11186 - Investigation of the spatial and temporal structure of Europa's atmospheric emissisons

Cycle: 16, 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) EUROPA-EAST	ACS/SBC	5	21-May-2008 21:00:43.0	yes

5 Total Orbits Used

ABSTRACT

We propose to explore the spatial structure and temporal variability of Europa's O2 atmosphere with ACS/SBC. Previous HST images display non-uniform UV emission from Europa's atmosphere, which maximizes within the disk of Europa on its anti-Jovian northern quadrant. These images were taken at western elongation and are not conclusive, but bring up the exciting question whether the non-uniform emission is due to a locally

enhanced neutral atmosphere. A locally inhomogeneous atmosphere would imply locally modified surface properties. This might provide clues on inhomogeneities of the underlying ice structure and thus properties of a potential subsurface ocean. Since the inhomogeneous emission comes from within the disk of Europa, we propose to study Europa at eastern and western elongation to decide if the locally enhanced emission is truly an atmospheric effect. We propose to take for each elongation five contiguous observations within one rotation period of Jupiter to discriminate between a competing effect that produces inhomogeneous emission patterns, i.e., the electrodynamic interaction with Jupiter's magnetosphere. We will use ACS/SBC with PR130L prism to completely separate the two prominent FUV oxygen lines OI 1304 A and OI 1356 A emitted from Europa's atmosphere.

OBSERVING DESCRIPTION

We propose to use ACS/SBC with prism PR130L to investigate the spatial structure of Europa's atmosphere. With this prism we will eliminate contributions from the long wavelength end of the SBC bandpass due to reflected sun light on Europa's surface by spectrally dispersing the image. We will be able to separate the two prominent FUV oxygen lines OI 1304 A and OI 1356 A emitted from Europa's atmosphere. We propose to center the disk of Europa (maximum diameter ~ 1.2") to obtain a symmetric field of view around the disk of Europa. We are requesting five contiguous orbits at eastern elongation, i.e., for the leading/downstream (longitude 90 degrees) hemisphere of Europa. The western elongation has been previously observed by STIS in cycle 8. Five orbits span more than one half of a Jovian rotation, so that a significant change of the orientation of Jupiter's magnetic field relative to Europa occurs over the course of the observations. This will allow us to test the dependence of the observed emission morphology on the magnetic field orientation.

Visit

Proposal 11186, Visit 01, implementation Thu May 22 01:00:49 GMT 2008

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/SBC

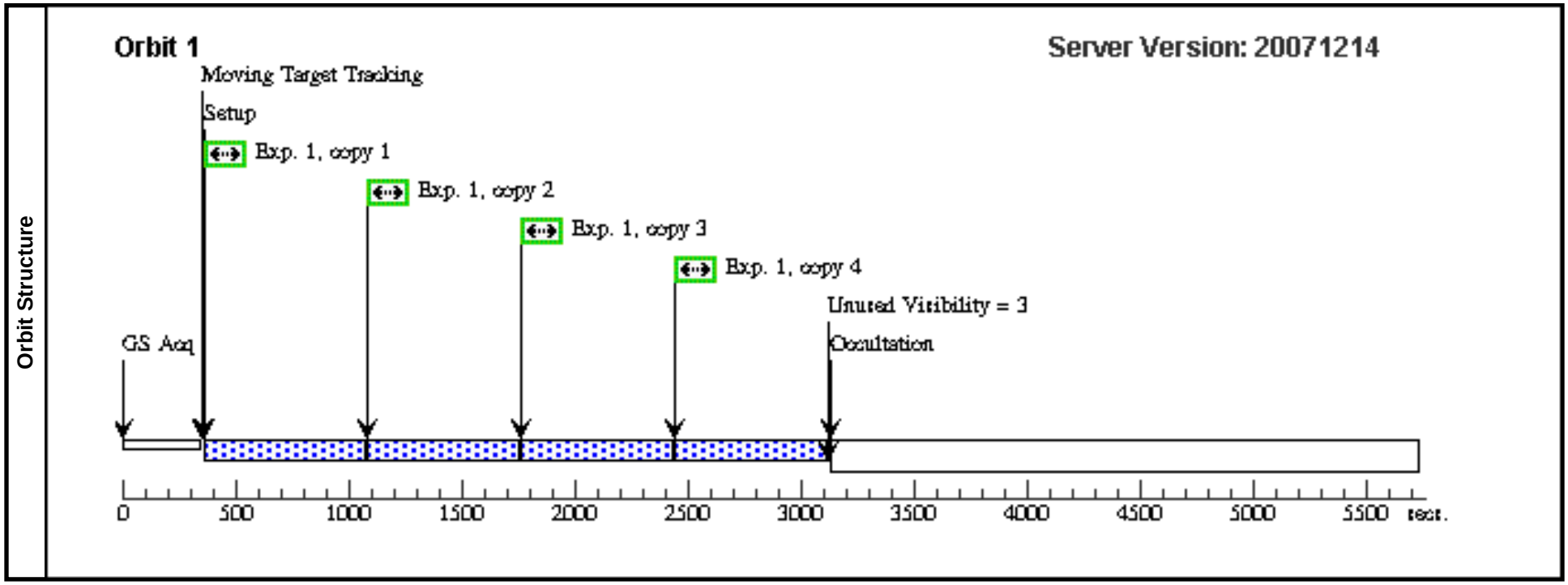
Special Requirements: (none)

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(1)	EUROPA-EAST	STD=JUPITER	STD=EUROPA		OLG OF JUPITER BETWEEN 330.0 30.0, OLG OF EUROPA-EAST BETWEEN 70.0 110.0, SEP OF GANYMEDE EUROPA FROM EARTH GT 5"	EARTH

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) EUROPA-EAST	ACS/SBC, ACCUM, SBC	PR130L				600.0 Secs X 20	
								[==>641.0 Secs (Copy 1)] *[==>641.0 Secs (Copy 2)]* *[==>641.0 Secs (Copy 3)]* *[==>641.0 Secs (Copy 4)]*	***[1]***
								[==>652.0 Secs (Copy 5)] *[==>652.0 Secs (Copy 6)]* *[==>652.0 Secs (Copy 7)]* *[==>652.0 Secs (Copy 8)]*	***[2]***
								[==>652.0 Secs (Copy 9)] *[==>652.0 Secs (Copy 10)]* *[==>652.0 Secs (Copy 11)]* *[==>652.0 Secs (Copy 12)]*	***[3]***
								[==>652.0 Secs (Copy 13)] *[==>652.0 Secs (Copy 14)]* *[==>652.0 Secs (Copy 15)]* *[==>652.0 Secs (Copy 16)]*	***[4]***
								[==>652.0 Secs (Copy 17)] *[==>652.0 Secs (Copy 18)]* *[==>652.0 Secs (Copy 19)]* *[==>652.0 Secs (Copy 20)]*	***[5]***


Orbit Structure
Orbit 1
Server Version: 20071214
Moving Target Tracking
Setup
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Exp. 1, copy 2
Exp. 1, copy 3
Exp. 1, copy 4
Unused Visibility = 3
Occultation
GS Acq
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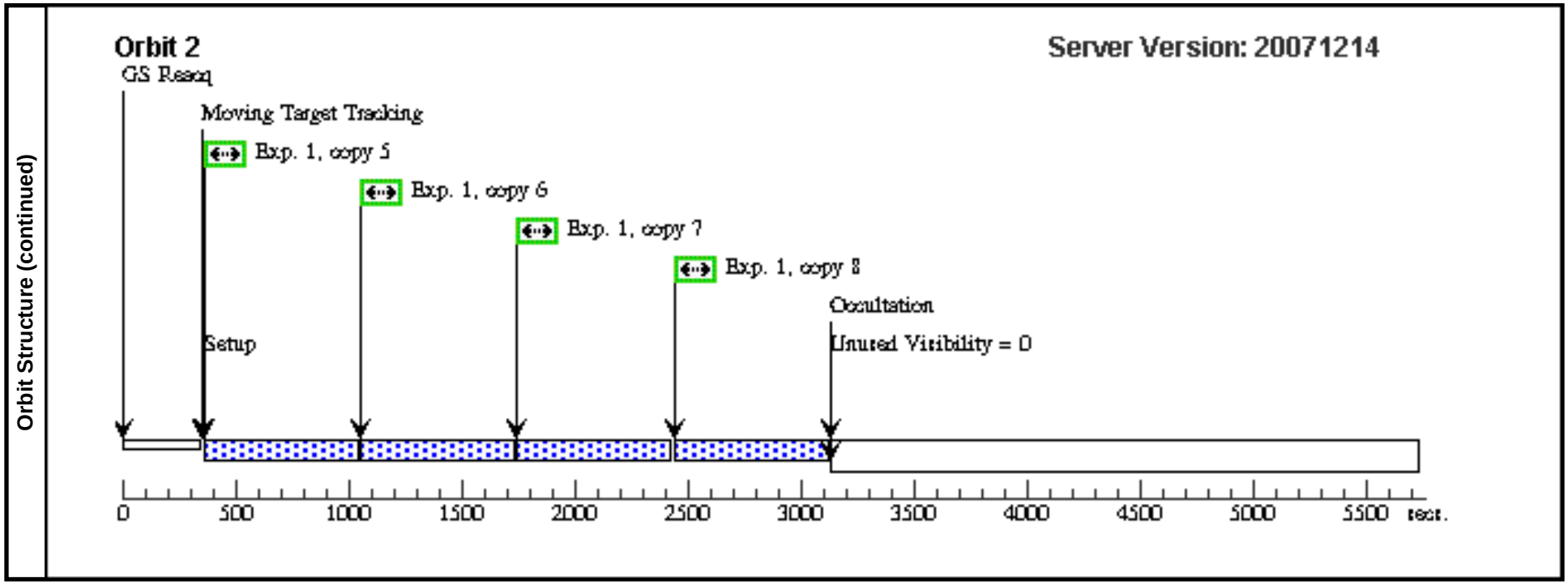
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec.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GS Reacq
Moving Target Tracking
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Exp. 1, copy 7
Exp. 1, copy 8
Occultation
Setup
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0
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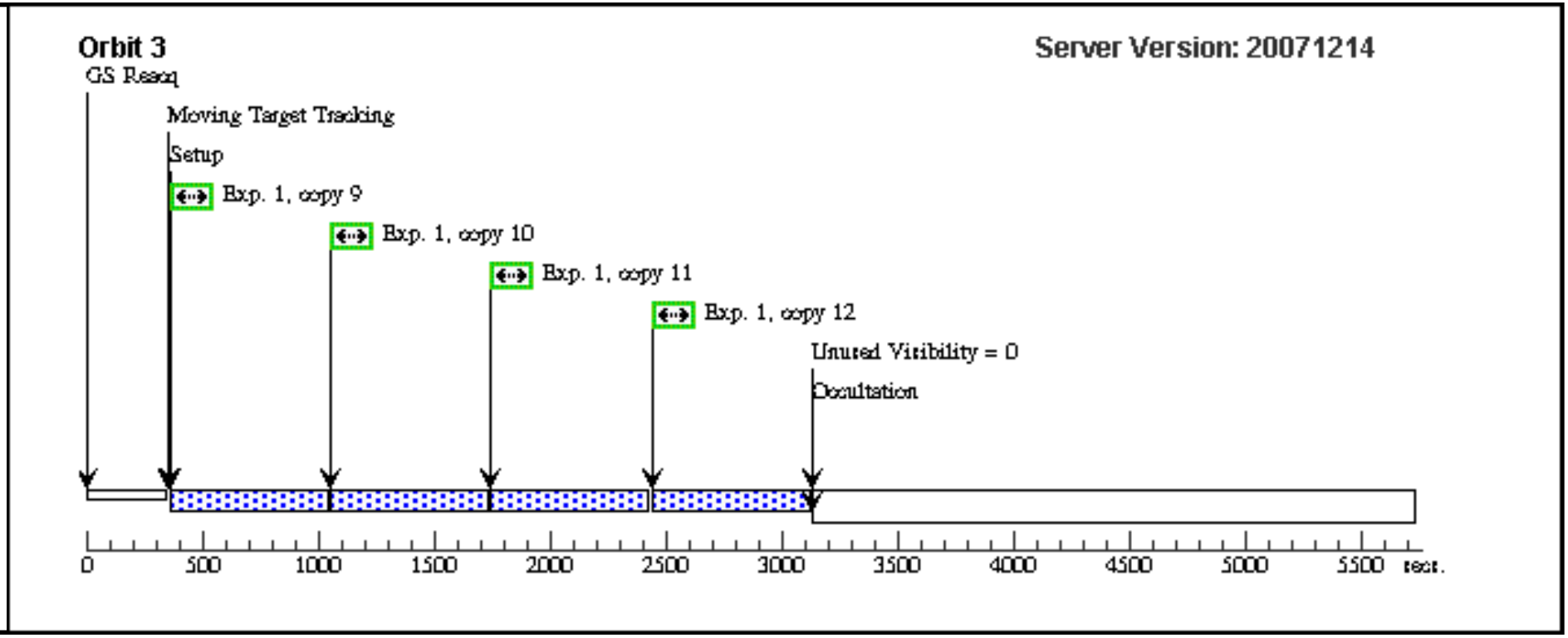
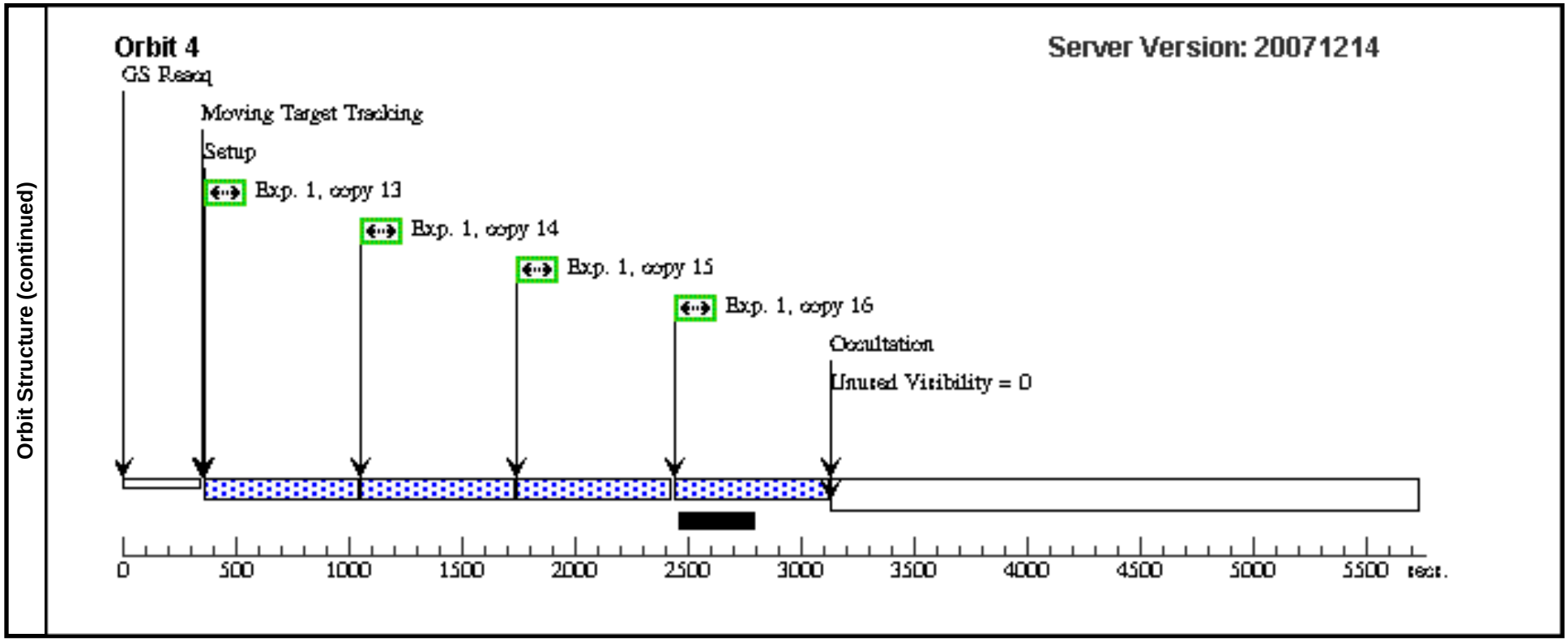
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec.

Orbit Structure (continued)




Orbit Structure (continued)
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GS Reacq
Moving Target Tracking
Setup
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Exp. 1, copy 14
Exp. 1, copy 15
Exp. 1, copy 16
Occultation
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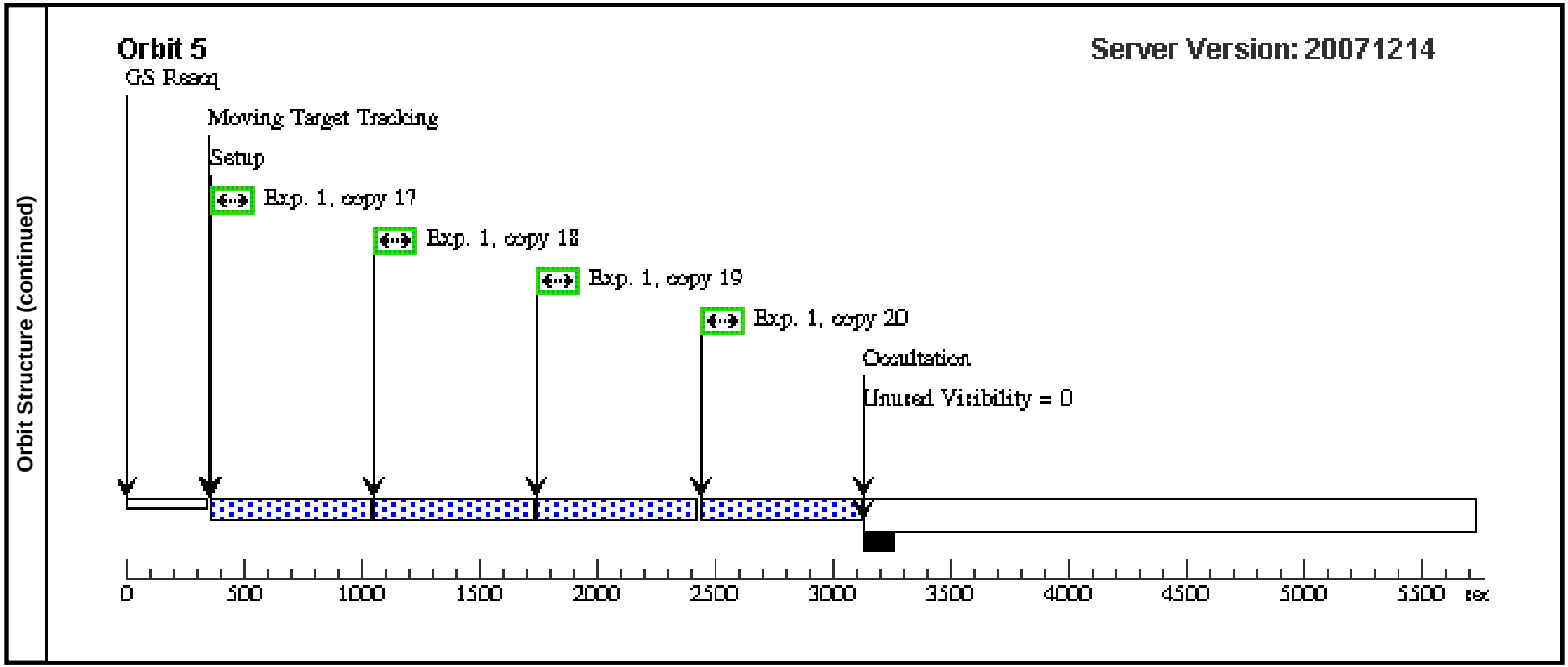
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec.


Orbit Structure (continued)
Orbit 5
Server Version: 20071214
GS Reacq
Moving Target Tracking
Setup
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Exp. 1, copy 18
Exp. 1, copy 19
Exp. 1, copy 20
Occultation
Unused Visibility = 0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec