



## 13493 - An XMM-Newton+HST study of the likely most X-ray luminous $z \geq 0.9$ galaxy cluster

Cycle: 21, 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) CLGJ120959.0+495352 ANY	ACS/WFC WFC3/IR	1	12-Jul-2013 14:08:15.0	yes
02	(1) CLGJ120959.0+495352 ANY	ACS/WFC WFC3/IR	1	12-Jul-2013 14:08:27.0	yes
03	(1) CLGJ120959.0+495352 ANY	ACS/WFC WFC3/IR	1	12-Jul-2013 14:08:38.0	yes
04	(1) CLGJ120959.0+495352 ANY	ACS/WFC WFC3/IR	1	12-Jul-2013 14:08:48.0	yes
05	(1) CLGJ120959.0+495352 ANY	ACS/WFC WFC3/IR	1	12-Jul-2013 14:08:58.0	yes

5 Total Orbits Used

### **ABSTRACT**

We propose XMM-Newton+HST observations of the new, extremely X-ray luminous cluster ClGJ120959.0+495352 ( $z=0.90$ ), discovered through our combined search of RASS and SDSS data. Optical and SZ data suggest that it is an excellent candidate for a very massive, dynamically relaxed cooling-core cluster, which are extremely rare at high  $z$ . The XMM-Newton data will provide the first resolved X-ray imaging of the system to confirm its dynamical state and constrain both the temperature profile and global cluster properties. The HST data will provide complementary constraints on the cluster mass and dynamical state from strong and weak lensing, enabling the comparison to scaling relations and the assessment if the cluster's discovery is in line with standard cosmological expectations.

### **OBSERVING DESCRIPTION**

We propose to obtain a 2x2 ACS/F606W mosaic (same orientation) plus central WFC3/IR F105W+F140W observations for the cluster ClGJ120959.0+495352. In addition, parallel observations are obtained in the same instrument/filter configurations.

The primary ACS tiles are split into 4 exposures each, accompanied by 2 WFC3/IR parallel exposures in F105W and F140W each. Here we employ a 3x enlarged version of the ACS-WFC-DITHER-BOX pattern, in order to optimize image quality both in the ACS and WFC3/IR frames.

Proposal 13493 (STScI Edit Number: 1, Created: Friday, July 12, 2013 1:09:05 PM EST) - Overview

For the WFC3/IR primary observations, we employ a 3 position dither pattern which is large enough to dither over blobs. At each position one F105W and one F140W exposure is taken, as well as one ACS F606W parallel.

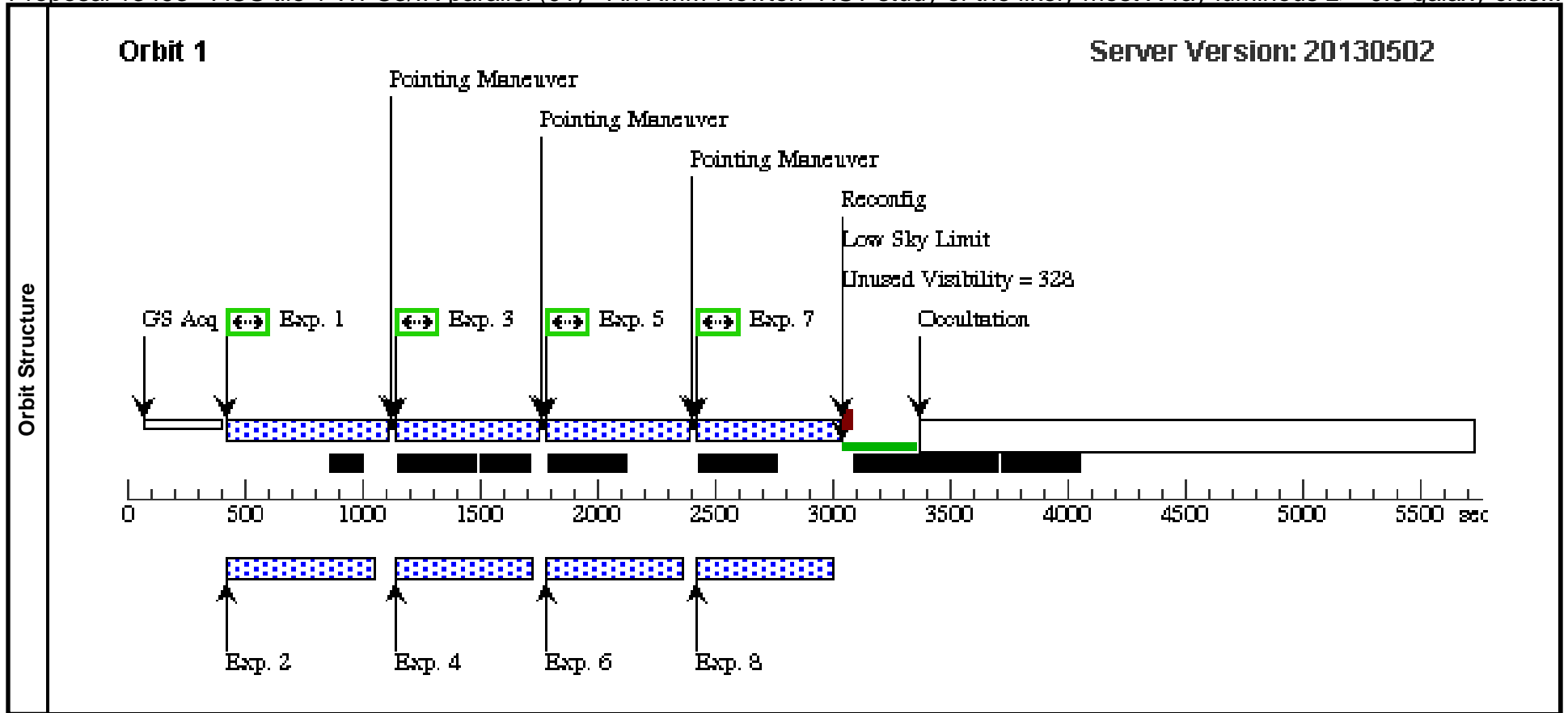
We have manually entered all dithers as POS-TARGET, in order to enable modification of the exposure times and instrument configurations at each dither step.

Low sky conditions are required for all exposures.

Proposal 13493 - ACS tile 1 WFC3/IR parallel (01) - An XMM-Newton+HST study of the likely most X-ray luminous  $z \geq 0.9$  galaxy clus...

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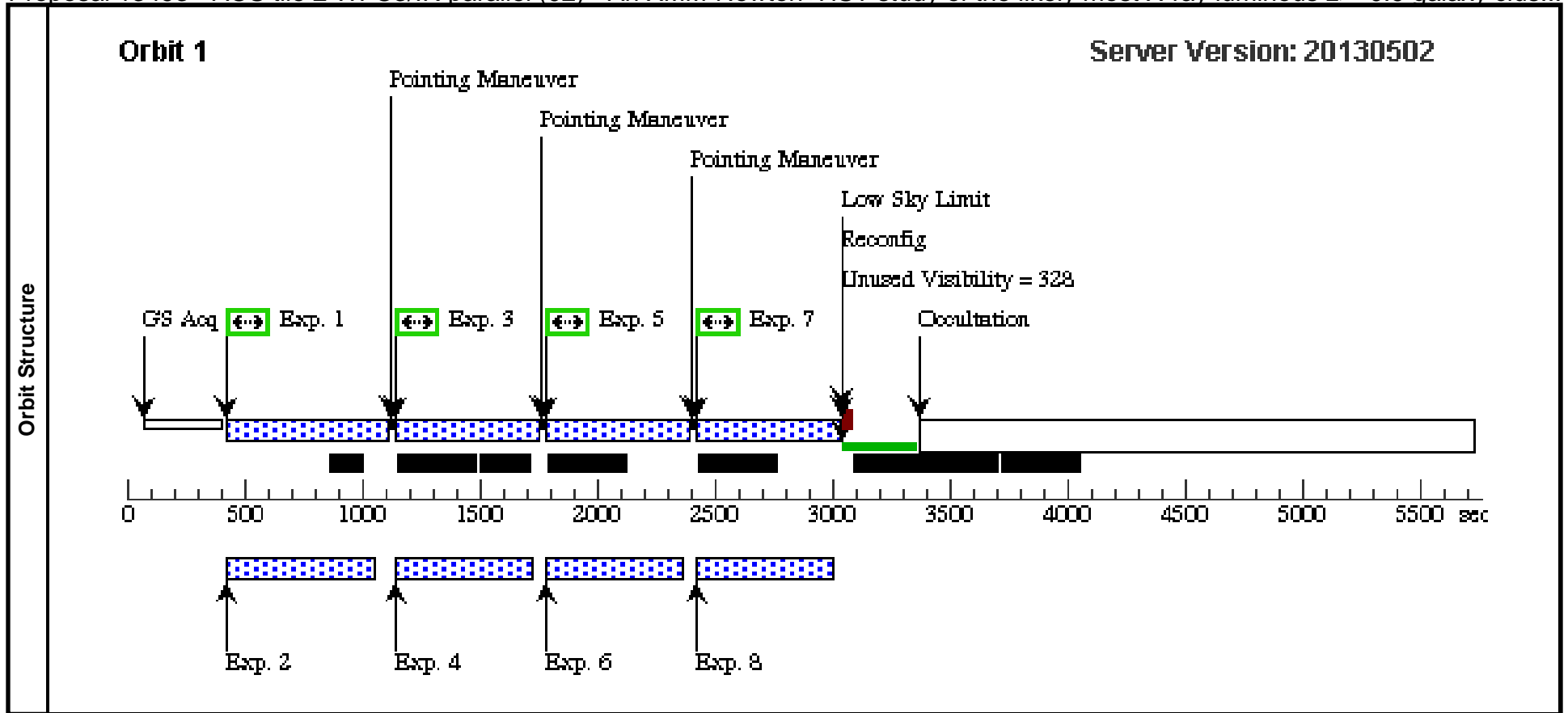
Visit	<b>Proposal 13493, ACS tile 1 WFC3/IR parallel (01), implementation</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/IR, ACS/WFC Special Requirements: (none)									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
	(1)	CLGJ120959.0+495352	RA: 12 09 59.1000 (182.4962500d) Dec: +49 53 52.00 (49.89778d) Equinox: J2000			V=20	Reference Frame: ICRS			
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) CLGJ120959.0+495352	ACS/WFC, ACCUM, WFCENTER	F606W		POS TARG -96.139 2379484 , -106.16322 86056 ; LOW-SKY; GS ACQ SCENARI O SINGLE	Prime + Parallel Group 1-2 in ACS tile 1 WFC3/IR parallel (01)	482 Secs (482 Secs) [==>]	[1]
	2		ANY	WFC3/IR, MULTIACCUM, IR	F105W	SAMP-SEQ=SPARS 100; NSAMP=7		Prime + Parallel Group 1-2 in ACS tile 1 WFC3/IR parallel (01)	602.934229 Secs (602.934 Secs) [==>]	[1]
	3		(1) CLGJ120959.0+495352	ACS/WFC, ACCUM, WFCENTER	F606W		POS TARG -95.398 2379484 , -105.88122 86056 ; LOW-SKY	Prime + Parallel Group 3-4 in ACS tile 1 WFC3/IR parallel (01)	482 Secs (482 Secs) [==>]	[1]
	4		ANY	WFC3/IR, MULTIACCUM, IR	F105W	SAMP-SEQ=SPARS 50; NSAMP=12		Prime + Parallel Group 3-4 in ACS tile 1 WFC3/IR parallel (01)	552.937252 Secs (552.937 Secs) [==>]	[1]
	5		(1) CLGJ120959.0+495352	ACS/WFC, ACCUM, WFCENTER	F606W		POS TARG -95.767 2379484 , -105.46722 86056 ; LOW-SKY	Prime + Parallel Group 5-6 in ACS tile 1 WFC3/IR parallel (01)	482 Secs (482 Secs) [==>]	[1]
	6		ANY	WFC3/IR, MULTIACCUM, IR	F140W	SAMP-SEQ=SPARS 50; NSAMP=12		Prime + Parallel Group 5-6 in ACS tile 1 WFC3/IR parallel (01)	552.937252 Secs (552.937 Secs) [==>]	[1]
	7		(1) CLGJ120959.0+495352	ACS/WFC, ACCUM, WFCENTER	F606W		POS TARG -96.511 2379484 , -105.74922 86056 ; LOW-SKY	Prime + Parallel Group 7-8 in ACS tile 1 WFC3/IR parallel (01)	482 Secs (482 Secs) [==>]	[1]
	8		ANY	WFC3/IR, MULTIACCUM, IR	F140W	SAMP-SEQ=SPARS 50; NSAMP=12		Prime + Parallel Group 7-8 in ACS tile 1 WFC3/IR parallel (01)	552.937252 Secs (552.937 Secs) [==>]	[1]



Proposal 13493 - ACS tile 2 WFC3/IR parallel (02) - An XMM-Newton+HST study of the likely most X-ray luminous  $z \geq 0.9$  galaxy clus...

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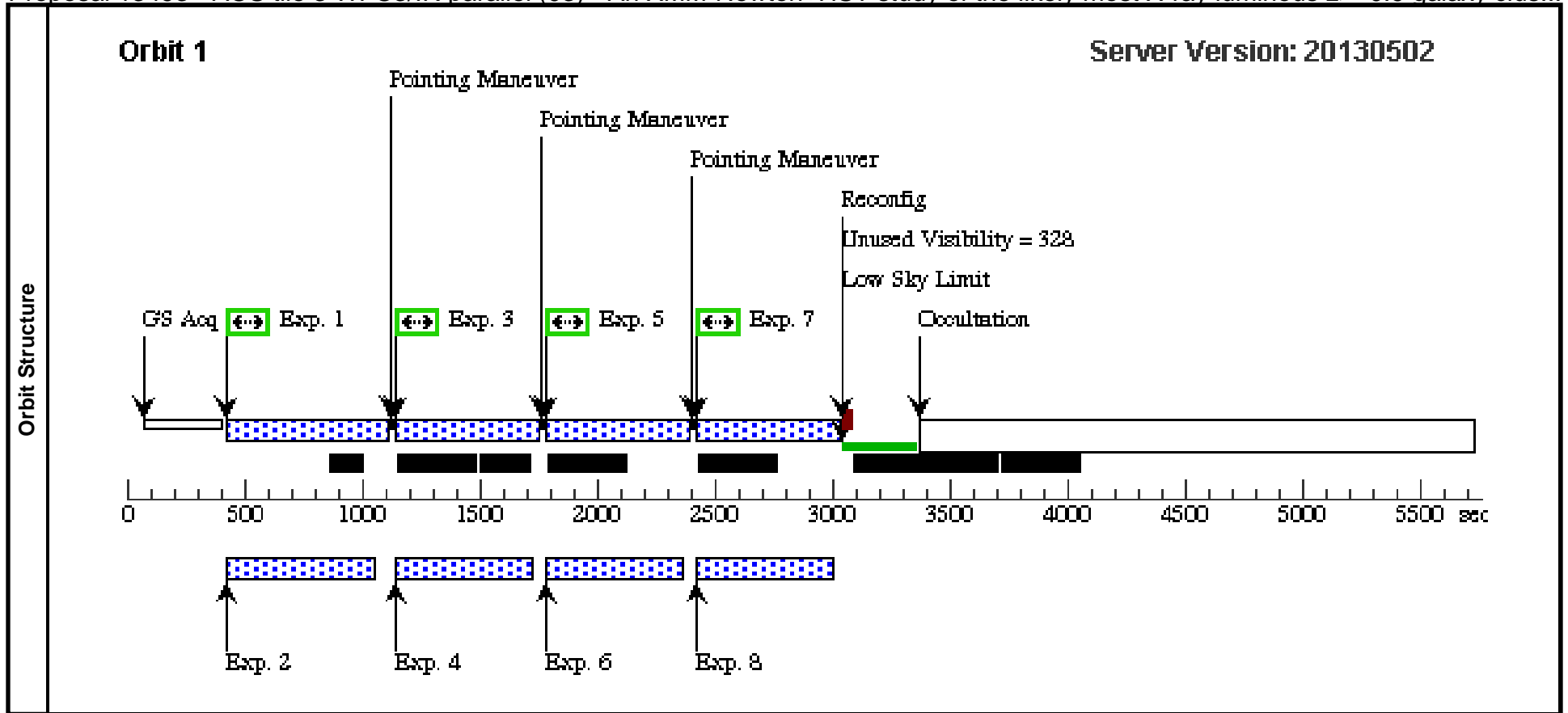
Visit	<b>Proposal 13493, ACS tile 2 WFC3/IR parallel (02), implementation</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/IR, ACS/WFC Special Requirements: SAME ORIENT AS 01									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
	(1)	CLGJ120959.0+495352	RA: 12 09 59.1000 (182.4962500d) Dec: +49 53 52.00 (49.89778d) Equinox: J2000		V=20	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) CLGJ120959.0+495352	ACS/WFC, ACCUM, WFCENTER	F606W		POS TARG 97.8737 879637 , -92.5965162 281 ; LOW-SKY; GS ACQ SCENARI O SINGLE	Prime + Parallel Group 1-2 in ACS tile 2 WFC3/IR parallel (0 2)	482 Secs (482 Secs) [==>]	[1]
	2		ANY	WFC3/IR, MULTIACCUM, IR	F105W	SAMP-SEQ=SPARS 100; NSAMP=7		Prime + Parallel Group 1-2 in ACS tile 2 WFC3/IR parallel (0 2)	602.934229 Secs (602.934 Secs) [==>]	[1]
	3		(1) CLGJ120959.0+495352	ACS/WFC, ACCUM, WFCENTER	F606W		POS TARG 98.6147 879637 , -92.3145162 281 ; LOW-SKY	Prime + Parallel Group 3-4 in ACS tile 2 WFC3/IR parallel (0 2)	482 Secs (482 Secs) [==>]	[1]
	4		ANY	WFC3/IR, MULTIACCUM, IR	F105W	SAMP-SEQ=SPARS 50; NSAMP=12		Prime + Parallel Group 3-4 in ACS tile 2 WFC3/IR parallel (0 2)	552.937252 Secs (552.937 Secs) [==>]	[1]
	5		(1) CLGJ120959.0+495352	ACS/WFC, ACCUM, WFCENTER	F606W		POS TARG 98.2457 879637 , -91.9005162 281 ; LOW-SKY	Prime + Parallel Group 5-6 in ACS tile 2 WFC3/IR parallel (0 2)	482 Secs (482 Secs) [==>]	[1]
	6		ANY	WFC3/IR, MULTIACCUM, IR	F140W	SAMP-SEQ=SPARS 50; NSAMP=12		Prime + Parallel Group 5-6 in ACS tile 2 WFC3/IR parallel (0 2)	552.937252 Secs (552.937 Secs) [==>]	[1]
	7		(1) CLGJ120959.0+495352	ACS/WFC, ACCUM, WFCENTER	F606W		POS TARG 97.5017 879637 , -92.1825162 281 ; LOW-SKY	Prime + Parallel Group 7-8 in ACS tile 2 WFC3/IR parallel (0 2)	482 Secs (482 Secs) [==>]	[1]
	8		ANY	WFC3/IR, MULTIACCUM, IR	F140W	SAMP-SEQ=SPARS 50; NSAMP=12		Prime + Parallel Group 7-8 in ACS tile 2 WFC3/IR parallel (0 2)	552.937252 Secs (552.937 Secs) [==>]	[1]



Proposal 13493 - ACS tile 3 WFC3/IR parallel (03) - An XMM-Newton+HST study of the likely most X-ray luminous  $z \geq 0.9$  galaxy clus...

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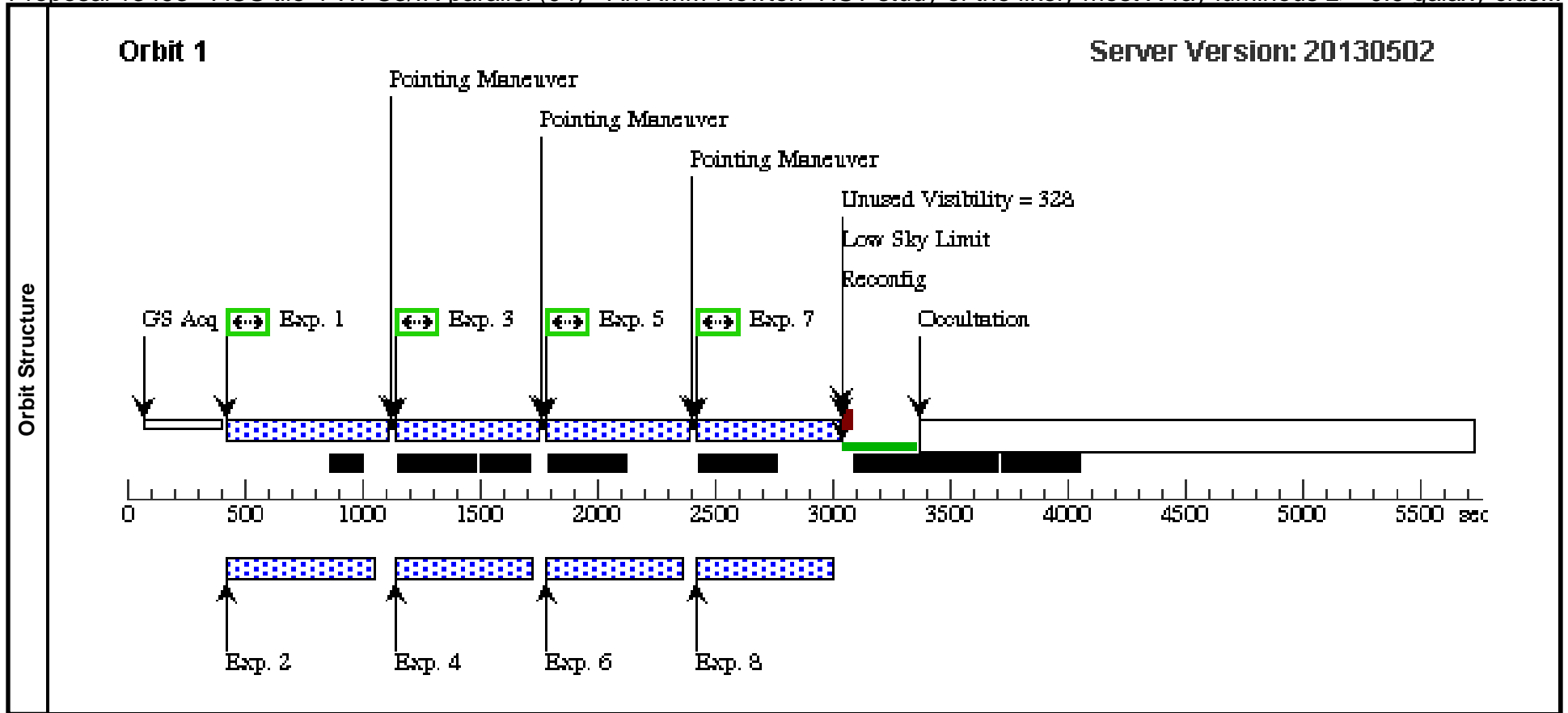
Visit	<b>Proposal 13493, ACS tile 3 WFC3/IR parallel (03), implementation</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/IR, ACS/WFC Special Requirements: SAME ORIENT AS 01									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
	(1)	CLGJ120959.0+495352	RA: 12 09 59.1000 (182.4962500d) Dec: +49 53 52.00 (49.89778d) Equinox: J2000		V=20	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) CLGJ120959.0+495352	ACS/WFC, ACCUM, WFCENTER	F606W		POS TARG -97.873 7879637 ,92.596516 2281 ; LOW-SKY; GS ACQ SCENARI O SINGLE	Prime + Parallel Group 1-2 in ACS tile 3 WFC3/IR parallel (03)	482 Secs (482 Secs) [==>]	[1]
	2		ANY	WFC3/IR, MULTIACCUM, IR	F105W	SAMP-SEQ=SPARS 100; NSAMP=7		Prime + Parallel Group 1-2 in ACS tile 3 WFC3/IR parallel (03)	602.934229 Secs (602.934 Secs) [==>]	[1]
	3		(1) CLGJ120959.0+495352	ACS/WFC, ACCUM, WFCENTER	F606W		POS TARG -97.132 7879637 ,92.878516 2281 ; LOW-SKY	Prime + Parallel Group 3-4 in ACS tile 3 WFC3/IR parallel (03)	482 Secs (482 Secs) [==>]	[1]
	4		ANY	WFC3/IR, MULTIACCUM, IR	F105W	SAMP-SEQ=SPARS 50; NSAMP=12		Prime + Parallel Group 3-4 in ACS tile 3 WFC3/IR parallel (03)	552.937252 Secs (552.937 Secs) [==>]	[1]
	5		(1) CLGJ120959.0+495352	ACS/WFC, ACCUM, WFCENTER	F606W		POS TARG -97.501 7879637 ,93.292516 2281 ; LOW-SKY	Prime + Parallel Group 5-6 in ACS tile 3 WFC3/IR parallel (03)	482 Secs (482 Secs) [==>]	[1]
	6		ANY	WFC3/IR, MULTIACCUM, IR	F140W	SAMP-SEQ=SPARS 50; NSAMP=12		Prime + Parallel Group 5-6 in ACS tile 3 WFC3/IR parallel (03)	552.937252 Secs (552.937 Secs) [==>]	[1]
	7		(1) CLGJ120959.0+495352	ACS/WFC, ACCUM, WFCENTER	F606W		POS TARG -98.245 7879637 ,93.010516 2281 ; LOW-SKY	Prime + Parallel Group 7-8 in ACS tile 3 WFC3/IR parallel (03)	482 Secs (482 Secs) [==>]	[1]
	8		ANY	WFC3/IR, MULTIACCUM, IR	F140W	SAMP-SEQ=SPARS 50; NSAMP=12		Prime + Parallel Group 7-8 in ACS tile 3 WFC3/IR parallel (03)	552.937252 Secs (552.937 Secs) [==>]	[1]



Proposal 13493 - ACS tile 4 WFC3/IR parallel (04) - An XMM-Newton+HST study of the likely most X-ray luminous  $z \geq 0.9$  galaxy clus...

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Visit	<b>Proposal 13493, ACS tile 4 WFC3/IR parallel (04), implementation</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/IR, ACS/WFC Special Requirements: SAME ORIENT AS 01									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
	(1)	CLGJ120959.0+495352	RA: 12 09 59.1000 (182.4962500d) Dec: +49 53 52.00 (49.89778d) Equinox: J2000		V=20	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) CLGJ120959.0+495352	ACS/WFC, ACCUM, WFCENTER	F606W		POS TARG 96.1392 379484 ,106.163228 6056 ; LOW-SKY; GS ACQ SCENARI O SINGLE	Prime + Parallel Group 1-2 in ACS tile 4 WFC3/IR parallel (04)	482 Secs (482 Secs) [==>]	[1]
	2		ANY	WFC3/IR, MULTIACCUM, IR	F105W	SAMP-SEQ=SPARS 100; NSAMP=7		Prime + Parallel Group 1-2 in ACS tile 4 WFC3/IR parallel (04)	602.934229 Secs (602.934 Secs) [==>]	[1]
	3		(1) CLGJ120959.0+495352	ACS/WFC, ACCUM, WFCENTER	F606W		POS TARG 96.8802 379484 ,106.445228 6056 ; LOW-SKY	Prime + Parallel Group 3-4 in ACS tile 4 WFC3/IR parallel (04)	482 Secs (482 Secs) [==>]	[1]
	4		ANY	WFC3/IR, MULTIACCUM, IR	F105W	SAMP-SEQ=SPARS 50; NSAMP=12		Prime + Parallel Group 3-4 in ACS tile 4 WFC3/IR parallel (04)	552.937252 Secs (552.937 Secs) [==>]	[1]
	5		(1) CLGJ120959.0+495352	ACS/WFC, ACCUM, WFCENTER	F606W		POS TARG 96.5112 379484 ,106.859228 6056 ; LOW-SKY	Prime + Parallel Group 5-6 in ACS tile 4 WFC3/IR parallel (04)	482 Secs (482 Secs) [==>]	[1]
	6		ANY	WFC3/IR, MULTIACCUM, IR	F140W	SAMP-SEQ=SPARS 50; NSAMP=12		Prime + Parallel Group 5-6 in ACS tile 4 WFC3/IR parallel (04)	552.937252 Secs (552.937 Secs) [==>]	[1]
	7		(1) CLGJ120959.0+495352	ACS/WFC, ACCUM, WFCENTER	F606W		POS TARG 95.7672 379484 ,106.577228 6056 ; LOW-SKY	Prime + Parallel Group 7-8 in ACS tile 4 WFC3/IR parallel (04)	482 Secs (482 Secs) [==>]	[1]
	8		ANY	WFC3/IR, MULTIACCUM, IR	F140W	SAMP-SEQ=SPARS 50; NSAMP=12		Prime + Parallel Group 7-8 in ACS tile 4 WFC3/IR parallel (04)	552.937252 Secs (552.937 Secs) [==>]	[1]



Proposal 13493 - WFC3 central ACS parallel (05) - An XMM-Newton+HST study of the likely most X-ray luminous  $z \geq 0.9$  galaxy cluster

Fri Jul 12 18:09:11 GMT 2013

Visit	Proposal 13493, WFC3 central ACS parallel (05), implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR, ACS/WFC Special Requirements: (none)									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
	(1)	CLGJ120959.0+495352	RA: 12 09 59.1000 (182.4962500d) Dec: +49 53 52.00 (49.89778d) Equinox: J2000		V=20	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(1) CLGJ120959.0+495352	WFC3/IR, MULTIACCUM, IR-FIX	F105W	NSAMP=9; SAMP-SEQ=SPAR S50	POS TARG -2.1 , -1.73 ; LOW-SKY	Prime + Parallel Group 1-3 in WFC3 central ACS parallel (05)	402.935899 Secs (402.936 Secs) [==>]	[1]	
	2	(1) CLGJ120959.0+495352	WFC3/IR, MULTIACCUM, IR-FIX	F140W	NSAMP=9; SAMP-SEQ=SPAR S50	POS TARG -2.1 , -1.73 ; LOW-SKY	Prime + Parallel Group 1-3 in WFC3 central ACS parallel (05)	402.935899 Secs (402.936 Secs) [==>]	[1]	
	3	ANY	ACS/WFC, ACCUM, WFCENTER	F606W			Prime + Parallel Group 1-3 in WFC3 central ACS parallel (05)	659 Secs (659 Secs) [==>]	[1]	
	4	(1) CLGJ120959.0+495352	WFC3/IR, MULTIACCUM, IR-FIX	F105W	NSAMP=9; SAMP-SEQ=SPAR S50	POS TARG 3.2; LOW-SKY	Prime + Parallel Group 4-6 in WFC3 central ACS parallel (05)	402.935899 Secs (402.936 Secs) [==>]	[1]	
	5	(1) CLGJ120959.0+495352	WFC3/IR, MULTIACCUM, IR-FIX	F140W	NSAMP=9; SAMP-SEQ=SPAR S50	POS TARG 3.2; LOW-SKY	Prime + Parallel Group 4-6 in WFC3 central ACS parallel (05)	402.935899 Secs (402.936 Secs) [==>]	[1]	
	6	ANY	ACS/WFC, ACCUM, WFCENTER	F606W			Prime + Parallel Group 4-6 in WFC3 central ACS parallel (05)	741 Secs (741 Secs) [==>]	[1]	
	7	(1) CLGJ120959.0+495352	WFC3/IR, MULTIACCUM, IR-FIX	F105W	NSAMP=9; SAMP-SEQ=SPAR S50	POS TARG 3.2 , -2.6 ; LOW-SKY	Prime + Parallel Group 7-9 in WFC3 central ACS parallel (05)	402.935899 Secs (402.936 Secs) [==>]	[1]	
	8	(1) CLGJ120959.0+495352	WFC3/IR, MULTIACCUM, IR-FIX	F140W	NSAMP=14; SAMP-SEQ=SPAR S25	POS TARG 3.2 , -2.6 ; LOW-SKY	Prime + Parallel Group 7-9 in WFC3 central ACS parallel (05)	327.938986 Secs (327.939 Secs) [==>]	[1]	
9	ANY	ACS/WFC, ACCUM, WFCENTER	F606W			Prime + Parallel Group 7-9 in WFC3 central ACS parallel (05)	672 Secs (672 Secs) [==>]	[1]		

