



12495 - Near-IR Spectroscopy of the Hottest Known Exoplanet, WASP-33b

Cycle: 19, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

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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	(1) WASP-33	WFC3/IR	5	12-Nov-2012 21:43:57.0	yes
02	(1) WASP-33	WFC3/IR	5	12-Nov-2012 21:52:14.0	yes

10 Total Orbits Used

ABSTRACT

We propose to use the WFC3 G141 grism to measure the near-IR thermal spectrum (1.1-1.7 microns) of the transiting exoplanet WASP-33b. WASP-33b is the most strongly irradiated and hottest known exoplanet, and it is key to testing hypotheses on the origin of temperature inversions in the atmospheres of giant hot exoplanets. Moreover, it orbits an A-type star whose spectrum is quite different from most planet-hosting stars. Consequently, the existence or non-existence of a temperature inversion in this planet is key to understanding what are the principal wavelengths where stellar irradiance drives the inversion process. The observational signature of an inversion in WASP-33b will be the presence of the strong 1.4-micron water band in emission, rather than in absorption as for non-inverted exoplanets. That signature will be very clear and obvious in our high-precision spectroscopy of this scorching world, and there will be no degeneracies in the interpretation. Our observations will span the time of

secondary eclipse for this transiting system. We will use a ratioing technique - proven by our ongoing Cycle-18 program - to cancel instrumental errors and achieve photon-limited precision for the spectroscopy. We propose utilizing the new WFC3 driftscan capability to collect vast numbers of stellar photons from this bright ($V=8.3$) system with high observing efficiency. Our observations will thereby produce some of the most precise exoplanet spectroscopy ever achieved.

OBSERVING DESCRIPTION

eclipses of WASP-33

Proposal 12495 - Visit 01 - Near-IR Spectroscopy of the Hottest Known Exoplanet, WASP-33b

Visit	Proposal 12495, Visit 01, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR Special Requirements: Period 1.21986967 D AND ZERO-PHASE HJD2454590.17936 <i>Comments: first eclipse of WASP-33</i>					Tue Nov 13 02:52:49 GMT 2012
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	WASP-33	RA: 02 26 51.0600 (36.7127500d) Dec: +37 33 1.80 (37.55050d) Equinox: J2000	Proper Motion RA: -1.26 mas/yr Proper Motion Dec: -9.22 mas/yr Epoch of Position: 2000.0	V=8.3	Reference Frame: ICRS

Proposal 12495 - Visit 01 - Near-IR Spectroscopy of the Hottest Known Exoplanet, WASP-33b

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(1) WASP-33	WFC3/IR, MULTIACCUM, IRSUB256	F139M	SAMP-SEQ=RAPID ; NSAMP=6	POS TARG 0.0,0.0; PHASE 0.340 TO 0. 348; GS ACQ SCENARI O BASE1B3		[==>]	
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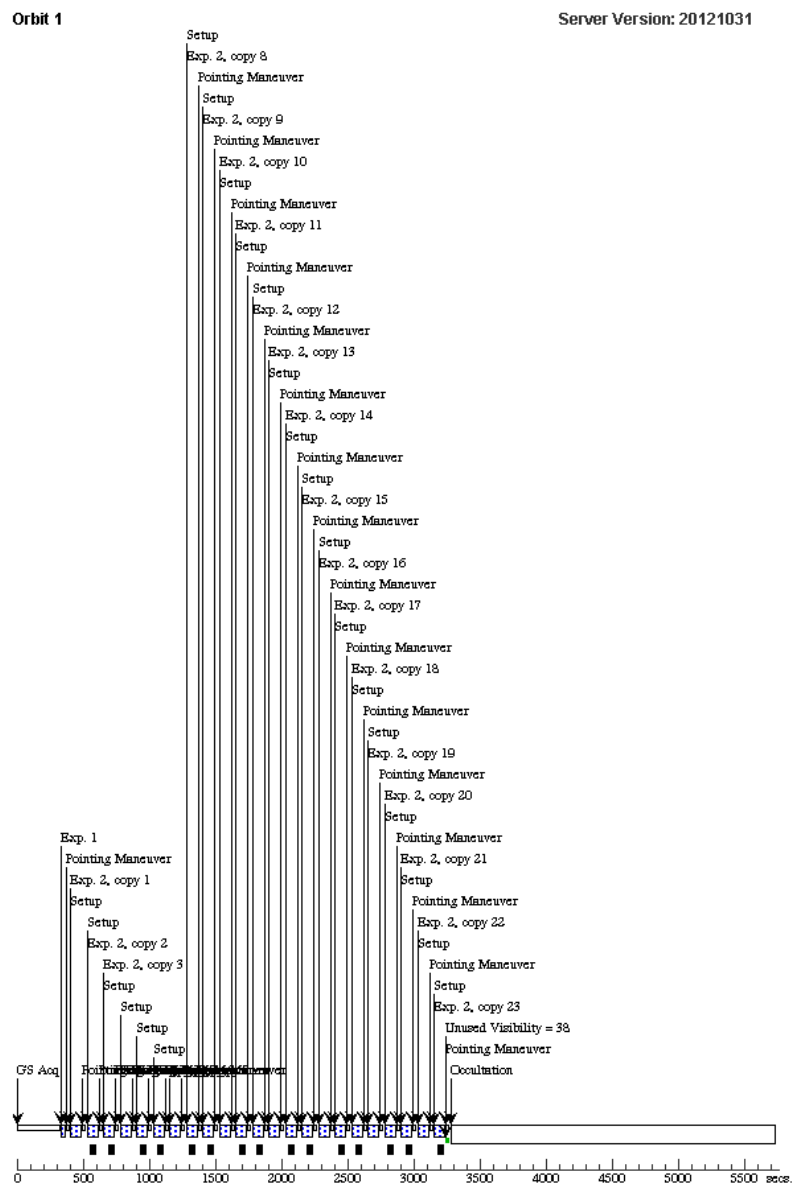
2	(1) WASP-33	WFC3/IR, MULTIACCUM, GRISM256	G141	SAMP-SEQ=SPARS 10; NSAMP=8	POS TARG 0.0,-6.5; SPATIAL SCAN 0.2 5,90.0 Degrees,Forward	[==>(Copy 1)] [==>(Copy 2)] [==>(Copy 3)] [==>(Copy 4)] [==>(Copy 5)] [==>(Copy 6)] [==>(Copy 7)] [==>(Copy 8)] [==>(Copy 9)] [==>(Copy 10)] [==>(Copy 11)] [==>(Copy 12)] [==>(Copy 13)] [==>(Copy 14)] [==>(Copy 15)] [==>(Copy 16)] [==>(Copy 17)] [==>(Copy 18)] [==>(Copy 19)] [==>(Copy 20)] [==>(Copy 21)] [==>(Copy 22)] [==>(Copy 23)]	[1]
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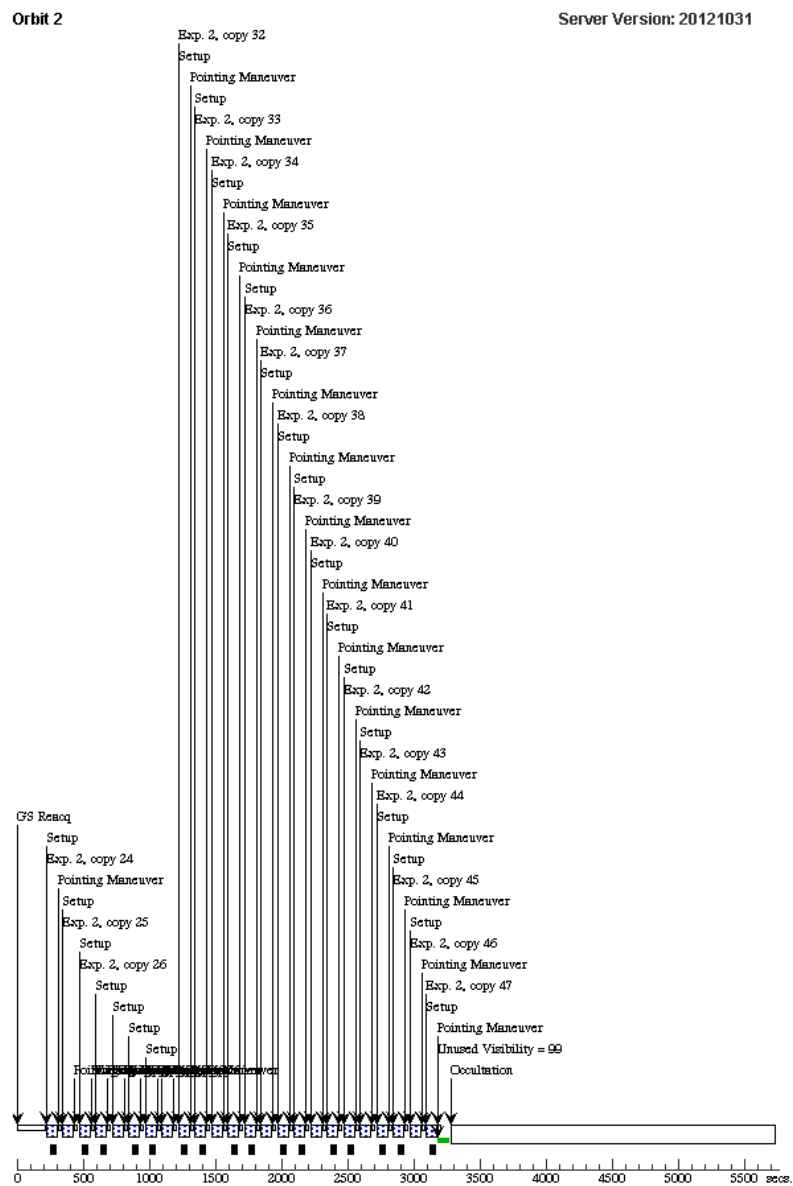
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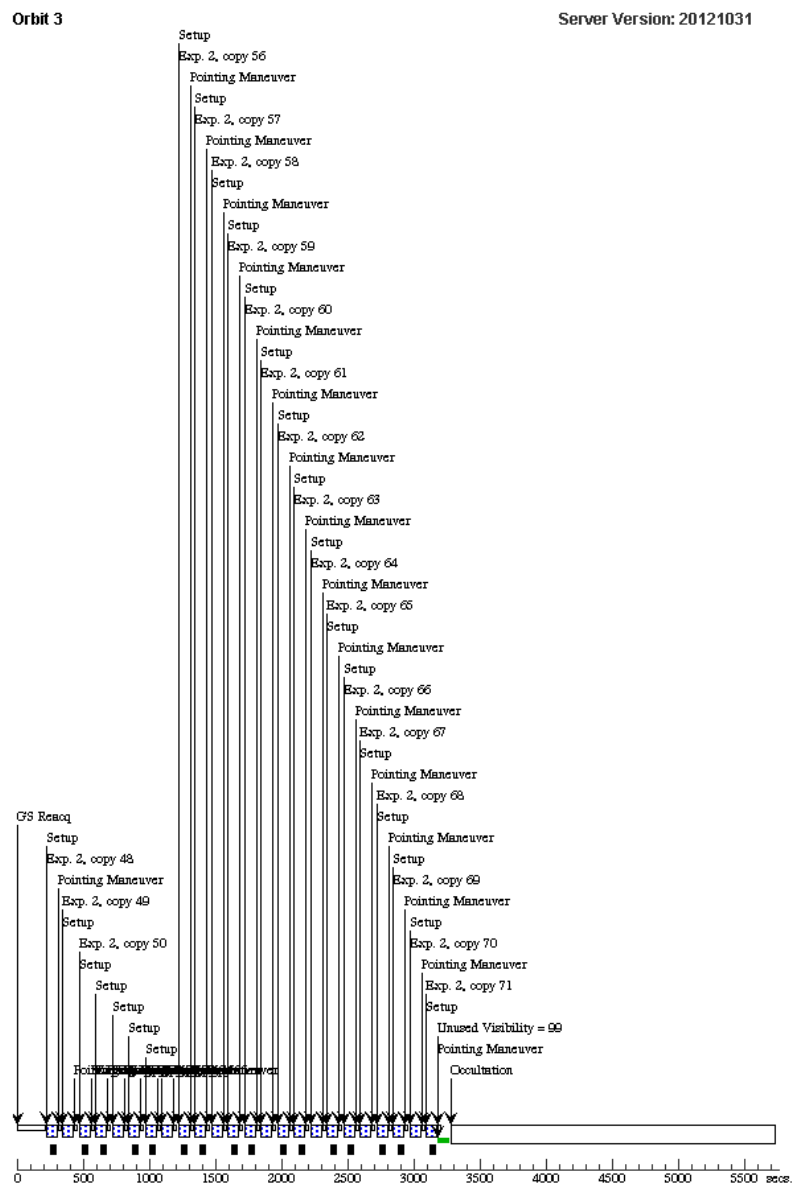
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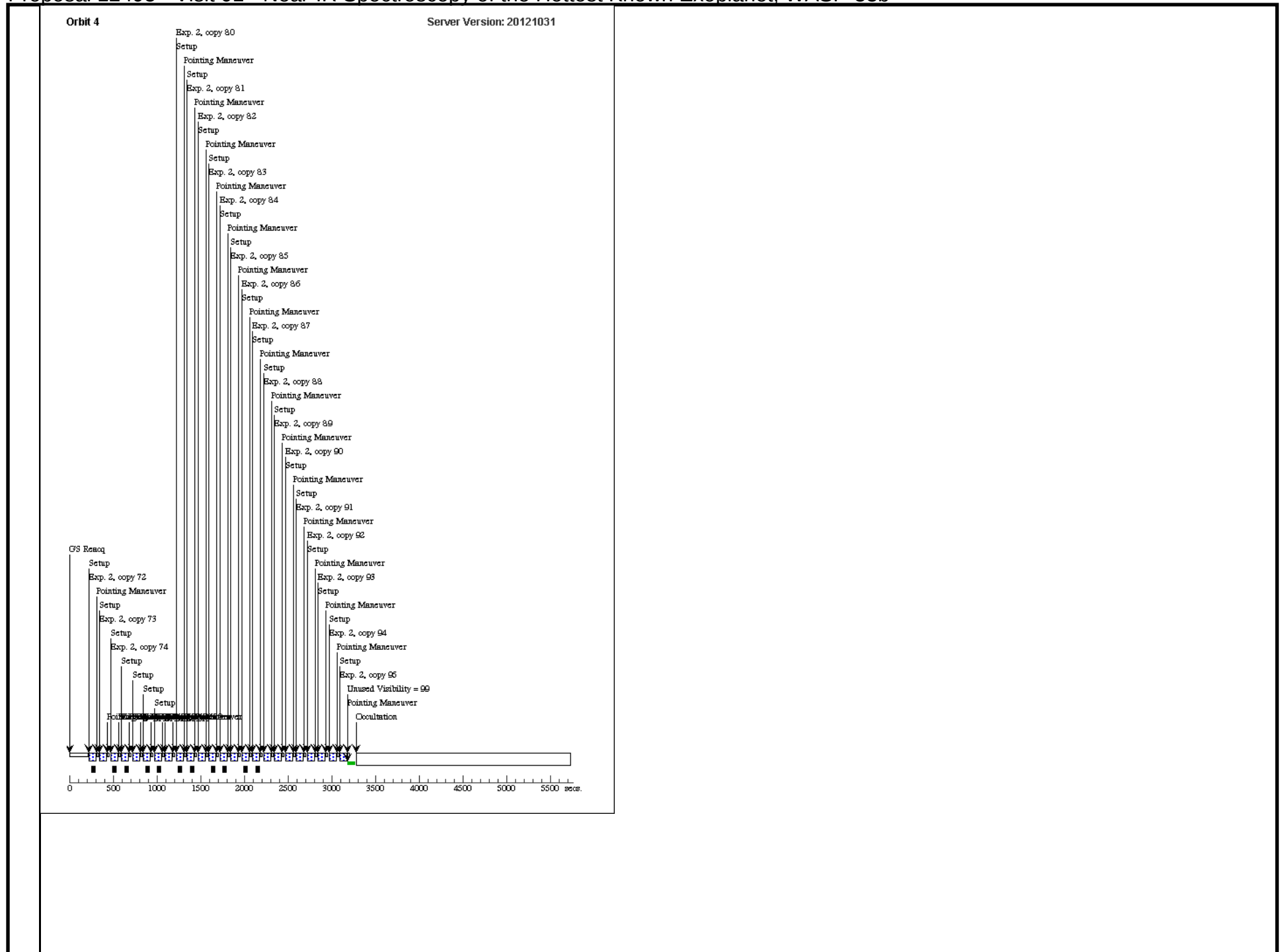
Proposal 12495 - Visit 01 - Near-IR Spectroscopy of the Hottest Known Exoplanet, WASP-33b



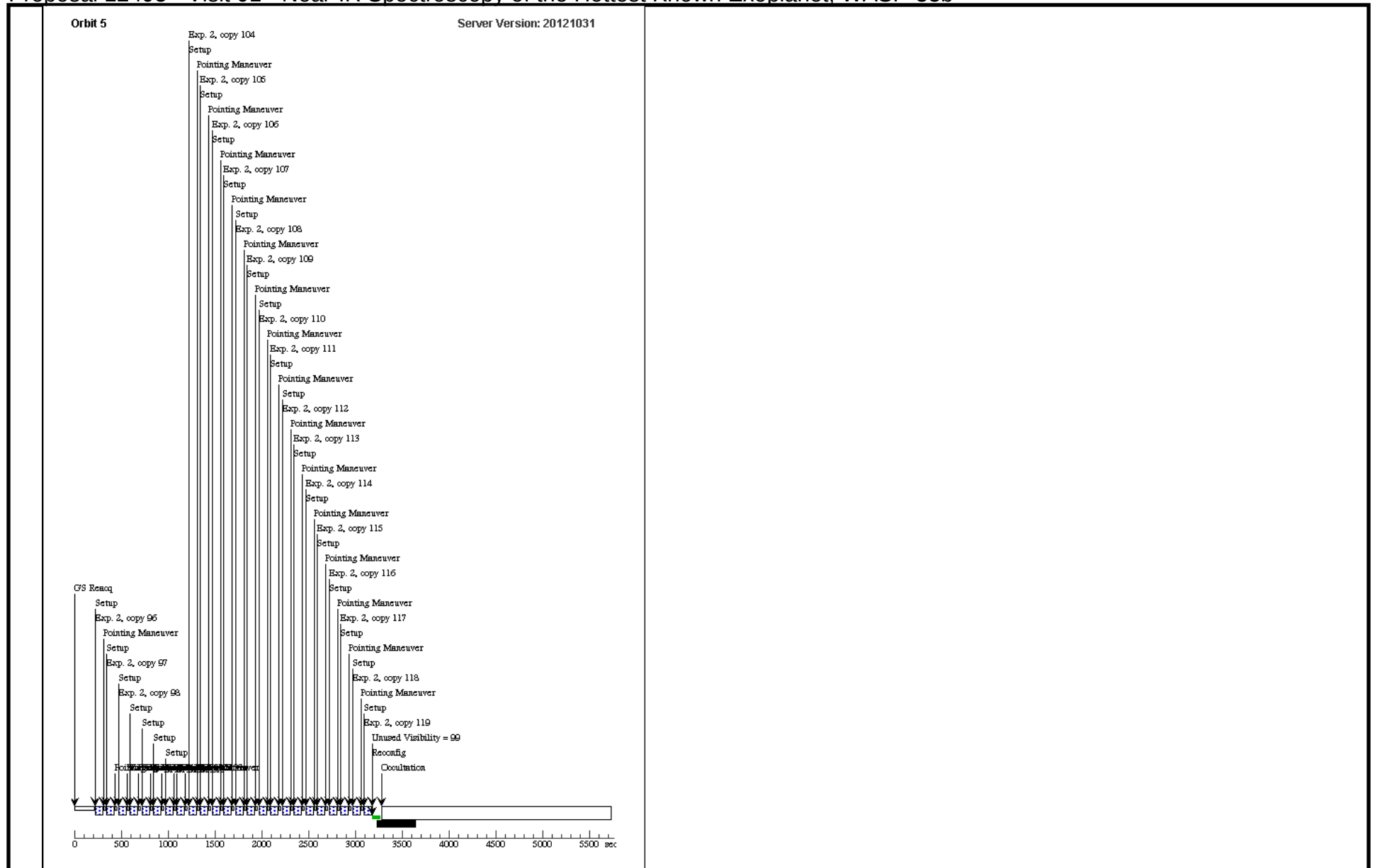
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Proposal 12495 - Visit 02 - Near-IR Spectroscopy of the Hottest Known Exoplanet, WASP-33b

Visit	Proposal 12495, Visit 02, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR Special Requirements: Period 1.21986967 D AND ZERO-PHASE HJD2454590.17936 <i>Comments: second eclipse of WASP-33</i>					Tue Nov 13 02:53:04 GMT 2012
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	WASP-33	RA: 02 26 51.0600 (36.7127500d) Dec: +37 33 1.80 (37.55050d) Equinox: J2000	Proper Motion RA: -1.26 mas/yr Proper Motion Dec: -9.22 mas/yr Epoch of Position: 2000.0	V=8.3	Reference Frame: ICRS

Proposal 12495 - Visit 02 - Near-IR Spectroscopy of the Hottest Known Exoplanet, WASP-33b

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(1) WASP-33	WFC3/IR, MULTIACCUM, IRSUB256	F139M	SAMP-SEQ=RAPID ; NSAMP=6	POS TARG 0.0,0.0; PHASE 0.3175 TO 0 .3255		[==>]	
										[1]

Proposal 12495 - Visit 02 - Near-IR Spectroscopy of the Hottest Known Exoplanet, WASP-33b

2	(1) WASP-33	WFC3/IR, MULTIACCUM, GRISM256	G141	SAMP-SEQ=SPARS 10; NSAMP=8	POS TARG 0.0,-6.5; SPATIAL SCAN 0.2 5,90.0 Degrees,Forw ard	[==>(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]
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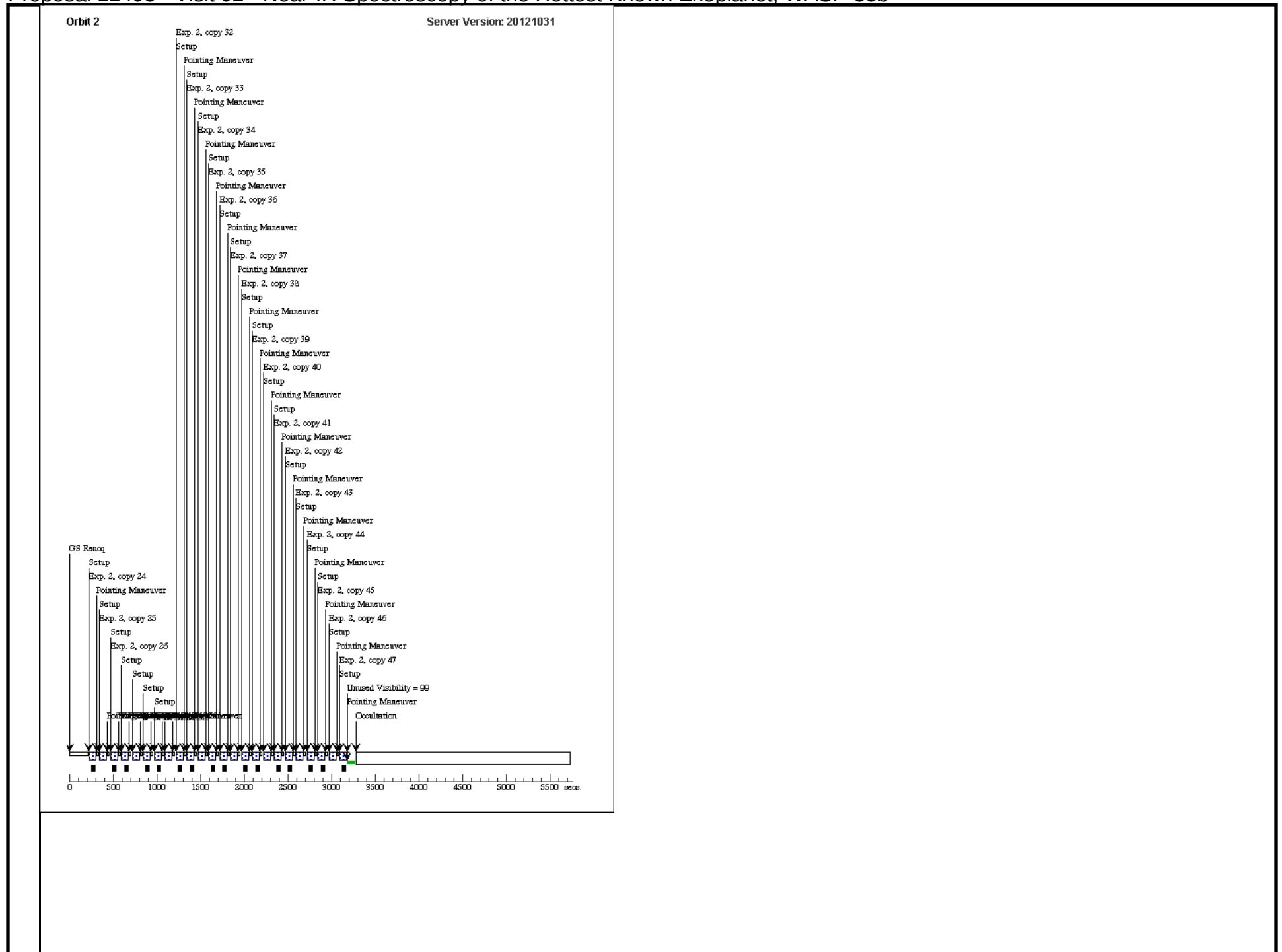
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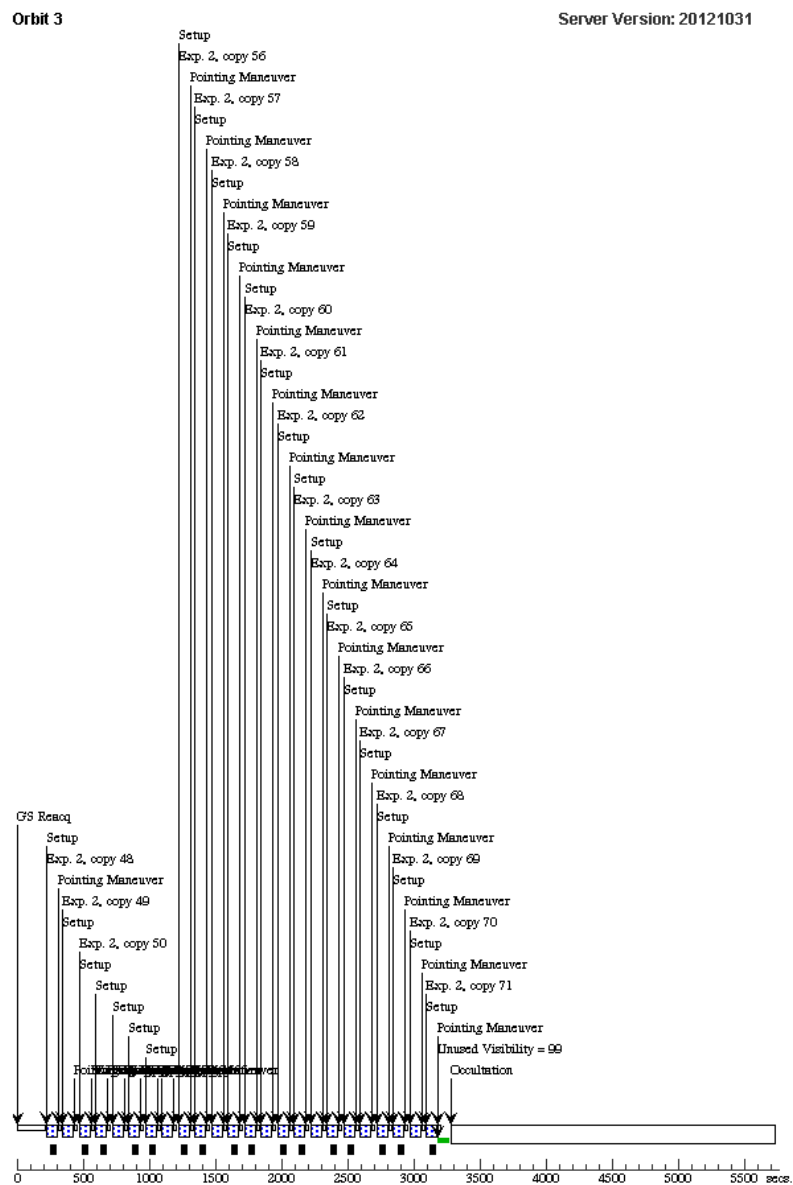
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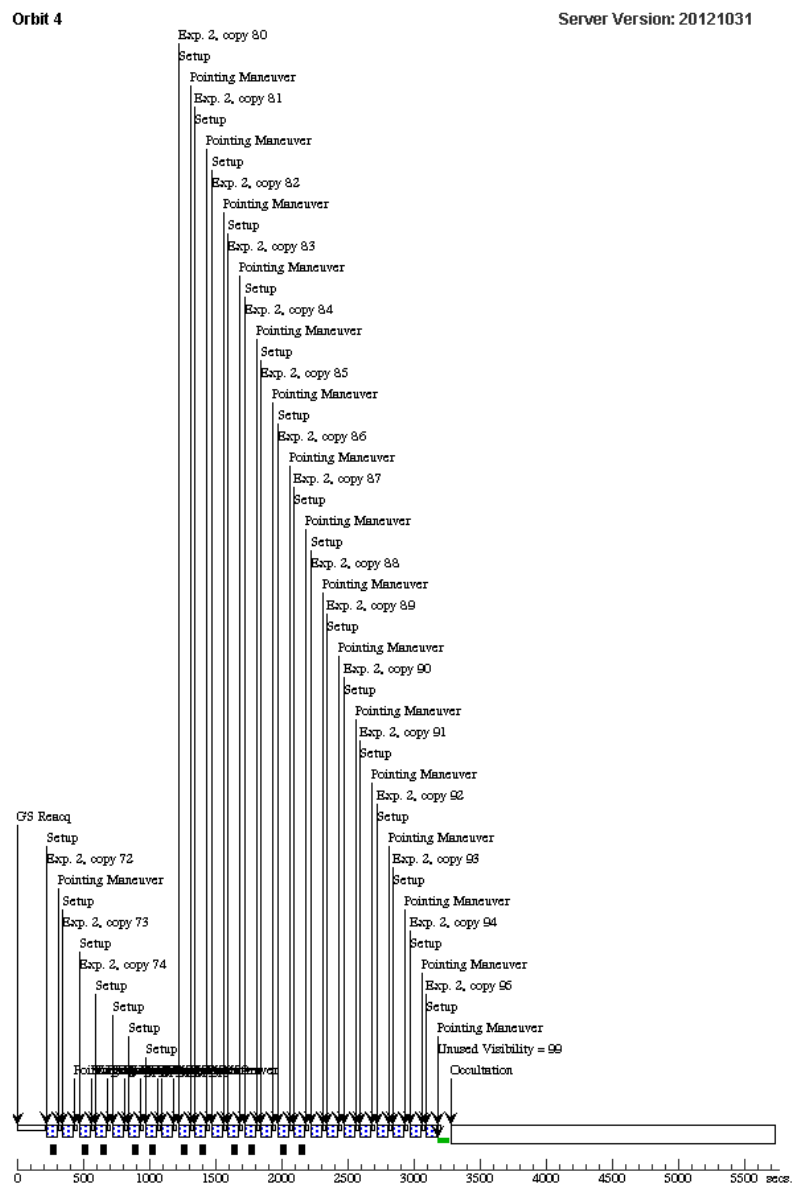
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