11576 - Physical parameters of the upper atmosphere of the extrasolar planet HD209458b

Cycle: 17, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	*Institution*	*E-Mail*
Mr. Jean-Michel Desert (PI) (ESA Member)	**CNRS, Institut d'Astrophysique de Paris**	**desert@iap.fr**
Dr. Alfred Vidal-Madjar (CoI) (ESA Member)	CNRS, Institut d'Astrophysique de Paris	vidalmadjar@iap.fr
Dr. Alain Lecavelier des Etangs (CoI) (ESA Member)	CNRS, Institut d'Astrophysique de Paris	lecaveli@iap.fr
Dr. Gilda E. Ballester (CoI)	University of Arizona	gilda@vega.lpl.arizona.edu
Dr. David Kent Sing (CoI) (ESA Member)	CNRS, Institut d'Astrophysique de Paris	sing@iap.fr
Dr. David Ehrenreich (CoI) (ESA Member)	Universite de Grenoble I	ehrenrei@iap.fr
Dr. Guillaume Hebrard (CoI) (ESA Member)	CNRS, Institut d'Astrophysique de Paris	hebrard@iap.fr
Dr. Roger D. Ferlet (CoI) (ESA Member)	CNRS, Institut d'Astrophysique de Paris	ferlet@iap.fr
Dr. D. Jack MacConnell (CoI)	York University	jack@nimbus.yorku.ca

VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) HD-209458	STIS/CCD STIS/NUV-MAMA	5	10-Jun-2010 21:01:28.0	yes
02	(1) HD-209458	STIS/CCD STIS/NUV-MAMA	5	10-Jun-2010 21:02:03.0	yes
03	(1) HD-209458	STIS/CCD STIS/NUV-MAMA	5	10-Jun-2010 21:02:32.0	yes

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
04	(1) HD-209458	STIS/CCD STIS/NUV-MAMA	1	10-Jun-2010 21:02:48.0	yes

16 Total Orbits Used

ABSTRACT

One of the most studied extrasolar planet, HD209458b, has revealed both its lower and upper atmosphere thanks to HST and Spitzer observatories.

Through transmission spectroscopy technique, several atmospheric species were detected: NaI, HI, OI and CII. Using STIS archived transit absorption spectrum from 3000 to 8000 Angstrom, we obtained detailed constraints on the vertical profile of temperature, pressure and abundances (Sing et al 2008a, 2008b, Lecavelier et al. 2008b).

By observing in the NUV, from 2300 to 3100 Angstrom, we expect to obtain new constraints on the physical conditions and the chemical composition of the upper atmosphere: temperature/pressure profile up to very high in the atmosphere, abundance and condensation altitudes of new species, and new insight in the atmospheric escape and ionization state at the upper levels. The observation of four HD209458b transits with a single E230M setting will give access to many NUV atomic lines addressing these issues. The proposed observations will probe, for the first time, in details the atmosphere of a hot Jupiter, thus bench marking follow up studies.

OBSERVING DESCRIPTION

We propose to observe during the planetary transit in front of the star HD 209458 all the stellar lines using STIS/E230M mode.
The transit occurs every 3.5 days and lasts about 3 hours. Thus each visit allows to obtain scientific data for about 2 consecutive orbits during the transit. We will perform 3 visits of 5 orbits beginning before the occultation.
The observations of the stellar spectrum before or after the occultation will be used as reference spectra to check the level of stellar variations.
A total of 15 orbits on the 16 allocated are used to perform the present program.

Visit

Proposal 11576, Visit 01, implementation Fri Jun 11 01:02:52 GMT 2010

Diagnostic Status: Warning

Scientific Instruments: STIS/CCD, STIS/NUV-MAMA

Special Requirements: Period 3.52474859 D AND ZERO-PHASE HJD2452826.628521

Comments: Period=3.52474859 +/- 0.00000038 (days)
Tc0=2452826.628521 +/- 0.000087 (HJD)
From Knutson et al. 2007

Diagnostics

(Visit 01) Warning (Orbit Planner): VISIBILITY OVERRUN
(Visit 01) Warning (Orbit Planner): VISIBILITY OVERRUN
(Visit 01) Warning (Orbit Planner): VISIBILITY OVERRUN
(Visit 01) Warning (Orbit Planner): VISIBILITY OVERRUN
(Visit 01) Warning (Orbit Planner): VISIBILITY OVERRUN

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	HD-209458	RA: 22 03 10.8000 (330.7950000d)		V=7.65	Reference Frame: ICRS
	Alt Name1: HD209458	Dec: +18 53 4.00 (18.88444d)			
		Equinox: J2000			

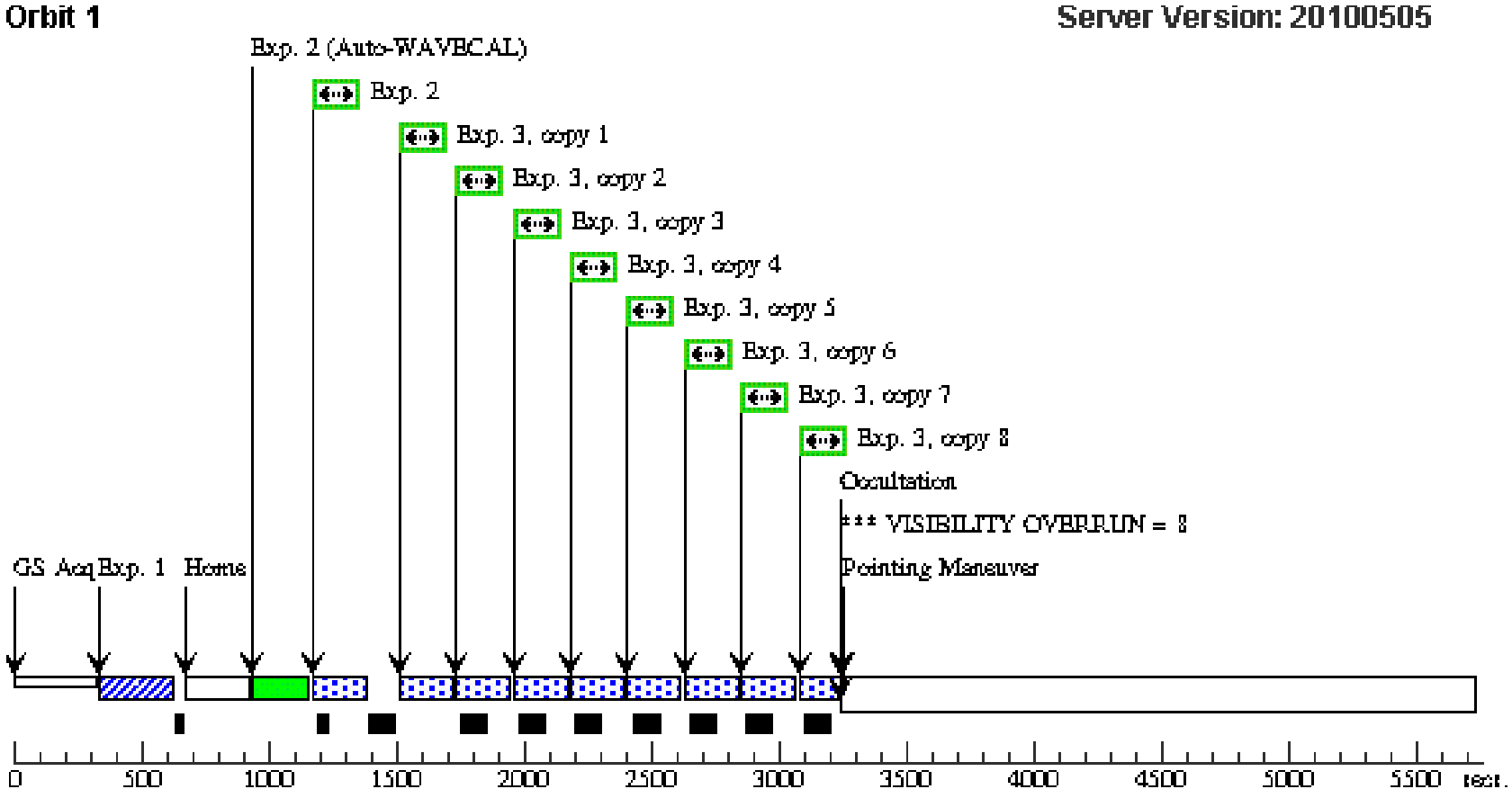
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.This object was generated by the targetselector and retrieved from the SIMBAD database.

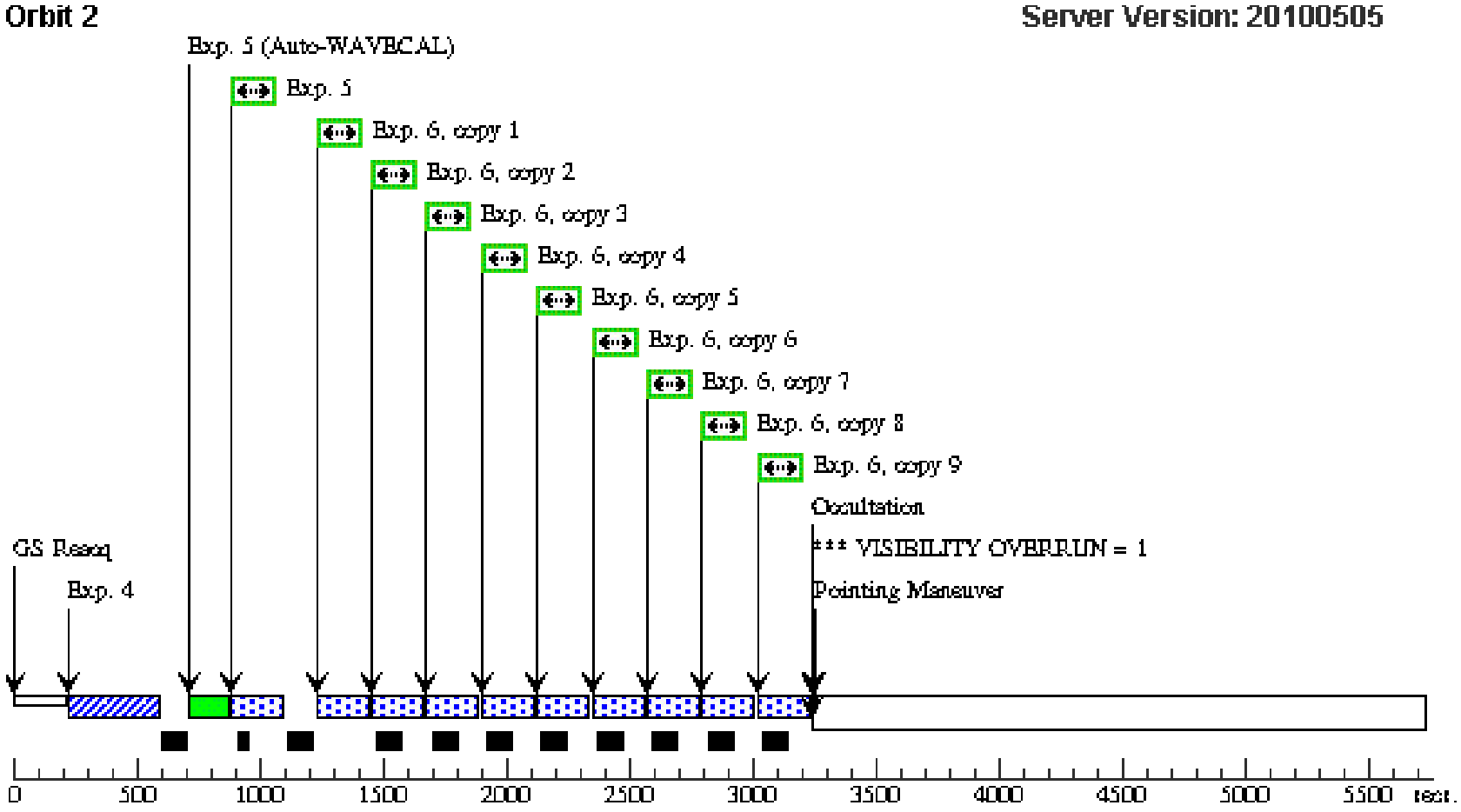
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) HD-209458	STIS/CCD, ACQ, F28X50OIII	MIRROR			Sequence 1-3 Non-Int	4 Secs *[==>]*	 ***[1]***
2		(1) HD-209458	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A		PHASE 0.94325 TO 0.95463	Sequence 1-3 Non-Int	200.0 Secs *[==>]*	 ***[1]***
3		(1) HD-209458	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 1-3 Non-Int	200 Secs X 8 *[==>(Copy 1)]* *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(Copy 4)]* *[==>(Copy 5)]* *[==>(Copy 6)]* *[==>(Copy 7)]* *[==>149.0 Secs (Copy 8)]*	 ***[1]***
4		(1) HD-209458	STIS/CCD, ACQ, F28X50OII	MIRROR			Sequence 4-6 Non-Int	4 Secs *[==>]*	 ***[2]***
5		(1) HD-209458	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 4-6 Non-Int	200 Secs *[==>]*	 ***[2]***
6		(1) HD-209458	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 4-6 Non-Int	200 Secs X 9 *[==>(Copy 1)]* *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(Copy 4)]* *[==>(Copy 5)]* *[==>(Copy 6)]* *[==>(Copy 7)]* *[==>(Copy 8)]* *[==>(Copy 9)]*	 ***[2]***
7		(1) HD-209458	STIS/CCD, ACQ, F28X50OII	MIRROR			Sequence 7-9 Non-Int	4 Secs *[==>]*	 ***[3]***
8		(1) HD-209458	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 7-9 Non-Int	200 Secs *[==>]*	 ***[3]***
9		(1) HD-209458	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 7-9 Non-Int	200 Secs X 9 *[==>(Copy 1)]* *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(Copy 4)]* *[==>(Copy 5)]* *[==>(Copy 6)]* *[==>(Copy 7)]* *[==>(Copy 8)]* *[==>(Copy 9)]*	 ***[3]***
10		(1) HD-209458	STIS/CCD, ACQ, F28X50OII	MIRROR			Sequence 10-12 Non-Int	4 Secs *[==>]*	 ***[4]***

	11	(1) HD-209458	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A	Sequence 10-12 Non-Int	200 Secs *[==>]*	 ***[4]***
	12	(1) HD-209458	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A	Sequence 10-12 Non-Int	200 Secs X 9 *[==>(Copy 1)]* *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(Copy 4)]* *[==>(Copy 5)]* *[==>(Copy 6)]* *[==>(Copy 7)]* *[==>(Copy 8)]* *[==>(Copy 9)]*	 ***[4]***
	13	(1) HD-209458	STIS/CCD, ACQ, F28X50OII	MIRROR	Sequence 13-15 Non-Int	4 Secs *[==>]*	 ***[5]***
	14	(1) HD-209458	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A	Sequence 13-15 Non-Int	200 Secs *[==>]*	 ***[5]***
	15	(1) HD-209458	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A	Sequence 13-15 Non-Int	200 Secs X 9 *[==>(Copy 1)]* *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(Copy 4)]* *[==>(Copy 5)]* *[==>(Copy 6)]* *[==>(Copy 7)]* *[==>(Copy 8)]* *[==>(Copy 9)]*	 ***[5]***

Orbit Structure

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Occultation
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GS Reacq
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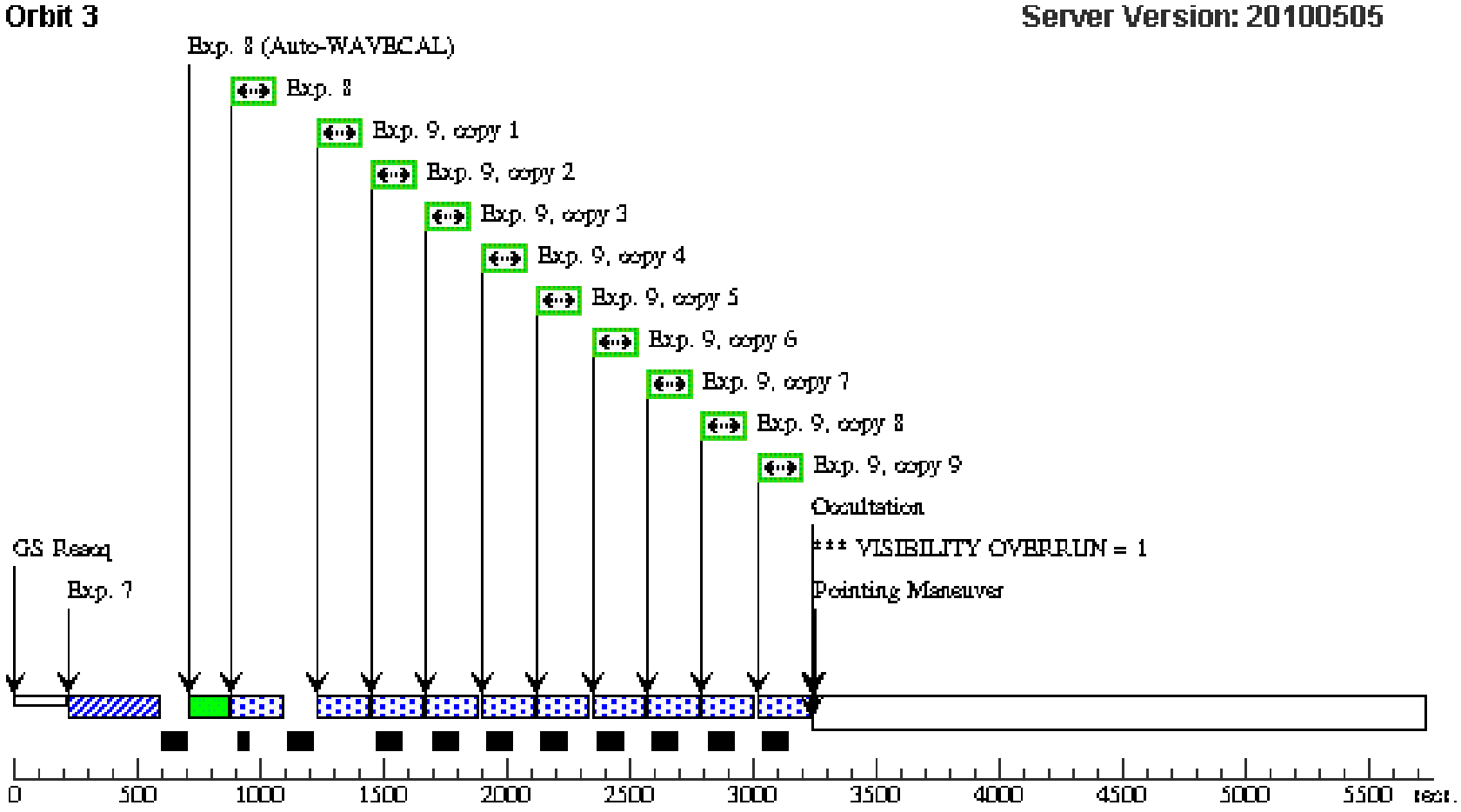
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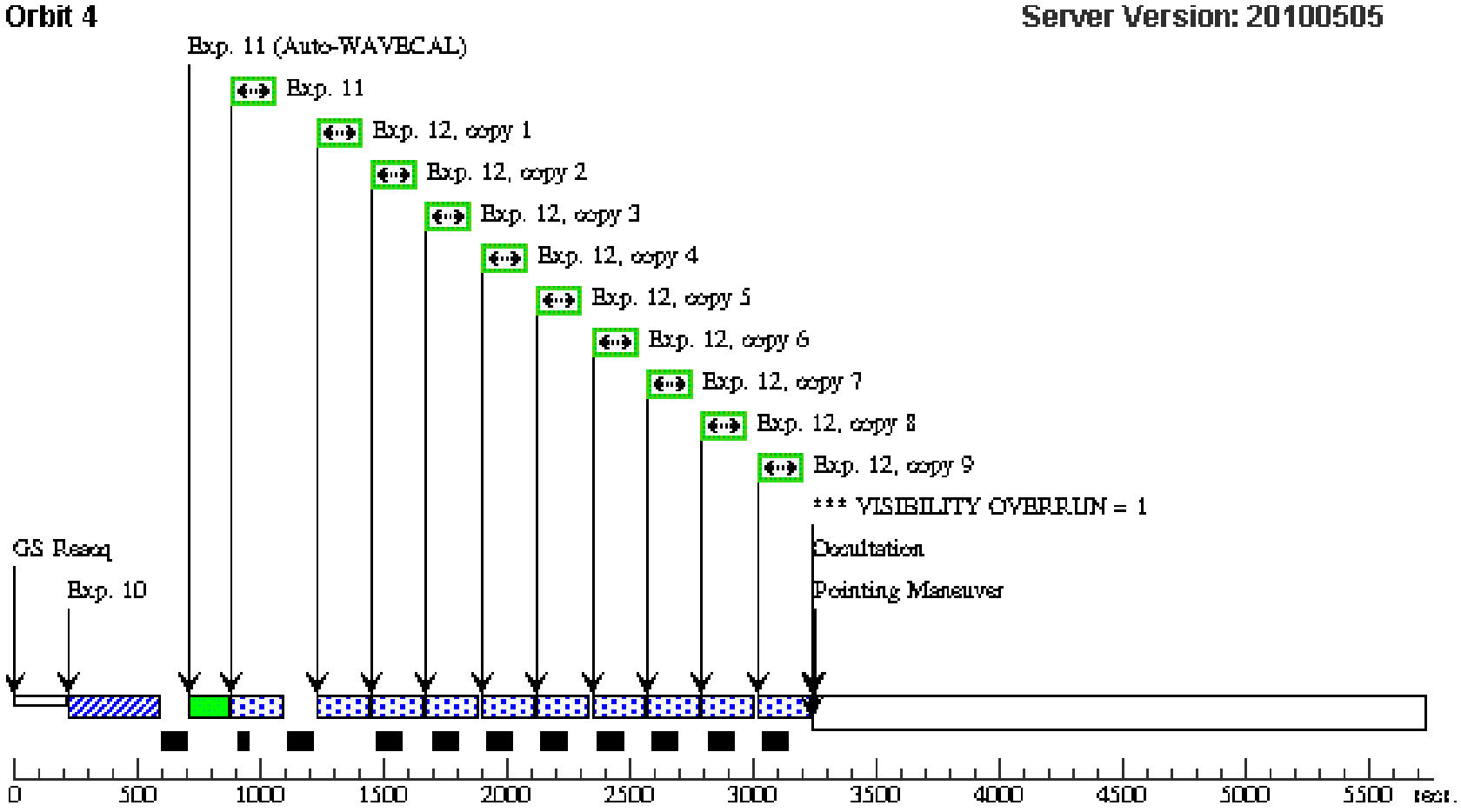
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GS Reacq
Exp. 10
Occultation
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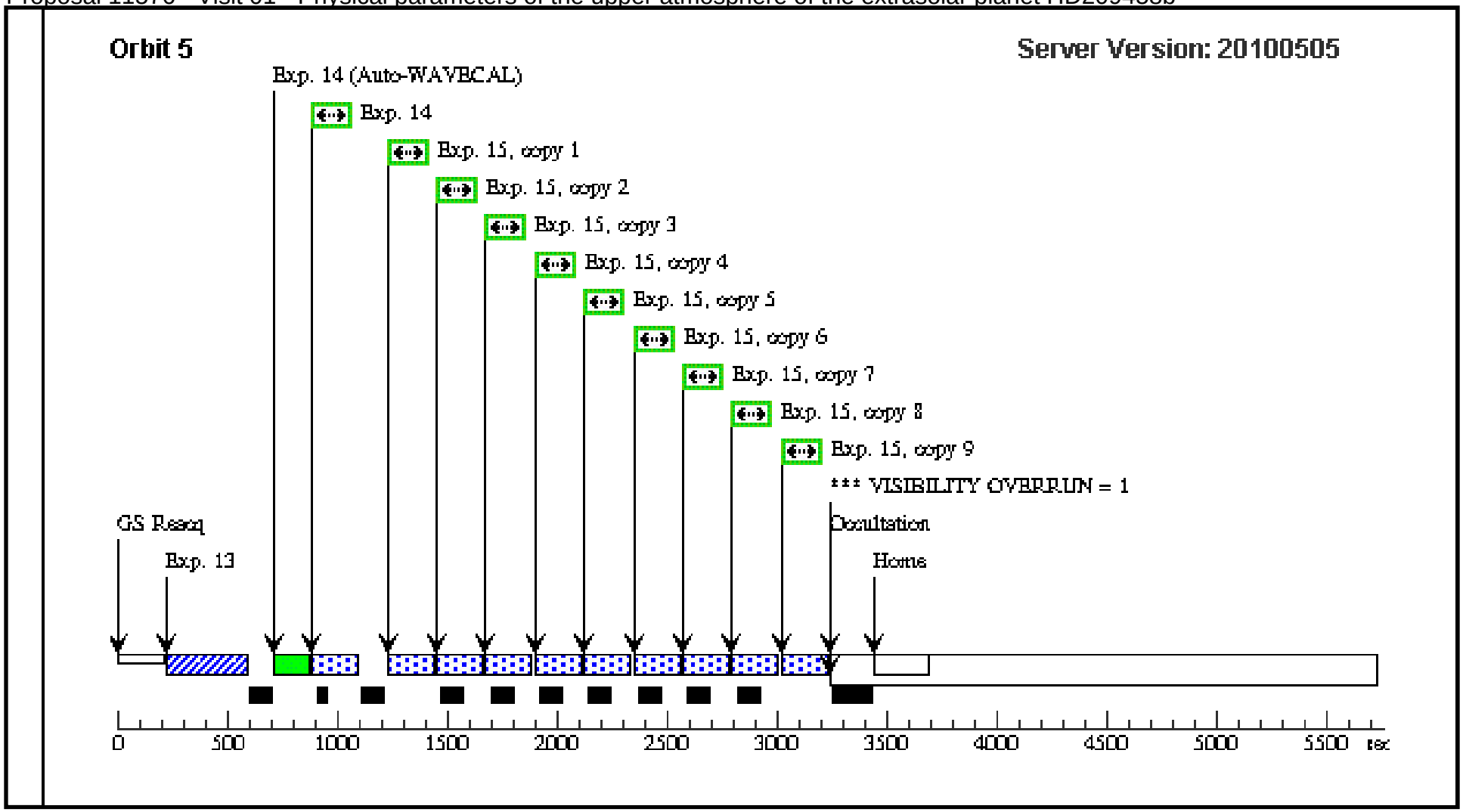
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Exp. 15, copy 8
Exp. 15, copy 9
*** VISIBILITY OVERRUN = 1
Occultation
GS Reacq
Exp. 13
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Visit

Proposal 11576, Visit 02, implementation Fri Jun 11 01:02:55 GMT 2010

Diagnostic Status: Warning

Scientific Instruments: STIS/CCD, STIS/NUV-MAMA

Special Requirements: Period 3.52474859 D AND ZERO-PHASE HJD2452826.628521

Comments: Period=3.52474859 +/- 0.00000038 (days)
Tc0=2452826.628521 +/- 0.000087 (HJD)
From Knutson et al. 2007

Diagnostics

(Visit 02) Warning (Orbit Planner): VISIBILITY OVERRUN
(Visit 02) Warning (Orbit Planner): VISIBILITY OVERRUN
(Visit 02) Warning (Orbit Planner): VISIBILITY OVERRUN
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(Visit 02) Warning (Orbit Planner): VISIBILITY OVERRUN

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	HD-209458	RA: 22 03 10.8000 (330.7950000d)		V=7.65	Reference Frame: ICRS
	Alt Name1: HD209458	Dec: +18 53 4.00 (18.88444d)			
		Equinox: J2000			

