



13427 - A Look Inside a Star: The Evolved Main-Sequence Channel and Hydrogen Depleted Ultracompact Binaries

Cycle: 21, Proposal Category: GO

(UV Initiative)

(Availability Mode: SUPPORTED)

INVESTIGATORS

<i>Name</i>	<i>Institution</i>	<i>E-Mail</i>
Dr. Peter Garnavich (PI) (Contact)	University of Notre Dame	pgarnavi@nd.edu
Mr. Colin Littlefield (CoI)	University of Notre Dame	clittlef@nd.edu
Prof. Paula Szkody (CoI)	University of Washington	szkody@astro.washington.edu

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>
03	(1) CSS120422	COS/FUV COS/NUV	6	08-Apr-2014 21:27:37.0	yes
B3	(2) CSS120422-SAFE-TARGET	COS/FUV COS/NUV	6	08-Apr-2014 21:27:57.0	yes
T3	(1) CSS120422	S/C	1	08-Apr-2014 21:28:04.0	yes

13 Total Orbits Used

ABSTRACT

The evolutionary paths of ultracompact interacting binaries often lead to helium transfer in AM CVn systems. But an "evolved main-sequence" channel has long been hypothesized to create ultracompact binaries with detectable hydrogen. Recently, a couple of prime candidate binaries have been identified from time-domain sky surveys that appear to have evolved through this unique path. We propose COS FUV observations of

CSS120422, the brightest of these candidates, to compare with the elemental abundance predictions of the evolved main-sequence model. This system has an orbital period of only 55 minutes, well below the hydrogen period minimum. The optical spectrum of CSS120422 is clearly depleted in hydrogen relative to helium, but still has two orders of magnitude more hydrogen than AM CVn stars. The CNO abundance ratios that are available only in the UV provide a stringent test of the evolved main-sequence scenario.

OBSERVING DESCRIPTION

We will observe the cataclysmic variable CSS1204 using COS and the G140L grating. Three orbits will be used for the standard grating setting (1105) and three more orbits will observe at the 1280 setting to include the OVI line at 1038 Ang. The two settings will be done in two visits separated by at most a few days. COS data will be taken in TIME-TAG mode to monitor variability.

The target is in the GCS2 catalog, so the coordinates are accurate to 0.4 arcsec and in the HST system.

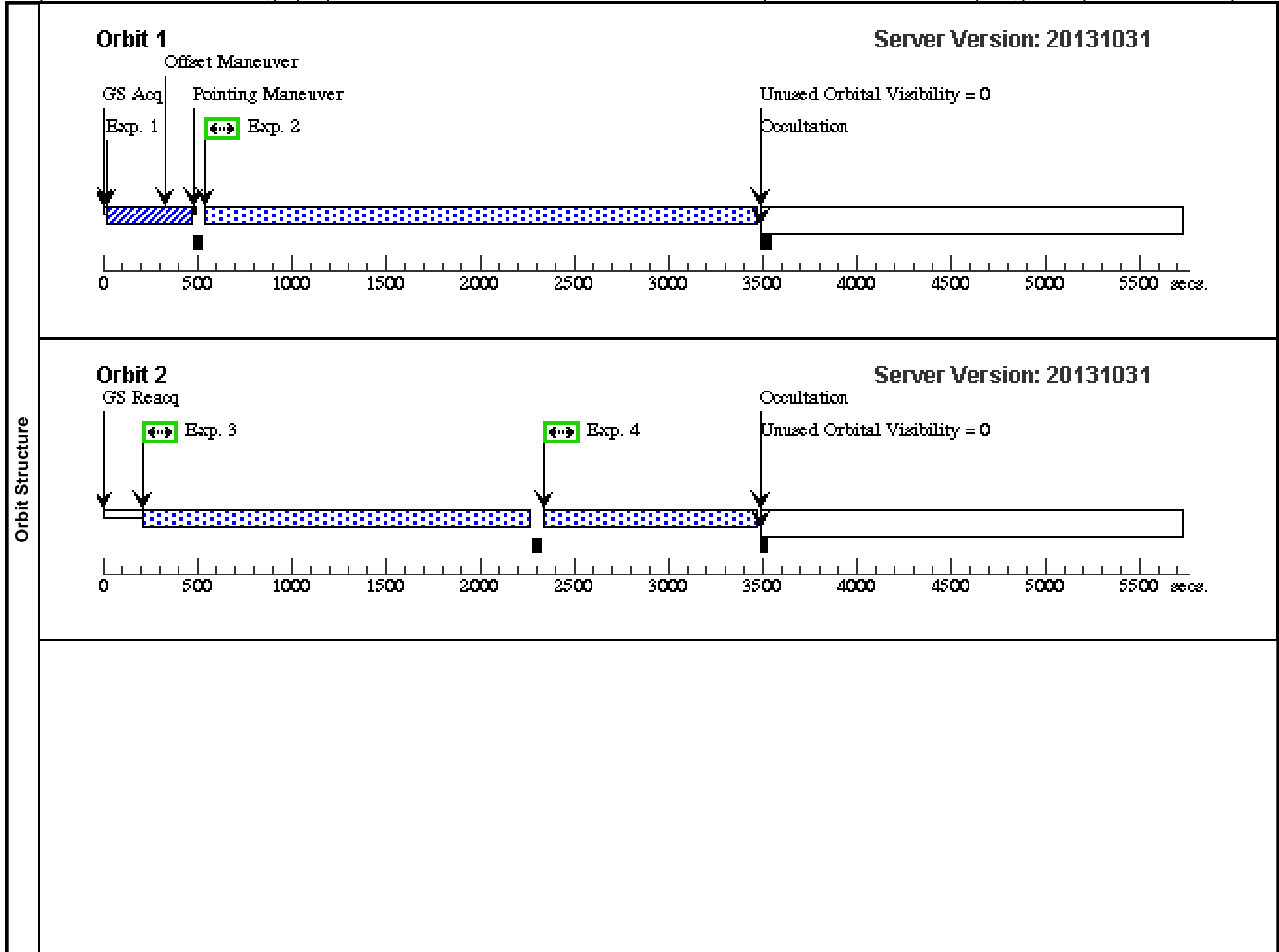
Proposal 13427 - bothsettings (03) - A Look Inside a Star: The Evolved Main-Sequence Channel and Hydrogen Depleted Ultracompac...

Wed Apr 09 01:28:12 GMT 2014

Visit	<p>Proposal 13427, bothsettings (03), implementation</p> <p>Diagnostic Status: Warning</p> <p>Scientific Instruments: COS/NUV, COS/FUV</p> <p>Special Requirements: ORIENT 115D TO 129 D</p> <p><i>Comments: This should be scheduled in evening local time if at all possible to allow flags to be cleared during the work day.</i></p>																							
	Diagnostics	<p>(acq1 (03.001) special requirements) Warning (Form): For ACS Coronagraphic Exposures it is recommended that you specify USE OFFSET to account for drift of the coronagraphic spots. All other uses of USE OFFSET are cautionary use.</p> <p>(sci1 (03.002) special requirements) Warning (Form): For ACS Coronagraphic Exposures it is recommended that you specify USE OFFSET to account for drift of the coronagraphic spots. All other uses of USE OFFSET are cautionary use.</p> <p>(sci2 (03.003) special requirements) Warning (Form): For ACS Coronagraphic Exposures it is recommended that you specify USE OFFSET to account for drift of the coronagraphic spots. All other uses of USE OFFSET are cautionary use.</p> <p>(sci3 (03.004) special requirements) Warning (Form): For ACS Coronagraphic Exposures it is recommended that you specify USE OFFSET to account for drift of the coronagraphic spots. All other uses of USE OFFSET are cautionary use.</p> <p>(sci4 (03.005) special requirements) Warning (Form): For ACS Coronagraphic Exposures it is recommended that you specify USE OFFSET to account for drift of the coronagraphic spots. All other uses of USE OFFSET are cautionary use.</p> <p>(sci5 (03.006) special requirements) Warning (Form): For ACS Coronagraphic Exposures it is recommended that you specify USE OFFSET to account for drift of the coronagraphic spots. All other uses of USE OFFSET are cautionary use.</p> <p>(sci6 (03.007) special requirements) Warning (Form): For ACS Coronagraphic Exposures it is recommended that you specify USE OFFSET to account for drift of the coronagraphic spots. All other uses of USE OFFSET are cautionary use.</p> <p>(sci7 (03.008) special requirements) Warning (Form): For ACS Coronagraphic Exposures it is recommended that you specify USE OFFSET to account for drift of the coronagraphic spots. All other uses of USE OFFSET are cautionary use.</p> <p>(sci8 (03.009) special requirements) Warning (Form): For ACS Coronagraphic Exposures it is recommended that you specify USE OFFSET to account for drift of the coronagraphic spots. All other uses of USE OFFSET are cautionary use.</p> <p>(sci9 (03.010) special requirements) Warning (Form): For ACS Coronagraphic Exposures it is recommended that you specify USE OFFSET to account for drift of the coronagraphic spots. All other uses of USE OFFSET are cautionary use.</p> <p>(sci10 (03.011) special requirements) Warning (Form): For ACS Coronagraphic Exposures it is recommended that you specify USE OFFSET to account for drift of the coronagraphic spots. All other uses of USE OFFSET are cautionary use.</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>CSS120422</td> <td>RA: 11 11 26.8650 (167.8619375d)</td> <td></td> <td>V=18.5+/-0.5</td> <td>Reference Frame: ICRS</td> </tr> <tr> <td></td> <td>Alt Name1: SBS1108+574</td> <td>Dec: +57 12 38.49 (57.21069d) Equinox: J2000</td> <td></td> <td>Galex FUV 20.0 mag (AB)</td> <td></td> </tr> </tbody> </table> <p><i>Comments: Target is a cataclysmic variable that can have outbursts. Ground monitoring will be done before and during HST visits.</i></p>					#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous	(1)	CSS120422	RA: 11 11 26.8650 (167.8619375d)		V=18.5+/-0.5	Reference Frame: ICRS		Alt Name1: SBS1108+574	Dec: +57 12 38.49 (57.21069d) Equinox: J2000		Galex FUV 20.0 mag (AB)	
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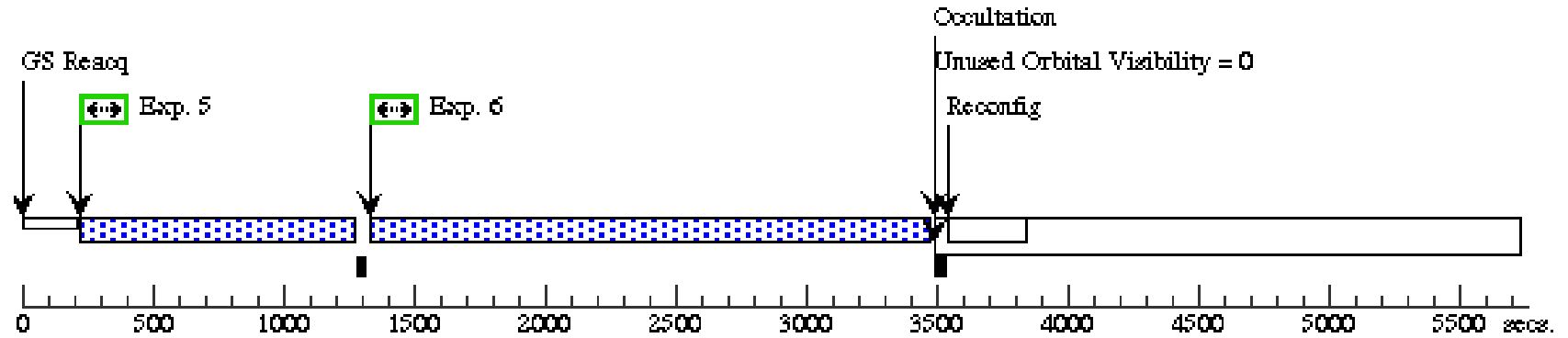
Proposal 13427 - bothsettings (03) - A Look Inside a Star: The Evolved Main-Sequence Channel and Hydrogen Depleted Ultracompac...

