11575 - The Stellar Origins of Supernovae

Cycle: 17, 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?*
01	(1) SN2009HD	ACS/WFC	1	01-Oct-2010 21:00:52.0	yes
02	(2) SN2009H	ACS/WFC	1	01-Oct-2010 21:00:57.0	yes
03	(3) SN2009JF	ACS/WFC	1	01-Oct-2010 21:01:00.0	yes
53	(3) SN2009JF	ACS/WFC	1	01-Oct-2010 21:01:04.0	yes
04	(4) SN2010BT	ACS/WFC	1	01-Oct-2010 21:01:08.0	yes

5 Total Orbits Used

ABSTRACT

Supernovae (SNe) have a profound effect on galaxies, and have been used recently as precise cosmological probes, resulting in the discovery of the accelerating Universe. They are clearly very important events deserving of intense study. Yet, even with nearly 4000 known SNe, we know relatively little about the stars which give rise to these powerful explosions. The main limitation has been the lack of spatial resolution in pre-SN imaging data. However, since 1999 our team has been at the vanguard of directly identifying SN progenitor stars in HST images. From this exciting new line of study, the emerging trend from 5 detections for Type II-Plateau SNe is that their progenitors appear to be relatively low mass (8 to 20 Msun) red supergiants, although more cases are needed. Nonetheless, the nature of the progenitors of Type Ib/c SNe, a subset of which are associated with the amazing gamma-ray bursts, remains ambiguous. Furthermore, we remain in the continually embarrassing situation that we still do not yet know which progenitor systems explode as Type Ia SNe, which are currently being used for precision cosmology. In Cycle 16 we have triggered on the Type Ic SN 2007gr and Type IIb SN 2008ax so far. We propose to determine the identities of the progenitors of 4 SNe within 17 Mpc, which we expect to occur during Cycle 17, through ToO observations using ACS/HRC.

OBSERVING DESCRIPTION

We plan for four ToO triggers during Cycle 17. If we detect one or more candidate stellar objects within a 1-sigma positional uncertainty in ACS or WFPC2 pre-supernova archival image(s), we will request a trigger to confirm the progenitor candidate. Our original plan was to image with ACS/HRC, however, with its unavailability, we are using ACS/WFC, instead, to provide the highest possible spatial resolution. Our strategy, generally, is to acquire a series of short-exposure (20-s) dithered images in one band, V (F555W), for the 3 core-collapse visits (which will likely best match with the available archival image data), and in B (F435W) for a putative, nearby (< ~ 6 Mpc) SN Ia visit, since these SNe will likely be too bright in redder bands, but fade more rapidly in the blue. We will likely request triggers when the SN is still fairly bright, depending on its age at discovery, but limit this, generally, to m>~13 mag. The ToOs are not intended to be high-impact, and the SNe can be imaged weeks after explosion, so there should be no disruption of normal scheduling.

Visit

Proposal 11575, Visit 01, completed Sat Oct 02 01:01:12 GMT 2010

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=3.011 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.28 Angle Between Sides= Center Pattern=false		(1-2)

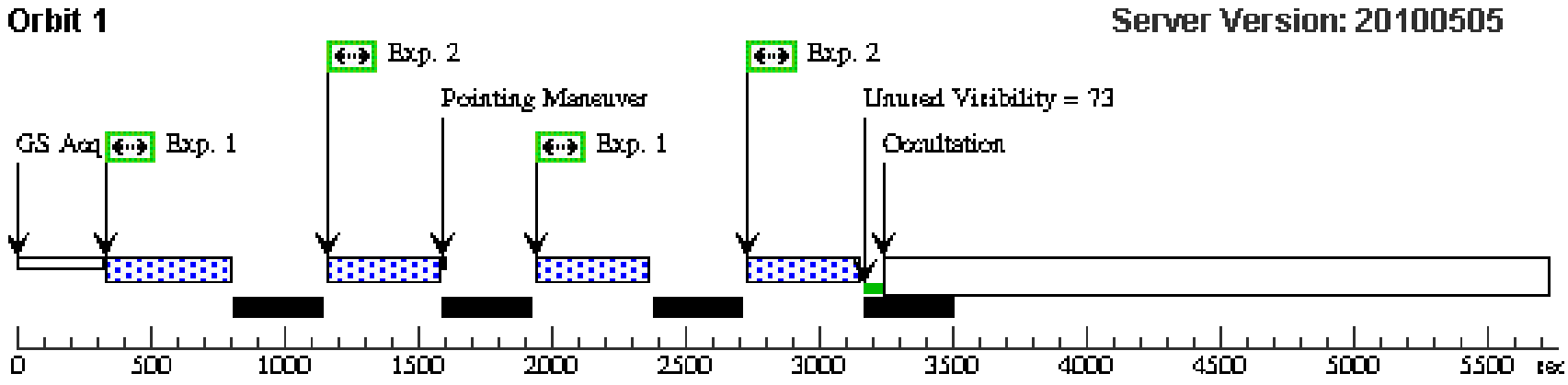
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	SN2009HD	RA: 11 20 16.9600 (170.0706667d) Dec: +12 58 46.60 (12.97961d) Equinox: J2000		V=20.9+/-2.0	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) SN2009HD	ACS/WFC, ACCUM, WFC	F555W	CR-SPLIT=NO	GS ACQ SCENARIO BASE1B3	Pattern 1, Exps 1-2 (1)	260 Secs *[==>(Pattern 1)]* *[==>(Pattern 2)]*	*[1]*
2		(1) SN2009HD	ACS/WFC, ACCUM, WFC	F814W	CR-SPLIT=NO		Pattern 1, Exps 1-2 (1)	260 Secs *[==>(Pattern 1)]* *[==>(Pattern 2)]*	*[1]*

Orbit Structure



Visit

Proposal 11575, Visit 02, completed Sat Oct 02 01:01:13 GMT 2010

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: SCHED 100%; BEFORE 01-DEC-2010:00:00:00

Patterns

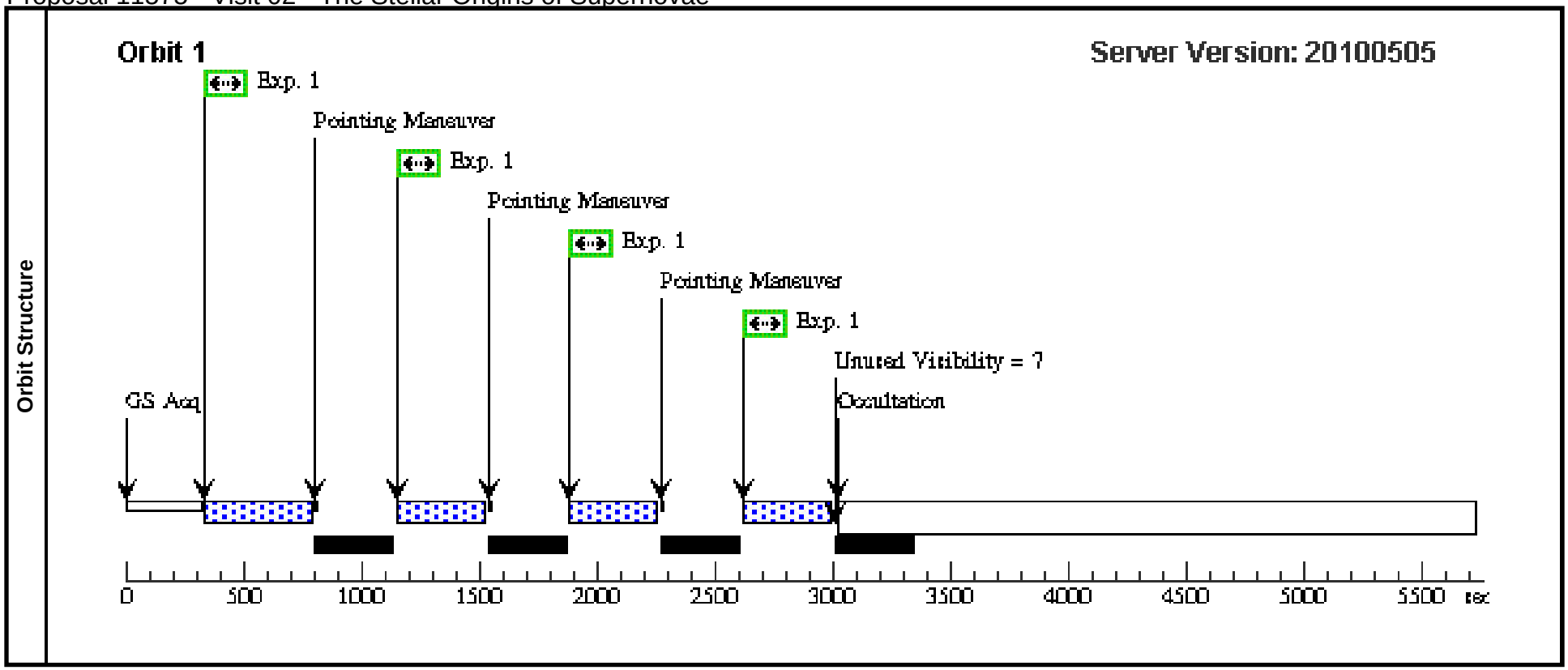
#	Primary Pattern		Secondary Pattern	Exposures
(2)	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.265 Line Spacing=0.187	Coordinate Frame=POS-TARG Pattern Orientation=20.67 Angle Between Sides=69.05 Center Pattern=false		(1)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	SN2009H	RA: 02 45 58.3600 (41.4931667d) Dec: -07 35 6.00 (-7.58500d) Equinox: J2000		V=26.5+/-1.0	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(2) SN2009H	ACS/WFC, ACCUM, WFC	F814W			Pattern 2, Exps 1-1 (2)	250 Secs	
								[==>(Pattern 1)] *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20100505
Exp. 1
Pointing Maneuver
Exp. 1
Pointing Maneuver
Exp. 1
Pointing Maneuver
Exp. 1
Unused Visibility = ?
GS Acq
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11575, Visit 03, failed Sat Oct 02 01:01:13 GMT 2010

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: BEFORE 01-DEC-2010:00:00:00

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=3.011 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.28 Angle Between Sides= Center Pattern=false		(1-2)

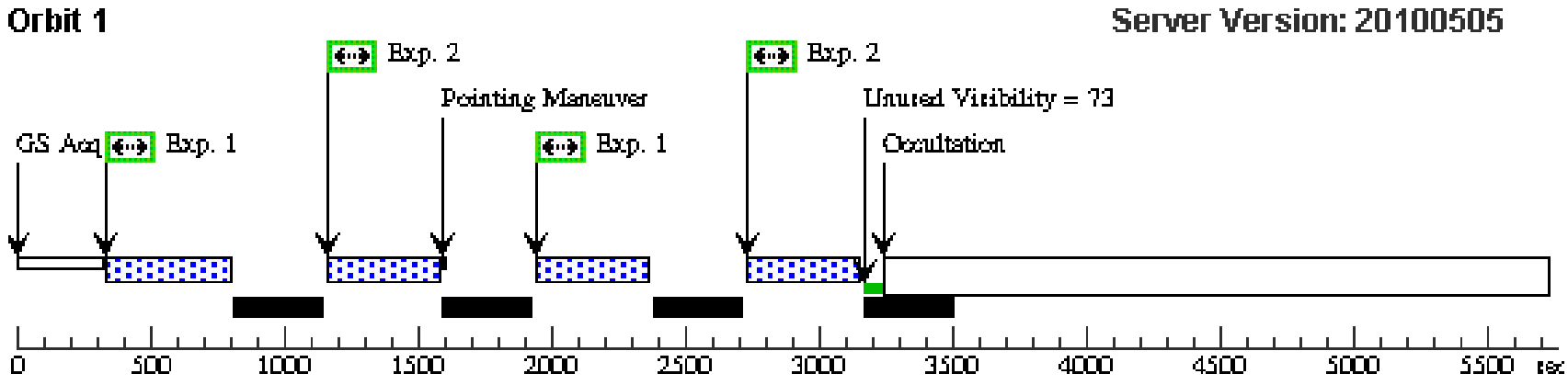
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	SN2009JF	RA: 23 04 55.6100 (346.2317083d) Dec: +12 19 47.00 (12.32972d) Equinox: J2000		V=22.4+/-1.0	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(3) SN2009JF	ACS/WFC, ACCUM, WFC	F555W	CR-SPLIT=NO	GS ACQ SCENARIO BASE1B3	Pattern 1, Exps 1-2 (1)	260 Secs *[==>(Pattern 1)]* *[==>(Pattern 2)]*	*[1]*
2		(3) SN2009JF	ACS/WFC, ACCUM, WFC	F814W	CR-SPLIT=NO		Pattern 1, Exps 1-2 (1)	260 Secs *[==>(Pattern 1)]* *[==>(Pattern 2)]*	*[1]*

Orbit Structure



Visit

Proposal 11575, Visit 53 Sat Oct 02 01:01:14 GMT 2010

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: BEFORE 01-DEC-2010:00:00:00

Comments: HOPR repeat of visit 3. Visit 3 lost due to ACS suspend.

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=3.011 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.28 Angle Between Sides= Center Pattern=false		(1-2)

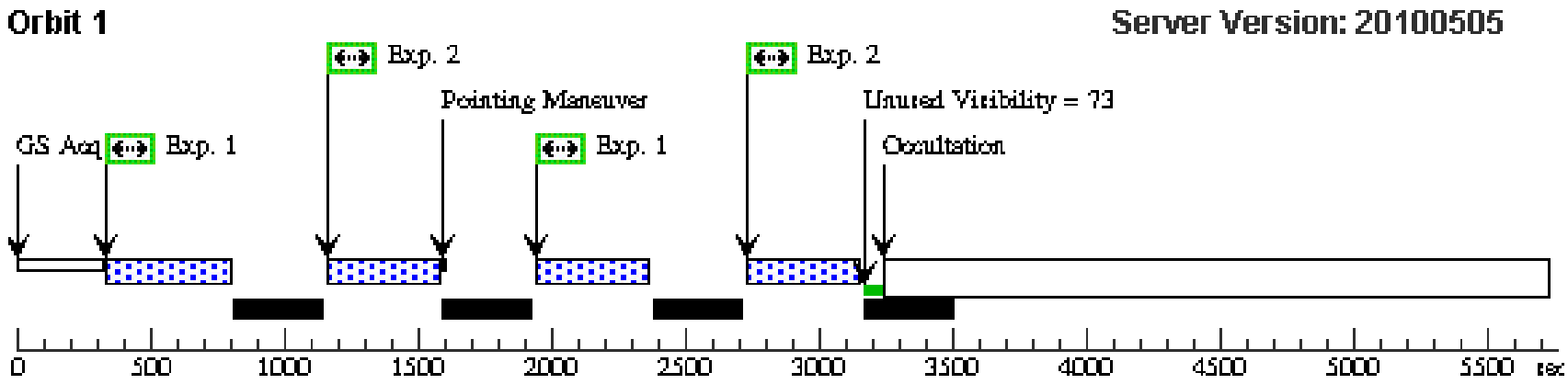
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	SN2009JF	RA: 23 04 55.6100 (346.2317083d) Dec: +12 19 47.00 (12.32972d) Equinox: J2000		V=22.4+/-1.0	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(3) SN2009JF	ACS/WFC, ACCUM, WFC	F555W	CR-SPLIT=NO	GS ACQ SCENARIO BASE1B3	Pattern 1, Exps 1-2 (1)	260 Secs *[==>(Pattern 1)]* *[==>(Pattern 2)]*	*[1]*
2		(3) SN2009JF	ACS/WFC, ACCUM, WFC	F814W	CR-SPLIT=NO		Pattern 1, Exps 1-2 (1)	260 Secs *[==>(Pattern 1)]* *[==>(Pattern 2)]*	*[1]*

Orbit Structure



Visit

Proposal 11575, Visit 04, scheduling Sat Oct 02 01:01:14 GMT 2010

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: BEFORE 01-DEC-2010:00:00:00

Patterns

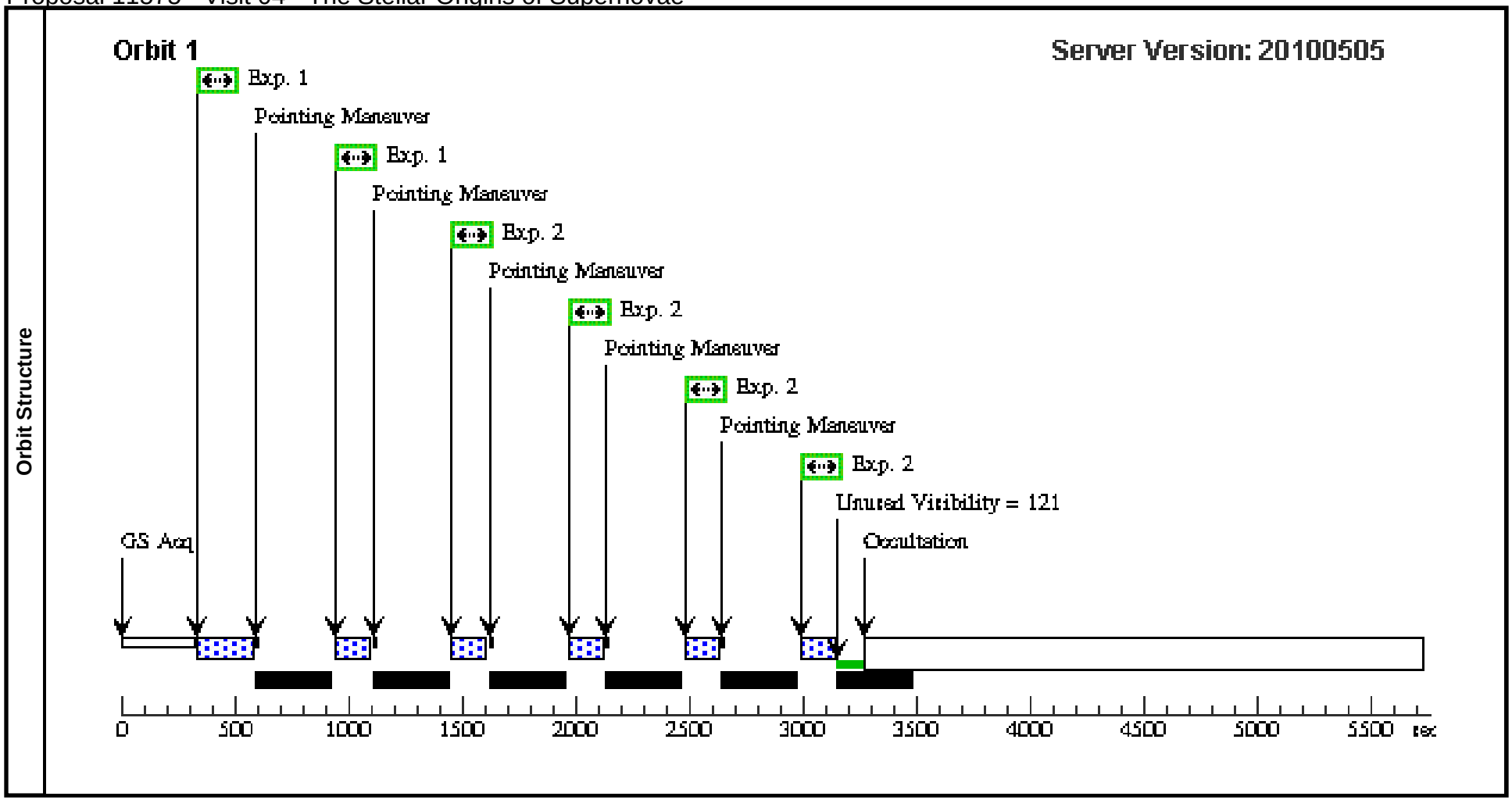
#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=3.011 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.28 Angle Between Sides= Center Pattern=false		(1)
(2)	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.265 Line Spacing=0.187	Coordinate Frame=POS-TARG Pattern Orientation=20.67 Angle Between Sides=69.05 Center Pattern=false		(2)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(4)	SN2010BT	RA: 21 48 17.9000 (327.0745833d) Dec: -34 57 30.00 (-34.95833d) Equinox: J2000		V=17.5+/-1.0	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(4) SN2010BT	ACS/WFC, ACCUM, WFC	F606W	CR-SPLIT=NO	GS ACQ SCENARIO BASE1B3	Pattern 1, Exps 1-1 (1)	20 Secs *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
2		(4) SN2010BT	ACS/WFC, ACCUM, WFC	F606W			Pattern 2, Exps 2-2 (2)	20 Secs *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20100505
Exp. 1
Pointing Maneuver
Exp. 1
Pointing Maneuver
Exp. 2
Pointing Maneuver
Exp. 2
Pointing Maneuver
Exp. 2
Pointing Maneuver
Exp. 2
Unused Vitibility = 121
GS Acq
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec