11662 - Improving the Radius-Luminosity Relationship for Broad-Lined AGNs with a New Reverberation Sample

Cycle: 17, 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) MRK-0142	WFC3/UVIS	1	14-Oct-2009 21:03:05.0	yes

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
02	(2) SBS-1116+583A	WFC3/UVIS	1	14-Oct-2009 21:03:09.0	yes
03	(3) ARP-151	WFC3/UVIS	1	14-Oct-2009 21:03:12.0	yes
04	(4) MRK-1310	WFC3/UVIS	1	14-Oct-2009 21:03:15.0	yes
05	(5) MRK-0202	WFC3/UVIS	1	14-Oct-2009 21:03:17.0	yes
06	(6) MRK-766	WFC3/UVIS	1	14-Oct-2009 21:03:20.0	yes
07	(7) NGC-4748	WFC3/UVIS	1	14-Oct-2009 21:03:22.0	yes
08	(8) IC-4218	WFC3/UVIS	1	14-Oct-2009 21:03:25.0	yes
09	(9) MCG-06-30-15	WFC3/UVIS	1	14-Oct-2009 21:03:27.0	yes
10	(10) MRK-0290	WFC3/UVIS	1	14-Oct-2009 21:03:30.0	yes
11	(11) MRK-871	WFC3/UVIS	1	14-Oct-2009 21:03:32.0	yes
12	(12) NGC-6814	WFC3/UVIS	1	14-Oct-2009 21:03:35.0	yes
13	(13) EGGR-102	WFC3/UVIS	1	14-Oct-2009 21:03:37.0	yes

13 Total Orbits Used

ABSTRACT

The radius-luminosity (R-L) relationship is currently the fundamental basis for all techniques used to estimate black hole masses in AGNs, in both the nearby and distant universe. However, the current R-L relationship is based on 34 objects that cover a limited range in black hole mass and luminosity. To improve our understanding of black hole growth and evolution, the R-L relationship must be extended to cover a broader range of black hole masses using the technique known as reverberation mapping. To this end, we have been awarded an unprecedented 64 nights on the Lick Observatory 3-m telescope between March 24 and May 31, 2008, to spectroscopically monitor 12 AGNs in order to measure their black hole masses. To properly determine the luminosities of these 12 AGNs, we must correct them for their host-galaxy starlight contributions using high-resolution images. Previous work by Bentz et al. (2006) has shown that the starlight correction to AGN luminosity measurements is an essential component to interpreting the R-L relationship. The correction will be substantial for each of the 12 sources we will monitor, as the AGNs are relatively faint and

embedded in nearby, bright galaxies. Starlight corrections are not possible with ground-based images, as the PSF and bulge contributions become indistinguishable under typical seeing conditions, and adaptive optics are not yet operational in the spectral range where the corrections are needed. In addition, spectral decompositions are very model-dependent and are limited by the degree of accuracy to which we understand emission processes and stellar populations in galaxies. Without correcting for starlight, we will be unable to apply the results of our Spring 2008 campaign to the body of knowledge from previous reverberation mapping work. Therefore, we propose to obtain high resolution, high dynamic range images of the host galaxies of the 12 AGNs in our ground-based monitoring sample, as well as one white dwarf which will be used as a PSF model.

OBSERVING DESCRIPTION

We propose to obtain Wide Field Camera 3 UVIS images of the host-galaxies of 12 nearby, low-luminosity AGNs through the F547M (medium-band V) filter. Each object will only require a single orbit. In addition, we also propose to image the white dwarf EGGR 102 with the same instrument configuration, in order to create a PSF model with a very high dynamic range. The proposed images will allow us to determine the host-galaxy starlight contribution to the optical luminosity measured from the spectrum of each AGN. The F547M filter ensures that we will have a continuum- only image of each host galaxy in a flat part of the spectrum, which will facilitate the correction of the continuum luminosity at 5100A. Removing the starlight contribution to the luminosity of each of these 12 objects is an essential component of the ground-based reverberation-mapping study we are carrying out at Lick Observatory during Spring 2008.

Due to our experiences with the previous HST programs to correct AGN luminosities (GO 9851, 10516, 10833), we can slightly improve upon the methods that were employed. In previous programs, starlight corrections were determined using the Advanced Camera for Surveys High Resolution Channel (ACS HRC) through the F550M filter. The main consideration in choosing the HRC over the Wide Field Channel was the smaller pixel size of the HRC, allowing a more accurate determination of the AGN PSF contribution to the surface brightness profile of each galaxy. However, for nearby galaxies, the small field of view of the HRC turned out to cause two issues – namely, that the sky background was not well constrained for galaxies that filled the entire field of view, and the scalelengths of some galaxy components were on the order of the size of the detector. The first has the effect of causing instabilities in the Sersic index for small-scale components in the center of the galaxy near the AGN PSF, and the second causes difficulties in disentangling the disk component from distinct inner-galaxy structures. In choosing WFC3 over ACS HRC, we will be making a slight sacrifice in our ability to determine the PSF contribution to a high degree of accuracy, as WFC3 has slightly larger pixels (0.04 vs. 0.025). However,

we will be gaining the higher sensitivity of WFC3 as well as the larger field of view necessary for the accurate determination of both the sky level and extended host-galaxy features in the images of these nearby objects.

One of the main considerations in this project is to maximize the dynamic range achieved by replacing the saturated pixels in deeper exposures with pixels from shallower, unsaturated exposures that are scaled by the exposure time ratio. This method was shown to work extremely well in the previous programs. In those cases, dithering was not employed between images, as the PSF is known to change shape at different locations on the detector. However, dithering has many useful features, including facilitating the rejection of cosmic rays and detector artifacts (such as transient warm pixels), as well as filling any gaps between detectors that would otherwise result in a loss of information. Therefore, we will use one of the standard 2-point dithering patterns for our program with WFC3, yet in a slightly different way, as explained below.

For the brightest object in our sample, the WFC3 exposure time calculator estimate a time to saturation of 47s. This is actually a lower limit on the time to saturation, as it assumes that all of the flux in the spectrum is due to the AGN point source, which we know is not the case for any of these objects. In order to obtain the dynamic range necessary to decompose the host galaxy and AGN surface brightness profiles, we must properly replace saturated pixels in deep exposures using shallower, unsaturated exposures. To this end, we will take two sets of exposures separated by a dithering maneuver, where each set of exposures will be graduated in time, for example 30s, 300s, and 690s. The exposures will be ordered such that two full parallel buffer dumps (which require 664 s each to transfer two full images to the SSR) will occur during the long exposures and will not create any additional overheads. For 11 of our 12 AGN targets, the FOV provided by a single WFC3 chip will be sufficient for measuring the structure of the host galaxy. For these objects, the UVIS1 aperture will be used for centering the galaxy, and the WFC3-UVIS-DITHER-LINE pattern with the standard dither size and orientation will be used. Three of these objects are somewhat elongated, so their orientations have been constrained to ensure that they will fit within the FOV provided by a single chip. The 12th AGN host galaxy (NGC 6814) is more spatially extended than the others, so we have elected to use the UVIS aperture with the WFC3-UVIS-MOST-DITH-LINE pattern with the following modifications to the defaults for this pattern: 2 pointings rather than 3 and no subpattern. The default orientation and offset will allow us to dither across the gap, thereby ensuring that we do not lose any information in the host galaxy structure.

In a similar manner, we propose to image EGGR 102, an isolated white dwarf with V = 12.8 to create a high-dynamic range PSF model. Its moderate apparent brightness makes EGGR 102 a suitable star to use with HST imaging, as it will not saturate in short exposures but also requires little time to

achieve a high S/N. In addition, its spectral shape in the optical is similar to the spectral shape of AGNs. EGGR 102 has been used extensively as a PSF model for HST imaging (e.g., McLure et al. 1999), as it more accurately fits both the bright core and the extended PSF wings than do TinyTim models of the PSF. We will again use two sets of graduated exposures to maximize the dynamic range. The WFC3 exposure time calculator estimates a time to saturation of 6.8 s for EGGR 102. We will take exposures that are 4s, 40s, and 600s in length. In this case, two of the buffer dumps will be in serial with the exposures. Two full buffer dumps of 664 s each must occur within the unrestricted visibility time of the object. The exposures for EGGR 102 will be centered with the UVIS1 aperture, and the WFC3-UVIS-DITHER-LINE pattern will be used, such that the pointings and dithers match the majority of the observations within this proposal.

As a final note, WFC3 is the best choice for this project, because of its high sensitivity, wide field of view, and relatively small pixels. However, should WFC3 not be available for use, the observations proposed here may be successfully carried out with the same number of requested orbits using ACS WFC, or even WFPC2, if necessary.

Visit

Proposal 11662, Visit 01, implementation Thu Oct 15 01:03:40 GMT 2009

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1)

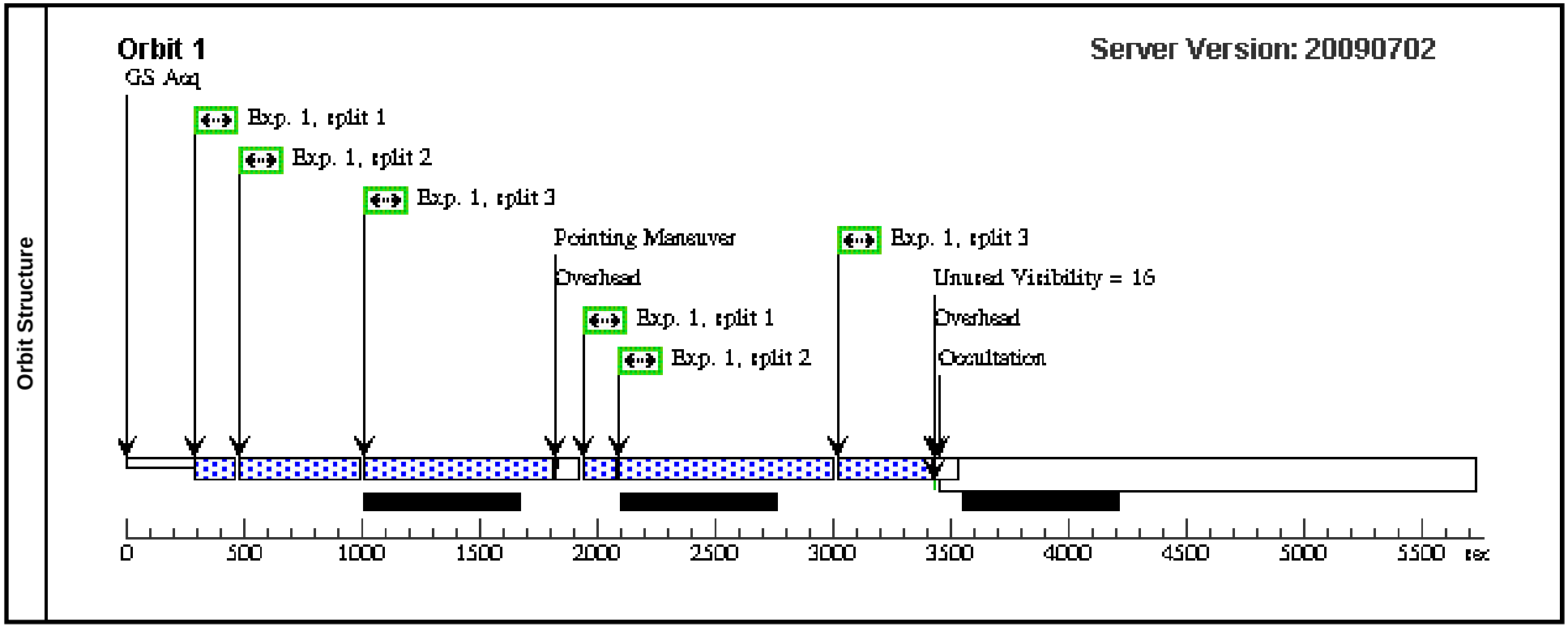
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	MRK-0142	RA: 10 25 31.3000 (156.3804167d) Dec: +51 40 35.00 (51.67639d) Equinox: J2000		V=(?) g= 15.8	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		(1) MRK-0142	WFC3/UVIS, ACCUM, UVIS1	F547M	CR-SPLIT=3		Pattern 1, Exps 1-1 (1)	2310 Secs	
								[==>25.0 Secs (Pattern 1, Split 1)] *[==>400.0 Secs (Pattern 1, Split 2)]* *[==>800.0 Secs (Pattern 1, Split 3)]* *[==>25.0 Secs (Pattern 2, Split 1)]* *[==>800.0 Secs (Pattern 2, Split 2)]* *[==>400.0 Secs (Pattern 2, Split 3)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20090702
GS Acq
Exp. 1, split 1
Exp. 1, split 2
Exp. 1, split 3
Pointing Maneuver
Overhead
Exp. 1, split 1
Exp. 1, split 2
Exp. 1, split 3
Unused Visibility = 16
Overhead
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11662, Visit 02, implementation Thu Oct 15 01:03:41 GMT 2009

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: (none)

Patterns

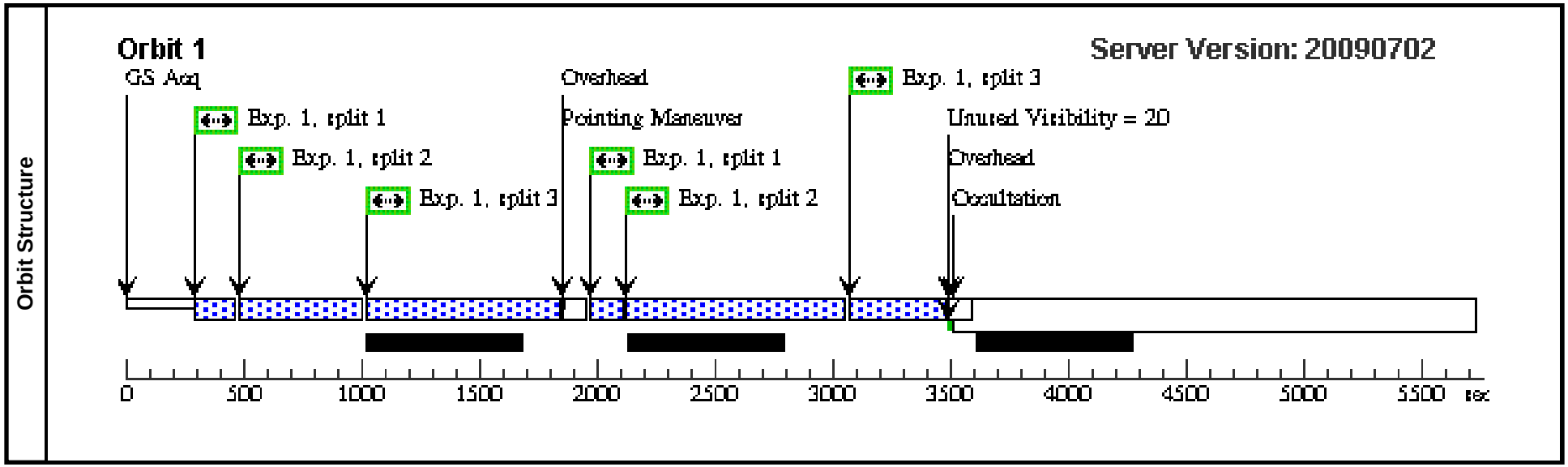
#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	SBS-1116+583A	RA: 11 18 57.7000 (169.7404167d) Dec: +58 03 24.00 (58.05667d) Equinox: J2000		V=(?) g=15.7	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(2) SBS-1116+583A	WFC3/UVIS, ACCUM, UVIS1	F547M	CR-SPLIT=3		Pattern 1, Exps 1-1 (1)	2310 Secs *[==>25 Secs (Pattern 1, Split 1)]* *[==>410.0 Secs (Pattern 1, Split 2)]* *[==>820.0 Secs (Pattern 1, Split 3)]* *[==>25 Secs (Pattern 2, Split 1)]* *[==>820.0 Secs (Pattern 2, Split 2)]* *[==>410.0 Secs (Pattern 2, Split 3)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20090702
GS Acq
Exp. 1, split 1
Exp. 1, split 2
Exp. 1, split 3
Overhead
Pointing Maneuver
Exp. 1, split 1
Exp. 1, split 2
Exp. 1, split 3
Unused Visibility = 20
Overhead
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11662, Visit 03, implementation Thu Oct 15 01:03:41 GMT 2009

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: ORIENT 165.0D TO 215.0 D

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1)

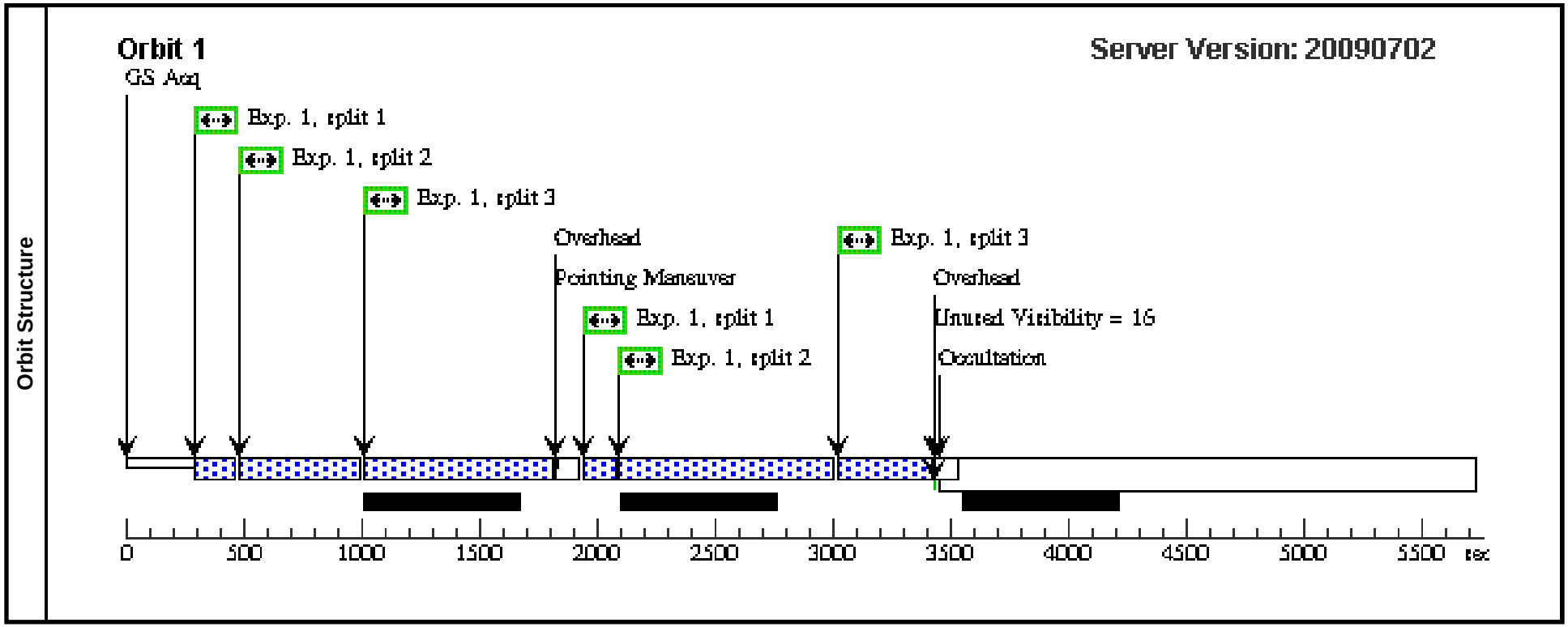
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	ARP-151	RA: 11 25 36.2000 (171.4008333d) Dec: +54 22 57.00 (54.38250d) Equinox: J2000		V=(?) g=16.0	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		(3) ARP-151	WFC3/UVIS, ACCUM, UVIS1	F547M	CR-SPLIT=3		Pattern 1, Exps 1-1 (1)	2310 Secs	
								[==>25 Secs (Pattern 1, Split 1)] *[==>400 Secs (Pattern 1, Split 2)]* *[==>800 Secs (Pattern 1, Split 3)]* *[==>25 Secs (Pattern 2, Split 1)]* *[==>800 Secs (Pattern 2, Split 2)]* *[==>400 Secs (Pattern 2, Split 3)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20090702
GS Acq
Exp. 1, split 1
Exp. 1, split 2
Exp. 1, split 3
Overhead
Pointing Maneuver
Exp. 1, split 1
Exp. 1, split 2
Exp. 1, split 3
Overhead
Unused Visibility = 16
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11662, Visit 04, implementation Thu Oct 15 01:03:42 GMT 2009

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1)

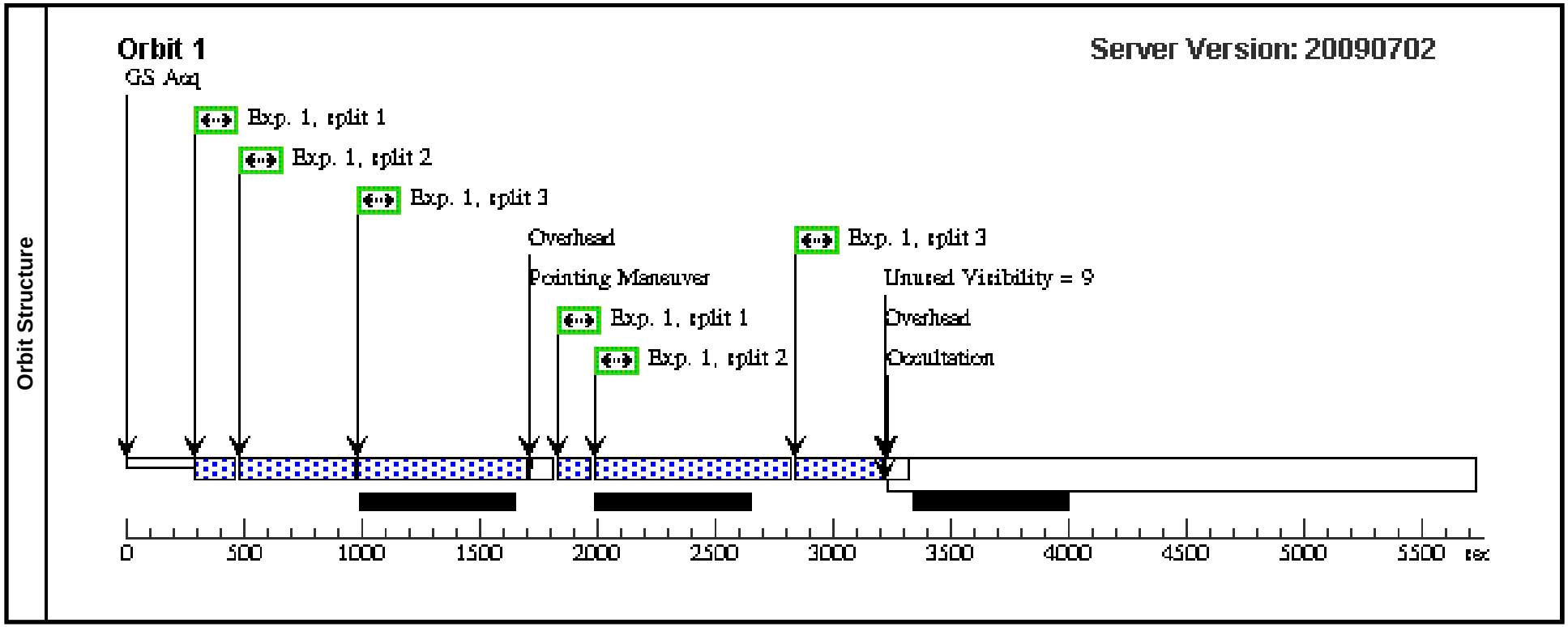
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(4)	MRK-1310	RA: 12 01 14.3000 (180.3095833d) Dec: -03 40 41.00 (-3.67806d) Equinox: J2000		V=(?) g= 14.8	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		(4) MRK-1310	WFC3/UVIS, ACCUM, UVIS1	F547M	CR-SPLIT=3		Pattern 1, Exps 1-1 (1)	2310 Secs	
								[==>25 Secs (Pattern 1, Split 1)] *[==>375 Secs (Pattern 1, Split 2)]* *[==>720.0 Secs (Pattern 1, Split 3)]* *[==>25 Secs (Pattern 2, Split 1)]* *[==>720.0 Secs (Pattern 2, Split 2)]* *[==>375 Secs (Pattern 2, Split 3)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20090702
GS Acq
Exp. 1, split 1
Exp. 1, split 2
Exp. 1, split 3
Overhead
Pointing Maneuver
Exp. 1, split 1
Exp. 1, split 2
Exp. 1, split 3
Unused Visibility = 9
Overhead
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11662, Visit 05, implementation Thu Oct 15 01:03:42 GMT 2009

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1)

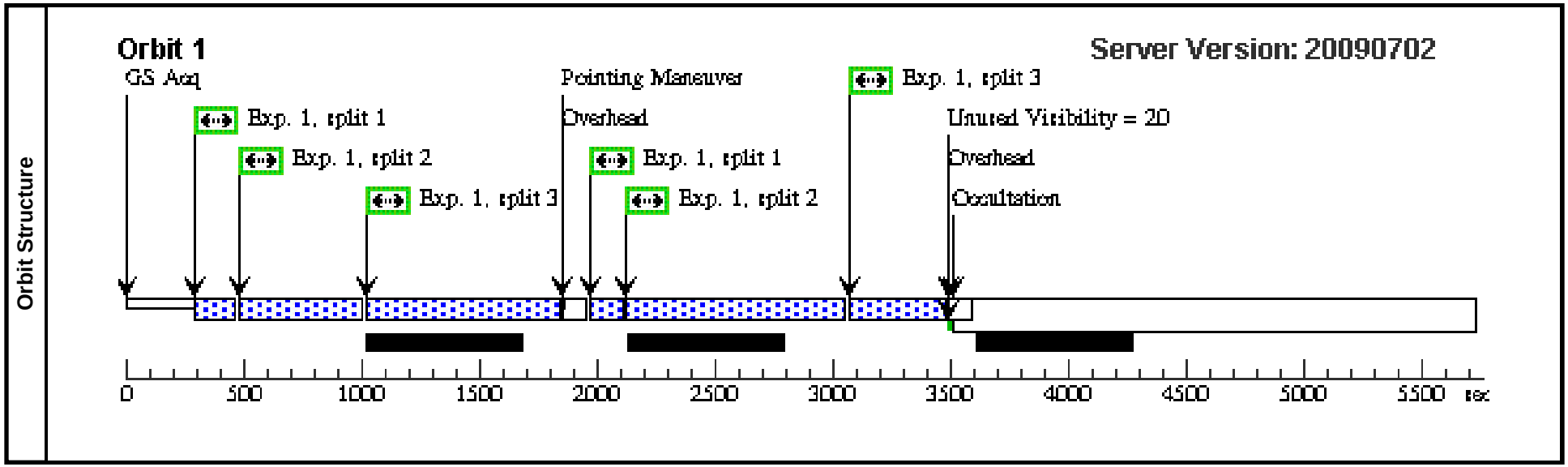
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(5)	MRK-0202	RA: 12 17 55.0000 (184.4791667d) Dec: +58 39 35.00 (58.65972d) Equinox: J2000		V=(?) g=15.4	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		(5) MRK-0202	WFC3/UVIS, ACCUM, UVIS1	F547M	CR-SPLIT=3		Pattern 1, Exps 1-1 (1)	2310 Secs	
								[==>25 Secs (Pattern 1, Split 1)] *[==>410.0 Secs (Pattern 1, Split 2)]* *[==>820.0 Secs (Pattern 1, Split 3)]* *[==>25 Secs (Pattern 2, Split 1)]* *[==>820.0 Secs (Pattern 2, Split 2)]* *[==>410.0 Secs (Pattern 2, Split 3)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20090702
GS Acq
Exp. 1, split 1
Exp. 1, split 2
Exp. 1, split 3
Pointing Maneuver
Overhead
Exp. 1, split 1
Exp. 1, split 2
Exp. 1, split 3
Unused Visibility = 20
Overhead
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11662, Visit 06, implementation Thu Oct 15 01:03:43 GMT 2009

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1)

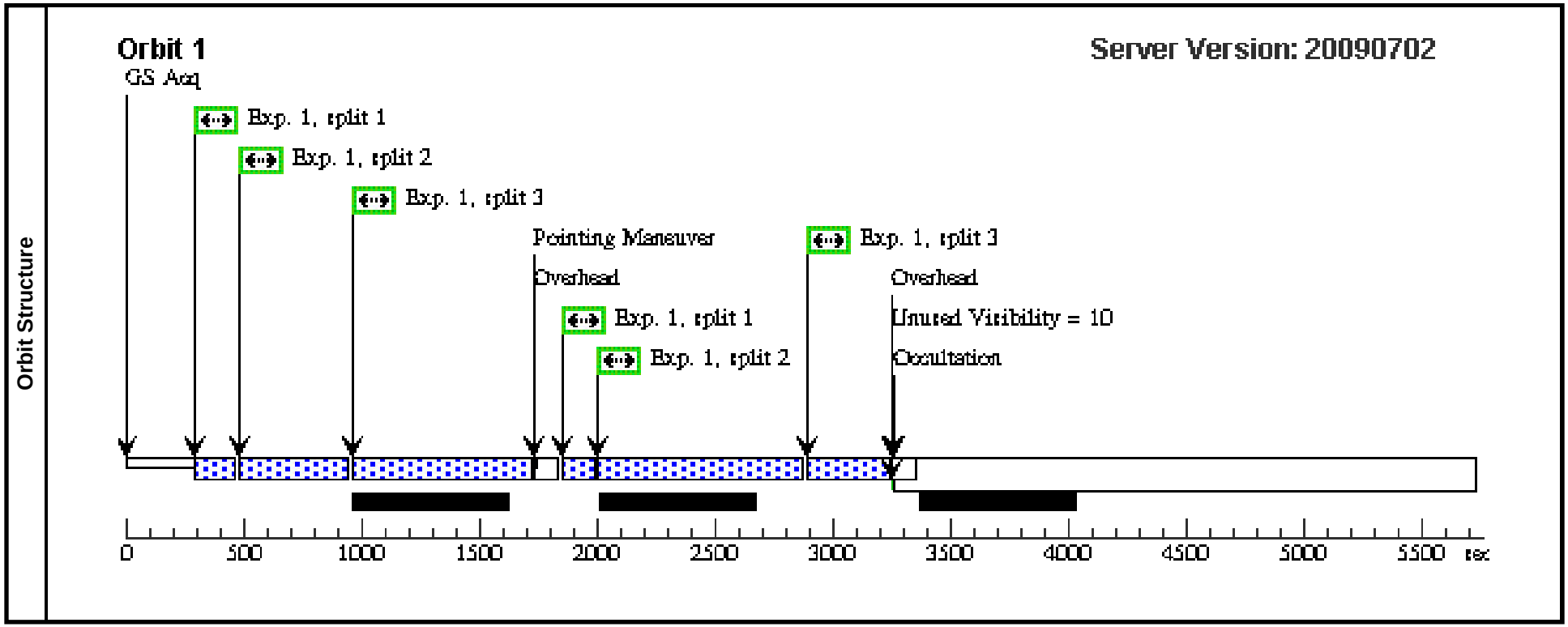
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(6)	MRK-766	RA: 12 18 26.5000 (184.6104167d) Dec: +29 48 46.00 (29.81278d) Equinox: J2000		V=(?) B=13.7	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		(6) MRK-766	WFC3/UVIS, ACCUM, UVIS1	F547M	CR-SPLIT=3		Pattern 1, Exps 1-1 (1)	2310 Secs	
								[==>25 Secs (Pattern 1, Split 1)] *[==>350 Secs (Pattern 1, Split 2)]* *[==>760.0 Secs (Pattern 1, Split 3)]* *[==>25 Secs (Pattern 2, Split 1)]* *[==>760.0 Secs (Pattern 2, Split 2)]* *[==>350 Secs (Pattern 2, Split 3)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20090702
GS Acq
Exp. 1, split 1
Exp. 1, split 2
Exp. 1, split 3
Pointing Maneuver
Overhead
Exp. 1, split 1
Exp. 1, split 2
Exp. 1, split 3
Overhead
Unused Visibility = 10
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11662, Visit 07, implementation Thu Oct 15 01:03:43 GMT 2009

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1)

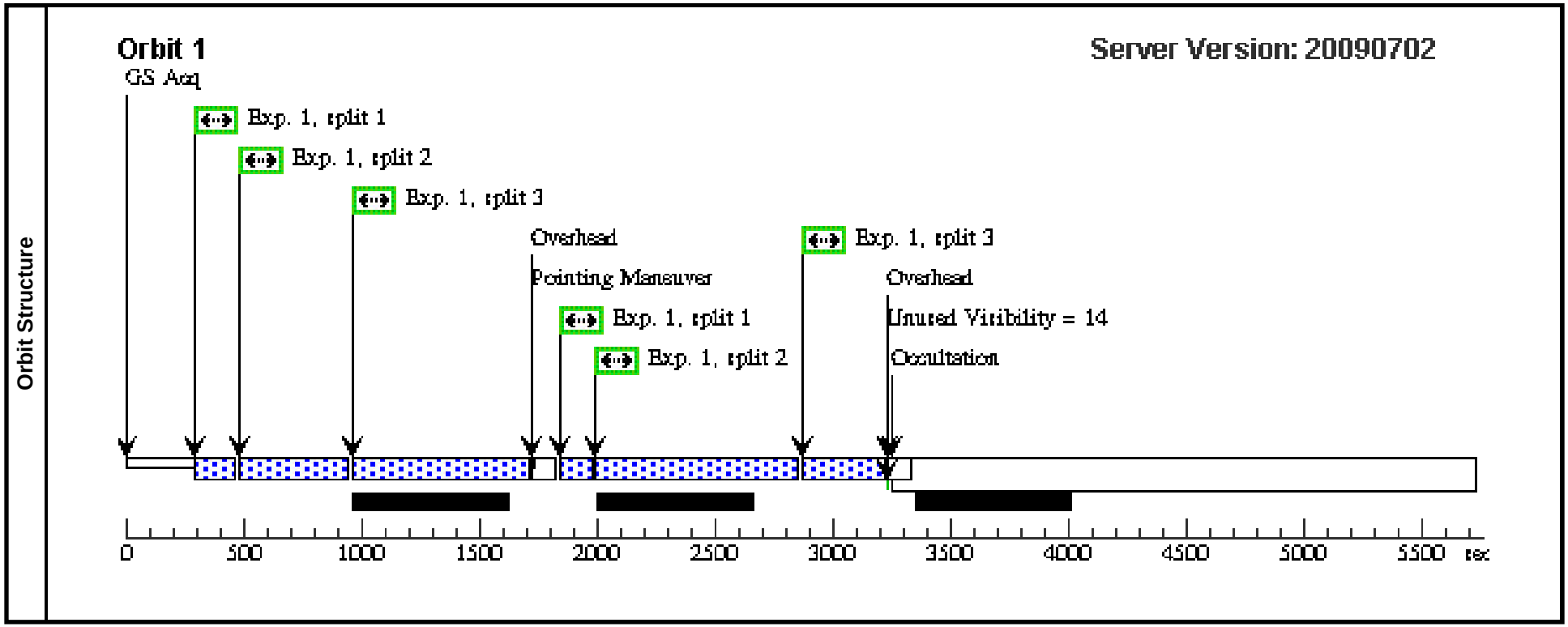
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(7)	NGC-4748	RA: 12 52 12.4000 (193.0516667d) Dec: -13 24 53.00 (-13.41472d) Equinox: J2000		V=(?) B=14.27	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		(7) NGC-4748	WFC3/UVIS, ACCUM, UVIS1	F547M	CR-SPLIT=3		Pattern 1, Exps 1-1 (1)	2310 Secs	
								[==>25 Secs (Pattern 1, Split 1)] *[==>350 Secs (Pattern 1, Split 2)]* *[==>750 Secs (Pattern 1, Split 3)]* *[==>25 Secs (Pattern 2, Split 1)]* *[==>750 Secs (Pattern 2, Split 2)]* *[==>350 Secs (Pattern 2, Split 3)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20090702
GS Acq
Exp. 1, split 1
Exp. 1, split 2
Exp. 1, split 3
Overhead
Pointing Maneuver
Exp. 1, split 1
Exp. 1, split 2
Exp. 1, split 3
Overhead
Unused Visibility = 14
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11662, Visit 08, implementation Thu Oct 15 01:03:43 GMT 2009

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: ORIENT 150D TO 240 D

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1)

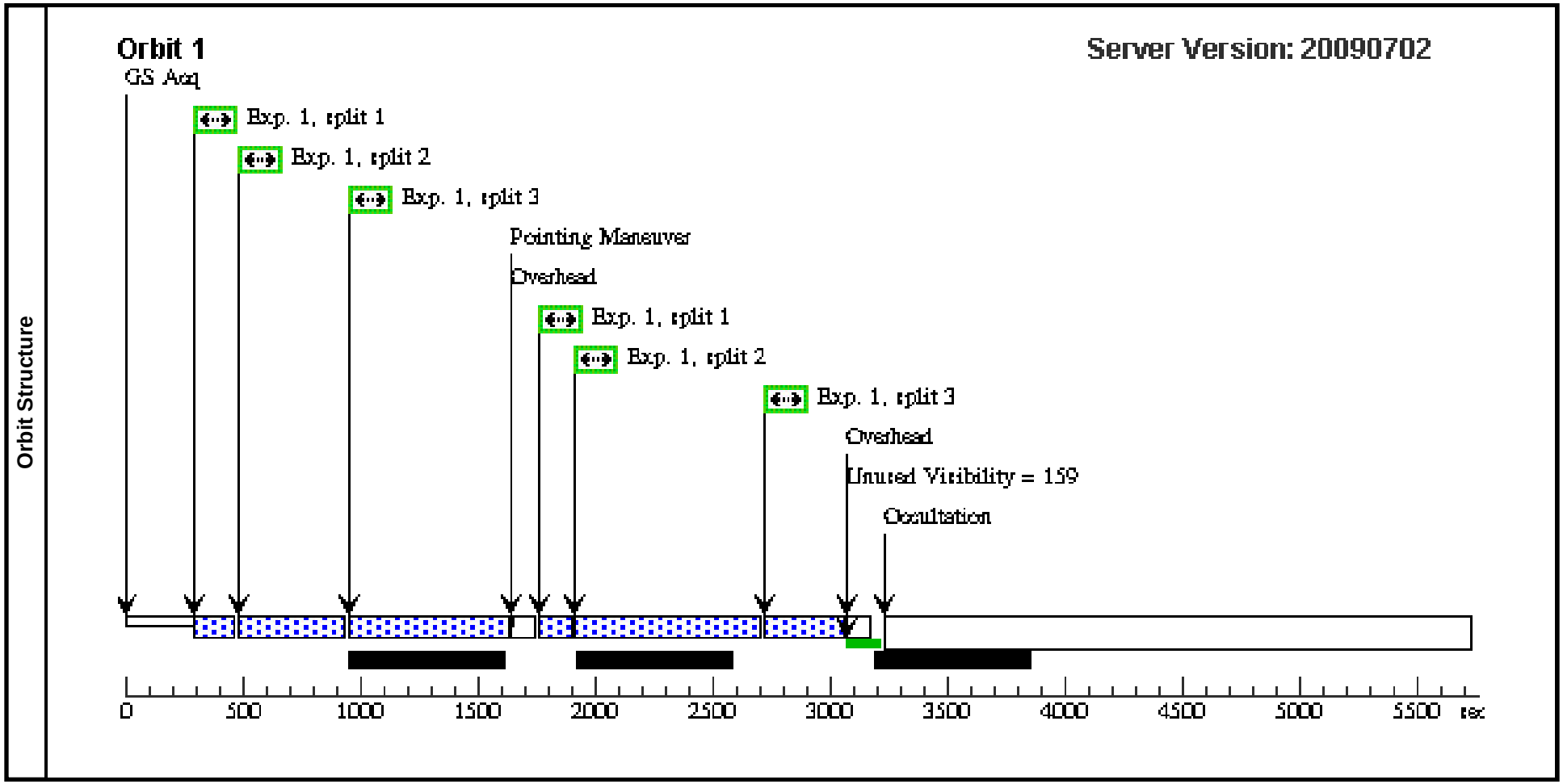
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(8)	IC-4218	RA: 13 17 3.4000 (199.2641667d) Dec: -02 15 41.00 (-2.26139d) Equinox: J2000		V=(?) B=14.6	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		(8) IC-4218	WFC3/UVIS, ACCUM, UVIS1	F547M	CR-SPLIT=3		Pattern 1, Exps 1-1 (1)	2310 Secs	
								[==>25 Secs (Pattern 1, Split 1)] *[==>340.0 Secs (Pattern 1, Split 2)]* *[==>680.0 Secs (Pattern 1, Split 3)]* *[==>25 Secs (Pattern 2, Split 1)]* *[==>680.0 Secs (Pattern 2, Split 2)]* *[==>340.0 Secs (Pattern 2, Split 3)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20090702
GS Acq
Exp. 1, split 1
Exp. 1, split 2
Exp. 1, split 3
Pointing Maneuver
Overhead
Exp. 1, split 1
Exp. 1, split 2
Exp. 1, split 3
Overhead
Unused Visibility = 159
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11662, Visit 09, implementation Thu Oct 15 01:03:43 GMT 2009

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1)

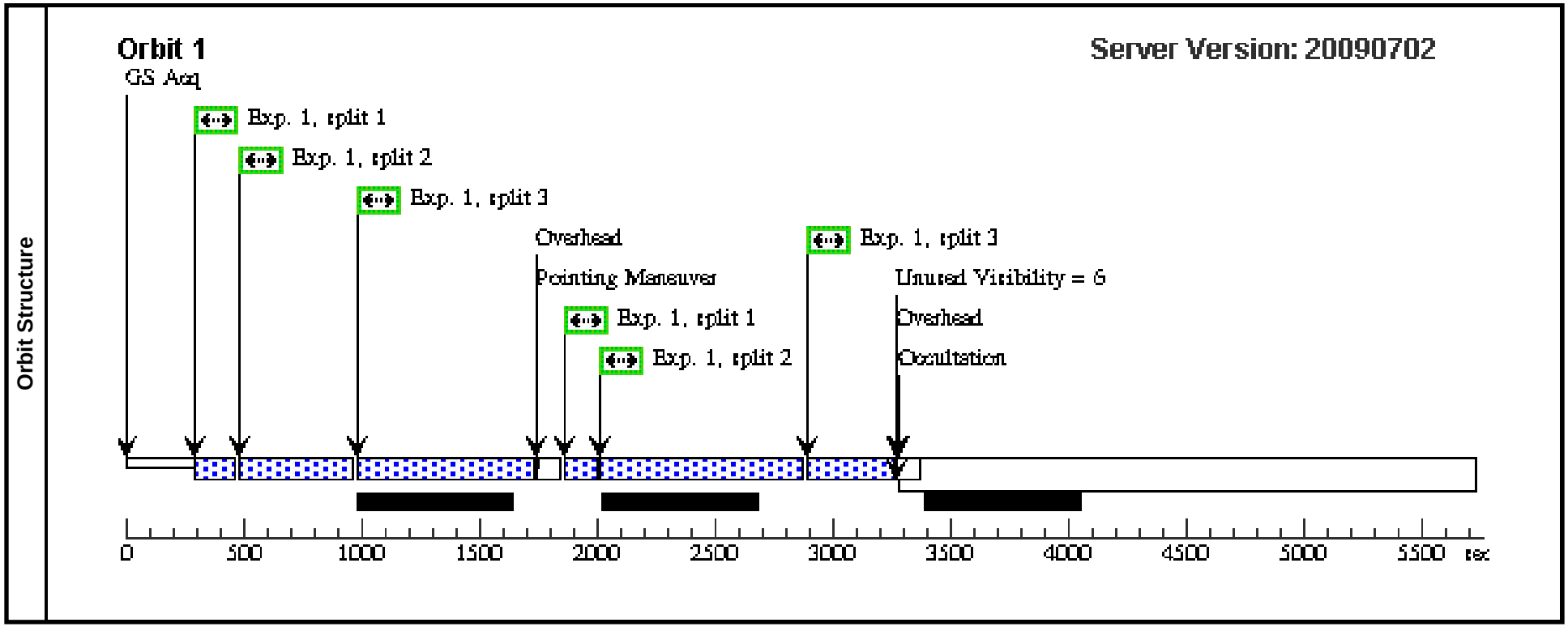
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(9)	MCG-06-30-15	RA: 13 35 53.8000 (203.9741667d) Dec: -34 17 44.00 (-34.29556d) Equinox: J2000		V=(?) B=13.9	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		(9) MCG-06-30-15	WFC3/UVIS, ACCUM, UVIS1	F547M	CR-SPLIT=3		Pattern 1, Exps 1-1 (1)	2310 Secs	
								[==>25 Secs (Pattern 1, Split 1)] *[==>370.0 Secs (Pattern 1, Split 2)]* *[==>750 Secs (Pattern 1, Split 3)]* *[==>25 Secs (Pattern 2, Split 1)]* *[==>750 Secs (Pattern 2, Split 2)]* *[==>370.0 Secs (Pattern 2, Split 3)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20090702
GS Acq
Exp. 1, split 1
Exp. 1, split 2
Exp. 1, split 3
Overhead
Pointing Maneuver
Exp. 1, split 1
Exp. 1, split 2
Exp. 1, split 3
Unused Visibility = 6
Overhead
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11662, Visit 10, implementation Thu Oct 15 01:03:44 GMT 2009

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1)

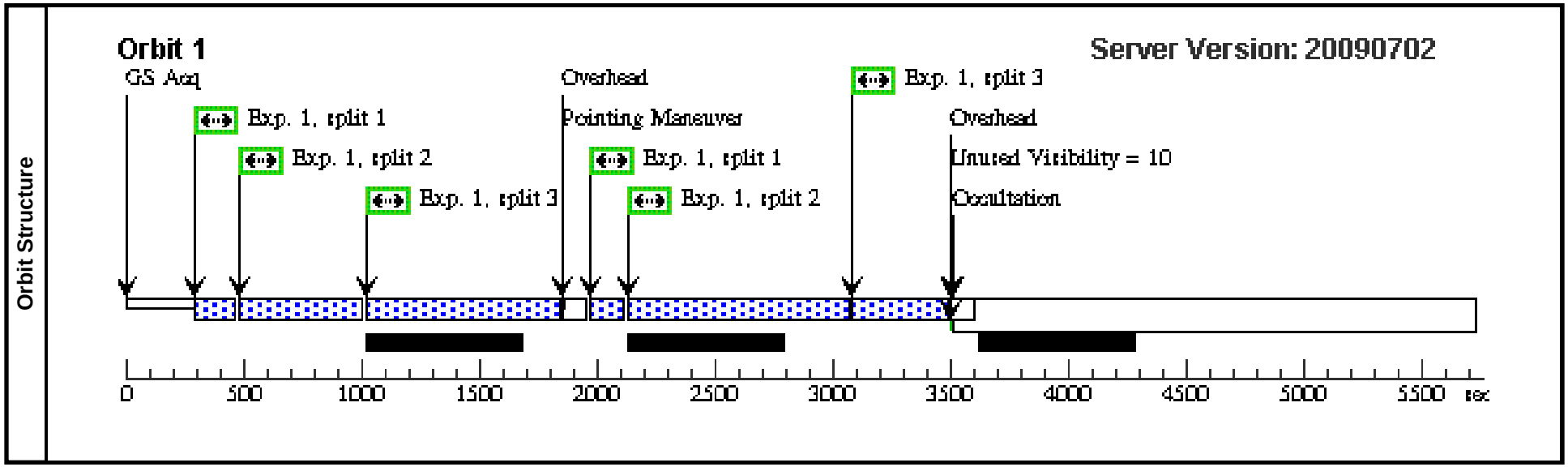
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(10)	MRK-0290	RA: 15 35 52.3000 (233.9679167d) Dec: +57 54 9.00 (57.90250d) Equinox: J2000		V=(?) g=15.1	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		(10) MRK-0290	WFC3/UVIS, ACCUM, UVIS1	F547M	CR-SPLIT=3		Pattern 1, Exps 1-1 (1)	2310 Secs	
								[==>25 Secs (Pattern 1, Split 1)] *[==>410.0 Secs (Pattern 1, Split 2)]* *[==>825.0 Secs (Pattern 1, Split 3)]* *[==>25 Secs (Pattern 2, Split 1)]* *[==>825.0 Secs (Pattern 2, Split 2)]* *[==>410.0 Secs (Pattern 2, Split 3)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20090702
GS Acq
Exp. 1, split 1
Exp. 1, split 2
Exp. 1, split 3
Overhead
Pointing Maneuver
Exp. 1, split 1
Exp. 1, split 2
Exp. 1, split 3
Overhead
Unused Visibility = 10
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11662, Visit 11, implementation Thu Oct 15 01:03:44 GMT 2009

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: ORIENT 103.0D TO 193 D

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1)

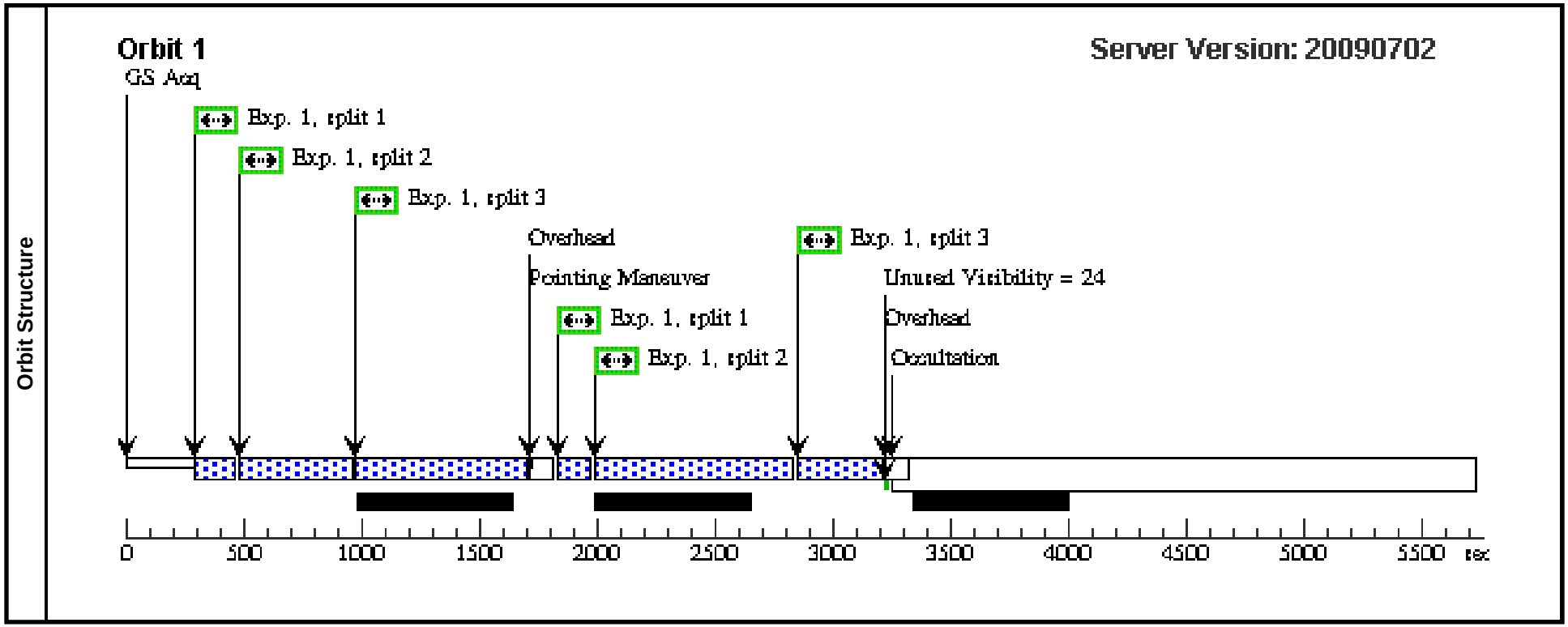
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(11)	MRK-871	RA: 16 08 36.4000 (242.1516667d) Dec: +12 19 51.00 (12.33083d) Equinox: J2000		V=(?) B=15.20	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		(11) MRK-871	WFC3/UVIS, ACCUM, UVIS1	F547M	CR-SPLIT=3		Pattern 1, Exps 1-1 (1)	2310 Secs	
								[==>25 Secs (Pattern 1, Split 1)] *[==>365.0 Secs (Pattern 1, Split 2)]* *[==>730.0 Secs (Pattern 1, Split 3)]* *[==>25 Secs (Pattern 2, Split 1)]* *[==>730.0 Secs (Pattern 2, Split 2)]* *[==>365.0 Secs (Pattern 2, Split 3)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20090702
GS Acq
Exp. 1, split 1
Exp. 1, split 2
Exp. 1, split 3
Overhead
Pointing Maneuver
Exp. 1, split 1
Exp. 1, split 2
Exp. 1, split 3
Unused Visibility = 24
Overhead
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11662, Visit 12, implementation Thu Oct 15 01:03:44 GMT 2009

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(2)	Pattern Type=WFC3-UVIS-MOS-DITH-LINE Purpose=DITHER Number Of Points=2 Point Spacing=4.0 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.754 Angle Between Sides= Center Pattern=true		(1)

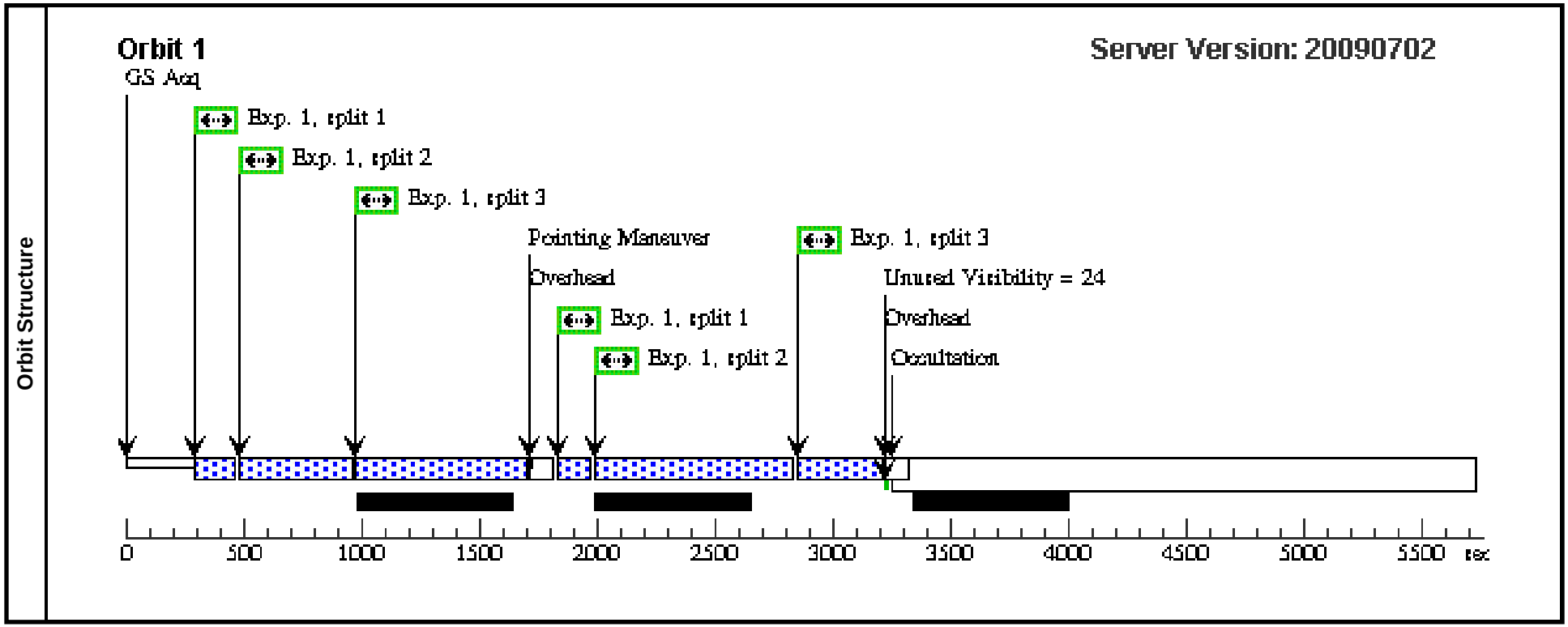
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(12)	NGC-6814	RA: 19 42 40.6000 (295.6691667d) Dec: -10 19 25.00 (-10.32361d) Equinox: J2000		V=(?) B=11.9	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		(12) NGC-6814	WFC3/UVIS, ACCUM, UVIS-FIX	F547M	CR-SPLIT=3		Pattern 2, Exps 1-1 (2)	2310 Secs	
								[==>25 Secs (Pattern 1, Split 1)] *[==>365 Secs (Pattern 1, Split 2)]* *[==>730 Secs (Pattern 1, Split 3)]* *[==>25 Secs (Pattern 2, Split 1)]* *[==>730 Secs (Pattern 2, Split 2)]* *[==>365 Secs (Pattern 2, Split 3)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20090702
GS Acq
Exp. 1, split 1
Exp. 1, split 2
Exp. 1, split 3
Pointing Maneuver
Overhead
Exp. 1, split 1
Exp. 1, split 2
Exp. 1, split 3
Unused Visibility = 24
Overhead
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11662, Visit 13, implementation Thu Oct 15 01:03:44 GMT 2009

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1)

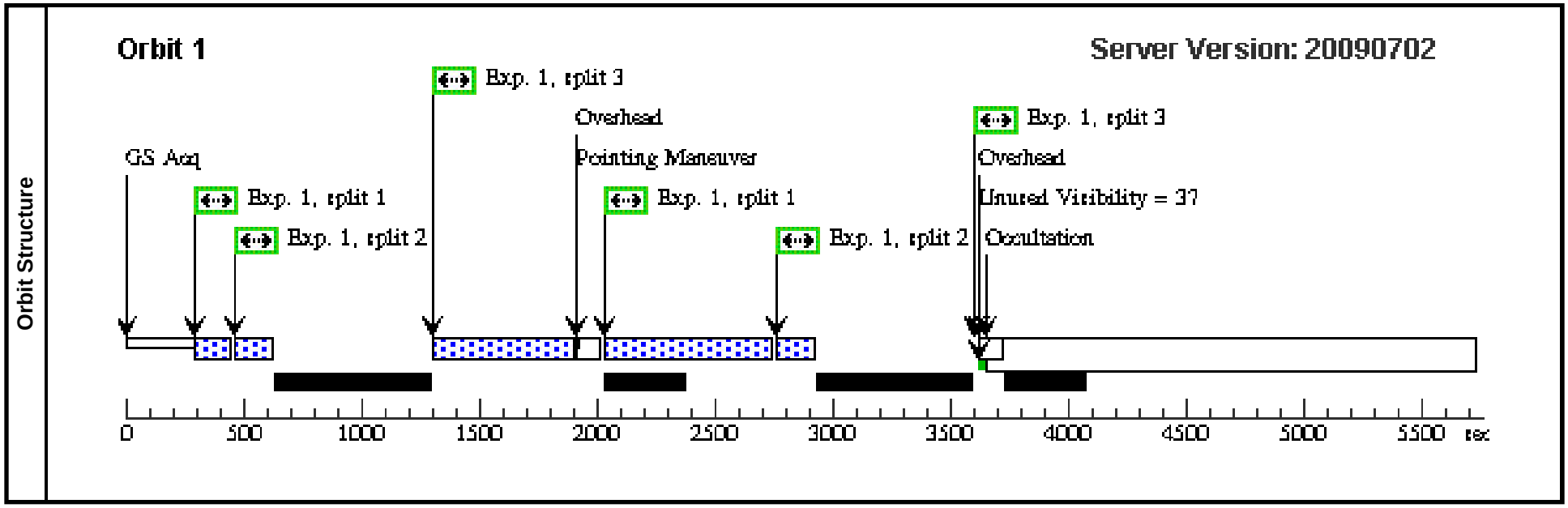
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(13)	EGGR-102	RA: 13 38 50.4743 (204.7103096d) Dec: +70 17 7.62 (70.28545d) Equinox: J2000		V=12.8 white dwarf	Reference Frame: ICRS

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		(13) EGGR-102	WFC3/UVIS, ACCUM, UVIS1	F547M	CR-SPLIT=3		Pattern 1, Exps 1-1 (1)	928 Secs *[==>4 Secs (Pattern 1, Split 1)]* *[==>40.0 Secs (Pattern 1, Split 2)]* *[==>600.0 Secs (Pattern 1, Split 3)]* *[==>600.0 Secs (Pattern 2, Split 1)]* *[==>40.0 Secs (Pattern 2, Split 2)]* *[==>4.0 Secs (Pattern 2, Split 3)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20090702
GS Acq
Exp. 1, split 1
Exp. 1, split 2
Exp. 1, split 3
Overhead
Pointing Maneuver
Exp. 1, split 1
Exp. 1, split 2
Exp. 1, split 3
Overhead
Unused Visibility = 37
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec