



14895 - Confirmation of ultra-luminous $z \sim 9$ galaxies

Cycle: 24, 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) UVISTA-Y-1	WFC3/IR	1	12-Dec-2016 21:01:35.0	yes
02	(2) UVISTA-Y-5-PVD	WFC3/IR	1	12-Dec-2016 21:01:37.0	yes
03	(3) UVISTA-Y-6	WFC3/IR	1	12-Dec-2016 21:01:39.0	yes
04	(4) UVISTA-J-1	WFC3/IR	1	12-Dec-2016 21:01:40.0	yes
05	(5) UVISTA-J-2-PVD	WFC3/IR	1	12-Dec-2016 21:01:42.0	yes

5 Total Orbits Used

ABSTRACT

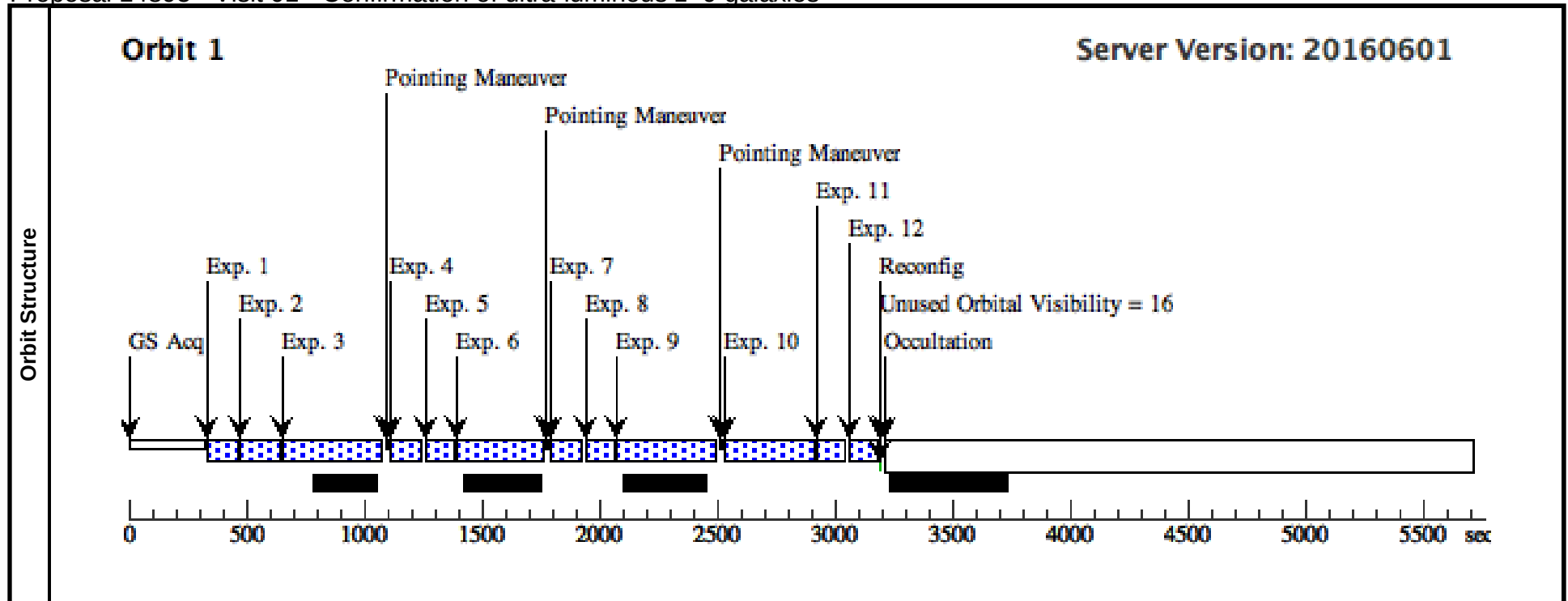
We propose to confirm the robustness of 5 ultrabright ($24.2 < H < 25.0$) candidate galaxies at redshift $z = 8.5 - 9.5$. The sources were unexpectedly found over the wide area (~ 1 sq degree) groundbased UltraVISTA near-infrared survey. If these are truly ultraluminous galaxies at $z \sim 9$ then the UV luminosity function has a power-law-like shape at very early times rather than the familiar Schechter function at lower redshift. This information places strong constraints on models for feedback and duty cycles in the earliest phases of galaxy formation during the epoch of reionization. In addition, the confirmation of a population of ultra-bright sources impacts survey strategies for JWST in 2017, while providing compelling targets for early cycle JWST studies. Given how little is known about the brightest, most massive galaxies at $z \sim 9$ we propose to immediately verify or reject these candidates in this Mid Cycle, before targeting them with deep dedicated observations in HST cycle 25.

OBSERVING DESCRIPTION

The H-band magnitude of sources in our bright sample range from ~ 24.2 to 25.0 . Since we desire the measure a break of 3 magnitudes (at 1 sigma), we need to reach 28.0 at 1 sigma. HST is capable of reaching those limits in 0.65 orbits / object. We note also that the $z \sim 9-10$ range is not particularly well suited for groundbased spectroscopic follow up due to poor transmission around 1.4 micron. We also devote a small fraction (0.35 orbits) of the minimum 1-orbit integration time on each source to obtaining imaging at 1.25 micron and 1.55 micron in the F125W and F160W bands, respectively. Not only will this ensure that we can connect our new HST photometry at 1, 1.25, and 1.55 microns to the ground-based photometry to obtain maximally robust results, but this will greatly improve our estimates of the redshifts for the individual sources assuming they are at $z > 8$. For $H \sim 24.2-25.0$ sources, a S/N of 8-10 can be obtained in just a 500 second exposure.

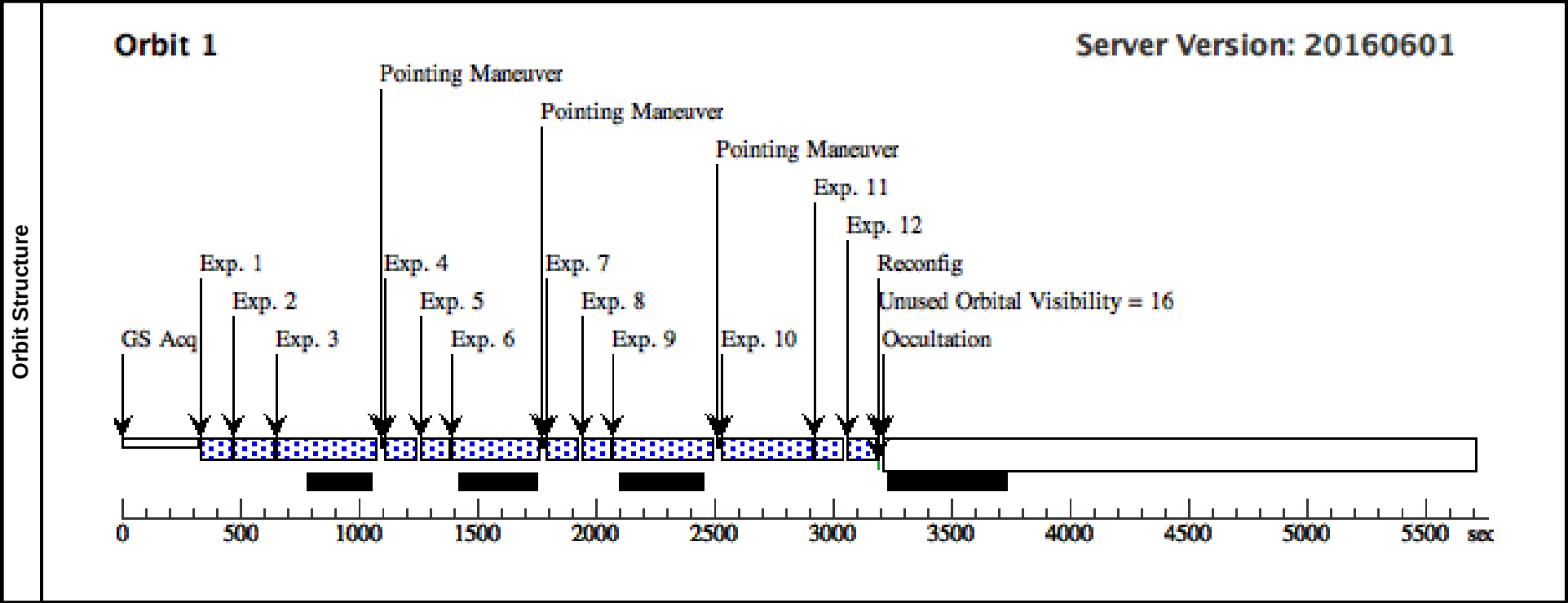
Proposal 14895 - Visit 01 - Confirmation of ultra-luminous z~9 galaxies

Visit	Proposal 14895, Visit 01 Tue Dec 13 02:01:42 GMT 2016									
	Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR Special Requirements: (none)									
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	UVISTA-Y-1	RA: 09 57 47.9000 (149.4495833d) Dec: +02 20 43.66 (2.34546d) Equinox: J2000		V=24.3	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(1) UVISTA-Y-1	(1) UVISTA-Y-1	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=3; SAMP-SEQ=SPAR S50	POS TARG -0.7,-0.7		102.933193 Secs (102.933 Secs) [==>]	[1]
	2	(1) UVISTA-Y-1	(1) UVISTA-Y-1	WFC3/IR, MULTIACCUM, IR	F125W	NSAMP=4; SAMP-SEQ=SPAR S50	POS TARG -0.7,-0.7		152.933644 Secs (152.934 Secs) [==>]	[1]
	3	(1) UVISTA-Y-1	(1) UVISTA-Y-1	WFC3/IR, MULTIACCUM, IR	F098M	NSAMP=9; SAMP-SEQ=SPAR S50	POS TARG -0.7,-0.7		402.935899 Secs (402.936 Secs) [==>]	[1]
	4	(1) UVISTA-Y-1	(1) UVISTA-Y-1	WFC3/IR, MULTIACCUM, IR	F125W	NSAMP=3; SAMP-SEQ=SPAR S50	POS TARG 0.85,0.8 5		102.933193 Secs (102.933 Secs) [==>]	[1]
	5	(1) UVISTA-Y-1	(1) UVISTA-Y-1	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=3; SAMP-SEQ=SPAR S50	POS TARG 0.85,0.8 5		102.933193 Secs (102.933 Secs) [==>]	[1]
	6	(1) UVISTA-Y-1	(1) UVISTA-Y-1	WFC3/IR, MULTIACCUM, IR	F098M	NSAMP=8; SAMP-SEQ=SPAR S50	POS TARG 0.85,0.8 5		352.935448 Secs (352.935 Secs) [==>]	[1]
	7	(1) UVISTA-Y-1	(1) UVISTA-Y-1	WFC3/IR, MULTIACCUM, IR	F125W	NSAMP=3; SAMP-SEQ=SPAR S50	POS TARG -0.57,0. 66		102.933193 Secs (102.933 Secs) [==>]	[1]
	8	(1) UVISTA-Y-1	(1) UVISTA-Y-1	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=3; SAMP-SEQ=SPAR S50	POS TARG -0.57,0. 66		102.933193 Secs (102.933 Secs) [==>]	[1]
	9	(1) UVISTA-Y-1	(1) UVISTA-Y-1	WFC3/IR, MULTIACCUM, IR	F098M	NSAMP=9; SAMP-SEQ=SPAR S50	POS TARG -0.57,0. 66		402.935899 Secs (402.936 Secs) [==>]	[1]
	10	(1) UVISTA-Y-1	(1) UVISTA-Y-1	WFC3/IR, MULTIACCUM, IR	F098M	NSAMP=8; SAMP-SEQ=SPAR S50	POS TARG 0.66,-0. 57		352.935448 Secs (352.935 Secs) [==>]	[1]
	11	(1) UVISTA-Y-1	(1) UVISTA-Y-1	WFC3/IR, MULTIACCUM, IR	F125W	NSAMP=3; SAMP-SEQ=SPAR S50	POS TARG 0.66,-0. 57		102.933193 Secs (102.933 Secs) [==>]	[1]
	12	(1) UVISTA-Y-1	(1) UVISTA-Y-1	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=3; SAMP-SEQ=SPAR S50	POS TARG 0.66,-0. 57		102.933193 Secs (102.933 Secs) [==>]	[1]



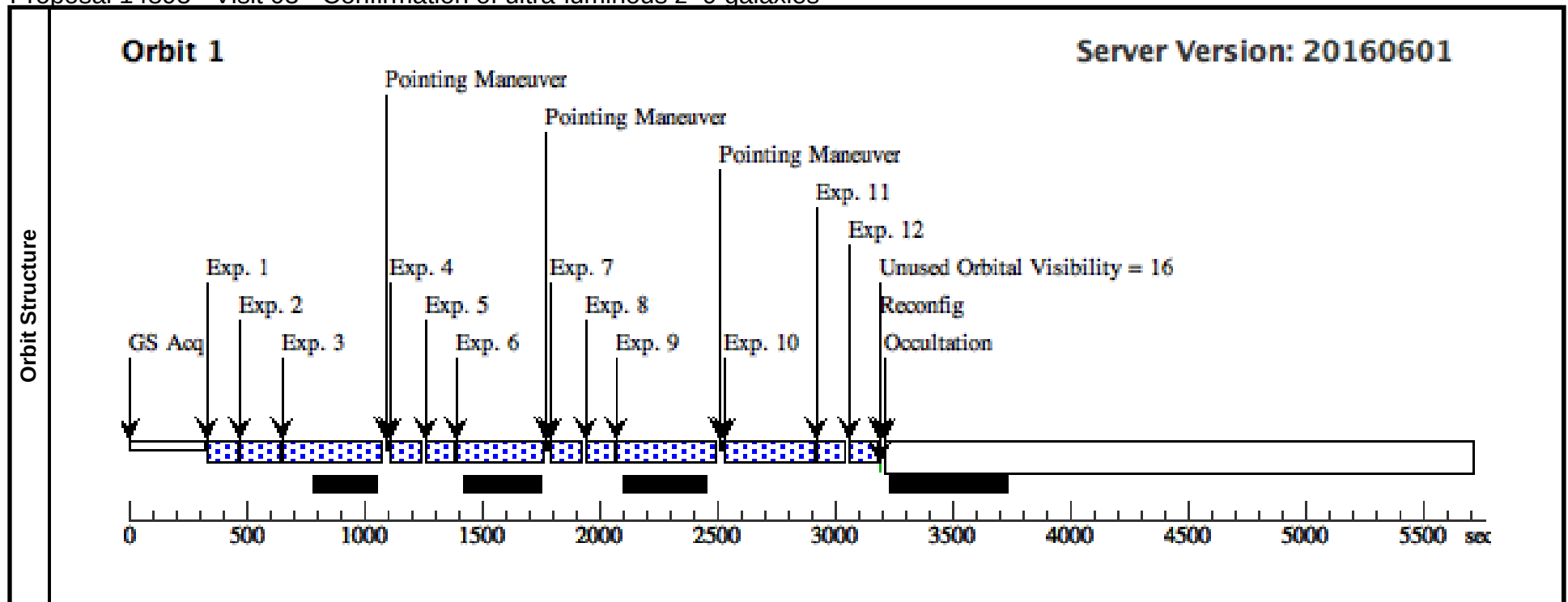
Proposal 14895 - Visit 02 - Confirmation of ultra-luminous z~9 galaxies

Visit	Proposal 14895, Visit 02 Tue Dec 13 02:01:43 GMT 2016									
	Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR Special Requirements: (none)									
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(2)	UVISTA-Y-5-PVD	RA: 10 00 31.8860 (150.1328583d) Dec: +01 57 50.23 (1.96395d) Equinox: J2000		V=25	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(2) UVISTA-Y-5-PV D	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=3; SAMP-SEQ=SPAR S50	POS TARG -0.7,-0.7			102.933193 Secs (102.933 Secs) [==>]	[1]
	2	(2) UVISTA-Y-5-PV D	WFC3/IR, MULTIACCUM, IR	F125W	NSAMP=4; SAMP-SEQ=SPAR S50	POS TARG -0.7,-0.7			152.933644 Secs (152.934 Secs) [==>]	[1]
	3	(2) UVISTA-Y-5-PV D	WFC3/IR, MULTIACCUM, IR	F098M	NSAMP=9; SAMP-SEQ=SPAR S50	POS TARG -0.7,-0.7			402.935899 Secs (402.936 Secs) [==>]	[1]
	4	(2) UVISTA-Y-5-PV D	WFC3/IR, MULTIACCUM, IR	F125W	NSAMP=3; SAMP-SEQ=SPAR S50	POS TARG 0.85,0.8 ⁵			102.933193 Secs (102.933 Secs) [==>]	[1]
	5	(2) UVISTA-Y-5-PV D	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=3; SAMP-SEQ=SPAR S50	POS TARG 0.85,0.8 ⁵			102.933193 Secs (102.933 Secs) [==>]	[1]
	6	(2) UVISTA-Y-5-PV D	WFC3/IR, MULTIACCUM, IR	F098M	NSAMP=8; SAMP-SEQ=SPAR S50	POS TARG 0.85,0.8 ⁵			352.935448 Secs (352.935 Secs) [==>]	[1]
	7	(2) UVISTA-Y-5-PV D	WFC3/IR, MULTIACCUM, IR	F125W	NSAMP=3; SAMP-SEQ=SPAR S50	POS TARG -0.57,0. ⁶⁶			102.933193 Secs (102.933 Secs) [==>]	[1]
	8	(2) UVISTA-Y-5-PV D	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=3; SAMP-SEQ=SPAR S50	POS TARG -0.57,0. ⁶⁶			102.933193 Secs (102.933 Secs) [==>]	[1]
	9	(2) UVISTA-Y-5-PV D	WFC3/IR, MULTIACCUM, IR	F098M	NSAMP=9; SAMP-SEQ=SPAR S50	POS TARG -0.57,0. ⁶⁶			402.935899 Secs (402.936 Secs) [==>]	[1]
	10	(2) UVISTA-Y-5-PV D	WFC3/IR, MULTIACCUM, IR	F098M	NSAMP=8; SAMP-SEQ=SPAR S50	POS TARG 0.66,-0. ⁵⁷			352.935448 Secs (352.935 Secs) [==>]	[1]
	11	(2) UVISTA-Y-5-PV D	WFC3/IR, MULTIACCUM, IR	F125W	NSAMP=3; SAMP-SEQ=SPAR S50	POS TARG 0.66,-0. ⁵⁷			102.933193 Secs (102.933 Secs) [==>]	[1]
	12	(2) UVISTA-Y-5-PV D	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=3; SAMP-SEQ=SPAR S50	POS TARG 0.66,-0. ⁵⁷			102.933193 Secs (102.933 Secs) [==>]	[1]



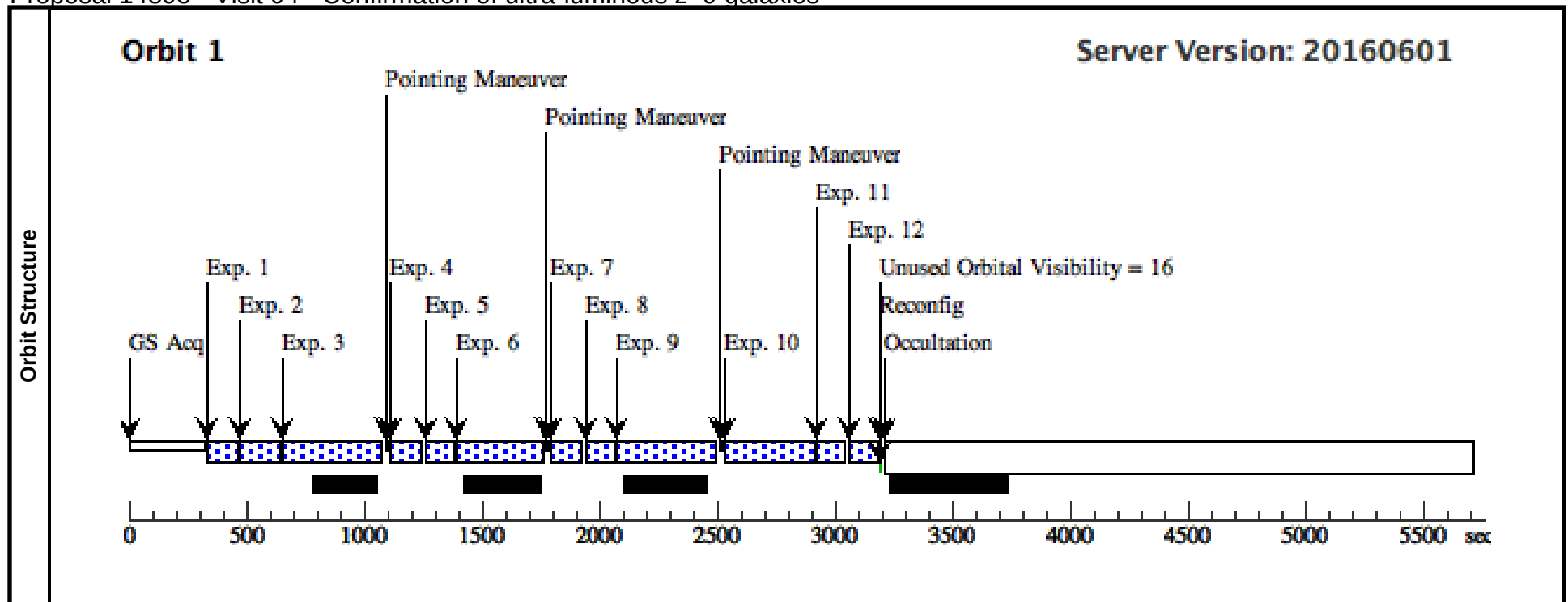
Proposal 14895 - Visit 03 - Confirmation of ultra-luminous z~9 galaxies

Visit	Proposal 14895, Visit 03 Tue Dec 13 02:01:43 GMT 2016									
	Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR Special Requirements: (none)									
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(3)	UVISTA-Y-6	RA: 10 00 12.5060 (150.0521083d) Dec: +02 03 0.50 (2.05014d) Equinox: J2000		V=25	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(3) UVISTA-Y-6	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=3; SAMP-SEQ=SPAR S50	POS TARG -0.7,-0.7		102.933193 Secs (102.933 Secs) [==>]	[1]
	2		(3) UVISTA-Y-6	WFC3/IR, MULTIACCUM, IR	F125W	NSAMP=4; SAMP-SEQ=SPAR S50	POS TARG -0.7,-0.7		152.933644 Secs (152.934 Secs) [==>]	[1]
	3		(3) UVISTA-Y-6	WFC3/IR, MULTIACCUM, IR	F098M	NSAMP=9; SAMP-SEQ=SPAR S50	POS TARG -0.7,-0.7		402.935899 Secs (402.936 Secs) [==>]	[1]
	4		(3) UVISTA-Y-6	WFC3/IR, MULTIACCUM, IR	F125W	NSAMP=3; SAMP-SEQ=SPAR S50	POS TARG 0.85,0.8 5		102.933193 Secs (102.933 Secs) [==>]	[1]
	5		(3) UVISTA-Y-6	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=3; SAMP-SEQ=SPAR S50	POS TARG 0.85,0.8 5		102.933193 Secs (102.933 Secs) [==>]	[1]
	6		(3) UVISTA-Y-6	WFC3/IR, MULTIACCUM, IR	F098M	NSAMP=8; SAMP-SEQ=SPAR S50	POS TARG 0.85,0.8 5		352.935448 Secs (352.935 Secs) [==>]	[1]
	7		(3) UVISTA-Y-6	WFC3/IR, MULTIACCUM, IR	F125W	NSAMP=3; SAMP-SEQ=SPAR S50	POS TARG -0.57,0. 66		102.933193 Secs (102.933 Secs) [==>]	[1]
	8		(3) UVISTA-Y-6	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=3; SAMP-SEQ=SPAR S50	POS TARG -0.57,0. 66		102.933193 Secs (102.933 Secs) [==>]	[1]
	9		(3) UVISTA-Y-6	WFC3/IR, MULTIACCUM, IR	F098M	NSAMP=9; SAMP-SEQ=SPAR S50	POS TARG -0.57,0. 66		402.935899 Secs (402.936 Secs) [==>]	[1]
	10		(3) UVISTA-Y-6	WFC3/IR, MULTIACCUM, IR	F098M	NSAMP=8; SAMP-SEQ=SPAR S50	POS TARG 0.66,-0. 57		352.935448 Secs (352.935 Secs) [==>]	[1]
	11		(3) UVISTA-Y-6	WFC3/IR, MULTIACCUM, IR	F125W	NSAMP=3; SAMP-SEQ=SPAR S50	POS TARG 0.66,-0. 57		102.933193 Secs (102.933 Secs) [==>]	[1]
	12		(3) UVISTA-Y-6	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=3; SAMP-SEQ=SPAR S50	POS TARG 0.66,-0. 57		102.933193 Secs (102.933 Secs) [==>]	[1]



Proposal 14895 - Visit 04 - Confirmation of ultra-luminous z~9 galaxies

Visit	Proposal 14895, Visit 04 Tue Dec 13 02:01:43 GMT 2016									
	Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR Special Requirements: (none)									
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(4)	UVISTA-J-1	RA: 10 02 25.4820 (150.6061750d) Dec: +02 29 13.62 (2.48712d) Equinox: J2000		V=24.2	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(4) UVISTA-J-1	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=3; SAMP-SEQ=SPAR S50	POS TARG -0.7,-0.7		102.933193 Secs (102.933 Secs) [==>]	[1]
	2		(4) UVISTA-J-1	WFC3/IR, MULTIACCUM, IR	F125W	NSAMP=4; SAMP-SEQ=SPAR S50	POS TARG -0.7,-0.7		152.933644 Secs (152.934 Secs) [==>]	[1]
	3		(4) UVISTA-J-1	WFC3/IR, MULTIACCUM, IR	F098M	NSAMP=9; SAMP-SEQ=SPAR S50	POS TARG -0.7,-0.7		402.935899 Secs (402.936 Secs) [==>]	[1]
	4		(4) UVISTA-J-1	WFC3/IR, MULTIACCUM, IR	F125W	NSAMP=3; SAMP-SEQ=SPAR S50	POS TARG 0.85,0.8 5		102.933193 Secs (102.933 Secs) [==>]	[1]
	5		(4) UVISTA-J-1	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=3; SAMP-SEQ=SPAR S50	POS TARG 0.85,0.8 5		102.933193 Secs (102.933 Secs) [==>]	[1]
	6		(4) UVISTA-J-1	WFC3/IR, MULTIACCUM, IR	F098M	NSAMP=8; SAMP-SEQ=SPAR S50	POS TARG 0.85,0.8 5		352.935448 Secs (352.935 Secs) [==>]	[1]
	7		(4) UVISTA-J-1	WFC3/IR, MULTIACCUM, IR	F125W	NSAMP=3; SAMP-SEQ=SPAR S50	POS TARG -0.57,0. 66		102.933193 Secs (102.933 Secs) [==>]	[1]
	8		(4) UVISTA-J-1	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=3; SAMP-SEQ=SPAR S50	POS TARG -0.57,0. 66		102.933193 Secs (102.933 Secs) [==>]	[1]
	9		(4) UVISTA-J-1	WFC3/IR, MULTIACCUM, IR	F098M	NSAMP=9; SAMP-SEQ=SPAR S50	POS TARG -0.57,0. 66		402.935899 Secs (402.936 Secs) [==>]	[1]
	10		(4) UVISTA-J-1	WFC3/IR, MULTIACCUM, IR	F098M	NSAMP=8; SAMP-SEQ=SPAR S50	POS TARG 0.66,-0. 57		352.935448 Secs (352.935 Secs) [==>]	[1]
	11		(4) UVISTA-J-1	WFC3/IR, MULTIACCUM, IR	F125W	NSAMP=3; SAMP-SEQ=SPAR S50	POS TARG 0.66,-0. 57		102.933193 Secs (102.933 Secs) [==>]	[1]
	12		(4) UVISTA-J-1	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=3; SAMP-SEQ=SPAR S50	POS TARG 0.66,-0. 57		102.933193 Secs (102.933 Secs) [==>]	[1]



Proposal 14895 - Visit 05 - Confirmation of ultra-luminous z~9 galaxies

Visit	Proposal 14895, Visit 05 Tue Dec 13 02:01:43 GMT 2016									
	Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR Special Requirements: (none)									
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(5)	UVISTA-J-2-PVD	RA: 09 59 7.1880 (149.7799500d) Dec: +01 56 53.96 (1.94832d) Equinox: J2000		V=24.3	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(5) UVISTA-J-2-PV D	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=3; SAMP-SEQ=SPAR S50	POS TARG -0.7,-0.7			102.933193 Secs (102.933 Secs) [==>]	[1]
	2	(5) UVISTA-J-2-PV D	WFC3/IR, MULTIACCUM, IR	F125W	NSAMP=4; SAMP-SEQ=SPAR S50	POS TARG -0.7,-0.7			152.933644 Secs (152.934 Secs) [==>]	[1]
	3	(5) UVISTA-J-2-PV D	WFC3/IR, MULTIACCUM, IR	F098M	NSAMP=9; SAMP-SEQ=SPAR S50	POS TARG -0.7,-0.7			402.935899 Secs (402.936 Secs) [==>]	[1]
	4	(5) UVISTA-J-2-PV D	WFC3/IR, MULTIACCUM, IR	F125W	NSAMP=3; SAMP-SEQ=SPAR S50	POS TARG 0.85,0.8 5			102.933193 Secs (102.933 Secs) [==>]	[1]
	5	(5) UVISTA-J-2-PV D	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=3; SAMP-SEQ=SPAR S50	POS TARG 0.85,0.8 5			102.933193 Secs (102.933 Secs) [==>]	[1]
	6	(5) UVISTA-J-2-PV D	WFC3/IR, MULTIACCUM, IR	F098M	NSAMP=8; SAMP-SEQ=SPAR S50	POS TARG 0.85,0.8 5			352.935448 Secs (352.935 Secs) [==>]	[1]
	7	(5) UVISTA-J-2-PV D	WFC3/IR, MULTIACCUM, IR	F125W	NSAMP=3; SAMP-SEQ=SPAR S50	POS TARG -0.57,0. 66			102.933193 Secs (102.933 Secs) [==>]	[1]
	8	(5) UVISTA-J-2-PV D	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=3; SAMP-SEQ=SPAR S50	POS TARG -0.57,0. 66			102.933193 Secs (102.933 Secs) [==>]	[1]
	9	(5) UVISTA-J-2-PV D	WFC3/IR, MULTIACCUM, IR	F098M	NSAMP=9; SAMP-SEQ=SPAR S50	POS TARG -0.57,0. 66			402.935899 Secs (402.936 Secs) [==>]	[1]
	10	(5) UVISTA-J-2-PV D	WFC3/IR, MULTIACCUM, IR	F098M	NSAMP=8; SAMP-SEQ=SPAR S50	POS TARG 0.66,-0. 57			352.935448 Secs (352.935 Secs) [==>]	[1]
	11	(5) UVISTA-J-2-PV D	WFC3/IR, MULTIACCUM, IR	F125W	NSAMP=3; SAMP-SEQ=SPAR S50	POS TARG 0.66,-0. 57			102.933193 Secs (102.933 Secs) [==>]	[1]
	12	(5) UVISTA-J-2-PV D	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=3; SAMP-SEQ=SPAR S50	POS TARG 0.66,-0. 57			102.933193 Secs (102.933 Secs) [==>]	[1]

