



## 15258 - Galaxies at the Extremes: Ultradiffuse Galaxies in the Virgo Cluster

Cycle: 25, Proposal Category: GO

(Availability Mode: SUPPORTED)

### INVESTIGATORS

<i>Name</i>	<i>Institution</i>	<i>E-Mail</i>
<b>Dr. Chris Mihos (PI) (Contact)</b>	<b>Case Western Reserve University</b>	<b>mihos@case.edu</b>
Dr. Patrick Cote (CoI) (CSA Member)	National Research Council of Canada	patrick.cote@nrc-cnrc.gc.ca
Dr. Patrick R. Durrell (CoI) (Contact)	Youngstown State University	prdurrell@ysu.edu
Dr. John J. Feldmeier (CoI)	Youngstown State University	jjfeldmeier@ysu.edu
Dr. Laura Ferrarese (CoI) (CSA Member)	Dominion Astrophysical Observatory	lauraferrarese.nrc@gmail.com
Dr. Paul Harding (CoI)	Case Western Reserve University	paul.harding@case.edu
Dr. Eric W. Peng (CoI)	Peking University	ewpeng@gmail.com
Dr. Elisa Toloba (CoI)	University of the Pacific	etoloba@pacific.edu
Prof. Puragra Guhathakurta (CoI)	University of California - Santa Cruz	raja@ucolick.org
Prof. Laura Virginia Sales (CoI)	University of California - Riverside	lsales@ucr.edu
Dr. Sungsoo Lim (CoI)		sslim00@gmail.com

### 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	(3) VCC-615 ANY	ACS/WFC WFC3/UVIS	2	06-Aug-2018 19:00:27.0	yes
02	(3) VCC-615 ANY	ACS/WFC WFC3/UVIS	2	06-Aug-2018 19:00:28.0	yes
03	(3) VCC-615 ANY	ACS/WFC WFC3/UVIS	2	06-Aug-2018 19:00:29.0	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>
04	(3) VCC-615 ANY	ACS/WFC WFC3/UVIS	1	06-Aug-2018 19:00:30.0	yes
05	(3) VCC-615 ANY	ACS/WFC WFC3/UVIS	1	06-Aug-2018 19:00:31.0	yes

8 Total Orbits Used

## **ABSTRACT**

The "ultradiffuse galaxies" (UDGs) recently discovered in massive galaxy clusters presents both challenges and opportunities for our understanding of galaxy evolution in dense clusters. Such large, low density galaxies should be most vulnerable to gravitational destruction within the cluster environment. Thus their presence in cluster cores argues either that they must be stabilized by massive dark halos or else be short-lived objects undergoing rapid transformation, perhaps leading to the formation of ultracompact dwarf galaxies (UCDs) if their destruction leaves only a compact nucleus behind.

We propose deep imaging of four Virgo Cluster UDGs to probe their local environment within Virgo via accurate tip of the red giant branch (TRGB) distances. With a distance precision of 1 Mpc, we will accurately place the objects in the Virgo core, cluster outskirts, or intervening field. When coupled with our extant kinematic data, we can determine whether they are infalling objects or instead have already passed through the cluster core. We will also compare their compact nuclei to Virgo UCDs, and study their globular cluster (GC) populations in detail. Probing three magnitudes beyond the turnover in the GC luminosity function, we will construct larger and cleaner GC samples than possible with ground-based imaging, using the total mass and radial extent of the globular cluster systems to estimate the dark halo mass and tidal radius for each UDG. The new information provided by HST about the local environment and intrinsic properties of these Virgo UDGs will be used in conjunction with simulation data to study cluster-driven evolution and transformation of low density galaxies.

## **OBSERVING DESCRIPTION**

The program is to obtain very deep F814W images of a single ultra-diffuse galaxy in the Virgo cluster, and to obtain photometry of very faint point sources over the entire FOV. We are using ACS as primary to get the larger FOV on the target galaxy, and using WFC3 in parallel to obtain a 'background' field necessary for our science goals. LOW-SKY is required due to the higher-than-average sky background for targets near the ecliptic plane, and our need to get high enough S/N for very faint point sources.

Visit locations: For each of the three 2-orbit visits, we are using a small 4 pt ACS-WFC-DITHER-BOX pattern to properly sample the PSF. Between visits, we are using POS-TARGs to create a larger BOX pattern such that we cover the chip gap. The 4th part of this larger box (location 4) is a single orbit (2 exposures only), so I have made a custom DITHER-LINE to match the first two points of the small, subpixel DITHER-BOX pattern.

Exposure times: All of our F814W observations are 2 images per orbit -- there will be 14 individual F814W images, so CR removal should be fine. We have left a few x10s of orbit visibility open for schedulability. The single orbit in F475W will employ 4 primary+parallel images, but with unequal exposure times.

Roll Angles: We are limited by the target availability for this object, as well as the need for all observations to be made at the same roll angle as the first Visit. We have chosen a rather restricted roll angle range so that we avoid (a) a bright star that lies to the E of VCC 615, and (b) such that the WFC3 parallel fields do not land on a region of bright stars. (the roll angle we used was chosen to co-incide with surprisingly small target visibility).

FLASH: Due to the length of the exposures, we do not need post-FLASH for any of the F814W exposures in either camera. However, some of the shorter F475W exposures in Visit 05 will require some post-FLASH. To conservatively determine the appropriate backgrounds, we used the ETC and assumed the faintest possible sky background ( $MU_V=22.6$  for target at 13 degrees ecliptic latitude), and no Earthshine or airglow. For 410S exposures in F475W this becomes 9 e-/pixel (<http://etc.stsci.edu/etc/results/WFC3UVIS.im.1012759/>). Thus we will need a post-FLASH of 3 e- for the shorter WFC3 F475W exposures. For the ACS, using these same (rather optimistic) conditions, we find a minimum of 19 e-/pixel in the 365s exposures (<http://etc.stsci.edu/etc/results/ACS.im.1012739/>), requiring a post-FLASH of 1.0 e- for the shorter ACS exposures

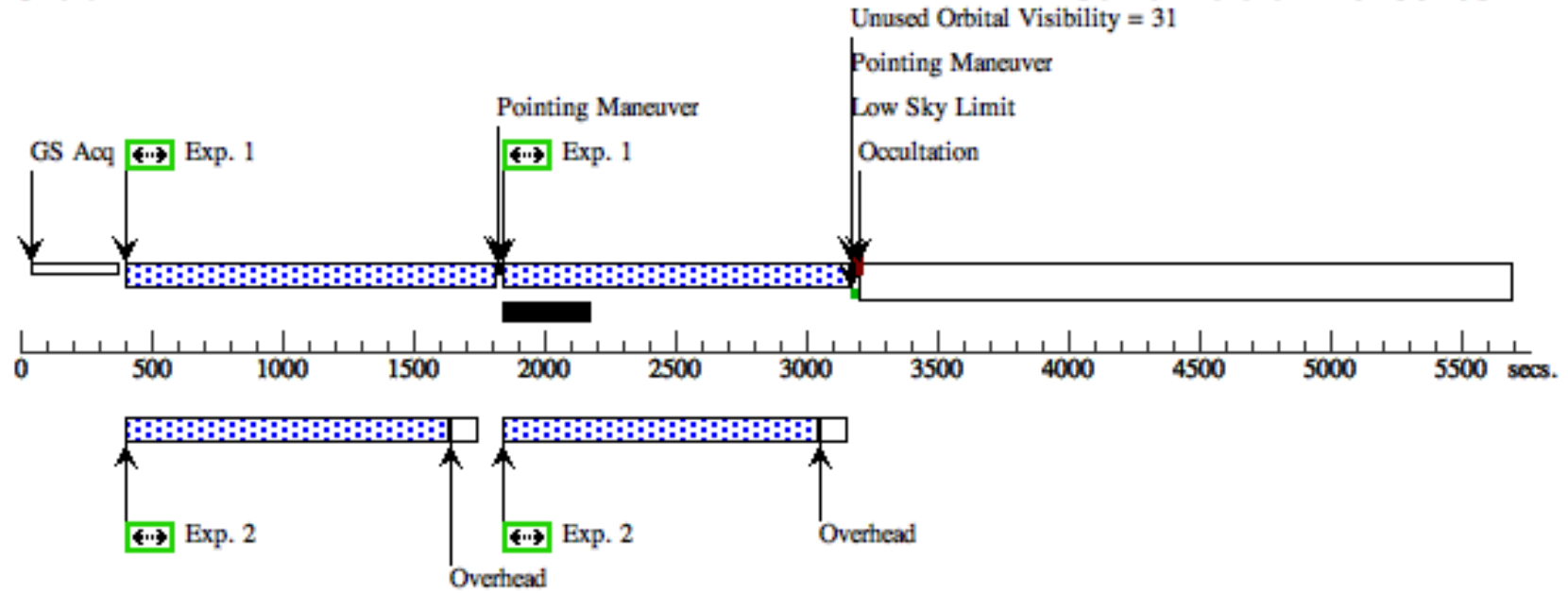
Proposal 15258 - VCC 615 - I - location 1 (01) - Galaxies at the Extremes: Ultradiffuse Galaxies in the Virgo Cluster

Mon Aug 06 23:00:32 GMT 2018

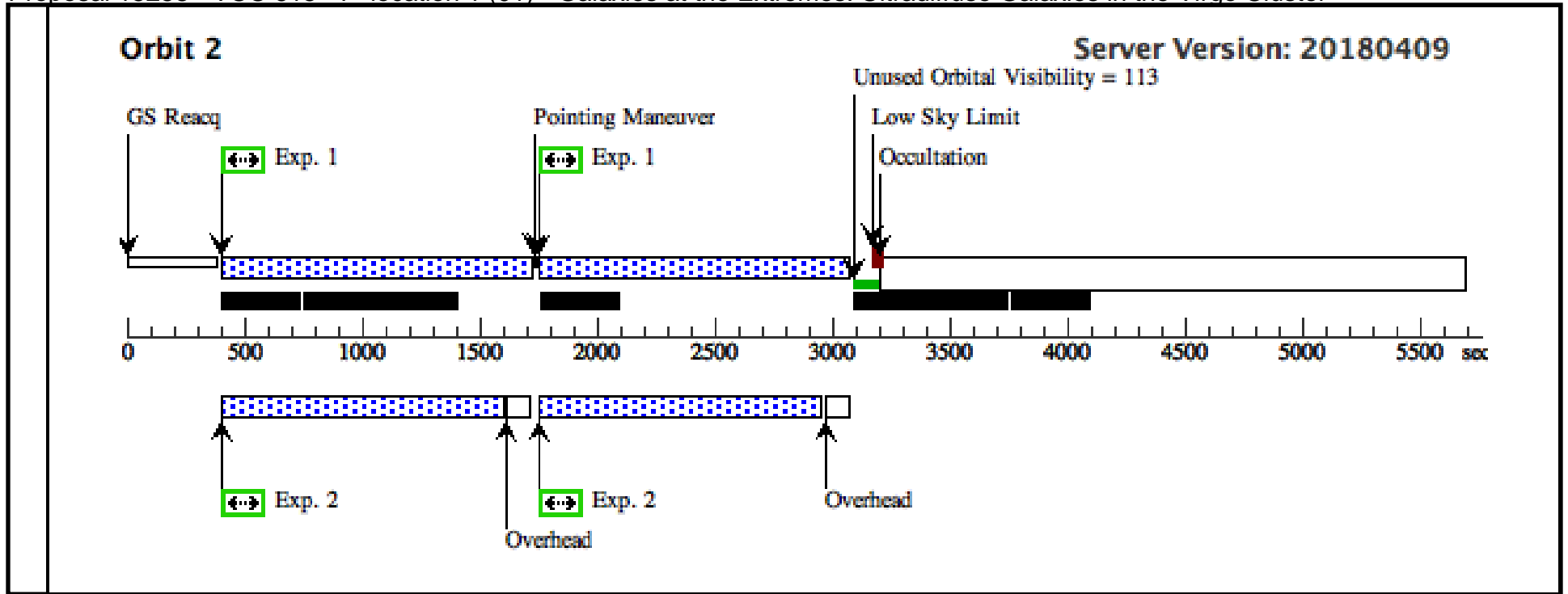
<b>Visit</b>	<b>Proposal 15258, VCC 615 - I - location 1 (01), implementation</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: ORIENT 116D TO 125 D <i>Comments: F814W images, 2 exposures per orbit in DITHER-BOX pattern. Location 1 of 4 different POST TARGs for each of the 4 F814W-related visits. Small ORIENT range dictated by limited target visibility and need to avoid a few bright stars both E and S of the galaxy</i>										
	<b>Patterns</b>	<b>#</b>	<b>Primary Pattern</b>				<b>Secondary Pattern</b>			<b>Exposures</b>	
(1)		Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.265 Line Spacing=0.187		Coordinate Frame=POS-TARG Pattern Orientation=20.67 Angle Between Sides=69.05 Center Pattern=false					(1-2)		
<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>		<b>Targ. Coord. Corrections</b>		<b>Fluxes</b>	<b>Miscellaneous</b>			
	(3)	VCC-615	RA: 12 23 2.7869 (185.7616121d) Dec: +12 01 10.55 (12.01960d) Equinox: J2000				V=29	Reference Frame: ICRS			
<i>Comments: Category=GALAXY Description=[LSB]</i>											
<b>Exposures</b>	<b>#</b>	<b>Label</b>	<b>Target</b>	<b>Config,Mode,Aperture</b>	<b>Spectral Els.</b>	<b>Opt. Params.</b>	<b>Special Reqs.</b>	<b>Groups</b>	<b>Exp. Time (Total)/[Actual Dur.]</b>		<b>Orbit</b>
	1	VCC 615	(3) VCC-615	ACS/WFC, ACCUM, WFCENTER	F814W		POS TARG 0.00,0.00; LOW-SKY; GS ACQ SCENARIO SINGLE	Pattern 1, Exps 1-2 in VCC 615 - I - location 1 (01) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in VCC 615 - I - location 1 (01)	1200 Secs (4800 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	
	2	WFC3 back ground	ANY	WFC3/UVIS, ACCUM, UVIS-CENTER	F814W			Pattern 1, Exps 1-2 in VCC 615 - I - location 1 (01) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in VCC 615 - I - location 1 (01)	1200 Secs (4800 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	
										[2]	

**Orbit 1**

**Server Version: 20180409**



Orbit Structure



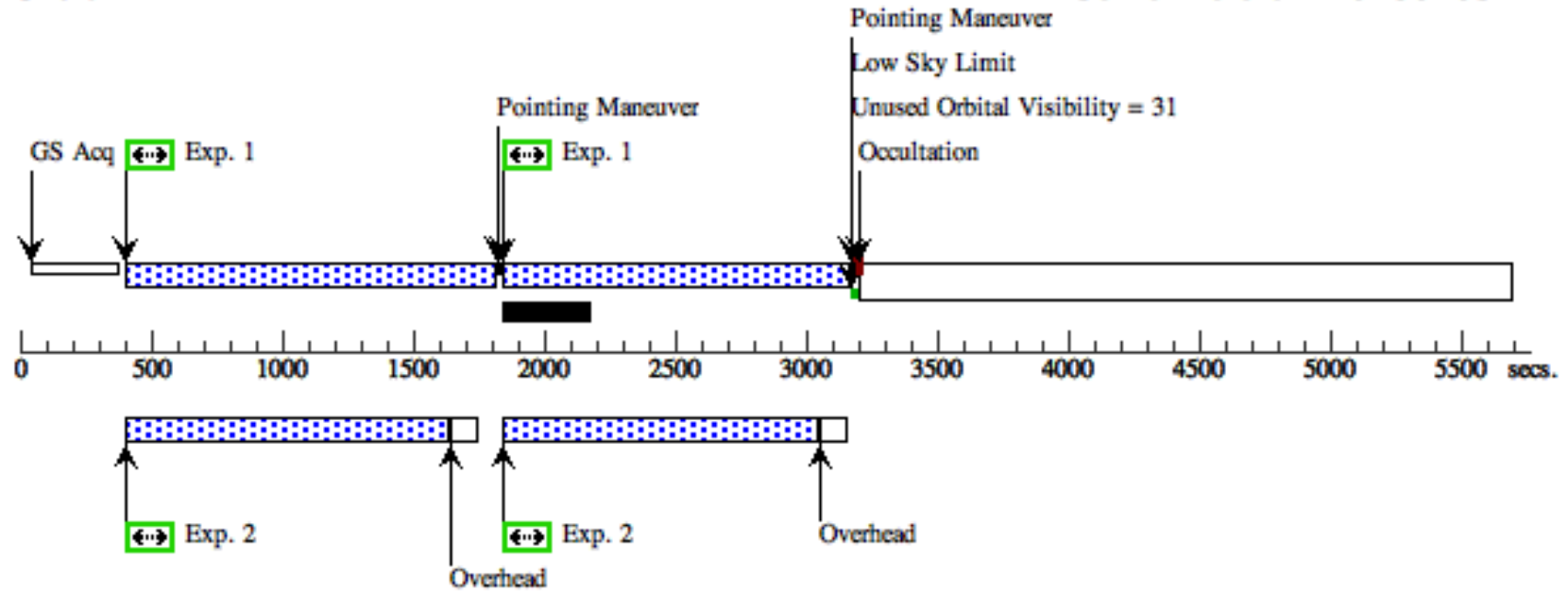
Proposal 15258 - VCC 615 - I - location 2 (02) - Galaxies at the Extremes: Ultradiffuse Galaxies in the Virgo Cluster

Mon Aug 06 23:00:32 GMT 2018

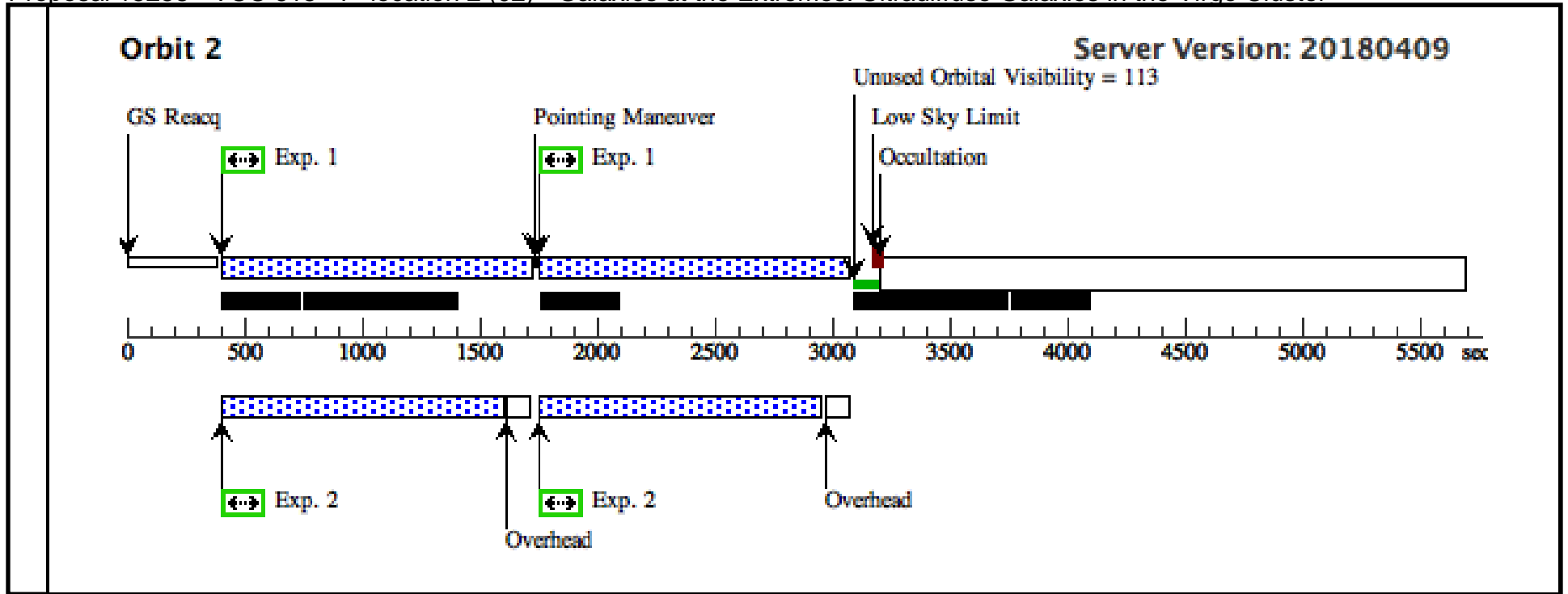
Visit	<b>Proposal 15258, VCC 615 - I - location 2 (02), implementation</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: SAME ORIENT AS 01 <i>Comments: F814W images, 2 exposures per orbit in DITHER-BOX pattern. Location 2 of 4 different POST TARGETS for each of the 4 F814W-related visits. This field X-1" of Visit 01.</i>									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(1)	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.265 Line Spacing=0.187	Coordinate Frame=POS-TARG Pattern Orientation=20.67 Angle Between Sides=69.05 Center Pattern=false		(1-2)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(3)	VCC-615	RA: 12 23 2.7869 (185.7616121d) Dec: +12 01 10.55 (12.01960d) Equinox: J2000		V=29	Reference Frame: ICRS				
	<i>Comments: Category=GALAXY Description=[LSB]</i>									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	VCC 615	(3) VCC-615	ACS/WFC, ACCUM, WFCENTER	F814W		POS TARG -0.98,0.00; LOW-SKY; GS ACQ SCENARIO SINGLE	Pattern 1, Exps 1-2 in VCC 615 - I - location 2 (02) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in VCC 615 - I - location 2 (02)	1200 Secs (4800 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1] [2]
2	WFC3 back ground	ANY	WFC3/UVIS, ACCUM, UVIS-CENTER	F814W			Pattern 1, Exps 1-2 in VCC 615 - I - location 2 (02) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in VCC 615 - I - location 2 (02)	1200 Secs (4800 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1] [2]	

**Orbit 1**

Server Version: 20180409



Orbit Structure



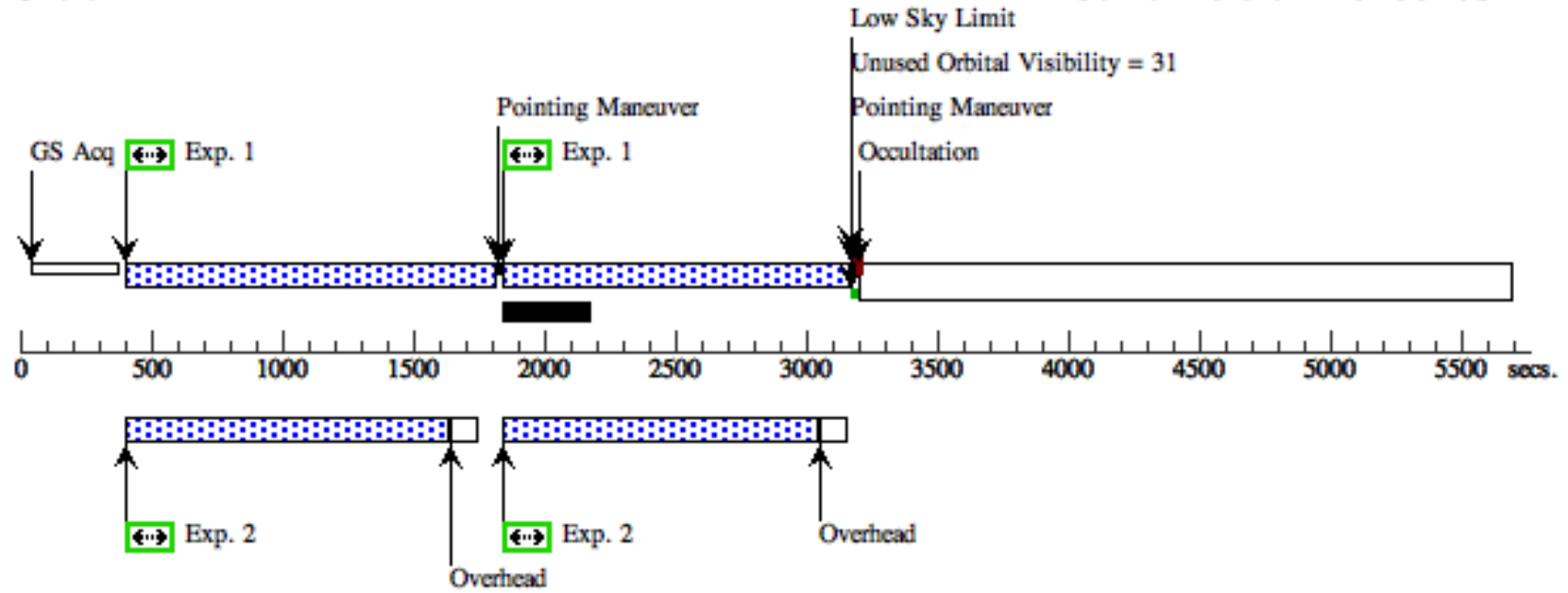
Proposal 15258 - VCC 615 - I - location 3 (03) - Galaxies at the Extremes: Ultradiffuse Galaxies in the Virgo Cluster

Mon Aug 06 23:00:32 GMT 2018

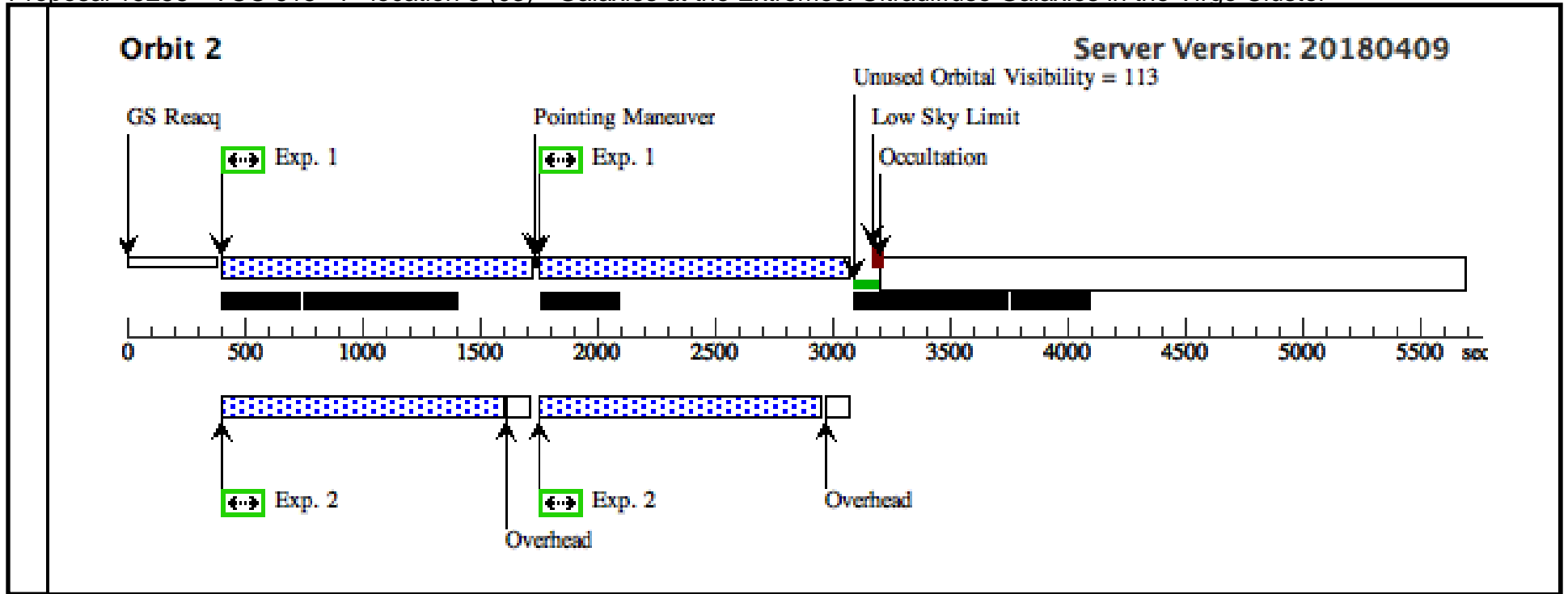
Visit	<b>Proposal 15258, VCC 615 - I - location 3 (03), implementation</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: SAME ORIENT AS 01 Comments: F814W images, 2 exposures per orbit in DITHER-BOX pattern. Location 3 of 4 different POST TARGETS for each of the 4 F814W-related visits. This field Y+3" from Visit 01, in order to cover chip gap									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
	(1)	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.265 Line Spacing=0.187	Coordinate Frame=POS-TARG Pattern Orientation=20.67 Angle Between Sides=69.05 Center Pattern=false		(1-2)					
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(3)	VCC-615	RA: 12 23 2.7869 (185.7616121d) Dec: +12 01 10.55 (12.01960d) Equinox: J2000		V=29	Reference Frame: ICRS				
	Comments: Category=GALAXY Description=[LSB]									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	VCC 615	(3) VCC-615	ACS/WFC, ACCUM, WFCENTER	F814W		POS TARG 0.00,2.94; LOW-SKY; GS ACQ SCENARIO SINGLE	Pattern 1, Exps 1-2 in VCC 615 - I - location 3 (03) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in VCC 615 - I - location 3 (03)	1200 Secs (4800 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1] [2]
	2	WFC3 back ground	ANY	WFC3/UVIS, ACCUM, UVIS-CENTER	F814W			Pattern 1, Exps 1-2 in VCC 615 - I - location 3 (03) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in VCC 615 - I - location 3 (03)	1200 Secs (4800 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1] [2]

**Orbit 1**

**Server Version: 20180409**



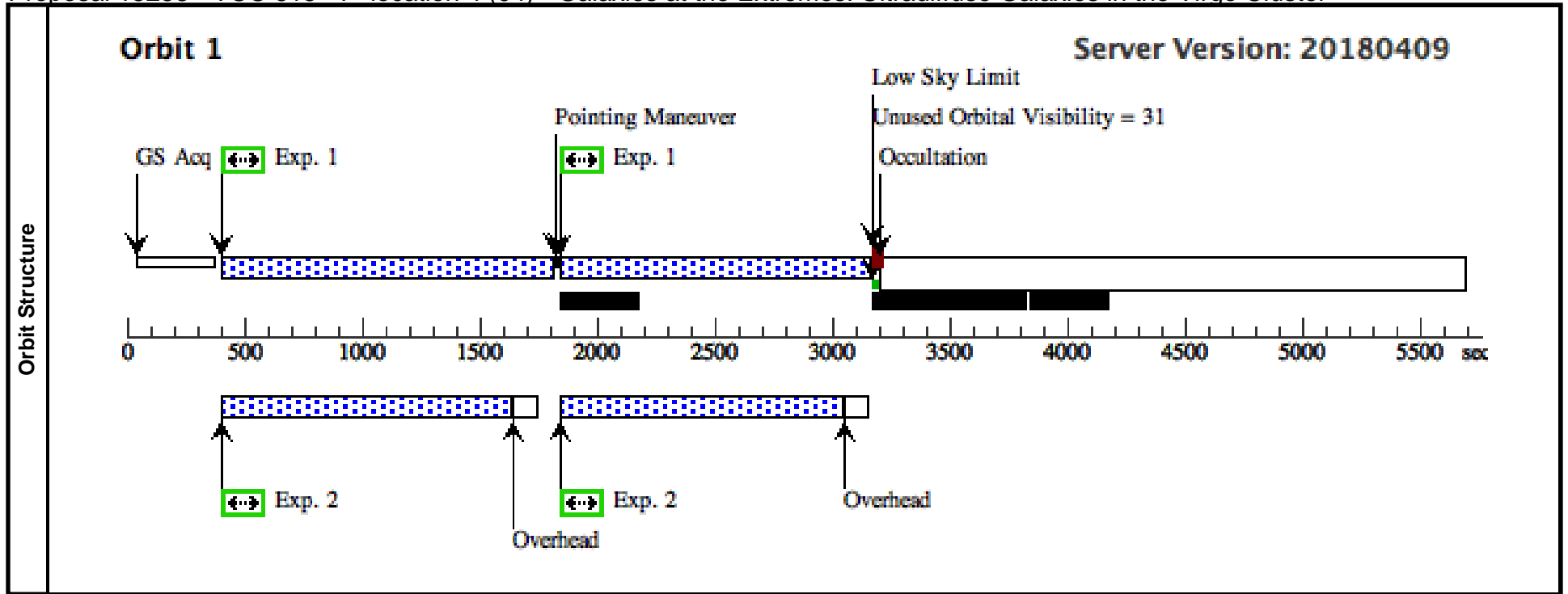
Orbit Structure



Proposal 15258 - VCC 615 - I - location 4 (04) - Galaxies at the Extremes: Ultradiffuse Galaxies in the Virgo Cluster

Mon Aug 06 23:00:33 GMT 2018

<b>Visit</b>	<b>Proposal 15258, VCC 615 - I - location 4 (04), implementation</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: SAME ORIENT AS 01 <i>Comments: Single orbit visit in F814W (2 exposures per orbit, much like previous 3 visits), using a 2 point DITHER-LINE to mimic first half of DITHER-BOX. Location 4 of 4 different POST TARGs for each of the 4 F814W-related visits. This field Y+3" from Visit 02, in order to cover chip gap.</i>																																			
	<b>Patterns</b>		<table border="1"> <thead> <tr> <th>#</th> <th>Primary Pattern</th> <th>Secondary Pattern</th> <th>Exposures</th> </tr> </thead> <tbody> <tr> <td>(2)</td> <td>                     Pattern Type=ACS-WFC-DITHER-LINE                      Purpose=DITHER                      Number Of Points=2                      Point Spacing=0.262                      Line Spacing=                 </td> <td>                     Coordinate Frame=POS-TARG                      Pattern Orientation=20.67                      Angle Between Sides=                      Center Pattern=false                 </td> <td>(1-2)</td> </tr> </tbody> </table>	#	Primary Pattern	Secondary Pattern	Exposures	(2)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.262 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=20.67 Angle Between Sides= Center Pattern=false	(1-2)																									
#	Primary Pattern	Secondary Pattern	Exposures																																	
(2)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.262 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=20.67 Angle Between Sides= Center Pattern=false	(1-2)																																	
<b>Fixed Targets</b>	<table border="1"> <thead> <tr> <th>#</th> <th>Name</th> <th>Target Coordinates</th> <th>Targ. Coord. Corrections</th> <th>Fluxes</th> <th>Miscellaneous</th> </tr> </thead> <tbody> <tr> <td>(3)</td> <td>VCC-615</td> <td>                     RA: 12 23 2.7869 (185.7616121d)                      Dec: +12 01 10.55 (12.01960d)                      Equinox: J2000                 </td> <td></td> <td>V=29</td> <td>Reference Frame: ICRS</td> </tr> </tbody> </table> <i>Comments: Category=GALAXY Description=[LSB]</i>						#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous	(3)	VCC-615	RA: 12 23 2.7869 (185.7616121d) Dec: +12 01 10.55 (12.01960d) Equinox: J2000		V=29	Reference Frame: ICRS																		
	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous																														
(3)	VCC-615	RA: 12 23 2.7869 (185.7616121d) Dec: +12 01 10.55 (12.01960d) Equinox: J2000		V=29	Reference Frame: ICRS																															
<b>Exposures</b>	<table border="1"> <thead> <tr> <th>#</th> <th>Label</th> <th>Target</th> <th>Config,Mode,Aperture</th> <th>Spectral Els.</th> <th>Opt. Params.</th> <th>Special Reqs.</th> <th>Groups</th> <th>Exp. Time (Total)/[Actual Dur.]</th> <th>Orbit</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>VCC 615</td> <td>(3) VCC-615</td> <td>ACS/WFC, ACCUM, WFCENTER</td> <td>F814W</td> <td></td> <td>                     POS TARG -0.98,2.984;                      LOW-SKY;                      GS ACQ SCENARIO SINGLE                 </td> <td>                     Pattern 2, Exps 1-2 in VCC 615 - I - location 4 (04) (2)                      Prime + Parallel Group 1-2 in Pattern 2, Exps 1-2 in VCC 615 - I - location 4 (04)                 </td> <td>                     1200 Secs (2400 Secs)                      [==&gt;(Pattern 1)]                      [==&gt;(Pattern 2)]                 </td> <td>[1]</td> </tr> <tr> <td>2</td> <td>WFC3 back ground</td> <td>ANY</td> <td>WFC3/UVIS, ACCUM, UVIS-CENTER</td> <td>F814W</td> <td></td> <td></td> <td>                     Pattern 2, Exps 1-2 in VCC 615 - I - location 4 (04) (2)                      Prime + Parallel Group 1-2 in Pattern 2, Exps 1-2 in VCC 615 - I - location 4 (04)                 </td> <td>                     1200 Secs (2400 Secs)                      [==&gt;(Pattern 1)]                      [==&gt;(Pattern 2)]                 </td> <td>[1]</td> </tr> </tbody> </table>						#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit	1	VCC 615	(3) VCC-615	ACS/WFC, ACCUM, WFCENTER	F814W		POS TARG -0.98,2.984; LOW-SKY; GS ACQ SCENARIO SINGLE	Pattern 2, Exps 1-2 in VCC 615 - I - location 4 (04) (2) Prime + Parallel Group 1-2 in Pattern 2, Exps 1-2 in VCC 615 - I - location 4 (04)	1200 Secs (2400 Secs) [==>(Pattern 1)] [==>(Pattern 2)]	[1]	2	WFC3 back ground	ANY	WFC3/UVIS, ACCUM, UVIS-CENTER	F814W			Pattern 2, Exps 1-2 in VCC 615 - I - location 4 (04) (2) Prime + Parallel Group 1-2 in Pattern 2, Exps 1-2 in VCC 615 - I - location 4 (04)	1200 Secs (2400 Secs) [==>(Pattern 1)] [==>(Pattern 2)]	[1]
	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit																										
1	VCC 615	(3) VCC-615	ACS/WFC, ACCUM, WFCENTER	F814W		POS TARG -0.98,2.984; LOW-SKY; GS ACQ SCENARIO SINGLE	Pattern 2, Exps 1-2 in VCC 615 - I - location 4 (04) (2) Prime + Parallel Group 1-2 in Pattern 2, Exps 1-2 in VCC 615 - I - location 4 (04)	1200 Secs (2400 Secs) [==>(Pattern 1)] [==>(Pattern 2)]	[1]																											
2	WFC3 back ground	ANY	WFC3/UVIS, ACCUM, UVIS-CENTER	F814W			Pattern 2, Exps 1-2 in VCC 615 - I - location 4 (04) (2) Prime + Parallel Group 1-2 in Pattern 2, Exps 1-2 in VCC 615 - I - location 4 (04)	1200 Secs (2400 Secs) [==>(Pattern 1)] [==>(Pattern 2)]	[1]																											



Proposal 15258 - VCC 615 - B - location 1 (05) - Galaxies at the Extremes: Ultradiffuse Galaxies in the Virgo Cluster

Mon Aug 06 23:00:33 GMT 2018

Visit	<b>Proposal 15258, VCC 615 - B - location 1 (05), implementation</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: SAME ORIENT AS 01 <i>Comments: F475W observations - single orbit. Small sub-pixel 4 point DITHER BOX used, input as POS-TARGS due to different post-FLASH values for different exposures. Exposures 1 and 4 are shorter in order to fit 4 dithered images in a single orbit.</i>												
	Fixed Targets	<table border="1"> <thead> <tr> <th>#</th> <th>Name</th> <th>Target Coordinates</th> <th>Targ. Coord. Corrections</th> <th>Fluxes</th> <th>Miscellaneous</th> </tr> </thead> <tbody> <tr> <td>(3)</td> <td>VCC-615</td> <td>RA: 12 23 2.7869 (185.7616121d) Dec: +12 01 10.55 (12.01960d) Equinox: J2000</td> <td></td> <td>V=29</td> <td>Reference Frame: ICRS</td> </tr> </tbody> </table> <p><i>Comments: Category=GALAXY Description=[LSB]</i></p>	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous	(3)	VCC-615	RA: 12 23 2.7869 (185.7616121d) Dec: +12 01 10.55 (12.01960d) Equinox: J2000		V=29
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous								
(3)	VCC-615	RA: 12 23 2.7869 (185.7616121d) Dec: +12 01 10.55 (12.01960d) Equinox: J2000		V=29	Reference Frame: ICRS								
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit			
	1		(3) VCC-615	ACS/WFC, ACCUM, WFCENTER	F475W		LOW-SKY; GS ACQ SCENARI O SINGLE	Prime + Parallel Group 1-2 in VCC 615 - B - location 1 (05)	365 Secs (365 Secs) [==>]	[1]			
	2		ANY	WFC3/UVIS, ACCUM, UVIS-CENTER	F475W	FLASH=3.0		Prime + Parallel Group 1-2 in VCC 615 - B - location 1 (05)	410 Secs (410 Secs) [==>]	[1]			
	3		(3) VCC-615	ACS/WFC, ACCUM, WFCENTER	F475W		POS TARG 0.247,0; LOW-SKY	Prime + Parallel Group 3-4 in VCC 615 - B - location 1 (05)	660 Secs (660 Secs) [==>]	[1]			
	4		ANY	WFC3/UVIS, ACCUM, UVIS-CENTER	F475W			Prime + Parallel Group 3-4 in VCC 615 - B - location 1 (05)	700 Secs (700 Secs) [==>]	[1]			
	5		(3) VCC-615	ACS/WFC, ACCUM, WFCENTER	F475W		POS TARG 0.124,0; LOW-SKY	Prime + Parallel Group 5-6 in VCC 615 - B - location 1 (05)	660 Secs (660 Secs) [==>]	[1]			
	6		ANY	WFC3/UVIS, ACCUM, UVIS-CENTER	F475W			Prime + Parallel Group 5-6 in VCC 615 - B - location 1 (05)	700 Secs (700 Secs) [==>]	[1]			
	7		(3) VCC-615	ACS/WFC, ACCUM, WFCENTER	F475W		POS TARG -0.124,0 .138; LOW-SKY	Prime + Parallel Group 7-8 in VCC 615 - B - location 1 (05)	365 Secs (365 Secs) [==>]	[1]			
	8		ANY	WFC3/UVIS, ACCUM, UVIS-CENTER	F475W	FLASH=3.0		Prime + Parallel Group 7-8 in VCC 615 - B - location 1 (05)	410 Secs (410 Secs) [==>]	[1]			

