15329 - Fine-Tuned Search for Kilonova Emission in a Short Gamma-Ray Burst: Implications for the Progenitors, Advanced LIGO, and r-Process Nucleosynthesis

Cycle: 25, Proposal Category: GO

(Availability Mode: SUPPORTED)

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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) GRB170817A	WFC3/IR	1	18-Dec-2017 13:00:12.0	yes
04	(1) GRB170817A	WFC3/UVIS	1	18-Dec-2017 13:00:14.0	yes
05	(1) GRB170817A	ACS/WFC	2	18-Dec-2017 13:00:15.0	yes
02	(2) SGRB	WFC3/IR	2	18-Dec-2017 13:00:16.0	yes

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
03	(2) SGRB	ACS/WFC WFC3/IR	4	18-Dec-2017 13:00:18.0	yes
06	(1) GRB170817A	WFC3/IR	3	18-Dec-2017 13:00:20.0	yes
07	(1) GRB170817A	ACS/WFC	1	18-Dec-2017 13:00:21.0	yes
08	(1) GRB170817A	ACS/WFC	1	18-Dec-2017 13:00:22.0	yes
09	(1) GRB170817A	ACS/WFC	1	18-Dec-2017 13:00:22.0	yes

16 Total Orbits Used

ABSTRACT

Short-duration gamma-ray bursts have long been suspected to result from the catastrophic mergers of binaries composed of two neutron stars (NS-NS) and/or a neutron star and a black hole (NS-BH). An important direct signature of NS-NS/NS-BH progenitors is near-infrared emission powered by radioactive r-process material synthesized by the ejection of neutron-rich matter during the merger, a so-called "kilonova". HST observations of the short GRB130603B provided the first tantalizing evidence for such an emission component, but unfortunately lacked detailed spectral and temporal information. Here, we propose fine-tuned TOO observations of a future short GRB that will definitively establish the presence of a kilonova and will also allow us to distinguish an NS-NS from an NS-BH merger, based on the ejecta mass (~0.01 vs. ~0.1 Msun, respectively). The results will not only serve as a smoking gun for compact object merger progenitors, but they will also establish whether compact object mergers are the primary site for cosmic r-process nucleosynthesis. To support and interpret the proposed HST observations, and to rule out alternative explanations for any detected emission, we will obtain a wide range of observations spanning radio to X-rays using active programs at Gemini, Magellan, MMT, VLA, Chandra, and XMM.

OBSERVING DESCRIPTION

To determine the expected apparent brightness of the kilonova for the expected range of ejecta masses (0.01 - 0.1 Msun), and to inform our choice of filters, we convolve the models of Barnes & Kasen (2013) as a function of redshift with the ACS/F814W, WFC3/F110W, and WFC3/F160W filter response functions. We calculate the resulting apparent brightness in two rest-frame times of 4 days (peak) and 10 days (post-maximum). The actual observer-frame times for the two HST epochs will therefore be 4x(1+z) days and 10x(1+z) days, where the redshift will be known prior to triggering the HST observations. The choice of filters is designed to straddle the break at 1 micron in the rest-frame, in order to capture the unusually red color

of a kilonova relative to the afterglow.

We base our HST trigger criteria and time request on the model with 0.01 Msun so that we can probe the wide range of ejecta masses predicted by numerical simulations (rather than just the bright upper bound of 0.1 Msun; this will allow any non-detections to place meaningful constraints on the nature of the binary (NS-NS vs. NS-BH) and on future searches for optical/near-IR counterparts of Advanced LIGO sources.

Epoch 1 [4x(1+z) days]: We find that at z < 0.2 it is advantageous to use the ACS/F814W and WFC3/F110W filters which give the best combination of sensitivity (5-sigma =27.7 and 27.5 AB mag in 2 orbits each, respectively, using the ACS and WFC3 ETCs) and color contrast (F814W - F110W ~ 1.6 - 2 AB mag). By comparison, the afterglow color in these filters is much bluer, with F814W - F110W ~ 0.3 AB mag. At z = 0.2 - 0.4 we will instead use the WFC3/F110W and F160W filters to capture the spectral peak (5-sigma = 26.3 AB mag for F160W in 2 orbits). The resulting color is F110W - F160W ~ 0.6 - 1.2 AB mag, compared to a bluer color for the afterglow, F110W - F160W ~ 0.3 AB mag. The kilonova emission for 0.1 Msun can be detected to z ~ 0.7, but we truncate our trigger criteria at z =0.4 to be able to detect the emission in the case of 0.01 Msun, typical of NS-NS mergers.

Epoch 2 [10x(1+z) days]: We will only obtain observations in a single filter redward of the 1 micron break since we are only concerned with demonstrating a rapid decline that will help to firm up the kilonova nature and to better constrain the ejecta mass (i.e., the unusually red color will already be established with the first epoch near peak). This will require 2 orbits in F110W (z < 0.2) or F160W (z = 0.2 - 0.4). In this case, if the ejecta mass is ~0.01 Msun we will obtain a deep upper limit that will establish the expected rapid fading, while in the case of ~0.1 Msun we will have a second detection.

Templates [>1 month]: We will require template images after the kilonova emission has faded away that match the exposure time and filters of the early observations. This will therefore require a total of 4 orbits (2 orbits in each filter). We note, however, that in the case of ~0.01 Msun a non-detection in the second epoch could be used as a template in one of the two filters (F110W or F160W depending on the redshift), meaning that the final observation will require only 2 orbits. Since we do not know the ejecta mass in advance we request 4 orbits for the final epoch, but may use only 2 orbits.

Visit

Proposal 15329, GRB170817A_JH (01), completed Mon Dec 18 18:00:23 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ON HOLD ; TOO RESPONSE TIME 4.0D

On Hold Comments: This visit is a target of opportunity triggered on a Short GRB of z < 0.2. This is our first epoch and should be triggered at 4 x (1+z) days after the GRB detection.

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(2)	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

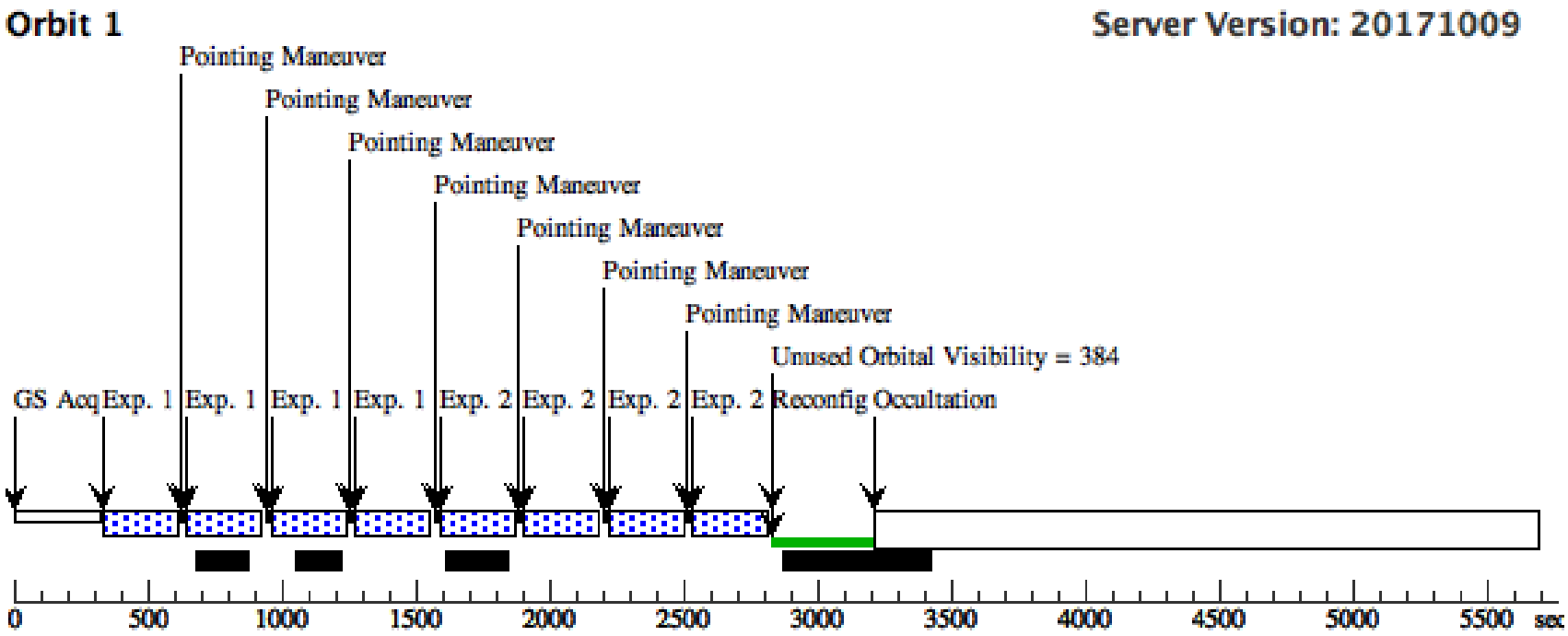
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	GRB170817A	RA: 13 09 48.0900 (197.4503750d) Dec: -23 22 53.35 (-23.38149d) Equinox: J2000		V=22	Reference Frame: ICRS

Comments:
Category=EXT-STAR
Description=[GAMMA RAY BURSTER]
Extended=NO

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) GRB170817A	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=6; SAMP-SEQ=SPARS50		Pattern 2, Exps 1-1 in GRB170817A_JH (01) (2)	252.934546 Secs (1011.738 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***
2		(1) GRB170817A	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=6; SAMP-SEQ=SPARS50		Pattern 2, Exps 2-2 in GRB170817A_JH (01) (2)	252.934546 Secs (1011.738 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***

Orbit Structure



Visit

Proposal 15329, GRB170817A_U (04), completed Mon Dec 18 18:00:23 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: ON HOLD ; TOO RESPONSE TIME 4.0D

Comments: Triggering now on this visit only - target visibility too short to activate other templates

On Hold Comments: This visit is a target of opportunity triggered on a Short GRB of z < 0.2. This is our first epoch and should be triggered at 4 x (1+z) days after the GRB detection.

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(3)	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

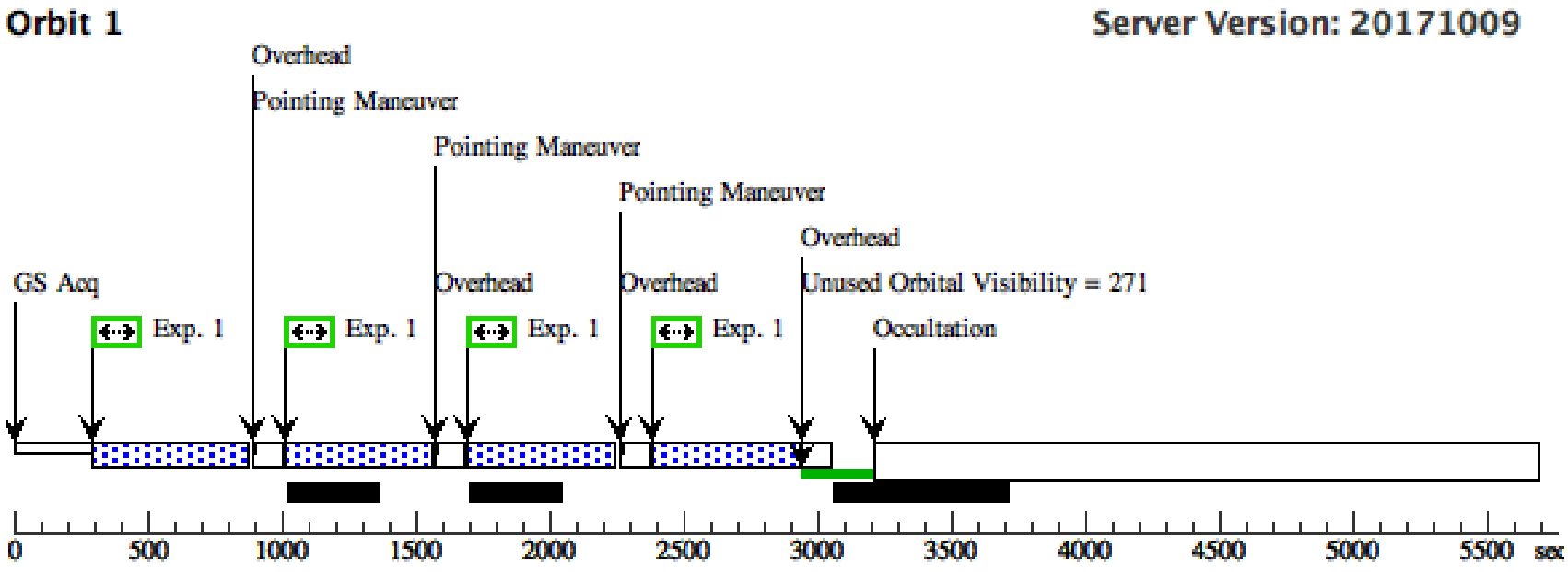
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	GRB170817A	RA: 13 09 48.0900 (197.4503750d) Dec: -23 22 53.35 (-23.38149d) Equinox: J2000		V=22	Reference Frame: ICRS

Comments:
Category=EXT-STAR
Description=[GAMMA RAY BURSTER]
Extended=NO

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) GRB170817A	WFC3/UVIS, ACCUM, UVIS	F336W	FLASH=12		Pattern 3, Exps 1-1 in GRB170817A_U (04) (3)	550 Secs (2200 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***

Orbit Structure



Visit

Proposal 15329, GRB170817A_griz (05), completed Mon Dec 18 18:00:23 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: ON HOLD ; TOO RESPONSE TIME 4.0D

Comments: Triggering now on this visit only - target visibility too short to activate other templates

On Hold Comments: This visit is a target of opportunity triggered on a Short GRB of z < 0.2. This is our first epoch and should be triggered at 4 x (1+z) days after the GRB detection.

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(4)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=3.034 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.29 Angle Between Sides= Center Pattern=false		(2), (3), (4)
(5)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=3 Point Spacing=3.034 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.29 Angle Between Sides= Center Pattern=false		(1)

Fixed Targets

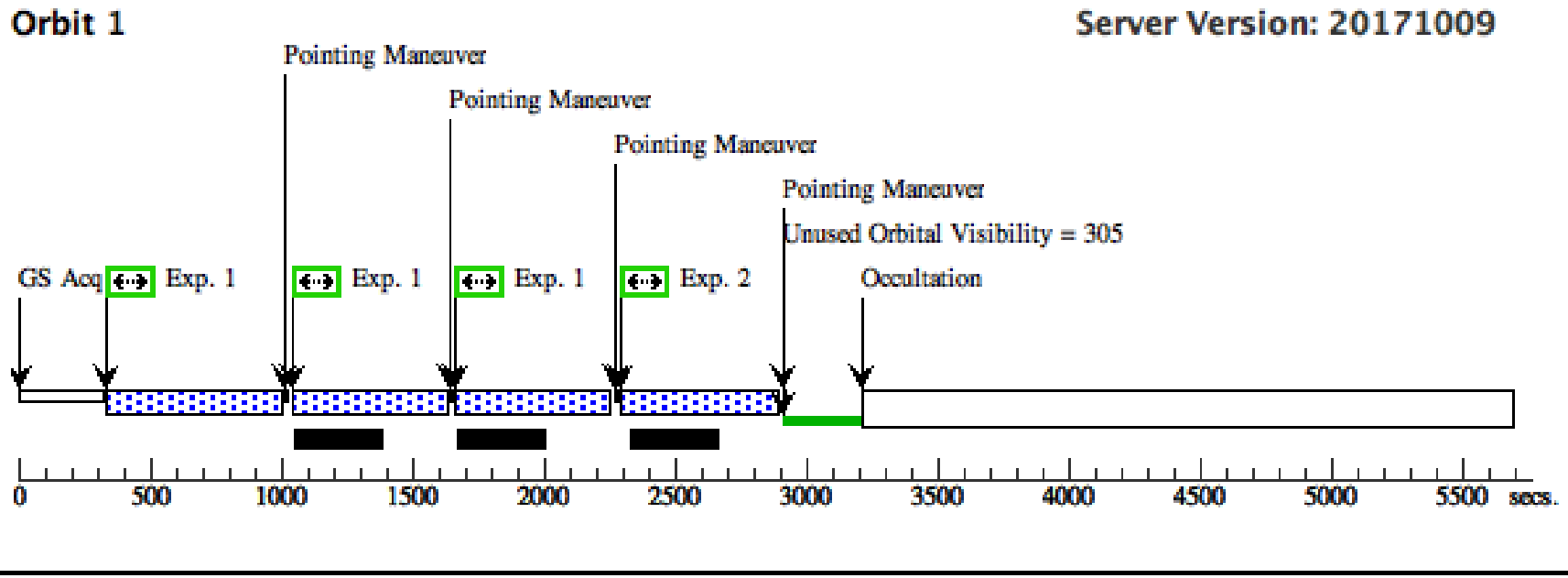
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	GRB170817A	RA: 13 09 48.0900 (197.4503750d) Dec: -23 22 53.35 (-23.38149d) Equinox: J2000		V=22	Reference Frame: ICRS

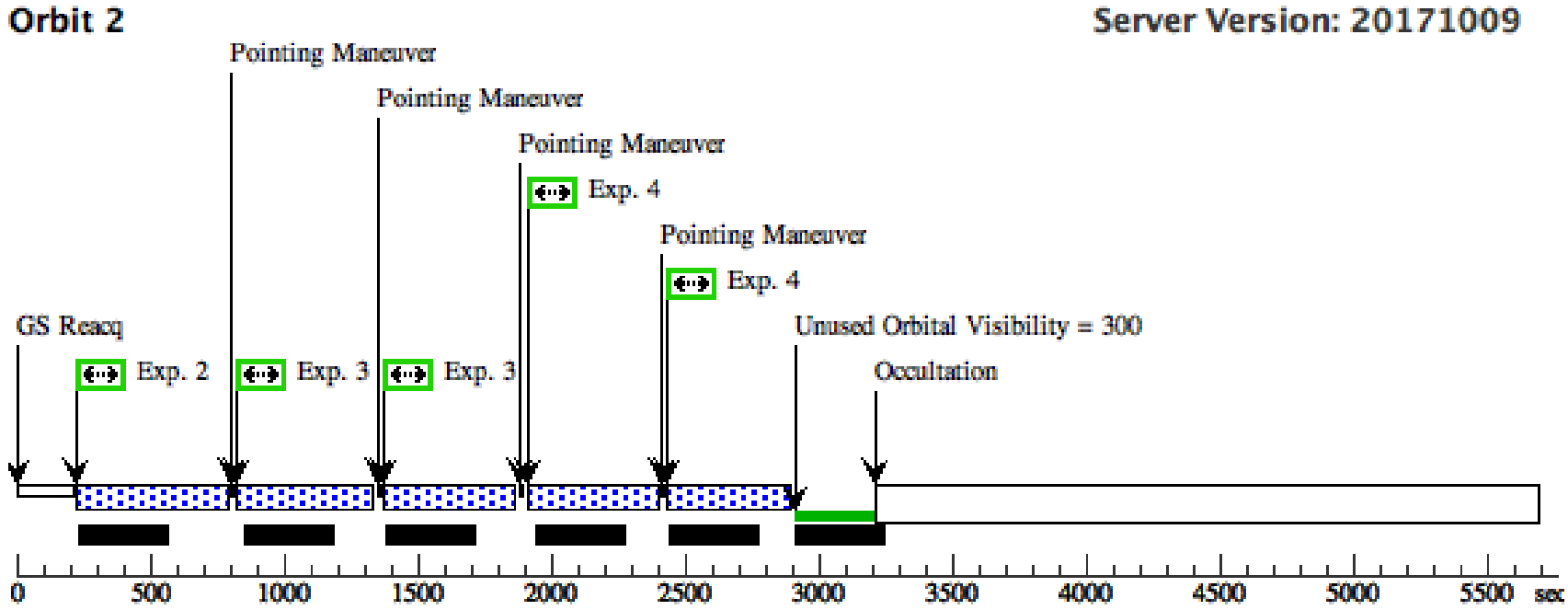
Comments:
Category=EXT-STAR
Description=[GAMMA RAY BURSTER]
Extended=NO

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) GRB170817A	ACS/WFC, ACCUM, WFC	F475W			Pattern 5, Exps 1-1 in GRB170817A_griz (05) (5)	465 Secs (1395 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	 ***[1]***
2		(1) GRB170817A	ACS/WFC, ACCUM, WFC	F625W			Pattern 4, Exps 2-2 in GRB170817A_griz (05) (4)	445 Secs (890 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	 ***[1]*** ***[2]***
3		(1) GRB170817A	ACS/WFC, ACCUM, WFC	F775W			Pattern 4, Exps 3-3 in GRB170817A_griz (05) (4)	370 Secs (740 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	 ***[2]***
4		(1) GRB170817A	ACS/WFC, ACCUM, WFC	F850LP			Pattern 4, Exps 4-4 in GRB170817A_griz (05) (4)	340 Secs (680 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	 ***[2]***

Orbit Structure





Visit

Proposal 15329, SRGB-DAY10 (02), withdrawn Mon Dec 18 18:00:23 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ON HOLD

Comments: This second visit describes the set of exposures that would be conducted for a Short GRB at a redshift of z < 0.2 using the WFC3/F110W filter. If the Short GRB is detected at z = 0.2-0.4, then WFC3/F160W will be used as described in our observing details.

On Hold Comments: This visit is a target of opportunity triggered on a Short GRB of z < 0.2. This is our second epoch and should be triggered at 10 x (1+z) days after the GRB detection.

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(2)	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)

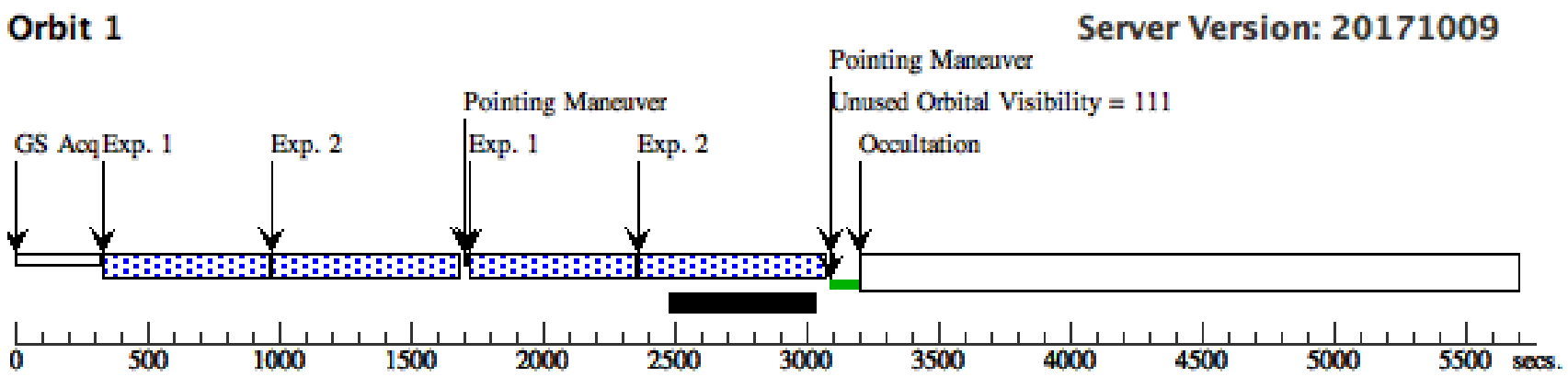
Generic Targets

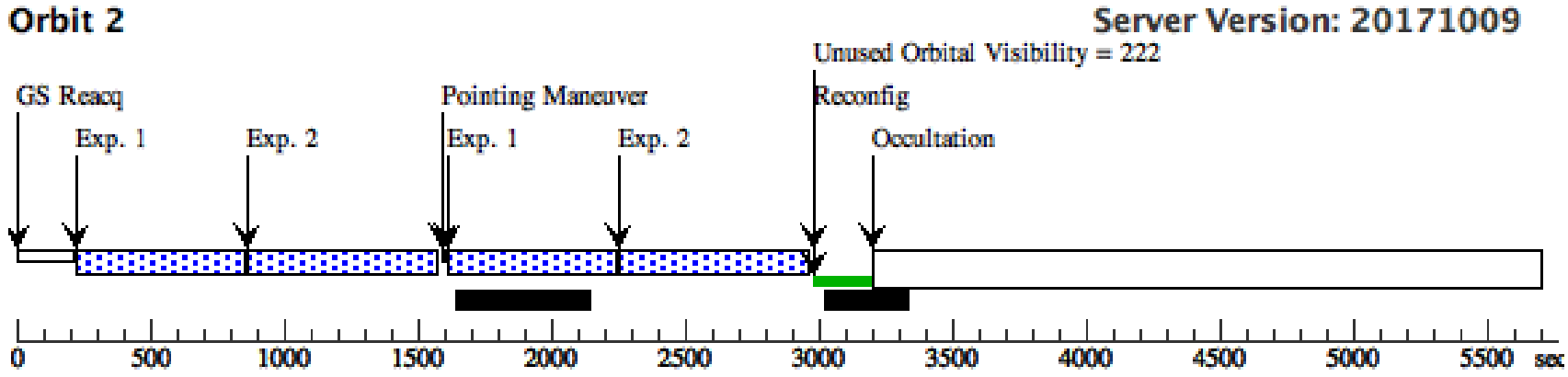
#	Name	Criteria	Description
(2)	SGRB	d<200Mpc	

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	SGRB-KILONOVA-DAY10-ORBIT1	(2) SGRB	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=7; SAMP-SEQ=SPARS100		Pattern 2, Exps 1-2 in SRGB-DAY10 (02) (2)	602.934229 Secs (2411.737 Secs)	
								[==>(Pattern 1)] *[==>(Pattern 2)]*	***[1]***
								[==>(Pattern 3)] *[==>(Pattern 4)]*	***[2]***
2	SGRB-KILONOVA-DAY10-ORBIT2	(2) SGRB	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=8; SAMP-SEQ=SPARS100		Pattern 2, Exps 1-2 in SRGB-DAY10 (02) (2)	702.934552 Secs (2811.738 Secs)	
								[==>(Pattern 1)] *[==>(Pattern 2)]*	***[1]***
								[==>(Pattern 3)] *[==>(Pattern 4)]*	***[2]***

Orbit Structure





Visit

Proposal 15329, SRGB-TEMPLATE (03), withdrawn Mon Dec 18 18:00:24 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR, ACS/WFC

Special Requirements: ON HOLD

Comments: This final visit describes the set of exposures that would be conducted for a Short GRB at a redshift of z < 0.2 using the ACS/F814W and WFC3/F110W filters. If the Short GRB is detected at z = 0.2-0.4, then WFC3/F110W and WFC3/F160W will be used as described in our observing details.

If the second visit results in a non-detection, then this visit will be reduced to just the first 2 orbits.

On Hold Comments: This visit is a target of opportunity triggered on a Short GRB of z < 0.2. This is our template epoch and should be triggered at >1 month after the GRB detection.

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.262 Line Spacing=0.192	Coordinate Frame=POS-TARG Pattern Orientation=18.39 Angle Between Sides=68.14 Center Pattern=false		(1-2)
(2)	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		(3-4)

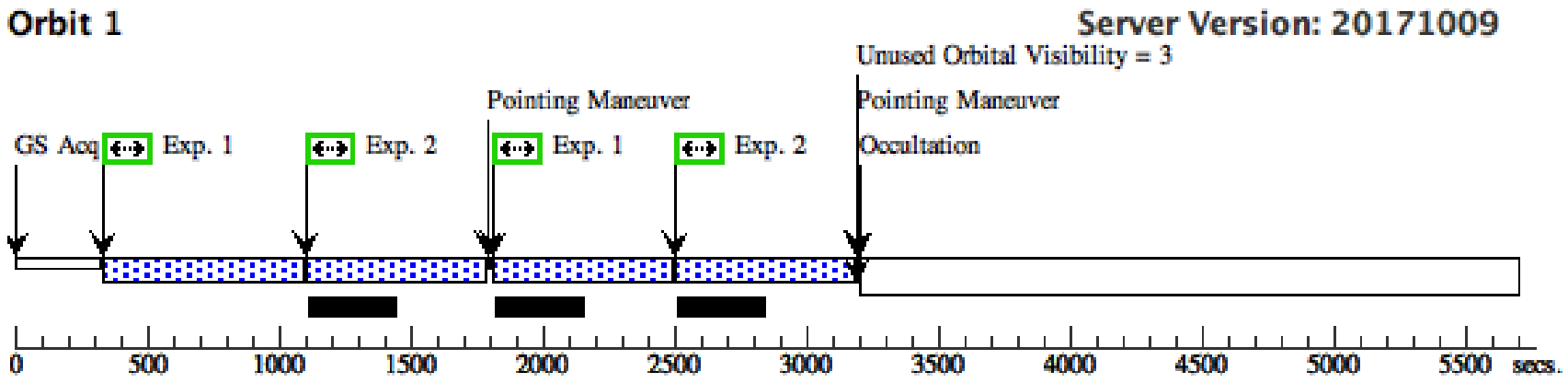
Generic Targets

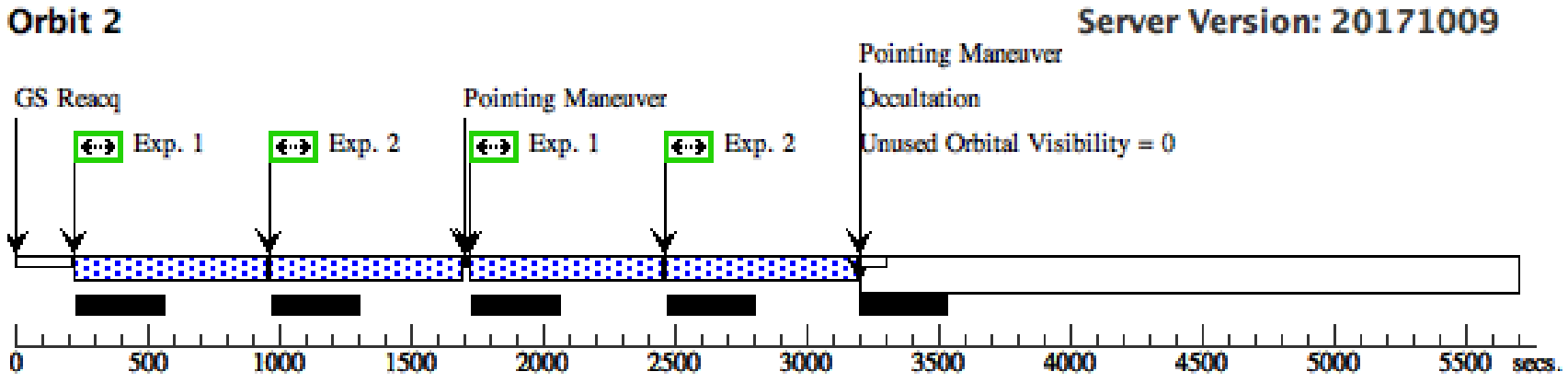
#	Name	Criteria	Description
(2)	SGRB	d<200Mpc	

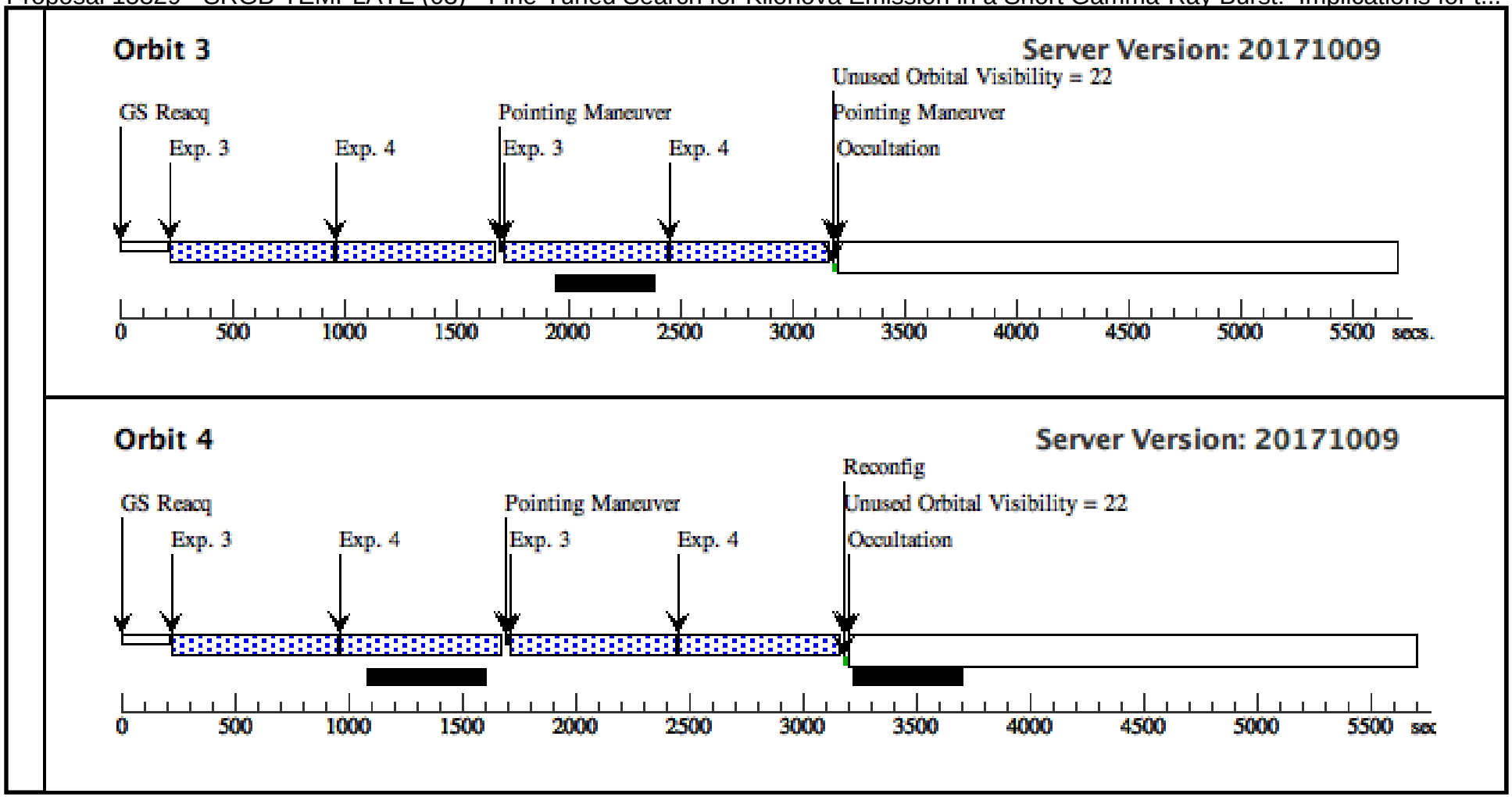
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	SGRB-KILONOVA-TEMPLATE-ORBIT1	(2) SGRB	ACS/WFC, ACCUM, WFC	F814W			Pattern 1, Exps 1-2 in SRGB-TEMPLATE (03) (1)	500 Secs (2310 Secs)	
								[==>553.0 Secs (Pattern 1)] *[==>553.0 Secs (Pattern 2)]*	***[1]***
								[==>602.0 Secs (Pattern 3)] *[==>602.0 Secs (Pattern 4)]*	***[2]***
2	SGRB-KILONOVA-TEMPLATE-ORBIT2	(2) SGRB	ACS/WFC, ACCUM, WFC	F814W			Pattern 1, Exps 1-2 in SRGB-TEMPLATE (03) (1)	500 Secs (2310 Secs)	
								[==>553.0 Secs (Pattern 1)] *[==>553.0 Secs (Pattern 2)]*	***[1]***
								[==>602.0 Secs (Pattern 3)] *[==>602.0 Secs (Pattern 4)]*	***[2]***
3	SGRB-KILONOVA-TEMPLATE-ORBIT3	(2) SGRB	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=8; SAMP-SEQ=SPARS100		Pattern 2, Exps 3-4 in SRGB-TEMPLATE (03) (2)	702.934552 Secs (2811.738 Secs)	
								[==>(Pattern 1)] *[==>(Pattern 2)]*	***[3]***
								[==>(Pattern 3)] *[==>(Pattern 4)]*	***[4]***
4	SGRB-KILONOVA-TEMPLATE-ORBIT4	(2) SGRB	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=8; SAMP-SEQ=SPARS100		Pattern 2, Exps 3-4 in SRGB-TEMPLATE (03) (2)	702.934552 Secs (2811.738 Secs)	
								[==>(Pattern 1)] *[==>(Pattern 2)]*	***[3]***
								[==>(Pattern 3)] *[==>(Pattern 4)]*	***[4]***

Orbit Structure






Orbit 3
Server Version: 20171009
Unused Orbital Visibility = 22
GS Reacq
Exp. 3
Exp. 4
Pointing Maneuver
Exp. 3
Exp. 4
Pointing Maneuver
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.
Orbit 4
Server Version: 20171009
Reconfig
GS Reacq
Exp. 3
Exp. 4
Pointing Maneuver
Exp. 3
Exp. 4
Unused Orbital Visibility = 22
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 15329, GRB170817A_J1 (06), completed Mon Dec 18 18:00:24 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: BEFORE 15-DEC-2017:00:00:00

Comments: 3 orbits with WFC3-IR/F110W

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(2)	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), (3)

Fixed Targets

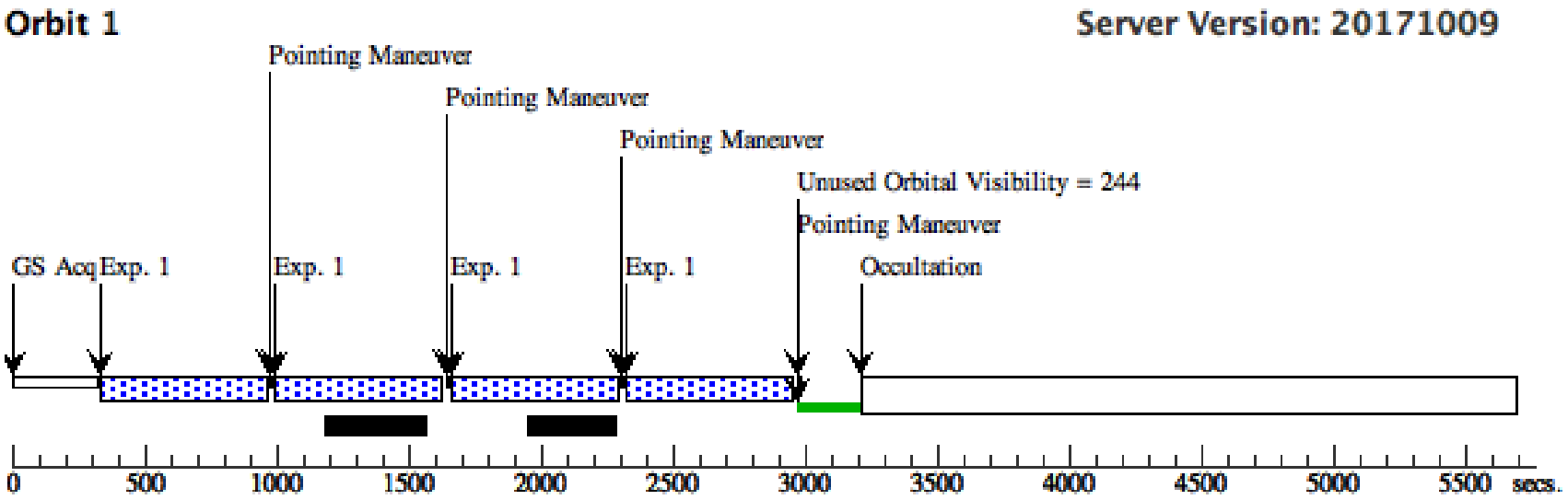
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	GRB170817A	RA: 13 09 48.0900 (197.4503750d) Dec: -23 22 53.35 (-23.38149d) Equinox: J2000		V=22	Reference Frame: ICRS

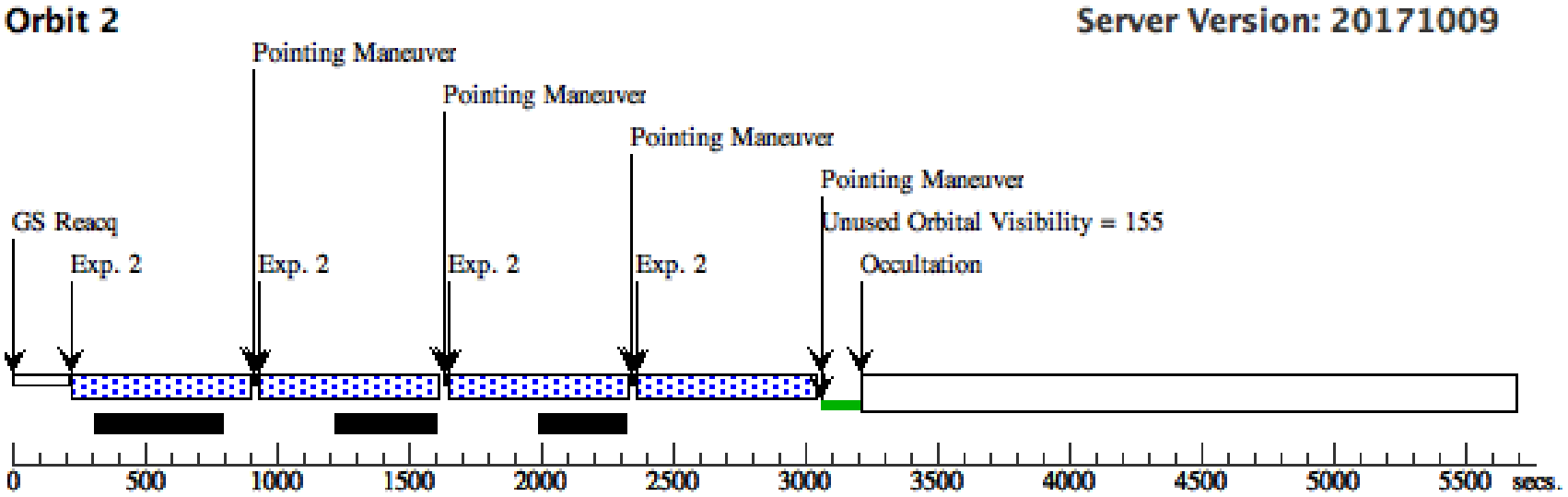
Comments:
Category=EXT-STAR
Description=[GAMMA RAY BURSTER]
Extended=NO

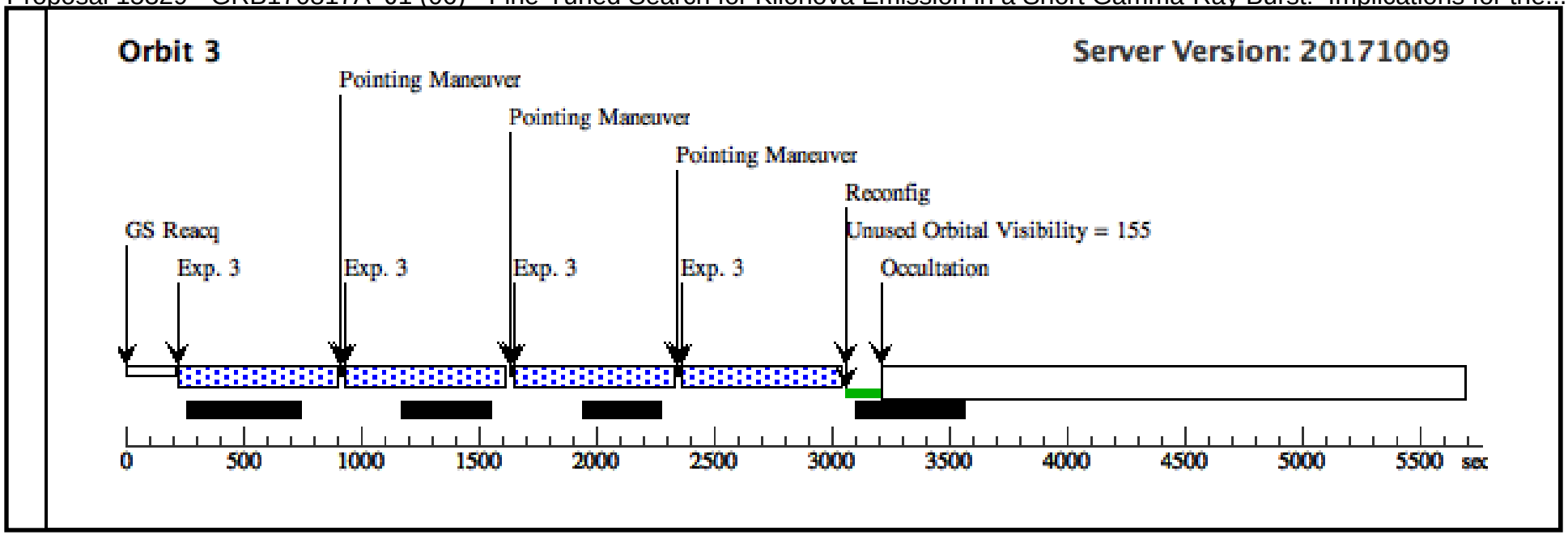
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) GRB170817A	WFC3/IR, MULTIACCUM, IR	F110W	SAMP-SEQ=SPARS50; NSAMP=13		Pattern 2, Exps 1-1 in GRB170817A_J1 (06) (2)	602.937703 Secs (2411.751 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***
2		(1) GRB170817A	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=14; SAMP-SEQ=SPARS50		Pattern 2, Exps 2-2 in GRB170817A_J1 (06) (2)	652.938154 Secs (2611.753 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[2]***
3		(1) GRB170817A	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=14; SAMP-SEQ=SPARS50		Pattern 2, Exps 3-3 in GRB170817A_J1 (06) (2)	652.938154 Secs (2611.753 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[3]***

Orbit Structure






Orbit 3
Server Version: 20171009
Pointing Maneuver
Pointing Maneuver
Pointing Maneuver
Reconfig
GS Reacq
Unused Orbital Visibility = 155
Exp. 3
Exp. 3
Exp. 3
Exp. 3
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 15329, GRB170817A_V1 (07), implementation Mon Dec 18 18:00:24 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: ORIENT 280D TO 230 D; BETWEEN 01-JAN-2018:00:00:00 AND 28-FEB-2018:00:00:00

Comments: 1 orbit with ACS/WFC/F606W in January/February 2018.

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.262 Line Spacing=0.192	Coordinate Frame=POS-TARG Pattern Orientation=18.39 Angle Between Sides=68.14 Center Pattern=false		(1)

Fixed Targets

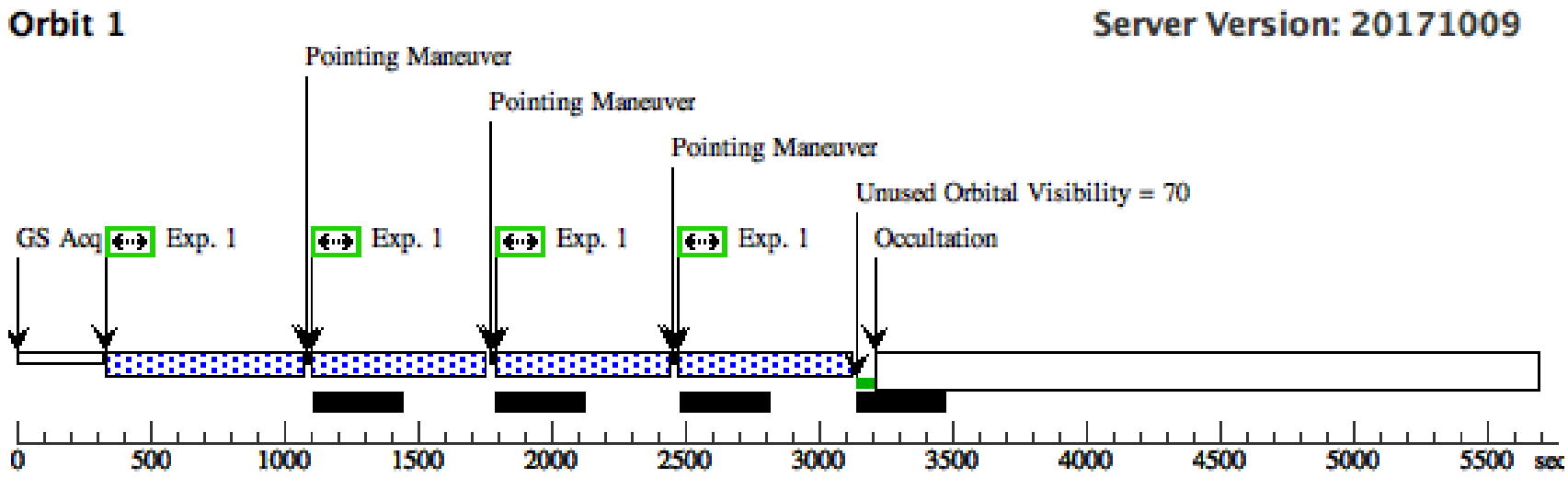
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	GRB170817A	RA: 13 09 48.0900 (197.4503750d) Dec: -23 22 53.35 (-23.38149d) Equinox: J2000		V=22	Reference Frame: ICRS

Comments:
Category=EXT-STAR
Description=[GAMMA RAY BURSTER]
Extended=NO

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) GRB170817A	ACS/WFC, ACCUM, WFC	F606W			Pattern 1, Exps 1-1 in GRB170817A_V1 (07) (1)	530 Secs (2120 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***

Orbit Structure



Visit

Proposal 15329, GRB170817A_V2 (08) Mon Dec 18 18:00:24 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: ORIENT 280D TO 230 D; AFTER 07 BY 80 D TO 100 D

Comments: 1 orbit with ACS/WFC/F606W in 3 months after visit 7

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.262 Line Spacing=0.192	Coordinate Frame=POS-TARG Pattern Orientation=18.39 Angle Between Sides=68.14 Center Pattern=false		(1)

Fixed Targets

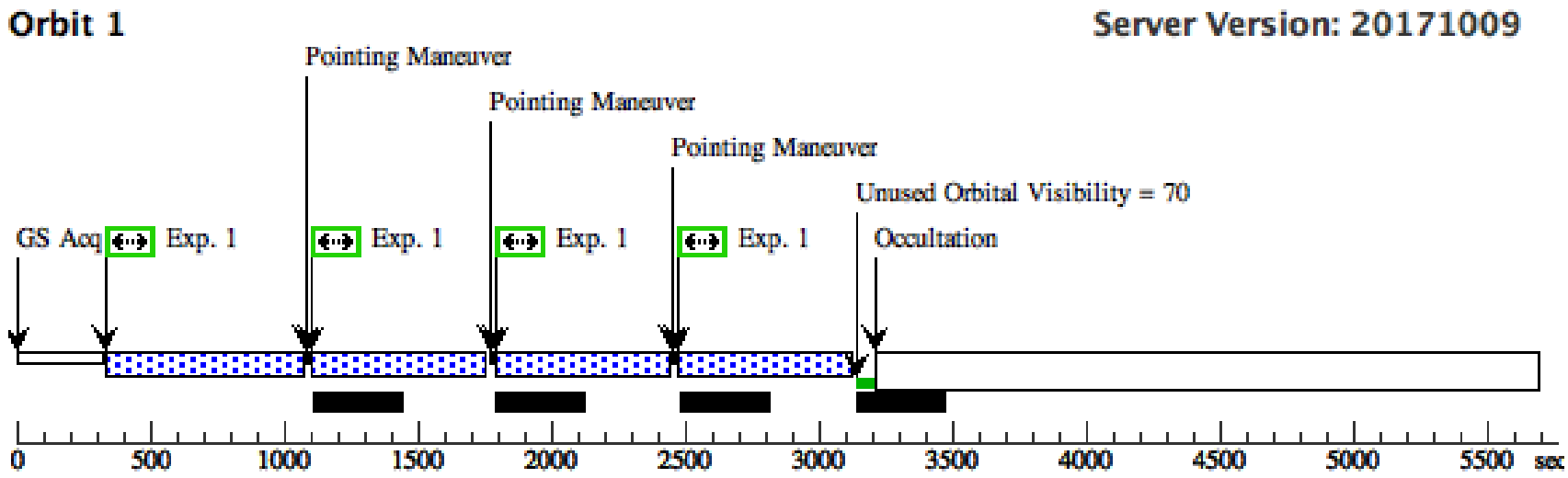
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	GRB170817A	RA: 13 09 48.0900 (197.4503750d) Dec: -23 22 53.35 (-23.38149d) Equinox: J2000		V=22	Reference Frame: ICRS

Comments:
Category=EXT-STAR
Description=[GAMMA RAY BURSTER]
Extended=NO

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) GRB170817A	ACS/WFC, ACCUM, WFC	F606W			Pattern 1, Exps 1-1 in GRB170817A_V2 (08) (1)	530 Secs (2120 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***

Orbit Structure



Visit

Proposal 15329, GRB170817A_V3 (09) Mon Dec 18 18:00:24 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: ORIENT 280D TO 230 D; AFTER 07 BY 180 D TO 220 D

Comments: 1 orbit with ACS/WFC/F606W in 7 months after visit 7

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.262 Line Spacing=0.192	Coordinate Frame=POS-TARG Pattern Orientation=18.39 Angle Between Sides=68.14 Center Pattern=false		(1)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	GRB170817A	RA: 13 09 48.0900 (197.4503750d) Dec: -23 22 53.35 (-23.38149d) Equinox: J2000		V=22	Reference Frame: ICRS

Comments:
Category=EXT-STAR
Description=[GAMMA RAY BURSTER]
Extended=NO

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) GRB170817A	ACS/WFC, ACCUM, WFC	F606W			Pattern 1, Exps 1-1 in GRB170817A_V3 (09) (1)	530 Secs (2120 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	*[1]*

Orbit Structure