

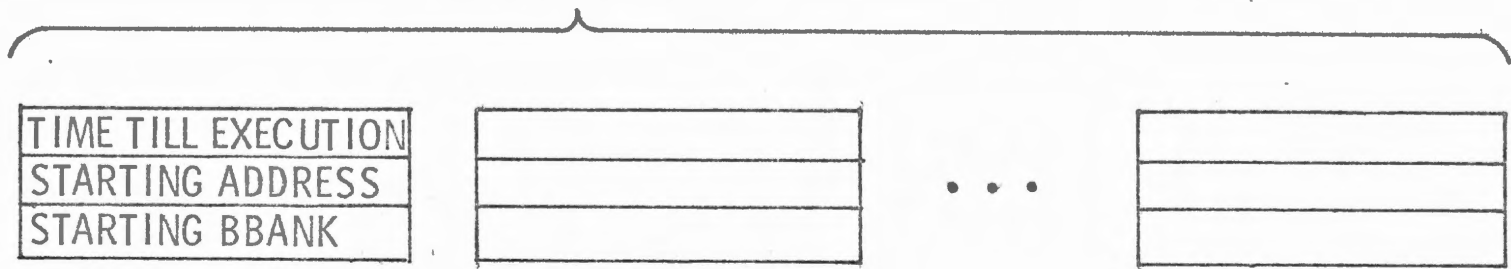
SOFTWARE STRUCTURE

INTERRUPT STRUCTURE

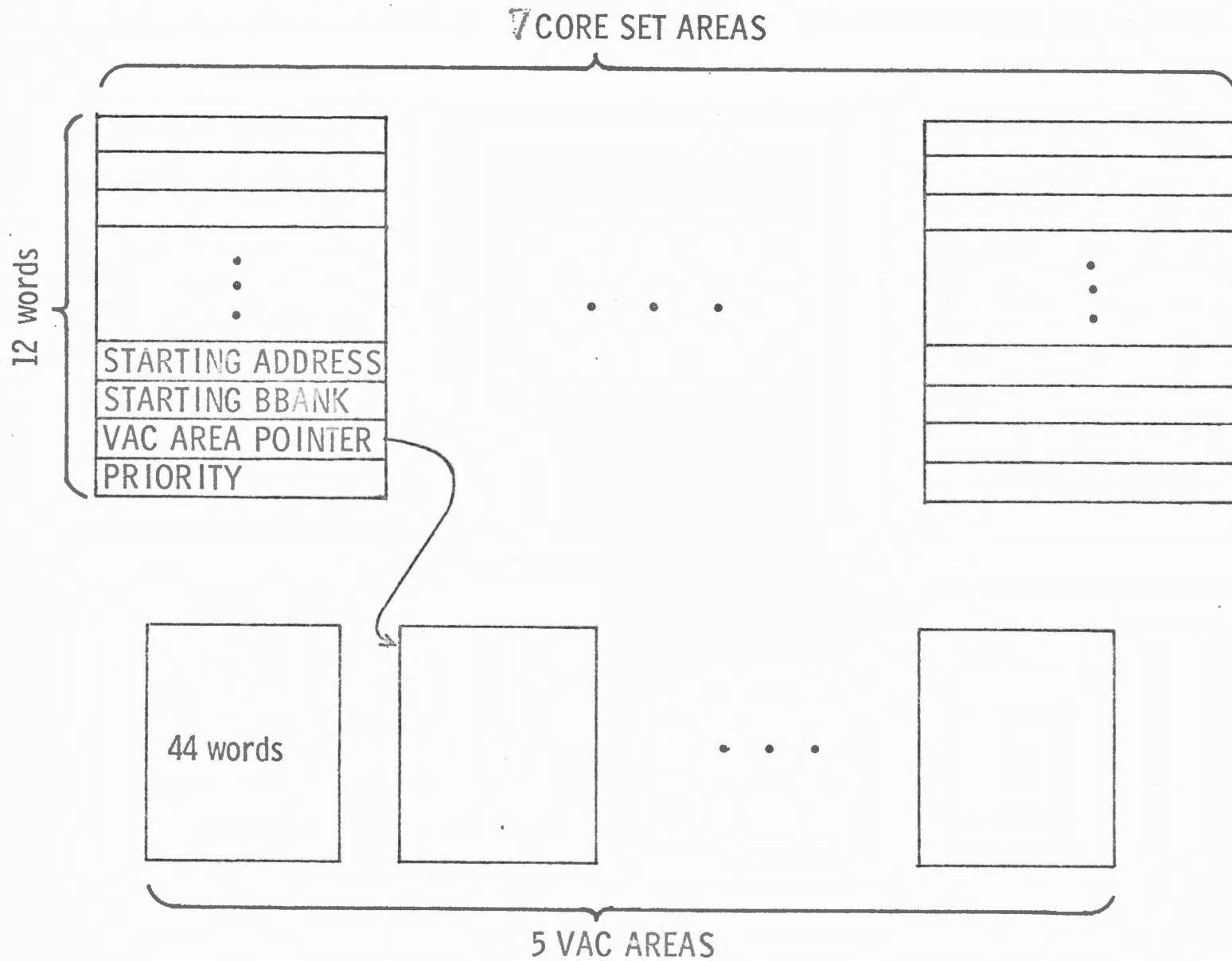
INTERRUPT	PURPOSE	HIERARCHY
T6RUPT	JET TURN ON/ OFF	2
T5RUPT	DAP	3
T4RUPT	IMU/ OPTICS MONITORING	5
UPRUPT	UPTelemetry PROCESSING	8
DOWNRUPT	DOWNLINK PROCESSING	9
KEYRUPT (2)	KEY STROKE PROCESSING	6,7
RADRUPT	RADAR RETURN PROCESSING	10
T3RUPT	WAITLIST	4
GOPROG	RESTARTS	1

WAITLIST STRUCTURE—TASKS

8 WAITLIST AREAS



EXECUTIVE STRUCTURE—JOBS



CAUSES OF RESTARTS - COLOSSUS

HARDWARE RESTART	POODOO RESTART	BAILOUT RESTART
TC TRAP	20430 SUB SURFACE S. V.	31104 DELAY ROUTINE BUFFER FULL
PARITY	20607 NO SOLN. FROM TIME-THETA 20610 LAMBDA < UNITY	31201 NO CORESETS AVAILABLE
NIGHTWATCHMAN	21204 NEG. WAITLIST CALL	31202 NO VAC AREAS AVAILABLE
RUPTLOCK	21206 2 USERS OF PINBALL	31203 NO WAITLIST AREAS AVAILABLE
OSC FAIL	21210 2 USERS OF IMU	31211 EXTENDED VERB INTERRUPTED BY MARKINGS
VOLTAGE FAIL	21302 SQRT OF NEG. NUMBER	
STANDBY	21501 2 USERS OF DISPLAY ROUTINE 21502 ILLEGAL DISPLAY BY PROGRAM 21521 P01 OR P07 SELECTED AFTER LIFTOFF	

CAUSES OF RESTARTS - LUMINARY

HARDWARE RESTART	POODOO RESTART	BAILOUT RESTART
TC TRAP	20430 SUB SURFACE S.V.	31104 DELAY ROUTINE BUFFER FULL
PARITY	20607 NO SOLN. FROM TIME-THETA	31201 NO CORESETS AVAILABLE
NIGHTWATCHMAN	21103 UNUSED CCS BRANCH	31202 NO VAC AREAS AVAILABLE
RUPTLOCK	21204 NEG. WAITLIST CALL	31203 NO WAITLIST AREAS AVAILABLE
OSC FAIL	21302 SQRT OF NEG. NUMBER	31206 2 USERS OF PINBALL
VOLTAGE FAIL	21406 BAD RETURN-IGNITION ALGORITHM	31207 NO VAC AREA FOR MARK
STANDBY	21501 2 USERS OF DISPLAY ROUTINE	31210 2 USERS OF IMU 31211 EXTENDED VERB INTERRUPTED BY MARKINGS 31502 ILLEGAL DISPLAY BY A PROGRAM 32000 DAP STILL IN PROGRESS AT NEXT RUPT

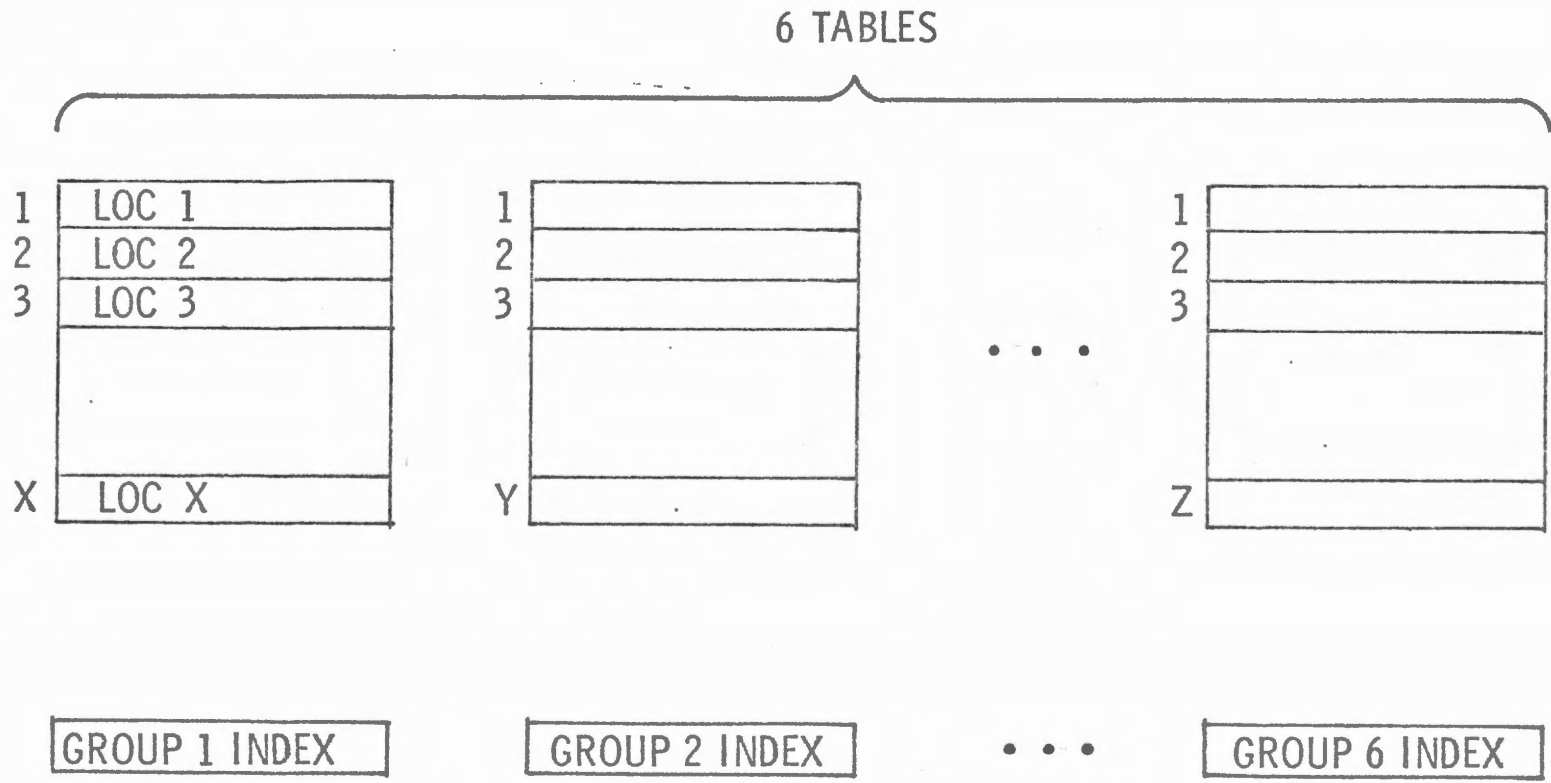
RESTART LOGIC PROCESSING

	OUT CHANNELS ZEROED/ REESTABLISHED	RESTARTABLE* PROGRAMS REESTABLISHED	EXTENDED VERBS REESTABLISHED	EXTERNAL INITIATED DISPLAYS REESTABLISHED
HARDWARE	Yes / Yes	Yes	No	No
BAILOUT	No / Yes	Yes	No	No
POODOO**	No / Yes	No	No	No

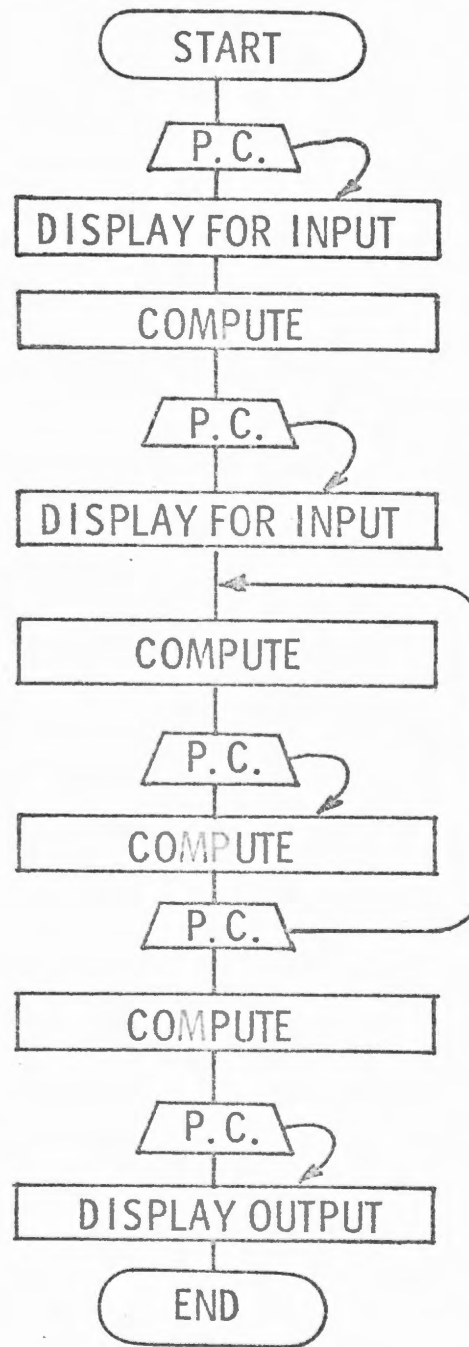
* R60 Non-rendezvous maneuvers and gyrotorquing are not restartable. Neither is P06.

** POODOO Restarts will become BAILOUT Restarts if AVERAGE-G is on or if an extended verb is active.

RESTART TABLE STRUCTURE



TYPICAL
PHASE
CHANGING



DISPLAY HIERARCHY

NORMAL PROGRAM DISPLAY

EXTENDED VERB DISPLAY

PRIORITY DISPLAY

EXTERNALLY INITIATED DISPLAY

Monitor

Non-monitor

WHAT IS AN EMP?

a change to erasable memory

loaded by ground uplink or by crew action

an EMP can be either

- a set of instructions in erasable memory performed as an independent program
(523, Monitor Jet-on Failure)
- a change in the setting of erasable registers or flagbits which alters the normal course of an existing fixed-memory program
(504, Backup Optics Variance)
- a partial program in erasable memory which interacts with an existing fixed-memory program
(515, Manual Range Input)

HOW IS AN EMP ACTIVATED?

- some EMP's do not require specific action to activate—
(504, Backup Optics Variance, becomes effective when the necessary erasable and flag settings have been loaded)

- most EMP's are activated by either
VERB 30 ENTR
or
VERB 31 ENTR

VERB 30 ENTR:

Start execution of the JOB specified in NOUN 26

VERB 31 ENTR:

Start execution of the TASK specified in NOUN 26

NOUN 26:

- R1 — { Priority and VAC requirements of a JOB
Time delay before execution of a TASK
- R2 — Starting address of a JOB or TASK
- R3 — F-bank, S-bank, and E-bank of a JOB or TASK

LIMITATIONS OF ERASABLE MEMORY

Restrictions on EMP operation—

an example from COLOSSUS:

EMP 500: LANDMARK TRACKING WITH DATALINK
FAILURE OR UNUSABLE OPTICS

RESTRICTIONS AND LIMITATIONS:

1. The following programs must not be operated between the time EMP 500 coding is uplinked and the time the program is initiated: P21, P22, P23, P29, P3x, P4x, P5x, P6x, P7x.

Restrictions on EMP design—

desirable features (restart protection, displays) must often be omitted from an EMP because the coding uses too much erasable memory.

1420	DELTA-V						
1430	UPDATE						
1440	SERVICE	KALCMANU					
1450	ALIGNMENT			REND P32-35			
1460	ALIGNMENT MARK DATA						
1470		MEASUREMENT	540.9	P47		P15	
1480		INCORPORATION					
1490							
1500	P22	R22				P32-33	
1510							
1520							
1530							
1540							
1550	P30's	S 2 2 . 1		RETURN TO EARTH		P32-33	
1560							P29
1570							
1580							
1590	INDIVIDUAL						
1600	MIDGIM	C I S L U N A R					
1610		N A V					
1620		P20					
1630	P30-40						
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COLOSSUS 3
MAP OF
EBANK 7
ERASABLE
MEMORY