



12749 - The Astrophysics of the Most Energetic Gamma-Ray Bursts

Cycle: 19, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

<i>Name</i>	<i>Institution</i>	<i>E-Mail</i>
Dr. Andrew S. Fruchter (PI) (Contact)	Space Telescope Science Institute	fruchter@stsci.edu
Dr. Kuntal Misra (CoI)	Aryabhata Research Institute of Observational Sci	kuntal@aries.res.in
Mr. John Graham (CoI)	The Johns Hopkins University	graham@stsci.edu
Dr. Asaf Pe'er (CoI)	Harvard University	apeer@cfa.harvard.edu
Dr. Stephen T. Holland (CoI)	Space Telescope Science Institute	sholland@stsci.edu
Prof. Nial R. Tanvir (CoI) (ESA Member)	University of Leicester	nrt3@star.le.ac.uk
Dr. Andrew J. Levan (CoI) (ESA Member)	The University of Warwick	a.j.levan@warwick.ac.uk
Dr. Neil Gehrels (CoI)	NASA Goddard Space Flight Center	neil.gehrels@nasa.gov

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) LAT-BURST	WFC3/UVIS	1	23-Jul-2013 21:01:00.0	yes
02	(1) LAT-BURST	WFC3/UVIS	2	23-Jul-2013 21:01:08.0	yes
03	(1) LAT-BURST	WFC3/UVIS	4	23-Jul-2013 21:01:17.0	yes
04	(2) GRB-120711A	WFC3/UVIS	2	23-Jul-2013 21:01:23.0	yes
05	(2) GRB-120711A	WFC3/UVIS	2	23-Jul-2013 21:01:27.0	yes
06	(2) GRB-120711A	WFC3/UVIS	3	23-Jul-2013 21:01:33.0	yes

14 Total Orbits Used

ABSTRACT

The Large Area Telescope (LAT) of Fermi has found a sample of highly relativistic gamma-ray bursts (GRBs), which may be among the most energetic bursts ever discovered. Here we propose to use Chandra and HST to follow the late time X-ray and optical light curves of a LAT detected burst that also has excellent early multiwavelength coverage. Our observations, in conjunction with the Fermi data, will allow us to measure the energy and the bulk Lorentz factor of the explosion. Recent work on some of the most powerful GRBs begins to substantially constrain physical models of the progenitors. The energetics of the highly relativistic LAT bursts may greatly strengthen these constraints and provide new insight into the currently unknown mechanism that determines the energy in a GRB.

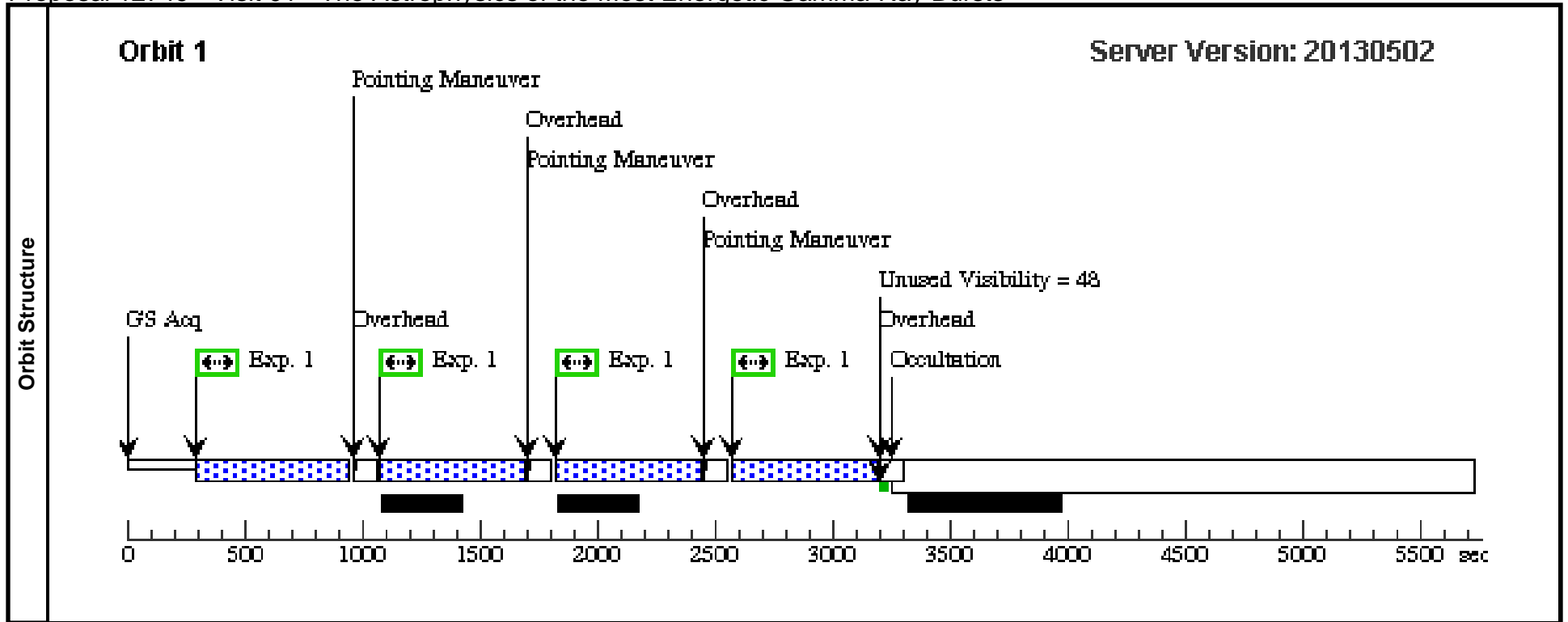
OBSERVING DESCRIPTION

We plan three visits with HST: the first an orbit long, a second two orbits long, and a third four orbits long. The first visit will occur about around twenty days after outburst. The second will be around forty days after outburst. The exact times will be scaled according to the decay seen from the ground. The third visit will be taken at least six months after the burst to allow an accurate host subtraction. We will use the UVIS camera on WFC3 because WFC3 easily has as good sensitivity on point sources as ACS with smaller detector-induced noise sources (CTE, bias-striping, etc). We will choose the filter at the time of the ToO to match one of the best observed bands from the ground (most likely a red band). If the OT and host are sufficiently bright in the first two epochs we will divide the last epoch into 3 orbits with WFC3/UVIS and one orbit with WFC3/IR, in order to better study the environment underlying this extremely energetic burst.

Proposal 12749 - Visit 01 - The Astrophysics of the Most Energetic Gamma-Ray Bursts

Wed Jul 24 01:01:41 GMT 2013

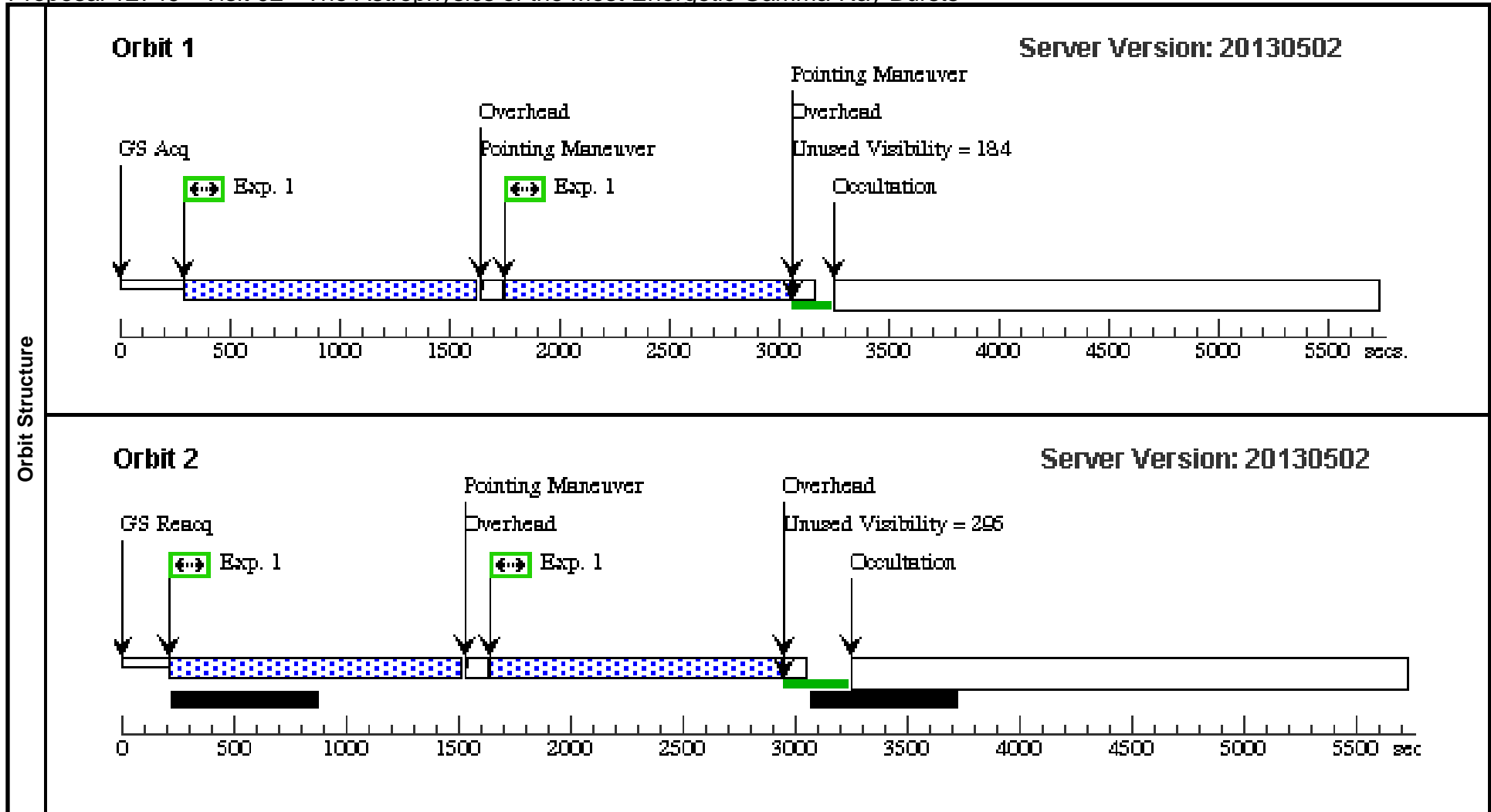
Visit	Proposal 12749, Visit 01, withdrawn Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: ON HOLD <i>On Hold Comments: This is a ToO</i>									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
	(1)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER 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		(1)					
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	LAT-BURST	RA: 00 00 0.0000 (.0000000d) Dec: -30 00 0.00 (-30.000000d) Equinox: J2000		V=20	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(1) LAT-BURST		WFC3/UVIS, ACCUM, UVIS1	F625W			Pattern 1, Exps 1-1 in Visit 01 (1)	620 Secs (2480 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1]



Proposal 12749 - Visit 02 - The Astrophysics of the Most Energetic Gamma-Ray Bursts

Wed Jul 24 01:01:43 GMT 2013

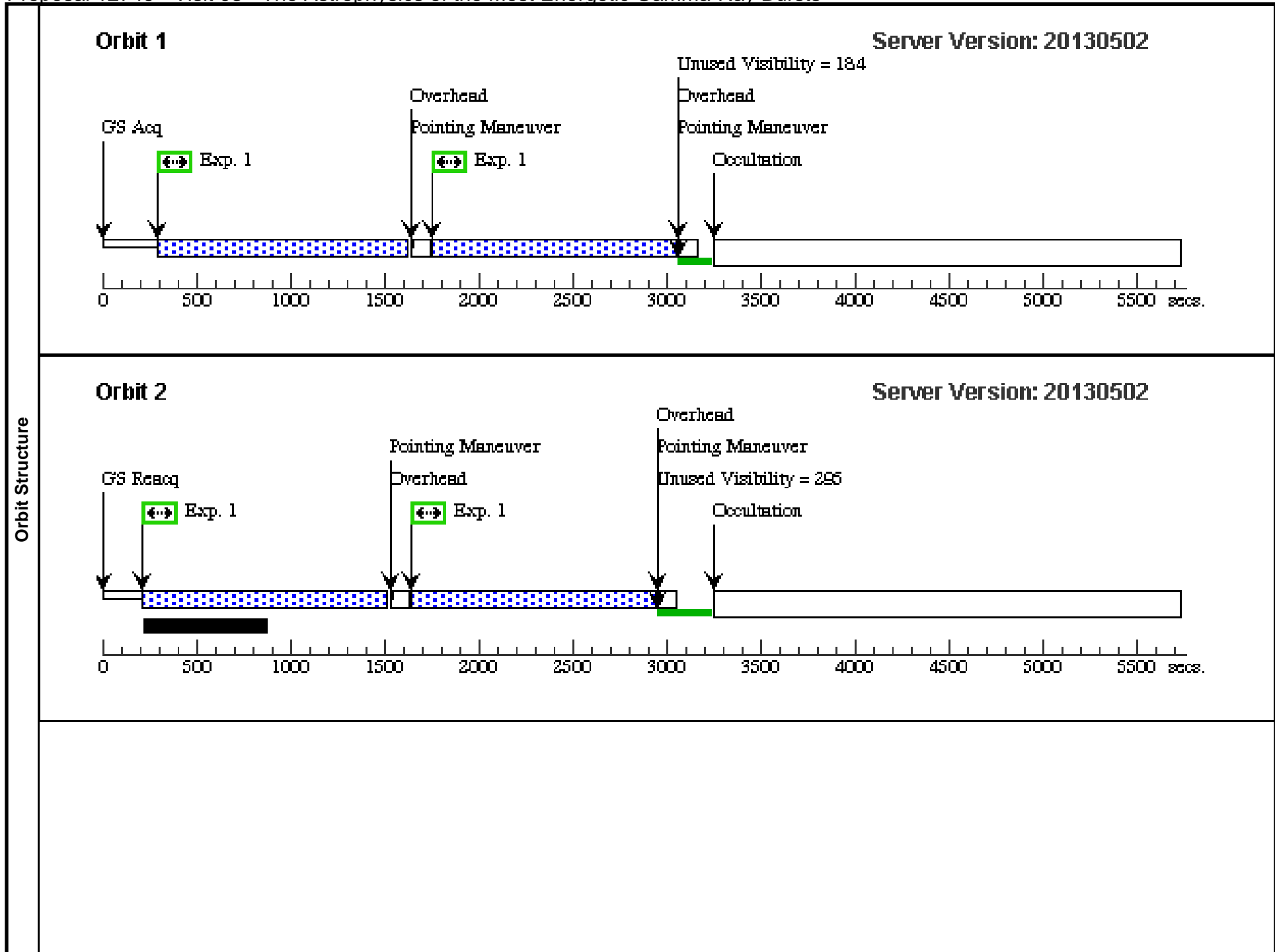
Visit	Proposal 12749, Visit 02, withdrawn Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: ON HOLD <i>On Hold Comments: This is a ToO</i>										
	Patterns	#	Primary Pattern				Secondary Pattern			Exposures	
(1)		Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER 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					(1)		
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes	Miscellaneous			
	(1)	LAT-BURST	RA: 00 00 0.0000 (.0000000d) Dec: -30 00 0.00 (-30.000000d) Equinox: J2000				V=20	Reference Frame: ICRS			
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
	1	(1) LAT-BURST		WFC3/UVIS, ACCUM, UVIS1	F625W			Pattern 1, Exps 1-1 i n Visit 02 (1)	1300 Secs (5200 Secs)		
									[=>(Pattern 1)]		[1]
									[=>(Pattern 2)]		[2]
								[=>(Pattern 3)]			
								[=>(Pattern 4)]			



Proposal 12749 - Visit 03 - The Astrophysics of the Most Energetic Gamma-Ray Bursts

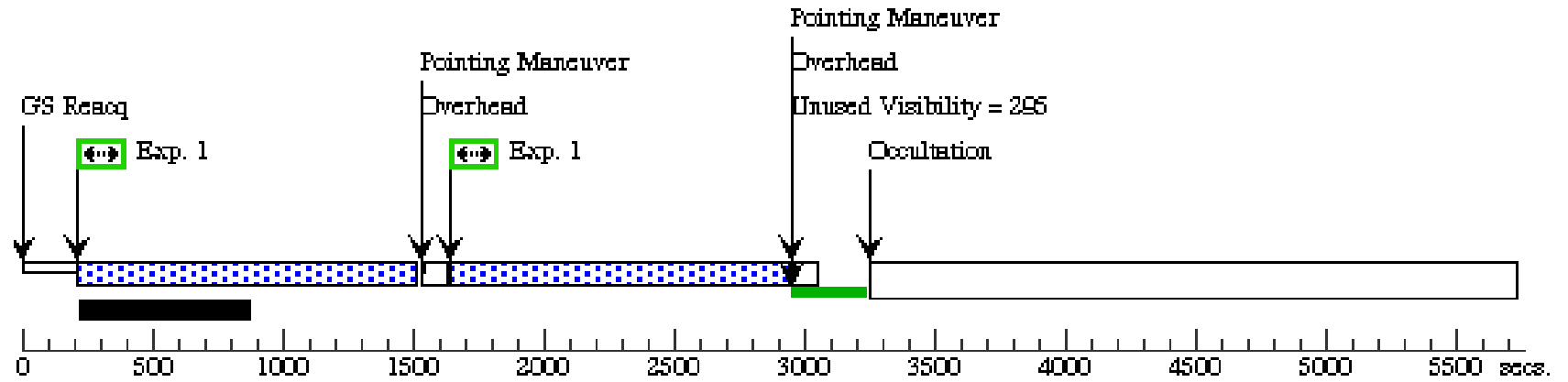
Wed Jul 24 01:01:44 GMT 2013

Visit	Proposal 12749, Visit 03, withdrawn Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: ON HOLD <i>On Hold Comments: This is a ToO</i>									
	Patterns	#	Primary Pattern				Secondary Pattern			
(2)		Pattern Type=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	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)	LAT-BURST	RA: 00 00 0.0000 (.0000000d) Dec: -30 00 0.00 (-30.000000d) Equinox: J2000		V=20	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(1) LAT-BURST	(1) LAT-BURST	WFC3/UVIS, ACCUM, UVIS1	F625W			Pattern 2, Exps 1-1 i n Visit 03 (2)	1300 Secs (10400 Secs)	
									[==>(Pattern 1,1)]	[1]
									[==>(Pattern 1,2)]	
									[==>(Pattern 2,1)]	[2]
									[==>(Pattern 2,2)]	
									[==>(Pattern 3,1)]	[3]
								[==>(Pattern 3,2)]		
								[==>(Pattern 4,1)]	[4]	
								[==>(Pattern 4,2)]		



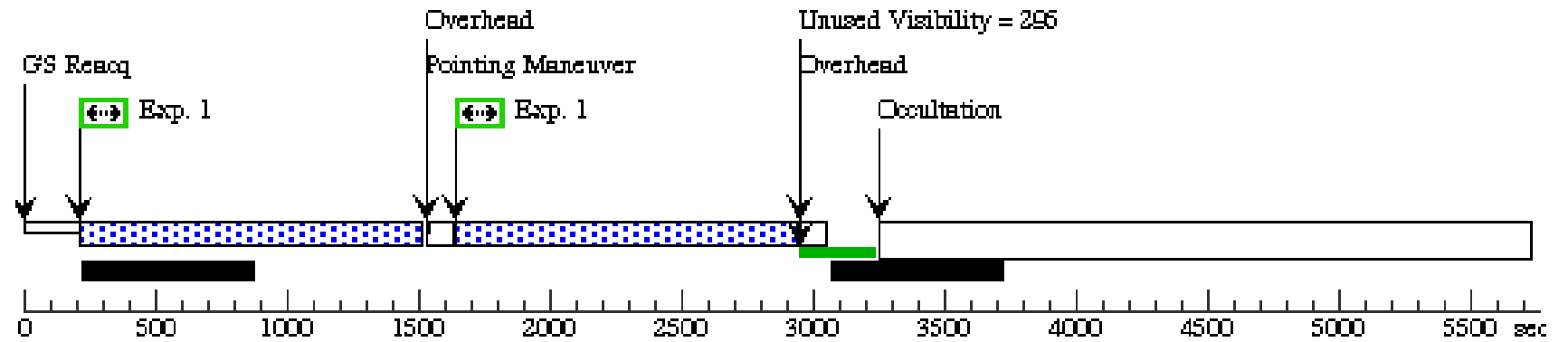
Orbit 3

Server Version: 20130502



Orbit 4

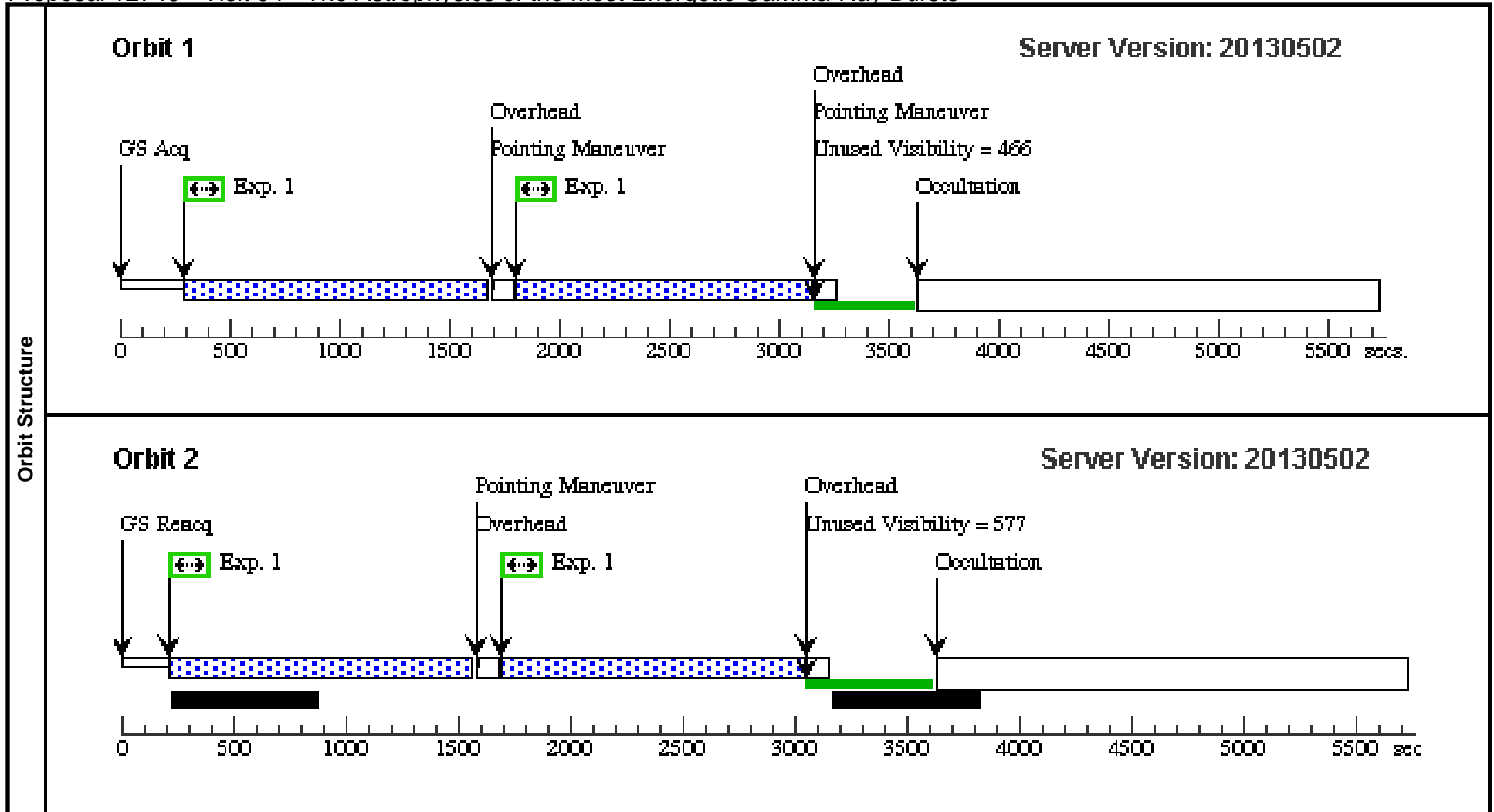
Server Version: 20130502



Proposal 12749 - Visit 04 - The Astrophysics of the Most Energetic Gamma-Ray Bursts

Wed Jul 24 01:01:46 GMT 2013

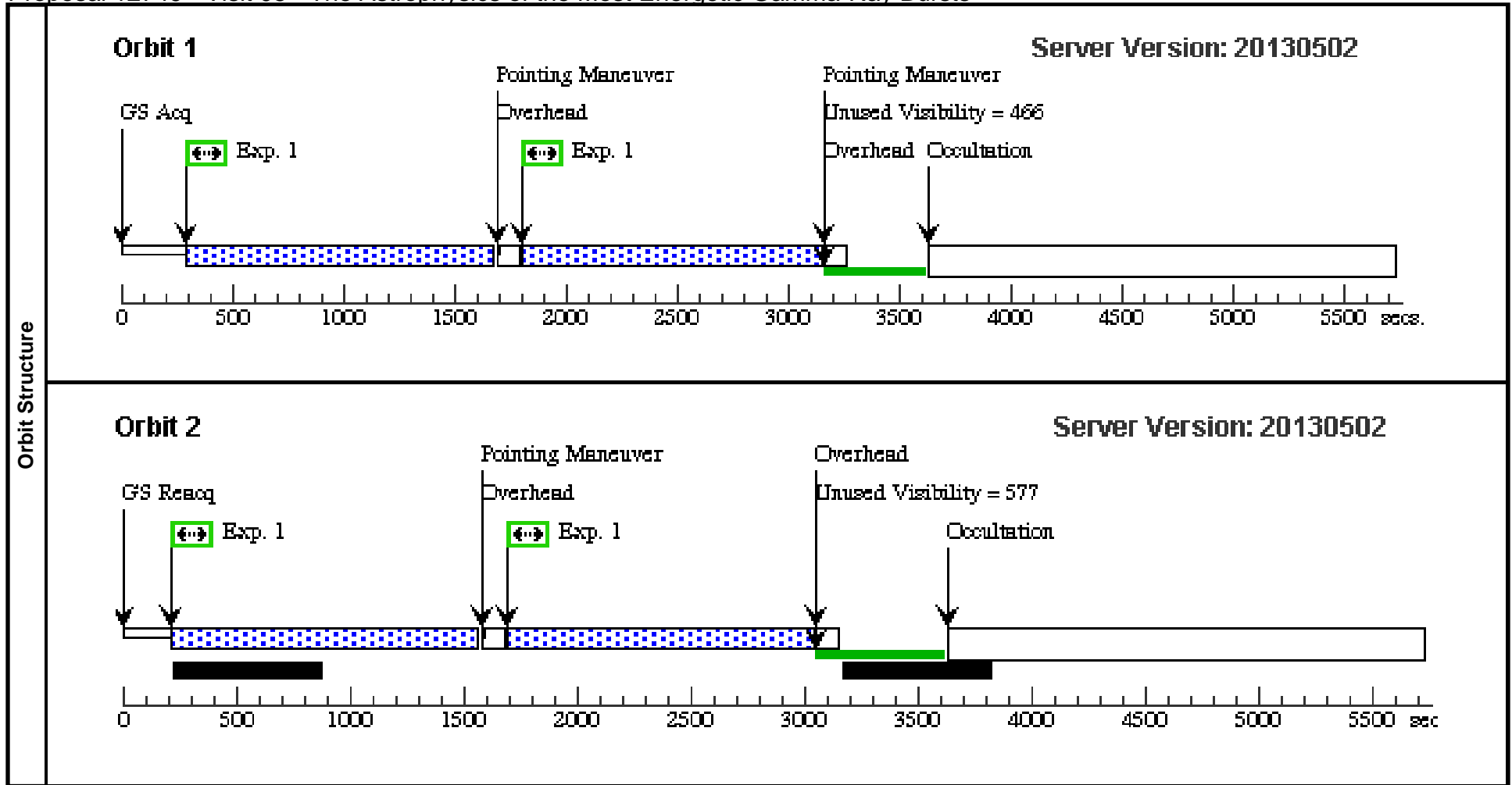
Visit	Proposal 12749, Visit 04, completed Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: ORIENT 209D TO 213 D; BETWEEN 29-JUL-2012 AND 01-AUG-2012									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
	(1)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER 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		(1)					
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(2)	GRB-120711A	RA: 06 18 42.8000 (94.6783333d) Dec: -70 59 57.00 (-70.99917d) Equinox: J2000		V=26	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(2) GRB-120711A	WFC3/UVIS, ACCUM, UVIS1	F625W		GS ACQ SCENARIO BASE1B3	Pattern 1, Exps 1-1 in Visit 04 (1)	1350 Secs (5400 Secs)	
									[=>(Pattern 1)]	[1]
									[=>(Pattern 2)]	
								[=>(Pattern 3)]		
								[=>(Pattern 4)]	[2]	



Proposal 12749 - Visit 05 - The Astrophysics of the Most Energetic Gamma-Ray Bursts

Wed Jul 24 01:01:47 GMT 2013

Visit	Proposal 12749, Visit 05, completed Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: ORIENT 230D TO 260 D; BETWEEN 29-AUG-2012 AND 02-SEP-2012										
	Patterns	#	Primary Pattern				Secondary Pattern			Exposures	
(1)		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					(1)		
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(2)	GRB-120711A	RA: 06 18 42.8000 (94.6783333d) Dec: -70 59 57.00 (-70.99917d) Equinox: J2000				V=26		Reference Frame: ICRS		
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
	1	(2) GRB-120711A	WFC3/UVIS, ACCUM, UVIS1	F625W			GS ACQ SCENARI O BASE1B3	Pattern 1, Exps 1-1 i n Visit 05 (1)	1350 Secs (5400 Secs)		
									[=>(Pattern 1)]		[1]
									[=>(Pattern 2)]		
								[=>(Pattern 3)]			
								[=>(Pattern 4)]		[2]	



Proposal 12749 - Visit 06 - The Astrophysics of the Most Energetic Gamma-Ray Bursts

Wed Jul 24 01:01:48 GMT 2013

Visit	Proposal 12749, Visit 06 Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: ORIENT 209D TO 213 D; ORIENT 230D TO 260 D; BEFORE 02-SEP-2013:00:00:00									
	Patterns	#	Primary Pattern				Secondary Pattern			
(4)		Pattern Type=LINE Purpose=DITHER Number Of Points=3 Point Spacing=.135 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false	Pattern Type=LINE Purpose=DITHER Number Of Points=2 Point Spacing=.139 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=0.0 Angle Between Sides= Center Pattern=false	(1)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections		Fluxes	Miscellaneous			
	(2)	GRB-120711A	RA: 06 18 42.8000 (94.6783333d) Dec: -70 59 57.00 (-70.99917d) Equinox: J2000			V=26	Reference Frame: ICRS			
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(2) GRB-120711A	WFC3/UVIS, ACCUM, UVIS1	F625W			Pattern 4, Exps 1-1 i n Visit 06 (4)	1400 Secs (8400 Secs)	
									[==>(Pattern 1,1)]	[1]
									[==>(Pattern 1,2)]	[2]
									[==>(Pattern 2,1)]	[3]
								[==>(Pattern 2,2)]	[3]	
								[==>(Pattern 3,1)]	[3]	
								[==>(Pattern 3,2)]	[3]	

