13717 - Polarimetry of SN 2014J in M82 as a Probe of Its Dusty Environment

Cycle: 22, 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?*
V1	(1) SN-2014J	ACS/WFC	2	01-Oct-2014 21:06:07.0	yes
V2	(1) SN-2014J	ACS/WFC	2	01-Oct-2014 21:06:10.0	yes
V3	(1) SN-2014J	ACS/WFC	2	01-Oct-2014 21:06:14.0	yes

6 Total Orbits Used

ABSTRACT

Late time polarimetry can effectively probe the circumstellar (CS) dust environment of SNe Ia. We propose to acquire imaging polarimetry of SN 2014J at three epochs between 200-400 days after the SN explosion. The delayed light from optical maximum may be scattered into the line of sight and reveal the scattering dust through polarization. Light echoes from interstellar dust at very large distances (> 10pc) from the SN will not be highly polarized in these observations due to the small scattering angle involved. Polarimetry at late time is thus an unambegeous probe of CS dust very close to the SN (at distances ~ 1 light year). Observations of the illusive CS matter is critical in constraining the progenitor systems of SNIa.

OBSERVING DESCRIPTION

This program attempts to acquire imaging polarization of SN2014J using ACS/WFC. We intend to observe at two separate epochs at around Nov, 2014, and Apr 15 2015. The polarization data will be observed in three filters: F475W, F606W, and F775W. For each filter three polarizers POL0V, POL120V, and POL60V are used to aqcuire a complete polarization data set. Multiple exposures are required for cosmic ray rejection.

Visit

Proposal 13717, Pol1 (V1), implementation Thu Oct 02 01:06:16 GMT 2014

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: BETWEEN 01-SEP-2014:00:00:00 AND 30-NOV-2014:00:00:00

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=3 Point Spacing=3.011 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.28 Angle Between Sides= Center Pattern=false		(1), (2), (3)
(2)	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		(4), (5), (6), (7)

Fixed Targets

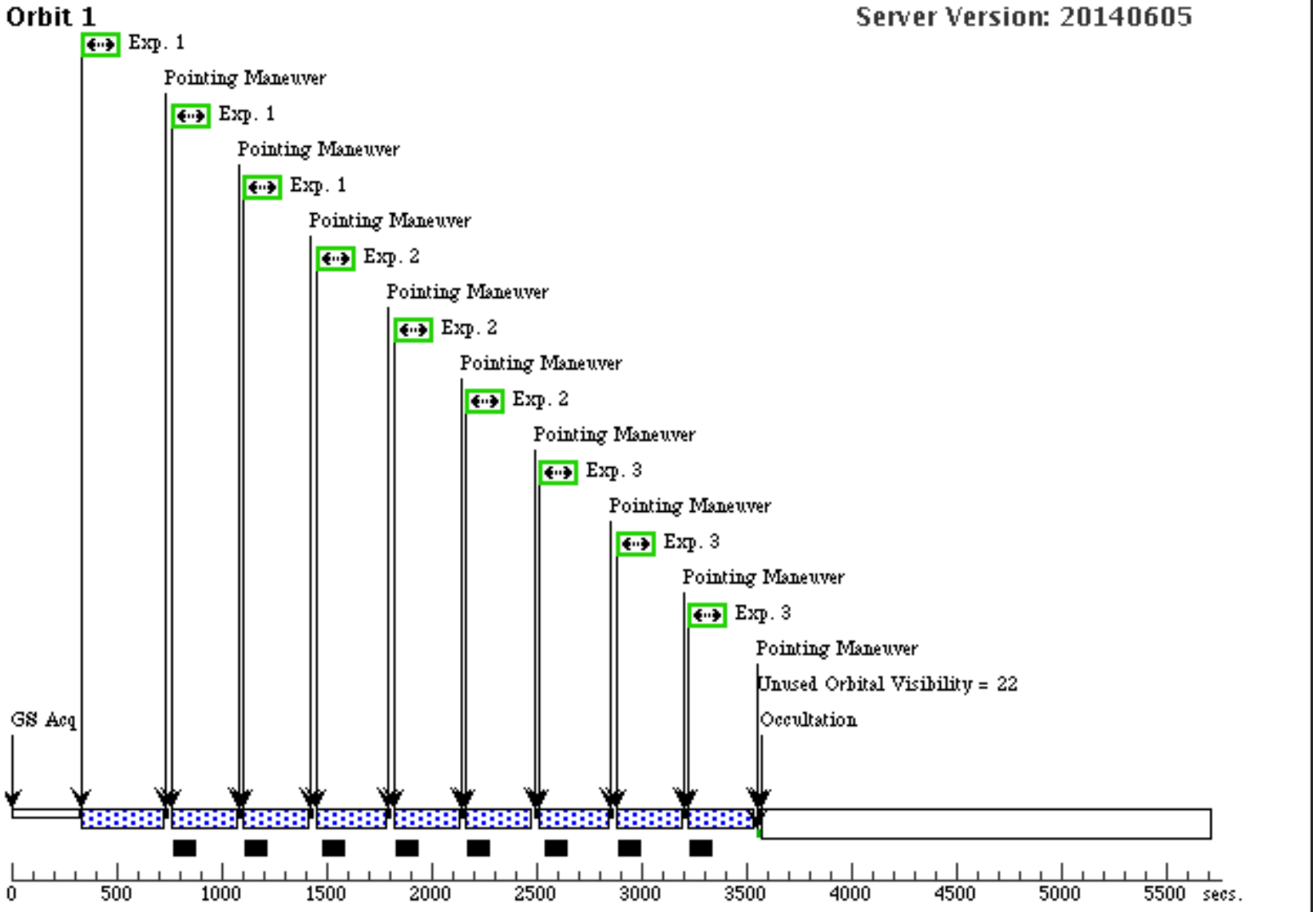
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	SN-2014J	RA: 09 55 42.1200 (148.9255000d) Dec: +69 40 25.90 (69.67386d) Equinox: J2000	Radial Velocity: 203.00 km/sec	V=17.5+/-1.5	Reference Frame: SIMBAD

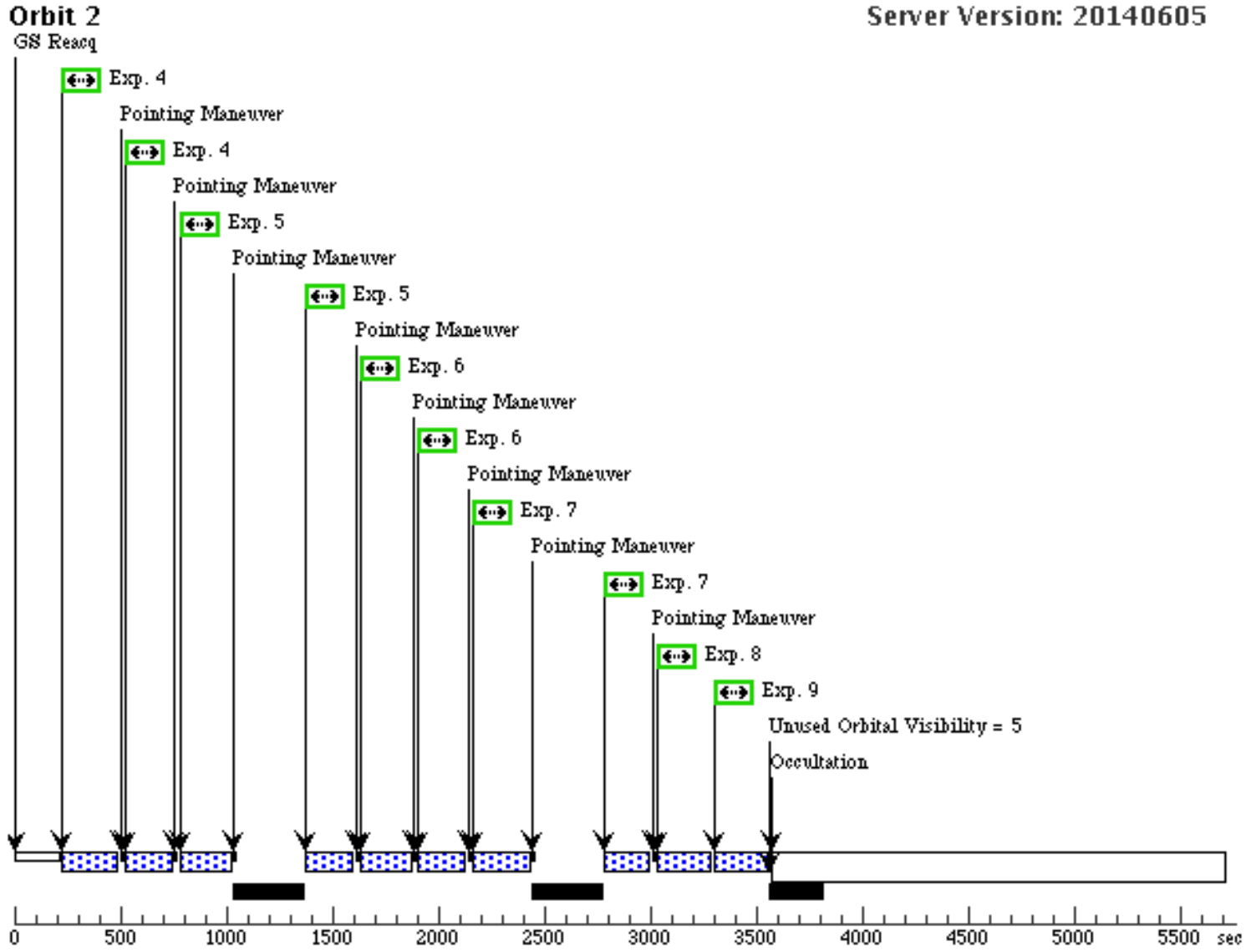
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	475-0	(1) SN-2014J	ACS/WFC, ACCUM, WFC	F475W POL0V			Pattern 1, Exps 1-1 in Pol1 (V1) (1)	130 Secs (390 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	 ***[1]***
2	475-120	(1) SN-2014J	ACS/WFC, ACCUM, WFC	F475W POL120V			Pattern 1, Exps 2-2 in Pol1 (V1) (1)	130 Secs (390 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	 ***[1]***
3	475-60	(1) SN-2014J	ACS/WFC, ACCUM, WFC	F475W POL60V			Pattern 1, Exps 3-3 in Pol1 (V1) (1)	130 Secs (390 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	 ***[1]***
4	606-0	(1) SN-2014J	ACS/WFC, ACCUM, WFC	F606W POL0V			Pattern 2, Exps 4-4 in Pol1 (V1) (2)	40 Secs (80 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	 ***[2]***
5	606-120	(1) SN-2014J	ACS/WFC, ACCUM, WFC	F606W POL120V			Pattern 2, Exps 5-5 in Pol1 (V1) (2)	40 Secs (80 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	 ***[2]***
6	606-60	(1) SN-2014J	ACS/WFC, ACCUM, WFC	F606W POL60V			Pattern 2, Exps 6-6 in Pol1 (V1) (2)	40 Secs (80 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	 ***[2]***
7	775-0	(1) SN-2014J	ACS/WFC, ACCUM, WFC	F775W POL0V			Pattern 2, Exps 7-7 in Pol1 (V1) (2)	30 Secs (60 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	 ***[2]***
8	775-120	(1) SN-2014J	ACS/WFC, ACCUM, WFC	F775W POL120V				55 Secs (55 Secs) *[==>]*	 ***[2]***
9	775-60	(1) SN-2014J	ACS/WFC, ACCUM, WFC	F775W POL60V				55 Secs (55 Secs) *[==>]*	 ***[2]***

Orbit Structure




Orbit 2
Server Version: 20140605
GS Reacq
Exp. 4
Pointing Maneuver
Exp. 4
Pointing Maneuver
Exp. 5
Pointing Maneuver
Exp. 5
Pointing Maneuver
Exp. 6
Pointing Maneuver
Exp. 6
Pointing Maneuver
Exp. 7
Pointing Maneuver
Exp. 7
Pointing Maneuver
Exp. 8
Exp. 9
Unused Orbital Visibility = 5
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 13717, Pol2 (V2), implementation Thu Oct 02 01:06:17 GMT 2014

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: BETWEEN 01-MAR-2015:00:00:00 AND 15-APR-2015:00:00:00

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=3 Point Spacing=3.011 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.28 Angle Between Sides= Center Pattern=false		(1), (2), (3)

Fixed Targets

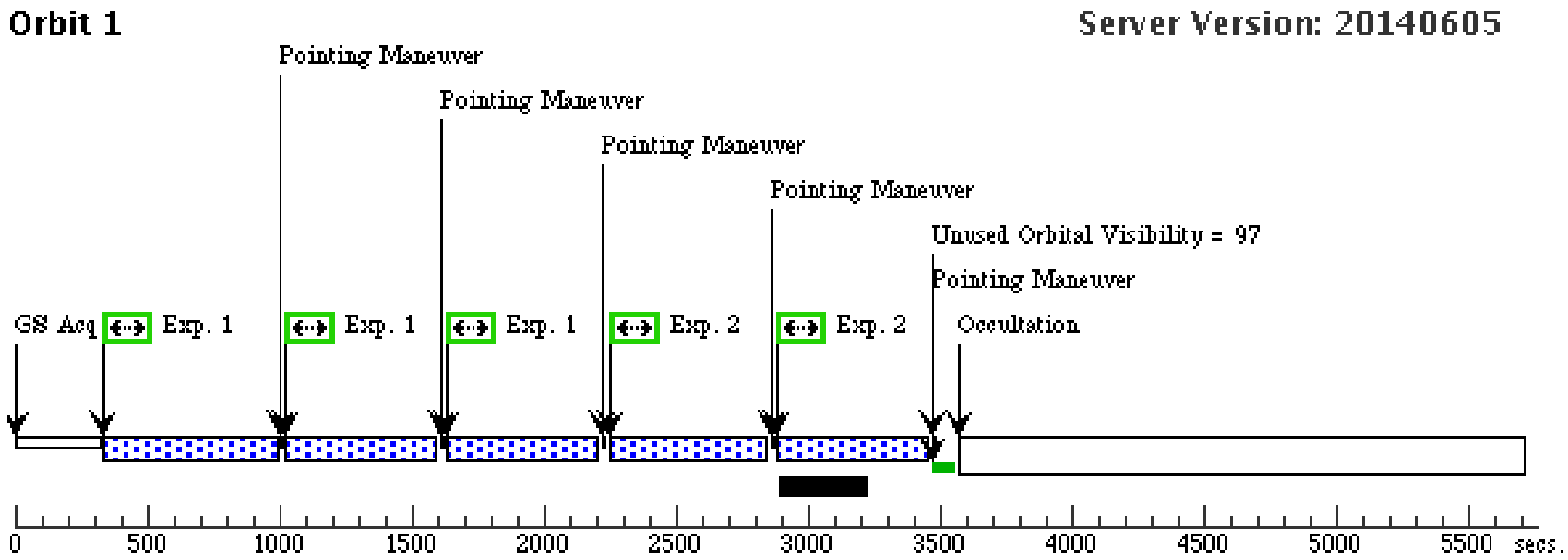
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	SN-2014J	RA: 09 55 42.1200 (148.9255000d) Dec: +69 40 25.90 (69.67386d) Equinox: J2000	Radial Velocity: 203.00 km/sec	V=17.5+/-1.5	Reference Frame: SIMBAD

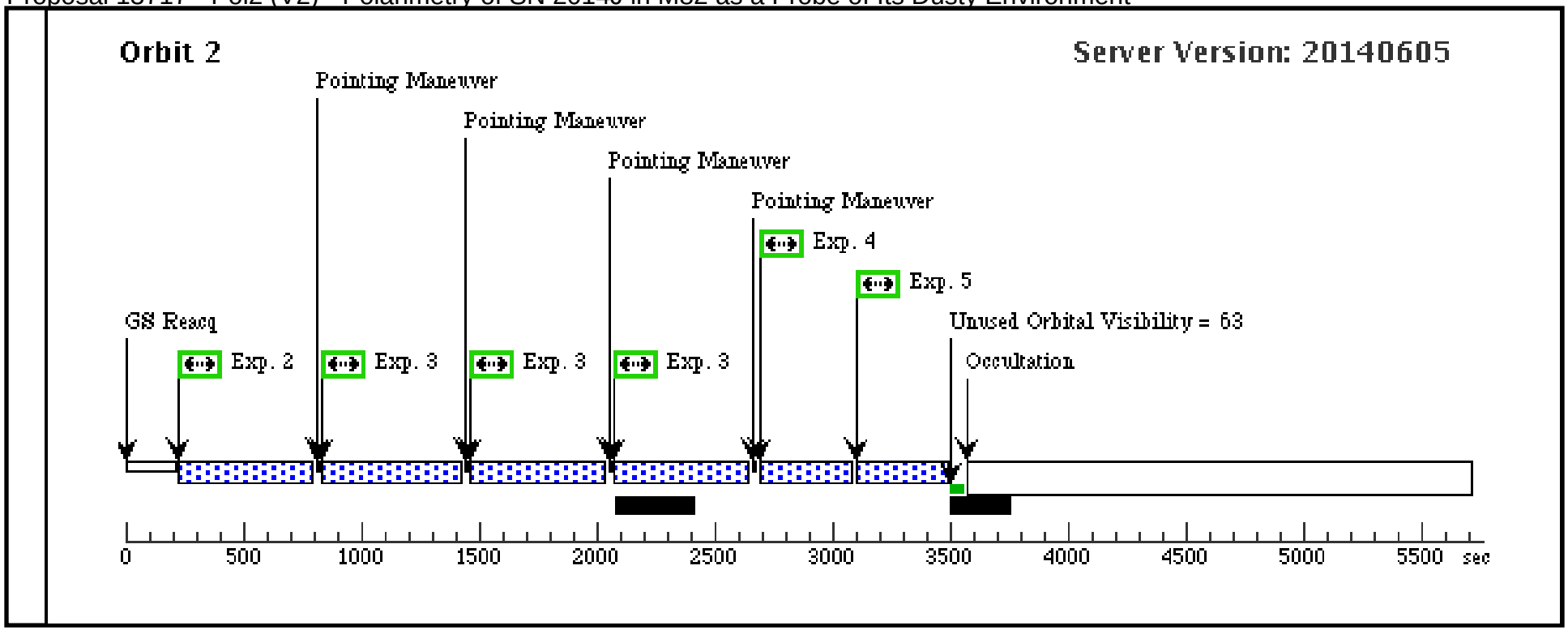
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	475-0	(1) SN-2014J	ACS/WFC, ACCUM, WFC	F475W POL0V			Pattern 1, Exps 1-1 in Pol2 (V2) (1)	400 Secs (1200 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	 ***[1]***
2	475-120	(1) SN-2014J	ACS/WFC, ACCUM, WFC	F475W POL120V			Pattern 1, Exps 2-2 in Pol2 (V2) (1)	400 Secs (1200 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	 ***[1]*** ***[2]***
3	475-60	(1) SN-2014J	ACS/WFC, ACCUM, WFC	F475W POL60V			Pattern 1, Exps 3-3 in Pol2 (V2) (1)	400 Secs (1200 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	 ***[2]***
4		(1) SN-2014J	ACS/WFC, ACCUM, WFC	F475W POL0V				200 Secs (200 Secs) *[==>]*	 ***[2]***
5		(1) SN-2014J	ACS/WFC, ACCUM, WFC	F475W POL120V				200 Secs (200 Secs) *[==>]*	 ***[2]***

Orbit Structure




Orbit 2
Server Version: 20140605
Pointing Maneuver
Pointing Maneuver
Pointing Maneuver
Pointing Maneuver
Exp. 4
Exp. 5
GS Reacq
Exp. 2
Exp. 3
Exp. 3
Exp. 3
Unused Orbital Visibility = 63
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 13717, Pol2 (V3), implementation Thu Oct 02 01:06:17 GMT 2014

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: BETWEEN 01-MAR-2015:00:00:00 AND 30-APR-2015:00:00:00

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=3 Point Spacing=3.011 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.28 Angle Between Sides= Center Pattern=false		(1), (2), (3), (4), (5), (6)

Fixed Targets

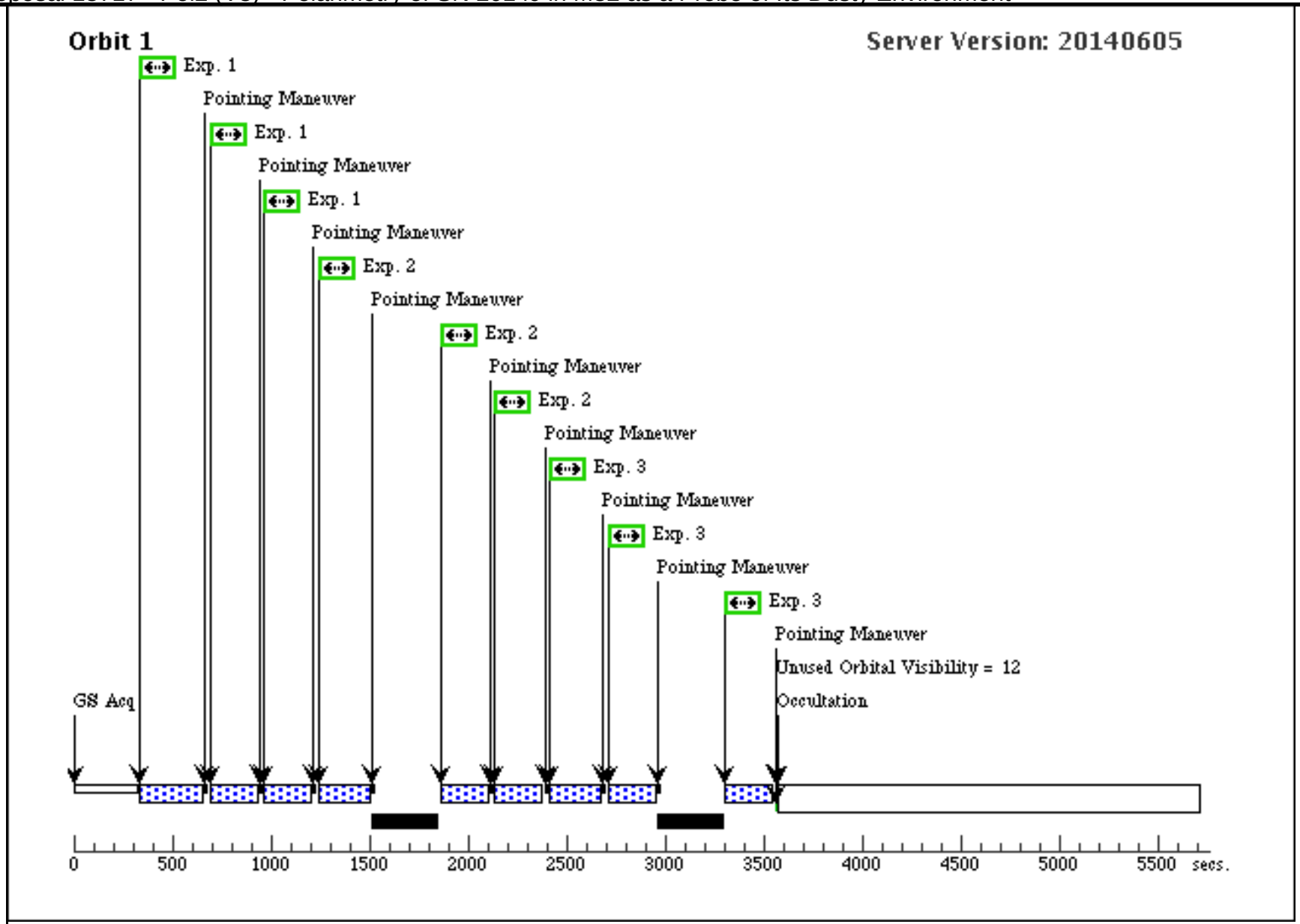
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	SN-2014J	RA: 09 55 42.1200 (148.9255000d) Dec: +69 40 25.90 (69.67386d) Equinox: J2000	Radial Velocity: 203.00 km/sec	V=17.5+/-1.5	Reference Frame: SIMBAD

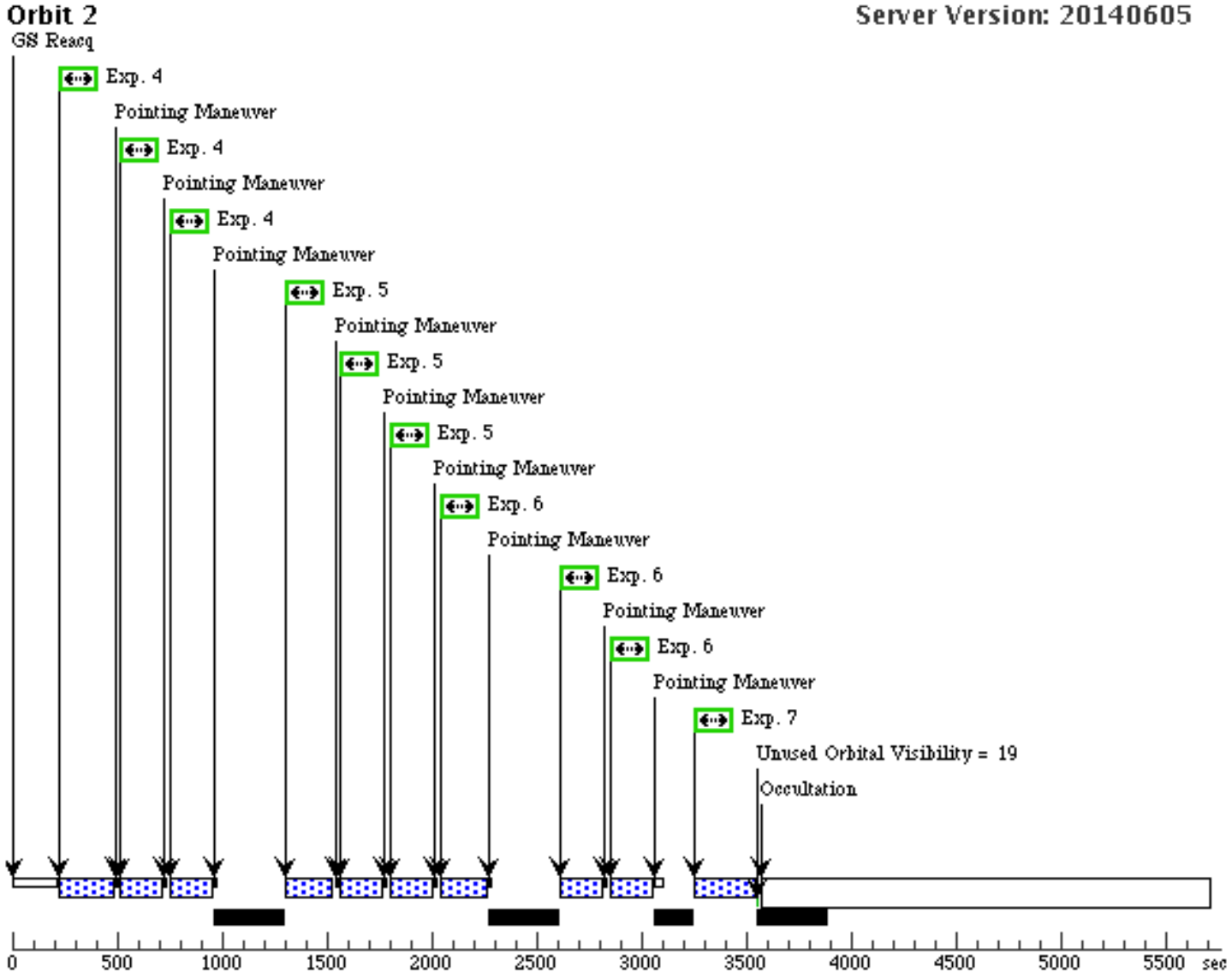
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	606-0	(1) SN-2014J	ACS/WFC, ACCUM, WFC	F606W POL0V			Pattern 1, Exps 1-1 in Pol2 (V3) (1)	60 Secs (180 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	***[1]***
2	606-120	(1) SN-2014J	ACS/WFC, ACCUM, WFC	F606W POL120V			Pattern 1, Exps 2-2 in Pol2 (V3) (1)	60 Secs (180 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	***[1]***
3	606-60	(1) SN-2014J	ACS/WFC, ACCUM, WFC	F606W POL60V			Pattern 1, Exps 3-3 in Pol2 (V3) (1)	60 Secs (180 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	***[1]***
4	775-0	(1) SN-2014J	ACS/WFC, ACCUM, WFC	F775W POL0V			Pattern 1, Exps 4-4 in Pol2 (V3) (1)	20 Secs (60 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	***[2]***
5	775-120	(1) SN-2014J	ACS/WFC, ACCUM, WFC	F775W POL120V			Pattern 1, Exps 5-5 in Pol2 (V3) (1)	20 Secs (60 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	***[2]***
6	775-60	(1) SN-2014J	ACS/WFC, ACCUM, WFC	F775W POL60V			Pattern 1, Exps 6-6 in Pol2 (V3) (1)	20 Secs (60 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	***[2]***
7		(1) SN-2014J	ACS/WFC, ACCUM, WFC	F775W				120 Secs (120 Secs) *[==>]*	***[2]***

Orbit Structure




Orbit 2
Server Version: 20140605
GS Reacq
Exp. 4
Pointing Maneuver
Exp. 4
Pointing Maneuver
Exp. 4
Pointing Maneuver
Exp. 5
Pointing Maneuver
Exp. 5
Pointing Maneuver
Exp. 5
Pointing Maneuver
Exp. 6
Pointing Maneuver
Exp. 6
Pointing Maneuver
Exp. 6
Pointing Maneuver
Exp. 7
Unused Orbital Visibility = 19
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec