



12253 - Gravity in the Crossfire: Revealing the Properties of Dark Matter in Bullet-like Clusters

Cycle: 18, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

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VISITS

<i>Visit</i>	<i>Targets used in Visit</i>	<i>Configurations used in Visit</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
01	(1) ABELL1758N-P1	ACS/WFC	4	02-Jul-2010 21:14:54.0	yes
02	(2) ABELL1758N-P2	ACS/WFC	4	02-Jul-2010 21:15:12.0	yes
03	(3) ABELL520-P1	ACS/WFC	4	02-Jul-2010 21:15:24.0	yes
04	(4) ABELL520-P2	ACS/WFC	4	02-Jul-2010 21:15:37.0	yes
05	(5) ABELL520-P3	ACS/WFC	4	02-Jul-2010 21:15:48.0	yes
06	(6) ABELL520-P4	ACS/WFC	4	02-Jul-2010 21:16:00.0	yes
07	(7) ABELL2163-P1	ACS/WFC	4	02-Jul-2010 21:16:12.0	yes
08	(8) ABELL2163-P2	ACS/WFC	4	02-Jul-2010 21:16:23.0	yes

ABSTRACT

We propose to study the physical nature of dark matter by using massive, merging clusters of galaxies. As shown with the Bullet Cluster (1E0657-56), such massive well-measured systems are critical for our understanding of dark matter. By more than doubling the number of clusters in the sample and obtaining systems at different observation angles, impact parameters, geometrical arrangements, and merger velocities, the systematic uncertainties in the dark matter cross section calculations can be improved substantially, allowing us to move from rough order of magnitude estimates to measurements with quantifiable uncertainties that can be compared usefully with the predictions from numerical simulations, and the constraints on alternate gravity models become unambiguous. Our proposed targets are three extraordinary, merging galaxy clusters with X-ray and optical offsets that are placed at ideal redshifts for such a study; A520, A1758N, and A2163. To pin down the position of the dark matter component we require high resolution, absolutely calibrated mass maps. High resolution gravitational lensing data is needed to attain this goal, which can only be achieved with the excellent resolving power of the HST.

OBSERVING DESCRIPTION

The goal of this program is to obtain a weak lensing mass reconstruction of three merging cluster systems and measure if the centroid of the lensing signal is offset from the position of the X-ray plasma, which contains the bulk of the visible mass in clusters.

Required Area: Because we are needing to calculate the centroid of the weak lensing signal from measurements of the gravitational shear, which is a non-local statistic, we need to measure shapes of background galaxies in a wide region around the possible locations of the centroids. We therefore are requesting the minimum number of pointings per cluster which provide us with a 1.5' buffer between the image edge and the expected centroid locations. Using this criteria we need 2 pointings in A1758N, 4 in A520, and 2 in A2163.

Required Filters: In addition to measuring the shapes of faint galaxies, we also need to be able to determine which galaxies are behind the clusters and therefore being lensed, and which are foreground or cluster dwarf galaxies, which are not being lensed. Without the ability to remove the non-lensed dwarf galaxies from the background galaxy sample, the signal-to-noise of the mass reconstruction is greatly diminished (Clowe & Schneider 2001) and the error in the centroid of the weak lensing peaks greatly increases. We found with the Bullet Cluster observations that a 3 passband set of F814W, F606W, and F435W allowed us to use cuts in color-color space to remove the dwarf galaxies while still having a sufficiently large number density of background galaxies to measure the weak lensing centroid with high significance.

Required Depth: Our target sensitivity for this program is defined by the need to get shape measurements for 90 background galaxies/arcmin² to measure the weak lensing peak centroids to the desired accuracy. To do this we need to obtain photometry at a S/N = 10 at IF 814W = 27.5 for a galaxy, which we can get (calculated from both the ACS ETC and our experience with the 1E0657-558 dataset) in 2 orbits with the F814W filter. For color selection, a single orbit in F435W and F606W will provide us the necessary photometric S/N.

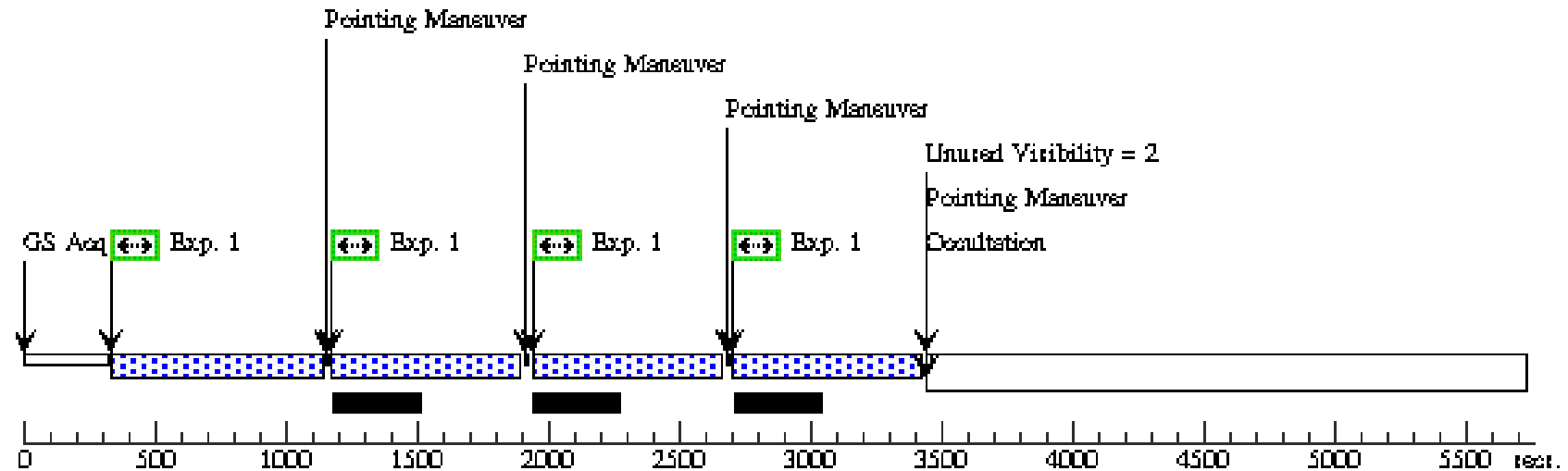
Dithering and Mosaicing Pattern: Our observing plan is to take 4 exposures per orbit, with a chip gap spanning offset between each exposure. Due to the 5 orbit limit per visit, we will schedule each mosaic pointing as a block of 4 orbits to take all the passbands for that pointing in the same visit. The other pointings for the same cluster will need to be constrained to occur at a similar rotation angle as the first (or 180 degrees to it). We will keep a small 10 overlap region between the pointings to detect any systematic errors between the shape measurements of the different pointings.

Proposal 12253 (STScI Edit Number: 0, Created: Friday, July 2, 2010 8:16:28 PM EST) - Overview

Visit	Proposal 12253, Visit 01					Sat Jul 03 01:16:29 GMT 2010				
	Diagnostic Status: No Diagnostics									
	Scientific Instruments: ACS/WFC									
	Special Requirements: ORIENT 312.5D TO 317.5 D									
Comments: A1758N pointing 1										
Patterns	#	Primary Pattern			Secondary Pattern		Exposures			
	(1)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=6.10486 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=91.16385 Angle Between Sides= Center Pattern=true	Pattern Type=LINE Purpose=DITHER Number Of Points=2 Point Spacing=3.085553 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.389987 Angle Between Sides= Center Pattern=false	(1), (2), (3), (4)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	ABELL1758N-P1	RA: 13 32 52.5869 (203.2191121d) Dec: +50 31 36.19 (50.52672d) Equinox: J2000		V=19	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(1) ABELL1758N-P 1	ACS/WFC, ACCUM, WFC	F814W			Pattern 1, Exps 1-1 (1)	500 Secs [==>601.0 Secs (Pattern 1,1)] [==>601.0 Secs (Pattern 1,2)] [==>601.0 Secs (Pattern 2,1)] [==>601.0 Secs (Pattern 2,2)]	[1]
	2		(1) ABELL1758N-P 1	ACS/WFC, ACCUM, WFC	F814W			Pattern 1, Exps 2-2 (1)	500 Secs [==>649.0 Secs (Pattern 1,1)] [==>649.0 Secs (Pattern 1,2)] [==>649.0 Secs (Pattern 2,1)] [==>649.0 Secs (Pattern 2,2)]	[2]
	3		(1) ABELL1758N-P 1	ACS/WFC, ACCUM, WFC	F606W			Pattern 1, Exps 3-3 (1)	500 Secs [==>636.0 Secs (Pattern 1,1)] [==>636.0 Secs (Pattern 1,2)] [==>636.0 Secs (Pattern 2,1)] [==>636.0 Secs (Pattern 2,2)]	[3]
	4		(1) ABELL1758N-P 1	ACS/WFC, ACCUM, WFC	F435W			Pattern 1, Exps 4-4 (1)	500 Secs [==>634.0 Secs (Pattern 1,1)] [==>634.0 Secs (Pattern 1,2)] [==>634.0 Secs (Pattern 2,1)] [==>634.0 Secs (Pattern 2,2)]	[4]

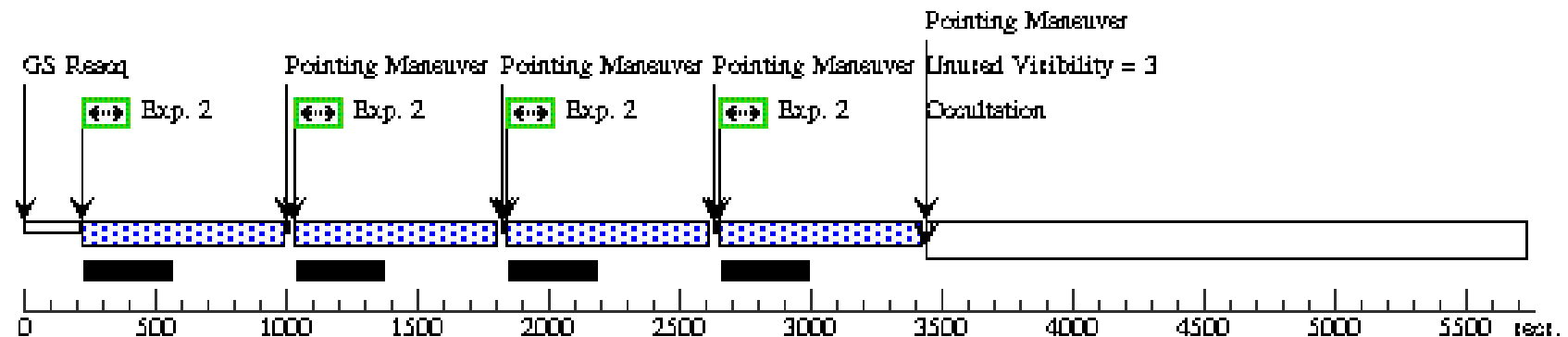
Orbit 1

Server Version: 20100505



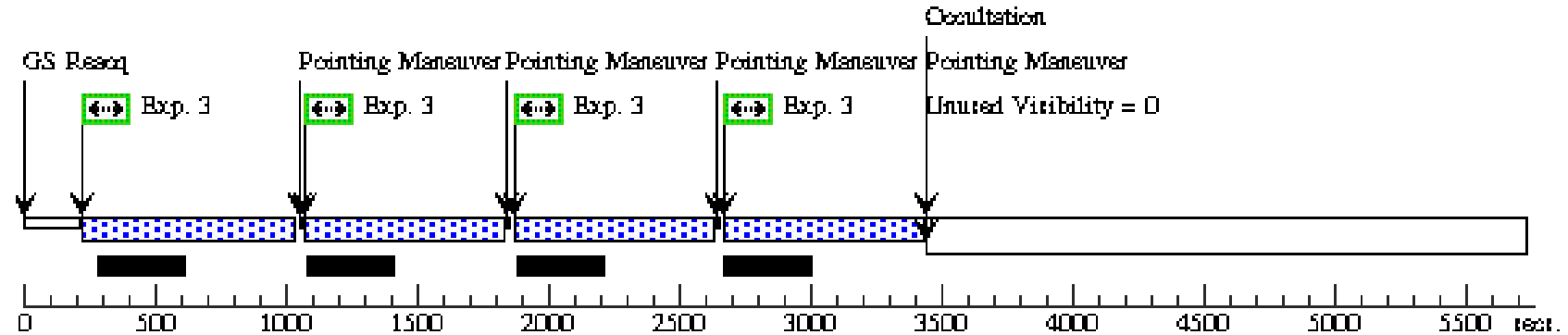
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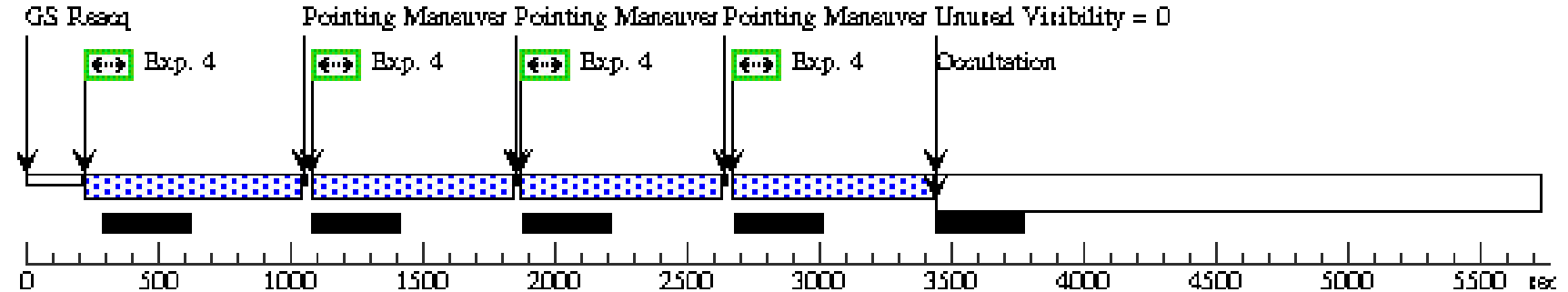
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Server Version: 20100505



Orbit 4

Server Version: 20100505

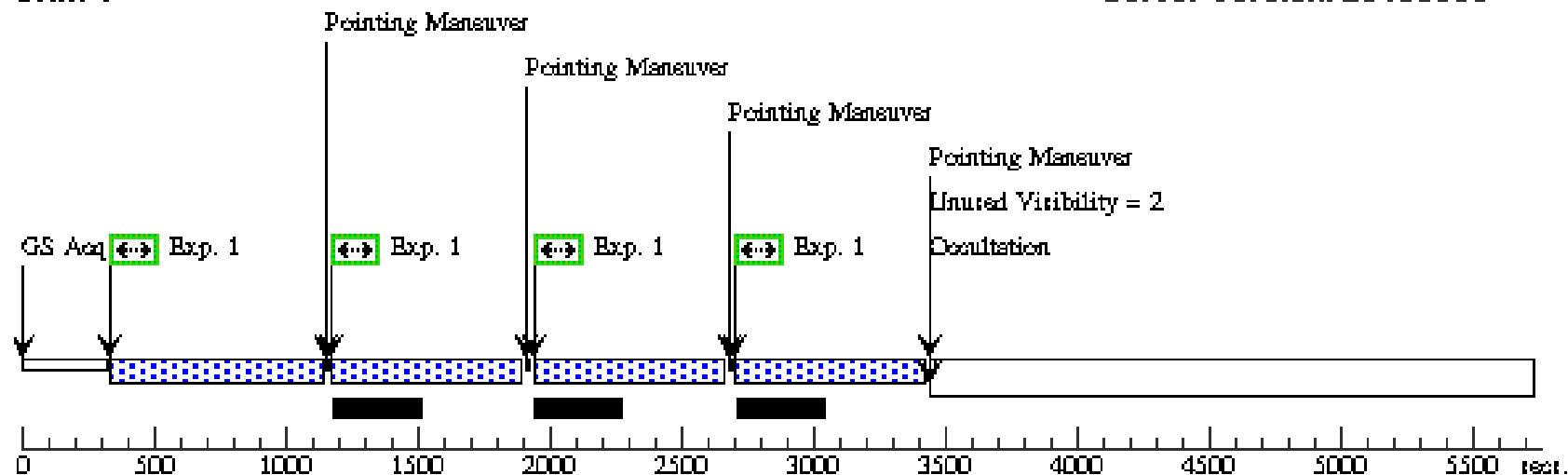


Proposal 12253 - Visit 01 - Gravity in the Crossfire: Revealing the Properties of Dark Matter in Bullet-like Clusters

Visit	Proposal 12253, Visit 02 Sat Jul 03 01:16:30 GMT 2010 Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: SAME ORIENT AS 01 Comments: A1758N pointing 2									
Patterns	#	Primary Pattern				Secondary Pattern				Exposures
	(1)	Pattern Type=ACS-WFC-DITHER- LINE Purpose=DITHER Number Of Points=2 Point Spacing=6.10486 Line Spacing=				Coordinate Frame=POS-TARG Pattern Orientation=91.16385 Angle Between Sides= Center Pattern=true Pattern Type=LINE Purpose=DITHER Number Of Points=2 Point Spacing=3.085553 Line Spacing=				(1), (2), (3), (4)
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous	
	(2)	ABELL1758N-P2	RA: 13 32 38.1076 (203.1587817d) Dec: +50 33 46.29 (50.56286d) Equinox: J2000				V=19		Reference Frame: ICRS	
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(2) ABELL1758N-P 2	ACS/WFC, ACCUM, WFC	F814W			Pattern 1, Exps 1-1 (1)	500 Secs	
									[==>601.0 Secs (Pattern 1,1)] [==>601.0 Secs (Pattern 1,2)] [==>601.0 Secs (Pattern 2,1)] [==>601.0 Secs (Pattern 2,2)]	[1]
	2		(2) ABELL1758N-P 2	ACS/WFC, ACCUM, WFC	F814W			Pattern 1, Exps 2-2 (1)	500 Secs	
									[==>649.0 Secs (Pattern 1,1)] [==>649.0 Secs (Pattern 1,2)] [==>649.0 Secs (Pattern 2,1)] [==>649.0 Secs (Pattern 2,2)]	[2]
	3		(2) ABELL1758N-P 2	ACS/WFC, ACCUM, WFC	F606W			Pattern 1, Exps 3-3 (1)	500 Secs	
									[==>636.0 Secs (Pattern 1,1)] [==>636.0 Secs (Pattern 1,2)] [==>636.0 Secs (Pattern 2,1)] [==>636.0 Secs (Pattern 2,2)]	[3]
	4		(2) ABELL1758N-P 2	ACS/WFC, ACCUM, WFC	F435W			Pattern 1, Exps 4-4 (1)	500 Secs	
									[==>634.0 Secs (Pattern 1,1)] [==>634.0 Secs (Pattern 1,2)] [==>634.0 Secs (Pattern 2,1)] [==>634.0 Secs (Pattern 2,2)]	[4]

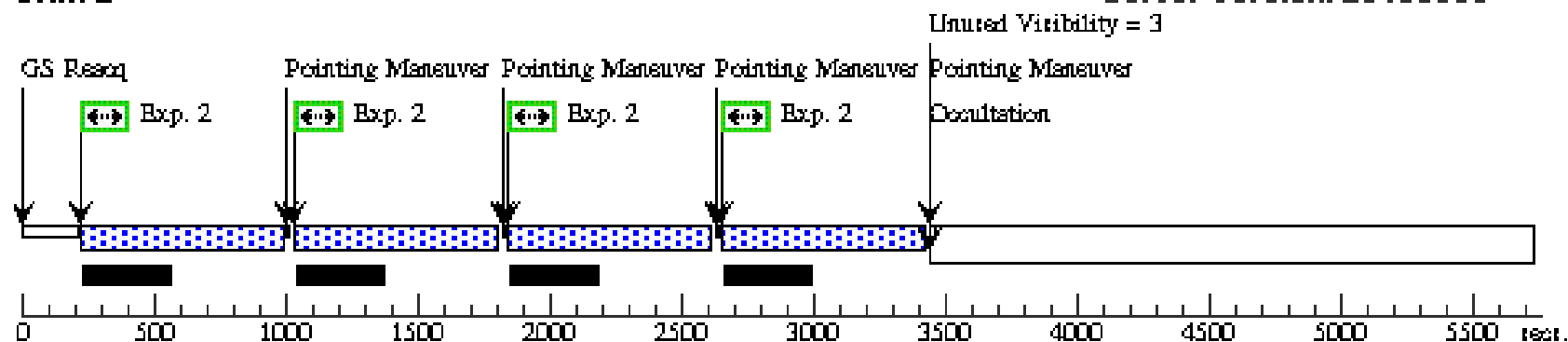
Orbit 1

Server Version: 20100505



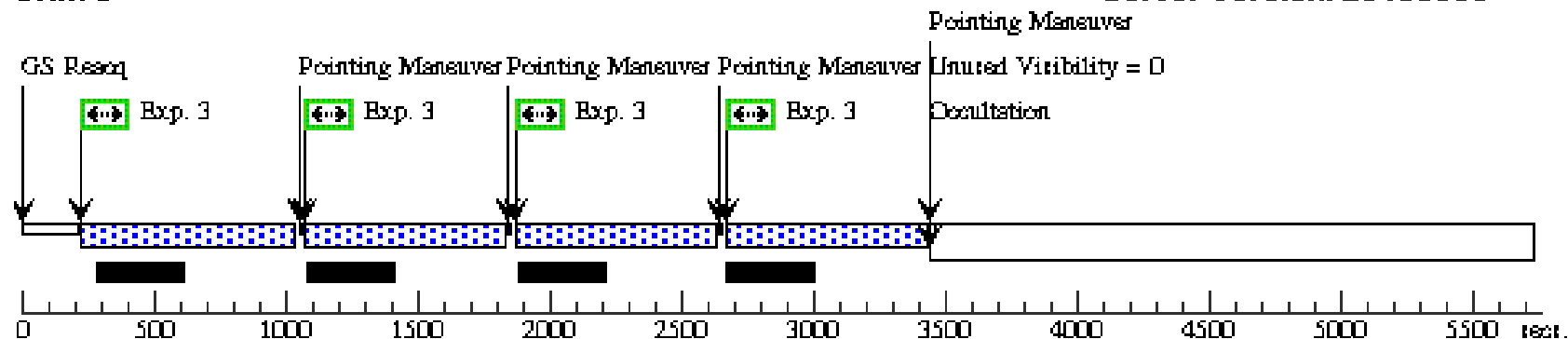
Orbit 2

Server Version: 20100505



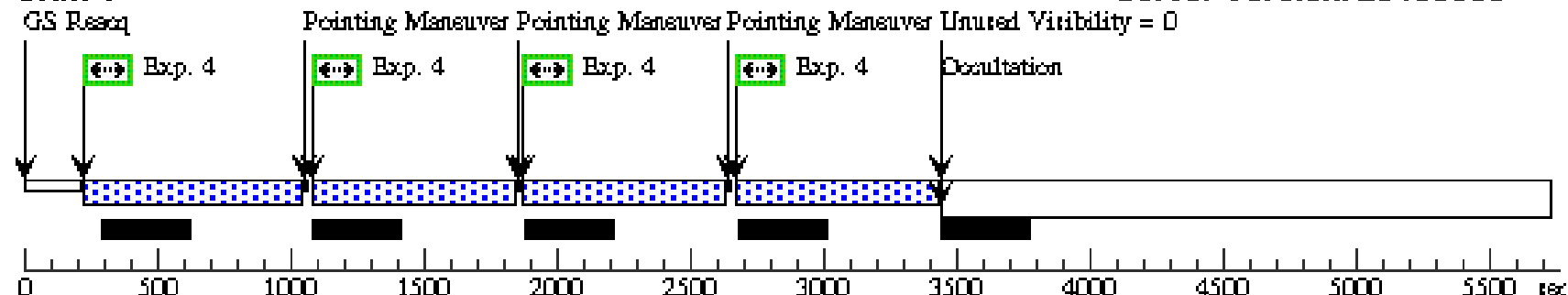
Orbit 3

Server Version: 20100505



Orbit 4

Server Version: 20100505

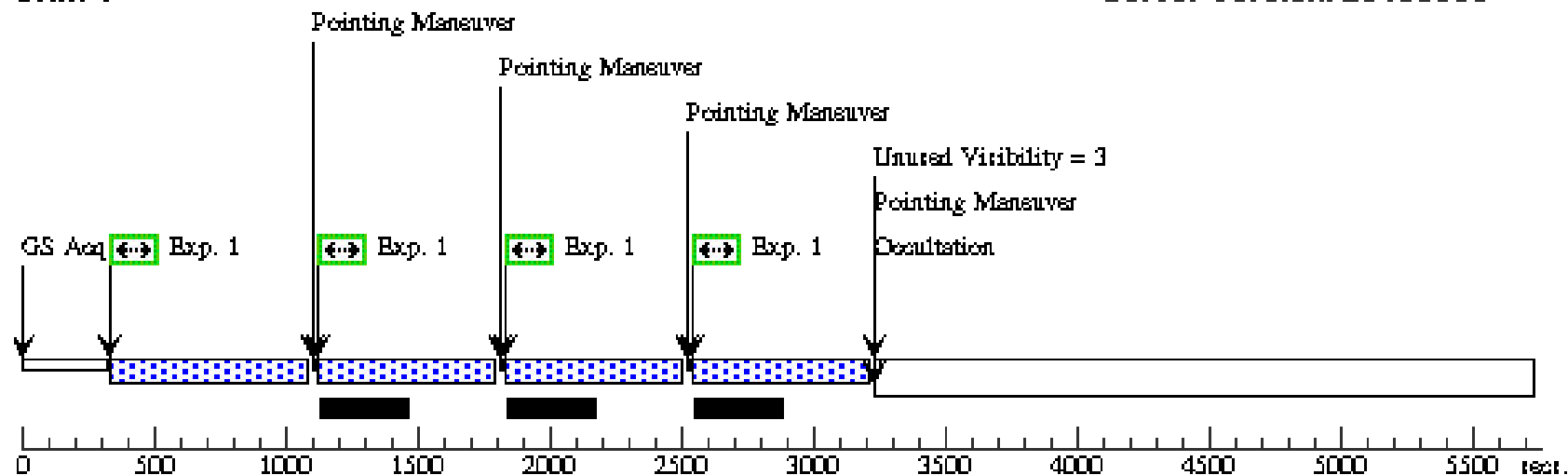


Proposal 12253 - Visit 02 - Gravity in the Crossfire: Revealing the Properties of Dark Matter in Bullet-like Clusters

Visit	Proposal 12253, Visit 03 Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: ORIENT 91D TO 96 D Comments: A520 pointing 1					Sat Jul 03 01:16:31 GMT 2010				
Patterns	#	Primary Pattern		Secondary Pattern		Exposures				
	(1)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=6.10486 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=91.16385 Angle Between Sides= Center Pattern=true	Pattern Type=LINE Purpose=DITHER Number Of Points=2 Point Spacing=3.085553 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.389987 Angle Between Sides= Center Pattern=false	(1), (2), (3), (4)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(3)	ABELL520-P1	RA: 04 54 17.5534 (73.5731392d) Dec: +02 58 0.29 (2.96675d) Equinox: J2000		V=19	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(3) ABELL520-P1	ACS/WFC, ACCUM, WFC	F814W			Pattern 1, Exps 1-1 (1)	500 Secs [==>548.0 Secs (Pattern 1,1)] [==>548.0 Secs (Pattern 1,2)] [==>548.0 Secs (Pattern 2,1)] [==>548.0 Secs (Pattern 2,2)]	[1]
	2		(3) ABELL520-P1	ACS/WFC, ACCUM, WFC	F814W			Pattern 1, Exps 2-2 (1)	500 Secs [==>597.0 Secs (Pattern 1,1)] [==>597.0 Secs (Pattern 1,2)] [==>597.0 Secs (Pattern 2,1)] [==>597.0 Secs (Pattern 2,2)]	[2]
	3		(3) ABELL520-P1	ACS/WFC, ACCUM, WFC	F606W			Pattern 1, Exps 3-3 (1)	500 Secs [==>583.0 Secs (Pattern 1,1)] [==>583.0 Secs (Pattern 1,2)] [==>583.0 Secs (Pattern 2,1)] [==>583.0 Secs (Pattern 2,2)]	[3]
	4		(3) ABELL520-P1	ACS/WFC, ACCUM, WFC	F435W			Pattern 1, Exps 4-4 (1)	500 Secs [==>581.0 Secs (Pattern 1,1)] [==>581.0 Secs (Pattern 1,2)] [==>581.0 Secs (Pattern 2,1)] [==>581.0 Secs (Pattern 2,2)]	[4]

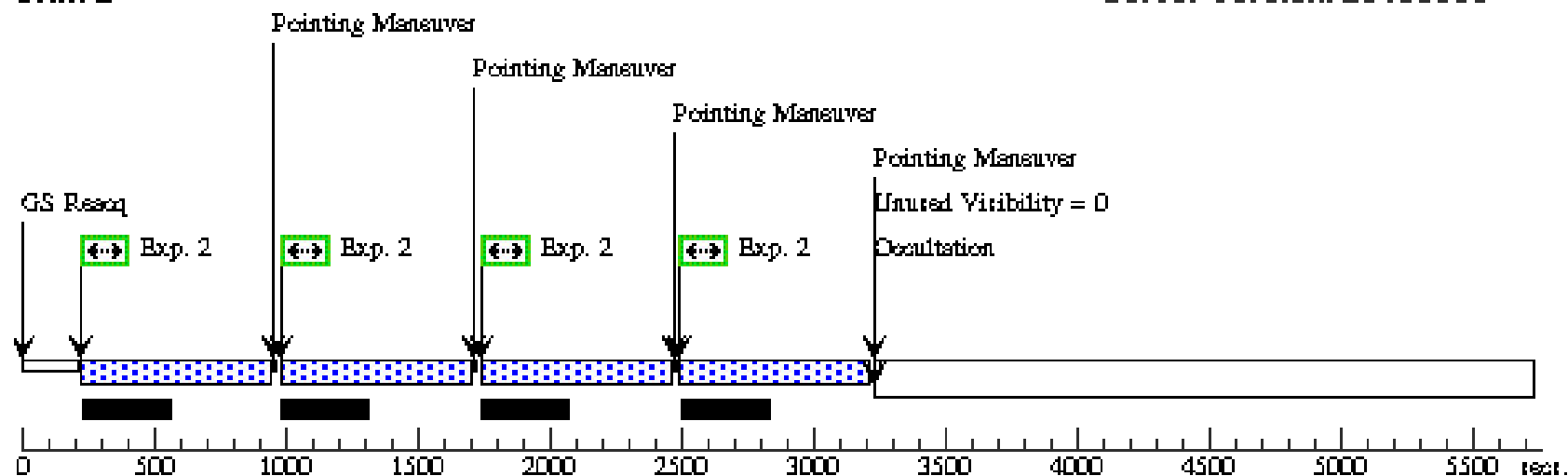
Orbit 1

Server Version: 20100505



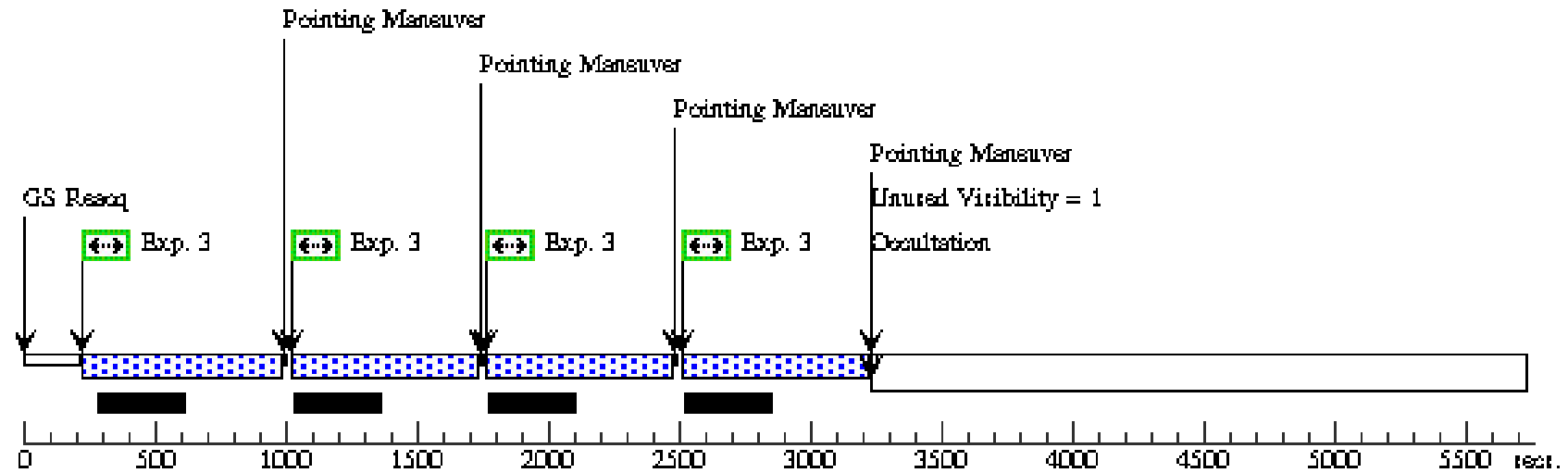
Orbit 2

Server Version: 20100505



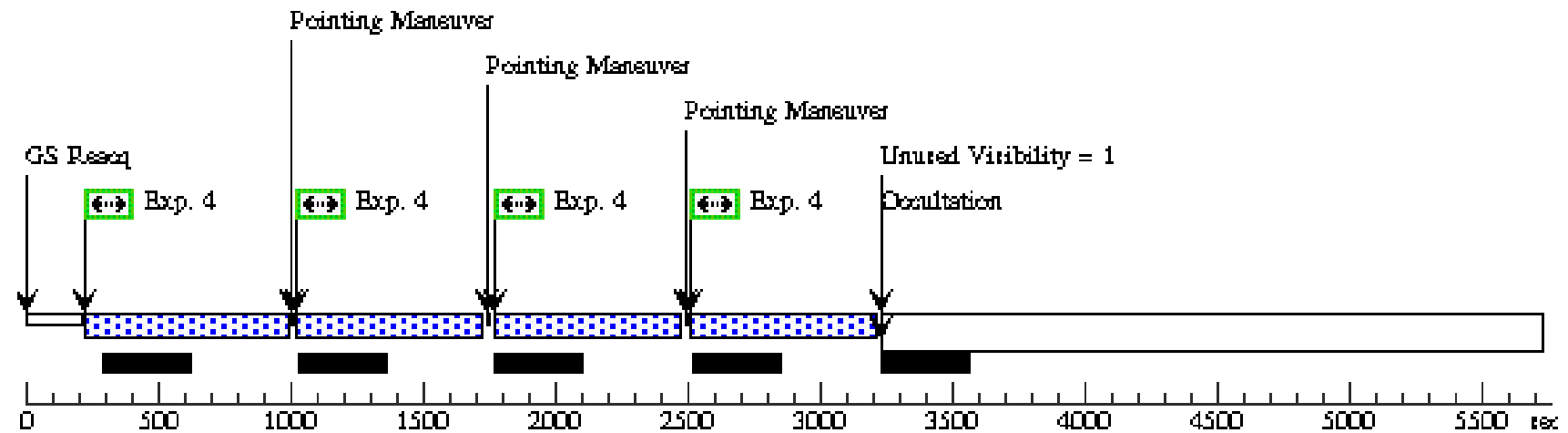
Orbit 3

Server Version: 20100505



Orbit 4

Server Version: 20100505

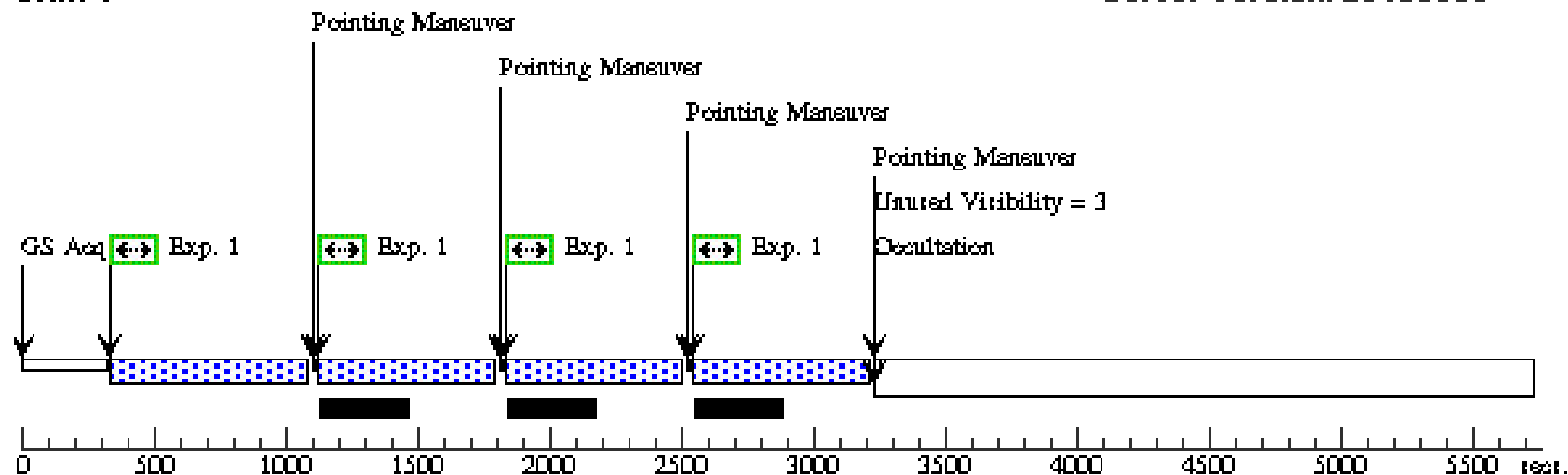


Proposal 12253 - Visit 03 - Gravity in the Crossfire: Revealing the Properties of Dark Matter in Bullet-like Clusters

Visit	Proposal 12253, Visit 04 Sat Jul 03 01:16:32 GMT 2010				
	Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: SAME ORIENT AS 03 Comments: A520 pointing 2				
Patterns	#	Primary Pattern		Secondary Pattern	
	(1)	Pattern Type=ACS-WFC-DITHER- LINE Purpose=DITHER Number Of Points=2 Point Spacing=6.10486 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=91.16385 Angle Between Sides= Center Pattern=true	Pattern Type=LINE Purpose=DITHER Number Of Points=2 Point Spacing=3.085553 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.389987 Angle Between Sides= Center Pattern=false
Fixed Targets	Exposures				
	(1), (2), (3), (4)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes
	(4)	ABELL520-P2	RA: 04 54 16.5462 (73.5689425d) Dec: +02 54 48.09 (2.91336d) Equinox: J2000		V=19
Fixed Targets	Miscellaneous				
	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.
	1	(4) ABELL520-P2	ACS/WFC, ACCUM, WFC	F814W	
Exposures	Groups				
	Pattern 1, Exps 1-1 (1)				
Exposures	Exp. Time/[Actual Dur.]				
	500 Secs				
Exposures	Orbit				
	[1]				
Exposures	2	(4) ABELL520-P2	ACS/WFC, ACCUM, WFC	F814W	
	Pattern 1, Exps 2-2 (1)				
Exposures	Exp. Time/[Actual Dur.]				
	500 Secs				
Exposures	Orbit				
	[2]				
Exposures	3	(4) ABELL520-P2	ACS/WFC, ACCUM, WFC	F606W	
	Pattern 1, Exps 3-3 (1)				
Exposures	Exp. Time/[Actual Dur.]				
	500 Secs				
Exposures	Orbit				
	[3]				
Exposures	4	(4) ABELL520-P2	ACS/WFC, ACCUM, WFC	F435W	
	Pattern 1, Exps 4-4 (1)				
Exposures	Exp. Time/[Actual Dur.]				
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Exposures	Orbit				
	[4]				

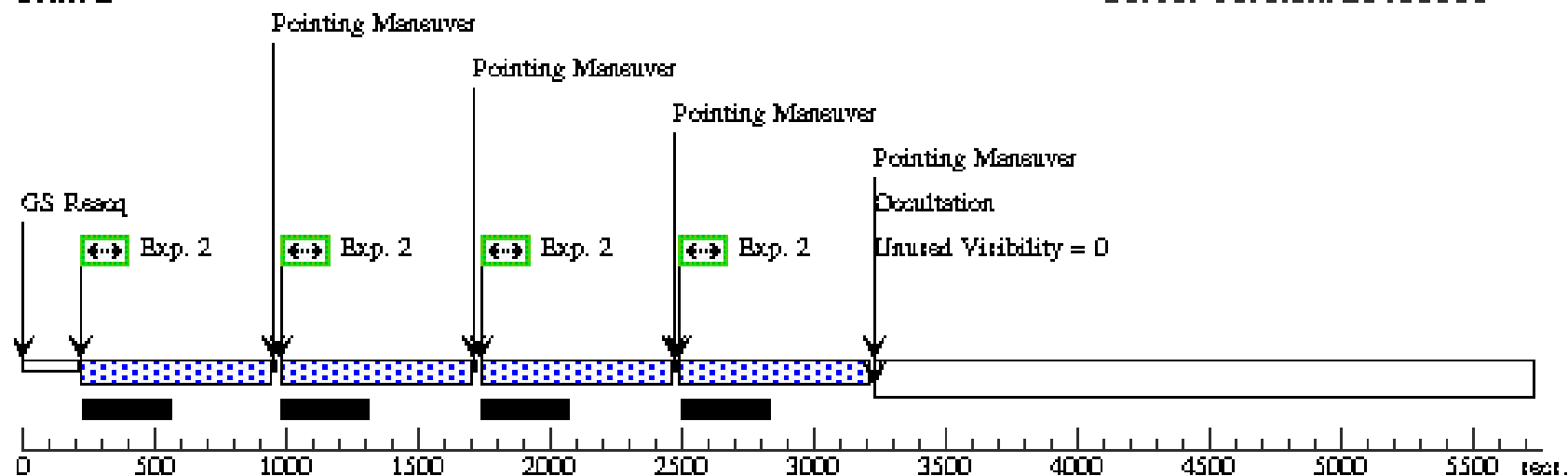
Orbit 1

Server Version: 20100505



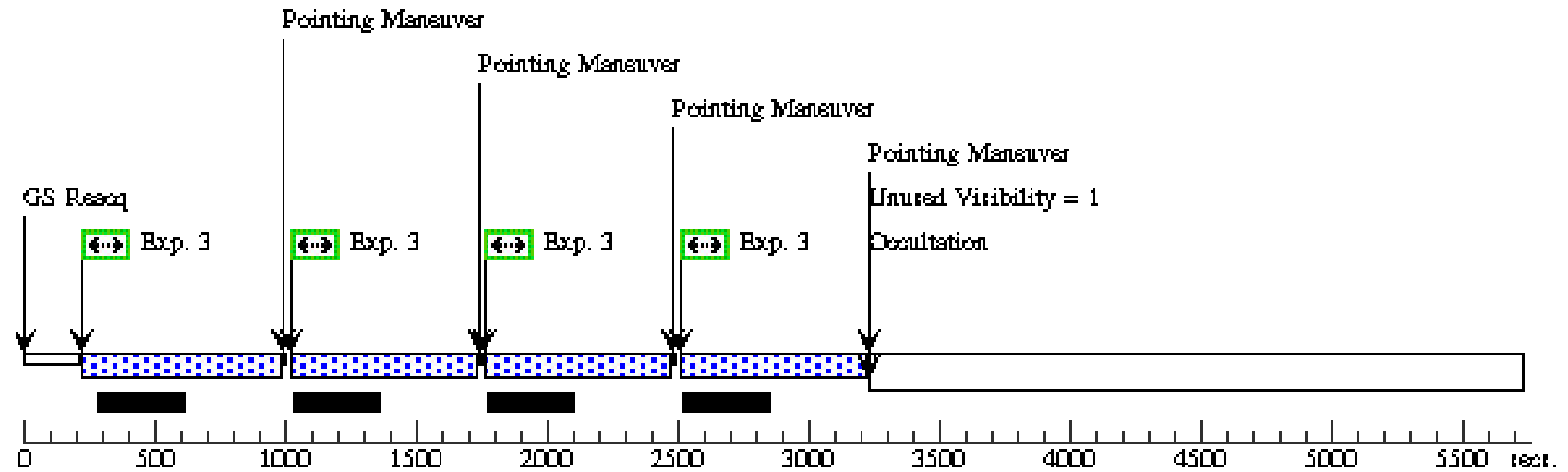
Orbit 2

Server Version: 20100505



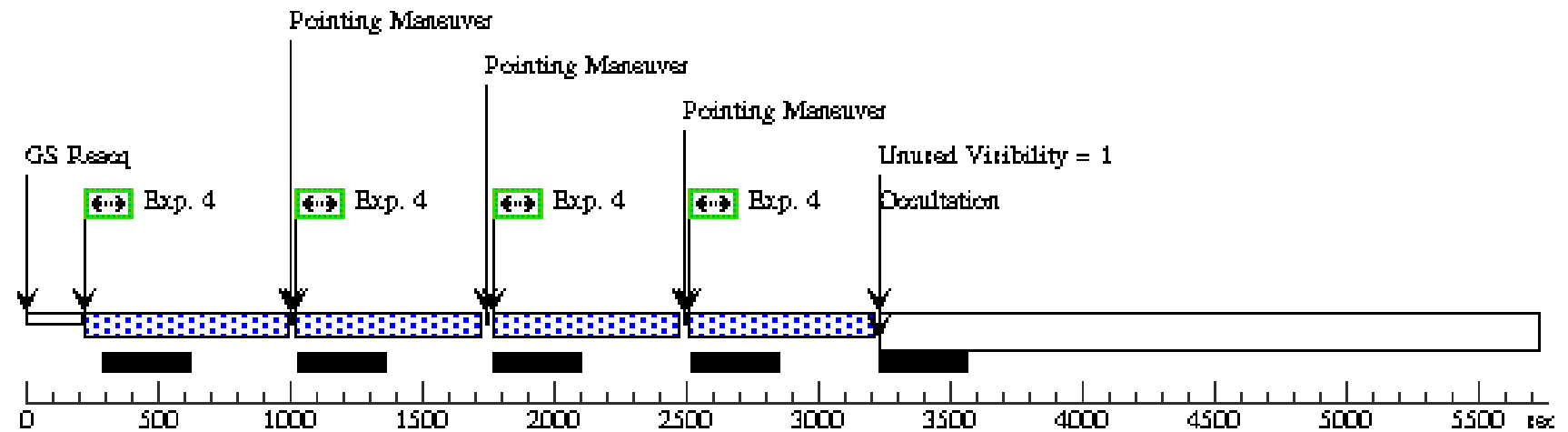
Orbit 3

Server Version: 20100505



Orbit 4

Server Version: 20100505

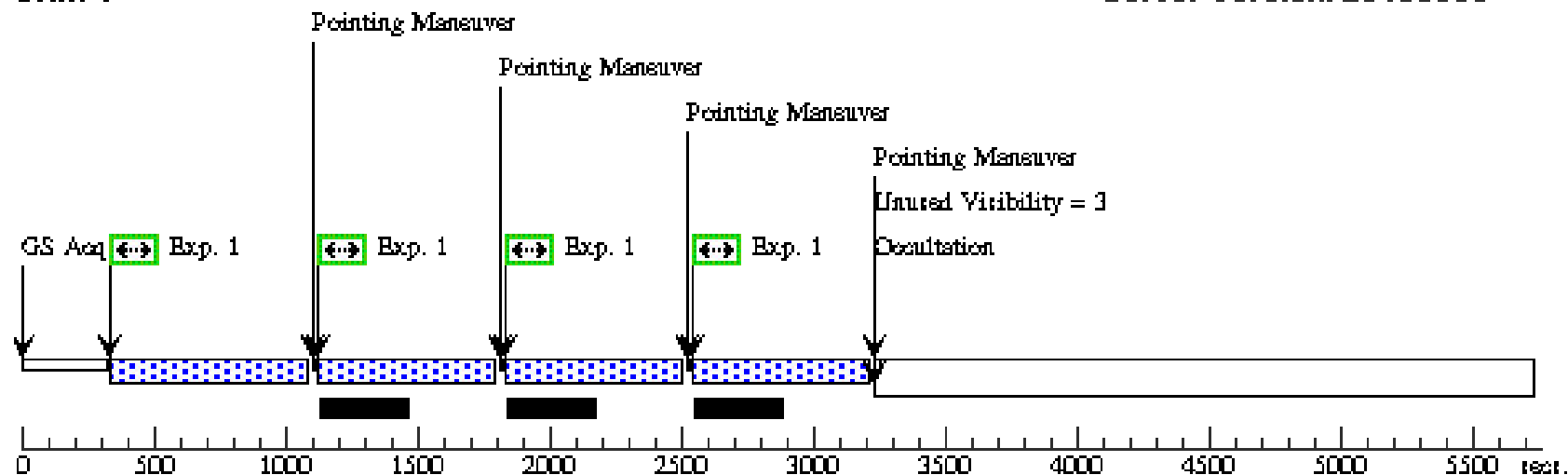


Proposal 12253 - Visit 04 - Gravity in the Crossfire: Revealing the Properties of Dark Matter in Bullet-like Clusters

Visit	Proposal 12253, Visit 05										Sat Jul 03 01:16:33 GMT 2010
	Diagnostic Status: No Diagnostics										
	Scientific Instruments: ACS/WFC										
	Special Requirements: SAME ORIENT AS 03										
	Comments: A520 pointing 3										
Patterns	#	Primary Pattern				Secondary Pattern				Exposures	
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Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(5)	ABELL520-P3	RA: 04 54 4.2652 (73.5177717d) Dec: +02 56 59.03 (2.94973d) Equinox: J2000				V=19		Reference Frame: ICRS		
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]		Orbit
	1		(5) ABELL520-P3	ACS/WFC, ACCUM, WFC	F814W			Pattern 1, Exps 1-1 (1)	500 Secs		
									[==>548.0 Secs (Pattern 1,1)]		[1]
									[==>548.0 Secs (Pattern 1,2)]		
									[==>548.0 Secs (Pattern 2,1)]		
									[==>548.0 Secs (Pattern 2,2)]		
	2		(5) ABELL520-P3	ACS/WFC, ACCUM, WFC	F814W			Pattern 1, Exps 2-2 (1)	500 Secs		
									[==>597.0 Secs (Pattern 1,1)]		[2]
									[==>597.0 Secs (Pattern 1,2)]		
									[==>597.0 Secs (Pattern 2,1)]		
									[==>597.0 Secs (Pattern 2,2)]		
	3		(5) ABELL520-P3	ACS/WFC, ACCUM, WFC	F606W				Pattern 1, Exps 3-3 (1)	500 Secs	
									[==>583.0 Secs (Pattern 1,1)]		[3]
									[==>583.0 Secs (Pattern 1,2)]		
									[==>583.0 Secs (Pattern 2,1)]		
									[==>583.0 Secs (Pattern 2,2)]		
4		(5) ABELL520-P3	ACS/WFC, ACCUM, WFC	F435W				Pattern 1, Exps 4-4 (1)	500 Secs		
									[==>581.0 Secs (Pattern 1,1)]		[4]
									[==>581.0 Secs (Pattern 1,2)]		
									[==>581.0 Secs (Pattern 2,1)]		
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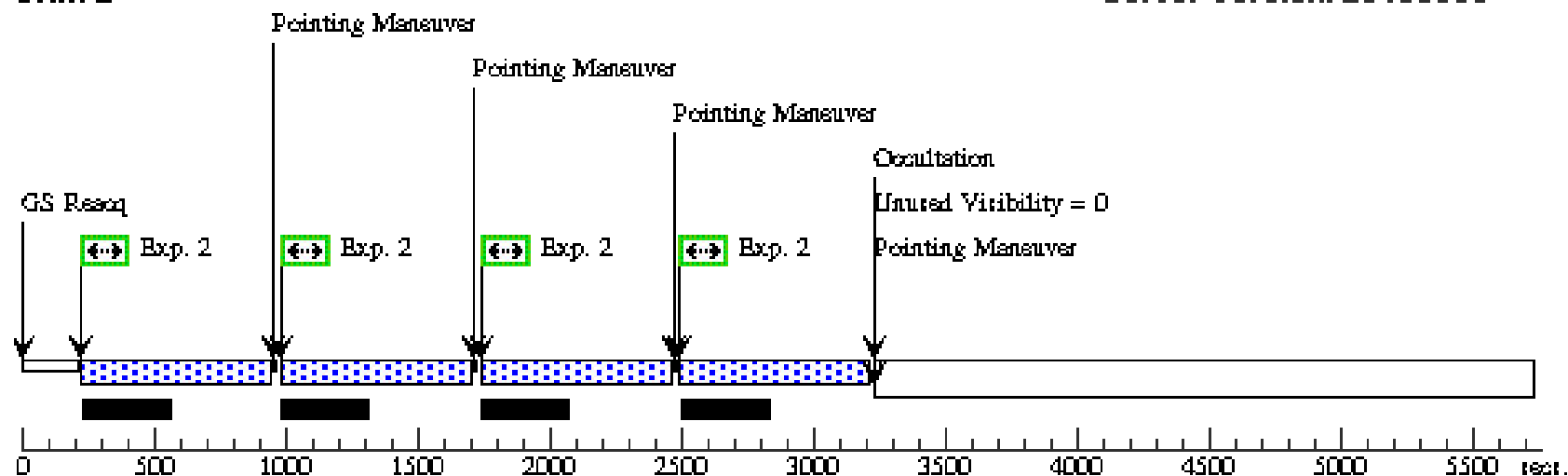
Orbit 1

Server Version: 20100505



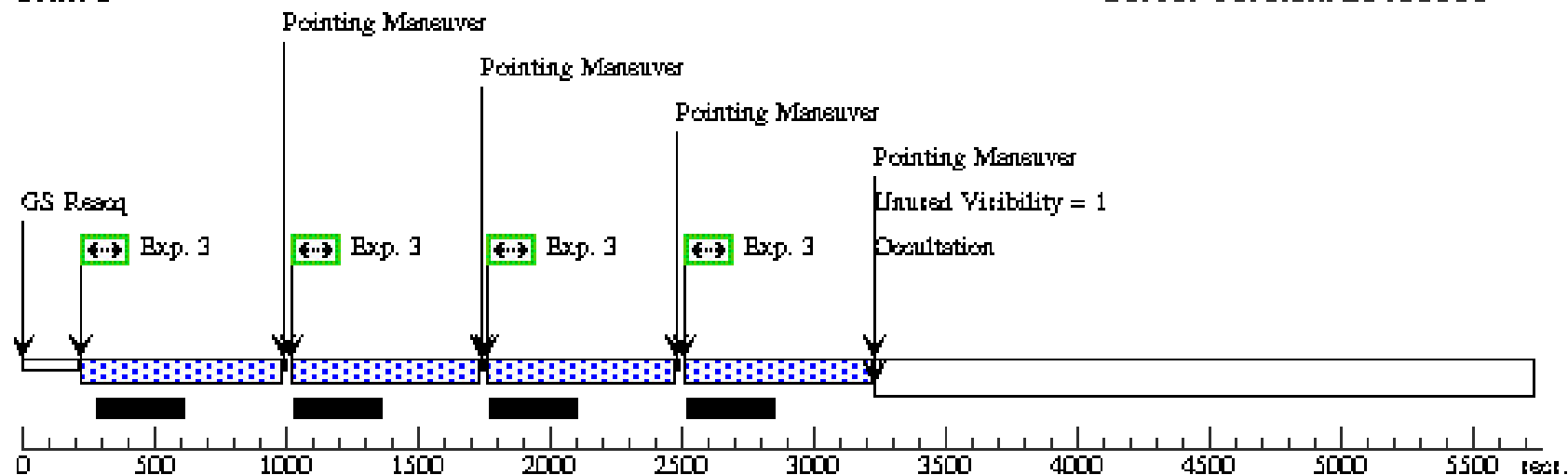
Orbit 2

Server Version: 20100505



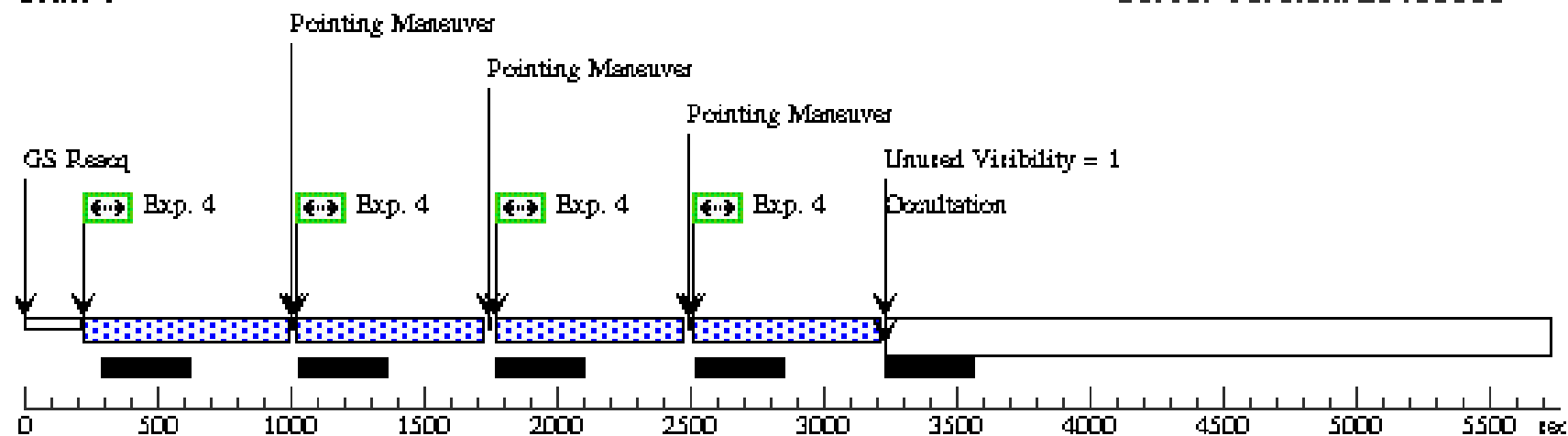
Orbit 3

Server Version: 20100505



Orbit 4

Server Version: 20100505

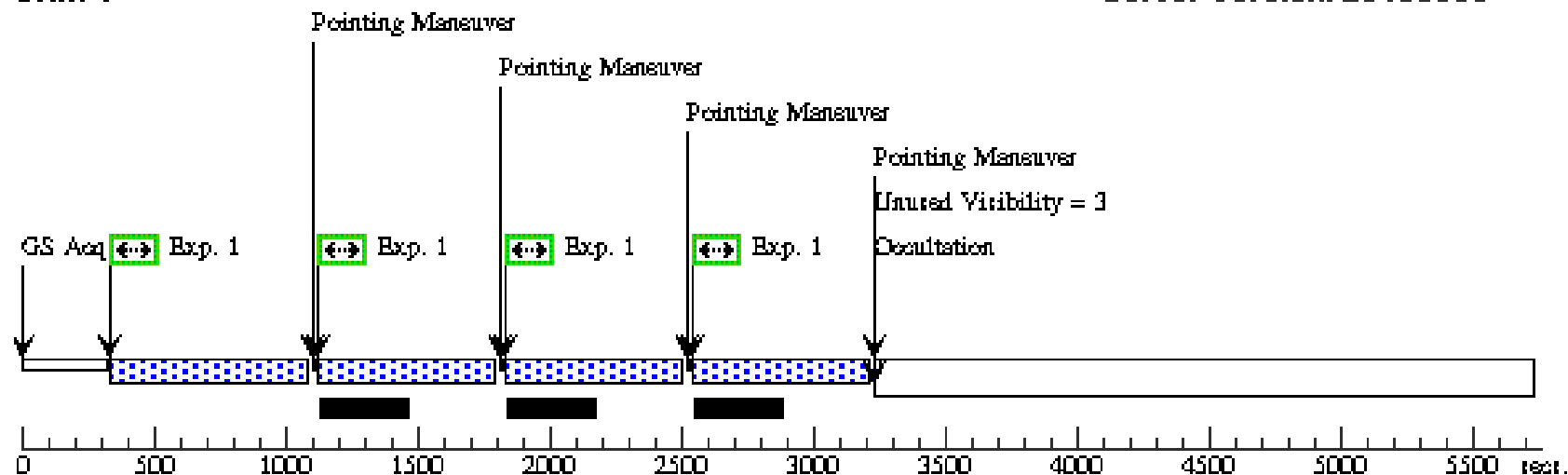


Proposal 12253 - Visit 05 - Gravity in the Crossfire: Revealing the Properties of Dark Matter in Bullet-like Clusters

Visit	Proposal 12253, Visit 06										Sat Jul 03 01:16:34 GMT 2010	
	Diagnostic Status: No Diagnostics											
	Scientific Instruments: ACS/WFC											
	Special Requirements: SAME ORIENT AS 03											
Comments: A520 pointing 4												
Patterns	#	Primary Pattern				Secondary Pattern				Exposures		
	(1)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=6.10486 Line Spacing=		Coordinate Frame=POS-TARG Pattern Orientation=91.16385 Angle Between Sides= Center Pattern=true		Pattern Type=LINE Purpose=DITHER Number Of Points=2 Point Spacing=3.085553 Line Spacing=		Coordinate Frame=POS-TARG Pattern Orientation=85.389987 Angle Between Sides= Center Pattern=false		(1), (2), (3), (4)		
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous			
	(6)	ABELL520-P4	RA: 04 54 3.1569 (73.5131538d) Dec: +02 53 45.79 (2.89605d) Equinox: J2000				V=19		Reference Frame: ICRS			
Exposures	#	Label	Target	Config,Mode,Aperture		Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]		Orbit
	1		(6) ABELL520-P4	ACS/WFC, ACCUM, WFC		F814W			Pattern 1, Exps 1-1 (1)	500 Secs		
										[==>548.0 Secs (Pattern 1,1)] [==>548.0 Secs (Pattern 1,2)] [==>548.0 Secs (Pattern 2,1)] [==>548.0 Secs (Pattern 2,2)]	[1]	
	2		(6) ABELL520-P4	ACS/WFC, ACCUM, WFC		F814W			Pattern 1, Exps 2-2 (1)	500 Secs		
										[==>597.0 Secs (Pattern 1,1)] [==>597.0 Secs (Pattern 1,2)] [==>597.0 Secs (Pattern 2,1)] [==>597.0 Secs (Pattern 2,2)]	[2]	
	3		(6) ABELL520-P4	ACS/WFC, ACCUM, WFC		F606W			Pattern 1, Exps 3-3 (1)	500 Secs		
										[==>583.0 Secs (Pattern 1,1)] [==>583.0 Secs (Pattern 1,2)] [==>583.0 Secs (Pattern 2,1)] [==>583.0 Secs (Pattern 2,2)]	[3]	
	4		(6) ABELL520-P4	ACS/WFC, ACCUM, WFC		F435W			Pattern 1, Exps 4-4 (1)	500 Secs		
									[==>581.0 Secs (Pattern 1,1)] [==>581.0 Secs (Pattern 1,2)] [==>581.0 Secs (Pattern 2,1)] [==>581.0 Secs (Pattern 2,2)]	[4]		

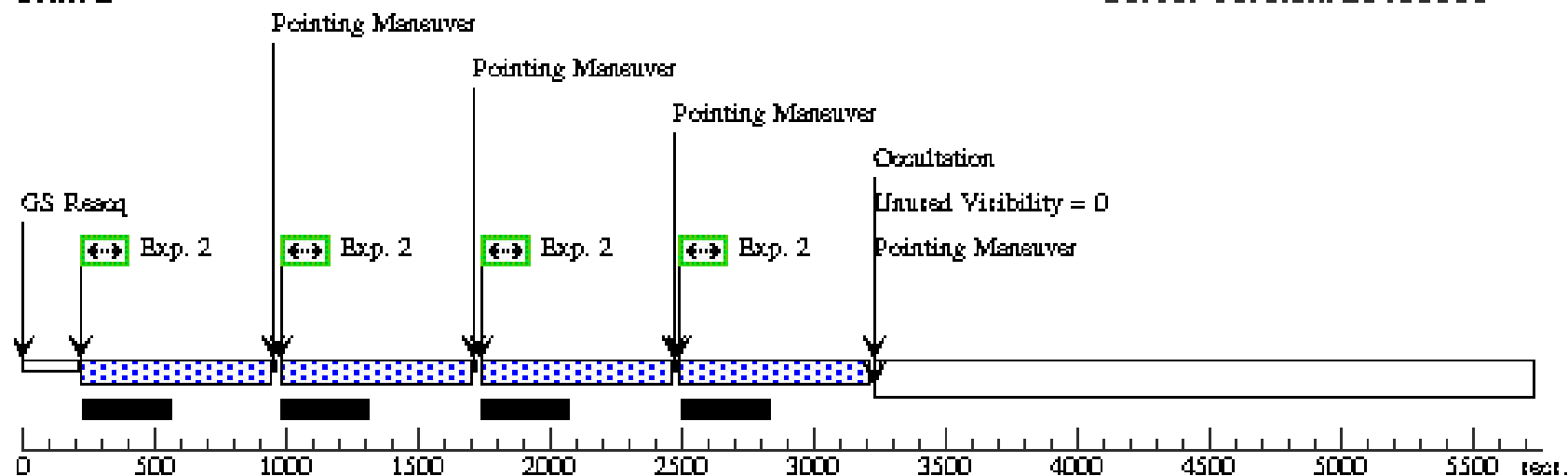
Orbit 1

Server Version: 20100505



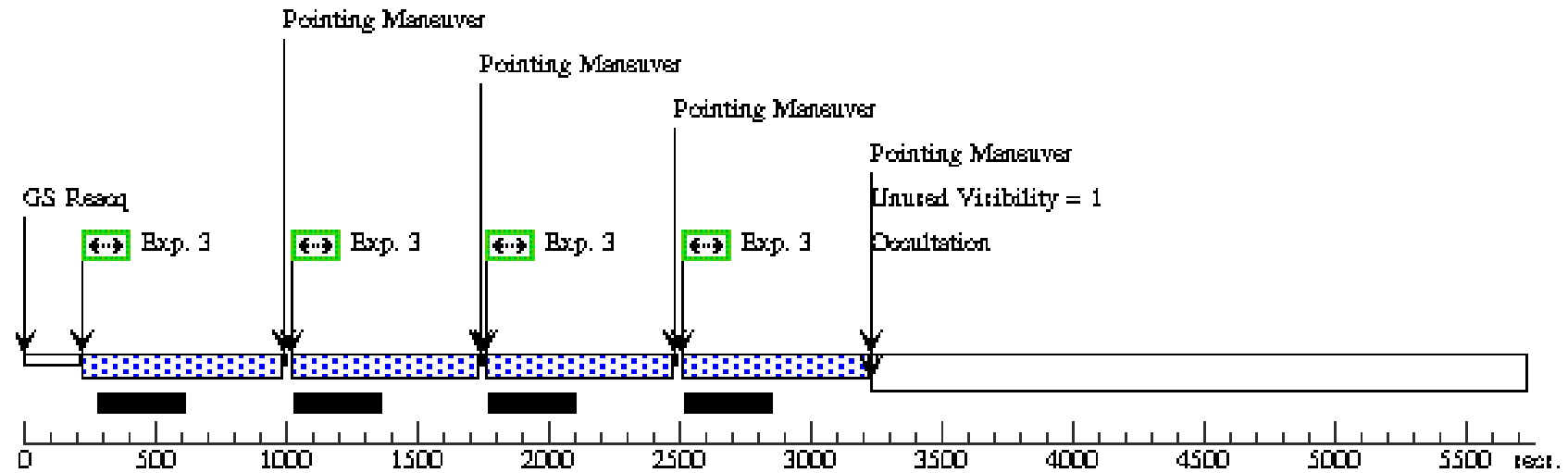
Orbit 2

Server Version: 20100505



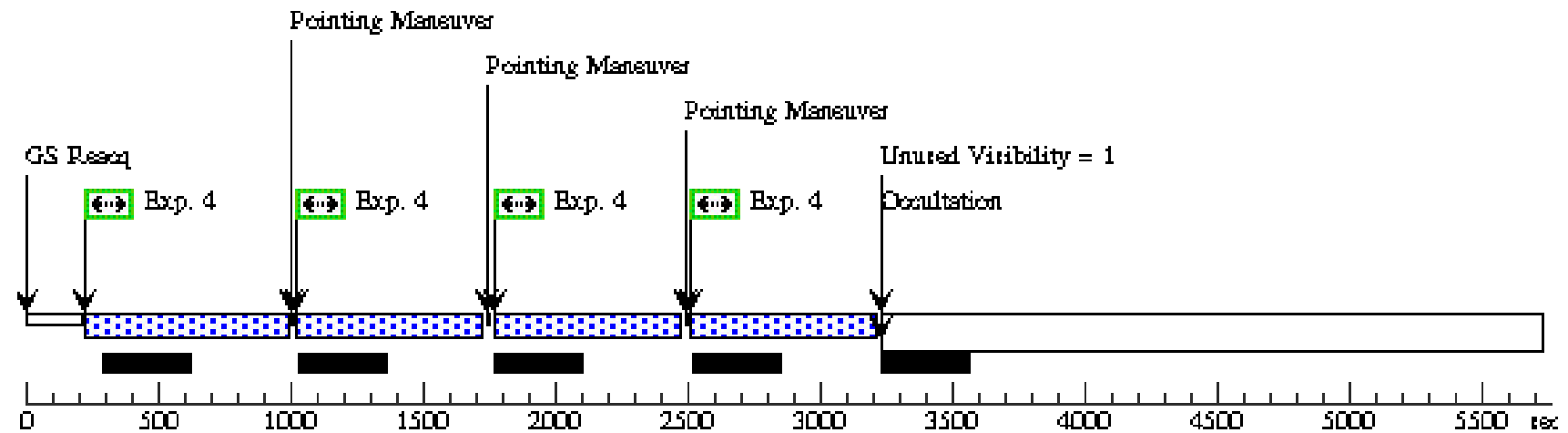
Orbit 3

Server Version: 20100505



Orbit 4

Server Version: 20100505

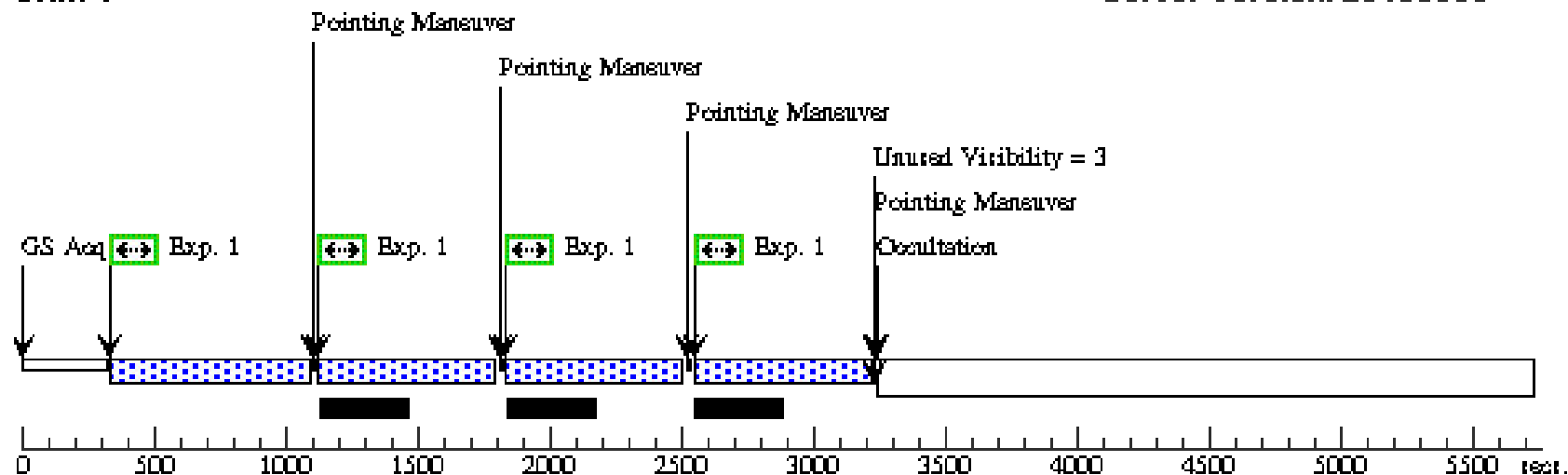


Proposal 12253 - Visit 06 - Gravity in the Crossfire: Revealing the Properties of Dark Matter in Bullet-like Clusters

Visit	Proposal 12253, Visit 07					Sat Jul 03 01:16:35 GMT 2010					
	Diagnostic Status: No Diagnostics										
	Scientific Instruments: ACS/WFC										
	Special Requirements: ORIENT 117.5D TO 122.5 D										
Comments: A2163 pointing 1											
Patterns	#	Primary Pattern				Secondary Pattern				Exposures	
	(1)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=6.10486 Line Spacing=		Coordinate Frame=POS-TARG Pattern Orientation=91.16385 Angle Between Sides= Center Pattern=true		Pattern Type=LINE Purpose=DITHER Number Of Points=2 Point Spacing=3.085553 Line Spacing=		Coordinate Frame=POS-TARG Pattern Orientation=85.389987 Angle Between Sides= Center Pattern=false		(1), (2), (3), (4)	
Fixed Targets	#	Name		Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous	
	(7)	ABELL2163-P1		RA: 16 15 41.7199 (243.9238329d) Dec: -06 10 6.94 (-6.16859d) Equinox: J2000				V=19		Reference Frame: ICRS	
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]		Orbit
	1		(7) ABELL2163-P1	ACS/WFC, ACCUM, WFC	F814W			Pattern 1, Exps 1-1 (1)	500 Secs [==>550.0 Secs (Pattern 1,1)] [==>550.0 Secs (Pattern 1,2)] [==>550.0 Secs (Pattern 2,1)] [==>550.0 Secs (Pattern 2,2)]		[1]
	2		(7) ABELL2163-P1	ACS/WFC, ACCUM, WFC	F814W			Pattern 1, Exps 2-2 (1)	500 Secs [==>599.0 Secs (Pattern 1,1)] [==>599.0 Secs (Pattern 1,2)] [==>599.0 Secs (Pattern 2,1)] [==>599.0 Secs (Pattern 2,2)]		[2]
	3		(7) ABELL2163-P1	ACS/WFC, ACCUM, WFC	F606W			Pattern 1, Exps 3-3 (1)	500 Secs [==>585.0 Secs (Pattern 1,1)] [==>585.0 Secs (Pattern 1,2)] [==>585.0 Secs (Pattern 2,1)] [==>585.0 Secs (Pattern 2,2)]		[3]
	4		(7) ABELL2163-P1	ACS/WFC, ACCUM, WFC	F435W			Pattern 1, Exps 4-4 (1)	500 Secs [==>583.0 Secs (Pattern 1,1)] [==>583.0 Secs (Pattern 1,2)] [==>583.0 Secs (Pattern 2,1)] [==>583.0 Secs (Pattern 2,2)]		[4]

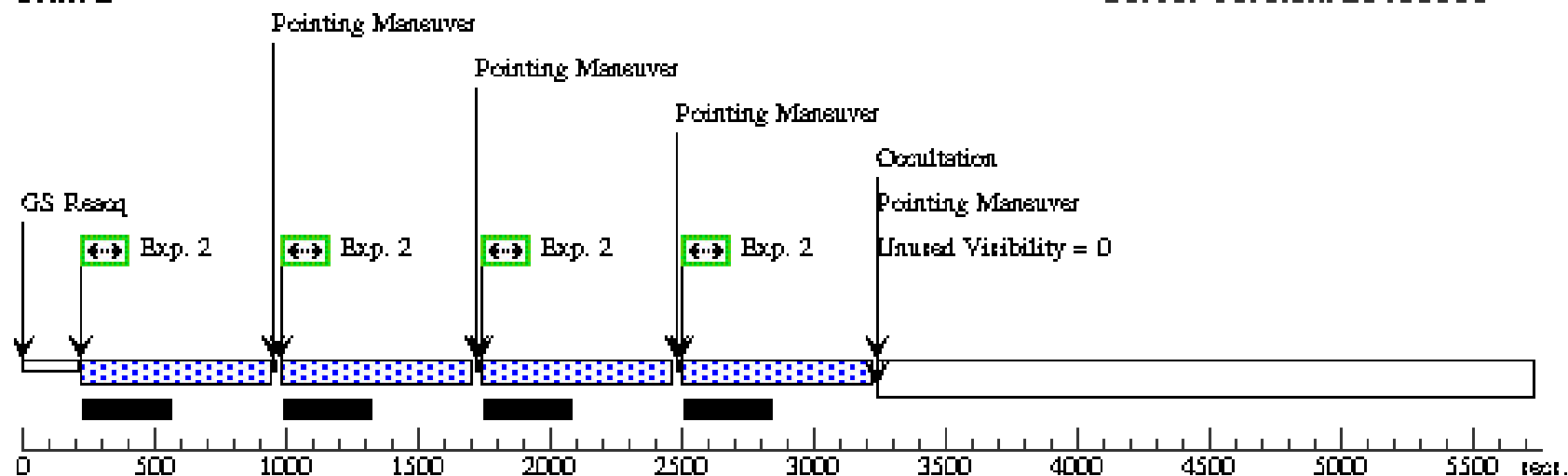
Orbit 1

Server Version: 20100505



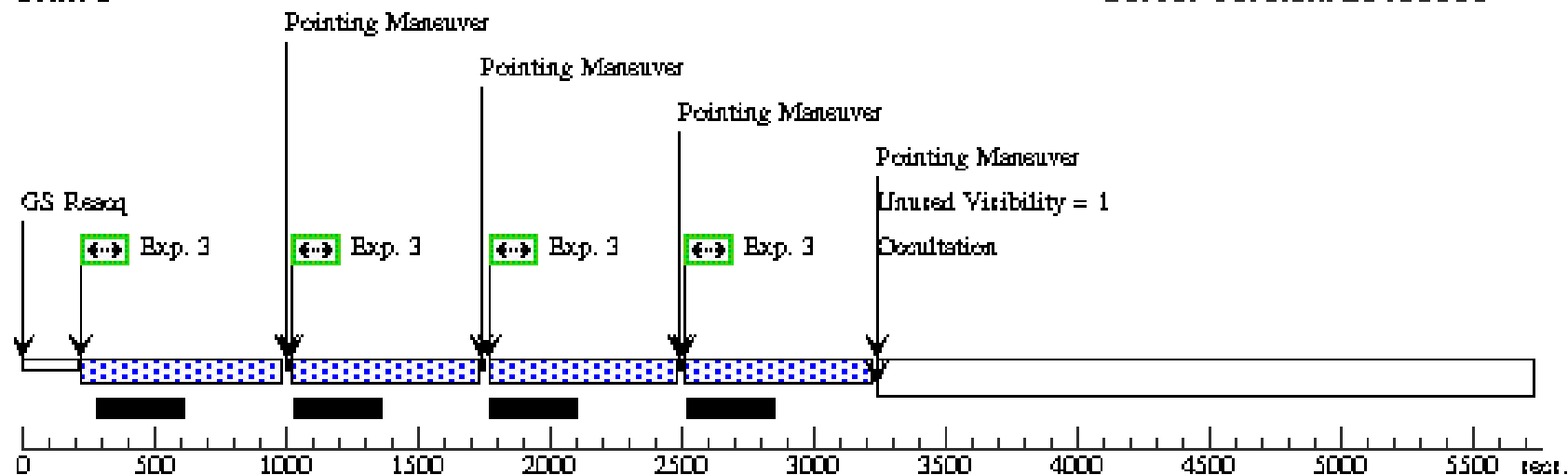
Orbit 2

Server Version: 20100505



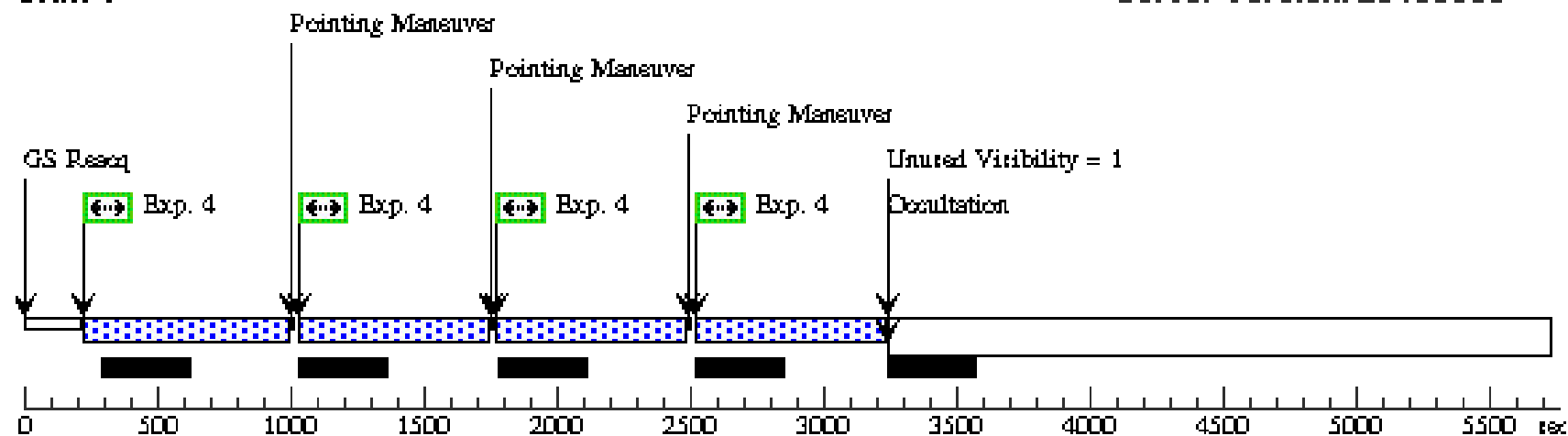
Orbit 3

Server Version: 20100505



Orbit 4

Server Version: 20100505

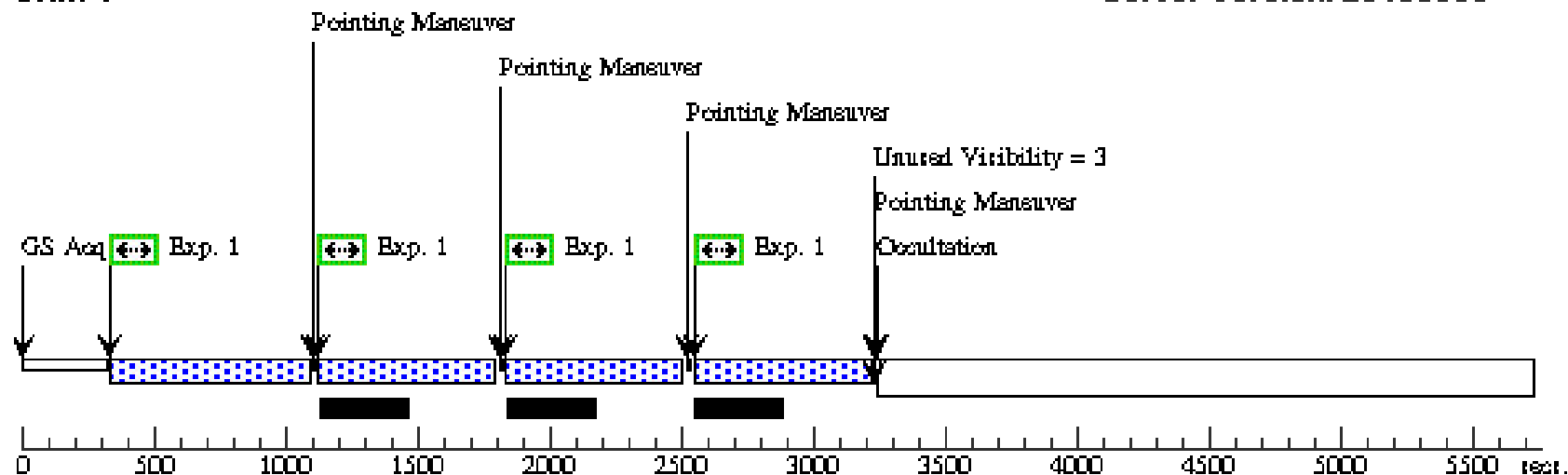


Proposal 12253 - Visit 07 - Gravity in the Crossfire: Revealing the Properties of Dark Matter in Bullet-like Clusters

Visit	Proposal 12253, Visit 08 Sat Jul 03 01:16:35 GMT 2010 Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: SAME ORIENT AS 07 Comments: A2163 pointing 2									
Patterns	#	Primary Pattern				Secondary Pattern				Exposures
	(1)	Pattern Type=ACS-WFC-DITHER- LINE Purpose=DITHER Number Of Points=2 Point Spacing=6.10486 Line Spacing=				Coordinate Frame=POS-TARG Pattern Orientation=91.16385 Angle Between Sides= Center Pattern=true Pattern Type=LINE Purpose=DITHER Number Of Points=2 Point Spacing=3.085553 Line Spacing=				(1), (2), (3), (4)
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous	
	(8)	ABELL2163-P2	RA: 16 15 50.1331 (243.9588879d) Dec: -06 07 41.23 (-6.12812d) Equinox: J2000				V=19		Reference Frame: ICRS	
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(8) ABELL2163-P2	ACS/WFC, ACCUM, WFC	F814W			Pattern 1, Exps 1-1 (1)	500 Secs	
									[==>550.0 Secs (Pattern 1,1)]	
									[==>550.0 Secs (Pattern 1,2)]	
									[==>550.0 Secs (Pattern 2,1)]	
									[==>550.0 Secs (Pattern 2,2)]	[1]
	2		(8) ABELL2163-P2	ACS/WFC, ACCUM, WFC	F814W			Pattern 1, Exps 2-2 (1)	500 Secs	
									[==>599.0 Secs (Pattern 1,1)]	
									[==>599.0 Secs (Pattern 1,2)]	
									[==>599.0 Secs (Pattern 2,1)]	
									[==>599.0 Secs (Pattern 2,2)]	[2]
	3		(8) ABELL2163-P2	ACS/WFC, ACCUM, WFC	F606W			Pattern 1, Exps 3-3 (1)	500 Secs	
									[==>585.0 Secs (Pattern 1,1)]	
									[==>585.0 Secs (Pattern 1,2)]	
									[==>585.0 Secs (Pattern 2,1)]	
									[==>585.0 Secs (Pattern 2,2)]	[3]
	4		(8) ABELL2163-P2	ACS/WFC, ACCUM, WFC	F435W			Pattern 1, Exps 4-4 (1)	500 Secs	
									[==>583.0 Secs (Pattern 1,1)]	
									[==>583.0 Secs (Pattern 1,2)]	
									[==>583.0 Secs (Pattern 2,1)]	
									[==>583.0 Secs (Pattern 2,2)]	[4]

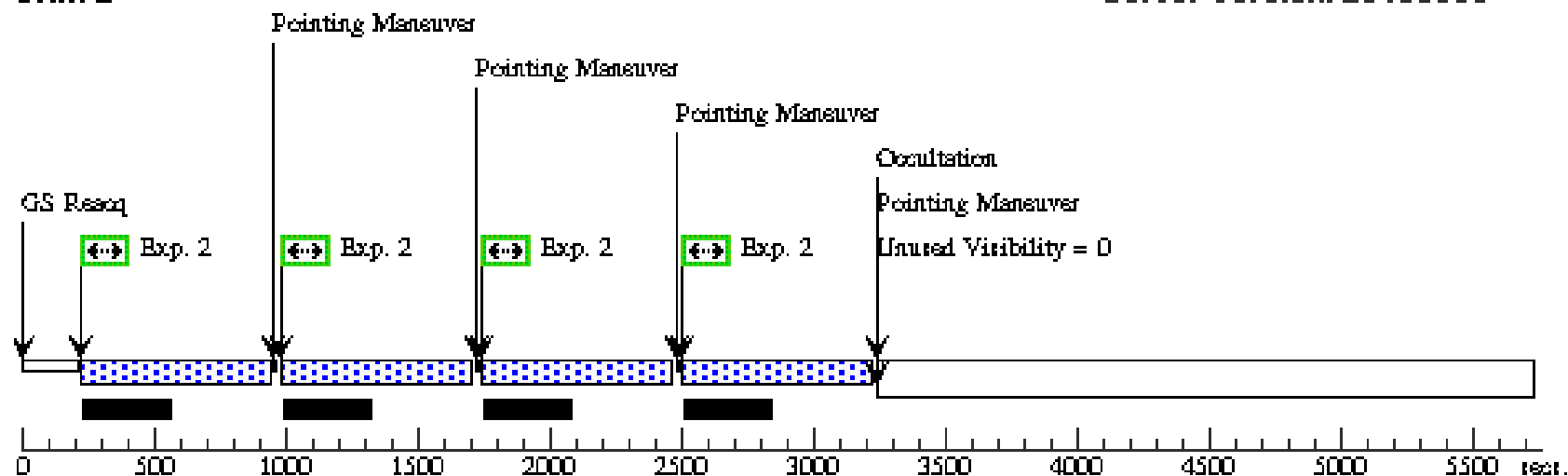
Orbit 1

Server Version: 20100505



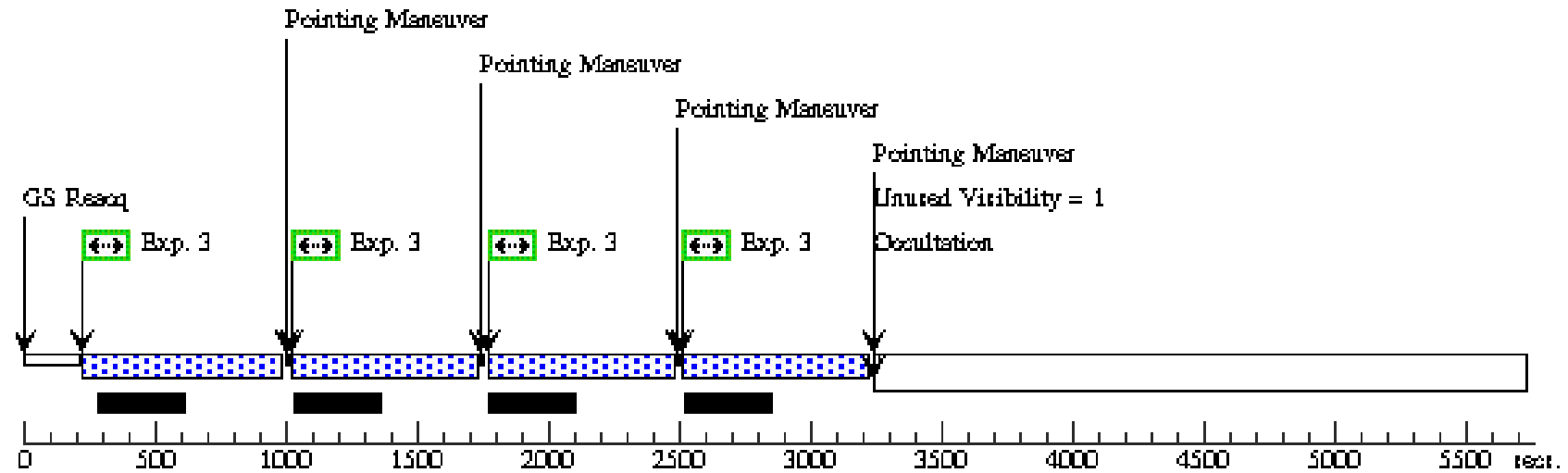
Orbit 2

Server Version: 20100505



Orbit 3

Server Version: 20100505



Orbit 4

Server Version: 20100505

