14051 - Constraining Dust Hazes at the L/T Transition via Variability

Cycle: 22, Proposal Category: GO

(Availability Mode: SUPPORTED)

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) 2MASS-J16291840+0335371	WFC3/IR	4	30-Jan-2015 21:27:01.0	yes

4 Total Orbits Used

ABSTRACT

The T2 dwarf SIMP 1629+03 is a variable L/T transition dwarf, with a normal near-infrared spectrum. However, it is remarkable in that the wavelength dependence of its variability differs markedly from that of other L/T transition brown dwarfs. In particular, the absence of a water absorption feature in its variability spectrum indicates that a patchy, high-altitude haze, rather than a deeper cloud layer is responsible for the observed variations. We propose to obtain Spitzer+HST observations of SIMP1629+02 over two consecutive rotations periods in order to simultaneously map it's spectral variability across 1-5 um. The wide wavelength coverage will provide a suitable lever-arm for constraining the particle size distribution in the haze. A truly flat spectrum across this wavelength range would indicate large particle sizes in comparison to those

inferred for red L-dwarf hazes, and would therefore provide direct evidence of grain growth with decreasing effective temperature and/or a grain-size dependence on surface gravity in brown dwarf atmospheres.

OBSERVING DESCRIPTION

ORIENTATION REQUIREMENTS:

We require that the spectral traces of our targets do not overlap with those of other stars in the field. Orientation constraints were calculated as follows:

PA=absolute position angle between target and background star
d= distance between target and background star
ORIENT = position angle of HST U3 axis
A_WFC3 = angle of WFC3 "-x" axis wrt HST = -45 deg
PA_WFC3 = PA - ORIENT - A_WFC3 = position angle between target and background star wrt WFC3 detector -x axis.
dY = absolute distance between spectral traces, perpedicular to the direction of dispersion

We have required that dy > 2 arcseconds, where dY=d * cos(PA_WFC3) for stars along the negative x-axis with d>18". For d< 18" constraints have been place in the -ve and +ve directions. In some cases an extra buffer of up to +/- 5 deg was added due to uncertainties in source and background star proper motions.

TARGETS

Our target is a brown dwarf (bright in the IR), and does not appear in optical images using the target confirmation tool. It also has significant proper motion, which has been provided.

Visit

Proposal 14051, visit_1629 (01) Sat Jan 31 02:27:05 GMT 2015

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 0D TO 14 D; ORIENT 218D TO 290 D; ORIENT 326D TO 359 D; ORIENT 38D TO 110 D; ORIENT 146D TO 194 D

Comments: Continuous observation of 2MASS-J16291840+0335371

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	2MASS-J16291840+0335371	RA: 16 29 18.4090 (247.3267042d) Dec: +03 35 37.10 (3.59364d) Equinox: J2000	Proper Motion RA: 0.243 arcsec/yr Proper Motion Dec: -0.158 arcsec/yr Epoch of Position: 2000.44	V=(?) J=15.3	Reference Frame: ICRS

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	PreImage	(1) 2MASS-J16291840+0335371	WFC3/IR, MULTIACCUM, GRISM256	F127M	NSAMP=2; SAMP-SEQ=SPARS10			7.624302 Secs X 2 (15.249 Secs) *[==>(Copy 1)]* *[==>(Copy 2)]*	***[1]***
2	SpectralSeries	(1) 2MASS-J16291840+0335371	WFC3/IR, MULTIACCUM, GRISM256	G141	NSAMP=6; SAMP-SEQ=SPARS25			112.00801 Secs X 20 (2240.16 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)]*	***[1]***
3	PreImage	(1) 2MASS-J16291840+0335371	WFC3/IR, MULTIACCUM, GRISM256	F127M	NSAMP=2; SAMP-SEQ=SPARS10			7.624302 Secs X 2 (15.249 Secs) *[==>(Copy 1)]* *[==>(Copy 2)]*	***[2]***

4	SpectralSeries	(1) 2MASS-J16291840+0335371	WFC3/IR, MULTIACCUM, GRISM256	G141	NSAMP=6; SAMP-SEQ=SPARS25	112.00801 Secs X 20 (2240.16 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)]*	***[2]***
5	PreImage	(1) 2MASS-J16291840+0335371	WFC3/IR, MULTIACCUM, GRISM256	F127M	NSAMP=2; SAMP-SEQ=SPARS10	7.624302 Secs (7.624 Secs) *[==>]*	***[3]***
6	SpectralSeries	(1) 2MASS-J16291840+0335371	WFC3/IR, MULTIACCUM, GRISM256	G141	NSAMP=6; SAMP-SEQ=SPARS25	112.00801 Secs X 20 (2240.16 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)]*	***[3]***

	7	PreImage	(1) 2MASS-J16291840+0335371	WFC3/IR, MULTIACCUM, GRISM256	F127M	NSAMP=2; SAMP-SEQ=SPARS10	7.624302 Secs X 2 (15.249 Secs)	
							[==>(Copy 1)]	***[3]***
							[==>(Copy 2)]	***[4]***
	8	SpectralSeries	(1) 2MASS-J16291840+0335371	WFC3/IR, MULTIACCUM, GRISM256	G141	NSAMP=6; SAMP-SEQ=SPARS25	112.00801 Secs X 20 (2240.16 Secs)	
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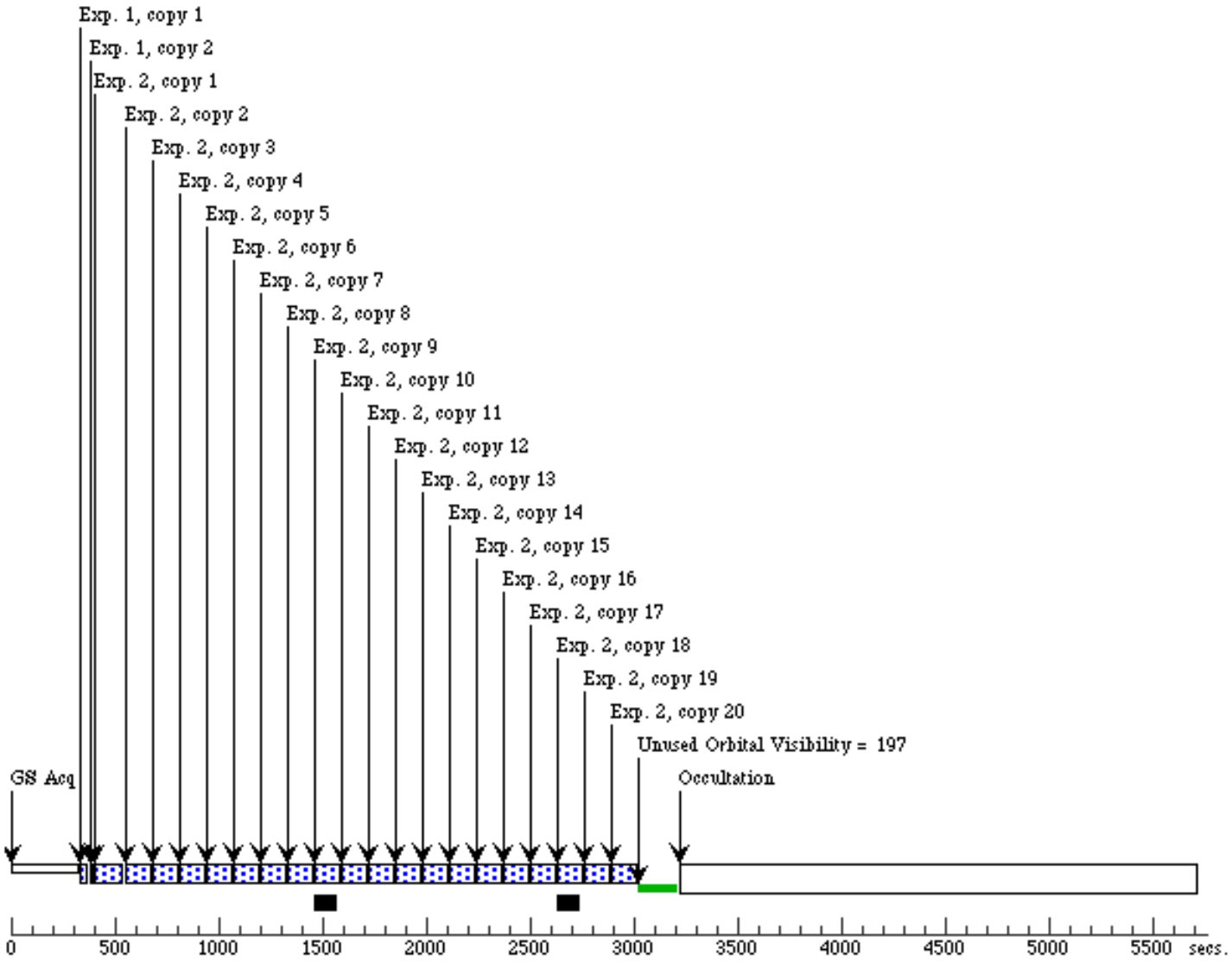
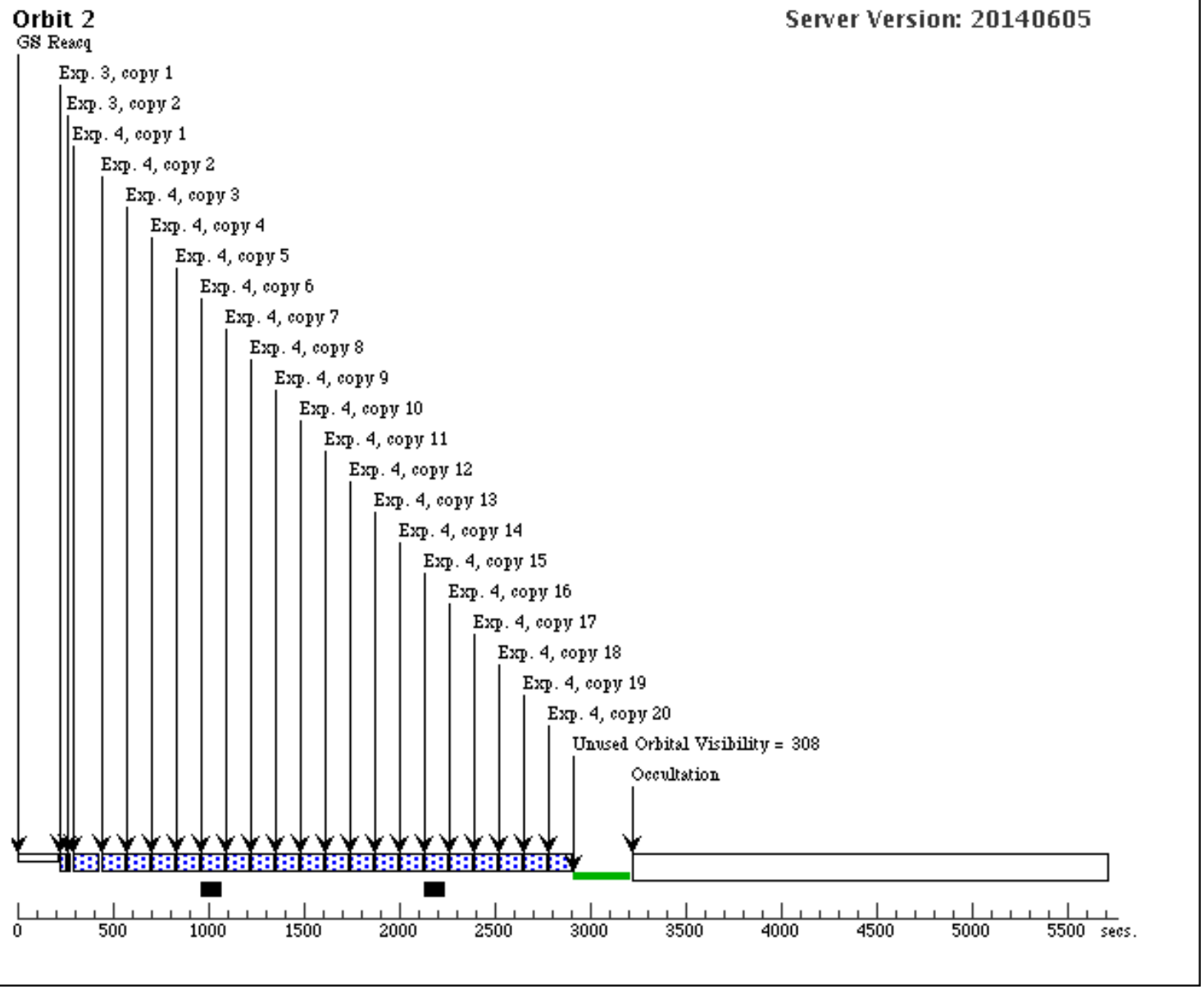
							[==>(Copy 20)]	

Orbit Structure

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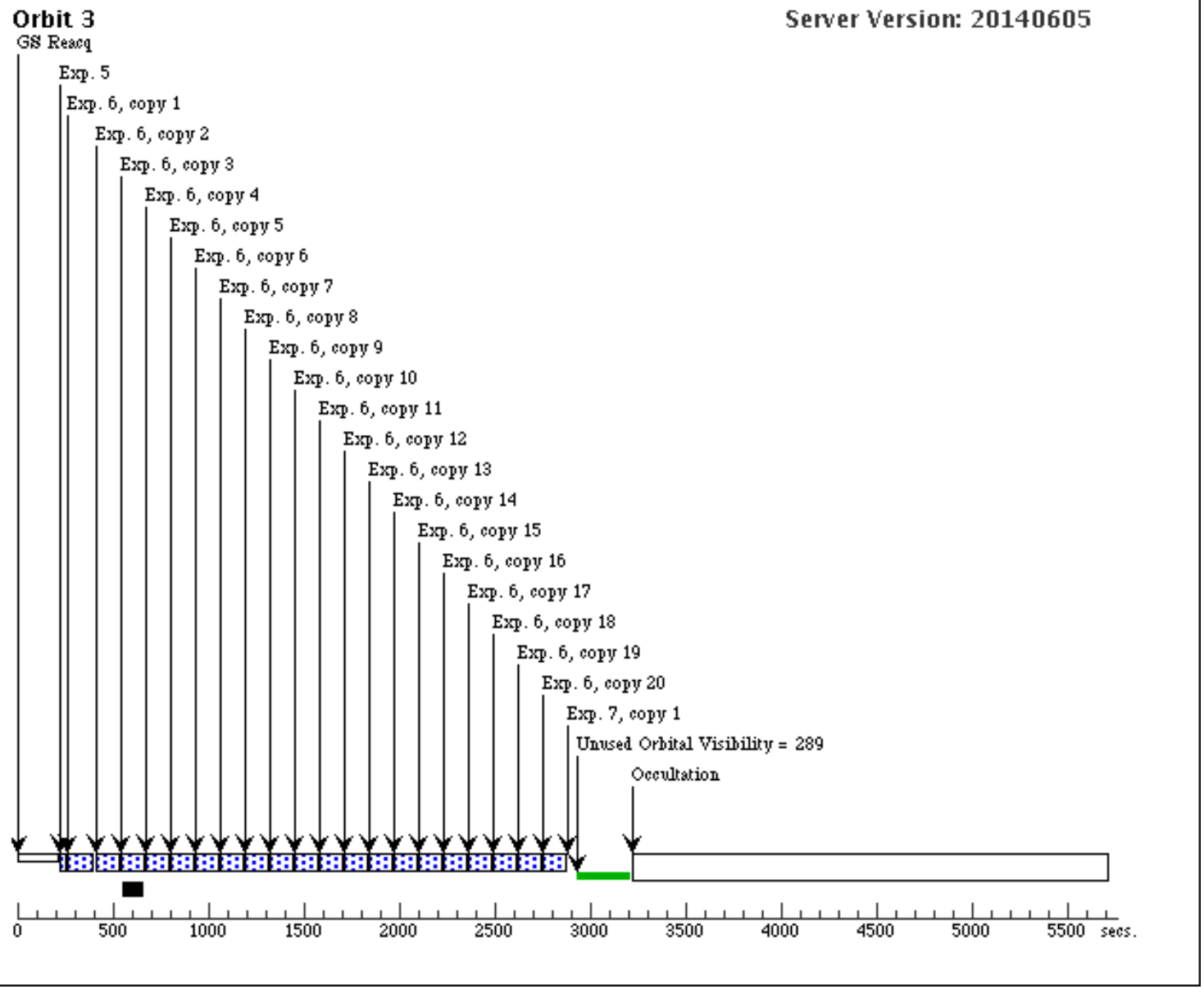
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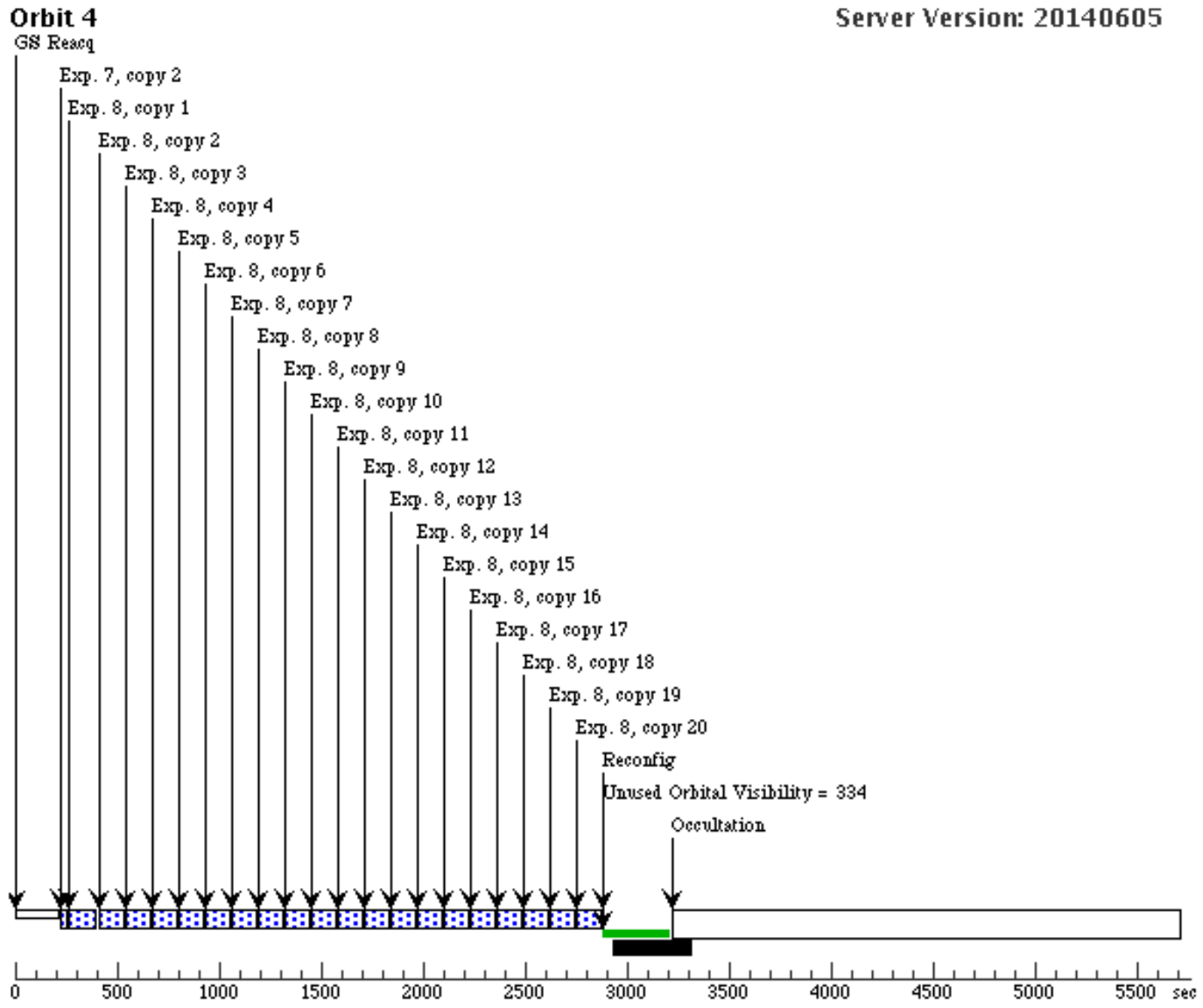
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