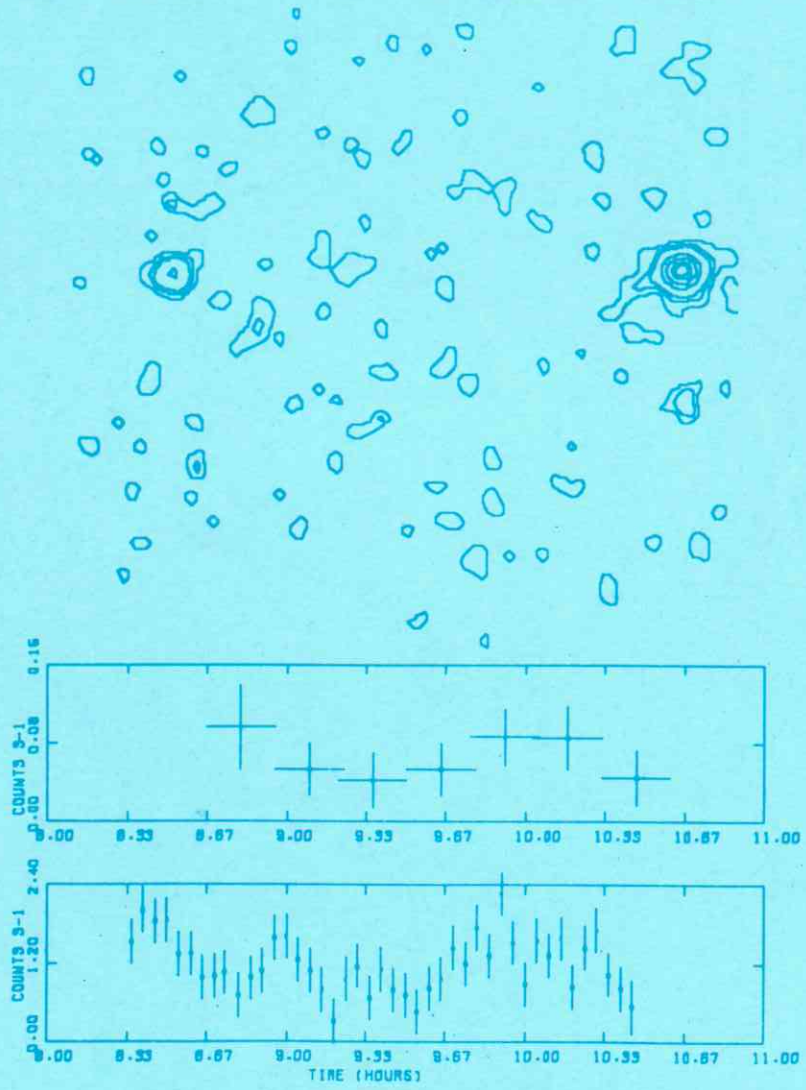
exosat esa

EXOSAT EXPRESS

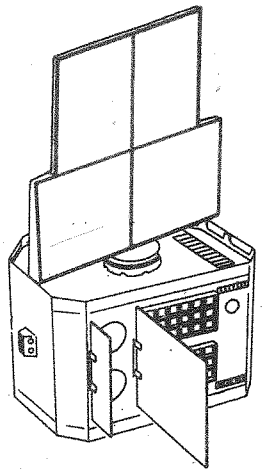


EXOSAT

April 1985

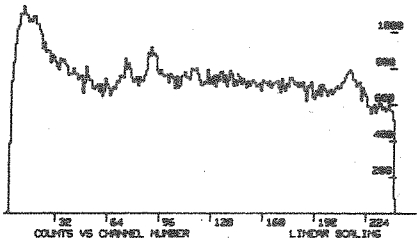
No. 10

EUROPEAN X-RAY ASTRONOMY SATELLITE



esa

EXOSAT EXPRESS



NO. 10 APRIL 1985

Front Cover

An image and light curves (CMA - centre, ME - lower) of the X-ray emission from the nearby spiral galaxy Messier 81, showing the nucleus slightly right of the centre of the image and rapid variability on timescales of ten minutes or less.

Courtesy: P. Barr, P. Giommi

FOREWORD

Now that EXOSAT has completed 187 orbits of the '194 orbit' nominal two-year lifetime, it is a pleasure to announce the opening of the EXOSAT data archive which presently contains data from observations carried out in the first year of the mission up to April 1984. The procedure for requesting archive data together with the list of data currently available is given in the article on p.52. Updates to the list, as and when further data becomes available, will be published in future editions of the Express.

Note that preprints of Observatory team publications (ref. p.24) are automatically despatched to some 200 individuals or institutes and that a limited number of additional copies are available on request. 'EXOSAT' publications (pp.25-30) have been grouped according to subject matter in the categories in which proposals are accepted for the observation programme viz: Low luminosity sources (LLX), High luminosity sources (HLX), Active galactic nuclei (AGN), Supernova Remnants (SNR) and Clusters (CLU) together with a pre-launch Hardware and post-launch General class.

In this issue of the Express, a complete list of the AO-2 observation programme is given, together with a summary of outstanding AO-1/AO-2 observations. Note that a number of observations carried out during the current AO-3 programme phase are designated 'Ops'. This category includes,for example, observations forming part of error box searches (ref. p.34) and certain calibration/performance assessment observations.

Notice is given on pp.60/61 of current vacancies within ESA's Space Science Department and readers are kindly requested to display a copy of these advertisements or bring them to the attention of any suitable candidates.

EXOSAT EXPRESS

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OBSERVATORY STATUS AS OF 30.4.85

1. Hardware

A significant increase has been observed recently in the Y-gyro spin motor current instability and hence the frequency of status changes from 'GOOD' to 'FAIL' of the health monitor, for example more than 250 occurrences within a period of 2 days, starting on day 083. Initial investigations by the contractor (Ferranti) suggest that the spin motor current variations are probably caused by occasional minor ball bearing cage instability and that this should not give cause for any additional concern about expected gyro lifetime. There has been no impact on operations, although naturally an increased probability of a spurious safety mode condition (2 gyros registering 'FAIL') occurring. Note that safety monitoring is now carried out by OBC software (ref. Express No.9, p.4) and that, in the event of an OBC malfunction, operational procedures guard against spurious triggering of safety mode should the Y-gyro health status change.

There have been no changes in the status of the payload hardware.

2. Performance and Operations

Tables 1 and 2 on p.4/5 give the current performance parameters of the EXOSAT instruments.

During the period 1.3.85 to 30.4.85, loss of normal observation time occurred on days 114 to 116 because of solar activity. Throughout the entire period it proved possible to replace the observing program with certain 'LE only' observations.

A second propane gauging operation (ref. Express No.9, p.51) was carried out in orbit 181 during the long observation of 4U1700-37 (constant β angle). Analysis of the data by Marconi Space Systems (MSS) indicates a continuing discrepancy with respect to the propane logging results both in total remaining propane (3.5 kg/5.1 kg as on 7.4.85) and usage during the period 9.2.85 to 7.4.85 (900 gm/420 gm). Further work is in progress to resolve the problem as a matter of urgency, given that the worst case figures would imply a mission lifetime termination at the end of 1985.

EXOSAT's fourth eclipse season, covering a period of 12 orbits from 16.3.85 to 23.4.85 with eclipses varying in duration from a few minutes to approximately 1 hour, has just ended.

A number of significant outstanding actions from the EXOSAT data analysis workshop (ref. Express No.8, p.23) have recently been completed and are referenced here:

-	ME dead time	This issue, p.35
-	Argon/Xenon calibration, gain and resolution	This issue, p.40
-	Boron filter calibration	Express No. 8 and this issue p.45
-	UV calibration	To be published in June 85 Express.

3. Observation Output

A few minor modifications to the Automatic Analysis software have been implemented:

- warning of gaps in data such that ESOC can check the telemetry archive tape prior to recycling and hence avoid any permanent loss of data (two occasions since launch).

- for the ME analysis, notification if a source has been detected during a slew.

- position monitors 1 and 2 of the ME array offsets modified to correspond to array half 1 and half 2 respectively.

Attention is drawn to the note on page 57 concerning organisation of the Interactive Analysis system.

4. Future Plans

A number of minor modifications have been introduced into the specification of the EXOSAT Observation Log (Express No. 9, p.44). This log should be complete by 1.7.85 and copies will be available on request from the Observatory in the form of computer listings (or magnetic tape) comprising one line for each stable pointing. Details of present and all further specification changes will be published in the next issues of the Express. Note that the Log will identify data available in the archive and should facilitate its exploitation.

Work is continuing on the definition and implementation of the 'back up' mode of operation of the AOCS for the situation of two gyros failed (ref. Express No.9, p.6). Only the 'direct thruster demand' operation will be defined since the alternative - 'star hopping' - would require an unacceptable level of software development.

TABLE 1

PERFORMANCE CHARACTERISTICS (LE)

LE1	Characteristics			
Energy Range	0.04-2 keV (6-300 A) CMA*			
	0.3 - 2 keV PSD			
Energy resolution	Five filters are available for broad-band spectroscopy (CMA)			
	$(\Delta E/E) = 41/E(keV)^{0.5}$ %FWHM (PSD)			
Field of view	2.2° diameter (CMA) 1.5° diameter (PSD)			
Effective area (cm^2)	Thin Lexan Filter	Al/P Filter	Boron Filter	Open position (PSD)
.05 keV	0.4	2.6	-	-
.1 keV	11.1	0.4	-	-
.5 keV	4.5	3.3	0.4	1.9
1.0 keV	3.2	2.5	2.0	13.5
1.5 keV	2.2	1.6	1.8	9.7
2.0 keV	0.6	0.5	0.6	1.9
Spatial resolution (Line spread function HEW)				
On axis :	18 arc sec (CMA)		3 arc min (PSD)	
20 arc minutes off-axis:	40 arc sec (CMA)		3.5 arc min (PSD)	
Average steady residual background**	1.8 cnts/sec/cm^2 (CMA)			
	0.7 cnts/sec/cm^2/kev (PSD)			

* Subject to UV contamination between 900 - 2600 A
** Background rate subject to flaring

TABLE 2

PERFORMANCE CHARACTERISTICS (ME & GSPC)

Medium Energy Experiment	Characteristics
Total effective area	1500 cm^2 (all quadrants co-aligned)
Effective energy range	1-20 keV (Argon proportional counters) 5-50 keV (Xenon proportional counters)
Energy resolution ($\Delta E/E$)	$51/E\ (kev)^{1/2}$ % FWHM (Argon counters) 18% for 10 keV$\leq E \leq$ 30 keV (Xenon counters)
Field of view	45 arc minutes FWHM, triangular response with a 3' flat top
Total residual background	4 cnts/sec/keV (2-10 keV Argon counters co-aligned)
Gas Scintillation Counter (GSPC)	
*Total effective area	100 cm^2
Effective energy range	2-18 keV or 2-40 keV, depending on gain setting
Energy resolution ($\Delta E/E$)	$27/E\ (kev)^{1/2}$ % FWHM
Field of view	45 arc minutes FWHM triangular response with a 3' flat top
Total residual background rate	1.3 cnts/sec/keV (2-10 keV)

* depends on E and burst length window setting

AO-3 OBSERVATIONS 01.03.85-30.04.85

Day (85)	Time	Target	RA	Dec	SAA	Duration h m	Principal Investigator	
061	00.46	2S1553-542	15 54 10	-54 14 29	91	6 56	Kelley	
061	09.13	HD 129791	14 46 10	-44 50 48	105	6 24	Gahm	AO-2
061	17.36	PROX CEN	14 26 21	-62 26 45	99	9 16	Butler	
062	07.10	NGC5548	14 15 46	+25 24 29	128	5 57	Branduardi	
062	14.41	PG 1711+336	17 11 15	+33 36 44	93	4 65	Rosen	AO-2
062	23.24	HD 109387	12 31 07	+70 06 14	114	3 23	Henrichs	AO-2
063	06.07	IOTA AUR	04 53 37	+33 02 50	92	6 0	Linsky	
063	1513	YZ CMI	07 41 59	+03 38 10	130	9 38	Butler	
064	22.29	KR AUR	06 12 26	+28 33 21	107	5 45	Weisskopf	
065	05.48	BD+37 1146	05 17 10	+37 21 12	95	3 36	Polcaro	
065	10.40	BD+37 1146 O/SET	05 17 10	+38 50 20	95	3 29	Polcaro	
065	17.28	MSH 15-52	15 10 18	-58 55 54	99	14 30	Aschenbach	
066	10.30	CEN X-3	11 19 19	-60 22 33	114	11 39	Peacock	AO-1
067	01.56	WOLF 6304B	16 53 09	-07 56 04	93	11 50	Johnson	AO-2
067	15.05	IH 1653-062	16 52 44	-06 22 19	94	5 37	Schwartz	AO-2
068	10.50	A2052	15 14 26	-07 13 44	120	16 26	Mushotzky	AO-2
069	08.04	EXO751-674	07 48 40	-67 39 36	99	7 45	TOO	
069	18.17	DELTA TRA	16 11 16	-63 32 58	94	5 50	Linsky	
070	02.19	GX301-2	12 24 10	-62 31 09	112	13 13	White	
070	16.55	IH1622-751	16 17 07	-75 06 58	90	3 22	Schwartz	AO-2
070	21.17	HD 147584	16 23 33	-69 57 19	91	9 9	Pallavicini	
071	17.20	ALPHA TRA	16 43 49	-68 54 56	90	8 10	Linsky	
072	09.10	G327.4+0.4	15 44 16	-53 25 32	102	6 26	Jones	AO-2
072	17.32	HD 155885	17 12 24	-26 29 40	93	9 28	Pallavicini	
073	03.49	TERZAN 2	17 24 28	-30 43 29	90	11 11	Belli	AO-2
073	16.48	CTB37A/B	17 11 09	-38 13 53	93	4 41	Bedford	AO-2
074	00.12	4U1700+24	17 04 24	+24 04 31	98	10 57	Frontera	AO-2
074	14.30	AG DRA	16 01 50	+66 57 07	101	7 21	TOO	
075	00.36	1E0951.5+691	09 53 50	+69 01 33	110	10 40	Barr	
076	00.07	PG0804+761	08 04 42	+76 10 53	99	6 32	Zamorani	
076	09.22	SU UMA	08 32 27	+53 38 26	114	5 44	Skody	
076	12.50	MKN 86	08 09 25	+46 07 28	114	6 17	Loose	AO-2
077	01.36	MCG 8-11-11	05 50 57	+46 23 06	91	4 10	Maraschi	AO-2
077	07.55	1E0630+1748	06 30 48	+17 46 23	100	17 45	Caraveo	AO-1
078	06.30	G 293-8+0.6	11 33 26	-60 35 42	102	11 5	Smith	
078	21.30	HER X-1	16 56 11	+35 27 37	102	8 7	Voges	AO-2
079	23.39	1235+63	12 35 14	+63 17 53	116	30 35	LE Cal	
081	08.57	ALPHA CrB	15 32 39	+26 55 13	123	6 3	Schmitt	
081	18.00	RS OPH	17 47 38	-06 39 53	94	5 2	TOO	
082	00.16	4U1758-20	17 58 39	-20 30 02	92	10 7	Kahn	AO-2
082	11.16	G6.5-0.1	17 57 54	-23 18 35	92	6 16	Jones	AO-2
082	19.25	COD-38 10980	16 20 21	-39 05 28	111	3 18	Heise	AO-2
083	22.00	4U 1744-26	17 44 56	-26 30 33	97	6 52	Turner	AO-2
084	07.10	4U1624-49	16 24 31	-49 03 40	109	55 50	Watson	
087	06.03	LMC X-1	05 39 43	-69 47 51	88	11 14	Ilovaisky	AO-2
087	19.24	EXO 0748-674	07 48 49	-67 41 48	100	9 21	TOO	
088	09.00	RS Oph	17 47 42	-06 41 10	100	5 1	TOO	
088	17.02	2S1642-455	16 42 22	-45 29 23	111	11 58	Turner	AO-2

Day (85)	Time	Target	RA	Dec	SAA	Duration h m	Principal Investigator	
089	07.54	RCW86	14 39 22	-62 04 55	117	13 01	Bleeker	AO-2
090	03.30	OA01653-40	16 57 26	-41 33 01	110	10 11	Parmar	AO-2
090	23.24	OA01653-40	16 57 28	-41 33 01	111	4 35	Parmar	AO-2
091	07.00	GX13+1	18 11 44	-17 08 08	98	8 20	Stella	
091	16.46	Kepler SNR	17 27 49	-21 25 01	108	23 18	Peacock	AO-2
092	19.24	V533 Her	18 12 32	+41 52 41	92	3 16	Lamb	AO-2
093	01.08	BD +61 1211	10 52 13	+60 44 43	110	14 16	Culhane	
093	16.35	MKN180	11 32 59	+70 26 32	103	2 55	McHardy	AO-2
093	22.40	EXO 1845-032	18 45 39	-03 12 22	91	2 44	TOO	
094	05.19	4U1700-37	17 00 43	-37 44 53	115	3 4	White	
094	18.49	4U1700-37	17 00 43	-37 44 37	115	77 41	White	
098	02.17	EXO 1747-215	17 47 42	-21 29 49	110	14 22	TOO	
099	01.16	EXO 0748-674	07 48 23	-67 41 21	100	4 44	TOO	
099	09.43	MKN501	16 52 16	+39 52 38	110	4 43	McHardy	AO-2
099	18.32	CP Puppis	08 09 42	-35 13 36	106	5 59	TOO	
100	06.00	RS Oph	17 47 42	-06 41 28	112	4 59	TOO	
100	16.30	3A0729+103	07 28 35	+10 01 31	92	13 59	Pye	
101	10.25	EXO 1747-214	17 47 25	-21 24 43	113	5 54	TOO	
101	18.57	IRAS 1833+326	18 33 19	+32 41 13	95	1 31	Ops	
101	07.31	IRAS 1833+326	18 33 17	+32 41 54	95	13 55	Ops	
102	23.48	HR6806	18 08 02	+38 29 37	98	11 18	Johnson	AO-2
103	14.44	2S1742-294	17 43 03	-29 27 44	116	11 53	Turner	AO-2
104	06.06	G326.2-1.8	15 48 44	-56 03 42	125	12 0	Jansen	
104	21.44	2S1254-690	12 54 41	-69 03 15	120	12 50	Courvoisier	
105	13.30	ESO 140-G43	18 40 32	-62 22 57	104	2 35	Molteni	AO-2
106	05.51	VW Hydri	04 09 31	-71 25 29	85	2 49	Van der Woerd	
106	11.23	1820-303	18 20 38	-30 21 20	111	12 6	Ponman	AO-2
107	02.50	4U1556-60	15 57 10	-60 36 16	123	27 58	Pakull	
108	09.13	ESO 012-G21	00 38 48	-79 28 09	90	3 36	Molteni	AO-2
108	16.24	X1745-203	17 46 03	-20 18 41	121	2 53	Ecran	AO-2
108	22.44	Nova Vul 2	20 24 50	+27 42 55	76	6 23	TOO	
109	07.20	IRAS 1833+326	18 33 19	+32 41 53	99	3 34	Ops	
109	21.24	IRAS 1833+326	18 33 17	+32 41 34	99	5 48	Ops	
110	06.10	RS Oph	17 47 43	-06 41 28	121	3 39	TOO	
110	12.25	EXO 1939+275	19 39 03	+27 30 21	87	1 35	TOO	
110	16.55	MXB 1728-34	17 28 50	-33 46 28	125	8 5	Lewin	
111	06.30	CW 1103+254	11 03 07	+25 23 59	124	5 9	Beuermann	
111	13.55	PG0844+349	08 44 22	+34 55 02	93	5 20	Kriss	
111	21.27	NGC 4151	12 07 48	+39 42 17	122	5 18	Pounds	
112	05.20	MKN 421	11 01 27	+38 28 40	114	5 15	Warwick	
112	14.48	Vela X-1	09 00 03	-40 23 10	109	14 48	Van der Klis	
113	21.05	VW Hydri	04 09 31	-71 28 05	86	2 55	Van der Woerd	
114	03.34	4U1746-37	17 47 00	-37 00 34	124	10 26	Lewin	
114	18.05	Her X-1*	16 56 03	+35 28 06	117	2 12	Voges	AO-2
115	00.10	GX339-4*	16 59 20	-48 42 21	129	7 39	Ilovaisky	AO-1
115	15.05	WR2018+43*	20 18 53	+43 39 20	79	1 44	TOO	
115	18.50	CM Dra*	16 33 44	+57 15 00	103	3 40	Jansen	
116	01.25	AN UMa*	11 01 46	+45 22 00	107	5 6	TOO	

*LE only: Solar activity.

Day (85)	Time	Target	RA	Dec	SAA	Duration h m	Principal Investigator
116	08.52	1156+295	11 56 42	+29 31 36	125	5 45	McHardy
116	17.50	3C382	18 33 17	+32 42 06	102	6 24	Perryman AO-1
117	16.00	IRAS 1833+326	18 33 16	+32 41 29	103	5 30	Ops
117	23.50	PG 1700+518	17 00 12	+51 56 02	105	8 18	Smith
118	11.21	NGC 4151	12 07 48	+39 42 02	117	5 15	Pounds
118	19.18	MKN 421	11 01 28	+38 28 33	109	5 47	Warwick
119	05.12	RS Oph	17 47 37	-06 39 49	129	2 17	TOO
119	11.25	GX339-4	16 59 20	-48 42 23	133	6 0	Ilovaisky AO-1
119	22.32	4U1758-25	17 58 14	-24 42 32	129	7 50	V.Paradijs AO-2
120	09.38	Vela X-1	09 00 02	-40 22 50	105	8 21	Van der Klis

COMPLETE AO-2 OBSERVATION PROGRAMME

Day (84)	Time	Target	RA	Dec	SAA	Duration h m	Principal Investigator
127	01.25	1636-53	16 36 56	-53 39 18	137	18 50	Turner
129	11.04	1636-53	16 36 56	-53 3956	138	22 55	Trümper
151	08.15	1156+295	11 56 57	+29 31 24	97	5 17	McHardy
151	22.03	Am Her	18 14 58	+49 50 27	104	7 37	Heise
152	08.08	2223-052	22 23 08	-05 12 44	93	3 12	McHardy
152	21.35	NGC6814	19 39 54	-10 26 57	134	6 59	Branduardi
153	21.18	4U1223-62	12 23 53	-62 29 19	121	1 41	Re
154	01.12	1207+39	12 08 02	+39 41 00	91	3 5	Dean
154	06.30	NGC4593	12 37 06	-05 04 13	119	5 50	Clavel
155	07.30	1114+18	11 14 37	+18 14 03	89	6 4	Biermann
155	19.45	GP Com	13 03 15	+18 17 06	112	4 4	Lamb
156	01.44	NGC 4278	12 17 35	+29 33 36	97	8 25	Palumbo
159	02.30	3C445	22 21 15	-02 21 15	99	7 51	Pounds
159	11.48	H2126+56	21 26 01	+56 00 12	84	7 10	Schwartz
160	02.25	IE2048+292	20 48 10	+29 13 04	105	3 51	Kahn
160	07.39	X0918-549	09 18 53	-54 59 34	94	9 20	McKechnie
160	19.20	Centaurus-A	13 22 30	-42 45 36	130	8 30	Molteni
161	22.00	UX UMA	13 34 40	+52 10 12	91	3 29	Van der Woerd
167	14.13	PG1159-035	11 58 58	-03 29 52	97	7 18	Barstow
171	03.50	A2589	23 21 23	+16 32 37	89	4 26	McKechnie
172	15.29	DA 530	20 50 50	+55 09 36	93	11 31	Davelaar
173	05.12	1308-326	13 08 09	-33 37 03	91	4 10	McHardy
173	23.44	III ZW 102	23 17 59	+25 57 19	92	5 48	Loose
175	07.45	SC 1251-288	12 51 00	-28 44 57	110	5 10	McKechnie
176	10.24	SC 1329-314	13 29 24	-31 25 56	117	11 32	Morini
178	15.48	LT 5	12 53 10	+26 09 41	86	5 37	De Korte
180	11.35	3C273	12 26 35	+02 19 27	89	11 16	Turner
182	01.45	X2127-119	21 27 31	+11 56 59	125	11 7	Redfern
183	00.56	NGC 4593	12 37 05	-05 04 41	91	5 41	Clavel
183	14.20	4U1145-619	11 45 34	-61 56 10	104	3 14	Willingdale
183	20.25	MKN 501	16 52 10	+39 50 00	112	3 22	Warwick
184	09.28	AM Her	18 14 55	+49 50 39	106	3 36	Heise
185	13.35	AR Lac	22 06 41	+45 30 31	99	47 8	White
187	16.15	4U1145-619	11 45 30	-61 56 01	101	1 45	Willingdale
188	09.02	NGC 7640	23 19 42	+40 34 47	92	2 31	Gioia
189	05.25	K 1-16	18 21 33	+64 20 11	92	3 5	Barstow
189	18.34	4U1145-619	11 45 35	-61 56 04	100	3 25	Willingdale
191	06.10	MKN 501	16 52 11	+39 50 00	109	2 33	Warwick
192	20.50	H1325-02	13 26 31	-02 33 49	92	2 5	Lawrence
192	23.45	H1325-02	13 22 48	-02 11 44	91	1 41	Lawrence
193	02.10	H1325-02	13 30 16	-02 55 34	93	2 29	Lawrence
193	05.32	H1325-02	13 21 46	-02 03 01	91	4 8	Lawrence
193	11.53	NGC 5548	14 15 43	+25 22 16	92	16 46	De Korte
196	23.47	Nova Muscae	11 49 37	-66 55 32	100	10 43	Krautter
197	13.10	Her X-1	16 56 03	+35 25 08	111	1 30	Voges
198	01.58	PG 0026+129	00 26 37	+12 59 08	101	9 23	Treves
200	22.40	IH2355-350	23 55 23	-35 01 12	125	5 9	Wood

Day (84)	Time	Target	RA	Dec	SAA	Duration h m	Principal Investigator
201	06.45	MKN 501	16 52 10	+39 50 04	106	3 0	Warwick
201	13.15	GX 304-1	12 58 10	-61 20 22	101	2 44	Pietsch
201	18.45	PG 0109+111	01 09 44	+11 08 09	96	2 44	Wulf-Mathies
201	23.50	IC 4329	13 46 27	-30 04 07	98	5 30	Pounds
202	05.27	MCG6-30-15	13 33 01	-34 02 51	96	7 10	Pounds
202	16.31	H1846-786	18 46 08	-78 36 11	121	6 3	Pounds
203	01.09	MKN 1152	01 11 21	-15 06 10	106	10 20	Pounds
207	00.25	MKN 501	16 52 15	+39 46 55	103	3 12	Staubert
207	23.33	Alpha Cruc.	12 23 22	-63 17 56	95	3 20	Swank
208	05.41	A2199	16 26 54	+39 39 43	99	5 54	Stewart
208	14.07	4C 50.44	18 17 50	+50 29 42	104	13 53	McHardy
209	06.05	3C47	01 33 40	+20 42 21	94	11 36	ME CAL
209	20.15	MKN 501	16 52 11	+39 59 26	102	3 35	Warwick
210	02.15	4C 7.38	14 44 02	+07 41 36	91	14 29	McHardy
210	19.19	PG 0108+101	01 08 29	+10 05 49	105	4 49	Wulf-Mathies
211	23.14	Centaurus-A	13 22 32	-42 45 42	90	9 24	Molteni
212	10.29	GX 304-1	12 58 13	-61 20 10	95	3 20	Pietsch
212	16.43	H0139-68	01 39 35	-68 08 24	112	3 16	Beuermann
213	04.43	NGC 5139	13 23 48	-47 13 12	91	14 11	Verbunt
213	20.50	LB 1663	03 20 30	-53 49 29	99	4 14	Heise
214	03.22	0235+164	02 35 51	+16 24 07	87	4 27	McHardy
214	19.51	AM Her	18 14 58	+49 50 39	104	2 10	Heise
215	14.51	RR Lyr	19 23 50	+42 40 53	116	3 27	Jameson
215	23.34	A 2315	19 01 09	+69 52 43	90	4 25	McKechnie
216	06.21	Sco X-1	16 14 20	-15 56 13	113	5 9	Pollock
216	12.56	PKS1510-08	15 10 09	-08 55 09	96	23 23	Petre
218	03.10	V442 OPH	17 29 22	-16 14 05	129	2 50	Van der Woerd
218	08.47	IH0151+359	01 51 29	+35 59 53	93	2 34	Wood
219	21.16	2S 1254-690	12 54 20	-69 01 07	94	16 37	Courvoisier
220	15.16	GX 304-1	12 58 10	-61 20 05	89	3 4	Pietsch
220	20.16	4U1538-52	15 38 37	-52 13 48	107	3 29	Ohashi
221	02.20	A1711-339	17 11 00	-33 59 45	123	12 10	Parmar
221	15.25	2S1715-321	17 15 31	-32 07 34	124	11 59	Parmar
222	06.31	GL 873	22 44 39	+44 04 46	116	3 06	Schmitt
223	16.51	G328.4+0.2	15 51 57	-53 08 08	107	6 9	Trussoni
224	21.58	A 262	01 49 51	+35 54 15	99	5 16	Mushotzky
225	06.06	II PEG	23 52 24	+28 21 42	124	11 52	White
225	20.26	PSR0540-69	05 36 28	-68 50 24	93	6 47	Schnopper
227	05.01	Circinus X-1	15 16 47	-56 58 57	99	10 45	Tennant
228	05.58	Circinus X-1	15 16 47	-56 58 57	99	16 59	Tennant
232	16.00	HD 1671	00 18 28	+37 41 39	119	3 48	Praderie
232	22.17	HD12929	02 04 20	+23 13 47	109	14 12	Praderie
233	15.35	Lanning 90	20 22 08	+46 20 55	117	3 33	Cook
234	17.16	HD3421	16 42 05	+35 07 21	120	1 52	Praderie
234	21.31	HD6903	01 07 07	+19 23 27	124	3 56	Praderie
235	03.52	GL 694	17 42 25	+43 24 20	98	3 0	De Korte
235	09.25	GX1+4	17 28 58	-24 42 35	114	3 22	Mason
235	15.15	Circinus X-1	15 16 48	-56 59 15	93	3 47	Tennant

Day (84)	Time	Target	RA	Dec	SAA	Duration h m	Principal Investigator
235	21.07	Her X-1	16 56 02	+35 25 00	93	9 52	Voges
236	15.15	4U1735-44	17 35 19	-44 25 29	113	8 7	Charles
237	02.02	NGC 1566	04 18 52	-55 03 25	98	2 58	Alloin
237	07.20	G342.1+0.1	16 50 11	-43 30 00	104	2 49	Davelaar
238	09.25	GX1+4	17 28 56	-24 42 45	111	4 35	Mason
238	16.36	GL 649	16 56 04	+25 49 31	94	3 9	De Korte
238	21.55	2S1543-624	15 43 29	-62 24 57	95	12 2	White
239	12.23	4U1755-33	17 55 18	-33 48 27	115	16 49	White
240	13.55	4U0142+61	01 42 55	+61 30 23	98	12 27	White
241	04.35	SS Cyg	21 40 41	+43 22 13	125	3 34	Watson
241	18.30	SS Cyg	21 40 43	+43 21 47	125	5 31	Watson
242	02.46	G 29.7-0.3	18 43 49	-03 02 00	123	11 12	Koch-Miramond
242	16.15	GX1+4	17 28 58	-24 42 31	107	3 0	Mason
242	21.44	V1223 Sgr	18 51 49	-31 13 34	124	6 31	Beuermann
244	03.23	1556-605	15 56 46	-60 35 52	93	7 57	Pakull
244	12.50	1E1875.5-16	18 17 34	-16 13 24	116	11 31	Pakull
245	20.28	V1223 SGR	18 51 40	-31 15 56	121	6 6	Beuermann
246	05.15	Cyg X-3	20 30 21	+40 47 31	122	10 29	Mason
246	18.15	GX1+4	17 28 48	-24 44 25	103	3 9	Mason
246	23.55	GK Per	03 27 54	+43 46 31	98	3 24	Watson
247	05.46	Cyg X-3	20 30 21	+40 47 27	122	10 7	Mason
247	20.40	VW Hydri	04 09 59	-71 23 43	100	3 30	Pringle
249	11.53	3C 120	04 30 39	+05 16 51	95	7 48	Tanzi
249	22.02	GX 17+2	18 13 01	-14 04 45	109	6 34	Sztajno
250	07.01	GX1+4	17 28 48	-24 44 03	99	3 17	Mason
250	12.28	Ophichus Cl.	17 09 35	-23 19 58	94	5 32	Nulsen
250	19.38	GX17+2	18 13 01	-14 04 45	109	7 52	Sztajno
251	05.16	2S1636-536	16 36 39	-53 40 31	91	9 25	Turner
251	23.13	V 603 Aqi	18 46 11	+00 30 18	115	5 18	Metz
252	07.26	VW Hydri	04 10 00	-71 24 18	99	2 54	Pringle
253	09.17	1H0414+009	04 14 24	+00 59 48	103	3 43	Warwick
253	15.00	Feige 24	02 32 35	+03 32 52	128	3 59	Heise
253	22.20	V603 Aqi	18 46 13	+00 30 12	113	6 12	Metz
254	07.30	PKS2005-489	20 05 42	-49 01 00	120	5 35	Warwick
254	19.27	1702-363	17 02 14	-36 22 47	90	5 32	Van Paradijs
255	02.30	GX1+4	17 28 49	-24 44 05	94	2 58	Mason
255	08.41	Feige 24	02 32 36	+03 32 51	130	2 53	Heise
255	14.25	VW Hydri	04 09 56	-71 24 19	99	3 24	Pringle
255	20.15	3C 371	18 06 53	+69 47 46	90	12 13	Worrall
256	23.29	V442 Oph	17 29 23	-16 06 00	92	5 20	Van d. Woerd
257	06.17	MXB 1728-34	17 27 00	-34 15 26	92	17 23	Foster
258	02.00	V0332+53	03 31 21	+53 02 37	103	3 19	Davelaar
258	07.48	1H0414+009	04 14 25	+00 59 46	108	3 32	Warwick
258	23.40	NGC 1129	02 51 23	+41 25 26	116	5 10	Morini
259	07.15	VW Hydri	04 10 01	-71 24 34	99	3 14	Pringle
260	18.41	4U2030+40	20 30 24	+40 46 32	119	6 15	Van der Klis
261	03.08	H1829-591	18 35 49	-59 16 37	99	1 53	Lawrence
261	05.53	H1829-591	18 21 00	-59 24 17	97	2 33	"

Day (84)	Time	Target	RA	Dec	SAA	Duration h m	Principal Investigator
261	09.10	H1829-591	18 28 45	-59 21 13	98	1 43	Lawrence
261	11.44	H1829-591	18 19 44	-59 40 53	97	4 52	"
261	19.01	V0332+53	03 31 17	+53 02 46	106	3 5	Davelaar
262	11.43	1758-250	17 57 56	-25 06 32	94	6 58	Van Paradijs
262	21.25	VW Hydri	04 09 58	-71 24 16	99	3 26	Pringle
263	07.30	2A 1822-371	18 22 15	-37 10 06	98	16 25	Mason
265	06.48	H0323+022	03 23 46	+02 16 20	127	5 28	Bradt
265	15.10	SS 433	19 09 13	+04 52 30	108	3 10	Stewart
265	21.00	SS CYG	21 40 45	+43 21 10	126	2 39	Lamb
266	02.43	Beta Hydri	00 25 36	-77 22 20	103	4 53	Dravins
266	10.16	1H0414+009	04 14 26	+00 59 32	115	2 59	Warwick
266	15.42	HD 25940	04 05 09	+47 37 01	108	2 38	Henrichs
266	20.47	VW Hydri	04 10 02	-71 25 00	98	7 12	Pringle
267	06.27	H0323+022	03 23 46	+02 16 18	129	5 49	Bradt
267	14.23	GL 205	05 29 05	-03 40 52	97	4 32	Schmitt
268	10.22	SS 433	19 09 15	+04 51 45	106	3 29	Stewart
268	16.04	BY Dra	18 32 33	+51 39 00	94	9 15	De Jager
269	03.05	V4260PH	18 05 18	+05 49 08	89	4 26	Szkody
269	09.04	SS 433	19 09 15	+04 51 44	105	6 1	Stewart
269	16.58	BY Dra	18 32 33	+51 38 58	94	11 7	De Jager
270	05.56	1820-303	18 20 20	-30 25 28	91	6 25	Ponman
270	14.18	Her X-1	16 55 56	+35 22 34	75	3 46	Voges
270	20.28	VW Hydri	04 10 01	-71 24 19	98	3 25	Van d. Woerd
271	02.06	SS 433	19 09 15	+04 51 43	104	4 17	Stewart
272	08.17	4U0614+09	06 14 31	+09 10 50	91	3 43	Mason
272	22.16	Am Her	18 14 46	+49 49 18	90	3 30	Heise
273	11.54	SS 433	19 09 14	+04 52 18	101	3 55	Stewart
273	18.02	VR042.05.01	05 23 29	+43 02 09	102	2 58	Bedford
273	23.00	3C 371	18 06 58	+69 46 52	91	7 14	Worrall
274	09.01	1H0414+009	04 14 26	+00 59 30	122	2 48	Warwick
274	13.51	VW Hydri	04 10 01	-71 25 11	97	3 29	Van d. Woerd
274	19.52	GD 391	20 27 54	+39 02 08	115	3 24	Heise
275	19.14	SS 433	19 09 21	+04 53 53	99	4 1	Stewart
276	00.40	H1833-077	18 34 41	-07 40 04	90	2 52	Cooke
276	06.36	3C120	04 30 07	+05 16 50	120	11 52	Pounds
276	20.43	A478	04 10 48	+10 22 18	125	5 46	Stewart
277	04.52	NGC 1566	04 19 12	-55 02 51	105	2 52	Alloin
277	10.25	3C120	04 30 07	+05 16 49	121	5 24	Pounds
277	18.01	PK 158+17.1	06 51 38	+55 39 41	91	2 53	De Korte
277	23.00	Aql X-1	19 08 35	+00 28 04	97	5 50	Van Paradijs
278	06.49	VW Hydri	04 10 04	-71 25 08	97	3 14	Van d. Woerd
278	13.02	3C 120	04 30 40	+05 16 48	122	5 32	Tanzi
278	21.35	SS 433	19 09 14	+04 51 54	97	2 29	Stewart
279	17.15	MCG 8-11-11	05 51 20	+46 27 27	102	3 14	Maraschi
279	23.14	G34.6-0.5	18 53 20	+01 14 36	92	11 59	Jones
280	13.48	3C120	04 30 07	+05 17 07	124	6 47	Pounds
281	19.46	VW Hydri	04 10 07	-71 25 00	96	4 0	Van d. Woerd
282	06.24	HM Sge	19 39 32	+16 35 14	102	6 05	Cordova

Day (84)	Time	Target	RA	Dec	SAA	Duration h m	Principal Investigator
283	13.57	MXB1906+00	19 05 47	+00 02 55	91	10 33	Brinkman
284	03.27	3C120	04 30 06	+05 17 15	128	5 19	Pounds
285	16.50	VW Hydri	04 10 06	-71 24 55	95	2 29	Van d. Woerd
286	01.27	3C120	04 30 06	+05 17 14	129	5 7	Pounds
287	16.10	PKS2005-489	20 05 39	-49 01 16	92	5 39	Warwick
287	23.32	NGC 6814	19 39 49	-10 29 01	94	6 3	Branduardi
288	07.12	1921-293	19 21 34	-29 22 41	87	6 43	Willmore
289	10.05	SC 0316-4581	03 16 22	-45 48 21	119	4 18	McKechnie
289	16.00	VW HYDRI	04 10 05	-71 25 20	93	3 59	van der Woerd
289	22.26	V1016 CYG	19 55 10	+39 39 18	101	4 28	Cordova
291	14.58	FAIRALL 9	22 05 03	-59 05 58	111	6 1	Scarsi
291	10.17	PKS0558-504	05 58 51	-50 26 32	96	3 32	Bradt
292	13.40	V0332+53	03 31 16	+53 02 57	130	2 30	Davelaar
292	19.49	MR 2251-178	22 51 20	-17 53 18	131	7 46	Pounds
293	06.05	VW HYDRI	04 10 01	-71 26 22	94	3 24	van der Woerd
293	11.48	FAIRALL 9	01 22 05	-59 05 57	110	2 52	Scarsi
293	18.11	HD 45314	06 24 34	+14 56 25	109	2 49	Henrichs
293	23.16	N 157B	05 38 30	-69 11 29	90	4 59	Trussoni
294	17.07	PSR0540-69	05 44 44	-68 48 33	90	5 58	Schnopper
295	12.35	FAIRALL 9	01 22 05	-59 05 58	110	5 22	Scarsi
296	03.59	X2127+119	21 27 27	+11 54 50	116	14 26	Redfern
296	21.03	FAIRALL 9	01 22 05	-59 05 58	110	2 52	Scarsi
297	01.02	H0139-68	01 39 57	-68 10 09	100	6 58	Beuermann
297	09.45	H0453-75	04 53 08	-74 59 14	89	6 43	Tuohy
297	17.38	VW HYDRI	04 09 59	-71 25 40	94	4 34	Heise
298	14.29	4U0504-04	05 07 48	-03 46 58	129	2 50	Patterson
298	19.58	4U0550+29	05 52 52	+28 48 45	122	2 42	Patterson
299	01.06	ABELL 15	06 25 11	-25 16 45	104	4 41	Heise
299	08.52	FAIRALL 9	01 22 05	-59 05 58	108	4 28	Scarsi
299	14.39	SMC X-1	01 16 09	-73 44 37	93	5 21	van der Klis
299	23.08	2223-052	22 23 05	-05 14 56	123	3 27	McHardy
300	05.18	1H 2322-269	23 17 00	-27 42 33	123	2 22	Praderie
300	10.55	MR 2251-178	22 51 23	-17 53 37	124	4 40	Pounds
301	14.02	AM HER	18 14 54	+49 48 10	82	3 52	Heise
302	08.05	HD10221	01 38 17	+67 48 27	125	4 23	Ferrari
302	15.03	S 147	05 38 07	+26 46 39	129	8 37	Rothenflug
303	02.00	3A0726-260	07 26 59	-25 59 15	94	2 54	Watson
303	13.12	SMC X-1	01 16 00	-73 44 25	92	4 18	van der Klis
303	19.37	PG 0834+488	08 35 00	+48 49 43	97	4 42	Cook
304	04.42	SC2059-247	20 59 08	-24 45 48	93	6 06	McKechnie
304	11.19	H0542+51A	04 55 50	+51 57 46	128	3 01	Tuohy
304	20.44	NGC 1566	04 19 09	-55 04 07	107	3 11	Alloin
305	02.27	4U0614+09	06 14 23	+09 10 32	122	6 14	Mason
306	06.33	A576	07 17 38	+55 53 31	111	6 46	Mushotzky
306	15.35	MGC 8-11-11	05 51 18	+46 28 22	126	3 15	Maraschi
306	21.00	GW00747+553	07 47 39	+55 21 54	107	3 0	Bradt
307	03.23	MR2251-178	22 51 21	-17 54 01	117	6 6	Pounds
307	11.50	SMC X-1	01 15 14	-73 43 54	90	3 30	Watson

Day (84)	Time	Target	RA	Dec	SAA	Duration h m	Principal Investigator
307	18.01	Cyg X-1	19 56 21	+35 01 02	91	5 50	Page
308	01.48	MKN 180	11 31 09	+70 25 21	90	3 41	Warwick
308	17.38	LMC X-3	05 39 10	-64 06 38	93	2 57	Van der Klis
308	23.40	4U0614+09	06 14 34	+09 11 07	126	5 28	Mason
310	05.34	NGC 2110	05 49 59	-07 16 55	127	5 29	Pounds
310	13.15	PK219+31.1	08 51 43	+09 07 00	90	3 2	De Korte
310	18.45	MR 374	06 55 46	+54 18 43	118	7 28	Bergeron
311	09.09	HD203387	21 19 21	-17 05 49	93	2 56	Praderie
311	13.43	PKS2155-304	21 55 52	-30 30 54	96	4 4	Tanzi
311	19.46	GL 876	22 50 30	-14 34 17	114	4 1	Schmitt
312	02.10	NGC7213	22 06 07	-47 28 05	90	6 27	Pounds
312	09.48	PKS2155-304	21 55 52	-30 30 54	95	3 59	Tanzi
312	16.38	4U0614+09	06 14 34	+09 11 03	129	7 42	Mason
313	16.45	S50014+81	00 13 05	+81 18 42	113	21 31	Zimmermann
314	17.02	4U0027+59	00 26 42	+59 29 57	129	3 16	Van Paradijs
314	23.10	IH1013+498	10 17 40	+49 34 51	90	3 7	Schwartz
315	04.29	0855+143	08 56 04	+14 22 21	95	13 9	Bregman
316	02.30	MR2251-178	22 51 22	-17 52 58	108	7 8	Pounds
316	11.24	PKS2155-304	21 55 53	-30 29 51	91	3 19	Tanzi
316	16.50	GD 394	21 10 54	+49 51 55	104	3 09	Heise
317	08.54	G78.2+2.1	20 21 24	+40 13 50	92	9 59	Peacock
317	20.50	MKN180	11 30 58	+70 25 42	96	2 40	Warwick
318	00.35	3C263	11 37 32	+66 04 36	92	3 35	Smith
319	03.15	YY Gem	07 31 34	+32 00 18	121	20 56	Gibson
320	04.30	N103B	05 09 44	-68 48 39	90	10 05	Schnopper
321	14.56	II ZW136	21 29 58	+09 52 23	94	6 5	Bergeron
322	15.43	Nova Vul 84	19 24 03	+27 16 42	73	5 34	Ögelman
322	23.40	MCG2-58-22	23 02 04	-08 59 40	107	3 11	Scarsi
323	03.55	Gliese 867	22 35 59	-20 55 28	97	4 6	Jensen
323	10.25	H0534-58	05 34 22	-58 03 43	98	8 7	Tuohy
325	06.15	MKN180	11 31 03	+70 25 54	99	3 13	Warwick
325	13.00	MR2251-178	22 51 20	-17 53 28	99	5 30	Pouinds
325	19.30	MCG 2-58-22	23 02 00	-08 59 32	105	3 16	Scarsi
326	12.50	GL 388	10 17 05	+20 08 12	90	3 22	De Korte
326	18.04	1053+70	10 54 00	+70 28 44	103	6 0	Witzel
327	03.08	MCG2-58-22	23 02 00	-08 59 32	103	3 9	Scarsi
327	08.39	A 140	01 02 04	-24 16 50	119	4 28	McKechnie
327	16.08	LMC X-1	05 40 35	-69 47 15	88	2 59	Ilovaisky
327	20.19	RR PIC	06 35 34	-62 36 25	91	4 17	Van der Woerd
328	14.30	LMC X-1	05 40 33	-69 47 06	78	7 0	Ilovaisky
328	23.55	IH0712+558	07 12 32	+55 51 40	129	2 20	Wood
329	05.10	CPD-48 1577	08 14 04	-49 03 30	90	3 7	Williams
329	10.44	MCG2-58-22	23 03 01	-08 59 24	101	3 33	Scarsi
329	16.23	WD0500-33	00 54 16	-33 17 13	110	3 19	Heise
329	23.00	CPD-48 1577	08 14 04	-49 03 40	90	9 2	Williams
330	10.10	LB 1663	03 23 57	-54 45 43	104	3 38	Kahn
331	00.35	A119	00 53 44	-01 34 29	127	8 13	Morini
331	11.05	Feige 108	23 13 31	-02 09 23	104	3 10	Heise

Day (84)	Time	Target	RA	Dec	SAA	Duration h m	Principal Investigator
331	15.09	MCG 2-58-22	23 02 01	-08 59 23	99	7 23	Scarsi
332	11.40	MR2251-178	22 51 23	-17 53 28	92	6 26	Pounds
333	04.44	MKN 180	11 33 41	+70 28 35	103	4 47	Warwick
333	10.45	I 691	11 24 11	+59 27 04	100	6 51	Peacock
333	18.44	NGC 3642	11 19 42	+59 22 18	100	4 2	Peacock
334	01.50	3A0726-260	07 27 01	-25 59 38	114	9 39	Corbet
334	13.50	BV Pup	07 47 09	-23 25 40	112	3 39	Szkody
334	20.02	PG0956+35	09 56 10	+35 55 40	107	2 58	Heise
335	00.02	GL 411	11 00 48	+36 16 52	95	2 49	Schmitt
335	04.35	A1318	11 33 58	+55 16 13	98	6 6	McKechnie
335	11.48	PG1210+533	12 11 11	+53 21 34	92	3 12	Heise
336	07.14	G109.1-1.0	22 58 46	+58 34 41	112	22 59	Morini
337	08.51	TY Pyx	08 58 01	-27 36 25	99	4 52	White
337	17.05	MKN 421	11 01 55	+38 29 46	98	3 13	Bowyer
337	23.00	NGC 2992	09 43 29	-14 04 47	96	3 48	Pounds
338	04.00	RW Sex	10 17 38	-08 25 52	91	3 43	Van der Woerd
338	10.13	3A2356-341	23 54 20	-35 05 09	91	6 20	Schwartz
338	19.13	MKN 421	11 01 55	+38 39 48	99	6 55	Bowyer
339	05.15	EZ Cam	06 52 21	-23 52 26	124	5 39	Willis
340	05.52	G127.1+0.5	01 24 42	+62 49 12	127	11 18	Peacock
340	19.13	MKN 421	11 01 50	+38 29 42	101	3 17	Bowyer
341	02.04	UV Ceti	01 36 24	-18 14 50	117	8 46	Butler
341	13.52	MKN 335	00 03 41	+19 53 34	113	8 58	Pounds
341	23.55	EQ Peg	23 29 16	+19 37 44	105	10 39	Butler
342	14.05	Gamma Cas	00 53 27	+60 25 32	123	5 30	Frontera
342	21.25	3A2206+543	22 06 02	+54 14 21	101	4 37	Watson
344	04.45	OJ 287	08 52 05	+20 19 05	127	8 20	Pollock
344	15.10	PK261+32.1	10 22 30	-18 22 42	92	2 50	de Korte
344	19.05	NGC 2992	09 43 26	-14 05 08	102	5 15	Pounds
345	02.59	0855+143	08 56 04	+14 22 20	125	12 7	Bregman
345	16.55	OJ 287	08 52 05	+20 19 05	128	9 25	Pollock
346	05.10	1156+295	11 57 07	+29 34 04	92	3 19	McHardy
346	11.17	HD36705	05 28 35	-65 19 19	91	1 47	Rucinski
347	13.49	LMX X-3	39 01 29	-64 08 00	92	5 42	Van der Klis
347	21.55	PG 1034+001	10 34 39	+00 08 37	100	3 55	Heise
348	04.25	3C263	11 37 29	+66 06 15	109	14 35	Smith
348	20.10	GD 323	13 02 50	+59 44 30	98	6 35	Heise
349	02.00	1044+71	10 45 09	+72 01 48	115	6 35	Witzel
349	10.43	1826+79	18 27 21	+79 34 46	103	6 1	Witzel
350	05.30	LMC X-3	05 39 00	-64 08 08	92	4 50	van der Klis
350	11.45	3A 0557-383	05 56 33	-38 21 37	118	7 25	Pounds
351	11.00	NGC 4151	12 08 13	+39 42 13	98	2 50	Perola
351	16.15	H0917-074	09 20 48	-07 48 00	116	2 9	Lawrence
351	19.05	H0917-074	09 13 12	-07 05 59	118	3 3	Lawrence
351	22.46	H0917-074	09 17 11	-07 26 05	118	8 15	Lawrence
353	18.50	NGC 2992	09 43 28	-14 04 50	110	3 58	Pounds
354	01.05	LMC X-3	05 38 59	-64 08 29	92	3 43	Treves
354	07.40	NGC 4151	12 08 13	+39 42 18	101	4 9	Perola

Day (84)	Time	Target	RA	Dec	SAA	Duration h m	Principal Investigator
355	07.11	1114+18	11 14 49	+18 14 46	105	6 48	Biermann
355	17.10	0008+70	00 08 24	+70 27 09	113	5 55	Witzel
356	00.15	0027+70	00 26 48	+70 19 51	114	6 50	Witzel
356	08.52	2010+72	20 10 18	+72 17 35	98	7 13	Witzel
356	18.25	2A1219+305	12 19 04	+30 27 47	97	3 25	Warwick
357	00.48	NOVA MUSCAE	11 50 01	-66 54 39	69	3 27	Krautter
357	07.15	NGC 4151	12 08 10	+39 42 48	103	5 15	Perola
357	23.40	LMC X-1	05 40 20	-69 48 28	86	4 10	Ilovaisky
358	04.37	LMC X-3	05 38 51	-64 09 01	92	4 29	Treves
359	03.27	NGC 2992	09 43 27	-35 05 44	115	3 45	Pounds
359	09.51	NGC 4151	08 12 53	+39 42 06	105	3 16	Perola
359	14.51	COMA CLU	13 00 58	+28 11 23	90	6 17	Goerenstein
359	22.12	COMA CLU	12 57 29	+28 11 24	91	3 32	Goerenstein
360	02.40	COMA CLU	12 54 00	+28 11 24	92	6 30	Goerenstein
360	10.46	COMA CLU	12 57 29	+28 29 24	91	9 15	Goerenstein
361	12.20	LMC X-3	05 38 54	-64 08 47	92	3 27	Treves
361	18.30	A 193	01 22 25	+08 24 32	107	7 09	McKechnie
363	00.49	0740+76	07 40 04	+76 48 53	125	6 16	Witzel
363	09.41	NGC 4151	12 08 11	+39 42 25	108	8 6	Perola
363	20.50	NGC 185	00 36 04	+48 01 18	108	8 15	Weisskopf
364	07.23	M31	00 39 54	+40 57 33	106	14 2	van der Klis
365	01.28	NGC 2992	09 43 27	-14 05 09	120	3 17	Pounds
365	07.24	BURST WATCH	05 26 09	-66 09 15	89	14 05	Staubert
(85)							
001	16.10	4U1145-619	11 45 47	-61 58 14	76	10 41	Willingale
002	06.06	NGC 4151	12 07 49	+39 43 01	112	7 24	Perola
002	18.18	4U1145-619	11 45 47	-61 58 15	77	6 18	Willingale
003	02.27	BURST WATCH	05 25 29	-66 08 28	89	14 14	Staubert
004	14.26	MKN 421	11 01 27	+38 28 54	126	3 37	Bowyer
004	21.24	4U1145-619	11 45 51	-61 57 29	78	6 13	Willingale
005	05.38	NGC 3783	11 36 42	-37 29 42	91	6 28	Bell-Burnell
005	15.30	2A1219+305	12 18 41	+30 28 41	110	3 4	Warwick
005	21.50	4U1145-619	11 45 51	-61 57 29	89	5 46	Willingale
006	06.18	IH1055+299	10 55 05	+29 55 06	128	3 31	Wood
006	18.00	NGC 2992	09 43 13	-14 08 16	127	3 39	Pounds
007	00.23	X0512-40	05 12 30	-40 08 37	111	5 37	Ecran
007	08.45	PKS0349-14	03 49 02	-14 40 02	118	2 25	Bradt
008	03.23	NGC 1068	02 39 58	-00 15 45	109	14 32	Lawrence
008	21.05	4U1145-619	11 45 51	-61 58 05	80	6 32	Willingale
009	05.05	HD 88661	10 10 07	-57 51 50	92	3 58	Henrichs
009	12.15	FORNAX	02 37 33	-34 44 53	92	8 7	Markert
009	23.10	GK Per	03 27 44	+43 40 55	127	18 19	Watson
012	10.10	A376	02 42 32	+36 37 37	116	8 15	Mushotzky
012	21.15	IH1430+423	14 26 36	+42 56 11	95	2 10	Schwartz
013	02.45	A400	02 54 52	+05 48 22	110	14 11	Morini
014	09.11	NGC5548	14 15 44	+25 24 22	91	5 56	Branduardi
014	17.20	HD108767	12 27 24	-16 15 44	101	6 6	Gamm
017	03.36	3A1346+259	13 46 48	+26 51 27	100	13 80	Perola
018	11.55	TT Ari	02 03 03	+14 55 18	95	7 22	Beuermann

Day (85)	Time	Target	RA	Dec	SAA	Duration h m	Principal Investigator
020	02.55	2A1219+305	12 19 01	+30 29 08	122	2 34	Warwick
023	13.27	A1837	13 59 17	-10 54 27	91	5 18	McKechnie
023	22.06	HO323+022	03 23 33	+02 11 52	105	8 0	Bradt
024	17.26	HO452+51B	05 00 21	+51 58 27	128	2 61	Tuohy
025	00.48	HO323+022	03 23 33	+02 11 52	104	5 18	Bradt
025	07.45	0235+164	02 35 58	+16 21 30	96	5 56	McHardy
025	14.44	NRAO 140	03 33 14	+32 06 45	111	18 19	Marscher
029	09.24	2A1219+305	12 18 52	+30 27 14	130	4 23	Warwick
029	16.45	GL 569	14 52 17	+16 19 16	93	2 55	De Korte
034	11.56	3A1239-59	12 39 27	-59 54 50	92	8 28	Trümper
035	01.48	1308+326	13 08 14	+32 39 10	123	2 0	McHardy
035	07.50	PKS0537-441	05 37 21	-44 06 47	102	3 54	Mushotzky
035	15.17	MKN 478	14 40 13	+35 41 06	105	5 43	Bergeron
035	22.15	MK 464	13 53 52	+38 51 06	115	6 19	Bell-Burnell
038	06.40	IH0628-609	06 29 28	-61 05 06	96	9 25	Schwartz
039	22.09	0317+18	03 16 53	+18 32 55	92	4 55	Maccagni
040	04.56	4U0404+47	04 03 47	+47 38 23	106	3 23	Van Paradijs
040	10.48	4U0322+59	03 22 20	+59 30 42	101	2 57	Van Paradijs
040	17.58	GL 494	12 59 49	+12 40 16	129	2 31	De Korte
040	23.00	GL 526	13 43 26	+15 10 33	119	2 50	Schmitt
042	01.35	PK303+40.1	12 51 10	-22 35 09	119	3 45	De Korte
042	19.18	1323-62	13 23 27	-61 47 48	92	35 52	Van der Klis
044	23.35	3C120	04 29 52	+05 12 57	101	5 56	Pounds
048	20.18	IH0422-086	04 23 12	-08 44 17	93	2 2	Schwartz
053	18.38	NGC3783	11 36 45	-37 28 43	129	5 24	Bell-Burnell
056	03.00	Sco X-1	16 17 05	-15 31 14	90	10 52	Priedhorsky
057	22.20	Abell 7	05 00 46	-15 42 26	93	3 6	Wolf-Mathies
060	03.50	2S1417-624	14 17 45	-62 17 45	99	4 12	Corbet
061	09.13	HD 129791	14 46 10	-44 50 48	105	6 24	Gahm
062	14.41	PG 1711+336	17 11 15	+33 36 44	93	4 65	Rosen
062	23.24	HD 109387	12 31 07	+70 06 14	114	3 23	Henrichs
067	01.56	WOLF 63AB	16 53 09	-07 56 04	93	11 50	Johnson
067	15.05	IH 1653-062	16 52 44	-06 22 19	94	5 37	Schwartz
068	10.50	A2052	15 14 26	-07 13 44	120	16 26	Mushotzky
070	16.55	IH1622-751	16 17 07	-75 06 58	90	3 22	Schwartz
070	21.17	HD 147584	16 23 33	-69 57 19	91	9 9	Pallavicini
072	09.10	G327.4+0.4	15 44 16	-53 25 32	102	6 26	Jones
073	03.49	TERZAN 2	17 24 28	-30 43 29	90	11 11	Belle
073	16.48	CTB37A/B	17 11 09	-38 13 53	93	4 41	Bedford
074	00.12	4U1700+24	17 04 24	+24 04 31	98	10 57	Frontera
076	12.50	MKN 86	08 09 25	+46 07 28	114	6 17	Loose
077	01.36	MCG 8-11-11	05 50 57	+46 23 06	91	4 10	Maraschi
078	21.30	Her X-1	16 56 11	+35 27 32	102	8 7	Voges
082	00.16	4U1758-20	17 58 39	-20 30 02	92	10 7	Kahn
082	11.16	G6.5-0.1	17 57 54	-23 18 35	92	6 16	Jones
082	19.25	COD-38 10980	16 20 21	-39 05 28	111	3 18	Heise
083	22.00	4U 1744-26	17 44 56	-26 30 33	97	6 52	Turner

