11099 - A silver bullet for the sources of reionization

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) 1ES-0657-55.8	WFPC2	5	17-Sep-2009 21:00:56.0	yes
02	(1) 1ES-0657-55.8	WFPC2	5	17-Sep-2009 21:01:04.0	yes
03	(1) 1ES-0657-55.8	WFPC2	5	17-Sep-2009 21:01:14.0	yes
04	(5) 1ES-0657-55.8-SE-WFC3	WFC3/IR	5	17-Sep-2009 21:01:24.0	yes
05	(6) 1ES-0657-55.8-NW-WFC3	WFC3/IR	5	17-Sep-2009 21:01:34.0	yes

25 Total Orbits Used

ABSTRACT

Recent discoveries of z>6 galaxies have given us the first glimpse of the Universe shortly after the era of reionization. The questions arose whether these first galaxies can be made responsible for the reionization process, and how long did it last. Neither observations nor theory provide a clean answer. In particular observations give results that are barely mutually consistent and need to be further tested. Observing high redshift (z>7) sources is in general difficult, mostly due to the high luminosity distance to these objects, and partly due to the lower expected stellar masses compared to objects at moderate redshifts.

We propose to use one of the most massive, merging cluster 1E0657-56 (z=0.295) as a cosmic telescopes to efficiently probe the high-redshift universe. The gravitational potential well of this cluster provides several magnitudes of magnification, enabling study of intrinsically lower luminosity galaxies.As we discuss in the proposal, due to its highly elongated mass distribution and ideal redshift the bullet cluster is a prime candidate for this study. We propose deep WFC3 (awarded as NICMOS) and WFPC2 observations; with much reduced observing time compared to e.g. NICMOS UDF we expect an order of magnitude more (~5 candidates) z>7 objects. They will also likely be multiply imaged, and since the geometry of images depends upon the redshift, we will be able to confirm their nature, thereby not requiring (often prohibitive at these magnitudes) spectroscopic follow-up. This will enable us to count high-redshift sources and constrain their luminosity function; a task made possible with the help of gravitational lensing even in the pre-JWST era.

OBSERVING DESCRIPTION

The goal of this program is to identify and study high-redshift (z>7) objects with the help of the magnifying power of one of the most massive and most elongated clusters. The use of HST is critical to this program for two reasons: (1) sensitivity and depth are absolutely crucial for this project and HST's IR cameras are more sensitive than a ground-based 8m telescope (2) the search for and identification of multiply imaged sources can only be done through exquisite resolution of the space based imaging.

The WFPC2 part of the program has been executed, the remaining NICMOS exposures have been transferred to WFC3/IR observations.

Required Area: This program requires two pointings with WFC3. For the two pointings we do not require specific roll-angles, however *****we will need to change the pointing positions depending on the roll-angle****** by no more than 20arcsec. Slight preference is given to positions angles of 70-110deg or 250-290 deg.

Required Filters: We request observations in WFC3-IR/F110W and WFC3-IR/F160W.

Dithering
- The 10 orbits in WFC3/F110W and F160W are split into 2 visits, 5 orbits each. Each of the 2 visits has 20 exposures, 10 pairs of exposures for two filters (half-orbit in F110W and F160W each). 5 orbits are used to implement 4-point WFC3-DITHER-BOX-MED dithering pattern and the last pair is used in the centre. Corresponding pixel positions of the dither pattern are (0,0),(20,7.5),(12.5,20), (-7.5,12.5), (6.25,8.25). Same dither pattern is repeated for the second visit.

Visit

Proposal 11099, Visit 01, completed Fri Sep 18 01:01:39 GMT 2009

Diagnostic Status: No Diagnostics

Scientific Instruments: WFPC2

Special Requirements: ORIENT 75.0D TO 95.0 D; ORIENT 255.0D TO 275.0 D

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFPC2-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.559017 Line Spacing=0.559017	Coordinate Frame=POS-TARG Pattern Orientation=26.56505 Angle Between Sides=143.1301 Center Pattern=false		(1), (2)
(2)	Pattern Type=LINE Purpose=DITHER Number Of Points=2 Point Spacing=3.394 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=45.0 Angle Between Sides= Center Pattern=false		(3)

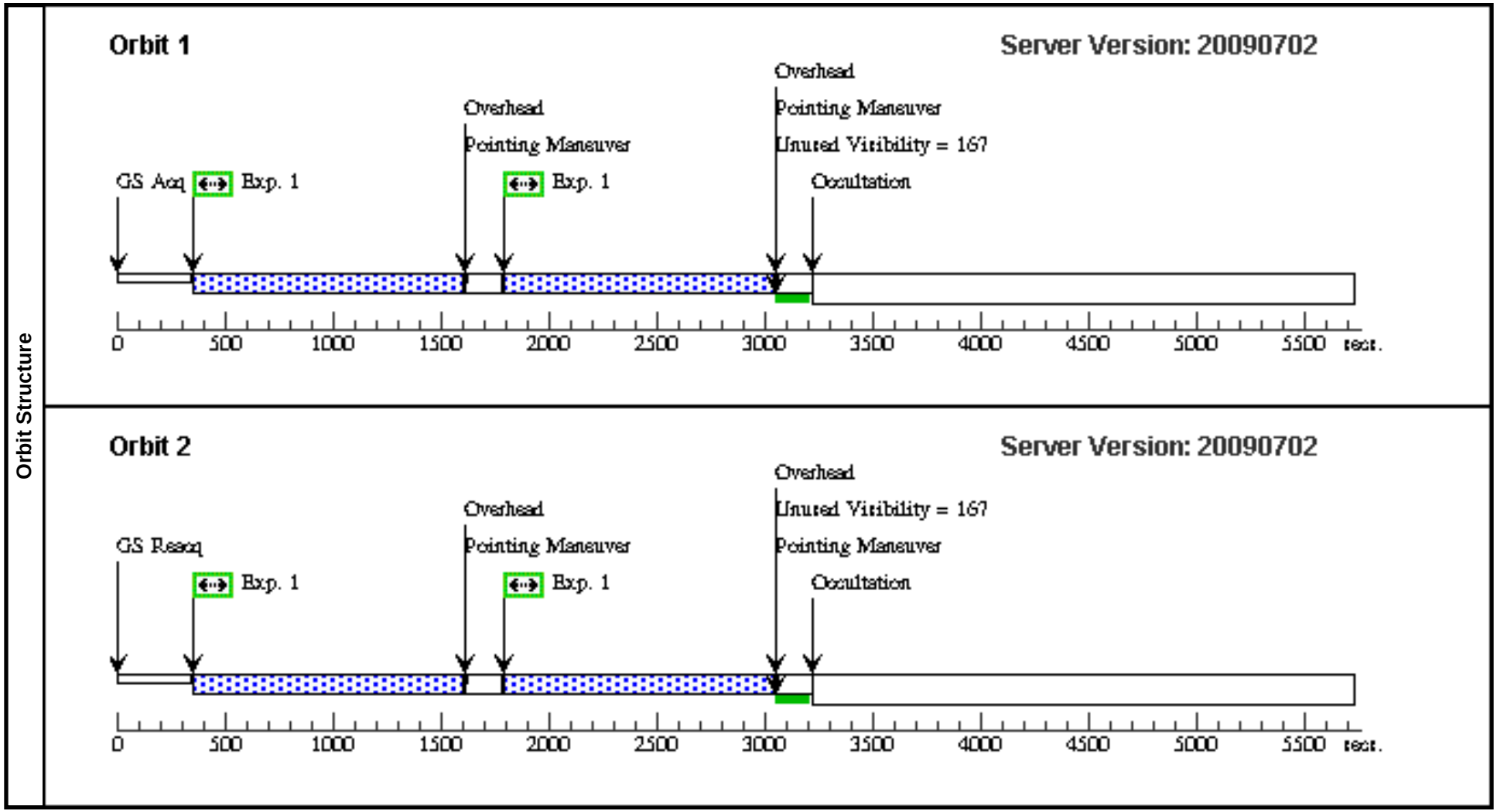
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	1ES-0657-55.8	RA: 06 58 37.2043 (104.6550179d) Dec: -55 56 37.22 (-55.94367d) Equinox: J2000		V=25	Reference Frame: SIMBAD

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/[Actual Dur.]	Orbit
1		(1) 1ES-0657-55.8	WFPC2, IMAGE, WFALL	F814W	CR-SPLIT=NO	POS TARG 1.0,1.0; GS ACQ SCENARIO BASE1TNS	Pattern 1, Exps 1-1 (1)	1100.0 Secs	
								[==>(Pattern 1)] *[==>(Pattern 2)]*	***[1]***
								[==>(Pattern 3)] *[==>(Pattern 4)]*	***[2]***
2		(1) 1ES-0657-55.8	WFPC2, IMAGE, WFALL	F814W	CR-SPLIT=NO	POS TARG 2.4,2.4	Pattern 1, Exps 2-2 (1)	1100.0 Secs	
								[==>(Pattern 1)] *[==>(Pattern 2)]*	***[3]***
								[==>(Pattern 3)] *[==>(Pattern 4)]*	***[4]***
3		(1) 1ES-0657-55.8	WFPC2, IMAGE, WFALL	F814W	CR-SPLIT=NO	POS TARG 0.0,-2.0	Pattern 2, Exps 3-3 (2)	1100.0 Secs	
								[==>(Pattern 1)] *[==>(Pattern 2)]*	***[5]***


Orbit Structure
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Server Version: 20090702
Overhead
Pointing Maneuver
Unused Visibility = 167
Overhead
Pointing Maneuver
GS Acq
Exp. 1
Exp. 1
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec.
Orbit 2
Server Version: 20090702
Overhead
Unused Visibility = 167
Overhead
Pointing Maneuver
Pointing Maneuver
GS Reacq
Exp. 1
Exp. 1
Occultation
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1000
1500
2000
2500
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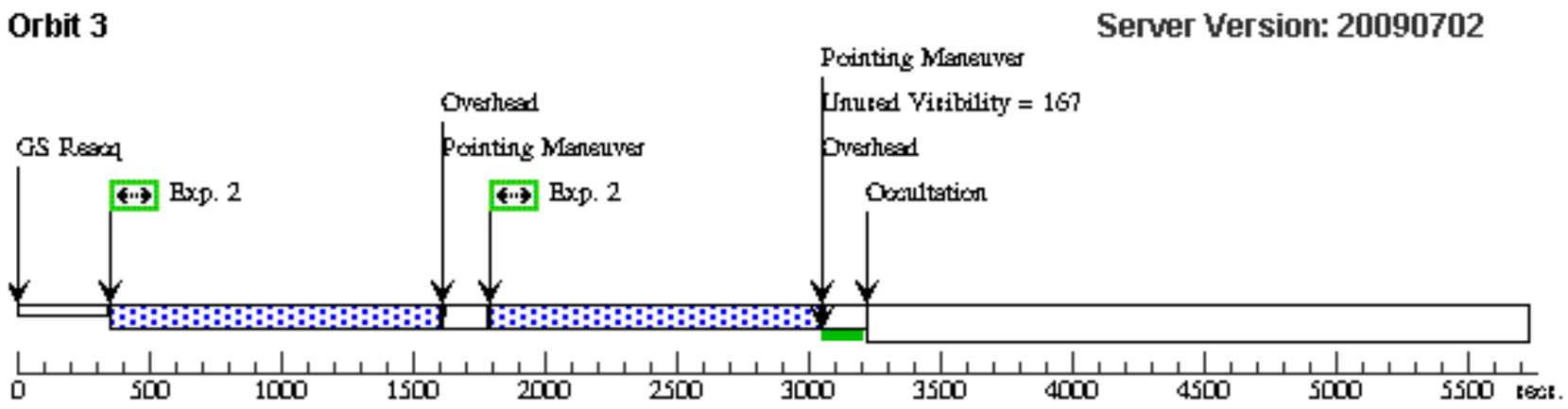
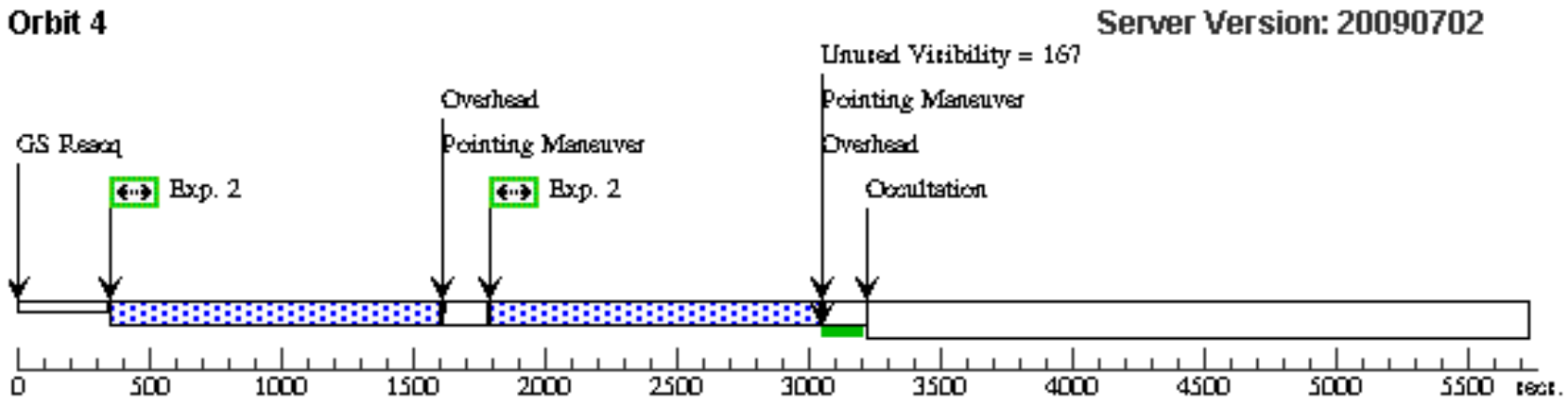
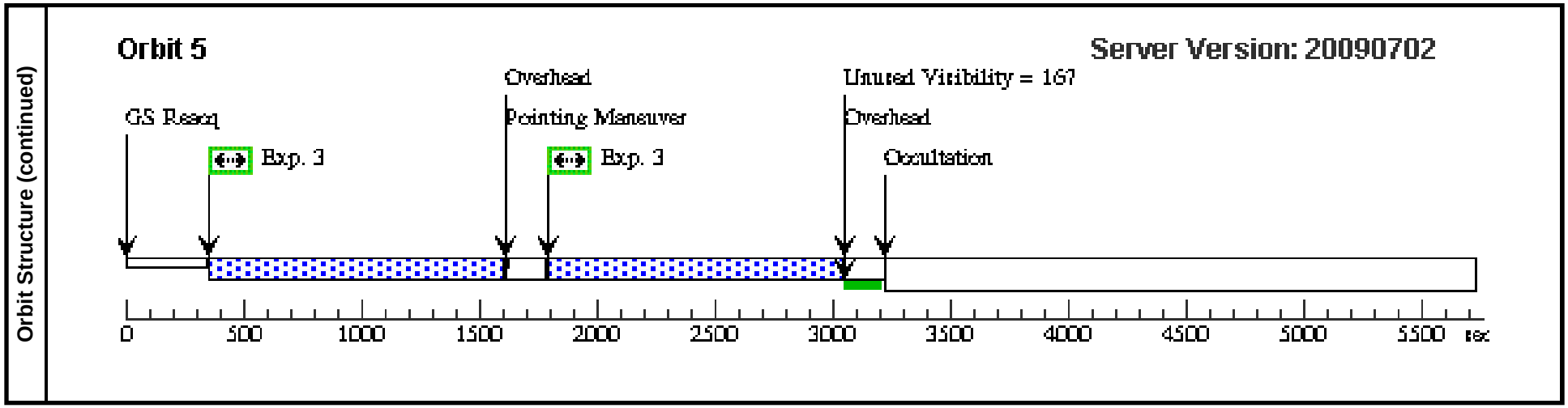
4000
4500
5000
5500
sec.

Orbit Structure (continued)






Orbit Structure (continued)
Orbit 5
Server Version: 20090702
GS Reacq
Exp. 3
Overhead
Pointing Maneuver
Exp. 3
Unused Vitibility = 167
Overhead
Occultation
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1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11099, Visit 02, completed Fri Sep 18 01:01:40 GMT 2009

Diagnostic Status: No Diagnostics

Scientific Instruments: WFPC2

Special Requirements: SAME ORIENT AS 01

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFPC2-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.559017 Line Spacing=0.559017	Coordinate Frame=POS-TARG Pattern Orientation=26.56505 Angle Between Sides=143.1301 Center Pattern=false		(1), (2)
(2)	Pattern Type=LINE Purpose=DITHER Number Of Points=2 Point Spacing=3.394 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=45.0 Angle Between Sides= Center Pattern=false		(3)

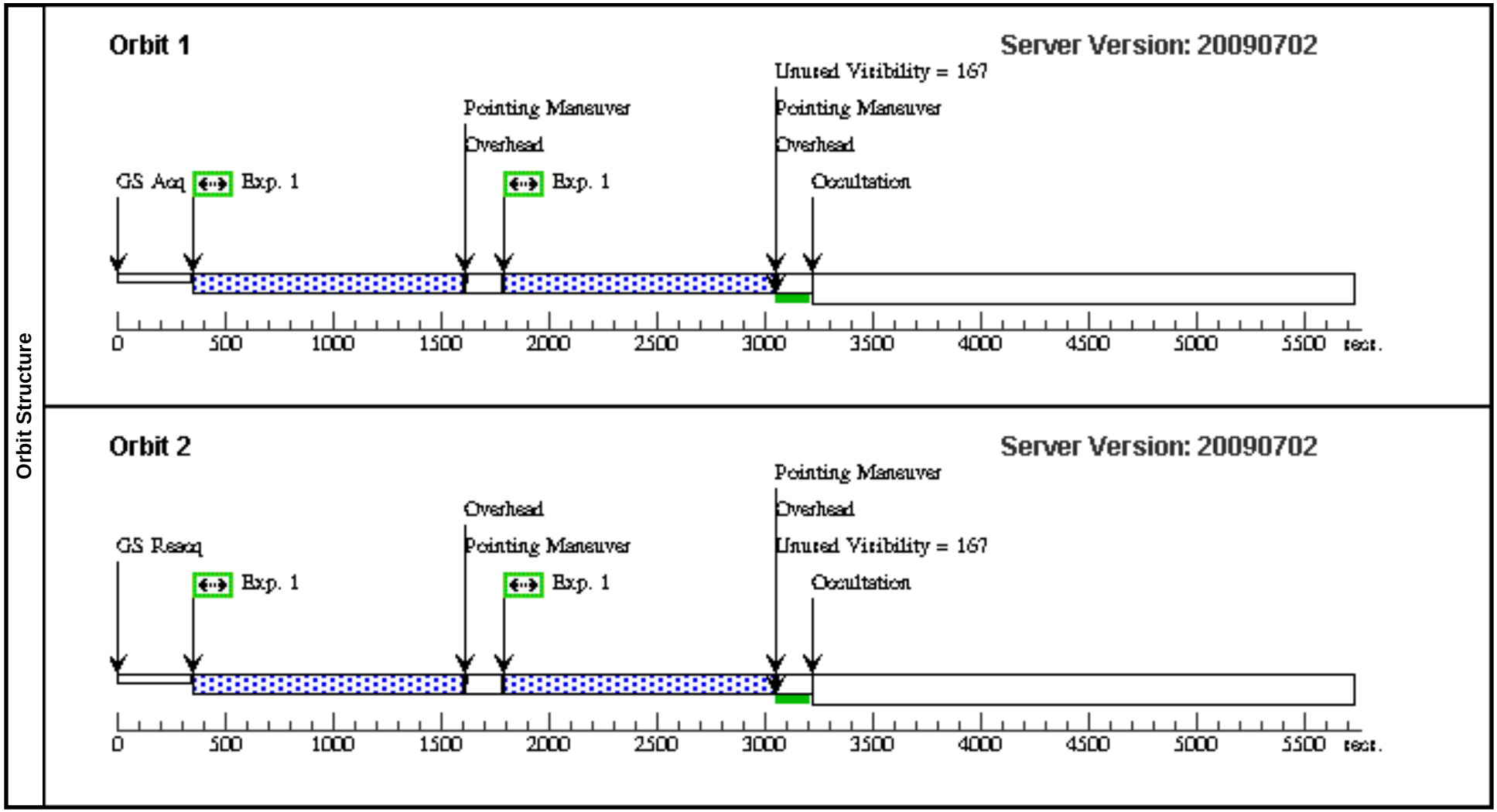
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	1ES-0657-55.8	RA: 06 58 37.2043 (104.6550179d) Dec: -55 56 37.22 (-55.94367d) Equinox: J2000		V=25	Reference Frame: SIMBAD

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/[Actual Dur.]	Orbit
1		(1) 1ES-0657-55.8	WFPC2, IMAGE, WFALL	F814W	CR-SPLIT=NO	POS TARG -2.4,-2.4 ; GS ACQ SCENARIO BASE1TNS	Pattern 1, Exps 1-1 (1)	1100.0 Secs	
								[==>(Pattern 1)] *[==>(Pattern 2)]*	***[1]***
								[==>(Pattern 3)] *[==>(Pattern 4)]*	***[2]***
2		(1) 1ES-0657-55.8	WFPC2, IMAGE, WFALL	F814W	CR-SPLIT=NO	POS TARG -2.0,2.0	Pattern 1, Exps 2-2 (1)	1100.0 Secs	
								[==>(Pattern 1)] *[==>(Pattern 2)]*	***[3]***
								[==>(Pattern 3)] *[==>(Pattern 4)]*	***[4]***
3		(1) 1ES-0657-55.8	WFPC2, IMAGE, WFALL	F814W	CR-SPLIT=NO	POS TARG -2.0,0.0	Pattern 2, Exps 3-3 (2)	1100.0 Secs	
								[==>(Pattern 1)] *[==>(Pattern 2)]*	***[5]***


Orbit Structure
Orbit 1
Server Version: 20090702
Unused Visibility = 167
Pointing Maneuver
Pointing Maneuver
Overhead
Overhead
GS Acq
Exp. 1
Exp. 1
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec.
Orbit 2
Server Version: 20090702
Pointing Maneuver
Overhead
Overhead
Pointing Maneuver
GS Reacq
Unused Visibility = 167
Exp. 1
Exp. 1
Occultation
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2500
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3500
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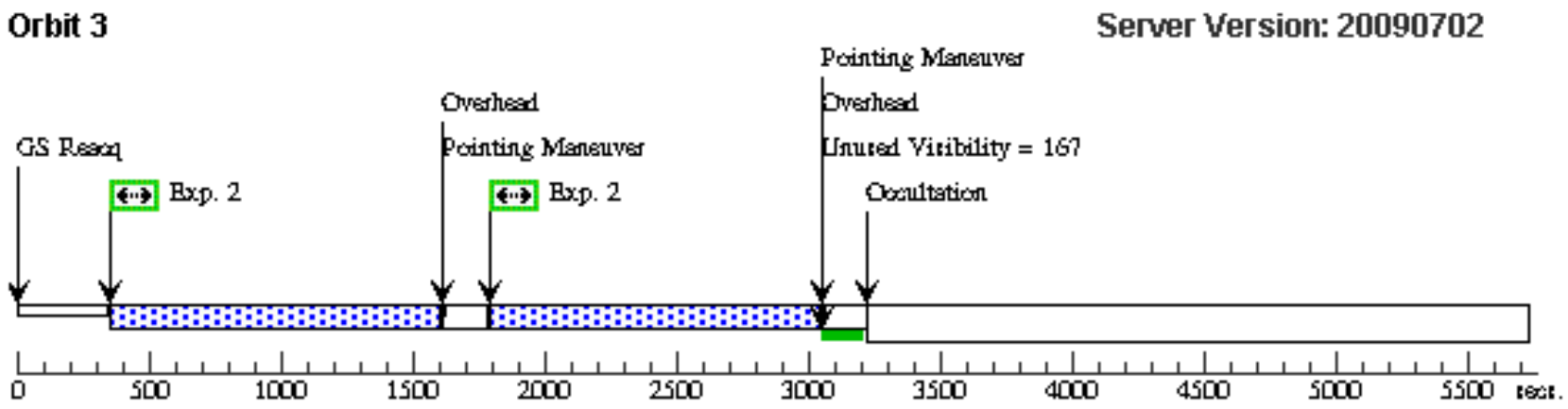
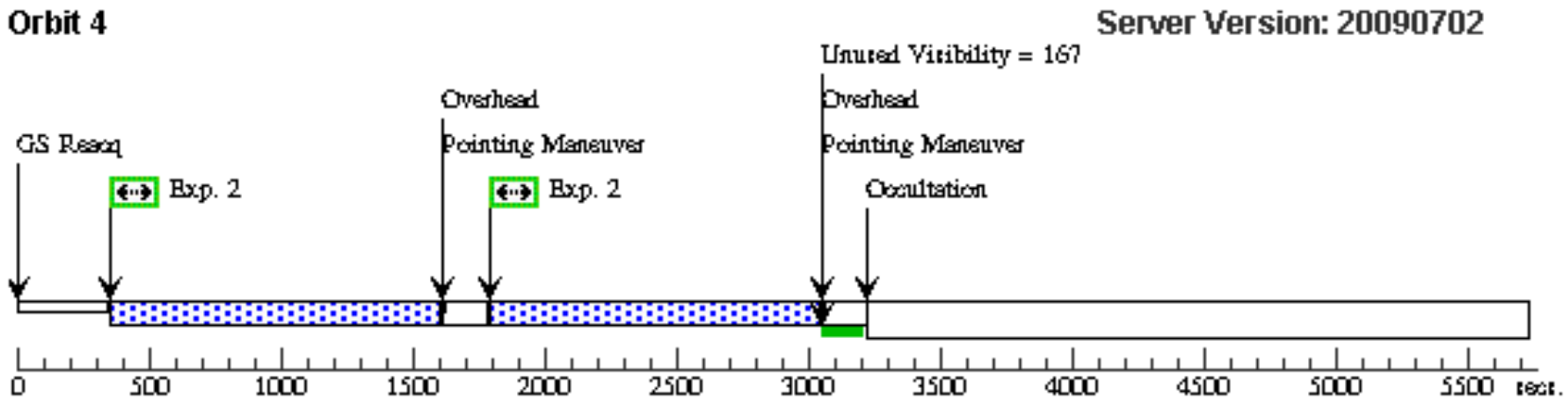
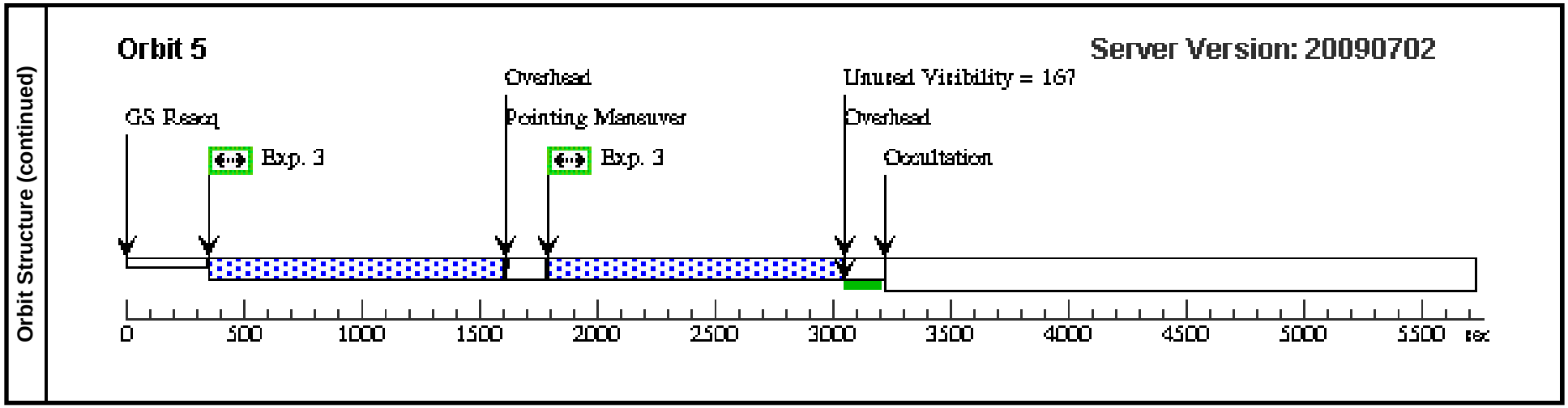
4500
5000
5500
sec.

Orbit Structure (continued)






Orbit Structure (continued)
Orbit 5
Server Version: 20090702
GS Reacq
Exp. 3
Overhead
Pointing Maneuver
Exp. 3
Unused Vitibility = 167
Overhead
Occultation
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1000
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5500
sec

Visit

Proposal 11099, Visit 03, completed Fri Sep 18 01:01:41 GMT 2009

Diagnostic Status: No Diagnostics

Scientific Instruments: WFPC2

Special Requirements: SAME ORIENT AS 01

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFPC2-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.559017 Line Spacing=0.559017	Coordinate Frame=POS-TARG Pattern Orientation=26.56505 Angle Between Sides=143.1301 Center Pattern=false		(1), (2)
(2)	Pattern Type=LINE Purpose=DITHER Number Of Points=2 Point Spacing=3.394 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=45.0 Angle Between Sides= Center Pattern=false		(3)

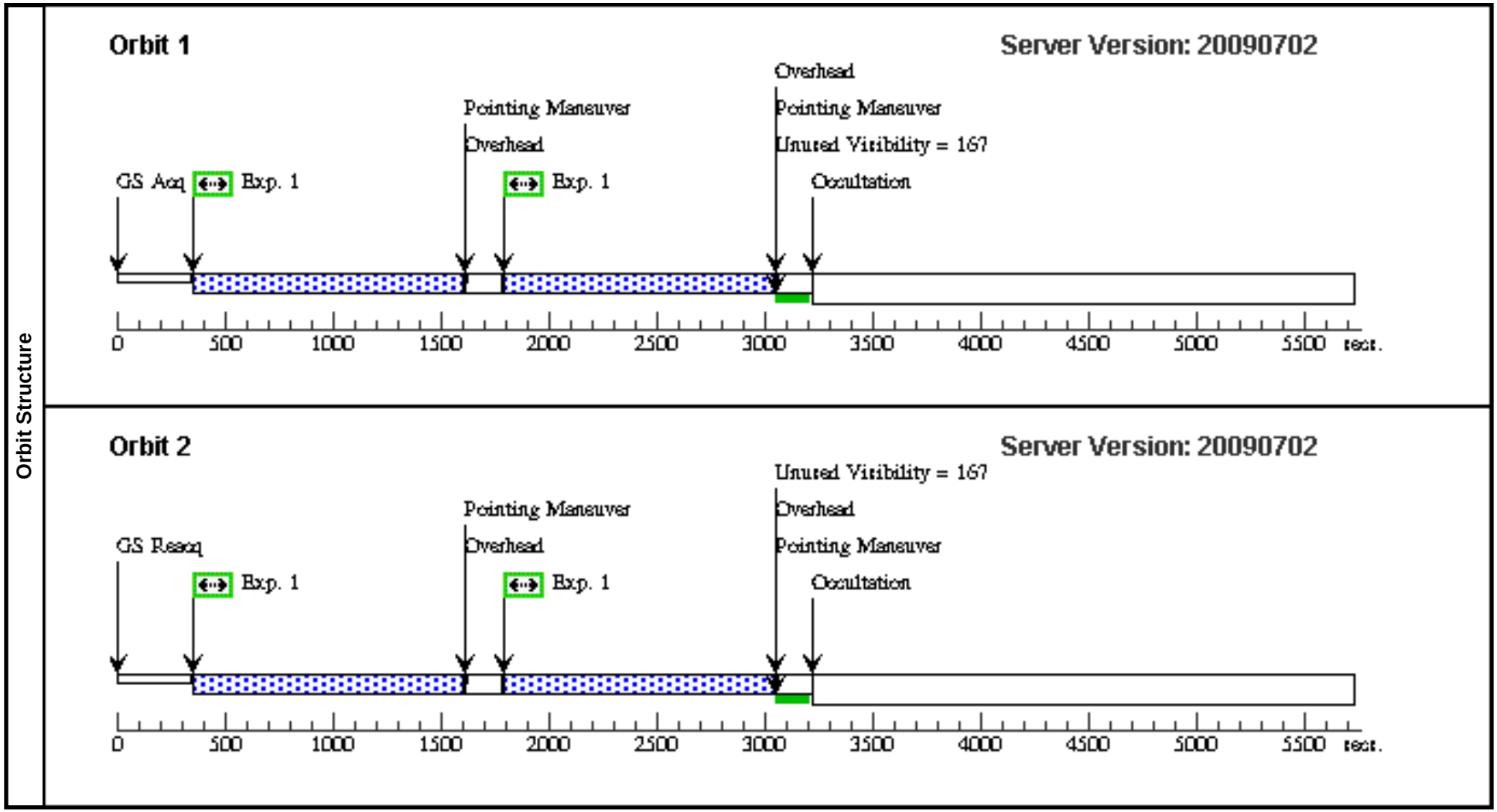
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	1ES-0657-55.8	RA: 06 58 37.2043 (104.6550179d) Dec: -55 56 37.22 (-55.94367d) Equinox: J2000		V=25	Reference Frame: SIMBAD

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/[Actual Dur.]	Orbit
1		(1) 1ES-0657-55.8	WFPC2, IMAGE, WFALL	F814W	CR-SPLIT=NO	POS TARG 2.0,-2.0; GS ACQ SCENARIO BASE1TNS	Pattern 1, Exps 1-1 (1)	1100.0 Secs	
								[==>(Pattern 1)] *[==>(Pattern 2)]*	***[1]***
								[==>(Pattern 3)] *[==>(Pattern 4)]*	***[2]***
2		(1) 1ES-0657-55.8	WFPC2, IMAGE, WFALL	F814W	CR-SPLIT=NO	POS TARG -1.0,-1.0	Pattern 1, Exps 2-2 (1)	1100.0 Secs	
								[==>(Pattern 1)] *[==>(Pattern 2)]*	***[3]***
								[==>(Pattern 3)] *[==>(Pattern 4)]*	***[4]***
3		(1) 1ES-0657-55.8	WFPC2, IMAGE, WFALL	F814W	CR-SPLIT=NO	POS TARG -1.2,-1.2	Pattern 2, Exps 3-3 (2)	1100.0 Secs	
								[==>(Pattern 1)] *[==>(Pattern 2)]*	***[5]***


