



## 12472 - CCC - The Cosmic Carbon Conundrum

Cycle: 19, Proposal Category: GO

(Availability Mode: SUPPORTED)

### INVESTIGATORS

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### VISITS

<i>Visit</i>	<i>Targets used in Visit</i>	<i>Configurations used in Visit</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
01	(1) MRK960 CCDFLAT	STIS/CCD STIS/NUV-MAMA	1	27-Feb-2012 21:14:50.0	yes
02	(2) SBS0218+003 CCDFLAT	STIS/CCD STIS/NUV-MAMA	2	27-Feb-2012 21:14:58.0	yes
03	(3) MRK1087 CCDFLAT	STIS/CCD STIS/NUV-MAMA	1	27-Feb-2012 21:15:05.0	yes
04	(4) NGC1741 CCDFLAT	STIS/CCD STIS/NUV-MAMA	1	27-Feb-2012 21:15:16.0	yes
05	(5) MRK5 CCDFLAT	STIS/CCD STIS/NUV-MAMA	1	27-Feb-2012 21:15:21.0	yes
06	(6) MRK1199 CCDFLAT	STIS/CCD STIS/NUV-MAMA	1	27-Feb-2012 21:15:26.0	yes

Proposal 12472 (STScI Edit Number: 5, Created: Monday, February 27, 2012 9:16:51 PM EST) - Overview

<i>Visit</i>	<i>Targets used in Visit</i>	<i>Configurations used in Visit</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
07	(7) IRAS08208+2816 CCDFLAT	STIS/CCD STIS/NUV-MAMA	1	27-Feb-2012 21:15:31.0	yes
08	(8) IRAS08339+6517 CCDFLAT	STIS/CCD STIS/NUV-MAMA	1	27-Feb-2012 21:15:37.0	yes
09	(9) SBS0926+606A CCDFLAT	STIS/CCD STIS/NUV-MAMA	2	27-Feb-2012 21:15:42.0	yes
19	(9) SBS0926+606A CCDFLAT	STIS/CCD STIS/NUV-MAMA	2	27-Feb-2012 21:15:49.0	yes
10	(10) ARP252 CCDFLAT	STIS/CCD STIS/NUV-MAMA	1	27-Feb-2012 21:15:54.0	yes
11	(11) SBS0948+532 CCDFLAT	STIS/CCD STIS/NUV-MAMA	4	27-Feb-2012 21:16:01.0	yes
12	(12) TOL9 CCDFLAT	STIS/CCD STIS/NUV-MAMA	2	27-Feb-2012 21:16:08.0	yes
13	(13) SBS1054+365 CCDFLAT	STIS/CCD STIS/NUV-MAMA	2	27-Feb-2012 21:16:15.0	yes
14	(14) POX4 CCDFLAT	STIS/CCD STIS/NUV-MAMA	1	27-Feb-2012 21:16:21.0	yes
15	(15) SBS1319+579 CCDFLAT	STIS/CCD STIS/NUV-MAMA	4	27-Feb-2012 21:16:29.0	yes
16	(16) SBS1415+437 CCDFLAT	STIS/CCD STIS/NUV-MAMA	2	27-Feb-2012 21:16:36.0	yes
17	(17) TOL1457-262A CCDFLAT	STIS/CCD STIS/NUV-MAMA	1	27-Feb-2012 21:16:42.0	yes
18	(18) IIIZW107 CCDFLAT	STIS/CCD STIS/NUV-MAMA	1	27-Feb-2012 21:16:46.0	yes

31 Total Orbits Used

## ABSTRACT

We propose STIS G230L ultraviolet spectroscopy of a carefully chosen sample of starburst galaxies to measure the strength of the C III] 1909 and other diagnostic lines. The C III] line is a key indicator of the carbon abundance. Atomic physics and ionization conditions in galaxies preclude any determination of nebular carbon abundances in the optical. Only HST's ultraviolet capabilities allow us to document, explore, model, and interpret the behavior of the 4th most abundant element in the universe in these galaxies. Our sample of 18 galaxies exhibits the signatures of Wolf-Rayet stars, whose presence will greatly facilitate population synthesis modeling and at the same time will provide clues on possible short-comings in stellar evolution modeling. The sample is large enough for meaningful statistics and parameter space coverage but still allows us to reach our science goals in an economic way. Together with short but deep co-spatial optical spectroscopy we will use the data for comparison with Mappings III photoionization models to determine abundances of the major elements. The full star-formation history will be established using the Starburst99 code. We will investigate the behavior of, e.g., C/O vs. O/H in order to constrain the production mechanism of carbon. We will test the predictions of chemical evolution models of galaxies and address the importance of starburst durations, infall, and outflows. The proposed study will help us understand the puzzling carbon abundances in objects as diverse as low-mass Galactic halo stars or distant damped Lyman-alpha absorbers.

## OBSERVING DESCRIPTION

Our survey is drawn from the sample of W-R galaxies studied by López-Sánchez & Esteban (2008). Their original list includes 20 program galaxies. We dropped two objects: NGC 5253, for which HST archival data are available, and SBS 1211+540, whose faintness would impose prohibitively long exposure times. The resulting list of 18 program galaxies is summarized in Table 1, where we give the galaxy name (col. 1), absolute B magnitude  $M(B)$  (col. 2), distance (col. 3), oxygen abundance (col. 4), expected continuum flux at 1900 Å (col. 5), required exposure time to reach  $S/N = 10$  for the line flux of the C III] 1909 line (col. 6), number of orbits (col. 7), and morphological type (col. 8).

We obtained the expected continuum fluxes at 1900 Å from the ground-based spectra of López-Sánchez & Esteban (2009), which reach down to 3500 Å. This procedure is quite reliable as tested for several program galaxies with existing archival UV data. Our tests also suggest that aperture size differences (1 for the ground-based observations, 0.2 for STIS) play no major role in the flux estimate for the continuum because the seeing inflicted light losses through larger ground-based apertures are similar to the losses through smaller, diffraction-limited apertures in space.

Following the discussion of Kobulnicky et al. (1999), we require  $S/N = 10$  for the line fluxes in order to determine precise abundances. The C III] 1909 line is expected to have a typical equivalent width of 2 Å, as suggested by a sample of local star forming galaxies (see Fig. 1) and observation of local H II regions. Therefore the line fluxes of C III] 1909 were taken to be 2 Å times the continuum fluxes in column 5 of Table 1. The STIS ETC was used to derive the necessary exposure times with the G230L grating in column 6. (G230LB is by far less efficient.) The corresponding number of

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orbits (column 7) refers to G230L+G430L+G750L and takes into account target visibility, the instrumental overhead, the switch between MAMA and CCD detectors, as well as the exposure times for the optical spectra (see below).

Our proposed observing sequence for each galaxy will be as follows. We will acquire with a standard guide star and imaging acquisition (6 + 6 minutes overhead), followed by spectroscopic observations with the G230L grating and the MAMA detector (8 minutes overhead). The 0.2x52 aperture will be used. This aperture is a good compromise between slit loss and spectral resolution. We have successfully used this aperture numerous times in our previous programs dedicated to observations of starburst galaxies. Then we will switch to the CCD side to perform spectroscopy with the G430L and G750L gratings (5 minutes overhead each). The total CCD time including overheads will be less than 30 minutes for all galaxies because the G230L observations are the sole driver of the total exposure time. Therefore we may combine the MAMA and CCD observations in the same orbit. This observational set-up will result in continuous spectra from 1600 to 11,000 Å at a resolving power of ~500 (accounting for spectral degradation due to the slit width). We emphasize the need for co-spatial UV and optical spectra. Therefore the optical HST spectra are not redundant but fulfill a crucial requirement at negligible cost.

### **REAL TIME JUSTIFICATION**

n/a

### **CALIBRATION JUSTIFICATION**

n/a

### **ADDITIONAL COMMENTS**

We request specific orientations for each galaxy in order to place more than one starburst region into the STIS aperture. The HST APT shows scheduling windows for all 18 galaxies with the specified orientations. However, if necessary, we can relax the orientation constraint since our science goals can be reached by observing the main starburst region only. Starburst galaxies are known to be well mixed. Therefore we do not expect to find abundance gradients. The only reason for observing more than one starburst region is the (modest) increase of the S/N.

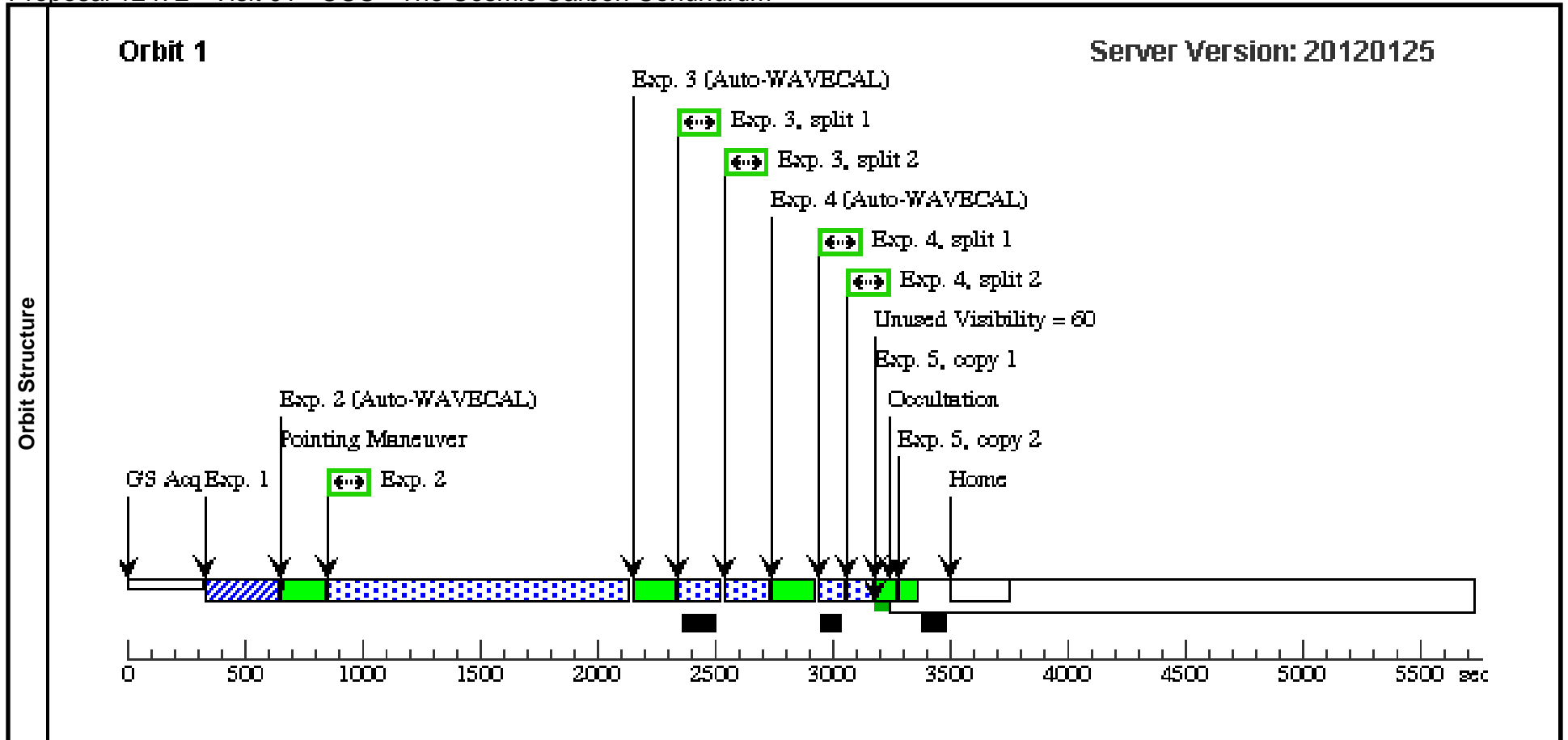
Proposal 12472 - Visit 01 - CCC - The Cosmic Carbon Conundrum

Tue Feb 28 02:16:51 GMT 2012

Fixed Targets	#		Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous		
	(1)		MRK960	RA: 00 48 35.4300 (12.1476250d) Dec: -12 42 59.77 (-12.71660d) Equinox: J2000	Redshift: 0.021371	V=14.1 F(1900)=3e-15	Reference Frame: ICRS		
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>									

Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
		1		(1) MRK960	STIS/CCD, ACQ, F28X50LP	MIRROR	ACQTYPE=POINT			20 Secs [==>]
	2	(STIS.sp.18 5612)	(1) MRK960	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A				1270 Secs [==>]	[1]
	3		(1) MRK960	STIS/CCD, ACCUM, 52X0.2	G430L 4300 A	CR-SPLIT=2			300 Secs [==>(Split 1)] [==>(Split 2)]	[1]
	4		(1) MRK960	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A	CR-SPLIT=2			150 Secs [==>(Split 1)] [==>(Split 2)]	[1]
	5		CCDFLAT	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A				[==>(Copy 1)] [==>(Copy 2)]	[1]



