14619 - Characterising the atmosphere of a uniquely low-density, sub-Saturn mass planet

Cycle: 24, Proposal Category: GO

(Availability Mode: AVAILABLE)

INVESTIGATORS

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VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) WASP-127 WAVE	STIS/CCD	5	22-Jan-2018 15:00:46.0	yes

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
02	(1) WASP-127 CCDFLAT NONE WAVE	STIS/CCD	5	22-Jan-2018 15:00:57.0	yes
04	(1) WASP-127	WFC3/IR	5	22-Jan-2018 15:01:21.0	yes

15 Total Orbits Used

ABSTRACT

We propose to use HST and Spitzer to measure the transmission spectrum of the recently discovered, hot sub-Saturn mass exoplanet WASP-127b. Its low mass (0.19 Mj) and large radius (1.39 Rj) give it the lowest density of any exoplanet with a radial velocity measured mass. It has the largest predicted atmospheric scale height of any planet, and orbits a bright (V~10.2) star, making it an exceptional target for atmospheric characterisation via transmission spectroscopy. With HST and Spitzer, we will measure the full transmission spectrum from 0.3 to 5 microns, covering water, sodium, and potassium absorption features, and scattering by molecular hydrogen or haze. The Spitzer transit photometry at 3.6 and 4.5 microns will be used alongside the HST spectrum to break the low abundance/cloud degeneracy which prevents constraints being made on atmospheric metallicity. With a low mass of 0.19 Mj, this planet sits in an unexplored mass range at the very low-end of gas giant planets, making WASP-127b strategecally important for constraining the planetary mass-metallicity relationship, which is important for understanding planet formation mechanisms.

OBSERVING DESCRIPTION

Our HST observations will proide a transmission spectrum for the transiting exoplanet WASP-127b across the 0.3-1.7 micron wavelength range. An additional two transits with the Spitzer Space Telescope will provide photometry at 3.6 and 4.5 microns. WASP-127b is a sub-Saturn mass, highly inflated exoplanet, and is extremely amenable to atmospheric studies. The broad wavelength coverage will probe water, sodium and potassium absoption features, Rayleigh scattering, and will allow us to break the degeneracies between clouds and low abundances.

**Observing strategy:

To construct the transmission spectrum, we require three separate transits of WASP-127b to be observed with HST: one with STIS+G430L, one with

STIS+G750L, and one with WFC3+G141. All observations will be made in spectroscopic mode. The STIS observations will be made with the 52x2 arcsec slit to avoid slit losses.

At the start of each visit, a standard phase-constrained acquisition image will be taken. The subsequent observing strategy consists of taking repeated exposures for the duration of the transit, plus time before and after the transit to establish the out-of-transit baseline flux.

For the STIS observations, we will use stare mode with individual exposure times of 206 and 143 sec for G430L and G750L respectively. We will read out a subarray size of 128 pixels to reduce overheads (SIZEAXIS2=128). As in our previous Programs 14099, 12473 and 11740, we will override the default wavelength calibrations at the end of each exposure (WAVECAL=NO). This is done to improve the duty cycle and to allow the thermal breathing trends to be removed, which is only possible with an un-interrupted photometric time series. During Earth occultation in the last orbit, after the transit data has been taken, the wavelength calibration (and flat fielding for G750L) exposures are performed, a strategy successfully used in the past HST programs (14110, 12473, 11572, 11117, 13006, 11740). A single wavecal (using the 52"x0.2" slit) at the end of the sequence is sufficient for calibrating the spectra for the whole visit, as we find from cross-correlation (GO 12473) of the stellar spectra (taken using the 52"x2" slit) that the shifts are repeatably no more than 0.015 to 0.02 pixels on average during a 5 orbit visit. In addition, we keep an identical setup for the entire visit and do not switch between any settings to further minimize instrument-induced systematic errors in the photometric time series observations.

For the WFC3 observations, we will use the forward spatial scanning mode with a scan rate of 0.17 arcsec/sec, using SPARS=10 and NSAMP=15, giving individual exposure times of 103 sec (i.e. resulting in a scan across 17.5 arcsec = 144 pixels per exposure). This will leave plenty of room on the detector to estimate the background flux. We will read out a subarray size of 256 pixels to reduce overheads.

Each transit of WASP-127b lasts for 4 hours 20 minutes. We therefore require 5 consecutive HST orbits per visit. The first orbit serves to allow the telescope to thermally relax into its new pointing position, which is a standard procedure adopted by all HST exoplanet observations. The remaining 4 orbits will provide good phase coverage during transit, and allow for sufficient time to establish the baseline stellar flux necessary to accurately measure the transit depth. Strict phasing constraints will ensure at least 5 eposures will be taken either side of the transit.

**Signal-to-noise estimates:

WASP-127b is a bright target in the conventional sense (V=10.2mag, J=9.1mag). The challenge with exoplanet transmission spectroscopy is to

measure subtle changes in the system brightness across different wavelength channels, via variations in the transit depth. We used the HST Exposure Time Calculator with the observational setup described above to calculate the following SNRs per resolution element per exposure: 530 for G430L, 579 for G750L, and 1901 for G141. Note that the G141 flux will be spread over ~73 pixel columns due to the spatial scan (see above), so there is no risk of saturation.

--------- Additional Comments ----------

Availability=AVAILABLE mode was enabled to increase the duty cycle of the STIS observations and prevent auto-wave calibration from disrupting the transit time sequence in each STIS visit. An explicit wavecal has been added to the end of each observing sequence. We were given permission to use this mode in past HST programs (e.g. 12473 and 11572).

Visit	
	Proposal 14619, WASP-127 G430L (01), implementation Mon Jan 22 20:01:25 GMT 2018
	Diagnostic Status: Warning
	Scientific Instruments: STIS/CCD
	Special Requirements: SCHED 100%; Period 4.1780620 D AND ZERO-PHASE HJD2457248.74131
	Comments: WASP-127. G430L. Each of the 5 HST orbits contain a non-interruptible sequence. It is essential that the 5 HST orbits be scheduled in a continuous block.

Diagnostics

(WASP-127 G430L (01)) Warning (Orbit Planner): STIS SCIENCE TOO FAR FROM WAVECAL
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Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	WASP-127	RA: 10 42 14.0808 (160.5586700d)	Proper Motion RA: 16.8 mas/yr	V=10.172	Reference Frame: ICRS
	Alt Name1: BD-03-2978	Dec: -03 50 6.26 (-3.83507d)	Proper Motion Dec: 15.3 mas/yr		
		Equinox: J2000	Epoch of Position: 2000		

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=STAR
Description=[EXTRA-SOLAR PLANET, G V-IV]

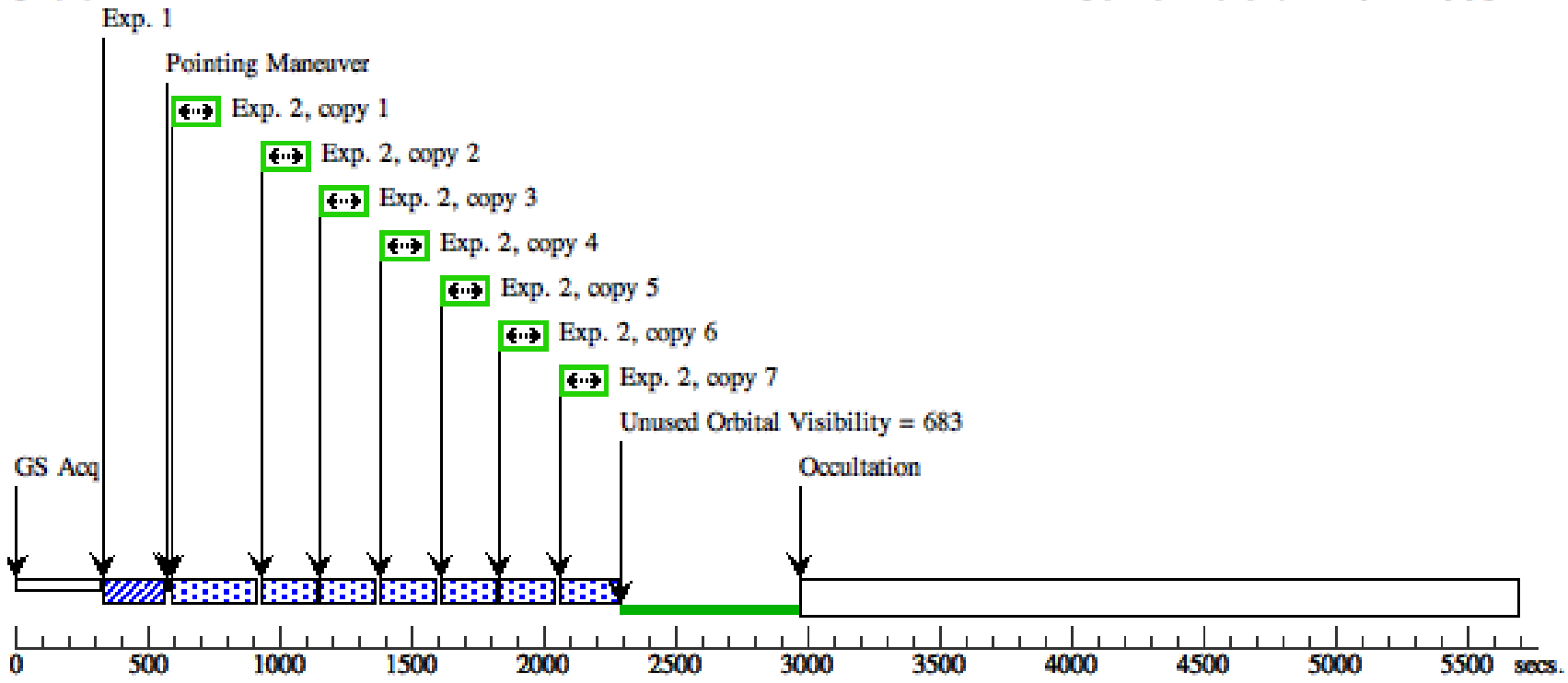
Exposures

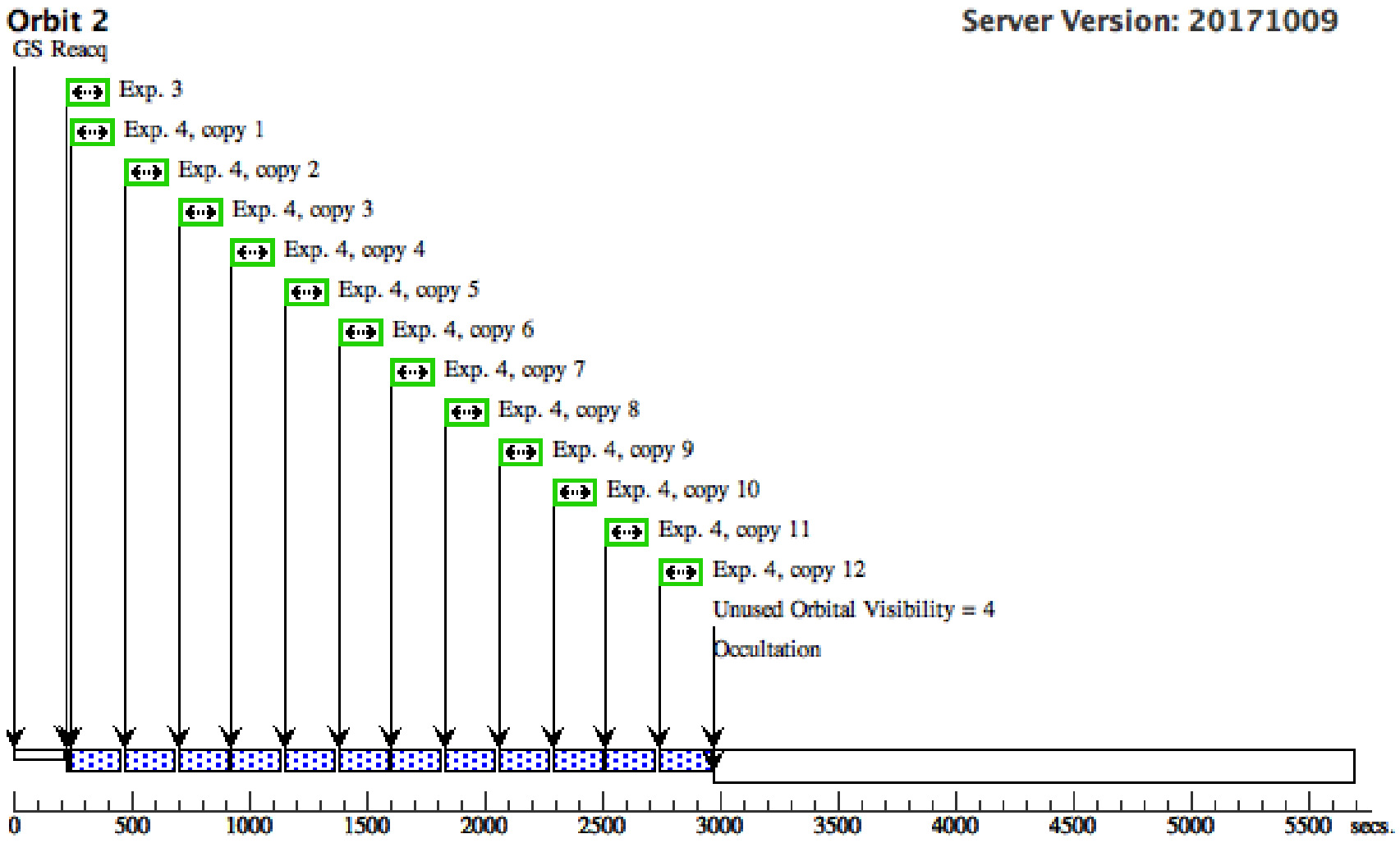
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ACQ, phase constrained (STIS.ta.825297)	(1) WASP-127	STIS/CCD, ACQ, F28X50LP	MIRROR	GAIN=4	PHASE 0.9580 TO 0.961; GS ACQ SCENARIO BASE1B3	Sequence 1-2 Non-Int in WASP-127 G430L (01)	0.2 Secs (0.2 Secs) *[==>]*	***[1]***
2	WASP-127 G430L Orbit 1 (STIS.sp.827583)	(1) WASP-127	STIS/CCD, ACCUM, 52X2	G430L 4300 A	CR-SPLIT=NO; GAIN=4; SIZEAXIS2=128.0; WAVECAL=NO		Sequence 1-2 Non-Int in WASP-127 G430L (01)	206 Secs X 7 (1442 Secs) *[==>(Copy 1)]* *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(Copy 4)]* *[==>(Copy 5)]* *[==>(Copy 6)]* *[==>(Copy 7)]*	***[1]***
3	WASP-127 G430L Orbit 2	(1) WASP-127	STIS/CCD, ACCUM, 52X2	G430L 4300 A	CR-SPLIT=NO; GAIN=4; SIZEAXIS2=128.0; WAVECAL=NO		Sequence 3-4 Non-Int in WASP-127 G430L (01)	1 Secs (1 Secs) *[==>]*	***[2]***
Comments: Short exposure to minimize instrument systematic of first exposure in each orbit.									
4	WASP-127 G430L Orbit 2 (STIS.sp.827583)	(1) WASP-127	STIS/CCD, ACCUM, 52X2	G430L 4300 A	CR-SPLIT=NO; GAIN=4; SIZEAXIS2=128.0; WAVECAL=NO		Sequence 3-4 Non-Int in WASP-127 G430L (01)	206. Secs X 12 (2472 Secs) *[==>(Copy 1)]* *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(Copy 4)]* *[==>(Copy 5)]* *[==>(Copy 6)]* *[==>(Copy 7)]* *[==>(Copy 8)]* *[==>(Copy 9)]* *[==>(Copy 10)]* *[==>(Copy 11)]* *[==>(Copy 12)]*	***[2]***
5	WASP-127 G430L Orbit 3	(1) WASP-127	STIS/CCD, ACCUM, 52X2	G430L 4300 A	CR-SPLIT=NO; GAIN=4; SIZEAXIS2=128.0; WAVECAL=NO		Sequence 5-6 Non-Int in WASP-127 G430L (01)	1 Secs (1 Secs) *[==>]*	***[3]***
Comments: Short exposure to minimize instrument systematic of first exposure in each orbit.									

6	WASP-127 G430L Orbit 1 (STIS.sp.827583)	(1) WASP-127	STIS/CCD, ACCUM, 52X2	G430L 4300 A	CR-SPLIT=NO; GAIN=4; SIZEAXIS2=128.0; WAVECAL=NO	Sequence 5-6 Non-Int in WASP-127 G430L (01)	206. Secs X 12 (2472 Secs) *[==>(Copy 1)]* *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(Copy 4)]* *[==>(Copy 5)]* *[==>(Copy 6)]* *[==>(Copy 7)]* *[==>(Copy 8)]* *[==>(Copy 9)]* *[==>(Copy 10)]* *[==>(Copy 11)]* *[==>(Copy 12)]*	***[3]***
7	WASP-127 G430L Orbit 4	(1) WASP-127	STIS/CCD, ACCUM, 52X2	G430L 4300 A	CR-SPLIT=NO; GAIN=4; SIZEAXIS2=128.0; WAVECAL=NO	Sequence 7-8 Non-Int in WASP-127 G430L (01)	1 Secs (1 Secs) *[==>]*	***[4]***
Comments: Short exposure to minimize instrument systematic of first exposure in each orbit.								
8	WASP-127 G430L Orbit 1 (STIS.sp.827583)	(1) WASP-127	STIS/CCD, ACCUM, 52X2	G430L 4300 A	CR-SPLIT=NO; GAIN=4; SIZEAXIS2=128.0; WAVECAL=NO	Sequence 7-8 Non-Int in WASP-127 G430L (01)	206. Secs X 12 (2472 Secs) *[==>(Copy 1)]* *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(Copy 4)]* *[==>(Copy 5)]* *[==>(Copy 6)]* *[==>(Copy 7)]* *[==>(Copy 8)]* *[==>(Copy 9)]* *[==>(Copy 10)]* *[==>(Copy 11)]* *[==>(Copy 12)]*	***[4]***
9	WASP-127 G430L Orbit 5	(1) WASP-127	STIS/CCD, ACCUM, 52X2	G430L 4300 A	CR-SPLIT=NO; GAIN=4; SIZEAXIS2=128.0; WAVECAL=NO	Sequence 9-11 Non-Int in WASP-127 G430L (01)	1 Secs (1 Secs) *[==>]*	***[5]***
Comments: Short exposure to minimize instrument systematic of first exposure in each orbit.								

	10	WASP-127 G430L Orbit 1 (STIS.sp.827583)	(1) WASP-127	STIS/CCD, ACCUM, 52X2	G430L 4300 A	CR-SPLIT=NO; GAIN=4; SIZEAXIS2=128.0; WAVECAL=NO	Sequence 9-11 Non-Int in WASP-127 G430L (01)	206. Secs X 12 (2472 Secs) *[==>(Copy 1)]* *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(Copy 4)]* *[==>(Copy 5)]* *[==>(Copy 6)]* *[==>(Copy 7)]* *[==>(Copy 8)]* *[==>(Copy 9)]* *[==>(Copy 10)]* *[==>(Copy 11)]* *[==>(Copy 12)]*	***[5]***
	11	WAVE	WAVE	STIS/CCD, ACCUM, 52X0.2	G430L 4300 A		Sequence 9-11 Non-Int in WASP-127 G430L (01)	*[==>]*	***[5]***
	Comments: Explicit WAVECAL, auto-waves disabled								

Orbit Structure

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GS Reacq
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Occultation
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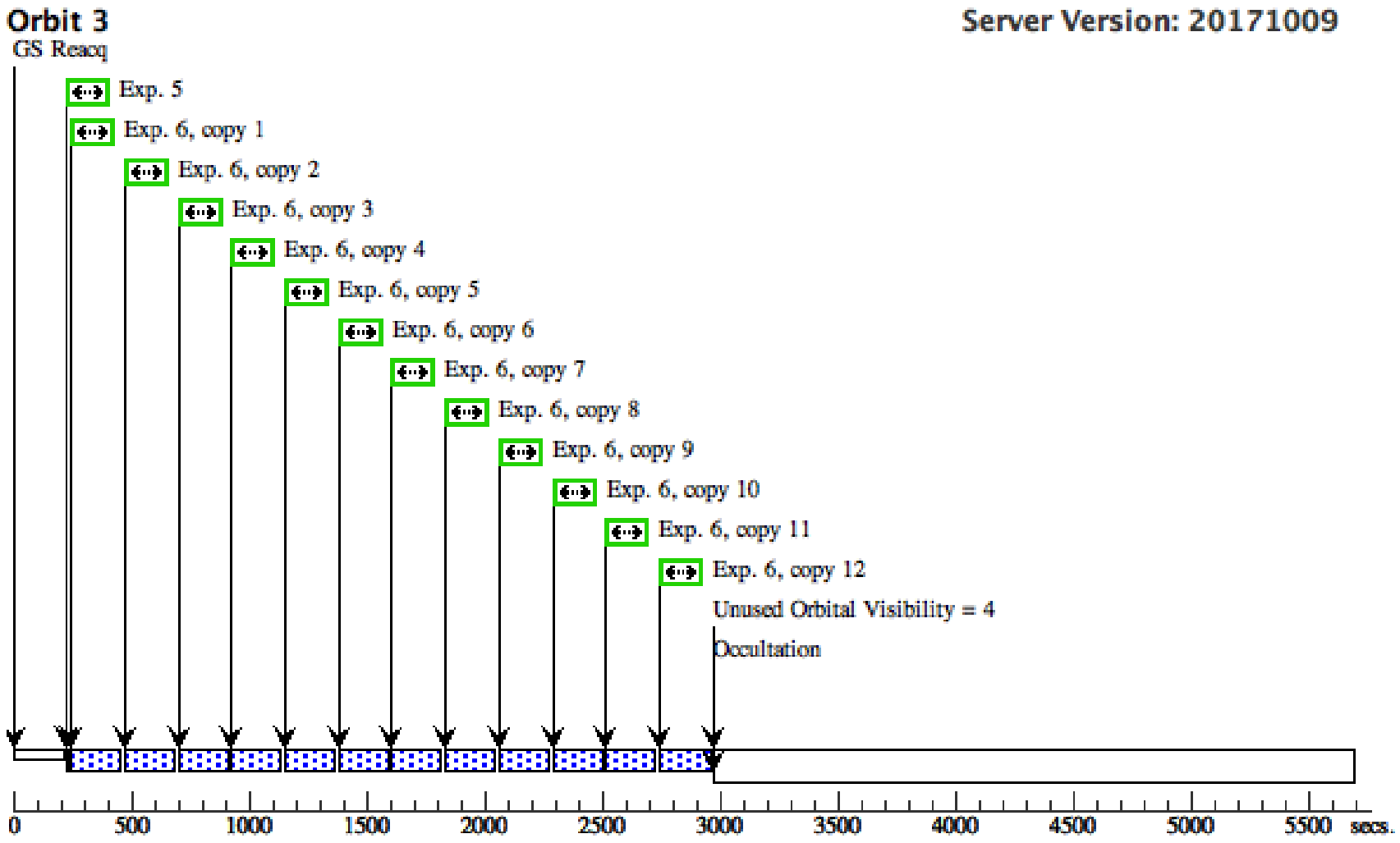
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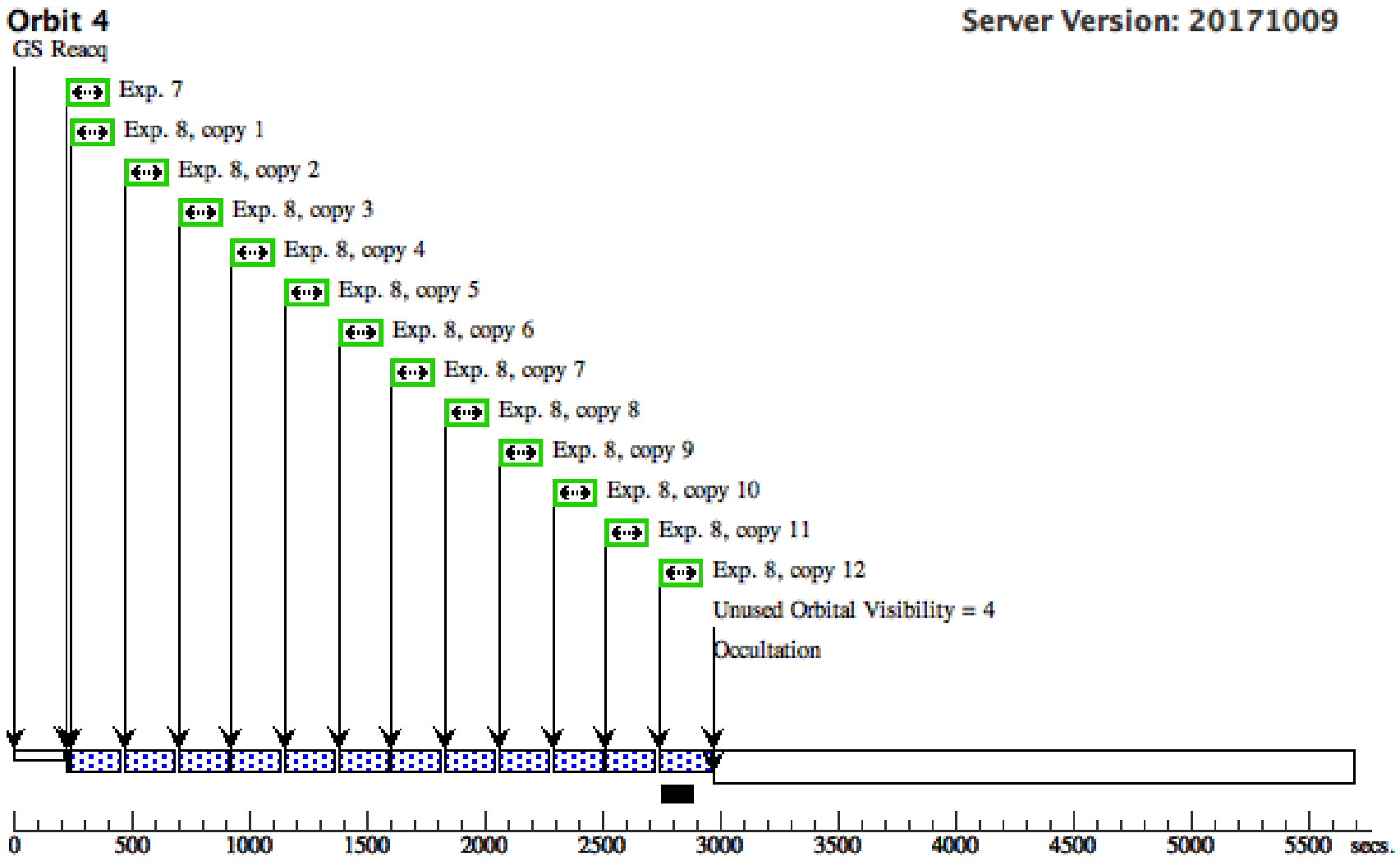
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Exp. 8, copy 12
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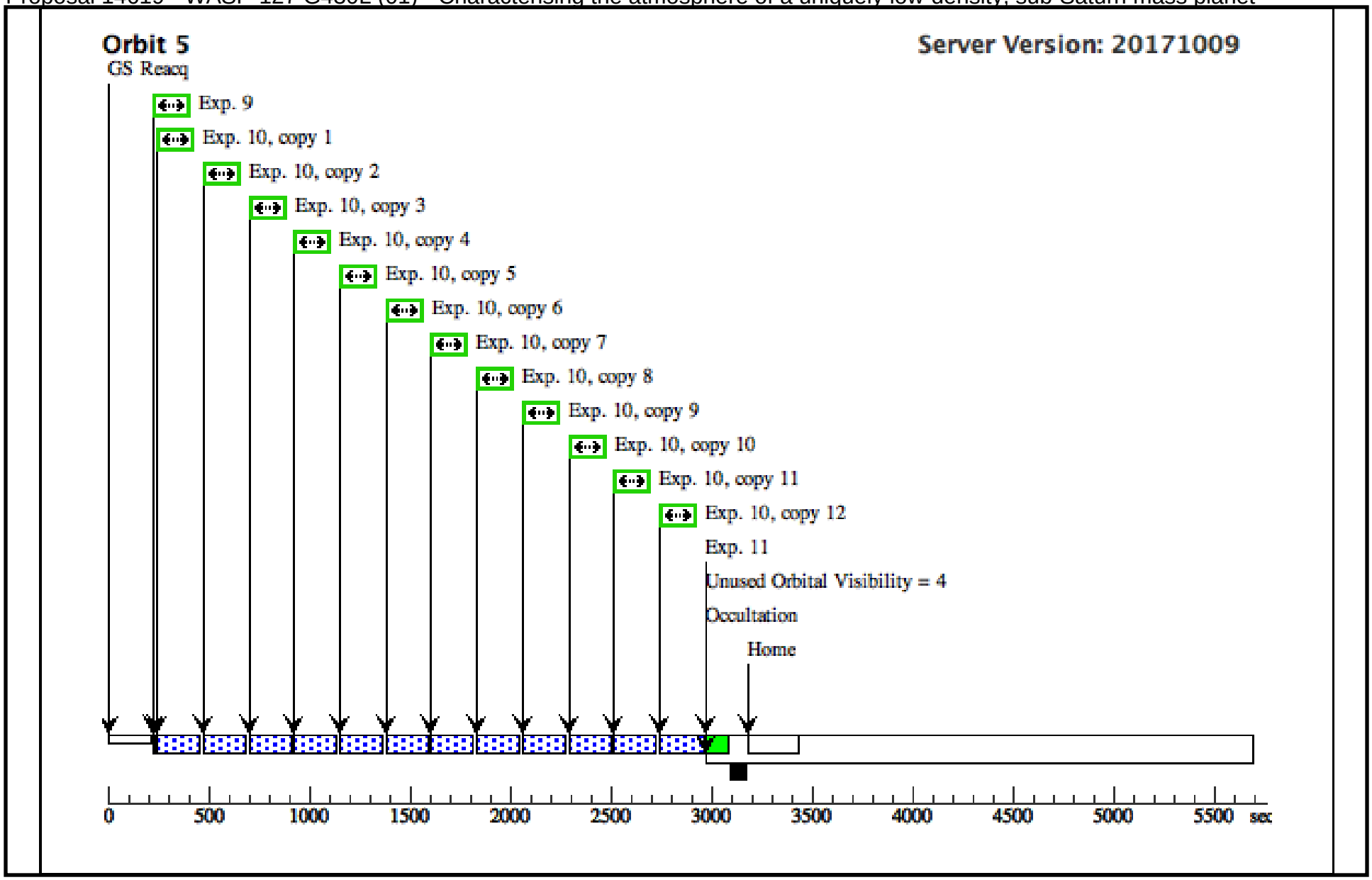
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Exp. 10, copy 7
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Exp. 10, copy 10
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Unused Orbital Visibility = 4
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Visit	
	Proposal 14619, WASP-127 G750L (02), implementation Mon Jan 22 20:01:25 GMT 2018
	Diagnostic Status: Warning
	Scientific Instruments: STIS/CCD
	Special Requirements: SCHED 100%; Period 4.1780620 D AND ZERO-PHASE HJD2457248.74131
	Comments: WASP-127. G750L. Each of the 5 HST orbits contain a non-interruptible sequence. It is essential that the 5 HST orbits be scheduled in a continuous block.

Diagnostics

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(WASP-127 G750L (02)) Warning (Orbit Planner): STIS SCIENCE TOO FAR FROM WAVECAL
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(WASP-127 G750L (02)) Warning (Orbit Planner): STIS SCIENCE TOO FAR FROM WAVECAL
(WASP-127 G750L (02)) Warning (Orbit Planner): STIS SCIENCE TOO FAR FROM WAVECAL

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	WASP-127	RA: 10 42 14.0808 (160.5586700d)	Proper Motion RA: 16.8 mas/yr	V=10.172	Reference Frame: ICRS
	Alt Name1: BD-03-2978	Dec: -03 50 6.26 (-3.83507d)	Proper Motion Dec: 15.3 mas/yr		
		Equinox: J2000	Epoch of Position: 2000		

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=STAR
Description=[EXTRA-SOLAR PLANET, G V-IV]

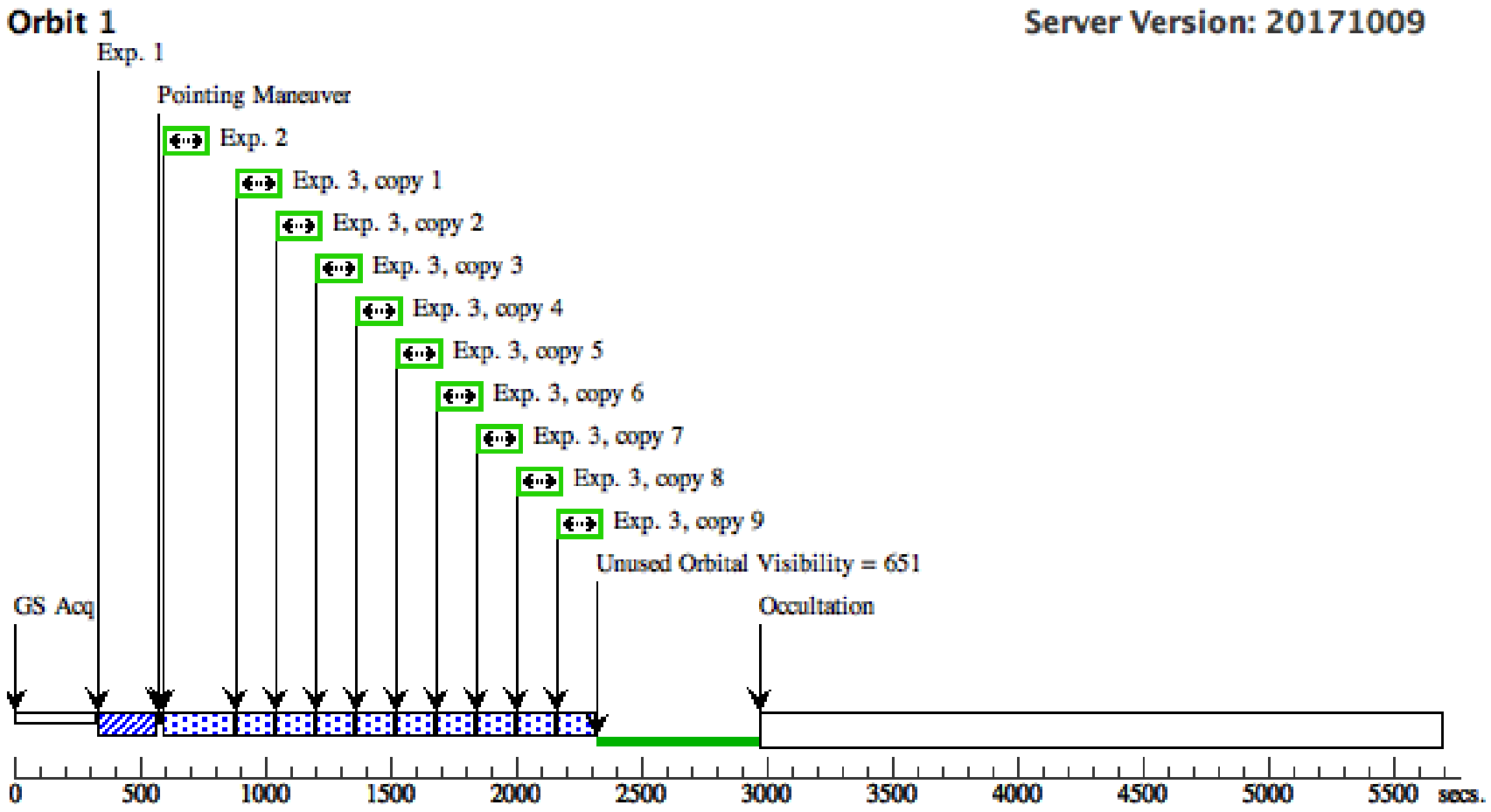
Exposures

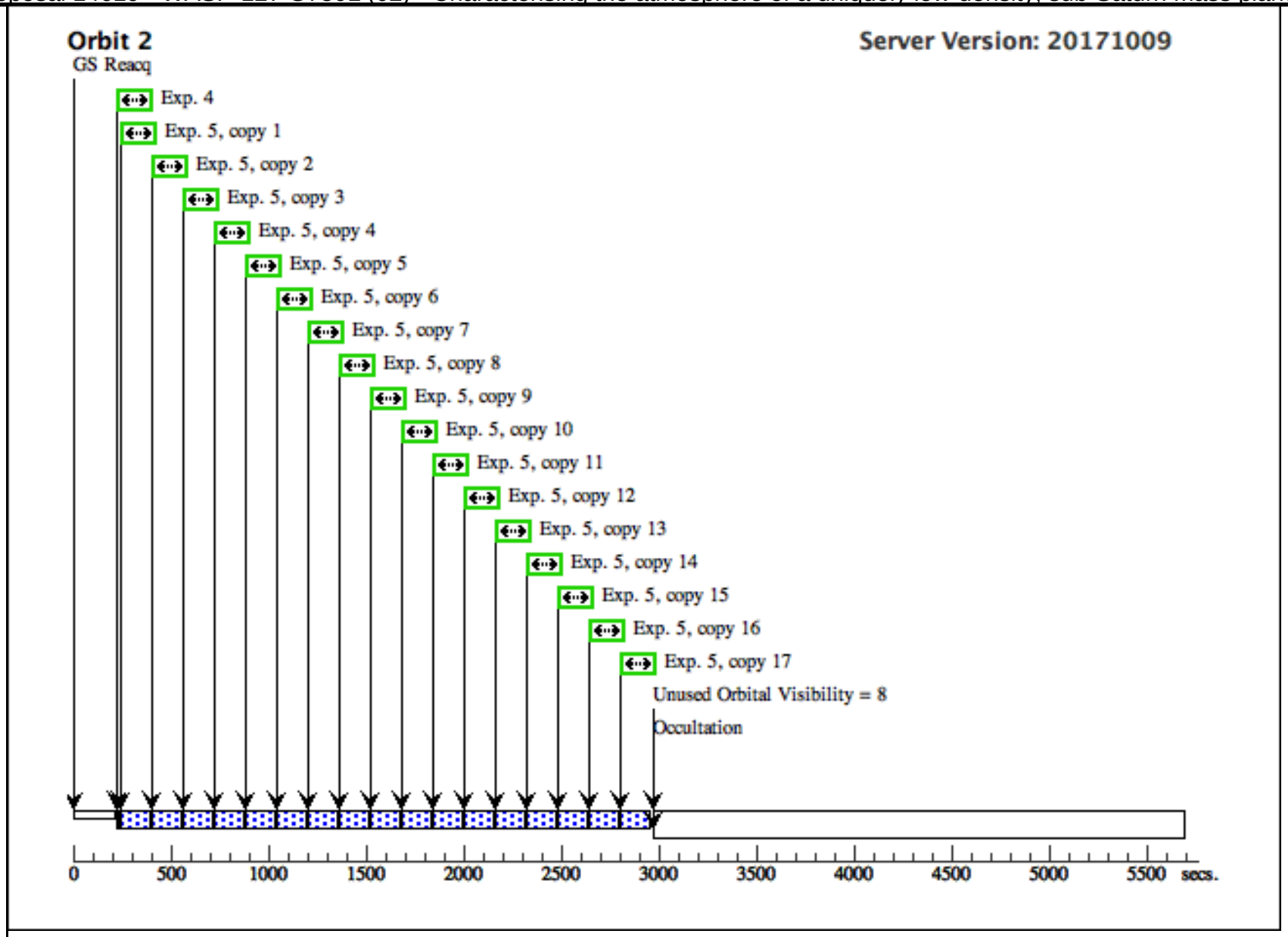
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ACQ, phase constrained (STIS.ta.825297)	(1) WASP-127	STIS/CCD, ACQ, F28X50LP	MIRROR	GAIN=4	PHASE 0.958 TO 0.961; GS ACQ SCENARIO BASE1B3	Sequence 1-3 Non-Int in WASP-127 G750L (02)	0.2 Secs (0.2 Secs) *[==>]*	***[1]***
2	WASP-127 G750L Orbit 2 (STIS.sp.998126)	(1) WASP-127	STIS/CCD, ACCUM, 52X2	G750L 7751 A	CR-SPLIT=NO; WAVECAL=NO; SIZEAXIS2=128.0; GAIN=4		Sequence 1-3 Non-Int in WASP-127 G750L (02)	140 Secs (140 Secs) *[==>]*	***[1]***
3	WASP-127 G750L Orbit 1 (STIS.sp.998126)	(1) WASP-127	STIS/CCD, ACCUM, 52X2	G750L 7751 A	CR-SPLIT=NO; GAIN=4; SIZEAXIS2=128.0; WAVECAL=NO		Sequence 1-3 Non-Int in WASP-127 G750L (02)	139 Secs X 9 (1251 Secs) *[==>(Copy 1)]* *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(Copy 4)]* *[==>(Copy 5)]* *[==>(Copy 6)]* *[==>(Copy 7)]* *[==>(Copy 8)]* *[==>(Copy 9)]*	***[1]***
4	WASP-127 G750L Orbit 2	(1) WASP-127	STIS/CCD, ACCUM, 52X2	G750L 7751 A	CR-SPLIT=NO; WAVECAL=NO; SIZEAXIS2=128.0; GAIN=4		Sequence 4-5 Non-Int in WASP-127 G750L (02)	1 Secs (1 Secs) *[==>]*	***[2]***
5	WASP-127 G750L Orbit 2 (STIS.sp.998126)	(1) WASP-127	STIS/CCD, ACCUM, 52X2	G750L 7751 A	CR-SPLIT=NO; GAIN=4; SIZEAXIS2=128.0; WAVECAL=NO		Sequence 4-5 Non-Int in WASP-127 G750L (02)	139 Secs X 17 (2363 Secs) *[==>(Copy 1)]* *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(Copy 4)]* *[==>(Copy 5)]* *[==>(Copy 6)]* *[==>(Copy 7)]* *[==>(Copy 8)]* *[==>(Copy 9)]* *[==>(Copy 10)]* *[==>(Copy 11)]* *[==>(Copy 12)]* *[==>(Copy 13)]* *[==>(Copy 14)]* *[==>(Copy 15)]* *[==>(Copy 16)]* *[==>(Copy 17)]*	***[2]***
6	WASP-127 G750L Orbit 3	(1) WASP-127	STIS/CCD, ACCUM, 52X2	G750L 7751 A	CR-SPLIT=NO; WAVECAL=NO; SIZEAXIS2=128.0; GAIN=4		Sequence 6-7 Non-Int in WASP-127 G750L (02)	1 Secs (1 Secs) *[==>]*	***[3]***

