



15940 - Completing the HST frontier fields legacy with a magnified cosmic noon

Cycle: 27, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

<i>Name</i>	<i>Institution</i>	<i>E-Mail</i>
Bruno Ribeiro (PI) (ESA Member) (Contact)	Sterrewacht Leiden	ribeiro@strw.leidenuniv.nl
Dr. Anahita Alavi (CoI)	California Institute of Technology	anahita@ipac.caltech.edu
Prof. Brian Siana (CoI) (AdminUSPI)	University of California - Riverside	brian.siana@ucr.edu
Dr. Rycharde Bouwens (CoI) (ESA Member)	Universiteit Leiden	bouwens@strw.leidenuniv.nl
Dr. Renske Smit (CoI) (ESA Member)	University of Cambridge	rs940@cam.ac.uk
Dr. Eros Vanzella (CoI) (ESA Member)	INAF, Osservatorio di Astrofisica e Scienza dello Spazio	eros.vanzella@inaf.it
Mr. Daniel K. Magee (CoI)	University of California - Santa Cruz	magee@ucolick.org
Prof. Garth D. Illingworth (CoI)	University of California - Santa Cruz	gdi@ucolick.org
Dr. Ana Paulino-Afonso (CoI) (ESA Member)	CENTRA-Multidisciplinary Centre for Astrophysics and IST	apaulinoafonso@tecnico.ulisboa.pt
Prof. Pascal Oesch (CoI) (ESA Member)	Observatoire de Geneve	pascal.oesch@unige.ch

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) ACO-370 ANY	ACS/WFC WFC3/UVIS	4	19-Dec-2019 10:00:18.0	yes
02	(1) ACO-370 ANY	ACS/WFC WFC3/UVIS	4	19-Dec-2019 10:00:20.0	yes
03	(2) ACO-2744 ANY	ACS/WFC WFC3/UVIS	4	19-Dec-2019 10:00:22.0	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>
04	(2) ACO-2744 ANY	ACS/WFC WFC3/UVIS	4	19-Dec-2019 10:00:23.0	yes
05	(3) ACO-S-1063 ANY	ACS/WFC WFC3/UVIS	4	19-Dec-2019 10:00:24.0	yes
06	(3) ACO-S-1063 ANY	ACS/WFC WFC3/UVIS	4	19-Dec-2019 10:00:26.0	yes
07	(4) MCS-J0416.1-2403 ANY	ACS/WFC WFC3/UVIS	4	19-Dec-2019 10:00:28.0	yes
08	(4) MCS-J0416.1-2403 ANY	ACS/WFC WFC3/UVIS	4	19-Dec-2019 10:00:29.0	yes
09	(5) CLG-J0717+3745 ANY	ACS/WFC WFC3/UVIS	4	19-Dec-2019 10:00:31.0	yes
10	(5) CLG-J0717+3745 ANY	ACS/WFC WFC3/UVIS	4	19-Dec-2019 10:00:32.0	yes
11	(6) MCS-J1149.5+2223 ANY	ACS/WFC WFC3/UVIS	4	19-Dec-2019 10:00:33.0	yes
12	(6) MCS-J1149.5+2223 ANY	ACS/WFC WFC3/UVIS	4	19-Dec-2019 10:00:35.0	yes

48 Total Orbits Used

ABSTRACT

Since the advent of the Hubble Frontier Fields (HFF) campaign more than 5.5 years ago, it has been a great success, combining the power of lensing magnification with deep space-based imaging to provide us with our most sensitive views of the universe. This has been due to both the significant effort put into obtaining high accuracy mass models of the clusters and effort in observing the fields with many different telescopes. While all this investment has been good, there has been comparably little focus in using the HFF clusters to study sources at $z < 2$, at cosmic noon, which not only are brighter, but with spectral features and lines which are readily accessible to current telescopes. To facilitate further $z < 2$ studies, we propose to add deep 0.2 micron imaging observations with the WFC3/UVIS F225W channel to all six HFF clusters, extending the wavelength coverage available with HST from 1.7 microns down to 0.2 microns and enabling tight constraints on the redshifts of star-forming galaxies down to $z \sim 1$. This opens up

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an immense range of science on lower-luminosity galaxies at $z < 2$, making it possible to probe the faint-end and possible turn-over of the UV luminosity function to $z \sim 1$, probing escaping ionizing radiation from galaxies at $z \sim 2$, expanding the search of tiny star-forming (proto-globular-like) sources down to $z \sim 1$, and studying star formation and dust properties of galaxies belonging to the targeted clusters ($0.3 < z < 0.6$). Our proposed WFC3/UVIS F225W observations will fill out the multi-wavelength observations we have of the HFF clusters with Hubble, providing us with an important legacy into the JWST era.

OBSERVING DESCRIPTION

We propose to obtain 8-orbit images with WFC3/UVIS F225W to complement existing data on all six clusters observed within Hubble Frontier Fields (HFF) program. Alongside our primary observations, we will also propose to obtain 8-orbit ACS/WFC F475W imaging in parallel mode. The chosen orientations are set to match the existing WFC3/UVIS observations with filters F275W and F336W in all six clusters, and also to match our parallel observations to the existing HFF parallel fields.

Visit strategy:

We request 4-orbit visits for our program since this strategy is crucial for its success. Obtaining fewer exposures per visit would impact image alignment, cosmic ray removal, and overall data quality. A shorter number of orbits per visit is prejudicial to the science output of this program.

UVIS imaging strategy:

We chose to have full orbit integrations with UVIS to minimize the amount of post-flash flux needed as the longer exposures will allow for more dark current per exposure. Due to the multiple exposures per field, we expect to successfully eliminate most cosmic rays from the final data. Each visit will be composed of a standard four-point dither pattern. We will offset the center for each visit by 4.13" (+0.42", +2.02" in POSTARG) to cover the chip gap and remove (or smooth) artifacts on scales smaller than the offset (see e.g. blotch dark pattern, Rafelski et al. 2015).

Post-Flash requirements:

The suggested background level required to minimize the impact of charger transfer inefficiency in the UVIS CCD is of 12e-/pixel. Since the targets were selected to have limited zodiacal light, we expect a background level lower than what is recommended (6e-/pixel). We require an additional 7e-/pixel per orbit to reach the desired level over the entire CCD.

ACS imaging strategy:

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Since we are taking full orbit exposures in the WFC3/UVIS camera, the ACS will not move during the orbit. We choose to dedicate the same 8 orbits exposure (split in two sub-exposures per orbit to minimize impact of cosmic rays) to the F475W filter. This filter is also in a wavelength range that JWST cannot image, and has no existing observations from HST. It will complement the existing dataset on the parallel fields by adding a new filter to a 0.7 mag shallower sensitivity. The new filter will help in distinguishing the Balmer break of galaxies at the cluster redshift from the Lyman break of background galaxies at $z \sim 4$.

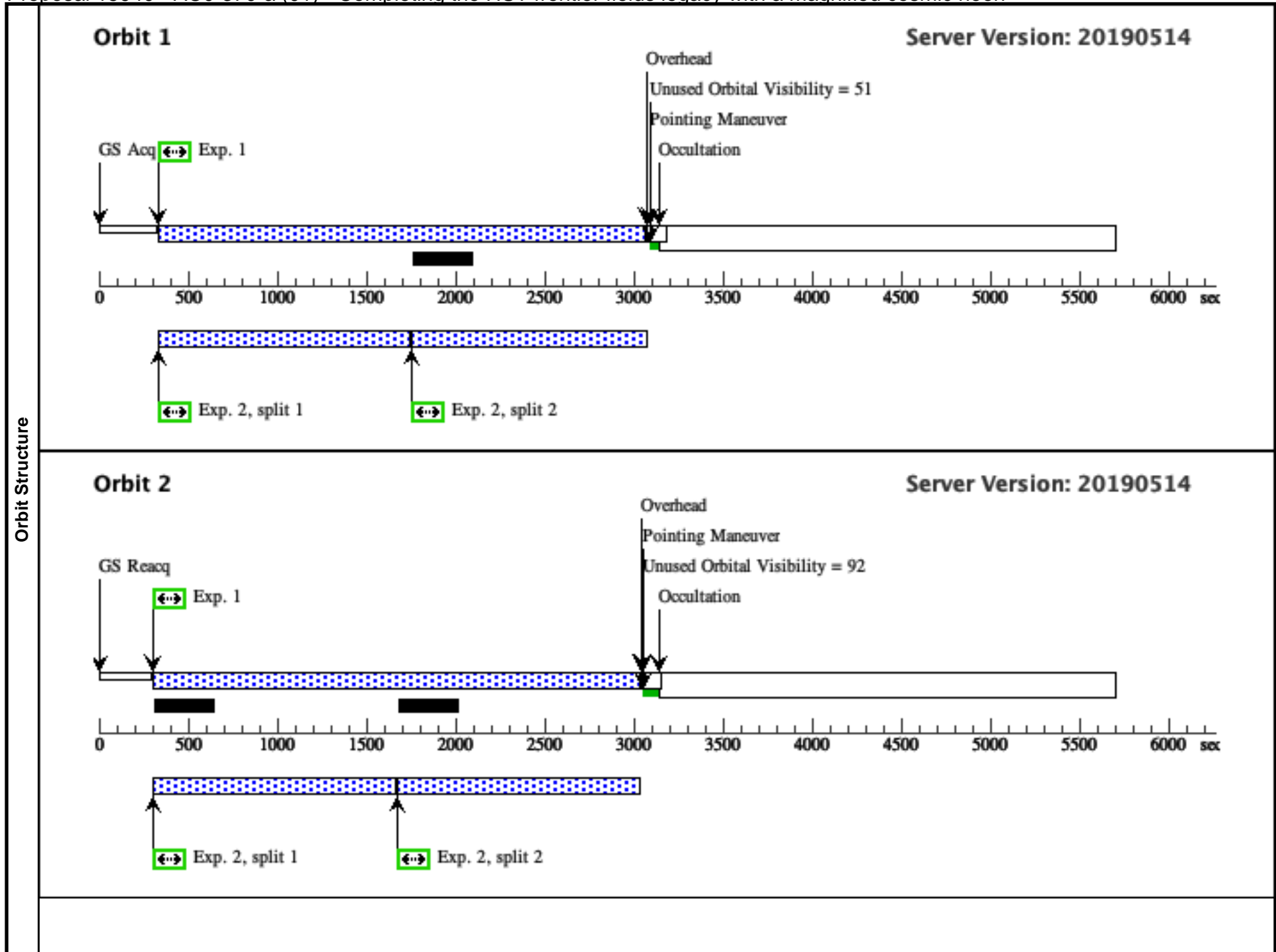
Reduced-gyro operations:

We do not expect a major impact on our observed program from reduced-gyro operations with the possible exception of schedulability problems. In the scenario where we need to adapt, we can relax constraints on orientation (longer schedulable windows) or drop one cluster from the program (suggested MACSJ0717.5+3745 due to higher galactic extinction on this sightline).

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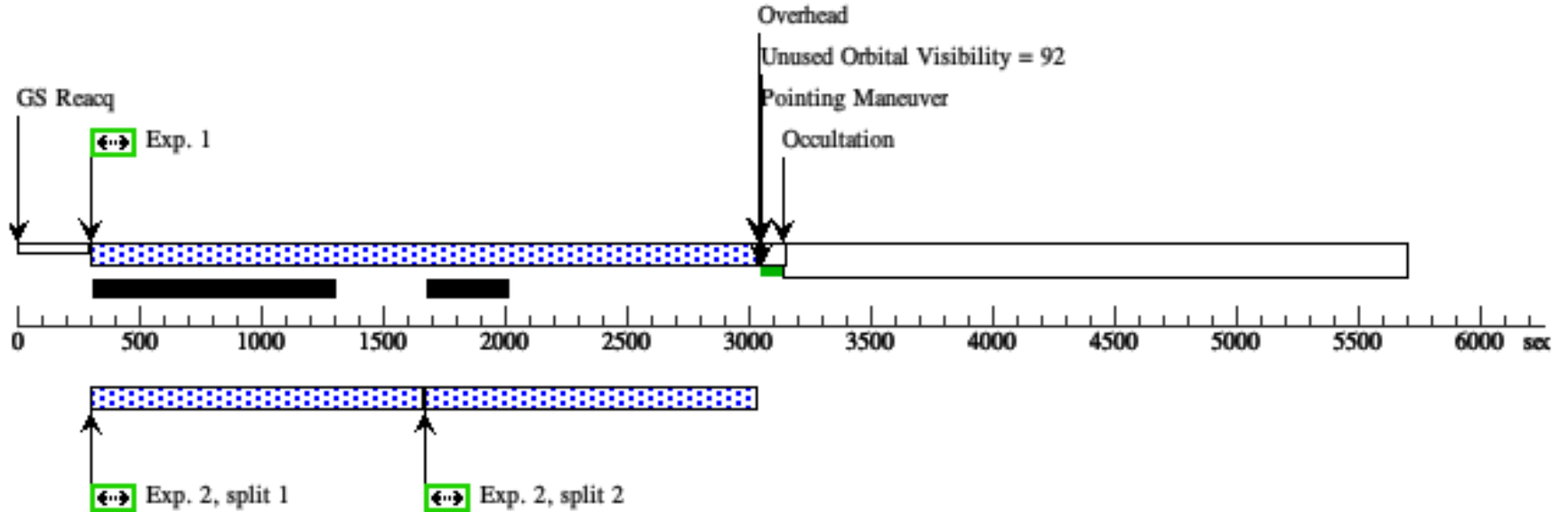
Thu Dec 19 15:00:35 GMT 2019

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	(1)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false		(1-2)					
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	ACO-370 Alt Name1: ABELL370	RA: 02 39 52.8000 (39.9700000d) Dec: -01 34 36.00 (-1.57667d) Equinox: J2000		V=26	Reference Frame: ICRS				
	<i>Comments:</i> Category=CLUSTER OF GALAXIES Description=[GRAVITATIONAL LENS, RICH CLUSTER]									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) ACO-370	WFC3/UVIS, ACCUM, UVIS-CENTER	F225W	FLASH=7	POS TARG -0.42,-2.02	Pattern 1, Exps 1-2 in AC0-370-a (01) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in AC0-370-a (01)	2750 Secs (10905 Secs) [==>2700.0 Secs (Pattern 1)] [==>2735 Secs (Pattern 2)] [==>2735 Secs (Pattern 3)] [==>2735 Secs (Pattern 4)]	[1] [2] [3] [4]
	2		ANY	ACS/WFC, ACCUM, WFC1	F475W	CR-SPLIT=2		Pattern 1, Exps 1-2 in AC0-370-a (01) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in AC0-370-a (01)	2500 Secs (9816 Secs) [==>1200.0 Secs (Pattern 1, Split 1)] [==>1200.0 Secs (Pattern 1, Split 2)] [==>1236.0 Secs (Pattern 2, Split 1)] [==>1236.0 Secs (Pattern 2, Split 2)] [==>1236.0 Secs (Pattern 3, Split 1)] [==>1236.0 Secs (Pattern 3, Split 2)] [==>1236.0 Secs (Pattern 4, Split 1)] [==>1236.0 Secs (Pattern 4, Split 2)]	[1] [2] [3] [4]



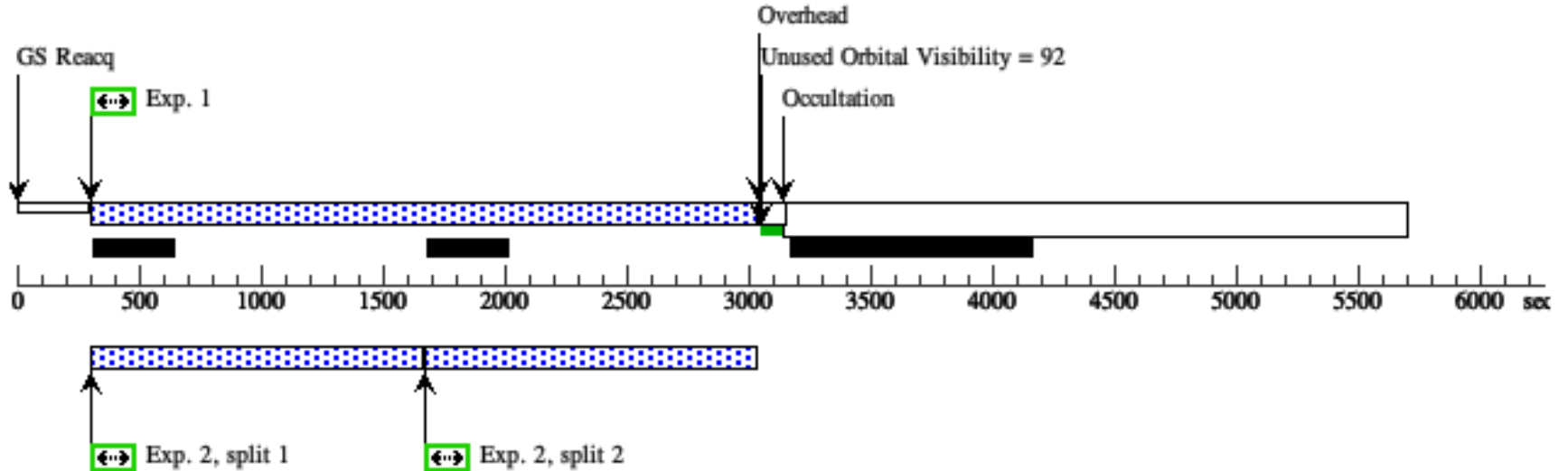
Orbit 3

Server Version: 20190514



Orbit 4

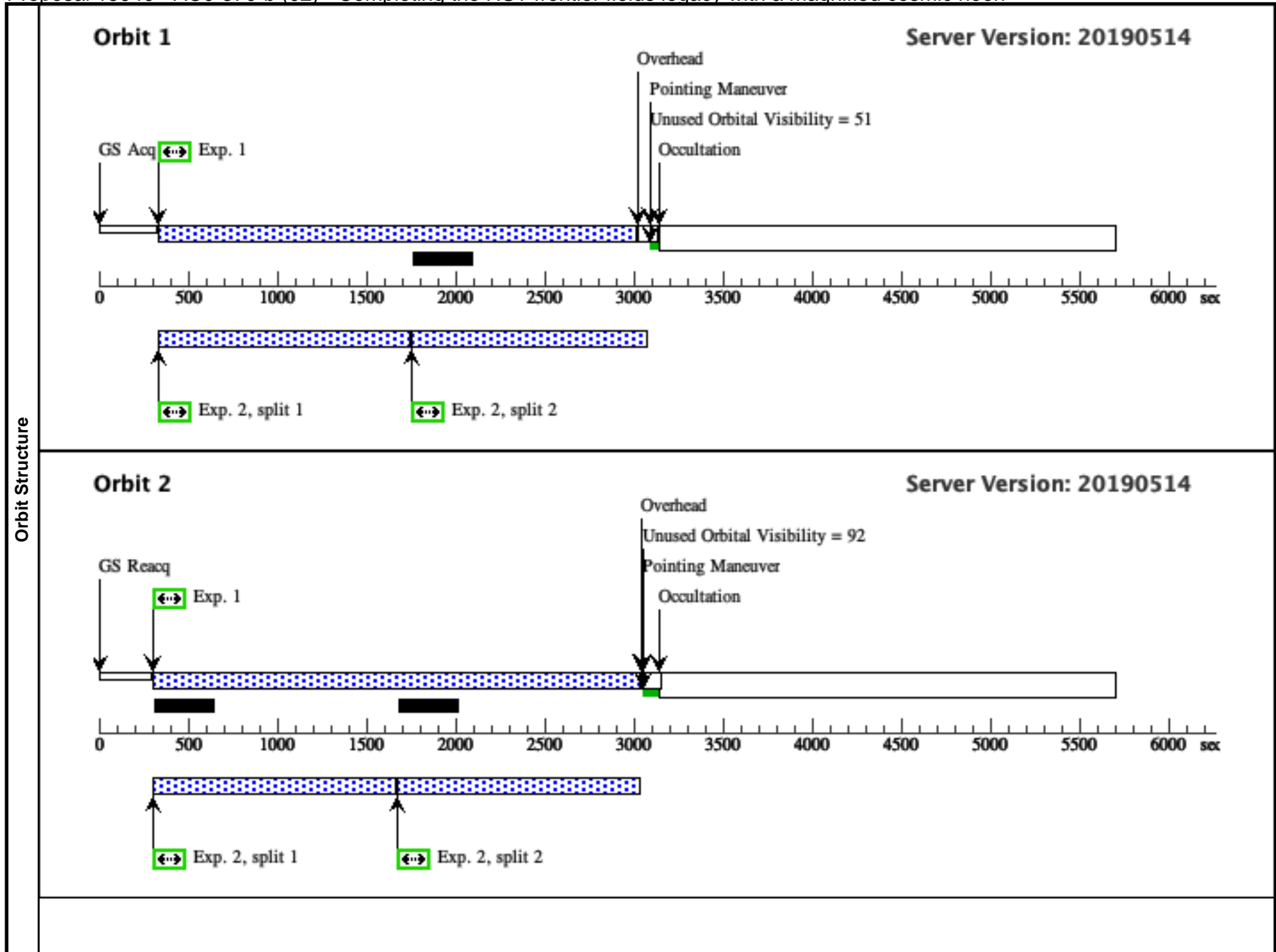
Server Version: 20190514



Proposal 15940 - AC0-370-b (02) - Completing the HST frontier fields legacy with a magnified cosmic noon

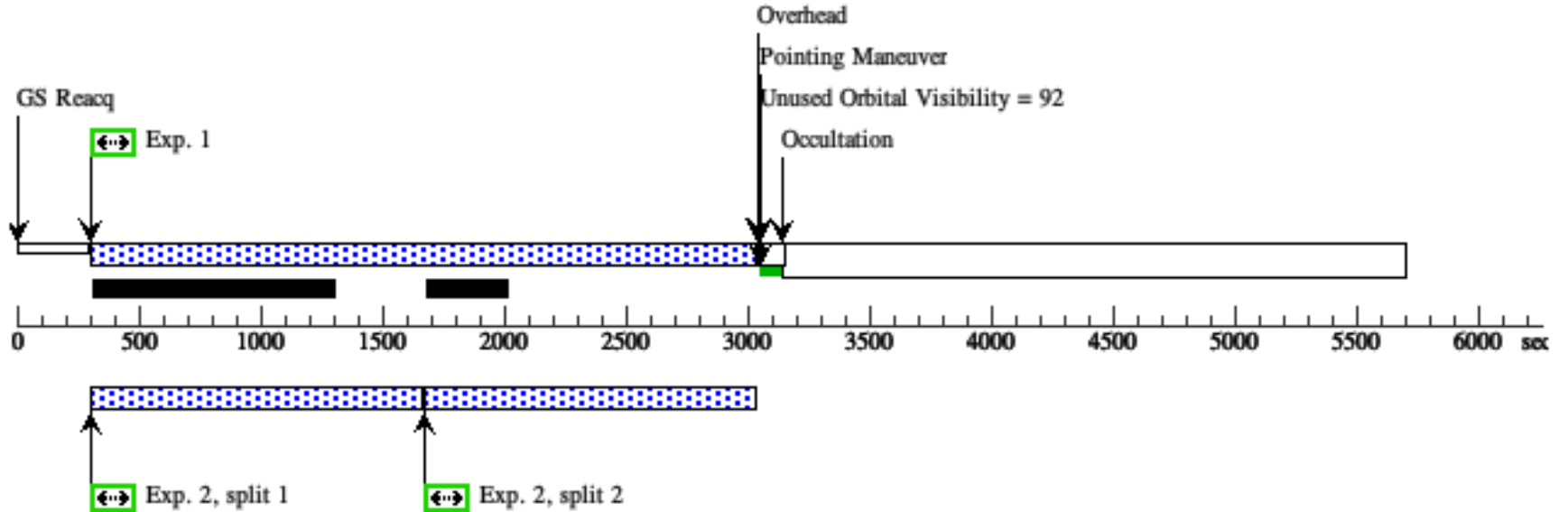
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Visit	Proposal 15940, AC0-370-b (02), implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: SAME ORIENT AS 01										
	Patterns	#	Primary Pattern				Secondary Pattern			Exposures	
(1)		Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112		Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false					(1-2)		
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes	Miscellaneous			
	(1)	ACO-370 Alt Name1: ABELL370	RA: 02 39 52.8000 (39.9700000d) Dec: -01 34 36.00 (-1.57667d) Equinox: J2000				V=26	Reference Frame: ICRS			
Comments: Category=CLUSTER OF GALAXIES Description=[GRAVITATIONAL LENS, RICH CLUSTER]											
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
	1		(1) ACO-370	WFC3/UVIS, ACCUM, UVIS-CENTER	F225W	FLASH=7	POS TARG 0.42,2.0 2	Pattern 1, Exps 1-2 in ACO-370-b (02) (1)	2750 Secs (10855 Secs)		
									[==>2650 Secs (Pattern 1)]		[1]
								Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in ACO-370-b (02)	[==>2735 Secs (Pattern 2)]		[2]
									[==>2735 Secs (Pattern 3)]		[3]
									[==>2735 Secs (Pattern 4)]		[4]
	2	ANY		ACS/WFC, ACCUM, WFC1	F475W	CR-SPLIT=2		Pattern 1, Exps 1-2 in ACO-370-b (02) (1)	2500 Secs (9816 Secs)		
									[==>1200.0 Secs (Pattern 1, Split 1)]		[1]
								Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in ACO-370-b (02)	[==>1200.0 Secs (Pattern 1, Split 2)]		
									[==>1236.0 Secs (Pattern 2, Split 1)]		[2]
								[==>1236.0 Secs (Pattern 2, Split 2)]			
								[==>1236.0 Secs (Pattern 3, Split 1)]		[3]	
								[==>1236.0 Secs (Pattern 3, Split 2)]			
								[==>1236.0 Secs (Pattern 4, Split 1)]		[4]	
								[==>1236.0 Secs (Pattern 4, Split 2)]			



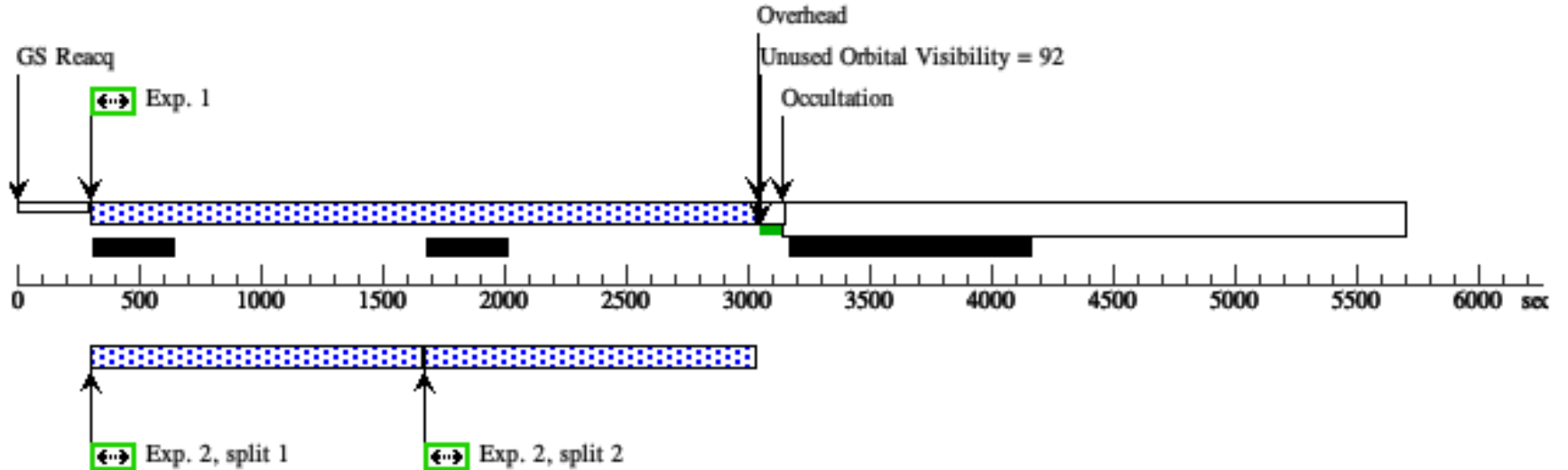
Orbit 3

Server Version: 20190514



Orbit 4

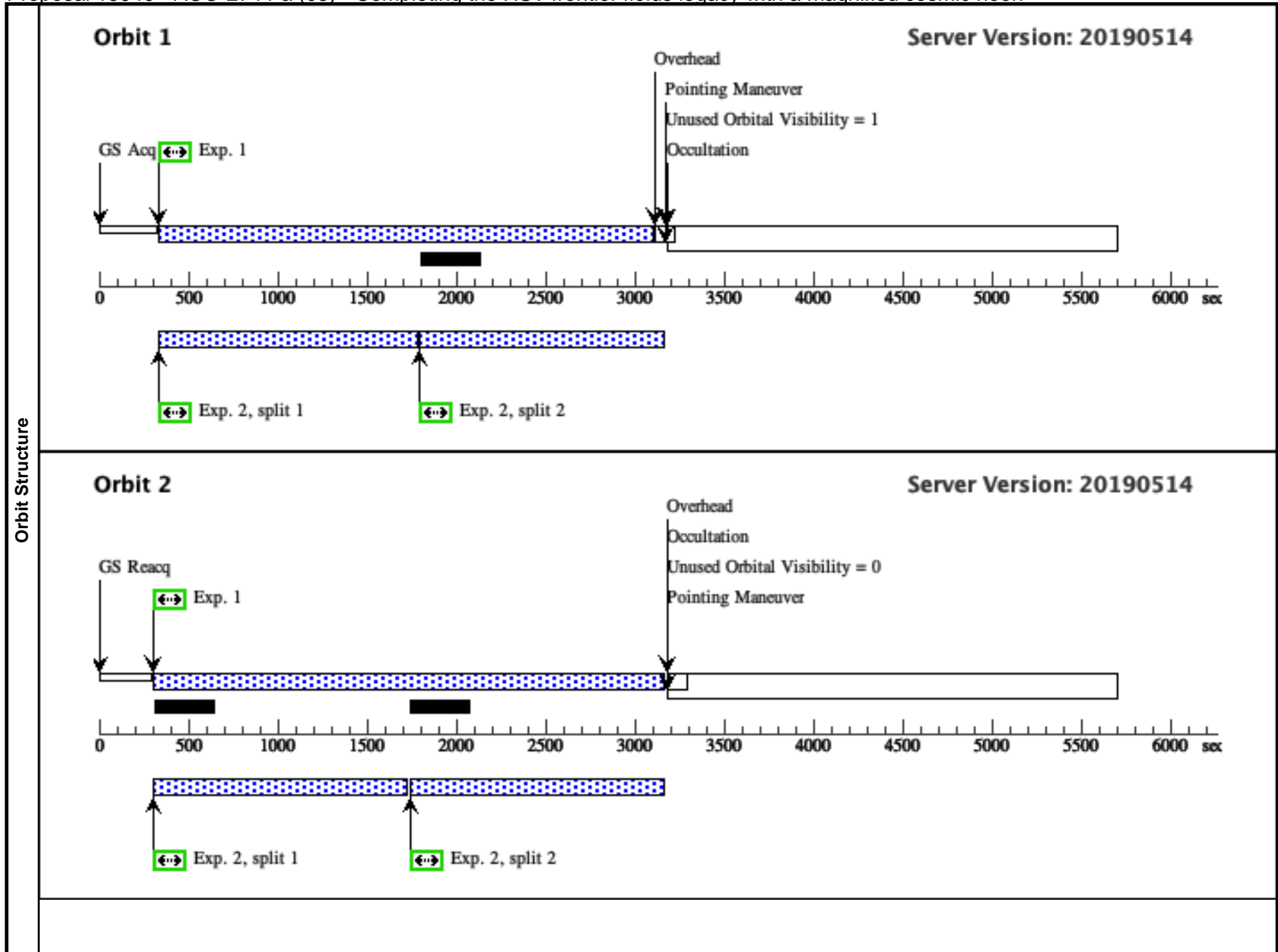
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Proposal 15940 - ACO-2744-a (03) - Completing the HST frontier fields legacy with a magnified cosmic noon

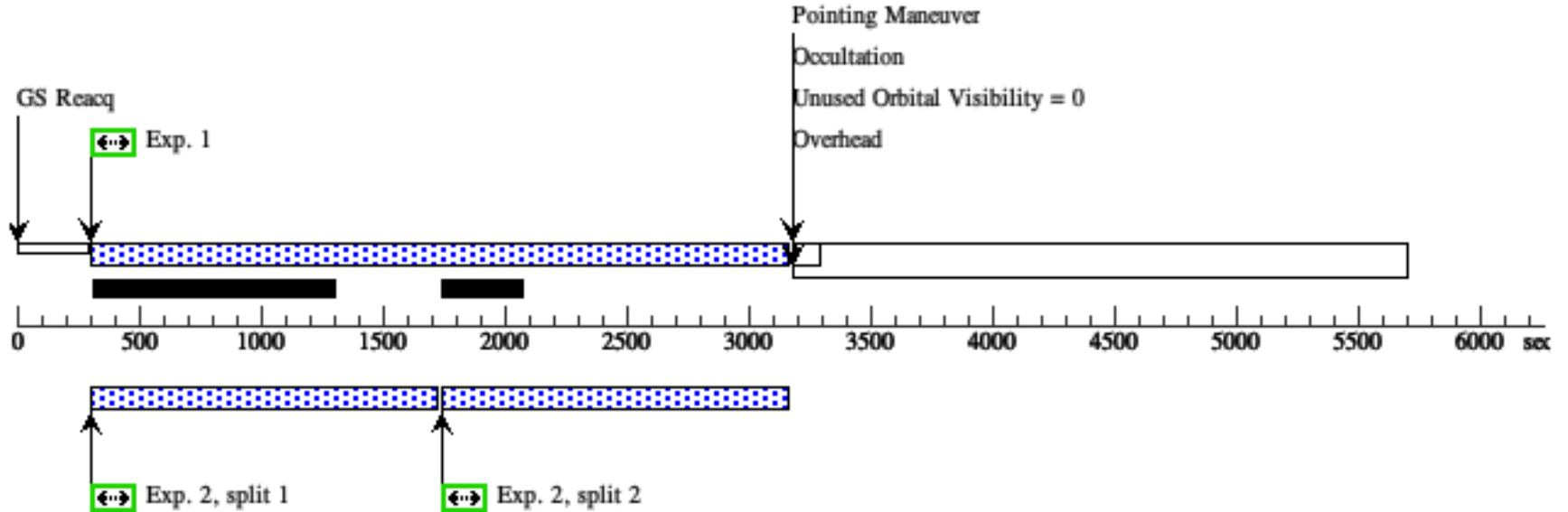
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Visit	Proposal 15940, ACO-2744-a (03), scheduling Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: ORIENT 53D TO 53 D									
	#	Primary Pattern	Secondary Pattern	Exposures						
Patterns	(1)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false	(1-2)						
	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
Fixed Targets	(2)	ACO-2744	RA: 00 14 21.2000 (3.5883333d)		V=26	Reference Frame: ICRS				
	Alt Name1: ABELL2744 Dec: -30 23 50.10 (-30.39725d) Equinox: J2000 Comments: Category=CLUSTER OF GALAXIES Description=[GRAVITATIONAL LENS, RICH CLUSTER]									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(2) ACO-2744	WFC3/UVIS, ACCUM, UVIS-CENTER	F225W	FLASH=7	POS TARG -0.42,-2.02	Pattern 1, Exps 1-2 in ACO-2744-a (03) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in ACO-2744-a (03)	2750 Secs (11337 Secs) [==>2739.0 Secs (Pattern 1)] [==>2866.0 Secs (Pattern 2)] [==>2866.0 Secs (Pattern 3)] [==>2866.0 Secs (Pattern 4)]	[1] [2] [3] [4]
2		ANY	ACS/WFC, ACCUM, WFC1	F475W	CR-SPLIT=2		Pattern 1, Exps 1-2 in ACO-2744-a (03) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in ACO-2744-a (03)	2500 Secs (10294 Secs) [==>1244.0 Secs (Pattern 1, Split 1)] [==>1244.0 Secs (Pattern 1, Split 2)] [==>1301.0 Secs (Pattern 2, Split 1)] [==>1301.0 Secs (Pattern 2, Split 2)] [==>1301.0 Secs (Pattern 3, Split 1)] [==>1301.0 Secs (Pattern 3, Split 2)] [==>1301.0 Secs (Pattern 4, Split 1)] [==>1301.0 Secs (Pattern 4, Split 2)]	[1] [2] [3] [4]	



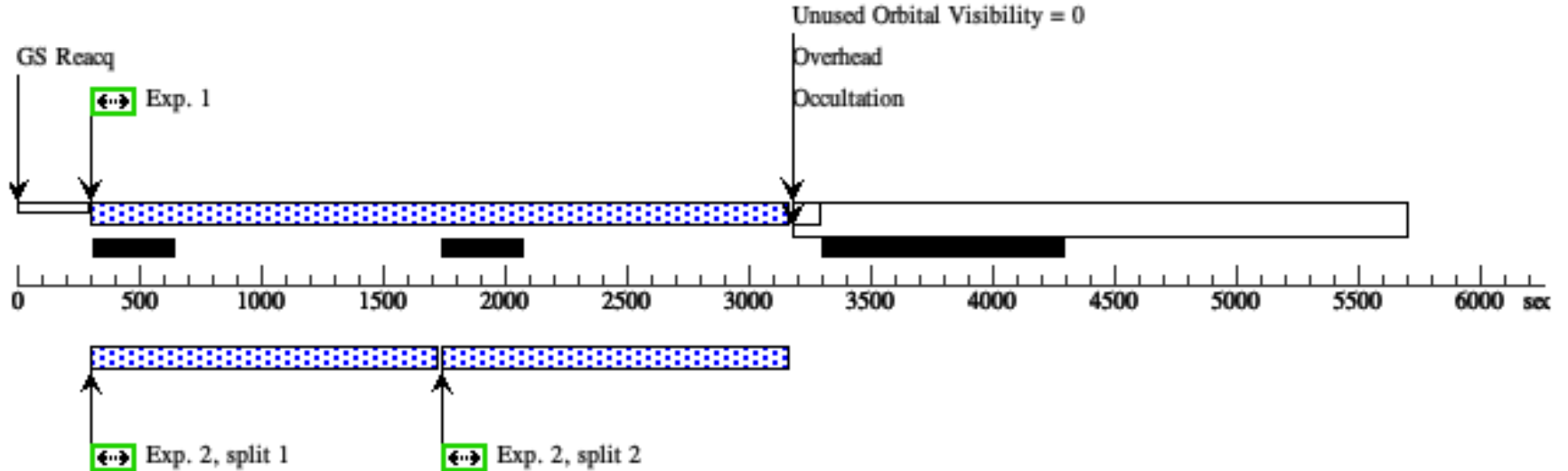
Orbit 3

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Orbit 4

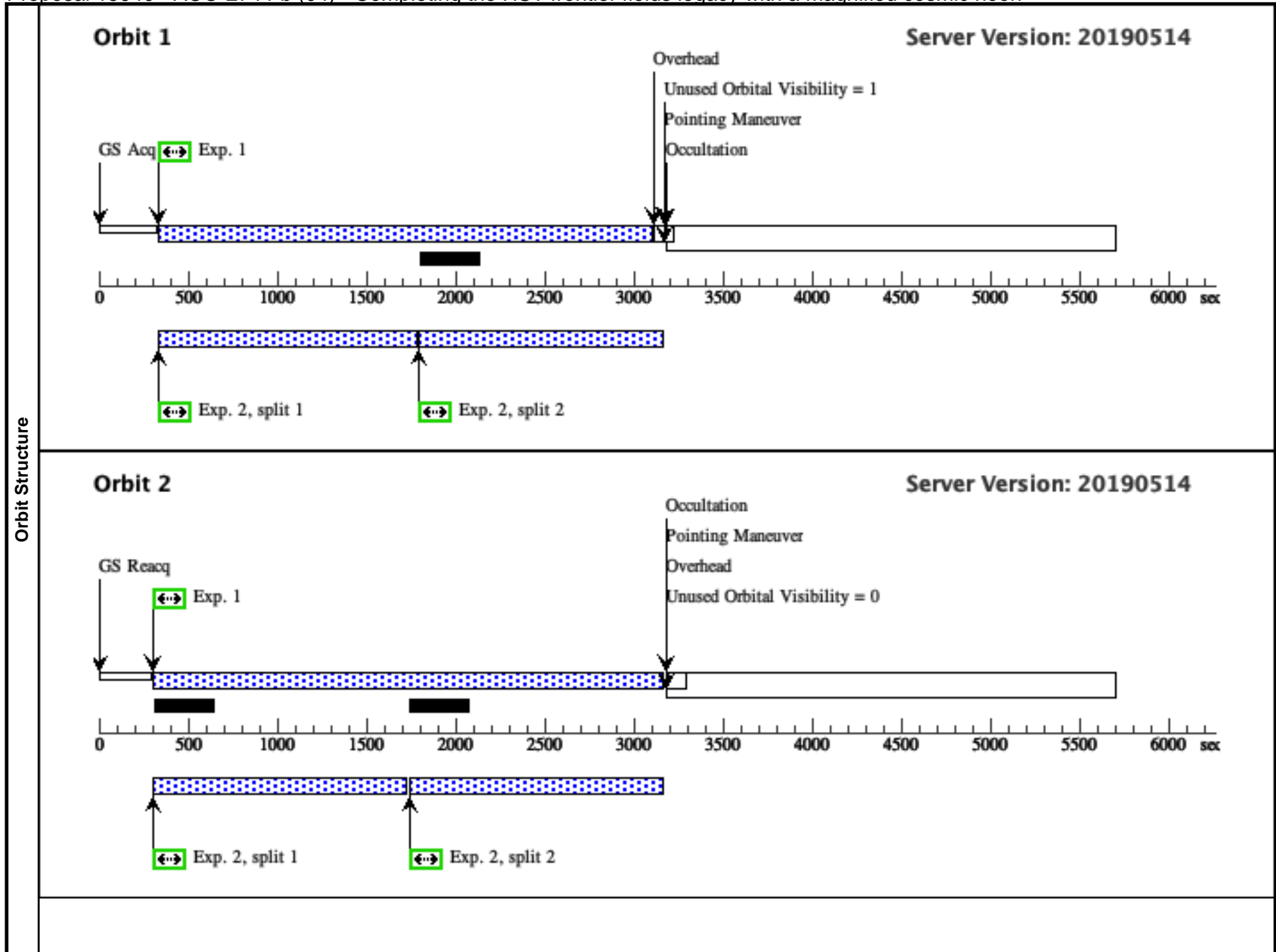
Server Version: 20190514



Proposal 15940 - ACO-2744-b (04) - Completing the HST frontier fields legacy with a magnified cosmic noon

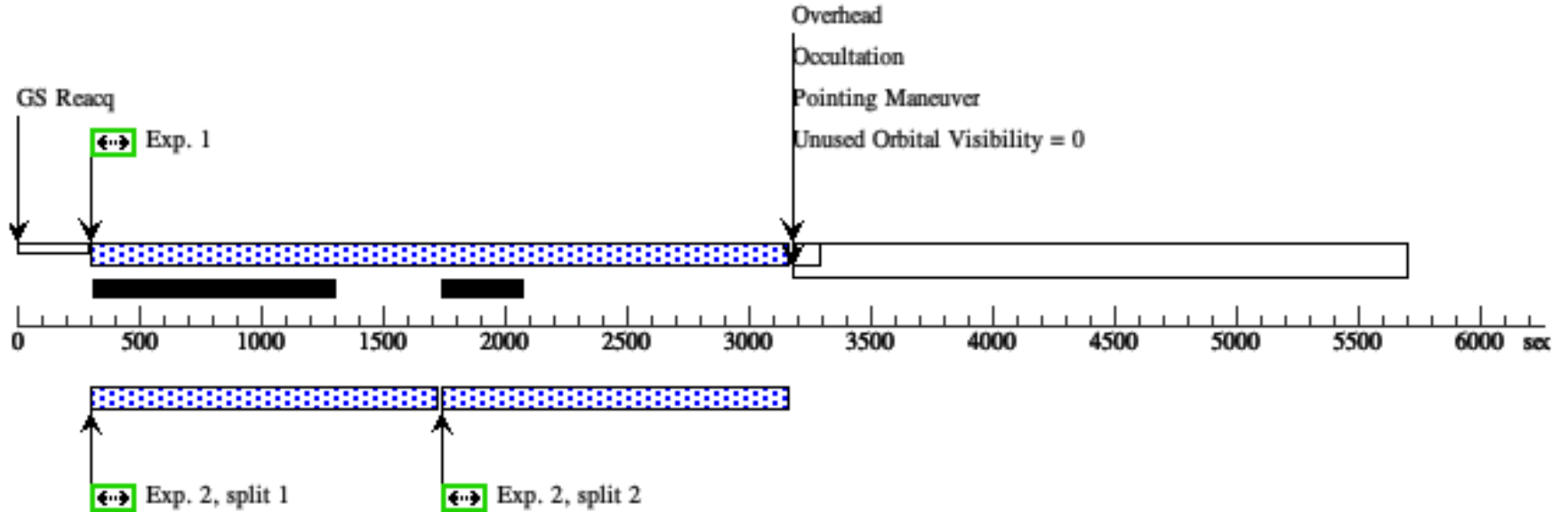
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Visit	Proposal 15940, ACO-2744-b (04), scheduling Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: SAME ORIENT AS 03									
	Patterns	#	Primary Pattern			Secondary Pattern			Exposures	
		(1)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false					(1-2)	
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(2)	ACO-2744	RA: 00 14 21.2000 (3.5883333d) Alt Name1: ABELL2744 Dec: -30 23 50.10 (-30.39725d) Equinox: J2000		V=26	Reference Frame: ICRS				
	<i>Comments:</i> Category=CLUSTER OF GALAXIES Description=[GRAVITATIONAL LENS, RICH CLUSTER]									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(2) ACO-2744	WFC3/UVIS, ACCUM, UVIS-CENTER	F225W	FLASH=7	POS TARG 0.42,2.0 2	Pattern 1, Exps 1-2 in ACO-2744-b (04) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in ACO-2744-b (04)	2750 Secs (11337 Secs) [==>2739.0 Secs (Pattern 1)] [==>2866.0 Secs (Pattern 2)] [==>2866.0 Secs (Pattern 3)] [==>2866.0 Secs (Pattern 4)]	[1] [2] [3] [4]
	2	ANY		ACS/WFC, ACCUM, WFC1	F475W	CR-SPLIT=2		Pattern 1, Exps 1-2 in ACO-2744-b (04) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in ACO-2744-b (04)	2500 Secs (10294 Secs) [==>1244.0 Secs (Pattern 1, Split 1)] [==>1244.0 Secs (Pattern 1, Split 2)] [==>1301.0 Secs (Pattern 2, Split 1)] [==>1301.0 Secs (Pattern 2, Split 2)] [==>1301.0 Secs (Pattern 3, Split 1)] [==>1301.0 Secs (Pattern 3, Split 2)] [==>1301.0 Secs (Pattern 4, Split 1)] [==>1301.0 Secs (Pattern 4, Split 2)]	[1] [2] [3] [4]



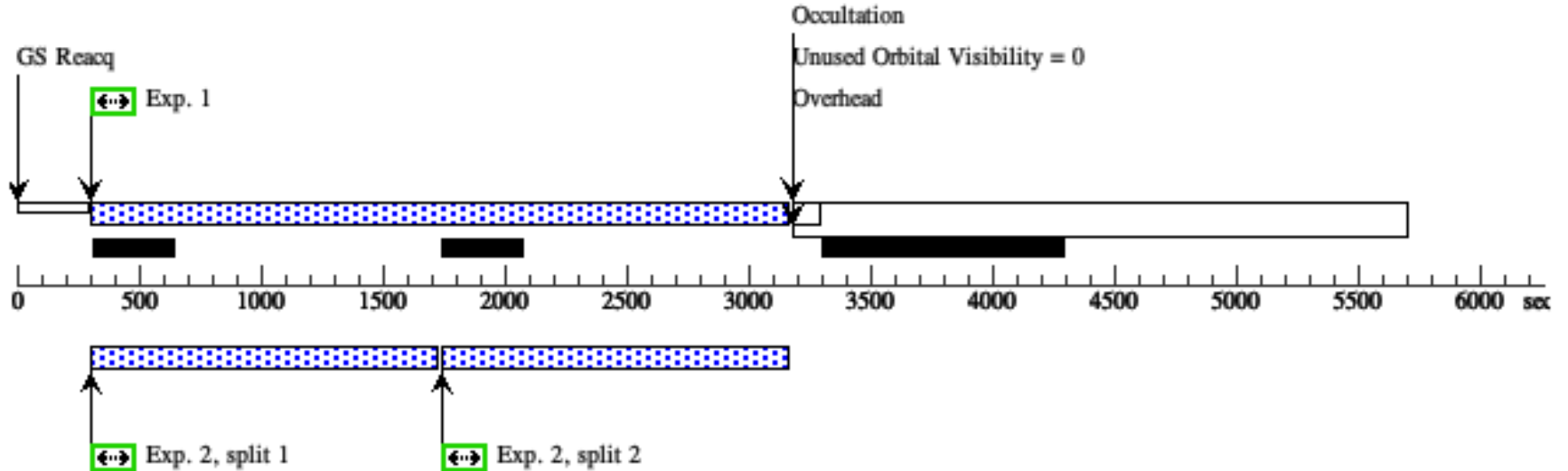
Orbit 3

Server Version: 20190514



Orbit 4

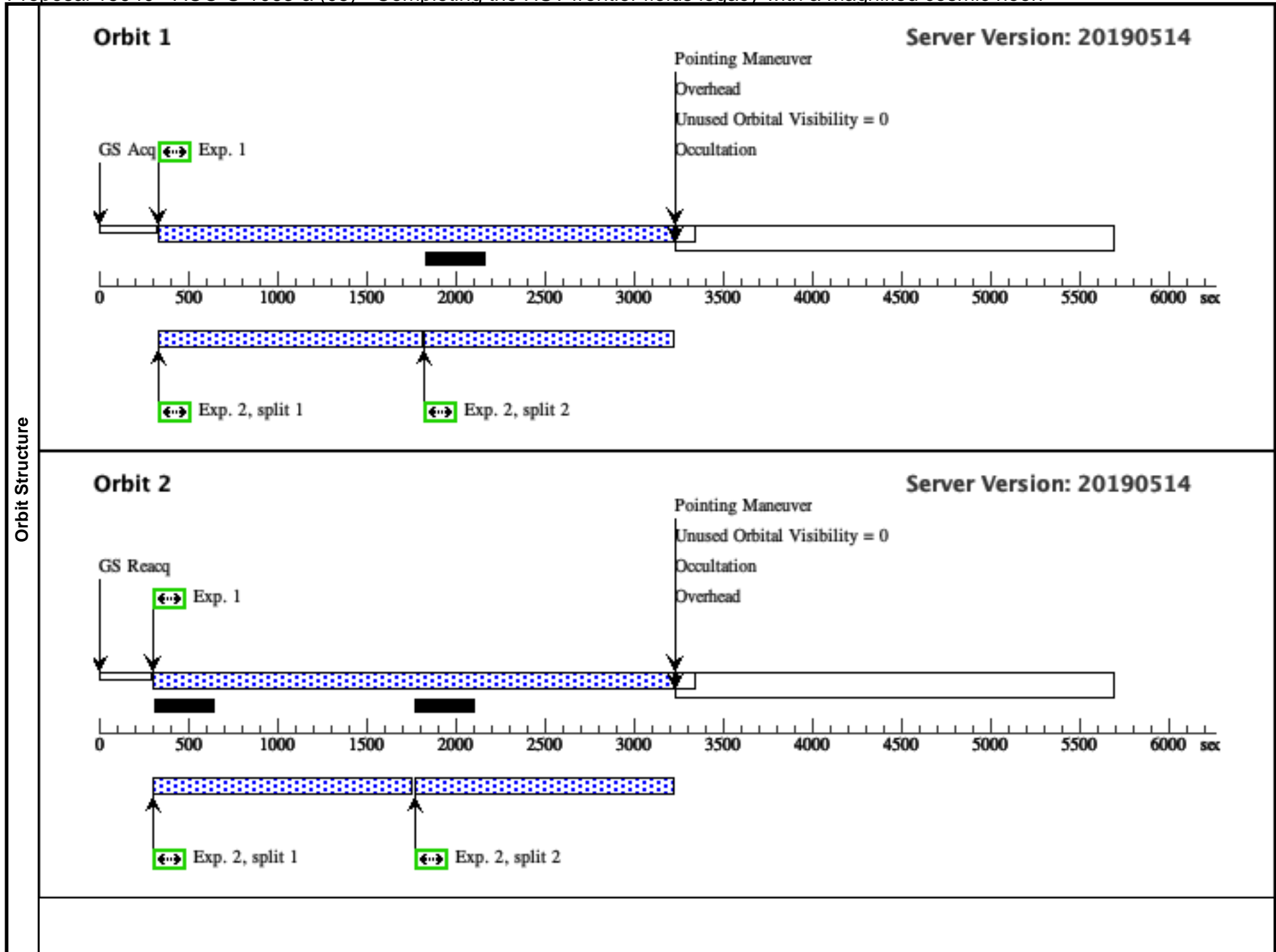
Server Version: 20190514



Proposal 15940 - ACO-S-1063-a (05) - Completing the HST frontier fields legacy with a magnified cosmic noon

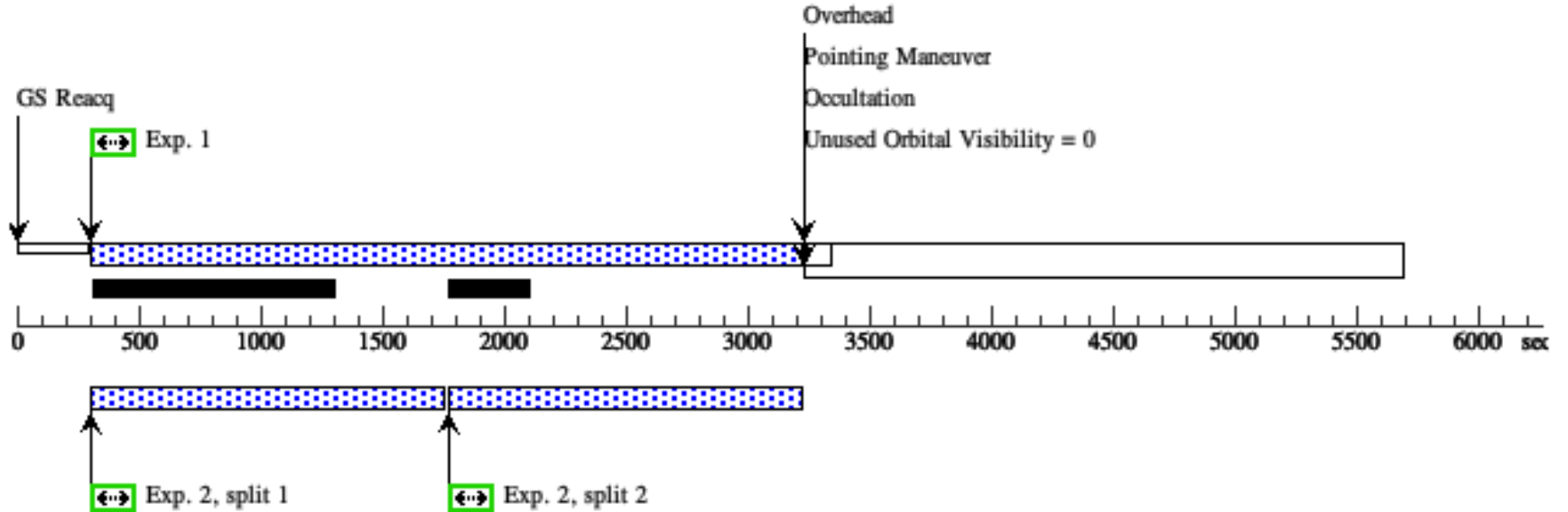
Thu Dec 19 15:00:36 GMT 2019

Visit	Proposal 15940, ACO-S-1063-a (05), scheduling Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: ORIENT 233D TO 233 D									
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Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(3)	ACO-S-1063 Alt Name1: ABELLS1063	RA: 22 48 44.3000 (342.1845833d) Dec: -44 31 48.40 (-44.53011d) Equinox: J2000		V=26	Reference Frame: ICRS				
	Comments: Category=CLUSTER OF GALAXIES Description=[GRAVITATIONAL LENS, RICH CLUSTER]									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(3) ACO-S-1063	WFC3/UVIS, ACCUM, UVIS-CENTER	F225W	FLASH=7	POS TARG -0.42,-2.02	Pattern 1, Exps 1-2 in ACO-S-1063-a (05) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in ACO-S-1063-a (05)	2750 Secs (11633 Secs) [=>2861.0 Secs (Pattern 1)] [=>2924.0 Secs (Pattern 2)] [=>2924.0 Secs (Pattern 3)] [=>2924.0 Secs (Pattern 4)]	[1] [2] [3] [4]
	2		ANY	ACS/WFC, ACCUM, WFC1	F475W	CR-SPLIT=2		Pattern 1, Exps 1-2 in ACO-S-1063-a (05) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in ACO-S-1063-a (05)	2500 Secs (10526 Secs) [=>1273.0 Secs (Pattern 1, Split 1)] [=>1273.0 Secs (Pattern 1, Split 2)] [=>1330.0 Secs (Pattern 2, Split 1)] [=>1330.0 Secs (Pattern 2, Split 2)] [=>1330.0 Secs (Pattern 3, Split 1)] [=>1330.0 Secs (Pattern 3, Split 2)] [=>1330.0 Secs (Pattern 4, Split 1)] [=>1330.0 Secs (Pattern 4, Split 2)]	[1] [2] [3] [4]



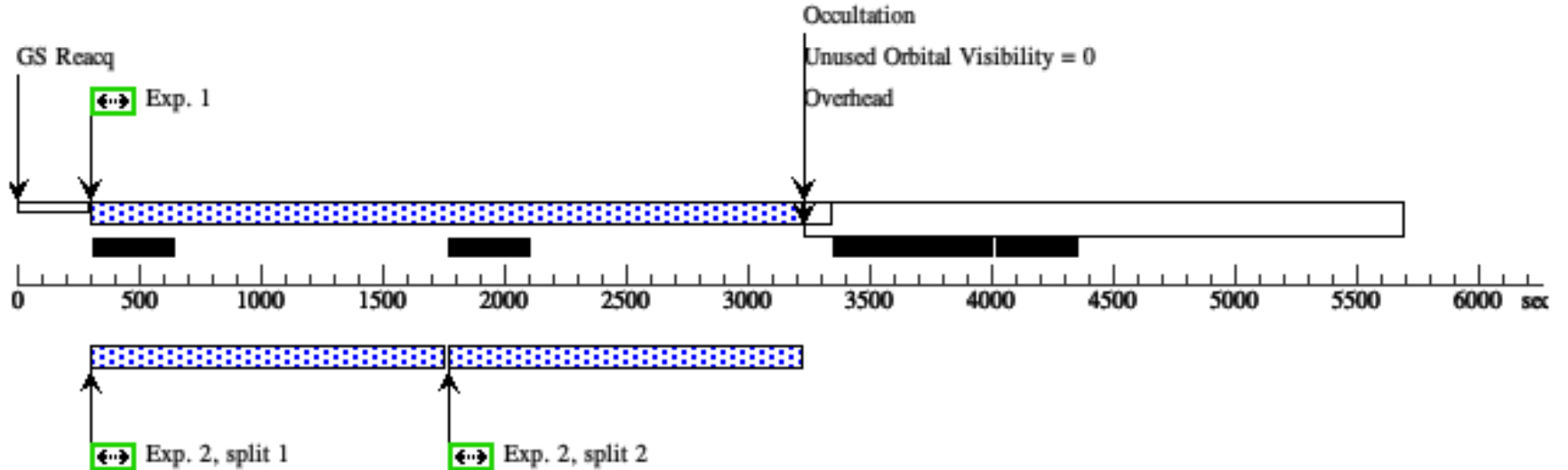
Orbit 3

Server Version: 20190514



Orbit 4

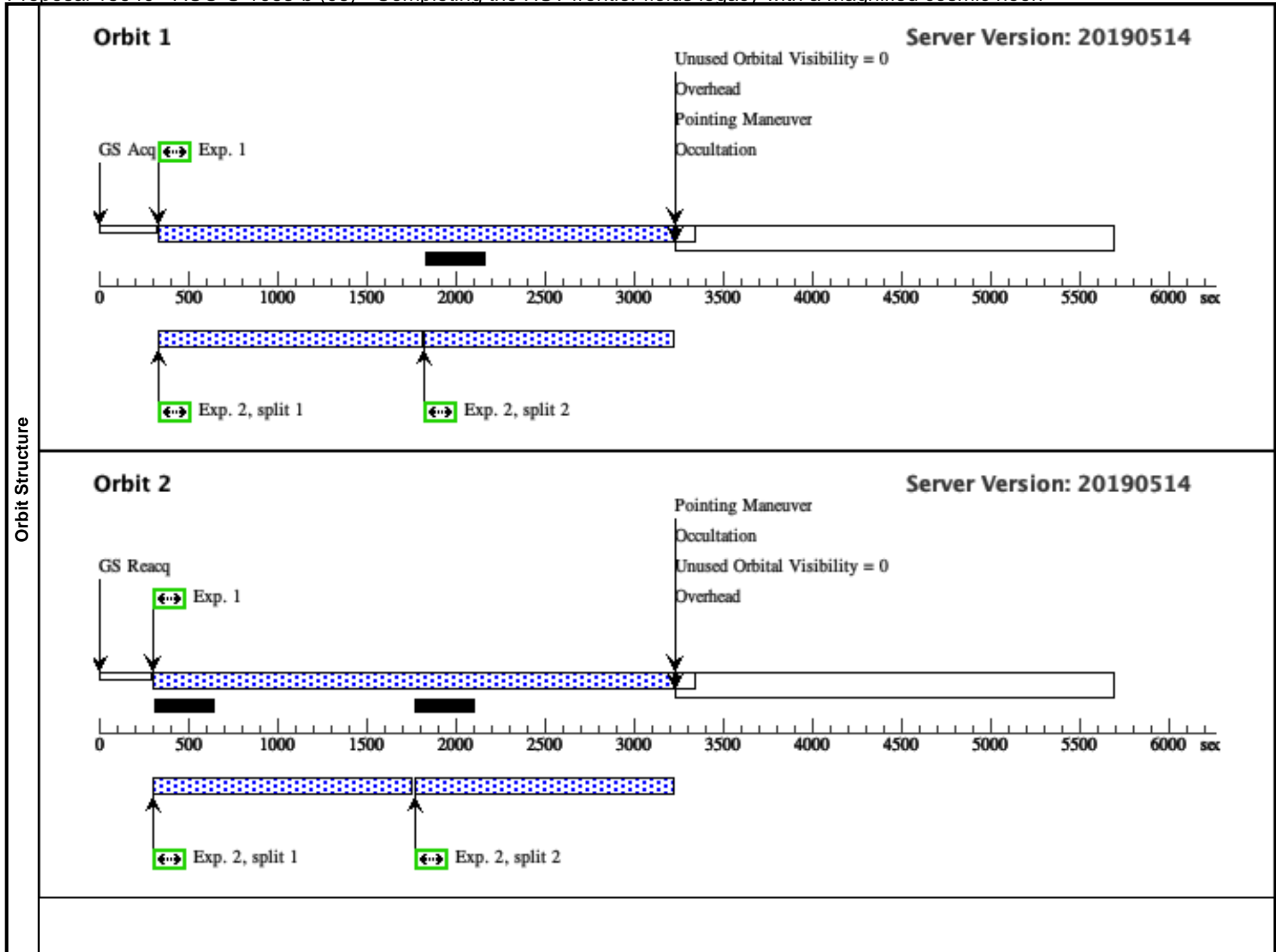
Server Version: 20190514



Proposal 15940 - ACO-S-1063-b (06) - Completing the HST frontier fields legacy with a magnified cosmic noon

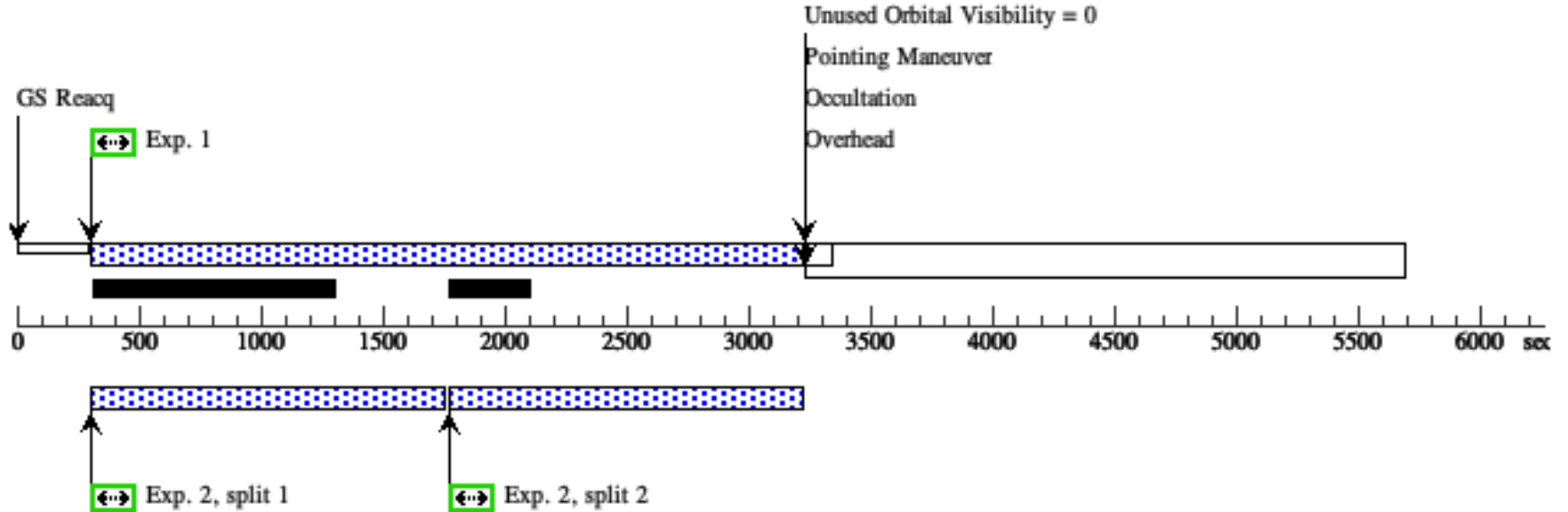
Thu Dec 19 15:00:36 GMT 2019

Visit	Proposal 15940, ACO-S-1063-b (06), scheduling Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: SAME ORIENT AS 05									
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Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(3)	ACO-S-1063	RA: 22 48 44.3000 (342.1845833d)		V=26	Reference Frame: ICRS				
		Alt Name1: ABELLS1063	Dec: -44 31 48.40 (-44.53011d)							
		Comments: Category=CLUSTER OF GALAXIES Description=[GRAVITATIONAL LENS, RICH CLUSTER]								
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(3) ACO-S-1063	WFC3/UVIS, ACCUM, UVIS-CENTER	F225W	FLASH=7	POS TARG 0.42,2.0 2	Pattern 1, Exps 1-2 in ACO-S-1063-b (06) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in ACO-S-1063-b (06)	2750 Secs (11633 Secs) [==>2861.0 Secs (Pattern 1)] [==>2924.0 Secs (Pattern 2)] [==>2924.0 Secs (Pattern 3)] [==>2924.0 Secs (Pattern 4)]	[1] [2] [3] [4]
	2		ANY	ACS/WFC, ACCUM, WFC1	F475W	CR-SPLIT=2		Pattern 1, Exps 1-2 in ACO-S-1063-b (06) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in ACO-S-1063-b (06)	2500 Secs (10526 Secs) [==>1273.0 Secs (Pattern 1, Split 1)] [==>1273.0 Secs (Pattern 1, Split 2)] [==>1330.0 Secs (Pattern 2, Split 1)] [==>1330.0 Secs (Pattern 2, Split 2)] [==>1330.0 Secs (Pattern 3, Split 1)] [==>1330.0 Secs (Pattern 3, Split 2)] [==>1330.0 Secs (Pattern 4, Split 1)] [==>1330.0 Secs (Pattern 4, Split 2)]	[1] [2] [3] [4]



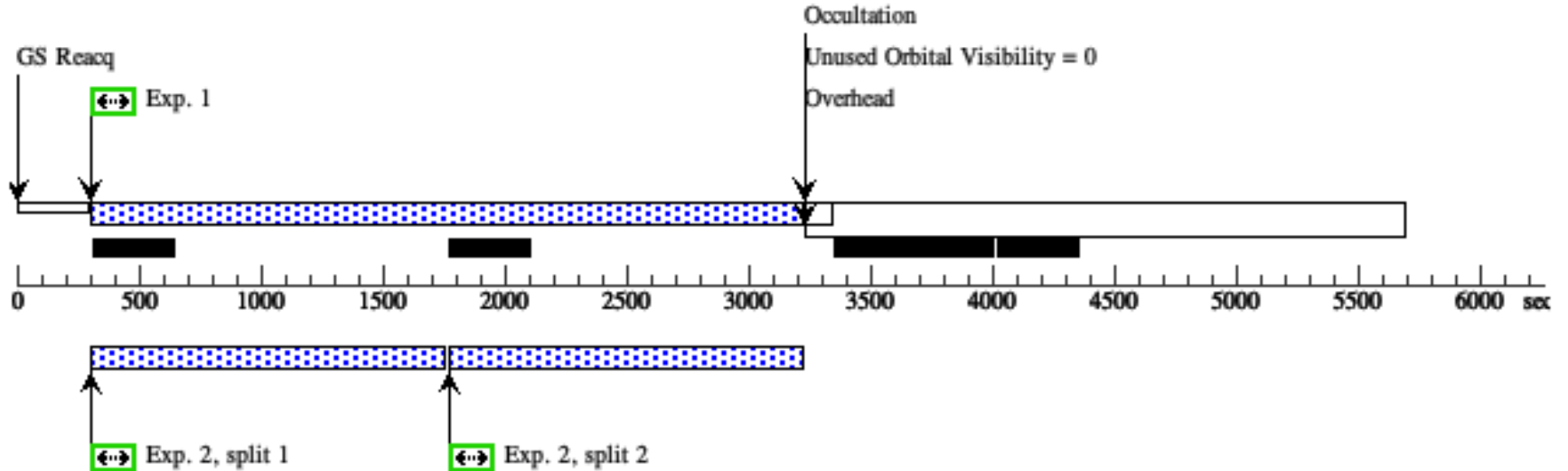
Orbit 3

Server Version: 20190514



Orbit 4

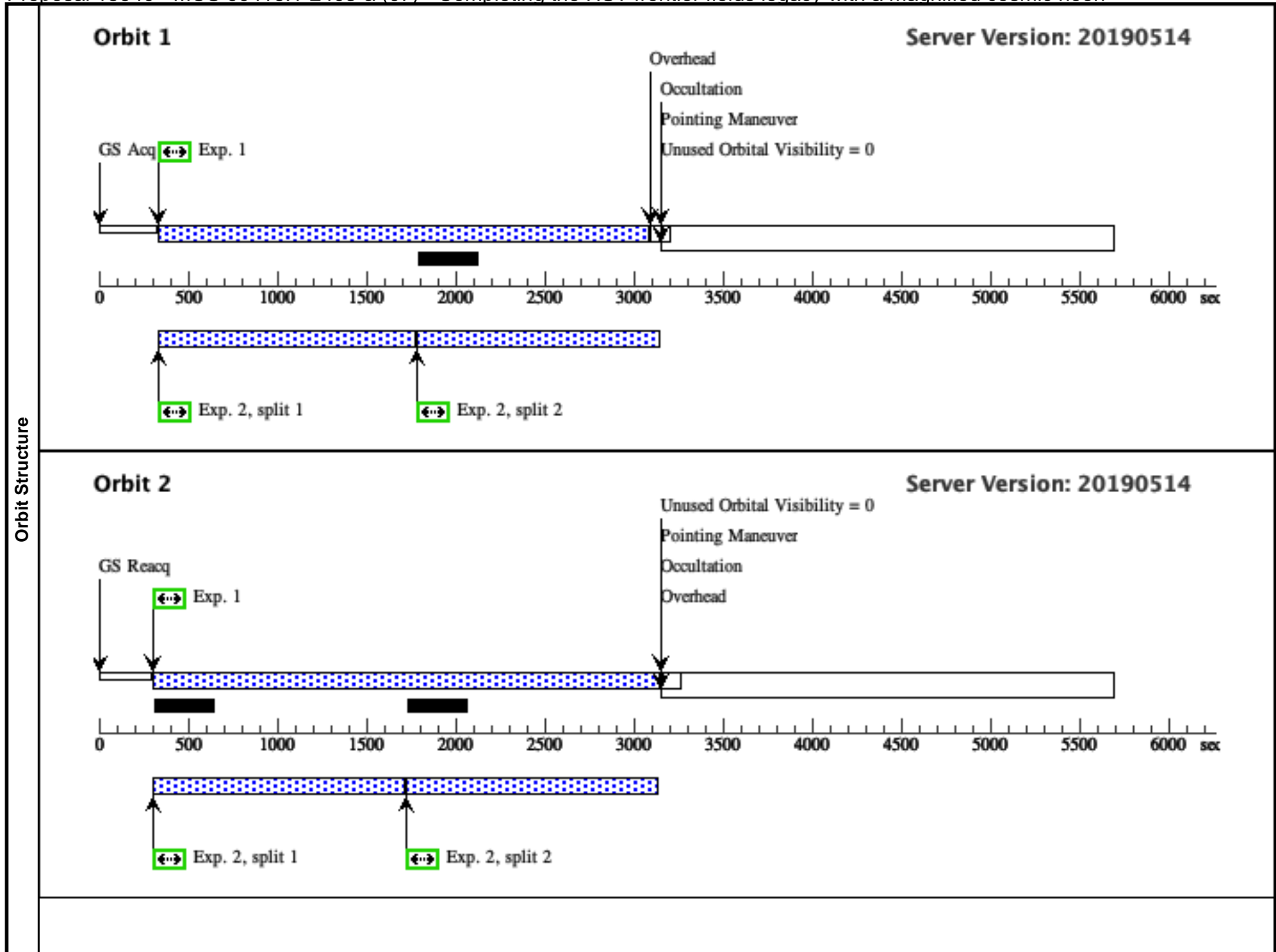
Server Version: 20190514



Proposal 15940 - MCS-J0416.1-2403-a (07) - Completing the HST frontier fields legacy with a magnified cosmic noon

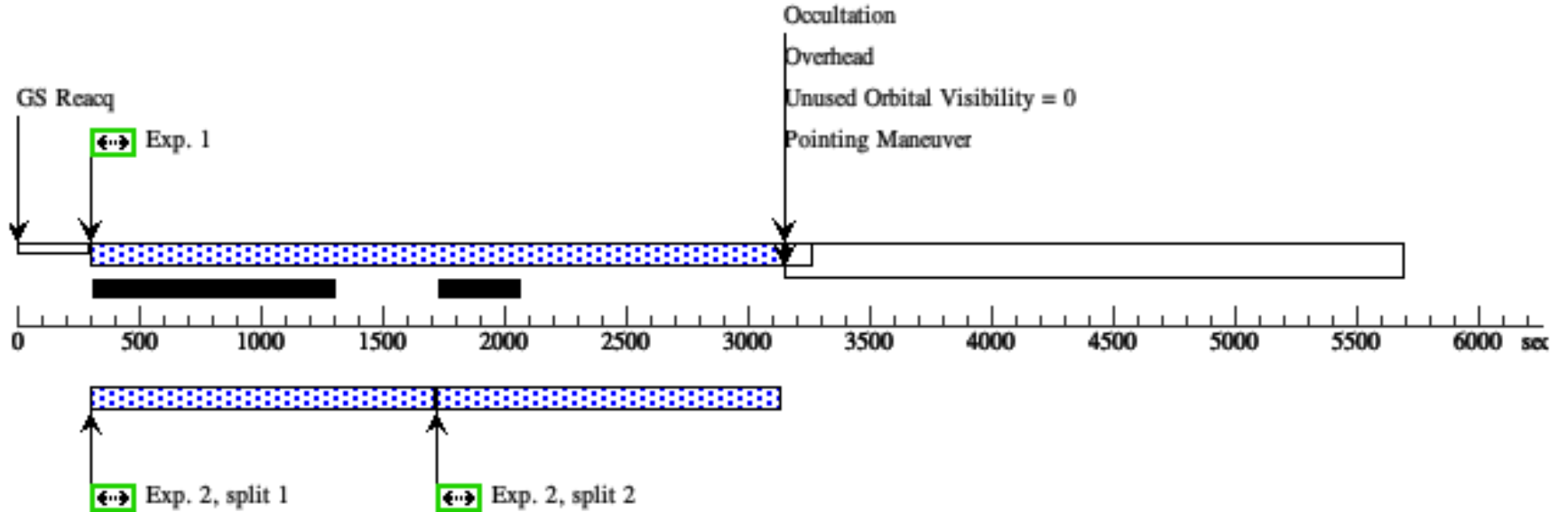
Thu Dec 19 15:00:36 GMT 2019

Visit	Proposal 15940, MCS-J0416.1-2403-a (07), scheduling Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: ORIENT 247D TO 247 D										
	Patterns	#	Primary Pattern				Secondary Pattern				Exposures
(1)		Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112				Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false				(1-2)	
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes	Miscellaneous			
	(4)	MCS-J0416.1-2403 Alt Name1: MACSJ0416	RA: 04 16 8.9000 (64.0370833d) Dec: -24 04 28.70 (-24.07464d) Equinox: J2000				V=26	Reference Frame: ICRS			
Comments: Category=CLUSTER OF GALAXIES Description=[GRAVITATIONAL LENS, RICH CLUSTER]											
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
	1		(4) MCS-J0416.1-2403	WFC3/UVIS, ACCUM, UVIS-CENTER	F225W	FLASH=7	POS TARG -0.42,-2.02	Pattern 1, Exps 1-2 in MCS-J0416.1-2403-a (07) (1)	2750 Secs (11245 Secs)		
								Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in MCS-J0416.1-2403-a (07)	[==>2716.0 Secs (Pattern 1)]		[1]
									[==>2843.0 Secs (Pattern 2)]		[2]
									[==>2843.0 Secs (Pattern 3)]		[3]
									[==>2843.0 Secs (Pattern 4)]		[4]
	2	ANY		ACS/WFC, ACCUM, WFC1	F475W	CR-SPLIT=2		Pattern 1, Exps 1-2 in MCS-J0416.1-2403-a (07) (1)	2500 Secs (10200 Secs)		
								Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in MCS-J0416.1-2403-a (07)	[==>1233.0 Secs (Pattern 1, Split 1)]		[1]
									[==>1233.0 Secs (Pattern 1, Split 2)]		
									[==>1289.0 Secs (Pattern 2, Split 1)]		[2]
								[==>1289.0 Secs (Pattern 2, Split 2)]			
								[==>1289.0 Secs (Pattern 3, Split 1)]		[3]	
								[==>1289.0 Secs (Pattern 3, Split 2)]			
								[==>1289.0 Secs (Pattern 4, Split 1)]		[4]	
								[==>1289.0 Secs (Pattern 4, Split 2)]			



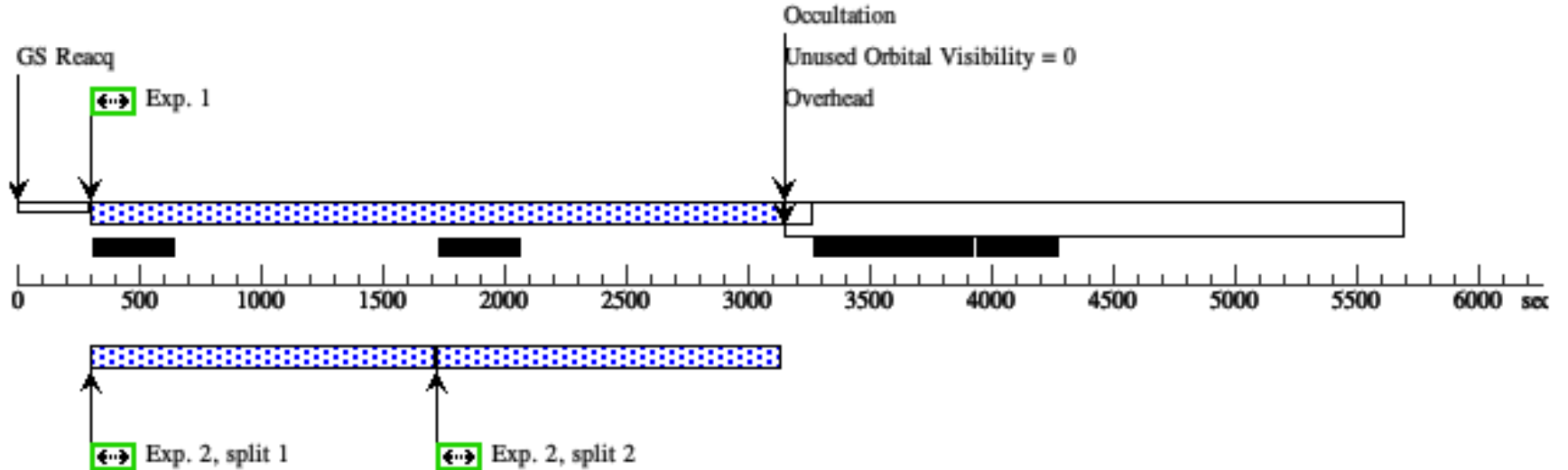
Orbit 3

Server Version: 20190514



Orbit 4

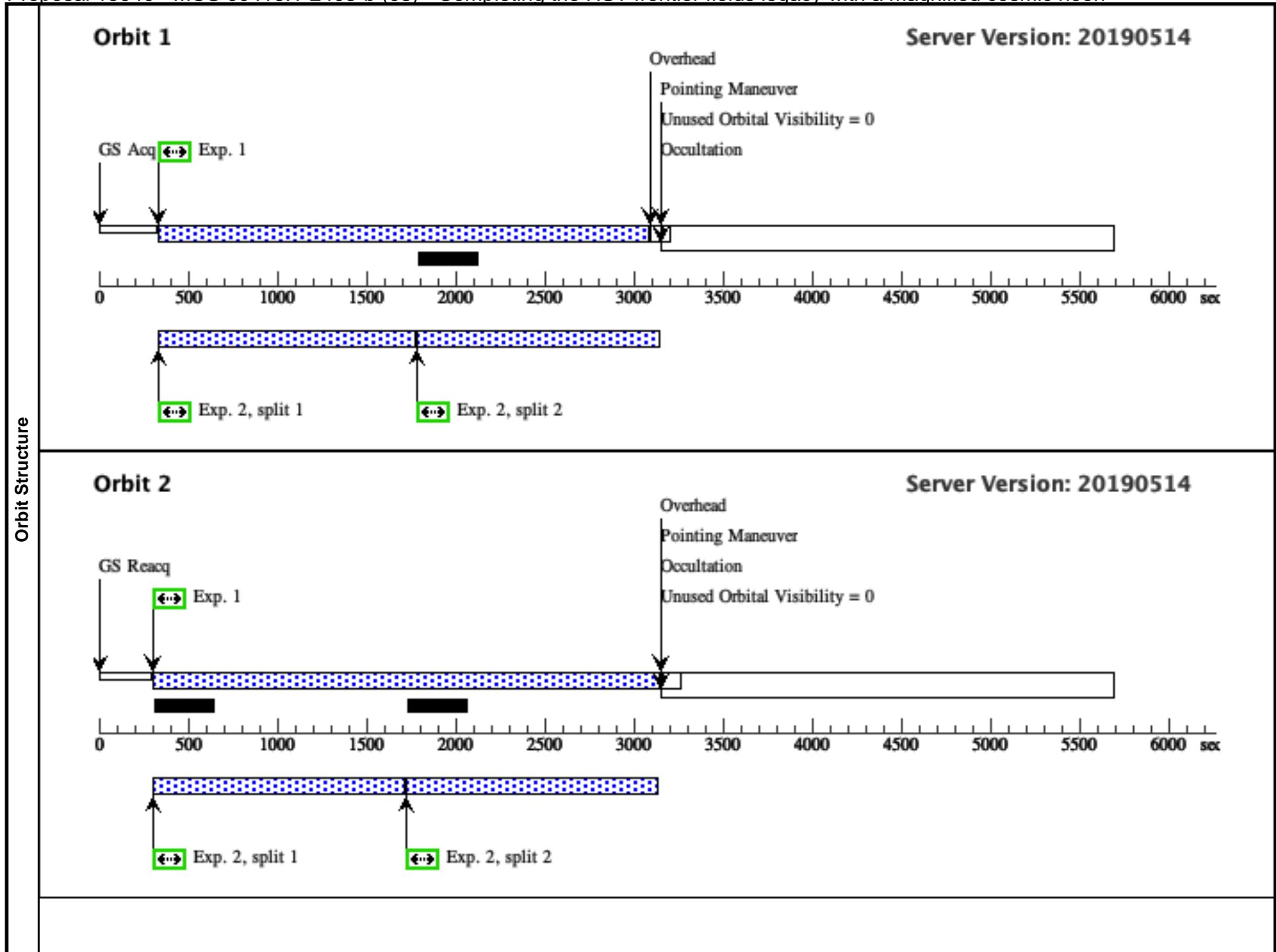
Server Version: 20190514



Proposal 15940 - MCS-J0416.1-2403-b (08) - Completing the HST frontier fields legacy with a magnified cosmic noon

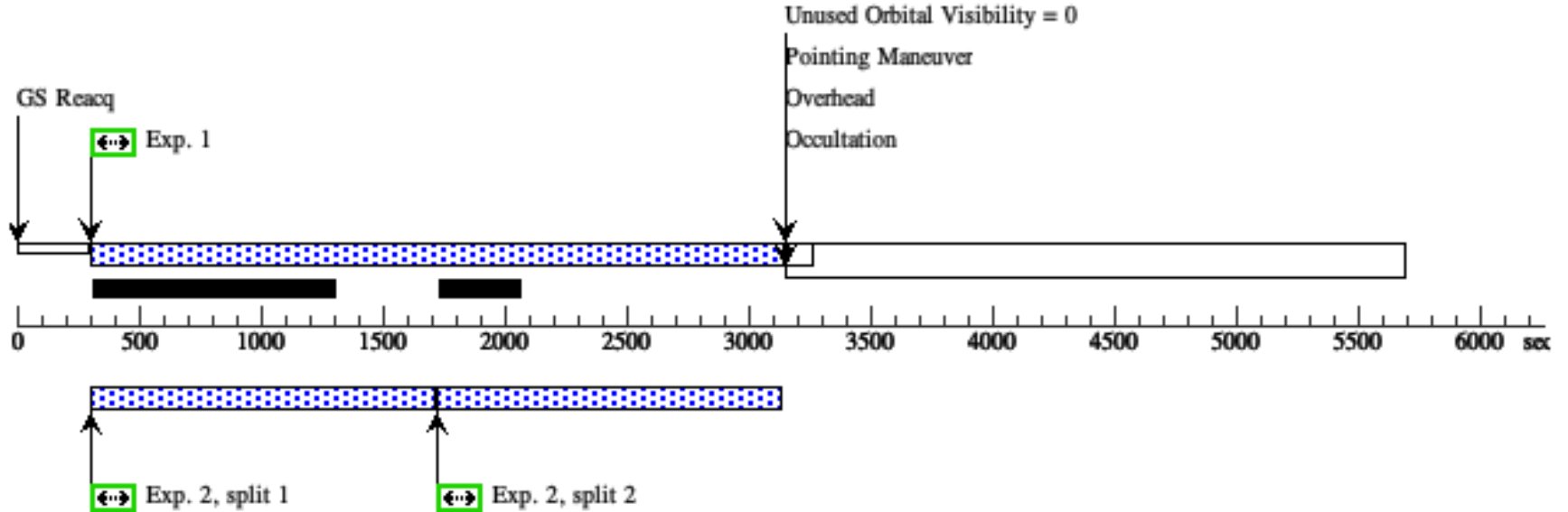
Thu Dec 19 15:00:36 GMT 2019

Visit	Proposal 15940, MCS-J0416.1-2403-b (08), scheduling Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: SAME ORIENT AS 07									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
	(1)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false		(1-2)					
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(4)	MCS-J0416.1-2403 Alt Name1: MACSJ0416	RA: 04 16 8.9000 (64.0370833d) Dec: -24 04 28.70 (-24.07464d) Equinox: J2000		V=26	Reference Frame: ICRS				
	<i>Comments:</i> Category=CLUSTER OF GALAXIES Description=[GRAVITATIONAL LENS, RICH CLUSTER]									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(4) MCS-J0416.1-2403	WFC3/UVIS, ACCUM, UVIS-CENTER	F225W	FLASH=7	POS TARG 0.42,2.0 2	Pattern 1, Exps 1-2 in MCS-J0416.1-2403-b (08) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in MCS-J0416.1-2403-b (08)	2750 Secs (11245 Secs) [=>2716.0 Secs (Pattern 1)] [=>2843.0 Secs (Pattern 2)] [=>2843.0 Secs (Pattern 3)] [=>2843.0 Secs (Pattern 4)]	[1] [2] [3] [4]
	2	ANY		ACS/WFC, ACCUM, WFC1	F475W	CR-SPLIT=2	Pattern 1, Exps 1-2 in MCS-J0416.1-2403-b (08) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in MCS-J0416.1-2403-b (08)	2500 Secs (10200 Secs) [=>1233.0 Secs (Pattern 1, Split 1)] [=>1233.0 Secs (Pattern 1, Split 2)] [=>1289.0 Secs (Pattern 2, Split 1)] [=>1289.0 Secs (Pattern 2, Split 2)] [=>1289.0 Secs (Pattern 3, Split 1)] [=>1289.0 Secs (Pattern 3, Split 2)] [=>1289.0 Secs (Pattern 4, Split 1)] [=>1289.0 Secs (Pattern 4, Split 2)]	[1] [2] [3] [4]	



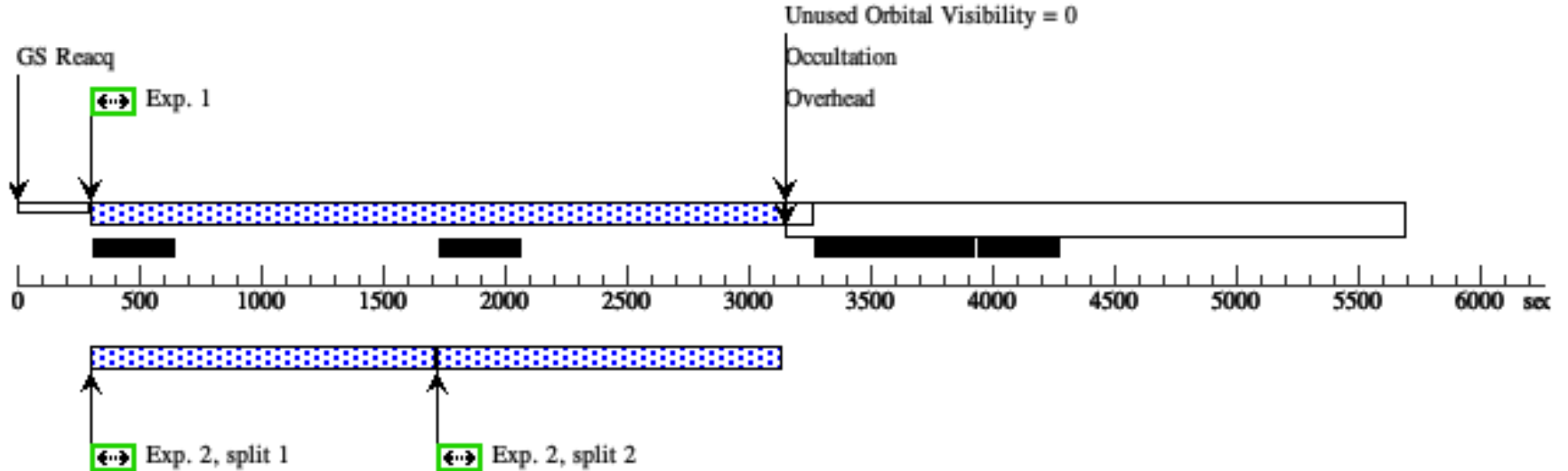
Orbit 3

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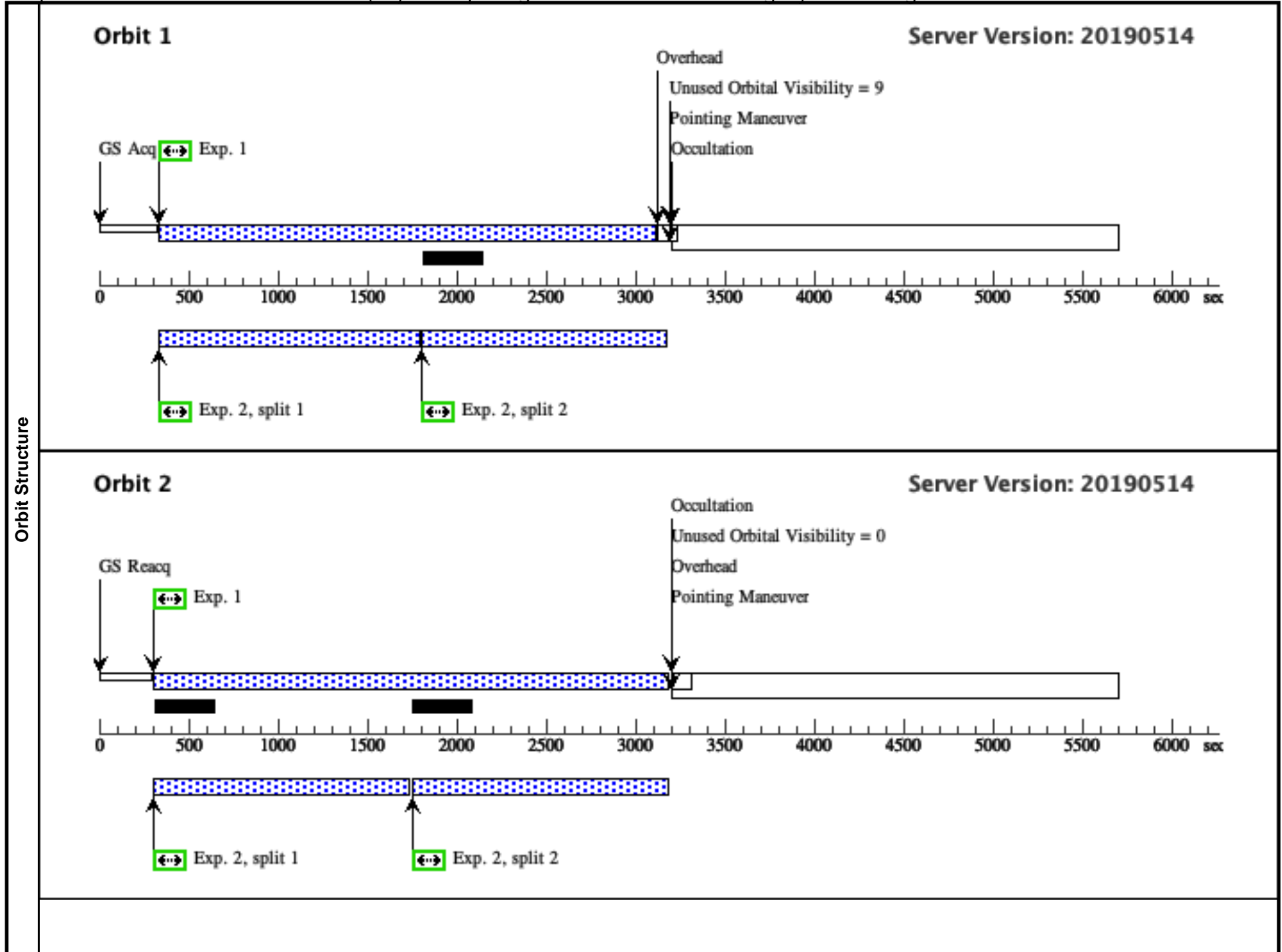
Server Version: 20190514



Proposal 15940 - CLG-J0717+3745-a (09) - Completing the HST frontier fields legacy with a magnified cosmic noon

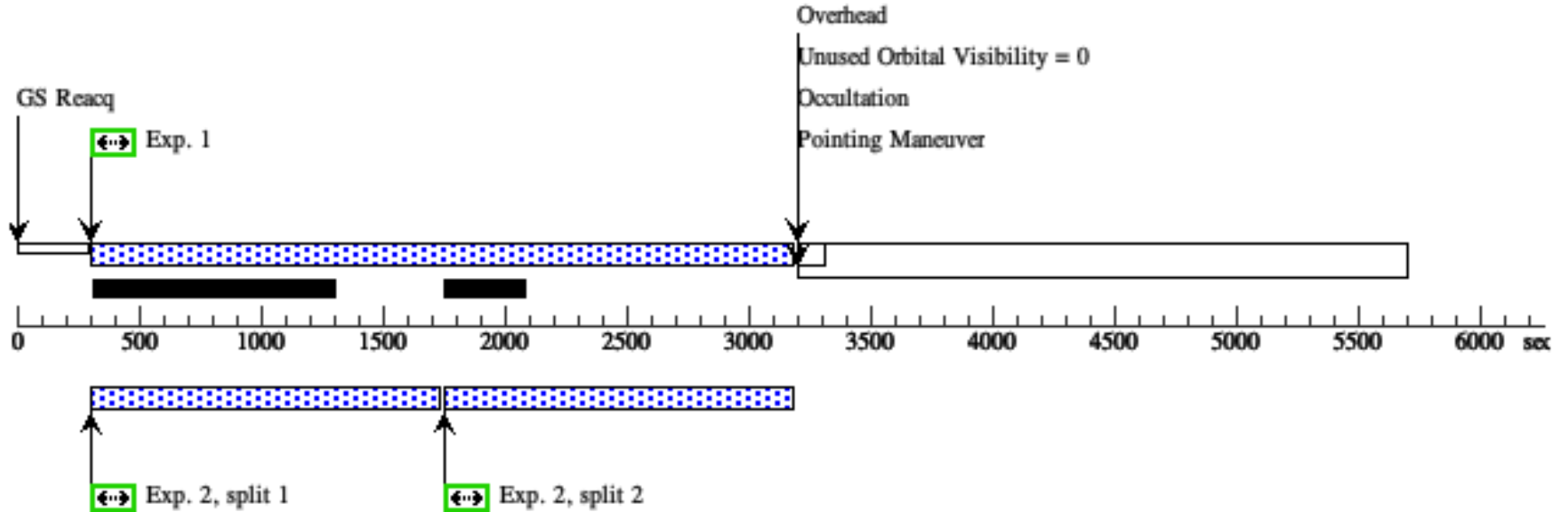
Thu Dec 19 15:00:36 GMT 2019

Visit	Proposal 15940, CLG-J0717+3745-a (09), scheduling Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: ORIENT 100D TO 100 D									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
	(1)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false		(1-2)					
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(5)	CLG-J0717+3745 Alt Name1: MACSJ0717	RA: 07 17 34.0000 (109.3916667d) Dec: +37 44 49.00 (37.74694d) Equinox: J2000		V=26	Reference Frame: ICRS				
	Comments: Category=CLUSTER OF GALAXIES Description=[GRAVITATIONAL LENS, RICH CLUSTER]									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(5) CLG-J0717+3745 5	WFC3/UVIS, ACCUM, UVIS-CENTER	F225W	FLASH=7	POS TARG -0.42,-2.02	Pattern 1, Exps 1-2 in CLG-J0717+3745-a (09) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in CLG-J0717+3745-a (09)	2750 Secs (11408 Secs) [==>(Pattern 1)] [==>2886.0 Secs (Pattern 2)] [==>2886.0 Secs (Pattern 3)] [==>2886.0 Secs (Pattern 4)]	[1] [2] [3] [4]
	2		ANY	ACS/WFC, ACCUM, WFC1	F475W	CR-SPLIT=2		Pattern 1, Exps 1-2 in CLG-J0717+3745-a (09) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in CLG-J0717+3745-a (09)	2500 Secs (10366 Secs) [==>(Pattern 1, Split 1)] [==>(Pattern 1, Split 2)] [==>1311.0 Secs (Pattern 2, Split 1)] [==>1311.0 Secs (Pattern 2, Split 2)] [==>1311.0 Secs (Pattern 3, Split 1)] [==>1311.0 Secs (Pattern 3, Split 2)] [==>1311.0 Secs (Pattern 4, Split 1)] [==>1311.0 Secs (Pattern 4, Split 2)]	[1] [2] [3] [4]



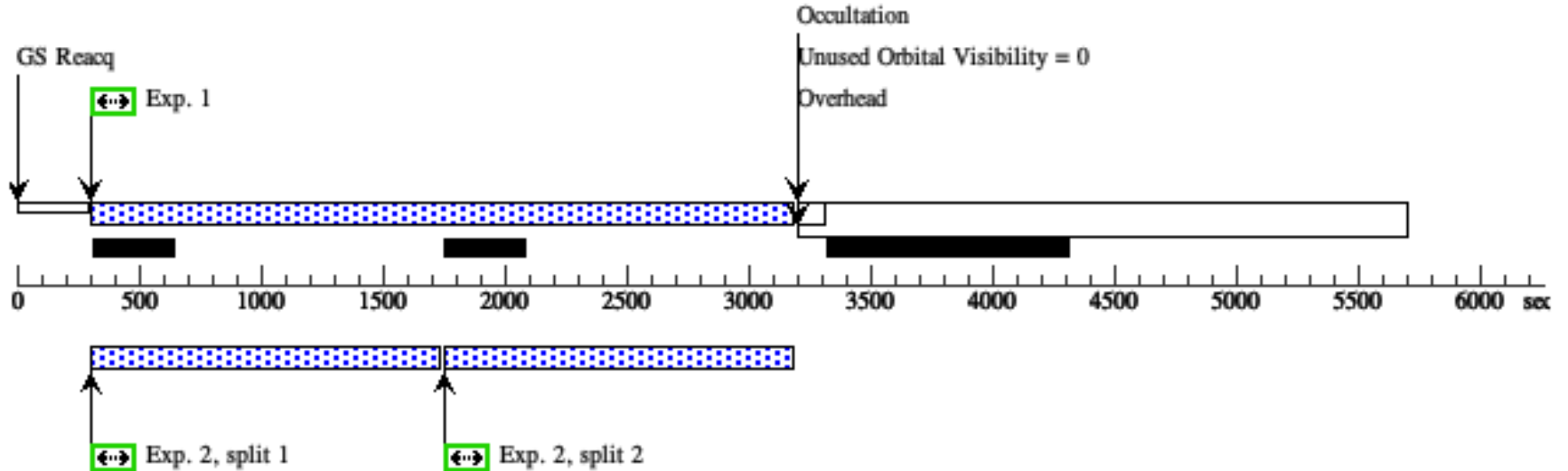
Orbit 3

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Orbit 4

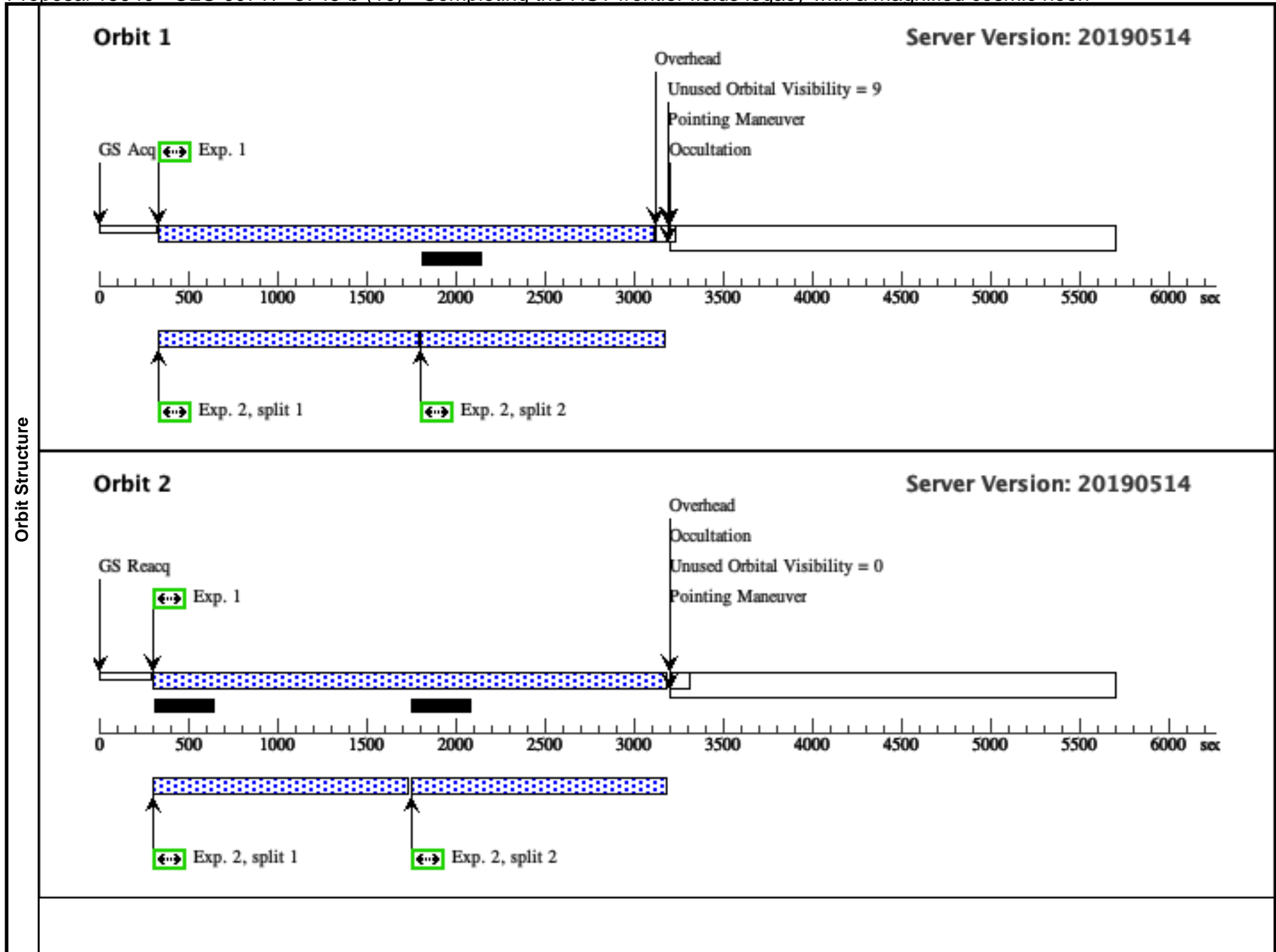
Server Version: 20190514



Proposal 15940 - CLG-J0717+3745-b (10) - Completing the HST frontier fields legacy with a magnified cosmic noon

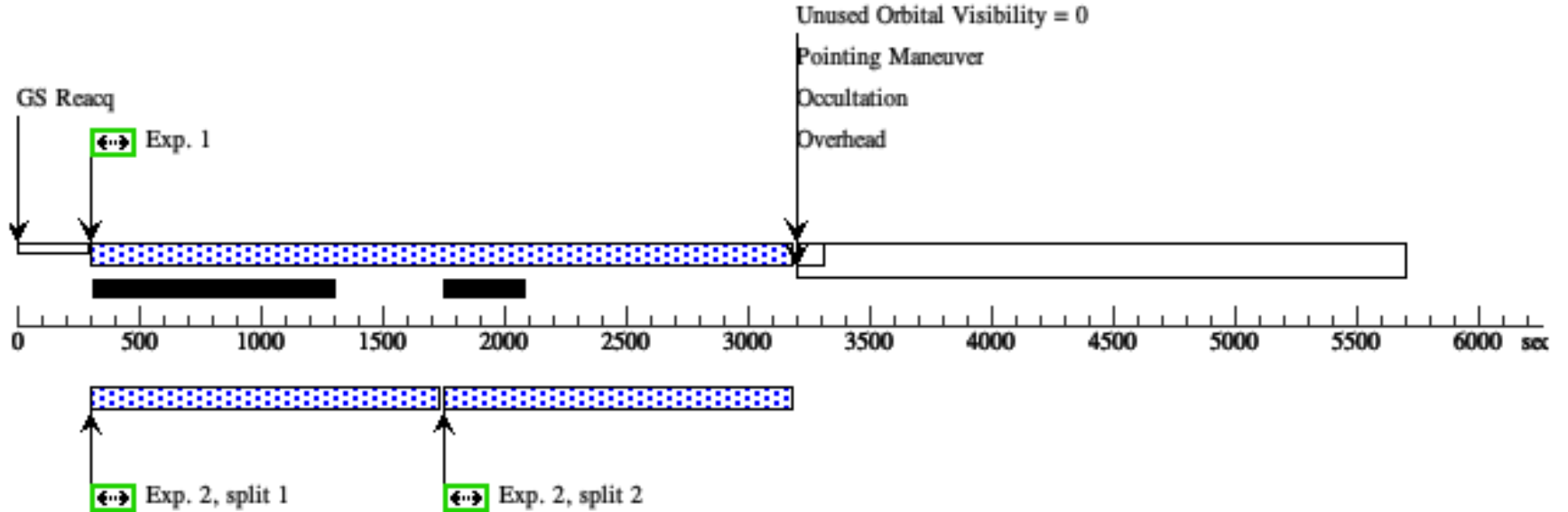
Thu Dec 19 15:00:37 GMT 2019

Visit	Proposal 15940, CLG-J0717+3745-b (10), scheduling Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: SAME ORIENT AS 09									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
	(1)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false		(1-2)					
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(5)	CLG-J0717+3745 Alt Name1: MACSJ0717	RA: 07 17 34.0000 (109.3916667d) Dec: +37 44 49.00 (37.74694d) Equinox: J2000		V=26	Reference Frame: ICRS				
	Comments: Category=CLUSTER OF GALAXIES Description=[GRAVITATIONAL LENS, RICH CLUSTER]									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(5) CLG-J0717+3745 5	WFC3/UVIS, ACCUM, UVIS-CENTER	F225W	FLASH=7	POS TARG 0.42,2.0 2	Pattern 1, Exps 1-2 in CLG-J0717+3745-b (10) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in CLG-J0717+3745-b (10)	2750 Secs (11408 Secs) [==>(Pattern 1)] [==>2886.0 Secs (Pattern 2)] [==>2886.0 Secs (Pattern 3)] [==>2886.0 Secs (Pattern 4)]	[1] [2] [3] [4]
	2		ANY	ACS/WFC, ACCUM, WFC1	F475W	CR-SPLIT=2		Pattern 1, Exps 1-2 in CLG-J0717+3745-b (10) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in CLG-J0717+3745-b (10)	2500 Secs (10366 Secs) [==>(Pattern 1, Split 1)] [==>(Pattern 1, Split 2)] [==>1311.0 Secs (Pattern 2, Split 1)] [==>1311.0 Secs (Pattern 2, Split 2)] [==>1311.0 Secs (Pattern 3, Split 1)] [==>1311.0 Secs (Pattern 3, Split 2)] [==>1311.0 Secs (Pattern 4, Split 1)] [==>1311.0 Secs (Pattern 4, Split 2)]	[1] [2] [3] [4]



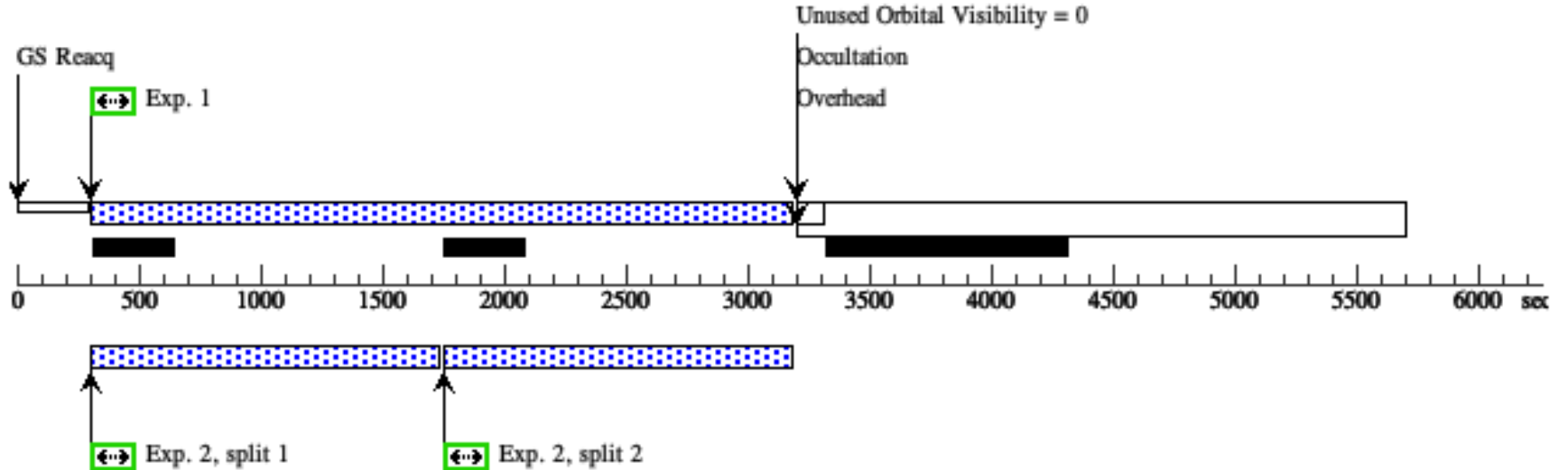
Orbit 3

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Orbit 4

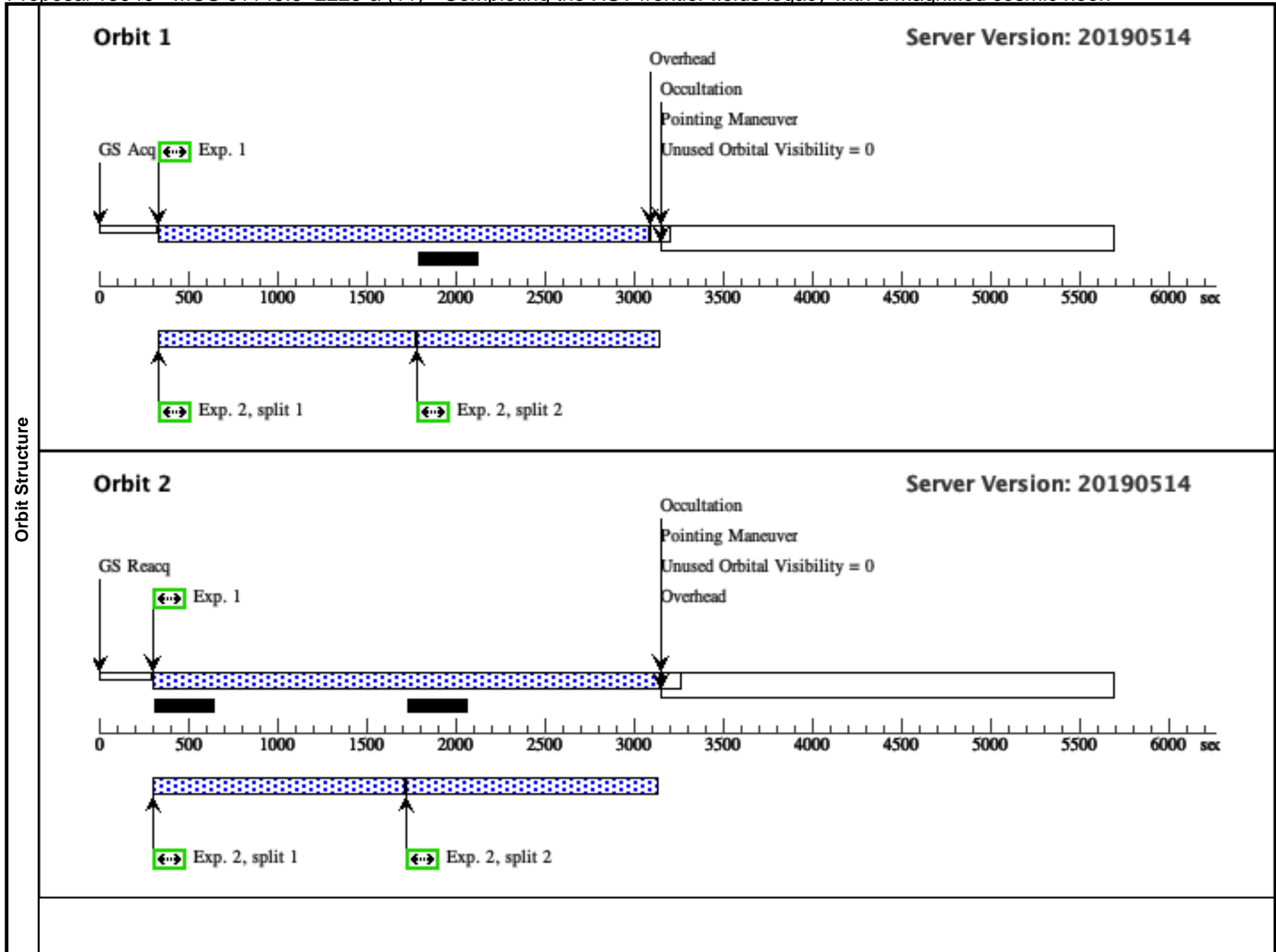
Server Version: 20190514



Proposal 15940 - MCS-J1149.5+2223-a (11) - Completing the HST frontier fields legacy with a magnified cosmic noon

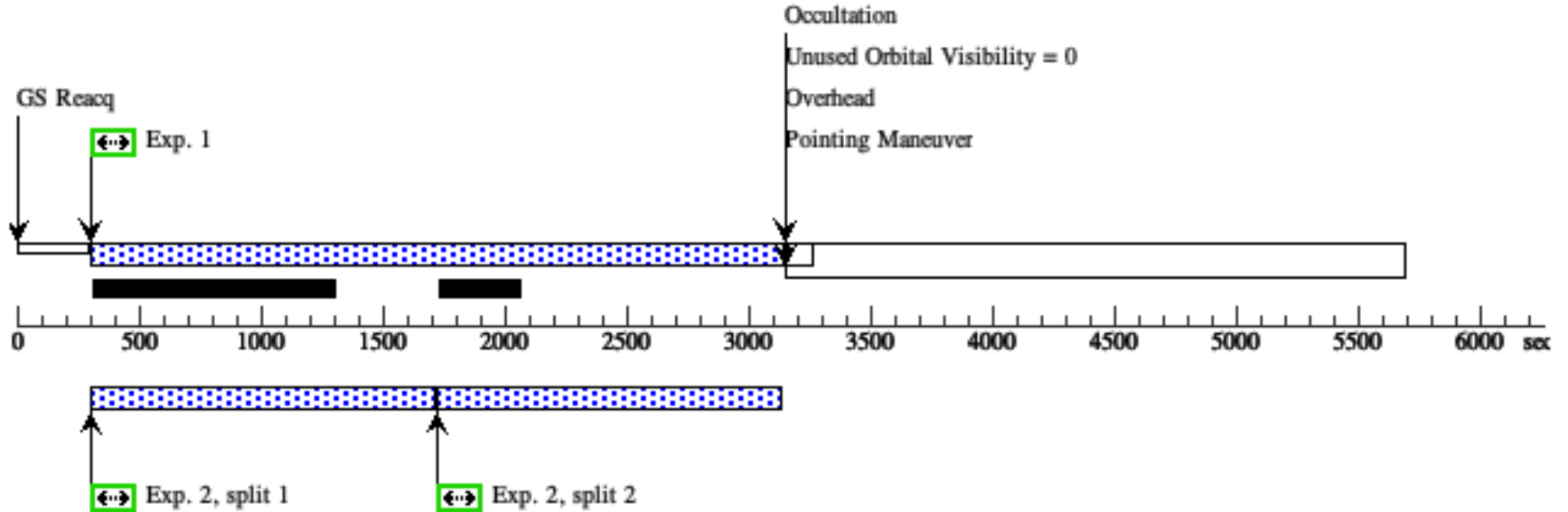
Thu Dec 19 15:00:37 GMT 2019

Visit	Proposal 15940, MCS-J1149.5+2223-a (11), scheduling Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: ORIENT 305D TO 305 D									
	Patterns	#	Primary Pattern				Secondary Pattern			Exposures
		(1)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false						(1-2)
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes	Miscellaneous		
	(6)	MCS-J1149.5+2223 Alt Name1: MACSJ1149	RA: 11 49 36.3000 (177.4012500d) Dec: +22 23 58.10 (22.39947d) Equinox: J2000			V=26	Reference Frame: ICRS			
	Comments: Category=CLUSTER OF GALAXIES Description=[GRAVITATIONAL LENS, RICH CLUSTER]									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(6) MCS-J1149.5+223	WFC3/UVIS, ACCUM, UVIS-CENTER	F225W	FLASH=7	POS TARG -0.42,+2 .98	Pattern 1, Exps 1-2 in MCS-J1149.5+2223-a (11) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in MCS-J1149.5+2223-a (11)	2750 Secs (11245 Secs) [==>2716.0 Secs (Pattern 1)] [==>2843.0 Secs (Pattern 2)] [==>2843.0 Secs (Pattern 3)] [==>2843.0 Secs (Pattern 4)]	[1] [2] [3] [4]
2		ANY	ACS/WFC, ACCUM, WFC1	F475W	CR-SPLIT=2		Pattern 1, Exps 1-2 in MCS-J1149.5+2223-a (11) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in MCS-J1149.5+2223-a (11)	2500 Secs (10200 Secs) [==>1233.0 Secs (Pattern 1, Split 1)] [==>1233.0 Secs (Pattern 1, Split 2)] [==>1289.0 Secs (Pattern 2, Split 1)] [==>1289.0 Secs (Pattern 2, Split 2)] [==>1289.0 Secs (Pattern 3, Split 1)] [==>1289.0 Secs (Pattern 3, Split 2)] [==>1289.0 Secs (Pattern 4, Split 1)] [==>1289.0 Secs (Pattern 4, Split 2)]	[1] [2] [3] [4]	



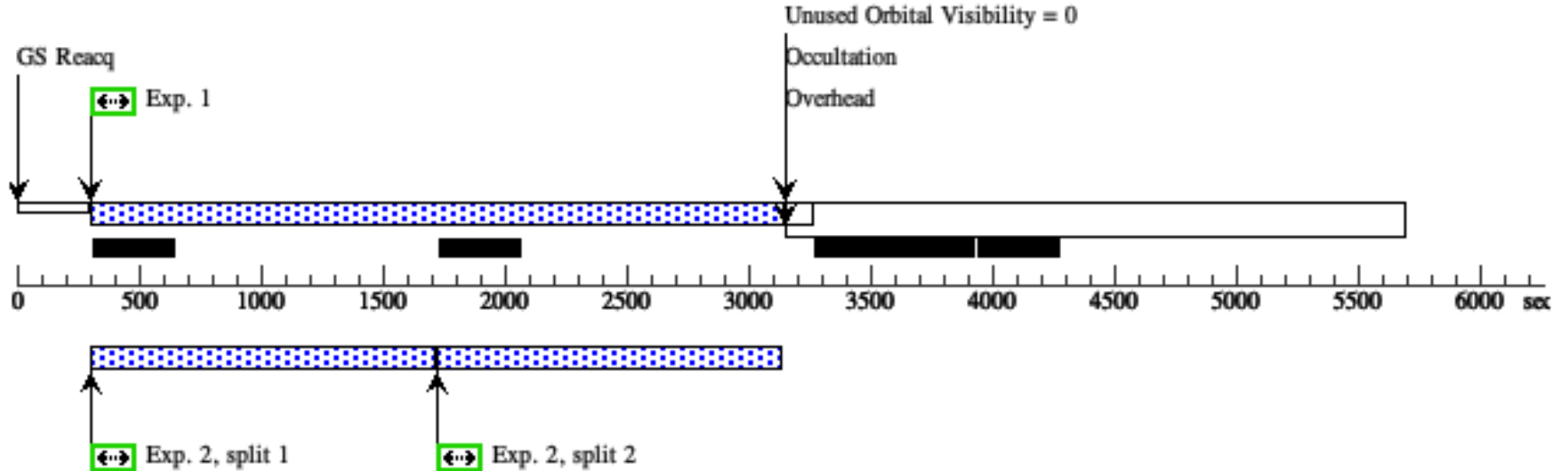
Orbit 3

Server Version: 20190514



Orbit 4

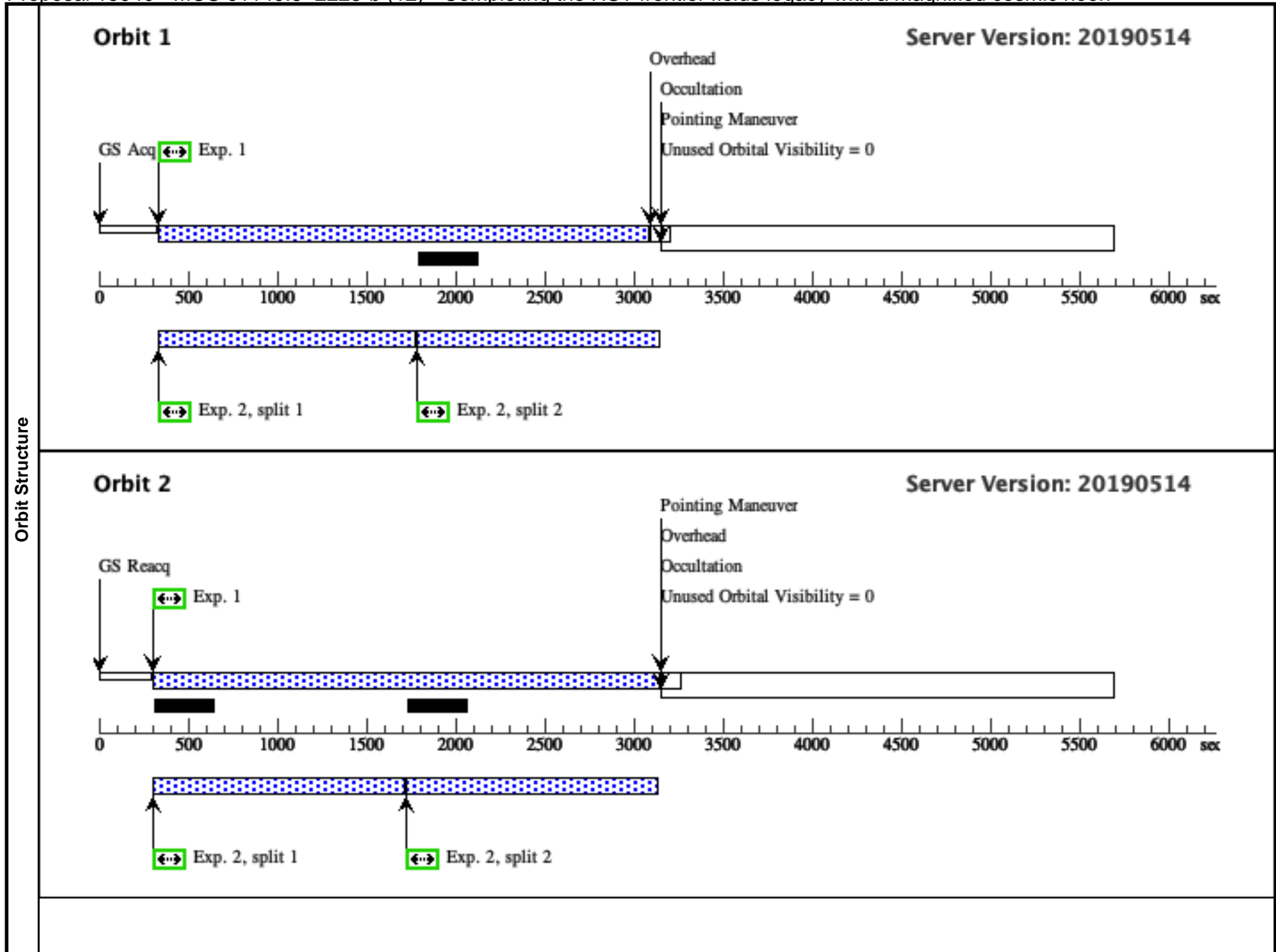
Server Version: 20190514



Proposal 15940 - MCS-J1149.5+2223-b (12) - Completing the HST frontier fields legacy with a magnified cosmic noon

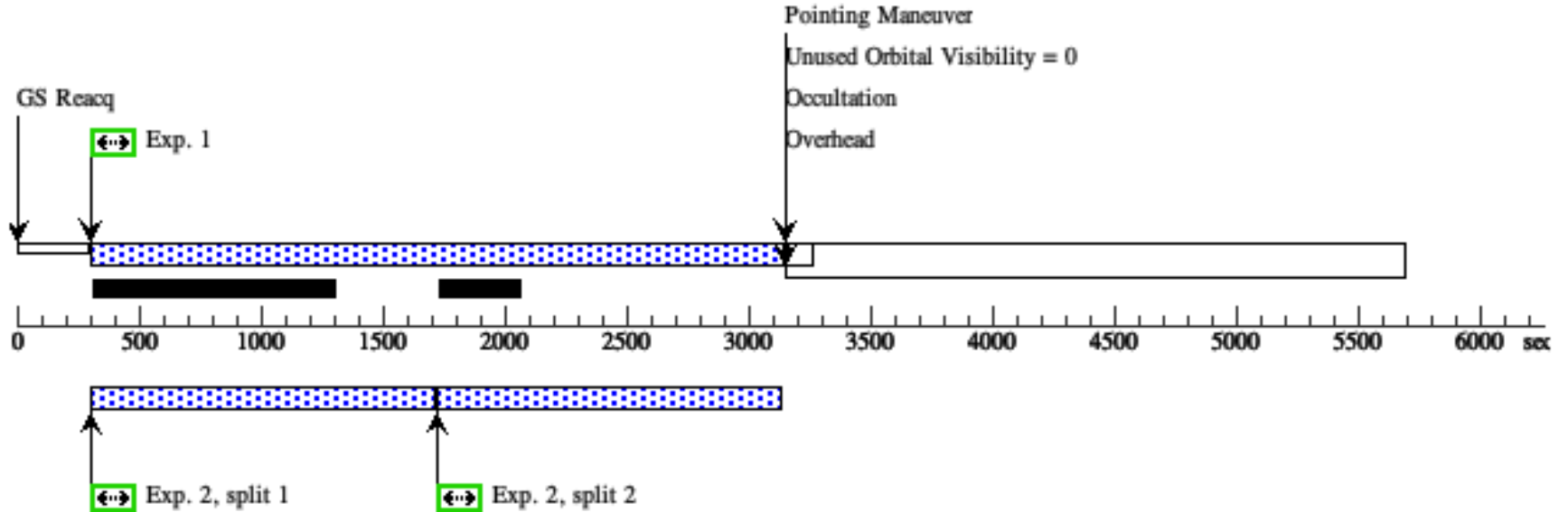
Thu Dec 19 15:00:37 GMT 2019

Visit	Proposal 15940, MCS-J1149.5+2223-b (12), scheduling Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: SAME ORIENT AS 11									
	Patterns	#	Primary Pattern			Secondary Pattern			Exposures	
		(1)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false					(1-2)	
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(6)	MCS-J1149.5+2223 Alt Name1: MACSJ1149	RA: 11 49 36.3000 (177.4012500d) Dec: +22 23 58.10 (22.39947d) Equinox: J2000		V=26	Reference Frame: ICRS				
	<i>Comments:</i> Category=CLUSTER OF GALAXIES Description=[GRAVITATIONAL LENS, RICH CLUSTER]									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(6) MCS-J1149.5+2223	WFC3/UVIS, ACCUM, UVIS-CENTER	F225W	FLASH=7	POS TARG 0.42,7.0 2	Pattern 1, Exps 1-2 in MCS-J1149.5+2223-b (12) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in MCS-J1149.5+2223-b (12)	2750 Secs (11245 Secs) [==>2716.0 Secs (Pattern 1)] [==>2843.0 Secs (Pattern 2)] [==>2843.0 Secs (Pattern 3)] [==>2843.0 Secs (Pattern 4)]	[1] [2] [3] [4]
2		ANY	ACS/WFC, ACCUM, WFC1	F475W	CR-SPLIT=2		Pattern 1, Exps 1-2 in MCS-J1149.5+2223-b (12) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in MCS-J1149.5+2223-b (12)	2500 Secs (10200 Secs) [==>1233.0 Secs (Pattern 1, Split 1)] [==>1233.0 Secs (Pattern 1, Split 2)] [==>1289.0 Secs (Pattern 2, Split 1)] [==>1289.0 Secs (Pattern 2, Split 2)] [==>1289.0 Secs (Pattern 3, Split 1)] [==>1289.0 Secs (Pattern 3, Split 2)] [==>1289.0 Secs (Pattern 4, Split 1)] [==>1289.0 Secs (Pattern 4, Split 2)]	[1] [2] [3] [4]	



Orbit 3

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