



12891 - Search For Binaries Among Ultra-Slow Rotating Trojans, Hildas, and Outer Main Belt Asteroids

Cycle: 20, 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) TROILUS	WFC3/UVIS	1	27-Sep-2012 21:44:06.0	yes
02	(2) OULU	WFC3/UVIS	1	27-Sep-2012 21:44:20.0	yes
03	(3) CLOANTHUS	WFC3/UVIS	1	27-Sep-2012 21:44:31.0	yes
04	(4) AMAZONE	WFC3/UVIS	1	27-Sep-2012 21:44:41.0	yes
05	(5) TROJAN5025	WFC3/UVIS	1	27-Sep-2012 21:44:52.0	yes
06	(6) HIERA	WFC3/UVIS	1	27-Sep-2012 21:45:03.0	yes
07	(7) TROJAN16974	WFC3/UVIS	1	27-Sep-2012 21:45:13.0	yes
08	(8) TROJAN13331	WFC3/UVIS	1	27-Sep-2012 21:45:24.0	yes

8 Total Orbits Used

ABSTRACT

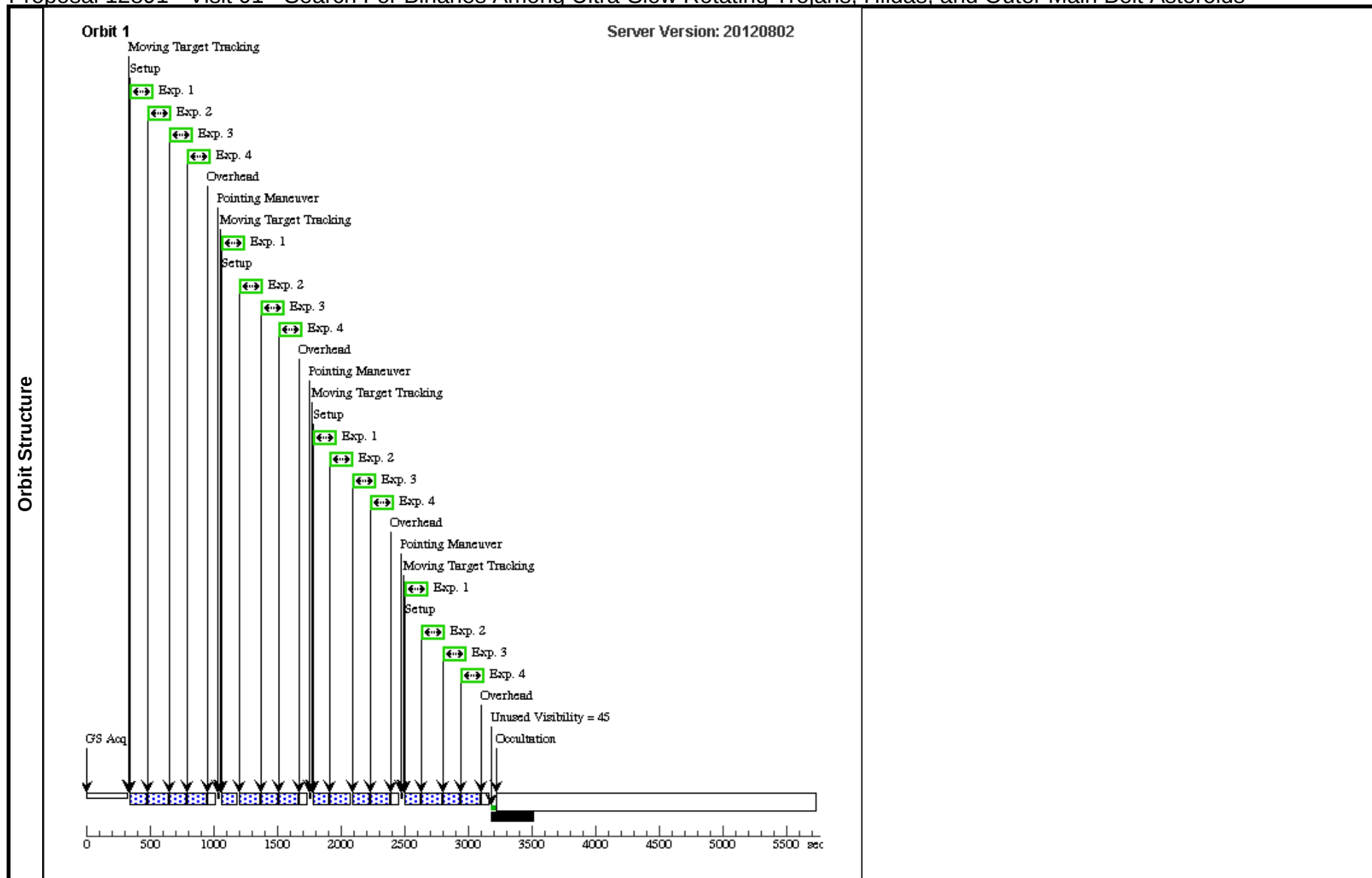
Various models of giant planet migration predict that the small bodies currently in the Kuiper Belt, the Trojans and the Outer Main Asteroid Belt may have had a common origin in the protoplanetary disk between and beyond the forming giant planets. If so, they should share common physical characteristics including low density. Binaries offer the only practical way to determine density and we therefore propose a search for more, focusing on a search for equal-mass binaries that are the most common kind of binary found in the Kuiper Belt. We propose to search all of the known ultra-slow rotators in the Outer Main Belt and Trojan population with the expectation that some of these may be tidally locked binaries like the already known binary Trojan 617 Patroclus. The identification of more of this variety of binary would provide additional linkages between small body populations. The lack of any new binaries would require and constrain other evolutionary processes such as collisions.

OBSERVING DESCRIPTION

x

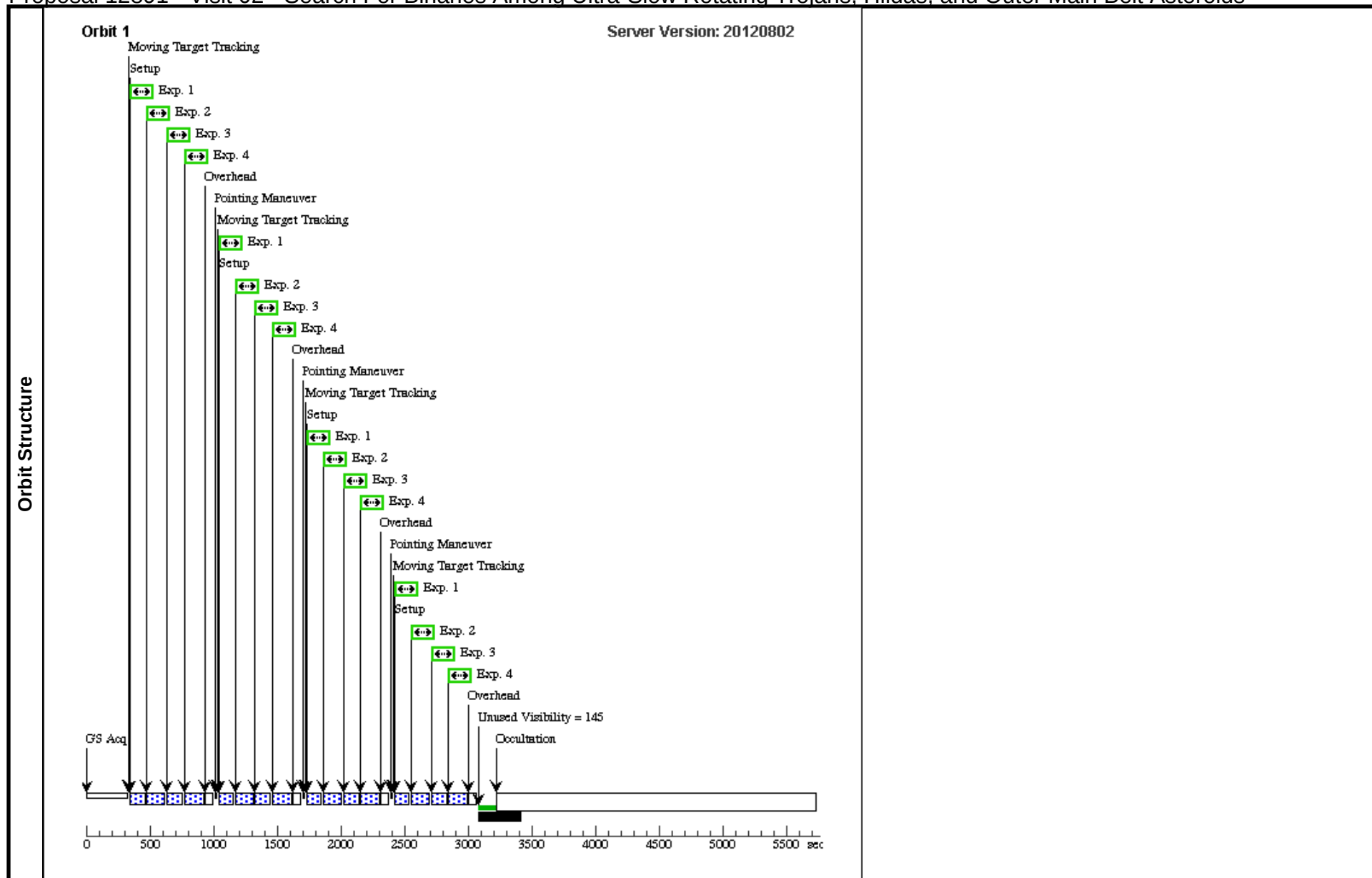
Proposal 12891 - Visit 01 - Search For Binaries Among Ultra-Slow Rotating Trojans, Hildas, and Outer Main Belt Asteroids

Visit	Proposal 12891, Visit 01, implementation										Fri Sep 28 01:45:33 GMT 2012		
	Diagnostic Status: No Diagnostics												
	Scientific Instruments: WFC3/UVIS												
	Special Requirements: BETWEEN 01-OCT-2012:00:00:00 AND 04-DEC-2012:00:00:00												
Patterns	#	Primary Pattern					Secondary Pattern					Exposures	
	(1)	Pattern Type=WFC3-UVIS-DITHER-BOX Coordinate Frame=POS-TARG Pattern Orientation=23.884 Purpose=DITHER Angle Between Sides=81.785 Number Of Points=4 Center Pattern=false Point Spacing=0.173 Line Spacing=0.112										(1-4)	
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center						
	(1)	TROILUS	TYPE=ASTEROID,A=5.24295844,E=0.09276816,I=33.562335,O=48.557825,W=295.626593,M=8.890946,EQUINOX=J2000,EPOCH=14-MAR-2012:00:00:00,EpochTimeScale=UTC									EARTH	
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]		Orbit		
	1		(1) TROILUS	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F555W			Pattern 1, Exps 1-4 in Visit 01 (1)	20 Secs				
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]		[1]		
	2		(1) TROILUS	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F438W			Pattern 1, Exps 1-4 in Visit 01 (1)	60 Secs				
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]		[1]		
	3		(1) TROILUS	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W			Pattern 1, Exps 1-4 in Visit 01 (1)	30 Secs				
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]		[1]		
	4		(1) TROILUS	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F336W			Pattern 1, Exps 1-4 in Visit 01 (1)	120 Secs				
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]		[1]		



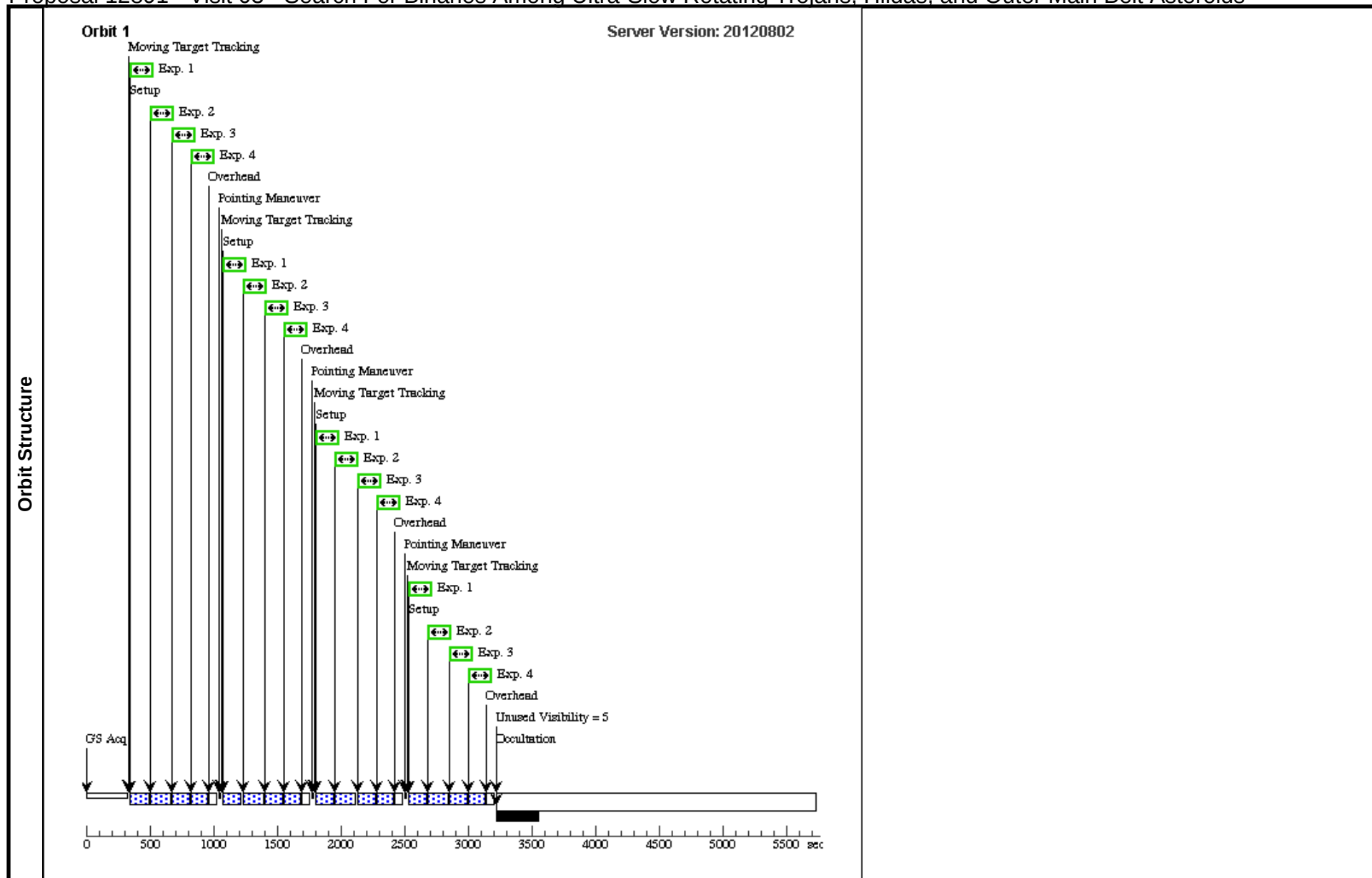
Proposal 12891 - Visit 02 - Search For Binaries Among Ultra-Slow Rotating Trojans, Hildas, and Outer Main Belt Asteroids

Visit	Proposal 12891, Visit 02, implementation										Fri Sep 28 01:45:35 GMT 2012
	Diagnostic Status: No Diagnostics										
	Scientific Instruments: WFC3/UVIS										
	Special Requirements: BETWEEN 01-OCT-2012:00:00:00 AND 13-NOV-2012:00:00:00										
Patterns	#	Primary Pattern				Secondary Pattern				Exposures	
	(1)	Pattern Type=WFC3-UVIS-DITHER-BOX Coordinate Frame=POS-TARG Pattern Orientation=23.884 Purpose=DITHER Angle Between Sides=81.785 Number Of Points=4 Center Pattern=false Point Spacing=0.173 Line Spacing=0.112								(1-4)	
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center				
	(2)	OULU	TYPE=ASTEROID,A=3.9439528,E=0.1512109,I=6.49671,O=10.28597,W=240.66476,M=80.57717,EQUINOX=J2000,EPOCH=14-MAR-2012:00:00:00,EpochTimeScale=UTC				EARTH				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit	
	1		(2) OULU	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F555W			Pattern 1, Exps 1-4 in Visit 02 (1)	15 Secs		
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	
	2		(2) OULU	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F438W			Pattern 1, Exps 1-4 in Visit 02 (1)	45 Secs		
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	
	3		(2) OULU	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W			Pattern 1, Exps 1-4 in Visit 02 (1)	25 Secs		
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	
	4		(2) OULU	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F336W			Pattern 1, Exps 1-4 in Visit 02 (1)	120 Secs		
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	



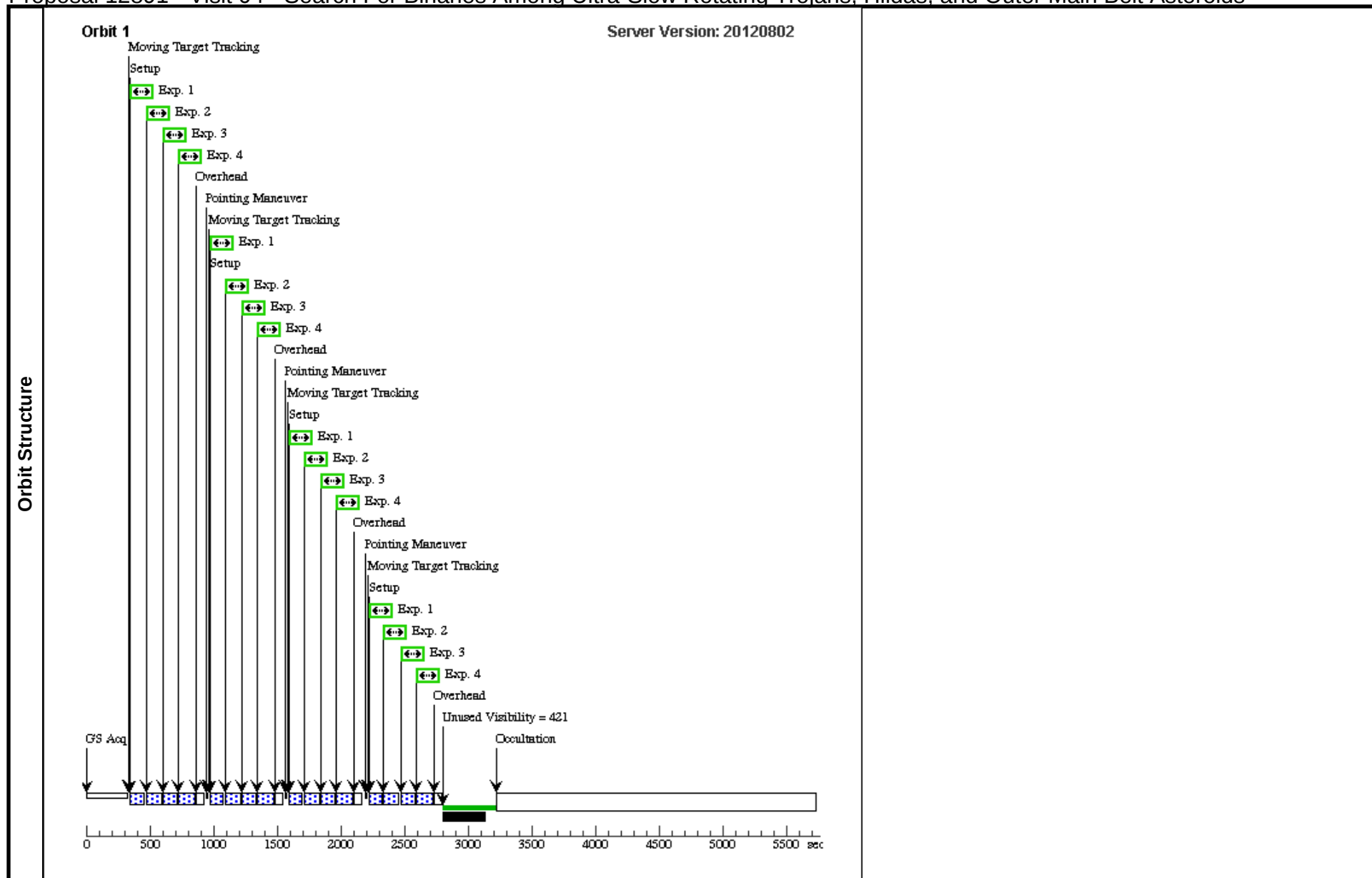
Proposal 12891 - Visit 03 - Search For Binaries Among Ultra-Slow Rotating Trojans, Hildas, and Outer Main Belt Asteroids

Visit	Proposal 12891, Visit 03, implementation										Fri Sep 28 01:45:37 GMT 2012		
	Diagnostic Status: No Diagnostics												
	Scientific Instruments: WFC3/UVIS												
	Special Requirements: BETWEEN 01-OCT-2012:00:00:00 AND 06-DEC-2012:00:00:00												
Patterns	#	Primary Pattern					Secondary Pattern					Exposures	
	(1)	Pattern Type=WFC3-UVIS-DITHER-BOX Coordinate Frame=POS-TARG Pattern Orientation=23.884 Purpose=DITHER Angle Between Sides=81.785 Number Of Points=4 Center Pattern=false Point Spacing=0.173 Line Spacing=0.112										(1-4)	
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center						
	(3)	CLOANTHUS	TYPE=ASTEROID,A=5.2341563,E=0.1181474,I=11.17605,O=172.73449,W=121.36389,M=59.25401,EQUINOX=J2000,EPOCH=14-MAR-2012:00:00:00,EpochTimeScale=UTC								EARTH		
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]		Orbit		
	1		(3) CLOANTHUS	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F555W			Pattern 1, Exps 1-4 in Visit 03 (1)	40 Secs				
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]		[1]		
	2		(3) CLOANTHUS	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F438W			Pattern 1, Exps 1-4 in Visit 03 (1)	60 Secs				
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]		[1]		
	3		(3) CLOANTHUS	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W			Pattern 1, Exps 1-4 in Visit 03 (1)	40 Secs				
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]		[1]		
	4		(3) CLOANTHUS	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F336W			Pattern 1, Exps 1-4 in Visit 03 (1)	100 Secs				
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]		[1]		



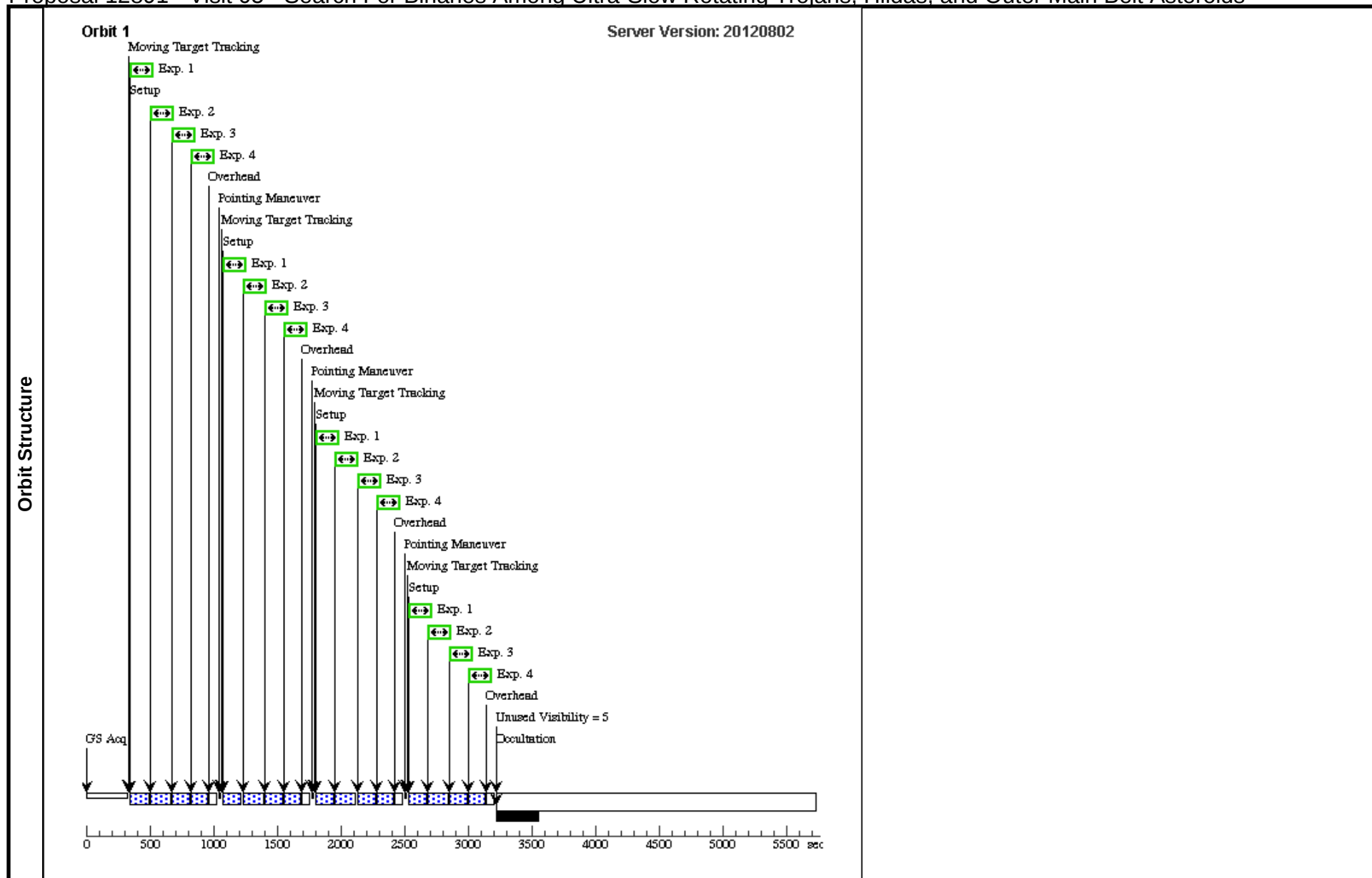
Proposal 12891 - Visit 04 - Search For Binaries Among Ultra-Slow Rotating Trojans, Hildas, and Outer Main Belt Asteroids

Visit	Proposal 12891, Visit 04, implementation										Fri Sep 28 01:45:38 GMT 2012	
	Diagnostic Status: No Diagnostics											
	Scientific Instruments: WFC3/UVIS											
	Special Requirements: BETWEEN 23-JUN-2013:00:00:00 AND 15-SEP-2013:00:00:00											
Patterns	#	Primary Pattern				Secondary Pattern				Exposures		
	(1)	Pattern Type=WFC3-UVIS-DITHER-BOX Coordinate Frame=POS-TARG Pattern Orientation=23.884 Purpose=DITHER Angle Between Sides=81.785 Number Of Points=4 Center Pattern=false Point Spacing=0.173 Line Spacing=0.112								(1-4)		
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center					
	(4)	AMAZONE	TYPE=ASTEROID,A=3.2358479,E=0.092790300000000001,I=20.68266,O=5.256312,W=295.47667,M=243.14679,EQUINOX=J2000,EPOCH=14-MAR-2012:00:00:00,EpochTimeScale=UTC									EARTH
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]		Orbit	
	1		(4) AMAZONE	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F555W			Pattern 1, Exps 1-4 in Visit 04 (1)	6 Secs		[1]	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]			
	2		(4) AMAZONE	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F438W			Pattern 1, Exps 1-4 in Visit 04 (1)	20 Secs			[1]
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]			
	3		(4) AMAZONE	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W			Pattern 1, Exps 1-4 in Visit 04 (1)	10 Secs		[1]	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]			
	4		(4) AMAZONE	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F336W			Pattern 1, Exps 1-4 in Visit 04 (1)	100 Secs			[1]
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]			



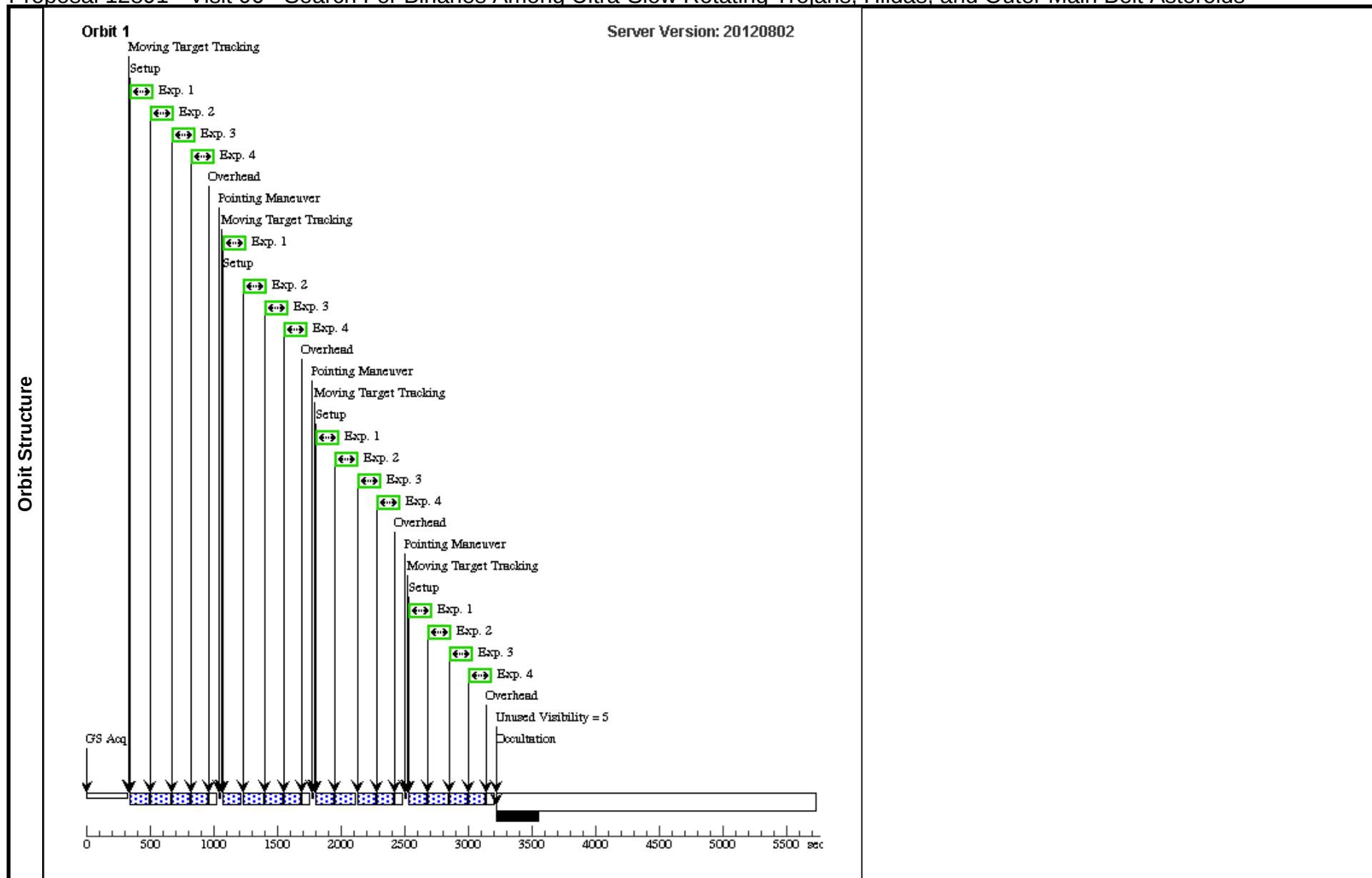
Proposal 12891 - Visit 05 - Search For Binaries Among Ultra-Slow Rotating Trojans, Hildas, and Outer Main Belt Asteroids

Visit	Proposal 12891, Visit 05, implementation										Fri Sep 28 01:45:40 GMT 2012	
	Diagnostic Status: No Diagnostics											
	Scientific Instruments: WFC3/UVIS											
	Special Requirements: BETWEEN 11-DEC-2012:00:00:00 AND 29-MAR-2013:00:00:00											
Patterns	#	Primary Pattern					Secondary Pattern				Exposures	
	(1)	Pattern Type=WFC3-UVIS-DITHER-BOX Coordinate Frame=POS-TARG Pattern Orientation=23.884 Purpose=DITHER Angle Between Sides=81.785 Number Of Points=4 Center Pattern=false Point Spacing=0.173 Line Spacing=0.112									(1-4)	
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center					
	(5)	TROJAN5025	TYPE=ASTEROID,A=5.20293989,E=0.07610617,I=11.022431,O=347.8470 80,W=73.959426,M=37.518692,EQUI NOX=J2000,EPOCH=14-MAR-2012:00:00:00,EpochTimeScale=UTC									EARTH
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]		Orbit	
	1		(5) TROJAN5025	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F555W			Pattern 1, Exps 1-4 in Visit 05 (1)	40 Secs			
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]		[1]	
	2		(5) TROJAN5025	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F438W			Pattern 1, Exps 1-4 in Visit 05 (1)	60 Secs			
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]		[1]	
	3		(5) TROJAN5025	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W			Pattern 1, Exps 1-4 in Visit 05 (1)	40 Secs			
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]		[1]	
	4		(5) TROJAN5025	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F336W			Pattern 1, Exps 1-4 in Visit 05 (1)	100 Secs			
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]		[1]	



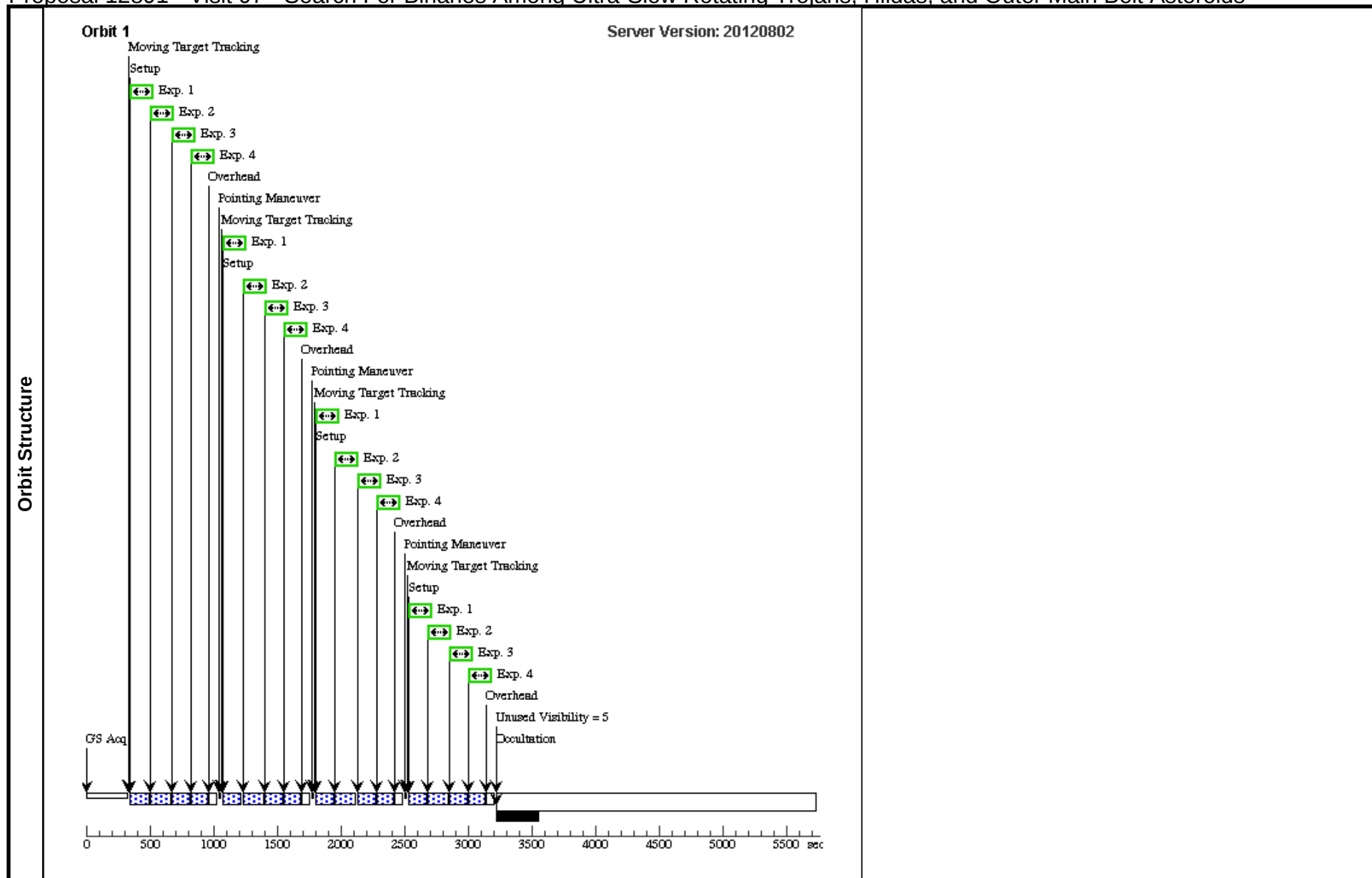
Proposal 12891 - Visit 06 - Search For Binaries Among Ultra-Slow Rotating Trojans, Hildas, and Outer Main Belt Asteroids

Visit	Proposal 12891, Visit 06, implementation										Fri Sep 28 01:45:41 GMT 2012		
	Diagnostic Status: No Diagnostics												
	Scientific Instruments: WFC3/UVIS												
	Special Requirements: BETWEEN 29-NOV-2012:00:00:00 AND 15-MAR-2013:00:00:00												
Patterns	#	Primary Pattern					Secondary Pattern					Exposures	
	(1)	Pattern Type=WFC3-UVIS-DITHER-BOX Coordinate Frame=POS-TARG Pattern Orientation=23.884 Purpose=DITHER Angle Between Sides=81.785 Number Of Points=4 Center Pattern=false Point Spacing=0.173 Line Spacing=0.112										(1-4)	
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center						
	(6)	HIERA	TYPE=ASTEROID,A=5.168352,E=0.1030461,I=19.29696,O=285.57605,W=122.71245,M=38.97766,EQUINOX=J2000,EPOCH=14-MAR-2012:00:00:00,EpochTimeScale=UTC									EARTH	
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]		Orbit		
	1		(6) HIERA	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F555W			Pattern 1, Exps 1-4 in Visit 06 (1)	40 Secs				
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]		[1]		
	2		(6) HIERA	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F438W			Pattern 1, Exps 1-4 in Visit 06 (1)	60 Secs				
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]		[1]		
	3		(6) HIERA	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W			Pattern 1, Exps 1-4 in Visit 06 (1)	40 Secs				
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]		[1]		
	4		(6) HIERA	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F336W			Pattern 1, Exps 1-4 in Visit 06 (1)	100 Secs				
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]		[1]		



Proposal 12891 - Visit 07 - Search For Binaries Among Ultra-Slow Rotating Trojans, Hildas, and Outer Main Belt Asteroids

Visit	Proposal 12891, Visit 07, implementation										Fri Sep 28 01:45:42 GMT 2012		
	Diagnostic Status: No Diagnostics												
	Scientific Instruments: WFC3/UVIS												
	Special Requirements: BETWEEN 01-DEC-2012:00:00:00 AND 24-MAR-2013												
Patterns	#	Primary Pattern					Secondary Pattern					Exposures	
	(1)	Pattern Type=WFC3-UVIS-DITHER-BOX Coordinate Frame=POS-TARG Pattern Orientation=23.884 Purpose=DITHER Angle Between Sides=81.785 Number Of Points=4 Center Pattern=false Point Spacing=0.173 Line Spacing=0.112										(1-4)	
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center						
	(7)	TROJAN16974	TYPE=ASTEROID,A=5.2035571,E=0.06927079999999999,I=15.01929,O=241.59759,W=136.46998,M=76.52542,EQUINOX=J2000,EPOCH=14-MAR-2012:00:00:00,EpochTimeScale=UTC						EARTH				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]		Orbit		
	1		(7) TROJAN16974	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F555W			Pattern 1, Exps 1-4 in Visit 07 (1)	40 Secs				
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]		[1]		
	2		(7) TROJAN16974	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F438W			Pattern 1, Exps 1-4 in Visit 07 (1)	60 Secs				
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]		[1]		
	3		(7) TROJAN16974	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W			Pattern 1, Exps 1-4 in Visit 07 (1)	40 Secs				
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]		[1]		
	4		(7) TROJAN16974	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F336W			Pattern 1, Exps 1-4 in Visit 07 (1)	100 Secs				
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]		[1]		



Proposal 12891 - Visit 08 - Search For Binaries Among Ultra-Slow Rotating Trojans, Hildas, and Outer Main Belt Asteroids

Visit	Proposal 12891, Visit 08, implementation										Fri Sep 28 01:45:44 GMT 2012		
	Diagnostic Status: No Diagnostics												
	Scientific Instruments: WFC3/UVIS												
	Special Requirements: BETWEEN 14-DEC-2012:00:00:00 AND 26-MAR-2013:00:00:00												
Patterns	#	Primary Pattern					Secondary Pattern					Exposures	
	(1)	Pattern Type=WFC3-UVIS-DITHER-BOX Coordinate Frame=POS-TARG Pattern Orientation=23.884 Purpose=DITHER Angle Between Sides=81.785 Number Of Points=4 Center Pattern=false Point Spacing=0.173 Line Spacing=0.112										(1-4)	
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center						
	(8)	TROJAN13331	TYPE=ASTEROID,A=5.2035571,E=0.06927079999999999,I=15.01929,O=241.59759,W=136.46998,M=76.52542,EQUINOX=J2000,EPOCH=14-MAR-2012:00:00:00,EpochTimeScale=UTC				EARTH						
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]		Orbit		
	1		(8) TROJAN13331	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F555W			Pattern 1, Exps 1-4 in Visit 08 (1)	40 Secs				
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]		[1]		
	2		(8) TROJAN13331	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F438W			Pattern 1, Exps 1-4 in Visit 08 (1)	60 Secs				
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]		[1]		
	3		(8) TROJAN13331	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W			Pattern 1, Exps 1-4 in Visit 08 (1)	40 Secs				
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]		[1]		
	4		(8) TROJAN13331	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F336W			Pattern 1, Exps 1-4 in Visit 08 (1)	100 Secs				
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]		[1]		

