



11839 - The Cycles of Alpha Centauri

Cycle: 17, 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) HD128620 (2) HD128621	STIS/CCD STIS/FUV-MAMA STIS/NUV-MAMA	3	10-Mar-2010 21:09:56.0	yes
02	(3) HD128620-COPY (4) HD128621-COPY	STIS/CCD STIS/FUV-MAMA STIS/NUV-MAMA	2	10-Mar-2010 21:10:11.0	yes

5 Total Orbits Used

ABSTRACT

This is the HST part of a joint Chandra/HST observing program. The objective of the HST part is to obtain new UV spectra of both components of the Alpha Centauri binary: the primary ("Alpha Cen A") is a near twin of the Sun, while the companion ("B") is an early K dwarf, slightly less massive, smaller and less luminous than the Sun. The orbital period is 80 yr, and the two stars currently are separated by about 8". The Alpha Cen

system has been the subject of long term coronal X-ray monitoring by four successive generations of space observatories, and extensive UV measurements were obtained periodically during the IUE era, from the late 1970's to late 1990's. The present program will obtain new STIS echelle spectra of both stars, which each were observed in selected wavelength windows by GHRS in the mid-1990's, and Alpha Cen A later by STIS in an extensive high-res program in 1999, although B unfortunately never was recorded by STIS.

OBSERVING DESCRIPTION

The observing program is straightforward, although the acquisition is a bit tricky owing to the close separation of the two bright stars. The idea is to acquire, and peak up on, brighter "A" first, then perform an offset to the fainter B component. Unlike the usual offset situation, in which the offset star is utilized merely as a positional reference, here a series of E140M exposures at A will be taken before moving on to the companion. Alp Cen A already has been observed extensively with the STIS high-res echelles, and is so bright in the 2800 Å continuum that one of the ND apertures must be used to avoid an overlight condition on the NUV MAMA, which imposes a serious penalty in observing time. It was decided, therefore, to only obtain a medium-res FUV echelle measurement of A: the E140M will complement the previous E140H spectra, and record with good sensitivity key high-temperature emission lines. These likely will be different during the contemporary starspot minimum of A, suggested by its depressed X-ray luminosity in the current epoch, compared with the cycle peak in 1999 when the prior E140H's were taken. In addition, virtually all other late-type stars have been observed at medium-res in the FUV, rather than in high-res, so the similar spectrum of bright Alp Cen A will serve as a valuable reference. For Alp Cen B, which has not been observed previously by STIS, the intent is to take a series of medium- and high-res echelle exposures to cover the full FUV+NUV region at the highest resolutions compatible with the limited observing time. Again, the centerpiece observation will be a deep E140M, which records the most valuable emission lines from a coronal diagnostic viewpoint. Although B also is bright in the 2800 Å region, the K-type spectrum is enough fainter in the continuum that the E230H measurements can be made safely with the 0.10X0.03 aperture rather than one of the low efficiency ND slots.

Alp Cen A can be acquired initially with the F25ND5 aperture of the CCD, but is bright enough that it is best to do the pickup in dispersed light. The G430M/3936 mode provides good S/N in the minimum CCD exposure tick of 0.1s for the purpose. The ACQ/PEAK will be done with the narrow 0.20X0.06 slot to ensure good centering of the target for an accurate wavelength scale. This will be followed by the E140M (with the 0.2X0.2 photometric aperture for highest flux accuracy): 5 ks in two subexposures for redundancy's sake. Then, the B component will be acquired by

the simple offset, and an initial ACQ/PEAK, again using the narrow slot, will be performed. This will be followed by a 5 ks E140M, again in two segments and again with the 0.2X0.2 slot; an E230M/2124 of 3 ks in two segments (0.20X0.06 slot for optimum resolution); an E230H/2513 (0.2X0.09 aperture) for 1.5 ks in two parts; then a second ACQ/PEAK with the 0.10X0.03 slot; and finally an E230H/2762 with that aperture in two parts totalling 0.75 ks. The total program requires 3 CVZ orbits.

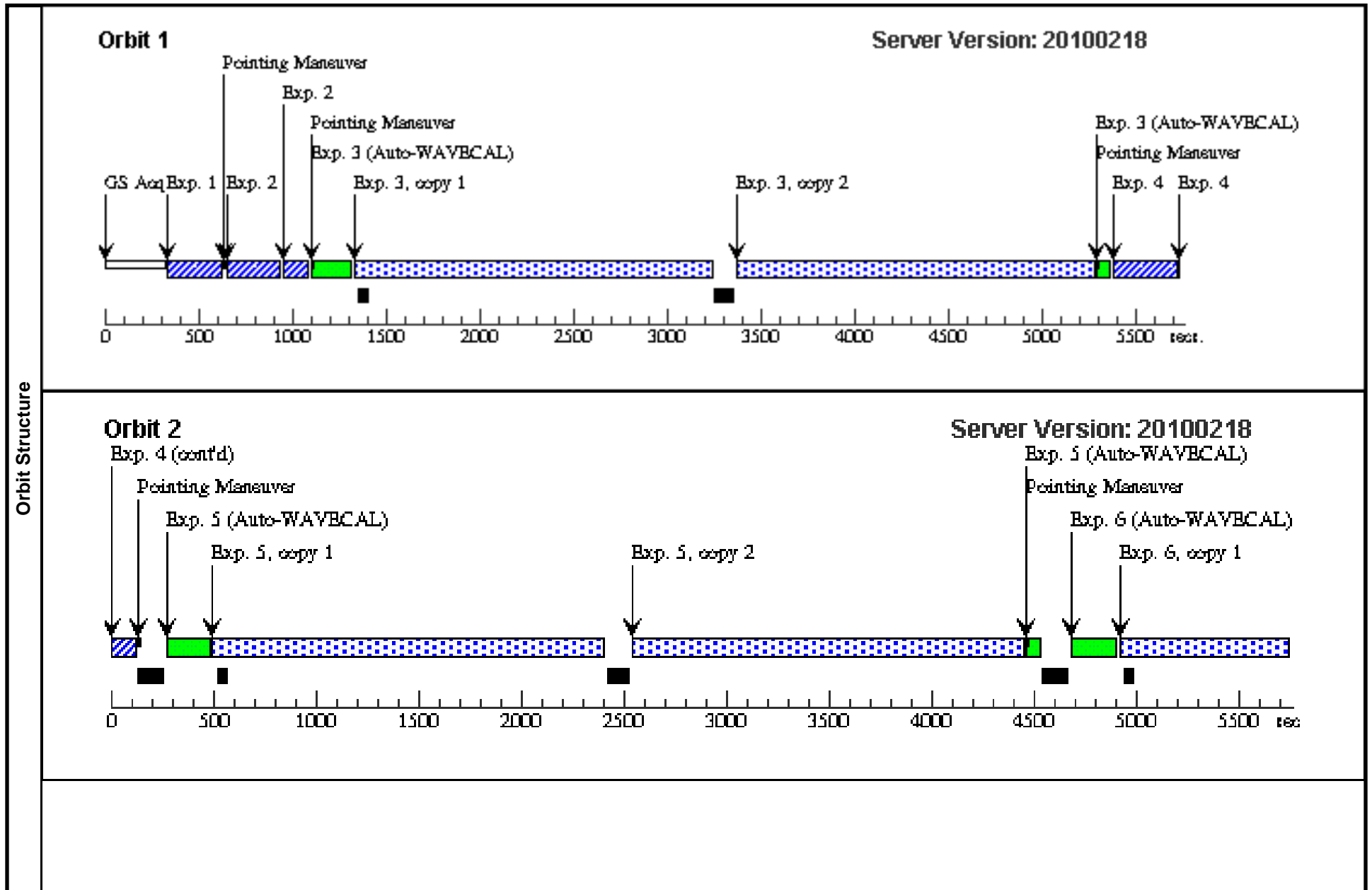
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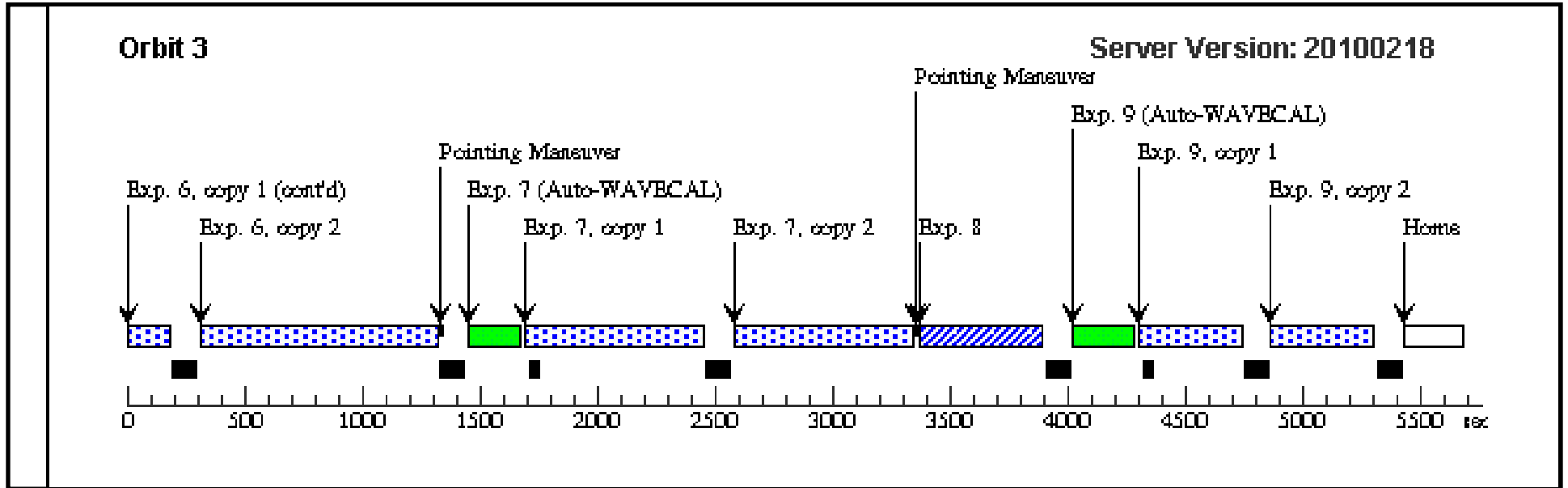
Thu Mar 11 02:10:16 GMT 2010

Visit	Proposal 11839, Visit 01, failed Thu Mar 11 02:10:16 GMT 2010					
	Diagnostic Status: No Diagnostics Scientific Instruments: STIS/FUV-MAMA, STIS/CCD, STIS/NUV-MAMA Special Requirements: CVZ					
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	HD128620 Alt Name1: ALP-CEN-A	RA: 14 39 32.3000 (219.8845833d) Dec: -60 50 0.40 (-60.83344d) Equinox: J2000	Proper Motion RA: -0.503s/yr Proper Motion Dec: +0.35"/yr Parallax: 0.747" Epoch of Position: 2008 Radial Velocity: -24 km/sec	V=-0.01 FUV peak fluxes are 5E-12 per Angstrom.	Reference Frame: ICRS
<i>Comments: The position is for epoch 2008 with proper motion and orbital motion taken into account. The cited proper motion values are appropriate to that epoch and also account for orbital motion in addition to the ordinary proper motion. This component ("A") will be utilized as an offset star for the fainter secondary ("B"), but an E140M exposure, split into several segments, will be taken as well, necessitating an ACQ/PEAK in addition to the ACQ.</i>						
(2)	HD128621 Alt Name1: ALP-CEN-B	Offset from HD128620 by RA Offset: -0.873 Secs Dec Offset: -3.26 Arcsec	Proper Motion RA: 0.s/yr Proper Motion Dec: 0."/yr Parallax: 0." Epoch of Position: 2008 Radial Velocity: -24. km/sec	V=1.33 peak FUV flux 5E-12 per A; peak NUV flux 3E-10 (Mg II 2800); 1E-11 (continuum @ 2500 A); 5E-12 (lines @ 1950 A)	Offset Position (HD128621) Reference Frame: ICRS	
<i>Comments: The offset given above is based on the relative orbit of B with respect to A, and is appropriate for mid-2009. The RA value increases by +0.03s over 6 months (i.e., -0.844 s in 2010.0) and the DEC value increases by 0.4" (to -2.85"). As long as the offset is relative to the A position, parallax and proper motion need not be taken into account.</i>						

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Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(1) HD128620	STIS/CCD, ACQ, F25ND5	MIRROR				0.1 Secs [==>]	[1]
	2		(1) HD128620	STIS/CCD, ACQ/PEAK, 0.2X0.06	G430M 3936 A				0.1 Secs [==>]	[1]
	3		(1) HD128620	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M 1425 A				1900 Secs X 2 [==>(Copy 1)] [==>(Copy 2)]	[1]
	4		(2) HD128621	STIS/CCD, ACQ/PEAK, 0.2X0.06	G430M 3936 A				0.2 Secs [==>]	[1]
	5		(2) HD128621	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M 1425 A				1900 Secs X 2 [==>(Copy 1)] [==>(Copy 2)]	[2]
	6		(2) HD128621	STIS/NUV-MAMA, ACCUM, 0.2X0.06	E230M 2124 A				1000 Secs X 2 [==>(Copy 1)] [==>(Copy 2)]	[2] [3]
	7		(2) HD128621	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H 2513 A				750 Secs X 2 [==>(Copy 1)] [==>(Copy 2)]	[3]
	8		(2) HD128621	STIS/CCD, ACQ/PEAK, 0.1X0.03	G430M 5093 A				0.1 Secs [==>]	[3]
	9		(2) HD128621	STIS/NUV-MAMA, ACCUM, 0.1X0.03	E230H 2762 A				425 Secs X 2 [==>(Copy 1)] [==>(Copy 2)]	[3]





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Thu Mar 11 02:10:18 GMT 2010

Visit	Proposal 11839, Visit 02, implementation					
	Diagnostic Status: No Diagnostics Scientific Instruments: STIS/FUV-MAMA, STIS/CCD, STIS/NUV-MAMA Special Requirements: CVZ					
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(3)	HD128620-COPY Alt Name1: ALP-CEN-A	RA: 14 39 31.3140 (219.8804750d) Dec: -60 49 59.08 (-60.83308d) Equinox: J2000	Proper Motion RA: -0.505s/yr Proper Motion Dec: +0.30"/yr Parallax: 0.747" Epoch of Position: 2009.95 Radial Velocity: -24 km/sec	V=-0.01 FUV peak fluxes are 5E-12 per Angstrom.	Reference Frame: ICRS
<i>Comments: The position is for epoch 2009.95, as measured from a Chandra HRI image. The cited proper motion values are appropriate to Alpha Cen A (Target 1) at that epoch and also account for orbital motion in addition to the ordinary proper motion. This component will be utilized as an offset star for the fainter secondary ("B").</i>						
(4)	HD128621-COPY Alt Name1: ALP-CEN-B	Offset from HD128620-COPY by RA Offset: -0.816 Secs Dec Offset: -2.44 Arcsec	Proper Motion RA: 0.s/yr Proper Motion Dec: 0."/yr Parallax: 0." Epoch of Position: 2010.20 Radial Velocity: -24. km/sec	V=1.33 peak FUV flux 5E-12 per A; peak NUV flux 3E-10 (Mg II 2800); 1E-11 (continuum @ 2500 A); 5E-12 (lines @ 1950 A)	Offset Position (HD128621-COPY)	
<i>Comments: The offset given above is based on the relative orbit of B with respect to A, and is appropriate for 2010.50 (early Jul). The RA value increases by +0.056s/yr and the DEC value increases by +0.82"/yr. The offset values for first half of 2010 are: 2010.10 (Feb 06): -0.839s, -2.77" 2010.20 (Mar 14): -0.833s, -2.68" (17-19 Mar scheduable) 2010.30 (Apr 20): -0.827s, -2.60" 2010.40 (May 26): -0.821s, -2.52" (12-14 May scheduable) 2010.50 (Jul 02): -0.816s, -2.44" (05-08 Jul scheduable) The offset is relative to the A position, so is not affected by parallax and ordinary proper motion; just the relative orbital motion as noted above.</i>						

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	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit	
Exposures	1		(3) HD128620-COP Y	STIS/CCD, ACQ, F25ND5	MIRROR				0.1 Secs [==>]	[1]	
	2		(4) HD128621-COP Y	STIS/CCD, ACQ, F25ND5	MIRROR				0.1 Secs [==>]	[1]	
	<i>Comments: Following the offset from brighter Target 3, a second ACQ is performed, now with Target 4 centered. The image size for the ACQ is 5"x5", which is small enough to exclude the primary star, which is 8" away from the secondary in the current epoch. Scattered light from the primary will be a diffuse source, but much lower than the peak of the secondary star.</i>										
	3		(4) HD128621-COP Y	STIS/CCD, ACQ/PEAK, 0.2X0.06	G230MB 2794 A				0.1 Secs [==>]	[1]	
	<i>Comments: ETC run: STIS.A230500</i>										
	4		(4) HD128621-COP Y	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M 1425 A				1800 Secs X 2 [==>(Copy 1)] [==>(Copy 2)]	[1]	
	5		(4) HD128621-COP Y	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 1978 A				890 Secs X 2 [==>(Copy 1)] [==>(Copy 2)]	[2]	
	<i>Comments: STIS.A230510</i>										
	6		(4) HD128621-COP Y	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H 2463 A				648 Secs X 2 [==>(Copy 1)] [==>(Copy 2)]	[2]	
	<i>Comments: STIS.A230506 (Note: this calculation was for "average flux density" SED of Alpha Cen B constructed from 11 good quality IUE LW-HI exposures selected at random from the existing archival collection.)</i>										
	7		(4) HD128621-COP Y	STIS/NUV-MAMA, ACCUM, 0.1X0.03	E230H 2713 A				442 Secs X 2 [==>(Copy 1)] [==>(Copy 2)]	[2]	
	<i>Comments: ETC run: STIS.A230504 (Note: this calculation was for "maximum flux density" SED of Alpha Cen B constructed from 11 good quality IUE LW-HI exposures selected at random from the existing archival collection. This was to check that the global count rate would be below the limit.)</i>										