Orbit Structure
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Overhead
Pointing Maneuver
Pointing Maneuver
Overhead
Unused Visibility = 167
GS Acq
Exp. 1
Exp. 1
Occultation
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1000
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3500
4000
4500
5000
5500
sec.
Orbit 2
Server Version: 20090702
Unused Visibility = 167
Pointing Maneuver
Overhead
Overhead
Pointing Maneuver
GS Reacq
Exp. 1
Exp. 1
Occultation
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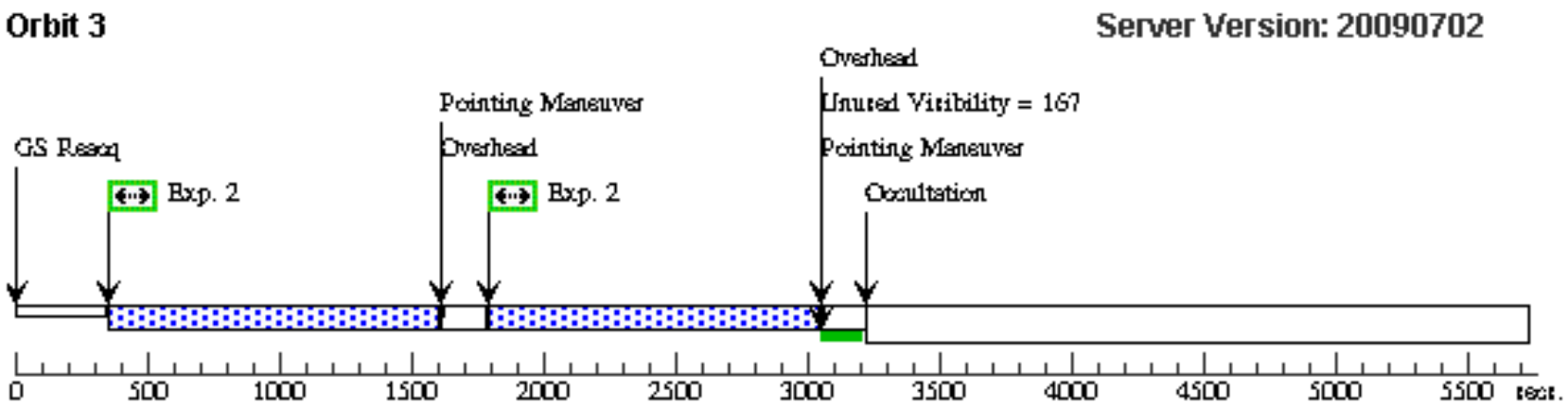
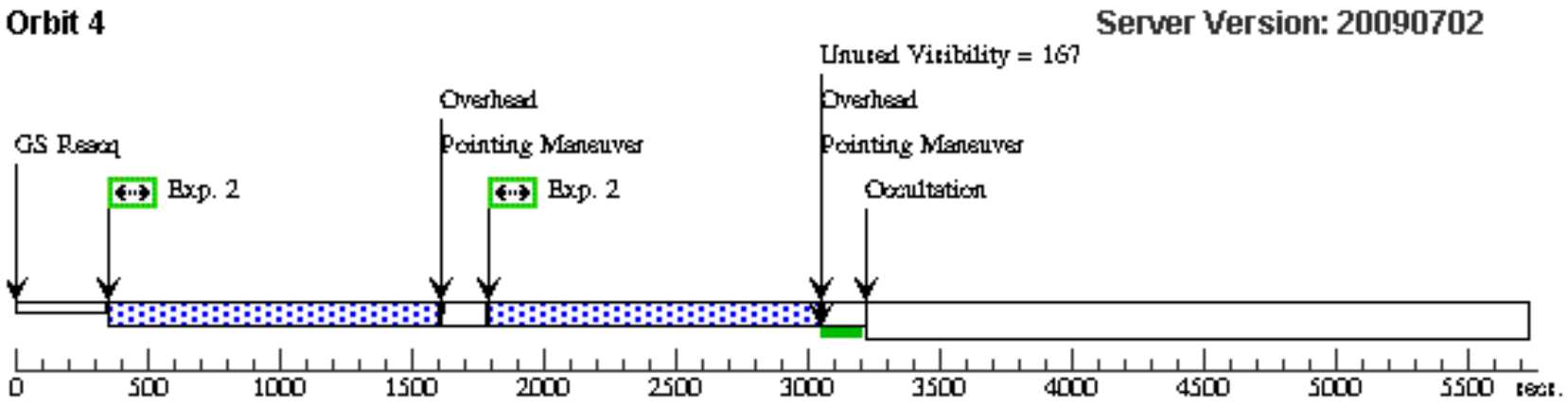
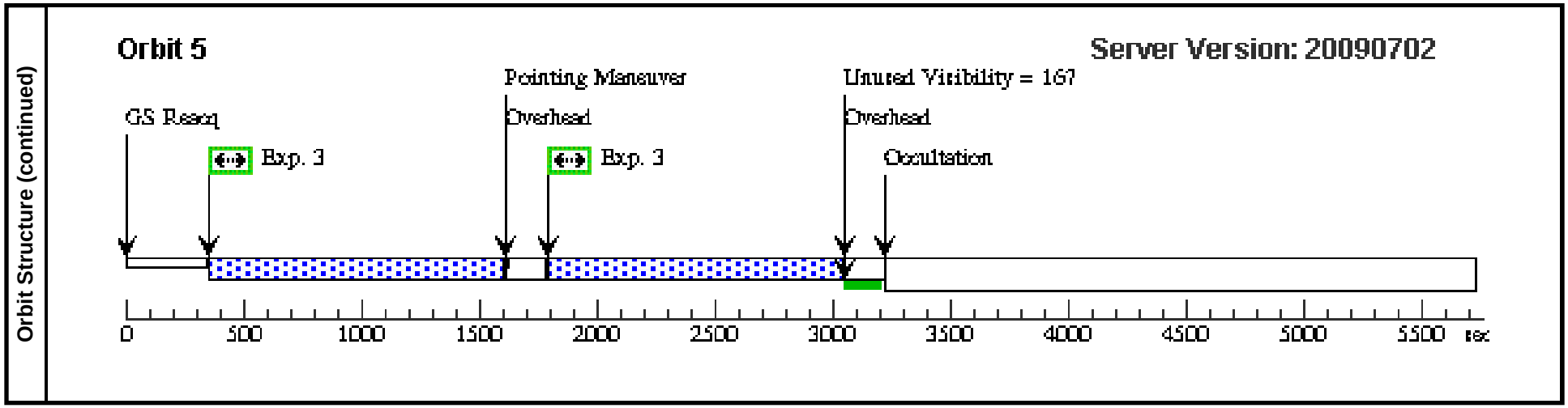
sec.

Orbit Structure (continued)






Orbit Structure (continued)
Orbit 5
Server Version: 20090702
GS Reacq
Exp. 3
Pointing Maneuver
Overhead
Exp. 3
Unused Vitibility = 167
Overhead
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11099, Visit 04, implementation Fri Sep 18 01:01:43 GMT 2009

Diagnostic Status: Warning

Scientific Instruments: WFC3/IR

Special Requirements: GYRO MODE 3GOBAD; ORIENT 313D TO 327 D

Diagnostics

(Visit 04) Warning (Form): Gyro Mode overrides default value of 2G.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(5)	1ES-0657-55.8-SE-WFC3	RA: 06 58 39.9585 (104.6664938d) Dec: -55 57 45.55 (-55.96265d) Equinox: J2000		V=25	Reference Frame: SIMBAD

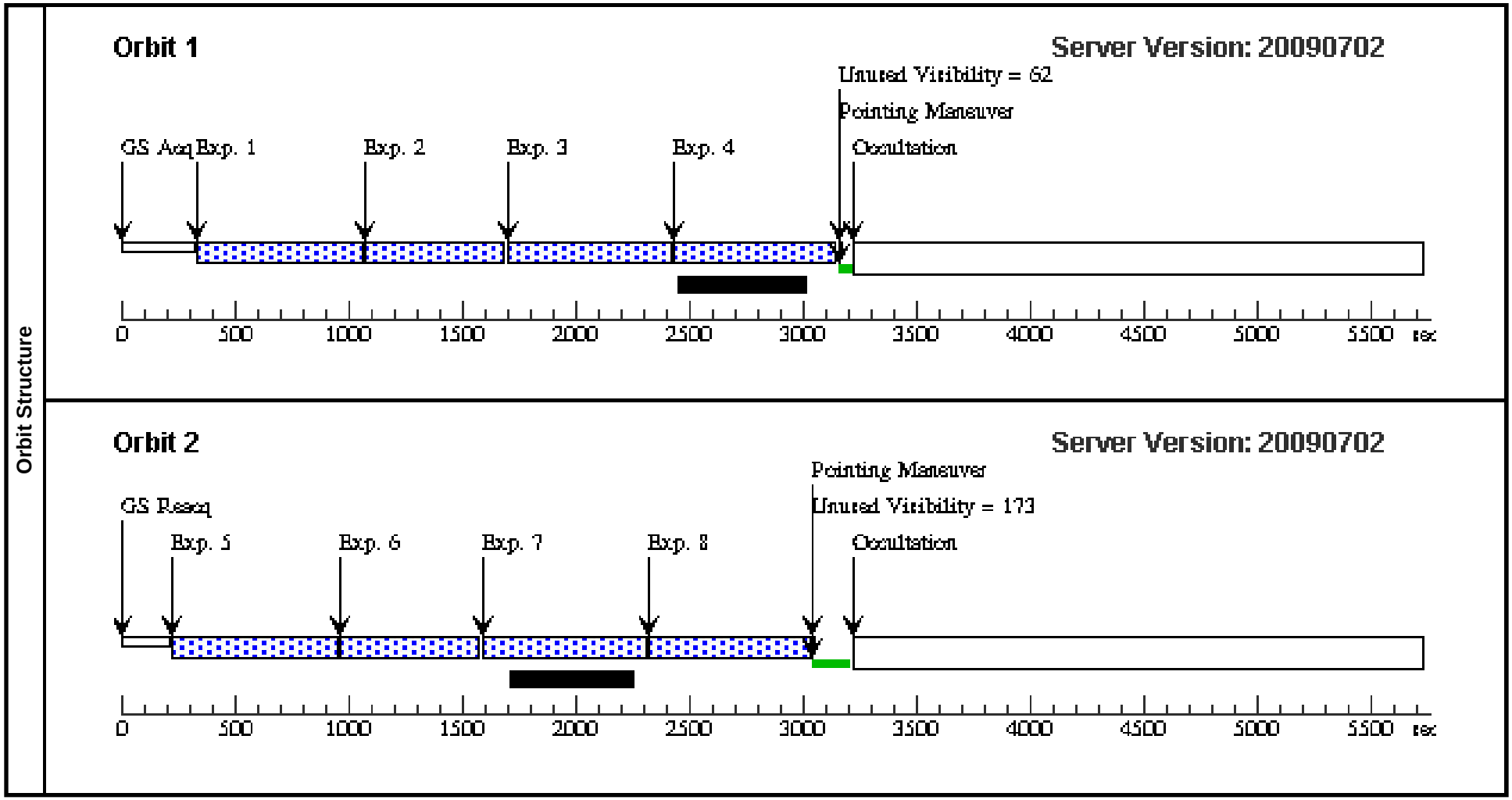
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

Exposures

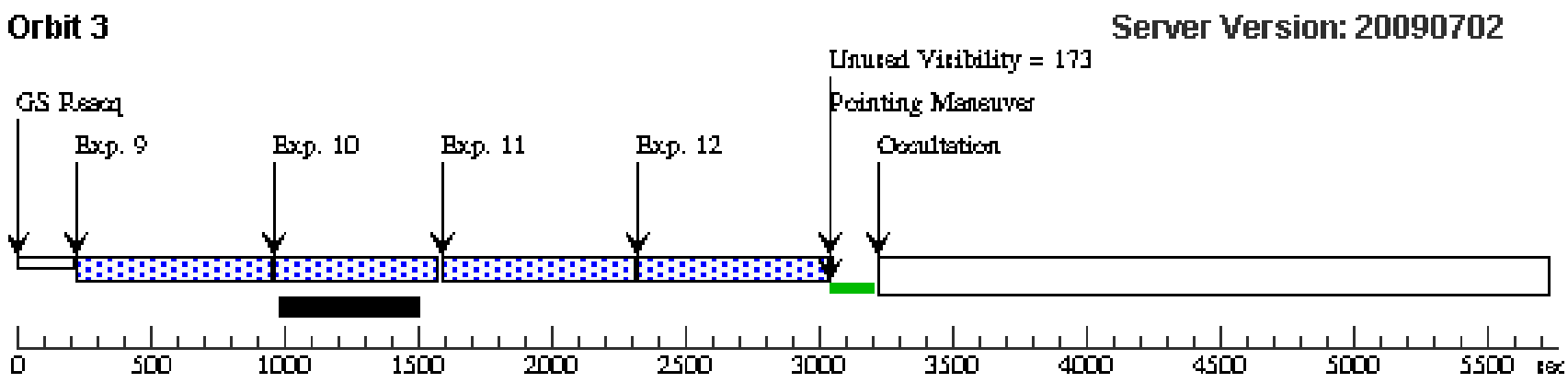
#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(5) 1ES-0657-55.8-SE-WFC3	WFC3/IR, MULTIACCUM, IR	F110W	SAMP-SEQ=SPARS 100; NSAMP=8			*[==>]*	***[1]***
2		(5) 1ES-0657-55.8-SE-WFC3	WFC3/IR, MULTIACCUM, IR	F110W	SAMP-SEQ=SPARS 100; NSAMP=7	SAME POS AS 1		*[==>]*	***[1]***
3		(5) 1ES-0657-55.8-SE-WFC3	WFC3/IR, MULTIACCUM, IR	F160W	SAMP-SEQ=SPARS 100; NSAMP=8	SAME POS AS 1		*[==>]*	***[1]***
4		(5) 1ES-0657-55.8-SE-WFC3	WFC3/IR, MULTIACCUM, IR	F160W	SAMP-SEQ=SPARS 100; NSAMP=8	SAME POS AS 1		*[==>]*	***[1]***
5		(5) 1ES-0657-55.8-SE-WFC3	WFC3/IR, MULTIACCUM, IR	F110W	SAMP-SEQ=SPARS 100; NSAMP=8	POS TARG 2.60,0.975		*[==>]*	***[2]***
6		(5) 1ES-0657-55.8-SE-WFC3	WFC3/IR, MULTIACCUM, IR	F110W	SAMP-SEQ=SPARS 100; NSAMP=7	SAME POS AS 5		*[==>]*	***[2]***
7		(5) 1ES-0657-55.8-SE-WFC3	WFC3/IR, MULTIACCUM, IR	F160W	SAMP-SEQ=SPARS 100; NSAMP=8	SAME POS AS 5		*[==>]*	***[2]***
8		(5) 1ES-0657-55.8-SE-WFC3	WFC3/IR, MULTIACCUM, IR	F160W	SAMP-SEQ=SPARS 100; NSAMP=8	SAME POS AS 5		*[==>]*	***[2]***

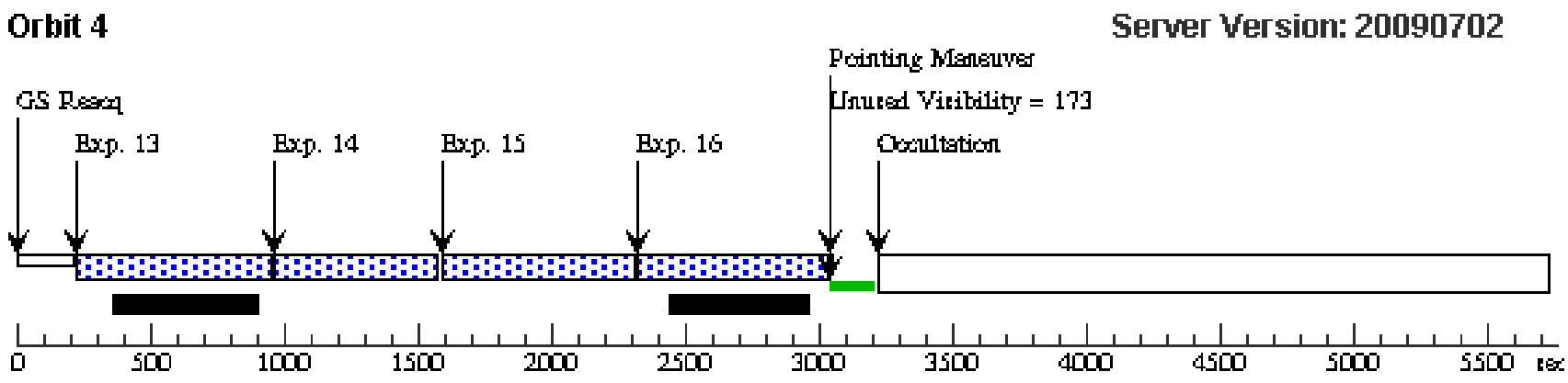
Exposures (continued)

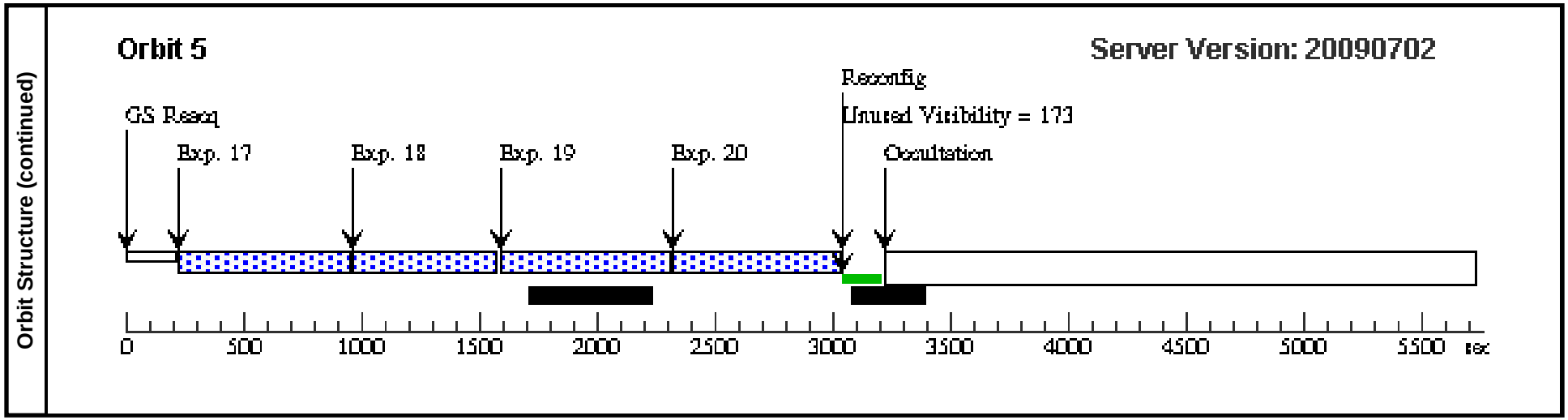
#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
9		(5) 1ES-0657-55.8-SE-WFC3	WFC3/IR, MULTIACCUM, IR	F110W	SAMP-SEQ=SPARS100; NSAMP=8	POS TARG 1.625,2.60		*[==>]*	*[3]*
10		(5) 1ES-0657-55.8-SE-WFC3	WFC3/IR, MULTIACCUM, IR	F110W	SAMP-SEQ=SPARS100; NSAMP=7	SAME POS AS 9		*[==>]*	*[3]*
11		(5) 1ES-0657-55.8-SE-WFC3	WFC3/IR, MULTIACCUM, IR	F160W	SAMP-SEQ=SPARS100; NSAMP=8	SAME POS AS 9		*[==>]*	*[3]*
12		(5) 1ES-0657-55.8-SE-WFC3	WFC3/IR, MULTIACCUM, IR	F160W	SAMP-SEQ=SPARS100; NSAMP=8	SAME POS AS 9		*[==>]*	*[3]*
13		(5) 1ES-0657-55.8-SE-WFC3	WFC3/IR, MULTIACCUM, IR	F110W	SAMP-SEQ=SPARS100; NSAMP=8	POS TARG -0.975,1.625		*[==>]*	*[4]*
14		(5) 1ES-0657-55.8-SE-WFC3	WFC3/IR, MULTIACCUM, IR	F110W	SAMP-SEQ=SPARS100; NSAMP=7	SAME POS AS 13		*[==>]*	*[4]*
15		(5) 1ES-0657-55.8-SE-WFC3	WFC3/IR, MULTIACCUM, IR	F160W	SAMP-SEQ=SPARS100; NSAMP=8	SAME POS AS 13		*[==>]*	*[4]*
16		(5) 1ES-0657-55.8-SE-WFC3	WFC3/IR, MULTIACCUM, IR	F160W	SAMP-SEQ=SPARS100; NSAMP=8	SAME POS AS 13		*[==>]*	*[4]*
17		(5) 1ES-0657-55.8-SE-WFC3	WFC3/IR, MULTIACCUM, IR	F110W	SAMP-SEQ=SPARS100; NSAMP=8	POS TARG 0.8125,1.0725		*[==>]*	*[5]*
18		(5) 1ES-0657-55.8-SE-WFC3	WFC3/IR, MULTIACCUM, IR	F110W	SAMP-SEQ=SPARS100; NSAMP=7	SAME POS AS 17		*[==>]*	*[5]*
19		(5) 1ES-0657-55.8-SE-WFC3	WFC3/IR, MULTIACCUM, IR	F160W	SAMP-SEQ=SPARS100; NSAMP=8	SAME POS AS 17		*[==>]*	*[5]*
20		(5) 1ES-0657-55.8-SE-WFC3	WFC3/IR, MULTIACCUM, IR	F160W	SAMP-SEQ=SPARS100; NSAMP=8	SAME POS AS 17		*[==>]*	*[5]*


Orbit Structure
Orbit 1
Server Version: 20090702
Unused Visibility = 62
Pointing Maneuver
GS Acq
Exp. 1
Exp. 2
Exp. 3
Exp. 4
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec
Orbit 2
Server Version: 20090702
Pointing Maneuver
Unused Visibility = 173
GS Reacq
Exp. 5
Exp. 6
Exp. 7
Exp. 8
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Orbit Structure (continued)






Orbit Structure (continued)
Orbit 5
Server Version: 20090702
GS Reacq
Exp. 17
Exp. 18
Exp. 19
Exp. 20
Reconfig
Unused Visibility = 173
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11099, Visit 05, implementation Fri Sep 18 01:01:45 GMT 2009

Diagnostic Status: Warning

Scientific Instruments: WFC3/IR

Special Requirements: GYRO MODE 3GOBAD; SAME ORIENT AS 04

Diagnostics

(Visit 05) Warning (Form): Gyro Mode overrides default value of 2G.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(6)	1ES-0657-55.8-NW-WFC3	RA: 06 58 32.5543 (104.6356429d) Dec: -55 56 32.36 (-55.94232d) Equinox: J2000		V=25	Reference Frame: SIMBAD

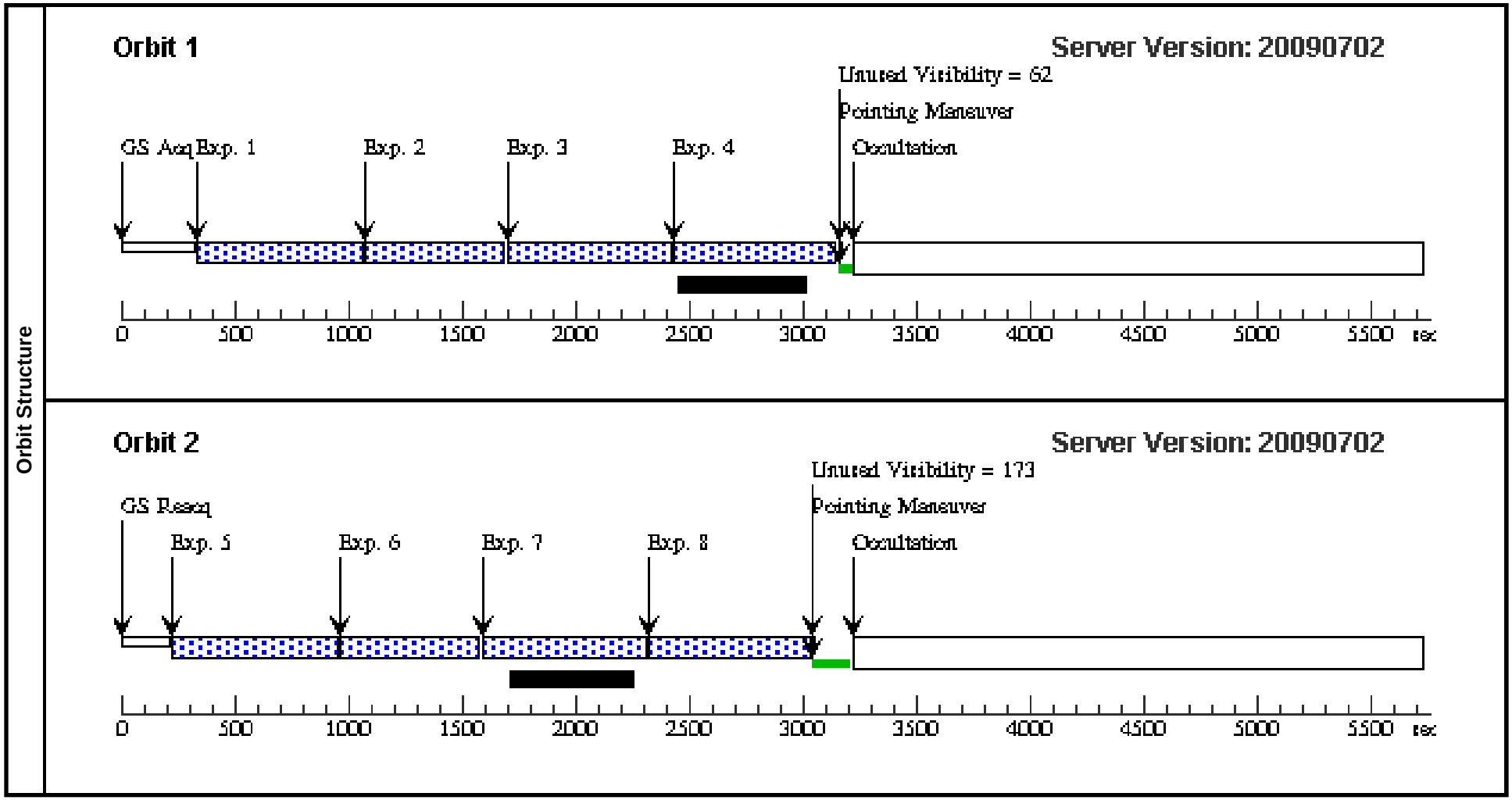
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(6) 1ES-0657-55.8-NW-WFC3	WFC3/IR, MULTIACCUM, IR	F110W	SAMP-SEQ=SPARS 100; NSAMP=8			*[==>]*	***[1]***
2		(6) 1ES-0657-55.8-NW-WFC3	WFC3/IR, MULTIACCUM, IR	F110W	SAMP-SEQ=SPARS 100; NSAMP=7	SAME POS AS 1		*[==>]*	***[1]***
3		(6) 1ES-0657-55.8-NW-WFC3	WFC3/IR, MULTIACCUM, IR	F160W	SAMP-SEQ=SPARS 100; NSAMP=8	SAME POS AS 1		*[==>]*	***[1]***
4		(6) 1ES-0657-55.8-NW-WFC3	WFC3/IR, MULTIACCUM, IR	F160W	SAMP-SEQ=SPARS 100; NSAMP=8	SAME POS AS 1		*[==>]*	***[1]***
5		(6) 1ES-0657-55.8-NW-WFC3	WFC3/IR, MULTIACCUM, IR	F110W	SAMP-SEQ=SPARS 100; NSAMP=8	POS TARG 2.60,0.975		*[==>]*	***[2]***
6		(6) 1ES-0657-55.8-NW-WFC3	WFC3/IR, MULTIACCUM, IR	F110W	SAMP-SEQ=SPARS 100; NSAMP=7	SAME POS AS 5		*[==>]*	***[2]***
7		(6) 1ES-0657-55.8-NW-WFC3	WFC3/IR, MULTIACCUM, IR	F160W	SAMP-SEQ=SPARS 100; NSAMP=8	SAME POS AS 5		*[==>]*	***[2]***
8		(6) 1ES-0657-55.8-NW-WFC3	WFC3/IR, MULTIACCUM, IR	F160W	SAMP-SEQ=SPARS 100; NSAMP=8	SAME POS AS 5		*[==>]*	***[2]***

Exposures (continued)

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
9		(6) 1ES-0657-55.8-NW-WFC3	WFC3/IR, MULTIACCUM, IR	F110W	SAMP-SEQ=SPARS100; NSAMP=8	POS TARG 1.625,2.60		*[==>]*	*[3]*
10		(6) 1ES-0657-55.8-NW-WFC3	WFC3/IR, MULTIACCUM, IR	F110W	SAMP-SEQ=SPARS100; NSAMP=7	SAME POS AS 9		*[==>]*	*[3]*
11		(6) 1ES-0657-55.8-NW-WFC3	WFC3/IR, MULTIACCUM, IR	F160W	SAMP-SEQ=SPARS100; NSAMP=8	SAME POS AS 9		*[==>]*	*[3]*
12		(6) 1ES-0657-55.8-NW-WFC3	WFC3/IR, MULTIACCUM, IR	F160W	SAMP-SEQ=SPARS100; NSAMP=8	SAME POS AS 9		*[==>]*	*[3]*
13		(6) 1ES-0657-55.8-NW-WFC3	WFC3/IR, MULTIACCUM, IR	F110W	SAMP-SEQ=SPARS100; NSAMP=8	POS TARG -0.975,1.625		*[==>]*	*[4]*
14		(6) 1ES-0657-55.8-NW-WFC3	WFC3/IR, MULTIACCUM, IR	F110W	SAMP-SEQ=SPARS100; NSAMP=7	SAME POS AS 13		*[==>]*	*[4]*
15		(6) 1ES-0657-55.8-NW-WFC3	WFC3/IR, MULTIACCUM, IR	F160W	SAMP-SEQ=SPARS100; NSAMP=8	SAME POS AS 13		*[==>]*	*[4]*
16		(6) 1ES-0657-55.8-NW-WFC3	WFC3/IR, MULTIACCUM, IR	F160W	SAMP-SEQ=SPARS100; NSAMP=8	SAME POS AS 13		*[==>]*	*[4]*
17		(6) 1ES-0657-55.8-NW-WFC3	WFC3/IR, MULTIACCUM, IR	F110W	SAMP-SEQ=SPARS100; NSAMP=8	POS TARG 0.8125,1.0725		*[==>]*	*[5]*
18		(6) 1ES-0657-55.8-NW-WFC3	WFC3/IR, MULTIACCUM, IR	F110W	SAMP-SEQ=SPARS100; NSAMP=7	SAME POS AS 17		*[==>]*	*[5]*
19		(6) 1ES-0657-55.8-NW-WFC3	WFC3/IR, MULTIACCUM, IR	F160W	SAMP-SEQ=SPARS100; NSAMP=8	SAME POS AS 17		*[==>]*	*[5]*
20		(6) 1ES-0657-55.8-NW-WFC3	WFC3/IR, MULTIACCUM, IR	F160W	SAMP-SEQ=SPARS100; NSAMP=8	SAME POS AS 17		*[==>]*	*[5]*


Orbit Structure
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Server Version: 20090702
Unused Visibility = 62
Pointing Maneuver
GS Acq
Exp. 1
Exp. 2
Exp. 3
Exp. 4
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec
Orbit 2
Server Version: 20090702
Unused Visibility = 173
Pointing Maneuver
GS Reacq
Exp. 5
Exp. 6
Exp. 7
Exp. 8
Occultation
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500
1000
1500
2000
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4500
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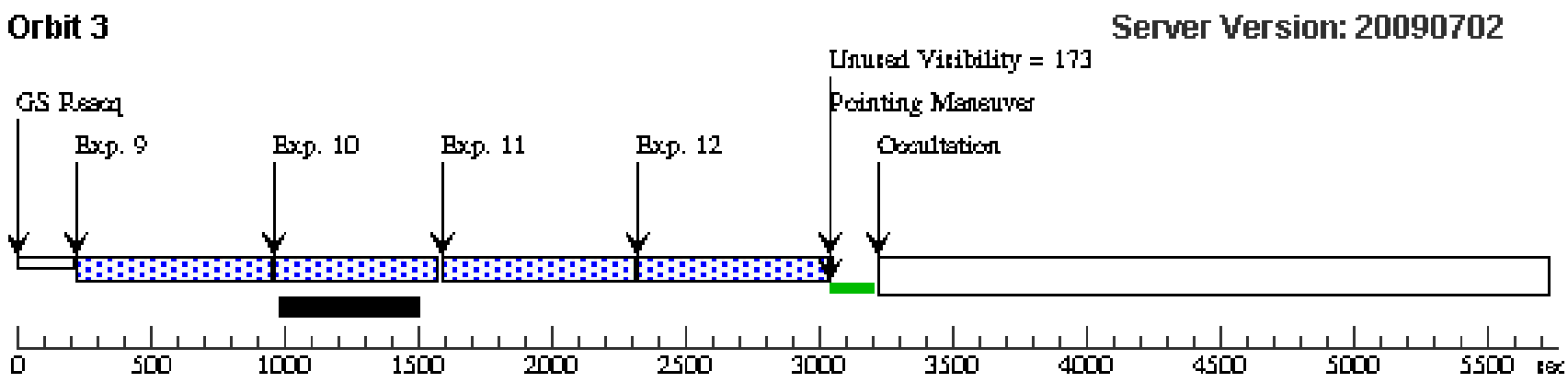
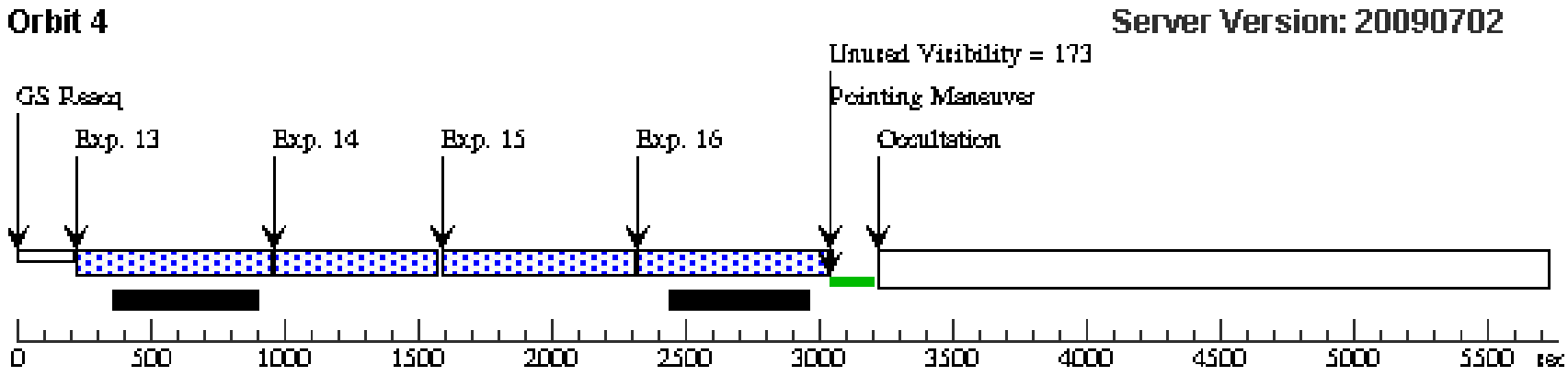
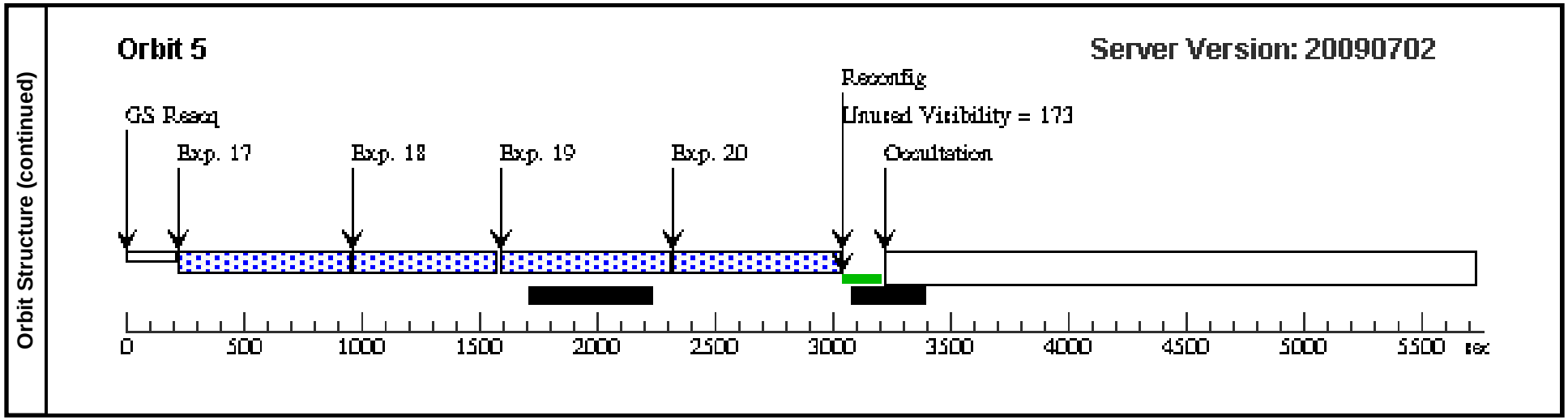
5500
sec

Orbit Structure (continued)






Orbit Structure (continued)
Orbit 5
Server Version: 20090702
GS Reacq
Exp. 17
Exp. 18
Exp. 19
Exp. 20
Reconfig
Unused Visibility = 173
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec