13477 - Unmasking the Supernova Impostors

Cycle: 21, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	*Institution*	*E-Mail*
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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) SN-1954J	WFC3/IR WFC3/UVIS	2	11-Jun-2013 21:49:49.0	yes
02	(2) SN-1961V	WFC3/IR WFC3/UVIS	2	11-Jun-2013 21:50:06.0	yes
03	(3) SN-1997BS	WFC3/IR WFC3/UVIS	2	11-Jun-2013 21:50:19.0	yes

6 Total Orbits Used

ABSTRACT

We propose measuring the optical/near-IR/mid-IR spectral energy distributions of the three nearby ``supernova impostors'' SN1954J, SN1961V and SN1997bs. All three have candidate surviving stars which, in order to explain their faintness, are believed to be shrouded by dusty

shells formed during the eruption. If this hypothesis is correct, we will be able to estimate the mass lost in the eruption, a key step towards understanding the physics of eruptions and their role in the evolution of massive stars. In the case of SN~1961V, however, the most likely outcome is to conclusively show that the standard hypothesis is wrong and that the transient was a true supernova. This outcome is less likely for the other two targets, but it would be revolutionary and is not disallowed by the existing fragmentary data.

OBSERVING DESCRIPTION

The goal is to obtain two optical (either F475W or F555W plus F814W) and two IR (F110W and F160W) WFC3 images of three "supernova impostors" in order to try to measure the SED of any surviving star on a long enough wavelength baseline to simultaneously estimate the stellar temperature, luminosity and extinction by circumstellar dust. Spitzer observations will be used to measure emission by the circumstellar dust. The blue WFC3/UVIS filter is picked to best match the available archival filters to optimize the ability to detect changes.

For UVIS, observing filter 1 at all dither points followed by filter 2 at all dither points produced slightly higher total integration times than interleaving the filters. There are 50 unused seconds in visit 03 WFC3/IR for which there was no efficient filler given the quantization of the WFC3/IR observing modes. However, mixing the optical/IR filters in each orbit (where auto-adjust on the optical would fill the time) seems to consistently produce slightly less total integration time.

While no constraints were requested, the archival value of the data would be maximized by shifting between the UVIS1 and UVIS2 pointing centers to put more of the chip real estate on the host galaxy of these sources given the orientation at the time of the observations.

This would have no effect on the primary science.

Visit

Proposal 13477, Visit 01 Wed Jun 12 01:50:28 GMT 2013

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR, WFC3/UVIS

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-UVIS-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.135 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1), (2)
(2)	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		(3-5)

Fixed Targets

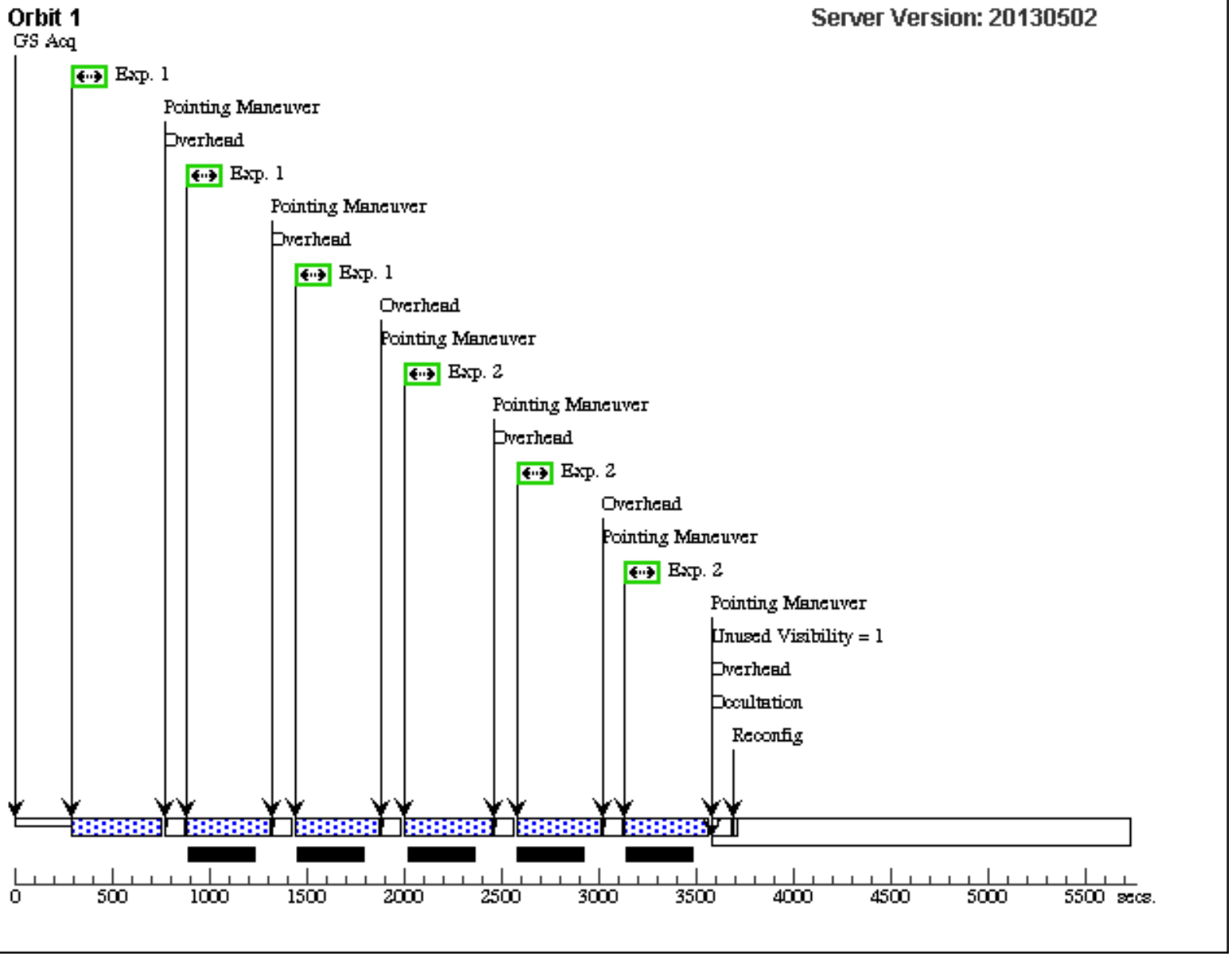
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	SN-1954J	RA: 07 36 55.3600 (114.2306667d) Dec: +65 37 52.10 (65.63114d) Equinox: J2000		V=23	Reference Frame: SIMBAD

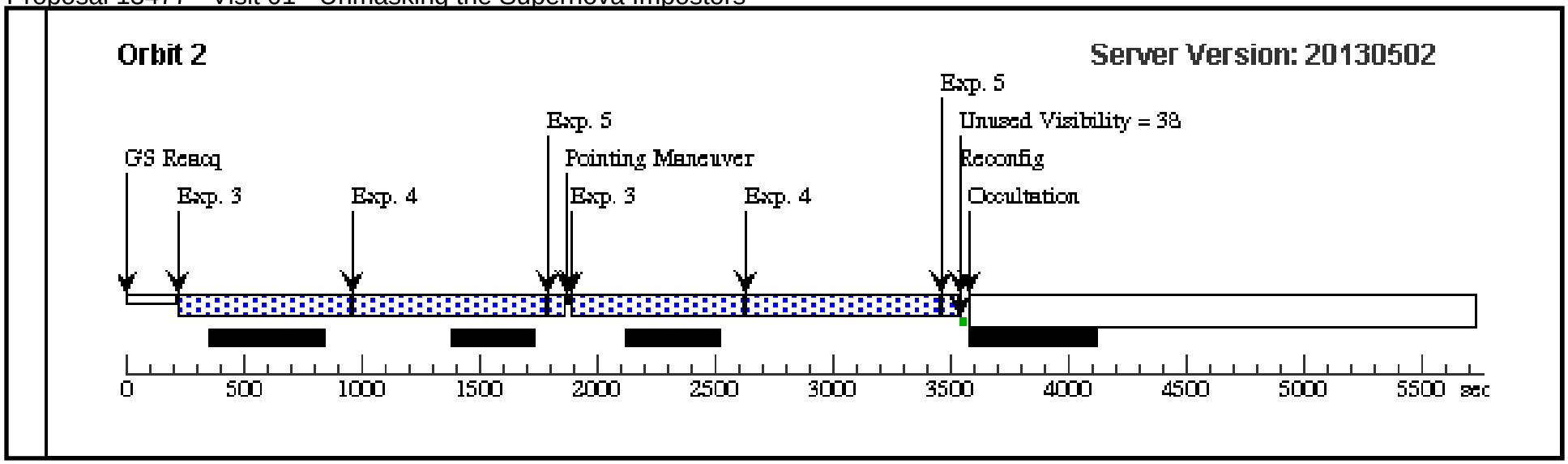
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) SN-1954J	WFC3/UVIS, ACCUM, UVIS1	F475W			Pattern 1, Exps 1-1 in Visit 01 (1)	400 Secs (1290 Secs) *[==>430.0 Secs (Pattern 1)]* *[==>430.0 Secs (Pattern 2)]* *[==>430.0 Secs (Pattern 3)]*	***[1]***
2		(1) SN-1954J	WFC3/UVIS, ACCUM, UVIS1	F814W			Pattern 1, Exps 2-2 in Visit 01 (1)	400 Secs (1290 Secs) *[==>430.0 Secs (Pattern 1)]* *[==>430.0 Secs (Pattern 2)]* *[==>430.0 Secs (Pattern 3)]*	***[1]***
3		(1) SN-1954J	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=13; SAMP-SEQ=STEP100		Pattern 2, Exps 3-5 in Visit 01 (2)	699.232615 Secs (1398.465 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[2]***
4		(1) SN-1954J	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=14; SAMP-SEQ=STEP100		Pattern 2, Exps 3-5 in Visit 01 (2)	799.232938 Secs (1598.466 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[2]***
5		(1) SN-1954J	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=6; SAMP-SEQ=STEP25		Pattern 2, Exps 3-5 in Visit 01 (2)	49.230226 Secs (98.46 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[2]***