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
Exposures	1	acq1 (COS.im.51 4811)	(1) CSS120422	COS/NUV, ACQ/IMAGE, PSA	MIRRORA		USE OFFSET V03S AF	25 Secs (25 Secs)	[==>]	[1]
	2	sci1 (COS.sp.514 842)	(1) CSS120422	COS/FUV, TIME-TAG, PSA	G140L 1105 A	FLASH=YES; BUFFER-TIME=82 00; FP-POS=1	USE OFFSET V03S AF	2754 Secs (2754 Secs)	[==>]	[1]
	3	sci2 (COS.sp.514 842)	(1) CSS120422	COS/FUV, TIME-TAG, PSA	G140L 1105 A	BUFFER-TIME=82 00; FLASH=YES; FP-POS=2	SAME POS AS 2; USE OFFSET V03S AF	2000 Secs (2000 Secs)	[==>]	[2]
	4	sci3 (COS.sp.514 842)	(1) CSS120422	COS/FUV, TIME-TAG, PSA	G140L 1105 A	BUFFER-TIME=82 00; FLASH=YES; FP-POS=3	SAME POS AS 2; USE OFFSET V03S AF	700 Secs (1081 Secs)	[==>1081.0 Secs]	[2]
	5	sci4 (COS.sp.514 842)	(1) CSS120422	COS/FUV, TIME-TAG, PSA	G140L 1105 A	BUFFER-TIME=82 00; FLASH=YES; FP-POS=3	SAME POS AS 2; USE OFFSET V03S AF	1000 Secs (1000 Secs)	[==>]	[3]
	6	sci5 (COS.sp.514 842)	(1) CSS120422	COS/FUV, TIME-TAG, PSA	G140L 1105 A	BUFFER-TIME=82 00; FLASH=YES; FP-POS=4	SAME POS AS 2; USE OFFSET V03S AF	2090 Secs (2090 Secs)	[==>]	[3]
	7	sci6 (COS.sp.514 842)	(1) CSS120422	COS/FUV, TIME-TAG, PSA	G140L 1280 A	FLASH=YES; BUFFER-TIME=82 00; FP-POS=1	USE OFFSET V03S AF	3205 Secs (3205 Secs)	[==>]	[4]
	8	sci7 (COS.sp.514 842)	(1) CSS120422	COS/FUV, TIME-TAG, PSA	G140L 1280 A	BUFFER-TIME=82 00; FLASH=YES; FP-POS=2	SAME POS AS 2; USE OFFSET V03S AF	2000 Secs (2000 Secs)	[==>]	[5]
	9	sci8 (COS.sp.514 842)	(1) CSS120422	COS/FUV, TIME-TAG, PSA	G140L 1280 A	BUFFER-TIME=82 00; FLASH=YES; FP-POS=3	SAME POS AS 2; USE OFFSET V03S AF	1081 Secs (1081 Secs)	[==>]	[5]
	10	sci9 (COS.sp.514 842)	(1) CSS120422	COS/FUV, TIME-TAG, PSA	G140L 1280 A	BUFFER-TIME=82 00; FLASH=YES; FP-POS=3	SAME POS AS 2; USE OFFSET V03S AF	1000 Secs (1000 Secs)	[==>]	[6]
	11	sci10 (COS.sp.514 842)	(1) CSS120422	COS/FUV, TIME-TAG, PSA	G140L 1280 A	BUFFER-TIME=82 00; FLASH=YES; FP-POS=4	SAME POS AS 2; USE OFFSET V03S AF	2090 Secs (2090 Secs)	[==>]	[6]



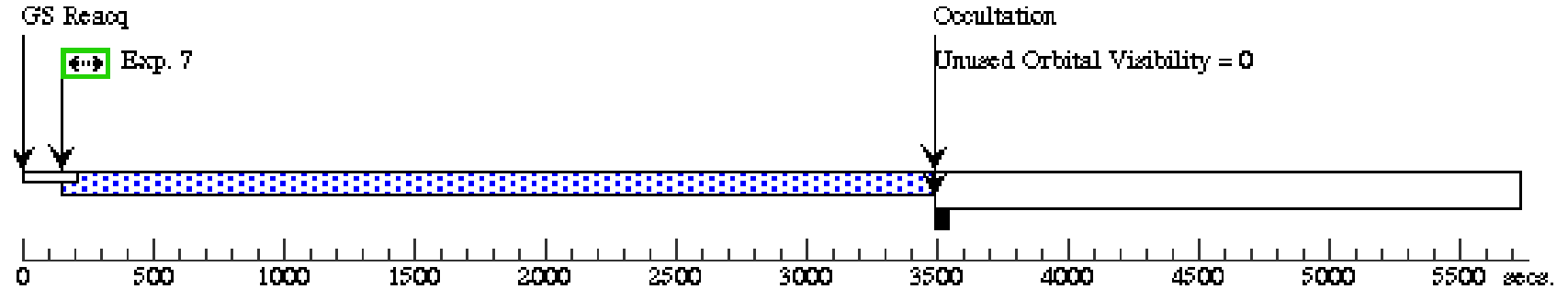
Orbit 3

Server Version: 20131031



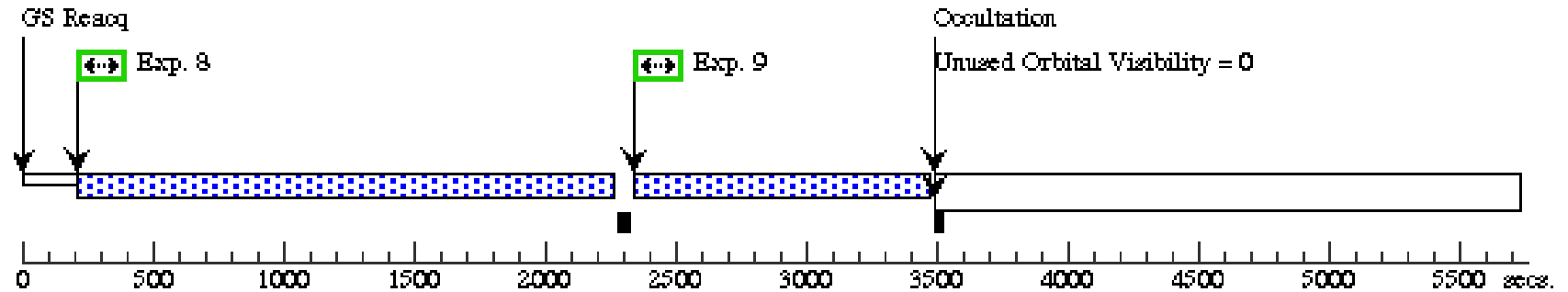
Orbit 4

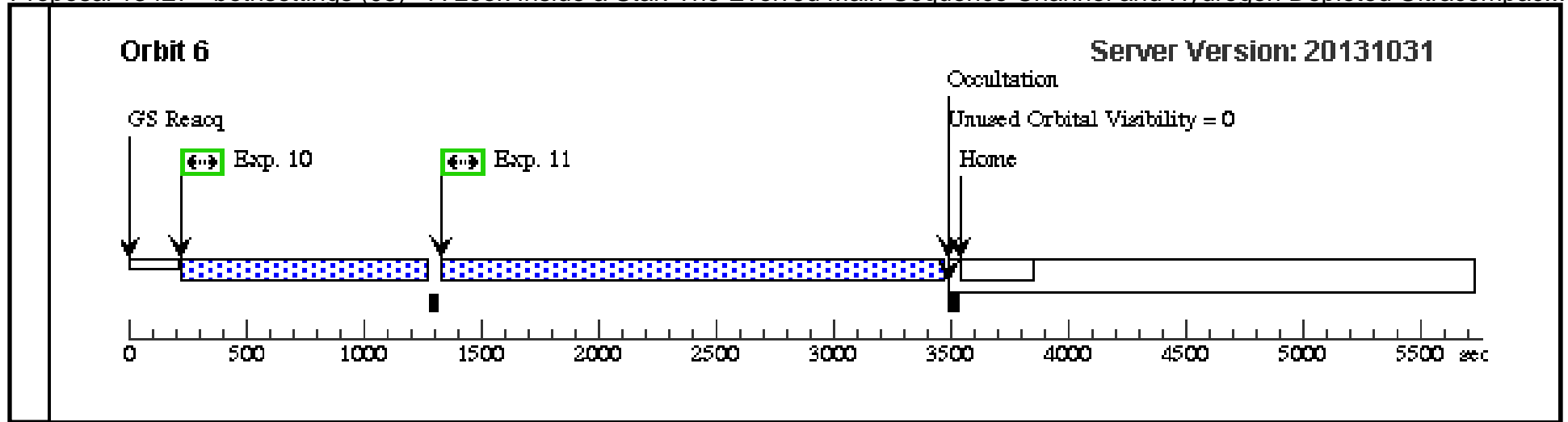
Server Version: 20131031



Orbit 5

Server Version: 20131031



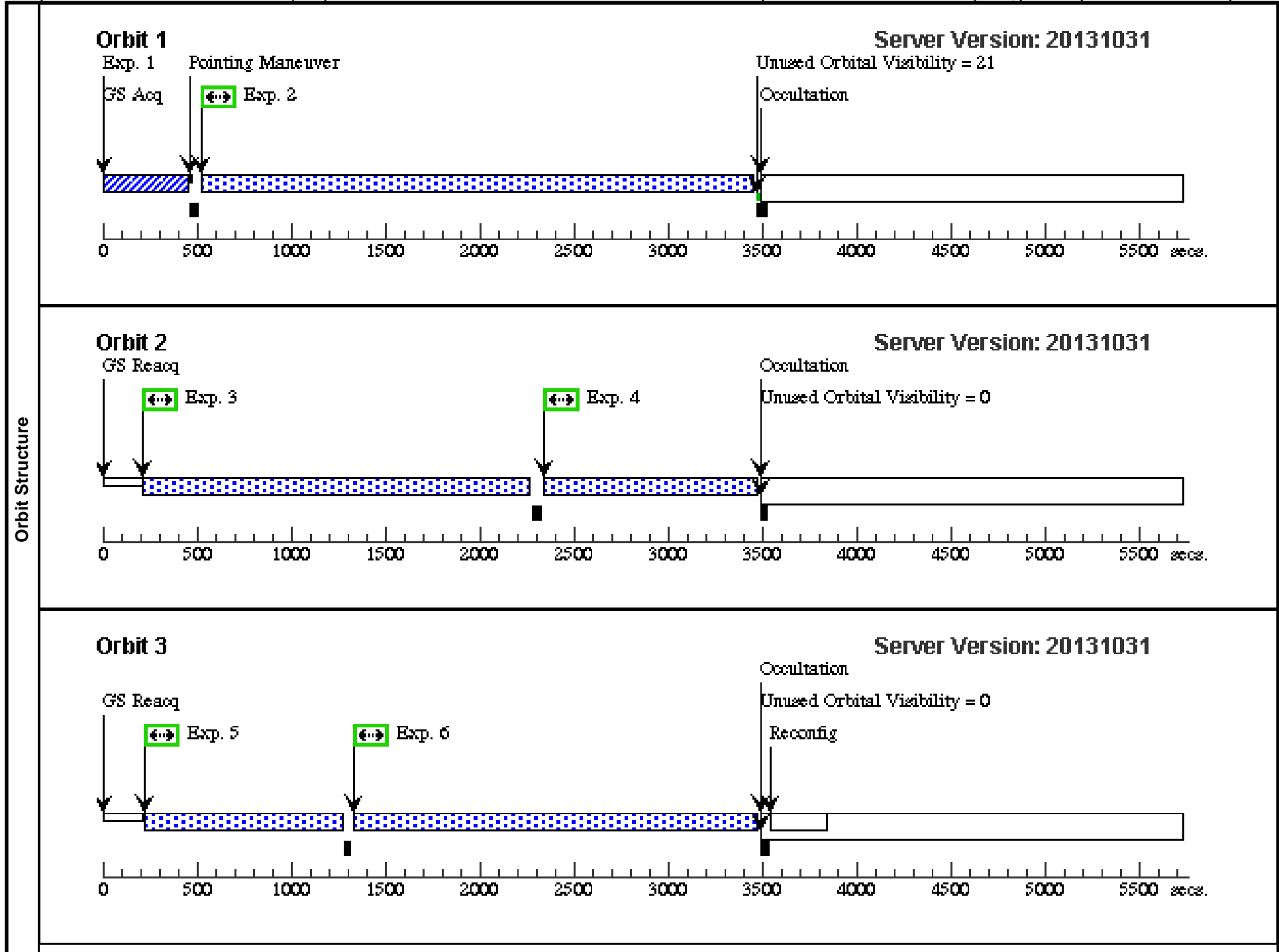


Proposal 13427 - BOP-ONLY (B3) - A Look Inside a Star: The Evolved Main-Sequence Channel and Hydrogen Depleted Ultracompac...

Visit	Proposal 13427, BOP-ONLY (B3), implementation Wed Apr 09 01:28:16 GMT 2014 Diagnostic Status: No Diagnostics Scientific Instruments: COS/NUV, COS/FUV Special Requirements: ORIENT 115D TO 129 D <i>Comments: This visit is for BOP checking the safe target only and should not execute onboard HST</i>					
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes
(1)		CSS120422 Alt Name1: SBS1108+574	RA: 11 11 26.8650 (167.8619375d) Dec: +57 12 38.49 (57.21069d) Equinox: J2000		V=18.5+/-0.5 Galex FUV 20.0 mag (AB)	Reference Frame: ICRS
<i>Comments: Target is a cataclysmic variable that can have outbursts. Ground monitoring will be done before and during HST visits.</i>						
	(2)	CSS120422-SAFE-TARGET Alt Name1: SBS1108+574	Offset from CSS120422 RA Offset: 0.0 Secs Dec Offset: -9.8 Arcsec		V=18.5+/-0.5	Offset Position (CSS120422-SAFE-TARGET)
<i>Comments: This target is a blank piece of sky which is the bright object safe pointing is 9.8 arcseconds away at PA=180 degrees from CSS120422</i>						

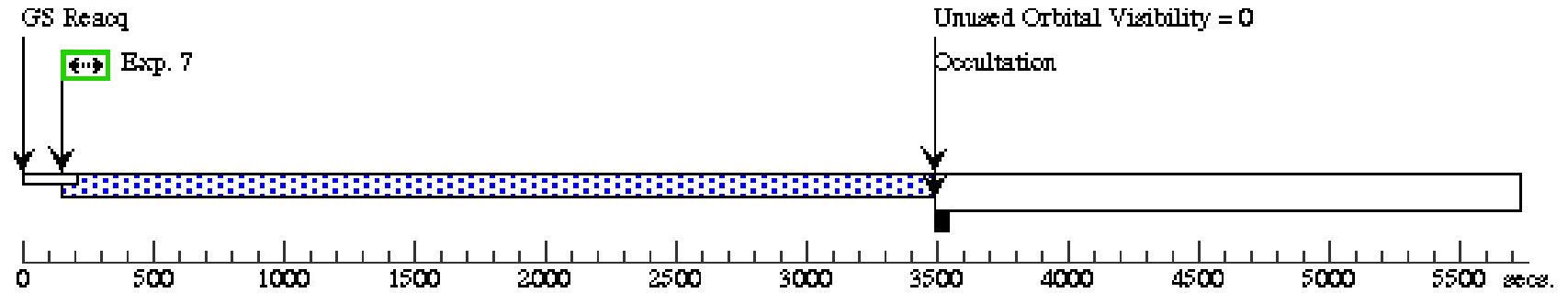
Proposal 13427 - BOP-ONLY (B3) - A Look Inside a Star: The Evolved Main-Sequence Channel and Hydrogen Depleted Ultracompac...

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
Exposures	1	acq1 (COS.im.51 4811)	(2) CSS120422-SAF E-TARGET	COS/NUV, ACQ/IMAGE, PSA	MIRRORA			25 Secs (25 Secs)	[==>]	[1]
	2	sci1 (COS.sp.514 842)	(2) CSS120422-SAF E-TARGET	COS/FUV, TIME-TAG, PSA	G140L 1105 A	FLASH=YES; BUFFER-TIME=82 00; FP-POS=1		2754 Secs (2754 Secs)	[==>]	[1]
	3	sci2 (COS.sp.514 842)	(2) CSS120422-SAF E-TARGET	COS/FUV, TIME-TAG, PSA	G140L 1105 A	BUFFER-TIME=82 00; FLASH=YES; FP-POS=2	SAME POS AS 2	2000 Secs (2000 Secs)	[==>]	[2]
	4	sci3 (COS.sp.514 842)	(2) CSS120422-SAF E-TARGET	COS/FUV, TIME-TAG, PSA	G140L 1105 A	BUFFER-TIME=82 00; FLASH=YES; FP-POS=3	SAME POS AS 2	700 Secs (1081 Secs)	[==>1081.0 Secs]	[2]
	5	sci4 (COS.sp.514 842)	(2) CSS120422-SAF E-TARGET	COS/FUV, TIME-TAG, PSA	G140L 1105 A	BUFFER-TIME=82 00; FLASH=YES; FP-POS=3	SAME POS AS 2	1000 Secs (1000 Secs)	[==>]	[3]
	6	sci5 (COS.sp.514 842)	(2) CSS120422-SAF E-TARGET	COS/FUV, TIME-TAG, PSA	G140L 1105 A	BUFFER-TIME=82 00; FLASH=YES; FP-POS=4	SAME POS AS 2	2090 Secs (2090 Secs)	[==>]	[3]
	7	sci6 (COS.sp.514 842)	(2) CSS120422-SAF E-TARGET	COS/FUV, TIME-TAG, PSA	G140L 1280 A	FLASH=YES; BUFFER-TIME=82 00; FP-POS=1		3205 Secs (3205 Secs)	[==>]	[4]
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	9	sci8 (COS.sp.514 842)	(2) CSS120422-SAF E-TARGET	COS/FUV, TIME-TAG, PSA	G140L 1280 A	BUFFER-TIME=82 00; FLASH=YES; FP-POS=3	SAME POS AS 2	1081 Secs (1081 Secs)	[==>]	[5]
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	11	sci10 (COS.sp.514 842)	(2) CSS120422-SAF E-TARGET	COS/FUV, TIME-TAG, PSA	G140L 1280 A	BUFFER-TIME=82 00; FLASH=YES; FP-POS=4	SAME POS AS 2	2090 Secs (2090 Secs)	[==>]	[6]



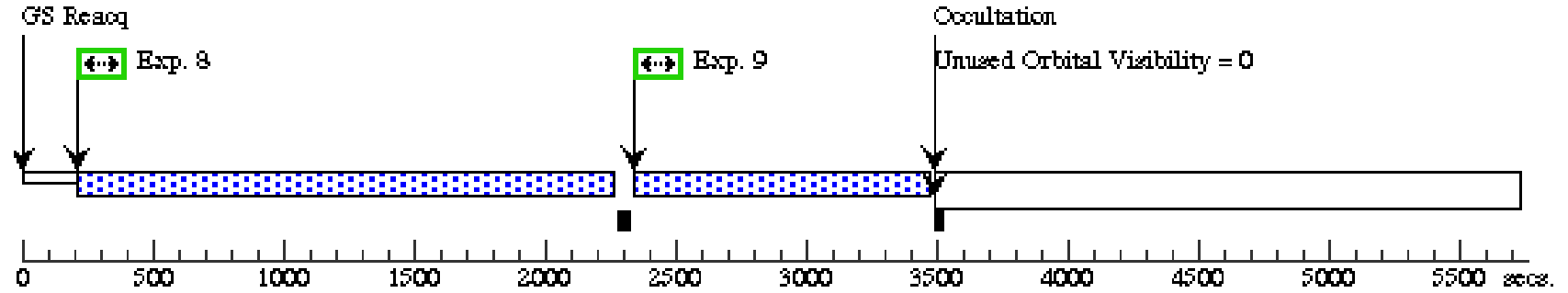
Orbit 4

Server Version: 20131031



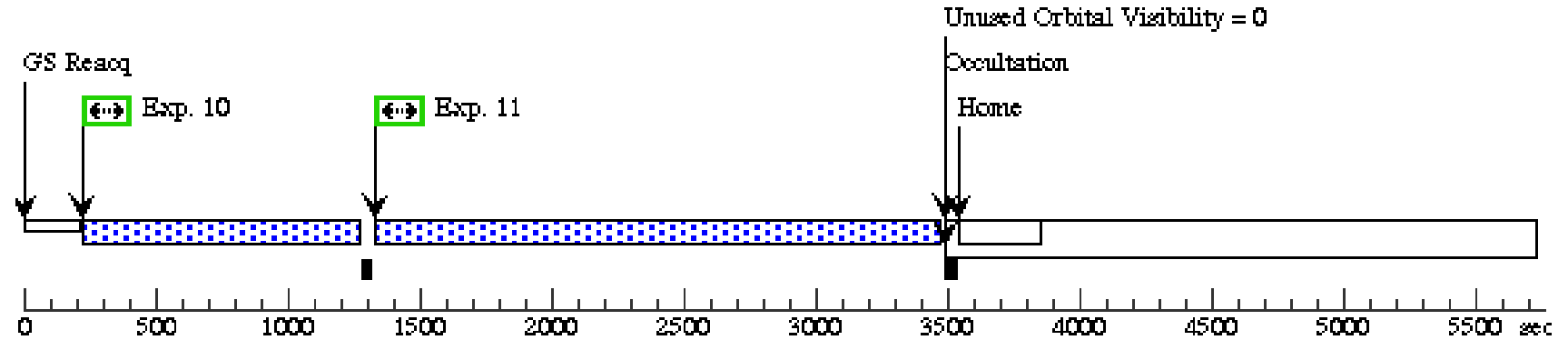
Orbit 5

Server Version: 20131031



Orbit 6

Server Version: 20131031



Proposal 13427 - Visit T3 - A Look Inside a Star: The Evolved Main-Sequence Channel and Hydrogen Depleted Ultracompact Binaries

Wed Apr 09 01:28:19 GMT 2014

Visit	<p>Proposal 13427, Visit T3, implementation</p> <p>Diagnostic Status: Error</p> <p>Scientific Instruments: S/C</p> <p>Special Requirements: ORIENT 115D TO 129 D</p> <p><i>Comments: This visit allocates and sets up the safe position offset slot for visit 03 which will use that slot. This S/C visit should go earlier than visit 03 by at least 3 days. This S/C visit will contain only 1 exposure and should be scheduled during the work week if possible.</i></p>																													
	<p>(Exposure 1 (Visit T3)) Error (Form): DATA is not a valid selection.</p> <p>(Exposure 1 (Visit T3)) Error (Form): This attribute is not allowed to have this value: Mode = DATA It is an Available option and cannot normally be used in a GO proposal.</p> <p>(Exposure 1 (Visit T3)) Error (Form): Illegal selection: S/C.</p> <p>(Exposure 1 (Visit T3)) Error (Form): V1 is not a valid selection.</p> <p>(Exposure 1 (Visit T3)) Error (Form): This attribute is not allowed to have this value: Aperture = V1 It is an Available option and cannot normally be used in a GO proposal.</p> <p>(Exposure 1 (Visit T3)) Error (Form): This attribute is not allowed to have this value: Config = S/C It is an Available option and cannot normally be used in a GO proposal.</p> <p>(Exposure 1 (Visit T3) special requirements) Error (Form): Special Commanding (Instrument) may not be specified in Supported mode or PC Only mode.</p> <p>(Exposure 1 (Visit T3) special requirements) Error (Form): Qesiparms may not be specified in Supported mode or PC Only mode.</p> <p>(Exposure 1 (Visit T3) special requirements) Error (Form): Special Commanding may not be specified in Supported mode or PC Only mode.</p> <p>(Exposure 1 (Visit T3) special requirements) Error (Form): Save Offset may not be specified in Supported mode or PC Only mode.</p>																													
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