15085 - Galaxies in the Diffuse Baryon Field Approaching Reionization: A Joint Study with JWST, HST, and Large Telescopes

Cycle: 25, Proposal Category: GO

(JWST Initative)

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	*Institution*	*E-Mail*
Prof. Robert Andrew Simcoe (PI) (Contact)	**Massachusetts Institute of Technology**	**simcoe@space.mit.edu**
Dr. Rongmon Bordoloi (CoI)	Massachusetts Institute of Technology	rongmon.bordoloi@gmail.com
Prof. Simon J. Lilly (CoI) (ESA Member)	Eidgenossiche Technische Hochschule (ETH)	simon.lilly@phys.ethz.ch
Dr. Daichi Kashino (CoI) (ESA Member)	Eidgenossiche Technische Hochschule (ETH)	kashinod@phys.ethz.ch

VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(2) SDSSJ103027.10+052455.0	ACS/WFC	2	29-Sep-2017 19:01:12.0	yes
02	(6) SDSSJ014837.63+060020.0	ACS/WFC	4	29-Sep-2017 19:01:15.0	yes
03	(5) PSOJ159.2257-02.5438	ACS/WFC	4	29-Sep-2017 19:01:18.0	yes
04	(4) SDSSJ010013.01+280225.7	ACS/WFC	4	29-Sep-2017 19:01:21.0	yes
05	(3) SDSSJ114816.65+525150.2	ACS/WFC	4	29-Sep-2017 19:01:24.0	yes

18 Total Orbits Used

ABSTRACT

Our team is conducting a dedicated survey for emission-line galaxies at 5 < z < 7 in six fields containing the best and brightest z > 6 quasars, using JWST/NIRCAM's slitless grism in a 110 hour GTO allocation. We have acquired deep near-IR spectra of the QSOs, revealing multiple heavy-element absorption systems and probing the HI optical depth within each object's survey volume. These data will provide the first systematic view of the circumgalactic medium at z > 4, allowing us to study early metal enrichment, correlations of the intergalactic HI optical depth with galaxy density, and the environment of the quasar hosts. These fields generally do not have deep multicolor photometry that would facilitate selection of broadband dropout galaxies for future observation with JWST/NIRSPEC. However during long spectroscopic integrations with NIRCAM's long channel we will obtain deep JWST photometry in F115W and F200W, together with F356W for wavelength calibration. Here we request 30 orbits with HST/ACS to acquire deep optical photometry that (together with the JWST IR bands) will constrain SED models and enable dropout selection of fainter objects. For lower redshift objects the rest-UV ACS data will improve estimates of star formation rate and stellar mass. Within a Small-GO program scope we will obtain sensitivity similar to CANDELS-Deep in all six fields, and approximately double the size of our galaxy sample appropriate for JWST/NIRSPEC followup at redshifts approaching the reionization epoch.

OBSERVING DESCRIPTION

The goal of this proposal is to obtain deep imaging in F775W and F606W for selection of faint dropout galaxies (AB=26-27) in six fields that will be observed with JWST / NIRCAM grism for a galaxy survey around bright quasars. We were awarded time for F775W but not F606W. After accounting for existing archival F775W, we will observe a total of five target fields over 18 orbits in this single filter.

Three targets require 4 orbits apiece to achieve our depth requirements (for selection on the blue side of a photometric break). The remaining two fields (SDSS1148 and J0100) each require 3 orbits because the archive already contains a single orbit in F775W.

Our observing strategy is heavily influenced by constraints imposed from the JWST GTO survey, in the following ways.

1) Dithers: the most valuable region is a 43" box centered upon the quasar, which we wish to be in the center of the field. This area will be imaged to ultra-deep levels with JWST in the infrared, and contains high-value targets for study of the early CGM. Our dither strategy is designed to avoid placing the ACS/WFC chip gap anywhere within this box. We achieve this by executing a +Y POS TARG offset of 11 arcsec to move the object ~21" from the chip gap initially. We then execute a 4-point dither where the first two points have sepearation just large enough to span the gap, and the second two are offset in -Y (POS TARG) by ~45" (effectively dithering the gap to the other side of the target). This leaves areas of shallower exposure depth on the outskirts of the field, but this is acceptable to get continuity and depth near the center. The dither angles and distances are

derived from offsets used in the COSMOS survey (Koekemoer et al 2007, ApJS 172:196), but rescaled to cover a larger distance in Y while still sampling +/-0.5 pixels for drizzle purposes. We understand and accept that the distances will not be exact because of optical distortions.

2) Roll angle/orientation restrictions: It is critically important for our data to be taken so that the cardinal directions of the ACS sensors are aligned with the corresponding orientation of JWST/NIRCAM. This aligns the regions of greatest exposure depth, where we will select targets for NIRSPEC followup. We have accordingly planned our ACS Phase II in conjunction with our JWST Phase II preparation. At the time of Phase I we did not have information about roll angle restrictions imposed by JWST, which turn out to be somewhat severe.

For our targets near the celestial equator (SDSS1030, SDSS0148, P159-02) our preferred roll angles (driven by JWST) could not be scheduled for ACS. For these fields we are forced to rotate 90 degrees from optimal, which loses field coverage but is the next most desirable configuration. At these angles the schedulability is high for ACS.

For our more Northern targets (SDSS1148, J0100) it was possible to schedule ACS at the proper orientation to align with JWST, although over a somewhat limited window. The tight tolerances on allowable orient angles is almost entirely driven by the scheduling requirements for JWST and coordination of programs across the observatories.

For the latter two targets, we included four roll angle envelopes to relax scheduling constraints for ACS but in both cases we have a significant preference for scheduling in one of the first two blocks (for optimal alignment with JWST).

Visit

Proposal 15085, SDSS1030 Visit (01), implementation Fri Sep 29 23:01:26 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: ORIENT 105D TO 110 D; ORIENT 285D TO 290 D

Patterns

#	Primary Pattern		Secondary Pattern		Exposures
(3)	Pattern Type=LINE	Coordinate Frame=POS-TARG	Pattern Type=LINE	Coordinate Frame=POS-TARG	(1), (2)
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	Number Of Points=2	Angle Between Sides=	Number Of Points=2	Angle Between Sides=	
	Point Spacing=48.83888	Center Pattern=false	Point Spacing=3.08553	Center Pattern=false	
	Line Spacing=		Line Spacing=		

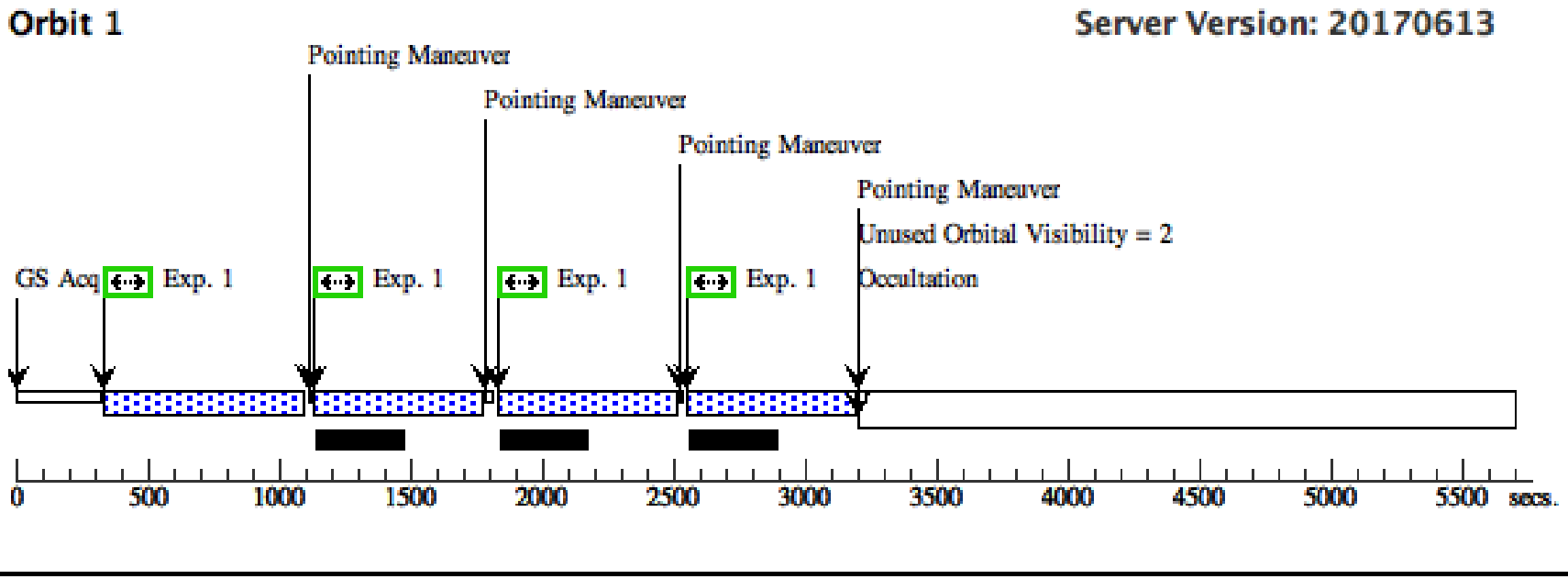
Fixed Targets

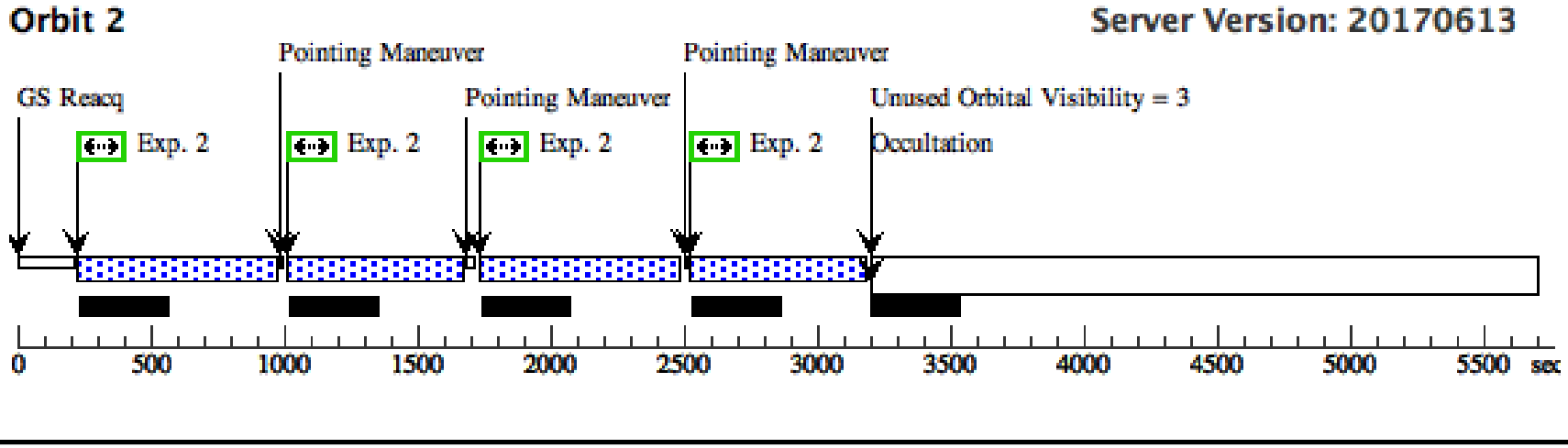
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	SDSSJ103027.10+052455.0	RA: 10 30 27.1000 (157.6129167d) Dec: +05 24 55.10 (5.41531d) Equinox: J2000		V=26.5	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(2) SDSSJ103027.10+052455.0	ACS/WFC, ACCUM, WFC	F775W		POS TARG 0,11	Pattern 3, Exps 1-1 in SDSS1030 Visit (01) (3)	500 Secs (2140 Secs) *[==>557.0 Secs (Pattern 1,1)]* *[==>513.0 Secs (Pattern 1,2)]* *[==>557.0 Secs (Pattern 2,1)]* *[==>513.0 Secs (Pattern 2,2)]*	***[1]***
2		(2) SDSSJ103027.10+052455.0	ACS/WFC, ACCUM, WFC	F775W		POS TARG 0,11	Pattern 3, Exps 2-2 in SDSS1030 Visit (01) (3)	500 Secs (2332 Secs) *[==>629.0 Secs (Pattern 1,1)]* *[==>537.0 Secs (Pattern 1,2)]* *[==>629.0 Secs (Pattern 2,1)]* *[==>537.0 Secs (Pattern 2,2)]*	***[2]***

Orbit Structure





Visit

Proposal 15085, SDSS0148 Visit (02), implementation Fri Sep 29 23:01:26 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: ORIENT 66D TO 70 D; ORIENT 246D TO 250 D

Patterns

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(3)	Pattern Type=LINE	Coordinate Frame=POS-TARG	Pattern Type=LINE	Coordinate Frame=POS-TARG	(1), (2), (3), (4)
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	Point Spacing=48.83888	Center Pattern=false	Point Spacing=3.08553	Center Pattern=false	
	Line Spacing=		Line Spacing=		

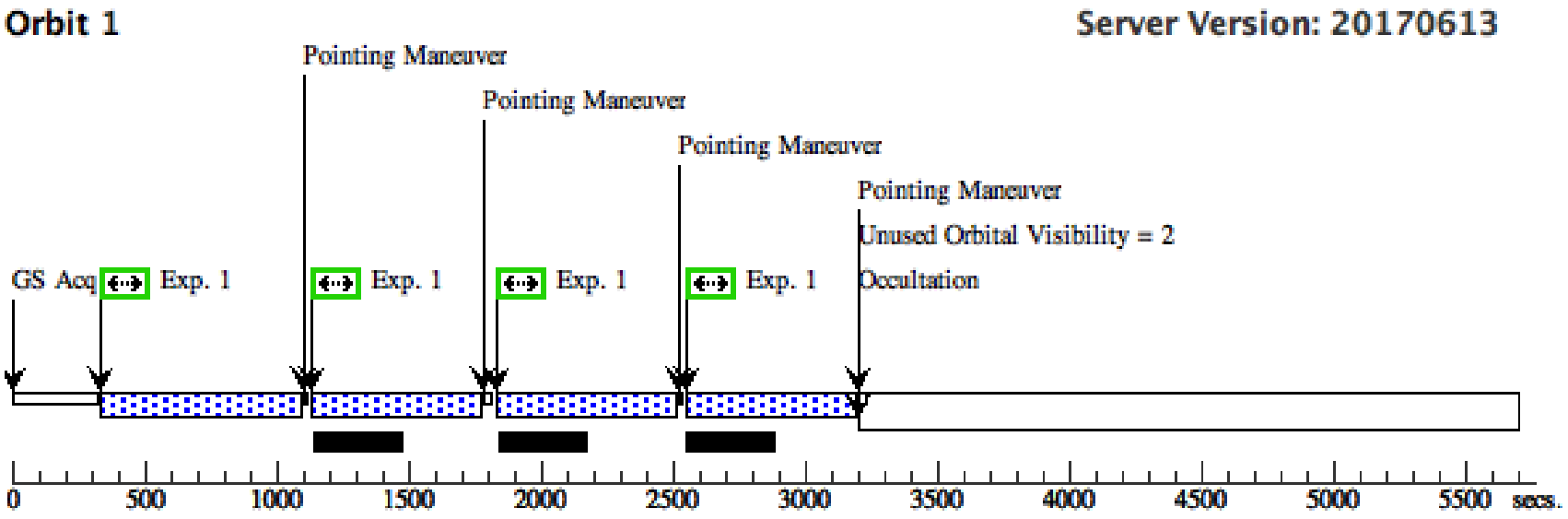
Fixed Targets

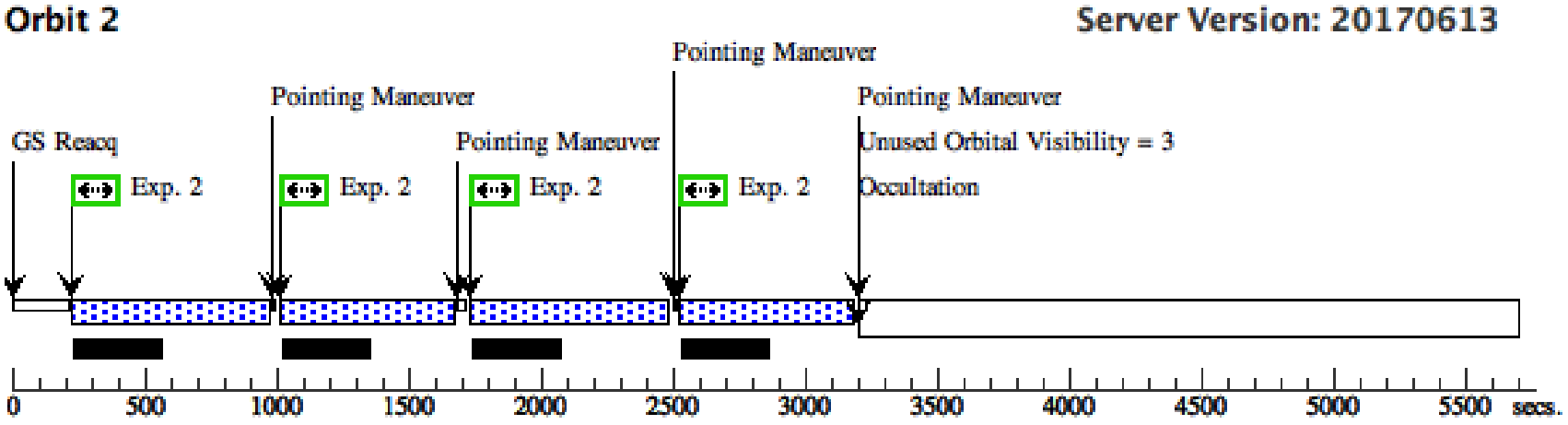
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(6)	SDSSJ014837.63+060020.0	RA: 01 48 37.6400 (27.1568333d) Dec: +06 00 20.06 (6.00557d) Equinox: J2000		V=26.5	Reference Frame: ICRS

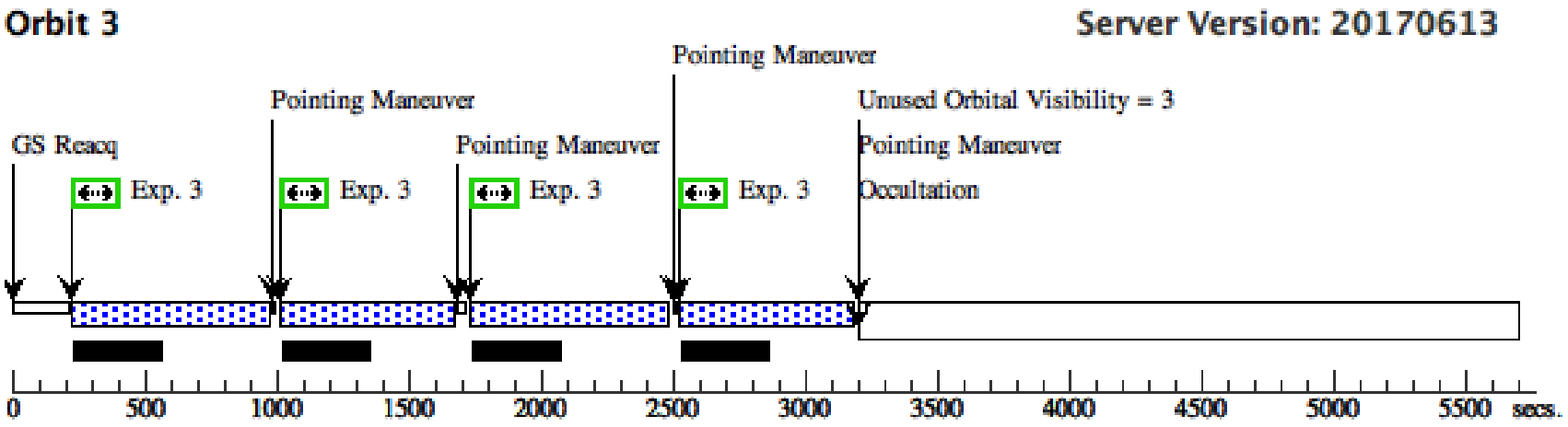
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(6) SDSSJ014837.63+060020.0	ACS/WFC, ACCUM, WFC	F775W		POS TARG 0,11	Pattern 3, Exps 1-1 in SDSS0148 Visit (02) (3)	500 Secs (2140 Secs) *[==>556.0 Secs (Pattern 1,1)]* *[==>514.0 Secs (Pattern 1,2)]* *[==>556.0 Secs (Pattern 2,1)]* *[==>514.0 Secs (Pattern 2,2)]*	***[1]***
2		(6) SDSSJ014837.63+060020.0	ACS/WFC, ACCUM, WFC	F775W		POS TARG 0,11	Pattern 3, Exps 2-2 in SDSS0148 Visit (02) (3)	500 Secs (2332 Secs) *[==>628.0 Secs (Pattern 1,1)]* *[==>538.0 Secs (Pattern 1,2)]* *[==>628.0 Secs (Pattern 2,1)]* *[==>538.0 Secs (Pattern 2,2)]*	***[2]***
3		(6) SDSSJ014837.63+060020.0	ACS/WFC, ACCUM, WFC	F775W		POS TARG 0,11	Pattern 3, Exps 3-3 in SDSS0148 Visit (02) (3)	500 Secs (2332 Secs) *[==>628.0 Secs (Pattern 1,1)]* *[==>538.0 Secs (Pattern 1,2)]* *[==>628.0 Secs (Pattern 2,1)]* *[==>538.0 Secs (Pattern 2,2)]*	***[3]***
4		(6) SDSSJ014837.63+060020.0	ACS/WFC, ACCUM, WFC	F775W		POS TARG 0,11	Pattern 3, Exps 4-4 in SDSS0148 Visit (02) (3)	500 Secs (2332 Secs) *[==>628.0 Secs (Pattern 1,1)]* *[==>538.0 Secs (Pattern 1,2)]* *[==>628.0 Secs (Pattern 2,1)]* *[==>538.0 Secs (Pattern 2,2)]*	***[4]***

Orbit Structure



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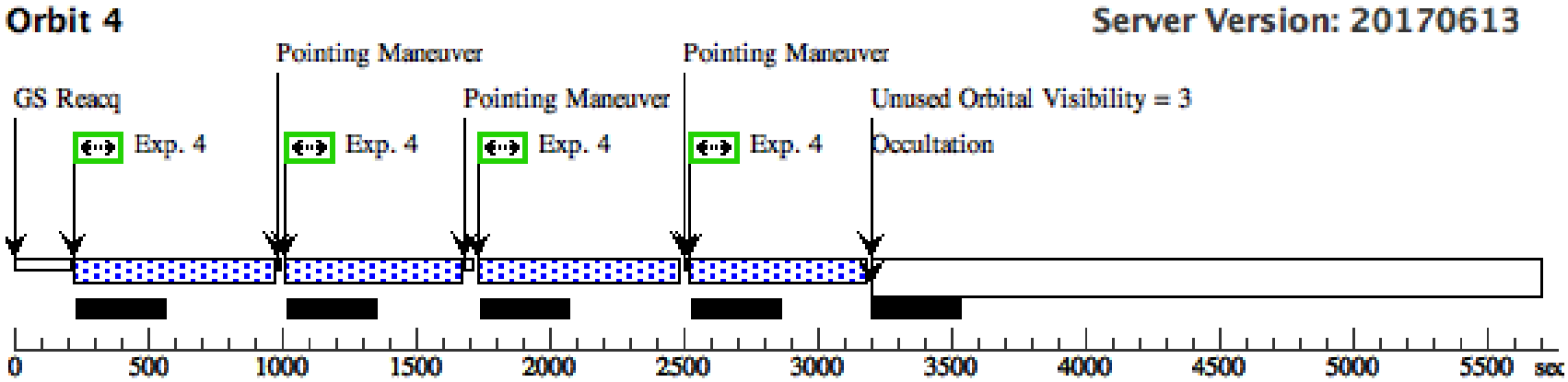
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Visit

Proposal 15085, P159-02 Visit (03), implementation Fri Sep 29 23:01:26 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: ORIENT 105D TO 110 D; ORIENT 285D TO 290 D

Patterns

#	Primary Pattern		Secondary Pattern		Exposures
(3)	Pattern Type=LINE	Coordinate Frame=POS-TARG	Pattern Type=LINE	Coordinate Frame=POS-TARG	(1), (2), (3), (4)
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	Number Of Points=2	Angle Between Sides=	Number Of Points=2	Angle Between Sides=	
	Point Spacing=48.83888	Center Pattern=false	Point Spacing=3.08553	Center Pattern=false	
	Line Spacing=		Line Spacing=		

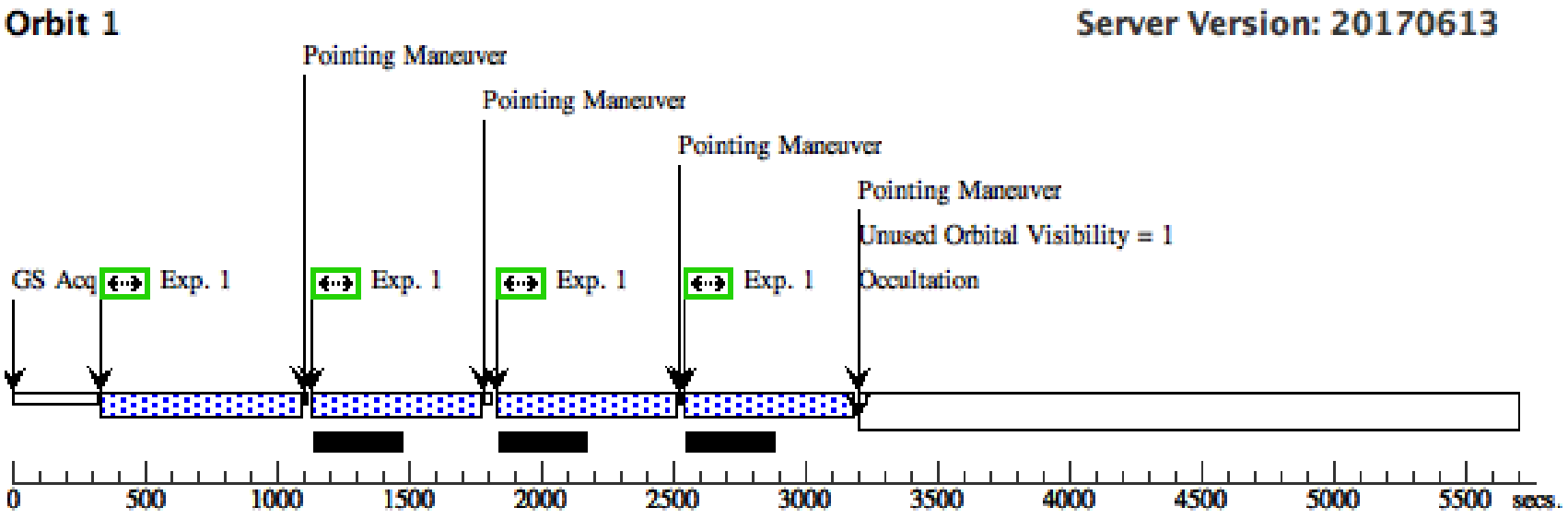
Fixed Targets

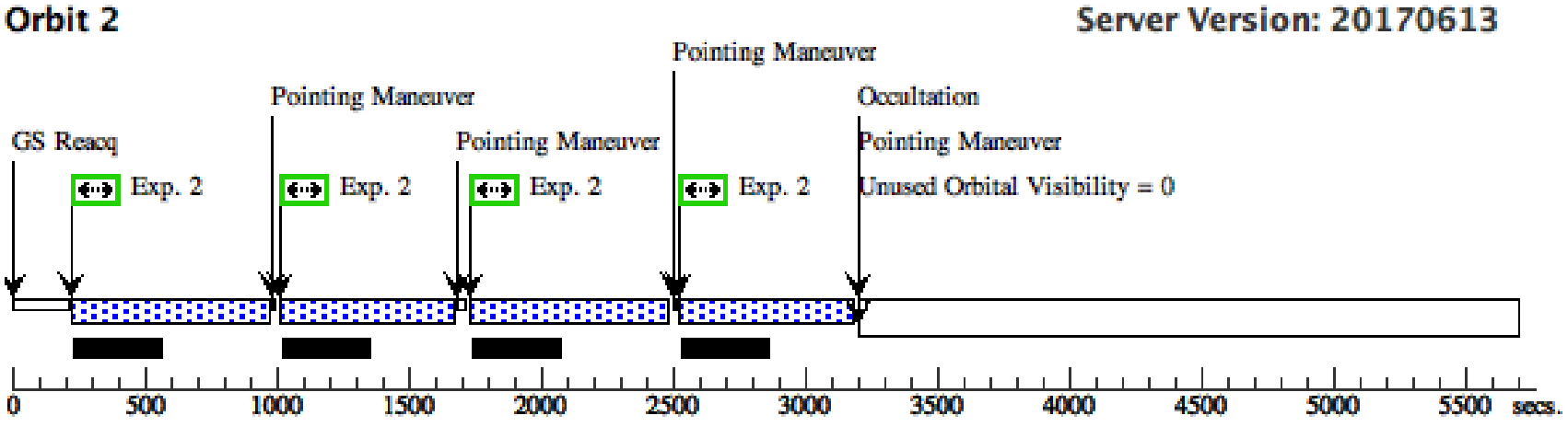
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(5)	PSOJ159.2257-02.5438	RA: 10 36 54.1900 (159.2257917d) Dec: -02 32 37.94 (-2.54387d) Equinox: J2000		V=26.5	Reference Frame: ICRS

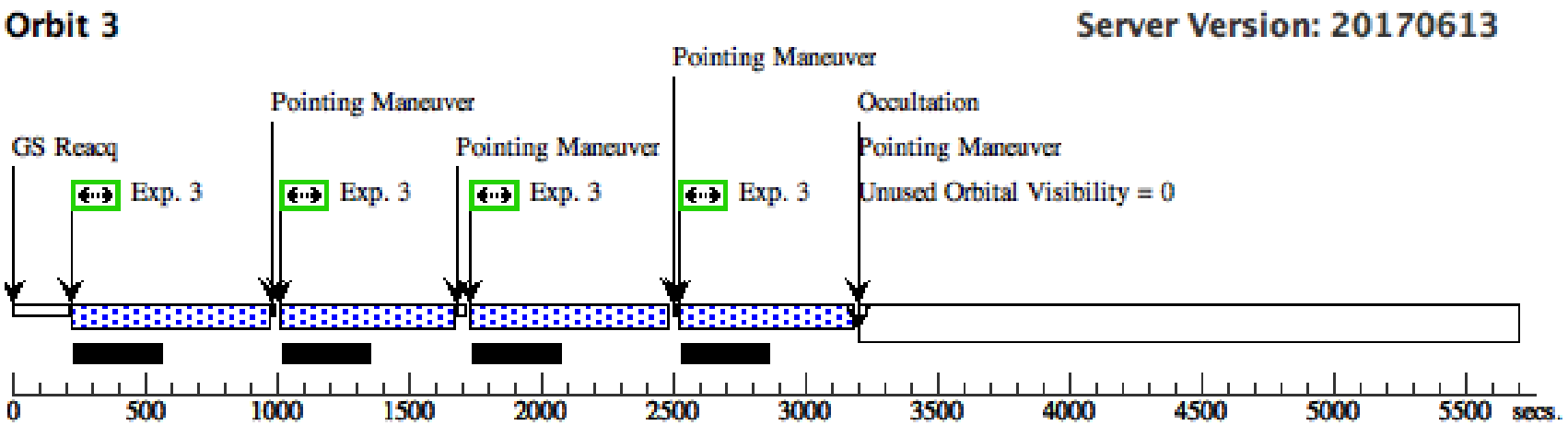
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(5) PSOJ159.2257-02.5438	ACS/WFC, ACCUM, WFC	F775W		POS TARG 0,11; GS ACQ SCENARIO BASE1B3	Pattern 3, Exps 1-1 in P159-02 Visit (03) (3)	500 Secs (2138 Secs) *[==>555.0 Secs (Pattern 1,1)]* *[==>514.0 Secs (Pattern 1,2)]* *[==>555.0 Secs (Pattern 2,1)]* *[==>514.0 Secs (Pattern 2,2)]*	***[1]***
2		(5) PSOJ159.2257-02.5438	ACS/WFC, ACCUM, WFC	F775W		POS TARG 0,11	Pattern 3, Exps 2-2 in P159-02 Visit (03) (3)	500 Secs (2332 Secs) *[==>628.0 Secs (Pattern 1,1)]* *[==>538.0 Secs (Pattern 1,2)]* *[==>628.0 Secs (Pattern 2,1)]* *[==>538.0 Secs (Pattern 2,2)]*	***[2]***
3		(5) PSOJ159.2257-02.5438	ACS/WFC, ACCUM, WFC	F775W		POS TARG 0,11	Pattern 3, Exps 3-3 in P159-02 Visit (03) (3)	500 Secs (2332 Secs) *[==>628.0 Secs (Pattern 1,1)]* *[==>538.0 Secs (Pattern 1,2)]* *[==>628.0 Secs (Pattern 2,1)]* *[==>538.0 Secs (Pattern 2,2)]*	***[3]***
4		(5) PSOJ159.2257-02.5438	ACS/WFC, ACCUM, WFC	F775W		POS TARG 0,11	Pattern 3, Exps 4-4 in P159-02 Visit (03) (3)	500 Secs (2332 Secs) *[==>628.0 Secs (Pattern 1,1)]* *[==>538.0 Secs (Pattern 1,2)]* *[==>628.0 Secs (Pattern 2,1)]* *[==>538.0 Secs (Pattern 2,2)]*	***[4]***

Orbit Structure



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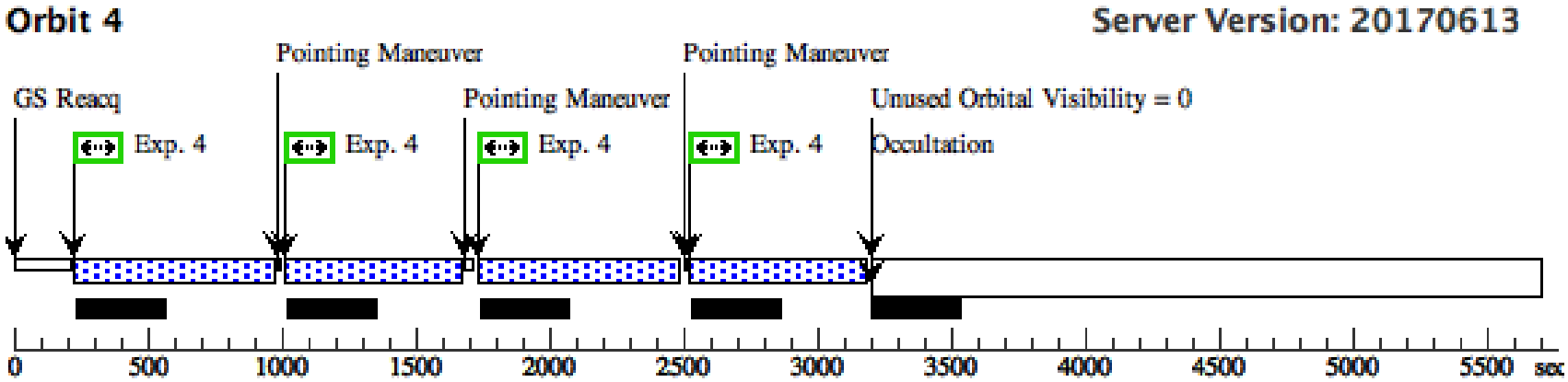
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Visit

Proposal 15085, J0100 Visit (04), implementation Fri Sep 29 23:01:26 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: ORIENT 130D TO 155 D; ORIENT 310D TO 335 D; ORIENT 40D TO 65 D; ORIENT 220D TO 245 D

Patterns

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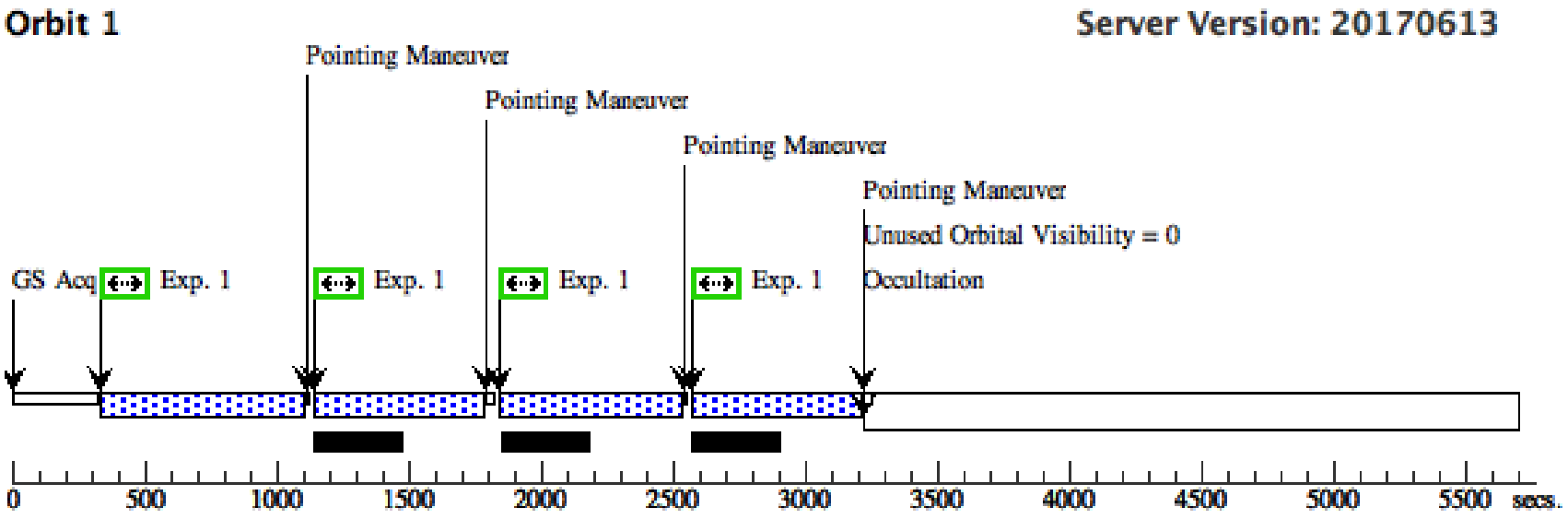
Fixed Targets

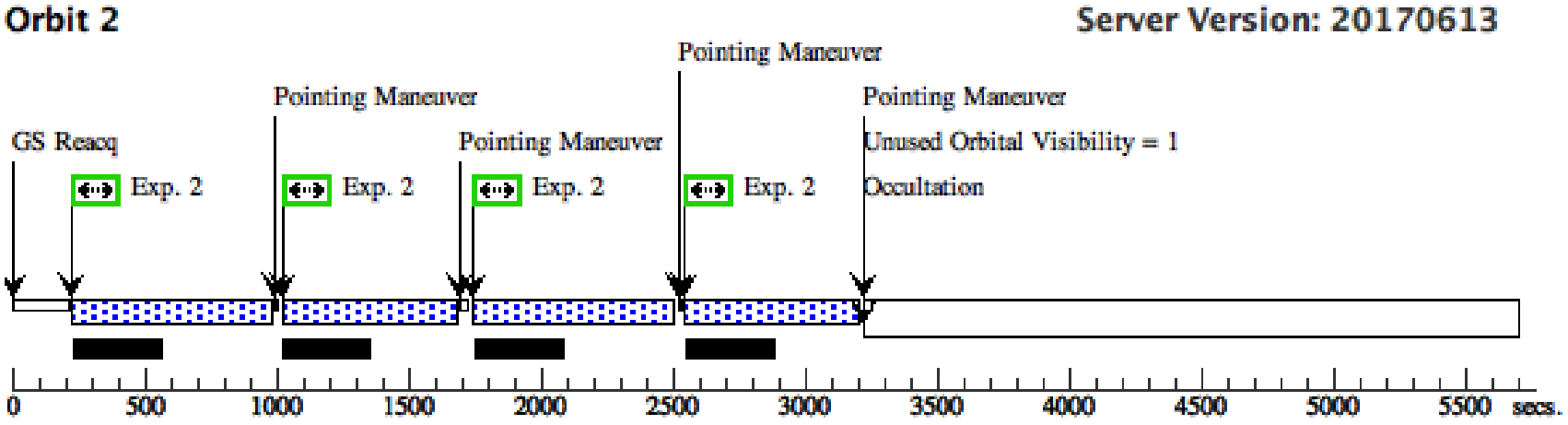
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(4)	SDSSJ010013.01+280225.7	RA: 01 00 13.0200 (15.0542500d) Dec: +28 02 25.84 (28.04051d) Equinox: J2000		V=26.5	Reference Frame: ICRS

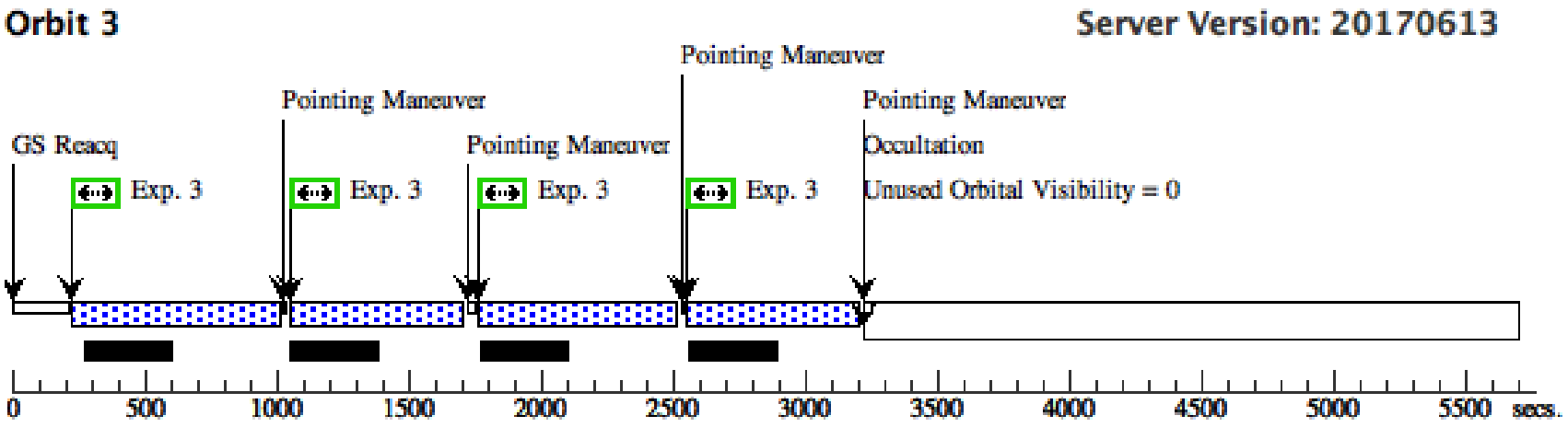
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(4) SDSSJ010013.01 +280225.7	ACS/WFC, ACCUM, WFC	F775W		POS TARG 0,11	Pattern 3, Exps 1-1 in J0100 Visit (04) (3)	500 Secs (2162 Secs) *[==>564.0 Secs (Pattern 1,1)]* *[==>517.0 Secs (Pattern 1,2)]* *[==>564.0 Secs (Pattern 2,1)]* *[==>517.0 Secs (Pattern 2,2)]*	***[1]***
2		(4) SDSSJ010013.01 +280225.7	ACS/WFC, ACCUM, WFC	F775W		POS TARG 0,11	Pattern 3, Exps 2-2 in J0100 Visit (04) (3)	500 Secs (2354 Secs) *[==>636.0 Secs (Pattern 1,1)]* *[==>541.0 Secs (Pattern 1,2)]* *[==>636.0 Secs (Pattern 2,1)]* *[==>541.0 Secs (Pattern 2,2)]*	***[2]***
3		(4) SDSSJ010013.01 +280225.7	ACS/WFC, ACCUM, WFC	F606W		POS TARG 0,11	Pattern 3, Exps 3-3 in J0100 Visit (04) (3)	500 Secs (2314 Secs) *[==>626.0 Secs (Pattern 1,1)]* *[==>531.0 Secs (Pattern 1,2)]* *[==>626.0 Secs (Pattern 2,1)]* *[==>531.0 Secs (Pattern 2,2)]*	***[3]***
4		(4) SDSSJ010013.01 +280225.7	ACS/WFC, ACCUM, WFC	F606W		POS TARG 0,11	Pattern 3, Exps 4-4 in J0100 Visit (04) (3)	500 Secs (2352 Secs) *[==>588.0 Secs (Pattern 1,1)]* *[==>588.0 Secs (Pattern 1,2)]* *[==>588.0 Secs (Pattern 2,1)]* *[==>588.0 Secs (Pattern 2,2)]*	***[4]***

Orbit Structure



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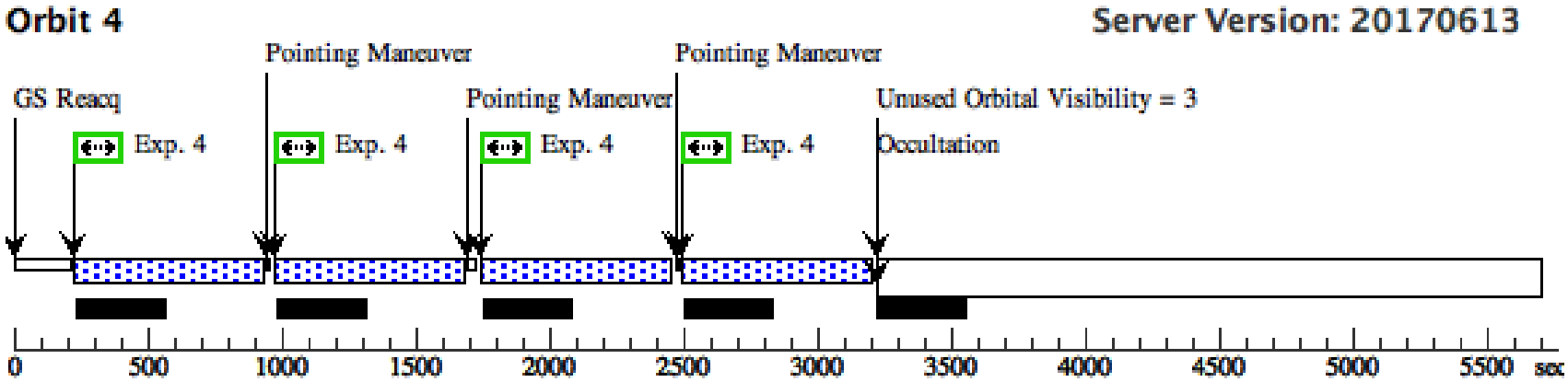
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Visit

Proposal 15085, SDSS1148 Visit (05), implementation Fri Sep 29 23:01:27 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: ORIENT 155D TO 165 D; ORIENT 335D TO 345 D; ORIENT 245D TO 255 D; ORIENT 65D TO 75 D

Patterns

#	Primary Pattern		Secondary Pattern		Exposures
(3)	Pattern Type=LINE	Coordinate Frame=POS-TARG	Pattern Type=LINE	Coordinate Frame=POS-TARG	(1), (2), (3), (4)
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	Number Of Points=2	Angle Between Sides=	Number Of Points=2	Angle Between Sides=	
	Point Spacing=48.83888	Center Pattern=false	Point Spacing=3.08553	Center Pattern=false	
	Line Spacing=		Line Spacing=		

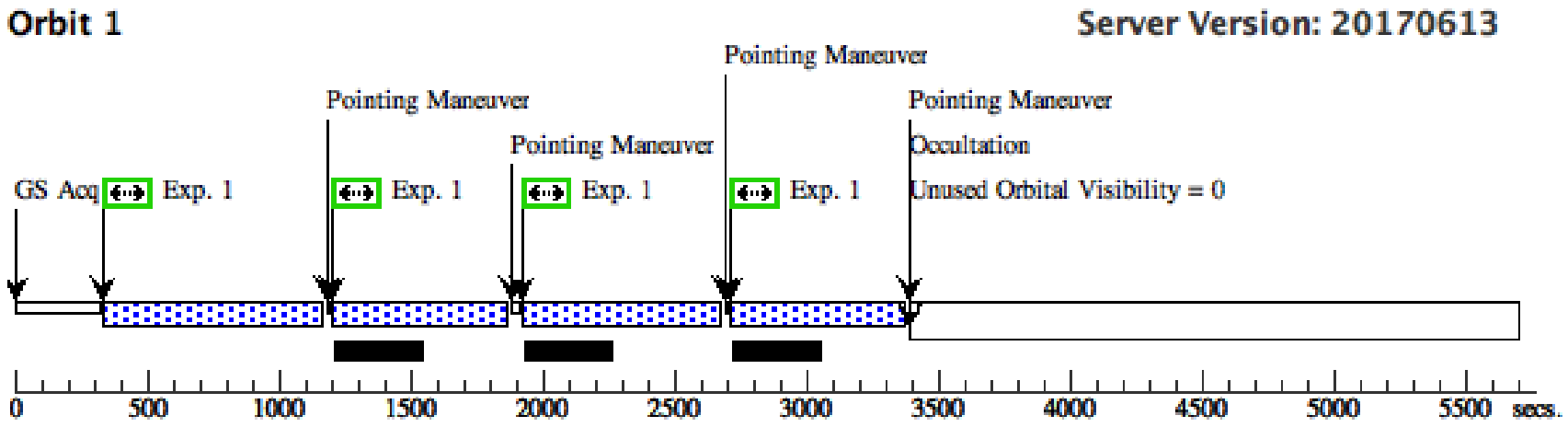
Fixed Targets

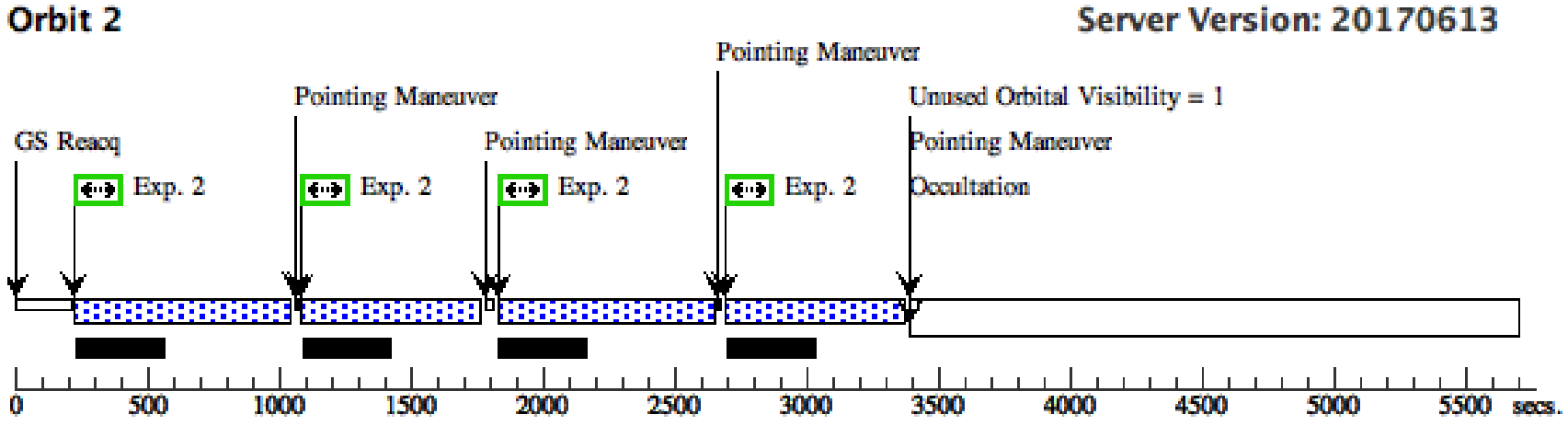
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	SDSSJ114816.65+525150.2	RA: 11 48 16.6400 (177.0693333d) Dec: +52 51 50.30 (52.86397d) Equinox: J2000		V=26.5	Reference Frame: ICRS

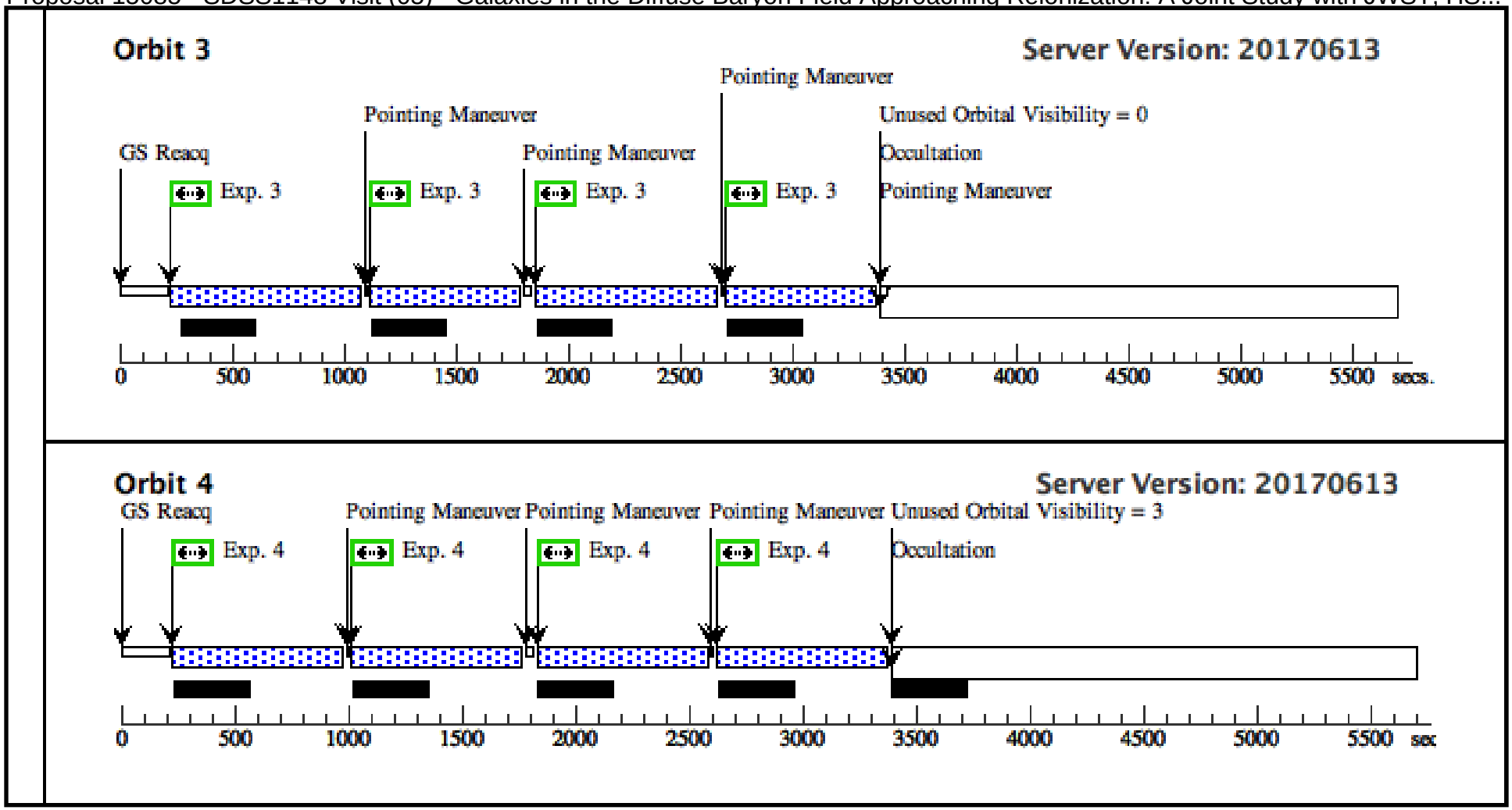
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(3) SDSSJ114816.65+525150.2	ACS/WFC, ACCUM, WFC	F775W		POS TARG 0,11; GS ACQ SCENARIO BASE1B3	Pattern 3, Exps 1-1 in SDSS1148 Visit (05) (3)	500 Secs (2330 Secs) *[==>628.0 Secs (Pattern 1,1)]* *[==>537.0 Secs (Pattern 1,2)]* *[==>628.0 Secs (Pattern 2,1)]* *[==>537.0 Secs (Pattern 2,2)]*	***[1]***
2		(3) SDSSJ114816.65+525150.2	ACS/WFC, ACCUM, WFC	F775W		POS TARG 0,11	Pattern 3, Exps 2-2 in SDSS1148 Visit (05) (3)	500 Secs (2522 Secs) *[==>700.0 Secs (Pattern 1,1)]* *[==>561.0 Secs (Pattern 1,2)]* *[==>700.0 Secs (Pattern 2,1)]* *[==>561.0 Secs (Pattern 2,2)]*	***[2]***
3		(3) SDSSJ114816.65+525150.2	ACS/WFC, ACCUM, WFC	F606W		POS TARG 0,11	Pattern 3, Exps 3-3 in SDSS1148 Visit (05) (3)	500 Secs (2482 Secs) *[==>690.0 Secs (Pattern 1,1)]* *[==>551.0 Secs (Pattern 1,2)]* *[==>690.0 Secs (Pattern 2,1)]* *[==>551.0 Secs (Pattern 2,2)]*	***[3]***
4		(3) SDSSJ114816.65+525150.2	ACS/WFC, ACCUM, WFC	F606W		POS TARG 0,11	Pattern 3, Exps 4-4 in SDSS1148 Visit (05) (3)	500 Secs (2520 Secs) *[==>630.0 Secs (Pattern 1,1)]* *[==>630.0 Secs (Pattern 1,2)]* *[==>630.0 Secs (Pattern 2,1)]* *[==>630.0 Secs (Pattern 2,2)]*	***[4]***

Orbit Structure






Orbit 3
Server Version: 20170613
Pointing Maneuver
Pointing Maneuver
Unused Orbital Visibility = 0
GS Reacq
Pointing Maneuver
Occultation
Exp. 3
Exp. 3
Exp. 3
Exp. 3
Pointing Maneuver
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.
Orbit 4
Server Version: 20170613
GS Reacq
Pointing Maneuver
Pointing Maneuver
Pointing Maneuver
Unused Orbital Visibility = 3
Exp. 4
Exp. 4
Exp. 4
Exp. 4
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec