



14917 - What is the origin of the UV-absorbing cloud orbiting the iconic star 55 Cnc ?

Cycle: 24, Proposal Category: GO

(UV Initiative)

(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>
01	(1) -RHO-CNC WAVE	STIS/CCD STIS/NUV-MAMA	5	15-Mar-2017 21:06:35.0	yes
02	(1) -RHO-CNC WAVE	STIS/CCD STIS/NUV-MAMA	5	15-Mar-2017 21:06:42.0	yes

10 Total Orbits Used

ABSTRACT

The super-Earth 55 Cnc e transits an extremely bright star ($V=6$) at a very short separation ($P=18$ hours). Optical and infrared observations suggest it could be surrounded by a heavyweight atmosphere. Heated to more than 2000 K, the planet surface could indeed be covered by magma oceans that would outgas large amounts of dust and metals, prone to escape. Our recent observations of the transit with HST/STIS at near-UV wavelengths revealed a deep absorption, repeatable over two visits, that could be produced by an extended cloud much larger than the planet. Surprisingly, this absorption occurs before the planet transit, raising the question of whether or not it originates from the planet. Earth occultation prevented the HST from observing the full duration of the occultation produced by the putative cloud. With two independent visits of five orbits each, a Mid-Cycle program is the perfect opportunity to assess the repeatability of the occultation and to complete our phase coverage, thus probing the full extension of the cloud. Its signature was not detected at optical/infrared wavelengths, and the unique UV capabilities of HST provide our only option to characterize the mysterious UV-absorbing cloud present in the 55 Cnc system.

OBSERVING DESCRIPTION

This program consists in 2 visits of 5 HST orbits each (total 10 HST orbits), dedicated to the observations of a transiting object in the 55 Cnc system. This object has the same orbital period as the super-Earth 55 Cnc e, but transits about 2.5h earlier. The transit of this object was observed in two different epochs in GO program #14094 (visits #1 and #3). Both visits in our current program aim at completing our coverage of the transit event, and will thus use the same settings as in program #14094 but with different phase constraints. Visits are scheduled so that the transit of the object occurs during the third orbit. The timing requirements are set as phase constraints on the first ACQ exposure of the first orbit in a visit. Because we need to observe the transit in the specific phase window that was not covered in previous HST observations, our phase constraints are relatively stringent and the allowed start phase range is ~ 15 min.

Ideally the two visits should be scheduled close from one another, to observe the transiting object in similar conditions. However we would also like to request, if possible, that the interval between the two visits is long enough that we can change the scheduling of the second visit based on the results of the first visit, if necessary.

Proposal 14917 - Visit 01 - What is the origin of the UV-absorbing cloud orbiting the iconic star 55 Cnc ?

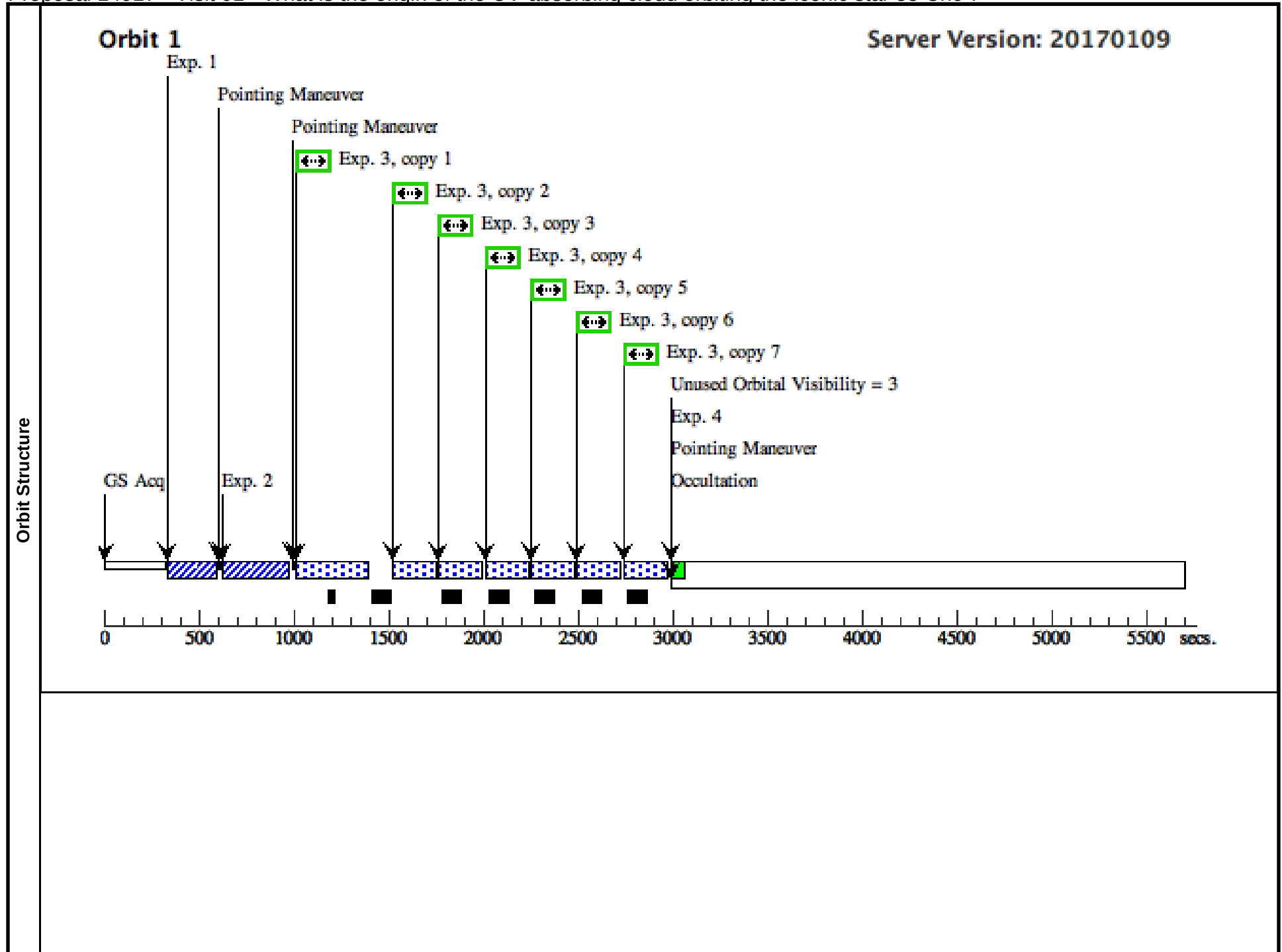
Visit	Proposal 14917, Visit 01					Thu Mar 16 01:06:46 GMT 2017
	Diagnostic Status: No Diagnostics					
	Scientific Instruments: STIS/NUV-MAMA, STIS/CCD					
	Special Requirements: SCHED 100%; Period 0.736543 D AND ZERO-PHASE HJD2455733.008					
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	-RHO-CNC	RA: 08 52 35.8109 (133.1492121d)	Proper Motion RA: -485.80 mas/yr	V=5.95	Reference Frame: ICRS
		Alt Name1: HR3522	Dec: +28 19 50.95 (28.33082d)	Proper Motion Dec: -234.05 mas/yr	U=7.45,	
		Alt Name2: GJ324A	Equinox: J2000	Parallax: 0.08103"	B=6.82,	
				Epoch of Position: 2000	R=5.4,	
				Radial Velocity: 27.36 km/sec	I=5.0,	
					J=4.59,	
				H=4.14,		
				K=4.015		
	Comments: This star is in a double system (common proper motions) with 55 Cancri B (GJ 324B), a much fainter (V=13) M4 dwarf that is 1.4-arcmin away. It also 4.6-arcmin away from the similarly bright (V=6.3) star 53 Cancri (BO Cancri).					
	Extended=NO					

Proposal 14917 - Visit 01 - What is the origin of the UV-absorbing cloud orbiting the iconic star 55 Cnc ?

Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	ACQ (STIS.ta.715 432)	(1) -RHO-CNC	STIS/CCD, ACQ, F28X50OII	MIRROR		PHASE 0.63 TO 0.6 45	Sequence 1-4 Non-Int in Visit 01	1 Secs (1 Secs) [==>]	[1]
	Comments: For the ACQ and ACQ/PEAK exposures, we selected the same settings as in Program #14094 which consisted of STIS observations of the same star with the same settings (Visits #1 and #3).									
	2	ACQ/PEAK (STIS.sp.71 5444)	(1) -RHO-CNC	STIS/CCD, ACQ/PEAK, 52X0.05	G430L 4300 A			Sequence 1-4 Non-Int in Visit 01	1 Secs (1 Secs) [==>]	[1]
	3	SCI (STIS.sp.71 6764)	(1) -RHO-CNC	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A	WAVECAL=NO		Sequence 1-4 Non-Int in Visit 01	250 Secs X 7 (1540 Secs) [==>220.0 Secs (Copy 1)] [==>220.0 Secs (Copy 2)] [==>220.0 Secs (Copy 3)] [==>220.0 Secs (Copy 4)] [==>220.0 Secs (Copy 5)] [==>220.0 Secs (Copy 6)] [==>220.0 Secs (Copy 7)]	[1]
	Comments: The count-rate estimated in time-tag mode results in too many buffer dumps. As an alternative for our scientific purpose, we use instead a series of ACCUM mode exposures with the optimal combination between time resolution, SNR, and buffer dumps. This the same strategy that was used in program #14094 (visits #1 and #3)									
	4	GO-WAVE CAL	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 1-4 Non-Int in Visit 01	[==>]	[1]
	5	ACQ/PEAK (STIS.sp.71 5444)	(1) -RHO-CNC	STIS/CCD, ACQ/PEAK, 52X0.05	G430L 4300 A			Sequence 5-7 Non-Int in Visit 01	1 Secs (1 Secs) [==>]	[2]
	6	SCI (STIS.sp.71 6764)	(1) -RHO-CNC	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 5-7 Non-Int in Visit 01	200 Secs X 8 (1872 Secs) [==>234.0 Secs (Copy 1)] [==>234.0 Secs (Copy 2)] [==>234.0 Secs (Copy 3)] [==>234.0 Secs (Copy 4)] [==>234.0 Secs (Copy 5)] [==>234.0 Secs (Copy 6)] [==>234.0 Secs (Copy 7)] [==>234.0 Secs (Copy 8)]	[2]
	7	GO-WAVE CAL	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 5-7 Non-Int in Visit 01	[==>]	[2]
	8	ACQ/PEAK (STIS.sp.71 5444)	(1) -RHO-CNC	STIS/CCD, ACQ/PEAK, 52X0.05	G430L 4300 A			Sequence 8-10 Non-Int in Visit 01	1 Secs (1 Secs) [==>]	[3]
	9	SCI (STIS.sp.71 6764)	(1) -RHO-CNC	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 8-10 Non-Int in Visit 01	200 Secs X 8 (1872 Secs) [==>234.0 Secs (Copy 1)] [==>234.0 Secs (Copy 2)] [==>234.0 Secs (Copy 3)] [==>234.0 Secs (Copy 4)] [==>234.0 Secs (Copy 5)] [==>234.0 Secs (Copy 6)] [==>234.0 Secs (Copy 7)] [==>234.0 Secs (Copy 8)]	[3]

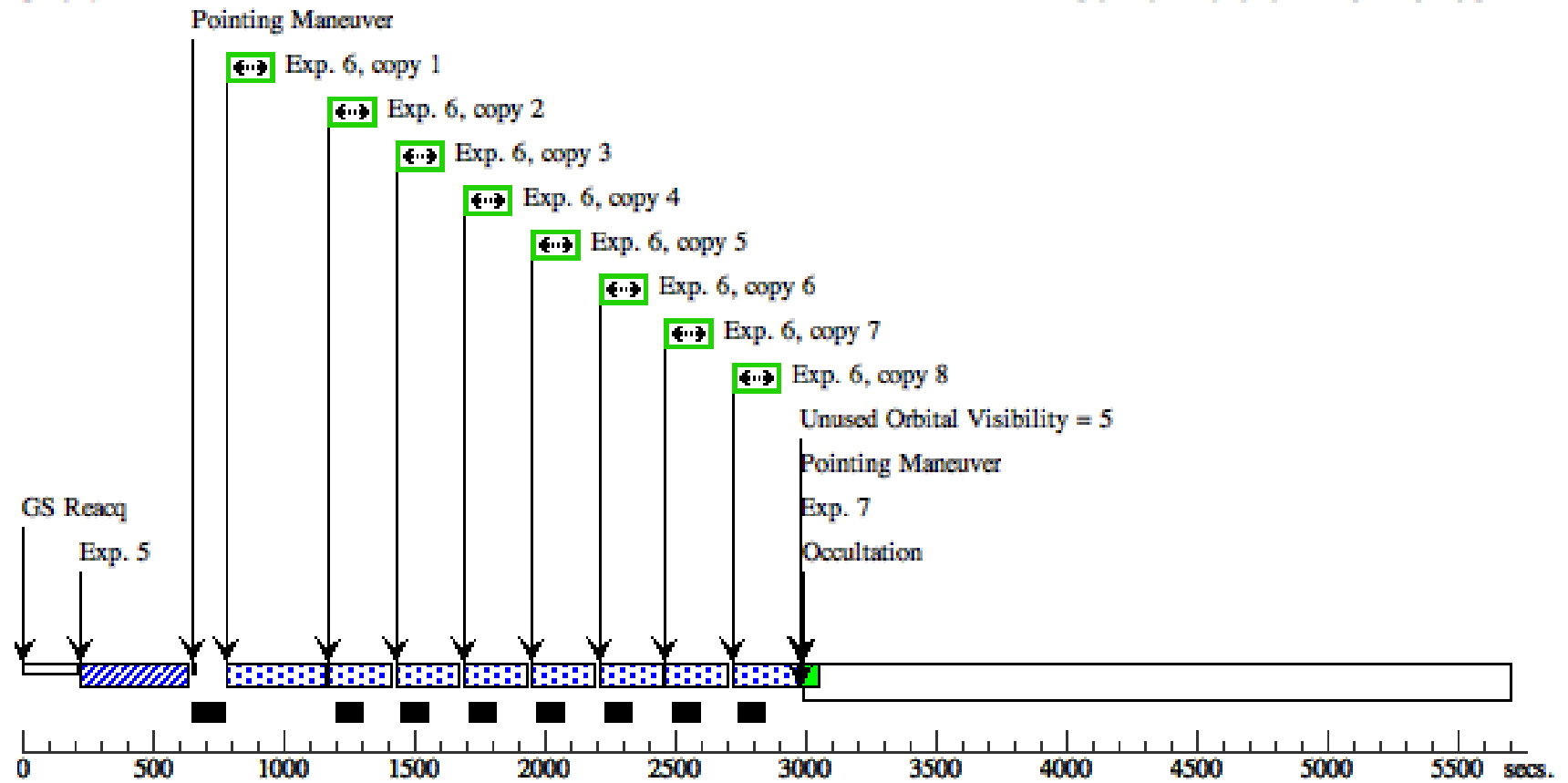
Proposal 14917 - Visit 01 - What is the origin of the UV-absorbing cloud orbiting the iconic star 55 Cnc ?

10	GO-WAVE CAL	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A	Sequence 8-10 Non-Int in Visit 01	[==>]	[3]
11	ACQ/PEAK (STIS.sp.71 5444)	(1) -RHO-CNC	STIS/CCD, ACQ/PEAK, 52X0.05	G430L 4300 A	Sequence 11-13 Non-Int in Visit 01	1 Secs (1 Secs) [==>]	[4]
12	SCI (STIS.sp.71 6764)	(1) -RHO-CNC	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A	Sequence 11-13 Non-Int in Visit 01	200 Secs X 8 (1872 Secs) [==>234.0 Secs (Copy 1)] [==>234.0 Secs (Copy 2)] [==>234.0 Secs (Copy 3)] [==>234.0 Secs (Copy 4)] [==>234.0 Secs (Copy 5)] [==>234.0 Secs (Copy 6)] [==>234.0 Secs (Copy 7)] [==>234.0 Secs (Copy 8)]	[4]
13	GO-WAVE CAL	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A	Sequence 11-13 Non-Int in Visit 01	[==>]	[4]
14	ACQ/PEAK (STIS.sp.71 5444)	(1) -RHO-CNC	STIS/CCD, ACQ/PEAK, 52X0.05	G430L 4300 A	Sequence 14-16 Non-Int in Visit 01	1 Secs (1 Secs) [==>]	[5]
15	SCI (STIS.sp.71 6764)	(1) -RHO-CNC	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A	Sequence 14-16 Non-Int in Visit 01	200 Secs X 8 (1872 Secs) [==>234.0 Secs (Copy 1)] [==>234.0 Secs (Copy 2)] [==>234.0 Secs (Copy 3)] [==>234.0 Secs (Copy 4)] [==>234.0 Secs (Copy 5)] [==>234.0 Secs (Copy 6)] [==>234.0 Secs (Copy 7)] [==>234.0 Secs (Copy 8)]	[5]
16	GO-WAVE CAL	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A	Sequence 14-16 Non-Int in Visit 01	[==>]	[5]



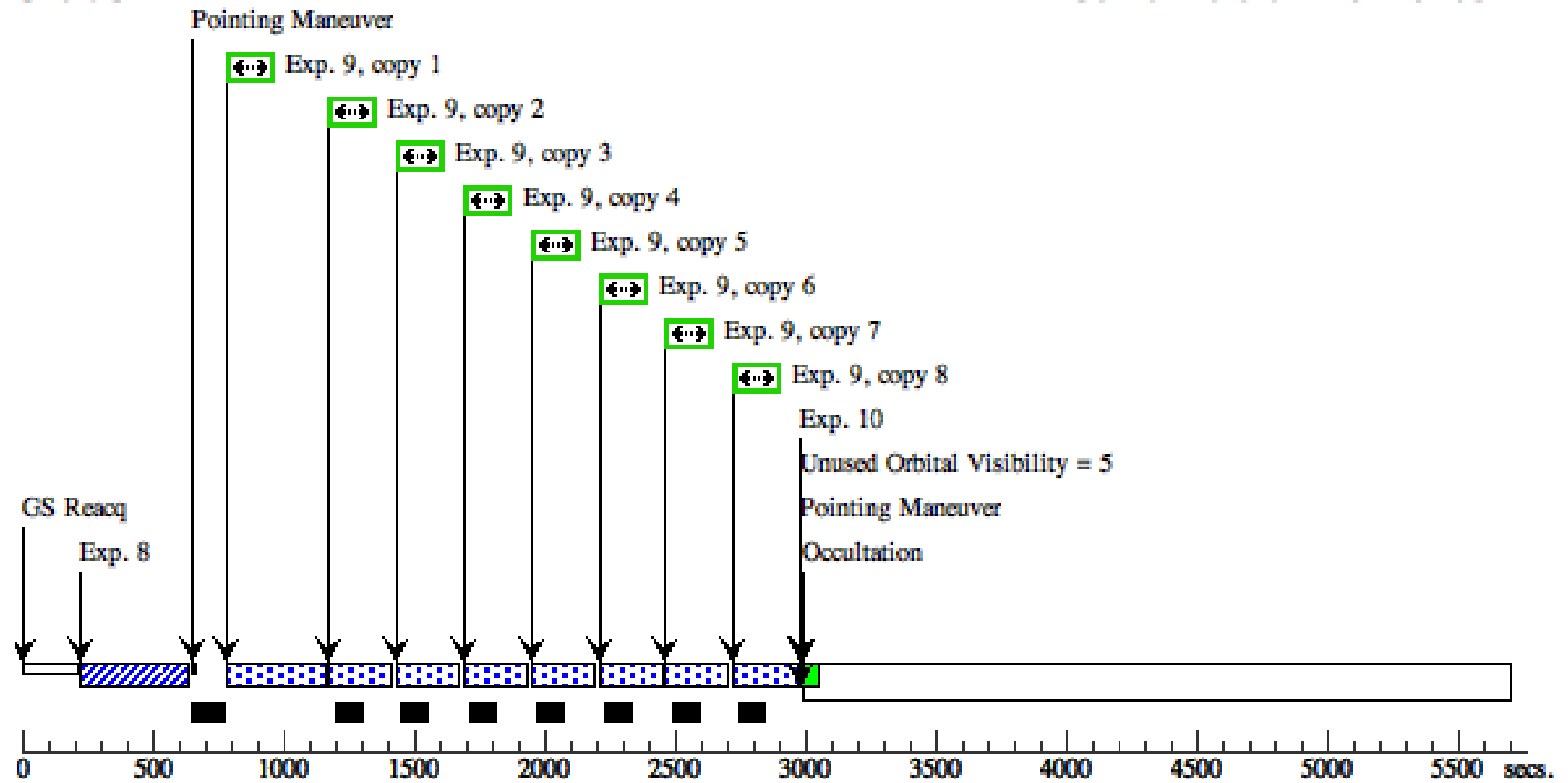
Orbit 2

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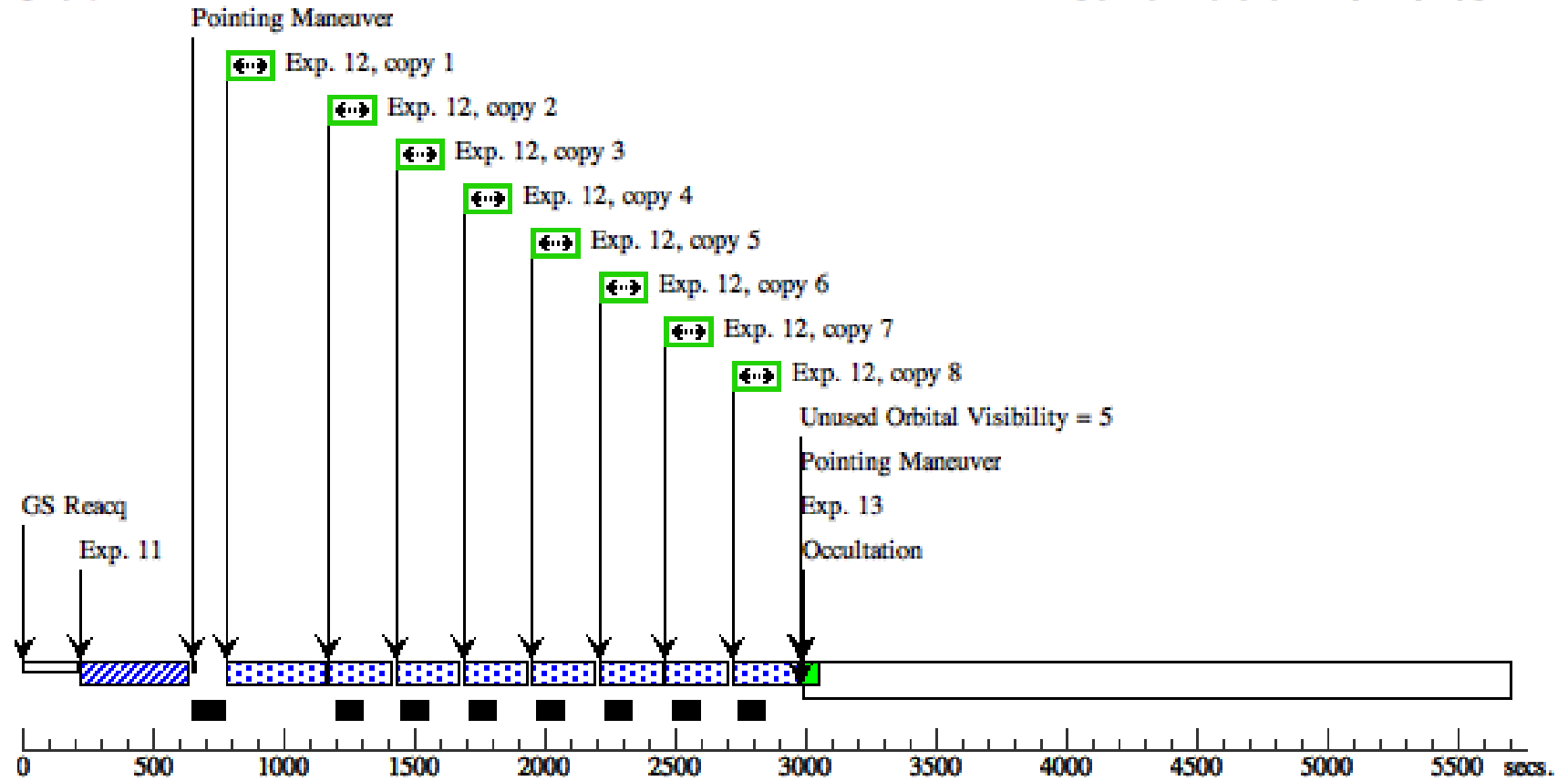
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Server Version: 20170109



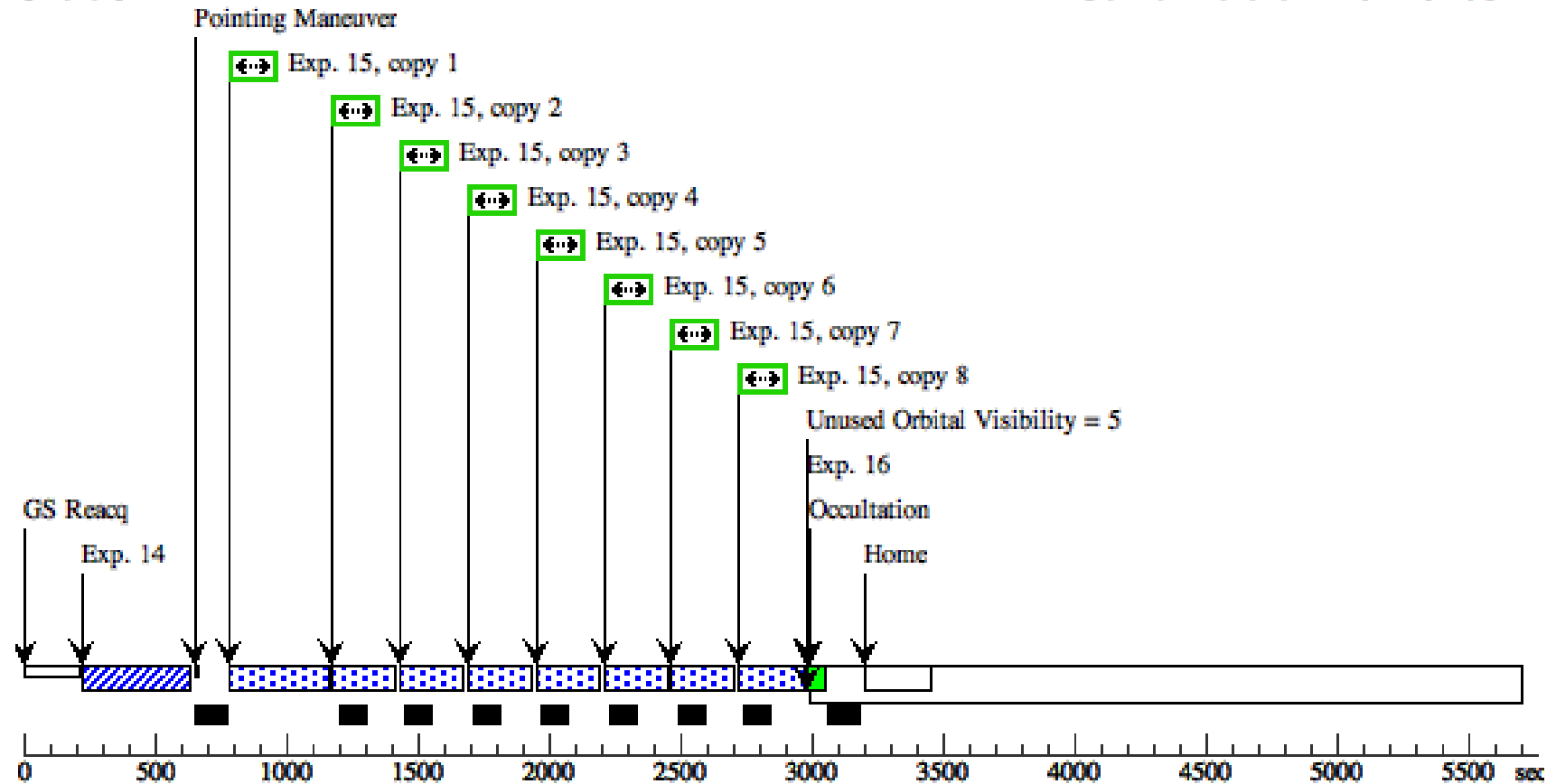
Orbit 4

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Orbit 5

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Proposal 14917 - Visit 02 - What is the origin of the UV-absorbing cloud orbiting the iconic star 55 Cnc ?

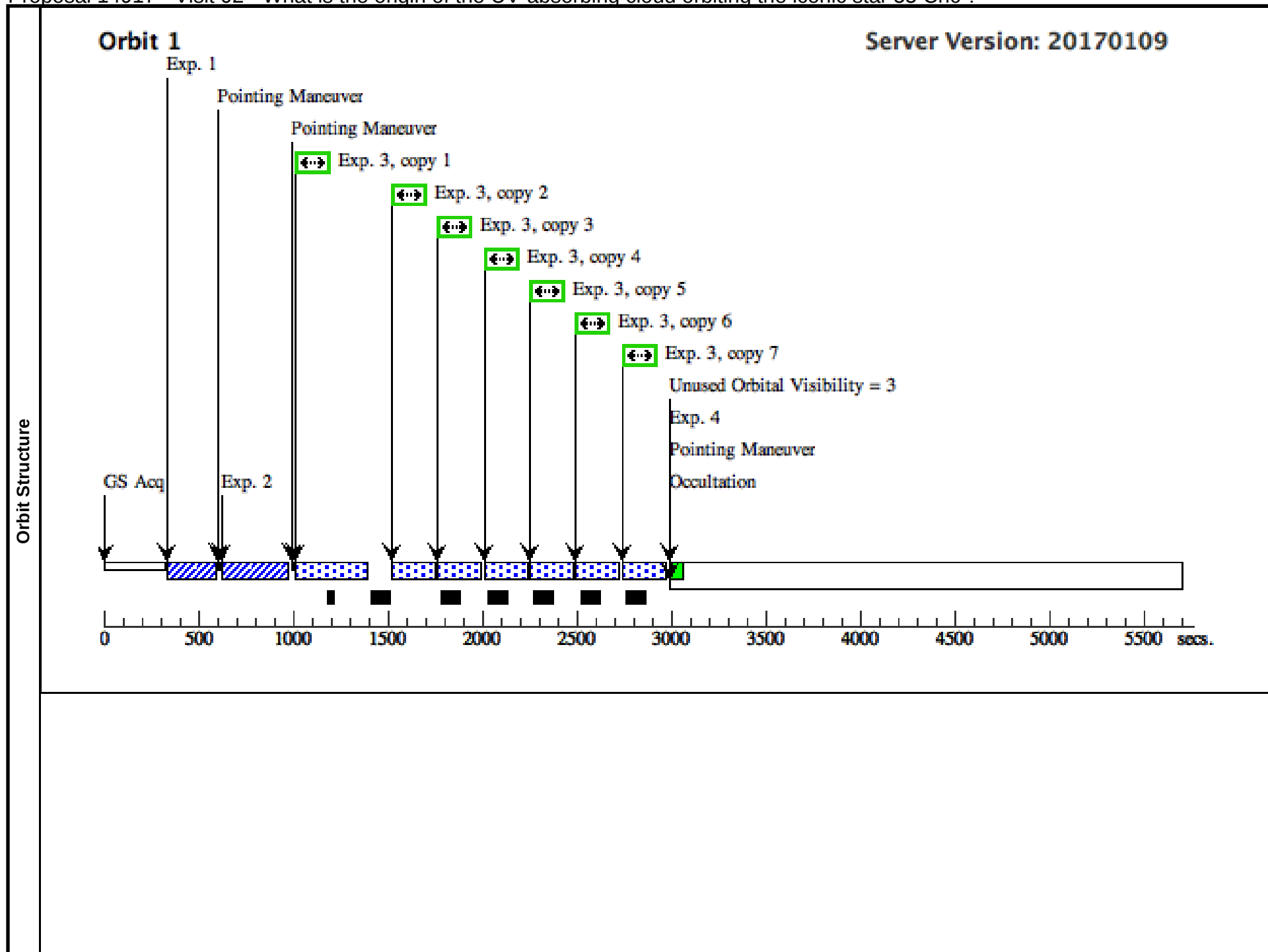
Visit	Proposal 14917, Visit 02 Thu Mar 16 01:06:46 GMT 2017				
	Diagnostic Status: No Diagnostics Scientific Instruments: STIS/NUV-MAMA, STIS/CCD Special Requirements: SCHED 100%; Period 0.736543 D AND ZERO-PHASE HJD2455733.008				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes
	(1)	-RHO-CNC	RA: 08 52 35.8109 (133.1492121d)	Proper Motion RA: -485.80 mas/yr	V=5.95
		Alt Name1: HR3522	Dec: +28 19 50.95 (28.33082d)	Proper Motion Dec: -234.05 mas/yr	U=7.45,
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				Epoch of Position: 2000	R=5.4,
				Radial Velocity: 27.36 km/sec	I=5.0,
					J=4.59,
					H=4.14,
					K=4.015
	Comments: This star is in a double system (common proper motions) with 55 Cancri B (GJ 324B), a much fainter (V=13) M4 dwarf that is 1.4-arcmin away. It also 4.6-arcmin away from the similarly bright (V=6.3) star 53 Cancri (BO Cancri). Extended=NO				

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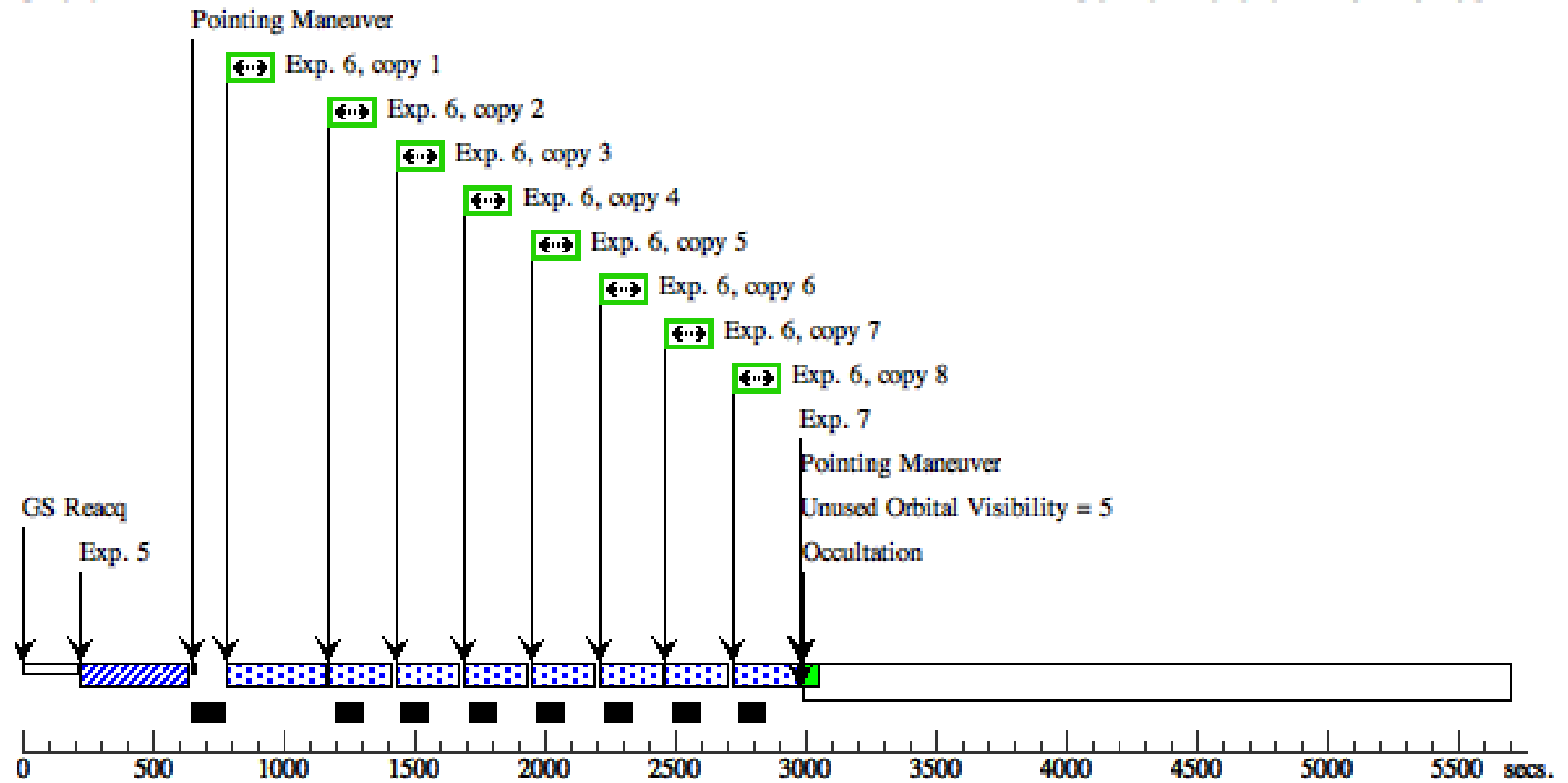
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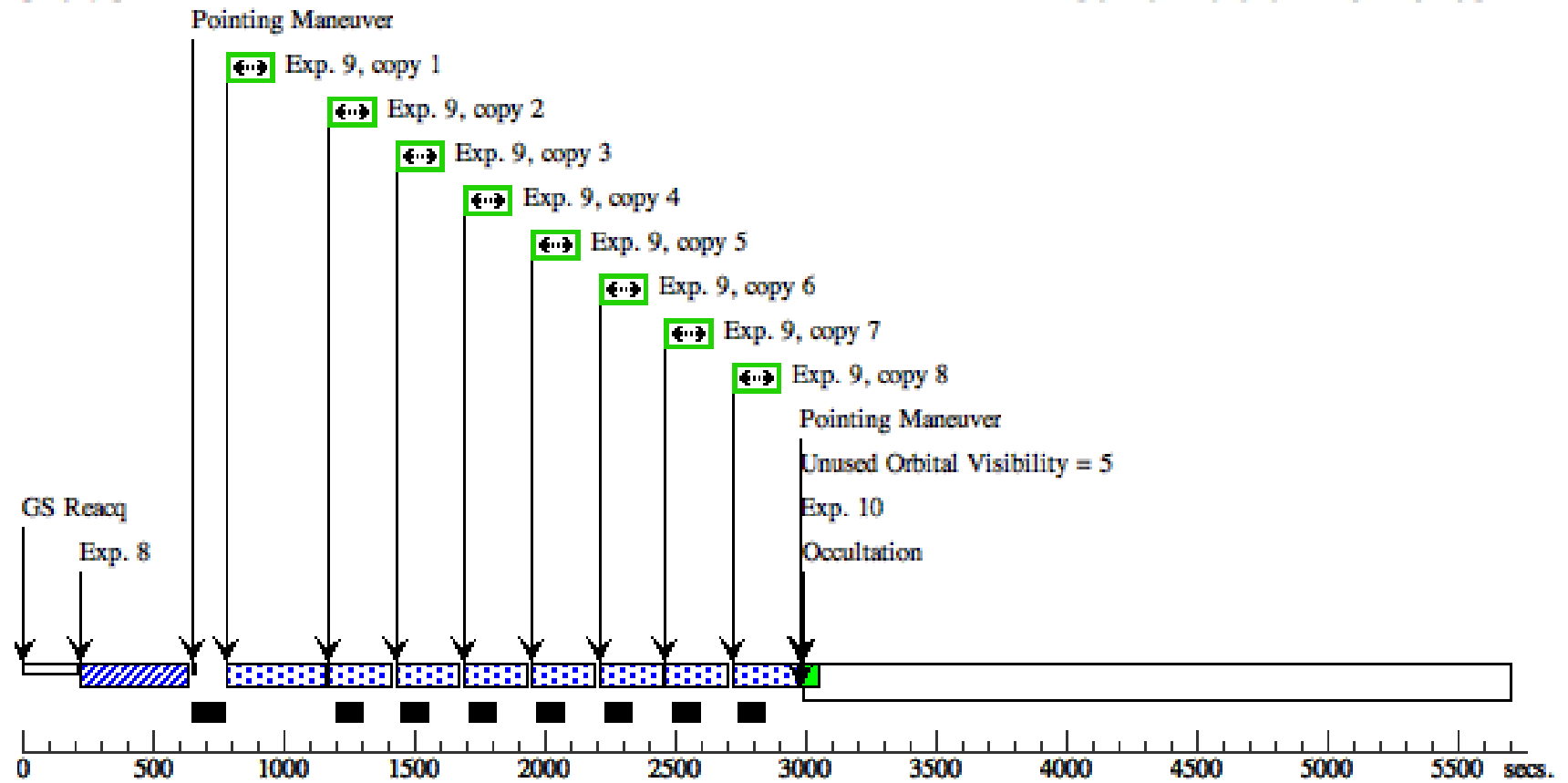
Orbit 2

Server Version: 20170109



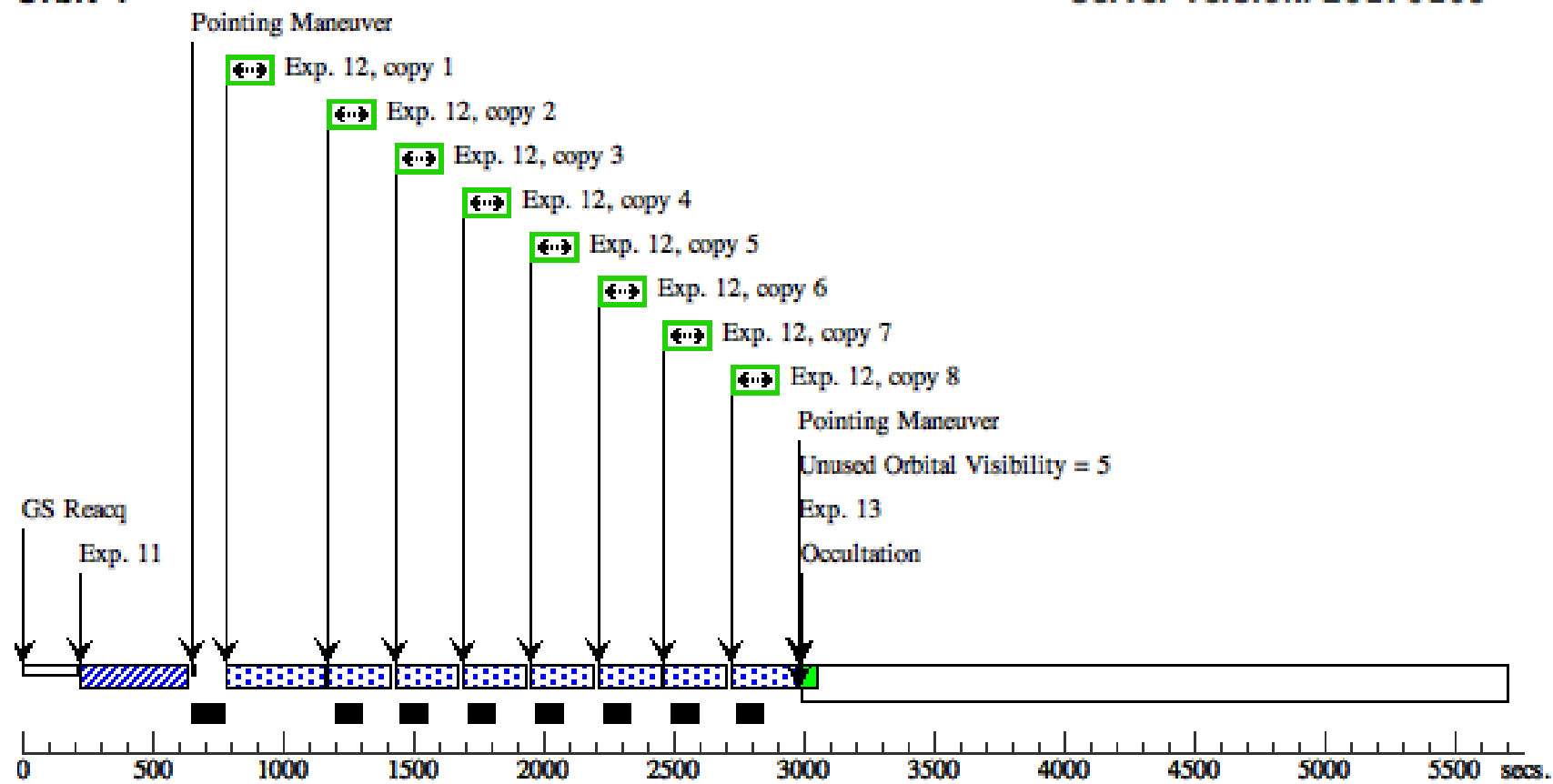
Orbit 3

Server Version: 20170109



Orbit 4

Server Version: 20170109



Orbit 5

Server Version: 20170109

