16724 - Hydrodynamic atmospheric escape in a benchmark ultra-hot Jupiter

Cycle: 29, Proposal Category: GO

(UV Initiative)

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	*Institution*	*E-Mail*
Dr. Leonardo Dos Santos (PI) (Contact)	**Space Telescope Science Institute**	**ldsantos@stsci.edu**
Prof. David Ehrenreich (CoI) (ESA Member)	University of Geneva, Department of Astronomy	david.ehrenreich@unige.ch
Dr. Vincent Bourrier (CoI) (ESA Member)	University of Geneva, Department of Astronomy	vincent.bourrier@unige.ch
Dr. Julia Seidel (CoI) (ESA Member)	University of Geneva, Department of Astronomy	jseidel@eso.org
Prof. Monika Lendl (CoI) (ESA Member)	University of Geneva, Department of Astronomy	monika.lendl@unige.ch
Dr. Jens Hoeijmakers (CoI) (ESA Member)	Lund University	jens.hoeijmakers@astro.lu.se
Prof. David K. Sing (CoI)	The Johns Hopkins University	dsing@jhu.edu
Dr. Joshua D. Lothringer (CoI) (AdminUSPI)	Utah Valley University	jlothringer@uvu.edu
Prof. Aline Vidotto (CoI) (ESA Member)	Universiteit Leiden	vidotto@strw.leidenuniv.nl
Dr. Vivien Parmentier (CoI) (ESA Member)	University of Oxford	vivien.parmentier@physics.ox.ac.uk
Dr. Munazza Alam (CoI)	Carnegie Institution of Washington	malam@carnegiescience.edu
Dr. Johanna Teske (CoI)	Carnegie Institution of Washington	jteske@carnegiescience.edu
Joost Wardenier (CoI) (ESA Member)	University of Oxford	joost.wardenier@physics.ox.ac.uk

VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) BD+01-316 WAVE	STIS/CCD STIS/NUV-MAMA	5	09-Jan-2023 10:00:16.0	yes
02	(1) BD+01-316 WAVE	STIS/CCD STIS/NUV-MAMA	5	09-Jan-2023 10:00:19.0	yes

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
R2	(1) BD+01-316 WAVE	STIS/CCD STIS/NUV-MAMA	5	09-Jan-2023 10:00:22.0	yes
S2	(1) BD+01-316 WAVE	STIS/CCD STIS/NUV-MAMA	5	09-Jan-2023 10:00:26.0	yes

20 Total Orbits Used

ABSTRACT

Hydrodynamic atmospheric escape is thought to be the main avenue for early evolution in exoplanets ranging from gas giants to terrestrial worlds, as shown by demographic studies resulting from the Kepler survey. However, with only three exoplanets to date that display smoking gun evidence of hydrodynamic escape, most modeling efforts to understand this process have been limited to semi-arbitrary assumptions and artificial test cases. This has a downstream effect that limits our capacity to assess if sub-Jovian planets are able to retain their volatile-rich atmospheres. While hot Jupiters are under no threat of losing significant fractions of their mass, they are the best targets to study hydrodynamic escape because they have detectable signals of exospheric metals in transmission spectroscopy. These signatures can only be observed by HST in the ultraviolet. In this program, we propose to observe the transmission spectrum of the ultra-hot Jupiter WASP-76b. We predict that this planet is losing mass at a rate 10 times larger than that of HD 209458b, and we can detect escape of Mg and Fe at more than 5-sigma confidence in high resolution. We further predict that the escaping material fills the Roche lobe of the planet and is in a state of geometric blow-off. Our results will automatically yield a precise near-UV transmission spectrum of WASP-76 b, a crucial measurement to probe opacity sources in its stratosphere and rainout of metallic species.

OBSERVING DESCRIPTION

We shall observe two transits of the ultra-hot Jupiter WASP-76b using STIS/NUV-MAMA. The objective is to detect metals escaping from the planet, and producing in-transit absorption in emission lines between 2400 and 2900 angstrom. This program is time sensitive because it can only be executed when the planet transits. Thus, we set a periodic time constraint. It is imperative to observe as many orbits as possible in a visit to cover the entirety of the transit, as well as obtain out-of-transit baseline observations. UV observations are limited to a maximum of five orbits, so we set the phase constraints to allow five consecutive orbits per visit. There are multiple observing opportunities between early November 2021 and mid-February 2022, as well as the last months of Cycle 29.

We will use the E230M grating centered at 2707 angstrom with the square 0.2x0.2 slit aiming for the best spectrophotometric stability. We will use

the TIME-TAG mode to allow us to break down each exposure into sub-exposures, which in turn is necessary to obtain a precise time series of fluxes. The ETC recommends a buffer time of 265 s, but at this value we would require special handling for the program because the number of buffer dumps exceeds 30. No further acquisition exposures are necessary in consecutive orbits within the same visit.

Each orbit was set to execute one peakup exposure before the science exposure. WASP-76 is too bright for a peakup using the MIRROR, so we use instead the G430L element; the aperture 31X0.05NDB is necessary to avoid saturation in comparison with other apertures. The wavelength calibration was set to happen after the science exposure in order to spend as much time as possible on target. Due to the position of our target in the sky, the available visibility is around 1700 s per orbit. In order to allow us to have as much time as possible on target, we set the schedulability to 30%.

Visit

Proposal 16724, Visit 01, completed Mon Jan 09 15:00:27 GMT 2023

Diagnostic Status: Warning

Scientific Instruments: STIS/NUV-MAMA, STIS/CCD

Special Requirements: SCHED 100%; Period 1.80988198 D AND ZERO-PHASE HJD2458080.626165

Diagnostics

(Visit 01) Warning (Orbit Planner): STIS TIME-TAG EXPOSURE GENERATES HEAVY DATA VOLUME

Fixed Targets

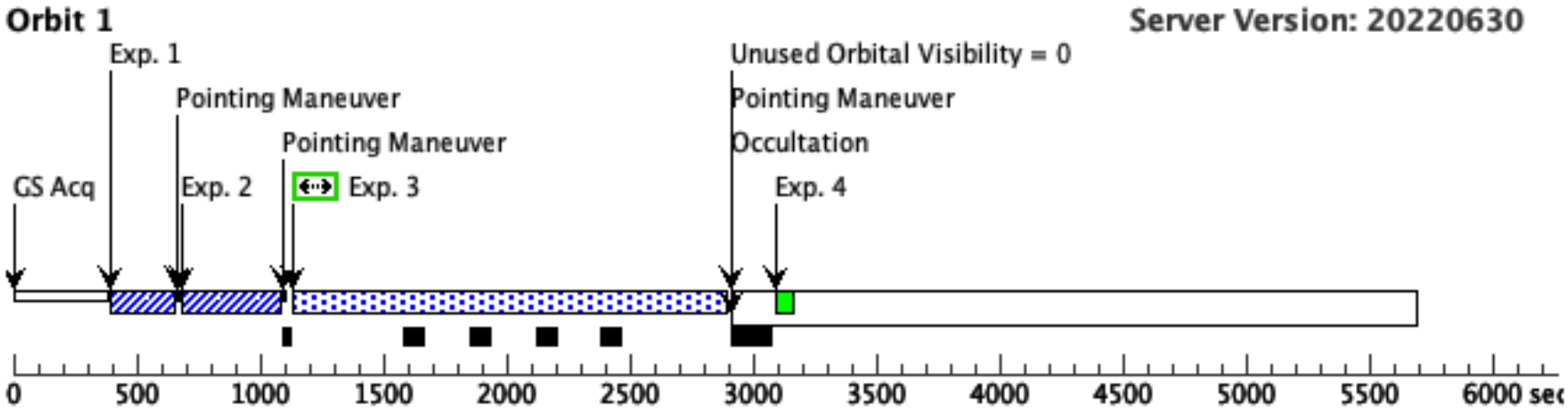
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	BD+01-316	RA: 01 46 31.8577 (26.6327404d)	Proper Motion RA: 45.398 mas/yr	V=9.52	Reference Frame: ICRS
	Alt Name1: WASP-76	Dec: +02 42 2.03 (2.70056d)	Proper Motion Dec: -40.819 mas/yr		
		Equinox: J2000	Epoch of Position: 2000		

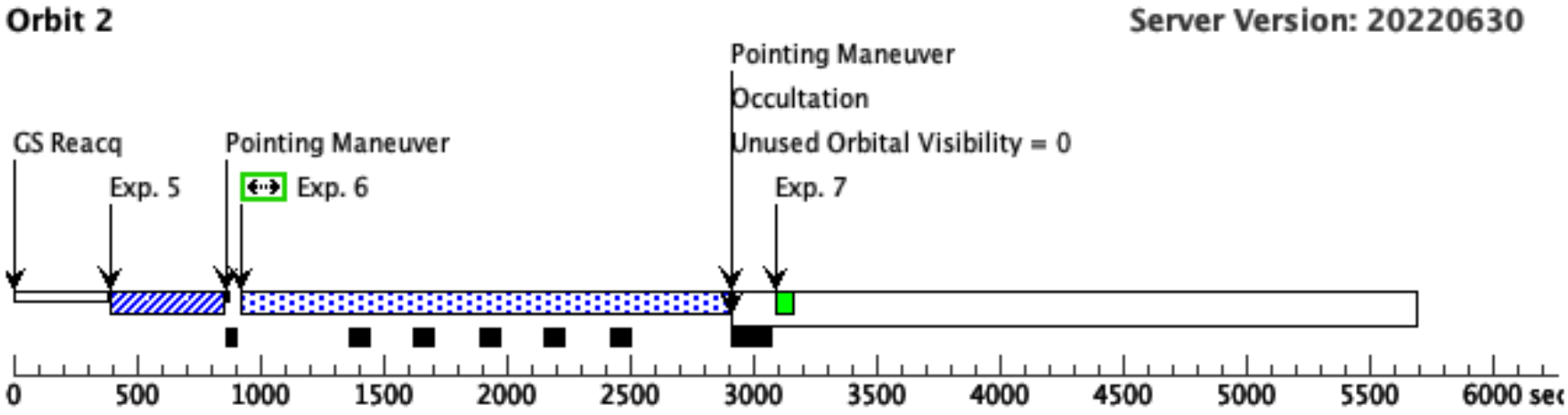
Comments: Coordinates updated to ICRS reference frame, epoch J2000.
Category=STAR
Description=[F3-F9]
Extended=NO

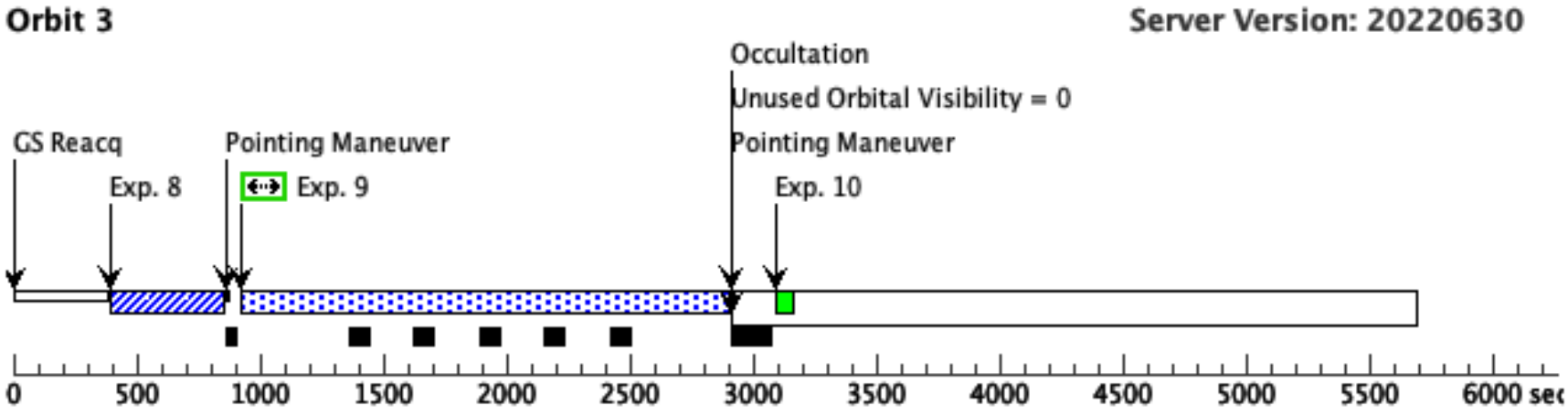
Exposures

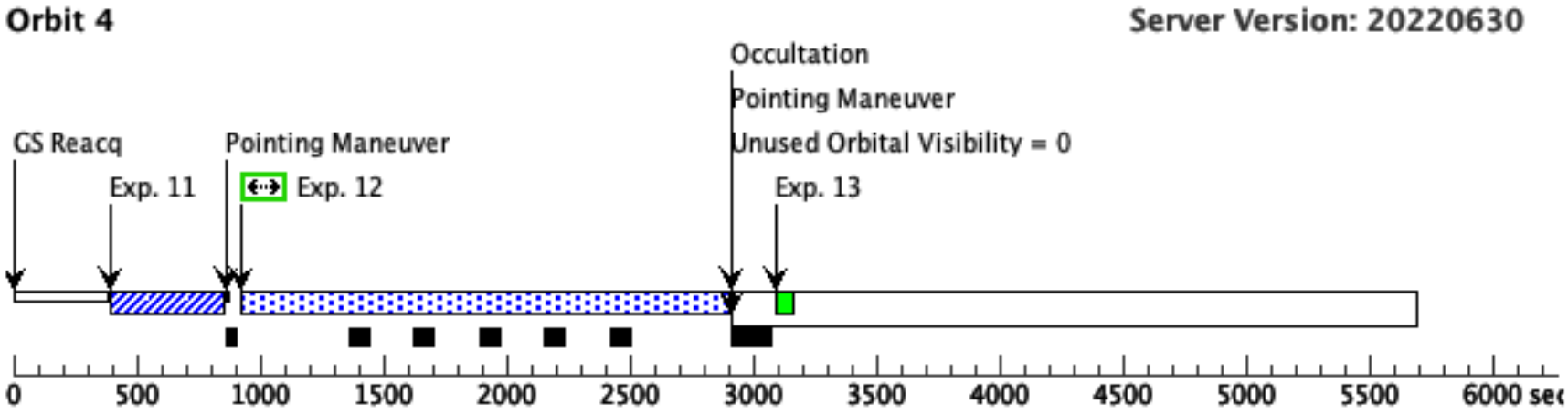
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ACQ (STIS.ta.1523489)	(1) BD+01-316	STIS/CCD, ACQ, F28X50OII	MIRROR		PHASE 0.9015628 TO 0.08462415	Sequence 1-4 Non-Int in Visit 01	1 Secs (1 Secs) *[==>]*	***[1]***
2	ACQ/PEAK (STIS.ta.1523493)	(1) BD+01-316	STIS/CCD, ACQ/PEAK, 31X0.05NDB	G430L 4300 A			Sequence 1-4 Non-Int in Visit 01	1 Secs (1 Secs) *[==>]*	***[1]***
3	SCIENCE (STIS.sp.1523481)	(1) BD+01-316	STIS/NUV-MAMA, TIME-TAG, 0.2X0.2	E230M 2707 A	BUFFER-TIME=265; WAVECAL=NO		Sequence 1-4 Non-Int in Visit 01	2700 Secs (1563 Secs) *[==>1563.0 Secs]*	***[1]***
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.ta.1523493)	(1) BD+01-316	STIS/CCD, ACQ/PEAK, 31X0.05NDB	G430L 4300 A			Sequence 5-7 Non-Int in Visit 01	1 Secs (1 Secs) *[==>]*	***[2]***
6	SCIENCE (STIS.sp.1523481)	(1) BD+01-316	STIS/NUV-MAMA, TIME-TAG, 0.2X0.2	E230M 2707 A	BUFFER-TIME=265; WAVECAL=NO		Sequence 5-7 Non-Int in Visit 01	2700 Secs (1792 Secs) *[==>1792.0 Secs]*	***[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.ta.1523493)	(1) BD+01-316	STIS/CCD, ACQ/PEAK, 31X0.05NDB	G430L 4300 A			Sequence 8-10 Non-Int in Visit 01	1 Secs (1 Secs) *[==>]*	***[3]***
9	SCIENCE (STIS.sp.1523481)	(1) BD+01-316	STIS/NUV-MAMA, TIME-TAG, 0.2X0.2	E230M 2707 A	BUFFER-TIME=265; WAVECAL=NO		Sequence 8-10 Non-Int in Visit 01	2700 Secs (1792 Secs) *[==>1792.0 Secs]*	***[3]***
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.ta.1523493)	(1) BD+01-316	STIS/CCD, ACQ/PEAK, 31X0.05NDB	G430L 4300 A			Sequence 11-13 Non-Int in Visit 01	1 Secs (1 Secs) *[==>]*	***[4]***
12	SCIENCE (STIS.sp.1523481)	(1) BD+01-316	STIS/NUV-MAMA, TIME-TAG, 0.2X0.2	E230M 2707 A	BUFFER-TIME=265; WAVECAL=NO		Sequence 11-13 Non-Int in Visit 01	2700 Secs (1792 Secs) *[==>1792.0 Secs]*	***[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.ta.1523493)	(1) BD+01-316	STIS/CCD, ACQ/PEAK, 31X0.05NDB	G430L 4300 A			Sequence 14-16 Non-Int in Visit 01	1 Secs (1 Secs) *[==>]*	***[5]***
15	SCIENCE (STIS.sp.1523481)	(1) BD+01-316	STIS/NUV-MAMA, TIME-TAG, 0.2X0.2	E230M 2707 A	BUFFER-TIME=265; WAVECAL=NO		Sequence 14-16 Non-Int in Visit 01	2700 Secs (1792 Secs) *[==>1792.0 Secs]*	***[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]***

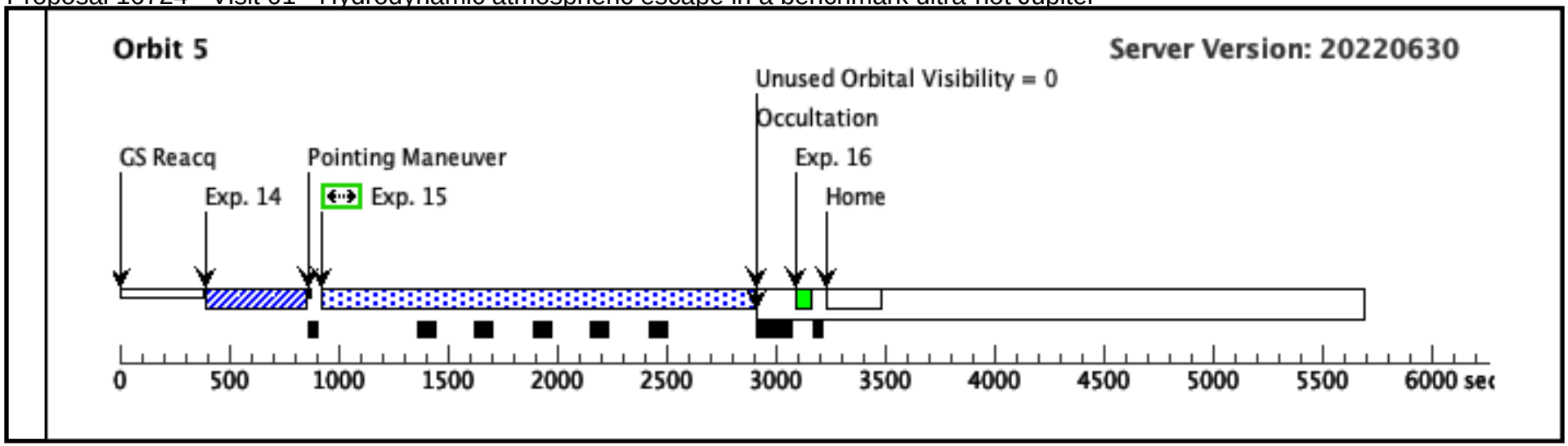
Orbit Structure






Orbit 3
Server Version: 20220630
Occultation
Unused Orbital Visibility = 0
GS Reacq
Pointing Maneuver
Pointing Maneuver
Exp. 8
Exp. 9
Exp. 10
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000 sec


Orbit 4
Server Version: 20220630
Occultation
Pointing Maneuver
Unused Orbital Visibility = 0
GS Reacq
Pointing Maneuver
Exp. 11
Exp. 12
Exp. 13
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000 sec


Orbit 5
Server Version: 20220630
Unused Orbital Visibility = 0
Occultation
GS Reacq
Pointing Maneuver
Exp. 16
Exp. 14
Exp. 15
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000 sec

Visit

Proposal 16724, Visit 02, failed Mon Jan 09 15:00:27 GMT 2023

Diagnostic Status: Warning

Scientific Instruments: STIS/NUV-MAMA, STIS/CCD

Special Requirements: SCHED 100%; Period 1.80988198 D AND ZERO-PHASE HJD2458080.626165

Diagnostics

(Visit 02) Warning (Orbit Planner): STIS TIME-TAG EXPOSURE GENERATES HEAVY DATA VOLUME

Fixed Targets

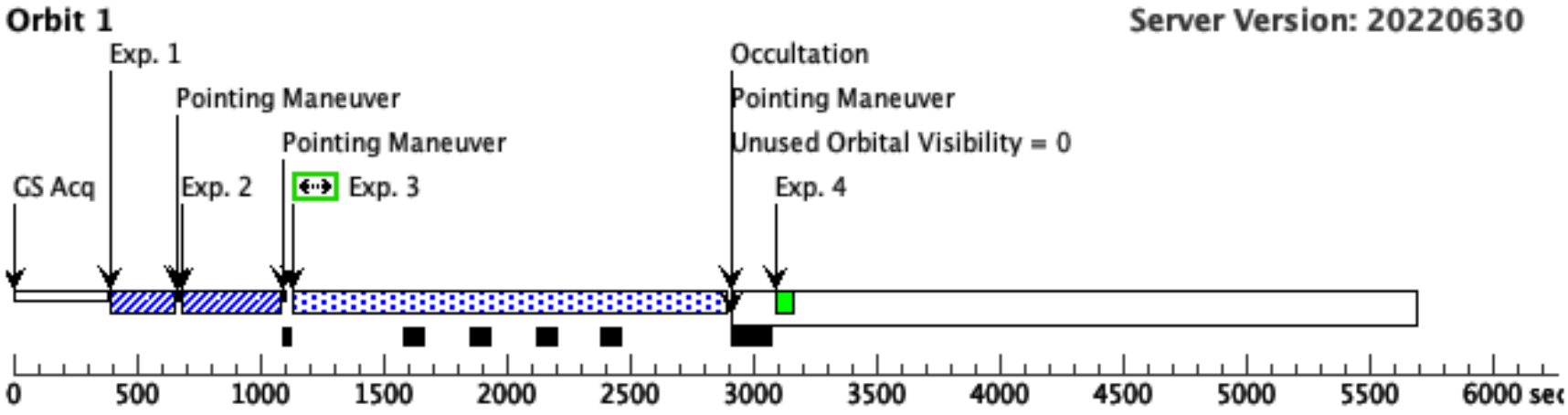
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	BD+01-316	RA: 01 46 31.8577 (26.6327404d)	Proper Motion RA: 45.398 mas/yr	V=9.52	Reference Frame: ICRS
	Alt Name1: WASP-76	Dec: +02 42 2.03 (2.70056d)	Proper Motion Dec: -40.819 mas/yr		
		Equinox: J2000	Epoch of Position: 2000		

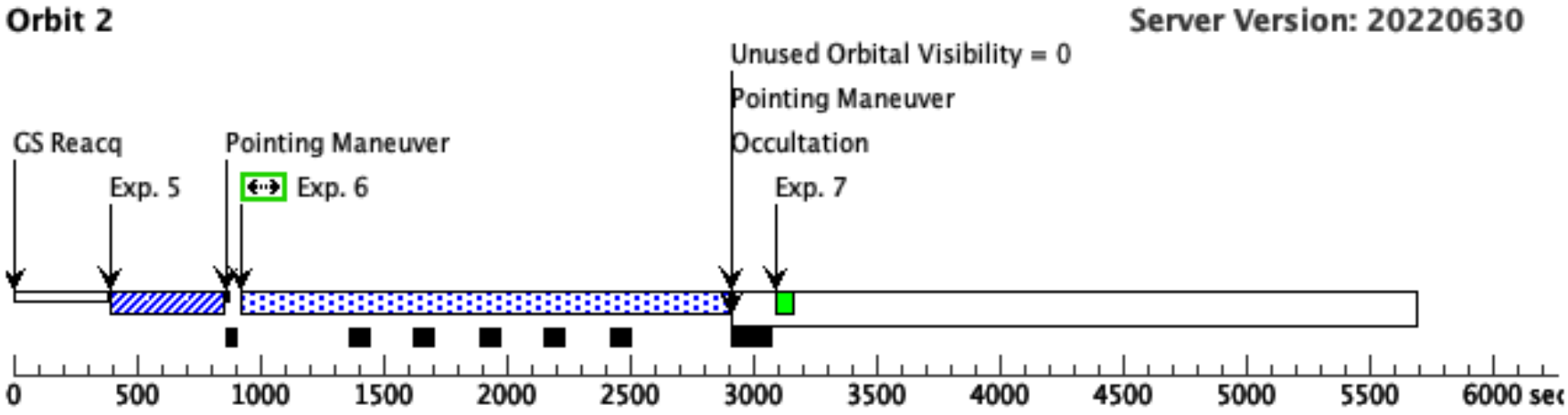
Comments: Coordinates updated to ICRS reference frame, epoch J2000.
Category=STAR
Description=[F3-F9]
Extended=NO

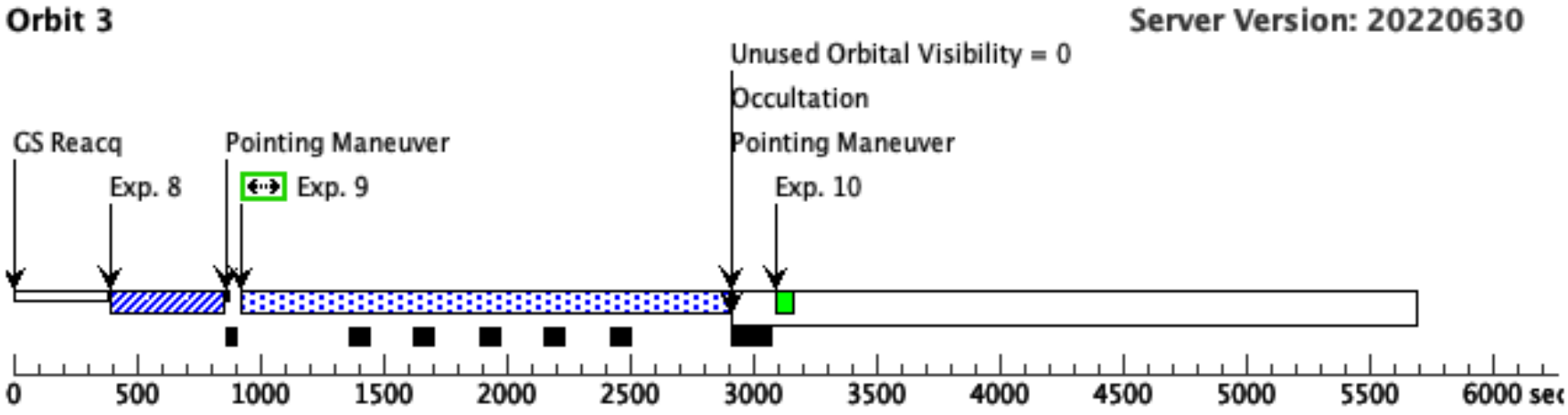
Exposures

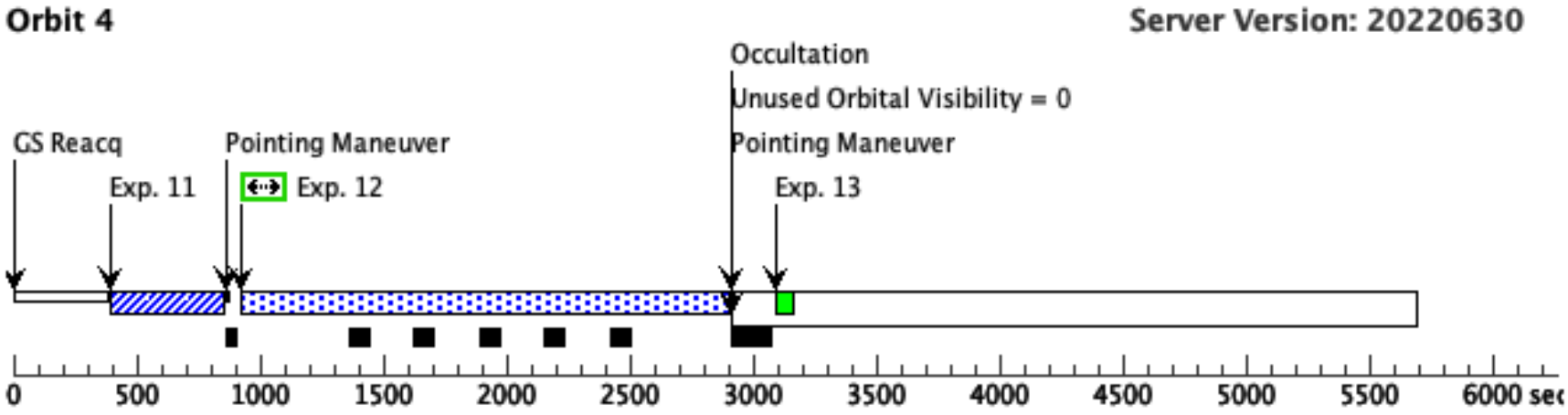
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ACQ (STIS.ta.1523489)	(1) BD+01-316	STIS/CCD, ACQ, F28X50OII	MIRROR		PHASE 0.91537585 TO 0.0984372	Sequence 1-4 Non-Int in Visit 02	1 Secs (1 Secs) *[==>]*	***[1]***
2	ACQ/PEAK (STIS.ta.1523493)	(1) BD+01-316	STIS/CCD, ACQ/PEAK, 31X0.05NDB	G430L 4300 A			Sequence 1-4 Non-Int in Visit 02	1 Secs (1 Secs) *[==>]*	***[1]***
3	SCIENCE (STIS.sp.1523481)	(1) BD+01-316	STIS/NUV-MAMA, TIME-TAG, 0.2X0.2	E230M 2707 A	BUFFER-TIME=265; WAVECAL=NO		Sequence 1-4 Non-Int in Visit 02	2700 Secs (1563 Secs) *[==>1563.0 Secs]*	***[1]***
4	GO-WAVE CAL	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 1-4 Non-Int in Visit 02	*[==>]*	***[1]***
5	ACQ/PEAK (STIS.ta.1523493)	(1) BD+01-316	STIS/CCD, ACQ/PEAK, 31X0.05NDB	G430L 4300 A			Sequence 5-7 Non-Int in Visit 02	1 Secs (1 Secs) *[==>]*	***[2]***
6	SCIENCE (STIS.sp.1523481)	(1) BD+01-316	STIS/NUV-MAMA, TIME-TAG, 0.2X0.2	E230M 2707 A	BUFFER-TIME=265; WAVECAL=NO		Sequence 5-7 Non-Int in Visit 02	2700 Secs (1792 Secs) *[==>1792.0 Secs]*	***[2]***
7	GO-WAVE CAL	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 5-7 Non-Int in Visit 02	*[==>]*	***[2]***
8	ACQ/PEAK (STIS.ta.1523493)	(1) BD+01-316	STIS/CCD, ACQ/PEAK, 31X0.05NDB	G430L 4300 A			Sequence 8-10 Non-Int in Visit 02	1 Secs (1 Secs) *[==>]*	***[3]***
9	SCIENCE (STIS.sp.1523481)	(1) BD+01-316	STIS/NUV-MAMA, TIME-TAG, 0.2X0.2	E230M 2707 A	BUFFER-TIME=265; WAVECAL=NO		Sequence 8-10 Non-Int in Visit 02	2700 Secs (1792 Secs) *[==>1792.0 Secs]*	***[3]***
10	GO-WAVE CAL	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 8-10 Non-Int in Visit 02	*[==>]*	***[3]***
11	ACQ/PEAK (STIS.ta.1523493)	(1) BD+01-316	STIS/CCD, ACQ/PEAK, 31X0.05NDB	G430L 4300 A			Sequence 11-13 Non-Int in Visit 02	1 Secs (1 Secs) *[==>]*	***[4]***
12	SCIENCE (STIS.sp.1523481)	(1) BD+01-316	STIS/NUV-MAMA, TIME-TAG, 0.2X0.2	E230M 2707 A	BUFFER-TIME=265; WAVECAL=NO		Sequence 11-13 Non-Int in Visit 02	2700 Secs (1792 Secs) *[==>1792.0 Secs]*	***[4]***
13	GO-WAVE CAL	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 11-13 Non-Int in Visit 02	*[==>]*	***[4]***
14	ACQ/PEAK (STIS.ta.1523493)	(1) BD+01-316	STIS/CCD, ACQ/PEAK, 31X0.05NDB	G430L 4300 A			Sequence 14-16 Non-Int in Visit 02	1 Secs (1 Secs) *[==>]*	***[5]***
15	SCIENCE (STIS.sp.1523481)	(1) BD+01-316	STIS/NUV-MAMA, TIME-TAG, 0.2X0.2	E230M 2707 A	BUFFER-TIME=265; WAVECAL=NO		Sequence 14-16 Non-Int in Visit 02	2700 Secs (1792 Secs) *[==>1792.0 Secs]*	***[5]***
16	GO-WAVE CAL	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 14-16 Non-Int in Visit 02	*[==>]*	***[5]***

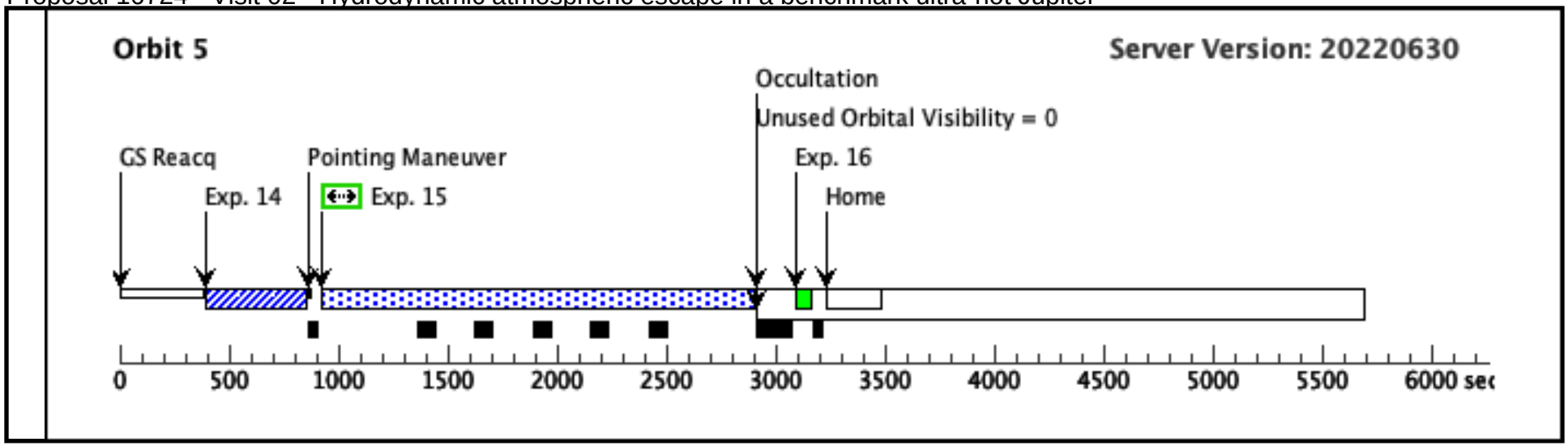
Orbit Structure






Orbit 3
Server Version: 20220630
Unused Orbital Visibility = 0
Occultation
GS Reacq
Pointing Maneuver
Pointing Maneuver
Exp. 8
Exp. 9
Exp. 10
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000 sec


Orbit 4
Server Version: 20220630
Occultation
Unused Orbital Visibility = 0
GS Reacq
Pointing Maneuver
Pointing Maneuver
Exp. 11
Exp. 12
Exp. 13
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000 sec


Orbit 5
Server Version: 20220630
Occultation
Unused Orbital Visibility = 0
GS Reacq
Pointing Maneuver
Exp. 16
Exp. 14
Exp. 15
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000 sec

Visit

Proposal 16724, Repeat of Visit 02 (R2), failed Mon Jan 09 15:00:27 GMT 2023

Diagnostic Status: Warning

Scientific Instruments: STIS/NUV-MAMA, STIS/CCD

Special Requirements: SCHED 100%; Period 1.80988198 D AND ZERO-PHASE HJD2458080.626165

Diagnostics

(Repeat of Visit 02 (R2)) Warning (Orbit Planner): STIS TIME-TAG EXPOSURE GENERATES HEAVY DATA VOLUME

Fixed Targets

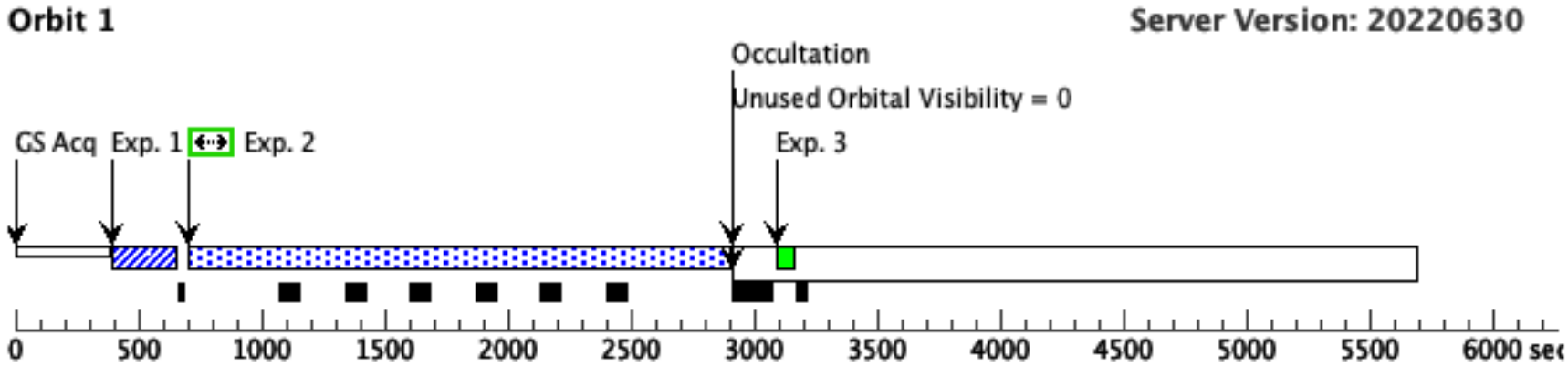
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	BD+01-316	RA: 01 46 31.8577 (26.6327404d)	Proper Motion RA: 45.398 mas/yr	V=9.52	Reference Frame: ICRS
	Alt Name1: WASP-76	Dec: +02 42 2.03 (2.70056d)	Proper Motion Dec: -40.819 mas/yr		
		Equinox: J2000	Epoch of Position: 2000		

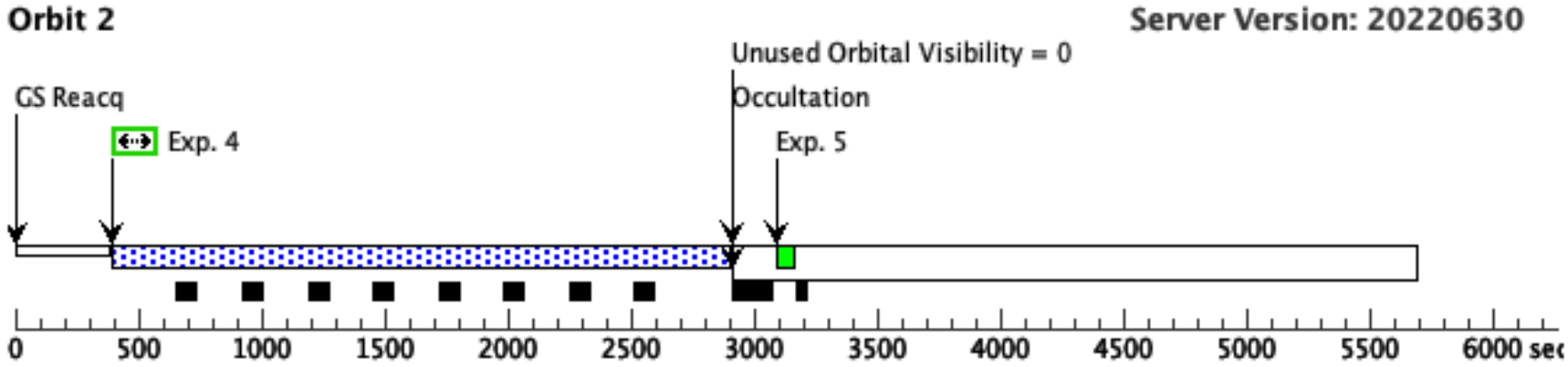
Comments: Coordinates updated to ICRS reference frame, epoch J2000.
Category=STAR
Description=[F3-F9]
Extended=NO

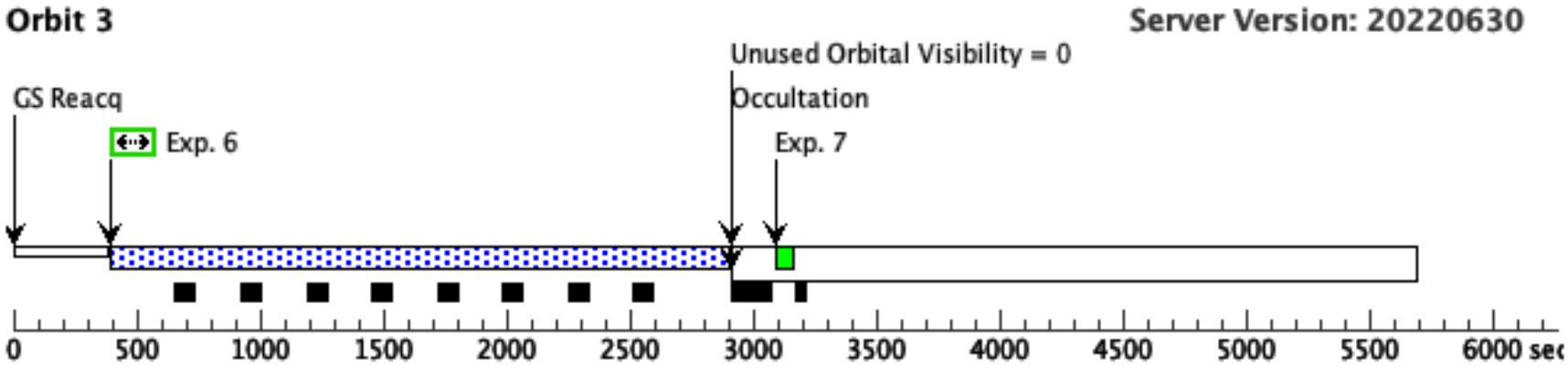
Exposures

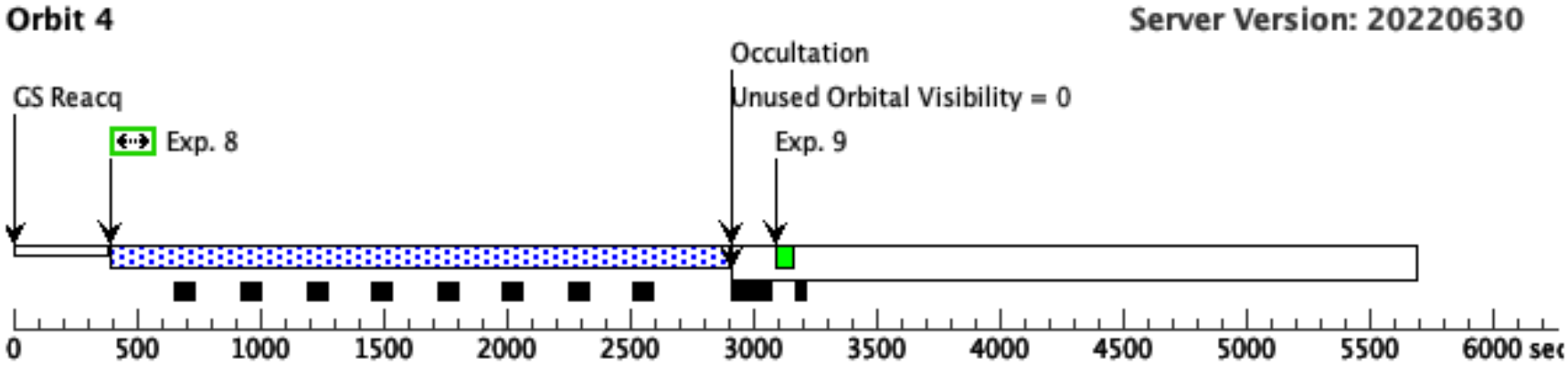
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ACQ (STIS.ta.1523489)	(1) BD+01-316	STIS/CCD, ACQ, F28X50OII	MIRROR		PHASE 0.91537585 TO 0.0984372	Sequence 1-3 Non-Int in Repeat of Visit 02 (R2)	1 Secs (1 Secs) *[==>]*	***[1]***
2	SCIENCE (STIS.sp.1523481)	(1) BD+01-316	STIS/NUV-MAMA, TIME-TAG, 0.2X0.2	E230M 2707 A	BUFFER-TIME=265; WAVECAL=NO		Sequence 1-3 Non-Int in Repeat of Visit 02 (R2)	2700 Secs (2079 Secs) *[==>2079.0 Secs]*	***[1]***
3	GO-WAVE CAL	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 1-3 Non-Int in Repeat of Visit 02 (R2)	*[==>]*	***[1]***
4	SCIENCE (STIS.sp.1523481)	(1) BD+01-316	STIS/NUV-MAMA, TIME-TAG, 0.2X0.2	E230M 2707 A	BUFFER-TIME=265; WAVECAL=NO		Sequence 4-5 Non-Int in Repeat of Visit 02 (R2)	2700 Secs (2496 Secs) *[==>2496.0 Secs]*	***[2]***
5	GO-WAVE CAL	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 4-5 Non-Int in Repeat of Visit 02 (R2)	*[==>]*	***[2]***
6	SCIENCE (STIS.sp.1523481)	(1) BD+01-316	STIS/NUV-MAMA, TIME-TAG, 0.2X0.2	E230M 2707 A	BUFFER-TIME=265; WAVECAL=NO		Sequence 6-7 Non-Int in Repeat of Visit 02 (R2)	2700 Secs (2496 Secs) *[==>2496.0 Secs]*	***[3]***
7	GO-WAVE CAL	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 6-7 Non-Int in Repeat of Visit 02 (R2)	*[==>]*	***[3]***
8	SCIENCE (STIS.sp.1523481)	(1) BD+01-316	STIS/NUV-MAMA, TIME-TAG, 0.2X0.2	E230M 2707 A	BUFFER-TIME=265; WAVECAL=NO		Sequence 8-9 Non-Int in Repeat of Visit 02 (R2)	2700 Secs (2496 Secs) *[==>2496.0 Secs]*	***[4]***
9	GO-WAVE CAL	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 8-9 Non-Int in Repeat of Visit 02 (R2)	*[==>]*	***[4]***
10	SCIENCE (STIS.sp.1523481)	(1) BD+01-316	STIS/NUV-MAMA, TIME-TAG, 0.2X0.2	E230M 2707 A	BUFFER-TIME=265; WAVECAL=NO		Sequence 10-11 Non-Int in Repeat of Visit 02 (R2)	2700 Secs (2496 Secs) *[==>2496.0 Secs]*	***[5]***
11	GO-WAVE CAL	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 10-11 Non-Int in Repeat of Visit 02 (R2)	*[==>]*	***[5]***

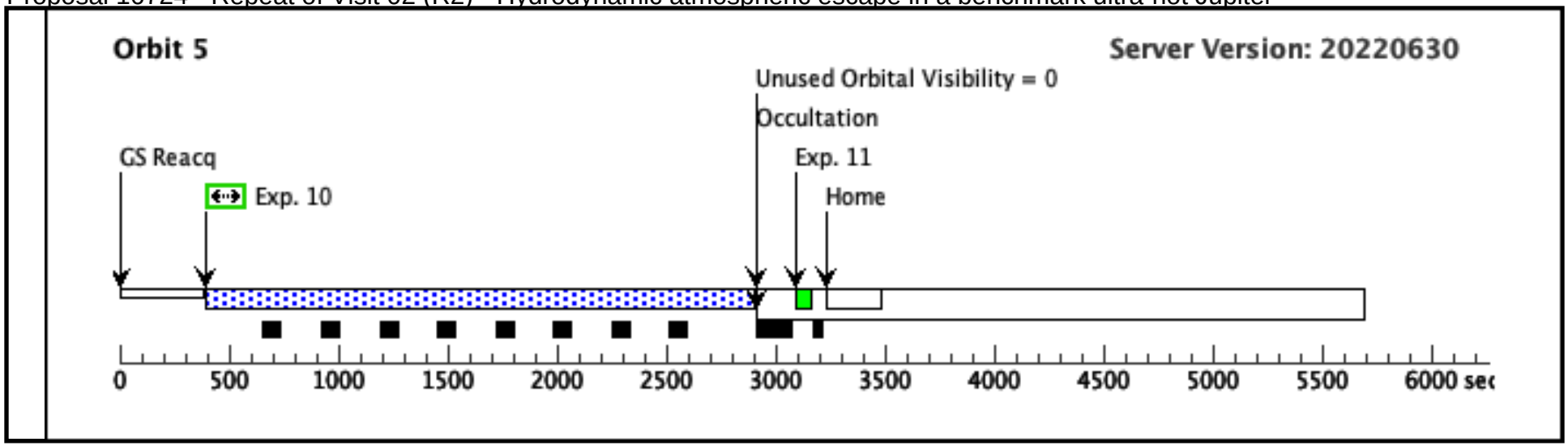
Orbit Structure






Orbit 3
Server Version: 20220630
Unused Orbital Visibility = 0
GS Reacq
Occultation
Exp. 6
Exp. 7
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000 sec


Orbit 4
Server Version: 20220630
Occultation
GS Reacq
Unused Orbital Visibility = 0
Exp. 8
Exp. 9
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000 sec


Orbit 5
Server Version: 20220630
Unused Orbital Visibility = 0
Occultation
GS Reacq
Exp. 10
Exp. 11
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000 sec

Visit

Proposal 16724, Repeat of Visit R2 (S2), implementation Mon Jan 09 15:00:27 GMT 2023

Diagnostic Status: Warning

Scientific Instruments: STIS/NUV-MAMA, STIS/CCD

Special Requirements: SCHED 100%; Period 1.80988198 D AND ZERO-PHASE HJD2458080.62570

Diagnostics

(Repeat of Visit R2 (S2)) Warning (Orbit Planner): STIS TIME-TAG EXPOSURE GENERATES HEAVY DATA VOLUME

Fixed Targets

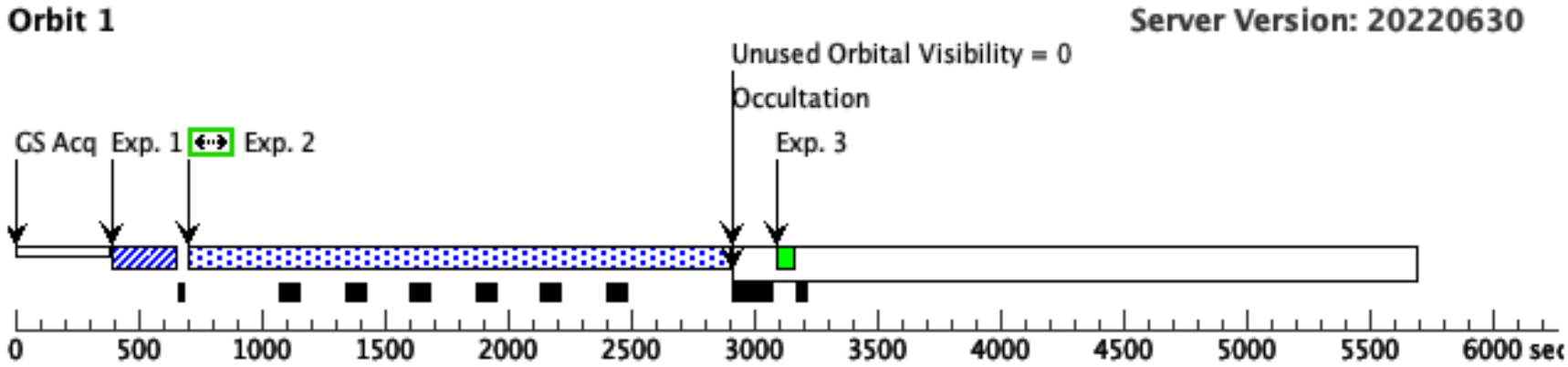
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	BD+01-316	RA: 01 46 31.8577 (26.6327404d)	Proper Motion RA: 45.398 mas/yr	V=9.52	Reference Frame: ICRS
	Alt Name1: WASP-76	Dec: +02 42 2.03 (2.70056d)	Proper Motion Dec: -40.819 mas/yr		
		Equinox: J2000	Epoch of Position: 2000		

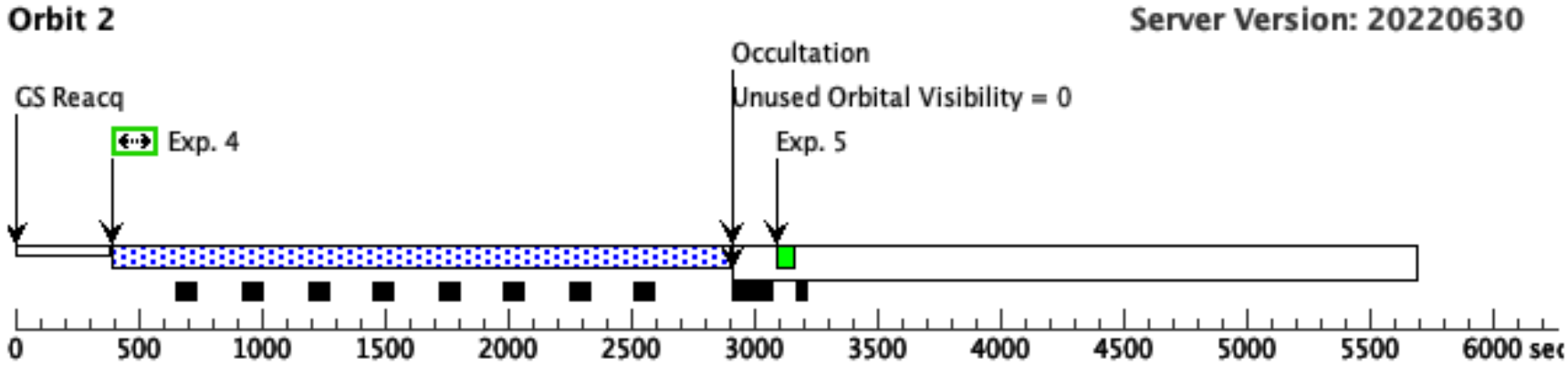
Comments: Coordinates updated to ICRS reference frame, epoch J2000.
Category=STAR
Description=[F3-F9]
Extended=NO

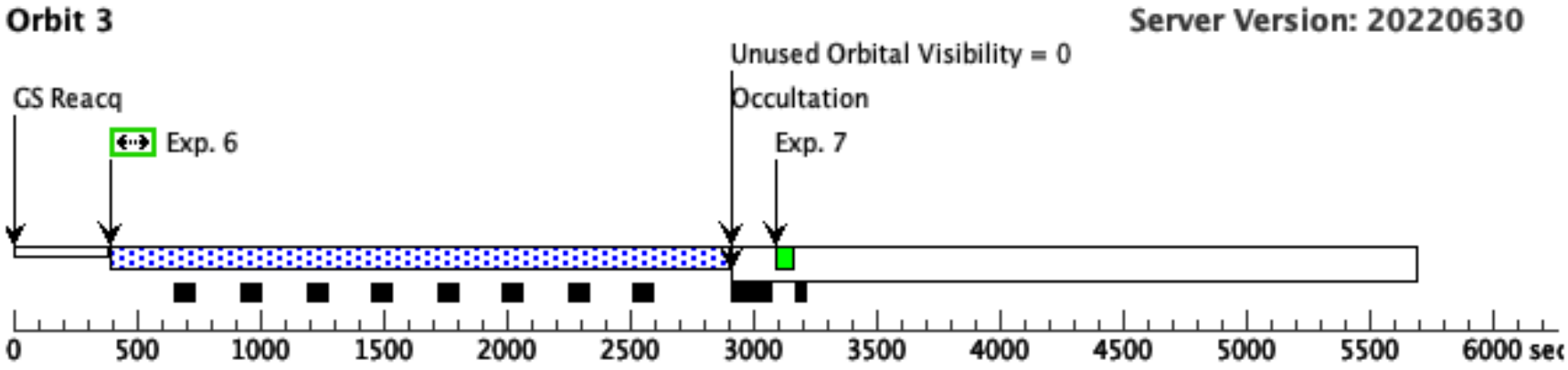
Exposures

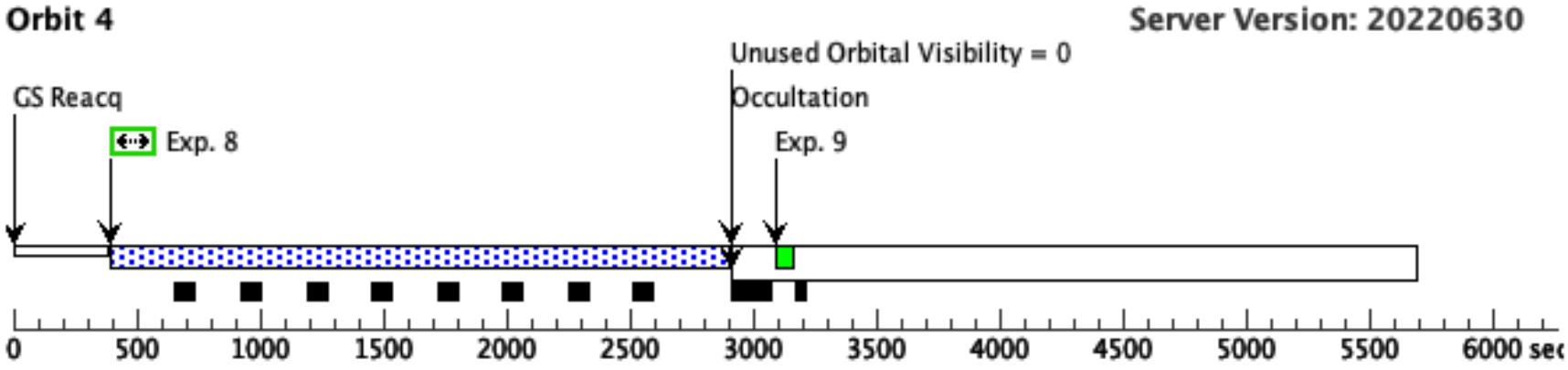
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ACQ (STIS.ta.1523489)	(1) BD+01-316	STIS/CCD, ACQ, F28X50OII	MIRROR		PHASE 0.9079130 TO 0.9309347	Sequence 1-3 Non-Int in Repeat of Visit R2 (S2)	1 Secs (1 Secs) *[==>]*	***[1]***
2	SCIENCE (STIS.sp.1523481)	(1) BD+01-316	STIS/NUV-MAMA, TIME-TAG, 0.2X0.2	E230M 2707 A	BUFFER-TIME=265; WAVECAL=NO		Sequence 1-3 Non-Int in Repeat of Visit R2 (S2)	2700 Secs (2079 Secs) *[==>2079.0 Secs]*	***[1]***
3	GO-WAVE CAL	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 1-3 Non-Int in Repeat of Visit R2 (S2)	*[==>]*	***[1]***
4	SCIENCE (STIS.sp.1523481)	(1) BD+01-316	STIS/NUV-MAMA, TIME-TAG, 0.2X0.2	E230M 2707 A	BUFFER-TIME=265; WAVECAL=NO		Sequence 4-5 Non-Int in Repeat of Visit R2 (S2)	2700 Secs (2496 Secs) *[==>2496.0 Secs]*	***[2]***
5	GO-WAVE CAL	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 4-5 Non-Int in Repeat of Visit R2 (S2)	*[==>]*	***[2]***
6	SCIENCE (STIS.sp.1523481)	(1) BD+01-316	STIS/NUV-MAMA, TIME-TAG, 0.2X0.2	E230M 2707 A	BUFFER-TIME=265; WAVECAL=NO		Sequence 6-7 Non-Int in Repeat of Visit R2 (S2)	2700 Secs (2496 Secs) *[==>2496.0 Secs]*	***[3]***
7	GO-WAVE CAL	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 6-7 Non-Int in Repeat of Visit R2 (S2)	*[==>]*	***[3]***
8	SCIENCE (STIS.sp.1523481)	(1) BD+01-316	STIS/NUV-MAMA, TIME-TAG, 0.2X0.2	E230M 2707 A	BUFFER-TIME=265; WAVECAL=NO		Sequence 8-9 Non-Int in Repeat of Visit R2 (S2)	2700 Secs (2496 Secs) *[==>2496.0 Secs]*	***[4]***
9	GO-WAVE CAL	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 8-9 Non-Int in Repeat of Visit R2 (S2)	*[==>]*	***[4]***
10	SCIENCE (STIS.sp.1523481)	(1) BD+01-316	STIS/NUV-MAMA, TIME-TAG, 0.2X0.2	E230M 2707 A	BUFFER-TIME=265; WAVECAL=NO		Sequence 10-11 Non-Int in Repeat of Visit R2 (S2)	2700 Secs (2496 Secs) *[==>2496.0 Secs]*	***[5]***
11	GO-WAVE CAL	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 10-11 Non-Int in Repeat of Visit R2 (S2)	*[==>]*	***[5]***

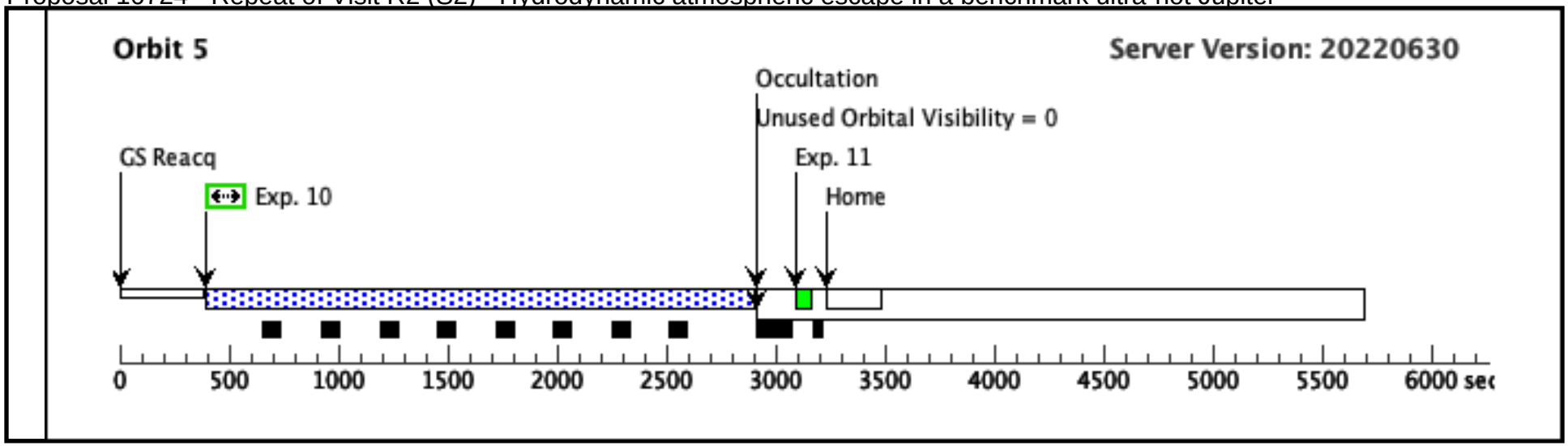
Orbit Structure






Orbit 3
Server Version: 20220630
Unused Orbital Visibility = 0
GS Reacq
Occultation
Exp. 6
Exp. 7
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000 sec


Orbit 4
Server Version: 20220630
Unused Orbital Visibility = 0
GS Reacq
Occultation
Exp. 8
Exp. 9
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000 sec


Orbit 5
Server Version: 20220630
Occultation
Unused Orbital Visibility = 0
GS Reacq
Exp. 10
Exp. 11
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000 sec