14270 - The late time behaviour and environments of the first gravitational wave transients

Cycle: 23, 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?*
AA	(2) ATLAS17AEU	WFC3/IR WFC3/UVIS	1	02-Oct-2017 12:00:14.0	yes
AB	(2) ATLAS17AEU	WFC3/UVIS	1	02-Oct-2017 12:00:15.0	yes
03	(3) GRB170817A	WFC3/UVIS	1	02-Oct-2017 12:00:16.0	yes
04	(3) GRB170817A	WFC3/IR	1	02-Oct-2017 12:00:16.0	yes

4 Total Orbits Used

ABSTRACT

The next generation of gravitational wave (GW) detectors (Advanced LIGO and VIRGO) will go into scientific operation at the end of 2015. These detectors will finally herald an era where routine detection of gravitational waves from the merger of compact object binaries at 100-400 Mpc is possible, ending the century long quest for their direct detection. However, GW alone provides only part of the picture, and comprehensive electromagnetic observations will also be undertaken. Here we propose to utilize the unique ability of HST to go deep and with extremely high resolution in order to track the late time evolution of the counterparts, and charaterise their environments in detail. These observations will in turn enable us to reconstruct the parameters of the explosions, pinpoint the birth sites, and hone our observations for future, more ambitious programmes of observations.

OBSERVING DESCRIPTION

Our aim is to map the late time emission and environments of the first gravitational wave sources, that will become detectable with Advanced-LIGO/VIRGO. We will target electromagnetic counterparts that may be identified via a variety of routes, and will trigger HST observations once the

transients are established as promising counterparts for the GW source. This might include (but is no exhasutive), simultaneous gamma-ray detections, location of kilonova like transients in GW error boxes, or unusual SNe.

Once identified we will trigger 4 visits of observations spaced over a period of ~6 months. Each visit will be identicial and consist of half an orbit of WFC3/UVIS F606W and half an orbit of WFC3/IR F140W. These will track the late time behaviour of the transient beyond the point that it is detectable from the ground, and will provide the best constraints on the environment.

Visit

Proposal 14270, Visit AA, completed Mon Oct 02 16:00:17 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR, WFC3/UVIS

Special Requirements: GROUP AA,AB WITHIN 14D

Patterns

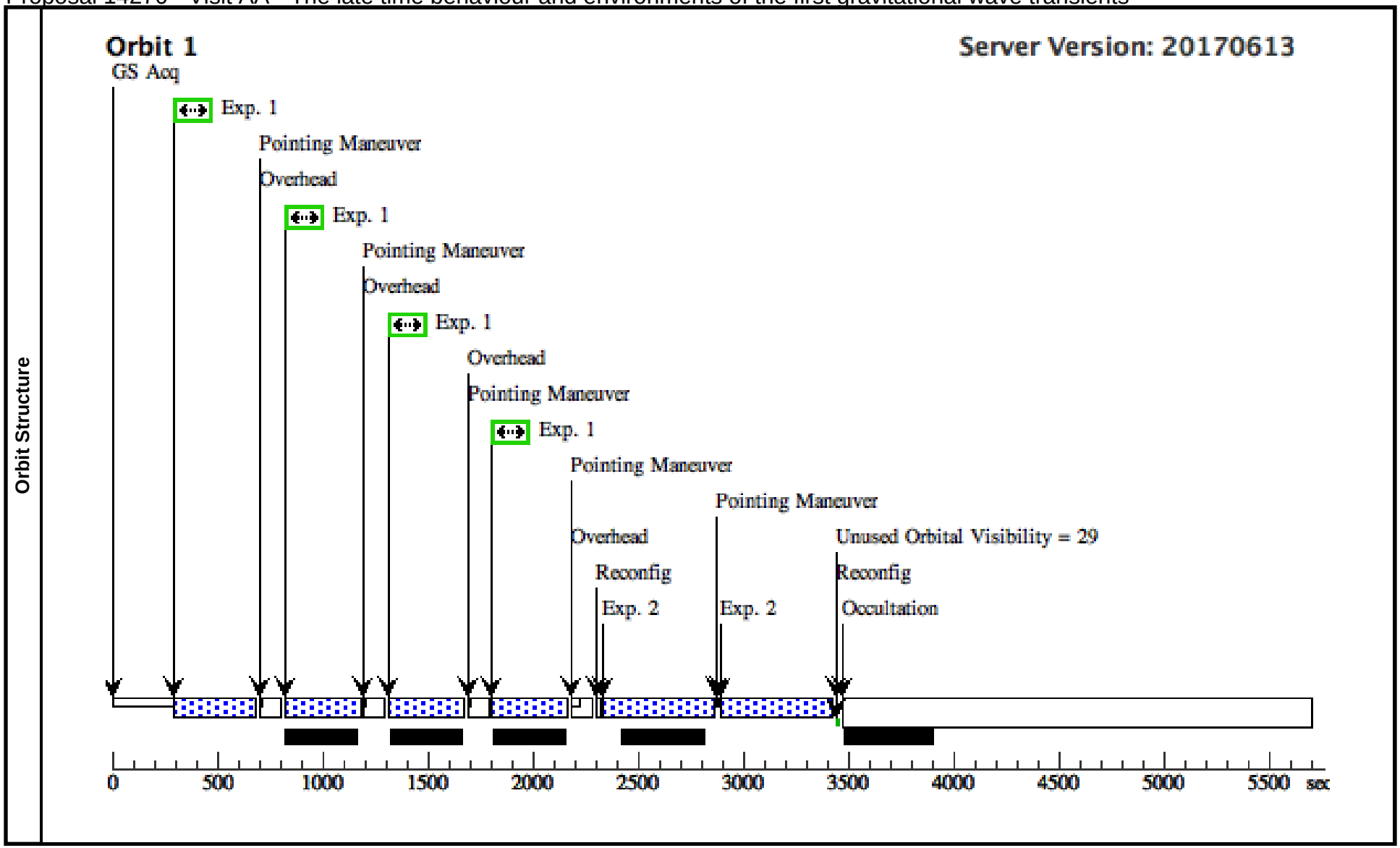
#	Primary Pattern		Secondary Pattern	Exposures
(4)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.636 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(2)
(5)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER 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)	ATLAS17AEU	RA: 09 13 13.8900 (138.3078750d) Dec: +61 05 33.60 (61.09267d) Equinox: J2000		V=26+/-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) ATLAS17AEU	WFC3/UVIS, ACCUM, UVIS2	F606W	CR-SPLIT=NO	POS TARG -40,-10	Pattern 5, Exps 1-1 in Visit AA (5)	365 Secs (1460 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***
2		(2) ATLAS17AEU	WFC3/IR, MULTIACCUM, IR	F140W	NSAMP=11; SAMP-SEQ=SPARS50		Pattern 4, Exps 2-2 in Visit AA (4)	502.936801 Secs (1005.874 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***


Orbit 1
Server Version: 20170613
Orbit Structure
GS Acq
Exp. 1
Pointing Maneuver
Overhead
Exp. 1
Pointing Maneuver
Overhead
Exp. 1
Overhead
Pointing Maneuver
Exp. 1
Pointing Maneuver
Pointing Maneuver
Overhead
Unused Orbital Visibility = 29
Reconfig
Reconfig
Exp. 2
Exp. 2
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 14270, Visit AB, completed Mon Oct 02 16:00:17 GMT 2017

Diagnostic Status: Warning

Scientific Instruments: WFC3/UVIS

Special Requirements: (none)

Diagnostics

(Visit AB) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(5)	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)

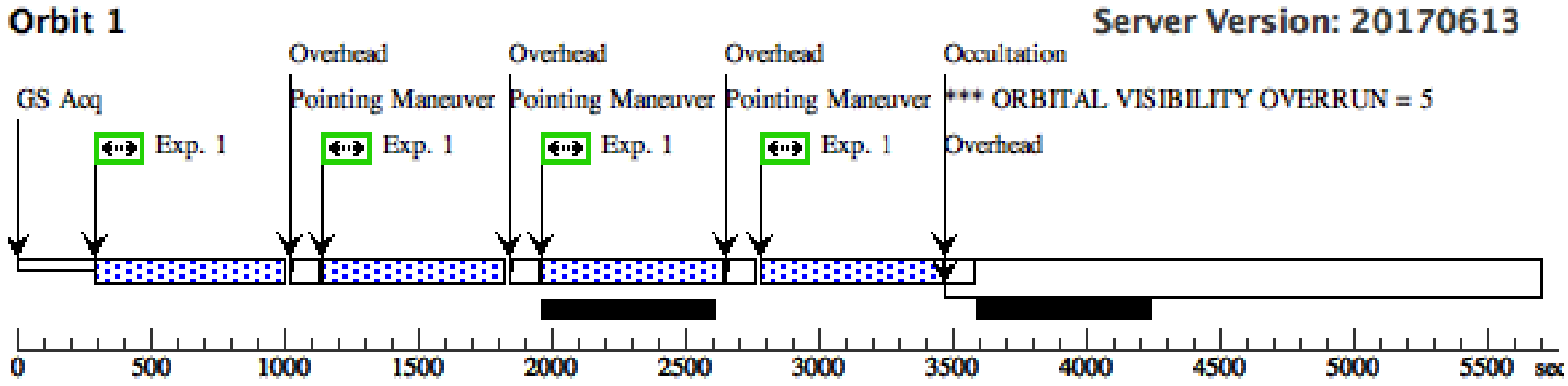
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	ATLAS17AEU	RA: 09 13 13.8900 (138.3078750d) Dec: +61 05 33.60 (61.09267d) Equinox: J2000		V=26+/-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) ATLAS17AEU	WFC3/UVIS, ACCUM, UVIS2	F390W	CR-SPLIT=NO; FLASH=7	POS TARG -40,-10	Pattern 5, Exps 1-1 in Visit AB (5)	365 Secs (2736 Secs) *[==>684.0 Secs (Pattern 1)]* *[==>684.0 Secs (Pattern 2)]* *[==>684.0 Secs (Pattern 3)]* *[==>684.0 Secs (Pattern 4)]*	*[1]*

Orbit Structure



Visit

Proposal 14270, Visit 03, implementation Mon Oct 02 16:00:18 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: SCHED 100%; BEFORE 10-DEC-2017:00:00:00; ON HOLD

On Hold Comments: Awaiting GW trigger

Patterns

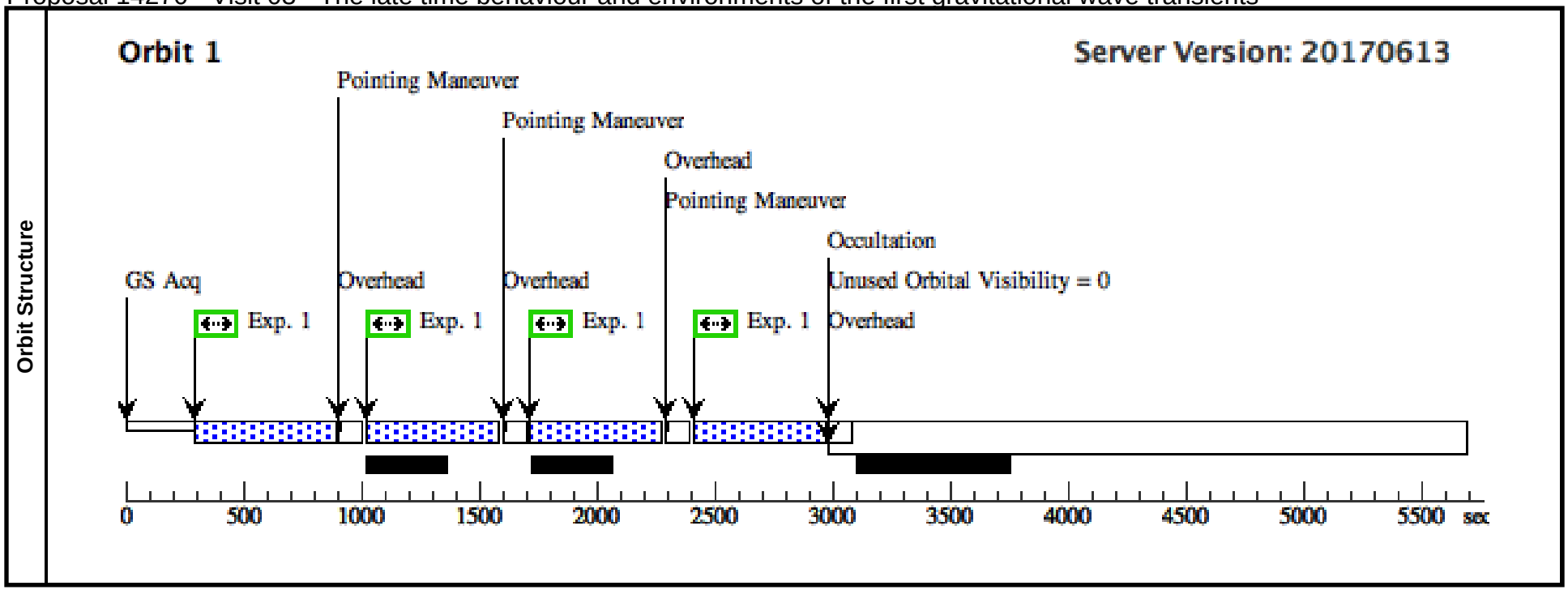
#	Primary Pattern		Secondary Pattern	Exposures
(5)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false		(1)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	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		(3) GRB170817A	WFC3/UVIS, ACCUM, UVIS2	F606W	CR-SPLIT=NO		Pattern 5, Exps 1-1 in Visit 03 (5)	365 Secs (2264 Secs)	
								[==>566.0 Secs (Pattern 1)] *[==>566.0 Secs (Pattern 2)]* *[==>566.0 Secs (Pattern 3)]* *[==>566.0 Secs (Pattern 4)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20170613
Pointing Maneuver
Pointing Maneuver
Overhead
Pointing Maneuver
Occultation
GS Acq
Overhead
Overhead
Unused Orbital Visibility = 0
Exp. 1
Exp. 1
Exp. 1
Exp. 1
Overhead
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 14270, Visit 04, implementation Mon Oct 02 16:00:18 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 100%; BEFORE 10-DEC-2017:00:00:00

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(6)	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)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	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		(3) GRB170817A	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=12; SAMP-SEQ=STEP100		Pattern 6, Exps 1-1 in Visit 04 (6)	599.232292 Secs (2396.929 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	*[1]*

Orbit Structure