



18095 - The Hidden Engines That Could: Tracing Clump Formation and Evolution in the Hearts of Infrared-Luminous AGN Hosts

Cycle: 33, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

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Dr. Laura Lenkic (CoI)	California Institute of Technology
Dr. Nuria Torres-Alba (CoI)	The University of Virginia
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Dr. Thomas Lai (CoI)	California Institute of Technology
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Dr. Jason A. Surace (CoI)	California Institute of Technology
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Dr. Cosima Eibensteiner (CoI)	National Radio Astronomical Observatory
Jaya Nagarajan-Swenson (CoI)	The University of Virginia
Mr. Alejandro Saravia (CoI)	The University of Virginia

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) ESO420-G013	WFC3/IR	1	13-Aug-2025 15:04:23.0	yes
02	(2) NGC5990	WFC3/IR	1	13-Aug-2025 15:04:24.0	yes
03	(3) NGC1961	WFC3/IR	1	13-Aug-2025 15:04:24.0	yes
04	(4) NGC5135	WFC3/IR	1	13-Aug-2025 15:04:25.0	yes
05	(5) NGC7130	WFC3/IR	1	13-Aug-2025 15:04:26.0	yes
06	(6) ESO432-IG006	WFC3/IR	1	13-Aug-2025 15:04:27.0	yes
07	(7) MCG-03-34-064	WFC3/IR	1	13-Aug-2025 15:04:27.0	yes
08	(8) NGC3110	WFC3/IR	1	13-Aug-2025 15:04:28.0	yes
09	(9) NGC1275	WFC3/IR	1	13-Aug-2025 15:04:29.0	yes
10	(10) NGC0958	WFC3/IR	1	13-Aug-2025 15:04:30.0	yes
11	(11) ESO339-G011	WFC3/IR	1	13-Aug-2025 15:04:31.0	yes
12	(12) NGC0034	WFC3/IR	1	13-Aug-2025 15:04:32.0	yes
13	(13) UGC02608	WFC3/IR	1	13-Aug-2025 15:04:32.0	yes
14	(14) IC5298	WFC3/IR	1	13-Aug-2025 15:04:33.0	yes
15	(15) NGC7674	WFC3/IR	1	13-Aug-2025 15:04:34.0	yes
16	(16) AM0702	WFC3/IR	1	13-Aug-2025 15:04:35.0	yes

16 Total Orbits Used

ABSTRACT

Galaxies evolve through a combination of secular processes, such as cold gas accretion, and through non-secular processes, such as galactic mergers, which can trigger massive starbursts and powerful active galactic nuclei (AGN). The ideal laboratories for studying the co-existence of starburst and AGN activity at high-resolution are low-redshift luminous infrared galaxies (LIRGs), which are primarily gas-rich merging spirals that drive the formation of massive star-forming clumps that rival in size and SFR surface density those found in high-redshift galaxies. We propose a HST WFC3/IR program to obtain Pa-beta line emission (F130N and F132N) and adjacent wide-band continuum (F110W and F160W) observations of 16 LIRGs that host AGN in the local Universe. Although many LIRGs have been mapped in Pa-beta emission, LIRGs that host powerful AGN (with a

bolometric luminosity fraction $> 20\%$) have been critically missed in existing studies. Due to the redshifts of these powerful AGN, their Pa-beta emission cannot be observed in the near-IR (NIR) with the available narrow-band filters on JWST. With measurements of the Pa-beta equivalent width, we will estimate the ages, masses and star formation rates of these stellar clumps and compare them to clump properties of previously studied starburst-dominated LIRGs. This proposed work provides, for the first time, a study of how AGN affect the formation and evolution of massive stellar clumps in nearby LIRGs.

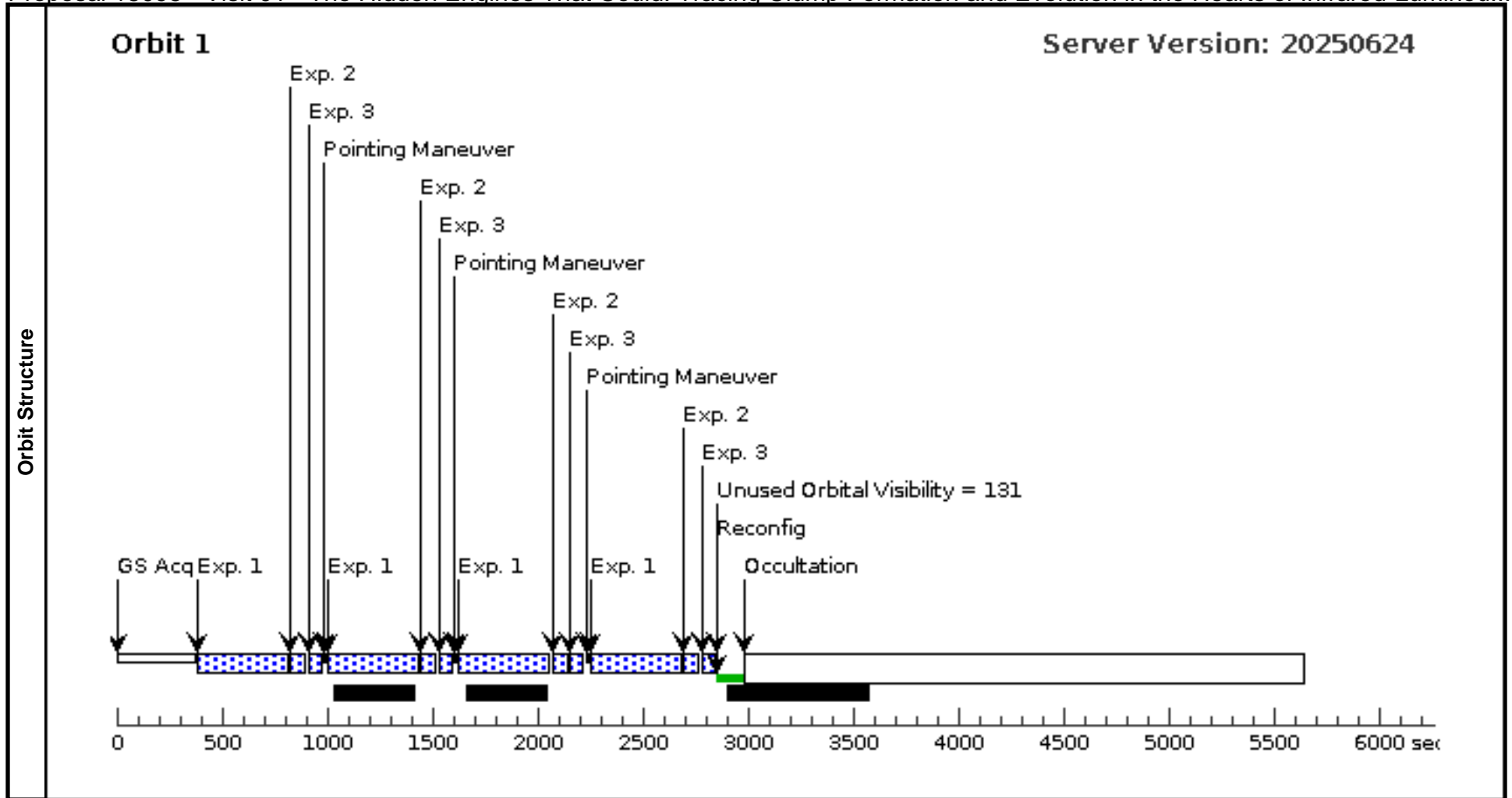
OBSERVING DESCRIPTION

This is a HST WFC3/IR program to obtain Pa-beta line emission (F130N and F132N) and adjacent wide-band continuum (F110W and F160W) observations of 16 LIRGs that host AGN in the local Universe. The F130N filter was chosen for galaxies with $z < 0.0225$, and the F132N filter was selected for galaxies within $0.0225 < z < 0.0352$. We have estimated the typical surface density of the Pa-beta line emission that we expect to observe in our targets using archival Pa-beta imaging of LIRGs (Larson et al. 2020). The measured surface densities for star forming regions observed in this sample ranges from $2 \times 10^{-18} - 2 \times 10^{-16} \text{ erg s}^{-1} \text{ cm}^{-2} \text{ A}^{-1} \text{ arcsec}^{-2}$. We further estimate the surface brightness of our targets in the wide-band F110W and F160W filters to be between $5 \times 10^{-18} - 2 \times 10^{-17} \text{ erg s}^{-1} \text{ cm}^{-2} \text{ A}^{-1} \text{ arcsec}^{-2}$. Therefore, we use $5 \times 10^{-18} \text{ erg s}^{-1} \text{ cm}^{-2} \text{ A}^{-1} \text{ arcsec}^{-2}$ as input for the 1.1 and 1.6um flux surface densities in the WFC3/IR ETC. We find that a single orbit is enough to image each of our LIRG systems with all filters. We have therefore distributed the time available for each orbit as follows: ~ 30 minutes of integration time for the narrow-band F132N or F130N Pa-beta line filter (dependent on the redshift of the object), ~ 3 minutes for the wide-band F110W filter, and ~ 3 minutes for the wide-band F160W filter. Thus, the 16 LIRG systems can be observed in 16 orbits. In order to detect and measure the clump properties, we use the python code `astrodendro`, which computes a dendrogram, i.e. a branching tree, of hierarchical structure of the image. This procedure compares each possible clump to the local background and therefore successfully identifies clumps down to the lowest detectable flux limit (Oklopčić et al. 2017). With measurements of the Pa-beta equivalent width, we will estimate the ages, masses and star formation rates of these stellar clumps and compare them to clump properties of previously studied starburst-dominated LIRGs.

Proposal 18095 - Visit 01 - The Hidden Engines That Could: Tracing Clump Formation and Evolution in the Hearts of Infrared-Luminou...

Wed Aug 13 19:04:35 GMT 2025

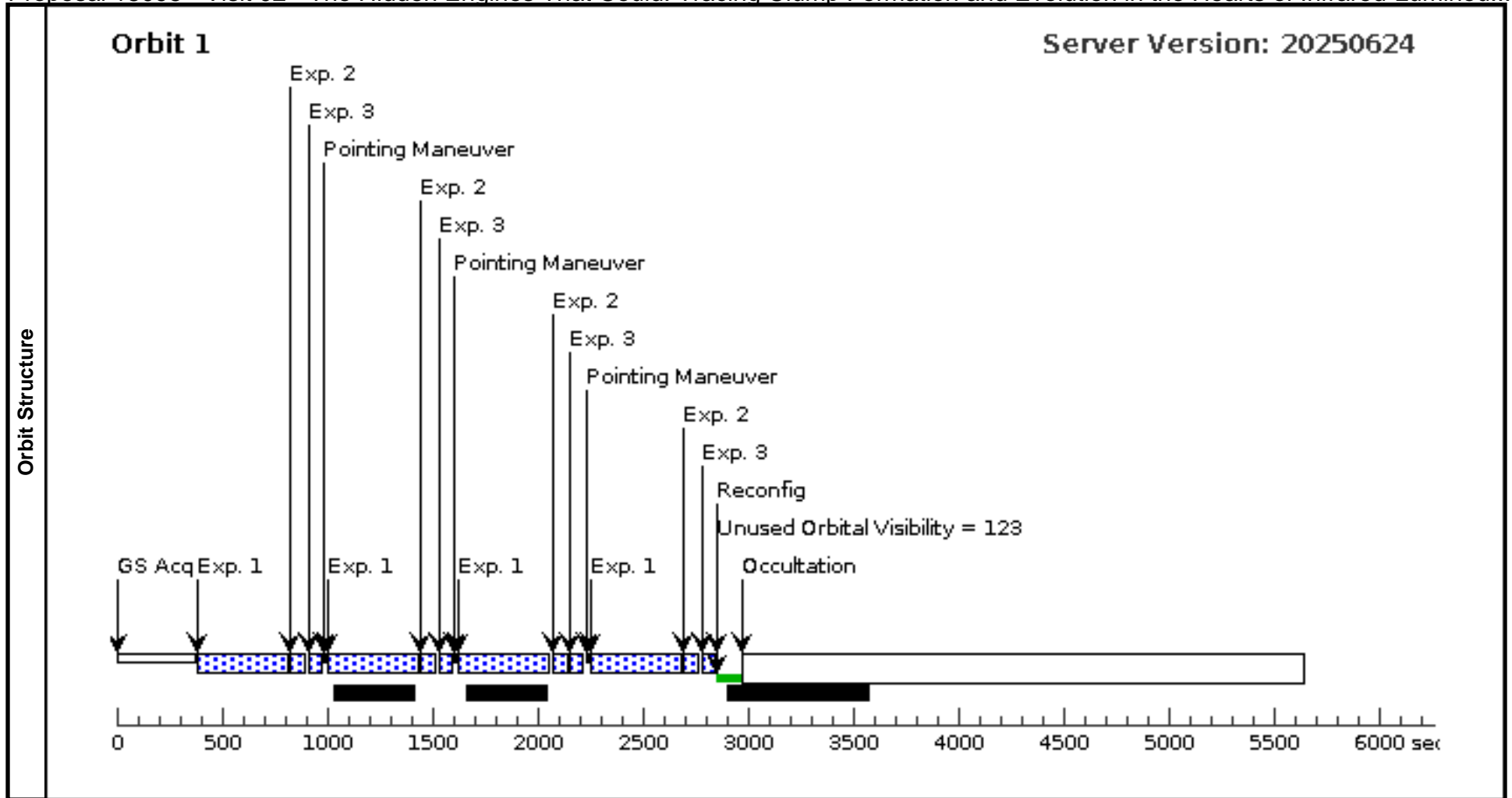
Visit	Proposal 18095, Visit 01, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR Special Requirements: (none)									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(1)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(1-3)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	ESO420-G013	RA: 04 13 49.6900 (63.4570417d) Dec: -32 00 25.10 (-32.00697d) Equinox: J2000	Epoch of Position: 2015.5	V=13.3	Reference Frame: SIMBAD				
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i> Category=GALAXY Description=[INTERACTING GALAXY, ULTRALUMINOUS IR GAL]										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) ESO420-G013	WFC3/IR, MULTIACCUM, IR	F130N	NSAMP=5; SAMP-SEQ=SPAR S100		Pattern 1, Exps 1-3 in Visit 01 (1)	402.933583 Secs (1611.734 Secs)	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(1) ESO420-G013	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=5; SAMP-SEQ=SPAR S10		Pattern 1, Exps 1-3 in Visit 01 (1)	42.936143 Secs (171.745 Secs)	
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	
3		(1) ESO420-G013	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=5; SAMP-SEQ=SPAR S10		Pattern 1, Exps 1-3 in Visit 01 (1)	42.936143 Secs (171.745 Secs)		
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	



Proposal 18095 - Visit 02 - The Hidden Engines That Could: Tracing Clump Formation and Evolution in the Hearts of Infrared-Luminou...

Wed Aug 13 19:04:35 GMT 2025

Visit	Proposal 18095, Visit 02, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR Special Requirements: (none)									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(1)	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		(1-3)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(2)	NGC5990	RA: 15 46 16.3700 (236.5682083d) Dec: +02 24 55.70 (2.41547d) Equinox: J2000		V=13.3	Reference Frame: NED				
<i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i> Category=GALAXY Description=[INTERACTING GALAXY, ULTRALUMINOUS IR GAL]										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(2) NGC5990	WFC3/IR, MULTIACCUM, IR	F130N	NSAMP=5; SAMP-SEQ=SPAR S100		Pattern 1, Exps 1-3 in Visit 02 (1)	402.933583 Secs (1611.734 Secs)	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(2) NGC5990	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=5; SAMP-SEQ=SPAR S10		Pattern 1, Exps 1-3 in Visit 02 (1)	42.936143 Secs (171.745 Secs)	
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	
3		(2) NGC5990	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=5; SAMP-SEQ=SPAR S10		Pattern 1, Exps 1-3 in Visit 02 (1)	42.936143 Secs (171.745 Secs)		
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	



Proposal 18095 - Visit 03 - The Hidden Engines That Could: Tracing Clump Formation and Evolution in the Hearts of Infrared-Luminou...

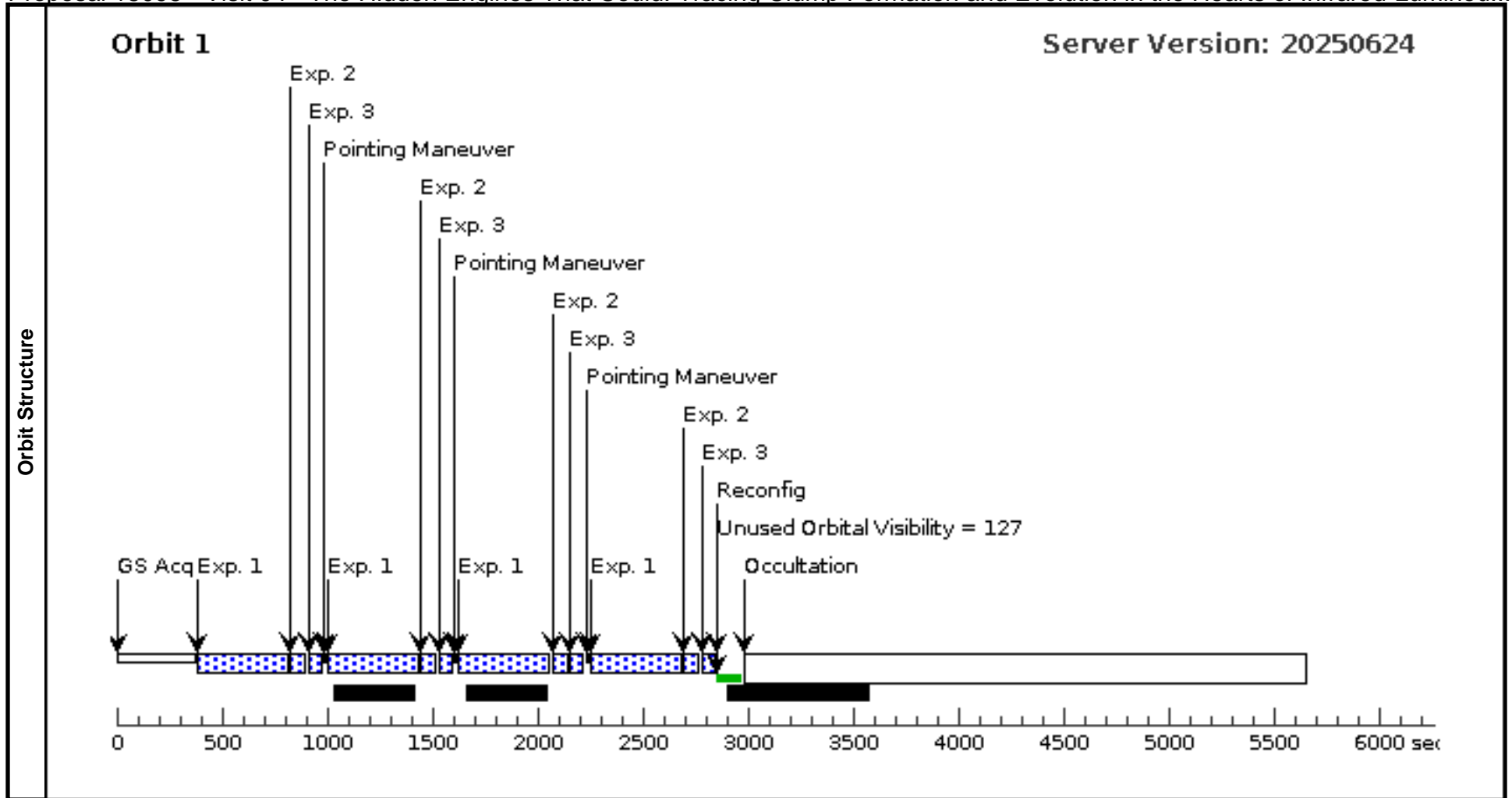
Wed Aug 13 19:04:35 GMT 2025

Visit	Proposal 18095, Visit 03, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR Special Requirements: (none)									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(1)	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		(1-3)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(3)	NGC1961	RA: 05 42 4.6500 (85.5193750d) Dec: +69 22 42.40 (69.37844d) Equinox: J2000	Epoch of Position: 2015.5	V=11.0	Reference Frame: SIMBAD				
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i> Category=GALAXY Description=[INTERACTING GALAXY, ULTRALUMINOUS IR GAL]										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(3) NGC1961	WFC3/IR, MULTIACCUM, IR	F130N	NSAMP=5; SAMP-SEQ=SPAR S100		Pattern 1, Exps 1-3 in Visit 03 (1)	402.933583 Secs (1611.734 Secs)	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(3) NGC1961	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=5; SAMP-SEQ=SPAR S10		Pattern 1, Exps 1-3 in Visit 03 (1)	42.936143 Secs (171.745 Secs)	
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	
3		(3) NGC1961	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=5; SAMP-SEQ=SPAR S10		Pattern 1, Exps 1-3 in Visit 03 (1)	42.936143 Secs (171.745 Secs)		
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	

Proposal 18095 - Visit 04 - The Hidden Engines That Could: Tracing Clump Formation and Evolution in the Hearts of Infrared-Luminou...

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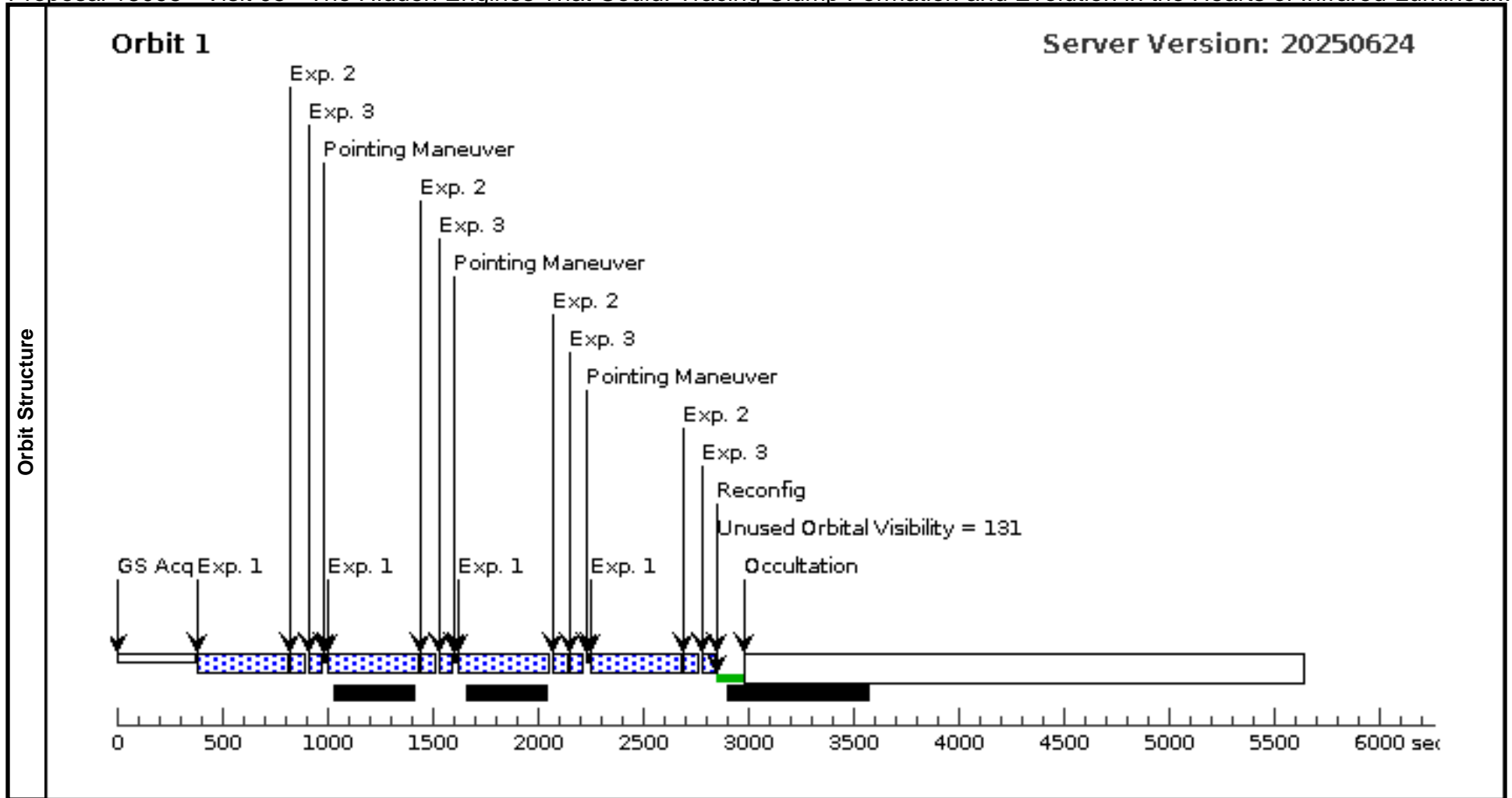
Visit	Proposal 18095, Visit 04, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR Special Requirements: (none)									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
	(1)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(1-3)					
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(4)	NGC5135	RA: 13 25 44.0600 (201.4335833d) Dec: -29 50 1.20 (-29.83367d) Equinox: J2000	Epoch of Position: 2015.5	V=12.1	Reference Frame: SIMBAD				
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i> Category=GALAXY Description=[INTERACTING GALAXY, ULTRALUMINOUS IR GAL]										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(4) NGC5135	WFC3/IR, MULTIACCUM, IR	F130N	NSAMP=5; SAMP-SEQ=SPAR S100		Pattern 1, Exps 1-3 in Visit 04 (1)	402.933583 Secs (1611.734 Secs)	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(4) NGC5135	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=5; SAMP-SEQ=SPAR S10		Pattern 1, Exps 1-3 in Visit 04 (1)	42.936143 Secs (171.745 Secs)	
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	
3		(4) NGC5135	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=5; SAMP-SEQ=SPAR S10			Pattern 1, Exps 1-3 in Visit 04 (1)	42.936143 Secs (171.745 Secs)	
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	



Proposal 18095 - Visit 05 - The Hidden Engines That Could: Tracing Clump Formation and Evolution in the Hearts of Infrared-Luminou...

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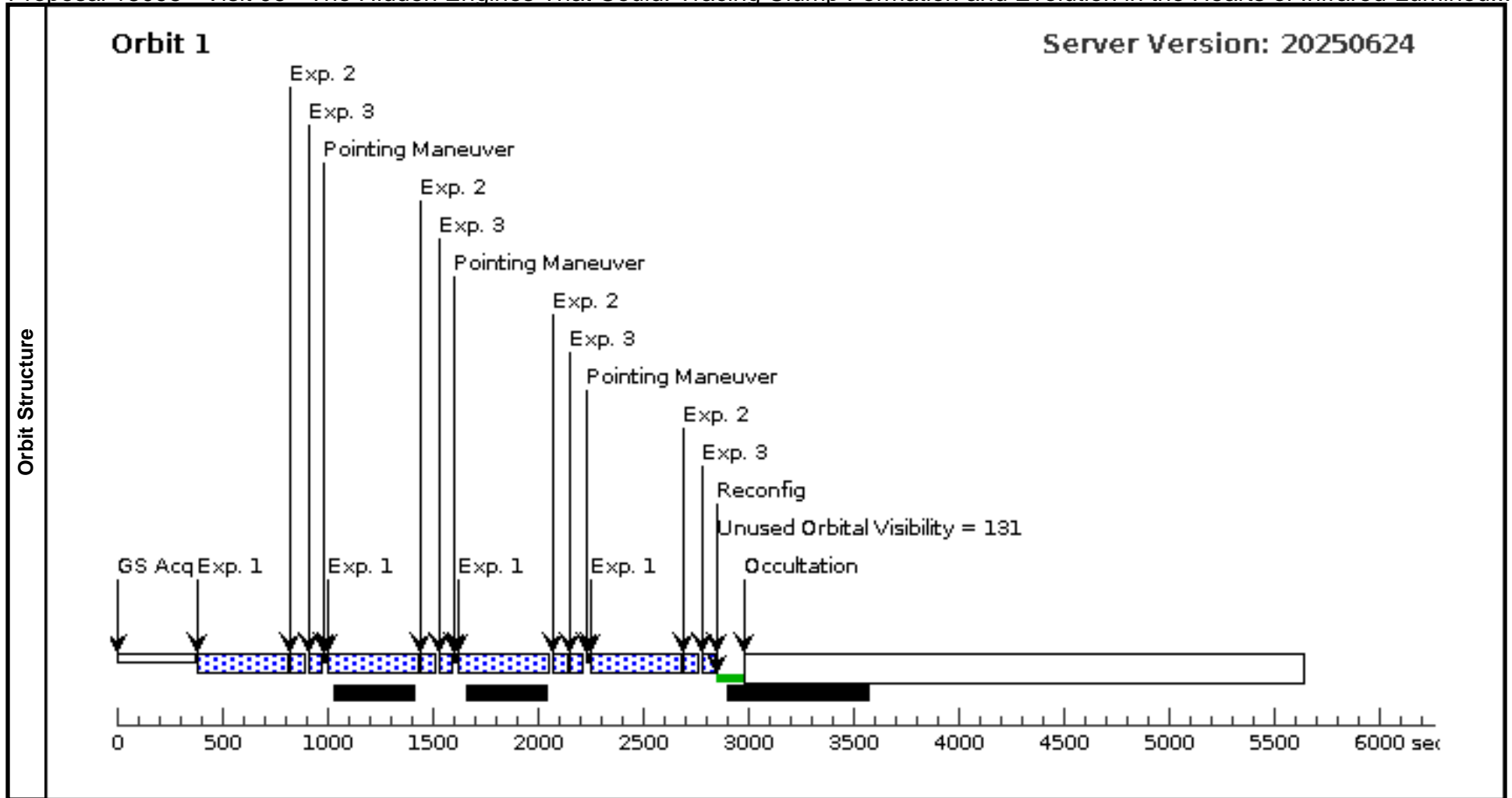
Visit	Proposal 18095, Visit 05, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR Special Requirements: (none)									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(1)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(1-3)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(5)	NGC7130	RA: 21 48 19.5000 (327.0812500d) Dec: -34 57 4.70 (-34.95131d) Equinox: J2000	Epoch of Position: 2015.5	V=12.9	Reference Frame: SIMBAD				
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i> Category=GALAXY Description=[INTERACTING GALAXY, ULTRALUMINOUS IR GAL]										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(5) NGC7130	WFC3/IR, MULTIACCUM, IR	F130N	NSAMP=5; SAMP-SEQ=SPAR S100		Pattern 1, Exps 1-3 in Visit 05 (1)	402.933583 Secs (1611.734 Secs)	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(5) NGC7130	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=5; SAMP-SEQ=SPAR S10		Pattern 1, Exps 1-3 in Visit 05 (1)	42.936143 Secs (171.745 Secs)	
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	
3		(5) NGC7130	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=5; SAMP-SEQ=SPAR S10			Pattern 1, Exps 1-3 in Visit 05 (1)	42.936143 Secs (171.745 Secs)	
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	



Proposal 18095 - Visit 06 - The Hidden Engines That Could: Tracing Clump Formation and Evolution in the Hearts of Infrared-Luminou...

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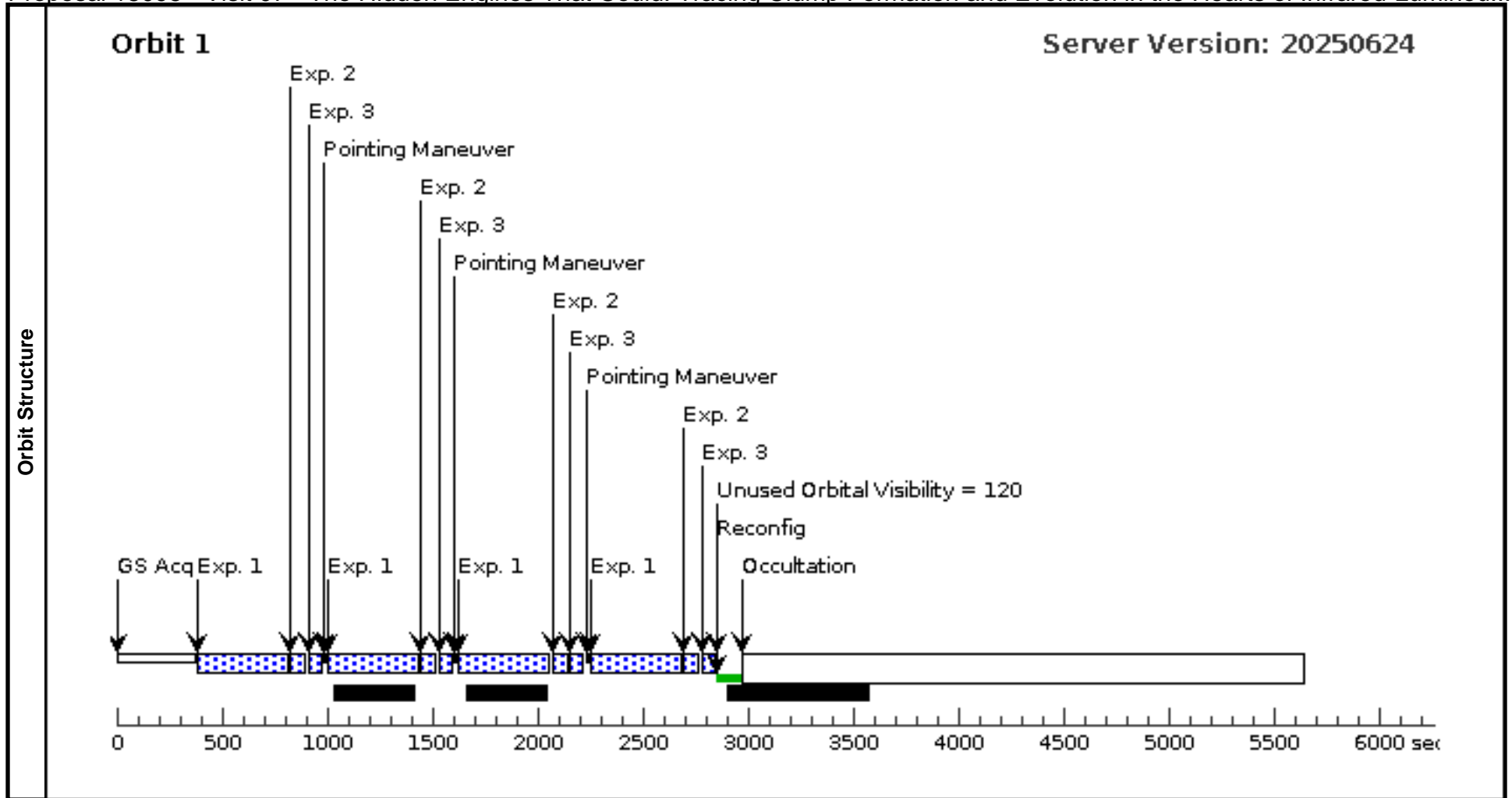
Visit	Proposal 18095, Visit 06, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR Special Requirements: (none)									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(1)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(1-3)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(6)	ESO432-IG006	RA: 08 44 28.0700 (131.1169583d) Dec: -31 41 40.60 (-31.69461d) Equinox: J2000	Epoch of Position: 2015.5	V=16.4	Reference Frame: SIMBAD				
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i> Category=GALAXY Description=[INTERACTING GALAXY, ULTRALUMINOUS IR GAL]										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(6) ESO432-IG006	WFC3/IR, MULTIACCUM, IR	F130N	NSAMP=5; SAMP-SEQ=SPAR S100		Pattern 1, Exps 1-3 in Visit 06 (1)	402.933583 Secs (1611.734 Secs)	
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	2		(6) ESO432-IG006	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=5; SAMP-SEQ=SPAR S10		Pattern 1, Exps 1-3 in Visit 06 (1)	42.936143 Secs (171.745 Secs)	
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	
3		(6) ESO432-IG006	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=5; SAMP-SEQ=SPAR S10		Pattern 1, Exps 1-3 in Visit 06 (1)	42.936143 Secs (171.745 Secs)		
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	



Proposal 18095 - Visit 07 - The Hidden Engines That Could: Tracing Clump Formation and Evolution in the Hearts of Infrared-Luminou...

Wed Aug 13 19:04:36 GMT 2025

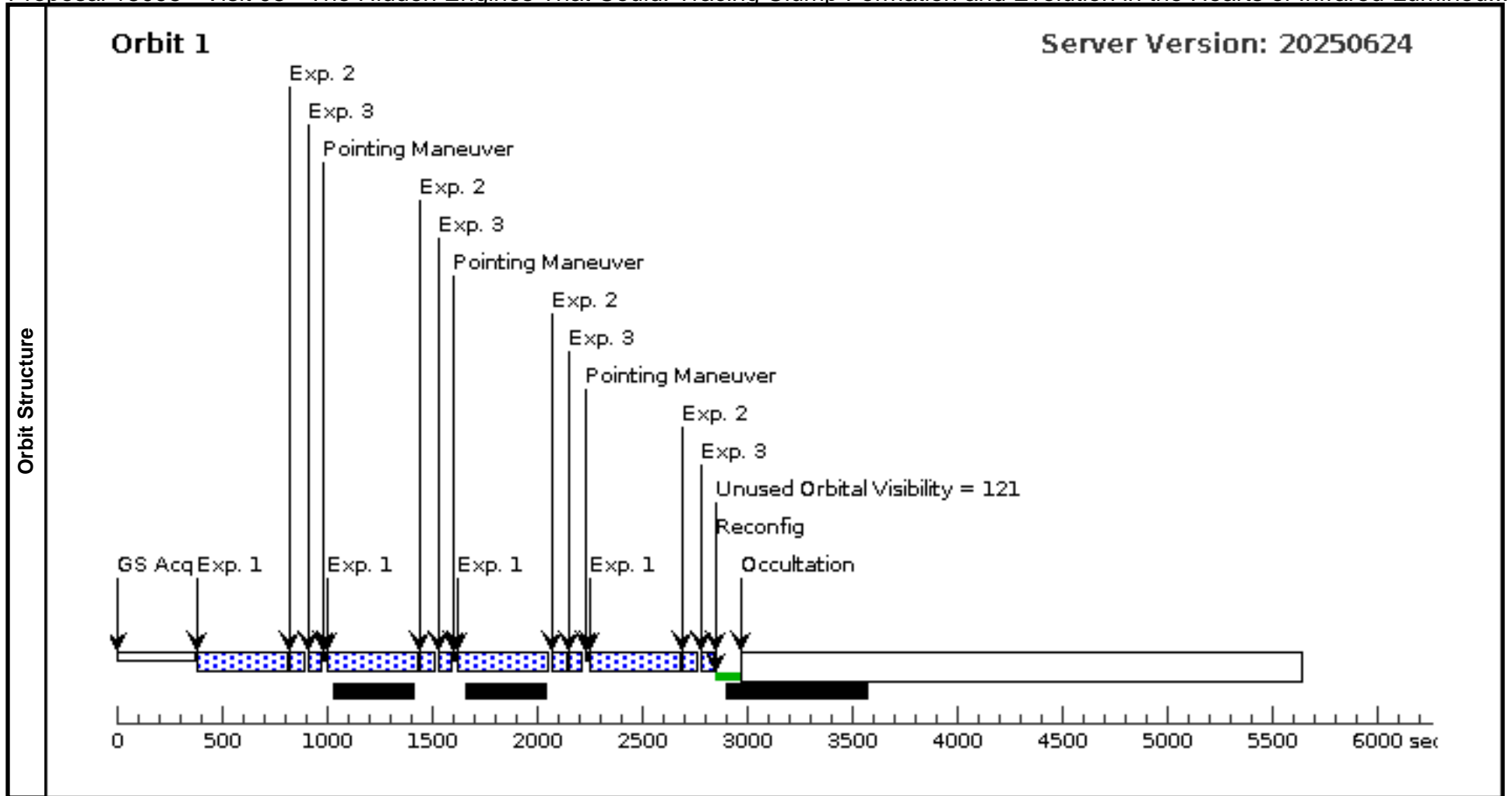
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	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(1)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(1-3)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(7)	MCG-03-34-064	RA: 13 22 24.4600 (200.6019167d) Dec: -16 43 42.90 (-16.72858d) Equinox: J2000	Epoch of Position: 2015.5	V=13.6	Reference Frame: SIMBAD				
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i> Category=GALAXY Description=[INTERACTING GALAXY, ULTRALUMINOUS IR GAL]										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(7) MCG-03-34-064	WFC3/IR, MULTIACCUM, IR	F130N	NSAMP=5; SAMP-SEQ=SPAR S100		Pattern 1, Exps 1-3 in Visit 07 (1)	402.933583 Secs (1611.734 Secs)	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(7) MCG-03-34-064	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=5; SAMP-SEQ=SPAR S10		Pattern 1, Exps 1-3 in Visit 07 (1)	42.936143 Secs (171.745 Secs)	
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	
	3		(7) MCG-03-34-064	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=5; SAMP-SEQ=SPAR S10		Pattern 1, Exps 1-3 in Visit 07 (1)	42.936143 Secs (171.745 Secs)	
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	



Proposal 18095 - Visit 08 - The Hidden Engines That Could: Tracing Clump Formation and Evolution in the Hearts of Infrared-Luminou...

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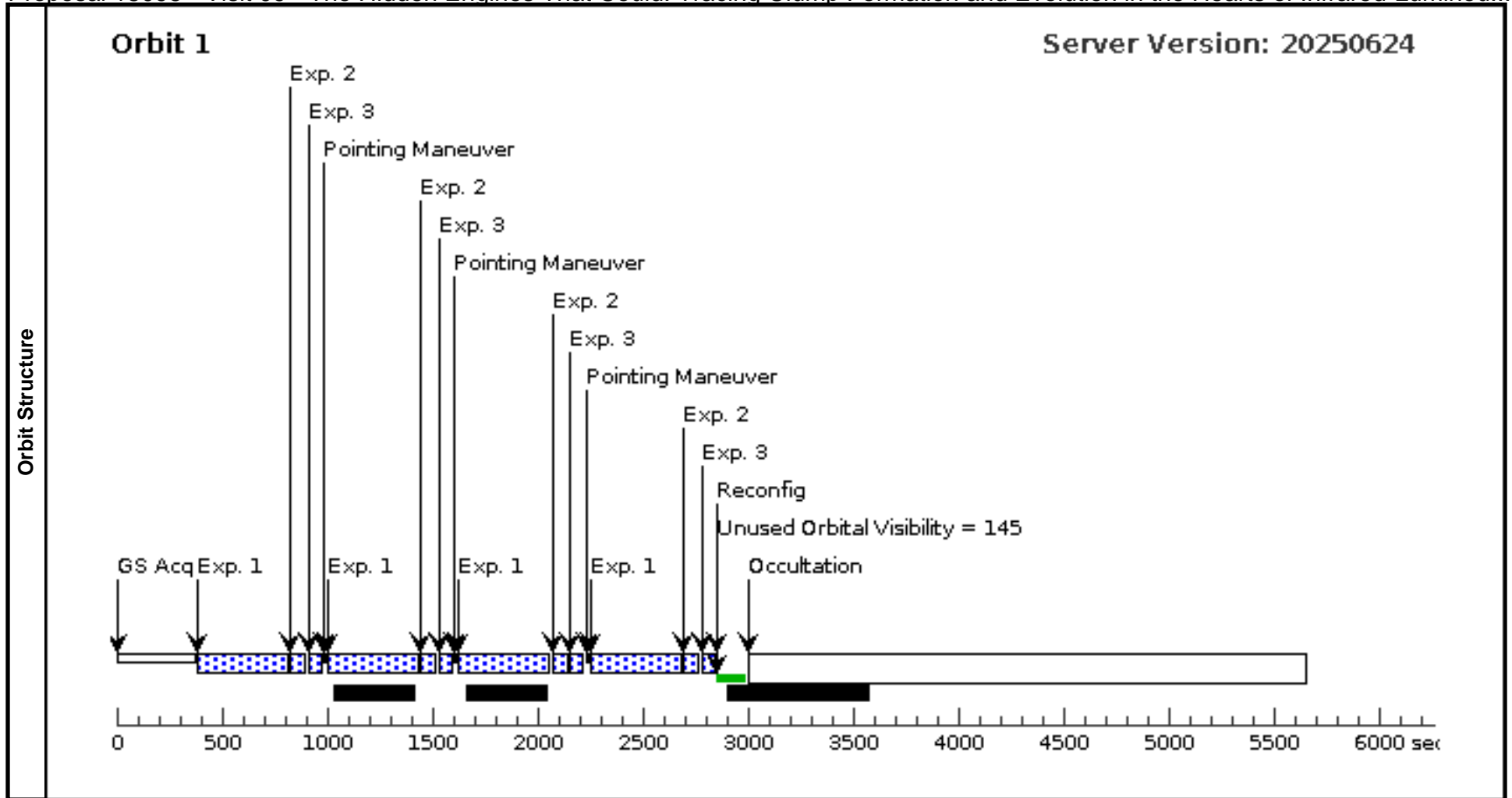
Visit	Proposal 18095, Visit 08, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR Special Requirements: (none)									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(1)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(1-3)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(8)	NGC3110	RA: 10 04 2.1100 (151.0087917d) Dec: -06 28 29.20 (-6.47478d) Equinox: J2000		V=13.4	Reference Frame: NED				
<i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i> Category=GALAXY Description=[INTERACTING GALAXY, ULTRALUMINOUS IR GAL]										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(8) NGC3110	WFC3/IR, MULTIACCUM, IR	F130N	NSAMP=5; SAMP-SEQ=SPAR S100		Pattern 1, Exps 1-3 in Visit 08 (1)	402.933583 Secs (1611.734 Secs)	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(8) NGC3110	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=5; SAMP-SEQ=SPAR S10		Pattern 1, Exps 1-3 in Visit 08 (1)	42.936143 Secs (171.745 Secs)	
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	
3		(8) NGC3110	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=5; SAMP-SEQ=SPAR S10		Pattern 1, Exps 1-3 in Visit 08 (1)	42.936143 Secs (171.745 Secs)		
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	



Proposal 18095 - Visit 09 - The Hidden Engines That Could: Tracing Clump Formation and Evolution in the Hearts of Infrared-Luminou...

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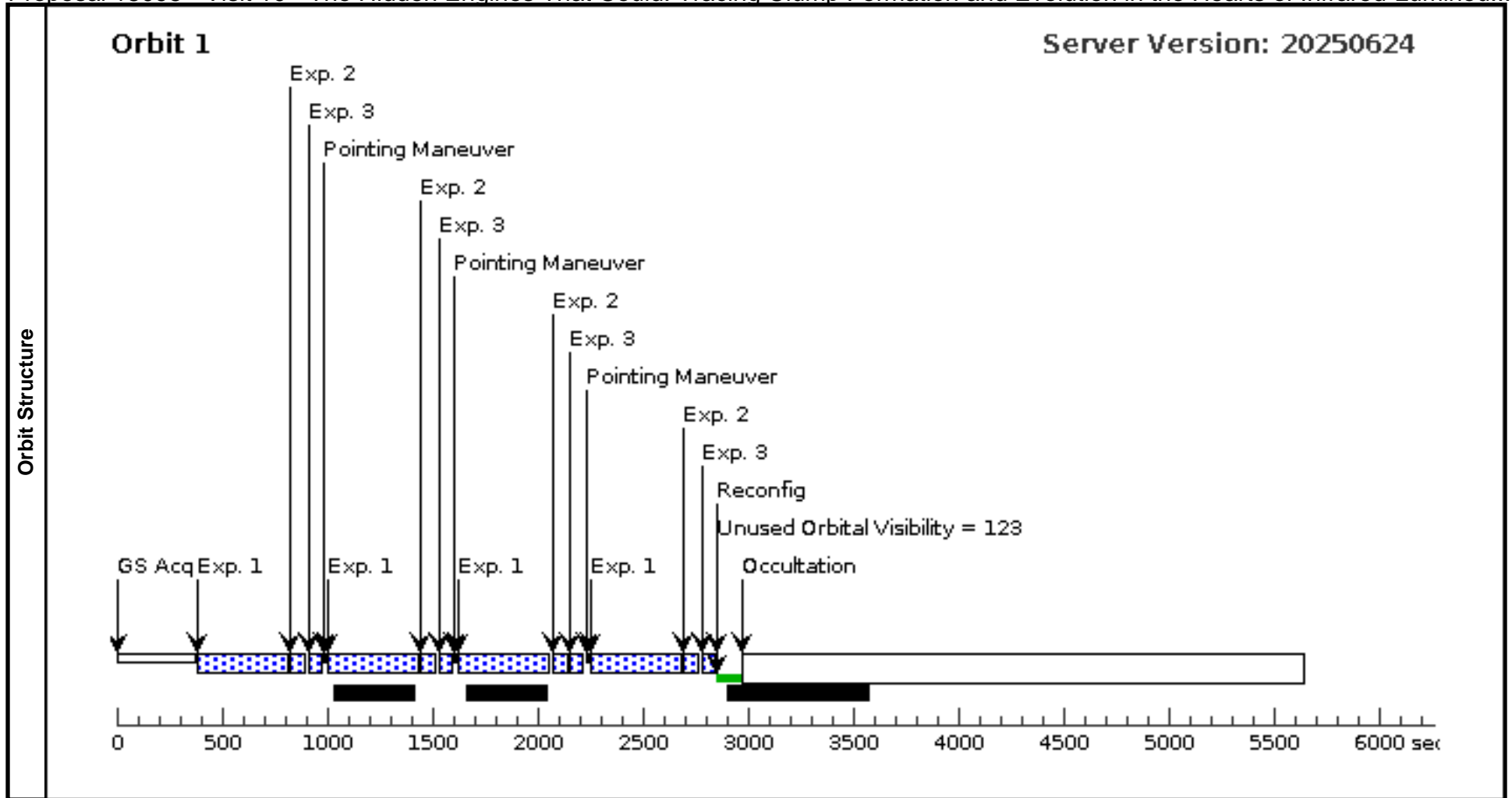
Visit	Proposal 18095, Visit 09, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR Special Requirements: (none)									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(1)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(1-3)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(9)	NGC1275	RA: 03 19 48.1600 (49.9506667d) Dec: +41 30 42.10 (41.51169d) Equinox: J2000	Epoch of Position: 2015.5	V=12.5	Reference Frame: SIMBAD				
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i> Category=GALAXY Description=[INTERACTING GALAXY, ULTRALUMINOUS IR GAL]										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(9) NGC1275	WFC3/IR, MULTIACCUM, IR	F130N	NSAMP=5; SAMP-SEQ=SPAR S100		Pattern 1, Exps 1-3 in Visit 09 (1)	402.933583 Secs (1611.734 Secs)	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(9) NGC1275	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=5; SAMP-SEQ=SPAR S10		Pattern 1, Exps 1-3 in Visit 09 (1)	42.936143 Secs (171.745 Secs)	
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	
3		(9) NGC1275	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=5; SAMP-SEQ=SPAR S10		Pattern 1, Exps 1-3 in Visit 09 (1)	42.936143 Secs (171.745 Secs)		
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	



Proposal 18095 - Visit 10 - The Hidden Engines That Could: Tracing Clump Formation and Evolution in the Hearts of Infrared-Luminou...

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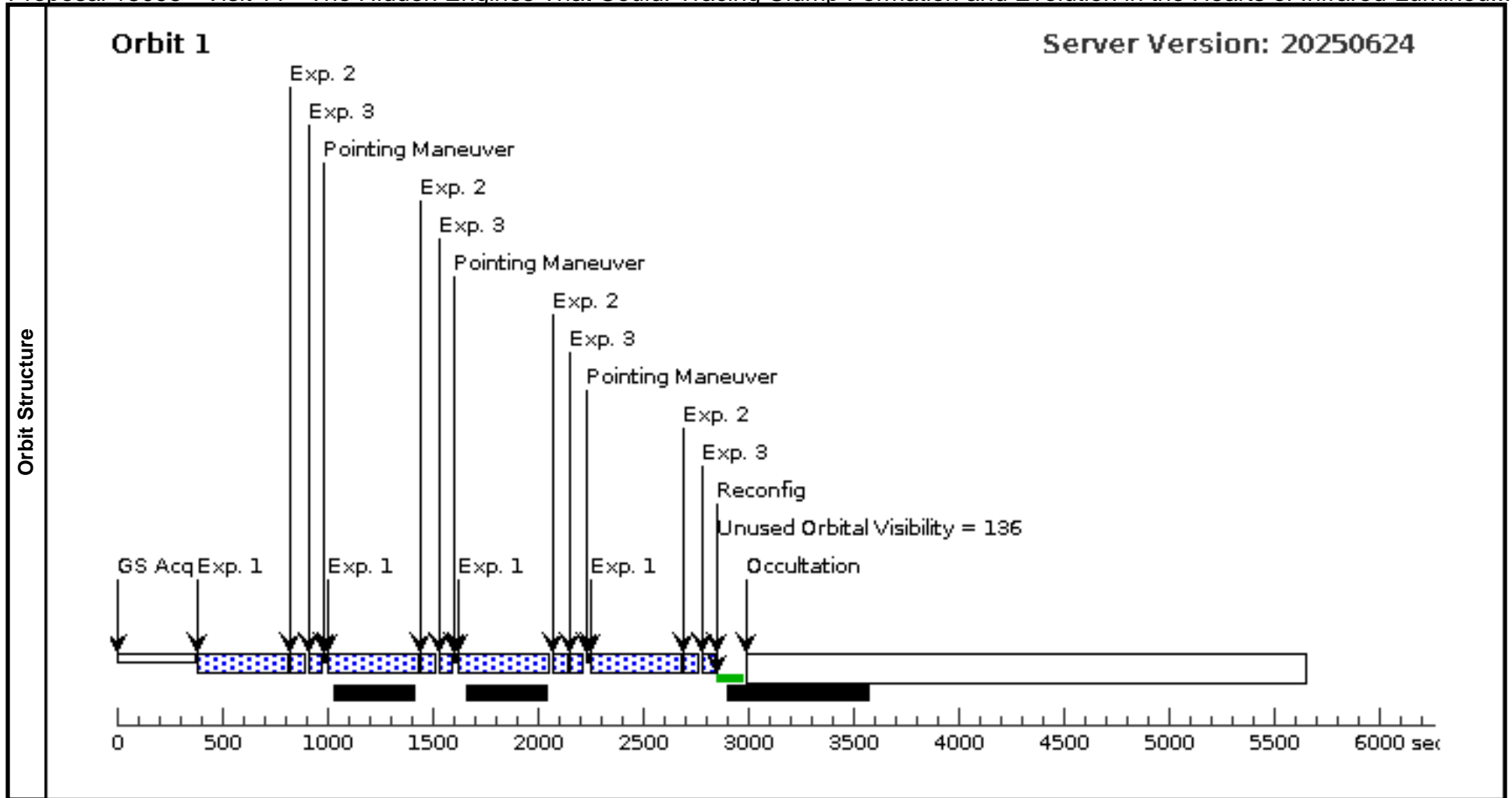
Visit	Proposal 18095, Visit 10, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR Special Requirements: (none)									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(1)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(1-3)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(10)	NGC0958	RA: 02 30 42.8300 (37.6784583d) Dec: -02 56 20.40 (-2.93900d) Equinox: J2000		V=12.1	Reference Frame: NED				
<i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i> Category=GALAXY Description=[INTERACTING GALAXY, ULTRALUMINOUS IR GAL]										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(10) NGC0958	WFC3/IR, MULTIACCUM, IR	F130N	NSAMP=5; SAMP-SEQ=SPAR S100		Pattern 1, Exps 1-3 in Visit 10 (1)	402.933583 Secs (1611.734 Secs)	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(10) NGC0958	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=5; SAMP-SEQ=SPAR S10		Pattern 1, Exps 1-3 in Visit 10 (1)	42.936143 Secs (171.745 Secs)	
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	
	3		(10) NGC0958	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=5; SAMP-SEQ=SPAR S10		Pattern 1, Exps 1-3 in Visit 10 (1)	42.936143 Secs (171.745 Secs)	
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	



Proposal 18095 - Visit 11 - The Hidden Engines That Could: Tracing Clump Formation and Evolution in the Hearts of Infrared-Luminou...

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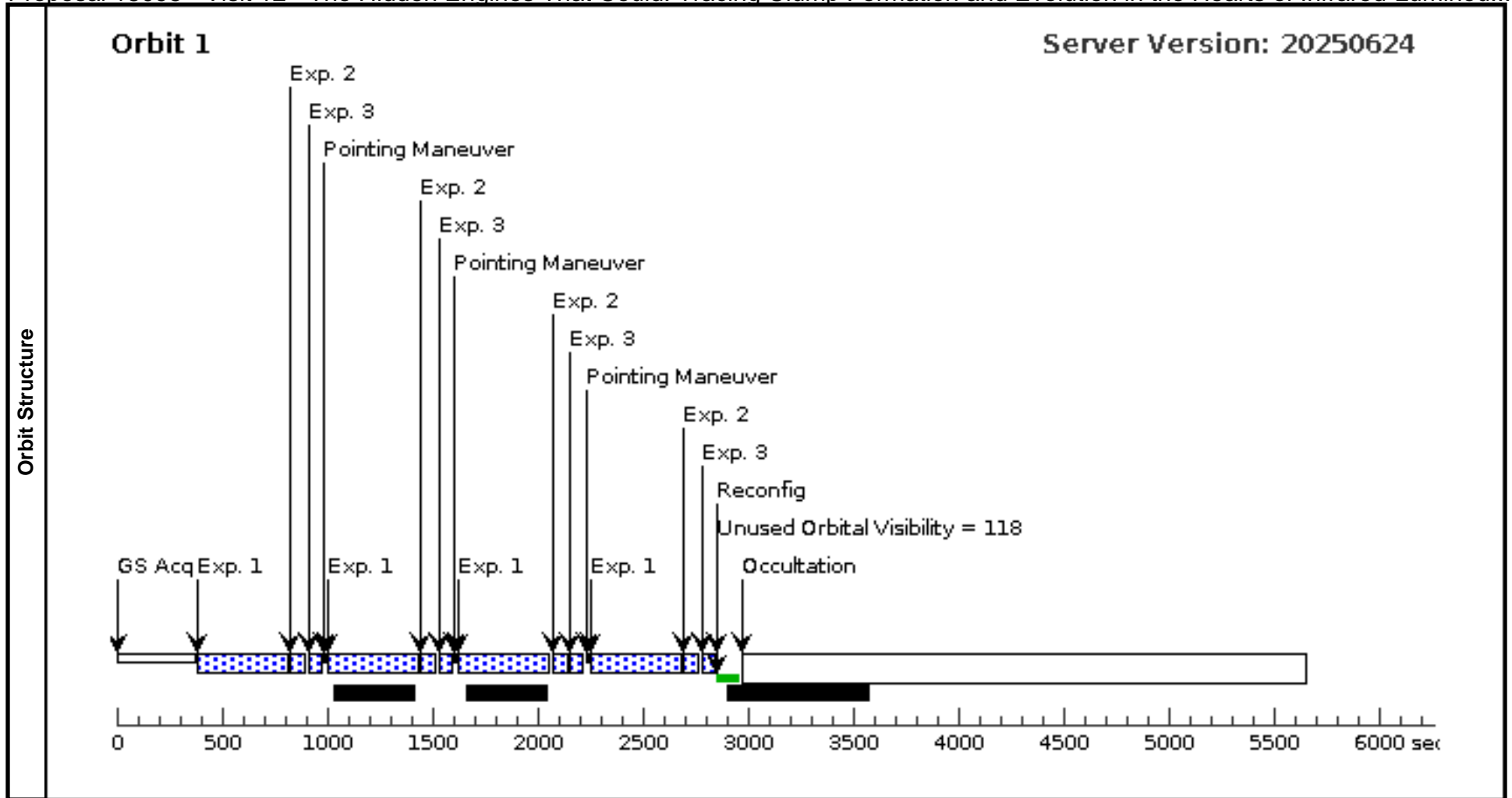
Visit	Proposal 18095, Visit 11, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR Special Requirements: (none)									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(1)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(1-3)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(11)	ESO339-G011	RA: 19 57 37.5400 (299.4064167d) Dec: -37 56 8.40 (-37.93567d) Equinox: J2000		V=14.5	Reference Frame: NED				
<i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i> Category=GALAXY Description=[INTERACTING GALAXY, ULTRALUMINOUS IR GAL]										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(11) ESO339-G011	WFC3/IR, MULTIACCUM, IR	F130N	NSAMP=5; SAMP-SEQ=SPAR S100		Pattern 1, Exps 1-3 in Visit 11 (1)	402.933583 Secs (1611.734 Secs)	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(11) ESO339-G011	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=5; SAMP-SEQ=SPAR S10		Pattern 1, Exps 1-3 in Visit 11 (1)	42.936143 Secs (171.745 Secs)	
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	
	3		(11) ESO339-G011	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=5; SAMP-SEQ=SPAR S10		Pattern 1, Exps 1-3 in Visit 11 (1)	42.936143 Secs (171.745 Secs)	
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	



Proposal 18095 - Visit 12 - The Hidden Engines That Could: Tracing Clump Formation and Evolution in the Hearts of Infrared-Luminou...

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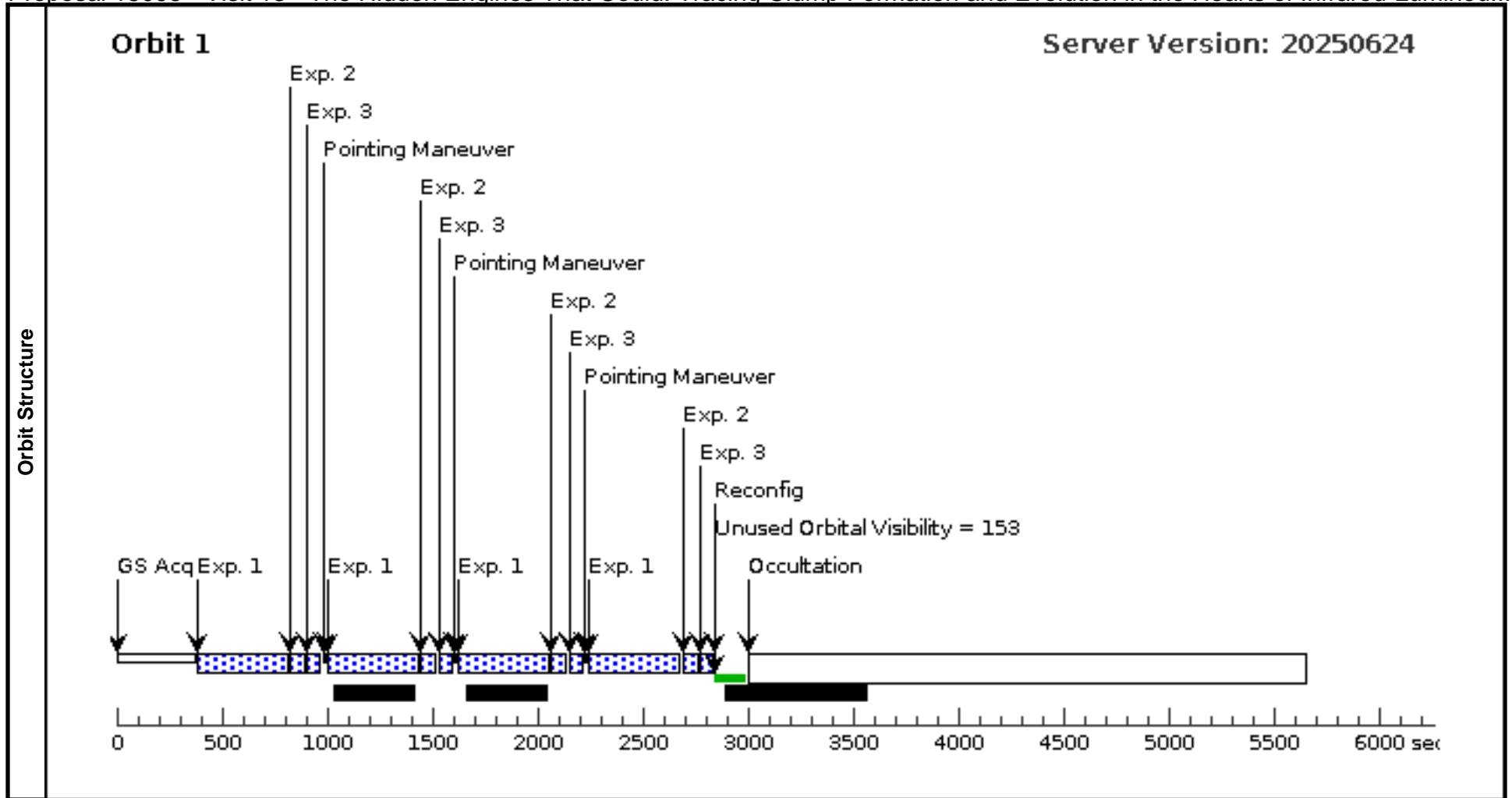
Visit	Proposal 18095, Visit 12, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR Special Requirements: (none)									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(1)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(1-3)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(12)	NGC0034	RA: 00 11 6.5500 (2.7772917d) Dec: -12 06 26.30 (-12.10731d) Equinox: J2000		V=13.1	Reference Frame: NED				
<i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i> Category=GALAXY Description=[INTERACTING GALAXY, ULTRALUMINOUS IR GAL]										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(12) NGC0034	WFC3/IR, MULTIACCUM, IR	F130N	NSAMP=5; SAMP-SEQ=SPAR S100		Pattern 1, Exps 1-3 in Visit 12 (1)	402.933583 Secs (1611.734 Secs)	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(12) NGC0034	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=5; SAMP-SEQ=SPAR S10		Pattern 1, Exps 1-3 in Visit 12 (1)	42.936143 Secs (171.745 Secs)	
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	
3		(12) NGC0034	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=5; SAMP-SEQ=SPAR S10		Pattern 1, Exps 1-3 in Visit 12 (1)	42.936143 Secs (171.745 Secs)		
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	



Proposal 18095 - Visit 13 - The Hidden Engines That Could: Tracing Clump Formation and Evolution in the Hearts of Infrared-Luminou...

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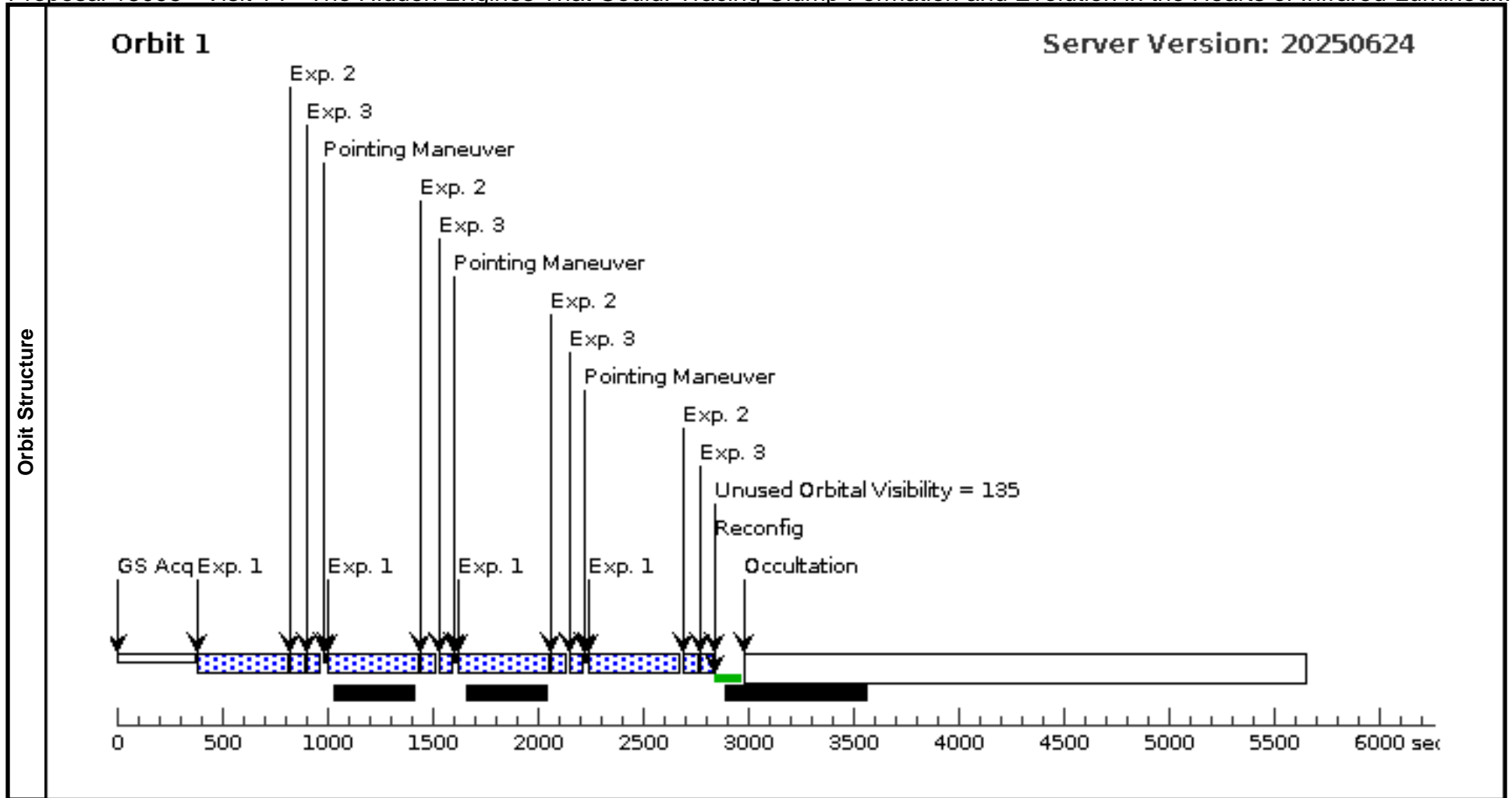
Visit	Proposal 18095, Visit 13, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR Special Requirements: (none)									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(1)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(1-3)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(13)	UGC02608	RA: 03 15 1.4200 (48.7559167d) Dec: +42 02 9.40 (42.03594d) Equinox: J2000		V=14.1	Reference Frame: NED				
<i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i> Category=GALAXY Description=[INTERACTING GALAXY, ULTRALUMINOUS IR GAL]										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(13) UGC02608	WFC3/IR, MULTIACCUM, IR	F132N	NSAMP=5; SAMP-SEQ=SPAR S100		Pattern 1, Exps 1-3 in Visit 13 (1)	402.933583 Secs (1611.734 Secs)	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(13) UGC02608	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=5; SAMP-SEQ=SPAR S10		Pattern 1, Exps 1-3 in Visit 13 (1)	42.936143 Secs (171.745 Secs)	
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	
	3		(13) UGC02608	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=5; SAMP-SEQ=SPAR S10		Pattern 1, Exps 1-3 in Visit 13 (1)	42.936143 Secs (171.745 Secs)	
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	



Proposal 18095 - Visit 14 - The Hidden Engines That Could: Tracing Clump Formation and Evolution in the Hearts of Infrared-Luminou...

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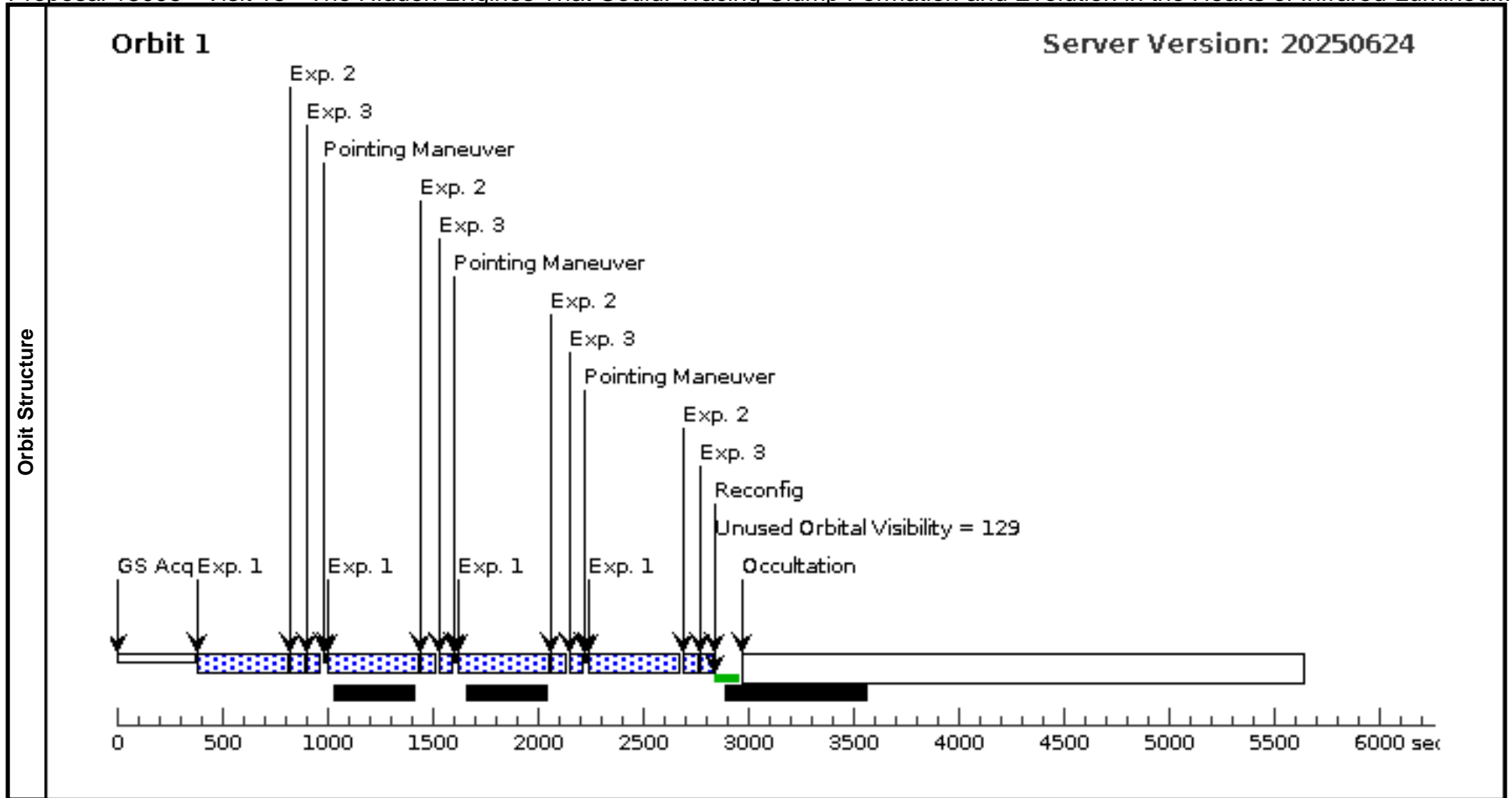
Visit	Proposal 18095, Visit 14, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR Special Requirements: (none)									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(1)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(1-3)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(14)	IC5298	RA: 23 16 0.7000 (349.0029167d) Dec: +25 33 24.10 (25.55669d) Equinox: J2000		V=14.9	Reference Frame: NED				
<i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i> Category=GALAXY Description=[INTERACTING GALAXY, ULTRALUMINOUS IR GAL]										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(14) IC5298	WFC3/IR, MULTIACCUM, IR	F132N	NSAMP=5; SAMP-SEQ=SPAR S100		Pattern 1, Exps 1-3 in Visit 14 (1)	402.933583 Secs (1611.734 Secs)	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(14) IC5298	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=5; SAMP-SEQ=SPAR S10		Pattern 1, Exps 1-3 in Visit 14 (1)	42.936143 Secs (171.745 Secs)	
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	
3		(14) IC5298	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=5; SAMP-SEQ=SPAR S10		Pattern 1, Exps 1-3 in Visit 14 (1)	42.936143 Secs (171.745 Secs)		
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	



Proposal 18095 - Visit 15 - The Hidden Engines That Could: Tracing Clump Formation and Evolution in the Hearts of Infrared-Luminou...

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Visit	Proposal 18095, Visit 15, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR Special Requirements: (none)									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(1)	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		(1-3)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(15)	NGC7674	RA: 23 27 56.7200 (351.9863333d) Dec: +08 46 44.50 (8.77903d) Equinox: J2000		V=13.2	Reference Frame: NED				
<i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i> Category=GALAXY Description=[INTERACTING GALAXY, ULTRALUMINOUS IR GAL]										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(15) NGC7674	WFC3/IR, MULTIACCUM, IR	F132N	NSAMP=5; SAMP-SEQ=SPAR S100		Pattern 1, Exps 1-3 in Visit 15 (1)	402.933583 Secs (1611.734 Secs)	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(15) NGC7674	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=5; SAMP-SEQ=SPAR S10		Pattern 1, Exps 1-3 in Visit 15 (1)	42.936143 Secs (171.745 Secs)	
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	
	3		(15) NGC7674	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=5; SAMP-SEQ=SPAR S10		Pattern 1, Exps 1-3 in Visit 15 (1)	42.936143 Secs (171.745 Secs)	
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	



Proposal 18095 - Visit 16 - The Hidden Engines That Could: Tracing Clump Formation and Evolution in the Hearts of Infrared-Luminou...

Wed Aug 13 19:04:36 GMT 2025

Visit	Proposal 18095, Visit 16, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR Special Requirements: (none)									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(1)	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		(1-3)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(16)	AM0702	RA: 07 03 26.3700 (105.8598750d) Dec: -60 16 3.70 (-60.26769d) Equinox: J2000		V=16.0	Reference Frame: NED				
<i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i> Category=GALAXY Description=[INTERACTING GALAXY, ULTRALUMINOUS IR GAL]										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(16) AM0702	WFC3/IR, MULTIACCUM, IR	F132N	NSAMP=5; SAMP-SEQ=SPAR S100		Pattern 1, Exps 1-3 in Visit 16 (1)	402.933583 Secs (1611.734 Secs)	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(16) AM0702	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=5; SAMP-SEQ=SPAR S10		Pattern 1, Exps 1-3 in Visit 16 (1)	42.936143 Secs (171.745 Secs)	
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	
3		(16) AM0702	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=5; SAMP-SEQ=SPAR S10			Pattern 1, Exps 1-3 in Visit 16 (1)	42.936143 Secs (171.745 Secs)	
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	