	7	WASP-127 G750L Orbit 3 (STIS.sp.998126)	(1) WASP-127	STIS/CCD, ACCUM, 52X2	G750L 7751 A	CR-SPLIT=NO; GAIN=4; SIZEAXIS2=128.0; WAVECAL=NO	Sequence 6-7 Non-Int in WASP-127 G750L (02)	139 Secs X 17 (2363 Secs) *[==>(Copy 1)]* *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(Copy 4)]* *[==>(Copy 5)]* *[==>(Copy 6)]* *[==>(Copy 7)]* *[==>(Copy 8)]* *[==>(Copy 9)]* *[==>(Copy 10)]* *[==>(Copy 11)]* *[==>(Copy 12)]* *[==>(Copy 13)]* *[==>(Copy 14)]* *[==>(Copy 15)]* *[==>(Copy 16)]* *[==>(Copy 17)]*	***[3]***
	8	WASP-127 G750L Orbit 4	(1) WASP-127	STIS/CCD, ACCUM, 52X2	G750L 7751 A	CR-SPLIT=NO; WAVECAL=NO; SIZEAXIS2=128.0; GAIN=4	Sequence 8-9 Non-Int in WASP-127 G750L (02)	1 Secs (1 Secs) *[==>]*	***[4]***
	9	WASP-127 G750L Orbit 4 (STIS.sp.998126)	(1) WASP-127	STIS/CCD, ACCUM, 52X2	G750L 7751 A	CR-SPLIT=NO; GAIN=4; SIZEAXIS2=128.0; WAVECAL=NO	Sequence 8-9 Non-Int in WASP-127 G750L (02)	139 Secs X 17 (2363 Secs) *[==>(Copy 1)]* *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(Copy 4)]* *[==>(Copy 5)]* *[==>(Copy 6)]* *[==>(Copy 7)]* *[==>(Copy 8)]* *[==>(Copy 9)]* *[==>(Copy 10)]* *[==>(Copy 11)]* *[==>(Copy 12)]* *[==>(Copy 13)]* *[==>(Copy 14)]* *[==>(Copy 15)]* *[==>(Copy 16)]* *[==>(Copy 17)]*	***[4]***
	10	WASP-127 G750L Orbit 5	(1) WASP-127	STIS/CCD, ACCUM, 52X2	G750L 7751 A	CR-SPLIT=NO; WAVECAL=NO; SIZEAXIS2=128.0; GAIN=4	Sequence 10-14 Non-Int in WASP-127 G750L (02)	1 Secs (1 Secs) *[==>]*	***[5]***

11	WASP-127 G750L Orbit 5 (STIS.sp.998126)	(1) WASP-127	STIS/CCD, ACCUM, 52X2	G750L 7751 A	CR-SPLIT=NO; GAIN=4; SIZEAXIS2=128.0; WAVECAL=NO	Sequence 10-14 Non-Int in WASP-127 G750L (02)	139 Secs X 17 (2363 Secs) *[==>(Copy 1)]* *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(Copy 4)]* *[==>(Copy 5)]* *[==>(Copy 6)]* *[==>(Copy 7)]* *[==>(Copy 8)]* *[==>(Copy 9)]* *[==>(Copy 10)]* *[==>(Copy 11)]* *[==>(Copy 12)]* *[==>(Copy 13)]* *[==>(Copy 14)]* *[==>(Copy 15)]* *[==>(Copy 16)]* *[==>(Copy 17)]*	***[5]***
12	WAVE	WAVE	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A		Sequence 10-14 Non-Int in WASP-127 G750L (02)	*[==>]*	***[5]***
Comments: Explicit WAVECAL, auto-waves disabled								
13	Flat	CCDFLAT	STIS/CCD, ACCUM, 0.3X0.09	G750L 7751 A		Sequence 10-14 Non-Int in WASP-127 G750L (02)	*[==>(Copy 1)]* *[==>(Copy 2)]*	***[5]***
14	Tungsten Lamp	NONE	STIS/CCD, ACCUM, 0.3X0.09	G750L 7751 A	LAMP=TUNGSTEN; CR-SPLIT=NO; GAIN=4; SIZEAXIS2=128.0	Sequence 10-14 Non-Int in WASP-127 G750L (02)	240 Secs X 4 (960 Secs) *[==>(Copy 1)]* *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(Copy 4)]*	***[5]***

Orbit Structure

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GS Reacq
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Exp. 5, copy 3
Exp. 5, copy 4
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Exp. 5, copy 6
Exp. 5, copy 7
Exp. 5, copy 8
Exp. 5, copy 9
Exp. 5, copy 10
Exp. 5, copy 11
Exp. 5, copy 12
Exp. 5, copy 13
Exp. 5, copy 14
Exp. 5, copy 15
Exp. 5, copy 16
Exp. 5, copy 17
Unused Orbital Visibility = 8
Occultation
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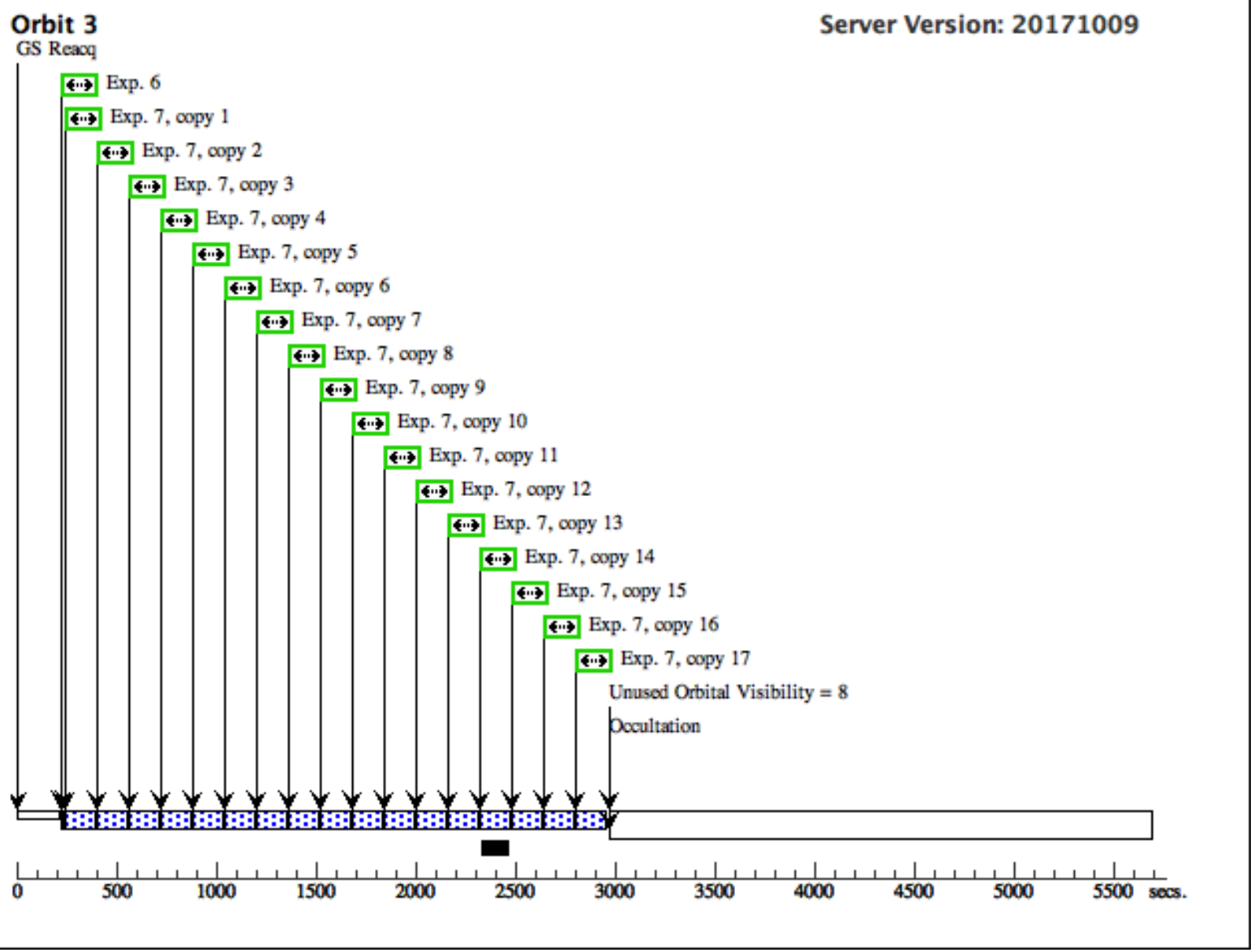
4500
5000
5500
secs.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GS Reacq
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Exp. 7, copy 2
Exp. 7, copy 3
Exp. 7, copy 4
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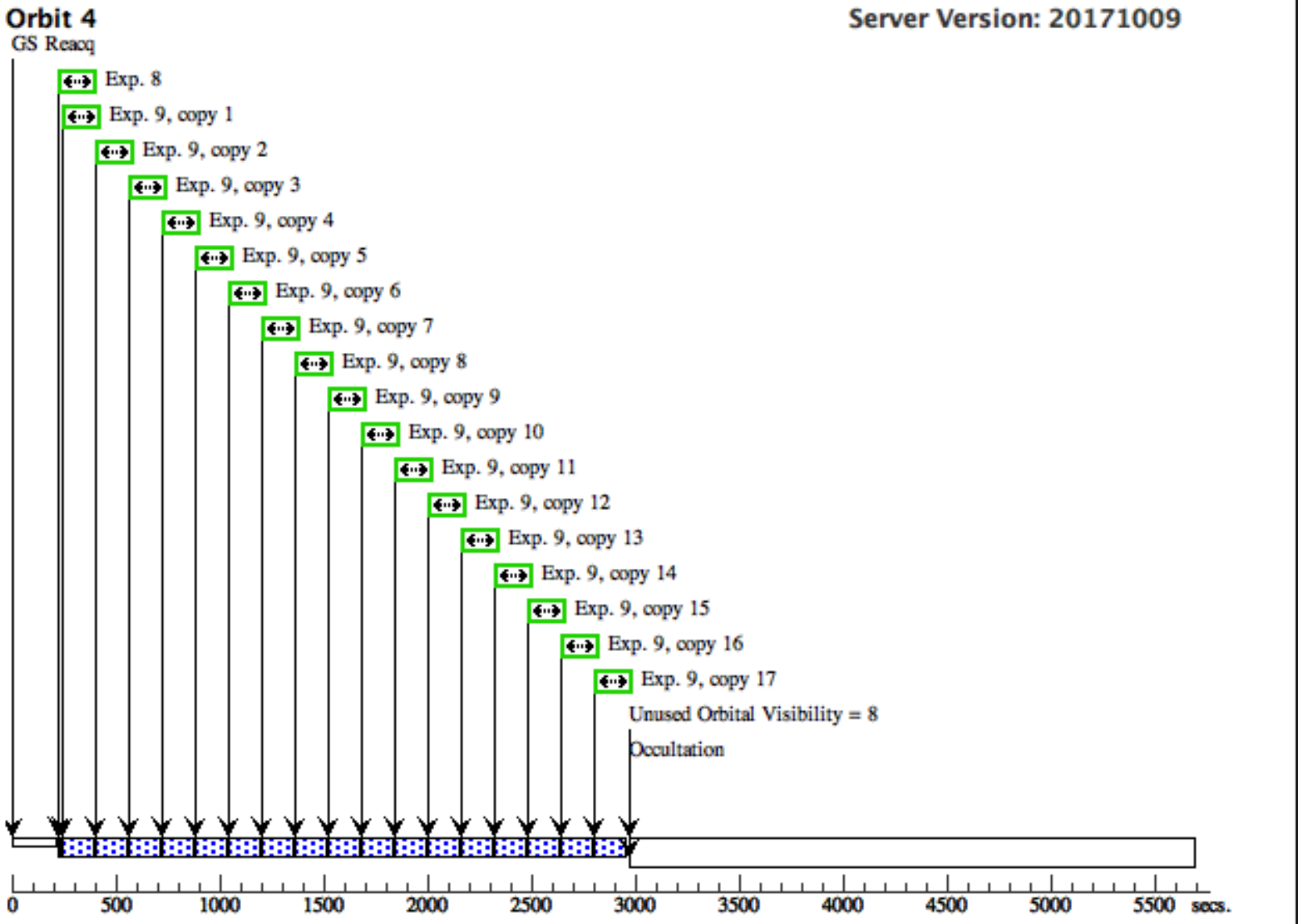
Exp. 7, copy 6
Exp. 7, copy 7
Exp. 7, copy 8
Exp. 7, copy 9
Exp. 7, copy 10
Exp. 7, copy 11
Exp. 7, copy 12
Exp. 7, copy 13
Exp. 7, copy 14
Exp. 7, copy 15
Exp. 7, copy 16
Exp. 7, copy 17
Unused Orbital Visibility = 8
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.


Orbit 4
Server Version: 20171009
GS Reacq
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Exp. 9, copy 2
Exp. 9, copy 3
Exp. 9, copy 4
Exp. 9, copy 5
Exp. 9, copy 6
Exp. 9, copy 7
Exp. 9, copy 8
Exp. 9, copy 9
Exp. 9, copy 10
Exp. 9, copy 11
Exp. 9, copy 12
Exp. 9, copy 13
Exp. 9, copy 14
Exp. 9, copy 15
Exp. 9, copy 16
Exp. 9, copy 17
Unused Orbital Visibility = 8
Occultation
0
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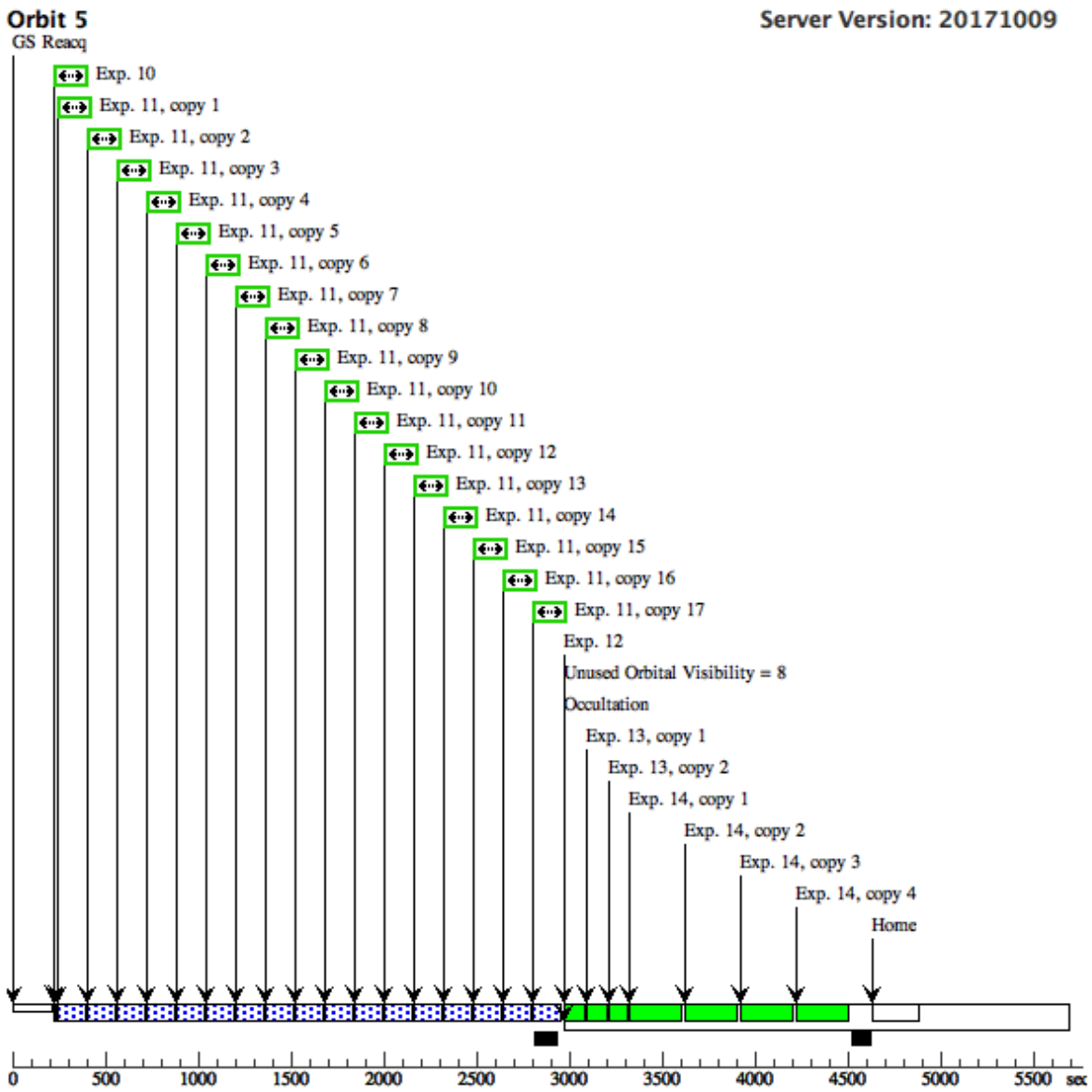
4500
5000
5500
secs.


Orbit 5
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GS Reacq
Exp. 10
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Exp. 11, copy 4
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Exp. 11, copy 7
Exp. 11, copy 8
Exp. 11, copy 9
Exp. 11, copy 10
Exp. 11, copy 11
Exp. 11, copy 12
Exp. 11, copy 13
Exp. 11, copy 14
Exp. 11, copy 15
Exp. 11, copy 16
Exp. 11, copy 17
Exp. 12
Unused Orbital Visibility = 8
Occultation
Exp. 13, copy 1
Exp. 13, copy 2
Exp. 14, copy 1
Exp. 14, copy 2
Exp. 14, copy 3
Exp. 14, copy 4
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 14619, WASP-127 WFC3 (04), implementation Mon Jan 22 20:01:25 GMT 2018

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 100%; ORIENT 318D TO 80 D; ORIENT 138D TO 260 D; Period 4.1780620 D AND ZERO-PHASE HJD2457248.74131

Comments: WFC3 IR transit of WASP-127. It is essential that the five orbits be scheduled in a coninuous block, free of the SAA.

We will use the spatial scanning mode to lengthen the spectrum along the slit during the exposures, to avoid saturation on relatively long exposures. This mode greatly increases the efficiency.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	WASP-127	RA: 10 42 14.0808 (160.5586700d)	Proper Motion RA: 16.8 mas/yr	V=10.172	Reference Frame: ICRS
	Alt Name1: BD-03-2978	Dec: -03 50 6.26 (-3.83507d)	Proper Motion Dec: 15.3 mas/yr		
		Equinox: J2000	Epoch of Position: 2000		

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=STAR
Description=[EXTRA-SOLAR PLANET, G V-IV]

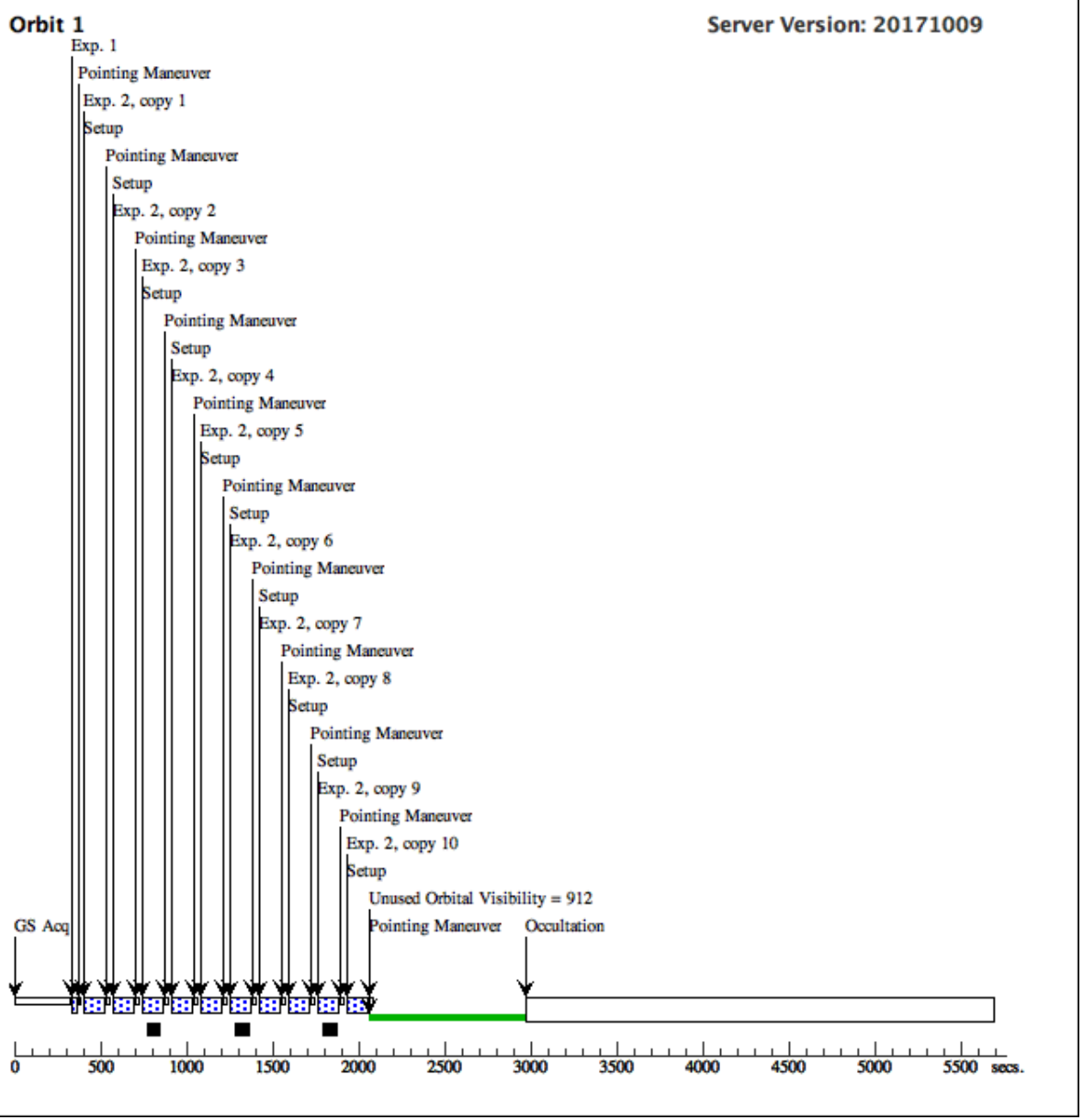
Exposures

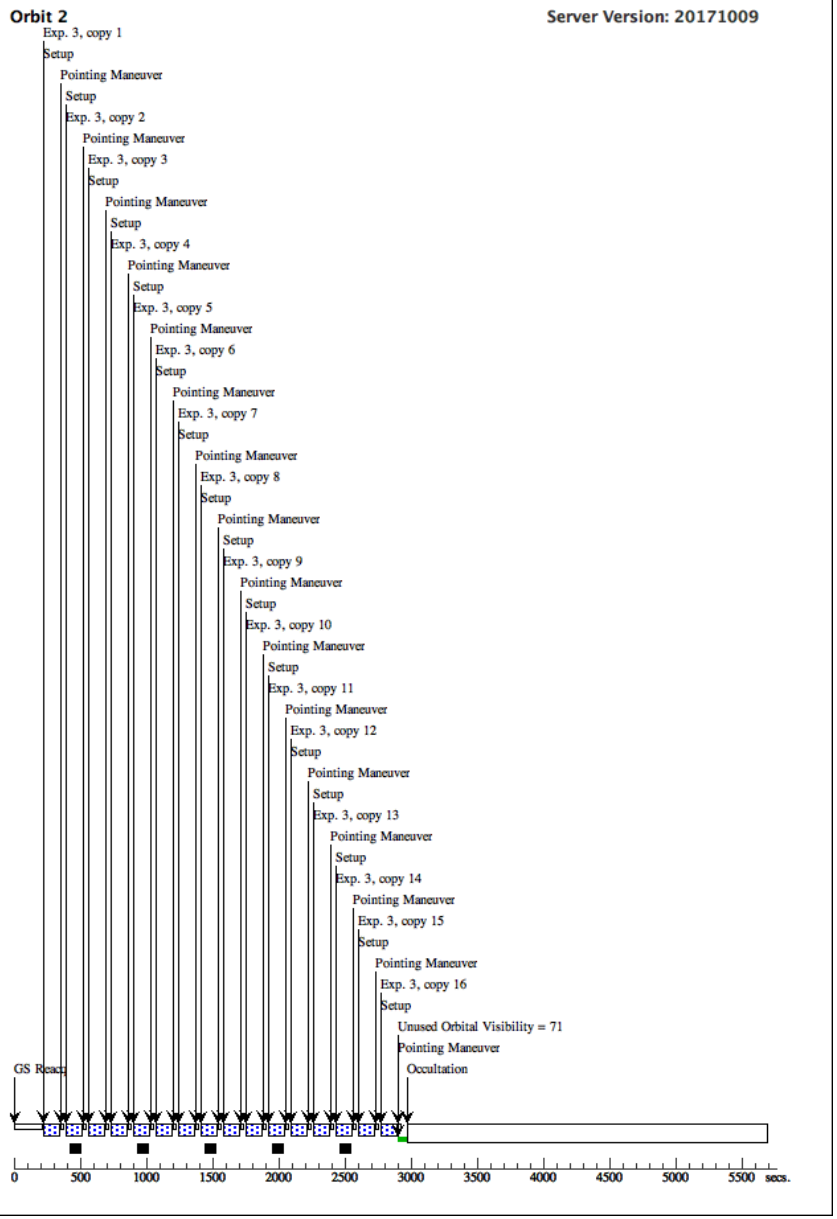
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	WASP-127 WFC3 Orbit 1	(1) WASP-127	WFC3/IR, MULTIACCUM, GRISM256	F139M	SAMP-SEQ=RAPID; NSAMP=7	PHASE 0.958 TO 0.961; GS ACQ SCENARIO BASE1B3	Sequence 1-2 Non-Int in WASP-127 WFC3 (04)	1.944705 Secs (1.945 Secs) *[==>]*	***[1]***
Comments: Direct image for wavelegnth calibration. Phase constrained so transit occurs between 2nd and 3rd contact.									
2	WASP-127 WFC3 Orbit 1 (WFC3IR.ss.828151)	(1) WASP-127	WFC3/IR, MULTIACCUM, GRISM256	G141	SAMP-SEQ=SPARS10; NSAMP=14	POS TARG 0.0,5.5; SPATIAL SCAN 0.17,270.0 Degrees,Forward	Sequence 1-2 Non-Int in WASP-127 WFC3 (04)	95.782146 Secs X 10 (957.821 Secs) *[==>(Copy 1)]* *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(Copy 4)]* *[==>(Copy 5)]* *[==>(Copy 6)]* *[==>(Copy 7)]* *[==>(Copy 8)]* *[==>(Copy 9)]* *[==>(Copy 10)]*	***[1]***
3	WASP-127 WFC3 Orbit 2 (WFC3IR.ss.828151)	(1) WASP-127	WFC3/IR, MULTIACCUM, GRISM256	G141	SAMP-SEQ=SPARS10; NSAMP=14	POS TARG 0.0,5.5; SPATIAL SCAN 0.17,270.0 Degrees,Forward	Sequence 3-3 Non-Int in WASP-127 WFC3 (04)	95.782146 Secs X 16 (1532.514 Secs) *[==>(Copy 1)]* *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(Copy 4)]* *[==>(Copy 5)]* *[==>(Copy 6)]* *[==>(Copy 7)]* *[==>(Copy 8)]* *[==>(Copy 9)]* *[==>(Copy 10)]* *[==>(Copy 11)]* *[==>(Copy 12)]* *[==>(Copy 13)]* *[==>(Copy 14)]* *[==>(Copy 15)]* *[==>(Copy 16)]*	***[2]***

	4	WASP-127 WFC3 Orbit 3 (WFC3IR.ss .828151)	(1) WASP-127	WFC3/IR, MULTIACCUM, GRISM256	G141	SAMP-SEQ=SPARS 10; NSAMP=14	POS TARG 0.0,5.5; SPATIAL SCAN 0.1 7,270.0 Degrees,Forward	Sequence 4-4 Non-Int in WASP-127 WFC 3 (04)	95.782146 Secs X 16 (1532.514 Secs)	
									[==>(Copy 1)] *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(Copy 4)]* *[==>(Copy 5)]* *[==>(Copy 6)]* *[==>(Copy 7)]* *[==>(Copy 8)]* *[==>(Copy 9)]* *[==>(Copy 10)]* *[==>(Copy 11)]* *[==>(Copy 12)]* *[==>(Copy 13)]* *[==>(Copy 14)]* *[==>(Copy 15)]* *[==>(Copy 16)]*	***[3]***
	5	WASP-127 WFC3 Orbit 4 (WFC3IR.ss .828151)	(1) WASP-127	WFC3/IR, MULTIACCUM, GRISM256	G141	SAMP-SEQ=SPARS 10; NSAMP=14	POS TARG 0.0,5.5; SPATIAL SCAN 0.1 7,270.0 Degrees,Forward	Sequence 5-5 Non-Int in WASP-127 WFC 3 (04)	95.782146 Secs X 16 (1532.514 Secs)	
									[==>(Copy 1)] *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(Copy 4)]* *[==>(Copy 5)]* *[==>(Copy 6)]* *[==>(Copy 7)]* *[==>(Copy 8)]* *[==>(Copy 9)]* *[==>(Copy 10)]* *[==>(Copy 11)]* *[==>(Copy 12)]* *[==>(Copy 13)]* *[==>(Copy 14)]* *[==>(Copy 15)]* *[==>(Copy 16)]*	***[4]***

	6	WASP-127 WFC3 Orbit 5 (WFC3IR.ss .828151)	(1) WASP-127	WFC3/IR, MULTIACCUM, GRISM256	G141	SAMP-SEQ=SPARS 10; NSAMP=14	POS TARG 0.0,5.5; SPATIAL SCAN 0.17,270.0 Degrees,Forward	Sequence 6-6 Non-Int in WASP-127 WFC3 (04)	95.782146 Secs X 16 (1532.514 Secs)	
									[==>(Copy 1)] *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(Copy 4)]* *[==>(Copy 5)]* *[==>(Copy 6)]* *[==>(Copy 7)]* *[==>(Copy 8)]* *[==>(Copy 9)]* *[==>(Copy 10)]* *[==>(Copy 11)]* *[==>(Copy 12)]* *[==>(Copy 13)]* *[==>(Copy 14)]* *[==>(Copy 15)]* *[==>(Copy 16)]*	***[5]***

Orbit Structure

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Setup
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Setup
Exp. 3, copy 5
Pointing Maneuver
Exp. 3, copy 6
Setup
Pointing Maneuver
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Setup
Pointing Maneuver
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Exp. 3, copy 14
Pointing Maneuver
Exp. 3, copy 15
Setup
Pointing Maneuver
Exp. 3, copy 16
Setup
Unused Orbital Visibility = 71
Pointing Maneuver
Occultation
GS Reacq
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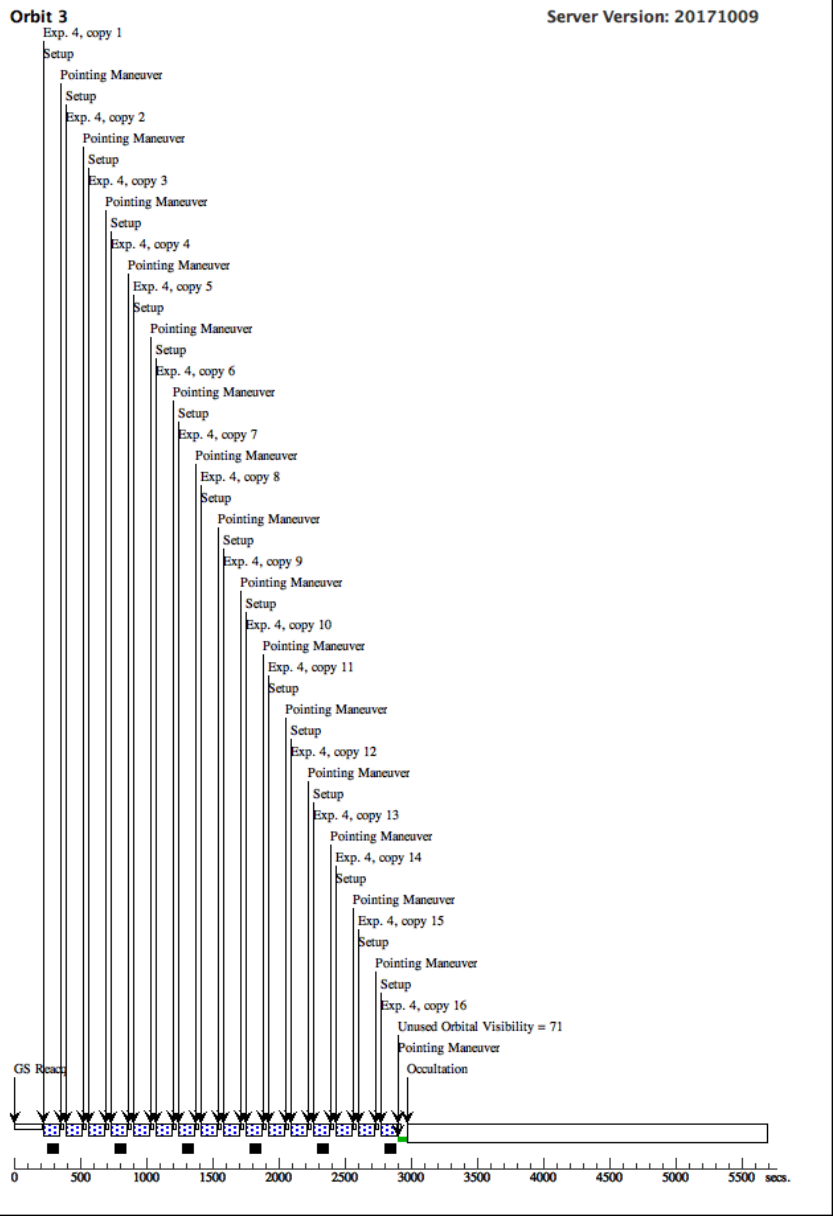
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.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Setup
Exp. 4, copy 2
Pointing Maneuver
Setup
Exp. 4, copy 3
Pointing Maneuver
Setup
Exp. 4, copy 4
Pointing Maneuver
Exp. 4, copy 5
Setup
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Setup
Exp. 4, copy 12
Pointing Maneuver
Setup
Exp. 4, copy 13
Pointing Maneuver
Exp. 4, copy 14
Setup
Pointing Maneuver
Exp. 4, copy 15
Setup
Pointing Maneuver
Setup
Exp. 4, copy 16
Unused Orbital Visibility = 71
Pointing Maneuver
Occultation
GS Reacq
0
500
1000
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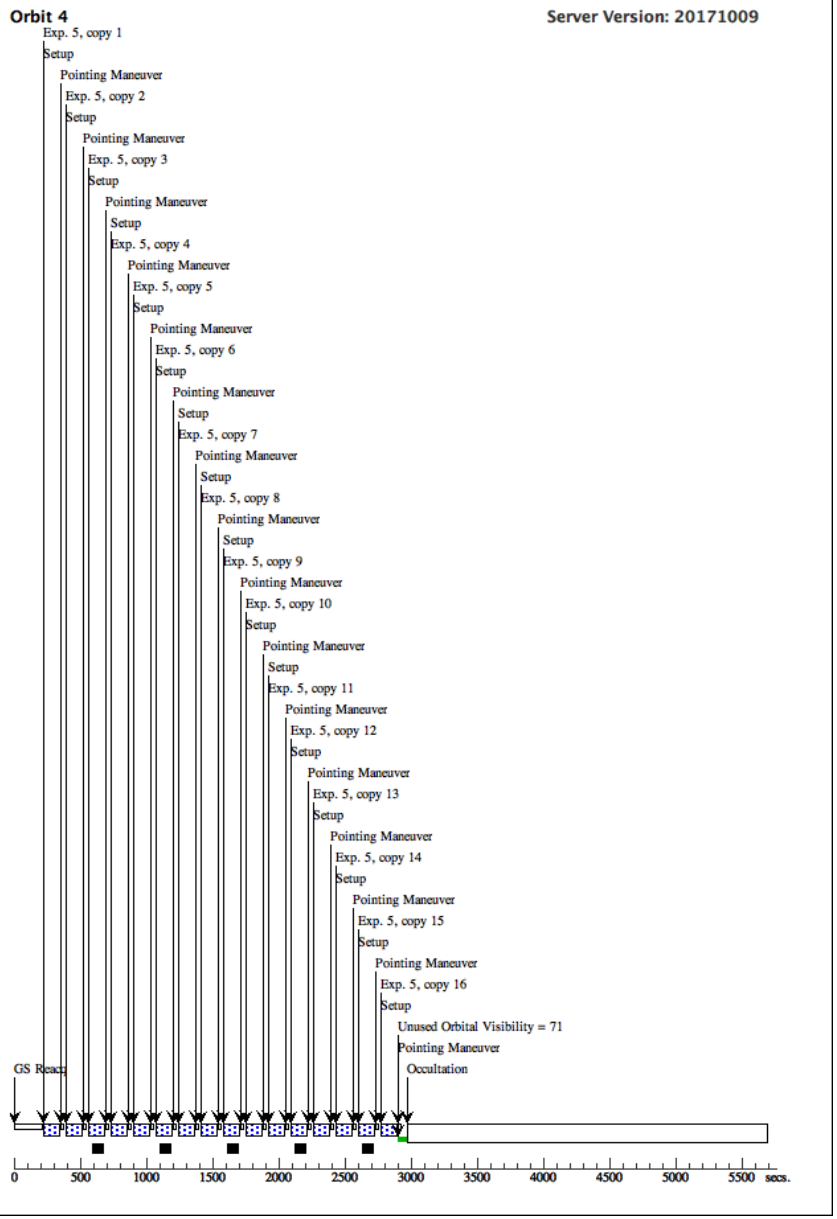
4500
5000
5500
secs.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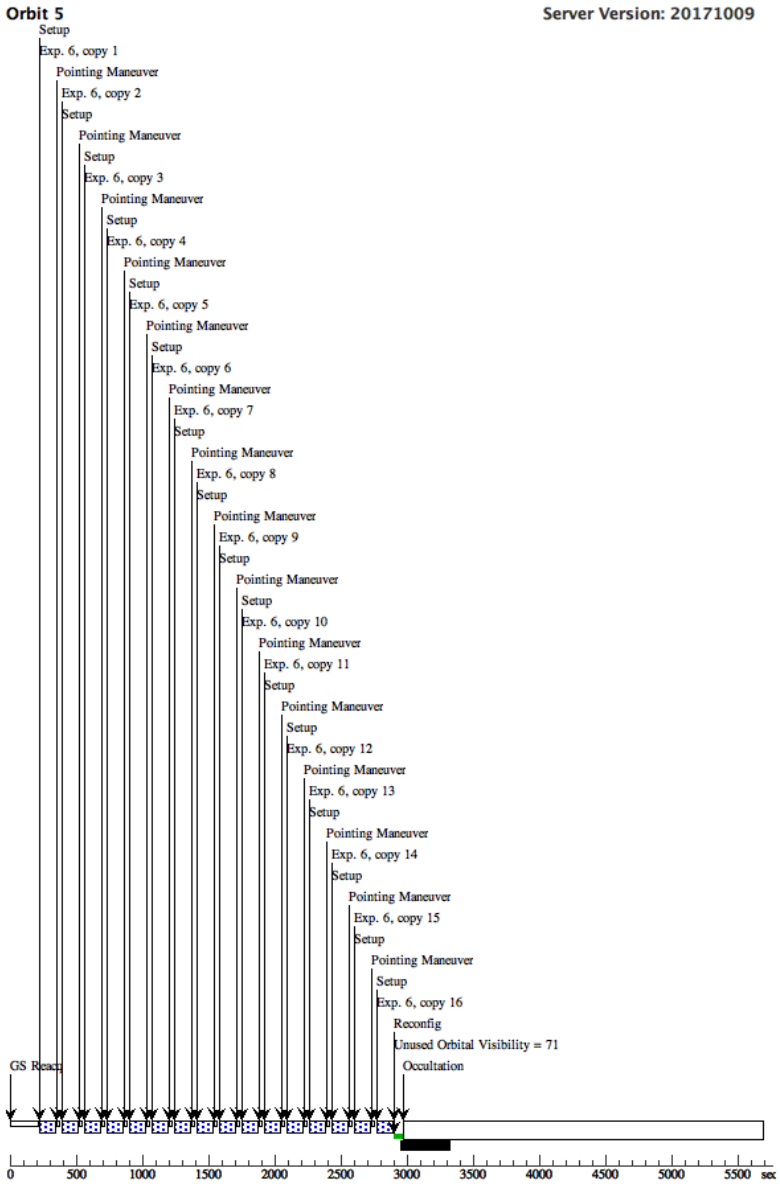
Setup
Pointing Maneuver
Exp. 5, copy 2
Setup
Pointing Maneuver
Exp. 5, copy 3
Setup
Pointing Maneuver
Setup
Exp. 5, copy 4
Pointing Maneuver
Exp. 5, copy 5
Setup
Pointing Maneuver
Exp. 5, copy 6
Setup
Pointing Maneuver
Setup
Exp. 5, copy 7
Pointing Maneuver
Setup
Exp. 5, copy 8
Pointing Maneuver
Setup
Exp. 5, copy 9
Pointing Maneuver
Exp. 5, copy 10
Setup
Pointing Maneuver
Setup
Exp. 5, copy 11
Pointing Maneuver
Exp. 5, copy 12
Setup
Pointing Maneuver
Exp. 5, copy 13
Setup
Pointing Maneuver
Exp. 5, copy 14
Setup
Pointing Maneuver
Exp. 5, copy 15
Setup
Pointing Maneuver
Exp. 5, copy 16
Setup
Unused Orbital Visibility = 71
Pointing Maneuver
Occultation
GS Reacq
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.


Orbit 5
Server Version: 20171009
Setup
Exp. 6, copy 1
Pointing Maneuver
Exp. 6, copy 2
Setup
Pointing Maneuver
Setup
Exp. 6, copy 3
Pointing Maneuver
Setup
Exp. 6, copy 4
Pointing Maneuver
Setup
Exp. 6, copy 5
Pointing Maneuver
Setup
Exp. 6, copy 6
Pointing Maneuver
Exp. 6, copy 7
Setup
Pointing Maneuver
Exp. 6, copy 8
Setup
Pointing Maneuver
Exp. 6, copy 9
Setup
Pointing Maneuver
Setup
Exp. 6, copy 10
Pointing Maneuver
Exp. 6, copy 11
Setup
Pointing Maneuver
Setup
Exp. 6, copy 12
Pointing Maneuver
Exp. 6, copy 13
Setup
Pointing Maneuver
Exp. 6, copy 14
Setup
Pointing Maneuver
Exp. 6, copy 15
Setup
Pointing Maneuver
Setup
Exp. 6, copy 16
Reconfig
Unused Orbital Visibility = 71
Occultation
GS Reacq
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec