



15400 - Mitigating Persistence for Time-Series Observations

Cycle: 25, Proposal Category: CAL/WFC3

(Calibration)

(Availability Mode: RESTRICTED)

INVESTIGATORS

<i>Name</i>	<i>Institution</i>	<i>E-Mail</i>
Dr. Kevin B. Stevenson (PI) (Contact)	Space Telescope Science Institute	kbs@stsci.edu
Dr. Knox S. Long (CoI)	Eureka Scientific Inc.	long@stsci.edu
Prof. Peter McCullough (CoI)	Space Telescope Science Institute	pmcc@stsci.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>
01	TUNGSTEN	WFC3/IR	1	25-Apr-2018 19:02:26.0	yes
02	(2) GJ-1214-FEB2018 TUNGSTEN	WFC3/IR	1	25-Apr-2018 19:02:50.0	yes
03	(2) GJ-1214-FEB2018 TUNGSTEN	WFC3/IR	1	25-Apr-2018 19:03:13.0	yes
04	(2) GJ-1214-FEB2018	WFC3/IR	1	25-Apr-2018 19:03:17.0	yes
11	(2) GJ-1214-FEB2018 TUNGSTEN	WFC3/IR	4	25-Apr-2018 19:04:36.0	yes

8 Total Orbits Used

ABSTRACT

Calibration

OBSERVING DESCRIPTION

This program uses 3 internal and 3 external orbits, all contiguous. The visit begins with an internal orbit (Exposures 1, 5 & 10) with the Tungsten lamp turned on, followed by a time-series observation of GJ 1214 (Exposures 4, 9 & 13), repeated 3 times. After each Tungsten observation, we fill the buffer to force a dump (Exposure 2, 6, 7, 10 & 11) in Visit 11. A different implementation of the same program (Visits 01-04, in this order) uses the end of the visit to force a buffer dump. Only one of these two observations should actually be executed. Buffer dumps occur in parallel with the GJ 1214 observations. We also take three direct images of GJ1214 (Exposures 3, 8 & 12) for wavelength calibration. The current sequence has Exposure 1 starting outside of Earth occultation, but this should be changed manually to begin just after the start of Earth occultation.

The observing strategy for GJ 1214 is identical to that applied to this target in program 13021 (PI: Bean), which is our baseline for comparison.

The phase constraint has been set to avoid the primary transit of GJ 1214b (phase = 0.1 - 0.75).

GJ 1214 has a large proper motion and a nearby star that could result in overlapping spectra. For February 2019, the position of GJ 1214 is (17:15:19.65, 4:57:36.1); we use this value for the location of the star rather than specify the proper motion. The nearby star is approximately 5 mags fainter in the NIR and its spectrum must not overlap that of GJ 1214. The strict orient constraints maximize the separation between stars.

Proposal 15400 - Visit 01 - Mitigating Persistence for Time-Series Observations

Visit	<p>Proposal 15400, Visit 01, implementation</p> <p>Diagnostic Status: Warning</p> <p>Scientific Instruments: WFC3/IR</p> <p>Special Requirements: SCHED 100%; SAME ORIENT AS 02; GROUP 01,02,03,04 WITHIN 3.6 Orbits</p> <p><i>Comments: Visits 01-04 are linked together in a sequence to form a single observation. We use visits to force a buffer dump at the end of each orbit.</i></p>	<p>Wed Apr 25 23:04:42 GMT 2018</p>
Diagnostics	<p>(Visit 01) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR EARTH CALIB SU</p>	

Proposal 15400 - Visit 01 - Mitigating Persistence for Time-Series Observations

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		TUNGSTEN	WFC3/IR, MULTIACCUM, GRISM256	G141	SAMP-SEQ=SPARS 10; NSAMP=4		Sequence 1-2 Non-Int in Visit 01	22.317276 Secs (22.317 Secs) [==>]	[1]
<p><i>Comments: For calculating the exposure time we have assumed a rate of 1450 e/s (Long et al, 2014) and want a level of ~30,000 e.</i></p>									

Exposures

Proposal 15400 - Visit 01 - Mitigating Persistence for Time-Series Observations

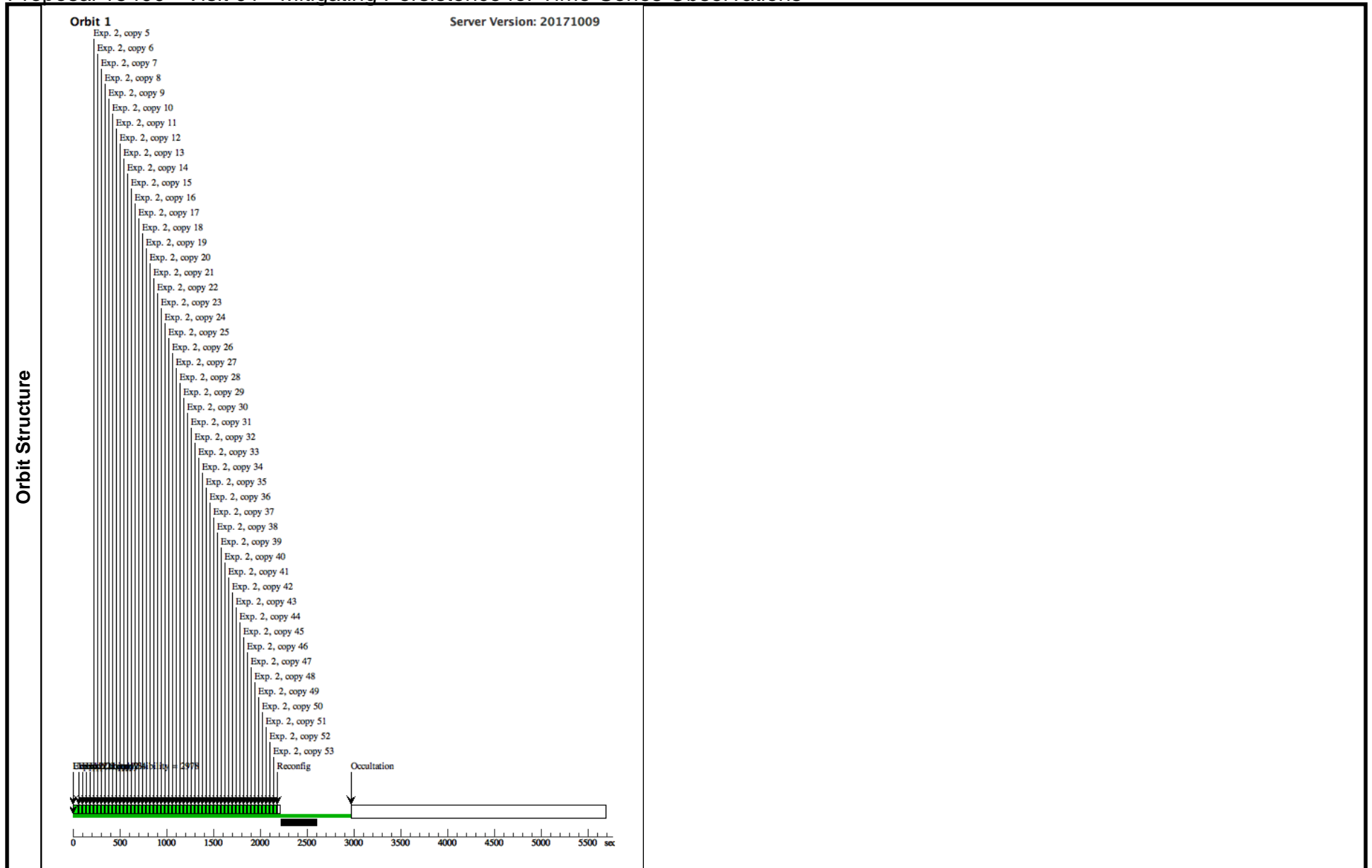
2	TUNGSTEN	WFC3/IR, MULTIACCUM, GRISM256	G141	SAMP-SEQ=SPARS 10; NSAMP=4	Sequence 1-2 Non-Int in Visit 01	22.317276 Secs X 53 (1182.816 Secs)
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Proposal 15400 - Visit 01 - Mitigating Persistence for Time-Series Observations

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<p><i>Comments: For calculating the exposure time we have assumed a rate of 1450 e/s (Long et al, 2014) and want a level of ~30,000 e.</i></p>		



Proposal 15400 - Visit 02 - Mitigating Persistence for Time-Series Observations

Visit	Proposal 15400, Visit 02, implementation Wed Apr 25 23:04:42 GMT 2018																	
	Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR Special Requirements: SCHED 100%; ORIENT 100D TO 120 D; ORIENT 280D TO 300 D; AFTER 01 BY 30 M TO 45 M; Period 1.58040481 D AND ZERO-PHASE HJD2454966.52512322																	
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>(2)</td> <td>GJ-1214-FEB2018</td> <td> RA: 17 15 19.6500 (258.8318750d) Dec: +04 57 36.10 (4.96003d) Equinox: J2000 </td> <td>Epoch of Position: 2018.2</td> <td>V=14.67</td> <td>Reference Frame: SIMBAD</td> </tr> </tbody> </table>	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous	(2)	GJ-1214-FEB2018	RA: 17 15 19.6500 (258.8318750d) Dec: +04 57 36.10 (4.96003d) Equinox: J2000	Epoch of Position: 2018.2	V=14.67	Reference Frame: SIMBAD	<i>Comments: This object was manually calculated after correcting for proper motion</i> <i>Category=STAR</i> <i>Description=[EXTRA-SOLAR PLANETARY SYSTEM]</i>				
	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous												
(2)	GJ-1214-FEB2018	RA: 17 15 19.6500 (258.8318750d) Dec: +04 57 36.10 (4.96003d) Equinox: J2000	Epoch of Position: 2018.2	V=14.67	Reference Frame: SIMBAD													

Proposal 15400 - Visit 02 - Mitigating Persistence for Time-Series Observations

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(2) GJ-1214-FEB2018	WFC3/IR, MULTIACCUM, GRISM256	F130N	NSAMP=3; SAMP-SEQ=RAPID	POS TARG null,-5.5 ; PHASE 0.15 TO 0.8	Sequence 1-3 Non-Int in Visit 02	0.833445 Secs (0.833 Secs) [==>]	[1]
2		(2) GJ-1214-FEB2018	WFC3/IR, MULTIACCUM, GRISM256	G141	NSAMP=15; SAMP-SEQ=SPARS10	POS TARG null,-5.5 ; SPATIAL SCAN 0.12,90.0 Degrees,Round trip	Sequence 1-3 Non-Int in Visit 02	103.128633 Secs X 9 (1856.315 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]

Exposures

Proposal 15400 - Visit 02 - Mitigating Persistence for Time-Series Observations

3	TUNGSTEN	WFC3/IR, MULTIACCUM, GRISM256	G141	SAMP-SEQ=SPARS 10; NSAMP=4	Sequence 1-3 Non-Int in Visit 02	22.317276 Secs X 55 (1227.45 Secs)
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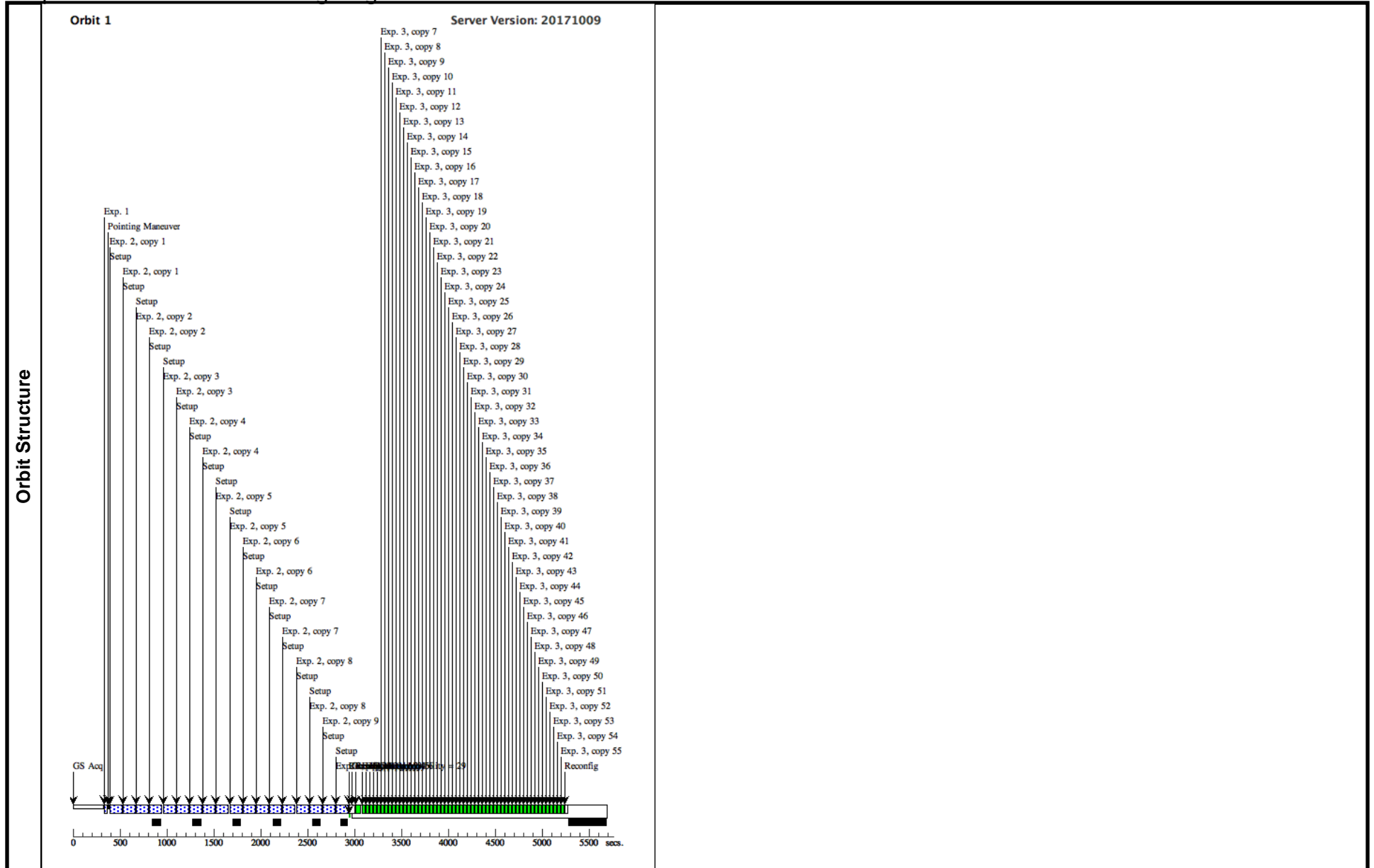
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Proposal 15400 - Visit 02 - Mitigating Persistence for Time-Series Observations

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Comments: For calculating the exposure time we have assumed a rate of 1450 e/s (Long et al, 2014) and want a level of ~30,000 e.



Proposal 15400 - Visit 03 - Mitigating Persistence for Time-Series Observations

Visit	Proposal 15400, Visit 03, implementation Wed Apr 25 23:04:43 GMT 2018					
	Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR Special Requirements: SCHED 100%; SAME ORIENT AS 02; AFTER 02					
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(2)	GJ-1214-FEB2018	RA: 17 15 19.6500 (258.8318750d) Dec: +04 57 36.10 (4.96003d) Equinox: J2000	Epoch of Position: 2018.2	V=14.67	Reference Frame: SIMBAD
Comments: This object was manually calculated after correcting for proper motion Category=STAR Description=[EXTRA-SOLAR PLANETARY SYSTEM]						

Proposal 15400 - Visit 03 - Mitigating Persistence for Time-Series Observations

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(2) GJ-1214-FEB2018	WFC3/IR, MULTIACCUM, GRISM256	F130N	NSAMP=3; SAMP-SEQ=RAPID	POS TARG null,-5.5	Sequence 1-3 Non-Int in Visit 03	0.833445 Secs (0.833 Secs) [==>]	[1]
2		(2) GJ-1214-FEB2018	WFC3/IR, MULTIACCUM, GRISM256	G141	NSAMP=15; SAMP-SEQ=SPARS10	POS TARG null,-5.5 ; SPATIAL SCAN 0.1 2,90.0 Degrees,Round trip	Sequence 1-3 Non-Int in Visit 03	103.128633 Secs X 9 (1856.315 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]

Exposures

Proposal 15400 - Visit 03 - Mitigating Persistence for Time-Series Observations

3	TUNGSTEN	WFC3/IR, MULTIACCUM, GRISM256	G141	SAMP-SEQ=SPARS 10; NSAMP=4	Sequence 1-3 Non-Int in Visit 03	22.317276 Secs X 55 (1227.45 Secs)
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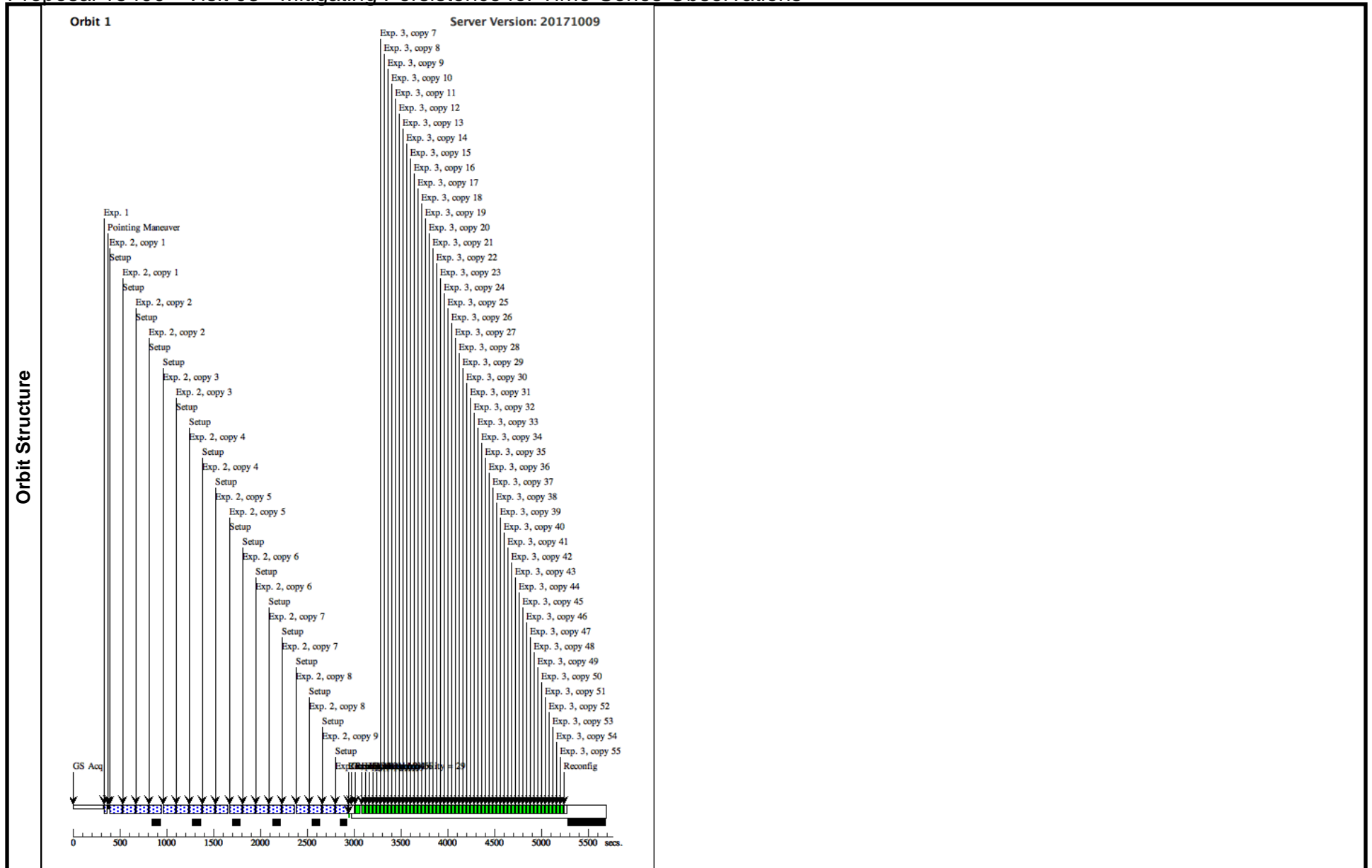
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Proposal 15400 - Visit 03 - Mitigating Persistence for Time-Series Observations

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Comments: For calculating the exposure time we have assumed a rate of 1450 e/s (Long et al, 2014) and want a level of ~30,000 e.

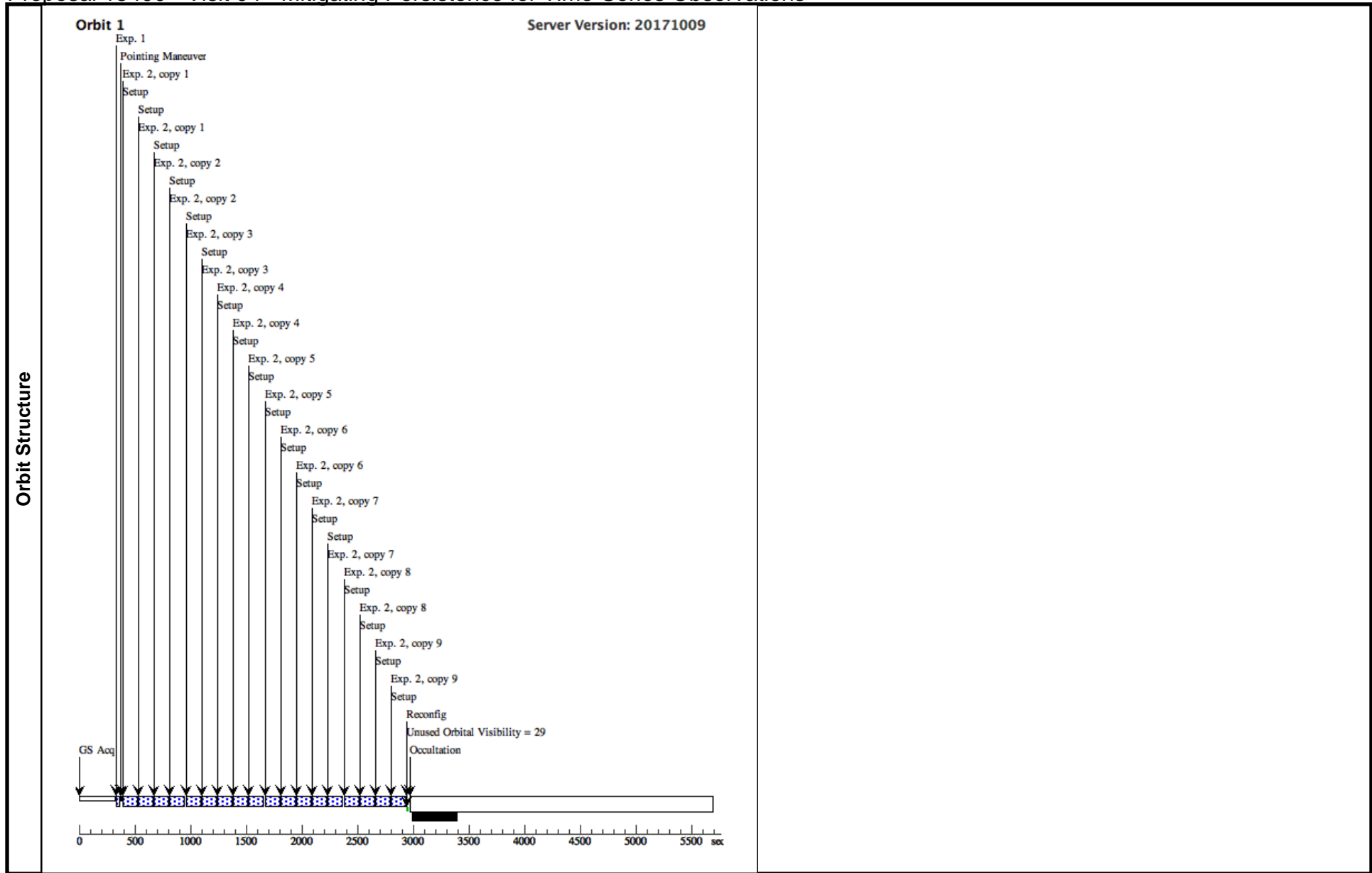
Proposal 15400 - Visit 03 - Mitigating Persistence for Time-Series Observations



Proposal 15400 - Visit 04 - Mitigating Persistence for Time-Series Observations

Wed Apr 25 23:04:43 GMT 2018

Visit	Proposal 15400, Visit 04, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR Special Requirements: SCHED 100%; SAME ORIENT AS 02; AFTER 03									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
	(2)	GJ-1214-FEB2018	RA: 17 15 19.6500 (258.8318750d) Dec: +04 57 36.10 (4.96003d) Equinox: J2000	Epoch of Position: 2018.2	V=14.67	Reference Frame: SIMBAD				
	<i>Comments: This object was manually calculated after correcting for proper motion</i> Category=STAR Description=[EXTRA-SOLAR PLANETARY SYSTEM]									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(2) GJ-1214-FEB2018	(2) GJ-1214-FEB2018	WFC3/IR, MULTIACCUM, GRISM256	F130N	NSAMP=3; SAMP-SEQ=RAPID	POS TARG null,-5.5	Sequence 1-2 Non-Int in Visit 04	0.833445 Secs (0.833 Secs)	[1]
	2	(2) GJ-1214-FEB2018	(2) GJ-1214-FEB2018	WFC3/IR, MULTIACCUM, GRISM256	G141	NSAMP=15; SAMP-SEQ=SPARS10	POS TARG null,-5.5; SPATIAL SCAN 0.12,90.0 Degrees,Rounded trip	Sequence 1-2 Non-Int in Visit 04	103.128633 Secs X 9 (1856.315 Secs)	[1]
								[==>] [==>(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)]		



Proposal 15400 - Visit 11 - Mitigating Persistence for Time-Series Observations

Wed Apr 25 23:04:43 GMT 2018

Visit	Proposal 15400, Visit 11, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR Special Requirements: SCHED 100%; ORIENT 100D TO 120 D; ORIENT 280D TO 300 D; Period 1.58040481 D AND ZERO-PHASE HJD2454966.52512322; ON HOLD Comments: Visit 11 is a different implementation of Visits 01-04 that uses a series of rapid exposures to fill the buffer. On Hold Comments: Pending decision on observing scenario.					
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes
(2)		GJ-1214-FEB2018	RA: 17 15 19.6500 (258.8318750d) Dec: +04 57 36.10 (4.96003d) Equinox: J2000	Epoch of Position: 2018.2	V=14.67	Reference Frame: SIMBAD
Comments: This object was manually calculated after correcting for proper motion Category=STAR Description=[EXTRA-SOLAR PLANETARY SYSTEM]						

Proposal 15400 - Visit 11 - Mitigating Persistence for Time-Series Observations

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		TUNGSTEN	WFC3/IR, MULTIACCUM, GRISM256	G141	SAMP-SEQ=SPARS 10; NSAMP=4	PHASE 0.1 TO 0.75	Sequence 1-3 Non-Int in Visit 11	22.317276 Secs (22.317 Secs) [==>]	[1]
<p><i>Comments: For calculating the exposure time we have assumed a rate of 1450 e/s (Long et al, 2014) and want a level of ~30,000 e.</i></p>									

Exposures

Proposal 15400 - Visit 11 - Mitigating Persistence for Time-Series Observations

2	TUNGSTEN	WFC3/IR, MULTIACCUM, GRISM256	G141	SAMP-SEQ=SPARS 10; NSAMP=4	Sequence 1-3 Non-Int in Visit 11	22.317276 Secs X 52 (1160.498 Secs)
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Proposal 15400 - Visit 11 - Mitigating Persistence for Time-Series Observations

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<i>Comments: For calculating the exposure time we have assumed a rate of 1450 e/s (Long et al, 2014) and want a level of ~30,000 e.</i>								
3	TUNGSTEN	WFC3/IR, MULTIACCUM, GRISM256	G141	SAMP-SEQ=RAPID ; NSAMP=12		Sequence 1-3 Non-Int in Visit 11	3.33378 Secs X 3 (10.001 Secs) [==>(Copy 1)] [==>(Copy 2)] [==>(Copy 3)]	[1]
<i>Comments: For calculating the exposure time we have assumed a rate of 1450 e/s (Long et al, 2014) and want a level of ~30,000 e.</i>								
4	(2) GJ-1214-FEB201 8	WFC3/IR, MULTIACCUM, GRISM256	F130N	NSAMP=3; SAMP-SEQ=RAPID	POS TARG null,-5.5	Sequence 4-8 Non-Int in Visit 11	0.833445 Secs (0.833 Secs) [==>]	[2]
5	(2) GJ-1214-FEB201 8	WFC3/IR, MULTIACCUM, GRISM256	G141	NSAMP=15; SAMP-SEQ=SPARS10	POS TARG null,-5.5 ; SPATIAL SCAN 0.1 2,90.0 Degrees,Round trip	Sequence 4-8 Non-Int in Visit 11	103.128633 Secs X 9 (1856.315 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)]	[2]

Proposal 15400 - Visit 11 - Mitigating Persistence for Time-Series Observations

6	TUNGSTEN	WFC3/IR, MULTIACCUM, GRISM256	G141	SAMP-SEQ=SPARS 10; NSAMP=4	Sequence 4-8 Non-Int in Visit 11	22.317276 Secs X 49 (1093.547 Secs)
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Proposal 15400 - Visit 11 - Mitigating Persistence for Time-Series Observations

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<i>Comments: For calculating the exposure time we have assumed a rate of 1450 e/s (Long et al, 2014) and want a level of ~30,000 e.</i>								
7	TUNGSTEN	WFC3/IR, MULTIACCUM, GRISM256	G141	SAMP-SEQ=RAPID ; NSAMP=15		Sequence 4-8 Non-Int in Visit 11	4.167225 Secs X 3 (12.502 Secs) [==>(Copy 1)] [==>(Copy 2)] [==>(Copy 3)]	[2]
<i>Comments: For calculating the exposure time we have assumed a rate of 1450 e/s (Long et al, 2014) and want a level of ~30,000 e.</i>								
8	TUNGSTEN	WFC3/IR, MULTIACCUM, GRISM256	G141	SAMP-SEQ=RAPID ; NSAMP=8		Sequence 4-8 Non-Int in Visit 11	2.22252 Secs (2.223 Secs) [==>]	[2]
<i>Comments: For calculating the exposure time we have assumed a rate of 1450 e/s (Long et al, 2014) and want a level of ~30,000 e.</i>								
9	(2) GJ-1214-FEB2018	WFC3/IR, MULTIACCUM, GRISM256	F130N	NSAMP=3; SAMP-SEQ=RAPID	POS TARG null,-5.5	Sequence 9-12 Non-Int in Visit 11	0.833445 Secs (0.833 Secs) [==>]	[3]
10	(2) GJ-1214-FEB2018	WFC3/IR, MULTIACCUM, GRISM256	G141	NSAMP=15; SAMP-SEQ=SPARS10	POS TARG null,-5.5 ; SPATIAL SCAN 0.1 2,90.0 Degrees, Round trip	Sequence 9-12 Non-Int in Visit 11	103.128633 Secs X 8 (1650.058 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)]	[3]

Proposal 15400 - Visit 11 - Mitigating Persistence for Time-Series Observations

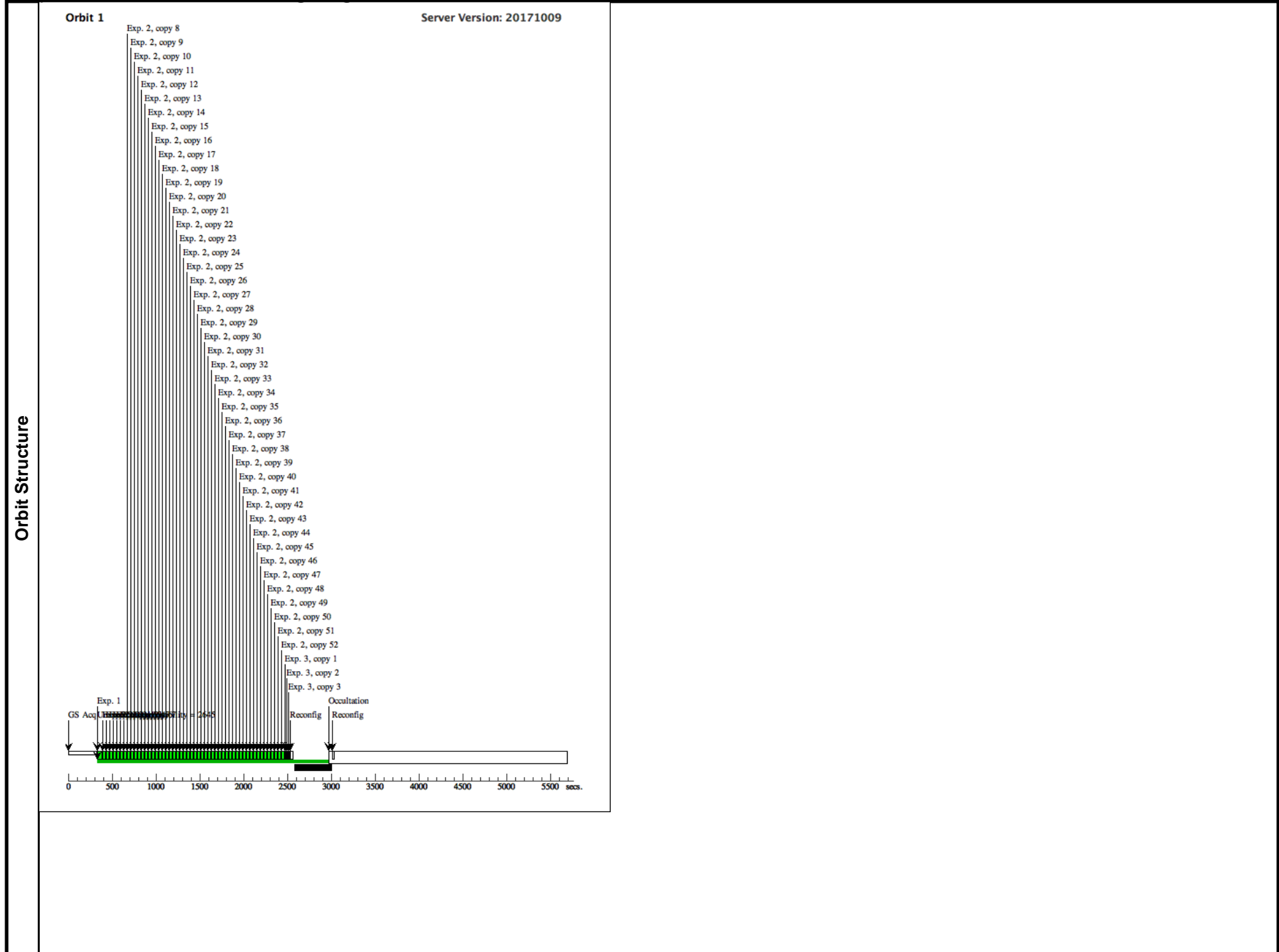
11	TUNGSTEN	WFC3/IR, MULTIACCUM, GRISM256	G141	SAMP-SEQ=SPARS 10; NSAMP=4	Sequence 9-12 Non-Int in Visit 11	22.317276 Secs X 53 (1182.816 Secs)
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Proposal 15400 - Visit 11 - Mitigating Persistence for Time-Series Observations

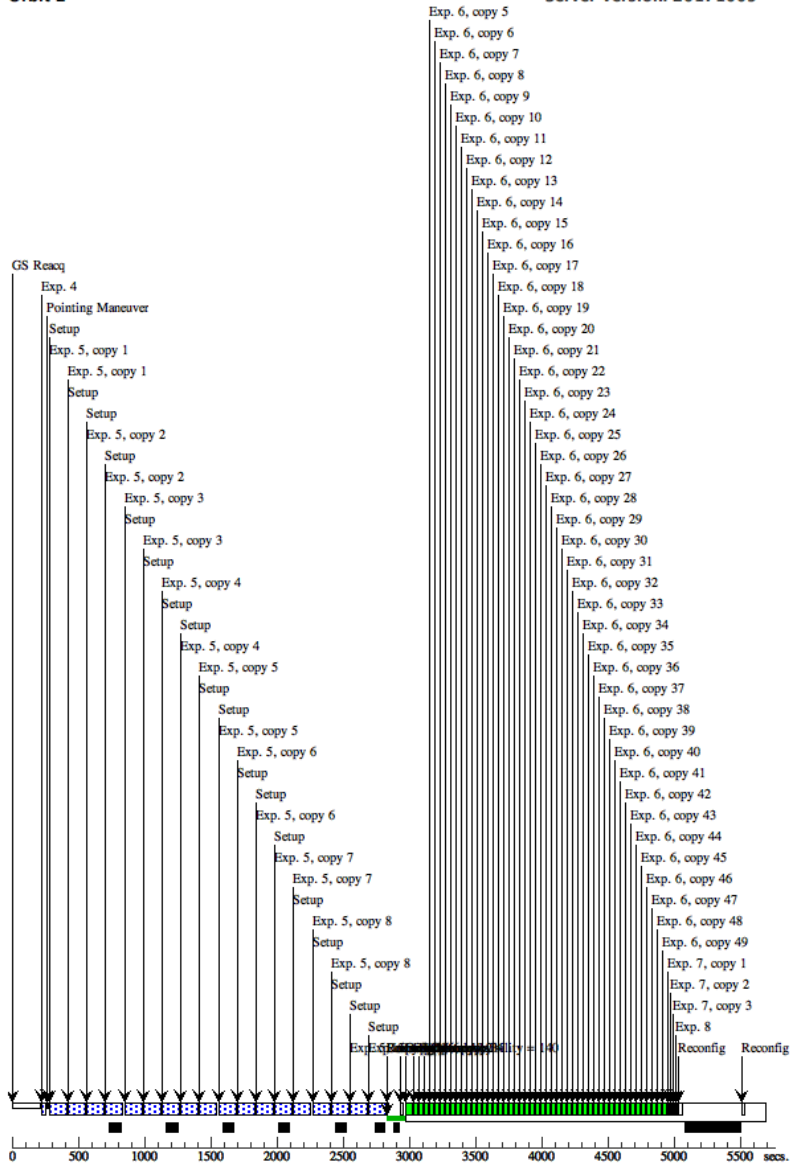
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<i>Comments: For calculating the exposure time we have assumed a rate of 1450 e/s (Long et al, 2014) and want a level of ~30,000 e.</i>								
12	TUNGSTEN	WFC3/IR, MULTIACCUM, GRISM256	G141	SAMP-SEQ=RAPID ; NSAMP=12		Sequence 9-12 Non-Int in Visit 11	3.33378 Secs X 3 (10.001 Secs)	
							[==>(Copy 1)] [==>(Copy 2)] [==>(Copy 3)]	[3]
<i>Comments: For calculating the exposure time we have assumed a rate of 1450 e/s (Long et al, 2014) and want a level of ~30,000 e.</i>								
13	(2) GJ-1214-FEB2018	WFC3/IR, MULTIACCUM, GRISM256	F130N	NSAMP=3; SAMP-SEQ=RAPID	POS TARG null,-5.5	Sequence 13-14 Non-Int in Visit 11	0.833445 Secs (0.833 Secs)	
							[==>]	[4]
14	(2) GJ-1214-FEB2018	WFC3/IR, MULTIACCUM, GRISM256	G141	NSAMP=15; SAMP-SEQ=SPARS10	POS TARG null,-5.5 ; SPATIAL SCAN 0.1 2,90.0 Degrees,Round trip	Sequence 13-14 Non-Int in Visit 11	103.128633 Secs X 9 (1856.315 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)]	[4]



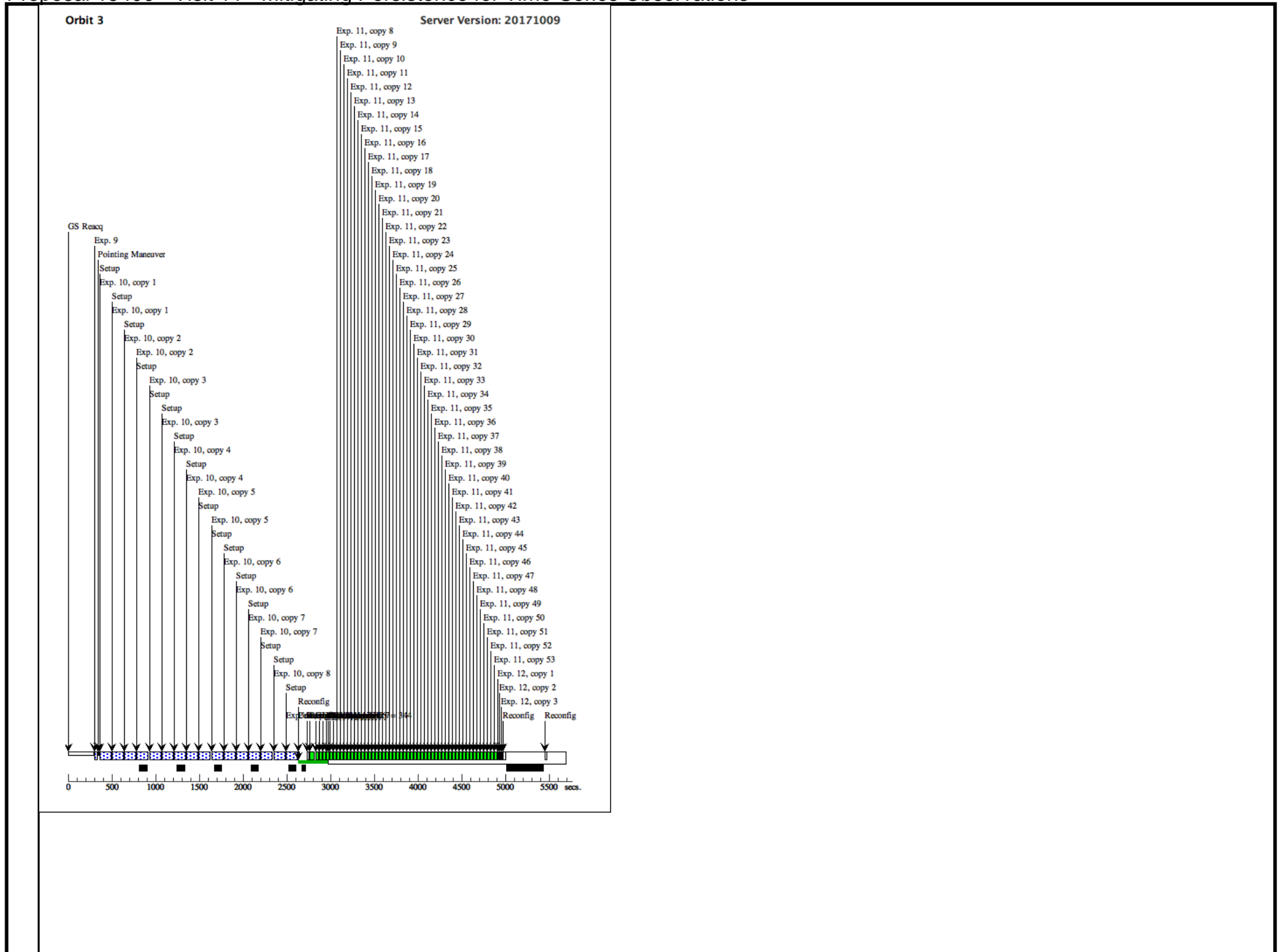
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