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.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/[Actual Dur.]	Orbit
1		(1) HD-209458	STIS/CCD, ACQ, F28X50OIII	MIRROR			Sequence 1-3 Non-Int	4 Secs	
								[==>]	***[1]***
2		(1) HD-209458	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A		PHASE 0.94325 TO 0.95463	Sequence 1-3 Non-Int	200 Secs	
								[==>]	***[1]***
3		(1) HD-209458	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 1-3 Non-Int	200 Secs X 8	
								[==>(Copy 1)] *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(Copy 4)]* *[==>(Copy 5)]* *[==>(Copy 6)]* *[==>(Copy 7)]* *[==>149.0 Secs (Copy 8)]*	***[1]***
4		(1) HD-209458	STIS/CCD, ACQ, F28X50OII	MIRROR			Sequence 4-6 Non-Int	4 Secs	
								[==>]	***[2]***
5		(1) HD-209458	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 4-6 Non-Int	200 Secs	
								[==>]	***[2]***
6		(1) HD-209458	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 4-6 Non-Int	200 Secs X 9	
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7		(1) HD-209458	STIS/CCD, ACQ, F28X50OII	MIRROR			Sequence 7-9 Non-Int	4 Secs	
								[==>]	***[3]***
8		(1) HD-209458	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 7-9 Non-Int	200 Secs	
								[==>]	***[3]***
9		(1) HD-209458	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 7-9 Non-Int	200 Secs X 9	
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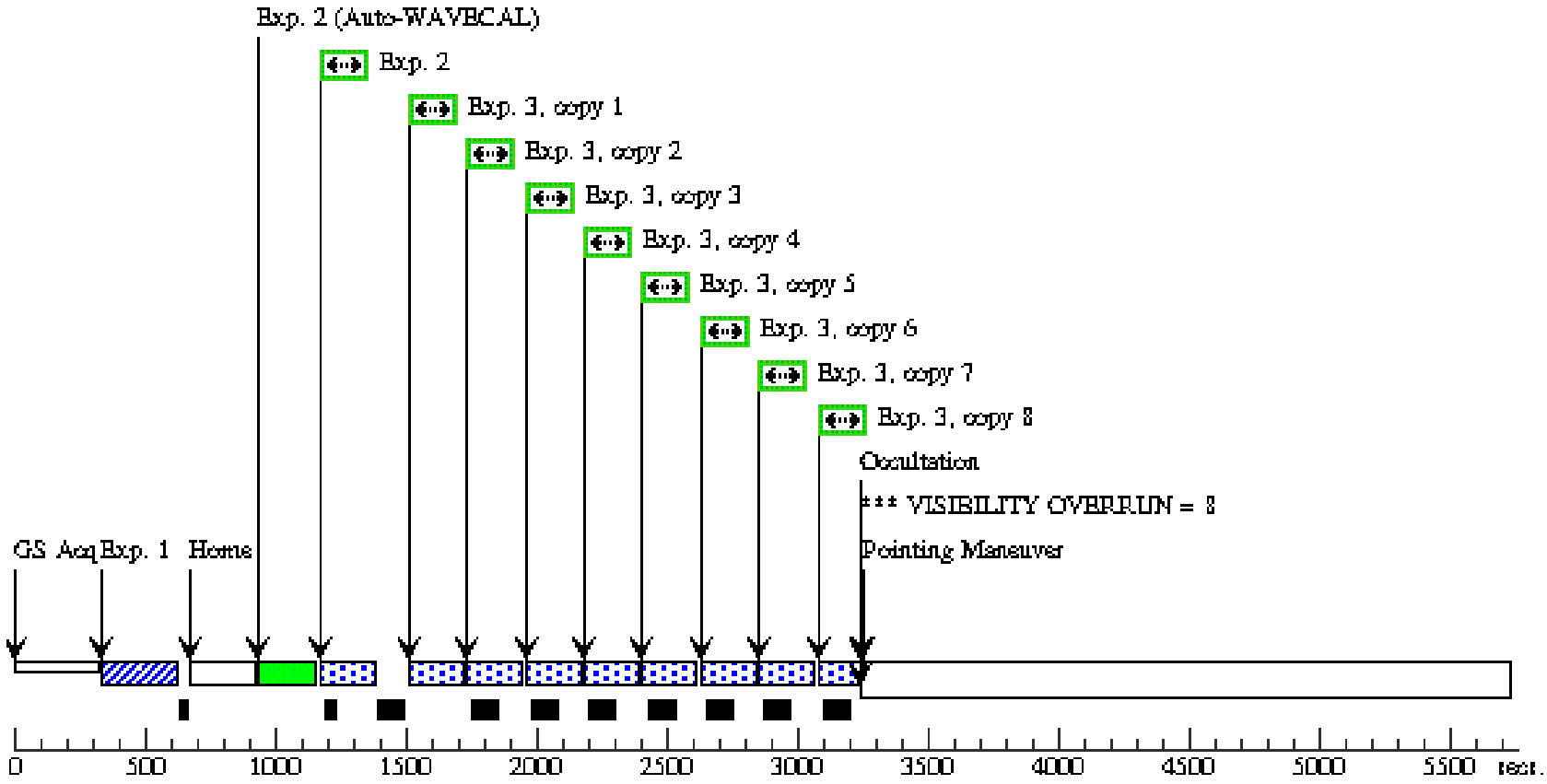
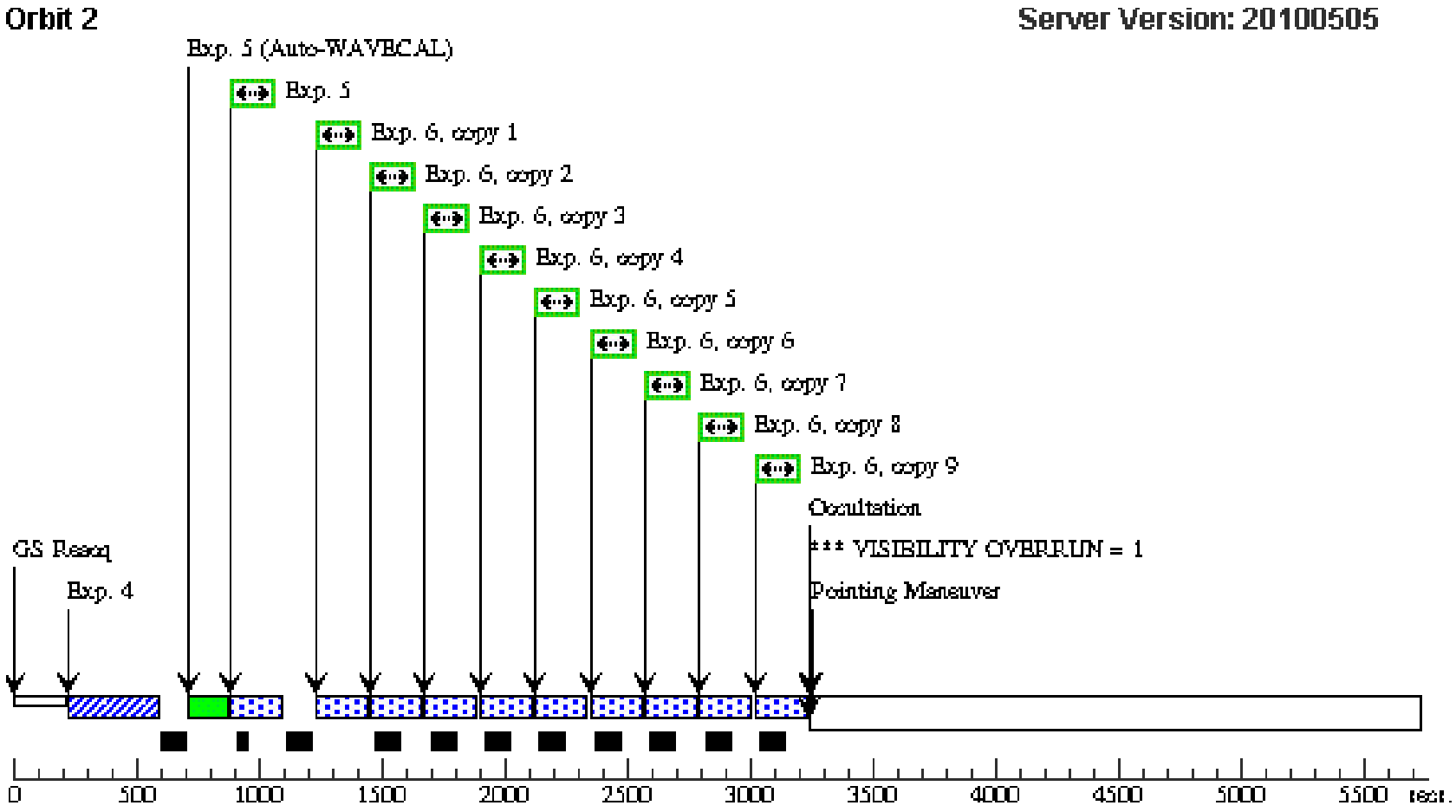
10		(1) HD-209458	STIS/CCD, ACQ, F28X50OII	MIRROR			Sequence 10-12 Non-Int	4 Secs	
								[==>]	***[4]***

	11	(1) HD-209458	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A	Sequence 10-12 Non-Int	200 Secs *[==>]*	 ***[4]***
	12	(1) HD-209458	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A	Sequence 10-12 Non-Int	200 Secs X 9 *[==>(Copy 1)]* *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(Copy 4)]* *[==>(Copy 5)]* *[==>(Copy 6)]* *[==>(Copy 7)]* *[==>(Copy 8)]* *[==>(Copy 9)]*	 ***[4]***
	13	(1) HD-209458	STIS/CCD, ACQ, F28X50OII	MIRROR	Sequence 13-15 Non-Int	4 Secs *[==>]*	 ***[5]***
	14	(1) HD-209458	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A	Sequence 13-15 Non-Int	200 Secs *[==>]*	 ***[5]***
	15	(1) HD-209458	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A	Sequence 13-15 Non-Int	200 Secs X 9 *[==>(Copy 1)]* *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(Copy 4)]* *[==>(Copy 5)]* *[==>(Copy 6)]* *[==>(Copy 7)]* *[==>(Copy 8)]* *[==>(Copy 9)]*	 ***[5]***

Orbit Structure

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Occultation
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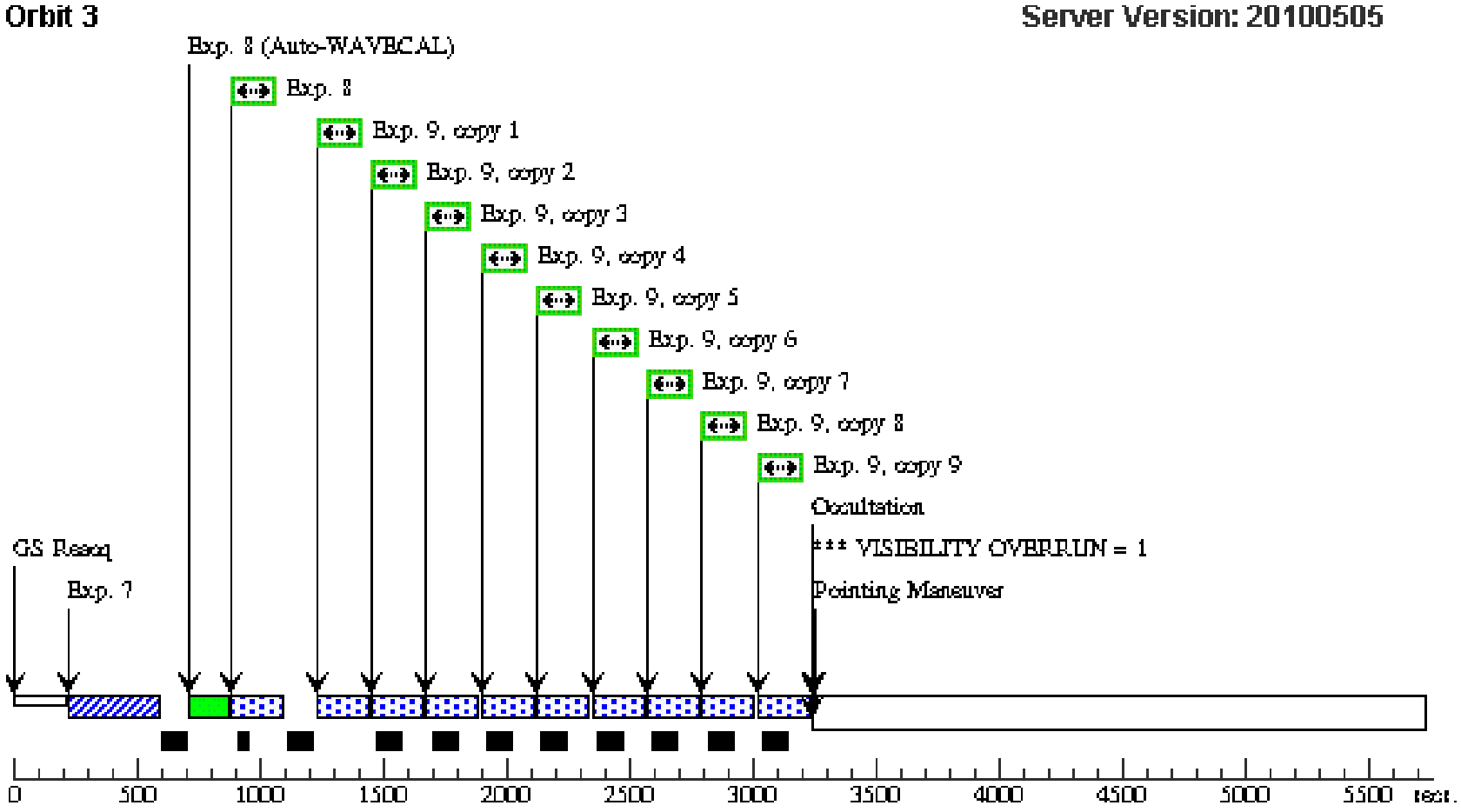
sec.


Orbit 3
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Exp. 9, copy 9
Occultation
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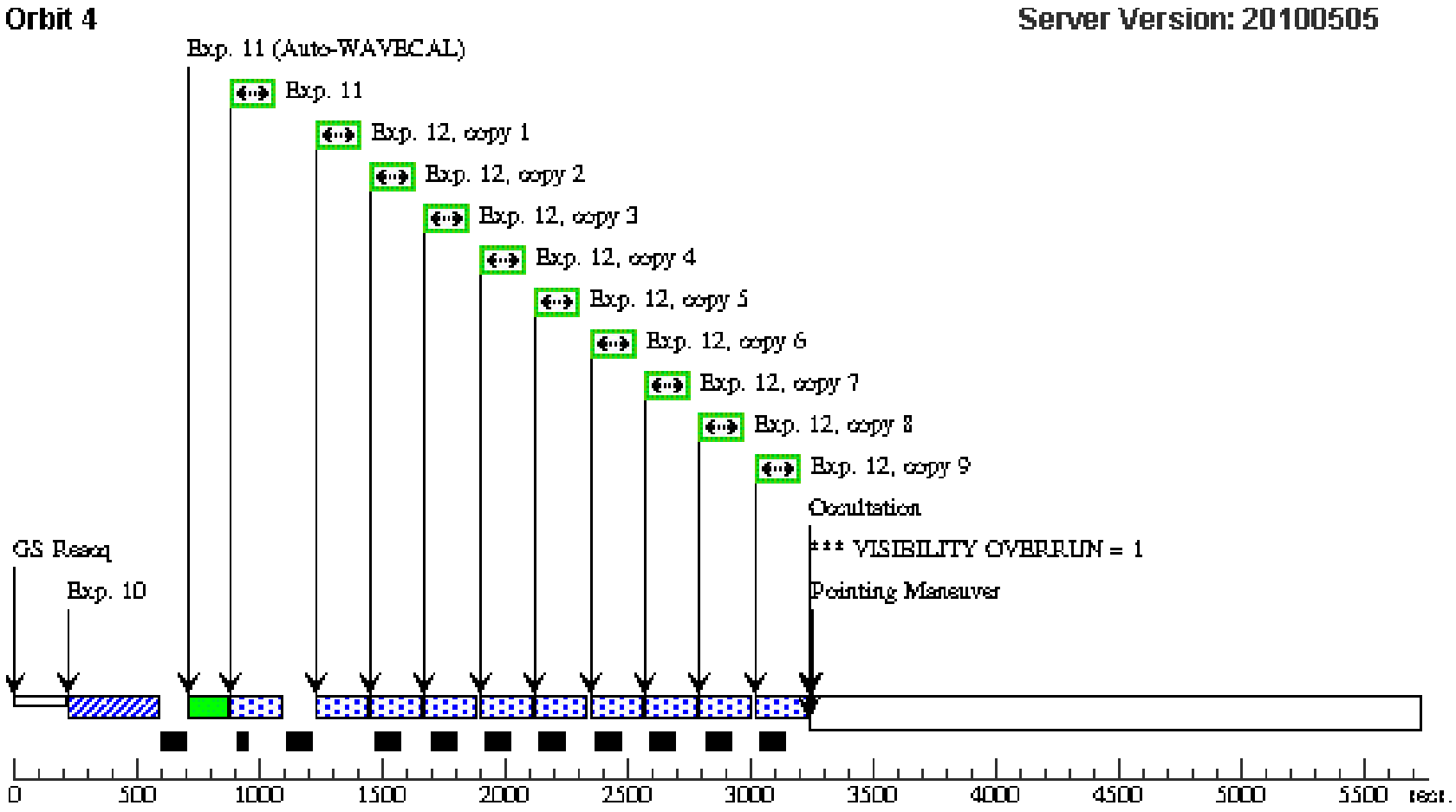
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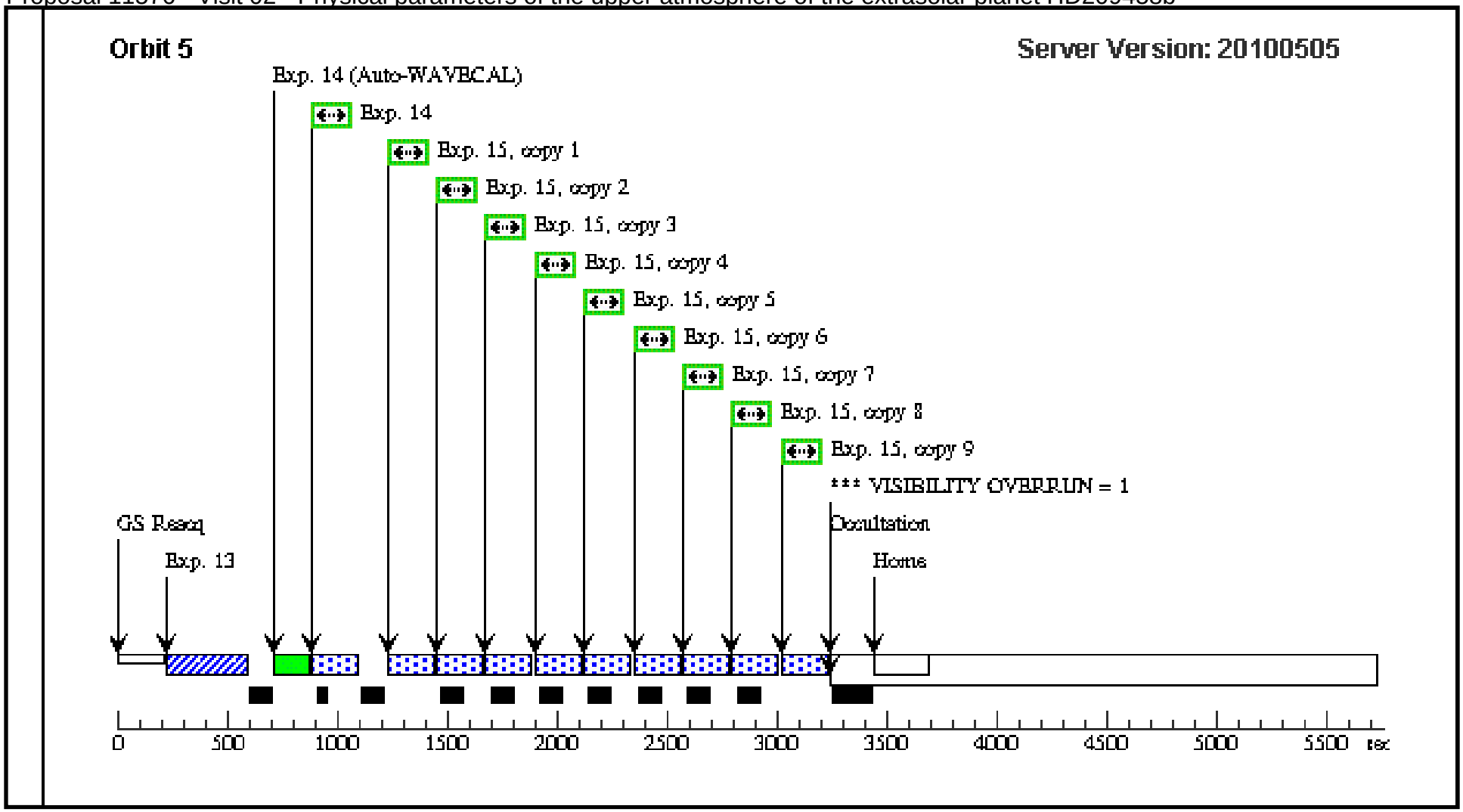
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*** VISIBILITY OVERRUN = 1
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Exp. 13
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Visit

Proposal 11576, Visit 03, implementation Fri Jun 11 01:02:57 GMT 2010

Diagnostic Status: Warning

Scientific Instruments: STIS/CCD, STIS/NUV-MAMA

Special Requirements: Period 3.52474859 D AND ZERO-PHASE HJD2452826.628521

Comments: Period=3.52474859 +/- 0.00000038 (days)
Tc0=2452826.628521 +/- 0.000087 (HJD)
From Knutson et al. 2007

Diagnostics

(Visit 03) Warning (Orbit Planner): VISIBILITY OVERRUN
(Visit 03) Warning (Orbit Planner): VISIBILITY OVERRUN
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(Visit 03) Warning (Orbit Planner): VISIBILITY OVERRUN

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	HD-209458	RA: 22 03 10.8000 (330.7950000d)		V=7.65	Reference Frame: ICRS
	Alt Name1: HD209458	Dec: +18 53 4.00 (18.88444d)			
		Equinox: J2000			

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.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/[Actual Dur.]	Orbit
1		(1) HD-209458	STIS/CCD, ACQ, F28X50OIII	MIRROR			Sequence 1-3 Non-Int	4 Secs	
								[==>]	***[1]***
2		(1) HD-209458	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A		PHASE 0.94325 TO 0.95463	Sequence 1-3 Non-Int	200 Secs	
								[==>]	***[1]***
3		(1) HD-209458	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 1-3 Non-Int	200 Secs X 8	
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4		(1) HD-209458	STIS/CCD, ACQ, F28X50OII	MIRROR			Sequence 4-6 Non-Int	4 Secs	
								[==>]	***[2]***
5		(1) HD-209458	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 4-6 Non-Int	200 Secs	
								[==>]	***[2]***
6		(1) HD-209458	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 4-6 Non-Int	200 Secs X 9	
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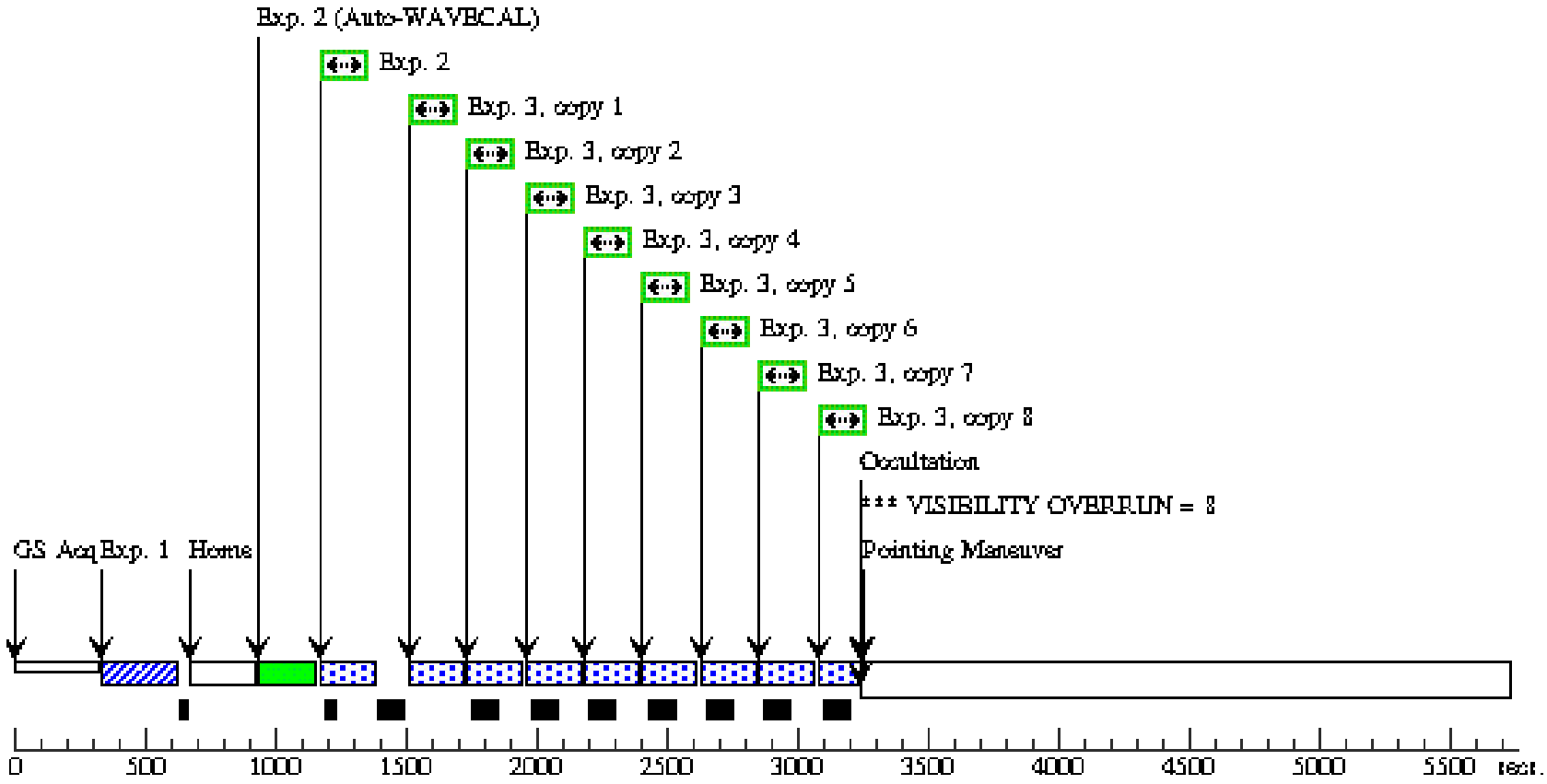
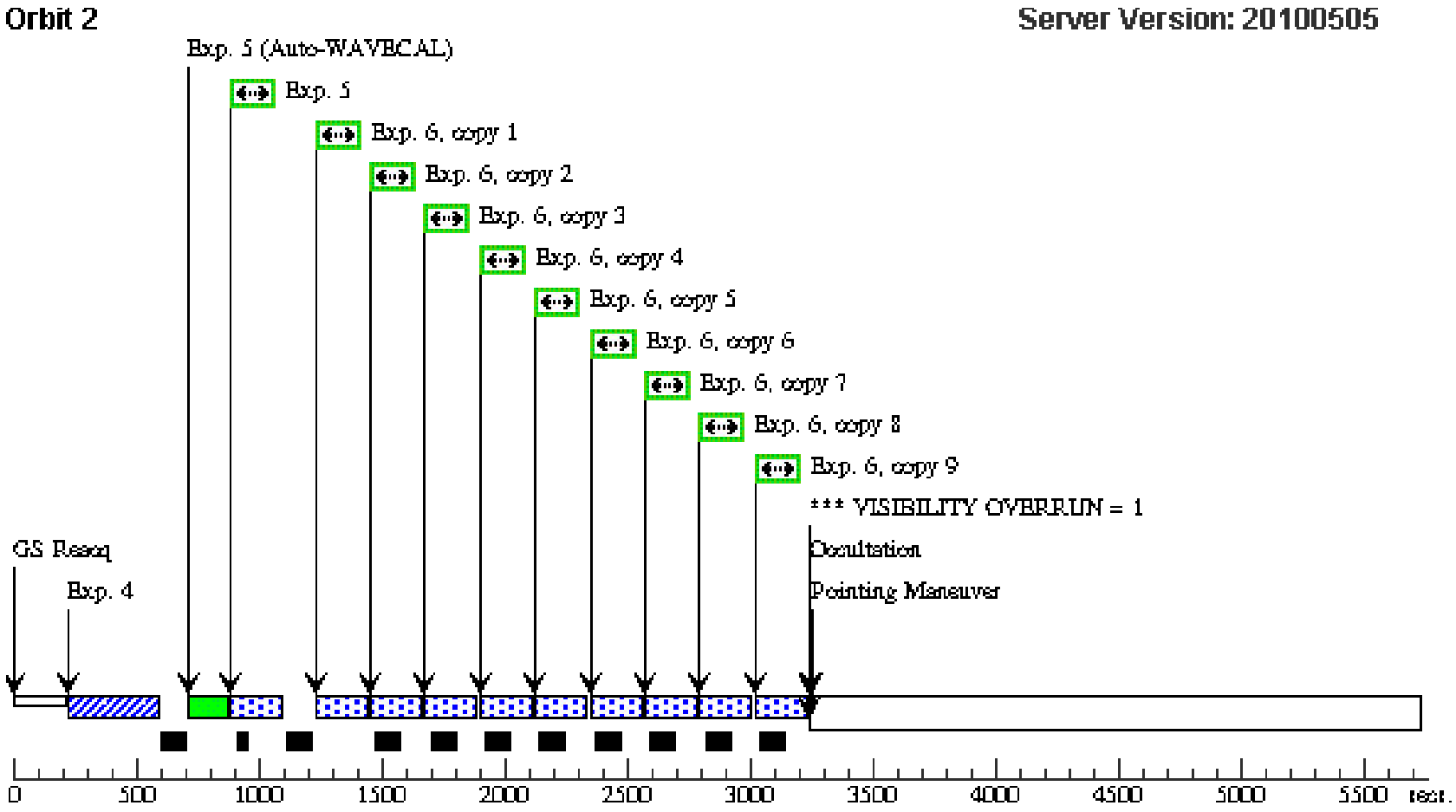
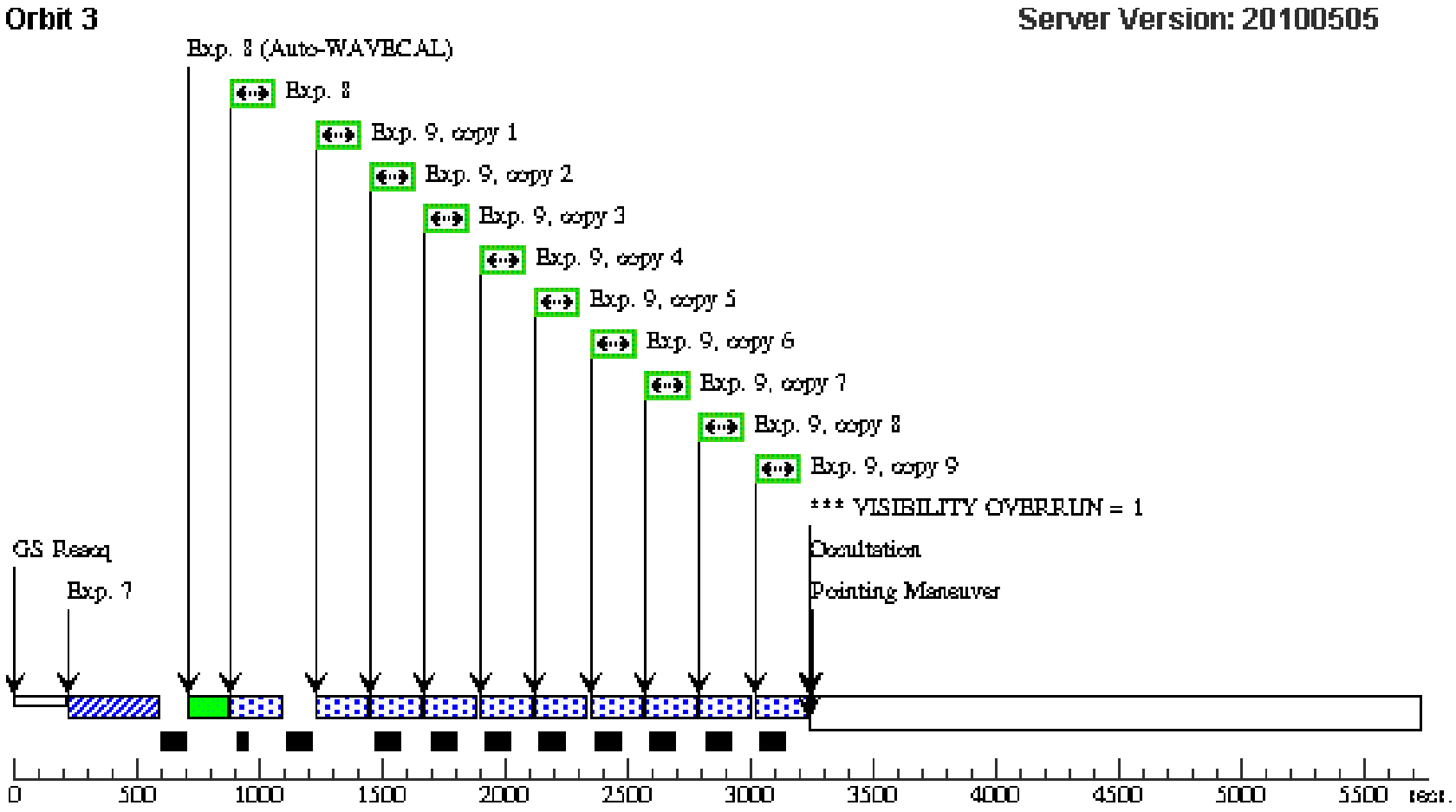
7		(1) HD-209458	STIS/CCD, ACQ, F28X50OII	MIRROR			Sequence 7-9 Non-Int	4 Secs	
								[==>]	***[3]***
8		(1) HD-209458	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 7-9 Non-Int	200 Secs	
								[==>]	***[3]***
9		(1) HD-209458	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A			Sequence 7-9 Non-Int	200 Secs X 9	
								[==>(Copy 1)] *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(Copy 4)]* *[==>(Copy 5)]* *[==>(Copy 6)]* *[==>(Copy 7)]* *[==>(Copy 8)]* *[==>(Copy 9)]*	***[3]***
10		(1) HD-209458	STIS/CCD, ACQ, F28X50OII	MIRROR			Sequence 10-12 Non-Int	4 Secs	
								[==>]	***[4]***

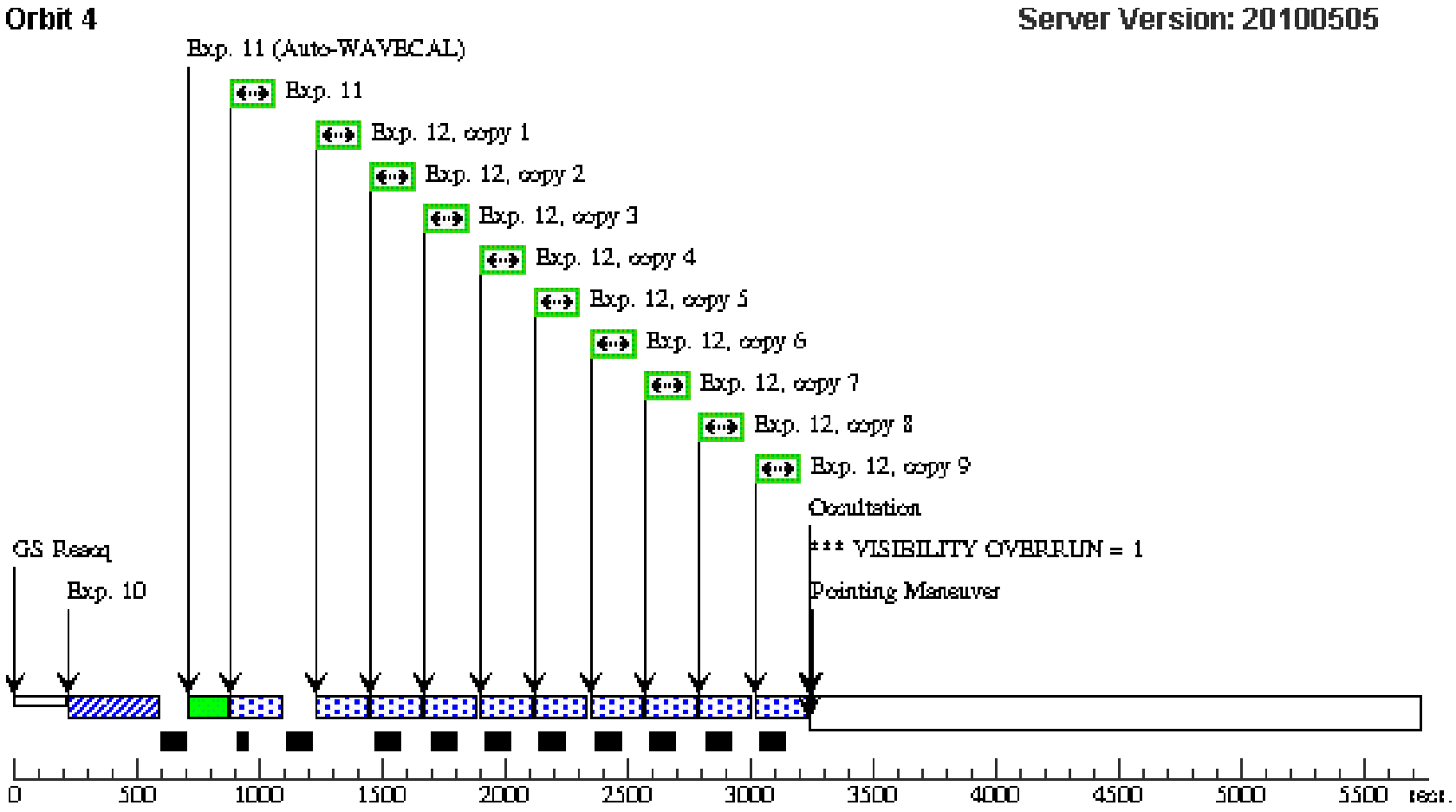
	11	(1) HD-209458	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A	Sequence 10-12 Non-Int	200 Secs *[==>]*	 ***[4]***
	12	(1) HD-209458	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A	Sequence 10-12 Non-Int	200 Secs X 9 *[==>(Copy 1)]* *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(Copy 4)]* *[==>(Copy 5)]* *[==>(Copy 6)]* *[==>(Copy 7)]* *[==>(Copy 8)]* *[==>(Copy 9)]*	 ***[4]***
	13	(1) HD-209458	STIS/CCD, ACQ, F28X50OII	MIRROR	Sequence 13-15 Non-Int	4 Secs *[==>]*	 ***[5]***
	14	(1) HD-209458	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A	Sequence 13-15 Non-Int	200 Secs *[==>]*	 ***[5]***
	15	(1) HD-209458	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A	Sequence 13-15 Non-Int	200 Secs X 9 *[==>(Copy 1)]* *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(Copy 4)]* *[==>(Copy 5)]* *[==>(Copy 6)]* *[==>(Copy 7)]* *[==>(Copy 8)]* *[==>(Copy 9)]*	 ***[5]***

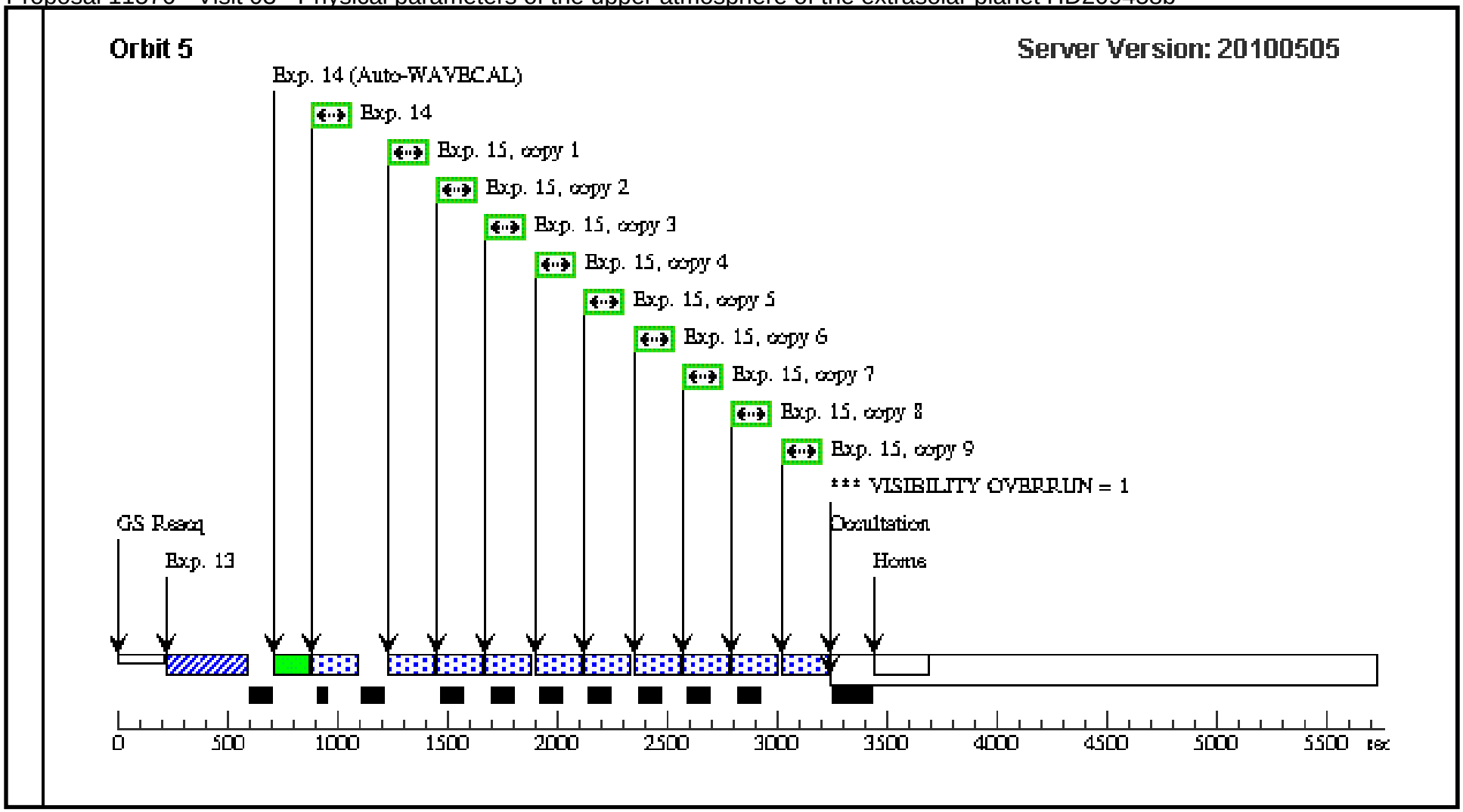
Orbit Structure




Orbit 2
Server Version: 20100505
Exp. 5 (Auto-WAVECAL)
Exp. 5
Exp. 6, copy 1
Exp. 6, copy 2
Exp. 6, copy 3
Exp. 6, copy 4
Exp. 6, copy 5
Exp. 6, copy 6
Exp. 6, copy 7
Exp. 6, copy 8
Exp. 6, copy 9
*** VISIBILITY OVERRUN = 1
Occultation
Pointing Maneuver
GS Reacq
Exp. 4
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec.


Orbit 3
Server Version: 20100505
Exp. 8 (Auto-WAVECAL)
Exp. 8
Exp. 9, copy 1
Exp. 9, copy 2
Exp. 9, copy 3
Exp. 9, copy 4
Exp. 9, copy 5
Exp. 9, copy 6
Exp. 9, copy 7
Exp. 9, copy 8
Exp. 9, copy 9
*** VISIBILITY OVERRUN = 1
GS Reacq
Exp. 7
Occultation
Pointing Maneuver
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec.


Orbit 4
Server Version: 20100505
Exp. 11 (Auto-WAVECAL)
Exp. 11
Exp. 12, copy 1
Exp. 12, copy 2
Exp. 12, copy 3
Exp. 12, copy 4
Exp. 12, copy 5
Exp. 12, copy 6
Exp. 12, copy 7
Exp. 12, copy 8
Exp. 12, copy 9
Occultation
*** VISIBILITY OVERRUN = 1
Pointing Maneuver
GS Reacq
Exp. 10
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec.


Orbit 5
Server Version: 20100505
Exp. 14 (Auto-WAVECAL)
Exp. 14
Exp. 15, copy 1
Exp. 15, copy 2
Exp. 15, copy 3
Exp. 15, copy 4
Exp. 15, copy 5
Exp. 15, copy 6
Exp. 15, copy 7
Exp. 15, copy 8
Exp. 15, copy 9
*** VISIBILITY OVERRUN = 1
Occultation
GS Reacq
Exp. 13
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11576, Visit 04, implementation Fri Jun 11 01:02:59 GMT 2010

Diagnostic Status: No Diagnostics

Scientific Instruments: STIS/CCD, STIS/NUV-MAMA

Special Requirements: Period 3.52474859 D AND ZERO-PHASE HJD2452826.628521

Comments: Period=3.52474859 +/- 0.00000038 (days)
Tc0=2452826.628521 +/- 0.000087 (HJD)
From Knutson et al. 2007

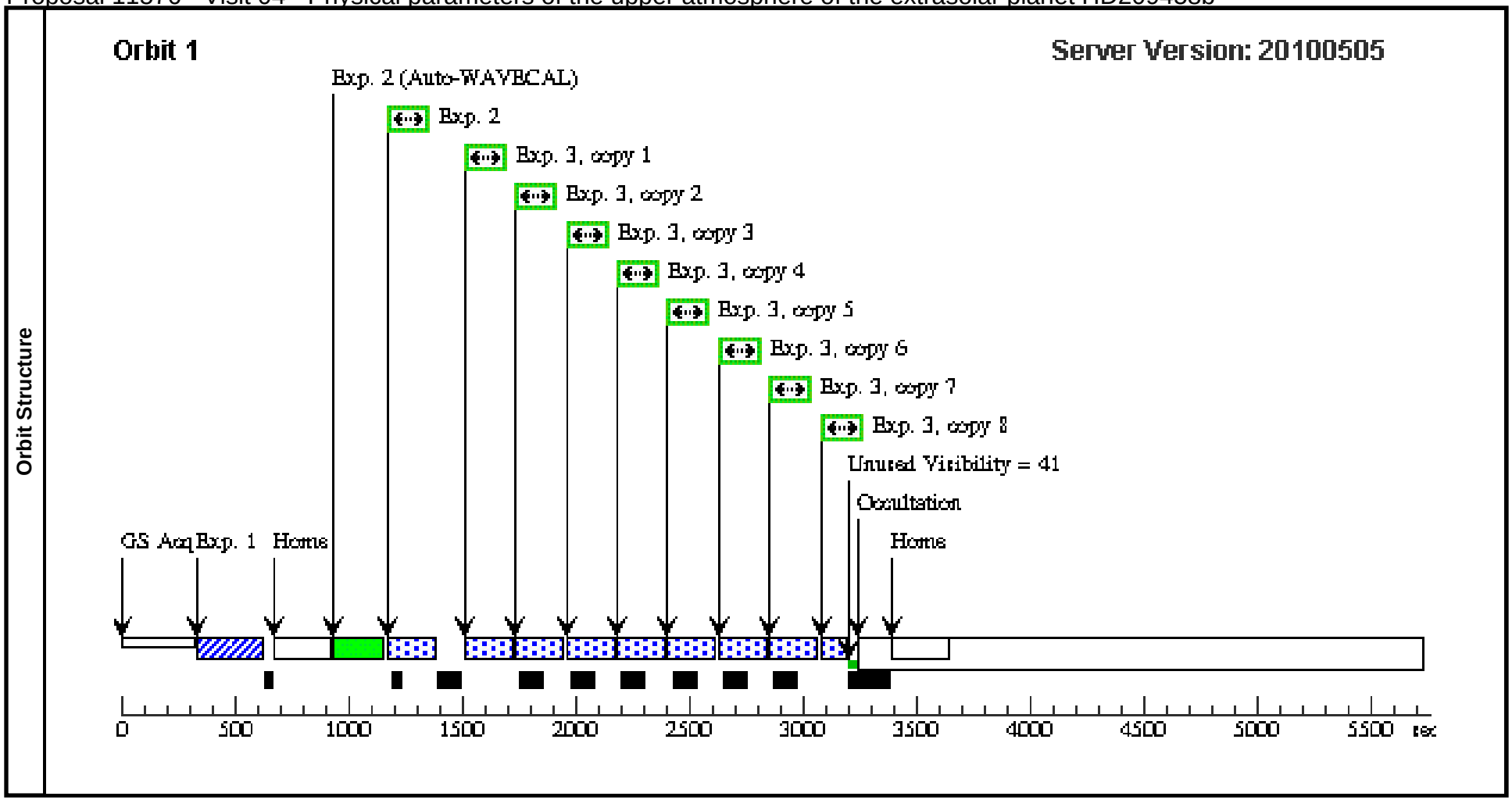
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	HD-209458	RA: 22 03 10.8000 (330.7950000d)		V=7.65	Reference Frame: ICRS
	Alt Name1: HD209458	Dec: +18 53 4.00 (18.88444d)			
		Equinox: J2000			

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.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/[Actual Dur.]	Orbit
1		(1) HD-209458	STIS/CCD, ACQ, F28X50OIII	MIRROR				4 Secs	
								[==>]	***[1]***
2		(1) HD-209458	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A		PHASE 0.2 TO 0.3		200.0 Secs	
								[==>]	***[1]***
3		(1) HD-209458	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A				200 Secs X 8	
								[==>(Copy 1)] *[==>(Copy 2)]* *[==>(Copy 3)]* *[==>(Copy 4)]* *[==>(Copy 5)]* *[==>(Copy 6)]* *[==>(Copy 7)]* *[==>100 Secs (Copy 8)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20100505
Exp. 2 (Auto-WAVECAL)
Exp. 2
Exp. 3, copy 1
Exp. 3, copy 2
Exp. 3, copy 3
Exp. 3, copy 4
Exp. 3, copy 5
Exp. 3, copy 6
Exp. 3, copy 7
Exp. 3, copy 8
Unused Visibility = 41
Occultation
GS Acq
Exp. 1
Home
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec