

#288

EXPLORER 42 ~~DATA - 10~~

X-RAY ALL SKY SURVEY

DAILY SUMMARY DATA

70-107A-01A, 01B, 01C, 01G

Table of Contents

1. Introduction
2. Errata/Change Log
3. LINKS TO RELEVANT INFORMATION IN THE ONLINE NSSDC
INFORMATION SYSTEM
4. Catalog Materials
 - a. Associated Documents
 - b. Core Catalog Materials

1. INTRODUCTION:

The documentation for this data set was originally on paper, kept in NSSDC's Data Set Catalogs (DSCs). The paper documentation in the Data Set Catalogs have been made into digital images, and then collected into a single PDF file for each Data Set Catalog. The inventory information in these DSCs is current as of July 1, 2004. This inventory information is now no longer maintained in the DSCs, but is now managed in the inventory part of the NSSDC information system. The information existing in the DSCs is now not needed for locating the data files, but we did not remove that inventory information.

The offline tape datasets have now been migrated from the original magnetic tape to Archival Information Packages (AIP's).

A prior restoration may have been done on data sets, if a requestor of this data set has questions; they should send an inquiry to the request office to see if additional information exists.

2. ERRATA/CHANGE LOG:

NOTE: Changes are made in a text box, and will show up that way when displayed on screen with a PDF reader.

When printing, special settings may be required to make the text box appear on the printed output.

Version	Date	Person	Page	Description of Change
01				
02				

3 LINKS TO RELEVANT INFORMATION IN THE ONLINE NSSDC
INFORMATION SYSTEM:

<http://nssdc.gsfc.nasa.gov/nmc/>

[NOTE: This link will take you to the main page of the NSSDC Master Catalog. There you will be able to perform searches to find additional information]

4. CATALOG MATERIALS:

- a. Associated Documents To find associated documents you will need to know the document ID number and then click here.
<http://nssdcftp.gsfc.nasa.gov/miscellaneous/documents/>

- b. Core Catalog Materials

SAS-A

SOURCE LIBRARY TAPE

70-107A-01B

ASXR-00047

This data set has been restored. There was originally one 9-track, 800 BPI tape written in Binary. There is one restored tape. The DR tape is a 3480 cartridge and the DS tape is 9-track, 6250 BPI. The original tape was created on a 7094 computer and the restored tape was created on an IBM 9021 computer. The DR and DS numbers along with the corresponding D number are as follows:

DR#	DS#	D#	FILES
-----	-----	-----	-----
DR004837	DS004837	D010072	1

o D010072: Read errors occurred in records 77, 276 of file 1.

See 70-107A-01C

EXPLORER 42

X-RAY ALL SKY SURVEY

DAILY SUMMARY DATA

70-107A-01C

ASXR-00057

This data set has been restored. There were originally 92 9-track, 800 BPI, Binary, multi-filed and standard labels. There are 15 restored tapes. The DR tapes are 3480 cartridges and the DS tapes are 6250 BPI. The DR and DS numbers along with the time spans are given as follows:

DR #	DS #	DD #	FILES	TIME SPAN
-----	-----	-----	-----	-----
DR03042	DS03042	D-10073	1 - 29	12/19/70 - 12/20/70
		D-10074	30 - 52	12/21/70 - 12/21/70
		D-10075	53 - 75	12/21/70 - 12/22/70
		D-10076	76 - 98	12/23/70 - 12/24/70
		D-10077	99 - 121	12/23/70 - 12/24/70
		D-10078	122 - 144	12/26/70 - 12/27/70
		D-10079	145 - 167	12/28/70 - 12/28/70
		D-10080	168 - 180	12/28/70 - 12/28/70
DR03043	DS03043	D-10081	1 - 23	12/29/70 - 12/29/70
		D-10082	24 - 46	12/30/70 - 12/30/70
		D-10083	47 - 69	12/30/70 - 12/31/70
		D-10084	70 - 92	12/31/70 - 12/31/70
		D-10085	93 - 115	01/01/71 - 01/02/71
		D-10086	116 - 138	01/02/71 - 01/02/71
		D-10087	139 - 161	01/03/71 - 01/03/71
		D-10088	162 - 184	01/03/71 - 01/04/71
DR03044	DS03044	D-10089	1 - 23	01/04/71 - 01/05/71
		D-10090	24 - 46	01/05/71 - 01/06/71
		D-10091	47 - 69	01/06/71 - 01/07/71
		D-10092	70 - 92	01/08/71 - 01/08/71
		D-10093	93 - 115	01/09/71 - 01/10/71
		D-10094	116 - 138	01/09/71 - 01/10/71
		D-10095	139 - 161	01/11/71 - 01/11/71
DR03045	DS03045	D-10096	1 - 25	01/11/71 - 01/11/71
		D-10098	26 - 48	01/13/71 - 01/14/71
		D-10099	49 - 71	01/14/71 - 01/15/71
		D-10100	72 - 94	01/21/71 - 01/21/71
		D-10102	95 - 127	01/15/71 - 01/16/71
		D-10103	128 - 140	01/17/81 - 01/18/71

DR03046	DS03046	D-10104	1 - 23	01/18/71 - 01/18/71
		D-10105	24 - 46	01/19/71 - 01/20/71
		D-10106	47 - 69	01/22/71 - 01/22/71
DR03047	DS03047	D-12939	1 - 23	12/16/70 - 12/17/70
		D-12942	24 - 52	12/17/70 - 12/18/70
		D-12934	53 - 75	12/21/70 - 12/21/70
		D-12905	76 - 98	12/21/70 - 12/22/70
		D-12933	99 - 121	12/21/70 - 12/22/70
		D-12936	122 - 145	12/22/70 - 12/23/70
DR03048	DS03048	D-12935	1 - 23	12/24/70 - 12/25/70
		D-12938	24 - 46	12/26/70 - 12/26/70
		D-12937	47 - 69	12/28/70 - 12/28/70
		D-12913	70 - 94	12/31/70 - 01/01/71
		D-12911	95 - 115	01/02/71 - 01/03/71
		D-12941	116 - 138	01/03/71 - 01/03/71
DR03049	DS03049	D-12912	1 - 23	01/03/71 - 01/04/71
		D-12907	24 - 46	01/04/71 - 01/05/71
		D-12908	47 - 69	01/07/71 - 01/08/71
		D-12931	70 - 92	01/08/71 - 01/09/71
		D-12904	93 - 117	01/11/71 - 01/12/71
		D-12916	118 - 140	01/13/71 - 01/14/71
DR03050	DS03050	D-12914	1 - 23	01/15/71 - 01/16/71
		D-12919	24 - 46	01/17/71 - 01/18/71
		D-12920	47 - 69	01/18/71 - 01/18/71
		D-12918	70 - 92	01/18/71 - 01/18/71
		D-13671	93 - 115	01/19/71 - 01/20/71
		D-12932	116 - 138	01/21/71 - 01/21/71
DR03051	DS03051	D-12910	1 - 21	01/22/71 - 01/22/71
		D-12909	22 - 44	01/22/71 - 01/23/71
		D-12906	45 - 67	01/23/71 - 01/24/71
		D-12915	68 - 90	01/24/71 - 01/25/71
		D-12903	91 - 114	01/27/71 - 01/28/71
DR03052	DS03052	D-12940	1 - 24	01/24/71 - 01/25/71
		D-12930	25 - 48	01/26/71 - 01/27/71
		D-12917	49 - 71	01/27/71 - 01/28/71
		D-12927	72 - 95	01/28/71 - 01/29/71
		D-12928	96 - 119	01/29/71 - 01/30/71
		D-12925	120 - 143	01/30/71 - 01/31/71
DR03053	DS03053	D-12926	1 - 24	02/01/71 - 02/02/71
		D-12923	25 - 48	02/02/71 - 02/03/71
		D-12924	49 - 72	02/03/71 - 02/04/71
		D-12929	73 - 96	02/04/71 - 02/05/71
		D-12943	97 - 120	02/04/71 - 02/05/71
		D-13670	121 - 144	02/06/71 - 02/07/71
DR03054	DS03054	D-13668	1 - 23	02/09/71 - 02/10/71
		D-13669	23 - 46	02/10/71 - 02/11/71
		D-13667	47 - 69	02/11/71 - 02/12/71
		D-13666	70 - 92	02/12/71 - 02/13/71
		D-12665	93 - 115	02/13/71 - 02/14/71
		D-12664	116 - 138	02/14/71 - 02/15/71

DR03055	DS03055	D-13663	1 - 23	02/15/71 - 02/16/71
		D-13662	24 - 46	02/16/71 - 02/17/71
		D-13679	47 - 70	02/25/71 - 02/26/71
		D-13681	71 - 94	03/02/71 - 03/03/71
		D-13680	95 - 117	03/07/71 - 03/08/71
		D-13677	118 - 140	04/18/71 - 04/19/71
DR03056	DS03056	D-13678	1 - 23	04/19/71 - 04/20/71
		D-13676	24 - 46	04/20/71 - 04/21/71
		D-13682	47 - 69	04/21/71 - 04/22/71
		D-13674	70 - 93	04/21/71 - 04/22/71
		D-13675	94 - 116	05/15/71 - 05/15/71
		D-13673	117 - 140	05/15/71 - 05/16/71
		D-13672	141 - 163	05/16/71 - 05/17/71

EXPLORER 42

X-RAY ALL SKY SURVEY

DAILY SUMMARY DATA

70-107A-01A, B, C

Data Set -01A consists of one executable systems program tape. Data Set -01B consists of one source library tape. These tapes are 800 BPI, ~~EBCDIC~~^{ASCII}, 9-track, and were created on an IBM 360 computer. Data Set -01C consists of 90 Daily Summary Data tapes. Thirty of ^hthese tapes are 800 BPI and 60 of them are 1600 BPI. All of the tapes are 9-track, binary, multi-filed, created on an IBM 360 computer. These tapes contain standard labels without Y or Z numbers.

70-107A-01A *released*

<u>D#</u>	<u>C#</u>	<u>FILES</u>	<u>STANDARD LABEL (VOL=SER)</u>	<u>TIME SPAN</u>
D-10071	C-11321	1	Z0350	
<u>70-107A-01B</u>				
D-10072	C-11322	1	Z1280	
<u>70-107A-01C (800 BPI)</u>				
D-10073	C-11323	29	Z0350	12/19/70 - 12/20/70
D-10074	C-11324	23	Z0997	12/21/70 - 12/21/70
D-10075	C-11325	23	Z1409	12/21/70 - 12/22/70
D-10076	C-11326	23	Z2136	12/23/70 - 12/23/70
D-10077	C-11327	23	Z2137	12/23/70 - 12/24/70
D-10078	C-11328	23	Z1289	12/26/70 - 12/27/70
D-10079	C-11329	23	Z0350	12/28/70 - 12/28/70
D-10080	C-11330	23	Z0997	12/28/70 - 12/28/70
D-10081	C-11331	23	Z1289	12/29/70 - 12/29/70

<u>D#</u>	<u>C#</u>	<u>FILES</u>	<u>STANDARD LABEL</u> <u>(VOL=SER)</u>	<u>TIME SPAN</u>
D-10082	C-11332	23	Z2137	12/30/70 - 12/30/70
D-10083	C-11333 C-11334	23	Z1409	12/30/70 - 12/31/70
D-10085	C-11335 C-11336	23	Z1280	1/01/70 - 1/02/71
D-10087	C-11337 C-11338	23	Z0999	1/03/71 - 1/03/71
D-10089	C-11339 ✓	23	Z1289	1/04/71 - 1/05/71
D-10090	C-11340 ✓	23	Z2136	1/05/71 - 1/06/71
D-10091	C-11341 ✓	23	Z1280	1/06/71 - 1/07/71
D-10092	C-11342 ✓	23	Z0350	1/08/71 - 1/08/71
D-10093	C-11343 ✓	23	Z0997	1/08/71 - 1/09/71
D-10094	C-11344 ✓	23	Z1289	1/09/71 - 1/10/71
D-10095	C-11345 ✓	23	Z2136	1/11/71 - 1/11/71
D-10096	C-11346 ✓	25		1/11/71
D-10098	C-11347 ✓	23	Z2137	1/13/71 - 1/14/71
D-10099	C-11348 ✓	23	Z1409	1/14/71 - 1/15/71
D-10100	C-11349 ✓	23	Z2136	1/21/71 - 1/21/71
D-10101		23		1/21/71 - 1/22/71
D-10102	C-11351 ✓	23	Z2137	1/15/71 - 1/16/71
D-10103	C-11352 ✓	23	Z2136	1/17/71 - 1/18/71
D-10104	C-11353 ✓	23	Z1409	1/18/71 - 1/18/71
D-10105	C-11354 ✓	23	Z0350	1/19/71 - 1/20/71
D-10106	C-11355 ✓	23	Z1280	1/22/71 - 1/22/71
<u>70-107A-01C (1600 BPI)</u>				
D-12903	C-12743 ✓	24	Z2137	1/27/71 - 1/28/71
D-12904	C-12744 ✓	25	Z1289	1/11/71 - 1/12/71
D-12905	C-12745 ✓	23	Z1041	12/21/70 - 12/22/70
D-12906	C-12746 ✓	23	Z2136	1/23/71 - 1/24/71 ²³
D-12907	C-12747 ✓	23	Z0994	1/04/71 - 1/05/71
D-12908	C-12748 ✓	23	Z1041	1/07/71 - 1/08/71
D-12909	C-12749 ✓	23	Z1408	1/22/71 ¹² - 1/23/71 ¹³
D-12910	C-12750 ✓	21	Z1409	1/22/71 - 1/22/71
D-12911	C-12751 ✓	23	Z2137	1/02/71 - 1/03/71

<u>D#</u>	<u>C#</u>	<u>FILES</u>	<u>STANDARD LABEL</u> <u>(VOL=SER)</u>	<u>TIME SPAN</u>
D-12912	C-12752 ✓	23	Z1289	1/03/71 - 1/04/71
D-12913	C-12753 ✓	23	Z2136	12/31/70 - 1/01/71
D-12914	C-12754 ✓	23	Z0996	1/15/71 - 1/16/71
D-12915	C-12755 ✓	23	Z1289	1/24/71 - 1/25/71
D-12916	C-12756 ✓	23	Z0350	1/13/71 - 1/14/71
D-12917	C-12757 ✓	23	Z1408	1/27/71 - 1/28/71
D-12918	C-12758 ✓	23	Z1282	1/18/71 - 1/18/71
D-12919	C-12759 ✓	23	Z1409	1/17/71 - 1/18/71
D-12920	C-12760 ✓	23	Z1409	1/18/71 - 1/18/71
D-12923	C-12761 ✓	24	Z1280	2/02/71 - 2/03/71
D-12924	C-12762 ✓	24	Z0996	2/03/71 - 2/04/71
D-12925	C-12763 ✓	24	Z1409	1/30/71 - 1/31/71
D-12926	C-12764 ✓	24	Z1280	2/01/71 - 2/02/71
D-12927	C-12765 ✓	24	Z1252	1/28/71 - 1/29/71
D-12928	C-12766 ✓	24	Z2137	1/29/71 - 1/30/71
D-12929	C-12767 ✓	24	Z0996	2/04/71 - 2/05/71
D-12930	C-12768 ✓	24	Z2137	1/26/71 - 1/27/71
D-12931	C-12769 ✓	23	Z0994	1/08/71 - 1/09/71
D-12932	C-12770 ✓	23	Z0350	1/21/71 - 1/21/71
D-12933	C-12771 ✓	23	Z2136	12/21/70 - 12/22/70
D-12934	C-12772 ✓	23	Z0348	12/21/70 - 12/21/70
D-12935	C-12773 ✓	23	Z1041	12/24/70 - 12/25/70
D-12936	C-12774 ✓	24	Z0343	12/22/70 - 12/23/70
D-12937	C-12775 ✓	23	Z0998	12/28/70 - 12/28/70
D-12938	C-12776 ✓	23	Z2137	12/26/70 - 12/26/70
D-12939	C-12777 ✓	23	Z1252	12/16/70 - 12/17/70
D-12940	C-12778 ✓	24	Z0350	1/24/71 - 1/25/71
D-12941	C-12779 ✓	23	Z1409	1/03/71 - 1/03/71
D-12942	C-12780 ✓	29	Z1252	12/17/70 - 12/18/70

<u>D#</u>	<u>C#</u>	<u>FILES</u>	STANDARD LABEL <u>(VOL=SER)</u>	<u>TIME SPAN</u>
D-12943.	C-12781✓	24	Z1280	2/04/71 - 2/05/71
D-13662	C-12782✓	24	Z1289	2/16/71 - 2/17/71
D-13663	C-12783✓	23	Z2137	2/15/71 - 2/16/71
D-12664	C-12784✓	23	Y1523	2/14/71 - 2/15/71
D-12665	C-12785✓	23	Y1522	2/13/71 - 2/14/71
D-13666	C-12786✓	23	Z0342	2/12/71 - 2/13/71
D-13667	C-12787✓	23	Z0994	2/11/71 - 2/12/71
D-13668	C-12788✓	23	Z0996	2/09/71 - 2/10/71
D-13669	C-12789✓	23	Z0997	2/10/71 - 2/11/71
D-13670	C-12790✓	24	Z0998	2/06/71 - 2/07/71
D-13671	C-12791✓	23	Z2137	1/19/71 - 1/20/71
D-13672	C-12792✓	24	Y1523	5/16/71 - 5/17/71
D-13673	C-12793✓	24	Z0350	5/15/71 - 5/16/71
D-13674	C-12794✓	24	Z2135	4/21/71 - 4/22/71
D-13675	C-12795	23	Z2136	5/15/71 - 5/15/71
D-13676	C-12796✓	23	Y1521	4/20/71 - 4/21/71
D-13677	C-12797✓	23	Z1409	4/18/71 - 4/19/71
D-13678	C-12798✓	23	Z1284	4/19/71 - 4/20/71
D-13679	C-12799✓	24	Z2135	2/25/71 - 2/26/71
D-13680	C-12800✓	23	Y1515	3/08/71 - 3/09/71
D-13681	C-12801✓	24	Z0340	3/02/71 - 3/03/71
D-13682	C-12802✓	23	Z0348	4/22/71 - 4/23/71

Data Set Name: SAS.P100.ORBITNx.+R

The data set is fixed block, 45 bytes/logical record and 10 logical records/physical record.

(RECFM=FB,LRECL=45,BLKSIZE=450)

LOGICAL RECORD FORMAT

<u>ITEM</u>	<u>LENGTH (IN BYTES)</u>	<u>POSITION IN RECORD (BYTES)</u>	<u>TYPE</u>
1. Actual Orbit ID	5	1- 5	EBCDIC Characters
2. Start time for orbit in days and fraction of days since Jan. 0, 1970. (see Documentation)	8	6-13	Double precision binary
3. Stop time for orbit (see documentation)	8	14-21	Double precision binary
4. Stations number		22-25	Binary integer
Minor frame LO	4	26-29	Binary integer
Minor frame HI	4	30-33	Binary integer
Minor frame MAX	4	34-37	Binary integer
Sub frame LO	2	38-39	Binary integer
Sub frame HI	2	40-41	Binary integer
Sub frame MAX	2	42-43	Binary integer
Orbit station word	2	44-45	Binary integer

April 1, 1975

To: Memo for the record
From: Data Set Processing Group
Subject: Release of DD10071 (70-107A-01A).

Please release DD10071 and the corresponding dupe DC11321. This data set, is being released at the request of the responsible Acquisition Scientist. The tape contains a dump of the object modules on disk and is not useable by anyone except the experimenter. Data set 70-107A-01B contains the source decks for these object modules and would be more useful to the user than data set 01A.

AMERICAN
SCIENCE 
AND ENGINEERING

22 MAY 1972

ASE-2960

955 MASSACHUSETTS AVENUE, CAMBRIDGE,
MASSACHUSETTS 02139 (617) (868-1600)

70-107A-01
SAS-A
Explorer 42
UH UPRU

THE UHURU DATA REDUCTION AND ANALYSIS SYSTEM

BY:

E. KELLOGG
R. CLEVELAND
G. MARTIN
S. MURRAY
E. SCHREIER
C. SHIH
H. TANANBAUM

PREPARED FOR:

NATIONAL AERONAUTICS
AND SPACE ADMINISTRATION
GODDARD SPACE FLIGHT CENTER
GREENBELT, MARYLAND 20771

THE UHURU DATA REDUCTION
AND ANALYSIS SYSTEM

Prepared Under Contract NAS5-11422 for:

National Aeronautics and Space Administration
Goddard Space Flight Center
Greenbelt, Maryland 20771

By:

E. Kellogg, R. Cleaveland, G. Martin, S. Murray,
E. Schreier, C. Shih and H. Tananbaum

American Science and Engineering
955 Massachusetts Avenue
Cambridge, Massachusetts 02139

22 May 1972

TABLE OF CONTENTS

- I. Introduction
- II. Processing System Library Description
- III. Output Tape Description
- IV. Hard Copy Data Set Description

I.0 INTRODUCTION

This document describes the automatic computer processing system which was developed and is now in use at AS&E for reducing and analyzing data from the UHURU X-ray astronomy satellite.

The satellite scans the sky by spinning slowly (12 min. period) with collimated detectors looking out approximately perpendicular to the spin axis. The spin axis is held fixed in the sky for about a day at a time, during which a $\approx 10^\circ$ band about the equator of the spin axis is scanned (see fig. 1). Star and sun sensors provide aspect data so that we can determine later where the detectors were pointing versus time.

Our primary data reduction objective is to superimpose the X-ray data from the 120 or so sweeps through a day's 10° band. The superposition is equivalent to a single sweep through the band with total observing time of one day. This increases our sensitivity in that band greatly over what we could obtain from a single twelve minute sweep. Essential to performing this superposition is solving the aspect of the satellite and obtaining an analytic rotational equation of motion which allows the data from many different sweeps to be precisely registered with respect to each other. Other objectives of the system are to detect and locate X-ray sources in the data, and to obtain X-ray spectra of these sources.

An overall flowchart of the UHURU processing system is shown in Figure 2. The input data for the processing are contained in three sets: the telemetry tape, the ephemeris tape and the control card deck. The UHURU processing system is contained on another tape. The results of the processing are preserved on the SASA Output Tape. Further processing can be done by reading the contents of

the Output Tape back onto a disk, accessing the desired data set, and processing it further, either with a portion of the standard SASA program library under different control parameters, or with a new program written to accomplish the specialized needs of the user. Such a new program cannot be written without detailed knowledge of the file structure of the data sets in the SASA Output Tape. The structure of these files is described in a series of documents under preparation at AS&E

The processing system embodied in the SASA system library is described in Section II; the general nature of the data sets contained in the SASA Output Tape is outlined in Section III, and a guide to the resulting hard copy data sets (printout and plots) is given in Section IV.

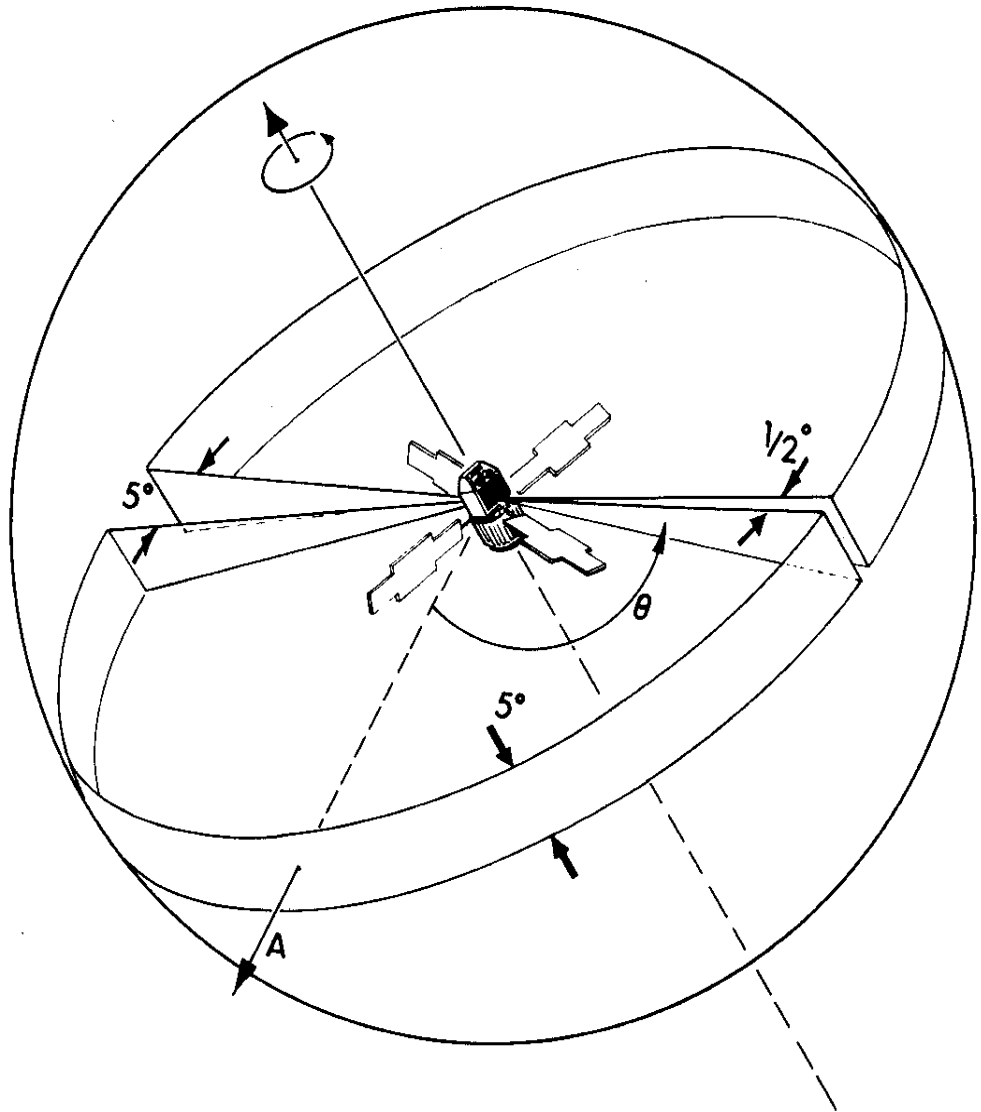
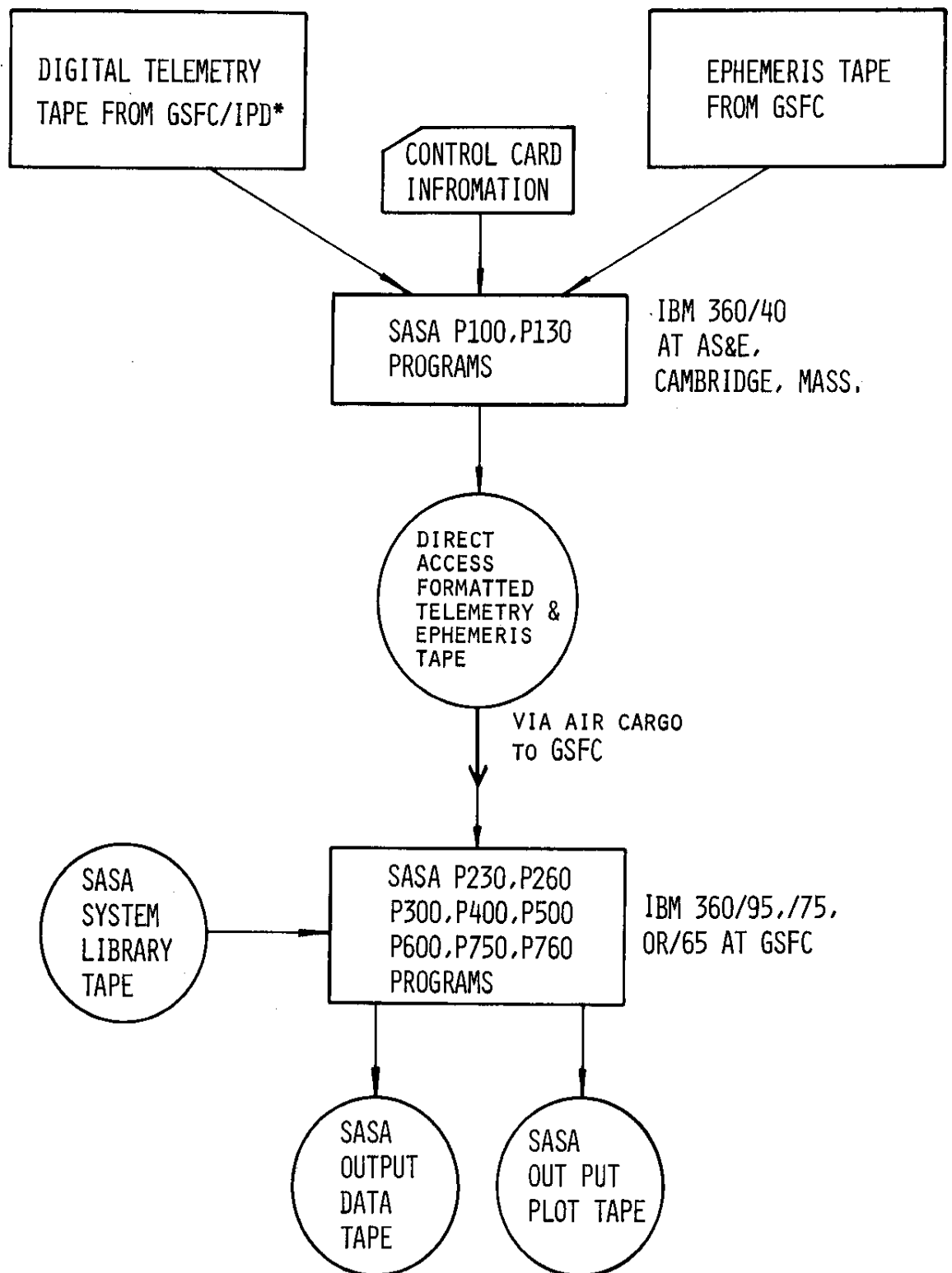


Figure 1 - Band of the sky swept out by the UHURU X-ray detectors during a satellite spin. The fields of view are indicated as the FWHM of each collimator. The angular position (θ) of a detector is the relative location in this band with respect to a fixed direction in the sky (A). This coordinate is called the azimuth of the detector.



*GSFC/IPD: GODDARD SPACE FLIGHT CENTER / INFORMATION PROCESSING DIVISION

Figure 2. Uhuru (SAS-A) Data System Flow Chart

II. PROCESSING SYSTEM LIBRARY DESCRIPTION

Normal production processing proceeds sequentially through 15 procedures designated as follows:

		Typical Run Time For One Day's Data (min.)	
		IBM 360/95	360/40
P100	Telemetry tape-to-disk-----		180 min.
P110	Orbit index definition list-----		1 min.
P130	Ephemeris tape-to-disk-----		15 min.
P230	Star Identification-----	25	1250 min. <i>not done</i>
P260	Rotational Equation of Motion-----	2	140 min.
P300	X-ray superposition-----	2	120 min.
P400	X-ray Peakfit-----	2	120 min.
P500	Crossing Window-----	1	60 min.
P600	3-Sigma Processor-----	2	20 min.
P750	Spectrum Analysis-----	1	60 min.
P760	Energy Calibration	1	
P910*	Decimal X-ray Dump		
P920*	Plot raw star & X-ray data		
P930*	Hex dump of T/M disk		
P960	System data set utility (unload) ---	1	
		Total:	37
			1966

*Optional, not normally used

P100 - Telemetry Tape-To-Disk

This procedure reads the telemetry tape provided by GSFC (Goddard Space Flight Center) corresponding to one scan of the sky, with the spin axis nominally fixed. The data corresponding to one scan are called a data group, and can be up to two days' duration, but it normally covers about 24 hours or 15 orbits. The procedure screens out bad data, creates dummy fill-in data and blocks the data in proper order on a disk. It also checks the signal switching state of the instrument to assure valid data, by examining the telltales.

P110 - Orbit Index Definition List

For the data group being processed, this procedure lists the correspondence between universal time in days and decimal

numbers. This is needed to execute some of the other programs properly because the data set may be defined by one of these variables, while the user knows another variable.

P130 - Ephemeris Tape-To-Disk

An orbital ephemeris tape for the satellite is supplied by GSFC. This procedure reads that tape and extracts the required ephemeris data for the time interval included in the data group being processed. These data are required for determining whether the detectors are looking at the earth or sky, and whether night or daytime sky is being viewed; also for eliminating data taken in the South Atlantic anomaly.

P230 - Star Identification (refer to Figure 3)

This procedure comprises the bulk of the processing system. Aspect data are identified and star (sun) pulses are recognized in the star (sun) sensor data. Using our knowledge of the star sensor reticle pattern, and estimates of the location of the satellite spin axis and spin rate, the procedure compares the observed pattern of star pulses with the expected pattern it generates from a star catalog contained as a permanent data set in the system (1950 equinox). Fifth magnitude or brighter stars from the SAO catalog are used. Elaborate iterative procedures are used to reject false star identifications and accept additional good ones. The result is a solution accurate to order $0^{\circ}.1$ for the spin axis, determined about every ten minutes of satellite real-time, as well as a 1% determination of the average spin rate. This "rough" solution with the sighting times of the accepted star pulses and star identifications is stored for input to P260.

P260 - Rotational Equation of Motion (refer to Figure 3)

In this procedure the X-ray data spin-to-spin superposition interval is defined. A refined analytic solution for the rotational motion of the satellite must be available for the entire interval. This can be

up to 72 hours in duration, but the satellite spin axis must not have drifted more than 3° on the sky or the subsequent superposition will be broken up into several subintervals. Normally a data group is named "R00171", for example, which stands for revolution 00171 (orbit). This would be the orbit number of the beginning of the data group. If the spin axis drifts more than 3° , the system performs several superpositions named, for example, R00171, R00171A and so on. The spin axis drift is limited to 3° in each group.

A model of rotation including first-order spin rate change, second-order drift in spin axis location, and torque-free precession amplitude, frequency and phase is fit to the aspect sensor data. The torque-free precession is a perturbation on the rotation of the satellite, due to the effect of a rotor spinning in the same direction as the spin axis in the satellite. The solution typically is precise to about ± 15 arc seconds in azimuth (angle about the spin axis, θ) and a few arc minutes in elevation (angle from the plane perpendicular to the spin axis, ϕ). It is described by a few constants of the equation of motion which are stored in a file for later use. Then, the superposition intervals are calculated according to the criteria specified above.

P300 - X-ray Superposition (refer to Figure 3)

An array is created, representing the average 360° circle scanned by the detector during a superposition interval, broken into 4320 (1080) elements of azimuth of $5'$ ($20'$) each for the $1/2^{\circ}$ (5°) detector. Each X-ray data word is added to the array element corresponding to the location on the sky of the detector at the time the data word was collected as calculated from the equation of motion solution. In this way, the X-ray data are superimposed over many spins of the satellite. The result is an array of count rate versus azimuth

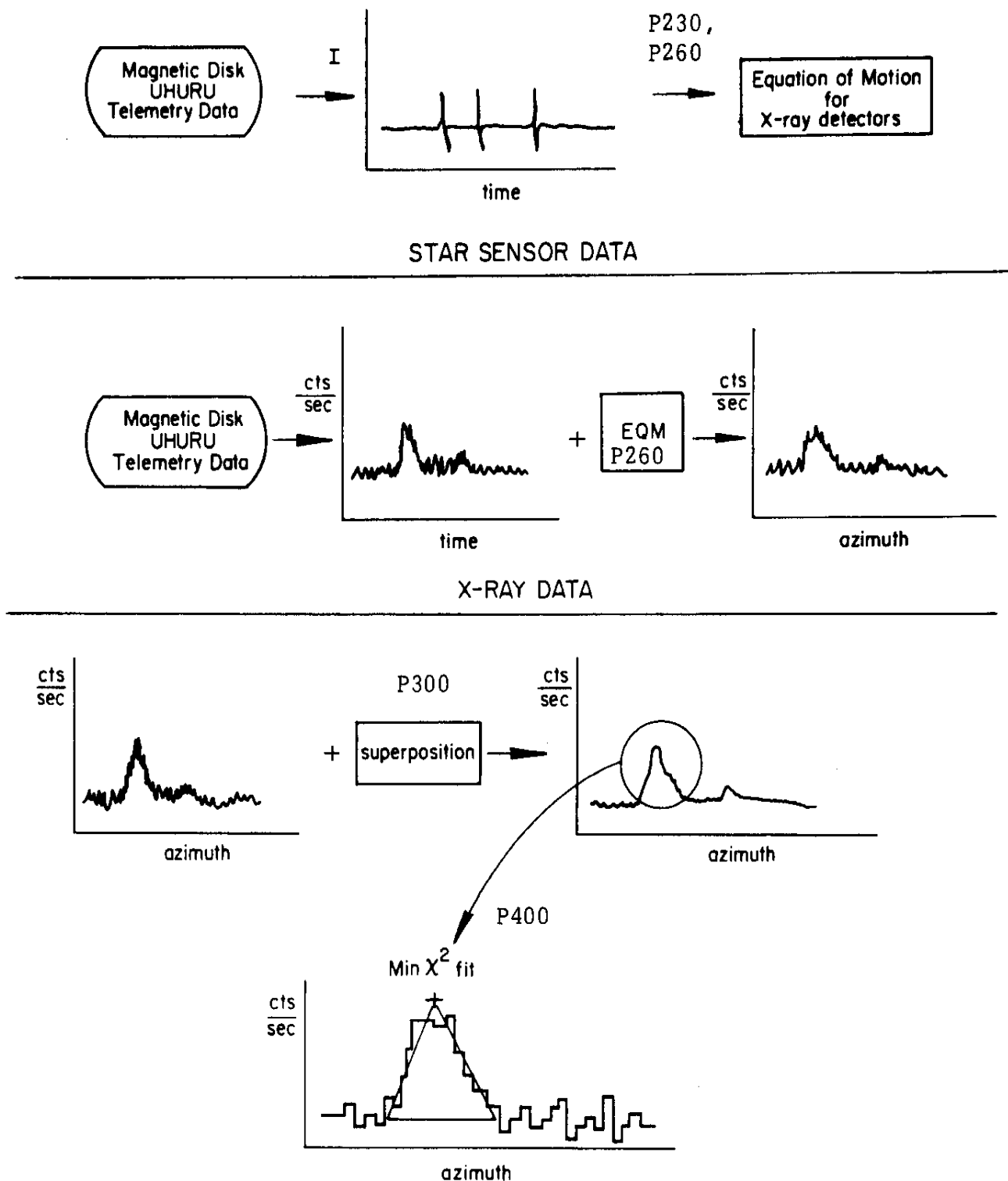


Figure 3 - The processing of data is schematically illustrated. Star sensor data is extracted from the telemetry data which was stored on magnetic disks and an equation of motion for the X-ray detectors is determined. Using this, the X-ray data which is on the telemetry disk as count rates vs. time can be transformed to count rate vs. azimuth. The data from a single spin axis orientation are summed (superimposed) increasing the signal to noise ratio and then these data are scanned for statistically significant peaks which are fit to the collimator response using a minimum x^2 technique.

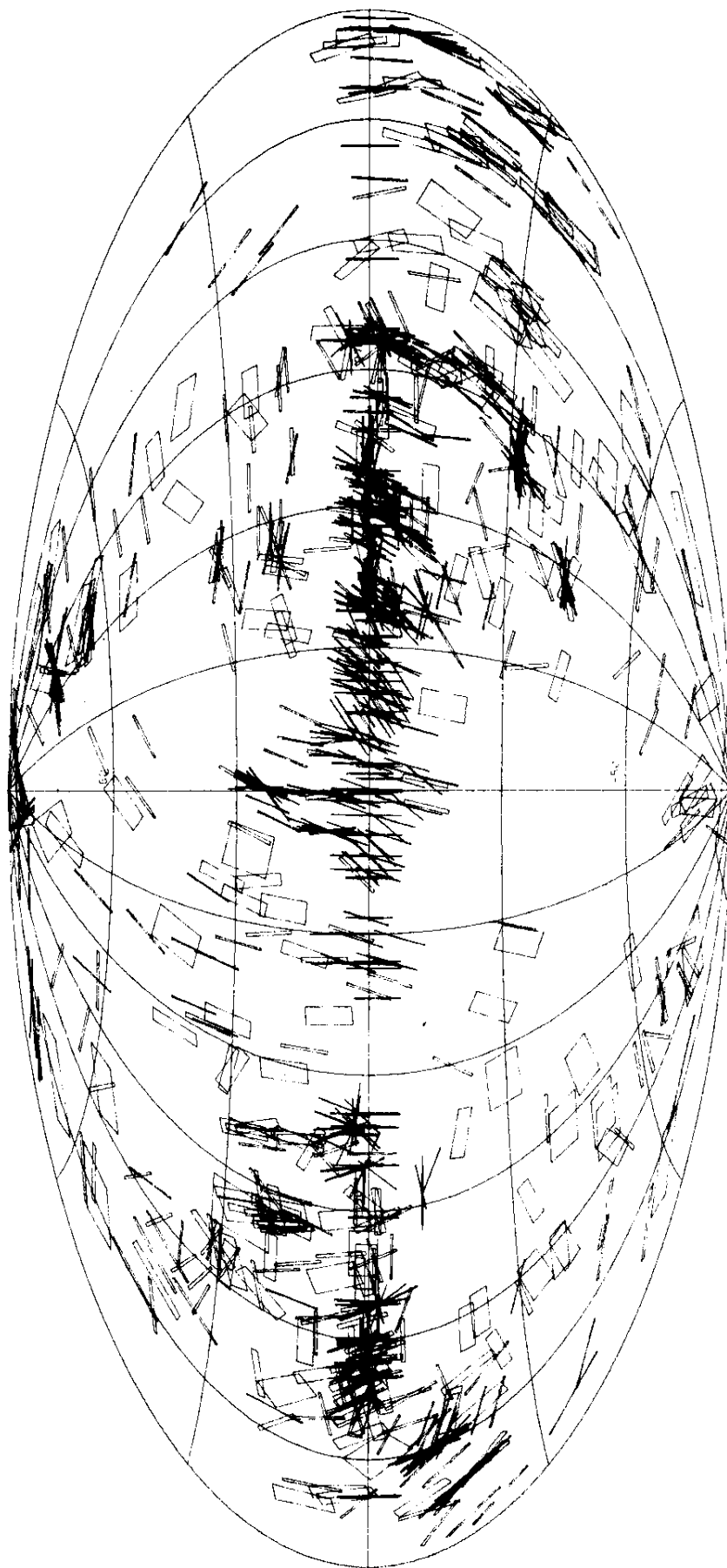


Figure 4 - Lines of position which result from the computer scan of superimposed data are plotted on an equal area projection of the sky in galactic coordinates. The line widths are $\pm 1\sigma$ as determined by the minimum χ^2 fits. There are 1171 lines on the plot.

with total exposure of order one day. As the data from each spin of the satellite are collected for superposition, the single spin data are scanned for possible peaks which are listed on an output file SPINPKS for future reference by the P600 3-Sigma program.

P400 - X-ray Peakfit

The objective of this procedure is to detect true X-ray sources and measure their location in azimuth and their intensity. Noise spikes are rejected, and confused regions of high source density are identified. Extended sources are detected, and an estimate of their width is made. An output file of lines of source position (azimuth) is generated. Figure 4 shows a plot of all the lines obtained from many different days' scans. Intersecting lines from several different days are used to obtain accurate source locations.

P500 - Crossing Window

This procedure inverts the equation of motion so that for a given azimuth all time intervals, or windows, when that azimuth was in the field of view of each detector are calculated, for all times when there is a valid equation of motion and no subcom gaps. These windows are used as inputs to P750.

P600 - 3-Sigma Processor

For each suspected peak from a single spin of the satellite, the T/M data are examined to see if there is a statistically significant peak and if so the data are fit to the collimator response to determine the location and strength of the X-ray source. This information is recorded in an output file SASA.P600.THREESIG.RXXXXX. If the source is one contained in a reference catalog of known strong sources stored in the system, it is so identified.

P750 - Spectrum Analysis

The 8-channel pulse height data for each source in the P400 lines file are extracted and printed out for each pass over the source. If more than 67 counts in channel 3 are observed from the source,

a rough fit to power law, exponential and blackbody spectra is done. Then the PHA data are summed over the entire superposition interval and a rough fit is done. These results are printed only. The printout is stored in binders at AS&E in room 638. It is generally known as the "bulk output".

P760 - Energy Calibration

When the telltales indicate that the onboard Fe⁵⁵ calibration sources are activated, the PHA system gain is measured and printed out. Experience has shown the gain to vary by about 4% for different days, mostly due to normal temperature excursions. Extreme temperatures are expected to cause greater gain shifts.

P910 - XRAYDUMP

The XRAYDUMP procedure is used to produce a time sequenced listing of part of the UHURU telemetry data (the X-ray data words only) formatted so as to be readily usable by the investigator. The program can produce such a listing from either raw telemetry tapes or from the SASA.P100.MINFRAME.RXXXXX file produced by the tape-to-disk program onto a 2314 disk pack. Program inputs are: a code to indicate whether telemetry is from disk or tape, start and stop times, and threshold levels for total counts per telemetry frame, below which output listing is suppressed.

P920 - Plot Raw Star and X-ray Data

A utility routine allowing graphic display of the raw data. Not normally used in production processing.

P930 - Hex Dump of Telemetry Disk

Generates a hexadecimal dump of the telemetry data (selected syllables). Useful for debugging. Also is the only access to commutated data. Not normally used in production processing.

P960-P970 - System Data Set Utility (Unload)

The P960 and P970 programs are used to automatically load and unload UHURU data batches between 2314 disk pack and magnetic tape.

The P960 program is used primarily at AS&E in Cambridge to:

1. Unload tape-to-disk (P100) data and Ephemeris data (P130) to tape to be sent to GSFC for further processing through the UHURU Production Processing System.
2. Load completed UHURU data batches from GSFC to 2314 disk at AS&E for summary investigation and more detailed final processing.

The P970 program is used exclusively at GSFC and is at the heart of the UHURU Automatic Processing System. The program is used to:

1. Load UHURU data batches onto available 2314 scratch volumes and catalog their location for further processing.
2. Load and ready the UHURU operating system on the /65, /75, or /95 computers at GSFC
3. Load an UHURU data batch as in '1' and load a temporary copy of a shortened version of the UHURU Automatic Processing System to scratch 2314 volumes.
4. Automatically unload finished UHURU data from 2314 scratch volumes to magnetic tape for shipment to AS&E.
5. Unload new copies of the UHURU Automatic Processing System to magnetic tape after update and SASA system library maintenance.

Both the P960 and P970 programs are used in conjunction with rather complicated catalog procedures for IBM 360. Information and description of these procedures are available from the UHURU group at AS&E in Cambridge.

III. OUTPUT TAPE DESCRIPTION

The SASA Output Tape is an image of a 2314-type disk containing a series of files listed below. The name of each file is in the following format:

SASA. PXXX. XXXXXXXX. RXXXXX

(a) (b) (c)

(a) Processing step which created the file

(b) Name of file

(c) Starting orbit number of telemetry data group

The files are:

SASA. P100. ORBITINX. RXXXXX

DEFINITION OF RANGE OF TELEMETRY PROCESSED

USED BY P110, P130, P230, P260, P300, P500, P600, P750, P760

SASA. P100. MINFRAME. RXXXXX

MINOR FRAMES OF TELEMETRY DATA

USED BY P110, P230, P300, P600, P750, P760

SASA. P100. SUBFRAME. RXXXXX

SUBCOMMUTATED TELEMETRY DATA

USED BY P110

SASA. P100. SUBGPSX1. RXXXXX

SUBCOM GAPS FOR SIDE 1

USED BY P300

SASA. P100. SUBGPSX2. RXXXXX

SUBCOM GAPS FOR SIDE 2

USED BY P300

SASA. P130. EPHEMERIS. RXXXXX

POSITION, VELOCITY EPHEMERIS DATA

USED BY P230, P300

SASA. P230. FINPOINT. RXXXXX

TRIPLET TABLE OF IDENTIFIED STARS (3 POINTS PER STAR)

USED BY P260

SASA. P230. RGHPOINT. RXXXXX

ROUGH SPIN AXIS POSITION FOR EACH TRIPLET TABLE OF
IDENTIFIED STARS

USED BY P260

SASA. P260. EQMCNSTS. RXXXXX

CONSTANTS FOR THE ROTATIONAL EQUATION OF MOTION

USED BY P300, P500, P600

SASA. P260. SUPINTVS. RXXXXX
 DEFINITION OF STABLE SUPERPOSITION PERIODS
 USED BY P300

SASA. P300. CURNTSUP. RXXXXX
 DEFINITION OF CURRENT SUPERPOSITION PERIOD BEING
 PROCESSED
 USED BY P400, P500, P600, P750, P760

SASA. P300. XSPINPKS. RXXXXX
 SINGLE PASS 3-SIGMA PEAKS ABOVE XRAY BACKGROUND
 USED BY P500, P600

SASA. P300. XSUPDATA. RXXXXX
 SUPERIMPOSED DATA FOR SIDE 1 AND SIDE 2
 USED BY P400

SASA. P300. XIGPSCMB. RXXXXX
 SIDE 1 SUPERPOSITION GAPS - COMBINATION OF ALL TYPES
 MERGED
 USED BY P500

SASA. P300. X1GPSIND. RXXXXX
 SIDE 1 SUPERPOSITION GAPS - EACH GAP FLAGGED (EARTH-
 BLOCK, SUBCOM ETC.)
 USED BY P750, P760

SASA. P300. X2GPSCMB. RXXXXX
 SIDE 2 SUPERPOSITION GAPS - COMBINATION OF ALL TYPES
 MERGED
 USED BY P500

SASA. P300. X2GPSIND. RXXXXX
 SIDE 2 SUPERPOSITION GAPS - EACH GAP FLAGGED (EARTH-
 BLOCK, SUBCOM ETC.)
 USED BY P750, P760

SASA. P400. CURNTLIN. RXXXXX
 LINES OF POSITION FROM SUPERIMPOSED XRAY DATA
 USED BY P500, P600, P750

SASA. P400. XXSKYSUM. RXXXXX
 EDITED SUPERIMPOSED DATA WITH NOISE REMOVED

SASA. P500. FLAREPKS. RXXXXX
 SINGLE PASS XRAY FLARE EVENTS

SASA. P600. THREESIG. RXXXXX
 FILE OF FITTED SINGLE PASS 3-SIGMA XRAY PEAKS

IV HARD COPY DATA SET DESCRIPTION

This section describes the printout and plots produced by the SASA data processing system. These hard copy data sets are stored at AS&E in the UHURU data room (638).

P100 Tape-To-Disk

The data are put on the disk by orbit groups. Usually these groups represent a day's worth of data. The tape-to-disk output lists each telemetry ground station receiving data within each orbit and shows where the data has had "parity" errors, undeterminable "parity" ("parity" check is done by comparing a frame of T/M data with a word within the next frame whose contents are a fixed function of the data content of the frame), frame sync errors, bit slip errors, and where there are data gaps. *

There is a listing of gaps at the end of the tape-to-disk (P100). These are times during which the data are not used in the superposition - long calibration, short calibration, radioactive calibration, PSD disabled, background anticoincidence disabled, PHA serial, and electronics cross switched. The existence of one of these conditions is determined by reading bits in the subcommutated data (telltales) indicating the logic and power switching state of the instrument. These gaps are called subcom gaps.

P110 - Orbit Index Definition List

The orbit index is a one page summary of the orbits in a data group. For each orbit the following information is given:

SEQ NO - sequence number of orbit within orbit group

*See document S2-0-43 "NASA SAS-A Satellite System Design and Interface Requirements", Johns Hopkins University Applied Physics Laboratory, April 1968.

ACTUAL IDENT. - five digit orbit name

STA. NO. - telemetry receiving station number where data was recorded, this is not always correct.

DURATION - length of orbit in seconds

START TIME - start time in universal time in days since Jan 0, 1970

STOP TIME - stop time in same units as START TIME

SUBCOM FRAMES - total number of subcom frames and the number of the first and last. Subcom frames contain subcommutative telemetry data.

MINOR FRAMES - total number of minor frames and the number of the first and last. The input to the rawplot program is the minor frame number.

DATA QUALITY - percent of good data to total; this is not accurate.

P130 - Ephemeris Tape-To-Disk

For each second of the data in a data group the following information is given:

DAY 1970 day of the year 1970 in universal time

DAY 1971 day of the year 1971 in universal time

SECONDS seconds of the day in universal time

DAY SECONDS day and fraction of a day in universal time since Jan 0, 1970

X, Y, Z the direction cosines of the position of the satellite in celestial coordinates relative to the earth.

EARTH RADIUS half angular size of the earth

P230 - Star Identification

The first page is a summary for an orbit of data telling when the satellite was in night and day, and for night, when each side was looking at earth and sky.

There follow the summary sheets for each set of star sightings identified. Each solution is identified by year and day of the data, orbit number (ACT. ORBIT=), solution number within orbit

(SET=) and date of processing. The parameters of the solution follow: spin axis position, spin rate, and phase. The phase is given by TZERO, the time at which the star sensor on side one passes zero azimuth, defined by a meridian passing through the spin axis direction and the vernal equinox. TOTAL SPIN AXIS DEV is the estimated error of the spin axis position in degrees of arc. Following the spin axis and phase information is a table of the identified stars giving for each one: SAO number, visual magnitude, position, sighting times in seconds (T1, T2, T3 correspond to transit times past the 3 slits of the star sensor reticle), which side of the satellite saw the star (SENSOR A=side 1=0.5° X-ray collimator), elevation in the field of view of the star sensor (positive elevation is towards spin axis direction), relative azimuth, and local spin rate (defined imprecisely by the separation of the first and third star pulses, T3-T1).

P260 - Rotational Equation of Motion

The program first produces a "rough fit" in which simple quadratic functions are fit to the spin rate and spin axis right ascension and declination. This preliminary fit is used to define superposition intervals and a "superposition coordinate system" (detailed below) and to reject individual star solutions which appear faulty. There is a page of output for each of the three least square solutions giving the parameters of the fit, e. g. $\omega = A_1 + A_2 t + A_3 t^2$ where ω is the spin rate and t is the time in seconds referenced from the center of the superposition interval.

The final form of the equation of motion solution involves two semi-empirical equations which are fit to the individual star sightings. These equations describe the position of the "center" of the side one star sensor (i. e. 90° from the spin axis, midway between the first and third slits of the sensor). The relevant offsets to relate

this to the X-ray collimator centers can be obtained from AS&E personnel. The equations give azimuth (θ) and elevation (ϕ) in a right handed spherical coordinate system fixed in space whose pole ($\phi = +90^\circ$) is given by the average spin axis for the superposition interval and whose zero of azimuth is defined by the meridian passing through the pole and the vernal equinox. This coordinate system is defined separately for each superposition interval, and is the basis for the superposition of X-ray data from successive spins. A separate fit is done for each orbit, thus, as many sets of constants are given as there are orbits in the superposition interval. Each page is headed by the definition of the superposition interval: the start and stop times (U.T.) and the average spin axis which defines the coordinate system.

For each orbit the following information is given:

- 1) Orbit number. A plus sign indicates that the tape recorder playback occurred during the data interval. This is further described by a "GAP" in the status column, followed by a START and STOP time for the gap, and by two extra constants for each equation describing the interpolation over the gap.
- 2) STATUS - NITE - all data as of the time of writing is night-time data.
GOOD - the equation for θ or ϕ is to be believed.
***** - the equation for θ or ϕ could not be fit.
- 3) START & STOP time - the time interval during which the solution is valid
- 4) STARS - the number of stars identified. The numbers preceding THETA and PHI are the number of stars used in the respective fits.
- 5) PARAMETER & CONSTANTS: the variable in question, followed by the constants necessary to calculate it:

$$\begin{aligned}
\omega &= \omega_1 + \omega_2 * t + \omega_3 * t^2 && \text{rough fit spin rate} \\
\alpha &= \alpha_1 + \alpha_2 * t + \alpha_3 * t^2 \\
\delta &= \delta_1 + \delta_2 * t + \delta_3 * t^2 && \text{rough fit spin axis location} \\
\theta &= A_1 + A_2 * t + A_3 * t^2 \\
&\quad + A_4 * \sin(\theta_0 * A_{10} + A_5) \\
&\quad + A_6 * t * \sin(\theta_0 * A_{10} + A_7) \\
&\quad + A_8 * t^2 * \sin(\theta_0 * A_{10} + A_9) \\
&\quad + H(t_j) * (A_{11} + A_{12} * t) \\
&\quad + \text{corrections for drift and precession}
\end{aligned}$$

where

θ is the position of identified star in the average co-ord system

$$\begin{aligned}
H(t_j) &= 0 \text{ for } t < t_j \\
&= 1 \text{ for } t \geq t_j
\end{aligned}$$

t_j = time of tape recorder playback

The equation for ϕ is similar to the equation for θ since the corrections for drift and precession involves information which the rough fit cannot provide, an iterative analysis is developed between the θ and ϕ equations to calculate the corrections which are of the order ± 2 arc mins. in general. For details consult A&SE personnel.

In all these equations, the time t is referenced to the center of the superposition interval:

$$\begin{aligned}
t &= \text{U. T.} - t_m \\
t_m &= (\text{U. T. START} + \text{U. T. STOP})/2.
\end{aligned}$$

There are some small higher-order corrections to the above equations; for further details consult AS&E personnel.

The equation of motion produces six CALCOMP plots. The first three show the behavior of the spin rate and spin axis right ascension and declination as a function of U. T. The fourth is a "map" of spin axis right ascension vs. declination, with time tic

marks. These first four plots correspond to the "rough fit" described above. The last two plots show the quality of the detailed equation of motion by comparing the positions of the observed stars with the fit equations for theta and phi as a function of U. T. The theta plot shows the difference (DELTA THETA) between the azimuth θ (as defined in 5 above) and a function $A*t$ where A represents the average spin rate. The phi plot represents the actual elevation ϕ as defined above.

P300 - Superposition Program

The printout begins with a dump of the ORBIT-INDEX file which is qualified by the name "ORBDEF". This contains a description of the orbits to be included in the superposition, i. e. orbit numbers, start and stop times, number of frames of data. This is followed by a listing of the program control parameters, some of which are input via cards to control program execution. The control parameters are qualified by the name "CTLDTA". The next group of data printed out are the start and stop times of the equation of motion for each orbit of data included in the superposition. Included in this list are the start and stop times of the gaps in the superposition due to the South Atlantic Anomaly. The above printout is for diagnostic purposes and usually is of no importance to the user.

A new page of printout labeled "Table of Earthblocking for Superposition Period from to ." indicates the beginning of useful printout. This page is labeled "PAGE 1" in the upper right hand corner of the printout. It contains a list of times when the X-ray detectors are blocked by the earth and therefore these times are not included in the superposition.

Page 2 is a table of "SUBCOM GAPS". These are gaps introduced in the superposition due to the S. A. Anomaly, Earthblocking, manually input gaps and subcom gaps from P100. On page 3 a

table of gaps is listed which is the result of combining all of the gaps on pages 1 and 2. It is the set of gaps which is actually used in determining what data are superimposed from the data group. The following output indicates the actual execution of the superposition phase of the program. Data from a single spin of the satellite are collected and tested for statistically significant peaks. As data are collected, the procedure which calculates the direction of the X-ray detectors (COORDS) is called and at each orbit boundary this procedure prints a message giving the relative orbit number and the start and stop time for the EQM. When a single spin of data (covering 360°) has been collected, the procedure which tests for peaks is invoked. This is indicated by the message "SINGLE PASS 3 SIGMA X-RAY PEAKS" followed by the average number of counts per bin in each side of the experiment and then a list of the peaks in the data. These peaks are also written onto a file SASA.P300.XSPINPKS.RXXXXX for use by programs P500 and P600. The processing of data and the subsequent printout continue in this way until the end of the superposition which is indicated by the message "SUPERPOSITION OVER AT XXXXX FRAMES".

A new page is started and the superimposed data are printed out with the bin numbers, number of counts, and number of minor frames

(BIN)	(COUNTS)	(T)
-------	----------	-----

of exposure listed. The data for side 1 are listed (4320 bins) followed by the data for side 2 (1080 bins). These data are also written onto a file (SASA.P300.XSUPDATA.RXXXXX)

Several additional files are created during the execution of P300. These were discussed in Section III.

P400- X-ray Peakfit

A. Printed Output:

The contents of the superposition program file SUPDEFX are printed out giving the start and stop time of the superposition interval, the

average spin axis coordinates and spin rate. This is followed by a title page "X1" which is a misnomer since the next page of output is the list of interesting objects possibly observable during the superposition interval. This list gives the object name, its coordinates in degrees of R. A. and Decl., and the elevation and azimuth in degrees for the current spin axis orientation. (Note in spacecraft coordinates the X-ray detectors X1 and X2 are at elevations of $1^{\circ}.118$ and $-1^{\circ}.228$ respectively.) The interesting objects list pertains to both side 1 and side 2. Immediately following this list is a list of the side 1 superposition data. The values given are bin numbers (12 bins per degree), the count rate (cts/sec) and exposure time (sec) for that bin.

The results of background estimates are listed on the next page. The background bin (3° width) number, the background rate (cts/sec) and its uncertainty are given. This is followed by the printed output describing the attempt to fit suspected peaks to the collimator response. First a sliding centroid test is made in which the integral count rate in a collimator width is calculated for various peak locations starting from low azimuth to high azimuth. If a significant positive excess in a collimator width is found, a centroid is calculated from the finite difference of adjacent half widths. Listed first are the counts and exposure times in a collimator half width and the difference in rates. The collimator location is incremented by one bin until a peak is detected and then finer divisions are used. For significant peaks the centroid fit is made and the results are printed out - azimuth of the centroid and uncertainty (the uncertainty is underestimated by about a factor of two) and an estimate of the peak amplitude and its uncertainty. The local background rate is also calculated and printed out, and the number of sigma in the peak are given. For peaks which appear extended a test is made by checking for an increase in the number of sigmas in a region of more than one collimator width. If there is an increase, then a fit to a uniform extended source is made which

results in printout listing the assumed width in degrees, the χ^2 for the fit, and a centroid for the extended emission. If the peak contains enough σ 's (2.4 side 1) then the data are fit to a triangle response, using a linearized iterative maximum likelihood technique. The results of this fit are given for each iteration and the best χ^2 value for azimuth and amplitude are summarized after a row of asterisks.

The above printout occurs for each suspected peak in the side 1 data. This is followed by the title page "X2" which is in turn followed by printout similar to that for side 1: the superposition data, potential peaks list, background summary, details of individual peak fits. (For side 2, a peak must contain more than the 2.0σ 's to be fit to a triangle response.)

After the side 2 printout a summary of the peaks which have been successfully fit to the collimator response is given. This summary is repeated several times as tearoff sheets for various users. The summary gives the superposition interval, the spin axis coordinates and the azimuthal offset for this spin axis orientation (θ_0). For each fitted peak (source) the azimuth and uncertainty, the R. A. and Decl. of the line of position pivot point, the observed intensity and uncertainty are given. (Note the pivot point is the location in space through which a great circle through the spin axis passes which corresponds to the line of position of the source as determined by the peak. This line of position has length of 10° due to the collimator acceptance angle. (The pivot point is offset from the center of the line of position by $-1^\circ.352$ for side 1 and $-0^\circ.728$ for side 2)). Also listed are the elevation, local background rate and status flags for each peak. The elevation is the X1 or X2 collimator offsets if the source was detected only on one side, or an estimate of true source elevation if it was seen on both sides. The status flags indicate if an X1-X2 correlation has been made.

P400 - X-ray Peakfit

B. Plotted Output:

The side 1 ($0^{\circ}.5$ FWHM) X-ray superposition data are plotted in cts/sec vs. azimuth from 0° to 360° . For peaks which have been identified and fit by the P400 program a triangular response is also plotted. Special symbols are plotted as a function of azimuth to indicate the location of interesting objects within the collimator field of view (FOV). The displacement of these symbols from the azimuth axis indicates the elevation of the object. This X1 data plot is followed by a plot in which every four bins of X1 data are summed. No triangles or symbols are plotted. Following the summed X1 data plot detailed plots of the regions about each fitted peak are made. The fitted triangle is also plotted.

The side 2 ($5^{\circ}.0$ FWHM) X-ray superposition data are plotted similarly

P500 - Crossing Window

The first page lists the version of the procedure used and the gaps table. The version number indicates which solution for the equation of motion has been assumed (VERSION ONE old version, VERSION TWO new version). If this printout is not present, then it is the old version. Under GAP A is a list of gaps that is a combination of subcom gaps, and gaps introduced in the superposition for the one-half degree FWHM collimator and under GAP B for the five degree FWHM. This is the same list that appears on page 3 of P300.

The next page or pages is the SUMMARY OF CROSSING TIMES. The period of time covered is indicated by 'CROSSING TIMES START AT DAY' and 'CROSSING TIMES ENDS AT DAY' where the times are given in universal time since Jan 0, 1970. AVERAGE OMEGA is the spin rate of the satellite, AVERAGE ALPHA is the right ascension, and

AVERAGE DELTA is the declination.

For each peak (CURRENT LINE) the following information is given:

THETA	the azimuth of the peak
DELTA THETA	the uncertainty of the peak
X RAY SIDE	the side, where side one is 1/2 degree FWHM and side two is 5 degrees FWHM
ORBIT NO	each orbit within the period is listed separately followed by
T1, T2	the sighting times in milliseconds of the peaks that were used in the superposition

The next summary is the TABULATION OF FLARE EVENTS. This is an early version of the three sigma program. It processes significant single peak passes to see if they correspond to a source or if they are noise.

P600 - Trisigma Processor

The first page of output from this program is a list of the strong known sources, and for those which are observable during the superposition interval, the azimuth and elevation expected. On the following pages (1 per peak) the output consists of the record of this procedure's attempt to find significant excesses where the possibility of such peaks has been flagged by the SUPERPOSITION program P300. The version number specified in the first line indicates which solution for the equation of motion has been assumed (Old - Ver. 3, New - Ver. 4). The approximate azimuth of the suspected peak and the maximum time of occurrence are called "THETA" and "SPIN STOP TIME". The program iteratively determines the correct time corresponding to "THETA" and then sets time bounds which will bracket the expected peak by ± 2 collimator widths. Status flags "STATUS OF PEAK TIME" indicate if a valid solution to the equation of motion exists at that time. "00" indicates valid results; "01" or "10" mean that there is no time corresponding to

the azimuth θ which is included in the equation of motion. The experiment side (X1 or X2) is indicated by "SIDE="; 00000000 means side X1, 10000000 means side X2.

Following the words "CHECK DATA FOR NOISE..." the number of data points, the estimated data point number of the peak, and the data point number limits corresponding to the collimator width are listed. The local background is then estimated excluding the data near the peak. (Values are in counts/bin.) The data are scanned for noise spikes which are eliminated and then the peak is found again by making a running average of five data points. The peak location and the collimator half width values are again listed after "RE-EVALUATE THE BACKGROUND..." and then the data are listed. Values of -1 indicate either noise which has to be suppressed or data drop out. The local background is again estimated excluding the peak region and then a test is made for data points with rates more than 2σ above the local background. "TEST=" the number of counts which must be exceeded (i.e. 2σ above background) and "NUM" is the number of data points which exceed TEST. If NUM is less than 2, the data is considered not to contain a significant peak and the message "THIS PEAK IS NOT SIGNIFICANT" is printed. If NUM is greater or equal to 2, a centroid fit is attempted using the method of a running average (sliding centroid). For each possible peak in the data a test is made for significance with a message printed out either:

- a. "SIGNIFICANT ZERO." followed by the centroid time as a day and fraction, relative data bin number of centroid, azimuth corresponding (not modulo 360) to the centroid time, the total number of counts and data bins included in the full width of the collimator and the number of sigmas above local background in this peak.
- b. "DISTRIBUTION ABOUT", time bin, "IS NOT SIGNIFICANT" followed by the total counts and bins and the number of sigmas above local background. There must be more than 3.0σ to be considered a significant peak.

There may be more than one point in the data selected which gives a zero in the sliding centroid calculation, thus the messages given above may appear more than once. In determining the best estimate of the centroid, a parabolic interpolation formula is used. If there is an invalid set of data for this fit the message, "THERE IS NO VALID SOLUTION TO THE PARABOLIC INTERPOLATION FORMULA. THIS CENTROID SKIPPED" is printed and the zero is ignored. If any significant centroid is found then the centroid calculation results in the weighted average value of all significant centroid locations. This location and the weighted value of the number of σ 's are listed with the message, "CENTROID CALCULATION RESULTS" followed by the time (day, fraction) data bin number, azimuth (mod. 360), status for the azimuth, average number of counts above local background, uncertainty in this average, number of sigmas above local background. If no significant centroid is found the messages "THE DIFFERENCE DOES NOT GO THROUGH ZERO" and "NO CENTROID FIT FOR THIS PEAK" are printed.

If a centroid is found the program next fits a triangular response to the data taking the centroid fit as a first estimate for the minimum χ^2 fitting procedure. After the message "BEGIN MINIMUM CHI SQUARED FIT TO TRIANGLE RESPONSE" is printed the initial parameters are listed - AMPLITUDE is in counts/bin above a fixed background (7.5 cts/sec side 1, 20.0 cts/sec side 2). BIN NUM. is the relative data bin number of the peak, CHISQRD is the value of χ^2 for these parameter values. Also listed on this line are the relative bin numbers of data used in fit, the number of degrees of freedom, the number of sigmas used to test data (DIFFM) and the number of data points which are more than DIFFM sigmas away from the expected values based on the centroid fit initial parameters. If more than the statistically expected number of data points are out of range (DIFFM), then the triangle fit is suppressed. Other-

wise an iterative minimum χ^2 search is made, the values of AMPLITUDE, BIN NUM. and CHISQRD are printed out for each step of the search, LAMDA is a parameter of the gradient expansion algorithm used to get a decrease in CHISQRD. When minimum χ^2 is found the triangle fit results are given, they are the peak time (day, fraction), the azimuth (and status), the bin number and uncertainty, the amplitude and uncertainty, χ^2 per degree of freedom, the number of degrees of freedom, and the collimator width in bins. If there is no convergence of the minimum χ^2 fit then a message is printed "THE TRIANGLE FIT DOES NOT CONVERGE. NO FIT MADE".

The above fits are made for each suspected peak. The end of the list of peaks is followed by the message "END OF SPIN PEAKS FILE." On a new page the "TRISIGMA SUMMARY" is printed. The heading lists the program version number, the superposition period, the spin axis and the orbit numbers. Then for each peak successfully fit (either centroid or triangle) the fit results are printed. The output columns are as labeled with the following additional information. The amplitudes are in cts/sec as determined by the fit, the intensities (also in cts/sec) are the corrected intensities for known sources taking elevation effects into account. For peaks not identified with unique source the intensity is listed as zero. Backgrounds listed are local as calculated in the program; however, in the triangle fit fixed background rates are used (7.5 cts/sec side 1, 20.0 cts/sec side 2). CHISQ is per degree of freedom and the source type is "NEW" if the azimuth of the peak is more than $\pm 5\sigma$ away from any known source. "NO." is the number of known sources with azimuths within $\pm 5\sigma$ of the peak.

P750 - Spectrum Analysis

The output is arranged in order of the azimuth angle of the source as listed in the lines file. For each pass (i. e. "crossing window") on a given source, the program will access the 8-channel pulse height

analyzer (PHA) data for the central 2/3 of the collimator width and also for approximately six collimator widths on either side to calculate the background. For each pass which shows the source strong enough, one block of computer printout is produced, including:

A) A table of counts and times for each PHA channel giving (1 through 8)

1. Source counts accumulated in given TIME
2. TIME (of source cts.) given in milliseconds
3. BKGD COUNTS accumulated in given TIME
4. TIME (of bkgd. cts.) given in milliseconds
5. C/S ABOVE BKGD } source counting rate and statistical
 } one-sigma error in counts per
6. STD DEVIATION } second

These numbers are also given for the X1 or X2 window (2-6 keV)

WARNING: Do not use channel one. It is contaminated by electronic noise.

B) TRIANGLE CORRECTION FACTOR: This is the multiplier needed if absolute counting rates or normalization factor is needed. It is normally about 1.5, reflecting the fact that only the center 2/3 of the triangular collimator response was used (full triangle would correspond to a factor of 2.0).

C) STATISTICAL ERROR OF NORM. FACTOR refers to error due just to Poisson counting statistics on the normalization coefficient of the spectral fit.

D) The best rough fit spectra are then found by a minimum- χ^2 comparison of the PHA data with a table of computed spectra for a grid of values for temperature, power law, and cutoff energy. The values of χ^2 for each set of parameters is displayed in a table for each spectral type:

BREMSSTRAHLUNG	→	temperature: (10 to 200 by 10) x 10 ⁶ °K
	↓	cutoff: 0 to 4 keV by 1 keV
POWER LAW	→	spectral energy index: 0.2 to 4.0 by 0.2
	↓	cutoff: 0 to 4 keV by 1 keV
BLACK BODY	→	temperature: (5 to 100 by 5) x 10 ⁶ °K
		cutoff = 0 keV

For each spectral type, the two best choices (i.e. lowest χ^2) of parameters are printed out, along with the predicted counting rate. It should be noted that only channels 2-8 are used in the fit, due to excess noise in channel 1.

For each pass in which the source was not strong enough to allow a spectral fit, the counts observed in both the crossing window and the background in channels 1-8 and the respective accumulation times (in milliseconds) are printed in an abbreviated format: bkgd channels 1-8, bkgd X1 or X2, source time, source channels 1-8. (No background subtraction is done at this point.)

For all passes on a given source, the source and background counts are accumulated and a spectrum is fit to the summed data. The format is the same as for a single pass. This summed spectra is the last one printed out with the given azimuth angle. (It can also be recognized by the greatly increased exposure times.)

It should be noted that due to the coarseness of the grid used and lack of pulse shape discriminator efficiency corrections, the results of the rough fit should not be used as quantitatively correct. A more detailed study of source spectra requires feeding the counting rate and sigma values listed into the FINEFIT spectrum program. It should also be noted that an auxiliary spectrum program exists which can substitute for P750 when much of the rest of the SAS data system (e.g. aspect solution) has not been run (see Memo EJS-26).

P760 - Energy Calibration

The first page of the calibration program gives the start and stop times of the superposition period

'LIST OF SUBCOM GAPS FROM ____ TO ____'.

Then follows a list of subcom gaps and gaps introduced in the superposition. This table corresponds to the table of page two of the superposition.

The second page is divided into two tables, 'LOOKING AT SKY' and 'LOOKING AT EARTH'. The background is calculated using the spin before or the spin after. The BACKGROUND COUNTS and TIME in milliseconds and the CALIBRATION COUNTS AND TIME are given for each side.

Page three gives the data and the sun angle. The data qualified by CALX and what follows that is for diagnostic purposes and is of no importance to the user. The next useful printout starts with DAY where day is in universal time since Jan 0, 1970. What follows is:

SIDE	just side 1, then side 2
ENERGY CORRECTION FACTOR	number close to 1, relative gain or pulse height analyzers compared to nominal pre-flight measured value. It is required for use in FINEFIT spectrum program.
NORMALIZATION FACTOR	conversion factor from assumed intensity to observed counts and computed by minimum chi square.
CHI SQUARE	minimum chi square for fit.

Then for each of the eight channels and side one and/or side two is given:

CENTRAL ENERGY	midpoint of energy band in keV
CHANNEL WIDTH	full width of channel in keV
OBS. COUNTS	counts above background accumulated during calibration interval

ERROR

uncertainty in counts

PREDICTED COUNTS

best fit to the data based on findings of the system, with small modifications based on prelaunch on ground calculations.

P910 - XRAYDUMP

The output of the XRAYDUMP program is a time sequenced listing of UHURU telemetry data. The following information is contained in the output. Day of data, time of telemetry syllable in seconds, frame no., flags for frame sync, bit slip and quality word errors, X1 and X2 counts by channel, pulse height analyzer data (PH1, PH2).

If there are any 'ones' in the flags, the data contains errors. If the flags are all 'zero', there can still be noise spikes, since not all errors are detected by checks on the frame sync, bit slip or quality word ("parity").

P920 - Plot Raw Star and X-ray Data

Each 12 minutes of data is plotted on an 18" long plot. At the left of the plot the orbit number and the start time of the plot are printed out. The 12 minutes of data are divided into 4 segments of 3 minutes each and are plotted one above the other. The following data are contained in the plot:

X1: $1/2^\circ$ collimator, integral window 2.4 to 6.9 keV. actual counts every 0.096 sec are plotted on a scale of 25 counts per half inch. This corresponds to 260.4 cts/sec per half inch, with saturation of the plot occurring at this level.

S1: Aspect sensor on the $1/2^\circ$ collimator side of the experiment. Digital levels from 0 to 10 are plotted every 0.048 seconds. Levels from 11 to 15 are saturated on the plot at level 10, corresponding to a half inch. The aspect information contains both star and sun sensor data which can usually be distinguished from each other by pattern recognition. Stars give 3 pulses of order .15 sec duration

with the first and third pulse separated by 10 seconds at the nominal $0.5^\circ/\text{sec}$ spin rate. The sun gives as many as 18 pulses of order 1 sec duration spread over 90 seconds at the nominal 0.5° spin rate. Sun pulses generally saturate in amplitude, while the height of star pulses depends on the individual star magnitudes.

X2: 5° collimator, integral window 2-6 keV. Actual counts every 0.384 seconds are plotted on a scale of 100 counts per half inch. This corresponds to 260.4 cts/sec per half inch with saturation of the plot occurring at this level.

S2: Aspect sensor on the 5° collimator side of the experiment. Plot same as S1.

Note that the times on the plot itself at the left of each segment and along the axes, are accurate, and the 3 and 12 minutes quoted above are only approximate to order 1 or 2 seconds.

P930 - Hex Dump of T/M Disk

Output: Output is fairly self-explanatory. One line is printed per minor frame giving the following information:
UT time in seconds of day (page header gives the day number of the mission. Days are numbered sequentially since January 0, 1970).

Minor frame number (within the major frame)

Whether the status bits for the frame indicate realtime (RT) or playback (PB) data.

Number of sync errors in the data (column is headed SE).

Number of bit slip errors in the data (Column is headed BS).

The requested syllables in hexadecimal (each column is headed with the syllable number).

The first ten bits of the STATUS_ADD field created by the tape-to-disk program (P100). This field gives data quality information.

Bit 1 on indicates that this is the last frame before a data gap.

Bit 2 on indicates that this is the first frame after a data gap.

Bit 3 on (SHOULD NOT APPEAR IN THIS PRINTOUT) dummy frame.

Bit 4 on Frame has frame sync errors.

Bit 5 on Frame has bit slip errors.

Bit 6 on Unused

Bit 7 on Definite parity error in first half of frame

Bit 8 on Definite parity error in second half of frame

Bit 9 on undeterminable parity in first half of frame

Bit 10 on undeterminable parity in second half of frame.

In addition there is a self-explanatory line, containing major frame number, for each major frame.

UHURU DATA SET DESCRIPTION

NAME SASA. P100. ORBITNX. &R

(where &R must be replaced by the (starting) orbit number for the data group.)

SOURCE AND PURPOSE:

This data set is used as an index to randomly access the minor frame data and the subframe data set¹ of the data group and is generated by P100 (the tape-to-disk program) as it derives these two other data sets from the telemetry tape.

In the production UHURU system, this data set is written by P100, the tape-to-disk program. It is read by

P110	Orbit index listing program
P130	Ephemeris tape-to-disk program
P230	Star identification program
P260	Rotational equation of motion program
P300	X-ray superposition program
P500	Crossing window program
P600	Three sigma processing program
P750	Spectrum analysis program
P760	Energy calibration program

FORMAT:

This data sets contains one record for each orbit in the data group. Each record contains the following information:

ACTUAL ORBIT _ ID

The five digit orbit number for this orbit

UTORB_START

The starting time for this orbit² in days and fraction of a day since January 0, 1970.

STATION_NO.

The station number is usually given as -5 for concatenated data, the normal case.³ If only data from a single station was used for this batch, the identifying number for that station is given. During tape recorder operation the number 5 was given.

The three items below are used as indices for referencing the minor frames file.

The first minor frame of the first orbit of the batch is numbered 1. The minor frames are numbered consecutively within each orbit, and dummies are inserted in place of any missing minor frames and assigned numbers; thus, within each orbit, there is a continuous linear correspondence between time and minor frame number. Dummy minor frames are not supplied, however, for the gap between orbits. The first minor frame of each orbit after the first orbit of the batch is numbered one plus the number of the last minor frame of the previous orbit.

The minor frame data set is sequentially organized in one-track records with each track containing 30 minor frames. To retrieve a particular minor frame from disk, one can compute the corresponding record number as

$$\text{record number} = \text{integral part of } \left(\frac{\text{minor frame number}}{30} \right) - 11$$

MINOR_FRAME_LO

The first minor frame number for this orbit

MINOR_FRAME_HIGH

The last minor frame number for this orbit

MINOR_FRAME_MAX

The number of minor frames in this orbit

The following three items are used as indices in referencing the subframe data set in a manner similar to that used for referencing the minor frames. Since this data set is not presently used, I will not go into further detail.

SUB_FRAME_LO

SUB_FRAME_HI

SUB_FRAME_MAX

ORBIT_STATUS

This item contains 16 bit flags. It was included by the person who originated the format of this data set in case it would be needed later. I am not sure if any of the bits are used or what they are used for.

Physical Format:

The DD statement used in writing this data set is:

ED DSF=SASB.P160.BREITING. VOL=DEF. ASL,RSP,DISP=C,RE

FEOL=45, SI=1, LE=450, RECFM=F, LPA=1, CDS=1, PLST=

9 8 3		9 8		10 14 18 11		8 3		3 4		8 0 7		7	
0000000000	0000000000	0000000000	0000000000	0000000000	0000000000	0000000000	0000000000	0000000000	0000000000	0000000000	0000000000	0000000000	0000000000
9 10 11 12 13 14 15 16 17	18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80	81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100	101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200										

where &R represents the data group (starting orbit) number, and &ORB represents the number of tracks needed for the data set.

A DD statement suitable for reading this data set is

DD DD = A.A.O.O.DRBITINX,90 VOL=REF=KAR, DISP=SHR

```

000000 00000 00 0 0000 00000 00 0000 -00000000000 00 00 000000000000000000000000
  1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80
  1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

```

where &R represents the data group number

The record format for this data set is given by:

CASA. PICO. ORIENT. REVIEW
DECLARE COPY FILE OUTPUT RECORD SEQUENTIAL;

04601000

DKW00920

~~(OKW) 11-11-44~~

~~SECRET~~

DKW00950

DEC 1966

0KW20970

054700942

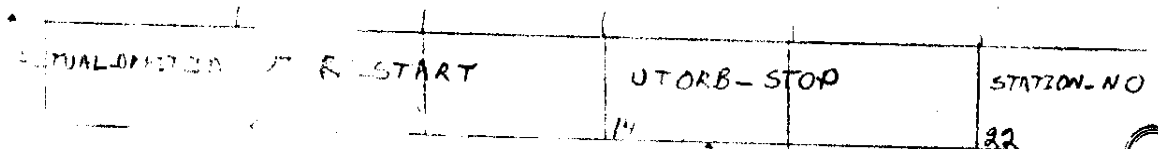
05000000

[illegible]

```

DECORE 01 ORBIT_DEFINITION ALIGNED,
02 ACTUAL_ORBIT_ID CHARACTER(5),
03 (UTORR_START, UTORR_STOP) FLOAT BINARY(53),
04 STATION_NO FIXED BINARY (15),
05 (MINOR_FRAME_LO, MINOR_FRAME_HI, MINOR_FRAME_MAX) FIXED
    BINARY(31,0),
06 (SUB_FRAME_LO, SUB_FRAME_HI, SUB_FRAME_MAX) FIXED BINARY(
07 ORBIT_STATUS BIT(16);

```



MINOR LUTING PLANT

34

38 40 42 44

SUB-FRAME ORBIT

SUB-FRAME ORBIT

NOTE 1: The subframe data set is not used in the UHURU production system

NOTE2: While the tape recorder in the spacecraft was working, the starting and stopping times were those associated with the beginning and end of the data in the tape recorder load. Since tape recorder failure, the starting time represents the time during this orbit that the Quito station (number 005) started receiving good telemetry, and the stopping time represents the time when the last station before Quito received its last good frame of telemetry.

NOTE 3: The spacecraft tape recorder was operational during about the first 700 orbits. During this time, as the spacecraft passed the Quito station, it would dump the accumulated data for the last orbit. After tape recorder failure, data from the spacecraft has been collected in real time at each of the approximately half dozen stations. "Concatenated data" refers to the combined real-time telemetry from these stations.

UHURU Data Set Description

INDEX

Raw Telemetry Tape

Ephemera Tape

PICO. MINIFRAME. R&E

P100 ORBITING, R & R

P100.SUBFRAME, R & R

P.00.SUBGPSXI.R&.R

P100.SVBGPSX2.R8.R

P130. EPHEMERIS. R&R

P 220, STP KINPT, RD 12

P230, FINPOINT, R2 R

P230, R6 H P O I N T, R Q R

P260, EQUIPMENTS, RQ R

P 260, SUPINTVS. RS

P300, C U K N T S U P : R & R

P300, XSPINPKS . RB R

P300, XERO DATA, R & R

P300, X16 SCMB, R812

P300, XIGPS IND, R8R

P300, X26PSCMB .RBR

P300, X2GPSIND, R8R

P400. CONTINU. R&R

PAOU, XX-44SUM R8R

P500. FLAREPKE R&R

9600, THREE SIX R8R

UHURU DATA SET DESCRIPTION

NAME: Raw Telemetry tape

SOURCE & PURPOSE:

The raw telemetry tape is generated by NASA-GSFC. It contains the raw data from the spacecraft, as recorded by the tracking stations. NASA assigns UT times to the data, subcommutates the subom data, and adds identifying information such as orbit number, station number, etc. The tape may be either written at GSFC and sent to AS&E over telephone lines or written here by the PDP-9. In the production UHURU system, this tape is read only by Pl00, the tape-to-disk program.

FORMAT:

Tapes written at GSFC are 7 track; those written at AS&E are 9 track, where each 8-bit character has the two leading bits set to zero. In either case, the tape appears to the computer to be a 7 track tape when read. Therefore the format is described in those terms.

The tape consists of several files, separated from one another by tape marks. Each file contains the data from a single pass over a tracking station in a single mode (realtime or playback). There are four tape marks after the last file. Prior to tape recorder failure, there are often two realtime data files per pass. After tape recorder failure, all the data is realtime and there is always one file per pass.

Each record contains 1152 6-bit characters. There are 4 types of records:

1. Tape ID record - appears at the beginning of each tape
2. File ID records - appears at the beginning of each file
(also referred to as "orbit header record")
3. Minor frame record - contains 8 minor frames of telemetry data, plus associated times and flags
4. Subcom record - contains subcommutated data from a single major frame.

The record formats are as follows:

1. Tape ID Record

<u>6-Bit Characters</u>	<u>Information</u>	<u>Comment</u>
1-5	International Code	Satellite # label
6-9	Edit Tape #	Sequential order of tapes written by IPD (not necessarily chronological)
10-11	Year of Digitation(70,71)	at IPD
12-14	Day of Digitation(1-365)	
15-16	A/D Operator ID	at IPD
17-18	A/D Line #	at IPD
19	"0" for Experimenter's Tape	
20-1152	Blanks (60)	

2. File Id Record

<u>6-Bit Characters</u>	<u>Information</u>	<u>Comment</u>
1-2	Edit File Number	File # within present tape
3-6	Analog Tape Number	1 to 9999
7-8	Analog File Number	1 to 99
9-11	Station Number	
12-17	Date of Recording(Yymmdd)	at ground Station
16	Shift Number	
19-22	Analog Start Time(HHMM)	At ground station
23-26	Analog Stop Time	GMT
27-31	Orbit Number	
32-35	Clock Calibration (+XXX)	If possible
36-39	Clock TapeCharacter	
40-1152	Blanks (60g)	

3 Minor Data Record

8 Minor Frames of Data (each 140 characters) followed by 192
Zero Bits

Minor Data Frame

<u>Characters</u>	<u>Information</u>
1-128	Minor Frame (96 syllables of data)
129-132	Data Status
133-140	Ground Time -(format shown above)

Data Status

<u>Bit #</u>	<u>Information</u>
1,2,3	Data Type { 0=R/T Stop Commutator Flags 1=P/B
4-9	Minor Frame Counter 0-63
10	Time flags { =Time decoder F2 11 ≠0 Minor Frame counter corrected 12 ≠0 ⇒ Ground Time corrected
11	
12	
13-18	Frame Sync Errors
19-24	Bit Slip Information

All frame syncs are adjusted to be perfect if necessary by GSFC
after frame sync errors counted.

4. Subcom Record

<u>Characters</u>	<u>Information</u>
1-140	Start of Sequence Identifier (see below)
141-280	AS&E Subcom Frame
281-420	APL Subcom Frame #1
421-560	APL Subcom Frame #2
561-700	Digital Subcom Frame #1

<u>Characters</u>	<u>Information</u>
701-840	Digital Subcom Frame #2
841-980	DM Frame #1
981-1020	DM Frame #2
1010-1152	Zeroes

Start of Sequence Identifier

<u>Characters</u>	<u>Information</u>
1-4	Inverted Minor Frame Sync Pattern
5-8	1st Minor Frame Count (right adjusted)
9-12	Last Minor Frame Count (right adjusted)
13- 140 140	Zero Fill

SE,APL,etc. Subcom Frame

<u>Characters</u>	<u>Information</u>
1-4	Frame Sync Pattern
5-92	Subcom Data: 512 bits & last 16 bits zero fill
93-124	Data Types 1 0 for R/T for P/B and stop com. Flags for each minor frame
125-128	Zero Fill
129-132	Major Frame Counter 20 bits (right adjusted)
133-140	Ground Time at Start of Major Frame

In a normal sequence (no data dropouts), each file (after the file ID record) is arranged as follows:

Subcom record

8 minor frame records

Subcom record

8 minor frame records

etc.

If there is a data dropout, the remainder of the minor frames in the record will be padded with 20₈ characters. If the dropout occurs at the end of a minor frame record, there will follow a record consisting entirely of 20₈ characters. If the data is picked up within the same major frame, the following record will be another minor frame record, starting with the first good minor frame, whether or not that minor frame is number (1 + a multiple of 8). Thus, in this case, minor frame #64 may not appear at the end of a minor frame record. In this case, the remainder of the last record will be padded with zeroes.

If the data after a dropout is picked up in a succeeding major frame, the dropout will be followed by a subcom record for the major frame in which the data is picked up, followed by a minor frame that begins with the first good minor frame.

The last minor frame record in a file will be filled out, if necessary, with zeroes.

UHURU DATA SET DESCRIPTION

NAME SASA.P100.SUBFRAME.. &R

where &R is replaced by the (starting) orbit number for the data group

SOURCE & PURPOSE:

This data set contains the subcommutated data that has been lifted from the raw data and put into a separate data set. It is created by P100 (tape-to-disk) and it is not used by any other programs at present.

FORMAT:

Each major frame contains the subcommutated data from sixty-four minor frames; it covers a time period of 49.152 seconds.

For each batch the number of the first major frame is zero and the major frames are numbered consecutively within each orbit, with bad or missing frames padded, so that within each orbit the time and major frame number increase linearly. Dummy major frames are not supplied for gaps between orbits. Starting with the second orbit, the first major frame of an orbit is the number of the last major frame of the previous orbit plus one. The first subcom frame and the last subcom frame of each orbit will not have sixty-four minor frames corresponding to them unless the start and stop times of the orbit land on a subcom boundary.

Each record contains the following information:

UT the beginning time of the frame in days and fraction of a day since January 0, 1970

MAJOR_COUNT number of subcoms on tape

MINOR_COUNT_START zero

MINOR_COUNT_END sixty-three

MINOR_POINT not filled in

SUBCOMS

PHYSICAL FORMAT:

DD for writing:

```
DD DD DSN=SASA.P100.SUBFRAME.R&R,VOL=REF=SASA.R&R,  
SPACE=(CYL,(&SUB,01),RLSE),DISP=(,KEEP,DELETE)
```

where &R represents the orbit number for the data group and
&SUB is the number of CYL needed for the data set.

DD for reading:

```
// DD DD DSN=SASA.P100.SUBFRAME.R&R,VOL=REF=SASA.R&R,DISP=SH
```

where &R represents the orbit number for the data group

Record Format

```
DECLARE SUBFIL FILE RECORD SEQUENTIAL KEYED OUTPUT ENVIRONMENT (F(472)  
REGIONAL(1));
```

```
DECLARE 01 SUBFRA ALIGNED, 02 (UT FLOAT BINARY(53), (MAJOR_COUNT,  
MINOR_COUNT_START, MINOR_COUNT_END) FIXED BINARY(24,0),  
MINOR_POINT FIXED BINARY(31,0), SUBCOMS(7,64) BIT(8));
```


UHURU DATA SET DESCRIPTION

NAME: SASA.P100.MINFRAME. &R

(where &R is replaced by the (starting) orbit number for the data group)

SOURCE & PURPOSE:

This data set is generated by P100 (the tape-to-disk program) from the raw data tape. This data set contains the raw data from the spacecraft, that is, the data from the star sensor, the sun sensor, and the X-ray sensors and the sub-commutated data.

In the production UHURU system, this data set is written by P100, the tape-to-disk program. It is read by

P230	star identification program
P300	X-ray superposition program
P400	three sigma processing program
P750	spectrum analysis program
P760	energy calibration program

FORMAT:

This data set is usually accessed through the subroutine DRECTAC and TLRECD on SASA.LOAD rather than directly. This relieves the user of the responsibility of figuring out the blocking factor; he uses it as if it were unblocked. DRECTAC is for random access, that is, when only the time is known. TLRECD is for sequential access, that is, when the minor frame number is already known.

Each minor frame is .768 seconds long and contains 8 samples of X-1, 4 samples of PH1-1-8, 2 samples of X-2 and PH2-1-8, 16 samples of aspect data, and 1 sample of housekeeping data. *64 minor frames = 1 major frame*

For each batch the number of the first minor frame is one and the minor frames are numbered consecutively within each orbit, with bad or missing frames padded, so that, within each orbit the time and minor frame number increase linearly. Dummy minor frames are not supplied for gaps between orbits. Starting with the second orbit, the first minor frame of an orbit is the number of the last minor frame of the previous orbit plus one.

The minor frame data set is sequentially organized in one track records with each track containing 30 minor frames. To retrieve a particular minor frame without using DRECTAC or TLRECD the record number is equal to the integral part of minor frame number minus one divided by 30. Actually this particular record size means there is one record per track on the 2311, two records per track on the 2314.

Each record contains the following information:

U is the beginning time of the frame in days and fraction of a day since Jan.0, 1970
MAJOR POINT is the number of the subcom frame that corresponds to the minor frame.

STATUS contains the minor frame number within the major frame and the frame sync errors. This information is used in the tape-to-disk program, but need not concern the users.

STATUS_ADD

DKW00590

```
*****
/* BITS IN STATUS_ADD ARE SET 1 WHEN THE FOLLOWING CONDITIONS HOLD: */DKW00600
/* */DKW00620
/* BIT CONDITION */DKW00630
/* */DKW00640
/* 1 LAST GOOD MINOR FRAME BEFORE DATA GAP; MAY HAVE PARITY SET */DKW00650
/* 2 FIRST GOOD MINOR FRAME AFTER DATA GAP; MAY HAVE PARITY SET */DKW00660
/* 3 ANY FRAME WITH CALCULATED EMBEDDED TIME */DKW00670
/* 4 MINOR FRAME WITH FRAME SYNC ERRORS; TIME CORRECTED */DKW00680
/* 5 MINOR FRAME WITH BIT SLIP ERRORS; TIME CORRECTED */DKW00690
/* 6 (CURRENTLY UNUSED) */DKW00700
/* 7 DEFINITE PARITY ERROR IN FIRST HALF OF MINOR FRAME */DKW00710
/* 8 DEFINITE PARITY ERRORS IN LAST HALF OF MINOR FRAME */DKW00720
/* 9 UNDETERMINABLE PARITY IN FIRST HALF OF MINOR FRAME */DKW00730
/* 10 UNDETERMINABLE PARITY IN LAST HALF OF MINOR FRAME */DKW00740
/* 11-24 (CURRENTLY UNUSED) */DKW00750
DKW00760
```

FRAME

Frame Format

WORD	SYLLABLE 1	SYLLABLE 2	SYLLABLE 3
1.	FRAME SYNC	FRAME SYNC	FRAME SYNC
2.	X-1		ASPECT
3.	PH1-1	PH2-1	PH1-2
4.	PH2-2	PH1-3	ASPECT
5.	PH1-4	FRAME IDENT.	PH1-5
6.	X-1		ASPECT
7.	PH1-6	PH2-3	PH1-7
8.	PH2-4	PH1-8	ASPECT
9.	X-2		APL HSKPG. SAMPLE #1
10.	X-1		ASPECT
11.	PH1-1	PH2-5	PH1-2
12.	PH2-6	PH1-3	ASPECT
13.	PH1-4	DM	PH1-5
14.	X-1		ASPECT
15.	PH1-6	PH2-7	PH1-7
16.	PH2-8	PH1-8	ASPECT
17.	DSC #1	DSC #2	AS&E HSKPG.
18.	X-1		ASPECT
19.	PH1-1	PH2-1	PH1-2
20.	PH2-2	PH1-3	ASPECT
21.	PH1-4	PARITY CHECK	PH1-5
22.	X-1		ASPECT
23.	PH1-6	PH2-3	PH1-7
24.	PH2-4	PH1-8	ASPECT
25.	X-		APL HSKPG. SAMPLE #2
26.	X-1		ASPECT
27.	PH1-1	PH2-5	PH1-2
28.	PH2-6	PH1-3	ASPECT
29.	PH1-4	DM	PH1-5
30.	X-1		ASPECT
31.	PH1-6	PH2-7	PH1-7
32.	PH2-8	PH1-8	ASPECT

Physical Format:

DD card for writing

```
//MINFRA DD DSN=SASA.P100.MINFRAME.R&R,VOL=REF=SASA.R&R,  
//SPACE=(CYL,(&MIN,05),RLSE),DISP=(,KEEP,DELETE)
```

where &R is the orbit number and &MIN is the number of cylinders required for the data set.

DD card for reading

```
//MINFRA DD DSN=SASA.P100.MINFRAME.R&R,VOL=REF=SASA.R&R,DISP=SHR
```

where &R is the orbit number

Record Format

```
DECLARE MINFRA FILE RECORD KEYED ENVIRONMENT (F(3360) REGIONAL (1));  
DECLARE 01 MAIN_DISK_REC'D ALIGNED, 03 MAINFRX(30) ALIGNED,  
      05 ( UT FLOAT BINARY(53), MAJOR_POINT,  
      STATUS_BIT(24), STATUS_ADD_BIT(24),  
      FRAME (96) BIT(8));
```

	MAJOR-POINT		FRAMES
	STATUS	STATUS-ADD	
9	11	14	17

FRAMES 03

FRAMES 41

57

FRAMES 65

XS

16
6/12/7
21-2
hit

UHURU DATA SET DESCRIPTION

NAME: SASA.P100.SUBGPSX1.R&R
SASA.P100.SUBGPSX2.R&R

SOURCE & PURPOSE: P100, the tape-to-disk program, checks each subcom record as it goes from the tape to the disk for bits indicating the logic and power switching state of the instrument. If one of these conditions exists, the data is not used in superposition. This file is input to P300, the superposition program.

FORMAT: There is one record for each subcom gap. There is a separate file for each side. The format of each record is

UT1 the start time in days and fraction of a day since January 0, 1970;
it is 8 times .768 sec before the bit first appears

UT2 the end time in days and fractions of a day since January 0, 1970;
it is 8 times .768 secs after the bit last appears

TYPEGAP1 Bit 1 on Long Calibration
Bit 2 on short calibration
Bit 3 on radioactive calibration
Bit 4 on PSD disabled
Bit 5 on background disabled
Bit 9 on PHA serial
Bit 10 on side switched

DD for writing (MOD file preallocated in earlier step)

// DD DSN=SASA.P100.SUBGPSX1.R&R,VOL=REF=SASA.R&R,DISP=(,KEEP),	00001200
// DSN=(LOGCL=18,BLKSIZE=180,RECFM=FB),SPACE=(TRK,(&GAP,1))	00001300
// DD DSN=SASA.P100.SUBGPSX2.R&R,VOL=REF=SASA.R&R,DISP=(,KEEP),	00001400
// DSN=(LOGCL=18,BLKSIZE=180,RECFM=FB),SPACE=(TRK,(&GAP,1))	00001500
// GAP1 DD DSN=SASA.P100.SUBGPSX1.R&R,VOL=REF=SASA.R&R,DISP=MOD	00001700
// GAP2 DD DSN=SASA.P100.SUBGPSX2.R&R,VOL=REF=SASA.R&R,DISP=MOD	00001800

Where &R represents the orbit number for the batch and &GAP
the number of tracks needed

DD for reading

// GAP1 DD DSN=SASA.P100.SUBGPSX1.R&R,VOL=REF=SASA.R&R,DISP=SHR,	00000250
// DSN=(LOGCL=18,BLKSIZE=180,RECFM=FB),SPACE=(TRK,(&GAP,1))	00000260
// GAP2 DD DSN=SASA.P100.SUBGPSX2.R&R,VOL=REF=SASA.R&R,DISP=SHR,	00000300
// DSN=(LOGCL=18,BLKSIZE=180,RECFM=FB),SPACE=(TRK,(&GAP,1))	00000310

where &R represents the orbit number for the batch

File Definition

DECLARE GAPS 1 FILE RECORD SEQUENTIAL,
GAPS 2 FILE RECORD SEQUENTIAL;

DECLARE 01 GAPREC1 ALIGNED,	/* X1 SIDE */	FIND2480
02 (UT1,UT2)	FLOAT BINARY(53),	FIND2490
02 TYPEGAP1	BIT(16),	FIND2500
01 GAPREC2 ALIGNED,	/* X2 SIDE */	FIND2510
02 (UT1,UT2)	FLOAT BINARY(53),	FIND2520
02 TYPEGAP2	BIT(16);	FIND2530

UT1

UT2

TYPE GAP1

9

17

Life

UHURU DATA SET DESCRIPTION

NAME: SASA.P130.EPHEMERIS.R&R

where the five digit (starting) orbit number must replace &R
SOURCE & PURPOSE:

The ephemeris tape-to-disk, P130 reads the tape supplied by GSFC and extracts the required ephemeris data for the time interval included in the data group. This file is called SASA.P130.EPHEMERIS.R&R. This file can be accessed by use of GETEPH. This file is used by P230 and P300.

FORMAT:

There is one record per minute for the orbit group. The format of the record is as follows:

OUTTIME day in days and fraction of a day since January 0, 1970

POSITION(3) the coordinates of the position of the satellite in celestial coordinates relative to the earth

VELOCITY(3) the velocity vector of the satellite

PHYSICAL FORMAT:

DD card for writing

```
//EPHEM DD DSN=SASA.P130.EPHEMERIS.R&R,VOL=REF=SASA.R&R,DISP=(,KEEP),
// DCB=(RECFM=FB,LRECL=32,BLKSIZE=320),SPACE=(TRK,(&EPH,20),RLSE)
where &R is the orbit number and &EPH is the number of tracks
needed for the data sets.
```

DD card for reading

```
//EPHEM DD DSN=SASA.P130.EPHEMERIS.R&R,VOL=REF=SASA.R&R,DISP=SHR
// DCB=BUFNO=&BUF
```

where &R is the orbit number and &BUF is the number of buffers.

File Definition

DECLARE EPHEM FILE RECORD SEQUENTIAL;

OUTPUT,

```
2 OUTTIME FLOAT BINARY(53),
2 POSITION(3) FLOAT BINARY,
2 VELOCITY(3) FLOAT BINARY;
```

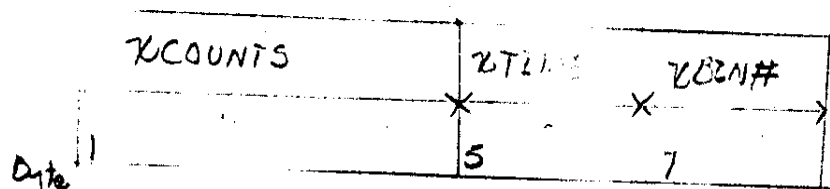
OUTTIME	POSITION(1)	POSITION(2)	POSITION(3)	VELOCITY(1)	VELOCITY(2)	VELOCITY(3)
1	9	13	17	21	25	29

Byte

SOURCE & PURPOSE

A superposition interval is defined by the equation of motion as a time period in which the satellite spin axis does not drift more than 3° on the sky so that the data from successive spins may be summed. The average 360° circle scanned by the detector during a superposition is broken into 4320 (1080) elements of azimuth of $5'(20')$ each for the $1/2^\circ(5^\circ)$ detector.

Each X-ray data word is added to the array element corresponding to the location on the sky of the detector at the time the data word was collected as calculated from the equation of motion solution. In this way, the X-ray data are superimposed over many spins of the satellite. The result is an array of count rate versus azimuth with total exposure of order one day and this is written out as SASA. P300. XSUPDATA. R&R.



UHURU DATA SET DESCRIPTION

NAME: SASA.P300.X1GPSCMB.R&R
 SASA.P300.X2GPSCMB.R&R
 (where the five character ((starting)) orbit must replace &R)

SOURCE & PURPOSE:

P300, the superposition program, combines the subcom gaps from the tape-to-disk program (SASA.P100.SUBGPSX1.R&R and SASA.P100.SUBGPSX2.R&R) with the manual gaps, the earth-blocking gaps and South Atlantic anomaly gaps. These last two kinds of gaps are found by using COORDS, which calculates the direction of the X-ray detectors using the output from the equation of motion (SASA.P260.EQMCNSTS.R&R). These gaps are written out with each type of gap flagged (SASA.P300.X1GPSIND.R&R and SASA.P300.X2GPSIND.R&R) and with all types merged. These gaps cover the time interval given in SASA.P300.CURNTSUP.R&R. They are used by P500, the cross-window program to eliminate bad times from the crossing window it puts in SASA.P400.CURNLIN.R&R

FORMAT:

TIME1 the start time in days and fraction of a day since January 0, 1970

TIME2 the stop time in days and fraction of a day since January 0, 1970

file definition

DECLARE XRGAP1 FILE RECORD SEQUENTIAL,

XRGAP2 FILE RECORD SEQUENTIAL;

DECLARE 01 TIMES STATIC,

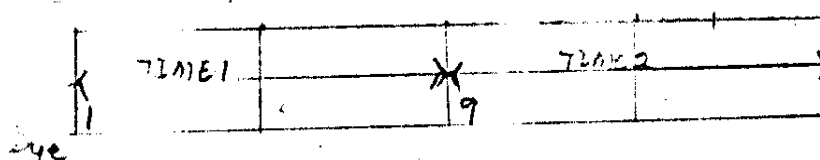
02 (TIME1,TIME2) FLOAT BINARY (53);

DD cards for writing

```
//XRGAP1 DD &DUP.DSN=SASA.P300.X1GPSCMB.R&R&SUF,VOL=REF=SASA.R&R&SUF,
// DCB=(BLKSIZE=0160,LRECL=0016,RECFM=FB,BUFNO=1),
// SPACE=(TRK,(01,1),RLSE),DISP=(NEW,KEEP)
//XRGAP2 DD &DUP.DSN=SASA.P300.X2GPSCMB.R&R&SUF,VOL=REF=SASA.R&R&SUF,
// DCB=(BLKSIZE=0160,LRECL=0016,RECFM=FB,BUFNO=1),
// SPACE=(TRK,(01,1),RLSE),DISP=(NEW,KEEP)
```

DD cards for reading

```
//XRGAP1 DD DSN=SASA.P300.X1GPSCMB.R&R&SUF,VOL=REF=SASA.R&R,DISP=SHR
//XRGAP2 DD DSN=SASA.P300.X2GPSCMB.R&R&SUF,VOL=REF=SASA.R&R,DISP=SHR
```



CHURCH DATA SET DESCRIPTION

NAME: SASA. P300. X1GPSIND. R&R
SASA. P300. X2GPSIND. R&R

(where the five character (starting) orbit number for the batch must replace &R)

SOURCE & PURPOSE: P300, the superposition program, combines the sub-com gaps from the tape-to-disk (SASA. P100. SUBGPSX1. R&R and SASA. P100. SUBGPSX2. R&R) with the nominal gaps, the earth-blocking and South Anomaly gaps. These last two kinds of gaps are found by using COORDS, which calculates the direction of the X-ray detectors using the output from the equation of motion (SASA. P260. EQMCNSTS. R&R). These gaps are written out with each type of gap flagged and also with all types merged (see SASA. P300. X1GPSCMB. R&R and SASA. P300. X2GPSCMB. R&R). These gaps cover the time interval given in SASA. P300. CURNTSUP. R&R. They are used by the spectrum program to compute background times and the calibration program to find calibration times.

FORMAT: There is one record for each subcom gap. There is a separate file for each side. The format of each record is

UT1 the start time in days and fraction of a day since January 0, 1970

UT2 the stop time in days and fraction of a day since January 0, 1970

TYPEGAP Bit 1 on long calibration
Bit 2 on short calibration
Bit 3 on radioactive calibration
Bit 4 on PSD disabled
Bit 5 on background disabled
Bit 6 on earth blocking
Bit 7 on "nothing" used for manual gaps
Bit 8 on South Atlantic anomaly
Bit 9 on PHA serial
Bit 10 on side switched

X7 YPEGAP
12

/*70.337*/GAPS0290
/*70.337*/GAPS0300
GAPS3190
GAPS3200
GAPS3210

11 DD &DU. DSN=SASA.P300.X1GPSIND.R&R&SUF,VOL=REF=SASA.R&R&SUF, 00000270
 SPACE=(TRK,(01,1),RLSE),DISP=(NEW,KEEP) 00000280
 11 DD &DU. DSN=SASA.P300.X2GPSIND.R&R&SUF,VOL=REF=SASA.R&R&SUF, 00000290
 SPACE=(TRK,(01,1),RLSE),DISP=(NEW,KEEP) 00000320
 11 DD &DU. DSN=SASA.P300.X1GPSIND.R&R&SUF,VOL=REF=SASA.R&R&SUF, 00000330
 SPACE=(TRK,(01,1),RLSE),DISP=(NEW,KEEP) 00000340
 11 DD &DU. DSN=SASA.P300.X2GPSIND.R&R&SUF,VOL=REF=SASA.R&R&SUF, 00000350
 SPACE=(TRK,(01,1),RLSE),DISP=(NEW,KEEP)

NAME: SASA. P400. CURNTLIN. RXXXXX

(where XXXXX represents the ((starting)) orbit number for the batch)

FORMAT:

This data set contains one record for each peak successfully fitted. Each data set contains the following information.

RA right ascension of the line of position pivot point
 DECL declination of the line of position, pivot point
 THETA azimuth of the peak (source)
 DT.HETA uncertainty in the azimuth
 PHI elevation of the source in the collimator if there is X1-X2 correlation otherwise elevation of center of collimator
 DPHI uncertainty in the elevation
 SI intensity of peak
 DSI uncertainty in the intensity
 BACKGROUND local background rate
 SXV vecor components of cross product of pivot point center vs. spin axis vector
 SPECTRAL output 1&2 Bremsstrahlung, 3&4 Power Law, 5&6 Black Body
 INDEX temperature (10 to 200 by 10) x 10^6 °K for Bremsstrahlung spectral energy index 0.2 to 4.0 by 0.2 for Power Law temperature (5 to 100 by 5) x 10^6 °K for Black Body
 EC cutoff 0 to 4 keV by 1 keV for Bremsstrahlung and Power Law 0 keV for Black Body
 INTENSITY normalization coefficient
 CHISQ chi square

the SPECTRAL output is from P750 and gives the two best fits (lowest χ^2) for each spectral type

X WINDOW output crossing times from P500

T_ON time on in milliseconds of day

DT length of crossing in centiseconds of day

DAY day since January 0, 1970

N_CROSS_TIMES number of individual sightings of the source (number of cross window times)

LINE_STATUS definition (LSB first):

- Bit 1 on X2
- Bit 2 on Binary
- Bit 3 on X1-X2 correlated
- Bit 4 on one peak fitted but may be extended
- Bit 5 on night time data only (not accurate)
- Bit 6 on production date
- Bit 7 on confused region
- Bit 8 not used

FILLER_CHARACTERS not used

SOURCE & PURPOSE:

SASA.P400.CURNTLIN.R&R is originated by P400, the peakfit program and additional information is added by P500, the crossing window program and P750, the spectrum program. This file contains the location in azimuth and intensity of the X-Ray sources found in the superimposed data (SASA.P300.XSUPOATA.R&R). For each line of position, P500 inverts the equation of motion to list all time intervals, or windows, when that particular line of position (azimuth) was in the field of view of each detector. These are the times within one superposition period for which there is a valid equation of motion and no subcom gaps or earth-blocking gaps. These crossing times are inserted in SASA.P400.CURNTLIN.R&R, see FORMAT. Using these times, P750 extracts the 8-channel pulse height data for each pass over the source. Then the PHA data are summed over the entire superposition interval and a rough fit is done. The two best fits (lowest χ^2) for Bremsstrahlung, Power Law, and Blackbody are stored in the lines record, see Format.

File Definition

RCL

CLINES FILE RECORD SEQUENTIAL;

RCL 01 LINE ALIGNED,	LINE0750
02 (RA,DECL,THETA,DTHTETA,PHI,DPHI,SI,DSI,BACKGROUND),	LINE0760
02 SXV(3),	LINE0770
02 SPECTRAL (6),	LINE0780
03 INDEX FIXED DECIMAL(3,1),	LINE0790
03 EC FIXED DECIMAL(3,1),	LINE0800
03 INTENSITY FLOAT,	LINE0810
03 CHISQ,	LINE0820
02 XWINDOW (120),	LINE0830
03 T_ON FIXED BINARY(31),	LINE0840
03 DT FIXED BINARY(15),	LINE0850
03 DAY FIXED BINARY(15),	LINE0860
02 N_CROSS_TIMES FIXED BINARY(15),	LINE0870
02 LINE_STATUS BIT(8),	LINE0880
02 FILLER_CHARACTERS CHARACTER(5);	LINE0890

DD cards for writing this file

DD DSN=SASA.P400.CURNTLIN.R&R&SUF,VOL=REF=SASA.R&R&SUF,	00000090
DISP=(NEW,RECFM=F,DCB=(BLKSIZE=1088,LRECL=1088,RECFM=F,BUFNO=6BUF),	00000100
SPACE=(TRK,(7,1),RLSE)	00000110

DD cards for reading this file

CLINES DD DSN=SASA.P400.CURNTLIN.R&R&SUF,VOL=REF=SASA.R&R,DISP=OLD

0000

UHURU DATA SET DESCRIPTION

NAME: SASA. P400. XXSKYSUM. R&R

(where the five digit ((starting)) orbit number replaces &R

SOURCE & PURPOSE:

The Peakfit program P400 after it has found the lines of position rewrites the SASA. P300. XSUPDATA. R&R file with the additional information that if data from a bin is part of a source in the line of position file it is so marked and if a bin contained noise that noise is suppressed, that is, the counts and time are set to zero. This output file is called SASA. P400. XXSKYSUM. R&R

FORMAT:

This data set contains a header record and then one record for each bin (4320 for side 1, 1080 for side 2). The header record contains the following information:

UD start time of superposition period in days and fractions of a day since January 0, 1970.

ALPHA right ascension of the spin axis

DELTA declination of the spin axis

The other records contain the following information:

ISIDE either 1 or 2

IBIN# number of the bin (1 to 4320 for side one, 1 to 1080 for side two)

ITIME number of samples of data (every .096 seconds for side one, every .384 seconds for side two)

ISOURCE =1 if data from bin in source of line of position file
 =0 if no line of position from peakfit corresponds to this bin.

ICOUNTS number of counts

NOTE: ITIME AND ISOURCE differ from corresponding items in superposition in that noise has been suppressed, these two quantities are set to zero if noise was found in this bin.

FILE DEFINITION

DCL 01 DATA_OUT	BASED (POUT),	WRITE111
02 ISIDE,		WRITE120
02 IAIN#,		WRITE130
02 ITIME,		WRITE140
02 ISOURCE,		WRITE150
02 ICOUNTS	FIXED BINARY(31),	WRITE160
01 HEADER	BASED (POUT),	WRITE170
02 (UT1,ALPHA,DELTA) FLOAT BINARY,		WRITE180
01 TRAILER	BASED (POUT),	WRITE190
02 IFILL2	CHARACTER(12);	WRITE200

DCL SUPXMAS FILE RECORD SEQUENTIAL; WRITE000

DD CARD FOR WRITING

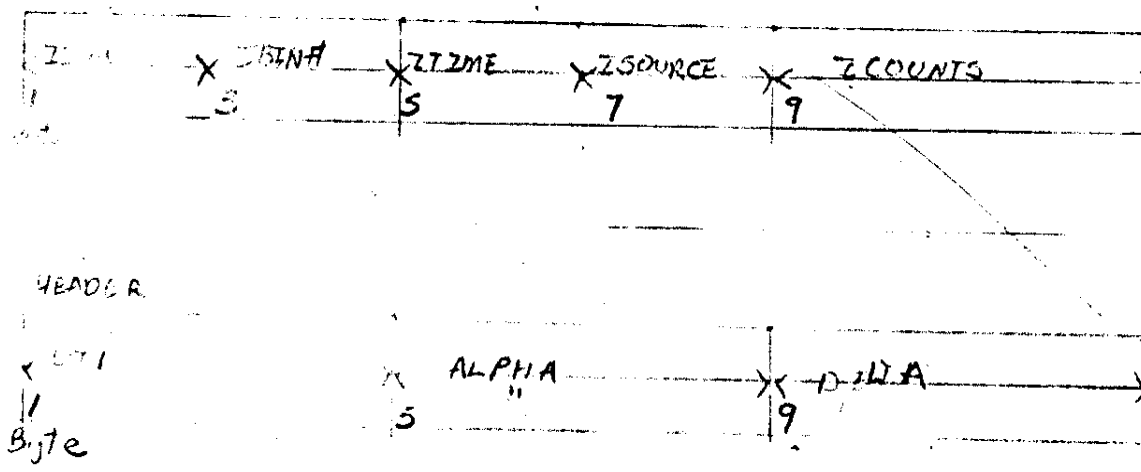
```

//SUPXMAS DD &DUM.DSN=SASA.P400.XXSKYSUM.R&R&SUF,VOL=REF=SASA.R&R&SUF, 00000210
// DISP=(NEW,KEEP),DCB=(BLKSIZE=1296,LRECL=12,RECFM=FB,BUFNO=&BUF), 00000220
// SPACE=(1,(9,1),RLSE) 00000230
  
```

DD CARD FOR READING

//SUPXMAS DD DSN=SASA.P400.XXSKYSUM.R&R&SUF,VOL=REF=SASA.R&R&SUF,

DISP=SHR



UHURU DATA SET DESCRIPTION

NAME: SASA.P500.FLAREPKS.RXXXXX

(where XXXXX represents the ((starting)) orbit number for the batch)

SOURCE & PURPOSE:

P500 checks the list of peaks (SASA.P300.XSPINPKS.R&R) to see if they are noise spikes or real peaks. A peak that appeared in only one telemetry sample would be considered noise; a peak that appears on the edge of a gap would be considered in a gap. The peaks are written in an output file SASA.P500.FLAREPKS.R&R. This was a preliminary program and this output should not be used. The three sigma program output should be looked at instead.

FORMAT:

This data set contains one record for each flare that it considers a peak successfully fitted. Each data set contains the following information:

FLARE_THETA	azimuth of peak in degrees
FLARE_TIME_ON	start time of peak in milliseconds of day
FLARE_DURATION	length of peak in milliseconds
FLARE_DAY	day since January 0, 1970
FLARE_INTENSITY	approx intensity of peak in counts per sec.
FLARE_WIDTH	approx width of the peak in bins, 1080 bins per 360° for side one, 108 bins per 360° for side two
FLARE_STATUS	'1'B side 2 '0'B side 1
FLARE_FILLER	filler characters

File Definition

DECLARE FLARES OUTPUT FILE RECORD SEQUENTIAL ;

CR2S0030

DECLARE 01 FLREVT ALIGNED STATIC,	
02 FLARE_THETA,	CR2S0110
02 FLARE_TIME_ON FIXED BINARY(31),	CR2S0120
02 FLARE_DURATION FIXED BINARY(15),	CR2S0130
02 FLARE_DAY FIXED BINARY(15),	CR2S0140
02 FLARE_INTENSITY,	CR2S0150
02 FLARE_WIDTH FIXED BINARY(15),	CR2S0160
02 FLARE_STATUS BIT(8),	CR2S0170
02 FLARE_FILLER CHAR(5) ;	CR2S0180
	CR2S0190

DD card for writing

// FLARES DD DSN=SASA.P500.FLAREPKS.R&R&SUF,VOL=REF=SASA.R&R,
// DCB=(BLKSIZE=240,LRECL=24,RECFM=FB),SPACE=(TRK,(3,1),RLSE),
// DISP=(NEW,KEEP)

DD card for reading

// FLARES DD DSN=SASA.P500.FLAREPKS.R&R&SUF,VOL=REF=SASA.R&R,
// DISP=OLD

UHURU DATA SET DESCRIPTION

NAME: SASA.P600.THREESIG.R&R

where the five digit (starting) orbit number replaces &R

FORMAT: This data set contains one record for each peak successfully fitted.
Each data set contains the following information:

PTIME time of peak in days and fractions of a day since January 0, 1970
 SIGMA_T error in time of peak
 PTHETA azimuth of peak in degrees
 SIGMA_TH error in azimuth of peak
 PPHI elevation of the center of the collimator in degrees
 SIGMA_PHI error in phi of peak (set to zero)
 PAMP amplitude of peak in cts/sec as determined by fit
 SIGMA_PAMP error in amplitude of peak
 PINT corrected intensity for known sources in cts/sec taking elevation effects into account. For peaks not identified with unique source the intensity is listed as zero
 SIGMA_PINT error in intensity of peak
 BKGD local background as calculated in the program
 SIGMA_BKGD error in background
 SIGS the number of sigmas above background in the peak
 CHI chi square per degree of freedom
 DEGS the number of degrees of freedom
 STATUS BIT 1 ON = NO TRIANGLE FIT
 BIT 2 ON = X2 (LSB FIRST)
 SRCNAME source if the azimuth of the peak is less than 5σ away

file definition

DCL TRISIG FILE RECORD SEQUENTIAL;

DCL 01 OUTREC ALIGNED EXTERNAL,
 02 (PTIME,SIGMA_T) FLOAT BIN(53),
 02 (PTHETA,SIGMA_TH),
 02 (PPHI,SIGMA_PHI),
 02 (PAMP,SIGMA_PAMP),
 02 (PINT,SIGMA_PINT),
 02 (BKGD,SIGMA_BKGD,SIGS,CHI),
 02 DEGS FIXED BIN(15),
 02 STATUS BIT(2),
 02 SRCNAME CHAR(12),
 02 NSRC FIXED BIN(15);

LEGEND: PEAK STATUS BITS DEFINITION (LSB FIRST):
 'BIT 1 ON => NO TRIANGLE FIT',
 'BIT 2 ON => X2')

DD statement used in writing this data set

```

// DD DSN=SASA.P600.THREESIG.R&R&SUF,VOL=REF=SASA.R&R&SUF,
// DISP=(NEW,KEEP),SPACE=(TRK,(5,1),RLSE),
// DB=(BLKSIZE=656,LRECL=82,RECFM=FB,ALCNG=&BUF)

```

where R represents the batch number, SUF represents a suffix added where there is more than one superposition period. And BUF indicates the number of buffers, it is set to one if core is limited.

The DD statement used in reading the data set

```

// DD DSN=SASA.P600.THREESIG.R&R&SUF,VOL=REF=SASA.R&R&SUF,
// DB=(BLKSIZE=656,LRECL=82,RECFM=FB,ALCNG=&BUF)

```

PROCESS & PURPOSE: For each suspected peak (SASA.P300.XSPINPKS.R&R) from a single spin of the satellite, the telemetry data are examined to see if there is a statistically significant peak and if so the data are fit to the coordinator response to determine the location and strength of the X-ray source. If the source is one contained in a reference catalog of known strong sources stored in the system, it is so identified. The significant peak are recorded in an output file called SASA-P600.THREESIG.R&R

P	SIGMA-T	X-THETA	X-SIGMA-TH	X-PMI	X-SIGMA-PMI
	13	17	21	25	29

SIGMA-PMI	PINT	SIGMA-PINT	BAGD	SIGMA-BAGD	X-PMI
41	45	49	53		61

STA705	SACNAME	NSRC
65 67 68		71

UHURU DATA SET DESCRIPTION

NAME: SASA. P230. FINPOINT. R&R

(where the five digit ((starting)) orbit number must replace &R

SOURCE & PURPOSE

The star identification program, P230, identifies set of star sightings for input to the equation of motion. SASA. 230. RGHPPOINT. R&R and SASA. P230. FINPOINT. R&R contain the sighting times of the accepted star pulses and star identification for input to P260.

FORMAT:

There is one record for each set. The format of the data is as follows:

JORBIT	number of orbit within processing group
JACTUAL_ORBIT	five digit orbit number
JSTARS_IN_SET	No. of identified stars in sets
FINE_ASPET(50)	information on up to 50 stars in set
STAR_UT1	time past first slit in days and fractions of a day since January 0, 1970
STAR_UT2	time past second slit in days and fractions of a day since January 0, 1970
STAR_UT3	time past third slit in days and fractions of a day since January 0, 1970
STAR_SA #	SAO number of star
STAR_RA	right ascension of star
STAR_DEC	declination of star
STAR_MAG	visual magnitude of star
STAR_STATUS	bit 8 on sensor side 'B' off sensor side 'A'

DD cards for writing (MOD file)

```
// DD2 DD &DUM.DSN=SASA.P230.FINPOINT.R&R&SUF,VOL=REF=SASA.R&R&SUF,
// DCC=(BLKSIZE=2403,LRECL=2403,RECFM=F),SPACE=(TRK,(9,9)),DISP=(,KEEP)
```

0000011
0000012

```
// DSN=SASA.P230.FINPOINT.R&R&SUF,VOL=REF=SASA.R&R&SUF,
// 3,LRECL=2403,RECFM=F,BUFNO=&BUF),DISP=MOD
```

0000013

DD cards for reading

```
// DD1 DD DSN=SASA.P230.FINPOINT.R&R,DCC=BUFNO=1,DISP=SHR,
// VOL=REF=SASA.R&R
```

00000160
00000170

where &R is the orbit number; &SUF is the suffix; &BUF is the number of buffers; &DUM is set equal to 'DUMMY'; is no out put is desired.

File Definition

DECLARE FOMFINE FILE RECCRD OUTPUT SEQUENTIAL;

PREQ0100

DECLARE 01 FINREC ALIGNED EXTERNAL,

```
02 JORBIT,
02 JACTUAL_ORBIT CHAR(5),
02 JSTARS_IN_SET,
02 FINE_ASPECT(50),
03 STAR_UT1 FLOAT BINARY(53),
03 STAR_UT2 FLOAT BINARY(53),
03 STAR_UT3 FLOAT BINARY(53),
03 STAR_SAO# FIXED BINARY(31),
03 STAR_RA,
03 STAR_DEC,
03 STAR_MAG,
03 STAR_STATUS BIT(8);
```

PREQ0450
PREQ0460
PREQ0470
PREQ0480
PREQ0490
PREQ0500
PREQ0510
PREQ0520
PREQ0530
PREQ0540
PREQ0550
PREQ0560
PREQ0570

JORBIT JACTUAL_ORBIT JSTARS_IN_SET
1 3 9

Aspect 50 is fine aspect

STAR_UT1	STAR_UT2	STAR_UT3	STAR_SAO#
11445(7-1) where 117050			

STAR_RA	STAR_DEC	STAR_MAG	STAR_STATUS
			NO USED
(-1) value 17050			

UHURU DATA SET DESCRIPTION

NAME: SASA. P230. RGHPPOINT. R&R

where the five digit (starting) orbit number must replace &R

SOURCE & PURPOSE:

The star identification program, P230, identified sets of star sightings for input to the equation of motion. This rough solution is saved for input to P260. SASA P230 RGHPPOINT. R&R and SASA. P230. FINPOINT. R&R contain the sighting times of the accepted star pulses and star identification for input to P260.

FORMAT:

There is one record for each set. The format of the data is as follows:

ISTARS_PER_SET	no. of identified stars in set
IACTUAL_ORBIT	five digit orbit number
ISETH	number of set within orbit
H(3)	spin rate, right ascension, declination of spin axis
B(3)	error in spin rate, right ascension, declination of spin axis
UT1START	time in days and fraction of a day since January 0, 1970 of first star sighting for the set
UT3START	time in days and fraction of a day, since January 0, 1970 of last star sighting for the set

DD cards for writing (MOD file)

```

// DD &DUM.DSN=SASA.P230.RGHPOINT.R&R&SUF,VOL=REF=SASA.R&R&SUF,
// DD &R&SUF= (BLKSIZE=0050,LRECL=0050,RECFM=F),SPACE=(TRK,(2,1)),DISP=(,KEEP)
// DD &R&SUF DD &DUM.DSN=SASA.P230.RGHPOINT.R&R&SUF,VOL=REF=SASA.R&R&SUF,
// DD &R&SUF= (BLKSIZE=0050,LRECL=0050,RECFM=F,BUFNC=&BUF),DISP=MOD

```

DD cards for reading

```

// DD &R&SUF DSN=SASA.P230.RGHPOINT.R&R,DCB=BUFNC=1,DISP=SHR,
// DD &R&SUF VOL=REF=SASA.R&R

```

where &R is the orbit number,&SUF is the suffix, &BUF is the number of buffers, and &DUM is set equal to 'DUMMY'. if no output is desired.

Record Format

LARE EQMRGH FILE RECCRD OUTPUT SEQUENTIAL;

PRE00110

```

DECLARE 01 RGHREC ALIGNED EXTERNAL,
02 ISTARSPERSET,
02 IACTUALORBIT CHAR(5),
02 ISET#,
02 ROUGHASPECTSET,
03 A(3), /* OMEGA, ALPHAS, DELTAS */
03 B(3), /* OMEGADEV, ALPHASDEV, DELTASDEV */
03 UT1START FLOAT BINARY(53),
03 UT3STOP FLOAT BINARY(53);

```

PRE00360
/*70.364*/PRE00370
PRE00380
/*70.364*/PRE00390
PRE00400
PRE00410
PRE00420
PRE00430
PRE00440

ACTUAL ORBIT		A(1)		A(2)		A(3)		B(1)		B(2)	
1	3	7	11	15	19	23	27				

UT1 START		UT3 STOP	
35		43	

UHURU DATA SET DESCRIPTION

NAME: SASA. P260. EQMCNSTS. R&R

where the five digit (starting) orbit must replace &R

SOURCE & PURPOSE:

The equation of motion program defines a superposition interval in which the spin axis does not drift more than 3° on the sky so that the data from successive spins may be summed. This file contains the constants of the equation of motion for each orbit. This file may be accessed through COORDS rather than directly. This file is used by P300, P500, P600.

FORMAT:

This data set contains one record for each superposition period. The format of each record is as follows:

UT_FIRST	start time of the superposition period in days and fraction of a day since January 0, 1970
UT_LAST	stop time of the superposition period in days and fraction of a day since January 0, 1970
NORBITS	number of orbits in the superposition period
NBAO	number of bad orbits in the superposition period
DUMMY	set equal to zero
ALPAVX	average right ascension of the superposition period
DELAVX	average declination of the superposition period
OMEAVX	average spin rate of the superposition period
AX(3, 3)	the rough fit spin rate is given by $\omega = AX(1, 1) + AX(1, 2)*t + AX(1, 3)*t^2$ the rough fit right ascension is given by $\alpha = AX(2, 1) + AX(2, 2)*t + AX(2, 3)*t^2$ the rough fit declination is given by $\delta = AX(3, 1) + AX(3, 2)*t + AX(3, 3)*t^2$
ORBITCNST	for each orbit up to thirty the following information is given
UT_MID	the center time of the superposition interval for the orbit in days and fractions of a day since January 0, 1970
UT_ORBX	records from the middle of the orbit (UT_MID) to the beginning of the orbit in fractions of a day
UT_ORBY	records from the end of the orbit to the middle of the orbit (UT_MID) in fractions of a day
UT_GAPX	seconds from the middle of the orbit (UT_MID) to the beginning of the gap in fractions of a day
UT_GAPY	seconds from the end of the gap to the middle of the orbit (UT_MID) in fractions of a day
AY(11)	constants for the azimuth
AZ(11)	constants for the elevation
TOX	
POX	
ORBIT_NO	five character orbit number for the orbit

ORBIT_DEF

- Bit 1 No θ fit for orbit
- Bit 2 No λ fit for orbit
- Bit 3 Poor θ fit for orbit i. e. RMS error exceeds THE_DEV
- Bit 4 " λ " " " " " " " PHI_DEV
- Bit 5 Limited number of groups of stars, no rough fit
- Bit 6
- Bit 7 No discontinuity in θ or λ is imposed across GAP
- Bit 8 Orbit includes data gap due to tape recorder playback hereby called CAP
- Bit 9 Limited number of stars in θ fit after Gap
- Bit 10 " " " " " θ " before Gap
- Bit 11 " " " " " λ " after Gap
- Bit 12 " " " " " λ " before Gap
- Bit 13 Range of θ fit was shortened because of segments of time with low star density
- Bit 14 Range of λ fit was shortened because of segments of time with low star density
- Bit 15 Small and groups of stars were rejected hence shortening range of and fits
- Bit 16 Extrapolate fit through daytime

ORBIT_SAT

- Bit 01
- Bit 02
- Bit 03
- Bit 04
- Bit 05
- Bit 06
- Bit 07
- Bit 08

Note: When a scheme for extrapolating fit through daytime data is completed and programmed into the Equation of Motion, bits in ORBIT_SAT will be set and a description of them reported.

File Definition

ARE SUPFIT FILE OUTPUT RECORD SEQUENTIAL ;

EQM00040

DECLARE 01 SUPCNST ALIGNED,

02 (UT_FIRST,UT_LAST) FLOAT BINARY(53),

EQM00560

02 NORBITS,

EQM00570

02 NRAD,

EQM00580

02 DUMMY,

EQM00590

02 (ALPAVX,DELAVX,OMEAVX),

EQM00600

02 AX(3,3),

EQM00610

02 ORBITCNST(30),

EQM00620

03 UT_MID FLOAT BINARY(53),

EQM00630

03 UT_ORBX,

EQM00640

03 UT_ORBY,

EQM00650

03 UT_GAPX,

EQM00660

03 UT_GAPY,

EQM00670

03 AY(11),

EQM00680

03 AZ(11),

EQM00690

03 TOX,

EQM00700

03 POX,

EQM00710

03 ORBIT_NO CHAR(5),

EQM00720

03 ORBIT_DET BIT(16),

EQM00730

03 ORBIT_STAT BIT(8) ;

EQM00740

EQM00750

DD for creating file (mod data set must be preallocated)

// DD DSN=SQM.DSN=SASA.P260.EQMCNSTS.R&R&SUF,VOL=REF=SASA.R&R&SUF,
// DCB=(RECFM=F,LRECL=3912,BLKSIZE=3912,BUFNO=1),SPACE=(TRK,(7,1)),
// DISP=(NEW,KEEP)

00000120

00000130

00000140

// SUPFIT DD &DUM.DSN=SASA.P260.EQMCNSTS.R&R&SUF,VOL=REF=SASA.R&R&SUF,
// DCB=(RECFM=F,LRECL=3912,BLKSIZE=3912,BUFNO=1),DISP=MCD

00000280

00000290

DD for reading

// SUPFIT DD DSN=SASA.P260.EQMCNSTS.R&R,VOL=REF=SASA.R&R,DISP=SHR,
// DCB=BUFNO=1

00000490

00000500

	UT_LAST	NONE	LEAD	DUMMYY	UT_LAST	
--	---------	------	------	--------	---------	--

UT_LAST	AZ(1,1)	AZ(1,2)	AZ(1,3)	AZ(2,1)	AZ(2,2)	AZ(2,3)	
---------	---------	---------	---------	---------	---------	---------	--

AZ(3,1)	AZ(3,2)						
---------	---------	--	--	--	--	--	--

upcat 3.2.1.1 on line on

UT_LAST	UT_ORBT	UT_ORBY	UT_ORBT	UT_ORBY	UT_ORBT	UT_ORBY	
---------	---------	---------	---------	---------	---------	---------	--

105 + 128(3-1) = 17030

105 + 128(3-1) = 17030

AY(3)	AY(4)	(5)	AY(6)	AY(7)	AY(8)	AY(9)	AY(10)
-------	-------	-----	-------	-------	-------	-------	--------

105 + 128(3-1) = 17030

AZ(1)	AZ(2)	AZ(3)	AZ(4)	AZ(5)	AZ(6)	AZ(7)	AZ(8)
-------	-------	-------	-------	-------	-------	-------	-------

105 + 128(3-1) = 17030

AZ(9)	AZ(10)	AZ(11)	TOX	POX	ORBT_NO	ORBT_NO	ORBT_NO
-------	--------	--------	-----	-----	--------------------	--------------------	--------------------

105 + 128(3-1) = 17030

UHERU DATA SET DESCRIPTION

NAME: SASA.P260.SUPINTVS

(where the five digit ((starting)) orbit number must replace &R)

SOURCE & PURPOSE:

The equation of motion program defines a superposition interval in which the spin axis does not drift more than 3° on the sky so that the data from successive spins may be summed. This file gives the start and stop times of the superposition period and the average right ascension, declination and spin rate of the spin axis. If there is only one record then this file is partly copied onto another file in P300 so that the constants may be used in the other programs. If there is more than one superposition interval, then all the programs are run over from P300 with the second record on this file.

FORMAT: This data sets contain one record for each superposition period.
The format of each record is as follows:

UTSUP_START	start time of superposition interval in days and fraction of a day since January 0, 1970
UTSUP_STOP	stop time of superposition interval in days and fraction of a day since January 0, 1970
ALPHA	average right ascension of the spin axis
DELTA	average declination of the spin axis
OMEGA	average spin rate of the spin axis
ISUP#	number of the superposition period, usually one unless there is a second period
SUPINTV_STATUS	all bits set to zero
NO_OF_BAD_ORBITS	number of bad orbits in superposition period
NO_OF_ORBITS	number of orbits in superposition period
ORBIT_INFO	for each orbit up to thirty, the following information
ORBIT_ID	five character orbit number for the orbit is given
ORBIT_STATUS	bit 1 on data includes daytime data (as of now all data is night time data)

File Definition

```

DECLARE SUPDEF FILE CUPUT RECORD SEQUENTIAL ;
DECLARE 01 SUPDATA ALIGNED,
      02 (UTSUP_START, UTSUP_STOP) FLOAT BINARY(53),
      02 (ALPHA, DELTA, OMEGA),
      02 ISUP#,
      02 SUPINTV_STATUS BIT(8),
      02 NO_OF_BAD_ORBITS,
      02 NO_OF_ORBITS,

      02 ORBIT_INFO(30),
      03 ORBIT_ID CHAR(5),
      03 ORBIT_STATUS BIT(8);

DD card for writing (MOD) file
// DD &DUM, DSN=SASA.P260.SUPINTVS.R&R&SUF, VOL=REF=SASA.R&R&SUF,
// DCB=(RECFM=F, LRECL=0216, BLKSIZE=0216, BUFNO=1), SPACE=(TRK,(1,1)),
// DISP=(NEW,KEEP);

// PDEF TO &DUM.DSN=SASA.P260.SUPINTVS.R&R&SUF, VOL=REF=SASA.R&R&SUF,
// DCB=(RECFM=F, LRECL=0216, BLKSIZE=0216, BUFNO=1), DISP=MOD
DD card for reading
// SUPDEF DD DSN=SASA.P260.SUPINTVS.R&R, VOL=REF=SASA.R&R, DISP=SHR,
// DCB=BUFNO=1

```

where &R is the orbit number, &SUF is the suffix, and &DUM is set equal to 'DUMMY,' if no output is desired.

UTS P-START	UTS UP-STOP	ALPHA	DELTA	THETA	PHI
1. 2. 3. 4.	7. 2. 13.	17.	21.	25.	27.
NO. OF BARS	1.	2.	3.	4.	
33 34 37	42 43	48 49	54 55	60 61	
67	70 71	78 79	84 85	90 91	96
102 103	108 109	114 115	120 121	126 127	
132 133	138 139	144 145	150 151	156 157	
162 163	168 169	174 175	180 181	186 187	192
198 199	204 205	210 211	216		

UNURU DATA SET DESCRIPTION

NAME: SASA. P300. CURNTSUP. R&R

(where the five digit ((starting)) orbit number must replace &R)

SOURCE & PURPOSE: This file is almost identical to the one from which it is copied SASA. P260. SUPINTVS. R&R. This file contains the start and stop times of the superposition as well as the average right ascension, declination and spin rate. This file defines the superposition interval and there is only one record in this file.

FORMAT: There is only one record in this file. It contains the following information:

UTSUP_START	start time of the superposition interval in days and fractions of a day since Jan 0, 1970
UTSUP_STOP	stop time of the superposition interval in days and fractions of a day since Jan 0, 1970
ALPHA	average right ascension of the spin axis
DELTA	average declination of the spin axis
OMEGA	average spin rate of the spin axis
ISUP#	number of the superposition interval within this processing group
SUPINTV_STATUS	Bit 1 on indicates superposition processed Bit 8 on indicates data cross switched
NO_OF_BAD_ORBITS	No. of bad orbits in superposition period
NO_OF_ORBITS	No. of orbits in superposition periods
ORBIT_INFO	for first 15 orbits(not usable)
ORBIT_ID	five character number for the orbit
ORBIT_STATUS	bit 1 on data includes daytime data (as of now all data is night-time data)

File Definition

DECLARE SUPDEFX FILE OUTPUT RECORD SEQUENTIAL;

INIT0050

DECLARE 01 SUPER_DEF ALIGNED,	INIT0540,
02 (UTSUP_START, UTSUP_STOP) FLOAT BINARY(53),	INIT0550
02 (ALPHA, DELTA, OMEGA),	INIT0560
02 ISUP#,	INIT0570
02 SUPINTV_STATUS BIT(8),	INIT0580
02 NO_OF_BAD_ORBITS,	INIT0590
02 NO_OF_ORBITS,	INIT0600
02 ORBIT_INFO(15),	INIT0610
03 ORBIT_ID CHAR(5),	INIT0620
03 SUPORBIT_STATUS BIT(8);	INIT0630

DD for writing

```
//SUPDEFX DD &CUM.DSN=SASA.P300.CURNTSUP.R&R&SUF,VOL=REF=SASA.R&R&SUF, 00000460
//DCB=(BLKSIZE=0126,LRECL=0126,RECFM=F,BUFNO=1), 00000470
//SPACE=(TRK,(01,1),RLSE),DISP=(NEW,KEEP) 00000480
```

DD for reading

```
//SUPDEFX DD DSN=SASA.P300.CURNTSUP.R&R&SUF,DISP=SHR,DCB=BUFNO=&BUF, 00000170
//VOL=REF=SASA.R&R&SUF 00000180
```

	X ₉	UTSIP-370P	X ₁₇ ALPHA	X ₂₁ DELTA	X ₂₅ GAMMA	X ₂₉ ZETA	X ₃₃ ETA
--	----------------	------------	-----------------------	-----------------------	-----------------------	----------------------	---------------------

	X ₄₂ X ₄₃	ORBIT-20(a)	X ₄₈ X ₄₉	ORBIT-20(b)	X ₅₄ X ₅₅	X ₆₀ X ₆₁
		ORBIT-STATUS(1)				

	X ₇₂ X ₇₃	ORBIT-20(c)	X ₇₈ X ₇₉	ORBIT-20(d)	X ₈₄ X ₈₅	X ₉₀ X ₉₁
--	---------------------------------	-------------	---------------------------------	-------------	---------------------------------	---------------------------------

	X ₁₀₂ X ₁₀₃	ORBIT-20(e)	X ₁₀₈ X ₁₀₉	ORBIT-20(f)	X ₁₁₄ X ₁₁₅	X ₁₂₀ X ₁₂₁	X ₁₂₆ X ₁₂₇
--	-----------------------------------	-------------	-----------------------------------	-------------	-----------------------------------	-----------------------------------	-----------------------------------

UHURU DATA SET DESCRIPTION

NAME: SASA.P300.XSPINPKS.R&R

where the five digit (starting) orbit number must replace &R

SOURCE & PURPOSE: As P300 (the superposition program) collects the data from each spin for superposition, the single spin data are scanned for possible peaks which are listed in SASA.P300.XSPINPKS.R&R for further processing by P600

FORMAT: This data set contains one record for each peak found. Each data set contains the following information.

UTSPINSTOP	is the end time of the spin period in which the peak occurred in day and fraction of a day since January 0, 1970
SIG3THETA	the azimuth of the peak in degrees
SIG3_INTENSITY	intensity in cts/sec of the peak
SIG3_WIDTH	width of the peak in bins 108 bins per 360° for side 2, 1080 for side 1
SIG3_STATUS	'1' B side 2 '0' B side 1
FILLER	filler characters

File Definition

DECLARE SPINPKS FILE OUTPUT RECORD SEQUENTIAL	:	SIGM0360
DECLARE 01 SIG3PKS ALIGNED	,	SIGM0370
02 UTSPINSTOP	FLOAT BINARY(53)	SIGM0380
02 SIG3THETA	,	SIGM0390
02 SIG3_INTENSITY,		SIGM0400
02 SIG3_WIDTH	FIXED BINARY(15)	SIGM0410
02 SIG3_STATUS	BIT(8)	SIGM0420
02 FILLER	CHAR(5)	SIGM0430

A DD statement for creating this data set (a MOD data must be pre-allocated)

```
//DD1 DD DDUM.DSN=SASA.P300.XSPINPKS.R&R&SUF,VOL=REF=SASA.R&R&SUF,
// DCB=(BLKSIZE=0096,LRECL=0024,RECFM=FB,BUFNO=1),SPACE=(TRK,(03,1)),
// DISP=(NEW,KEEP)
//SPINPKS DD DDUM.DSN=SASA.P300.XSPINPKS.R&R&SUF,VOL=REF=SASA.R&R&SUF,
// DCB=(BLKSIZE=0096,LRECL=0024,RECFM=FB,BUFNO=1),DISP=MOD
```

A DD statement for writing this data set

```
//SPINPKS DD DSN=SASA.P300.XSPINPKS.R&R&SUF,VOL=REF=SASA.R&R,DISP=SHR
```

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DISPERSED				SIG 637 HETA								SIG INTENSITY			

17	18	19	20	21	22	23	24
FILLER							

UHURU DATA SET DESCRIPTION

NAME:SASA.P300.XSUPDATA.R&R

(where the five character ((starting)) orbit number for the batch must replace &R)

Format:

This data set contains 4320 records for side 1, followed by 1080 records for side 2.

Each data set contains the following information:

XCOUNTS	number of counts
XTIME	number of times data is sampled every 0.96 second for side one, (every .384 seconds for side two)
XBINTH	number of the bin (1 to 4320 for side one, -1 to -1080 for for side two)

File Definition

DECLARE SUPXFIL FILE OUTPUT RECORD SEQUENTIAL;

DECLARE 01 SUPXREC ALIGNED,
02 XCOUNTS FIXED BINARY(31),
02 XTIME FIXED BINARY(15),
02 XBINTH FIXED BINARY(15);

DD for writing

```
//SUPXFIL DD &SUP.DSN=SASA.P300.XSUPDATA.R&R&SUF,VOL=REF=SASA.R&R&SUF,  
// DCB=(BLKSIZE=0000,LRECL=0008,RECFM=FB,BUFNO=1),  
// SPACE=(TRK,(1,1),RLSE),DISP=(NEW,KEEP)
```

DD for reading

```
//SUPXFIL DD DSN=SASA.P300.XSUPDATA.R&R&SUF,VOL=REF=SASA.R&R&SUF,  
// DISP=SHR,DCB=BUFNO=&BUF
```

PROS0330

PROS036

PROS0370

PROS0380

PROS0390

 STANDARD LABEL DUPE OF N00597 ONTO Z350

D-10101

THE FOLLOWING FILES WERE COPIED :

VS-SEQ	DSNAME	DSSEN	RECFM	LRCL	BLKSIZ	BLKCNT
0001	A.GADCARD.R00597	0001	FB	00080	00800	5
0001	S.A.DDCARDS.R00597	0002	FB	00080	00800	7
0001	O.VINFRAME.R00597	0003	F	03360	03360	1600
0001	O.PRBITINX.R00597	0004	FB	00045	00450	1
0001	O.SUBFRAME.R00597	0005	F	00472	00472	1200
0001	O.SURGPSX1.R00597	0006	FB	00018	00180	1
0001	O.SURGPSX2.R00597	0007	FB	00018	00180	1
0001	O.EPHEMRS.R00597	0008	FB	00032	00320	86
0001	O.FINPOINT.R00597	0009	F	02403	02403	22
0001	O.RGHPOINT.R00597	0010	F	00050	00050	22
0001	O.FQMCNSTS.R00597	0011	F	03912	03912	1
0001	O.SUPINTVS.R00597	0012	F	00216	00216	1
0001	O.CUENTSUP.R00597	0013	F	00126	00126	1
0001	O.XSPINPKS.R00597	0014	FB	00024	00096	15
0001	O.XSUPDATA.R00597	0015	FB	00008	00800	54
0001	O.X1GPSCHB.R00597	0016	FB	00016	00150	2
0001	O.X1GPSIND.R00597	0017	FB	00018	00180	2
0001	O.X2GPSCHB.R00597	0018	FB	00016	00160	1
0001	O.X2GPSIND.R00597	0019	FB	00018	00180	2
0001	O.CURNTLIN.R00597	0020	F	01088	01088	19
0001	O.XXSKYSUM.R00597	0021	FR	00012	01296	51
0001	O.FLAREPKS.R00597	0022	FB	00024	00240	2
0001	O.THREESIG.R00597	0023	FB	00082	00656	3

END OF VOLUME. DUPE COMPLETED.

598

F0F0F5F9F843181F745C8BC289431820909AA40417000547E00000000100001E800000079007A0000F0F0F5F9F9
431820C3E759E713431821B633ECD637000547F000001E8100003880000019C9007A00E100680000F0F0F6F0F1431821BF8F
508258431822027B241403000547F0000036810000560000001D5800E20157007600000F0F0F6F0F2431822D8D687C0234318
23F368641BF9000547F0000056010000740000001D8D015801CF00780000F0F0F6F0F3431823FF1B4D8ADD43182516B02A16
B3000547F0000074010009920000001DF401D002470C780000

603

1. LENGTH 225

P-10101

1/24/71 - 1/22/71

ORR75 598-603

REQ. AGENT

CMW

ACQ. AGENT

WHW

SAS-A
4th UHURA SELECTED X-RAY DATA

70-107A-01G ASXR-00068

This data set catalog contains 1 magnetic tape. One SAS-A tape. This tape is 6250 BPI, ASCII, 9 track, contains 1 file, and created on the IBM computer. The following list the D#'s, C#'s, and NSSDC ID#'s of the tape.

D#	C#	TIME SPAN	NSSDC ID#
-----	-----	-----	-----
D-85882	C-29055	NOT AVAILABLE	70-107A-01G

SECTION 1 - INTRODUCTION

In recent years there has been a trend away from publishing catalogues in book form to preparing catalogues by computer and distributing them on magnetic tape, with appearance in book form a secondary occurrence. This memo is the result of the development of the documentation for the machine-readable version of the catalogue and includes the basic information given in the original preface of the published catalogue. This memo should be distributed along with any copy of the machine-readable version of the catalogue.

SECTION 2 - TAPE CONTENTS

A byte-by-byte description of the contents of the catalogue is given in Table 2-1. The information in the "Description" column is derived mainly from the published version of the catalogue whenever possible. The "Suggested Format" column is for FORTRAN-formatted reads.

Table 2-1. Tape Contents

4TH UHURU CATALOGUE

<u>Bytes</u>	<u>Description</u>	<u>Suggested Format</u>
1-12	Name of celestial source	12A1
13-22	Right Ascension (1950.0) (unit = degrees)	F10.4
23-32	Declination (1950.0) (unit = degrees)	F10.4
33-40	X-ray intensity (where applicable in units of given detector)	8A1
41-80	Comments	40A1

SECTION 3 - REMARKS AND MODIFICATIONS

The 4th UHURU Catalogue (W. Forman, C. Jones, L. Cominsky, P. Julien, S. Murray, G. Peters, H. Tananbaum, and R. Giacconi, 1977, Center for Astrophysics Preprint #763 - submitted to the Astrophysical Journal Supplement) has been made machine-readable by Dr. G. Share (Naval Research Laboratory). The information given in this document has been obtained via private communication with Dr. Share. No effort has been expended to verify the contents and Dr. Share bears the responsibility for any ~~key~~ punching errors.

4th UHURU Catalogue

First 58 records of file.

Logical record length is 80 bytes.

Each record is printed in one line of 80 characters.

```

11111111112222222222333333333344444444445555555555666666666677777777778
1234567890123456789012345678901234567890123456789012345678901234567890
4U0000+72      0.0000  72.6100  1.65
4U0005+20      1.4500  20.0500  2.52 SEYFERT-MKN 335
4U0009-33      2.3000 -33.9000  2.15 3U0001-31 NGC10 CLUSTER CA0007-306
4U0010+39      2.7000  39.6000  2.93 FLARE STAR BD+43 44
4U0015+02      3.8300  2.8600  2.45
4U0022+63      5.6000  63.8800  8.89 3U0022+63 SNR TYCHO=3C10 CEPHR-1
4U0026-73      6.6000 -73.0200  2.76
4U0026-29      6.7200 -29.1500  3.12
4U0027+59      6.9500  59.7000  3.30
4U0028+22      7.2200  22.0800  3.30
4U0033+58      8.3000  58.8500  4.33
4U0037+39      9.2700  39.8750  2.40 M31
4U0037-10      9.3500 -10.1250  2.90 ABELL 85
4U0041+36      10.4800  36.8300  3.15
4U0041+32      10.5000  32.7750  30 5
4U0050-01      12.6300 -1.9900  3.39 ABELL119 PHL 923
4U0051-68      13.0000 -68.7500  2.82
4U0054+60      13.5750  60.9250  4.24 STAR CAS
4U0103-21      15.9750 -21.8750  2.74 ABELL 133
4U0106-59      16.5200 -59.7700  3.04
4U0115+63      18.8070  63.4770  70 TRANSIENT
4U0115-73      18.8300 -73.6950  36 STAR SANDULEAK 160 SMC X-1
4U0115-36      18.9500 -36.5500  1.91
4U0129-09      22.4000 -9.9900  1.95
4U0134-11      23.6400 -11.5400  2.70 SUPERCLUSTER
4U0138+48      24.6250  48.0500  3.55
4U0142+61      25.6900  61.2300  4.99
4U0148+36      27.1600  36.0400  2.44 ABELL 262
4U0223+31      35.9500  31.2750  3.11 SEYFERT MKN81
4U0228-13      37.1300 -13.0600  5.27 ABELL 358
4U0241+61      40.3100  61.8800  3.25
4U0248-85      42.1000 -85.3500  2.11
4U0253+41      43.2700  41.7100  4.89
4U0254+13      43.6500  13.2500  3.4 ABELL 401
4U0302-22      45.7300 -22.3000  2.71
4U0310+46      47.5500  46.5500  3.71
4U0311+53      47.9600  53.0500  2.88
4U0316+41      49.1450  41.3530  47.4 ABELL 426
4U0320-45      50.2500 -45.0250  2.16 CLUSTER
4U0322+59      50.6500  59.5500  2.93
4U0334-30      53.5500 -30.2000  2.88
4U0336+01      54.0500  1.0200  100 10 TRANSIENT
4U0339-54      54.8500 -54.5000  1.90 CLUSTER
4U0344+11      56.2440  11.1500  1.80
4U0352+30      58.0900  30.9100  30 STAR X PERSEI
4U0357-74      59.4000 -74.3250  1.76
4U0403+47      61.0000  47.6750  3.67 STAR 48 PER
4U0406-30      61.6000 -30.8750  1.72
4U0407+37      61.8500  37.9250  2.62
4U0410+10      62.7200  10.5500  3.06 ABELL 478
4U0421+34      65.3750  34.7250  3.74
4U0423-53      65.8500 -53.1500  3.30 NGC 1566
4U0427-07      66.9000 -7.7000  3.46 ABELL 494
4U0427-61      66.9400 -61.5500  2.31 CLUSTER
4U0429-31      67.3400 -31.0000  3.82
4U0431-12      67.8500 -12.9500  2.54 ABELL 496
4U0432+05      68.1000  5.6000  2.76 SEYFERT
4U0443-09      70.8000 -9.5000  1.77

```

4th UHURU Catalogue

Last 58 records of file.

Logical record length is 80 bytes.

Each record is printed in one line of 80 characters.

```

11111111112222222222333333333344444444445555555555666666666677777777778
1234567890123456789012345678901234567890123456789012345678901234567890
4U1852+37      283.1600    37.0000    1.77
4U1853-23      283.4000   -23.9500    3.22
4U1857+01      284.3500    1.1900    4.05 BURSTER A1905+00 MXB1906+00
4U1859+69      284.8500    69.8500    2.09 ABELL2312 3U1843+67 ABELL2315 2A1854+683
4U1901+03      285.4250    3.1000    87 10      3U1901+03 TRANSIENT
4U1907+09      286.8250    9.7250    20 5       3U1906+09
4U1908+00      287.0300    .5200     200 20 AQLXR1 3U1908+00 RECURRENT TRANSIENT
4U1908+05      287.0500    5.1250    3.66 A1909+04
4U1909+07      287.3000    7.6250    4.61      3U1912+07
4U1915-05      288.8250   -5.2000    20 2       3U1915-05
4U1915-79      289.0000   -79.3000    2.50      3U1849-77
4U1918+15      289.7000    15.0000    50 10      TRANSIENT A1918+14
4U1919+44      289.8550    44.0700    3.90 ABELL2319 3U1921+43      2A1919+438
4U1920+34      290.0500    34.0500    3.50
4U1924-59      291.1460   -59.4390    1.93      2A1914-589
4U1933+36      293.4000    36.1500    2.26
4U1943+36      295.8500    36.4000    3.02
4U1954+31      298.5070    31.9570    63 5       3U1953+31
4U1955-68      298.9000   -68.9000    3.07 CLUSTER 3U1959-69 CA1955-692 PKS1955-
4U1956+35      299.0920    35.0600   1175 5 CYGX-1 3U1956+35 HDE226868
4U1957+11      299.3200    11.5750   17.4      3U1956+11
4U1957+40      299.3200    40.5400    4.03 CYG A 3U1957+40 CLUSTER 3C405
4U2001+62      300.3500    62.6000    2.56      3U1956+65
4U2003+64      300.9000    64.3700    2.64
4U2018+39      304.7500    39.5000    3.45
4U2028+42      307.2000    42.8200    3.84
4U2030+40      307.6390    40.7850   385 2 CYG X3 3U2030+40 PERIODS0 4.8 HR;16.8
4U2046+31      311.6900    31.9000    1.69      SNR CYGNUS LOOP
4U2048+44      312.1500    44.3750    3.57
4U2055+49      314.0000    49.3250    3.39      3U2052+47
4U2058+32      314.5500    32.8750    2.88
4U2103+31      316.0000    31.5000    2.08
4U2120+32      320.0900    32.1300    3.05
4U2126-60      321.6150   -60.3250    1.81      2A2155-609 MX2140-60
4U2129+47      322.4000    47.1050    20 2       3U2129+47
4U2129+12      322.4400    12.1000    4.42 NGC7078 3U2131+11 GLOB CLUS M15
4U2134+55      323.6500    55.7500    2.63
4U2135+57      323.9250    57.1500    2.83 CEP X-4
4U2142+38      325.6480    38.0870    550 2 CYG X2 3U2142+38 PERIOD0 11.17 DAY
4U2206+54      331.5750    54.4000    2.93      3U2208+54 A2204+54
4U2209+26      332.3000    26.1000    2.47
4U2213+23      333.4750    23.9000    2.19
4U2224-78      336.2000   -78.2500    3.90
4U2238+60      339.7250    60.7250    2.81      3U2233+59
4U2240+26      340.1000    26.7000    2.95
4U2252+18      343.1400    18.1500    2.49
4U2259+16      344.7800    16.1000    2.95 SUPERCLUSTER
4U2300+08      345.1780    8.7760    2.69 SEYFERT NGC 7469 2A2259+085
4U2305-07      346.2930   -7.3150    2.31 2A2302-088
4U2315+15      348.8600    15.3200    4.41 ABELL 2589 2A2322+166
4U2316+61      349.1500    61.8000    2.40
4U2321+58      350.3030    58.5580   53.4      3U2321+58 SNR CAS A 3C461
4U2335+42      353.9750    42.7250    1.97
4U2344+08      356.0200    8.6500    3.03 ABELL 2657
4U2344-27      356.0250   -27.0000    1.80 CLUSTER KLEMOLA 44 2A2344-285
4U2345+27      356.3500    27.3000    2.44 ABELL2666 3U2346+26
4U2351+06      357.8200    6.7700    3.69 SEYFERT MKN 541 ABELL 2665
4U2358+21      359.6750    21.0750    1.92

```

7-8883

TO-107A-01G

***** LIST OF CMW 12 *****

INPUT PARAMETERS ARE: AS AL 1 1 1

TAPE NO.	1	FILE NO.	1
RECORD	1	LENGTH	2712
40000072	72.61	1.63	
20.0500	2.52	SEYFERT-MKN 335	
30.0001-31	NGC1	CLUSTER CA1007-305	
40.0022+63	5.6400	63.8800	40.0015+02
6.6000	-73.9200	2.76	40.0026-29
3.12	40.026+59	8.3000	58.8500
40.033+58	8.3000	58.8500	40.033+58
9.2700	39.8750	2.40	M31
2.94	ABELL 85	30.126-29	2A1035-196
40.0050-01	12.6300	-1.9900	40.0041+32
13.0000	-68.7500	2.82	MX1053+64
4.24	STAR CAS	40.116-59	16.5200
30.00	57-23	2A112-222	40.115+63
18.8300	-73.6500	36	STAR SANDULEAK 160 SMC X-1
1.91	40.0134-11	23.6400	-11.5400
40.0138+48	24.6250	48.7500	3.55
25.6900	61.2300	4.95	30.1143+61
2.44	ABELL 262	30.151+36	40.223+31
40.241+61	40.3100	61.8800	3.25
42.1000	-85.3500	2.11	40.228-13
4.89	30.227+43	MX0255+41	2A0351+41
30.225+132	40.3100	46.5500	3.71
40.311+53	47.9600	53.0500	2.88
41.3530	47.4	ABELL 426	30.316+41
30.1302-47	SC0315-458	40.334-30	53.5500
54.3500	1.90	CLUSTER	30.328-52
1.80	2A1335+096	40.335+096	2A1335+096
30.352+39	40.357-74	59.4600	-74.3250
40.403+47	61.0000	47.6750	3.67
61.6000	-30.8750	1.72	40.407+37
37.9250	2.62	40.410+10	62.7200
40.423-53	65.8500	-53.1500	3.30
66.9000	-7.7000	3.46	ABELL 494
2.31	CLUSTER	30.426-63	SC0430-616
40.432+05	68.1000	5.6700	40.431-12
70.8000	-9.5000	1.77	30.031-10
44.5900	4.95	30.446+44	CLUSTER 3C129
40.504-21	76.2500	-21.3500	3.65
76.2500	-3.4250	1.92	40.513-40
1.9500	2.16	MX1513-40	40.515+38
18.0000	30.531-37	NGC 1851	MX1513-40
40.504-21	76.2500	-21.3500	3.65
76.2500	-3.4250	1.92	40.513-40
1.9500	2.16	MX1513-40	40.515+38
18.0000	30.531-37	NGC 1851	MX1513-40

1	9+6	40518-26	79.6400	-26.2000	2.31	40517+17	79.3900	17.5705	3.10	30	138	4051
2	-72.1321	16	2	LMC X-2	30521-72	40531+21	82.8770	21.9810	947	CRA		
3	30531+21	TAU X-1	40531-05	82.9600	-5.3000	4.74	ORION	30527-35	2A	4		
4	1532-356	40532-66	83.3800	-66.6210	3.92	LMC X-4	30532-66					
5	4538+26	64.55	26.4000	2.36	40535+26							
6	18	-64.1400	25	3	LMC X-3	30539-64	2A539-642					
7	LMC X-1	30554-69	2A540-698	40541+60	85.4500	60.8500	2.65					
8				40543-31	85.9500	-31.6500	3.66					
9	40546+88	86.6000	-88.2250	3.55								
10	1.0000	29.0000	4.45									
11	3.53											
12	1551+40	559-57	89.9500	-57.1750	3.63							
13	92.1000	-49.1500	3.08									
14	12	5	STAR	30614+09								
15												
16	30157	40621+11	95.4100	11.7810	2.07							
17	96.8100	67.5710	2.63	SUPERCLUSTER								
18	1800	3.61										
19	30624-55	SC627-544	2A626-544	628-28	97.2000	-28.4000	4.56	PSF	628-28			
20	40629+02	97.5000	4.22									
21	34+03	98.7500	-3.3250									
22	74.2000	2.31	SEYFERT	MKN 6	ABELL 558							
23												
24												
25	40711-38	107.8250	-38.4000	2.61								
26	300	-54.6000	15.44									
27	ABELL 576											
28												
29												
30	40733-18	113.3400	-18.6000	2.17								
31	14.3300	-10.8100	3.06									
32	3.84	PKS745-19										
33	57-26	40759-49	123.3500	-38.5500	2.81							
34	123.5500	-56.7500	2.76	A1833-57								
35	7.5	SNR	PUP A	30821-42	VEL XR-2							
36	30833-45	VELA PULSAR	40836-42	129.0500	-42.6150	47	10	TRANSIENT	MX0836-42			
37	40842-47	139.6000	-47.8000	2.95	A0835-48							
38	34	13.7400	-34.9200	2.57								
39	1.65											
40	40813-38	123.3500	-38.5500	2.81								
41	40821-42	125.3550	-42.74									
42	40844-25	131.2500	-2									
43	40854-44	133.5500	-44.5000	3.96	A085							
44	40854-44	133.5500	-44.5000	3.96	A085							
45	40854-44	133.5500	-44.5000	3.96	A085							
46	40854-44	133.5500	-44.5000	3.96	A085							
47	40854-44	133.5500	-44.5000	3.96	A085							
48	40854-44	133.5500	-44.5000	3.96	A085							
49	40854-44	133.5500	-44.5000	3.96	A085							
50	40854-44	133.5500	-44.5000	3.96	A085							
51	40854-44	133.5500	-44.5000	3.96	A085							
52	40854-44	133.5500	-44.5000	3.96	A085							
53	40854-44	133.5500	-44.5000	3.96	A085							
54	40854-44	133.5500	-44.5000	3.96	A085							
55	40854-44	133.5500	-44.5000	3.96	A085							
56	40854-44	133.5500	-44.5000	3.96	A085							
57	40854-44	133.5500	-44.5000	3.96	A085							
58	40854-44	133.5500	-44.5000	3.96	A085							
59	40854-44	133.5500	-44.5000	3.96	A085							
60	40854-44	133.5500	-44.5000	3.96	A085							
61	40854-44	133.5500	-44.5000	3.96	A085							
62	40854-44	133.5500	-44.5000	3.96	A085							

DS03062

DUMP OF TAPE CN111U

INPUT TAPE CN111U ON FT1
DATA INPUT H9 WFE11 SRE11E1E2

FILE	INPUT	DATA RECORDS	MAX. SIZE	READ ERROR SUMMARY	PERM ZERO	SHORT	UNDEF.	#RECS.	TOTAL#
1	2	3	4	5	6	7	8	9	10
FILE	11	RECORD	LENGTH	BYTES					
(0)	F0F0F1F0	F043150F	5E328192	BB431510	8A408F1C	77000547	F0000000	0100001E	8000001E 39000000
(40)	79007A01	00F0F0F1	F0F14316	103398F2	C8984316	11AD15A1	420C1005	47F00000	1E810000 3CB40000
(80)	1E51037A	00F20479	0000F0F0	F1F0F243	16118B89	E9F13943	1612D7C7	F45F98C0	0E47F000 003CB500
(120)	005B3498	0C1CF904	F3116C07	7A0000F0	F0F1F0F3	4316120A	25C94E0A	431613F5	63D6D887 000547F0
(160)	00005835	00007934	00001E2C	016D01E5	007A0000	F0F0F1F0	F4431613	F06AB7AD	41431615 19A8C218
(200)	00000547	F0F00079	B5100098	3400001E	3E01E702	60007A00	00F0F0F1	F0F54316	151C0697 0AD24316
(240)	163844A4	948FA005	47F00000	98355000	B6B40000	1E140261	02DACC7A	0010F0F0	F1F0F643 161641A0
(280)	0840AF43	15173389	9F07A800	0547F000	00B6B500	0004F400	001E1192	0B035300	790000F0 F0F1F0F7
(320)	43161760	3BEAB99E	4316187C	79F527FD	000547F0	0000F374	00001E29	035403C0	007A0000 007A0000
(360)	F0F0F1F0	F8431618	85D538EF	75431619	A213663D	D6000547	F00000F3	7E100111	F400001E 4103CE04
(400)	47007A00	00F0F0F1	F0F94316	19A6C5C1	3FD04316	1AC303CB	AE300005	47F00001	11F50001 30740000
(440)	1E470448	04C1087A	0000						

FILE	INPUT	DATA RECORDS	MAX. SIZE	READ ERROR SUMMARY	PERM ZERO	SHORT	UNDEF.	#RECS.	TOTAL#
1	2	3	4	5	6	7	8	9	10
FILE	11	RECORD	LENGTH	BYTES					
(0)	F0F0F1F1	F043161A	CA1AAC82	EA43161B	E3A5A35B	8A000547	F0000130	7500014E	AC00001D FF94C205
(40)	3A007907	00F0F0F1	F1F14316	16ED4F97	C8034316	100686A2	0FE10005	47F00001	4EAD0001 5CDE0000
(80)	1BFF053B	15B31079	0010						

***** EOF ON COMPLETION OF DUMP FOR REQUEST SR=11E=2X

EQD DUMP STOPPED AFTER FILE 11 # OF PERMANENT READ ERRORS 0

START TIME 03/10/92 13:29:36 STOP TIME 03/10/92 13:30:55