Day (85)	Time	Target	RA	Dec	SAA	Duration h m	Principal Investigator
087	06.03	LMC X-1	05 39 43	-69 47 51	88	11 14	Ilovaisky
088	17.02	2S1642-455	16 42 22	-45 29 23	111	11 58	Turner
089	07.54	RCW86	14 39 22	-62 04 55	117	13 1	Bleeker
090	03.30	OA01653-40	16 57 26	-41 33 01	110	10 11	Parmar
090	23.24	OA01653-40	16 57 28	-41 33 01	111	4 35	Parmar
091	16.46	Kepler SNR	17 27 49	-21 25 01	108	23 18	Peacock
092	19.24	V533 Her	18 12 32	+41 52 41	92	3 16	Lamb
093	16.35	MKN180	11 32 59	+70 26 32	103	2 55	McHardy
099	09.43	MKN501	16 52 6	+39 52 38	110	4 43	McHardy
102	23.48	HR6806	18 08 02	+38 29 37	98	11 18	Johnson
103	14.44	2S1742-294	17 43 03	-29 27 44	116	11 53	Turner
105	13.30	ESO 140-G43	18 40 32	-62 22 57	104	2 35	Molteni
106	11.23	1820-303	18 20 38	-30 21 20	111	12 6	Ponman
108	09.13	ESO 012-G21	00 38 48	-79 28 09	90	3 36	Molteni
108	16.24	X1745-203	17 46 03	-20 18 41	121	2 53	Ecran
114	18.05	Her X-1	16 56 03	+35 28 06	117	2 12	Voges
119	22.32	4U1758-25	17 58 14	-24 42 32	129	7 50	Van Paradijs

OUTSTANDING AO-1/AO-2 POINTINGS

AO-1 (9)

Target	Proposal No.	Comments
SC 0627-54	CLU F10	To be scheduled
3C345	AGN F50	TOO Status waiting for outburst
U Gem	LLX G17	" " " "
GX340+0	OCC G1	Occultation - on hold
GX349+2	OCC G4	" "
3C382	AGN G8	Scheduled - June 1985
3C273	AGN G16	Scheduled May 1985
PKS 1934-63	EXG F36	Scheduled Aug. 1985
G292.0+1.8	SNR F47	To be re-scheduled

AO-2 (43)

Target	Proposal No.	Comments
MKN464	AGN 007	Scheduled in June 1985
Decided by PI	AGN 024	
NGC 7172	AGN 036	Scheduled in June 1985
NGC 1808	AGN 057	To be scheduled
Abell 2235	CLU 006	" "
IH2032-358	MIS 011	" "
3A1006+475	MIS 011	" "
IH2158-602	MIS 011	" "
IH2236-372	MIS 011	Scheduled in May 1985
N63A	SNR 028	To be scheduled
G41.1-0.3	SNR 030	" "
G39.9+0.0	SNR 041	" "
OY Car	LLX 005	TOO status waiting for outburst
U Gem	LLX 105	TOO status waiting for outburst (2 observations)
GL 754	LLX 171	To be scheduled
3A1954+319	HLX 039	" "
AO538-66	HLX 053	TOO Status (5 observations)
NGC 6553	HLX 055	To be scheduled
AM Her	HLX 063	" " (2 observations)
AO535+26	HLX 154	" " Mar.86 (5 ")
2S1636-536	HLX 046	" " (partially completed)
Fornax	AGN 075	" " (partially completed)
NGC 5448	AGN 032	" " (4 observations)
1758-250	HLX 095	" " (AO2 extension)
Nova Muscae	LLX 162	" "
PK318+41.1	LLX 110	" "
IH0422-086	MIS 011	" "
Cyg X-1	HLX 044	" re-scheduled
H1615+09	MIS 019	" "
RCW 86	SNR 039	Partially complete to be scheduled

EXOSAT X-RAY SOURCES

'New' X-ray sources are discovered by EXOSAT serendipitously in the FOV of the telescope or in the offset quadrants of the ME or from an analysis of ME/GSPC 'background' data recorded during manoeuvres. We intend to maintain a list of published 'new' sources and readers are encouraged to report 'discoveries'.

It is recommended that the following convention be used when referring to EXOSAT sources in publications; in any case, this format will be adopted for any list maintained by the Observatory Team and is consistent with the recommendations referenced (below) and the Einstein HRI format.

Please note that this convention supercedes and renders obsolete the definition printed in Express issues 4 to 6.

EXOSAT Source Nomenclature

Source Position: RA 02H 30m 20.5s (1950)
DEC -02D 20m 33.2s

Name : EXO 023020-0220.5

EXO 074824-6737.4:	IAU Telegram No. 4039
EXO 184639-0307.5:	IAU Telegram No. 4051
EXO 174725-2124.7:	IAU Telegram No. 4058

Ref.(1) Dictionary of the Nomenclature of Celestial Objects
M.C. Lortet and F. Spite, Observatoire de Paris, Meudon

(2) IAU Sub-Group on Nomenclature Problems

IAU (EXOSAT) TELEGRAMS

Circular No.	Title	Comment	Authors
3841	Hercules X-1	Anomalous X-ray behaviour	EXOSAT Team
3842	Supernova in NGC 5236	Multi-waveband observations	W. Wamsteker
3850	GK Persei	351s periodicity during an outburst	M. Watson, A. Smith EXOSAT Team
3854	MXB 1730-335	Active, type 1 bursts	G. Pollard, N. White P. Barr, L. Stella
3858	4U 1543-45	Accurate position, ultra-soft spectrum	R. Blissett, EXOSAT Team
3872	GX 1+4	Unexpected low X-ray state: $\lesssim$ 4 UFU	R. Hall, J. Davelaar EXOSAT Team
3882	4U1755-33	Periodic dips in intensity	N. White, A. Parmar K. Mason
3887	4U2129+47 = V1727 Cygni	Unexpected low X-ray and optical state	W. Pietsch, H. Steinle M. Gottwald
3893	V0332+53	Accurate position, and flux	J. Davelaar, R. Blissett, L. Stella M. McKay, N. White, J. Bleeker
3902	V0332+53	Discovery of 4.4s period	L. Stella, N. White
3906	V0332+53	Unexpected brightening	A.N. Parmar R.J. Blissett T. Courvoisier L. Chiappetti
3912	V0332+53	Orbital parameters determination	N. White, J.Davelaar, A.N. Parmar, L. Stella M. van der Klis

Circular No.	Title	Comment	Authors
3923	Her X-1	Her X-1 'on' again at 80 Uhuru flux units, 1.24s pulsations (March 1.5 - 1.8)	J. Trümper, P. Kahabka H. Ögelmann, W. Pietsch, W. Voges, M. Gottwald, A. Parmar
3932	2S1254-690	Discovery of type 1 Burst and an absorption 'event'.	T. J.-L. Courvoisier, A. Peacock, M. Pakull
3935	AN URSAE MAJORIS	Serendipitous observation: soft X-ray flux suggests a return to the 'bright' state.	J.P. Osborne
3939	VW HYDRI	Discovery of X-ray pulsations during superoutburst	J. Heise, F. Paerels, H. van der Woerd
3952	2S1254-690	Discovery of a 3.9hr period in the X-ray light curve	T. J.-L. Courvoisier A. Parmar, A. Peacock
3961	4U1323-62	Type 1 Burst discovered	M. van der Klis, F.A. Jansen, J. van Paradijs, W.H.G. Lewin
3980	TV Columbae	X-ray periodicity discovered in range 1-7 keV.	A.C. Brinkman, J. Schrijver
3996	2S 0142+61	1456 sec Modulation of the X-ray flux	N.E. White, P. Giommi, A.N. Parmar, F.E. Marshall
4033	1E1402.3+0416	Rapid variability in BL Lac Objects.	P. Giommi, P. Barr
4038	PG0834-488	Detection of a hard X-ray flux	M.C. Cook
4039	EXO 0748-676	Discovery of a bright transient X-ray source which shows bursts, irregular intensity dips and periodic total eclipses	A.N. Parmar, N.E. White, P. Giommi F. Haberl.
4043	GX 5-1	Quasi periodic oscillation in the 1-10 keV flux	M. van der Klis, F. Jansen, J. van Paradijs, W. Lewin, J. Trümper, M. Sztajno
4044	4U 1323-62	Periodic dips in the 1-10 keV flux	M. van der Klis, A. Parmar, J. van Paradijs, F. Jansen, W. Lewin
4044	NGC 3031	Flux increases and variablity in the 0.1-6 keV range	P. Barr, P. Giommi

Circular No	Title	Comment	Authors
4049	RS OPHIUCHI	Intense X-ray emission detected; spectrum soft & absorbed.	F.A. Cordova, K.O. Mason, M.F. Bode, P. Barr
4051	EXO 1846-031	Detection of a new bright X-ray transient; non-variable flux .2 Crab.	A.N. Parmar, N.E.White
4051	4U1624-49	Periodic intensity dips discovered in the 2-10 keV flux.	M.G. Watson, R. Willingale, R. King I.E. Grindlay, J. Halpern
4054	NGC 4051	Quasi-periodic flux variations observed.	A. Lawrence, M. Elvis K. Pounds, M. Watson
4057	EXO 0748-676	Still active at 0.01 Crab - 21 type I bursts in total.	A.N. Parmar, M. Gottwald, F.Haberl N.E. White
4058	EXO 1747-214	New transient X-ray source Intensity 0.07 Crab, Type I bursts seen.	A.N. Parmar, N.E.White P. Giommi, L. Stella M. Sweeney

RECENT EXOSAT Preprint List

This list of recent EXOSAT preprints refers to all papers, with an Observatory Team member as author, which have been accepted for publication. Once the paper is published in the literature, it will be removed from this list. Note that the first three papers have already been published and are included here for the sake of completeness only.

1. The Discovery of an extended X-ray Low State from Hercules X-1
   Parmar, A.N., Pietsch, W., McKechnie, S., White, N.E., Trümper, J., Voges, W., Barr, P.

2. The Discovery of 4.4s X-ray pulsations from the rapidly variable X-ray transient V0332+53.
   Stella, L., White, N.E., Davelaar, J., Parmar, A.N., Blissett, R.J., Van der Klis, M.

3. EXOSAT observations of intermediate polars. Preliminary Results.
   Osborne, J., Mason, K.O., Rosen, S., Bonnet-Bidaud, J.M., Beuermann, K.

4. The Structure of Low-Mass X-ray Binaries.
   White, N.E., Mason, K.

5. The Contributions of the EXOSAT Observatory to the 18th ESLAB Symposium.
   Observatory Team.

6. The identification of H2311+77 with HD220140: A probable RS CVn.
   Pravdo, S., White, N.E., Giommi, P.

7. EXOSAT Observations of broad Iron-K line emission from Sco X-1.
   White, N.E., Peacock, A., Taylor, B.G.

Copies of these preprints are available on request to the Observatory Secretary.

EXOSAT BIBLIOGRAPHY

Hardware (Pre-launch)

A simple method of obtaining high background rejection in large area proportional counters. Bailey, T.A., Smith, A., and Turner, M.J.L., Nucl. Instrum. and Methods 115, 177 (1978).

Efficiency and resolution measurements of gratings between 7.1 and 304 Angstroms. Brinkman, A.C., Dijkstra, J.H., Geerlings, W.F.P.A.L., van Rooijen, F.A., Timmermann, C., and Korte, P.A.J., de., Appl. Opt. 19, 1601 (1980).

X-ray scattering from epoxy replica surfaces. Korte, P.A.J., de., SPIE Proceedings Space Optics - Imaging X-ray Optics Workshop 184, 189 (1979).

The X-ray imaging telescopes on EXOSAT. Korte, P.A.J., de, Bleeker, J.A.M., den Boggende, A.J.F., Branduardi-Raymont, G., Brinkman, A.C., Culhane, J.L., Gronenschild, E.H.B.M., Mason, I. and McKechnie, S.P., Space.Sci.Rev. 30, 495 (1981).

X-ray imaging telescope on EXOSAT. Lainé, R., Giralt, R., Zobl, R., Korte, P.A.J., de and Bleeker, J.A.M., SPIE Proceedings Space Optics - Imaging X-ray Optics Workshop 184, 181 (1979).

The gas scintillation proportional counter on EXOSAT. Peacock,A., Andresen, R.D., Manzo, G., Taylor, B.G., Re, S., Ives, J.C., and Kellock, S., Space.Sci.Rev. 30, 525 (1981).

The parallel-plate imaging proportional counter and its performance with different gas mixtures. Sanford, P.W., Mason, I.M., Dimmock, K. and Ives, J.C., IEEE Trans.Nucl.Sci., NS-26 (1) 169 (1979).

The EXOSAT Mision. Taylor, B.G., Andresen, R.D., Peacock, A. and Zobl, R., Space.Sci.Rev. 30, 479 (1981).

The Medium Energy Instrument on EXOSAT. Turner, M.J.L., Smith,A., and Zimmermann, H.U., Space.Sci.Rev. 30, 513 (1981).

High Luminosity X-ray sources (HLX)

Spectral and temporal features in bursts from 2S1636-536 observed with EXOSAT. Turner, M.J.L. and Breedon, L.M., MNRAS (1984), 208, 29p.

Evidence for 4.4 hour periodic dips in the X-ray flux from 4U1755-33. White, N.E., Parmar, A.N., Sztajno, M., Zimmermann, H.U., Mason, K.O., Kahn, S.M. Ap.J., 238, L9-12, 1984.

An extended X-ray low state from Hercules X-1. Parmar, A.N., Pietsch, W., McKechnie, S., White, N.E., Trümper,J. Voges, W., Barr, P. Nature 313 (1985), 119.

The Discovery of 4.4 second X-ray pulsations from the rapidly variable X-ray transient V0332+53. Stella, L., White, N.E. Davelaar, J., Parmar, A.N., Blissett, R.J., and van der Klis, M. Ap.J., 288, L45-49 (1985).

Transient quasi-periodic oscillations in the X-ray flux of Cygnus X-3. Van der Klis, M., Jansen, F.A. Nature 313 (1985), p.768-770.

Evidence for variation in the phase-dependent ionisation structure of the stellar wind in VELA X-1. Van der Klis, M., Hammerschlag-Hensberg, G. Proc. 4th European IUE Conference 15-18 May 1985, Rome. ESA SP(218), 443.

Spectral Studies of Low Mass X-ray Binaries Observed by EXOSAT. Sztanjno, M., Trümper, J,. & Langmeier. A., Proceedings Int. Symposium on X-ray Astronomy, Bologna, 1984, p.111.

Discovery of Regularities in the Cycle-to-Cycle Variability of Cygnus X-3. van der Klis, M., Jansen, F. Proceedings Int. Symposium on X-ray Astronomy, Bologna, 1984, p.115.

EXOSAT Observation of 4U1705-44. Langmeier, A., Sztajno, M., & Trümper, J. Proceedings Int. Symposium on X-ray Astronomy, Bologna, 1984, p.121.

EXOSAT Observations of 1636-536. Breedon, L.M., Turner, M.J.L. Proceedings Int. Symposium on X-ray Astronomy, Bologna, 1984, p.145.

Recent Results of EXOSAT observations of 2S1254-690. Courvosier, T. J.-L., Parmar, A.N., Peacock, A. Proceedings. Int. Symposium on X-ray Astronomy, Bologna, 1984, p.153.

Pulse Phase Spectroscopy of Her X-1 with EXOSAT. Kahabka, P., Pietsch, W., Trümper, J., Voges, W., Kendziorra, E., and Staubert, R. Proceedings Int. Symposium on X-ray Astronomy, Bologna, 1984, p.193.

EXOSAT Observations of the 35 days Intensity Variations of Her X-1. Oegelman, H., Kahabka, P., Pietsch., W., Trümper, W., Voges, W., Kendziorra, E, & Staubert, R. Proceedings Int. Symposium on X-ray Astronomy, Bologna, 1984, p.197.

EXOSAT Observations of 3A1954+319. Cook, M.C., Warwick, R.S., and Watson, M.G. Proceedings Int. Symposium on X-ray Astronomy, Bologna, 1984, p.225.

EXOSAT Observations of the X-ray Transient V0332+53. Davelaar,J., White, N.E., Parmar, A.N., Blissett, R.J., van der Klis, M., and Schrijver, H. Proceedings Int. Symposium on X-ray Astronomy, Bologna, 1984, p.235.

Observations of LMC X-3 with EXOSAT. Treves, A., Bonnet-Bidaud, J.M., Chiappetti, L., Maraschi, L., Stella, L., Tanzi, E.G., and van der Klis, M. Proceedings Int. Symposium on X-ray Astronomy, Bologna, 1984, p.259.

EXOSAT Observations of the Andromeda Nebula. McKechnie, S.P., Jansen, F.A., de Korte, P.A.J., Hulscher, F.W.H., van der Klis,M. Bleeker, J.A.M., and Mason, K.O. Proceedings Int. Symposium on X-ray Astronomy, Bologna, 1984, p.373.

Low Luminosity X-ray sources (LLX)

EXOSAT Observation of the candidate X-ray counterpart of Geminga.Caraveo, P.A., Bignami, G.F., Giommi, P., Mereghetti, S., and Paul, J.A., Nature 310, 481-483 (1984).

EXOSAT Observations of H2215-086: detection of the X-ray pulse period. Cook, M.C., Watson, M.G., McHardy, I.M. M.N.R.A.S (1984), 210, 7p.

Further Evidence on the Increasing One Minute Period in the X-ray Data of Geminga (1E0630+178). Bignami, G.F., Caraveo, P.A., and Salotti, L. Proceedings Int. Symposium on X-ray Astronomy, Bologna, 1984, p.209.

EXOSAT Observation of "Geminga". Caraveo, P., Bignami, G.F., and Mereghetti, S. Proceedings Int. Symposium on X-ray Astronomy, Bologna, 1984, p.213.

The detection of X-rays from Nova Muscae 1983 with the EXOSAT Satellite. Ögelman, H., Beuermann, K., Krautter, J., Ap.J., 287, L31-34, 1984.

EXOSAT soft X-ray Observations of EX HYDRAE. Cordova, F.A., Mason, K.O., Kahn, S.M. M.N.R.A.S. (1985), 212, 447-461.

An X-ray corona in SS Cygni. King, A.R., Watson, M.G., Heise, J. Nature 313 (1985), p.290-291.

The old Nova GK Per: discovery of the X-ray pulse period. Watson, M.G., King, A.R., Osborne, J. M.N.R.A.S. (1985), 212, 917-930.

Preliminary results of co-ordinated optical UV and X-ray observations of magnetic white dwarfs in binaries. Maraschi, L., Beuermann, K., Bonnet-Bidaud, J.M., Charles, P.A., Chiappetti, L. Hammerschlag, G., Howarth, I., Motch, C., Mouchet, M., Osborne,J. Stella, L., Treves, A., Van Paradijs, J., Willis, A.J., Wilson,R. Proc. 4th European IUE Conference 15-18 May 1985, Rome. ESA SP(218), 427.

EXOSAT hard X-ray observations of EX Hydrae. Beuermann, K., and Osborne, J. Proceedings, Int. Symposium on X-ray Astronomy, Bologna, 1984. p.23.

X-ray observations of the AM Her Star CW1103+254. Beuermann, K., Stella, L., and Krautter, J. Proceedings, Int. Symposium on X-ray Astronomy, Bologna, 1984. p.27.

EXOSAT Observations of late-type stars: Preliminary Results. Landini, M., Monsignori-Fossi, B.C., and Pallavicini, R. Proceedings, Int. Symposium on X-ray Astronomy, Bologna, 1984. p.31.

X-ray Emission from the Planetary Nebulae NGC 1360. de Korte, P.A.J., Claas, J.J., Jansen, F.A., McKechnie, S.P. Proceedings, Int. Symposium on X-ray Astronomy, Bologna, 1984. p.35.

The soft X-ray superoutburst of VW Hydri: 14 second periodicity. van der Woerd, H., Heise, J., and Paerels, F. Proceedings, Int. Symposium on X-ray Astronomy, Bologna, 1984. p.55.

EXOSAT Observations of Am Her objects: Preliminars Results. Osborne, J., Maraschi, L., Beuermann, K., Bonnet-Bidaud, J.M., Charles, P.A., Chiappetti, L., Motch, C., Mouchet, M., Tanzi, E.G., Treves, A., and Mason, K.O. Proceedings, Int. Symposium on X-ray Astronomy, Bologna, 1984. p.59.

EXOSAT observations of Intermediate Polars: Preliminary Results. Osborne, J., Mason, K.O., Bonnet-Bidaud, J.M., Beuermann, K., and Rosen, S. Proceedings, Int. Symposium on X-ray Astronomy, Bologna, 1984. p.63.

Simultaneous EXOSAT and optical observations of the pulsing X-ray binary H2252-035/AO Psc. Pietsch, W., Pakull, M., Tjemkes, S., Voges, W., Kendziorra, E., and van Paradijs, J. Proceedings, Int. Symposium on X-ray Astronomy, Bologna, 1984. p.67.

Active Galactic Nuclei (AGN)

EXOSAT Observations of Active Galactic Nuclei. Branduardi-Raymont G. MPE Report 184. X-ray and UV Emission from Active Galactic Nuclei. October 1984, p.88.

EXO1102.8+2539, an X-ray Variable AGN. Beuermann, K. MPE Report 1984. X-ray and UV Emission from Active Galactic Nuclei. October 1984, p.111.

Multi-frequency observations of active galactic nuclei. Tanzi, E.G., Chiappetti, L., Danziger, J., Palomo, R., Maccagni, D., Maraschi, L., Treves, A., Wamsteker, W. Proc. 4th European IUE Conference 15-18 May 1985, Rome. ESA SP(218), 111.

X-ray timing and spectral observations of active galactic nuclei. McHardy, I.M. Proceedings: 'Non-thermal and very high temperature phenomenan in X-ray Astronomy, Rome, 1983. p.117.

EXOSAT Observations of Active Galactic Nuclei. Pounds, K.A., McHardy, I.M., Stewart, G., and Warwick, R.S. Proceedings Int. Symposium on X-ray Astronomy, Bologna, 1984. p.409.

EXOSAT Observations of Three Bright BL Lac objects. Warwick, R.S. McHardy, I.M., Pounds, K.A. Proceedings Int. Symposium on X-ray Astronomy, Bologna, 1984. p.467.

IUE-EXOSAT Observations of NGC 4151. Perola, G.C., Altmore, A., Boksenberg, A., Bromage, G.E., Clavel, J., Elvius, A., Penson, M.V., Pettini, M., Piro, L., Snijders, M.A.J., Tarenghi, M., and Ulrich, M.H. Proceedings Int. Symposium on X-ray Astronomy, Bologna, 1984. p.475.

The Soft X-ray emission from ON 235 and MK766. Maccagni, D., Garilli, B., Rampini, A., Chiappetti, L., & Giommi, P. Proceedings Int. Symposium on X-ray Astronomy, Bologna, 1984. p.479.

Supernova Remnants (SNR)

X-ray spectra of Supernova Remnants: observations in continuum and lines. Bleeker, J.A.M. Proceedings: 'Non-thermal and very high temperature phenomenon in X-ray Atronomy, ROME, 1983, p.77.

The X-ray structure of the Crab Nebula. Aschenbach, B., Brinkmann, W., Langmeier, A., Hasinger, G., and Bork, T. Proceedings, Int. Symposium on X-ray Astronomy, Bologna, 1984. p.302.

EXOSAT Observations of SN 1006. Jones, L.R., Pye, J.P., Culhane, J.L. Proceedings, Int. Symposium on X-ray Astronomy, Bologna, 1984. p.305.

Recent results on the Crab pulsar X-ray light curve. Hasinger, G. Proceedings, Int. Symposium on X-ray Astronomy, Bologna, 1984. p.321.

EXOSAT observations of the Supernova Remnant Cas A. Jansen, F.A., McKechnie, S.P., de Korte, P.A.J., Bleeker, J.A.M., Gronenschild, E., Peacock, A., Manzo, G., Branduardi-Raymont, G., & Kellett, B. Proceedings, Int. Symposium on X-ray Astronomy, Bologna, 1984. p.289.

General

First Results from the X-ray Satellite EXOSAT. Biermann, P., Mitteilungen der Astronomischen Gesellschaft Nr. 62, p.101-121, 1984 (Minden 1984).

NB: Reprints are obtainable from authors in the usual way.

A COMMENTARY ON SOME PRESENTATIONS AT THE ESA WORKSHOP 'RECENT RESULTS ON CATACLYSMIC VARIABLES' REMEIS OBSERVATORY; BAMBERG, APRIL 1985

The session on magnetic catacylsmic variables opened with invited talks by A. King (Leicester) and J. Bailey (N.S.W. Australia). A. King pointed out that most AM Her objects have orbital periods shorter than the 2-3 hour period gap, whereas the opposite is true for the intermediate polars. These latter systems evolve through the period gap, which is caused by an episode of low accretion rate during a transition between orbit decay mechanisms, to become AM Her objects. Thus the magnetic fields of AM Her objects as a class must be similar to those of the intermediate polars. The fact that there are virtually no intermediate polars below the period gap suggests that weakly magnetic accreting white dwarfs do not exist, in agreement with the observed distribution of isolated white dwarf magnetic fields.

The EXOSAT X-ray light curve of EX Hya was discussed. This intermediate polar shows a quasi-sinusoidal orbital variation in soft X-rays but very little variation in hard X-rays except for a brief partial eclipse (also seen in soft X-rays). An explanation was proposed in terms of an X-ray shock at the point where the accretion stream hits the magnetosphere (and no real accretion disk formation). The soft X-ray variation is caused by absorption in the material outside the magnetosphere. Both the partial X-ray eclipse of EX Hya and the two component X-ray spectrum of these objects can be explained by the 2 X-ray emission regions.

J. Bailey discussed the sources of luminosity seen in the UV/optical/IR wavelengths from AM Her objects, with particular emphasis on cyclotron radiation. This may be emitted from either the shock region or the cooler, larger pre-shock region. The cyclotron radiation is predominantly at high harmonics, the plasma being optically thick in the IR and becoming thin in the visible. Emission variations with temperature, wavelength and viewing angle cause complex variations in the light curves of these objects. Modelling of optical cyclotron spectra requires a high temperature emission region, which suggests the shock as the site of emission.

Non-cyclotron radiation also contributes to the flux in these wavelength ranges. In particular, measurements of ellipsoidal light variations in the IR lead to the determination of the orbital period (almost all other techniques refer to the rotation of the white dwarf). The white dwarf photosphere and reprocessed X-rays illuminating the accretion stream may contribute to the optical and UV flux.

J. Heise (Utrecht) reported EXOSAT observations of a change in the soft and hard X-ray light curves of AM Her which occurred during a low state and persisted for a few months. An explanation was given in terms of 2 pole accretion, transitions from 1 to 2 pole accretion being possible because of the 60° azimuthal angle of the pole to the red dwarf.

J. van Paradijs (Amsterdam) reported determinations of the rate of change of the spin period of the intermediate polar H2252-035 which, when applied to the theory of torques on accreting magnetic degenerate stars, implies a magnetic field only 10% of that seen in the AM Her objects. A similar situation exists for EX Hya and DQ Her.

J. Osborne (EXOSAT Observatory), J. Bonnet-Bidaud (Saclay) and M. Watson (Leicester) reported respectively on EXOSAT observations of the AM Her objects E2003+225, E1405-451, 2A0311-227. E2003+225 has been observed using the transmission grating to provide only the second precise temperature determination of the soft X-ray blackbody component of an AM Her object. The relatively faint hard X-ray flux cannot be explained by radiatively cooled accretion column models.

The observed hard X-ray modulation of E1405-451 is difficult to understand if there is only one accretion pole, since this is always in the hemisphere facing the observer. Possibly there exists one pole emitting predominantly hard X-rays and one pole soft X-rays. Short term period changes are seen in this source ($\Delta\phi = .1$), although the period is stable over the longer term. The soft X-ray light curve of 2A0311-227 was shown to be similar to that in hard X-rays (apart from a dip at $\phi = 0.4$ due to the accretion column), the main differences being phase stable dips in soft X-rays which might be caused by a few x 10^{21} cm^{-2} of absorbing matter.

A. Schwope (Berlin) reported low state observations of the AM Her object H0139-68. The soft X-ray light curve, double peaked in the high state, had become single-peaked. Zeeman-Balmer absorption features were used to calculate a magnetic field of 39 MGauss.

The session on low mass X-ray binaries started with a review by N. White (EXOSAT Observatory) on the properties of low mass X-ray binaries, particularly in respect of the spectral characteristics of this class of sources and their interpretation in the framework of models of an accretion via a disk onto a weakly magnetised neutron star. He also discussed the distribution of orbital periods in these systems. EXOSAT has recently discovered 5 new "dipping" X-ray sources, which have given further insights into the structure of the outer regions of accretion disks.

First results on an exciting new X-ray transient EXO 0748-676 were presented by A. Parmar (ESOC). This source was discovered serendipitously during an EXOSAT manoeuvre and exhibits X-ray

dips, eclipses and bursts. The eclipses which last for 8 min 20 sec and recur with a period of 3.8 hr are not total suggesting that there is also a region of extended emission in the system. The dips are associated with an increase in low energy absorption. 24 bursts have been observed from EXO 0748-676 including 3 pairs of double bursts - type I bursts occurring within 20 minutes of each other.

J. van Paradijs discussed EXOSAT observations of the time variability of the bright galactic bulge source GX5-1 which led to the discovery of quasiperiodic pulsations in the period range of 25 to 50 ms. A clear correlation of the centroid frequency with source intensity was found. He presented a model in which the quasiperiodic pulsations arise at the magnetospheric boundary of a fast rotating magnetised neutron star (period $\sim$ 6 ms), with the observed range of periods reflecting the difference between the local Keplerian period and the rotation period of the magnetised neutron star.

One of the long-outstanding problems in the study of binary X-ray source constancy has been to explain the 35 day period of Her X-1. Most of the models to date have used a precessing accretion disk surrounding the neutron star to provide the intensity modulation although it is not at all clear whether an accretion disk could act as a solid body and precess. However, recent EXOSAT observations, discussed by J. Trümper (MPI) may lead to an explanation of the mechanism responsible for the 35 day modulation. The EXOSAT observations show that the X-ray pulse profile changes during the 35 day cycle suggesting that the neutron star itself is precessing. The MPI group propose that a co-precessing centrifugally-supported ring, located close to the magnetospheric boundary, produces the observed intensity variation.

G. Hasinger (MPI Garching) described results of two EXOSAT observations of Cyg X-2 during which the source displayed two distinct modes of intensity-correlated spectral changes. The source spectrum together with the spectral variations was discussed on the basis of a model consisting of an unsaturated Compton spectrum and a blackbody spectrum.

L. Stella (EXOSAT Observatory) presented the results of an EXOSAT observation of the bright galactic bulge source GX13+1. Analysis of the data gave a precise characterisation of the source spectrum and led to the discovery of a bimodal behaviour in its intensity-correlated spectral changes, the transition between the two modes occurring on timescales of hours. An autocorrelation function analysis technique revealed also the presence of Cyg X-1 like aperiodic activity in GX13+1 on characteristic timescales of $\sim$ 1s.

J. Osborne
A. Parmar
L. Stella

ERROR BOX SEARCH

The approved AO-3 programme does not contain any proposals which involve error box searches as a dedicated programme. This is for two reasons. First, performing such observations with a three axis stabilised spacecraft is very expensive in terms of both time and manoeuvre fuel. Typical manoeuvres are 3-6 hours and exposure generally about 3 hours. Attention is drawn to the current status on fuel usage (ref. p.2) and remaining lifetime for EXOSAT to carry out its main mission objectives. Secondly, the ROSAT spacecraft to be launched in a few years will, in its all-sky survey, perform such source location far more efficiently, with similar angular resolution and a higher limiting sensitivity than that of the CMA.

It does however make sense to perform a limited number of error box observations with EXOSAT in order to allow follow-up observations during the remaining EXOSAT lifetime.

Ideal candidates have (i) error box size $<$ 1 degree in the largest dimension ie. within the central part of the CMA field of view, (ii) 2-6 keV count rate $>$ 1 UFU, to yield a detection plus some spectral information in the ME with high probability of detection in the CMA.

Approximately 60 candidates meet these requirements, some of which will be observed by EXOSAT when operational constraints allow and provided the associated fuel usage is minimal. The best position, error radius, CMA count rate (and where applicable, finding chart and ME spectral fits) will be published regularly in the EXOSAT Express.

P. Barr

ME DEAD TIME CONSIDERATIONS

Following a general survey of the EXOSAT instrumentation timing and dead time characteristics (Express No. 5, p.31) a number of discussions have taken place at the Data Analysis Workshop and elsewhere to try to resolve an outstanding discrepancy in the ME dead time correction factor and its functional form. All observatory software and analysis routines use an empirical effective sample rate to correct spectral counts to fluxes through the known dead times of the HK QEP counts. Although this method produces the 'correct' result, several users, notably C. Page at Leicester and A. Tennent at Cambridge, have pointed out that for certain high time resolution measurements precise knowledge of the factors contributing to the total loss is important. This note explores in more detail the predicted loss of events from sampling, inherent electronic dead times and subsidiary effects, which taken together give good agreement with the observational data.

Figure 1 shows the distribution of time tags (raw channel counts) of a sample of ME events (245760 - mainly background), selected on board according to valid E ($\equiv$ QEP) with a sample scheme of E, TT at 4K s^{-1} (sampling scheme eg. E, ID or E, ID, TT has no effect).

Note that the maximum time tag possible is 31, determined by sample interval/clock interval (244.1 μs/7.63 μs) and that the following contributions to overall dead time are evident.

a. loss of events from an expected flat random input signal because of the restriction of $\leqslant$ 1 event per sample interval (shaded area).

b. deficit of counts in channel 0 ($\sim$ 25% of expected counts).

c. deficit of counts in channels 26 ($\sim$ 10% loss), 27-30 (0 counts) appearing as an excess in channel 31, the maximum time tag possible for a 4K Hz sample rate.

Simple Poisson statistics give the dead time correction factor associated with (a).

$$f_a = MT\,(1-\exp[-MT])^{-1} \qquad (1)$$

where f_a = correction factor
M = true total qualified event rate
T = sample period.

M can be obtained with sufficient accuracy from the HK QEP counts, corrected for the electronic chain coincidence logic dead time for events > Emin (factor $\sim$ 1.005).

A fixed correction ($\sim$0.25 x TM clock period) must be added to account for the deficit in channel 0, representing the time between the sample pulse trailing edge and the reset ($\sim$2 x 1 MHz clock pulses - ref. figure 2). For a 4K Hz sample rate, 1.91 μs/ 244.1 μs gives approximately 0.8%, in fair agreement with the loss of 2200 events in an expected 269.000.

An analysis of figure 2 with respect to the assignment of chs.26, 27-30 time tags to channel 31, shows that these events must be at a time such that the reset pulse (after last sample pulse) occurs while the ADC conversion (33 μs) is in progress, that is within the period defined by X-ray events X_1 and X_2 (TT/QEP at t_1 and t_2). In these cases, the event is processed by the next sample cycle and is assigned a time tag of 31 (maximum). Because the current sample pulse does not process this data there is an effective extra dead time for these events only (fraction occurring in channels 26, 27-30) of 1 sample cycle. Thus the overall loss of data from this effect can be determined as the probability of the events occurring in channels 26, 27-30 having a second event within the time period of the next sample cycle.

Again from Poisson statistics, the dead time correction factor which accounts for (a), (b) and (c) can be determined as:

$$f_{TOT} = MT\left\{1-\exp[-MT'] - \exp[-M(T'-\tau)]\ (1-\exp[-M\tau])(1-\exp[-MT'])\right\} \qquad (2)$$

where f_{TOT} = total correction factor
τ = ADC conversion time (33 μs)
T' = $T-T_R$, T_R = 1.91 μs = 'sampling/reset' dead time

Table 1 shows the correction factor obtained from equations (1) (for sampling rates of 4096 Hz and 3569 Hz) and (2) for various housekeeping event rates. Note that the concept of an effective sampling rate is not totally invalid given the 'loss' of a sample cycle for the events of type (c) and in most cases equation (1) with an effective sample rate of 3569 Hz and the true count rate determined from the housekeeping count rate is a sufficiently precise approximation to the total dead time correction.

The best results are however obtained by using equation (2) as shown in table 2 which gives a comparison of the observed and predicted count rates of selected sources.

D. Andrews
L. Stella

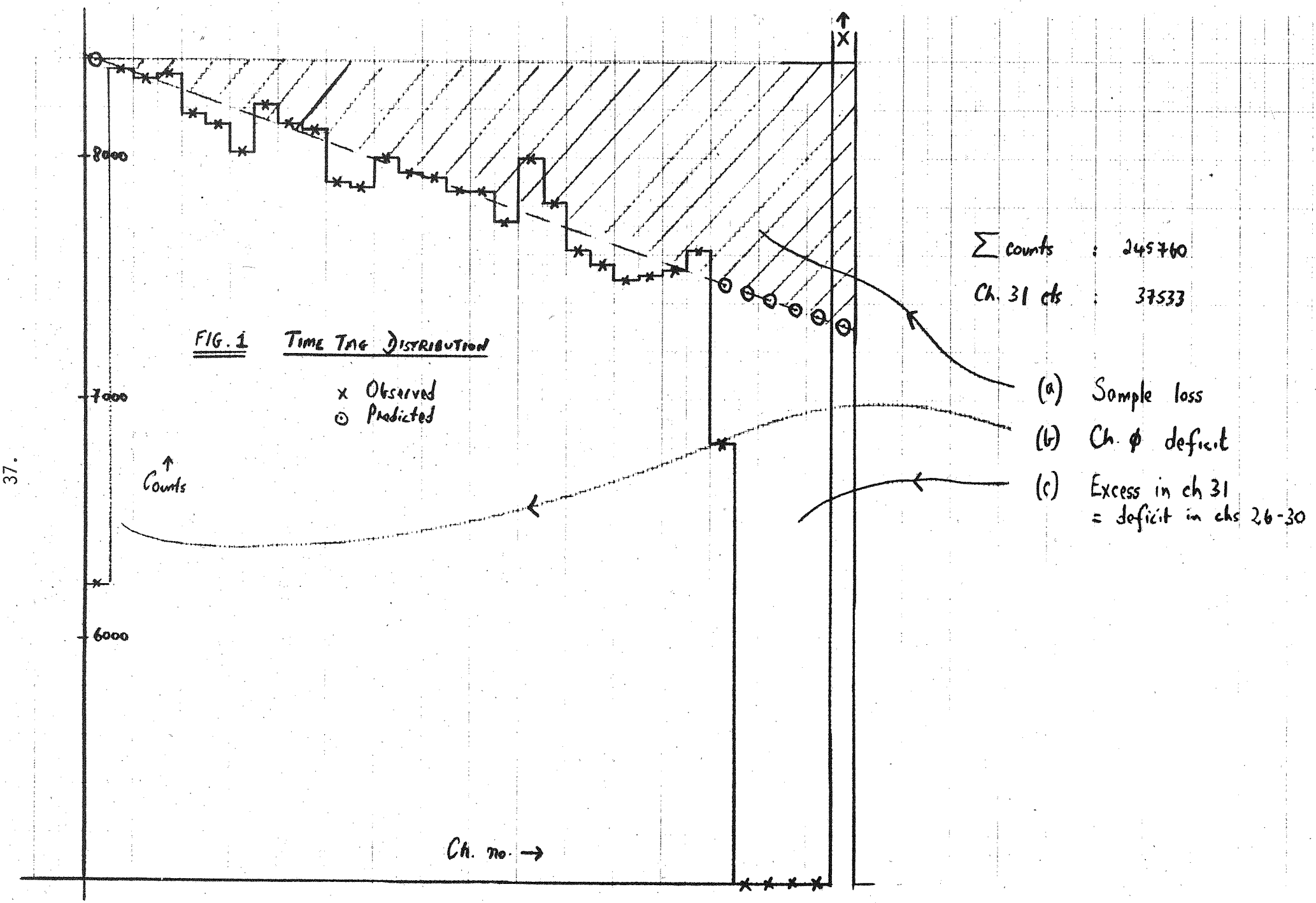


FIG. 1 TIME TAG DISTRIBUTION

FIG. 2 TIMING LOGIC

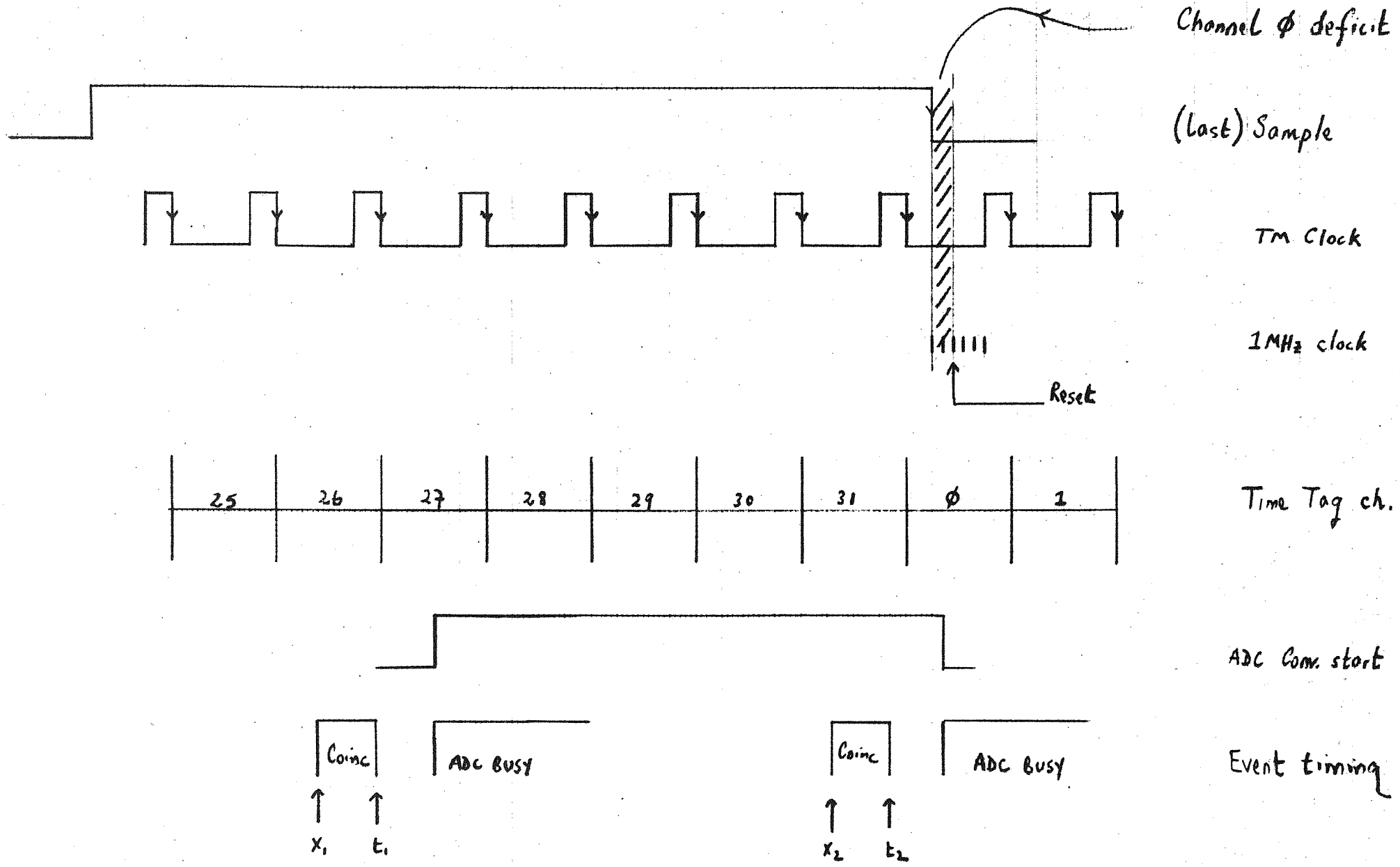


Table 1: Predicted dead time correction factors, for the various approximation described in the text.

H/K cts/s	Eq.(1) (4096)	Eq.(2)	Eq.(1) (3569)
500.	1.062	1.087	1.072
600.	1.075	1.102	1.086
700.	1.088	1.118	1.101
800.	1.101	1.134	1.116
900.	1.114	1.150	1.131
1000.	1.127	1.166	1.147
1200.	1.154	1.199	1.178
1400.	1.181	1.231	1.209
1600.	1.208	1.264	1.241
1800.	1.236	1.296	1.273
2000.	1.264	1.329	1.306
2300.	1.307	1.379	1.357
2600.	1.351	1.429	1.408
3000.	1.411	1.496	1.478
3300.	1.456	1.546	1.533
3600.	1.503	1.598	1.588
4000.	1.567	1.666	1.663
4300.	1.615	1.718	1.721
4600.	1.664	1.771	1.779
5000.	1.732	1.841	1.859

Table 2: Housekeeping and the observed count rates for selected X-ray sources are compared with the values predicted by Eq.(2).

HK cts/s	Observed cts/s	Predicted cts/s	Diff	%Diff
2736.1	1896.7	1894.6	-2.1	-.1
2885.9	1965.8	1964.3	-1.5	-.1
3203.6	2105.9	2104.2	-1.7	-.1
3692.6	2302.9	2300.1	-2.8	-.1
4348.6	2533.2	2531.0	-2.2	-.1
4873.0	2693.9	2692.9	-1.0	-.0
2752.8	1903.6	1902.5	-1.1	-.0
2272.8	1663.6	1662.2	-1.4	-.1
1604.9	1276.9	1275.7	-1.2	-.1
1089.9	927.8	927.6	-.2	-.0
762.7	678.5	679.3	.8	.1
583.9	533.1	533.5	.4	.1
359.1	338.1	339.1	1.0	.3

ME CALIBRATION AND UPDATES TO THE CCF

Introduction

Changes in both format and content of the ME CCF have been introduced and are incorporated on FOTs produced from about the end of April 1985. Users can identify the new CCF by layout numbers of 5 and 3 for data types CB and SD respectively. The only other data type to have been changed is type SU.

These changes reflect recent work on both the Ar and Xe detector calibrations. Fitting the combined Ar and Xe half 1 spectra for the 1984 day 318 Crab Nebula observation using the Observatory Interactive Analysis System gives a chisq. of 141 for 148 degrees of freedom (Figure 1), with the column density fixed at 3×10^{21} atoms/cm^2 and the power law slope at -2.1. 1% systematic uncertainties were included for both detectors. A normalisation figure of 9.53 and relative normalisation between the Ar and Xe detectors (a free parameter in the fitting) of 0.998 were determined. The improved Ar calibration results in residuals a factor of 2-4 smaller than in the previous calibration although the characteristic shape, a dip between 2-3 keV, is still present. For some unexplained reason detector E appears to give systematically larger residuals than the other detectors.

Changes to the Ar calibrations concern mainly the gain curves and their time dependence. The calibrations to date have assumed that the observed gain changes could be modelled as a change in the overall gain of each detector. Analysis of 6 Crab Nebula observations suggests that this is an oversimplification and that the amount of curvature, or non-linearity, is also time-dependent. To include this effect, the gain change parameters for both A1 and A2 are now included on the CCF.

The main change to the Xenon calibration is that an extra term has to be included in the Xenon resolution function, broadening the resolution by about 10% at 20 keV. This additional broadening, which was not present in the ground calibrations, is possibly caused by noise on the system power supplies. Its effect is expected to be considerably smaller for Ar. In addition there is evidence for a gradual decrease in overall gain of the Xe detectors, corresponding to a gain change of about 3.7% since launch. The change appears to be linear with time and occurs over the whole mission, except for detector A which exhibits an apparent change in gradient around 1984(85). Note that the Xe gain changes are in the opposite sense to Argon detector gain increases (ref. Express No.9, p.38).

Revised Record Layouts

Data Type CB

Words	Contents
1-128	As before
129-144	Ar Fiducial or Reference Times dets A to H.
145-160	Start Time 1 of Applicability for A1 change
161-176	" " 1 " " A2 "
177-184	A1 Gain change/day (*E-4) at Times T1 to T2.
185-192	A2 " " (*E-5) " " "
193-200	Amplifier Gain Settings at Fudicial Time
201-216	Start Time 2 of Applicability for A1 change
217-232	" " 2 " " A2 "
233-240	A1 Gain Change/day (*E-4) at Times T2
241-248	A2 " " (*E-5) " T2
249-384	Currently Blank
385-504	As words 129-248 but for Xe except that the units of the A1 and A2 change are E-7/day
505-768	Currently Blank
	Note that if Start Time 2 = 0 then the Gain Change parameters for Time 1 apply at all times.

Data Type SD

Words	Contents
1-128	Unchanged layout, Ar data
129-129	N1/0.01 for Xe Det. A Mode A
130-130	N2/0.01 " "
131-131	N3/1.E-4 " "
132-132	N4/1.E-5 " "
133-133	N5/0.01 " "
134-134	N6/0.01 " "
135-135	N7/1.E-4 " "
136-136	N8/1.E-2 " "
137-144	As above but for Mode B (The nominal)
145-160	As words 124-144 but for Det. B
161-176	" " " C
177-192	" " " D
193-208	" " " E
209-224	" " " F
225-240	" " " G
241-256	" " " H

How to use the Revised Calibrations

1. Xenon Resolution Function

The spectral distribution function for Ar is unchanged. For Xe it is now given by:

$$\frac{\text{Del.V}}{\text{V}} = \text{SQRT}\ (R^2+(N8x20/E)^2)$$

where E is energy in keV and R the original Resolution. See the FOTH ch. 3.7.2.6, ie:

$R=N1/10+N2/100/E+N3/1.E4xE+N4/1.E5xE^2$ $\quad E < N5/100$
$R=N6/100+N7/1.E4xE$ $\quad E > N5/100$

The values of N1 through N8 are given in the CCF record type SD.

2. Xenon Gain Coefficients

The Xe gain coefficients at time t can be determined using the following relations where T2 is the start of applicability of the second set of gain change parameters, T_{fud} is the Fiducial time, DEL(T) the gain change per/day at time interval T, and A2 the gain coefficient.

```
DX = 0.0
IF  (t.GT.T2.AND.T2.NE.0) then
     DX = (t-T2)*DEL(T2)
     t=T2
ENDIF
TX = t-T1
DG = TX*DEL(T1)+DX
A2 = A2/(DG*1.0)
```

A2 must be corrected for any difference in digital amplifier settings (DGAIN) between the observation time and the fiducial time (see Express No. 6, p.25). The values of DGAIN can be obtained from the Memory Load Commands in the observation directory.

```
GAIN = (DGAIN-200)*0.004+1.0
R = GAIN(t)/GAIN(Tfud)
```

and

```
A2 = A2/R
```

This relation differs from that given earlier for Ar since the Ar gain coefficients give channel boundaries for a given energy whereas the Xe coefficients give the reverse. The relation between energy and channel number (k between 1 and 128) is given by (FOTH Ch. 3.7.2.5):

$E = A1/100+A2*K+A3*K^2/1.E6+A4*K^3/1.E8$

Note that the Xe gain relation is actually linear since A1, A3 and A4 are all zero!

3. Argon Gain Coefficients

The CCF contains gain change parameters for coefficients A1 and A2. However rather than storing the values of A2 the values of $A2_{real}+A1*A4$ are actually stored since these are easier to determine. The gain relation is unchanged as (FOTH Ch. 3.7.2.5):

$mV = A1*(1.0-EXP(-A4*E))+A2*E*EXP(-A3*E)$

However the values of A2 stored on the CCF must first have the value of A4*A1 subtracted from them thus:

$A2_{real} = A2_{stored}-A1*A4$

Then the effect of the gain change with time can be calculated. Since T2=0 for all Ar detectors, the relation is:

$TX = T-T_{fud}$
$DG1 = TX*DEL1(T1)$
$DG2 = TX*DEL2(T1)$

$A1 = A1+DG1$
$A2_{real} = A2_{real}+DG2$
$A2 = A2_{real}-A4*A1$

Note that R has to be calculated as for Xe but is applied in the opposite sense since the gain coefficient relation is reversed. So finally:

$A1 = A1*R$
$A2 = A2*R$

Examples:

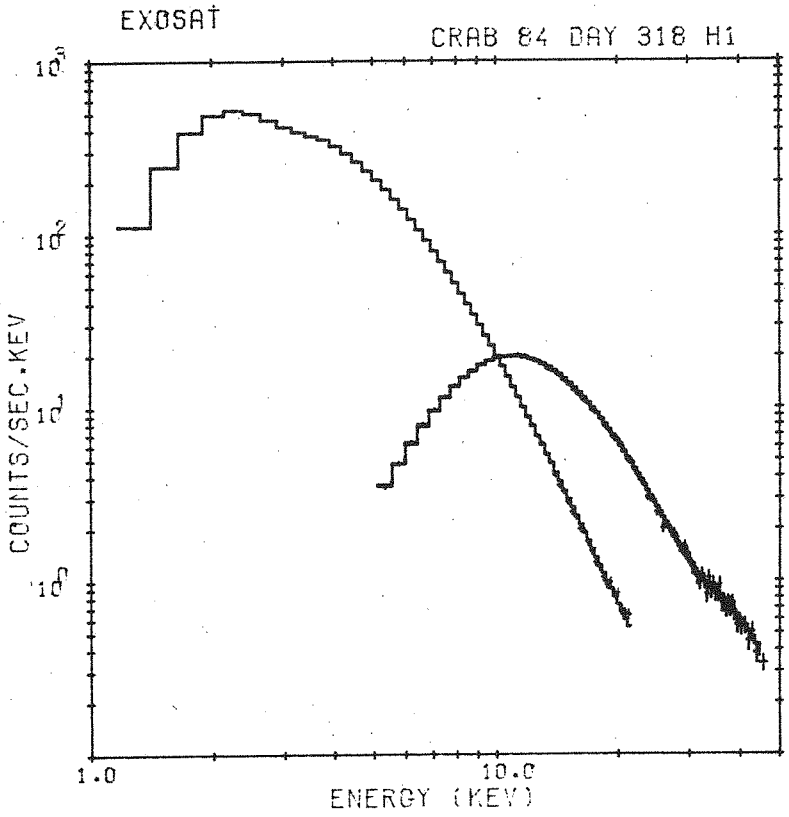
The following gives the gain parameters calculated using the Observatory Interactive Analysis system. For Detector D:

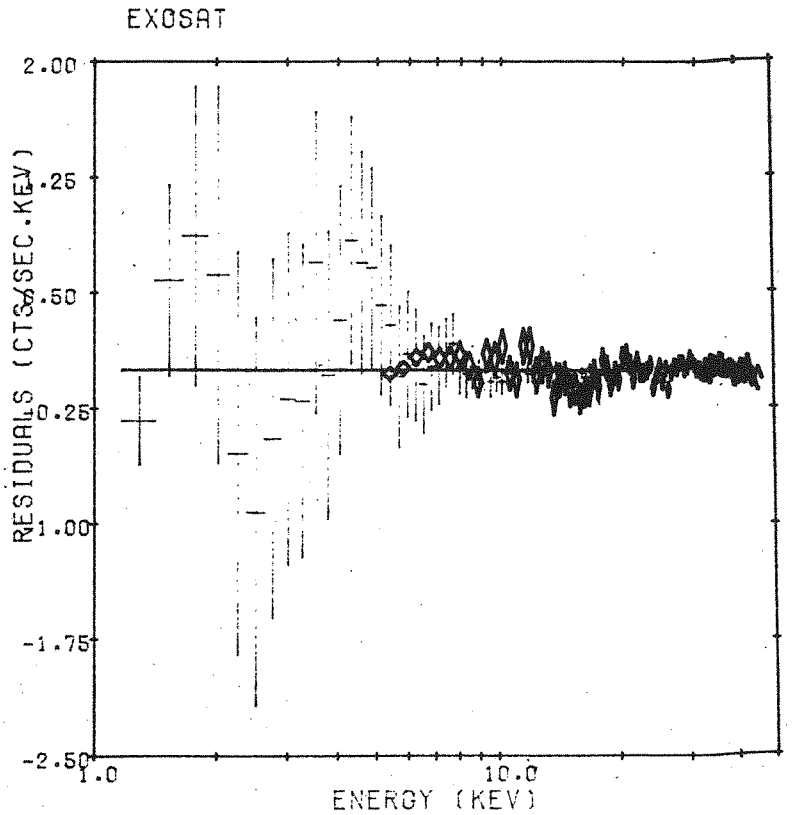
Date	Ar/Xe	DGAIN	A1	A2	A3	A4
84/086	Ar	252	748.25	15.544	0.0	0.05
84/086	Xe	193	0.0	0.4139	0.0	0.0
85/087	Ar	209	889.75	7.787	0.0	0.05
85/087	Xe	193	0.0	0.4318	0.0	0.0

A.N. Parmar
A. Smith

FIGURE 1.

ME data for experiment half 1 from the CRAB calibration observation (84/318). Observed Argon (1-20 keV) and Xenon (5-45 keV) spectra and differences between these and the 'best fit' model (Argon - crosses, Xenon - diamonds) are shown in the upper and lower diagrams respectively.





POINT RESPONSE WITH BORON FILTER

An apparent count rate deficiency has been evident in data for all observations carried out with the Boron filter (ref. Express No.8 p.31) and a clear explanation of the effect has now been established viz: the point spread function (PSF) is much wider because of scattering of the X-rays within the boron filter. This scattering is energy dependent and strongest at low energies. Figure 1 shows a comparison of the integral PSF for a number of point sources observed during the mission. Clearly, the PSF for HZ43, a soft X-ray emitter with kT $\sim$0.006 keV and low column density $\sim 10^{18}$ cm^{-2}, is so wide that an integration box size of $\sim$ 16 arcmin is necessary to retrieve all source photons. Her X-1 with a column density of $\sim 10^{20}$ cm^{-2}, shows the on-set of the effect in comparison with 7 harder and/or more cut-off sources, which comprise all strong sources ($\gtrsim$.3 cts/s) observed with the boron filter. Note that for these hard sources, the PSF is still wider than the PSF for a lexan filter measured in flight. All other filters have comparable PSF's to that of lexan.

Using a single integration box size for all filters, for example as for lexan, will thus give an underestimate of the source counts for observations with the boron filter. The onset of this effect at $\sim 10^{20}$ cm^{-2} is further illustrated in figure 2, which shows the ratio of predicted to measured boron filter count rates for a sample of bright AGN's. A photon spectral index of 1.7 was assumed and the corresponding N_H was found from the lexan/Al-Parylene count ratios. An increase of the count rate deviation at lower N_H is clearly visible. Note that this figure merely illustrates the energy dependence and cannot, because of the underlying assumptions, be regarded as a calibration.

In view of the above, we give some guidelines to aid the analysis of the boron filter data. Strong sources with good signal-to-noise ratio should be integrated with a large box size, which can be estimated from figure 1. Increasing the box size will indicate when the full source flux is collected. Source fluxes to an accuracy of $\sim$20% for a hard or highly cut-off ($N_H \gtrsim 10^{21}$ cm^{-2}) source can be found with a correction for the almost constant shape of the PSF (see figure 1). The CCF PSF is fairly representative in this case. For soft and/or fairly non-absorbed sources the CCF currently does not contain sufficient information to accurately process the data. The PSF as a function of energy has been calculated at the Space Research Lab. Leiden, using predictions of the scattering in the boron filter. This data is being implemented at ESOC. A comparison with in-flight calibration sources such as HZ43 will be carried out to validate the model data. Finally, the PSF for the boron filter will be updated in the CCF, probably in the form of the scattering data and an algorithm to construct the boron PSF for a given source spectrum.

J. Davelaar & P. Giommi

FIGURE 1.

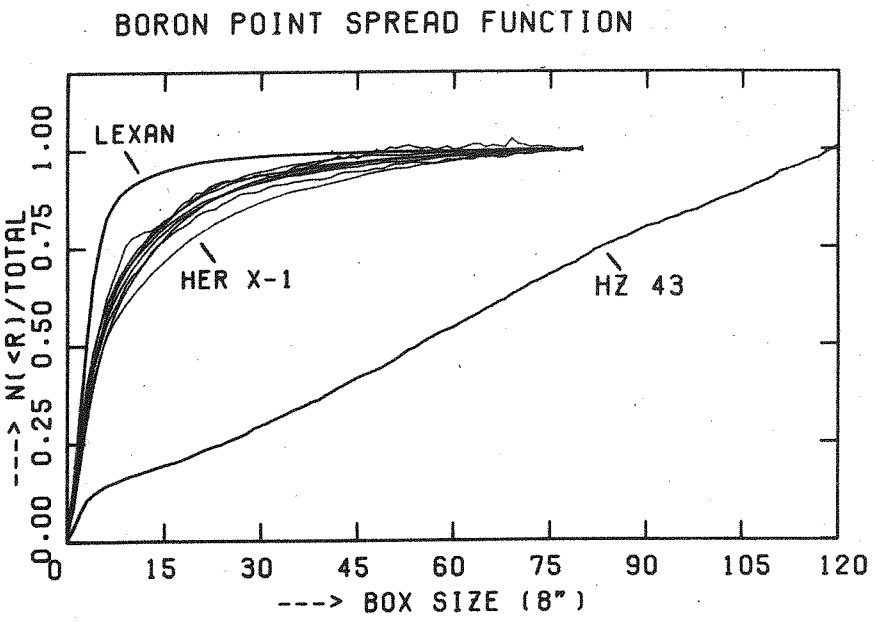
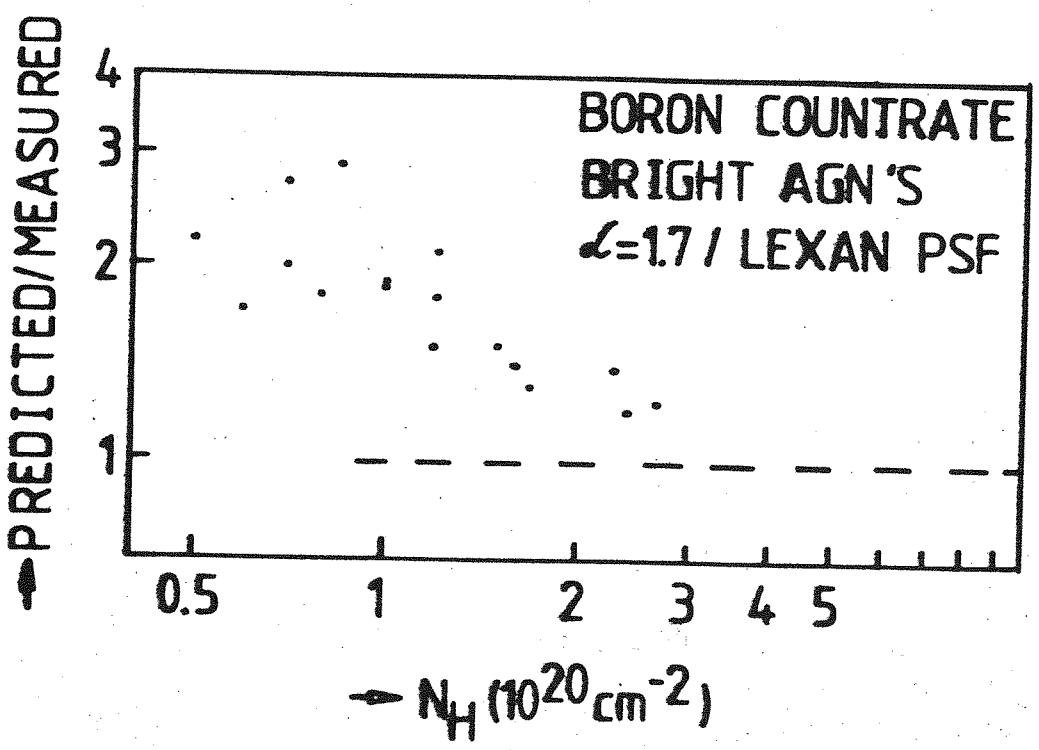


FIGURE 2.



NEW DEFINITION OF ARRAY POSITION MONITORS ON ME FOTs

The position monitors, bytes 30/31 of each ME observation directory record, give the orientations of the 2 array halves during the time period covered by that record. Any change in array orientation therefore constitutes an observation boundary. A few minutes' worth of data have sometimes been omitted from the FOT because of the many status changes associated with an array swap. A change in the FOT production software was implemented on April 1st 1985 to minimise the data loss:

a. bytes 78 and 85 of every ME observation directory record are set to binary zero (previously they contained the ME drive status).

b. each position monitor is set to binary zero, if all the Argon HT's for the corresponding array half are below their nominal values.

Change a. has no consequences for observers' analysis systems because these two bytes are irrelevant and should never be used by any software. Change b. has the consequence that the value zero (exactly) for a position monitor means "unknown and not useful". It does not mean any particular offset. If this change is introduced into institutes' FOT decoding software, then "backward compatibility" is assured for all FOTs generated before April 1985. There is no need for the analysis software to be aware of the FOT generation date.

In this note all byte offsets are counted from zero, for consistency with the FOT Handbook. Note that bytes 30 and 31 correspond to array halves 2 and 1 respectively.

J.R. Sternberg

SCIENTIFIC DATA SEQUENCER (SDS) REDEFINITION

A new set of 16 SDS configurations numbered 1 to 16 is specified. The table following this article shows the OBC modes and functions supported by each new SDS.

SDS1 is usually used for Electronic In-Flight Tests and the standard payload test comprising the diagnostic word spectra of the ME detectors (MDIAG), GSPC burst length spectra and standard CMA sum signal spectra.

SDS2 supports the standard OBC program configuration for weak sources (LDIR2, MHER4, MHTR3, GHEBL4)* as well as the higher time resolution ME programs MHER5 and MHER6. Indeed, for almost all observations, SDS2 is appropriate.

For sources with well-known periods, MPULS and MPULS2 provide folded spectra. These programs are supported by SDS 3,6,7,8 with SDS7 used when the highest sampling rate for MHTR3 is required.

MDIR is supported by all SDSs (except 2, 9 and 16) at different rates: 8, 4, 2 and 1 kHz giving time resolutions of 0.125, 0.25, 0.5 and 1 ms respectively.

The standard GSPC program GHEBL4 can be used with all SDSs except SDS1. For the alternative program GDIR sampling rates of 2k, 1k, 512 amd 128 Hz are available, giving time resolutions of 0.5, 1, 2, 8 ms respectively. The actual choice of the SDS will then depend on the timescale over which a source is variable.

*see Express Oct. 84 for a brief description of the principal OBC modes.

F. Haberl

Program	Function	Sample rate	SDS
LDIR2	all options	512	1
KDIR2	"	512	
MDIAG		1K	
MDIR		4K	
MHER 2,4,5,6		4K	
GDIR	all options	128	
MHTR3	"	128	
LQEMON		32	
KQEMON		32	
MBOM		32	
LDIR2	all options	512	2
KDIR2	No TT	512	
MHER 2,4,5,6	all options	4K	
MHTR3	"	32	
GDIR	1	2K	
GHEBL4	1 (no BL filter)	2K	
LQEMON		32	
KQEMON		32	
LDIR2	all options	4K	3
MHTR3	1	2K	
MDIR		2K	
MHER 2,4,5,6	all options	2K	
MPULS2		2K	
GDIR	1	2K	
GHEBL4	1 (no BL filter)	2K	
LDIR2	all options	512	4
MHER 2,4,5,6	"	4K	
MDIR		4K	
MHTR3		2K	
GDIR	1	2K	
GHEBL4	1 (no BL filter)	2K	
LQEMON		32	
KQEMON		32	
LDIR2	all options	512	5
MDIR		4K	
MHER 2,4,5,6	all options	4K	
MHTR3	"	512	
GDIR	1	2K	
GHEBL4	1 (no BL filter)	2K	
LQEMON		32	
KQEMON		32	

Program	Function	Sample rate	SDS
KDIR		512	6
LDIR2	all options	512	
MDIR	"	4K	
MPULS		4K	
MHTR3	all options	32	
GDIR	1	2K	
GHEBL4	1 (no BL filter)	2K	
LQEMON		32	
KQEMON		32	
LDIR2	all options	512	7
MDIR		1K	
MPULS		1K	
MHTR3	1 or 2	4K	
GDIR	1	1K	
GHEBL4	1 (no BL filter)	1K	
LDIR2	all options	512	8
KDIR2	no ADC2	512	
MDIR		4K	
MPULS		4K	
MHTR3	all options	32	
GDIR	1	1K	
GHEBL4	1 (no BL filter)	1K	
LDIR2	all options	512	9
MHTR3	1, 2	32	
MHER 4,5,6	all options	4K	
GDIR	1	1K	
GHEBL4	1 (no BL filter)	1K	
LDIR2	no ADC2	512	10
KDIR2	all options	512	
MDIR		4K	
MHER 2,4,5,6	all options	4K	
MHTR3	"	128	
GDIR	1	2K	
GHEBL4	1 (no BL filter)	2K	
LQEMON		32	
KQEMON		32	

Program	Function	Sample rate	SDS
LDIR	ADC1,2 not sampled	512	11
KDIR	all options	512	
MDIR		4K	
MHER 2,4,5,6	all options	4K	
MHTR3	1, 3	512	
GDIR	1	2K	
GHEBL4	1 (no BL filter)	2K	
LDIR2	all options	512	12
MDIR		2K	
MHER 2,4,5,6	all options	2K	
MHTR3	1 only	2K	
GDIR	1	512	
GHEBL4	1 (no BL filter)	512	
LDIR2	all options	512	13
MDIR		8K	
MHER2		8K	
MHTR3	1-3	32	
GDIR	1	2K	
GHEBL4	1 (no BL filter)	2K	
LDIR2	all options	512	14
MDIR		4K	
MHER2		4K	
MHTR3	1-3	128	
GDIR	1	2K	
GHEBL4	1 (no BL filter)	2K	
LDIR2	all options	512	15
MDIR		2K	
MHER2		2K	
MHTR3	1,3	128	
GDIR	1	2K	
GHEBL4	1 (no BL filter)	2K	
LDIR2	all options	512	16
MHTR3	1, 2	128	
MHER 4,5,6	all options	4K	
GDIR	1	1K	
GHEBL4	1 (no BL filter)	1K	

EXOSAT DATA ARCHIVE

The EXOSAT Observatory Data Archive currently comprises the majority of observations performed before April 1984. A list of those observations provisionally in the data archive is provided in the accompanying pages. This list will be expanded and revised in future issues of the EXPRESS. Note that a temporary format has been adopted in order to inform the community of the release of data as quickly as possible, but future lists should be structured eg. according to RA, DEC with use of the Observatory Log.

Only those observations for which an adequate calibration has been available for more than one year are considered as part of the archive. The current list is extensive but provisional and may therefore contain observations for which calibration uncertainties still exist. Such targets would not appear in future revised lists until the specific calibration problem has been overcome.

The procedure for requesting archive tapes is a written input to the Project Scientist at the address below with the following information:

- Target name, day number, year, experiment of interest.
- A clear description (1-2 paragraphs) of the exact purpose for which the data is required. This should be at the level at which ESA can establish if the archive data will meet the needs of the user, e.g. ME experiment time resolution required, telescope filters.

On approval of an archive request the appropriate FOT will be despatched from ESOC. This activity will of course have a lower priority than the observation programme FOT production and despatch.

It is not envisaged to provide copies of the Automatic Scientific Analysis of FOTs. The interactive analysis facility at ESOC will however be available for analysis of archive data, but at a lower priority than the analysis of current observation data.

A. Peacock

EXOSAT Project Scientist,
Space Science Department,
ESTEC, Noordwijk,
The Netherlands.

Day (83)	Time	Target
165	16.17	Denebola
166	12.30	Blank Field
170	20.23	Cygnus X-1
170	23.48	Cygnus X-1 -30'
171	09.10	Cygnus X-1 -3'
171	17.40	Cygnus X-1 -3'
173	05.56	Cygnus X-1 -3'
174	20.52	N. Polar Spur
175	09.34	1837+049
175	22.28	1758-205
176	08.02	Vega
177	15.45	1E1145-616
178	05.32	SNR1209
178	17.21	SNR1209
181	21.30	M31
184	12.31	M31
186	06.26	Cyg X-2 (Raster)
187	11.24	Supernova Evans
188	06.10	Supernova Evans
189	07.58	Ton 256
190	18.54	PSR1937+214
192	01.47	PSR1937+214
197	08.17	Coma Cluster
198	01.42	GX339-4
198	17.57	2S1636-536
200	21.58	Deep Field
202	04.42	Supernova Evans
206	01.55	A Eri
203	08.30	Supernova Evans
206	11.06	A Eri
207	15.21	M31
208	19.31	LMC X-1
209	06.31	2S0114+65
209	16.13	Cyg X-1 (Offset)
209	18.41	Cyg X-1
211	02.50	2S1705-440
211	12.30	2S1702-429
211	22.10	EX Hya
213	19.05	1702-363
213	02.40	Jupiter
214	19.30	2S1728-337
215	04.57	H1658-298
215	15.40	GX 17+2
216	02.05	H1426+01
216	10.41	H1426+01
216	15.52	WZ Sge
217	00.10	4U 1822-00
218	17.43	Supernova Evans
219	01.14	2S1755-338
219	11.28	1730-333
219	15.46	Sco X-1
220	01.50	Sco X-1
220	08.40	Sco X-1
220	15.55	2A 2206+542
220	21.32	3C445
221	03.22	GK Per
222	10.54	H 2215-086
223	15.50	W 49B
224	05.46	A 133
224	13.54	A0851-467
224	23.20	NGC 6221
226	19.50	1730-333
227	00.20	1730-333
227	14.53	1730-333
227	21.35	GK Per
228	08.47	3C120
229	21.45	1514-241
231	21.40	4U1223-62
232	07.58	NGC 1316
232	14.18	NGC 1360
233	15.00	T Tau
234	02.00	Feige 24
234	13.00	Feige 31
235	07.28	NGC 1090
234	17.56	NGC 1068
235	11.45	FA 71
235	19.29	NGC 5506
236	07.25	GK Per
238	23.35	MKN 506
239	04.26	2S1957+115
240	05.21	1543-475
241	05.09	G191 828
241	17.39	HD 149499B
241	22.20	1617-155
242	05.05	1617-155
242	10.35	1617-155
242	16.30	1617-155
242	21.14	4U1626-67
243	09.05	3A1246-588
243	14.51	40 Eri-B
243	22.27	2A0316+413
244	23.40	NGC 1685
245	07.10	MKN 1040
245	09.46	MKN 1040
245	13.55	0241+622
246	06.55	Roph (C)
247	03.14	NGC 6814
247	11.47	ES0141-G55
247	17.02	ES0103-G35
248	18.51	NGC 7314
249	01.58	Fairall 9
249	07.35	3A0234-526
249	13.16	NGC 526A
249	22.40	1978 Nov 19
251	00.20	1803+78
251	09.16	AKN 120
251	13.20	NGC 2110
251	19.43	VW Cep
252	22.19	IE0630+1748
253	10.23	NGC 2264
254	02.51	LP658-2
254	11.30	4U1715-39
254	14.13	HR 5999
254	22.46	4U1705-32
256	07.44	SU Uma
256	18.12	BD 75-325
256	22.50	Cyg X-2
257	04.18	WW Cet
257	17.04	GX5-1
257	21.40	H2252-035
258	07.48	3U1809+50
258	19.20	Cyg X-2
258	10.05	3U1809+50
258	23.46	GR 372
260	04.25	H2252-035
260	22.38	V 566 Oph
260	12.58	XB1916-05
261	04.03	MKN 504
261	09.13	4U1909+07
261	12.41	4U1812-12
261	16.26	Cyg X-2
261	20.46	HD 209943
262	16.37	3A0656-072
263	23.35	Cyg X-2
264	03.29	NGC 1832
264	07.44	HD 497985
265	09.48	G357.7-0.1
265	16.12	Cyg X-2
265	20.40	GX13+1
266	03.12	1803+78
266	13.02	4U1744-26
267	13.03	GX1+4
268	04.15	Cyg X-1
268	12.20	Tycho SNR
268	17.47	Tycho SNR

Day (83)	Time	Target
269	06.01	3C58
270	00.15	4U1728-16
271	11.20	D143631
272	20.21	4U2129+47
273	02.11	NGC 3031
275	12.23	Crab Nebula
275	04.18	Beta Ori
276	02.13	Crab Raster
277	14.15	Crab Raster
277	15.46	Crab Nebula
277	19.58	4U2129+47
279	02.06	EY Cygni
279	13.10	MR 2251
280	15.17	1822-371
280	23.20	CN Ori
281	14.40	1803+78
281	23.26	0851+202
282	16.34	Fairall 9
282	21.21	WX Hyi
283	03.53	1928+73
283	14.35	MK509
283	21.50	H0850+13
284	04.11	H225-086
284	12.45	Fairall 9
284	16.50	V1223 SGR
285	02.59	H2003+22
285	11.50	W Uma
286	12.16	Fairall 9
286	22.40	SS433
287	14.39	OA0538-66
288	03.10	SS433
288	16.15	Fairall 9
288	21.48	MR2251-179
289	02.50	SS433
290	09.05	V410TAU
290	14.34	Fairall 9
290	20.35	HR1009
291	02.32	HD45348
291	11.34	EPS ORI
291	18.21	LMC X-4
292	03.25	Sirius B
293	21.40	HD37128
294	19.07	Alpha CM
295	05.57	4C59.08
295	12.10	MK509
295	22.10	3A1954+319

Day (83)	Time	Target
296	08.08	GR 288
296	16.22	1803+78
297	21.57	Capella
300	01.40	YZ CNC
300	05.56	E0135.1-7122
300	10.17	E0121.9-7335
300	15.45	MR 2251-179
301	14.15	H0850+13
301	21.31	YZ CNC
302	02.45	E0112.0-7059
302	05.54	E0101-3-7301
302	10.20	E0101.5-7226
302	14.14	E0059.0-7228
302	18.26	E0057.6-7228
303	01.27	LMC X-4
303	08.30	SU Uma
303	14.04	E0049.4-7339
303	19.37	YZ CNC
304	00.45	PKS2155-304
305	08.21	3C120
305	16.28	4U0033+58
305	22.41	YZ CNC
306	03.28	ES0141-G55
306	10.30	PKS0521-365
306	16.52	PKS0548-322
306	22.13	NGC 6814
307	07.25	MK 509
307	21.56	YZ CNC
309	05.25	MKN 335
309	11.48	NGC 7469
309	23.13	YZ CNC
310	02.59	NGC 7213
310	09.06	NGC 526A
310	18.26	MR 2251-179
310	22.49	MCG2-58-22
311	03.56	PHL 380
311	11.08	NGC 4151
311	20.18	PG0026+129
312	02.15	YZ CNC
312	21.04	MCG8-11-11
313	01.40	Ton 524A
313	11.38	Praesepe
313	21.25	YZ CNC
314	18.01	MKN 205
314	23.31	MKN 618
315	06.43	SS Cygni

Day (83)	Time	Target
315	10.56	NGC 4151
318	16.25	VW Hyi
315	17.31	YZ CNC
316	13.57	PKS0735+178
316	21.50	1928+73
317	07.17	3A2056+493
317	14.32	PKS0735+178
317	21.10	YZ CNC
318	05.04	LMC X-4
318	09.34	PKS0735+178
318	16.25	VW Hyi
318	22.30	3C111
319	02.46	MKN 352
319	06.03	VW Hyi
319	11.16	NGC 4151
320	08.21	G0921+06
320	16.53	2A1348+700
320	23.17	RU Peg
321	04.20	MR2251-179
321	08.22	KT Per
321	12.45	LMC X-4
323	01.17	NGC 4151
324	04.36	V0332+53
324	12.36	NGC 3587
324	16.44	EG 71
324	20.25	Ton 524A
325	01.11	XY Leo
325	04.46	NGC 2811
325	15.32	V0332+53
325	21.20	VW Hyi
326	06.00	BPM 97859
326	10.00	A0543-68
326	17.28	LMC X-4
327	01.15	KT Per
327	21.53	PHL 5200
328	14.47	IRAS I
328	22.47	IRAS II
329	05.40	V0332+53
329	14.23	OX 169
329	21.38	VW Hyi
330	06.20	3A0020-260
330	12.10	OX 169
330	19.16	OA0526-328
331	14.45	MR 2251-179
331	18.47	OX 169
332	01.33	2A0526-328

Day (83)	Time	Target
332	09.50	MR 2251-178
332	18.10	V0332+53
333	02.32	2A0311-227
333	08.11	HD 22049
333	18.47	PKS2155-304
333	23.39	VW Hyi
334	10.06	PKS0521-365
334	16.56	PKS0548-322
335	23.44	V0332+53
336	08.40	1156+295
336	14.48	2223-05
336	20.04	TT Ari
337	05.21	VW Hyi
337	07.55	A0538-66
337	20.00	2109-09
338	01.49	SS Cygni
338	10.52	PG1012-029
339	07.01	PG1257+279
339	11.02	BE Uma
339	19.04	Lamda AND
339	23.50	Feige 4
340	05.25	1156+295
340	11.19	VW Hyi
340	15.00	2223-05
340	21.01	TT Ari
341	00.46	0235+164
341	08.11	2200+420
341	19.48	0851+202
342	22.34	1156+295
343	05.25	MR2251-179
343	09.01	0235+104
343	14.53	2223-05
343	20.44	CW1103+253
344	04.08	1928+73
344	13.52	MKN 382
345	01.06	LMC X-3
345	09.25	0235+164
345	16.07	2223-05
345	21.09	1156+295
346	18.20	2S0921-630
347	05.05	PSR0031-07
347	10.45	NGC3783
347	19.58	MCG5-23-16
348	05.09	0235+164
348	08.53	HT Cas
348	17.09	A1202+31
348	23.25	NGC 246

Day (83)	Time	Target
349	03.44	II ZW 1
349	11.42	NGC 3227
350	17.44	0241+622
351	02.02	NGC 4151
351	09.47	HZ 21
351	13.14	HZ 34
351	17.10	3C273
352	07.20	MR2251-179
352	11.02	III ZW 2
352	17.45	NGC2922
353	01.58	1215+303
353	12.35	NGC 6888
354	01.53	NGC 6888
355	02.33	4U0115+634
356	09.30	X Per
356	13.55	HD 121130
356	19.01	NGC 4096
356	23.34	NGC 4490
358	19.08	M82
358	12.49	V0332+53
359	18.40	V0332+53
360	00.37	NGC 5005
360	05.17	NGC 4244
360	08.46	NGC 4656
360	11.52	NGC 4395
360	16.19	HD 111812
360	18.51	NGC 4559
361	19.20	MR 2251-179
361	22.56	NGC 693
362	03.04	PG0134+070
362	08.26	EG 187
362	17.20	NGC 3991/4/5
363	07.40	HT Cas
363	14.49	NGC 4725
363	17.27	NGC 4565
363	22.08	V0332+53
364	03.22	3A1146-118
364	07.29	3A1030-346
364	19.53	SU UMA
365	12.56	MKN 290
365	16.07	MKN 474
365	20.56	SA57

Day (84)	Time	Target
002	03.25	II ZW I
002	08.24	V0332+53
002	13.20	HD 224801
002	19.05	3A0316-442
003	00.11	NGC 988
003	05.43	MKN 590
004	08.52	A1060
004	18.47	3A0729+103
005	08.08	A1367
005	18.35	HD 115383
005	23.01	3C273
006	15.32	4U0033+58
006	21.34	CW 1103+253
007	08.40	V0332+53
008	02.19	3C120
008	05.55	Lamda AND
008	23.55	CW 1103+253
009	09.40	NGC 4581
009	18.46	4U0352+309
009	23.01	1928+73
010	08.45	V0332+53
010	19.15	4U0352+309
010	22.55	HD 127762
011	20.54	0109+49
012	01.31	HD 4614
012	08.08	4U1036-56
012	10.51	E0336-358
012	20.53	HD133029A
013	00.37	OQ 208
013	21.46	1309-057
014	13.00	HD 115521
015	18.51	HD 13174
015	22.18	4U0115+63
016	06.44	1147+245
016	17.26	E1352.2+1830
017	00.39	HD 124897
017	09.20	1147+245
017	17.37	HD 118100
017	22.55	HD 20630
018	04.00	BE Uma
018	09.43	1147+245
018	17.56	BE Uma
019	09.30	3A0004+725
019	15.52	V0332+53
019	21.48	BE Uma
020	01.40	PKS1103-006
020	10.39	NGC 4690

Day (84)	Time	Target
021	15.15	NGC 4507
021	23.41	HD 81799
022	04.00	HD 18322
022	08.56	V0332+53
023	03.34	PSR1055-52
023	20.58	V0332+53
024	09.22	4U0316+41
025	03.32	3A0316+414
025	11.58	A426
025	23.10	4U0352+309
027	01.33	MCG8-11-11
027	05.37	MKN 348
027	17.4	3C111
027	22.47	MKN 205
028	04.00	PKS 1136-13
028	18.30	2A1348+700
029	00.44	PKS 1217+23
029	07.08	0916+86
029	12.10	3A1344-325
029	18.24	3C 273
030	16.38	EPS CRA
030	22.20	PKS1136-13
031	08.07	HD 16157
031	13.57	HD 72905
031	18.22	HD 2905
031	23.35	2A1219+305
032	04.38	NGC 5548
032	11.04	MKN 421
032	17.45	MKN 501
033	01.01	LMC X-2
033	11.44	MKN 421
033	17.17	2A1219+305
034	12.02	MKN 501
034	16.30	NGC 5033
034	22.01	NGC 4593
035	23.47	VV Pup
036	05.46	2S1254-690
036	14.03	PG 1524+438
036	17.45	MKN 501
037	00.55	MKN 421
037	06.24	2A1219+305
037	13.08	MKN 79
038	05.48	0851+202
038	14.32	MKN 876
039	00.48	0014+81
039	06.35	0851+202
039	13.34	HD 20902
039	22.40	2353+81
040	06.20	0851+202
040	14.07	0I417

Day (84)	Time	Target
041	00.05	4C55.16
041	04.25	IE0643-1648
042	01.10	Omega Cen
042	18.09	4U1323-62
042	21.20	3A1239-599
043	02.12	IE0643-1648
043	06.07	0754+100
043	16.47	IE0643-1648
043	21.47	E1149.4-6209
044	05.28	4U1322-42
044	18.25	3A1431-409
045	19.32	4U0115+63
046	05.15	Vela X-1
046	10.53	0300+470
046	15.45	Cen X-3
047	06.05	Vela X-1
047	11.30	4U1547-49
048	19.22	Vela X-1
049	08.52	Vela X-1
049	14.18	Pleiades
050	05.35	Vela X-1
051	12.38	HD 127493
051	16.44	A2147
052	00.23	MKN 29845
052	06.23	Vela X-1
052	10.39	MKN 291
053	07.10	Vela X-1
053	17.46	H1626+01
054	07.15	1538+149
054	18.55	HD 30945
058	00.49	3C279
055	10.55	M13A
055	18.15	4U0352+309
055	22.40	4U0115+63
056	04.43	E0731.4+3158
057	00.55	N2146
057	06.00	H1659+44
057	08.38	Her 1/2
058	15.58	MKN 291
059	23.06	GR 275
059	09.06	H1642+11
059	13.18	1308+326
061	02.55	NGC 5506
062	00.10	1020+40
062	05.19	0615+82
062	09.43	HD 35296
062	14.35	1038+52
062	21.14	NGC 5548
063	08.15	I ZW 186

Day (84)	Time	Target
064	16.31	0954+55
065	12.33	4U1624-49
065	21.11	0945+40
066	06.07	Orion
066	21.53	1308+326
067	05.08	RCW 103
068	13.30	1308+326
069	17.46	1308+326
069	23.07	G191 B2B
071	02.37	Sco X-1
072	03.12	Sco X-1
072	10.07	GX339-4
072	18.45	E0718-312
073	00.48	Sco X-1
073	02.51	Sco X-1
073	03.10	Crab Nebula
073	06.55	HD 168454
073	10.49	HD 99967
073	23.04	H1557+08
074	03.10	1510+70
075	22.10	1003+83
076	02.02	1053+81
076	07.27	1150+81
076	13.24	HD 159532
077	02.06	HD 155555
077	09.22	4U1538-52
077	21.35	SU Uma
079	19.11	VW Cep
080	19.50	HD 161471
081	00.13	Zeta Pup
081	13.55	4U1743-28
081	21.10	Gamma Gem
083	10.35	E1013-477
083	16.31	T Pyx
083	21.10	Z Cam
084	02.05	E1405-451
084	21.00	3A1431-409
085	04.15	HD 65339A
085	09.07	MKN 40
085	16.10	Crab Nebula
086	12.00	MKN 501
087	05.00	PKS 1934-63
087	10.36	NGC 31185
088	13.00	DW 0839+18
088	18.50	H1504+65
089	04.02	HD 133029A
089	09.40	0752+258
089	16.00	HD 10029
090	05.00	MKN 79

INTERACTIVE ANALYSIS SYSTEM

A number of changes based on the experience of the first users and the Observatory Team have been introduced into the organisation of the Interactive Analysis system, and those which affect users are noted here.

Booking of the system has been made more flexible in that:

a. Short notice booking will be accepted, subject to computer availability; advance booking is, however, preferred.

b. Two bookings per day can be accepted - one for the period 08.00 - 15.00 and another for the period 15.00 - 23.00. Only users with previous experience of the system will be booked for the second period.

c. In principle, every booking is for one of the above periods, although in practice users may have access to the system for both periods, should they require it.

Users' guides to the analysis are available (ME) or in preparation (LE/GS). Copies will be sent to first time users at the time of booking as an aid to pre-familiarisation with the system.

Attention is drawn to the letter on p.58, already mailed to all EXOSAT P.I's, to remind users of the level of support provided by the Observatory Team to assist with the analysis.

Finally, all users of the IA system are kindly requested to complete a questionnaire (copies in the computer room) prior to leaving the Observatory, to enable the Observatory Team to continue to improve the facilities according to users' requirements.

D. Andrews

european space agency
agence spatiale européenne

european space operations centre
europäisches operationszentrum der esa

darmstadt 30.4.1985

your ref:

our ref: EX.12.7/094

telephone:

Dear Colleague,

EXOSAT Interactive Analysis System

Now that the EXOSAT Interactive Analysis System has officially entered its routine phase of operation, I would like to bring to your attention some specific aspects of the function and exploitation of the system.

ESA undertook the design, development and commissioning of the Interactive Analysis System in a period of about six months from April to December 1984 in parallel with the normal activities of the Observatory. The prime raison d'être of this facility is to provide EXOSAT Observers with the means to carry out a detailed scientific analysis of their EXOSAT data at the Observatory and the system is geared principally for those who have only limited analysis facilities at their home institute.

After a 'trial' period of four months, routine use of the system began on 1.4.85. Utilisation, defined as the percentage of 'booked' days, has risen from about 30% initially to 80% in April 1985. Based on the experience of the first users, a number of improvements in procedures, facilities and supporting infrastructure have been implemented, generally to the mutual satisfaction of both Observatory Team and user community, nevertheless one aspect deserves emphasis.

The system is made available for users to carry out their own analysis. Support, by the Duty Scientists, is provided to give a general demonstration of the use of the facilities together with advice on specific features of the analysis. First time users will be given a few hours' full-time support followed by consultancy on request, subject to staff availability. It is however neither the function nor the intent of the system that the complete scientific analysis of the users' data be carried out by a member of the Observatory Team, and users are therefore expected to be familiar with general X-ray data analysis techniques and common aspects of the use of small computer systems within a scientific environment.

Yours sincerely,

D. Andrews

D. ANDREWS
OBSERVATORY MANAGER

esoc - robert-bosch-strasse 5, 6100 darmstadt

telephone (switchboard): (0 61 51) 88 61 - telex: 41 94 53 -cables: esoc darmstadt
p. o. box: 406 — bank account: 1735676 dresdner bank a.g. darmstadt

OBSERVATORY TEAM

		Ext.
David Andrews	Observatory Manager	705*
Julian Sternberg	Observatory Software	703
Julian Lewis	System Software/HP Computers	702
Nick White	Senior Observatory Scientist	764
Paul Barr	Duty Scientist/Mission Planning	711
Paolo Giommi	"	710
Manfred Gottwald	"	758
Julian Osborne	"	714
Arvind Parmar	"	763
Luigi Stella	"	715
Anne Fahey	Mission Planning	707
Paolo Ferri	Observatory Controller	772
Maria Gonano	" "	772
Frank Haberl	" "	717
Geoff Mellor	" "	716
Antonella Nota	" "	717
Mark Sweeney	" "	716
Susanne Ernst	Data Assistant	713
Margit Farkas	" "	709
Grazia Giommi	" "	709
Linda Osborne	" "	713
Sandra Andrews	Secretary	704

*Direct dialling to any extension, prefixed by 886, is possible, eg. 06151-886-705

Personnel Changes (1.3.85 - 30.4.85)

Dr J. Davelaar has resigned his position as Duty Scientist

THE EUROPEAN SPACE AGENCY

VACANCIES AT THE EUROPEAN SPACE OPERATIONS CENTRE, ESOC, DARMSTADT, GERMANY

The European X-ray Observatory satellite EXOSAT was launched in May 1983 with an orbital life expectancy of about 3.5 years. The orbit is such that EXOSAT is more or less continuously in real time contact with the Observatory Control Centre at ESOC Darmstadt where operations are conducted round-the-clock seven days per week.

Applications are invited from graduates with a first degree in physics or other physical science, mathematics or computer science or electronics to work as

OBSERVATORY CONTROLLERS

Their tasks, to be undertaken in a shift system, include -

- operation of the on-board scientific instruments in the optimum mode for the observation being conducted.
- operation of quick-look displays, visual display units, alpha-numerics and strip charts while the observation is in progress.
- monitoring of the proper functioning of the instruments over short timescales and the determination of longer term trends.
- operation of computer equipment to generate automatic scientific analysis output.
- writing and update of software modules associated with instrument calibration, data analysis and display.
- participation in and assistance with the research programme of the Observatory Team.

Applicants should have an aptitude for operations and experience of working with computer based systems including programming. They must possess a good knowledge of English or French with a working knowledge of the other. Applications can only be accepted from candidates who are nationals of ESA member states.

Please send a detailed CV to the Head of Personnel, ESOC, Darmstadt.

Head of Personnel,
ESOC,
Robert Bosch Strasse 5,
6100 Darmstadt, W. Germany.

THE EUROPEAN SPACE AGENCY

The European Space Agency has a number of vacancies in Scientific positions as follows:

ASTROPHYSICS DIVISION, SPACE SCIENCE DEPARTMENT
at ESTEC, Noordwijk, The Netherlands

RESEARCH FELLOWSHIP POSITIONS (PhD or equivalent) in:

OPTICAL ASTRONOMY - Observational astronomy using the ESA photon counting system developed for the Space Telescope and the development of detector systems for future space astronomy missions.

X-RAY ASTRONOMY - Development of imaging detectors for future space astronomy missions with participation in the analysis of EXOSAT data.

SUBMILLIMETRE ASTRONOMY - Development of a super-heterodyne system for ground-based submillimetre astronomy, participation in observational campaigns and data analysis.

GAMMA-RAY ASTRONOMY - Development of the COMPTEL instrument for the Gamma Ray Observatory mission and data analysis.

The research fellowship positions at ESTEC are normally limited to a duration of two years.

Salary will depend on qualifications, experience, marital status, etc.

A good knowledge of English or French is required, with a working knowledge of the other language.

Applications should be directed to the Head of Personnel, ESTEC, Postbus 299, 2200 AG Noordwijk, The Netherlands, including detailed curriculum vitae and stating for which post(s) they wish to be considered.
For enquiries phone 1719-83308 or 1719-83556.

QUESTIONNAIRE

☐ There is an error/change of address on the current mailing list; the correct version is given below.

☐ Please add my name and address (printed below) to the EXOSAT Express mailing list.

☐ Please delete my name and address (printed below) from the EXOSAT Express mailing list.

NAME: _____

ADDRESS: _____

_____

_____

_____

Tear off the page and return to: EXOSAT Observatory, ESOC,
Robert Bosch Str. 5,
6100 Darmstadt, W. Germany.