



15977 - Characterizing the Environment Around The Most Distant Known Galaxy

Cycle: 27, Proposal Category: GO

(JWST Initiative)

(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) GN-Z11 ANY	ACS/WFC WFC3/IR	2	15-Jul-2019 13:01:14.0	yes
02	(1) GN-Z11 ANY	ACS/WFC WFC3/IR	2	15-Jul-2019 13:01:16.0	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>
03	(1) GN-Z11 ANY	ACS/WFC WFC3/IR	2	15-Jul-2019 13:01:18.0	yes
04	(1) GN-Z11 ANY	ACS/WFC WFC3/IR	2	15-Jul-2019 13:01:20.0	yes
05	(1) GN-Z11 ANY	ACS/WFC WFC3/IR	3	15-Jul-2019 13:01:24.0	yes

11 Total Orbits Used

ABSTRACT

The discovery of the very luminous galaxy GN-z11 at only 400 Myr after the Big Bang in the GOODS-North field with an HST grism spectroscopic redshift of $z=11.1\pm0.1$ presents a real puzzle for early Universe science. Its detection raises significant questions about our understanding of early galaxy formation, as theoretical models did not predict any such galaxy in the small HST survey area. However, models do predict that the most luminous early galaxies form in the most massive halos, such that they should be significantly clustered, and surrounded by fainter neighbors. Two promising neighbor candidates have already been identified: one lower S/N source seen in HST imaging and one candidate from a NOEMA [CII] emission line search. Clearly, the GOODS-N field around GN-z11 represents the best chance to identify a larger number of $z\sim11$ sources that can immediately be followed up with JWST spectroscopy from day one. But already now, GN-z11 provides a unique window deep into cosmic dawn, before reionization occurs -- an epoch we thought was inaccessible before JWST. Here, we thus propose one pointing of deeper WFC3/IR imaging in three filters to fully characterize the $z\sim11$ environment around GN-z11 and to confirm its neighbor candidate galaxies. At the same time, these data will further constrain the morphology of GN-z11, and enhance the HST legacy in the prime extragalactic field GOODS-North for the JWST era.

OBSERVING DESCRIPTION

This program is aimed at the discovery of fainter neighbors around the currently most distant known galaxy GN-z11. It will provide 11 orbit WFC3/IR imaging split over three filters, as well as ACS F435W parallels back over the GOODS-North field. These data will be extremely valuable for the community to select targets for JWST spectroscopy follow-up, which is why we waive the proprietary time and submitted the proposal as JWST-initiative. It would be important to be able to schedule these data as quickly as possible before the JWST launch.

For the filters F125W and F160W, we submit 2 visits of 2 orbits each, and for filter F140W, we created one 3-orbit visit. Each orbit is broken up into

4 WFC3/IR exposures and 4 ACS parallel exposures. The total integration time is thus 4 orbits in F125W and F160W and 3 orbits in F140W.

We use a combination of two dither patterns, WFC3-IR-DITHER-BOX-MIN + WFC3-IR-DITHER-BLOB for the two orbit visits, and offset them using small POSTARGS for the next visit. This ensures that both the WFC3/IR images as well as the ACS parallels are well dithered, and we step across the ACS chip gap.

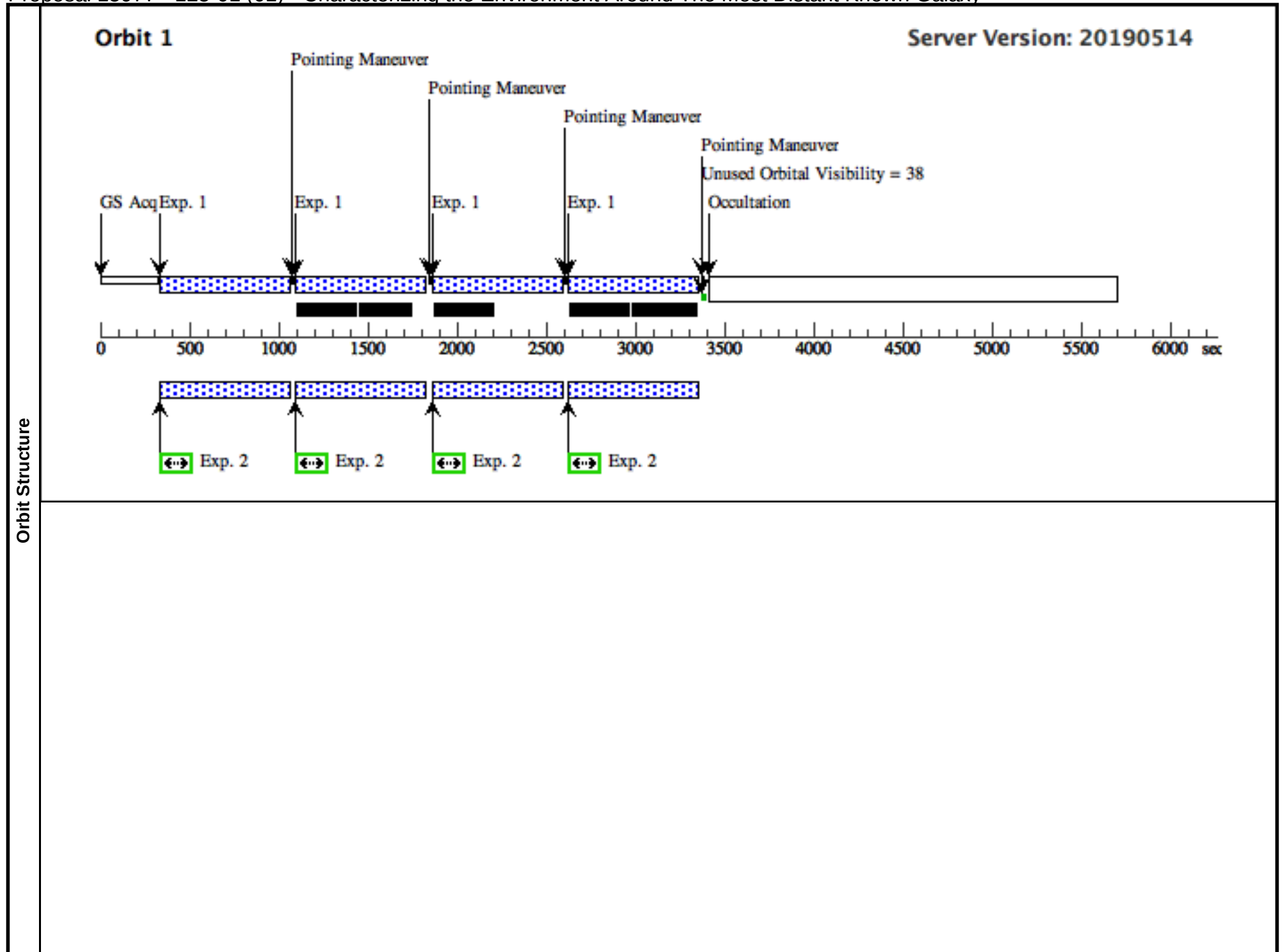
We apply a small constraint on the orients such that the parallel ACS images land back on the original GOODS field to improve the blue coverage and legacy. This only mildly reduces the scheduling opportunities, but if needed, this constraint could be weakened.

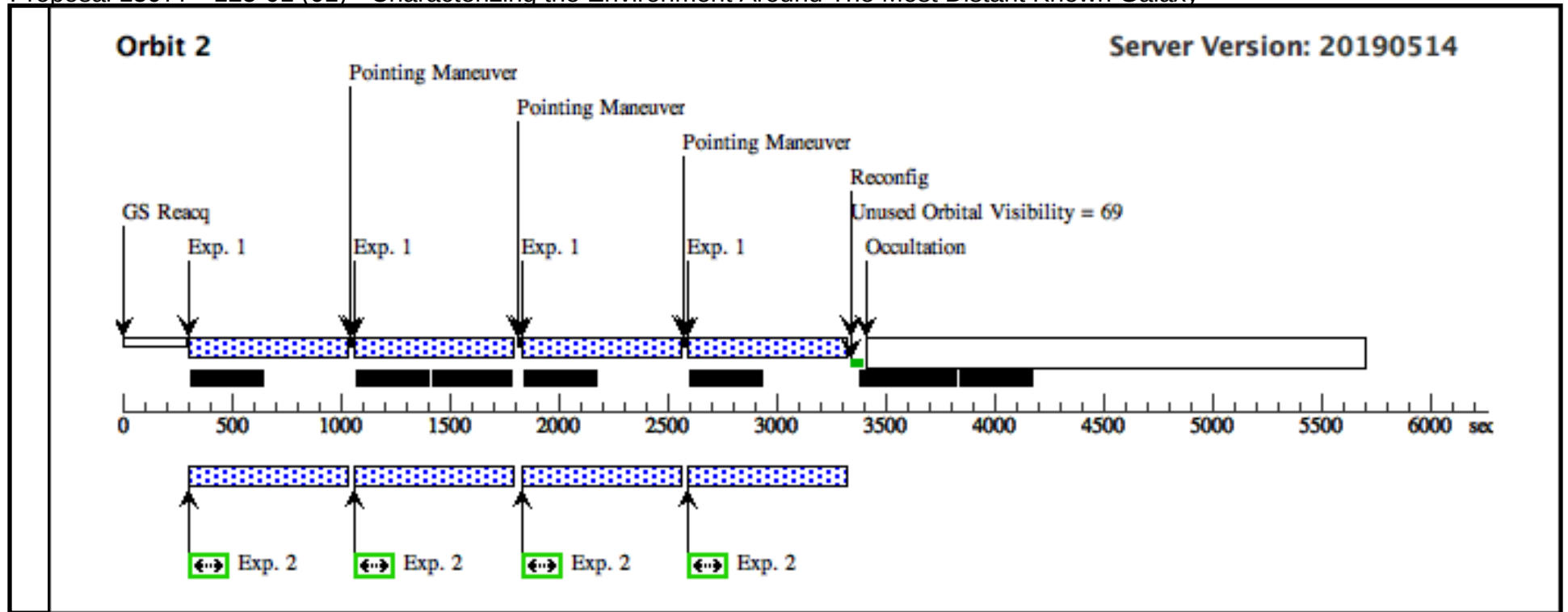
Gyro mode failure:

We do not expect a major impact on our observed program from a possible gyro failure. If the observing windows were to shrink, we can decrease the exposure times accordingly.

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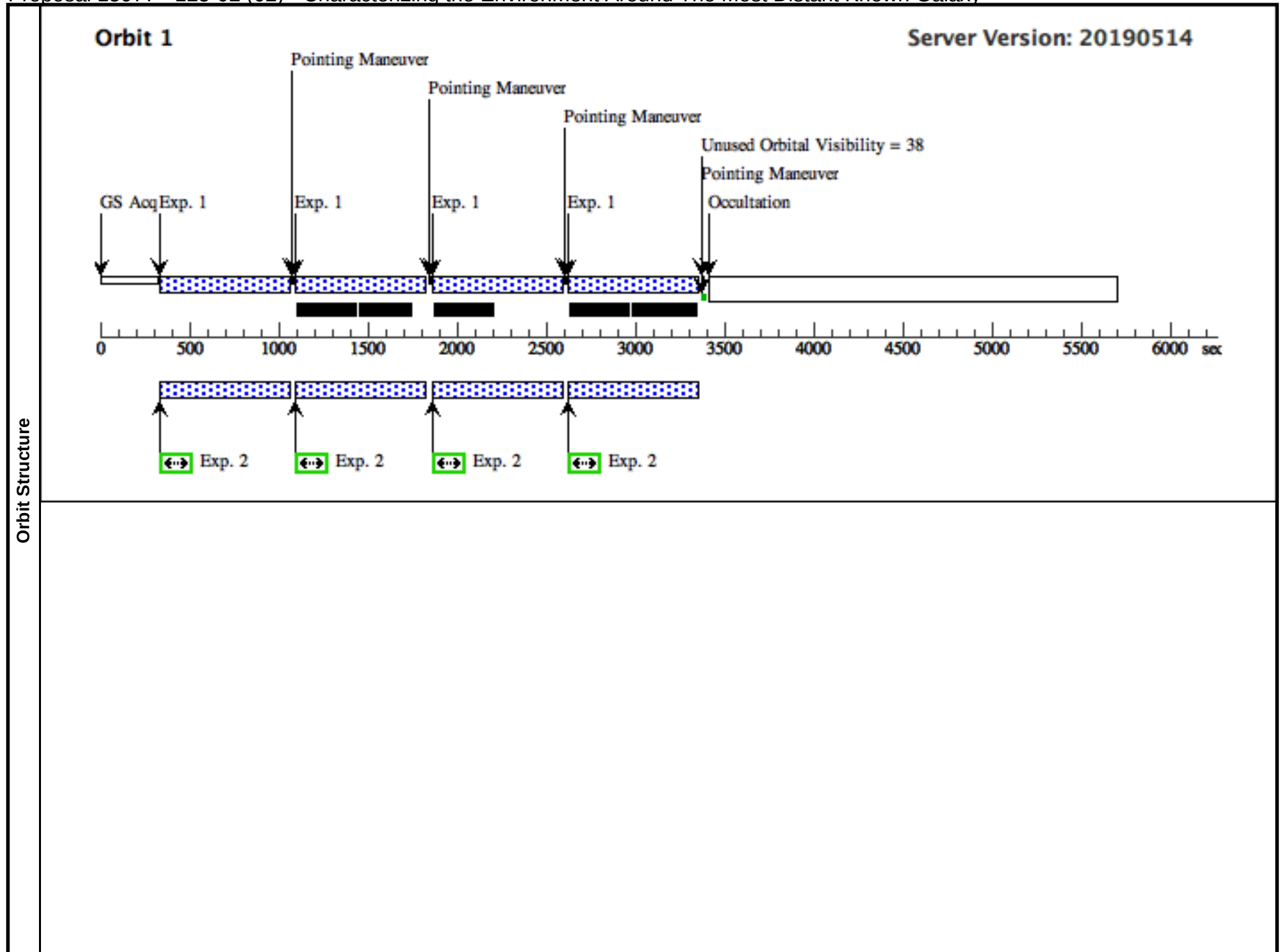
Visit	Proposal 15977, 125-01 (01)										Mon Jul 15 17:01:25 GMT 2019	
	Diagnostic Status: No Diagnostics											
	Scientific Instruments: WFC3/IR, ACS/WFC											
	Special Requirements: ORIENT 150D TO 355 D											
Patterns	#	Primary Pattern				Secondary Pattern				Exposures		
	(2)	Pattern Type=WFC3-IR-DITHER-BLOB Purpose=DITHER Number Of Points=2 Point Spacing=5.183 Line Spacing=		Coordinate Frame=POS-TARG Pattern Orientation=41.859 Angle Between Sides= Center Pattern=false		Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365		Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(1-2)		
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous			
	(1)	GN-Z11	RA: 12 36 25.4500 (189.1060417d) Dec: +62 14 31.35 (62.24204d) Equinox: J2000				V=(?) H-band AB = 26.0		Reference Frame: SIMBAD			
	Comments: Category=GALAXY Description=[HIGH REDSHIFT GALAXY]											
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit	
	1	(1) GN-Z11	WFC3/IR, MULTIACCUM, IR-FIX	F125W	NSAMP=8; SAMP-SEQ=SPAR S100			Pattern 2, Exps 1-2 in 125-01 (01) (2) Prime + Parallel Group 1-2 in Pattern 2, Exps 1-2 in 125-01 (01)	702.934552 Secs (5623.476 Secs)			
									[==>(Pattern 1,1)]		[1]	
									[==>(Pattern 1,2)]			
									[==>(Pattern 1,3)]			
	[==>(Pattern 1,4)]		[2]									
[==>(Pattern 2,1)]												
[==>(Pattern 2,2)]												
[==>(Pattern 2,3)]												
[==>(Pattern 2,4)]												
2	ANY	ACS/WFC, ACCUM, WFC	F435W					Pattern 2, Exps 1-2 in 125-01 (01) (2) Prime + Parallel Group 1-2 in Pattern 2, Exps 1-2 in 125-01 (01)	400 Secs (4774 Secs)			
									[==>525.0 Secs (Pattern 1,1)]		[1]	
									[==>607.0 Secs (Pattern 1,2)]			
									[==>607.0 Secs (Pattern 1,3)]			
									[==>607.0 Secs (Pattern 1,4)]		[2]	
									[==>607.0 Secs (Pattern 2,1)]			
[==>607.0 Secs (Pattern 2,2)]												
[==>607.0 Secs (Pattern 2,3)]												
[==>607.0 Secs (Pattern 2,4)]												

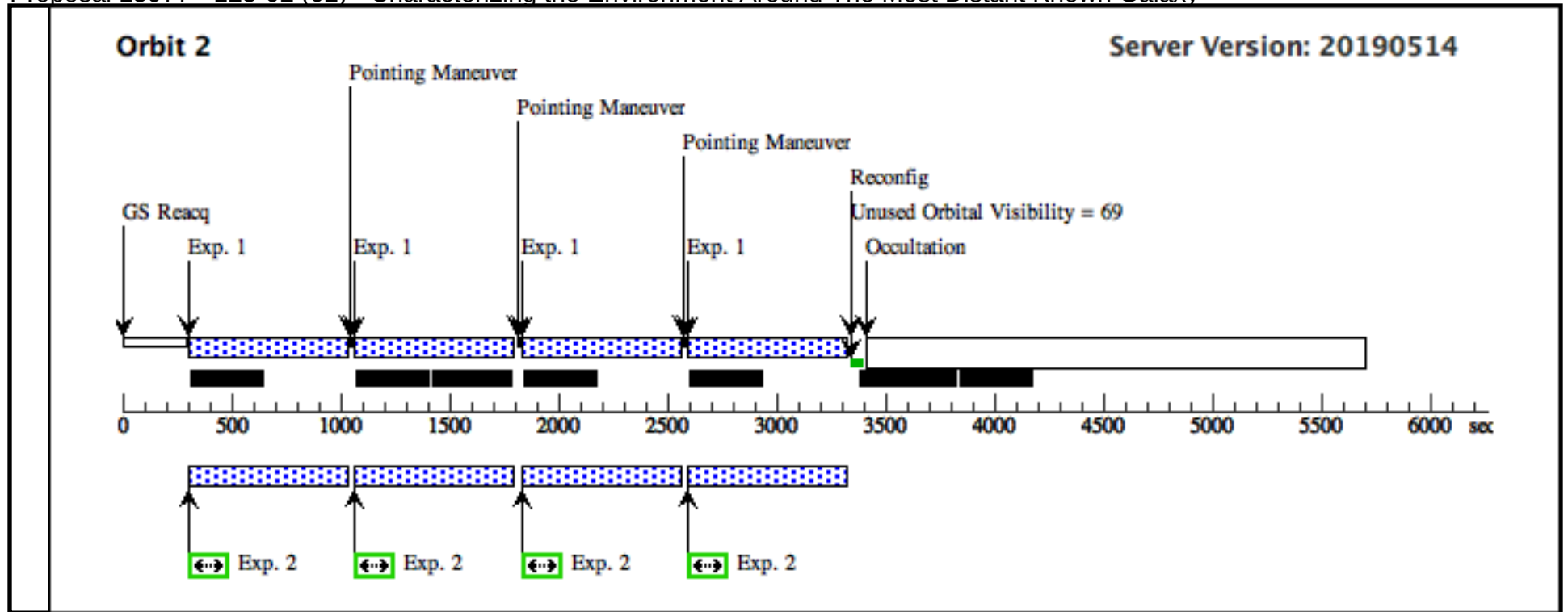




Proposal 15977 - 125-02 (02) - Characterizing the Environment Around The Most Distant Known Galaxy

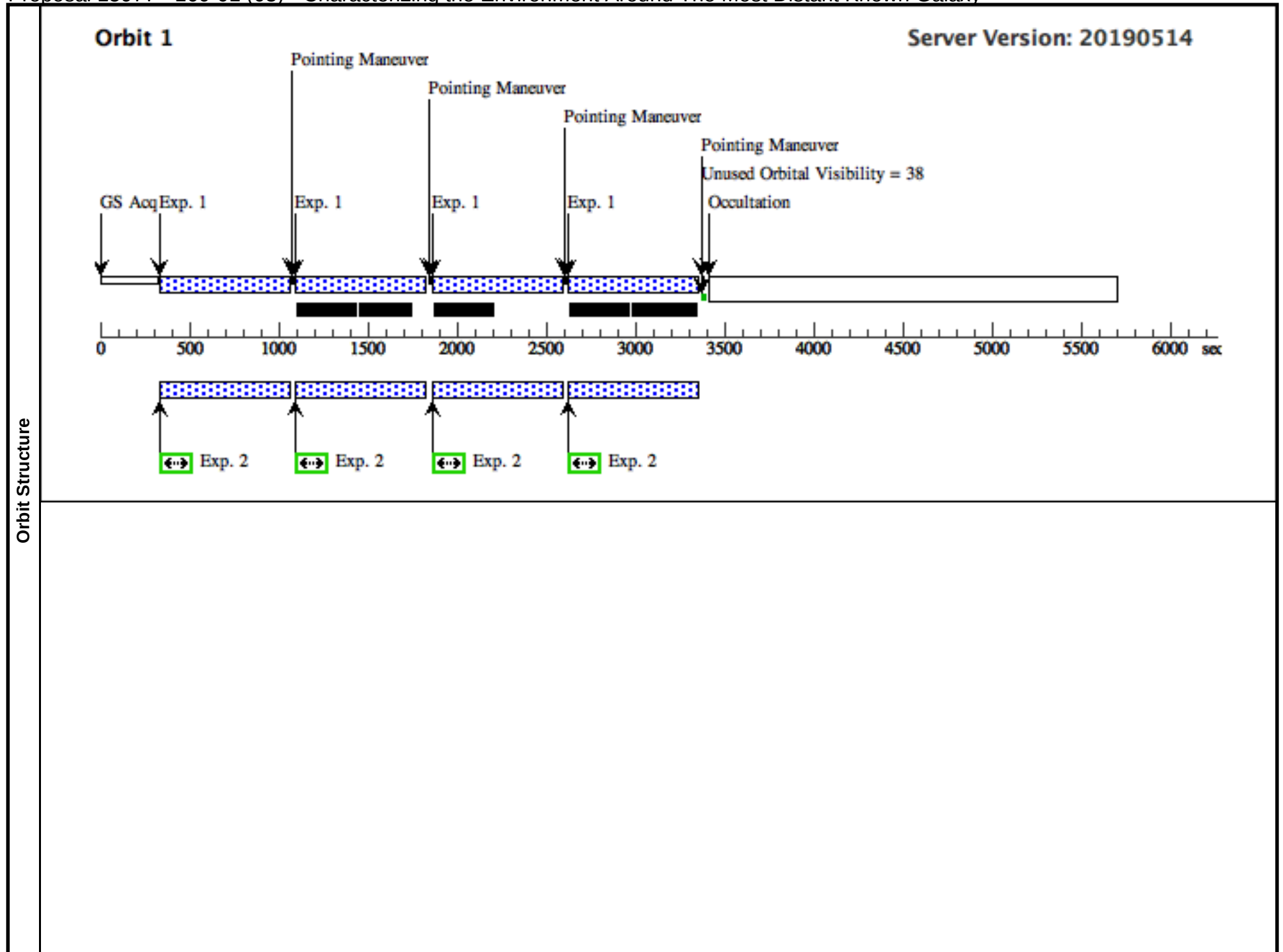
Visit	Proposal 15977, 125-02 (02)										Mon Jul 15 17:01:25 GMT 2019
	Diagnostic Status: No Diagnostics										
	Scientific Instruments: WFC3/IR, ACS/WFC										
	Special Requirements: ORIENT 150D TO 355 D										
Patterns	#	Primary Pattern				Secondary Pattern				Exposures	
	(2)	Pattern Type=WFC3-IR-DITHER-BLOB Purpose=DITHER Number Of Points=2 Point Spacing=5.183 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.859 Angle Between Sides= Center Pattern=false	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false	(1-2)					
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(1)	GN-Z11	RA: 12 36 25.4500 (189.1060417d) Dec: +62 14 31.35 (62.24204d) Equinox: J2000				V=(?) H-band AB = 26.0		Reference Frame: SIMBAD		
	Comments: Category=GALAXY Description=[HIGH REDSHIFT GALAXY]										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit	
	1	(1) GN-Z11	WFC3/IR, MULTIACCUM, IR-FIX	F125W	NSAMP=8; SAMP-SEQ=SPAR S100	POS TARG 2.0,-6.5	Pattern 2, Exps 1-2 in 125-02 (02) (2) Prime + Parallel Group 1-2 in Pattern 2, Exps 1-2 in 125-02 (02)	702.934552 Secs (5623.476 Secs)			
								[==>(Pattern 1,1)]	[1]		
								[==>(Pattern 1,2)]			
								[==>(Pattern 1,3)]			
	2	ANY	ACS/WFC, ACCUM, WFC	F435W			Pattern 2, Exps 1-2 in 125-02 (02) (2) Prime + Parallel Group 1-2 in Pattern 2, Exps 1-2 in 125-02 (02)	[==>(Pattern 1,4)]	[2]		
								[==>(Pattern 2,1)]			
								[==>(Pattern 2,2)]			
[==>(Pattern 2,3)]											
2	ANY	ACS/WFC, ACCUM, WFC	F435W			Pattern 2, Exps 1-2 in 125-02 (02) (2) Prime + Parallel Group 1-2 in Pattern 2, Exps 1-2 in 125-02 (02)	[==>(Pattern 2,4)]	[1]			
							400 Secs (4774 Secs)				
							[==>525.0 Secs (Pattern 1,1)]				
							[==>607.0 Secs (Pattern 1,2)]				
2	ANY	ACS/WFC, ACCUM, WFC	F435W			Pattern 2, Exps 1-2 in 125-02 (02) (2) Prime + Parallel Group 1-2 in Pattern 2, Exps 1-2 in 125-02 (02)	[==>607.0 Secs (Pattern 1,3)]	[2]			
							[==>607.0 Secs (Pattern 1,4)]				
							[==>607.0 Secs (Pattern 2,1)]				
							[==>607.0 Secs (Pattern 2,2)]				
2	ANY	ACS/WFC, ACCUM, WFC	F435W			Pattern 2, Exps 1-2 in 125-02 (02) (2) Prime + Parallel Group 1-2 in Pattern 2, Exps 1-2 in 125-02 (02)	[==>607.0 Secs (Pattern 2,3)]	[1]			
							[==>607.0 Secs (Pattern 2,4)]				
							[==>607.0 Secs (Pattern 2,1)]				
							[==>607.0 Secs (Pattern 2,2)]				
2	ANY	ACS/WFC, ACCUM, WFC	F435W			Pattern 2, Exps 1-2 in 125-02 (02) (2) Prime + Parallel Group 1-2 in Pattern 2, Exps 1-2 in 125-02 (02)	[==>607.0 Secs (Pattern 2,3)]	[2]			
							[==>607.0 Secs (Pattern 2,4)]				
							[==>607.0 Secs (Pattern 2,1)]				
							[==>607.0 Secs (Pattern 2,2)]				

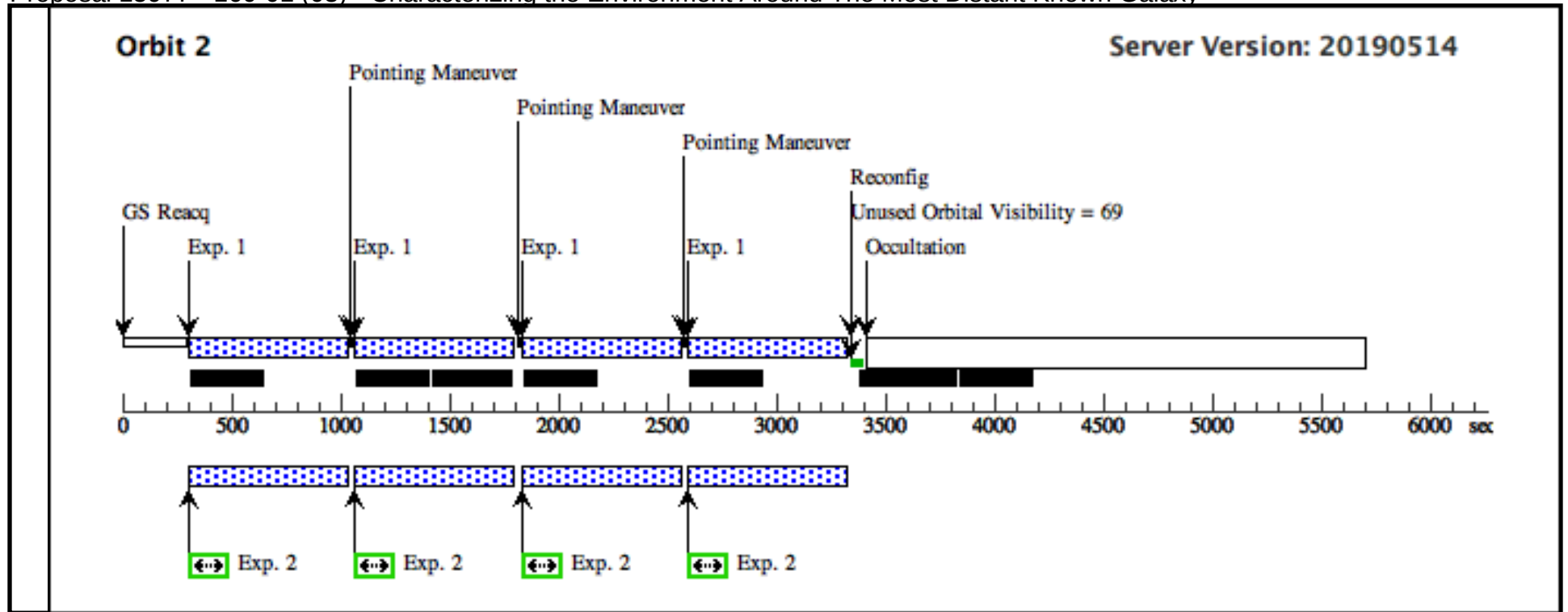




Proposal 15977 - 160-01 (03) - Characterizing the Environment Around The Most Distant Known Galaxy

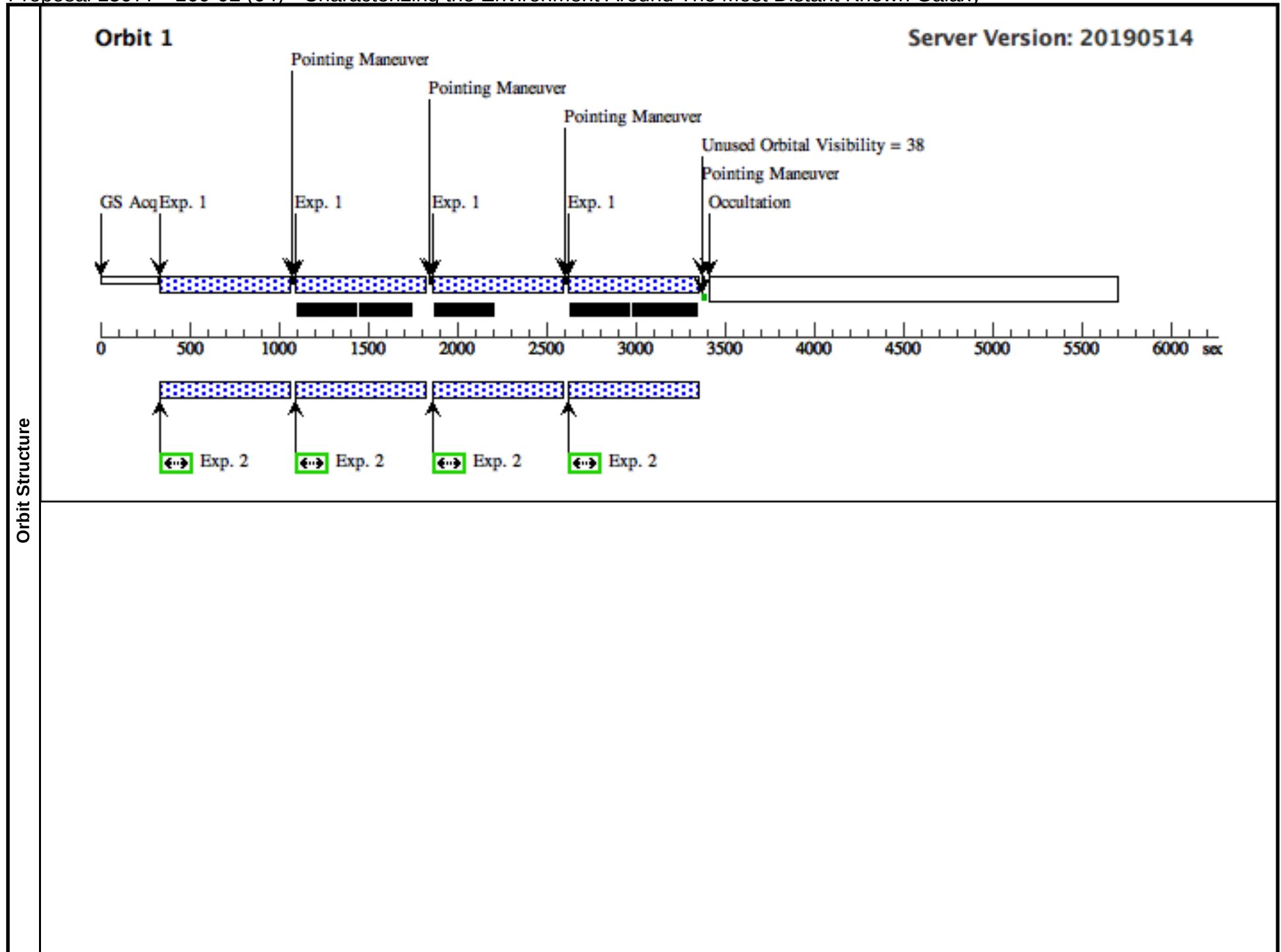
Visit	Proposal 15977, 160-01 (03)										Mon Jul 15 17:01:25 GMT 2019	
	Diagnostic Status: No Diagnostics											
	Scientific Instruments: WFC3/IR, ACS/WFC											
	Special Requirements: ORIENT 150D TO 355 D											
Patterns	#	Primary Pattern				Secondary Pattern				Exposures		
	(2)	Pattern Type=WFC3-IR-DITHER-BLOB Purpose=DITHER Number Of Points=2 Point Spacing=5.183 Line Spacing=		Coordinate Frame=POS-TARG Pattern Orientation=41.859 Angle Between Sides= Center Pattern=false		Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365		Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(1-2)		
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous			
	(1)	GN-Z11	RA: 12 36 25.4500 (189.1060417d) Dec: +62 14 31.35 (62.24204d) Equinox: J2000				V=(?) H-band AB = 26.0		Reference Frame: SIMBAD			
	Comments: Category=GALAXY Description=[HIGH REDSHIFT GALAXY]											
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit	
	1		(1) GN-Z11	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=8; SAMP-SEQ=SPAR S100		Pattern 2, Exps 1-2 in 160-01 (03) (2) Prime + Parallel Group 1-2 in Pattern 2, Exps 1-2 in 160-01 (03)	702.934552 Secs (5623.476 Secs)			
									[==>(Pattern 1,1)]		[1]	
									[==>(Pattern 1,2)]			
									[==>(Pattern 1,3)]			
	[==>(Pattern 1,4)]		[2]									
	[==>(Pattern 2,1)]											
[==>(Pattern 2,2)]												
[==>(Pattern 2,3)]												
[==>(Pattern 2,4)]												
2	ANY	ACS/WFC, ACCUM, WFC		F435W			Pattern 2, Exps 1-2 in 160-01 (03) (2) Prime + Parallel Group 1-2 in Pattern 2, Exps 1-2 in 160-01 (03)	400 Secs (4774 Secs)				
								[==>525.0 Secs (Pattern 1,1)]		[1]		
								[==>607.0 Secs (Pattern 1,2)]				
								[==>607.0 Secs (Pattern 1,3)]				
								[==>607.0 Secs (Pattern 1,4)]		[2]		
								[==>607.0 Secs (Pattern 2,1)]				
[==>607.0 Secs (Pattern 2,2)]												
[==>607.0 Secs (Pattern 2,3)]												
[==>607.0 Secs (Pattern 2,4)]												

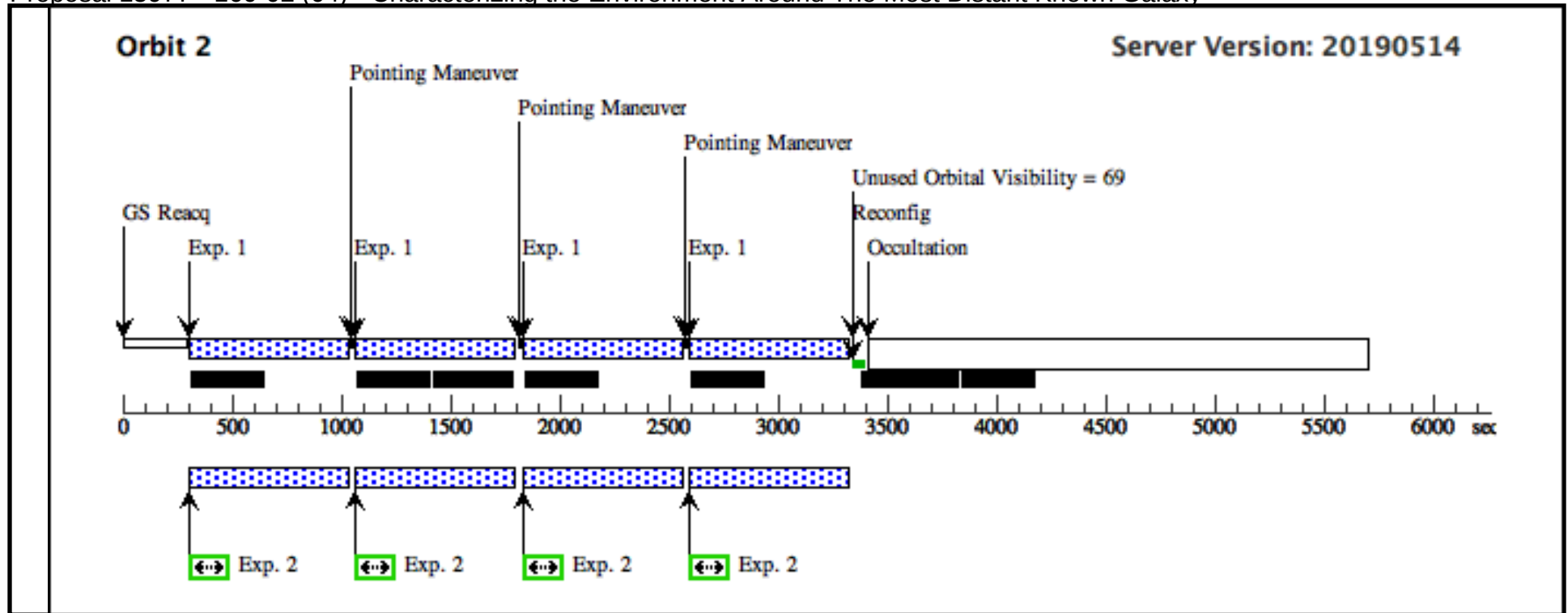




Proposal 15977 - 160-02 (04) - Characterizing the Environment Around The Most Distant Known Galaxy

Visit	Proposal 15977, 160-02 (04)										Mon Jul 15 17:01:25 GMT 2019	
	Diagnostic Status: No Diagnostics											
	Scientific Instruments: WFC3/IR, ACS/WFC											
	Special Requirements: ORIENT 150D TO 355 D											
Patterns	#	Primary Pattern				Secondary Pattern				Exposures		
	(2)	Pattern Type=WFC3-IR-DITHER-BLOB Purpose=DITHER Number Of Points=2 Point Spacing=5.183 Line Spacing=		Coordinate Frame=POS-TARG Pattern Orientation=41.859 Angle Between Sides= Center Pattern=false		Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365		Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(1-2)		
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous			
	(1)	GN-Z11	RA: 12 36 25.4500 (189.1060417d) Dec: +62 14 31.35 (62.24204d) Equinox: J2000				V=(?) H-band AB = 26.0		Reference Frame: SIMBAD			
	Comments: Category=GALAXY Description=[HIGH REDSHIFT GALAXY]											
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit	
	1		(1) GN-Z11	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=8; SAMP-SEQ=SPAR S100	POS TARG 2.0,-6.5	Pattern 2, Exps 1-2 in 160-02 (04) (2) Prime + Parallel Group 1-2 in Pattern 2, Exps 1-2 in 160-02 (04)	702.934552 Secs (5623.476 Secs)			
									[==>(Pattern 1,1)]		[1]	
									[==>(Pattern 1,2)]			
									[==>(Pattern 1,3)]			
										[==>(Pattern 1,4)]		
									[==>(Pattern 2,1)]		[2]	
									[==>(Pattern 2,2)]			
									[==>(Pattern 2,3)]			
									[==>(Pattern 2,4)]			
	2		ANY	ACS/WFC, ACCUM, WFC	F435W			Pattern 2, Exps 1-2 in 160-02 (04) (2) Prime + Parallel Group 1-2 in Pattern 2, Exps 1-2 in 160-02 (04)	400 Secs (4774 Secs)			
									[==>525.0 Secs (Pattern 1,1)]		[1]	
									[==>607.0 Secs (Pattern 1,2)]			
									[==>607.0 Secs (Pattern 1,3)]			
									[==>607.0 Secs (Pattern 1,4)]		[2]	
									[==>607.0 Secs (Pattern 2,1)]			
									[==>607.0 Secs (Pattern 2,2)]			
									[==>607.0 Secs (Pattern 2,3)]		[2]	
									[==>607.0 Secs (Pattern 2,4)]			



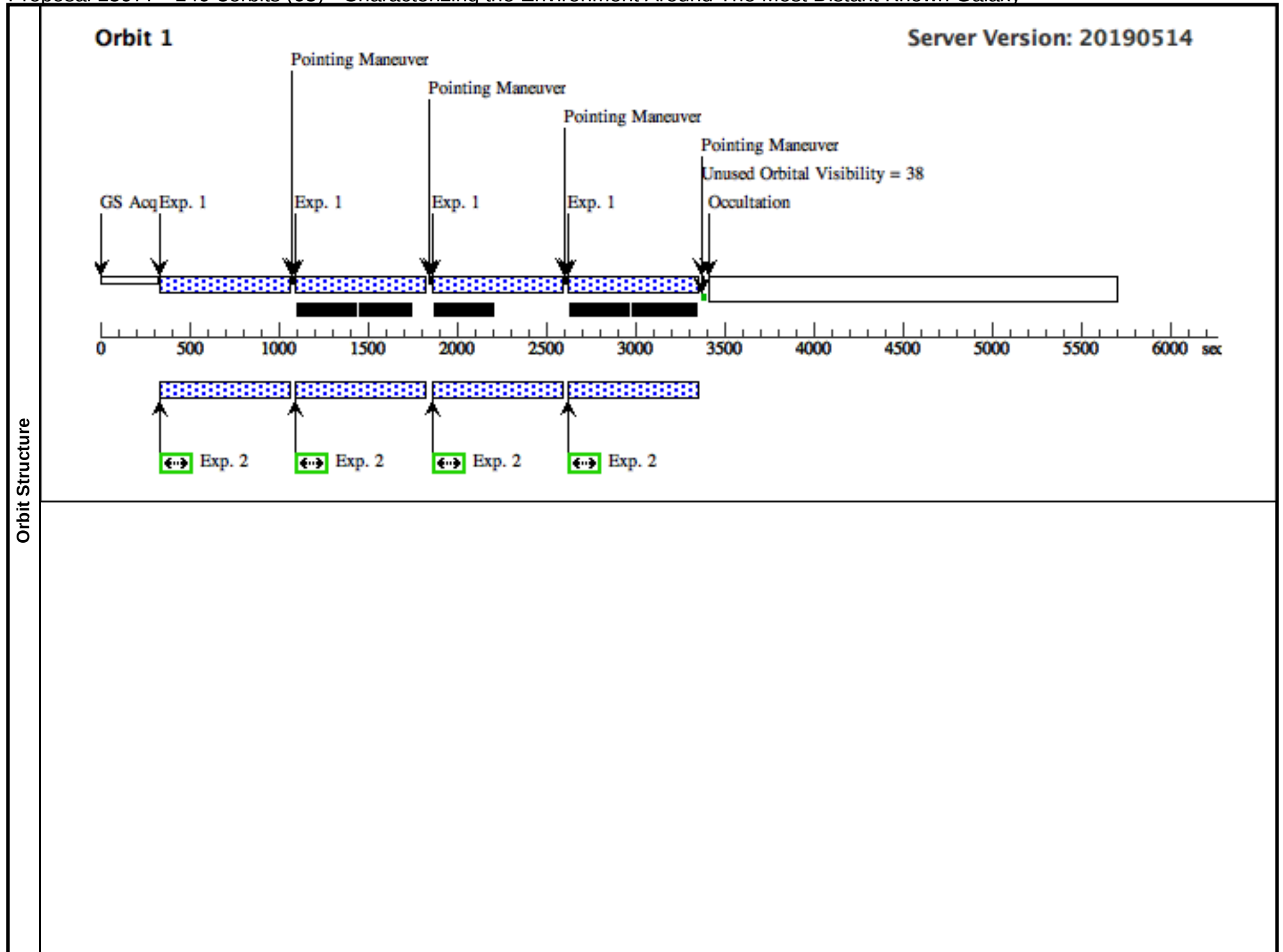


Proposal 15977 - 140-3orbits (05) - Characterizing the Environment Around The Most Distant Known Galaxy

Visit	Proposal 15977, 140-3orbits (05)					Mon Jul 15 17:01:25 GMT 2019	
	Diagnostic Status: No Diagnostics						
	Scientific Instruments: WFC3/IR, ACS/WFC						
	Special Requirements: ORIENT 150D TO 355 D						
Patterns	#	Primary Pattern			Secondary Pattern		Exposures
	(1)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=1.144 Line Spacing=0.73	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false			(3-4)	
	(2)	Pattern Type=WFC3-IR-DITHER-BLOB Purpose=DITHER Number Of Points=2 Point Spacing=5.183 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.859 Angle Between Sides= Center Pattern=false	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false	(1-2)	
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous	
	(1)	GN-Z11	RA: 12 36 25.4500 (189.1060417d) Dec: +62 14 31.35 (62.24204d) Equinox: J2000		V=(?) H-band AB = 26.0	Reference Frame: SIMBAD	
Comments: Category=GALAXY Description=[HIGH REDSHIFT GALAXY]							

Proposal 15977 - 140-3orbits (05) - Characterizing the Environment Around The Most Distant Known Galaxy

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) GN-Z11	WFC3/IR, MULTIACCUM, IR-FIX	F140W	NSAMP=8; SAMP-SEQ=SPAR S100		Pattern 2, Exps 1-2 in 140-3orbits (05) (2) Prime + Parallel Group 1-2 in Pattern 2, Exps 1-2 in 140-3orbits (05)	702.934552 Secs (5623.476 Secs) [==>(Pattern 1,1)] [==>(Pattern 1,2)] [==>(Pattern 1,3)] [==>(Pattern 1,4)] [==>(Pattern 2,1)] [==>(Pattern 2,2)] [==>(Pattern 2,3)] [==>(Pattern 2,4)]	[1] [2]
	2		ANY	ACS/WFC, ACCUM, WFC	F435W			Pattern 2, Exps 1-2 in 140-3orbits (05) (2) Prime + Parallel Group 1-2 in Pattern 2, Exps 1-2 in 140-3orbits (05)	400 Secs (4774 Secs) [==>525.0 Secs (Pattern 1,1)] [==>607.0 Secs (Pattern 1,2)] [==>607.0 Secs (Pattern 1,3)] [==>607.0 Secs (Pattern 1,4)] [==>607.0 Secs (Pattern 2,1)] [==>607.0 Secs (Pattern 2,2)] [==>607.0 Secs (Pattern 2,3)] [==>607.0 Secs (Pattern 2,4)]	[1] [2]
	3		(1) GN-Z11	WFC3/IR, MULTIACCUM, IR-FIX	F140W	NSAMP=15; SAMP-SEQ=SPAR S50	POS TARG 2.0,-6.0	Pattern 1, Exps 3-4 in 140-3orbits (05) (1) Prime + Parallel Group 3-4 in Pattern 1, Exps 3-4 in 140-3orbits (05)	702.938605 Secs (2811.754 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[3]
	4		ANY	ACS/WFC, ACCUM, WFC	F435W			Pattern 1, Exps 3-4 in 140-3orbits (05) (1) Prime + Parallel Group 3-4 in Pattern 1, Exps 3-4 in 140-3orbits (05)	325.0 Secs (2428 Secs) [==>607.0 Secs (Pattern 1)] [==>607.0 Secs (Pattern 2)] [==>607.0 Secs (Pattern 3)] [==>607.0 Secs (Pattern 4)]	[3]



Orbit 2

Server Version: 20190514

