



# 15229 - Spectroscopic redshifts and age dating of a first statistical sample of passive galaxies at $z \sim 3$

Cycle: 25, Proposal Category: GO

(Availability Mode: SUPPORTED)

## INVESTIGATORS

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## VISITS

<i>Visit</i>	<i>Targets used in Visit</i>	<i>Configurations used in Visit</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
01	(1) ID20600	WFC3/IR	1	31-Oct-2017 15:01:24.0	yes

<i>Visit</i>	<i>Targets used in Visit</i>	<i>Configurations used in Visit</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
02	(9) ID402009	WFC3/IR	1	31-Oct-2017 15:01:25.0	yes
03	(7) ID266486	WFC3/IR	1	31-Oct-2017 15:01:26.0	yes
04	(2) ID21292	WFC3/IR	1	31-Oct-2017 15:01:27.0	yes
05	(3) ID93434	WFC3/IR	2	31-Oct-2017 15:01:29.0	yes
06	(10) ID581181	WFC3/IR	2	31-Oct-2017 15:01:31.0	yes
07	(8) ID316710	WFC3/IR	2	31-Oct-2017 15:01:33.0	yes
08	(6) ID248503	WFC3/IR	2	31-Oct-2017 15:01:35.0	yes
09	(5) ID227846	WFC3/IR	2	31-Oct-2017 15:01:38.0	yes
10	(4) ID169603	WFC3/IR	3	31-Oct-2017 15:01:40.0	yes

17 Total Orbits Used

## **ABSTRACT**

Ultradeep WFC3/G141 observations from one of our past HST programs allowed us to confirm the redshift and measure the age of a quiescent galaxy at  $z=3$ . This unique object was found inside a single WFC3 pointing (4 sq. arcmin) suggesting that massive old galaxies even at  $z\sim 3$  are more common than previously thought. The strong correlation observed between evolved stellar populations and a bulge-dominated morphology at least up to  $z\sim 2$  may also imply that the Hubble sequence comes into place at very early times. Guided by the properties of this spectroscopically confirmed  $z=3$  passive galaxy, we have identified a substantial sample of  $2.5 < z < 3.5$  passive candidates over the full COSMOS field, selecting the brightest, most massive and most secure targets for which sufficient S/N on the continuum can be obtained in  $\sim 2$  orbits with WFC3/G141 grism spectroscopy. We request here a total of 17 orbits to observe a sample of 10 passive galaxies at  $z > 2.5$ , to detect their 4000Å breaks and measure precise redshifts, confirming their identification as distant, quiescent systems (as opposed to dusty star-forming sources), and measuring their stellar ages as well as sizes from the WFC3/F140 ancillary imaging. We have verified that no object of this kind, bright enough to be confirmed spectroscopically, can be found inside existing WFC3 spectroscopy in the CANDELS fields, and that this science cannot be competitively done from the ground. These new observations will push the constraints on the evolution, nature and abundance of passive galaxies to the highest redshifts, and will allow a first detailed picture of the early assembly of the Hubble sequence.

**OBSERVING DESCRIPTION**

This program is observing 10 targets,  $z \sim 2.5-3$  passive galaxy candidates.

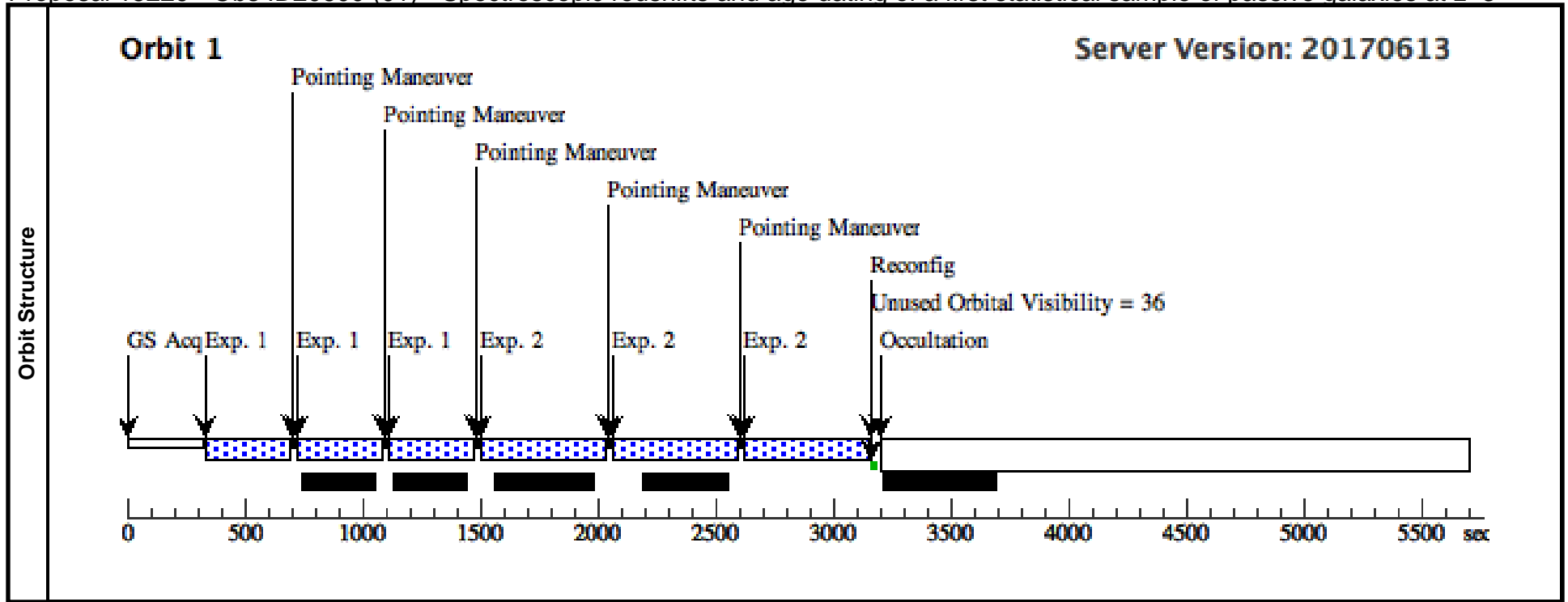
For each of them, we start with short imaging exposures in F140W, followed by a grism G141 series of exposures.

Depending on the target, we observe for either one or two orbits.

Proposal 15229 - Obs ID20600 (01) - Spectroscopic redshifts and age dating of a first statistical sample of passive galaxies at z~3

Tue Oct 31 19:01:42 GMT 2017

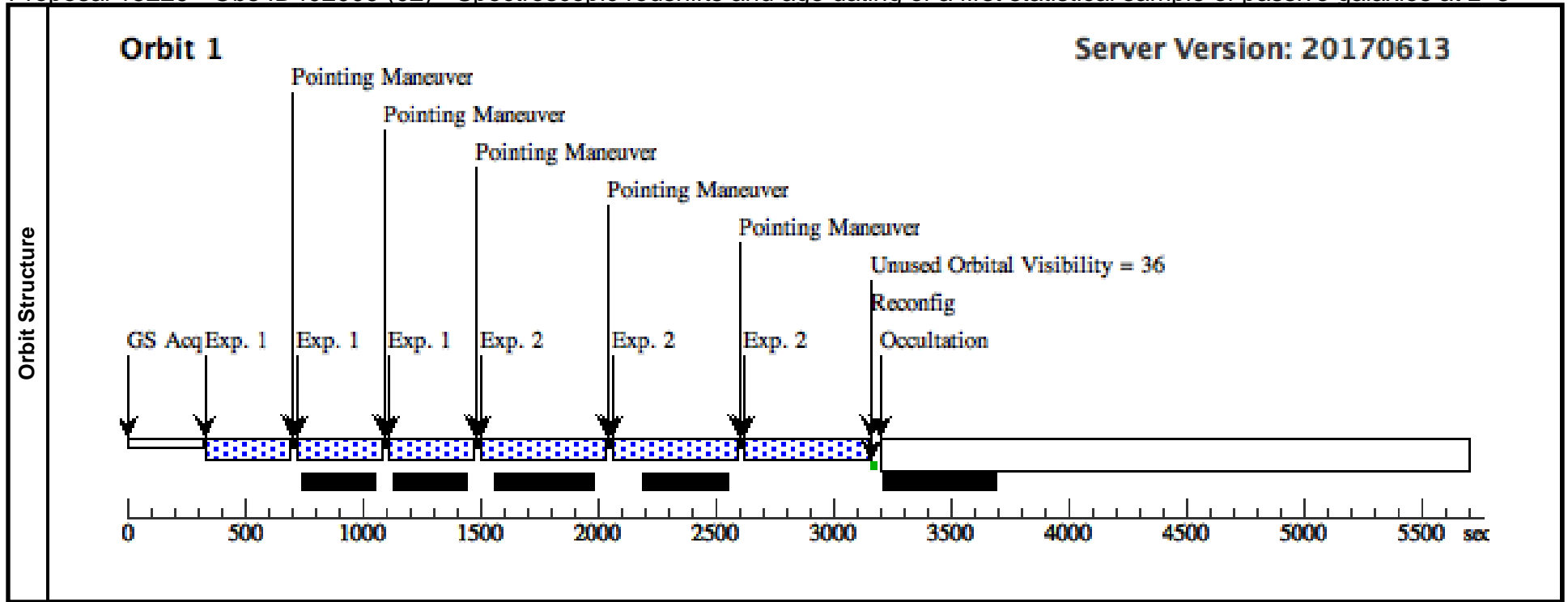
Visit	<b>Proposal 15229, Obs ID20600 (01), implementation</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/IR Special Requirements: ORIENT 168.5D TO 174.5 D; ORIENT 346.5D TO 353.5 D; ORIENT 178.5D TO 179.5 D; ORIENT 357.5D TO 358.5 D Comments: Observing ID20600									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(1)	Pattern Type=WFC3-IR-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.605 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(1), (2)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	ID20600	RA: 10 01 39.9790 (150.4165792d) Dec: +01 29 34.49 (1.49291d) Equinox: J2000		V=(?) zp=2.6 logM=11.0	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(1) ID20600	(1) ID20600	WFC3/IR, MULTIACCUM, GRISM1024	F160W	SAMP-SEQ=SPARS 25; NSAMP=14			Pattern 1, Exps 1-1 in Obs ID20600 (01) (1) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	327.938986 Secs (983.817 Secs)
2	(1) ID20600	(1) ID20600	(1) ID20600	WFC3/IR, MULTIACCUM, GRISM1024	G141	SAMP-SEQ=STEP5 0; NSAMP=15		Pattern 1, Exps 2-2 in Obs ID20600 (01) (1) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	499.234285 Secs (1497.703 Secs)	[1]



Proposal 15229 - Obs ID402009 (02) - Spectroscopic redshifts and age dating of a first statistical sample of passive galaxies at z~3

Tue Oct 31 19:01:42 GMT 2017

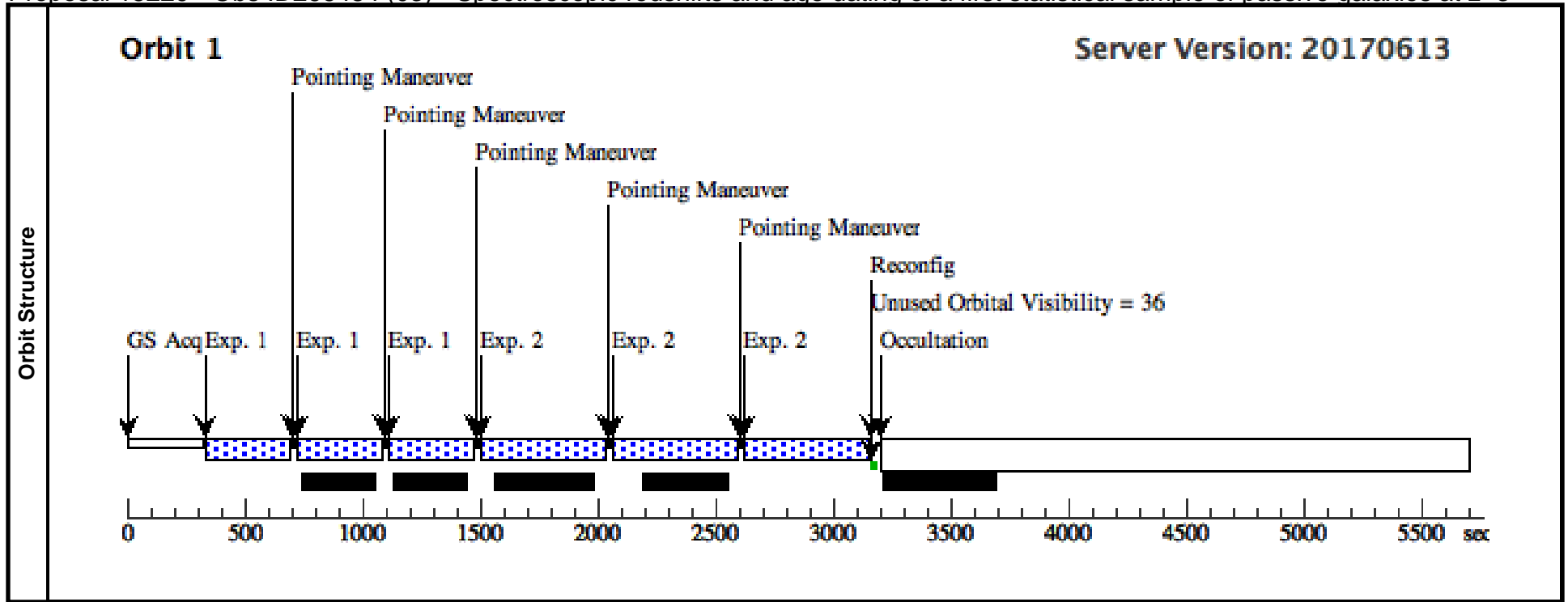
Visit	Proposal 15229, Obs ID402009 (02), implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR Special Requirements: ORIENT 60.5D TO 64.5 D; ORIENT 239.5D TO 244.5 D; ORIENT 250.5D TO 251.5 D									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
	(1)	Pattern Type=WFC3-IR-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.605 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(1), (2)					
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(9)	ID402009	RA: 09 59 32.5170 (149.8854875d) Dec: +02 22 21.99 (2.37277d) Equinox: J2000		V=(?) zp=2.6 logM=11.1	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(9) ID402009	WFC3/IR, MULTIACCUM, GRISM1024	F160W	SAMP-SEQ=SPARS 25; NSAMP=14		Pattern 1, Exps 1-1 in Obs ID402009 (02) (1)	327.938986 Secs (983.817 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[1]
	2		(9) ID402009	WFC3/IR, MULTIACCUM, GRISM1024	G141	SAMP-SEQ=STEP5 0; NSAMP=15		Pattern 1, Exps 2-2 in Obs ID402009 (02) (1)	499.234285 Secs (1497.703 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[1]



Proposal 15229 - Obs ID266484 (03) - Spectroscopic redshifts and age dating of a first statistical sample of passive galaxies at z~3

Tue Oct 31 19:01:42 GMT 2017

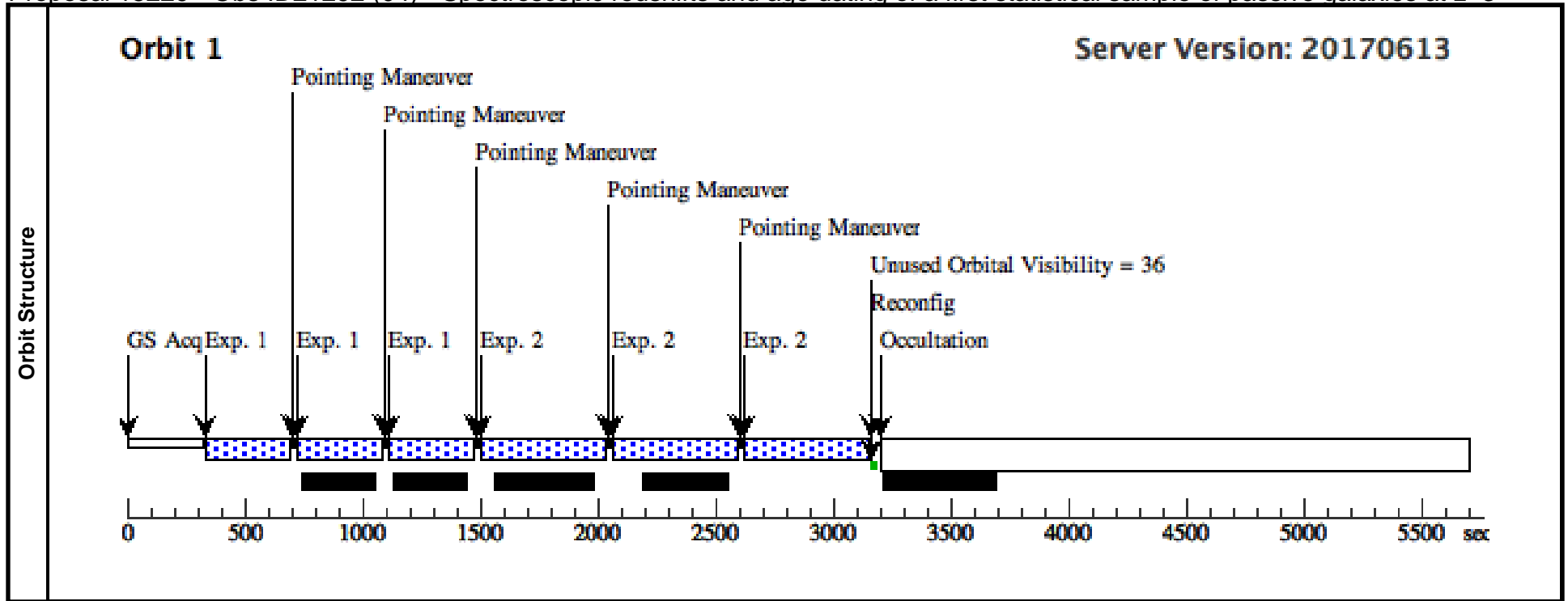
Visit	Proposal 15229, Obs ID266484 (03), implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR Special Requirements: ORIENT 26.5D TO 31.5 D; ORIENT 45.5D TO 51.5 D; ORIENT 205.5D TO 210.5 D; ORIENT 226.5D TO 228.5 D; ORIENT 347.5D TO 348.5 D; ORIENT 352.5D TO 353.5 D									
	Patterns	#	Primary Pattern			Secondary Pattern			Exposures	
		(1)	Pattern Type=WFC3-IR-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.605 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false					(1), (2)	
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections		Fluxes	Miscellaneous			
	(7)	ID266486	RA: 10 01 31.8594 (150.3827475d) Dec: +02 03 58.79 (2.06633d) Equinox: J2000			V=(?) zp=2.6 logM=11.4	Reference Frame: ICRS			
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(7) ID266486	WFC3/IR, MULTIACCUM, GRISM1024	F160W	SAMP-SEQ=SPARS 25; NSAMP=14		Pattern 1, Exps 1-1 in Obs ID266484 (03) (1)	327.938986 Secs (983.817 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[1]
2		(7) ID266486	WFC3/IR, MULTIACCUM, GRISM1024	G141	SAMP-SEQ=STEP5 0; NSAMP=15		Pattern 1, Exps 2-2 in Obs ID266484 (03) (1)	499.234285 Secs (1497.703 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[1]	



Proposal 15229 - Obs ID21292 (04) - Spectroscopic redshifts and age dating of a first statistical sample of passive galaxies at z~3

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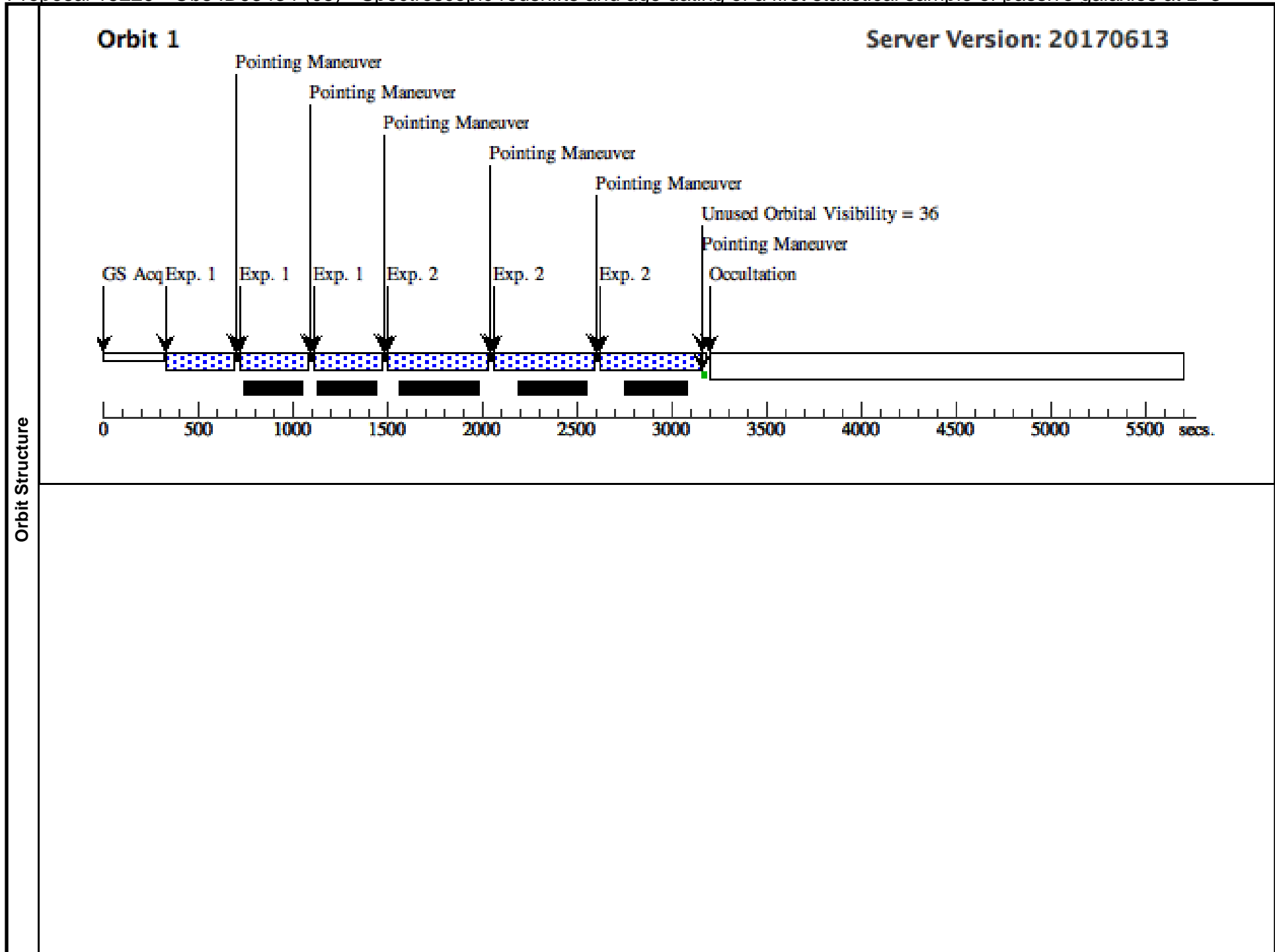
Visit	<b>Proposal 15229, Obs ID21292 (04), implementation</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/IR Special Requirements: ORIENT 10.5D TO 11.5 D; ORIENT 27.5D TO 29.5 D; ORIENT 34.5D TO 35.5 D; ORIENT 80.5D TO 82.5 D; ORIENT 133.5D TO 135.5 D; ORIENT 197.5D TO 198.5 D; ORIENT 208.5D TO 209.5 D; ORIENT 260.5D TO 262.5 D; ORIENT 315.5D TO 316.5 D									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
	(1)	Pattern Type=WFC3-IR-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.605 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(1), (2)					
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(2)	ID21292	RA: 10 00 57.3452 (150.2389383d) Dec: +01 29 39.46 (1.49429d) Equinox: J2000		V=(?) zp=2.7 logM=11.2	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(2) ID21292	WFC3/IR, MULTIACCUM, GRISM1024	F160W	SAMP-SEQ=SPARS 25; NSAMP=14		Pattern 1, Exps 1-1 in Obs ID21292 (04) (1)	327.938986 Secs (983.817 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)]	[1]
	2		(2) ID21292	WFC3/IR, MULTIACCUM, GRISM1024	G141	SAMP-SEQ=STEP5 0; NSAMP=15		Pattern 1, Exps 2-2 in Obs ID21292 (04) (1)	499.234285 Secs (1497.703 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)]	[1]

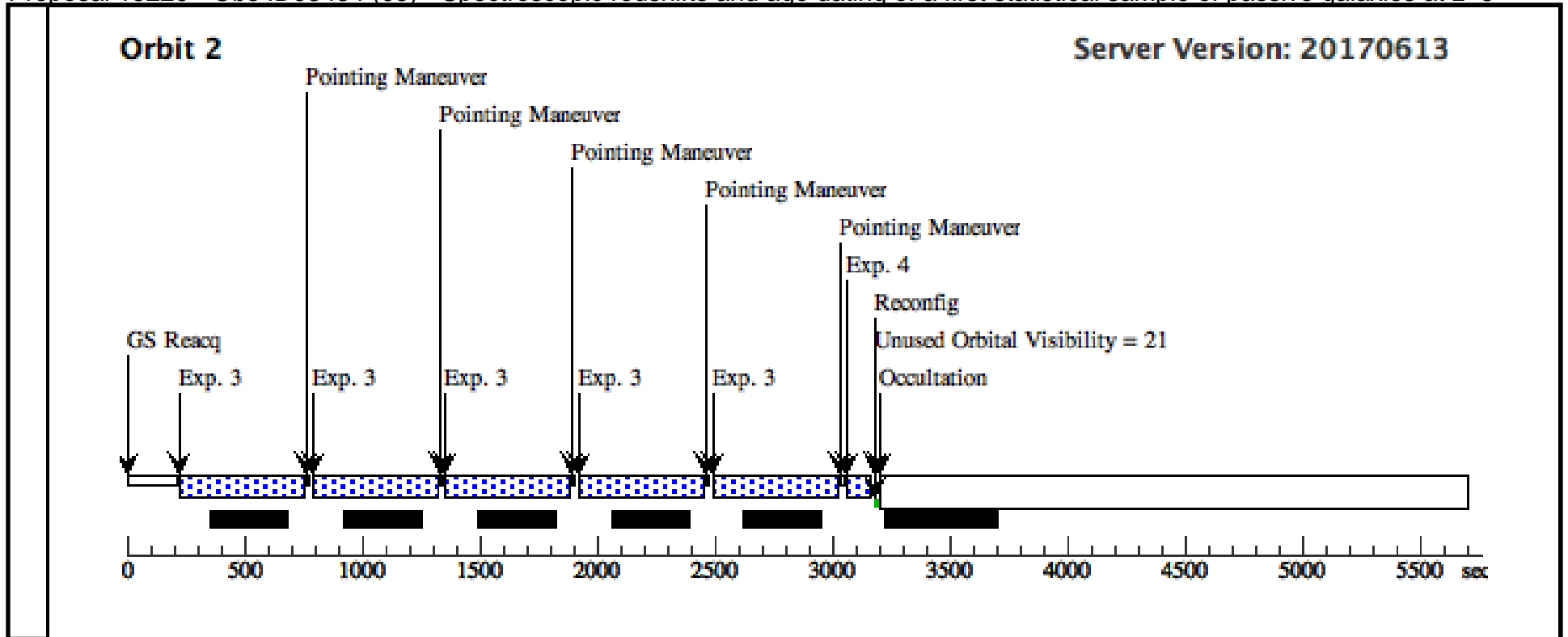


Proposal 15229 - Obs ID93434 (05) - Spectroscopic redshifts and age dating of a first statistical sample of passive galaxies at z~3

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Visit	<b>Proposal 15229, Obs ID93434 (05), implementation</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/IR Special Requirements: ORIENT 65.5D TO 66.5 D; ORIENT 71.5D TO 72.5 D; ORIENT 161.5D TO 164.5 D; ORIENT 242.5D TO 244.5 D; ORIENT 250.5D TO 252.5 D; ORIENT 341.5D TO 343.5 D									
	#	Primary Pattern	Secondary Pattern	Exposures						
Patterns	(1)	Pattern Type=WFC3-IR-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.605 Line Spacing= Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(1), (2)						
	(2)	Pattern Type=WFC3-IR-DITHER-BLOB Purpose=DITHER Number Of Points=5 Point Spacing=5.183 Line Spacing= Coordinate Frame=POS-TARG Pattern Orientation=41.859 Angle Between Sides= Center Pattern=true		(3)						
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(3)	ID93434	RA: 09 57 48.5727 (149.4523862d) Dec: +01 39 57.82 (1.66606d) Equinox: J2000		V=(?) zp=2.8 logM=11.0	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(3) ID93434	WFC3/IR, MULTIACCUM, GRISM1024	F160W	SAMP-SEQ=SPARS 25; NSAMP=14		Pattern 1, Exps 1-1 in Obs ID93434 (05) (1)	327.938986 Secs (983.817 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[1]
	2		(3) ID93434	WFC3/IR, MULTIACCUM, GRISM1024	G141	SAMP-SEQ=STEP5 0; NSAMP=15		Pattern 1, Exps 2-2 in Obs ID93434 (05) (1)	499.234285 Secs (1497.703 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[1]
	3		(3) ID93434	WFC3/IR, MULTIACCUM, GRISM1024	G141	SAMP-SEQ=STEP5 0; NSAMP=15		Pattern 2, Exps 3-3 in Obs ID93434 (05) (2)	499.234285 Secs (2496.171 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)] [==>(Pattern 5)]	[2]
4		(3) ID93434	WFC3/IR, MULTIACCUM, GRISM1024	F160W	SAMP-SEQ=SPARS 5; NSAMP=15			72.943085 Secs (72.943 Secs) [==>]	[2]	

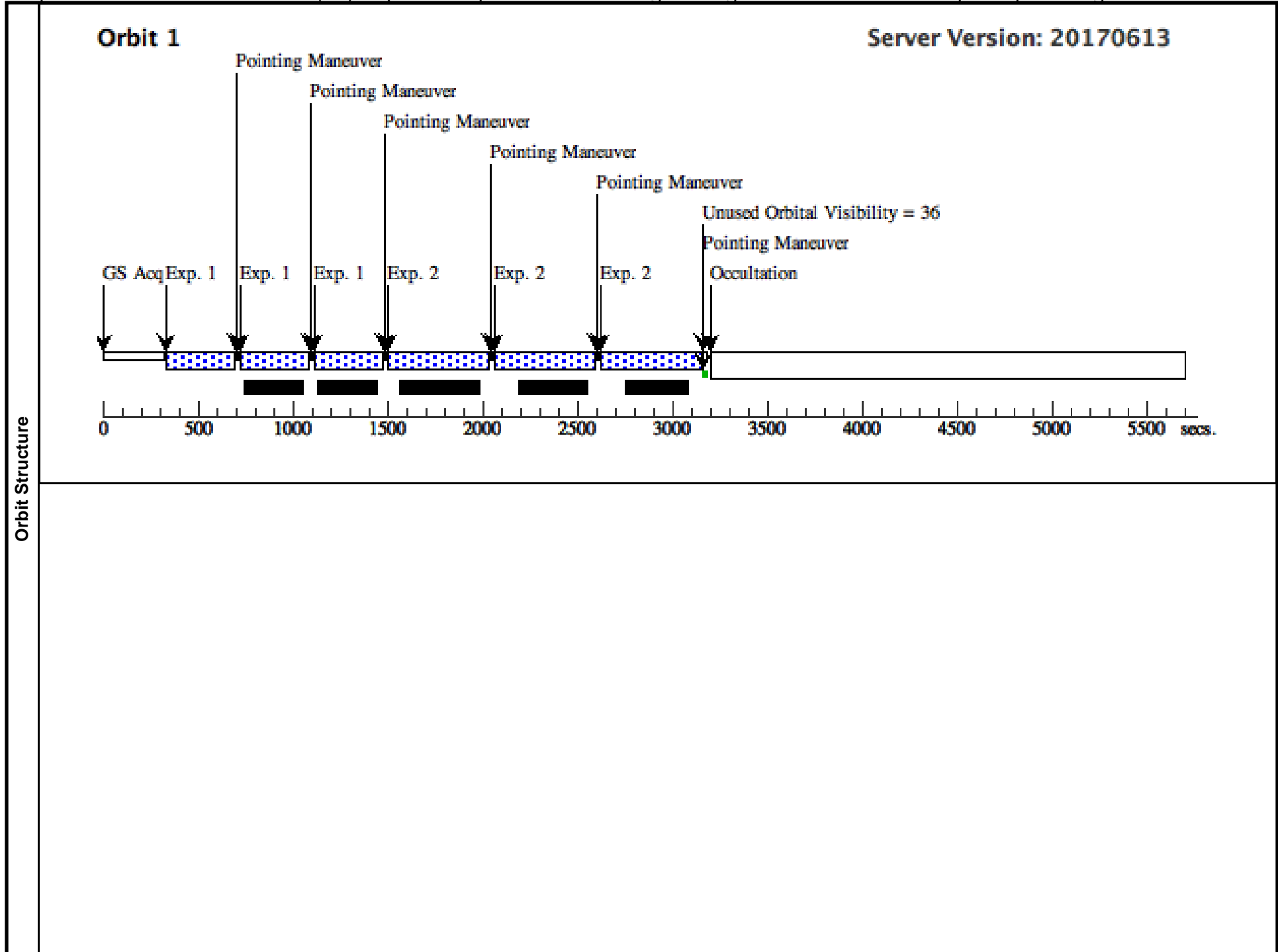


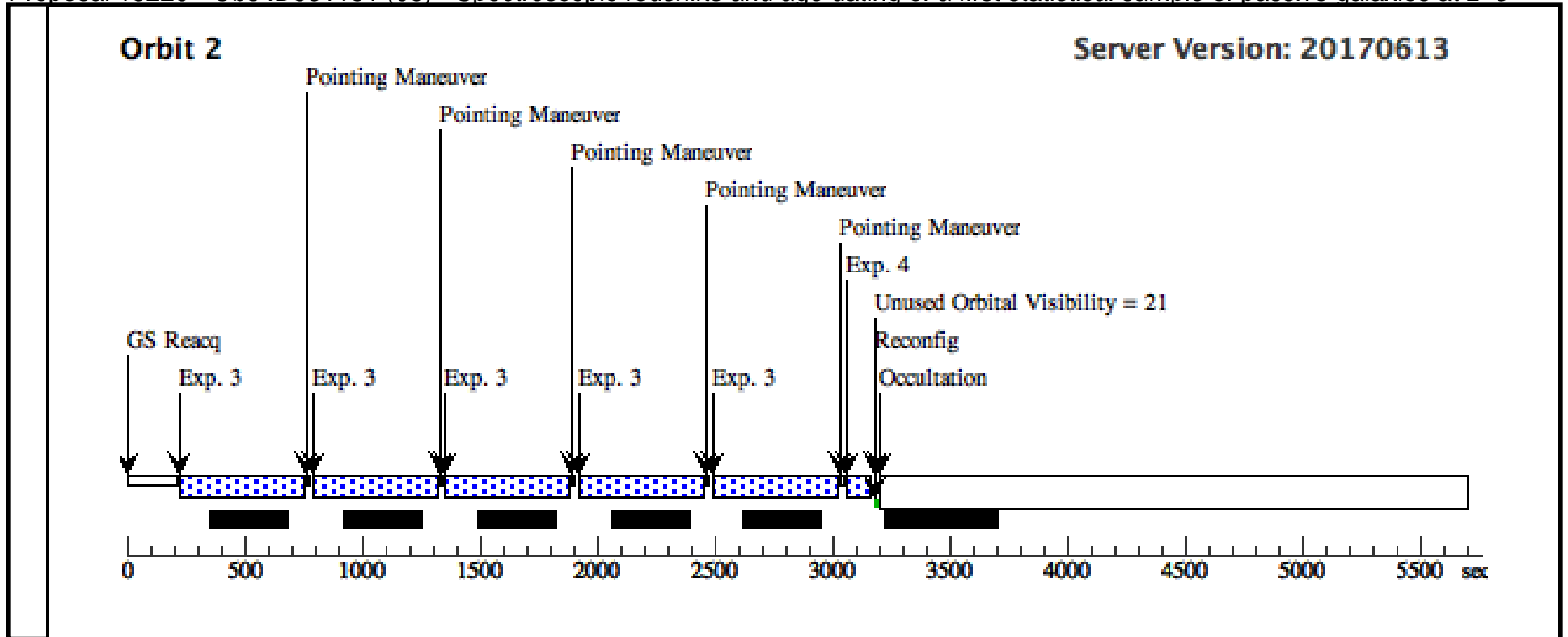


Proposal 15229 - Obs ID581181 (06) - Spectroscopic redshifts and age dating of a first statistical sample of passive galaxies at z~3

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Visit	<b>Proposal 15229, Obs ID581181 (06), implementation</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/IR Special Requirements: ORIENT 47.5D TO 48.5 D; ORIENT 118.5D TO 125.5 D; ORIENT 227.5D TO 229.5 D; ORIENT 300.5D TO 301.5 D; ORIENT 302.5D TO 303.5 D									
	#	Primary Pattern	Secondary Pattern	Exposures						
Patterns	(1)	Pattern Type=WFC3-IR-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.605 Line Spacing= Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(1), (2)						
	(2)	Pattern Type=WFC3-IR-DITHER-BLOB Purpose=DITHER Number Of Points=5 Point Spacing=5.183 Line Spacing= Coordinate Frame=POS-TARG Pattern Orientation=41.859 Angle Between Sides= Center Pattern=true		(3)						
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(10)	ID581181	RA: 10 00 12.6549 (150.0527287d) Dec: +02 47 23.47 (2.78985d) Equinox: J2000		V=(?) zp=2.5 logM=11.0	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(10) ID581181	WFC3/IR, MULTIACCUM, GRISM1024	F160W	SAMP-SEQ=SPARS 25; NSAMP=14		Pattern 1, Exps 1-1 in Obs ID581181 (06) (1)	327.938986 Secs (983.817 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[1]
	2		(10) ID581181	WFC3/IR, MULTIACCUM, GRISM1024	G141	SAMP-SEQ=STEP5 0; NSAMP=15		Pattern 1, Exps 2-2 in Obs ID581181 (06) (1)	499.234285 Secs (1497.703 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[1]
	3		(10) ID581181	WFC3/IR, MULTIACCUM, GRISM1024	G141	SAMP-SEQ=STEP5 0; NSAMP=15		Pattern 2, Exps 3-3 in Obs ID581181 (06) (2)	499.234285 Secs (2496.171 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)] [==>(Pattern 5)]	[2]
4		(10) ID581181	WFC3/IR, MULTIACCUM, GRISM1024	F160W	SAMP-SEQ=SPARS 5; NSAMP=15			72.943085 Secs (72.943 Secs) [==>]	[2]	

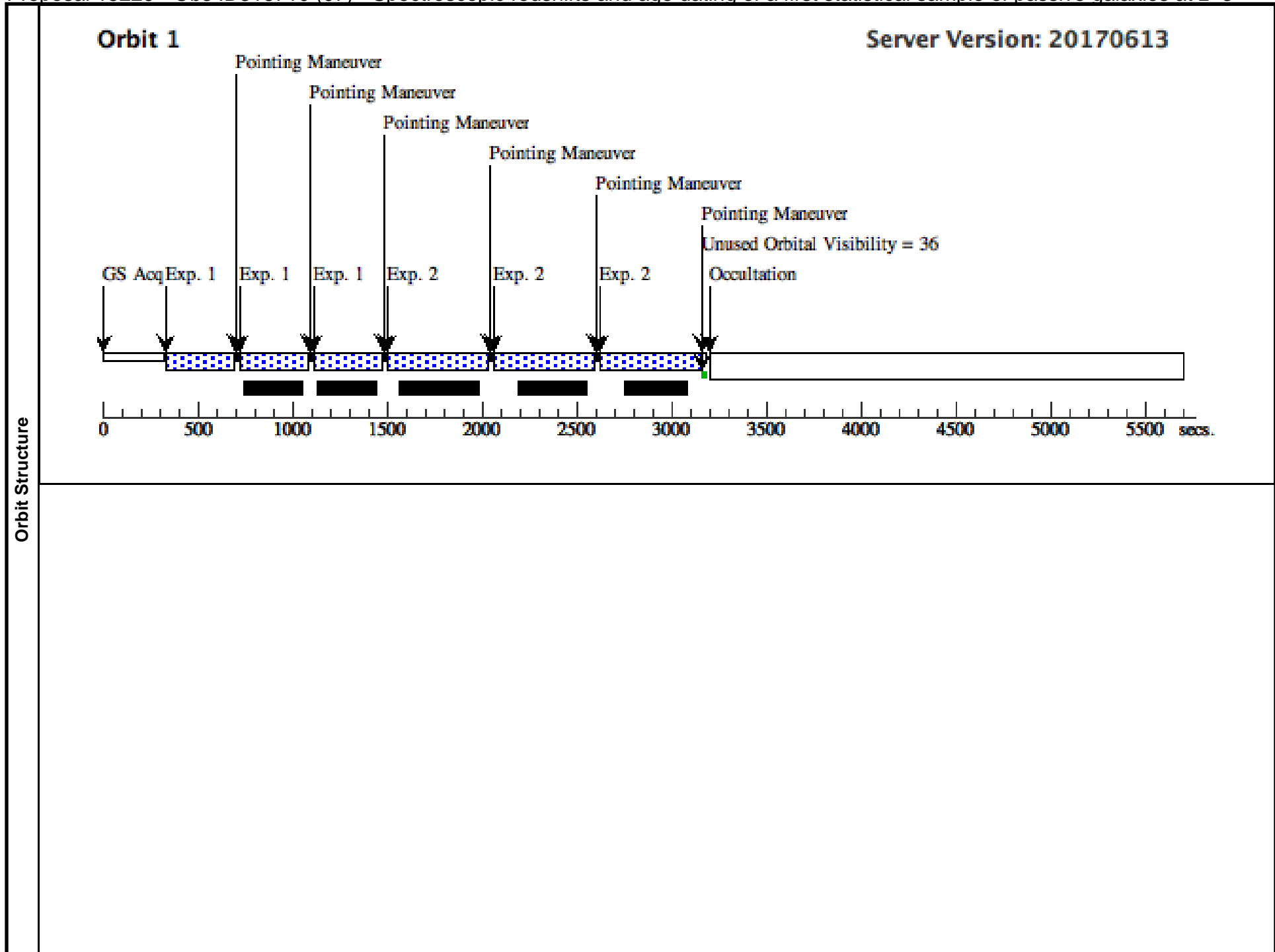


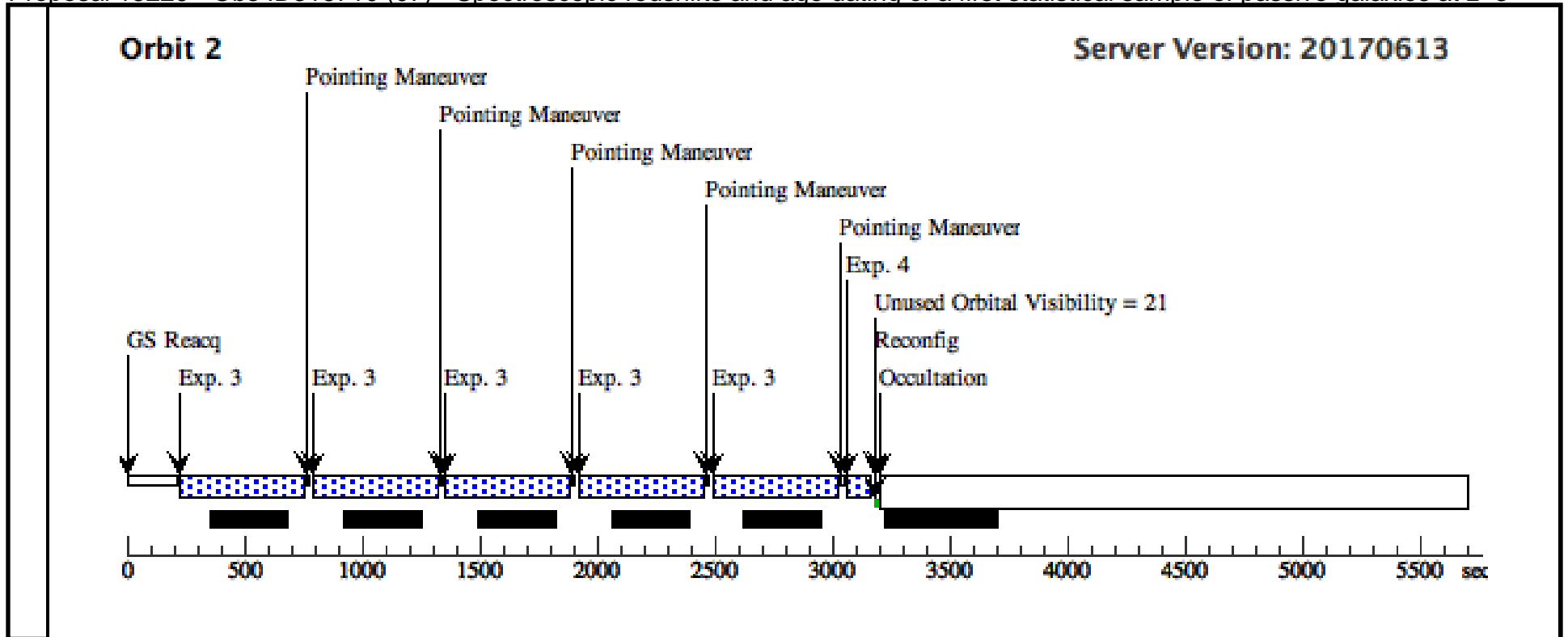


Proposal 15229 - Obs ID316710 (07) - Spectroscopic redshifts and age dating of a first statistical sample of passive galaxies at z~3

Tue Oct 31 19:01:42 GMT 2017

Visit	<b>Proposal 15229, Obs ID316710 (07), implementation</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/IR Special Requirements: ORIENT 40.5D TO 42.5 D; ORIENT 96.5D TO 97.5 D; ORIENT 221.5D TO 223.5 D; ORIENT 275.5D TO 277.5 D									
	#	Primary Pattern	Secondary Pattern	Exposures						
Patterns	(1)	Pattern Type=WFC3-IR-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.605 Line Spacing= Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(1), (2)						
	(2)	Pattern Type=WFC3-IR-DITHER-BLOB Purpose=DITHER Number Of Points=5 Point Spacing=5.183 Line Spacing= Coordinate Frame=POS-TARG Pattern Orientation=41.859 Angle Between Sides= Center Pattern=true		(3)						
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(8)	ID316710	RA: 10 00 43.7668 (150.1823617d) Dec: +02 10 28.71 (2.17464d) Equinox: J2000		V=(?) zp=2.8 logM=11.0	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(8) ID316710	WFC3/IR, MULTIACCUM, GRISM1024	F160W	SAMP-SEQ=SPARS 25; NSAMP=14		Pattern 1, Exps 1-1 i n Obs ID316710 (07) (1)	327.938986 Secs (983.817 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[1]
	2		(8) ID316710	WFC3/IR, MULTIACCUM, GRISM1024	G141	SAMP-SEQ=STEP5 0; NSAMP=15		Pattern 1, Exps 2-2 i n Obs ID316710 (07) (1)	499.234285 Secs (1497.703 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[1]
	3		(8) ID316710	WFC3/IR, MULTIACCUM, GRISM1024	G141	SAMP-SEQ=STEP5 0; NSAMP=15		Pattern 2, Exps 3-3 i n Obs ID316710 (07) (2)	499.234285 Secs (2496.171 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)] [==>(Pattern 5)]	[2]
4		(8) ID316710	WFC3/IR, MULTIACCUM, GRISM1024	F160W	SAMP-SEQ=SPARS 5; NSAMP=15			72.943085 Secs (72.943 Secs) [==>]	[2]	





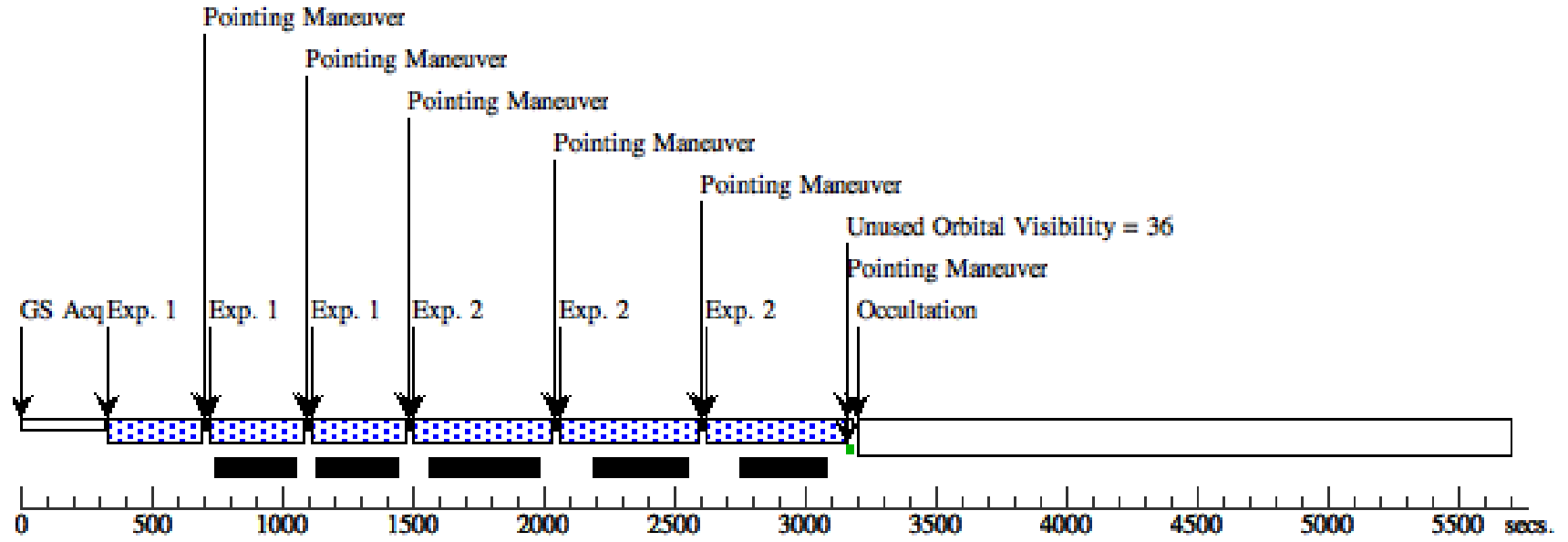
Proposal 15229 - Obs ID248503 (08) - Spectroscopic redshifts and age dating of a first statistical sample of passive galaxies at z~3

Tue Oct 31 19:01:42 GMT 2017

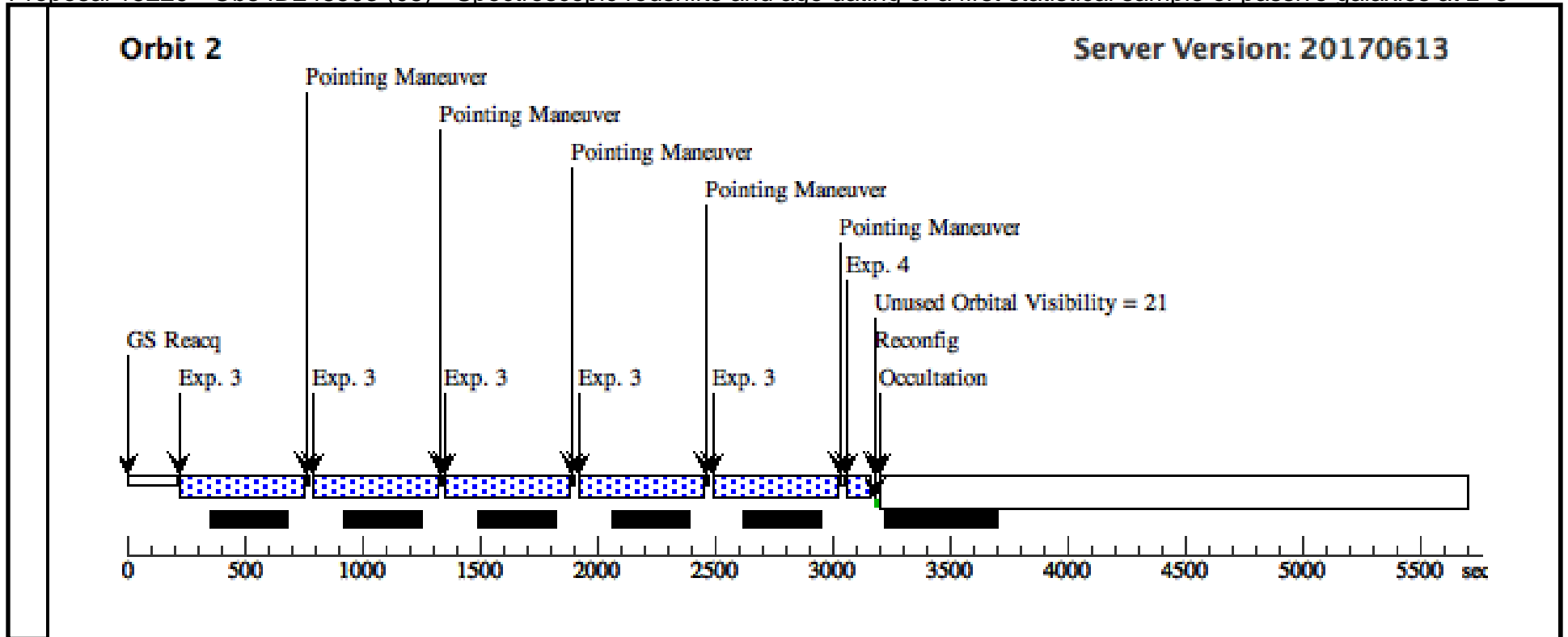
Visit	<b>Proposal 15229, Obs ID248503 (08), implementation</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/IR Special Requirements: ORIENT 14.5D TO 15.5 D; ORIENT 135.5D TO 136.5 D; ORIENT 194.5D TO 195.5 D; ORIENT 313.5D TO 316.5 D									
	#	Primary Pattern	Secondary Pattern	Exposures						
Patterns	(1)	Pattern Type=WFC3-IR-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.605 Line Spacing= Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(1), (2)						
	(2)	Pattern Type=WFC3-IR-DITHER-BLOB Purpose=DITHER Number Of Points=5 Point Spacing=5.183 Line Spacing= Coordinate Frame=POS-TARG Pattern Orientation=41.859 Angle Between Sides= Center Pattern=true		(3)						
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(6)	ID248503	RA: 09 59 1.3123 (149.7554679d) Dec: +02 01 34.15 (2.02615d) Equinox: J2000		V=(?) zp=2.6 logM=10.9	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(6) ID248503	WFC3/IR, MULTIACCUM, GRISM1024	F160W	SAMP-SEQ=SPARS 25; NSAMP=14		Pattern 1, Exps 1-1 in Obs ID248503 (08) (1)	327.938986 Secs (983.817 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[1]
	2		(6) ID248503	WFC3/IR, MULTIACCUM, GRISM1024	G141	SAMP-SEQ=STEP5 0; NSAMP=15		Pattern 1, Exps 2-2 in Obs ID248503 (08) (1)	499.234285 Secs (1497.703 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[1]
	3		(6) ID248503	WFC3/IR, MULTIACCUM, GRISM1024	G141	SAMP-SEQ=STEP5 0; NSAMP=15		Pattern 2, Exps 3-3 in Obs ID248503 (08) (2)	499.234285 Secs (2496.171 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)] [==>(Pattern 5)]	[2]
4		(6) ID248503	WFC3/IR, MULTIACCUM, GRISM1024	F160W	SAMP-SEQ=SPARS 5; NSAMP=15			72.943085 Secs (72.943 Secs) [==>]	[2]	

**Orbit 1**

**Server Version: 20170613**



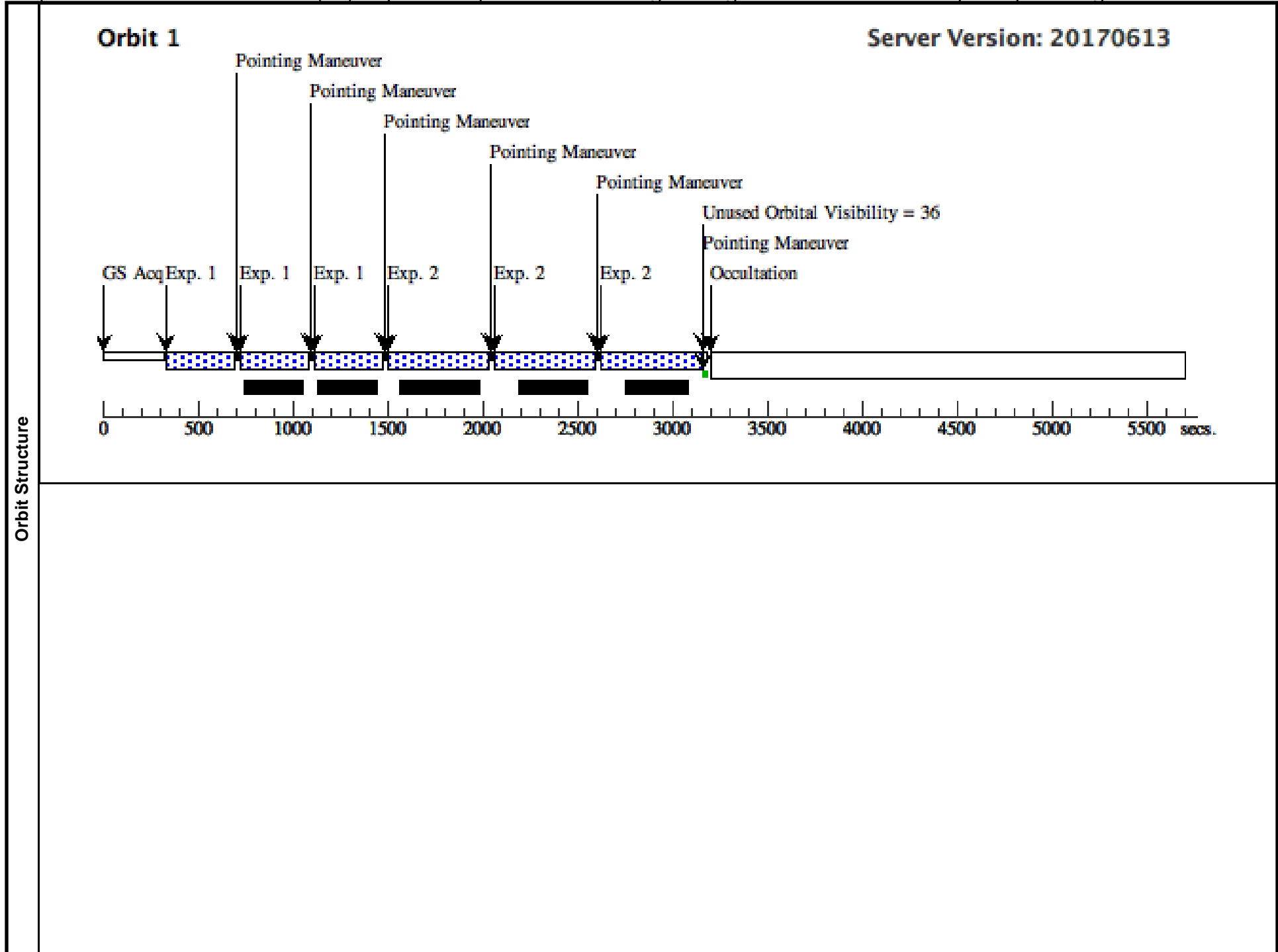
Orbit Structure

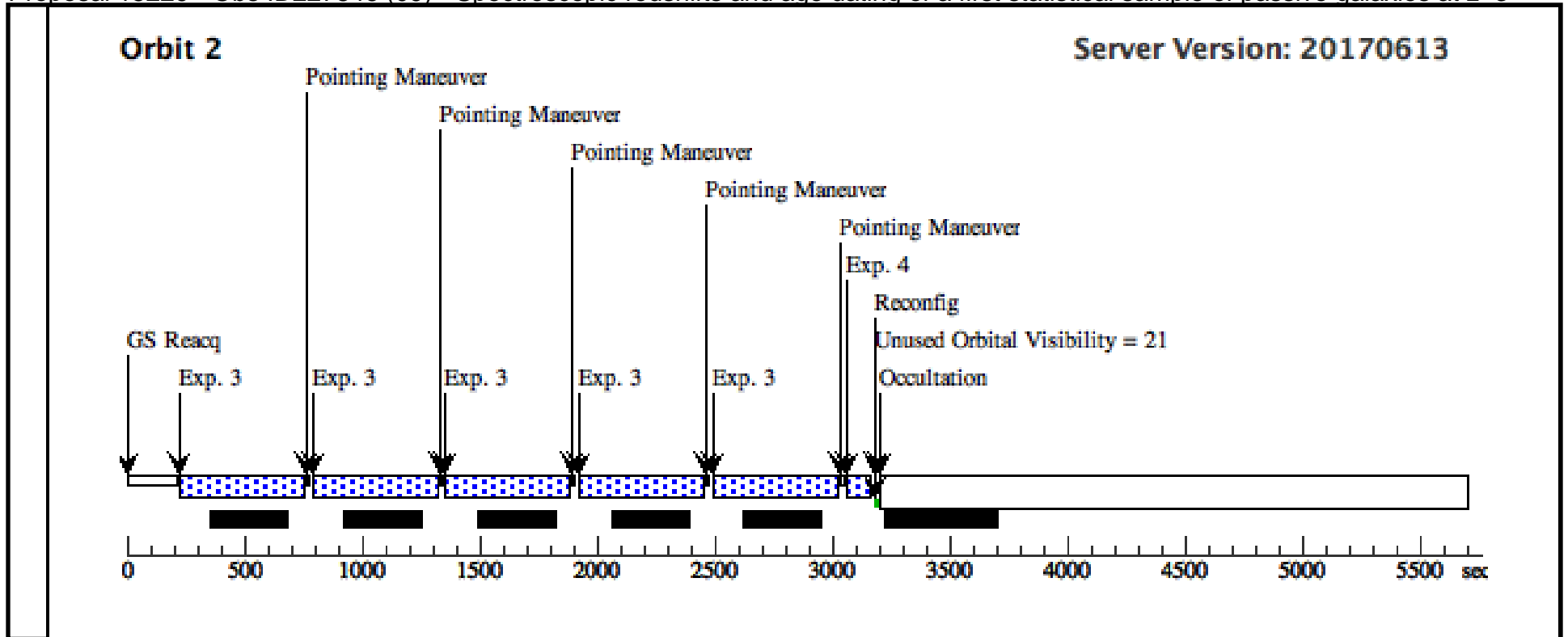


Proposal 15229 - Obs ID227846 (09) - Spectroscopic redshifts and age dating of a first statistical sample of passive galaxies at z~3

Tue Oct 31 19:01:42 GMT 2017

Visit	<b>Proposal 15229, Obs ID227846 (09), implementation</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/IR Special Requirements: ORIENT 74.5D TO 79.5 D; ORIENT 85.5D TO 88.5 D; ORIENT 90.5D TO 93.5 D; ORIENT 94.5D TO 95.5 D; ORIENT 119.5D TO 120.5 D; ORIENT 131.5D TO 135.5 D; ORIENT 254.5D TO 257.5 D; ORIENT 267.5D TO 268.5 D; ORIENT 272.5D TO 273.5 D; ORIENT 274.5D TO 275.5 D; ORIENT 311.5D TO 316.5 D									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(1)	Pattern Type=WFC3-IR-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.605 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(1), (2)				
	(2)	Pattern Type=WFC3-IR-DITHER-BLOB Purpose=DITHER Number Of Points=5 Point Spacing=5.183 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.859 Angle Between Sides= Center Pattern=true		(3)					
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(5)	ID227846	RA: 09 59 11.7700 (149.7990417d) Dec: +01 58 32.96 (1.97582d) Equinox: J2000		V=(?) zp=2.5 logM=10.9	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(5) ID227846	WFC3/IR, MULTIACCUM, GRISM1024	F160W	SAMP-SEQ=SPARS 25; NSAMP=14		Pattern 1, Exps 1-1 in Obs ID227846 (09) (1)	327.938986 Secs (983.817 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[1]
	2		(5) ID227846	WFC3/IR, MULTIACCUM, GRISM1024	G141	SAMP-SEQ=STEP5 0; NSAMP=15		Pattern 1, Exps 2-2 in Obs ID227846 (09) (1)	499.234285 Secs (1497.703 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[1]
	3		(5) ID227846	WFC3/IR, MULTIACCUM, GRISM1024	G141	SAMP-SEQ=STEP5 0; NSAMP=15		Pattern 2, Exps 3-3 in Obs ID227846 (09) (2)	499.234285 Secs (2496.171 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)] [==>(Pattern 5)]	[2]
4		(5) ID227846	WFC3/IR, MULTIACCUM, GRISM1024	F160W	SAMP-SEQ=SPARS 5; NSAMP=15			72.943085 Secs (72.943 Secs) [==>]	[2]	





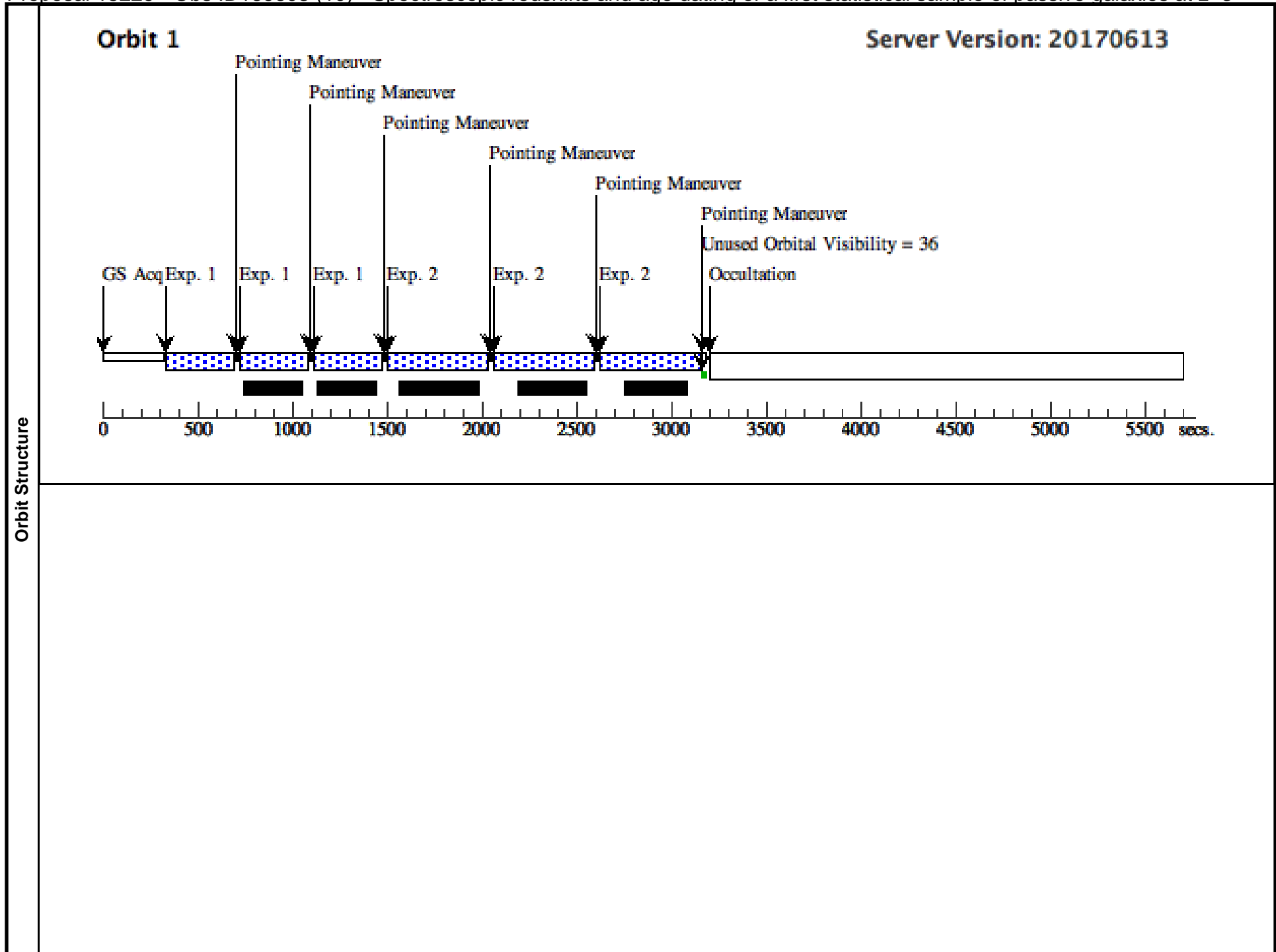
Proposal 15229 - Obs ID169603 (10) - Spectroscopic redshifts and age dating of a first statistical sample of passive galaxies at z~3

Tue Oct 31 19:01:42 GMT 2017

<b>Visit</b>	<b>Proposal 15229, Obs ID169603 (10), implementation</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/IR Special Requirements: ORIENT 1.5D TO 13.5 D; ORIENT 149.5D TO 167.5 D; ORIENT 172.5D TO 193.5 D; ORIENT 330.5D TO 336.5 D; ORIENT 339.5D TO 348.5 D; ORIENT 352.5D TO 0.5 D; ORIENT 22.5D TO 24.5 D; ORIENT 37.5D TO 43.5 D; ORIENT 202.5D TO 205.5 D; ORIENT 214.5D TO 223.5 D; ORIENT 259.5D TO 263.5 D; ORIENT 79.5D TO 80.5 D; ORIENT 33.5D TO 34.5 D; ORIENT 306.5D TO 308.5 D; ORIENT 313.5D TO 314.5 D					
	<b>Patterns</b>	<b>#</b>	<b>Primary Pattern</b>	<b>Secondary Pattern</b>	<b>Exposures</b>	
(1)		Pattern Type=WFC3-IR-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.605 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(1), (2)	
(2)		Pattern Type=WFC3-IR-DITHER-BLOB Purpose=DITHER Number Of Points=5 Point Spacing=5.183 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.859 Angle Between Sides= Center Pattern=true		(3), (5)	
<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>	<b>Targ. Coord. Corrections</b>	<b>Fluxes</b>	<b>Miscellaneous</b>
	(4)	ID169603	RA: 10 02 0.9600 (150.5040000d) Dec: +01 50 24.30 (1.84008d) Equinox: J2000		V=(?) zp=3.2 logM=10.7	Reference Frame: ICRS

Proposal 15229 - Obs ID169603 (10) - Spectroscopic redshifts and age dating of a first statistical sample of passive galaxies at z~3

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(4) ID169603	(4) ID169603	WFC3/IR, MULTIACCUM, GRISM1024	F160W	SAMP-SEQ=SPARS 25; NSAMP=14		Pattern 1, Exps 1-1 in Obs ID169603 (10) (1)	327.938986 Secs (983.817 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[1]
	2	(4) ID169603	(4) ID169603	WFC3/IR, MULTIACCUM, GRISM1024	G141	SAMP-SEQ=STEP5 0; NSAMP=15		Pattern 1, Exps 2-2 in Obs ID169603 (10) (1)	499.234285 Secs (1497.703 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[1]
	3	(4) ID169603	(4) ID169603	WFC3/IR, MULTIACCUM, GRISM1024	G141	SAMP-SEQ=STEP5 0; NSAMP=15		Pattern 2, Exps 3-3 in Obs ID169603 (10) (2)	499.234285 Secs (2496.171 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)] [==>(Pattern 5)]	[2]
	4	(4) ID169603	(4) ID169603	WFC3/IR, MULTIACCUM, GRISM1024	F160W	SAMP-SEQ=SPARS 5; NSAMP=15			72.943085 Secs (72.943 Secs) [==>]	[2]
	5	(4) ID169603	(4) ID169603	WFC3/IR, MULTIACCUM, GRISM1024	G141	SAMP-SEQ=STEP5 0; NSAMP=15		Pattern 2, Exps 5-5 in Obs ID169603 (10) (2)	499.234285 Secs (2496.171 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)] [==>(Pattern 5)]	[3]
	6	(4) ID169603	(4) ID169603	WFC3/IR, MULTIACCUM, GRISM1024	F160W	SAMP-SEQ=SPARS 5; NSAMP=15			72.943085 Secs (72.943 Secs) [==>]	[3]



**Orbit 2**

**Server Version: 20170613**

