



12323 - Stretching the diversity of cosmic explosions: The supernovae of gamma-ray bursts

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>
FA	(1) GRB100316D	WFC3/UVIS	2	16-Sep-2010 21:35:25.0	yes
FB	(1) GRB100316D	WFC3/IR	1	16-Sep-2010 21:35:33.0	yes
FC	(1) GRB100316D	WFC3/UVIS	1	16-Sep-2010 21:35:38.0	yes

<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>
FD	(1) GRB100316D	ACS/WFC WFC3/UVIS	2	16-Sep-2010 21:35:46.0	yes
FE	(1) GRB100316D	WFC3/UVIS	1	16-Sep-2010 21:35:50.0	yes
FF	(1) GRB100316D	WFC3/UVIS	1	16-Sep-2010 21:35:54.0	yes

8 Total Orbits Used

ABSTRACT

While the association between gamma-ray bursts (GRBs) and massive stars is robust, there is a large diversity of properties among supernovae (SNe) associated with GRBs. The converse is also true: Several recent events show that there is a large brightness range among high energy transients associated with SNe. As part of a comprehensive program, we propose to use HST in order to search for and characterize the SNe associated with GRB.

HST offers the means to cleanly separate the light curve of the GRB afterglow from the supernova, and to remove the contamination from the host galaxy, opening a clear path to the fundamental parameters of the SN, and thence to the progenitor. From these observations, we will determine the absolute magnitude at maximum, the shape of the spectral energy distribution, and any change over time of the energy distribution. We will also measure the rate of decay of the exponential tail.

Merged with the ground-based data that we will obtain for each event, we will be able to compare our data set to models and constrain the energy of the explosion, the mass of the ejecta and the mass of Nickel synthesized during the explosion. These results will shed light on the apparent variety of supernovae associated with gamma-ray bursts and X-ray flashes, and on the relation between these SNe and other, more common, types of core-collapse explosions.

OBSERVING DESCRIPTION

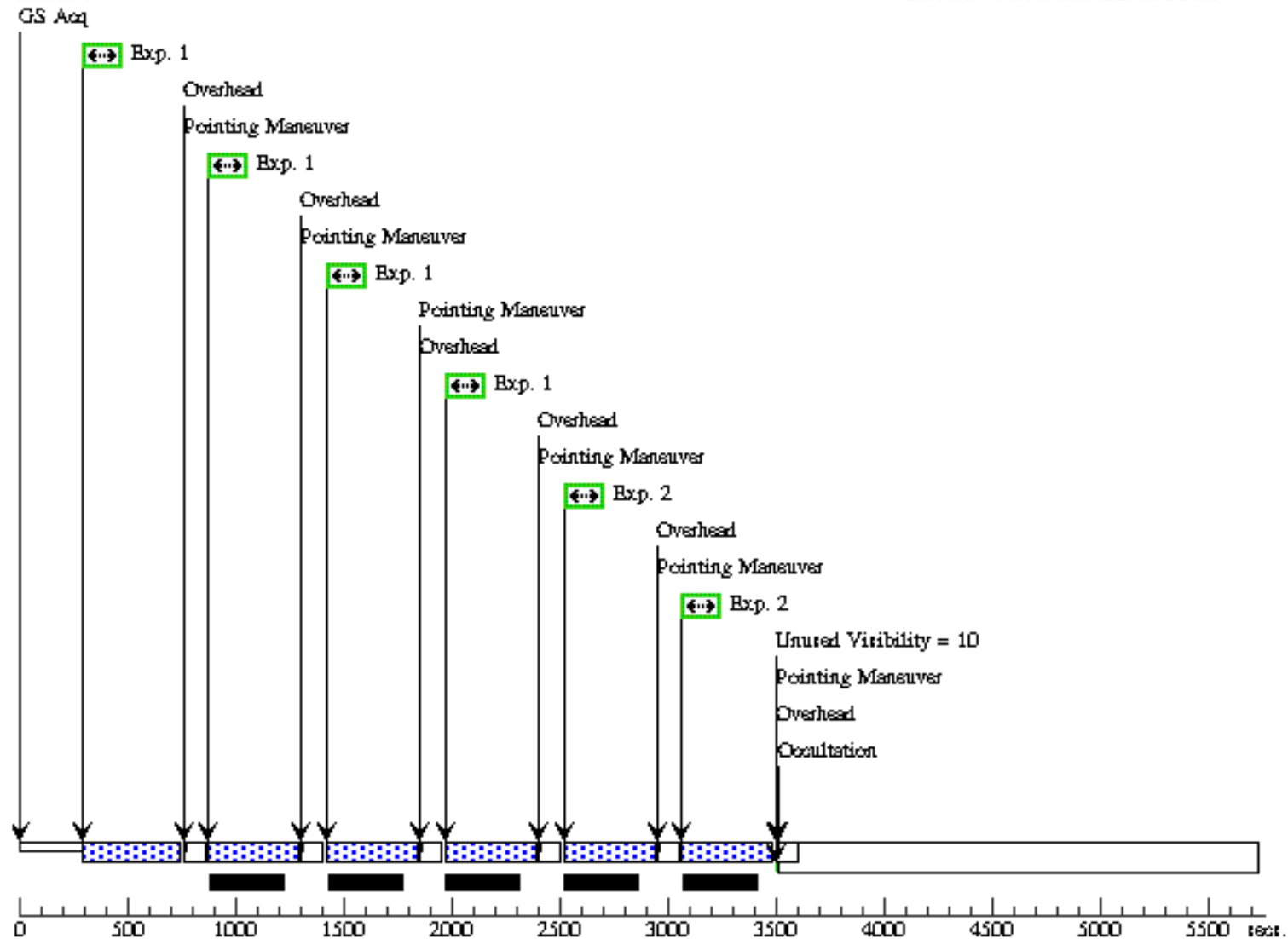
In cycle 17 we observed a supernova associated with a gamma-ray burst. The orbits cycle 18 are used to characterise the host galaxy, via multi-wavelength imaging. These images will be used as templates for accurate subtraction of the host galaxy flux, thus providing a clean light curve for the supernova.

Proposal 12323 (STScI Edit Number: 0, Created: Thursday, September 16, 2010 8:35:57 PM EST) - Overview

Visit	Proposal 12323, Visit FA, implementation					Fri Sep 17 01:35:58 GMT 2010					
	Diagnostic Status: No Diagnostics										
	Scientific Instruments: WFC3/UVIS										
	Special Requirements: ORIENT 5D TO 60 D; ORIENT 95D TO 150 D; ORIENT 185D TO 240 D; ORIENT 275D TO 330 D; AFTER 30-APR-2011:00:00:00; GROUP FA,FB WITHIN 30D										
Comments: Last observations of GRB 100316D = SN 2010bh. This is for the host galaxy., filters F336W and F555W											
Patterns	#	Primary Pattern				Secondary Pattern				Exposures	
	(7)	Pattern Type=WFC3-UVIS-DITHER-BOX Coordinate Frame=POS-TARG Pattern Orientation=23.884 Purpose=DITHER Angle Between Sides=81.785 Number Of Points=4 Center Pattern=false Point Spacing=0.173 Line Spacing=0.112								(1), (2), (3)	
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(1)	GRB100316D	RA: 07 10 30.7700 (107.6282083d) Dec: -56 15 20.70 (-56.25575d) Equinox: J2000				V=22+/-2		Reference Frame: ICRS		
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]		Orbit
	1	WFC3/F336 W/6	(1) GRB100316D	WFC3/UVIS, ACCUM, UVIS1	F336W			Pattern 7, Exps 1-1 (7)	420 Secs		
									[==>(Pattern 1)]		
									[==>(Pattern 2)]		
									[==>(Pattern 3)]		
									[==>(Pattern 4)]		[1]
	2	WFC3/F336 W/6	(1) GRB100316D	WFC3/UVIS, ACCUM, UVIS1	F336W			Pattern 7, Exps 2-2 (7)	420 Secs		
									[==>(Pattern 1)]		
									[==>(Pattern 2)]		[1]
									[==>(Pattern 3)]		
									[==>(Pattern 4)]		[2]
	3	WFC3/F555 W/6	(1) GRB100316D	WFC3/UVIS, ACCUM, UVIS1	F555W			Pattern 7, Exps 3-3 (7)	420 Secs		
									[==>(Pattern 1)]		
									[==>(Pattern 2)]		
									[==>(Pattern 3)]		
									[==>(Pattern 4)]		[2]

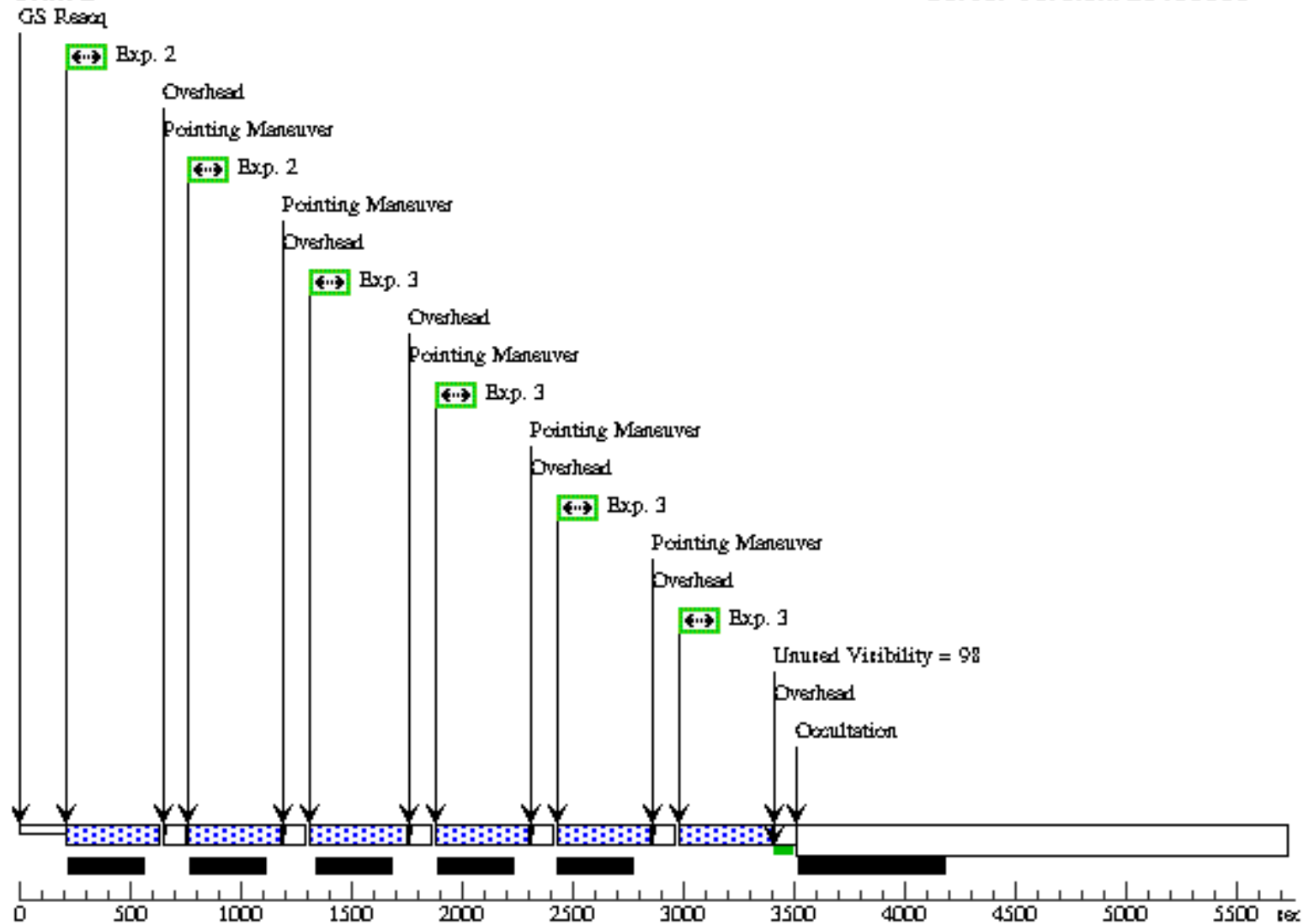
Orbit 1

Server Version: 20100505



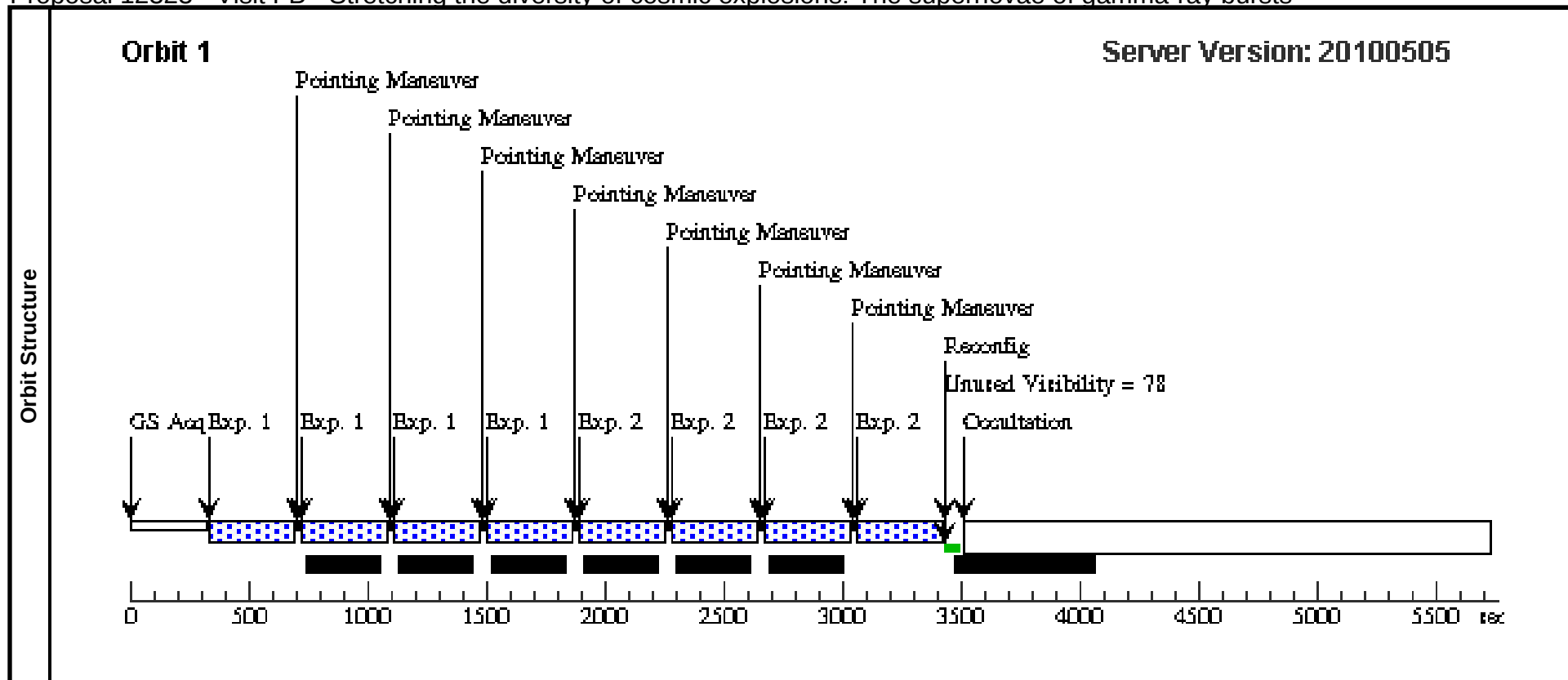
Orbit 2

Server Version: 20100505



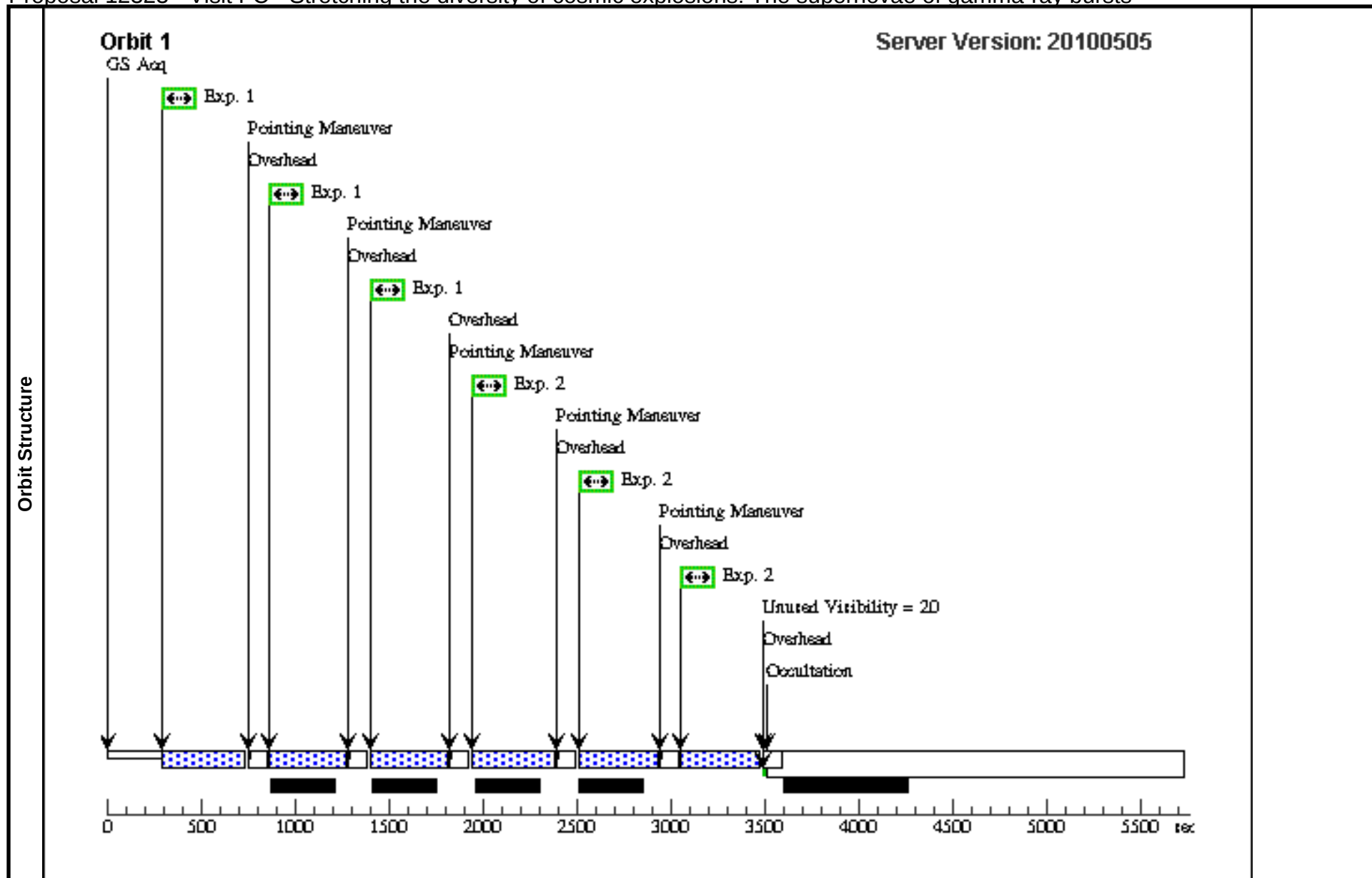
Proposal 12323 - Visit FA - Stretching the diversity of cosmic explosions: The supernovae of gamma-ray bursts

Visit	Proposal 12323, Visit FB, implementation Fri Sep 17 01:35:59 GMT 2010									
	Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR Special Requirements: ORIENT 5D TO 60 D; ORIENT 95D TO 150 D; ORIENT 185D TO 240 D; ORIENT 275D TO 330 D; AFTER 30-APR-2011:00:00:00; GROUP FB,FA WITHIN 30D <i>Comments: Last observations of GRB 100316D = SN 2010bh. This is for the host galaxy, IR filters F125W+F160W</i>									
Patterns	#	Primary Pattern				Secondary Pattern			Exposures	
	(5)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365				Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false			(1), (2)	
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous	
	(1)	GRB100316D	RA: 07 10 30.7700 (107.6282083d) Dec: -56 15 20.70 (-56.25575d) Equinox: J2000				V=22+/-2		Reference Frame: ICRS	
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	WFC3/F125 W/6	(1) GRB100316D	WFC3/IR, MULTIACCUM, IR	F125W	NSAMP=14; SAMP-SEQ=SPAR S25		Pattern 5, Exps 1-1 (5)	[=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1]
	2	WFC3/F160 W/6	(1) GRB100316D	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=14; SAMP-SEQ=SPAR S25		Pattern 5, Exps 2-2 (5)	[=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1]



Proposal 12323 - Visit FB - Stretching the diversity of cosmic explosions: The supernovae of gamma-ray bursts

Visit	Proposal 12323, Visit FC, implementation										Fri Sep 17 01:36:00 GMT 2010		
	Diagnostic Status: No Diagnostics												
	Scientific Instruments: WFC3/UVIS												
	Special Requirements: ORIENT 5D TO 60 D; ORIENT 95D TO 150 D; ORIENT 185D TO 240 D; ORIENT 275D TO 330 D; AFTER 30-APR-2011:00:00:00; GROUP FC,FA WITHIN 30D												
Comments: Last observations of GRB 100316D = SN 2010bh. This is for the host galaxy, filters F438W+F814W													
Patterns	#	Primary Pattern						Secondary Pattern				Exposures	
	(4)	Pattern Type=LINE		Coordinate Frame=POS-TARG						(1), (2)			
		Purpose=DITHER		Pattern Orientation=41.788									
		Number Of Points=3		Angle Between Sides=									
		Point Spacing=.4235		Center Pattern=false									
		Line Spacing=											
Fixed Targets	#	Name		Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous			
	(1)	GRB100316D		RA: 07 10 30.7700 (107.6282083d)				V=22+/-2		Reference Frame: ICRS			
				Dec: -56 15 20.70 (-56.25575d)									
				Equinox: J2000									
Exposures	#	Label	Target	Config,Mode,Aperture		Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]		Orbit	
	1	WFC3/F438 W	(1) GRB100316D	WFC3/UVIS, ACCUM, UVIS1		F438W			Pattern 4, Exps 1-1 (4)	410 Secs			
									[==>(Pattern 1)]		[1]		
									[==>(Pattern 2)]				
									[==>(Pattern 3)]				
	2	WFC3/F814 W	(1) GRB100316D	WFC3/UVIS, ACCUM, UVIS1		F814W			Pattern 4, Exps 2-2 (4)	420 Secs			
										[==>(Pattern 1)]		[1]	
										[==>(Pattern 2)]			
										[==>(Pattern 3)]			



Proposal 12323 - Visit FC - Stretching the diversity of cosmic explosions: The supernovae of gamma-ray bursts

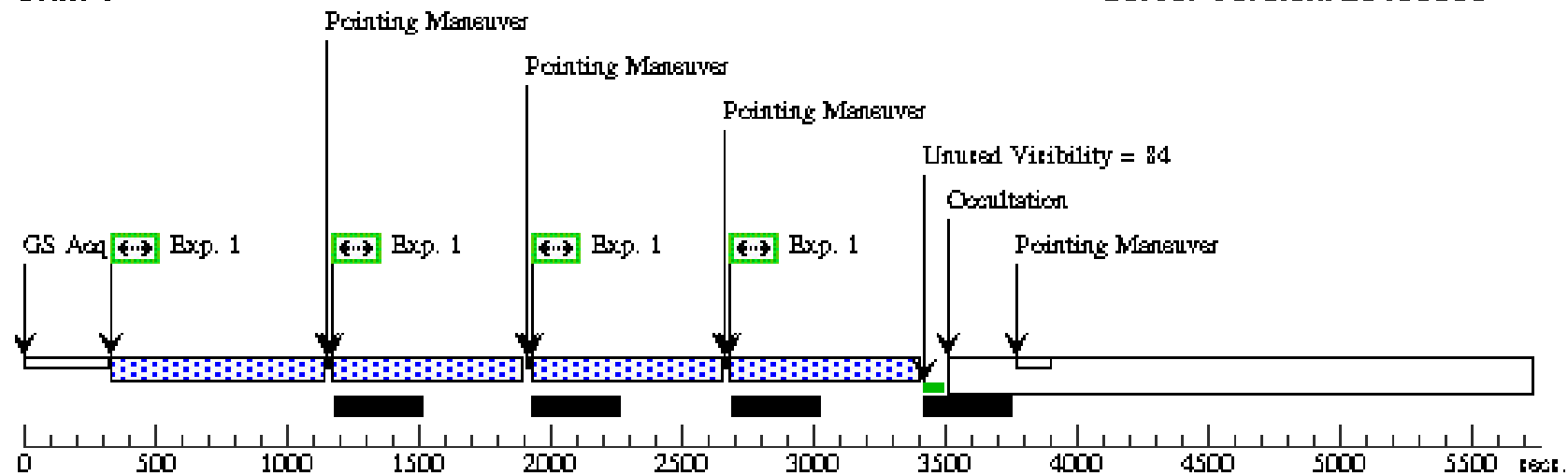
Visit	Proposal 12323, Visit FD, implementation				Fri Sep 17 01:36:00 GMT 2010	
	Diagnostic Status: Warning					
	Scientific Instruments: ACS/WFC, WFC3/UVIS					
	Special Requirements: ORIENT 5D TO 60 D; ORIENT 95D TO 150 D; ORIENT 185D TO 240 D; ORIENT 275D TO 330 D; AFTER 30-MAY-2011:00:00:00					
Comments: Last observations of GRB 100316D = SN 2010bh. This is for the host galaxy, ACS/RAMP filter FR716N centered on 6950.2 A and WFC3/F763M and WFC/F625W.						
Diagnostics	(ACS/FR716N RAMP Halpha (FD.001)) Warning (Form): POS TARG & PATTERN should be used carefully with ACS/WFPC2 ramp or WFC3 quad filters as central wavelengths & transmission efficiencies vary within the apertures.					
Patterns	#	Primary Pattern		Secondary Pattern	Exposures	
	(6)	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		(3)	
	(7)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false		(2)	
	(8)	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.265 Line Spacing=0.187	Coordinate Frame=POS-TARG Pattern Orientation=20.67 Angle Between Sides=69.05 Center Pattern=false		(1)	
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	GRB100316D	RA: 07 10 30.7700 (107.6282083d) Dec: -56 15 20.70 (-56.25575d) Equinox: J2000		V=22+/-2	Reference Frame: ICRS

Proposal 12323 - Visit FC - Stretching the diversity of cosmic explosions: The supernovae of gamma-ray bursts

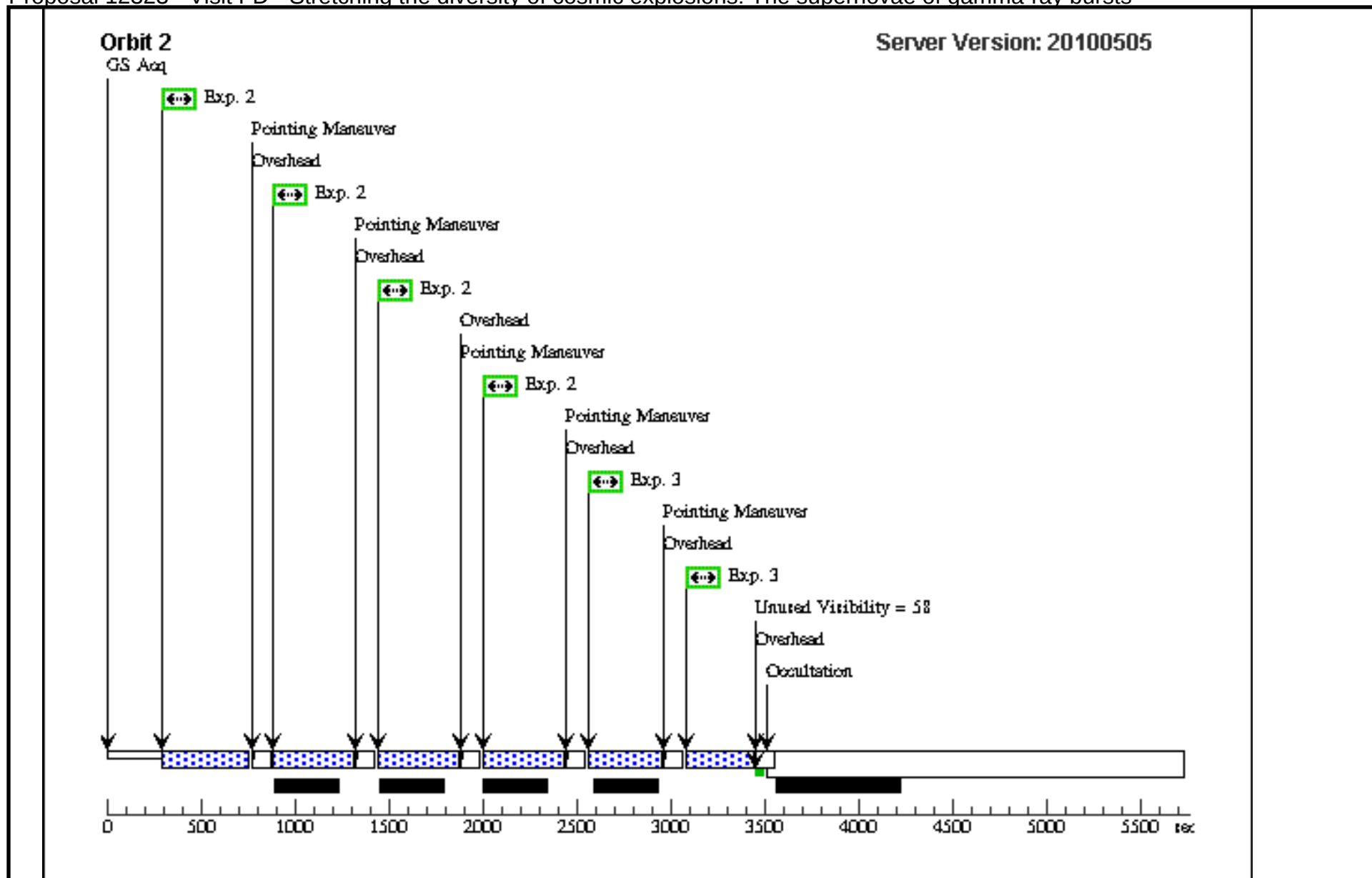
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	ACS/FR716 N RAMP H alpha	(1) GRB100316D	ACS/WFC, ACCUM, WFC1-IRAMP	FR716N 6950.2 A			Pattern 8, Exps 1-1 (8)	600 Secs [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1]
	2	WFC3/F763 M	(1) GRB100316D	WFC3/UVIS, ACCUM, UVIS1	F763M			Pattern 7, Exps 2-2 (7)	430 Secs [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[2]
	3	WFC3/F625 W	(1) GRB100316D	WFC3/UVIS, ACCUM, UVIS1	F625W			Pattern 6, Exps 3-3 (6)	360 Secs [=>(Pattern 1)] [=>(Pattern 2)]	[2]

Orbit 1

Server Version: 20100505

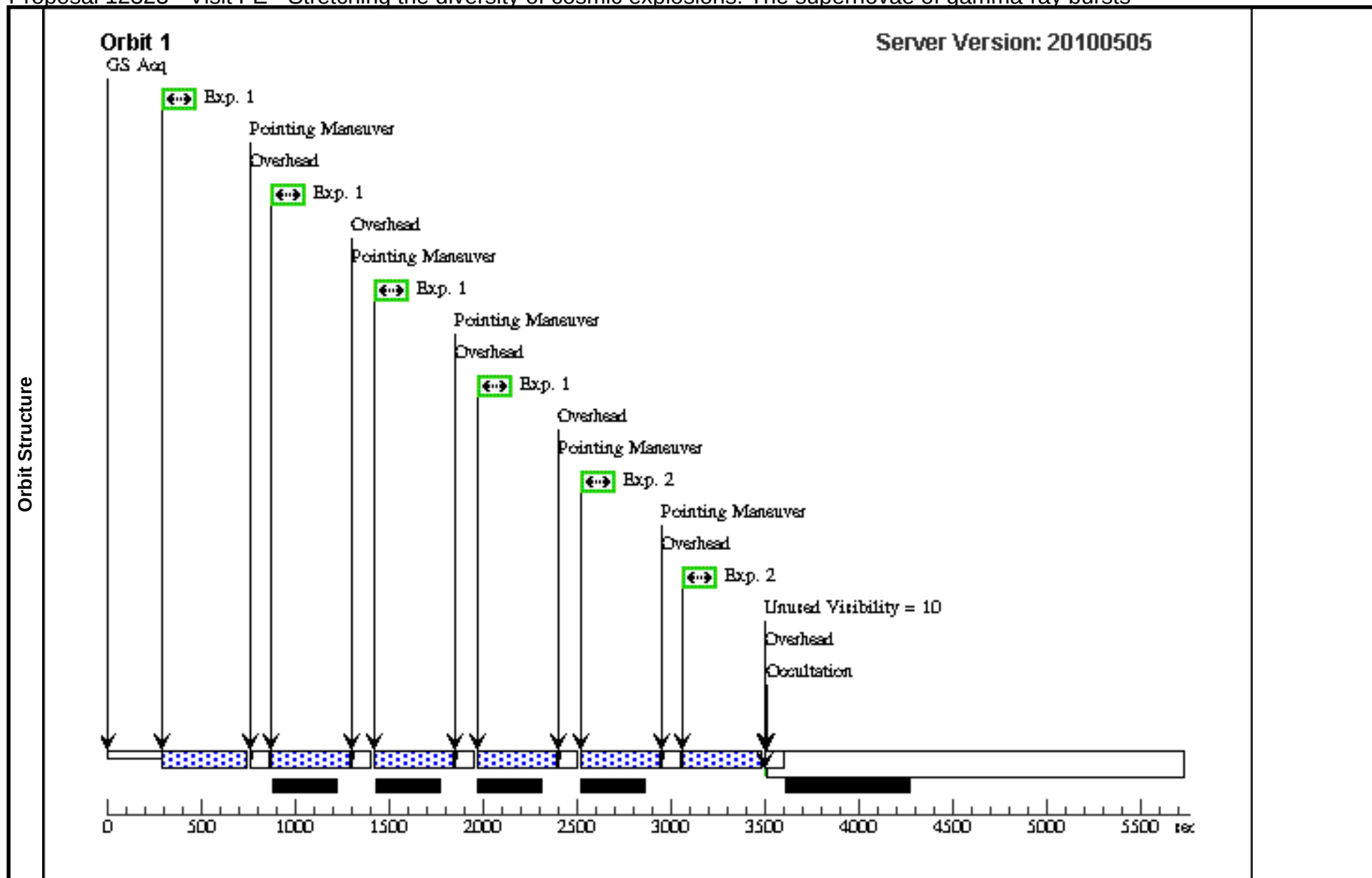


Orbit Structure



Proposal 12323 - Visit FD - Stretching the diversity of cosmic explosions: The supernovae of gamma-ray bursts

Visit	Proposal 12323, Visit FE, implementation Fri Sep 17 01:36:01 GMT 2010									
	Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: ORIENT 5D TO 60 D; ORIENT 95D TO 150 D; ORIENT 185D TO 240 D; ORIENT 275D TO 330 D; AFTER 30-MAY-2011:00:00:00 <i>Comments: Last observations of GRB 100316D = SN 2010bh. This is for the host galaxy, filter F225W</i>									
Patterns	#	Primary Pattern				Secondary Pattern			Exposures	
	(6)	Pattern Type=WFC3-UVIS-DITHER-LINE Coordinate Frame=POS-TARG Pattern Orientation=46.84 Purpose=DITHER Angle Between Sides= Number Of Points=2 Center Pattern=false Point Spacing=0.145 Line Spacing=							(2)	
	(7)	Pattern Type=WFC3-UVIS-DITHER-BOX Coordinate Frame=POS-TARG Pattern Orientation=23.884 Purpose=DITHER Angle Between Sides=81.785 Number Of Points=4 Center Pattern=false Point Spacing=0.173 Line Spacing=0.112							(1)	
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous	
	(1)	GRB100316D	RA: 07 10 30.7700 (107.6282083d) Dec: -56 15 20.70 (-56.25575d) Equinox: J2000				V=22+/-2		Reference Frame: ICRS	
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	WFC3/F225 W	(1) GRB100316D	WFC3/UVIS, ACCUM, UVIS1	F225W			Pattern 7, Exps 1-1 (7)	420 Secs	[1]
									[=>(Pattern 1)]	
									[=>(Pattern 2)]	
									[=>(Pattern 3)]	
									[=>(Pattern 4)]	
	2	WFC3/F225 W	(1) GRB100316D	WFC3/UVIS, ACCUM, UVIS1	F225W			Pattern 6, Exps 2-2 (6)	420 Secs	[1]
									[=>(Pattern 1)]	
									[=>(Pattern 2)]	



Proposal 12323 - Visit FE - Stretching the diversity of cosmic explosions: The supernovae of gamma-ray bursts

Visit	Proposal 12323, Visit FF, implementation Fri Sep 17 01:36:02 GMT 2010									
	Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: ORIENT 5D TO 60 D; ORIENT 95D TO 150 D; ORIENT 185D TO 240 D; ORIENT 275D TO 330 D; AFTER 30-MAY-2011:00:00:00 <i>Comments: Last observations of GRB 100316D = SN 2010bh. This is for the host galaxy, filter F275W</i>									
Patterns	#	Primary Pattern				Secondary Pattern			Exposures	
	(6)	Pattern Type=WFC3-UVIS-DITHER-LINE Coordinate Frame=POS-TARG Pattern Orientation=46.84 Purpose=DITHER Angle Between Sides= Number Of Points=2 Center Pattern=false Point Spacing=0.145 Line Spacing=							(2)	
	(7)	Pattern Type=WFC3-UVIS-DITHER-BOX Coordinate Frame=POS-TARG Pattern Orientation=23.884 Purpose=DITHER Angle Between Sides=81.785 Number Of Points=4 Center Pattern=false Point Spacing=0.173 Line Spacing=0.112							(1)	
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous	
	(1)	GRB100316D	RA: 07 10 30.7700 (107.6282083d) Dec: -56 15 20.70 (-56.25575d) Equinox: J2000				V=22+/-2		Reference Frame: ICRS	
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	WFC3/F275 W	(1) GRB100316D	WFC3/UVIS, ACCUM, UVIS1	F275W			Pattern 7, Exps 1-1 (7)	420 Secs	[1]
									[=>(Pattern 1)]	
									[=>(Pattern 2)]	
									[=>(Pattern 3)]	
									[=>(Pattern 4)]	
	2	WFC3/F275 W	(1) GRB100316D	WFC3/UVIS, ACCUM, UVIS1	F275W			Pattern 6, Exps 2-2 (6)	420 Secs	[1]
									[=>(Pattern 1)]	
									[=>(Pattern 2)]	