Orbit Structure




Orbit 2
Server Version: 20130502
GS Reacq
Exp. 3
Exp. 4
Exp. 5
Pointing Maneuver
Exp. 3
Exp. 4
Exp. 5
Unused Visibility = 38
Reconfig
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 13477, Visit 02 Wed Jun 12 01:50:31 GMT 2013

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR, WFC3/UVIS

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-UVIS-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.135 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1), (2)
(2)	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		(3-5)

Fixed Targets

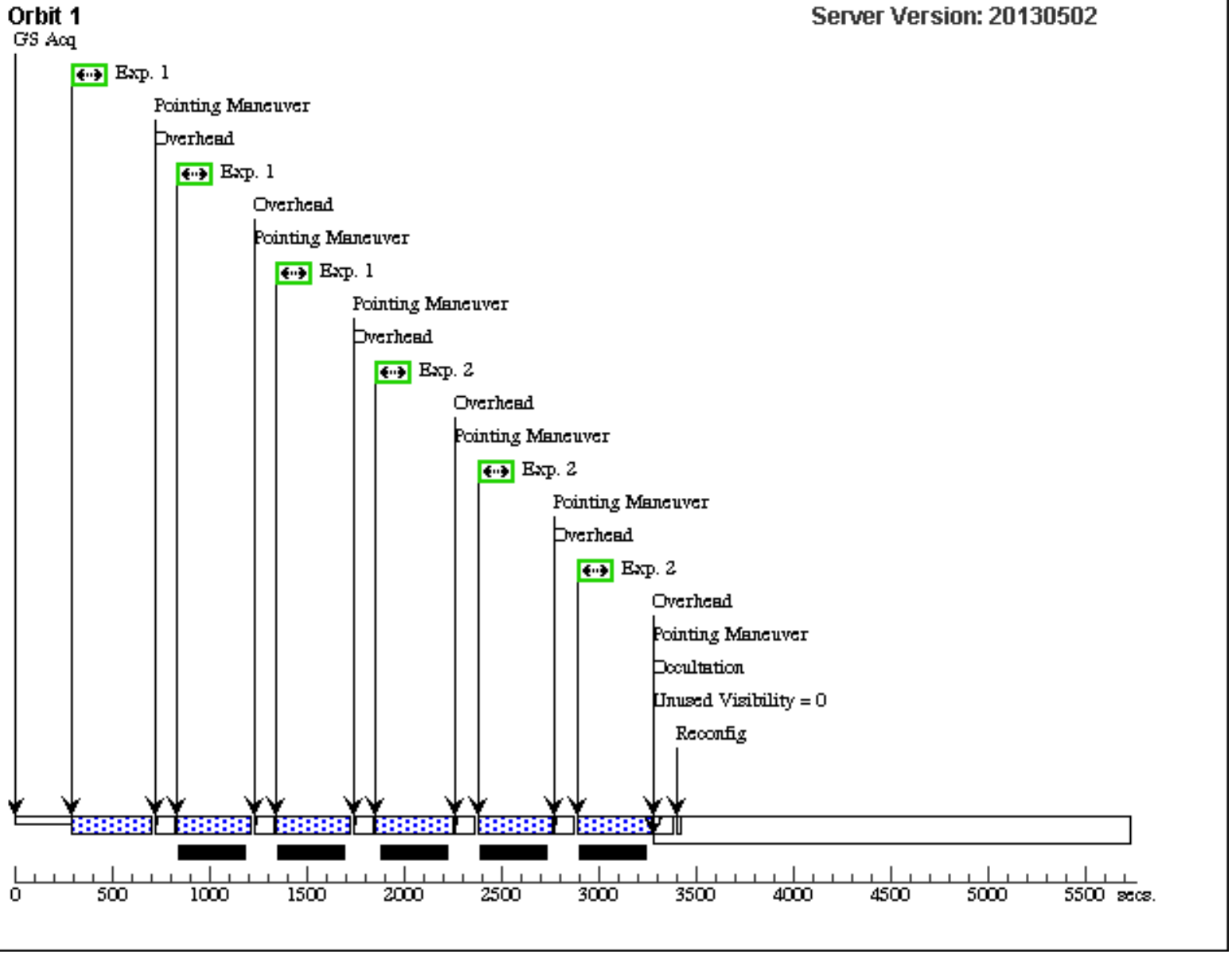
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	SN-1961V	RA: 02 43 36.4200 (40.9017500d) Dec: +37 20 43.60 (37.34544d) Equinox: J2000		V=24	Reference Frame: SIMBAD

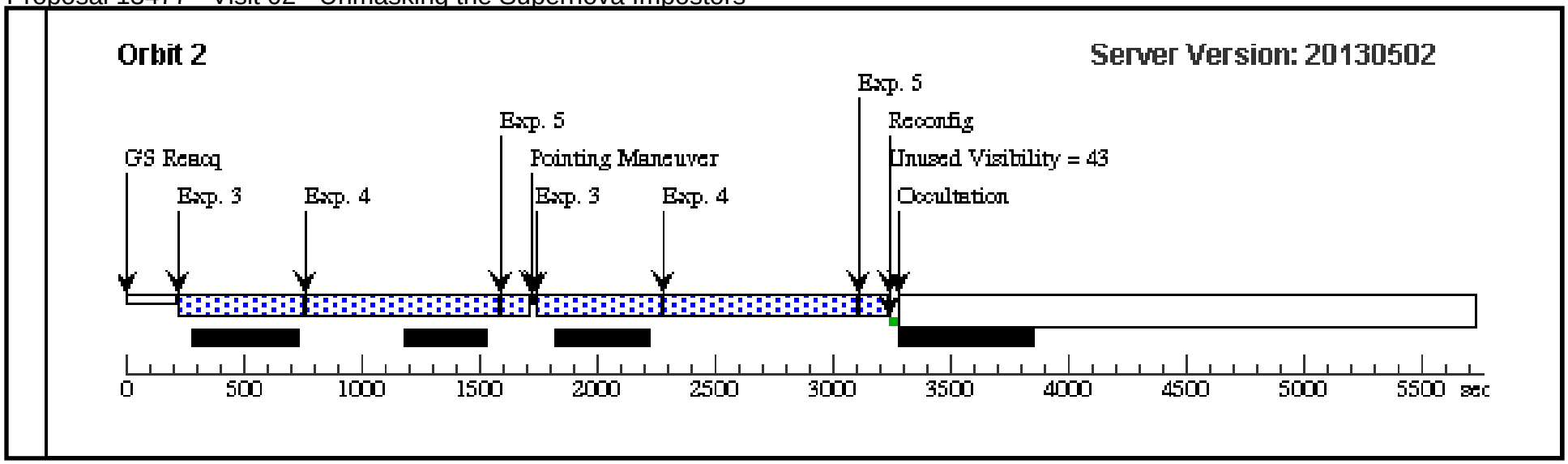
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(2) SN-1961V	WFC3/UVIS, ACCUM, UVIS1	F475W			Pattern 1, Exps 1-1 in Visit 02 (1)	400 Secs (1143 Secs) *[==>381.0 Secs (Pattern 1)]* *[==>381.0 Secs (Pattern 2)]* *[==>381.0 Secs (Pattern 3)]*	***[1]***
2		(2) SN-1961V	WFC3/UVIS, ACCUM, UVIS1	F814W			Pattern 1, Exps 2-2 in Visit 02 (1)	400 Secs (1143 Secs) *[==>381.0 Secs (Pattern 1)]* *[==>381.0 Secs (Pattern 2)]* *[==>381.0 Secs (Pattern 3)]*	***[1]***
3		(2) SN-1961V	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=11; SAMP-SEQ=STEP100		Pattern 2, Exps 3-5 in Visit 02 (2)	499.231969 Secs (998.464 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[2]***
4		(2) SN-1961V	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=14; SAMP-SEQ=STEP100		Pattern 2, Exps 3-5 in Visit 02 (2)	799.232938 Secs (1598.466 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[2]***
5		(2) SN-1961V	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=8; SAMP-SEQ=STEP25		Pattern 2, Exps 3-5 in Visit 02 (2)	99.231256 Secs (198.463 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[2]***

Orbit Structure




Orbit 2
Server Version: 20130502
GS Reacq
Exp. 3
Exp. 4
Exp. 5
Pointing Maneuver
Exp. 3
Exp. 4
Exp. 5
Reconfig
Unused Visibility = 43
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 13477, Visit 03 Wed Jun 12 01:50:36 GMT 2013

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR, WFC3/UVIS

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-UVIS-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.135 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1), (2)
(2)	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		(3-4)

Fixed Targets

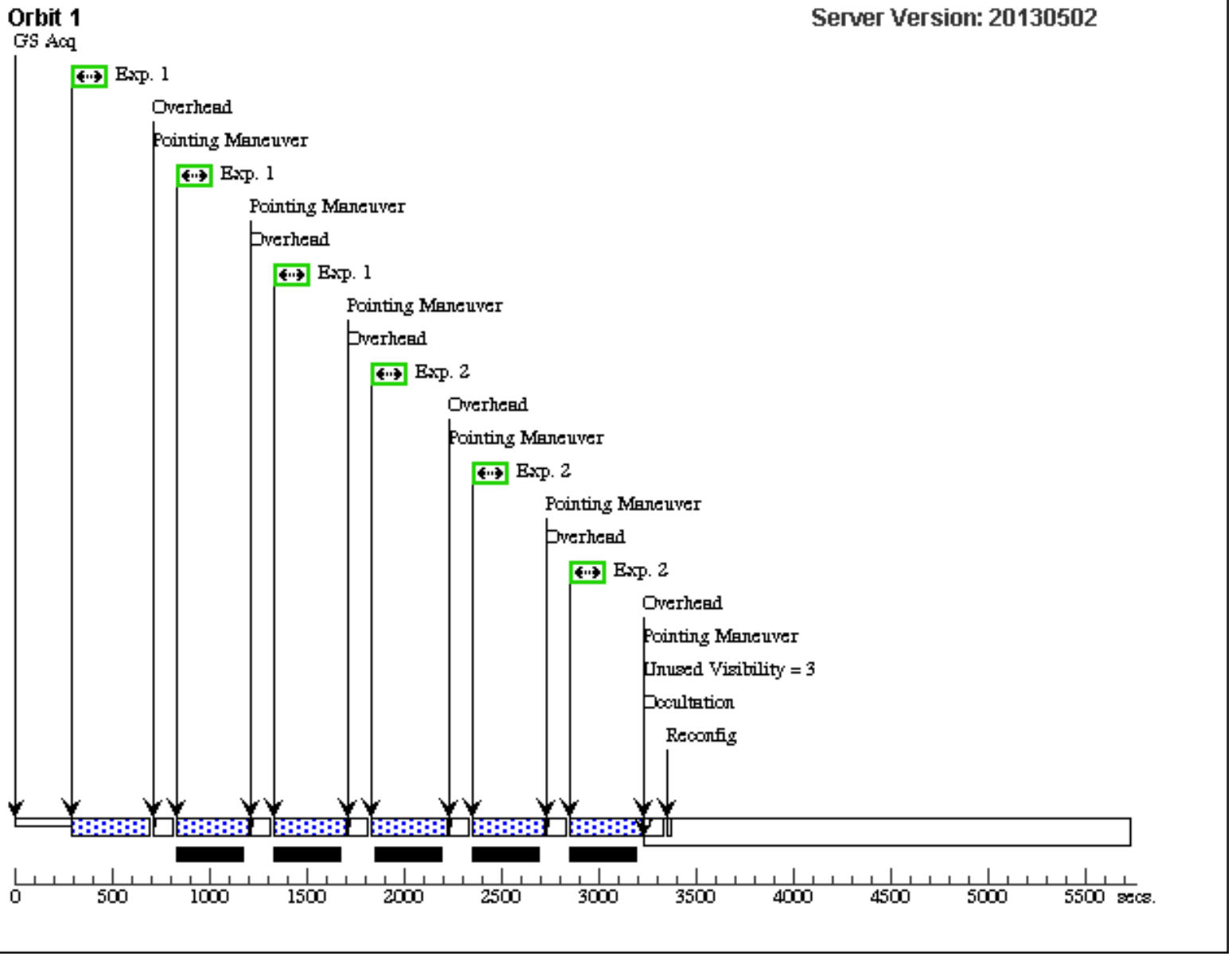
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	SN-1997BS	RA: 11 20 14.2500 (170.0593750d) Dec: +12 58 19.60 (12.97211d) Equinox: J2000		V=26	Reference Frame: SIMBAD

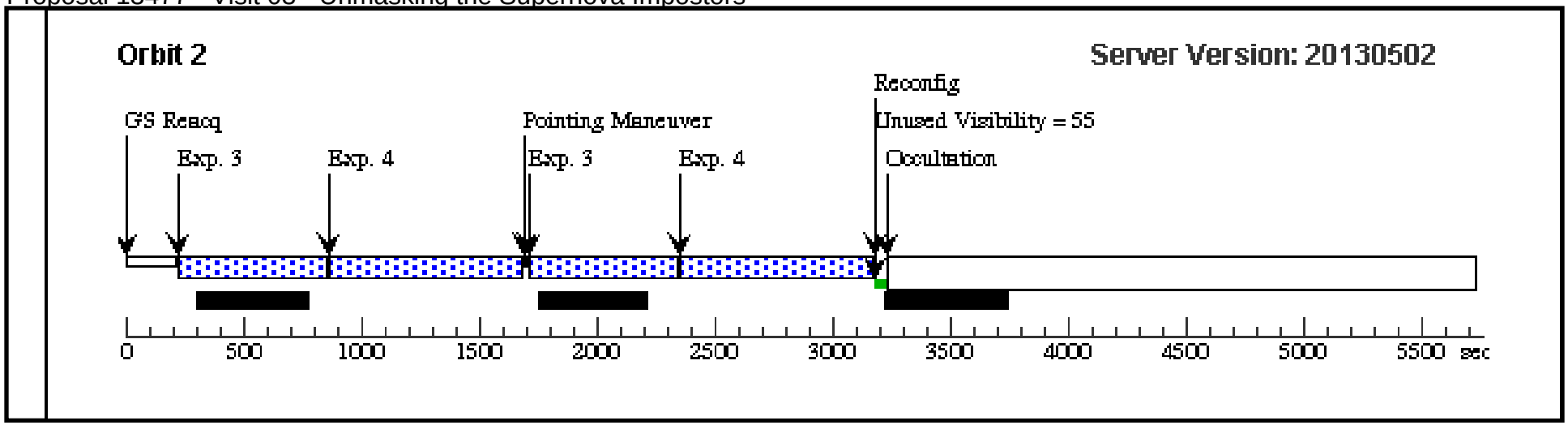
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(3) SN-1997BS	WFC3/UVIS, ACCUM, UVIS1	F555W			Pattern 1, Exps 1-1 in Visit 03 (1)	400 Secs (1119 Secs) *[==>373.0 Secs (Pattern 1)]* *[==>373.0 Secs (Pattern 2)]* *[==>373.0 Secs (Pattern 3)]*	***[1]***
2		(3) SN-1997BS	WFC3/UVIS, ACCUM, UVIS1	F814W			Pattern 1, Exps 2-2 in Visit 03 (1)	400 Secs (1119 Secs) *[==>373.0 Secs (Pattern 1)]* *[==>373.0 Secs (Pattern 2)]* *[==>373.0 Secs (Pattern 3)]*	***[1]***
3		(3) SN-1997BS	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=12; SAMP-SEQ=STEP100		Pattern 2, Exps 3-4 in Visit 03 (2)	599.232292 Secs (1198.465 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[2]***
4		(3) SN-1997BS	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=14; SAMP-SEQ=STEP100		Pattern 2, Exps 3-4 in Visit 03 (2)	799.232938 Secs (1598.466 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[2]***

Orbit Structure




Orbit 2
Server Version: 20130502
Reconfig
GS Reacq
Pointing Maneuver
Unused Visibility = 55
Exp. 3
Exp. 4
Exp. 3
Exp. 4
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec