14777 - Deciphering Quasar Outflows and Measuring their Contribution to AGN Feedback

Cycle: 24, Proposal Category: GO

(UV Initiative)

(Availability Mode: AVAILABLE)

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) PKS0350-0711	COS/FUV COS/NUV	4	13-Sep-2017 15:01:00.0	yes
02	(2) UM425	COS/FUV COS/NUV	4	13-Sep-2017 15:01:04.0	yes

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
03	(3) VV2006-J075514.6+230607	COS/FUV COS/NUV	4	13-Sep-2017 15:01:07.0	yes
04	(4) VV2006-J132957.2+540506	COS/FUV COS/NUV	4	13-Sep-2017 15:01:11.0	yes
05	(5) SDSS-J104244.23+164656.1	COS/FUV COS/NUV	4	13-Sep-2017 15:01:14.0	yes
06	(6) SDSS-J093602.10+200542.9	COS/FUV COS/NUV	4	13-Sep-2017 15:01:17.0	yes
07	(7) 2MASS-J10512569+1247462	COS/FUV COS/NUV	4	13-Sep-2017 15:01:19.0	yes
08	(8) 7C-163119.39+393037.00	COS/FUV COS/NUV	4	13-Sep-2017 15:01:22.0	yes
09	(9) LBQS-1206+1052	COS/FUV COS/NUV	4	13-Sep-2017 15:01:25.0	yes
10	(10) 2MASS-J14362129+0727208	COS/FUV COS/NUV	4	13-Sep-2017 15:01:27.0	yes

40 Total Orbits Used

ABSTRACT

We propose to observe, for the first time, a sample of quasar outflows covering the diagnostic-rich 500-1050 Angstrom rest-frame (XUV). This program will advance the science of quasar outflows and measure their contribution to AGN feedback more than the combined HST observations of quasar outflows to date.

Using similar COS archival data of two such objects, we have published a robust case of two-ionization-phase outflow, which is the missing link between UV AGN outflows and X-ray warm absorbers. More importantly, the superb spectral diagnostics allowed us to determine the distances of these outflows from the central source, and thus their energetics. These findings demonstrate that outflows in luminous quasars have sufficient energy to fulfill the theoretical predictions of AGN feedback processes. However, to date, not a single dedicated COS observation of outflows in the XUV has been performed. An exhaustive survey of all HST and SDSS quasar spectra and a significant improvement in analysis techniques allow us now to

target a sample of 10 such objects using a reasonable amount of exposure time, hence the extraordinary scientific promise of this program.

OBSERVING DESCRIPTION

Sample Selection

We searched through all of the MAST UV quasar spectra with a resolution > 800 and a S/N > 6. This search encompassed all of the HST quasar programs (COS, STIS, FOS) and all of the FUSE AGN data with z>0.4. We also searched the SDSS and BOSS quasar spectra database. The search criteria we used were: a) 0.4 > z > 1.5 to cover the spectral rich 500--1050 A rest frame region (XUV) with COS FUV gratings, b) continuum flux across the observed waveband > 2e-15 ergs cm^-2 s^-1 A^-1) c) absorption troughs indicative of outflows, that is, satisfying at least two of the following: troughs from excited states, doublet optical depth ratio smaller than 2:1, trough width > 300 km s^-1, appearance suggestive of solar or super solar metalicity. We identified the best 10 targets fulfilling these requirements. All of them are high ionization outflows similar to 90% of all quasar outflows.

Choice of instruments and SNR requirements

Since absorption troughs show significant changes in physical characteristics over 200 km s^-1 scales (e.g. Arav et al., 2007, 2008) we require a resolution R > 5000 in order to obtain a few resolution elements across that width. The medium resolution of the COS FUV settings combined with their high throughput make them the only suitable instrumental setup to reach the S/N and resolution needed for our program.

Our experience in analyzing similar data from LBQS 1206+1052 (Chamberlain & Arav 2015) show that we can achieve our scientific goals with S/N of 10 per R = 5000 resolution element. 9 of our targets have FUV fluxes above 2e-15 ergs cm^-2 s^-1 A^-1, based on their observed UV spectra or their Galax FUV fluxes. Using the COS ETC on the lower flux (2.0e-15 ergs cm^-2 s^-1 A^-1) such a S/N can be obtained in 3 ks and 6 ks for the G130M and G160M gratings, respectively. Taking into account the overheads, this translates to a total of 4 orbits per object. The higher throughput G130M covers shorter wavelength diagnostics, which tends to yield higher scientific return. Therefore, we opt to obtain 2 orbits each with G130M and G160M to slightly increase the S/N in the shorter wavelength covered.

Instrument Configuration and Bright Object Checking

In selecting our grating settings, we have chosen central wavelengths to avoid placing the gap between the COS detectors on any of the crucial spectral features we will use in our analysis. We note that in several cases, the proximity of crucial spectral features to the edge of a central wavelength's wavelength range precludes using all four FP-POS positions. For ETC calculations for our moderate redshift quasars, we use the FOS-

based QSO composite spectrum at the redshift of the object with a foreground E(B-V) as given by NED. Bright object checking is simple--our brightest quasar, PKS0350-0711, has a continuum flux of 4e-15 at 1516 A. To be conservative, we have used an ETC calculation for a flux 3x brighter, the maximum range typically observed for AGN variability (if not a BL Lac) (Dunn et al. 2006). This flux is safe for all gratings, and for an imaging target acquisition using Mirror B. Since all other objects are fainter, they too are safe. (Emission lines in the wavelength ranges visible here do not have sufficient contrast relative to the continuum to cause any local count rate issues.) (We note also that the screening limits for variable objects include an additional factor of two safety in count rate above the limits we are using.)

To plan our observations, we use ETC calculations that are conservative (both fainter and brighter) to ensure success--we plan target acquisition exposure times for minimum fluxes that are 3x lower than the mean observed historically, and set BUFFER-TIME for fluxes 3x brighter than the mean flux, and use the factor of 2/3 recommended by the ETC. In practice, all BUFFER times from the ETC are >2000, so, to optimize buffer useage and minimize overheads, we generally choose BUFFER-TIME such that BUFFER-TIME=ExposureTime - 110 s. Our results for all objects are summarized here for convenience.

- ACQUISITION -

Object	F(1516)	E(B-V)	z	COS-ETC-ID
PKS0350-07	1.2e-14	0.070	0.966246	COS.ta.827061 (High flux: for BO checking)
PKS0350-07	1.3e-15	0.070	0.966246	COS.ta.827060 (Low flux: for target acq)
UM425	0.7e-15	0.032	1.472	COS.ta.827063
VV2006-J075514.6+230607	2.5e-16	0.047	0.85437	COS.ta.827066
VV2006-J132957.2+540506	3.3e-16	0.013	0.949595	COS.ta.827067
SDSS-J104244.23+164656.1	4.3e-16	0.023	0.978063	COS.ta.827068
SDSS-J093602.10+200542.9	6.3e-16	0.027	1.183234	COS.ta.827069
2MASS-J10512569+1247462	3.3e-16	0.021	1.282753	COS.ta.827070
7C-163119.39+393037.00	4.6e-16	0.007	1.024575	COS.ta.827072
LBQS-1206+1052	5.3e-16	0.021	0.395549	COS.ta.827074
2MASS-J143621.29+072720.8	5.0e-16	0.026	0.894367	COS.ta.827075

- EXPOSURES -

Object	F(1516)	E(B-V)	z	G130M:COS-ETC-ID	BUFF	G160M:COS-ETC	BUFF

PKS0350-07 1.2e-14 0.070 0.966246 COS.sp.827078 2660 COS.sp.827081 7745

For all 10 visits in this program, we have set Schedulability to 100 to maximize flexibility in planning each observation and increase the opportunities for scheduling.

Visit

Proposal 14777, Visit 01, completed Wed Sep 13 19:01:29 GMT 2017

Diagnostic Status: Error

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: SCHED 100%

Diagnostics

(Exposure 2 (Visit 01)) Error (Form): LIFETIME-POS is required with G130M when not in Supported mode.

(Exposure 3 (Visit 01)) Error (Form): LIFETIME-POS is required with G130M when not in Supported mode.

(Visit 01) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(Visit 01) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(Visit 01) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(Exposure 2 (Visit 01)) Warning (Form): Defaults for SEGMENT have changed in APT25.2 for use of LP4 with G130M. See full description for details.

(Exposure 3 (Visit 01)) Warning (Form): Defaults for SEGMENT have changed in APT25.2 for use of LP4 with G130M. See full description for details.

Fixed Targets

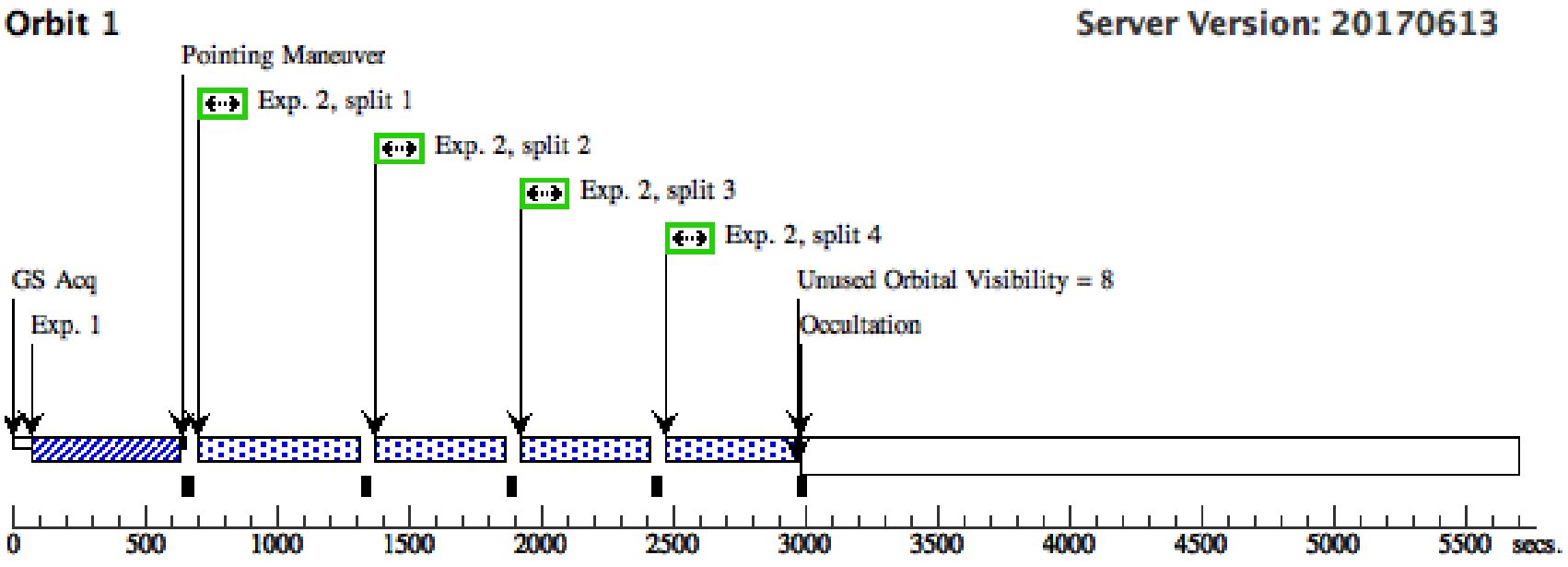
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	PKS0350-0711	RA: 03 52 30.5520 (58.1273000d) Dec: -07 11 2.32 (-7.18398d) Equinox: J2000	Redshift: 0.966246	V=16.67+/-0.5 2.0e-15 at 2300 A	Reference Frame: ICRS

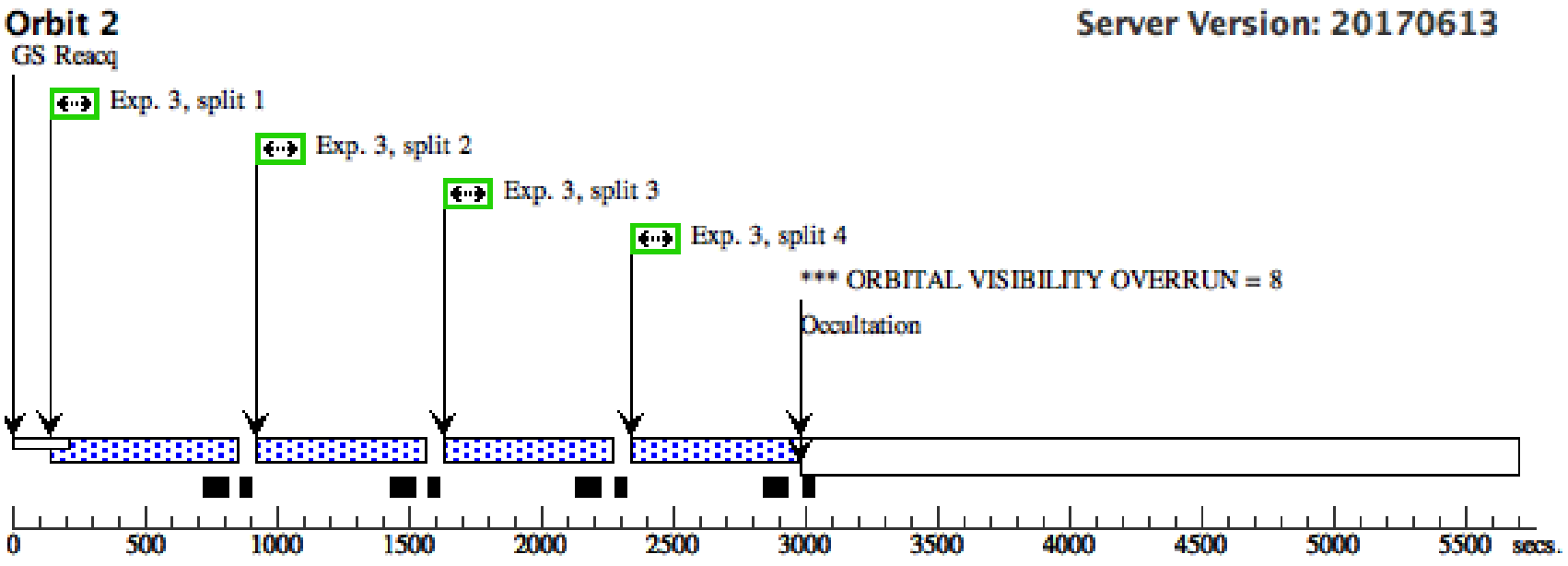
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.This object was generated by the targetselector and retrieved from the SIMBAD database. Extended=NO

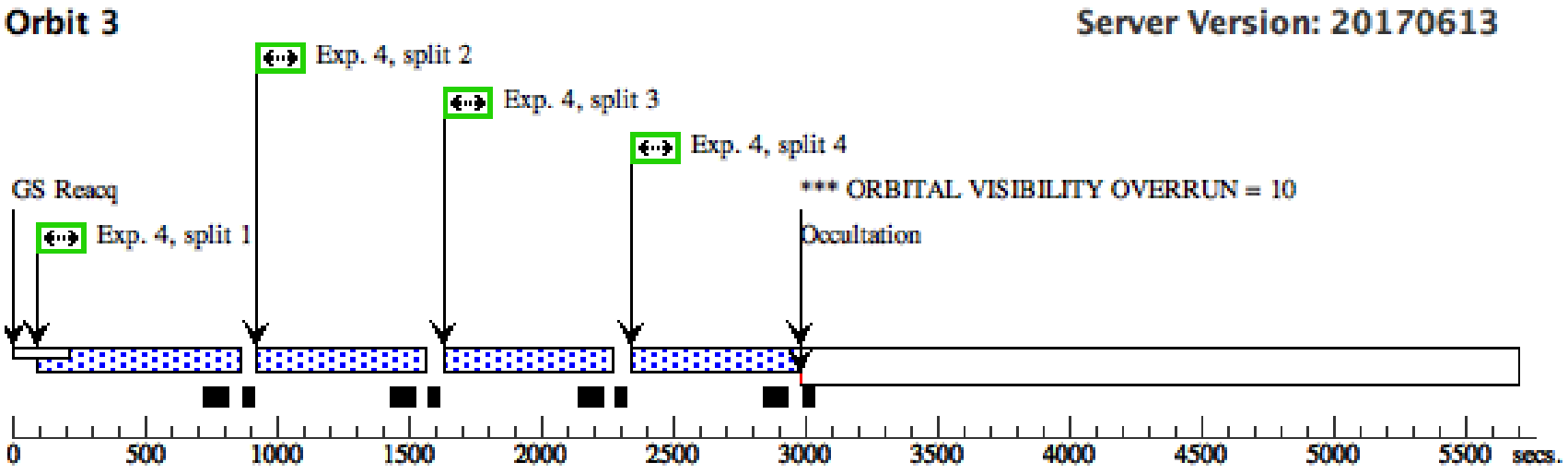
Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	(COS.ta.827060)	(1) PKS0350-0711	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				120 Secs (120 Secs) *[==>]*	***[1]***
2	(COS.sp.827078)	(1) PKS0350-0711	COS/FUV, TIME-TAG, PSA	G130M 1309 A	BUFFER-TIME=2000; FP-POS=ALL			435 Secs (1740 Secs) *[==>(Split 1)]* *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]*	***[1]***
3	(COS.sp.827078)	(1) PKS0350-0711	COS/FUV, TIME-TAG, PSA	G130M 1327 A	BUFFER-TIME=470; FP-POS=ALL			580 Secs (2332 Secs) *[==>583.0 Secs (Split 1)]* *[==>583.0 Secs (Split 2)]* *[==>583.0 Secs (Split 3)]* *[==>583.0 Secs (Split 4)]*	***[2]***
4	(COS.sp.827081)	(1) PKS0350-0711	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=470; FP-POS=ALL			580 Secs (2332 Secs) *[==>583.0 Secs (Split 1)]* *[==>583.0 Secs (Split 2)]* *[==>583.0 Secs (Split 3)]* *[==>583.0 Secs (Split 4)]*	***[3]***
5	(COS.sp.827081)	(1) PKS0350-0711	COS/FUV, TIME-TAG, PSA	G160M 1600 A	BUFFER-TIME=470; FP-POS=ALL			580 Secs (2332 Secs) *[==>583.0 Secs (Split 1)]* *[==>583.0 Secs (Split 2)]* *[==>583.0 Secs (Split 3)]* *[==>583.0 Secs (Split 4)]*	***[4]***

Orbit Structure



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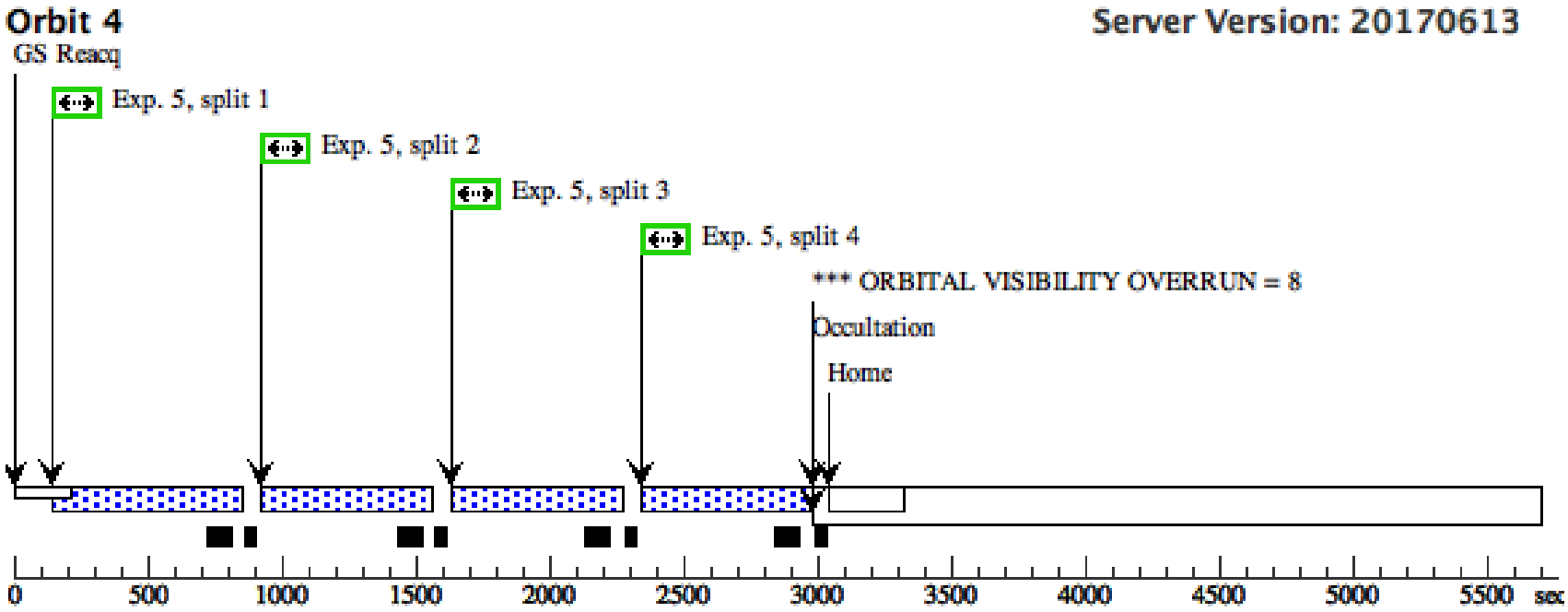
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sec

Visit

Proposal 14777, Visit 02, scheduling Wed Sep 13 19:01:29 GMT 2017

Diagnostic Status: Warning

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: SCHED 100%

Diagnostics

(Visit 02) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(Visit 02) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(Visit 02) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(Visit 02) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

Fixed Targets

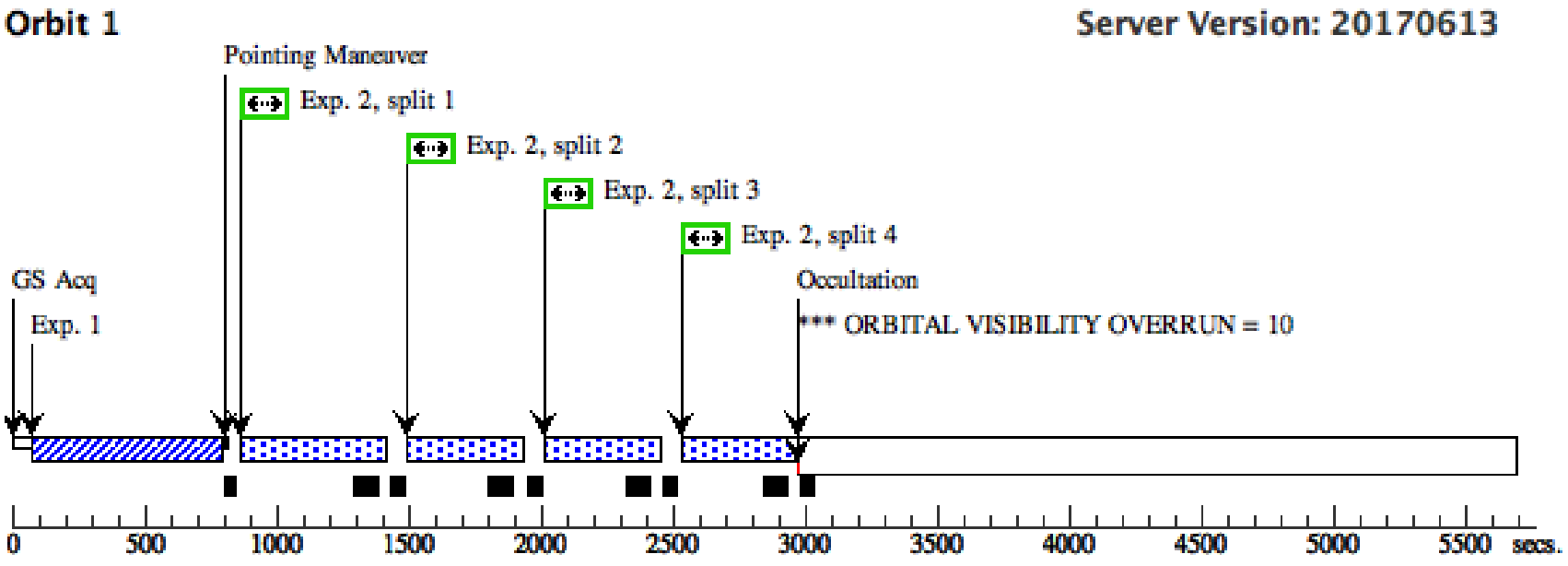
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	UM425	RA: 11 23 20.7300 (170.8363750d) Dec: +01 37 47.52 (1.62987d) Equinox: J2000	Redshift: 1.472	V=16.12+/-0.5 2.2e-15 at 1516 A	Reference Frame: ICRS

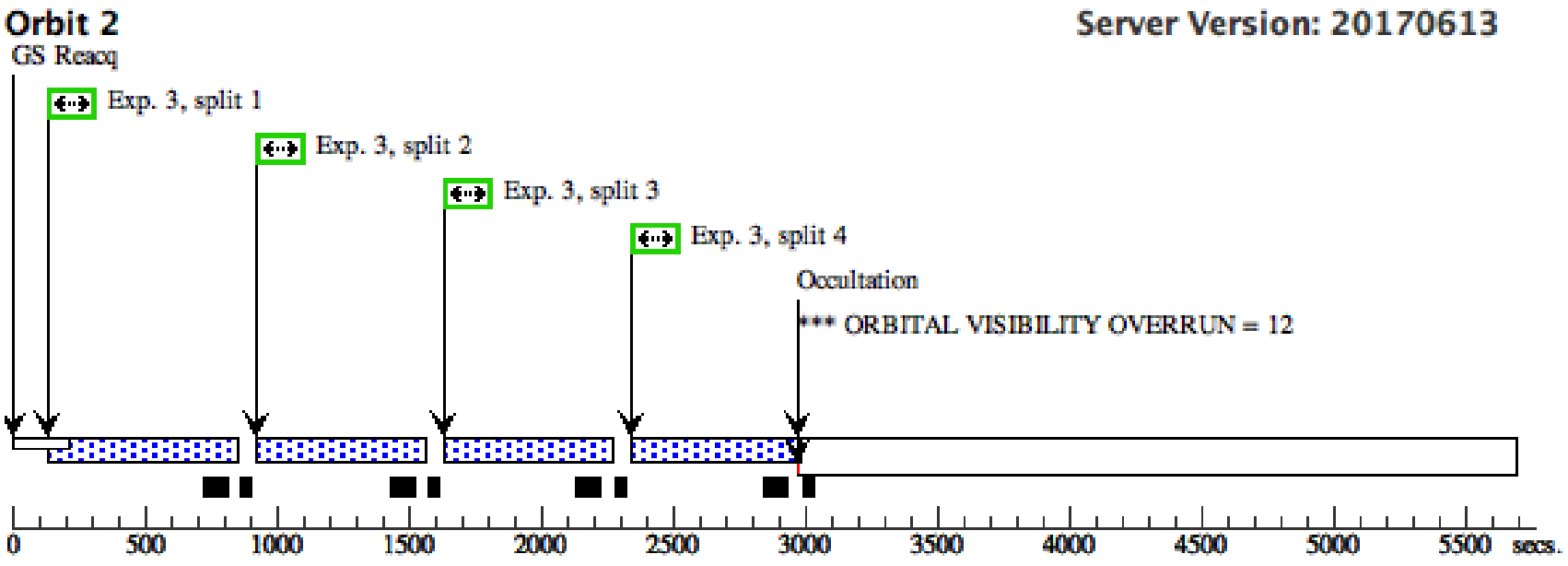
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Extended=NO

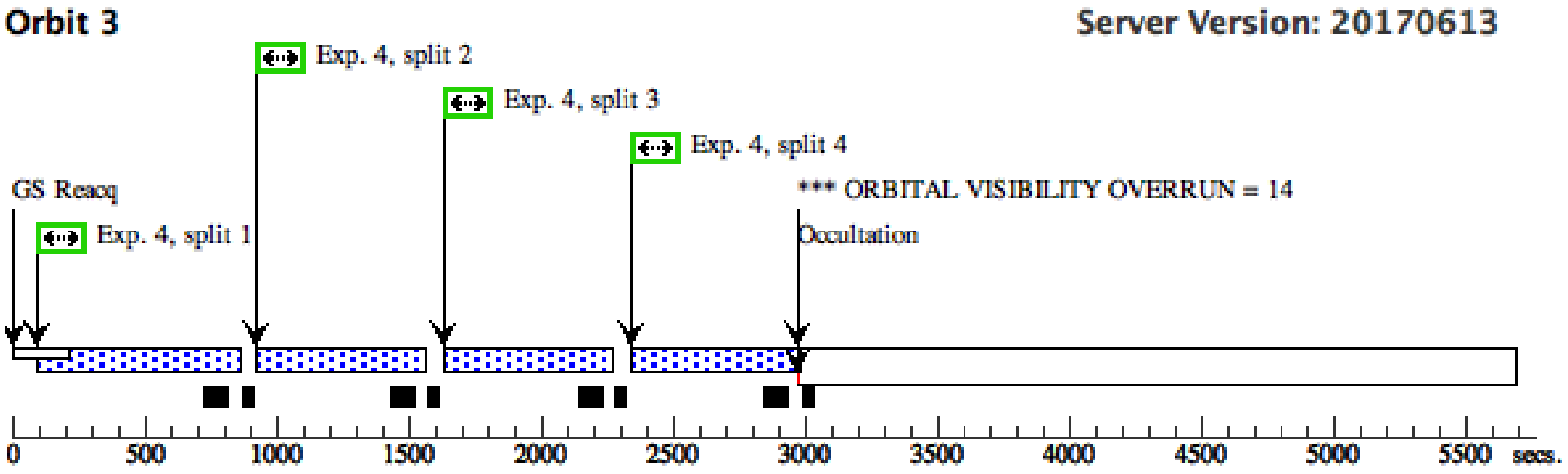
Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	(COS.ta.827063)	(2) UM425	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				202 Secs (202 Secs) *[==>]*	*[1]*
2	(COS.sp.827078)	(2) UM425	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=275; FP-POS=ALL; LIFETIME-POS=LP3			385 Secs (1540 Secs) *[==>(Split 1)]* *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]*	*[1]*
3	(COS.sp.827078)	(2) UM425	COS/FUV, TIME-TAG, PSA	G130M 1327 A	BUFFER-TIME=470; FP-POS=ALL; LIFETIME-POS=LP3			580 Secs (2332 Secs) *[==>583.0 Secs (Split 1)]* *[==>583.0 Secs (Split 2)]* *[==>583.0 Secs (Split 3)]* *[==>583.0 Secs (Split 4)]*	*[2]*
4	(COS.sp.827081)	(2) UM425	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=470; FP-POS=ALL			580 Secs (2332 Secs) *[==>583.0 Secs (Split 1)]* *[==>583.0 Secs (Split 2)]* *[==>583.0 Secs (Split 3)]* *[==>583.0 Secs (Split 4)]*	*[3]*
5	(COS.sp.827081)	(2) UM425	COS/FUV, TIME-TAG, PSA	G160M 1600 A	BUFFER-TIME=470; FP-POS=ALL			580 Secs (2332 Secs) *[==>583.0 Secs (Split 1)]* *[==>583.0 Secs (Split 2)]* *[==>583.0 Secs (Split 3)]* *[==>583.0 Secs (Split 4)]*	*[4]*

Orbit Structure



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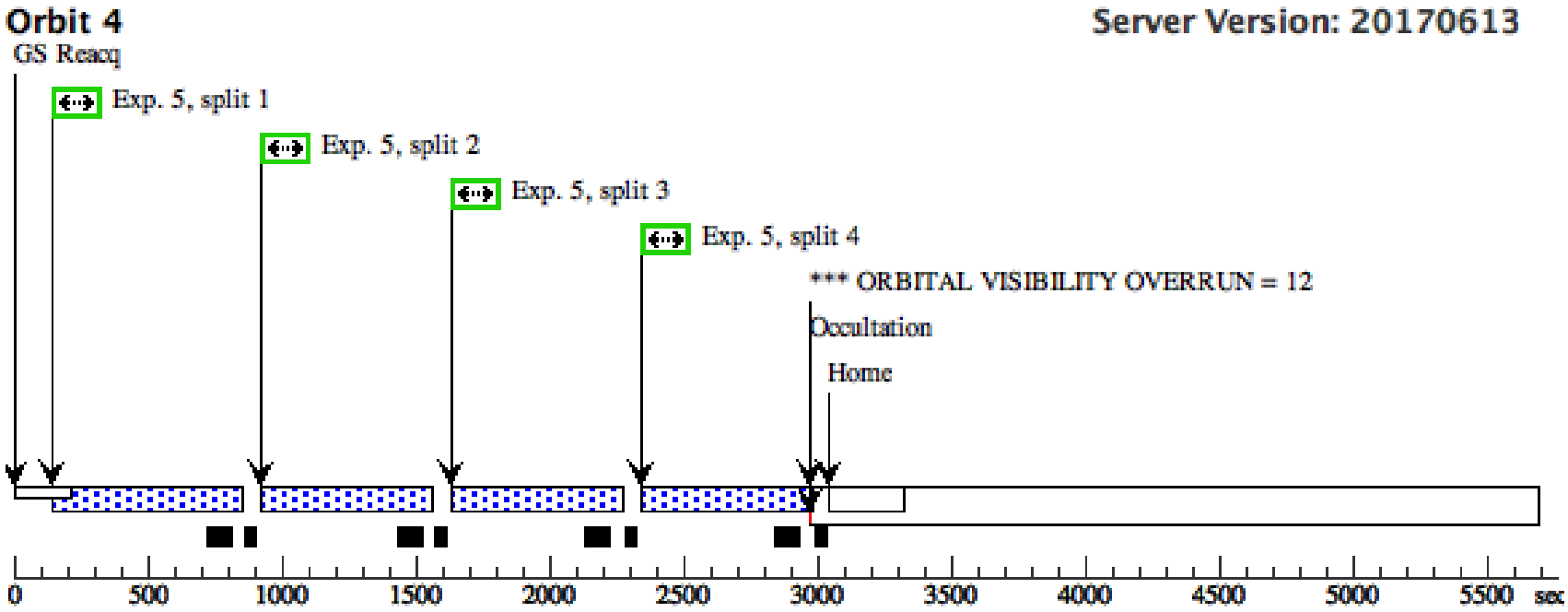
secs.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Exp. 5, split 3
Exp. 5, split 4
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sec

Visit

Proposal 14777, Visit 03, scheduled Wed Sep 13 19:01:29 GMT 2017

Diagnostic Status: Error

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: SCHED 100%

Diagnostics

(Exposure 2 (Visit 03)) Error (Form): LIFETIME-POS is required with G130M when not in Supported mode.

(Exposure 3 (Visit 03)) Error (Form): LIFETIME-POS is required with G130M when not in Supported mode.

(Visit 03) Warning (Form): For the best data quality, it is strongly recommended that the maximum number of allowed FP-POS positions is used when observing at a given COS CENWAVE setting. See full description for details.

(Visit 03) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(Visit 03) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(Visit 03) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(Visit 03) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(Exposure 3 (Visit 03)) Warning (Form): Defaults for SEGMENT have changed in APT25.2 for use of LP4 with G130M. See full description for details.

Fixed Targets

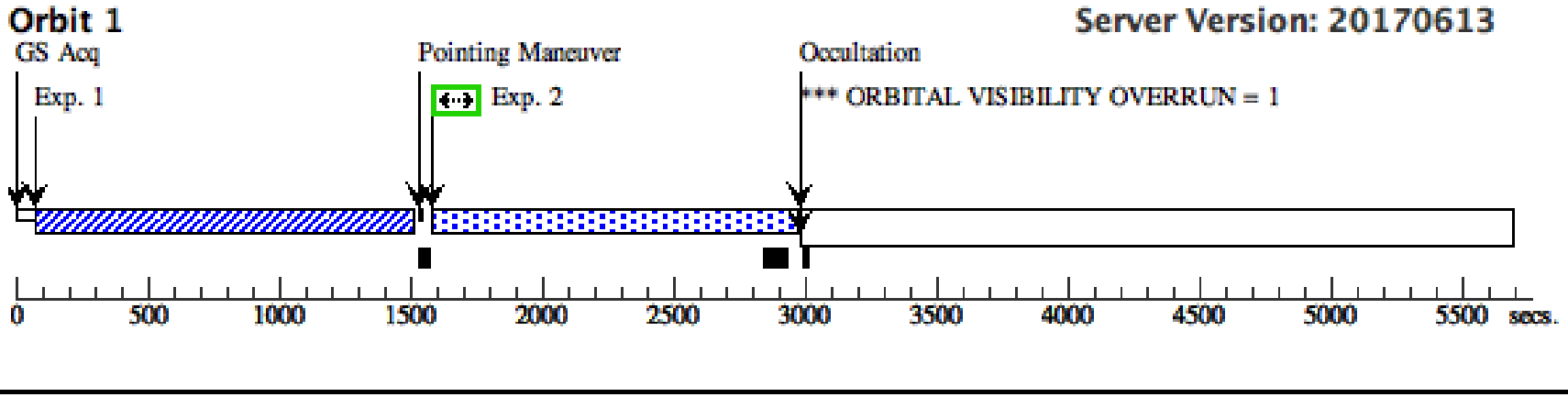
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	VV2006-J075514.6+230607	RA: 07 55 14.5824 (118.8107600d) Dec: +23 06 7.13 (23.10198d) Equinox: J2000	Redshift: 0.85437	V=17.38+/-0.5 7.4e-16 at 1516 A	Reference Frame: ICRS

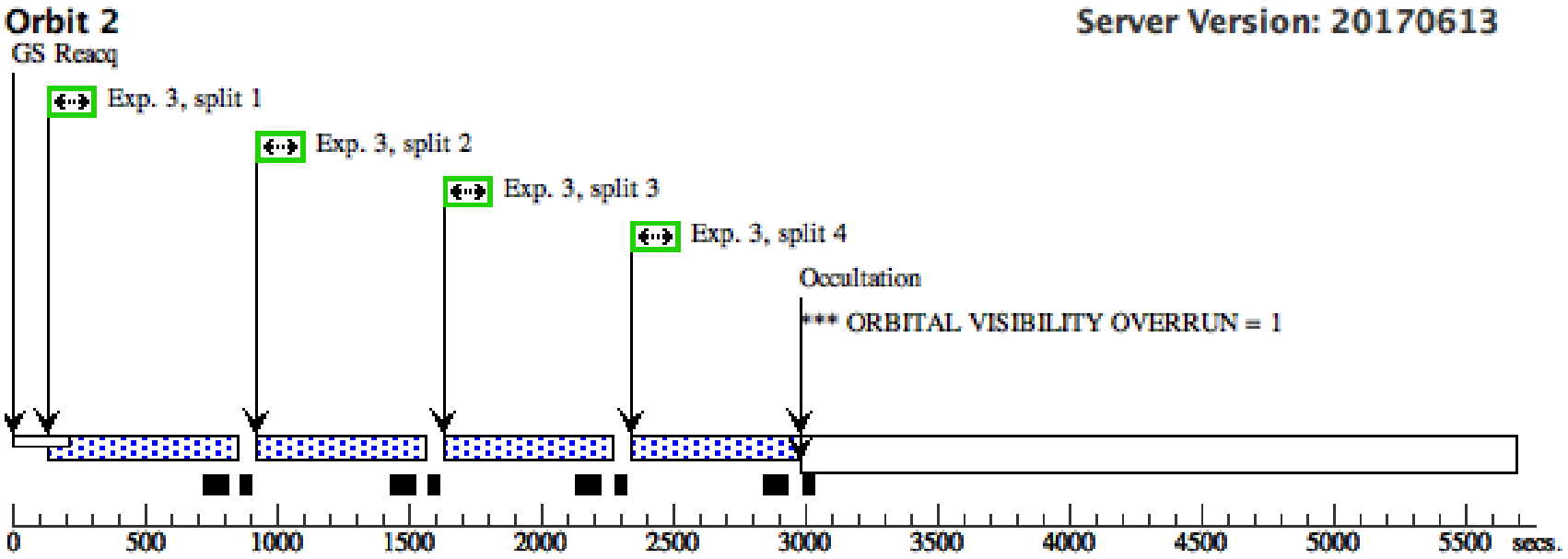
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Extended=NO

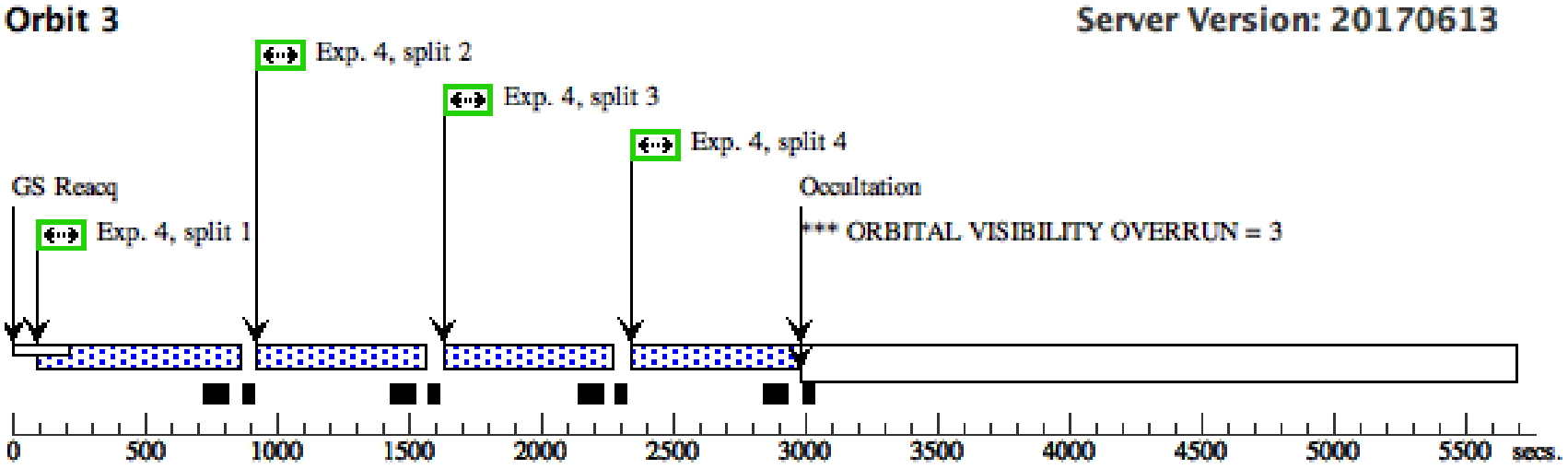
Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	(COS.ta.827066)	(3) VV2006-J075514.6+230607	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				564 Secs (564 Secs) *[==>]*	*[1]*
2	(COS.sp.827078)	(3) VV2006-J075514.6+230607	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=1110; FP-POS=4			1220 Secs (1220 Secs) *[==>]*	*[1]*
Comments: First exposure in G130M/1291 must be in FP-POS-4 since lines of interest are in the 1130-1140 A range.									
3	(COS.sp.827078)	(3) VV2006-J075514.6+230607	COS/FUV, TIME-TAG, PSA	G130M 1327 A	BUFFER-TIME=470; FP-POS=ALL			580 Secs (2332 Secs) *[==>583.0 Secs (Split 1)]* *[==>583.0 Secs (Split 2)]* *[==>583.0 Secs (Split 3)]* *[==>583.0 Secs (Split 4)]*	*[2]*
4	(COS.sp.827081)	(3) VV2006-J075514.6+230607	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=470; FP-POS=ALL			580 Secs (2332 Secs) *[==>583.0 Secs (Split 1)]* *[==>583.0 Secs (Split 2)]* *[==>583.0 Secs (Split 3)]* *[==>583.0 Secs (Split 4)]*	*[3]*
5	(COS.sp.827081)	(3) VV2006-J075514.6+230607	COS/FUV, TIME-TAG, PSA	G160M 1600 A	BUFFER-TIME=470; FP-POS=ALL			580 Secs (2332 Secs) *[==>583.0 Secs (Split 1)]* *[==>583.0 Secs (Split 2)]* *[==>583.0 Secs (Split 3)]* *[==>583.0 Secs (Split 4)]*	*[4]*

Orbit Structure






Orbit 3
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Exp. 4, split 3
Exp. 4, split 4
GS Reacq
Occultation
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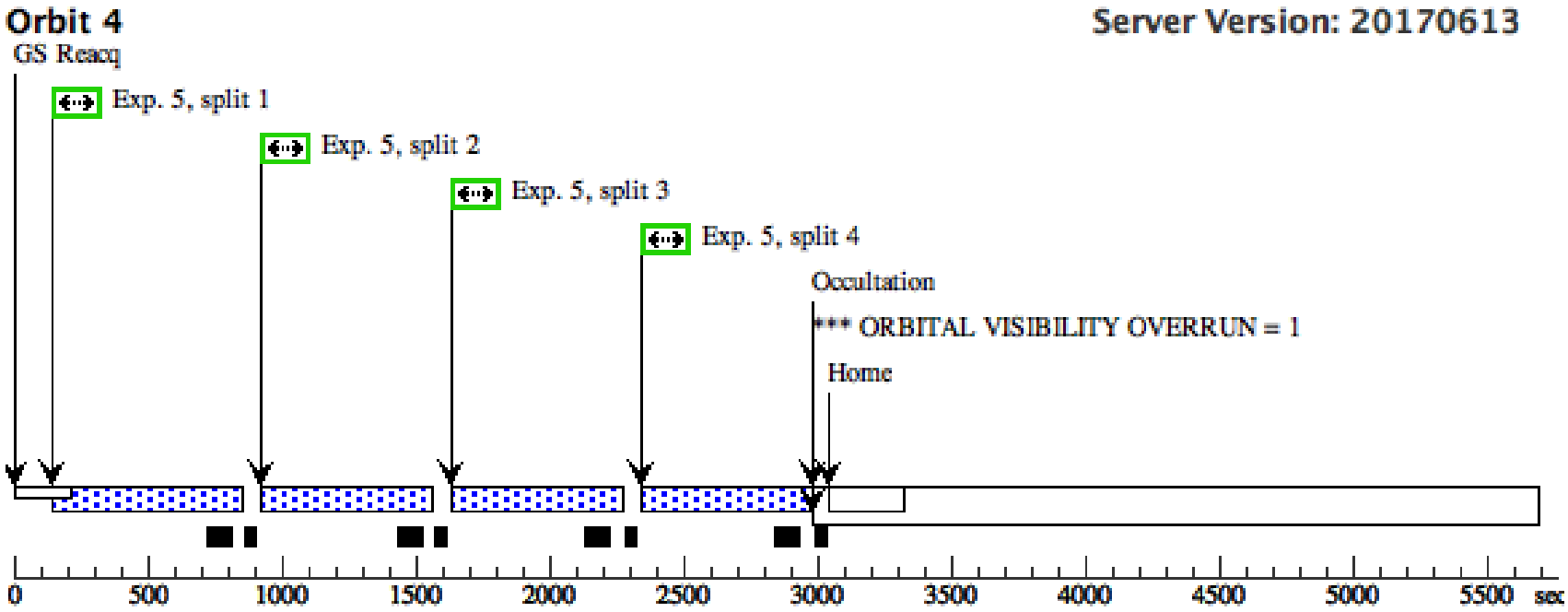
secs.


Orbit 4
Server Version: 20170613
GS Reacq
Exp. 5, split 1
Exp. 5, split 2
Exp. 5, split 3
Exp. 5, split 4
Occultation
*** ORBITAL VISIBILITY OVERRUN = 1
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500
1000
1500
2000
2500
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3500
4000
4500
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5500
sec

Visit

Proposal 14777, Visit 04, scheduling Wed Sep 13 19:01:30 GMT 2017

Diagnostic Status: Warning

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: SCHED 100%

Diagnostics

(Visit 04) Warning (Form): For the best data quality, it is strongly recommended that the maximum number of allowed FP-POS positions is used when observing at a given COS CENWAVE setting. See full description for details.

Fixed Targets

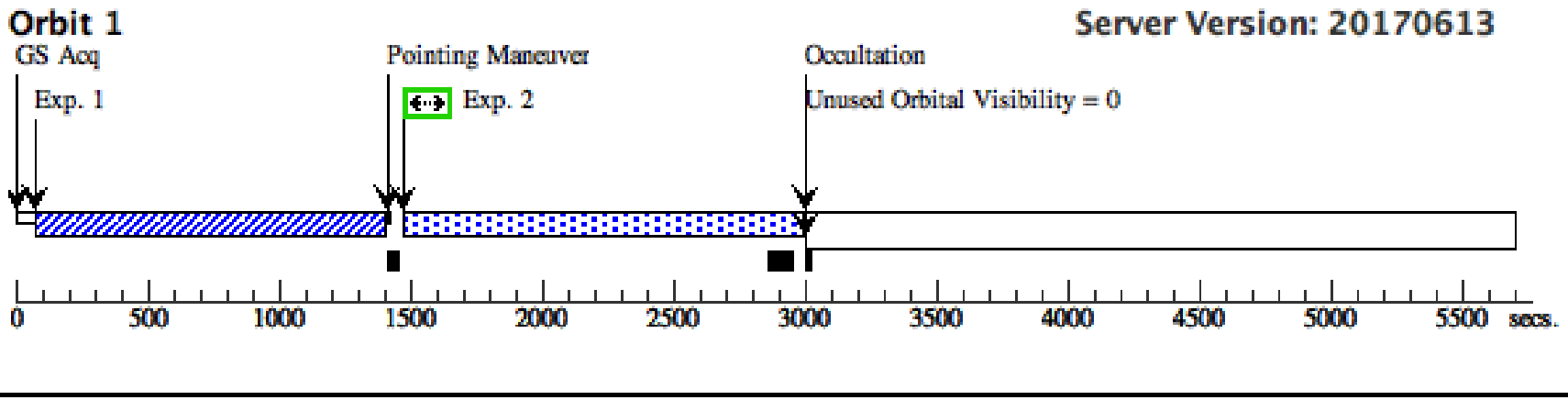
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(4)	VV2006-J132957.2+540506	RA: 13 29 57.1389 (202.4880787d) Dec: +54 05 5.98 (54.08499d) Equinox: J2000		V=16.85+/-0.5 2.95e-15 at 1516 A	Reference Frame: ICRS

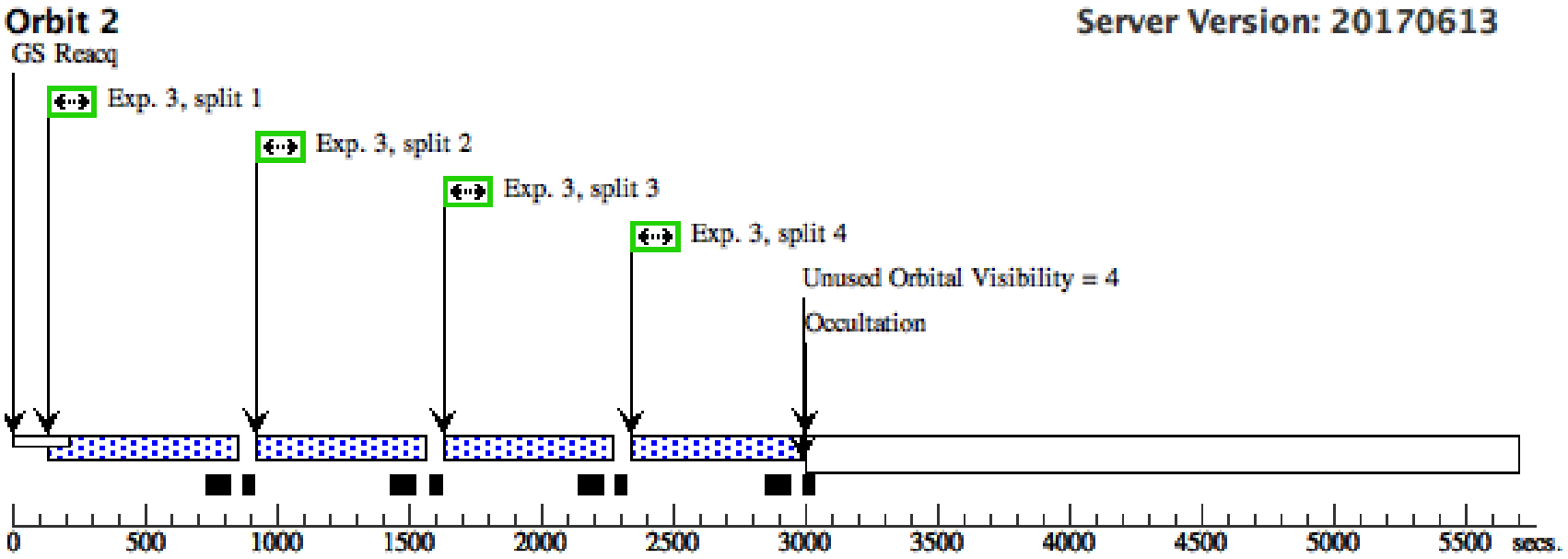
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Extended=NO

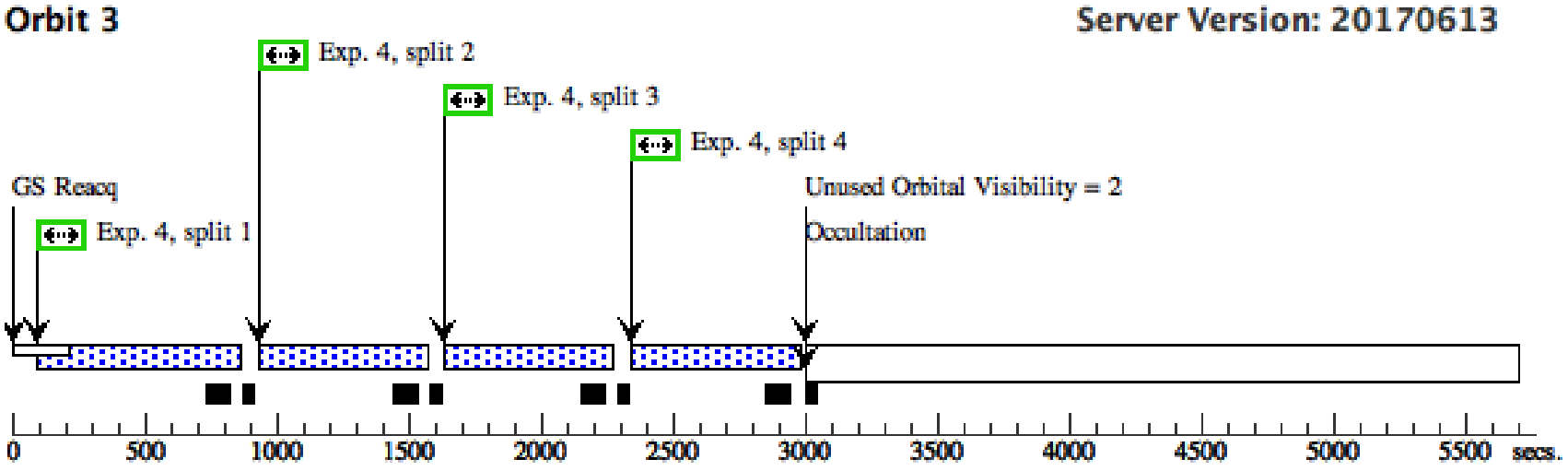
Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	(COS.ta.827067)	(4) VV2006-J132957.2+540506	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				505 Secs (505 Secs) *[==>]*	*[1]*
2	(COS.sp.827078)	(4) VV2006-J132957.2+540506	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=1240; FP-POS=4; LIFETIME-POS=LP3			1350 Secs (1350 Secs) *[==>]*	*[1]*
	Comments: First exposure in G130M/1291 must be in FP-POS-4 since lines of interest are in the 1130-1140 A range.								
3	(COS.sp.827078)	(4) VV2006-J132957.2+540506	COS/FUV, TIME-TAG, PSA	G130M 1327 A	BUFFER-TIME=475; FP-POS=ALL; LIFETIME-POS=LP3			585 Secs (2340 Secs) *[==>(Split 1)]* *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]*	*[2]*
4	(COS.sp.827081)	(4) VV2006-J132957.2+540506	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=475; FP-POS=ALL			585 Secs (2340 Secs) *[==>(Split 1)]* *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]*	*[3]*
5	(COS.sp.827081)	(4) VV2006-J132957.2+540506	COS/FUV, TIME-TAG, PSA	G160M 1600 A	BUFFER-TIME=475; FP-POS=ALL			585 Secs (2340 Secs) *[==>(Split 1)]* *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]*	*[4]*

Orbit Structure






Orbit 3
Server Version: 20170613
Exp. 4, split 2
Exp. 4, split 3
Exp. 4, split 4
GS Reacq
Exp. 4, split 1
Unused Orbital Visibility = 2
Occultation
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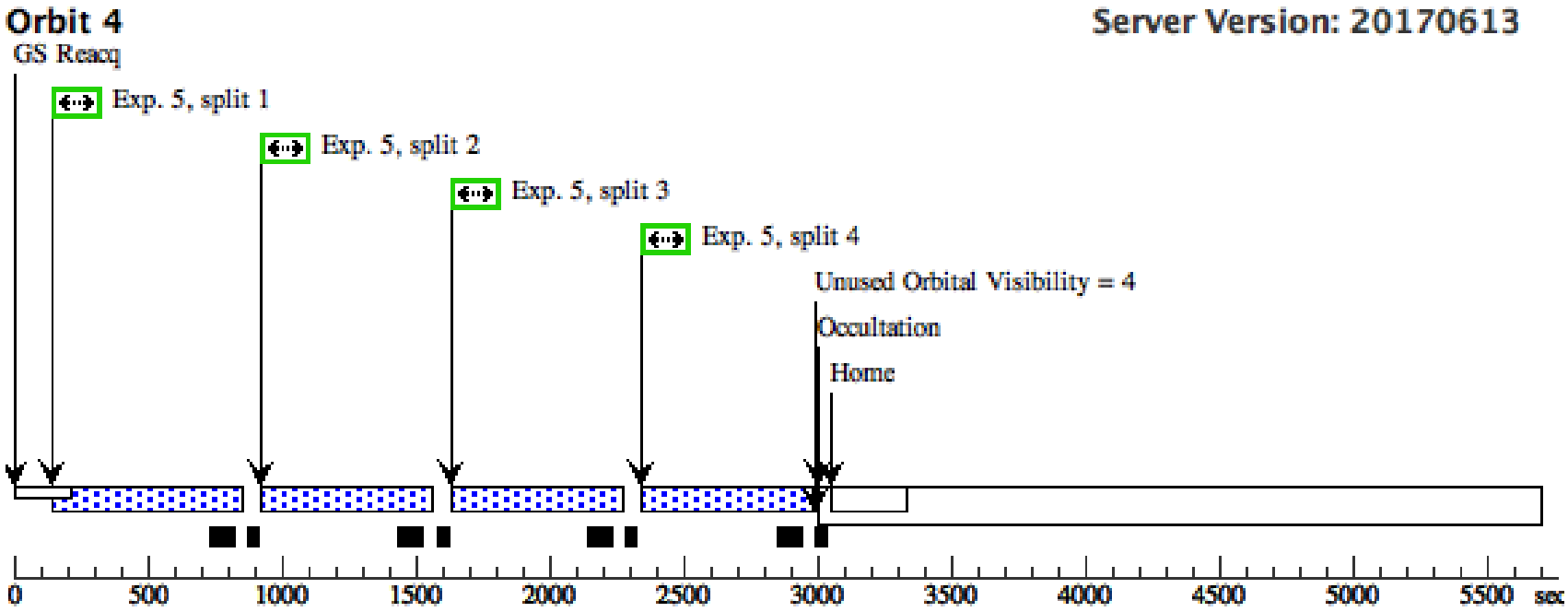
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.


Orbit 4
Server Version: 20170613
GS Reacq
Exp. 5, split 1
Exp. 5, split 2
Exp. 5, split 3
Exp. 5, split 4
Unused Orbital Visibility = 4
Occultation
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 14777, Visit 05, scheduling Wed Sep 13 19:01:30 GMT 2017

Diagnostic Status: Warning

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: SCHED 100%

Diagnostics

(Visit 05) Warning (Form): For the best data quality, it is strongly recommended that the maximum number of allowed FP-POS positions is used when observing at a given COS CENWAVE setting. See full description for details.

(Visit 05) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(Visit 05) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

Fixed Targets

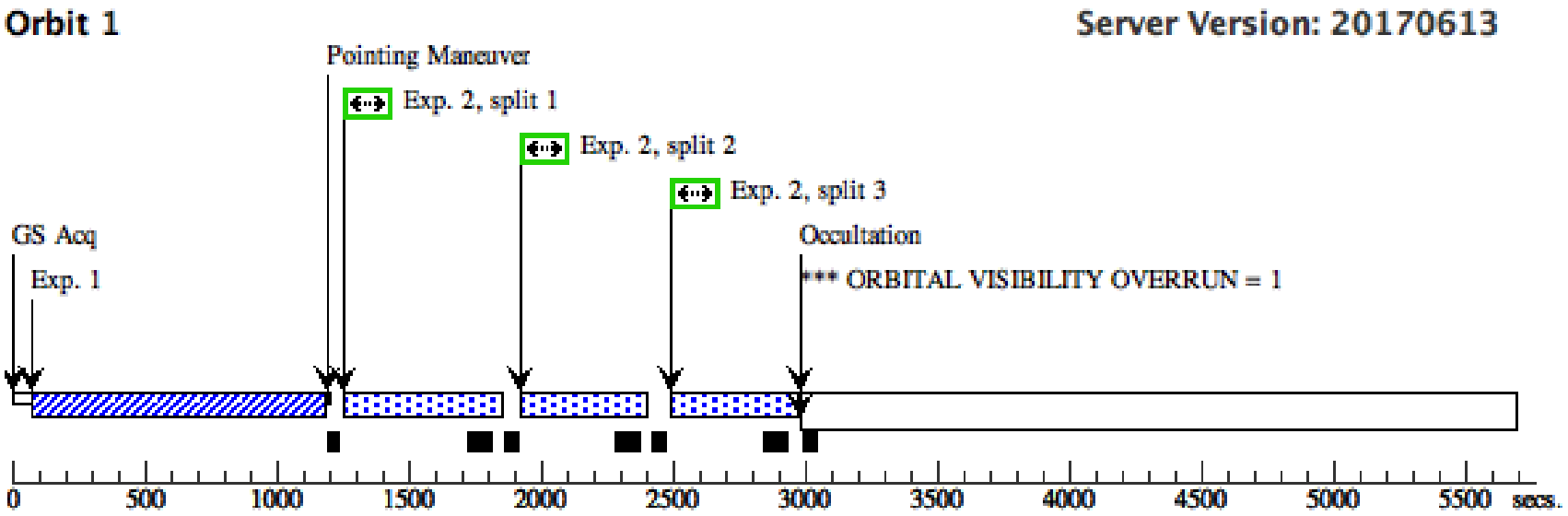
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(5)	SDSS-J104244.23+164656.1	RA: 10 42 44.2390 (160.6843292d) Dec: +16 46 56.14 (16.78226d) Equinox: J2000	Redshift: 0.978063	V=16.75+/-0.5 1.3e-15 at 1516 A	Reference Frame: ICRS

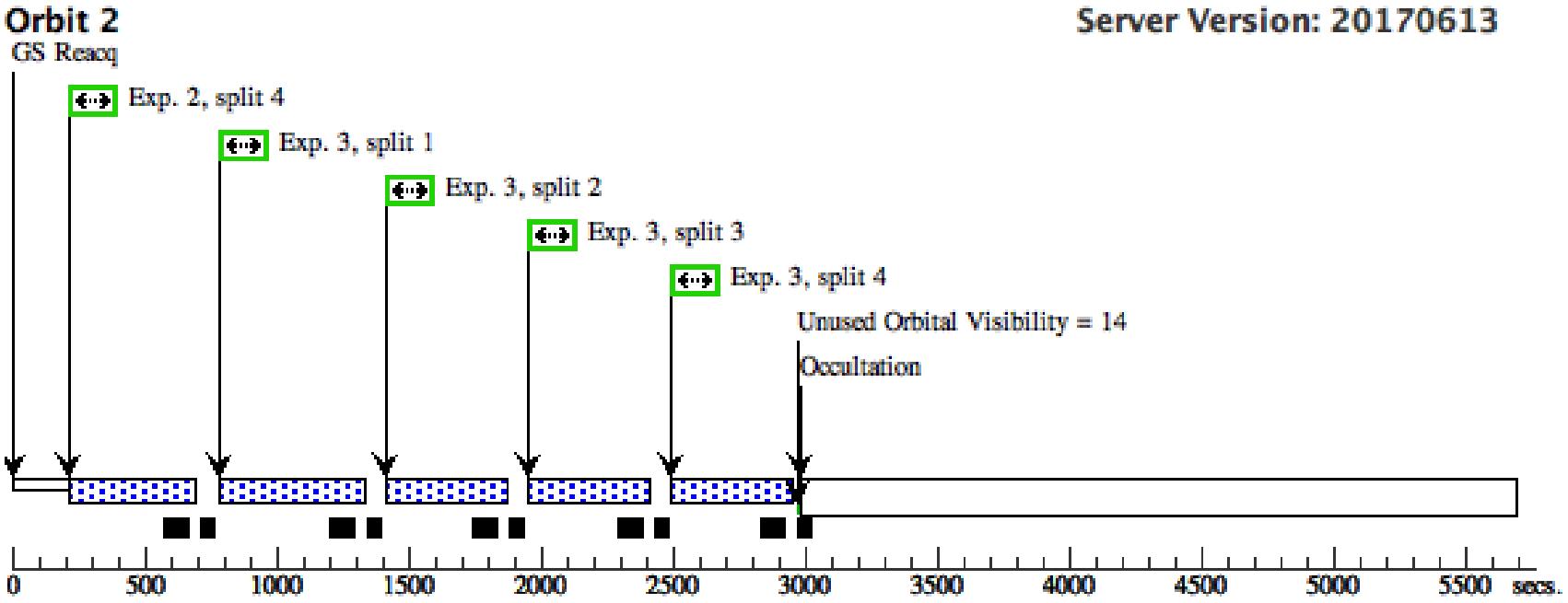
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Extended=NO

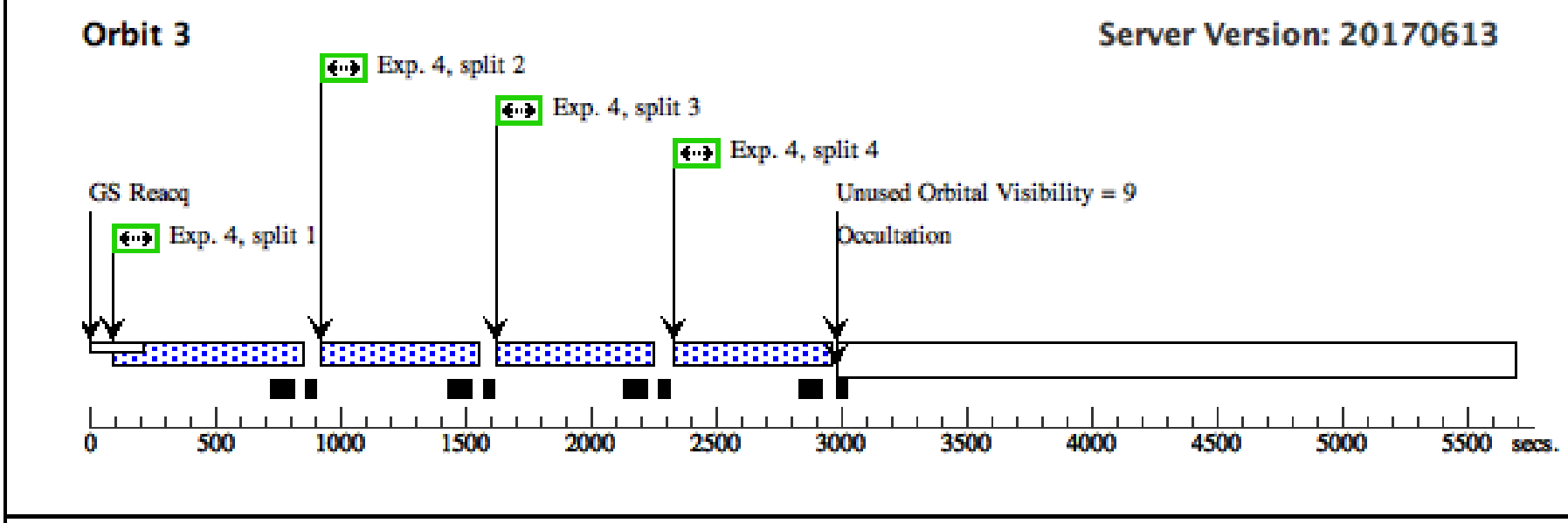
Exposures

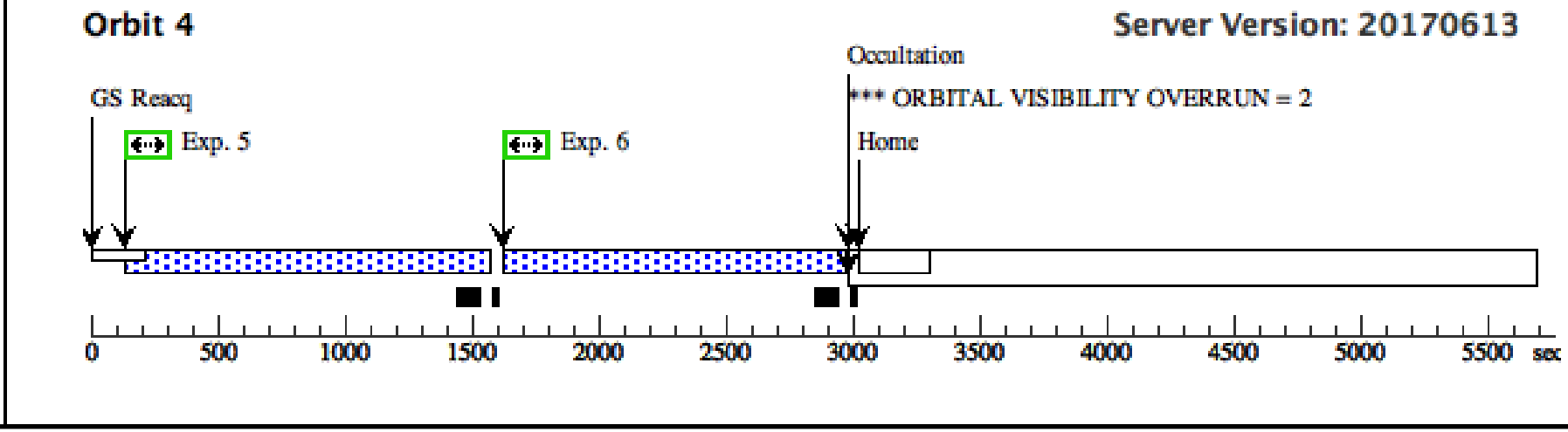
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	(COS.ta.827068)	(5) SDSS-J104244.23+164656.1	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				395 Secs (395 Secs) *[==>]*	*[1]*
2	(COS.sp.827078)	(5) SDSS-J104244.23+164656.1	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=3200; FP-POS=ALL; LIFETIME-POS=LP3			430 Secs (1720 Secs) *[==>(Split 1)]* *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]*	*[1]* *[2]*
3	(COS.sp.827078)	(5) SDSS-J104244.23+164656.1	COS/FUV, TIME-TAG, PSA	G130M 1327 A	BUFFER-TIME=3000; FP-POS=ALL; LIFETIME-POS=LP3			410 Secs (1640 Secs) *[==>(Split 1)]* *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]*	*[2]*
4	(COS.sp.827081)	(5) SDSS-J104244.23+164656.1	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=4700; FP-POS=ALL			580 Secs (2320 Secs) *[==>(Split 1)]* *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]*	*[3]*
5	(COS.sp.827081)	(5) SDSS-J104244.23+164656.1	COS/FUV, TIME-TAG, PSA	G160M 1623 A	BUFFER-TIME=11190; FP-POS=1			1300 Secs (1300 Secs) *[==>]*	*[4]*
Comments: Can only use FP-POS=1 & 2 for this cenwave to retain coverage of the O II 833 absorption trough.									
6	(COS.sp.827081)	(5) SDSS-J104244.23+164656.1	COS/FUV, TIME-TAG, PSA	G160M 1623 A	BUFFER-TIME=11190; FP-POS=2			1300 Secs (1300 Secs) *[==>]*	*[4]*
Comments: Can only use FP-POS=1 & 2 for this cenwave to retain coverage of the O II 833 absorption trough.									

Orbit Structure






Orbit 3
Server Version: 20170613
Exp. 4, split 2
Exp. 4, split 3
Exp. 4, split 4
GS Reacq
Exp. 4, split 1
Unused Orbital Visibility = 9
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.


Orbit 4
Server Version: 20170613
Occultation
*** ORBITAL VISIBILITY OVERRUN = 2
GS Reacq
Exp. 5
Exp. 6
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Proposal 14777 - Visit 06 - Deciphering Quasar Outflows and Measuring their Contribution to AGN Feedback

Visit

Proposal 14777, Visit 06, scheduling Wed Sep 13 19:01:30 GMT 2017

Diagnostic Status: Warning

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: SCHED 100%

Diagnostics

(Visit 06) Warning (Form): For the best data quality, it is strongly recommended that the maximum number of allowed FP-POS positions is used when observing at a given COS CENWAVE setting. See full description for details.

(Visit 06) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(Visit 06) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(Visit 06) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

Fixed Targets

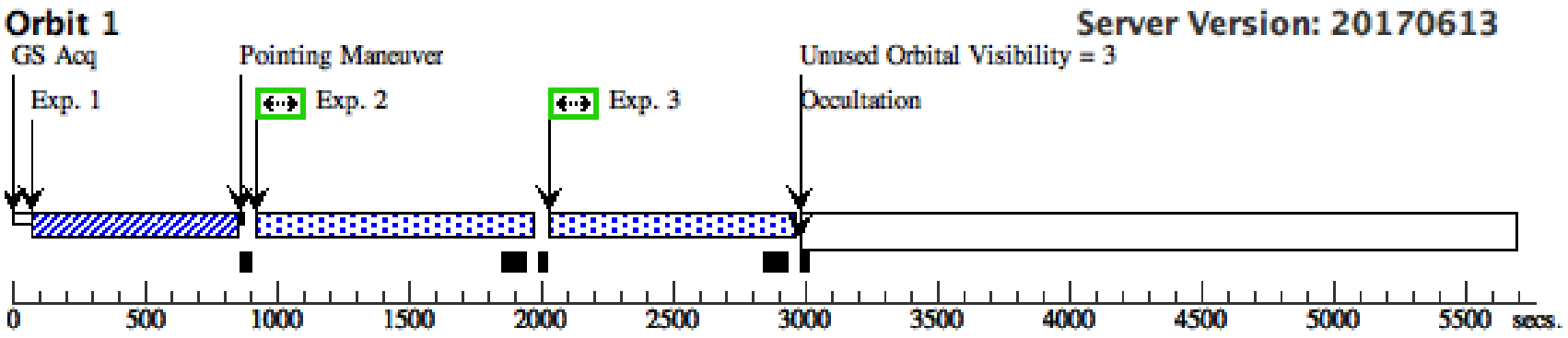
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(6)	SDSS-J093602.10+200542.9	RA: 09 36 2.1080 (144.0087833d) Dec: +20 05 42.94 (20.09526d) Equinox: J2000	Redshift: 1.183234	V=17.22+/-0.5 2.5e-15 at 1516 A	Reference Frame: ICRS

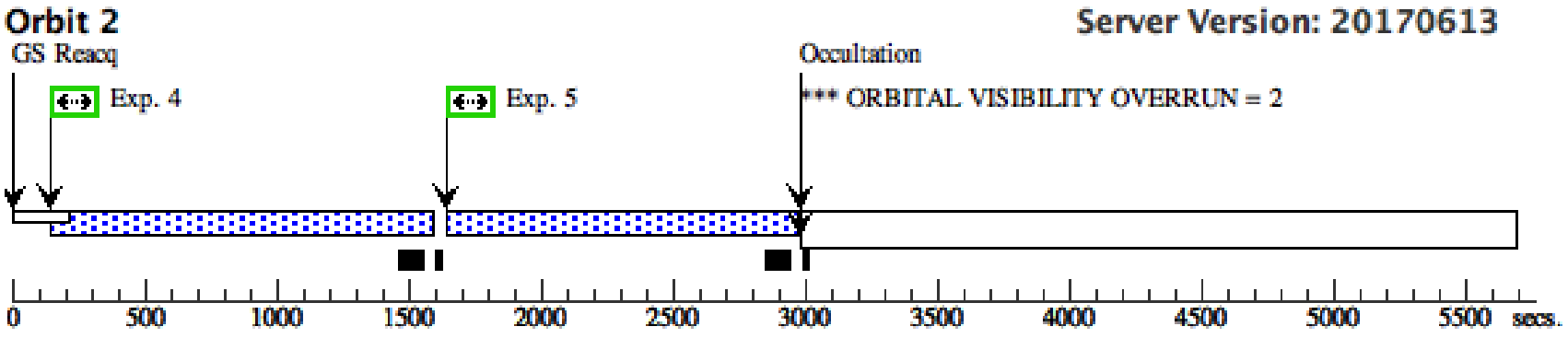
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Extended=NO

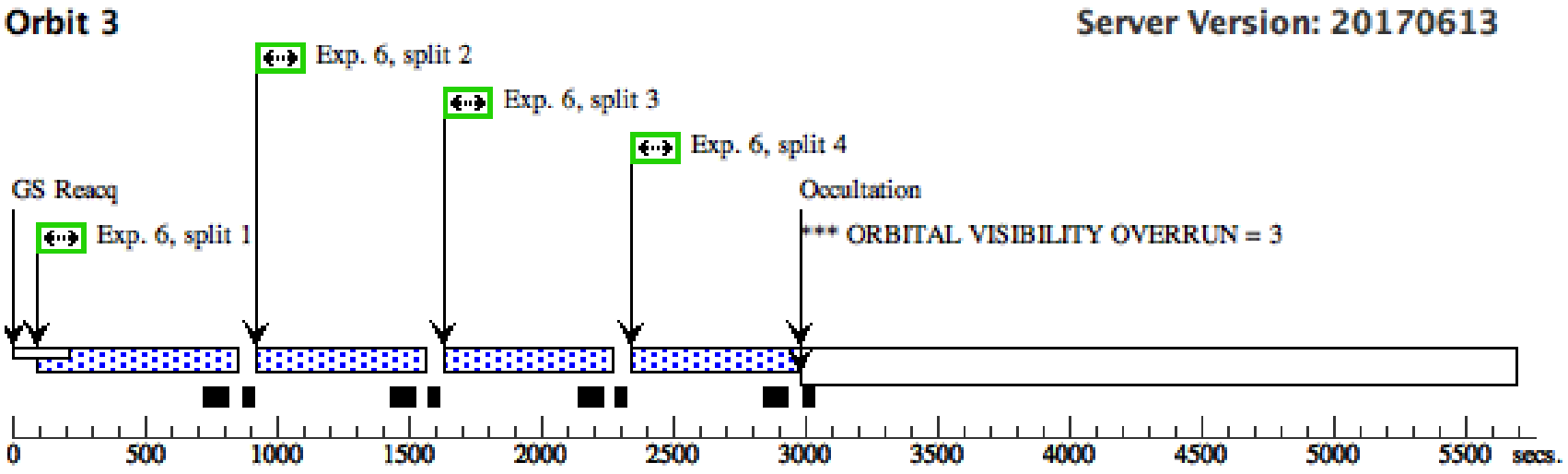
Exposures

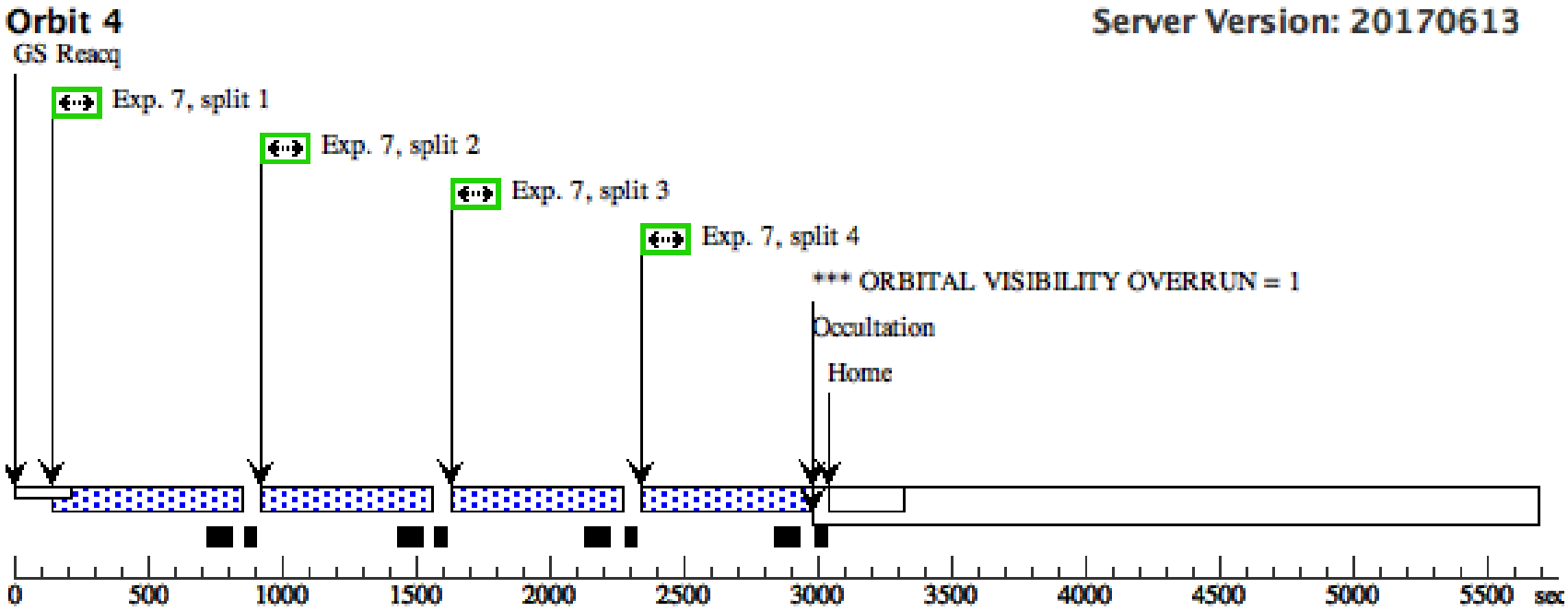
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	(COS.ta.827069)	(6) SDSS-J093602.10+200542.9	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				231 Secs (231 Secs) *[==>]*	***[1]***
2	(COS.sp.827078)	(6) SDSS-J093602.10+200542.9	COS/FUV, TIME-TAG, PSA	G130M 1309 A	BUFFER-TIME=770; FP-POS=1; LIFETIME-POS=LP3			880 Secs (880 Secs) *[==>]*	***[1]***
3	(COS.sp.827078)	(6) SDSS-J093602.10+200542.9	COS/FUV, TIME-TAG, PSA	G130M 1309 A	BUFFER-TIME=770; FP-POS=2; LIFETIME-POS=LP3			880 Secs (880 Secs) *[==>]*	***[1]***
4	(COS.sp.827078)	(6) SDSS-J093602.10+200542.9	COS/FUV, TIME-TAG, PSA	G130M 1318 A	BUFFER-TIME=1210; FP-POS=3; LIFETIME-POS=LP3			1320 Secs (1320 Secs) *[==>]*	***[2]***
Comments: Can only use FP-POS=4 with cenwave 1327 to retain coverage of the Mg X 624 absorption trough.									
5	(COS.sp.827078)	(6) SDSS-J093602.10+200542.9	COS/FUV, TIME-TAG, PSA	G130M 1318 A	BUFFER-TIME=1170; FP-POS=4; LIFETIME-POS=LP3			1280 Secs (1280 Secs) *[==>]*	***[2]***
Comments: Can only use FP-POS=4 with cenwave 1327 to retain coverage of the Mg X 624 absorption trough.									
6	(COS.sp.827081)	(6) SDSS-J093602.10+200542.9	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=470; FP-POS=ALL			580 Secs (2332 Secs) *[==>583.0 Secs (Split 1)]* *[==>583.0 Secs (Split 2)]* *[==>583.0 Secs (Split 3)]* *[==>583.0 Secs (Split 4)]*	***[3]***
7	(COS.sp.827081)	(6) SDSS-J093602.10+200542.9	COS/FUV, TIME-TAG, PSA	G160M 1589 A	BUFFER-TIME=470; FP-POS=ALL			580 Secs (2332 Secs) *[==>583.0 Secs (Split 1)]* *[==>583.0 Secs (Split 2)]* *[==>583.0 Secs (Split 3)]* *[==>583.0 Secs (Split 4)]*	***[4]***

Orbit Structure






Orbit 3
Server Version: 20170613
Exp. 6, split 2
Exp. 6, split 3
Exp. 6, split 4
GS Reacq
Occultation
Exp. 6, split 1
*** ORBITAL VISIBILITY OVERRUN = 3
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.


Orbit 4
Server Version: 20170613
GS Reacq
Exp. 7, split 1
Exp. 7, split 2
Exp. 7, split 3
Exp. 7, split 4
*** ORBITAL VISIBILITY OVERRUN = 1
Occultation
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 14777, Visit 07, scheduling Wed Sep 13 19:01:30 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: SCHED 100%

Fixed Targets

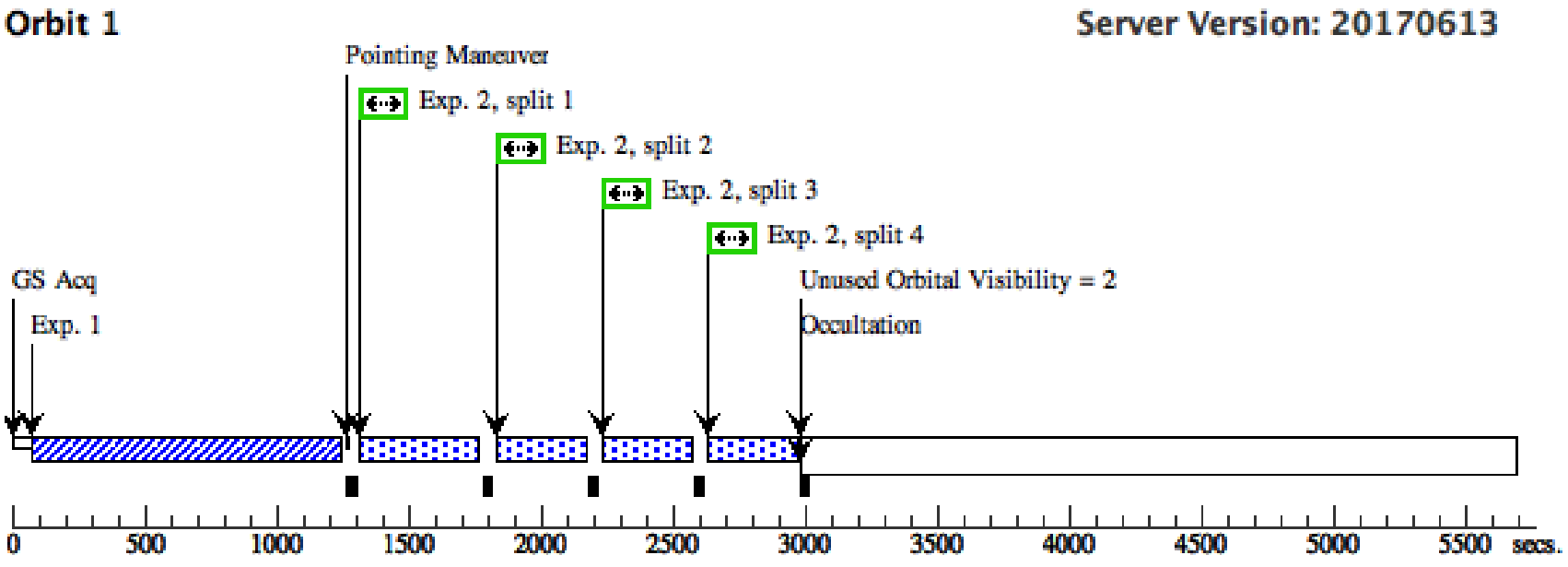
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(7)	2MASS-J10512569+1247462	RA: 10 51 25.7284 (162.8572017d) Dec: +12 47 46.29 (12.79619d) Equinox: J2000	Redshift: 1.282753	V=17.88+/-0.5 1.0e-15 at 1516 A	Reference Frame: ICRS

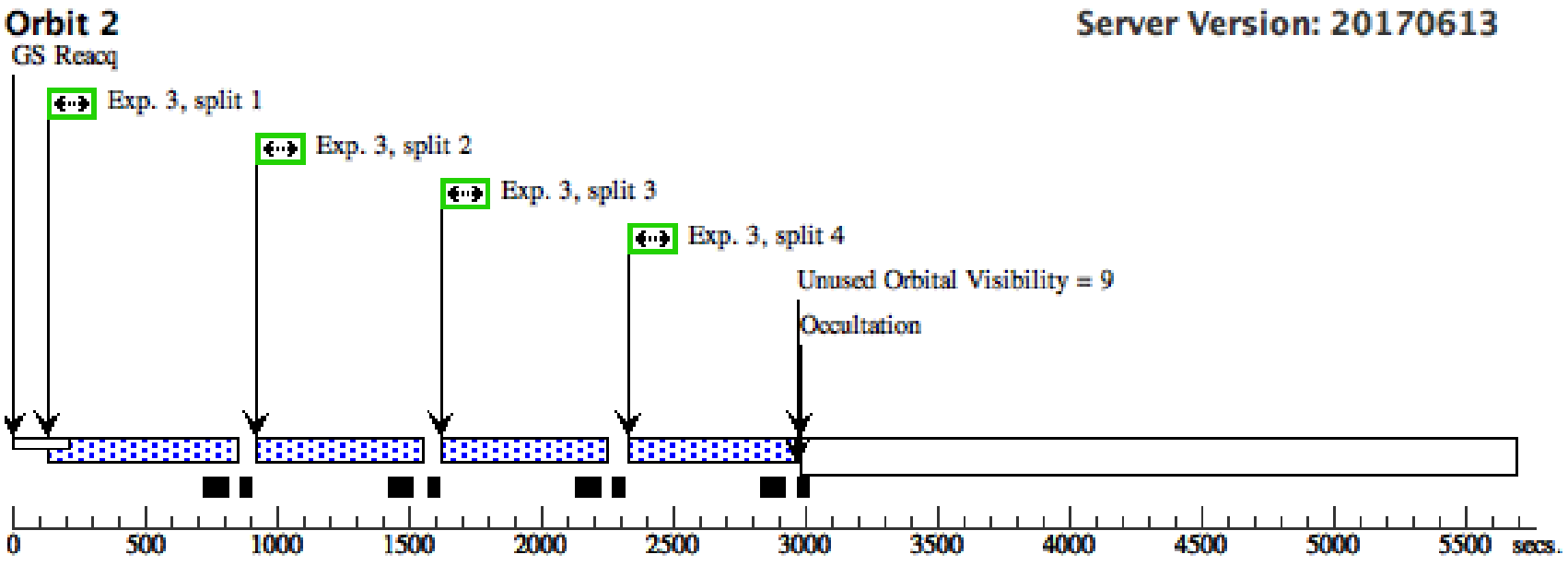
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Extended=NO

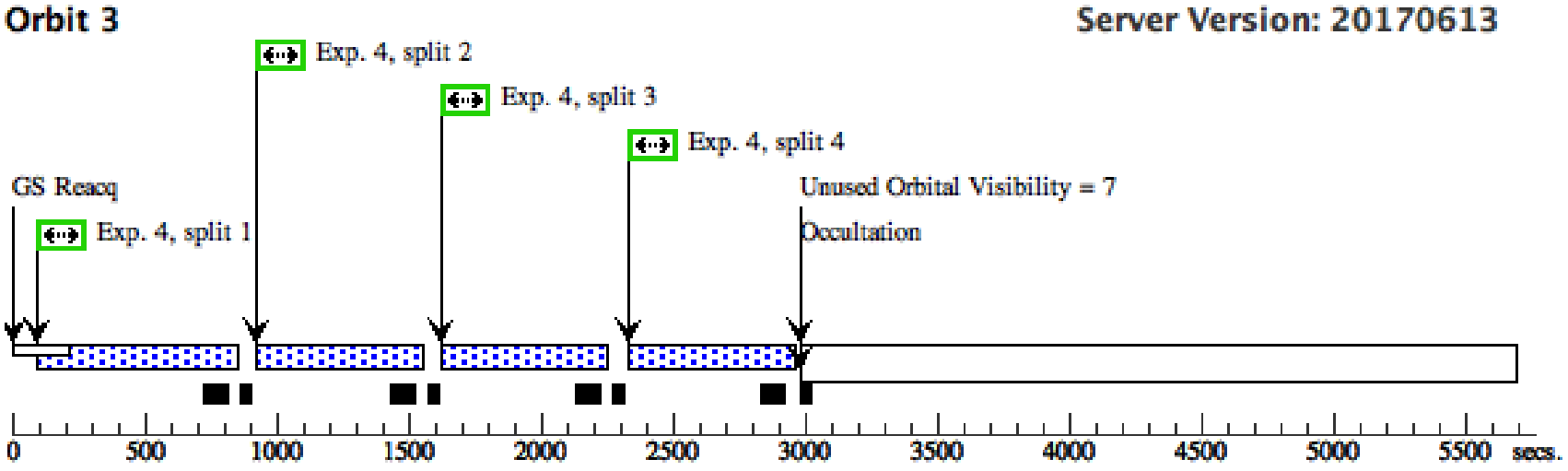
Exposures

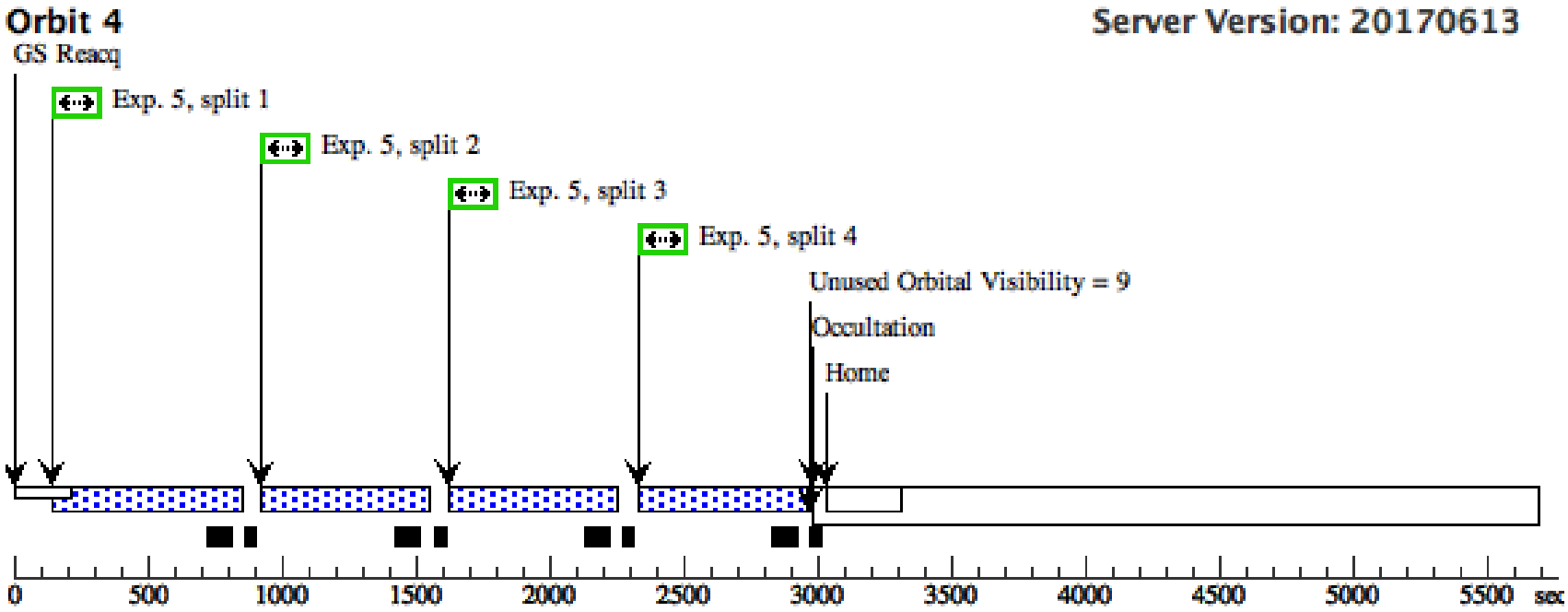
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	(COS.ta.827070)	(7) 2MASS-J10512569+1247462	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				429 Secs (429 Secs)	
								[==>]	***[1]***
2	(COS.sp.827078)	(7) 2MASS-J10512569+1247462	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=2000; FP-POS=ALL; LIFETIME-POS=LP3			285 Secs (1140 Secs)	
								[==>(Split 1)] *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]*	***[1]***
3	(COS.sp.827078)	(7) 2MASS-J10512569+1247462	COS/FUV, TIME-TAG, PSA	G130M 1327 A	BUFFER-TIME=470; FP-POS=ALL; LIFETIME-POS=LP3			580 Secs (2320 Secs)	
								[==>(Split 1)] *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]*	***[2]***
4	(COS.sp.827081)	(7) 2MASS-J10512569+1247462	COS/FUV, TIME-TAG, PSA	G160M 1600 A	BUFFER-TIME=470; FP-POS=ALL			580 Secs (2320 Secs)	
								[==>(Split 1)] *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]*	***[3]***
5	(COS.sp.827081)	(7) 2MASS-J10512569+1247462	COS/FUV, TIME-TAG, PSA	G160M 1623 A	BUFFER-TIME=470; FP-POS=ALL			580 Secs (2320 Secs)	
								[==>(Split 1)] *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]*	***[4]***

Orbit Structure






Orbit 3
Server Version: 20170613
Exp. 4, split 2
Exp. 4, split 3
Exp. 4, split 4
GS Reacq
Exp. 4, split 1
Unused Orbital Visibility = 7
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.


Orbit 4
Server Version: 20170613
GS Reacq
Exp. 5, split 1
Exp. 5, split 2
Exp. 5, split 3
Exp. 5, split 4
Unused Orbital Visibility = 9
Occultation
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 14777, Visit 08, completed Wed Sep 13 19:01:30 GMT 2017

Diagnostic Status: Error

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: SCHED 100%

Diagnostics

(Exposure 2 (Visit 08)) Error (Form): LIFETIME-POS is required with G130M when not in Supported mode.

(Exposure 3 (Visit 08)) Error (Form): LIFETIME-POS is required with G130M when not in Supported mode.

(Exposure 4 (Visit 08)) Error (Form): LIFETIME-POS is required with G130M when not in Supported mode.

(Exposure 5 (Visit 08)) Error (Form): LIFETIME-POS is required with G130M when not in Supported mode.

(Visit 08) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(Visit 08) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(Visit 08) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(Visit 08) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(Exposure 2 (Visit 08)) Warning (Form): Defaults for SEGMENT have changed in APT25.2 for use of LP4 with G130M. See full description for details.

(Exposure 3 (Visit 08)) Warning (Form): Defaults for SEGMENT have changed in APT25.2 for use of LP4 with G130M. See full description for details.

Fixed Targets

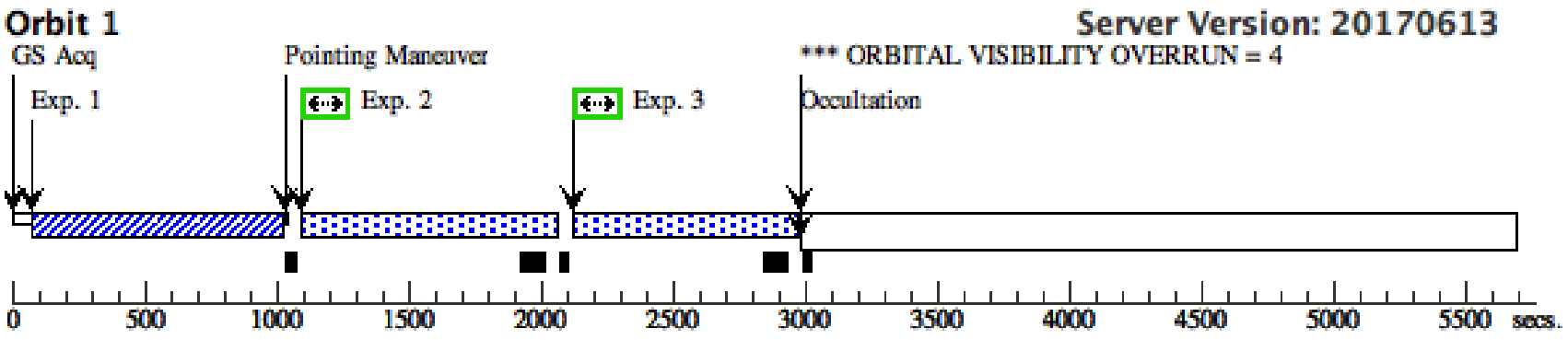
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(8)	7C-163119.39+393037.00	RA: 16 33 2.1047 (248.2587696d) Dec: +39 24 27.40 (39.40761d) Equinox: J2000	Redshift: 1.024575	V=16.92+/-0.5 1.4e-15 at 1516 A	Reference Frame: ICRS

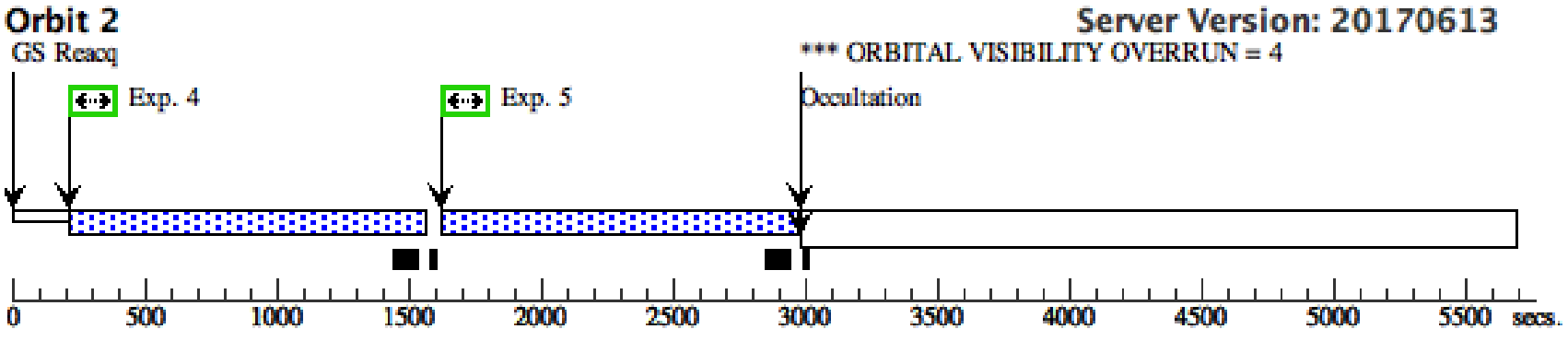
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Extended=NO

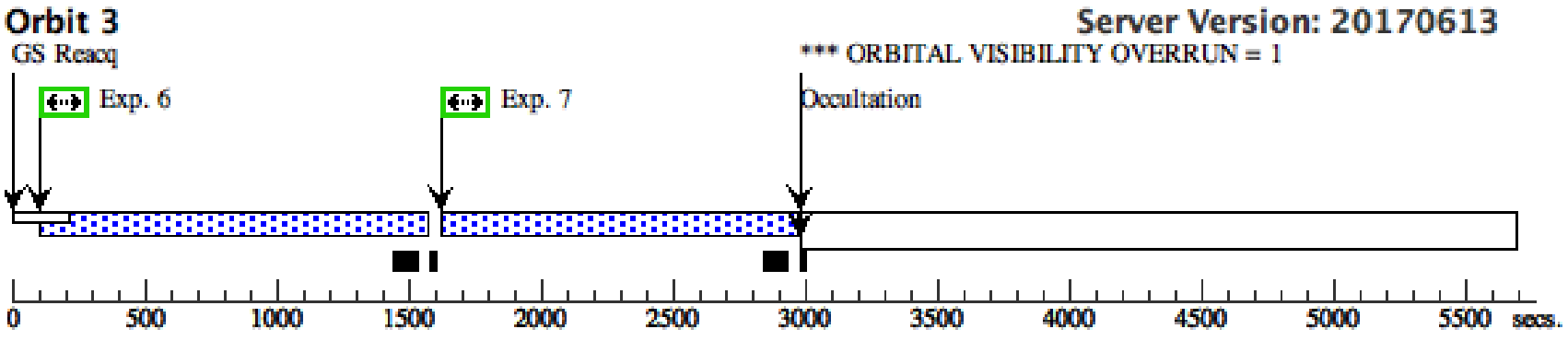
Exposures

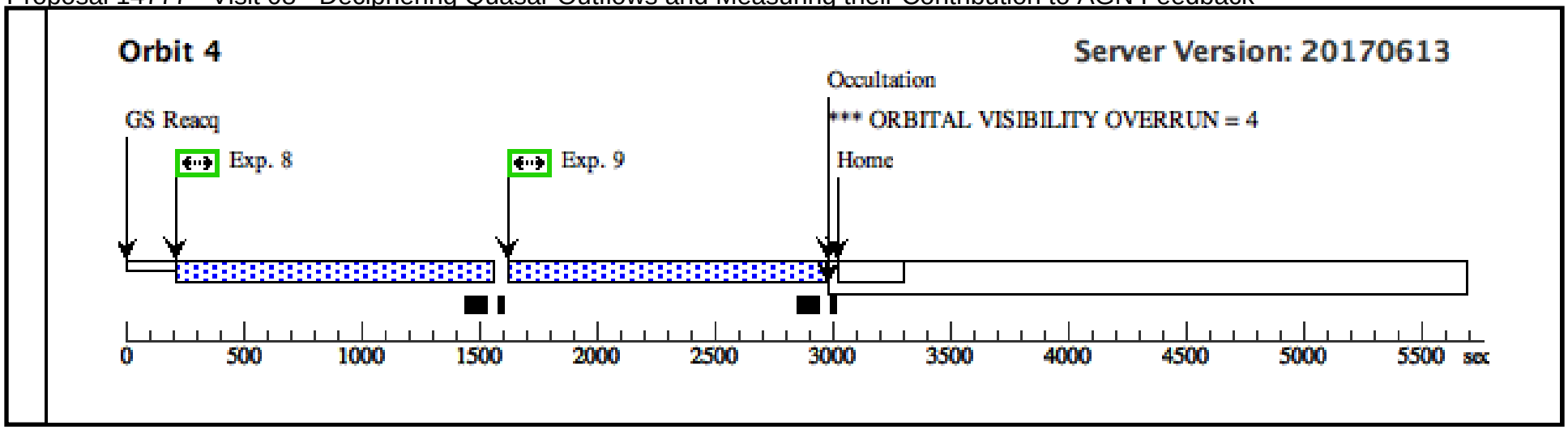
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	(COS.ta.827072)	(8) 7C-163119.39+393037.00	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				317 Secs (317 Secs) *[==>]*	*[1]*
2	(COS.sp.827078)	(8) 7C-163119.39+393037.00	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=6800; FP-POS=1			800 Secs (800 Secs) *[==>]*	*[1]*
3	(COS.sp.827078)	(8) 7C-163119.39+393037.00	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=6800; FP-POS=2			800 Secs (800 Secs) *[==>]*	*[1]*
4	(COS.sp.827078)	(8) 7C-163119.39+393037.00	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=1190; FP-POS=3			1300 Secs (1300 Secs) *[==>]*	*[2]*
5	(COS.sp.827078)	(8) 7C-163119.39+393037.00	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=1190; FP-POS=4			1300 Secs (1300 Secs) *[==>]*	*[2]*
6	(COS.sp.827081)	(8) 7C-163119.39+393037.00	COS/FUV, TIME-TAG, PSA	G160M 1623 A	BUFFER-TIME=1190; FP-POS=1			1300 Secs (1300 Secs) *[==>]*	*[3]*
7	(COS.sp.827081)	(8) 7C-163119.39+393037.00	COS/FUV, TIME-TAG, PSA	G160M 1623 A	BUFFER-TIME=1185; FP-POS=2			1295 Secs (1295 Secs) *[==>]*	*[3]*
8	(COS.sp.827081)	(8) 7C-163119.39+393037.00	COS/FUV, TIME-TAG, PSA	G160M 1623 A	BUFFER-TIME=1190; FP-POS=3			1300 Secs (1300 Secs) *[==>]*	*[4]*
9	(COS.sp.827081)	(8) 7C-163119.39+393037.00	COS/FUV, TIME-TAG, PSA	G160M 1623 A	BUFFER-TIME=1190; FP-POS=4			1300 Secs (1300 Secs) *[==>]*	*[4]*

Orbit Structure








Orbit 4
Server Version: 20170613
Occultation
GS Reacq
*** ORBITAL VISIBILITY OVERRUN = 4
Exp. 8
Exp. 9
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 14777, Visit 09, completed Wed Sep 13 19:01:30 GMT 2017

Diagnostic Status: Error

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: SCHED 100%

Diagnostics

(Exposure 2 (Visit 09)) Error (Form): LIFETIME-POS is required with G130M when not in Supported mode.

(Exposure 3 (Visit 09)) Error (Form): LIFETIME-POS is required with G130M when not in Supported mode.

(Visit 09) Warning (Form): For the best data quality, it is strongly recommended that the maximum number of allowed FP-POS positions is used when observing at a given COS CENWAVE setting. See full description for details.

(Visit 09) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(Exposure 2 (Visit 09)) Warning (Form): Defaults for SEGMENT have changed in APT25.2 for use of LP4 with G130M. See full description for details.

(Exposure 3 (Visit 09)) Warning (Form): Defaults for SEGMENT have changed in APT25.2 for use of LP4 with G130M. See full description for details.

Fixed Targets

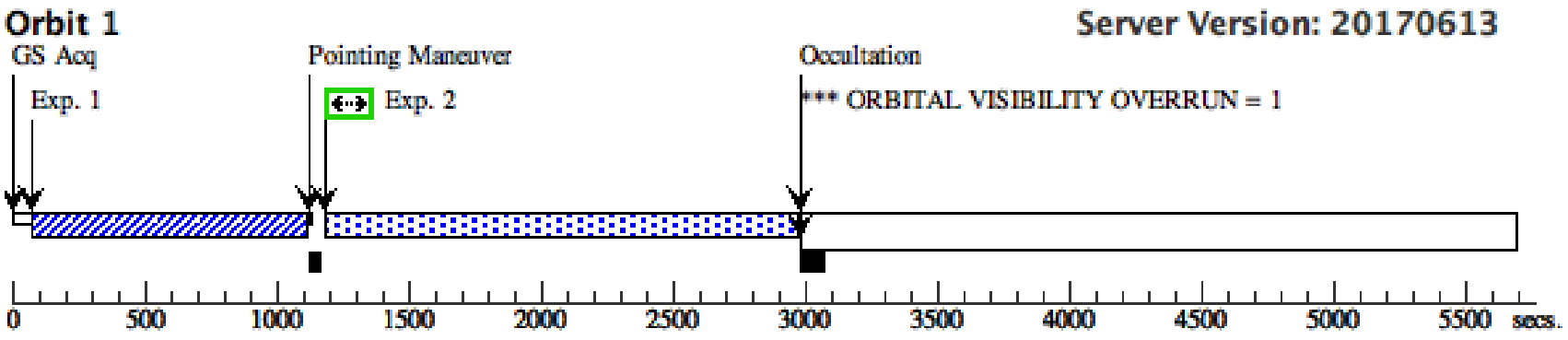
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(9)	LBQS-1206+1052	RA: 12 09 24.0776 (182.3503233d) Dec: +10 36 11.93 (10.60331d) Equinox: J2000	Redshift: 0.395549	V=16.89+/-0.5 1.6e-15 at 1516 A	Reference Frame: ICRS

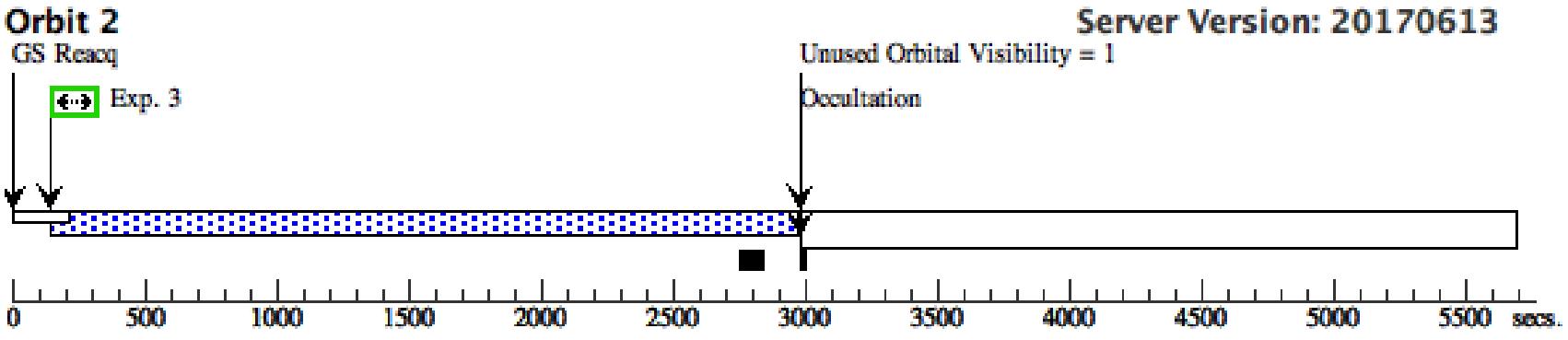
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Extended=NO

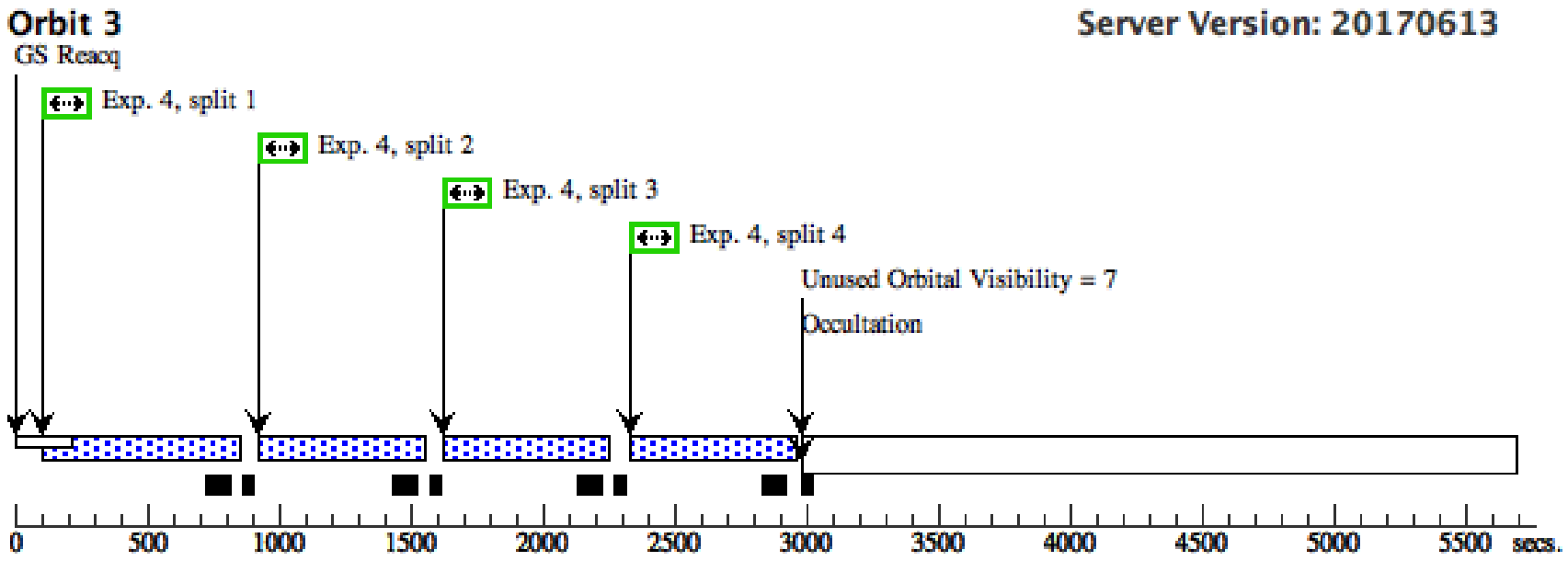
Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	(COS.ta.827074)	(9) LBQS-1206+1052	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				361 Secs (361 Secs) *[==>]*	*[1]*
2	(COS.sp.827078)	(9) LBQS-1206+1052	COS/FUV, TIME-TAG, PSA	G130M 1300 A	BUFFER-TIME=2000; FP-POS=1			1620 Secs (1620 Secs) *[==>]*	*[1]*
3	(COS.sp.827078)	(9) LBQS-1206+1052	COS/FUV, TIME-TAG, PSA	G130M 1309 A	BUFFER-TIME=2500; FP-POS=4			2700 Secs (2700 Secs) *[==>]*	*[2]*
4	(COS.sp.827081)	(9) LBQS-1206+1052	COS/FUV, TIME-TAG, PSA	G160M 1589 A	BUFFER-TIME=470; FP-POS=ALL			580 Secs (2320 Secs) *[==>(Split 1)]* *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]*	*[3]*
5	(COS.sp.827081)	(9) LBQS-1206+1052	COS/FUV, TIME-TAG, PSA	G160M 1600 A	BUFFER-TIME=470; FP-POS=ALL			580 Secs (2320 Secs) *[==>(Split 1)]* *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]*	*[4]*

Orbit Structure






Orbit 3
Server Version: 20170613
GS Reacq
Exp. 4, split 1
Exp. 4, split 2
Exp. 4, split 3
Exp. 4, split 4
Unused Orbital Visibility = 7
Occultation
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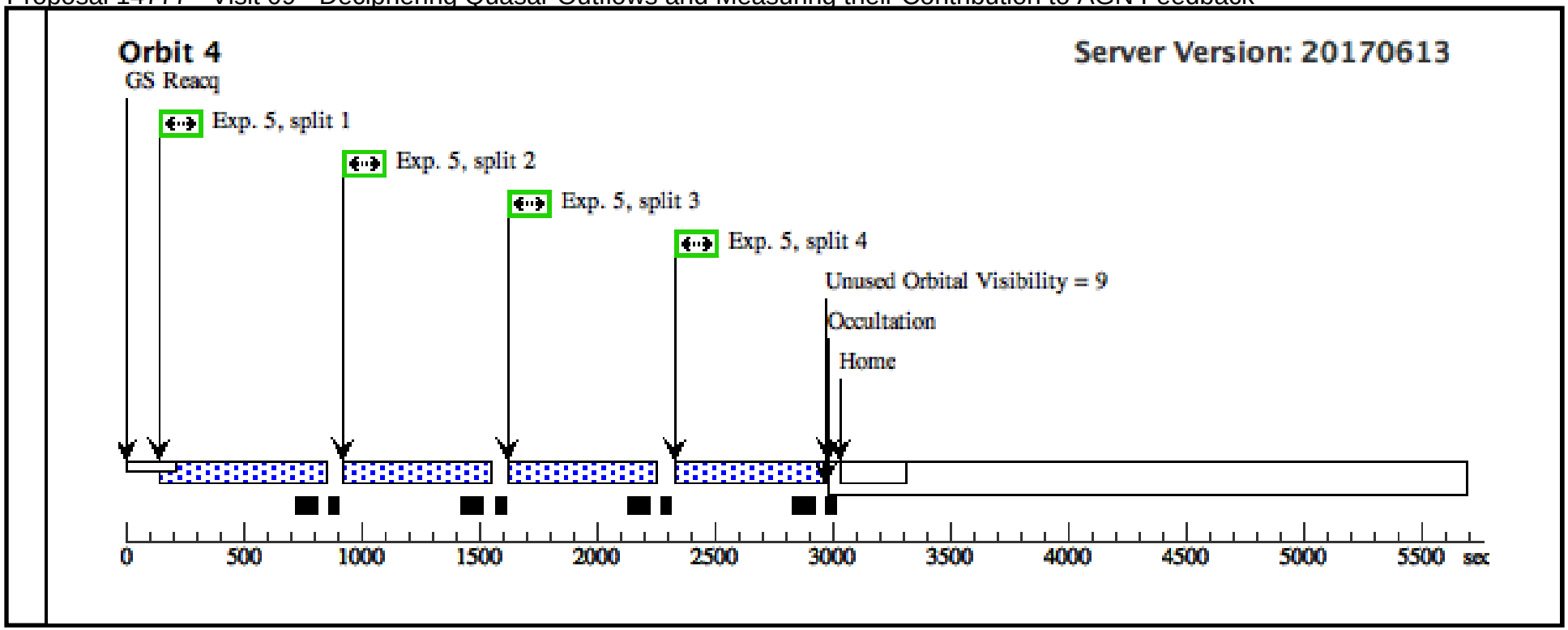
2500
3000
3500
4000
4500
5000
5500
secs.


Orbit 4
Server Version: 20170613
GS Reacq
Exp. 5, split 1
Exp. 5, split 2
Exp. 5, split 3
Exp. 5, split 4
Unused Orbital Visibility = 9
Occultation
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 14777, Visit 10, completed Wed Sep 13 19:01:30 GMT 2017

Diagnostic Status: Error

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: SCHED 100%

Diagnostics

(Exposure 2 (Visit 10)) Error (Form): LIFETIME-POS is required with G130M when not in Supported mode.

(Exposure 3 (Visit 10)) Error (Form): LIFETIME-POS is required with G130M when not in Supported mode.

(Visit 10) Warning (Form): For the best data quality, it is strongly recommended that the maximum number of allowed FP-POS positions is used when observing at a given COS CENWAVE setting. See full description for details.

(Visit 10) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(Visit 10) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(Visit 10) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(Visit 10) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(Exposure 3 (Visit 10)) Warning (Form): Defaults for SEGMENT have changed in APT25.2 for use of LP4 with G130M. See full description for details.

Fixed Targets

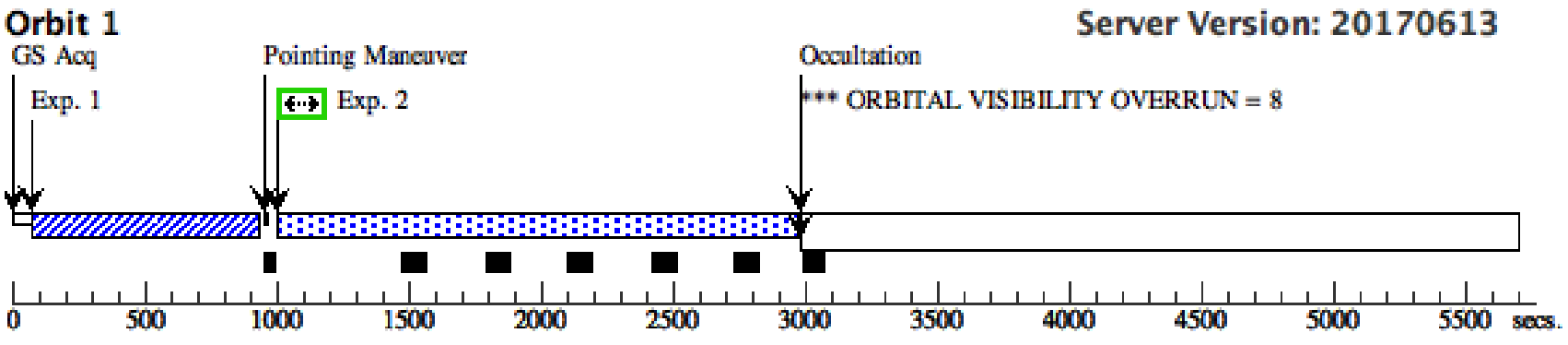
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(10)	2MASS-J14362129+0727208	RA: 14 36 21.2990 (219.0887458d) Dec: +07 27 20.80 (7.45578d) Equinox: J2000	Redshift: 0.894	V=17.33+/-0.5 1.3e-15 at 1516 A	Reference Frame: ICRS

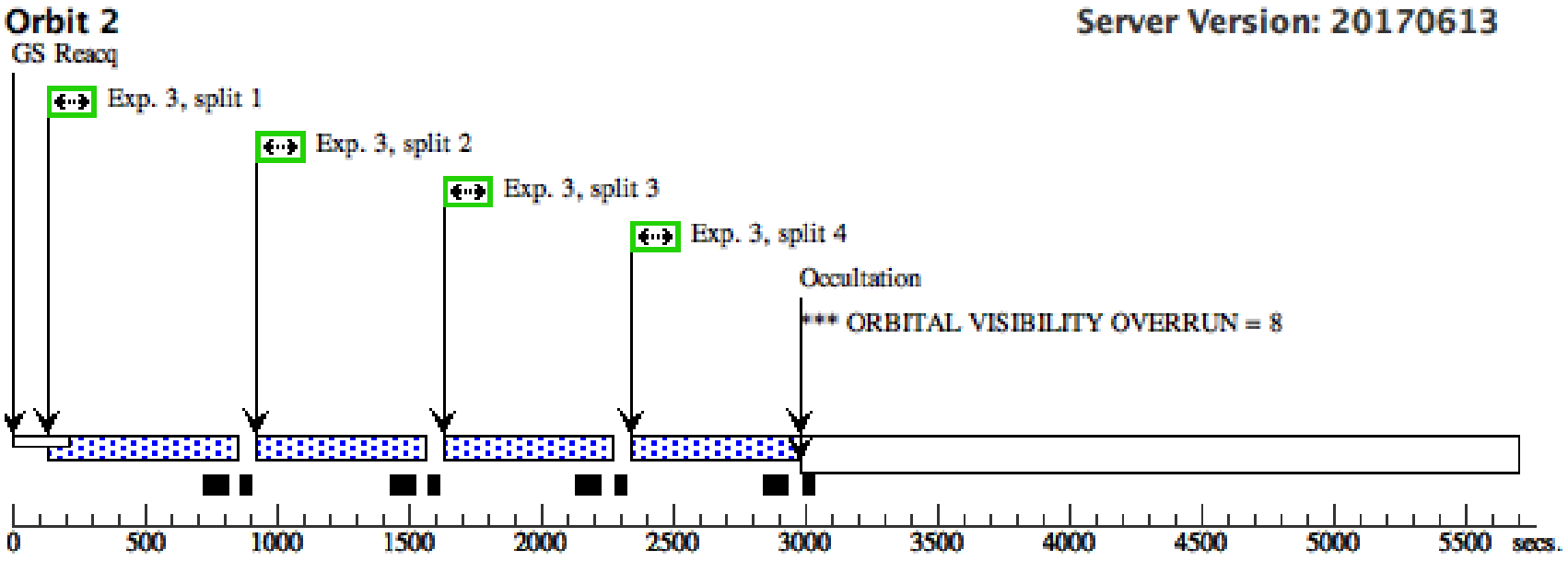
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Extended=NO

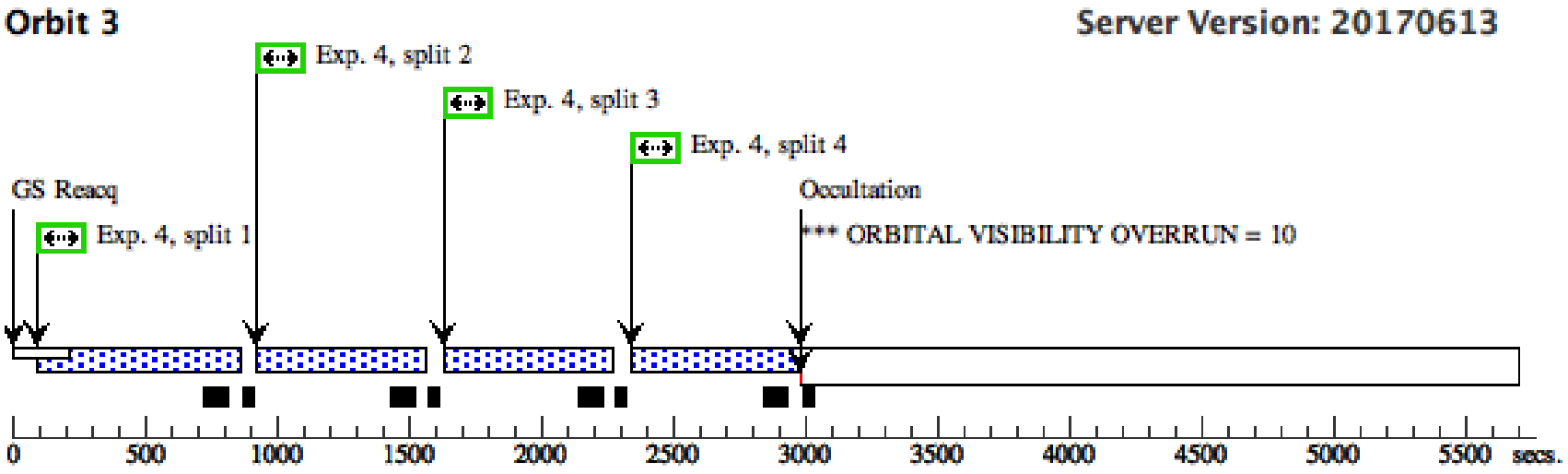
Exposures

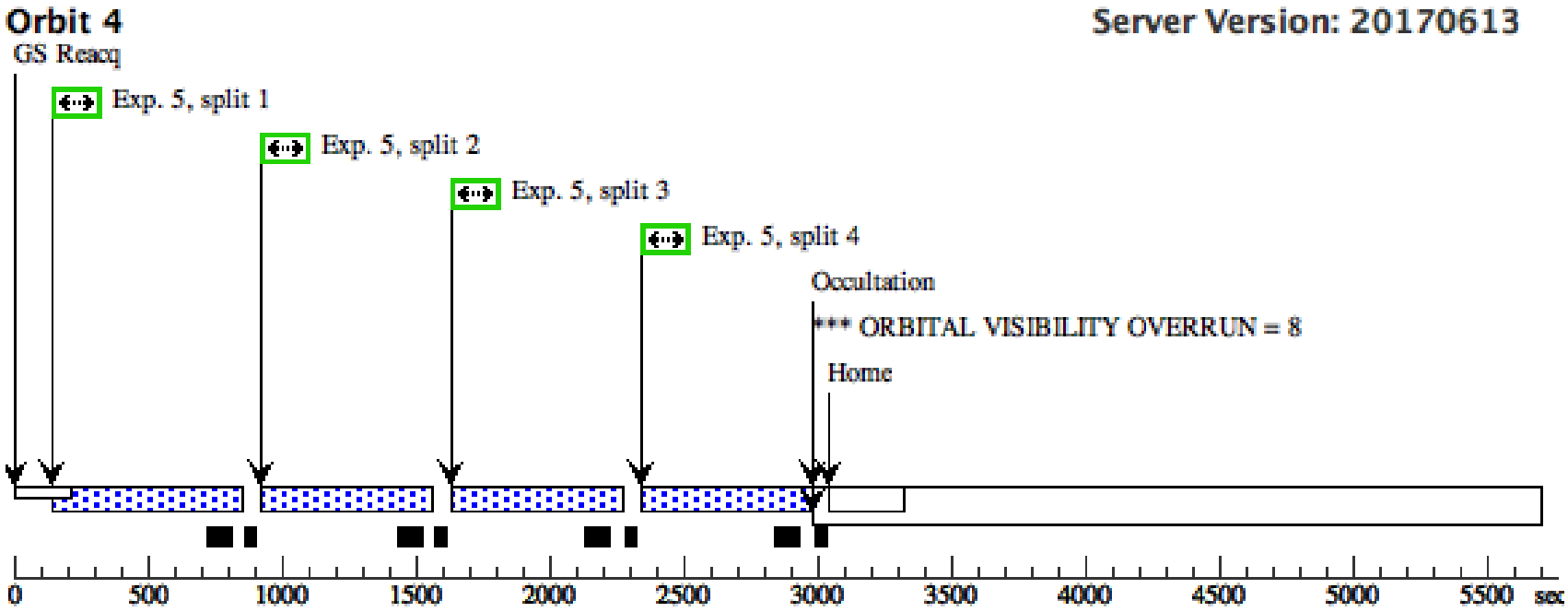
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	(COS.ta.827075)	(10) 2MASS-J14362129+0727208	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				274 Secs (274 Secs) *[==>]*	*[1]*
2	(COS.sp.827078)	(10) 2MASS-J14362129+0727208	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=315; FP-POS=4			1800 Secs (1800 Secs) *[==>]*	*[1]*
Comments: First exposure in G130M/1291 must be in FP-POS-4 since lines of interest are in the 1130-1140 A range.									
3	(COS.sp.827078)	(10) 2MASS-J14362129+0727208	COS/FUV, TIME-TAG, PSA	G130M 1327 A	BUFFER-TIME=470; FP-POS=ALL			580 Secs (2332 Secs) *[==>583.0 Secs (Split 1)]* *[==>583.0 Secs (Split 2)]* *[==>583.0 Secs (Split 3)]* *[==>583.0 Secs (Split 4)]*	*[2]*
4	(COS.sp.827081)	(10) 2MASS-J14362129+0727208	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=470; FP-POS=ALL			580 Secs (2332 Secs) *[==>583.0 Secs (Split 1)]* *[==>583.0 Secs (Split 2)]* *[==>583.0 Secs (Split 3)]* *[==>583.0 Secs (Split 4)]*	*[3]*
5	(COS.sp.827081)	(10) 2MASS-J14362129+0727208	COS/FUV, TIME-TAG, PSA	G160M 1600 A	BUFFER-TIME=470; FP-POS=ALL			580 Secs (2332 Secs) *[==>583.0 Secs (Split 1)]* *[==>583.0 Secs (Split 2)]* *[==>583.0 Secs (Split 3)]* *[==>583.0 Secs (Split 4)]*	*[4]*

Orbit Structure






Orbit 3
Server Version: 20170613
Exp. 4, split 2
Exp. 4, split 3
Exp. 4, split 4
GS Reacq
Occultation
Exp. 4, split 1
*** ORBITAL VISIBILITY OVERRUN = 10
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.


Orbit 4
Server Version: 20170613
GS Reacq
Exp. 5, split 1
Exp. 5, split 2
Exp. 5, split 3
Exp. 5, split 4
Occultation
*** ORBITAL VISIBILITY OVERRUN = 8
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec