



15888 - A pure-parallel search for faint stuff in star forming regions

Cycle: 27, Proposal Category: GO

(Pure Parallel)

(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	ANY	WFC3/UVIS	1	18-Dec-2019 13:01:48.0	yes
02	ANY	WFC3/UVIS	1	18-Dec-2019 13:01:49.0	yes
03	ANY	ACS/WFC	1	18-Dec-2019 13:01:50.0	yes
18	ANY	WFC3/UVIS	1	18-Dec-2019 13:01:50.0	yes
05	ANY	WFC3/UVIS	1	18-Dec-2019 13:01:51.0	yes
06	ANY	ACS/WFC	1	18-Dec-2019 13:01:51.0	yes
07	ANY	WFC3/UVIS	1	18-Dec-2019 13:01:52.0	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>
09	ANY	WFC3/UVIS	1	18-Dec-2019 13:01:52.0	yes
10	ANY	WFC3/UVIS	1	18-Dec-2019 13:01:52.0	yes
12	ANY	WFC3/UVIS	1	18-Dec-2019 13:01:53.0	yes
13	ANY	ACS/WFC	1	18-Dec-2019 13:01:53.0	yes
15	ANY	WFC3/UVIS	1	18-Dec-2019 13:01:54.0	yes
16	ANY	ACS/WFC	1	18-Dec-2019 13:01:54.0	yes

13 Total Orbits Used

ABSTRACT

Star forming regions contain many resolved structures, ranging from disks around individual stars to narrow and wide binaries to large-scale outflows, bubbles and shock fronts traversing the entire cloud. In many cases, optical high-resolution imaging is the best tool to find and study these objects. We propose a pure-parallel survey, where no primary orbits are allocated and instead observations are performed on whatever happens to be in the field-of-view of the WFC3 or ACS when other programs use STIS or COS on targets in star forming regions. In this way, we can survey a large area to discover (i) previously unresolved companions, (ii) jets and outflows from young stars and (iii) irradiated and evaporating disks. Typically, such imaging studies are done in the most "interesting" regions close to the most massive and brightest stars. Our survey can complement that by imaging more "typical" parts of the cloud. We will use a combination of broad-band filters to detect nebulosity and identify and separate point sources as well as narrow-band filters in emission lines typically seen from irradiated disks, jets, and outflows.

OBSERVING DESCRIPTION

This is a program to carry out pure-parallel observations of star forming regions in our galaxy.

We designed a pure-parallel survey, where no primary orbits are allocated and instead observations are performed on whatever happens to be in the field-of-view of the WFC3 or ACS when other programs use STIS or COS on targets in star forming regions. In this way, we can survey a large area to discover (i) previously unresolved companions, (ii) jets and outflows from young stars and (iii) irradiated and evaporating disks. Typically, such imaging studies are done in the most "interesting" regions close to the most massive and brightest stars. Our survey can complement that by imaging more "typical" parts of the cloud. We will use a combination of broad-band filters to detect nebulosity

and identify and separate point sources as well as narrow-band filters in emission lines typically seen from irradiated disks, jets, and outflows.

As such, we aim for a combination of broad-band and narrow band filters. Narrow band images trace instead the rich phenomenology typical of these regions. In particular, in high-mass star-forming regions, [O iii] is a good tracer of hot nebular gas, either radiatively or collisionally excited, whereas in low-mass star-forming regions, [O iii] 5007 Ang only traces shock excitation (jets and HH objects). The soft-UV flux typical of these regions supports the complex chemical networks typical of PDR regions, which includes [O i] emission from the photodissociation of water molecules. WFC3 has a larger choice of narrow-band filters, and, if we have the opportunity (see below) we propose to add observations in [O i] 6300 Ang and two lines in the UV that are unique to HST /WFC3 because they are inaccessible from the ground (Mg ii 2800 Ang and [Ne v] 3426 Ang) as well as additional broad-band WFC2 V images. In particular, Mg ii 2800 Ang has been shown to be strong, even stronger than H α in jets from low-mass stars (Coffey et al. 2007).

If we have only one orbit with a specific pointing, we will perform imaging with the WFC3 because it is located closer to the STIS or COS FOV. In a star-forming region, a STIS or COS observation is most likely centered on a bright, active star and thus observing closer to it increases the chances to find irradiated cloud or outflow features. However, it is typical for FUV spectroscopic observations to last for more than one orbit. In those cases, we may have access to more than one parallel orbit with almost the same pointing. We use the extra orbits for additional observations with ACS/WFC and to observe in other filters in the WFC3. ACS has a FOV a few arcmin away from WFC3. The ACS is equipped with fewer filters than the WFC3 and thus there would be little use to add another orbit for a second set of filters in the ACS. In general, if we have more than three orbits with the same pointing, we plan to repeat the cycle of three orbits (WFC3, ACS, and WFC3 with other filters) observations to detect fainter features and to take advantage of multiple dither positions (if the primary observation dithers); taking multiple exposures in each filter will also mitigate against cosmic rays.

We selected five opportunities from the list provided to us and, following the general strategy above, selected WFC3 and ACS observations. The time available in each orbit varies widely and so does the duration and spacing of the buffer dumps in the primary instrument. We fiddled with the exposure times by hand to place our buffer dumps between the primary buffer dumps. In some cases, that limits the number of exposures we can take in a single orbit, e.g. in parallel observations 9 we cannot squeeze a buffer dump between the primary dumps and are thus forced to limit ourselves to two exposures per orbit, such that the buffer can be dumped in occultation.

Proposal 15888 - Visit 01 (Parallel Observation 01) - A pure-parallel search for faint stuff in star forming regions

Wed Dec 18 18:01:54 GMT 2019

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
		1		ANY	WFC3/UVIS, ACCUM, UVIS	F656N	FLASH=12			508 Secs (508 Secs)
									[==>]	[?]
	2		ANY	WFC3/UVIS, ACCUM, UVIS	F502N	FLASH=10			509 Secs (509 Secs)	
									[==>]	[?]

Orbit Structure	Orbit 1		Server Version: 20190514	
		<p>The diagram illustrates the orbit structure for Orbit 1. The x-axis represents time in seconds, ranging from 0 to 6000. Key events are marked: Exp. 1 (0-508s), Overhead (508-618s), Exp. 2 (618-1127s), Overhead (1127-1227s), and Occultation (1227-1327s). A green square marks the end of the occultation at 1327s. A black bar indicates a period of 61 seconds of unused orbital visibility starting at 1327s. A long white bar represents the total orbit duration, ending at approximately 5700s.</p>		

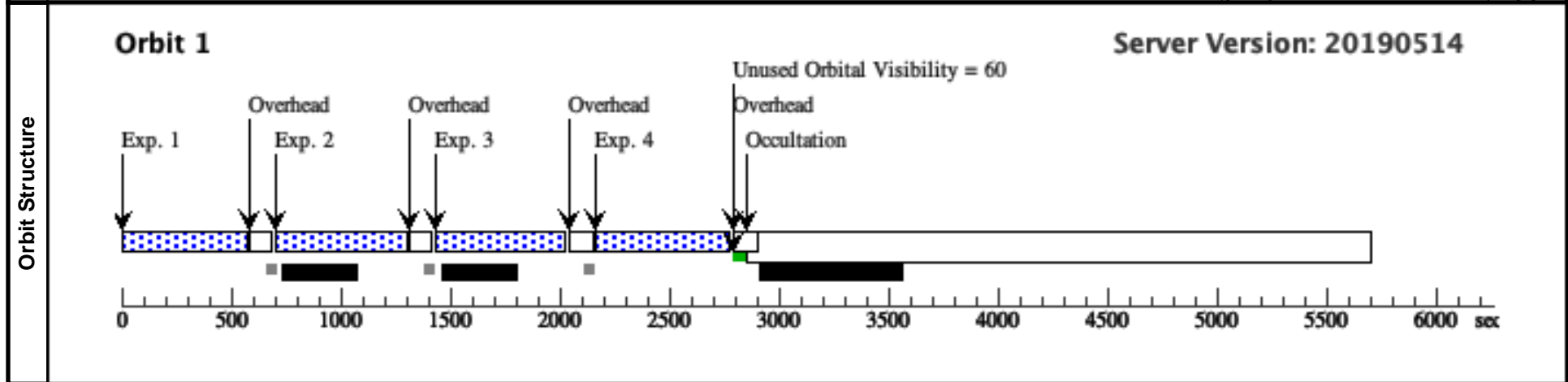
Proposal 15888 - Visit 02 (Parallel Observation 01) - A pure-parallel search for faint stuff in star forming regions

Wed Dec 18 18:01:55 GMT 2019

Visit	Proposal 15888, Visit 02, implementation Diagnostic Status: Warning Scientific Instruments: WFC3/UVIS Special Requirements: (none)
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Diagnostics	(Exposure 1 (Visit 02)) Warning (Form): FLASH level may be too high for this exposure or a long subexposure. See extended explanation in the diagnostic browser
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Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		ANY		WFC3/UVIS, ACCUM, UVIS	F625W	FLASH=2			540 Secs (540 Secs) [==>]
2		ANY		WFC3/UVIS, ACCUM, UVIS	F775W	FLASH=2			580 Secs (580 Secs) [==>]	[?]
3		ANY		WFC3/UVIS, ACCUM, UVIS	F656N	FLASH=10			580 Secs (580 Secs) [==>]	[?]
4		ANY		WFC3/UVIS, ACCUM, UVIS	F502N	FLASH=10			584 Secs (584 Secs) [==>]	[?]

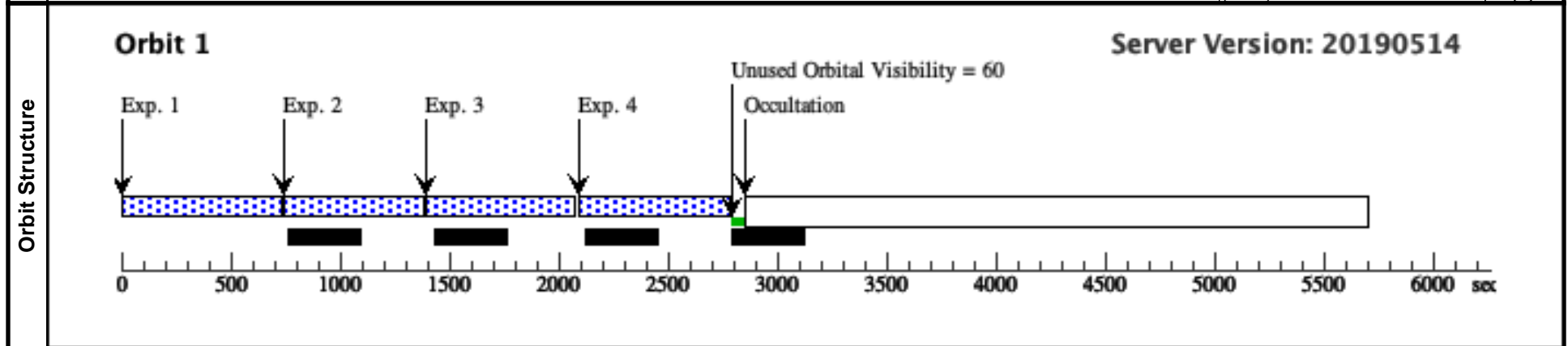


Proposal 15888 - Visit 03 (Parallel Observation 01) - A pure-parallel search for faint stuff in star forming regions

Wed Dec 18 18:01:55 GMT 2019

Visit	Proposal 15888, Visit 03, implementation									
	Diagnostic Status: No Diagnostics									
	Scientific Instruments: ACS/WFC									
	Special Requirements: (none)									

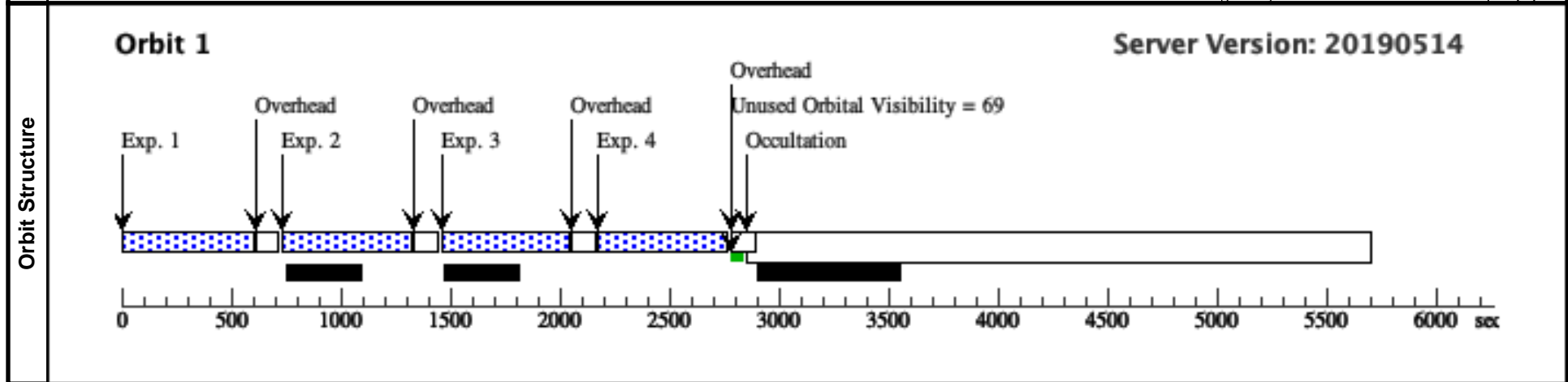
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
		1		ANY	ACS/WFC, ACCUM, WFC	F625W				523 Secs (523 Secs)
									[==>]	[?]
	2		ANY	ACS/WFC, ACCUM, WFC	F775W				500 Secs (500 Secs)	
									[==>]	[?]
	3		ANY	ACS/WFC, ACCUM, WFC	F658N	FLASH=21			523 Secs (523 Secs)	
									[==>]	[?]
	4		ANY	ACS/WFC, ACCUM, WFC	F502N	FLASH=21			535 Secs (535 Secs)	
									[==>]	[?]



Proposal 15888 - Visit 18 (Parallel Observation 01) - A pure-parallel search for faint stuff in star forming regions

Wed Dec 18 18:01:55 GMT 2019

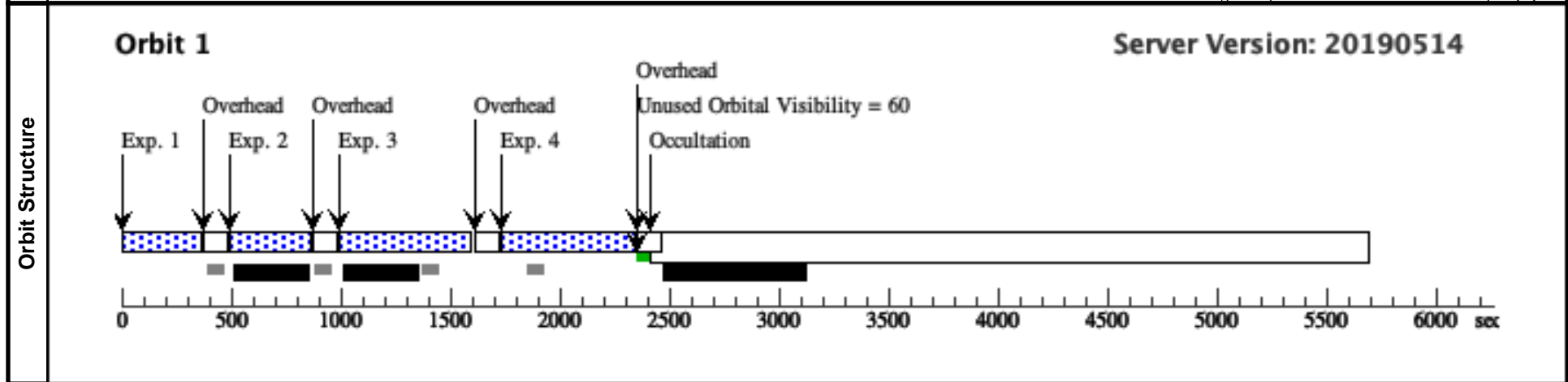
Visit	Proposal 15888, Visit 18, implementation										
	Diagnostic Status: No Diagnostics										
Scientific Instruments: WFC3/UVIS											
Special Requirements: (none)											
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
	1		ANY		WFC3/UVIS, ACCUM, UVIS	F555W				575 Secs (575 Secs)	[?]
										[==>]	[?]
	2		ANY		WFC3/UVIS, ACCUM, UVIS	F343N	FLASH=10			575 Secs (575 Secs)	[?]
										[==>]	[?]
3		ANY		WFC3/UVIS, ACCUM, UVIS	F280N	FLASH=11			575 Secs (575 Secs)	[?]	
									[==>]	[?]	
4		ANY		WFC3/UVIS, ACCUM, UVIS	F631N	FLASH=10			575 Secs (575 Secs)	[?]	
									[==>]	[?]	



Proposal 15888 - Visit 05 (Parallel Observation 05) - A pure-parallel search for faint stuff in star forming regions

Wed Dec 18 18:01:55 GMT 2019

Visit	Proposal 15888, Visit 05, scheduling											
	Diagnostic Status: No Diagnostics											
Scientific Instruments: WFC3/UVIS												
Special Requirements: (none)												
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit	
	1		ANY		WFC3/UVIS, ACCUM, UVIS	F625W	FLASH=4			328 Secs (328 Secs)		
										[==>]		[?]
	2		ANY		WFC3/UVIS, ACCUM, UVIS	F775W	FLASH=5			352 Secs (352 Secs)		
										[==>]		[?]
3		ANY		WFC3/UVIS, ACCUM, UVIS	F656N	FLASH=10			587 Secs (587 Secs)			
									[==>]		[?]	
4		ANY		WFC3/UVIS, ACCUM, UVIS	F502N	FLASH=10			582 Secs (582 Secs)			
									[==>]		[?]	

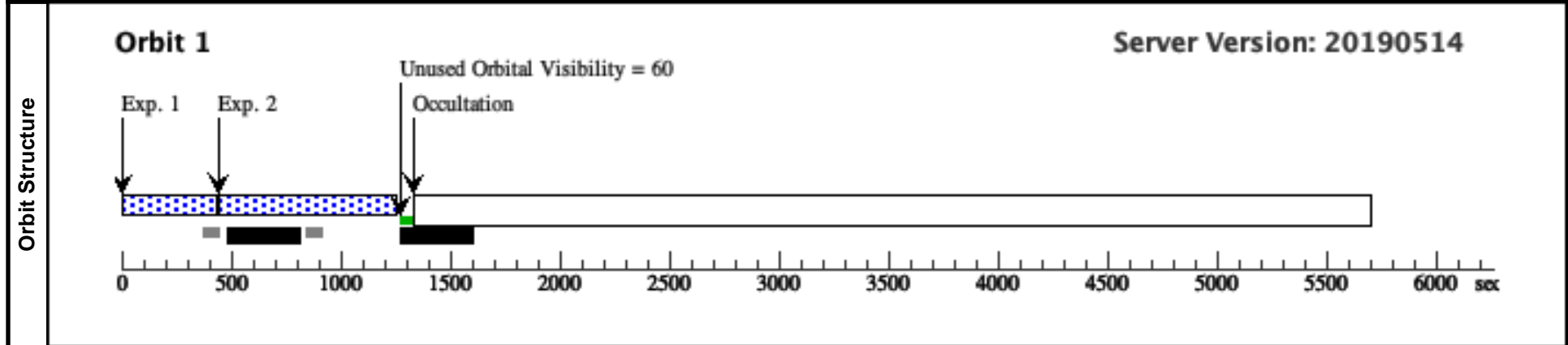


Proposal 15888 - Visit 06 (Parallel Observation 05) - A pure-parallel search for faint stuff in star forming regions

Wed Dec 18 18:01:55 GMT 2019

Visit	Proposal 15888, Visit 06, scheduling									
	Diagnostic Status: No Diagnostics									
	Scientific Instruments: ACS/WFC									
	Special Requirements: (none)									

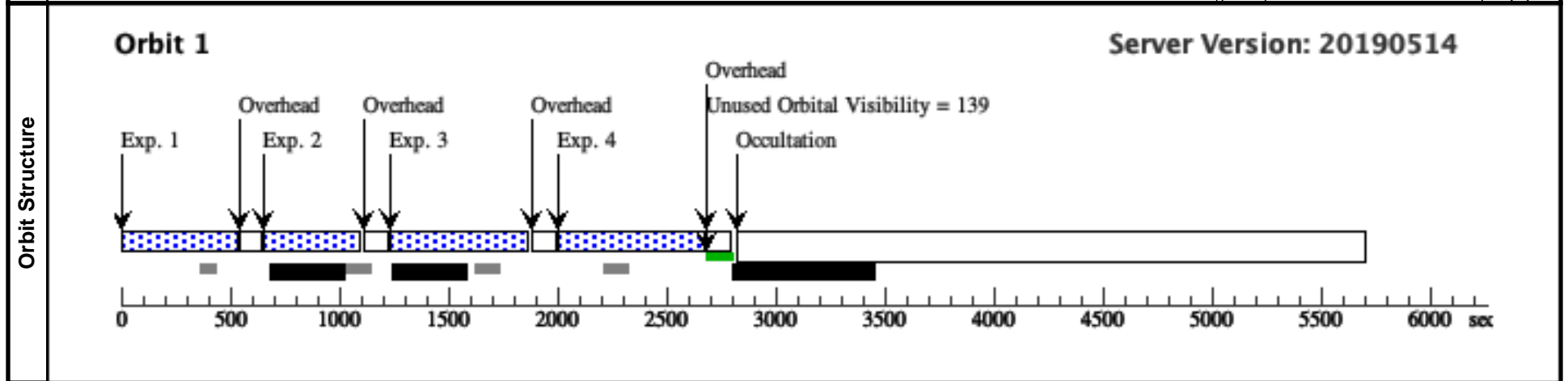
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1			ANY	ACS/WFC, ACCUM, WFC	F625W	FLASH=10			220 Secs (220 Secs)
									[=>]	[?]
2			ANY	ACS/WFC, ACCUM, WFC	F658N	FLASH=21			649 Secs (649 Secs)	
									[=>]	[?]



Proposal 15888 - Visit 07 (Parallel Observation 05) - A pure-parallel search for faint stuff in star forming regions

Wed Dec 18 18:01:55 GMT 2019

Visit	Proposal 15888, Visit 07, scheduling										
	Diagnostic Status: No Diagnostics										
Scientific Instruments: WFC3/UVIS											
Special Requirements: (none)											
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
	1		ANY		WFC3/UVIS, ACCUM, UVIS	F555W				499 Secs (499 Secs)	[?]
										[==>]	
	2		ANY		WFC3/UVIS, ACCUM, UVIS	F343N	FLASH=10			425 Secs (425 Secs)	[?]
										[==>]	
3		ANY		WFC3/UVIS, ACCUM, UVIS	F280N	FLASH=11			625 Secs (625 Secs)	[?]	
									[==>]		
4		ANY		WFC3/UVIS, ACCUM, UVIS	F631N	FLASH=10			650 Secs (650 Secs)	[?]	
									[==>]		



Proposal 15888 - Visit 09 (Parallel Observation 09) - A pure-parallel search for faint stuff in star forming regions

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Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
		1		ANY	WFC3/UVIS, ACCUM, UVIS	F625W				1202 Secs (1202 Secs) [==>]
	2		ANY	WFC3/UVIS, ACCUM, UVIS	F775W				1211 Secs (1211 Secs) [==>]	[?]

Orbit Structure	Orbit 1		Server Version: 20190514	
		<p>The diagram shows a horizontal timeline for Orbit 1 from 0 to 6000 seconds. A blue checkered bar represents the total orbital visibility, starting at 0 and ending at approximately 5700 seconds. Two exposure periods are shown: 'Exp. 1' from 0 to 1202 seconds and 'Exp. 2' from 1211 to 2412 seconds. Small white rectangles between exposures represent 'Overhead'. A black bar from approximately 2600 to 3400 seconds represents 'Occultation'. A green square at approximately 2600 seconds marks the end of the occultation. The text 'Unused Orbital Visibility = 60' is located above the occultation period.</p>		

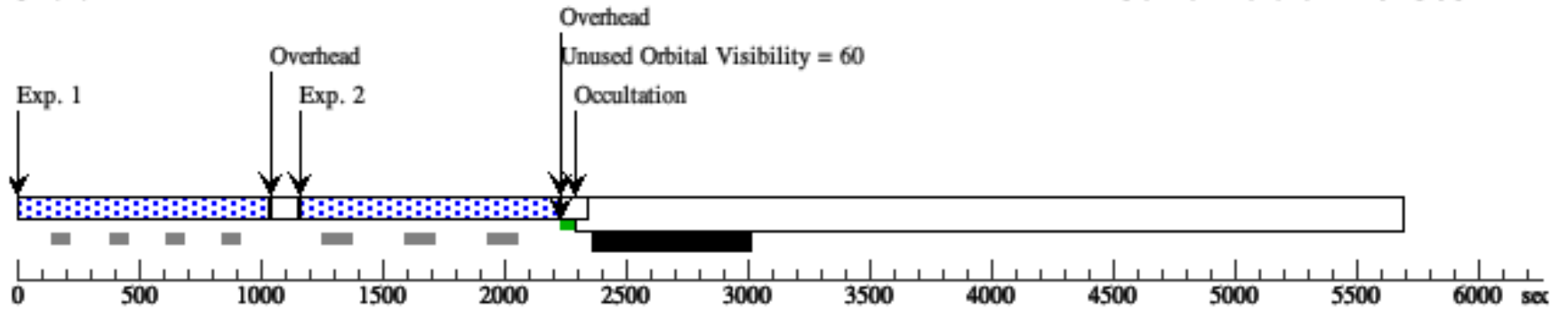
Proposal 15888 - Visit 10 (Parallel Observation 09) - A pure-parallel search for faint stuff in star forming regions

Wed Dec 18 18:01:55 GMT 2019

Exposures	Orbit Structure									
	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		ANY		WFC3/UVIS, ACCUM, UVIS	F656N	FLASH=10			1000 Secs (1000 Secs)	[?]
									[==>]	[?]
2		ANY		WFC3/UVIS, ACCUM, UVIS	F502N	FLASH=10			1031 Secs (1031 Secs)	[?]
									[==>]	[?]

Orbit 1

Server Version: 20190514



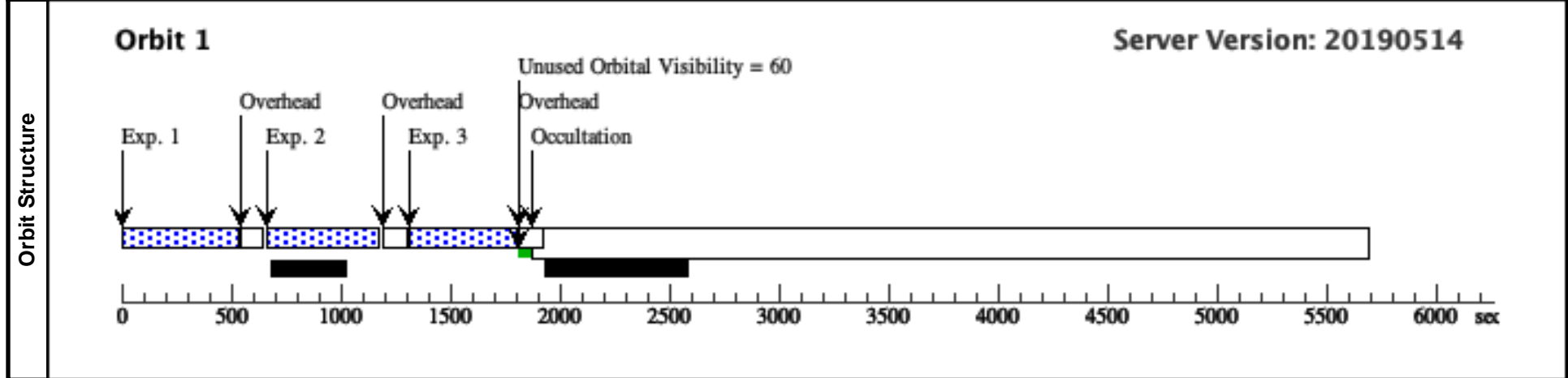
Proposal 15888 - Visit 12 (Parallel Observation 12) - A pure-parallel search for faint stuff in star forming regions

Wed Dec 18 18:01:55 GMT 2019

Visit	Proposal 15888, Visit 12, scheduling Diagnostic Status: Warning Scientific Instruments: WFC3/UVIS Special Requirements: (none)
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Diagnostics	(Exposure 1 (Visit 12)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser
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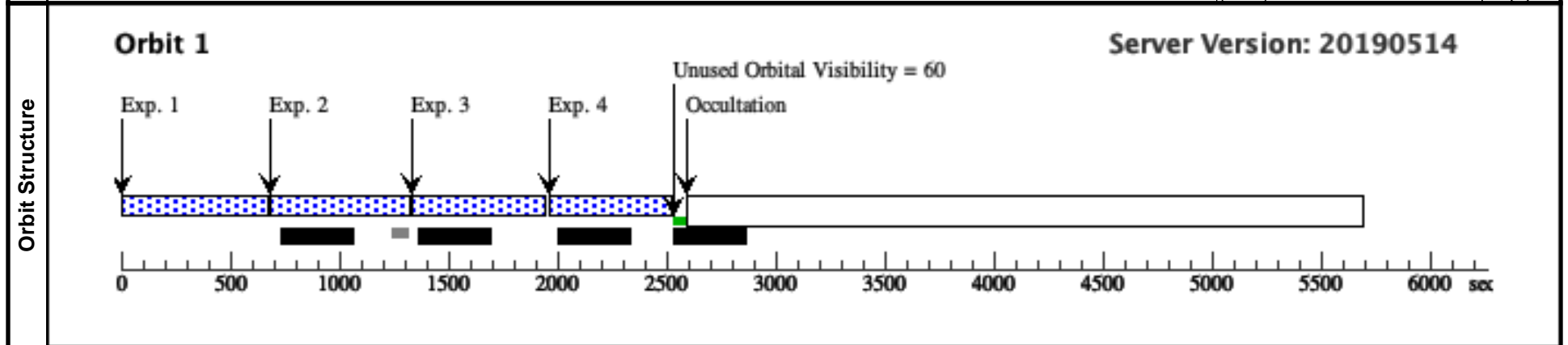
#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		ANY	WFC3/UVIS, ACCUM, UVIS	F775W	FLASH=2			499 Secs (499 Secs)	
								[==>]	[?]
2		ANY	WFC3/UVIS, ACCUM, UVIS	F656N	FLASH=11			500 Secs (500 Secs)	
								[==>]	[?]
3		ANY	WFC3/UVIS, ACCUM, UVIS	F502N	FLASH=10			461 Secs (461 Secs)	
								[==>]	[?]



Proposal 15888 - Visit 13 (Parallel Observation 12) - A pure-parallel search for faint stuff in star forming regions

Wed Dec 18 18:01:55 GMT 2019

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
1		ANY	ACS/WFC, ACCUM, WFC	F625W				460 Secs (460 Secs)	[?]	
2		ANY	ACS/WFC, ACCUM, WFC	F502N	FLASH=21			470 Secs (470 Secs)	[?]	
3		ANY	ACS/WFC, ACCUM, WFC	F658N	FLASH=21			462 Secs (462 Secs)	[?]	
4		ANY	ACS/WFC, ACCUM, WFC	F775W				407 Secs (407 Secs)	[?]	



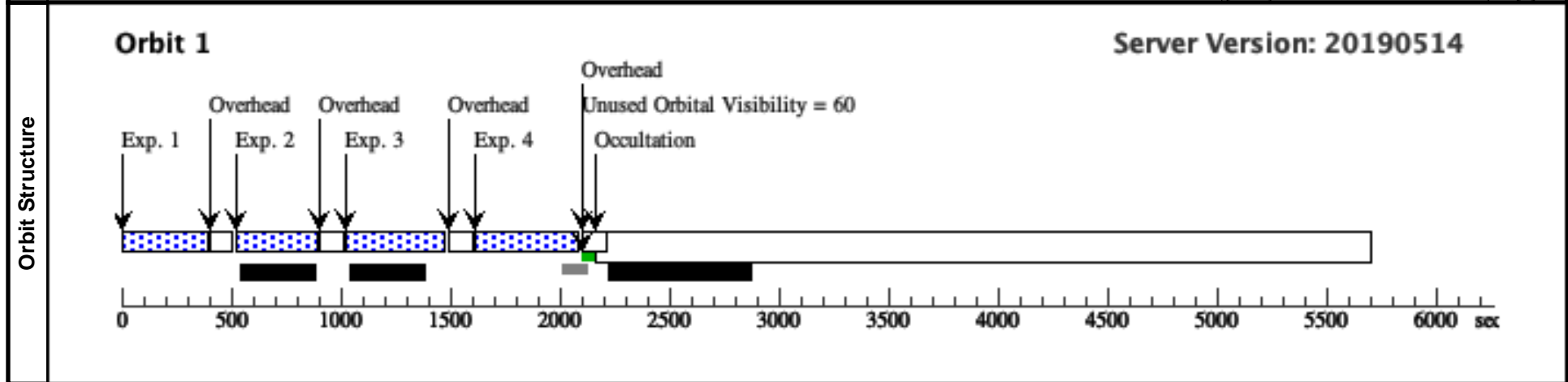
Proposal 15888 - Visit 15 (Parallel Observation 15) - A pure-parallel search for faint stuff in star forming regions

Wed Dec 18 18:01:55 GMT 2019

Visit	Proposal 15888, Visit 15, scheduling Diagnostic Status: Warning Scientific Instruments: WFC3/UVIS Special Requirements: (none)
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Diagnostics	(Exposure 1 (Visit 15)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser (Exposure 2 (Visit 15)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser
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Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		ANY	WFC3/UVIS, ACCUM, UVIS	F625W				360 Secs (360 Secs)	
									[==>]	[?]
	2		ANY	WFC3/UVIS, ACCUM, UVIS	F775W	FLASH=4			352 Secs (352 Secs)	
									[==>]	[?]
	3		ANY	WFC3/UVIS, ACCUM, UVIS	F656N	FLASH=11			440 Secs (440 Secs)	
									[==>]	[?]
	4		ANY	WFC3/UVIS, ACCUM, UVIS	F502N	FLASH=10			447 Secs (447 Secs)	
									[==>]	[?]



Proposal 15888 - Visit 16 (Parallel Observation 15) - A pure-parallel search for faint stuff in star forming regions

Wed Dec 18 18:01:55 GMT 2019

Visit	Proposal 15888, Visit 16, scheduling Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: (none)									
	Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]
1			ANY	ACS/WFC, ACCUM, WFC	F658N	FLASH=21			1083 Secs (1083 Secs) [==>]	[?]
Orbit Structure	<p>Orbit 1 Server Version: 20190514</p>									
	<p>Unused Orbital Visibility = 60</p>									