10529 - A Deep H-band Probe of the Globular Cluster Mass function

Cycle: 14, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

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VISITS

Visit	*Targets*	*Configurations*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) MESSIER-087-POS1	ACS/WFC NIC3	4	20-Jun-2005 12:49:26.0	yes
02	(3) MESSIER-087-POS2	ACS/WFC NIC3	4	20-Jun-2005 12:49:41.0	yes
03	(4) MESSIER-087-POS3	ACS/WFC NIC3	4	20-Jun-2005 12:49:49.0	yes

12 Total Orbits Used

ABSTRACT

We propose to obtain deep NICMOS H-band data for the globular clusters in the inner region of M87 and coordinated parallel ACS WFC g and z band observations of a second field which has very deep archival NICMOS data. Therefore, our proposed deep NICMOS observation overlaps corresponding deep archival optical data in the inner regions, and the parallel ACS observations overlap deep NICMOS images in the outer field. The combination of the sensitivity of the near infrared to the mass of old stellar systems such as the globular clusters in M87 and the ability of the optical to isolate the metal-rich and metal-poor subcomponents of the globular cluster system will allow us to probe the mass function, and the possible variation with metallicity, to unprecedented depths. These observations are critical to linking the commonly observed cluster luminosity function to the usually derived mass function in theoretical calculations of globular cluster and globular cluster system formation and evolution models. The multiple pointings will allow us to probe the radial variations in globular cluster properties and test the predictions of cluster formation and dynamical destruction models. Because of its extremely rich globular cluster system (~15,000 clusters) M87 is one of the only galaxies in which such a study can be conducted with a statistically significant number of candidate clusters (approximately 300 globular clusters in this study) with efficient use of HST time.

OBSERVING DESCRIPTION

The goal of this study is to combine deep archival and proposed data at near infrared and optical wavelengths in order to probe the mass function of globular clusters around M87, the cD galaxy in Virgo as a function of metallicity well past the estimated turnover mass.

M87 is uniquely suited for this experiment due to the wealth of deep imaging data in the central region from a variety of observing campaigns (e.g. the 30 orbit imaging campaign of GO-8592, the jet monitoring observations over multiple observing cycles etc.). Some of these observations yield the deep parallel NIC3 F160W observations of GO-7907 (~15,000s) at a galactocentric distance of 7.5'. This
provides us with the unique opportunity to probe the mass function to unprecedented depths at two distinct galactocentric radii with a single well chosen set of exposures that provides complementary infrared and optical observations.

We shall primarily use the GO-9401 ACS observations in the inner region of M87 for this study because the ACS provides the widest color separation F475W - F850LP and is also the most efficient imaging instrument. Similarly the archival NICMOS NIC3 observations are in the efficient F160W band. We replicate the same filter systems in our NICMOS and ACS coordinated parallel observations in order to obtain a self consistent

data set.

These observations aim to reach S/N~30 in the H-band (NIC3 F160W) for H=23.5 mag clusters. This will allow us to probe the mass function roughly two magnitudes past the estimated globular cluster turnover magnitude at this wavelength.

ADDITIONAL COMMENTS

This program requires a specific orientation of the primary NIC3 and parallel ACS observations such that they overalap archival ACS and NIC3 observations respectively. The roll angle range, and hence the number of schedulable days, can be maximised by using different combinations of primary pointings and roll angle ranges. Each of the visits corresponds to a particular range of roll angles and primary NIC3 pointing location. The program can be successfully implemented by scheduling any one of the available visits.Visit 2 is the most preferred orientation.

Visit

Proposal 10529, Visit 01 Mon Jun 20 16:49:52 GMT 2005

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC, NIC3

Special Requirements: PCS MODE FINE; ORIENT 306.0D TO 315.0 D

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	MESSIER-087-POS1	RA: 12 30 54.6158 (187.7275658d) Dec: +12 22 35.65 (12.37657d) Equinox: J2000 Plate Id: 00IY		V=23.5 Globular cluster magnitude of V =23.6	Coordinate Source: GSC_SURVEY_PLATE

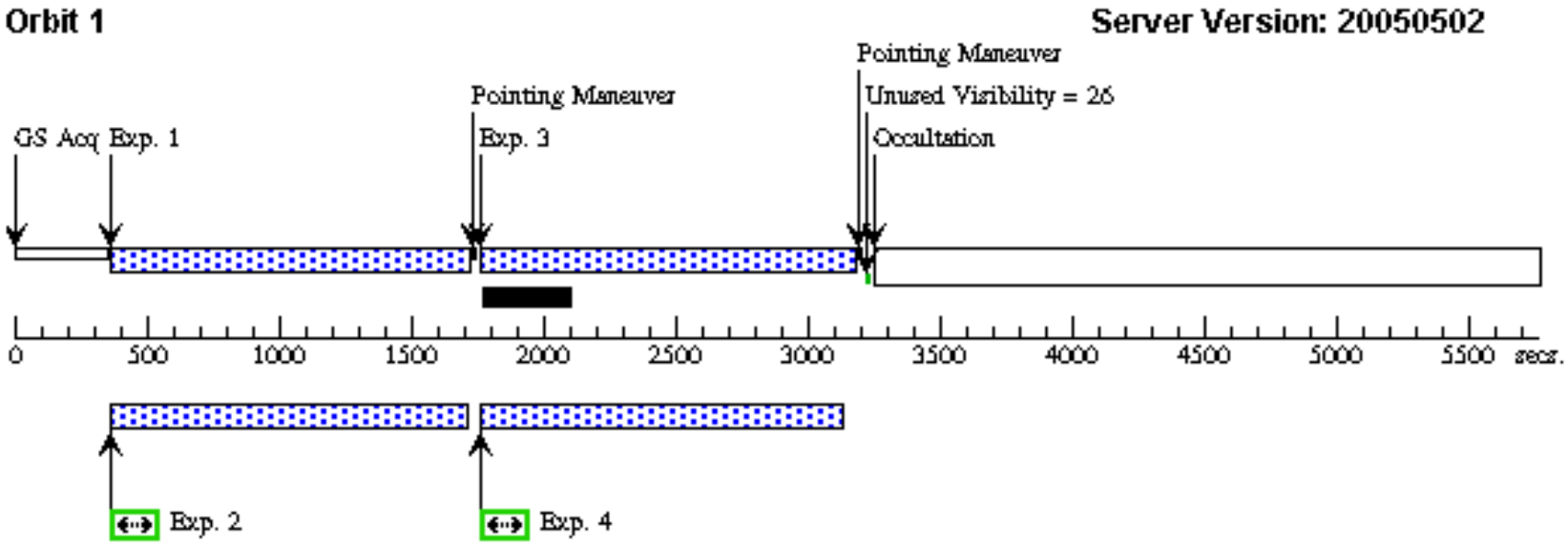
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) MESSIER-087-POS1	NIC3, MULTIACCUM, NIC3-FIX	F160W	SAMP-SEQ=SPARS64; NSAMP=23	POS TARG 0,0	Prime + Parallel Group 1-2	*[==>]*	***[1]***
2		(1) MESSIER-087-POS1	ACS/WFC, ACCUM, WFC	F475W	CR-SPLIT=NO		Prime + Parallel Group 1-2	1150.0 Secs *[==>]*	***[1]***
3		(1) MESSIER-087-POS1	NIC3, MULTIACCUM, NIC3-FIX	F160W	SAMP-SEQ=SPARS64; NSAMP=24	POS TARG 0,5.5	Prime + Parallel Group 3-4	*[==>]*	***[1]***
4		(1) MESSIER-087-POS1	ACS/WFC, ACCUM, WFC	F475W	CR-SPLIT=NO		Prime + Parallel Group 3-4	1250.0 Secs *[==>]*	***[1]***
5		(1) MESSIER-087-POS1	NIC3, MULTIACCUM, NIC3-FIX	F160W	SAMP-SEQ=SPARS64; NSAMP=23	POS TARG 5.5,5.5	Prime + Parallel Group 5-6	*[==>]*	***[2]***
6		(1) MESSIER-087-POS1	ACS/WFC, ACCUM, WFC	F850LP	CR-SPLIT=NO		Prime + Parallel Group 5-6	1150.0 Secs *[==>]*	***[2]***
7		(1) MESSIER-087-POS1	NIC3, MULTIACCUM, NIC3-FIX	F160W	SAMP-SEQ=SPARS64; NSAMP=24	POS TARG 5.5,0	Prime + Parallel Group 7-8	*[==>]*	***[2]***
8		(1) MESSIER-087-POS1	ACS/WFC, ACCUM, WFC	F850LP	CR-SPLIT=NO		Prime + Parallel Group 7-8	1250.0 Secs *[==>]*	***[2]***
9		(1) MESSIER-087-POS1	NIC3, MULTIACCUM, NIC3-FIX	F160W	SAMP-SEQ=SPARS64; NSAMP=23	POS TARG 0.25,0.25	Prime + Parallel Group 9-10	*[==>]*	***[3]***
10		(1) MESSIER-087-POS1	ACS/WFC, ACCUM, WFC	F850LP	CR-SPLIT=NO		Prime + Parallel Group 9-10	1150.0 Secs *[==>]*	***[3]***
11		(1) MESSIER-087-POS1	NIC3, MULTIACCUM, NIC3-FIX	F160W	SAMP-SEQ=SPARS64; NSAMP=24	POS TARG 0.25,5.75	Prime + Parallel Group 11-12	*[==>]*	***[3]***
12		(1) MESSIER-087-POS1	ACS/WFC, ACCUM, WFC	F850LP	CR-SPLIT=NO		Prime + Parallel Group 11-12	1250.0 Secs *[==>]*	***[3]***

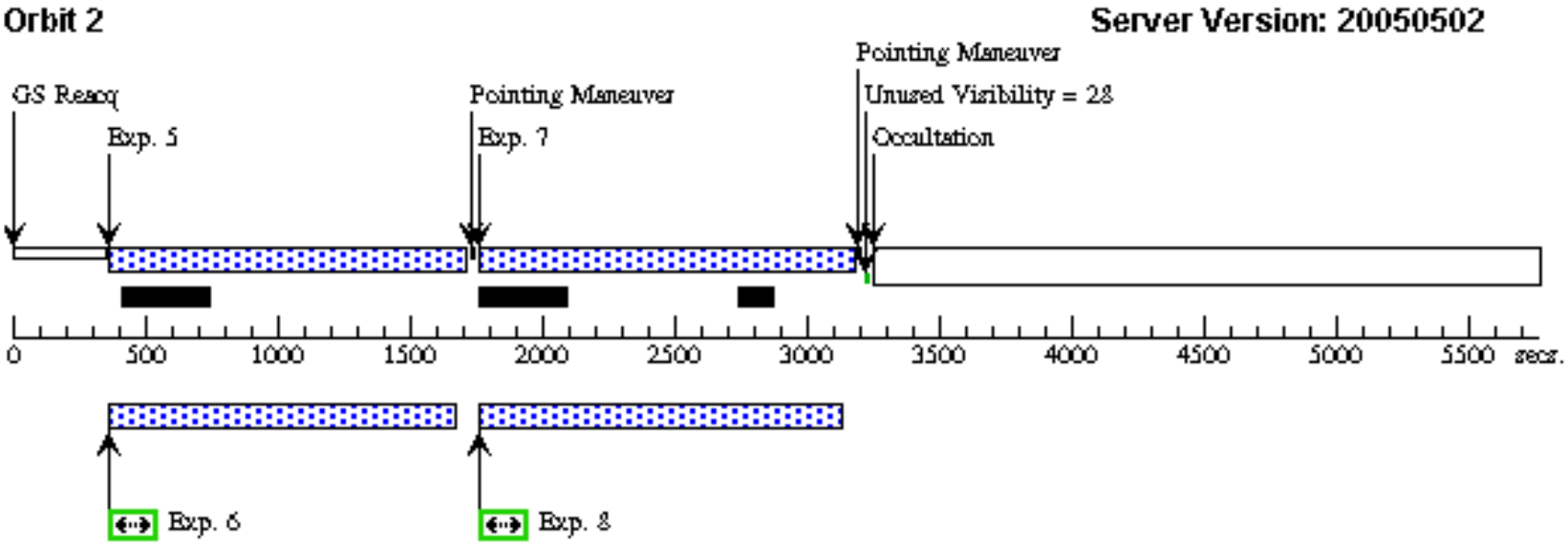
Exposures (continued)

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
13		(1) MESSIER-087-POS1	NIC3, MULTIACCUM, NIC3-FIX	F160W	SAMP-SEQ=SPARS64; NSAMP=23	POS TARG 5.75,5.75	Prime + Parallel Group 13-14	*[==>]*	***[4]***
14		(1) MESSIER-087-POS1	ACS/WFC, ACCUM, WFC	F475W	CR-SPLIT=NO		Prime + Parallel Group 13-14	1150.0 Secs *[==>]*	***[4]***
15		(1) MESSIER-087-POS1	NIC3, MULTIACCUM, NIC3-FIX	F160W	SAMP-SEQ=SPARS64; NSAMP=24	POS TARG 5.75,0.25	Prime + Parallel Group 15-16	*[==>]*	***[4]***
16		(1) MESSIER-087-POS1	ACS/WFC, ACCUM, WFC	F475W	CR-SPLIT=NO		Prime + Parallel Group 15-16	1250.0 Secs *[==>]*	***[4]***

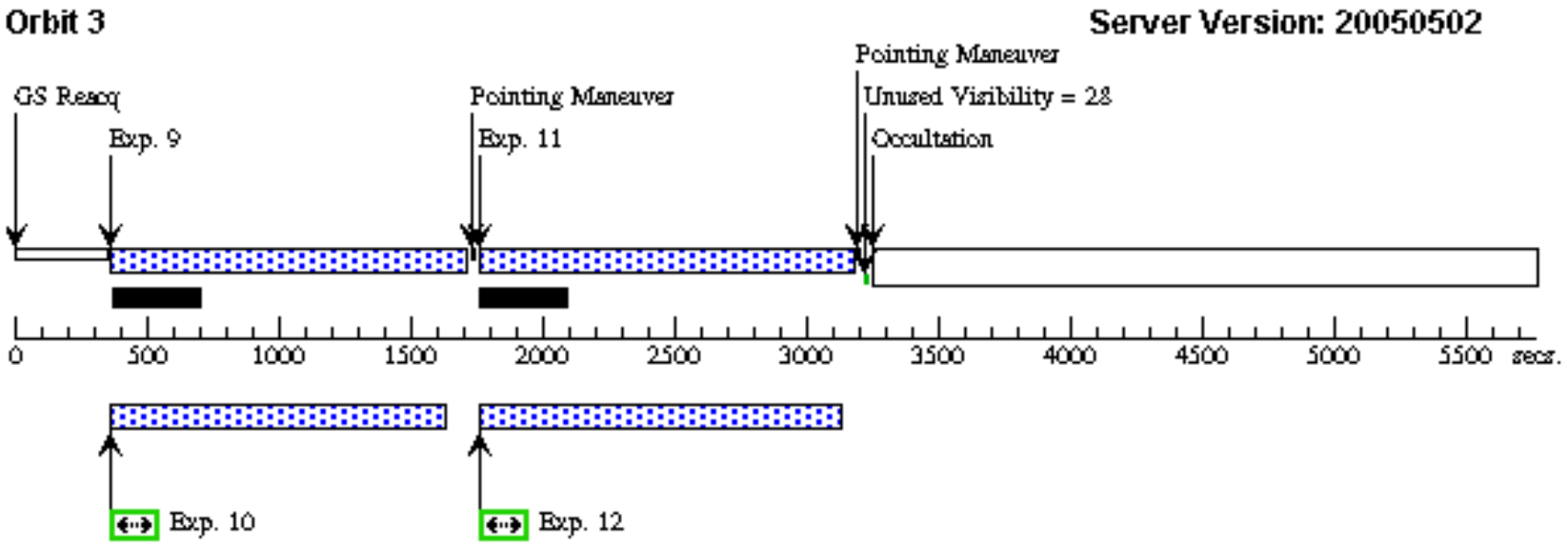
Orbit Structure



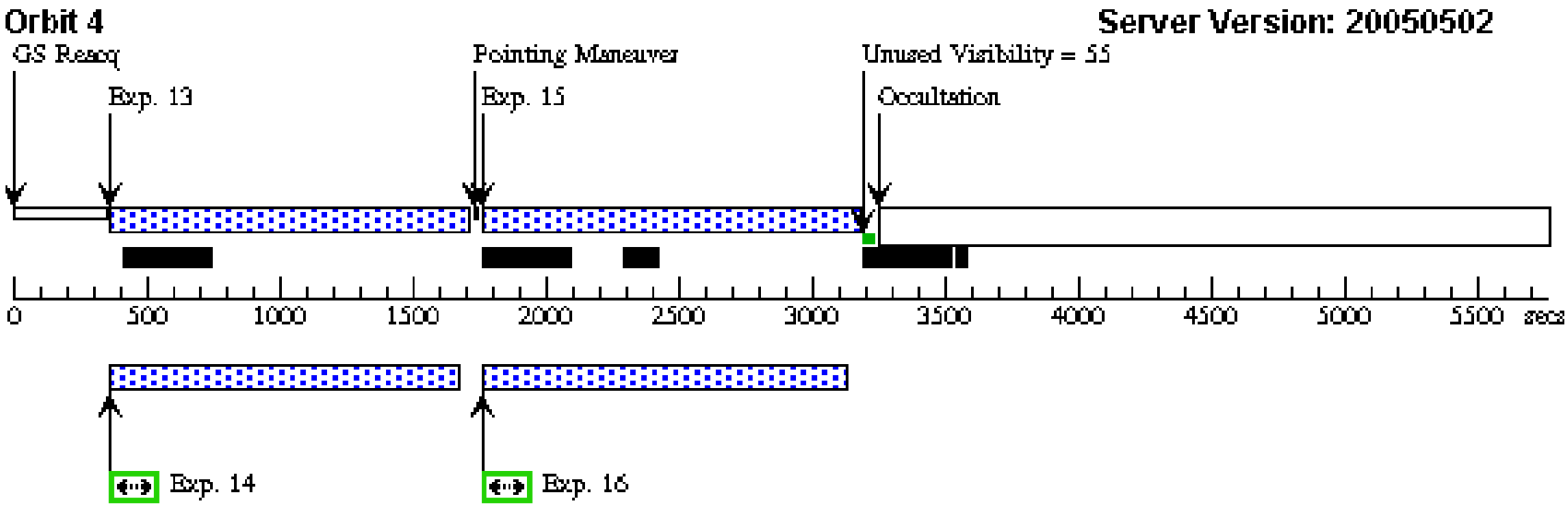
Orbit Structure (continued)



Orbit Structure (continued)



Orbit Structure (continued)



Visit

Proposal 10529, Visit 02 Mon Jun 20 16:49:56 GMT 2005

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC, NIC3

Special Requirements: PCS MODE FINE; ORIENT 300.0D TO 308.0 D

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	MESSIER-087-POS2	RA: 12 30 53.8055 (187.7241896d) Dec: +12 23 40.27 (12.39452d) Equinox: J2000 Plate Id: 00IY		V=23.5 Globular cluster magnitude of V =23.6	Coordinate Source: GSC_SURVEY_PLATE

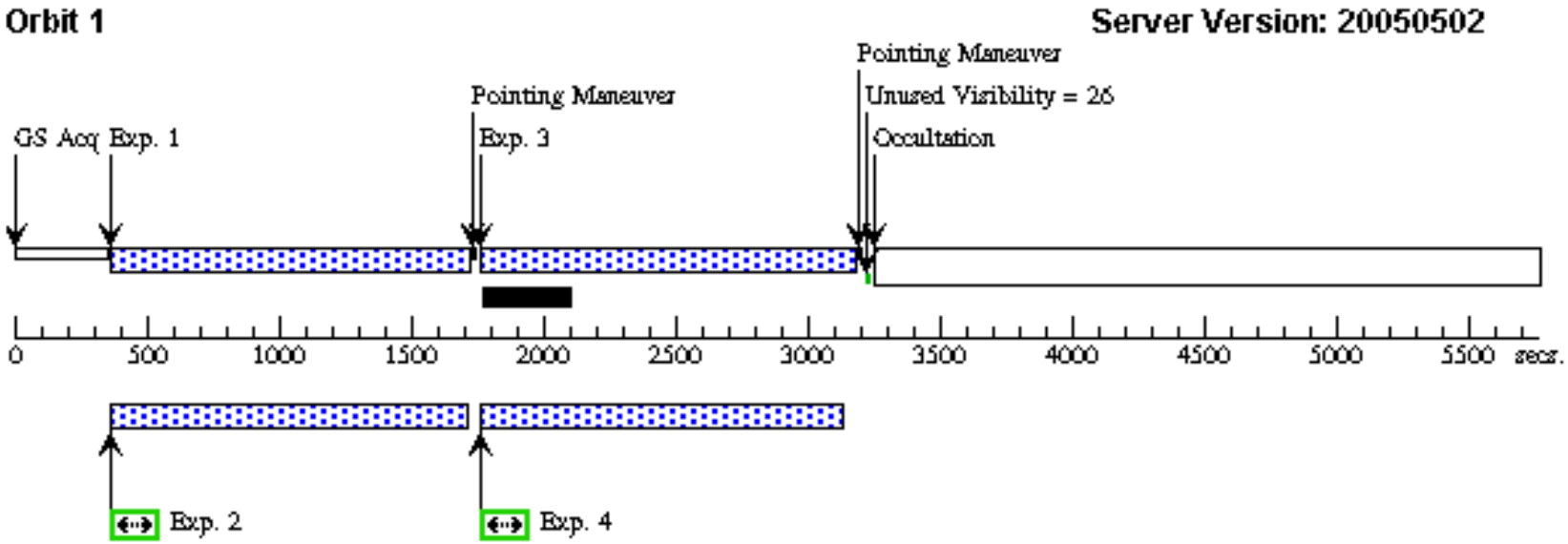
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(3) MESSIER-087-POS2	NIC3, MULTIACCUM, NIC3-FIX	F160W	SAMP-SEQ=SPARS64; NSAMP=23	POS TARG 0,0	Prime + Parallel Group 1-2	*[==>]*	***[1]***
2		(3) MESSIER-087-POS2	ACS/WFC, ACCUM, WFC	F475W	CR-SPLIT=NO		Prime + Parallel Group 1-2	1150.0 Secs *[==>]*	***[1]***
3		(3) MESSIER-087-POS2	NIC3, MULTIACCUM, NIC3-FIX	F160W	SAMP-SEQ=SPARS64; NSAMP=24	POS TARG 0,5.5	Prime + Parallel Group 3-4	*[==>]*	***[1]***
4		(3) MESSIER-087-POS2	ACS/WFC, ACCUM, WFC	F475W	CR-SPLIT=NO		Prime + Parallel Group 3-4	1250.0 Secs *[==>]*	***[1]***
5		(3) MESSIER-087-POS2	NIC3, MULTIACCUM, NIC3-FIX	F160W	SAMP-SEQ=SPARS64; NSAMP=23	POS TARG 5.5,5.5	Prime + Parallel Group 5-6	*[==>]*	***[2]***
6		(3) MESSIER-087-POS2	ACS/WFC, ACCUM, WFC	F850LP	CR-SPLIT=NO		Prime + Parallel Group 5-6	1150.0 Secs *[==>]*	***[2]***
7		(3) MESSIER-087-POS2	NIC3, MULTIACCUM, NIC3-FIX	F160W	SAMP-SEQ=SPARS64; NSAMP=24	POS TARG 5.5,0	Prime + Parallel Group 7-8	*[==>]*	***[2]***
8		(3) MESSIER-087-POS2	ACS/WFC, ACCUM, WFC	F850LP	CR-SPLIT=NO		Prime + Parallel Group 7-8	1250.0 Secs *[==>]*	***[2]***
9		(3) MESSIER-087-POS2	NIC3, MULTIACCUM, NIC3-FIX	F160W	SAMP-SEQ=SPARS64; NSAMP=23	POS TARG 0.25,0.25	Prime + Parallel Group 9-10	*[==>]*	***[3]***
10		(3) MESSIER-087-POS2	ACS/WFC, ACCUM, WFC	F850LP	CR-SPLIT=NO		Prime + Parallel Group 9-10	1150.0 Secs *[==>]*	***[3]***
11		(3) MESSIER-087-POS2	NIC3, MULTIACCUM, NIC3-FIX	F160W	SAMP-SEQ=SPARS64; NSAMP=24	POS TARG 0.25,5.75	Prime + Parallel Group 11-12	*[==>]*	***[3]***
12		(3) MESSIER-087-POS2	ACS/WFC, ACCUM, WFC	F850LP	CR-SPLIT=NO		Prime + Parallel Group 11-12	1250.0 Secs *[==>]*	***[3]***

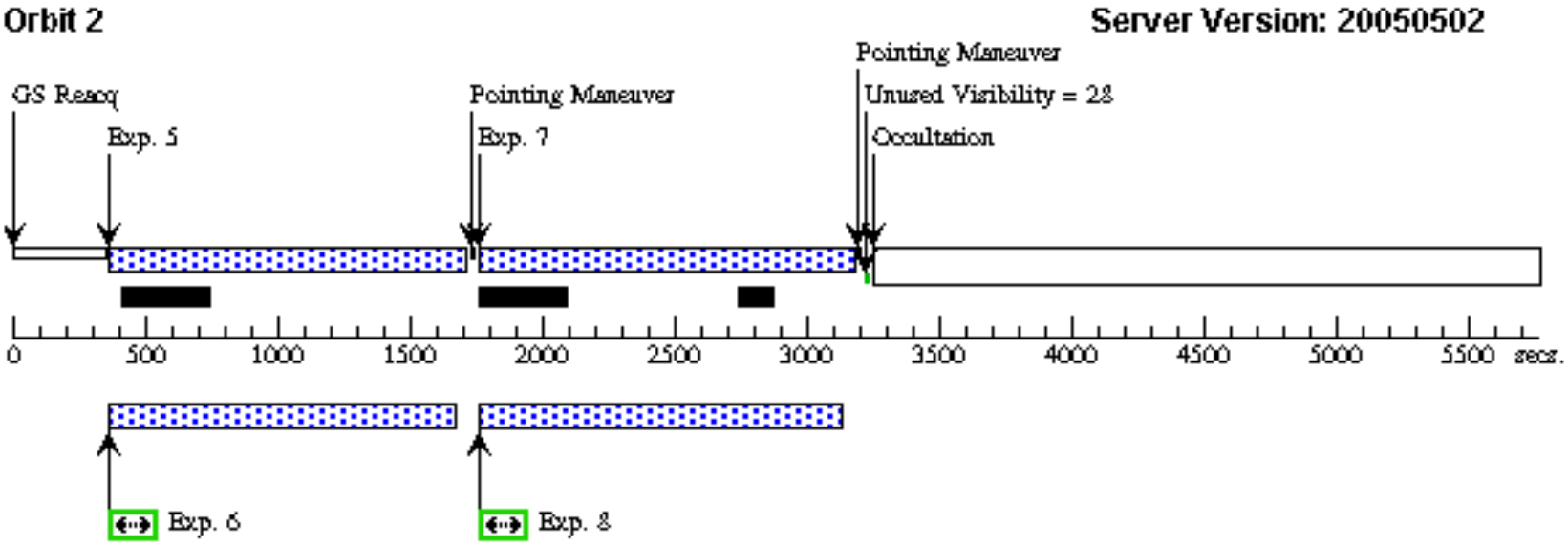
Exposures (continued)

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
13		(3) MESSIER-087-POS2	NIC3, MULTIACCUM, NIC3-FIX	F160W	SAMP-SEQ=SPARS64; NSAMP=23	POS TARG 5.75,5.75	Prime + Parallel Group 13-14	*[==>]*	***[4]***
14		(3) MESSIER-087-POS2	ACS/WFC, ACCUM, WFC	F475W	CR-SPLIT=NO		Prime + Parallel Group 13-14	1150.0 Secs *[==>]*	***[4]***
15		(3) MESSIER-087-POS2	NIC3, MULTIACCUM, NIC3-FIX	F160W	SAMP-SEQ=SPARS64; NSAMP=24	POS TARG 5.75,0.25	Prime + Parallel Group 15-16	*[==>]*	***[4]***
16		(3) MESSIER-087-POS2	ACS/WFC, ACCUM, WFC	F475W	CR-SPLIT=NO		Prime + Parallel Group 15-16	1250.0 Secs *[==>]*	***[4]***

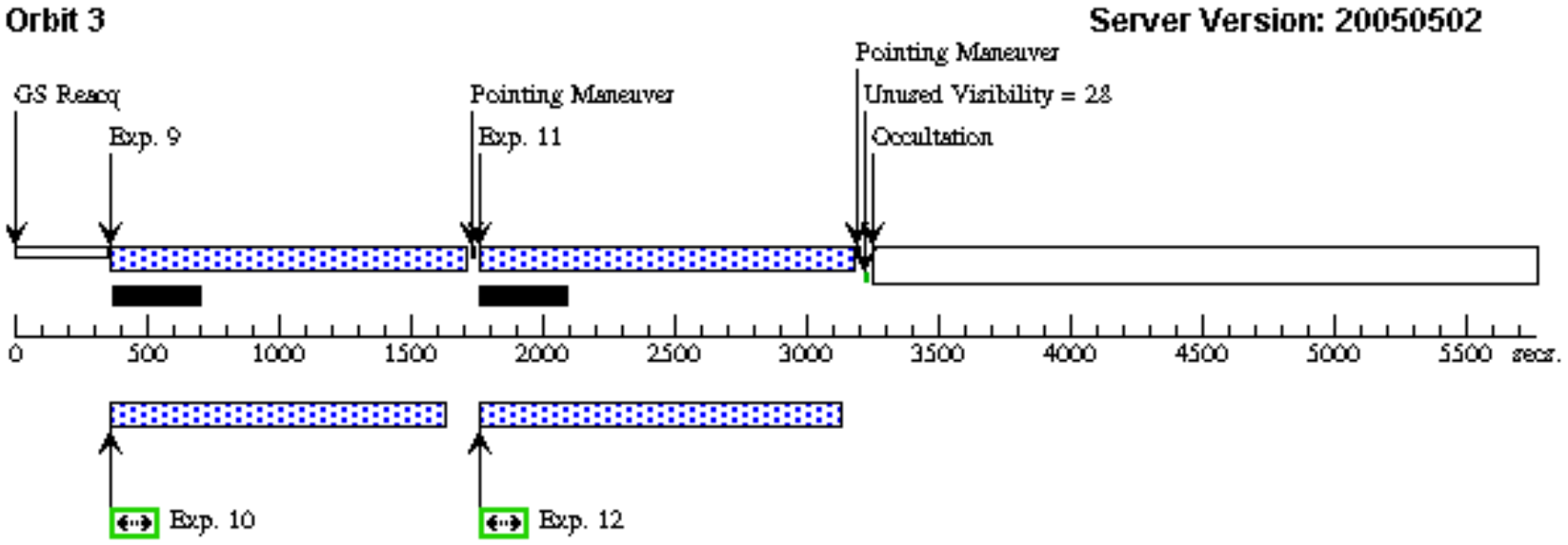
Orbit Structure



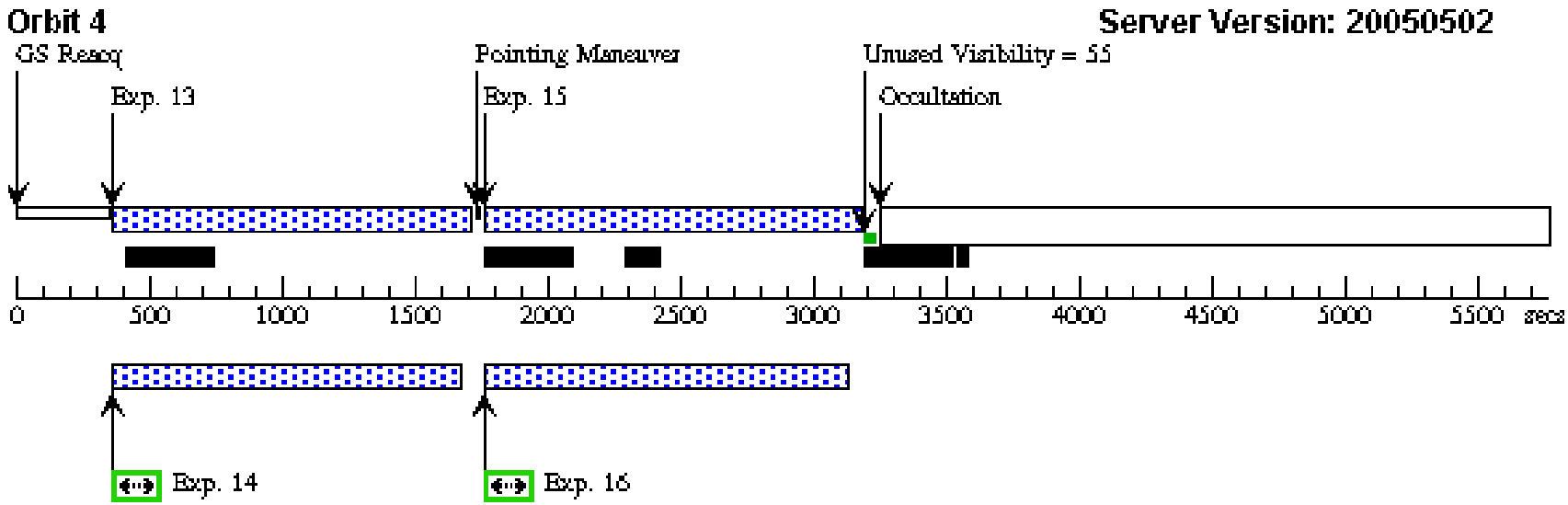
Orbit Structure (continued)



Orbit Structure (continued)



Orbit Structure (continued)



Visit

Proposal 10529, Visit 03 Mon Jun 20 16:50:00 GMT 2005

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC, NIC3

Special Requirements: PCS MODE FINE; ORIENT 290.0D TO 300.0 D

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(4)	MESSIER-087-POS3	RA: 12 30 47.7718 (187.6990492d) Dec: +12 24 12.61 (12.40350d) Equinox: J2000 Plate Id: 00IY		V=23.5 Globular cluster magnitude of V =23.6	Coordinate Source: GSC_SURVEY_PLATE

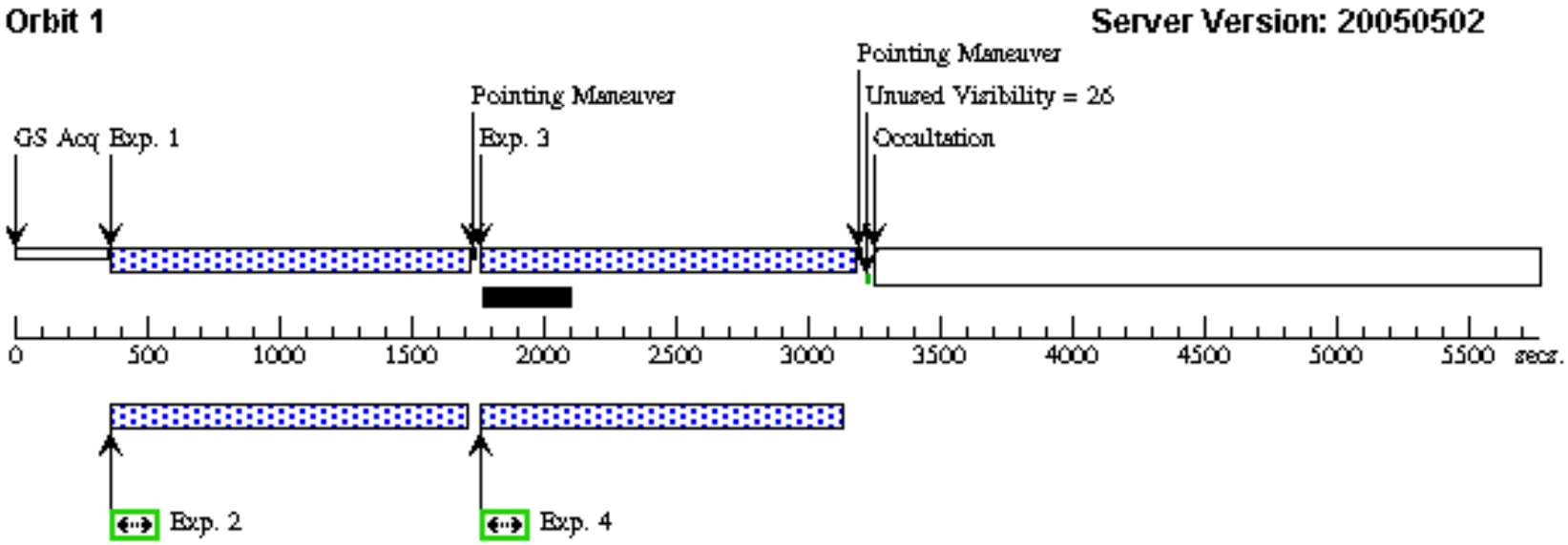
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(4) MESSIER-087-POS3	NIC3, MULTIACCUM, NIC3-FIX	F160W	SAMP-SEQ=SPARS64; NSAMP=23	POS TARG 0,0	Prime + Parallel Group 1-2	*[==>]*	***[1]***
2		(4) MESSIER-087-POS3	ACS/WFC, ACCUM, WFC	F475W	CR-SPLIT=NO		Prime + Parallel Group 1-2	1150.0 Secs *[==>]*	***[1]***
3		(4) MESSIER-087-POS3	NIC3, MULTIACCUM, NIC3-FIX	F160W	SAMP-SEQ=SPARS64; NSAMP=24	POS TARG 0,5.5	Prime + Parallel Group 3-4	*[==>]*	***[1]***
4		(4) MESSIER-087-POS3	ACS/WFC, ACCUM, WFC	F475W	CR-SPLIT=NO		Prime + Parallel Group 3-4	1250.0 Secs *[==>]*	***[1]***
5		(4) MESSIER-087-POS3	NIC3, MULTIACCUM, NIC3-FIX	F160W	SAMP-SEQ=SPARS64; NSAMP=23	POS TARG 5.5,5.5	Prime + Parallel Group 5-6	*[==>]*	***[2]***
6		(4) MESSIER-087-POS3	ACS/WFC, ACCUM, WFC	F850LP	CR-SPLIT=NO		Prime + Parallel Group 5-6	1150.0 Secs *[==>]*	***[2]***
7		(4) MESSIER-087-POS3	NIC3, MULTIACCUM, NIC3-FIX	F160W	SAMP-SEQ=SPARS64; NSAMP=24	POS TARG 5.5,0	Prime + Parallel Group 7-8	*[==>]*	***[2]***
8		(4) MESSIER-087-POS3	ACS/WFC, ACCUM, WFC	F850LP	CR-SPLIT=NO		Prime + Parallel Group 7-8	1250.0 Secs *[==>]*	***[2]***
9		(4) MESSIER-087-POS3	NIC3, MULTIACCUM, NIC3-FIX	F160W	SAMP-SEQ=SPARS64; NSAMP=23	POS TARG 0.25,0.25	Prime + Parallel Group 9-10	*[==>]*	***[3]***
10		(4) MESSIER-087-POS3	ACS/WFC, ACCUM, WFC	F850LP	CR-SPLIT=NO		Prime + Parallel Group 9-10	1150.0 Secs *[==>]*	***[3]***
11		(4) MESSIER-087-POS3	NIC3, MULTIACCUM, NIC3-FIX	F160W	SAMP-SEQ=SPARS64; NSAMP=24	POS TARG 0.25,5.75	Prime + Parallel Group 11-12	*[==>]*	***[3]***
12		(4) MESSIER-087-POS3	ACS/WFC, ACCUM, WFC	F850LP	CR-SPLIT=NO		Prime + Parallel Group 11-12	1250.0 Secs *[==>]*	***[3]***

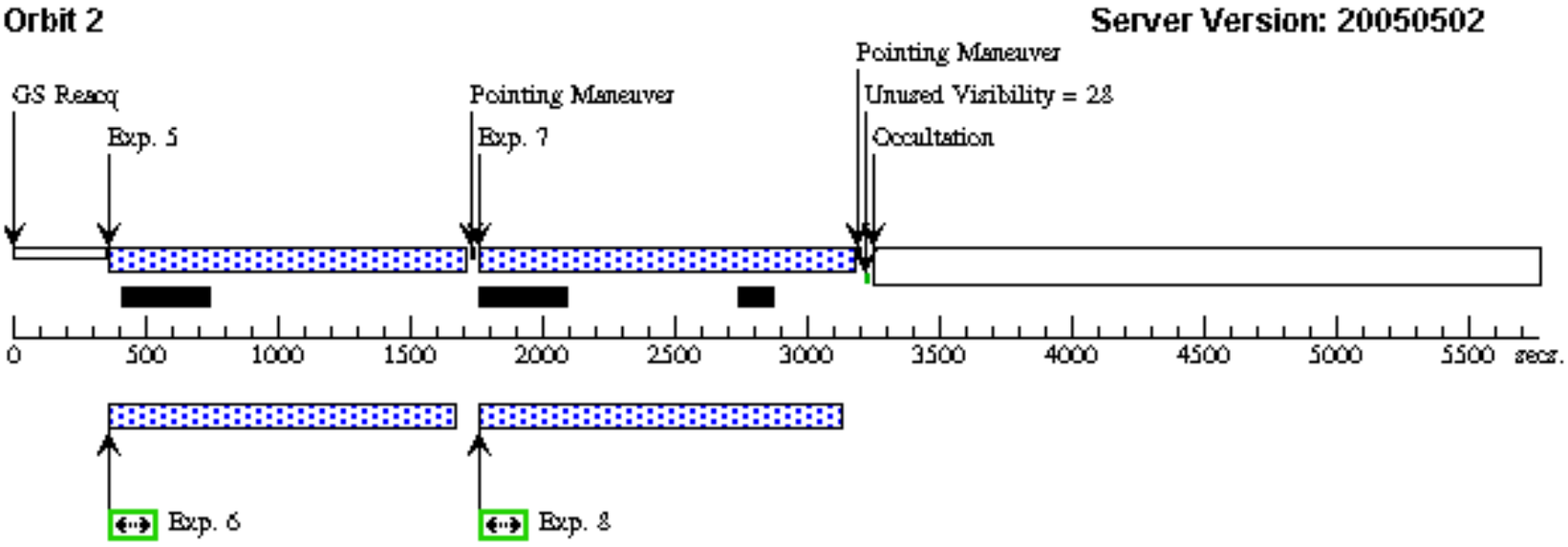
Exposures (continued)

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
13		(4) MESSIER-087-POS3	NIC3, MULTIACCUM, NIC3-FIX	F160W	SAMP-SEQ=SPARS64; NSAMP=23	POS TARG 5.75,5.75	Prime + Parallel Group 13-14	*[==>]*	***[4]***
14		(4) MESSIER-087-POS3	ACS/WFC, ACCUM, WFC	F475W	CR-SPLIT=NO		Prime + Parallel Group 13-14	1150.0 Secs *[==>]*	***[4]***
15		(4) MESSIER-087-POS3	NIC3, MULTIACCUM, NIC3-FIX	F160W	SAMP-SEQ=SPARS64; NSAMP=24	POS TARG 5.75,0.25	Prime + Parallel Group 15-16	*[==>]*	***[4]***
16		(4) MESSIER-087-POS3	ACS/WFC, ACCUM, WFC	F475W	CR-SPLIT=NO		Prime + Parallel Group 15-16	1250.0 Secs *[==>]*	***[4]***

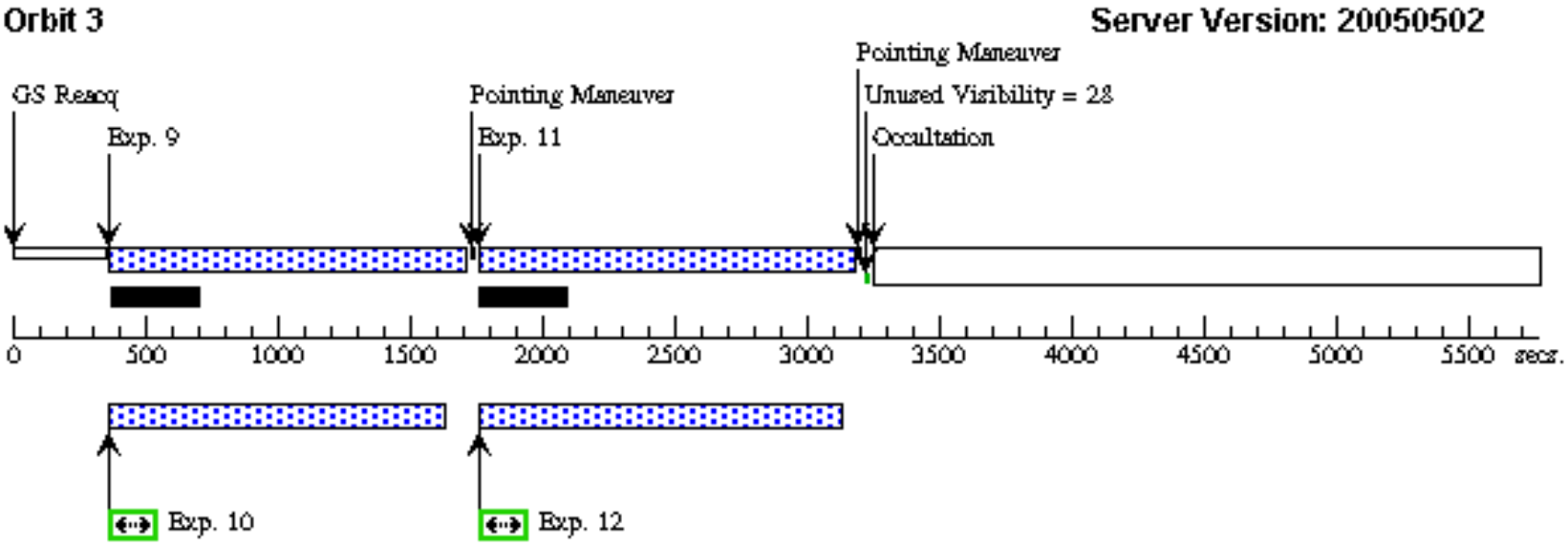
Orbit Structure



Orbit Structure (continued)



Orbit Structure (continued)



Orbit Structure (continued)