



17082 - Measuring the refractory and volatile content of a dynamically distinct ultrahot Jupiter

Cycle: 30, Proposal Category: GO

(UV Initiative)

(Availability Mode: AVAILABLE)

INVESTIGATORS

<i>Name</i>	<i>Institution</i>	<i>E-Mail</i>
Dr. Yayaati Chachan (PI) (Contact)	McGill University	yayaati.chachan@mcgill.ca
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Jessica Spake (CoI)	California Institute of Technology	jspake@caltech.edu

VISITS

<i>Visit</i>	<i>Targets used in Visit</i>	<i>Configurations used in Visit</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
04	(1) HD-185603 BIAS	WFC3/UVIS	5	05-Dec-2022 11:00:44.0	yes
05	(1) HD-185603 BIAS	WFC3/UVIS	5	05-Dec-2022 11:00:53.0	yes
02	(1) HD-185603	WFC3/IR	6	05-Dec-2022 11:01:25.0	yes
03	(1) HD-185603	WFC3/IR	6	05-Dec-2022 11:02:00.0	yes

22 Total Orbits Used

ABSTRACT

Ultrahot Jupiters (UHJs) provide us with an exciting opportunity to probe the refractory content of exoplanetary atmospheres. These planets are hot enough to retain species such as iron and silicon in gaseous phase, which contribute significant opacity in the optical and near-IR but especially in near-UV. By observing a planet's transmission spectrum across this wide wavelength range with HST, we can measure the refractory abundance in its atmosphere. Additionally, we can characterize the refractory-to-volatile ratio of the planet by simultaneously measuring the water abundance in the near-IR. The joint characterization of refractory and volatile abundances can place significantly tighter constraints on the origin of gas giant planets than volatiles alone can. This technique has been used to characterize two UHJs (WASP-121b and WASP-178b) so far but both of them have polar orbits around their host stars. Here, we propose to observe the UHJ KELT-20b ($T_{\text{eq}} = 2260$ K) that orbits a very bright and hot star (V mag = 7.6, $T_{\text{eff}} = 8720$ K) and yet has a projected obliquity of 0.6 ± 4 degrees. This extremely rare dynamical configuration for KELT-20b points to a formation and migration history that is potentially different from its compatriots. We will obtain a comprehensive transmission spectrum of KELT-20b and characterize both its refractory and water content by observing it with the WFC3 instrument in the UVIS, G102, and G141 bandpasses. With our proposed observations, we can strongly distinguish between different formation scenarios, evaluate the role of rainout, and determine if KELT-20b's distinct dynamical configuration is reflected in its atmospheric composition.

OBSERVING DESCRIPTION

This program includes four separate transit observations of KELT-20b. Two transits will be taken with UVIS/G280 (five orbits/transit), and one transit each with WFC3/G102 and WFC3/G141 (six orbits/transit).

Proposal 17082 - UVIS transit 1 (04) - Measuring the refractory and volatile content of a dynamically distinct ultrahot Jupiter

Mon Dec 05 16:02:04 GMT 2022

Visit	<p>Proposal 17082, UVIS transit 1 (04), scheduling</p> <p>Diagnostic Status: No Diagnostics</p> <p>Scientific Instruments: WFC3/UVIS</p> <p>Special Requirements: Period 3.4741085 D AND ZERO-PHASE HJD2458698.21073</p> <p><i>Comments: All five orbits must be scheduled in a continuous block. For this bright target, we saturate the +1 order in 4.7 s. This leads to a very low observing efficiency, and is problematic because UVIS has a shutter timing jitter of 0.004 rms, which leads to a photometric error of 0.004/integration time. In order to mitigate for this shutter timing jitter, we elect to use the -1 spectral order instead. This order has a peak throughput that is a factor of ~5 lower than the +1 order (Fig. 8.3 in the WFC3 Instrument Handbook and Fig. 1 of Wakeford et al. 2020). We therefore increase our integration time by a factor of five, to 23.5 s. This saturates the +1 order, but results in an equivalent number of photons in the -1 order as we would have obtained in the +1 order with a 4.7 s exposure.</i></p> <p><i>This test uses a subarray that is 100 pixels shorter than the one used by GO 16086, which is needed to ensure that the buffer dump occurs after the end of the visibility window in each orbit. It may be worth exploring an even smaller y axis range for the subarray, if that allows for additional exposures in each orbit.</i></p>					
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes
(1)		HD-185603	RA: 19 38 38.7390 (294.6614125d) Dec: +31 13 9.12 (31.21920d) Equinox: J2000	Proper Motion RA: 2.456372437434589E-4 sec of time/yr Proper Motion Dec: -0.006264999910854385 arcsec/yr Epoch of Position: 2015.5	V=7.58	Reference Frame: SIMBAD
<p><i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i></p> <p>Category=STAR</p> <p>Description=[A0-A3 V-IV]</p>						

Proposal 17082 - UVIS transit 1 (04) - Measuring the refractory and volatile content of a dynamically distinct ultrahot Jupiter

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Filter ACQ (WFC3UVI S.im.181340 3)	(1) HD-185603	WFC3/UVIS, ACCUM, G280-REF	F469N	FLASH=20; SIZEAXIS1=2250; SIZEAXIS2=490; CENTERAXIS1=2136; CENTERAXIS2=1216	POS TARG null,-50; PHASE 0.9539 TO 0.9599	Sequence 1-2 Non-Int in UVIS transit 1 (04)	0.5 Secs (0.5 Secs) [==>]	[1]
<p><i>Comments: Configured following the example in GO 16086. We use a subarray (SIZEAXIS1=2250 and SIZEAXIS2=590) to minimize data volume, and center the subarray readout on the zeroth order of G280 spectrum using CENTERAXIS1 and CENTERAXIS2.</i></p> <p><i>We also adopt FLASH=20 following the approach adopted in GO 16086 and discussed in the Instrument Science Report WFC3 2021-09. The specific value of 20 is the one recommended by the ETC.</i></p> <p><i>We needed to use a narrower filter than in GO 16086 to avoid saturating, we picked one with an equivalent central wavelength (F469N vs F467M).</i></p>									
2	Orbit 1 (WFC3UVI S.sp.181339 2)	(1) HD-185603	WFC3/UVIS, ACCUM, UVIS	G280	FLASH=20; CENTERAXIS1=2136; CENTERAXIS2=1216; SIZEAXIS1=2250; SIZEAXIS2=490	POS TARG null,-50	Sequence 1-2 Non-Int in UVIS transit 1 (04)	23.5 Secs X 23 (540.5 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)]	[1]
<p><i>Comments: Detector chip 2. We include FLASH=20, as we anticipate < 1 e- of background per science exposure, in order to ensure maximum CTE.</i></p>									

Exposures

Proposal 17082 - UVIS transit 1 (04) - Measuring the refractory and volatile content of a dynamically distinct ultrahot Jupiter

3	Orbit 2 (WFC3UVI S.sp.181339 2)	(1) HD-185603	WFC3/UVIS, ACCUM, UVIS	G280	FLASH=20; CENTERAXIS1=21 36; CENTERAXIS2=12 16; SIZEAXIS1=2250; SIZEAXIS2=490	POS TARG null,-50	Sequence 3-3 Non-Int in UVIS transit 1 (0 4)	23.5 Secs X 24 (564 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)]	[2]
<p>Comments: Detector chip 2. We include FLASH=20, as we anticipate < 1 e- of background per science exposure, in order to ensure maximum CTE.</p>										

Proposal 17082 - UVIS transit 1 (04) - Measuring the refractory and volatile content of a dynamically distinct ultrahot Jupiter

4	Orbit 3 (WFC3UVI S.sp.181339 2)	(1) HD-185603	WFC3/UVIS, ACCUM, UVIS	G280	FLASH=20; CENTERAXIS1=21 36; CENTERAXIS2=12 16; SIZEAXIS1=2250; SIZEAXIS2=490	POS TARG null,-50	Sequence 4-4 Non-Int in UVIS transit 1 (0 4)	23.5 Secs X 24 (564 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)]	[3]
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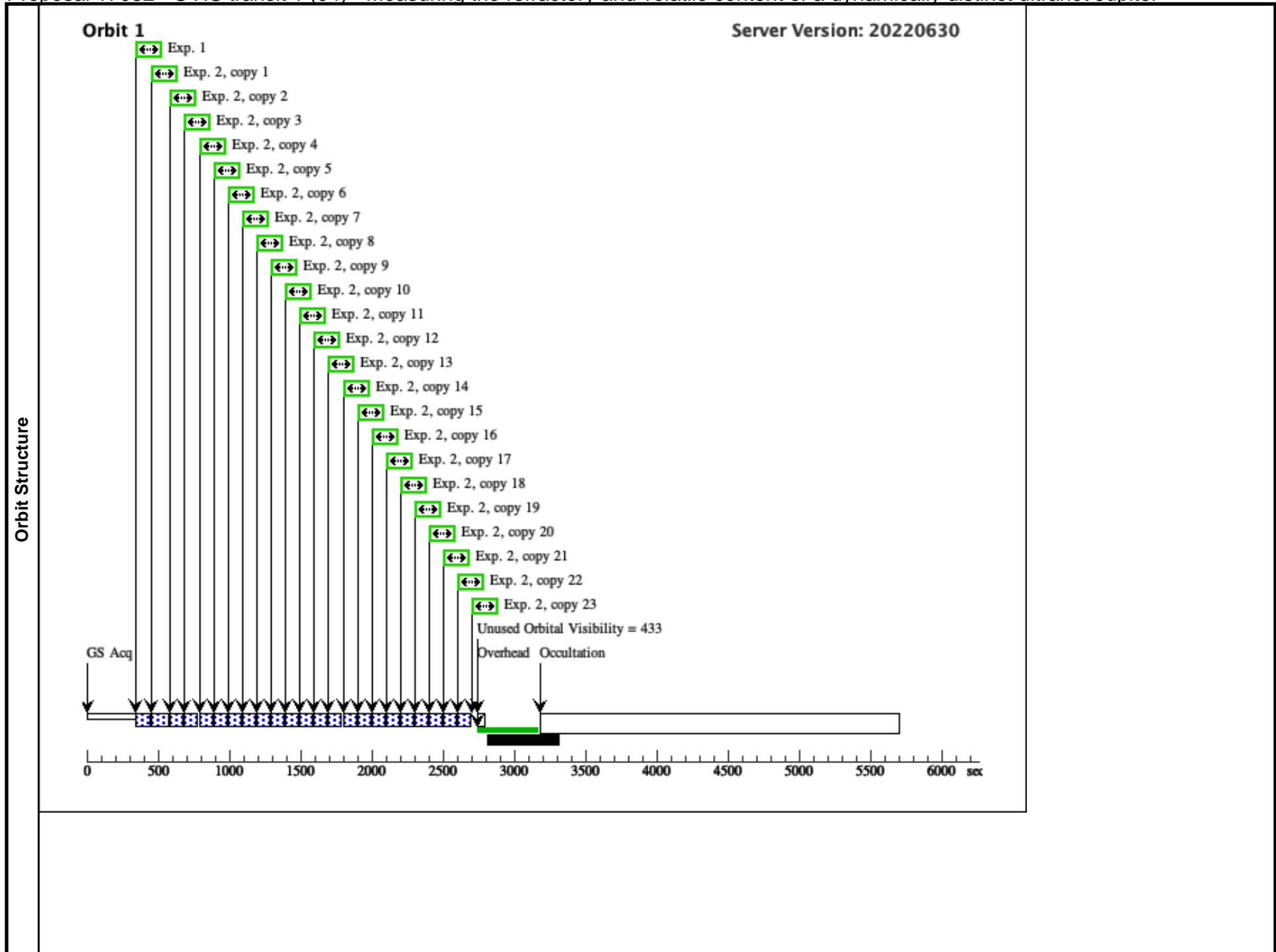
Comments: Detector chip 2. We include FLASH=20, as we anticipate < 1 e- of background per science exposure, in order to ensure maximum CTE.

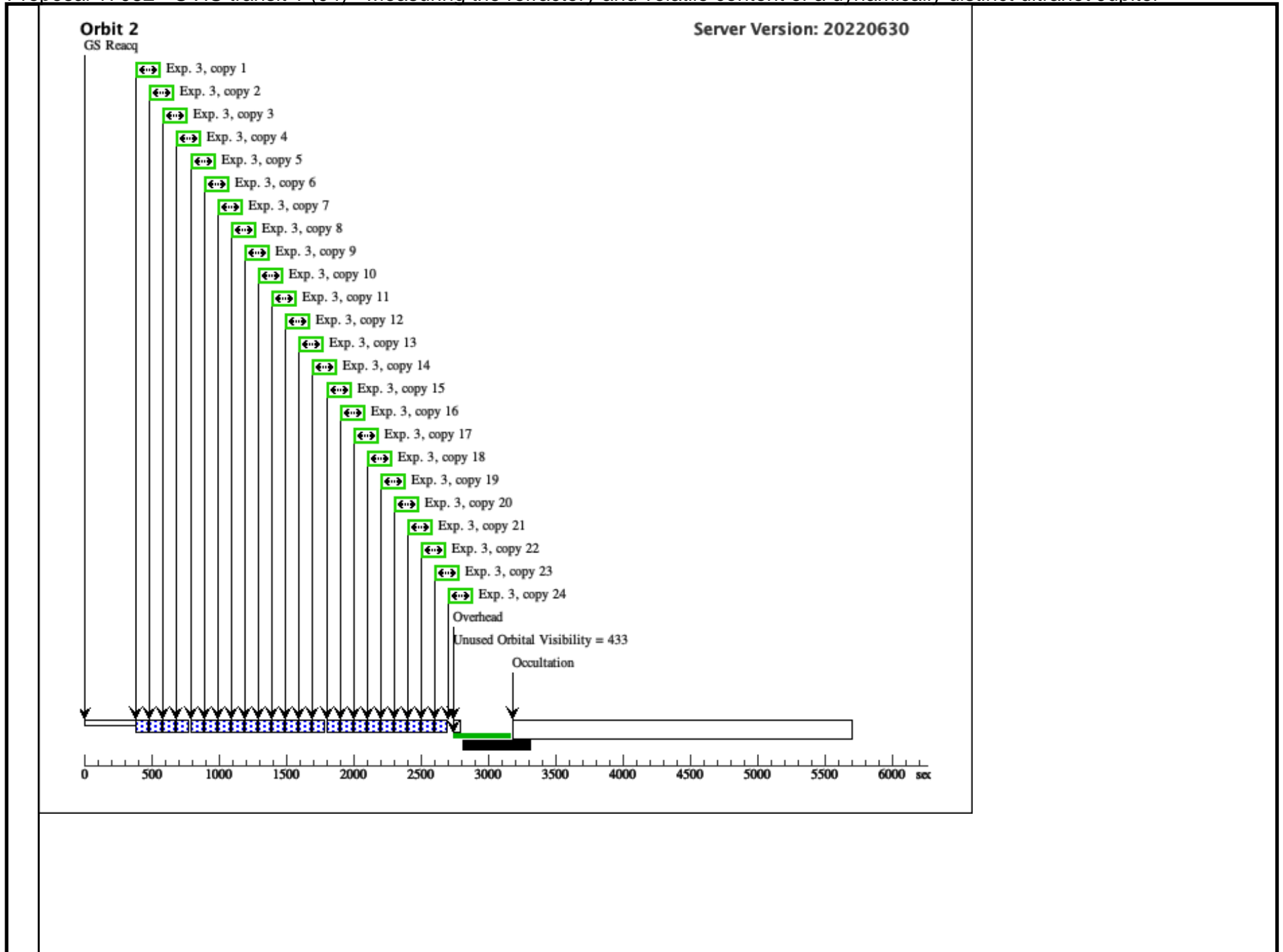
Proposal 17082 - UVIS transit 1 (04) - Measuring the refractory and volatile content of a dynamically distinct ultrahot Jupiter

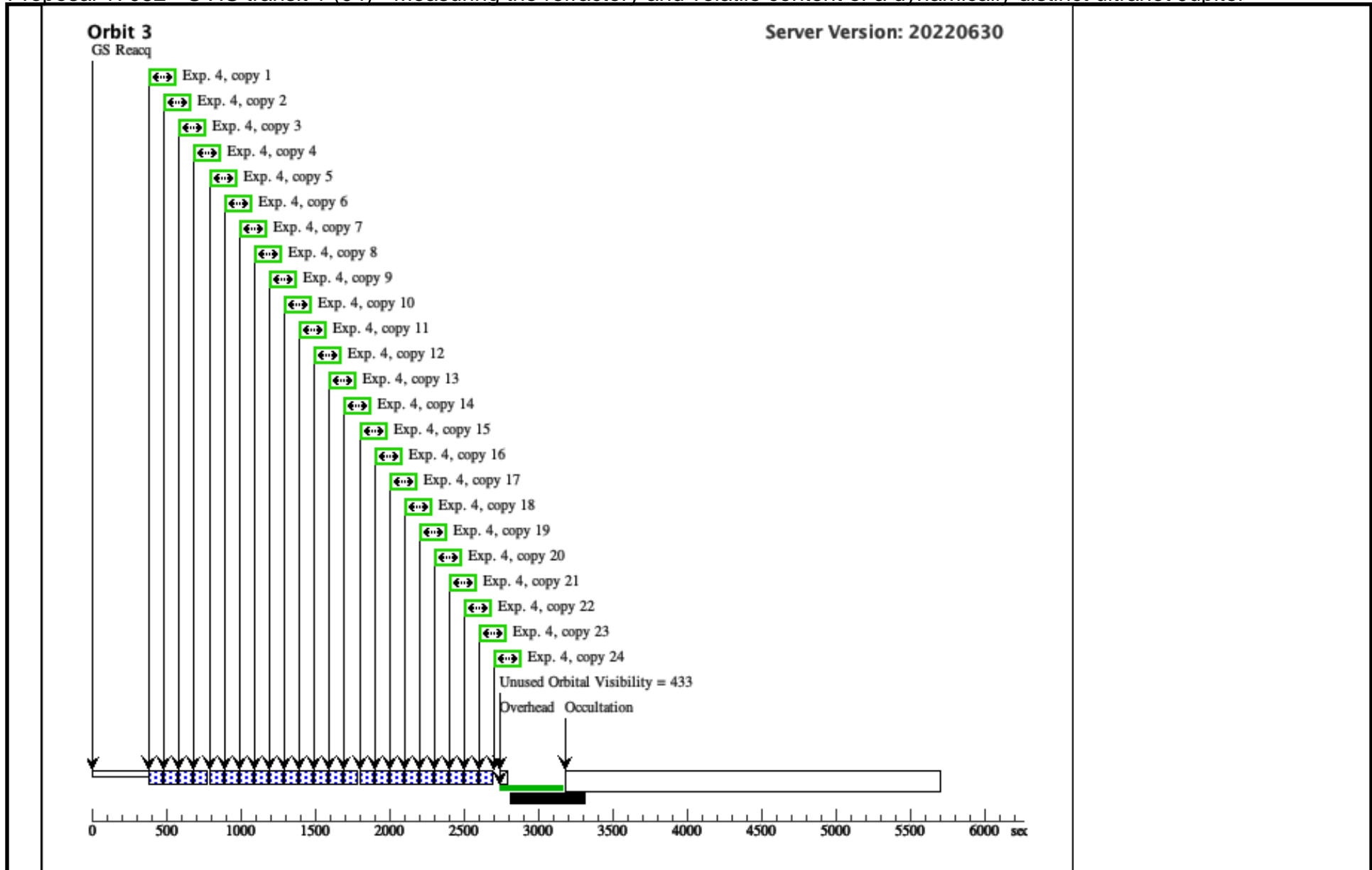
5	Orbit 4 (WFC3UVI S.sp.181339 2)	(1) HD-185603	WFC3/UVIS, ACCUM, UVIS	G280	FLASH=20; CENTERAXIS1=21 36; CENTERAXIS2=12 16; SIZEAXIS1=2250; SIZEAXIS2=490	POS TARG null,-50	Sequence 5-5 Non-Int in UVIS transit 1 (0 4)	23.5 Secs X 24 (564 Secs)	[==>(Copy 1)] [==>(Copy 2)] [==>(Copy 3)] [==>(Copy 4)] [==>(Copy 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)]	[4]
<p>Comments: Detector chip 2. We include FLASH=20, as we anticipate < 1 e- of background per science exposure, in order to ensure maximum CTE.</p>										

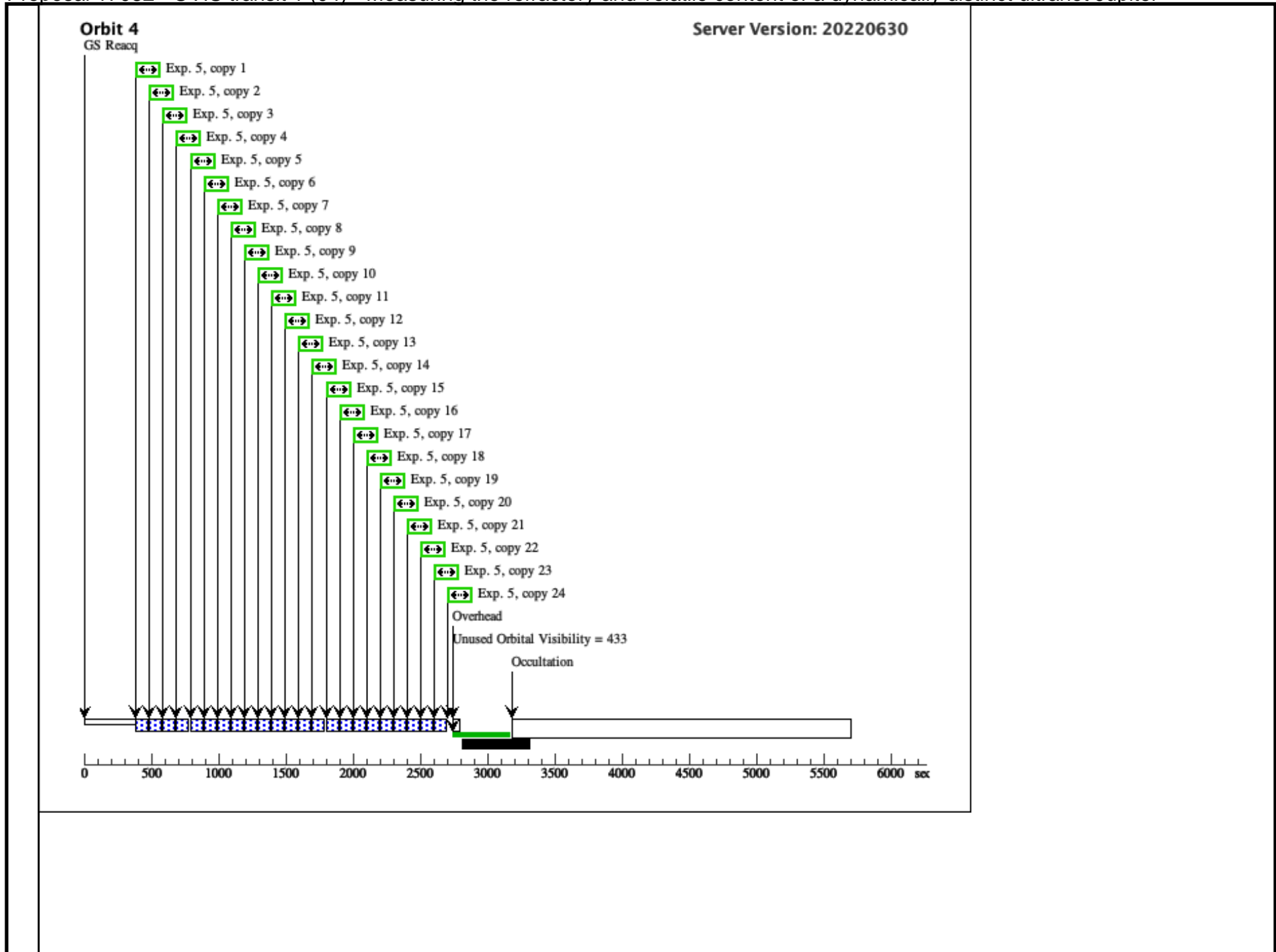
Proposal 17082 - UVIS transit 1 (04) - Measuring the refractory and volatile content of a dynamically distinct ultrahot Jupiter

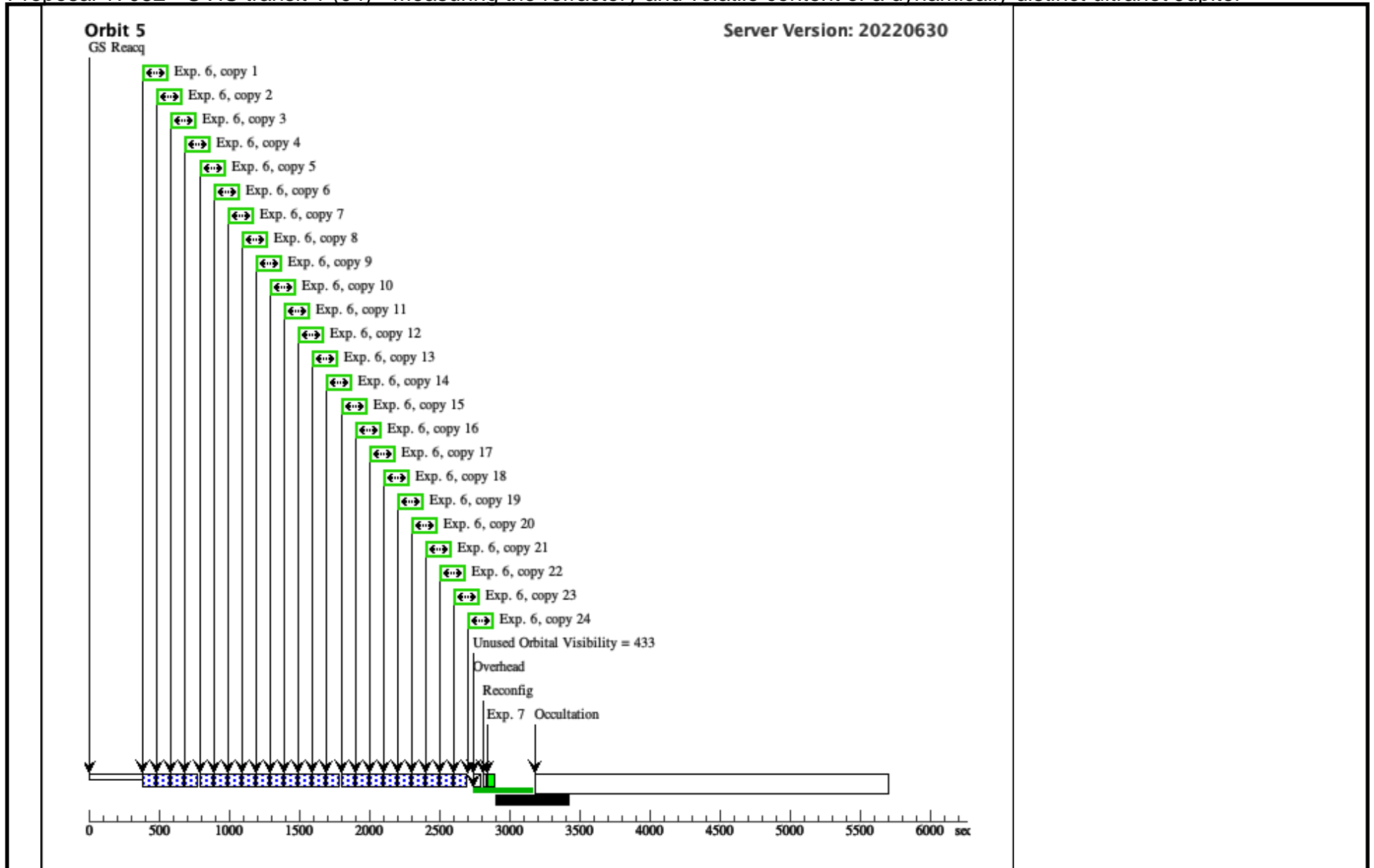
6	Orbit 5 (WFC3UVI S.sp.181339 2)	(1) HD-185603	WFC3/UVIS, ACCUM, UVIS	G280	FLASH=20; CENTERAXIS1=21 36; CENTERAXIS2=12 16; SIZEAXIS1=2250; SIZEAXIS2=490	POS TARG null,-50 Sequence 6-7 Non-Int in UVIS transit 1 (0 4)	23.5 Secs X 24 (564 Secs)	[==>(Copy 1)] [==>(Copy 2)] [==>(Copy 3)] [==>(Copy 4)] [==>(Copy 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)]	[5]
<i>Comments: Detector chip 2. We include FLASH=20, as we anticipate < 1 e- of background per science exposure, in order to ensure maximum CTE.</i>									
7	Bias	BIAS	WFC3/UVIS, ACCUM, UVIS	DEF	CENTERAXIS1=21 36; CENTERAXIS2=12 16; SIZEAXIS1=2250; SIZEAXIS2=490	Sequence 6-7 Non-Int in UVIS transit 1 (0 4)	0.0 Secs (0 Secs)	[==>]	[5]











Proposal 17082 - UVIS transit 2 (05) - Measuring the refractory and volatile content of a dynamically distinct ultrahot Jupiter

Mon Dec 05 16:02:04 GMT 2022

Visit	<p>Proposal 17082, UVIS transit 2 (05), completed</p> <p>Diagnostic Status: No Diagnostics</p> <p>Scientific Instruments: WFC3/UVIS</p> <p>Special Requirements: Period 3.4741085 D AND ZERO-PHASE HJD2458698.21073</p> <p><i>Comments: All five orbits must be scheduled in a continuous block. For this bright target, we saturate the +1 order in 4.7 s. This leads to a very low observing efficiency, and is problematic because UVIS has a shutter timing jitter of 0.004 rms, which leads to a photometric error of 0.004/integration time. In order to mitigate for this shutter timing jitter, we elect to use the -1 spectral order instead. This order has a peak throughput that is a factor of ~5 lower than the +1 order (Fig. 8.3 in the WFC3 Instrument Handbook and Fig. 1 of Wakeford et al. 2020). We therefore increase our integration time by a factor of five, to 23.5 s. This saturates the +1 order, but results in an equivalent number of photons in the -1 order as we would have obtained in the +1 order with a 4.7 s exposure.</i></p> <p><i>This test uses a subarray that is 100 pixels shorter than the one used by GO 16086, which is needed to ensure that the buffer dump occurs after the end of the visibility window in each orbit. It may be worth exploring an even smaller y axis range for the subarray, if that allows for additional exposures in each orbit.</i></p>					
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Proposal 17082 - UVIS transit 2 (05) - Measuring the refractory and volatile content of a dynamically distinct ultrahot Jupiter

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<p><i>Comments: Configured following the example in GO 16086. We use a subarray (SIZEAXIS1=2250 and SIZEAXIS2=590) to minimize data volume, and center the subarray readout on the zeroth order of G280 spectrum using CENTERAXIS1 and CENTERAXIS2.</i></p> <p><i>We also adopt FLASH=20 following the approach adopted in GO 16086 and discussed in the Instrument Science Report WFC3 2021-09. The specific value of 20 is the one recommended by the ETC.</i></p> <p><i>We needed to use a narrower filter than in GO 16086 to avoid saturating, we picked one with an equivalent central wavelength (F469N vs F467M).</i></p>									
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Exposures

Proposal 17082 - UVIS transit 2 (05) - Measuring the refractory and volatile content of a dynamically distinct ultrahot Jupiter

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Comments: Detector chip 2. We include FLASH=20, as we anticipate < 1 e- of background per science exposure, in order to ensure maximum CTE.

Proposal 17082 - UVIS transit 2 (05) - Measuring the refractory and volatile content of a dynamically distinct ultrahot Jupiter

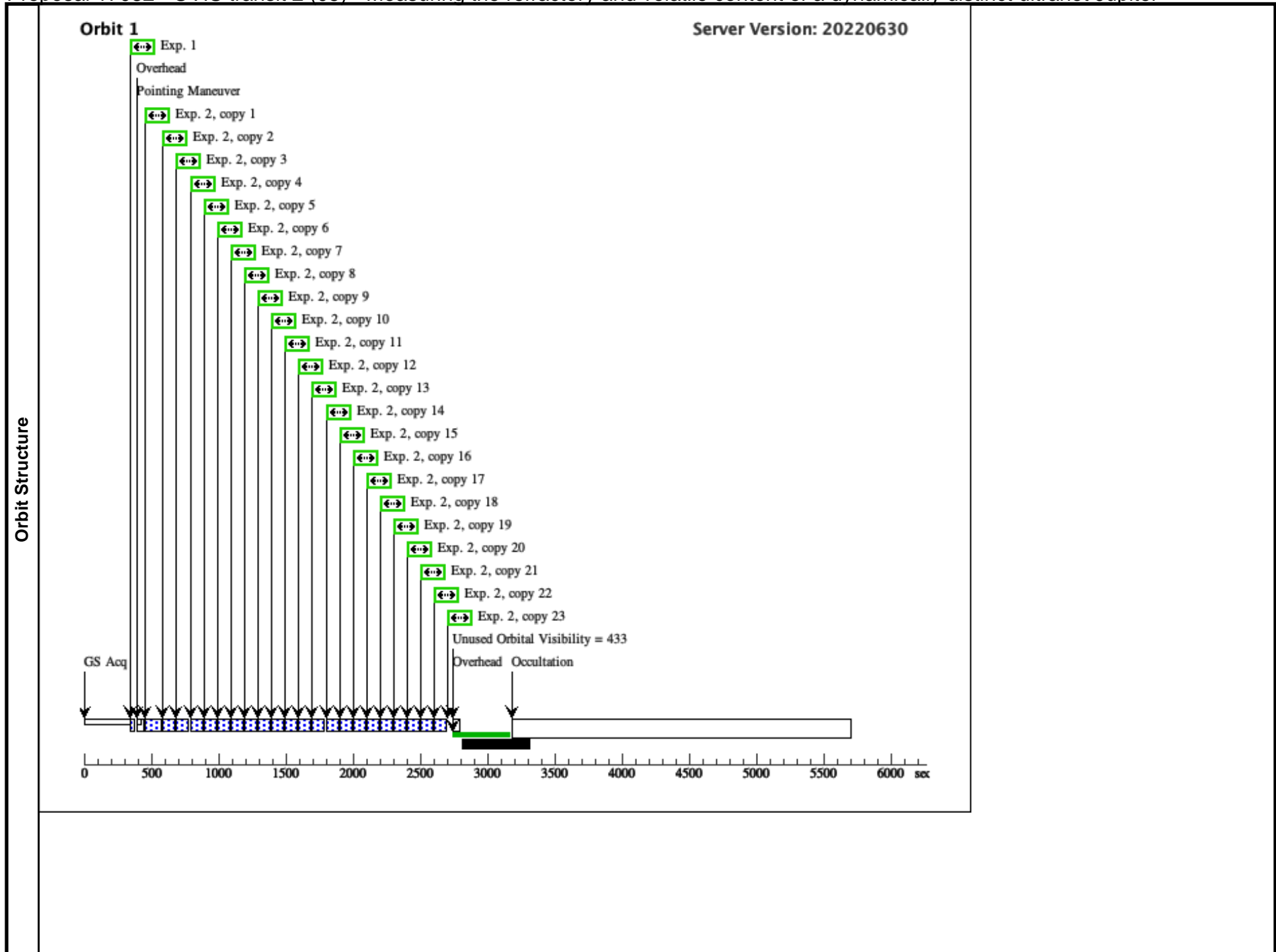
4	Orbit 3 (WFC3UVI S.sp.181339 2)	(1) HD-185603	WFC3/UVIS, ACCUM, UVIS	G280	FLASH=20; CENTERAXIS1=21 36; CENTERAXIS2=12 16; SIZEAXIS1=2250; SIZEAXIS2=490	Sequence 4-4 Non-Int in UVIS transit 2 (0 5)	23.5 Secs X 24 (564 Secs) [==>(Copy 1)] [==>(Copy 2)] [==>(Copy 3)] [==>(Copy 4)] [==>(Copy 5)] [==>(Copy 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)]	[3]
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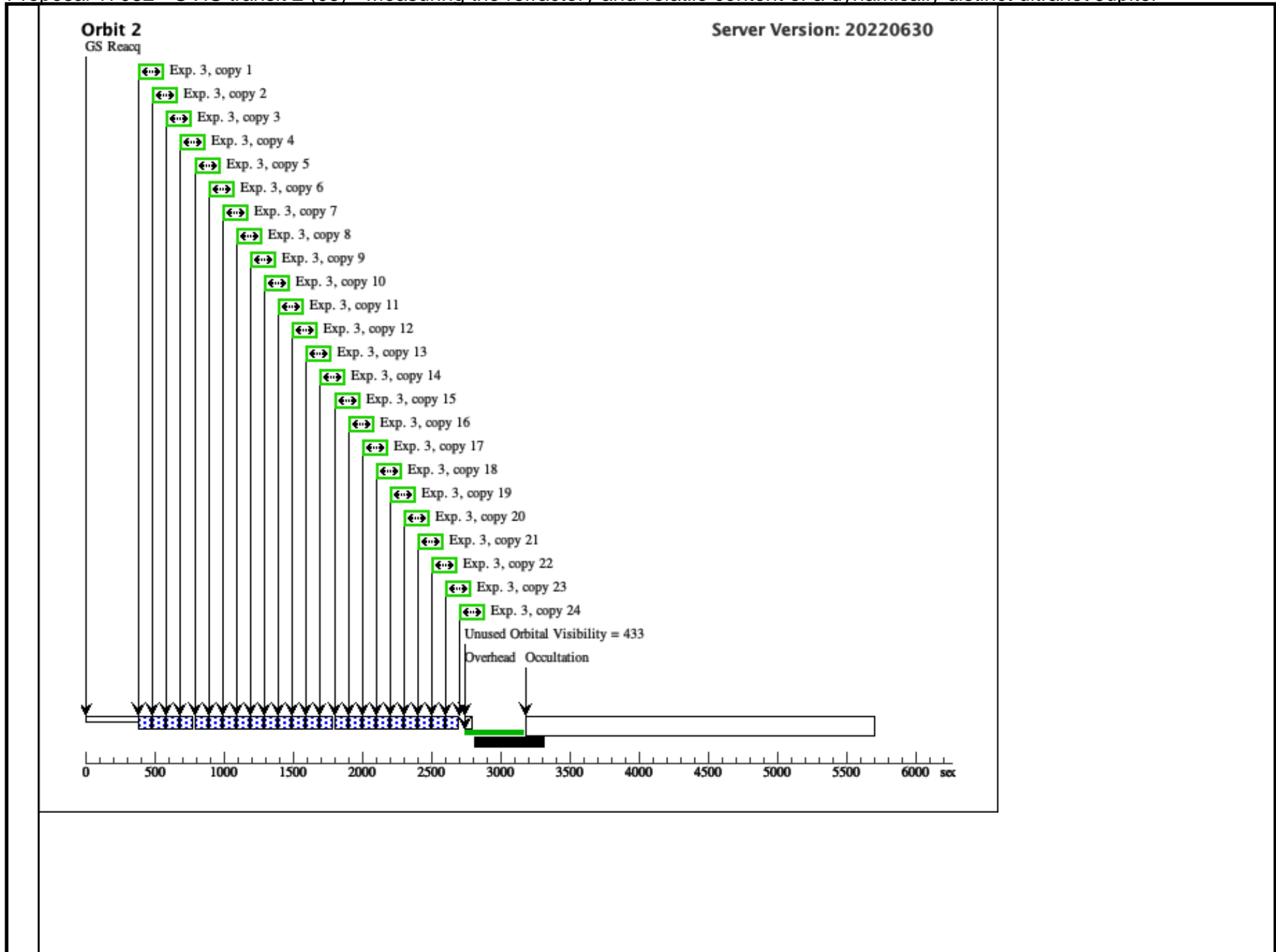
Proposal 17082 - UVIS transit 2 (05) - Measuring the refractory and volatile content of a dynamically distinct ultrahot Jupiter

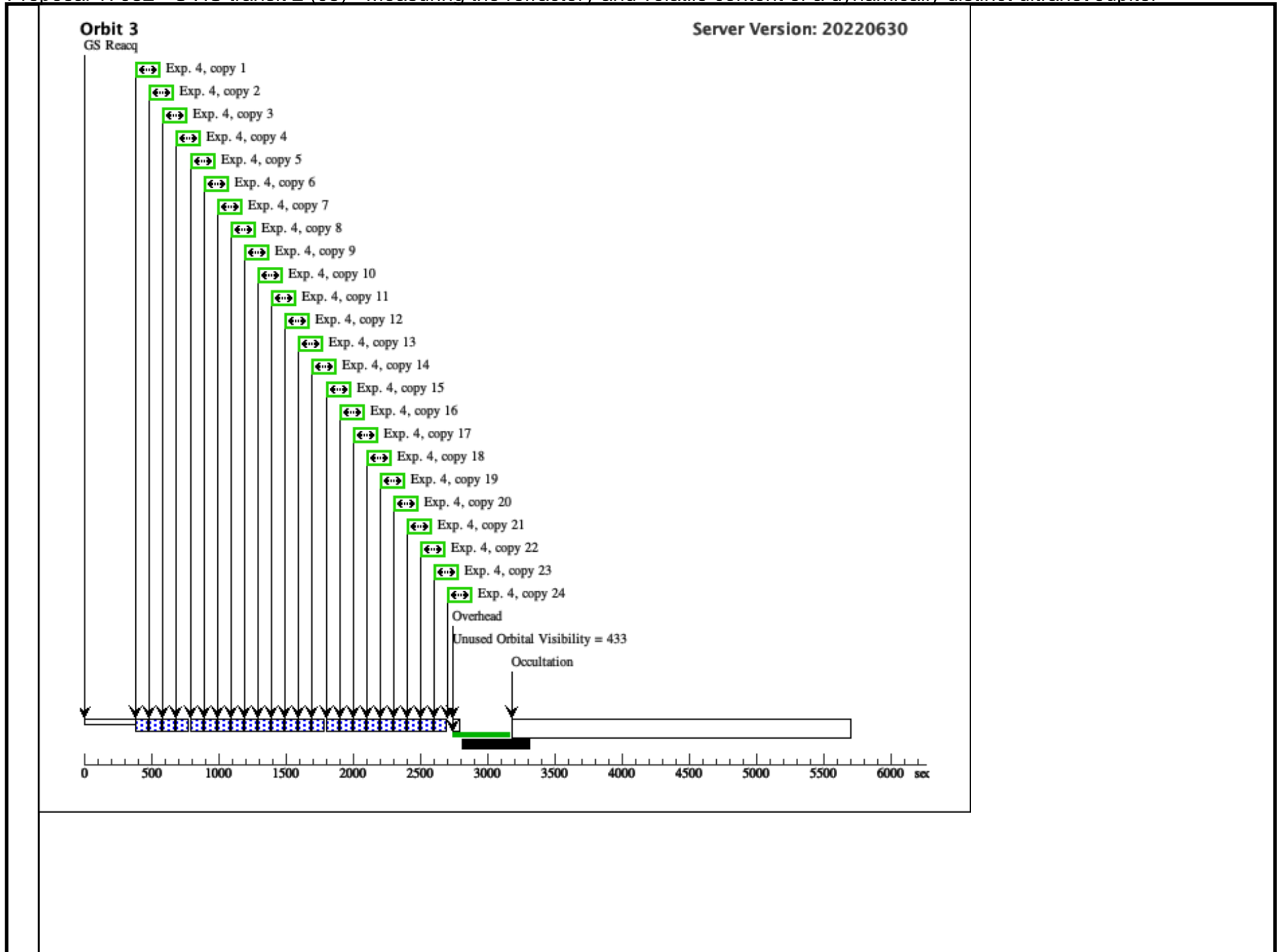
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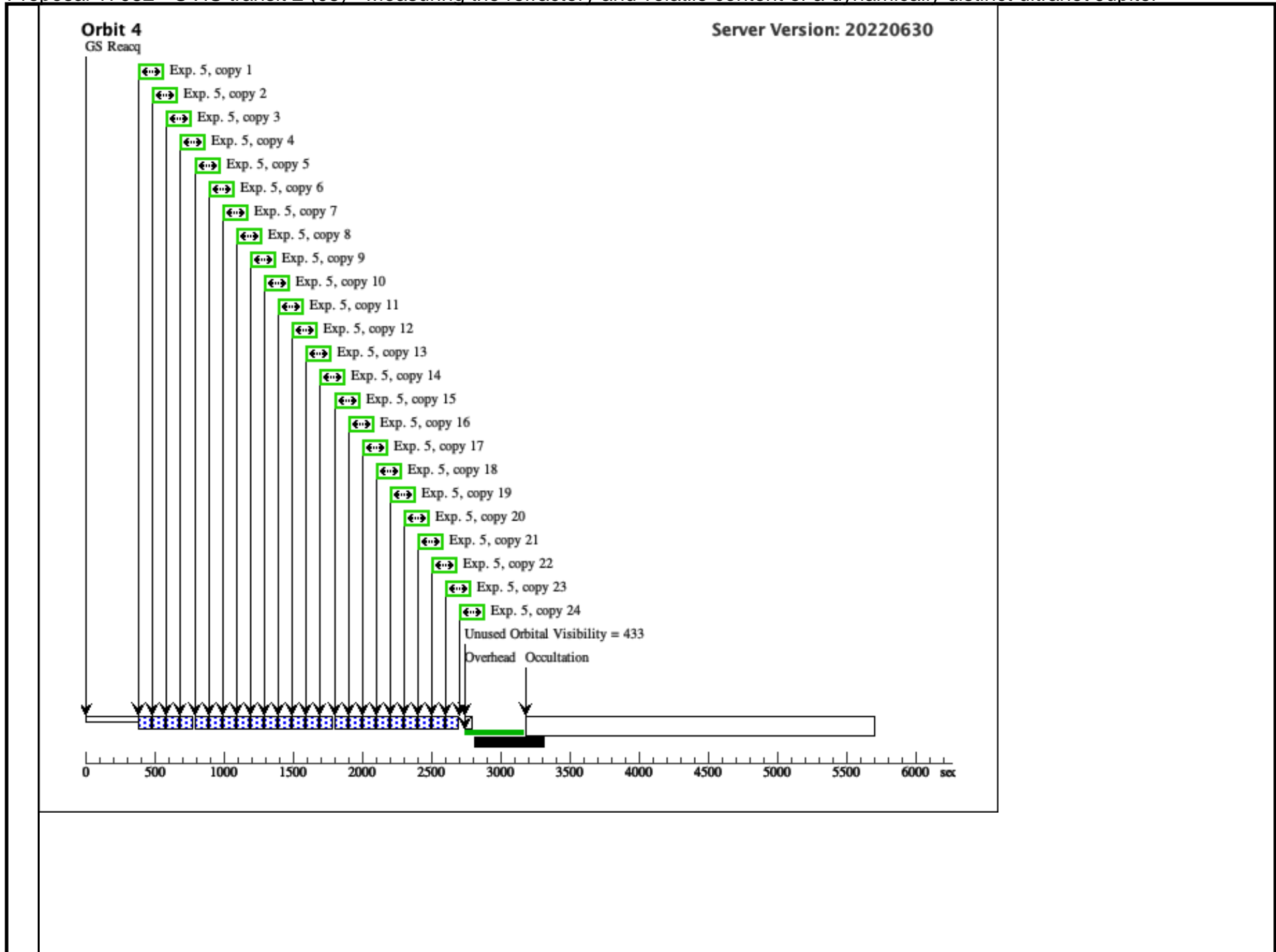
Proposal 17082 - UVIS transit 2 (05) - Measuring the refractory and volatile content of a dynamically distinct ultrahot Jupiter

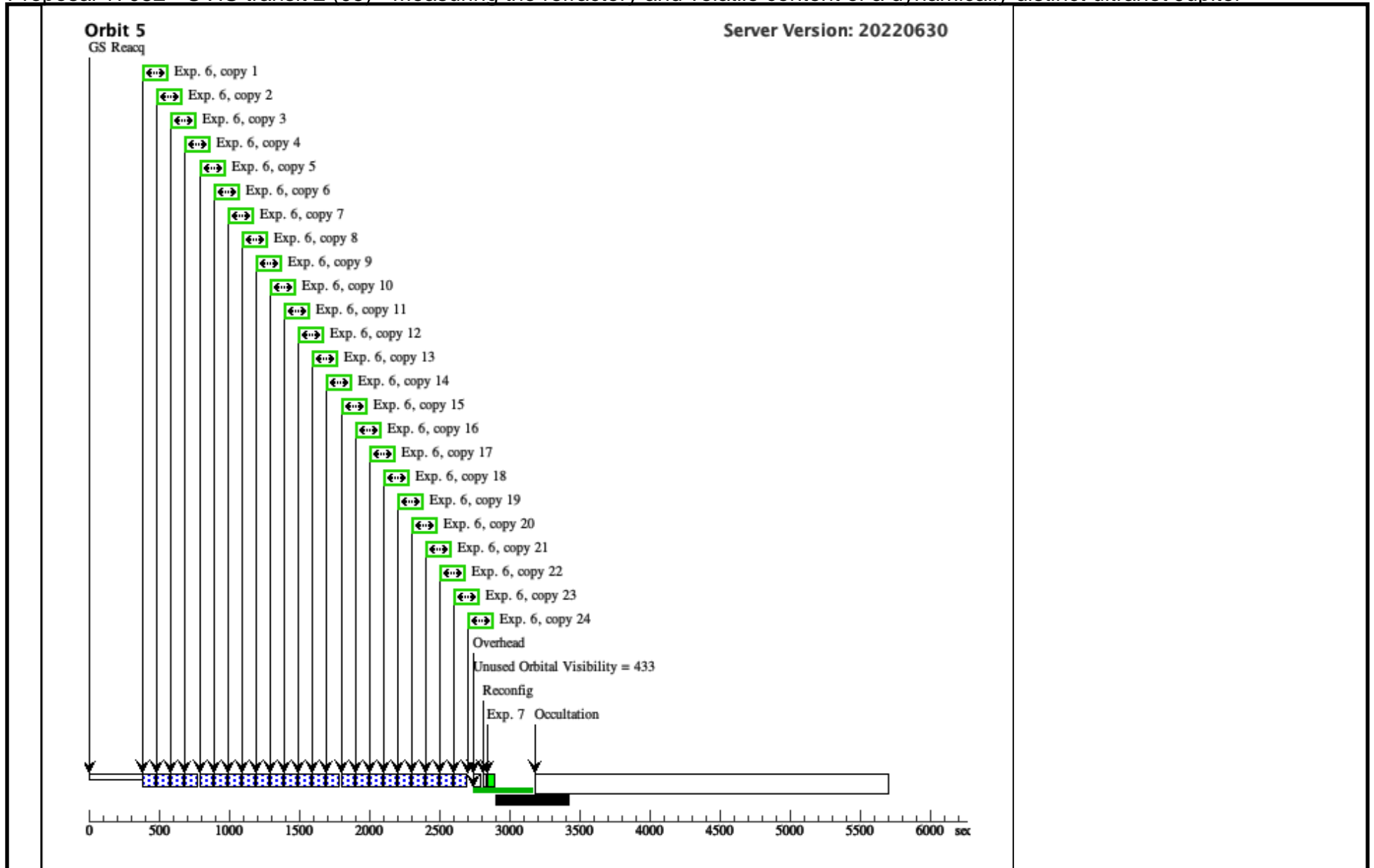
6	Orbit 5 (WFC3UVI S.sp.181339 2)	(1) HD-185603	WFC3/UVIS, ACCUM, UVIS	G280	FLASH=20; CENTERAXIS1=21 36; CENTERAXIS2=12 16; SIZEAXIS1=2250; SIZEAXIS2=490	Sequence 6-7 Non-Int in UVIS transit 2 (0 5)	23.5 Secs X 24 (564 Secs)	[==>(Copy 1)] [==>(Copy 2)] [==>(Copy 3)] [==>(Copy 4)] [==>(Copy 5)] [==>(Copy 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)]	[5]
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7	Bias	BIAS	WFC3/UVIS, ACCUM, UVIS	DEF	CENTERAXIS1=21 36; CENTERAXIS2=12 16; SIZEAXIS1=2250; SIZEAXIS2=490	Sequence 6-7 Non-Int in UVIS transit 2 (0 5)	0.0 Secs (0 Secs)	[==>]	[5]











Proposal 17082 - WFC3/G102 (02) - Measuring the refractory and volatile content of a dynamically distinct ultrahot Jupiter

Mon Dec 05 16:02:05 GMT 2022

Visit	<p>Proposal 17082, WFC3/G102 (02), implementation</p> <p>Diagnostic Status: No Diagnostics</p> <p>Scientific Instruments: WFC3/IR</p> <p>Special Requirements: SCHED 80%; Period 3.474119 D AND ZERO-PHASE HJD2457909.5906</p> <p><i>Comments: All six orbits must be scheduled in a continuous block. Visit patterned after GO 16307 (PI Fu), which observed a secondary eclipse of this same target with G141. The overall efficiency is only 51%, but this is needed in order to keep the maximum flux in an individual pixel < 28,000 electrons (recommendation from Wilkins et al. 2014 is fluxes below 30,000 electrons to avoid "hook" feature, but up to 40,000 seemed to work okay for HD 209458). Might consider if there are slightly slower scan rates/integration times that would result in a modestly higher peak electron flux but still stay below ~<35,000 electrons, but the gain in SNR is probably marginal and trades off against increased instrumental systematics.</i></p>												
	Fixed Targets	<table border="1"> <thead> <tr> <th>#</th> <th>Name</th> <th>Target Coordinates</th> <th>Targ. Coord. Corrections</th> <th>Fluxes</th> <th>Miscellaneous</th> </tr> </thead> <tbody> <tr> <td>(1)</td> <td>HD-185603</td> <td>RA: 19 38 38.7390 (294.6614125d) Dec: +31 13 9.12 (31.21920d) Equinox: J2000</td> <td>Proper Motion RA: 2.456372437434589E-4 sec of time/yr Proper Motion Dec: -0.006264999910854385 arcsec/yr Epoch of Position: 2015.5</td> <td>V=7.58</td> <td>Reference Frame: SIMBAD</td> </tr> </tbody> </table> <p><i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i> Category=STAR Description=[A0-A3 V-IV]</p>	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous	(1)	HD-185603	RA: 19 38 38.7390 (294.6614125d) Dec: +31 13 9.12 (31.21920d) Equinox: J2000	Proper Motion RA: 2.456372437434589E-4 sec of time/yr Proper Motion Dec: -0.006264999910854385 arcsec/yr Epoch of Position: 2015.5	V=7.58
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(1)	HD-185603	RA: 19 38 38.7390 (294.6614125d) Dec: +31 13 9.12 (31.21920d) Equinox: J2000	Proper Motion RA: 2.456372437434589E-4 sec of time/yr Proper Motion Dec: -0.006264999910854385 arcsec/yr Epoch of Position: 2015.5	V=7.58	Reference Frame: SIMBAD								

Proposal 17082 - WFC3/G102 (02) - Measuring the refractory and volatile content of a dynamically distinct ultrahot Jupiter

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	(WFC3IR.im.1813479)	(1) HD-185603	WFC3/IR, MULTIACCUM, GRISM512	F126N	NSAMP=1; SAMP-SEQ=RAPID	PHASE 0.9424 TO 0.9484	Sequence 1-3 Non-Int in WFC3/G102 (02)	0.853027 Secs (0.853 Secs) [==>]	[1]
<p><i>Comments: The ETC says that the imaging exposure will modestly saturate, but a similar setting was used successfully by GO 14793 on a comparably brightness star (HAT-11). It's okay to saturate the central pixel(s) because we are simply using this image to determine the position of the star on the array.</i></p>									
2	(WFC3IR.ss.1813473)	(1) HD-185603	WFC3/IR, MULTIACCUM, GRISM512	G102	NSAMP=4; SAMP-SEQ=SPARS25	POS TARG -25,-27; SPATIAL SCAN 0.701903,90.0 Degrees, Round trip	Sequence 1-3 Non-Int in WFC3/G102 (02)	69.61678 Secs X 9 (1253.102 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]
<p><i>Comments: Use same settings as GO 16307 (0.7"/s scan rate, 512 x 512 subarray).</i></p>									
3		(1) HD-185603	WFC3/IR, MULTIACCUM, GRISM512	G102	NSAMP=4; SAMP-SEQ=SPARS25		Sequence 1-3 Non-Int in WFC3/G102 (02)	69.61678 Secs (69.617 Secs) [==>]	[1]

Exposures

Proposal 17082 - WFC3/G102 (02) - Measuring the refractory and volatile content of a dynamically distinct ultrahot Jupiter

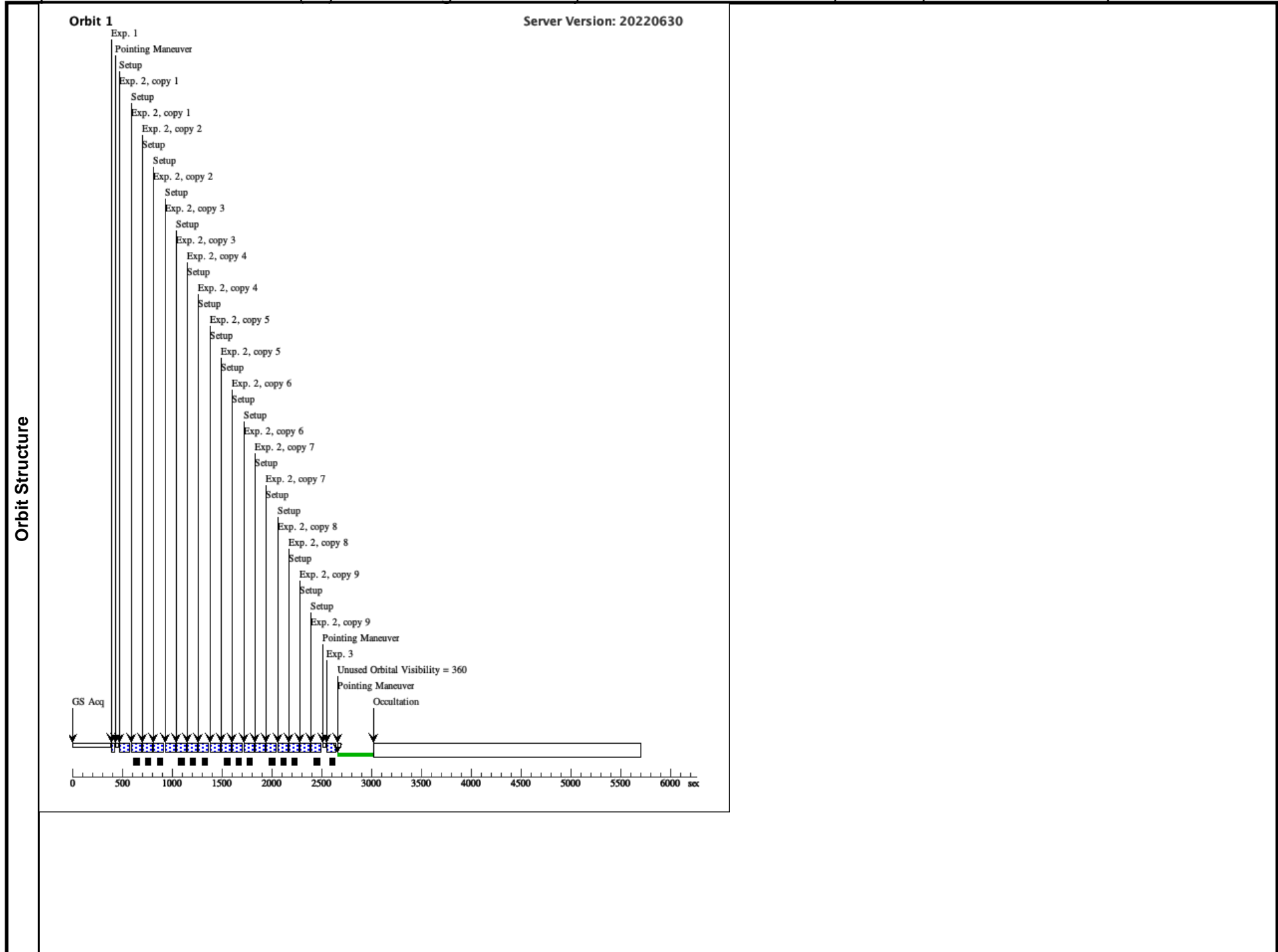
4	(1) HD-185603	WFC3/IR, MULTIACCUM, GRISM512	G102	NSAMP=4; SAMP-SEQ=SPAR S25	POS TARG -25,-27; SPATIAL SCAN 0.7 01903,90.0 Degrees, Round trip	Sequence 4-4 Non-Int in WFC3/G102 (02)	69.61678 Secs X 10 (1392.336 Secs) [==>(Copy 1, Forward)] [==>(Copy 1, Reverse)] [==>(Copy 2, Forward)] [==>(Copy 2, Reverse)] [==>(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]
5	(1) HD-185603	WFC3/IR, MULTIACCUM, GRISM512	G102	NSAMP=4; SAMP-SEQ=SPAR S25	POS TARG -25,-27; SPATIAL SCAN 0.7 01903,90.0 Degrees, Round trip	Sequence 5-5 Non-Int in WFC3/G102 (02)	69.61678 Secs X 10 (1392.336 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]

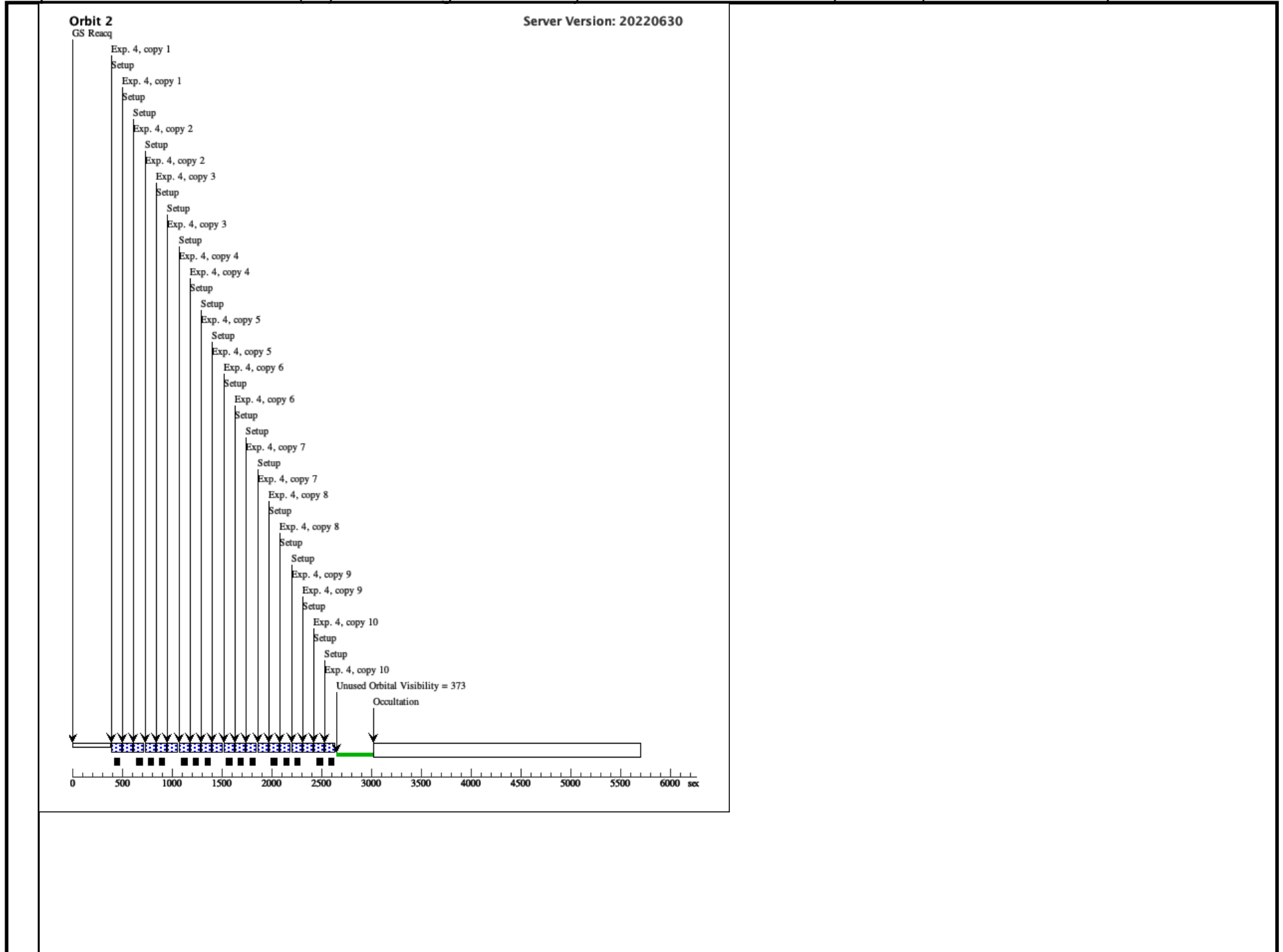
Proposal 17082 - WFC3/G102 (02) - Measuring the refractory and volatile content of a dynamically distinct ultrahot Jupiter

6	(1) HD-185603	WFC3/IR, MULTIACCUM, GRISM512	G102	NSAMP=4; SAMP-SEQ=SPAR S25	POS TARG -25,-27; SPATIAL SCAN 0.7 01903,90.0 Degrees, Round trip	Sequence 6-6 Non-In t in WFC3/G102 (02	69.61678 Secs X 10 (1392.336 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]
7	(1) HD-185603	WFC3/IR, MULTIACCUM, GRISM512	G102	NSAMP=4; SAMP-SEQ=SPAR S25	POS TARG -25,-27; SPATIAL SCAN 0.7 01903,90.0 Degrees, Round trip	Sequence 7-7 Non-In t in WFC3/G102 (02	69.61678 Secs X 10 (1392.336 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)]	[5]

Proposal 17082 - WFC3/G102 (02) - Measuring the refractory and volatile content of a dynamically distinct ultrahot Jupiter

8	(1) HD-185603	WFC3/IR, MULTIACCUM, GRISM512	G102	NSAMP=4; SAMP-SEQ=SPAR S25	POS TARG -25,-27; SPATIAL SCAN 0.7 01903,90.0 Degrees, Round trip	Sequence 8-8 Non-In- t in WFC3/G102 (02)	69.61678 Secs X 10 (1392.336 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)]	[6]
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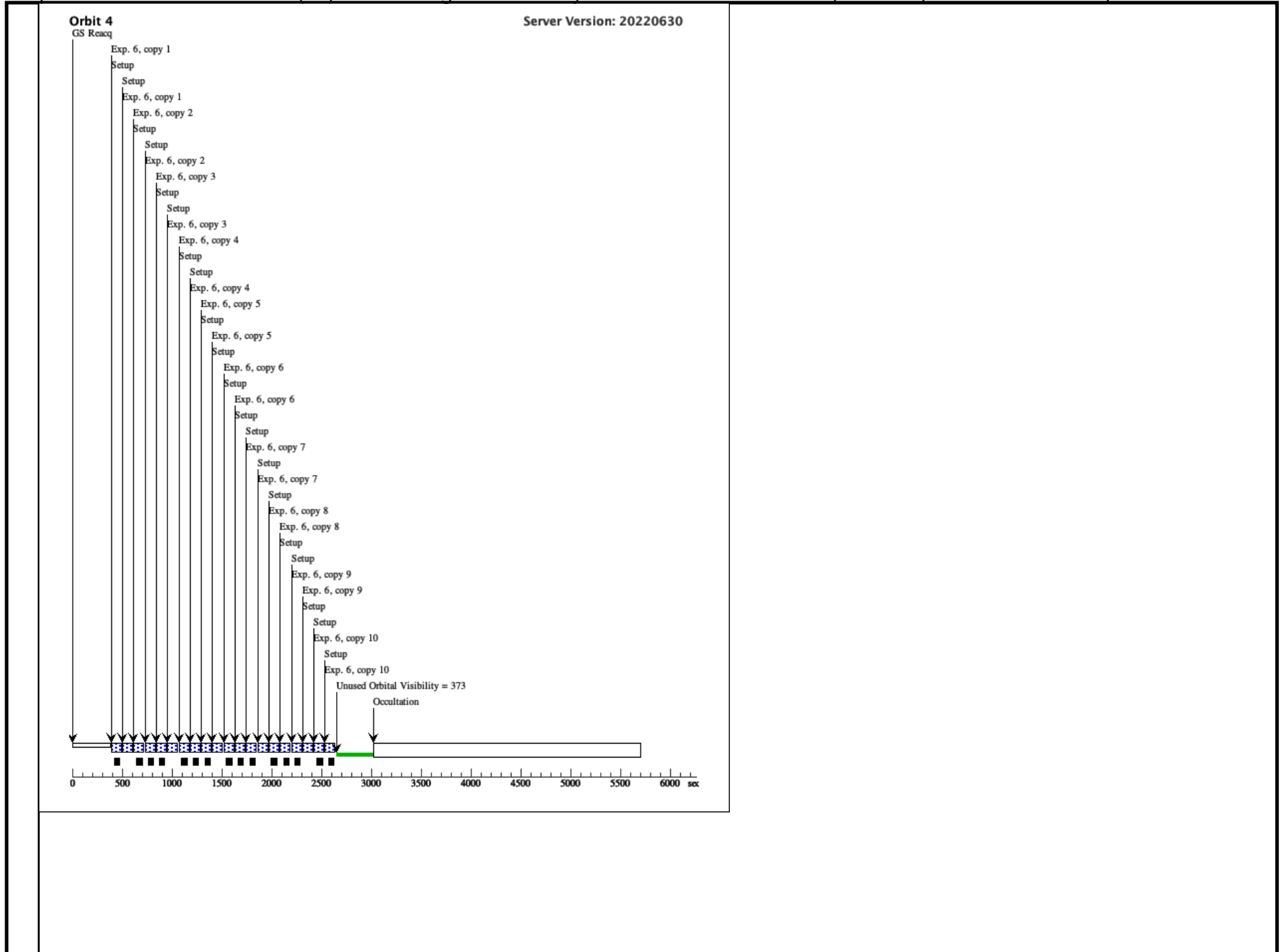




Proposal 17082 - WFC3/G102 (02) - Measuring the refractory and volatile content of a dynamically distinct ultrahot Jupiter

Server Version: 20220630



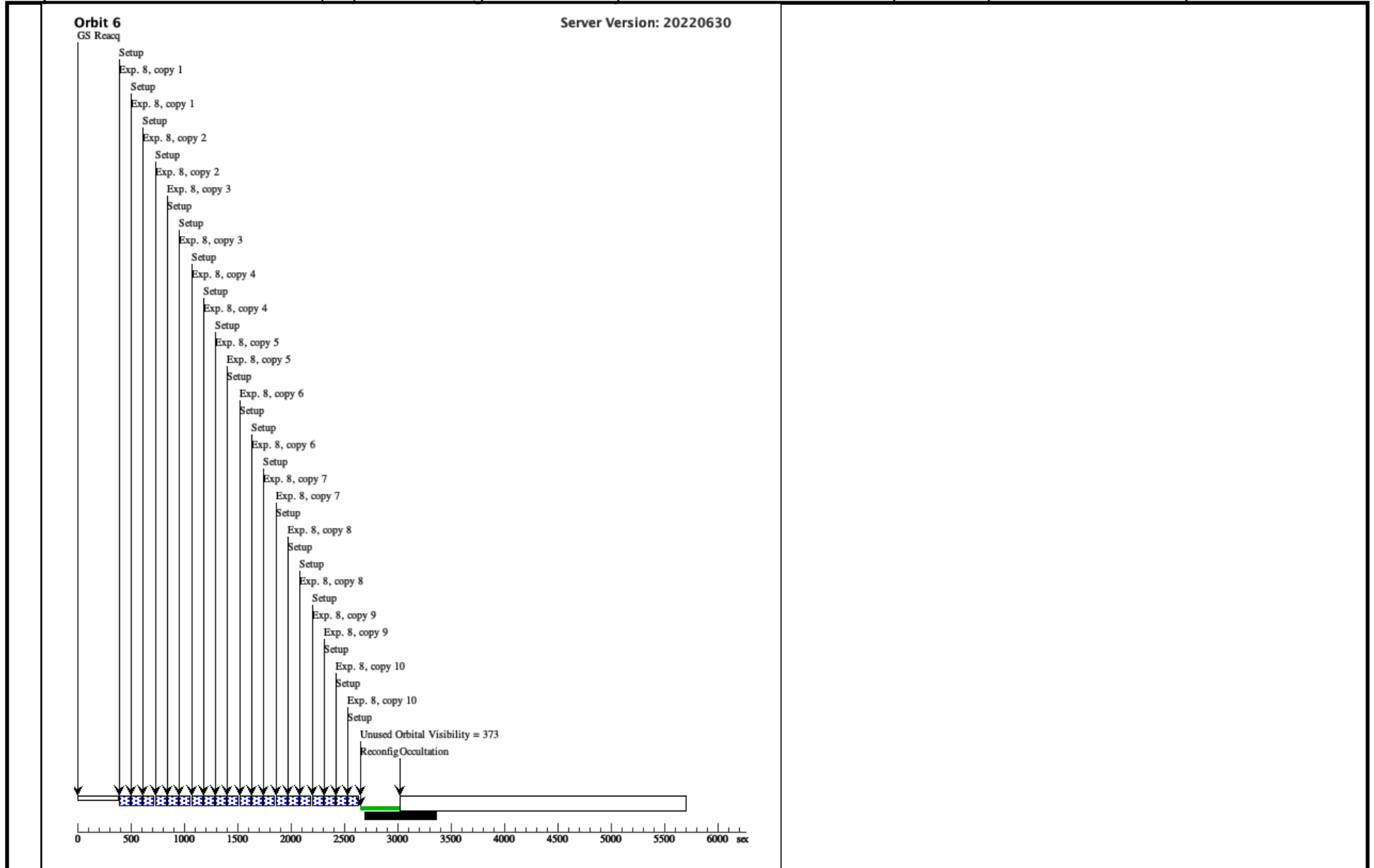


Proposal 17082 - WFC3/G102 (02) - Measuring the refractory and volatile content of a dynamically distinct ultrahot Jupiter

Server Version: 20220630



Proposal 17082 - WFC3/G102 (02) - Measuring the refractory and volatile content of a dynamically distinct ultrahot Jupiter



Proposal 17082 - WFC3/G141 (03) - Measuring the refractory and volatile content of a dynamically distinct ultrahot Jupiter

Mon Dec 05 16:02:05 GMT 2022

Visit	<p>Proposal 17082, WFC3/G141 (03), implementation</p> <p>Diagnostic Status: No Diagnostics</p> <p>Scientific Instruments: WFC3/IR</p> <p>Special Requirements: SCHED 80%; Period 3.474119 D AND ZERO-PHASE HJD2457909.5906</p> <p><i>Comments: All six orbits must be scheduled in a continuous block. Visit patterned after GO 16307 (PI Fu), which observed a secondary eclipse of this same target with G141. Overall efficiency is 51%, but this is needed in order to keep the maximum flux in an individual pixel < 33,000 electrons (recommendation from Wilkins et al. 2014 is fluxes below 30,000 electrons to avoid "hook" feature, but up to 40,000 seemed to work okay for HD 209458). Might consider if there are slightly slower scan rates/integration times that would result in a modestly higher peak electron flux but still stay below ~<35,000 electrons, but the gain in SNR is probably marginal and trades off against increased instrumental systematics.</i></p>												
	Fixed Targets	<table border="1"> <thead> <tr> <th>#</th> <th>Name</th> <th>Target Coordinates</th> <th>Targ. Coord. Corrections</th> <th>Fluxes</th> <th>Miscellaneous</th> </tr> </thead> <tbody> <tr> <td>(1)</td> <td>HD-185603</td> <td>RA: 19 38 38.7390 (294.6614125d) Dec: +31 13 9.12 (31.21920d) Equinox: J2000</td> <td>Proper Motion RA: 2.456372437434589E-4 sec of time/yr Proper Motion Dec: -0.006264999910854385 arcsec/yr Epoch of Position: 2015.5</td> <td>V=7.58</td> <td>Reference Frame: SIMBAD</td> </tr> </tbody> </table> <p><i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i> Category=STAR Description=[A0-A3 V-IV]</p>	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous	(1)	HD-185603	RA: 19 38 38.7390 (294.6614125d) Dec: +31 13 9.12 (31.21920d) Equinox: J2000	Proper Motion RA: 2.456372437434589E-4 sec of time/yr Proper Motion Dec: -0.006264999910854385 arcsec/yr Epoch of Position: 2015.5	V=7.58
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous								
(1)	HD-185603	RA: 19 38 38.7390 (294.6614125d) Dec: +31 13 9.12 (31.21920d) Equinox: J2000	Proper Motion RA: 2.456372437434589E-4 sec of time/yr Proper Motion Dec: -0.006264999910854385 arcsec/yr Epoch of Position: 2015.5	V=7.58	Reference Frame: SIMBAD								

Proposal 17082 - WFC3/G141 (03) - Measuring the refractory and volatile content of a dynamically distinct ultrahot Jupiter

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	(WFC3IR.im.1813418)	(1) HD-185603	WFC3/IR, MULTIACCUM, GRISM512	F164N	NSAMP=1; SAMP-SEQ=RAPID	PHASE 0.9424 TO 0.9484	Sequence 1-3 Non-Int in WFC3/G141 (03)	0.853027 Secs (0.853 Secs) [==>]	[1]
<p><i>Comments: The ETC says that the imaging exposure will saturate, but this same setting was used successfully by GO 14793. It's okay to saturate the central pixel(s) because we are simply using this image to determine the position of the star on the array.</i></p>									
2	(WFC3IR.ss.1813470)	(1) HD-185603	WFC3/IR, MULTIACCUM, GRISM512	G141	NSAMP=4; SAMP-SEQ=SPARS25	POS TARG -25,-27; SPATIAL SCAN 0.7 01903,90.0 Degrees, Round trip	Sequence 1-3 Non-Int in WFC3/G141 (03)	69.61678 Secs X 9 (1253.102 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		(1) HD-185603	WFC3/IR, MULTIACCUM, GRISM512	G141	NSAMP=4; SAMP-SEQ=SPARS25	POS TARG -25,-27; SPATIAL SCAN 0.7 01903,90.0 Degrees, Forward	Sequence 1-3 Non-Int in WFC3/G141 (03)	69.61678 Secs (69.617 Secs) [==>]	[1]

Exposures

Proposal 17082 - WFC3/G141 (03) - Measuring the refractory and volatile content of a dynamically distinct ultrahot Jupiter

4	(1) HD-185603	WFC3/IR, MULTIACCUM, GRISM512	G141	NSAMP=4; SAMP-SEQ=SPAR S25	POS TARG -25,-27; SPATIAL SCAN 0.7 01903,90.0 Degrees, Round trip	Sequence 4-4 Non-Int in WFC3/G141 (03)	69.61678 Secs X 10 (1392.336 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]
5	(1) HD-185603	WFC3/IR, MULTIACCUM, GRISM512	G141	NSAMP=4; SAMP-SEQ=SPAR S25	POS TARG -25,-27; SPATIAL SCAN 0.7 01903,90.0 Degrees, Round trip	Sequence 5-5 Non-Int in WFC3/G141 (03)	69.61678 Secs X 10 (1392.336 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]

Proposal 17082 - WFC3/G141 (03) - Measuring the refractory and volatile content of a dynamically distinct ultrahot Jupiter

6	(1) HD-185603	WFC3/IR, MULTIACCUM, GRISM512	G141	NSAMP=4; SAMP-SEQ=SPAR S25	POS TARG -25,-27; SPATIAL SCAN 0.7 01903,90.0 Degrees, Round trip	Sequence 6-6 Non-In t in WFC3/G141 (03	69.61678 Secs X 10 (1392.336 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]
7	(1) HD-185603	WFC3/IR, MULTIACCUM, GRISM512	G141	NSAMP=4; SAMP-SEQ=SPAR S25	POS TARG -25,-27; SPATIAL SCAN 0.7 01903,90.0 Degrees, Round trip	Sequence 7-7 Non-In t in WFC3/G141 (03	69.61678 Secs X 10 (1392.336 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)]	[5]

Proposal 17082 - WFC3/G141 (03) - Measuring the refractory and volatile content of a dynamically distinct ultrahot Jupiter

8	(1) HD-185603	WFC3/IR, MULTIACCUM, GRISM512	G141	NSAMP=4; SAMP-SEQ=SPAR S25	POS TARG -25,-27; SPATIAL SCAN 0.7 01903,90.0 Degrees, Round trip	Sequence 8-8 Non-In- t in WFC3/G141 (03)	69.61678 Secs X 10 (1392.336 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)]	[6]
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