14804 - Rapid ToO observations of the first gravitational wave counterparts

Cycle: 24, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

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VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
G1	(2) GRB170817A	WFC3/IR	1	18-Aug-2017 14:05:32.0	yes
G3	(2) GRB170817A	WFC3/IR	1	18-Aug-2017 14:05:34.0	yes
G2	(2) GRB170817A	WFC3/IR	1	18-Aug-2017 14:05:35.0	yes
G4	(2) GRB170817A	WFC3/IR	1	18-Aug-2017 14:05:36.0	yes

4 Total Orbits Used

ABSTRACT

We propose a series of disruptive ToO observations of the first electromagnetic counterparts to gravitational wave sources. These observations will track the likely rapidly fading counterparts to levels a factor 10 fainter than possible from the ground. They will determine the spectral and temporal evolution, evaluate their power sources, ascertain their contribution to the production of heavy elements in the Universe, pinpoint them on their host galaxies and provide information to hone further searches. In concert with already award late time (>3 week turnaround) observations these observations will provide a unique and powerful view of a newly discovered, but long awaited class of astronomical object.

OBSERVING DESCRIPTION

This is a proposal to obtain HST observations of the first electromagnetic counterparts to gravitational wave sources. It
is a disruptive ToO programme, with the first observations taking place after a few days (3-6 after trigger) and subsequent observations at ~1 week intervals. Late time observations will be obtained with a separate programme. Our programme
envisages different strategies depending on the nature of the counterpart, we outline each of these below:

1) Optical/IR counterpart discovery

In this case we will likely trigger IR spectroscopy to search for kilonova emission. This will be through visits G1 and G2 which call for G102 and G141 grism spectroscopy as well as short direct images in F125W and F160W. Our later observations will be imaging in F125W and F160W (visits I1 and I2) to track the lightcurve. If the source is very faint, then we may omit the grism spectroscopy and use the X visits in F140W instead.

2) X-ray only counterpart discovery

Here we assume that deep optical observations at the counterpart location have failed to identify a optical counterpart. In this case we will conduct a deep imaging search with HST. This will use visits X1-X4 (1 and 2 orbit visits in F140W) in order to conduct a deep search for any kilonova emission.

Visit

Proposal 14804, Visit G1, implementation Fri Aug 18 18:05:37 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 100%; ORIENT 125D TO 135 D; BETWEEN 19-AUG-2017:00:00:00 AND 24-AUG-2017:00:00:00; ON HOLD

On Hold Comments: Awaiting SGRB trigger

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		(2)
(3)	Pattern Type=WFC3-IR-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.605 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(1)

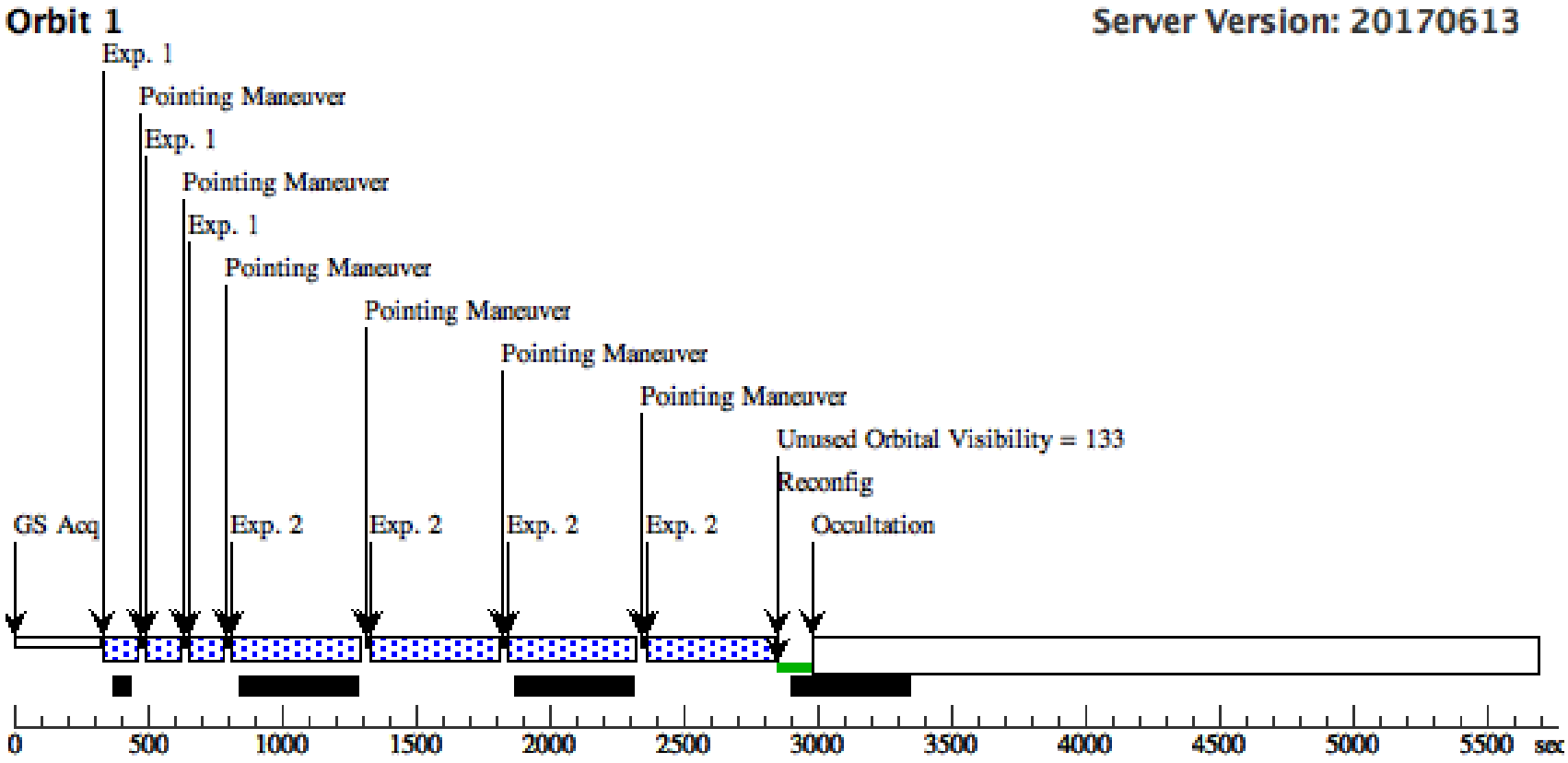
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	GRB170817A	RA: 13 09 48.0800 (197.4503333d) Dec: -23 22 53.20 (-23.38144d) Equinox: J2000		V=16+/-1	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(2) GRB170817A	WFC3/IR, MULTIACCUM, GRISM1024	F110W	NSAMP=7; SAMP-SEQ=STEP50		Pattern 3, Exps 1-1 in Visit G1 (3)	99.230677 Secs (297.692 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	 ***[1]***
2		(2) GRB170817A	WFC3/IR, MULTIACCUM, GRISM1024	G102	NSAMP=10; SAMP-SEQ=SPARS50		Pattern 1, Exps 2-2 in Visit G1 (1)	452.93635 Secs (1811.745 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	 ***[1]***

Orbit Structure



Visit

Proposal 14804, Visit G3 Fri Aug 18 18:05:37 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 100%; SAME ORIENT AS G1; BETWEEN 23-AUG-2017:00:00:00 AND 27-AUG-2017:00:00:00; ON HOLD

On Hold Comments: Awaiting SGRB trigger

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		(2)
(3)	Pattern Type=WFC3-IR-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.605 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(1)

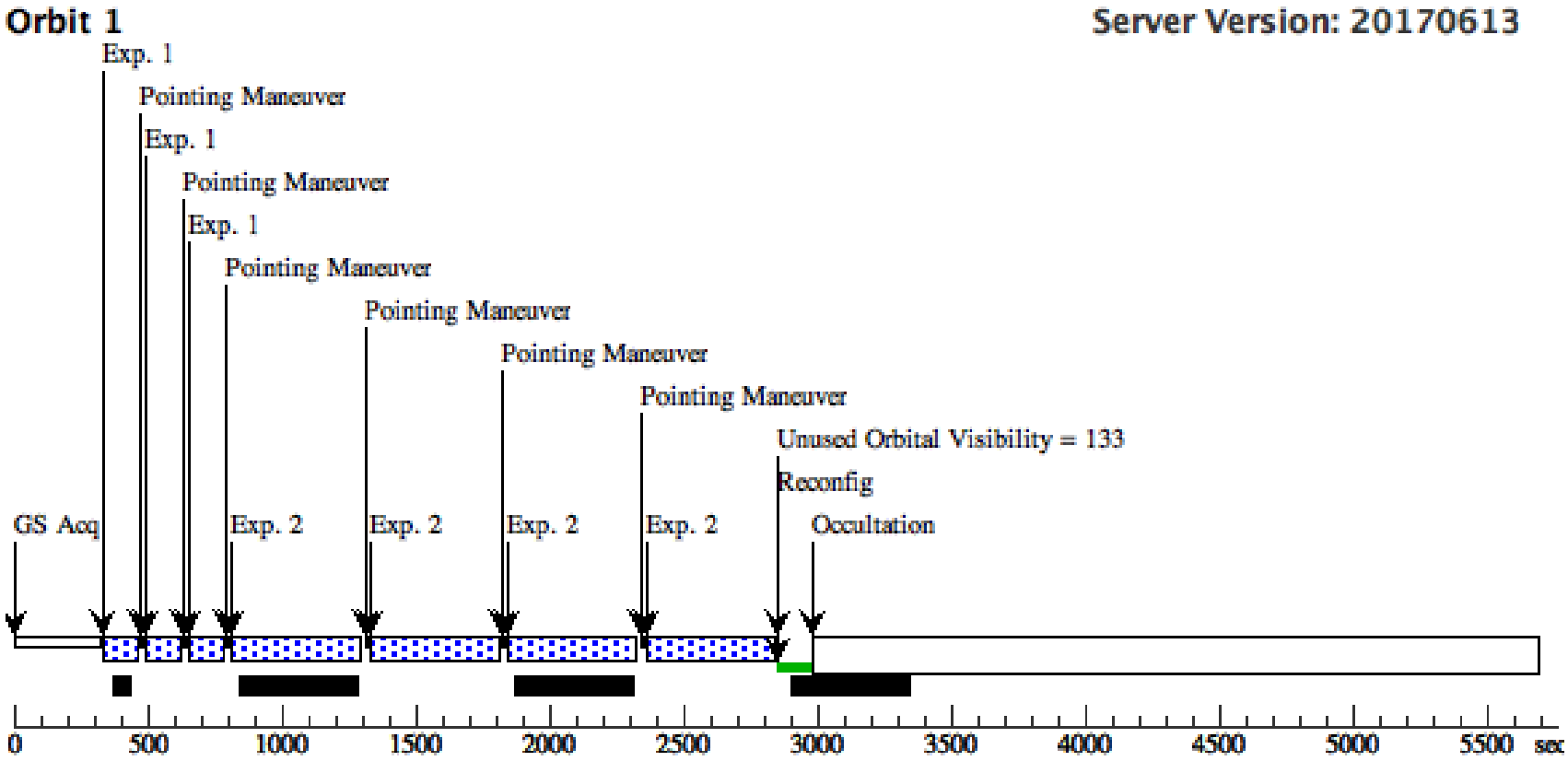
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	GRB170817A	RA: 13 09 48.0800 (197.4503333d) Dec: -23 22 53.20 (-23.38144d) Equinox: J2000		V=16+/-1	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(2) GRB170817A	WFC3/IR, MULTIACCUM, GRISM1024	F110W	NSAMP=7; SAMP-SEQ=STEP50		Pattern 3, Exps 1-1 in Visit G3 (3)	99.230677 Secs (297.692 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	***[1]***
2		(2) GRB170817A	WFC3/IR, MULTIACCUM, GRISM1024	G102	NSAMP=10; SAMP-SEQ=SPARS50		Pattern 1, Exps 2-2 in Visit G3 (1)	452.93635 Secs (1811.745 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***

Orbit Structure



Visit

Proposal 14804, Visit G2, implementation Fri Aug 18 18:05:37 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 100%; SAME ORIENT AS G1; BETWEEN 19-AUG-2017:00:00:00 AND 24-AUG-2017:00:00:00; ON HOLD

On Hold Comments: Awaiting SGRB trigger

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		(2)
(3)	Pattern Type=WFC3-IR-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.605 Line Spacing= Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(1)

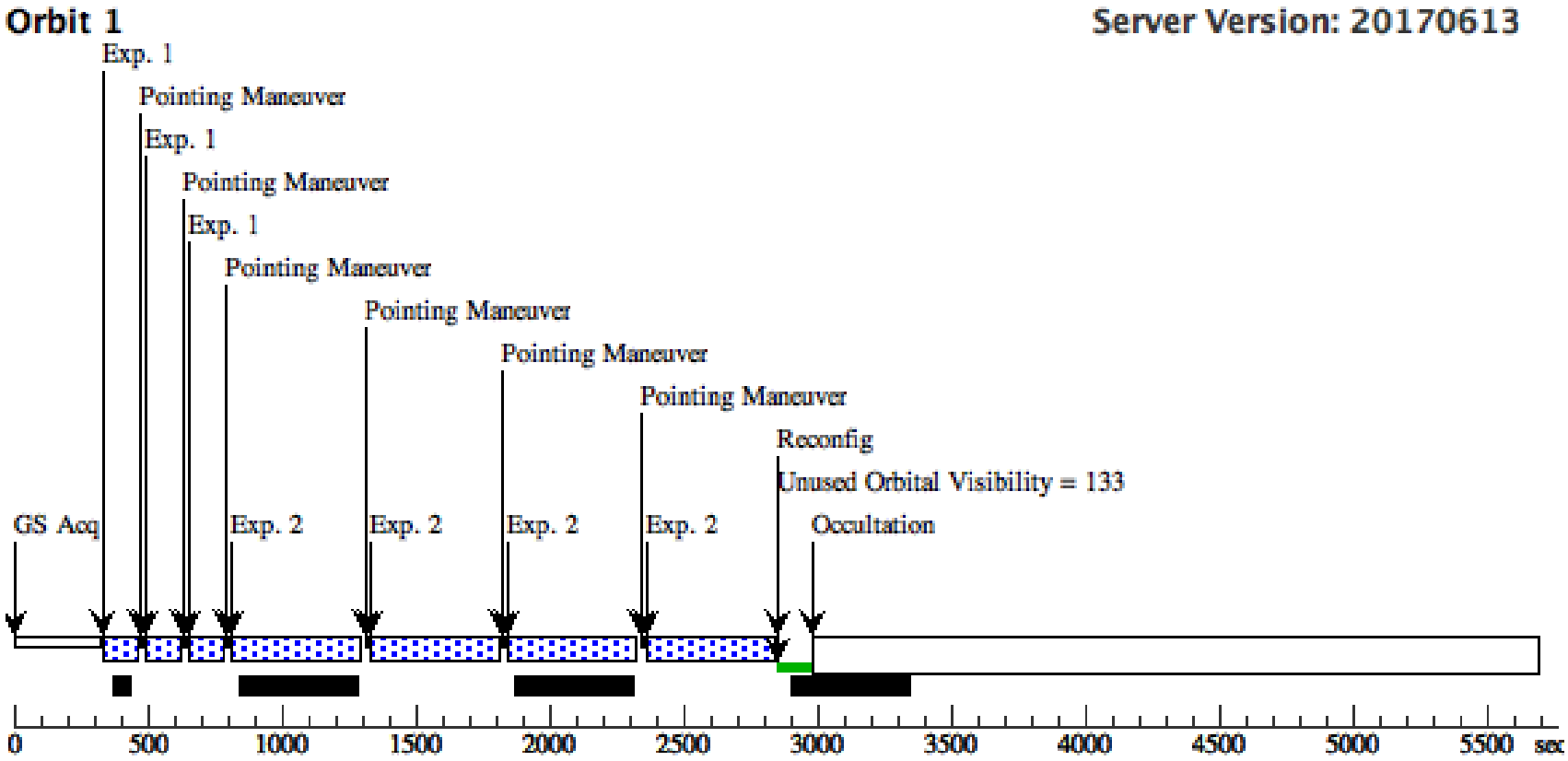
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	GRB170817A	RA: 13 09 48.0800 (197.4503333d) Dec: -23 22 53.20 (-23.38144d) Equinox: J2000		V=16+/-1	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(2) GRB170817A	WFC3/IR, MULTIACCUM, GRISM1024	F160W	NSAMP=7; SAMP-SEQ=STEP50		Pattern 3, Exps 1-1 in Visit G2 (3)	99.230677 Secs (297.692 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	***[1]***
2		(2) GRB170817A	WFC3/IR, MULTIACCUM, GRISM1024	G141	NSAMP=10; SAMP-SEQ=SPARS50		Pattern 1, Exps 2-2 in Visit G2 (1)	452.93635 Secs (1811.745 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***

Orbit Structure



Visit

Proposal 14804, Visit G4 Fri Aug 18 18:05:37 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 100%; SAME ORIENT AS G1; BETWEEN 23-AUG-2017:00:00:00 AND 27-AUG-2017:00:00:00; ON HOLD

On Hold Comments: Awaiting SGRB trigger

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		(2)
(3)	Pattern Type=WFC3-IR-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.605 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(1)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	GRB170817A	RA: 13 09 48.0800 (197.4503333d) Dec: -23 22 53.20 (-23.38144d) Equinox: J2000		V=16+/-1	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(2) GRB170817A	WFC3/IR, MULTIACCUM, GRISM1024	F160W	NSAMP=7; SAMP-SEQ=STEP50		Pattern 3, Exps 1-1 in Visit G4 (3)	99.230677 Secs (297.692 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	***[1]***
2		(2) GRB170817A	WFC3/IR, MULTIACCUM, GRISM1024	G141	NSAMP=10; SAMP-SEQ=SPARS50		Pattern 1, Exps 2-2 in Visit G4 (1)	452.93635 Secs (1811.745 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***

Orbit Structure