14708 - Probing the circumgalactic medium of galaxies with deep observations.

Cycle: 24, Proposal Category: GO

(UV Initiative)

(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) QSO-J1009+0713	COS/FUV COS/NUV	5	29-Jul-2016 14:58:53.0	yes
02	(1) QSO-J1009+0713	COS/FUV COS/NUV	4	29-Jul-2016 14:58:55.0	yes
03	(1) QSO-J1009+0713	COS/FUV COS/NUV	4	29-Jul-2016 14:58:56.0	yes
04	(1) QSO-J1009+0713	COS/FUV COS/NUV	4	29-Jul-2016 14:58:57.0	yes
05	(1) QSO-J1009+0713	COS/FUV COS/NUV	4	29-Jul-2016 14:58:58.0	yes

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
06	(1) QSO-J1009+0713	COS/FUV COS/NUV	4	29-Jul-2016 14:58:59.0	yes

25 Total Orbits Used

ABSTRACT

The circumgalactic medium (CGM) of galaxies is critical for understanding galaxy formation and evolution, the interplay between feedback and accretion, recycling of metals, and an overall accounting of cosmic baryons. Several large, shallow HST surveys have provided a major step in this direction, finding extended, massive, metal bearing CGMs around star-forming galaxies. High ionization metal lines, such as OVI and NeVIII, are particularly useful to probe the warm-hot gas which is believed to contain most of the baryonic mass. However, these metal lines could be produced in the hot gas in collisional ionization equilibrium, or in cooler photoionized gas. This ambiguity can be resolved by using kinematic information. At the expected temperature of 300,000K, the fraction of neutral hydrogen is small, but detectable and the Lyman alpha line is thermally broadened to about 75 km/s. Thus Broad Lyman Alpha (BLA) lines provide a useful tool to probe the hot gas, but detecting BLAs require high S/N spectra. We propose high S/N COS G160M observations of a carefully selected target to detect BLAs from CGMs of two galaxies to better understand the physics of the CGM. With the proposed deep observations we will directly measure the temperature, metallicity and mass of the warm-hot gas, providing valuable input to models of galaxy formation. Such deep observations are crucial to understand the results from shallow surveys that have used hundreds of HST orbits, but the investment of time is still modest. With the 25 orbits allocated to this program we will obtain S/N of about 25 at 1600 A.

OBSERVING DESCRIPTION

We will be observing our target for 25 HST orbits with COS/FUV G160M.
Our goal is to detect broad, shallow, Ly alpha absorption.
Our target has been observed with COS/160M beofre, for a shallow observation,
so we know the overall spectral properties.

Target acquision: From the previous COS observations, we know the precise coordinates of the target.
Additionally, it's a SDSS target with precise coordinates. So we will use ACQ/Image with COS NUV/Mirror B.

Science observations: We will obtain COS FUV G160M spectra to detect BLAs from two intervening galaxies.
To cover the segments gaps, we will use two central wavelengths: 1577 and 1600. This will enable us to reach down to
1387 A, and cover OVI from one of the galaxies of interest.

We will use recommended parameter of FLASH=Yes. Instead of FP-POS=ALL, we will use FP-POS=1, followed by FP-POS=2, followed by FP-POS=3, followed by FP-POS=4 in subsequent orbits. This should help increase the S/N.

Visit

Proposal 14708, Visit 01 Fri Jul 29 18:59:00 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: (none)

Fixed Targets

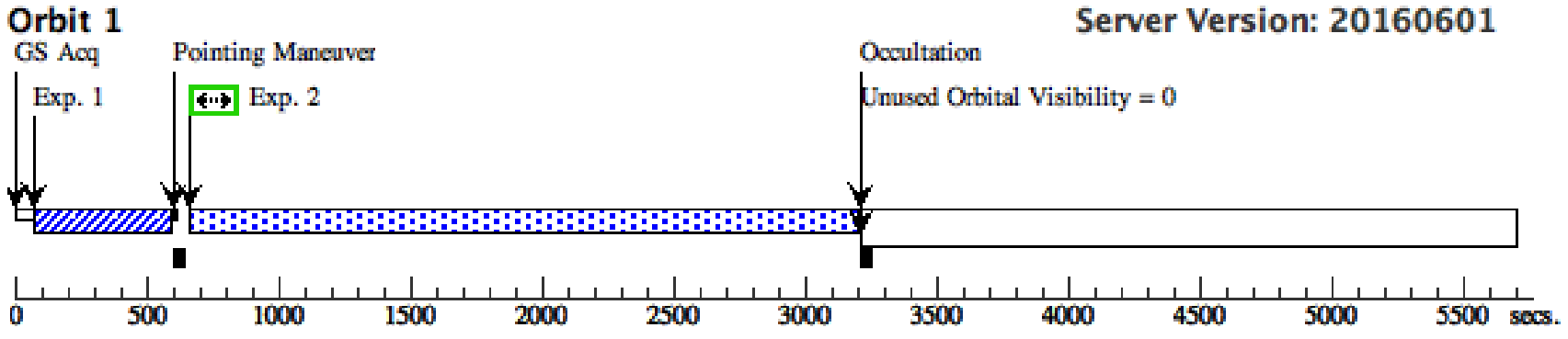
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	QSO-J1009+0713 Alt Name1: SDSSJ100902.07+071343.9	RA: 10 09 2.0698 (152.2586242d) Dec: +07 13 43.81 (7.22884d) Equinox: J2000	Redshift: 0.456	V=17.27	Reference Frame: ICRS

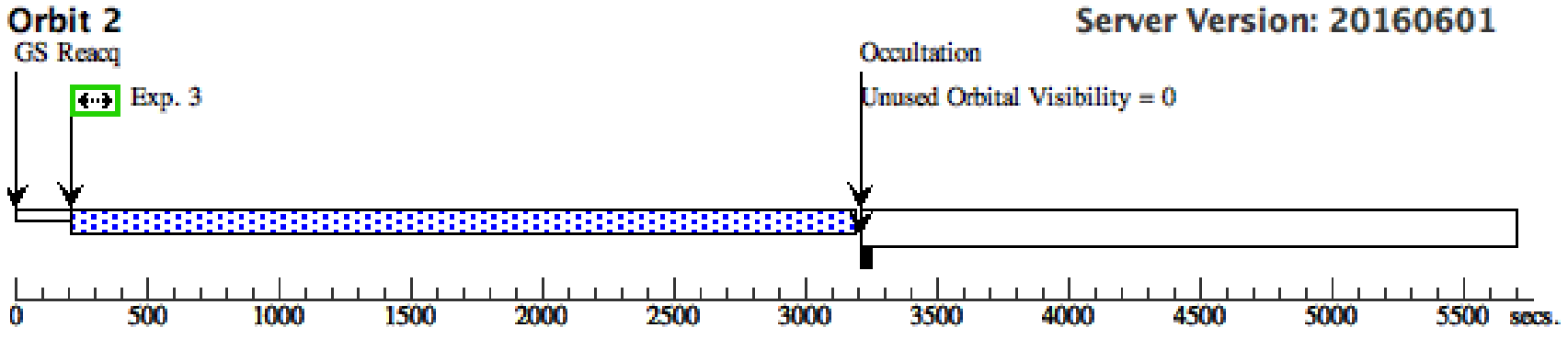
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Extended=NO

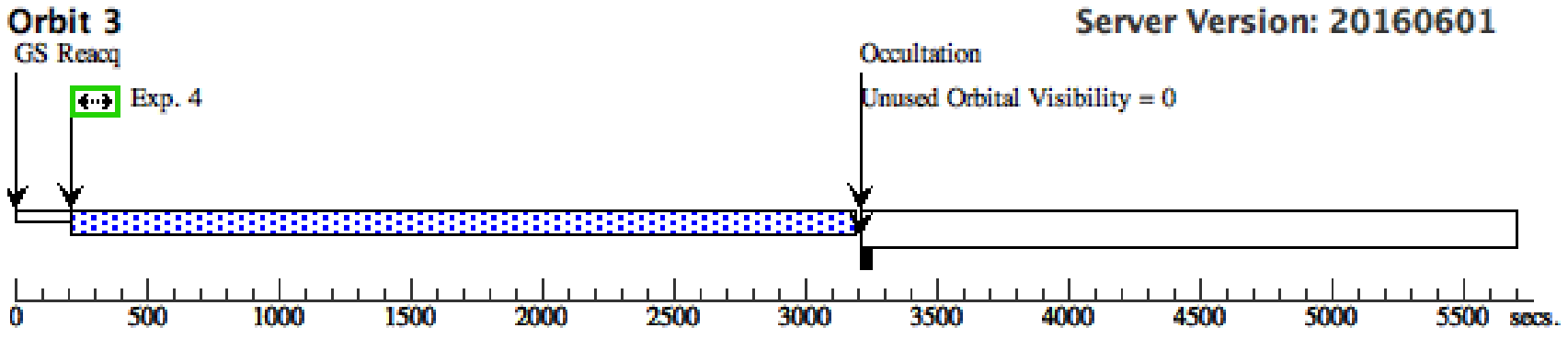
Exposures

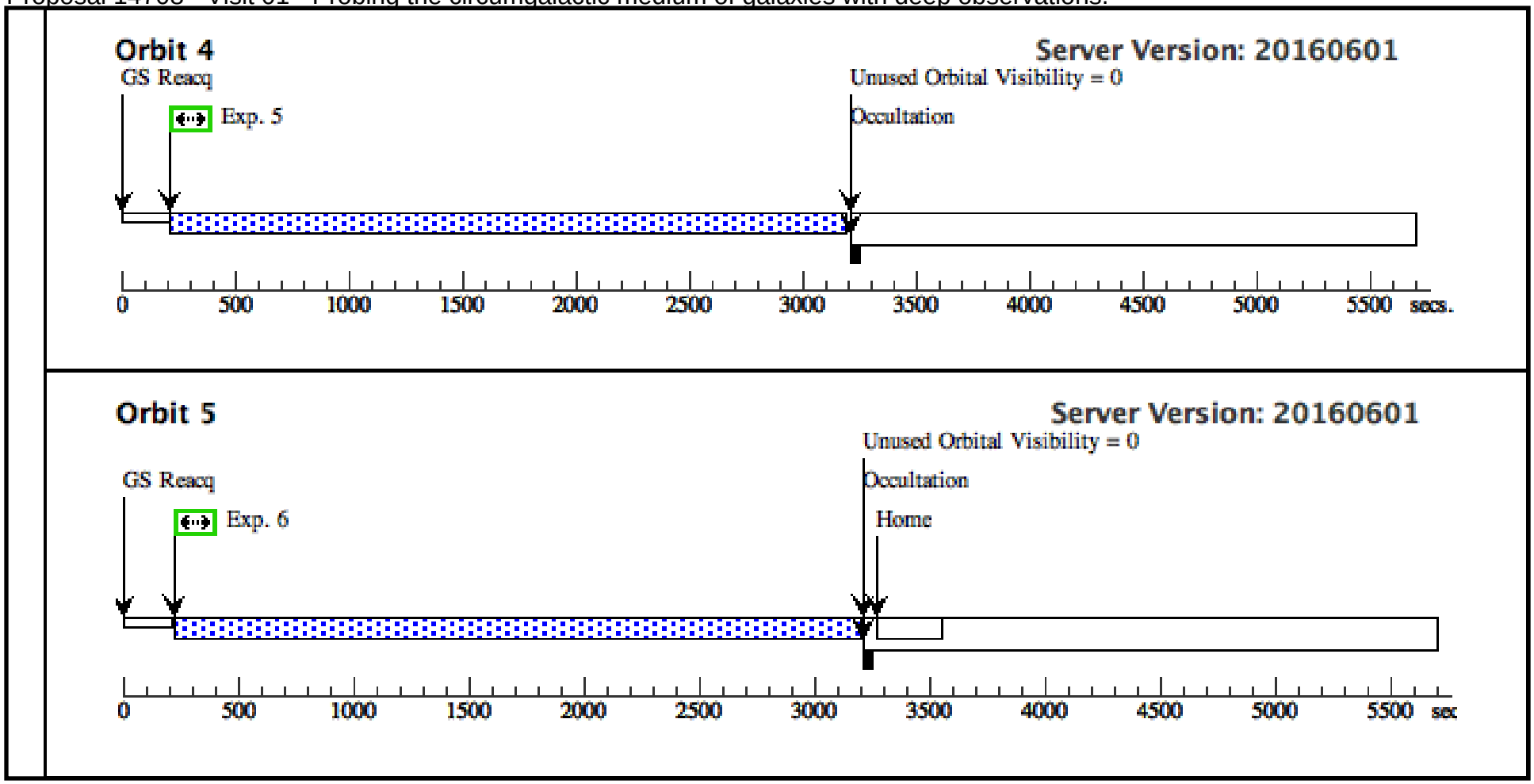
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	(COS.ta.823067)	(1) QSO-J1009+0713	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				100 Secs (100 Secs) *[==>]*	***[1]***
2	(COS.sp.826551)	(1) QSO-J1009+0713	COS/FUV, TIME-TAG, PSA	G160M 1577 A	FLASH=YES; BUFFER-TIME=9925; FP-POS=1			2000 Secs (2323 Secs) *[==>2323.0 Secs]*	***[1]***
3	(COS.sp.826551)	(1) QSO-J1009+0713	COS/FUV, TIME-TAG, PSA	G160M 1577 A	FLASH=YES; BUFFER-TIME=9925; FP-POS=2			2000 Secs (2927 Secs) *[==>2927.0 Secs]*	***[2]***
4	(COS.sp.826551)	(1) QSO-J1009+0713	COS/FUV, TIME-TAG, PSA	G160M 1577 A	FLASH=YES; BUFFER-TIME=9925; FP-POS=3			2000 Secs (2927 Secs) *[==>2927.0 Secs]*	***[3]***
5	(COS.sp.826551)	(1) QSO-J1009+0713	COS/FUV, TIME-TAG, PSA	G160M 1577 A	FLASH=YES; BUFFER-TIME=9925; FP-POS=4			2000 Secs (2927 Secs) *[==>2927.0 Secs]*	***[4]***
6	(COS.sp.826551)	(1) QSO-J1009+0713	COS/FUV, TIME-TAG, PSA	G160M 1577 A	FLASH=YES; BUFFER-TIME=9925; FP-POS=4			2927 Secs (2927 Secs) *[==>]*	***[5]***

Orbit Structure





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Visit

Proposal 14708, Visit 02 Fri Jul 29 18:59:00 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: (none)

Fixed Targets

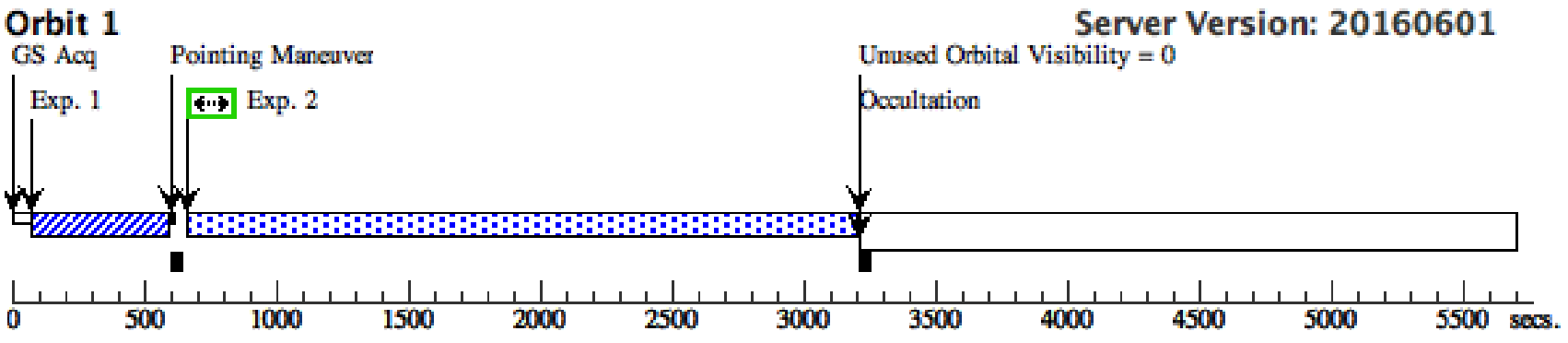
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	QSO-J1009+0713 Alt Name1: SDSSJ100902.07+071343.9	RA: 10 09 2.0698 (152.2586242d) Dec: +07 13 43.81 (7.22884d) Equinox: J2000	Redshift: 0.456	V=17.27	Reference Frame: ICRS

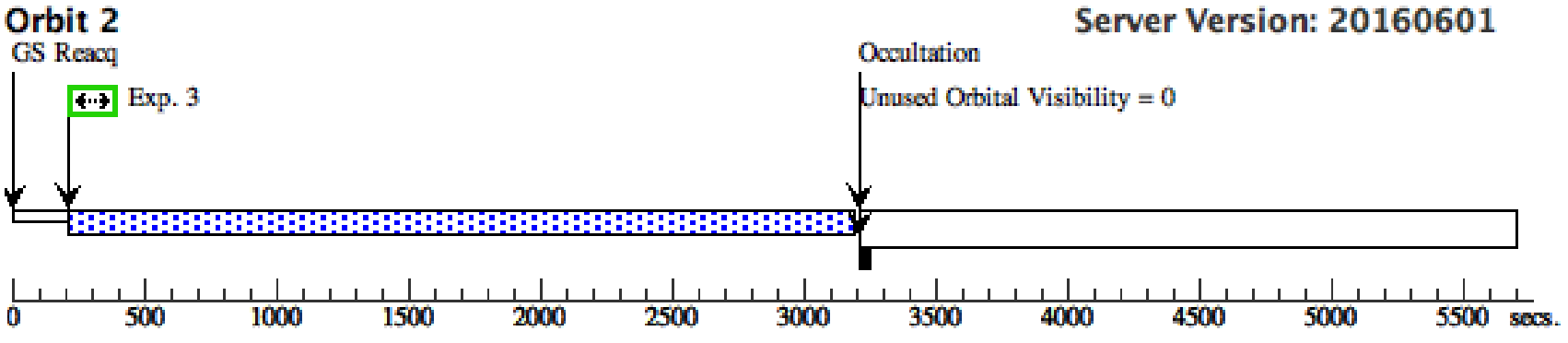
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Extended=NO

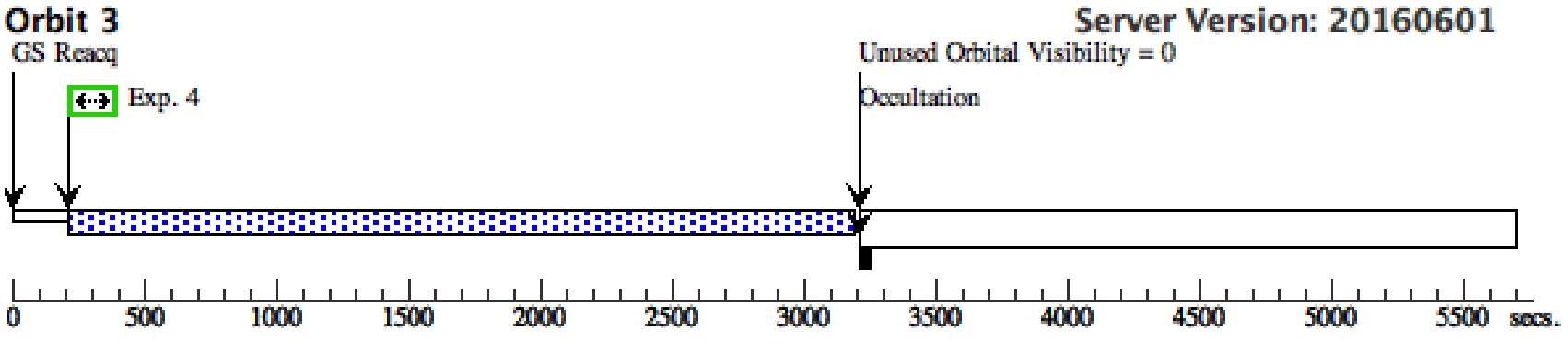
Exposures

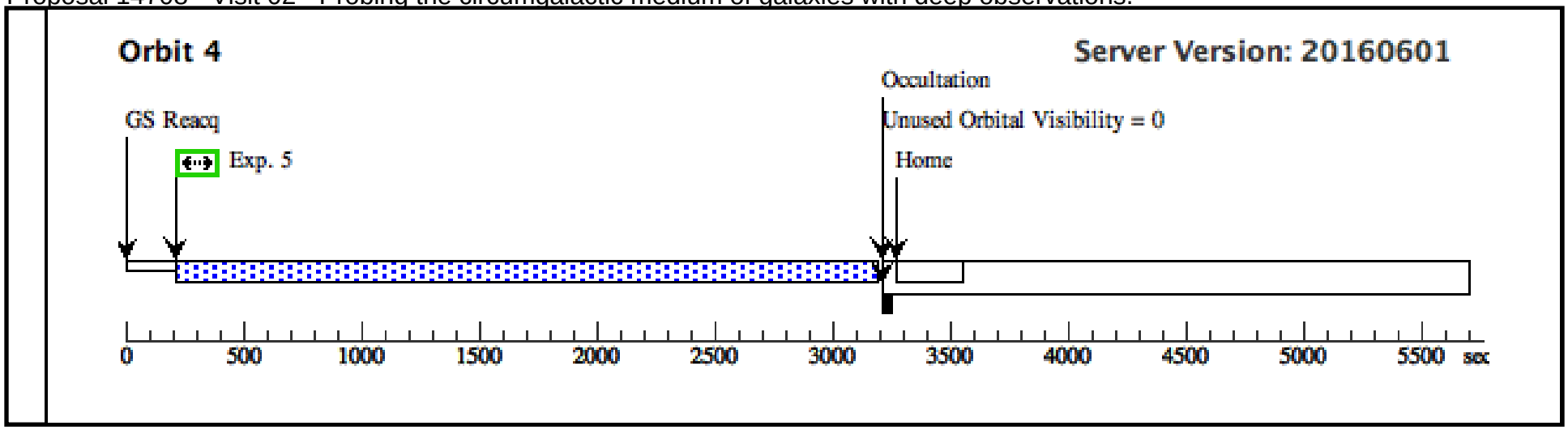
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	(COS.ta.823067)	(1) QSO-J1009+0713	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				100 Secs (100 Secs) *[==>]*	*[1]*
2	(COS.sp.826551)	(1) QSO-J1009+0713	COS/FUV, TIME-TAG, PSA	G160M 1577 A	FLASH=YES; BUFFER-TIME=9925; FP-POS=1			2000 Secs (2323 Secs) *[==>2323.0 Secs]*	*[1]*
3	(COS.sp.826551)	(1) QSO-J1009+0713	COS/FUV, TIME-TAG, PSA	G160M 1577 A	FLASH=YES; BUFFER-TIME=9925; FP-POS=2			2000 Secs (2927 Secs) *[==>2927.0 Secs]*	*[2]*
4	(COS.sp.826551)	(1) QSO-J1009+0713	COS/FUV, TIME-TAG, PSA	G160M 1577 A	FLASH=YES; BUFFER-TIME=9925; FP-POS=3			2000 Secs (2927 Secs) *[==>2927.0 Secs]*	*[3]*
5	(COS.sp.826551)	(1) QSO-J1009+0713	COS/FUV, TIME-TAG, PSA	G160M 1577 A	FLASH=YES; BUFFER-TIME=9925; FP-POS=4			2000 Secs (2927 Secs) *[==>2927.0 Secs]*	*[4]*

Orbit Structure





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Visit

Proposal 14708, Visit 03 Fri Jul 29 18:59:00 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: (none)

Fixed Targets

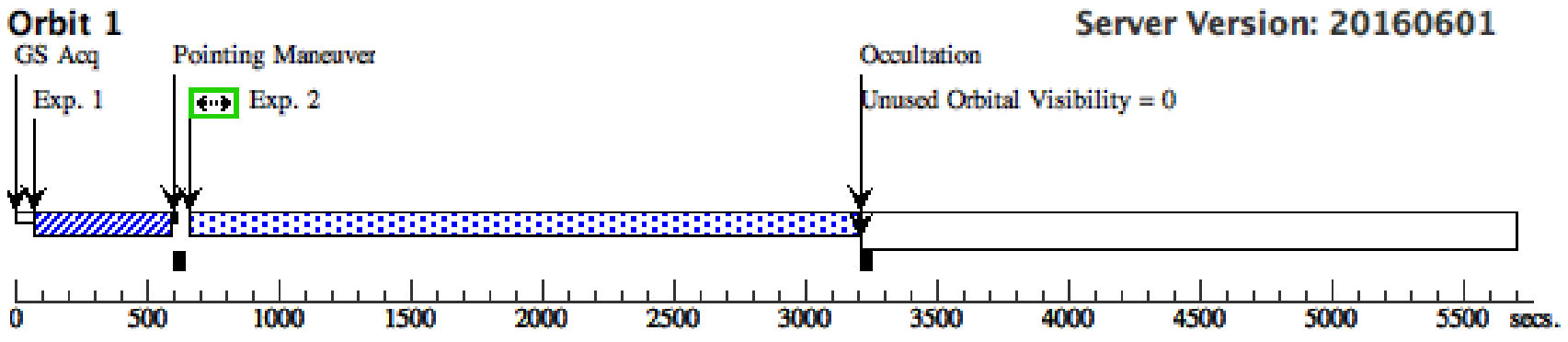
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	QSO-J1009+0713 Alt Name1: SDSSJ100902.07+071343.9	RA: 10 09 2.0698 (152.2586242d) Dec: +07 13 43.81 (7.22884d) Equinox: J2000	Redshift: 0.456	V=17.27	Reference Frame: ICRS

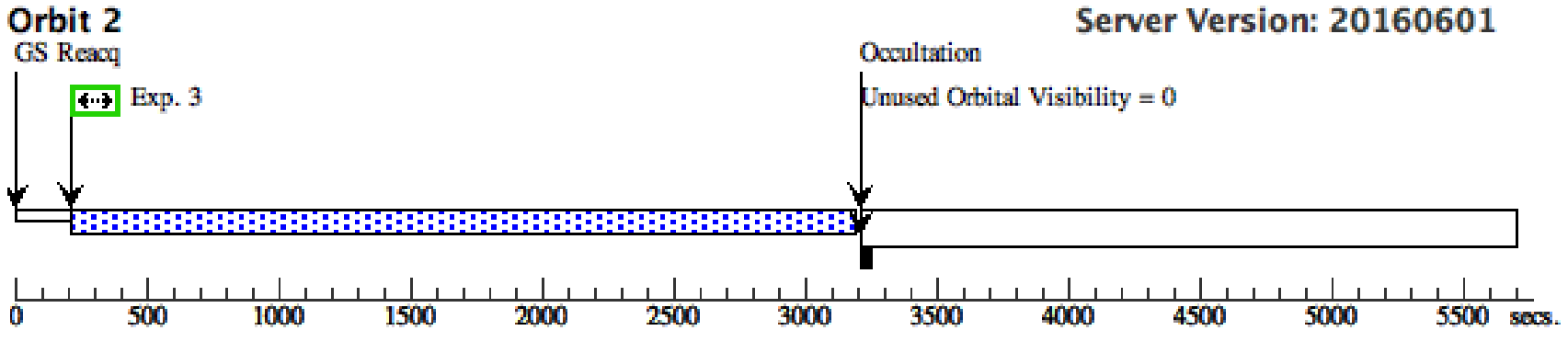
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Extended=NO

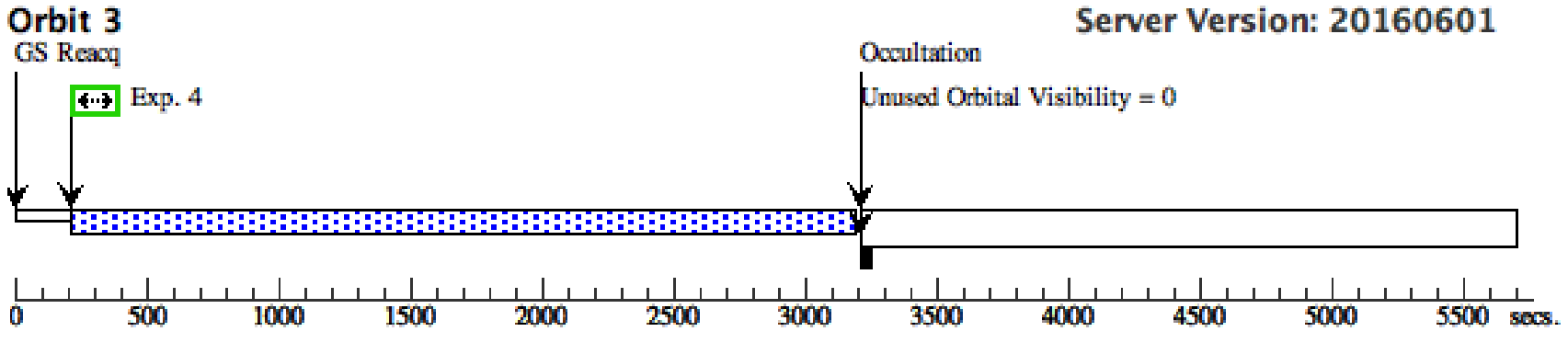
Exposures

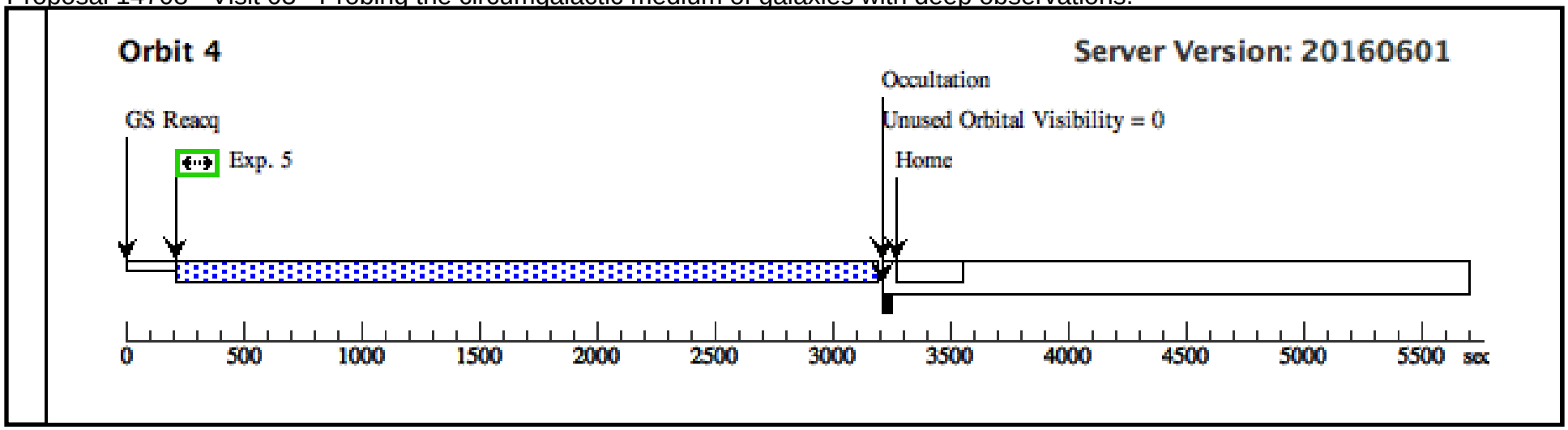
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	(COS.ta.823067)	(1) QSO-J1009+0713	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				100 Secs (100 Secs) *[==>]*	*[1]*
2	(COS.sp.826551)	(1) QSO-J1009+0713	COS/FUV, TIME-TAG, PSA	G160M 1577 A	FLASH=YES; BUFFER-TIME=9925; FP-POS=1			2000 Secs (2323 Secs) *[==>2323.0 Secs]*	*[1]*
3	(COS.sp.826551)	(1) QSO-J1009+0713	COS/FUV, TIME-TAG, PSA	G160M 1577 A	FLASH=YES; BUFFER-TIME=9925; FP-POS=2			2000 Secs (2927 Secs) *[==>2927.0 Secs]*	*[2]*
4	(COS.sp.826551)	(1) QSO-J1009+0713	COS/FUV, TIME-TAG, PSA	G160M 1577 A	FLASH=YES; BUFFER-TIME=9925; FP-POS=3			2000 Secs (2927 Secs) *[==>2927.0 Secs]*	*[3]*
5	(COS.sp.826551)	(1) QSO-J1009+0713	COS/FUV, TIME-TAG, PSA	G160M 1577 A	FLASH=YES; BUFFER-TIME=9925; FP-POS=4			2000 Secs (2927 Secs) *[==>2927.0 Secs]*	*[4]*

Orbit Structure





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Visit

Proposal 14708, Visit 04 Fri Jul 29 18:59:00 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: (none)

Fixed Targets

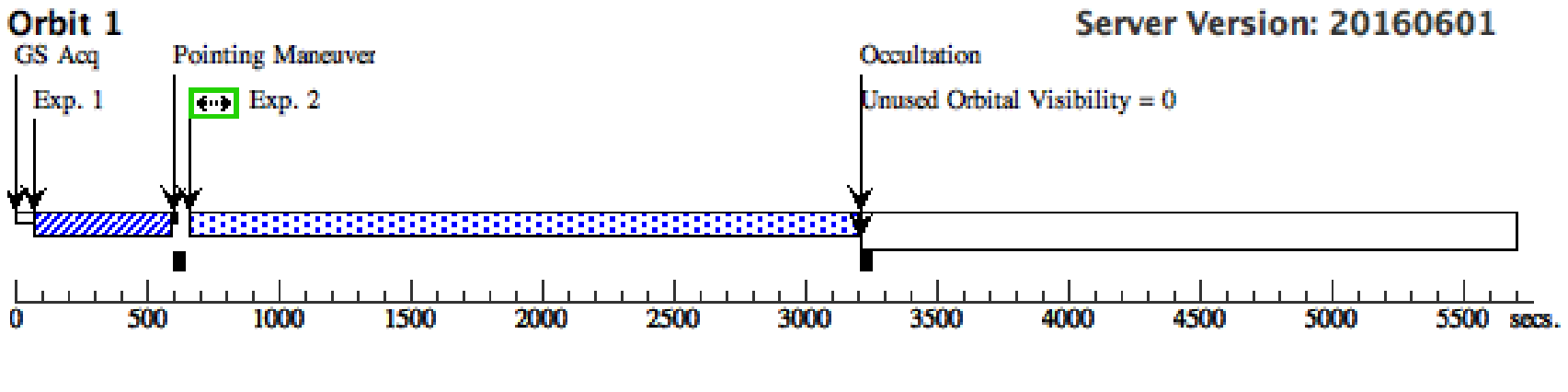
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	QSO-J1009+0713 Alt Name1: SDSSJ100902.07+071343.9	RA: 10 09 2.0698 (152.2586242d) Dec: +07 13 43.81 (7.22884d) Equinox: J2000	Redshift: 0.456	V=17.27	Reference Frame: ICRS

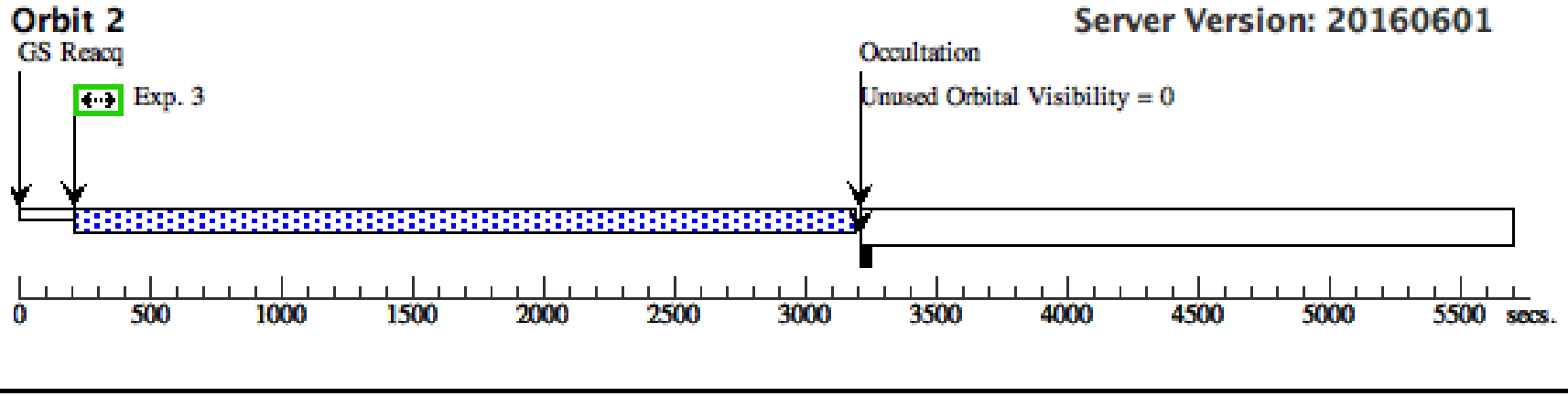
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Extended=NO

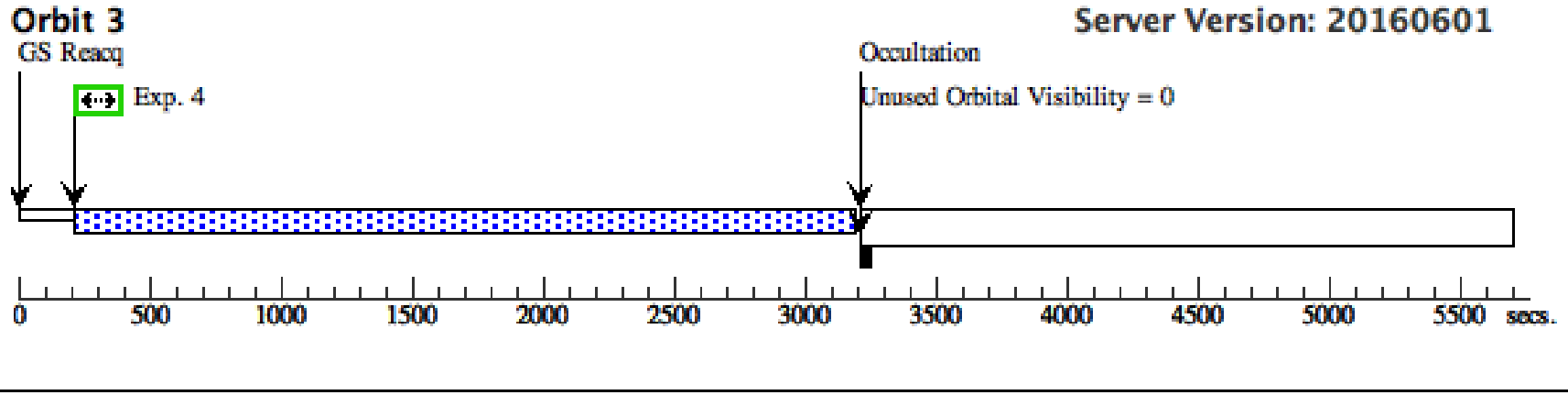
Exposures

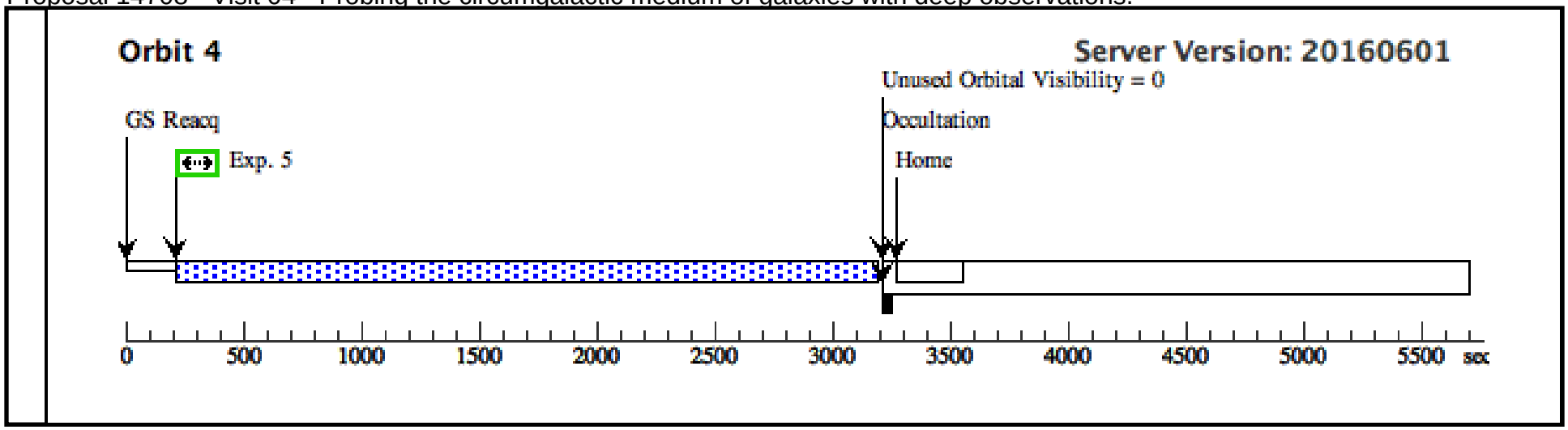
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	(COS.ta.823067)	(1) QSO-J1009+0713	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				100 Secs (100 Secs) *[==>]*	***[1]***
2	(COS.sp.826551)	(1) QSO-J1009+0713	COS/FUV, TIME-TAG, PSA	G160M 1600 A	FLASH=YES; BUFFER-TIME=9925; FP-POS=1			2000 Secs (2329 Secs) *[==>2329.0 Secs]*	***[1]***
3	(COS.sp.826551)	(1) QSO-J1009+0713	COS/FUV, TIME-TAG, PSA	G160M 1600 A	FLASH=YES; BUFFER-TIME=9925; FP-POS=2			2000 Secs (2927 Secs) *[==>2927.0 Secs]*	***[2]***
4	(COS.sp.826551)	(1) QSO-J1009+0713	COS/FUV, TIME-TAG, PSA	G160M 1600 A	FLASH=YES; BUFFER-TIME=9925; FP-POS=3			2000 Secs (2927 Secs) *[==>2927.0 Secs]*	***[3]***
5	(COS.sp.826551)	(1) QSO-J1009+0713	COS/FUV, TIME-TAG, PSA	G160M 1600 A	FLASH=YES; BUFFER-TIME=9925; FP-POS=4			2000 Secs (2927 Secs) *[==>2927.0 Secs]*	***[4]***

Orbit Structure





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Visit

Proposal 14708, Visit 05 Fri Jul 29 18:59:00 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: (none)

Fixed Targets

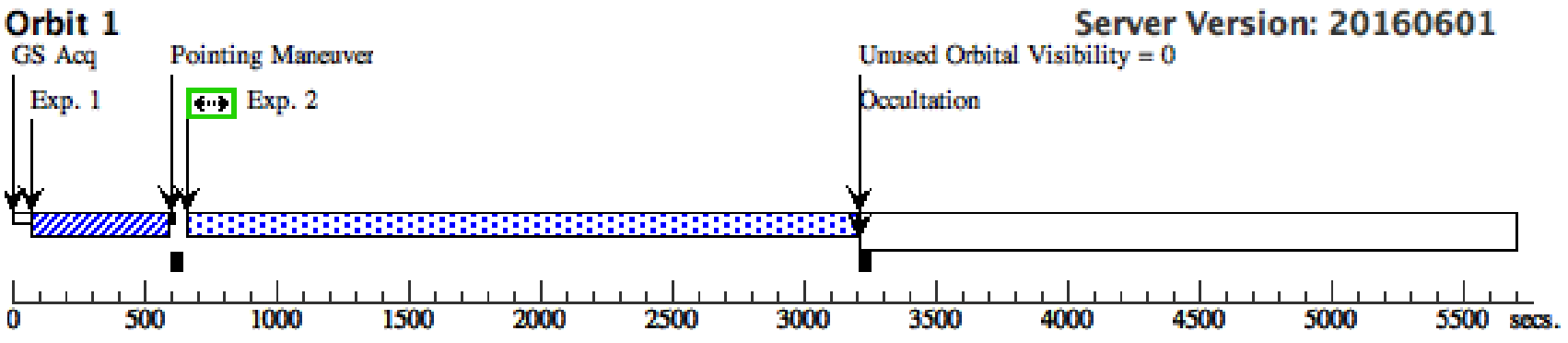
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	QSO-J1009+0713 Alt Name1: SDSSJ100902.07+071343.9	RA: 10 09 2.0698 (152.2586242d) Dec: +07 13 43.81 (7.22884d) Equinox: J2000	Redshift: 0.456	V=17.27	Reference Frame: ICRS

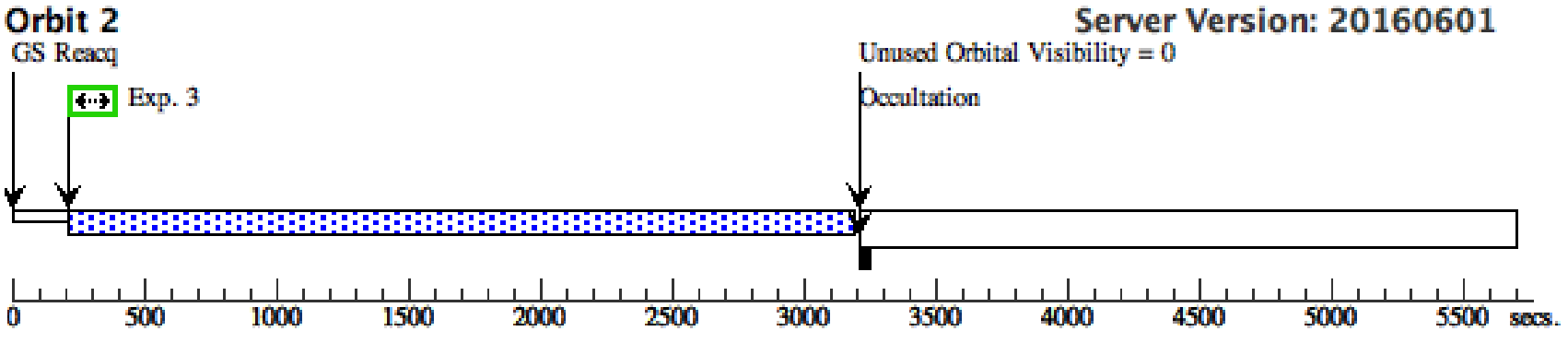
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Extended=NO

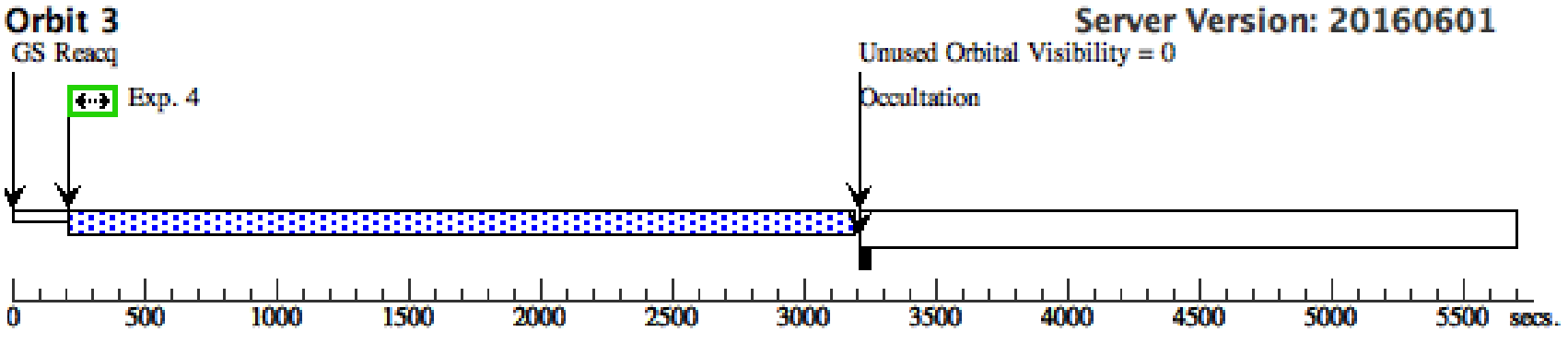
Exposures

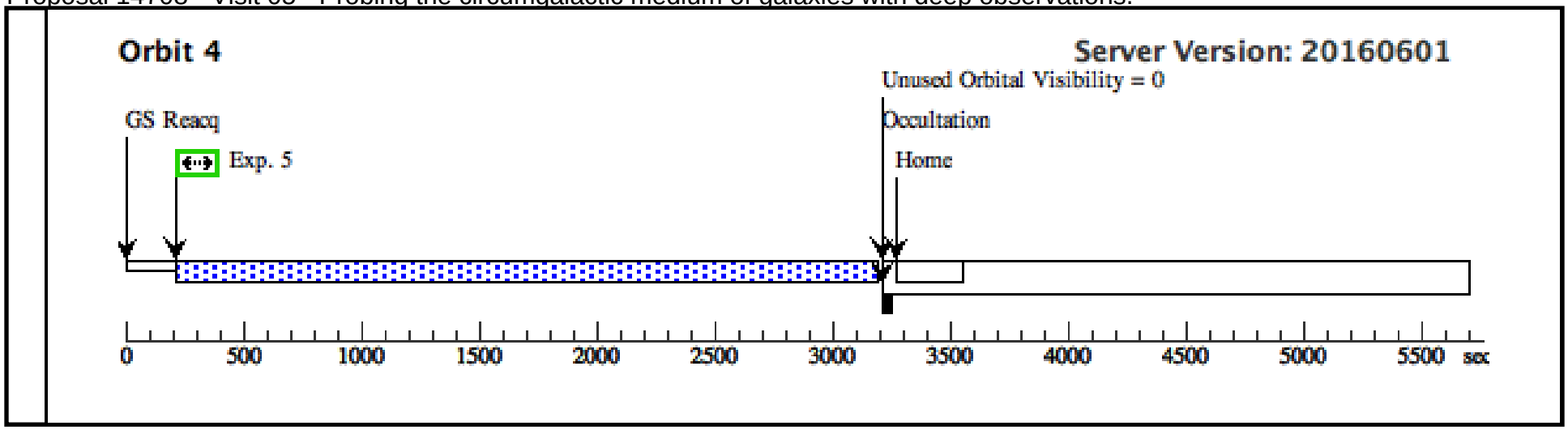
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	(COS.ta.823067)	(1) QSO-J1009+0713	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				100 Secs (100 Secs) *[==>]*	*[1]*
2	(COS.sp.826551)	(1) QSO-J1009+0713	COS/FUV, TIME-TAG, PSA	G160M 1600 A	FLASH=YES; BUFFER-TIME=9925; FP-POS=1			2000 Secs (2329 Secs) *[==>2329.0 Secs]*	*[1]*
3	(COS.sp.826551)	(1) QSO-J1009+0713	COS/FUV, TIME-TAG, PSA	G160M 1600 A	FLASH=YES; BUFFER-TIME=9925; FP-POS=2			2000 Secs (2927 Secs) *[==>2927.0 Secs]*	*[2]*
4	(COS.sp.826551)	(1) QSO-J1009+0713	COS/FUV, TIME-TAG, PSA	G160M 1600 A	FLASH=YES; BUFFER-TIME=9925; FP-POS=3			2000 Secs (2927 Secs) *[==>2927.0 Secs]*	*[3]*
5	(COS.sp.826551)	(1) QSO-J1009+0713	COS/FUV, TIME-TAG, PSA	G160M 1600 A	FLASH=YES; BUFFER-TIME=9925; FP-POS=4			2000 Secs (2927 Secs) *[==>2927.0 Secs]*	*[4]*

Orbit Structure





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Visit

Proposal 14708, Visit 06 Fri Jul 29 18:59:00 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: (none)

Fixed Targets

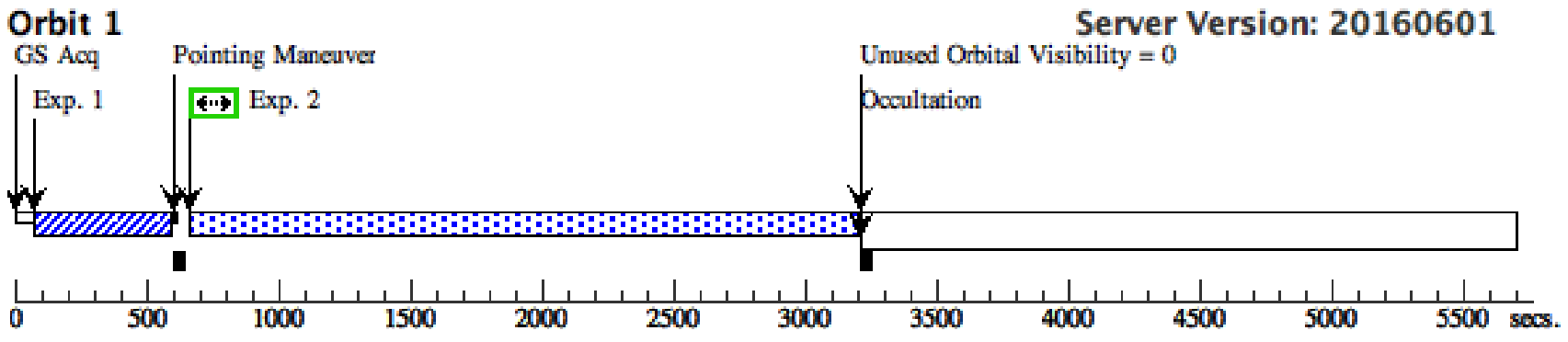
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	QSO-J1009+0713 Alt Name1: SDSSJ100902.07+071343.9	RA: 10 09 2.0698 (152.2586242d) Dec: +07 13 43.81 (7.22884d) Equinox: J2000	Redshift: 0.456	V=17.27	Reference Frame: ICRS

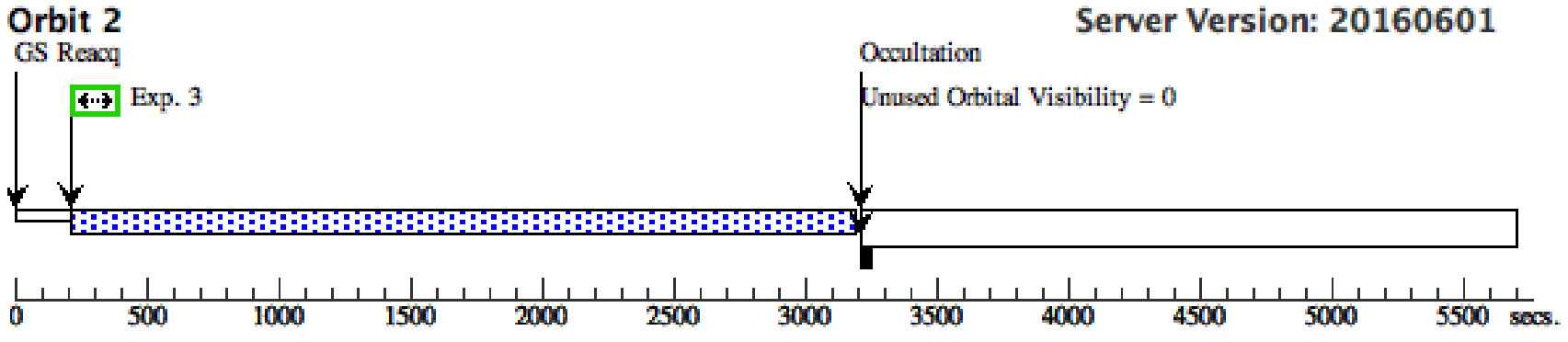
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Extended=NO

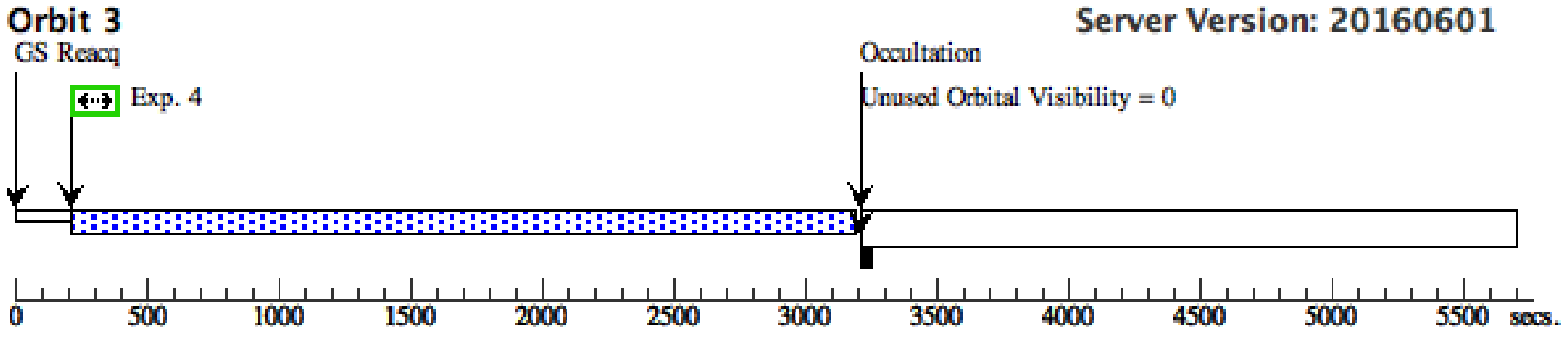
Exposures

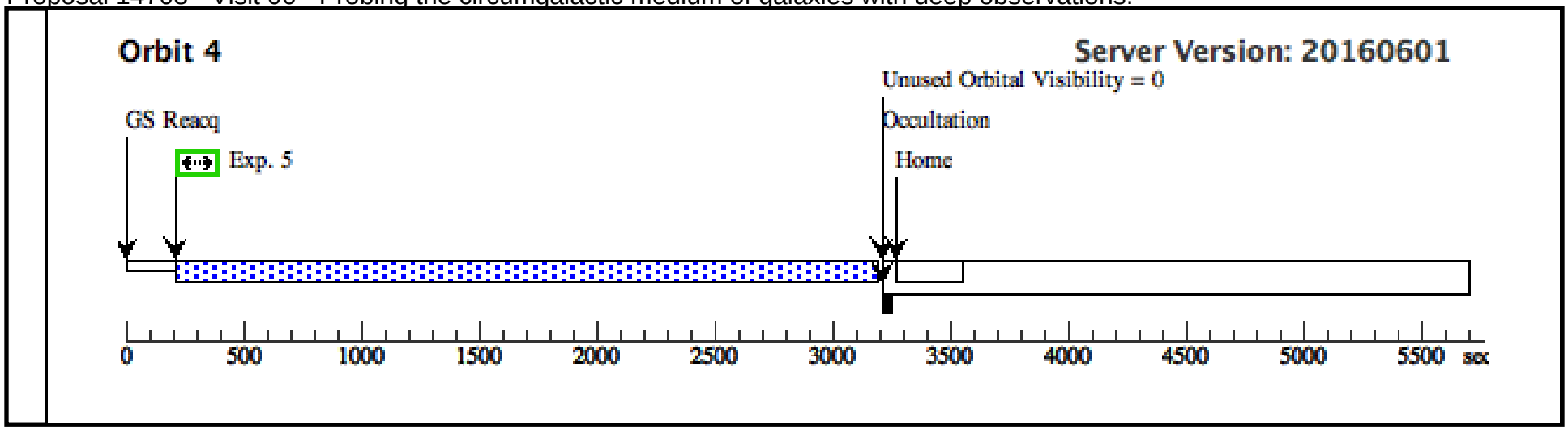
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	(COS.ta.823067)	(1) QSO-J1009+0713	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				100 Secs (100 Secs) *[==>]*	*[1]*
2	(COS.sp.826551)	(1) QSO-J1009+0713	COS/FUV, TIME-TAG, PSA	G160M 1600 A	FLASH=YES; BUFFER-TIME=9925; FP-POS=1			2000 Secs (2329 Secs) *[==>2329.0 Secs]*	*[1]*
3	(COS.sp.826551)	(1) QSO-J1009+0713	COS/FUV, TIME-TAG, PSA	G160M 1600 A	FLASH=YES; BUFFER-TIME=9925; FP-POS=2			2000 Secs (2927 Secs) *[==>2927.0 Secs]*	*[2]*
4	(COS.sp.826551)	(1) QSO-J1009+0713	COS/FUV, TIME-TAG, PSA	G160M 1600 A	FLASH=YES; BUFFER-TIME=9925; FP-POS=3			2000 Secs (2927 Secs) *[==>2927.0 Secs]*	*[3]*
5	(COS.sp.826551)	(1) QSO-J1009+0713	COS/FUV, TIME-TAG, PSA	G160M 1600 A	FLASH=YES; BUFFER-TIME=9925; FP-POS=4			2000 Secs (2927 Secs) *[==>2927.0 Secs]*	*[4]*

Orbit Structure





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Unused Orbital Visibility = 0
GS Reacq
Occultation
Exp. 5
Home
0
500
1000
1500
2000
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3000
3500
4000
4500
5000
5500
sec