15162 - Constraining the Late-Time Light Curve Behavior of Three Diverse Superluminous Supernovae

Cycle: 25, 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	(3) GAIA16APD	ACS/WFC	1	06-Jan-2022 13:02:01.0	yes
02	(2) PS16FGT	ACS/WFC	1	06-Jan-2022 13:02:02.0	yes
03	(1) PS16AQV	ACS/WFC	1	06-Jan-2022 13:02:03.0	yes
04	(3) GAIA16APD	ACS/WFC	1	06-Jan-2022 13:02:03.0	yes
05	(2) PS16FGT	ACS/WFC	1	06-Jan-2022 13:02:04.0	yes
06	(1) PS16AQV	ACS/WFC	1	06-Jan-2022 13:02:04.0	yes

6 Total Orbits Used

ABSTRACT

The current generation of untargeted optical time-domain surveys have led to the discovery of rare and extreme transients such as superluminous supernovae (SLSNe). The mechanism that powers the hydrogen-poor Type I SLSNe remains elusive, though models such as a magnetar central engine and interaction with a hydrogen-poor circumstellar medium are both major contenders. One of the most promising observational methods available to test these models is to track the light curve evolution to very late times where model predictions diverge. We propose to obtain ACS/WFC imaging of three Type I SLSNe (PS16aqv, PS16fgt, and Gaia16apd) at greater than 500 rest-frame days after peak brightness when only HST provides the required sensitivity. These events span the diversity of decline timescales and colors exhibited by Type I SLSNe and will allow us to compare the late-time evolution of a diverse sample of events among themselves and with model predictions. These HST observation will be the latest ever of Type I SLSNe and will help to address important questions regarding their power source and diversity.

OBSERVING DESCRIPTION

In Cycle 25 we will use 6 orbits to observe three superluminous supernovae (PS16aqv, PS16fgt, and Gaia16apd) using ACS/WFC. We will obtain 2 orbits for each object, separated by at least a few months, to measure the late-time lightcurve decline rate. In Cycle 26 we will obtain 3 additional orbits (1 orbit per object) to measure the host galaxy flux after the supernovae have faded below r ~ 30.

Visit

Proposal 15162, Visit 01, completed Thu Jan 06 18:02:05 GMT 2022

Diagnostic Status: Warning

Scientific Instruments: ACS/WFC

Special Requirements: BEFORE 15-DEC-2017:00:00:00

Comments: First visit for Gaia16apd

Diagnostics

(Visit 01) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.262 Line Spacing=0.192	Coordinate Frame=POS-TARG Pattern Orientation=18.39 Angle Between Sides=68.14 Center Pattern=false		(1)

Fixed Targets

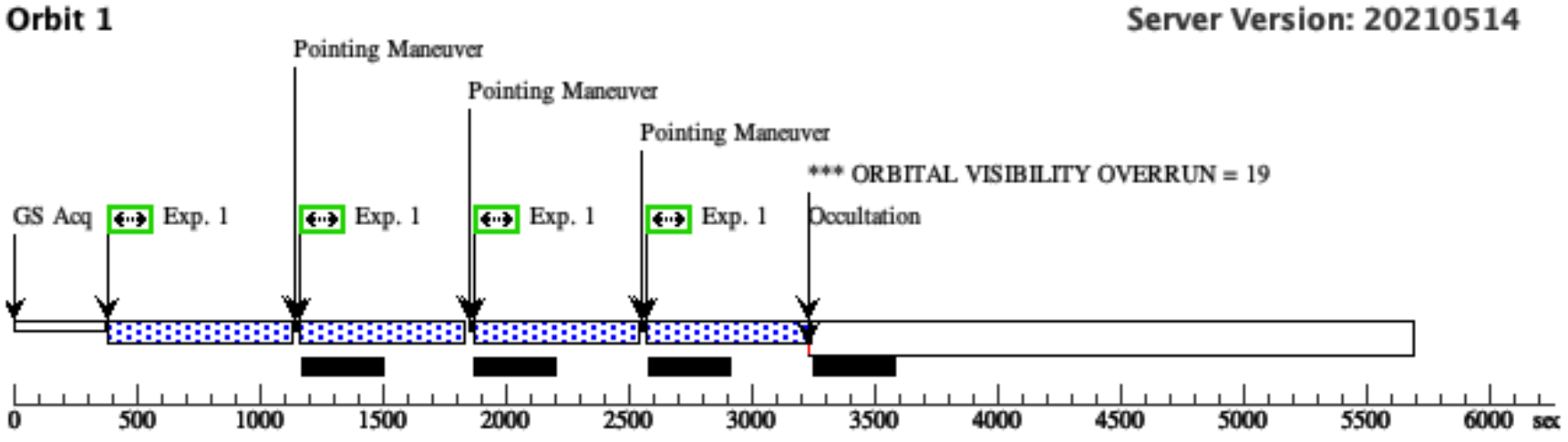
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	GAIA16APD	RA: 12 02 51.7100 (180.7154583d) Dec: +44 15 27.40 (44.25761d) Equinox: J2000	Redshift: 0.10	V=24 supernova: r = 24, host: r = 21.7	Reference Frame: ICRS

Comments:
Category=STAR
Description=[SUPERNOVA]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(3) GAIA16APD	ACS/WFC, ACCUM, WFC1	F625W			Pattern 1, Exps 1-1 in Visit 01 (1)	545 Secs (2180 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***

Orbit Structure



Visit

Proposal 15162, Visit 02, completed Thu Jan 06 18:02:05 GMT 2022

Diagnostic Status: Warning

Scientific Instruments: ACS/WFC

Special Requirements: ORIENT 285D TO 310 D; ORIENT 10D TO 80 D; ORIENT 100D TO 170 D; ORIENT 190D TO 265 D; BETWEEN 01-JAN-2018:00:00:00 AND 01-MAR-2018:00:00:00

Comments: First visit for PS16fgt

Diagnostics

(Visit 02) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.262 Line Spacing=0.192	Coordinate Frame=POS-TARG Pattern Orientation=18.39 Angle Between Sides=68.14 Center Pattern=false		(1)

Fixed Targets

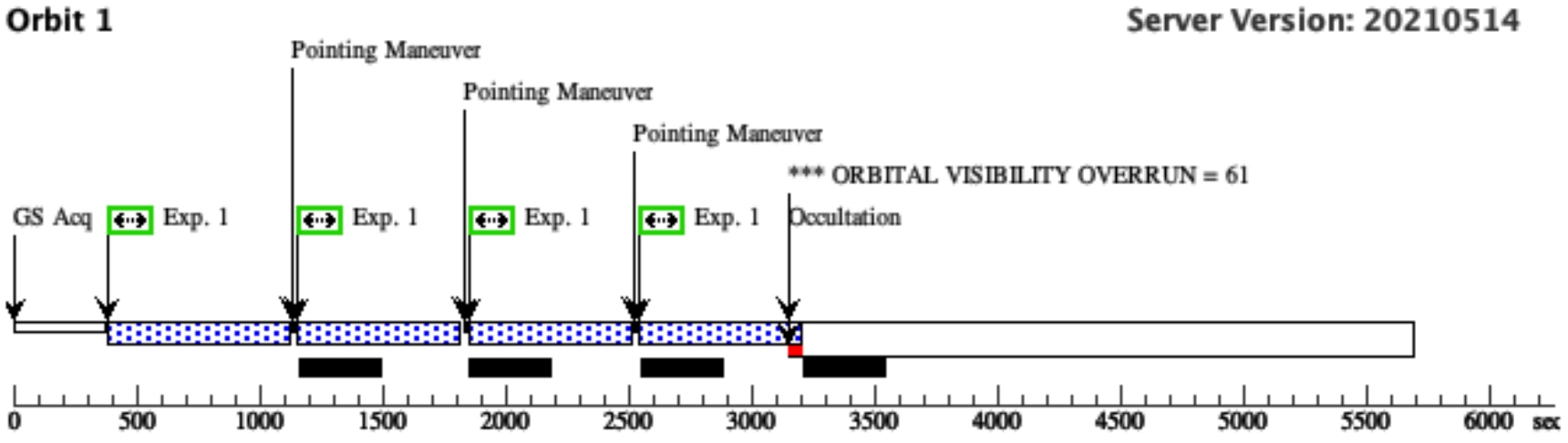
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	PS16FGT	RA: 02 44 25.8200 (41.1075833d) Dec: +19 10 42.60 (19.17850d) Equinox: J2000	Redshift: 0.30	V=24	Reference Frame: ICRS

Comments:
Category=STAR
Description=[SUPERNOVA]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(2) PS16FGT	ACS/WFC, ACCUM, WFC1	F625W			Pattern 1, Exps 1-1 in Visit 02 (1)	535 Secs (2140 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***

Orbit Structure



Visit

Proposal 15162, Visit 03, completed Thu Jan 06 18:02:05 GMT 2022

Diagnostic Status: Warning

Scientific Instruments: ACS/WFC

Special Requirements: BEFORE 15-JAN-2018:00:00:00

Comments: First visit for PS16aqv

Diagnostics

(Visit 03) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.262 Line Spacing=0.192	Coordinate Frame=POS-TARG Pattern Orientation=18.39 Angle Between Sides=68.14 Center Pattern=false		(1)

Fixed Targets

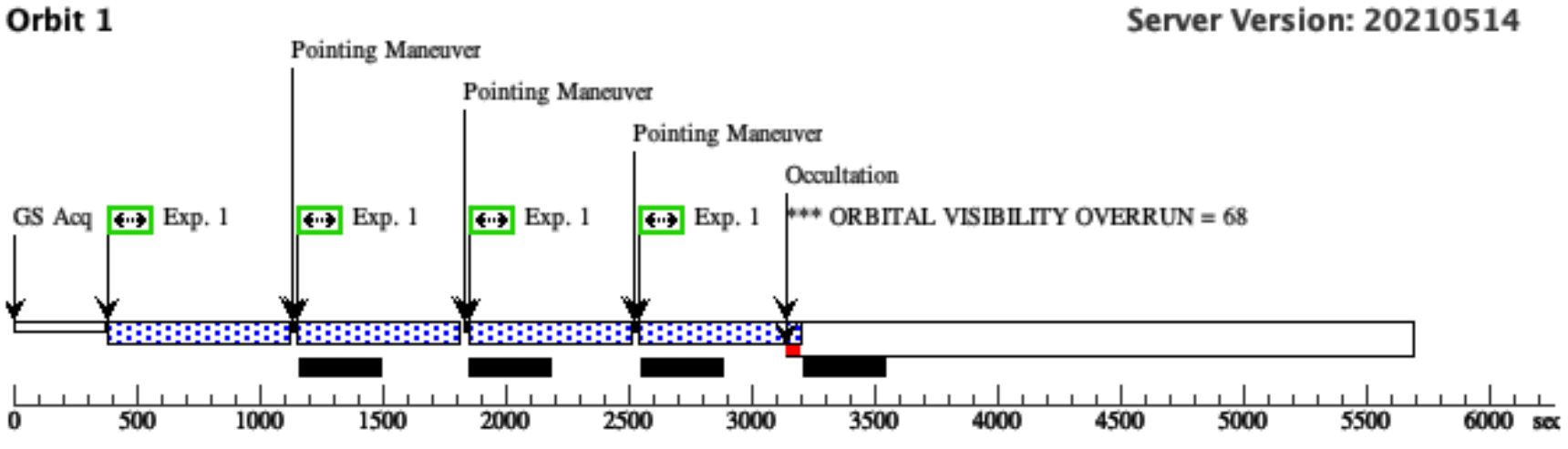
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	PS16AQV	RA: 14 10 44.5500 (212.6856250d) Dec: -10 09 35.40 (-10.15983d) Equinox: J2000	Redshift: 0.20	V=26 supernova: i = 26, host: i = 22.8	Reference Frame: ICRS

Comments:
Category=STAR
Description=[SUPERNOVA]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) PS16AQV	ACS/WFC, ACCUM, WFC1	F775W			Pattern 1, Exps 1-1 in Visit 03 (1)	535 Secs (2140 Secs)	
								[==>(Pattern 1)] *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***

Orbit Structure



Visit

Proposal 15162, Visit 04, completed Thu Jan 06 18:02:05 GMT 2022

Diagnostic Status: Warning

Scientific Instruments: ACS/WFC

Special Requirements: AFTER 01 BY 80 D TO 110 D

Comments: Second visit for Gaia16apd

Diagnostics

(Visit 04) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.262 Line Spacing=0.192	Coordinate Frame=POS-TARG Pattern Orientation=18.39 Angle Between Sides=68.14 Center Pattern=false		(1)

Fixed Targets

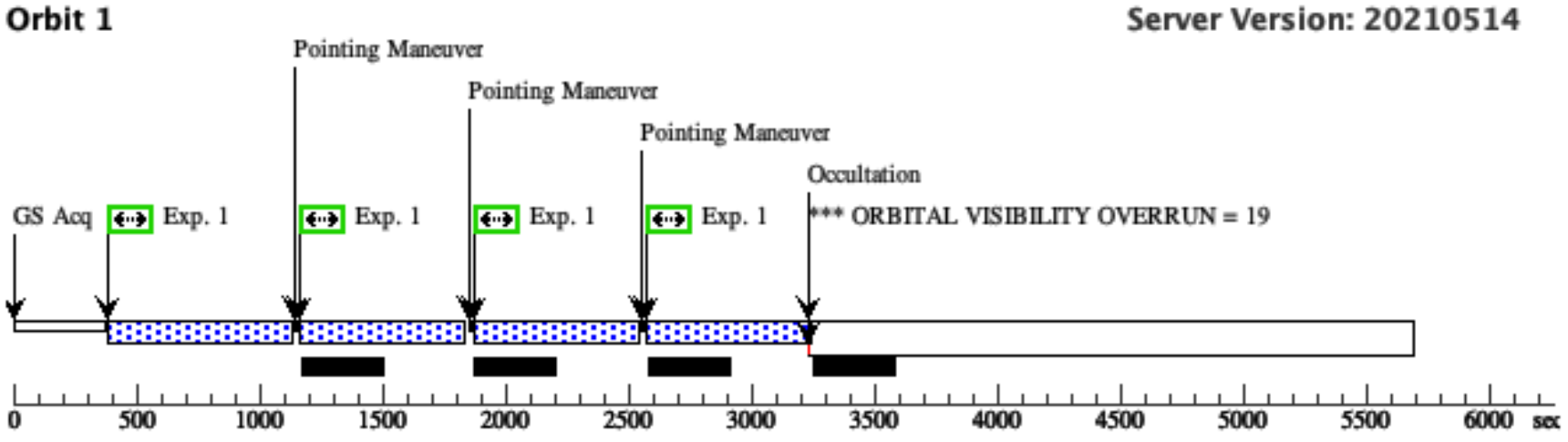
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	GAIA16APD	RA: 12 02 51.7100 (180.7154583d) Dec: +44 15 27.40 (44.25761d) Equinox: J2000	Redshift: 0.10	V=24 supernova: r = 24, host: r = 21.7	Reference Frame: ICRS

Comments:
Category=STAR
Description=[SUPERNOVA]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(3) GAIA16APD	ACS/WFC, ACCUM, WFC1	F625W			Pattern 1, Exps 1-1 in Visit 04 (1)	545 Secs (2180 Secs)	
								[==>(Pattern 1)]	***[1]***
								[==>(Pattern 2)]	
								[==>(Pattern 3)]	
								[==>(Pattern 4)]	

Orbit Structure



Visit

Proposal 15162, Visit 05, completed Thu Jan 06 18:02:05 GMT 2022

Diagnostic Status: Warning

Scientific Instruments: ACS/WFC

Special Requirements: ORIENT 285D TO 310 D; ORIENT 10D TO 80 D; ORIENT 100D TO 170 D; ORIENT 190D TO 265 D; AFTER 02 BY 90 D TO 150 D

Comments: Second visit for PS16fgt

Diagnostics

(Visit 05) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.262 Line Spacing=0.192	Coordinate Frame=POS-TARG Pattern Orientation=18.39 Angle Between Sides=68.14 Center Pattern=false		(1)

Fixed Targets

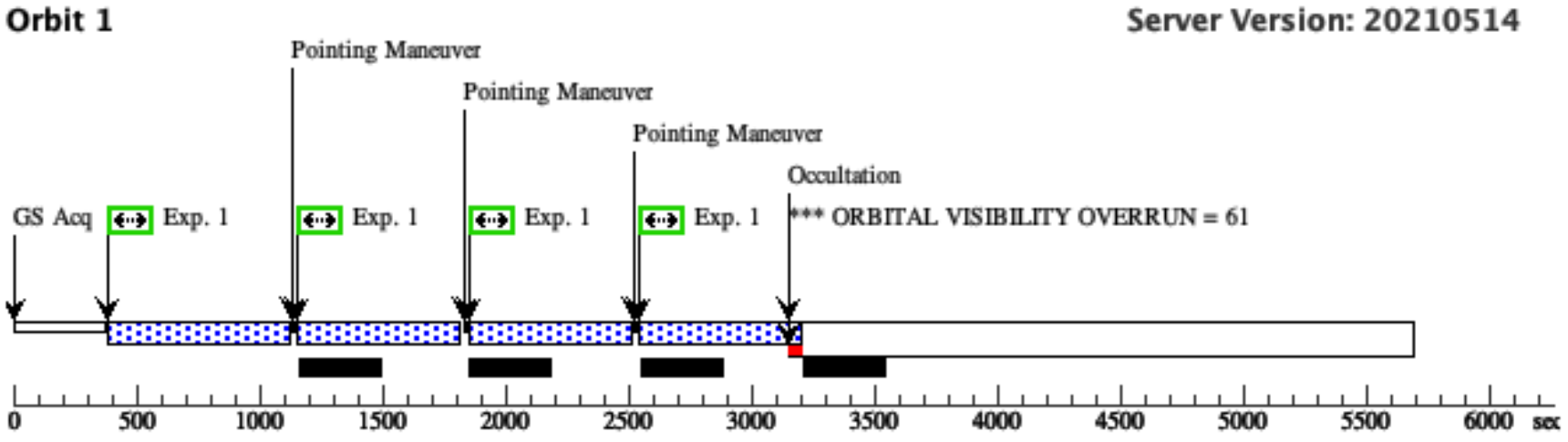
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	PS16FGT	RA: 02 44 25.8200 (41.1075833d) Dec: +19 10 42.60 (19.17850d) Equinox: J2000	Redshift: 0.30	V=24	Reference Frame: ICRS

Comments:
Category=STAR
Description=[SUPERNOVA]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(2) PS16FGT	ACS/WFC, ACCUM, WFC1	F625W			Pattern 1, Exps 1-1 in Visit 05 (1)	535 Secs (2140 Secs)	
								[==>(Pattern 1)]	***[1]***
								[==>(Pattern 2)]	
								[==>(Pattern 3)]	
								[==>(Pattern 4)]	

Orbit Structure



Visit

Proposal 15162, Visit 06, completed Thu Jan 06 18:02:05 GMT 2022

Diagnostic Status: Warning

Scientific Instruments: ACS/WFC

Special Requirements: AFTER 03 BY 60 D TO 100 D

Comments: Second visit for PS16aqv

Diagnostics

(Visit 06) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.262 Line Spacing=0.192	Coordinate Frame=POS-TARG Pattern Orientation=18.39 Angle Between Sides=68.14 Center Pattern=false		(1)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	PS16AQV	RA: 14 10 44.5500 (212.6856250d) Dec: -10 09 35.40 (-10.15983d) Equinox: J2000	Redshift: 0.20	V=26 supernova: i = 26, host: i = 22.8	Reference Frame: ICRS

Comments:
Category=STAR
Description=[SUPERNOVA]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) PS16AQV	ACS/WFC, ACCUM, WFC1	F775W			Pattern 1, Exps 1-1 in Visit 06 (1)	535 Secs (2140 Secs)	
								[==>(Pattern 1)] *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***

Orbit Structure