



11621 - SDSS J1507: The First Halo CV or the First CV Born With a Brown Dwarf Donor?

Cycle: 17, Proposal Category: GO
(Availability Mode: AVAILABLE)

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>
1A	(1) SDSS-J1507	S/C	1	29-Jan-2010 21:05:45.0	yes
01	(1) SDSS-J1507	STIS/CCD STIS/NUV-MAMA	3	29-Jan-2010 21:05:53.0	yes
1B	(2) TARGET1-SAFE-TARGET	STIS/CCD STIS/NUV-MAMA	3	29-Jan-2010 21:06:04.0	yes
1C	(3) TARGET2-SAFE-TARGET	STIS/CCD STIS/NUV-MAMA	3	29-Jan-2010 21:06:12.0	yes
2A	(1) SDSS-J1507	S/C	1	29-Jan-2010 21:06:15.0	yes
02	(1) SDSS-J1507	COS/FUV	3	29-Jan-2010 21:06:20.0	yes
2B	(2) TARGET1-SAFE-TARGET	COS/FUV	3	29-Jan-2010 21:06:27.0	yes

<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>
2C	(3) TARGET2-SAFE-TARGET	COS/FUV	3	29-Jan-2010 21:06:33.0	yes

20 Total Orbits Used

ABSTRACT

The eclipsing cataclysmic variable (CV) SDSS J1507 has an orbital period well below the period minimum obeyed by other CVs. Furthermore, it contains a cool, pulsating primary white dwarf (WD) and a sub-stellar brown-dwarf (BD) companion. We have now discovered that J1507 is also a high proper motion star, with a transverse velocity much higher than other CVs. These characteristics can all be reconciled if the system is the first Galactic halo CV to be discovered. However, there is one possible alternative explanation, according to which the system formed only recently from a detached WD-BD binary system. Here, we propose a definitive test of these two scenarios by using time-resolved, FUV + NUV spectroscopy to determine the metallicity of the system. The outcome of this test will have an immediate impact on our understanding of the Galactic CV population and of close binary evolution more generally. We will also measure the wavelength-dependence of the WD pulsation amplitudes in J1507 and determine high precision binary parameters based on a combination of spectroscopic modelling and eclipse analysis. As a result, J1507 will become the benchmark for theoretical studies of CV evolution and the first proper calibrator for models of pulsations in accreting WDs.

OBSERVING DESCRIPTION

We propose to observe J1507 for 3 orbits each in the FUV and NUV waveband in two separate visits. In both visits, our goal is to obtain sensitive spectroscopy at high time resolution, but low spectral resolution. In order to achieve this, we will use the COS/FUV-XDL/G140L combination in the FUV and the STIS/NUV-MAMA/G230L combination in the NUV, with both combinations operating in TIME-TAG mode. These set-ups provide the most efficient way to achieve full FUV or NUV wavelength coverage throughout each visit while also maintaining high time-resolution without any significant dead-time.

The key features we are interested in are the quasi-molecular H₂ troughs at ~1400 Å and ~1600 Å, as well as the absorption features caused by the blends of Fe II transitions near ~1600 Å and ~2500 Å. Since these features are quite broad, low-resolution spectroscopy is completely sufficient for

our purposes. Based on COS and STIS ETC calculations, we estimate that we will achieve S/N ~ 10 - 15 (FUV) and 20 - 30 (NUV) per resolution element (the difference is due to the higher resolution of the FUV grating). These estimates assume 9 ksec of science exposure time in both FUV and NUV channels, which (allowing for overheads) is based on a slightly longer than standard visibility period, as explained in Special Requirements. Note, however, that our S/N estimates would not change significantly for standard visibilities. The SED model used in the calculations is based on the assumption that the WD primary will dominate the UV spectrum, as expected for such a low \dot{M} system (e.g. Szkody et al. 2005). More specifically, we used synthetic WD models based on the numbers estimated by Patterson et al. (2008), $M_{\text{WD}} = 0.9 M_{\text{sun}}$, $T_{\text{eff}} = 12,000 \text{ K}$ and $d = 200 \text{ pc}$. These numbers are comparable to those obtained by Littlefair et al. (2007). The S/N levels we will achieve are well-matched to our goal of accurately measuring the WD parameters and metallicity.

In each visit, we will observe J1507 continuously in TIME-TAG mode, with the only interruptions coming from Earth occultations and the associated guide star (re)acquisitions. We request 3 orbits in each waveband to ensure a high enough S/N to provide an accurate and reliable [Fe/H] measurement, but also because we wish to obtain precise average eclipse profiles (to allow precise parameter determinations). Moreover, we aim to detect the UV counterpart of the optical pulsations (P08). As shown in Figure 3, these pulsations have periods in the range 10 - 20 min, so 3 HST orbits will ensure that we cover at least 15 cycles of each pulsation mode. This will be sufficient to resolve the modes and accurately determine their waveforms and amplitudes.

FUV and NUV coverage is needed for two reasons. First, both quasi-molecular H₂ and the Fe II blend can produce broad absorption near 1600 Å, and even though reddening is expected to be almost negligible -- $E(B-V) < 0.01$; Schlegel et al. 1998 -- the 2200 Å reddening feature could in principle contaminate the 2500 Å Fe II absorption blend. By modelling the spectrum across the full FUV+NUV (and even optical) region, we will be able to reliably distinguish between these effects. Second, we need a large enough wavelength range to measure the wavelength dependence of the pulsation amplitudes (allowing for the fact that we will probably have to adopt coarse wavelength bins to produce high S/N light curves for this purpose). The pulsation amplitudes are predicted to be very strong functions of wavelength across the FUV-NUV range (e.g. Kepler et al. 2000). We will also obtain (near-)simultaneous ground-based observations, thus extending coverage into the optical region.

REAL TIME JUSTIFICATION

The expected FUV and NUV count rates from J1507 are well below the COS/FUV and STIS/NUV brightness limits. However, as a CV, J1507 is expected to exhibit a dwarf nova eruption at some point in time. However, it has actually never been seen to erupt, which implies that the outburst recurrence time is a few years or more. This is as expected: the proto-type for low-accretion rate systems like J1507 is the famous CV WZ~Sge, which has an outburst recurrence time of 20 - 30 yrs. Nevertheless, scaling from the 2001 eruption of WZ Sge, we estimate that J1507 could be around $1e-12$ ergs/s/cm²/Å in the FUV/NUV region if caught very close to the peak of an outburst. This would be above the instrument bright limits.

The probability of this happening is, of course, very low (we estimate no more than 0.1 percent), but we nevertheless consulted with STScI prior to Phase I to devise a strategy to deal with this remote possibility. As discussed in ACS-ISR 2006-04, we expect that STScI will implement a "dead-man's switch" in the scheduling of this observations, so that the observations will only be triggered once a member of the team certifies that it is safe to do so within 1 day or less. This certification will be done on the basis of co-ordinated ground-based observations. One of us (JOP) runs the Center for Backyard Astrophysics (CBA), which coordinates monitoring campaigns involving a large number of dedicated amateur astronomers. Even though J1507 is faint in quiescence, the equipment owned by most CBA observers is easily sufficient to verify that the system is not on the rise to outburst. Moreover, two of us (JOP and JRT) will be able to get private time on the MDM 2.4m Hiltner telescope in the days surrounding our HST visits. Thus, leading up to the HST visits, we will carry out dense ground-based monitoring with a combination of professional and amateur observations from a wide range of observing sites (thus mitigating bad observing conditions at any one site). This strategy will ensure that we can safely trigger the HST observations unless the system is, in fact, experiencing an outburst. It is worth noting that, because of the ground-based target visibility, HST visits scheduled for the first half of the year (say Jan - Jul) are much easier to verify as safe.

ADDITIONAL COMMENTS

J1507 is contained in the GALEX databased. FUV and NUV magnitudes (in the GALEX ABMAG system) are given in the "other fluxes" section of the target description and have been used to estimate appropriate buffer-times and exposure times. We have also used the GALEX images to verify (using the Aladin viewer in APT), that our target is the brightest FUV and NUV source within area of concern for our STIS and COS observations. We would be happy to provide the GALEX fits images for verification.

As described above in "Realtime Justification", our program will require a dead-man's switch to be implemented, so that it is only executed if one of the Co-Is confirms that it is safe to do so 1 day or less before the observations take place. We will obviously make all Co-I email addresses available

to STScI (if they are not already in place). We understand, of course, that aborting a scheduled observations is poor use of HST/STScI resources, and we expect to be able to confirm all scheduled visits, especially if scheduled in the first half of the year (Jan - Jul). Note that CBA observers are located around the globe, providing good coverage and protection against poor weather at any one site.

As discussed with our CS (Nolan Walborn) and following advice from Tony Keyes, in this latest incarnation of the Phase II we have implemented a different target acquisition method for the FUV visit, which should ensure reliable acquisition even in the face of possible small uncertainties regarding the position of the COS focal plane. Since this method requires multiple exposures of a variable eclipsing system, we have followed the advice of our CS and added timing (orbital phase) constraints to ensure that target acquisition will not be affected by the eclipse. We have also added a constraint to ensure that both visits take place within a day of each other so that only one ground-based safety check will be needed.

Proposal 11621 - Visit 1A - SDSS J1507: The First Halo CV or the First CV Born With a Brown Dwarf Donor?

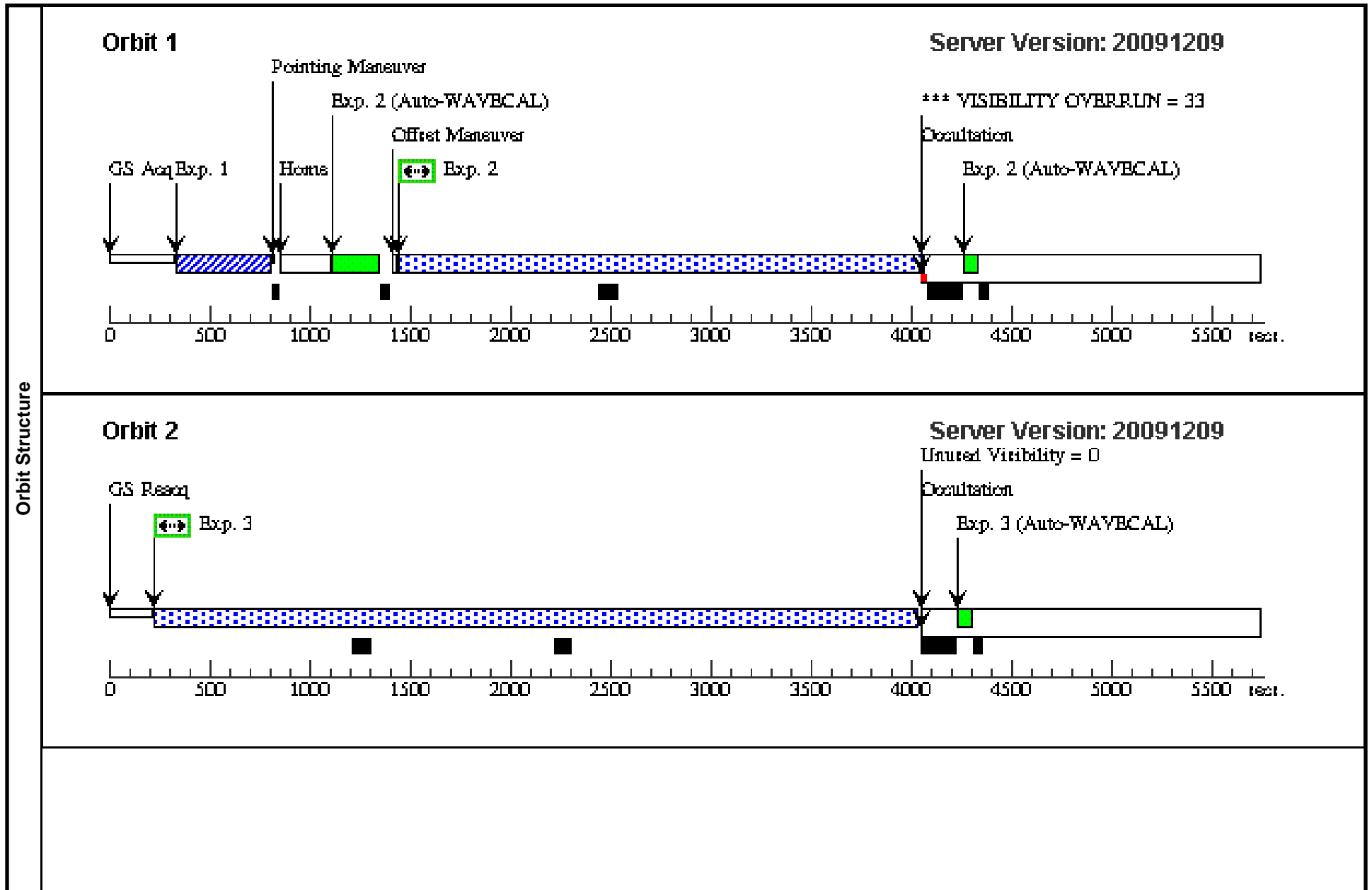
Sat Jan 30 02:06:36 GMT 2010

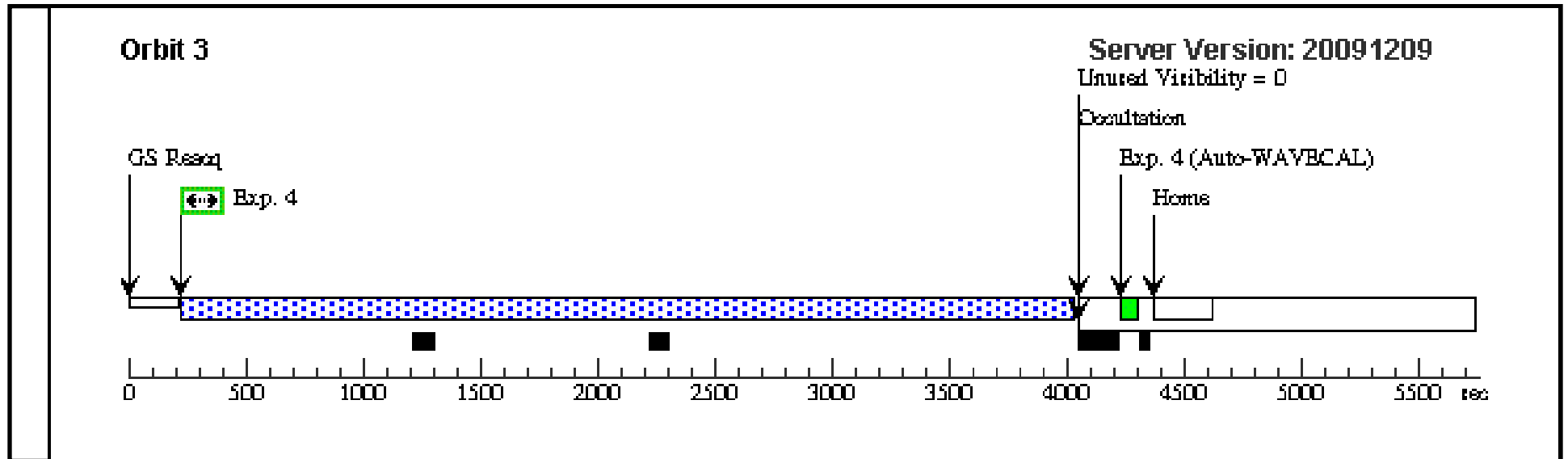
Visit	Proposal 11621, Visit 1A, implementation Diagnostic Status: No Diagnostics Scientific Instruments: S/C Special Requirements: PCS MODE FINE; ORIENT 270D TO 270 D Comments: This visit allocates and sets up the safe position offset slot for visit 01 which will use that slot									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
(1)		SDSS-J1507	RA: 15 07 22.2250 (226.8426042d) Dec: +52 30 40.12 (52.51114d) Equinox: J2000	Proper Motion RA: -0.016s/yr Proper Motion Dec: +0.056"/yr Epoch of Position: 2010.14	V=18.3+/-0.5 m_FUV(ABMAG, GALEX) = 18.6 m_NUV (ABMAG, GALEX) = 18.6	Reference Frame: ICRS				
Comments: The quoted position for the epoch 2010.14 (roughly the February scheduling window), referred to the J2000 equator and equinox, using a plate solution explicitly referred to the GSC2, and taking into account the proper motion. We can provide updated positions for other scheduling windows as required.										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	(1) SDSS-J1507	S/C, DATA, V1				POS TARG -213.94 41,-224.8428; SAVE OFFSET V01 SAF; SPEC COM INSTR ECSLOTSET; GS ACQ SCENARI O BASE1B3; QESIPARM ANGL E 90; QESIPARM DIST 9. 2; QESIPARM SLOT X		5 Secs [==>]	[1]
Orbit Structure	Orbit 1									
	<p>Server Version: 20091209</p>									

Proposal 11621 - Visit 1A - SDSS J1507: The First Halo CV or the First CV Born With a Brown Dwarf Donor?

Sat Jan 30 02:06:37 GMT 2010

Visit	<p>Proposal 11621, Visit 01, implementation</p> <p>Diagnostic Status: Error</p> <p>Scientific Instruments: STIS/CCD, STIS/NUV-MAMA</p> <p>Special Requirements: PCS MODE FINE; ORIENT 270D TO 270 D; BETWEEN 01-JAN-2010:00:00:00 AND 01-AUG-2010:00:00:00; Period 0.0462583411 D AND ZERO-PHASE HJD2453498.892264; VISIBILITY INTERVAL 67.5 M</p> <p><i>Comments: As previously discussed (and approved in Phase I), the execution of this visit should be subject to a "dead-man's switch", to ensure that the system is not in outburst. I.e. the visit can be scheduled, but should only be executed if a member of the investigator team certifies that it is safe to do so within 1 day of the scheduled observations (based on ground-based observations).</i></p> <p><i>As also previously agreed, we have put in an enhanced visibility period of 67.5 minutes.</i></p> <p><i>As discussed with our CS (Nolan Walborn) in May 2009, we have added a BETWEEN timing requirement to ensure that the program executes at a time when the required ground-based optical confirmation that the system is not in outburst can be acquired. We have also linked the two visits so that only one such ground-based confirmation is necessary.</i></p> <p><i>Following further discussions with Nolan Walborn and Tony Keyes, we have added timing requirements to the two visits to ensure target acquisitions won't happen during eclipses (which could affect the ability of the algorithms to center the target). For the FUV orbit, we have also switched strategies now to use a dispersed acquisition with a 3x3 spiral search followed by peak-ups in and perpendicular to the dispersion directions. This should circumvent the worries about the COS focal plane positions that caused us to place the program on hold previously.</i></p> <p><i>APT indicates that there are 3 possible scheduling windows for our program, Feb 2010, June 2010, July 2010. Of these, the first is strongly preferred, while the last is by far the least preferred option.</i></p>									
	<p>(NUV Exposure (01.003) special requirements) Error (Form): Use Offset Id specified, but no Save Offset specified with this Id.</p> <p>(NUV Exposure (01.004) special requirements) Error (Form): Use Offset Id specified, but no Save Offset specified with this Id.</p> <p>(Visit 01) Warning (Orbit Planner): VISIBILITY OVERRUN</p> <p>(Visit 01) Warning (Orbit Planner): USE OFFSET NOT SPECIFIED ON ALL EXPOSURES</p>									
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	SDSS-J1507	RA: 15 07 22.2250 (226.8426042d) Dec: +52 30 40.12 (52.51114d) Equinox: J2000	Proper Motion RA: -0.016s/yr Proper Motion Dec: +0.056"/yr Epoch of Position: 2010.14	V=18.3+/-0.5 m_FUV(ABMAG, GALEX) = 18.6 m_NUV (ABMAG, GALEX) = 18.6	Reference Frame: ICRS				
<p><i>Comments: The quoted position for the epoch 2010.14 (roughly the February scheduling window), referred to the J2000 equator and equinox, using a plate solution explicitly referred to the GSC2, and taking into account the proper motion. We can provide updated positions for other scheduling windows as required.</i></p>										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	Target Acquisition	(1) SDSS-J1507	STIS/CCD, ACQ, F28X50LP	MIRROR		PHASE 0.2 TO 0.8; GS ACQ SCENARI O BASE1B3	Same Guide Stars	60 Secs [==>]	[1]
	2	NUV Exposure	(1) SDSS-J1507	STIS/NUV-MAMA, TIME-TAG, 52X0.2	G230L 2376 A	BUFFER-TIME=10 00	USE OFFSET V01S AF; NEW OBSET; GS ACQ SCENARI O BASE1B3	Same Guide Stars	2000 Secs [==>2606 Secs]	[1]
	3	NUV Exposure	(1) SDSS-J1507	STIS/NUV-MAMA, TIME-TAG, 52X0.2	G230L 2376 A	BUFFER-TIME=10 00	USE OFFSET V01S AF	Same Guide Stars	2000 Secs [==>3800 Secs]	[2]
	4	NUV Exposure	(1) SDSS-J1507	STIS/NUV-MAMA, TIME-TAG, 52X0.2	G230L 2376 A	BUFFER-TIME=10 00	USE OFFSET V01S AF	Same Guide Stars	2000 Secs [==>3800 Secs]	[3]

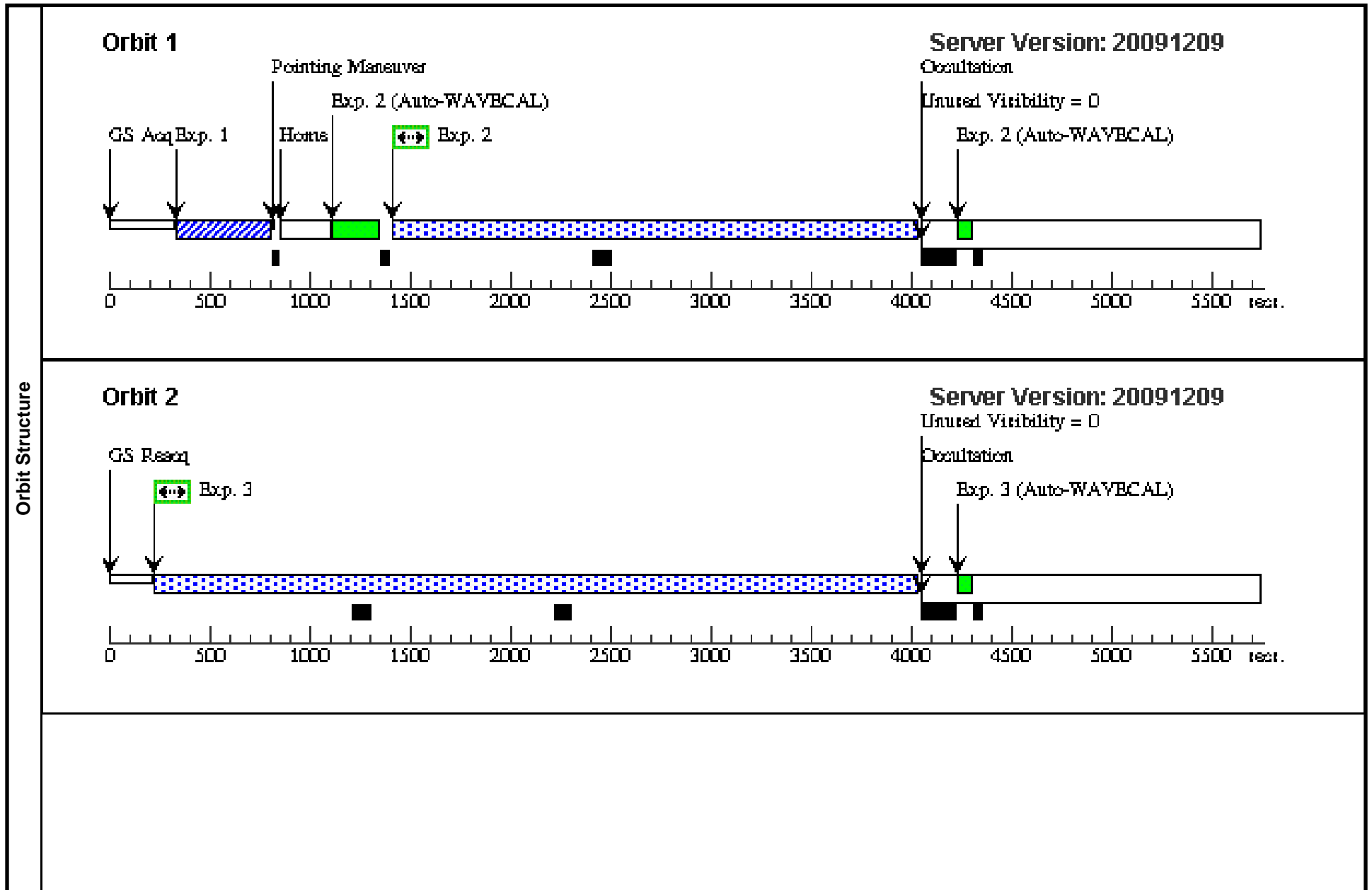


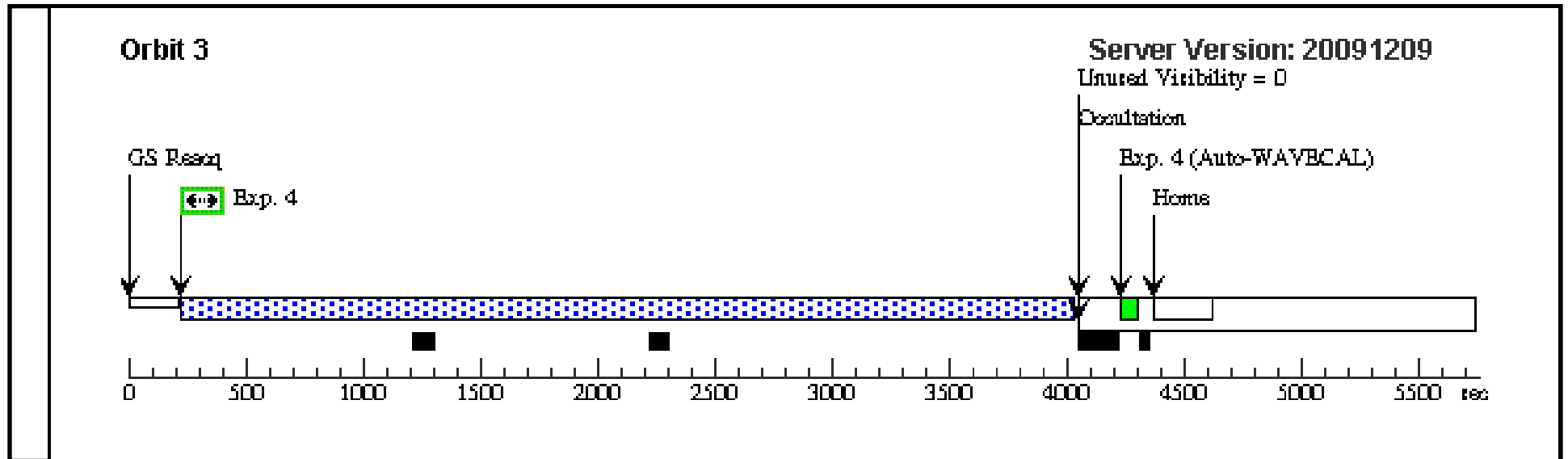


Proposal 11621 - Visit 1B - SDSS J1507: The First Halo CV or the First CV Born With a Brown Dwarf Donor?

Sat Jan 30 02:06:38 GMT 2010

Visit	Proposal 11621, Visit 1B, implementation Diagnostic Status: No Diagnostics Scientific Instruments: STIS/CCD, STIS/NUV-MAMA Special Requirements: PCS MODE FINE; ORIENT 270D TO 270 D; BETWEEN 01-JAN-2010:00:00:00 AND 01-AUG-2010:00:00:00; Period 0.0462583411 D AND ZERO-PHASE HJD2453498.892264; VISIBILITY INTERVAL 67.5 M Comments: This visit is for BOP checking the 'safe' target only and should not be executed onboard HST.									
	Fixed Targets									
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous					
(1)	SDSS-J1507	RA: 15 07 22.2250 (226.8426042d) Dec: +52 30 40.12 (52.51114d) Equinox: J2000	Proper Motion RA: -0.016s/yr Proper Motion Dec: +0.056"/yr Epoch of Position: 2010.14	V=18.3+/-0.5 m_FUV(ABMAG, GALEX) = 18.6 m_NUV (ABMAG, GALEX) = 18.6	Reference Frame: ICRS	Comments: The quoted position for the epoch 2010.14 (roughly the February scheduling window), referred to the J2000 equator and equinox, using a plate solution explicitly referred to the GSC2, and taking into account the proper motion. We can provide updated positions for other scheduling windows as required.				
(2)	TARGET1-SAFE-TARGET	Offset from SDSS-J1507 by RA Offset: 0.0042 Degrees Dec Offset: 0.0 Degrees		V=20+/-0.1	Offset Position (TARGET1-SAFE-TARGET) Reference Frame: ICRS	Comments: This target is a blank piece of sky which is the bright object safe pointing and is 9.2 arcseconds away at PA 90.0 degrees from Target #1.				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	Target Acquisition	(2) TARGET1-SAFE-TARGET	STIS/CCD, ACQ, F28X50LP	MIRROR		PHASE 0.2 TO 0.8; GS ACQ SCENARIO BASE1B3	Same Guide Stars	60 Secs [==>]	[1]
	2	NUV Exposure	(2) TARGET1-SAFE-TARGET	STIS/NUV-MAMA, TIME-TAG, 52X0.2	G230L 2376 A	BUFFER-TIME=1000	NEW OBSET; GS ACQ SCENARIO BASE1B3	Same Guide Stars	2000 Secs [==>2606 Secs]	[1]
	3	NUV Exposure	(2) TARGET1-SAFE-TARGET	STIS/NUV-MAMA, TIME-TAG, 52X0.2	G230L 2376 A	BUFFER-TIME=1000		Same Guide Stars	2000 Secs [==>3800 Secs]	[2]
	4	NUV Exposure	(2) TARGET1-SAFE-TARGET	STIS/NUV-MAMA, TIME-TAG, 52X0.2	G230L 2376 A	BUFFER-TIME=1000		Same Guide Stars	2000 Secs [==>3800 Secs]	[3]

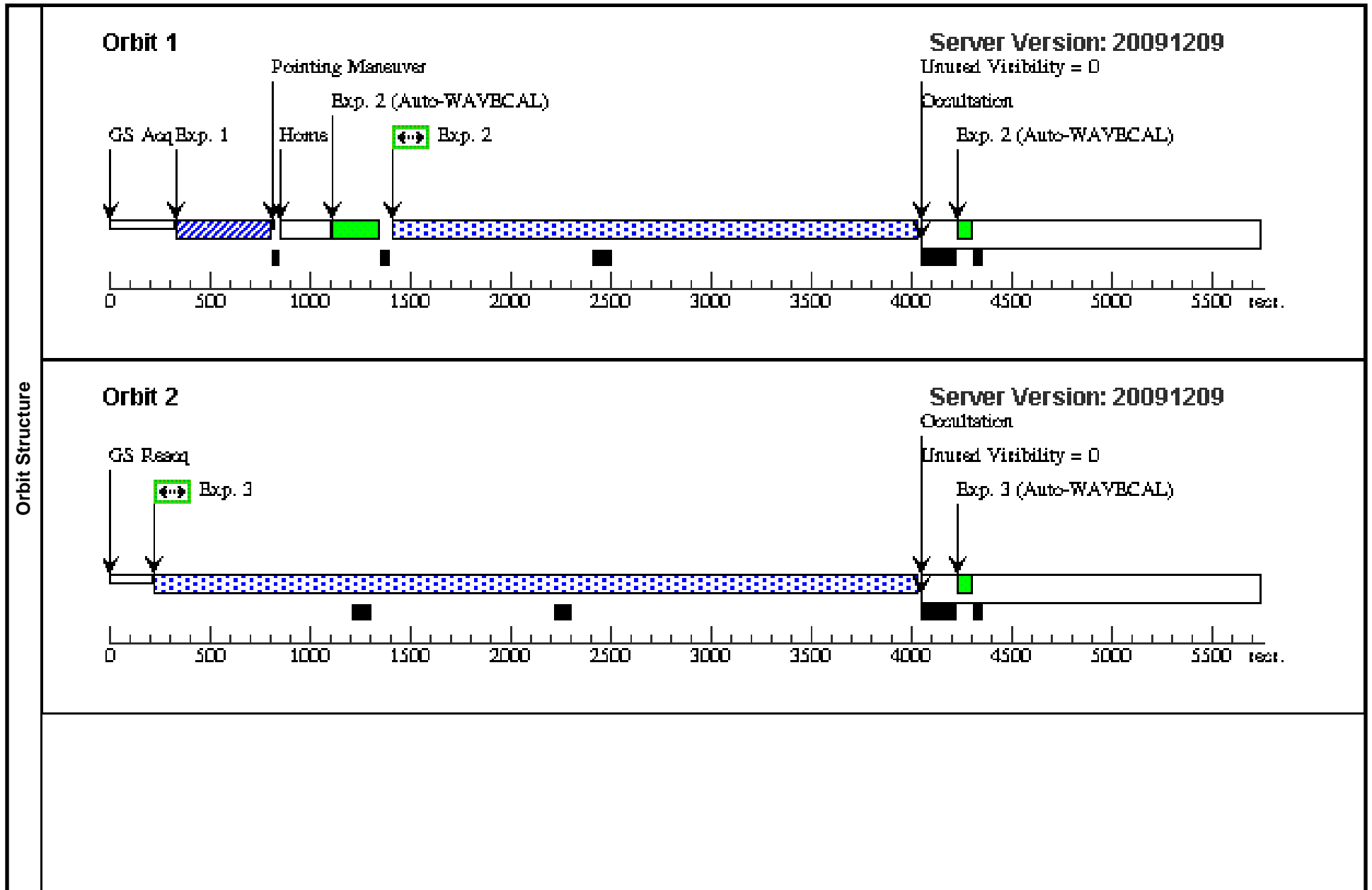


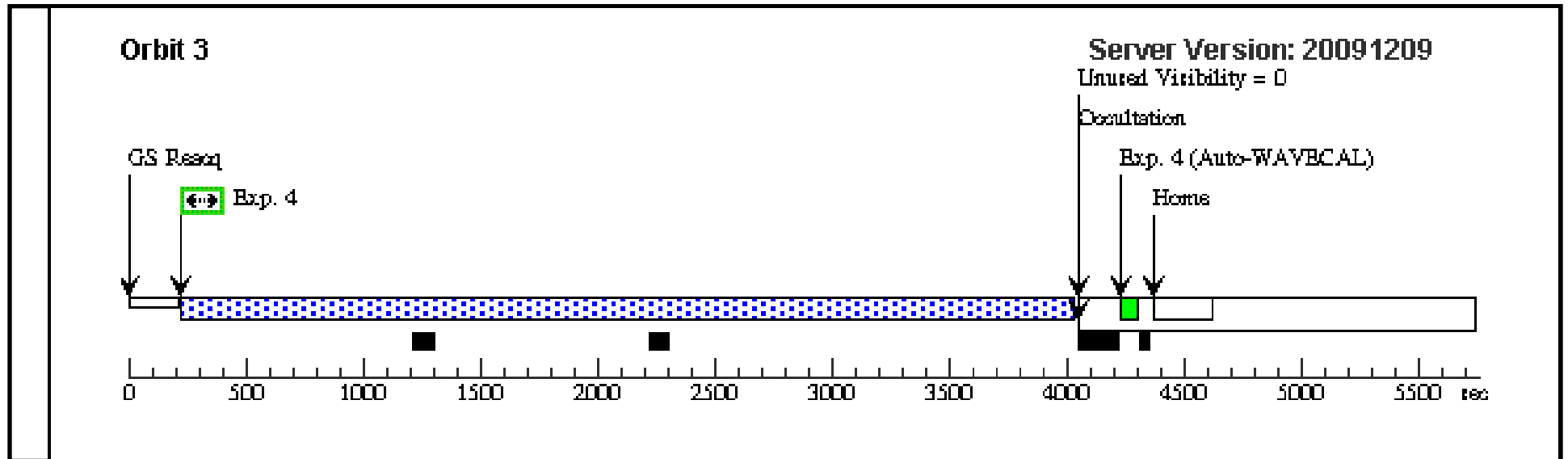


Proposal 11621 - Visit 1C - SDSS J1507: The First Halo CV or the First CV Born With a Brown Dwarf Donor?

Sat Jan 30 02:06:39 GMT 2010

Visit	Proposal 11621, Visit 1C, implementation Diagnostic Status: No Diagnostics Scientific Instruments: STIS/CCD, STIS/NUV-MAMA Special Requirements: PCS MODE FINE; ORIENT 270D TO 270 D; BETWEEN 01-JAN-2010:00:00:00 AND 01-AUG-2010:00:00:00; Period 0.0462583411 D AND ZERO-PHASE HJD2453498.892264; VISIBILITY INTERVAL 67.5 M Comments: This visit is for BOP checking a second 'safe' target only and should not be executed onboard HST.									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
(1)		SDSS-J1507	RA: 15 07 22.2250 (226.8426042d) Dec: +52 30 40.12 (52.51114d) Equinox: J2000	Proper Motion RA: -0.016s/yr Proper Motion Dec: +0.056"/yr Epoch of Position: 2010.14	V=18.3+/-0.5 m_FUV(ABMAG, GALEX) = 18.6 m_NUV (ABMAG, GALEX) = 18.6	Reference Frame: ICRS				
Comments: The quoted position for the epoch 2010.14 (roughly the February scheduling window), referred to the J2000 equator and equinox, using a plate solution explicitly referred to the GSC2, and taking into account the proper motion. We can provide updated positions for other scheduling windows as required.										
(3)	TARGET2-SAFE-TARGET	Offset from SDSS-J1507 by RA Offset: -0.0042 Degrees Dec Offset: 0.0 Degrees		V=20+/-0.1	Offset Position (TARGET2-SAFE-TARGET) Reference Frame: ICRS					
Comments: This target is a blank piece of sky which is the bright object safe pointing and is 9.2 arcseconds away at PA 270.0 degrees from Target #1.										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	Target Acquisition	(3) TARGET2-SAFE-TARGET	STIS/CCD, ACQ, F28X50LP	MIRROR		PHASE 0.2 TO 0.8; GS ACQ SCENARIO BASE1B3	Same Guide Stars	60 Secs [==>]	[1]
	2	NUV Exposure	(3) TARGET2-SAFE-TARGET	STIS/NUV-MAMA, TIME-TAG, 52X0.2	G230L 2376 A	BUFFER-TIME=1000	NEW OBSET; GS ACQ SCENARIO BASE1B3	Same Guide Stars	2000 Secs [==>2606 Secs]	[1]
	3	NUV Exposure	(3) TARGET2-SAFE-TARGET	STIS/NUV-MAMA, TIME-TAG, 52X0.2	G230L 2376 A	BUFFER-TIME=1000		Same Guide Stars	2000 Secs [==>3800 Secs]	[2]
	4	NUV Exposure	(3) TARGET2-SAFE-TARGET	STIS/NUV-MAMA, TIME-TAG, 52X0.2	G230L 2376 A	BUFFER-TIME=1000		Same Guide Stars	2000 Secs [==>3800 Secs]	[3]





Proposal 11621 - Visit 2A - SDSS J1507: The First Halo CV or the First CV Born With a Brown Dwarf Donor?

Sat Jan 30 02:06:40 GMT 2010

Visit	Proposal 11621, Visit 2A, implementation Diagnostic Status: No Diagnostics Scientific Instruments: S/C Special Requirements: PCS MODE FINE; ORIENT 270D TO 270 D <i>Comments: This visit allocates and sets up the safe position offset slot for visit 02 which will use that slot</i>									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
(1)		SDSS-J1507	RA: 15 07 22.2250 (226.8426042d) Dec: +52 30 40.12 (52.51114d) Equinox: J2000	Proper Motion RA: -0.016s/yr Proper Motion Dec: +0.056"/yr Epoch of Position: 2010.14	V=18.3+/-0.5 m_FUV(ABMAG, GALEX) = 18.6 m_NUV (ABMAG, GALEX) = 18.6	Reference Frame: ICRS				
<i>Comments: The quoted position for the epoch 2010.14 (roughly the February scheduling window), referred to the J2000 equator and equinox, using a plate solution explicitly referred to the GSC2, and taking into account the proper motion. We can provide updated positions for other scheduling windows as required.</i>										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(1) SDSS-J1507	S/C, DATA, V1			POS TARG 232.771, -237.511; SAVE OFFSET V02 SAF; SPEC COM INSTR ECSLOTSET; GS ACQ SCENARI O BASE1B3; QESIPARM ANGL E 90; QESIPARM DIST 9. 2; QESIPARM SLOT X		5 Secs [==>]	[1]
Orbit Structure	<p>Orbit 1 Server Version: 20091209</p> <p>Unused Visibility = 3107</p> <p>GS Acq</p> <p>Exp. 1</p> <p>Occultation</p> <p>0 500 1000 1500 2000 2500 3000 3500 4000 4500 5000 5500 sec</p>									

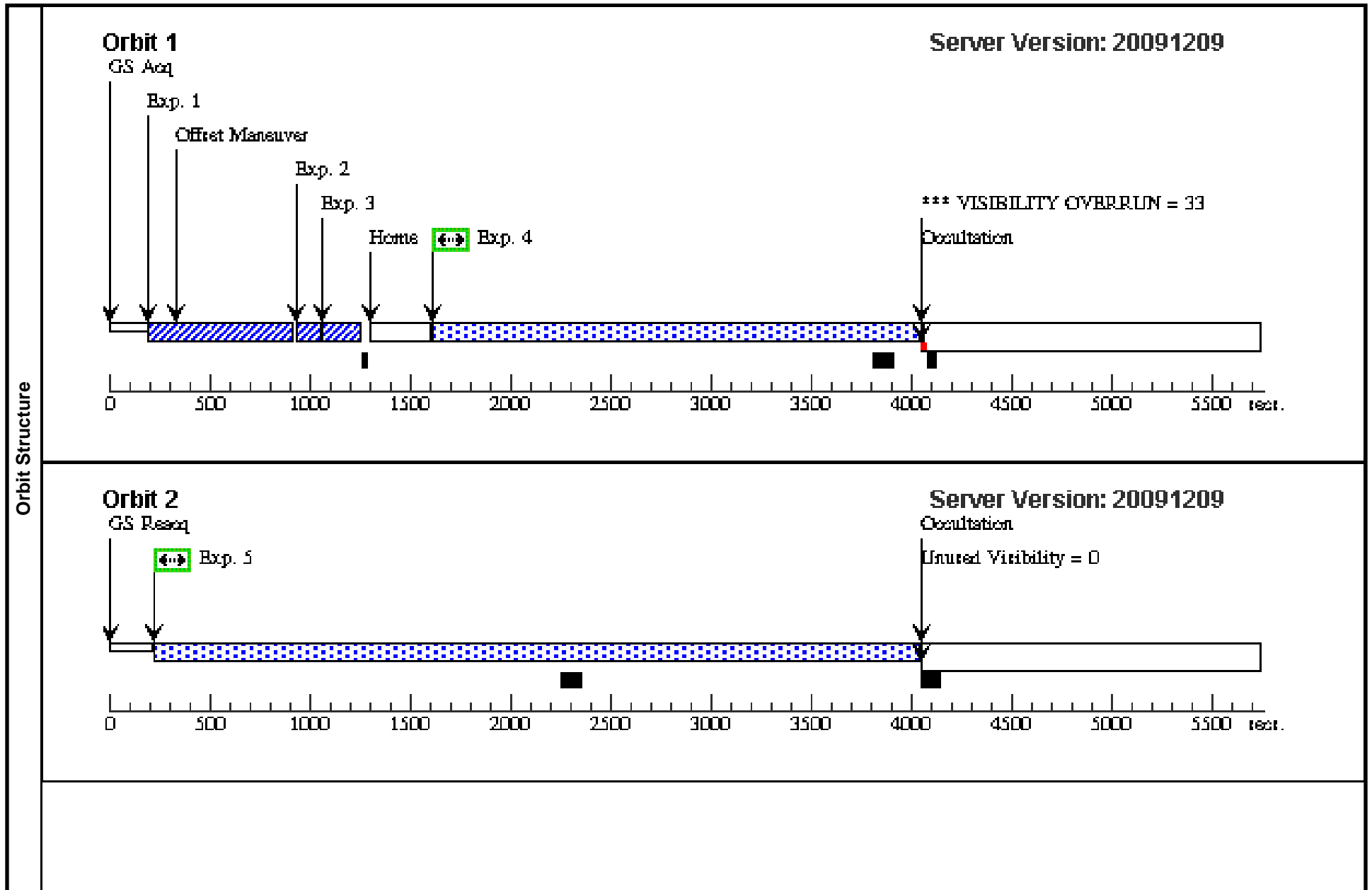
Proposal 11621 - Visit 2A - SDSS J1507: The First Halo CV or the First CV Born With a Brown Dwarf Donor?

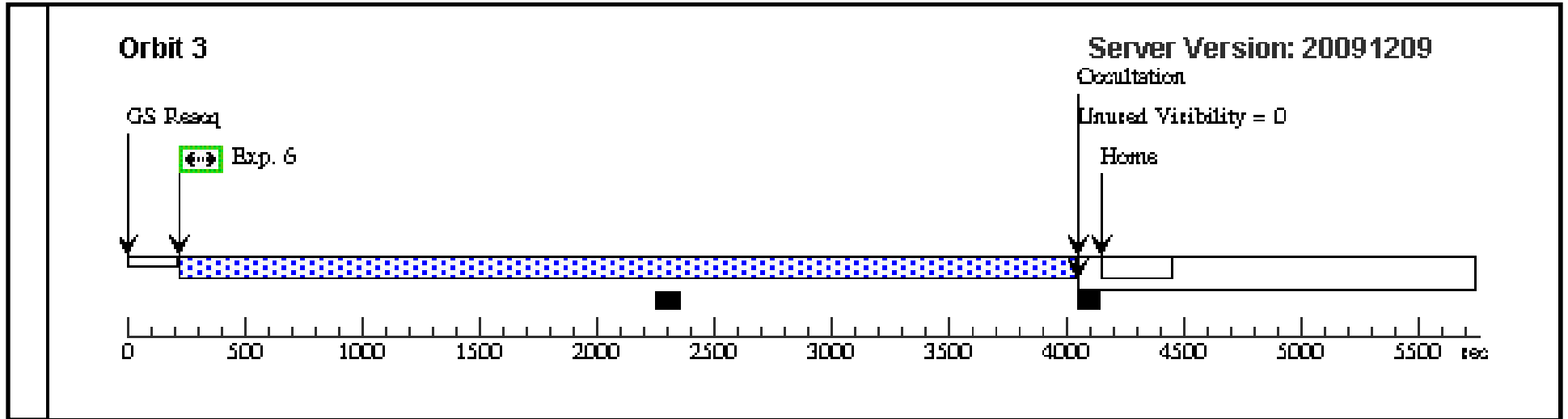
Sat Jan 30 02:06:40 GMT 2010

Visit	<p>Proposal 11621, Visit 02, implementation</p> <p>Diagnostic Status: Error</p> <p>Scientific Instruments: COS/FUV</p> <p>Special Requirements: PCS MODE FINE; ORIENT 270D TO 270 D; AFTER 01 BY 0 D TO 1 D; Period 0.0462583411 D AND ZERO-PHASE HJD2453498.892264; VISIBILITY INTERVAL 67.5 M</p> <p><i>Comments: As previously discussed (and approved in Phase I), the execution of this visit should be subject to a "dead-man's switch", to ensure that the system is not in outburst. I.e. the visit can be scheduled, but should only be executed if a member of the investigator team certifies that it is safe to do so within 1 day of the scheduled observations (based on ground-based observations).</i></p> <p><i>As also previously agreed, we have put in an enhanced visibility period of 67.5 minutes.</i></p> <p><i>As discussed with our CS (Nolan Walborn) in May 2009, we have added a BETWEEN timing requirement to ensure that the program executes at a time when the required ground-based optical confirmation that the system is not in outburst can be acquired. We have also linked the two visits so that only one such ground-based confirmation is necessary.</i></p> <p><i>Following further discussions with Nolan Walborn and Tony Keyes, we have added timing requirements to the two visits to ensure target acquisitions won't happen during eclipses (which could affect the ability of the algorithms to center the target). For the FUV orbit, we have also switched strategies now to use a dispersed acquisition with a 3x3 spiral search followed by peak-ups in and perpendicular to the dispersion directions. This should circumvent the worries about the COS focal plane positions that caused us to place the program on hold previously.</i></p> <p><i>APT indicates that there are 3 possible scheduling windows for our program, Feb 2010, June 2010, July 2010. Of these, the first is strongly preferred, while the last is by far the least preferred option.</i></p>																
	Diagnostics	<p>(Peak-Up XD (02.002) special requirements) Error (Form): Use Offset Id specified, but no Save Offset specified with this Id.</p> <p>(Peak-Up D (02.003) special requirements) Error (Form): Use Offset Id specified, but no Save Offset specified with this Id.</p> <p>(FUV Exposure (02.004) special requirements) Error (Form): Use Offset Id specified, but no Save Offset specified with this Id.</p> <p>(FUV Exposure (02.005) special requirements) Error (Form): Use Offset Id specified, but no Save Offset specified with this Id.</p> <p>(FUV Exposure (02.006) special requirements) Error (Form): Use Offset Id specified, but no Save Offset specified with this Id.</p> <p>(Visit 02) Warning (Orbit Planner): VISIBILITY OVERRUN</p>															
Fixed Targets		<table border="1"> <thead> <tr> <th>#</th> <th>Name</th> <th>Target Coordinates</th> <th>Targ. Coord. Corrections</th> <th>Fluxes</th> <th>Miscellaneous</th> </tr> </thead> <tbody> <tr> <td>(1)</td> <td>SDSS-J1507</td> <td>RA: 15 07 22.2250 (226.8426042d) Dec: +52 30 40.12 (52.51114d) Equinox: J2000</td> <td>Proper Motion RA: -0.016s/yr Proper Motion Dec: +0.056"/yr Epoch of Position: 2010.14</td> <td>V=18.3+/-0.5 m_FUV(ABMAG, GALEX) = 18.6 m_NUV (ABMAG, GALEX) = 18.6</td> <td>Reference Frame: ICRS</td> </tr> </tbody> </table> <p><i>Comments: The quoted position for the epoch 2010.14 (roughly the February scheduling window), referred to the J2000 equator and equinox, using a plate solution explicitly referred to the GSC2, and taking into account the proper motion. We can provide updated positions for other scheduling windows as required.</i></p>					#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous	(1)	SDSS-J1507	RA: 15 07 22.2250 (226.8426042d) Dec: +52 30 40.12 (52.51114d) Equinox: J2000	Proper Motion RA: -0.016s/yr Proper Motion Dec: +0.056"/yr Epoch of Position: 2010.14	V=18.3+/-0.5 m_FUV(ABMAG, GALEX) = 18.6 m_NUV (ABMAG, GALEX) = 18.6
	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous											
(1)	SDSS-J1507	RA: 15 07 22.2250 (226.8426042d) Dec: +52 30 40.12 (52.51114d) Equinox: J2000	Proper Motion RA: -0.016s/yr Proper Motion Dec: +0.056"/yr Epoch of Position: 2010.14	V=18.3+/-0.5 m_FUV(ABMAG, GALEX) = 18.6 m_NUV (ABMAG, GALEX) = 18.6	Reference Frame: ICRS												

Proposal 11621 - Visit 02 - SDSS J1507: The First Halo CV or the First CV Born With a Brown Dwarf Donor?

	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
Exposures	1	Target Acquisition	(1) SDSS-J1507	COS/FUV, ACQ/SEARCH, PSA	G140L 1230 A	SCAN-SIZE=3	PHASE 0.2 TO 0.4; USE OFFSET V02S AF; GS ACQ SCENARIO BASE1B3	Same Guide Stars	30 Secs [==>]	[1]
	2	Peak-Up XD	(1) SDSS-J1507	COS/FUV, ACQ/PEAKXD, PSA	G140L 1230 A		USE OFFSET V02S AF	Same Guide Stars	30 Secs [==>]	[1]
	3	Peak-Up D	(1) SDSS-J1507	COS/FUV, ACQ/PEAKD, PSA	G140L 1230 A	NUM-POS=3; STEP-SIZE=1.2	USE OFFSET V02S AF	Same Guide Stars	30 Secs [==>]	[1]
	4	FUV Exposure	(1) SDSS-J1507	COS/FUV, TIME-TAG, PSA	G140L 1230 A	BUFFER-TIME=20 00	USE OFFSET V02S AF; NEW OBSET; GS ACQ SCENARIO BASE1B3	Same Guide Stars	1500 Secs [==>2234.0 Secs]	[1]
	5	FUV Exposure	(1) SDSS-J1507	COS/FUV, TIME-TAG, PSA	G140L 1230 A	BUFFER-TIME=20 00	USE OFFSET V02S AF	Same Guide Stars	1500 Secs [==>3764 Secs]	[2]
	6	FUV Exposure	(1) SDSS-J1507	COS/FUV, TIME-TAG, PSA	G140L 1230 A	BUFFER-TIME=20 00	USE OFFSET V02S AF	Same Guide Stars	1500 Secs [==>3764 Secs]	[3]





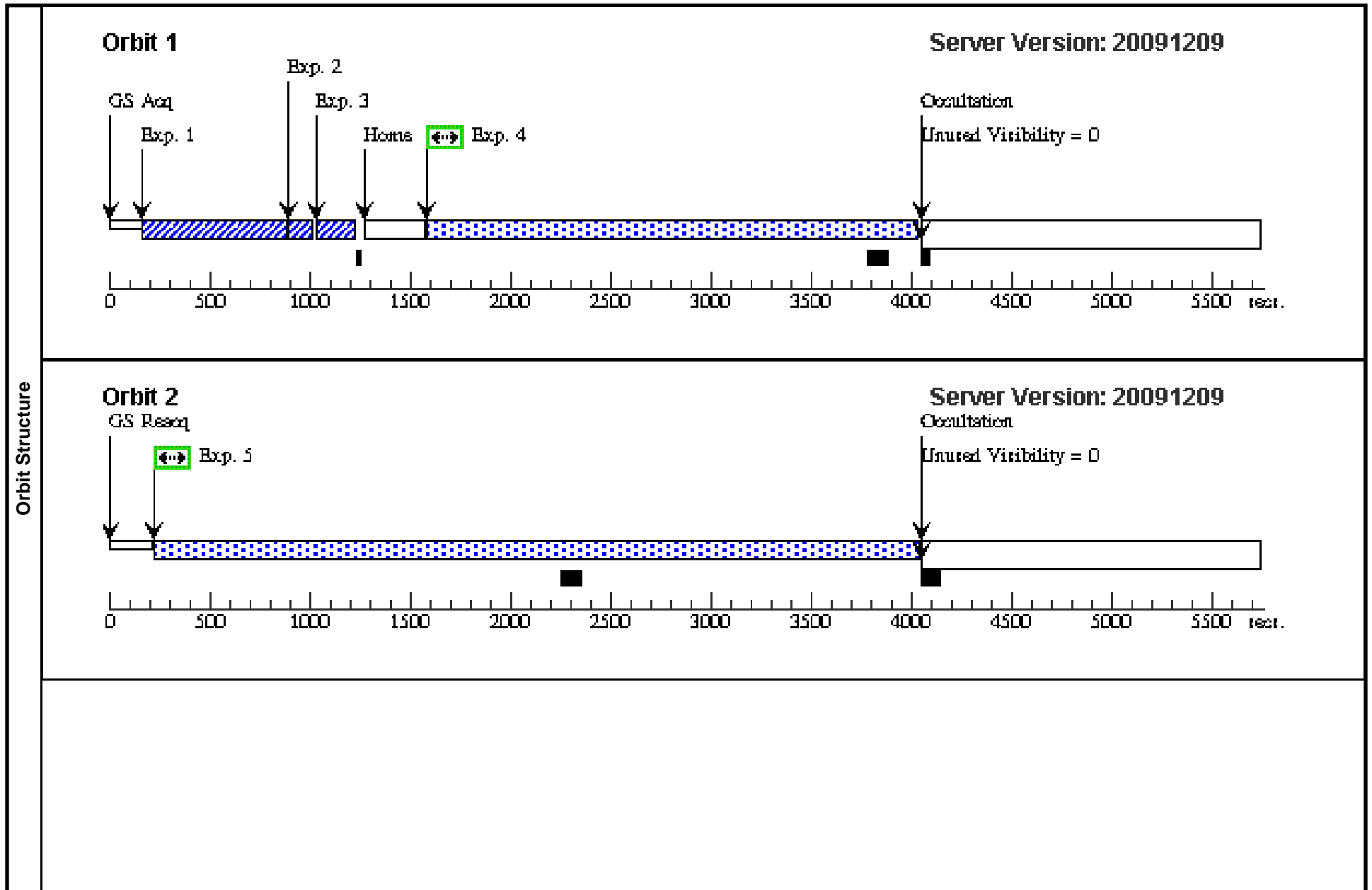
Proposal 11621 - Visit 2B - SDSS J1507: The First Halo CV or the First CV Born With a Brown Dwarf Donor?

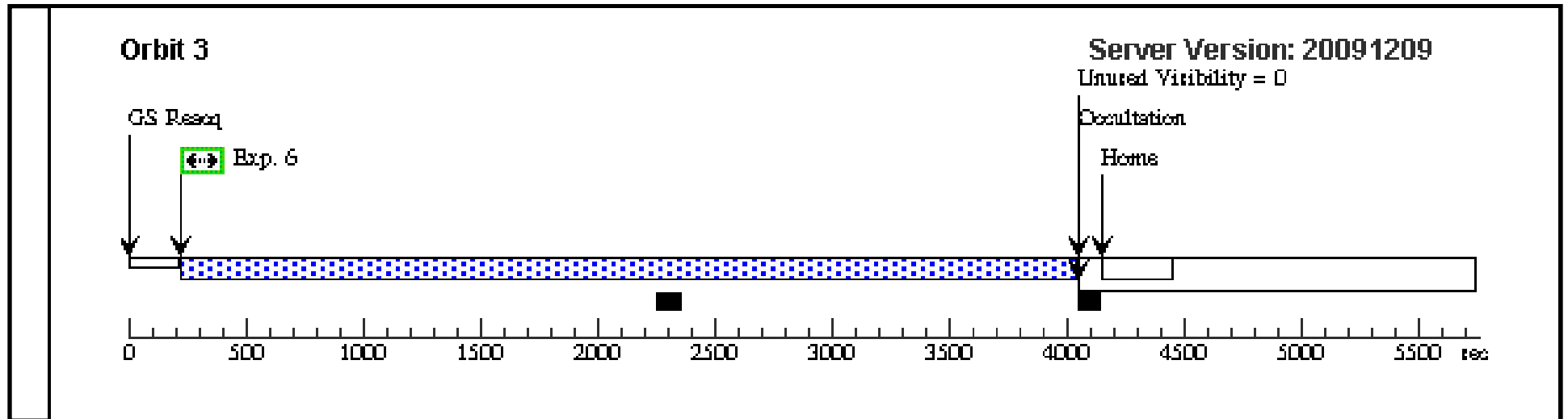
Sat Jan 30 02:06:40 GMT 2010

Visit	Proposal 11621, Visit 2B, implementation Diagnostic Status: No Diagnostics Scientific Instruments: COS/FUV Special Requirements: PCS MODE FINE; ORIENT 270D TO 270 D; BETWEEN 01-JAN-2010:00:00:00 AND 01-AUG-2010:00:00:00; Period 0.0462583411 D AND ZERO-PHASE HJD2453498.892264; VISIBILITY INTERVAL 67.5 M <i>Comments: This visit is for BOP checking the 'safe' target only and should not be executed onboard HST.</i>				

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	SDSS-J1507	RA: 15 07 22.2250 (226.8426042d) Dec: +52 30 40.12 (52.51114d) Equinox: J2000	Proper Motion RA: -0.016s/yr Proper Motion Dec: +0.056"/yr Epoch of Position: 2010.14	V=18.3+/-0.5 m_FUV(ABMAG, GALEX) = 18.6 m_NUV (ABMAG, GALEX) = 18.6	Reference Frame: ICRS
<i>Comments: The quoted position for the epoch 2010.14 (roughly the February scheduling window), referred to the J2000 equator and equinox, using a plate solution explicitly referred to the GSC2, and taking into account the proper motion. We can provide updated positions for other scheduling windows as required.</i>						
(2)	TARGET1-SAFE-TARGET	Offset from SDSS-J1507 by RA Offset: 0.0042 Degrees Dec Offset: 0.0 Degrees		V=20+/-0.1	Offset Position (TARGET1-SAFE-TARGET) Reference Frame: ICRS	
<i>Comments: This target is a blank piece of sky which is the bright object safe pointing and is 9.2 arcseconds away at PA 90.0 degrees from Target #1.</i>						

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
		1	Target Acquisition	(2) TARGET1-SAFE-TARGET	COS/FUV, ACQ/SEARCH, PSA	G140L 1230 A	SCAN-SIZE=3	PHASE 0.2 TO 0.4; GS ACQ SCENARIO BASE1B3	Same Guide Stars	30 Secs [==>]
	2	Peak-Up XD	(2) TARGET1-SAFE-TARGET	COS/FUV, ACQ/PEAKXD, PSA	G140L 1230 A			Same Guide Stars	30 Secs [==>]	[1]
	3	Peak-Up D	(2) TARGET1-SAFE-TARGET	COS/FUV, ACQ/PEAKD, PSA	G140L 1230 A	NUM-POS=3; STEP-SIZE=1.2		Same Guide Stars	30 Secs [==>]	[1]
	4	FUV Exposure	(2) TARGET1-SAFE-TARGET	COS/FUV, TIME-TAG, PSA	G140L 1230 A	BUFFER-TIME=2000	NEW OBSET; GS ACQ SCENARIO BASE1B3	Same Guide Stars	1500 Secs [==>2234 Secs]	[1]
	5	FUV Exposure	(2) TARGET1-SAFE-TARGET	COS/FUV, TIME-TAG, PSA	G140L 1230 A	BUFFER-TIME=2000		Same Guide Stars	1500 Secs [==>3764 Secs]	[2]
	6	FUV Exposure	(2) TARGET1-SAFE-TARGET	COS/FUV, TIME-TAG, PSA	G140L 1230 A	BUFFER-TIME=2000		Same Guide Stars	1500 Secs [==>3764 Secs]	[3]





Proposal 11621 - Visit 2C - SDSS J1507: The First Halo CV or the First CV Born With a Brown Dwarf Donor?

Sat Jan 30 02:06:41 GMT 2010

Visit		Proposal 11621, Visit 2C, implementation Diagnostic Status: No Diagnostics Scientific Instruments: COS/FUV Special Requirements: PCS MODE FINE; ORIENT 270D TO 270 D; BETWEEN 01-JAN-2010:00:00:00 AND 01-AUG-2010:00:00:00; Period 0.0462583411 D AND ZERO-PHASE HJD2453498.892264; VISIBILITY INTERVAL 67.5 M Comments: This visit is for BOP checking a second 'safe' target only and should not be executed onboard HST.									
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous					
	(1)	SDSS-J1507	RA: 15 07 22.2250 (226.8426042d) Dec: +52 30 40.12 (52.51114d) Equinox: J2000	Proper Motion RA: -0.016s/yr Proper Motion Dec: +0.056"/yr Epoch of Position: 2010.14	V=18.3+/-0.5 m_FUV(ABMAG, GALEX) = 18.6 m_NUV (ABMAG, GALEX) = 18.6	Reference Frame: ICRS	Comments: The quoted position for the epoch 2010.14 (roughly the February scheduling window), referred to the J2000 equator and equinox, using a plate solution explicitly referred to the GSC2, and taking into account the proper motion. We can provide updated positions for other scheduling windows as required.				
Fixed Targets	(3)	TARGET2-SAFE-TARGET	Offset from SDSS-J1507 by RA Offset: -0.0042 Degrees Dec Offset: 0.0 Degrees		V=20+/-0.1	Offset Position (TARGET2-SAFE-TARGET) Reference Frame: ICRS	Comments: This target is a blank piece of sky which is the bright object safe pointing and is 9.2 arcseconds away at PA 270.0 degrees from Target #1.				
	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit	
Exposures	1	Target Acquisition	(3) TARGET2-SAFE-TARGET	COS/FUV, ACQ/SEARCH, PSA	G140L 1230 A	SCAN-SIZE=3	PHASE 0.2 TO 0.4; GS ACQ SCENARIO BASE1B3	Same Guide Stars	30 Secs [==>]	[1]	
	2	Peak-Up XD	(3) TARGET2-SAFE-TARGET	COS/FUV, ACQ/PEAKXD, PSA	G140L 1230 A			Same Guide Stars	30 Secs [==>]	[1]	
	3	Peak-Up D	(3) TARGET2-SAFE-TARGET	COS/FUV, ACQ/PEAKD, PSA	G140L 1230 A	NUM-POS=3; STEP-SIZE=1.2		Same Guide Stars	30 Secs [==>]	[1]	
	4	FUV Exposure	(3) TARGET2-SAFE-TARGET	COS/FUV, TIME-TAG, PSA	G140L 1230 A	BUFFER-TIME=2000	NEW OBSET; GS ACQ SCENARIO BASE1B3	Same Guide Stars	1500 Secs [==>2234 Secs]	[1]	
	5	FUV Exposure	(3) TARGET2-SAFE-TARGET	COS/FUV, TIME-TAG, PSA	G140L 1230 A	BUFFER-TIME=2000		Same Guide Stars	1500 Secs [==>3764 Secs]	[2]	
	6	FUV Exposure	(3) TARGET2-SAFE-TARGET	COS/FUV, TIME-TAG, PSA	G140L 1230 A	BUFFER-TIME=2000		Same Guide Stars	1500 Secs [==>3764 Secs]	[3]	

