13325 - Pushing COS to the (Lyman-)Limit

Cycle: 21, 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?*
10	(1) TOL-0440-381	COS/FUV COS/NUV	4	19-Mar-2014 21:01:27.0	yes
11	(1) TOL-0440-381	COS/FUV COS/NUV	4	19-Mar-2014 21:01:37.0	yes
12	(1) TOL-0440-381	COS/FUV COS/NUV	5	19-Mar-2014 21:01:49.0	yes
20	(2) TOL-1247-232	COS/FUV COS/NUV	4	19-Mar-2014 21:01:58.0	yes
21	(2) TOL-1247-232	COS/FUV COS/NUV	4	19-Mar-2014 21:02:06.0	yes
30	(3) MRK-54	COS/FUV COS/NUV	4	19-Mar-2014 21:02:13.0	yes

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
31	(3) MRK-54	COS/FUV COS/NUV	3	19-Mar-2014 21:02:23.0	yes
51	(1) TOL-0440-381	COS/FUV COS/NUV	5	19-Mar-2014 21:02:35.0	yes
52	(1) TOL-0440-381	COS/FUV COS/NUV	5	19-Mar-2014 21:02:48.0	yes

38 Total Orbits Used

ABSTRACT

The newly attained UV sensitivity of COS below 1150 A opens a wavelength domain not available since the end of the FUSE mission in 2007 and enables fundamentally new UV science with HST. We take advantage of this capability and propose COS+G140L spectroscopy of three carefully selected starburst galaxies at cz =13,000 km/s to measure or place stringent limits on the intrinsic Lyman continuum, and constrain the fraction of hydrogen-ionizing photons that escape the galaxies. Our galaxies were selected to have reliable, observed fluxes at 1000 A (based on FUSE archival spectra), and physical properties that provide the most favorable conditions for measuring the escape of Lyman continuum photons. The opacity to ionizing photons within star-forming galaxies, even in our own Galaxy, remains highly uncertain. Using Starburst99 with our newly developed set of model atmospheres, we will compute significantly improved constraints on the expected Lyman continuum. By measuring the redshifted Lyman break we can derive or set an upper limit to the escape fraction of ionizing radiation. In contrast, prior FUSE observations below 912 A are dominated by systematics due to variable background noise. The proposed observations will also enable studies of outflows, the interstellar reddening law, and stellar population properties, including star-formation rates and the stellar initial mass function. We will compare our results to existing data at higher redshift in an effort to understand the evolution of the escape fraction with redshift, and to shed light on the conditions that must have prevailed if primeval galaxies were responsible for reionizing the intergalactic medium at z >6.

OBSERVING DESCRIPTION

We will use COS and the G140L (1280) grating to collect R = 2000 spectra in the wavelength range ~875 Angstroms to 2100 Angstroms of the central starburst regions of the three nuclear starburst galaxies listed in Table 1. We carefully considered the trades between the G130M and G140L gratings. Both gratings (coincidentally) provide similar S/N in the Lyman continuum when rebinned to the same spectral resolution. Therefore our choice is driven by the performance longward of 912 Angstroms. G130M has R = 10,000, as compared to R =2000 for G140L. However, the G130M

setting exactly duplicates the existing FUSE spectra, both in terms of resolving power and specific wavelength coverage. The FUSE data are of good quality longward of the Lyman break. The G140L data will open new parameter space by extending to ~2300 Angstroms, which allows us to study the stellar populations and the reddening law simultaneously with the Lyman continuum measurement. This is a clear case in favor of G140L.
The galaxies are at a redshift of ~0.04 (column 2 of Table 1), providing a window of ~40 Angstroms between the Milky Way and the intrinsic Lyman edge. The total luminosities (column 3) and oxygen abundances (column 4) are taken from the literature. The galaxies were observed before with FUSE; therefore accurate flux information for estimating exposure times and evaluating target acquisition strategies are available. Most of the UV flux is concentrated in the central ~2 kpc sized nuclear starburst so that the smaller COS aperture size (circular 2.5 arcsec diameter versus 30 by 30 square arcsec) is not an issue. The observed FUSE fluxes (column 5 of Table 1) were measured in the archival spectra and refer to a wavelength of 1000 Angstroms, hereafter F(1000). The observed FUSE fluxes at shorter wavelengths are dominated by systematics and cannot used here. This is illustrated in Figures 2 and 3, which show the case of Haro 11, a controversial FUSE Lyman continuum detection with claimed values of fesc between 10% Bergvall et al. (2006) and an upper limit of 2% (Grimes et al. 2007).
The SEDs of the three galaxies are more or less flat at these wavelengths. The exposure times are driven by the primary science goal of the program, constraining the Lyman continuum. We account for the intrinsic Lyman break by assuming an average Lyman continuum flux of 0.5 times F(1000) for each galaxy. The most stringent upper limits on the escape fraction of Lyman radiation in individual galaxies at low to intermediate redshifts are 2% (Bridge et al. 2010). We therefore aim to reach S/N = 50 integrated over the accessible 40 Angstroms of the Lyman continuum. The G140L grating with its ~0.5 Angstroms resolution (over six pixels) covers 40/0.5 = 80 resolution elements. Since geocoronal emission lines are not an issue for the COS background (as opposed to FUSE!), we gain a factor of sqrt(80) = 9 in S/N by binning. The current version of the COS ETC uses an overly conservative value of ~4.5 x 10e-6 c/s/pix for the dark current, whereas the currently observed values are ~1.5 x 10e-6 c/s/pix. We therefore corrected the ETC predictions by using the current values. Since all observations are time-tagged, we can test the actual dark rate during the observations, and if necessary, we will a posteriori remove observations affected by temporary bursts of high background. The required exposure times to reach S/N = 50 in the Lyman continuum are 39 ks, 24 ks, and 19 ks for Tol 0440-381, Tol 1247-232, and Mrk 54, respectively (column 6 of Table 1). At all wavelengths longward of the Lyman edge we will reach an S/N > 50 at the original R = 2000 resolving power of the G140L grating (except for slight degradations due to the targets not being point sources).
The expected orbit duration for the three galaxies is 3200 s. This translates into 12, 7, and 6 orbits for Tol 0440-381, Tol 1247-232, and Mrk 54, respectively, if only exposure times are accounted for. The maximum visit duration per galaxy is 5 orbits. Therefore we need to split the observations into groups of three or two visits. We will perform a standard imaging target acquisition. This will provide deep, scientifically valuable UV images at a resolution of ~0.05 arcsec. Accounting for guide star acquisitions, a 3 by 3 target search, re-acquisitions, visit splits, and all the overheads, we require one more orbit for each galaxy. Therefore the final orbit request is (12+1), (7+1), and (6+1) orbits (column 7). This gives a grand total of 28 orbits.

Visit

Proposal 13325, TOL-0440-381-Part1 (10), failed Thu Mar 20 01:02:59 GMT 2014

Diagnostic Status: Warning

Scientific Instruments: COS/NUV, COS/FUV

Special Requirements: (none)

Diagnostics

(TOL-0440-381-Part1 (10)) Warning (Form): If the target coordinates are not known to 0.4" (or better), an ACQ/SEARCH should precede the ACQ/IMAGE.

Fixed Targets

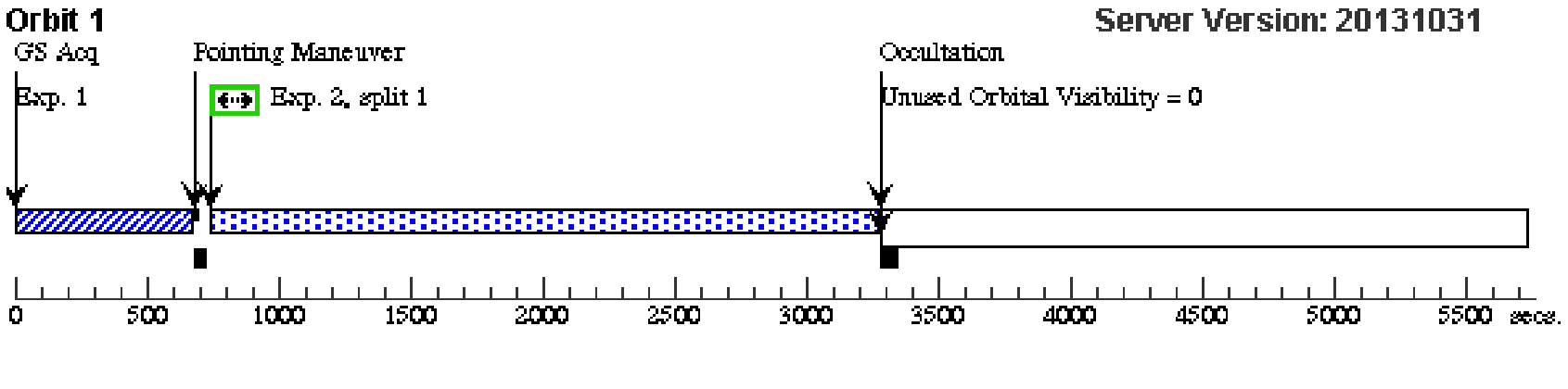
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	TOL-0440-381	RA: 04 42 8.1000 (70.5337500d) Dec: -38 01 11.00 (-38.01972d) Equinox: J2000	Radial Velocity: 12249 km/sec	V=16.1+/-0.5 F(1000)=1.0e-14	Reference Frame: ICRS

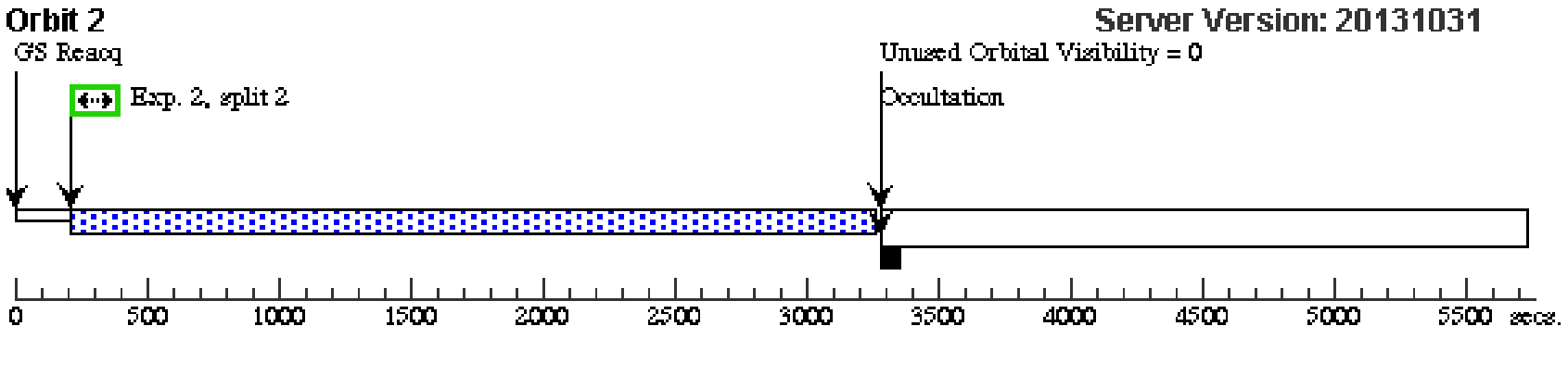
Comments: This object was generated by the target selector and retrieved from the SIMBAD database.

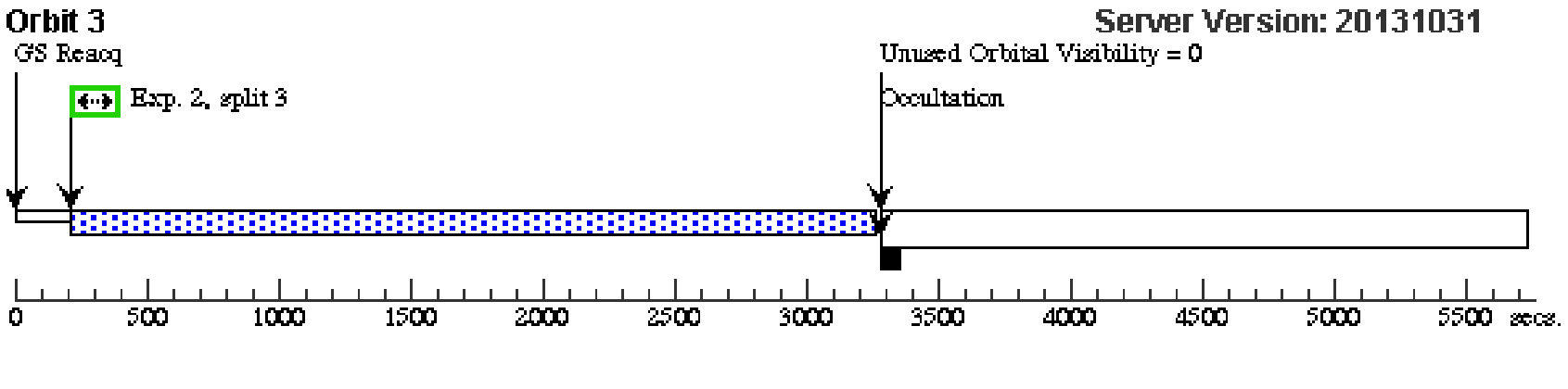
Exposures

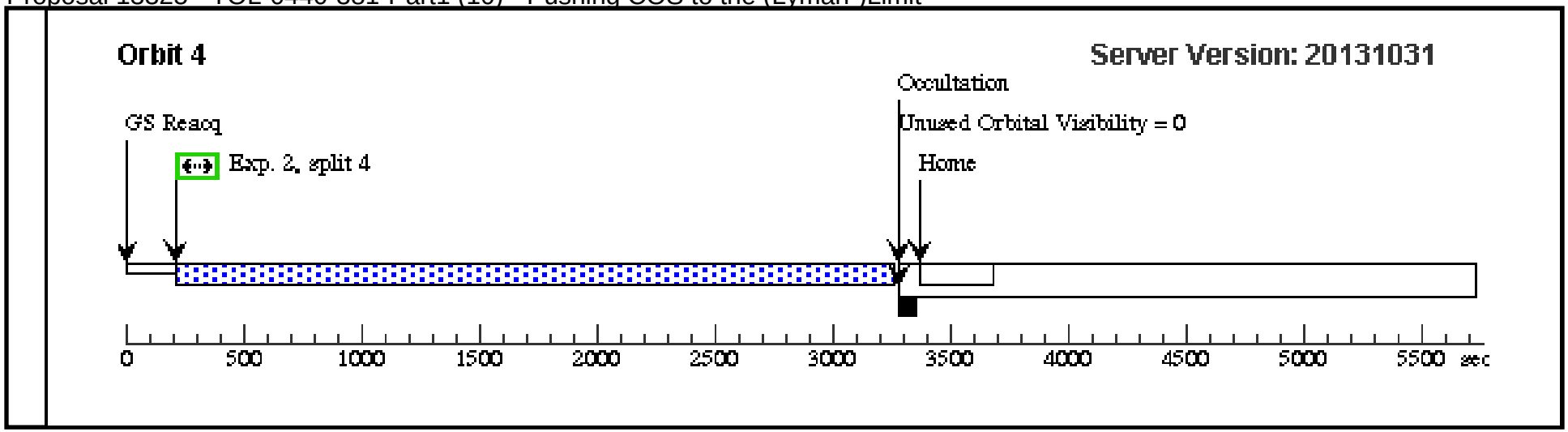
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	(513489)	(1) TOL-0440-381	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				120 Secs (120 Secs)	
								[==>]	***[1]***
2	(513494)	(1) TOL-0440-381	COS/FUV, TIME-TAG, PSA	G140L 1280 A	BUFFER-TIME=5000; FP-POS=ALL			3200 Secs (11355 Secs)	
								[==>2352.0 Secs (Split 1)]	***[1]***
								[==>3001.0 Secs (Split 2)]	***[2]***
								[==>3001.0 Secs (Split 3)]	***[3]***
								[==>3001.0 Secs (Split 4)]	***[4]***

Orbit Structure








Orbit 4
Server Version: 20131031
Occultation
GS Reacq
Unused Orbital Visibility = 0
Exp. 2, split 4
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 13325, TOL-0440-381-Part2 (11), failed Thu Mar 20 01:03:02 GMT 2014

Diagnostic Status: Warning

Scientific Instruments: COS/NUV, COS/FUV

Special Requirements: (none)

Diagnostics

(TOL-0440-381-Part2 (11)) Warning (Form): If the target coordinates are not known to 0.4" (or better), an ACQ/SEARCH should precede the ACQ/IMAGE.

Fixed Targets

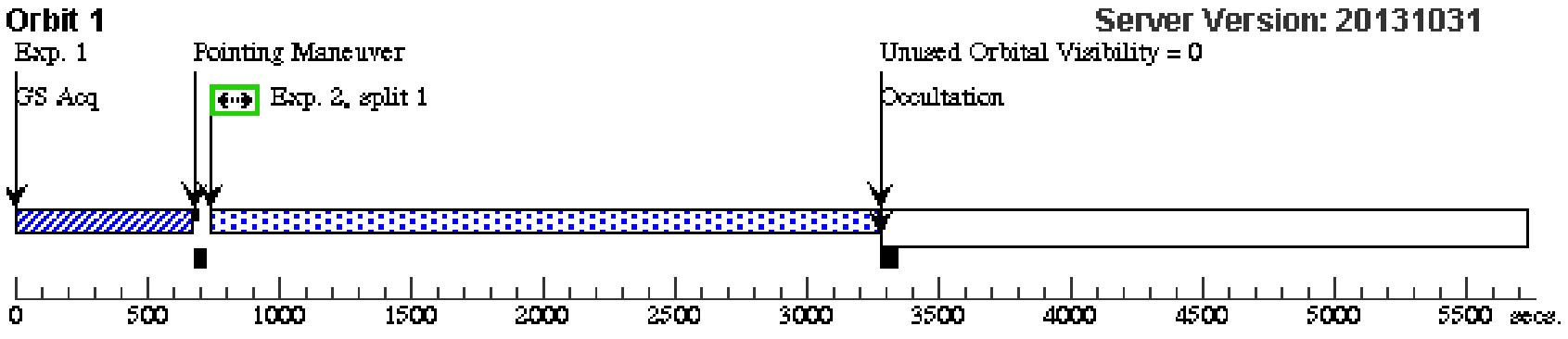
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	TOL-0440-381	RA: 04 42 8.1000 (70.5337500d) Dec: -38 01 11.00 (-38.01972d) Equinox: J2000	Radial Velocity: 12249 km/sec	V=16.1+/-0.5 F(1000)=1.0e-14	Reference Frame: ICRS

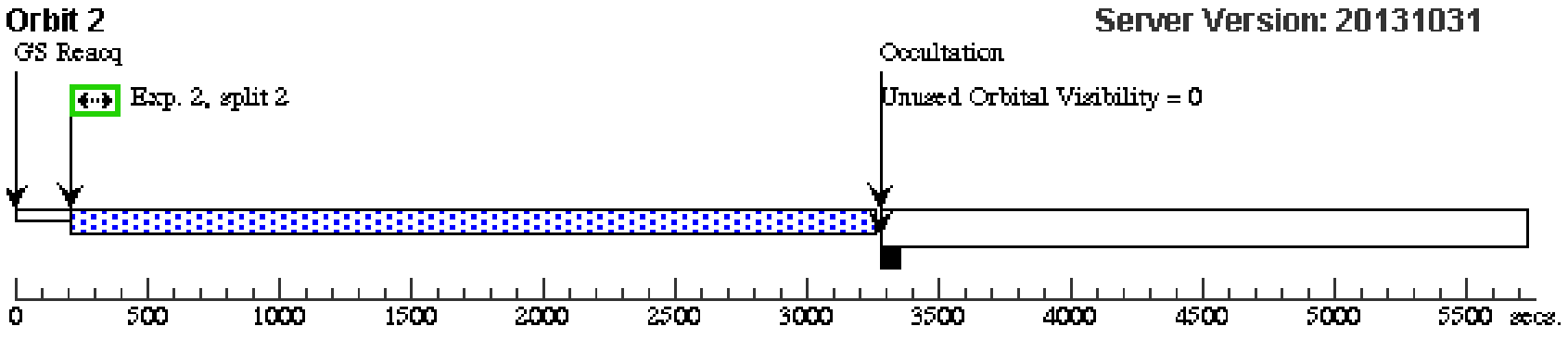
Comments: This object was generated by the target selector and retrieved from the SIMBAD database.

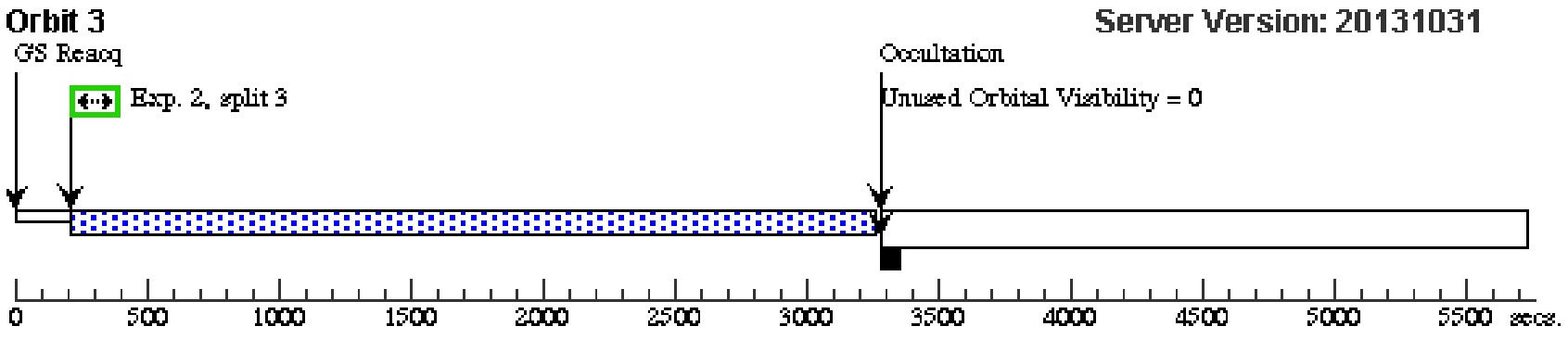
Exposures

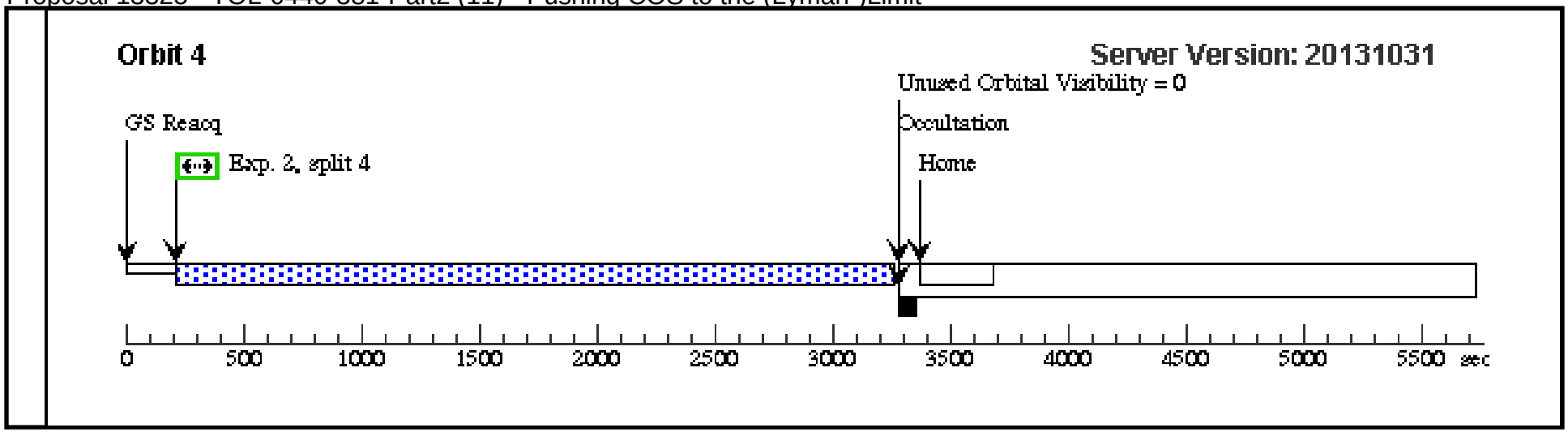
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	(513489)	(1) TOL-0440-381	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				120 Secs (120 Secs)	
								[==>]	***[1]***
2	(513494)	(1) TOL-0440-381	COS/FUV, TIME-TAG, PSA	G140L 1280 A	BUFFER-TIME=5000; FP-POS=ALL			3200 Secs (11355 Secs)	
								[==>2352.0 Secs (Split 1)]	***[1]***
								[==>3001.0 Secs (Split 2)]	***[2]***
								[==>3001.0 Secs (Split 3)]	***[3]***
								[==>3001.0 Secs (Split 4)]	***[4]***

Orbit Structure








Orbit 4
Server Version: 20131031
Unused Orbital Visibility = 0
GS Reacq
Exp. 2, split 4
Occultation
Home
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1500
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3000
3500
4000
4500
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5500
sec

Visit

Proposal 13325, TOL-0440-381-Part3 (12), failed Thu Mar 20 01:03:04 GMT 2014

Diagnostic Status: Warning

Scientific Instruments: COS/NUV, COS/FUV

Special Requirements: (none)

Diagnostics

(TOL-0440-381-Part3 (12)) Warning (Form): If the target coordinates are not known to 0.4" (or better), an ACQ/SEARCH should precede the ACQ/IMAGE.

(TOL-0440-381-Part3 (12)) Warning (Orbit Planner): INEFFICIENT ORDERING OF FP-POS POSITIONS

Fixed Targets

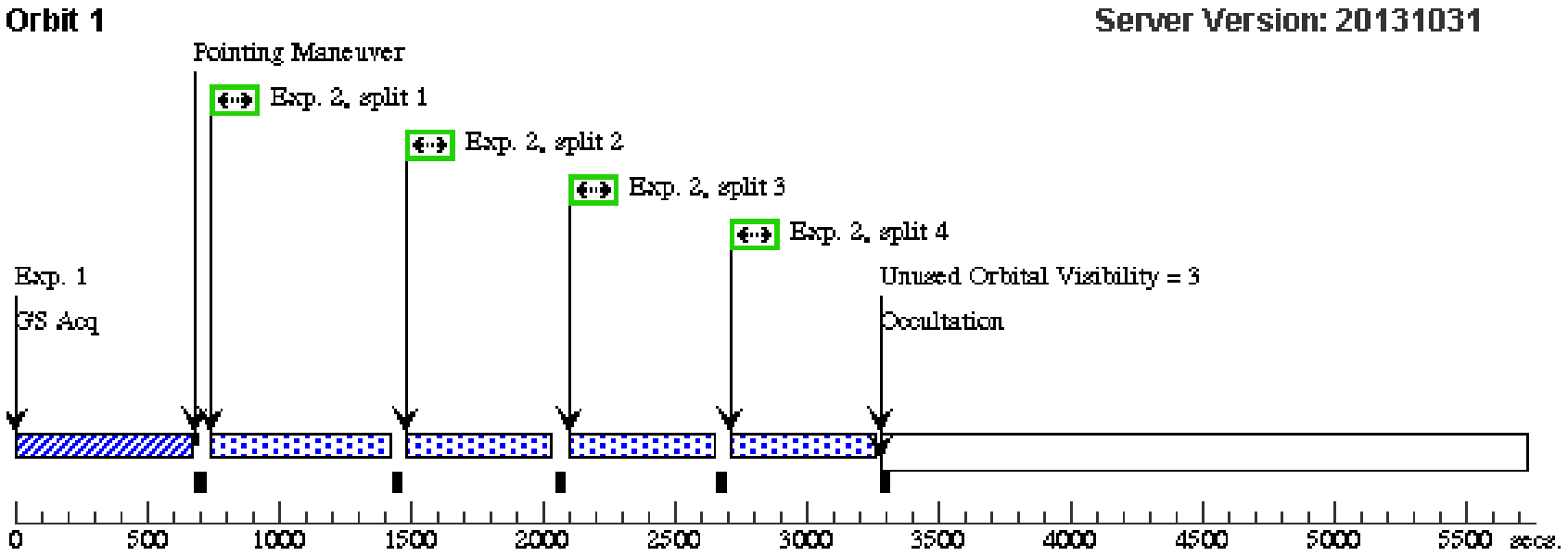
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	TOL-0440-381	RA: 04 42 8.1000 (70.5337500d) Dec: -38 01 11.00 (-38.01972d) Equinox: J2000	Radial Velocity: 12249 km/sec	V=16.1+/-0.5 F(1000)=1.0e-14	Reference Frame: ICRS

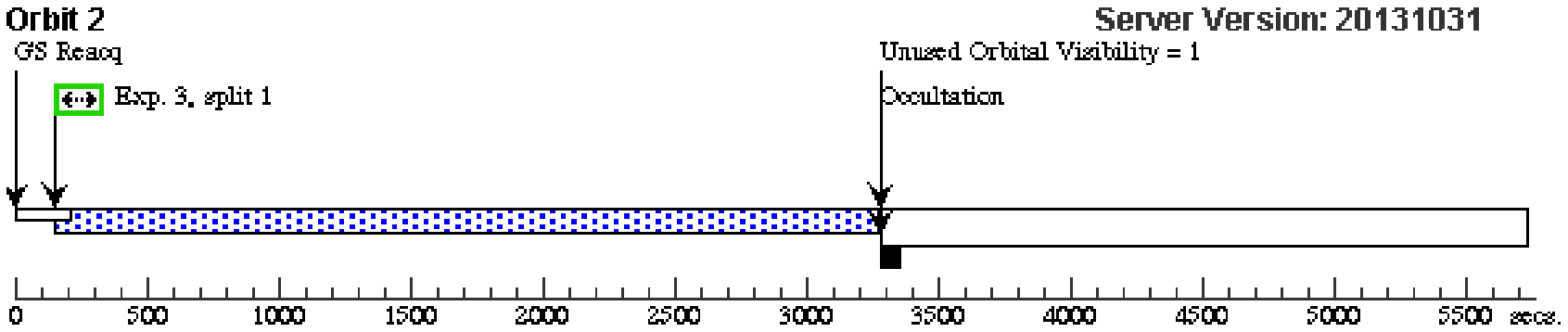
Comments: This object was generated by the target selector and retrieved from the SIMBAD database.

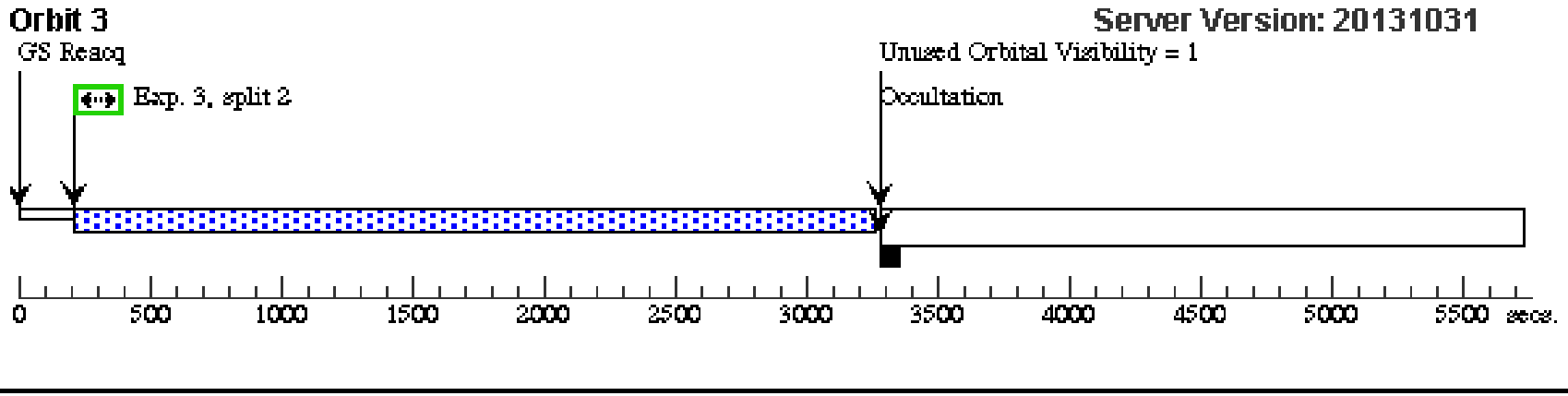
Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	(513489)	(1) TOL-0440-381	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				120 Secs (120 Secs)	
								[==>]	***[1]***
2	(513494)	(1) TOL-0440-381	COS/FUV, TIME-TAG, PSA	G140L 1280 A	BUFFER-TIME=3000; FP-POS=ALL			495 Secs (2004 Secs)	
								[==>501.0 Secs (Split 1)] *[==>501.0 Secs (Split 2)]* *[==>501.0 Secs (Split 3)]* *[==>501.0 Secs (Split 4)]*	***[1]***
3	(513493)	(1) TOL-0440-381	COS/FUV, TIME-TAG, PSA	G140L 1280 A	BUFFER-TIME=5000; FP-POS=ALL			3000 Secs (12000 Secs)	
								[==>(Split 1)]	***[2]***
								[==>(Split 2)]	***[3]***
								[==>(Split 3)]	***[4]***
								[==>(Split 4)]	***[5]***

Orbit Structure






Orbit 3
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GS Reacq
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Occultation
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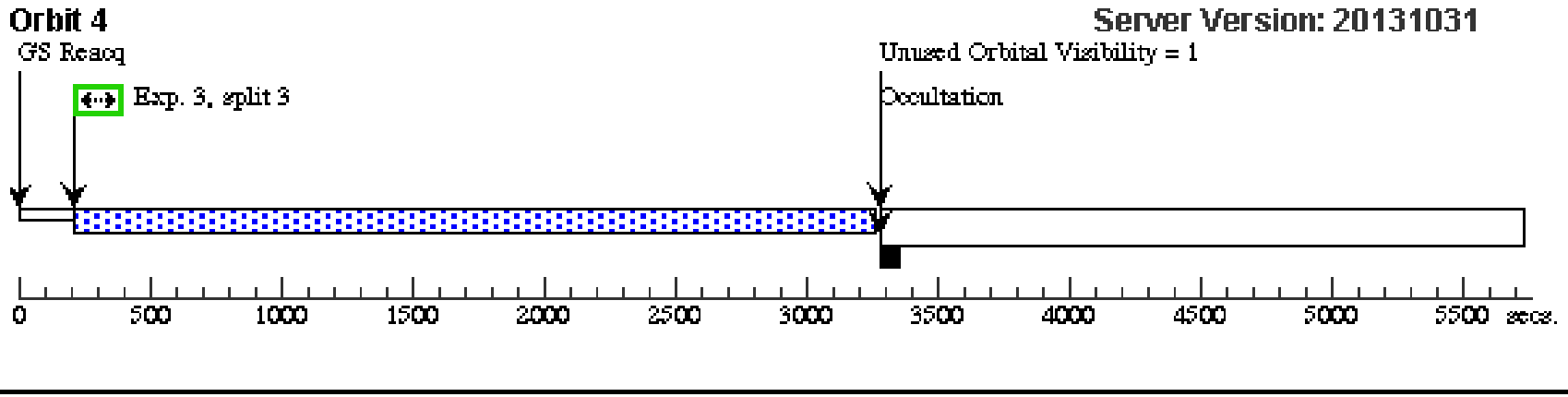
5500
secs.


Orbit 4
Server Version: 20131031
GS Reacq
Exp. 3, split 3
Unused Orbital Visibility = 1
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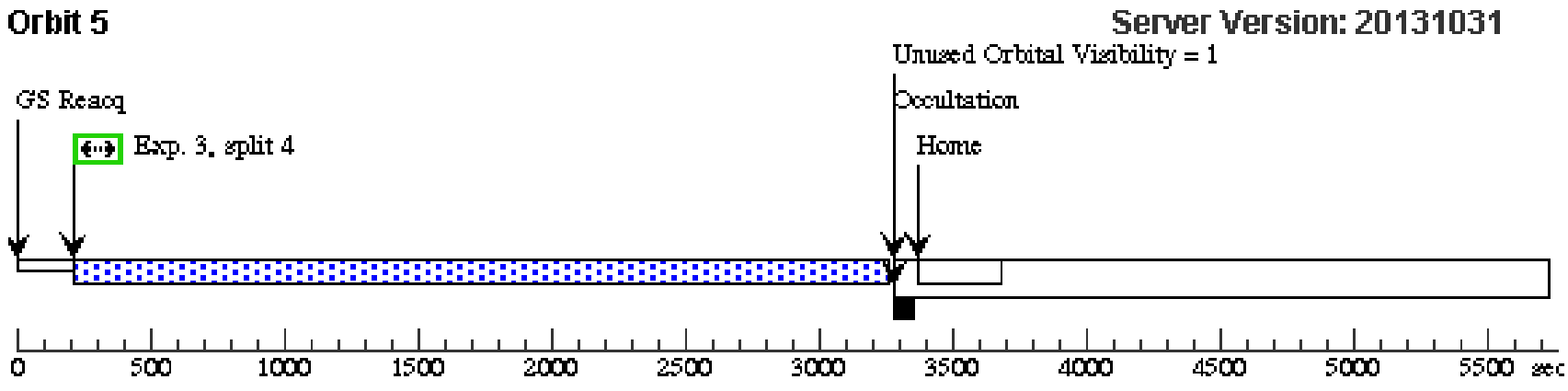
secs.


Orbit 5
Server Version: 20131031
GS Reacq
Exp. 3, split 4
Unused Orbital Visibility = 1
Occultation
Home
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1000
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2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 13325, TOL-1247-232-Part1 (20), completed Thu Mar 20 01:03:06 GMT 2014

Diagnostic Status: Warning

Scientific Instruments: COS/NUV, COS/FUV

Special Requirements: (none)

Diagnostics

(TOL-1247-232-Part1 (20)) Warning (Form): If the target coordinates are not known to 0.4" (or better), an ACQ/SEARCH should precede the ACQ/IMAGE.

Fixed Targets

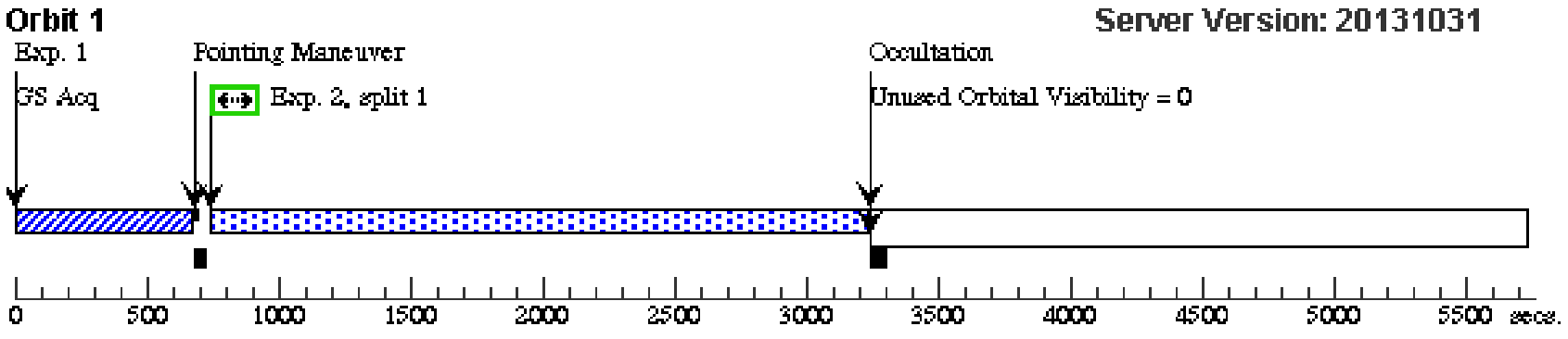
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	TOL-1247-232	RA: 12 50 18.9000 (192.5787500d) Dec: -23 33 57.60 (-23.56600d) Equinox: J2000	Radial Velocity: 14390 km/sec	V=15.5+/-0.5 F(1000)=1.5e-14	Reference Frame: ICRS

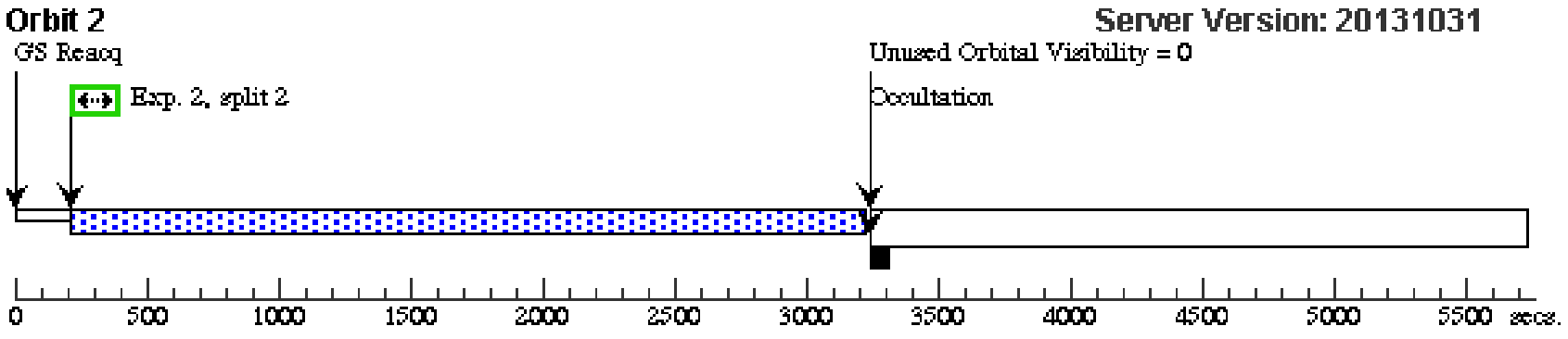
Comments: This object was generated by the target selector and retrieved from the SIMBAD database.

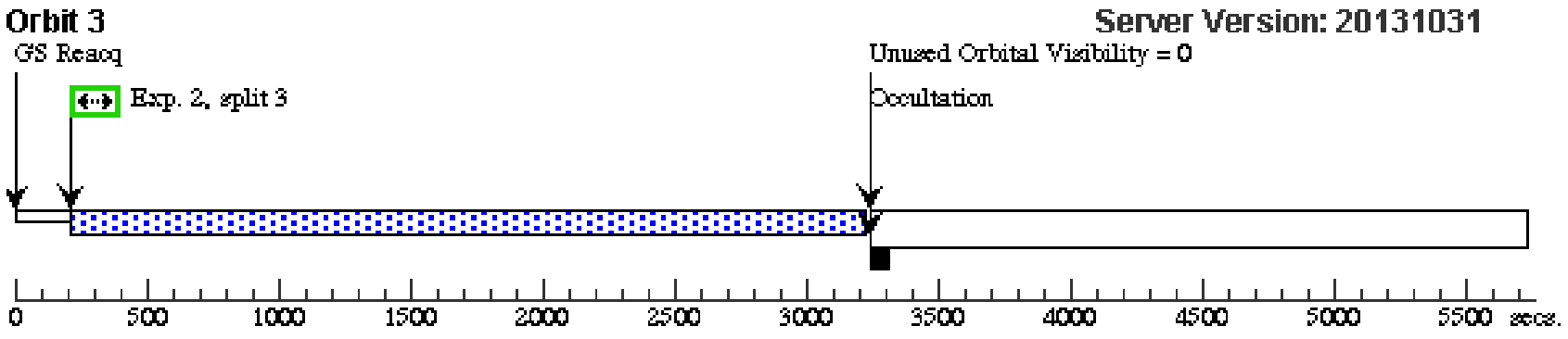
Exposures

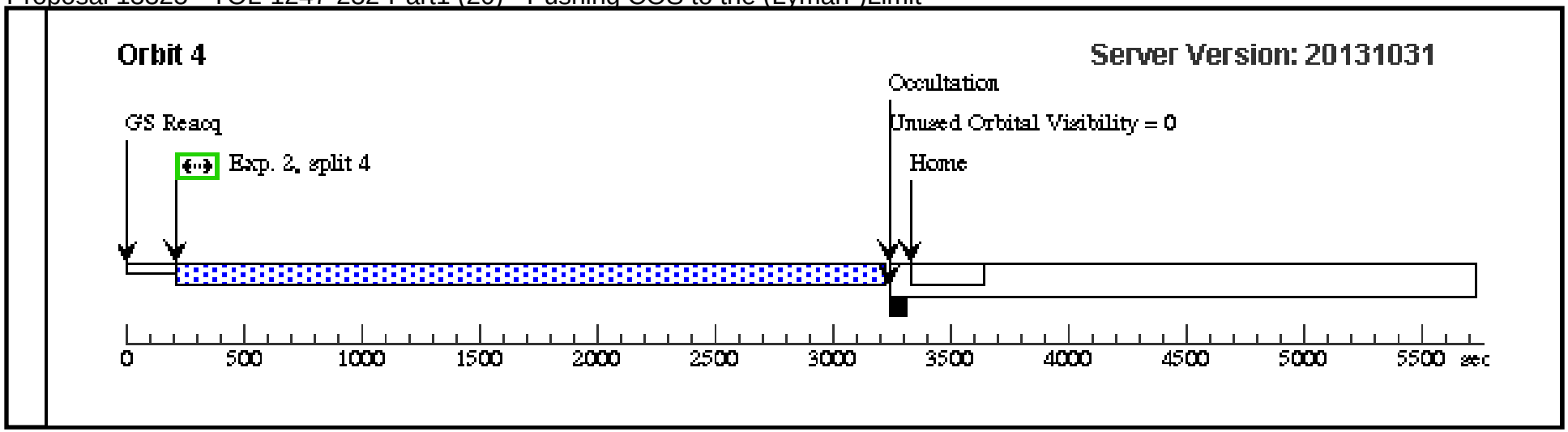
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	(513489)	(2) TOL-1247-232	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				120 Secs (120 Secs)	
								[==>]	***[1]***
2	(513494)	(2) TOL-1247-232	COS/FUV, TIME-TAG, PSA	G140L 1280 A	BUFFER-TIME=5000; FP-POS=ALL			3200 Secs (11183 Secs)	
								[==>2309.0 Secs (Split 1)]	***[1]***
								[==>2958.0 Secs (Split 2)]	***[2]***
								[==>2958.0 Secs (Split 3)]	***[3]***
								[==>2958.0 Secs (Split 4)]	***[4]***

Orbit Structure








Orbit 4
Server Version: 20131031
Occultation
GS Reacq
Unused Orbital Visibility = 0
Exp. 2, split 4
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 13325, TOL-1247-232-Part2 (21), completed Thu Mar 20 01:03:07 GMT 2014

Diagnostic Status: Warning

Scientific Instruments: COS/NUV, COS/FUV

Special Requirements: (none)

Diagnostics

(TOL-1247-232-Part2 (21)) Warning (Form): If the target coordinates are not known to 0.4" (or better), an ACQ/SEARCH should precede the ACQ/IMAGE.

Fixed Targets

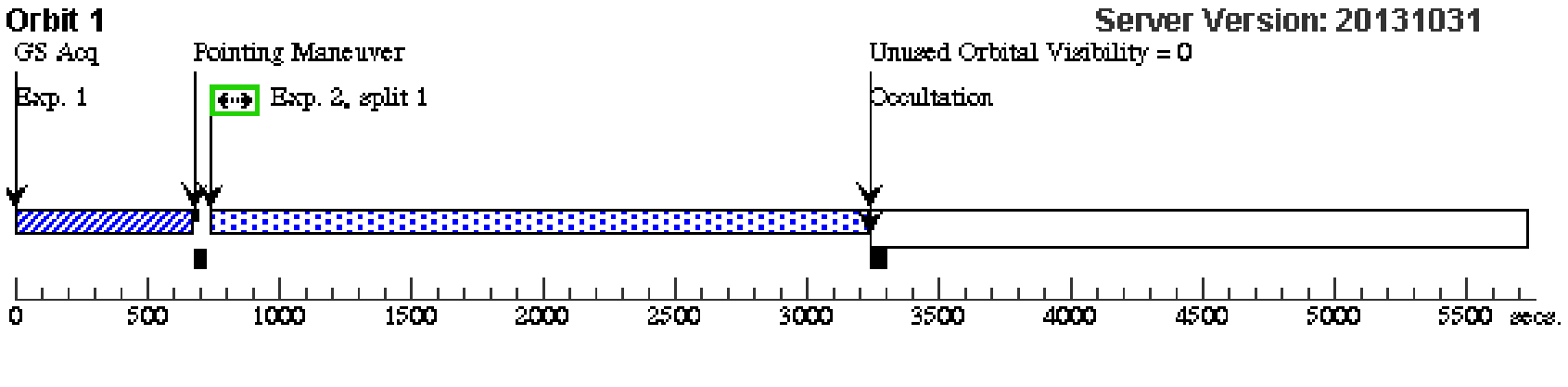
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	TOL-1247-232	RA: 12 50 18.9000 (192.5787500d) Dec: -23 33 57.60 (-23.56600d) Equinox: J2000	Radial Velocity: 14390 km/sec	V=15.5+/-0.5 F(1000)=1.5e-14	Reference Frame: ICRS

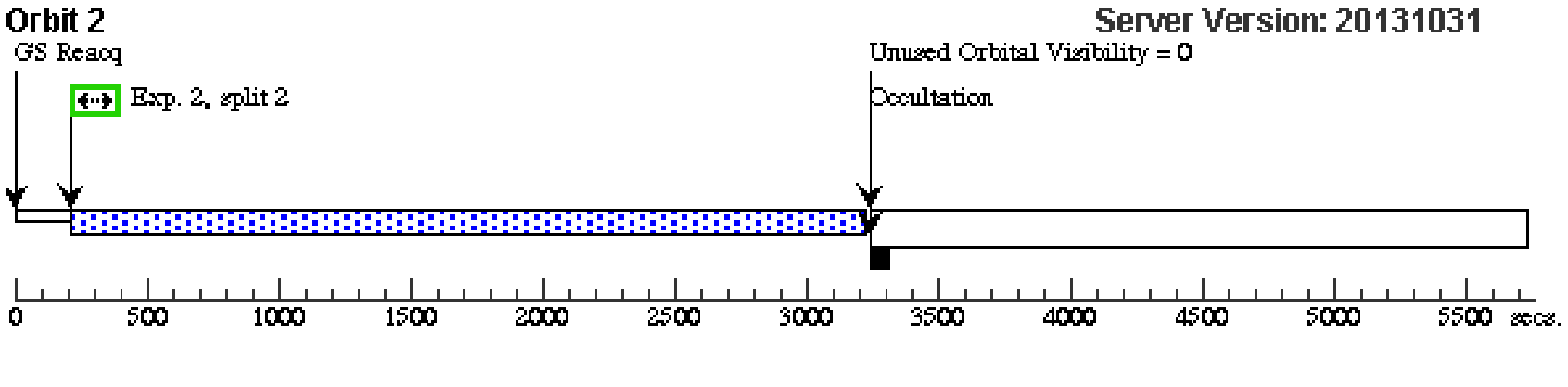
Comments: This object was generated by the target selector and retrieved from the SIMBAD database.

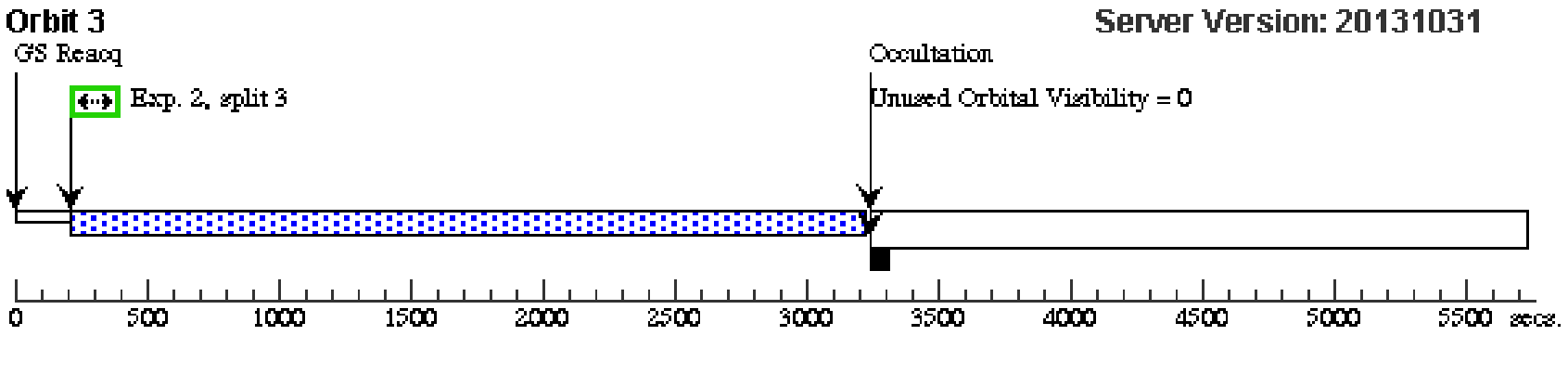
Exposures

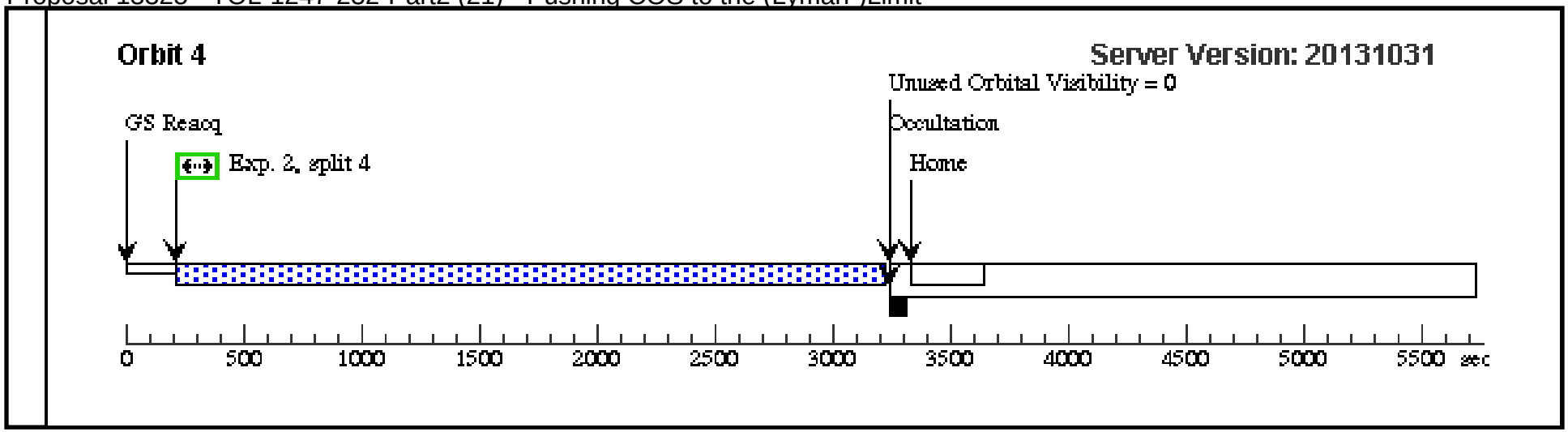
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	(513489)	(2) TOL-1247-232	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				120 Secs (120 Secs)	
								[==>]	***[1]***
2	(513494)	(2) TOL-1247-232	COS/FUV, TIME-TAG, PSA	G140L 1280 A	BUFFER-TIME=5000; FP-POS=ALL			3200 Secs (11183 Secs)	
								[==>2309.0 Secs (Split 1)]	***[1]***
								[==>2958.0 Secs (Split 2)]	***[2]***
								[==>2958.0 Secs (Split 3)]	***[3]***
								[==>2958.0 Secs (Split 4)]	***[4]***

Orbit Structure








Orbit 4
Server Version: 20131031
Unused Orbital Visibility = 0
GS Reacq
Exp. 2, split 4
Occultation
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 13325, MRK-54-Part1 (30), scheduling Thu Mar 20 01:03:08 GMT 2014

Diagnostic Status: Warning

Scientific Instruments: COS/NUV, COS/FUV

Special Requirements: (none)

Diagnostics

(MRK-54-Part1 (30)) Warning (Form): If the target coordinates are not known to 0.4" (or better), an ACQ/SEARCH should precede the ACQ/IMAGE.

Fixed Targets

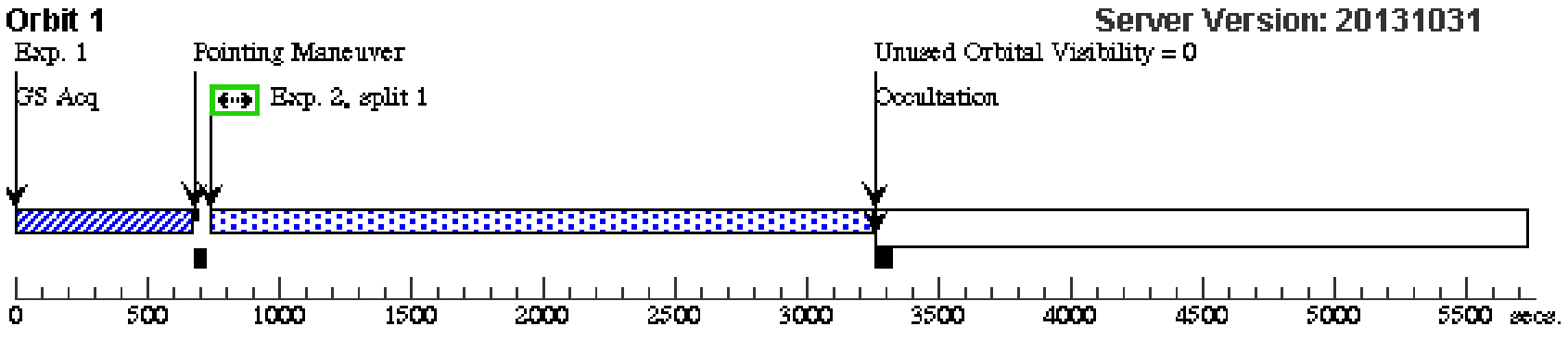
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	MRK-54	RA: 12 56 55.6600 (194.2319167d) Dec: +32 26 51.40 (32.44761d) Equinox: J2000	Radial Velocity: 13450 km/sec	V=15.3+/-0.5 F(1000)=2.0e-14	Reference Frame: ICRS

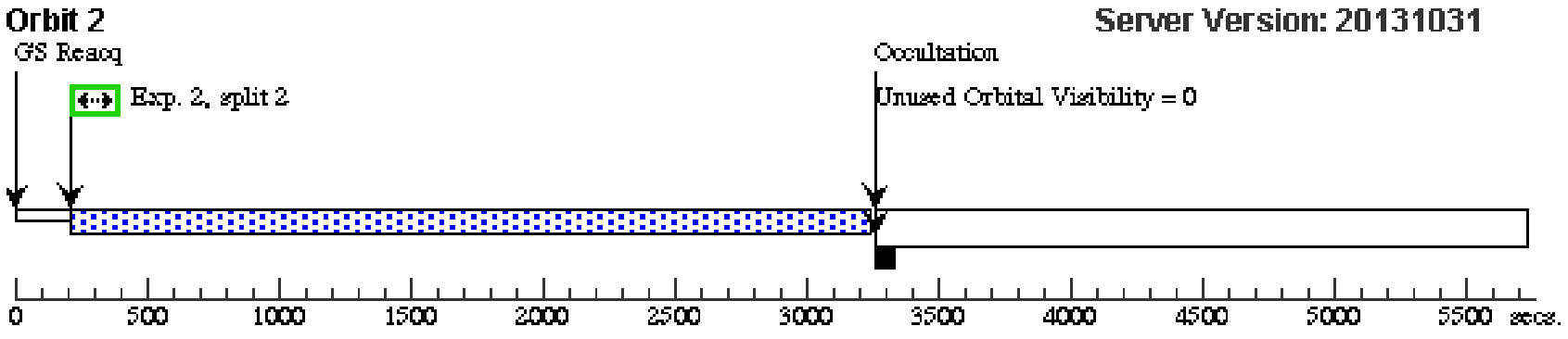
Comments: This object was generated by the target selector and retrieved from the SIMBAD database.

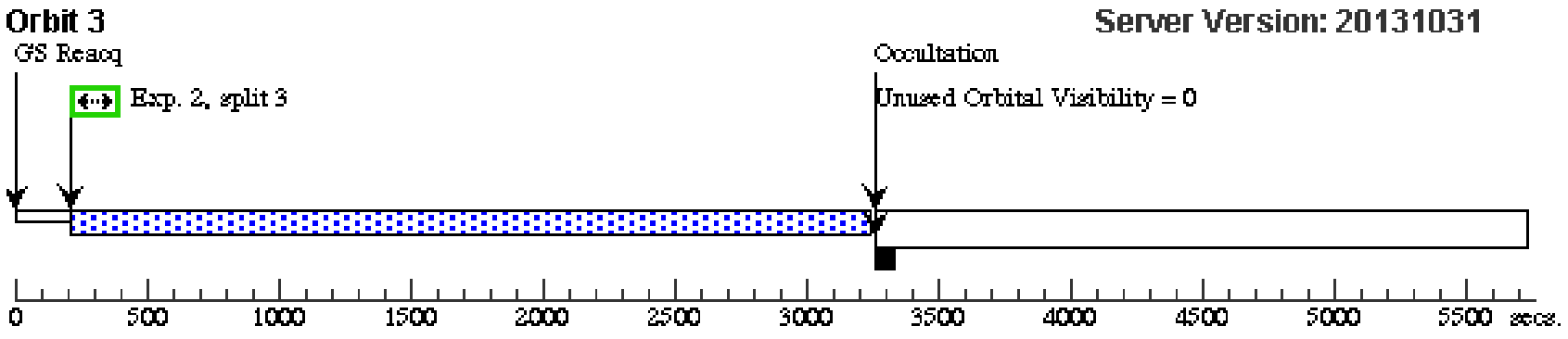
Exposures

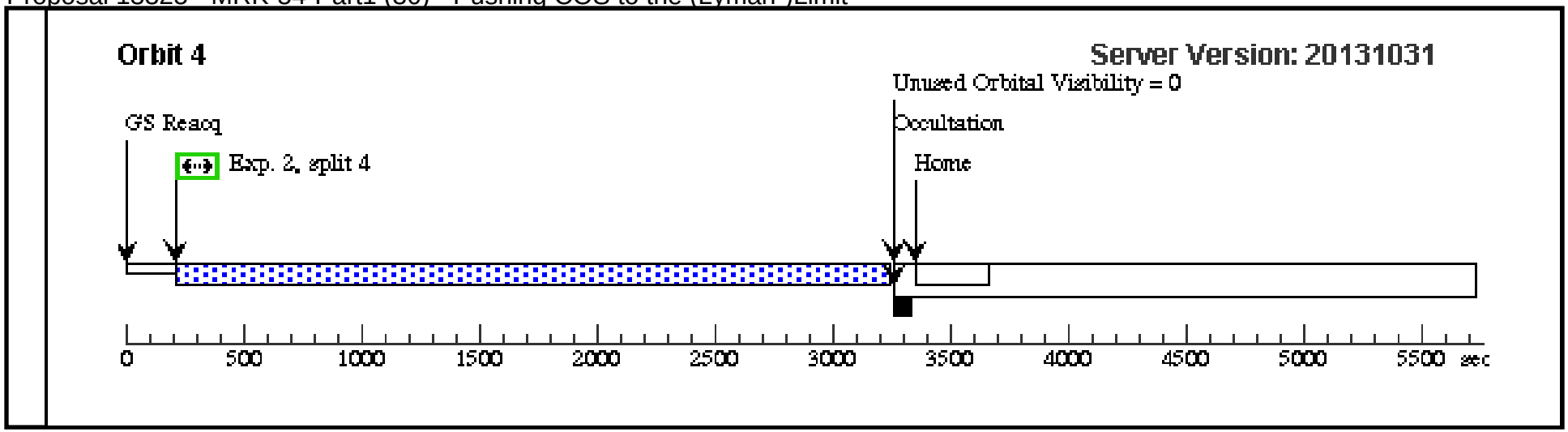
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	(513489)	(3) MRK-54	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				120 Secs (120 Secs)	
								[==>]	***[1]***
2	(513494)	(3) MRK-54	COS/FUV, TIME-TAG, PSA	G140L 1280 A	BUFFER-TIME=5000; FP-POS=ALL			3200 Secs (11275 Secs)	
								[==>2332.0 Secs (Split 1)]	***[1]***
								[==>2981.0 Secs (Split 2)]	***[2]***
								[==>2981.0 Secs (Split 3)]	***[3]***
								[==>2981.0 Secs (Split 4)]	***[4]***

Orbit Structure








Orbit 4
Server Version: 20131031
Unused Orbital Visibility = 0
GS Reacq
Exp. 2, split 4
Occultation
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 13325, MRK-54-Part2 (31), scheduling Thu Mar 20 01:03:10 GMT 2014

Diagnostic Status: Warning

Scientific Instruments: COS/NUV, COS/FUV

Special Requirements: (none)

Diagnostics

(MRK-54-Part2 (31)) Warning (Orbit Planner): INEFFICIENT ORDERING OF FP-POS POSITIONS

(MRK-54-Part2 (31)) Warning (Form): If the target coordinates are not known to 0.4" (or better), an ACQ/SEARCH should precede the ACQ/IMAGE.

Fixed Targets

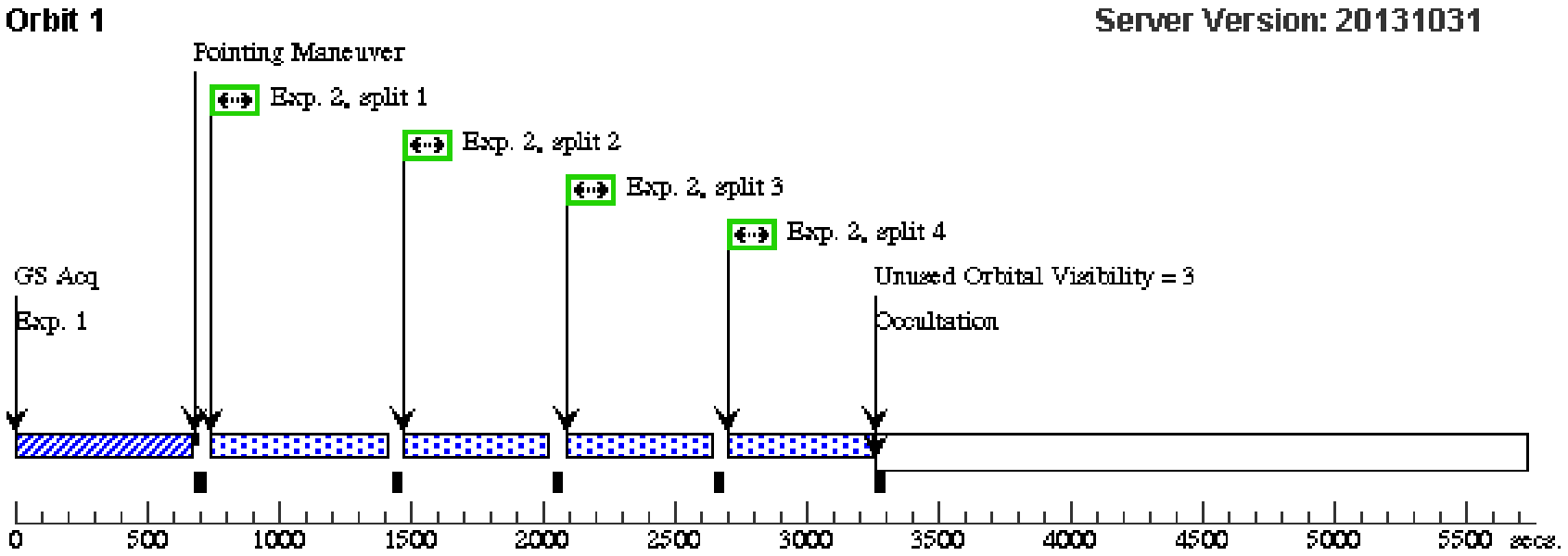
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	MRK-54	RA: 12 56 55.6600 (194.2319167d) Dec: +32 26 51.40 (32.44761d) Equinox: J2000	Radial Velocity: 13450 km/sec	V=15.3+/-0.5 F(1000)=2.0e-14	Reference Frame: ICRS

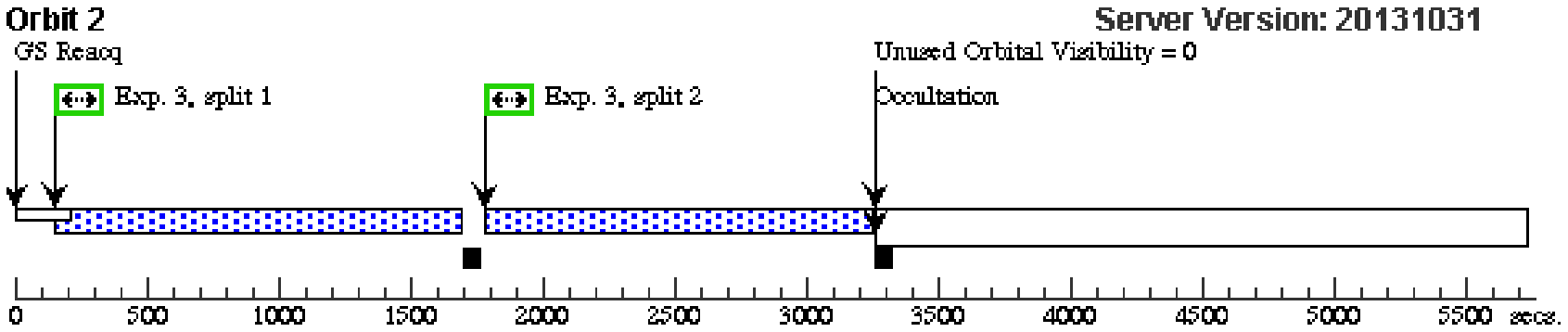
Comments: This object was generated by the target selector and retrieved from the SIMBAD database.

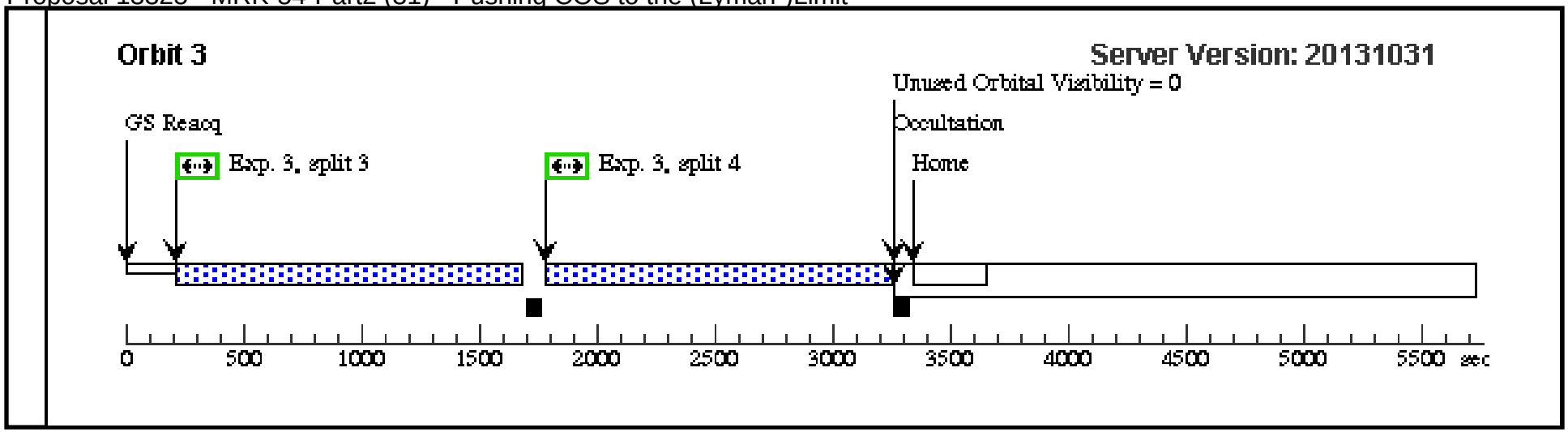
Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	(513489)	(3) MRK-54	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				120 Secs (120 Secs)	
								[==>]	***[1]***
2	(513494)	(3) MRK-54	COS/FUV, TIME-TAG, PSA	G140L 1280 A	BUFFER-TIME=3000; FP-POS=ALL			495 Secs (1984 Secs)	
								[==>496.0 Secs (Split 1)] *[==>496.0 Secs (Split 2)]* *[==>496.0 Secs (Split 3)]* *[==>496.0 Secs (Split 4)]*	***[1]***
3	(513494)	(3) MRK-54	COS/FUV, TIME-TAG, PSA	G140L 1280 A	BUFFER-TIME=3000; FP-POS=ALL			1400 Secs (5676 Secs)	
								[==>1419.0 Secs (Split 1)] *[==>1419.0 Secs (Split 2)]*	***[2]***
								[==>1419.0 Secs (Split 3)] *[==>1419.0 Secs (Split 4)]*	***[3]***

Orbit Structure






Orbit 3
Server Version: 20131031
Unused Orbital Visibility = 0
GS Reacq
Exp. 3, split 3
Exp. 3, split 4
Occultation
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 13325, TOL-0440-381-Part3 (51), implementation Thu Mar 20 01:03:11 GMT 2014

Diagnostic Status: Warning

Scientific Instruments: COS/NUV, COS/FUV

Special Requirements: GROUP 51,52 WITHIN 30D

Diagnostics

(TOL-0440-381-Part3 (51)) Warning (Orbit Planner): INEFFICIENT ORDERING OF FP-POS POSITIONS

(TOL-0440-381-Part3 (51)) Warning (Form): If the target coordinates are not known to 0.4" (or better), an ACQ/SEARCH should precede the ACQ/IMAGE.

Fixed Targets

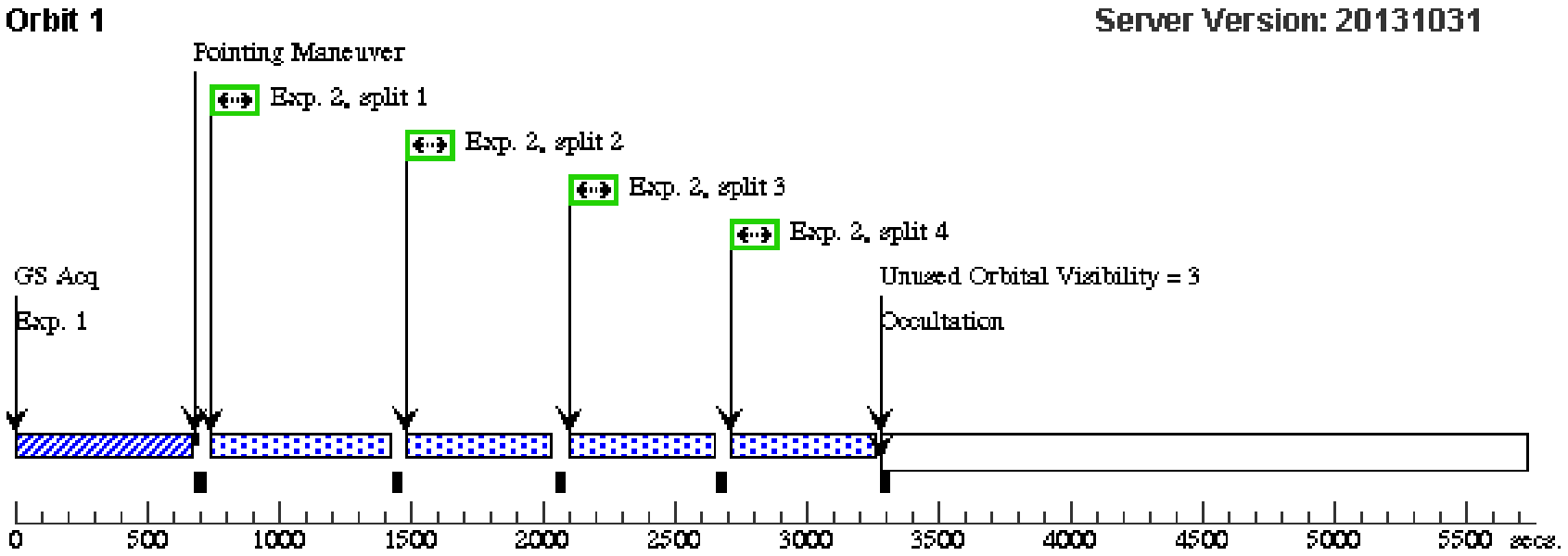
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	TOL-0440-381	RA: 04 42 8.1000 (70.5337500d) Dec: -38 01 11.00 (-38.01972d) Equinox: J2000	Radial Velocity: 12249 km/sec	V=16.1+/-0.5 F(1000)=1.0e-14	Reference Frame: ICRS

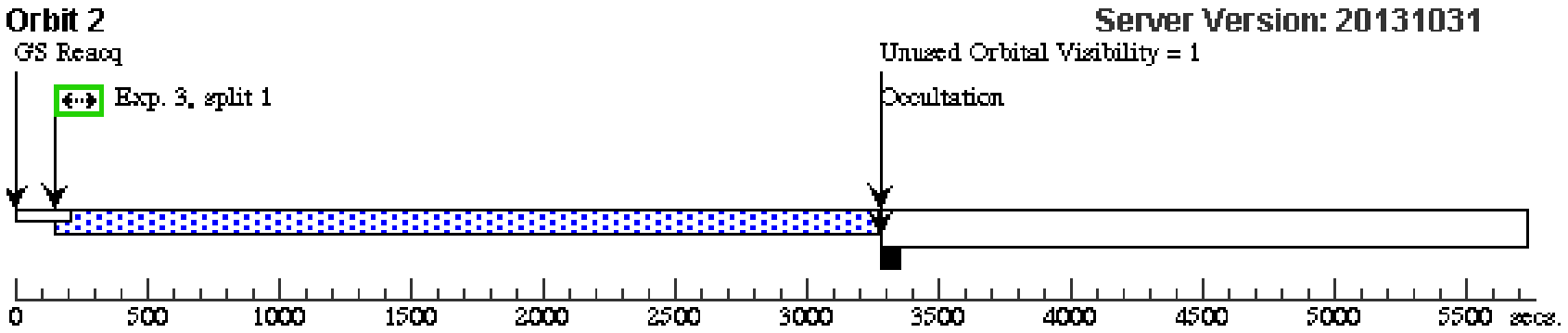
Comments: This object was generated by the target selector and retrieved from the SIMBAD database.

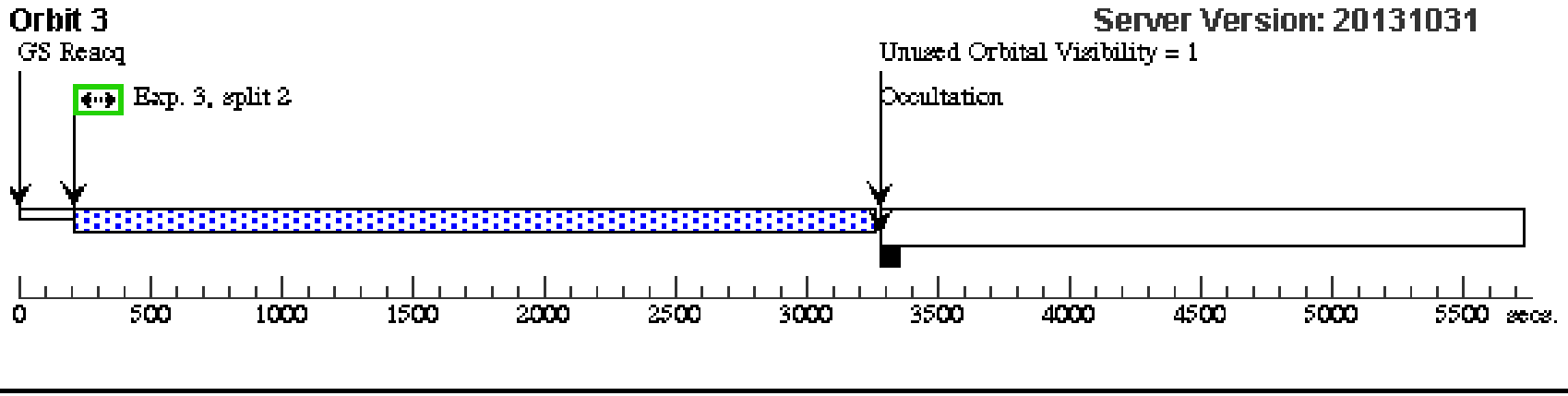
Exposures

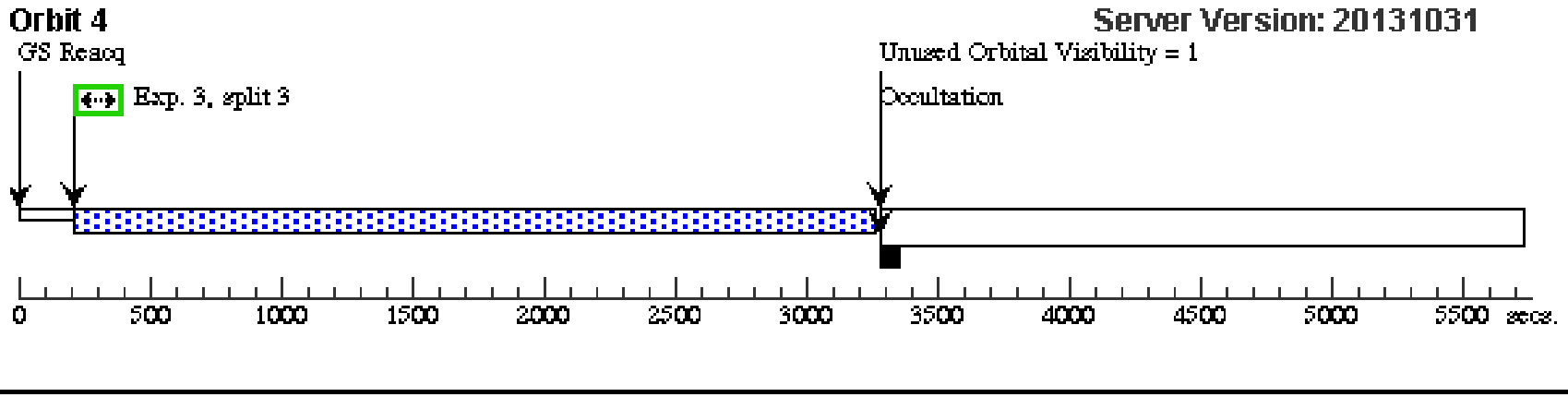
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	(513489)	(1) TOL-0440-381	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				120 Secs (120 Secs)	
								[==>]	***[1]***
2	(513494)	(1) TOL-0440-381	COS/FUV, TIME-TAG, PSA	G140L 1280 A	BUFFER-TIME=3000; FP-POS=ALL			495 Secs (2004 Secs)	
								[==>501.0 Secs (Split 1)] *[==>501.0 Secs (Split 2)]* *[==>501.0 Secs (Split 3)]* *[==>501.0 Secs (Split 4)]*	***[1]***
3	(513493)	(1) TOL-0440-381	COS/FUV, TIME-TAG, PSA	G140L 1280 A	BUFFER-TIME=5000; FP-POS=ALL			3000 Secs (12000 Secs)	
								[==>(Split 1)]	***[2]***
								[==>(Split 2)]	***[3]***
								[==>(Split 3)]	***[4]***
								[==>(Split 4)]	***[5]***

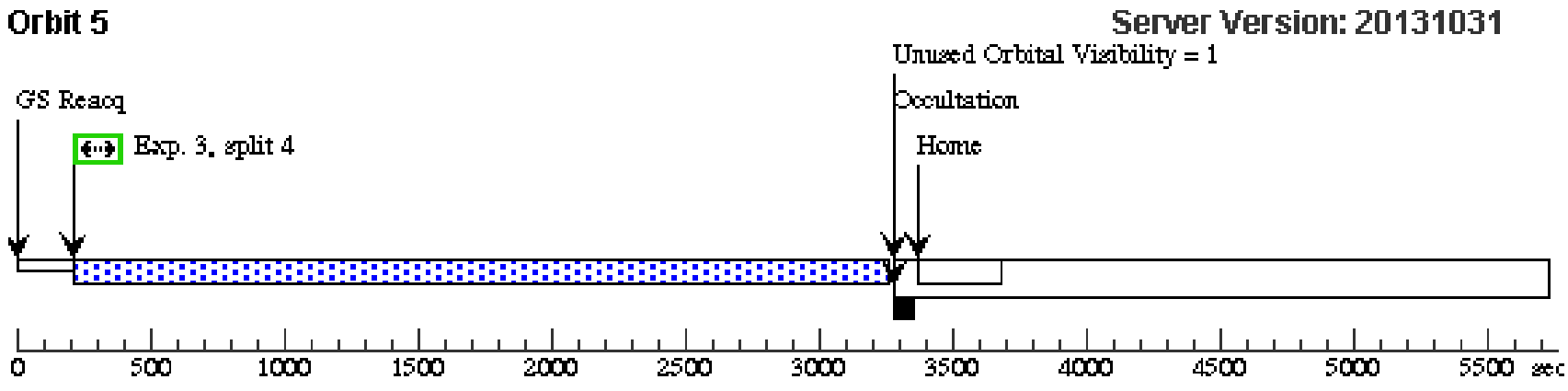
Orbit Structure






Orbit 3
Server Version: 20131031
GS Reacq
Exp. 3, split 2
Unused Orbital Visibility = 1
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.


Orbit 4
Server Version: 20131031
GS Reacq
Exp. 3, split 3
Unused Orbital Visibility = 1
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.


Orbit 5
Server Version: 20131031
GS Reacq
Exp. 3, split 4
Unused Orbital Visibility = 1
Occultation
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 13325, TOL-0440-381-Part3 (52), implementation Thu Mar 20 01:03:12 GMT 2014

Diagnostic Status: Warning

Scientific Instruments: COS/NUV, COS/FUV

Special Requirements: (none)

Diagnostics

(TOL-0440-381-Part3 (52)) Warning (Orbit Planner): INEFFICIENT ORDERING OF FP-POS POSITIONS

(TOL-0440-381-Part3 (52)) Warning (Form): If the target coordinates are not known to 0.4" (or better), an ACQ/SEARCH should precede the ACQ/IMAGE.

Fixed Targets

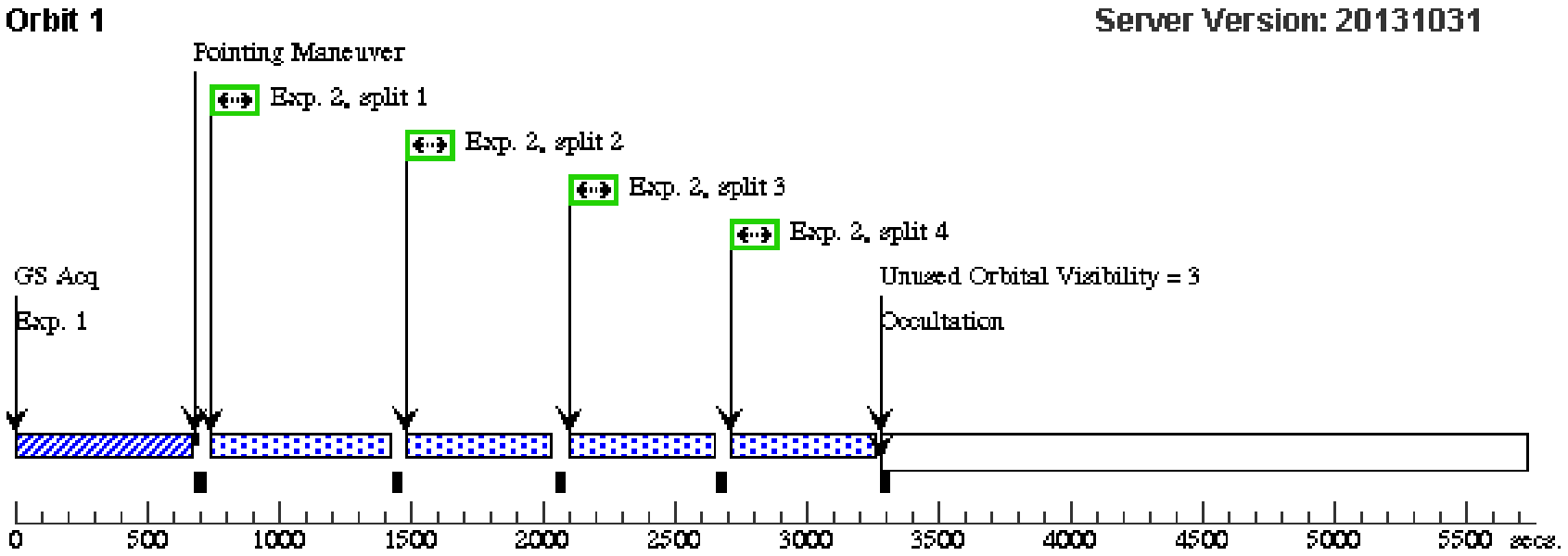
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	TOL-0440-381	RA: 04 42 8.1000 (70.5337500d) Dec: -38 01 11.00 (-38.01972d) Equinox: J2000	Radial Velocity: 12249 km/sec	V=16.1+/-0.5 F(1000)=1.0e-14	Reference Frame: ICRS

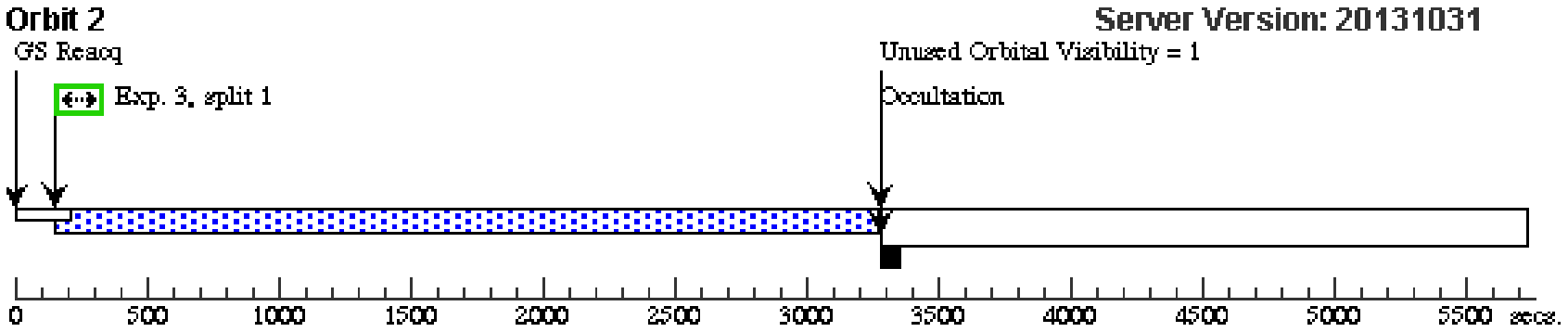
Comments: This object was generated by the target selector and retrieved from the SIMBAD database.

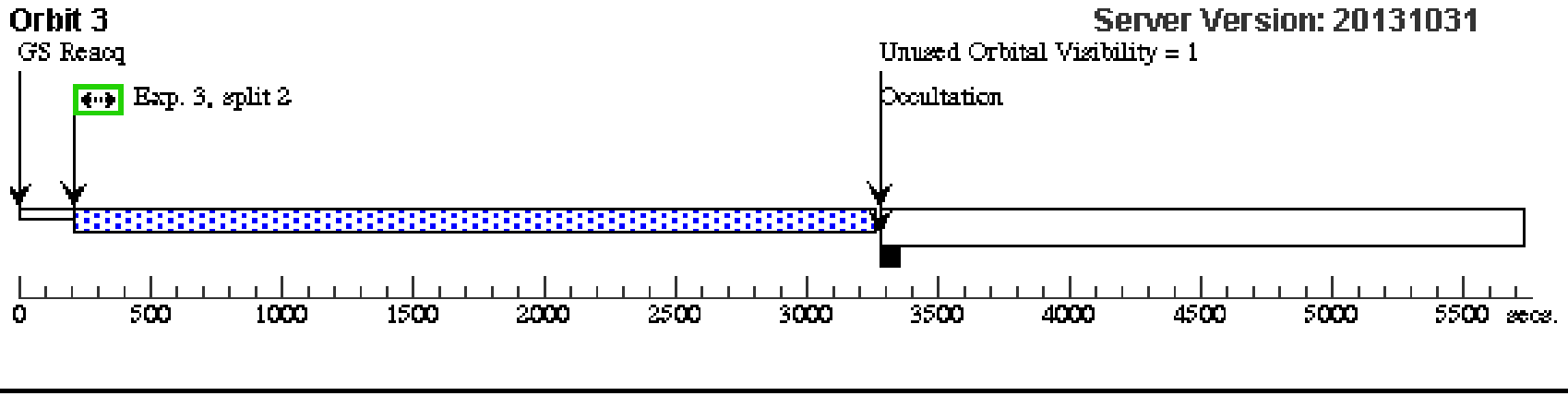
Exposures

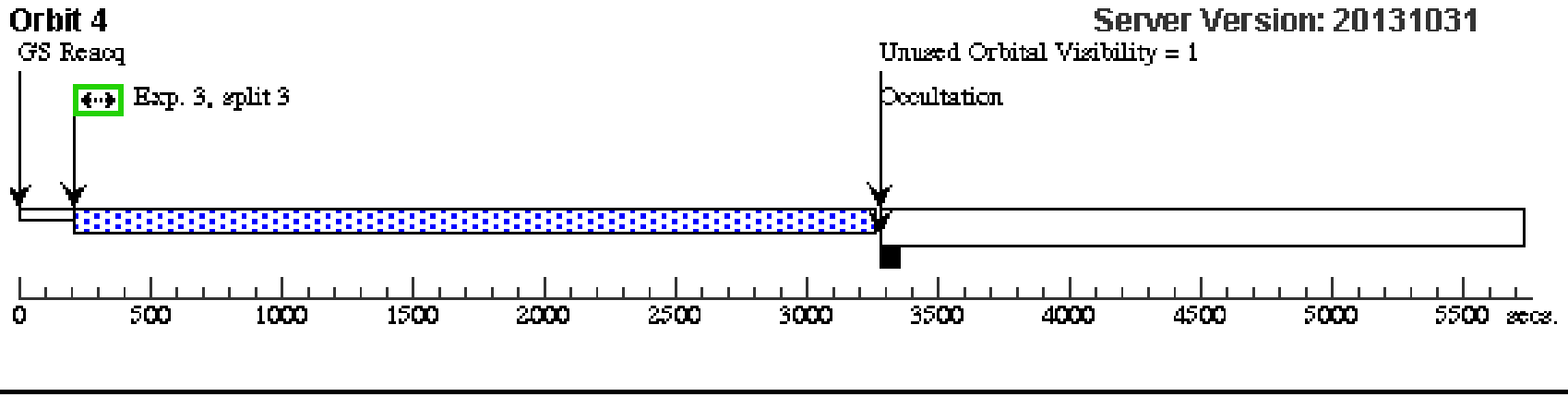
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	(513489)	(1) TOL-0440-381	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				120 Secs (120 Secs)	
								[==>]	***[1]***
2	(513494)	(1) TOL-0440-381	COS/FUV, TIME-TAG, PSA	G140L 1280 A	BUFFER-TIME=3000; FP-POS=ALL			495 Secs (2004 Secs)	
								[==>501.0 Secs (Split 1)] *[==>501.0 Secs (Split 2)]* *[==>501.0 Secs (Split 3)]* *[==>501.0 Secs (Split 4)]*	***[1]***
3	(513493)	(1) TOL-0440-381	COS/FUV, TIME-TAG, PSA	G140L 1280 A	BUFFER-TIME=5000; FP-POS=ALL			3000 Secs (12000 Secs)	
								[==>(Split 1)]	***[2]***
								[==>(Split 2)]	***[3]***
								[==>(Split 3)]	***[4]***
								[==>(Split 4)]	***[5]***

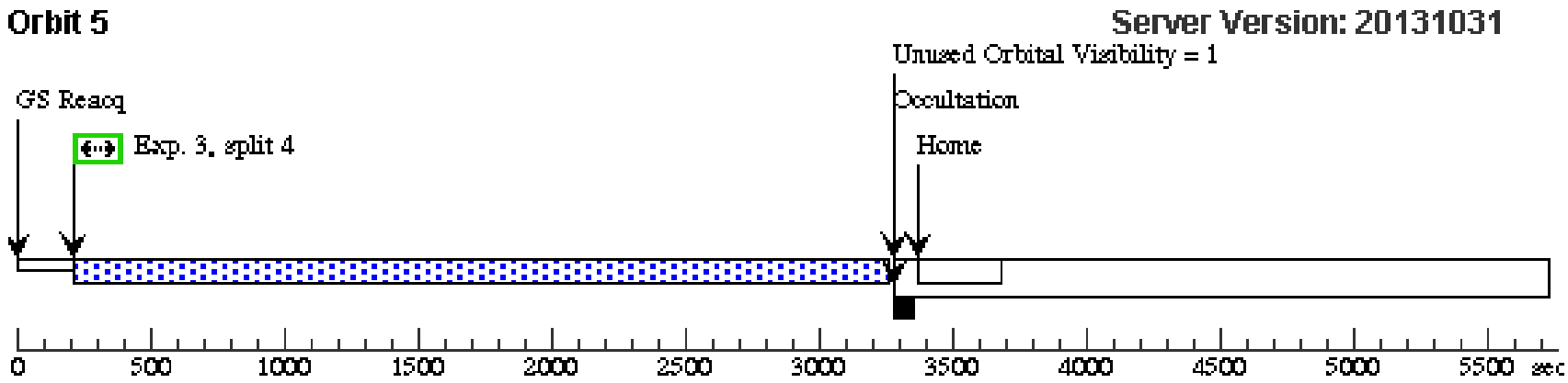
Orbit Structure






Orbit 3
Server Version: 20131031
GS Reacq
Exp. 3, split 2
Unused Orbital Visibility = 1
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.


Orbit 4
Server Version: 20131031
GS Reacq
Exp. 3, split 3
Unused Orbital Visibility = 1
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.


Orbit 5
Server Version: 20131031
GS Reacq
Exp. 3, split 4
Unused Orbital Visibility = 1
Occultation
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec