



15860 - Accretion-Triggered Starbursts in Tadpole Galaxies

Cycle: 27, 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) KISO3868	WFC3/UVIS	3	11-Mar-2020 14:00:19.0	yes
05	(1) KISO3868	ACS/WFC	1	11-Mar-2020 14:00:20.0	yes
55	(1) KISO3868	ACS/WFC	1	11-Mar-2020 14:00:20.0	yes
02	(2) SBS0	WFC3/UVIS	3	11-Mar-2020 14:00:21.0	yes
06	(2) SBS0	ACS/WFC	1	11-Mar-2020 14:00:22.0	yes
03	(3) SBS1	WFC3/UVIS	3	11-Mar-2020 14:00:23.0	yes
07	(3) SBS1	ACS/WFC	1	11-Mar-2020 14:00:24.0	yes
04	(4) UM461	WFC3/UVIS	3	11-Mar-2020 14:00:25.0	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>
08	(4) UM461	ACS/WFC	1	11-Mar-2020 14:00:26.0	yes

17 Total Orbits Used

ABSTRACT

Gas accretion onto galaxies is believed to drive the average star formation rate. However, there are few observations of this accretion for late-type galaxies, especially impacting the disk or triggering a starburst in the disk. Here we propose optical and H α imaging of four metal-poor tadpole galaxies that have local metallicity drops by a factor of ~ 5 in relatively large off-center starburst clumps. The bursts and the unusual metallicities suggest recent accretion of large gas masses. Photometry plus SED modeling will determine the ages, masses, and luminosity distributions of the star clusters and star complexes in the bursts. H α will reveal ionization rates along with feedback and possible accretion structures. The sample represents the nearest low-mass galaxies that have high-resolution metallicity variations and single dominant starburst clumps. The results have broad implications for understanding the mass-metallicity relation for galaxies, the formation and feedback of stars and massive clusters in accretion-induced starbursts, and the origin of metal-poor globular clusters in the early universe. Only HST has the combination of angular resolution and sensitivity to carry out this program.

OBSERVING DESCRIPTION

We are imaging 4 tadpole galaxies with 3 NUV to optical filters and 1 H-alpha filter for 4 orbits each for a total of 16 orbits. These galaxies have a clear metallicity drop measured in the head vs. the tail with a clear star-forming head and an extended tail. The F390W filter samples the rest-frame NUV redward of the 2175A dust 'bump'. F547M samples the optical redward of the [OII] 3727 A line and the Balmer break at 3650A and is blueward of H-alpha making it perfect for continuum subtraction. F814W samples the red-optical. F657N samples the H-alpha line and is broader than F656N to encompass possible blueshifts or redshifts with respect to the galaxies.

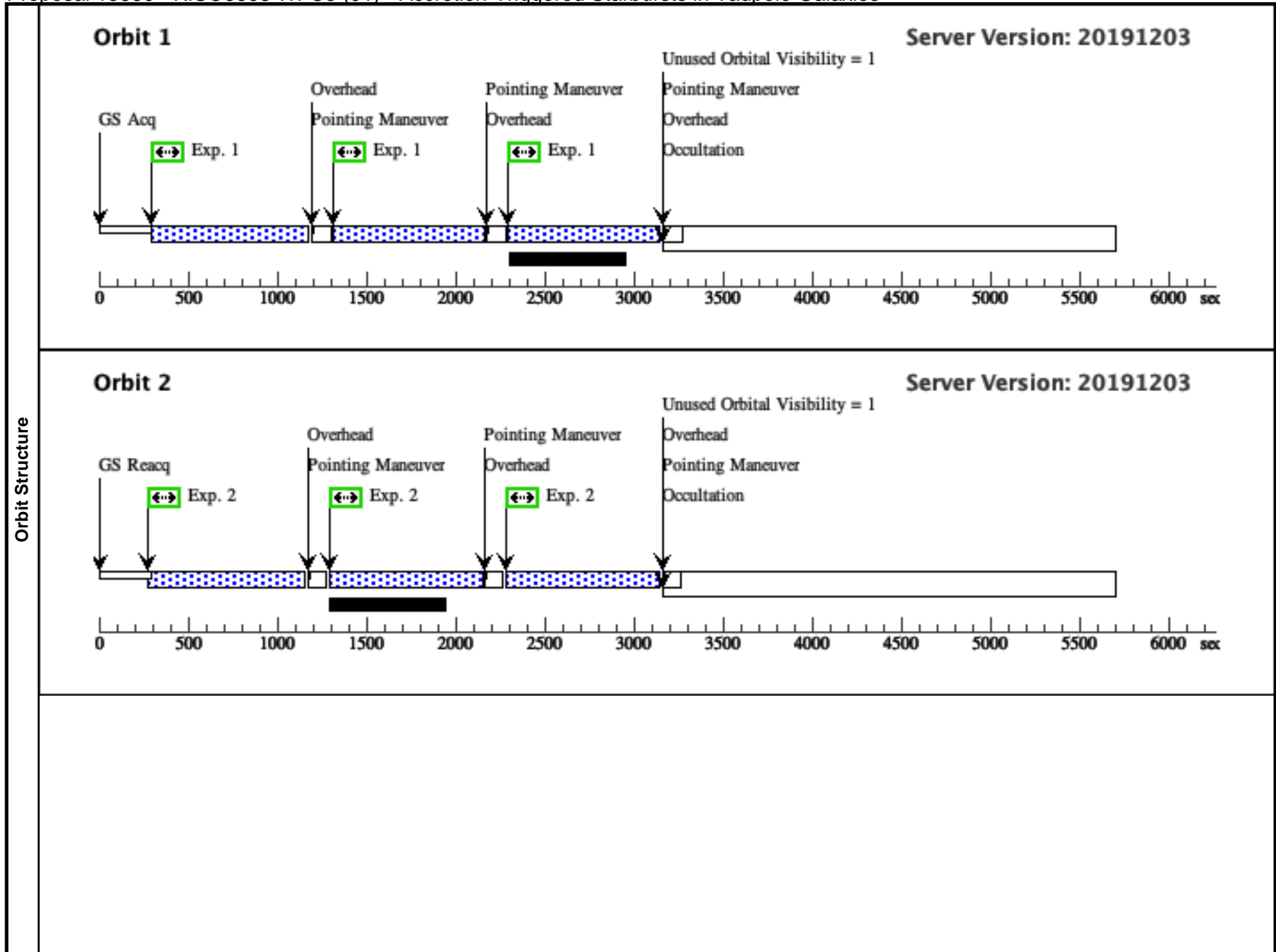
We are obtaining 3 dithered exposures per filter to clean them of cosmic rays and image artifacts and subsample the PSF. We use a 3 point dither pattern with the step sized multiplied by a factor of 5 for WFC3 to dither over the blotchy pattern remaining in the background of the observations. We use a 4 point dither pattern with a step sized multiplied by 17 for ACS. We post-flash F390W by 5e-, F547M by 2e-, and F657N by 9 e- to get to 12e- background per exposure. We use WFC3/UVIS for the blue filters and F657N, and use ACS/WFC for F814W since it has approximately a factor of 2 higher throughput in the red. We use F657N with WFC3/UVIS instead of ACS as it is broader than the H-alpha filter on ACS allowing us to include possible blue or redshifted flux. We will drizzle all images to the same plate scale for pixel-matched images.

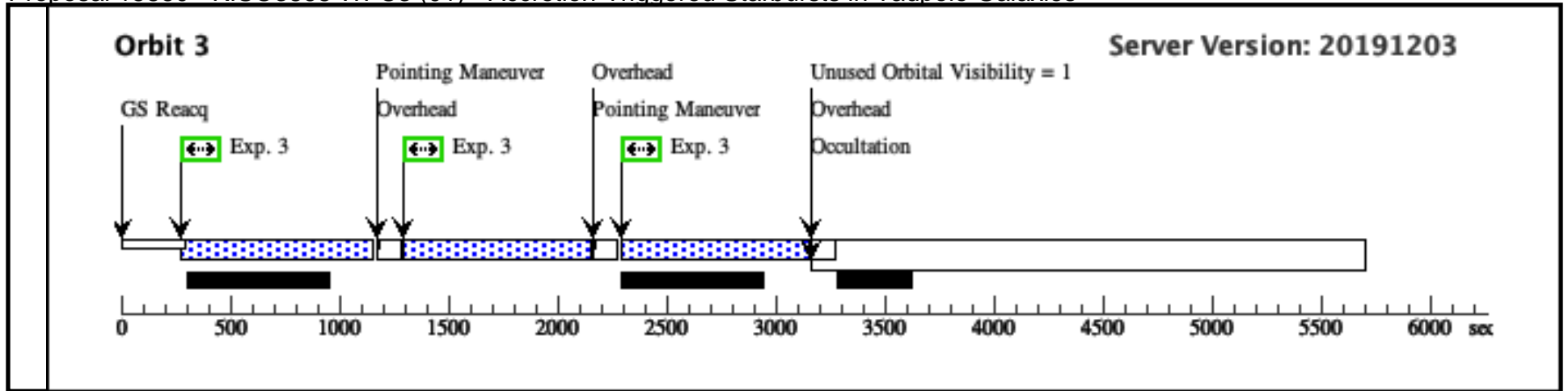
We place the entire galaxy on one chip as not to have the chip gap on the galaxy. We place the galaxies on Chip 2 of WFC3 as it has a slightly higher throughput in the UV. We place the galaxies on Chip 1 of ACS as it has lower read noise. We place the galaxy on the center of the chip aligned with the chip to capture peripheral emission. We ensure that the head to tail direction is not in line with the readout direction. We make sure the allowed PAs are sufficiently wide for easy scheduling.

Proposal 15860 - KISO3868 WFC3 (01) - Accretion-Triggered Starbursts in Tadpole Galaxies

Wed Mar 11 18:00:26 GMT 2020

Visit	Proposal 15860, KISO3868 WFC3 (01), scheduling Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: ORIENT 290D TO 330 D; ORIENT 110D TO 150 D									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(1)	Pattern Type=WFC3-UVIS-DITHER- LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=3.025 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1), (2), (3)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	KISO3868	RA: 09 40 12.1780 (145.0507417d) Dec: +29 35 29.72 (29.59159d) Equinox: J2000		V=15.69	Reference Frame: ICRS				
	<i>Comments:</i> Category=GALAXY Description=[DWARF COMPACT]									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) KISO3868	WFC3/UVIS, ACCUM, UVIS2	F390W	FLASH=5		Pattern 1, Exps 1-1 in KISO3868 WFC3 (01) (1)	853 Secs (2559 Secs)	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[1]
	2		(1) KISO3868	WFC3/UVIS, ACCUM, UVIS2	F547M	FLASH=2		Pattern 1, Exps 2-2 in KISO3868 WFC3 (01) (1)	864 Secs (2592 Secs)	
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[2]	
	3		(1) KISO3868	WFC3/UVIS, ACCUM, UVIS2	F657N	FLASH=9		Pattern 1, Exps 3-3 in KISO3868 WFC3 (01) (1)	862 Secs (2586 Secs)	
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[3]	





Proposal 15860 - KISO3868 ACS (05) - Accretion-Triggered Starbursts in Tadpole Galaxies

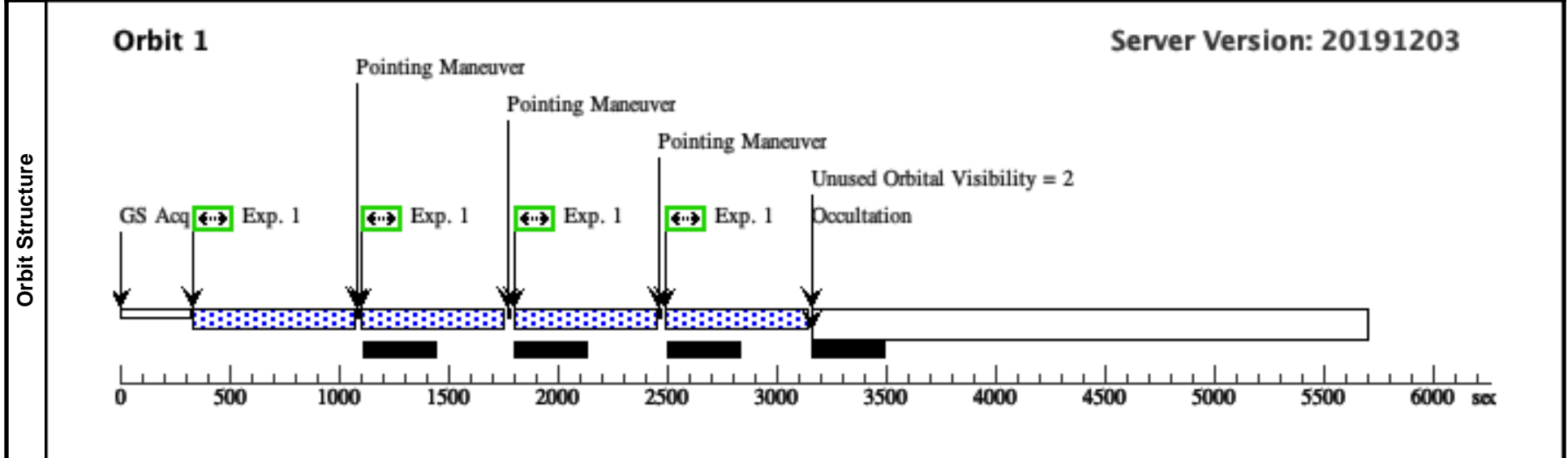
Wed Mar 11 18:00:27 GMT 2020

Visit	Proposal 15860, KISO3868 ACS (05), failed Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: ORIENT 315D TO 35 D; ORIENT 135D TO 215 D		

Patterns	#	Primary Pattern	Secondary Pattern	Exposures
	(3)	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=4.454 Line Spacing=3.264	Coordinate Frame=POS-TARG Pattern Orientation=18.39 Angle Between Sides=68.14 Center Pattern=false	(1)

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	KISO3868	RA: 09 40 12.1780 (145.0507417d) Dec: +29 35 29.72 (29.59159d) Equinox: J2000		V=15.69	Reference Frame: ICRS
	<i>Comments:</i> Category=GALAXY Description=[DWARF COMPACT]					

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) KISO3868	ACS/WFC, ACCUM, WFC1	F814W			Pattern 3, Exps 1-1 in KISO3868 ACS (05) (3)	339 Secs (2120 Secs) [=>530.0 Secs (Pattern 1)] [=>530.0 Secs (Pattern 2)] [=>530.0 Secs (Pattern 3)] [=>530.0 Secs (Pattern 4)]	[1]



Proposal 15860 - KISO3868 ACS (55) - Accretion-Triggered Starbursts in Tadpole Galaxies

Wed Mar 11 18:00:27 GMT 2020

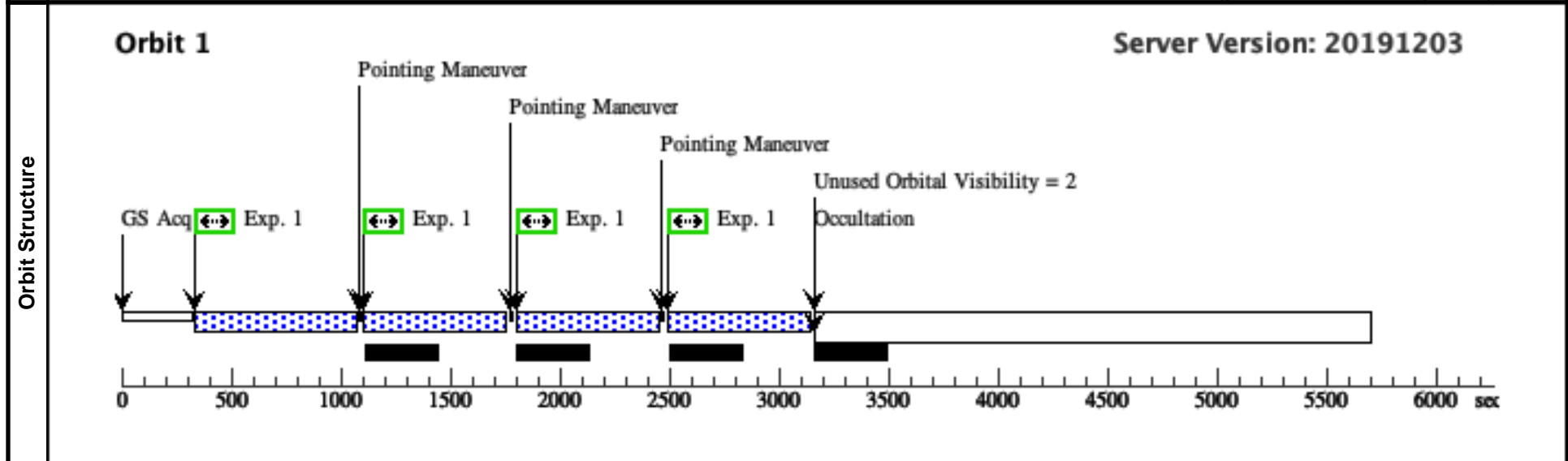
Visit	Proposal 15860, KISO3868 ACS (55) Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: ORIENT 315D TO 35 D; ORIENT 135D TO 215 D <i>Comments: Duplicate of failed visit 05</i>		
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Patterns	#	Primary Pattern	Secondary Pattern	Exposures
	(3)	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=4.454 Line Spacing=3.264	Coordinate Frame=POS-TARG Pattern Orientation=18.39 Angle Between Sides=68.14 Center Pattern=false	(1)

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	KISO3868	RA: 09 40 12.1780 (145.0507417d) Dec: +29 35 29.72 (29.59159d) Equinox: J2000		V=15.69	Reference Frame: ICRS

Comments: Category=GALAXY Description=[DWARF COMPACT]

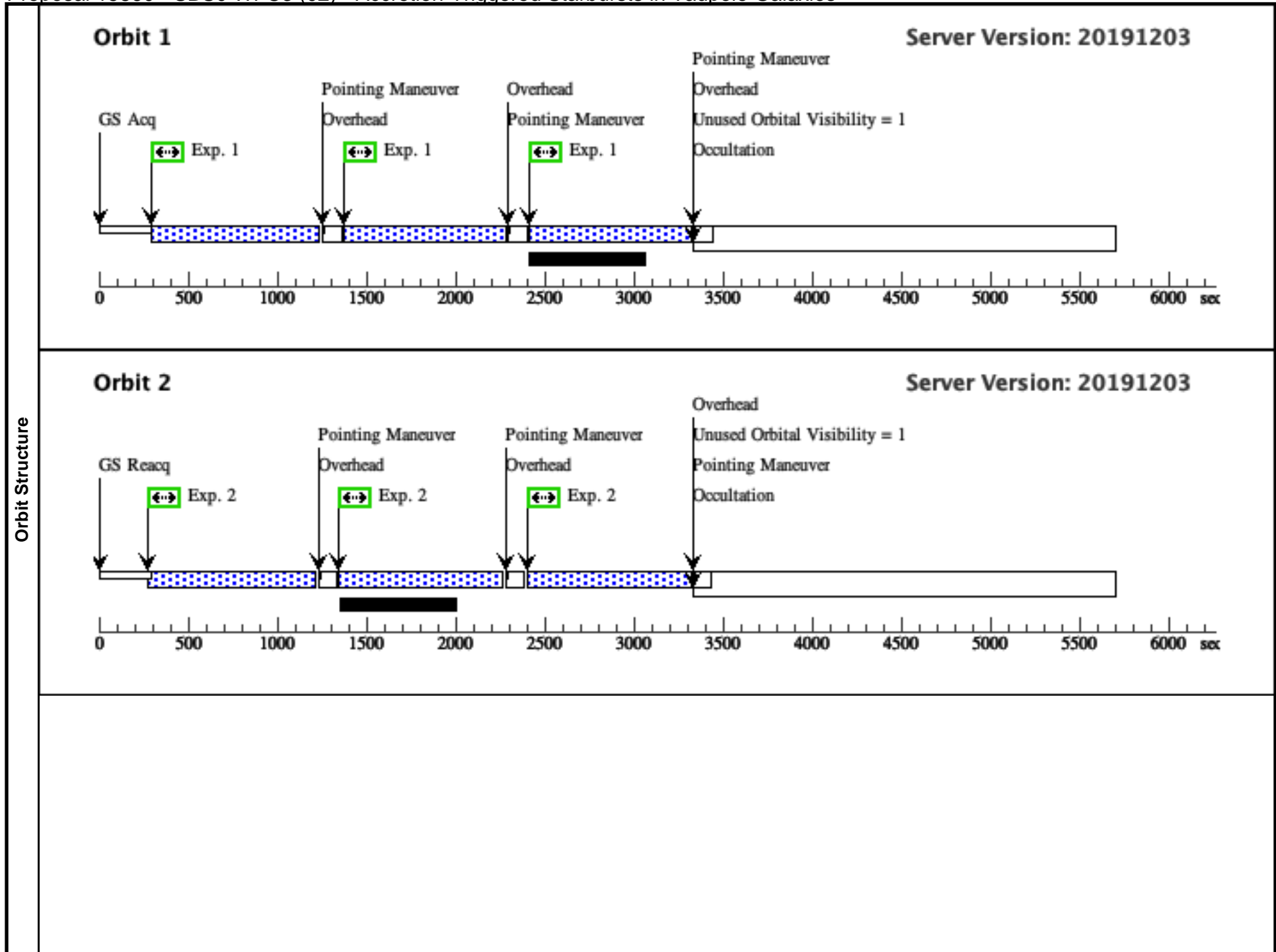
#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) KISO3868	ACS/WFC, ACCUM, WFC1	F814W			Pattern 3, Exps 1-1 in KISO3868 ACS (55) (3)	339 Secs (2120 Secs) [==>530.0 Secs (Pattern 1)] [==>530.0 Secs (Pattern 2)] [==>530.0 Secs (Pattern 3)] [==>530.0 Secs (Pattern 4)]	[1]

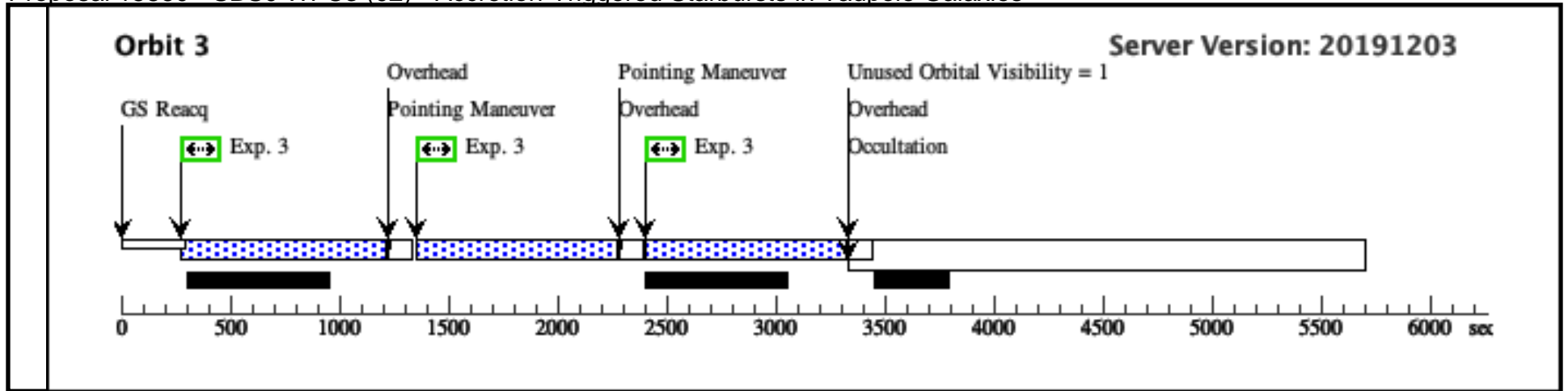


Proposal 15860 - SBS0 WFC3 (02) - Accretion-Triggered Starbursts in Tadpole Galaxies

Wed Mar 11 18:00:27 GMT 2020

Visit	Proposal 15860, SBS0 WFC3 (02), scheduling Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: ORIENT 310D TO 70 D; ORIENT 130D TO 250 D									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
	(1)	Pattern Type=WFC3-UVIS-DITHER- LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=3.025 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1), (2), (3)					
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(2)	SBS0	RA: 09 44 17.2605 (146.0719188d) Dec: +54 11 28.45 (54.19124d) Equinox: J2000		V=18.68	Reference Frame: ICRS				
	<i>Comments:</i> Category=GALAXY Description=[DWARF COMPACT]									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(2) SBS0	WFC3/UVIS, ACCUM, UVIS2	F390W	FLASH=5		Pattern 1, Exps 1-1 in SBS0 WFC3 (02) (1)	909 Secs (2727 Secs)	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[1]
	2		(2) SBS0	WFC3/UVIS, ACCUM, UVIS2	F547M	FLASH=2		Pattern 1, Exps 2-2 in SBS0 WFC3 (02) (1)	920 Secs (2760 Secs)	
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[2]	
	3		(2) SBS0	WFC3/UVIS, ACCUM, UVIS2	F657N	FLASH=9		Pattern 1, Exps 3-3 in SBS0 WFC3 (02) (1)	918 Secs (2754 Secs)	
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[3]	





Proposal 15860 - SBS0 ACS (06) - Accretion-Triggered Starbursts in Tadpole Galaxies

Wed Mar 11 18:00:27 GMT 2020

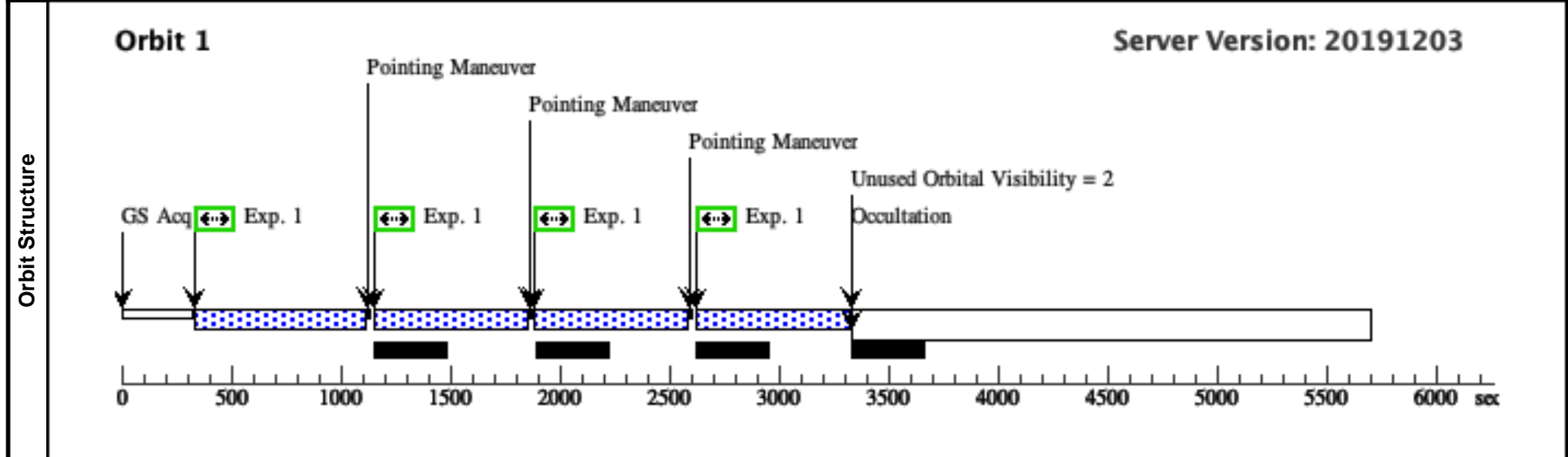
Visit	Proposal 15860, SBS0 ACS (06), completed Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: ORIENT 355D TO 115 D; ORIENT 175D TO 295 D		

Patterns	#	Primary Pattern	Secondary Pattern	Exposures
	(3)	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=4.454 Line Spacing=3.264	Coordinate Frame=POS-TARG Pattern Orientation=18.39 Angle Between Sides=68.14 Center Pattern=false	

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(2)	SBS0	RA: 09 44 17.2605 (146.0719188d) Dec: +54 11 28.45 (54.19124d) Equinox: J2000		V=18.68	Reference Frame: ICRS

Comments:
 Category=GALAXY
 Description=[DWARF COMPACT]

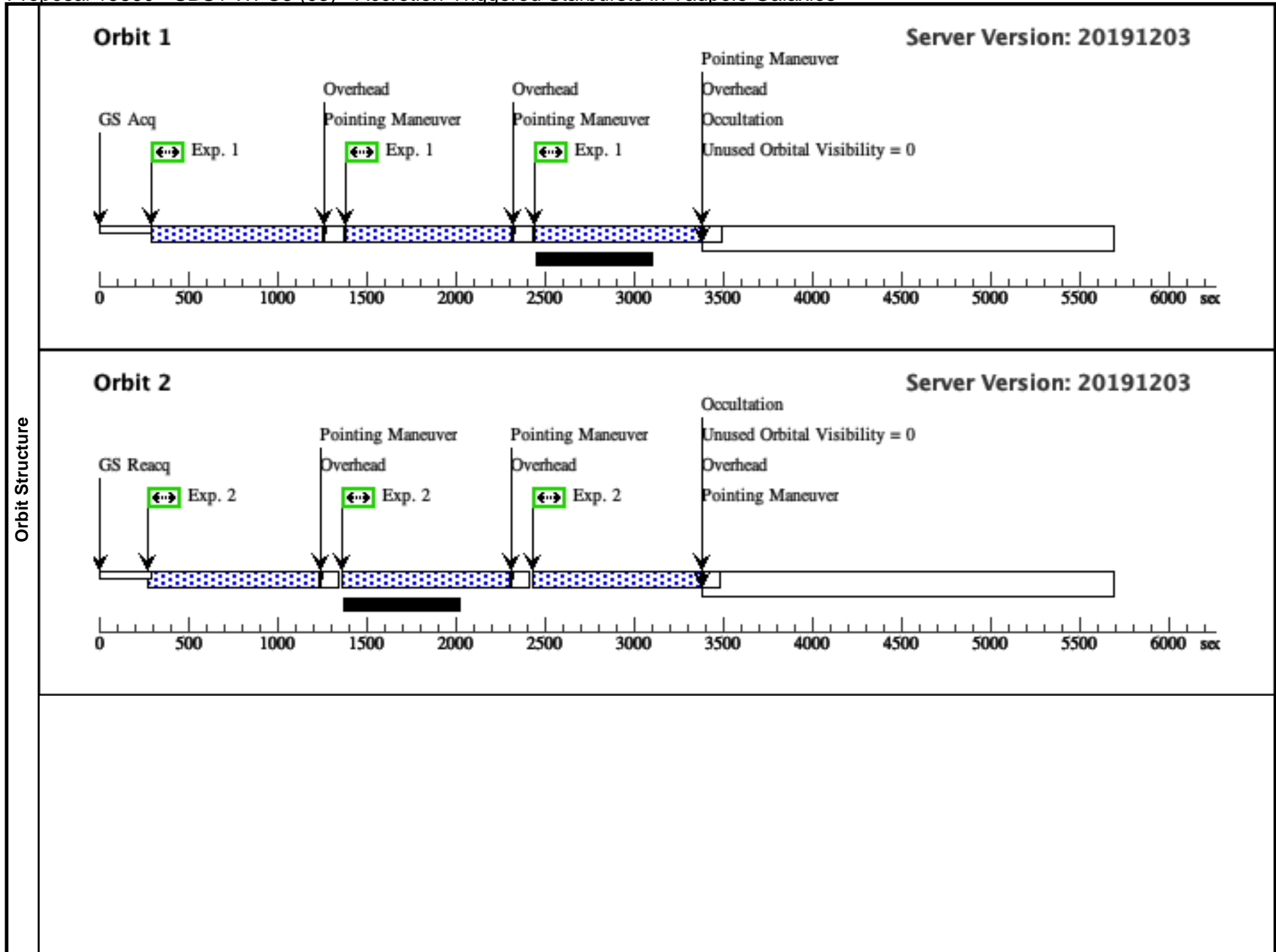
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(2) SBS0	ACS/WFC, ACCUM, WFC1	F814W					Pattern 3, Exps 1-1 in SBS0 ACS (06) (3)	339 Secs (2288 Secs)
									[=>572.0 Secs (Pattern 1)] [=>572.0 Secs (Pattern 2)] [=>572.0 Secs (Pattern 3)] [=>572.0 Secs (Pattern 4)]	[1]

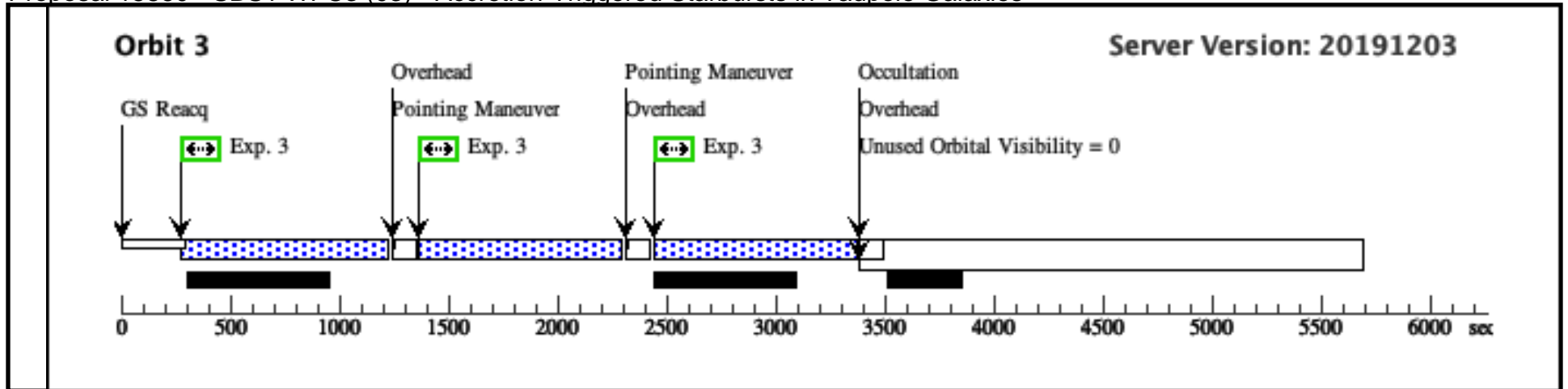


Proposal 15860 - SBS1 WFC3 (03) - Accretion-Triggered Starbursts in Tadpole Galaxies

Wed Mar 11 18:00:27 GMT 2020

Visit	Proposal 15860, SBS1 WFC3 (03), completed Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: ORIENT 320D TO 80 D; ORIENT 140D TO 260 D									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(1)	Pattern Type=WFC3-UVIS-DITHER- LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=3.025 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1), (2), (3)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(3)	SBS1	RA: 11 32 2.4232 (173.0100967d) Dec: +57 22 45.68 (57.37936d) Equinox: J2000		V=16.26	Reference Frame: ICRS				
	<i>Comments:</i> Category=GALAXY Description=[DWARF COMPACT]									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(3) SBS1	WFC3/UVIS, ACCUM, UVIS2	F390W	FLASH=5		Pattern 1, Exps 1-1 in SBS1 WFC3 (03) (1)	928 Secs (2784 Secs)	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[1]
	2		(3) SBS1	WFC3/UVIS, ACCUM, UVIS2	F547M	FLASH=2		Pattern 1, Exps 2-2 in SBS1 WFC3 (03) (1)	939 Secs (2817 Secs)	
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[2]	
	3		(3) SBS1	WFC3/UVIS, ACCUM, UVIS2	F657N	FLASH=9		Pattern 1, Exps 3-3 in SBS1 WFC3 (03) (1)	937 Secs (2811 Secs)	
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[3]	





Proposal 15860 - SBS1 ACS (07) - Accretion-Triggered Starbursts in Tadpole Galaxies

Wed Mar 11 18:00:27 GMT 2020

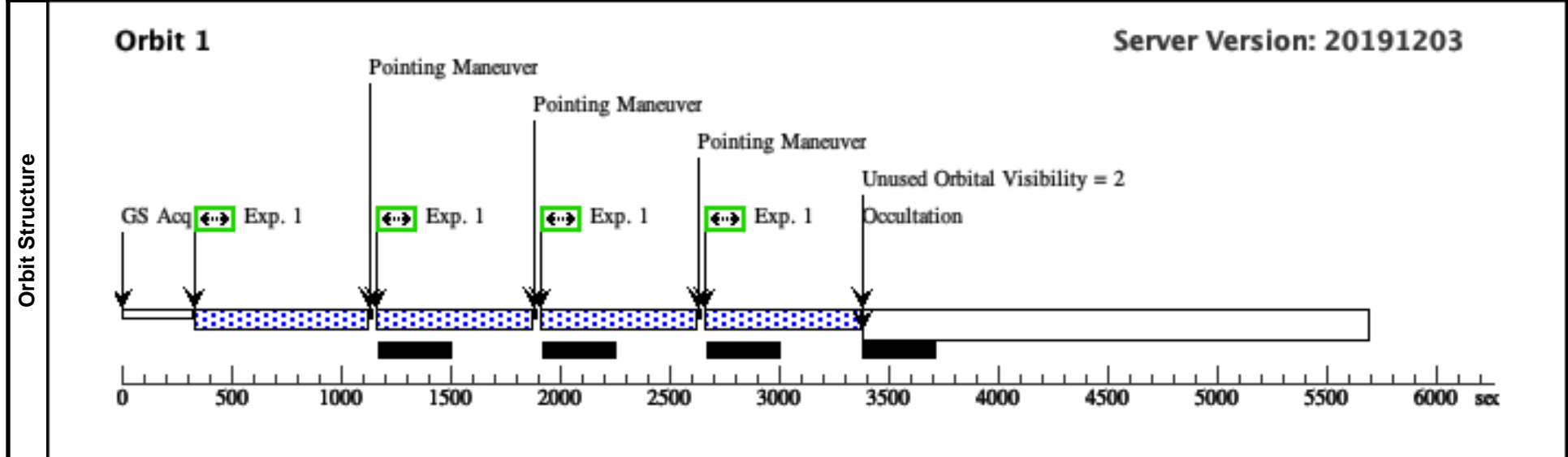
Visit	Proposal 15860, SBS1 ACS (07), completed Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: ORIENT 05D TO 74 D; ORIENT 185D TO 305 D		

Patterns	#	Primary Pattern	Secondary Pattern	Exposures
	(3)	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=4.454 Line Spacing=3.264	Coordinate Frame=POS-TARG Pattern Orientation=18.39 Angle Between Sides=68.14 Center Pattern=false	

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(3)	SBS1	RA: 11 32 2.4232 (173.0100967d) Dec: +57 22 45.68 (57.37936d) Equinox: J2000		V=16.26	Reference Frame: ICRS

Comments:
Category=GALAXY
Description=[DWARF COMPACT]

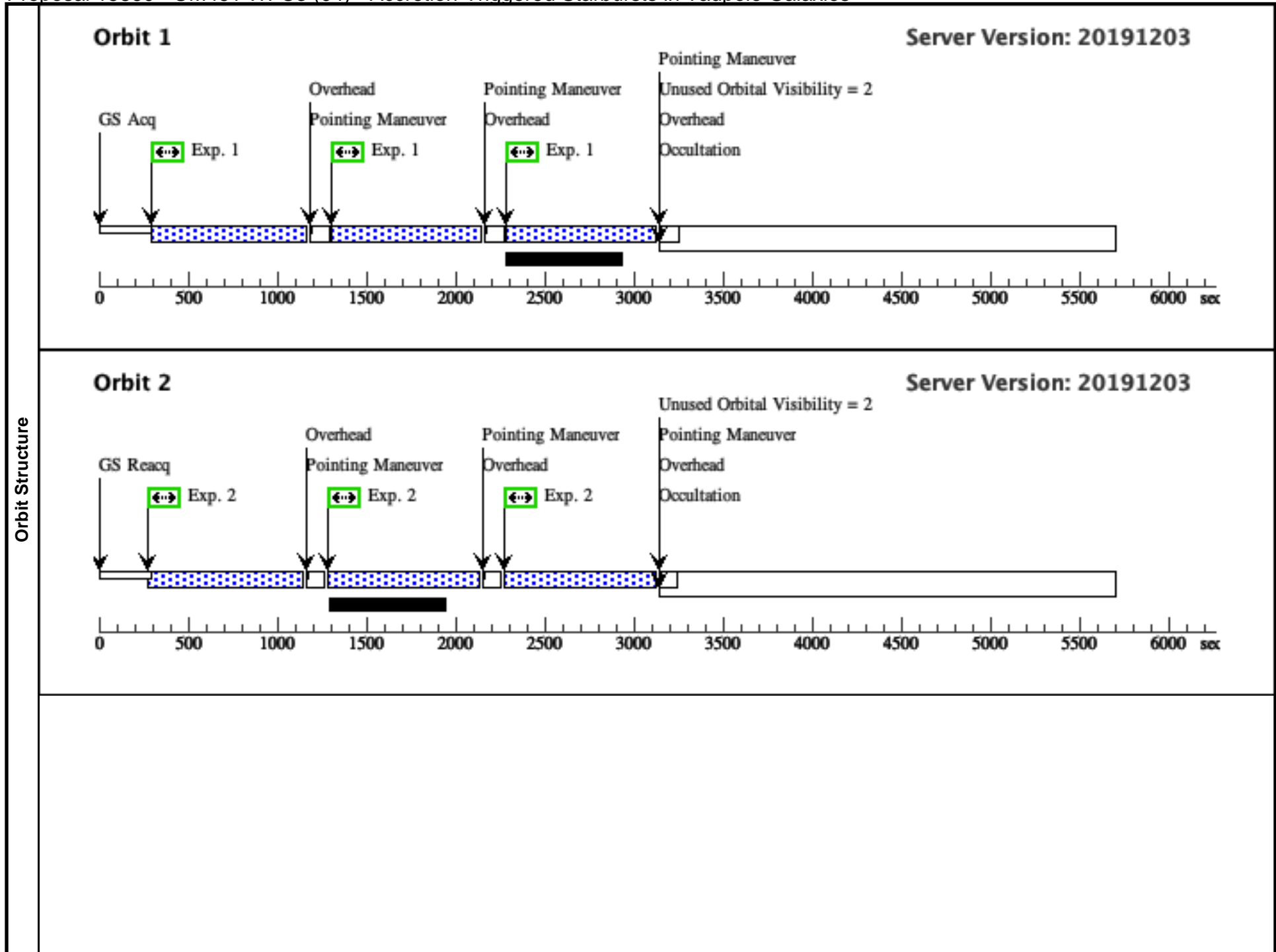
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(3) SBS1	ACS/WFC, ACCUM, WFC1	F814W				Pattern 3, Exps 1-1 in SBS1 ACS (07) (3)	339 Secs (2344 Secs) [=>586.0 Secs (Pattern 1)] [=>586.0 Secs (Pattern 2)] [=>586.0 Secs (Pattern 3)] [=>586.0 Secs (Pattern 4)]	[1]

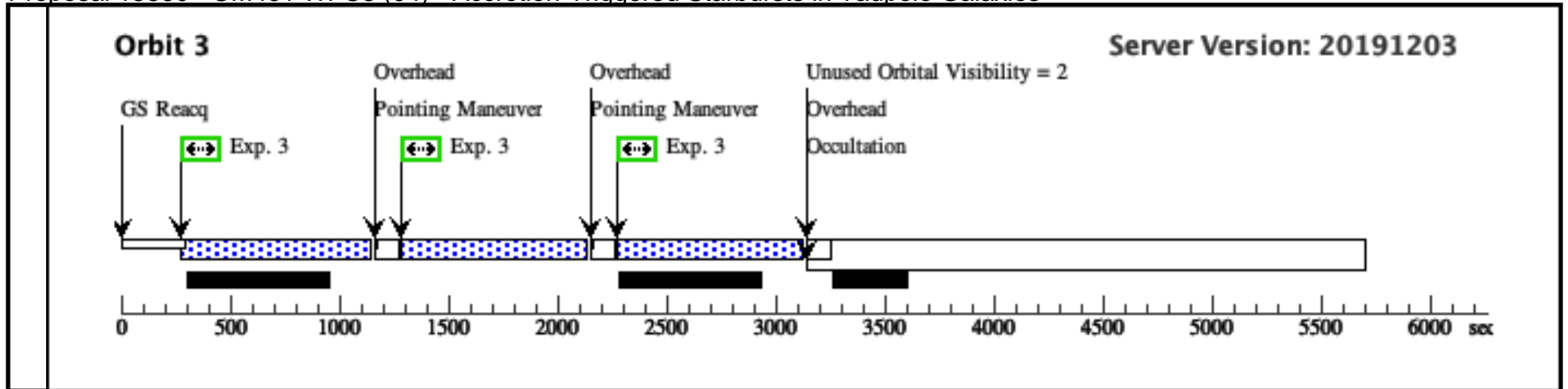


Proposal 15860 - UM461 WFC3 (04) - Accretion-Triggered Starbursts in Tadpole Galaxies

Wed Mar 11 18:00:27 GMT 2020

Visit	Proposal 15860, UM461 WFC3 (04), scheduling Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: ORIENT 290D TO 330 D; ORIENT 110D TO 150 D									
Patterns	#	Primary Pattern	Secondary Pattern	Exposures						
	(1)	Pattern Type=WFC3-UVIS-DITHER- LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=3.025 Line Spacing= Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1), (2), (3)						
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(4)	UM461	RA: 11 51 32.4925 (177.8853854d) Dec: -02 22 22.00 (-2.37278d) Equinox: J2000		V=16.38	Reference Frame: ICRS				
Comments: Category=GALAXY Description=[DWARF COMPACT]										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(4) UM461	(4) UM461	WFC3/UVIS, ACCUM, UVIS2	F390W	FLASH=5	GS ACQ SCENARI O BASE1B3	Pattern 1, Exps 1-1 i n UM461 WFC3 (04) (1)	845 Secs (2535 Secs)	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[1]
	2	(4) UM461	(4) UM461	WFC3/UVIS, ACCUM, UVIS2	F547M	FLASH=2		Pattern 1, Exps 2-2 i n UM461 WFC3 (04) (1)	856 Secs (2568 Secs)	
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[2]	
3	(4) UM461	(4) UM461	WFC3/UVIS, ACCUM, UVIS2	F657N	FLASH=9		Pattern 1, Exps 3-3 i n UM461 WFC3 (04) (1)	854 Secs (2562 Secs)		
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[3]	





Proposal 15860 - UM461 ACS (08) - Accretion-Triggered Starbursts in Tadpole Galaxies

Wed Mar 11 18:00:27 GMT 2020

Visit	Proposal 15860, UM461 ACS (08), completed		
	Diagnostic Status: No Diagnostics		
	Scientific Instruments: ACS/WFC		
	Special Requirements: ORIENT 315D TO 35 D; ORIENT 135D TO 215 D		

Patterns	#	Primary Pattern	Secondary Pattern	Exposures
	(3)	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=4.454 Line Spacing=3.264	Coordinate Frame=POS-TARG Pattern Orientation=18.39 Angle Between Sides=68.14 Center Pattern=false	

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(4)	UM461	RA: 11 51 32.4925 (177.8853854d) Dec: -02 22 22.00 (-2.37278d) Equinox: J2000		V=16.38	Reference Frame: ICRS

Comments:
Category=GALAXY
Description=[DWARF COMPACT]

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(4) UM461	ACS/WFC, ACCUM, WFC1	F814W				Pattern 3, Exps 1-1 in UM461 ACS (08) (3)	339 Secs (2096 Secs)
									[==>524.0 Secs (Pattern 1)] [==>524.0 Secs (Pattern 2)] [==>524.0 Secs (Pattern 3)] [==>524.0 Secs (Pattern 4)]	[1]

