



13763 - WFC3 Spectroscopy of Faint Young Companions to Orion Young Stellar Objects

Cycle: 22, 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) HOPS086B	WFC3/IR	1	08-Sep-2014 21:10:45.0	yes
02	(2) HOPS92B	WFC3/IR	1	08-Sep-2014 21:10:46.0	yes
03	(3) HOPS140B	WFC3/IR	1	08-Sep-2014 21:10:47.0	yes
04	(4) HOPS268B	WFC3/IR	1	08-Sep-2014 21:10:48.0	yes
05	(5) HOPS177B	WFC3/IR	1	08-Sep-2014 21:10:49.0	yes
06	(6) HOPS15B	WFC3/IR	1	08-Sep-2014 21:10:49.0	yes
07	(7) HOPS71B	WFC3/IR	1	08-Sep-2014 21:10:50.0	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	(8) CLASSII-FM727B	WFC3/IR	1	08-Sep-2014 21:10:51.0	yes
09	(9) HOPS5B	WFC3/IR	1	08-Sep-2014 21:10:51.0	yes
10	(10) HOPS183B	WFC3/IR	1	08-Sep-2014 21:10:52.0	yes

10 Total Orbits Used

ABSTRACT

We propose G141 grism spectroscopy of faint young companions to young stellar objects (YSOs) in the Orion molecular cloud which were recently identified in a WFC3/HST 1.6 micron survey of 320 YSOs in Orion. We will target the ten faintest companions detected between 80-1000 AU which have F160W magnitudes between 19 and 22.6 mag; these are too faint to obtain spectra from ground-based telescopes. The faint magnitudes of these ten companions suggest that they have masses as small as 5 Mjupiter depending on their age and reddening. To determine spectral types and masses for these sources, we will use grism spectroscopy to detect broad water features in the photospheric spectrum. These observations are part of a coordinated spectroscopy campaign; the remaining 50 brighter companions will be observed using spectrographs on the IRTF and SUBARU. These data will constrain the companion mass function at projected separations of 80-1000 AU from Orion young stellar objects. Given their faint magnitudes, as many as half of the 60 companions may be below the Hydrogen burning limit. With spectra, we can determine whether there is an excess of sub-stellar companions relative to the field IMF at these separations; the detection of such an excess would be evidence for the formation of sub-stellar objects in the outer regions of protostellar disks. Furthermore, the observed fraction of companions at these separations increases from 7.8 to 14.1% between low and high stellar density region in Orion; suggesting that the formation of multiple systems is dependent on the birth environment. With spectra, we can explore the dependence of the companion mass function on the birth environment.

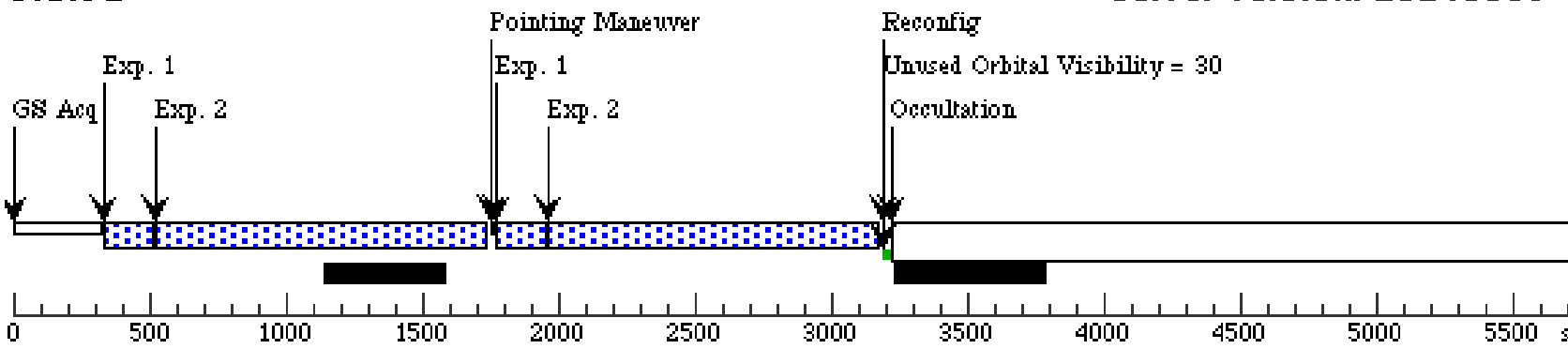
OBSERVING DESCRIPTION

We will use grism observations to obtain 1.075 to 1.7 micron spectra of our targeted source. The anticipated spectral resolution of the GRISM for a point source, $\lambda/\Delta\lambda \sim 130$, is sufficient to detect the broad water features and overall spectrum shape needed to determine spectral types and extinction (Figure 3). The companions we have chosen are at separations of 1", 1.4", 2.3", 1.8", 0.8", 0.22", 1.06", 1", 2" and 0.74", for HOPS 68b, HOPS92b, HOPS140B, HOPS268B, HOPS177B, HOP15B, HOPS71B, FM727B, HOPS5B and HOPS18B, respectively. The primary reason for using WFC3 to obtain these spectra is their faintness in the H-band, 19 to 22.6 mag, spectra of such objects with S/N sufficient for spectral typing are very difficult to obtain from the ground even with an 8 meter telescope. We note that shorter (< 1 micron) wavelength observations are typically not feasible due to the high extinction, while longer (> 2 micron) wavelength observations will be strongly contaminated by emission from

hot dust in a protostellar disk and envelope. Furthermore, this wavelength range shows strong spectral features that are sensitive to effective temperature and surface gravity (Peterson et al. 2008). For these reasons, the G140 wavelength range is optimal for this program.

Since these companions have nearby primary stars, the roll angles have been constrained to ensure that the spectra are well separated. Fortunately, since Orion is near the equator, a wide range of roll angles can be accommodated on a larger number of days. To avoid ensure that the primary and companion do not overlap, and to avoid other stars and nebulosity in the field, we have chosen very strict angle requirements. We have estimated the S/N that can be obtained in a single orbit, taking into account acquisition time, and the time to obtain a direct image the source. After acquiring the object, we will take two dithered spectra each with its own direct image in the F160W band. In a 50 minute orbit, with 6 minutes of acquisition time and about ~ 5 minutes of overhead, we will obtain two 5 minute direct images, leaving time for two 1200 second exposures in a single orbit (for example with STEP200, nsamp = 13). This would provide a signal to noise at 1.6 micron ranging from 40 for the faintest targets to 300 for the brightest targets. We note that the sources are very red and will have a lower S/N at 1 micron. In addition, high signal to noise across the spectrum will provide the best constraints on spectral type and extinction. Furthermore, acquiring two sources in a single orbit would require large overheads per orbit for acquisition and direct images. For this reason, we ask for one orbit per source independent of the magnitude.

Proposal 13763 - Visit 01 - WFC3 Spectroscopy of Faint Young Companions to Orion Young Stellar Objects

Visit	Proposal 13763, Visit 01, implementation										Tue Sep 09 01:10:53 GMT 2014																													
	Diagnostic Status: No Diagnostics																																							
	Scientific Instruments: WFC3/IR																																							
	Special Requirements: ORIENT 61D TO 61 D																																							
Patterns	#	Primary Pattern										Secondary Pattern										Exposures																		
	(2)	Pattern Type=LINE Purpose=DITHER Number Of Points=2 Point Spacing=1.5675 Line Spacing=										Coordinate Frame=POS-TARG Pattern Orientation=73.13 Angle Between Sides= Center Pattern=false																				(1-2)								
Fixed Targets	#	Name		Target Coordinates				Targ. Coord. Corrections				Fluxes				Miscellaneous																								
	(1)	HOPS086B		RA: 05 35 23.9110 (83.8496292d) Dec: -05 01 16.60 (-5.02128d) Equinox: J2000								V=30 F160W 20.23 mag				Reference Frame: ICRS																								
Exposures	#	Label	Target	Config,Mode,Aperture				Spectral Els.		Opt. Params.		Special Reqs.		Groups		Exp. Time (Total)/[Actual Dur.]						Orbit																		
	1		(1) HOPS086B	WFC3/IR, MULTIACCUM, GRISM1024				F160W		NSAMP=10; SAMP-SEQ=STEP25				Pattern 2, Exps 1-2 in Visit 01 (2)		149.232286 Secs (298.465 Secs)																								
																[==>(Pattern 1)] [==>(Pattern 2)]						[1]																		
	2		(1) HOPS086B	WFC3/IR, MULTIACCUM, GRISM1024				G141		NSAMP=13; SAMP-SEQ=STEP200				Pattern 2, Exps 1-2 in Visit 01 (2)		1199.231335 Secs (2398.463 Secs)																								
																[==>(Pattern 1)] [==>(Pattern 2)]						[1]																		
Orbit Structure	Orbit 1																				Server Version: 20140605																			
																																								

Proposal 13763 - Visit 02 - WFC3 Spectroscopy of Faint Young Companions to Orion Young Stellar Objects

Visit	Proposal 13763, Visit 02, implementation										Tue Sep 09 01:10:54 GMT 2014			
	Diagnostic Status: No Diagnostics													
	Scientific Instruments: WFC3/IR													
	Special Requirements: ORIENT 10D TO 10 D													
Patterns	#	Primary Pattern				Secondary Pattern				Exposures				
	(3)	Pattern Type=LINE Purpose=DITHER Number Of Points=2 Point Spacing=2.066 Line Spacing=				Coordinate Frame=POS-TARG Pattern Orientation=77.28 Angle Between Sides= Center Pattern=false				(1-2)				
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous					
	(2)	HOPS92B	RA: 05 35 18.2662 (83.8261092d) Dec: -05 00 34.11 (-5.00948d) Equinox: J2000				V=30 F160W 19.61 mag		Reference Frame: ICRS					
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit			
	1		(2) HOPS92B	WFC3/IR, MULTIACCUM, GRISM1024	F160W	NSAMP=9; SAMP-SEQ=STEP25	GS ACQ SCENARI O SINGLE	Pattern 3, Exps 1-2 in Visit 02 (3)	124.231771 Secs (248.464 Secs) [==>(Pattern 1)] [==>(Pattern 2)]		[1]			
	2		(2) HOPS92B	WFC3/IR, MULTIACCUM, GRISM1024	G141	SAMP-SEQ=STEP200; NSAMP=13		Pattern 3, Exps 1-2 in Visit 02 (3)	1199.231335 Secs (2398.463 Secs) [==>(Pattern 1)] [==>(Pattern 2)]		[1]			
Orbit Structure	Orbit 1												Server Version: 20140605	

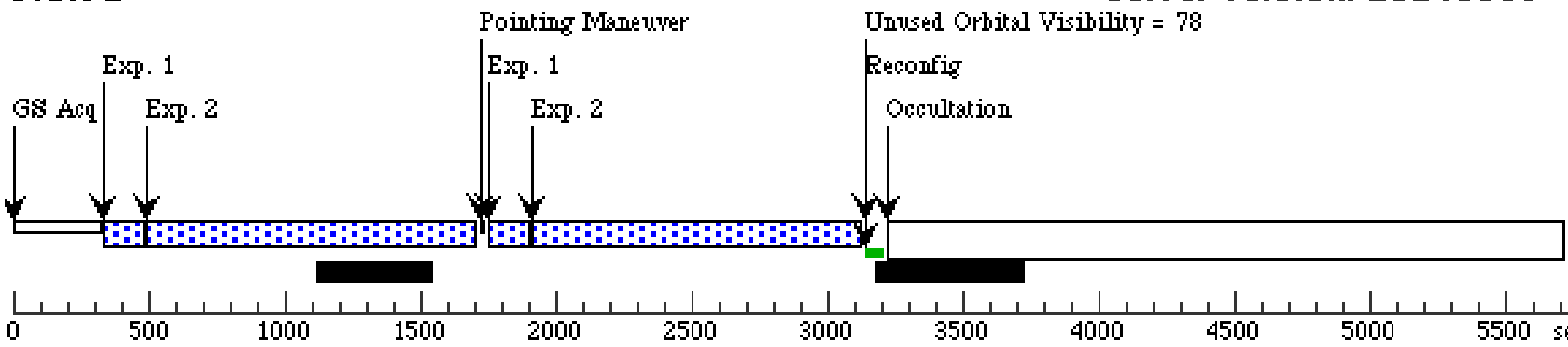
Proposal 13763 - Visit 03 - WFC3 Spectroscopy of Faint Young Companions to Orion Young Stellar Objects

Visit	Proposal 13763, Visit 03, implementation										Tue Sep 09 01:10:54 GMT 2014	
	Diagnostic Status: No Diagnostics											
	Scientific Instruments: WFC3/IR											
	Special Requirements: ORIENT 295D TO 295 D											
Patterns	#	Primary Pattern				Secondary Pattern				Exposures		
	(1)	Pattern Type=LINE Purpose=DITHER Number Of Points=2 Point Spacing=1.0759 Line Spacing=		Coordinate Frame=POS-TARG Pattern Orientation=65 Angle Between Sides= Center Pattern=false						(1-2)		
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous			
	(3)	HOPS140B	RA: 05 38 46.2768 (84.6928200d) Dec: -07 01 51.39 (-7.03094d) Equinox: J2000				V=30 F160W 20.69 mag		Reference Frame: ICRS			
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit	
	1		(3) HOPS140B	WFC3/IR, MULTIACCUM, GRISM1024	F160W	NSAMP=9; SAMP-SEQ=STEP25		Pattern 1, Exps 1-2 in Visit 03 (1)	124.231771 Secs (248.464 Secs) [==>(Pattern 1)] [==>(Pattern 2)]		[1]	
	2		(3) HOPS140B	WFC3/IR, MULTIACCUM, GRISM1024	G141	SAMP-SEQ=STEP200; NSAMP=13		Pattern 1, Exps 1-2 in Visit 03 (1)	1199.231335 Secs (2398.463 Secs) [==>(Pattern 1)] [==>(Pattern 2)]		[1]	
Orbit Structure	Orbit 1											
	Server Version: 20140605											
	Pointing Maneuver Unused Orbital Visibility = 81 Reconfig Occultation GS Acq Exp. 1 Exp. 2 Exp. 1 Exp. 2 0 500 1000 1500 2000 2500 3000 3500 4000 4500 5000 5500 sec											

Proposal 13763 - Visit 04 - WFC3 Spectroscopy of Faint Young Companions to Orion Young Stellar Objects

Visit	Proposal 13763, Visit 04, implementation										Tue Sep 09 01:10:54 GMT 2014																													
	Diagnostic Status: No Diagnostics																																							
	Scientific Instruments: WFC3/IR																																							
	Special Requirements: ORIENT 80D TO 80 D																																							
Patterns	#	Primary Pattern										Secondary Pattern										Exposures																		
	(2)	Pattern Type=LINE Purpose=DITHER Number Of Points=2 Point Spacing=1.5675 Line Spacing=										Coordinate Frame=POS-TARG Pattern Orientation=73.13 Angle Between Sides= Center Pattern=false																				(1-2)								
Fixed Targets	#	Name		Target Coordinates				Targ. Coord. Corrections				Fluxes				Miscellaneous																								
	(4)	HOPS268B		RA: 05 40 38.3588 (85.1598283d) Dec: -08 00 35.72 (-8.00992d) Equinox: J2000								V=30 F160W 19.24 mag				Reference Frame: ICRS																								
Exposures	#	Label	Target	Config,Mode,Aperture				Spectral Els.		Opt. Params.		Special Reqs.		Groups		Exp. Time (Total)/[Actual Dur.]						Orbit																		
	1		(4) HOPS268B	WFC3/IR, MULTIACCUM, GRISM1024				F160W		NSAMP=9; SAMP-SEQ=STEP25				Pattern 2, Exps 1-2 in Visit 04 (2)		124.231771 Secs (248.464 Secs) [==>(Pattern 1)] [==>(Pattern 2)]						[1]																		
	2		(4) HOPS268B	WFC3/IR, MULTIACCUM, GRISM1024				G141		SAMP-SEQ=STEP200; NSAMP=13				Pattern 2, Exps 1-2 in Visit 04 (2)		1199.231335 Secs (2398.463 Secs) [==>(Pattern 1)] [==>(Pattern 2)]						[1]																		
Orbit Structure	Orbit 1																				Server Version: 20140605																			
	Diagram illustrating the Orbit Structure for Orbit 1. The timeline shows various events and durations in seconds (sec). - GS Acq (Green Start Acquisition) - Exp. 1 (Exposure 1) - Exp. 2 (Exposure 2) - Pointing Maneuver - Reconfig (Reconfiguration) - Occultation (Green bar indicating occultation) - Unused Orbital Visibility = 80 The timeline ranges from 0 to 5500 seconds.																																							

Proposal 13763 - Visit 05 - WFC3 Spectroscopy of Faint Young Companions to Orion Young Stellar Objects

Visit	Proposal 13763, Visit 05, implementation										Tue Sep 09 01:10:54 GMT 2014																			
	Diagnostic Status: No Diagnostics																													
	Scientific Instruments: WFC3/IR																													
	Special Requirements: ORIENT 11D TO 11 D																													
Patterns	#	Primary Pattern										Secondary Pattern										Exposures								
	(4)	Pattern Type=LINE Purpose=DITHER Number Of Points=2 Point Spacing=2.5755 Line Spacing=										Coordinate Frame=POS-TARG Pattern Orientation=79.8245 Angle Between Sides= Center Pattern=false										(1-2)								
Fixed Targets	#	Name		Target Coordinates				Targ. Coord. Corrections				Fluxes				Miscellaneous														
	(5)	HOPS177B		RA: 05 35 49.8706 (83.9577942d) Dec: -06 34 53.84 (-6.58162d) Equinox: J2000								V=30 F160W 20.03 mag				Reference Frame: ICRS														
Exposures	#	Label	Target	Config,Mode,Aperture				Spectral Els.		Opt. Params.		Special Reqs.		Groups		Exp. Time (Total)/[Actual Dur.]				Orbit										
	1		(5) HOPS177B	WFC3/IR, MULTIACCUM, GRISM1024				F160W		NSAMP=9; SAMP-SEQ=STEP25		GS ACQ SCENARIO BASE1B3		Pattern 4, Exps 1-2 in Visit 05 (4)		124.231771 Secs (248.464 Secs)														
																[==>(Pattern 1)] [==>(Pattern 2)]				[1]										
	2		(5) HOPS177B	WFC3/IR, MULTIACCUM, GRISM1024				G141		SAMP-SEQ=STEP200; NSAMP=13				Pattern 4, Exps 1-2 in Visit 05 (4)		1199.231335 Secs (2398.463 Secs)														
																[==>(Pattern 1)] [==>(Pattern 2)]				[1]										
Orbit Structure	Orbit 1																				Server Version: 20140605									
																					Unused Orbital Visibility = 78									

Proposal 13763 - Visit 06 - WFC3 Spectroscopy of Faint Young Companions to Orion Young Stellar Objects

Visit	Proposal 13763, Visit 06, implementation										Tue Sep 09 01:10:54 GMT 2014																													
	Diagnostic Status: No Diagnostics																																							
	Scientific Instruments: WFC3/IR																																							
	Special Requirements: ORIENT 340D TO 350 D																																							
Patterns	#	Primary Pattern										Secondary Pattern										Exposures																		
	(3)	Pattern Type=LINE Purpose=DITHER Number Of Points=2 Point Spacing=2.066 Line Spacing=										Coordinate Frame=POS-TARG Pattern Orientation=77.28 Angle Between Sides= Center Pattern=false																				(1-2)								
Fixed Targets	#	Name		Target Coordinates				Targ. Coord. Corrections				Fluxes				Miscellaneous																								
	(6)	HOPS15B		RA: 05 36 19.0238 (84.0792658d) Dec: -05 55 24.51 (-5.92347d) Equinox: J2000								V=30 F160W 18.99 mag				Reference Frame: ICRS																								
Exposures	#	Label	Target	Config,Mode,Aperture				Spectral Els.		Opt. Params.		Special Reqs.		Groups		Exp. Time (Total)/[Actual Dur.]				Orbit																				
	1		(6) HOPS15B	WFC3/IR, MULTIACCUM, GRISM1024				F160W		NSAMP=7; SAMP-SEQ=STEP25				Pattern 3, Exps 1-2 in Visit 06 (3)		74.230741 Secs (148.461 Secs)																								
																[==>(Pattern 1)] [==>(Pattern 2)]				[1]																				
	2		(6) HOPS15B	WFC3/IR, MULTIACCUM, GRISM1024				G141		SAMP-SEQ=STEP200; NSAMP=13				Pattern 3, Exps 1-2 in Visit 06 (3)		1199.231335 Secs (2398.463 Secs)																								
																[==>(Pattern 1)] [==>(Pattern 2)]				[1]																				
Orbit Structure	Orbit 1																				Server Version: 20140605																			
	GS Acq Exp. 1 Exp. 2 Pointing Maneuver Exp. 1 Exp. 2 Reconfig Occultation Unused Orbital Visibility = 179 0 500 1000 1500 2000 2500 3000 3500 4000 4500 5000 5500 sec																																							

Proposal 13763 - Visit 07 - WFC3 Spectroscopy of Faint Young Companions to Orion Young Stellar Objects

Visit	Proposal 13763, Visit 07, implementation										Tue Sep 09 01:10:54 GMT 2014																			
	Diagnostic Status: No Diagnostics																													
	Scientific Instruments: WFC3/IR																													
	Special Requirements: ORIENT 25D TO 25 D																													
Patterns	#	Primary Pattern										Secondary Pattern										Exposures								
	(5)	Pattern Type=LINE Purpose=DITHER Number Of Points=2 Point Spacing=3.604 Line Spacing=										Coordinate Frame=POS-TARG Pattern Orientation=82.75 Angle Between Sides= Center Pattern=false										(1-2)								
Fixed Targets	#	Name		Target Coordinates				Targ. Coord. Corrections				Fluxes				Miscellaneous														
	(7)	HOPS71B		RA: 05 35 25.5852 (83.8566050d) Dec: -05 07 57.55 (-5.13265d) Equinox: J2000								V=30 F160W 20.46 mag				Reference Frame: ICRS														
Exposures	#	Label	Target	Config,Mode,Aperture				Spectral Els.		Opt. Params.		Special Reqs.		Groups		Exp. Time (Total)/[Actual Dur.]				Orbit										
	1		(7) HOPS71B	WFC3/IR, MULTIACCUM, GRISM1024				F160W		NSAMP=9; SAMP-SEQ=STEP2 5				Pattern 5, Exps 1-2 in Visit 07 (5)		124.231771 Secs (248.464 Secs)														
																[==>(Pattern 1)] [==>(Pattern 2)]				[1]										
	2		(7) HOPS71B	WFC3/IR, MULTIACCUM, GRISM1024				G141		SAMP-SEQ=STEP2 00; NSAMP=13				Pattern 5, Exps 1-2 in Visit 07 (5)		1199.231335 Secs (2398.463 Secs)														
																[==>(Pattern 1)] [==>(Pattern 2)]				[1]										
Orbit Structure	Orbit 1																				Server Version: 20140605									
	The diagram illustrates the orbit structure over a 5500-second timeline. Key events and durations are marked: - GS Acq: ~100s - Exp. 1: ~300s - Exp. 2: ~400s - Pointing Maneuver: ~1700s - Exp. 1: ~1800s - Exp. 2: ~1900s - Reconfig: ~3100s - Occultation: ~3200s - Unused Orbital Visibility = 76: ~3200s to ~3300s																													

Proposal 13763 - Visit 08 - WFC3 Spectroscopy of Faint Young Companions to Orion Young Stellar Objects

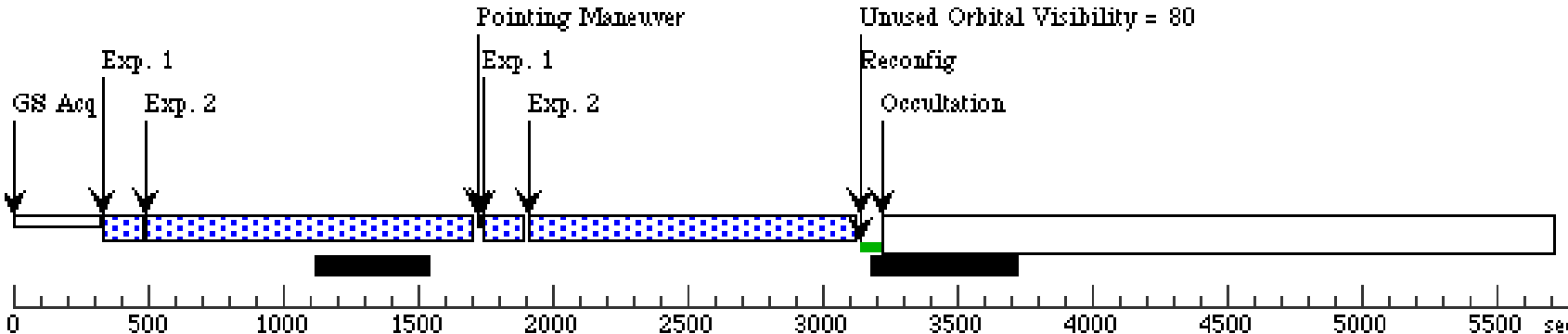
Visit	Proposal 13763, Visit 08, implementation										Tue Sep 09 01:10:54 GMT 2014		
	Diagnostic Status: No Diagnostics												
	Scientific Instruments: WFC3/IR												
	Special Requirements: ORIENT 73D TO 73 D												
Patterns	#	Primary Pattern					Secondary Pattern					Exposures	
	(3)	Pattern Type=LINE Purpose=DITHER Number Of Points=2 Point Spacing=2.066 Line Spacing=					Coordinate Frame=POS-TARG Pattern Orientation=77.28 Angle Between Sides= Center Pattern=false					(1-2)	
Fixed Targets	#	Name		Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous			
	(8)	CLASSII-FM727B		RA: 05 46 33.0970 (86.6379042d) Dec: +00 06 23.22 (.10645d) Equinox: J2000				V=30 F160W 19.5 mag		Reference Frame: ICRS			
Exposures	#	Label	Target	Config,Mode,Aperture		Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit	
	1		(8) CLASSII-FM727B	WFC3/IR, MULTIACCUM, GRISM1024		F160W	NSAMP=9; SAMP-SEQ=STEP25	GS ACQ SCENARI O BASE1B3	Pattern 3, Exps 1-2 in Visit 08 (3)	124.231771 Secs (248.464 Secs) [==>(Pattern 1)] [==>(Pattern 2)]		[1]	
	2		(8) CLASSII-FM727B	WFC3/IR, MULTIACCUM, GRISM1024		G141	SAMP-SEQ=STEP200; NSAMP=13		Pattern 3, Exps 1-2 in Visit 08 (3)	1199.231335 Secs (2398.463 Secs) [==>(Pattern 1)] [==>(Pattern 2)]		[1]	
Orbit Structure	Orbit 1 Server Version: 20140605 GS Acq Exp. 1 Exp. 2 Pointing Maneuver Exp. 1 Exp. 2 Reconfig Unused Orbital Visibility = 79 Occultation </												

Proposal 13763 - Visit 09 - WFC3 Spectroscopy of Faint Young Companions to Orion Young Stellar Objects

Tue Sep 09 01:10:54 GMT 2014

Visit	Proposal 13763, Visit 09, implementation										Tue Sep 09 01:10:54 GMT 2014												
	Diagnostic Status: No Diagnostics																						
	Scientific Instruments: WFC3/IR																						
	Special Requirements: ORIENT 52D TO 58 D																						
Patterns	#	Primary Pattern										Secondary Pattern										Exposures	
	(1)	Pattern Type=LINE Purpose=DITHER Number Of Points=2 Point Spacing=1.0759 Line Spacing=					Coordinate Frame=POS-TARG Pattern Orientation=65 Angle Between Sides= Center Pattern=false															(1-2)	
Fixed Targets	#	Name		Target Coordinates				Targ. Coord. Corrections				Fluxes				Miscellaneous							
	(9)	HOPS5B		RA: 05 54 32.2760 (88.6344833d) Dec: +01 48 6.39 (1.80178d) Equinox: J2000								V=30 F160W 22.5 mag				Reference Frame: ICRS							
Exposures	#	Label	Target	Config,Mode,Aperture				Spectral Els.		Opt. Params.		Special Reqs.		Groups		Exp. Time (Total)/[Actual Dur.]				Orbit			
	1		(9) HOPS5B	WFC3/IR, MULTIACCUM, GRISM1024				F160W		NSAMP=9; SAMP-SEQ=STEP25				Pattern 1, Exps 1-2 in Visit 09 (1)		124.231771 Secs (248.464 Secs)							
																[==>(Pattern 1)] [==>(Pattern 2)]				[1]			
	2		(9) HOPS5B	WFC3/IR, MULTIACCUM, GRISM1024				G141		SAMP-SEQ=STEP200; NSAMP=13				Pattern 1, Exps 1-2 in Visit 09 (1)		1199.231335 Secs (2398.463 Secs)							
																[==>(Pattern 1)] [==>(Pattern 2)]				[1]			
Orbit Structure	Orbit 1 GS Acq Exp. 1 Exp. 2 Pointing Maneuver Exp. 1 Exp. 2 Reconfig Occultation Server Version: 20140605 Unused Orbital Visibility = 81																						
	0 500 1000 1500 2000 2500 3000 3500 4000 4500 5000 5500 sec																						

Proposal 13763 - Visit 10 - WFC3 Spectroscopy of Faint Young Companions to Orion Young Stellar Objects

Visit	Proposal 13763, Visit 10, implementation										Tue Sep 09 01:10:54 GMT 2014			
	Diagnostic Status: No Diagnostics													
	Scientific Instruments: WFC3/IR													
	Special Requirements: ORIENT 320D TO 320 D													
Patterns	#	Primary Pattern					Secondary Pattern					Exposures		
	(2)	Pattern Type=LINE Purpose=DITHER Number Of Points=2 Point Spacing=1.5675 Line Spacing=					Coordinate Frame=POS-TARG Pattern Orientation=73.13 Angle Between Sides= Center Pattern=false					(1-2)		
Fixed Targets	#	Name		Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous				
	(10)	HOPS183B		RA: 05 36 17.8867 (84.0745279d) Dec: -06 22 27.21 (-6.37423d) Equinox: J2000				V=30 F160W 22.7 mag		Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture		Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit		
	1		(10) HOPS183B	WFC3/IR, MULTIACCUM, GRISM1024		F160W	NSAMP=9; SAMP-SEQ=STEP25		Pattern 2, Exps 1-2 in Visit 10 (2)	124.231771 Secs (248.464 Secs) [==>(Pattern 1)] [==>(Pattern 2)]		[1]		
	2		(10) HOPS183B	WFC3/IR, MULTIACCUM, GRISM1024		G141	SAMP-SEQ=STEP200; NSAMP=13		Pattern 2, Exps 1-2 in Visit 10 (2)	1199.231335 Secs (2398.463 Secs) [==>(Pattern 1)] [==>(Pattern 2)]		[1]		
Orbit Structure	Orbit 1												Server Version: 20140605	
													Unused Orbital Visibility = 80	