11615 - HUNTING FOR OPTICAL COMPANIONS TO BINARY MSPS IN GLOBULAR CLUSTERS

Cycle: 17, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	*Institution*	*E-Mail*
Prof. Francesco R. Ferraro (PI) (ESA Member)	**Universita di Bologna**	**francesco.ferraro3@unibo.it**
Dr. Andrea Possenti (CoI) (ESA Member)	INAF, Osservatorio Astronomico di Cagliari	Possenti@ca.astro.it
Dr. Paulo C. Freire (CoI)	Cornell University	pfreire@naic.edu
Dr. Scott M. Ransom (CoI) (AdminUSPI)	Associated Universities, Inc.	sransom@nrao.edu
Dr. Ingrid Stairs (CoI)	University of British Columbia	stairs@astro.ubc.ca
Prof. Robert T. Rood (CoI)	The University of Virginia	rtr@virginia.edu
Dr. Giacomo Beccari (CoI) (ESA Member)	Universita di Bologna	giacomo.beccari@bo.astro.it
Dr. Barbara Lanzoni (CoI) (ESA Member)	Universita di Bologna	barbara.lanzoni@bo.astro.it
Dr. Alessio Mucciarelli (CoI) (ESA Member)	Universita di Bologna	alessio.mucciarelli@studio.unibo.it
Dr. Emanuele Dalessandro (CoI) (ESA Member)	Universita di Bologna	emanuele.dalessandr2@unibo.it
Dr. Sara Lucatello (CoI) (ESA Member)	Osservatorio Astronomico di Padova	sara.lucatello@oapd.inaf.it
Dr. Gabriele Cocozza (CoI) (ESA Member)	Universita di Bologna	gabrielecocozza@virgilio.it
Dr. Elena Valenti (CoI) (ESA Member)	European Southern Observatory - Chile	evalenti@eso.org
Dr. Livia Origlia (CoI) (ESA Member)	INAF, Osservatorio Astronomico di Bologna	livia.origlia@bo.astro.it

VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) TERZAN-005 ANY	ACS/WFC WFC3/IR	6	09-Jul-2009 12:26:22.0	yes
02	(3) MESSIER-028	WFC3/UVIS	6	09-Jul-2009 12:26:46.0	yes
03	(4) MESSIER-005	WFC3/UVIS	4	09-Jul-2009 12:27:04.0	yes
04	(6) NGC6266B-OFFSET (7) NGC6266B-COPY ANY CCDFLAT	ACS/WFC STIS/CCD	2	09-Jul-2009 12:27:14.0	yes

18 Total Orbits Used

ABSTRACT

Here we present a proposal which exploits the re-newed potential of HST after the Service Mission 4 for probing the population of binary Millisecond Pulsars (MSPs) in Globular Clusters. In particular we intend to: (1) extend the search for optical counterparts in Terzan 5, by pushing the performance of the WFC3 IR channel to sample the entire MS extension down to M=0.1 Mo; (2) perform a deep multi-band search of MSP companions with the WFC3, in 3 clusters (namely NGC6440, M28 and M5), where recent radio observations have found particularly interesting objects; (3) derive an accurate radial velocity (with STIS) of the puzzling optical companion COM6266B recently discovered by our group, to firmly assess its cluster membership.

This program is the result of a large collaboration among the three major groups (lead by Freire, Ransom and Possenti) which are performing extensive MSP search in GCs in the radio bands, and our group which has a large experience in performing accurate stellar photometry in crowded environments. This collaboration has produced a number of outstanding discoveries. In fact, three of the 6 optical counterparts to binary MSP companions known to date in GCs have been discovered by our group.

The observations here proposed would easily double/triple the existing sample of known MSP companions, allowing the first meaningful approach to the study of the formation, evolution and recycling process of pulsar in GCs. Moreover, since most of binary MSPs in GCs are thought to form via stellar interactions in the high density core regions, the determination of the nature of the companion and the incidence of this collisionally induced

population has a significant impact on our knowledge of the cluster dynamics. Even more interesting, the study of the optical companions to NSs in GCs allows one to derive tighter constraints (than those obtainable for NS binaries in the Galactic field) on the system properties. This has, in turn, an intrisic importance for fundamental physics, since it offers the opportunity of measuring the mass of the NS and hence constraining the equation of state of matter at the nuclear equilibrium density.

OBSERVING DESCRIPTION

The proposal is organized in 4 visits, one for each programme cluster.

Visit 1 (6 orbits) is devoted to secure deep IR observations of Terzan 5 by using the WFC3/IR. Deep exposures in the F160W and F125W filters are planned. Parallel observations with the ACS/WFC (in the F606W,F814W and F435W) are also included.

Visit 2 (6 orbits) is devoted to multiband deep imaging of M28, by using the WFC3/UVIS channel. Deep exposures in the F390W, F606W, F814W and F656N (Halpha) filters are secured. Parallel observations are dropped because the long buffer dump times of both the ACS and WFC3 prevent to properly plan the primary WFC3 exposures. In order to reduce the overheads caused by the required short V and I exposures, we decided to organized the visit in an appropriate sequence of short and long exposures thus to allow "parallel" buffer dumps.

Visit 3 (4 orbits) is devoted to multiband deep imaging of M5, by using the WFC3/UVIS channel. Deep exposures in the F390W, F606W, F814W and F656N (Halpha) filters are secured. Parallel observations are dropped because the long buffer dump times of both the ACS and WFC3 prevent to properly plan the primary WFC3 exposures. In order to reduce the overheads caused by the required short V and I exposures, we decided to organized the visit in an appropriate sequence of short and long exposures thus to allow "parallel" buffer dumps.

Visit 4 (2 orbits) is devoted to perform STIS spectroscopy of a faint object suspected to be the optical companion of a MSP in NGC6266. The two orbits are organised as follows: an ACQ exposure to image the reference star and a set of 6 long exposures dithered along the slit direction. We use the 52X0.2 aperture and the G750L spectral element. A fringe flat field exposure is also planned at the end of the second orbit. Parallel ACS/WFC observations are also planned.

Visit

Proposal 11615, Visit 01, implementation Thu Jul 09 16:27:18 GMT 2009

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR, ACS/WFC

Special Requirements: (none)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	TERZAN-005	RA: 17 48 4.8500 (267.0202083d) Dec: -24 46 44.60 (-24.77906d) Equinox: J2000		V=25	Reference Frame: ICRS

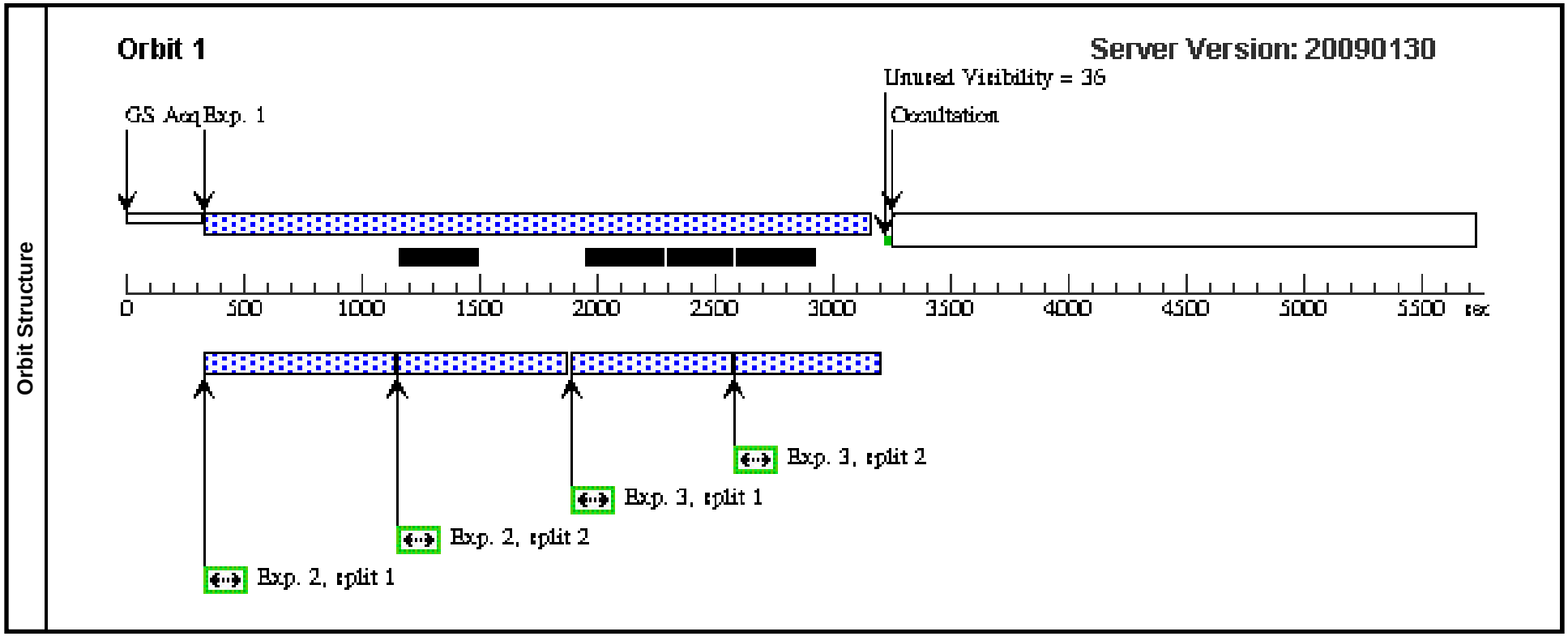
Comments: This object was generated by the targetselector and retrieved from the NED database.

Exposures

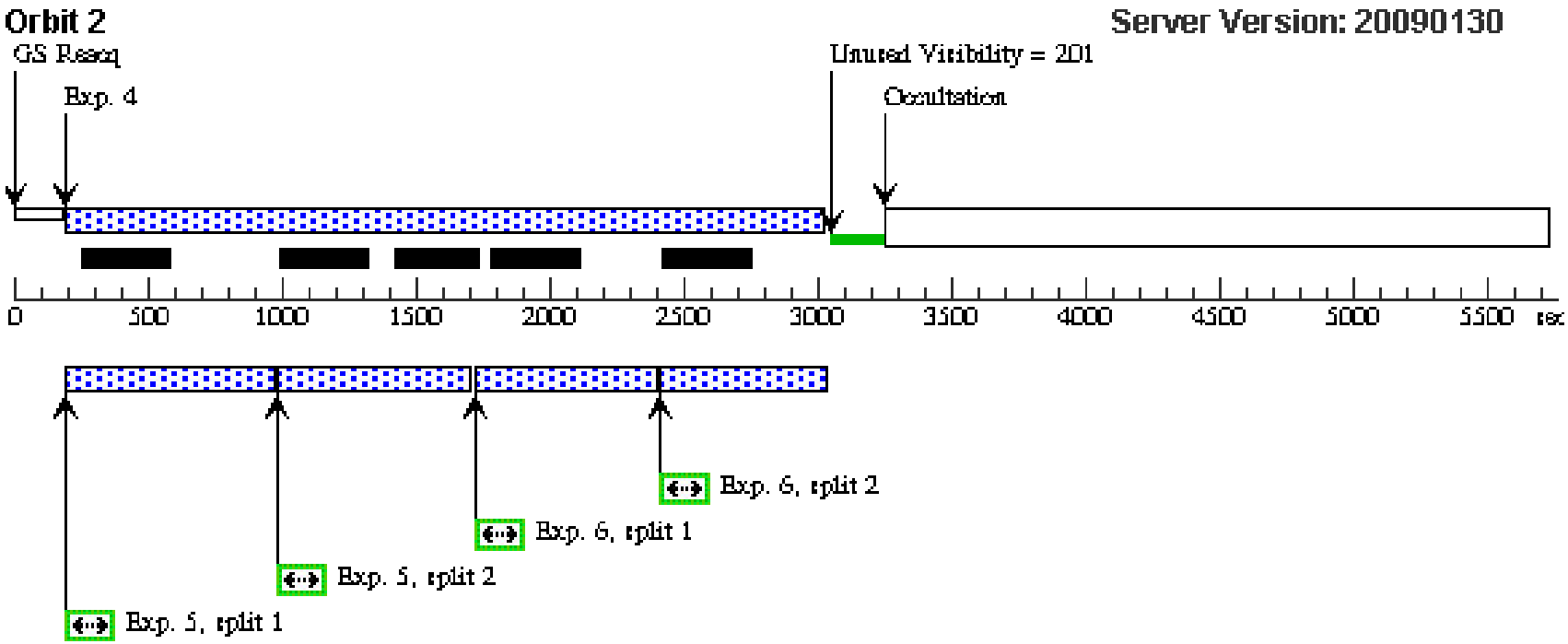
#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	ter5_j1	(1) TERZAN-005	WFC3/IR, MULTIACCUM, IR	F125W	SAMP-SEQ=STEP400; NSAMP=15		Prime + Parallel Group 1-3	*[==>]*	***[1]***
2		ANY	ACS/WFC, ACCUM, WFC	F606W	CR-SPLIT=2		Prime + Parallel Group 1-3	1200 Secs *[==>(Split 1)]* *[==>(Split 2)]*	***[1]***
3		ANY	ACS/WFC, ACCUM, WFC	F814W	CR-SPLIT=2		Prime + Parallel Group 1-3	1000 Secs *[==>(Split 1)]* *[==>(Split 2)]*	***[1]***
4	ter5_h1	(1) TERZAN-005	WFC3/IR, MULTIACCUM, IR	F160W	SAMP-SEQ=STEP400; NSAMP=15		Prime + Parallel Group 4-6	*[==>]*	***[2]***
5		ANY	ACS/WFC, ACCUM, WFC	F606W	CR-SPLIT=2		Prime + Parallel Group 4-6	1200 Secs *[==>(Split 1)]* *[==>(Split 2)]*	***[2]***
6		ANY	ACS/WFC, ACCUM, WFC	F814W	CR-SPLIT=2		Prime + Parallel Group 4-6	1000 Secs *[==>(Split 1)]* *[==>(Split 2)]*	***[2]***
7	ter5_j2	(1) TERZAN-005	WFC3/IR, MULTIACCUM, IR	F125W	SAMP-SEQ=STEP400; NSAMP=15		Prime + Parallel Group 7-9	*[==>]*	***[3]***
8		ANY	ACS/WFC, ACCUM, WFC	F606W	CR-SPLIT=2		Prime + Parallel Group 7-9	1200 Secs *[==>(Split 1)]* *[==>(Split 2)]*	***[3]***
9		ANY	ACS/WFC, ACCUM, WFC	F814W	CR-SPLIT=2		Prime + Parallel Group 7-9	1000 Secs *[==>(Split 1)]* *[==>(Split 2)]*	***[3]***

Exposures (continued)

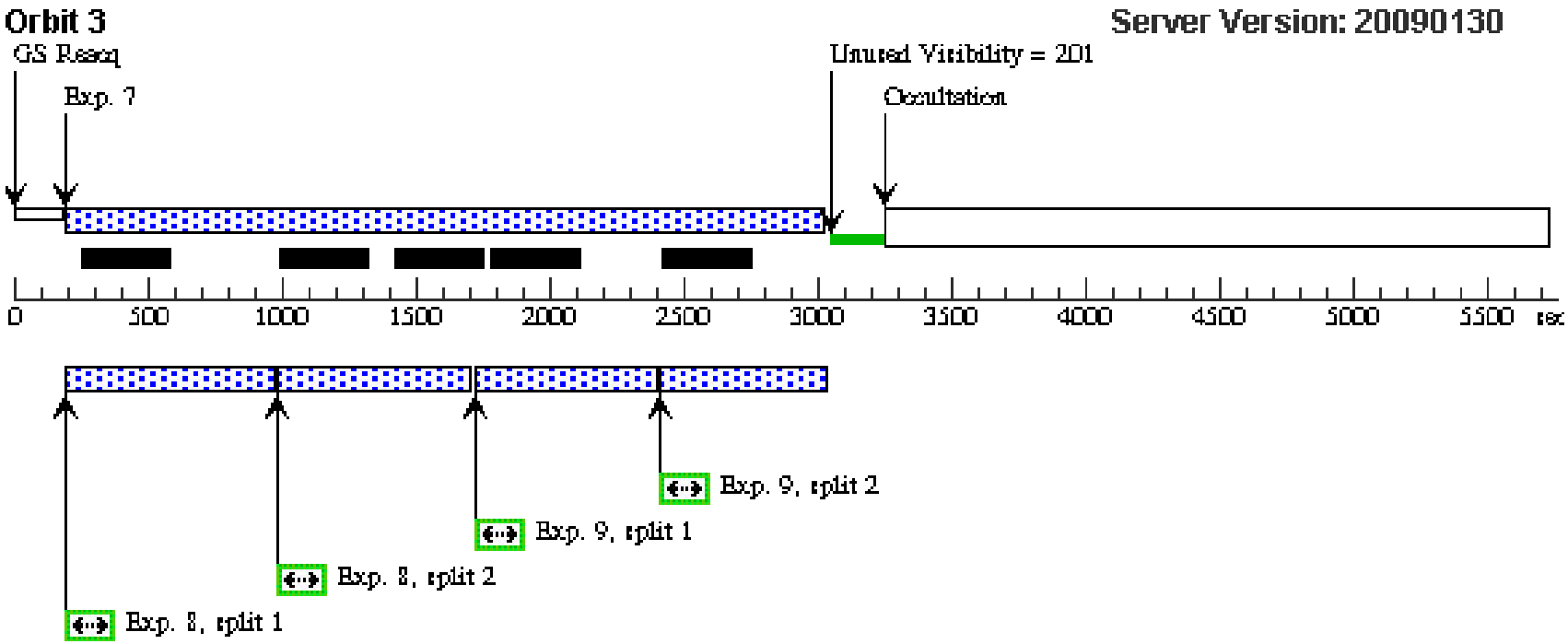
#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
10	ter5_h2	(1) TERZAN-005	WFC3/IR, MULTIACCUM, IR	F160W	SAMP-SEQ=STEP400; NSAMP=15		Prime + Parallel Group 10-12	*[==>]*	***[4]***
11		ANY	ACS/WFC, ACCUM, WFC	F606W	CR-SPLIT=2		Prime + Parallel Group 10-12	1200 Secs *[==>(Split 1)]* *[==>(Split 2)]*	***[4]***
12		ANY	ACS/WFC, ACCUM, WFC	F814W	CR-SPLIT=2		Prime + Parallel Group 10-12	1000 Secs *[==>(Split 1)]* *[==>(Split 2)]*	***[4]***
13	ter5_j3	(1) TERZAN-005	WFC3/IR, MULTIACCUM, IR	F125W	SAMP-SEQ=STEP400; NSAMP=15		Prime + Parallel Group 13-15	*[==>]*	***[5]***
14		ANY	ACS/WFC, ACCUM, WFC	F435W	CR-SPLIT=2		Prime + Parallel Group 13-15	1200 Secs *[==>(Split 1)]* *[==>(Split 2)]*	***[5]***
15		ANY	ACS/WFC, ACCUM, WFC	F435W	CR-SPLIT=2		Prime + Parallel Group 13-15	1000 Secs *[==>(Split 1)]* *[==>(Split 2)]*	***[5]***
16	ter5_h3	(1) TERZAN-005	WFC3/IR, MULTIACCUM, IR	F160W	SAMP-SEQ=STEP400; NSAMP=11		Prime + Parallel Group 16-18	*[==>]*	***[6]***
17	ter5_j4	(1) TERZAN-005	WFC3/IR, MULTIACCUM, IR	F125W	SAMP-SEQ=STEP400; NSAMP=12		Prime + Parallel Group 16-18	*[==>]*	***[6]***
18		ANY	ACS/WFC, ACCUM, WFC	F435W	CR-SPLIT=4		Prime + Parallel Group 16-18	2000 Secs *[==>(Split 1)]* *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]*	***[6]***


Orbit Structure
Orbit 1
Server Version: 20090130
Unused Visibility = 36
GS Acq
Exp. 1
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec
Exp. 3, split 2
Exp. 3, split 1
Exp. 2, split 2
Exp. 2, split 1

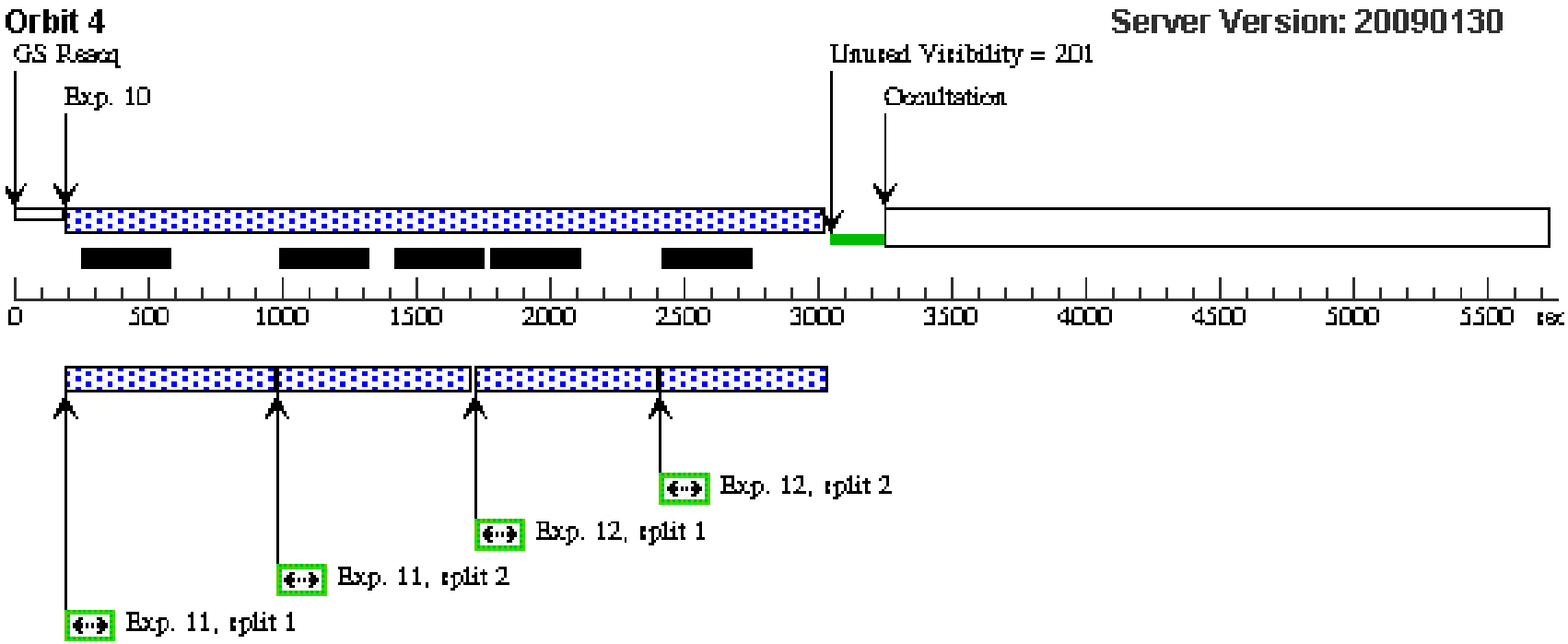
Orbit Structure (continued)



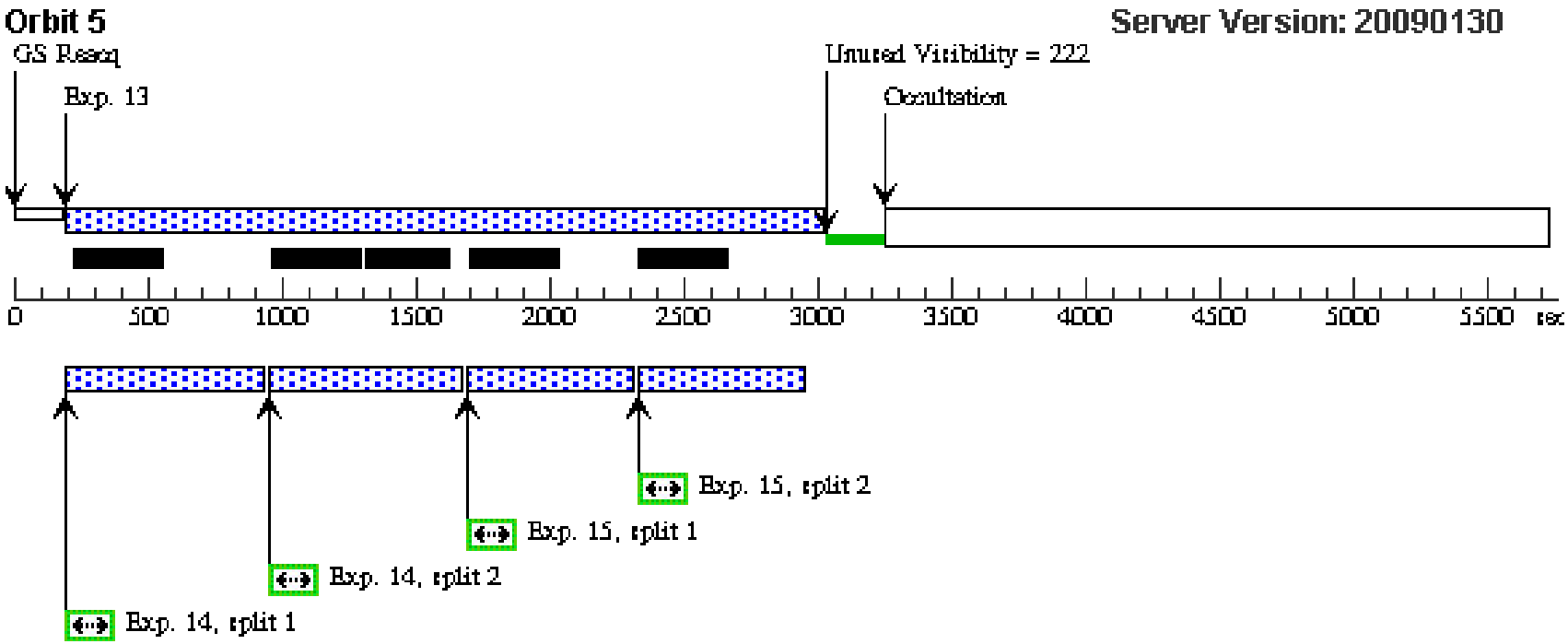
Orbit Structure (continued)



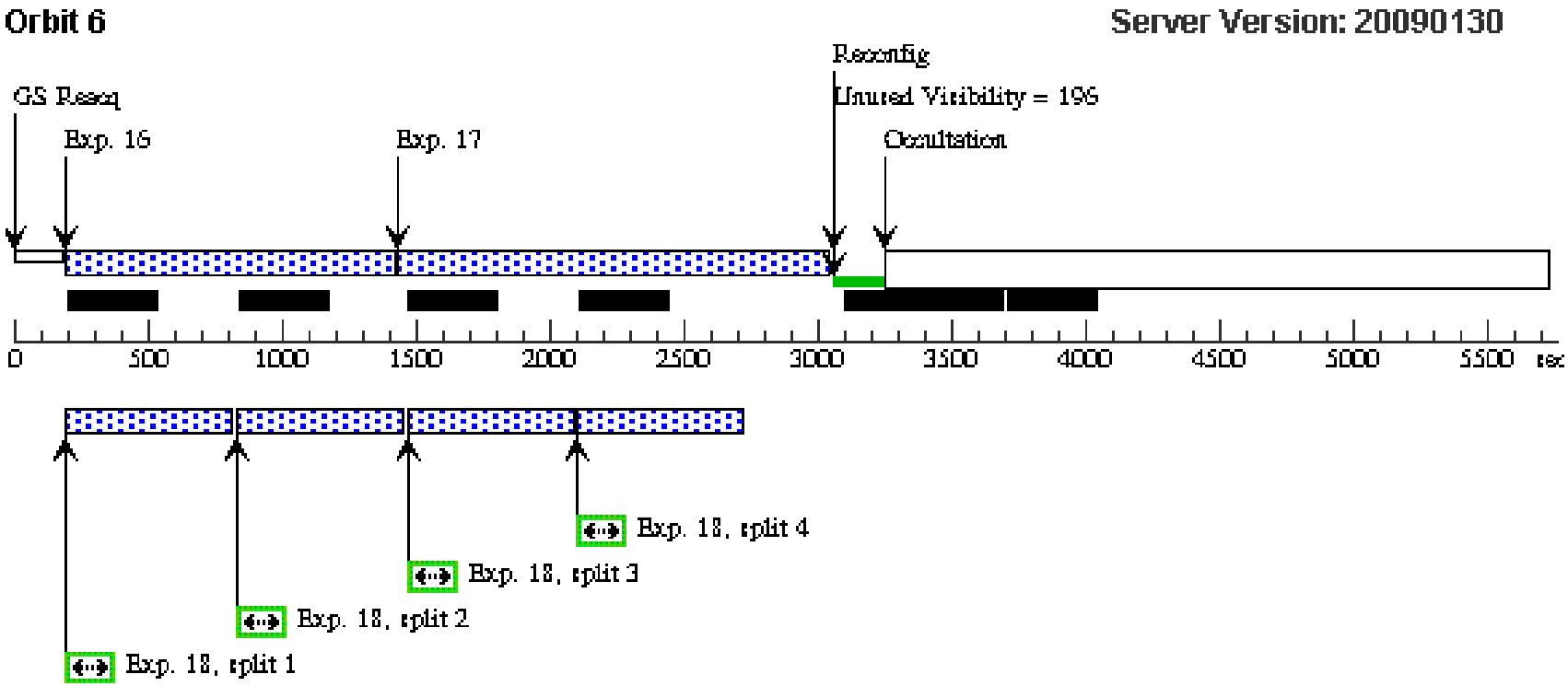
Orbit Structure (continued)



Orbit Structure (continued)



Orbit Structure (continued)



Visit

Proposal 11615, Visit 02, implementation Thu Jul 09 16:27:21 GMT 2009

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: (none)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	MESSIER-028	RA: 18 24 32.9000 (276.1370833d) Dec: -24 52 11.00 (-24.86972d) Equinox: J2000		V=26	Reference Frame: ICRS

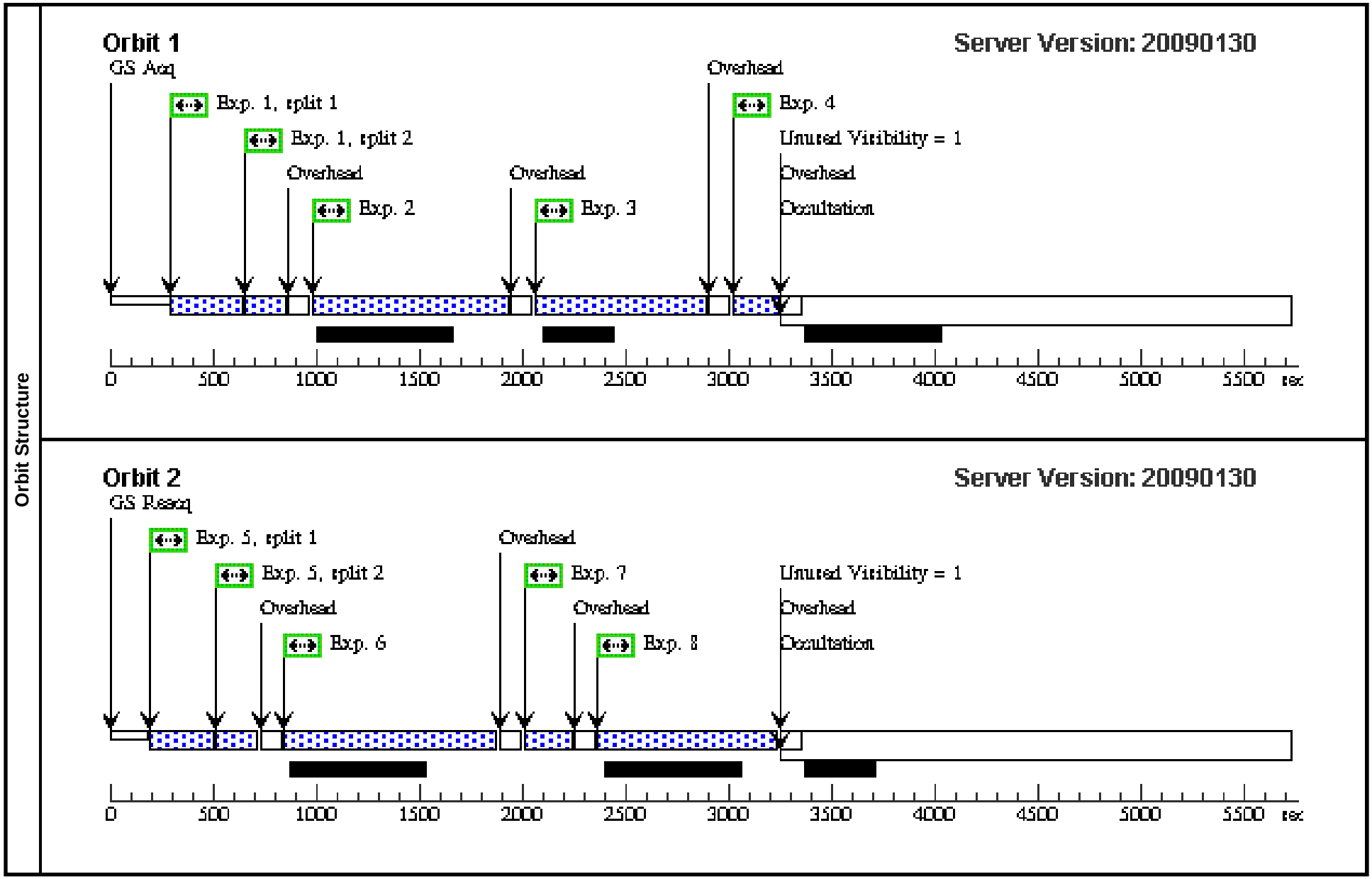
Comments: This object was generated by the targetselector and retrieved from the NED database.

Exposures

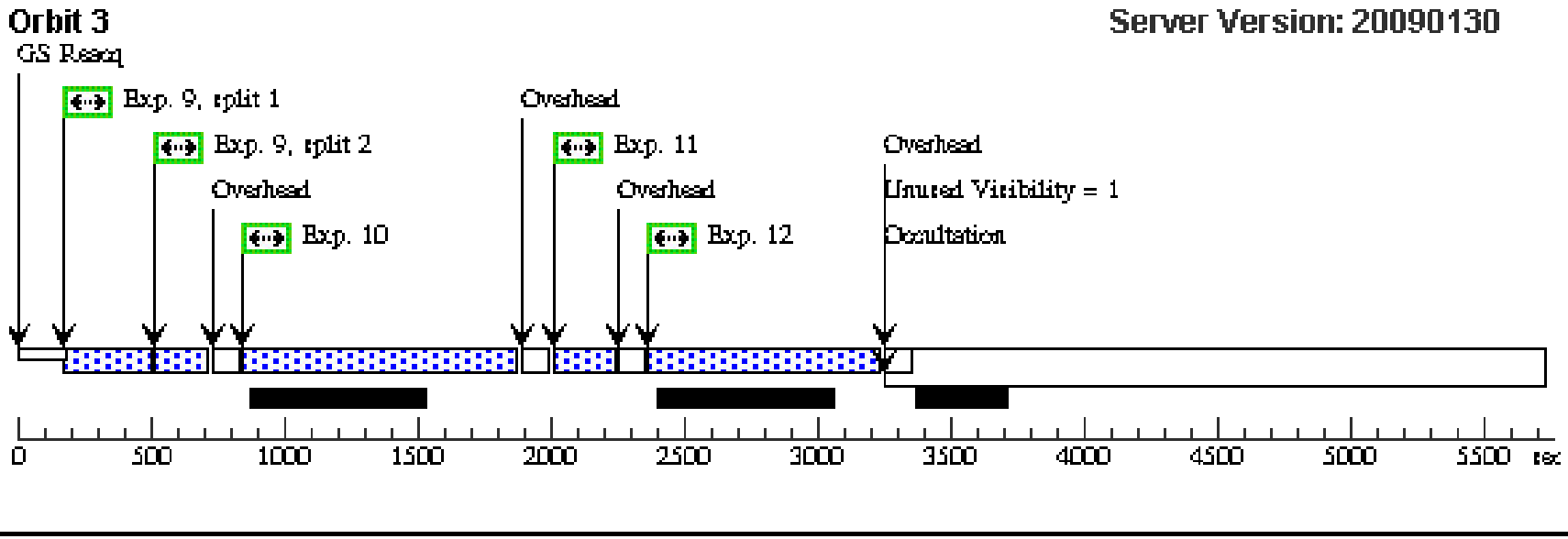
#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	m28_v12	(3) MESSIER-028	WFC3/UVIS, ACCUM, UVIS1	F606W	CR-SPLIT=2			400 Secs *[==>(Split 1)]* *[==>(Split 2)]*	***[1]***
2	m28_ha1	(3) MESSIER-028	WFC3/UVIS, ACCUM, UVIS1	F656N	CR-SPLIT=NO			935 Secs *[==>]*	***[1]***
3	m28_u1	(3) MESSIER-028	WFC3/UVIS, ACCUM, UVIS1	F390W	CR-SPLIT=NO			800 Secs *[==>]*	***[1]***
4	m28_i1	(3) MESSIER-028	WFC3/UVIS, ACCUM, UVIS1	F814W	CR-SPLIT=NO			200 Secs *[==>]*	***[1]***
5	m28_i23	(3) MESSIER-028	WFC3/UVIS, ACCUM, UVIS1	F814W	CR-SPLIT=2			400 Secs *[==>(Split 1)]* *[==>(Split 2)]*	***[2]***
6	m28_ha2	(3) MESSIER-028	WFC3/UVIS, ACCUM, UVIS1	F656N	CR-SPLIT=NO			1020 Secs *[==>]*	***[2]***
7	m28_v3	(3) MESSIER-028	WFC3/UVIS, ACCUM, UVIS1	F606W	CR-SPLIT=NO			200 Secs *[==>]*	***[2]***
8	m28_u2	(3) MESSIER-028	WFC3/UVIS, ACCUM, UVIS1	F390W	CR-SPLIT=NO			850 Secs *[==>]*	***[2]***
9	m28_v45	(3) MESSIER-028	WFC3/UVIS, ACCUM, UVIS1	F606W	CR-SPLIT=2			400 Secs *[==>(Split 1)]* *[==>(Split 2)]*	***[3]***
10	m28_ha3	(3) MESSIER-028	WFC3/UVIS, ACCUM, UVIS1	F656N	CR-SPLIT=NO			1020 Secs *[==>]*	***[3]***
11	m28_i4	(3) MESSIER-028	WFC3/UVIS, ACCUM, UVIS1	F814W	CR-SPLIT=NO			200 Secs *[==>]*	***[3]***
12	m28_u3	(3) MESSIER-028	WFC3/UVIS, ACCUM, UVIS1	F390W	CR-SPLIT=NO			850 Secs *[==>]*	***[3]***

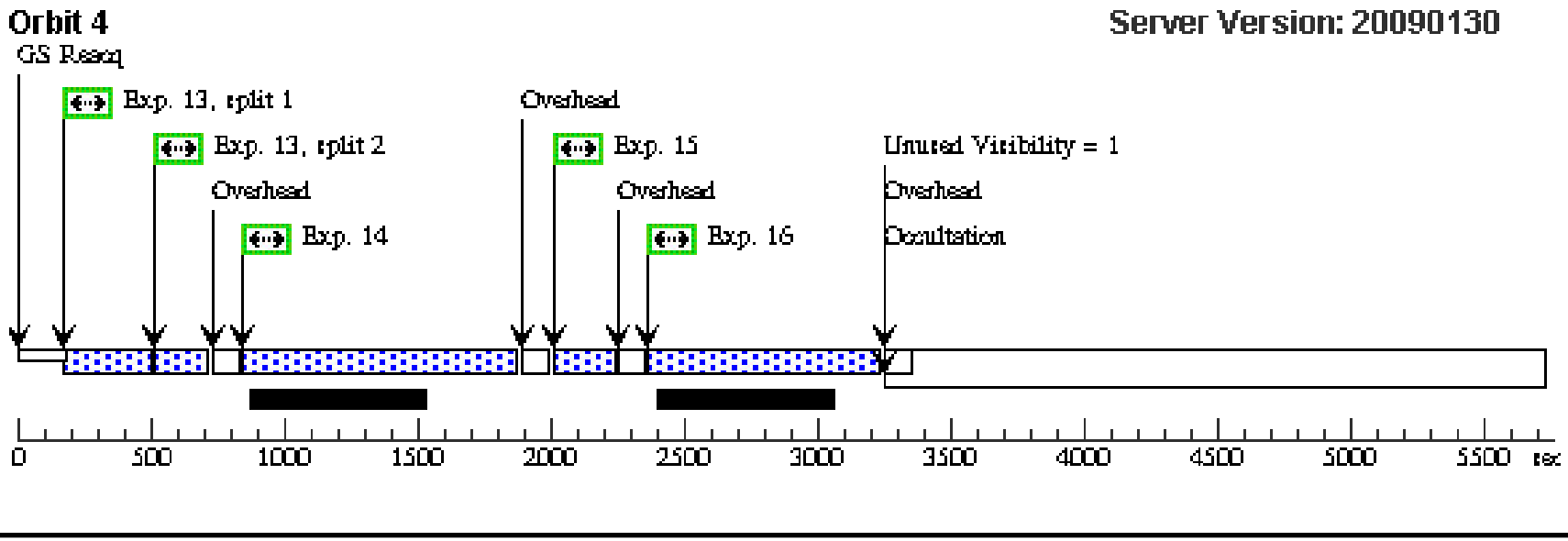
Exposures (continued)

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
13	m28_i56	(3) MESSIER-028	WFC3/UVIS, ACCUM, UVIS1	F814W	CR-SPLIT=2			400 Secs	
								[==>(Split 1)]	***[4]***
								[==>(Split 2)]	
14	m28_ha4	(3) MESSIER-028	WFC3/UVIS, ACCUM, UVIS1	F656N	CR-SPLIT=NO			1020 Secs	
								[==>]	***[4]***
15	m28_v6	(3) MESSIER-028	WFC3/UVIS, ACCUM, UVIS1	F606W	CR-SPLIT=NO			200 Secs	
								[==>]	***[4]***
16	m28_u4	(3) MESSIER-028	WFC3/UVIS, ACCUM, UVIS1	F390W	CR-SPLIT=NO			850 Secs	
								[==>]	***[4]***
17	m28_u56	(3) MESSIER-028	WFC3/UVIS, ACCUM, UVIS1	F390W	CR-SPLIT=2			1700 Secs	
								[==>(Split 1)]	***[5]***
								[==>(Split 2)]	
18	m28_ha5	(3) MESSIER-028	WFC3/UVIS, ACCUM, UVIS1	F656N	CR-SPLIT=NO			1070 Secs	
								[==>]	***[5]***
19	m28_i7	(3) MESSIER-028	WFC3/UVIS, ACCUM, UVIS1	F814W	CR-SPLIT=NO			200 Secs	
								[==>]	***[6]***
20	m28_ha6	(3) MESSIER-028	WFC3/UVIS, ACCUM, UVIS1	F656N	CR-SPLIT=NO			1100 Secs	
								[==>]	***[6]***
21	m28_v7	(3) MESSIER-028	WFC3/UVIS, ACCUM, UVIS1	F606W	CR-SPLIT=NO			200 Secs	
								[==>]	***[6]***
22	m28_ha7	(3) MESSIER-028	WFC3/UVIS, ACCUM, UVIS1	F656N	CR-SPLIT=NO			1100 Secs	
								[==>]	***[6]***

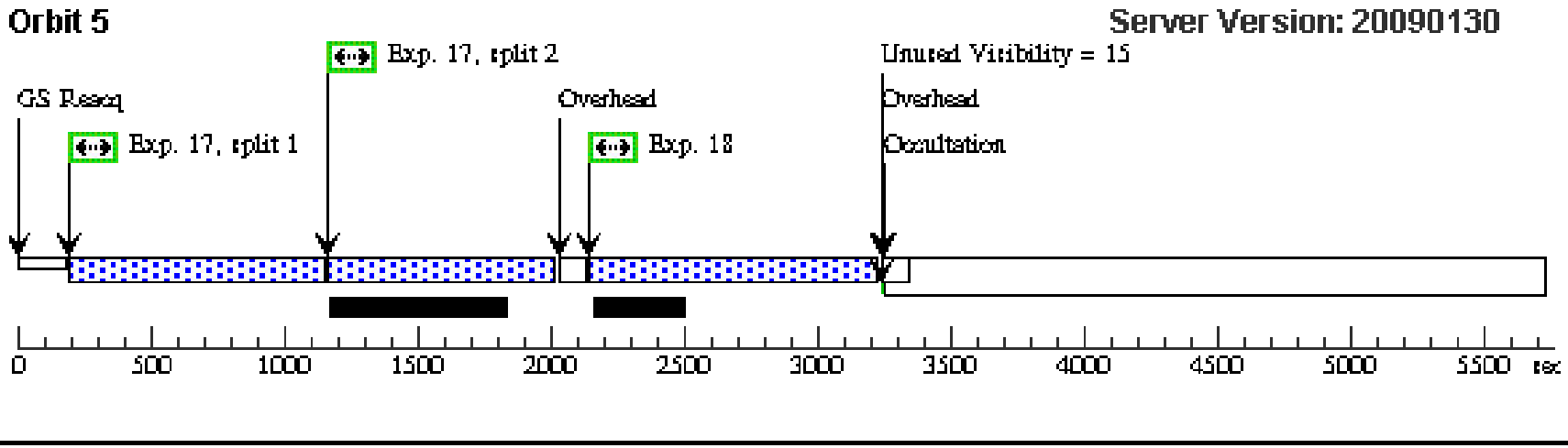

Orbit Structure
Orbit 1
Server Version: 20090130
GS Acq
Exp. 1, split 1
Exp. 1, split 2
Overhead
Exp. 2
Overhead
Exp. 3
Overhead
Exp. 4
Unused Visibility = 1
Overhead
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec
Orbit 2
Server Version: 20090130
GS Reacq
Exp. 5, split 1
Exp. 5, split 2
Overhead
Exp. 6
Overhead
Exp. 7
Overhead
Exp. 8
Unused Visibility = 1
Overhead
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

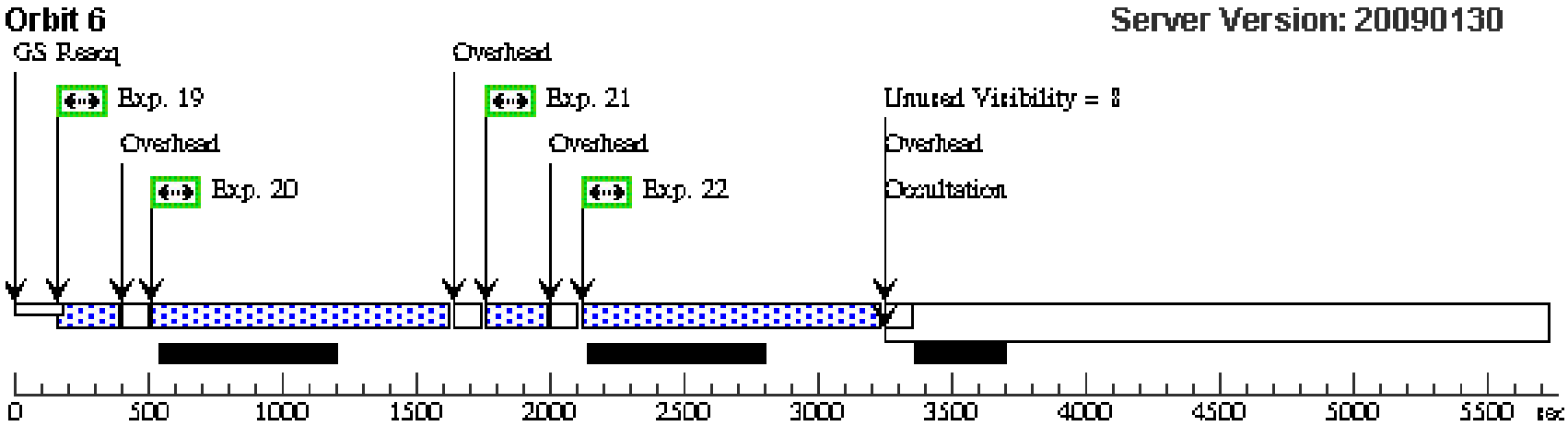
Orbit Structure (continued)





Orbit Structure (continued)





Visit

Proposal 11615, Visit 03, implementation Thu Jul 09 16:27:23 GMT 2009

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: (none)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(4)	MESSIER-005	RA: 15 18 33.7000 (229.6404167d) Dec: +02 04 48.00 (2.08000d) Equinox: J2000		V=26	Reference Frame: ICRS

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

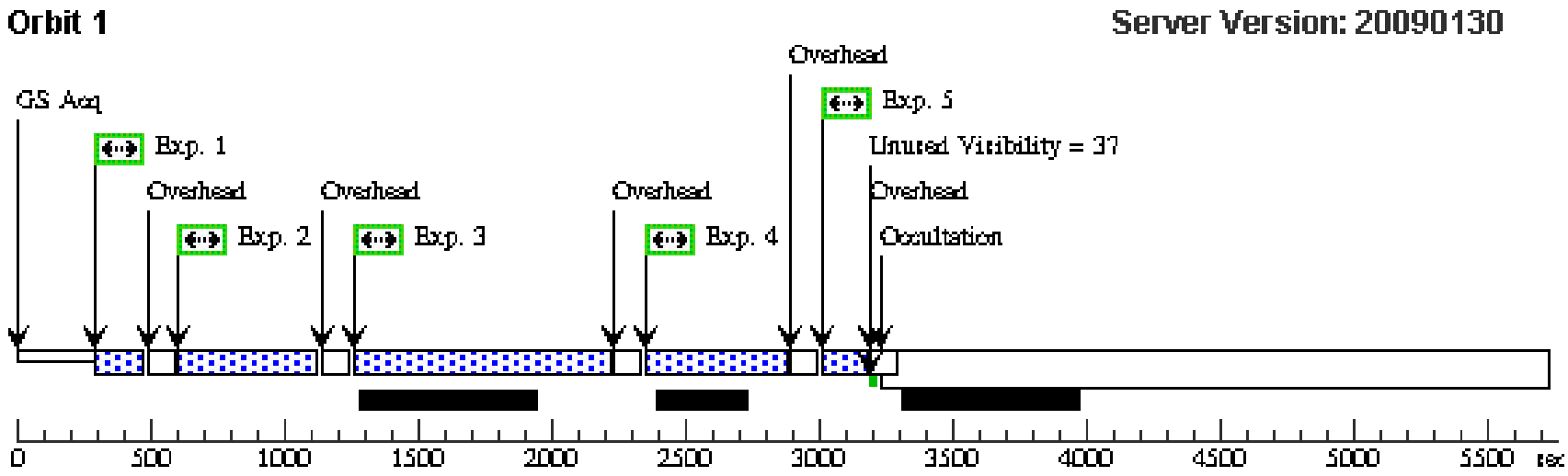
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	m5_v1	(4) MESSIER-005	WFC3/UVIS, ACCUM, UVIS1	F606W	CR-SPLIT=NO			150 Secs	
								[==>]	***[1]***
2	m5_u1	(4) MESSIER-005	WFC3/UVIS, ACCUM, UVIS1	F390W	CR-SPLIT=NO			500 Secs	
								[==>]	***[1]***
3	m5_ha1	(4) MESSIER-005	WFC3/UVIS, ACCUM, UVIS1	F656N	CR-SPLIT=NO			950 Secs	
								[==>]	***[1]***
4	m5_u2	(4) MESSIER-005	WFC3/UVIS, ACCUM, UVIS1	F390W	CR-SPLIT=NO			500 Secs	
								[==>]	***[1]***
5	m5_i1	(4) MESSIER-005	WFC3/UVIS, ACCUM, UVIS1	F814W	CR-SPLIT=NO			150 Secs	
								[==>]	***[1]***
6	m5_v2	(4) MESSIER-005	WFC3/UVIS, ACCUM, UVIS1	F606W	CR-SPLIT=NO			150 Secs	
								[==>]	***[2]***
7	m5_u3	(4) MESSIER-005	WFC3/UVIS, ACCUM, UVIS1	F390W	CR-SPLIT=NO			500 Secs	
								[==>]	***[2]***
8	m5_ha2	(4) MESSIER-005	WFC3/UVIS, ACCUM, UVIS1	F656N	CR-SPLIT=NO			800 Secs	
								[==>]	***[2]***
9	m5_ha3	(4) MESSIER-005	WFC3/UVIS, ACCUM, UVIS1	F656N	CR-SPLIT=NO			800 Secs	
								[==>]	***[2]***
10	m5_i2	(4) MESSIER-005	WFC3/UVIS, ACCUM, UVIS1	F814W	CR-SPLIT=NO			150 Secs	
								[==>]	***[2]***
11	m5_v3	(4) MESSIER-005	WFC3/UVIS, ACCUM, UVIS1	F606W	CR-SPLIT=NO			150 Secs	
								[==>]	***[3]***
12	m5_u4	(4) MESSIER-005	WFC3/UVIS, ACCUM, UVIS1	F390W	CR-SPLIT=NO			500 Secs	
								[==>]	***[3]***
13	m5_ha4	(4) MESSIER-005	WFC3/UVIS, ACCUM, UVIS1	F656N	CR-SPLIT=NO			1100 Secs	
								[==>]	***[3]***
14	m5_u5	(4) MESSIER-005	WFC3/UVIS, ACCUM, UVIS1	F390W	CR-SPLIT=NO			500 Secs	
								[==>]	***[3]***

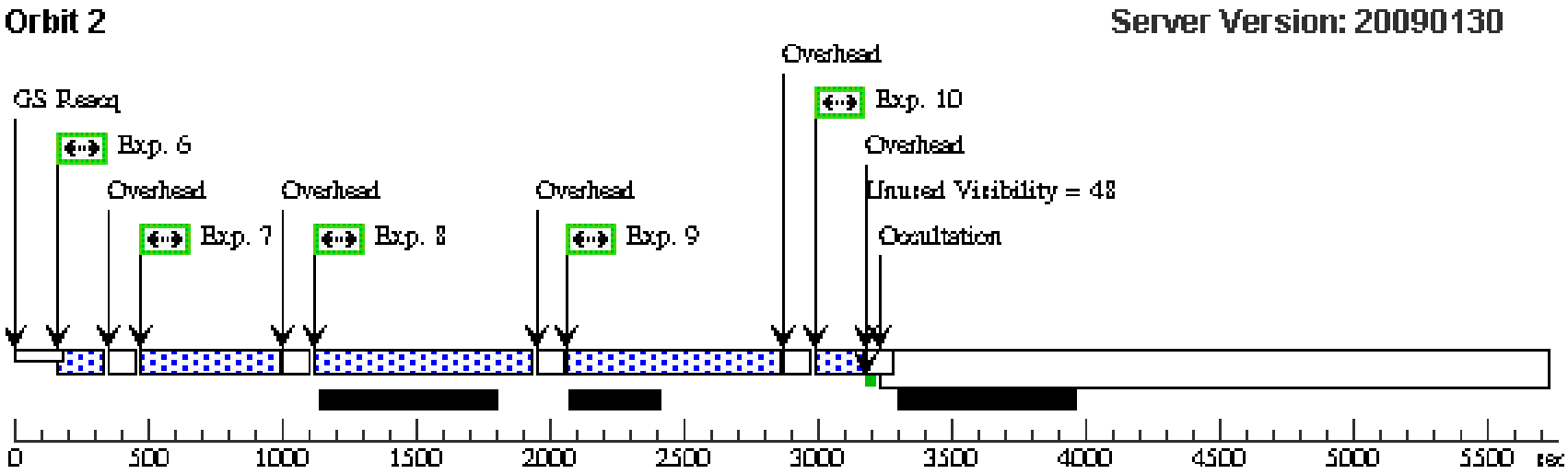
Exposures (continued)

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
15	m5_i3	(4) MESSIER-005	WFC3/UVIS, ACCUM, UVIS1	F814W	CR-SPLIT=NO			150 Secs	
								[==>]	***[3]***
16	m5_v4	(4) MESSIER-005	WFC3/UVIS, ACCUM, UVIS1	F606W	CR-SPLIT=NO			150 Secs	
								[==>]	***[4]***
17	m5_u6	(4) MESSIER-005	WFC3/UVIS, ACCUM, UVIS1	F390W	CR-SPLIT=NO			500 Secs	
								[==>]	***[4]***
18	m5_ha5	(4) MESSIER-005	WFC3/UVIS, ACCUM, UVIS1	F656N	CR-SPLIT=NO			800 Secs	
								[==>]	***[4]***
19	m5_ha6	(4) MESSIER-005	WFC3/UVIS, ACCUM, UVIS1	F656N	CR-SPLIT=NO			800 Secs	
								[==>]	***[4]***
20	m5_i4	(4) MESSIER-005	WFC3/UVIS, ACCUM, UVIS1	F814W	CR-SPLIT=NO			150 Secs	
								[==>]	***[4]***

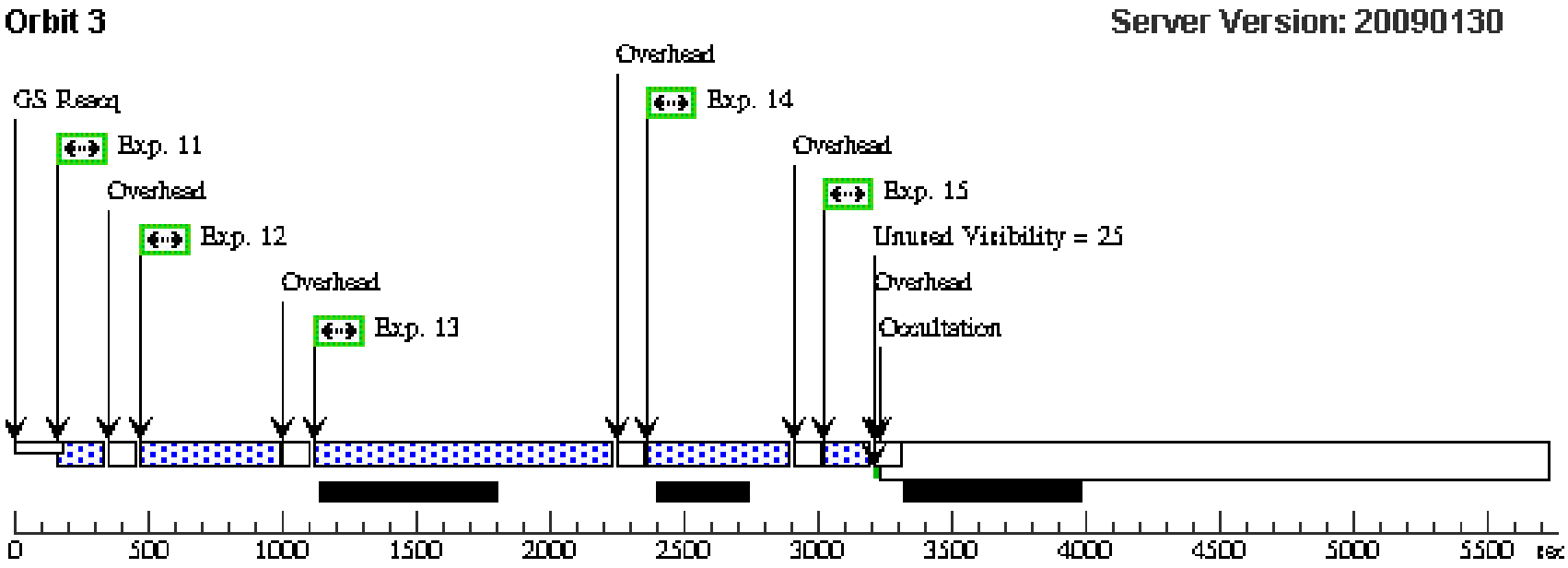
Orbit Structure

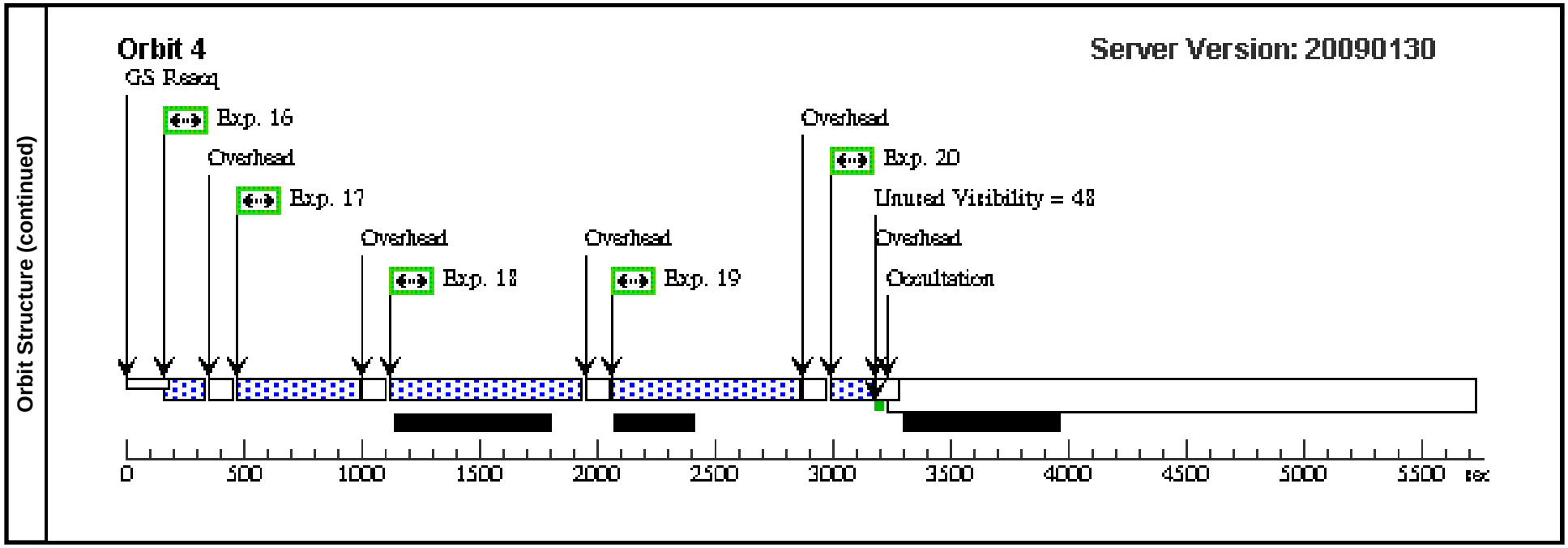


Orbit Structure (continued)



Orbit Structure (continued)




Orbit Structure (continued)
Orbit 4
Server Version: 20090130
GS Reacq
Exp. 16
Overhead
Exp. 17
Overhead
Exp. 18
Overhead
Exp. 19
Overhead
Exp. 20
Unused Visibility = 48
Overhead
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11615, Visit 04, scheduling Thu Jul 09 16:27:24 GMT 2009

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC, STIS/CCD

Special Requirements: (none)

Patterns

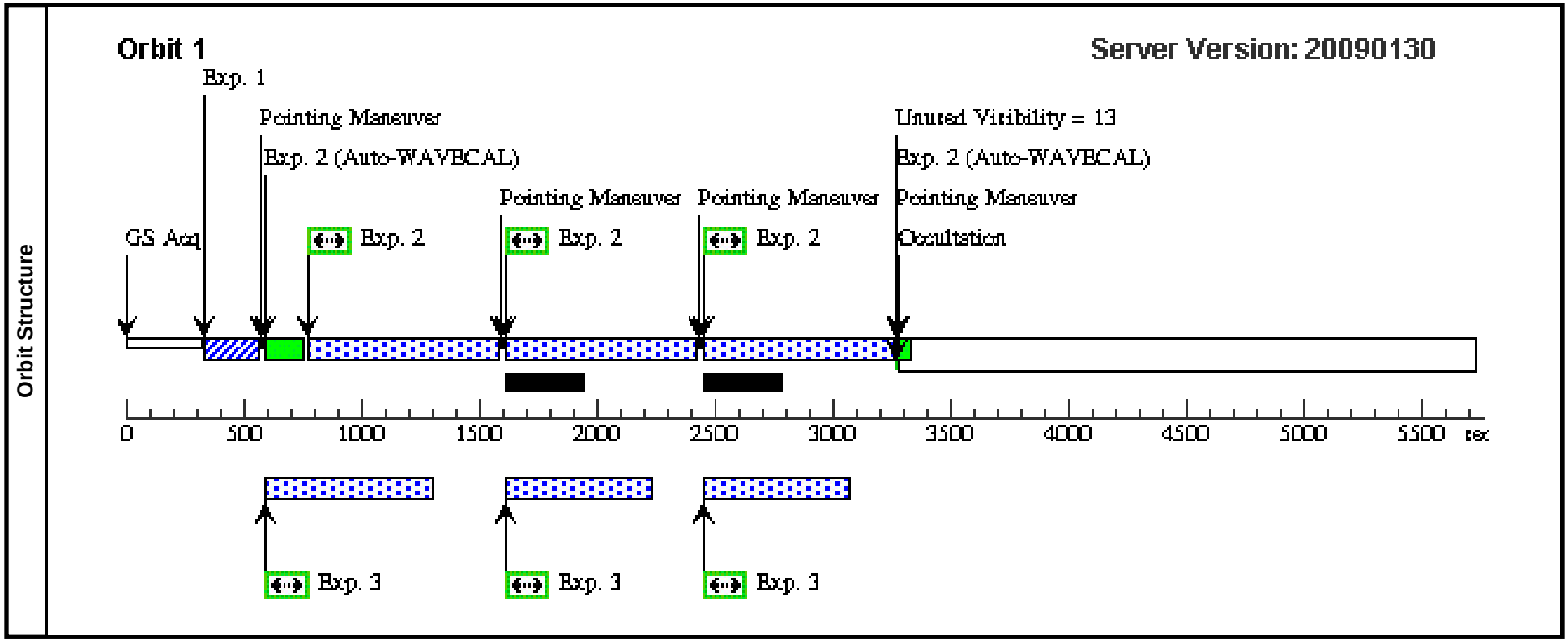
#	Primary Pattern		Secondary Pattern	Exposures
(5)	Pattern Type=STIS-ALONG-SLIT	Coordinate Frame=POS-TARG		(2-3), (4-5)
	Purpose=DITHER	Pattern Orientation=90.0		
	Number Of Points=3	Angle Between Sides=		
	Point Spacing=0.15	Center Pattern=false		
	Line Spacing=			

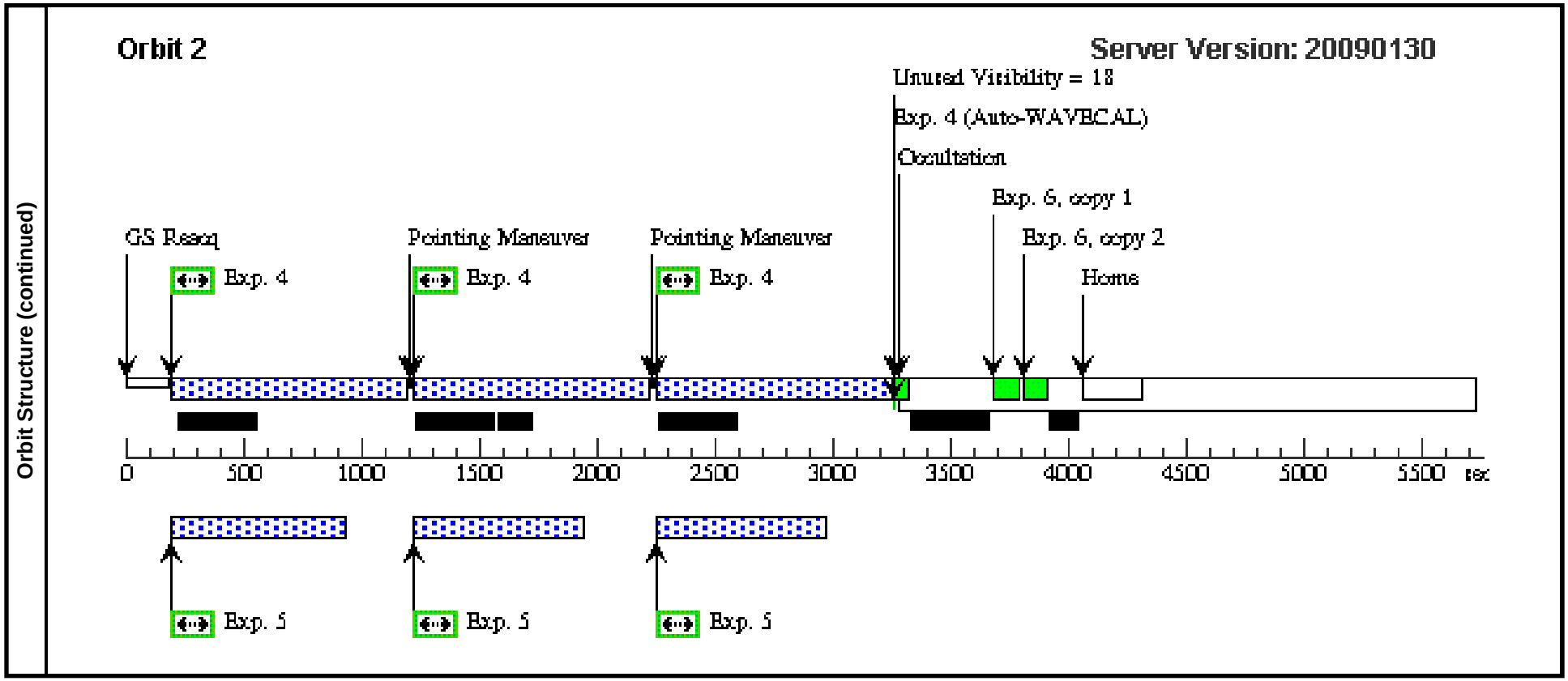
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(6)	NGC6266B-OFFSET	RA: 17 01 12.8256 (255.3034400d) Dec: -30 06 49.71 (-30.11381d) Equinox: J2000		V=16.5	Reference Frame: ICRS
(7)	NGC6266B-COPY	RA: 17 01 12.6900 (255.3028750d) Dec: -30 06 48.59 (-30.11350d) Equinox: J2000		V=19.5	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(6) NGC6266B-OFFSET	STIS/CCD, ACQ, F28X50LP	MIRROR	ACQTYPE=POINT			0.1 Secs *[==>]*	***[1]***
2		(7) NGC6266B-COPY	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A	CR-SPLIT=NO		Pattern 5, Exps 2-3 (5) Prime + Parallel Group 2-3	770.0 Secs *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	***[1]***
3		ANY	ACS/WFC, ACCUM, WFC	F814W	CR-SPLIT=NO		Pattern 5, Exps 2-3 (5) Prime + Parallel Group 2-3	500 Secs *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	***[1]***
4		(7) NGC6266B-COPY	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A	CR-SPLIT=NO		Pattern 5, Exps 4-5 (5) Prime + Parallel Group 4-5	960.0 Secs *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	***[2]***
5		ANY	ACS/WFC, ACCUM, WFC	F435W	CR-SPLIT=NO		Pattern 5, Exps 4-5 (5) Prime + Parallel Group 4-5	600 Secs *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	***[2]***
6		CCDFLAT	STIS/CCD, ACCUM, 0.3X0.09	G750L 7751 A				*[==>(Copy 1)]* *[==>(Copy 2)]*	***[2]***


Orbit Structure
Orbit 1
Server Version: 20090130
Exp. 1
Pointing Maneuver
Exp. 2 (Auto-WAVECAL)
Unused Visibility = 13
Exp. 2 (Auto-WAVECAL)
Pointing Maneuver
Pointing Maneuver
Pointing Maneuver
GS Acq
Exp. 2
Exp. 2
Exp. 2
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec
Exp. 3
Exp. 3
Exp. 3


Orbit Structure (continued)
Orbit 2
Server Version: 20090130
Unused Visibility = 18
Exp. 4 (Auto-WAVECAL)
Occultation
Exp. 6, copy 1
Exp. 6, copy 2
Home
GS Reacq
Pointing Maneuver
Pointing Maneuver
Exp. 4
Exp. 4
Exp. 4
Exp. 5
Exp. 5
Exp. 5
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec