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CSC/TM-82/6091

primary edit notes

IMP PROGRAMMING SYSTEMS OVERVIEW FOR THE COSMIC RAY AND SOLAR ELECTRON EXPERIMENTS 10, 11, 28, 32, 52

Prepared For

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Goddard Space Flight Center

Greenbelt, Maryland

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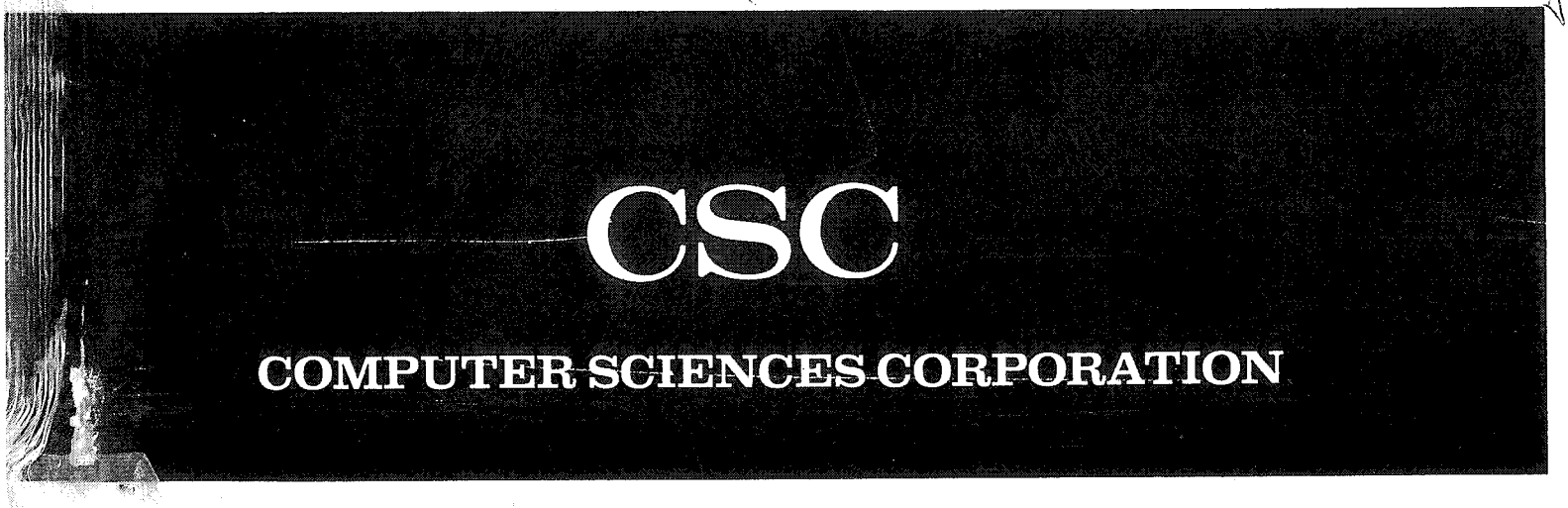
Task Assignment 718

APRIL 1982



users should refer to

Introduction to the Crescent Cosmic Ray Management System Report for:

as of 9/83

listings of 3081 archive catalog of SB#IM
3081 " " of SEIMP
360/91 archive catalog of SEIMP

and listcat (lc) command listings of LIBMAN backups

** See the Cosmic Ray Tape Librarian for primary backups

generally, replace SEIMP project ID with SB#IM

CSC/TM-82/6091

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Prepared for
GODDARD SPACE FLIGHT CENTER

by
COMPUTER SCIENCES CORPORATION

Under
Contract No. NAS 5-24350
Task Assignment 718

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PREFACE

This document was prepared to serve as a reference manual to the IMP maintenance programmer and other IMP system users. The intent has been to prepare in a concise, summary fashion, an overview of the IMP-I (-6), -H (-7), and -J (-8) cosmic ray experiment program systems.

In addition to the work of organizing, summarizing, and cross-referencing a large number of programs, the generation of this document involved a lot of tired fingers. The author wishes to thank Ms. Betty Pynn for her help in editing SCRIPT commands and typing into the computer, additions and changes to various portions of this manual. Her help in researching and expanding many of the first skeleton subroutine trees is also greatly appreciated.

ABSTRACT

This document describes the data processing and analysis program systems for the cosmic-ray experiments onboard the Interplanetary Monitoring Platform (IMP)-6, -7, -8 spacecraft. The IMP-6 and IMP-7 solar electron program systems are also discussed. The experiments are described briefly.

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1.0 INTRODUCTION

1.1 THE INTERPLANETARY MONITORING PLATFORM (IMP) SATELLITES

The IMP satellites together constitute an overall program to study the near-interplanetary region, the outer portions of the earth's magnetosphere, and the interactions of the sun-earth system. A series of 10 satellites were developed and launched over a 10 year period beginning with IMP-A in 1963. These satellites are considered one of the stepping stones to manned space travel, and contributed a number of important firsts in the development of spacecraft technology (see reference 1.) . Table 1, reproduced from this reference, summarizes these spacecraft names and launch dates.

The IMP satellites 1 - 6 have mapped in broad detail part of an 11 year solar cycle, from the declining phase in 1963 through solar maximum, IMP-F and -G covering the solar maximum period. Improvements in the IMP-H and -J technology allowed a more detailed understanding of the regions broadly surveyed by IMPs A - I (see references 1, 2) . IMP satellites are earth - orbiting (with one exception), spin-stabilized craft. The earth-orbiting IMPs had highly elliptical orbits until the launch of IMP-H and -J, which had nearly circular orbits. IMP-I had an orbital period of slightly longer than 4 days, and IMPs -H and -J of 10 to 15 days. The orbits of IMPs -I and -J are inclined approximately 28 degrees to the earth's equator, and IMP-H approximately 17 degrees to the equator. IMPs -H and -J are located about 1/2 way to the moon; their orbit apogees are close to that of IMP-I.

Figures 1 and 2 are photographs of the IMP-I launch vehicle and satellite. IMP -I, -H and -J are 16-sided drums, about 135 cm across by 183 cm high, weighing about 288 kg (-I), 390 kg (-H) and 401 kg (-J).

This overview document will summarize information on programming systems for the IMP-I, -H, and -J cosmic ray experiments,

and will briefly mention the solar electron experiments of IMP - I and - H.

Table 1: IMP Spacecraft Launch Dates

IMP	Explorer	IMP	AIMP	AIMP	Launch Date
A	18	1			11/27/63
B	21	2			10/04/64
C	28	3			05/29/65
D	33		D	1*	07/01/66
E	35		E	2**	07/19/67
F	34	4			05/24/67
G	41	5			06/21/69
I	43	6			03/13/71
H	47	7			09/22/72
J	50	8			10/25/73

* Lunar orbit intended but not achieved.

** Lunar orbit achieved

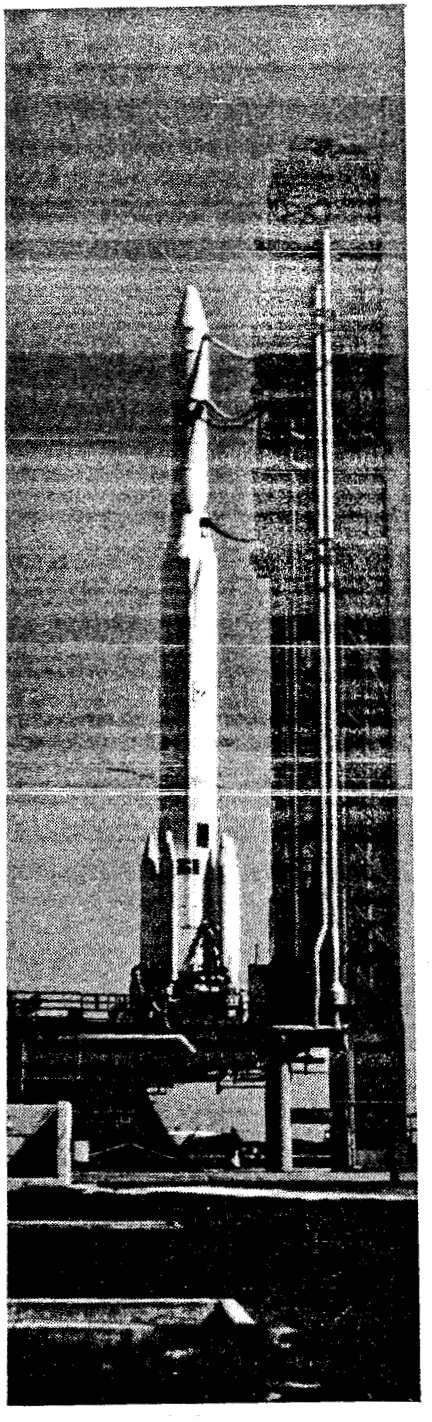


Figure 1: IMP-6 Spacecraft Launch Vehicle

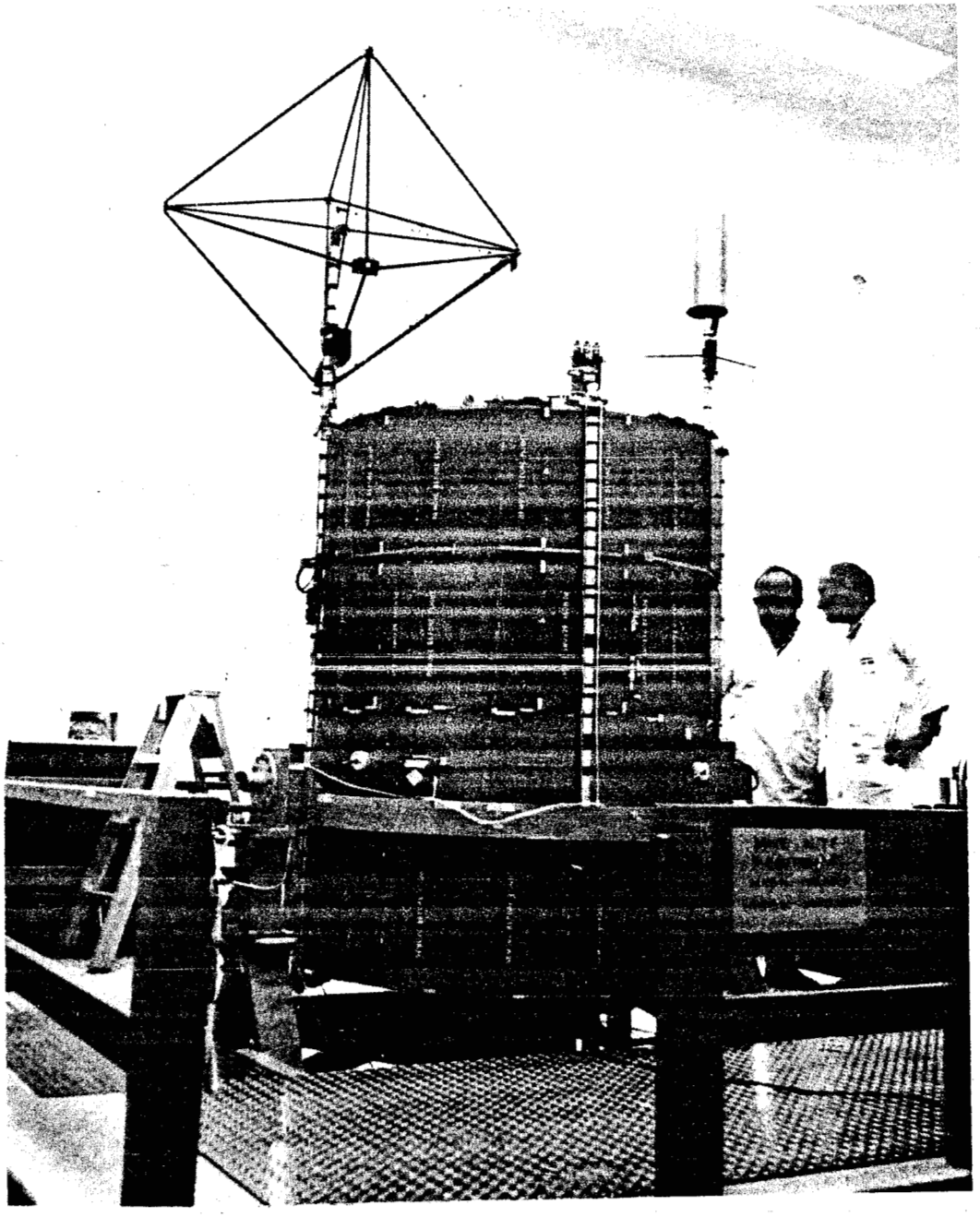


Figure 2: IMP-6 Spacecraft

1.2 THE IMP-6, -7, AND -8 COSMIC RAY EXPERIMENTS

These experiments were designed to measure charged particle spectra, compositions and flux anisotropies from 0.5 to 500 MeV/nucleon for electrons, protons, alpha, and heavier nuclei of up to about atomic number 30. The experiments consisted of 3 to 4 separate telescopes made up of various combinations of dE/dx and E detectors, including scintillators, surface barrier, and lithium-drifted silicon detectors.

Nuclei from protons thru iron have been found. Electrons were identified from 150 kev to 15 MeV. Isotopes of hydrogen and helium were measured up to 80 MeV/nucleon. Solar protons were measured from 200 - 700 MeV.

Figures 3 through 9 show the Cosmic Ray detector systems used on IMP -6, -7, and -8. Table 2 summarizes the types of detectors on each satellite. These detector systems measure pulse height analysis data (PHA data) and rate data. The general kind of events measured are listed in Table 3 . The reader is referred to Appendix A, Section III, for an explanation of notation in that table. The reader is also referred to references 3 - 6 for discussions of telemetry and event priority specific to the IMP experiments.

The sections referred to in references 7 and 8 are also recommended as general introductions to cosmic ray data and how they are used to determine cosmic ray fluxes. The IMP experiments have different telemetry systems and the step-by-step data processing is different, but the general objectives and final data quantities are the same. Table 4 lists the locations for some crucial information used in IMP FLUX and RATE determinations.

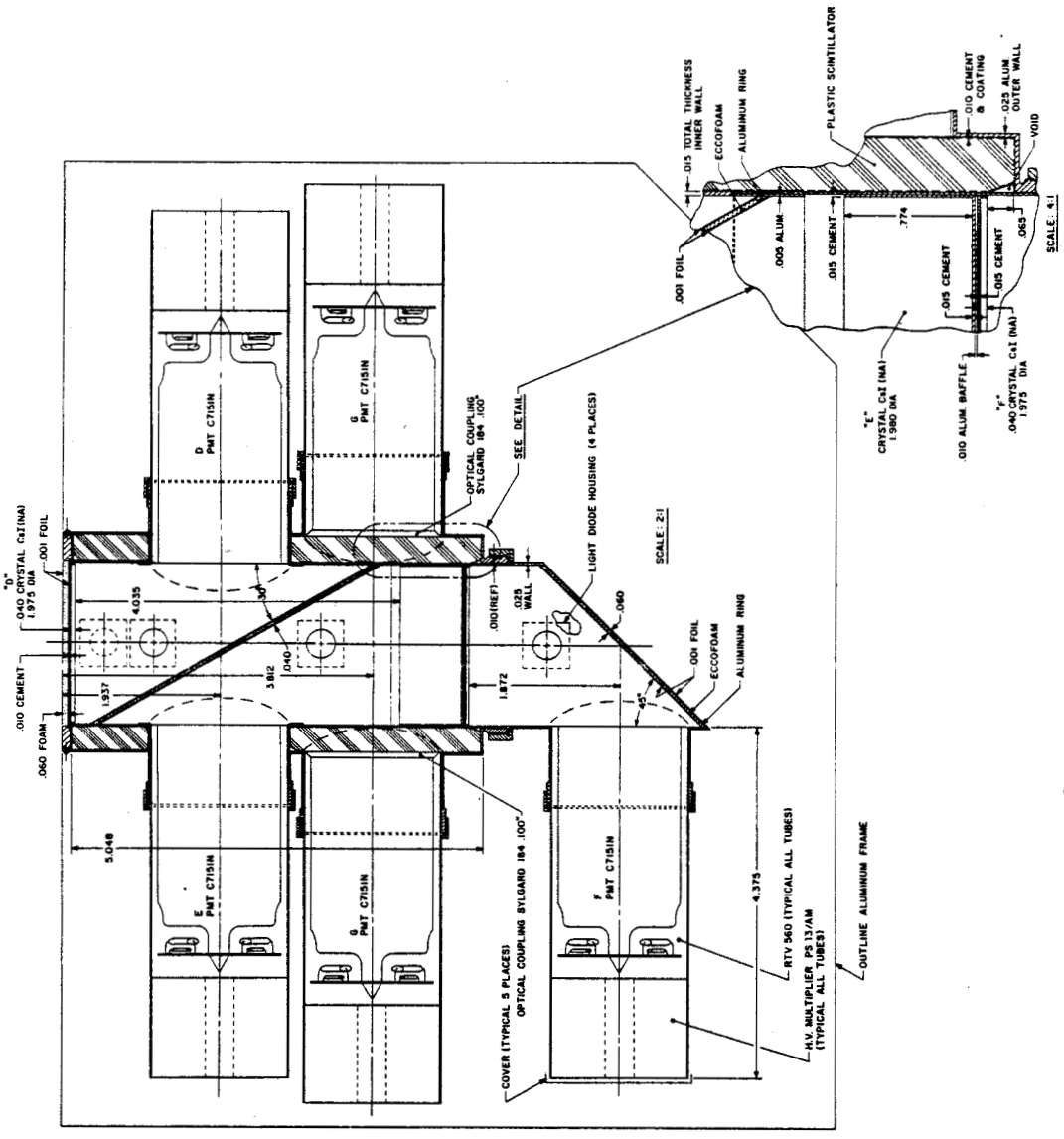


Figure 3 – MEDIUM ENERGY DETECTOR IMP 6

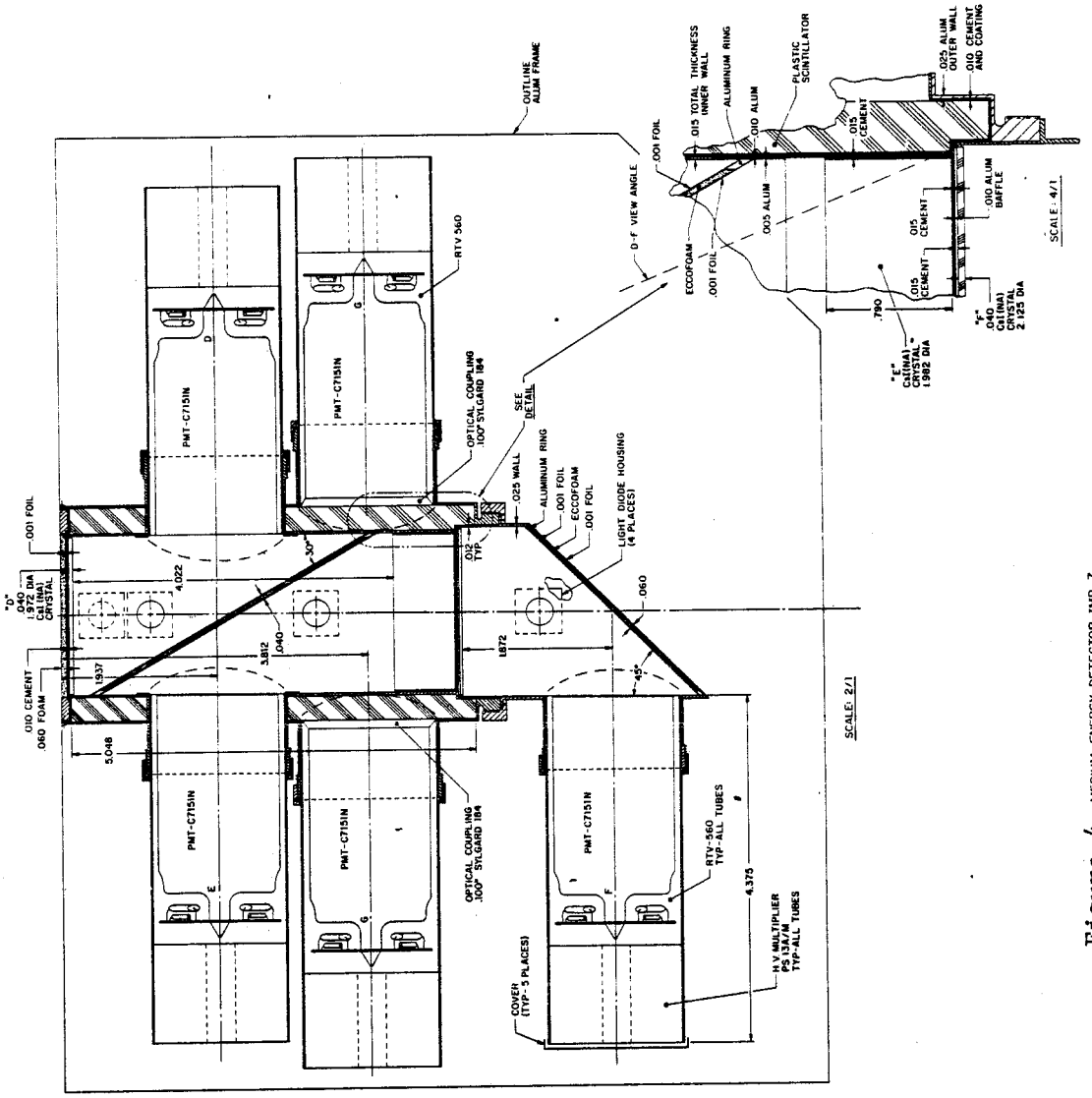


Figure 4— MEDIUM ENERGY DETECTOR IMP 7

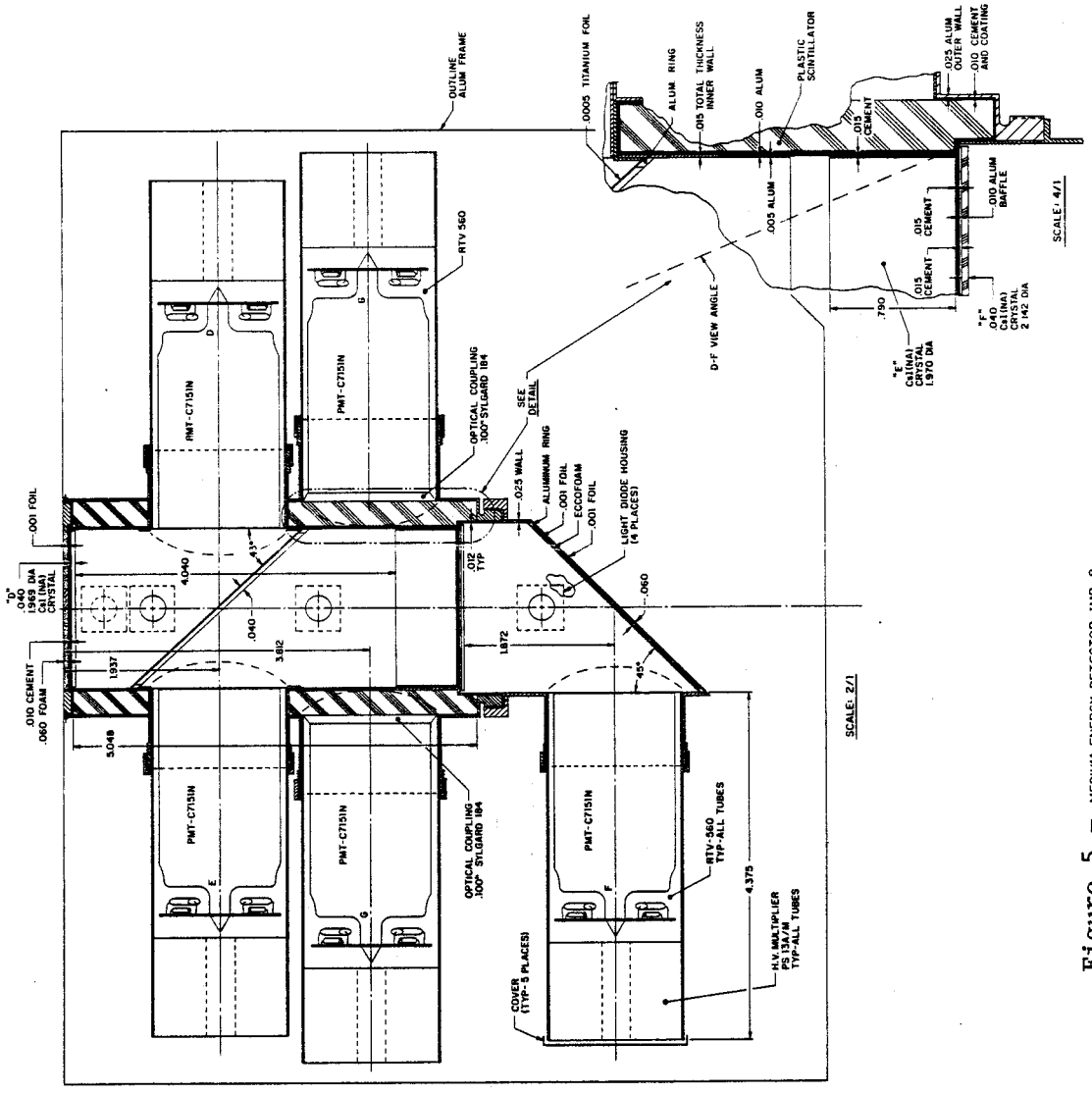


Figure 5 – MEDIUM ENERGY DETECTOR IMP 8

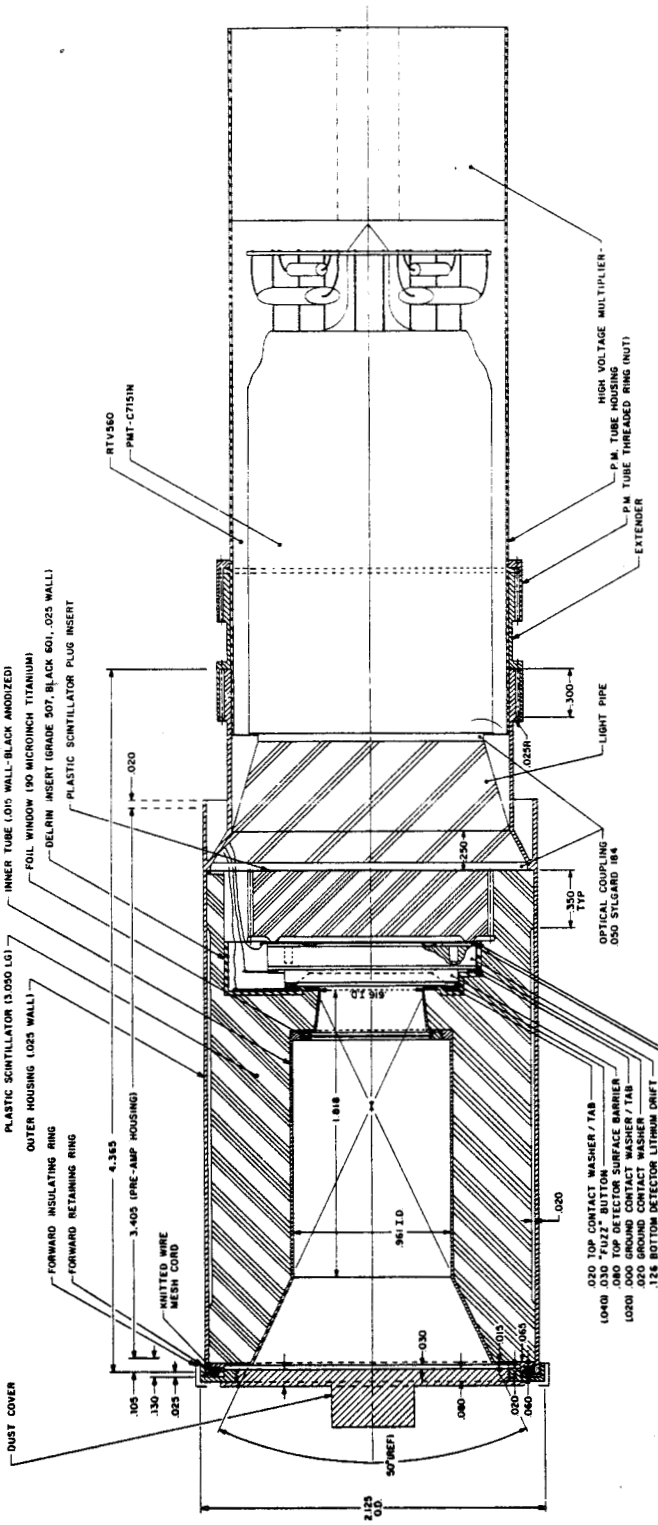


Figure 6 - LOW ENERGY DETECTOR - IMP 6, 7, AND 8

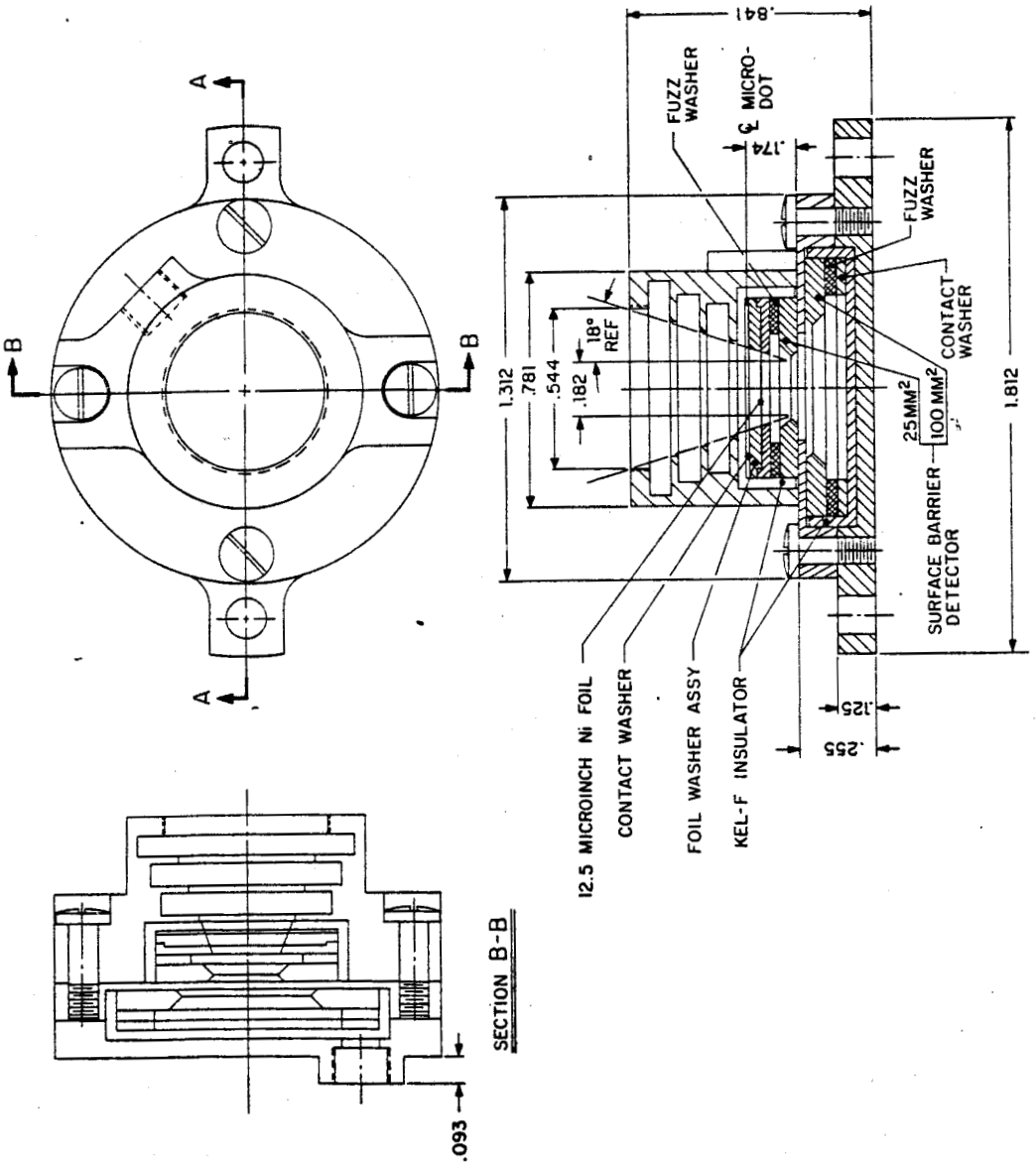


FIGURE 7 - VERY LOW ENERGY DETECTOR - IMP 6

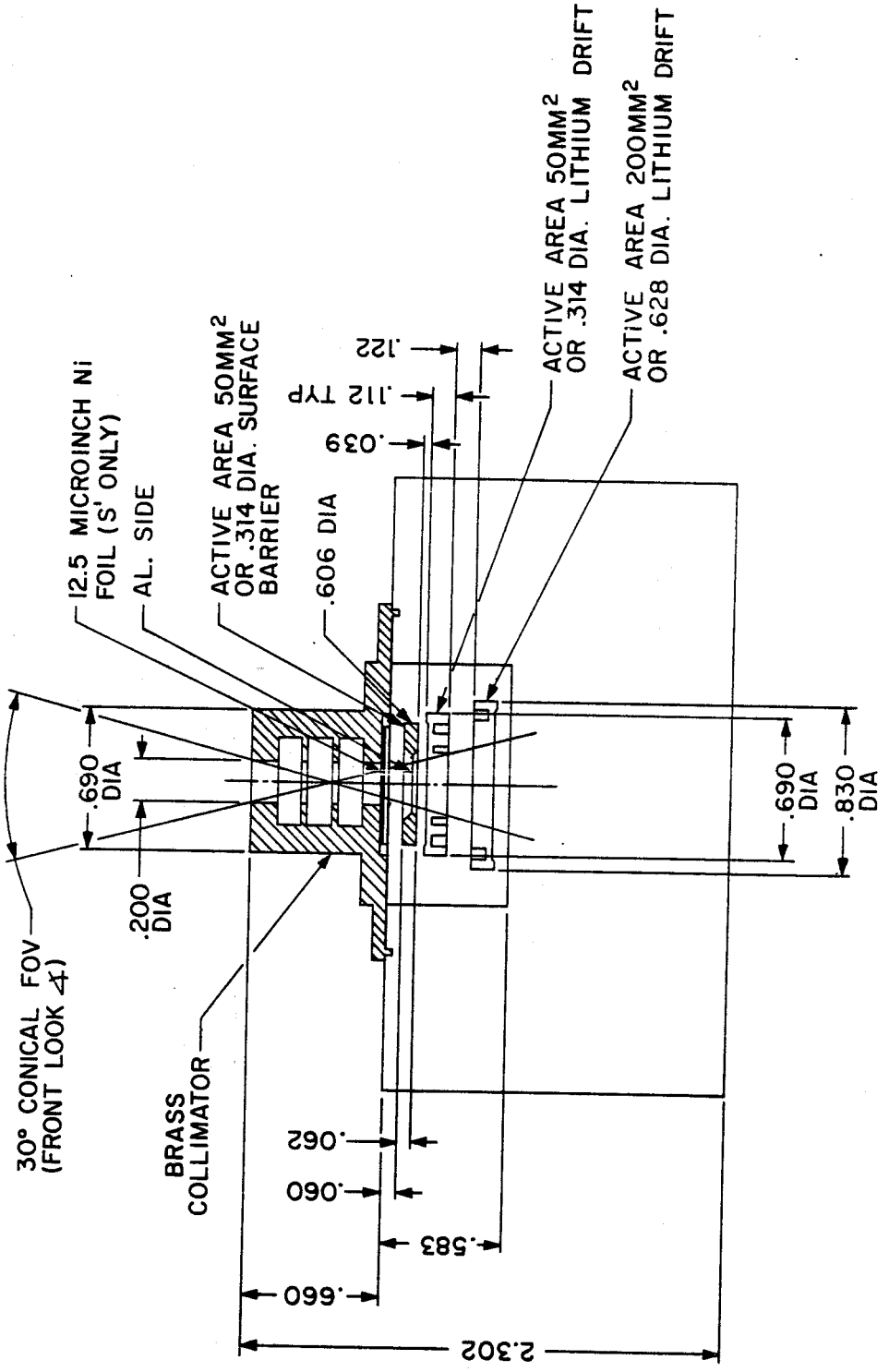


FIGURE 8 - LOW ENERGY TELESCOPE II - IMP-7

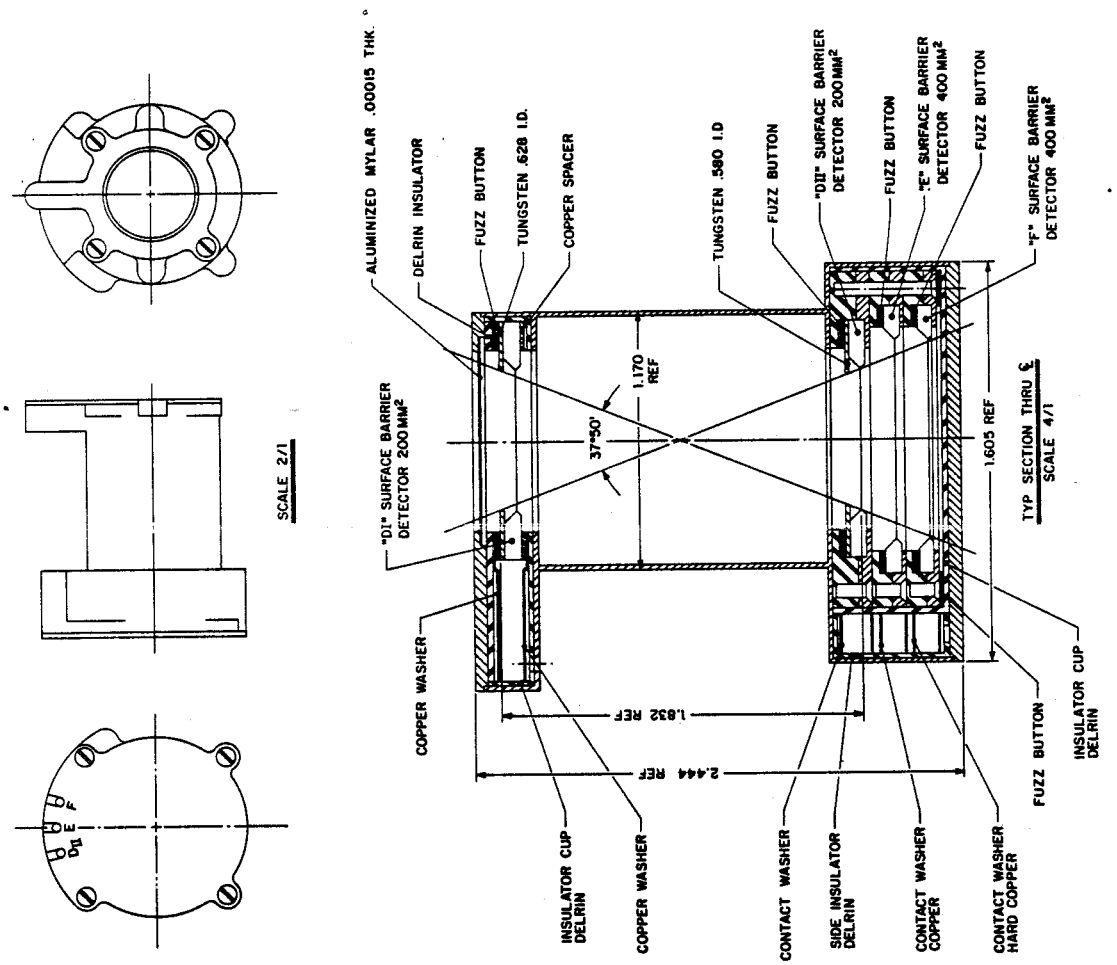


Figure 9 - VERY LOW ENERGY TELESCOPE - IMP-8

Table 2: Cosmic Ray Detector Systems

The following detector name mnemonics are used:

MED	Medium Energy Detector
LED	Low Energy Detector
VLED	Very Low Energy Detector
VLET	Very Low Energy Telescope
LET-II	Low Energy Telescope - II

Detector telescopes on the satellites are as follows:

IMP-6	IMP-7	IMP-8
MED	MED	MED
LED	LED	LED
VLED (4)	LET-II (2)	VLET (1)

Detector element letter designations for each type of telescope:

	letter(s)	detector type
MED	D	CsI(Na)
	E	CsI(Na)
	F	CsI(Na)
	G	Plastic Scintillator (anti-coincidence)
LED	A	Surface Barrier
	B	Si(Li)
	C	Plastic Scintillator (anti-coincidence)

VLED	S1,T1,S2,T2	Surface Barrier
VLED	AS1,AT1,AS2,AT2	" "
LET-II*	SI	Surface Barrier
	SII	Si(Li) }
	SIIa	SI(Li) } double grooved
	SIII	Si(Li)
VLET	DI	Surface Barrier
	DII	Surface Barrier
	E	Surface Barrier
	F	Surface Barrier (anti-coincidence)

* identical to Pioneer LET-II

Table 3: Cosmic Ray Telescope General Event Types

Detector	Event Type	
MED	(D & E)2 • $\overline{F}$ • $\overline{G}$	Telescope Gains:
	D1 • E1 • $\overline{F}$ • $\overline{G}$	X 1 = high
	D1 • E1 • F • $\overline{G}$	X 1/8 = medium
	D1 • E1 • G	X 1/50 = low
LED	(A & B)1 • B • $\overline{C}$	Telescope Gains:
	A1 • B • C	X 1 = low
	A1 • $\overline{B}$ • $\overline{C}$	X 10 = high
	(A & B)1 • $\overline{B}$ • $\overline{C}$	
VLET	DI • DII • Σ_1D • $\overline{F}$	
	DI • DII • Σ_2D • $\overline{F}$	
	where ΣD = DI + 2/3 DII + 1.25 E is set to never measure protons.	
	Σ_1D allows alpha particles Σ_2D allows lithium and higher Z nuclei	
VLED	S • $\overline{AS}$	No PHA events are measured by these detectors; only rates for certain hard-wired energy ranges.
LET-II	SI • $\overline{SII}$ • $\overline{SIIa}$ • $\overline{SIII}$	No PHA events are measured by these detectors; only rates for certain hard-wired energy ranges.
	SI • SII • $\overline{SIIa}$ • $\overline{SIII}$	

Table 4: Cosmic Ray FLUX And RATE Crucial Information Locations

Information	Best Location
FLUX box energies and particle types	FLUXPLOT program COMMON FLXPBL
detector geometry factors	FLUXPLOT program COMMON FLXPBL
PHA accumulation times	FLUXPLOT program COMMON FLXPBL
FLUX event types	FLUXPLOT program COMMON FLXPBL
RATE LISTS	RATEPLOT program COMMON IMPDAT RATEPLOT documentation
Rate accumulation times	RATEPLOT documentation
ANISTOTROPY-sector locations	Documentation book b-3
number of spins sectored	IMP-6 5 spins rpm= 5 12 sec IMP-7 14 spins =45 1.4 sec IMP-8 7 spins =23 2.3 sec
Positive spin axis of IMP-6,7	Point to the south ecliptic plane

IMP-8 Points to the north ecliptic plane

IMP-8 is phased 180 degrees with IMP-7.

1.3 THE IMP-6 AND -7 SOLAR ELECTRON EXPERIMENTS

These experiments were designed to study both electrons and positrons from the non-relativistic to the relativistic regions, and solar flare X-rays. Scintillator detectors and background detectors were used. Solar flare X-rays from 20 keV to 1 MeV were measured. Electrons and positrons were measured from about 100 keV to 2 MeV.

Figure 10 shows a diagram of the solar-electron experiment for IMP -7 . References 3 and 4 contain telemetry explanations for these experiments.

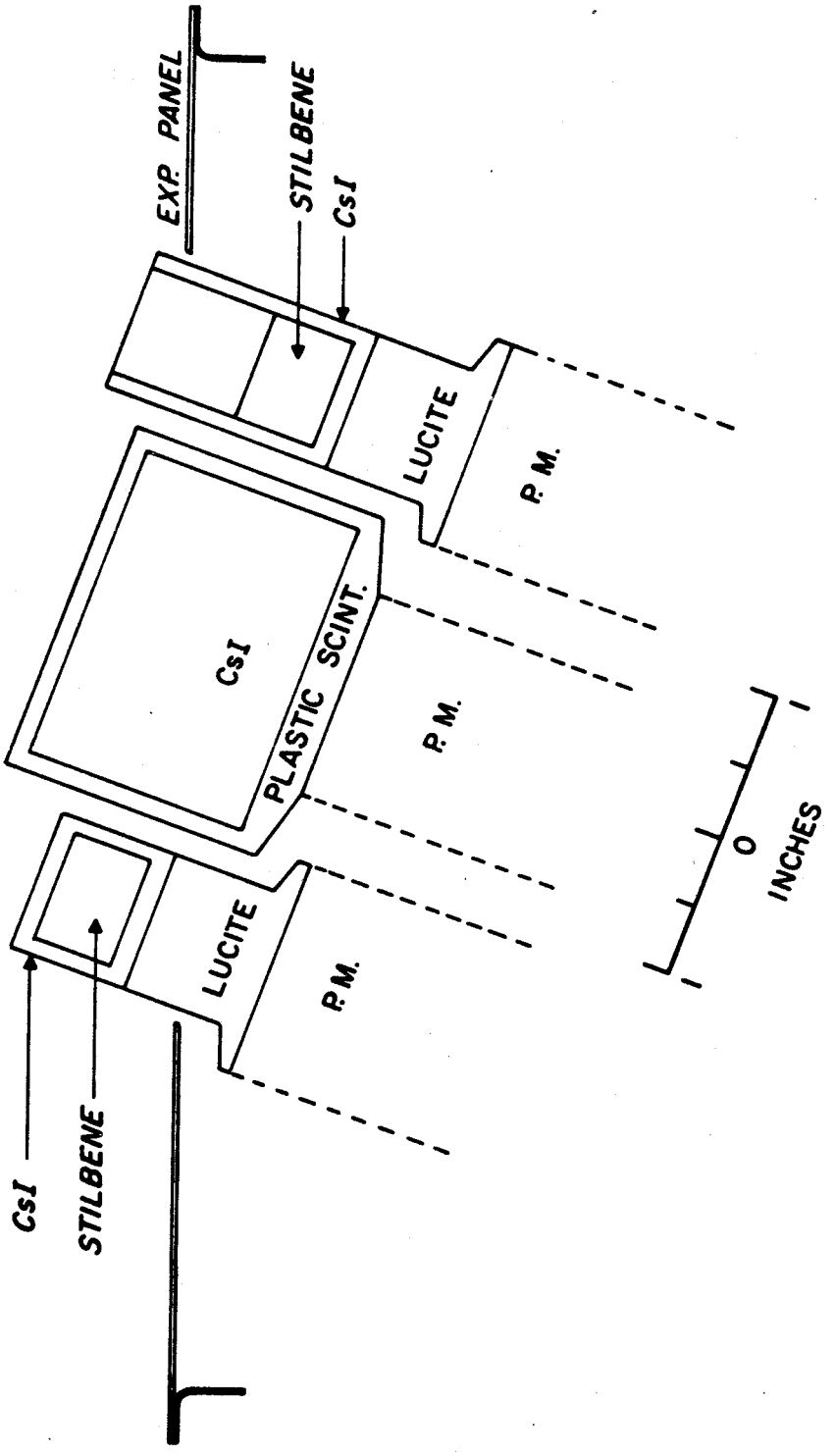


Figure 10 - Solar Electron Detector Schematic Diagram

1.4 DOCUMENT PURPOSE

The following sections of this document concisely summarize the contents of the IMP -6, -7, and -8 cosmic ray data processing and analysis program systems. The IMP -6 and -7 solar electron program systems are also discussed.

2.0 INFORMATION CATEGORIES RELEVANT TO IMP SYSTEMS

This document is located in the dataset 'SEIMP.IMPOVIEW.TEXT'. That dataset is intended to be the central location for on-going maintenance notes, as well as the general program system overview reference. The dataset member $ZCOMMNT should be updated when any special problem occurs.

Script commands are imbedded within the individual members of the dataset. They allow this formal document to be generated.

The IMPOVIEW dataset was created to document the IMP source program reorganization which took place through 1980 and the early part of 1981 when the USERID SEIMP was established on the IBM computers. It is intended to summarize the contents of the IMP cosmic ray programming systems, their datasets, and other relevant information which a maintenance person might need to know about or be aware of.

The $aalook member of the IMPOVIEW dataset explains the general contents of each overview member.

2.1 GENERAL CATEGORIES

The following is a list of the basic categories of information relevant to the IMP systems:

2.1.1 EXPERIMENTS:

The IMP experiments are known as

experiment 10	-	IMP-6(I) solar electron
experiment 11	-	IMP-6(I) cosmic ray

experiment 28 - IMP-7(H) solar electron
experiment 32 - IMP-7(H) cosmic ray

experiment 52 - IMP-8(J) cosmic ray

At the date of this writing, IMP -8 is the only IMP satellite which is still active. Data are being received and processed. (See Appendix E for a summary of typical production program run times for IMP -8 data.)

2.1.2 TERMINOLOGY:

For basic telemetry term explanations see Section 2.9, Telemetry Terminology.

Certain other terms are defined below:

INTERVAL	4 day contiguous time periods defined from 'time zero = 23SEPT72 00:00:00 (applicable to IMP-7 and 8)
ORBIT	approximately 4 days, but the time of one complete orbit for IMP-6
LED	the Low Energy Detector
MED	the Medium Energy Detector
VLED	the Very Low Energy Detector
VLET	the Very Low Energy Telescope
LET	the Low Energy Telescope

2.1.3 GENERAL PROGRAMS:

Each program now has a source dataset which contains sources peculiar to that program, and in some cases, sources which are shared with other programs. The source dataset also contains members prefixed by the symbol '$'. These members contain information such as job control language to run the

program, build or ADDTOLIB procedures, a directory of all program subroutine names referenced, and in some cases, additional documentation relevant to the program.

There are basically three categories of IMP programs:

1) Data base generation programs
   These programs organize and summarize data by event type and by time, and write the data onto tapes which are given different tape names accordingly.
2) Data base analysis programs
   These programs read the data base tape types and do various kinds of data summaries
3) Utility programs and generalized subroutines
   These programs perform database maintenance functions for the IMP systems, or common calculations, such as Julian day from date.

2.1.4 TAPE CATALOGS:

2.1.4.1 Tape Types:

A tape catalog exists for each experiment. The catalog is a dataset form summary containing the tape volume-serial names, the tape type, the date the tape was created, the data times covered on the tape, and other information relevant to IMP system requirements.

For IMP there exist several different tape types:

DECOM	experimenter raw data tapes
ENCY	encyclopedia tape with data reformatted
PHAS	pulse height analyzed data
CNTS	rates data
MATR	high gain data summarized by interval
LOWG	low gain data summarized by interval

IMP catalogs words 14 & 15
decoding the hexadecimal characters:

		# INTERVALS present
0001	1	1
0010	2	1
0011	3	2
0100	4	1
0101	5	2
0110	6	2
0111	7	3
1000	8	1
1001	9	2
1010	10 = A	2
1011	11 = B	3
1100	12 = C	2
1101	13 = D	3
1110	14 = E	3
1111	15 = F	4

for IMP, these hexadecimal character meanings will tell the user the production status of an INTERVAL as follows:

for example:

clex52cat type tape catalog:

word 14	word 15	# INTERVALS present
3FFFFFFF	3FFFFFFF	60
3FFFBFFF	2000 1FFF	29 + 14 = 43
380FF800	0000001F	12 + 5 = 17

Intervals processed are indicated by turning bits on, one bit for each INTERVAL, starting from the right, going to the left, word 15 first, then word 14 as explained on the next page.

word 14

word 15

00000000 00000000 00000000 00000000

bit #

00000000 00000000 00000000 00000000

EXAMPLE OF ASSOCIATING any INTERVAL WITH the tape catalog entry words 14 and 15 ; for any tape type except ENCY.

IMP-8 LOWG tape type ; 50 INTERVALS per tape ; one SL file per INTERVAL

If reel #10 had tape catalog words 14 & 15 as follows:

word 14	word 15
000FFFFF	3FFFFFFF

this would indicate a completely full production tape containing data from 50 INTERVALS, specifically INTERVALS 451–500.

for reel #10 $10 \times 50 = 500$ IS the last INTERVAL on the tape
therefore 451 IS the first INTERVAL

the entry 000FFFFF 3FFFFFFF has the following correspondence to the INTERVALS 451–500

WORD 15

bit position	00000000	00000000	00000000	00000000
bit number	31 30 29 28 27 26 25	24 23 22 21 20 19 18 17	16 15 14 13 12 11 10 9	8 7 6 5 4 3 2 1
INTERVAL correspondence	480 479 478 477 476 ← etc ← 475	467 ← etc ←	459 458 457 456 455 454 453 452	451
never used	never used			

word 14

bit position	00 0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0
bit number			etc ← 12 11 10 9 8 7 6 5 4 3 2 1	
INTERVAL correspondence			etc ← 492 491 490 489 488 487 486 485 484 483 482 481	
never used	never used	497 498 499 500		

For any given reel sequence number and, knowing the number of INTERVALS per tape type, the exact status of processing of any INTERVAL can be determined from an analagous INTERVAL / bit position correspondence.

Continued –

the number of INTERVALS per tape type

	IMP-6 (ORBIT #)	IMP-7	IMP-8
PHAS	5	5	5
CNTS	5	5	5
MATR	30	30	20
LOWG	60	50	60
SMCT	40	30	30
FLUX	60	60	60
FLEX	-	60 (max)	60 (max)
VLET	-	-	40

See IMP Programming Systems Overview
CSC/TM-82/6091
Section 20.1.4

In the previous example, if INTERVALS 489, 490, and 491 had not been processed, but all others in the range 451-500 had been processed, the tape catalog entry words 14 and 15 would appear thus:

FF8FF 3FFEFFFF
word 14 ↑ word 15 ↑

explicitly, word 14 would have the following bit pattern:

00000000 0000 1111 1111 1000 1111 1111 bit position = INTERVAL

INTERVAL 501 would be the first INTERVAL for read sequence number 11

WARNING: a bit will be turned ON by any production program, even if data from only a small part of the INTERVAL is present. Therefore, finding datagaps is difficult if all DECOM tapes covering

the INTERVAL time span have not been initially processed before any subsequent production steps are run.

SMCR	rates data summarized by interval
VLET	VLET data summarized by interval
FLUX	PHA data summarized by 5 minute periods within one interval

2.1.4.2 Program usage of the Tape Catalogs:

A summary of the current slot allocations within the IMP-6,7 and 8 cosmic ray tape libraries is given in Table 5 A . A summary of the frequency of access of the slots is given in Table 5 B . Most of the database tapes were created at density = 1600 BPI. The physical characteristics of these tapes are presented in Appendix D, along with TAPESCAN information on some representative volumes. (Quiet time and flare periods, and some random time periods were selected for TAPESCAN to discover typical tape lengths for the number of data blocks present.)

Most production and analysis programs access these tapes through the TAPE CATALOGS.

Section 2.2.1 lists the tape types required for each of the major production and analysis programs in the IMP systems.

These programs have hard-coded into them certain assumptions about the quantity of data on the various tape types. For example, the DATABASE GENERATOR programs which create CNTS and PHAS tape types, reformat 5 intervals of data into one physical tape file. The PHA SUMMARIZOR programs, which create MATR and LOWG tape types, process one interval of data from a CNTS or PHAS tape into one physical tape file of a MATR or LOWG tape; for IMP-8 a MATR tape is assumed to hold a maximum of 20 files, and a LOWG tape a maximum of 50 files of data.

The TAPE CATALOG word structure is also limited by the various assumptions about the quantity of data on the different tape

types. The catalog format has 2 full words set aside for indicating when intervals of data have been processed. One bit, on or off, is used to indicate that an interval of data had been processed (whether fully or partially). One of these words can have up to 30 bits set as intervals of data are processed. Consequently,within the current tape catalog format, one tape entry could hold information on a maximum of 60 intervals of data. The FLUX (and FLEX) tapes utilize all available space in the catalog entry, as they have 60 files of data per tape.

Analysis programs use the interval bits, along with the tape type reel sequence numbers, to determine if required data are actually on a given tape.

Production programs use the interval bits to determine if data are being reprocessed or newly processed.

See Appendix D for tapescan survey results for the DENSITY=1600 BPI databases. Table 6 gives a summary of expected IMP-8 database growth should it be left turned on. That table gives numbers for the current DEN=1600 databases.

2.1.5 GAIN FACTORS:

There exist MED gain factor tables for IMP-6,7, and 8. The gain tables contain one set of gain factors (D, E, and F detector elements) for each interval.

There is also an MED finegain table which currently contains entries for time periods for IMP-7, and 8. This table contains gain factors for each of the 96 hours within one interval.

The LED detectors do not appear to have degraded with time and accordingly do not require gain factor corrections.

2.1.6 LOAD LIBRARY SOURCE LISTS AND PROGRAM USERGUIDES:

Computer load library ADDTOLIB listings for current load library members are located with the IMP maintenance programmer.

User guides for programs and additional program documentation are also located with the IMP maintenance programmer.

Room 242 is the headquarters for the production activities. Bound production run listings are kept there for reference. Also, certain standard plots are run and kept there.

Table 5: A. Current Slot Usage Allocations

Tape Type	IMP: 6	7	8 (to 1980 end)
ENCY	0/316<1>	27/367 (3) <2>	126/426 (3) <3>
PHAS	63	110 (5)	132 (5)
CNTS	63	110 (5)	132 (5)
LOWG	6	11 (50)	14 (50)
MATH	11	19 (30)	33 (20)
SNCT	8	19 (30)	22 (30)
FLUX	6	10 (60)	12 (60)
VLET	--	--	17 (40)
Totals	157	306	488

Parentheses indicate the number of intervals contained on that tape.

Slots Allocated in TLS

IMP-6	180 slots	62640-62759;62400-63459
IMP-7	335 slots	60180-60239;60000-60119;68120-68239; 18978-19010
IMP-8	500 slots	60840-60919;60960-61079;65140-65439
	70 slots	allocated for production work such as backups,plot tapes,DECOM processing.

Total database tapes in slots as of the end of 1980 data production:	951
Blank + Special	64
Working Slots	70

<1>All IMP-6 ENCY tapes have been removed = 316 tapes.
<2>All IMP-7 ENCY tapes have been removed through catalog record 12 = 340 tapes.
<3>All IMP-8 ENCY tapes have been removed through catalog record 11 = 300 tapes.

Table 5: B. Frequency of Slot Access

	Slots obtained	Reassigned	Accessed since reassignment
IMP-6	12/19/76	9/ 7/78	37/180 slots<1> 6 in the last 6 months 143 never accessed since reassignment
IMP-7	4/14/75	11/22/78	215/335 slots 134 in the last 6 months 77 PHAS 7 CNTS 13 MATR 11 LOWG 18 SMCT 8 FLUX 120 never read since reassignment
IMP-8	[5/20/75 + 11/24/76]	n/a	499/500 slots 291 in the last 6 months 89 PHAS 71 CNTS 24 MATR 13 LOWG 15 SMCT 16 VLET 8 FLUX 63 ENCY + BLNK

<1> 6 have been read more than 5 times (FLUX type)

Table 6: IMP-8 Growth-Tape Usage at Density = 1600 BPI

	intervals/tape	tapes/year @ 91.25 intervals/year
PHAS	5	18.25
CNTS	5	18.25
LOWG	50	1.83
MATR	20	4.56
SMCT	30	3.04
FLUX	60	1.52
VLET	40	2.28

(rounds to about 53 tape slots per year)

IMP-8 Projected Slot Requirements through 1985
Assuming completed 1980 data production:

(interval 756-1014 = 656 intervals of data coverage)

tape/ type	int/ tape	1980	1981	1982	1983	1984	1985
PHAS	5	132	150	168	187	205	223
CNTS	5	132	150	168	187	205	223
LOWG	50	14	15	17	19	21	23
MATR	20	33	38	42	47	52	56
SMCT	30	22	25	28	32	35	38
FLUX	60	12	14	15	17	19	20
VLET	40	17	19	21	24	26	28

Includes data coverage into interval number:	1980	1981	1982	1983	1984	1985
	757	849	939	1031	1122	1213

Total high Level Tapes	1980	1981	1982	1983	1984	1985
	98	111	123	139	153	165

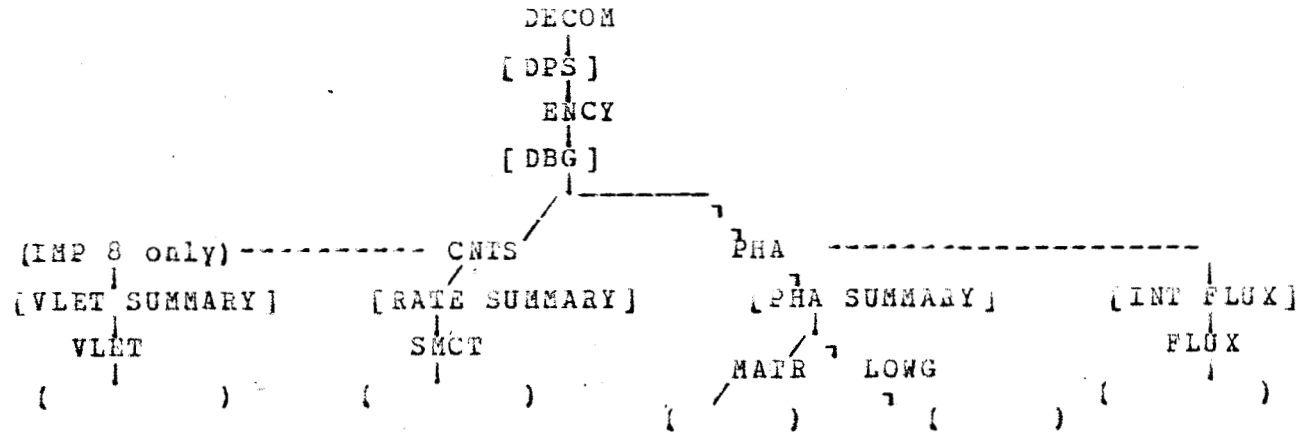
2.2 SYSTEM FLOW DIAGRAMS

2.2.1 SYSTEM FLOW - EXPERIMENTS 11, 32, 52:

****

In the following, brackets indicate a processing program and parenthesis indicate an analysis program.

IMP 6(I),7(H),8(J) processing systems for data base generation and analysis for cosmic ray experiments 11, 32 and 52



general program	produces tape type(s)
DATA PROCESSING SYSTEM	ENCY
DATA BASE GENERATOR	PHA,CNTS
PHA SUMMARIZER	MATR,LOWG
TIMSUM (PHAS tape input)	MATR,LOWG
INTERMEDIATE FLUX	FLUX
INTERMEDIATE FLEX	FLEX
RATE SUMMARY	SMCT
VLET SUMMARY	VLET
PROTON FLUX (PHAS tape input)	KING Data Center Tapes

****

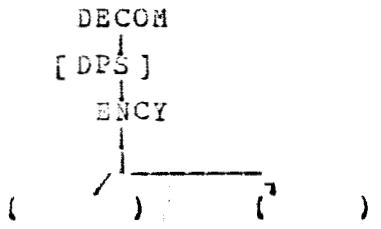
IMP 6,7,8 analysis programs

general program	requires tape types
(ANALIMP)	PHAS,MATR,LOWG
(HGPLOT)	MATR
(LGPLOT)	LOWG
(FLUXPLOT)	FLUX
(FLEXPLOT)	FLEX
(RATEPLOT)	CNTS,SMCT
(ANISOTROPY)	CNTS,SMCT
(VLET PLOT)	VLET
(ELECTRON FLUX)	PHAS

2.2.2 SYSTEM FLOW - EXPERIMENT 28:

****

IMP 7(H) processing systems for data base generation and analysis for solar electron experiment 28



general program	produces tape type(s)
DATA PROCESSING SYSTEM	ENCY

****

EX28 analysis programs

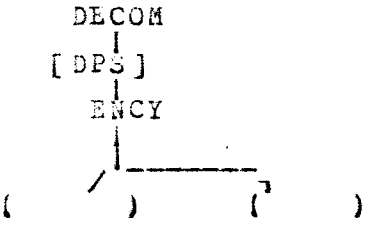
general program	tape types applicable
{LISTALL}	ENCY
{DISPLAY}	ENCY

****

2.2.3 SYSTEM FLOW - EXPERIMENT 10:

****

IMP 6(I) processing systems for data base generation and analysis for solar electron experiment 10



general program	produces tape type(s)
DATA PROCESSING SYSTEM	ENCY

****

RELINK DAID

SB#1M all PDS

All tape dataset names are SB#1M.PROGRAM.LOAD for Cosmic Ray Backup system

PROGRAM	ENTRY	3380 TRKS	File IMPBK3	UBMAN dataset name	date / notes
ANALIMP6	ANALIM		18	Z.ANALIMP6.LOAD.V#384047	2/16/84 = day 47
ANALIMP7	ANALIM		17	Z.ANALIMP7.LOAD.V#384047	
ANALIMP8	ANALIM		16	Z.ANALIMP8.LOAD.V#384047	
CNTSMRY8	JSMCT		13	Z.CNTSMRY8.LOAD.V#684047	
DBG8	IMRJMN		11	Z.DBG8.LOAD.V#384047	
FLUX8	FLUX8		15	Z.FLUX8.LOAD.V#384047	
IMP8DPS	.MAIN		10	Z.IMP8DPS.LOAD.V#484047	
PHASUM8	SUMMN		12	Z.PHASUM8.LOAD.V#384047	
VLTSMRY8	VLSMMN		14	Z.VLTSMRY8.LOAD.V#384047	
ANLIMP7F	ANALIM		19	Z.ANLIMP7F.LOAD.V#384048	2/17/84 = day 48
ANLIMP8F	ANALIM		20	Z.ANLIMP8F.LOAD.V#384048	
TIMSM7	TIMSM7		21	Z.TIMSM7.LOAD.V#384048	
TIMSM8	TIMSM8		22	Z.TIMSM8.LOAD.V#384048	
CNTSMRY7	HSMCT		23	Z.CNTSMRY7.LOAD.V#684048	
DBG7	IMPHMN		24	Z.DBG7.LOAD.V#384048	
FLEX8	FLUX8		25	Z.FLEX8.LOAD.V#384048	
FLEX7	FLUX7		26	Z.FLEX7.LOAD.V#384048	
FLUX7	FLUX7		27	Z.FLUX7.LOAD.V#384048	
PHASUM7	SUMMN	3	28	Z.PHASUM7.LOAD.V#484052	day 48 human archive failed; redo on day 52
FLUXPLOT	FLXPMN		29	Z.FLUXPLOT.LOAD.V#284048	
FLEXPLOT	FLXPMN		30	Z.FLEXPLOT.LOAD.V#284048	
IMPLOT	IMPLOT		31	Z.IMPLOT.LOAD.V#384048	

RELINKDAIO

All Cosmic Ray system dataset names on tape are SB#IM.PROGRAM.LOAD

PROGRAM	ENTRY	3380 TRKS	file NMBR3	DBMAN dataset name	date/notes
ANSTRPY6	ANISPL	6	32	Z.ANSTRPY6.LOAD.V0384052	2/21/84 = day 52
ANSTRPY7	ANSTRP	5	33	Z.ANSTRPY7.LOAD.V0384052	
ANSTRPY8	ANSTRP	5	34	Z.ANSTRPY8.LOAD.V0384052	
CNTSMRY6	CNTSUM	3	35	Z.CNTSMRY6.LOAD.V0484052	
ELFLUX	EFLXMN	4	36	Z.ELFLUX.LOAD.V0384052	
HGPLT6	HGPLT6	3	37	Z.HGPLT6.LOAD.V0384052	
HGPLT7	HGPLT7	3	38	Z.HGPLT7.LOAD.V0384052	
HGPLT8	HGPLT8		39	Z.HGPLT8.LOAD.V0384052	
IMPTDPS	EX32	4	46	Z.IMPTDPS.LOAD.V0484052	
PFLUX8	PFLUX	4	41	Z.PFLUX8.LOAD.V0384052	
LGPLT6	LGPLOT	3	42	Z.LGPLT6.LOAD.V0484052	
LGPLT7	LGPLOT	3	43	Z.LGPLT7.LOAD.V0384052	
LGPLT8	LGPLT8	3	44	Z.LGPLT8.LOAD.V0384052	
I8VLTPLT	PIPLOT	3	45	Z.I8VLTPLT.LOAD.V0284052	

SB#IM.UTILITY.LOAD members:

		46	46	Z.UTILITY.LOAD.V0684052	2/21/84 = day 52
BLANKCAT	MAIN				
CATMOD	MAIN				
DUMPCAT	MAIN				
GAINADD	MAIN				
GAINREAD	MAIN				
LGN8TEST	LGN8TST1	X			no dread. reference
LISTGN	LISTGN				
MAINTCAT	MAIN				
MAINTFLX	MAIN				
READCAT	MAIN				
READCATF	MAIN				
READCATI	MAIN				
READFLEX	READCA				
RESTORE	RESTOR	X			no dread references
RITCAT	RITCAT	X			no dread reference
VLBTLIST	MAIN				

REUNK DAIO

SB#1.M all PDS

all tape dataset names are SB#1.M.PROGRAM.LOAD for Cosmic Ray Backup system

PROGRAM	ENTRY	3380 TRKS	file IMPBK3	LIBMAN dataset name	date / notes
ANALIMP6	ANALIM		18	Z.ANALIMP6.LOAD.V0484047	2/16/84 = day 47
ANALIMP7	ANALIM		17	Z.ANALIMP7.LOAD.V0384047	
ANALIMP8	ANALM		16	Z.ANALIMP8.LOAD.V0384047	
CNTSMRY8	JSMCT		13	Z.CNTSMRY8.LOAD.V0684047	
DBG8	IMPJMN		11	Z.DBG8.LOAD.V0384047	
FLUX8	FLUX8		15	Z.FLUX8.LOAD.V0384047	
IMP8DPS	MAIN		10	Z.IMP8DPS.LOAD.V0484047	
PHASUM8	SUMMN		12	Z.PHASUM8.LOAD.~~V0484047~~	
VLTSMRY8	VLSMMN		14	Z.VLTSMRY8.LOAD.V0384047	
ANLIMP7F	ANALIM		19	Z.ANLIMP7F.LOAD.V0384048	2/17/84 = day 48
ANLIMP8F	ANALM		20	Z.ANLIMP8F.LOAD.V0384048	
TIMSM7	TIMSM7		21	Z.TIMSM7.LOAD.V0384048	
TIMSM8	TIMSM8		22	Z.TIMSM8.LOAD.V0384048	
CNTSMRY7	HSMCT		23	Z.CNTSMRY7.LOAD.V0684048	
DBG7	IMPHMN		24	Z.DBG7.LOAD.V0384048	
FLEX8	FLUX8		25	Z.FLEX8.LOAD.V0384048	
FLEX7	FLUX7		26	Z.FLEX7.LOAD.V0384048	
FLUX7	FLUX7		27	Z.FLUX7.LOAD.V0384048	
PHASUM7	SUMMN	3	28	Z.PHASUM7.LOAD.V0484052	day 48 WOMAN archive failed; redo on day 52
FLUXPLOT	FLXPMN		29	Z.FLUXPLOT.LOAD.V0284048	
FLEXPLOT	FLXPMN		30	Z.FLEXPLOT.LOAD.V0284048	
IMPLOT	IMPLOT		31	Z.IMPLOT.LOAD.V0384048	

RELINKDAIO

All Cosmic Ray system dataset names on tape are SB#IM.PROGRAM.LOAD

PROGRAM	ENTRY	3380 TRKS	file IMPBK3	DBMAN dataset name	date/notes
ANSTRPY6	ANISPL	6	32	Z.ANSTRPY6.LOAD.V#384052	2/21/84 = day 52
ANSTRPY7	ANSTRP	5	33	Z.ANSTRPY7.LOAD.V#384052	
ANSTRPY8	ANSTRP	5	34	Z.ANSTRPY8.LOAD.V#384052	
CNTSMRY6	CNTSUM	3	35	Z.CNTSMRY6.LOAD.V#484052	
ELFLUX	EFLXMN	4	36	Z.ELFLUX.LOAD.V#384052	
HGPLT6	HGPLT6	3	37	Z.HGPLT6.LOAD.V#384052	
HGPLT7	HGPLT7	3	38	Z.HGPLT7.LOAD.V#384052	
HGPLT8	HGPLT8		39	Z.HGPLT8.LOAD.V#384052	
IMP7DPS	EX32	4	40	Z.IMP7DPS.LOAD.V#484052	
PFLUX8	PFLUX	4	41	Z.PFLUX8.LOAD.V#384052	
LGPLT6	LGPLOT	3	42	Z.LGPLT6.LOAD.V#484052	
LGPLT7	LGPLOT	3	43	Z.LGPLT7.LOAD.V#384052	
LGPLT8	LGPLT8	3	44	Z.LGPLT8.LOAD.V#384052	
ISVLTPLT	PIPLOT	3	45	Z.ISVLTPLT.LOAD.V#284052	
SB#IM.UTILITY.LOAD	members:				
		40	46	Z.UTILITY.LOAD.V#684052	2/21/84 = day 52
BLANKCAT	MAIN				
CATMOD	MAIN				
DUMPCAT	MAIN				
GAINADD	MAIN				
GAINREAD	MAIN				
LGN8TEST	LGN8TST1	X			no dread references
LISTGN	LISTGN				
MAINTCAT	MAIN				
MAINTFLX	MAIN				
READCAT	MAIN				
READCATF	MAIN				
READCATI	MAIN				
READFLEX	READCA				
RESTORE	RESTOR	X			no dread references
RITCAT	RITCAT	X			no dread references
VLETLIST	MAIN				

2.3 SYSTEM PROGRAMS LIST

2.3.1 COSMIC RAY PROGRAMS:

replace project id SEIMP with SBHIRM

Table 7: Cosmic Ray Programs

IMP 6,7,8 cosmic ray system programs; source library names and backup locations

Cosmic ray experiments 11,32,52 only

Data base generation programs:

Program Name		Source
data processing system	-6	seimp.imp6dps.source
	-7	seimp.imp7dps.source
	-8	seimp.imp8dps.source
data base generator	-6	seimp.dbg6.source
	-7	seimp.dbg7.source
	-8	seimp.dbg8.source
counts summary	-6	seimp.cntsmry6.source
	-7	seimp.cntsmry7.source
	-8	seimp.cntsmry8.source
pha summarizer	-6	seimp.phasum6.source
	-7	seimp.phasum7.source
	-8	seimp.phasum8.source
pha summarizer (mtsum)	-6	seimp.mtsum6.source
(timsm7)	-7	seimp.timsm7.source
(timsm8)	-8	seimp.timsm8.source
orbital merge summary	-6	seimp.orbmrg6.source
intermediate flux	-all	seimp.intflux.source
intermediate flux (flex)	-7,8	seimp.intflux.newsourc
vlet summary	-8	seimp.vltsmry8.source
proton flux (King tapes)	-8	seimp.i8pflux.source
imp-8 data base edit (COPYTAPE program)		seimp.cpytape8.source

+load

FLUX7.LOAD
FLUX8.LOAD

+load

PFLUX8.LOAD

+load

+timsum7.source
+timsum8.source

FLEX7.LOAD
FLEX8.LOAD

Data base analysis programs:

Program Name		source
analimp6		seimp.analimp6.source
analimp7		seimp.analimp7.source
analimp8		seimp.analimp8.source
D vs F analimp-7		seimp.dfanlimp.source
D vs F analimp-8		seimp.dfanlimp.source
high gain plot6		seimp.hgplt6.source
high gain plot7		seimp.hgplt7.source
high gain plot8		seimp.hgplt8.source
low gain plot6		seimp.lgplt6.source
low gain plot7		seimp.lgplt7.source
low gain plot8		seimp.lgplt8.source
flxplot (all)		seimp.flxplot.source
flxplot (flex tapes)		seimp.flxplot.newsourc
flxplot (c.paizis) (special version)		seimp.flxplotc.source
special flux	-8	seimp.rflux8.source
ratesplot (all)		seimp.implot2.source
anisotropy	-6	seimp.anstrpy6.source
anisotropy	-7	seimp.anstrpy7.source
anisotropy	-8	seimp.anstrpy8.source
vlet plot	-8	seimp.i8vltplt.source
electron flux	-7,8	seimp.elflux.source

+load

FLUXPLOT.LOAD
FLEXPLOT.LOAD

IMPLOT.LOAD

+load

+load

+load

* see below

Other source libraries, with their purposes are

1)	main gain tables and finegain table maintenance	seimp.finegain.cntl
2)	imp generalized subroutines and utility programs	seimp.utility.source ✓
3)	general tape dump programs - all IMPS	seimp.tapedmps.source ✓
4)	special list programs, in addition to tape dump dataset	seimp.lst32.source ✓ seimp.i8vitlst.source ✓
5)	general fitting program - all IMPS (GLSWS program)	seimp.fitting.source ✓
6)	spectral fit package - all IMPS	seimp.impflux.papfit ✓

Primary backups for each dataset can be found with the IMP systems tape backup librarian .

Secondary backups for these datasets will be found in the SACC user backup system ASM2, using the TSO command $AI.

9/83. * SB#IM.ANLIMP7F.SOURCE , LOAD
SB#IM.ANLIMP8F.SOURCE , LOAD

These versions of the ANALIMP programs have access to the IMP finegain tables. This work was completed in the fall of 1982. The versions have not replaced the previous versions because more testing should be done by Dr. McGuire

IMP Fourier Analysis programs:

FOURIMP7.LOAD
FOURIMP8.LOAD

Source:

2.3.2 SOLAR ELECTRON PROGRAMS:

Table 8: Solar Electron Programs

IMP 6,7 solar electron system programs; source library names and backup locations

solar electron experiments 10,28 only

Data base generation programs:

Program Name		Source
data processing system	-6	seimp.ex10dps.source
	-7	seimp.ex28dps.source

Data base analysis programs:

trplot	-7	seimp.trplot.source
DESI	-7	seimp.dsply28.source

Data base list and utility programs:

seimp.lst28.source (DECOM list source)
seimp.listall7.source (utility pgms for EX28)

Primary backups for each dataset can be found with the IMP systems tape backup librarian.

Secondary backups for these datasets will be found in the SACC user backup system ASM2, using the TSO command $AI.

2.4 DOCUMENTATION SUMMARY

Table 9 gives the status of IMP documentation. A key explaining the symbols follows the table.

Table 9: Documentation - Existence and Locations

COSMIC RAY DATABASE GENERATION PROGRAMS - EXPERIMENTS 11, 32, 52

program name	description	doc.	loc.	guide	tape format
IMP-6 EX11	data processing system	y	b1	y	b1
IMP-7 EX32	data processing system	y(mod)	b2	y	bt
IMP-8 EX52	data processing system	y(mod)	b2	y	bt
6 IMPIMN	data base generator	y	b1	y	b1
7 IMPHMN	data base generator	y(mod)	b2	y	bt
8 IMPJMN	data base generator	y(mod)	b2	y	bt
6 SUMMN	pha summary	y	b1	y	b1
7 SUMMN	pha summary	y(mod)	b2	y	bt
8 SUMMN	pha summary	y(mod)	b2	y	bt
6 ORBMRG	merge summary (obsolete)	y	b1	y	b1
6 MTSUM	multiple time summary	y	b1	y	phasum
7 TIMSM7	multiple time summary	-	-	y	phasum
8 TIMSUM	multiple time summary	-	-	y	phasum
6 CNTSUM	counts summary	y	b1	y	b1
7 HSMCT	counts summary	y	b2	y	b2,bt
8 JSMCT	counts summary	y	b2	y	b2,bt

6,7,8 FLUX	intermediate flux	y	b2	y	bt
7,8 FLUX	intermediate flux (flex)	-	-	jcl	bt
8 VLTSUM	vlet summary	specs	b3	y	bt
8 PFLUX	King tapes-proton flux	specs	b3	jcl	-
8 cpytape	IMP-8 database edit pgm	-	-	jcl	-
8 LGN8TEST	lowgain tape check pgm	-	-	jcl	-

COSMIC RAY DATABASE ANALYSIS PROGRAMS - EXPERIMENTS 11, 32, 52

* See page 39

6 ANALIMP	analimp	y	b1*	y	-
7 ANALIMP	analimp	y (mod)	b2#	y	-
8 ANALIMP	analimp	y	b2#	y	-
7 DFANLIMP	analimp D vs F vsn.	-	-	jcl	-
8 DFANLIMP	analimp D vs F vsn.	-	-	jcl	-
6 HGPLOT	high gain plot	y	b1*	y	-
7 HGPLOT	high gain plot	-	-	y	-
8 HGPLT8	high gain plot	-	-	y	-
6 LGPLOT	low gain plot	y	b1*	y	-
7 LGPLOT	low gain plot	-	-	y	-
8 LGPLT8	low gain plot	-	-	y	-
all FLXPMN	flux plot	prologue source		y	source
7,8 FLXPMN	flex plot (flex)	prologue source		jcl	source
FLXPLOTC	flux plot (special vsn)	-	-	y	source
8 RFLUX	special flux program	notes	b3	y (no jcl)	-
all IMPLOT	rate plot	I-6 (old)	b1	y	-
6 ANSTRPY	anisotropy display	-	-	y	-
7 ANSTRPY	anisotropy display	-	-	y	-
8 ANSTRPY	anisotropy display	-	-	y	-
8 VLTPLOT	vlet plot	specs	b3	y	-
EFLUX78	electron flux	-	-	y	-
ISOTIMP6,7	isotope analysis program	notes	b3	y	-
GLSWS	general fitting program	y	b3	jcl	-

SPECTRAL FIT	fit package for FLUXPLOT	spec.,source	y	-

ANLIMPTF } versions accessing finegam tables
ANLIMPSF } see source

COSMIC RAY UTILITIES, GENERAL PROGRAMS

vlet list	VLET events from CNTS tapes	-	-	y	
olglst	lowgain events from MATR tapes	-	-	y	
listall	ex11 DECOM list	y	b1	y	
listall	ex32/52 DECOM list	y(mod)	b2	jcl	
encyread	IMP-7,8 ENCY tape list	-	-	jcl	
tape cats.	tape catalogs	y	b1	n/a	
tape cats	tape catalogs 7,8	y(mod)	b2	n/a	
utilities	BLANKCAT, readcat,dumpcat,maintcat,restore,CATMOD	y	b1	y	
utilities	readcat,dumpcat,restore,..	y(mod)	b2	y	
gen.subr.	katlog,btmnp,dpktn,etc.	y	b1	y	
gen.subr.	katlog,btmnp,dpktn,etc.	y(mod)	b2	y	
tapedumps	dumps for various tapes	-	-	jcl	
fg build	finegain tables maint.	y	source	jcl	
gain build	main gain tables maint.	y	source	jcl	

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imp-6 EX10	data processing system	y	b1	y	b1
EX10 linlst	linlist pgm(oimpilib)	source missing			
EX10 listall	DECOM list (LSTAL3,EX10LIST	source missing			
display	IMP-1 solar electron analysis	source missing			
	(There are other programs, for which there are no sources.)				
imp-7 DPS28	data processing system	y	b28	y	b28
imp-7 TRPLOT	solar electron plot	y	b28	y	-

7 lst28	list all for DECOM	y	b28	y	b28
7 lst28e	list all for ENCY	-	-	-	-
utilities	read28,dump28,rest28,.....	-	-	-	-
imp-7 DESI	display for ex28	-	-	jcl	-

* does not include gain factor interface (GNFACT)

\# does not include new entry for ENERGY routine: ENGCHL
For IMP-8, does not include alternate energy function for MED alpha particles.

source indicates that the source dataset contains PDL and/or Prologue type documentation, and may contain additional documentation, such as program calculation methods, or maintenance methods (e.g. for gain and finegain tables). If the program generates a special tape (e.g. a tape for the PDP11 computer),the tape format description is included.

b1 = loose-leaf bound book 'imp-6 documentation-book b1'

b2 = loose-leaf bound book 'imp-7/8 documentation-book b2'

b28 = documentation in a brown folder for all EX28 information

bt = loose-leaf bound book 'imp-7/8 tape formats'

b3 = collected loose documentation located in black folder 'book b3'

y = for the column labelled 'guide' ,loose-leaf bound book of userguides

GENERAL COMMENTS ON DOCUMENTATION STATUS

After initial maintenance, each program source dataset contains a JCL member and a DIRECTORY member. The directory member lists all the subroutines that the program requires and gives their source dataset locations. Additional documentation may be present.

b1: The loose-leaf bound book b1 contains all IMP-6 documentation. This book contains a section for each general program. There are usually 4 to 10 sentences for each routine that give functions and method. There are no calling sequence lists. There are common block lists with variable names and uses and a common block/subroutine interface chart. There are tape formats and card input formats, but no actual JCL. There is sometimes a primitive program flow diagram.

The program sources themselves contain no in-line documentation, except for some comments.

b2: The loose-leaf notebook b2 contains most IMP-7 and IMP-8 documentation. This book contains a section for each general program, except as noted above. Each section is usually two to three pages long, and refers to the IMP-6 documentation, except for required differences. The specialized differences are elaborated in varying detail. There are common area variable lists and subroutine interfaces. Tape formats are located in a separate book 'bt'. The program sources themselves contain no in-line documentation, except for some comments.

Other programs contained in book b2 :

INTERMEDIATE FLUX	program for all IMPs
ANALIMP8	a formal document for the IMP-8 analysis program

NOTE** The COUNT SUMMARY programs for IMP-7 and IMP-8 are complete documents, not modifications.

b3: The folder labelled b3 contains the notes and specifications referred to above, Dalton's LINK-LIST documentation, and some telemetry documentation. It also contains the old documents on the IMP-6 INTERMEDIATE FLUX and FLUX DISPLAY programs.

b28: The large brown folder contains all EX28 system documentation. Formal documents exist for the EX28 data processing system, the TRPLOT program, and the LISTALL program.

2.5 GENERAL SUBROUTINES AND UTILITIES

2.5.1 GENERAL PURPOSES:

Table 10: Generalized Subroutines And Utilities

IMP 6,7,8 generalized subroutines and utilities

members in this list perform utility and generalized functions for all IMP systems

MEMBER	DESCRIPTION
BLANKCAT	make tape catalog entry into a 'BLNK' tape
BTMNP	get selected bits from input words
CATLOG	search IMP catalogs for specified tape entry words
CATSUP *	tape catalog search routine used by ratesplot & flxplot programs (like CATLOG)
CATMOD	modify summary record entry of catalog record
CWRITE	write a printer copy of a catalog record to verify
DPKTN	pack a tape VOL-SER for use with FTIO
DUMPCAT	dump catalog onto tape
FMOVE	byte mover
IDIFF	time difference calculator
IFIXIT	time aligner for end of year overflow
INTVLGEN	generate listing of interval numbers and their
WRITE	start times in year,month,day.
KATLOG	return the number of records in the tape catalogs
MAINTCAT	change one or several words of a tape catalog entry
CHANGE	used with MAINTCAT
COUNT	used with MAINTCAT
ORBIT6	return the times associated with IMP6 orbits
PRNTCG	print out the reference tape record entry
PRNSUP *	mount/unmount message generator used by ratesplot & flxplot programs (like PRNTCG)
READCAT	read the catalog deciseconds, years format
READCAT1	read the catalog month,day, year; hhmmss format
WHEN	used with readcat1
RESTORE	restore a catalog from a tape backup
UNPACK	time conversion from & to deciseconds:mth:day:hr:min:sec

* these utilities are located in 'SEIMP.IMPLOT2.SOURCE'

2.5.2 DUMP AND LIST PROGRAMS:

Table 11: Dump And List Programs

DIRECTORY OF MEMBERS IN THE DATASET 'SEIMP.TAPEDMPS.SOURCE'

(refer to LSTAB2.SOURCE, I8VLTLST.SOURCE,
for other specific list programs)

MEMBERS CONTAINING JCL TO RUN DUMP PROGRAMS:

$CNTD7	CNTS tape dump for IMP-7
$LGN8	LOWG tape dump for IMP-8
$LGN7	LOWG tape dump for IMP-7
$ENCD8	ENCYCLOPEDIA tape dump for IMP-8
$FLUXD	FLUX tape dump
$ENCD6	ENCY for IMP-6
$PHAD7	PHAS tapes for IMP-7
$PHAD8	PHAS tapes for IMP-8
$SMCTD7	SMCT tapes for IMP-7

MEMBERS CONTAINING SOURCES FOR DUMP PROGRAMS

COUNTDMP	CNTS source dump
LGN8DMP	LOWG source dump
LGN7DMP	LOWG source dump
ENC6DMP2	ENCY source dump (second) for IMP6
ENC6DUMP	ENCY source dump (first) for IMP6
ENC78DMP	ENCY source dump for IMP7,8 (formatted)
FLUXDMP8	FLUX dump tailored for IMP-8
FLUXDUMP	FLUX dump (skeleton format)
PHA78DMP	PHAS tapes dump source for IMP7,8
SMCTDMP	SUMMARY COUNT dump source; IMP7 is expanded

2.5.3 GAIN TABLE PROGRAMS:

Table 12: Gain Table Programs

index to members of SEIMP.FINEGAIN.CNTL:

MEMBER	CONTENTS
DOCUMENT	description of gain and fine gain tables;
PROCEDUR	description of procedures in use for maintaining IMP gain and fine gain tables.
STATUS	lists current status of table entries and FLUX data base generation.
APR10797	finegains
APR10798	finegains
APR10808	finegains
APR30808	finegains
DEC20797	finegains
DEC20798	finegains
I749 3OLD	old 493 finegains
JAN4808	finegains
JUN11797	finegains
MAR10808	finegains
.	
.	
etc.	
FGBACK	backup routine for finegain tables
FGBILD	entry routine for finegain tables (background)
FGBLDJCL	JCL for entry of data into finegain tables
FGCREATE	create finegain tables
FGDATE	convert IMP7,8 interval into year, day of year
FGFIXUP	fixup finegain entry
FGLIST	routine to list finegain tables
FGLSTJCL	JCL for FGLIST program
FGLSTS	list finegain record inputted as argument
FGREST	restore finegain tables from tape backup
GAINAD	main program for addition of gain factors to main gain tables - replaces GAININ 11/80
GGMD	subroutine to read and change gain tables
GAINREAD	foreground (principally) read of gain tables
GGMDRD	subroutine to read gain tables
GAINEXP	routine to expand a gain table
GAININOR	source for gain entry, used before interval 700.
GEXPJCL	JCL for gain table expansion
LISTGN	background list program for gain tables
LISTGJCL	JCL for gain table list program
BACKG8	adaption for backup of IMP-8 gain table
MAINGJCL	routine for backup and restore of all gain tables
RSTRGAIN	routine for restore from scratch of gain tables
GAINNJCL	JCL for gain table addition before 11/80
GAN6INIT	IMP-6 gain table initialization
GAN7INIT	IMP-7 gain table initialization
GAN8INIT	IMP-8 gain table initialization
STABGAIN	JCL for gain table addition (background) after 11/80
G581T598	gain factors - main tables
G599T610	"
G611T647	"
G648T659	"
G658T667	"
G668T685	"
G686T697	"
G698T710	"

.
.
.
etc.

2.6 IMP LOAD LIBRARIES, CATALOGS AND TABLES

replace SEIMP by SB#IM

Table 13: Load Libraries, Catalogs And Tables

IMP SYSTEMS LISTING OF LOAD LIBRARIES,CATALOGS,TABLES

I. TAPE CATALOGS

EX11 - IMP 6	SEIMP.DEX11CAT.DATA	
EX32 - IMP 7	SEIMP.DEX32CAT.DATA	
	SEIMP.IMP7.FLEXCAT	(FLEX CATALOG)
EX28 - IMP 7	SEIMP.DEX28CAT.DATA	
EX52 - IMP 8	SEIMP.DEX52CAT.DATA	
	SEIMP.IMP8.FLEXCAT	(FLEX CATALOG)

The tape catalogs have these dataset attributes:
recfm= f lrecl=3060 blksize=3060 dsorg=ps

II. GAIN FACTOR TABLES

EX11 - IMP 6	SEIMP.IMP6GAIN.DATA
EX32 - IMP 7	SEIMP.IMP7GAIN.DATA
EX52 - IMP 8	SEIMP.IMP8GAIN.DATA

The main gain tables have these dataset attributes:

IMP-6	recfm= fb	lrecl=1600	blksize=1600	dsorg=da
IMP-7/8	recfm= fb	lrecl= 800	blksize= 800	dsorg=da

FINEGAIN TABLES SEIMP.FINEGAIN.DATA

The finegain tables have these dataset attributes:
recfm= fb lrecl=1160 blksize=1160 dsorg=ps

III. LOAD LIBRARIES

SEIMP.OIMPGLIB.LOAD NOT IN LIBMAN
SEIMP.OIMPILIB.LOAD ✓
SEIMP.OIMPHLIB.LOAD ✓
SEIMP.OIMPJLIB.LOAD ✓
SEIMP.OIMPLIB.LOAD ✓
SEIMP.OIMPMOD.LOAD ✓
SEIMP.IMPFLUX.LOAD ✓
SEIMP.NEWFLUX.LOAD ✓
SEIMP.ORFLUX.LOAD NOT IN LIBMAN
SEIMP.HLIB28.LOAD

IMP special load module datasets:

SEIMP.EX52.LOAD old
SEIMP.FLXPLOTC.LOAD not in LIBMAN
SEIMP.GAINAD.LOAD in SB#IM.UTILITY.LOAD
SEIMP.ZIRFSFIT.LOAD } GLSWS FITTING routines not in LIBMAN
SEIMP.FITTING.LOAD

IIIa. OTHER COSMIC RAY SYSTEMS LOAD LIBRARIES REFERENCED:

K3.SEHGD.SB001.FLUXPLOT
K3.ZBJHB.SB001.FLUX.LOAD
K3.SBCID.SB001.OPIOTEMP } NOT IN LIBMAN
K3.SBCID.SB001.OPIONEER
K3.ZB2NL.SD001.OPIONEER

2.7 PROGRAM MEMBER CROSS REFERENCE

Table 14: Program Member Cross Reference

IMP systems program member names cross reference:

Programs included- analysis programs:

analimp	(6,7,8)
high gain plot	(6,7,8)
low gain plot	(6,7,8)
fluxplot program	(for all IMPs)
rateplot	(all IMPs)
anisotropy	(6,7,8)
electron flux	(,7,8)
vlet plot	(imp-8)

data base generation programs:

data processing system	(6,7,8)
database generator	(6,7,8)
multiple time summary	(,7,8)
pha summary	(6,7,8)
intflux program	(for all IMPs, FLUX database)
intflux program	(for all IMPs, FLEX database)
counts summary	(6,7,8)
vlet summary	(imp-8)
proton flux	(imp-8)

Load Library Codes:

1	= seimp.oimpilib.load
2	= seimp.oimphlib.load
3	= seimp.oimpjlib.load
4	= seimp.oimplib.load
5	= seimp.impflux.load
5N	= seimp.newflux.load
6	= seimp.oimpmod.load
9	= k3.zbjhb.sb001.flux.load
10	= k3.sbcid.sb001.opiotemp
11	= k3.sbcid.sb001.opioneer
12	= k3.sehgd.sb001.fluxplot
A	= seimp.ex52.load ← became IMP3DPS.LOAD

Program Abbreviations:

a6,7,8	analimp
hg6,7,8	high gain plot
lg6,7,8	low gain plot
f	fluxplot (FLUX tapes)
ad6,7,8	anisotropy display
r	rateplot (all IMPs)
e	electron flux (7,8)
vp	vlet plot (imp-8)
dps6,7,8	data processing system
dbg6,7,8	data base generator
t7,8	mult. time summary
p6,7,8	pha summary
I6,7,8	intermediate flux (FLUX database)
IN6,7,8	intermediate flux (FLEX database)
c6,7,8	cnts summary
vs	vlet summary (imp-8)
pf	proton flux (imp-8)
u	seimp.utility.source
FGC	seimp.finegain.cntl

Members followed by a * are utility type and expanded. Entries are to be found in the overview member $xrefap. Members followed by a ** are located in PIONEER listings or are part of the N. Lal plot package.

member name	referenced by	load lib.	source listing	load lib. member (if other than subroutine name)
acc6	r	6	r	
acc6c	r	6	r	
acc6e	r	6	r	
acc6s	r	6	r	
acc7	r	6	r	
acc7c	r	6	r	
acc7e	r	6	r	
acc7s	r	6	r	
acc8	r	6	r	
acc8c	r	6	r	
acc8e	r	6	r	
acc8s	r	6	r	
accum	e	3	e	
accump	pf	6	pf	
accum6	hq6	1	hg6	
accum7	hq7	1	hg7	
accum8	hq8	3	hg8	
addate	e,pf	3	e	
addtim	dps6,7,8 t7,t8 vs	1	dps6	
addtsc	e,pf	3	e	
all	ad6	4	ad6	
analimp6 (analim)	a6	1	a6	
analimp7 (analim)	a7	2	a7	
analimp8 (analim)	a8	3	a8	
anispl	ad6	4	ad6	
anstrpy7	ad7	2	ad7	anstrp
anstrpy8	ad8	3	ad8	anstrp
aplot	a6,7	1	a6	
blkdat	c6	6	c6	
btmnp *		1	u	
bytes	ad7,8	4	ad7	
calinp	r	6	r	
camplt	ad6	4	ad6	
cams7	ad7	2	ad7	
cams8	ad8	3	ad8	
catlog *		1	u	
catsup	f,r	6	r	
chead	ad6	4	ad6	
chimin	ad6	4	ad6	
chim78	ad7,8	4	ad7	
clstap	c6	6	c6	
citape	c7,8	6	c7	
cntsum	c6	6	c6	
cnvmjd/ cnvdat	vs,vp	11	**	
comtim	dps6,7,8 dbg8	1	dps6	
contim	vp	11	**	
conv	c6	6	c6	
conv78	ad7,8	4	ad7	
correc	ad6	4	ad6	
date	a8,7 I7,8 IN7,8	2	a7	
date/ day	dps6,7,8 e,pf	1	dps6	
dcread/	dps6	1	dps6	

tapeid/			
fileid/			
datrd/			
filskp/			
reot			
dist	p6	1	p6
dist	p7	4	p7
dist	p8	3	p8
distqf	hq6,7 a6,7	1	hq6
dist1	t7	4	t7
diag	lq6	1	lq6
diag	lq7	4	lq7
dltape	dps6,7,8	1	dps6
dpchek	dbq7	4	dbq7
dpktn *		1	u
dsply7	ad7	2	ad7
dsply8	ad8	3	ad8
dvsf	lq6	1	lq6
dvsf	lq7	4	lq7
eflxmn	e	3	e
efplot/ efplfo/ efplff	e	3	e
energy/ enqwrt	a6	1	a6
energy/ enqwrt	a7	2	a7
energy/ enqwrt	a8	3	a8
evlist	lq8,hq8 a8	3	a8
exitq	f	12	**
extrc	a7,I7,IN7	2	I
extrcj	I8,IN8	5	I
extrct	dps6	1	dps6
extrct	dps7,8	4	dps7
extrc6	a6,I6,IN6	1	I
extrc8	a8	3	a8
ex11	dps6	1	dps6
ex32	dps7	4	dps7
ex52	dps8	3	dps8
fcn/ fcnwrt	a6	1	a6
fcn/ fcnwrt	a7	2	a7
fcn fcnwrt	a8	3	a8
fermsg	vp,vs	10	**
fgdate	I7,8 IN7,8	1	FGC
fill6	hq6	1	hq6
fill7	hq7	1	hq7
fill8	hq8	3	hq8
fillup	hq6,7	1	hq6
flux6	I6,IN6	5	I
flux7	I7,IN7	5	I
flux8	I8,IN8	5	I
flxcat	IN7,8	5N	IN
flxfg	I7,8 IN7,8	5	I
flxqmd	I6,7,8 IN6,7,8	5	I
flxqnn	I6,7,8 IN6,7,8	5	I
flxpa	f	5	f
flxpaa	f	5	f
flxpab	f	5	f
flxpbl	f	5	f
flxpbx	f	5	f
flxpcl	f	5	f
flxphd	f	5	f
flxpin	f	5	f
flxpmn	f	5	f
flxpms	f	5	f

flxpmt	f	5	f
flxppr	f	5	f
flxpps	f	5	f
flxppt	f	5	f
flxpp1	f	5	f
flxpss	f	5	f
flxpst	f	5	f
flxptc	f	5	f
flxpt1	f	5	f
flxupk (flxbuf)	e,pf	3	e
flx6bl	I6	5	I
flx6mt	I6,7,8 IN7,8	5	I
flx6pr	I6	5	I
flx6sm	I6	5	I
flx7bl	I7	5	I
flx7bl	IN7	5N	IN
flx7el	I7	5	I
flx7pr	I7	5	I
flx7sm	I7	5	I
flx7sm	IN7	5N	IN
flx8bl	I8	5	I
flx8bl	IN8	5N	IN
flx8el	I8	5	I
flx8pr	I8	5	I
flx8sm	I8	5	I
flx8sm	IN8	5N	IN
fmove *		1	
frchms	vp	3	vp
fpl1	vp,vs	10	**
fread	vp,vs	10	**
functn	r	6	r
funitabl	vp,vs	10	**
gain8d	pf	6	pf
gencnt	dbg6	1	dbg6
gencnt	dbg7	4	dbg7
gencnt	dbg8	3	dbg8
genpha	dbg6	1	dbg6
genpha	dbg7	4	dbg7
genpha	dbg8	3	dbg8
getbx7	I7,IN7	5	I
getbx8	I8,IN8	5	I
gfprnt	a6	1	a6
gfprnt	a7	2	a7
gfprt	lg6,7	1	lg6
gnfact	lg6,7,8 hg6,7,8 a6,7,8	1	a8
gtnode	lg8, hg6,7,8	3	hg8
hdprnt	lg6	1	lg6
headrp	r	6	r
headr7	ad7	2	ad7
headr8	ad8	3	ad8
hgprnt	lg7	4	lg7
hqprnt	a6	1	a6
hgprnt	a7	2	a7
hgplt6	hg6	1	hg6
hgplt7	hg7	1	hg7
hgplt8	hg8	3	hg8
histgr	lg6,7	1	lg6
histo	a6,7,8	1	a6
histos	lg8, hg6,7,8	1	hg6
hmatn6	a6	1	a6
hmatn7	a7	2	a7
hmatn8	a8	3	a8
hacums	c7	6	c7
hacumx	c7	6	c7
hcal	c7	6	c7
hcoord/ hclose	c7	6	c7
hdata	c7	6	c7
hlook	c7	6	c7

hmess	c7	6	c7
hout	c7	6	c7
hprep	c7	6	c7
hsumrb	c7	6	c7
hsmct	c7	6	c7
htab	c7	6	c7
icntb	a8	3	a8
idiff	f,c7,8 r	6	u
idunpk	dps6	1	dps6
ifixit	f,c7,8 r	6	u
iflip	vs	3	vs
ihalf	lq7,a7	4	a7
impdat	r	6	r
impeak	hg6,7,8	1	hg6
imphmn	dbg7	4	dbg7
impimn	dbg6	1	dbg6
impjmn	dbg8	3	dbg8
implot	r	6	r
incrmn	a6,7,8	2	a6
incrt	ad6	4	ad6
init	e,pf	3	e
init	c6	6	c6
inpars	r	6	r
inpar7	ad7	2	ad7
inpar8	ad8	3	ad8
iplots/ camout	ad6	4	ad6
inrec	c6	6	c6
intrvl	dbg7,8	4	dbg7
intrvl	ad7,8	2	ad7
isqdqf	dbg6	1	dbg6
jacums	c8	6	c8
jacumx	c8	6	c8
jcal	c8	6	c8
jcoord/ jclose	c8	6	c8
jdata	c8	6	c8
jlook	c8	6	c8
jmess	c8	6	c8
jout	c8	6	c8
jprep	c8	6	c8
jsumrb	c8	6	c8
jsmct	c8	6	c8
jtab	c8	6	c8
jdays	lq7 a7,8 I7,8 ad7,8	1	a7
jlb2cl/ jmb2st	t8,p8	3	p8
katlog *		1	u
label7	ad7	2	ad7
label8	ad8	3	ad8
ledcor	dbg8	3	dbg8
ledst2	dbg8	3	dbg8
legndg	f	12	**
lqfil8	lq8	3	lg8
lqfill	lq6	1	lg6
lqfill	lq7	4	lg7
lqio	lq6,7	1	lg6
lqphau	lq8,a8	3	a8
lqplt8	lq8	3	lg8
lqplot	lq6	1	lg6
lqplot	lq7	4	lg7
lqsts8	lq8	3	lg8
lmatn6	a6	1	a6
lmatn7	a7	2	a7
lmatn8	a8	3	a8
logdec/ log10/ log12	dps6,7,8	1	dps6
lookp	r	6	r
loop	c6	6	c6

maqac7	ad7	2	ad7	
maqac8	ad8	3	ad8	
maqd78	ad7,8	4	ad7	
maqhst	ad6	4	ad6	
maqplt	ad6	4	ad6	
matrx8	a8	3	a8	
merge	p6	1	p6	
merge	p7	4	p7	
merge	p8	3	p8	
mergej	t8	3	t8	
mergel	t7	4	t7	
messaq	c6	6	c6	
meswtr	dps6	1	dps6	
meswtr	dps7	4	dps7	
meswtr	dps8	3	dps8	
mntap	c6	6	c6	
mntape	c7,8	6	c7	
modesg	f	12	**	
mount6	ad6	1	ad6	
mrtape	dps6	1	dps6	
msd	ad6	4	ad6	
mstohm	ad6	4	ad6	
mtflx/ clsflx	I6,7,8	5	I	
mtflx/ clsflx	IN6,7,8	5N	IN	
mtsadd (mpxcom)	lq8, hq6,7,8	3	hg8	
mtxclr	lq8, hq6,7,8	3	hg8	
mtxlod	lq8, hq6,7,8	3	hg8	
ntic	lq6,7,8 hq6,7,8	1	hg6	
onoff	r	6	r	
orbit6	lq6,a6	1	a6	
output/ outfil	e	3	e	
outrec	c6	6	c6	
overlp	dps6	1	dps6	
overlp	dps7	4	dps7	
overlp	dps8	3	dps8	
packc	c6	6	c6	
packzz	f	12	**	
pacpha	dbg6	1	dbg6	
pageq	f	12	**	
paltit	r	6	r	
pcardp	vp	11	**	
pch	lq6,7	1	lq6	
pchosp	vp	11	**	
pdist	a6,7,8	1	a6	
pfillp	vp	3	vp	
pflux	pf	6	pf	
pfplot/ efplfo/ efplff	pf	6	pf	
phacnt	I6	5	I	
phact7	I7	5	I	
phact7	IN7	5N	IN	
phact8	I8	5	I	
phact8	IN8	5N	IN	
pharpt	dbg6	1	dbg6	genpha
pharpt	dbg7	4	dbg7	genpha
pharpt	dbg8	3	dbg8	genpha
phaupk	hg8,a8	3	a8	
phfil6	a6	1	a6	
phfil7	a7	2	a7	
phfil8	a8	3	a8	
phistp	vp	3	vp	
pinitp/ pfill/ pretrv	vp	3	vp	
piplot	vp	3	vp	
plabes	r	6	r	
plot	lq6	1	lq6	

plot	lg7	4	lg7
plot6	hq6	1	hq6
plot7	hq7	1	hq7
plot8	hq8	3	hq8
pltlq8	lq8	3	lq8
pltmes	r	6	r
pmesqp	vs	3	vs
pmount	r	6	r
potabo	hq8	3	hq8
pparmp/ parmup	vp	11	**
pplotp	vp	3	vp
ppltin	r	6	r
ppltdr	r	6	r
ppoint	r	6	r
pprint	r	6	r
prepr7	ad7	2	ad7
preptp	c6	6	c6
prnfix	IN7,8	5N	IN
prnsup	f,r	6	r
prntcg	*	1	u
proce7	ad7	2	ad7
proce8	ad8	3	ad8
protfx/ prinfx	pf	6	pf
prty8	a8	3	a8
psort	r	6	r
psort	vs	11	**
psum	vs	11	**
ptapep	vp	3	vp
pupdap	vp	3	vp
putput/ outfin	pf	6	pf
qpit/ $private	vp	11	**
qual	dps6	1	dps6
qual	dps7,8	4	dps7
ratchk	I6	5	I
ratout	ad6	4	ad6
report	dbg6	1	dbg6
report	dbg7	4	dbg7
report	dbg8	3	dbg8
reset	f	9	**
retdat	dps8	A	dps8
rhisti	a8,t8	3	a8
rhistp	hq8,a8 t8	3	a8
rseq	dps7,8	4	dps7
search/ tabwrt/ tabdel/ twrite	dps6,7,8	1	dps6
sector	c6	6	c6
setmtg	f	12	**
setsmg	f	12	**
skip	vp	11	**
slctt/ clst	p6	1	p6
slctt/ clst	t8,p8	3	p8
slctt/ clst	t7,p7	4	p7
slvlet/ cvlst	vs	3	vs
sort	r	6	r
sort	p6	1	p6
sort	t8,p8	3	p8
sort	t7,p7	4	p7
spctr8	a8	3	a8
spcxl/ splax	f	12	**
spcxs/ splaxs	f	12	**
spectr	a6	1	a6
spectr	a7	2	a7

spplot	f	12	**	
states	ad6	4	ad6	
stats6	hq6	1	hg6	
stats7	hq7	1	hg7	
stats8	hq8	3	hg8	
stcyl/ stlay	f	12	**	
sumary	dps6	1	dps6	
sumary	dps7	4	dps7	
sumary	dps8	3	dps8	
sumled	p6	1	p7	
summed	p6	1	p7	
sumled	t7,t8 p7,p8	4	p7	
summed	t7,t8 p7,p8	4	p7	
summn	p6	1	p6	
summn	p7	4	p7	
summn	p8	3	p8	
sumorb	c6	6	c6	
sumpr7	ad7	2	ad7	
sumpr8	ad8	3	ad8	
sumunt	t8	3	t8	mergej
sumunt	t7	4	t7	mergel
sumunt	p6	1	p6	merge
sumunt	p7	4	p7	merge
sumunt	p8	3	p8	merge
tab6	r	6	r	
tab7	r	6	r	
tab8	r	6	r	
table	dbq7	4	dbg7	
table	dbq8	3	dbg8	
tapdup	dps6	1	dps6	
tapdup	dps7	4	dps7	
tapdup	dps8	3	dps8	
tape78	ad7,8	4	ad7	
tapou7	ad7	2	ad7	
tapou8	ad8	3	ad8	
tentod/ dtoten/ ydtomd/ mdtoyd/ fhtohm	ad6	4	ad6	
thplot	f	12	**	
thxlab	f	12	**	
timcom	ad6	1	ad6	
timdis	t8	3	t8	
time/ dtime/ ftime	dps6,7,8 t7,t8 p6,7,8 dbq6,7,8 c6,7,8,vs I6,7,8 IN6,7,8	1	dps6	
timecp	dps6	1	dps6	
timecp	dps7,8	4	dps7	
timfix	dps6	1	dps6	
timfix	dps7,8	4	dps7	
timein/ timout/ igloo	vp	3	vp	
timsum	t8	3	t8	
timsm7	t7	4	t7	
total8	a8	3	a8	
tpunpk/ tppack	lg6,7,8 dps6,7,8	1	dps6	
tqdqfs	dbq7,8	4	dbg7	
tq$sc	dbq6	1	dbg6	
trend	mt6,p6	1	p6	
trend	dbq7	4	dbg7	
trend	dbq8	3	dbg8	
trend6	a6	1	a6	
trndsm/ trnsmp	dbq7	4	dbg7	

trndsm/ trnsmp	dbg8	3	dbg8
tstcat	lq8,a8, vs	3	a8
unpack/ pack	f,c7,8 r	6	u
unpk/ unpack	dps6	1	dps6
unpk/ unpack	dps7	4	dps7
unpk/	dps8	3	dps8
vletcr/ vletsm	dps8	3	dps8
vletpk	vs	3	vs
vlsmmn	vs	3	vs
vltsum/ vsmfin	vs	3	vs
vdist	a6,7,8	1	a6
wpapll	r	6	r
write	vp	3	vp
wrtg	ad6	4	ad6
xaxs1	r	6	r
xaxs2	r	6	r
xaxs3	r	6	r
xaxs4	r	6	r
xaxs5	r	6	r
xaxs6	r	6	r
yaxs	r	6	r

2.7.1 CROSS REFERENCE APPENDIX:

Table 15: Cross Reference Appendix

Appendix to the IMP systems program member cross reference:

Members in the appendix are utility type and are used throughout the IMP systems. For an explanation of the symbols used, see Table 14 .

member name	referenced by	load lib.	source listing
btmnp /iget /getput	lg6,7,8 hg6,7,8 a6,7,8 t7,8,mt6 p6,7,8 dbg6,7,8 e,c6,8,r vs,pf	1	u
catlog	lg6,7,8 hg6,7,8 a6,7,8 t7,8,mt6 p6,7,8 dbg6,7,8 e,c6,8 vs,pf,vp	1	u
dpktn	hg6,7,8 a6,7,8 t7,8,mt6 p6,7,8 ,r dbg6,7,8 e,c6,8 vs,pf,vp	1	u
fmove	lg6,7,8 hg6,7,8 a6,7,8 ,r c6,8,vp	1	
katlog	lg6,7,8 hg6,7,8 a6,7,8 t7,8,mt6 p6,7,8 dbg6,7,8 e,c6,8 vs,pf	1	u
prntcg	lg6,7,8 hg6,7,8 a6,7,8 t7,8,mt6 p6,7,8 dbg6,7,8 c6,8,vs	1	u
ranfast	lg6,7,8 hg6,7,8 a6,7,8 mt6		

2.8 SYSTEM PROBLEMS AND PECULIARITIES

The $comment member of this dataset is created for recording IMP system peculiarities and problems which either are not yet resolved or which will be left as they are.

IMP dataset renaming:

The following IMP datasets were renamed in SEPT80:

Old Name	New Name
k3.sbjph.oimpilib	seimp.oimpilib.load
k3.sbjph.oimpglib	seimp.oimpglib.load
k3.aijtd.sb008.oimphlib	seimp.oimphlib.load
k3.aijtd.sb008.oimpjlib	seimp.oimpjlib.load
k3.aijtd.sb008.oimplib	seimp.oimplib.load
k3.zbjdc.oimpmod	seimp.oimpmod.load
k3.zbjdc.orflux	seimp.orflux.load
k3.sbjph.sb016.dex52cat	seimp.dex52cat.data
k3.aijtd.sb016.dex32cat	seimp.dex32cat.data
k3.sbjph.dex11cat	seimp.dex11cat.data
k3.zbjdc.imp6gain	seimp.imp6gain.data
k3.zbjdc.imp7gain	seimp.imp7gain.data
k3.zbjdc.imp8gain	seimp.imp8gain.data
k3.zbjdc.finegain	seimp.finegain.data

Catalog System: Any use of the current tape catalogs by many IMP programs requires a call to the subroutine KATLOG. This routine returns the number of records in the catalog, so that the CATLOG subroutine knows how many DREADs to execute when searching for a tape entry. Periodically, as the database grows, the KATLOG routine needs to reflect the addition of records. Therefore, whenever a tape catalog is expanded, the subroutine KATLOG must be modified.

```
***
*** If any tape catalogs are renamed, KATLOG must
*** be modified, because the catalog names are
```

*** hard-coded.
***
If no match is found, a user 1 abend occurs.

Catalog System: Any use of the current tape catalogs by either the ratesplot program or the fluxplot program requires a call to the tape catalog subroutine CATSUP. In this routine, the number of records in dex11cat, dex32cat, and dex52cat is hard coded, and needs to be updated whenever any of these catalogs is expanded. For programs using the routine CATSUP, the call to KATLOG is avoided.

Catalog System: Any modification of the current tape catalogs by the MAINTCAT program, requires a subsequent run of the program CATMOD located in 'seimp.utility.source'. The CATMOD program must be edited each time, and changes the summary tape entry record of the tape catalog record.

only when a tape type is changed

******** THIS IS VERY IMPORTANT **********
or catalog search routines will not work properly.

Data Processing System:

The data processing system, which generates ENCY tapes from DECOM tapes, could not assign a decade year for the DECOM data prior to the fall of 1980 . The year file header contains one digit (it had been assumed IMP-8 would not be functioning by the end of 1979), and that single digit was used in the logic to assign a year for the data. It was discovered that a two digit year exists as part of the orbit attitude data on the DECOM. The DPS system now uses the orbit attitude year, with a check also from the single digit file header year, to assign a year to the data being processed.

The year is checked in this way once at the start of each DECOM file.

Data Processing System:

The data processing system contains a bug in the tape handling; if a dps run abends, the tape catalog may be partially modified . It needs to be reset. If it is not reset, runs are noted in which no duplicate tape exists. Subsequent runs fill up an interval, and multiple tapes then exist for the same time period. It is not known whether data are properly merged for these multiple tape entries, so data have been reprocessed for the time period covering the multiple tape entries. (The problem was first observed in processing May 1980 data.)

forced dismount code added to handle this

DECOM Tape Record Header:

It was noted in 1980 that the day file header no longer properly accounted for leap year. The file header day is one less than it should be.

ENCY and OTHER Tape Duplicates:

Any modification of a database tape requires a modification of the duplicates and backups that exist.

Gain Factors - ITECH Option in ANALIMP

The application of gain factors is not correct for other than ITECH=0. A check should be made of program flow for the application of gain factors.

which ANALIMP is this?

there is no ITECH option in ANALIMP 8

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Record Deletions from the IMP-8 Database:

The following times were deleted:

Dec. 13, 1973

TYPE	Tape	Start time	Stop time	int.	#records
ENCY	E02732	20:20:25	20:23:09	112	3
PHAS	E02674	"	"	"	"
CNTS	E00759	"	"	"	"

Dec. 20, 1973

ENCY	E02732	21:04:19	21:08:24	114	4
PHAS	E02274	"	"	"	"
CNTS	E00759	"	"	"	"

Jan. 1, 1974

ENCY	E02702	18:25:36	19:44:41	117	59
PHAS	E00750	"	"	"	"
CNTS	E00755	"	"	"	"

Jan. 15, 1974

ENCY	E02815	07:42:32	08:09:48	120	21
PHAS	E00750	"	"	"	"
CNTS	E00755	"	"	"	"

Linked List Subroutines:

A subroutine package used in the accumulation and retrieval of sparse matrices using a linked data structure; written by J. Dalton, April, 1975 This is used in HIGH and LOW GAIN PLOT programs. The detailed documentation is located

in the bound documentation for IMP 7/8 .
Routine names: GETNODE, MTXADD(MXPCOM), MTXLOD,
MTXCLR
dd card name: POOLSTOR
USER ABEND codes: 801-806 see appropriate
documentation

IMP 6 Flux Data Base Bad Years:

Periodically, bad years appear throughout the IMP-6 flux database. The FLUXPLOT program was modified to check for this problem and correct for it when it occurs.

Intermediate FLUX and FLEX Programs:

The intermediate FLUX and FLEX programs have a bug which is the fault of program flow under unusual circumstances. Gain factors are retrieved by FLXGNN before calls to FLXMT6, which is the tape handling routine. If the orbit(s) requested as JORB is (are) not in the tape catalog, the program may try to find data of a later date which may fall within the time processing request. At each call to FLXMT6 the following could occur: the tape mounted and first available data might not correspond to the gain factors which FLXGNN has already retrieved. There is no flag to indicate when this circumstance happens and data may be processed with the wrong gain factors. Intermediate Flux runs should have their printout scanned to make sure the correct gains are being used.

FLUXPLOT (FLEXPLOT) program:

Flux boxes 1-11 had their energies revised 1/31/82 and 2/2/82 as per R. McGuire request. (Some calibration data were reevaluated.)

** ANALIMP-3 MEDL is not divided into LOW 10 and LOW 50.
This presents a problem as both event types 5 and 6 are
directed into the 4th section (MEDL) of array 'C'.
This 'C' array needs to be redimensioned C(5,3,20,5) and
logic changed to allow Low 50 ANALIMP coefficients to be handled.

2.9 TELEMETRY TERMINOLOGY

This member is a description of IMP telemetry terminology:

16 minor frames = 1 sequence
1 sequence = 256 channels

1 minor frame = 16 channels
= 1 PFM frame (1/16 sequence)
1 major frame = 8 minor frames
= 1 PCM frame (1/ 2 sequence) (128 channels)
The spacecraft clock advances once per major frame (.64 sec)

1 sequence	= 256	channels	(= 2 major frames)
1 snapshot	= 4	sequences	
1 page	= 4	snapshots	
1 album	= 4	pages	(= 128 major frames)
			(= 128 PCM frames)
			(= 64 sequences)
			(= 1024 minor frames)

$\frac{1024}{8}$ = 128 major frames

128 x .64 = 81.92 sec

16 ss = 1 album
5.12 sec/ss (at high rate)

3.0 PROGRAMS

The following applies to the individual program overviews. For each Imp program, the overview member contains the subroutine names (other than SACC system names) referenced by the program, their source, and their load library dataset locations. Typically, these member lists were taken from the LINK job printouts. Since most major IMP programs are similar or are derived from the IMP-6 versions, an attempt was made to offer a summary of the IMP-6,7,and 8 subroutines, so that one could see at a glance their subroutine relationships. (Often the IMP-6,7,and 8 versions will share common subroutines or share names.)

In the subroutine tree listings which follow, capital letters are used to denote the main IMP system subroutines for the particular 00000180 programs; small letters are used for IMP utilities and generalized 00000190 subroutines as well as SACC or other routines non-specific to IMP. 00000200

Table 16: Programs

ANALIMP

IMP data analysis systems : program to analyze pha data from PHA, MATR, or LOWG tapes ANALIMP programs

main programs for analimp : analimp6 (IMP-6,or IMP-I)
analimp7 (IMP-7,or IMP-H)
analimp8 (IMP-8,or IMP-J)

In the following 6, 7, 8, and * refer to these source datasets:

6: seimp.analimp6.source
7: seimp.analimp7.source
8: seimp.analimp8.source
I: seimp.intflux.source
* = seimp.hgplt6.source
(.8) = append a 6,7,and 8 to the name to obtain actual source name

In the following 1, 2, 3, and 4 refer to these load libraries:

1: seimp.oimpilib.load
2: seimp.oimphlib.load
3: seimp.oimpjlib.load
4: seimp.oimplib.load

member	description	source listing IMP : I	H	J	load library I	H	J
analimp (.8)	main program	6	7	8	1	2	3
hmatn (.8)	accumulate data from MATR tapes	6	7	8	1	2	3
lmatn (.8)	accumulate data from LOWG tapes	6	7	8	1	2	3
phfil (.8)	accumulate data from PHA tapes	6	7	8	1	2	3
energy /engwrt	define & calc. particle energies	6	-	-	1	-	-
energy /engwrt /engchl	define & calc. particle energies	-	7	8	-	2	3
fcn /fcnwrt	define the std curve used for calc. of histograms	6	7	8	1	2	3
evlist	list input card compatible event types	-	-	8	-	-	3
rhistp	print # occurrences of rate readouts versus readout for each rate	-	-	8	-	-	3
tstcat	compare bit strings	-	-	8	-	-	3
lgphau	unpack pha in LOWG format	-	-	8	-	-	3
rhisti	conv. PHA tape rate entry to counts per readout and rate histogram index	-	-	8	-	-	3
phaupk	unpack 1st 16 bits of datawords in PHA and MATR tape formats	-	-	8	-	-	3
prty8	list table of events vs priority order	-	-	8	-	-	3
matrx8	print out pha matrices	-	-	8	-	-	3
aplot	" " "	6	6	-	1	1	-
spctr8	compute particle dist. about std curve and print out histograms	-	-	8	-	-	3
spectr	" " "	6	7	-	1	2	-
extrc8	unpack 128 pha values	-	-	8	-	-	3
extrc	" "	-	I	-	-	2	-
extrc6	" "	1	-	-	1	-	-
total8	print out time periods & gain factors	-	-	8	-	-	3
ngprnt	" "	6	7	-	1	2	-

qfprnt	" "	6	7	-	1	2	-
qnfact	return interval/orbit gain factors	8	8	8	1	1	1
date	return date given days from time=0	-	7	7	-	2	2
jdays	return days given date	-	7	7	-	1	1
incrmn	get start & stop times for inc. option	6	6	6	2	2	2
histo	print out histograms	6	6	6	1	1	1
pdist	compute perp. dist. from point to line	6	6	6	1	1	1
vdist	" vert. " "	6	6	6	1	1	1
distgf	set up arrays used to apply reciprocal smoothing gain factor technique	*	*	-	1	1	-
ihalf	return 16 bits from word without sign propagation	-	7	-	-	4	-
orbit6	table of imp6 orbit times	6	-	-	1	-	-
trend6	apply trend check on events counts	6	-	-	1	-	-

btmnp	imp general subroutine to extract bits
catlog	" " " " to read tape catalogs
dpktn	" " " " to get tape vol-ser from tape catalog entry
fmove	imp general subroutine for data movement
katlog	" " " " returning the total number of records in a catalog
prntcg	imp routine to print out tape catalog entry
ranfast	imp routine to return random number

RAND

the imp general subroutines are located in

seimp.utility.source

rtio package	SACC tape control package (fread,fwrite,mount,posn,unload,leave,etc.)

subroutine tree:
IMP-6,7,8 ANALIMP routine interaction chart

ANALIMP6	ANALIMP7	ANALIMP8
		EVLIST
SPECTR	SPECTR	SPECTR8
		FCNWRT
		PDIST
		VDIST
		FCN
		EMDCMD
		HISTO
fmove	fmove	fmove
INCRMN	INCRMN	INCRMN
ORBIT6		
PHFIL6	PHFIL7	PHFIL8
catlog	catlog	catlog
unload	unload	unload
mount	mount	mount
prntcg	prntcg	prntcg
fread	fread	fread
EXTRC6	EXTRC	EXTRC8
abend	abend	abend
dread	dread	dread
DISTGF	DISTGF	RHISTI
fmove	fmove	RAND
GNFACT	GNFACT	GNFACT
abend	abend	abend
dread	dread	dread
TREND6		DPKTN
	DATE	DATE
HMATN6	HMATN7	HMATN8
catlog	catlog	catlog
mount	mount	mount
prntcg	prntcg	prntcg
posn	posn	posn
fread	fread	fread
GNFACT	GNFACT	GNFACT
abend	abend	abend
dread	dread	dread
DISTGF	DISTGF	IGET
fmove	fmove	RAND
leave	leave	DPKTN IGET GETPUT
		unload
		PHAUPK
LMATN6	LMATN7	LMATN8
catlog	catlog	catlog
mount	mount	mount
prntcg	prntcg	prntcg
posn	posn	posn
fread	fread	fread
GNFACT	GNFACT	GNFACT
abend	abend	abend
dread	dread	dread
DISTGF	DISTGF	DPKTN
fmove	fmove	IGET
leave	leave	GETPUT
ORBIT6		RAND
		LGPHAU
		TSTCAT
		unload
GFPRNT	GFPRNT	
APLOT	APLOT	
HGPRNT	HGPRNT	JDAYS
GFPRNT	GFPRNT	abend
		PRTY8
		RHISTP
		MATRX8
		TOTAL8
		ENERGY

IMP utilities:
btmnp, catlog, dpktn, fmove, prntcg, rand,
FTIO package

CATLOG
DREAD
KATLOG
ABEND
KCLC
DSNAME

ANISOTROPY DISPLAY

imp data analysis systems : program to generate cam plots from sectored rates data using CNTS and/or SMCT tapes ANISOTROPY DISPLAY programs

main programs are called : anispl (imp-6,or imp-I)
anstrp (imp-7,or imp-H)
anstrp (imp-8,or imp-J)

in the following 6, 7, and 8 refer to these source datasets:

6: seimp.anstrpy6.source
7: seimp.anstrpy7.source
8: seimp.anstrpy8.source
\+ = seimp.analimp7.source
(&) = append a 7, or 8 to the name to obtain actual source name

in the following 1, 2, 3, and 4 refer to these load libraries:

1: seimp.oimpilib.load
2: seimp.oimphlib.load
3: seimp.oimpjlib.load
4: seimp.oimplib.load

member	description	IdP :	source listing I	H	J	load library I	H	J
anstrpy(&)	main program	-	7	8	-	2	3
cams(&)	draw cam plots	-	7	8	-	2	3
dsply(&)	display accumulation inverval	-	7	8	-	2	3
headr(&)	write 4060 page header info	-	7	8	-	2	3
inpar(&)	print & plot input paramaters	-	7	8	-	2	3
label(&)	label cam plot	-	7	8	-	2	3
magac(&)	accumulate magnetic field data	-	7	8	-	2	3
proce(&)	process sectored rates from CNTS tapes	-	7	8	-	2	3
tapou(&)	make PDP11/70 tape	-	7	8	-	2	3
sumpr(&)	process from SMCT tapes (dummy imp-8)	-	7	8	-	2	3
prepr7	fix up 2 bugs on imp-7 CNTS tapes**	-	7	-	-	2	-
chim78	find min chi-squared of function	-	7	7	-	4	4
conv78	convert yr & deci to mth,day,hr,min,julday	-	7	7	-	4	4
magd78	display magnetic field data	-	7	7	-	4	4
tape78	tape handling	-	7	7	-	4	4
intrvl	add a time increment to get a processing interval	-	7	7	-	2	2
bytes	reform intrvl bits of catalog entry for search/compare of data available	-	7	7	-	4	4
anispl	main program imp-6	6	-	-	4	-	-
all	block data	6	-	-	4	-	-
ratout	plot rate data	6	-	-	4	-	-
srates	return corrected or uncorrected srates	6	-	-	4	-	-
campit	draw cams	6	-	-	4	-	-
cnead	plot header info	6	-	-	4	-	-
chimin	perform chi-squared on function	6	-	-	4	-	-
maghst	read & process mag. field data	6	-	-	4	-	-
magplt	plot mag. field data	6	-	-	4	-	-
iplots/ camout	plot data from srate disk files	6	-	-	4	-	-
tentod/ dtoten/ mdtoyd/ ydtomd/ fstohm	time converter	6	-	-	4	-	-
incrt	increment time	6	-	-	4	-	-
msd	time converter	6	-	-	4	-	-
mstohm	ms of day -> hr,min,sec,ms	6	-	-	4	-	-
correc	angle correction	6	-	-	4	-	-

wrtg	write message on plot	6	-	-	4	-	-
mount6	mount tapes	6	-	-	1	-	-
timcom	determ. if one input time is .gt. , .eq. , or .lt. another input time.	6	-	-	1	-	-
jdays	return days, given date	-	+	+	-	1	1

fmove	imp general subroutine for data movement
catlog	imp general subroutine to read tape catalogs
btmnp	imp general subroutine to extract bits
katlog	imp general subroutine returning the total number of records in a catalog
prntcg	print a record of a tape entry
dpktn	return the vol-ser from tape catalog entry for use with FTIO package

the imp general subroutines are located in

seimp.utility.source

ftio package	SACC tape control package (fread,fwrite,mount,posn,unload,leave,etc.)

subroutine tree:

Routine interaction charts for IMP-6,7,8 Anisotropy:

```
ANISPL
  IPLOTS
    modesg
    setsmg
    objctg
    legndg
    numbrg
    pageg
    YDTOMD
    MSTOHM
    CHEAD
      legndg
      numbrg
    CHIMIN
    CAMPLT
      objctg
      psubjg
      setsmg
      psegmg
      pcirg
      pnumg
      subjeg
    MAGHST
      fread
      INCRT
      rewind
      mount
    MAGPLT
      objctg
      psubjg
      setsmg
      pcirg
      psegmg
      legndg
      numbrg
  TIMCOM
  MOUNT6
    catlog
    mount

  MDTOYD
  YDTOMD
  INCRT
  fread
  CAMOUT
    YDTOMD
    MSTOHM
    CHEAD
    CHIMIN
    CAMPLT
    MAGHST
      INCRT
    MAGPLT
  fwrite
  exitg
  RATOUT
    setz
    qform
    WRTG
      legndg
    form
    prtgph
    rewind
    fread
    MSTOHM
    setup
    grid
    plotpf
    YDTOMD
    INCRT
  finis
```

```
ANSTRPY7
  modesg
  setsmg
  rmove
  INPAR7
    setsmg
    objctg
    subjeg
    legndg
    CONV78
    numbrg
    pageg
  TAPE78
    catlog
    unload
    mount
    exitg
    posn
    BYTES
  INTRVL
  fread
  PROCE7
    PREPR7
      getput
  DSPLY7
    MAGAC7
      fmove
      mount
      fread
      rewind
    CAMS7
      objctg
      psubjg
      plineg
      setsmg
      pnumg
      pcirg
      subjeg
      CHIM78
      numbrg
    HEADR7
      objctg
      subjeg
      legndg
      numbrg
      CONV78
    LABEL7
      objctg
      subjeg
      legndg
      numbrg
    MAGD78
      objctg
      psubjg
      pcirg
      plineg
      setsmg
      legndg
    pageg
    TAPOU7
      setb99
      ztime
      fwrite
    fmove
    INTRVL
  SUMPR7
  rewind
  exitg
```

```
ANSTRPY8
  modesg
  setsmg
  rmove
  INPAR8
    setsmg
    objctg
    subjeg
    legndg
    CONV78
    numbrg
    pageg
  TAPE78
    catlog
    unload
    mount
    exitg
    posn
    BYTES
  INTRVL
  fread
  PROCE8

  DSPLY8
    MAGAC8
      fmove
      mount
      fread
      rewind
    CAMS8
      objctg
      psubjg
      plineg
      setsmg
      pnumg
      pcirg
      subjeg
      CHIM78
      numbrg
    HEADR8
      objctg
      subjeg
      legndg
      numbrg
      CONV78
    LABEL8
      objctg
      subjeg
      legndg
      numbrg
    MAGD78
      objctg
      psubjg
      pcirg
      plineg
      setsmg
      legndg
    pageg
    TAPOU8
      setb99
      ztime
      fwrite
    fmove
    INTRVL
  SUMPR8
  rewind
  exitg
```

```
SRATES
   CORREC
rewind
```

COUNT SUMMARY

imp data processing systems : program to generate SMCT tapes from CNTS tapes
COUNT SUMMARY programs

main programs are called : cntsum (imp-6,or imp-I)
hsmct (imp-7,or imp-H)
jsmct (imp-8,or imp-J)

In the following 6, 7, and 8 refer to these source datasets:

6: seimp.cntsmry6.source
7: seimp.cntsmry7.source
8: seimp.cntsmry8.source
+: seimp.imp6dps.source
(&) : replace with 'h' or 'j' for imps 7 and 8

In the following I, and 6 refer to these load libraries:

I: seimp.oimpilib.load
6: seimp.oimpmod.load

member	description	IMP :	source listing I	H	J	load library I	H	J
(&)smct	main program		-	7	8	-	6	6
(&)data	block data		-	7	8	-	6	6
(&)accums	pack sectored rates		-	7	8	-	6	6
(&)acumx	pack non-sectored rates		-	7	8	-	6	6
(&)cal	calculate accumulation intervals		-	7	8	-	6	6
(&)coord/ (&)close	transfer coordinate information		-	7	8	-	6	6
(&)look	set up rates table		-	7	8	-	6	6
(&)mess	print diagnostic messages		-	7	8	-	6	6
(&)out	write record and update catalog		-	7	8	-	6	6
(&)prep	mount CNTS tape; close tapes		-	7	8	-	6	6
(&)sumrb	print orbit summary		-	7	8	-	6	6
(&)tab	set up event time table		-	7	8	-	6	6
cntsum	main program		6	-	-	6	-	-
blkdat	block data		6	-	-	6	-	-
sector	accumulate sector data		6	-	-	6	-	-
packc	store non-sectored data,do trend check		6	-	-	6	-	-
loop	accum. non-sectored data, average perform. param, , and coord data		6	-	-	6	-	-
messag	run time messages		6	-	-	6	-	-
outrec	write interval onto SMCT tape, updte catalog		6	-	-	6	-	-
preptp	prepare input & output tape for new orbit		6	-	-	6	-	-
sumorb	print summary report on trend chk flags & fill data		6	-	-	6	-	-
init	init a 15 min. summary interval		6	-	-	6	-	-
inrec	read CNTS record; chk.bit rate,time gaps		6	-	-	6	-	-
conv	close a 15 min. summary interval		6	-	-	6	-	-
clstap	finish processing SMCT & updte catalog		6	-	-	6	-	-
mntap	handle output tapes		6	-	-	6	-	-
mntape	mount SMCT tape(s)		-	7	7	-	6	6
cltape	unload SMCT tape(s); update catalog		-	7	7	-	6	6
time/ dtime/ ftime	return today's date		-	+	+	-	I	I

idiff	calculate time differences
ifixit	align time
unpack/ pack	time converter
fmove	imp general subroutine for data movement
catlog	imp general subroutine to read tape catalogs
btmnp	imp general subroutine to extract bits

katlog	imp general subroutine returning the total number of records in a catalog
prntcg	print a record of a tape entry
dpktn	return the vol-ser from tape catalog entry for use with FTIO package

the imp general subroutines are located in

seimp.utility.source

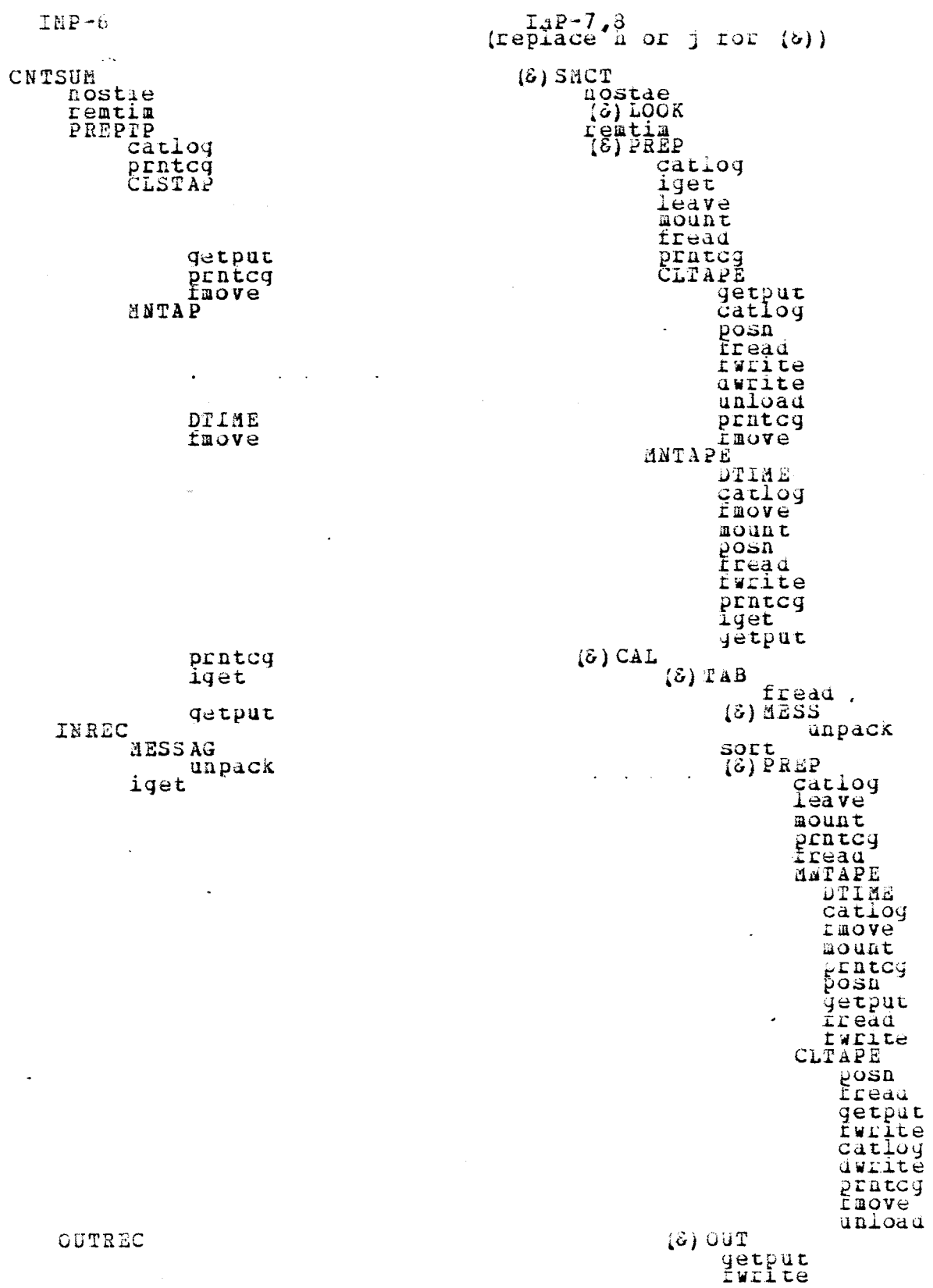
SACC system utilities:

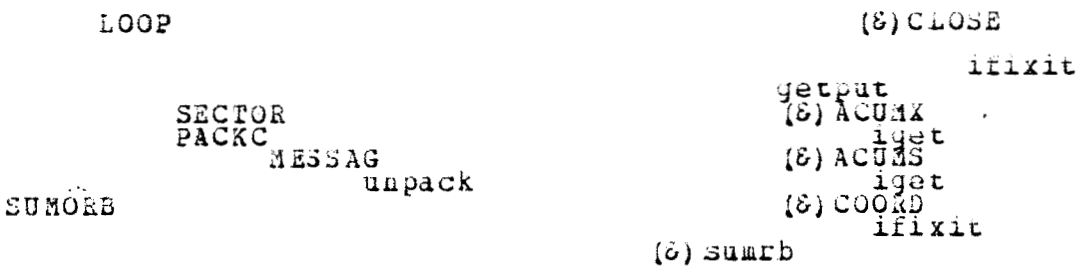
remtim	return the cpu & i/o remaining from jobcard estimate
nostae	initialize abend buffers
sort	system sort routine (for ,7,8)

ftio package	SACC tape control package (fread,fwrite,mount,posn,unload,leave,etc.)

subroutine tree:

Count Summary Routine Interaction Charts:




LOOP
SECTOR
PACKC
MESSAG
unpack
SUMORB
(&)CLOSE
ifixit
getput
(&) ACUMX
iget
(&) ACUMS
iget
(&) COORD
ifixit
(&) sumrb

DATA BASE GENERATOR

imp data processing systems : program to generate PHAS and CNTS tapes from ENCY tapes DATABASE GENERATOR programs

main programs are called : implmn (imp-6,or imp-1)
imphmn (imp-7,or imp-H)
impjmn (imp-8,or imp-J)

in the following 6, /, * and 8 refer to these source datasets:

6: seimp.dbg6.source
7: seimp.dbg7.source
8: seimp.dbg8.source
*: seimp.imp6dps.source

in the following 1, 3, and 4 refer to these load libraries:

1: seimp.oimpilib.load
3: seimp.oimpjlib.load
4: seimp.oimplib.load

member	description	source listing IMP : I	H	J	load library I	H	J
imp&mn	main program	6	7	8	1	4	3
genent	build a CNTS record form ENCY data	6	7	8	1	4	3
genpha	extract PHA data from ENCY & build PHAS data record	6	7	8	1	4	3
report	generate printed report of PHA data summary	6	7	8	1	4	3
isqdqf	function giving the arithmetic sum of the squares of each byte of a word	6	-	-	1	-	-
pacpha	determine acceptability & event classification of PHA (1 LED & 1 MED)	6	-	-	1	-	-
phaprt	a csect attached to genpha	6	7	8	1	4	3
tq$sc	examine time quality and spacecraft clock	6	-	-	1	-	-
tqdqfs	compute sum of data qual & time qual flags	-	7	7	-	4	4
table	block data	-	7	8	-	4	3
trend	trend check on rates; resulting flags appear on CNTS and PHAS tapes	-	7	8	-	4	3
intrvl	compute 4-day interval of data record	-	7	7	-	4	4
trndsm/ trnsmp	count # of readouts rejected by trend check and print summary	-	7	8	-	4	3
dpchek	count # of non-padded readouts of DPa3-17 (a8) for each of its possible values for one album	-	7	-	-	4	-
ledcor	correct LED sectored rates	-	-	8	-	-	3
ledst2	set certain event tag bits for LED	-	-	8	-	-	3
comtim	compute time difference	*	*	*	1	1	1
time/ dtime/ ftime	get current data and time	*	*	*	1	1	1

catlog	imp general subroutine to read tape catalogs
btmnp	imp general subroutine to extract bits
katlog	imp general subroutine returning the total number of records in a catalog
prntcg	print a record of a tape entry
dpktn	return the vol-ser from tape catalog entry for use with FTIO package

the imp general subroutines are located in

seimp.utility.source

ftio package SACC tape control package
(fread,fwrite,mount,posn,unload,leave,etc.)

subroutine tree:

IMP Database Generator Routine Interaction Chart:

```
    IMP-6                    IMP-7                    IMP-8

IMPIMN                   IMPHMN                   IMPJMN
                             INTRVL                   INTRVL
                             catlog                   catlog
                             mount                    mount
                             fread                    fread
                             unload                   unload
                             prntcg                   prntcg
                             dwrite                   dwrite
                             fwrite                   fwrite
    REPORT                   REPORT                   REPORT
    GENPHA
         getput              TREND                    TREND
         TQ$SC                    TQDQFS                   TQDQFS
         PACPHA                   DPCHEK                   TRNDSM
    GENCNT                   TRNDSM                   GENPHA
         getput              GENPHA                   GENCNT
         TQ$SC               GENCNT                   LEDCOR
         ISQDQF              DTIME                        comtim
    DTIME                    getput                   LEDST2
    getput                   TRNSMP                   dtime
                                                      getput
                                                      TRNSMP
                                                      CORSUM ---?
```

DATA PROCESSING SYSTEM

imp data processing systems : program to generate ENCY tapes from DECOM tapes
DATA PROCESSING SYSTEM programs

main programs are called : ex11 (imp-6,or imp-I)
ex32 (imp-7,or imp-H)
ex52 (imp-8,or imp-J)

in the following 6, 7, and 8 refer to these source datasets:

6: seimp.imp6dps.source
7: seimp.imp7dps.source
8: seimp.imp8dps.source

in the following 1, 3, and 4 refer to these load libraries:

1: seimp.oimpilib.load
3: seimp.oimpjlib.load
4: seimp.oimplib.load

member	description	source listing IMP : I	H	J	load library I	H	J
main	driver for data processing system	6	7	8	1	4	3
meswtr	write error messages, other messages	6	7	8	1	4	3
overlp	eliminate overlap & write ENCY tape	6	7	8	1	4	3
sumary	print data summaries during processing	6	7	8	1	4	3
tapdup	duplicate ENCY tape	6	7	8	1	4	3
unpack	unpack decom data & reformat into ENCY	6	7	8	1	4	3
vletcr /vletsm	subtract offsets from VLET PHA D1,D11,E	-	-	8	-	-	3
retdat	return orbit attitude data to main prog	-	-	8	-	-	3
extrct	extract times & spacecraft clocks	6	7	7	1	4	4
timfix	determine if records are time consistent	6	7	7	1	4	4
qual	set ENCY data qual & time qual values	6	7	7	1	4	4
timecp	check if ovrlp exists between 2 ENCY record	6	7	7	1	4	4
rseq	store reel sequence # in ENCY tape record	-	7	7	-	4	4
addtim	increment or decrement by a given time	6	6	6	1	1	1
comtim	return the difference of two time	6	6	6	1	1	1
logdec /log10 /log12	decompress counts on DECOM tape	6	6	6	1	1	1
tpunpk /tppack	pack & unpack tape vol-ser	6	6	6	1	1	1
search /tabwrt /tabdel /twrite	check for overlap on new ENCY record	6	6	6	1	1	1
time /ftime /dtime	get the current time & date	6	6	6	1	1	1
date /day	return date from year, julian day; visa-versa	6	6	6	1	1	1
dltape	blank tape records in the tape catalog	6	6	6	1	1	1
ucread /datrd /feot /filskp /tapeid	handle I/O from DECOM tapes	6	-	-	1	-	-
iduupk /filhed /taphed /mrfile	unpack tape & file ID records	6	-	-	1	-	-

mrtape	check first file of 2nd tape of multi-reel orbit. determine if data is continuation of previous file, or new file	6	-	-	1	- -

fmove	imp general subroutine for data movement
catlog	imp general subroutine to read tape catalogs
btmnp	imp general subroutine to extract bits
katlog	imp general subroutine returning the total number of records in a catalog

the imp general subroutines are located in

seimp.utility.source

ftio package	SACC tape control package (fread,fwrite,mount,posn,unload,leave,etc.)

subroutine tree:

IMP Data Processing Systems - calling sequence

```
EX52
      MESWTR
            FTIME
      SUMARY
      EXTRCT
      TIMFIX
      unpack
            LOG10/LOG12
      DATE/DAY
      VLETCK/SM
      OVERLP/ENDTAP
            SEARCH/TABWRT/TABDEL/TWRITE
            QUAL
            TPUNPK
            MESWTR
            TIMECP
            SUMARY
            TAPDUP
                  TPUNPK
                  RSEQ
                  MESWTR
            DLTAPE
```

ELECTRON FLUX

imp data analysis systems : program to analyze electron flux using PHAS tapes
ELECTRON FLUX program

main programs are called :
eflxmn (imp-7,or imp-8)
eflxmn (imp-8,or imp-J)

in the following @ and $ refers to this source dataset:

$: seimp.elflux78.source
@: seimp.imp6dps.source

in the following 1, 3, refer to these load libraries:

1: seimp.oimpilib.load
3: seimp.oimpjlib.load

member	description	IMP :	source listing I	source listing H	source listing J	load library I	load library H	load library J
eflxmn	main program		-	$	$	-	3	3
accum	process data into electron flux boxes		-	$	$	-	3	3
addate	add time increments to input arguments		-	$	$	-	3	3
addtsc	add tenths of seconds to time arguments		-	$	$	-	3	3
efplot	plot data		-	$	$	-	3	3
/efplfo	generate last plot frame							
/efplff	draw grid lines,labels,generate plot frames							
flxupk	unpack G, D1.E1.-F-G rates, MED event types D pulse heights		-	$	$	-	3	3
output	output accumulated data		-	$	$	-	3	3
/outfin	*							
flxbuf	a csect attached to FLXUPK		-	$	$	-	3	3
init	initialize arrays and print heading		-	$	$	-	3	3
date	return date from year, julian day; visa-versa		-	@	@	-	1	1
/day								

catlog imp general subroutine to read tape catalogs
btmnp imp general subroutine to extract bits
katlog imp general subroutine returning the total number of records in a catalog
dpktn imp general subroutine to return the vol-ser from tape catalog for use with FTIO package

the imp general subroutines are located in

seimp.utility.source

ftio package SACC tape control package
(fread,fwrite,mount,posn,unload,leave,etc.)

subroutine tree:

Electron Flux Routine Interaction Chart:

```
EFLXMN
     catlog
     EFPLOT
          DATE
          DAY
          ADDTSC
     DATE
     DAY
     ACCUM
          FLXUPK
     ADDATE
          DATE
          DAY
     EFPLFF
     OUTFIN
     ADDTSC
     EFPLFO
     OUTPUT
```

EXPERIMENT 10 DATA PROCESSING SYSTEM

imp data processing systems : program to generate
SOLAR ELECTRON EXP. ENCY tapes from DECOM tapes
DATA PROCESSING SYSTEM programs
main programs are called : ex10 (imp-6,or imp-I)

in the following 6, 7, and 8 refer to these source datasets:

6: seimp.imp6dps.source
X: seimp.ex10dps.source

in the following 1, 3, and 4 refer to these load libraries:

1: seimp.oimpilib.load
3: seimp.oimpjlib.load
4: seimp.oimplib.load

member	description	source listing IMP : I	H	J	load library I	H	J
main	driver for data processing system	X	-	-	1	-	-
meswtr	write error messages, other messages	6	-	-	1	-	-
overlp	eliminate overlap & write ENCY tape	6	-	-	1	-	-
sumary	print data summaries during processing	6	-	-	1	-	-
tapdup	duplicate ENCY tape	6	-	-	1	-	-
unpack	unpack decom data & reformat into ENCY	6	-	-	1	-	-
extrct	extract times & spacecraft clocks	6	-	-	1	-	-
timfix	determine if records are time consistent	6	-	-	1	-	-
qual	set ENCY data qual & time qual values	6	-	-	1	-	-
timecp	check if ovrlp exists between 2 ENCY record	6	-	-	1	-	-
addtim	increment or decrement by a given time	6			1		
comtim	return the difference of two time	6			1		
logdec /log10 /log12	decompress counts on DECOM tape	6	-	-	1	-	-
tpunpk /tppack	pack & unpack tape vol-ser	6	-	-	1	-	-
search /tabwrt /tabdel /twrite	check for overlap on new ENCY record	6	-	-	1	-	-
time /ftime /dtime	get the current time & date	6	-	-	1	-	-
date /day	return date from year, julian day; visa-versa	6	-	-	1	-	-
dltape	blank tape records in the tape catalog	6	-	-	1	-	-
dcread /datrd /feot /filskp /tapeid	handle I/O from DECOM tapes	6	-	-	1	-	-
idunpk /filhed /taphed /mrfile	unpack tape & file ID records	6	-	-	1	-	-
mrtape	check first file of 2nd tape of multi-reel orbit. determine if data is continuation of previous file, or new file	6	-	-	1	-	-
rmove	imp general subroutine for data movement						
catlog	imp general subroutine to read tape catalogs						

btmnp	imp general subroutine to extract bits
katlog	imp general subroutine returning the total number of records in a catalog

the imp general subroutines are located in

seimp.utility.source

rtio package	SACC tape control package (fread,fwrite,mount,posn,unload,leave,etc.)

EXPERIMENT 28 DATA PROCESSING SYSTEM

imp data processing systems : program to generate
SOLAR ELECTRON EXP. ENCY tapes from DECOM tapes
DATA PROCESSING SYSTEM programs
main programs are called : ex28 (imp-7,or imp-n)

in the following 6, 7, and 8 refer to these source datasets:

6: seimp.imp6dps.source
7: seimp.ex28dps.source

in the following 1, 3, and 4 refer to these load libraries:

1: seimp.oimpilib.load
1A: seimp.hlib28.load
4: seimp.oimplib.load

member	description	source listing IMP : I	H	J	load library I	H	J
main	driver for data processing system	-	7	-	-	1A	-
meswtr	write error messages, other messages	-	7	-	-	1A	-
overlp	eliminate overlap & write ENCY tape	-	7	-	-	1A	-
sumary	print data summaries during processing	-	7	-	-	1A	-
tapdup	duplicate ENCY tape	-	7	-	-	1A	-
unpack	unpack decom data & reformat into ENCY	-	7	-	-	1A	-
extrct	extract times & spacecraft clocks	-	7	-	-	1A	-
timfix	determine if records are time consistent	-	7	-	-	1A	-
qual	set ENCY data qual & time qual values	-	7	-	-	1A	-
logdec /log10 /log12	decompress counts on DECOM tape	-	7	-	-	1A	-
search /tabwrt /tabdel /twrite	check for overlap on new ENCY record	-	7	-	-	1A	-
dltape	blank tape records in the tape catalog		7	-		1A	-
ucread /datrd /feot /filskp /tapeid	handle I/O from DECOM tapes		7	-		1A	-
timecp	check if ovrlp exists between 2 ENCY record	6	-	-	1	-	-
addtim	increment or decrement by a given time	6			1		
comtim	return the difference of two time	6			1		
tpunpk /tppack	pack & unpack tape vol-ser	6	-	-	1	-	-
time /ftime /gtime	get the current time & date	6	-	-	1	-	-
date /day	return date from year, julian day; visa-versa	6	-	-	1	-	-
sunang		-	7	-	-	1A	-
ctlg28		-	7	-	-	1A	-
cwrite		-	7	-	-	1A	-
prntcq		-	7	-	-	1A	-
qtest		-	7	-	-	1A	-
alsync/ $private		-	7	-	-	1A	-

rmove imp general subroutine for data movement
upktn imp general subroutine to unpack a tape vol-ser

btmnp	imp general subroutine to extract bits
katlog	imp general subroutine returning the total number of records in a catalog

the imp general subroutines are located in

seimp.utility.source

ftio package	SACC tape control package (fread,fwrite,mount,posn,unload,leave,etc.)

FLUXPLOT

IMP-6/7/8 Flux Plot Program.

****

The following member sources are located in the dataset 'SEIMP.FLXPLOT.SOURCE' .

(Routine Interaction Chart:)

```
flxpmn                  main driver
   flxpbl               block data
   flxpin               reads and analyzes input parameters
      flxpbx            checks bin integrity and geometry factors
      flxpms            issues messages
   flxpmt               mounts input flux tapes
   flxppl               initializes plotter
   flxphd               prints and/or plots header page
   flxpcl               calculates plot frame range
   flxpa                accumulates flux for a plot frame
      flxpss            accumulates flux within a plot point
         flxtck         checks decisecond continuity(IMP6 only)
         flxpaa         checks IMP-6 perigee altitude
         flxptc         performs gross rate trend check
         flxpmt         positions files; mounts new tapes
      flxpst            prints statistics
      flxpab            combines IMP-8 alpha boxes
   flxpt1               generates flux output tape (ie, for PDP-11/70)
   flxppr               generates line printer listing
   flxppt               generates time history plot on plot tape
   flxpps               generates spectral plot on plot tape
```

The following members perform utility type functions and are located in the IMP ratesplot program dataset 'SEIMP.IMPLOT2.SOURCE', which also uses them.

```
   catsup               tape catalog search routine
   prnsup               mount/unmount message generator
```

The following IMP utilities are used; they are located in the dataset 'SEIMP.UTILITY.SOURCE' .

```
   unpack               time convert
   gpktn                tape name unpacker
   iget                 bit manipulator
   ifixit               time aligner
   idiff                time difference calculator
   rmove                byte mover
```

The following routines are used from the N. Lal 4060 plot package:

```
   spcxl                sets up abscissa scaling and bins
   stcyl                sets up pointers for stlay
   modesg               initializes
   legndg               types string of characters
   pageg                advances paging
   thxlab               labels abscissa and draws vertical grids
   setsmg               changes mode array values
   stlay                labels ordinate and draws horizontal grid
   thplot               plots in time history format
   splax                labels abscissa
   spplot               plots in spectral format
   exitg                terminates plotting
```

Miscellaneous system routines:

```
   ftio                 fortran I/O package
   incore               character format
```

****

The library 'SEIMP.FLXPLOT.NEWSOURC' contains

flxplot program members which were modified to accommodate IMP flux box changes and other changes initiated by Bob McGuire at the beginning of 1980. A different flux tape is mounted - a 'flex' tape. This new data base is generated by a modified intermediate flux program, whose modified members are found in the dataset 'SEIMP.INTFLUX.NEWSOURC'. A new tape catalog is presently used for just the flex tape database. It is called 'SEIMP.IMP6.FLEXCAT', or 'SEIMP.IMP7.FLEXCAT'. The load module to run the fluxplot and intermediate flux programs with the above changes is created by adding as the first syslib dataset in the run JCL, the load library 'SEIMP.NEWFLUX.LOAD' .

fluxplot members changed (and located in 'SEIMP.FLXPLOT.NEWSOURC')

flxpss	this member was modified to allow a dead time correction factor
flxpmt	this member mounts flex tapes, as the 13th catalog word of each records summary entry
flxpbx	box checking routine modified to allow new boxes
flxpbl	main block data modified as indicated in that member
flxsup	version of catsup allowing search for 'flex' tapes

subroutine tree:

FLUXPLOT Routine Interaction Chart:

```
FLXPMN
   nostae
   FLXPIN
      FLXPMS
      FLXPBX
      pack
   FLXPMT
      catsup
      unload
      prnsup
      mount
      fread
      posn
      unpack
      ifixit
   FLXPPI
      incore
      fmove
      modesg
      stcyl
      SPCXL
   FLXPHD
      unpack
      legndg
      incore
      fmove
      pageg
   FLXPTI
      posn
      fmove
      ztime
      fwrite
      unpack
   FLXPCL
      ifixit
      unpack
      pack
   FLXPA
      FLXPSS
         SPLAX
         stlay
         ssplot
         setsmg
         legndg
         unpack
         incore
         fmove
         pageg
      FLXPST
      FLXPAB
   FLXPPR
      ifixit
      unpack
   FLXPT2
   FLXPPT
      unpack
      thxlab
      stcyl
      stlay
      thplot
      setsmg
      legndg
      pageg
   FLXPPS
      SPLAX
      stlay
      ssplot
      setsmg
      legndg
      unpack
      incore
      fmove
      pageg
```

```
exitq
```

HIGH GAIN PLOT

imp data analysis systems : program to analyze pha and counts data from MATR tapes
HIGH GAIN PLOT programs

high gain plot main programs: hgplt6 (imp-6,or imp-I)
hgplt7 (imp-7,or imp-H)
hgplt8 (imp-8,or imp-J)

In the following 6, 7, 8, and * refer to these source datasets:

6: seimp.hgplt6.source
7: seimp.hgplt7.source
8: seimp.hgplt8.source
*: seimp.analimp8.source
(.&)= append a 6,7, or 8 for individual IMP source name

In the following 1, and 3 refer to these load libraries:

1: seimp.oimpilib.load
3: seimp.oimpjlib.load

member	description	source listing IMP : I	H	J	load library I	H	J
hgplt(.&)	main program	6	7	8	1	1	3
fill(.&)	accumulate data for one interval	6	7	8	1	1	3
accum(.&)	accumulate MATR tape header record info	6	7	8	1	1	3
plot(.&)	plot data of 128 X 128 matrices	6	7	8	1	1	3
stats(.&)	print out statistics of plot	6	7	8	1	1	3
potabo	print a table of number of events vs priority order	-	-	8	-	-	3
rhistp	print out a 14 X 18 array of the number of occurrences of rate readouts vs readout value, for each rate	-	-	*	-	-	3
phaupk	unpack the first halfword of a PHA event in the PHA and MATR tape formats	-	-	*	-	-	3
evlist	return a list of event types which match input card specification via IEV	-	-	*	-	-	3
gnfact	return gain factors from the IMP8 main gain table	*	*	*	1	1	1
mtxadd	add a count to a matrix	8	8	8	3	3	3
qtnode	locate an index in storage	8	8	8	3	3	3
mtxclr	clear a matrix	8	8	8	3	3	3
mtxlod	load a matrix into core	8	8	8	3	3	3
mxpcom	a CSECT in source mtxadd, a DSECT elsewhere	8	8	8	3	3	3
distqf	set up arrays used to apply reciprocal smoothing tech. for gain factor appl.	6	6	-	1	1	-
fillup	add counts to matrices under certain options	6	6	-	1	1	-
ntic	return the magnitude of the verticle increment of the histograms	6	6	6	1	1	1
histos	print out the histograms	6	6	6	1	1	1
impeak	generate the histograms and do peak analyses	6	6	6	1	1	1

put into HGPLT8 source als

The following member sources are located in the dataset 'seimp.utility source' as they are in general use throughout IMP programs

Change control #26

catlog	find a tape in the catalog
btmnp	get selected bits from datawords
dpktn	pack a tape vol-ser from catalog entry, for use with FTIO package
prntcg	print out the tape catalog entry
fmove	move bytes en masse

The following SACC members are referenced

nostae
FTIO FORTRAN I/O tape package

RAND/RDINIT/RANFAST source masses

subroutine tree:

IMP Data Analysis Programs - Hi Gain Plot

```
HGPLT6              HGPLT7              HGPLT8
                      nostae              nostae
   fmove              fmove               fmove
                                          EVLIST
   catlog             catlog              catlog
   mount              mount               mount
   prntcg             prntcg              prntcg
   posn               posn                posn
   FILL6              FILL7               FILL8
     fmove              fmove               fmove
     fread              fread               fread
     GNFACT             GNFACT              GNFACT
       abend              abend               abend
       dread              dread               dread
     ACCUM6             ACCUM7              ACCUM8
     FILLUP             FILLUP
       DISTGF             DISTGF
         fmove              fmove
                                            PHAUPK
                        MTXADD              MTXADD
                          GTNODE              GTNODE
                                            POTABO
                                            RHISTP
     PLOT6              PLOT7               PLOT8
       MTXLOD             MTXLOD              MTXLOD
       STATS6             STATS7              STATS8
         IMPEAK                                 IMPEAK
           HISTOS                                 HISTOS
       MTXCLR             MTXCLR              MTXCLR
   leave              leave               leave
******NOTE*** MPXCOM is a CSECT in MTXADD, a DSECT elsewhere.
```

INTERMEDIATE FLUX (and FLEX)

IMP 6,7,8 INTERMEDIATE FLUX PROGRAM
GENERATES 'FLUX' TAPES

the following member sources are located in the dataset 'seimp.intflux.source'

MEMBER	DESCRIPTION
flux6	main program for IMP-6
flx6bl	block data containing flux box definitions
flx6pr	control processing of one orbit of data
flx6sm	print out flux box summary
phacnt	IMP-6 sort PHA data into flux boxes
ratchk	perform trend check on rates
flux7	main program for IMP-7
flx7bl	block data containing flux box definitions
flx7el	sort electron data into flux boxes
flx7pr	control processing for one interval
flx7sm	print out flux box summary
phact7	sort PHA data into flux boxes
getbx7	sort LOW GAIN data into flux boxes
print7	print out box definition arrays for LOW GAIN routine
flux8	main program for IMP-8
extrcj	IMP-8 extract PHA data from records
flx8bl	block data containing flux box definitions
flx8el	sort electron data into flux boxes
flx8pr	control processing for one interval
flx8sm	print out flux box summary
phact8	sort PHA data into flux boxes
getbx8	sort LOW GAIN data into flux boxes
print8	print out box definition arrays for LOW GAIN routine

common routines to all 3 programs

flx6mt	control handling of PHAS tapes
mtflx	control FLUX tape handling
flxqnn	get gain factors from gain tables, or cards
flxqmd	read and return main gain table gains for D, E, F

the following member is located in the dataset 'seimp.finegain.cntl'

flxfg (IMP7,8)	return finegain table values, when available, for D, E, F, detectors

the following member is located in the dataset 'seimp.impcups.source', as it is shared

time/ dtime ftime	return current date/time

the following members are located in the dataset 'seimp.utility.source', as they are shared.

rmove	imp general subroutine for data movement
catlog	imp general subroutine to read tape catalogs
btmnp	imp general subroutine to extract bits
katlog	imp general subroutine returning the total number of records in a catalog
prntcg	print a record of a tape entry
rpktn	return the vol-ser from tape catalog entry for use with FTIO package

rtio package SACC tape control package
(fread,fwrite,mount,posn,unload,leave,etc.)

This dataset contains the version in use before the introduction of 'FLEX' tapes
SEE 'seimp.intflux.newsourc' for an explanation of 'FLEX' tapes
also see 'seimp.impoview.text(fluxplot)' for doc.

the new FLEX database generating program has the following members changed from the above program:

- flx7b1
- flx7sm
- flx8b1
- flx8sm
- mtflx
- phact7
- phact8

in addition, certain other routines were adapted from their IMP originals:

- flxcat adaption of CATLOG to allow search for FLEX tapes (unit 26).
- prnflx adaption of PRNTCG to allow print out of FLEX catalog entries

The calling routine for MTFLX is as follows:

MTFLX
- dtime
- FLXCAT
  - dread
- fmove
- mount
- PRNFLX
- posn

subroutine tree:

IMP Intermediate Flux Program Routine Interaction Chart

```
FLUX6                FLUX7                FLUX8
  FLXGNN               FLXGNN               FLXGNN
    FLXGMD               FLXGMD               FLXGMD
      dread                dread                dread
  FLX6MT               FLX6MT               FLX8MT
    catlog               catlog               catlog
    dpktn                dpktn                dpktn
    leave                leave                leave
    mount                mount                mount
    prntcg               prntcg               prntcg
    CLSFLX               CLSFLX               CLSFLX
      posn                 posn                 posn
      fread                fread                fread
      iget                 iget                 iget
      getput               getput               getput
      fwrite               fwrite               fwrite
      catlog               catlog               catlog
      dwrite               dwrite               dwrite
      leave                leave                leave
    MTFLX                MTFLX                MTFLX
      posn                 posn                 posn
      DTIME                DTIME                DTIME
      dpktn                dpktn                dpktn
      getput               getput               getput
      fwrite               fwrite               fwrite
      catlog               catlog               catlog
      mount                mount                mount
      prntcg               prntcg               prntcg
      leave                leave                leave
      fmove                fmove                fmove
      fread                fread                fread
      dwrite               dwrite               dwrite
  FLX6PR               FLX7PR               FLX8PR
    fread                fread                fread
    abend                abend(99)            abend(99)
    iget
    BATCHK               FLXFG                FLXFG
      iget                 dread                dread
      float                FGDATE               FGDATE
    PHACNT               abend(123)           abend(123)
      EXTRCo             iget                 iget
      rand               PHACT7               PHACT8
    getput                 EXTRC                EXTRCJ
    fmove                  GETBX7               GETBX8
    fwrite                 rand                 rand
                                                pdump

                         fmove                  abend(880)
                         fwrite               fmove
                         getput               fwrite
  FLX6SM               FLX7SM                 getput
  unload               unload               FLX8SM
                                            unload
  CLSFLX               CLSFLX               CLSFLX
    posn                 posn                 posn
    fread                fread                fread
    iget                 iget                 iget
    getput               getput               getput
    fwrite               fwrite               fwrite
    catlog               catlog               catlog
    dwrite               dwrite               dwrite
    leave                leave                leave
```

PROTON FLUX

imp data analysis systems : program to generate proton flux using PHAS tapes
PROTON FLUX program
for KING at the DATA CENTER

main programs are called :
pflux (imp-8,or imp-J)

in the following 8, @ and $ refers to this source dataset:

8: seimp.i8pflux.source
$: seimp.elflux78.source
@: seimp.imp6dps.source

in the following 1, 3, 6, refer to these load libraries:

1: seimp.oimpilib.load
3: seimp.oimpjlib.load
6: seimp.oimpmod.load

member	description	IMP :	source listing I	8	J	load library I	8	J
pflux	main program		-	-	8	-	-	6
accump	process data into electron flux boxes		-	-	8	-	-	6
gain6d	return MED gain factors		-	-	8	-	-	6
protfx/ prinfx	write data to output in NOAA format and print data		-	-	8	-	-	6
pfplot /erplfo /efplff	plot data generate last plot frame draw grid lines,labels,generate plot frames		-	-	8	-	-	6
putput /outfin	output accumulated data		-	-	8	-	-	6
addate	add time increments to input arguments		-	-	$	-	-	3
addtsc	add tenths of seconds to time arguments		-	-	$	-	-	3
flxupk	unpack G, D1,E1,-F-G rates, MED event types D pulse heights		-	-	$	-	-	3
flxbuf	a csect attached to FLXUPK		-	-	$	-	-	3
init	initialize arrays and print heading		-	-	$	-	-	3
date /day	return date from year, julian day; visa-versa		-	-	@	-	-	1

catlog imp general subroutine to read tape catalogs
btmnp imp general subroutine to extract bits
katlog imp general subroutine returning the total number of records in a catalog
dpktn imp general subroutine to return the vol-ser from tape catalog for use with FTIO package

the imp general subroutines are located in

seimp.utility.source

ftio package SACC tape control package
(fread,fwrite,mount,posn,unload,leave,etc.)

subroutine tree:

IMP-8 Proton Flux Program Routine Interaction Chart:

```
PFLUX
    INIT
    catlog
    iget
    DAY
    ADDTSC
    dpkth
    DATE
    mount
    fread
    ACCUMP
          GAIN8D
            dread
          FLXUPK
    PUTPUT
          abend(99)
          PROTFX
    PFPLOT
          DAY
          modesg
          objctg
          subjeg
          setsmg
          POINTG
          SEGMTG
          exitg
          legndg
          numbrg
          pageg
          ADDTSC
          DATE
    PRINFX
    OUTFIN
    EFPLFO
    EFPLFF
          ADDTSC
          DATE
    ADDATE
```

LOW GAIN PLOT

imp data analysis	systems :	program to analyze pha and counts data from LOWG tapes LOW GAIN PLOT programs
low gain plot main programs:		lgplt6 (imp-6,or imp-I) lgplt7 (imp-7,or imp-H) lgplt8 (imp-8,or imp-J)

in the following 6, 7, 8, #, +, @, $, ?, and * refer to these source datasets

```
6:    seimp.lgplt6.source
7:    seimp.lgplt7.source
8:    seimp.lgplt8.source
*:    seimp.analimp8.source
#:    seimp.hgplt8.source
+:    seimp.hgplt6.source
@:    seimp.impodps.source
$:    seimp.analimp7.source
?:    seimp.analimp6.source
```

in the following 1, 3, and 4 refer to these load libraries:

```
1:    seimp.oimpilib.load
3:    seimp.oimpjlib.load
4:    seimp.oimplib.load
```

member	description	source listing IMP : I	H	J	load library I	H	J
lgplot	main program	6	7	-	1	4	-
lgplt8	main program	-	-	8	-	-	3
lgfill	accumulate data for one interval	6	7	-	1	4	-
lgfil8	accumulate data for one interval	-	-	8	-	-	3
plot	plot data of 128 X 128 matrices	6	7	-	1	4	-
pltlg8	plot data of 128 X 128 matrices	-	-	8	-	-	3
hgprnt	print out statistics of plot	6	-	-	1	-	-
hgprnt	print out statistics of plot	-	7	-	-	4	-
lgsts8	print out statistics of plot	-	-	8	-	-	3
diag	analyze and verify plot card info	6	7	-	1	4	-
dvsf	accumulate D vs F data	6	7	-	1	4	-
lgio	transfer matrices from disk to core and visa-versa	6	6	-	1	1	-
gfprt	print out header info relevant to gain factors.	6	6	-	1	1	-
histgr	print out the histograms	6	6	-	1	1	-
pch	punch out the matrices	6	6	-	1	1	-
lgphau	unpack lowgain PHA events on LOWG tape	-	-	*	-	-	3
tstcat	test bits for ON status	-	-	*	-	-	3
evlist	return a list of event types which match input card specification via IEV	-	-	*	-	-	3
gnfact	return gain factors from the IMP main gain tables	*	*	*	1	1	1
mtxadd	add a count to a matrix	-	-	#	-	-	3
gtnode	locate an index in storage	-	-	#	-	-	3
mtxclr	clear a matrix	-	-	#	-	-	3
mtxlod	load a matrix into core	-	-	#	-	-	3
mxpcom	a CSECT in source mtxadd, a DSECT elsewhere	-	-	#	-	-	3
ntic	return the magnitude of the verticle increment of the histograms	+	+	+	1	1	1
histos	print histograms requested	-	-	+	-	-	1
tpunpk	unpack tape catalog vol-ser for use	@	@	@	1	1	1

/tppack	with FTIO						
jdays	return number of days from time zero (9/23/72) given the date	-	$	-	-	1	-
ihalf	return 16 bits from the argument without sign propagation	-	$	-	-	4	-
orbit6	return times of IMP-6 orbits	?	-	-	1	-	-

The following member sources are located in the dataset 'seimp.utility.source' as they are in general use throughout IMP programs

btmnp	get selected bits from datawords
catlog	find a tape in the catalog
mpktn	pack a tape vol-ser from catalog entry, for use with FTIO package
rmove	move bytes en masse
prntcg	print out the tape catalog entry
ranfast	generate random numbers

The following SACC members are referenced

FTIO	FORTRAN I/O tape package			
nostae		-	-	x

subroutine tree:

IMP Data Analysis Programs - Low Gain Plot

IMP-6	IMP-7	IMP-8
LGPLOT	LGPLOT	LGPLT8
DIAG	DIAG	
fmove	fmove	fmove
LGIO	LGIO	
dwrite	dwrite	
dread	dread	
catlog	catlog	catlog
ORBIT6		
TPUNPK	TPUNPK	TPUNPK
posn	posn	posn
unload	unload	unload
prntcg	prntcg	prntcg
mount	mount	mount
fread	fread	fread
GNFACT	GNFACT	GNFACT
abend	abend	abend
dread	dread	dread
LGFILL	LGFILL	LGFIL8
LGIO	LGIO	LGPHAU
dwrite	dwrite	MTXADD
dread	dread	
PCH	PCH	
		PLTLG8
		LGSTS8
		NTIC
		HISTO
		MTXLOD
		MTXCLR
PLOT	PLOT	
HDPRNT	HDPRNT	
GFPRT	GFPRT	
HISTGR	HISTGR	
		NOSTAE
		EVLIST
		TSTCAT
DVSF	DVSF	
LGIO	LGIO	
dwrite	dwrite	
dread	fread	

PHA SUMMARIZOR

imp data processing systems : program to generate MATR and LOWG tapes from PHA tapes PHA SUMMARIZOR programs

main programs are called : summn (imp-6,or imp-I)
summn (imp-7,or imp-H)
summn (imp-8,or imp-J)

in the following 6, 7, 8, *, and + refer to these source datasets:

6: seimp.phasum6.source
7: seimp.phasum7.source
8: seimp.phasum8.source
*: seimp.imp6dps.source
+: seimp.analimp8.source

in the following 1, 3, and 4 refer to these load libraries:

1: seimp.oimpilib.load
3: seimp.oimpjlib.load
4: seimp.oimplib.load

member	description	IMP :	source listing I	H	J	load library I	H	J
summn	main program		6	7	8	1	4	3
slctt/ clst	tape handling for MATR and LOWG		6	7	8	1	4	3
dist	put all LED & MED data into core arrays		6	7	8	1	4	3
merge	merge newly sorted data onto disk space		6	7	8	1	4	3
sumunt	a csect attached to merge		6	7	8	1	4	3
sort	binary sort data into descending order		6	7	8	1	4	3
sumled	sum binary sorted A & B into arrays by priority and PHA value		6	7	7	1	4	4
summed	sum binary sorted D,E,& F into arrays by priority and PHA value		6	7	7	1	4	4
trend	perform trend check on rates		6	-	-	1	-	-
jlb2cl/ jmb2st	clear or set bit 2 indicating LED or MED event on LOWG tape		-	-	8	-	-	3
rhistp	print out rate histogram		-	-	+	-	-	3
rhisti	convert rate entry value into histogram index		-	-	+	-	-	3
time/ ftime/ dtime	set current time and date		*	*	*	1	1	1
catlog	imp general subroutine to read tape catalogs							
btmnp	imp general subroutine to extract bits							
katlog	imp general subroutine returning the total number of records in a catalog							
prntcg	print a record of a tape entry							
dpktn	return the vol-ser from tape catalog entry for use with FTIO package							
nostae	SACC abend initializor		-	-	X	-	-	X

the imp general subroutines are located in

seimp.utility.source

rtio package SACC tape control package (fread,fwrite,mount,posn,unload,leave,etc.)

subroutine tree:

IMP PHA SUMMARIZOR Routine Interaction Chart:

```
SUMMN
   SLCTT
   DIST
      TREND
      sort
      merge
        SUMLED
        SUMMED
   CLST
        DTIME
```

```
SUMMN
   catlog
   mount
   prntcg
   fread
   SLCTT
      catlog
      mount
      prntcg
      fread
      fwrite
      posn
      unload
      dwrite
      DTIME
      getput
   DIST
      RHISTI
      JLB2CL
      JMB2ST
      fwrite
      SORT
      MERGE
   CLST
   fwrite
   RHIST2
```

RATEPLOT

IMP-6/7/8 Rate Plot Program.

****

The following member sources are found in the dataset 'SEIMP.IMPLOT2.SOURCE'.

(Routine Interaction Chart:)

```
implot                  main driver
   impdat               block data
   impars               reads and analyzes input parameters
      pltmes            issues error messages
   lookp                setup record event displacements
   pmount               mounts input rate tapes
   ppltin               initializes plotter
   headrp               prints and/or plots header page
   calinp               calculates plot frame range
   acc(.&)e              accumulate rates for a plot frame for every
                         readout case
      acc(.&)c           accumulate rates from counts tapes
      tab(.&)            set up event type table & snapshot times in
                         album
            pmount       mount and position tapes
            psort        sort album events into time order
      paltit             checks IMP-6 perigee altitude
   acc(.&)               accumulate data for all but every readout case
      acc(.&)s           accumulate from SMCT tape
      tab(.&)            set up event type table & snapshot times in
            pmount       mount and position tapes
            psort        sort album events into time order
                         album
      paltit             checks IMP-6 perigee altitude
      acc(.&)c           accumulate from CNTS tape
      onoff              check experiment on/off status & set switches
      pmount             mount and position tapes
   functn                combine rates into requested functions of rates
   pprint                prints results of the run
   wpup11                generates rate output tape (ie, for PDP-11/70)
   ppltdr                driver routine for plot generation to plot tape
     yaxs                scale Y axis of plot frame
     xaxs1               format a plot frame X axis for 'every readout'
     xaxs2               format a plot frame X axis for 5 & 10 min avg
     xaxs3               format a plot frame X axis for 15& 30 min avg
     xaxs4               format a plot frame X axis for 1 hr averages
     xaxs5               format a plot frame X axis for 6 hr averages
     xaxs6               format a plog frame X axis for 12& 24 hr avg
     plabes            put labels on the graph
     ppoint            plot points and error bars
```

++++++++ where (.&) is specified, routines exist for all IMPS, i.e. IMP 6,7,8

The following are utility type members, which are shared by the IMP fluxplot program, but located in this dataset .

```
   catsup               tape catalog search routine
   prnsup               mount/unmount message generator
```

The following IMP utilities are used, whose sources are located in the dataset 'SEIMP.UTILITY.SOURCE' .

```
   unpack               time convert
   dpktn                tape name unpacker
   iget                 bit manipulator
   ifixit               time aligner
   idiff                time difference calculator
   fmove                byte mover
```

The following routines are used from the SYS2.SC4060 plot package:

numprq	types numbers
leghuq	types string of characters
pageq	advances paging
setsmq	changes mode array values
exitq	terminates plotting

Miscellaneous System Routines:

ftio	fortran I/O package
nostae	

****

Subroutine Tree:
Routine Interaction Chart for IMPLOT2 (RATEPLOT)

```
IMPLOT
  nostae
  INPARS
    PLIMES
    pack..
  LOOKP
  PMOUNT
    CATSUP
      dread
    mount
    PRNSUP
    fread
    ifixit
    posn
    unpack
    unload
  PPLTIN
    modesq
    setsmq
  HEADRP
    unpack
    legnaq
    numbrq
    pageq
  CALINP
    ifixit
    unpack
    pack
  WPDPII
    posn
    fmove
    ztime
    fwrite
    ifixit
    unpack
    unload
  ACC6E
    TAB6
      fread
      ONOFF
      PMOUNT
        CATSUP
          dread
        mount
        PRNSUP
        fread
        ifixit
        posn
        unpack
        unload
      PSORT
      ifixit
    PALTIT
    ACC6C

  ACC6
    TAB6
      fread
      ONOFF
      PMOUNT
        CATSUP
          dread
        mount
        PRNSUP
        fread
        ifixit
        posn
        unpack
        unload
      PSORT
      ifixit
    PALTIT

ACC7E
    TAB7
        fread
        ONOFF
        PMOUNT
            CATSUP
                dread
            mount
            PRNSUP
            fread
            ifixit
            posn
            unpack
            unload
        PSORT

    ACC7C
        getput
ACC7
    TAB7
        fread
        ONOFF
        PMOUNT
            CATSUP
                dread
            mount
            PRNSUP
            fread
            ifixit
            posn
            unpack
            unload

ACC8E
    TAB8
        fread
        ONOFF
        PMOUNT
            CATSUP
                dread
            mount
            PRNSUP
            fread
            ifixit
            posn
            unpack
            unload
        PSORT

    ACC8C
ACC8
    TAB8
        fread
        ONOFF
        PMOUNT
            CATSUP
                dread
            mount
            PRNSUP
            fread
            ifixit
            posn
            unpack
            unload
```

```
   ACC6C                    ACC7C                    ACC8C
                              getput
   ACC6S                    ACC7S                    ACC8S
   fread                    fread                    fread
   ONOFF                    ONOFF                    ONOFF
   PMOUNT                   PMOUNT                   PMOUNT
     CATSUP                   CATSUP                   CATSUP
       dread                    dread                    dread
     mount                    mount                    mount
     PRNSUP                   PRNSUP                   PRNSUP
     fread                    fread                    fread
     ifixit                   ifixit                   ifixit
     posn                     posn                     posn
     unpack                   unpack                   unpack
     unload                   unload                   unload
FUNCTN
PPRINT
   ifixit
   unpack
WPDP12
PPLTDR
   unpack
   YAXS
     setsmg
     segmtg
     numbrg
     mltplg
   PLABES
     legndg
     numbrg
     setsmg
   XAXS1
     setsmg
     segmtg
     MLTPLG
     unpack
     numbrg
     legndg
   XAXS2
     setsmg
     MLTPLG
     unpack
     numbrg
     legndg
   XAXS3
     setsmg
     MLTPLG
     segmtg
     ifixit
     unpack
     numbrg
     legndg
   XAXS4
     setsmg
     MLTPLG
     unpack
     ifixit
     numbrg
     legndg
   XAXS5
     unpack
     MLTPLG
     numbrg
     legndg
   XAXS6
     MLTPLG
     segmtg
     legndg
     unpack
     numbrg
   PPOINT
     legndg
     segmtg
exitg
WPDP13
```

MULTIPLE TIME SUMMARIZOR

imp data processing systems : program to generate multiple time period MATR tapes from PHA tapes
PHA SUMMARIZOR programs

main programs are called :
- mtsum (imp-6,or imp-I)
- timsm7 (imp-7,or imp-H)
- timsum (imp-8,or imp-J)

in the following 6, 7, 8, p6, p7, p8, *, and + refer to these source datasets:

6:	seimp.mtsum6.source
7:	seimp.timsm7.source
8:	seimp.timsum.source
p6:	seimp.phasum6.source
p7:	seimp.phasum7.source
p8:	seimp.phasum8.source
*:	seimp.imp6dps.source
+:	seimp.anaiimp8.source

in the following 1, 3, and 4 refer to these load libraries:

1:	seimp.oimpilib.load
3:	seimp.oimpjlib.load
4:	seimp.oimplib.load

member	description	source listing IMP : I	H	J	load library I	H	J
mtsum	main program	6	-	-	1	-	-
timsm7	main program	-	7	-	-	4	-
timsum	main program	-	-	8	-	-	3
dist	put all LED & MED data into core arrays	6	-	-	1	-	-
disth	as above imp-7	-	7	-	-	4	-
timdis	as above imp-8	-	-	8	-	-	3
merge	merge newly sorted data onto disk space	6	-	-	1	-	-
mergeh	as above imp-7	-	7	-	-	4	-
mergej	as above imp-8	-	-	8	-	-	3
sumunt	a csect attached to merge	6	7	8	-	-	-
sictt/ clst	tape handling for MATR and LOWG	-	p7	p8	-	4	3
sort	binary sort data into descending order	p6	p7	p8	1	4	3
sumled	sum binary sorted A & B into arrays by priority and PHA value	p6	p7	p7	1	4	4
summed	sum binary sorted D,E,& F into arrays by priority and PHA value	p6	p7	p7	1	4	4
trend	perform trend check on rates	p6	-	-	1	-	-
jlb2cl/ jmb2st	clear or set bit 2 indicating LED or MED event on LOWG tape	-	-	p8	-	-	3
rhistp	print out rate histogram	-	-	+	-	-	3
rhisti	convert rate entry value into histogram index	-	-	+	-	-	3
time/ ftime/ dtime	set current time and date	*	*	*	1	1	1
addtim	add time increment to argument	-	*	*	-	1	1
catloq	imp general subroutine to read tape catalogs						
btmnp	imp general subroutine to extract bits						
katloq	imp general subroutine returning the total number of records in a catalog						
prntcq	print a record of a tape entry						
dpktn	return the vol-ser from tape catalog entry for use with FTIO package						
nostae	SACC abend initializor	-	-	X	-	-	X

the imp general subroutines are located in

seimp.utility.source

ftio package SACC tape control package
(fread,fwrite,mount,posn,unload,leave,etc.)

subroutine tree:
TIMSUM Programs Routine Interaction Charts:

IMP-8

```
TIMSUM
     ADDTIM
     SLCTT/CLST
          DTIME
     TIMDIS
          RHISTI
          JLB2CL/JMB2ST
          sort
          MERGEJ
               SUMMED
               SUMLED
RHISTP
```

IMP-o

```
MTSUM
     DTIME
     DIST
          TREND
          sort
          MERGE
               SUMLED
               SUMMED
```

VLET SUMMARY - IMP 8

imp data processing systems : program to generate VLET tapes from CNTS tapes
VLET SUMMARY program
main programs are called : vlsmmn (imp-8,or imp-j)

in the following 8, dp6, a8, pi, and gpi refer to these sources :

8:	seimp.vltsmry8.source
dp6:	seimp.imp6dps.source
a8:	seimp.analimp8.source
pi:	pioneer II PHA summary program PPHASP
gpi:	pioneer general system subroutines

in the following 1, 3, 10, and 11 refer to these load libraries:

1:	seimp.oimpilib.load
3:	seimp.oimpjlib.load
10:	kj.sbcid.sb001.opiotemp
11:	kj.sbcid.sb001.opioneer

member	description	source listing IMP : I	J	load library I	J
vlsmmn	main program	-	8	-	3
slvlet/ cvlst	tape handling	-	8	-	3
vltsum/ vsmfin	summarize VLET PHA and rates from CNTS record	-	8	-	3
iflip	remove sign bit	-	8	-	3
vletpk	move and store data	-	8	-	3
pmesge	call an abend depending on arg. list	-	8	-	3
cnvmjd/ cnvdat	convert to or from time relative to 0jan72	-	gpi	-	11
psort	binary sort of PHA priority data	-	pi	-	11
psum	summarize sorted data from psort	-	pi	-	11
addtim	increment and decrement time	-	dp6	-	1
tstcat	compare bit strings	-	a8	-	1
time/ dtime/ ftime	get current time	-	dp6	-	1
fread	system type functions (probably should come from FTIO)	-	-	-	10
funitabl	system type functions	-	-	-	10
fpil	system type functions	-	-	-	10
rermsg	system type functions	-	-	-	10

catloq	imp general subroutine to read tape catalogs
btmnp	imp general subroutine to extract bits
katloq	imp general subroutine returning the total number of records in a catalog
prntcq	print a record of a tape entry
apktn	return the vol-ser from tape catalog entry for use with FTIO package

the imp general subroutines are located in

seimp.utility.source

subroutine tree:

IMP-8 VLET Summary Program Routine Interaction Chart:

```
VLSMMN
    nostae
    catloq
    prnteq
    fread
    VLTSUM
          CNVDAT
          CNVMJD
          abend
          fwrite
          posn
          fread
          IFLIP
          VLETPK
          PSORT
          PSUM
    SLVLET
          catloq
          getput
          posn
          mount
          fwrite
          unload
          fread
          dwrite
          tstcat
          abend
          prnteq
          DTIME
    ADDTIM
    VSMFIN
          CNVDAT
          CNVMJD
          PSORT
          PSUM
    CVLST
    posn
    mount
```

VLET PLOT - IMP 8

imp data analysis systems : program to analyze PHA and rate data VLET tapes are input
**formal documentation does not exist but this program is an adaption of the PIONEER 11 PIPLOT program

main programs are called : piplot (imp-8,or imp-J)

---

in the following 8, pi, and gpi refer to these sources :

8: seimp.i8vltplt.source
pi: pioneer plot program PIPLOT
gpi: pioneer programs data reduction subroutines

in the following 1, 3, 10, 11, and 14 refer to these load libraries:

1: seimp.oimpilib.load
3: seimp.oimpjlib.load
10: k3.spcid.sb001.opiotemp
11: k3.spcid.sb001.opioneer
14: m2.zb2n1.sd001.opioneer

member	description	source listing IMP : I	H	J	load library I	H	J
piplot	main program	-	-	8	-	-	3
pfillp	put data into plots	-	-	8	-	-	3
phistp	generate one detector histograms	-	-	8	-	-	3
pplotp	generate 2 detector plots	-	-	8	-	-	3
ptapep	get required tape	-	-	8	-	-	3
pinitp/ pfill/ pretrv	initialize plot areas; add data to coords.	-	-	8	-	-	3
timein/ timout/ igloo	get & report plot period times	-	-	8	-	-	3
pupdap	get data from summary dataset	-	-	8	-	-	3
write	print out matrices	-	-	8	-	-	3
frchms	cnvrt fractions of hours to hr/min/sec	-	-	8	-	-	3
cttloq	CATLOG analogy	-	-	8	-	-	3
pcardp	read and sort card input data ← these cards	-	-	pi	-	-	11
pchosp	allocate plot resources	-	-	pi	-	-	11
pparmp/ parmup	create compressed vsn of plot parameters	-	-	pi	-	-	11
cnvmjd/ cnvdat	convert time & date for internal use	-	-gpi		-	-	11
contim	convert millisec to hr/min/sec	-	-gpi		-	-	11
qbit/ $private	set or test a bit	-	-gpi		-	-	11
skip	unknown -	-	-gpi		-	-	11
fread	system type functions	-	-	-	-	-	10
funitabl	system type functions	-	-	-	-	-	10
fpll	system type functions	-	-	-	-	-	10
fermsg	system type functions	-	-	-	-	-	10
fmove	SACC analogy	-	-	-	-	-	14

fpktn return the vol-ser from tape catalog entry for use with FTIO package

the imp general subroutines are located in

seimp.utility.source

ftio package SACC tape control package
(fread,fwrite,mount,posn,unload,leave,etc.)

subroutine tree:
Routine Interaction Chart for I8VLTPLT

```
PIPLOT
  nostae
  PCARDP
  PTAPEP
     CTLLOG
        dread
     mount
     posn
     fread
     TIMEIN
        CNVMJD
        FRCHMS
     fmove
     CNVMJD
     CONTIM
  REMTIM
  PCHOSP
  PFILLP
     skip
     fread
     PUPDAP
     PFILL
  PPLOTP
     write
     fmove
     PRETRV
     TIMOUT
  PHISTP
     fmove
     TIMOUT
  abend
  posn
  fread
```

4.0 IMP -7 AND -8 DATAGAP PROBLEM

The following memo summarizes the datagap problem for IMP-7 and IMP-8.

4.1 IMP - 7 STATUS

to: H. Domchick
from: John Broomhall
Data: 05 May 1981
subject: Statement of Work / Recovery of suspected data gaps in the various IMP-7 High Level Data Bases (SMCT , LOWG and MATR).

Due to the large number of data gaps which I discovered in the IMP-8 production data bases, Dr. Tycho von Rosenvinge requested that a similar study be done on the IMP-7 cosmic ray experiment (EX32), and that a report on its status be prepared. The following report describes:

1) The general definition of the problem.
2) The method used to locate the data gaps.
3) The results of this research.
4) The cost of the research done thus far.
5) The proposed method for data recovery.
6) The approximate cost of the entire process.

General Definition of the Problem

In general the same problem exists in the IMP-7 production data bases that was in the IMP-8 experiment. Several data gaps exist for periods greater than a day which appear on interval boundarys. In the case of IMP-8 most of these gaps (>90%) were caused by errors in processing.

Method Used

The following method was used to uncover the IMP-7 data gaps:

1) The LGM3DMP program was modified to run for IMP-7 and was used to dump the start and end times of each and every interval (LGM7DMP).
2) From the listings generated from these runs, a table of the missing LOWG data were created.
3) Then the rate plots were completely checked to determine if the same data gaps exist.
4) The high gain matrices were also examined for gaps.
5) A table was created containing a list of all of the gaps greater than one day.

Results of the Research

Attached is the 'IMP-7 MISSING DATA TABLE' which contains the results of this research. However it is yet to be determined if these missing periods are recoverable, because no research has been done as to their cause. I can state that most of the IMP-7 gaps resemble the type which were all fixed in the IMP-8 experiment data. The gaps which are either in the SUMMN (LOWG and MATR) or the HSMCT (SMCT) data bases will only require reprocessing through those programs only. The ones which reflect all three are hard to diagnose, but most will require reprocessing from the IMPHMN (PHAS and CNTS) step . The others will either regress or progress one production step, i.e., reconverting to DECOM or progressing to the high level tape generator programs.

Proposal for Data Recovery

I propose the following steps be followed toward eliminating these data gaps.

1) Request a priority from 1 to n be placed on each interval containing a data gap by the cognizant GSFC scientists.
2) Since all of the IMP-7 data processing runs have been boxed for paper

storage, these printouts will have to be unboxed and assembled so that the cause of each gap may be determined.

3) Using the priorities assigned above, the production printouts will be examined for the irregularity in processing which caused the gap, and it will then filled. For those gaps which cannot be resolved by this process, dumps of the data will be obtained, examined for irregularities,and when the cause is known, they will be filled if possible to do so.

4) As each gap is filled, the appropriate line in the 'ZSPAS.IMPOVIEW.TEXT(SI/DAIGP)' member will be changed to 'YES' when all data bases affected are corrected.

5) When the data gap is found in the PHA or ENCY data base, the FLUX data base will also have to be rerun for those intervals.

6) The printouts will be saved and stored with others runs of the same type in interval order then reboxed for paper storage.

4.2 IMP - 7 GAPS

Table 17 summarizes the missing data for IMP-7.

Table 17: IMP-7 Gaps

CNT	INTERVAL COVERAGE						MISSING DATA TIMES				D/ B.	AFFECTED	PKTY	SUN	FIXUP
	YR	START DAY	HR	TO	STOP DAY	HR	START DAY	HR:MN	STOP DAY	HR:MN	LOW GAIN	HIGH GAIN	RATE		N/A	DONE?
209	75	003	00	TO	007	00	005	08:52	007	00:00	YES	YES	NO	4		NO
260	75	207	00	TO	211	00	207	00:02	211	00:00	YES	YES	NO	4		NO
300	76	002	00	TO	006	00	004	23:27	006	00:00	YES	YES	YES	4		NO
400	77	036	00	TO	040	00	036	00:00	037	00:19	YES	YES	YES	4		NO
405	77	056	00	TO	060	00	059	07:17	060	00:00	YES	YES	YES	4		NO
435	77	176	00	TO	180	00	178	18:00	180	00:00	NO	NO	YES	4		NO
436	77	180	00	TO	184	00	180	00:00	182	18:00	NO	NO	YES	4		NO
452	77	244	00	TO	248	00	247	14:59	248	00:00	YES	YES	YES	4		NO
464	77	292	00	TO	296	00	292	15:27	296	00:00	YES	YES	YES	4		NO
474	77	332	00	TO	336	00	333	08:01	336	00:00	YES	YES	YES	4		NO
481	77	360	00	TO	364	00	361	20:57	364	00:00	YES	YES	NO	4		NO
482	77	364	00	TO	003	00	365	23:28	003	00:00	YES	YES	NO	2	N/A	NO
486	78	003	00	TO	007	00	003	00:00	004	22:08	YES	YES	NO	2		NO
487	78	019	00	TO	023	00	020	18:16	023	00:00	YES	YES	YES	4		NO
488	78	023	00	TO	027	00	023	00:00	024	23:36	YES	YES	YES	4		NO
492	78	039	00	TO	043	00	041	05:36	043	00:00	YES	YES	YES	4		NO
493	78	043	00	TO	047	00	045	03:13	047	00:00	YES	YES	YES	1		NO
494	78	047	00	TO	051	00	047	00:00	049	11:44	YES	YES	YES	1		NO
502	78	079	00	TO	083	00	082	00:19	083	00:00	YES	YES	YES	4		NO
503	78	083	00	TO	087	00	083	00:00	086	06:43	YES	YES	YES	4		NO
512	78	119	00	TO	123	00	122	14:06	123	00:00	YES	YES	YES	1		NO
513	78	123	00	TO	127	00	123	00:00	126	16:07	YES	YES	YES	1		NO
530	78	191	00	TO	195	00	191	20:30	195	00:00	YES	YES	YES	2	N/A	NO
531	78	195	00	TO	199	00	195	00:00	196	00:12	YES	YES	YES	2	N/A	NO
539	78	227	00	TO	231	00	228	10:55	231	00:00	YES	YES	YES	3		NO
540	78	231	00	TO	235	00	231	00:00	232	14:37	YES	YES	YES	3		NO
541	78	235	00	TO	239	00	236	12:37	239	00:00	YES	YES	YES	3		NO
542	78	239	00	TO	243	00	239	00:00	240	12:36	YES	YES	YES	3		NO

4.3 IMP - 8 GAPS AND THEIR METHOD OF RECOVERY

Table 18 summarizes the missing data for IMP-8 and the status of the data gap.

Table 18: IMP-8 Missing Data

JULY 15,1981

INT	INTERVAL COVERAGE						MISSING DATA TIMES				DATA BASES AFFECTED				SUN	FIXUP
	START				STOP		START		STOP		LOW	HIGH	RATE	VLBI	A/A	DONE?
	YR	DAY	HR	TO	DAY	HR	DAY	HR:MN	DAY	HR:MN	GAIN	GAIN				
109	73	333	00	TO	337	00	335	23:53	337	00:00	YES	YES	NO	NO	Q	YES
110	73	337	00	TO	341	00	337	00:00	338	22:00	NO	NO	NO	YES	Q	YES
120	74	012	00	TO	016	00	012	17:39	016	00:00	YES	YES	NO	NO	Q	YES
138	74	084	00	TO	088	00	084	14:15	088	00:00	YES	YES	NO	NO	A	YES
194	74	308	00	TO	312	00	310	05:50	312	00:00	NO	NO	NO	YES	A	YES
195	74	312	00	TO	316	00	312	00:00	314	04:50	NO	NO	NO	YES	A	YES
221	75	051	00	TO	055	00	053	12:00	055	00:50	NO	NO	NO	YES	A	YES
222	75	055	00	TO	059	00	055	00:00	057	13:30	NO	NO	NO	YES	A	YES
253	75	179	00	TO	183	00	179	00:00	181	00:34	YES	YES	YES	YES	Q&A	YES
297	75	355	00	TO	359	00	355	01:24	359	00:00	YES	NO	NO	NO	Q	YES
330	76	122	00	TO	126	00	125	15:08	126	00:00	YES	NO	NO	NO	A	OFF
331	76	126	00	TO	130	00	126	00:00	126	07:12	YES	NO	NO	NO	A	OFF
345	76	182	00	TO	186	00	183	04:57	186	00:00	YES	YES	NO	NO	A	YES
382	76	330	00	TO	334	00	332	03:07	334	00:00	YES	YES	YES	YES	Q&A	YES
383	76	334	00	TO	338	00	334	00:00	336	08:03	YES	YES	YES	YES	Q&A	YES
413	77	088	00	TO	092	00	088	09:28	092	00:00	YES	YES	NO	NO	Q	YES
420	77	116	00	TO	120	00	119	05:34	120	00:00	YES	YES	YES	YES	Q	YES
456	77	260	00	TO	264	00	261	03:39	264	00:00	YES	YES	NO	NO	A	YES
457	77	264	00	TO	268	00	264	00:00	265	04:30	YES	YES	NO	NO	A	YES
475	77	336	00	TO	340	00	337	11:16	340	00:00	YES	YES	YES	YES	Q&A	YES
476	77	340	00	TO	344	00	340	00:00	340	18:13	YES	YES	YES	YES	Q&A	YES
484	78	007	00	TO	011	00	009	06:08	011	00:00	YES	YES	YES	YES	A	YES
485	78	011	00	TO	015	00	011	00:00	013	09:23	YES	YES	YES	YES	A	YES
494	78	047	00	TO	051	00	049	12:40	051	00:00	YES	YES	YES	YES	A	YES
495	78	051	00	TO	055	00	051	00:00	053	14:00	YES	YES	YES	YES	A	YES
497	78	059	00	TO	063	00	061	12:45	067	00:00	NO	NO	NO	YES	A	YES
498	78	063	00	TO	067	00	063	00:00	065	09:45	NO	NO	NO	YES	A	YES
499	78	067	00	TO	071	00	069	07:39	071	00:00	YES	YES	YES	YES	A	YES
500	78	071	00	TO	075	00	071	00:00	073	08:34	YES	YES	NO	YES	A	YES
502	78	079	00	TO	083	00	079	00:00	081	10:22	YES	YES	NO	YES	A	YES
503	78	083	00	TO	087	00	085	11:30	087	00:00	YES	YES	NO	YES	A	YES
504	78	087	00	TO	091	00	087	00:00	089	14:39	YES	YES	NO	YES	A	YES
506	78	095	00	TO	099	00	097	04:30	099	00:00	NO	NO	NO	YES	A	YES
552	78	283	00	TO	287	00	283	13:13	287	00:00	YES	YES	YES	YES	A	YES
557	78	299	00	TO	303	00	299	11:57	303	00:00	YES	YES	YES	YES	Q&A	YES
558	78	303	00	TO	307	00	303	00:00	303	16:57	YES	YES	YES	YES	Q&A	YES
598	79	098	00	TO	102	00	101	01:50	102	00:00	NO	NO	NO	YES	A	YES
599	79	10_	00	TO	106	00	102	00:00	105	06:45	YES	YES	NO	YES	A	YES
600	79	106	00	TO	110	00	109	03:20	110	00:00	NO	NO	NO	YES	A	YES
653	79	318	00	TO	322	00	319	08:51	322	00:00	YES	YES	YES	YES	A	YES

THE FOLLOWING FLUX INTERVALS HAD DATA GAPS WHICH WERE FILLED AFTER THE GAIN FACTORS WERE CHECKED FOR CORRECTNESS ON JUNE 29,1981 BY THE COG-NIZANT CSC PERSONNEL.

INT	INTERVAL COVERAGE						MISSING DATA TIMES				GAIN SHIFT CHECKED ?	FLUX RERUN ?	DATE OF RERUN MM/DD/YY
	START				STOP		START		STOP				
	YR	DAY	HR	TO	DAY	HR	DAY	HR:MN	DAY	HR:MN			
120	74	012	00	TO	016	00	012	17:39	016	00:00	YES	YES	07/01/81
253	75	179	00	TO	183	00	179	00:00	181	00:34	YES	YES	07/01/81
345	76	182	00	TO	186	00	183	04:57	186	00:00	YES	YES	07/01/81
382	76	330	00	TO	334	00	332	03:07	334	00:00	YES	YES	07/01/81
383	76	334	00	TO	338	00	334	00:00	336	08:03	YES	YES	07/01/81
475	77	336	00	TO	340	00	337	11:16	340	00:00	YES	YES	07/01/81

476	77	340	00	TO	344	00	340	00:00	340	18:13	YES	YES	07/01/81
484	78	007	00	TO	011	00	009	06:08	011	00:00	YES	YES	07/01/81
485	78	011	00	TO	015	00	011	00:00	013	09:23	YES	YES	07/01/81
494	78	047	00	TO	051	00	049	12:40	051	00:00	YES	YES	07/01/81
495	78	051	00	TO	055	00	051	00:00	053	14:00	YES	YES	07/01/81
496	78	067	00	TO	071	00	069	07:39	071	00:00	YES	YES	07/01/81
553	78	283	00	TO	287	00	283	13:13	287	00:00	YES	YES	07/01/81
557	78	299	00	TO	303	00	299	11:57	303	00:00	YES	YES	07/01/81
558	78	303	00	TO	307	00	303	00:00	303	16:57	YES	YES	07/01/81
653	79	318	00	TO	322	00	319	08:51	322	00:00	YES	YES	07/01/81

THE FOLLOWING TABLE INDICATES HOW THE DATA GAPS WERE FILLED IN THE 1ST TABLE.

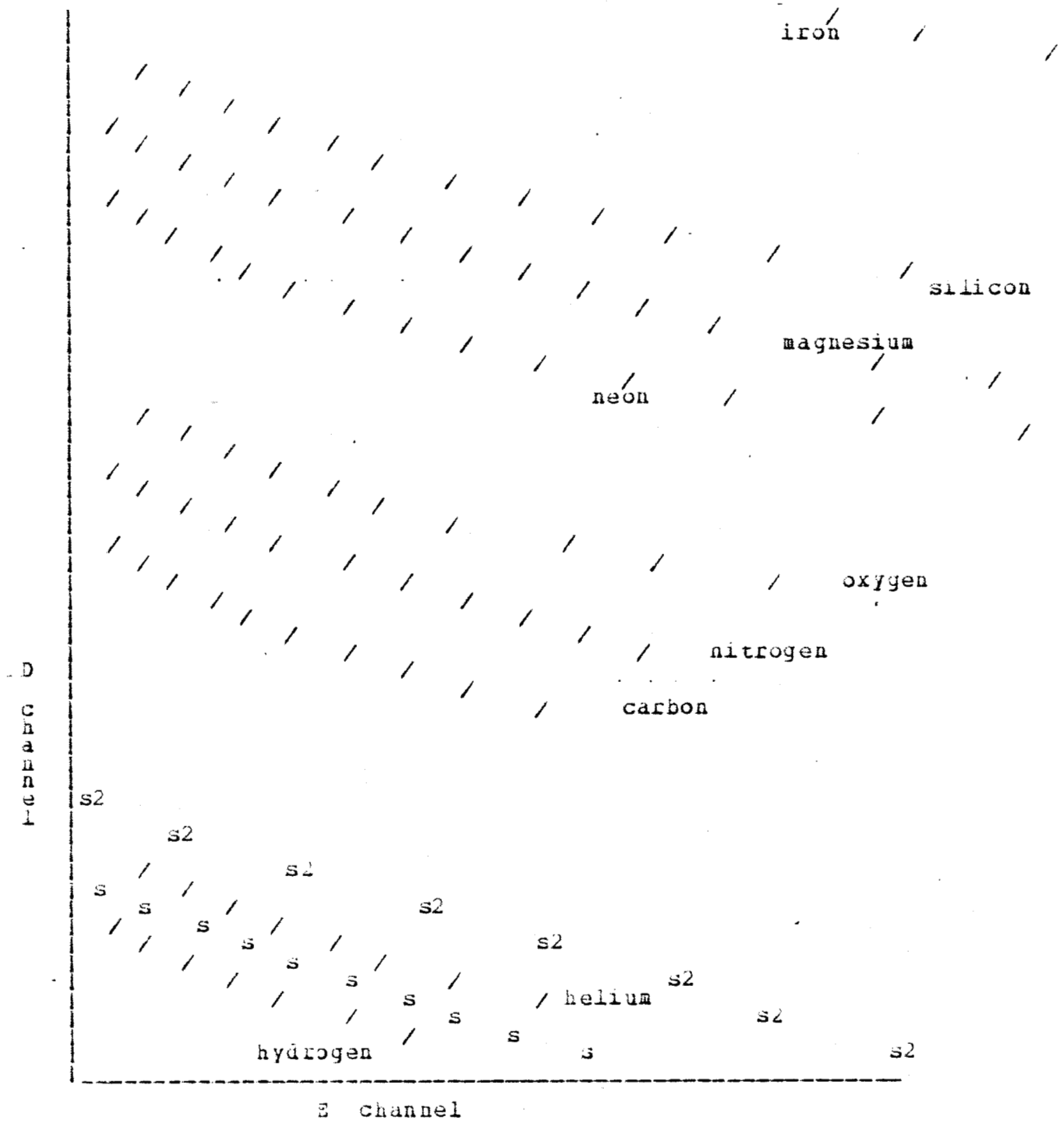
INT	METHOD
109	PHA SUMMARIZER RERUN.
110	VLET SUMMARIZER RERUN.
120	BUG FOUND AND CORRECTED IN THE DATA BASE GENERATOR (DBG) WHICH PREVENTED THE REPROCESSING OF THE LAST INTERVAL ON ANY PHA OR COUNTS TAPE. DBG RERUN , PHA SUMMARIZER RERUN. BUG ALSO EXISTS IN THE IMP-7 VERSION.
148	SAME AS INT. 109.
194	SAME AS INT. 110.
195	SAME AS INT. 110.
221	SAME AS INT. 110.
222	SAME AS INT. 110.
253	DECOM RECALLED FROM STORAGE AND RERUN THRU ENTIRE SYSTEM.
297	PHA SUMMARIZER (LOWG ONLY) RERUN.
330	DATA WAS REJECTED BY THE DATA BASE GENERATOR FOR F=0 AND L1=A (MED AND LED OFF RESPECTIVELY).
331	SAME AS INT. 330.
345	DBG (PHA ONLY) AND PHA SUMMARIZER RERUN.
382	DBG (PHA AND COUNTS) AND PHA , COUNTS AND VLET SUMMARIZERS RERUN.
383	SAME AS INT. 382.
413	SAME AS INT. 109.
420	PHA , COUNTS AND VLET SUMMARIZERS RERUN.
456	BUG FOUND IN THE PHA SUMMARY PROGRAM WHICH CAUSED DATA TO BE REJECTED WHEN S/C DISTANCE FROM EARTH (KM.) WAS NOT SUPPLIED ON THE DECOM TAPE. THE TEST FOR S/C DISTANCE FROM EARTH WAS ONLY NEEDED FOR IMP-6 AND WAS REMOVED FROM BOTH THE IMP-7 AND IMP-8 VERSIONS OF THIS PROGRAM AND THE PHA SUMMARIZER WAS RERUN.
457	SAME AS INT. 456.
475	SAME AS INT. 253.
476	SAME AS INT. 253.
484	SAME AS INT. 253.
485	SAME AS INT. 253.
494	SAME AS INT. 382.
495	SAME AS INT. 382.
497	SAME AS INT. 110.
498	SAME AS INT. 110.
499	SAME AS INT. 382.
500	PHA AND VLET SUMMARIZERS RERUN.
502	SAME AS INT. 500.
503	SAME AS INT. 500.
504	SAME AS INT. 500.
506	SAME AS INT. 110.
553	SAME AS INT. 382.
557	SAME AS INT. 382.
558	SAME AS INT. 382.
598	SAME AS INT. 194.
599	SAME AS INT. 500.
600	SAME AS INT. 194.
653	SAME AS INT. 382.

APPENDIX A

IMP COSMIC RAY DATA

This section contains a brief description of the kind of data seen from IMP experiments.

I. A D (DELTA ENERGY) VS E (ENERGY) EVENT PLOT:



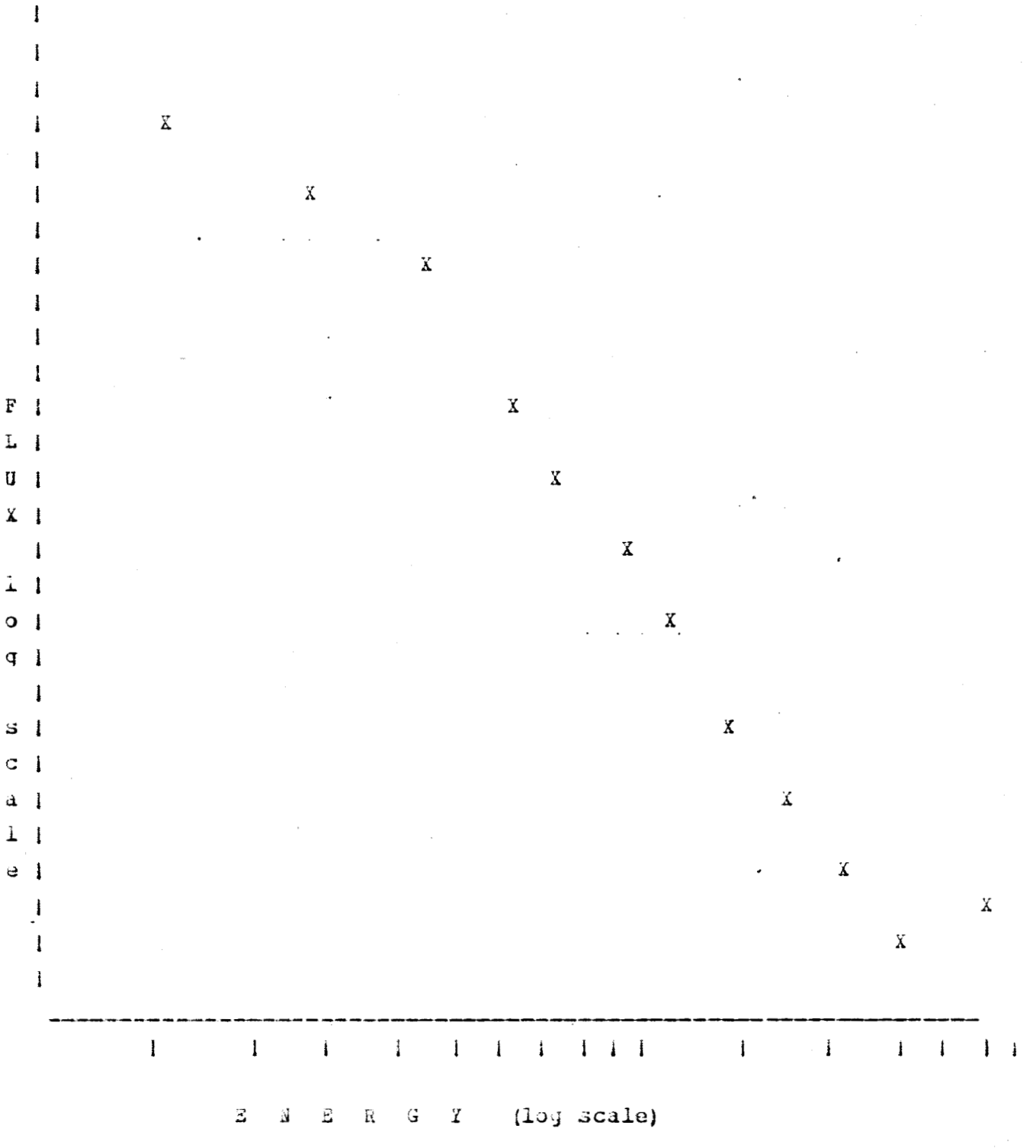
The main features to be noted in this plot are as follows:

a. mass lines
b. slant thresholds
c. low gain vs high gain
d. low gain vs high gain threshold cutoff

As an example, for IMP-8, mass lines and slant thresholds exist approximately as drawn; high gain data would usually contain some CNO data, but not much Ne,Mg, Si or above data. Low gain data would contain hydrogen and helium bunched up in the lower left corner of the diagram, and if a 's2' threshold was in effect, the diagram would be blank in that area (no events in that energy range were allowed); low gain data would also show Ne, Mg, Si, and Fe data. For IMP-8, there exist two low gain instrument settings, a LOW10 and a LOW50. The ideal energy cutoff between those two was to be below the Ne,Mg,Si mass lines. However, when the experiment actually was in orbit, the threshold to the LOW50 mode actually cut across the Ne and Mg mass lines! Data collection was also hindered, since the lower level discriminators for the X50 mode, are also now eliminating Ne and Mg events.

II. SPECTRAL FLUX AND EVENT TYPES:

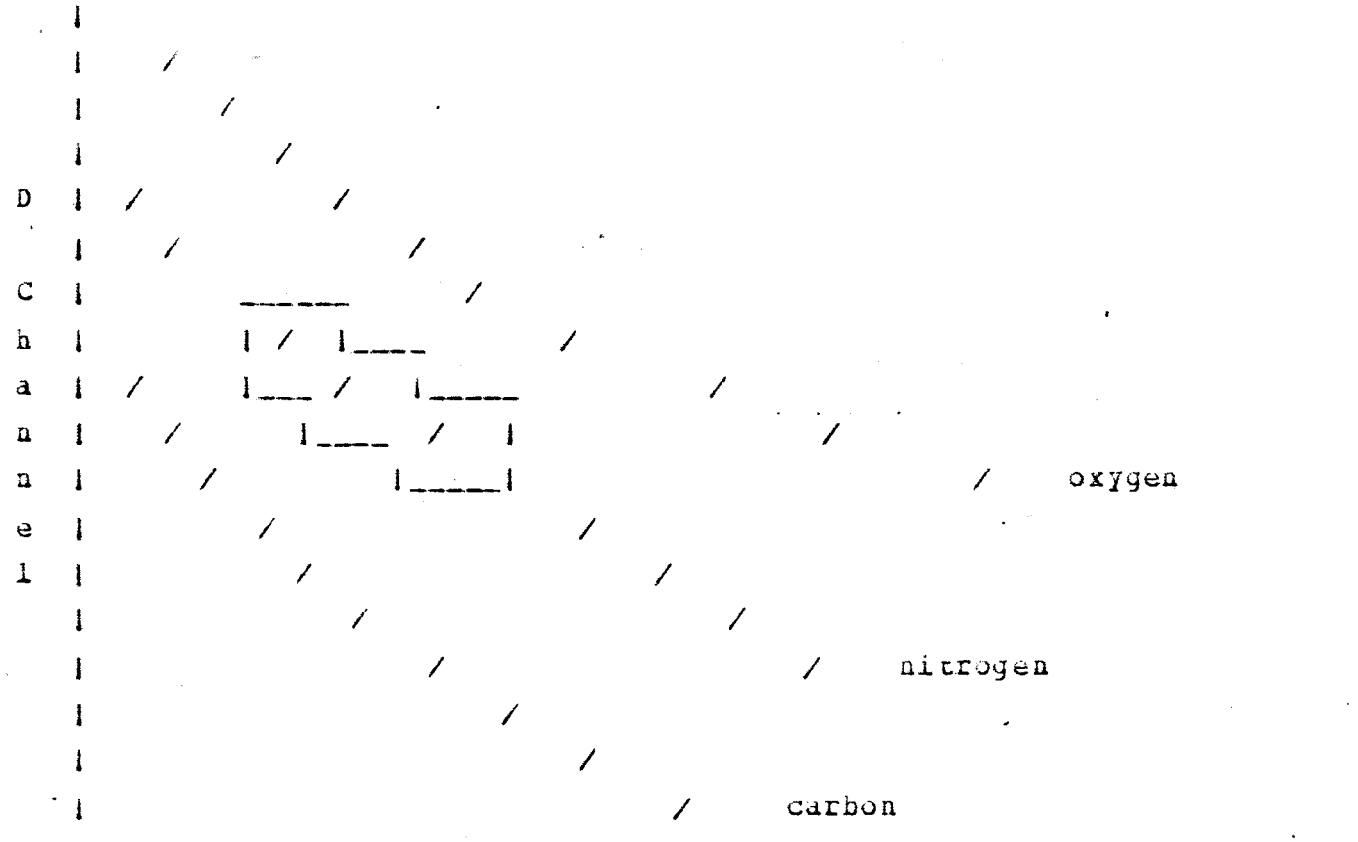
This diagram illustrates a 'spectral plot'.
Flux (y axis) is plotted against energy for a given time period.



The individual points are called 'FLUX BINS'. A FLUX BIN contains the number of events(counts) of a particular event type falling within the summed 'bin', from which the FLUX value is calculated.

The bins are formed from literal boxes (or combined boxes) that are drawn around the mass lines in Section I. above. The boxes have been predefined by government scientists. Then the bin point is plotted, usually at the midpoint of the bin energy.

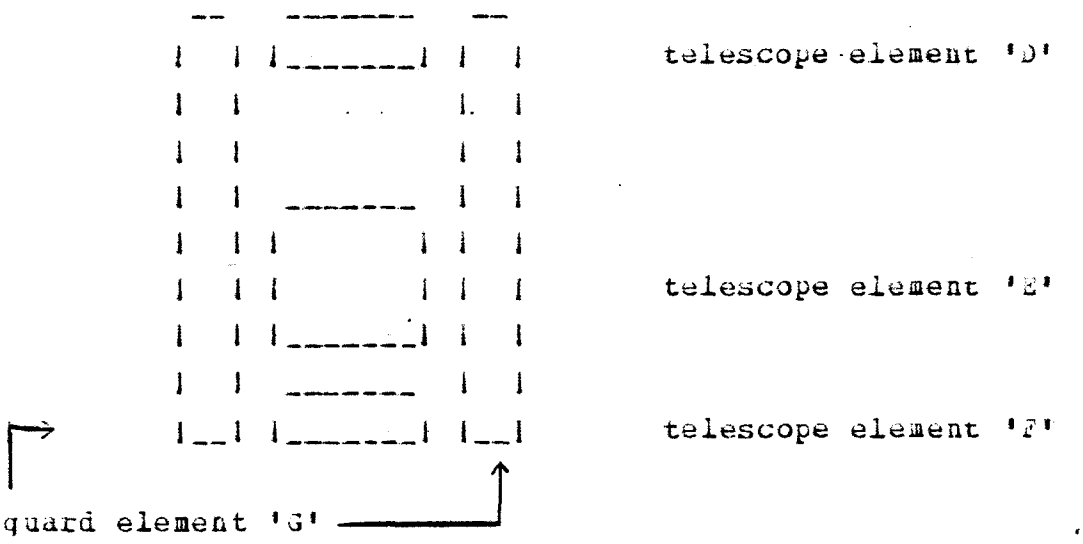
A given mass line may have several boxes drawn along it. The following represents a portion of the D vs E plot, with a nitrogen box drawn:



To reiterate:

The spectral plot bin point for the above 'box' would be obtained by summing all the appropriate events in the 'box' for the time period requested, and then calculating a FLUX value for those events.

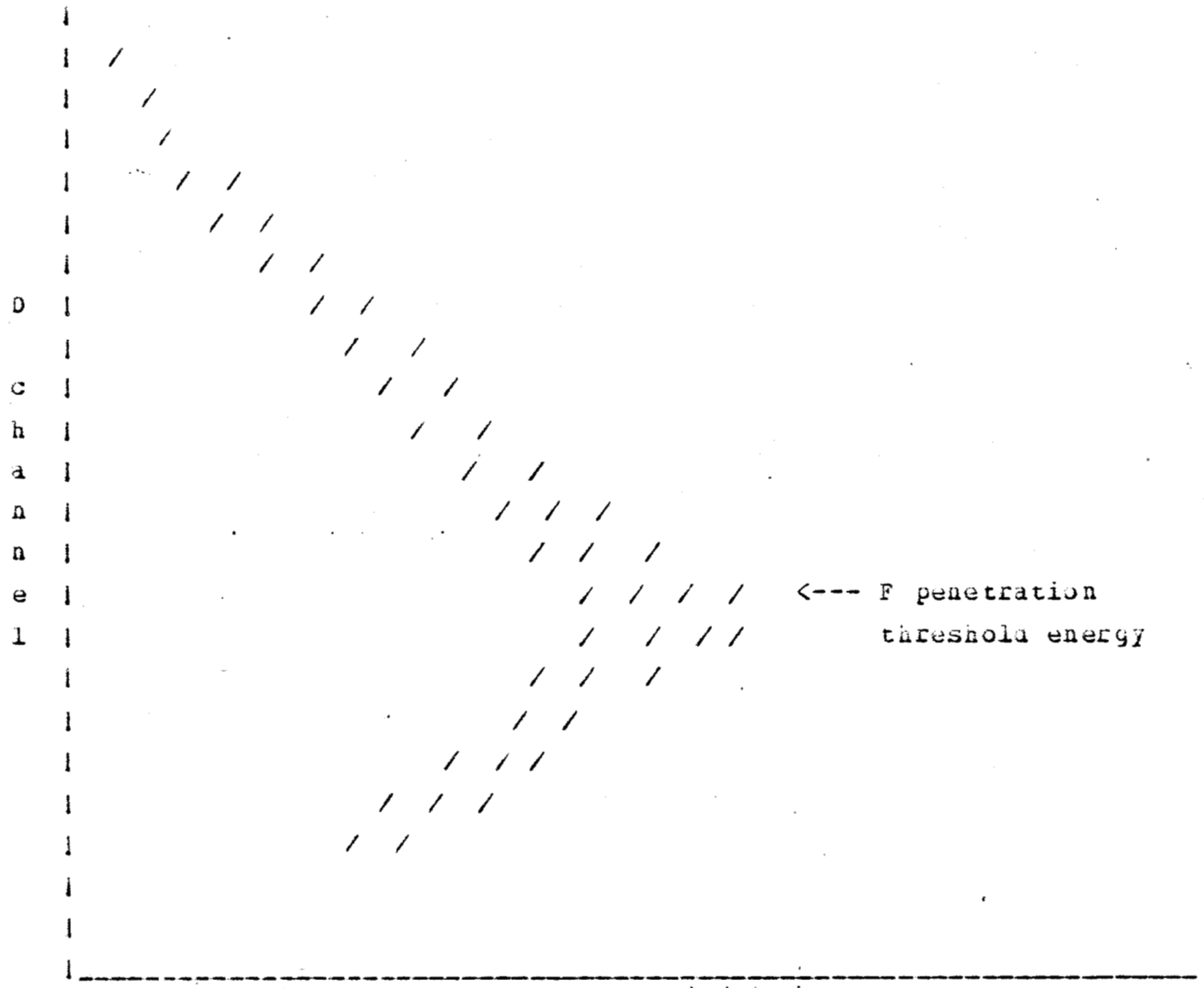
The above mass curves are examples of 'stopping events'. Consider the three-detector telescope :



Cosmic ray particles which go entirely through the D detector and are stopped in the E detector, are called E stopping events. A plot of D versus E energies for each event will give a diagram like that in overview member $intro2 section I

Cosmic ray particles which go entirely through the D and E detectors and stop in the F detector, have events viewed relative to the E detector and are called 'penetrating' events.

For penetrating events, a D versus E energy plot resembles the follo



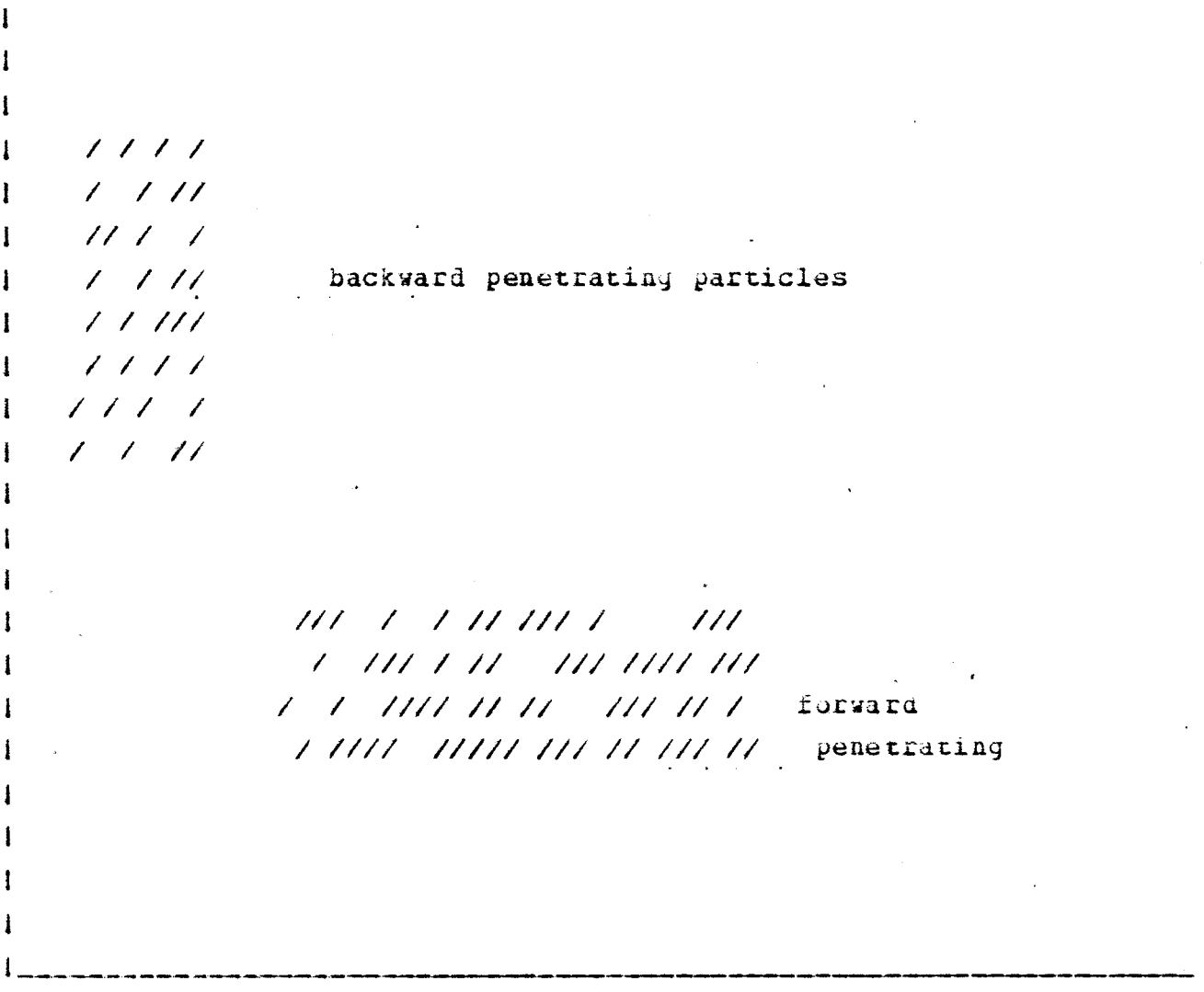
The mass line is drawn on a larger energy scale and shows that the mass line has a width (called the track width). This is partly due to the detector resolution, the geometry of entry into the detector telescope, as well as other factors.

For the 'penetrating' events this plot shows the energy threshold where events begin to completely penetrate the E detec-

tor. This threshold occurs where the mass curve begins to fold back toward the D axis.

At that point, all cosmic rays above that incident energy deposit the same energy in detector D, and are just barely passing through detector E. As the energy of these events increases beyond that turn-back point, less of the total energy is deposited in E, and the mass curve continues to fold back.

In analyzing these events, energy gates are set up for the E detector in the fold back region, and a D vs F plot is constructed. When this is done, the following plot is seen

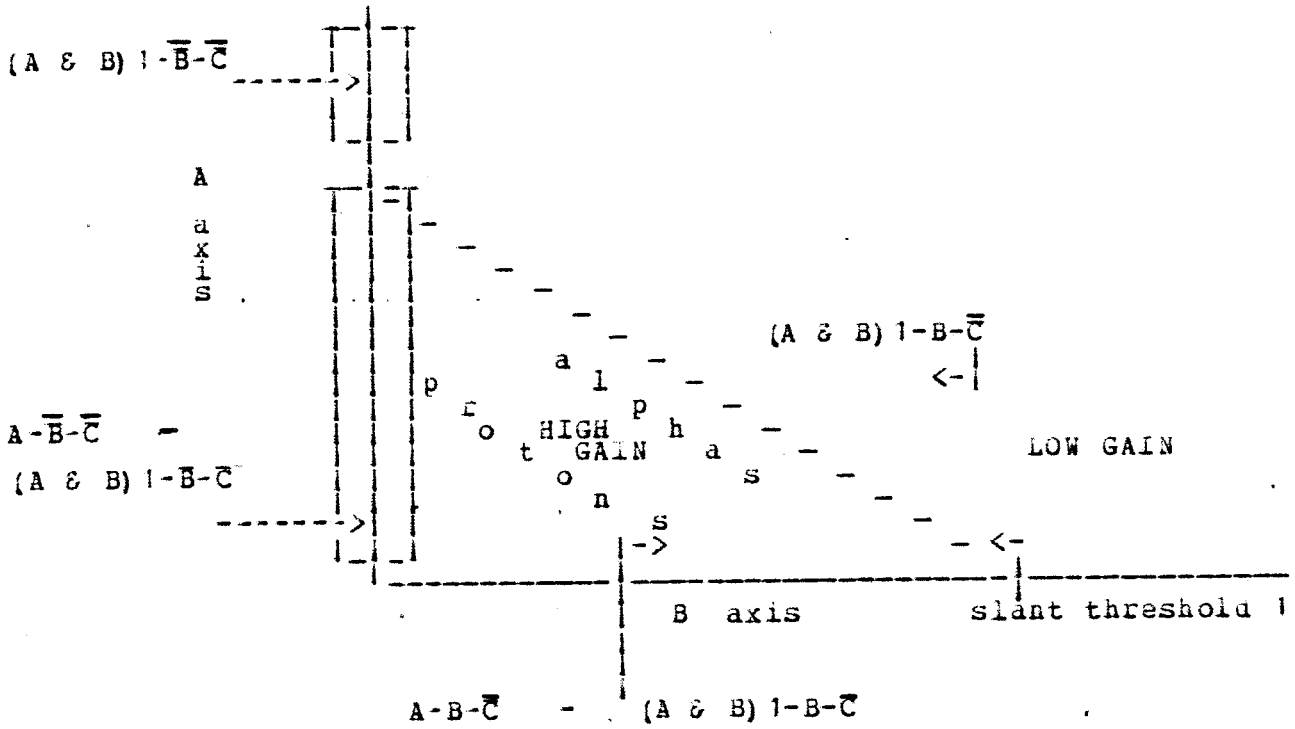


Backward penetrating particles come from the 'F' detector element side of the telescope. Forward penetrating particles come from the 'D' detector side of the telescope.

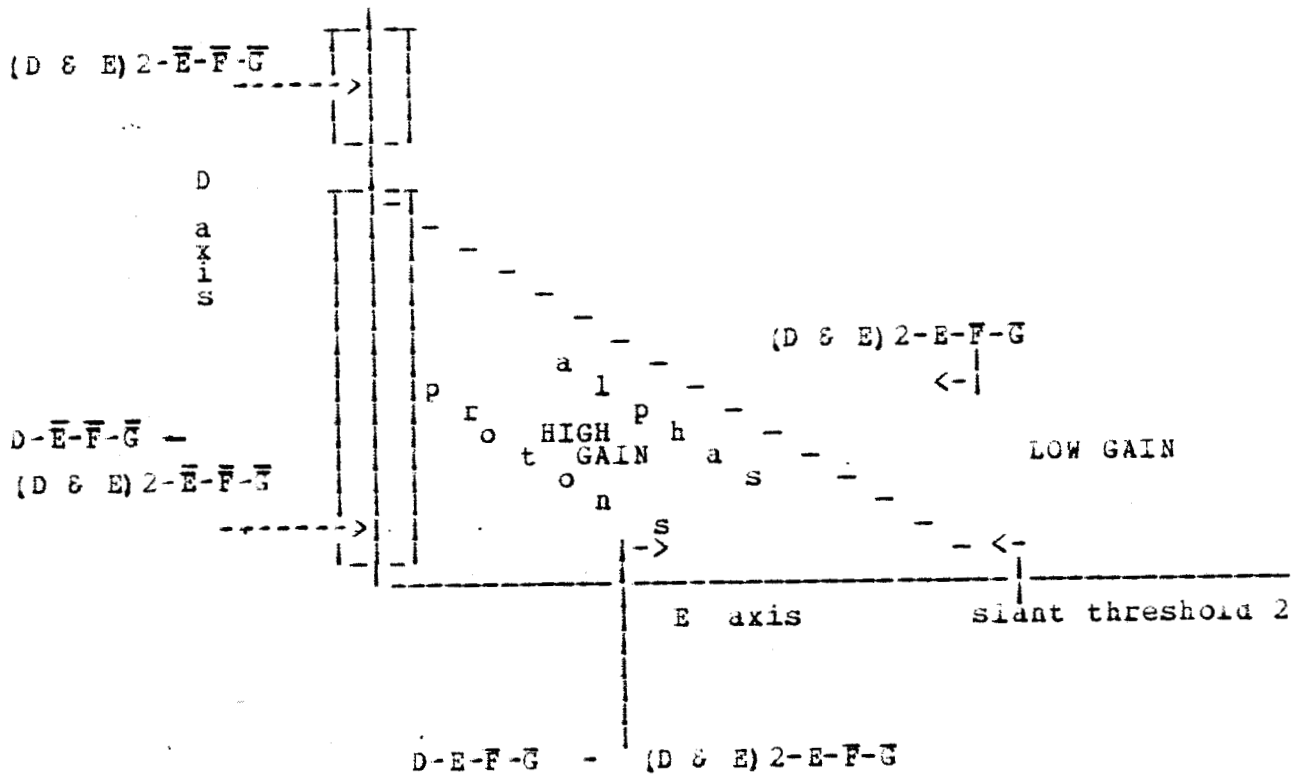
III. EVENT LOCATIONS ON A MATRIX PLOT:

IMP 6,7 pha event type locations :

LED detector



MED detector:



APPENDIX B
MEMBER LISTS FOR AUTOMATIC CALL LIBRARIES - IMP

The following lists reflect the state of the IMP automatic call libraries as of February 1982, when executable load modules were made for major programs.

The lists were created from a SHOWDIR command on TSO. The IMP program librarian has IMBLIST utility listings for all of these IMP automatic call libraries. Some member names contain more than one subroutine; for example, the MAINTCAT name below also contains the subroutines CHANGE and COUNT.

members found in dataset 'SEIMP.OIMPILIB.LOAD'

ACCUM6	ACCUM7	ADDTIM	ANALIMP6	APLOT	AUTHOR
BLANKCAT	BTMNP	(GETPUT)	(IGET)	CALORB	CATLOG
CATLO1	CATLO2	CATMAIN	COMTIM	CRTSTK	CTLG28
CWRITE	DATE	(DAY)	DCREAD	(DATRD)	(FEOT)
FILEID)	(FILSKP)	(TAPEID)	DIAG	DIST	DISTGF
DLIST2	DLTAPE	DMPLBL	DPKTN	DUMPCAT	DVSF
DYNAM	EBCDIC	ENERGY	(ENGWRT)	ERRORD	EXTRCT
TIMREC)	EXTRC6	EX10	EX10LIST	EX11	EX11LIST
FCN	(FCNWRT)	FGDATE	FILL	FILLPT	FILLUP
FILL6	FILL7	FLUX6	FLXPA6	FLXPCL	FLXPIN
FLXPMT	FLXPPR	FLX6BL	FLX6GN	FLX6MT	FLX6PR
FLX6SM	FMOVE	FREE	FRMRG	GAININ	GAINOD
GENCNT	GENPHA	GFPRNT	GFPRT	GNFACT	GRAPH
HDPRNT	HGPLOT	HGPLT6	HGPLT7	HGPRNT	HISTGR
HISTO	HISTOS	HMATN6	IDUNPK	IMPBLK	IMPEAK
IMPIMN	IMP6RD	ISQDQF	JDAYS	KATLOG	LGFILL
LGIO	LGN8TSFI	LGPLOT	LINLST	LISTALL	LISTGN
LMATN6	LOGDEC	(LOG10)	(LOG12)	LSTAL2	LSTAL3
MAINGN	MAINTCAT	MAINT28	MERGE	MESWTR	MNTMRG
CLSMRG)	MOUNT6	MOUNT7	MRGHDR	MRGORB	MRTAPE
MTFLX	(CLSFLX)	MTSUM	MTXIO	NFLAG	NTIC
OGO3RD	OGO5RD	ORBIT6	ORBMRG	ORBSUM	OVERLP
ENDTAP)	PACPHA	PCH	PDIST	PHACNT	PHASUB
PHFIL6	PLOT	PLOT6	PLOT7	PNDRCT	PRNTCG
PRTAPE	QFLAG	QLINE	QUAL	(SATQ)	RATCHK
RATES6	RATES7	RATLST	RDINIT	(RAND)	READCAT
READCAT1	READ6	READ7	REPORT	RESTOR	(RESTORE)
RESTOREO	RITCAT	RTLST1	RTLST2	SATCAT	SD4060
SEARCH	(TABDEL)	(TABWRT)	(TWRITE)	SELECT	SKPSET
SKPINT)	(SKPRST)	(SKPTST)	SLCTT	(CLST)	SORT
SPECTR	SSYN	(ALSYNC)	(SYNC)	STATS6	STATS7
SUMARY	SUMLED	SUMMED	SUMMN	SUMREP	TAILOR
TAPDUP	TIMCOM	TIME	(DTIME)	(FTIME)	TIMECP
TIMFIX	TPUNPK	(TPPACK)	TQ$SC	TREND	TRENDO
UNPACK	UNPKL	VDIST	WHEN	WRTMRG	XENCYA
XTIMOR					

members found in dataset 'SEIMP.OIMPHLIB.LOAD'

ANALIM	(ANALIMP7)	ANSTRP	(ANSTRPY7)	CAMS	CAMS7
CONVRT	DATE	DSPLY	DSPLY7	ENERGY	(ENGCHL)
ENGWRT)	EXTRC	FCN	(FCNWRT)	GFPRNT	HEADER
HEADR7	HGPRNT	HMATN7	INCRMN	INPARM	INPAR7
INTIMP	INTRVL	LABEL	LABEL7	LIST32	LMATN7
LSTA32	LSTC32	MAGACC	MAGAC7	MAGDSP	OCTAL
PHFIL7	PREPRO	PREPR7	PROCES	PROCE7	SPECTR
SUMPR7	TAPOU7				

members found in dataset 'SEIMP.OIMPJLIB.LOAD'

ACCUM	ACCUM8	ADDATE	ADDTSC	ANALIM	(ANALIMP8)
ANSTRP	(ANSTRPY8)	BLANKCAT	BLGLST	CAMS8	CONVRT
CTLLOG	DIST	DSPLY8	EFLXMN	EFPLOT	(EFPLFF)
EFPLFO)	EMDCMD	ENERGY	(ENGCHL)	(ENGWRT)	EVLIST
EXTRC8	EX52	FCN	(FCNWRT)	FILL8	FLXUPK
FLXBUF)	FRCHMS	GENCNT	GENPHA	(PHARPT)	GTNODE
HEADR8	HGPLT3	HMATN8	ICNTB	IFLIP	IMPJMN
INIT	INPARM	INPAR8	JLB2CL	(JMB2ST)	LABEL8
LEDCOR	(CORSUM)	LEDST2	LGFIL8	LGPHAU	LGPLT8
LGSTS8	LMATN8	MAGAC8	MATRX8	MERGE	MERGEJ
SUMUNT)	MESWTR	MTXADD	(MXPCOM)	MTXCLR	MTXLOD
OUTPUT	(OUTFIN)	OVERLP	(ENDTAP)	PFILLP	PHAUPK
PHFIL8	PHISTP	PINITP	(PFILL)	(PRETRV)	PIPLOT
PLOT8	PLTLG8	PMESGE	POTABO	PPLOTP	PROCES
PRTY8	PTAPEP	PUPDAP	REPORT	RHISTI	RHISTP
SLCTT	(CLST)	SLVLET	(CVLST)	SORT	SPCTR8
STATS8	SUMARY	SUMMN	SUMPR8	TABLE	TAPDUP
TAPOU8	TIMDIS	TIMEIN	(IGLOO)	(TIMOUT)	TIMSUM
TOTAL8	TREND	TRNDSM	(TRNSMP)	TSPACE	TSTCAT
UNPACK	VLETCR	(VLETSM)	VLETLIST	VLETPK	VLSMMN
VLTSUM	(VSMFIN)	WRITE			

members found in the dataset 'SEIMP.OIMPLIB.LOAD'

ACOS	ALL	ANISPL	BYTES	CAMPLT	CHEAD
CHIMIN	CHIM78	CONV78	CORREC	DIAG	DIST
DIST1	DPCHEK	DVSF	EXTPHA	EXTRCT	EX32
FILLPT	GENCNT	GENPHA	(PHARPT)	HGPLOT	HGPRNT
IHALF	IMPHMN	INCRT	INTRVL	IPLOTS	(CAMOUT)
LGFILL	LGPLOT	MAGD78	MAGHST	MAGPLT	MERGE
MERGE1	(SUMUNT)	MESWTR	MSD	MSTOHM	OVERLP
ENDTAP)	PLOT	QUAL	RATOUT	REPORT	RSEQ
SLCTT	(CLST)	SORT	SRATES	SUMARY	SUMLED
SUMMED	SUMMN	TABLE	TAPDUP	TAPE78	TENTOD
DTOTEN)	(FHTOHM)	(MDTOYD)	(YDTOMD)	TIMECP	TIMFIX
TIMSM7	TQDQFS	TREND	TRNDSM	(TRNSMP)	UNPACK
WRTG					

members found in the dataset 'SEIMP.IMPFLUX.LOAD'

EXTRCJ	FLUX6	FLUX7	FLUX8	FLXFG	FLXGMD
FLXGNN	FLXPA	FLXPAA	FLXPAB	FLXPBL	FLXPBX
FLXPCL	FLXPHD	FLXPIN	FLXPMN	FLXPMS	FLXPMT
FLXPPR	FLXPPS	FLXPPT	FLXPP1	FLXPSS	FLXPST
FLXPTC	FLXPT1	(FLXPT2)	FLXTCK	FLX6BL	FLX6MT
FLX6PR	FLX6SM	FLX7BL	FLX7EL	FLX7PR	FLX7SM
FLX8BL	FLX8EL	FLX8PR	FLX8SM	GETBX7	GETBX8
MAIN	MTFLX	(CLSFLX)	PHACNT	PHACT7	PHACT8
WATCHK	RESET				

members found in the dataset 'SEIMP.NEWFLUX.LOAD'

BLANKC	BLANKCAT	CHANGE	FLXCAT	FLXPBL	FLXPBX
FLXPMT	FLXPSS	FLXSUP	FLX7BL	FLX7SM	FLX8BL
FLX8SM	MAINTCAT	MTFLX	(CLSFLX)	PHACT7	PHACT8
PRNFLX	READCA	(READCAT1)	READFLEX		

members found in the dataset 'SEIMP.OIMPMOD.LOAD'

ACCUMP	ACC6	ACC6C	ACC6E	ACC6S	ACC7
ACC7C	ACC7E	ACC7S	ACC8	ACC8C	ACC8E
ACC8S	BLKDAT	CALINP	CATSUP	CLSTAP	CLTAPE
CNTSUM	CONV	FUNCTN	GAIN3D	HACUMS	HACUMX
HCAL	HCOORD	(HCLOSE)	HDATA	HEADRP	HGPRT6
HGPRT7	HLOOK	HMESS	HOUT	HPREP	HSMCT
HSUMRB	HTAB	IDIFF	IFIXIT	IMPDAT	IMPLOT
INIT	INPARS	INREC	ISODT6	ISODT7	ISOFIT
ISOHIS	ISOHMA	ISOPH7	ISOPLT	ISOTOP	JACUMS
JACUMX	JCAL	JCOORD	(JCLOSE)	JDATA	JLOOK
JMESS	JOUT	JPREP	JSMCT	JSUMRB	JTAB
LOOKP	LOOP	MESSAG	MNTAP	MNTAPE	ONOFF
OUTREC	PACKC	PALTIT	PFLUX	PFPLOT	(PFPLFF)
PFPLFO)	PLABES	PLDAT	PLTMES	PMOUNT	PPLTDR
PPLTIN	PPOINT	PPRINT	PREPTP	PRNSUP	PROTFX
PRINFX)	PSORT	PUTPUT	(OUTFIN)	SECTOR	SORT
SUMORB	TAB6	TAB7	TAB8	UNPACK	(ZACK)
UNTIME	WPDP11	(WPDP12)	(WPDP13)	XAXS1	XAXS2
XAXS3	XAXS4	XAXS5	XAXS6	YAXS	

APPENDIX C

MEMBER LISTS FOR LIB.CNTL AND LIB.CLIST DATASETS

SEIMP.OLDLIB.CNTL

MEMBERS FOUND IN THE OLD LIB.CNTL DATASET

This is a listing of the former LIB.CNTL dataset for the IMP satellites. When executable load modules were made (FEB 1982) a new LIB.CNTL was created containing the check-reload JCL using the new load modules.

$RETAIN	datasets to maintain on disk
ANALIMP6	linkgo JCL to run program
ANALIMP7	linkgo JCL to run program
ANALIMP8	linkgo JCL to run program
ANIS7	JCL to run an executable loadmodule
ANIS8	JCL to run an executable loadmodule
ANSTRPY6	linkgo JCL to run program
ANSTRPY7	linkgo JCL to run program
ANSTRPY8	linkgo JCL to run program
BLANKCAT	linkgo JCL to run program to blank Tape Catalog entries
CATMOD	linkgo JCL to run program to fix catalog summary entry
CNTSMRY6	linkgo JCL to run COUNT SUMMARY program
CNTSMRY7	linkgo JCL to run COUNT SUMMARY program
CNTSMRY8	linkgo JCL to run COUNT SUMMARY program
DMPCAT11	linkgo JCL to run program to back up tape catalog
DMPCAT32	linkgo JCL to run program to back up tape catalog
DMPCAT52	linkgo JCL to run program to back up tape catalog
ELFLUX	linkgo JCL to run ELECTRON FLUX program
ENCYCOPY	linkgo JCL to run program
FGLSTJCL	linkgo JCL to run program which lists FINEGAIN.DATA
FLEXPLT7	linkgo JCL to run program to plot FLEX tape data
FLEXPLT8	linkgo JCL to run program to plot FLEX tape data
FLEX7JCL	linkgo JCL to run program INTERMEDIATE FLEX
FLEX8JCL	linkgo JCL to run program INTERMEDIATE FLEX
FLUXPLT6	linkgo JCL to run program to plot FLUX tape data
FLUXPLT7	linkgo JCL to run program to plot FLUX tape data
FLUXPLT8	linkgo JCL to run program to plot FLUX tape data
FLUX7JCL	linkgo JCL to run program INTERMEDIATE FLUX
FLUX8JCL	linkgo JCL to run program INTERMEDIATE FLUX
FLXDATA	list of data cards for FLXPLOT programs
FOUR8	linkgo JCL to run FOURIER analysis program
HGP6JCL	linkgo JCL to run HIGH GAIN PLOT program
HGP7JCL	linkgo JCL to run HIGH GAIN PLOT program
HGP8JCL	linkgo JCL to run HIGH GAIN PLOT program
HGP8NOW	linkgo JCL to run HIGH GAIN PLOT program
IMPRAT	linkgo JCL to run RATEPLOT program
IMP6FLUX	JCL to make PATRICK copies of IMP6 FLUX TAPES
IMP6SMCT	JCL to make PATRICK copies of IMP6 SUMMARY TAPES
IMP7LOWG	JCL to make PATRICK copies of IMP7 LOW GAIN TAPES
IMP7MATR	JCL to make PATRICK copies of IMP7 MATRIX TAPES
IMP8ENCY	JCL to make PATRICK copies of IMP8 ENCY TAPES
IMP8FLUX	JCL to make PATRICK copies of IMP8 FLUX TAPES
IMP8LOWG	JCL to make PATRICK copies of IMP8 LOW GAIN TAPES
IMP8MATR	JCL to make PATRICK copies of IMP8 MATRIX TAPES
IMP8SMCT	JCL to make PATRICK copies of IMP8 SUMMARY COUNTS TAPES
IMP8VLET	JCL to make PATRICK copies of IMP8 VLET TAPES
I28DPS	JCL to do the DATA PROCESSING SYSTEM for IMP7 EXP28
I7DBGPH	linkgo JCL to run DATABASE GENERATOR program
I7DBG32	JCL to run the DATA BASE GENERATOR FOR IMP7 EXP32
I7DPS32	JCL to run the DATA PROCESSING SYSTEM FOR IMP7 EXP32
I7PCNTS	JCL to make PATRICK copies of IMP7 COUNTS TAPES
I7PLOWG	JCL to make PATRICK copies of IMP7 LOW GAINS TAPES
I7PMATR	JCL to make PATRICK copies of IMP7 MATRIX TAPES
I7PSMCT	JCL to make PATRICK copies of IMP7 SUMMARY COUNTS TAPES
I8DBG	JCL to run the DATA BASE GENERATOR FOR IMP8
I8DPS	JCL to run the DATA PROCESSING SYSTEM FOR IMP8
I8PROFLX	linkgo JCL to run PROTON FLUX program (King data center tapes)
I8PROPLT	linkgo JCL to run PROTON FLUX PLOT program
I8SMCT	linkgo JCL to run program TO CREATE IMP8 SUMMARY TAPES
I8VLET	linkgo JCL to run program TO CREATE IMP8 VLET SUMMARY TAPE

JC8N	class N jobcard
JOBCARD6	JOBCARD to run programs CLASS=A
JOBCARD7	JOBCARD to run programs CLASS=E (EVENINGS)
JOBCARD8	JOBCARD to run programs CLASS=F (WEEKENDS)
JOBHOLD	HOLD type jobcard
KATLOG	FORTRAN source for FLEX database routines
LGN8TEST	linkgo JCL to run program LGN8TST1
LGP6JCL	linkgo JCL to run LOW GAIN PLOT program
LGP7JCL	linkgo JCL to run LOW GAIN PLOT program
LGP7MX2	linkgo JCL to run LOW GAIN PLOT program
LGP7MX3	linkgo JCL to run LOW GAIN PLOT program
LGP8JCL	linkgo JCL to run LOW GAIN PLOT program
LGP8MX2	linkgo JCL to run LOW GAIN PLOT program
LGP8MX3	linkgo JCL to run LOW GAIN PLOT program
LINK	JCL to link program
LISTGJCL	linkgo JCL to run program to list gain tables
LISTTSO	linkgo JCL to run program TO LIST TSO LIBRARY
MAINTFLX	linkgo JCL to run MAINTCAT for FLEX database
MAINTUPD	record of MAINTCAT runs on IMP-8
MAINT52	linkgo JCL to run MAINTCAT program
MEMO415	memo regarding datagaps
PHASUM7	JCL to run the PHA SUMMERIZER creating MATR & LOWG TPS E32
PHASUM8	JCL to run the PHA SUMMERIZER creating MATR & LOWG TPS E52
RATEPLT6	JCL to run standard RATE PLOTS for IMP6
RATEPLT7	JCL to run standard RATE PLOTS for IMP7
RATEPLT8	JCL to run standard RATE PLOTS for IMP8
RATEPPDP	linkgo JCL to run program TO PLOT RATES ON THE PDP11
READCATS	JCL to read the IMP7 & IMP8 CATALOGUES
READCT11	linkgo JCL to run program to list the IMP6 CATALOG
READCT28	linkgo JCL to run program to list the IMP7 EX28 CAT
READCT32	linkgo JCL to run program to list the IMP7 EX32 CAT
READCT52	linkgo JCL to run program to list the IMP8 CATALOG
REDFLEXC	linkgo JCL to run program to list the IMP8 FLEX CATALOG
RESTOR11	JCL to run program to restore CATALOGS from TAPE backups
RESTOR28	JCL to run program to restore CATALOGS from TAPE backups
RESTOR32	JCL to run program to restore CATALOGS from TAPE backups
RESTOR52	JCL to run program to restore CATALOGS from TAPE backups
SMCD4060	linkgo JCL to run program creating 4060 plots
SORTCATS	linkgo JCL to run program to give sorted CATALOG listings
SORT32	linkgo JCL to run program to give sorted CATALOG listings
SORT52	linkgo JCL to run program to give sorted CATALOG listings
STOTLMYR	linkgo JCL to run program
SWEBMED	special RATEPLOT program request
TIMSUM7	linkgo JCL to run the special PHA TIME SUMMARY program
TIMSUM8	linkgo JCL to run the special PHA TIME SUMMARY program
USAVEDS	this procedure will open and close all datasets
UTSO	this procedure makes a PDS listing.
VLETLST8	linkgo JCL to run VLET list program
VLETSUM	linkgo JCL to run VLET SUMMARY program
VLT8PLT	linkgo JCL to run VLET PLOT program
VSBKCOPY	JCL to backup & restore from LIBRARIAN tapes
VSIEBCPY	JCL to backup & restore from LIBRARIAN tapes
VSRELOAD	JCL to backup & restore from LIBRARIAN tapes
VSUNLOAD	JCL to backup & restore from LIBRARIAN tapes
ZIRFS	reference to IMP fitting program

MEMBERS FOUND IN THE CLIST DATASET

~~ALNEW~~	allocate a new dataset
~~AR~~	request ASM2 archive
BGRA	background restore from ASM2 archives
~~BGRATRI~~	background restore from ASM2 archives
~~BGRA8T~~	background restore from ASM2 archives
BGRB	background restore from ASM2 archives
CATMOD	foreground utility to change summary entry for TAPE CAT.
~~CHADSN~~	change all occurrences of a string in a dataset member
~~CHANGE~~	change all occurrences of a string in a dataset member
GAINREAD	foreground executing program to read gain tables
~~IMP8GAIN~~ gainadd	foreground executing program to enter gain factors (main tables)
~~LAB~~	submit a job to label tapes
~~LPDS~~	submit a job to list source datasets
~~LTU~~	list a USERID entry from 'SYS1.UADS'
~~MF~~	execute a foreground mass coefficient fit program
~~QD~~	short for QED
READCAT	foreground read for TAPE CATALOGS
READFLEX	foreground read for FLEX CATALOGS
~~REAL~~	reallocate a dataset (for more space)
~~SAVEDS~~	submit job to access datasets
~~START~~	perform certain TSO commands upon logging on
~~STSCAN~~	submit tapescan job
~~TLSREP~~	generate TLS reports
~~TPSCAN~~	submit tapescan job
~~UPDATEDS~~	save datasets
USAVEIMP	save datasets

GAINADD

CATS8

INTVLGEN

LSTCAT11

LSTCAT32

LSTCAT52

SUBCR

IMP-6 Tapes

				# files/tape
ENCY	F B	4120	12360	1600
PHAS	F B	1444	4332	
CNTS	F B	1492	4476	
MATR	F	7280	7280	30
LONG	F B	236	~~1770~~ 3540	60
SMCT	F B	1980	7920	40
FLUX	F B	452	4520	60

60

APPENDIX D
TAPESCAN SURVEY

TAPESCAN SURVEY
typical results

IMP-8

			lrecl	BLKSIZE		den	length	data blks
ENCY	E05078	FB	2812	8436	1 file	3	19'	39
PHAS	E02766	FB	1552	4656	1 file	3	2000'	6741
CNTS	E02777	FB	1188	3564	1 file	3	1523'	6348
MATR	E02917	F	7280	7280	20 files	3	1668'	3875
LOWG	E00729	FB	356	5340	50 files	3	1157'	3527
SMCT	E02745	FB	1332	5328	30 files	3	992'	3021
SMCT	E05051				30 files	4	306'	2990
VLET	E04615	F	7280	7280	40 files	3	89'	257
FLUX	E00760	FB	588	5880	60 files	4	648'	5917

Flux ~ 29 blocks/day
=> 6912 blocks on full tape
≈ 4100 @ 60% coverage

IMP-7

ENCY								
PHAS	E04518	FB	1504	4512	1 file	3	1337'	4622
CNTS	E04519	FB	1188	3564	1 file	3	1109'	4622
MATR	E04874	F	7280	7280	30 files	3	1695'	3949
LOWG	E03662	FB	328	4920	50 files	3	558'	1825
SMCT	E04838	FB	2460	4920	30 files	4	548'	5832
FLUX	E04963	FB	520	5200	60 files	3	1849'	5736

APPENDIX E

TYPICAL PRODUCTION RUN TIMES FOR IMP-8

PART A

This table contains typical run times. Data gap rerun data are explicitly given for 4 intervals for comparison.

Program name	Add-on type runs CPU/IO (360/75) (minutes)		Re-run data CPU/IO (360/75) (minutes)
Data Processing System	2.59/8.23 (one DECOM)		
Database Generator	1.48/1.31	(approx. average for one interval)	
	.76/ .76	(int 475)	2.77/4.54
	1.26/1.07	(int 476)	2.44/5.00
	.39/ .82	(int 484)	2.12/3.66
	.93/ .76	(int 485)	2.10/4.25
PHA Summarizor	4.58/3.93	(approx. average for one interval)	
	2.60/2.94	(475)	8.64/12.22
	4.23/4.28	(476)	6.80/9.20
	3.77/3.50	(484)	7.01/8.84
	.96/1.54	(485)	5.47/7.52
Count Summary	Single interval data were unavailable; for multiple intervals:		
	10.87/2.47	(711-719)	
	3.53/1.11	(726-728)	
	25.61/5.14	(661-688)	
	unavailable directly	(475-476)	3.86/2.98
	unavailable directly	(484-485)	2.93/2.66
VLET Summary	.32/1.34	(approx. average for one interval)	
	.16/1.39	(475)	.54/1.90
	.16/ .67	(476)	.34/1.12
	.34/1.13	(484)	.50/1.67
	.24/1.18	(485)	.49/1.83
Intermediate Flux	Single interval numbers not available:		
	56.02/19.17	(616-647)	
	2.67/1.35	(679-680)	
	4.06/1.52	(714-715)	
	16.55/2.45	(481-490)	
			Re-run for finegains
	unavailable as double intervals;	(548-549)	4.85/3.37
		(472-473)	6.89/3.76
		(493-494)	6.13/3.36
		(511-512)	5.91/2.97

From the preceding summary, it can be seen that:

CPU bound programs are:	Count Summary Intermediate Flux
IO bound programs are:	Data Processing System VLET Summary
about equal CPU and IO:	Database Generator PHA Summary

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