13811 - Feedback in action in the type 1 Seyfert IZw 1

Cycle: 22, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	*Institution*	*E-Mail*
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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) IZW1	COS/FUV COS/NUV	4	18-Jul-2014 21:11:23.0	yes
02	(1) IZW1	COS/FUV COS/NUV	4	18-Jul-2014 21:11:26.0	yes

8 Total Orbits Used

ABSTRACT

We propose simultaneous 200 ks XMM-Newton-RGS and HST-COS observations of the narrow line Seyfert1 IZw1. We will study the connection between the X-ray and UV absorber, mapping the ionization structure, kinematic behavior and elemental abundances. Finally we will quantify the

AGN feedback by directly measuring the metal enrichment by C, N, O, and Fe and the kinetic luminosity of the outflow.

OBSERVING DESCRIPTION

We will observe I Zw1 with HST-COS for 8 orbits organized into 2 identical visits. Both visits should be within days of each other, and coordinated with an approved XMM-Newton observation of I Zw 1. This will allow us to study the combined UV-X-ray properties of the outflowing gas, not not only in the strong Ly alpha and CIV troughs, but also among others such as N V (1238,1242 A) and Si IV(1393,1402 A) transitions. A large number of ions will put more stringent constraints on the ionization parameter of the multi-kinetic components of the UV gas. The sensitivity of COS will also allow us to study metastable levels such as CIII* at =1176 A. These excited levels have a similar ionization of the UVX-ray absorbers and provide valuable density (and therefore distance) diagnostic measurements. We will reanalyze the FUSE data with updated methods for an estimate of the CIII ground level transition (977 A). Even a non-detection of CIII will put useful upper limit on the gas density.

I Zw1 has been recently observed (Nov 2012) using the G130M grating of COS for a total of only 1.8 ks. A preliminary look at the data highlights the broad Ly alpha trough, outflowing at 2000 km s^{-1}, tentatively confirming the existence of the long-lived UV-X-ray outflow, which possibly varies only in ionization state. CIII* 1176 is tentatively identified, possibly outflowing, but the
present quality of the data makes it difficult to disentagle it from other intrinsic and Galactic lines. We will therefore observe I Zw 1 using both the G130M grating for ~6 ks and the G160M grating for ~11 ks in order to reach a S/N of 20 in the continuum. This will assure a S/N=10 in the bottom of the UV absorption troughs, which will enable us to determine the covering fraction of the absorbing gas to an accuracy of 10%. The enhanced exposure time for G160M relative to G130M is needed to compensate for its lower sensitivity. We based our ETC calculations using the fluxes of the COS data already acquired, considering a flux of 1e-14 erg cm^{-2} s^{-1} A^{-1} at 1440 A.

We use multiple central wavelength settings and multiple FP-POS positions to bridge the gap between detector segments, and to avoid detector and flat-field artifacts. Central wavelengths and FP-POS positiopns were chosen to avoid placing the gap in wavelength regions corresponding to features of interest, as described in our comments for each exposure.

To allow for source variability, we have chosen BUFFER TIMES significantly shorter than the 2/3 factor recommended in the ETC. We have also chosen the BUFFER TIMES to be integer multiples of (exposure time - 110 s) to minimze the overheads due to buffer readouts between successive exspoures.

These observations pose no bright object concerns. All historical flux levels for I Zw 1 lie below the bright object limits for COS (see Dunn et al. 2006, PASP, 118, 572). Since I Zw 1 has been observed successfully before, there are also no surrounding field objects that are too bright. This is confirmed by the BOT tool for GALEX in APT.

Proposal 13811 - Visit 01 - Feedback in action in the type 1 Seyfert IZw 1

Visit

Proposal 13811, Visit 01 Sat Jul 19 01:11:28 GMT 2014

Diagnostic Status: Warning

Scientific Instruments: COS/NUV, COS/FUV

Special Requirements: SCHED 100%

Comments: Visit 1 should be scheduled within days of Visit 2. Both should be coordinated with approved XMM-Newton observations of I Zw 1.

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)	IZW1	RA: 00 53 34.9300 (13.3955417d) Dec: +12 41 36.19 (12.69339d) Equinox: J2000	Redshift: 0.0589	V=14.1+/-0.1 1.0e-14 at 1440 A	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	(COS.ta.618 535)	(1) IZW1	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				100 Secs (100 Secs) *[==>]*	***[1]***
	Comments: Exposure time increased by 4x from ETC to allow for source variability.								
2	(COS.sp.618 529)	(1) IZW1	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=425; FP-POS=4			960 Secs (960 Secs) *[==>]*	***[1]***
	Comments: FP-POS=4 gives shortest wavelengths for G130M/1289. But, B->A segment gap onpeak of redshifted Ly alpha, so only want one exposure here. *Buffer time reduced by more than 2/3 of the ETC value to allow for source variability.* *Buffer times also chosen to be (exposure time - 110 s)/n to minimize overheads due to buffer dumps between exposures.*								
3	(COS.sp.618 529)	(1) IZW1	COS/FUV, TIME-TAG, PSA	G130M 1327 A	BUFFER-TIME=420; FP-POS=4			950 Secs (950 Secs) *[==>]*	***[1]***
	Comments: FP-POS=1 for 1327 puts the gap from in the red wing of redshifted N V. *Buffer time reduced by more than 2/3 of the ETC value to allow for source variability.* *Buffer times also chosen to be (exposure time - 110 s)/n to minimize overheads due to buffer dumps between exposures.*								
4	(COS.sp.618 529)	(1) IZW1	COS/FUV, TIME-TAG, PSA	G130M 1309 A	BUFFER-TIME=420; FP-POS=3			950 Secs (950 Secs) *[==>]*	***[2]***
	Comments: FP-POS=3 and 4 puts the B->A segment gap in the red wing of redshifted Ly alpha, and well blueshifted from N V. Avoids the gaps from 1291 and 1327. *Buffer time reduced by more than 2/3 of the ETC value to allow for source variability.* *Buffer times also chosen to be (exposure time - 110 s)/n to minimize overheads due to buffer dumps between exposures.*								
5	(COS.sp.618 529)	(1) IZW1	COS/FUV, TIME-TAG, PSA	G130M 1309 A	BUFFER-TIME=420; FP-POS=4			950 Secs (950 Secs) *[==>]*	***[2]***
	Comments: FP-POS=3 and 4 puts the B->A segment gap in the red wing of redshifted Ly alpha, and well blueshifted from N V. Avoids the gaps from 1291 and 1327. *Buffer time reduced by more than 2/3 of the ETC value to allow for source variability.* *Buffer times also chosen to be (exposure time - 110 s)/n to minimize overheads due to buffer dumps between exposures.*								
6	(COS.sp.618 675)	(1) IZW1	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=330; FP-POS=1			440 Secs (440 Secs) *[==>]*	***[2]***
	Comments: 1577 and 1589 place the gap far in the blue wing of redshifted C IV, so concentrate exposures on FP-POS in each that bridge the gap between the segments. *Buffer time reduced by more than 2/3 of the ETC value to allow for source variability.* *Buffer times also chosen to be (exposure time - 110 s)/n to minimize overheads due to buffer dumps between exposures.*								
7	(COS.sp.618 675)	(1) IZW1	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=390; FP-POS=2			1280 Secs (1280 Secs) *[==>]*	***[3]***
	Comments: 1577 and 1589 place the gap far in the blue wing of redshifted C IV, so concentrate exposures on FP-POS in each that bridge the gap between the segments. *Buffer time reduced by more than 2/3 of the ETC value to allow for source variability.* *Buffer times also chosen to be (exposure time - 110 s)/n to minimize overheads due to buffer dumps between exposures.*								
8	(COS.sp.618 675)	(1) IZW1	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=390; FP-POS=3			1280 Secs (1280 Secs) *[==>]*	***[3]***
	Comments: 1577 and 1589 place the gap far in the blue wing of redshifted C IV, so concentrate exposures on FP-POS in each that bridge the gap between the segments. *Buffer time reduced by more than 2/3 of the ETC value to allow for source variability.* *Buffer times also chosen to be (exposure time - 110 s)/n to minimize overheads due to buffer dumps between exposures.*								
9	(COS.sp.618 675)	(1) IZW1	COS/FUV, TIME-TAG, PSA	G160M 1589 A	BUFFER-TIME=390; FP-POS=3			1280 Secs (1280 Secs) *[==>]*	***[4]***
	Comments: 1577 and 1589 place the gap far in the blue wing of redshifted C IV, so concentrate exposures on FP-POS in each that bridge the gap between the segments. *Buffer time reduced by more than 2/3 of the ETC value to allow for source variability.* *Buffer times also chosen to be (exposure time - 110 s)/n to minimize overheads due to buffer dumps between exposures.*								

	10	(COS.sp.618 675) (1) IZW1	COS/FUV, TIME-TAG, PSA	G160M 1589 A	BUFFER-TIME=390; FP-POS=4	1280 Secs (1280 Secs) *[==>]*	***[4]***

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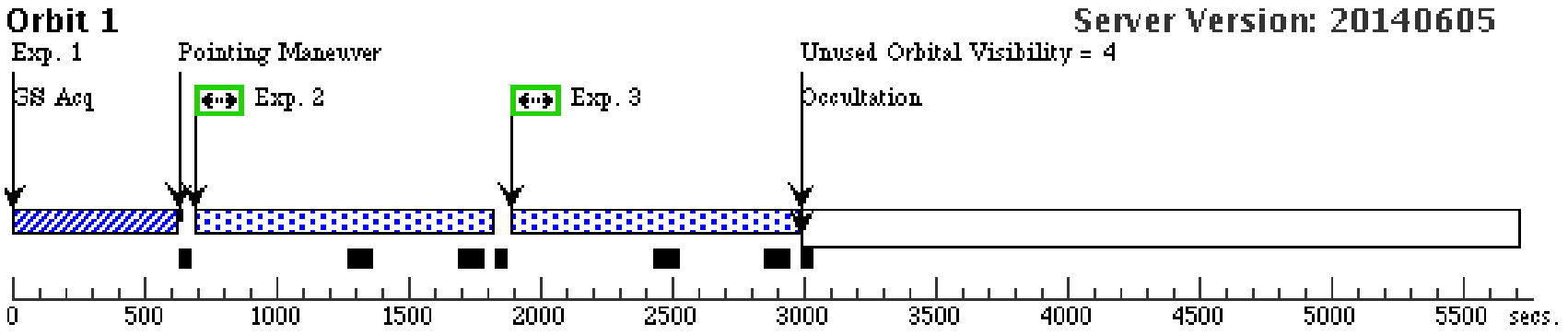
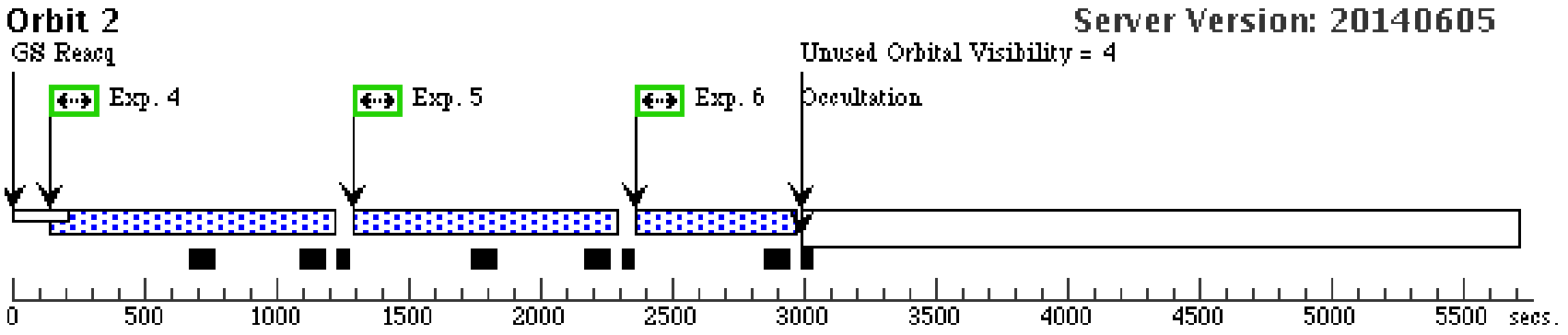
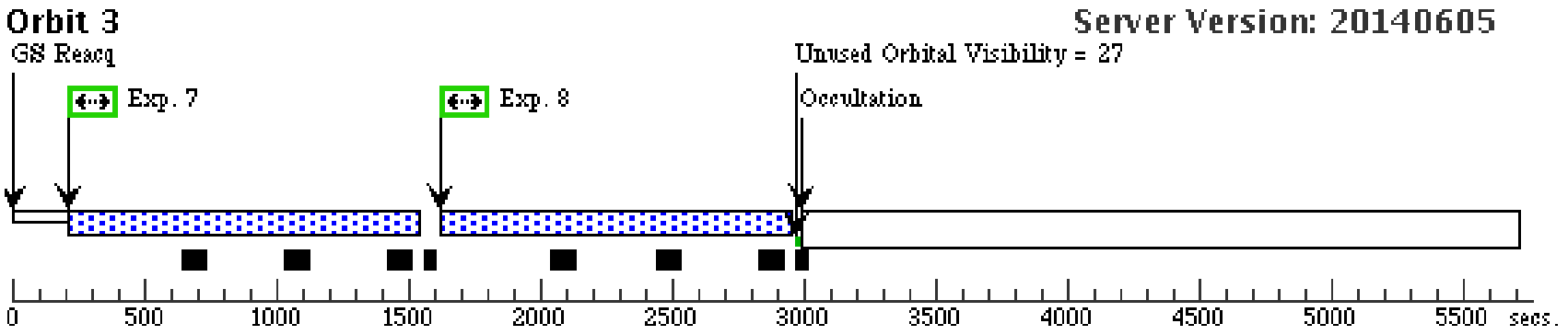
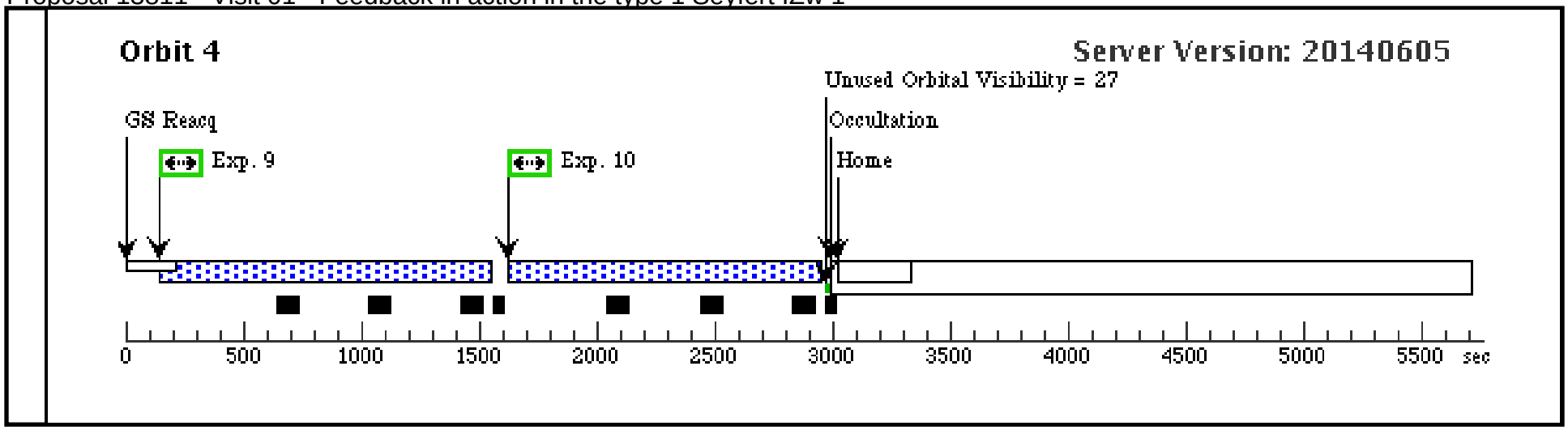
Orbit Structure





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Visit

Proposal 13811, Visit 02 Sat Jul 19 01:11:29 GMT 2014

Diagnostic Status: Warning

Scientific Instruments: COS/NUV, COS/FUV

Special Requirements: SCHED 100%

Comments: Visit 2 should be scheduled within days of Visit 1. Both should be coordinated with approved XMM-Newton observations of I Zw 1.

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.

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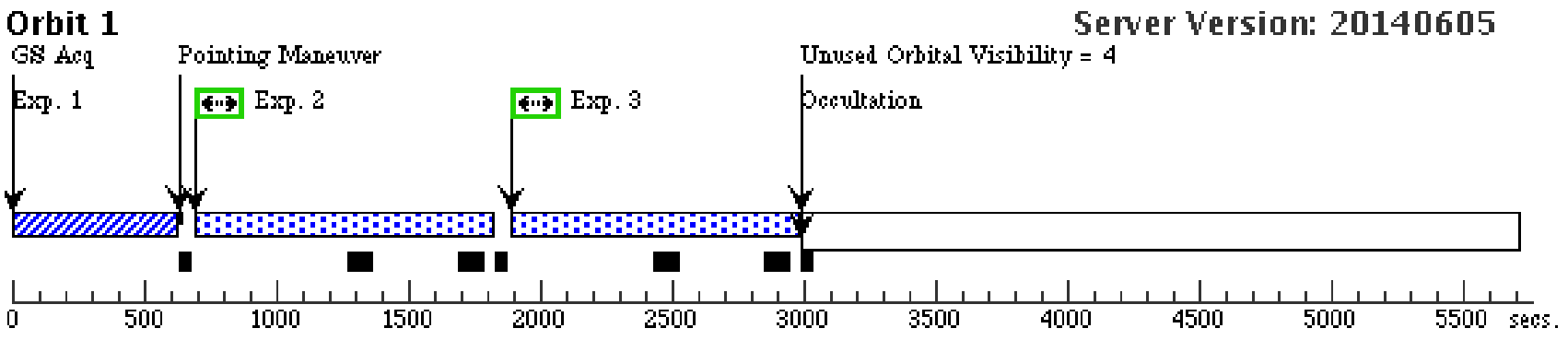
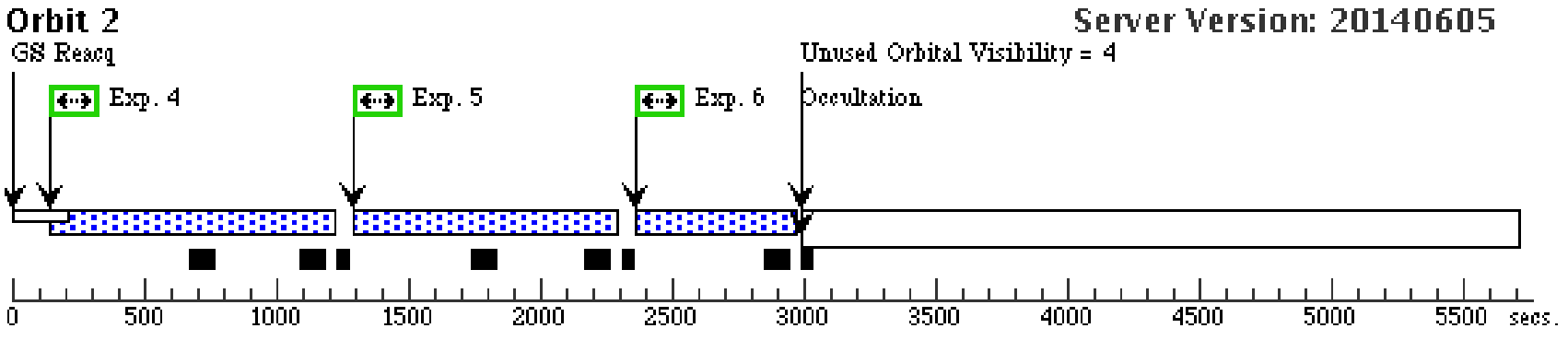
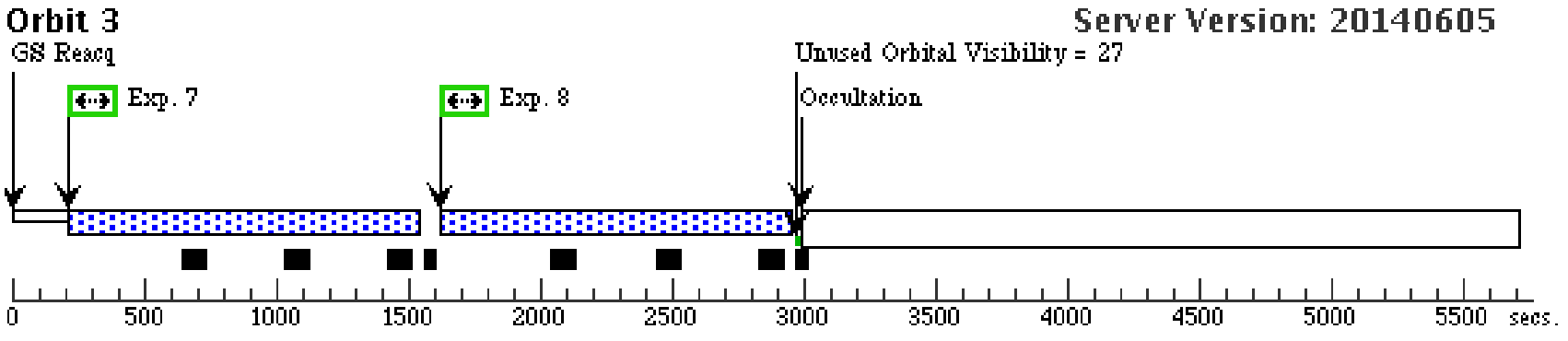
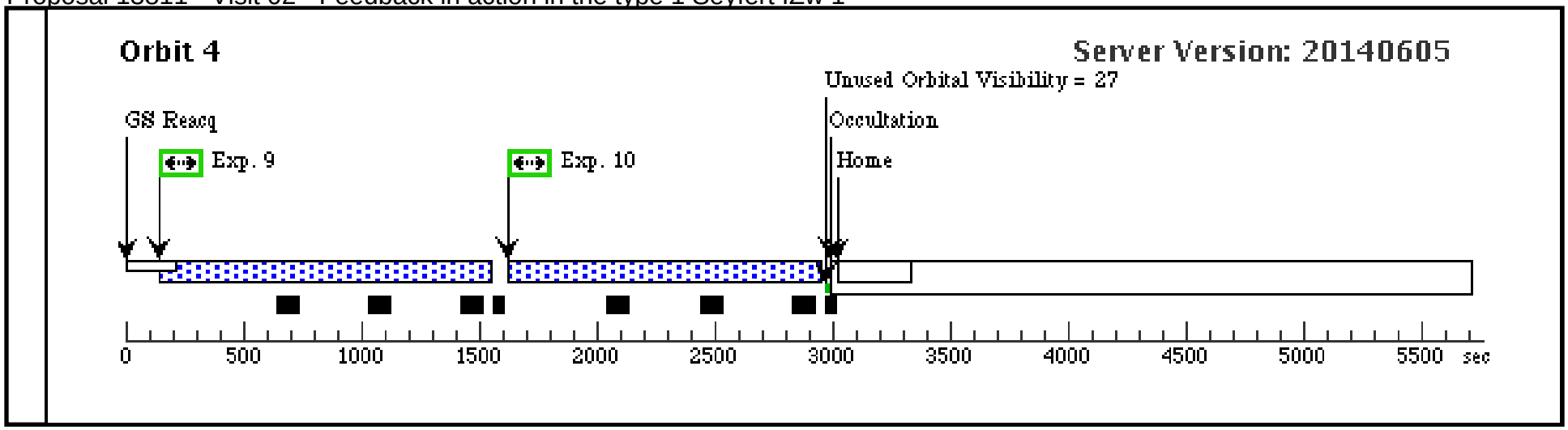
Orbit Structure





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