



13409 - Hubble Observations of Kepler-Monitored Seyfert Is

Cycle: 21, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

<i>Name</i>	<i>Institution</i>	<i>E-Mail</i>
Dr. Richard Mushotzky (PI)	University of Maryland	richard@astro.umd.edu
Prof. Matthew A. Malkan (CoI)	University of California - Los Angeles	malkan@astro.ucla.edu
Dr. Michael J Koss (CoI)	University of Hawaii	koss@ifa.hawaii.edu
Dr. Rick Edelson (CoI)	University of Maryland	rickedelson@gmail.com
Ms. Krista Lynne Smith (CoI) (Contact)	University of Maryland	klsmith@astro.umd.edu

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) 1847+47	WFC3/UVIS	1	15-Nov-2013 21:09:40.0	yes
02	(2) 1910+38	WFC3/UVIS	1	15-Nov-2013 21:09:48.0	yes
03	(3) 1917+45	WFC3/UVIS	1	15-Nov-2013 21:09:55.0	yes
04	(4) 1923+45	WFC3/UVIS	1	15-Nov-2013 21:10:02.0	yes
05	(5) 1931+43	WFC3/UVIS	1	15-Nov-2013 21:10:08.0	yes
06	(6) 1936+49	WFC3/UVIS	1	15-Nov-2013 21:10:14.0	yes
07	(7) 1946+49	WFC3/UVIS	1	15-Nov-2013 21:10:20.0	yes
08	(8) 1954+48	WFC3/UVIS	1	15-Nov-2013 21:10:26.0	yes

8 Total Orbits Used

ABSTRACT

The bulk of AGN optical variability is generated by viscous processes in the accretion disk. The nature and amplitude of the variability is thought to be strongly connected to the black hole mass and Eddington ratio (McLeod et al 2010). For the past 3 years we have obtained high-precision (milli-magnitude errors), densely-sampled (every 30 min), long-duration (years) optical light curves from Kepler of 28 AGN our team has discovered in the Kepler field. These data permit, for the first time, the precise measurement of the optical variability of a sample of AGN over a wide range of timescales (from hours to years), BH masses and Eddington ratios, allowing a detailed characterization of the variability processes.

To properly model the disk emission and probe the origin of the variability, it is necessary to measure and subtract off the substantial but uncertain contribution due to starlight in the underlying galaxy. Because of the poor angular resolution of Kepler and ground based data, only HST can obtain this data. Without this measurement it is impossible to determine the absolute variability amplitude of the AGN, an accurate black hole mass or AGN luminosity. We request 8 GO orbits for WFC3 imaging of 8 AGN selected to span a wide range of Eddington ratio and black hole mass. These 8 objects are representative of the full range of mass and Eddington ratio of the present Kepler monitored sample. HST observations are crucial to obtain the full value of the already-extraordinary Kepler AGN light curves. In addition the HST observations will determine the nature of the host galaxy, a key parameter in understanding the origin and evolution of AGN.

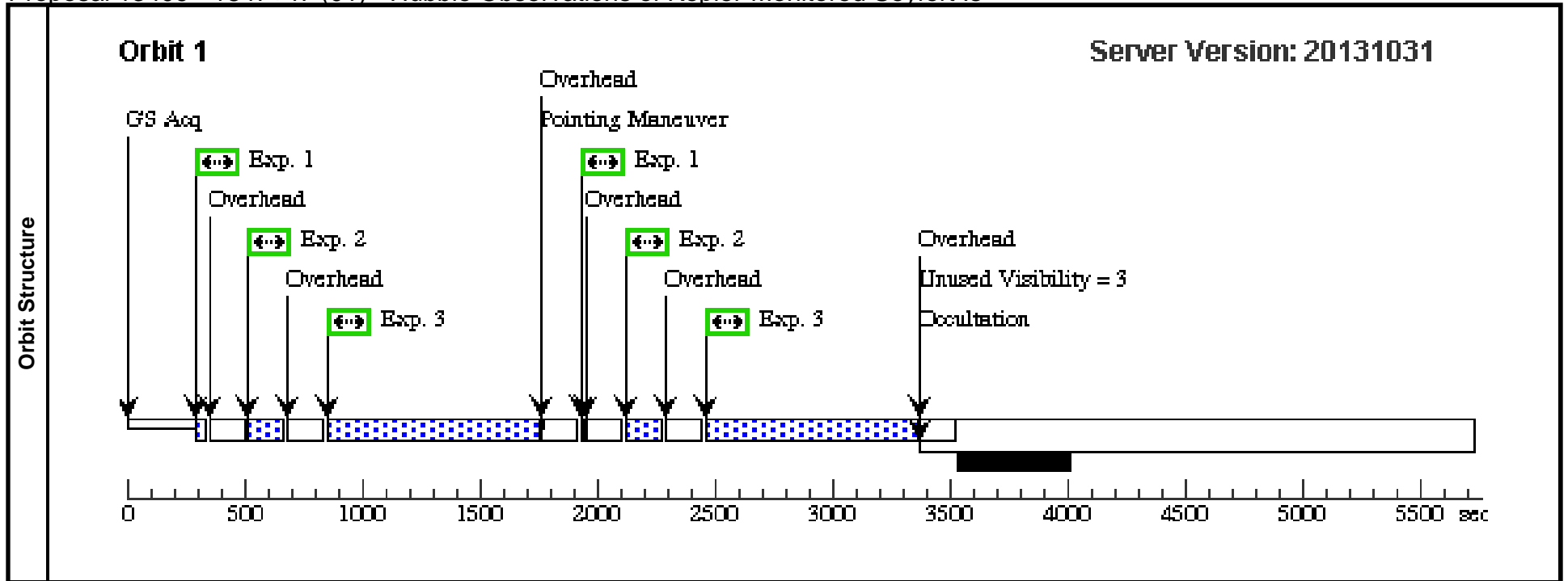
OBSERVING DESCRIPTION

All observations will use WFC3-UVIS with broad-bandpass filter F350LP. This is a good match to the Kepler 4200-9000 angstrom bandpass in the red. We will use a 2k x 2k subarray to encompass the full target galaxy and to get a decent number of PSFs from nearby stars. To obtain high contrast image of the bright nuclear point source and the rest of the galaxy, we obtain images in 3 steps of exposure times (eg. 2x15s, 2x200s, 2x800s). The short exposures are aimed at imaging the nucleus without saturation and minimal likelihood of cosmic ray hits there. They will be used to fix saturation in the longer exposures at the same pointing. The long exposures image the dimmer galaxy's outer component. Each exposure time is repeated using the default 2-point dither pattern WFC3-UVIS-DITHER-LINE. We will correct saturated pixels where possible, excluding unfixable pixels, then combine all exposures with AstroDrizzle to produce final images with a wide dynamic range.

Proposal 13409 - 1847+47 (01) - Hubble Observations of Kepler-Monitored Seyfert Is

Sat Nov 16 02:10:33 GMT 2013

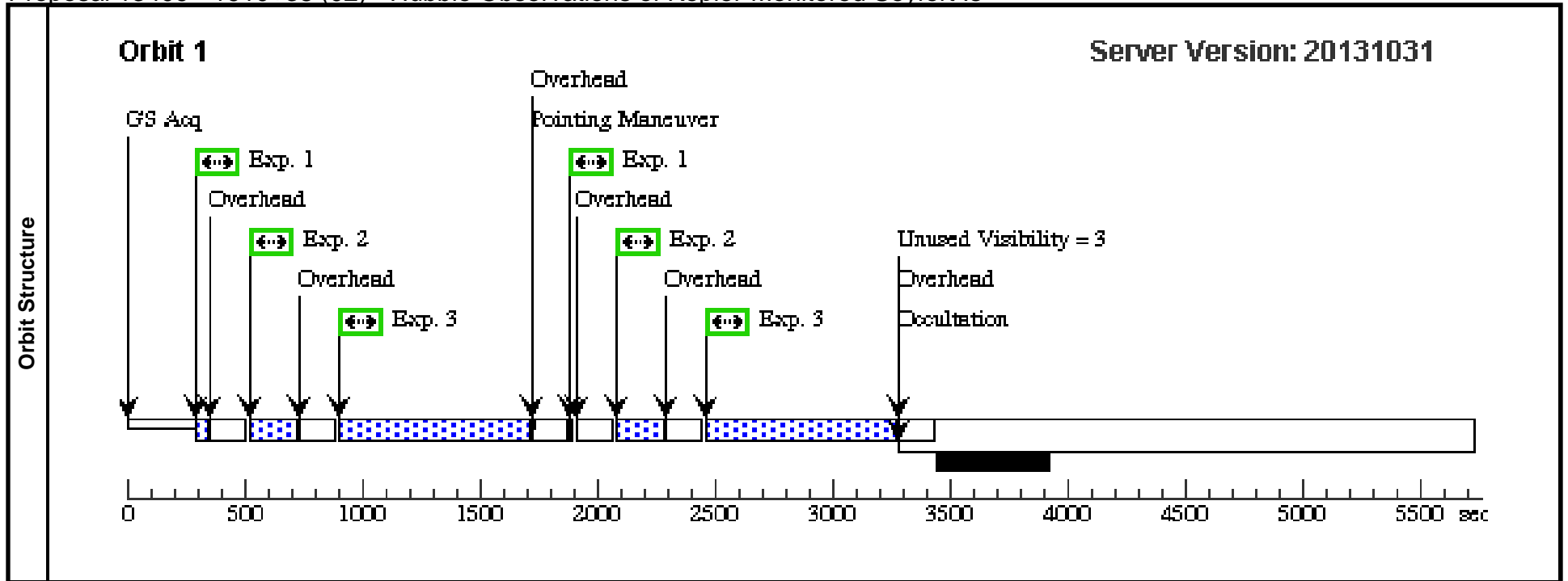
Visit	Proposal 13409, 1847+47 (01), implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: ORIENT 46D TO 170 D: ORIENT 207D TO 6 D									
Patterns	#	Primary Pattern			Secondary Pattern		Exposures			
	(1)	Pattern Type=WFC3-UVIS-DITHER- LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing= Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false					(1-3)			
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	1847+47 Alt Name1: 2MASXJ18472233+4756 161 Alt Name2: KIC10645722	RA: 18 47 22.3400 (281.8430833d) Dec: +47 56 16.13 (47.93781d) Equinox: J2000	Redshift: 0.068	V=15.7+/-0.5	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	Short	(1) 1847+47	WFC3/UVIS, ACCUM, UVIS2-2K2C-SUB	F350LP			Pattern 1, Exps 1-3 i n 1847+47 (01) (1)	10 Secs (20 Secs) [=>(Pattern 1)] [=>(Pattern 2)]	[1]
	2	Mid	(1) 1847+47	WFC3/UVIS, ACCUM, UVIS2-2K2C-SUB	F350LP			Pattern 1, Exps 1-3 i n 1847+47 (01) (1)	155 Secs (310 Secs) [=>(Pattern 1)] [=>(Pattern 2)]	[1]
	3	Long	(1) 1847+47	WFC3/UVIS, ACCUM, UVIS2-2K2C-SUB	F350LP			Pattern 1, Exps 1-3 i n 1847+47 (01) (1)	902 Secs (1804 Secs) [=>(Pattern 1)] [=>(Pattern 2)]	[1]



Proposal 13409 - 1910+38 (02) - Hubble Observations of Kepler-Monitored Seyfert Is

Sat Nov 16 02:10:35 GMT 2013

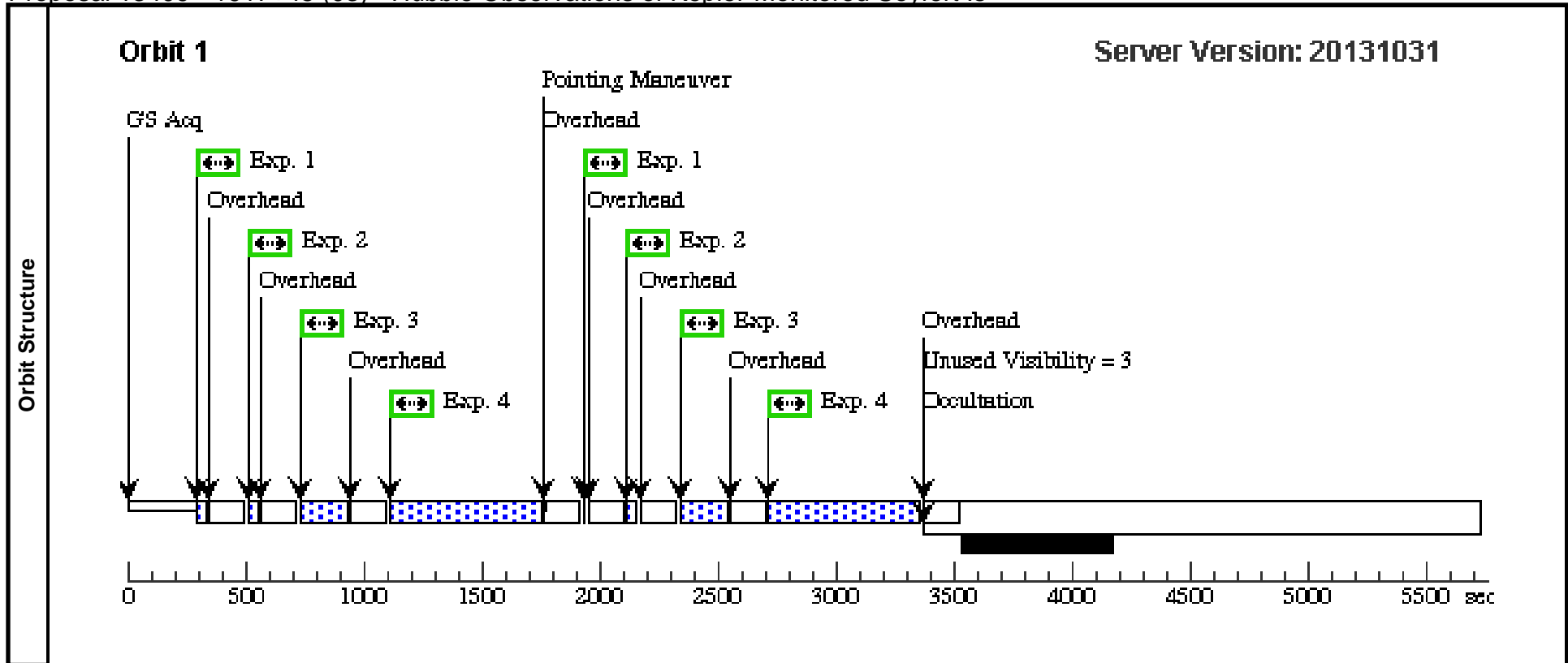
Visit	Proposal 13409, 1910+38 (02), implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: ORIENT 202D TO 247 D; ORIENT 118D TO 148 D									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(1)	Pattern Type=WFC3-UVIS-DITHER- LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1-3)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(2)	1910+38	RA: 19 10 2.4960 (287.5104000d)	Redshift: 0.130	V=17.6+/-0.5	Reference Frame: ICRS				
		Alt Name1: 2MASXJ19100249+3800 094	Dec: +38 00 9.47 (38.00263d) Equinox: J2000							
		Alt Name2: KIC2837332								
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	Short	(2) 1910+38	WFC3/UVIS, ACCUM, UVIS2-2K2C-SUB	F350LP		POS TARG -4.0147 06546641718,-5.764 564717239387	Pattern 1, Exps 1-3 i n 1910+38 (02) (1)	15 Secs (30 Secs) [=>(Pattern 1)] [=>(Pattern 2)]	[1]
	2	Mid	(2) 1910+38	WFC3/UVIS, ACCUM, UVIS2-2K2C-SUB	F350LP		POS TARG -4.0147 06546641718,-5.764 564717239387	Pattern 1, Exps 1-3 i n 1910+38 (02) (1)	200 Secs (400 Secs) [=>(Pattern 1)] [=>(Pattern 2)]	[1]
	3	Long	(2) 1910+38	WFC3/UVIS, ACCUM, UVIS2-2K2C-SUB	F350LP		POS TARG -4.0147 06546641718,-5.764 564717239387	Pattern 1, Exps 1-3 i n 1910+38 (02) (1)	811 Secs (1622 Secs) [=>(Pattern 1)] [=>(Pattern 2)]	[1]



Proposal 13409 - 1917+45 (03) - Hubble Observations of Kepler-Monitored Seyfert Is

Sat Nov 16 02:10:36 GMT 2013

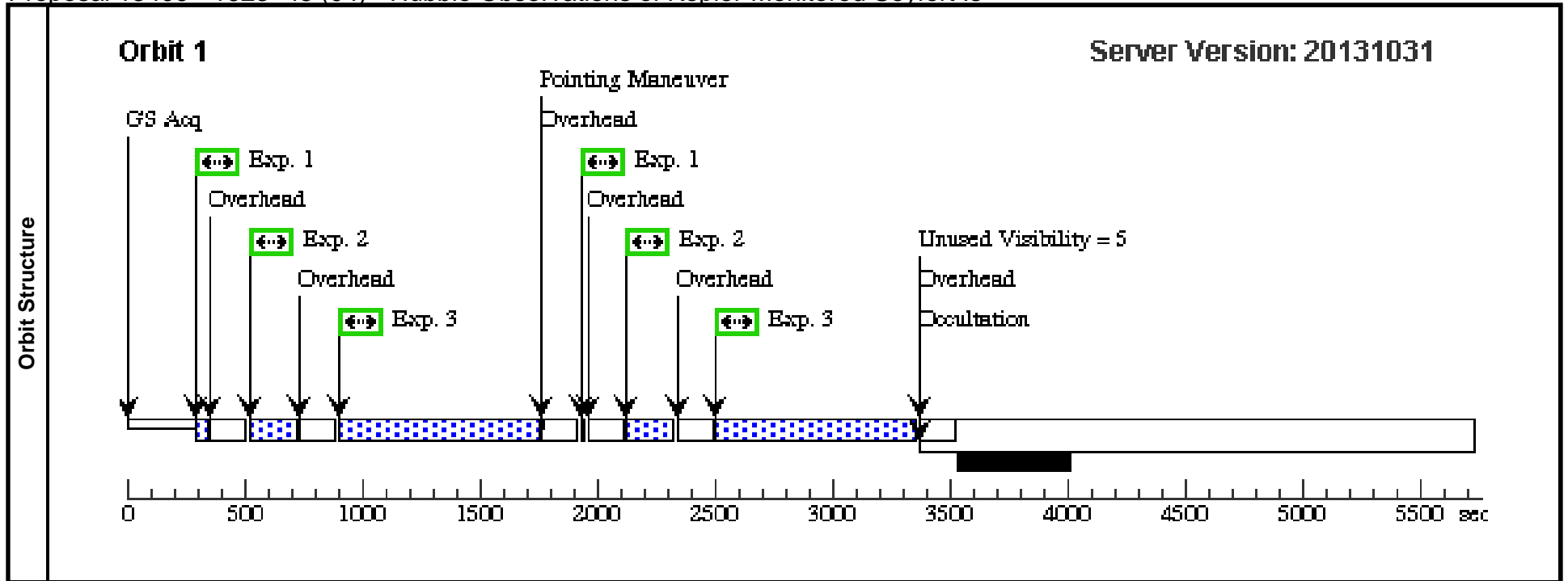
Visit	Proposal 13409, 1917+45 (03), implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: ORIENT 105D TO 266 D									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(1)	Pattern Type=WFC3-UVIS-DITHER- LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1-4)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(3)	1917+45 Alt Name1: 2MASXJ19173481+4513 371 Alt Name2: KIC8946433	RA: 19 17 34.8830 (289.3953458d) Dec: +45 13 37.57 (45.22710d) Equinox: J2000	Redshift: 0.078	V=14.3+/-0.5	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	Short	(3) 1917+45	WFC3/UVIS, ACCUM, UVIS2-2K2C-SUB	F350LP			Pattern 1, Exps 1-4 in 1917+45 (03) (1)	5 Secs (10 Secs) [=>(Pattern 1)] [=>(Pattern 2)]	[1]
	2	Mid	(3) 1917+45	WFC3/UVIS, ACCUM, UVIS2-2K2C-SUB	F350LP			Pattern 1, Exps 1-4 in 1917+45 (03) (1)	40 Secs (80 Secs) [=>(Pattern 1)] [=>(Pattern 2)]	[1]
	3	Longer	(3) 1917+45	WFC3/UVIS, ACCUM, UVIS2-2K2C-SUB	F350LP			Pattern 1, Exps 1-4 in 1917+45 (03) (1)	200 Secs (400 Secs) [=>(Pattern 1)] [=>(Pattern 2)]	[1]
	4	Long	(3) 1917+45	WFC3/UVIS, ACCUM, UVIS2-2K2C-SUB	F350LP			Pattern 1, Exps 1-4 in 1917+45 (03) (1)	645 Secs (1290 Secs) [=>(Pattern 1)] [=>(Pattern 2)]	[1]



Proposal 13409 - 1923+45 (04) - Hubble Observations of Kepler-Monitored Seyfert Is

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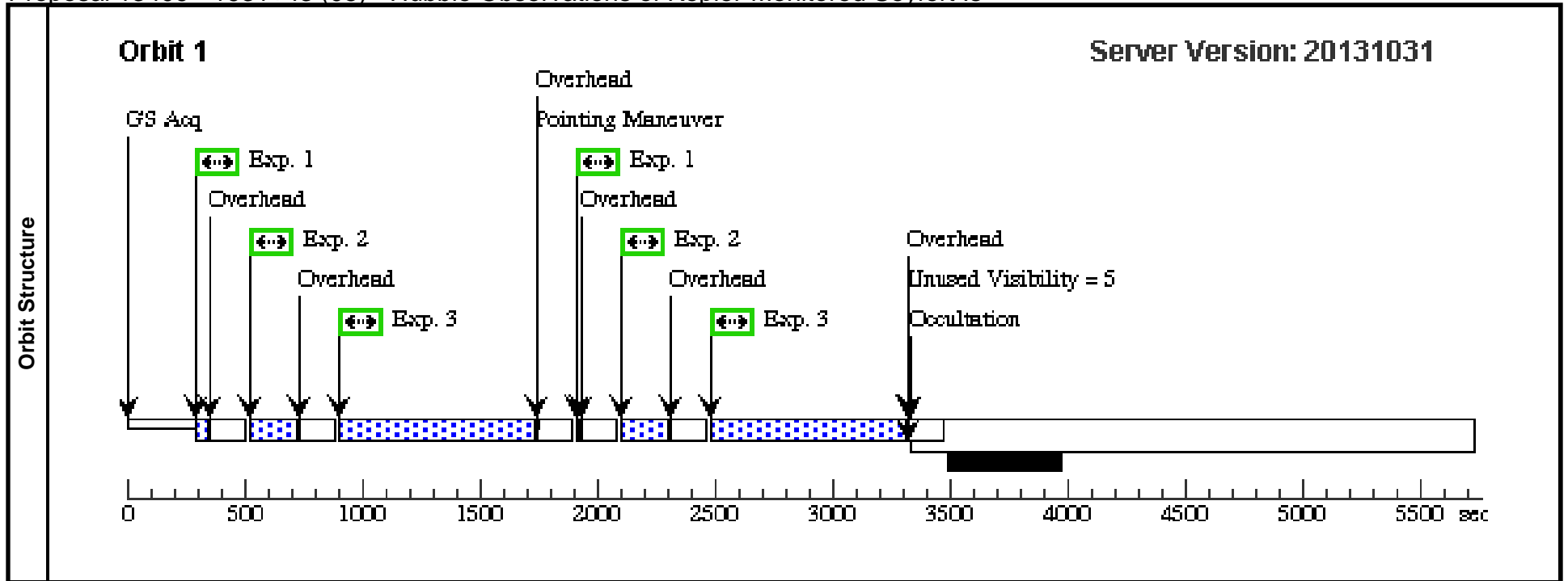
Visit	Proposal 13409, 1923+45 (04), implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: ORIENT 333D TO 347 D; ORIENT 254D TO 262 D									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(1)	Pattern Type=WFC3-UVIS-DITHER- LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1-3)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(4)	1923+45 Alt Name1: 2MASXJ19232454+4548 098 Alt Name2: KIC9339957	RA: 19 23 24.5430 (290.8522625d) Dec: +45 48 9.83 (45.80273d) Equinox: J2000	Redshift: 0.438	V=17.0+/-0.5	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	Short	(4) 1923+45	WFC3/UVIS, ACCUM, UVIS1-2K2A-SUB	F350LP			Pattern 1, Exps 1-3 i n 1923+45 (04) (1)	15 Secs (30 Secs) [=>(Pattern 1)] [=>(Pattern 2)]	[1]
	2	Mid	(4) 1923+45	WFC3/UVIS, ACCUM, UVIS1-2K2A-SUB	F350LP			Pattern 1, Exps 1-3 i n 1923+45 (04) (1)	200 Secs (400 Secs) [=>(Pattern 1)] [=>(Pattern 2)]	[1]
	3	Long	(4) 1923+45	WFC3/UVIS, ACCUM, UVIS1-2K2A-SUB	F350LP			Pattern 1, Exps 1-3 i n 1923+45 (04) (1)	855 Secs (1710 Secs) [=>(Pattern 1)] [=>(Pattern 2)]	[1]



Proposal 13409 - 1931+43 (05) - Hubble Observations of Kepler-Monitored Seyfert Is

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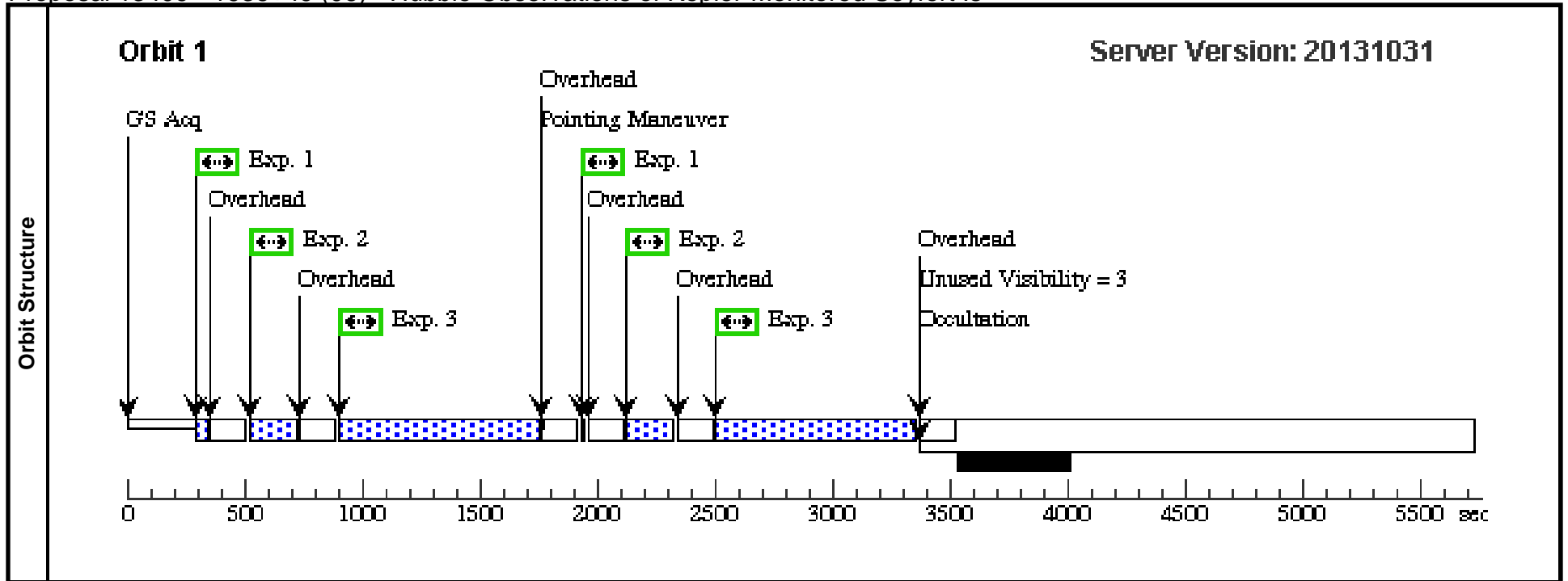
Visit	Proposal 13409, 1931+43 (05), implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: ORIENT 186D TO 334 D; ORIENT 140D TO 165 D									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(1)	Pattern Type=WFC3-UVIS-DITHER- LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1-3)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(5)	1931+43 Alt Name1: 2MASXJ19311256+4313 276 Alt Name2: KIC7610713	RA: 19 31 12.5660 (292.8023583d) Dec: +43 13 27.62 (43.22434d) Equinox: J2000	Redshift: 0.439	V=16.7+/-0.5	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	Short	(5) 1931+43	WFC3/UVIS, ACCUM, UVIS2-2K2C-SUB	F350LP			Pattern 1, Exps 1-3 i n 1931+43 (05) (1)	15 Secs (30 Secs) [=>(Pattern 1)] [=>(Pattern 2)]	[1]
	2	Mid	(5) 1931+43	WFC3/UVIS, ACCUM, UVIS2-2K2C-SUB	F350LP			Pattern 1, Exps 1-3 i n 1931+43 (05) (1)	200 Secs (400 Secs) [=>(Pattern 1)] [=>(Pattern 2)]	[1]
	3	Long	(5) 1931+43	WFC3/UVIS, ACCUM, UVIS2-2K2C-SUB	F350LP			Pattern 1, Exps 1-3 i n 1931+43 (05) (1)	833 Secs (1666 Secs) [=>(Pattern 1)] [=>(Pattern 2)]	[1]



Proposal 13409 - 1936+49 (06) - Hubble Observations of Kepler-Monitored Seyfert Is

Sat Nov 16 02:10:38 GMT 2013

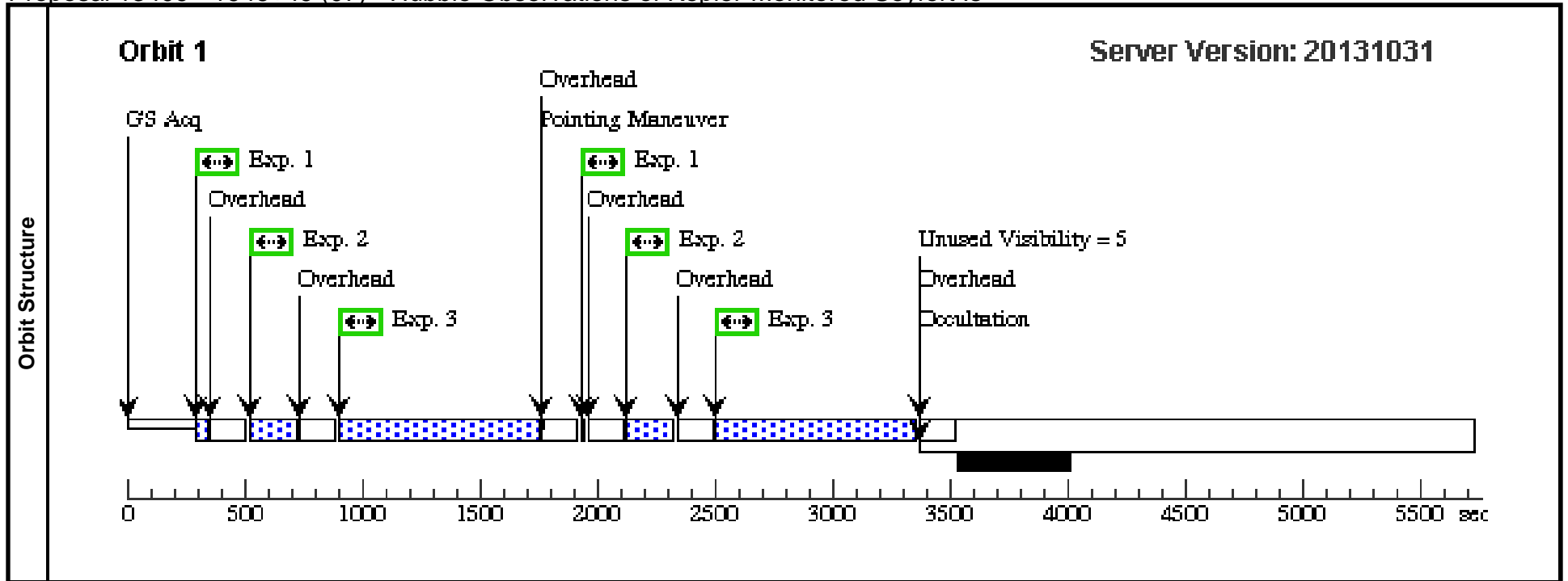
Visit	Proposal 13409, 1936+49 (06), implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: ORIENT 297D TO 335 D; ORIENT 207D TO 243 D; ORIENT 119D TO 153 D; ORIENT 26D TO 61 D									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(1)	Pattern Type=WFC3-UVIS-DITHER- LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1-3)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(6)	1936+49	RA: 19 36 3.0770 (294.0128208d)	Redshift: 0.204	V=17.9+/-0.5	Reference Frame: ICRS				
		Alt Name1: 2MASXJ19360307+4936 167	Dec: +49 36 16.78 (49.60466d) Equinox: J2000							
		Alt Name2: KIC11614932								
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	Short	(6) 1936+49	WFC3/UVIS, ACCUM, UVIS2-2K2C-SUB	F350LP			Pattern 1, Exps 1-3 i n 1936+49 (06) (1)	15 Secs (30 Secs)	
									[==>(Pattern 1)] [==>(Pattern 2)]	[1]
	2	Mid	(6) 1936+49	WFC3/UVIS, ACCUM, UVIS2-2K2C-SUB	F350LP			Pattern 1, Exps 1-3 i n 1936+49 (06) (1)	200 Secs (400 Secs)	
								[==>(Pattern 1)] [==>(Pattern 2)]	[1]	
	3	Long	(6) 1936+49	WFC3/UVIS, ACCUM, UVIS2-2K2C-SUB	F350LP			Pattern 1, Exps 1-3 i n 1936+49 (06) (1)	856 Secs (1712 Secs)	
								[==>(Pattern 1)] [==>(Pattern 2)]	[1]	



Proposal 13409 - 1946+49 (07) - Hubble Observations of Kepler-Monitored Seyfert Is

Sat Nov 16 02:10:39 GMT 2013

Visit	Proposal 13409, 1946+49 (07), implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: ORIENT 280D TO 342 D									
	Patterns	#	Primary Pattern				Secondary Pattern			Exposures
(1)		Pattern Type=WFC3-UVIS-DITHER- LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=				Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false			(1-3)	
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes	Miscellaneous		
	(7)	1946+49	RA: 19 46 5.5490 (296.5231208d)		Redshift: 0.161		V=17.1+/-0.5	Reference Frame: ICRS		
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	Short	(7) 1946+49	WFC3/UVIS, ACCUM, UVIS2-2K2C-SUB	F350LP			Pattern 1, Exps 1-3 i n 1946+49 (07) (1)	15 Secs (30 Secs) [=>(Pattern 1)] [=>(Pattern 2)]	[1]
2	Mid	(7) 1946+49	WFC3/UVIS, ACCUM, UVIS2-2K2C-SUB	F350LP			Pattern 1, Exps 1-3 i n 1946+49 (07) (1)	200 Secs (400 Secs) [=>(Pattern 1)] [=>(Pattern 2)]	[1]	
3	Long	(7) 1946+49	WFC3/UVIS, ACCUM, UVIS2-2K2C-SUB	F350LP			Pattern 1, Exps 1-3 i n 1946+49 (07) (1)	855 Secs (1710 Secs) [=>(Pattern 1)] [=>(Pattern 2)]	[1]	



Proposal 13409 - 1954+48 (08) - Hubble Observations of Kepler-Monitored Seyfert Is

Sat Nov 16 02:10:40 GMT 2013

Visit	Proposal 13409, 1954+48 (08), implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: ORIENT 301D TO 304 D; ORIENT 314D TO 323 D									
Patterns	#	Primary Pattern			Secondary Pattern		Exposures			
	(1)	Pattern Type=WFC3-UVIS-DITHER- LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing= Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false					(1-3)			
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(8)	1954+48 Alt Name1: 2MASXJ19540028+4813 198 Alt Name2: KIC10879978	RA: 19 54 0.2880 (298.5012000d) Dec: +48 13 19.85 (48.22218d) Equinox: J2000	Redshift: 0.174	V=17.3+/-0.5	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	Short	(8) 1954+48	WFC3/UVIS, ACCUM, UVIS1-2K2A-SUB	F350LP		POS TARG 12.3984 21214788101,-6.926 78718893557	Pattern 1, Exps 1-3 i n 1954+48 (08) (1)	15 Secs (30 Secs) [=>(Pattern 1)] [=>(Pattern 2)]	[1]
	2	Mid	(8) 1954+48	WFC3/UVIS, ACCUM, UVIS1-2K2A-SUB	F350LP		POS TARG 12.3984 21214788101,-6.926 78718893557	Pattern 1, Exps 1-3 i n 1954+48 (08) (1)	200 Secs (400 Secs) [=>(Pattern 1)] [=>(Pattern 2)]	[1]
	3	Long	(8) 1954+48	WFC3/UVIS, ACCUM, UVIS1-2K2A-SUB	F350LP		POS TARG 12.3984 21214788101,-6.926 78718893557	Pattern 1, Exps 1-3 i n 1954+48 (08) (1)	855 Secs (1710 Secs) [=>(Pattern 1)] [=>(Pattern 2)]	[1]

