16695 - Cloudy mornings and clear afternoons: mapping atmospheric dynamics at the limbs of an exceptional hot Saturn

Cycle: 29, Proposal Category: GO

(UV Initiative)

(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) HAT-P-67	WFC3/UVIS	6	08-Dec-2023 09:00:32.0	yes
02	(1) HAT-P-67 BIAS	WFC3/UVIS	5	08-Dec-2023 09:00:39.0	yes
03	(1) HAT-P-67	WFC3/IR	4	08-Dec-2023 09:00:53.0	yes

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
04	(1) HAT-P-67	WFC3/IR	4	08-Dec-2023 09:01:06.0	yes
05	(1) HAT-P-67	WFC3/IR	4	08-Dec-2023 09:01:13.0	yes

23 Total Orbits Used

ABSTRACT

Two decades of modeling and observations have revealed hot Jupiter atmospheres to be incredibly dynamic worlds, with extreme circulation patterns, strong day-night temperature contrast, and complex cloud feedback processes. While much of our understanding of hot Jupiter atmospheres is derived from information-rich transmission spectroscopy with HST, such observations spatially blend the inhomogeneous atmosphere, introducing strong biases to the retrieved mean molecular weight, temperature, and molecular abundances. Spatial, vertical, and even temporal aerosol inhomogeneities compound these uncertainties, further complicating our interpretations of traditional, blended transmission spectra. Observations that can spatially resolve both the morning and evening terminators are therefore extremely valuable to illuminate a deeper, more holistic portrait of a hot Jupiter's atmosphere with less degeneracy. We propose to measure NUV-to-IR transmission spectra of both terminators of a highly exceptional target to measure each lim'bs aerosol properties, temperature, and chemical abundances in order to trace its dynamics. Our proposed observations will be sensitive to even subtle differences between the limbs, providing an entirely novel and unprecedented dataset which can be used to test models of atmospheric dynamics, aerosol formation, and radiative processes.

OBSERVING DESCRIPTION

We will measure the NUV-to-IR transmission spectra of both terminators of a highly exceptional target to measure each limbs aerosol properties, temperature, and chemical abundances in order to trace its dynamics. Our proposed observations will be sensitive to even subtle differences between the limbs, providing an entirely novel and unprecedented dataset which can be used to test models of atmospheric dynamics, aerosol formation, and radiative processes. During an exoplanet transit, the precise shape of the light curve during transit ingress and egress (T12 and T34, respectively) contains radius information of the two terminators, en- abling studies of limb-to-limb variations. In particular, sections T1-1.5 and T3.5-4 contain information about the leading terminator, and sections T1.5-2 and T3-3.5 capture the trailing terminator (see Fig. 1). This is because the change in flux during these phases of the light curve is dominated by the respective terminator entering or leaving the stellar limb.

The spirit of exoplanet transit/eclipse observations is to attempt to gather as many spectra as possible before, during, and after a transit event with each image as identical as possible. As a transit observation consists of measuring a differential drop in stellar flux during the event, identical

exposures are resistant to uncertainties in flat-fielding and very high photometric precisions are achievable. The WFC3 UVIS and IR observations require 11 to 12 orbit visits, as the baseline stellar flux and instrument systematics need to be measured before and after the transit/eclipse event, with the transit/eclipse event taking about 2.5 orbits orbits and is phase constrained to occur mid-way through the visit.

We place phase constraints such that ingress and egress are fully observed, such that the limb differences can be seen.

We would like to work with the scheduler to find a set a of orbits that minimally impact the observation. In general SAA hiding can be used which does not impact the observations, or the SAA can occur during the latter half of certain orbits. In general, orbits 4 through 8 for G280 and 5 through 9 for G141 occur during the exoplanet transit and would idealy use SAA hiding or not have SAA ipact those orbits. The rest of the baseline orbits could have some SAA imact with minimal science loss. Similar long programs with visits of 9 to 20 orbits with minimal SAA impact have recently been observed (e.g. GO15255, GO15134).

Visit

Proposal 16695, HAT-P-67b WFC3/UVIS orbits 1-6 (01), completed Fri Dec 08 14:01:14 GMT 2023

Diagnostic Status: Warning

Scientific Instruments: WFC3/UVIS

Special Requirements: ORIENT 75D TO 128 D; ORIENT 156D TO 164 D; ORIENT 228D TO 288 D; ORIENT 332D TO 346 D; Period 4.8101097063247105 D AND ZERO-PHASE HJD2455961.384653756

Comments: Visits 1 and 2 must be observed consecutively.

The optional parameters SIZEAXIS1=1700 and SIZEAXIS2=170 are used for all exposures to minimize the data volume and hence time lost to buffer dumps. This is fine for the data that needs to be obtained because the spectum of HAT-P-67 will occupy only a narrow swath of pixel rows within the field. This also requires the use of optional parameters CENTERAXIS1 and CENTERAXIS2 in order to "steer" the location of the subarray readout so that it is centered on the target spectrum. If we were positioning on chip 1 we could set CENTERAXIS2=TARGET. However, for the field center (nominal "UVIS" aperture) location on chip 2, we cannot center the subarray on the target because this would cause the subarray to extend into the chip gap, so we hardwire CENTERAXIS1=2136 and CENTERAXIS2=1221, which is intended to put the vertical center of the subarray on the zeroth order of the target spectrum.

Chip 2 biases are taken at the end of the visit because the grism exposures use custom subarrays, which will not have matching biases from the WFC3 bias calibration program.

For each visit we have phase constraints around the event of the planetary transit, both the orbital period of the planet and the phasing needed are placed on the target acq exposure.

To avoid any contamination by several dim, nearby stars, we have placed Orient Ranges for the observations to reach our science goals.

Diagnostics

(HAT-P-67b WFC3/UVIS orbits 1-6 (01)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(HAT-P-67b WFC3/UVIS orbits 1-6 (01)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	HAT-P-67	RA: 17 06 26.5747 (256.6107279d) Dec: +44 46 36.79 (44.77689d) Equinox: J2000	Proper Motion RA: 8.861904318161867E-4 sec of time/yr Proper Motion Dec: -0.018184999976256222 arcsec/yr Epoch of Position: 2015.5	V=10.11	Reference Frame: SIMBAD

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=STAR
Description=[F3-F9]

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Filter ACQ, phase constrained (WFC3UVIS.im.1530243)	(1) HAT-P-67	WFC3/UVIS, ACCUM, G280-REF	F657N	FLASH=20; CENTERAXIS1=2136; CENTERAXIS2=1221; SIZEAXIS1=1700; SIZEAXIS2=170	POS TARG null,-50; PHASE 0.92637 TO 0.92810	Sequence 1-3 Non-Int in HAT-P-67b WFC3/UVIS orbits 1-6 (01)	3.3 Secs (3.3 Secs) *[==>]*	***[1]***

Comments: For target acq, saturation in 3.5 seconds. 3.3 seconds gives SNR > 500.

Nominal "UVIS" aperture is ~10" above the chip gap on chip 1; a Y-postarg of about -50" places the target near the center of subarray on chip 2.

SIZEAXIS1=1600 and SIZEAXIS2=170 are used to collect a wide acquisition image of the field, while CENTERAXIS1 and CENTERAXIS2 are used to center the subarray readout on the zeroth order of G280 spectrum. These parameters are based upon similar observations obtained successfully in GOs 16039 & 16086 but have been adjusted to better center the zeroth order spectrum on the sub-array.

We use FLASH=20 to meet the nominal count level.

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
2	Filter ACQ (WFC3UVIS.im.1530241)	(1) HAT-P-67	WFC3/UVIS, ACCUM, G280-REF	F225W	FLASH=20; CENTERAXIS1=2136; CENTERAXIS2=1221; SIZEAXIS1=1700; SIZEAXIS2=170	POS TARG null,-50	Sequence 1-3 Non-Int in HAT-P-67b WFC3/UVIS orbits 1-6 (01)	12 Secs (12 Secs) *[==>]*	***[1]***

Comments: For target acq, saturation in 14 seconds. 12 seconds gives SNR of >500.

Nominal "UVIS" aperture is ~10" above the chip gap on chip 1; a Y-postarg of about -50" places the target near the center of subarray on chip 2.

SIZEAXIS1=1600 and SIZEAXIS2=170 are used to minimize overheads, while CENTERAXIS1 and CENTERAXIS2 are used to center the subarray readout on the zeroth order of the G280 spectrum. These parameters are based upon similar observations obtained successfully in GOs 16039 & 16086 but have been adjusted to better center the zeroth order spectrum on the sub-array.

We use FLASH=20 to meet the nominal count level.

3	Orbit 1 (WFC3UVIS.sp.1529720)	(1) HAT-P-67	WFC3/UVIS, ACCUM, UVIS	G280	CENTERAXIS1=2136; CENTERAXIS2=1221; SIZEAXIS1=1700; SIZEAXIS2=170; FLASH=14	POS TARG null,-50	Sequence 1-3 Non-Int in HAT-P-67b WFC3/UVIS orbits 1-6 (01)	53 Secs X 28 (1484 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)]* *[==>(Copy 18)]* *[==>(Copy 19)]* *[==>(Copy 20)]* *[==>(Copy 21)]* *[==>(Copy 22)]* *[==>(Copy 23)]* *[==>(Copy 24)]* *[==>(Copy 25)]* *[==>(Copy 26)]* *[==>(Copy 27)]* *[==>(Copy 28)]*	***[1]***

Comments: We add a FLASH of 14, which when combined with the natural background of about 6 e- per exposure will result in 20 e- and better CTE.

	4	Orbit 2 (WFC3UVIS.sp.1529720)	(1) HAT-P-67	WFC3/UVIS, ACCUM, UVIS	G280	CENTERAXIS1=2136; CENTERAXIS2=1221; SIZEAXIS1=1700; SIZEAXIS2=170; FLASH=14	POS TARG null,-50	Sequence 4-4 Non-Int in HAT-P-67b WFC3/UVIS orbits 1-6 (01)	53 Secs X 30 (1590 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)]* *[==>(Copy 18)]* *[==>(Copy 19)]* *[==>(Copy 20)]* *[==>(Copy 21)]* *[==>(Copy 22)]* *[==>(Copy 23)]* *[==>(Copy 24)]* *[==>(Copy 25)]* *[==>(Copy 26)]* *[==>(Copy 27)]* *[==>(Copy 28)]* *[==>(Copy 29)]* *[==>(Copy 30)]*	***[2]***

Comments: We add a FLASH of 14, which when combined with the natural background of about 6 e- per exposure will result in 20 e- and better CTE.

5	Orbit 3 (WFC3UVIS.sp.1529720)	(1) HAT-P-67	WFC3/UVIS, ACCUM, UVIS	G280	CENTERAXIS1=2136; CENTERAXIS2=1221; SIZEAXIS1=1700; SIZEAXIS2=170; FLASH=14	POS TARG null,-50	Sequence 5-5 Non-Int in HAT-P-67b WFC3/UVIS orbits 1-6 (01)	53 Secs X 30 (1590 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)]* *[==>(Copy 18)]* *[==>(Copy 19)]* *[==>(Copy 20)]* *[==>(Copy 21)]* *[==>(Copy 22)]* *[==>(Copy 23)]* *[==>(Copy 24)]* *[==>(Copy 25)]* *[==>(Copy 26)]* *[==>(Copy 27)]* *[==>(Copy 28)]* *[==>(Copy 29)]* *[==>(Copy 30)]*	***[3]***

Comments: We add a FLASH of 14, which when combined with the natural background of about 6 e- per exposure will result in 20 e- and better CTE.

6	Orbit 4 (WFC3UVIS.sp.1529720)	(1) HAT-P-67	WFC3/UVIS, ACCUM, UVIS	G280	CENTERAXIS1=2136; CENTERAXIS2=1221; SIZEAXIS1=1700; SIZEAXIS2=170; FLASH=14	POS TARG null,-50	Sequence 6-6 Non-Int in HAT-P-67b WFC3/UVIS orbits 1-6 (01)	53 Secs X 29 (1537 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)]* *[==>(Copy 18)]* *[==>(Copy 19)]* *[==>(Copy 20)]* *[==>(Copy 21)]* *[==>(Copy 22)]* *[==>(Copy 23)]* *[==>(Copy 24)]* *[==>(Copy 25)]* *[==>(Copy 26)]* *[==>(Copy 27)]* *[==>(Copy 28)]* *[==>(Copy 29)]*	***[4]***

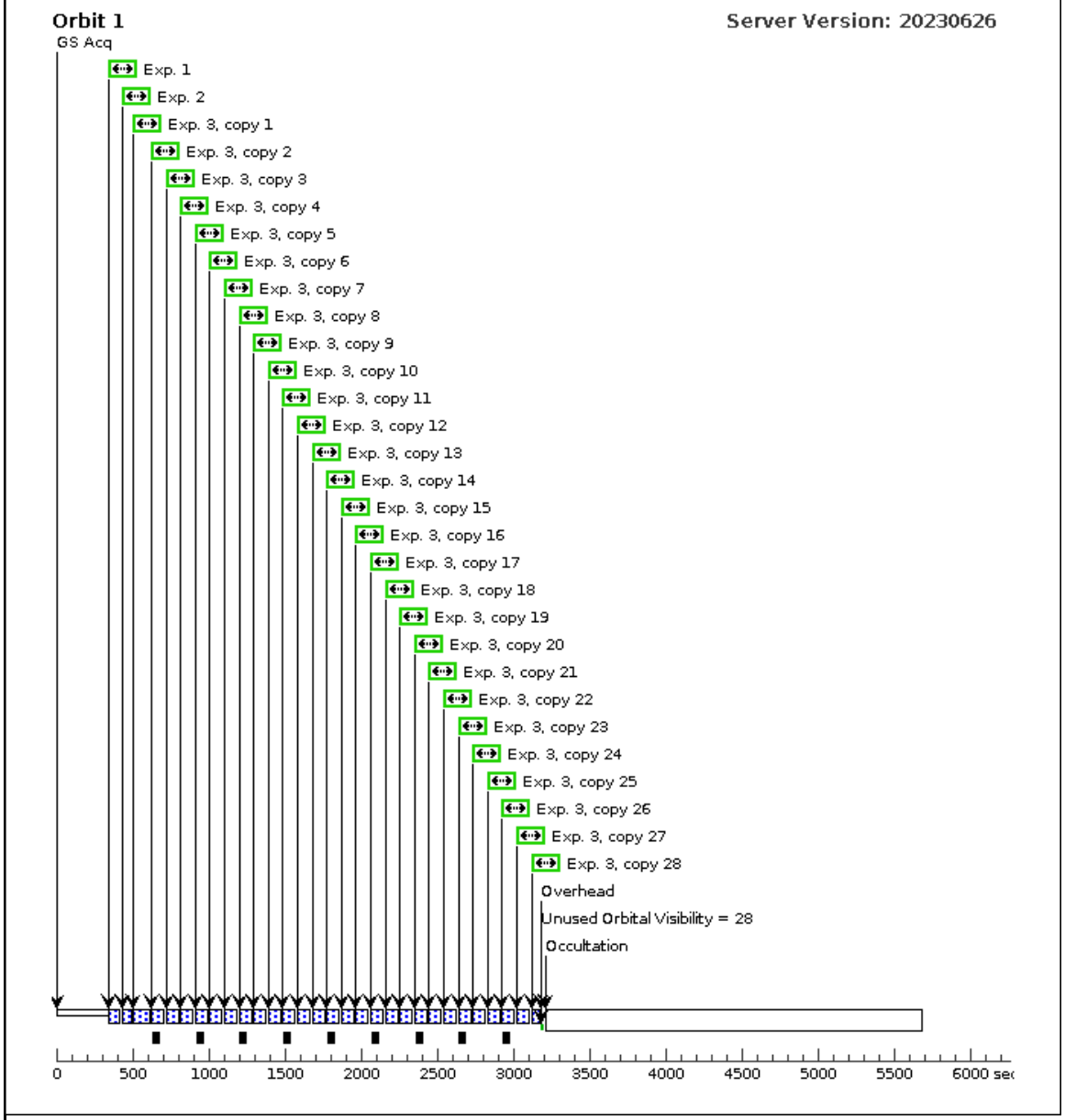
Comments: We add a FLASH of 14, which when combined with the natural background of about 6 e- per exposure will result in 20 e- and better CTE.

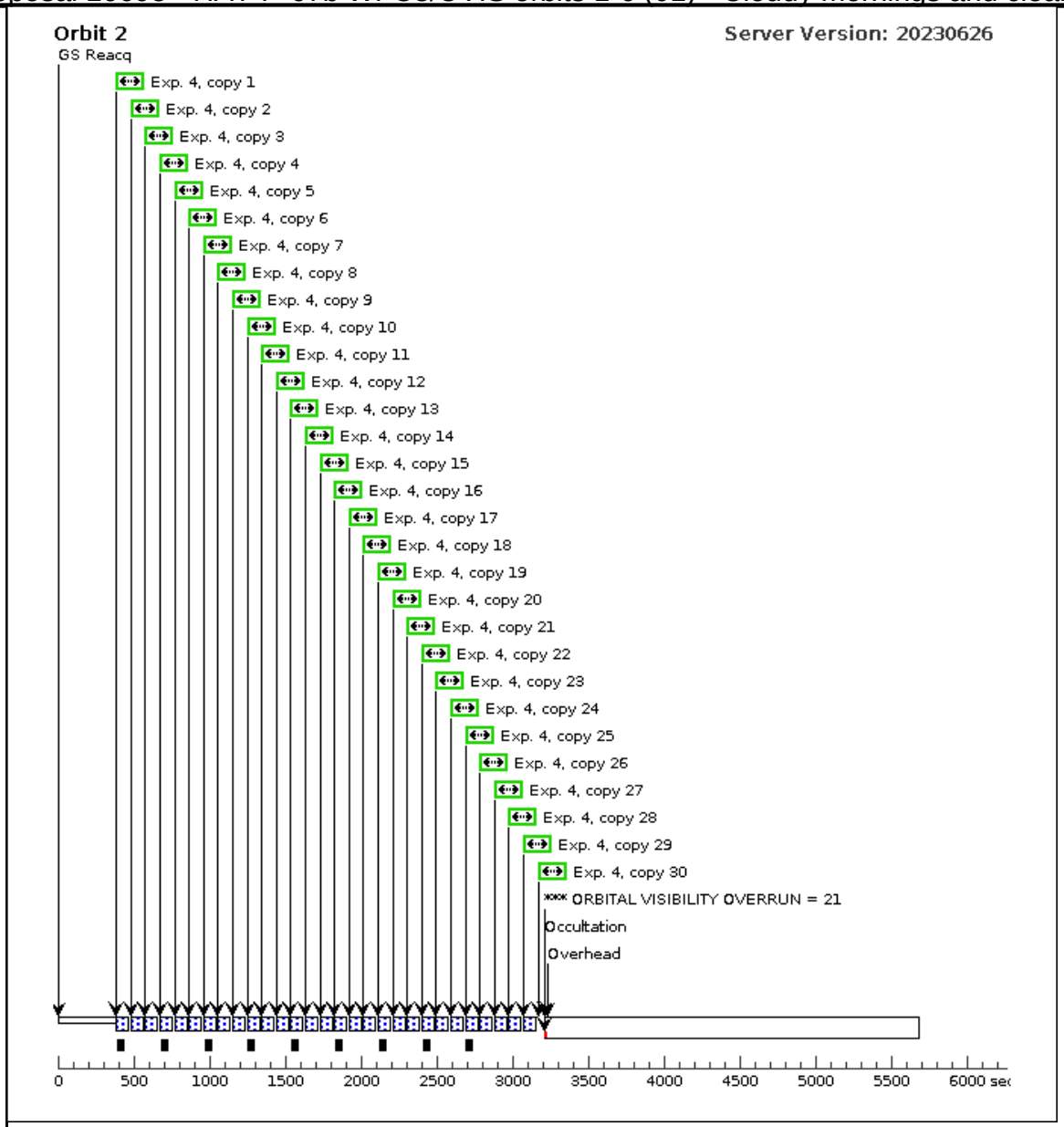
7	Orbit 5 (WFC3UVIS.sp.1529720)	(1) HAT-P-67	WFC3/UVIS, ACCUM, UVIS	G280	CENTERAXIS1=2136; CENTERAXIS2=1221; SIZEAXIS1=1700; SIZEAXIS2=170; FLASH=14	POS TARG null,-50	Sequence 7-7 Non-Int in HAT-P-67b WFC3/UVIS orbits 1-6 (01)	53 Secs X 29 (1537 Secs) *[==>(Copy 1)]* *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(Copy 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)]* *[==>(Copy 18)]* *[==>(Copy 19)]* *[==>(Copy 20)]* *[==>(Copy 21)]* *[==>(Copy 22)]* *[==>(Copy 23)]* *[==>(Copy 24)]* *[==>(Copy 25)]* *[==>(Copy 26)]* *[==>(Copy 27)]* *[==>(Copy 28)]* *[==>(Copy 29)]*	***[5]***

Comments: We add a FLASH of 14, which when combined with the natural background of about 6 e- per exposure will result in 20 e- and better CTE.

	8	Orbit 6 (WFC3UVIS.sp.1529720)	(1) HAT-P-67	WFC3/UVIS, ACCUM, UVIS	G280	CENTERAXIS1=2136; CENTERAXIS2=1221; SIZEAXIS1=1700; SIZEAXIS2=170; FLASH=14	POS TARG null,-50	Sequence 8-8 Non-Int in HAT-P-67b WFC3/UVIS orbits 1-6 (01)	53 Secs X 29 (1537 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)]* *[==>(Copy 18)]* *[==>(Copy 19)]* *[==>(Copy 20)]* *[==>(Copy 21)]* *[==>(Copy 22)]* *[==>(Copy 23)]* *[==>(Copy 24)]* *[==>(Copy 25)]* *[==>(Copy 26)]* *[==>(Copy 27)]* *[==>(Copy 28)]* *[==>(Copy 29)]*	***[6]***
	Comments: We add a FLASH of 14, which when combined with the natural background of about 6 e- per exposure will result in 20 e- and better CTE.										

Orbit Structure

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Exp. 4, copy 29
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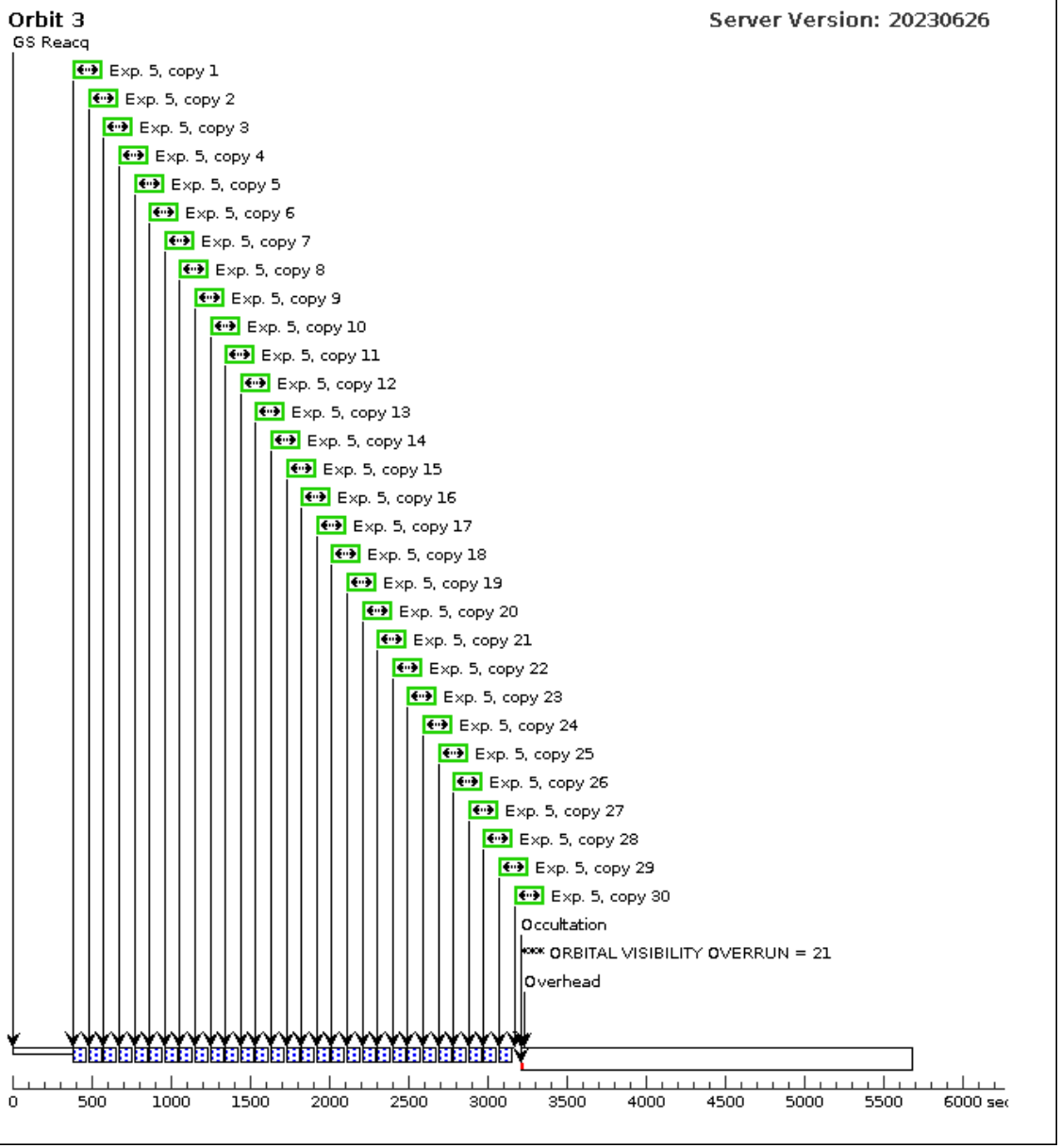
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Occultation
*** ORBITAL VISIBILITY OVERRUN = 21
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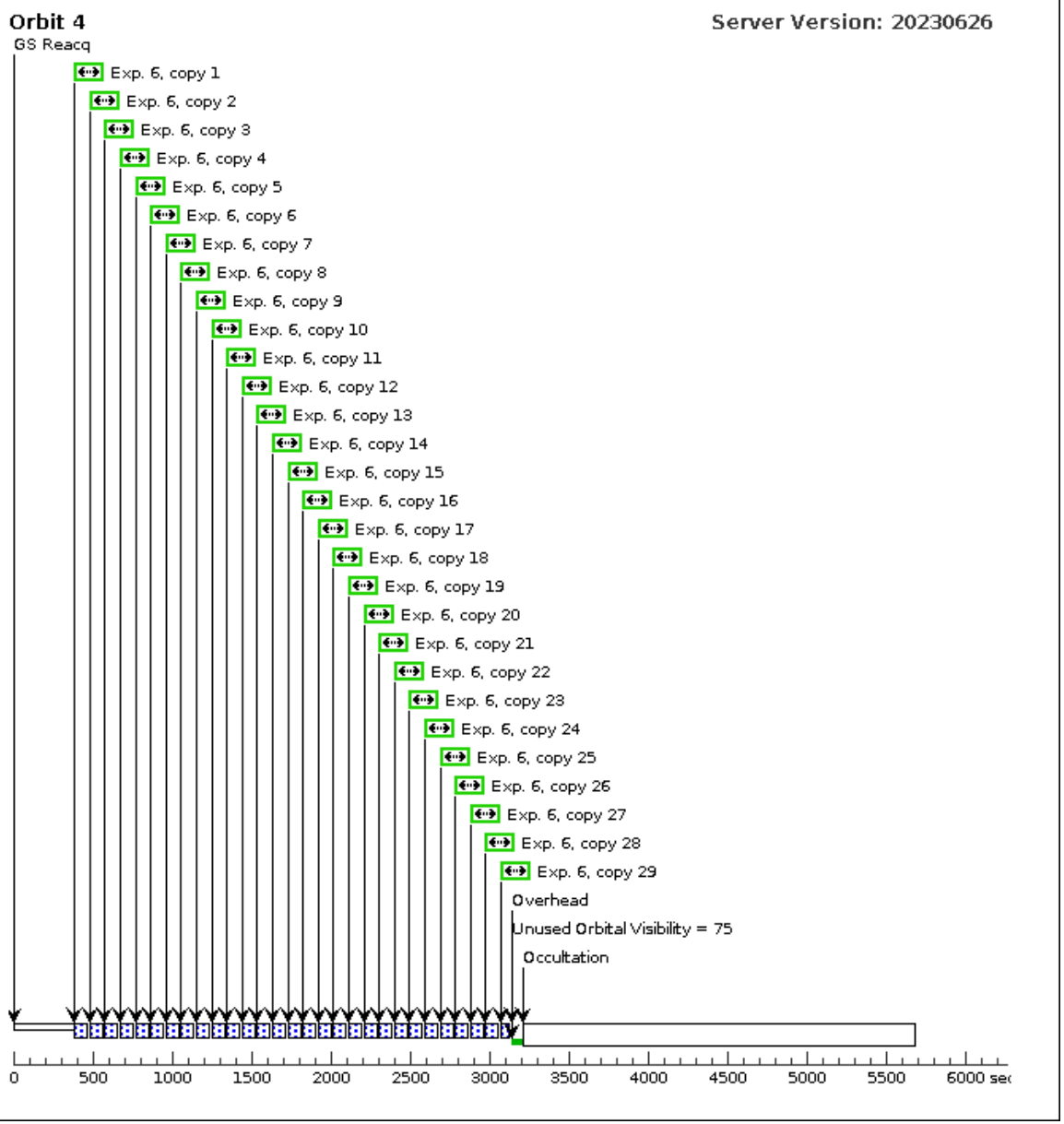
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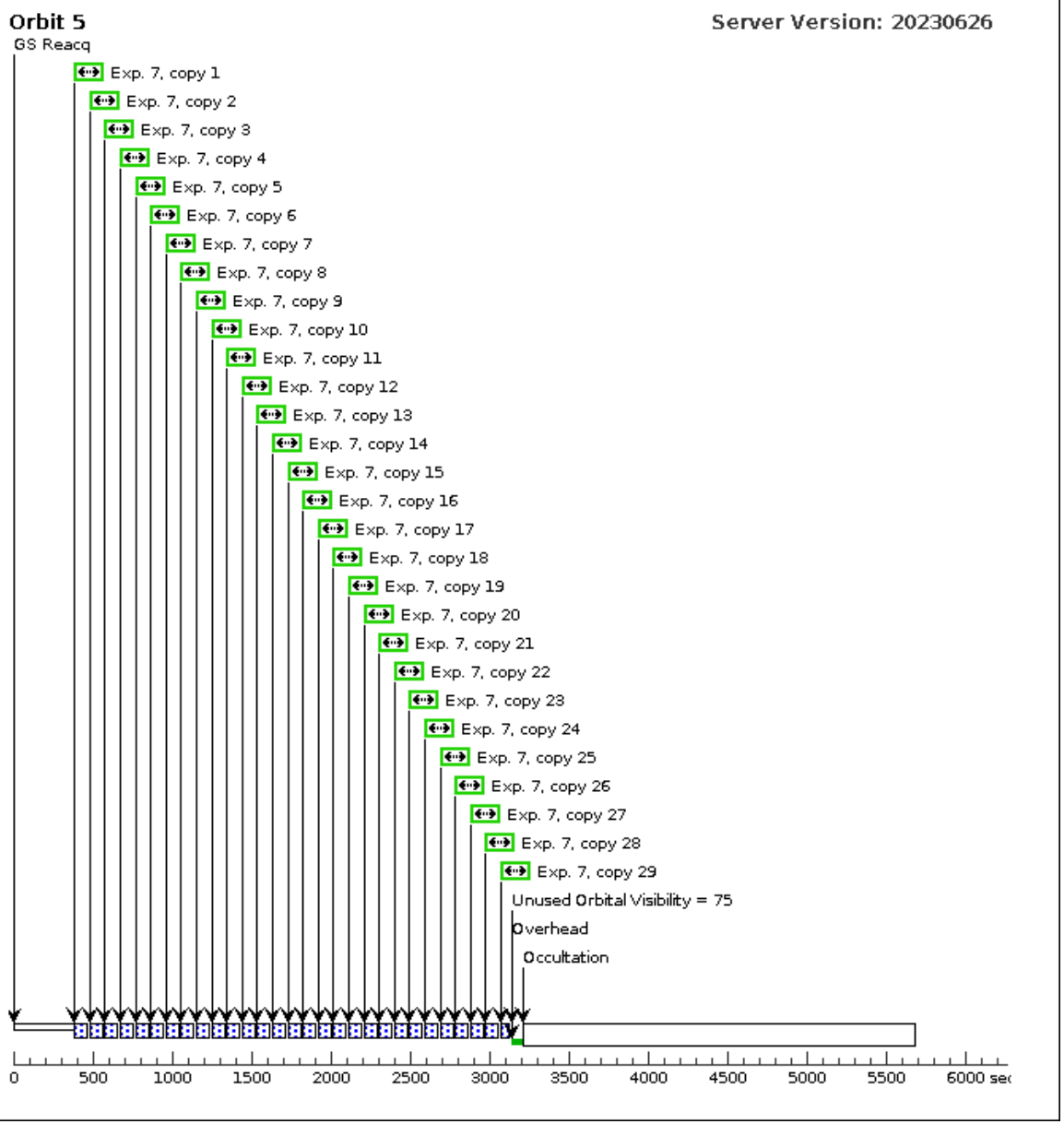
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Exp. 7, copy 26
Exp. 7, copy 27
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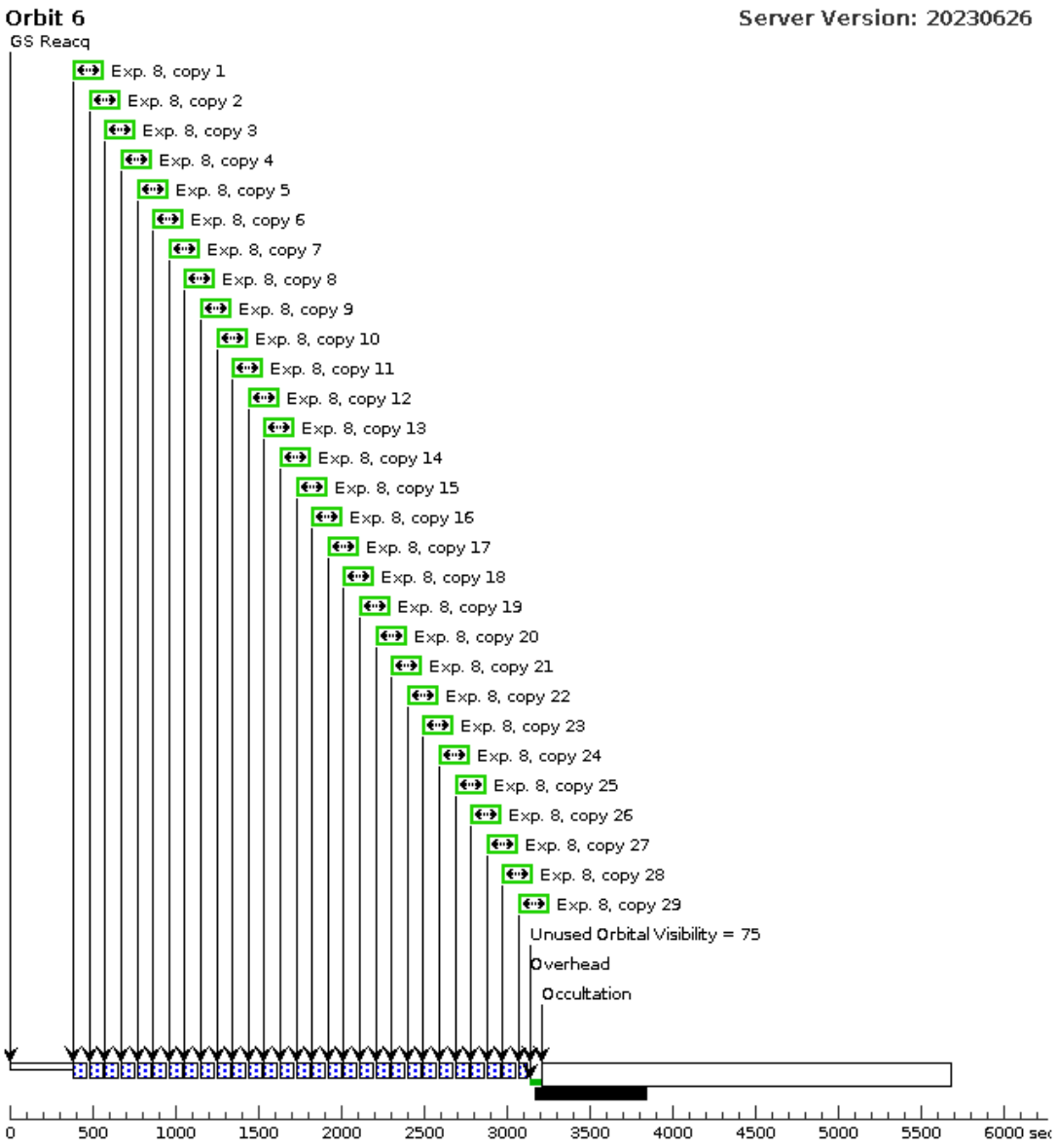
5500
6000 sec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Exp. 8, copy 23
Exp. 8, copy 24
Exp. 8, copy 25
Exp. 8, copy 26
Exp. 8, copy 27
Exp. 8, copy 28
Exp. 8, copy 29
Unused Orbital Visibility = 75
Overhead
Occultation
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500
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1500
2000
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4000
4500
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5500
6000 sec

Visit

Proposal 16695, HAT-P-67b WFC3/UVIS orbits 7-11 (02), completed Fri Dec 08 14:01:14 GMT 2023

Diagnostic Status: Informational

Scientific Instruments: WFC3/UVIS

Special Requirements: SAME ORIENT AS 01; AFTER 01 BY 5.9 Orbits TO 6.1 Orbits

Diagnostics

(HAT-P-67b WFC3/UVIS orbits 7-11 (02)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	HAT-P-67	RA: 17 06 26.5747 (256.6107279d) Dec: +44 46 36.79 (44.77689d) Equinox: J2000	Proper Motion RA: 8.861904318161867E-4 sec of time/yr Proper Motion Dec: -0.018184999976256222 arcsec/yr Epoch of Position: 2015.5	V=10.11	Reference Frame: SIMBAD

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=STAR
Description=[F3-F9]

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Orbit 7 (WFC3UVIS.sp.1529720)	(1) HAT-P-67	WFC3/UVIS, ACCUM, UVIS	G280	CENTERAXIS1=2136; CENTERAXIS2=1221; SIZEAXIS1=1700; SIZEAXIS2=170; FLASH=14	POS TARG null,-50; SAA CONTOUR 02	Sequence 1-1 Non-Int in HAT-P-67b WFC3/UVIS orbits 7-11 (02)	53 Secs X 29 (1537 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)]* *[==>(Copy 18)]* *[==>(Copy 19)]* *[==>(Copy 20)]* *[==>(Copy 21)]* *[==>(Copy 22)]* *[==>(Copy 23)]* *[==>(Copy 24)]* *[==>(Copy 25)]* *[==>(Copy 26)]* *[==>(Copy 27)]* *[==>(Copy 28)]* *[==>(Copy 29)]*	***[1]***

Comments: We add a FLASH of 14, which when combined with the natural background of about 6 e- per exposure will result in 20 e- and better CTE.

2	Orbit 8 (WFC3UVIS.sp.1529720)	(1) HAT-P-67	WFC3/UVIS, ACCUM, UVIS	G280	CENTERAXIS1=2136; CENTERAXIS2=1221; SIZEAXIS1=1700; SIZEAXIS2=170; FLASH=14	POS TARG null,-50	Sequence 2-2 Non-Int in HAT-P-67b WFC3/UVIS orbits 7-11 (02)	53 Secs X 17 (901 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]***

Comments: We add a FLASH of 14, which when combined with the natural background of about 6 e- per exposure will result in 20 e- and better CTE.

3	Orbit 9 (WFC3UVIS.sp.1529720)	(1) HAT-P-67	WFC3/UVIS, ACCUM, UVIS	G280	CENTERAXIS1=2136; CENTERAXIS2=1221; SIZEAXIS1=1700; SIZEAXIS2=170; FLASH=14	POS TARG null,-50	Sequence 3-3 Non-Int in HAT-P-67b WFC3/UVIS orbits 7-11 (02)	53 Secs X 18 (954 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)]* *[==>(Copy 18)]*	***[3]***

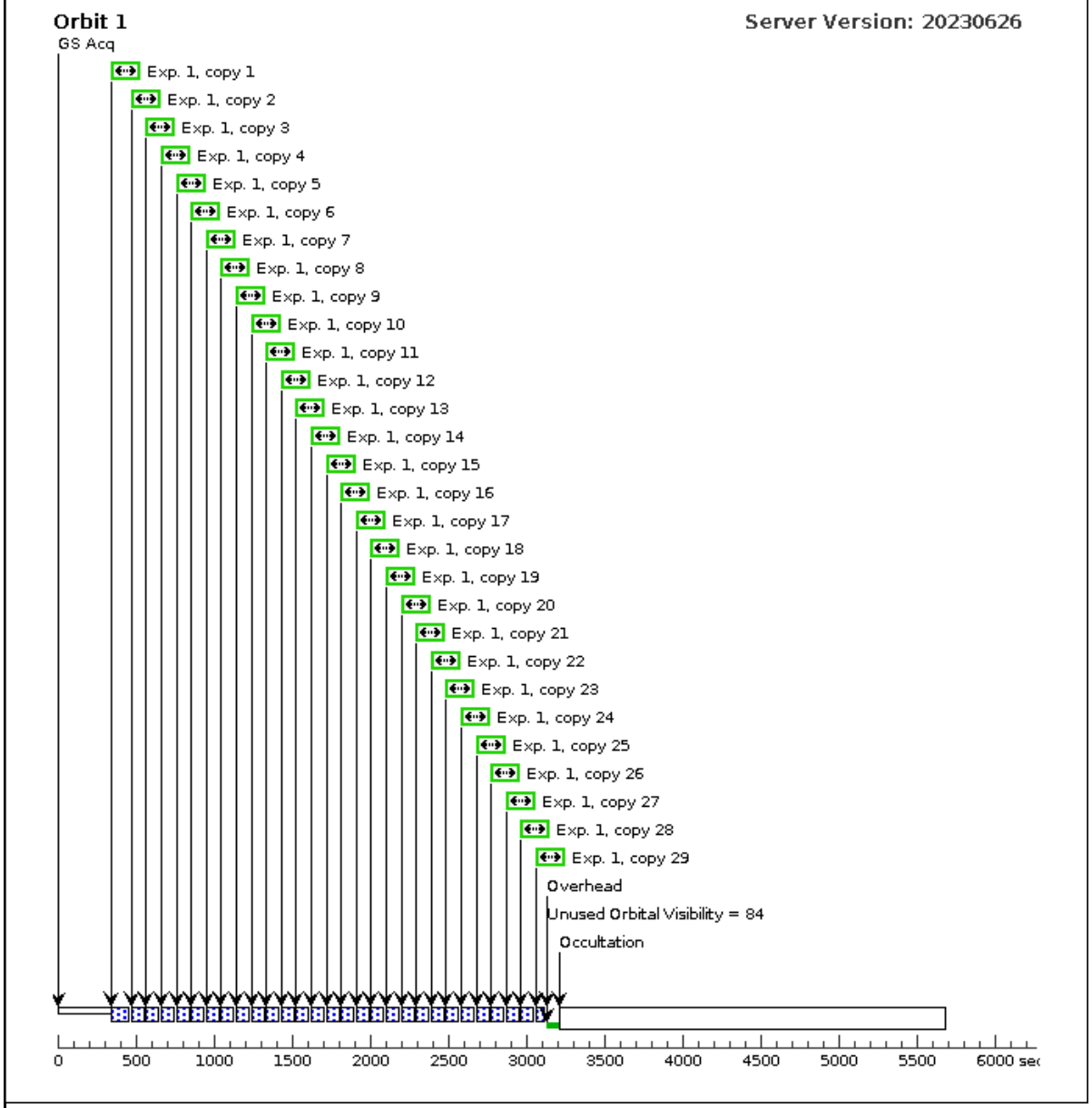
Comments: We add a FLASH of 14, which when combined with the natural background of about 6 e- per exposure will result in 20 e- and better CTE.

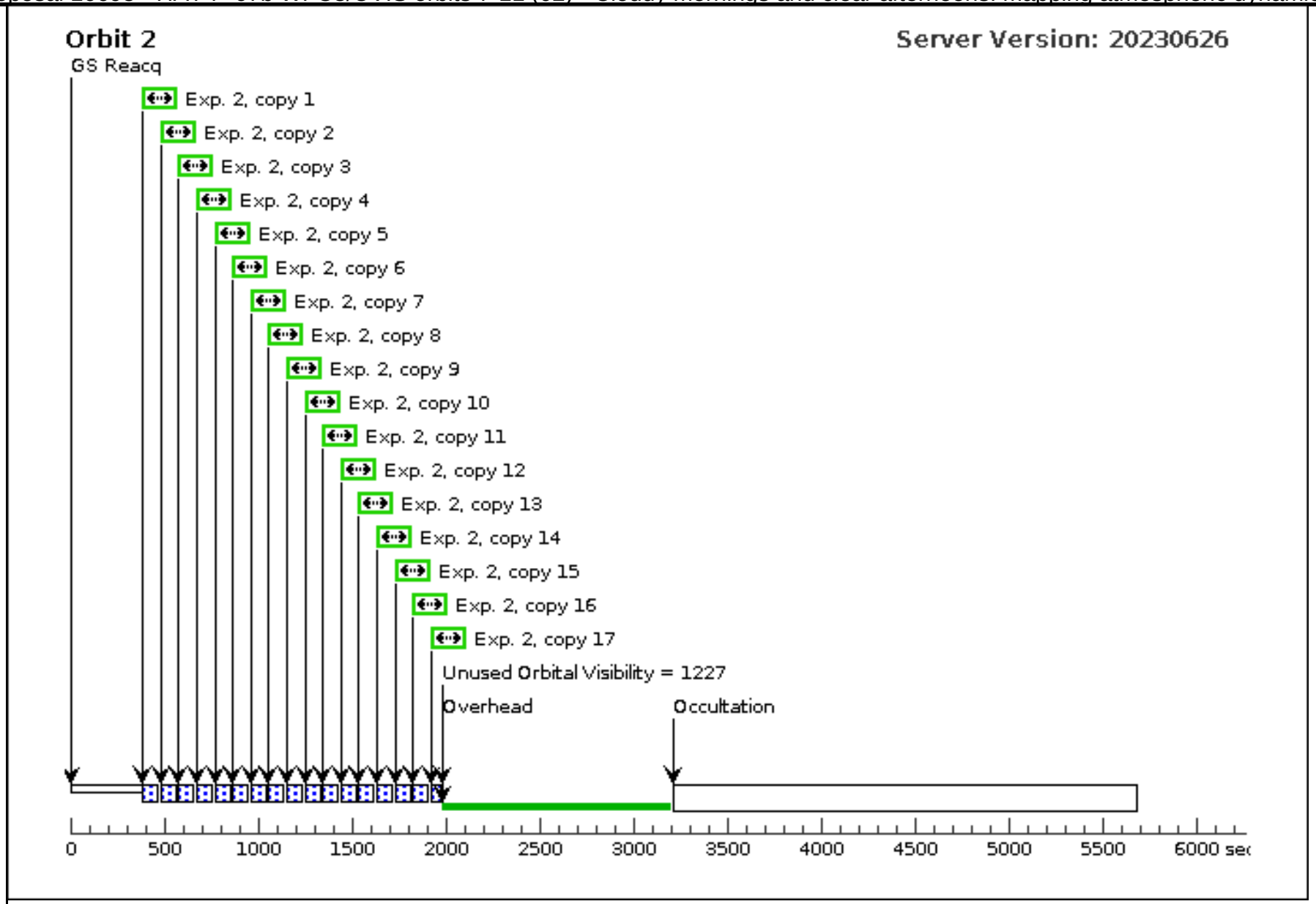
4	Orbit 10 (WFC3UVIS.sp.1529720)	(1) HAT-P-67	WFC3/UVIS, ACCUM, UVIS	G280	CENTERAXIS1=2136; CENTERAXIS2=1221; SIZEAXIS1=1700; SIZEAXIS2=170; FLASH=14	POS TARG null,-50	Sequence 4-4 Non-Int in HAT-P-67b WFC3/UVIS orbits 7-11 (02)	53 Secs X 21 (1113 Secs) *[==>(Copy 1)]* *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(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)]* *[==>(Copy 18)]* *[==>(Copy 19)]* *[==>(Copy 20)]* *[==>(Copy 21)]*	***[4]***

Comments: We add a FLASH of 14, which when combined with the natural background of about 6 e- per exposure will result in 20 e- and better CTE.

	5	Orbit 11 (WFC3UVIS.sp.1529720)	(1) HAT-P-67	WFC3/UVIS, ACCUM, UVIS	G280	CENTERAXIS1=2136; CENTERAXIS2=1221; SIZEAXIS1=1700; SIZEAXIS2=170; FLASH=14	POS TARG null,-50	Sequence 5-6 Non-Int in HAT-P-67b WFC3/UVIS orbits 7-11 (02)	53 Secs X 22 (1166 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)]* *[==>(Copy 18)]* *[==>(Copy 19)]* *[==>(Copy 20)]* *[==>(Copy 21)]* *[==>(Copy 22)]*	***[5]***
	Comments: We add a FLASH of 14, which when combined with the natural background of about 6 e- per exposure will result in 20 e- and better CTE.									
	6	Bias	BIAS	WFC3/UVIS, ACCUM, UVIS	DEF	CENTERAXIS1=2136; CENTERAXIS2=1221; SIZEAXIS1=1700; SIZEAXIS2=170		Sequence 5-6 Non-Int in HAT-P-67b WFC3/UVIS orbits 7-11 (02)	0.0 Secs X 4 (0 Secs) *[==>(Copy 1)]* *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(Copy 4)]*	***[5]***
	Comments: We set up the bias frames based on previously sucessful program 11934 and are using the same Aperture and subarray size and position as the observations for direct calibration.									

Orbit Structure

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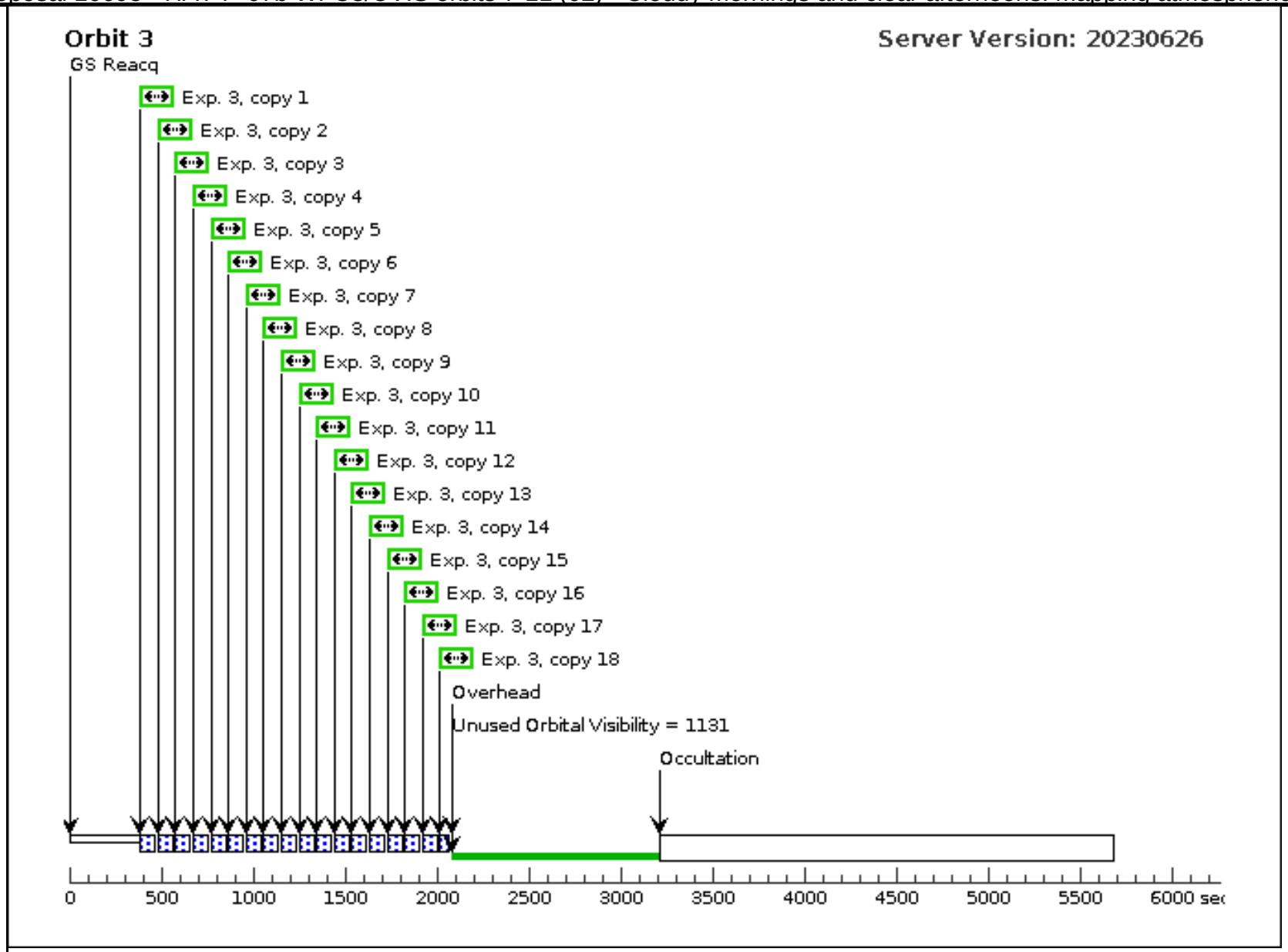
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Exp. 3, copy 14
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Exp. 3, copy 17
Exp. 3, copy 18
Overhead
Unused Orbital Visibility = 1131
Occultation
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3000
3500
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4500
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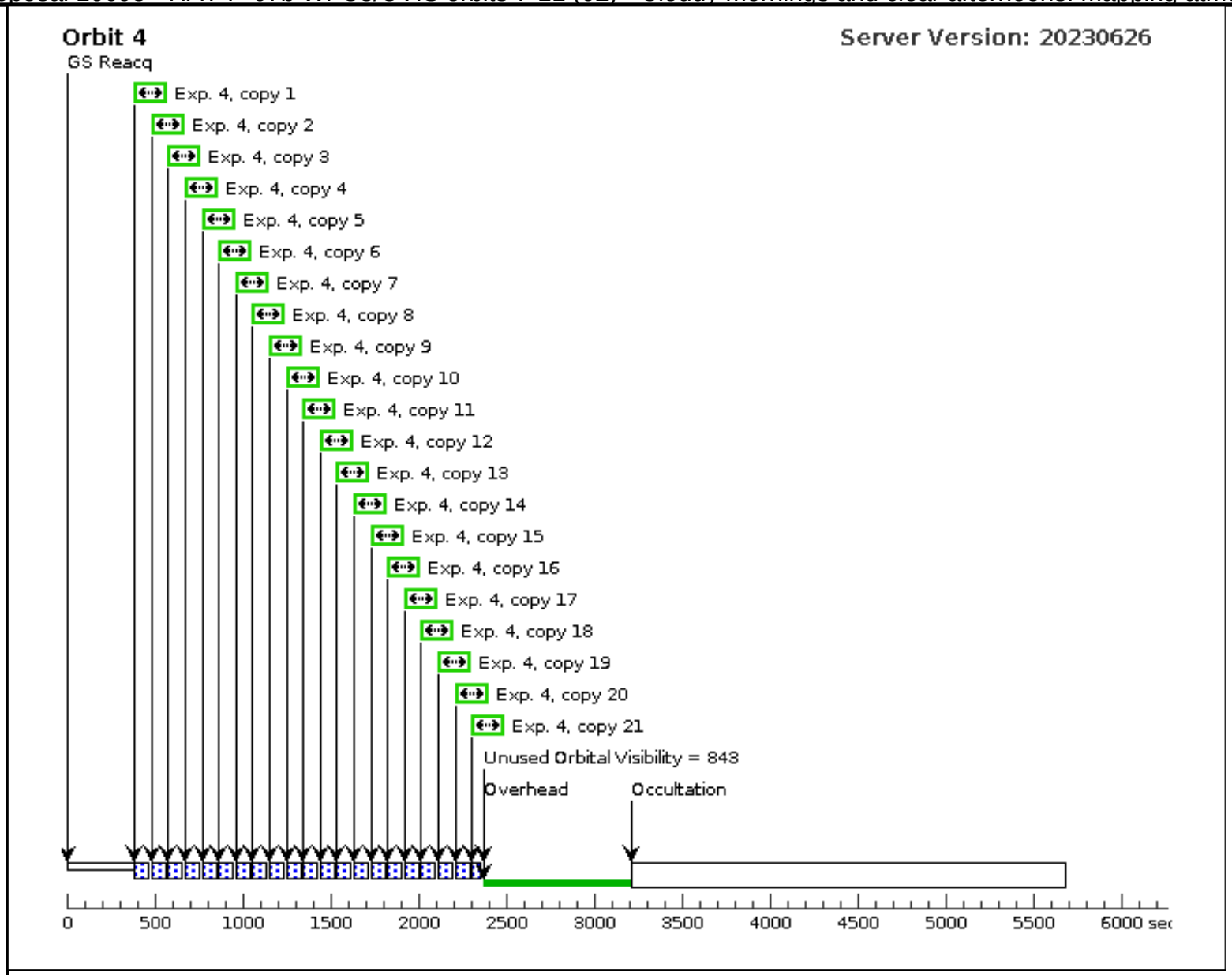
5500
6000 sec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Exp. 4, copy 15
Exp. 4, copy 16
Exp. 4, copy 17
Exp. 4, copy 18
Exp. 4, copy 19
Exp. 4, copy 20
Exp. 4, copy 21
Unused Orbital Visibility = 843
Overhead
Occultation
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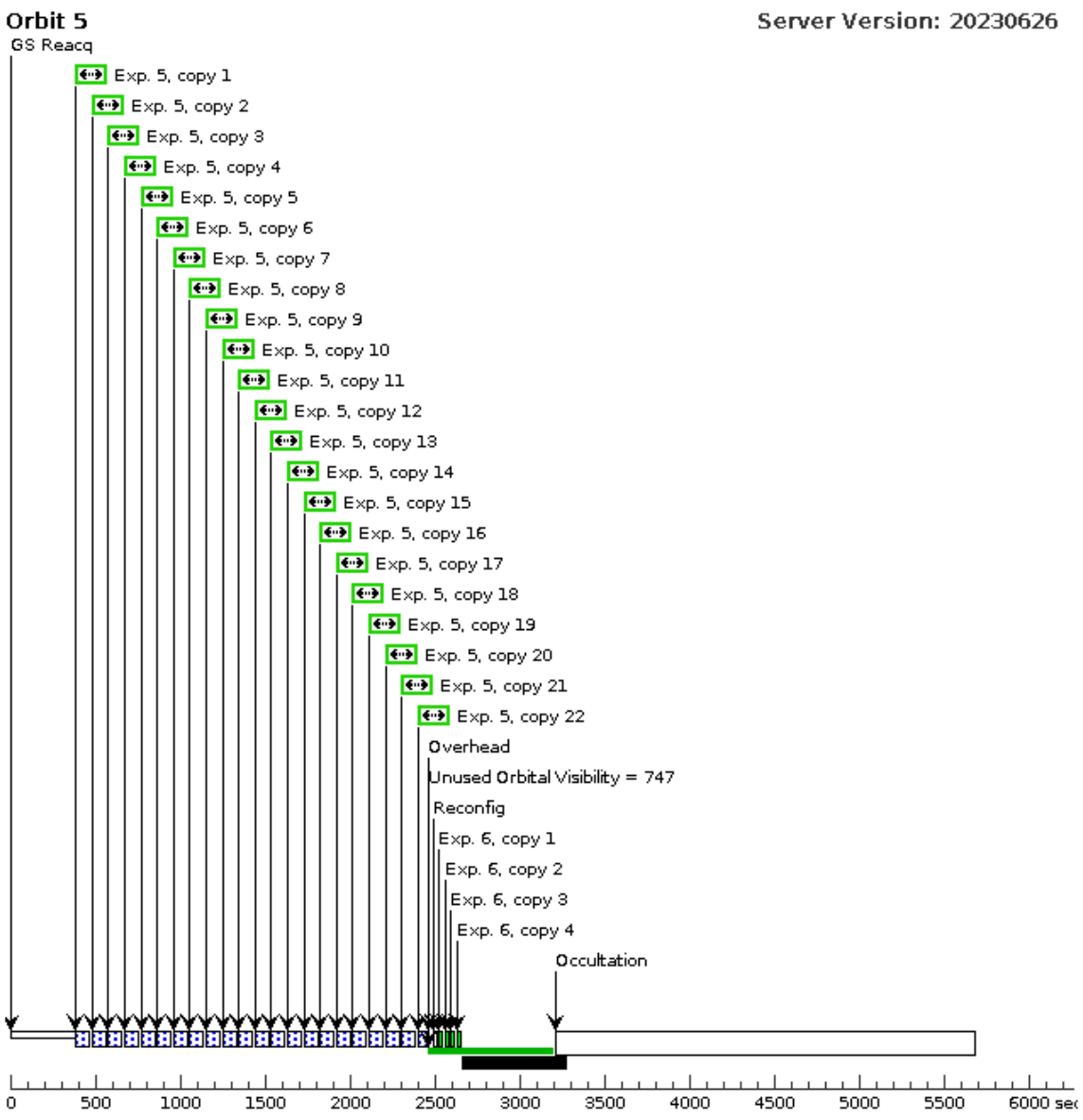
6000 sec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Overhead
Unused Orbital Visibility = 747
Reconfig
Exp. 6, copy 1
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Exp. 6, copy 3
Exp. 6, copy 4
Occultation
0
500
1000
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2000
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3000
3500
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4500
5000
5500
6000 sec

Visit

Proposal 16695, HAT-P-67b WFC3/G141 orbits 1-4 (03), implementation Fri Dec 08 14:01:15 GMT 2023

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 30%; ORIENT 43D TO 163 D; ORIENT 223D TO 343 D; Period 4.8101097063247105 D AND ZERO-PHASE HJD2455961.384653756

Comments: Roll constraints have been added to avoid a nearby red companion star located 9.7" north east of the target (visible in a SDSS image).

Visits 3, 4 and 5 must be observed consecutively.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	HAT-P-67	RA: 17 06 26.5747 (256.6107279d) Dec: +44 46 36.79 (44.77689d) Equinox: J2000	Proper Motion RA: 8.861904318161867E-4 sec of time/yr Proper Motion Dec: -0.018184999976256222 arcsec/yr Epoch of Position: 2015.5	V=10.11	Reference Frame: SIMBAD

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=STAR
Description=[F3-F9]

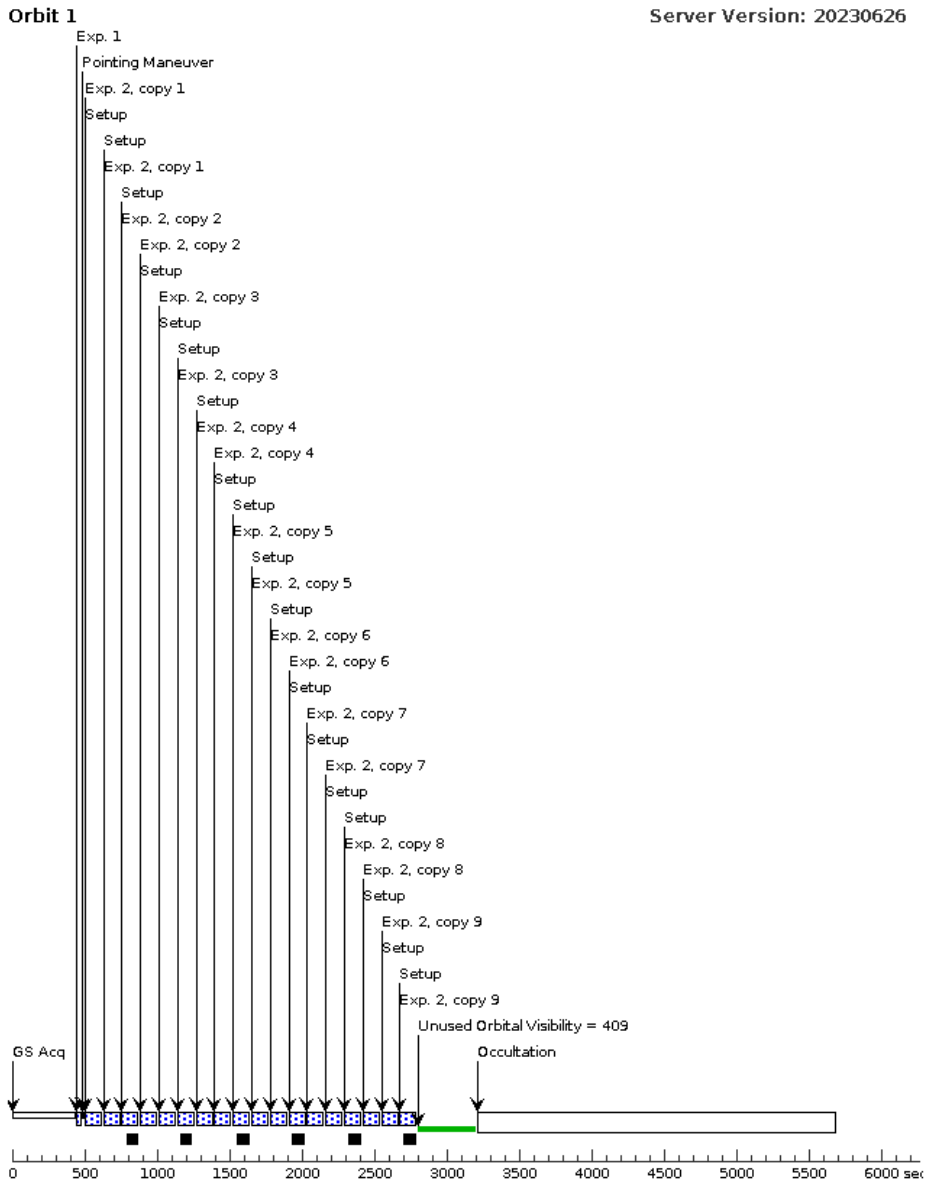
Exposures

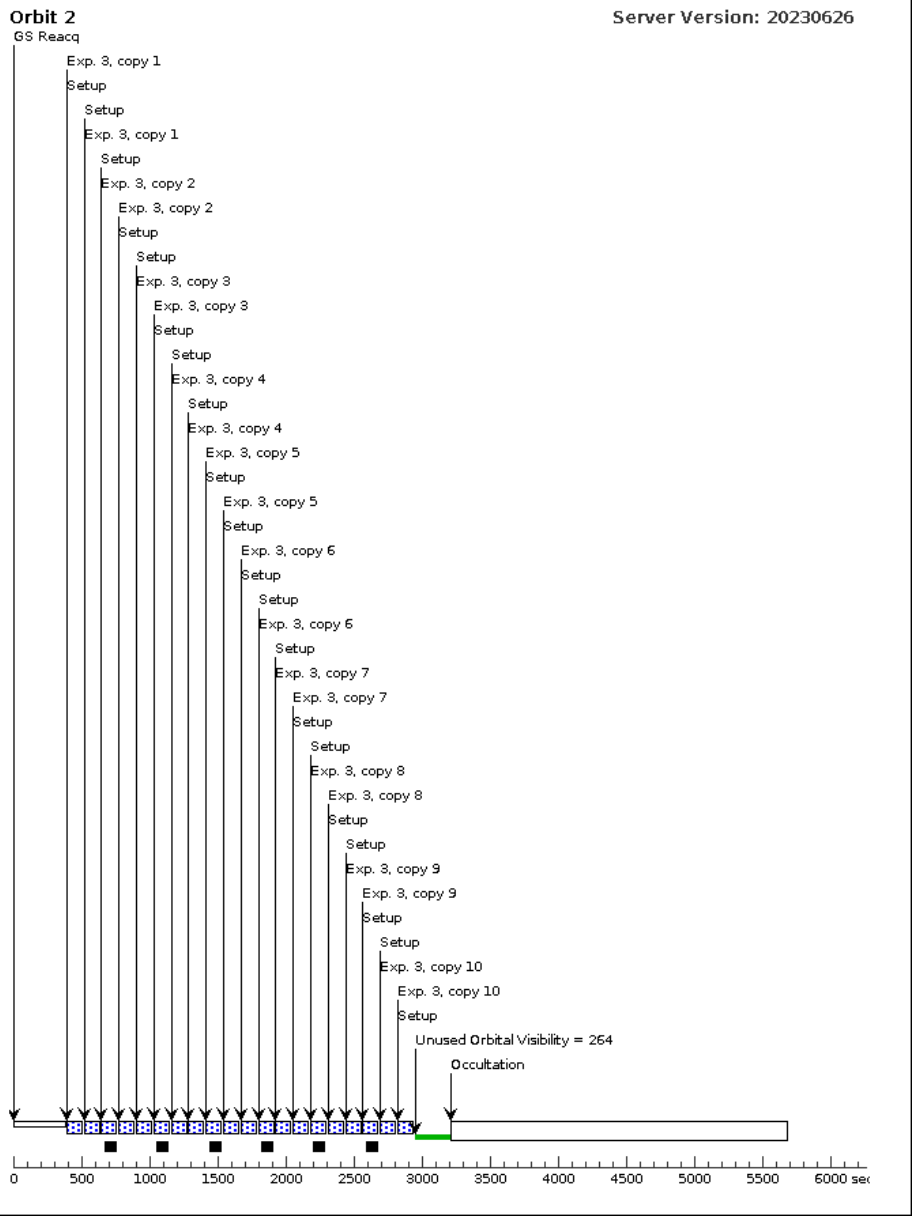
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Acq, phase constraint (WFC3IR.im.1530422)	(1) HAT-P-67	WFC3/IR, MULTIACCUM, GRISM256	F130N	NSAMP=4; SAMP-SEQ=RAPID	POS TARG null,-7; PHASE 0.9126548989571659 TO 0.9140986196355598; GS ACQ SCENARIO BASE1BR	Sequence 1-2 Non-Int in HAT-P-67b WFC3/G141 orbits 1-4 (03)	1.11126 Secs (1.111 Secs) *[==>]*	***[1]***
2	Orb 1 Spec (WFC3IR.ss.1530501)	(1) HAT-P-67	WFC3/IR, MULTIACCUM, GRISM256	G141	NSAMP=13; SAMP-SEQ=SPARS10	POS TARG null,-7; SPATIAL SCAN 0.1,90.0 Degrees,Round trip	Sequence 1-2 Non-Int in HAT-P-67b WFC3/G141 orbits 1-4 (03)	88.435659 Secs X 9 (1591.842 Secs) *[==>(Copy 1, Forward)]* *[==>(Copy 1, Reverse)]* *[==>(Copy 2, Forward)]* *[==>(Copy 2, Reverse)]* *[==>(Copy 3, Forward)]* *[==>(Copy 3, Reverse)]* *[==>(Copy 4, Forward)]* *[==>(Copy 4, Reverse)]* *[==>(Copy 5, Forward)]* *[==>(Copy 5, Reverse)]* *[==>(Copy 6, Forward)]* *[==>(Copy 6, Reverse)]* *[==>(Copy 7, Forward)]* *[==>(Copy 7, Reverse)]* *[==>(Copy 8, Forward)]* *[==>(Copy 8, Reverse)]* *[==>(Copy 9, Forward)]* *[==>(Copy 9, Reverse)]*	***[1]***

	3	Orb 2 Spec	(1) HAT-P-67	WFC3/IR, MULTIACCUM, GRISM256	G141	NSAMP=13; SAMP-SEQ=SPARS10	POS TARG null,-7; SPATIAL SCAN 0.1 ,90.0 Degrees,Round trip	Sequence 3-3 Non-Int in HAT-P-67b WFC3/G141 orbits 1-4 (03)	88.435659 Secs X 10 (1768.713 Secs)	
									[==>(Copy 1, Forward)] *[==>(Copy 1, Reverse)]* *[==>(Copy 2, Forward)]* *[==>(Copy 2, Reverse)]* *[==>(Copy 3, Forward)]* *[==>(Copy 3, Reverse)]* *[==>(Copy 4, Forward)]* *[==>(Copy 4, Reverse)]* *[==>(Copy 5, Forward)]* *[==>(Copy 5, Reverse)]* *[==>(Copy 6, Forward)]* *[==>(Copy 6, Reverse)]* *[==>(Copy 7, Forward)]* *[==>(Copy 7, Reverse)]* *[==>(Copy 8, Forward)]* *[==>(Copy 8, Reverse)]* *[==>(Copy 9, Forward)]* *[==>(Copy 9, Reverse)]* *[==>(Copy 10, Forward)]* *[==>(Copy 10, Reverse)]*	***[2]***
	4	Orb 3 Spec	(1) HAT-P-67	WFC3/IR, MULTIACCUM, GRISM256	G141	NSAMP=13; SAMP-SEQ=SPARS10	POS TARG null,-7; SPATIAL SCAN 0.1 ,90.0 Degrees,Round trip	Sequence 4-4 Non-Int in HAT-P-67b WFC3/G141 orbits 1-4 (03)	88.435659 Secs X 10 (1768.713 Secs)	
									[==>(Copy 1, Forward)] *[==>(Copy 1, Reverse)]* *[==>(Copy 2, Forward)]* *[==>(Copy 2, Reverse)]* *[==>(Copy 3, Forward)]* *[==>(Copy 3, Reverse)]* *[==>(Copy 4, Forward)]* *[==>(Copy 4, Reverse)]* *[==>(Copy 5, Forward)]* *[==>(Copy 5, Reverse)]* *[==>(Copy 6, Forward)]* *[==>(Copy 6, Reverse)]* *[==>(Copy 7, Forward)]* *[==>(Copy 7, Reverse)]* *[==>(Copy 8, Forward)]* *[==>(Copy 8, Reverse)]* *[==>(Copy 9, Forward)]* *[==>(Copy 9, Reverse)]* *[==>(Copy 10, Forward)]* *[==>(Copy 10, Reverse)]*	***[3]***

	5	Orb 4 Spec	(1) HAT-P-67	WFC3/IR, MULTIACCUM, GRISM256	G141	NSAMP=13; SAMP-SEQ=SPARS10	POS TARG null,-7; SPATIAL SCAN 0.1 ,90.0 Degrees,Round trip	Sequence 5-5 Non-Int in HAT-P-67b WFC3/G141 orbits 1-4 (03)	88.435659 Secs X 10 (1768.713 Secs) *[==>(Copy 1, Forward)]* *[==>(Copy 1, Reverse)]* *[==>(Copy 2, Forward)]* *[==>(Copy 2, Reverse)]* *[==>(Copy 3, Forward)]* *[==>(Copy 3, Reverse)]* *[==>(Copy 4, Forward)]* *[==>(Copy 4, Reverse)]* *[==>(Copy 5, Forward)]* *[==>(Copy 5, Reverse)]* *[==>(Copy 6, Forward)]* *[==>(Copy 6, Reverse)]* *[==>(Copy 7, Forward)]* *[==>(Copy 7, Reverse)]* *[==>(Copy 8, Forward)]* *[==>(Copy 8, Reverse)]* *[==>(Copy 9, Forward)]* *[==>(Copy 9, Reverse)]* *[==>(Copy 10, Forward)]* *[==>(Copy 10, Reverse)]*	***[4]***

Orbit Structure

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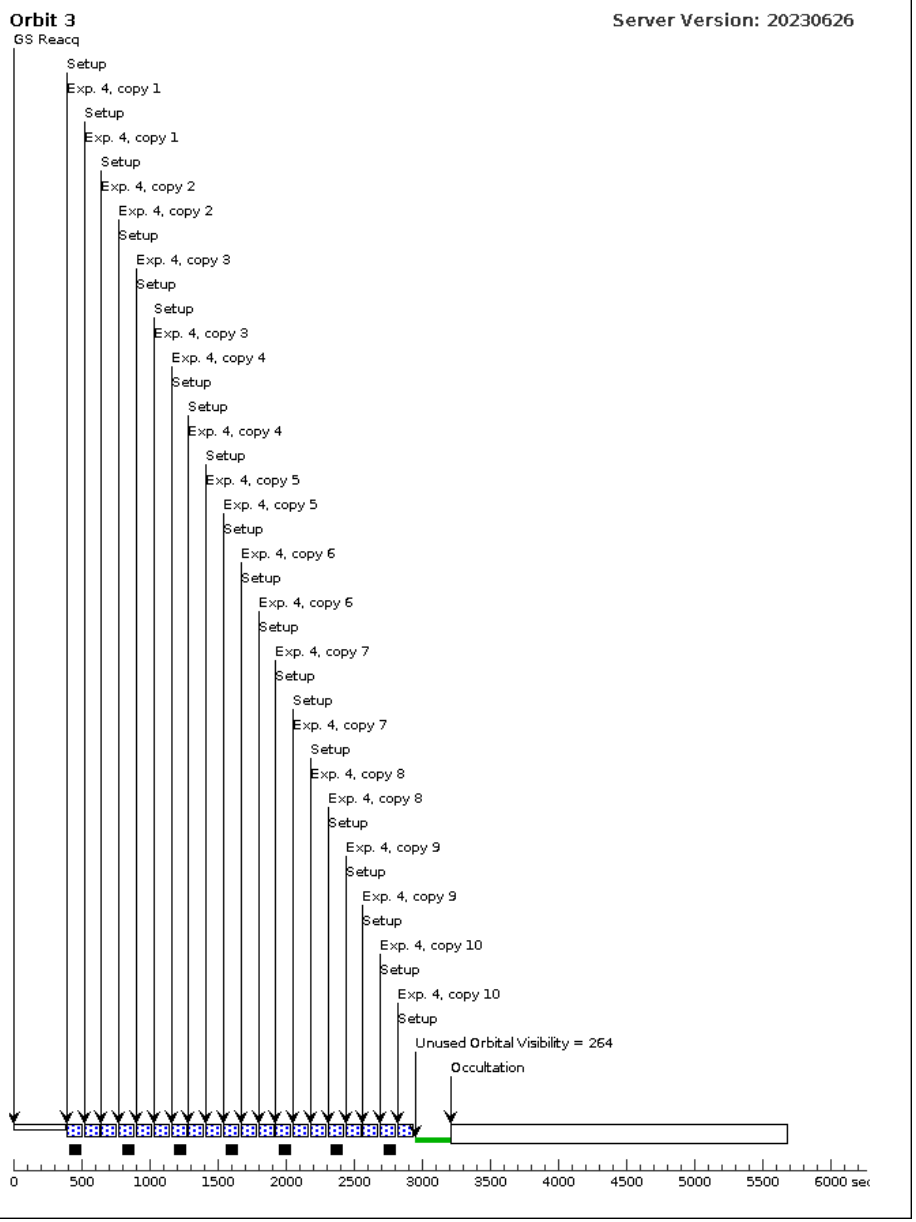
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Exp. 4, copy 10
Setup
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Occultation
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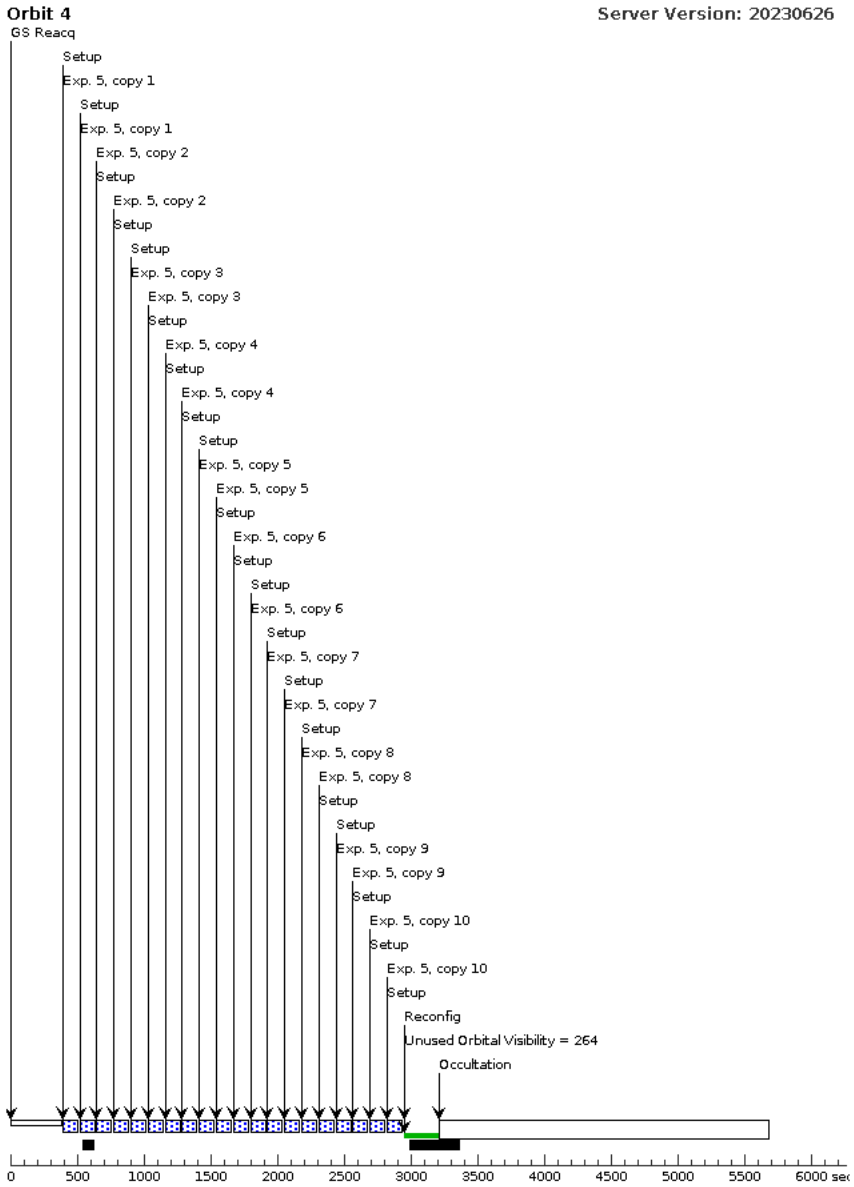
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Exp. 5, copy 10
Setup
Reconfig
Unused Orbital Visibility = 264
Occultation
0
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Visit

Proposal 16695, HAT-P-67b WFC3/G141 orbits 5-8 (04), implementation Fri Dec 08 14:01:15 GMT 2023

Diagnostic Status: Informational

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 30%; SAME ORIENT AS 03; AFTER 03 BY 3.9 Orbits TO 4.1 Orbits

Comments: Roll constraints have been added to avoid a nearby red companion star located 9.7" north east of the target (visible in a SDSS image).

Diagnostics

(HAT-P-67b WFC3/G141 orbits 5-8 (04)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	HAT-P-67	RA: 17 06 26.5747 (256.6107279d) Dec: +44 46 36.79 (44.77689d) Equinox: J2000	Proper Motion RA: 8.861904318161867E-4 sec of time/yr Proper Motion Dec: -0.018184999976256222 arcsec/yr Epoch of Position: 2015.5	V=10.11	Reference Frame: SIMBAD

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=STAR
Description=[F3-F9]

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Orb 5 Spec (WFC3IR.ss.1530501)	(1) HAT-P-67	WFC3/IR, MULTIACCUM, GRISM256	G141	NSAMP=13; SAMP-SEQ=SPARS10	POS TARG null,-7; SPATIAL SCAN 0.1 ,90.0 Degrees,Round trip; GS ACQ SCENARIO BASE1BR	Sequence 1-1 Non-Int in HAT-P-67b WFC3/G141 orbits 5-8 (04)	88.435659 Secs X 10 (1768.713 Secs)	
								[==>(Copy 1, Forward)] *[==>(Copy 1, Reverse)]* *[==>(Copy 2, Forward)]* *[==>(Copy 2, Reverse)]* *[==>(Copy 3, Forward)]* *[==>(Copy 3, Reverse)]* *[==>(Copy 4, Forward)]* *[==>(Copy 4, Reverse)]* *[==>(Copy 5, Forward)]* *[==>(Copy 5, Reverse)]* *[==>(Copy 6, Forward)]* *[==>(Copy 6, Reverse)]* *[==>(Copy 7, Forward)]* *[==>(Copy 7, Reverse)]* *[==>(Copy 8, Forward)]* *[==>(Copy 8, Reverse)]* *[==>(Copy 9, Forward)]* *[==>(Copy 9, Reverse)]* *[==>(Copy 10, Forward)]* *[==>(Copy 10, Reverse)]*	***[1]***
2	Orb 6 Spec	(1) HAT-P-67	WFC3/IR, MULTIACCUM, GRISM256	G141	NSAMP=13; SAMP-SEQ=SPARS10	POS TARG null,-7; SPATIAL SCAN 0.1 ,90.0 Degrees,Round trip	Sequence 2-2 Non-Int in HAT-P-67b WFC3/G141 orbits 5-8 (04)	88.435659 Secs X 10 (1768.713 Secs)	
								[==>(Copy 1, Forward)] *[==>(Copy 1, Reverse)]* *[==>(Copy 2, Forward)]* *[==>(Copy 2, Reverse)]* *[==>(Copy 3, Forward)]* *[==>(Copy 3, Reverse)]* *[==>(Copy 4, Forward)]* *[==>(Copy 4, Reverse)]* *[==>(Copy 5, Forward)]* *[==>(Copy 5, Reverse)]* *[==>(Copy 6, Forward)]* *[==>(Copy 6, Reverse)]* *[==>(Copy 7, Forward)]* *[==>(Copy 7, Reverse)]* *[==>(Copy 8, Forward)]* *[==>(Copy 8, Reverse)]* *[==>(Copy 9, Forward)]* *[==>(Copy 9, Reverse)]* *[==>(Copy 10, Forward)]* *[==>(Copy 10, Reverse)]*	***[2]***

	3	Orb 7 Spec	(1) HAT-P-67	WFC3/IR, MULTIACCUM, GRISM256	G141	NSAMP=13; SAMP-SEQ=SPARS10	POS TARG null,-7; SPATIAL SCAN 0.1 ,90.0 Degrees,Round trip	Sequence 3-3 Non-Int in HAT-P-67b WFC3/G141 orbits 5-8 (04)	88.435659 Secs X 10 (1768.713 Secs)	
									[==>(Copy 1, Forward)] *[==>(Copy 1, Reverse)]* *[==>(Copy 2, Forward)]* *[==>(Copy 2, Reverse)]* *[==>(Copy 3, Forward)]* *[==>(Copy 3, Reverse)]* *[==>(Copy 4, Forward)]* *[==>(Copy 4, Reverse)]* *[==>(Copy 5, Forward)]* *[==>(Copy 5, Reverse)]* *[==>(Copy 6, Forward)]* *[==>(Copy 6, Reverse)]* *[==>(Copy 7, Forward)]* *[==>(Copy 7, Reverse)]* *[==>(Copy 8, Forward)]* *[==>(Copy 8, Reverse)]* *[==>(Copy 9, Forward)]* *[==>(Copy 9, Reverse)]* *[==>(Copy 10, Forward)]* *[==>(Copy 10, Reverse)]*	***[3]***
	4	Orb 8 Spec	(1) HAT-P-67	WFC3/IR, MULTIACCUM, GRISM256	G141	NSAMP=13; SAMP-SEQ=SPARS10	POS TARG null,-7; SPATIAL SCAN 0.1 ,90.0 Degrees,Round trip	Sequence 4-4 Non-Int in HAT-P-67b WFC3/G141 orbits 5-8 (04)	88.435659 Secs X 10 (1768.713 Secs)	
									[==>(Copy 1, Forward)] *[==>(Copy 1, Reverse)]* *[==>(Copy 2, Forward)]* *[==>(Copy 2, Reverse)]* *[==>(Copy 3, Forward)]* *[==>(Copy 3, Reverse)]* *[==>(Copy 4, Forward)]* *[==>(Copy 4, Reverse)]* *[==>(Copy 5, Forward)]* *[==>(Copy 5, Reverse)]* *[==>(Copy 6, Forward)]* *[==>(Copy 6, Reverse)]* *[==>(Copy 7, Forward)]* *[==>(Copy 7, Reverse)]* *[==>(Copy 8, Forward)]* *[==>(Copy 8, Reverse)]* *[==>(Copy 9, Forward)]* *[==>(Copy 9, Reverse)]* *[==>(Copy 10, Forward)]* *[==>(Copy 10, Reverse)]*	***[4]***

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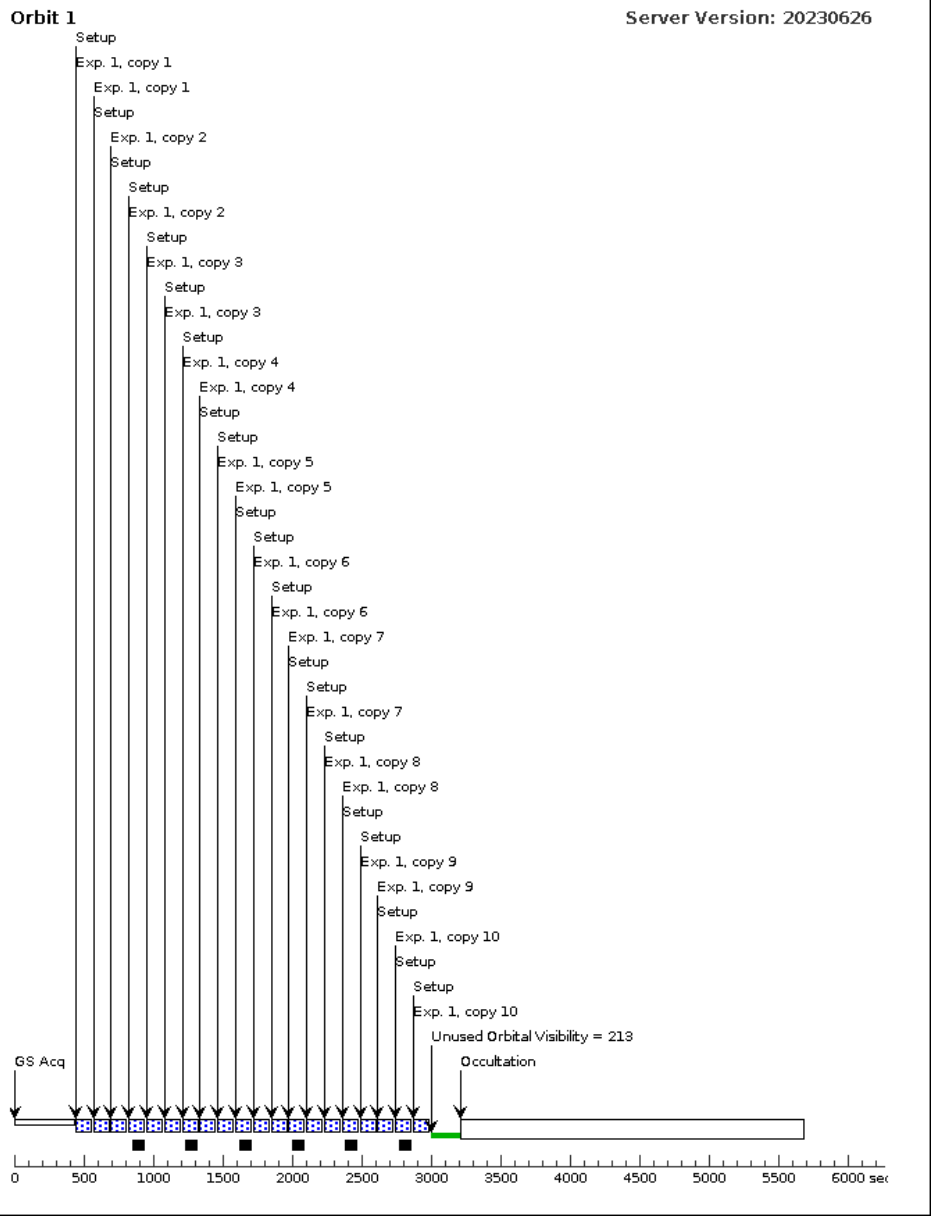

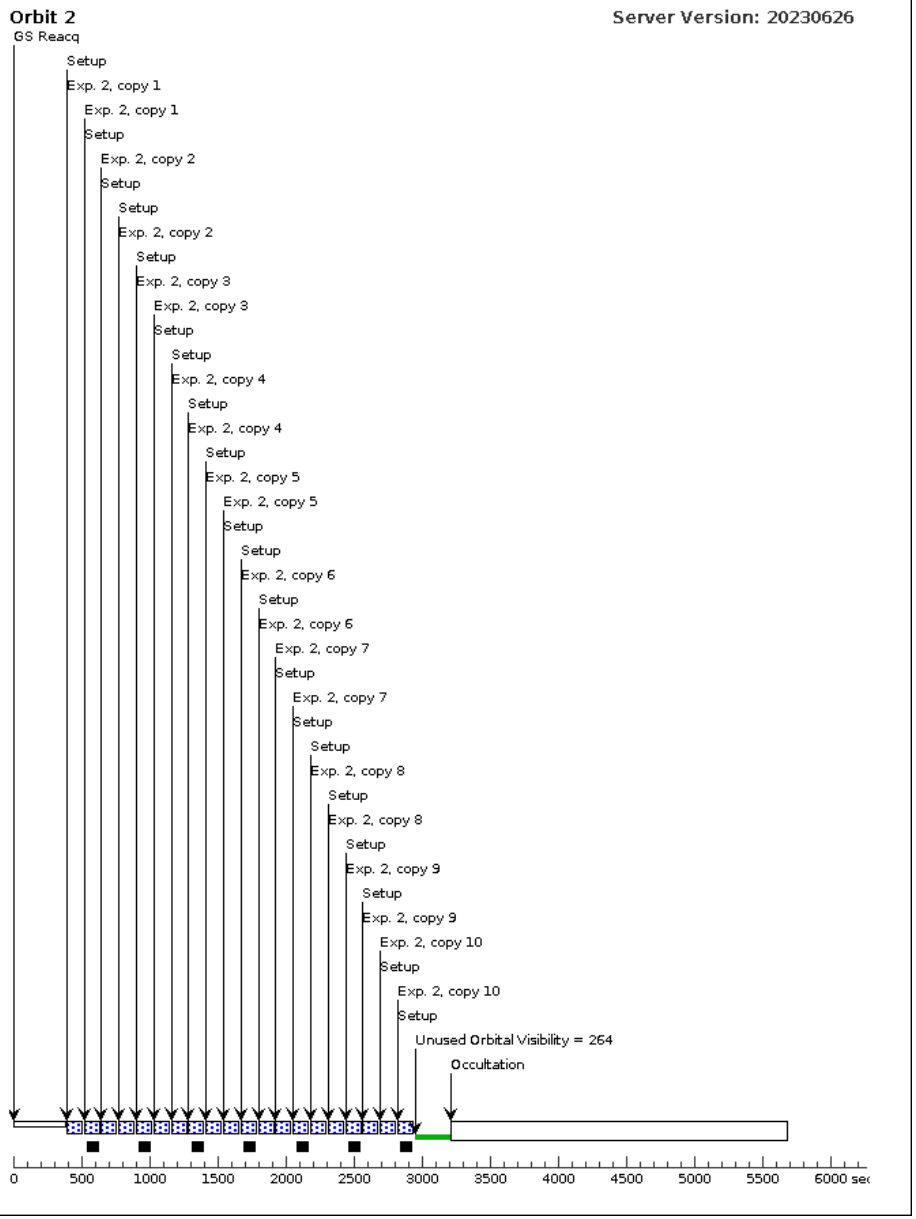
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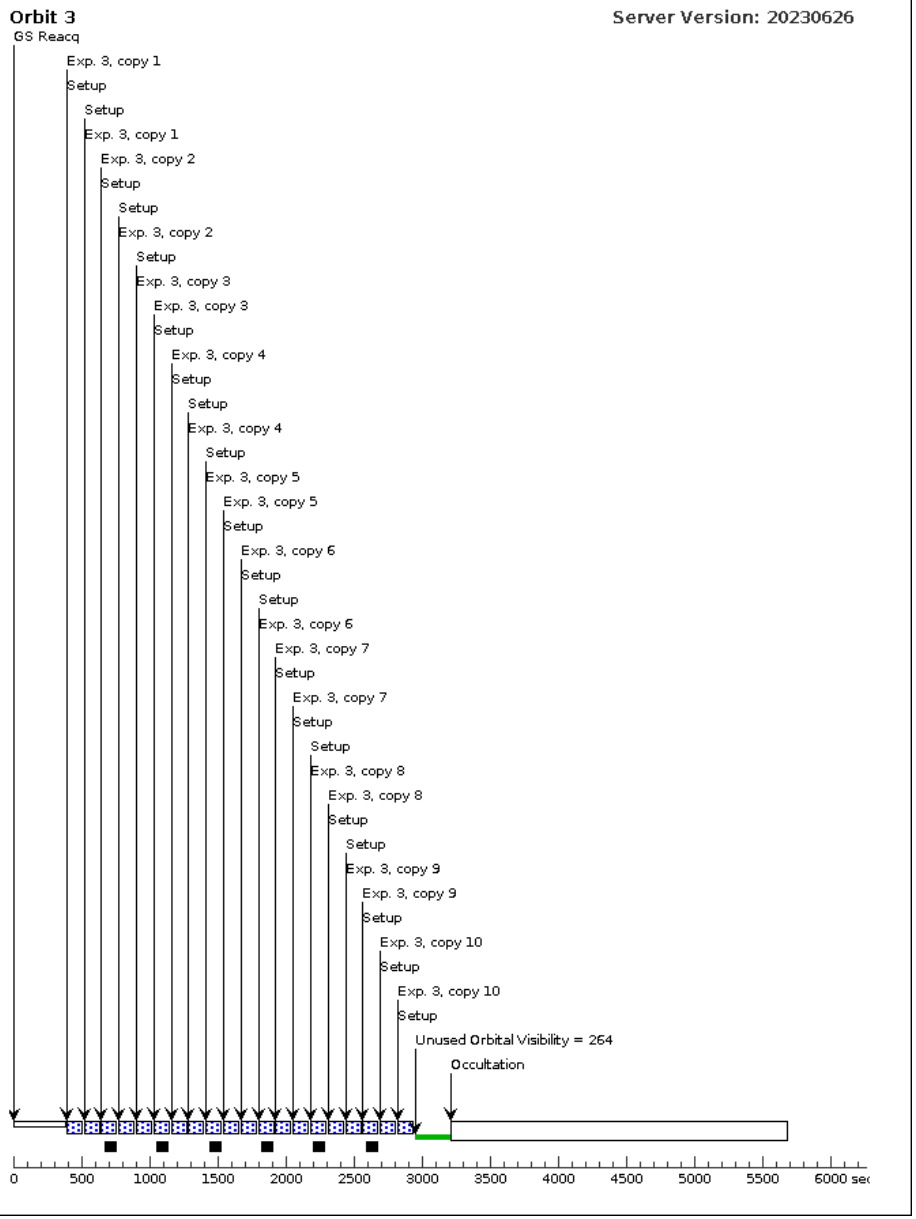
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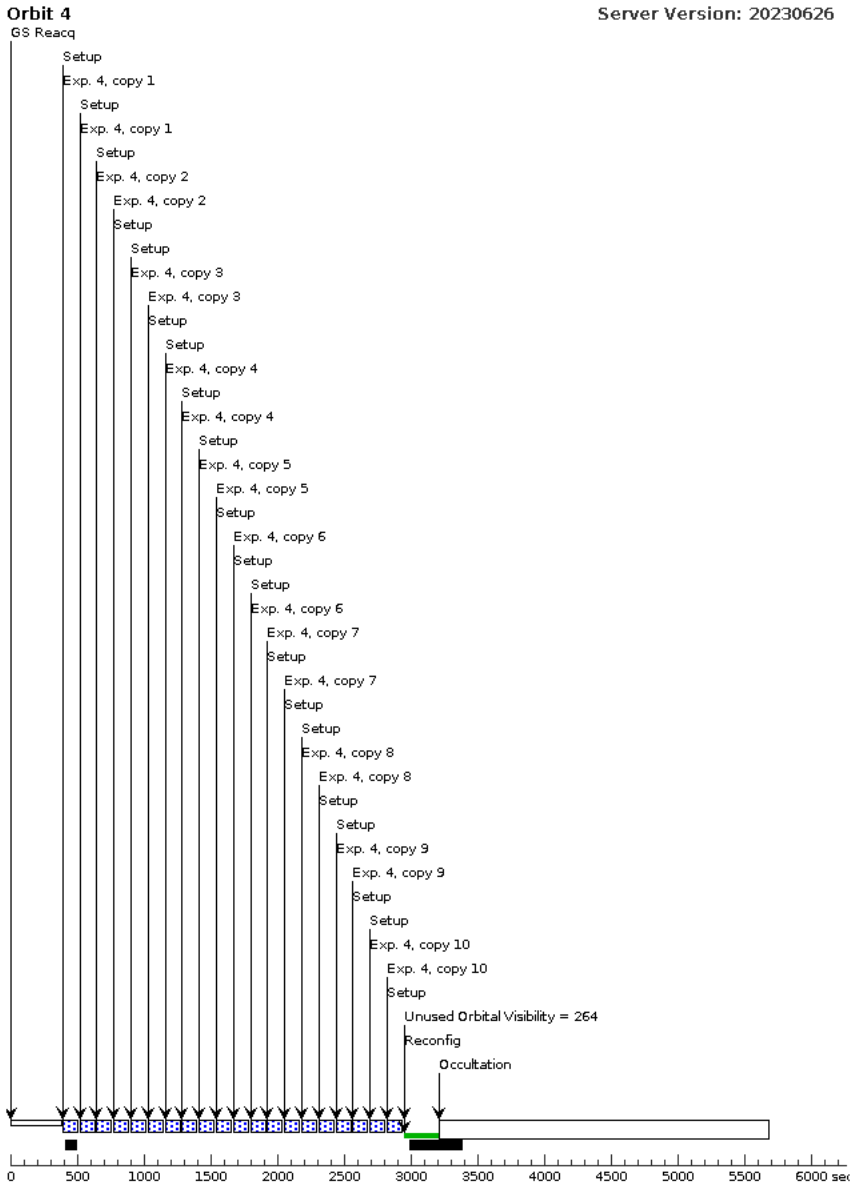
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Reconfig
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6000 sec

Visit

Proposal 16695, HAT-P-67b WFC3/G141 orbits 9-12 (05), implementation Fri Dec 08 14:01:15 GMT 2023

Diagnostic Status: Informational

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 30%; SAME ORIENT AS 03; AFTER 04 BY 3.9 Orbits TO 4.1 Orbits

Comments: Roll constraints have been added to avoid a nearby red companion star located 9.7" north east of the target (visible in a SDSS image).

Diagnostics

(HAT-P-67b WFC3/G141 orbits 9-12 (05)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	HAT-P-67	RA: 17 06 26.5747 (256.6107279d) Dec: +44 46 36.79 (44.77689d) Equinox: J2000	Proper Motion RA: 8.861904318161867E-4 sec of time/yr Proper Motion Dec: -0.018184999976256222 arcsec/yr Epoch of Position: 2015.5	V=10.11	Reference Frame: SIMBAD

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=STAR
Description=[F3-F9]

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Orb 9 Spec (WFC3IR.ss.1530501)	(1) HAT-P-67	WFC3/IR, MULTIACCUM, GRISM256	G141	NSAMP=13; SAMP-SEQ=SPARS10	POS TARG null,-7; SPATIAL SCAN 0.1 ,90.0 Degrees,Round trip; GS ACQ SCENARIO BASE1BR	Sequence 1-1 Non-Int in HAT-P-67b WFC3/G141 orbits 9-12 (05)	88.435659 Secs X 6 (1061.228 Secs) *[==>(Copy 1, Forward)]* *[==>(Copy 1, Reverse)]* *[==>(Copy 2, Forward)]* *[==>(Copy 2, Reverse)]* *[==>(Copy 3, Forward)]* *[==>(Copy 3, Reverse)]* *[==>(Copy 4, Forward)]* *[==>(Copy 4, Reverse)]* *[==>(Copy 5, Forward)]* *[==>(Copy 5, Reverse)]* *[==>(Copy 6, Forward)]* *[==>(Copy 6, Reverse)]*	***[1]***
2	Orb 10 Spec	(1) HAT-P-67	WFC3/IR, MULTIACCUM, GRISM256	G141	NSAMP=13; SAMP-SEQ=SPARS10	POS TARG null,-7; SPATIAL SCAN 0.1 ,90.0 Degrees,Round trip	Sequence 2-2 Non-Int in HAT-P-67b WFC3/G141 orbits 9-12 (05)	88.435659 Secs X 5 (884.357 Secs) *[==>(Copy 1, Forward)]* *[==>(Copy 1, Reverse)]* *[==>(Copy 2, Forward)]* *[==>(Copy 2, Reverse)]* *[==>(Copy 3, Forward)]* *[==>(Copy 3, Reverse)]* *[==>(Copy 4, Forward)]* *[==>(Copy 4, Reverse)]* *[==>(Copy 5, Forward)]* *[==>(Copy 5, Reverse)]*	***[2]***
3	Orb 11 Spec	(1) HAT-P-67	WFC3/IR, MULTIACCUM, GRISM256	G141	NSAMP=13; SAMP-SEQ=SPARS10	POS TARG null,-7; SPATIAL SCAN 0.1 ,90.0 Degrees,Round trip	Sequence 3-3 Non-Int in HAT-P-67b WFC3/G141 orbits 9-12 (05)	88.435659 Secs X 6 (1061.228 Secs) *[==>(Copy 1, Forward)]* *[==>(Copy 1, Reverse)]* *[==>(Copy 2, Forward)]* *[==>(Copy 2, Reverse)]* *[==>(Copy 3, Forward)]* *[==>(Copy 3, Reverse)]* *[==>(Copy 4, Forward)]* *[==>(Copy 4, Reverse)]* *[==>(Copy 5, Forward)]* *[==>(Copy 5, Reverse)]* *[==>(Copy 6, Forward)]* *[==>(Copy 6, Reverse)]*	***[3]***

	4	Orb 12 Spec (1) HAT-P-67	WFC3/IR, MULTIACCUM, GRISM256	G141	NSAMP=13; SAMP-SEQ=SPARS10	POS TARG null,-7; SPATIAL SCAN 0.1 ,90.0 Degrees,Round trip	Sequence 4-4 Non-Int in HAT-P-67b WFC3/G141 orbits 9-12 (05)	88.435659 Secs X 7 (1238.099 Secs) *[==>(Copy 1, Forward)]* *[==>(Copy 1, Reverse)]* *[==>(Copy 2, Forward)]* *[==>(Copy 2, Reverse)]* *[==>(Copy 3, Forward)]* *[==>(Copy 3, Reverse)]* *[==>(Copy 4, Forward)]* *[==>(Copy 4, Reverse)]* *[==>(Copy 5, Forward)]* *[==>(Copy 5, Reverse)]* *[==>(Copy 6, Forward)]* *[==>(Copy 6, Reverse)]* *[==>(Copy 7, Forward)]* *[==>(Copy 7, Reverse)]*	***[4]***

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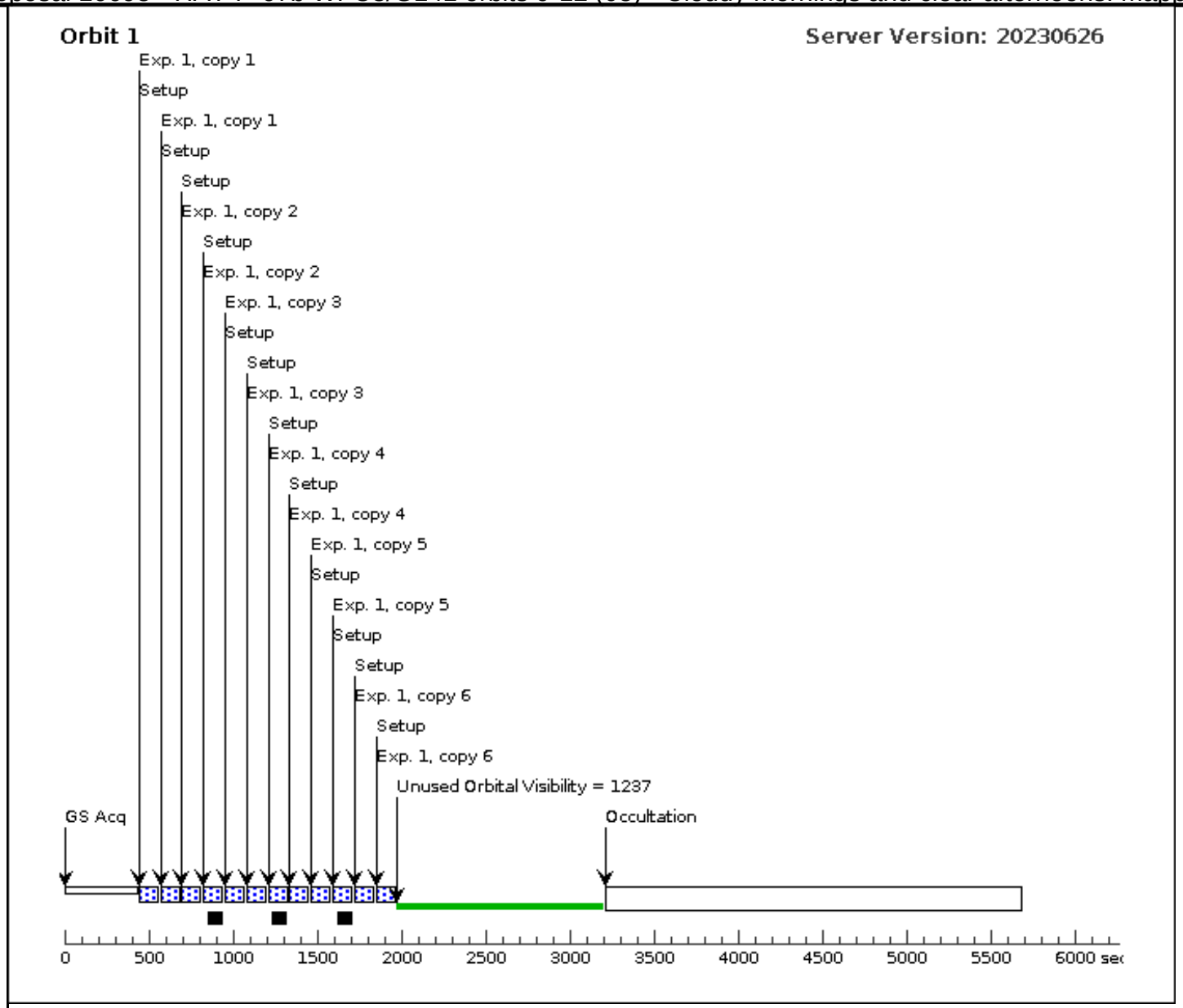

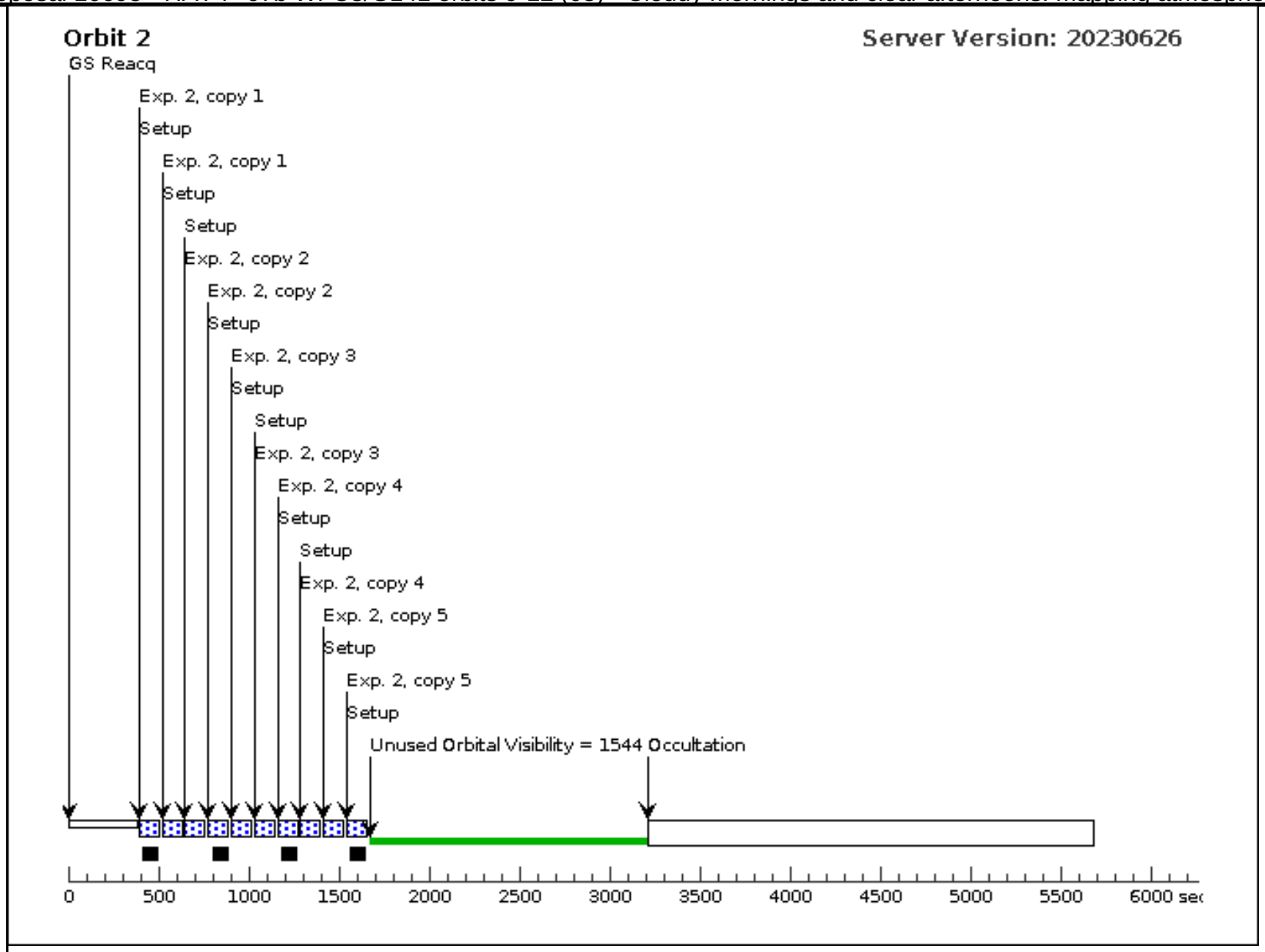
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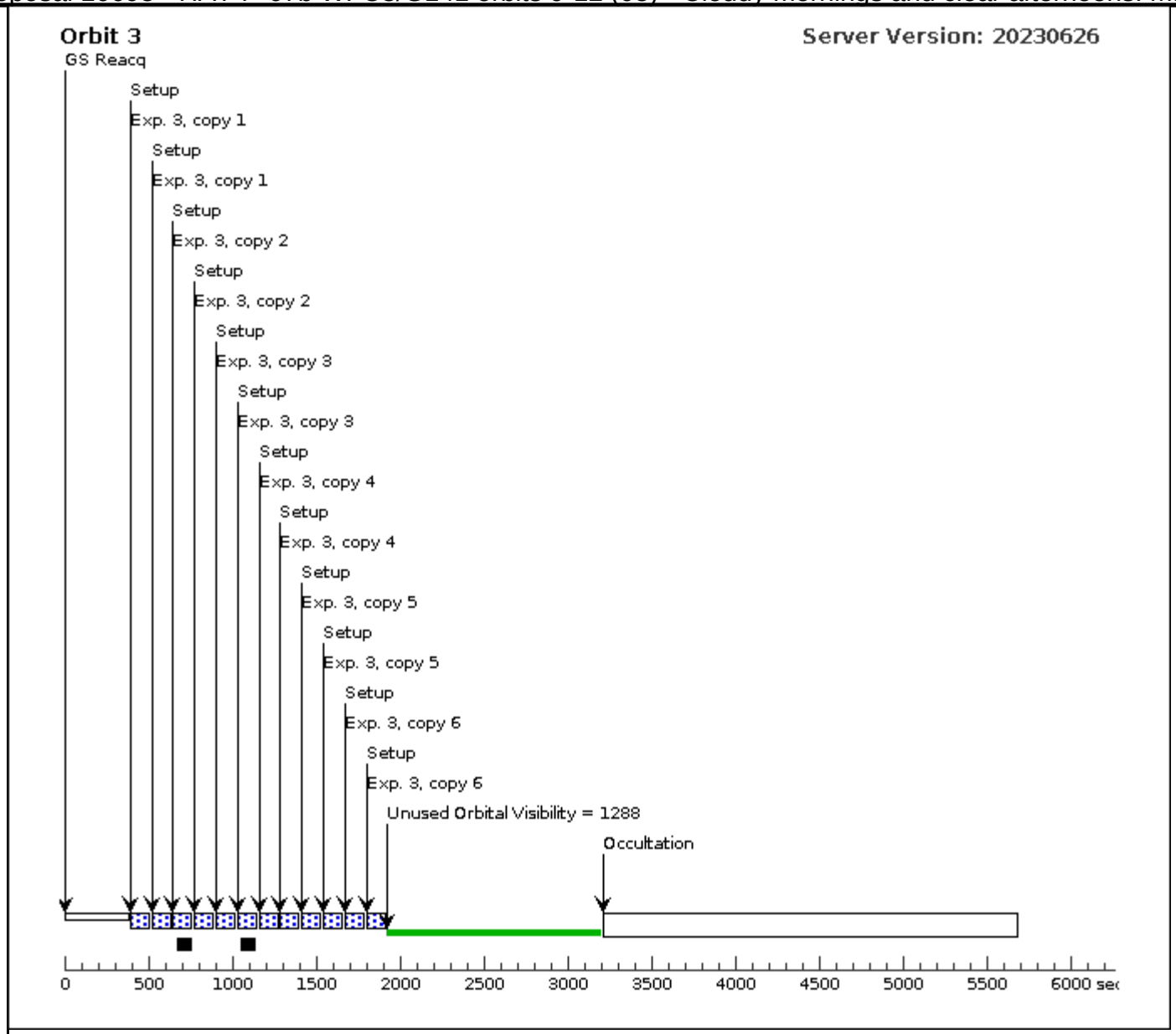
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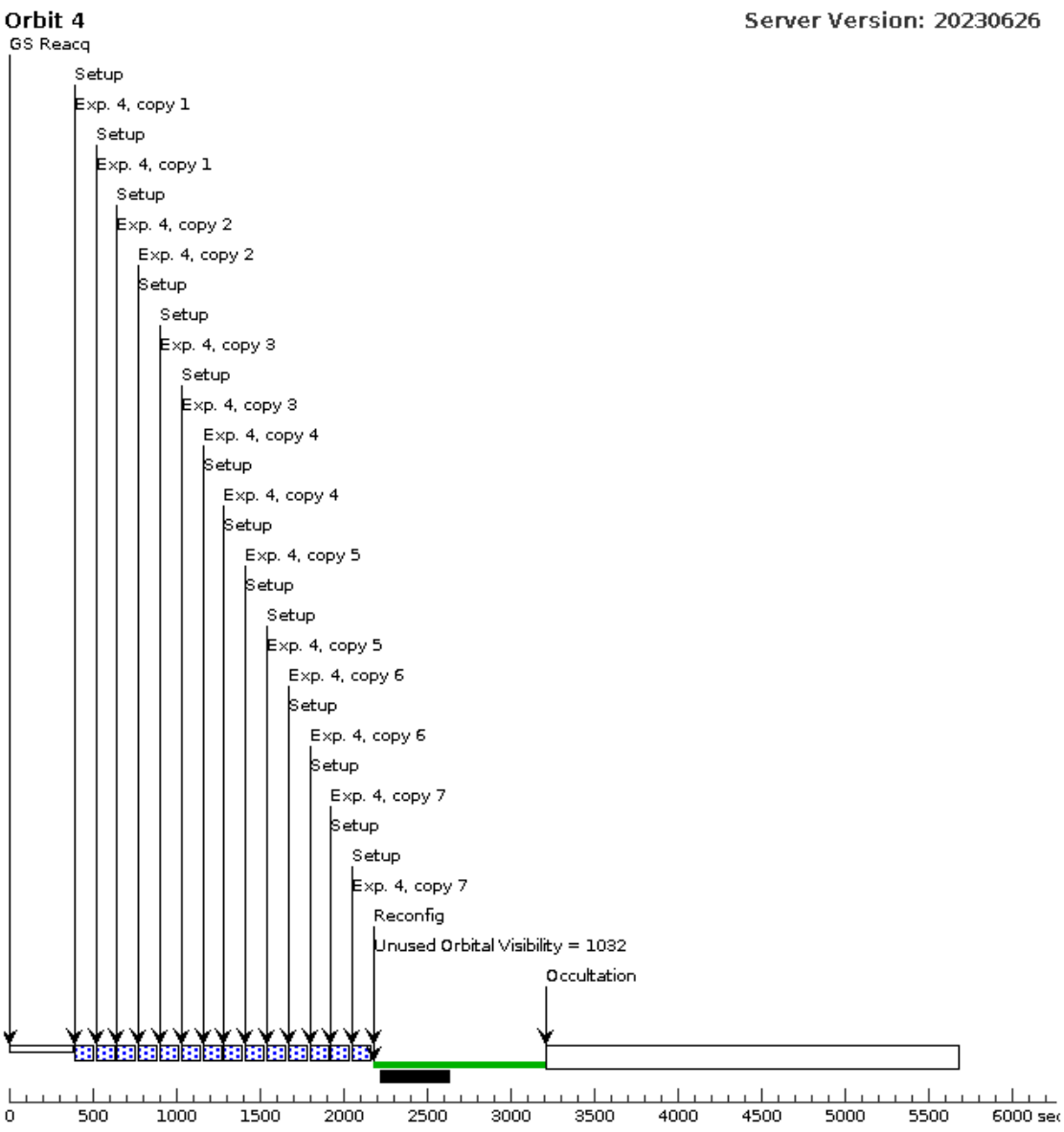
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