17779 - A massive protocluster at z=4.3 selected by the South Pole Telescope

Cycle: 32, 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?*
14	(1) SPT2349	ACS/WFC	2	08-Nov-2024 11:02:50.0	yes
15	(1) SPT2349	ACS/WFC	2	08-Nov-2024 11:02:51.0	yes
17	(1) SPT2349	ACS/WFC	2	08-Nov-2024 11:02:51.0	yes
18	(1) SPT2349	ACS/WFC	2	08-Nov-2024 11:02:52.0	yes
19	(1) SPT2349	ACS/WFC	2	08-Nov-2024 11:02:52.0	yes

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
20	(1) SPT2349	ACS/WFC	2	08-Nov-2024 11:02:53.0	yes
23	(1) SPT2349	ACS/WFC	1	08-Nov-2024 11:02:53.0	yes
24	(1) SPT2349	ACS/WFC	1	08-Nov-2024 11:02:53.0	yes
22	(1) SPT2349	WFC3/IR	5	08-Nov-2024 11:02:54.0	yes

19 Total Orbits Used

ABSTRACT

We request deep imaging of an SPT-selected protocluster, SPT2349-56 located at z=4.3, using HST and JWST in F435W through F1800W filters. SPT2349 possesses a very large ~10^13 Msun halo mass for any structure at z>4. Selected via millimeter-wavelength dust emission in the 2500 square degree South Pole Telescope (SPT) survey, it has been resolved by ALMA into more than 30 gas-rich galaxies, with a surrounding overdensity of LBGs and LAEs. Sensitive observations of carbon monoxide and ionized carbon with ALMA, allow assessment of the obscured star formation and gas masses of bright cluster members. The goal of this proposal is to obtain HST ACS imaging to uncover the overdensity of faint LBGs, and constrain the extincted UV properties of the SMGs. HST WFC3 + JWST NIRCam/MIRI will be used to measure the stellar properties and galaxy morphologies. The proposed HST+JWST observations leverage HST to minimize this initial JWST required to provide the imaging and photometric information for a complete picture of the obscured and unobscured stellar components of the ALMA galaxies, and the overdensity of LBGs, revealing the structure in the gas-rich galaxies that host rapid star formation and the less luminous galaxies which trace the filaments of an early collapsing structure. The combination of high resolution ALMA datasets with the proposed HST observations will allow a full characterization of the stars, gas, and dust in this cosmologically important protocluster of primordial starburst galaxies. From an outreach perspective, the high spatial resolution of the identifications of protocluster galaxies will complement the ALMA data in publicizing these high impact results.

OBSERVING DESCRIPTION

3 filter ACS observations (g,r,i equivalents for LBG selection)
2 filter WFC3 observations (J and H band equivalents) for SED fitting.

observational setup:
standard setups to fill orbits in ACS

typically NSAMP = 13 and SAMP-SEQ=SPARS50 for WFC3

the various choices of filters: 435w,606w, 814w in ACS for selecting lyman break galaxies
125w and 160w in WFC3 for SED fitting along with JWST bands at longer wave

dither patterns,
ACS-WFC-Dither-box and -line to fill available orbits accordingly

Visit

Proposal 17779, SPT2349 ACS f814w (14), implementation Fri Nov 08 16:02:55 GMT 2024

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: (none)

Comments: 5300s of ACS Pointing of SPT0311 with ditherig

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(2)	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)	SPT2349	RA: 23 49 42.7800 (357.4282500d) Dec: -56 38 23.80 (-56.63994d) Equinox: J2000		V=20	Reference Frame: ICRS

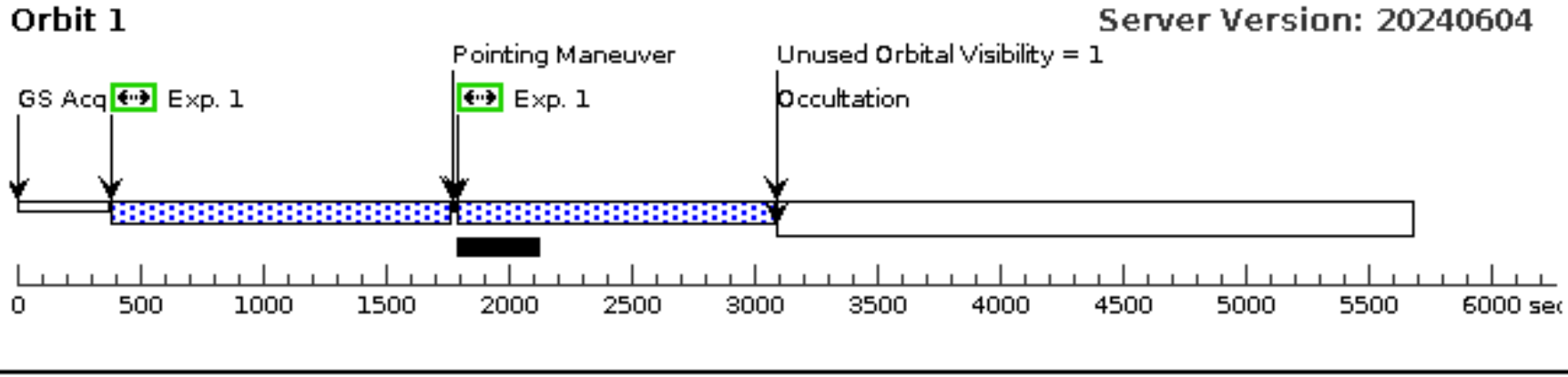
Comments:
Category=CLUSTER OF GALAXIES
Description=[HIGH REDSHIFT CLUSTER]

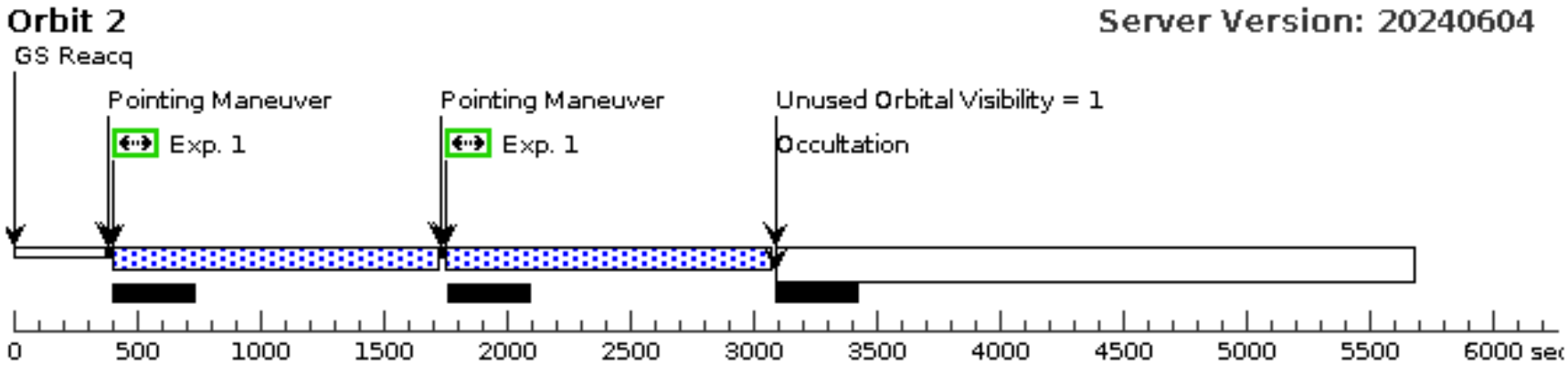
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	SPT2349 ACS 814	(1) SPT2349	ACS/WFC, ACCUM, WFC	F814W		POS TARG 5,-5	Pattern 2, Exps 1-1 in SPT2349 ACS f814w (14) (2)	25800 Secs (4742 Secs)	
								[==>1170.0 Secs (Pattern 1)] *[==>1170.0 Secs (Pattern 2)]*	***[1]***
								[==>1201.0 Secs (Pattern 3)] *[==>1201.0 Secs (Pattern 4)]*	***[2]***

Comments: 11000s of ACS Pointing of SPT0311 with dithering

Orbit Structure





Visit

Proposal 17779, SPT2349 ACS f814w (15), implementation Fri Nov 08 16:02:55 GMT 2024

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: (none)

Comments: 5300s of ACS Pointing of SPT0311 with ditherig

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(2)	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)	SPT2349	RA: 23 49 42.7800 (357.4282500d) Dec: -56 38 23.80 (-56.63994d) Equinox: J2000		V=20	Reference Frame: ICRS

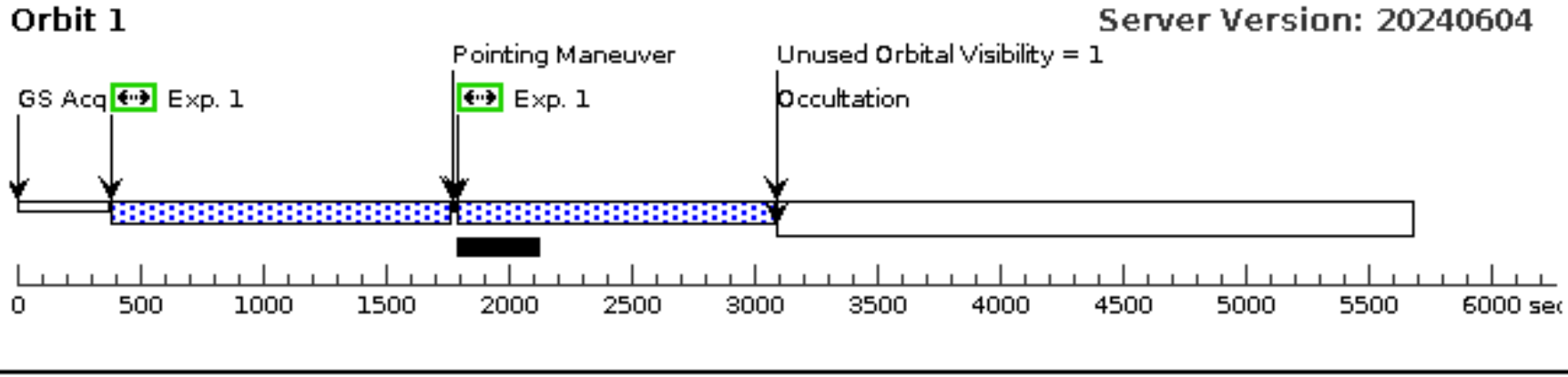
Comments:
Category=CLUSTER OF GALAXIES
Description=[HIGH REDSHIFT CLUSTER]

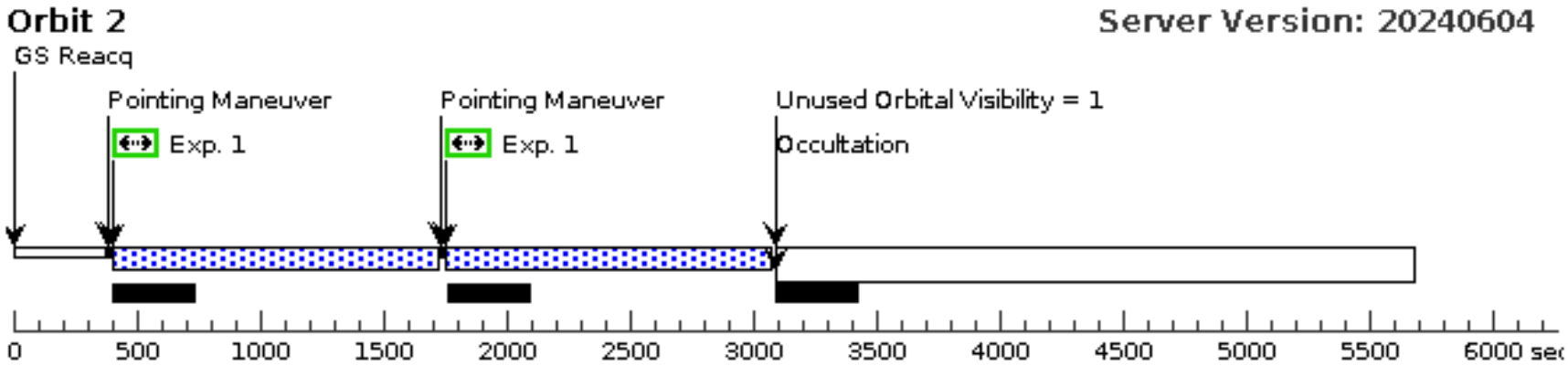
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	SPT2349 ACS 814	(1) SPT2349	ACS/WFC, ACCUM, WFC	F814W		POS TARG 5,-5	Pattern 2, Exps 1-1 in SPT2349 ACS f814w (15) (2)	25800 Secs (4742 Secs)	
								[==>1170.0 Secs (Pattern 1)] *[==>1170.0 Secs (Pattern 2)]*	***[1]***
								[==>1201.0 Secs (Pattern 3)] *[==>1201.0 Secs (Pattern 4)]*	***[2]***

Comments: 11000s of ACS Pointing of SPT0311 with dithering

Orbit Structure





Visit

Proposal 17779, SPT2349 ACS f435w (17), implementation Fri Nov 08 16:02:55 GMT 2024

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: (none)

Comments: 5300s of ACS Pointing of SPT2349 with ditherig

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(2)	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)	SPT2349	RA: 23 49 42.7800 (357.4282500d) Dec: -56 38 23.80 (-56.63994d) Equinox: J2000		V=20	Reference Frame: ICRS

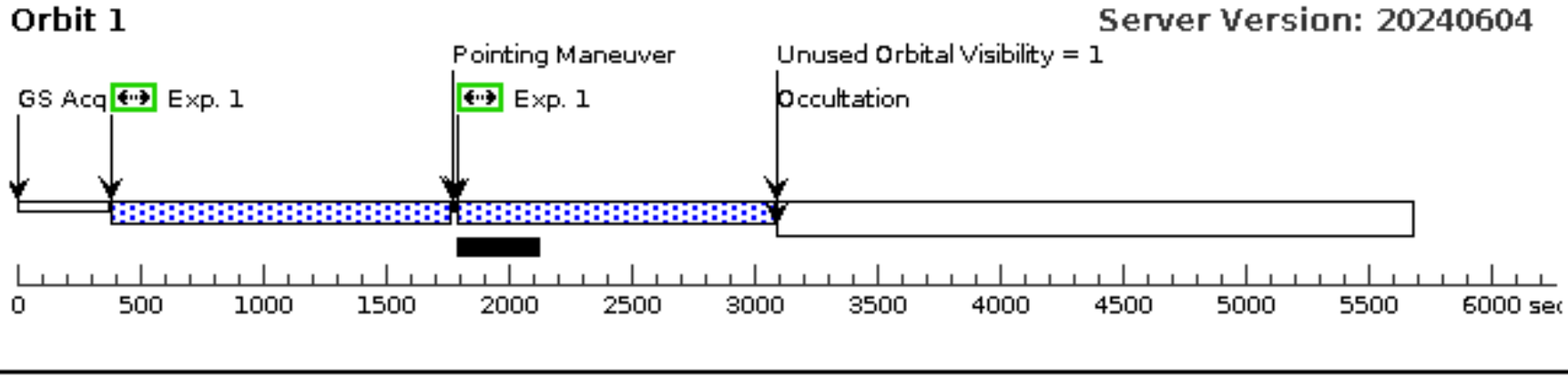
Comments:
Category=CLUSTER OF GALAXIES
Description=[HIGH REDSHIFT CLUSTER]

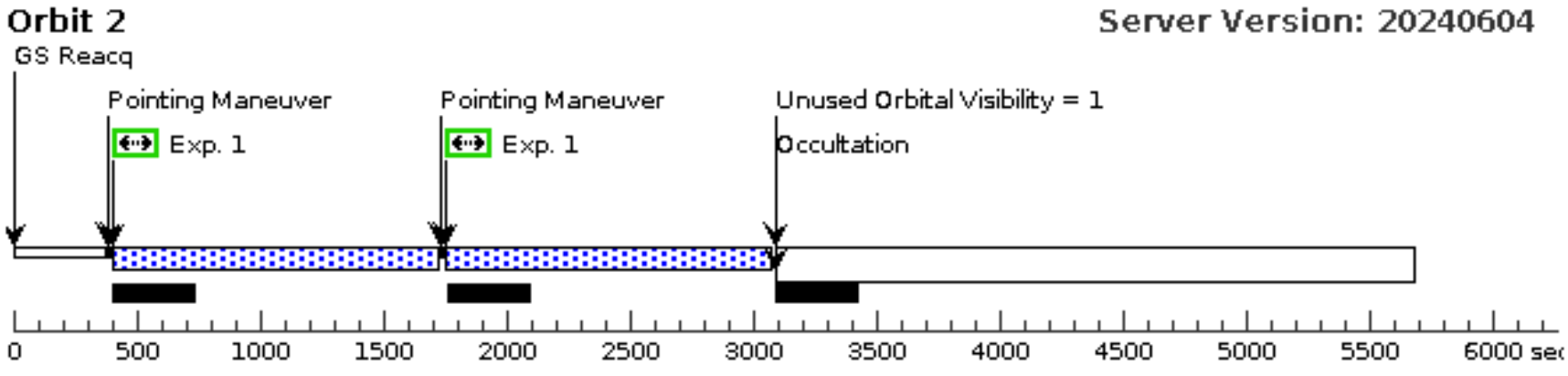
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	SPT2349 ACS 435	(1) SPT2349	ACS/WFC, ACCUM, WFC	F435W		POS TARG 5,-5	Pattern 2, Exps 1-1 in SPT2349 ACS f435w (17) (2)	25800 Secs (4742 Secs) *[==>1170.0 Secs (Pattern 1)]* *[==>1170.0 Secs (Pattern 2)]* *[==>1201.0 Secs (Pattern 3)]* *[==>1201.0 Secs (Pattern 4)]*	 ***[1]*** ***[2]***

Comments: 11000s of ACS Pointing of SPT0311 with dithering

Orbit Structure





Visit

Proposal 17779, SPT2349 ACS f435w (18), implementation Fri Nov 08 16:02:55 GMT 2024

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: (none)

Comments: 5300s of ACS Pointing of SPT2349 with ditherig

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(2)	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)	SPT2349	RA: 23 49 42.7800 (357.4282500d) Dec: -56 38 23.80 (-56.63994d) Equinox: J2000		V=20	Reference Frame: ICRS

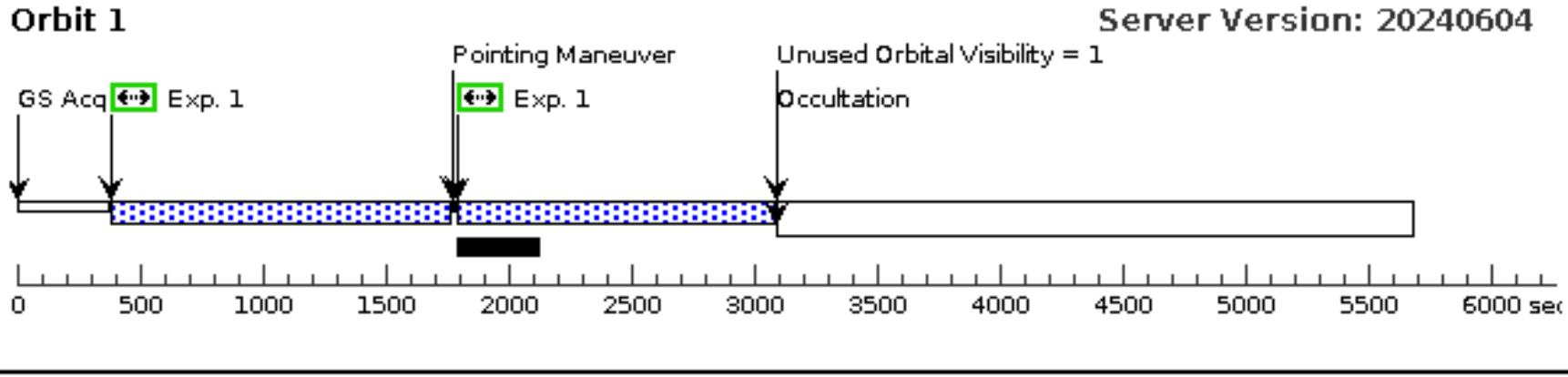
Comments:
Category=CLUSTER OF GALAXIES
Description=[HIGH REDSHIFT CLUSTER]

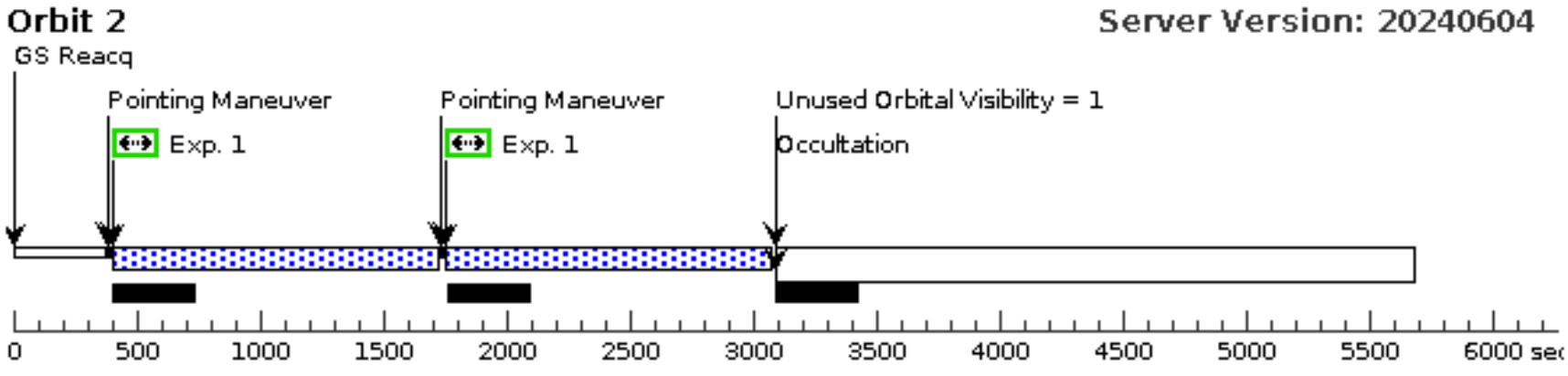
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	SPT2349 ACS 435	(1) SPT2349	ACS/WFC, ACCUM, WFC	F435W		POS TARG 5,-5	Pattern 2, Exps 1-1 in SPT2349 ACS f435w (18) (2)	25800 Secs (4742 Secs)	
								[==>1170.0 Secs (Pattern 1)] *[==>1170.0 Secs (Pattern 2)]*	***[1]***
								[==>1201.0 Secs (Pattern 3)] *[==>1201.0 Secs (Pattern 4)]*	***[2]***

Comments: 11000s of ACS Pointing of SPT0311 with dithering

Orbit Structure





Visit

Proposal 17779, SPT2349 ACS f435w (19), implementation Fri Nov 08 16:02:55 GMT 2024

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: (none)

Comments: 5300s of ACS Pointing of SPT2349 with ditherig

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(2)	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)	SPT2349	RA: 23 49 42.7800 (357.4282500d) Dec: -56 38 23.80 (-56.63994d) Equinox: J2000		V=20	Reference Frame: ICRS

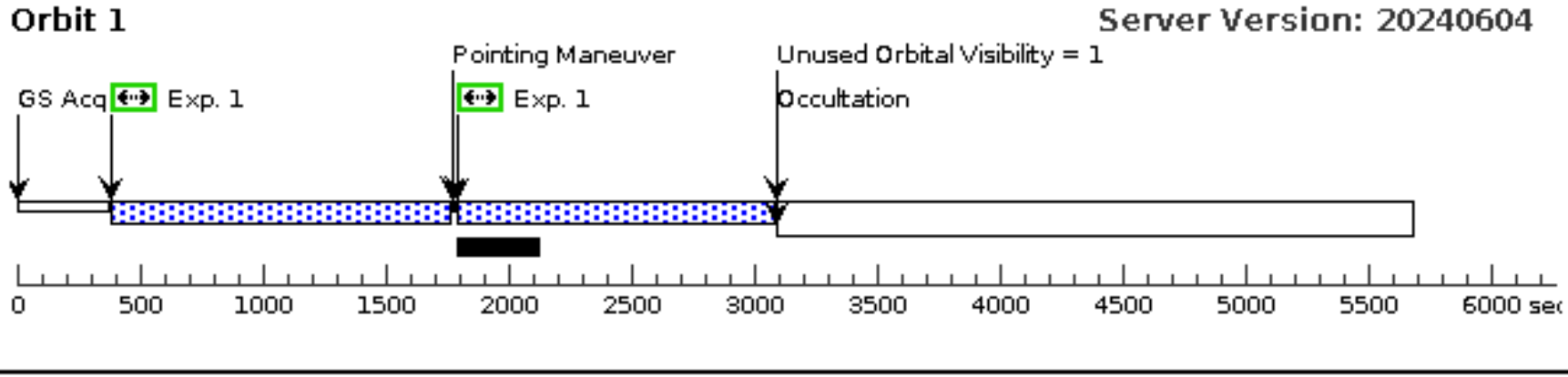
Comments:
Category=CLUSTER OF GALAXIES
Description=[HIGH REDSHIFT CLUSTER]

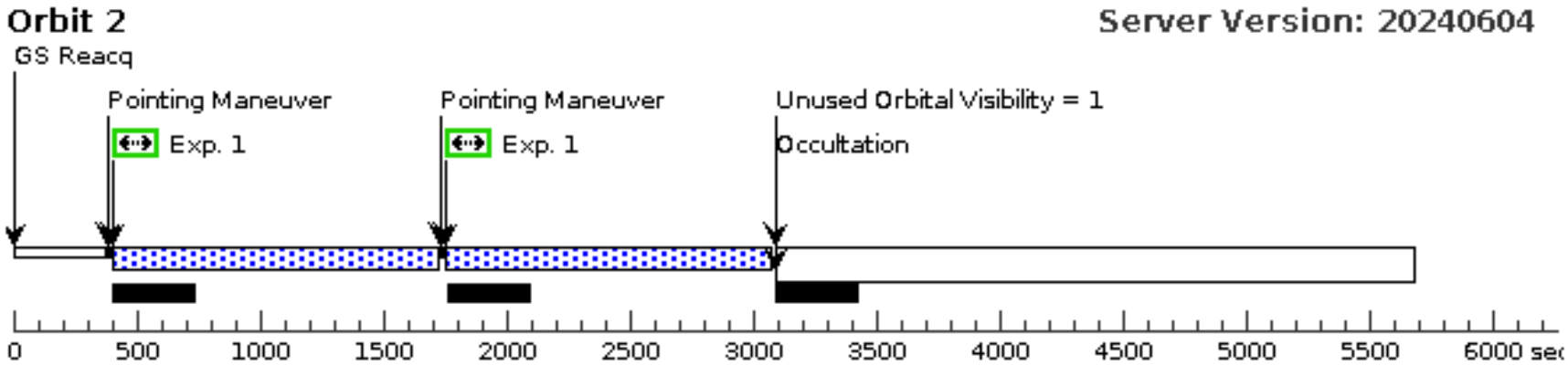
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	SPT2349 ACS 435	(1) SPT2349	ACS/WFC, ACCUM, WFC	F435W		POS TARG 5,-5	Pattern 2, Exps 1-1 in SPT2349 ACS f435w (19) (2)	25800 Secs (4742 Secs)	
								[==>1170.0 Secs (Pattern 1)] *[==>1170.0 Secs (Pattern 2)]*	***[1]***
								[==>1201.0 Secs (Pattern 3)] *[==>1201.0 Secs (Pattern 4)]*	***[2]***

Comments: 11000s of ACS Pointing of SPT0311 with dithering

Orbit Structure





Visit

Proposal 17779, SPT2349 ACS f606w (20), implementation Fri Nov 08 16:02:56 GMT 2024

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: (none)

Comments: 5300s of ACS Pointing of SPT2349 with ditherig

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(2)	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)	SPT2349	RA: 23 49 42.7800 (357.4282500d) Dec: -56 38 23.80 (-56.63994d) Equinox: J2000		V=20	Reference Frame: ICRS

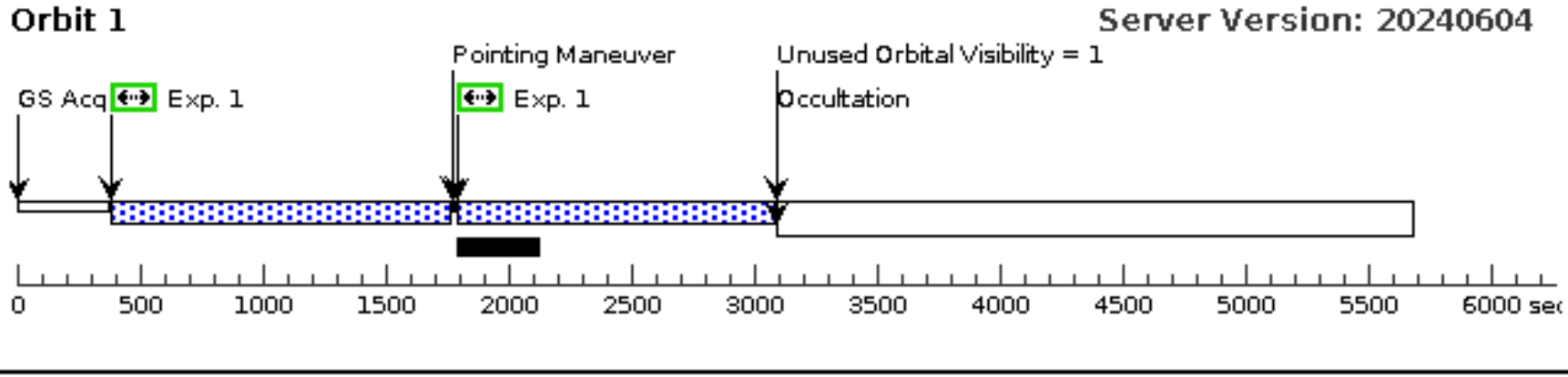
Comments:
Category=CLUSTER OF GALAXIES
Description=[HIGH REDSHIFT CLUSTER]

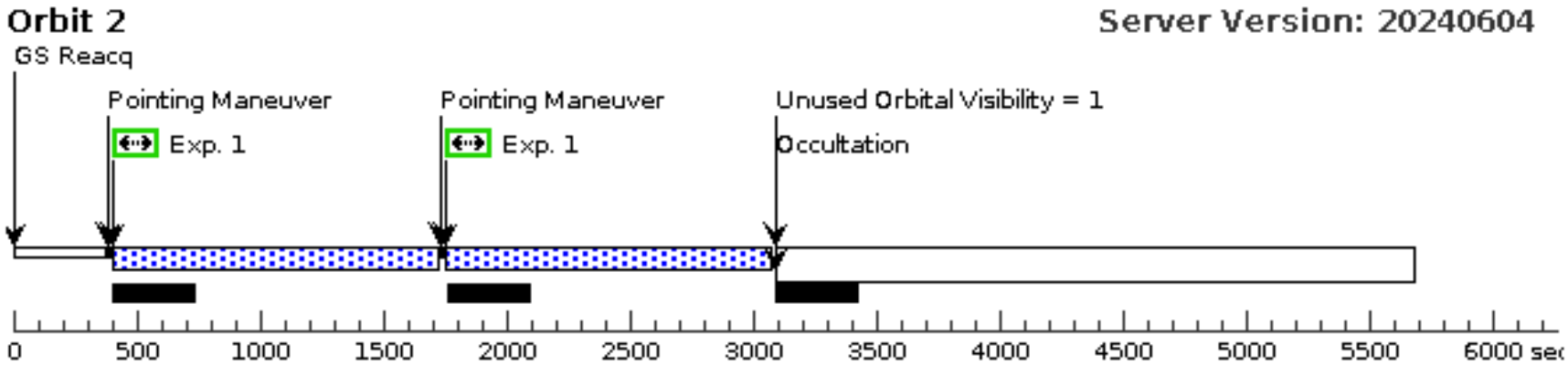
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	SPT2349 ACS 606	(1) SPT2349	ACS/WFC, ACCUM, WFC	F606W		POS TARG 5,-5	Pattern 2, Exps 1-1 in SPT2349 ACS f606w (20) (2)	25800 Secs (4742 Secs) *[==>1170.0 Secs (Pattern 1)]* *[==>1170.0 Secs (Pattern 2)]* *[==>1201.0 Secs (Pattern 3)]* *[==>1201.0 Secs (Pattern 4)]*	 ***[1]*** ***[2]***

Comments: 11000s of ACS Pointing of SPT0311 with dithering

Orbit Structure





Visit

Proposal 17779, SPT2349 ACS f814w (23), implementation Fri Nov 08 16:02:56 GMT 2024

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: (none)

Comments: 5300s of ACS Pointing of SPT0311 with dither - here use a line dither to get final orbit

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(4)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=3.034 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.29 Angle Between Sides= Center Pattern=false		(1)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	SPT2349	RA: 23 49 42.7800 (357.4282500d) Dec: -56 38 23.80 (-56.63994d) Equinox: J2000		V=20	Reference Frame: ICRS

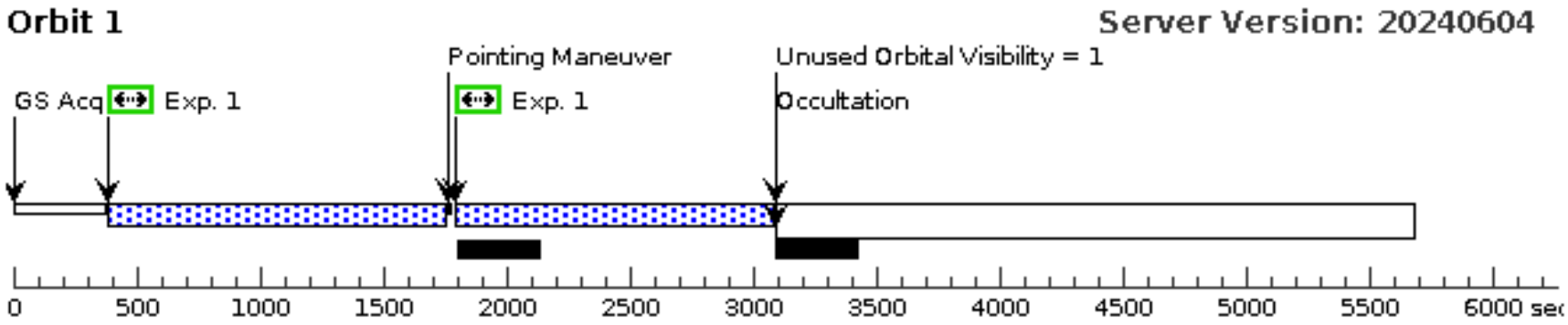
Comments:
Category=CLUSTER OF GALAXIES
Description=[HIGH REDSHIFT CLUSTER]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	SPT2349 ACS 814	(1) SPT2349	ACS/WFC, ACCUM, WFC	F814W		POS TARG 5,-5	Pattern 4, Exps 1-1 in SPT2349 ACS f814w (23) (4)	25800 Secs (2336 Secs) *[==>1168.0 Secs (Pattern 1)]* *[==>1168.0 Secs (Pattern 2)]*	*[1]*

Comments: ACS Pointing of SPT0311 with dithering

Orbit Structure



Visit

Proposal 17779, SPT2349 ACS f606w (24), implementation Fri Nov 08 16:02:56 GMT 2024

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: (none)

Comments: 5300s of ACS Pointing of SPT0311 with dither - here use a line dither to get final orbit

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(4)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=3.034 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.29 Angle Between Sides= Center Pattern=false		(1)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	SPT2349	RA: 23 49 42.7800 (357.4282500d) Dec: -56 38 23.80 (-56.63994d) Equinox: J2000		V=20	Reference Frame: ICRS

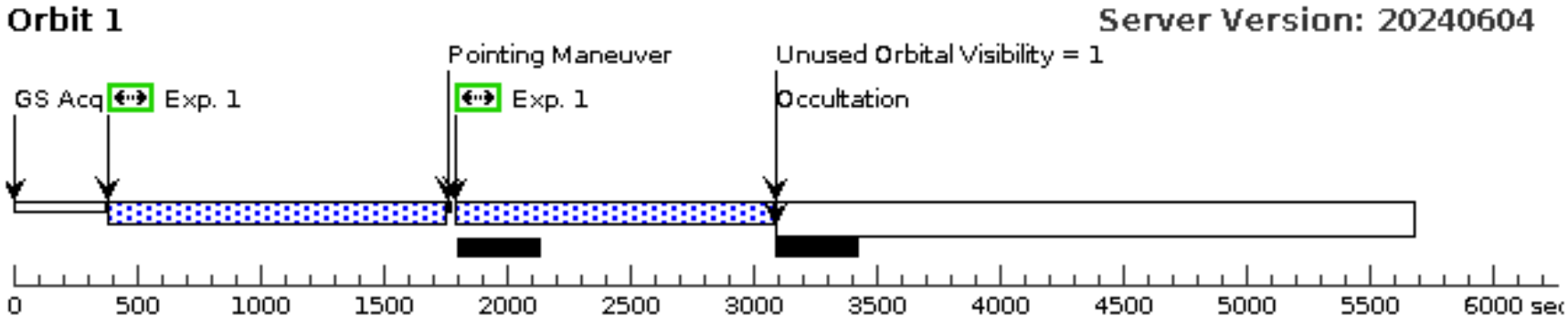
Comments:
Category=CLUSTER OF GALAXIES
Description=[HIGH REDSHIFT CLUSTER]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	SPT2349 ACS 606	(1) SPT2349	ACS/WFC, ACCUM, WFC	F606W		POS TARG 5,-5	Pattern 4, Exps 1-1 in SPT2349 ACS f606w (24) (4)	25800 Secs (2336 Secs) *[==>1168.0 Secs (Pattern 1)]* *[==>1168.0 Secs (Pattern 2)]*	*[1]*

Comments: ACS Pointing of SPT0311 with dithering

Orbit Structure



Visit

Proposal 17779, WFC3 observations (22), implementation Fri Nov 08 16:02:56 GMT 2024

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(3)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=1.716 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(1-2), (3-4), (5)

Fixed Targets

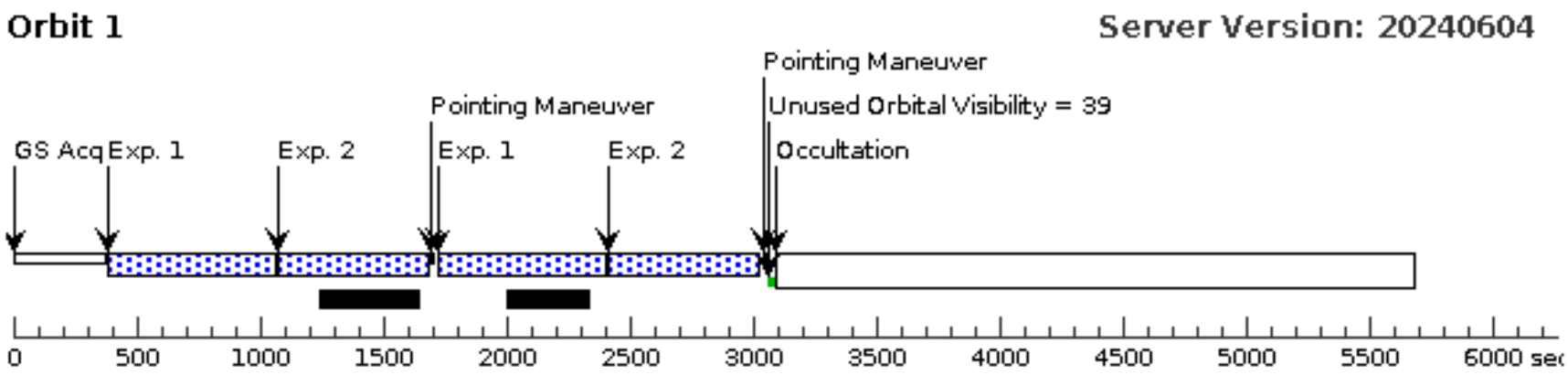
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	SPT2349	RA: 23 49 42.7800 (357.4282500d) Dec: -56 38 23.80 (-56.63994d) Equinox: J2000		V=20	Reference Frame: ICRS

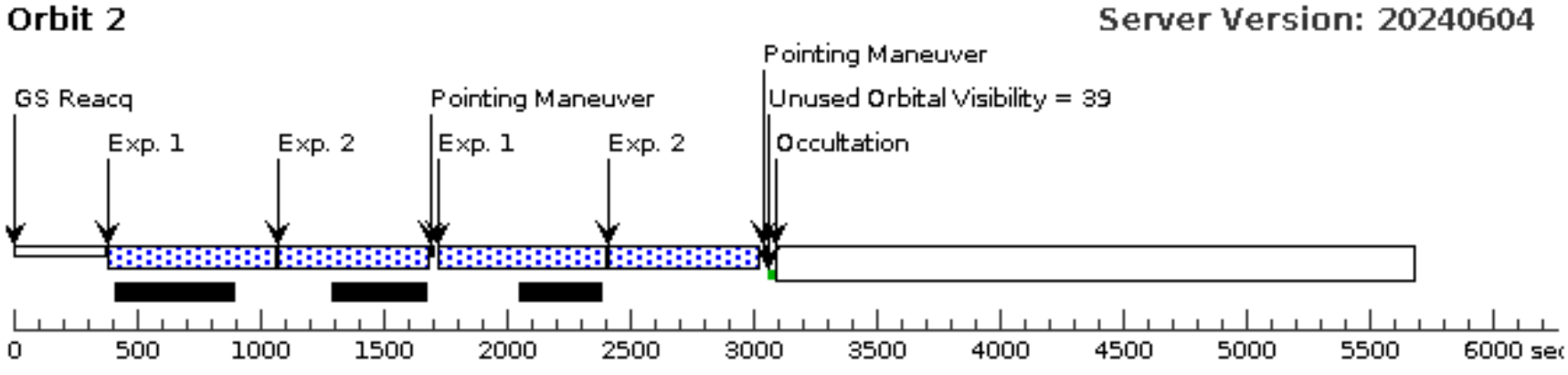
Comments:
Category=CLUSTER OF GALAXIES
Description=[HIGH REDSHIFT CLUSTER]

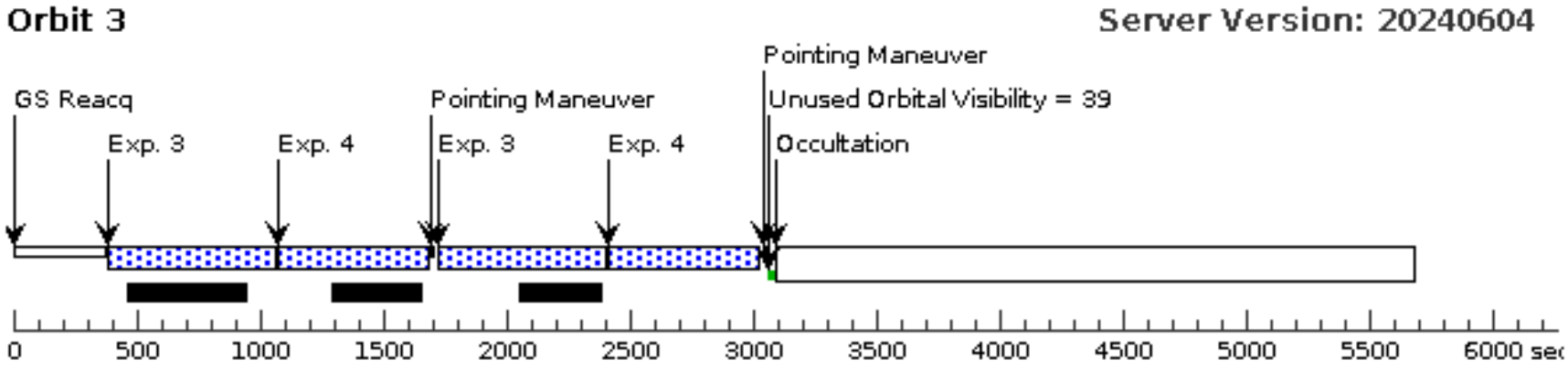
Exposures

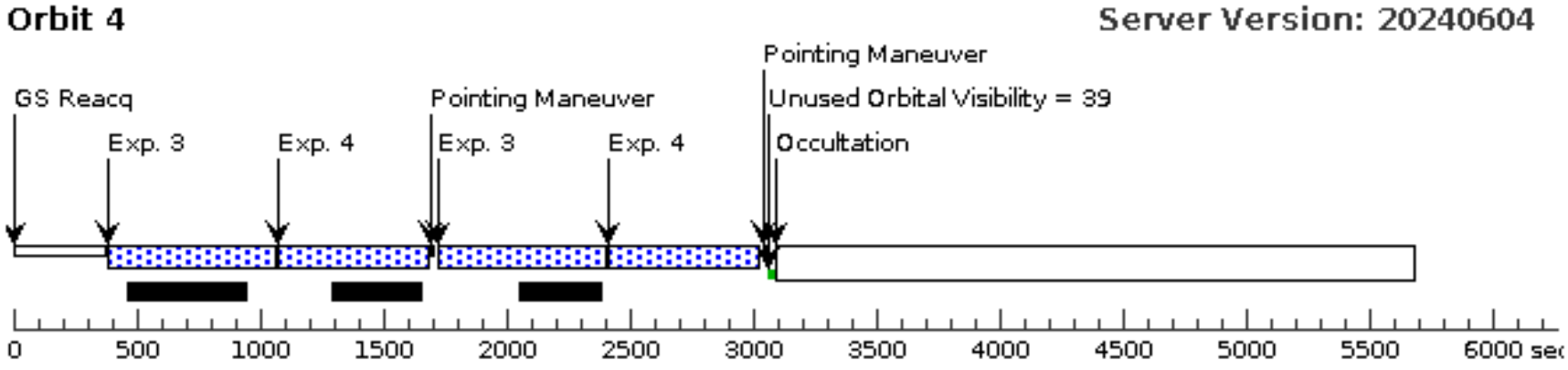
#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) SPT2349	WFC3/IR, MULTIACCUM, IR	F125W	NSAMP=14; SAMP-SEQ=SPARS50		Pattern 3, Exps 1-2 in WFC3 observations (22) (3)	652.938154 Secs (2611.753 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
								[==>(Pattern 3)] *[==>(Pattern 4)]*	***[2]***
2		(1) SPT2349	WFC3/IR, MULTIACCUM, IR	F125W	NSAMP=13; SAMP-SEQ=SPARS50		Pattern 3, Exps 1-2 in WFC3 observations (22) (3)	602.937703 Secs (2411.751 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
								[==>(Pattern 3)] *[==>(Pattern 4)]*	***[2]***
3		(1) SPT2349	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=14; SAMP-SEQ=SPARS50		Pattern 3, Exps 3-4 in WFC3 observations (22) (3)	652.938154 Secs (2611.753 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[3]***
								[==>(Pattern 3)] *[==>(Pattern 4)]*	***[4]***
4		(1) SPT2349	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=13; SAMP-SEQ=SPARS50		Pattern 3, Exps 3-4 in WFC3 observations (22) (3)	602.937703 Secs (2411.751 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[3]***
								[==>(Pattern 3)] *[==>(Pattern 4)]*	***[4]***
5		(1) SPT2349	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=13; SAMP-SEQ=SPARS50		Pattern 3, Exps 5-5 in WFC3 observations (22) (3)	602.937703 Secs (2411.751 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[5]***

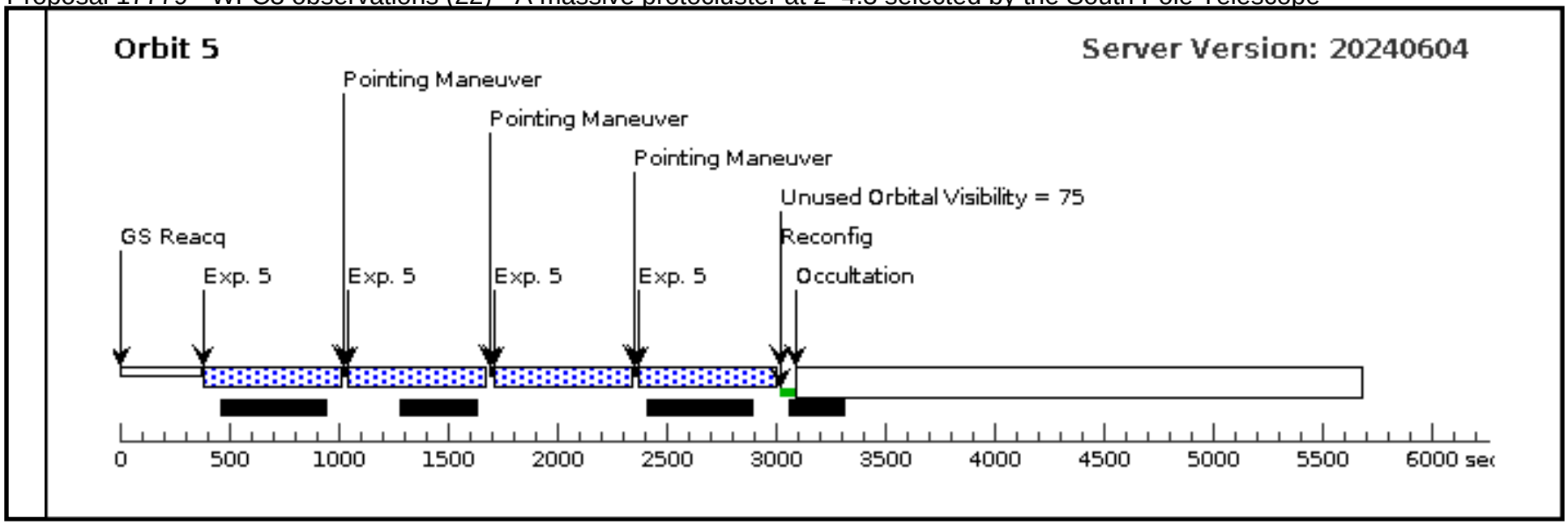
Orbit Structure






Orbit 3
Server Version: 20240604
Pointing Maneuver
GS Reacq
Pointing Maneuver
Unused Orbital Visibility = 39
Exp. 3
Exp. 4
Exp. 3
Exp. 4
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000 sec


Orbit 4
Server Version: 20240604
Pointing Maneuver
GS Reacq
Pointing Maneuver
Unused Orbital Visibility = 39
Exp. 3
Exp. 4
Exp. 3
Exp. 4
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000 sec


Orbit 5
Server Version: 20240604
Pointing Maneuver
Pointing Maneuver
Pointing Maneuver
Unused Orbital Visibility = 75
GS Reacq
Reconfig
Exp. 5
Exp. 5
Exp. 5
Exp. 5
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000 sec