



# 13611 - The nature of the low redshift ultra-long GRB130925A: core collapse or tidal disruption?

Cycle: 21, Proposal Category: GO/DD

(Availability Mode: SUPPORTED)

## INVESTIGATORS

<i>Name</i>	<i>Institution</i>	<i>E-Mail</i>
<b>Prof. Nial R. Tanvir (PI) (ESA Member) (Contact )</b>	<b>University of Leicester</b>	<b>nrt3@star.le.ac.uk</b>
Dr. Stephen Bradley Cenko (CoI) (AdminUSPI)	NASA Goddard Space Flight Center	brad.cenko@nasa.gov
Dr. Daniel Perley (CoI)	California Institute of Technology	dperley@astro.caltech.edu
Prof. Andrew J. Levan (CoI) (ESA Member)	The University of Warwick	a.j.levan@warwick.ac.uk
Dr. Paul T. O'Brien (CoI) (ESA Member)	University of Leicester	pto@star.le.ac.uk
Dr. Andrew S. Fruchter (CoI)	Space Telescope Science Institute	fruchter@stsci.edu

## 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) GRB130925A	WFC3/IR	1	30-Jul-2014 21:00:31.0	yes
02	(1) GRB130925A	WFC3/UVIS	1	30-Jul-2014 21:00:32.0	yes
03	(1) GRB130925A	WFC3/IR	1	30-Jul-2014 21:00:33.0	yes
04	(1) GRB130925A	WFC3/UVIS	1	30-Jul-2014 21:00:34.0	yes
05	(1) GRB130925A	WFC3/IR	1	30-Jul-2014 21:00:35.0	yes
06	(1) GRB130925A	WFC3/UVIS	1	30-Jul-2014 21:00:36.0	yes

6 Total Orbits Used

## **ABSTRACT**

In the past three years several cosmological high-energy transients have been found by Swift and other satellites that have durations of at least several hours, well above the typical few minute durations of classical long-GRBs. The origin of these so-called "ultra-long" bursts remains very uncertain due to the small number found and their comparatively high redshifts. They could be produced by some kind of massive star core-collapse, like ordinary long-GRBs but perhaps with a more extended progenitor star, or alternatively via a relativistic jet produced in a tidal disruption event, similar to the well-studied source Swift J1644+57. Recently a new ultra-long duration burst was identified, GRB 130925A, at a redshift of only  $z=0.35$ , which is close enough to allow a deep search for any accompanying supernova event with HST, and also detailed constraints on the location of the transient with respect to the nucleus of its host galaxy. This promises to provide the definitive test of core-collapse vs TDE models for these events.

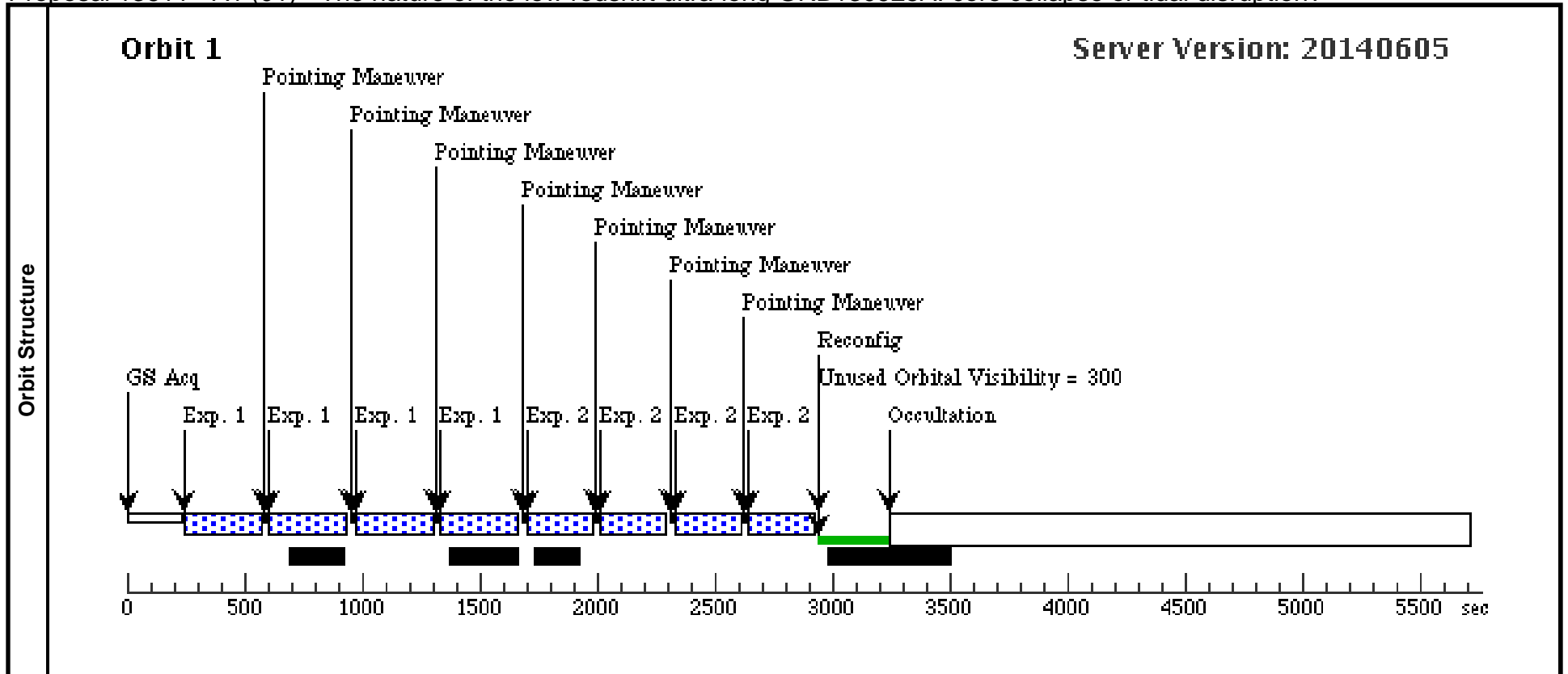
## **OBSERVING DESCRIPTION**

We propose three pairs visits, the first pair as soon as possible to monitor around the peak of any supernova light, the second pair a few weeks later when the transient light should largely have disappeared, and a final visits a few months later which will be assuredly only host light. Each pair of visits is intended to be split between IR (F110 and F160) and optical (F814) exposures.

Proposal 13611 - A1 (01) - The nature of the low redshift ultra-long GRB130925A: core collapse or tidal disruption?

Thu Jul 31 01:00:37 GMT 2014

Visit	<b>Proposal 13611, A1 (01), completed</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/IR Special Requirements: (none)									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(1)	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)	GRB130925A	RA: 02 44 42.9600 (41.1790000d) Dec: -26 09 11.20 (-26.15311d) Equinox: J2000		V=22+/-0.3	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(1) GRB130925A	(1) GRB130925A	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=7; SAMP-SEQ=SPAR S50	GS ACQ SCENARI O ONEB1B3	Pattern 1, Exps 1-1 in A1 (01) (1)	302.934997 Secs (1211.74 Secs)	[1]
									[=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	
2	(1) GRB130925A	(1) GRB130925A	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=6; SAMP-SEQ=SPAR S50		Pattern 1, Exps 2-2 in A1 (01) (1)	252.934546 Secs (1011.738 Secs)	[1]	
									[=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	



Proposal 13611 - A2 (02) - The nature of the low redshift ultra-long GRB130925A: core collapse or tidal disruption?

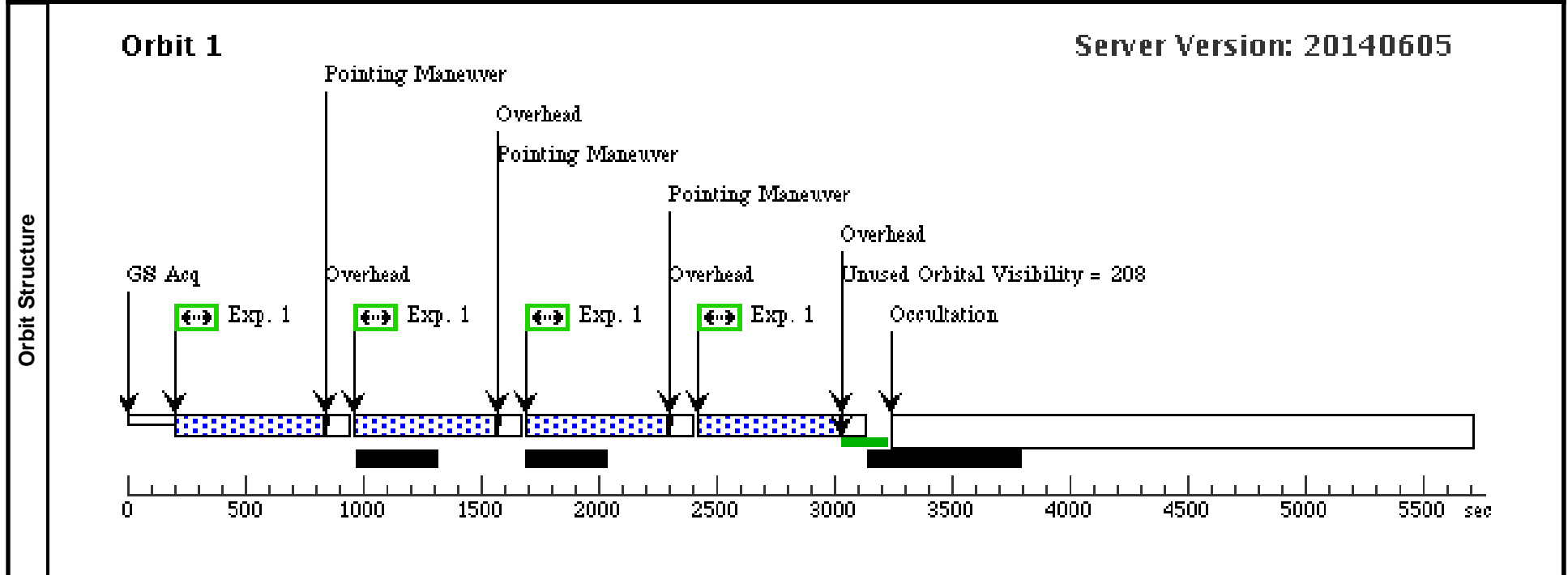
Thu Jul 31 01:00:37 GMT 2014

<b>Visit</b>	Proposal 13611, A2 (02), completed Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: SAME ORIENT AS 01; GROUP 02,01 WITHIN 1D		

<b>Patterns</b>	#	Primary Pattern	Secondary Pattern	Exposures
	(2)	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	

<b>Fixed Targets</b>	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	GRB130925A	RA: 02 44 42.9600 (41.1790000d) Dec: -26 09 11.20 (-26.15311d) Equinox: J2000		V=22+/-0.3	Reference Frame: ICRS

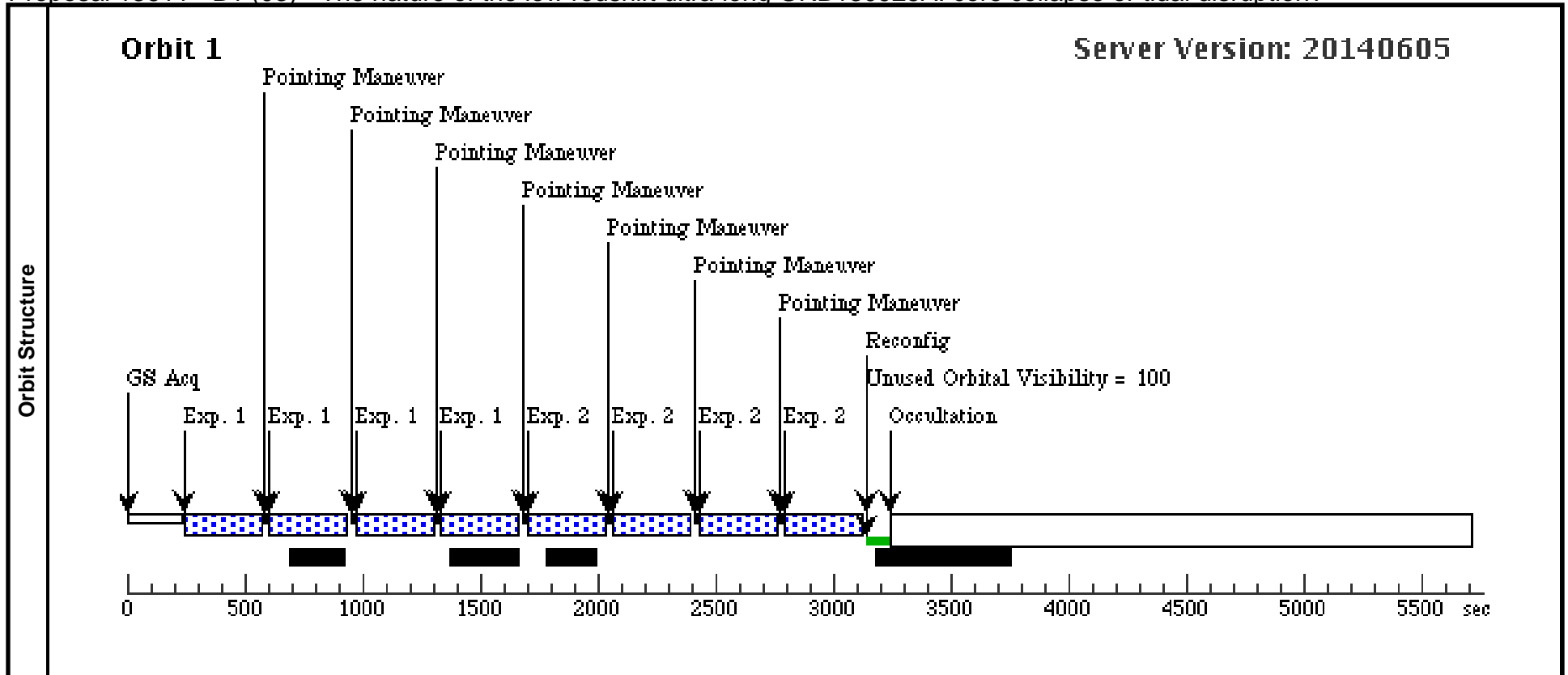
<b>Exposures</b>	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) GRB130925A	WFC3/UVIS, ACCUM, UVIS2	F814W	CR-SPLIT=NO	GS ACQ SCENARI ONEB1B3	Pattern 2, Exps 1-1 in A2 (02) (2)	600 Secs (2400 Secs)	
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	



Proposal 13611 - B1 (03) - The nature of the low redshift ultra-long GRB130925A: core collapse or tidal disruption?

Thu Jul 31 01:00:37 GMT 2014

Visit	Proposal 13611, B1 (03), completed Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR Special Requirements: AFTER 01 BY 25 D TO 40 D									
	Patterns	#	Primary Pattern			Secondary Pattern			Exposures	
		(1)	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)	GRB130925A	RA: 02 44 42.9600 (41.1790000d) Dec: -26 09 11.20 (-26.15311d) Equinox: J2000			V=22+/-0.3	Reference Frame: ICRS			
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(1) GRB130925A	(1) GRB130925A	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=7; SAMP-SEQ=SPAR S50	GS ACQ SCENARI O ONEB1B3	Pattern 1, Exps 1-1 i n B1 (03) (1)	302.934997 Secs (1211.74 Secs)	[1]
									[=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	
2	(1) GRB130925A	(1) GRB130925A	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=7; SAMP-SEQ=SPAR S50		Pattern 1, Exps 2-2 i n B1 (03) (1)	302.934997 Secs (1211.74 Secs)	[1]	
									[=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	



Proposal 13611 - B2 (04) - The nature of the low redshift ultra-long GRB130925A: core collapse or tidal disruption?

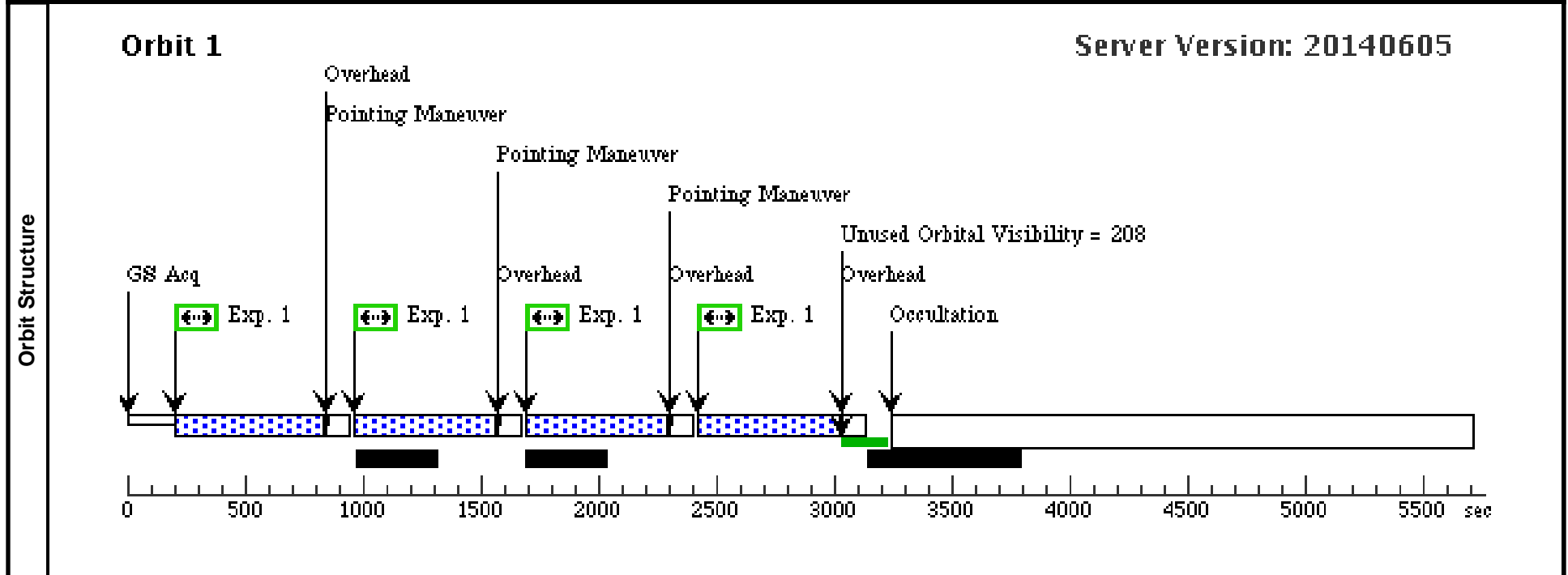
Thu Jul 31 01:00:37 GMT 2014

<b>Visit</b>	<b>Proposal 13611, B2 (04), completed</b>		
	<b>Diagnostic Status: No Diagnostics</b>		
	Scientific Instruments: WFC3/UVIS		
	Special Requirements: SAME ORIENT AS 03; GROUP 04.03 WITHIN 5D		

<b>Patterns</b>	#	Primary Pattern	Secondary Pattern	Exposures
	(2)	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)

<b>Fixed Targets</b>	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	GRB130925A	RA: 02 44 42.9600 (41.1790000d) Dec: -26 09 11.20 (-26.15311d) Equinox: J2000		V=22+/-0.3	Reference Frame: ICRS

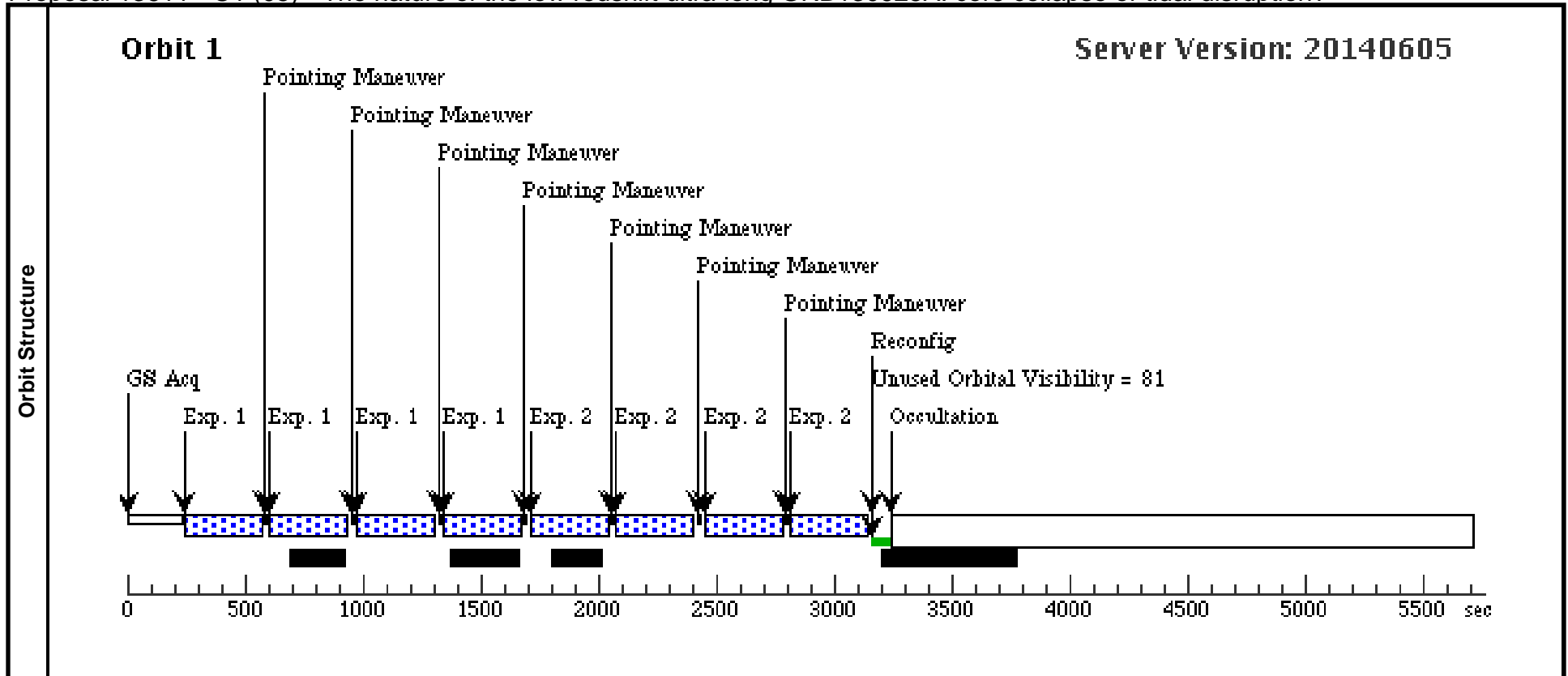
<b>Exposures</b>	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) GRB130925A	WFC3/UVIS, ACCUM, UVIS2	F814W	CR-SPLIT=NO	GS ACQ SCENARI ONEB1B3	Pattern 2, Exps 1-1 in B2 (04) (2)	600 Secs (2400 Secs)	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]



Proposal 13611 - C1 (05) - The nature of the low redshift ultra-long GRB130925A: core collapse or tidal disruption?

Thu Jul 31 01:00:37 GMT 2014

Visit	<b>Proposal 13611, C1 (05), implementation</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/IR Special Requirements: ORIENT 285D TO 285 D; BEFORE 25-AUG-2014:00:00:00									
	Patterns	#	Primary Pattern				Secondary Pattern			
		(3)	Pattern Type=WFC3-IR-DITHER-BLOB Purpose=DITHER Number Of Points=2 Point Spacing=5.183 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.859 Angle Between Sides= Center Pattern=false	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.636 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false	(1), (2)			
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections		Fluxes	Miscellaneous			
	(1)	GRB130925A	RA: 02 44 42.9600 (41.1790000d) Dec: -26 09 11.20 (-26.15311d) Equinox: J2000			V=22+/-0.3	Reference Frame: ICRS			
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(1) GRB130925A	(1) GRB130925A	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=7; SAMP-SEQ=SPAR S50	POS TARG -9.7819 01438715447,-35.27 975702180538; GS ACQ SCENARI O ONEB1B3	Pattern 3, Exps 1-1 i n C1 (05) (3)	302.934997 Secs (1211.74 Secs) [==>(Pattern 1,1)] [==>(Pattern 1,2)] [==>(Pattern 2,1)] [==>(Pattern 2,2)]	[1]
2	(1) GRB130925A	(1) GRB130925A	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=7; SAMP-SEQ=SPAR S50	POS TARG -9.7819 01438715447,-35.27 975702180538	Pattern 3, Exps 2-2 i n C1 (05) (3)	302.934997 Secs (1211.74 Secs) [==>(Pattern 1,1)] [==>(Pattern 1,2)] [==>(Pattern 2,1)] [==>(Pattern 2,2)]	[1]	



Proposal 13611 - C2 (06) - The nature of the low redshift ultra-long GRB130925A: core collapse or tidal disruption?

Thu Jul 31 01:00:38 GMT 2014

Visit	Proposal 13611, C2 (06), implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: SAME ORIENT AS 05; BEFORE 25-AUG-2014:00:00:00										
	Patterns	#	Primary Pattern				Secondary Pattern			Exposures	
		(2)	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)	GRB130925A	RA: 02 44 42.9600 (41.1790000d) Dec: -26 09 11.20 (-26.15311d) Equinox: J2000				V=22+/-0.3		Reference Frame: ICRS		
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
	1		(1) GRB130925A	WFC3/UVIS, ACCUM, UVIS2	F814W	CR-SPLIT=NO	GS ACQ SCENARI O ONEB1B3	Pattern 2, Exps 1-1 i n C2 (06) (2)	600 Secs (2400 Secs)		[1]
									[=>(Pattern 1)]		
									[=>(Pattern 2)]		
									[=>(Pattern 3)]		
									[=>(Pattern 4)]		

