FUV fluxes. These fluxes were obtained simultaneously and their ratio should be insensitive to luminosity variations in the AGN. Observed GALEX UV indices are 0 < alpha < 2, typical of those seen in detailed UV spectra of BL Lac objects (e.g., Stocke, Danforth & Perlman 2011).

All targets will be monitored on the ground by a network of small, optical telescopes (see Coordinated Observations below) with a ~3 day cadence. We estimate optical trigger thresholds for each target based on these power laws and the observed Galactic extinction toward each object. When the optical magnitude indicates that the reddened |*|ux in the far-UV is ~(2-3)e-14 erg cm-2 s-1 Ang-11, we will activate a non-disruptive ToO observation. The typical magnitude for triggering these observations is V < 13.5.
For F1500=3e-14 erg cm-2 s-1 Ang-1, we estimate that we can achieve S/N ~25 per resolution element in a single five-orbit HST visit. The observations will be carried out in both COS/G130M (~2 orbits) and COS/G160M (~3 orbits) using muliple grating central wavelength and FP positions. This is to ensure continuous spectral coverage over the 1132 < lambda < 1795 wavelength range and to dither instrumental features (repellor grid wire shadows, gain sag artifacts, etc.) across the spectrum. Two members of the team have extensive experience in this area as members of the COS GTO team.

Unfortunately, we cannot guarantee that any particular object will remain above our flare threshold for the 2-4 weeks required for Preferred Scheduling observations (a.k.a. non-disruptive ToO). To minimize the chances of a miss, we will carefully examine the historical variability record for each object and the trend of the flare in progress to predict the duration of a flare. However, even if our chosen blazar has faded somewhat below our F1500~3e-14 erg cm-2 s-1 Ang-1 trigger level, we can still obtain very useful data at lower S/N with our planned observations. As a case in point, 1ES 1553+113 was observed in a non-flaring state (3 HST orbits, F1500~1.5e-14, S/N ~ 15). Danforth et al. (2010) published a study of over 100 intervening absorption lines, including several interesting new OVI absorbers, and constrained the source redshift to 0.3950 < z < 0.45. Even if the objects are not near peak flux during the HST observations, our data (obtained at an above-average flux level) will enable compelling and original science.

Proposal 13008 - Visit 01 - Probing Weak Intergalactic Absorption with Flaring Blazar Spectra 2

Visit

Proposal 13008, Visit 01, completed Fri Dec 13 02:02:51 GMT 2013

Diagnostic Status: Warning

Scientific Instruments: COS/FUV

Special Requirements: (none)

Diagnostics

(Visit 01) Warning (Form): For the best data quality, it is strongly recommended that all four FP-POS positions be used when observing at a given COS CENWAVE setting.

Fixed Targets

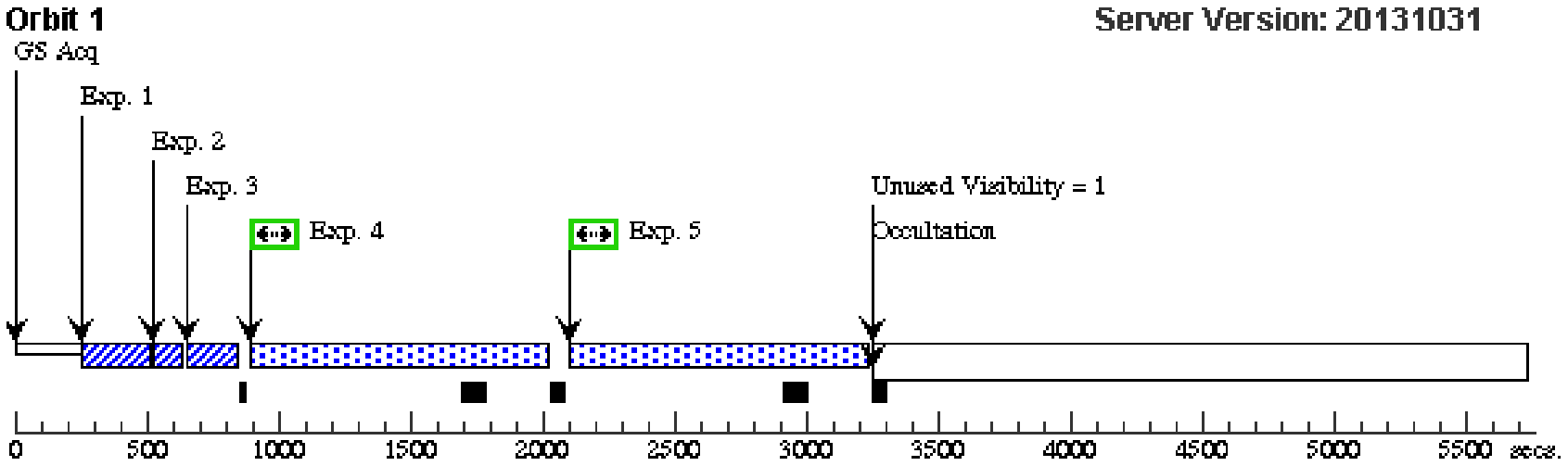
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	BZBJ1001+2911 Alt Name1: RXJ1001.1+2911 Alt Name2: 9CJ1001+2911	RA: 10 01 10.2056 (150.2925233d) Dec: +29 11 37.54 (29.19376d) Equinox: J2000		V=14.0+/-0.5 F(1300A)~1.5e-14 erg cm-2 s-1 Ang-1 (estimated)	Reference Frame: ICRS

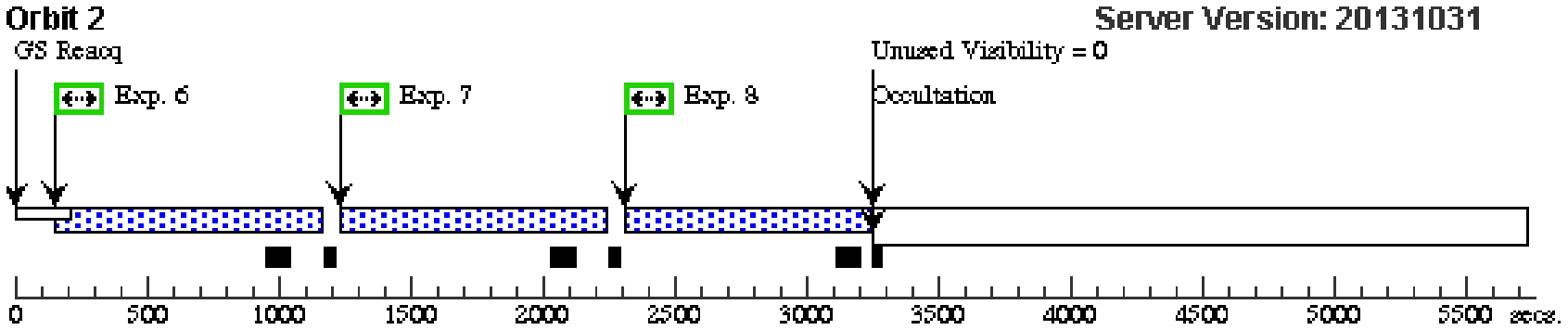
Exposures

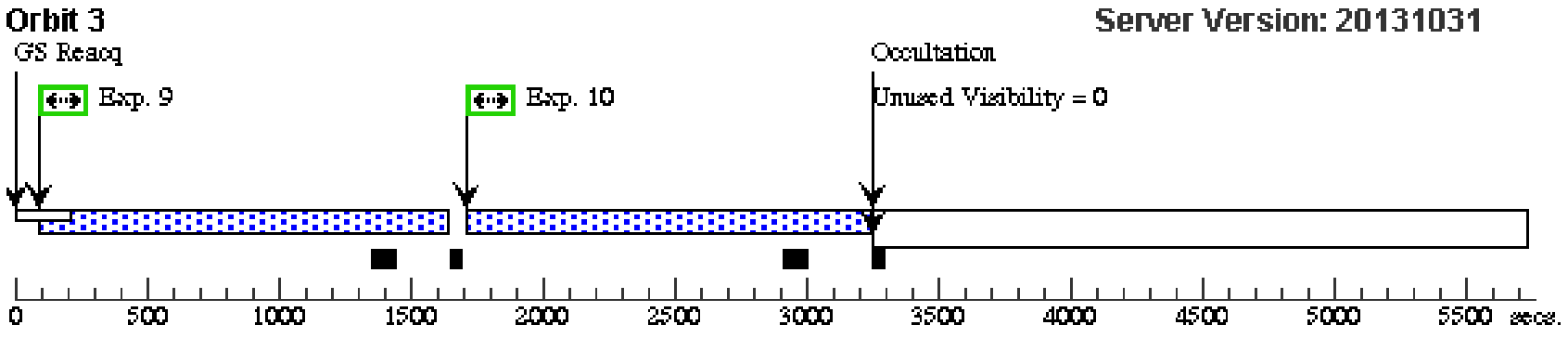
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ACQ/SEARCH (COS.sa.499016)	(1) BZBJ1001+2911	COS/FUV, ACQ/SEARCH, PSA	G130M 1291 A	SCAN-SIZE=2			8 Secs (8 Secs) *[==>]*	*[1]*
	Comments: S/N>40 at 50% nominal flux or above (F_1500>0.8e-14). However, if flux is 2x expected level, count rate is still acceptable (COS.sa.499016).								
2	ACQ/PEAKXD (COS.sa.499016)	(1) BZBJ1001+2911	COS/FUV, ACQ/PEAKXD, PSA	G130M 1291 A				22 Secs (22 Secs) *[==>]*	*[1]*
	Comments: S/N>40 at 50% nominal flux or above (F_1500>0.8e-14). However, if flux is 2x expected level, count rate is still acceptable (COS.sa.499016).								
3	ACQ/PEAKD (COS.sa.499016)	(1) BZBJ1001+2911	COS/FUV, ACQ/PEAKD, PSA	G130M 1291 A	NUM-POS=5; STEP-SIZE=0.9			8 Secs (8 Secs) *[==>]*	*[1]*
	Comments: S/N>40 at 50% nominal flux or above (F_1500>0.8e-14). However, if flux is 2x expected level, count rate is still acceptable (COS.sa.499016).								
4	Blazar 1 - G130M 1291 (COS.sp.499017)	(1) BZBJ1001+2911	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=1; BUFFER-TIME=7000			700 Secs (1011 Secs) *[==>1011.0 Secs]*	*[1]*
	Comments: For F(1300)=1.6e-14, expect S/N~8 per resel. Buffer time based on 2x nominal count rate.								
5	Blazar 1 - G130M 1300 (COS.sp.499017)	(1) BZBJ1001+2911	COS/FUV, TIME-TAG, PSA	G130M 1300 A	FP-POS=2; BUFFER-TIME=7000			700 Secs (1011 Secs) *[==>1011.0 Secs]*	*[1]*
	Comments: For F(1300)=1.6e-14, expect S/N~8 per resel. Buffer time based on 2x nominal count rate.								
6	Blazar 1 - G130M 1309 (COS.sp.186162)	(1) BZBJ1001+2911	COS/FUV, TIME-TAG, PSA	G130M 1309 A	FP-POS=3; BUFFER-TIME=7000			830 Secs (887 Secs) *[==>887.0 Secs]*	*[2]*
	Comments: For F(1500)=3e-14, expect S/N~18 per resel. Buffer time based on 2x nominal count rate.								
7	Blazar 1 - G130M 1318 (COS.sp.186162)	(1) BZBJ1001+2911	COS/FUV, TIME-TAG, PSA	G130M 1318 A	FP-POS=4; BUFFER-TIME=7000			830 Secs (887 Secs) *[==>887.0 Secs]*	*[2]*
	Comments: For F(1500)=3e-14, expect S/N~18 per resel. Buffer time based on 2x nominal count rate.								
8	Blazar 1 - G130M 1327 (COS.sp.186162)	(1) BZBJ1001+2911	COS/FUV, TIME-TAG, PSA	G130M 1327 A	FP-POS=1; BUFFER-TIME=7000			750 Secs (807 Secs) *[==>807.0 Secs]*	*[2]*
	Comments: For F(1500)=3e-14, expect S/N~18 per resel. Buffer time based on 2x nominal count rate.								
9	Blazar 1 - G160M 1623 (COS.sp.186167)	(1) BZBJ1001+2911	COS/FUV, TIME-TAG, PSA	G160M 1623 A	FP-POS=4; BUFFER-TIME=1100			1300 Secs (1366 Secs) *[==>1366.0 Secs]*	*[3]*
	Comments: For F(1500)=3e-14, we expect S/N~16 per resel. Buffer time based on 2x nominal count rate.								
10	Blazar 1 - G160M 1611 (COS.sp.186167)	(1) BZBJ1001+2911	COS/FUV, TIME-TAG, PSA	G160M 1611 A	FP-POS=3; BUFFER-TIME=1100			1340 Secs (1406 Secs) *[==>1406.0 Secs]*	*[3]*
	Comments: For F(1500)=3e-14, we expect S/N~16 per resel. Buffer time based on 2x nominal count rate.								

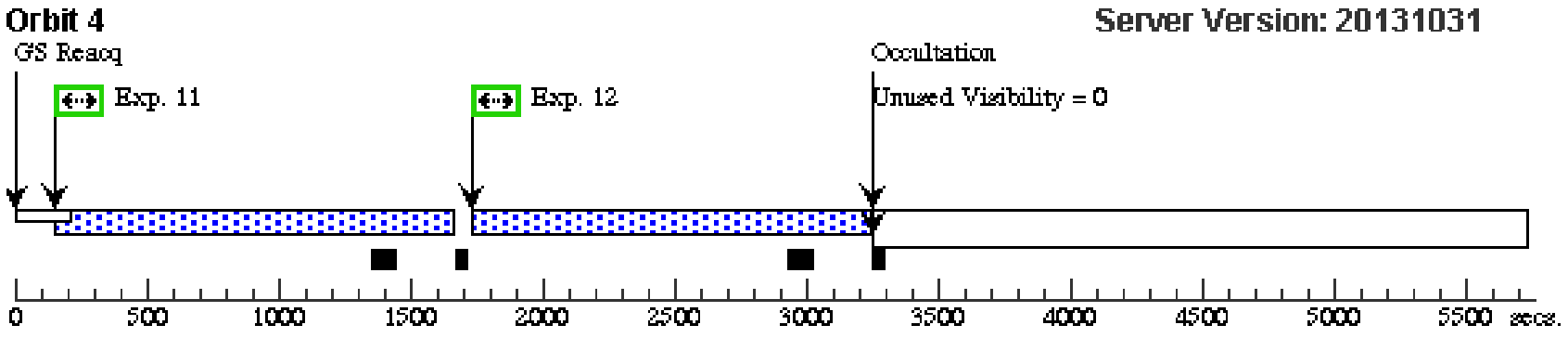
11	Blazar 1 - G 160M 1600 (COS.sp.186 167)	(1) BZBJ1001+2911	COS/FUV, TIME-TAG, PSA	G160M 1600 A	FP-POS=2; BUFFER-TIME=1100	1340 Secs (1387 Secs) *[==>1387.0 Secs]*	***[4]***
	Comments: For F(1500)=3e-14, we expect S/N~16 per resel. Buffer time based on 2x nominal count rate.						
12	Blazar 1 - G 160M 1589 (COS.sp.186 167)	(1) BZBJ1001+2911	COS/FUV, TIME-TAG, PSA	G160M 1589 A	FP-POS=1; BUFFER-TIME=1100	1340 Secs (1387 Secs) *[==>1387.0 Secs]*	***[4]***
	Comments: For F(1500)=3e-14, we expect S/N~16 per resel. Buffer time based on 2x nominal count rate.						
13	Blazar 1 - G 160M 1577 (COS.sp.186 167)	(1) BZBJ1001+2911	COS/FUV, TIME-TAG, PSA	G160M 1577 A	FP-POS=2; BUFFER-TIME=1100	1340 Secs (1421 Secs) *[==>1421.0 Secs]*	***[5]***
	Comments: For F(1500)=3e-14, we expect S/N~16 per resel. Buffer time based on 2x nominal count rate.						
14	Blazar 1 - G 160M 1577 (COS.sp.186 167)	(1) BZBJ1001+2911	COS/FUV, TIME-TAG, PSA	G160M 1577 A	FP-POS=3; BUFFER-TIME=1100	1340 Secs (1421 Secs) *[==>1421.0 Secs]*	***[5]***
	Comments: For F(1500)=3e-14, we expect S/N~16 per resel. Buffer time based on 2x nominal count rate.						

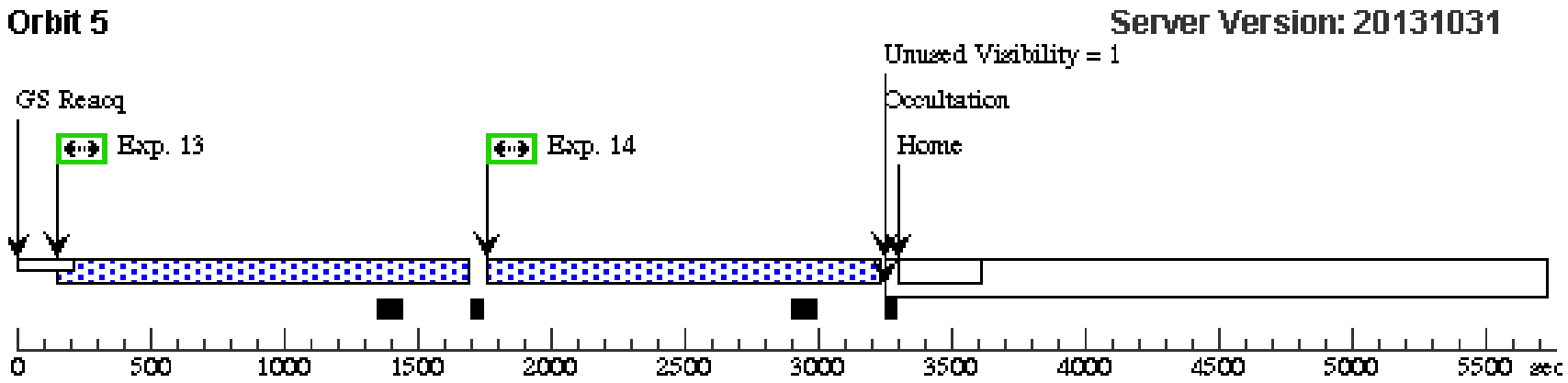
Orbit Structure






Orbit 3
Server Version: 20131031
GS Reacq
Exp. 9
Exp. 10
Occultation
Unused Visibility = 0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.


Orbit 4
Server Version: 20131031
GS Reacq
Exp. 11
Exp. 12
Occultation
Unused Visibility = 0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.


Orbit 5
Server Version: 20131031
Unused Visibility = 1
GS Reacq
Exp. 13
Exp. 14
Occultation
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 13008, Visit 02, completed Fri Dec 13 02:02:55 GMT 2013

Diagnostic Status: Warning

Scientific Instruments: COS/NUV, COS/FUV

Special Requirements: SCHED 100%

Comments: ToO observations of PMNJ2345-1555 activated Aug 13, 2013

Diagnostics

(Visit 02) Warning (Form): For the best data quality, it is strongly recommended that all four FP-POS positions be used when observing at a given COS CENWAVE setting.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	PMNJ2345-1555 Alt Name1: VV2010-J234512.4-155507 Alt Name2: BZQJ2345-1555	RA: 23 45 12.4623 (356.3019262d) Dec: -15 55 7.83 (-15.91884d) Equinox: J2000	Proper Motion RA: 0 Proper Motion Dec: 0 Redshift: 0.621	V=14.5+/-1 F(1500A)~1.5e-14 erg cm-2 s-1 Ang-1	Reference Frame: ICRS

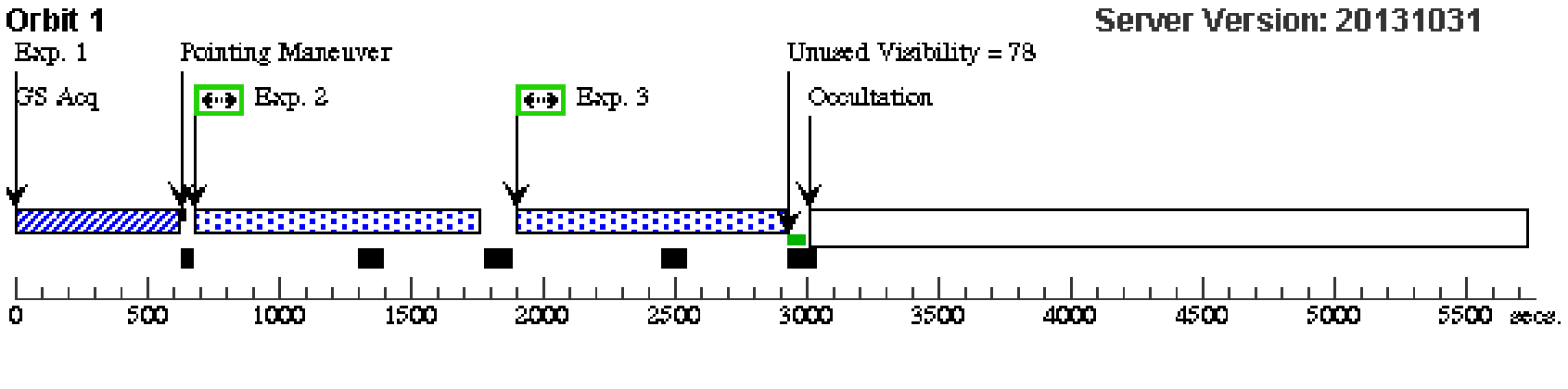
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

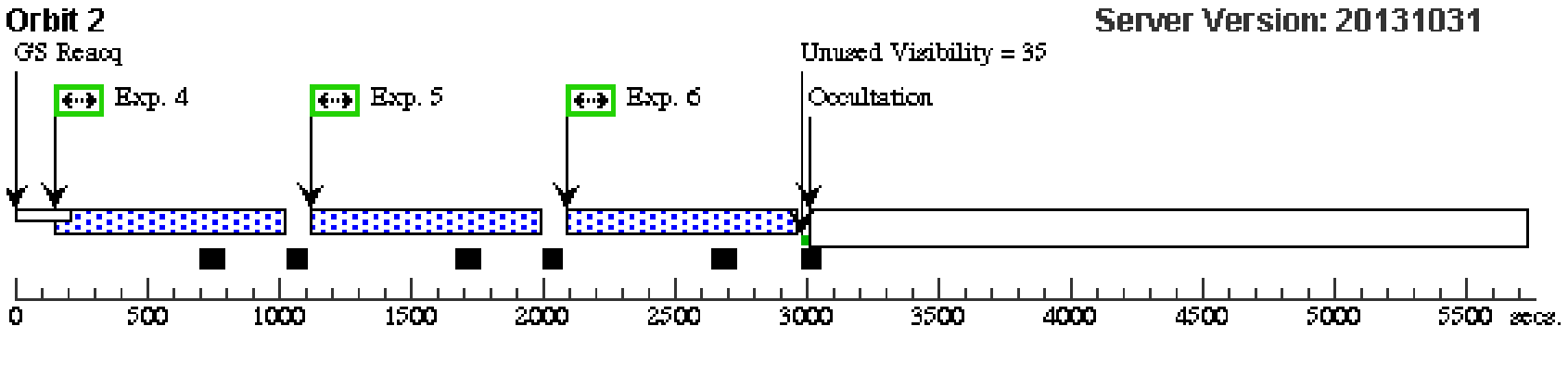
Exposures

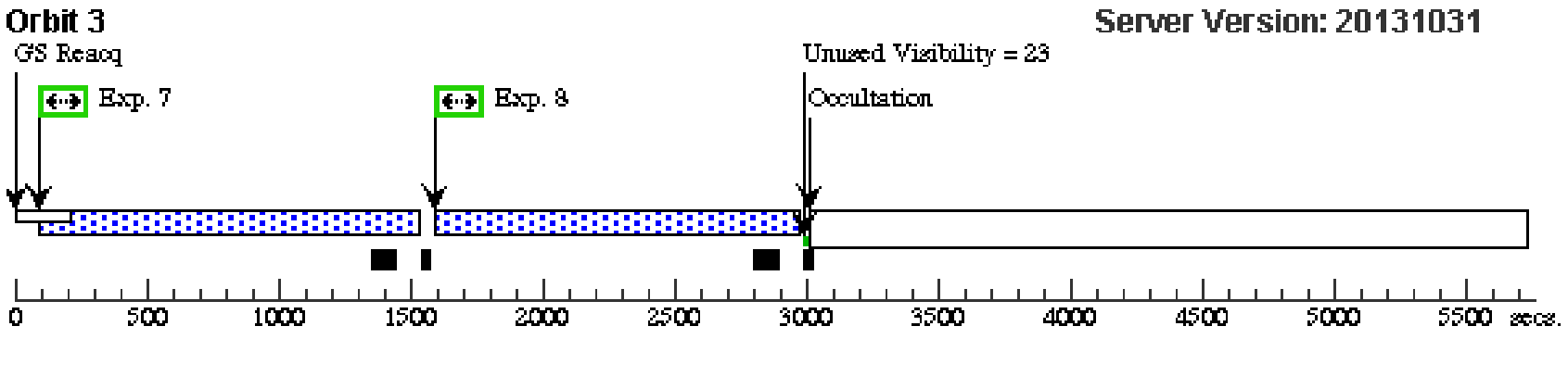
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ACQ/IMAGE (COS.ta.196481)	(2) PMNJ2345-1555	COS/NUV, ACQ/IMAGE, BOA	MIRRORA				105 Secs (105 Secs) *[==>]*	***[1]***
Comments: S/N>40 at 50% nominal flux or above (F_1500>1.5e-14). However, if flux is 2x expected level, count rate is still acceptable (COS.ta.196577).									
2	Blazar 2 - G 130M 1291 (COS.sp.186162)	(2) PMNJ2345-1555	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=1; BUFFER-TIME=450			900 Secs (900 Secs) *[==>]*	***[1]***
Comments: For F(1500)=3e-14, expect S/N~18 per resel. Buffer time based on 2x nominal count rate.									
3	Blazar 2 - G 130M 1300 (COS.sp.186162)	(2) PMNJ2345-1555	COS/FUV, TIME-TAG, PSA	G130M 1300 A	FP-POS=2; BUFFER-TIME=450			900 Secs (900 Secs) *[==>]*	***[1]***
Comments: For F(1500)=3e-14, expect S/N~18 per resel. Buffer time based on 2x nominal count rate.									
4	Blazar 2 - G 130M 1309 (COS.sp.186162)	(2) PMNJ2345-1555	COS/FUV, TIME-TAG, PSA	G130M 1309 A	FP-POS=3; BUFFER-TIME=450			750 Secs (750 Secs) *[==>]*	***[2]***
Comments: For F(1500)=3e-14, expect S/N~18 per resel. Buffer time based on 2x nominal count rate.									
5	Blazar 2 - G 130M 1318 (COS.sp.186162)	(2) PMNJ2345-1555	COS/FUV, TIME-TAG, PSA	G130M 1318 A	FP-POS=4; BUFFER-TIME=450			750 Secs (750 Secs) *[==>]*	***[2]***
Comments: For F(1500)=3e-14, expect S/N~18 per resel. Buffer time based on 2x nominal count rate.									
6	Blazar 2 - G 130M 1327 (COS.sp.186162)	(2) PMNJ2345-1555	COS/FUV, TIME-TAG, PSA	G130M 1327 A	FP-POS=1; BUFFER-TIME=450			750 Secs (750 Secs) *[==>]*	***[2]***
Comments: For F(1500)=3e-14, expect S/N~18 per resel. Buffer time based on 2x nominal count rate.									
7	Blazar 2 - G 160M 1623 (COS.sp.186167)	(2) PMNJ2345-1555	COS/FUV, TIME-TAG, PSA	G160M 1623 A	FP-POS=1; BUFFER-TIME=1100			1260 Secs (1260 Secs) *[==>]*	***[3]***
Comments: For F(1500)=3e-14, we expect S/N~16 per resel. Buffer time based on 2x nominal count rate.									
8	Blazar 2 - G 160M 1611 (COS.sp.186167)	(2) PMNJ2345-1555	COS/FUV, TIME-TAG, PSA	G160M 1611 A	FP-POS=1; BUFFER-TIME=1100			1260 Secs (1260 Secs) *[==>]*	***[3]***
Comments: For F(1500)=3e-14, we expect S/N~16 per resel. Buffer time based on 2x nominal count rate.									
9	Blazar 2 - G 160M 1600 (COS.sp.186167)	(2) PMNJ2345-1555	COS/FUV, TIME-TAG, PSA	G160M 1600 A	FP-POS=1; BUFFER-TIME=1100			1260 Secs (1260 Secs) *[==>]*	***[4]***
Comments: For F(1500)=3e-14, we expect S/N~16 per resel. Buffer time based on 2x nominal count rate.									
10	Blazar 2 - G 160M 1589 (COS.sp.186167)	(2) PMNJ2345-1555	COS/FUV, TIME-TAG, PSA	G160M 1589 A	FP-POS=1; BUFFER-TIME=1100			1260 Secs (1260 Secs) *[==>]*	***[4]***
Comments: For F(1500)=3e-14, we expect S/N~16 per resel. Buffer time based on 2x nominal count rate.									

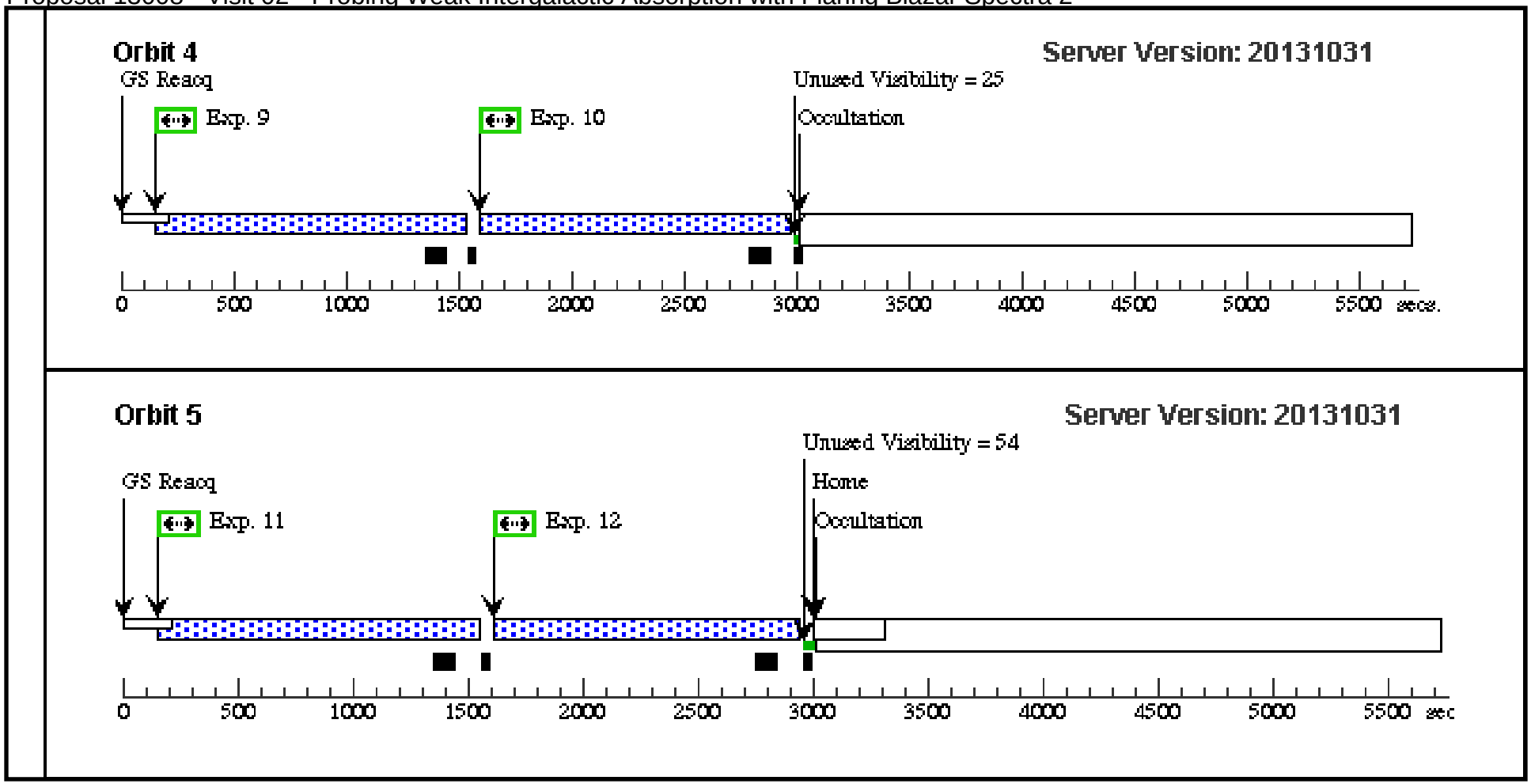
	11	Blazar 2 - G 160M 1577 (COS.sp.186 167)	(2) PMNJ2345-1555	COS/FUV, TIME-TAG, PSA	G160M 1577 A	FP-POS=1; BUFFER-TIME=1100	1280 Secs (1280 Secs) *[==>]*	**[5]**
		Comments: For F(1500)=3e-14, we expect S/N~16 per resel. Buffer time based on 2x nominal count rate.					
	12	Blazar 2 - G 160M 1577 (COS.sp.186 167)	(2) PMNJ2345-1555	COS/FUV, TIME-TAG, PSA	G160M 1577 A	FP-POS=3; BUFFER-TIME=1100	1280 Secs (1280 Secs) *[==>]*	**[5]**
		Comments: For F(1500)=3e-14, we expect S/N~16 per resel. Buffer time based on 2x nominal count rate.					

Orbit Structure








Orbit 4
Server Version: 20131031
GS Reacq
Exp. 9
Exp. 10
Unused Visibility = 25
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.
Orbit 5
Server Version: 20131031
Unused Visibility = 54
GS Reacq
Exp. 11
Exp. 12
Home
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 13008, Visit 03, implementation Fri Dec 13 02:02:57 GMT 2013

Diagnostic Status: Warning

Scientific Instruments: COS/FUV

Special Requirements: SCHED 100%

Diagnostics

(Visit 03) Warning (Form): For the best data quality, it is strongly recommended that all four FP-POS positions be used when observing at a given COS CENWAVE setting.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	PG1222+216 Alt Name1: PKS1222+216 Alt Name2: 4C+21.35	RA: 12 24 54.4482 (186.2268675d) Dec: +21 22 46.34 (21.37954d) Equinox: J2000	Redshift: 0.432	V=14.5+/-1 F(1500)~(4+/-2)e-14 erg/cm2/s/Ang	Reference Frame: ICRS

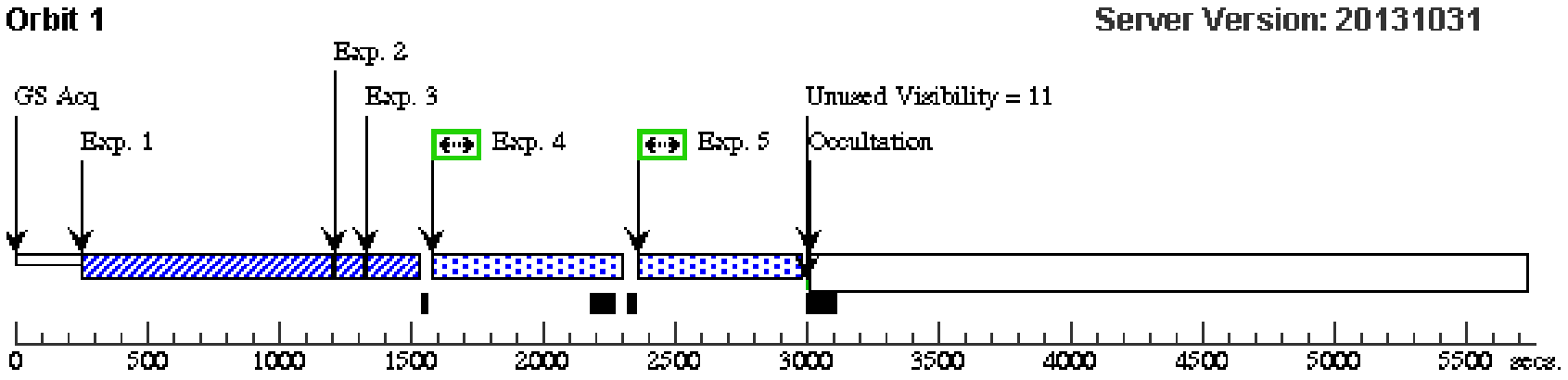
Comments: This object was generated by the targetselector and retrieved from the GSC 2.3 database.

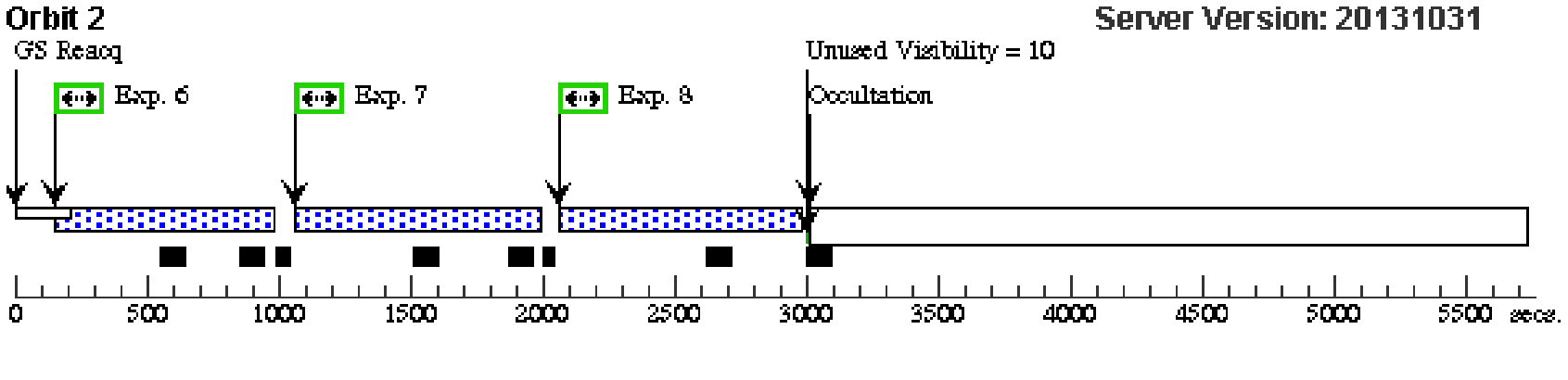
Exposures

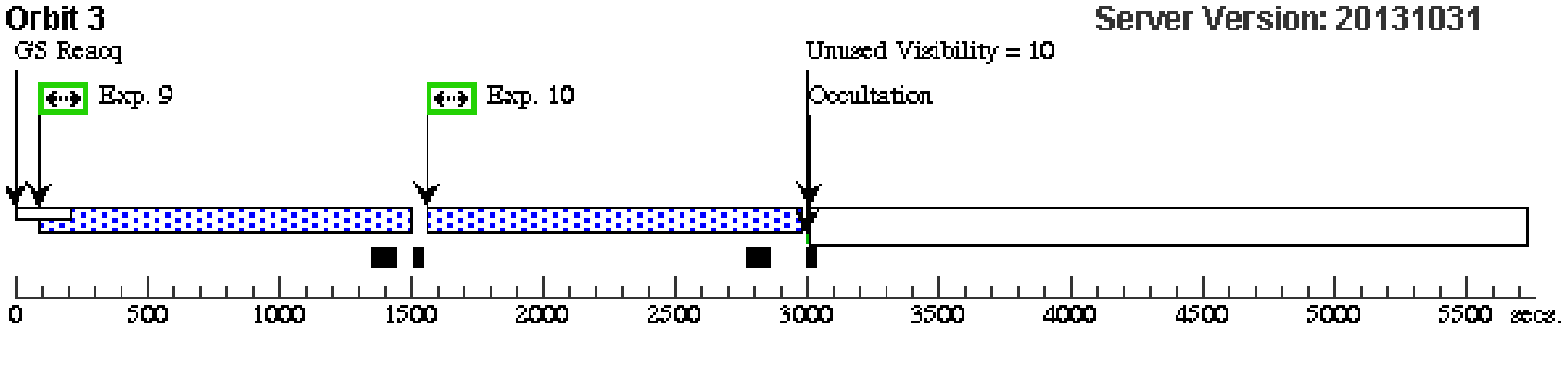
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ACQ/SEARCH (COS.sa.548198)	(3) PG1222+216	COS/FUV, ACQ/SEARCH, PSA	G130M 1291 A	SCAN-SIZE=5; CENTER=FLUX-WT-FLR; STEP-SIZE=1.767			4 Secs (4 Secs) *[==>]*	*[1]*
	Comments: S/N>40 at 50% nominal flux or above (F_1500>2e-14). However, if flux is 2x expected level, count rate is still acceptable (COS.sa.548199).								
2	ACQ/PEAKXD (COS.sa.548197)	(3) PG1222+216	COS/FUV, ACQ/PEAKXD, PSA	G130M 1291 A				22 Secs (22 Secs) *[==>]*	*[1]*
	Comments: S/N>40 at 50% nominal flux or above (F_1500>2e-14). However, if flux is 2x expected level, count rate is still acceptable (COS.sa.548199).								
3	ACQ/PEAKD (COS.sa.548197)	(3) PG1222+216	COS/FUV, ACQ/PEAKD, PSA	G130M 1291 A	NUM-POS=5; STEP-SIZE=0.9			9 Secs (9 Secs) *[==>]*	*[1]*
	Comments: S/N>40 at 50% nominal flux or above (F_1500>2e-14). However, if flux is 2x expected level, count rate is still acceptable (COS.sa.548199).								
4	Blazar 3 - G130M 1291 (COS.sp.548201)	(3) PG1222+216	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=1; BUFFER-TIME=500			600 Secs (600 Secs) *[==>]*	*[1]*
	Comments: For F(1500)=4e-14, we expect S/N~15 per resel. Buffer time based on 2x nominal count rate.								
5	Blazar 3 - G130M 1300 (COS.sp.548201)	(3) PG1222+216	COS/FUV, TIME-TAG, PSA	G130M 1300 A	FP-POS=2; BUFFER-TIME=450			500 Secs (500 Secs) *[==>]*	*[1]*
	Comments: For F(1500)=3e-14, expect S/N~18 per resel. Buffer time based on 2x nominal count rate.								
6	Blazar 3 - G130M 1309 (COS.sp.548201)	(3) PG1222+216	COS/FUV, TIME-TAG, PSA	G130M 1309 A	FP-POS=3; BUFFER-TIME=300			710 Secs (710 Secs) *[==>]*	*[2]*
	Comments: For F(1500)=3e-14, expect S/N~18 per resel. Buffer time based on 2x nominal count rate.								
7	Blazar 3 - G130M 1318 (COS.sp.548201)	(3) PG1222+216	COS/FUV, TIME-TAG, PSA	G130M 1318 A	FP-POS=4; BUFFER-TIME=350			810 Secs (810 Secs) *[==>]*	*[2]*
	Comments: For F(1500)=3e-14, expect S/N~18 per resel. Buffer time based on 2x nominal count rate.								
8	Blazar 3 - G130M 1327 (COS.sp.548201)	(3) PG1222+216	COS/FUV, TIME-TAG, PSA	G130M 1327 A	FP-POS=1; BUFFER-TIME=450			803 Secs (803 Secs) *[==>]*	*[2]*
	Comments: For F(1500)=3e-14, expect S/N~18 per resel. Buffer time based on 2x nominal count rate.								
9	Blazar 3 - G160M 1623 (COS.sp.548202)	(3) PG1222+216	COS/FUV, TIME-TAG, PSA	G160M 1623 A	FP-POS=1; BUFFER-TIME=1100			1230 Secs (1230 Secs) *[==>]*	*[3]*
	Comments: For F(1500)=4e-14, we expect S/N~14 per resel. Buffer time based on 2x nominal count rate.								
10	Blazar 3 - G160M 1611 (COS.sp.548202)	(3) PG1222+216	COS/FUV, TIME-TAG, PSA	G160M 1611 A	FP-POS=1; BUFFER-TIME=1100			1303 Secs (1303 Secs) *[==>]*	*[3]*
	Comments: For F(1500)=4e-14, we expect S/N~14 per resel. Buffer time based on 2x nominal count rate.								

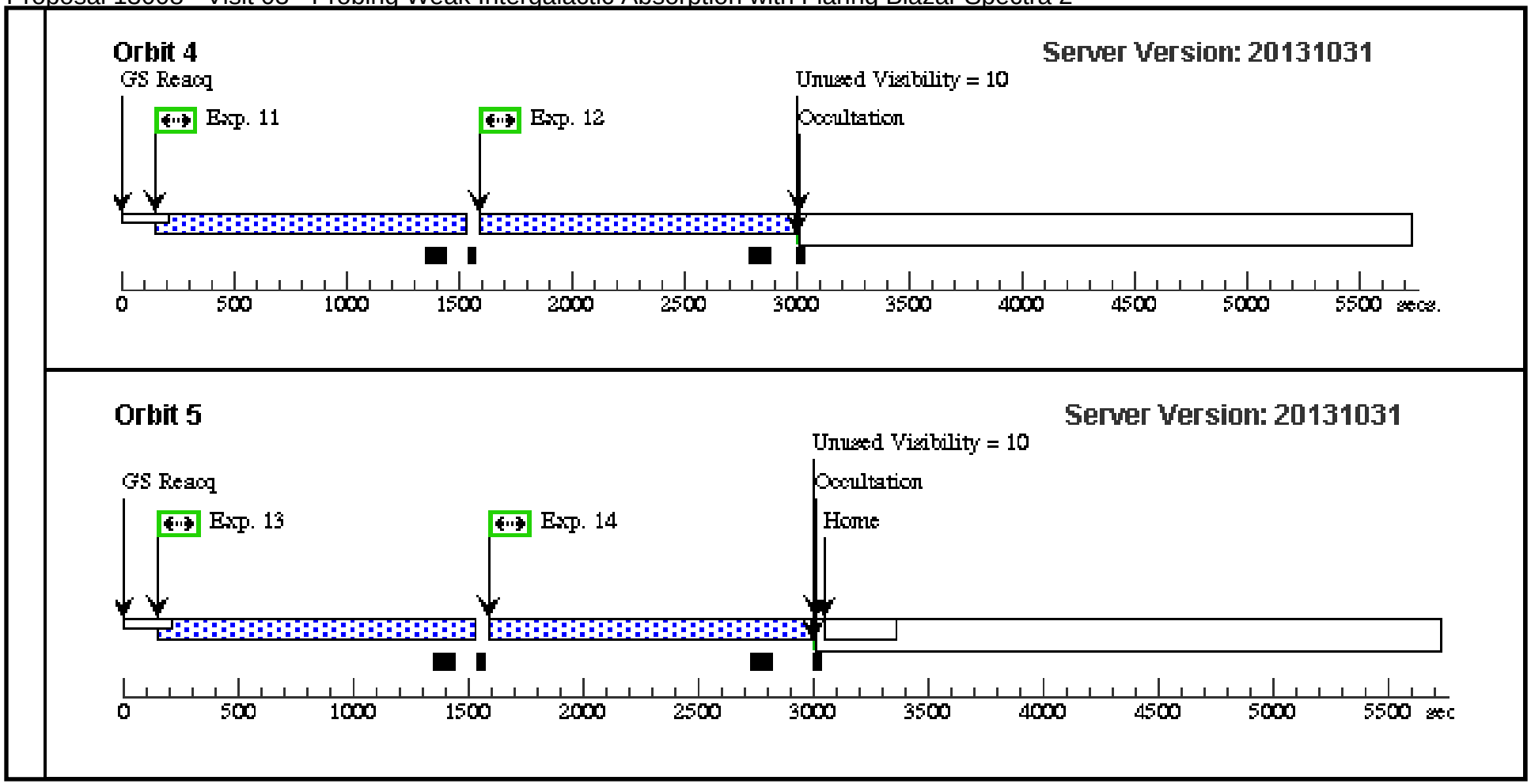
11	Blazar 3 - G 160M 1600 (COS.sp.548 202)	(3) PG1222+216	COS/FUV, TIME-TAG, PSA	G160M 1600 A	FP-POS=1; BUFFER-TIME=1100	1260 Secs (1260 Secs) *[==>]*	***[4]***
Comments: For F(1500)=4e-14, we expect S/N~14 per resel. Buffer time based on 2x nominal count rate.							
12	Blazar 3 - G 160M 1589 (COS.sp.548 202)	(3) PG1222+216	COS/FUV, TIME-TAG, PSA	G160M 1589 A	FP-POS=1; BUFFER-TIME=1100	1275 Secs (1275 Secs) *[==>]*	***[4]***
Comments: For F(1500)=4e-14, we expect S/N~14 per resel. Buffer time based on 2x nominal count rate.							
13	Blazar 3 - G 160M 1577 (COS.sp.548 202)	(3) PG1222+216	COS/FUV, TIME-TAG, PSA	G160M 1577 A	FP-POS=1; BUFFER-TIME=1100	1260 Secs (1260 Secs) *[==>]*	***[5]***
Comments: For F(1500)=4e-14, we expect S/N~14 per resel. Buffer time based on 2x nominal count rate.							
14	Blazar 3 - G 160M 1577 (COS.sp.548 202)	(3) PG1222+216	COS/FUV, TIME-TAG, PSA	G160M 1577 A	FP-POS=2; BUFFER-TIME=1100	1344 Secs (1344 Secs) *[==>]*	***[5]***
Comments: For F(1500)=4e-14, we expect S/N~14 per resel. Buffer time based on 2x nominal count rate.							

Orbit Structure








Orbit 4
Server Version: 20131031
GS Reacq
Exp. 11
Exp. 12
Unused Visibility = 10
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.
Orbit 5
Server Version: 20131031
Unused Visibility = 10
GS Reacq
Occultation
Exp. 13
Exp. 14
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec