



17156 - Transiting Ultra-hot Gas Giants: Astrophysical Laboratories for Atmospheric Escape Studies

Cycle: 30, Proposal Category: GO

(UV Initiative)

(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) HD-195689--KELT-9	STIS/CCD STIS/FUV-MAMA	5	09-Dec-2022 14:01:41.0	yes
02	(2) HD-185603--KELT-20	COS/FUV COS/NUV	5	09-Dec-2022 14:01:46.0	yes
03	(3) HD-15082--WASP-33	COS/FUV COS/NUV	5	09-Dec-2022 14:01:50.0	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>
53	(3) HD-15082--WASP-33	COS/FUV COS/NUV	5	09-Dec-2022 14:01:53.0	yes
04	(4) HD-201585--MASCARA-1	COS/FUV COS/NUV	5	09-Dec-2022 14:01:56.0	yes

25 Total Orbits Used

ABSTRACT

Transit surveys employing small telescopes have revealed a population of ultra-hot gas giant planets ($T_{\text{eff}} > 2000$ K, $R_p > R_{\text{Jup}}$) orbiting early-type stars, worlds unlike anything in our solar system. Many of these planets orbit hot host stars (A-type) with very short periods ($P_{\text{orb}} < 5$ days), experiencing large radiative heating rates. These ultra-hot planets are the most far-ultraviolet (FUV)-irradiated systems known. However, their extreme-ultraviolet (EUV) irradiation, which drives mass loss from traditional hot Jupiters, is likely quite low. We propose an FUV transit spectroscopy experiment to study four planets straddling the “EUV divide” to quantify the transition from EUV-driven to FUV-driven escape. We will use these data to measure the dependence of atmospheric ionization and mass loss rate on the relative strengths of the stellar FUV and EUV radiation fields.

A-stars emit strong photospheric flux at FUV wavelengths, providing a backlight against which a myriad of outflowing species can be observed. Our FUV spectroscopic program will measure transit depths in never-before-detected low-ionization, neutral, and molecular species believed to be rapidly escaping from the atmosphere of these planets (e.g., S I, Si II, C I, N I, Al II, and possibly CO and He II). These observations will provide mass loss and atmospheric ionization measurements of planets orbiting A-type stars to test the importance of the FUV/EUV radiation environment and characterize atmospheric escape in its most extreme forms.

OBSERVING DESCRIPTION

We propose to observe one transit each of KELT-9b, KELT-20b, WASP-33b, and MASCARA-1b using HST's far-UV spectroscopic instruments in a pilot program to 1) detect low-ionization/neutral metal species and possibly molecules in the escaping exoplanetary atmosphere (predicted spectral detections are given below) and 2) model the light curve to infer the mass loss rates (and thus the ultimate fates of these planets). We have based our observing methodology after the 5-orbit transit sequence used for many short-period exoplanet transit observations with HST (e.g., Lecavelier et al. 2012; Vidal-Madjar et al. 2013; Ehrenreich et al. 2015). These observations place the first spectroscopic measurements ahead of the ingress of

primary transit, followed by a combination of pre-transit, in-transit, and post-transit phase coverage (see Figure 4). Because these observations of FUV transits around A stars are the first of their kind, we elected to conduct this Small GO pilot program: 5 orbits x 4 targets = 20 total orbits. We will use these results to motivate future spectroscopic investigations of specific targets of interest.

Depending on the target brightness, we will employ either the STIS E140M mode or the COS G160M mode. For KELT-9b, which is the brightest target, we will use the STIS instrument with the standard 0.2 arcsecond x 0.2 arcsecond slit and the E140M grating mode. We chose E140M instead of the more-standard G140M mode for several science-focused reasons: First, the G140M mode has an instantaneous bandpass of roughly 50 angstroms, whereas E140M covers approximately 1150-1700 angstrom in a single observation. Second, A stars have strong H I photospheric absorption, so while most transit studies target Lyman-alpha with G140M, we instead focus on the entire rest of the FUV spectrum except Lyman-alpha, necessitating a broader wavelength coverage. Third, KELT-9 is a factor of 10-100 times brighter in the FUV than the typical planet-hosting cool star, making the higher-resolution/broader bandpass E140M mode feasible. We note that jitter-driven spectral resolution degradation (see recent STIS ISR) does not compromise the science return from this program.

We have estimated exposure times, signal-to-noise ratios, and verified instrumental safety using the on-line STScI ETCs. KELT-9b is too bright to carry out these observations using the FUV MAMA detector's time-tag mode, so we will operate in the ACCUM mode using observations of a fixed exposure time. We estimate approximately 2800s per observation prior to Earth occultation, and break this into four 700 second exposures per orbit - resulting in a S/N = 18.3 per exposure per spectral resolution element at $R \sim 40,000$ (STIS.sp.1045254) at 1420 angstroms. This will result in 20 high S/N, high spectral resolution light curve points per visit.

KELT-20b, WASP-33b, and MASCARA-1b are fainter and better suited to the higher-sensitivity of the COS instrument. Comparison of UV transit features between COS and STIS has been previously demonstrated (e.g., Linsky et al. 2010; Garcia-Munoz et al. 2021). For KELT-20b, WASP-33b, and MASCARA-1b, we will use the COS G160M mode in time-tagged mode. We chose G160M over the G130M grating used in some previous transit observations (e.g., Linsky et al. 2010; Ben-Jaffel & Ballester 2013) for two primary reasons: 1) the stars are all cooler than 10,000K, meaning that their continuum flux begins to fall precipitously below 1400 angstroms and as noted below, low-ionization species (H I, O I, C II) have strong photospheric and interstellar absorption that will make the transit detection difficult, and 2) several key neutral, low-ionization metals, and (possibly) molecules have strong features in the G160M bandpass (including C I, Si II, Fe II, and CO). The APT observation planning tool indicates approximately 3000s of observing time per orbit for these stars, which we break into three 1000s exposures (note the data will be taken in time-tagged mode, enabling post facto rebinning to arbitrary cadence). The S/Ns per resolution elements ($R \sim 16,000$) at 1420 angstroms generated by the on-line ETC are ~ 50 , 8, and 8 for KELT-20b, WASP-33b, and MASCARA-1b, respectively. We note that many of the predicted species (e.g., CO, C

I) are multiplet features, so we will integrate the lightcurves over many spectral resolution elements, enhancing the detection threshold for these species.

Proposal 17156 - Visit 01 - Transiting Ultra-hot Gas Giants: Astrophysical Laboratories for Atmospheric Escape Studies

Visit	Proposal 17156, Visit 01, implementation Fri Dec 09 19:01:57 GMT 2022				
	Diagnostic Status: No Diagnostics Scientific Instruments: STIS/CCD, STIS/FUV-MAMA Special Requirements: SCHED 100%; Period 1.4811235 D AND ZERO-PHASE HJD 2457095.68572				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes
	(1)	HD-195689--KELT-9	RA: 20 31 26.3759 (307.8598996d) Dec: +39 56 20.10 (39.93892d) Equinox: J2000	Proper Motion RA: 0.0014535334391491837 sec of time/yr Proper Motion Dec: 0.02096099999999997 arcsec/yr Epoch of Position: 2015.5	V=7.56 Reference Frame: ICRS
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. Category=STAR Description=[A0-A3 V-IV] Extended=NO					

Proposal 17156 - Visit 01 - Transiting Ultra-hot Gas Giants: Astrophysical Laboratories for Atmospheric Escape Studies

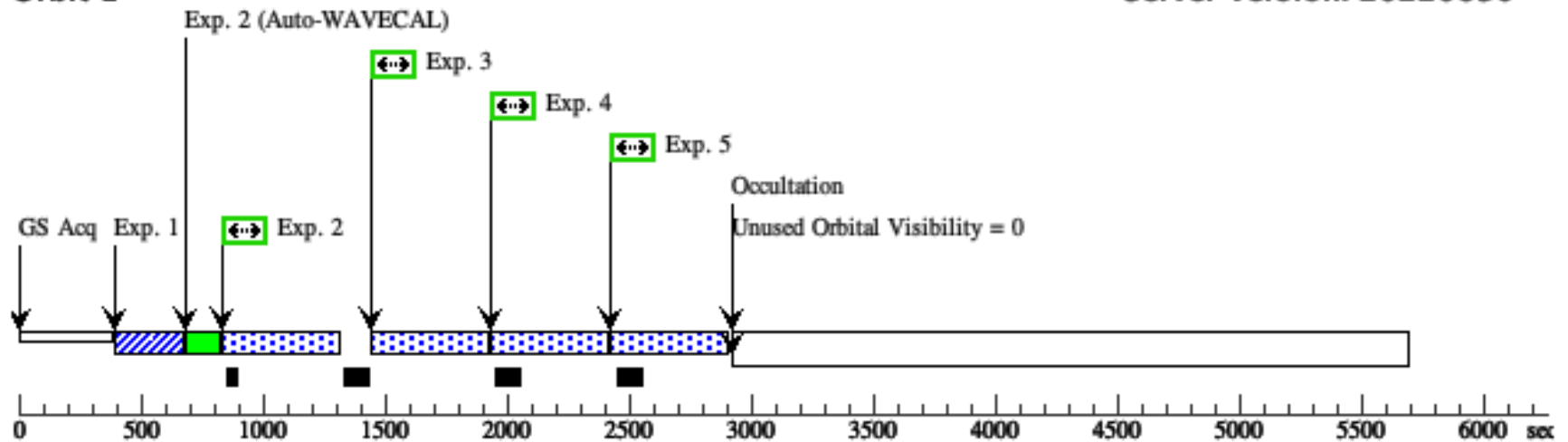
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	1	(STIS.ta.180 8811)	(1) HD-195689--KE LT-9	STIS/CCD, ACQ, F28X50OIII	MIRROR		PHASE .90 TO .91		1.0 Secs (1 Secs)	
									[==>]	[1]
	2	(STIS.sp.10 45254)	(1) HD-195689--KE LT-9	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M	1425 A			468 Secs (468 Secs)	
									[==>]	[1]
	3	(STIS.sp.10 45254)	(1) HD-195689--KE LT-9	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M	1425 A			469 Secs (469 Secs)	
									[==>]	[1]
	4	(STIS.sp.10 45254)	(1) HD-195689--KE LT-9	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M	1425 A			469 Secs (469 Secs)	
									[==>]	[1]
	5	(STIS.sp.10 45254)	(1) HD-195689--KE LT-9	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M	1425 A			471 Secs (471 Secs)	
									[==>]	[1]
	6	(STIS.sp.10 45254)	(1) HD-195689--KE LT-9	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M	1425 A			558 Secs (558 Secs)	
									[==>]	[2]
	7	(STIS.sp.10 45254)	(1) HD-195689--KE LT-9	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M	1425 A			552 Secs (552 Secs)	
									[==>]	[2]
	8	(STIS.sp.10 45254)	(1) HD-195689--KE LT-9	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M	1425 A			552 Secs (552 Secs)	
									[==>]	[2]
	9	(STIS.sp.10 45254)	(1) HD-195689--KE LT-9	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M	1425 A			552 Secs (552 Secs)	
									[==>]	[2]
	10	(STIS.sp.10 45254)	(1) HD-195689--KE LT-9	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M	1425 A			433 Secs (433 Secs)	
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	11	(STIS.sp.10 45254)	(1) HD-195689--KE LT-9	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M	1425 A			430 Secs (430 Secs)	
									[==>]	[3]
	12	(STIS.sp.10 45254)	(1) HD-195689--KE LT-9	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M	1425 A			430 Secs (430 Secs)	
									[==>]	[3]
	13	(STIS.sp.10 45254)	(1) HD-195689--KE LT-9	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M	1425 A			432 Secs (432 Secs)	
									[==>]	[3]
	14	(STIS.sp.10 45254)	(1) HD-195689--KE LT-9	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M	1425 A			465 Secs (465 Secs)	
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	15	(STIS.sp.10 45254)	(1) HD-195689--KE LT-9	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M	1425 A			552 Secs (552 Secs)	
									[==>]	[4]
	16	(STIS.sp.10 45254)	(1) HD-195689--KE LT-9	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M	1425 A			552 Secs (552 Secs)	
									[==>]	[4]
	17	(STIS.sp.10 45254)	(1) HD-195689--KE LT-9	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M	1425 A			555 Secs (555 Secs)	
									[==>]	[4]
	18	(STIS.sp.10 45254)	(1) HD-195689--KE LT-9	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M	1425 A			555 Secs (555 Secs)	
									[==>]	[4]
	19	(STIS.sp.10 45254)	(1) HD-195689--KE LT-9	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M	1425 A			555 Secs (555 Secs)	
									[==>]	[5]
	20	(STIS.sp.10 45254)	(1) HD-195689--KE LT-9	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M	1425 A			553 Secs (553 Secs)	
									[==>]	[5]
	21	(STIS.sp.10 45254)	(1) HD-195689--KE LT-9	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M	1425 A			553 Secs (553 Secs)	
									[==>]	[5]

Proposal 17156 - Visit 01 - Transiting Ultra-hot Gas Giants: Astrophysical Laboratories for Atmospheric Escape Studies

	22	(STIS.sp.10 45254)	(1) HD-195689--KE LT-9	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M 1425 A	553 Secs (553 Secs)	
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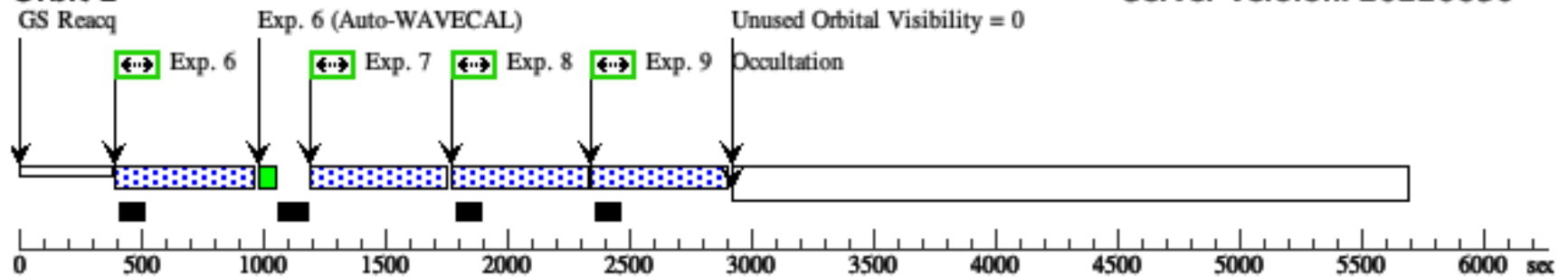
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Server Version: 20220630



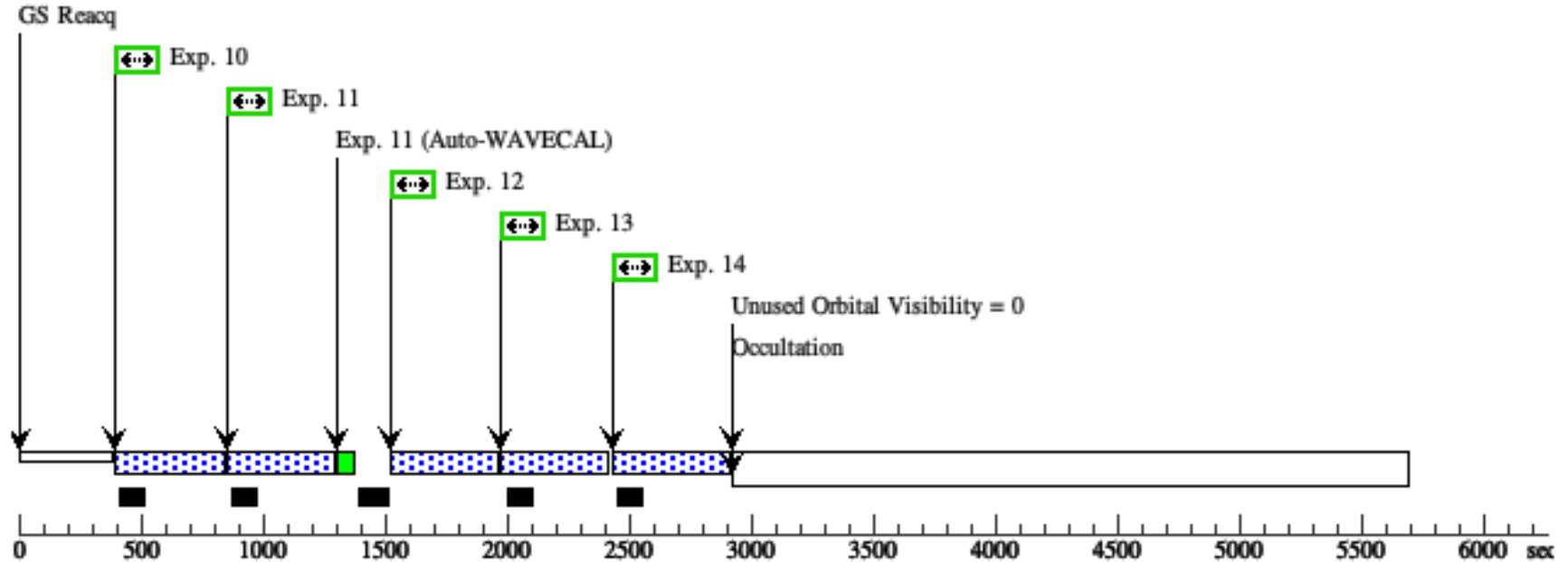
Orbit 2

Server Version: 20220630



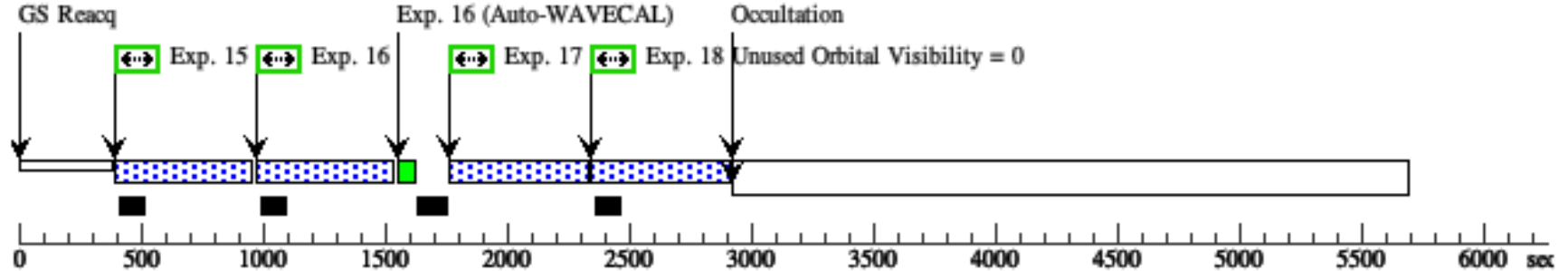
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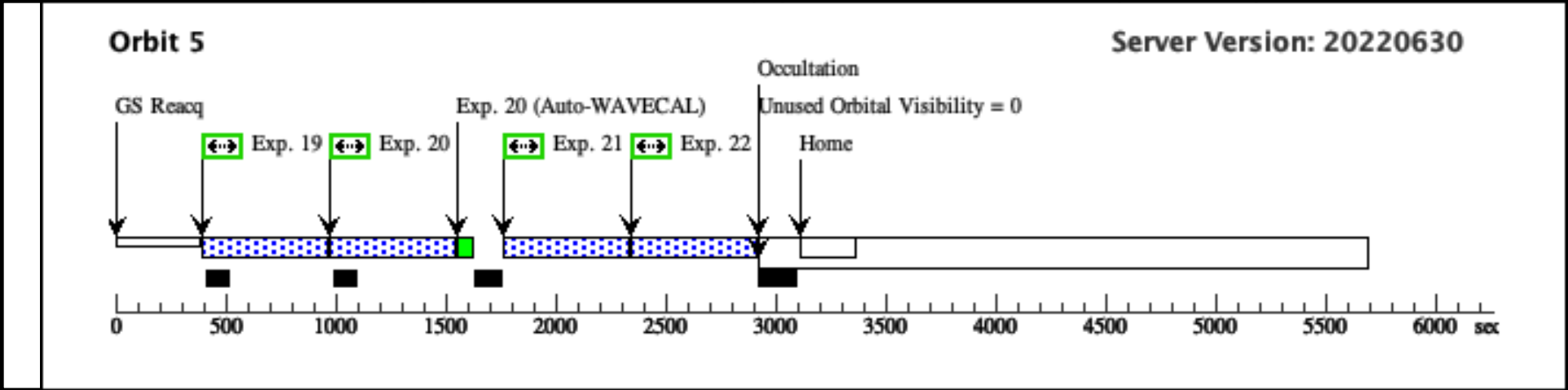
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Orbit 4

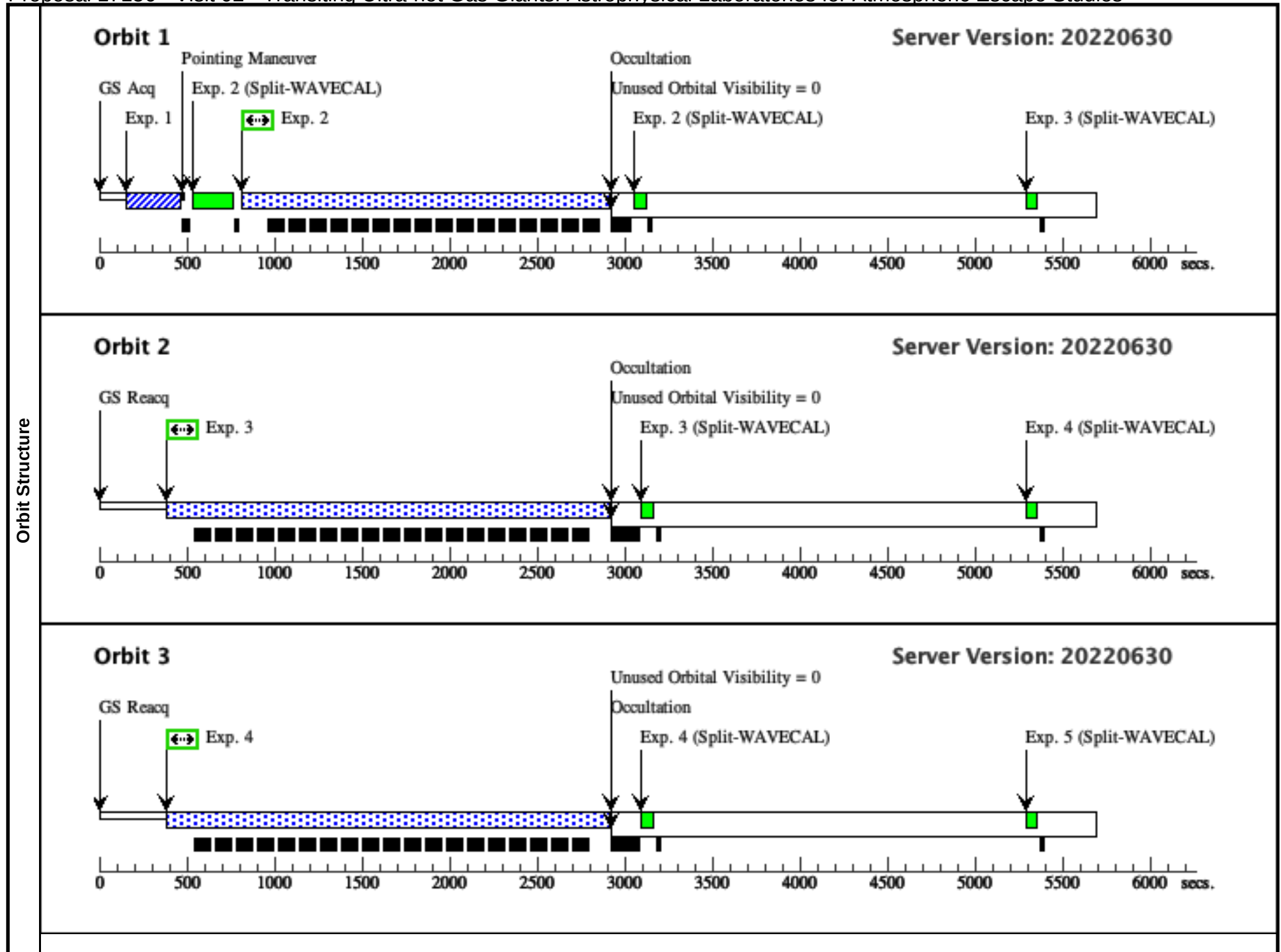
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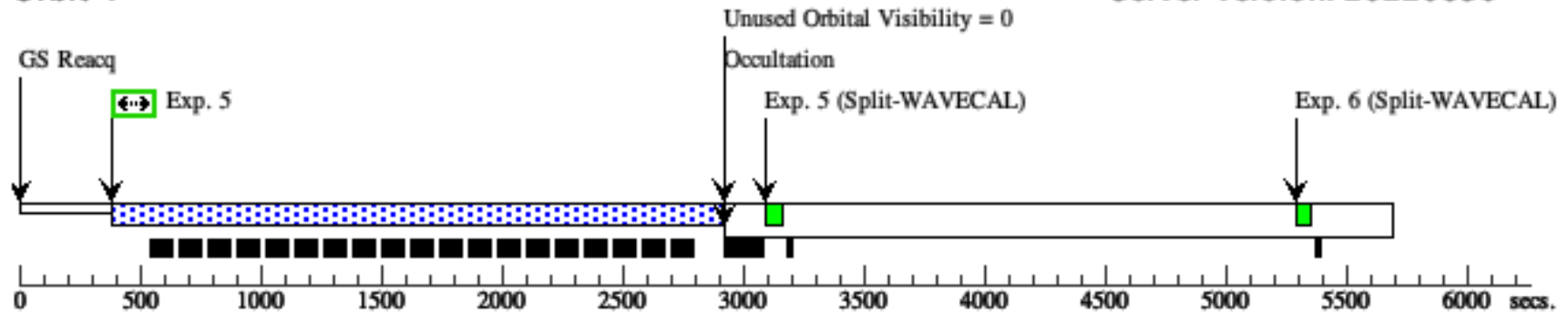
Proposal 17156 - Visit 02 - Transiting Ultra-hot Gas Giants: Astrophysical Laboratories for Atmospheric Escape Studies

Visit	Proposal 17156, Visit 02, implementation										Fri Dec 09 19:01:57 GMT 2022		
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	Scientific Instruments: COS/FUV, COS/NUV												
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	(Visit 02) Warning (Orbit Planner): COS LP6 EXPOSURE WITH MORE THAN 2400 SECONDS VISIBILITY												
	(Visit 02) Warning (Orbit Planner): COS LP6 EXPOSURE WITH MORE THAN 2400 SECONDS VISIBILITY												
	(Visit 02) Warning (Orbit Planner): COS LP6 EXPOSURE WITH MORE THAN 2400 SECONDS VISIBILITY												
	(Visit 02) Warning (Orbit Planner): COS LP6 EXPOSURE WITH MORE THAN 2400 SECONDS VISIBILITY												
Fixed Targets	#	Name		Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous			
	(2)	HD-185603--KELT-20		RA: 19 38 38.7390 (294.6614125d) Dec: +31 13 9.12 (31.21920d) Equinox: J2000		Proper Motion RA: 2.456372437434589E-4 sec of time/yr Proper Motion Dec: -0.006264999910854385 arcsec/yr Epoch of Position: 2015.5		V=7.58		Reference Frame: ICRS			
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.												
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Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture		Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit	
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										[==>]		[1]	
	2	(COS.sp.181 2252)	(2) HD-185603--KE LT-20	COS/FUV, TIME-TAG, PSA		G160M 1589 A	BUFFER-TIME=12 0; FP-POS=1			2052 Secs (2052 Secs)			
										[==>]		[1]	
	3	(COS.sp.181 2252)	(2) HD-185603--KE LT-20	COS/FUV, TIME-TAG, PSA		G160M 1589 A	BUFFER-TIME=12 0; FP-POS=1			2475 Secs (2475 Secs)			
										[==>]		[2]	
	4	(COS.sp.181 2252)	(2) HD-185603--KE LT-20	COS/FUV, TIME-TAG, PSA		G160M 1589 A	BUFFER-TIME=12 0; FP-POS=1			2475 Secs (2475 Secs)			
										[==>]		[3]	
	5	(COS.sp.181 2252)	(2) HD-185603--KE LT-20	COS/FUV, TIME-TAG, PSA		G160M 1589 A	BUFFER-TIME=12 0; FP-POS=1			2475 Secs (2475 Secs)			
										[==>]		[4]	
	6	(COS.sp.181 2252)	(2) HD-185603--KE LT-20	COS/FUV, TIME-TAG, PSA		G160M 1589 A	BUFFER-TIME=12 0; FP-POS=1			2475 Secs (2475 Secs)			
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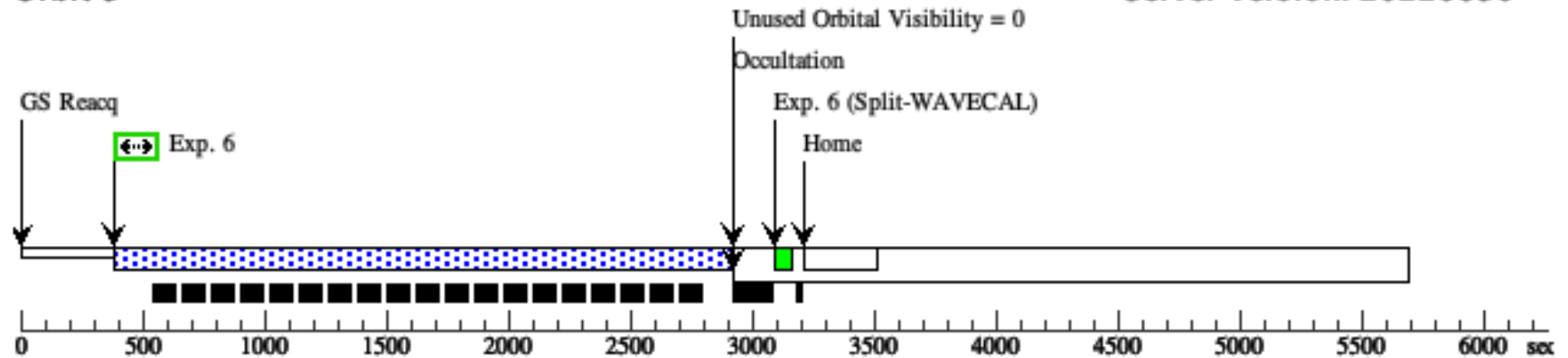
Orbit 4

Server Version: 20220630



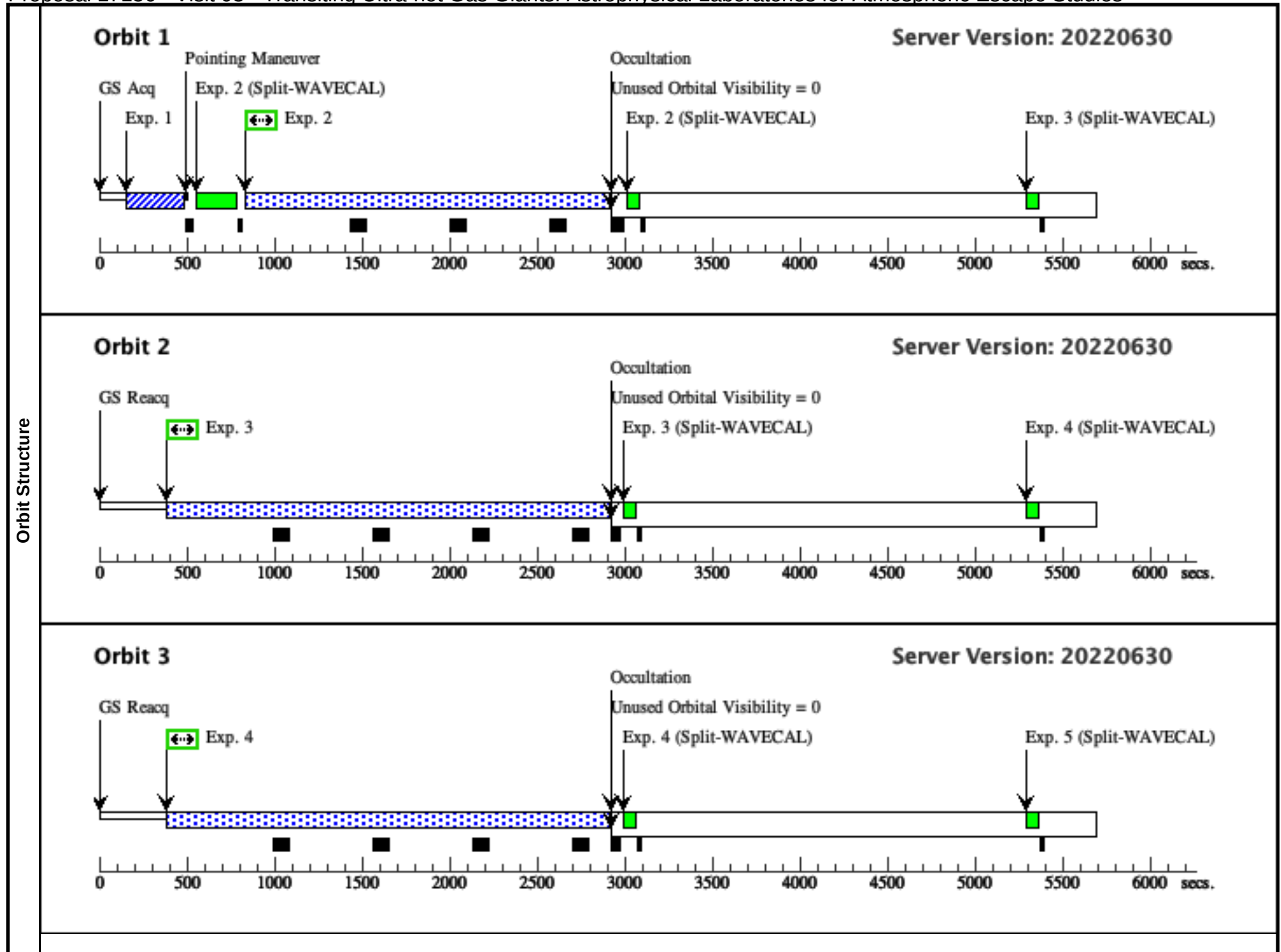
Orbit 5

Server Version: 20220630



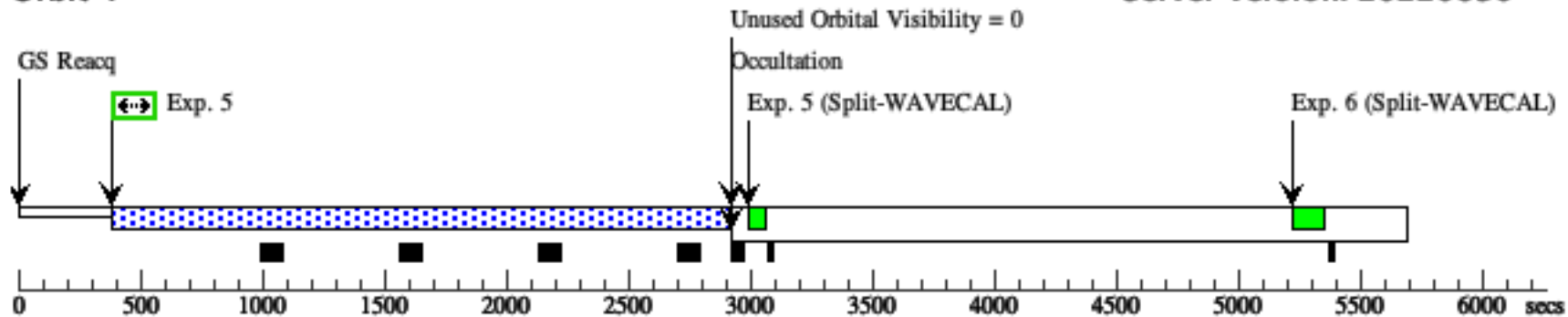
Proposal 17156 - Visit 03 - Transiting Ultra-hot Gas Giants: Astrophysical Laboratories for Atmospheric Escape Studies

Visit	Proposal 17156, Visit 03, failed										Fri Dec 09 19:01:57 GMT 2022	
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	Special Requirements: SCHED 100%; Period 1.219870 D AND ZERO-PHASE HJD2454163.22367											
Diagnostics	(Visit 03) Warning (Orbit Planner): COS LP6 EXPOSURE WITH MORE THAN 2400 SECONDS VISIBILITY											
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	(Visit 03) Warning (Orbit Planner): REFERENCE-FRAME MUST BE ICRS OR GSC1 FOR SMALL APERTURE											
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	Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous		
(3)		HD-15082--WASP-33	RA: 02 26 51.0570 (36.7127375d) Dec: +37 33 1.60 (37.55044d) Equinox: J2000		Proper Motion RA: -8.215430239512923E-5 sec of time/yr Proper Motion Dec: -0.008895000064512715 arcsec/yr Epoch of Position: 2015.5		V=8.14		Reference Frame: SIMBAD			
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.												
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Description=[F3-F9] Extended=NO												
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit	
	1	(COS.ta.181 2265)	(3) HD-15082--WAS P-33	COS/NUV, ACQ/IMAGE, BOA	MIRRORB		PHASE .890 TO .91 5		15 Secs (15 Secs) [==>]		[1]	
	2	(COS.sp.181 2268)	(3) HD-15082--WAS P-33	COS/FUV, TIME-TAG, PSA	G160M 1589 A	BUFFER-TIME=57 0; FP-POS=1			2032 Secs (2032 Secs) [==>]		[1]	
	3	(COS.sp.181 2252)	(3) HD-15082--WAS P-33	COS/FUV, TIME-TAG, PSA	G160M 1589 A	BUFFER-TIME=57 0; FP-POS=2			2475 Secs (2475 Secs) [==>]		[2]	
	4	(COS.sp.181 2252)	(3) HD-15082--WAS P-33	COS/FUV, TIME-TAG, PSA	G160M 1589 A	BUFFER-TIME=57 0; FP-POS=3			2475 Secs (2475 Secs) [==>]		[3]	
	5	(COS.sp.181 2252)	(3) HD-15082--WAS P-33	COS/FUV, TIME-TAG, PSA	G160M 1589 A	BUFFER-TIME=57 0; FP-POS=4			2475 Secs (2475 Secs) [==>]		[4]	
	6	(COS.sp.181 2252)	(3) HD-15082--WAS P-33	COS/FUV, TIME-TAG, PSA	G160M 1589 A	BUFFER-TIME=57 0; FP-POS=1			2475 Secs (2475 Secs) [==>]		[5]	



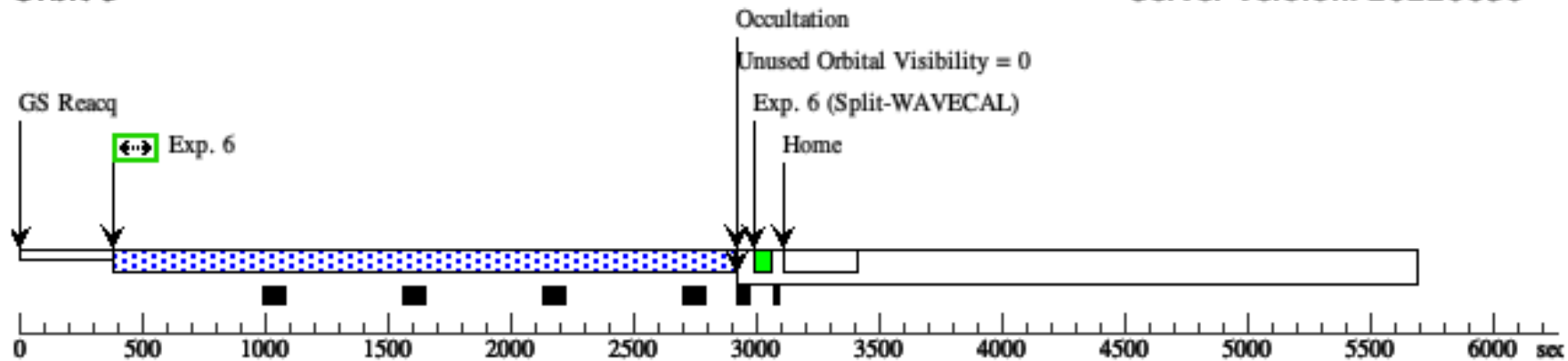
Orbit 4

Server Version: 20220630



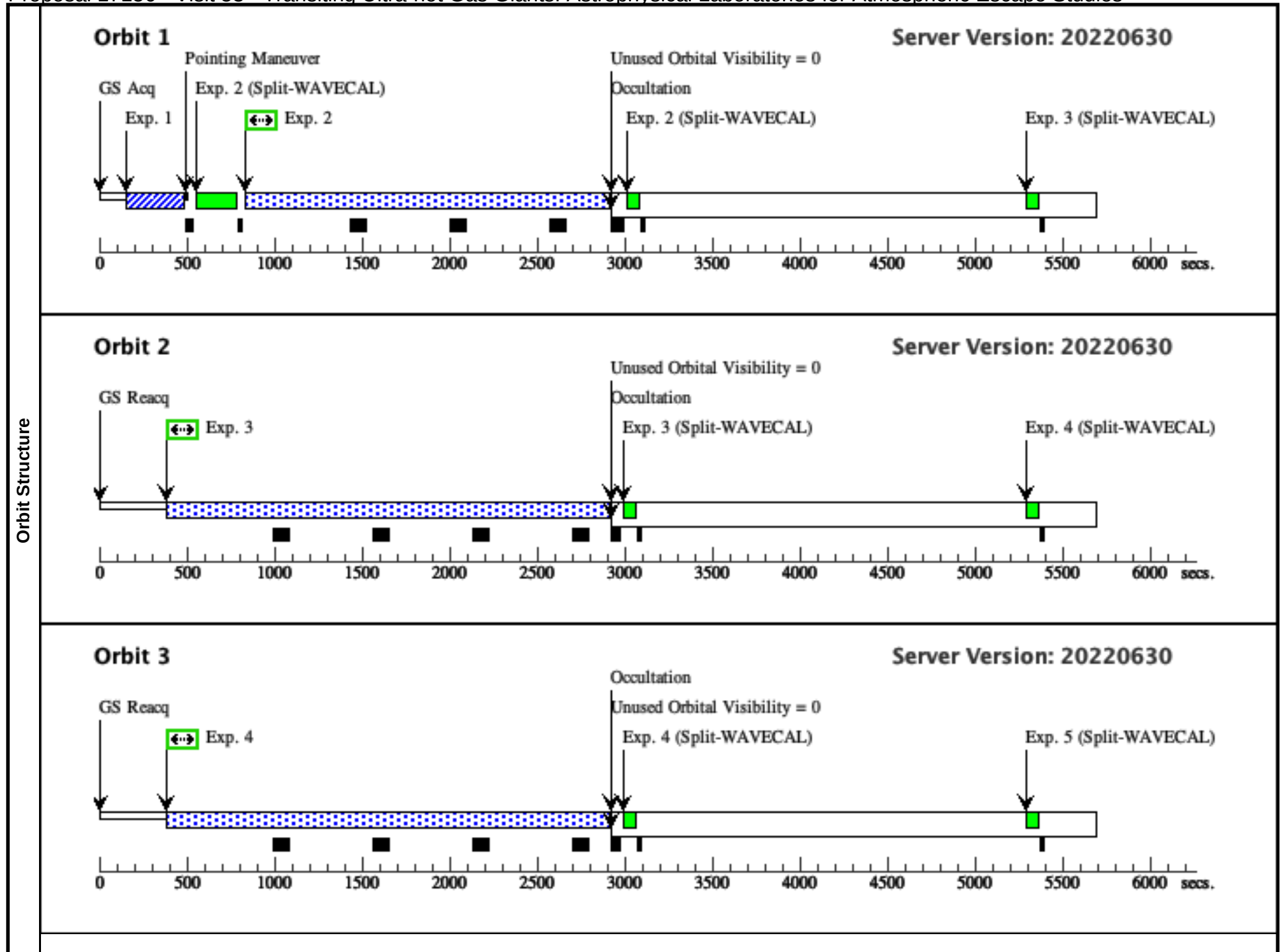
Orbit 5

Server Version: 20220630



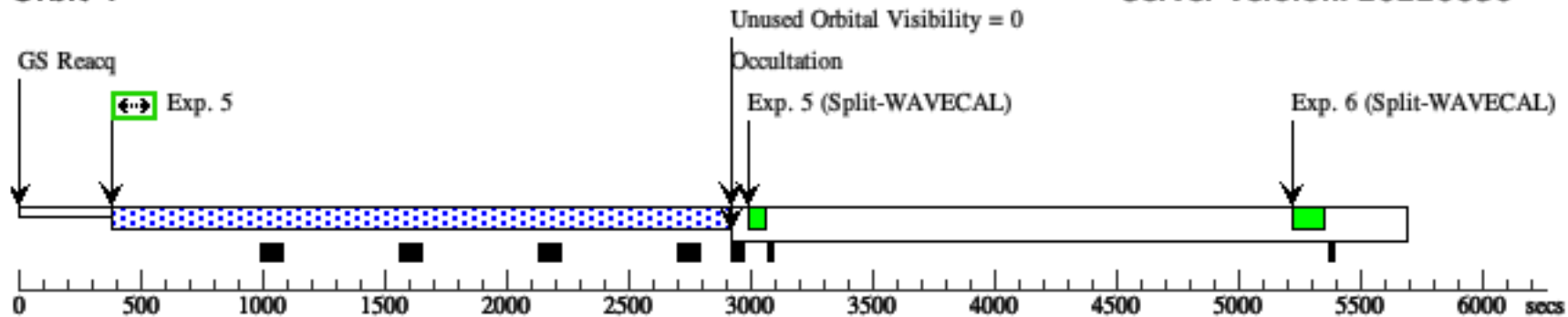
Proposal 17156 - Visit 53 - Transiting Ultra-hot Gas Giants: Astrophysical Laboratories for Atmospheric Escape Studies

Visit	Proposal 17156, Visit 53										Fri Dec 09 19:01:58 GMT 2022												
	Diagnostic Status: Warning																						
	Scientific Instruments: COS/FUV, COS/NUV																						
	Special Requirements: SCHED 100%; Period 1.219870 D AND ZERO-PHASE HJD2454163.22367																						
	Comments: This visit is a duplicate of failed visit 03.																						
Diagnostics	(Visit 53) Warning (Orbit Planner): COS LP6 EXPOSURE WITH MORE THAN 2400 SECONDS VISIBILITY																						
	(Visit 53) Warning (Orbit Planner): COS LP6 EXPOSURE WITH MORE THAN 2400 SECONDS VISIBILITY																						
	(Visit 53) Warning (Orbit Planner): COS LP6 EXPOSURE WITH MORE THAN 2400 SECONDS VISIBILITY																						
	(Visit 53) Warning (Orbit Planner): COS LP6 EXPOSURE WITH MORE THAN 2400 SECONDS VISIBILITY																						
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	(Visit 53) Warning (Orbit Planner): REFERENCE-FRAME MUST BE ICRS OR GSC1 FOR SMALL APERTURE																						
	(Visit 53) Warning (Orbit Planner): REFERENCE-FRAME MUST BE ICRS OR GSC1 FOR SMALL APERTURE																						
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Fixed Targets	<table><tr><th>#</th><th>Name</th><th>Target Coordinates</th><th>Targ. Coord. Corrections</th><th>Fluxes</th><th>Miscellaneous</th></tr><tr><td>(3)</td><td>HD-15082--WASP-33</td><td>RA: 02 26 51.0570 (36.7127375d) Dec: +37 33 1.60 (37.55044d) Equinox: J2000</td><td>Proper Motion RA: -8.215430239512923E-5 sec of time/yr Proper Motion Dec: -0.008895000064512715 arcsec/yr Epoch of Position: 2015.5</td><td>V=8.14</td><td>Reference Frame: SIMBAD</td></tr></table>											#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous	(3)	HD-15082--WASP-33	RA: 02 26 51.0570 (36.7127375d) Dec: +37 33 1.60 (37.55044d) Equinox: J2000	Proper Motion RA: -8.215430239512923E-5 sec of time/yr Proper Motion Dec: -0.008895000064512715 arcsec/yr Epoch of Position: 2015.5	V=8.14	Reference Frame: SIMBAD
	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous																	
	(3)	HD-15082--WASP-33	RA: 02 26 51.0570 (36.7127375d) Dec: +37 33 1.60 (37.55044d) Equinox: J2000	Proper Motion RA: -8.215430239512923E-5 sec of time/yr Proper Motion Dec: -0.008895000064512715 arcsec/yr Epoch of Position: 2015.5	V=8.14	Reference Frame: SIMBAD																	
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.																						
	Category=STAR																						
Description=[F3-F9]																							
Extended=NO																							
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit												
	1	(COS.ta.181 2265)	(3) HD-15082--WAS P-33	COS/NUV, ACQ/IMAGE, BOA	MIRRORB		PHASE .890 TO .91 5		15 Secs (15 Secs)														
									[==>]		[1]												
	2	(COS.sp.181 2268)	(3) HD-15082--WAS P-33	COS/FUV, TIME-TAG, PSA	G160M 1589 A	BUFFER-TIME=57 0;			2032 Secs (2032 Secs)														
						FP-POS=1			[==>]		[1]												
	3	(COS.sp.181 2252)	(3) HD-15082--WAS P-33	COS/FUV, TIME-TAG, PSA	G160M 1589 A	BUFFER-TIME=57 0;			2475 Secs (2475 Secs)														
						FP-POS=2			[==>]		[2]												
	4	(COS.sp.181 2252)	(3) HD-15082--WAS P-33	COS/FUV, TIME-TAG, PSA	G160M 1589 A	BUFFER-TIME=57 0;			2475 Secs (2475 Secs)														
						FP-POS=3			[==>]		[3]												
	5	(COS.sp.181 2252)	(3) HD-15082--WAS P-33	COS/FUV, TIME-TAG, PSA	G160M 1589 A	BUFFER-TIME=57 0;			2475 Secs (2475 Secs)														
						FP-POS=4			[==>]		[4]												
	6	(COS.sp.181 2252)	(3) HD-15082--WAS P-33	COS/FUV, TIME-TAG, PSA	G160M 1589 A	BUFFER-TIME=57 0;			2475 Secs (2475 Secs)														
						FP-POS=1			[==>]		[5]												



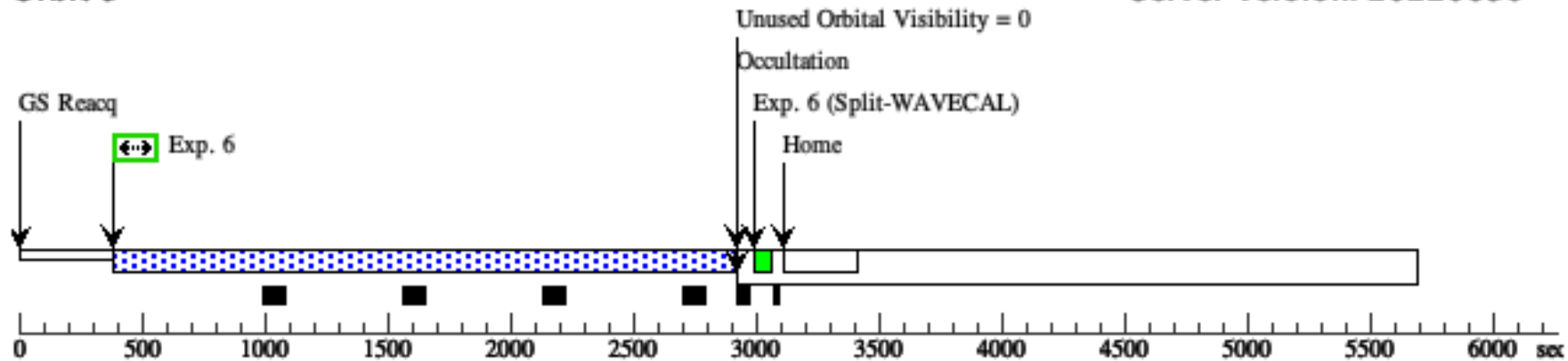
Orbit 4

Server Version: 20220630



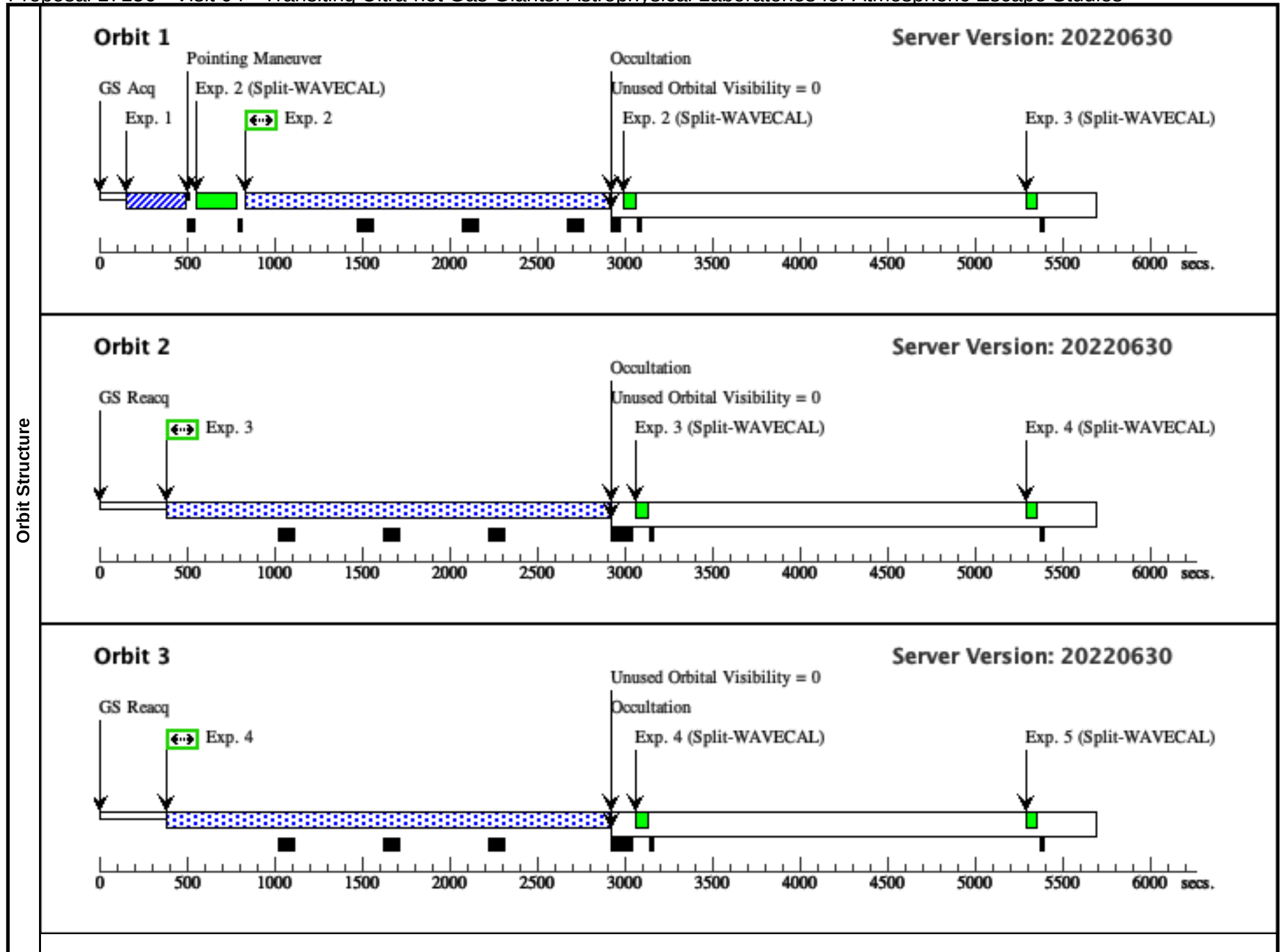
Orbit 5

Server Version: 20220630



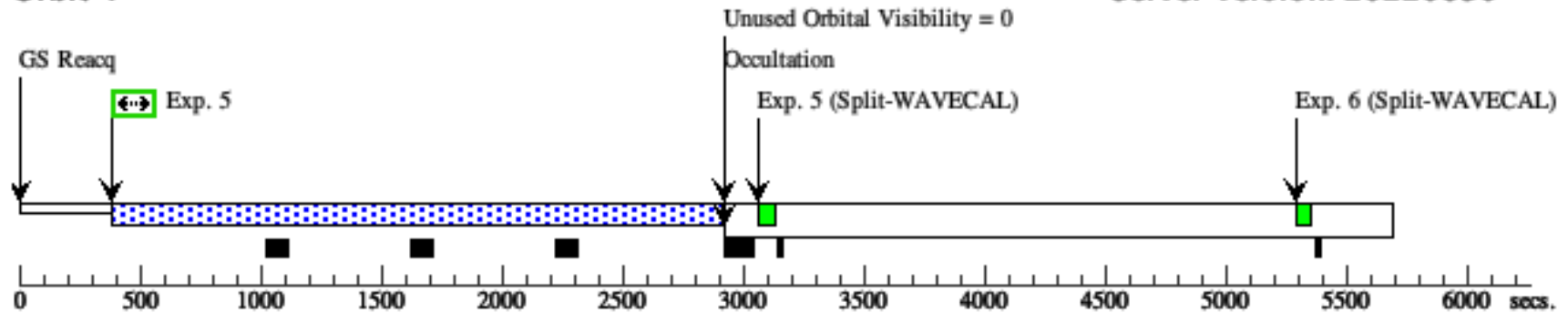
Proposal 17156 - Visit 04 - Transiting Ultra-hot Gas Giants: Astrophysical Laboratories for Atmospheric Escape Studies

Visit	Proposal 17156, Visit 04, implementation										Fri Dec 09 19:01:58 GMT 2022	
	Diagnostic Status: Warning											
	Scientific Instruments: COS/FUV, COS/NUV											
	Special Requirements: SCHED 100%; Period 2.148780 D AND ZERO-PHASE HJD2457097.278											
Diagnostics	(Visit 04) Warning (Form): For the best data quality, it is generally required to use all four FP-POS positions when observing at a given COS cenwave. See the COS Instrument Handbook for exceptions that may apply to observations with G130M/1291 or G160M.											
	(Visit 04) Warning (Orbit Planner): COS LP6 EXPOSURE WITH MORE THAN 2400 SECONDS VISIBILITY											
	(Visit 04) Warning (Orbit Planner): COS LP6 EXPOSURE WITH MORE THAN 2400 SECONDS VISIBILITY											
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	(Visit 04) Warning (Orbit Planner): COS LP6 EXPOSURE WITH MORE THAN 2400 SECONDS VISIBILITY											
Fixed Targets	#	Name	Target Coordinates			Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(4)	HD-201585--MASCARA-1	RA: 21 10 12.3663 (317.5515262d) Dec: +10 44 20.03 (10.73890d) Equinox: J2000			Proper Motion RA: -3.8616305676133947E-4 V=8.27 sec of time/yr Proper Motion Dec: 0.005066 arcsec/yr Epoch of Position: 2015.5				Reference Frame: ICRS		
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.											
	Category=STAR											
	Description=[A4-A9 V-IV] Extended=NO											
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture		Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
	1	(COS.ta.181 2291)	(4) HD-201585--MA SCARA-1	COS/NUV, ACQ/IMAGE, BOA		MIRRORB		PHASE .926 TO .94 2		17.5 Secs (17.5 Secs)		
										[==>]		[1]
	2	(COS.sp.181 2292)	(4) HD-201585--MA SCARA-1	COS/FUV, TIME-TAG, PSA		G160M 1589 A	BUFFER-TIME=60 0; FP-POS=1			2026 Secs (2026 Secs)		
										[==>]		[1]
	3	(COS.sp.181 2292)	(4) HD-201585--MA SCARA-1	COS/FUV, TIME-TAG, PSA		G160M 1589 A	BUFFER-TIME=60 0; FP-POS=1			2475 Secs (2475 Secs)		
										[==>]		[2]
	4	(COS.sp.181 2292)	(4) HD-201585--MA SCARA-1	COS/FUV, TIME-TAG, PSA		G160M 1589 A	BUFFER-TIME=60 0; FP-POS=1			2475 Secs (2475 Secs)		
										[==>]		[3]
	5	(COS.sp.181 2292)	(4) HD-201585--MA SCARA-1	COS/FUV, TIME-TAG, PSA		G160M 1589 A	BUFFER-TIME=60 0; FP-POS=1			2475 Secs (2475 Secs)		
										[==>]		[4]
	6	(COS.sp.181 2292)	(4) HD-201585--MA SCARA-1	COS/FUV, TIME-TAG, PSA		G160M 1589 A	BUFFER-TIME=60 0; FP-POS=1			2475 Secs (2475 Secs)		
										[==>]		[5]



Orbit 4

Server Version: 20220630



Orbit 5

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