Proposal 12472 - Visit 02 - CCC - The Cosmic Carbon Conundrum

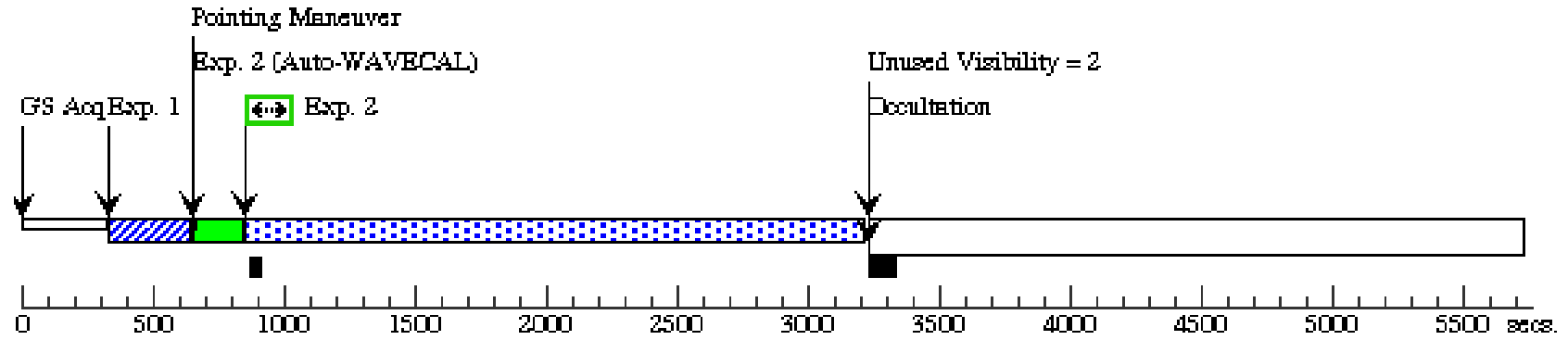
Tue Feb 28 02:16:52 GMT 2012

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(2)	SBS0218+003 Alt Name1: UM420	RA: 02 20 54.5500 (35.2272917d) Dec: +00 33 23.00 (.55639d) Equinox: J2000	Redshift: 0.058420	V=16.5 F(1900)=4e-16	Reference Frame: ICRS
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>						

Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(2) SBS0218+003	STIS/CCD, ACQ, F28X50LP	MIRROR					20 Secs [==>]
2	(STIS.sp.18 5695)	(2) SBS0218+003	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A					2350 Secs [==>]	[1]
3	(STIS.sp.18 5695)	(2) SBS0218+003	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A					1565 Secs [==>]	[2]
4		(2) SBS0218+003	STIS/CCD, ACCUM, 52X0.2	G430L 4300 A		CR-SPLIT=2			500 Secs [==>(Split 1)] [==>(Split 2)]	[2]
5		(2) SBS0218+003	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A		CR-SPLIT=2			250 Secs [==>(Split 1)] [==>(Split 2)]	[2]
6		CCDFLAT	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A					[==>(Copy 1)] [==>(Copy 2)]	[2]

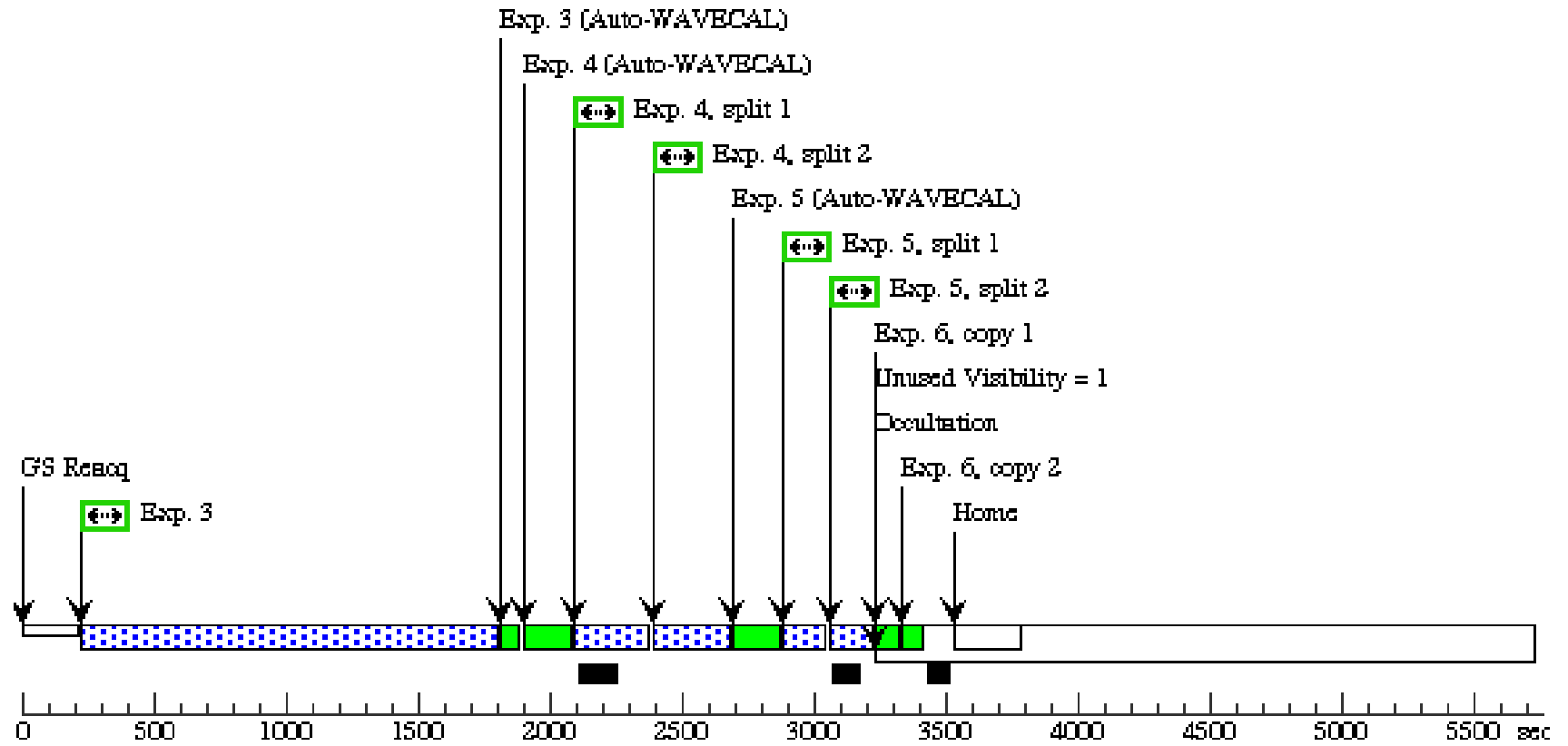
Orbit 1



Orbit Structure

Orbit 2

Server Version: 20120125



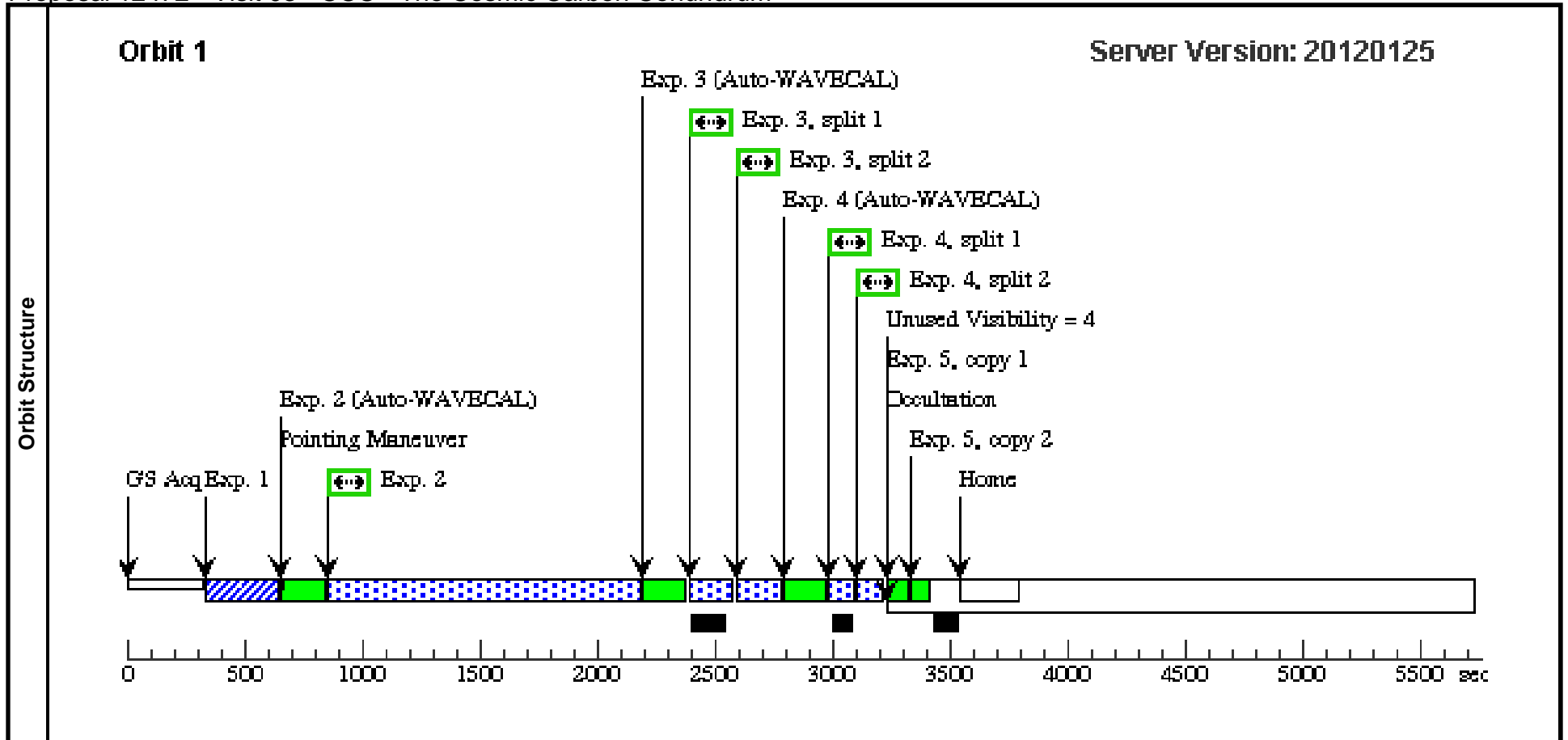
Proposal 12472 - Visit 03 - CCC - The Cosmic Carbon Conundrum

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Fixed Targets	#		Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous		
		(3)		MRK1087 Alt Name1: IIZW23	RA: 04 49 44.4600 (72.4352500d) Dec: +03 20 2.67 (3.33408d) Equinox: J2000	Redshift: 0.027809	V=14.5 F(1900)=1e-15	Reference Frame: ICRS	
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>									

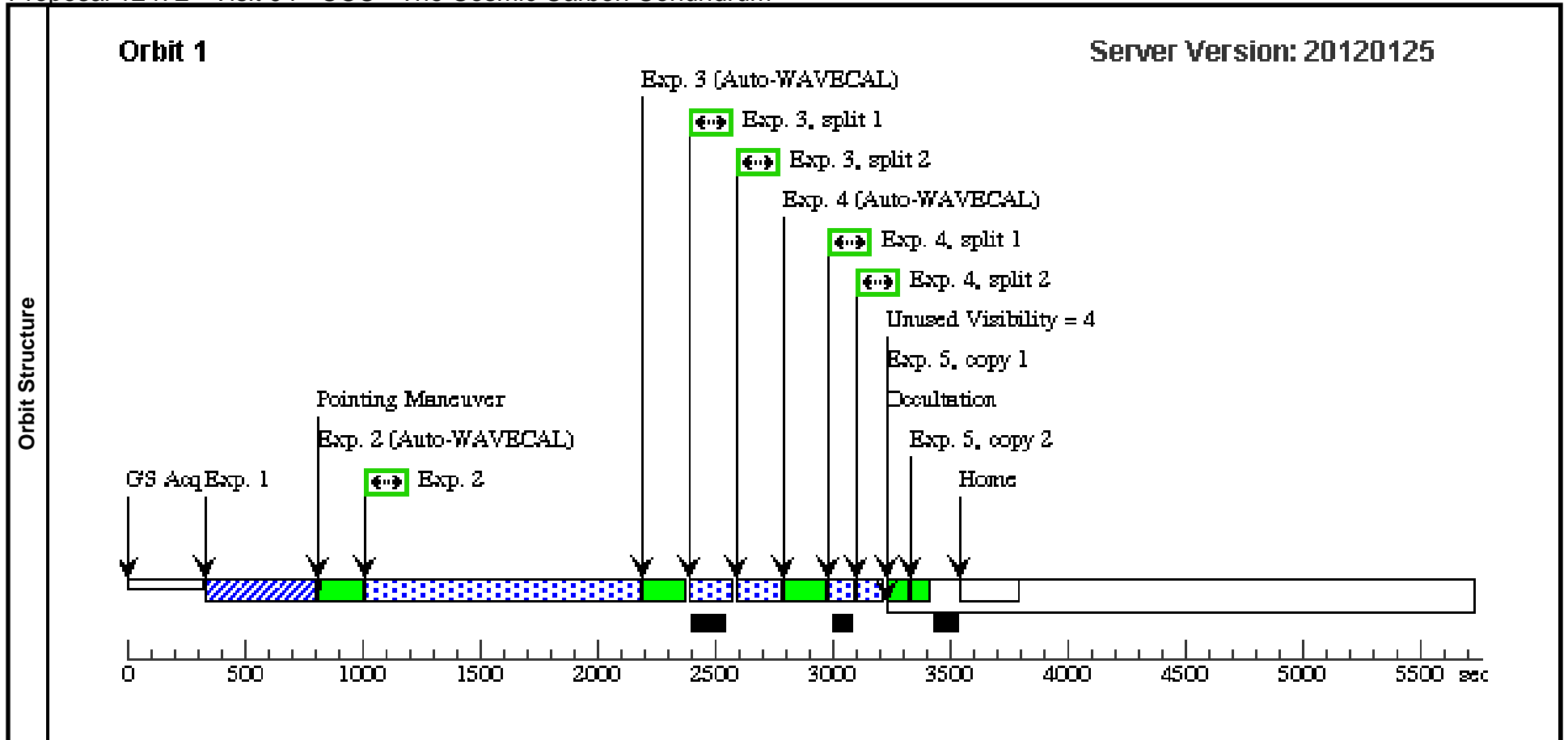
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
		1		(3) MRK1087	STIS/CCD, ACQ, F28X50LP	MIRROR				20 Secs [==>]
	2	(STIS.sp.18 5742)	(3) MRK1087	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A				1315 Secs [==>]	[1]
	3		(3) MRK1087	STIS/CCD, ACCUM, 52X0.2	G430L 4300 A	CR-SPLIT=2			300 Secs [==>(Split 1)] [==>(Split 2)]	[1]
	4		(3) MRK1087	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A	CR-SPLIT=2			150 Secs [==>(Split 1)] [==>(Split 2)]	[1]
	5		CCDFLAT	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A				[==>(Copy 1)] [==>(Copy 2)]	[1]



Proposal 12472 - Visit 04 - CCC - The Cosmic Carbon Conundrum

Tue Feb 28 02:16:54 GMT 2012

Visit	<b>Proposal 12472, Visit 04, completed</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: STIS/CCD, STIS/NUV-MAMA Special Requirements: ORIENT 55.4D TO 55.4 D										
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous					
	(4)	NGC1741	RA: 05 01 37.4500 (75.4060417d) Alt Name1: MRK1089 Alt Name2: SBS0459-043	Dec: -04 15 31.50 (-4.25875d) Equinox: J2000	Redshift: 0.013473	V=13.6 F(1900)=3e-15	Reference Frame: ICRS				
	<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>										
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit	
	1		(4) NGC1741	STIS/CCD, ACQ, F28X50LP	MIRROR				60 Secs [==>]	[1]	
	2	(STIS.sp.18 5755)	(4) NGC1741	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A				1155 Secs [==>]	[1]	
	3		(4) NGC1741	STIS/CCD, ACCUM, 52X0.2	G430L 4300 A	CR-SPLIT=2			300 Secs [==>(Split 1)] [==>(Split 2)]	[1]	
	4		(4) NGC1741	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A	CR-SPLIT=2			150 Secs [==>(Split 1)] [==>(Split 2)]	[1]	
	5		CCDFLAT	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A				[==>(Copy 1)] [==>(Copy 2)]	[1]	



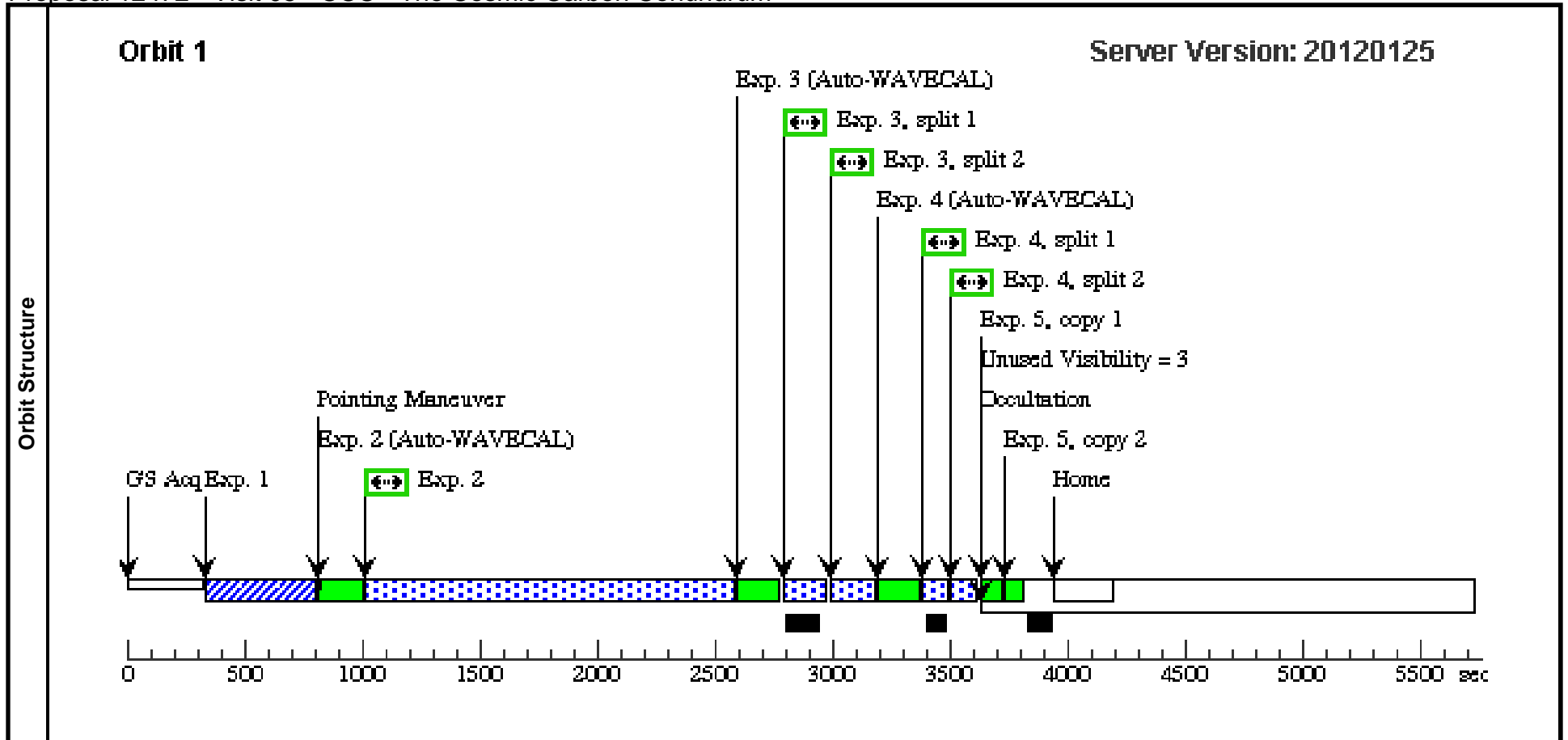
Proposal 12472 - Visit 05 - CCC - The Cosmic Carbon Conundrum

Tue Feb 28 02:16:54 GMT 2012

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(5)	MRK5 Alt Name1: SBS0635+756	RA: 06 42 15.5028 (100.5645950d) Dec: +75 37 30.00 (75.62500d) Equinox: J2000	Redshift: 0.002642	V=15.6 F(1900)=8e-16	Reference Frame: ICRS
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>						

Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(5) MRK5		STIS/CCD, ACQ, F28X50LP	MIRROR		GS ACQ SCENARI O BASE1B3		60 Secs [==>]
2	(STIS.sp.18 5759)	(5) MRK5		STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A				1555 Secs [==>]	[1]
3		(5) MRK5		STIS/CCD, ACCUM, 52X0.2	G430L 4300 A	CR-SPLIT=2			300 Secs [==>(Split 1)] [==>(Split 2)]	[1]
4		(5) MRK5		STIS/CCD, ACCUM, 52X0.2	G750L 7751 A	CR-SPLIT=2			150 Secs [==>(Split 1)] [==>(Split 2)]	[1]
5		CCDFLAT		STIS/CCD, ACCUM, 52X0.2	G750L 7751 A				[==>(Copy 1)] [==>(Copy 2)]	[1]



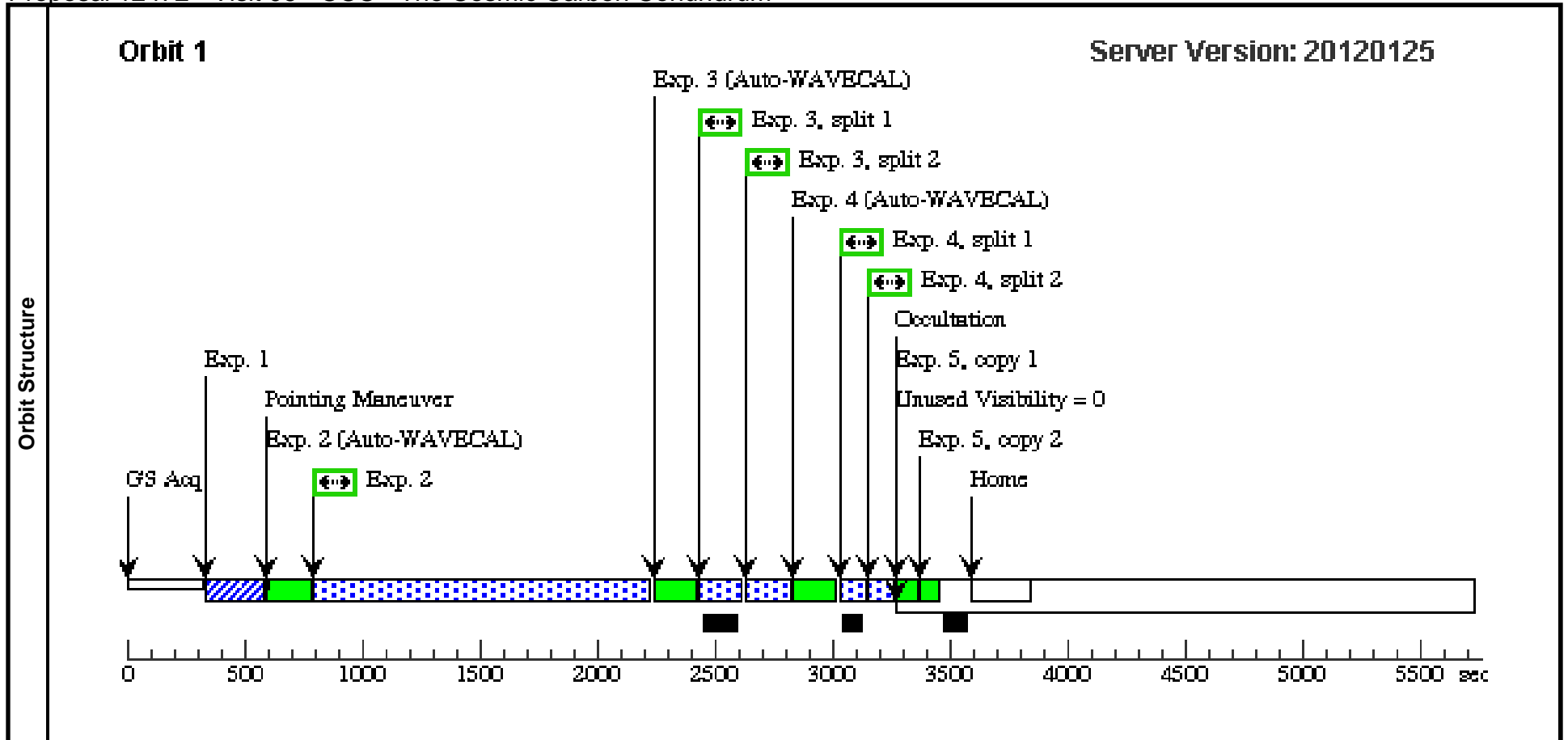
Proposal 12472 - Visit 06 - CCC - The Cosmic Carbon Conundrum

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Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(6)	MRK1199 Alt Name1: SBS0720+335	RA: 07 23 43.4620 (110.9310917d) Dec: +33 26 31.22 (33.44201d) Equinox: J2000	Redshift: 0.013540	V=13.1 F(1900)=1e-14	Reference Frame: ICRS
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>						

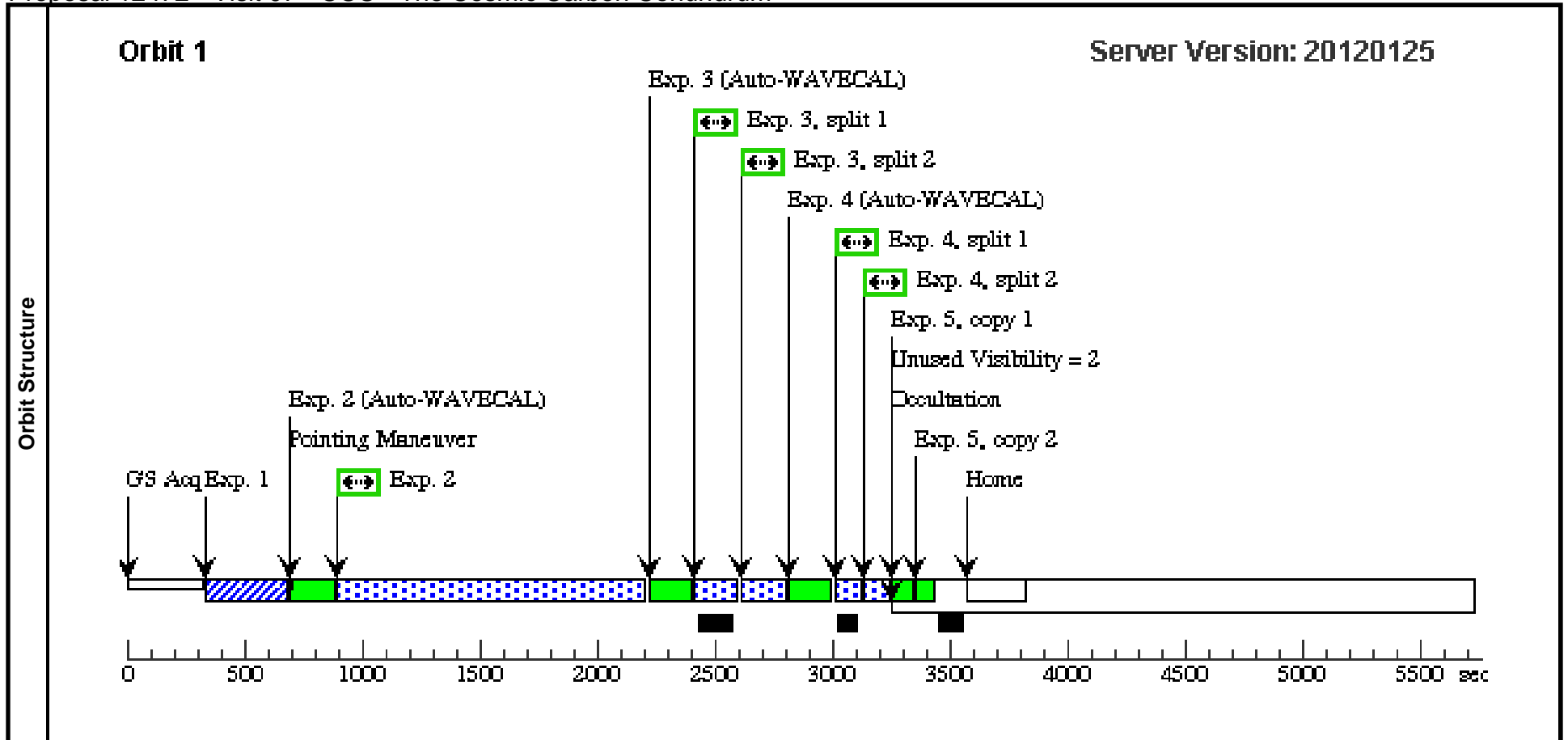
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(6) MRK1199		STIS/CCD, ACQ, F28X50LP	MIRROR				5 Secs [==>]
2	(STIS.sp.18 5764)	(6) MRK1199		STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A				1420 Secs [==>]	[1]
3		(6) MRK1199		STIS/CCD, ACCUM, 52X0.2	G430L 4300 A	CR-SPLIT=2			300 Secs [==>(Split 1)] [==>(Split 2)]	[1]
4		(6) MRK1199		STIS/CCD, ACCUM, 52X0.2	G750L 7751 A	CR-SPLIT=2			150 Secs [==>(Split 1)] [==>(Split 2)]	[1]
5		CCDFLAT		STIS/CCD, ACCUM, 52X0.2	G750L 7751 A				[==>(Copy 1)] [==>(Copy 2)]	[1]



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Fixed Targets	Visit									
	Proposal 12472, Visit 07, completed Diagnostic Status: No Diagnostics Scientific Instruments: STIS/CCD, STIS/NUV-MAMA Special Requirements: ORIENT 243D TO 243 D									
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous					
(7)	IRAS08208+2816 Alt Name1: KUG0820+282	RA: 08 23 54.9500 (125.9789583d) Dec: +28 06 21.60 (28.10600d) Equinox: J2000	Redshift: 0.046776	V=16.9 F(1900)=6e-16	Reference Frame: ICRS					
<i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i>										
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(7) IRAS08208+2816	STIS/CCD, ACQ, F28X50LP	MIRROR				30 Secs [==>]	[1]
	2	(STIS.sp.18 5791)	(7) IRAS08208+2816	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A				1300 Secs [==>]	[1]
	3		(7) IRAS08208+2816	STIS/CCD, ACCUM, 52X0.2	G430L 4300 A	CR-SPLIT=2			300 Secs [==>(Split 1)] [==>(Split 2)]	[1]
	4		(7) IRAS08208+2816	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A	CR-SPLIT=2			150 Secs [==>(Split 1)] [==>(Split 2)]	[1]
	5		CCDFLAT	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A				[==>(Copy 1)] [==>(Copy 2)]	[1]



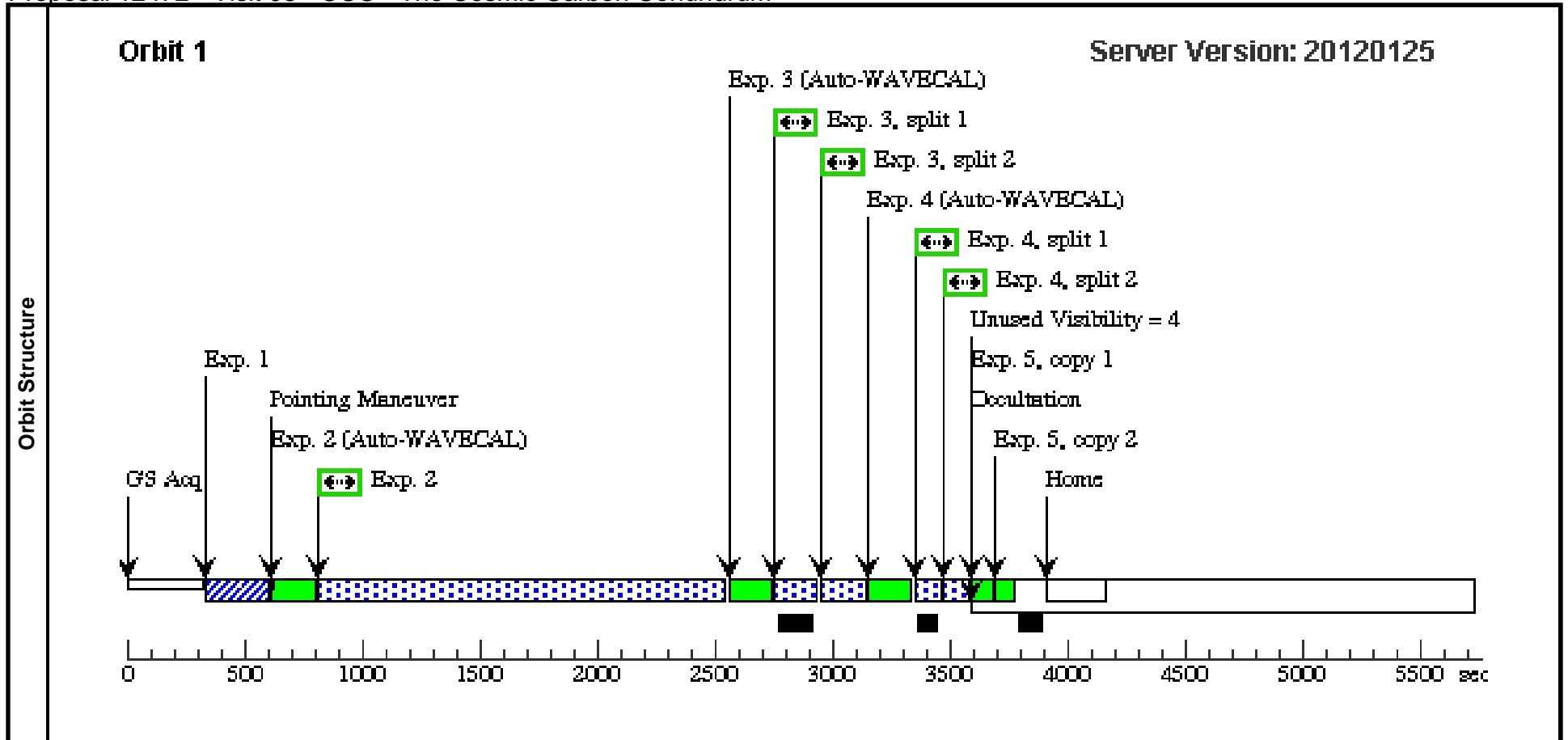
Proposal 12472 - Visit 08 - CCC - The Cosmic Carbon Conundrum

Tue Feb 28 02:16:55 GMT 2012

Fixed Targets	#		Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(8)		IRAS08339+6517	RA: 08 38 23.1200 (129.5963333d) Dec: +65 07 15.20 (65.12089d) Equinox: J2000	Redshift: 0.019113	V=14.2 F(1900)=5e-15	Reference Frame: ICRS
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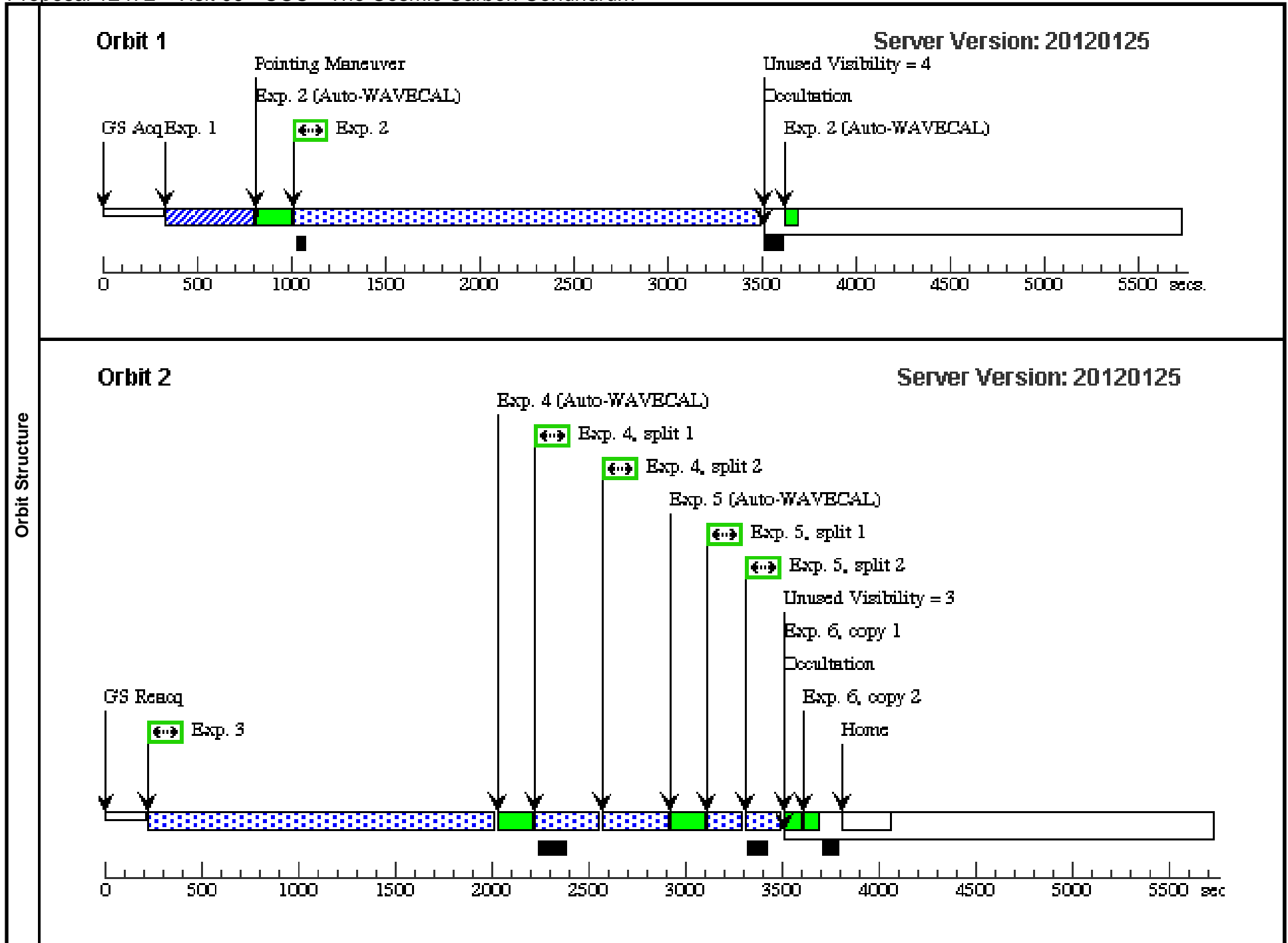
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(8) IRAS08339+6517	STIS/CCD, ACQ, F28X50LP	MIRROR			GS ACQ SCENARI O BASE1B3		10 Secs [==>]
2	(STIS.sp.18 5785)	(8) IRAS08339+6517	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A					1720 Secs [==>]	[1]
3		(8) IRAS08339+6517	STIS/CCD, ACCUM, 52X0.2	G430L 4300 A	CR-SPLIT=2				300 Secs [==>(Split 1)] [==>(Split 2)]	[1]
4		(8) IRAS08339+6517	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A	CR-SPLIT=2				150 Secs [==>(Split 1)] [==>(Split 2)]	[1]
5		CCDFLAT	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A					[==>(Copy 1)] [==>(Copy 2)]	[1]



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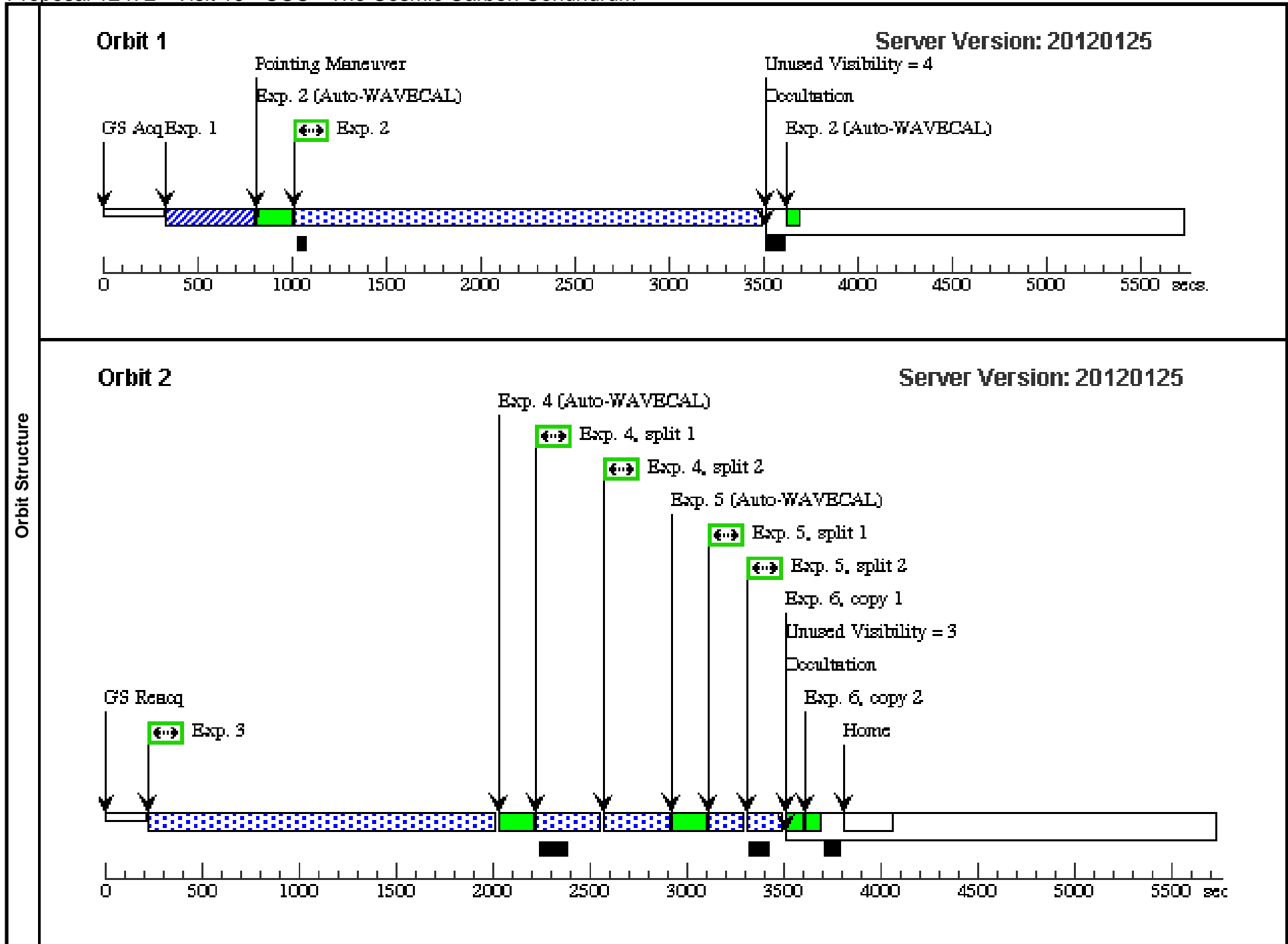
Fixed Targets	Visit									
	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(9)	SBS0926+606A	RA: 09 30 6.4360 (142.5268167d) Dec: +60 26 53.42 (60.44817d) Equinox: J2000	Redshift: 0.013642	V=17.1 F(1900)=5e-16	Reference Frame: ICRS				
	<i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i>									
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(9) SBS0926+606A	STIS/CCD, ACQ, F28X50LP	MIRROR		GS ACQ SCENARI O BASE1B3		60 Secs [==>]	[1]
	2	(STIS.sp.18 5795)	(9) SBS0926+606A	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A				2470 Secs [==>]	[1]
	3	(STIS.sp.18 5795)	(9) SBS0926+606A	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A				1780 Secs [==>]	[2]
	4		(9) SBS0926+606A	STIS/CCD, ACCUM, 52X0.2	G430L 4300 A	CR-SPLIT=2			600 Secs [==>(Split 1)] [==>(Split 2)]	[2]
	5		(9) SBS0926+606A	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A	CR-SPLIT=2			300 Secs [==>(Split 1)] [==>(Split 2)]	[2]
	6		CCDFLAT	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A				[==>(Copy 1)] [==>(Copy 2)]	[2]



Proposal 12472 - Visit 19 - CCC - The Cosmic Carbon Conundrum

Tue Feb 28 02:16:56 GMT 2012

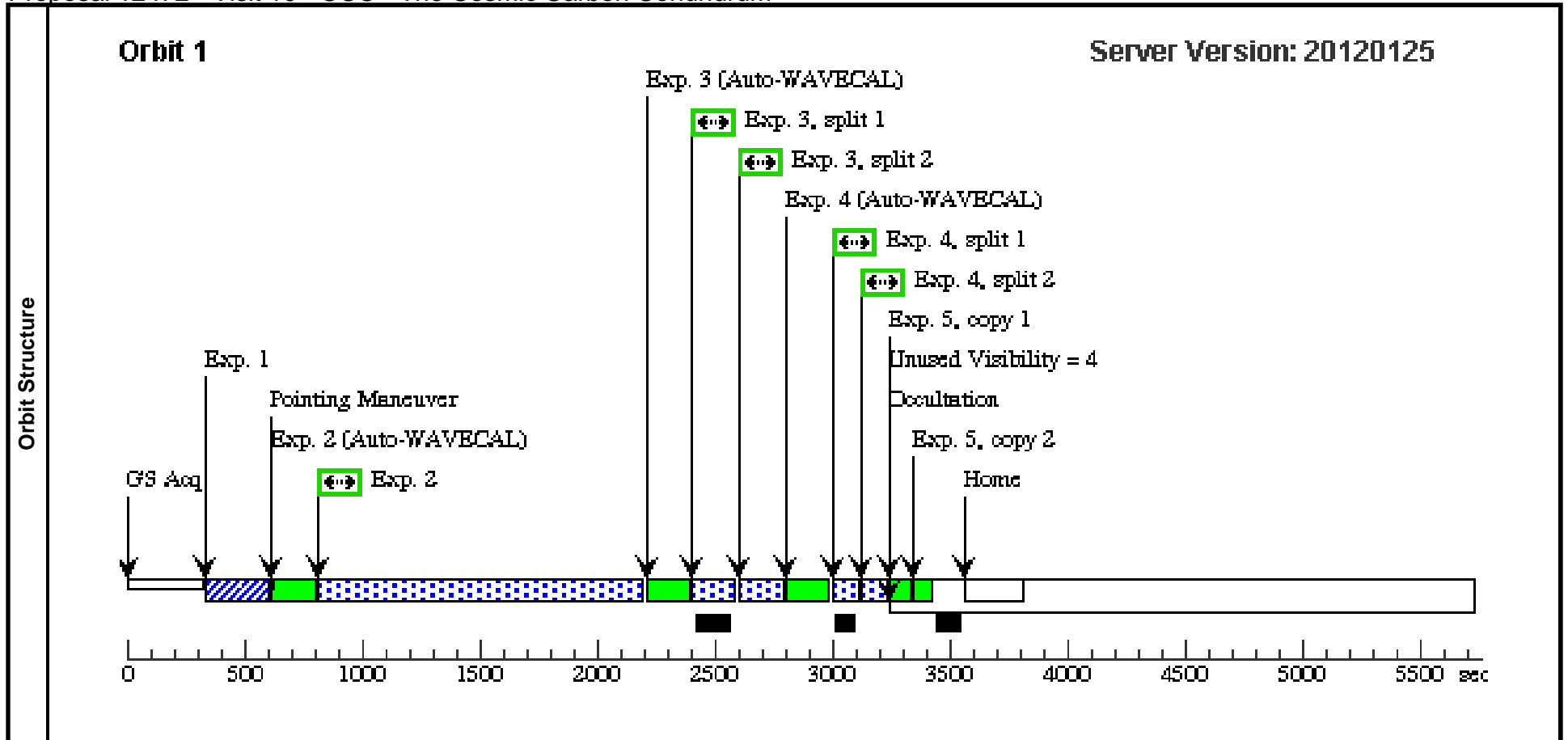
Visit	<b>Proposal 12472, Visit 19</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: STIS/CCD, STIS/NUV-MAMA Special Requirements: ORIENT 162D TO 162 D Comments: HOPR repeat of visit 09.									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
	(9)	SBS0926+606A	RA: 09 30 6.4360 (142.5268167d) Dec: +60 26 53.42 (60.44817d) Equinox: J2000	Redshift: 0.013642	V=17.1 F(1900)=5e-16	Reference Frame: ICRS				
	Comments: This object was generated by the targetselector and retrieved from the NED database.									
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(9) SBS0926+606A	STIS/CCD, ACQ, F28X50LP	MIRROR		GS ACQ SCENARI O BASE1B3		60 Secs [==>]	[1]
	2	(STIS.sp.18 5795)	(9) SBS0926+606A	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A				2470 Secs [==>]	[1]
	3	(STIS.sp.18 5795)	(9) SBS0926+606A	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A				1780 Secs [==>]	[2]
	4		(9) SBS0926+606A	STIS/CCD, ACCUM, 52X0.2	G430L 4300 A	CR-SPLIT=2			600 Secs [==>(Split 1)] [==>(Split 2)]	[2]
	5		(9) SBS0926+606A	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A	CR-SPLIT=2			300 Secs [==>(Split 1)] [==>(Split 2)]	[2]
	6		CCDFLAT	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A				[==>(Copy 1)] [==>(Copy 2)]	[2]



Proposal 12472 - Visit 10 - CCC - The Cosmic Carbon Conundrum

Tue Feb 28 02:16:57 GMT 2012

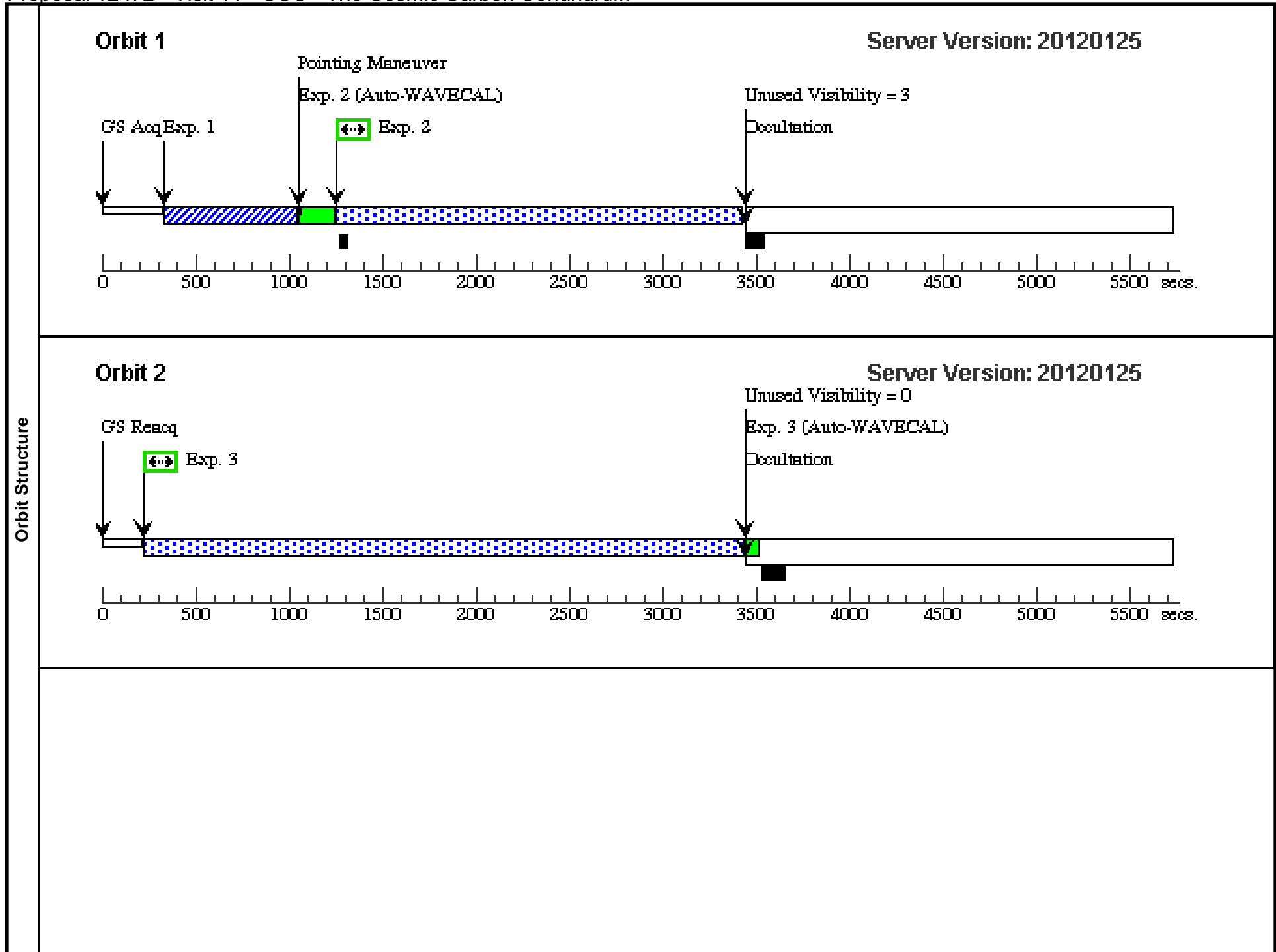
Visit	<b>Proposal 12472, Visit 10, scheduling</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: STIS/CCD, STIS/NUV-MAMA Special Requirements: ORIENT 63D TO 63 D									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
	(10)	ARP252	RA: 09 44 59.7000 (146.2487500d)	Redshift: 0.032989	V=16.2	Reference Frame: ICRS				
		Alt Name1: ESO566-IG007+008	Dec: -19 42 46.00 (-19.71278d)		F(1900)=5e-15					
			Equinox: J2000	<i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i>						
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(10) ARP252	STIS/CCD, ACQ, F28X50LP	MIRROR				10 Secs	
									[==>]	[1]
	2	(STIS.sp.18 5822)	(10) ARP252	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A				1370 Secs	
									[==>]	[1]
	3	(STIS.sp.18 5822)	(10) ARP252	STIS/CCD, ACCUM, 52X0.2	G430L 4300 A				300 Secs	
								[==>(Split 1)]	[1]	
								[==>(Split 2)]		
4		(10) ARP252	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A		CR-SPLIT=2			150 Secs	
								[==>(Split 1)]	[1]	
								[==>(Split 2)]		
5		CCDFLAT	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A					[==>(Copy 1)]	[1]
								[==>(Copy 2)]		



Proposal 12472 - Visit 11 - CCC - The Cosmic Carbon Conundrum

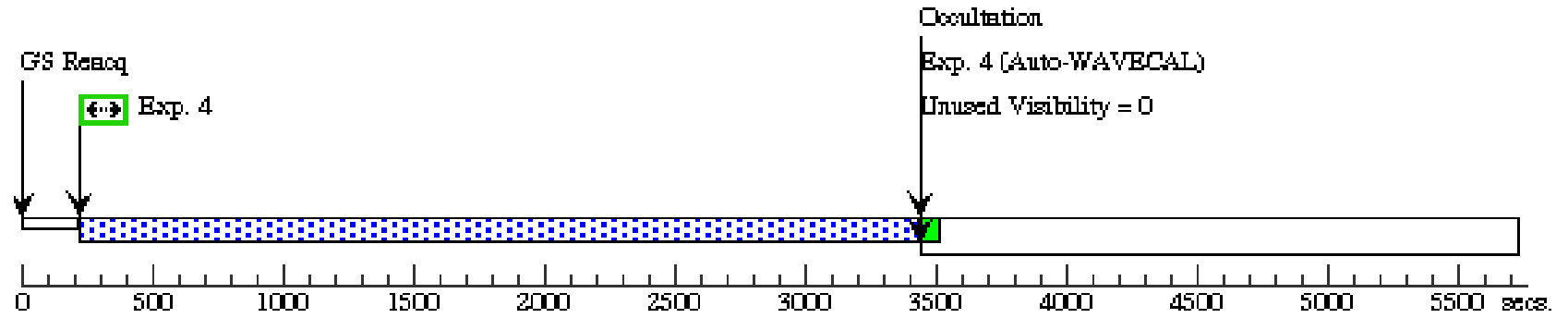
Tue Feb 28 02:16:57 GMT 2012

Visit	<b>Proposal 12472, Visit 11, implementation</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: STIS/CCD, STIS/NUV-MAMA Special Requirements: ORIENT 162D TO 162 D									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
	(11)	SBS0948+532	RA: 09 51 31.7664 (147.8823600d) Dec: +52 59 36.00 (52.99333d) Equinox: J2000	Redshift: 0.046240	V=17.6 F(1900)=2e-16	Reference Frame: ICRS				
	<i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i>									
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(11) SBS0948+532	STIS/CCD, ACQ, F28X50LP	MIRROR		GS ACQ SCENARI O BASE1B3		120 Secs [==>]	[1]
	2	(STIS.sp.18 5823)	(11) SBS0948+532	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A				2160 Secs [==>]	[1]
	3	(STIS.sp.18 5823)	(11) SBS0948+532	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A				3195 Secs [==>]	[2]
	4	(STIS.sp.18 5823)	(11) SBS0948+532	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A				3195 Secs [==>]	[3]
	5		(11) SBS0948+532	STIS/CCD, ACCUM, 52X0.2	G430L 4300 A	CR-SPLIT=3			1842 Secs [==>(Split 1)] [==>(Split 2)] [==>(Split 3)]	[4]
	6		(11) SBS0948+532	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A	CR-SPLIT=3			900 Secs [==>(Split 1)] [==>(Split 2)] [==>(Split 3)]	[4]
	7		CCDFLAT	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A				[==>(Copy 1)] [==>(Copy 2)]	[4]



**Orbit 3**

**Server Version: 20120125**



**Orbit 4**

GS Reacq

Exp. 5 (Auto-WAVECAL)

Exp. 5, split 1

Exp. 5, split 2

Exp. 5, split 3

Exp. 6 (Auto-WAVECAL)

Exp. 6, split 1

Exp. 6, split 2

Exp. 6, split 3

Exp. 7, copy 1

Unused Visibility = 6

Occlusion

Exp. 7, copy 2

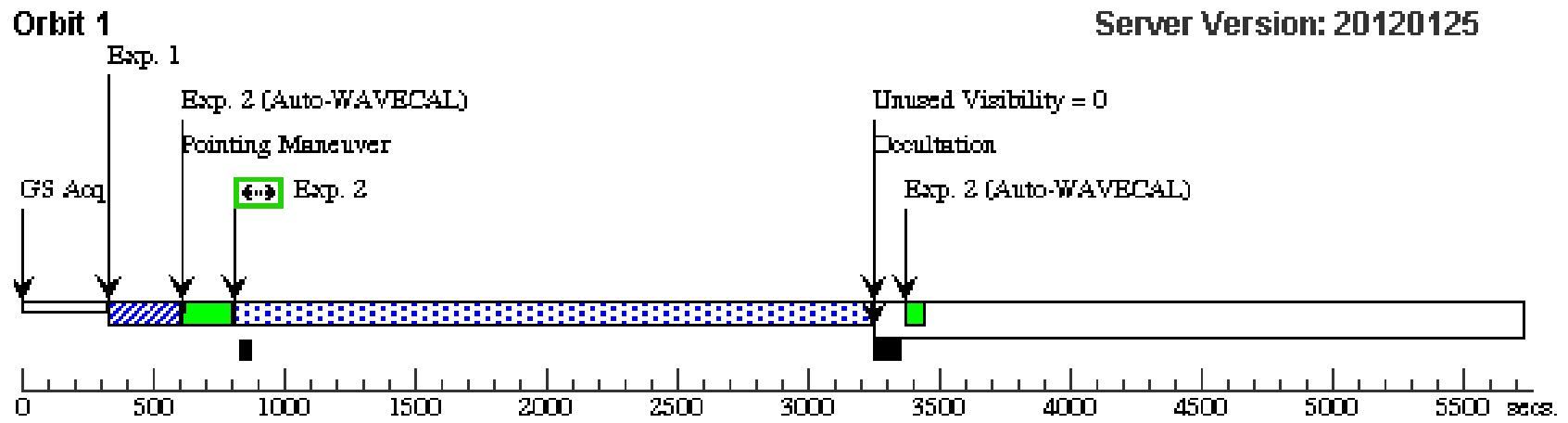
Home



Proposal 12472 - Visit 12 - CCC - The Cosmic Carbon Conundrum

Tue Feb 28 02:16:58 GMT 2012

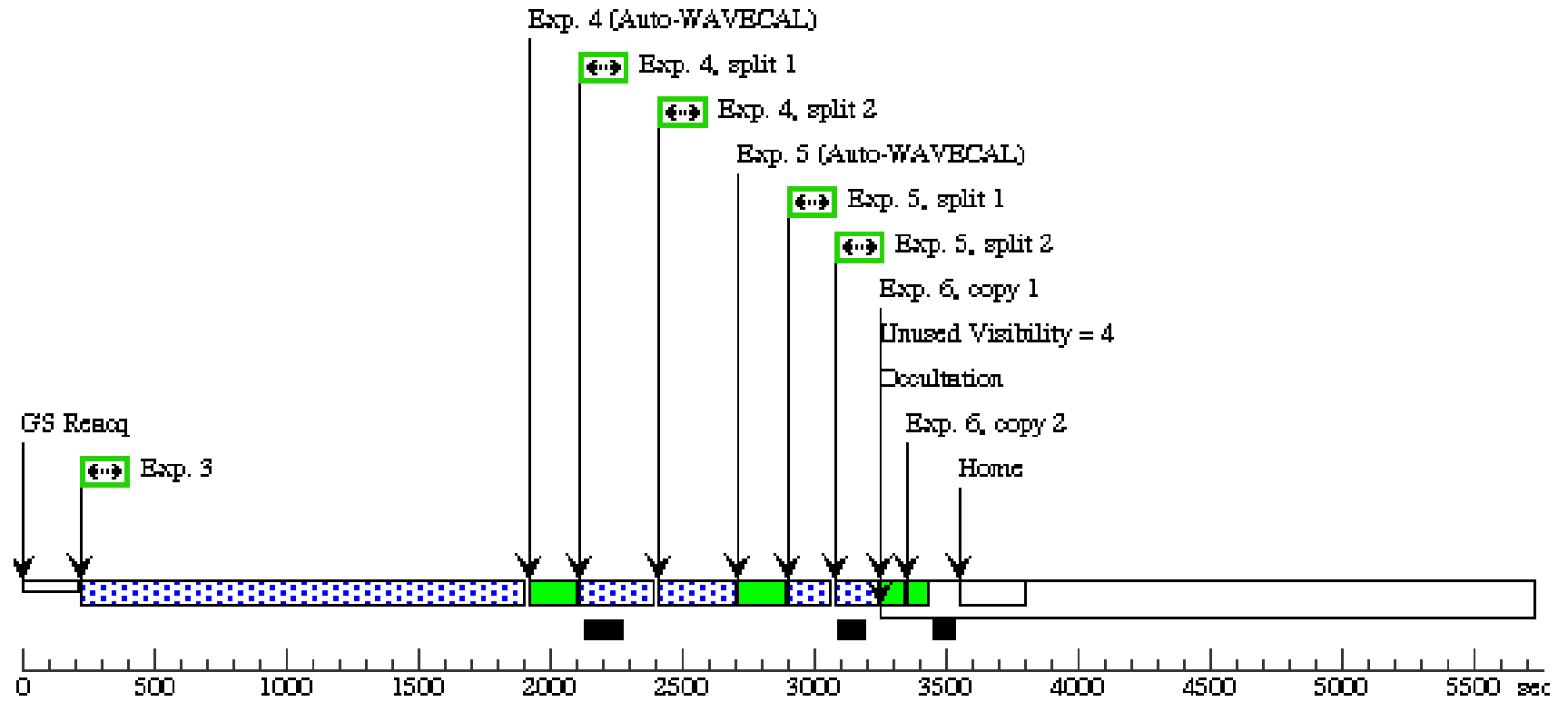
Visit	<b>Proposal 12472, Visit 12, scheduling</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: STIS/CCD, STIS/NUV-MAMA Special Requirements: ORIENT 94D TO 94 D									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
	(12)	TOL9	RA: 10 34 38.7500 (158.6614583d) Dec: -28 34 59.90 (-28.58331d) Equinox: J2000	Redshift: 0.010641	V=14.4 F(1900)=4e-16	Reference Frame: ICRS				
	<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>									
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(12) TOL9	STIS/CCD, ACQ, F28X50LP	MIRROR				10 Secs [==>]	[1]
	2	(STIS.sp.18 5826)	(12) TOL9	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A				2415 Secs [==>]	[1]
	3	(STIS.sp.18 5826)	(12) TOL9	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A				1670 Secs [==>]	[2]
	4		(12) TOL9	STIS/CCD, ACCUM, 52X0.2	G430L 4300 A	CR-SPLIT=2			500 Secs [==>(Split 1)] [==>(Split 2)]	[2]
	5		(12) TOL9	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A	CR-SPLIT=2			250 Secs [==>(Split 1)] [==>(Split 2)]	[2]
	6		CCDFLAT	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A				[==>(Copy 1)] [==>(Copy 2)]	[2]



Orbit Structure

Orbit 2

Server Version: 20120125



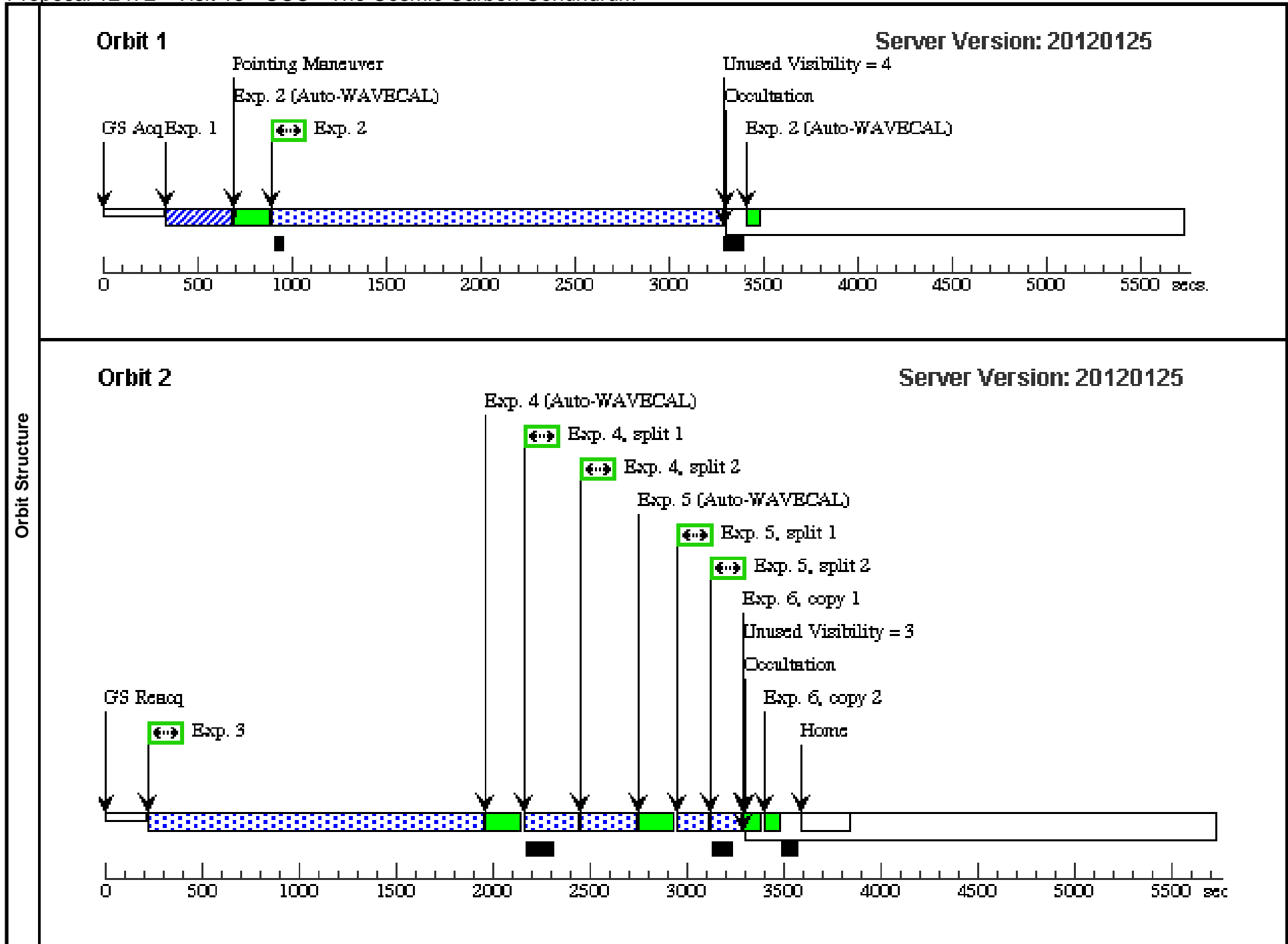
Proposal 12472 - Visit 13 - CCC - The Cosmic Carbon Conundrum

Tue Feb 28 02:16:59 GMT 2012

Fixed Targets	#		Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(13)		SBS1054+365	RA: 10 57 47.0000 (164.4458333d) Dec: +36 15 38.70 (36.26075d) Equinox: J2000	Redshift: 0.002010	V=16.0 F(1900)=3e-16	Reference Frame: ICRS
<i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i>							

Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(13) SBS1054+365	STIS/CCD, ACQ, F28X50LP	MIRROR					30 Secs [==>]
2	(STIS.sp.18 5827)	(13) SBS1054+365	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A					2375 Secs [==>]	[1]
3	(STIS.sp.18 5827)	(13) SBS1054+365	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A					1715 Secs [==>]	[2]
4		(13) SBS1054+365	STIS/CCD, ACCUM, 52X0.2	G430L 4300 A		CR-SPLIT=2			500 Secs [==>(Split 1)] [==>(Split 2)]	[2]
5		(13) SBS1054+365	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A		CR-SPLIT=2			250 Secs [==>(Split 1)] [==>(Split 2)]	[2]
6		CCDFLAT	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A					[==>(Copy 1)] [==>(Copy 2)]	[2]



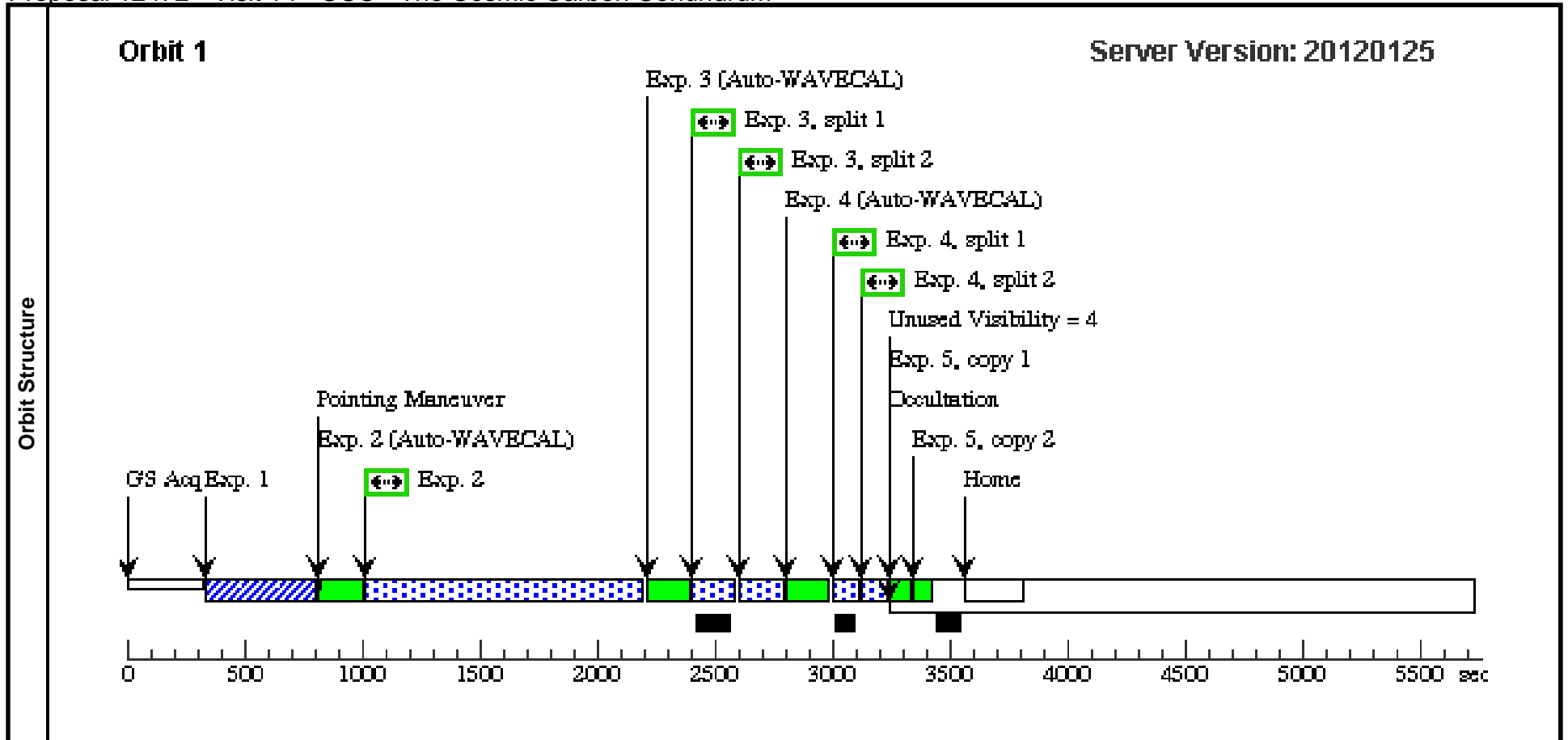
Proposal 12472 - Visit 14 - CCC - The Cosmic Carbon Conundrum

Tue Feb 28 02:16:59 GMT 2012

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(14)	POX4 Alt Name1: IRAS11485-2018	RA: 11 51 11.6000 (177.7983333d) Dec: -20 35 57.00 (-20.59917d) Equinox: J2000	Redshift: 0.011970	V=16.2 F(1900)=9e-16	Reference Frame: ICRS
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>						

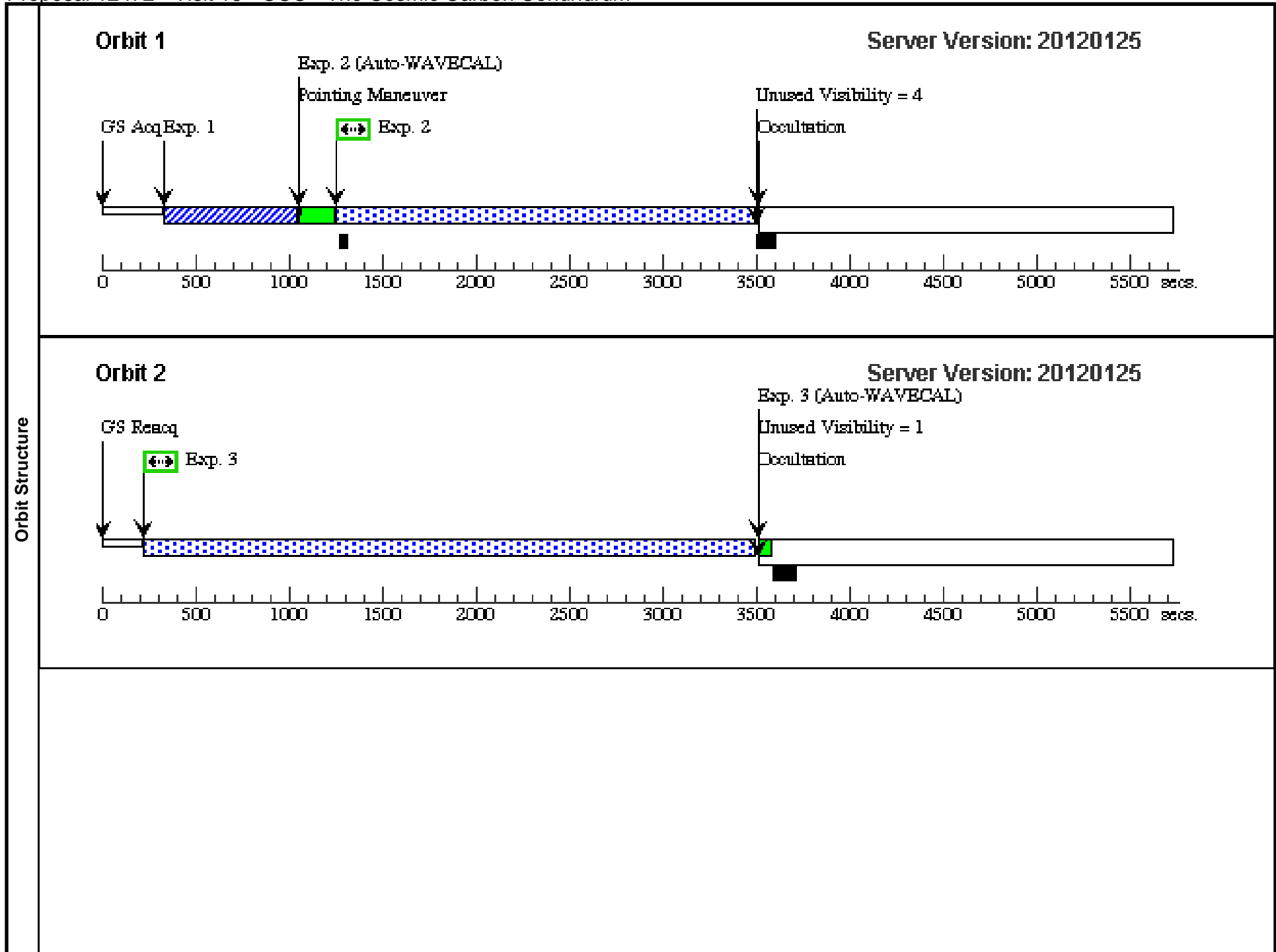
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(14) POX4		STIS/CCD, ACQ, F28X50LP	MIRROR				60 Secs [==>]
2	(STIS.sp.18 5828)	(14) POX4		STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A				1170 Secs [==>]	[1]
3		(14) POX4		STIS/CCD, ACCUM, 52X0.2	G430L 4300 A	CR-SPLIT=2			300 Secs [==>(Split 1)] [==>(Split 2)]	[1]
4		(14) POX4		STIS/CCD, ACCUM, 52X0.2	G750L 7751 A	CR-SPLIT=2			150 Secs [==>(Split 1)] [==>(Split 2)]	[1]
5		CCDFLAT		STIS/CCD, ACCUM, 52X0.2	G750L 7751 A				[==>(Copy 1)] [==>(Copy 2)]	[1]



Proposal 12472 - Visit 15 - CCC - The Cosmic Carbon Conundrum

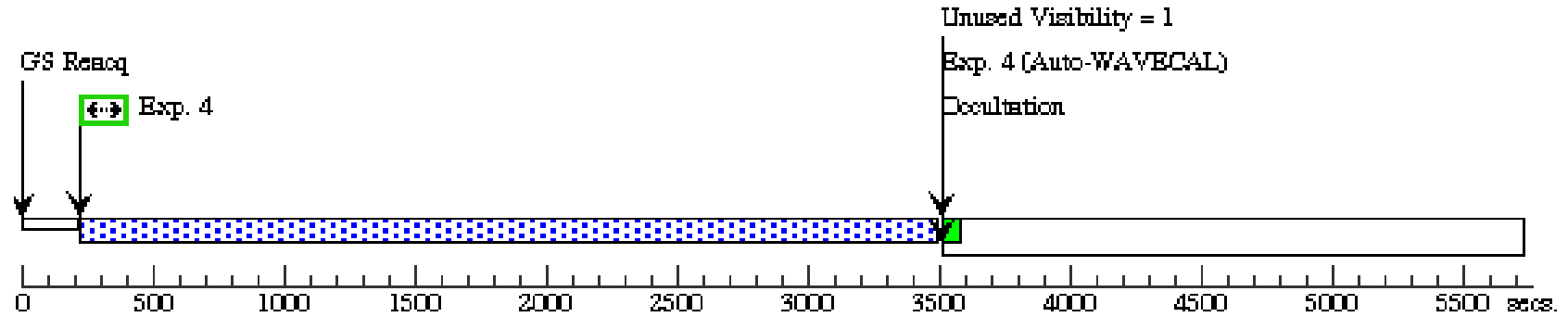
Tue Feb 28 02:16:59 GMT 2012

Visit	Proposal 12472, Visit 15, scheduling Diagnostic Status: No Diagnostics Scientific Instruments: STIS/CCD, STIS/NUV-MAMA Special Requirements: ORIENT 84D TO 84 D									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
	(15)	SBS1319+579	RA: 13 21 22.5700 (200.3440417d) Dec: +57 41 29.48 (57.69152d) Equinox: J2000	Redshift: 0.006870	V=18.5 F(1900)=2e-16	Reference Frame: ICRS				
Exposures	#	Label (ETC Run)	Target	Config, Mode, Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(15) SBS1319+579	STIS/CCD, ACQ, F28X50LP	MIRROR				120 Secs [==>]	[1]
	2	(STIS.sp.18 6020)	(15) SBS1319+579	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A				2225 Secs [==>]	[1]
	3	(STIS.sp.18 6020)	(15) SBS1319+579	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A				3260 Secs [==>]	[2]
	4	(STIS.sp.18 6020)	(15) SBS1319+579	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A				3260 Secs [==>]	[3]
	5		(15) SBS1319+579	STIS/CCD, ACCUM, 52X0.2	G430L 4300 A	CR-SPLIT=3			1899 Secs [==>(Split 1)] [==>(Split 2)] [==>(Split 3)]	[4]
	6		(15) SBS1319+579	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A	CR-SPLIT=3			912 Secs [==>(Split 1)] [==>(Split 2)] [==>(Split 3)]	[4]
	7		CCDFLAT	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A				[==>(Copy 1)] [==>(Copy 2)]	[4]



**Orbit 3**

**Server Version: 20120125**



**Orbit 4**

GS Reacq

Exp. 5 (Auto-WAVECAL)

Exp. 5, split 1

Exp. 5, split 2

Exp. 5, split 3

Exp. 6 (Auto-WAVECAL)

Exp. 6, split 1

Exp. 6, split 2

Exp. 6, split 3

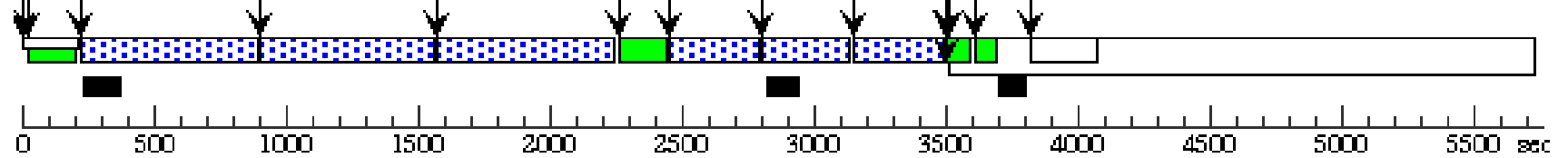
Exp. 7, copy 1

Unused Visibility = 3

Occultation

Exp. 7, copy 2

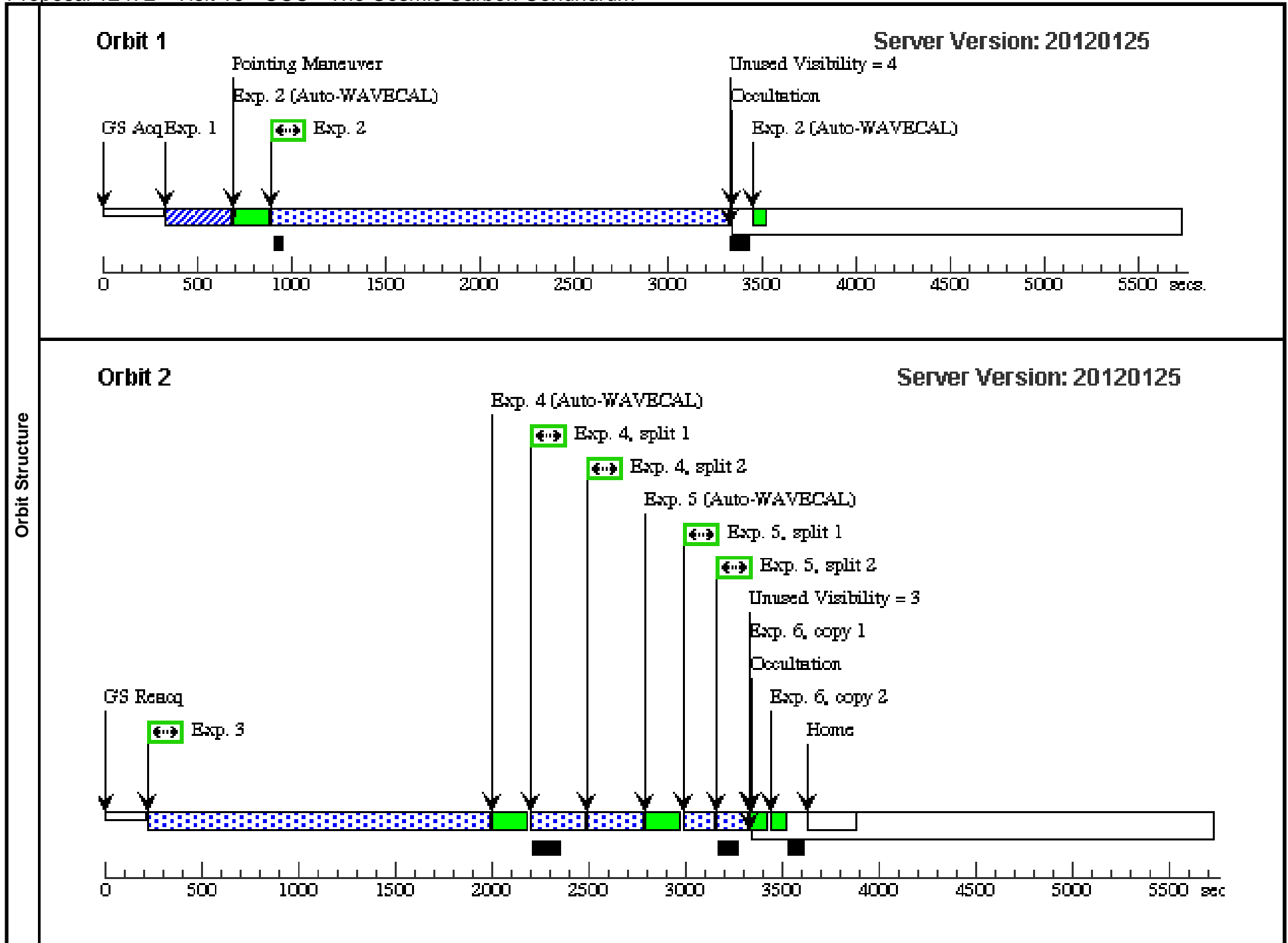
Home



Proposal 12472 - Visit 16 - CCC - The Cosmic Carbon Conundrum

Tue Feb 28 02:17:00 GMT 2012

Visit	<b>Proposal 12472, Visit 16, scheduling</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: STIS/CCD, STIS/NUV-MAMA Special Requirements: ORIENT 272.2D TO 272.2 D									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
	(16)	SBS1415+437	RA: 14 17 1.4080 (214.2558667d) Dec: +43 30 5.47 (43.50152d) Equinox: J2000	Redshift: 0.002031	V=15.6 F(1900)=5e-16	Reference Frame: ICRS				
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(16) SBS1415+437	STIS/CCD, ACQ, F28X50LP	MIRROR		GS ACQ SCENARI O BASE1B3		30 Secs [==>]	[1]
	2	(STIS.sp.18 6021)	(16) SBS1415+437	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A				2415 Secs [==>]	[1]
	3	(STIS.sp.18 6021)	(16) SBS1415+437	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A				1755 Secs [==>]	[2]
	4		(16) SBS1415+437	STIS/CCD, ACCUM, 52X0.2	G430L 4300 A	CR-SPLIT=2			500 Secs [==>(Split 1)] [==>(Split 2)]	[2]
	5		(16) SBS1415+437	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A	CR-SPLIT=2			250 Secs [==>(Split 1)] [==>(Split 2)]	[2]
	6		CCDFLAT	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A				[==>(Copy 1)] [==>(Copy 2)]	[2]



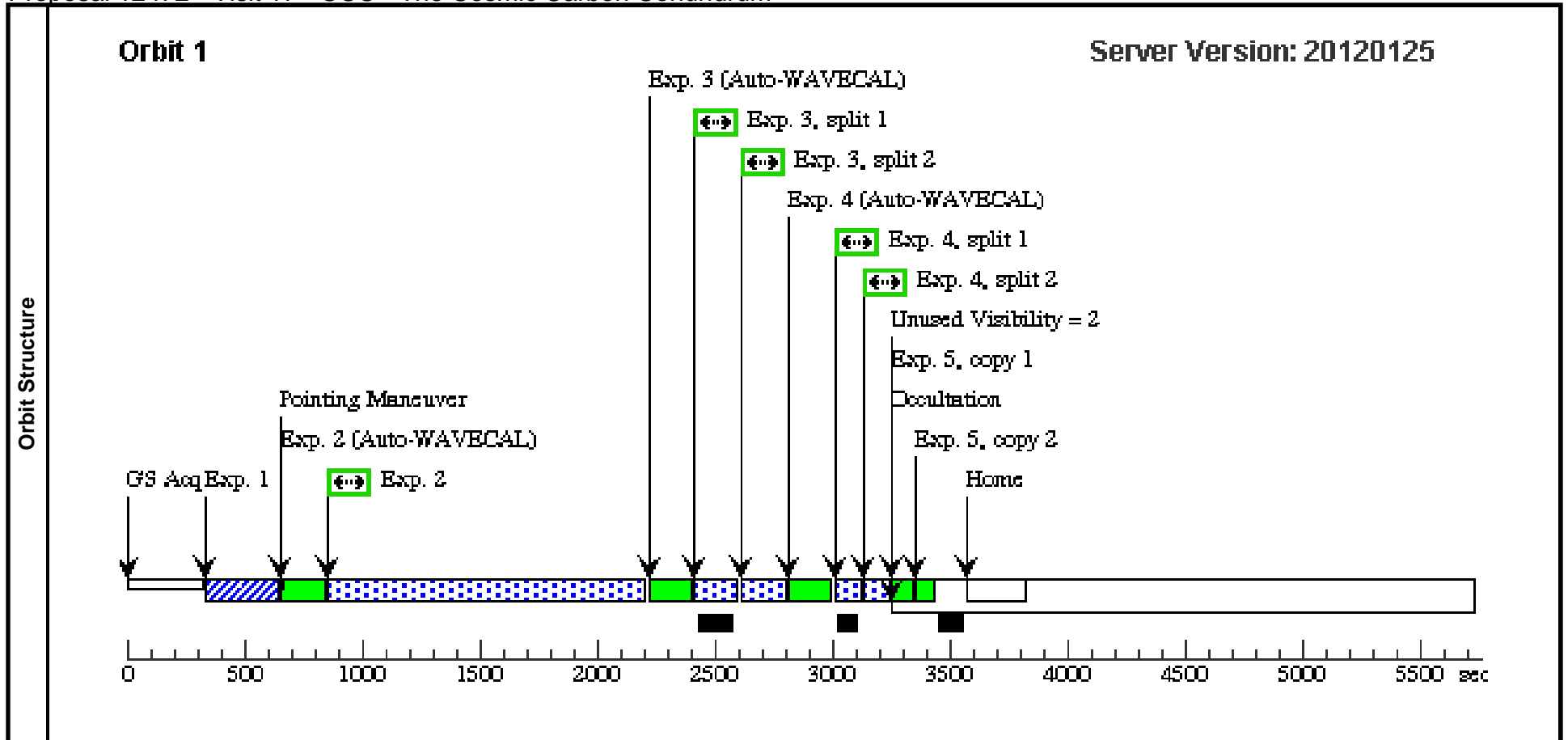
Proposal 12472 - Visit 17 - CCC - The Cosmic Carbon Conundrum

Tue Feb 28 02:17:00 GMT 2012

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(17)	TOL1457-262A Alt Name1: IRAS14575-2615 Alt Name2: ESO513-IG11	RA: 15 00 28.9900 (225.1207917d) Dec: -26 26 49.20 (-26.44700d) Equinox: J2000	Redshift: 0.017280	V=14.4 F(1900)=3e-15	Reference Frame: ICRS

Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(17) TOL1457-262A	STIS/CCD, ACQ, F28X50LP	MIRROR					20 Secs [==>]
2	(STIS.sp.18 6022)	(17) TOL1457-262A	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A					1340 Secs [==>]	[1]
3		(17) TOL1457-262A	STIS/CCD, ACCUM, 52X0.2	G430L 4300 A	CR-SPLIT=2				300 Secs [==>(Split 1)] [==>(Split 2)]	[1]
4		(17) TOL1457-262A	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A	CR-SPLIT=2				150 Secs [==>(Split 1)] [==>(Split 2)]	[1]
5		CCDFLAT	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A					[==>(Copy 1)] [==>(Copy 2)]	[1]



Proposal 12472 - Visit 18 - CCC - The Cosmic Carbon Conundrum

Tue Feb 28 02:17:01 GMT 2012

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(18)	IIIZW107 Alt Name1: IVZW153 Alt Name2: IRAS23276+2515	RA: 23 30 9.8000 (352.5408333d) Dec: +25 31 50.00 (25.53056d) Equinox: J2000	Redshift: 0.019127	V=14.4 F(1900)=9e-16	Reference Frame: ICRS

Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(18) IIIZW107	STIS/CCD, ACQ, F28X50LP	MIRROR				20 Secs [==>]	[1]
	2	(STIS.sp.18 6023)	(18) IIIZW107	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A				1340 Secs [==>]	[1]
	3		(18) IIIZW107	STIS/CCD, ACCUM, 52X0.2	G430L 4300 A	CR-SPLIT=2			300 Secs [==>(Split 1)] [==>(Split 2)]	[1]
	4		(18) IIIZW107	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A	CR-SPLIT=2			150 Secs [==>(Split 1)] [==>(Split 2)]	[1]
	5		CCDFLAT	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A				[==>(Copy 1)] [==>(Copy 2)]	[1]

