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Technical  
Summary  
Document

November 5, 1976

DR-MA-03

Appendices

# Atmospheric, Magnetospheric, and Plasmas in Space (AMPS) Spacelab Payload Definition Study

{NASA-CR-152563} ATMOSPHERIC, MAGNETOSPHERIC, AND PLASMAS IN SPACE (AMPS) N77-28166  
SPACELAB PAYLOAD DEFINITION STUDY,  
APPENDIXES (Martin Marietta Corp.) 155 p HC Unclas  
A08/MF A01 CSCL 22A G3/12 39995



**MARTIN MARIETTA**

**Bendix**

*NDP.O*

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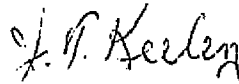
Appendixes

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ATMOSPHERIC, MAGNETOSPHERIC  
AND PLASMAS IN SPACE (AMPS)  
SPACELAB PAYLOAD DEFINITION  
STUDY

Prepared for

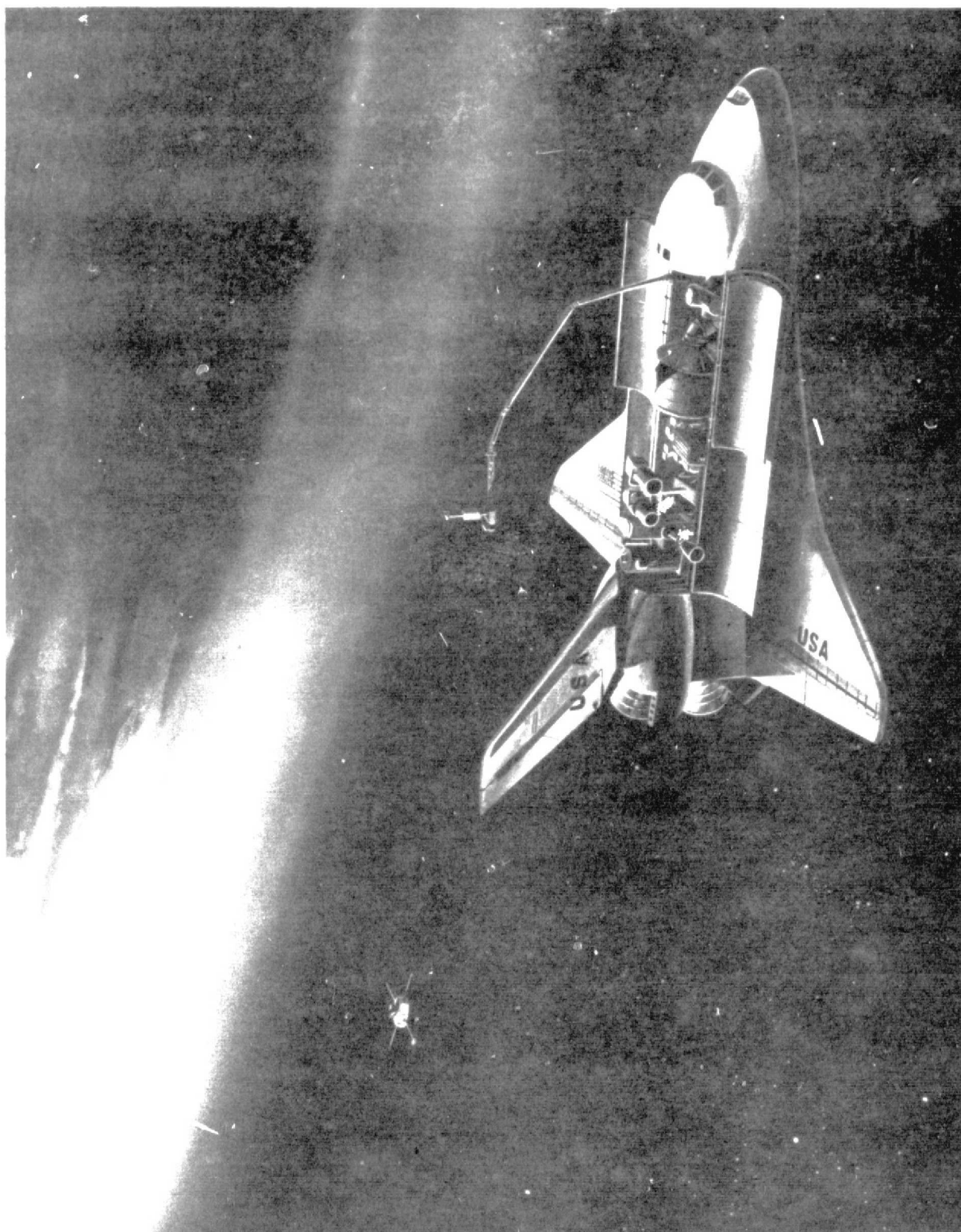
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FOREWORD

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The AMPS Technical Summary Document is submitted by Martin Marietta in accordance with Data Procurement Document Number 486, Revision A, of Goddard Space Flight Center NAS8-31689.

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APPENDIX A

EQUIPMENT LIST

AMPS -----FLIGHT 1-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

NUMENCLATURE	PNL	QTY	UNIT WT (KG)	MAKE BUY GFE	POTENTIAL SOURCE	DEV STATUS	REUSE REMARKS CODE
SPACELAB MODULE	A5	1	3363.00	GFE	GFP	---	
6 METER PALLET TRAIN	A1	1	1236.00	GFE	GFP	---	
3 METER PALLET	A4	1	618.00	GFE	GFP	---	
SL/ORBITER UTILITY BRIDGE	A6	1	218.20	GFE	GFP	---	
TUNNEL	A8	1	352.00	GFE	GFP	---	
TUNNEL ADAPTER	A8	1	408.20	GFE	GFP	---	
P/L ARS FAN AND DUCTING	AR	1	9.50	GFE	GFP	---	
AIRLOCK	A9	1	364.00	GFE	GFP	---	
LESS SHUTTLE AIRLOCK	A9	1	-363.00	GFE	GFP	---	

\*\*\*\*\* BASIC SPACELAB

A-2

RANGE (PNL) CODES (XY)

<u>AMPS/APP/SPP</u> (X)		<u>AMPS</u> (Y)	
Basic Spacelab	A	Orbiter	0
Mission Dependent	B	Pallet Train	1
AMPS Instruments	D	Pallet-Fwd	2
AMPS Labcraft	C	Pallet-Mid	3
		Pallet-Aft	4
		Module	5
		Util Bridge-Fwd	6
		Util Bridge-Aft	7
		Tunnel	8
		Airlock	9

Reuse Code

A - Reuse Flight 1 Equipment with no modification  
 B - Reuse Flight 1 Equipment with modification



AMPS -----FLIGHT I-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

NOMENCLATURE	PNL	QTY	UNIT WT (KG)	MAKE BUY GFE	POTENTIAL SOURCE	DEV STATUS	REUSE CODE	REMARKS
* EXTRA WATER FOR COOLING	B0	1	68.20	GFE	GFP	---	---	
EPS KIT 2-DRY PLUS RESIDUALS	B0	1	357.02	GFE	GFP	---	---	
* EPS KIT 2-EXPENDABLES	B0	1	383.30	GFE	GFP	---	---	
ORBITER HEAT REJECTION KIT	B0	1	87.50	GFE	GFP	---	---	
LONGERON FITTING-PALLET	B0	1	40.40	GFE	GFP	---	---	
LONGERON FITTING-PALLET	B0	1	40.40	GFE	GFP	---	---	
LONGERON FITTING-PALLET	B0	1	40.40	GFE	GFP	---	---	
LONGERON FITTING-PALLET	B0	1	40.40	GFE	GFP	---	---	
LONGERON FITTING-PALLET	B0	1	40.40	GFE	GFP	---	---	
LONGERON FITTING-PALLET	B0	1	40.40	GFE	GFP	---	---	
LONGERON FITTING-PALLET	B0	1	40.40	GFE	GFP	---	---	
LONGERON FITTING-PALLET	B0	1	40.40	GFE	GFP	---	---	
KEEL FITTING-PALLET	B0	1	35.40	GFE	GFP	---	---	
KEEL FITTING-PALLET	B0	1	35.40	GFE	GFP	---	---	
LONGERON FITTING-MODULE	B0	1	40.40	GFE	GFP	---	---	
LONGERON FITTING-MODULE	B0	1	40.40	GFE	GFP	---	---	
LONGERON FITTING-MODULE	B0	1	40.40	GFE	GFP	---	---	
LONGERON FITTING-MODULE	B0	1	40.40	GFE	GFP	---	---	
KEEL FITTING-MODULE	B0	1	35.40	GFE	GFP	---	---	
LESS ORBITER ALLOWANCE	B0	1	-204.00	GFE	GFP	---	---	
CREWMAN 5	B0	1	77.10	---	---	---	---	
CREWMAN 6	B0	1	77.10	---	---	---	---	
SEAT 5	B0	1	24.50	GFE	GFP	---	---	
SEAT 6	B0	1	24.50	GFE	GFP	---	---	
O2 TANKAGE PLUS RESIDUAL	B0	1	37.60	GFE	GFP	---	---	
* USABLE O2	B0	1	22.70	GFE	GFP	---	---	
EMERGENCY EQUIPMENT	B0	1	49.50	GFE	GFP	---	---	
WASTE WATER TANKAGE	B0	1	22.00	GFE	GFP	---	---	
FOOD	B0	1	28.60	GFE	GFP	---	---	
HYGIENE EQUIPMENT	B0	1	26.20	GFE	GFP	---	---	
CREW PROVISIONS	B0	1	25.20	GFE	GFP	---	---	
LION	B0	1	31.90	GFE	GFP	---	---	
RESTRAINTS	B0	1	1.70	GFE	GFP	---	---	
STOWAGE VOLUME PENTALY	B0	1	43.90	GFE	GFP	---	---	
MONITOR AND CONTROL PANEL	B0	1	5.00	GFE	GFP	---	---	
KEYBOARD	B0	1	3.50	GFE	GFP	---	---	
CRT DISPLAY/SIGNAL GENERATOR	B0	1	28.90	GFE	GFP	---	---	
REMOTE STATION, COMMUNICATIO	B0	1	1.50	GFE	GFP	---	---	
DOUBLE RACK	B5	1	58.10	GFE	GFP	---	---	
SINGLE RACK	B5	1	37.10	GFE	GFP	---	---	
PALLET HARDPPOINTS	B1	45	.82	GFE	GFP	---	---	
INSERTS FOR PANELS	B1	6	6.50	GFE	GFP	---	---	
EXP SWITCH PANEL	B5	1	12.70	GFE	GFP	---	---	
EXP SWITCH PANEL	B5	1	12.70	GFE	GFP	---	---	
EXP SWITCH PANEL	B5	1	12.70	GFE	GFP	---	---	

AMPS -----FLIGHT I-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

NO/ENCLATURE	PNL	QTY	UNIT WT (KG)	MAKE BUY GFE	POTENTIAL SOURCE	DEV STATUS	REUSE CODE	REMARKS
INVERTER (400 HZ)	B5	1	32.20	GFE	GFP	---		
COLD PLATE-IECM	B4	1	5.50	GFE	GFP	---		
COLD PLATE-ELECT ACCEL	B4	1	5.50	GFE	GFP	---		
COLD PLATE-ELECT ACCEL	B4	1	5.50	GFE	GFP	---		
COLD PLATE-ELECT ACCEL	B4	1	5.50	GFE	GFP	---		
COLD PLATE-ELECT ACCEL	B4	1	5.50	GFE	GFP	---		
COLD PLATE-ELECT ACCEL	B4	1	5.50	GFE	GFP	---		
COLD PLATE-PEAKING PATTERY	B4	1	5.50	GFE	GFP	---		
COLD PLATE-PS	B4	1	5.50	GFE	GFP	---		
COLD PLATE-RF TERMINAL	B3	1	5.50	GFE	GFP	---		
EXP RAU	B2	1	2.30	GFE	GFP	---		
EXP RAU	B3	1	2.30	GFE	GFP	---		
EXP RAU	B3	1	2.30	GFE	GFP	---		
EXP RAU	B4	1	2.30	GFE	GFP	---		
EXP RAU	P4	1	2.30	GFE	GFP	---		
EXP RAU	B5	1	2.30	GFE	GFP	---		
EXP COMPUTER	B5	1	30.20	GFE	GFP	---		
DIGITAL TAPE RECORDER	B5	1	43.00	GFE	GFP	---		
EXPERIMENT I/O	B5	1	27.50	GFE	GFP	---		
HIGH RATE DIGITAL HUX	B5	1	10.00	GFE	GFP	---		
TAPE AND CANISTERS	B5	15	5.90	GFE	GFP	---		
CONSOI VERTICAL RAILS	B5	4	.50	GFE	GFP	---		
CONSOI HORIZONTAL RAILS	B5	4	.75	GFE	GFP	---		
PSA FOOT RESTRAINTS	B5	6	3.00	GFE	GFP	---		
RACK CLOSEOUT FT RESTRAINTS	B5	4	7.93	GFE	GFP	---		
KEYBOARD	B5	1	3.50	GFE	GFP	---		
CRT AND SYMBOL GENERATOR	B5	1	28.90	GFE	GFP	---		

\*\*\*\*\* MISSION DEPENDENT EQUIPMENT

AMPS -----FLIGHT I-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

NOMENCLATURE	PNL	QTY	UNIT WT (KG)	MAKE BUY GFE	POTENTIAL SOURCE	DEV STATUS	REUSE CODE	REMARKS
C AND D PANELS	C5	1	18.00	BUY	BENDIX	NEW		
C AND D PANELS	C5	1	8.40	BUY	BENDIX	NEW		
C AND D PANELS	C5	1	3.00	BUY	BENDIX	NEW		
TV MONITOR	C5	1	10.00	BUY	---	O/S		
OSCILLOSCOPE	C5	1	20.00	BUY	XXX	O/S		10 PERCENT HOD OF AVAILABLE UNIT
C AND W SENSORS-PRESSURE	C2	12	.16	BUY	XXX	NEW		PURCHASE ORBITER OR SPACELAB DES
C AND W SENSORS-TEMPERATURE	C2	8	.16	BUY	XXX	NEW		PURCHASE ORBITER OR SPACELAB DES
SIPS PLATFORM	C3	1	527.00	GFE	GFP	---		INCLUDES ELECTRONICS
TWO AXES GYRO PACKAGE	C3	1	8.00	GFE	GFP	---		FOR CYRO LIMB SCANNER
TWO AXES GYRO PACKAGE	C3	1	8.00	GFE	GFP	---		FOR CYRO IR SPEC
3 AXES GYRO PACKAGE-OBIFS	C4	1	10.00	GFE	GFP	---		
3 AXES GYRO PACKAGE-NIR SPEC	C2	1	10.00	GFE	GFP	---		
MPH PLATFORM-OBIFS	C4	1	56.00	GFE	GFP	---		INCLUDES ELECTRONICS
FIXED HD STAR TRKER-II-7-10	C4	1	4.00	GFE	GFP	---		WITH SUN SHADE
MPH PLATFORM-NIR SPEC	C2	1	56.00	GFE	GFP	---		INCLUDES ELECTRONICS
FIXED HEAD STAR TRACKER-NIR	C2	1	4.00	GFE	GFP	---		WITH SUN SHADE
I/F PLUMBING KITS-PALLET 3	C4	1	12.00	MAKE	MHC	NEW		
THERMAL CURTAIN-PALLET 1	C2	1	10.00	MAKE	MHC	NEW		
THERMAL CURTAIN-PALLET 2	C3	1	10.00	MAKE	MHC	NEW		
THERMAL CURTAIN-PALLET 3	C4	1	10.00	MAKE	MHC	NEW		
EXP HEAT EXCHANGER-LIDAR	C4	1	25.00	BUY	---	NEW		
TCS PUMP-LIDAR	C4	1	10.00	BUY	---	O/S		
COOLANT FILTERS	C4	6	.45	BUY	---	O/S		
MPH CANISTER-NIR SPEC	C2	1	215.00	GFE	GFP	---		
CABLE SET-PALLET 1	C2	1	102.00	MAKE	MHC	NEW		POWER AND SIGNAL SEPARATE
CABLE SET-PALLET 2	C3	1	91.00	MAKE	MHC	NEW		POWER AND SIGNAL SEPARATE
CABLE SET-PALLET 3	C4	1	68.00	MAKE	MHC	NEW		POWER AND SIGNAL SEPARATE
CABLE SET-MODULE TO PALLET	C7	1	57.00	MAKE	MHC	NEW		POWER AND SIGNAL SEPARATE
CABLE SET-MODULE	C5	1	34.00	MAKE	MHC	NEW		POWER AND SIGNAL SEPARATE
CABLE SET-SIPS TO INSTRUMENT	C3	1	40.00	MAKE	MHC	NEW		POWER AND SIGNAL SEPARATE
PULSE POWER SUPPLY-LIDAR	C4	1	95.00	BUY	---	NEW		
PULSE POWER SUPPLY-ACCELER	C4	1	600.00	BUY	---	---		
PEAKING BATTERY	C4	1	40.30	BUY	---	O/S		
ELECTRICAL DIST UNIT	C2	1	10.00	MAKE	MHC	NEW		
ELECTRICAL DIST UNIT	C3	1	10.00	MAKE	MHC	NEW		
ELECTRICAL DIST UNIT	C4	1	10.00	MAKE	MHC	NEW		
FM MODULE	C5	1	21.80	BUY	---	O/S		
SENSOR INTERFACE BOX	C3	1	2.27	MAKE	MHC	NEW		SIPS YOKE 1
SENSOR INTERFACE BOX	C3	1	2.27	MAKE	MHC	NEW		SIPS YOKE 2
SENSOR INTERFACE BOX	C2	1	2.27	MAKE	MHC	NEW		MPH
SENSOR INTERFACE BOX	C4	1	2.27	MAKE	MHC	NEW		MPH
ANALOG RECORDER	C5	1	22.70	BUY	---	O/S		
TRANSIENT RECORDER	C5	5	6.16	BUY	---	O/S		
SWITCHING PANEL	C5	1	3.63	MAKE	MHC	NEW		
VIDEO RECORDER	C5	1	36.30	BUY	---	O/S		

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AMPS ----- FLIGHT 1----- LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

NOMENCLATURE	PNL	QTY	UNIT WT (KG)	MAKE BUY GFF	POTENTIAL SOURCE	DEV STATUS	REUSE CODE	REMARKS
COMHAND TRANSMITTER	C3	1	.50	BUY	---	O/S		
RF MULTIPLEXER	C3	1	1.36	MAKE	BENDIX	NEW		
WIDE BAND RECEIVER	C3	2	1.13	BUY	---	NEW		
CONICAL ANTENNA	C3	1	.91	MAKE	BENDIX	NEW		
FOR HV POWER SUPPLY	C4	1	12.00	MAKE	MHC	NEW		BASE MOUNT BRACKETRY
FOR INSTRUMENT IV-1	C4	1	1.40	MAKE	MHC	NEW		BASE MOUNT BRACKETRY
FOR INSTRUMENT I-21	C2	1	20.80	MAKE	MHC	NEW		INDIVIDUAL TRUSS MOUNT
FOR INSTRUMENT I-21	C2	1	20.80	MAKE	MHC	NEW		INDIVIDUAL TRUSS MOUNT
FOR INSTRUMENT I-21	C2	1	20.80	MAKE	MHC	NEW		INDIVIDUAL TRUSS MOUNT
FOR INSTRUMENT I-21	C2	1	20.80	MAKE	MHC	NEW		INDIVIDUAL TRUSS MOUNT
FOR INSTRUMENT I-21	C2	1	20.80	MAKE	MHC	NEW		INDIVIDUAL TRUSS MOUNT
FOR INSTRUMENT I-21	C2	1	20.80	MAKE	MHC	NEW		INDIVIDUAL TRUSS MOUNT
INSTRUMENT I-21 PLATFORM	C2	1	65.30	MAKE	MHC	NEW		PLATFORM FOR SIX
FOR INSTRUMENT I-1	C4	1	39.00	MAKE	MHC	NEW		TRUSS SUPPORT
FOR INSTRUMENT II-3	C4	1	20.40	MAKE	MHC	NEW		PTG PLATFORM TO PALLET (TRUSS)
FOR INSTRUMENT II-7	C3	1	6.40	MAKE	MHC	NEW		INSTR TO YOKE
FOR INSTRUMENT II-9	C2	1	20.40	MAKE	MHC	NEW		PTG PLATFORM TO PALLET
FOR INSTRUMENT II-10	C3	1	6.40	MAKE	MHC	NEW		INSTR TO YOKE
FOR IECH	C4	1	22.70	MAKE	MHC	NEW		TRUSS/PLATFORM
FOR ESP	C2	1	13.60	MAKE	MHC	NEW		TRUSS/PLATFORM
FOR BEAM DIAGNOSTIC PACKAGE	C3	1	9.10	MAKE	MHC	NEW		TRUSS/PLATFORM
FOR RF TERMINAL	C3	1	5.00	MAKE	MHC	NEW		BASE MOUNTING BRACKETRY
INSTR TO INSTR I/F STRUCTURE	C4	14	1.14	MAKE	MHC	NEW		SETS OF BRACKETS
THERMAL CURTAIN SPT-PALLET 1	C2	1	11.30	MAKE	MHC	NEW		TRUSS MEMBERS
THERMAL CURTAIN SPT-PALLET 2	C3	1	11.30	MAKE	MHC	NEW		TRUSS MEMBERS
THERMAL CURTAIN SPT-PALLET 3	C4	1	11.30	MAKE	MHC	NEW		TRUSS MEMBERS
L/L LOCKS -OBIPS	C4	1	6.80	MAKE	MHC	NEW		
EMERGENCY JETT-MPH PLATFORM	C4	1	8.20	GFF	GFP	NEW		
CAPTURE RELEASE DEVICE	C3	1	1.80	MAKE	MHC	NEW		BEAM DIAG PKG, FWD
CAPTURE RELEASE DEVICE	C3	1	10.00	MAKE	MHC	NEW		BEAM DIAG PKG, AFT
L/L LOCKS-NIR SPEC	C2	1	1.80	MAKE	MHC	NEW		
L/L LOCKS-NIR SPEC	C2	1	9.10	MAKE	MHC	NEW		
EMERGENCY JETT-MPH PLATFORM	C2	1	8.20	GFF	GFP	NEW		
CAPTURE RELEASE DEVICE	C2	1	10.40	GFF	GFP	NEW		ENVIR TENSOR PKG
PIC( FOR HOLDDOWN NUTS)	C2	6	1.00	MAKE	MHC	O/S		
HOLDDOWN ORDNANCE	C2	18	.10	BUY	---	O/S		FOR GAS RELEASE MODULES

\*\*\*\*\* AMPS LABCRAFT

A-6

AMPS -----FLIGHT 1-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

NOMENCLATURE	PNL	QTY	UNIT WT (KG)	MAKE BUY GFE	POTENTIAL SOURCE	DEV STATUS	REUSE CODE	REMARKS
EMERGENCY JETTISON FOR I-1	D4	1	.90	GFE	GFP	---		COVERS ONLY
LIDAR EMITTER	D4	1	75.00	GFE	GFP	---		FRENCH VERSION
LIDAR EMITTER	D4	1	75.00	GFE	GFP	---		FRENCH VERSION
LIDAR RECEIVER	D4	1	300.00	GFE	GFP	---		FRENCH VERSION
***** LASER SOUNDER (I-1)								

AMPS -----FLIGHT 1-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

NOMENCLATURE	PNL	QTY	UNIT WT (KG)	MAKE BUY GFE	POTENTIAL SOURCE	DEV STATUS	REUSE CODE	REMARKS
EMERGENCY JETTISON FOR I-9	D4	1	.90	GFE	GFP	---		COVERS ONLY
ELECTRON ACCEL (I-9)	D4	1	40.50	GFE	GFP	---		
GAS PLUME RELEASE (III-3)	D4	1	9.00	GFE	GFP	---		
***** ELECT ACCELERATOR								

AMPS -----FLIGHT 1-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

NOMENCLATURE	PNL	QTY	UNIT WT (KG)	MAKE BUY GFE	POTENTIAL SOURCE	DEV STATUS	REUSE CODE	REMARKS
IECH	D4	1	340.00	GFE	GFP	---		CONTAMINATION PKG FRM
***** IECH								

A-7

AMPS -----FLIGHT 1-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

NOMENCLATURE	PNL	QTY	UNIT WT (KG)	MAKE BUY GFE	POTENTIAL SOURCE	DEV STATUS	REUSE CODE	REMARKS
SOLAR FLUX MONITOR (IV-1)	D4	1	3.00	GFE	GFP	---		

\*\*\*\*\* SOLAR FLUX MONITOR

AMPS -----FLIGHT 1-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

NOMENCLATURE	PNL	QTY	UNIT WT (KG)	MAKE BUY GFE	POTENTIAL SOURCE	DEV STATUS	REUSE CODE	REMARKS
OBIPS (II-3)	D4	1	43.00	GFE	GFP	---		S/S 1 ONLY W/SUNSHIELD

\*\*\*\*\* OBIPS

AMPS -----FLIGHT 1-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

NOMENCLATURE	PNL	QTY	UNIT WT (KG)	MAKE BUY GFE	POTENTIAL SOURCE	DEV STATUS	REUSE CODE	REMARKS
CRYO LIMB SCANNER-DRY (II-7)	D3	1	207.00	GFE	GFP	---		
* CRYO	D3	1	293.00	BUY	---	O/S		

\*\*\*\*\* CRYO LIMB SCANNER

AMPS -----FLIGHT 1-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

NOMENCLATURE	PNL	QTY	UNIT WT (KG)	MAKE BUY GFE	POTENTIAL SOURCE	DEV STATUS	REUSE CODE	REMARKS
CRYO IR INTERFEROMETER-DRY	D3	1	215.00	GFE	GFP	---		INSTRUMENT II-10
* CRYO	D3	1	225.00	BUY	---	O/S		INSTRUMENT II-10

\*\*\*\*\* CRYO IR INTERFEROMETER

AMPS -----FLIGHT 1-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

NOMENCLATURE	PNL	QTY	UNIT WT (KG)	MAKE BUY GFE	POTENTIAL SOURCE	DEV STATUS	REUSE CODE	REMARKS
WIDE BAND TRANSMITTER	C3	2	.50	BUY	---	O/S		
COMMAND RECEIVER	C3	1	1.00	BUY	---	O/S		
RF MULTIPLEXER	C3	1	1.00	MAKE	BENDIX	NEW		
ANTENNA ,STUB	C3	1	1.00	BUY	---	O/S		
CABLE SET-BEAM DIAG PACKAGE	C3	1	1.50	MAKE	HMC	NEW		POWER AND SIGNAL SEPARATE
POWER SUPPLY	C3	1	29.00	M/R	---	O/S		BATTERY/SWITCHING
STRIP HEATERS	C3	1	1.00	BUY	---	O/S		
MULTILAYER INSULATION	C3	1	4.00	MAKE	HMC	NEW		
SUBCARRIER OSCILLATOR ASSY	C3	1	5.00	BUY	---	O/S		
PCH PROGRAMMER	C3	1	2.00	BUY	---	O/S		
COMMAND DECODER	C3	1	1.50	BUY	---	O/S		
DEPLOY DEVICE (III-2)	C3	1	2.70	MAKE	MMC	NEW		EXTEND AND RETRACT
CAPTURE/RELEASE INTERFACE	C3	1	.50	MAKE	HMC	NEW		
LAUNCH LOCK-VECTOR MAG	C3	1	1.00	MAKE	HMC	NEW		
BASIC STRUCTURE PACKAGE	C2	1	26.00	MAKE	MMC	NEW		
OBIPS (II-3)	D3	1	38.00	GFE	GFP	---		S/S 1 ONLY W/O SUNSHIELD
VECTOR MAGNETOMETER (III-2)	D3	1	4.10	GFE	GFP	---		S/S 2 AND 4 ONLY
LEVEL II DIAGNOSTIC (III-4)	D3	1	23.00	GFE	GFP	---		

\*\*\*\*\* SEAM DIAGNOSTIC PKG

AMPS -----FLIGHT 1-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

NOMENCLATURE	PNL	QTY	UNIT WT (KG)	MAKE BUY GFE	POTENTIAL SOURCE	DEV STATUS	REUSE CODE	REMARKS
* COMMAND RECEIVER	C2	1	1.00	BUY	---	O/S		
* COMMAND RECEIVER	C2	1	1.00	BUY	---	O/S		
* COMMAND RECEIVER	C2	1	1.00	BUY	---	O/S		
* COMMAND RECEIVER	C2	1	1.00	BUY	---	O/S		
* COMMAND RECEIVER	C2	1	1.00	BUY	---	O/S		
* ANTENNA,STUB	C2	1	1.00	BUY	---	O/S		
* ANTENNA,STUB	C2	1	1.00	BUY	---	O/S		
* ANTENNA,STUB	C2	1	1.00	BUY	---	O/S		
* ANTENNA,STUB	C2	1	1.00	BUY	---	O/S		
* ANTENNA,STUB	C2	1	1.00	BUY	---	O/S		
* ANTENNA,STUB	C2	1	1.00	BUY	---	O/S		
* COMMAND DECODER	C2	1	1.50	BUY	---	O/S		
* COMMAND DECODER	C2	1	1.50	BUY	---	O/S		
* COMMAND DECODER	C2	1	1.50	BUY	---	O/S		
* COMMAND DECODER	C2	1	1.50	BUY	---	O/S		
* COMMAND DECODER	C2	1	1.50	BUY	---	O/S		
* CABLE SET-GAS RELEASE	C2	1	1.36	MAKE	MMC	NEW		POWER AND SIGNAL SEPARATE
* CABLE SET-GAS RELEASE	C2	1	1.36	MAKE	MMC	NEW		POWER AND SIGNAL SEPARATE
* CABLE SET-GAS RELEASE	C2	1	1.36	MAKE	MMC	NEW		POWER AND SIGNAL SEPARATE
* CABLE SET-GAS RELEASE	C2	1	1.36	MAKE	MMC	NEW		POWER AND SIGNAL SEPARATE
* CABLE SET-GAS RELEASE	C2	1	1.36	MAKE	MMC	NEW		POWER AND SIGNAL SEPARATE
* CABLE SET-GAS RELEASE	C2	1	1.36	MAKE	MMC	NEW		POWER AND SIGNAL SEPARATE
* POWER SUPPLY-GAS RELEASE	C2	1	3.00	B/M	MMC	O/S		BATTERY,SWITCHING
* POWER SUPPLY-GAS RELEASE	C2	1	3.00	B/M	MMC	O/S		BATTERY,SWITCHING
* POWER SUPPLY-GAS RELEASE	C2	1	3.00	B/M	MMC	O/S		BATTERY,SWITCHING
* POWER SUPPLY-GAS RELEASE	C2	1	3.00	B/M	MMC	O/S		BATTERY,SWITCHING
* POWER SUPPLY-GAS RELEASE	C2	1	3.00	B/M	MMC	O/S		BATTERY,SWITCHING
* POWER SUPPLY-GAS RELEASE	C2	1	3.00	B/M	MMC	O/S		BATTERY,SWITCHING
FOR INSTRUMENT I-21	C2	1	6.16	MAKE	MMC	NEW		5 H/S DELTA V
* FOR INSTRUMENT I-21	C2	1	6.40	MAKE	MMC	NEW		5 H/S DELTA V
FOR INSTRUMENT I-21	C2	1	6.16	MAKE	MMC	NEW		5 H/S DELTA V
* FOR INSTRUMENT I-21	C2	1	6.40	MAKE	MMC	NEW		5 H/S DELTA V
FOR INSTRUMENT I-21	C2	1	6.16	MAKE	MMC	NEW		5 H/S DELTA V
* FOR INSTRUMENT I-21	C2	1	6.40	MAKE	MMC	NEW		5 H/S DELTA V
FOR INSTRUMENT I-21	C2	1	6.16	MAKE	MMC	NEW		5 H/S DELTA V
* FOR INSTRUMENT I-21	C2	1	6.40	MAKE	MMC	NEW		5 H/S DELTA V
FOR INSTRUMENT I-21	C2	1	6.16	MAKE	MMC	NEW		5 H/S DELTA V
* FOR INSTRUMENT I-21	C2	1	6.40	MAKE	MMC	NEW		5 H/S DELTA V
FOR INSTRUMENT I-21	C2	1	6.16	MAKE	MMC	NEW		5 H/S DELTA V
* FOR INSTRUMENT I-21	C2	1	6.40	MAKE	MMC	NEW		5 H/S DELTA V
FOR GAS RELEASE INSTR (I-21)	C2	2	.04	BUY	---	O/S		ORDNANCE
FOR GAS RELEASE INSTR (I-21)	C2	2	.04	BUY	---	O/S		ORDNANCE
FOR GAS RELEASE INSTR (I-21)	C2	2	.04	BUY	---	O/S		ORDNANCE



AMPS ——— FLIGHT 1 ——— LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

NOMENCLATURE	P/NL	QTY	UNIT WT (KG)	MAKE BUY GFE	POTENTIAL SOURCE	DEV STATUS	REUSE CODE	REMARKS
FOR GAS RELEASE INSTR (I-21)	C2	2	.04	BUY	---	O/S		ORDNANCE
FOR GAS RELEASE INSTR (I-21)	C2	2	.04	BUY	---	O/S		ORDNANCE
FOR GAS RELEASE INSTR (I-21)	C2	2	.04	BUY	---	O/S		ORDNANCE
*PIC(FOR GAS RELEASE)	C2	1	.20	MAKE	MHC	O/S		
*PIC(FOR GAS RELEASE)	C2	1	.20	MAKE	MHC	O/S		
*PIC(FOR GAS RELEASE)	C2	1	.20	MAKE	MHC	O/S		
*PIC(FOR GAS RELEASE)	C2	1	.20	MAKE	MHC	O/S		
*PIC(FOR GAS RELEASE)	C2	1	.20	MAKE	MHC	O/S		
*PIC(FOR GAS RELEASE)	C2	1	.20	MAKE	MHC	O/S		
*MULTILAYER INSULATION	C2	1	1.60	MAKE	MHC	NEW		
*MULTILAYER INSULATION	C2	1	1.60	MAKE	MHC	NEW		
*MULTILAYER INSULATION	C2	1	1.60	MAKE	MHC	NEW		
*MULTILAYER INSULATION	C2	1	1.60	MAKE	MHC	NEW		
*MULTILAYER INSULATION	C2	1	1.60	MAKE	MHC	NEW		
*MULTILAYER INSULATION	C2	1	1.60	MAKE	MHC	NEW		
*STRIP HEATERS	C2	1	1.00	MAKE	MHC	NEW		
*STRIP HEATERS	C2	1	1.00	MAKE	MHC	NEW		
*STRIP HEATERS	C2	1	1.00	MAKE	MHC	NEW		
*STRIP HEATERS	C2	1	1.00	MAKE	MHC	NEW		
*STRIP HEATERS	C2	1	1.00	MAKE	MHC	NEW		
*STRIP HEATERS	C2	1	1.00	MAKE	MHC	NEW		
* GAS RELEASE	D2	1	160.00	GFE	GFP	---		PRESSURE SPHERES
* GAS RELEASE	D2	1	160.00	GFE	GFP	---		PRESSURE SPHERES
* GAS RELEASE	D2	1	160.00	GFE	GFP	---		PRESSURE SPHERES
* GAS RELEASE	D2	1	160.00	GFE	GFP	---		PRESSURE SPHERES
* GAS RELEASE	D2	1	160.00	GFE	GFP	---		PRESSURE SPHERES
* GAS RELEASE	D2	1	160.00	GFE	GFP	---		PRESSURE SPHERES

\*\*\*\*\* GAS RELEASE TOTAL

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AMPS -----FLIGHT 1-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

NOMENCLATURE	PNL	QTY	UNIT WT (KG)	MAKE BUY GFE	POTENTIAL SOURCE	DEV STATUS	REUSE CODE	REMARKS
NEAR IR SPECTROMETER (II-9)	D2	1	60.00	GFE	GFP	---		

\*\*\*\*\* NEAR IR SPECTROMETER TOTAL

AMPS -----FLIGHT 1-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

NOMENCLATURE	PNL	QTY	UNIT WT (KG)	MAKE BUY GFE	POTENTIAL SOURCE	DEV STATUS	REUSE CODE	REMARKS
* TH XMITTER (S-BAND)	C2	1	.50	BUY	---	O/S		
* ANTENNA, CONICAL	C2	1	1.00	MAKE	BENDIX	NEW		
* ANTENNA, CONICAL	C2	1	1.00	MAKE	BENDIX	NEW		
* COMMAND RECEIVER	C2	1	.60	BUY	---	O/S		
* DIPLEXER/SPLITTER	C2	1	1.00	BUY	---	O/S		
* PCM PROGRAMMER	C2	1	2.00	MAKE	HMC	NEW		
* COMMAND DECODER	C2	1	1.00	BUY	---	O/S		
* CABLE SET-ESP	C2	1	2.00	MAKE	HMC	NEW		POWER AND SIGNAL SEPARATE
* POWER SUPPLY-ESP	C2	1	23.00	R/H	HMC	O/S		BATTERY, SWITCHING
* STRIP HEATERS	C2	1	1.00	BUY	---	O/S		
* MULTILAYER INSULATION	C2	1	3.90	MAKE	HMC	NEW		
* CAPTURE/RELEASE INTERFACE	C2	1	3.30	MAKE	HMC	NEW		
* FOR ESP -ANTENNA	C2	1	.75	BUY	---	O/S		EXT AND RETR (.1-1 H)
* FOR ESP -ANTENNA	C2	1	.75	BUY	---	O/S		
* LAUNCH LOCK-VECTOR MAG	C2	1	1.00	BUY	---	O/S		
* FOR ESP -PROBE	C2	1	2.00	BUY	---	O/S		EXT AND RETR
* III-2 SENSOR DRIVE	C2	1	1.00	BUY	---	O/S		EXT AND RETR
* SPIN TABLE- ESP	C2	1	6.50	BUY	---	NEW		
* ESP STRUCTURE	C2	1	47.60	MAKE	HMC	NEW		
* RELEASE DRONANCE + CONT	C2	1	4.00	BUY	---	O/S		PIC/NSI/SPRINGS/LOCK
* EMI DIAGNOSTIC (III-25)	D2	1	22.60	GFE	GFP	---		
* PLANAR RPA (III-18)	D2	1	3.00	GFE	GFP	---		
* NEUTRAL MASS SPEC (III-23)	D2	1	10.00	GFE	GFP	---		

\*\*\*\*\* ESP

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AMPS -----FLIGHT 2-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

NOMENCLATURE	PNL	QTY	UNIT WT (KG)	MAKE BUY GFE	POTENTIAL SOURCE	DEV STATUS	REUSE CODE	REMARKS
SPACELAB MODULE	A5	1	3363.00	GFE	GFP	---	A	
6 METER PALLET TRAIN	A1	1	1236.00	GFE	GFP	---	A	
3 METER PALLET	A4	1	618.00	GFE	GFP	---	A	
SL/ORBITER UTILITY BRIDGE	A6	1	218.20	GFE	GFP	---	A	
TUNNEL	A8	1	352.00	GFE	GFP	---	A	
TUNNEL ADAPTER	A8	1	408.20	GFE	GFP	---	A	
P/L ARS FAN AND DUCTING	A8	1	9.50	GFE	GFP	---	A	
AIRLOCK	A9	1	364.00	GFE	GFP	---	A	
LESS SHUTTLE AIRLOCK	A9	1	-363.00	GFE	GFP	---	A	

\*\*\*\*\* BASIC SPACELAB

AMPS -----FLIGHT 2-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

NOMENCLATURE	PNL	QTY	UNIT WT (KG)	MAKE BUY GFE	POTENTIAL SOURCE	DEV STATUS	REUSE CODE	REMARKS
RMS (SECOND UNIT)	B0	1	393.50	GFE	GFP	---	A	
* EXTRA WATER FOR COOLING	B0	1	68.20	GFE	GFP	---		
EPS KIT 2-DRY PLUS RESIDUALS	B0	1	357.02	GFE	GFP	---	A	
* EPS KIT 2-EXPENDABLES	B0	1	303.30	GFE	GFP	---		
ORBITER HEAT REJECTION KIT	B0	1	07.50	GFE	GFP	---	A	
LONGERON FITTING-PALLET	B0	1	40.40	GFE	GFP	---	A	
LONGERON FITTING-PALLET	B0	1	40.40	GFE	GFP	---	A	
LONGERON FITTING-PALLET	B0	1	40.40	GFE	GFP	---	A	
LONGERON FITTING-PALLET	B0	1	40.40	GFE	GFP	---	A	
LONGERON FITTING-PALLET	B0	1	40.40	GFE	GFP	---	A	
LONGERON FITTING-PALLET	B0	1	40.40	GFE	GFP	---	A	
LONGERON FITTING-PALLET	B0	1	40.40	GFE	GFP	---	A	
LONGERON FITTING-PALLET	B0	1	40.40	GFE	GFP	---	A	
KEEL FITTING-PALLET	B0	1	35.40	GFE	GFP	---	A	
KEEL FITTING-PALLET	B0	1	35.40	GFE	GFP	---	A	
LONGERON FITTING-MODULE	B0	1	40.40	GFE	GFP	---	A	
LONGERON FITTING-MODULE	B0	1	40.40	GFE	GFP	---	A	
LONGERON FITTING-MODULE	B0	1	40.40	GFE	GFP	---	A	
LONGERON FITTING-MODULE	B0	1	40.40	GFE	GFP	---	A	
KEEL FITTING-MODULF	B0	1	35.40	GFE	GFP	---	A	
LESS ORBITER ALLOWANCE	B0	1	-204.00	GFE	GFP	---		
CREWMAN 5	B0	1	77.10	---	---	---		
CREWMAN 6	B0	1	77.10	---	---	---		
SEAT 5	B0	1	24.50	GFE	GFP	---	A	
SEAT 6	B0	1	24.50	GFE	GFP	---	A	
O2 TANKAGE PLUS RESIDUAL	B0	1	37.60	GFE	GFP	---	A	
* USABLE O2	B0	1	22.70	GFE	GFP	---		
EMERGENCY EQUIPMENT	B0	1	49.50	GFE	GFP	---	A	
WASTE WATER TANKAGE	B0	1	22.00	GFE	GFP	---	A	
FOOD	B0	1	20.60	GFE	GFP	---		
HYGIENE EQUIPMENT	B0	1	26.20	GFE	GFP	---	A	
CREW PROVISIONS	B0	1	25.20	GFE	GFP	---	A	
LIGH	B0	1	31.90	GFE	GFP	---	A	
RESTRAINTS	B0	1	1.70	GFE	GFP	---	A	
STORAGE VOLUME PENALTY	B0	1	43.90	GFE	GFP	---	A	
MONITOR AND CONTROL PANEL	B0	1	5.00	GFE	GFP	---	A	
KEYBOARD	B0	1	3.50	GFE	GFP	---	A	
CRT DISPLAY/SIGNAL GENERATOR	B0	1	20.90	GFE	GFP	---	A	
REMOTE STATION, COMMUNICATIO	B0	1	1.50	GFE	GFP	---	A	
DOUBLE RACK	B5	1	58.10	GFE	GFP	---	A	
SINGLE RACK	B5	1	37.60	GFE	GFP	---	A	
PALLET HARDPOINTS	B1	45	.03	GFE	GFP	---	A	
INSERTS FOR PANELS	B1	6	6.50	GFE	GFP	---	A	
EXP SWITCH PANEL	B5	1	12.70	GFE	GFP	---	A	
EXP SWITCH PANEL	B5	1	12.70	GFE	GFP	---	A	

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AMPS -----FLIGHT 2-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

NOMENCLATURE	PNL	QTY	UNIT WT (KG)	MAKE BUY GFE	POTENTIAL SOURCE	DEV STATUS	REUSE CODE	REMARKS
EXP SWITCH PANEL	B5	1	12.70	GFE	GFP	---	A	
INVERTER (400 HZ)	B5	1	32.20	GFF	GFP	---	A	
COLD PLATE-RF INSTR	B4	1	5.50	GFE	GFP	---	A	
COLD PLATE-PEAKING BATTERY	B4	1	5.50	GFE	GFP	---	A	
COLD PLATE-PS	B4	1	5.50	GFF	GFP	---	A	
COLD PLATE-RF TERMINAL	B3	1	5.50	GFE	GFP	---	A	
EXP RAU	B2	1	2.30	GFF	GFP	---	A	
EXP RAU	B3	1	2.30	GFE	GFP	---	A	
EXP RAU	B3	1	2.30	GFE	GFP	---	A	
EXP RAU	B4	1	2.30	GFE	GFP	---	A	
EXP RAU	B4	1	2.30	GFE	GFP	---	A	
EXP RAU	B5	1	2.30	GFE	GFP	---	A	
EXP COMPUTER	B5	1	30.20	GFE	GFP	---	A	
DIGITAL TAPE RECORDER	B5	1	43.00	GFE	GFP	---	A	
EXPERIMENT I/O	B5	1	27.50	GFE	GFP	---	A	
HIGH RATE DIGITAL MUX	B5	1	10.00	GFE	GFP	---	A	
TAPE AND CANISTERS	B5	15	5.90	GFE	GFP	---	A	
CONSOL VERTICAL RAILS	B5	4	.50	GFE	GFP	---	A	
CONSOL HORIZONTAL RAILS	B5	4	.75	GFE	GFP	---	A	
PSA FOOT RESTRAINTS	B5	6	3.00	GFE	GFP	---	A	
RACK CLOSEOUT FT RESTRAINTS	B5	4	7.93	GFE	GFP	---	A	
KEYBOARD	B5	1	3.50	GFE	GFP	---	A	
CRT AND SYMBOL GENERATOR	B5	1	28.90	GFE	GFP	---	A	

\*\*\*\*\* MISSION DEPENDENT EQUIPMENT

AMPS -----FLIGHT 2-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

NOMENCLATURE	PNL	QTY	UNIT WT (KG)	MAKE BUY GFE	POTENTIAL SOURCE	DEV STATUS	REUSE CODE	REMARKS
C AND D PANELS	C5	1	18.00	BUY	BENDIX	NEW	B	
C AND D PANELS	C5	1	8.40	BUY	BENDIX	NEW	B	
C AND D PANELS	C5	1	3.00	BUY	BENDIX	NEW	B	
TV MONITOR	C5	1	10.00	BUY	---	O/S	A	
C AND W SENSORS-PRESSURE	C2	4	.16	BUY	XXX	NEW	A	PURCHASE ORBITER OR SPACELAB DES
C AND W SENSORS-TEMPERATURE	C2	4	.16	BUY	XXX	NEW	A	PURCHASE ORBITER OR SPACELAB DES
SENSOR INTERFACE BOX	C3	1	2.27	MAKE	MMC	NEW	A	SIPS YOKE 1
SENSOR INTERFACE BOX	C3	1	2.27	MAKE	MMC	NEW	A	SIPS YOKE 2
SENSOR INTERFACE BOX	C2	1	2.27	MAKE	MMC	NEW	A	MPH
SENSOR INTERFACE BOX	C4	1	2.27	MAKE	MMC	NEW	A	MPH
VIDEO RECORDER	C5	1	36.30	BUY	---	O/S	A	
ANALOG RECORDER	C5	1	22.70	BUY	---	O/S	A	
TRANSIENT RECORDER	C5	5	6.16	BUY	---	O/S	A	
SWITCHING PANEL	C5	1	3.63	MAKE	MMC	NEW	A	
FM MODULE	C5	1	21.80	BUY	---	O/S	B	
SIPS PLATFORM	C3	1	527.00	GFE	GFP	---	A	INCLUDES ELECTRONICS
MPM PLATFORM-OBIPS	C4	1	56.00	GFE	GFP	---	A	INCLUDES ELECTRONICS
MPM PLATFORM-NIR SPEC	C2	1	56.00	GFE	GFP	---	A	INCLUDES ELECTRONICS
FIXED HD STAR TRACKER-II-7-10	C4	1	4.00	GFE	GFP	---	A	WITH SUN SHADE
FIXED HEAD STAR TRACKER-NIR	C2	1	4.00	GFE	GFP	---	A	WITH SUN SHADE
TWO AXES GYRO PACKAGE	C3	1	8.00	GFE	GFP	---	A	FOR CYRO LIMB SCANNER
TWO AXES GYRO PACKAGE	C3	1	8.00	GFE	GFP	---	A	FOR CYRO IR SPEC
3 AXES GYRO PACKAGE-OBIPS	C4	1	10.00	GFE	GFP	---	A	
3 AXES GYRO PACKAGE-NIR SPEC	C2	1	10.00	GFE	GFP	---	A	
SIPS CANISTER-NIP SPEC	C2	1	90.00	GFE/M	GFP/MMC	---	A	GFP + EXTENSION MOD
I/F PLUMBING KITS-PALLET 3	C4	1	12.00	MAKE	MMC	NEW	B	
EXP HEAT EXCHANGER-LIDAR	C4	1	25.00	BUY	---	NEW	A	
THERMAL CURTAIN-PALLET 1	C2	1	10.00	MAKE	MMC	NEW	B	10% MOD FROM FLIGHT 1
THERMAL CURTAIN-PALLET 2	C3	1	10.00	MAKE	MMC	NEW	B	10% MOD FROM FLIGHT 1
THERMAL CURTAIN-PALLET 3	C4	1	10.00	MAKE	MMC	NEW	B	10% MOD FROM FLIGHT 1
TCS PUMP-LIDAR	C4	1	10.00	BUY	---	O/S	A	
COOLANT FILTERS	C4	6	.45	BUY	---	O/S	A	
PULSE POWER SUPPLY-LIDAR	C4	1	95.00	BUY	---	NEW	B	5 % MOD FROM FLT 1
PULSE POWER SUPPLY	C4	1	600.00	BUY	---	---	A	
PEAKING BATTERY	C4	1	40.30	BUY	---	O/S	A	
ELECT DIST PANEL	C2	1	10.00	MAKE	MMC	NEW	A	
ELECT DIST PANEL	C4	1	10.00	MAKE	MMC	NEW	A	
ELECT DIST PANEL	C3	1	10.00	MAKE	MMC	NEW	A	
CABLE SET-PALLET 1	C2	1	102.00	MAKE	MMC	NEW	B	POWER AND SIGNAL SEPARATE
CABLE SET-PALLET 2	C3	1	91.00	MAKE	MMC	NEW	B	POWER AND SIGNAL SEPARATE
CABLE SET-PALLET 3	C4	1	68.00	MAKE	MMC	NEW	B	POWER AND SIGNAL SEPARATE
CABLE SET-MODULE TO PALLET	C7	1	57.00	MAKE	MMC	NEW	B	POWER AND SIGNAL SEPARATE
CABLE SET-MODULE	C5	1	34.00	MAKE	MMC	NEW	B	POWER AND SIGNAL SEPARATE
CABLE SET-SIPS TO INSTRUMENT	C3	1	40.00	MAKE	MMC	NEW	A	POWER AND SIGNAL SEPARATE
WIDE BAND RECEIVER	C3	1	2.27	BUY	---	NEW	A	

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AMPS -----FLIGHT 2-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

NOHENCLATURE	PNL	QTY	UNIT WT (KG)	MAKE BUY GFE	POTENTIAL SOURCE	DEV STATUS	REUSE CODE	REMARKS
NARROW BAND RECEIVER	C3	1	.57	BUY	---	O/S		
COMMAND TRANSMITTER	C3	1	.50	BUY	---	O/S	A	
MULTIPLEXER	C3	1	1.36	MAKE	BENDIX	NEW	A	
CONICAL ANTENNA	C3	1	.91	MAKE	BENDIX	NEW	A	
L/L LOCKS-NIR SPEC	C2	1	1.80	MAKE	MMC	NEW		
L/L LOCKS-NIR SPEC	C2	1	9.10	MAKE	MMC	NEW		
L/L LOCKS-OBIPS	C4	1	6.80	MAKE	MMC	NEW	A	
EMER JETTISON (MPM PLATFORM)	C2	1	8.20	GFE	GFP	NEW	A	FOR NIR SPEC
EMER JETTISON (MPM PLATFORM)	C4	1	8.20	GFE	GFP	NEW	A	FOR OBIPS
FOR PLASMA WAKE DIAGNOSTIC	C3	1	10.00	MAKE	MMC	NEW	A	CAPTURE/RELEASE DEVICE
FOR PLASMA WAKE GENERATOR	C2	1	10.40	MAKE	MMC	NEW	A	CAPTURE/RELEASE DEVICE
PIC( FOR HOLDDOWN NUTS)	C2	1	.20	MAKE	HMC	O/S		FOR CHEM RELEASE MODULE
PIC( FOR HOLDDOWN NUTS)	C4	1	.20	MAKE	HMC	O/S		FOR RF RECEIVER PACKAGE
HOLDDOWN ORDNANCE	C2	6	1.00	BUY	---	O/S		FOR CHEM RELEASE MODULE
FOR HV POWER SUPPLY	C4	1	12.00	MAKE	MMC	NEW	A	DIRECT H/C BRACKETRY
FOR INSTRUMENT IV-1	C4	1	1.40	MAKE	MMC	NEW	A	DIRECT H/C BRACKETRY
FOR CHEMICAL RELEASE	C2	1	5.40	MAKE	HMC	NEW		DIRECT H/C BRACKETRY
INSTRUMENT I-21 PLATFORM	C2	1	65.30	MAKE	MMC	NEW	A	INTER SPT STRUCTURE
FOR INSTRUMENT I-1	C4	1	39.00	MAKE	MMC	NEW	A	TRUSS SUPPORT
FOR INSTRUMENT II-3	C4	1	20.40	MAKE	HMC	NEW	A	PTG PLATFORM TO PALLET(TRUSS)
FOR INSTRUMENT II-7	C3	1	6.35	MAKE	HMC	NEW	A	INSTR TO YOKE
FOR INSTRUMENT II-9 AND II-4	C2	1	20.40	MAKE	HMC	NEW	B	PTG PLATFORM TO PALLET
FOR INSTRUMENT II-10	C3	1	6.35	MAKE	HMC	NEW	A	INSTR TO YOKE
FOR RF RECEIVER PACKAGE	C3	1	13.60	MAKE	MMC	NEW		INTER SPT STRUCTURE
FOR PLASMA WAKE GENERATOR	C2	1	13.60	MAKE	MMC	NEW	A	INTER SPT STRUCTURE
FOR PLASMA WAKE DIAGNOSTIC	C3	1	13.60	MAKE	MMC	NEW	A	INTER SPT STRUCTURE
FOR RF TERMINAL	C3	1	5.00	MAKE	HMC	NEW	A	BASE MOUNTING BRACKETRY
INSTR TO INSTR I/F STRUCTURE	C4	14	1.14	MAKE	HMC	NEW	B	SETS OF BRACKETS
THERMAL CURTAIN SPT-PALLET 1	C2	1	11.34	MAKE	MMC	NEW	B	TRUSS(10% MOD FROM FLT 1)
THERMAL CURTAIN SPT-PALLET 2	C3	1	11.34	MAKE	HMC	NEW	B	TRUSS(10% MOD FROM FLT 1)
THERMAL CURTAIN SPT-PALLET 3	C4	1	11.34	MAKE	HMC	NEW	B	TRUSS(10% MOD FROM FLT 1)

\*\*\*\*\* AMPS LABCRAFT

A-17

AMPS -----FLIGHT 2-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

NOMENCLATURE	PNL	QTY	UNIT WT (KG)	MAKE BUY GFE	POTENTIAL SOURCE	DEV STATUS	REUSE CODE	REMARKS
EMERGENCY JETTISON FOR I-1	D4	1	.90	GFE	GFP	---	A	COVER ONLY
LIDAR EMITTER	D4	1	75.00	GFE	GFP	---	A	FRENCH VERSION
LIDAR EMITTER	D4	1	75.00	GFE	GFP	---	A	FRENCH VERSION
LIDAR RECEIVER	D4	1	300.00	GFE	GFP	---	A	FRENCH VERSION

\*\*\*\*\* LASER SOUNDER (I-1)

AMPS -----FLIGHT 2-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

NOMENCLATURE	PNL	QTY	UNIT WT (KG)	MAKE BUY GFE	POTENTIAL SOURCE	DEV STATUS	REUSE CODE	REMARKS
SOLAR FLUX MONITOR (IV-1)	D4	1	3.00	GFE	GFP	---	A	

\*\*\*\*\* SOLAR FLUX MONITOR

AMPS -----FLIGHT 2-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

NOMENCLATURE	PNL	QTY	UNIT WT (KG)	MAKE BUY GFE	POTENTIAL SOURCE	DEV STATUS	REUSE CODE	REMARKS
OBIPS (II-3)	D4	1	43.00	GFE	GFP	---	A	S/S 1 ONLY W/SUNSHIELD

\*\*\*\*\* OBIPS



AMPS -----FLIGHT 2-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

NOHENCLATURE	PNL	QTY	UNIT WT (KG)	MAKE BUY GFE	POTENTIAL SOURCE	DEV STATUS	REUSE CODE	REMARKS
CRYO LIMB SCANNER-DRY	D3	1	207.00	GFE	GFP	---	A	INSTRUMENT II-7
* CRYO	D3	1	293.00	BUY	---	O/S		FOR INSTRUMENT II-7

\*\*\*\*\* CRYO LIMB SCANNER-WET

AMPS -----FLIGHT 2-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

NOHENCLATURE	PNL	QTY	UNIT WT (KG)	MAKE BUY GFE	POTENTIAL SOURCE	DEV STATUS	REUSE CODE	REMARKS
CRYO IR INTERFEROMETER-DRY	D2	1	215.00	GFE	GFP	---	A	INSTRUMENT II-10
* CRYO	D2	1	285.00	BUY	---	O/S		FOR INSTRUMENT II-10

\*\*\*\*\* CRYO IR INTERFEROMETER

AMPS -----FLIGHT 2-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

NOHENCLATURE	PNL	QTY	UNIT WT (KG)	MAKE BUY GFE	POTENTIAL SOURCE	DEV STATUS	REUSE CODE	REMARKS
* COMMAND RECEIVER	C2	1	.60	BUY	---	O/S		
* ANTENNA,STUB	C2	1	1.00	BUY	---	O/S		
* COMMAND DECODER	C2	1	1.50	BUY	---	---		
* SEQUENCER	C2	1	10.00	BUY	---	---		
* CHEMICAL RELEASE (I-21)	D2	1	1472.00	GFE	GFP	---		THERMITE CANISTERS
* POWER SUPPLY	C2	1	3.00	MAKE	HMC	NEW		BATTERY, SWITCHING
* CABLE SET-CHEMICAL RELEASE	C2	1	2.00	MAKE	HMC	NEW		POWER AND SIGNAL SEPARATE
FOR CHEMICAL RELEASE (I-21)	C2	1	.50	BUY	---	O/S		TIE DOWN ORDNANCE
* CHEMICAL RELEASE STRUCTURE	C2	1	174.60	MAKE	HMC	NEW		INTEGRATED EQUIP MODULE
*PIC	C2	2	1.00	MAKE	HMC	O/S		FOR BURN INITIATION

\*\*\*\*\* CHEMICAL RELEASE

AMPS -----FLIGHT 2-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

NOHENCALTURE	PNL	QTY	UNIT WT (KG)	MAKE BUY GFE	POTENTIAL SOURCE	DEV STATUS	REUSE REHARKS CODE
RF PLASMA WAVE PACKAGE(I-12) D4		1	205.00	GFE	GFP	---	SUBSYSTEMS 1 AND 2 ONLY I-12,S/S 3-USE I-17C
DIPOLE ANTENNA (100 METERS) C4		1	19.96	BUY	XXX	NEW	

\*\*\*\*\* RF PLASMA WAVE PACKAGE

AMPS -----FLIGHT 2-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

NOHENCALTURE	PNL	QTY	UNIT WT (KG)	MAKE BUY GFE	POTENTIAL SOURCE	DEV STATUS	REUSE REHARKS CODE
UV/VIS/NIR SPEC (II-4)	D2	2	22.00	GFE	GFP	---	2 EBERT FASTIE UNITS ONLY

\*\*\*\*\* UV/VIS/NIR SPEC

AMPS ----- FLIGHT 2 ----- LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

NOMENCLATURE	PNL	QTY	UNIT WT (KG)	MAKE BUY GFE	POTENTIAL SOURCE	DEV STATUS	REUSE CODE	REMARKS
DEPLOYABLE TEST BODY(III-17)	D2	1	16.00	GFE	GFP	---		
* DEPLOYABLE TEST BODY	D2	1	4.00	GFE	GFP	---		III-17, SPHERICAL SHAPE
PROG EJEC (PWG, III-17)	C2	1	.90	MAKE	HMC	NEW		REL BALLOON PR RETRAC OF RMS
CAPTURE/RELEASE INTERFACE	C2	1	.50	MAKE	HMC	NEW		
PLASMA WAKE GENERATOR STRUCT	C2	1	20.40	MAKE	HMC	NEW		INTEGRATED EQUIP MODULE
DATA TRANSMITTER	C2	1	.50	BUY	---	O/S		
COMMAND RECEIVER	C2	1	1.00	BUY	---	O/S		A
DIPLEXER	C2	1	1.00	MAKE	BENDIX	NEW		
ANTENNA, STUB	C2	1	1.00	BUY	---	O/S		
PCM PROGRAMMER/MULTIPLEXER	C2	1	1.00	BUY	---	O/S		
COMMAND DECODER	C2	1	1.50	BUY	---	O/S		
POWER SUPPLY	C2	1	18.00	MAKE/B	HMC	NEW		BATTERY, SWITCHING
CABLE SET	C2	1	1.00	MAKE	HMC	NEW		POWER AND SIGNAL SEPARATE
STRIP HEATERS	C2	1	1.00	BUY	---	O/S		
MULTILAYER INSULATION	C2	1	1.70	BUY	---	O/S		
EXTENSION MECHANISM	C2	1	10.00	BUY	---	O/S		

\*\*\*\*\* PLASMA WAKE GENERATOR

AMPS -----FLIGHT 2-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

NOMENCLATURE	PNL	QTY	UNIT WT (KG)	MAKE BUY GFF	POTENTIAL SOURCE	DEV STATUS	REUSE REMARKS CODE
* TM XMITTER (S-BAND)	C4	1	.50	BUY	---	O/S	
* 10 METER DIPOLE ANTENNA	C4	1	2.00	BUY	---	O/S	
* CONICAL ANTENNA	C4	1	1.00	MAKE	BENDIX	NEW	
* CONICAL ANTENNA	C4	1	1.00	MAKE	BENDIX	NEW	
* COMMAND RECEIVER	C4	1	.60	BUY	---	O/S	
* DIPLEXER/SPLITTER	C4	1	1.00	MAKE	BENDIX	NEW	
* SUBCARRIER OSCILLATOR ASSY	C4	1	.90	MAKE	MHC	NEW	
* PCM PROGRAMMER/MULTIPLEXER	C4	1	2.00	BUY	---	O/S	
* COMMAND DECODER	C4	1	1.00	BUY	---	O/S	
* RF PLASMA WAVE (I-12)	D4	1	5.00	GFE	GFP	---	SUBSYSTEM 2 ONLY
* VECTOR MAGNETOMETER (III-2)	D4	1	4.10	GFE	GFP	---	SUBSYSTEM 2 AND 4 ONLY
* POWER SUPPLY-RF RCVR PKG	C4	1	10.00	BUY	---	NEW	
* CABLE SET-RF RECEIVER PKG	C4	1	1.00	MAKE	MHC	NEW	
PROG EJEC-RF RECEIVER PKG	C4	1	3.00	MAKE	MHC	NEW	5 M/S DELTA V
* PROG EJEC-RF RECEIVER PKG	C4	1	4.00	MAKE	MHC	NEW	5 M/S DELTA V
* SPIN TABLE-RF RCVR PKG	C4	1	4.50	MAKE	MHC	NEW	
RF RECEIVER PACKAGE STRUCT	C4	1	14.20	MAKE	MHC	NEW	INTEGRATED EQUIP MODULE
*STRIP HEATERS	C4	1	1.00	BUY	---	O/S	
*MULTILAYER INSULATION	C4	1	1.70	BUY	---	O/S	

\*\*\*\*\* RF RECEIVER PACKAGE

AMPS -----FLIGHT 2-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

NOMENCLATURE	PNL	QTY	UNIT WT (KG)	MAKE BUY GFE	POTENTIAL SOURCE	DEV STATUS	REUSE CODE	REMARKS
VECTOR MAGNETOMETER	D3	1	4.10	GFE	GFP	---		INSTRUMENT III-2
ION MASS + DIST ANALYSIS	D3	1	2.00	GFE	GFP	---		INSTRU III-10, ONE AXIS ONLY
PLANAR RPA	D3	1	3.00	GFE	GFP	---		INSTRUMENT III-19
LANGMUIR PROBE	D3	1	3.50	GFE	GFP	---		INSTRUMENT III-22
NEUTRAL MASS SPEC	D3	1	10.00	GFE	GFP	---		INSTRUMENT III-23
PLASMA WAKE DIA-STRUCTURE	C3	1	11.34	MAKE	MMC	NEW		INTEGRATED EQUIP MODULE
CAPTURE/RELEASE INTERFACE	C3	1	.60	MAKE	MHC	NEW		
DATA TRANSMITTER	C3	1	.50	BUY	---	O/S		
COMMAND RECEIVER	C3	1	.60	BUY	---	O/S	A	
DIPLERX	C3	1	1.00	MAKE	BENDIX	NEW	A	
ANTENNA, STUB	C3	1	1.00	BUY	---	O/S	A	
COMMAND DECODER	C3	1	1.40	BUY	---	O/S	A	
PCM PROGRAMMER/MULTIPLEXER	C3	1	2.00	BUY	---	O/S	A	
SUBCARRIER OSCILLATOR ASSY	C3	1	2.14	BUY	---	---	B	
POWER SUPPLY	C3	1	17.00	M/B	MHC	O/S		BATTERY/SWITCHING
CABLE SET	C3	1	1.40	MAKE	MHC	NEW		POWER AND SIGNAL SEPARATE
STRIP HEATERS	C3	1	1.00	BUY	---	O/S		
MULTILAYER INSULATION	C3	1	3.50	BUY	---	O/S		

\*\*\*\*\* PLASMA WAKE DIAGNOSTIC PKG

AMPS -----FLIGHT 2-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

NOMENCLATURE	PNL	QTY	UNIT WT (KG)	MAKE BUY GFE	POTENTIAL SOURCE	DEV STATUS	REUSE CODE	REMARKS
NEAR IR SPECTROMETER (II-9)	D4	1	60.00	GFE	GFP	---		

\*\*\*\*\* NEAR IR SPECTROMETER

APPENDIX B

INSTRUMENT BASELINE DATA

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# INSTRUMENT BASELINE DATA

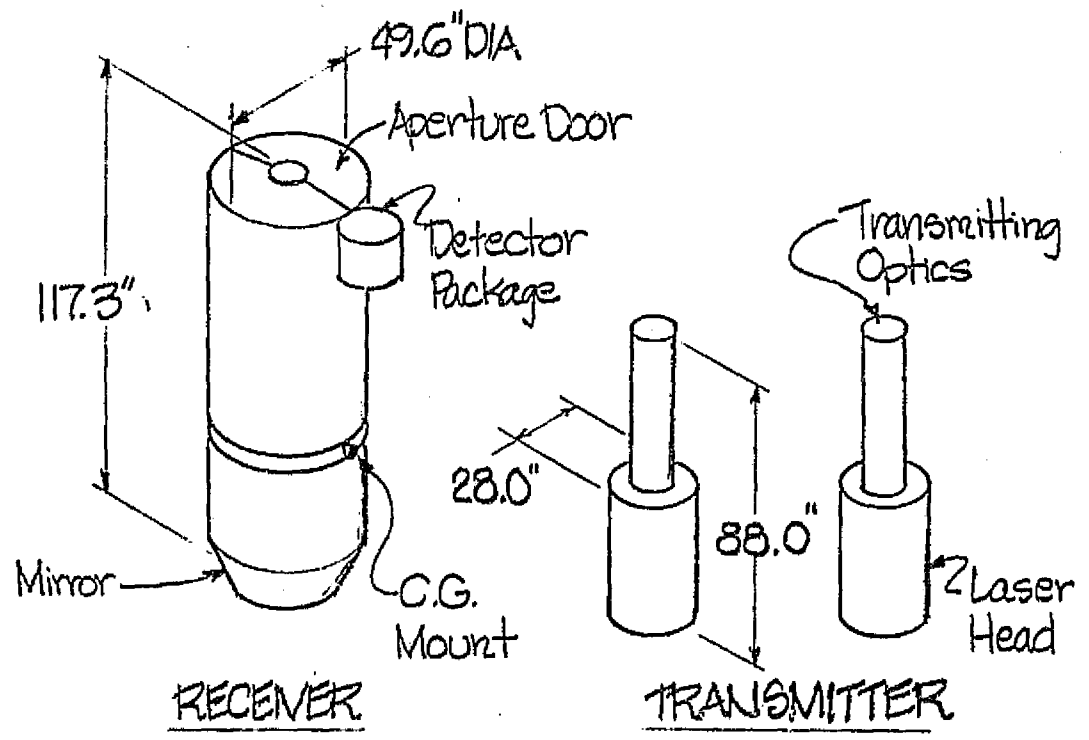
IFRD NO.: I-1

FLIGHT 

1	2
x	x

INSTRUMENT: LIDAR

## PHYSICAL DESCRIPTION



**WEIGHT:** Receiver: 300kg Transmitters: 75 kg each = 450kg  
**MOUNTING:** Pallet hard mount  
**OPERATIONAL REQUIREMENTS:** Co-alignment between transmitter & receiver, requires pulse power supply (capacitor bank), viewing: + Z axis, receiver & transmitters may be separated  
**SOURCE:** French version 1.0 meter Newton telescope

# INSTRUMENT BASELINE DATA

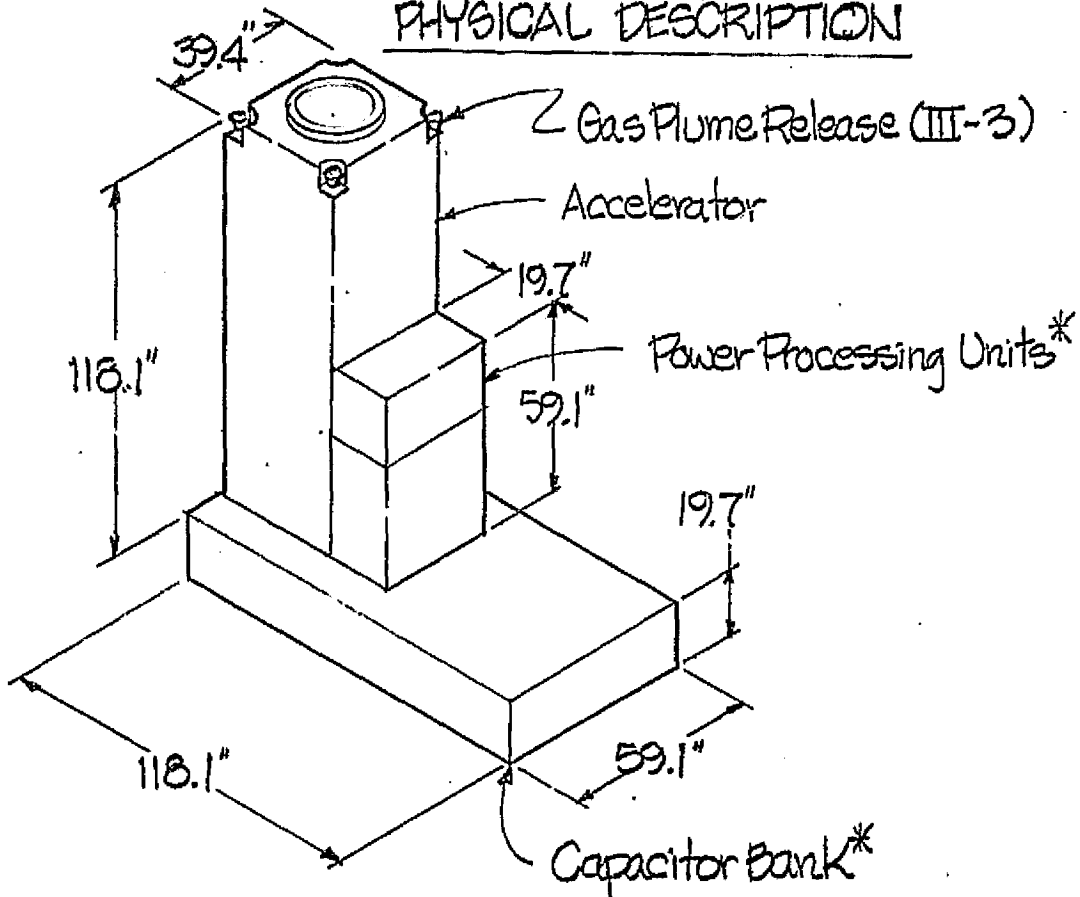
IFRD NO.: I-9

FLIGHT 

1	2
X	*

INSTRUMENT: ELECTRON ACCELERATOR \*Partial

## PHYSICAL DESCRIPTION



WEIGHT: Accelerator 40.5kg, Gas Release 9.0kg, Power Processing Unit 95kg, Capacitor Bank 600kg = 744.5kg

MOUNTING: Pallet hard mount

OPERATIONAL REQUIREMENTS: Share power supply with LIDAR (I-1), Capacitor Bank & Power Processing Units used on Flight 2

SOURCE: IFRD



## INSTRUMENT BASELINE DATA

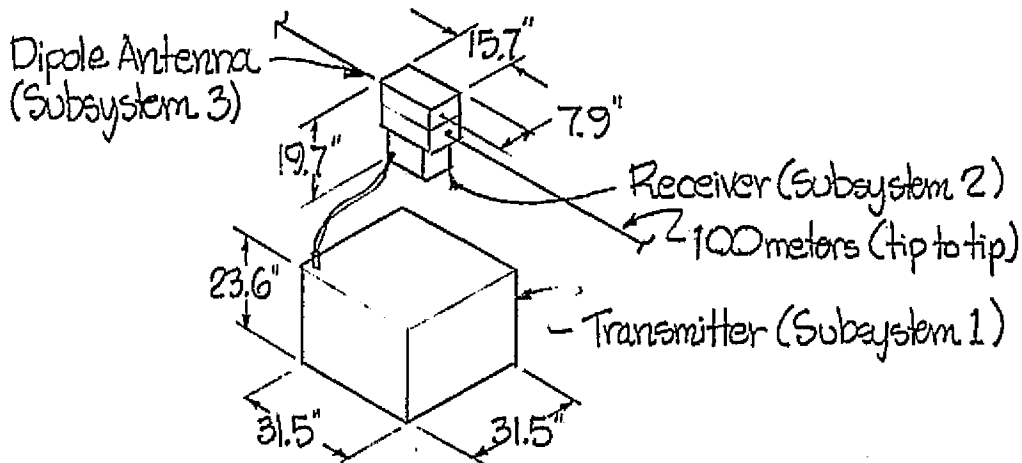
IFRD: I-12 (Subsystems 1, 2 & 3)

- FLIGHT

1	2
	X

INSTRUMENT: RF PLASMA WAVE

### PHYSICAL DESCRIPTION



WEIGHT: Transmitter 180 kg, Receiver 5 kg, Dipole Antenna 20 kg = 205 kg

MOUNTING: Pallet hard mount

OPERATIONAL REQUIREMENTS: Mount antenna as high in bay as possible

INSTRUMENT BASELINE DATA

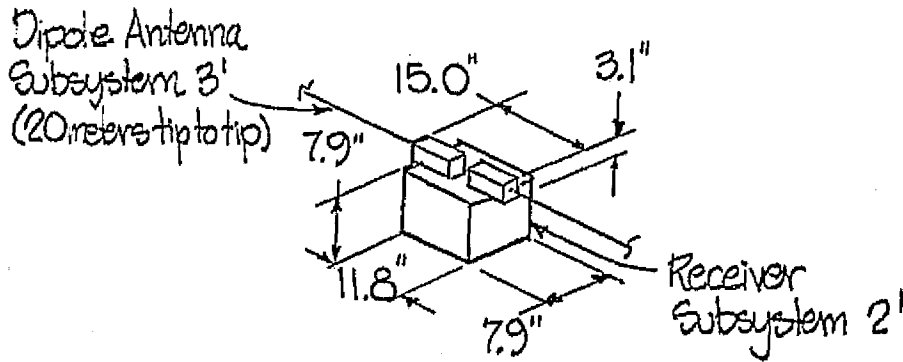
IFRD NO.: I-12 Subsystem 2' & 3'

FLIGHT

1	2
	X

INSTRUMENT: RF PLASMA WAVE PACKAGE

PHYSICAL DESCRIPTION



WEIGHT: Receiver 5kg, Antenna 1.0kg each = 7.0kg

MOUNTING: Mount on ejected module

OPERATIONAL REQUIREMENTS: Ejected from orbiter

SOURCE: IFRD

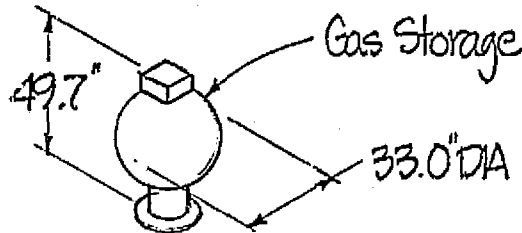
# INSTRUMENT BASELINE DATA

IFRD NO.: I-21 Subsystem 1  
INSTRUMENT: GAS RELEASE

FLIGHT 

1	2
X	

## PHYSICAL DESCRIPTION



6 REQUIRED

WEIGHT:

160Kg

MOUNTING: Pallet hand mount/Ejected

OPERATIONAL REQUIREMENTS: Ejected from orbiter  
( $\Delta V = 5\text{m/sec}$ ), Remote tank rupture to release gas

SOURCE: IFRD & MMC (See MMC sketch SK05-006)

# INSTRUMENT BASELINE DATA

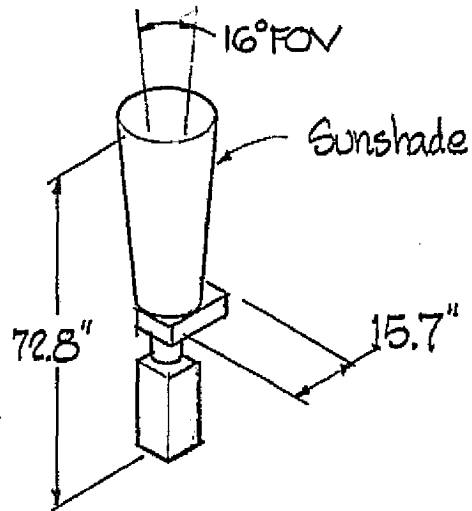
IFRD NO.: II-3 Subsystem 1

FLIGHT 

1	2
x	x

INSTRUMENT: OPTICAL BAND IMAGER & PHOTOMETER SYSTEM

## PHYSICAL DESCRIPTION



WEIGHT: OBIPS 38kg, Sunshade 5kg

43.0kg

MOUNTING: Pointing platform mount required

OPERATIONAL REQUIREMENTS: Viewing "over the sill,"

SOURCE: IFRD & MMC (sunshade)

INSTRUMENT BASELINE DATA

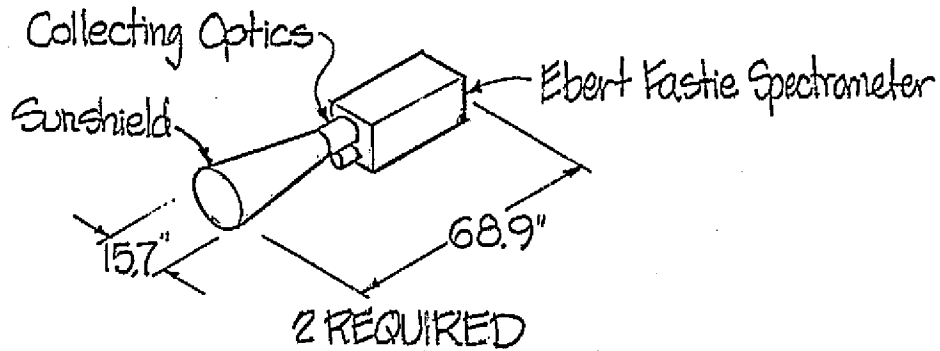
IFRD NO.: II-4

FLIGHT 

1	2
	X

INSTRUMENT: UV-VIS-NIR SPECTROMETER

PHYSICAL DESCRIPTION



WEIGHT: 11 Kg each

11.0 Kg

MOUNT: Pointing platform

OPERATIONAL REQUIREMENTS: Co-alignment between spectrometers & OBIPS, requires environmental enclosure

SOURCE: IFRD

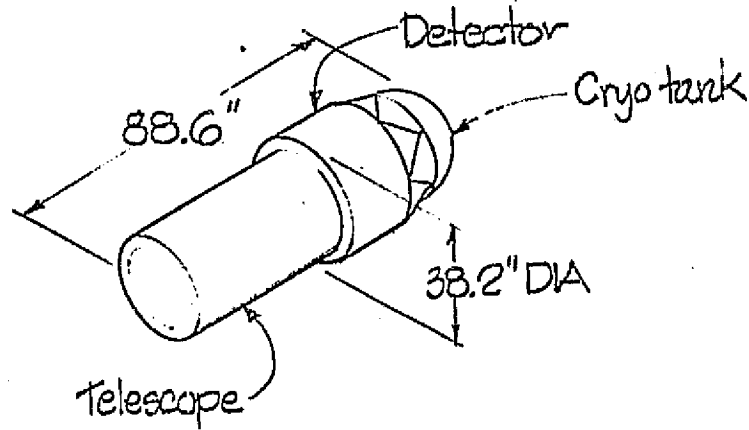
(Signature)

INSTRUMENT BASELINE DATA

IFRD NO.: II-7  
INSTRUMENT: CRYO LIMB SCANNER

	1	2
FLIGHTS	X	X

PHYSICAL DESCRIPTION



WEIGHT: Limb scanner 207kg Cryo 135kg = 342kg

MOUNTING: Pointing platform

OPERATIONAL REQUIREMENTS: "Over the all" viewing (+Y),  
Co-alignment with II-10

SOURCE: IFRD & MMC

# INSTRUMENT BASELINE DATA

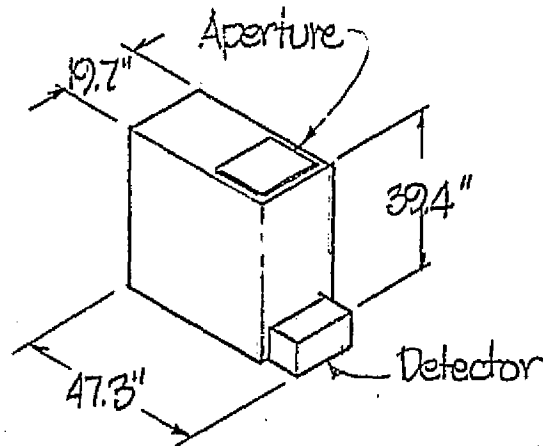
IFRD NO.: II-9

FLIGHT 

1	2
X	X

INSTRUMENT: NEAR IR SPECTROMETER

## PHYSICAL DESCRIPTION



WEIGHT: Spectrometer 50kg, Detector 10kg = 60kg

MOUNTING: Pointing platform

OPERATIONAL REQUIREMENTS: Environmental enclosure required,  $\pm Y$  viewing

SOURCE: IFRD

# INSTRUMENT BASELINE DATA

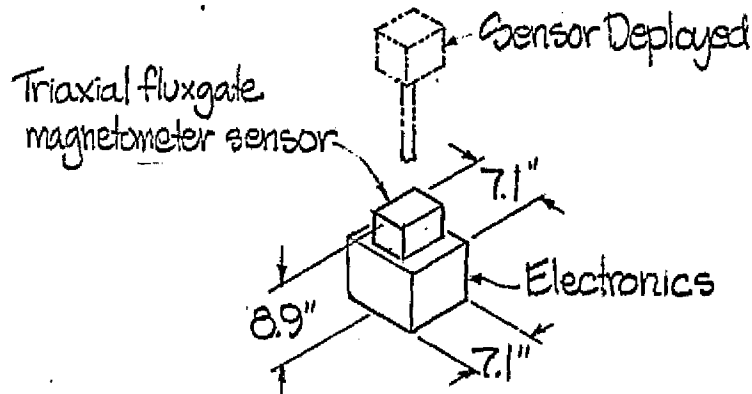
IFRD NO.: III-2

FLIGHT 

1	2
X	X

INSTRUMENT: VECTOR MAGNETOMETER

## PHYSICAL DESCRIPTION



WEIGHT: Electronics 3.6kg Sensor .5kg = 4.1 kg  
MOUNTING: Mount on deployed & ejected modules  
OPERATIONAL REQUIREMENTS: Sensor deployed away from electronics during operation

SOURCE: IFRD



# INSTRUMENT BASELINE DATA

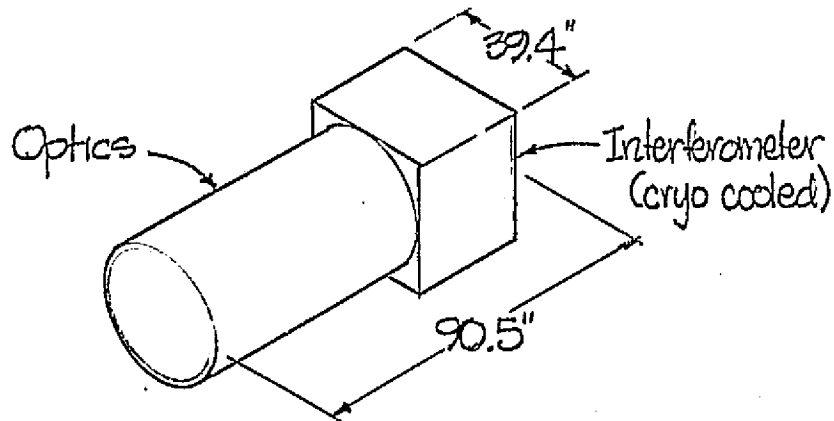
IFRD NO.: II-10

FLIGHT 

1	2
X	X

INSTRUMENT: CRYO IR INTERFEROMETER SPECTROMETER

## PHYSICAL DESCRIPTION



WEIGHT: Interferometer 215kg Cryo 135kg = 350kg

MOUNTING: Pointing platform

OPERATIONAL REQUIREMENTS: "Over the sill viewing" (+Y),  
Co-alignment with II-7

SOURCE: IFRD

INSTRUMENT BASELINE DATA

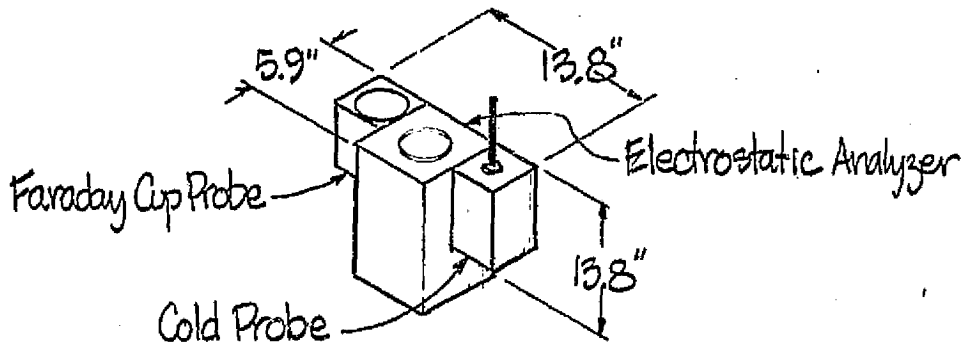
IFRD NO.: III-4

FLIGHT 

1	2
x	

INSTRUMENT: LEVEL II BEAM DIAGNOSTICS

PHYSICAL DESCRIPTION



WEIGHT: Faraday probe 7kg, Electrostatic analyzer 9kg,  
Cold probe 5k

23kg

MOUNTING: Mount on deployed package

OPERATIONAL REQUIREMENTS: Deploy over and scan  
electron accelerator beam

SOURCE: IFRD

INSTRUMENT BASELINE DATA

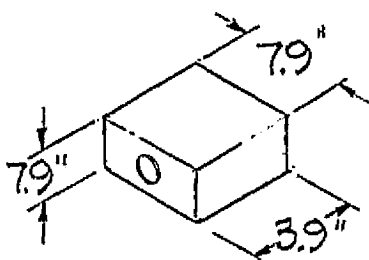
IFRD NO.: III-10

FLIGHT 

1	2
	X

INSTRUMENT: ION MASS & DISTRIBUTION ANALYSIS

PHYSICAL DESCRIPTION



WEIGHT:

2kg

MOUNTING: Mount on deployed module

OPERATIONAL REQUIREMENTS: Orient facing velocity vector

SOURCE: IFRD

# INSTRUMENT BASELINE DATA

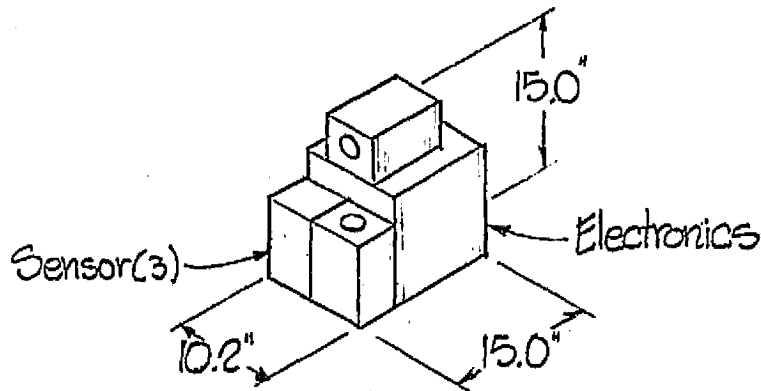
IFRD NO.: III-16

FLIGHT 

1	2
X	

INSTRUMENT: ION MASS & DISTRIBUTION ANALYZER

## PHYSICAL DESCRIPTION



WEIGHT: Electronics 2Kg Sensors 3Kg = 5Kg  
MOUNTING: Mount on deployed module  
OPERATIONAL REQUIREMENTS: Orient sensors parallel & perpendicular to module spin axis

SOURCE: IFRD

## INSTRUMENT BASELINE DATA

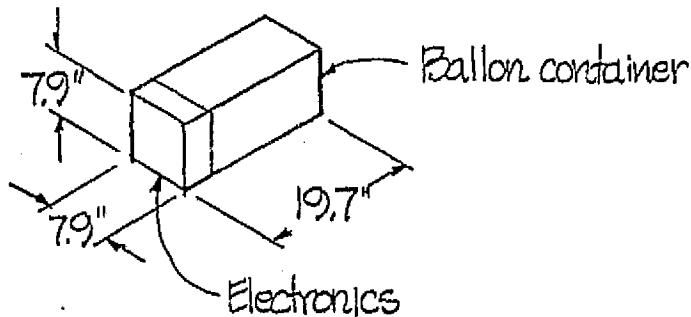
IFRD NO.: III-17

FLIGHT

1	2
	X

INSTRUMENT: PLASMA WAKE GENERATOR

### PHYSICAL DESCRIPTION



WEIGHT:

20kg

MOUNTING: Mount on deployed module

OPERATIONAL REQUIREMENTS: Package to be deployed approx 70' beyond payload bay, ballon is jettisoned & package is restowed

SOURCE: IFRD #MMC

INSTRUMENT BASELINE DATA

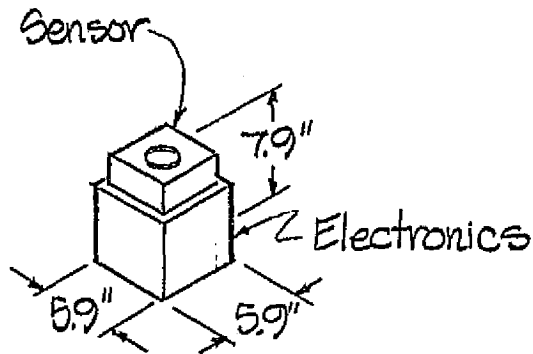
IFRD NO.: III-18

FLIGHT

1	2
X	X

INSTRUMENT: RETARDING POTENTIAL ANALYZER

PHYSICAL DESCRIPTION



WEIGHT:

3Kg

MOUNTING: Mount on deployed/ejected modules

OPERATIONAL REQUIREMENTS = Approx 180° FOV, exposed conducting surface required

SOURCE: IFRD

# INSTRUMENT BASELINE DATA

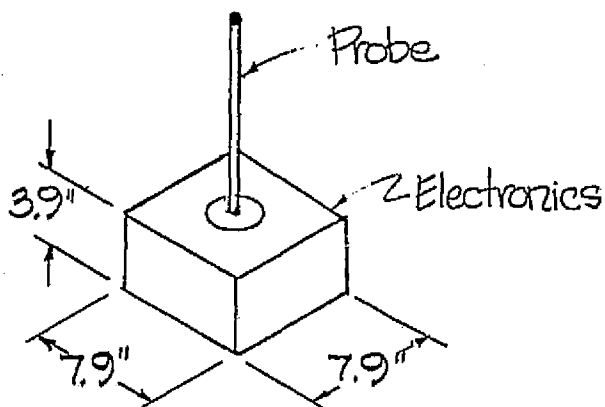
IFRD NO. III-22

FLIGHT 

1	2
X	X

INSTRUMENT: LANGMUIR PROBE

## PHYSICAL DESCRIPTION



WEIGHT:

3.5 kg

MOUNTING: Mount on deployed/ejected modules

OPERATIONAL REQUIREMENTS: Conducting surface required

SOURCE: IFRD

# INSTRUMENT BASELINE DATA

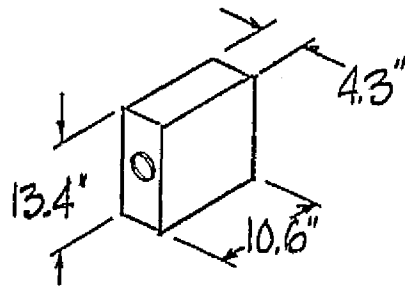
IFRD NO.: III-23

FLIGHT

1	2
X	X

INSTRUMENT: NEUTRAL MASS SPECTROMETER

## PHYSICAL DESCRIPTION



WEIGHT:

10kg

MOUNTING: Mount on deployed modules

OPERATIONAL REQUIREMENTS: Orient facing velocity vector

SOURCE: IFRD



# INSTRUMENT BASELINE DATA

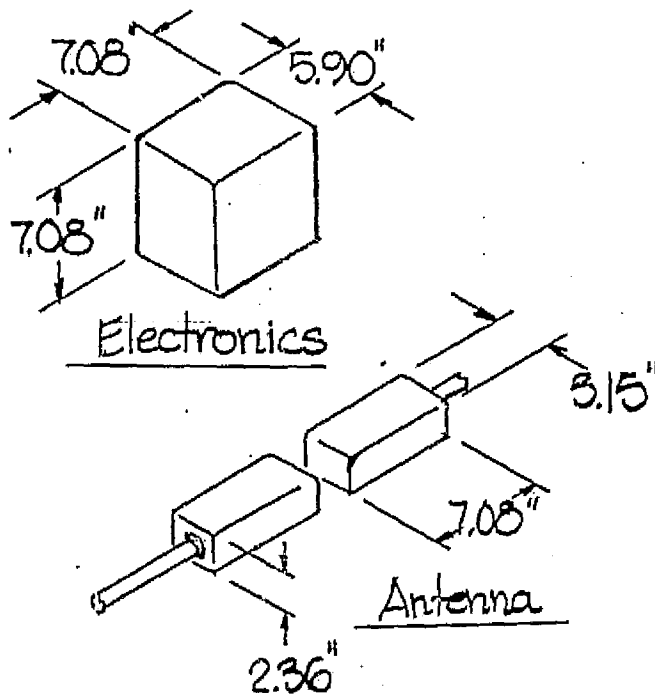
IFRD NO. : III-25 Subsystem A

FLIGHT

1	2
X	

INSTRUMENT: EMI DIAGNOSTICS PACKAGE

## PHYSICAL DESCRIPTION



WEIGHT: Electronics: 3kg Antenna: 1kg each =  
MOUNTING: Mount on deployed/ejected module  
OPERATIONAL REQUIREMENTS:

5kg

SOURCE: MMC

INSTRUMENT BASELINE DATA

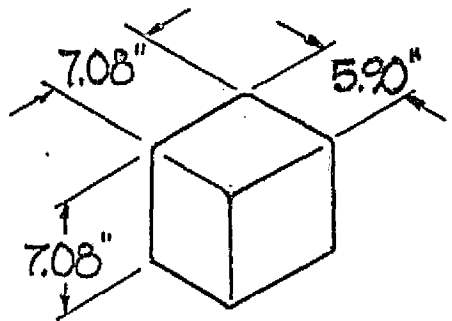
IFRD NO. : III-25 Subsystem B

INSTRUMENT: EMI DIAGNOSTICS PACKAGE

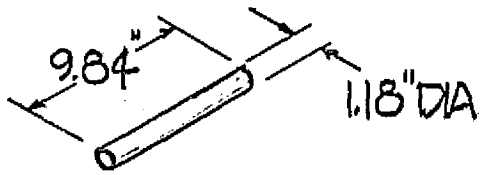
FLIGHT 

1	2
X	

PHYSICAL DESCRIPTION



Electronics



Antenna

WEIGHT: Electronics : 3kg Antenna 1kg =  
MOUNTING: Mount on deployed/ejected module  
OPERATIONAL REQUIREMENTS:

4kg

SOURCE: MMC

- INSTRUMENT BASELINE DATA

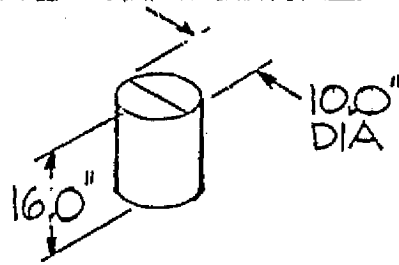
IFRD NO.: IV-1

- FLIGHT

1	2
x	x

INSTRUMENT: SOLAR FLUX MONITOR

PHYSICAL DESCRIPTION



-WEIGHT:

3kg

MOUNTING: Pallet hard mount

OPERATIONAL REQUIREMENTS: Orient towards sun (+Z)

SOURCE: MMC

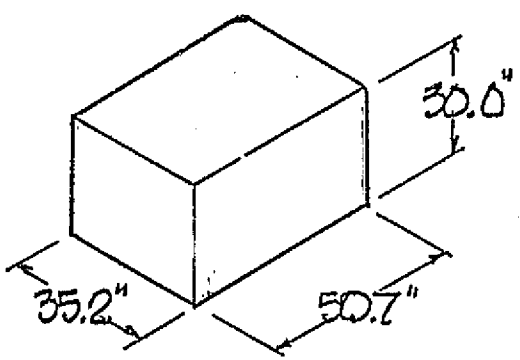
- INSTRUMENT BASELINE DATA

IFRID NO.: NONE  
INSTRUMENT: INDUCED EMIR. CONTAMINATION MONITOR

FLIGHT 

X	2
---	---

PHYSICAL DESCRIPTION



WEIGHT: 160 kg  
MOUNTING: Pallet hard mount  
OPERATIONAL REQUIREMENTS:

SOURCE: MSFC

APPENDIX C

ENGINEERING DRAWINGS

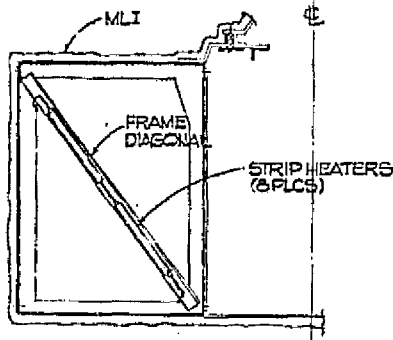
PRECEDING PAGE BLANK NOT FILMED

ENGINEERING DRAWINGS

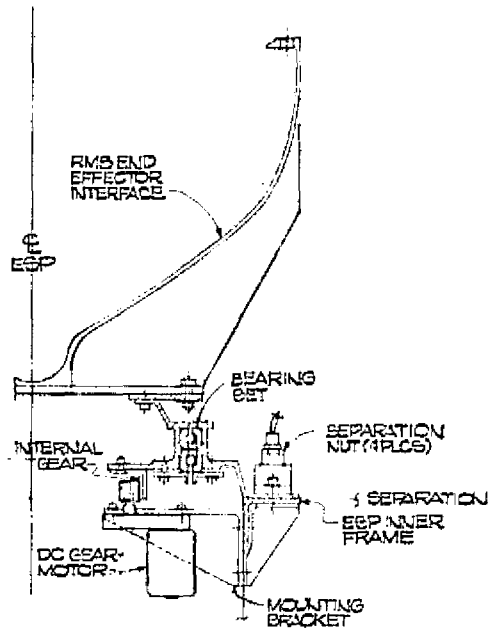
INDEX

SK05-004	ESP Equipment Layout (sheets 1 and 2)
SK05-005	Beam Diagnostic Package Equipment Layout
SK05-006	Gas Release Module Equipment Layout
SK05-007	RF Receiver Package Equipment Layout
SK05-008	Plasma Wake Diagnostics Package Equipment Layout
SK05-009	Chemical Release Module Equipment Layout
SK05-010	Plasma Wake Generator Equipment Layout
SK05-011	Flight 1 - Aft Pallet Layout

EJECTION SPRINGS (4 PLCS)



SECTION E-E



SECTION A-A  
SCALE: 1/2  
(MLI OMITTED)  
ROTATED 22 1/2° CW

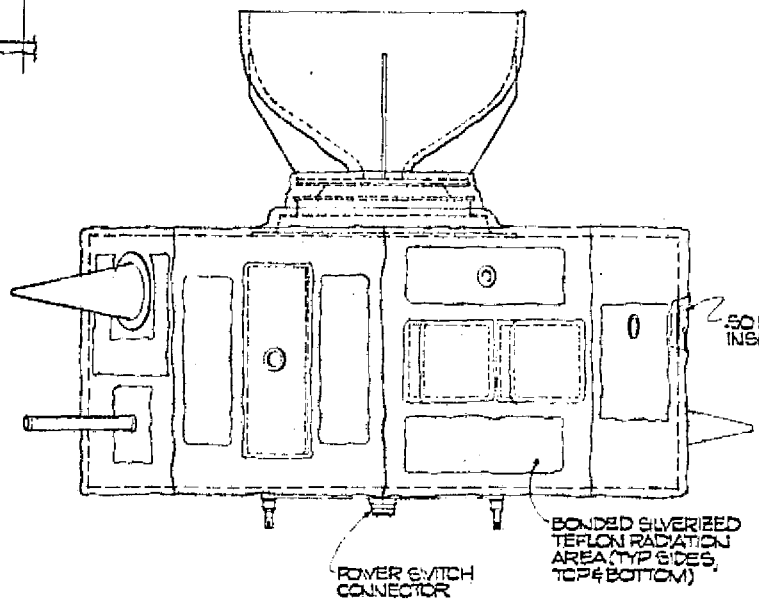
SEE SHEET 2 FOR EQUIPMENT LAYOUT & FRAME DETAILS

E  
Y

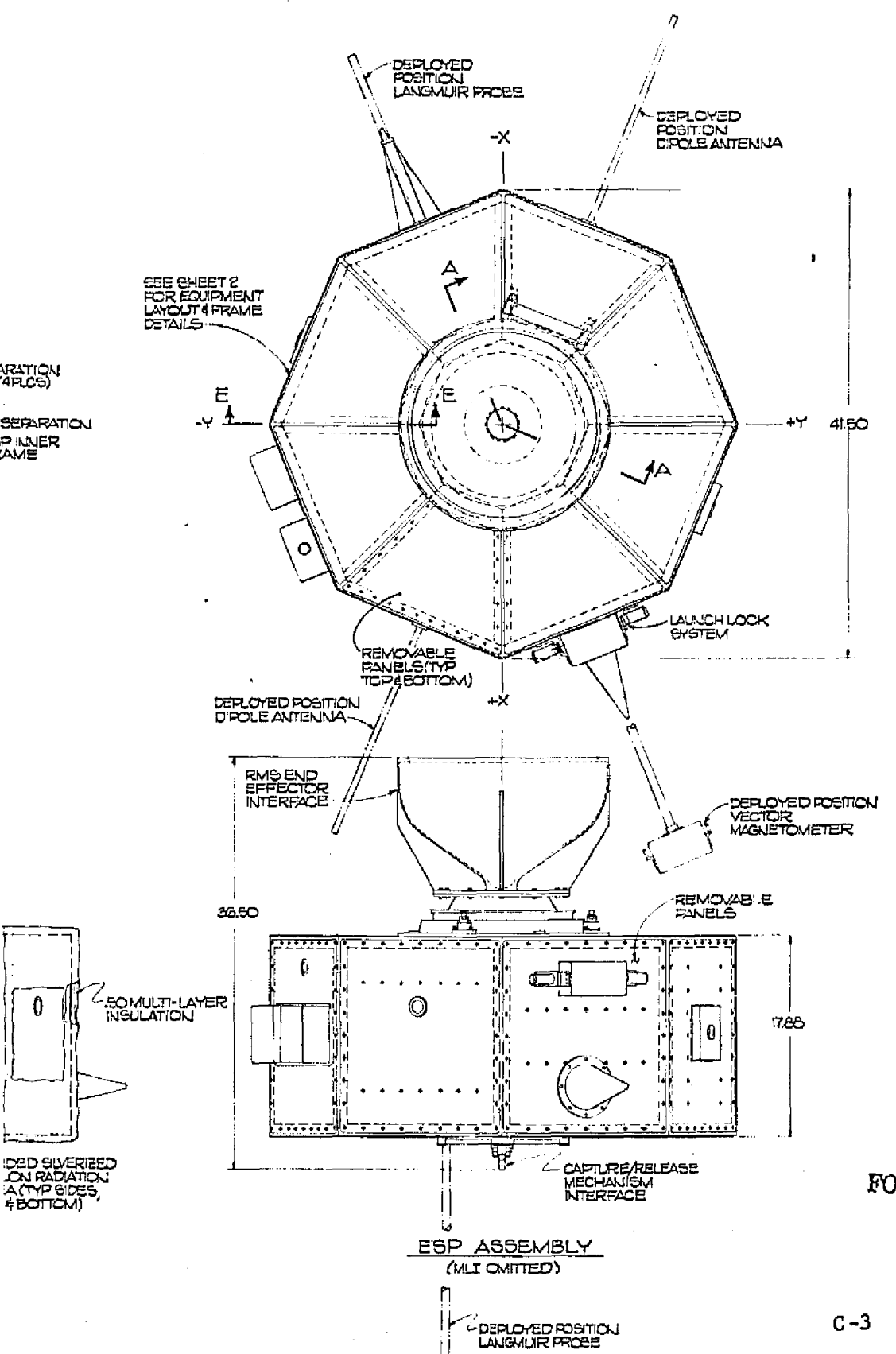
DEPLOYED POSITION  
DIPPLE ANTE

RMS END EFFECTOR INTERFACE

22.50

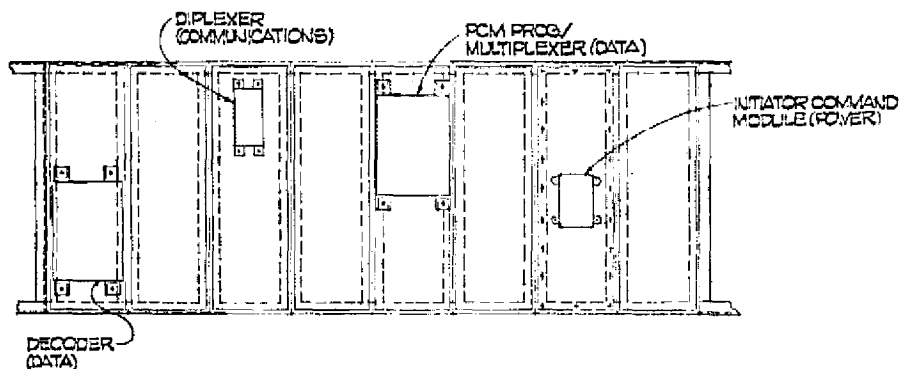


FOLDOUT FRAME

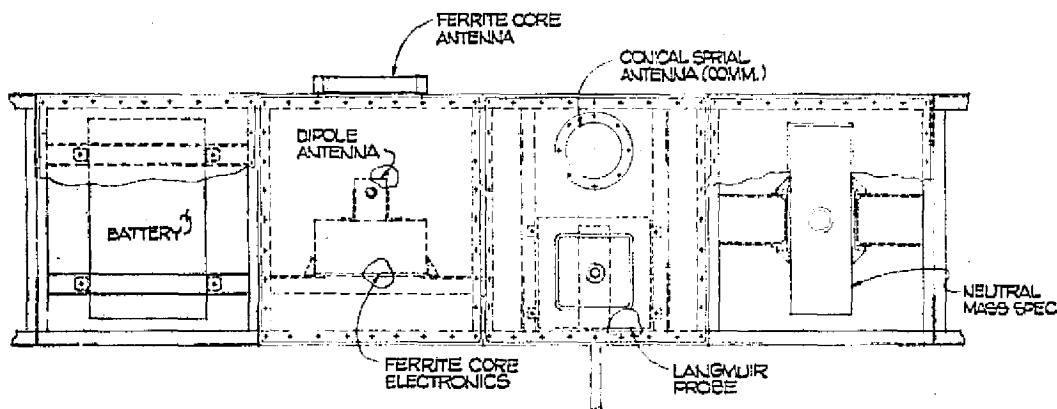


FOLDOUT FRAME 2

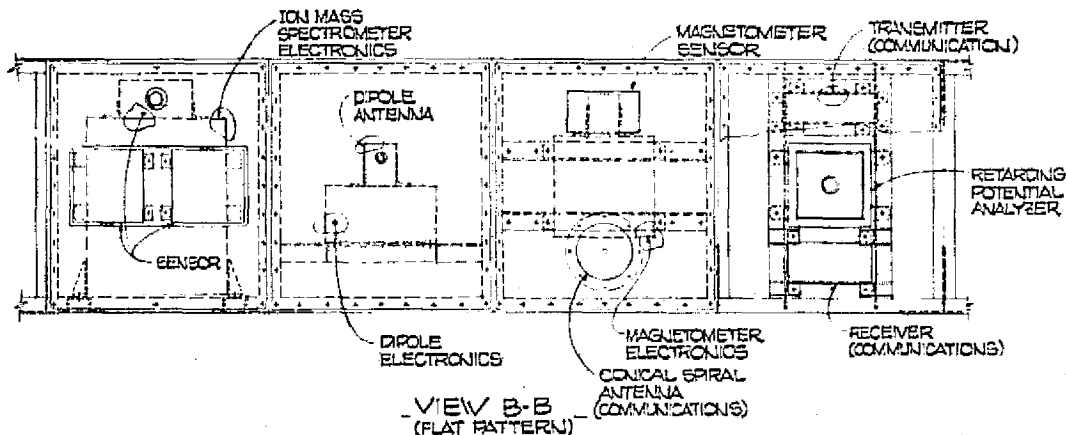




EQUIPMENT COMPARTMENT  
(FLAT PATTERN)



VIEW C-C  
(FLAT PATTERN)  
ROTATED 180°



VIEW B-B  
(FLAT PATTERN)

FOLDOUT FRAME

LAN  
PRG  
ELE  
(II-7)

NEUTRAL MASS SPEC (II-23)

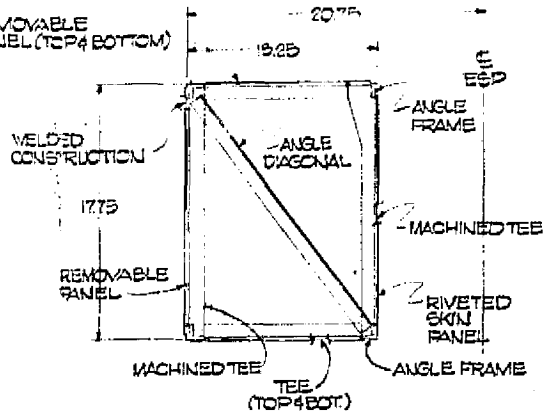
PCM PROGRAMMER MULTIPLEXER (DATA)

ION MASS SPEC SENSOR (II-12)

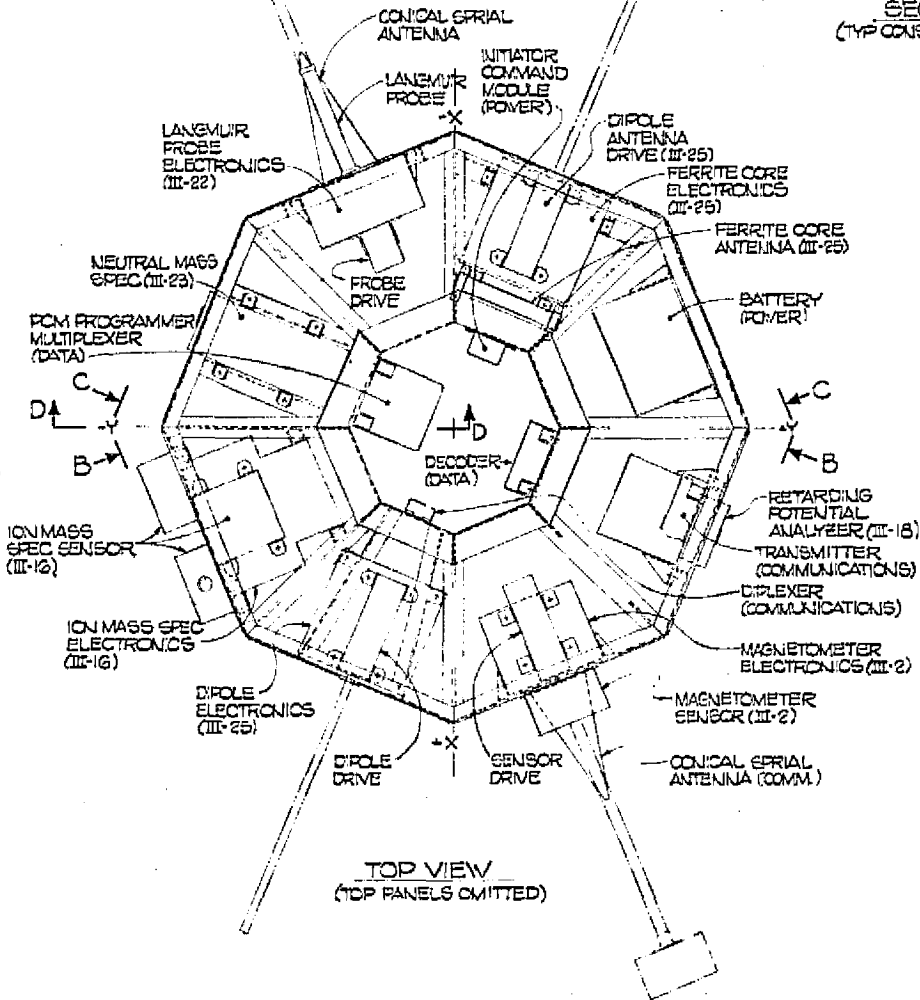
ION MASS SPEC ELECTRONICS (II-16)

DA  
C  
B

REMOVABLE PANEL (TOP & BOTTOM)



SECTION D-D  
(TYP CONSTRUCTION DETAILS)

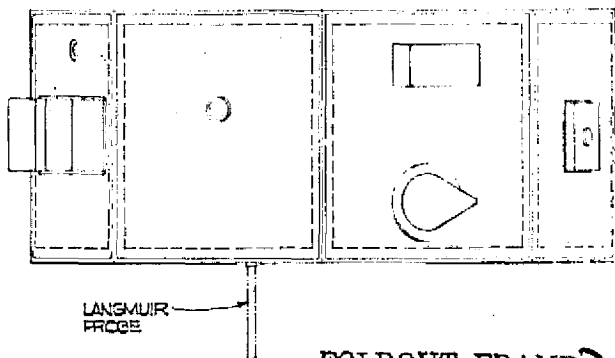


**MATERIALS:**

SKIN & FORMED SHAPES - 6061-T6 ALUM. SHEET  
MACHINED FITTINGS & BERTS - 6061-T6 ALUM. PLATE  
ACTUATORS & LOCKS - STEEL & ALUMINUM

**FINISHES:**

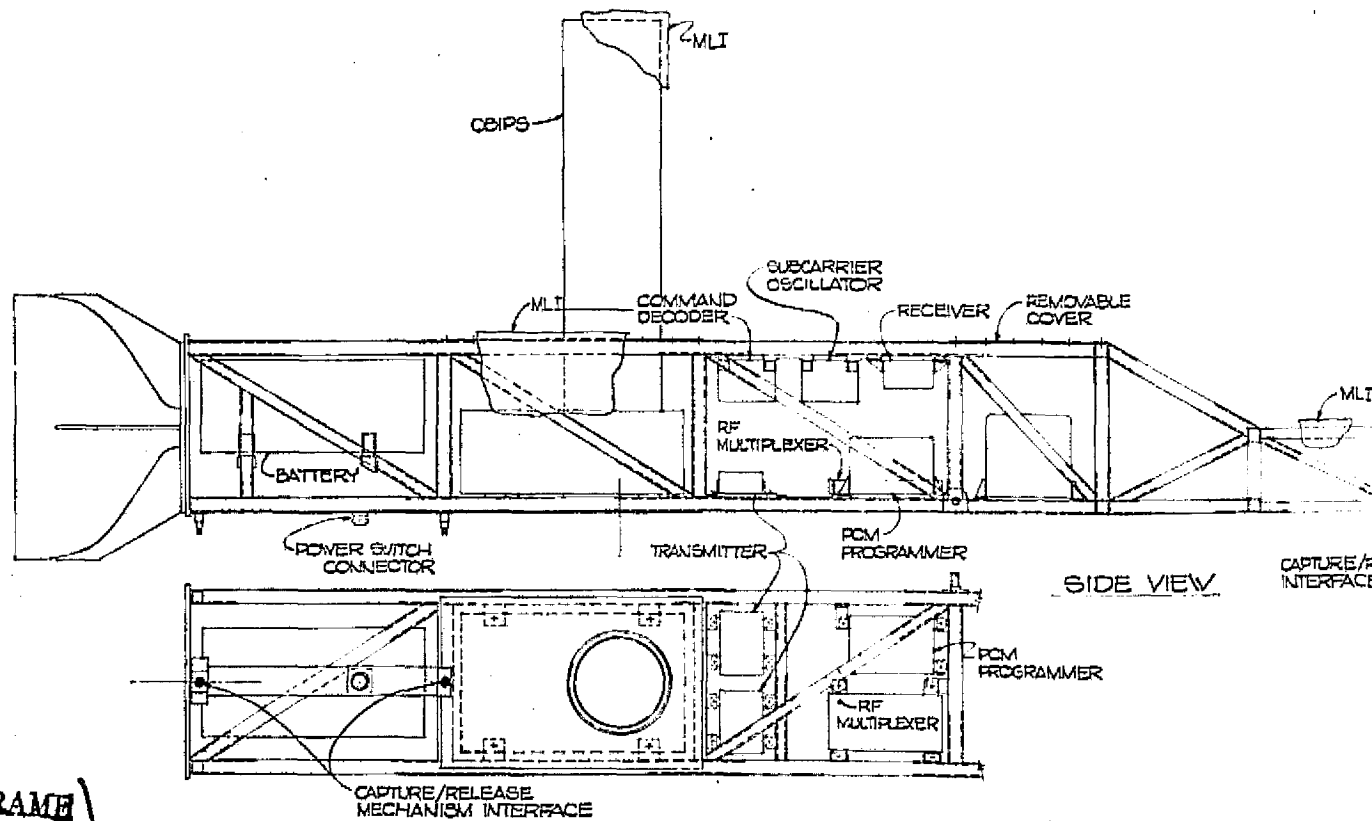
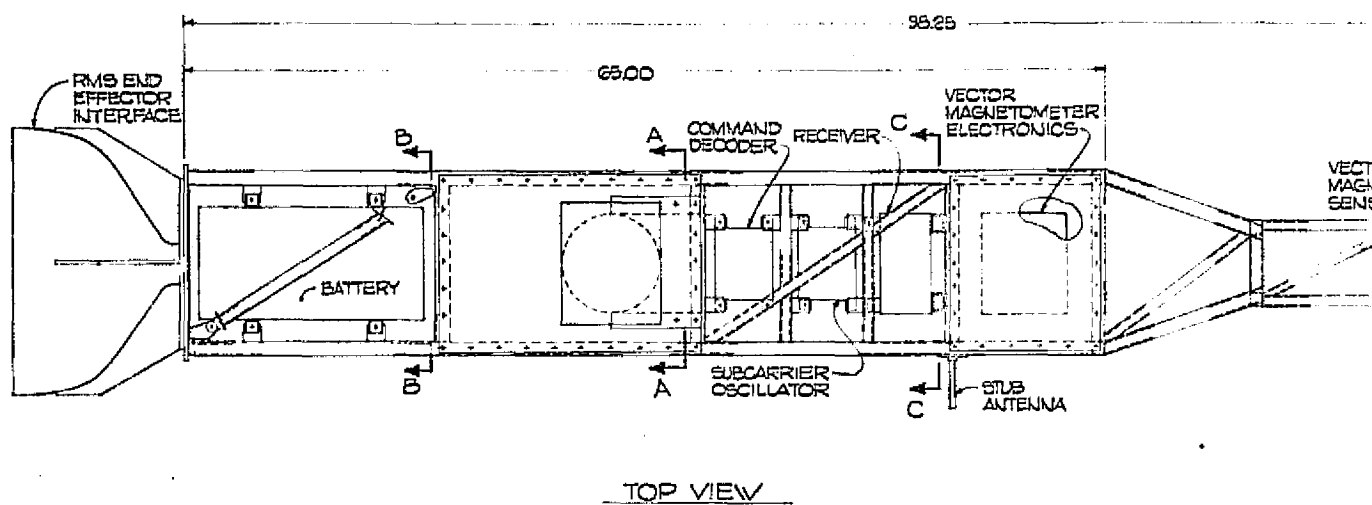
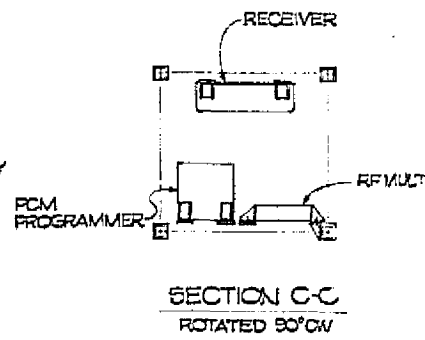
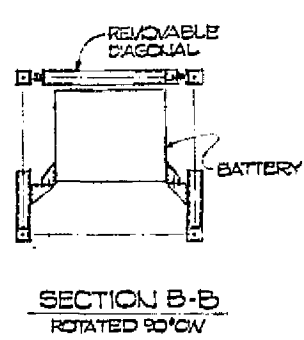
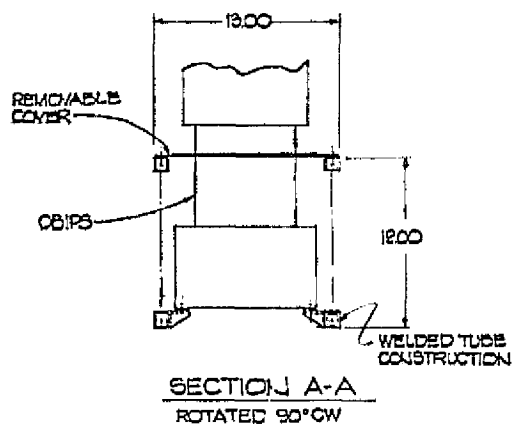
PRIME ALL ALUMINUM  
DIFFUSE BLACK PAINT ON INSIDE SURFACES



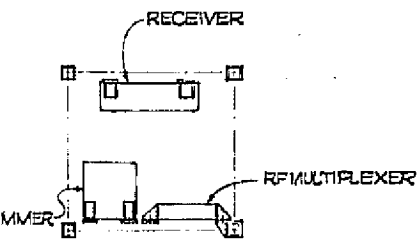
FOLDOUT FRAME

G-4

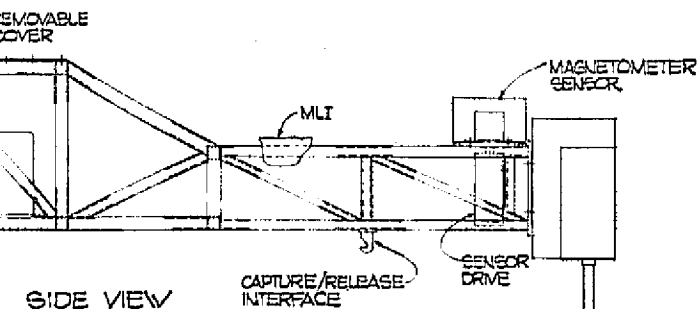
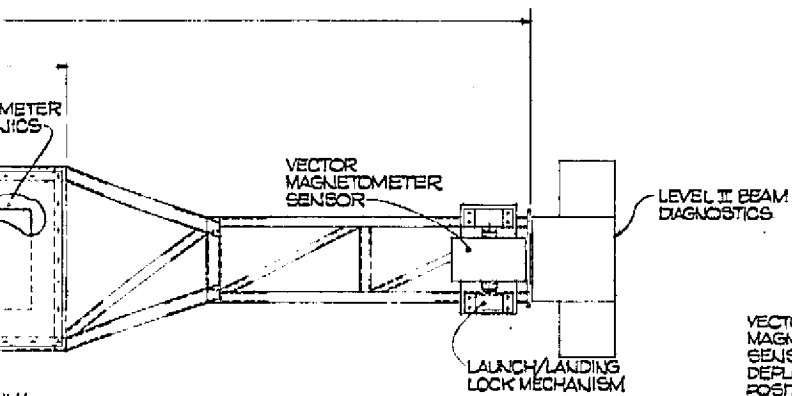
SK05-004  
ESP-EQUIPMENT LAYOUT &  
STRUCTURAL CONCEPT  
SCALE: 1/4" = 15 JULY 76 SHEET 2 OF 2



FOLDOUT FRAME



SECTION C-C  
ROTATED 90° CW



MATERIALS

FRAME: 6061-T6 ALUM. TUBES  
 SKIN & COVERS: 6061-T6 ALUM. SHEET  
 ACTUATORS & LOCKS: STEEL & ALUM.  
 MACHINED FITTINGS: 6061-T6 ALUM. PLATE  
 INSULATION: ALUMINIZED MYLAR (MULTILAYER)

FINISHES

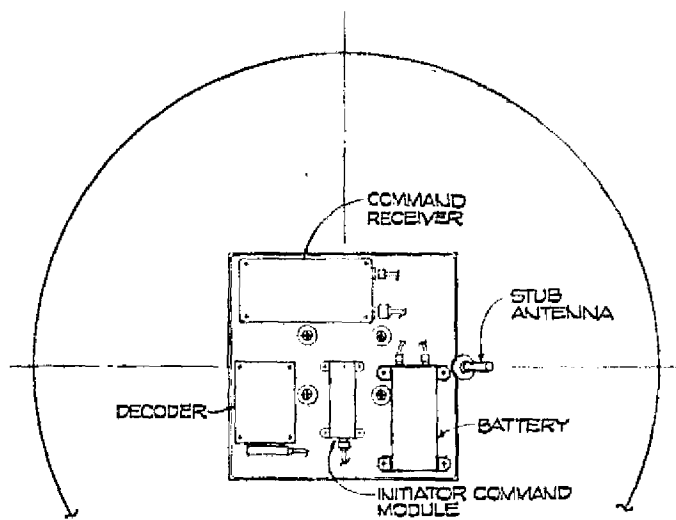
IRIDITE ALL ALUMINIUM  
 SILVER COATED TEFLON RADIATION AREAS  
 DIFFUSE BLACK PAINT ON INSIDE SURFACES



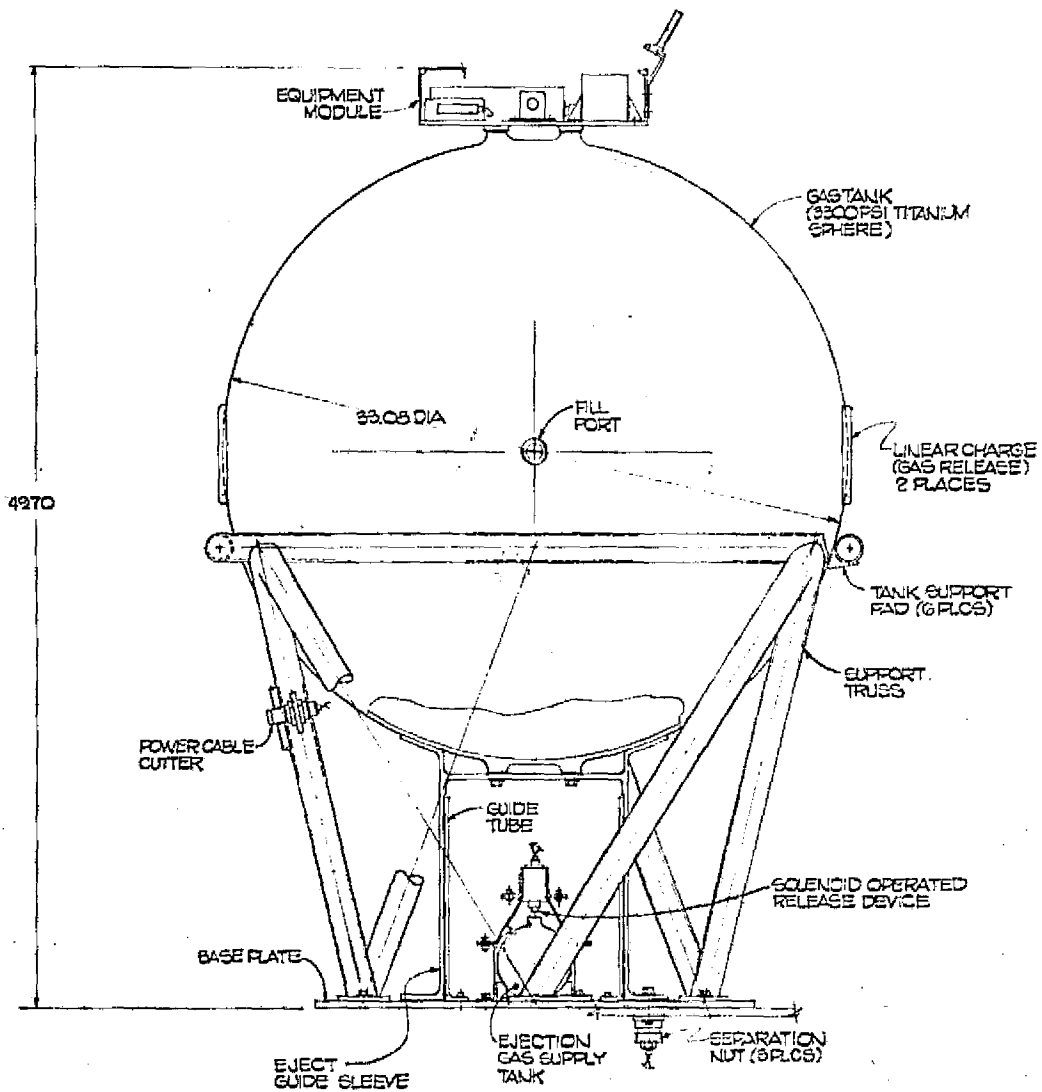
FOLDOUT FRAME 2

C-5

SK05-005  
 BEAM DIAGNOSTICS PKG.  
 EQUIPMENT LAYOUT  
 SCALE: 1/4" = 1" 26 JULY 76 SHEET 1 OF 1



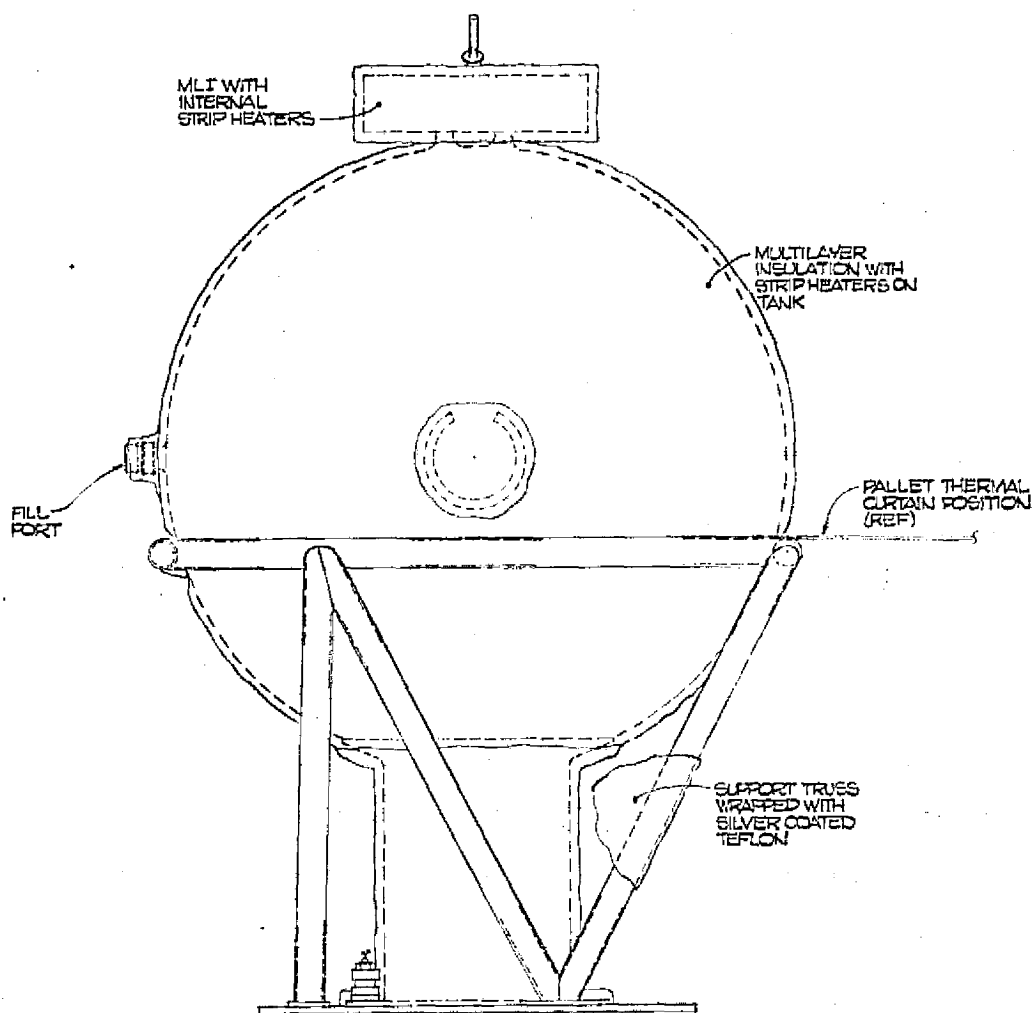
TOP VIEW



STRUCTURAL & MECHANICAL DETAILS

WELDOUT FRAME

MLT WITH INTERNAL STRIP HE



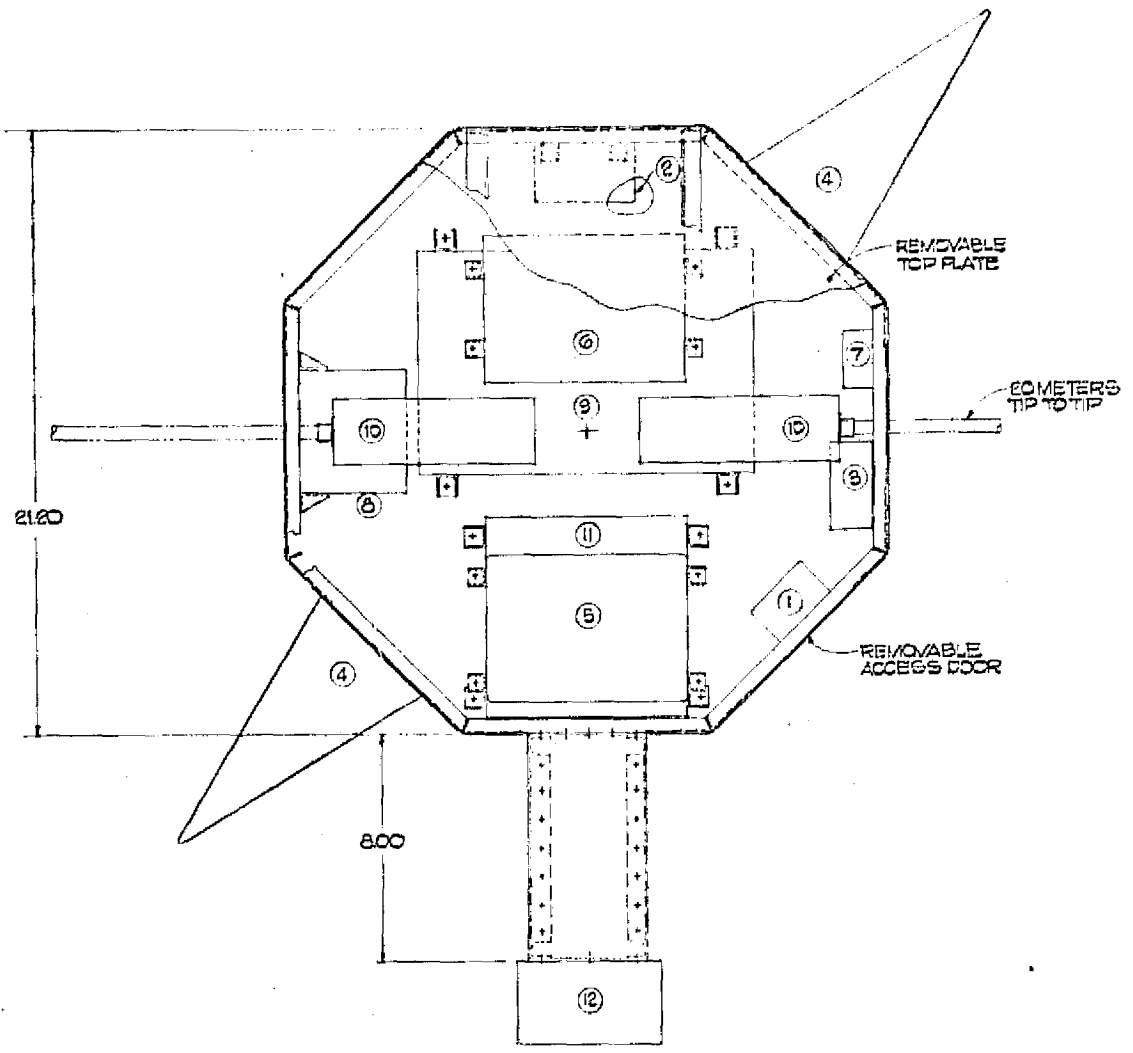
ASSEMBLY

MATERIALS

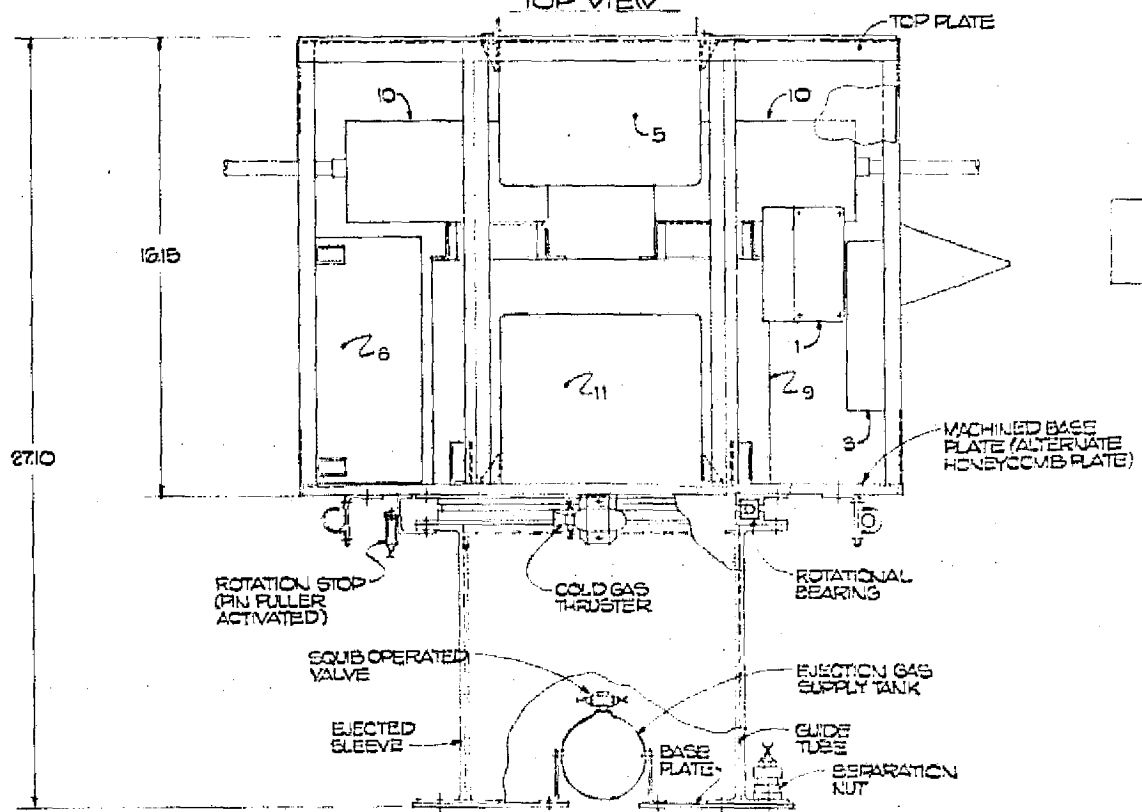
TANK: FORGED & WELDED TITANIUM  
 TRUSS: 6061-T6 ALUM. TUBE  
 MACHINED FITTINGS & BRKTS: 6061-T651 PLATE  
 INSULATION: ALUMINIZED MYLAR (MULTILAYER)

FINISHES

IRIDITE ALL ALUMINUM  
 SILVER COATED TEFLON RADIATION AREAS

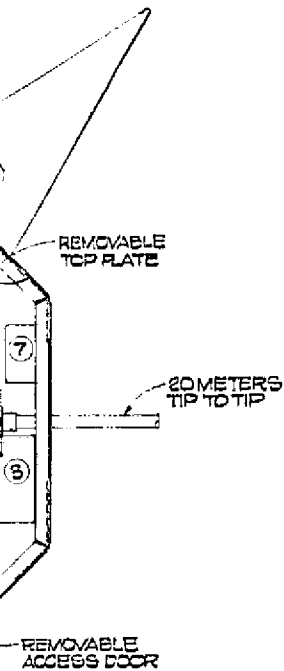


TOP VIEW



STRUCTURAL & MECHANICAL DETAILS  
(MAGNETOMETER SENSOR NOT SHOWN)

FOLDOUT FRAME



EQUIPMENT LIST

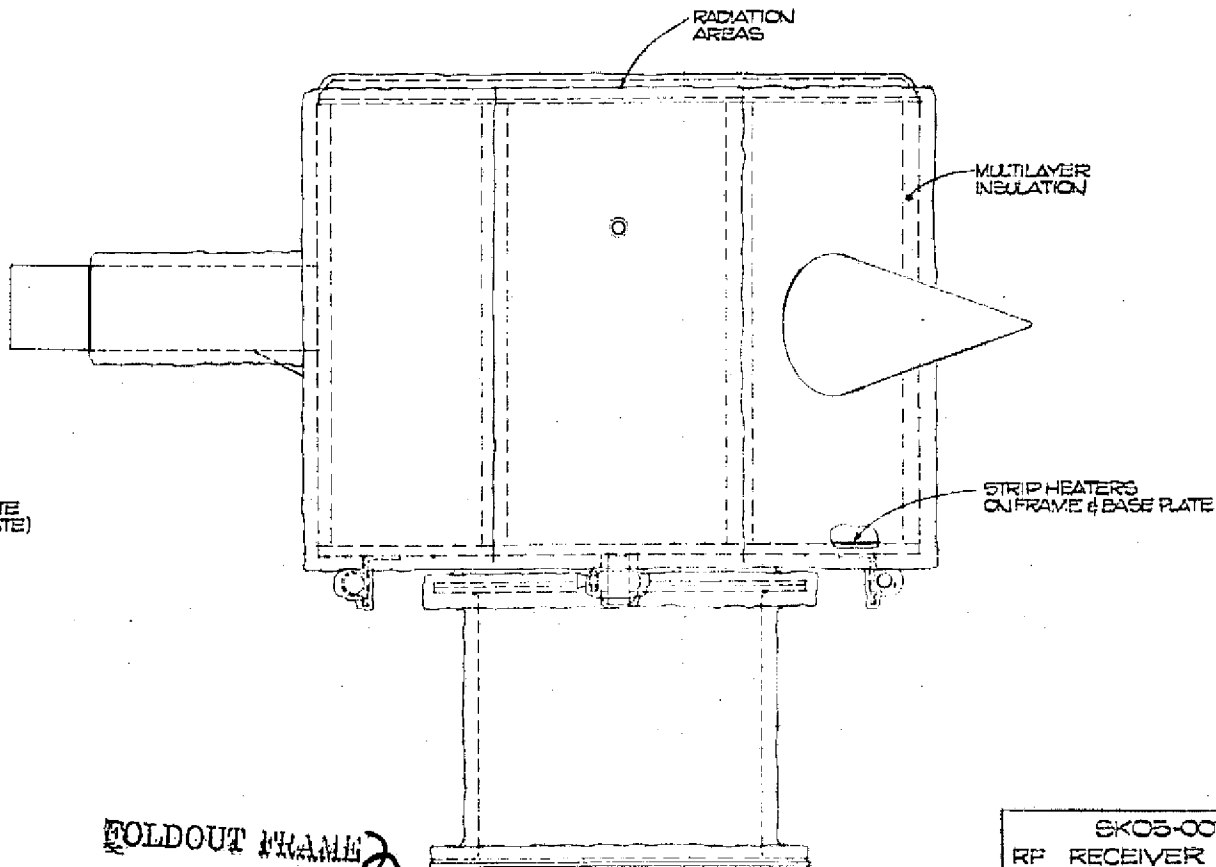
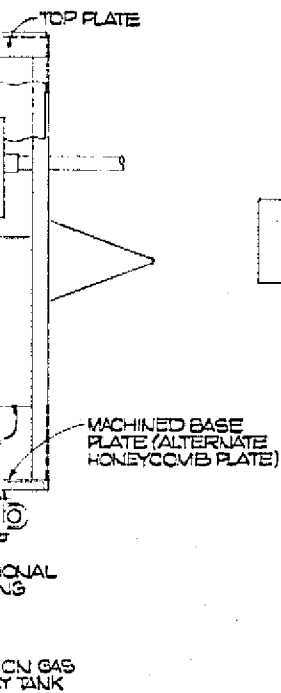
- 1 TRANSMITTER
- 2 COMMAND RECEIVER
- 3 DIPLEXER/SPLITTER
- 4 CONICAL ANTENNA
- 5 PROGRAMMER
- 6 DECODER
- 7 PREMODULATION PROCESSOR
- 8 BATTERY
- 9 RF PLASMA WAVE ELECTRONICS (I-12)
- 10 RF PLASMA WAVE DIPOLE ANTENNA
- 11 VECTOR MAGNETOMETER ELECTRONICS (II-2)
- 12 VECTOR MAGNETOMETER GENERATOR

MATERIALS

FRAME (MACHINED SHAPES): 6061-T651 PLATE  
 SKIN & FORMED SHAPES: 6061-T6 ALUM. SHEET  
 FITTINGS & BRACKETS: 6061-T651 ALUM. PLATE  
 INSULATION: ALUMINIZED MYLAR (MULTILAYER)

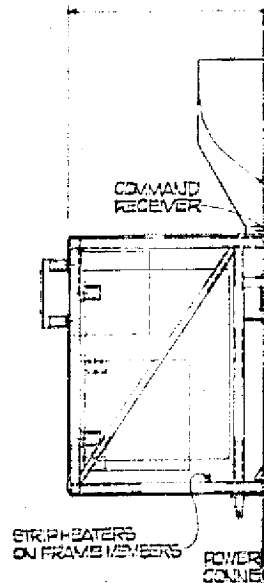
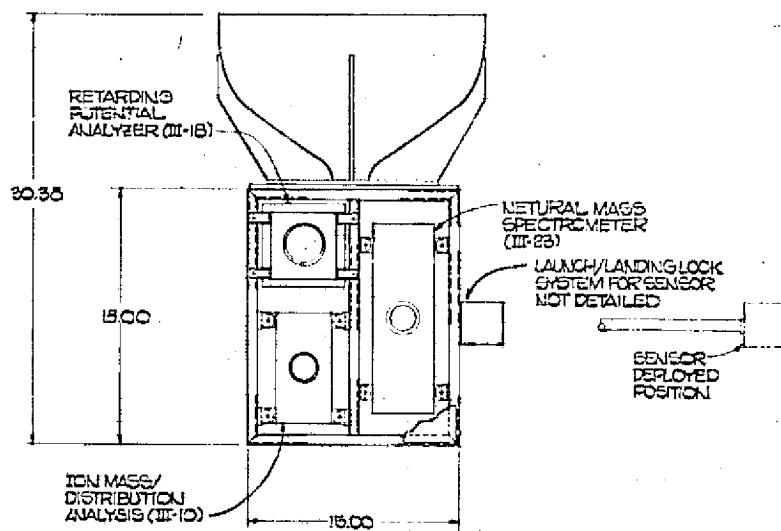
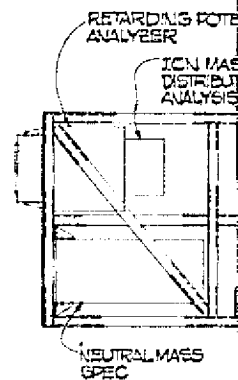
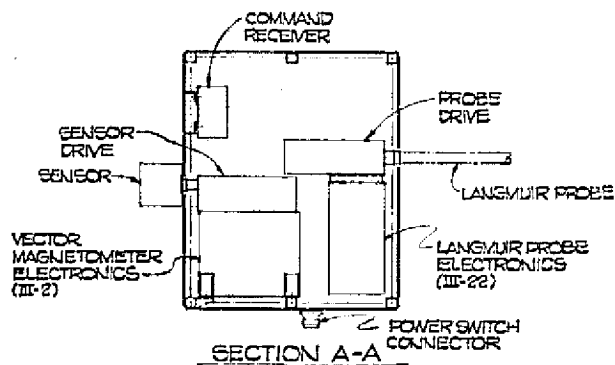
FINISHES

IRIDITE ALL ALUMINUM  
 DIFFUSE BLACK PAINT ON INSIDE SURFACES  
 SILVER COATED TEFLON RADIATION AREAS

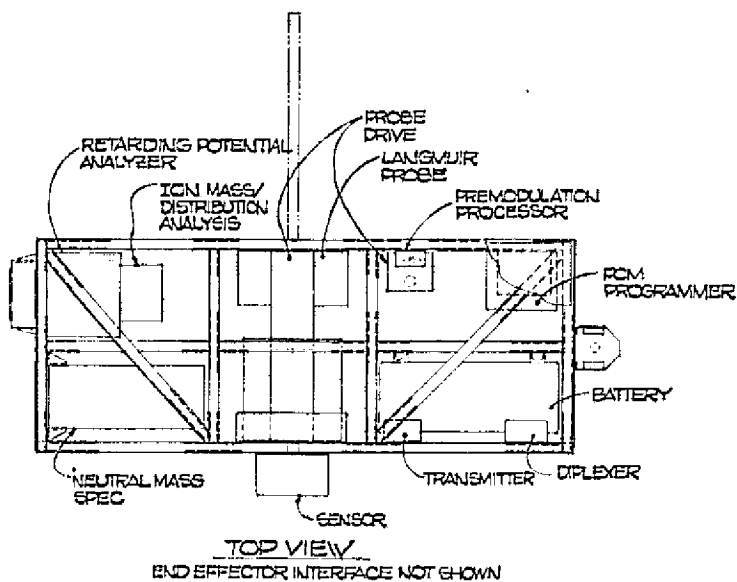


SK05-007  
 RF RECEIVER PACKAGE  
 EQUIPMENT LAYOUT  
 SCALE: 1/2" = 1' JULY 76 SHEET 1 OF 1





FOLDOUT FRAME (

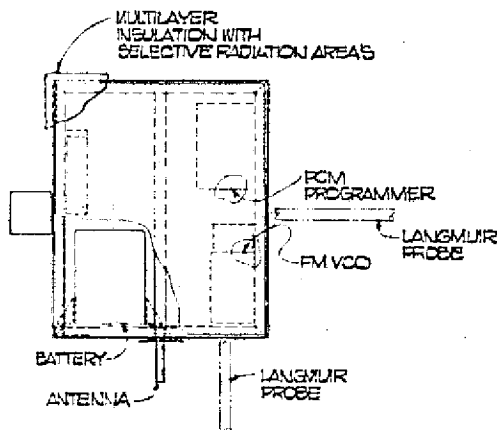
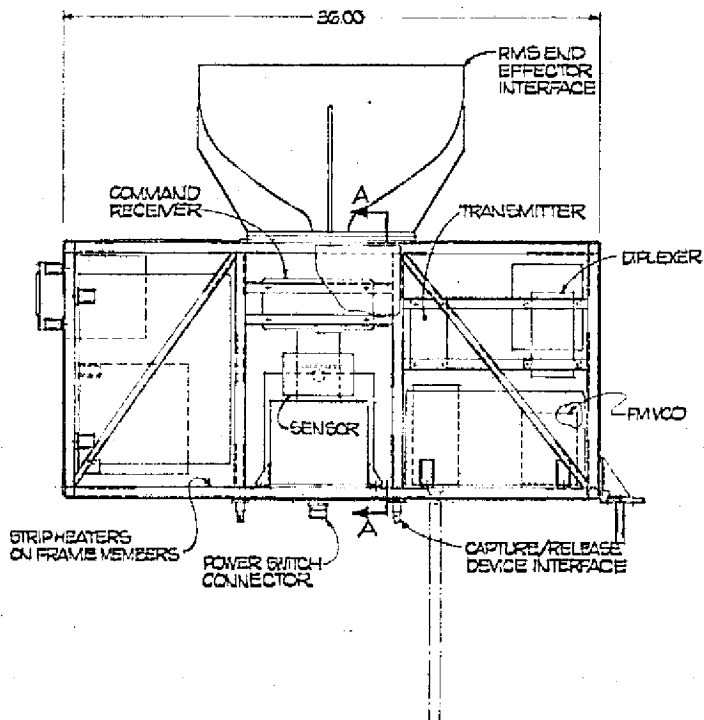


**MATERIALS**

FRAME: 6061-T6 ALUMINUM TUBES  
SKIN: 4 FORMED SHAPES: 6061-T6 ALUM. SHEET  
MACHINED FITTINGS: 6061-T6 51 ALUM. PLATE  
ACTUATORS & LOCKS: STEEL & ALUM.  
INSULATION: ALUMINIZED MYLAR (MULTILAYER)

**FINISHES**

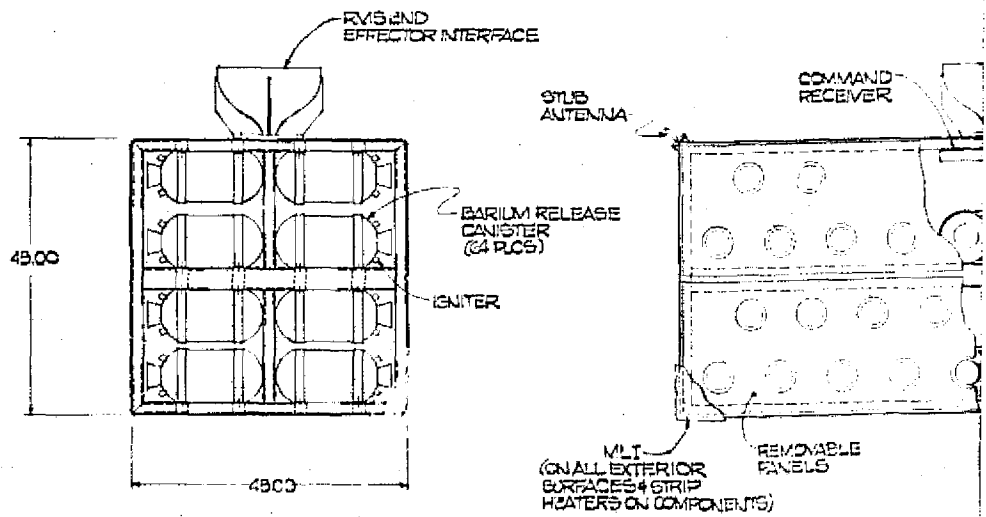
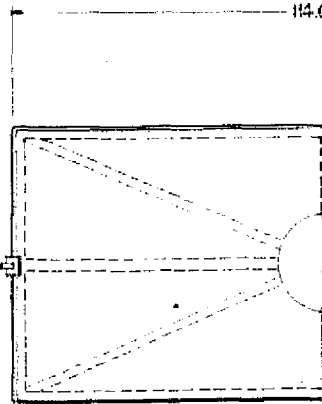
IRIDITE ALL ALUMINUM  
DIFFUSE BLACK PAINT ON INTERIOR SURFACES  
SILVER COATED TEFLON RADIATION AREAS



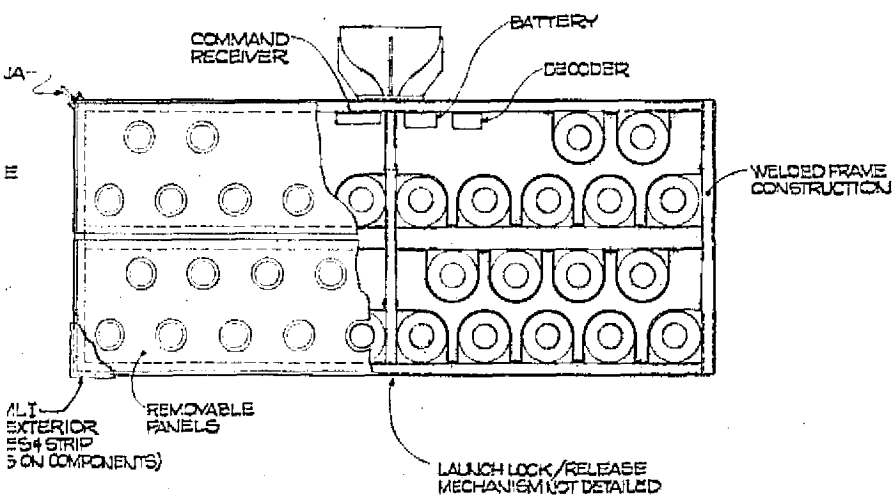
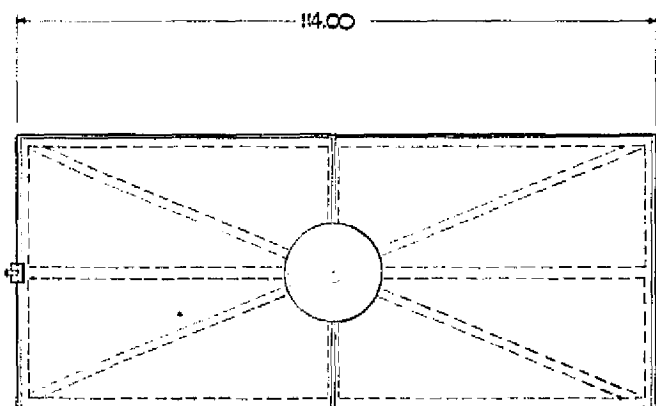
**FOLDOUT FRAME**

C-8

SK05-008  
PLASMA WAKE DIAGNOSTICS PKG  
EQUIPMENT LAYOUT  
SCALE: 1/4" = 1" SHEET 1 OF 1



FOLDOUT FRAME



MATERIALS

FRAME: 6061-T6 ALUMINUM TUBES  
 SKIN: 6061-T6 ALUMINUM SHEET  
 ACTUATORS & LOCKS: STEEL & ALUM.  
 INSULATION: ALUMINIZED MYLAR (MULTILAYER)

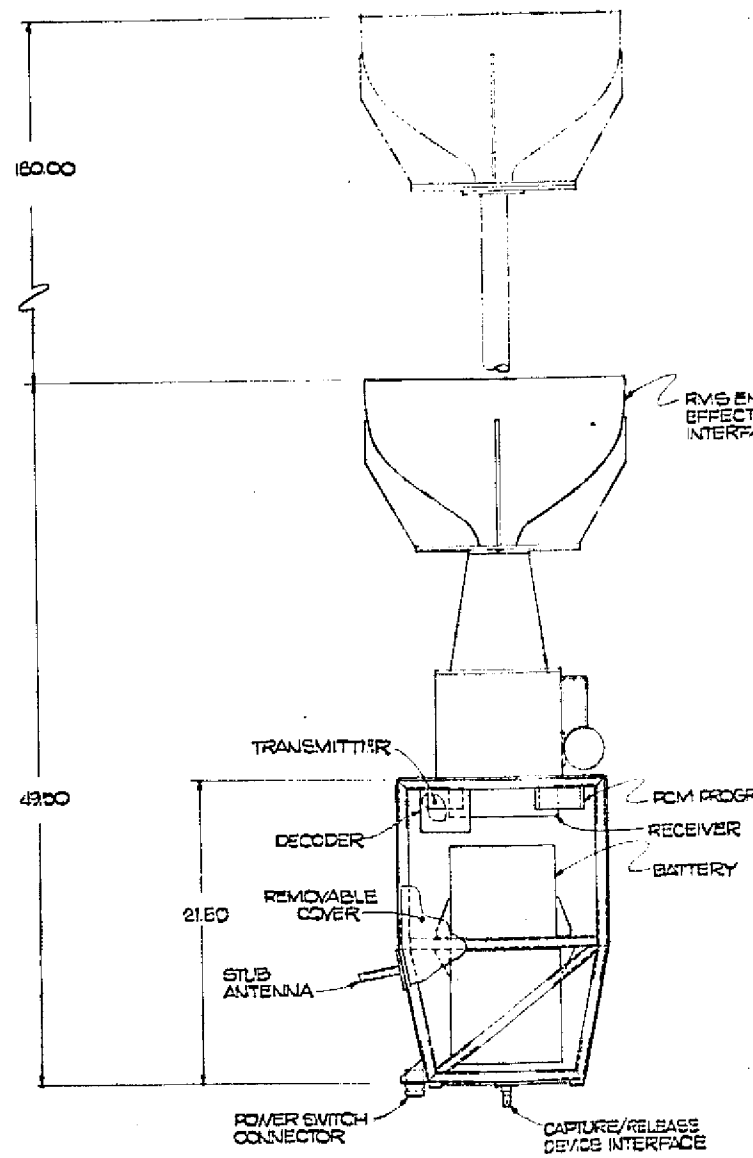
FINISHES

IRIDITE ALL ALUMINUM

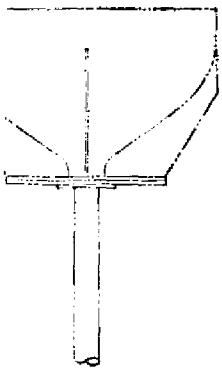
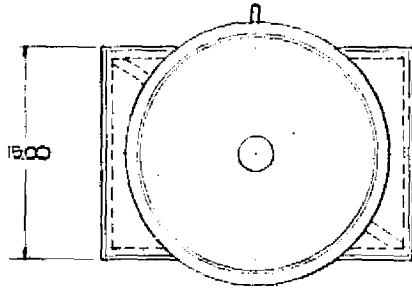
FOLDOUT FRAME 2

C-9

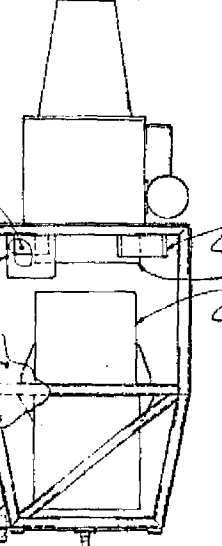
SK05-009  
 CHEMICAL RELEASE MODULE  
 EQUIPMENT LAYOUT  
 SCALE: 1/8" = 2 1/2" 1973 SHEET 10F1



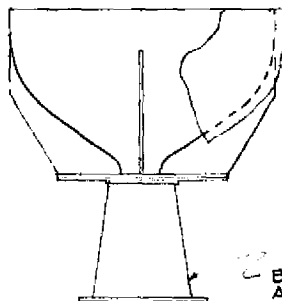
**COLDOUT FRAME**



RMS END  
EFFECTOR  
INTERFACE



CAPTURE/RELEASE  
DEVICE INTERFACE



MLI

SYSTEM  
ACTUATOR

PCM PROGRAMMER

RF MULTIPLEXER

MLI

RECEIVER

PCM PROGRAMMER

RECEIVER

BATTERY

DECODER

TRANSMITTER

PLASMA WAKE  
GENERATOR  
(M-17)

22.00

MATERIALS

FRAME: 6061-T6 ALUMINUM TUBES  
SKIN & COVERS: 6061-T6 ALUMINUM SHEET  
MACHINED FITTINGS: 6061-T651 ALUM. PLATE  
LOCK INTERFACE: STEEL & ALUMINUM  
INSULATION: ALUMINIZED MYLAR (MULTILAYER)

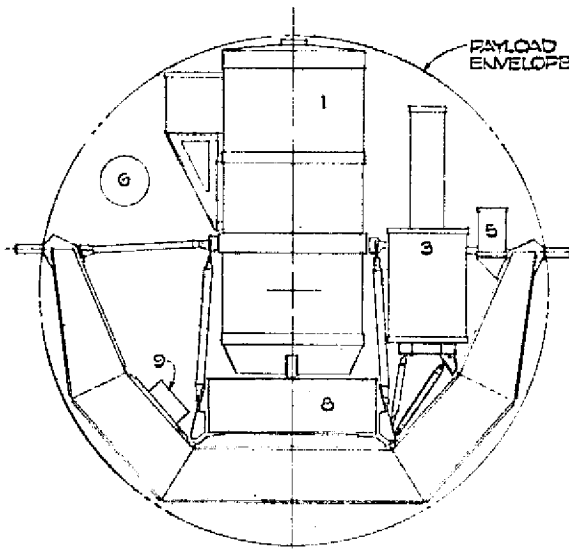
FINISHES

TRIDITE ALL ALUMINUM  
DIFFUSE BLACK PAINT ON INTERIOR SURFACES  
SILVER COATED TEFLON RADIATION AREAS

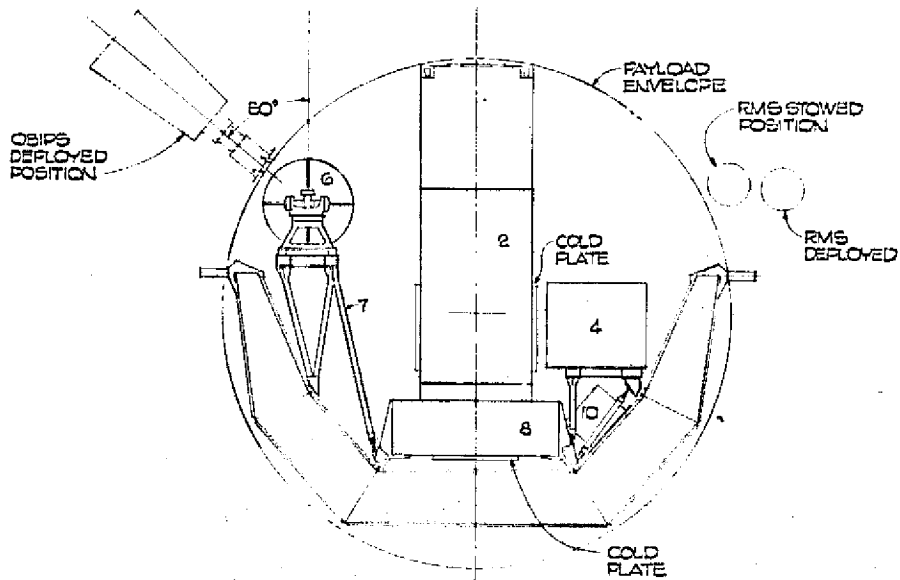
FOLDOUT FRAME 2

C-10

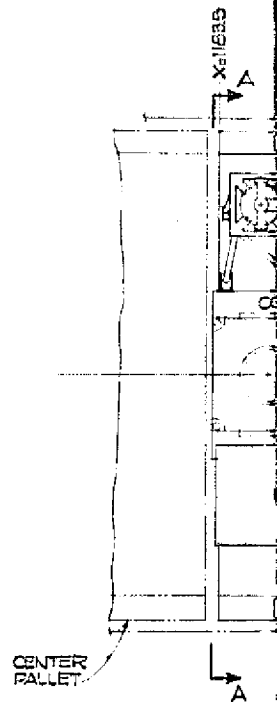
SK05-010  
PLASMA WAKE GENERATOR  
EQUIPMENT LAYOUT  
SCALE: 3/4" 6AUG1976 SHEET 1 OF 1



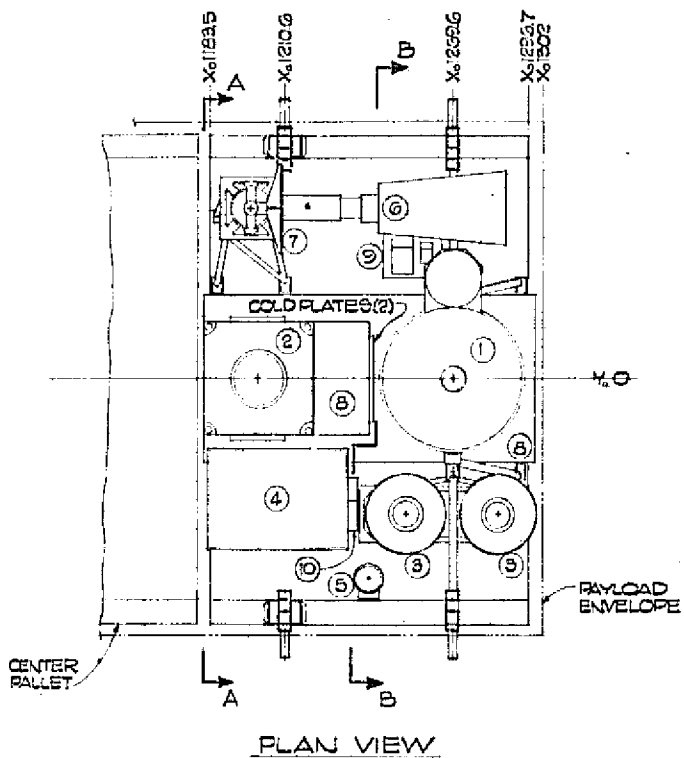
SECTION B-B



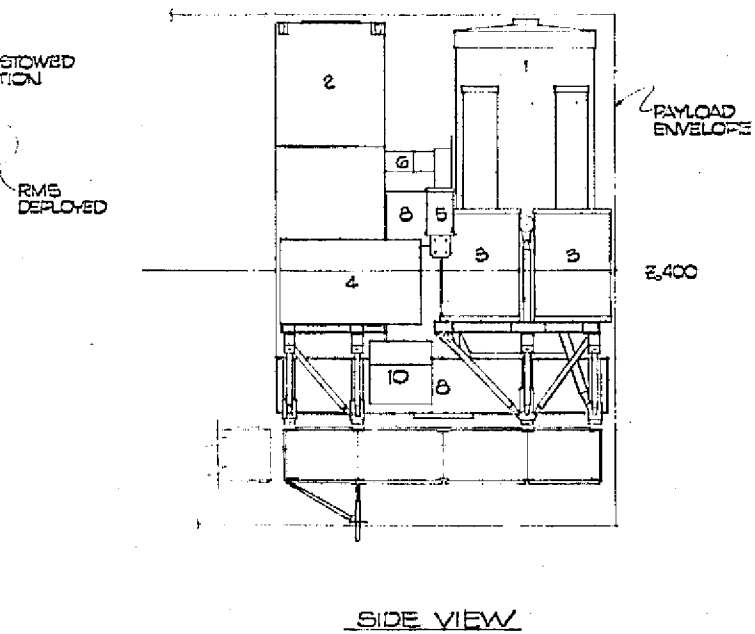
SECTION A-A



FOLDOUT FRAME



- LEGEND
- 1 LIDAR RECEIVER (I-1)
  - 2 ELECTRON ACCELERATOR (I-9)
  - 3 LIDAR TRANSMITTER (I-1)
  - 4 INDUCED ENVIRONMENTAL CONTAM. MONITOR
  - 5 SOLAR FLUX MONITOR (IV-1)
  - 6 CBIPS (II-3)
  - 7 MINI-POINTING MOUNT
  - 8 HIGH-VOLTAGE POWER SUPPLY
  - 9 PEAKING BATTERY & CHARGER ON COLD PLATE
  - 10 EXPERIMENT HEAT EXCHANGER



C-11

SK05-011  
 AMPS FLIGHT ONE  
 AFT PALLET LAYOUT  
 SCALE: K0 23AUG1976 SH 1 OF 1

FOLDOUT FRAME 2



APPENDIX D

MASS PROPERTIES COMPUTER PRINTOUTS

MASS PROPERTIES COMPUTER PRINTOUTS

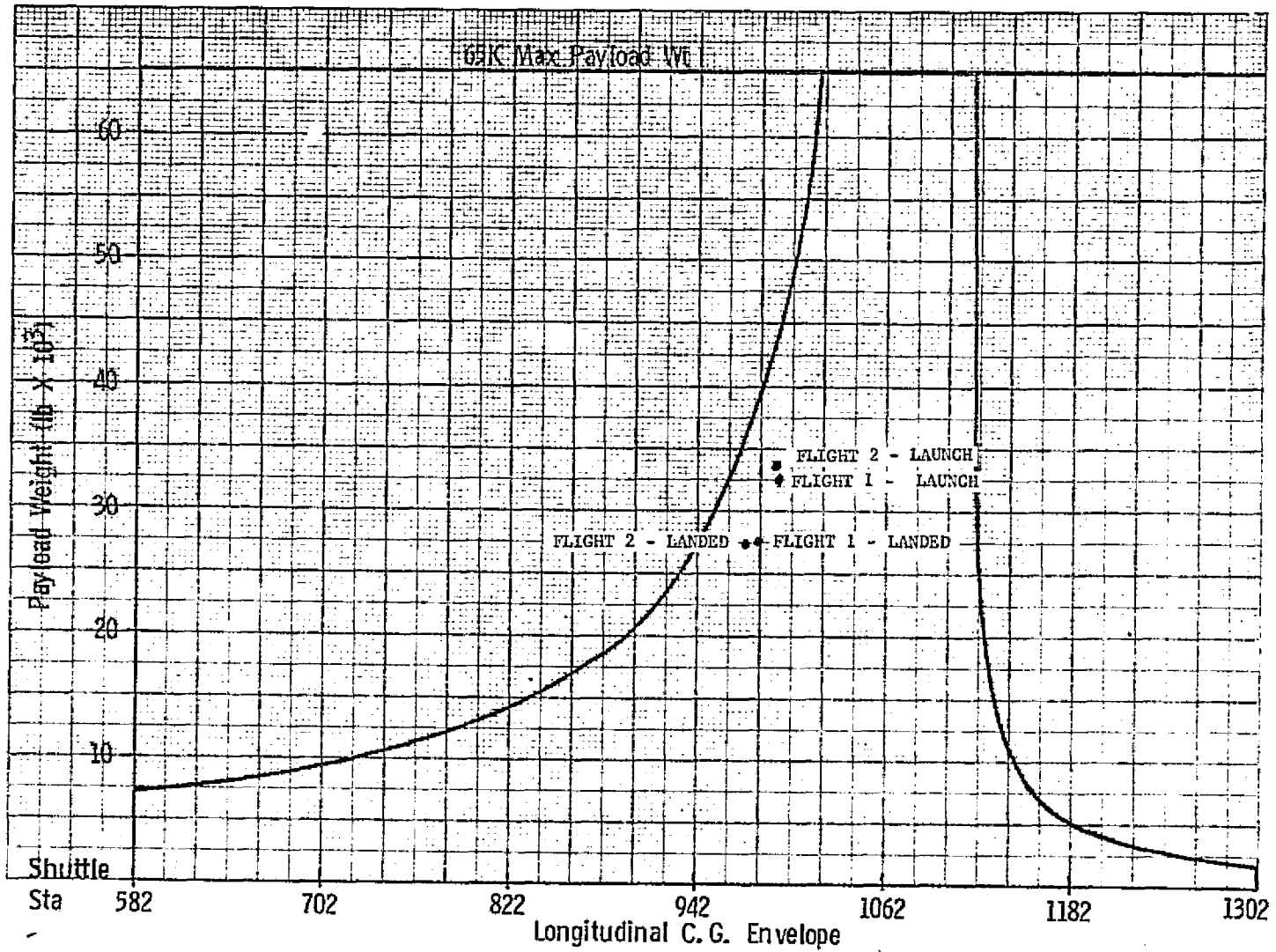
INDEX

Longitudinal CG Curve with Plots for Flights 1 and 2  
Flight 1 Launch Weights and CG  
Flight 1 Landed Weights and CG  
Flight 2 Launch Weights and CG  
Flight 2 Landed Weights and CG

LOCATION CODES (XY)

(X)		(Y)	
Basic Spacelab	A	Orbiter	0
Mission Dependent	B	Pallet Train	1
AMPS Instruments	D	Pallet-Fwd	2
AMPS Labcraft	C	Pallet-Mid	3
		Pallet-Aft	4
		Module	5
		Util Bridge-Fwd	6
		Util Bridge-Aft	7
		Tunnel	8
		Airlock	9

\* Indicates expendable--not included in landed weight.



AMPS -----FLIGHT 1-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

DATE OF RUN 09/20/76  
 PAGE 1

DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y (CM)	Z	KX	KY (CM)	KZ
SPACELAB MODULE	A5 1	3363.00	2156.5	-8.5	1004.3	160.5	165.9	154.9
6 METER PALLET TRAIN	A1 1	1236.00	2700.0	11.9	911.9	212.5	179.4	223.0
3 METER PALLET	A4 1	618.00	3163.6	11.9	911.9	212.6	10.6	189.0
SL/ORBITER UTILITY BRIDGE	A6 1	218.20	1836.0	0.	914.0	0.	0.	0.
TUNNEL	A8 1	352.00	1877.1	0.	907.7	142.0	17.1	141.0
TUNNEL ADAPTER	A8 1	408.20	1800.0	0.	907.7	87.1	105.4	95.0
P/L A/R FAN AND DUCTING	A8 1	9.50	1877.3	0.	907.7	0.	0.	0.
AIRLOCK	A9 1	364.00	1805.3	0.	1033.3	0.	0.	0.
LESS SHUTTLE AIRLOCK	A9 1	-363.00	1402.0	0.	914.0	0.	0.	0.
***** BASIC SPACELAB		6205.90	2305.7	-1.1	973.7	177.9	430.4	432.8
* EXTRA WATER FOR COOLING	B0 1	68.20	1117.6	0.	1016.0	0.	0.	0.
EPS KIT 2-DRY PLUS RESIDUALS	B0 1	357.02	2634.0	-16.2	794.9	206.0	294.4	357.1
* EPS KIT 2-EXPENDABLES	B0 1	383.30	2763.8	-109.	30.0	58.7	110.5	125.7
EPS KIT 2		740.32	2701.2	-65.6	82.4	156.0	228.8	275.6
ORBITER HEAT REJECTION KIT	B0 1	87.50	3083.6	0.	4.0	98.0	171.7	108.5
LONGERON FITTING-PALLET	B0 1	40.40	2475.5	238.8	1051.6	0.	0.	0.
LONGERON FITTING-PALLET	B0 1	40.40	2475.5	-238.7	1051.6	0.	0.	0.
LONGERON FITTING-PALLET	B0 1	40.40	2925.1	238.8	1051.6	0.	0.	0.
LONGERON FITTING-PALLET	B0 1	40.40	2925.1	-238.7	1051.6	0.	0.	0.
LONGERON FITTING-PALLET	B0 1	40.40	3074.9	238.8	1051.6	0.	0.	0.
LONGERON FITTING-PALLET	B0 1	40.40	3074.9	-238.7	1051.6	0.	0.	0.
LONGERON FITTING-PALLET	B0 1	40.40	3224.8	238.8	1051.6	0.	0.	0.
LONGERON FITTING-PALLET	B0 1	40.40	3224.8	-238.7	1051.6	0.	0.	0.
KEEL FITTING-PALLET	B0 1	35.40	2593.4	0.	777.2	0.	0.	0.
KEEL FITTING-PALLET	B0 1	35.40	3000.6	0.	777.2	0.	0.	0.
LONGERON FITTING-MODULE	B0 1	40.40	2035.9	238.8	1051.6	0.	0.	0.
LONGERON FITTING-MODULE	B0 1	40.40	2035.9	-238.7	1051.6	0.	0.	0.
LONGERON FITTING-MODULE	B0 1	40.40	2275.7	238.8	1051.6	0.	0.	0.
LONGERON FITTING-MODULE	B0 1	40.40	2275.7	-238.7	1051.6	0.	0.	0.

D-4

ORIGINAL PAGE IS  
 OF POOR QUALITY

AMPS -----FLIGHT 1-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

DATE OF RUN 09/20/76  
 PAGE 2

DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y (CM)	Z	KX	KY (CM)	KZ
KEEL FITTING-MODULE	B0 1	35.40	2275.7	0.	777.2	0.	0.	0.
LESS ORBITER ALLOWANCE	B0 1	-204.00	2728.0	0.	1003.3	0.	0.	0.
ORBITER RETENTION FITTINGS		387.00	2661.5	.1	1001.8	297.2	534.1	582.9
CREWMAN 5	B0 1	77.10	1244.6	121.9	886.5	0.	0.	0.
CREWMAN 6	B0 1	77.10	1244.6	71.1	886.5	0.	0.	0.
SEAT 5	B0 1	24.50	1254.8	121.9	863.6	0.	0.	0.
SEAT 6	B0 1	24.50	1254.8	71.1	863.6	0.	0.	0.
O2 TANKAGE PLUS RESIDUAL	B0 1	37.60	1905.0	0.	782.3	0.	0.	0.
* USABLE O2	B0 1	22.70	1905.0	0.	782.3	0.	0.	0.
EMERGENCY EQUIPMENT	B0 1	49.50	1366.5	0.	1016.0	0.	0.	0.
WASTE WATER TANKAGE	B0 1	22.00	1216.7	12.7	800.1	0.	0.	0.
FOOD	B0 1	28.60	1181.1	-177.7	934.7	0.	0.	0.
HYGIENE EQUIPMENT	B0 1	26.20	1414.8	-109.1	904.2	0.	0.	0.
CREW PROVISIONS	B0 1	25.20	1244.6	96.5	886.5	0.	0.	0.
LIQH	B0 1	31.90	1244.6	0.	800.1	0.	0.	0.
RESTRAINTS	B0 1	1.70	1206.5	0.	1016.0	0.	0.	0.
STOWAGE VOLUME PENTALY	B0 1	43.90	1104.9	-25.3	939.8	0.	0.	0.
CREW SYSTEMS		492.50	1330.3	26.9	884.0	103.6	235.5	239.8
MONITOR AND CONTROL PANEL	B0 1	5.00	1358.9	0.	1016.0	0.	0.	0.
KEYBOARD	B0 1	3.50	1358.9	0.	1016.0	0.	0.	0.
CRT DISPLAY/SIGNAL GENERATOR	B0 1	28.90	1358.9	0.	1016.0	0.	0.	0.
REMOTE STATION, COMMUNICATIO	B0 1	1.50	1358.9	0.	1016.0	0.	0.	0.
PSS EQUIPMENT		38.90	1358.9	0.	1016.0	.0	.0	.0
DOUBLE RACK	B5 1	58.10	2080.0	127.0	1034.3	0.	0.	0.
SINGLE RACK	B5 1	37.60	2207.0	127.0	1034.3	0.	0.	0.
PALLET HARDPOINTS	B1 45	37.35	2853.8	0.	934.7	0.	0.	0.
INSERTS FOR PANELS	B1 6	39.00	2846.3	0.	904.2	0.	0.	0.

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AMPS -----FLIGHT 1-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

DATE OF RUN 09/20/76  
 PAGE 3

DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y	Z	KX	KY	KZ
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*								
STRUCTURE		172.05	2450.5	70.6	983.2	85.8	366.6	367.4
EXP SWITCH PANEL	B5 1	12.70	2156.0	0.	1016.0	0.	0.	0.
EXP SWITCH PANEL	B5 1	12.70	2156.0	0.	1016.0	0.	0.	0.
EXP SWITCH PANEL	B5 1	12.70	2156.0	0.	1016.0	0.	0.	0.
INVERTER (400 HZ)	B5 1	32.20	2197.9	-123.9	934.0	0.	0.	0.
EPUS		70.30	2175.2	-56.8	978.4	74.0	45.9	65.2
COLD PLATE-IECM	B4 1	5.50	3051.7	-109.2	965.2	0.	0.	0.
COLD PLATE-ELECT ACCEL	B4 1	5.50	3051.0	50.0	1013.5	0.	0.	0.
COLD PLATE-ELECT ACCEL	B4 1	5.50	3051.0	-50.0	1013.5	0.	0.	0.
COLD PLATE-ELECT ACCEL	B4 1	5.50	3152.6	0.	1092.2	0.	0.	0.
COLD PLATE-ELECT ACCEL	B4 1	5.50	3152.6	0.	990.0	0.	0.	0.
COLD PLATE-PEAKING BATTERY	B4 1	5.50	3192.4	114.0	914.0	0.	0.	0.
COLD PLATE-PS	B4 1	5.50	3154.3	0.	889.0	0.	0.	0.
COLD PLATE-RF TERMINAL	B3 1	5.50	2836.0	114.0	914.0	0.	0.	0.
ECS		44.00	3080.2	14.9	973.9	95.5	123.8	128.4
EXP RAU	B2 1	2.30	2524.8	0.	889.0	3.5	5.8	5.2
EXP RAU	B3 1	2.30	2824.5	0.	889.0	3.5	5.3	5.2
EXP RAU	B3 1	2.30	2824.5	0.	889.0	3.5	5.3	5.2
EXP RAU	B4 1	2.30	3124.2	0.	889.0	3.5	5.8	5.2
EXP RAU	B4 1	2.30	3124.2	0.	889.0	3.5	5.8	5.2
EXP RAU	B5 1	2.30	2156.5	-139.6	990.5	3.5	5.8	5.2
EXP COMPUTER	B5 1	30.20	2156.0	-0.	1016.0	0.	0.	0.
DIGITAL TAPE RECORDER	B5 1	43.00	2156.0	-0.	1016.0	0.	0.	0.
EXPERIMENT I/O	B5 1	27.50	2156.0	-0.	1016.0	0.	0.	0.
HIGH RATE DIGITAL MUX	B5 1	10.00	2156.0	-0.	1016.0	0.	0.	0.
TAPE AND CANISTERS	B5 15	88.50	2165.5	0.	1016.0	0.	0.	0.

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AMPS -----FLIGHT 1-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

DATE OF RUN 09/20/76  
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DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY (CM)			RADIUS OF GYRATION (CM)		
			X	Y	Z	KX	KY	KZ
CMDS		213.00	2199.3	-1.5	1008.9	32.2	174.2	172.4
CONSOL VERTICAL RAILS	B5 4	2.00	2156.5	0.	1016.0	0.	0.	0.
CONSOL HORIZONTAL RAILS	B5 4	3.00	2156.5	0.	1016.0	0.	0.	0.
PSA FOOT RESTRAINTS	B5 6	18.00	2156.5	0.	1016.0	0.	0.	0.
RACK CLOSEOUT FT RESTRAINTS	B5 4	31.70	2156.5	0.	1016.0	0.	0.	0.
HABITABILITY		54.70	2156.5	0.	1016.0	0.	.0	.0
KEYBOARD	B5 1	3.50	2156.0	-141.9	984.5	0.	0.	0.
CRT AND SYMBOL GENERATOR	B5 1	28.90	2156.0	-141.9	1009.9	0.	0.	0.
CONTROL AND DISPLAY		32.40	2156.0	-141.9	1007.2	7.9	7.9	0.
***** MISSION DEPENDENT EQUIPMENT		2400.87	2270.2	-13.1	916.5	198.1	673.5	677.9
C AND D PANELS	C5 1	18.00	2156.0	0.	1016.0	0.	0.	0.
C AND D PANELS	C5 1	8.40	2156.0	0.	1016.0	0.	0.	0.
C AND D PANELS	C5 1	3.00	2156.0	0.	1016.0	0.	0.	0.
TV MONITOR	C5 1	10.00	2156.0	0.	1016.0	0.	0.	0.
OSCILLOSCOPE	C5 1	20.00	2156.0	0.	1016.0	0.	0.	0.
C AND W SENSORS-PRESSURE	C2 12	1.90	2156.0	0.	1016.0	0.	0.	0.
C AND W SENSORS-TEMPERATURE	C2 8	1.30	2156.0	0.	1016.0	0.	0.	0.
CONTROL AND DISPLAY		62.60	2156.0	0.	1016.0	.0	.0	.0
SIPS PLATFORM	C3 1	527.00	2356.0	0.	990.6	0.	0.	0.
TWO AXES GYRO PACKAGE	C3 1	8.00	2856.0	50.8	977.9	0.	0.	0.
TWO AXES GYRO PACKAGE	C3 1	8.00	2856.0	-50.7	977.9	0.	0.	0.
3 AXES GYRO PACKAGE-OBIPS	C4 1	10.00	3092.0	152.0	1066.8	0.	0.	0.
3 AXES GYRO PACKAGE-NIR SPEC	C2 1	10.00	2452.0	139.7	1054.1	0.	0.	0.

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DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y	Z	KX	KY	KZ
(CM)								
RATE GYROS		36.00	2809.3	81.1	1023.8	90.1	245.6	255.0
MPM PLATFORM-OBIPS	C4 1	50.00	3067.0	152.0	1104.9	0.	0.	0.
FIXED HD STAR TRKER-II-7-10	C4 1	30.00	3079.0	406.0	1104.9	0.	0.	0.
MPM PLATFORM-NIR SPEC	C2 1	3.00	2452.0	139.7	1117.6	0.	0.	0.
FIXED HEAD STAR TRACKER-NIR	C2 1	4.00	2452.0	0.	1054.1	0.	0.	0.
MPM		120.00	2759.9	149.7	1109.1	55.9	308.1	312.7
ATTITUDE POINTING		683.00	2836.7	30.6	1013.2	79.6	152.5	159.1
I/F PLUMBING KITS-PALLET 3	C4 1	12.00	3156.0	0.	876.3	0.	0.	0.
THERMAL CURTAIN-PALLET 1	C2 1	10.00	2561.0	0.	1016.0	0.	0.	0.
THERMAL CURTAIN-PALLET 2	C3 1	10.00	2864.0	0.	1016.0	0.	0.	0.
THERMAL CURTAIN-PALLET 3	C4 1	10.00	3156.0	0.	1016.0	0.	0.	0.
EXP HEAT EXCHANGER-LIDAR	C4 1	25.00	3219.0	-127.0	952.0	0.	0.	0.
TCS PUMP-LIDAR	C4 1	10.00	3219.0	-127.0	952.0	0.	0.	0.
COOLANT FILTERS	C4 6	2.70	3219.0	-127.0	952.0	0.	0.	0.
THERMAL CONTROL-LIDAR		37.70	3219.0	-127.0	952.0	.0	.0	.0
MPM CANISTER-NIR SPEC	C2 1	215.00	2452.0	10.0	1140.0	0.	0.	0.
THERMAL		294.70	2620.4	-9.0	1092.6	93.4	311.0	303.5
CABLE SET-PALLET 1	C2 1	102.00	2561.0	-119.3	914.4	0.	0.	0.
CABLE SET-PALLET 2	C3 1	91.00	2864.0	-119.3	914.4	0.	0.	0.
CABLE SET-PALLET 3	C4 1	68.00	3156.0	-119.3	914.4	0.	0.	0.

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AMPS -----FLIGHT 1-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

DATE OF RUN 09/20/76  
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DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y (CM)	Z	KX	KY (CM)	KZ
CABLE SET-MODULE TO PALLET	C7 1	57.00	2362.0	-152.3	863.6	0.	0.	0.
CABLE SET-MODULE	C5 1	34.00	2156.0	-152.3	863.6	0.	0.	0.
CABLE SET-SIFS TO INSTRUMENT	C3 1	40.00	2856.0	-152.3	833.6	0.	0.	0.
COMMON CABLE SET		392.00	2700.6	-130.3	897.4	28.6	304.4	303.9
PULSE POWER SUPPLY-LIDAR	C4 1	95.00	3156.0	0.	1010.9	0.	0.	0.
PULSE POWER SUPPLY-ACCELER	C4 1	600.00	3156.0	0.	909.3	0.	0.	0.
PEAKING BATTERY	C4 1	40.30	3166.0	101.6	902.0	0.	0.	0.
ELECTRICAL DIST UNIT	C2 1	10.00	2561.0	-0.	902.0	0.	0.	0.
ELECTRICAL DIST UNIT	C3 1	10.00	2664.0	-0.	902.0	0.	0.	0.
ELECTRICAL DIST UNIT	C4 1	10.00	3166.0	-0.	902.0	0.	0.	0.
POWER SUPPLIES		785.30	3145.1	5.4	921.2	40.7	82.3	78.4
ELECTRICAL		1157.30	2994.5	-40.6	913.2	75.0	283.3	289.3
FM MODULE	C5 1	21.80	2156.0	-0.	1016.0	0.	0.	0.
SENSOR INTERFACE BOX	C3 1	2.27	2864.0	-0.	890.0	0.	0.	0.
SENSOR INTERFACE BOX	C3 1	2.27	2864.0	-0.	890.0	0.	0.	0.
SENSOR INTERFACE BOX	C2 1	2.27	3168.0	-0.	890.0	0.	0.	0.
SENSOR INTERFACE BOX	C4 1	2.27	3168.0	-0.	890.0	0.	0.	0.
ANALOG RECORDER	C5 1	22.70	2156.0	-0.	1016.0	0.	0.	0.
TRANSIENT RECORDER	C5 5	30.80	2156.0	-0.	1016.0	0.	0.	0.
SWITCHING PANEL	C5 1	3.63	2156.0	-0.	1016.0	0.	0.	0.
VIDEO RECORDER	C5 1	36.30	2156.0	-0.	1016.0	0.	0.	0.
DATA MANAGEMENT SYSTEM		124.31	2218.8	0.	1006.8	32.8	229.9	227.5
COMMAND TRANSMITTER	C3 1	.50	2926.1	-172.6	1059.2	0.	0.	0.
RF MULTIPLEXER	C3 1	1.36	2926.1	-172.6	1059.2	0.	0.	0.

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AMPS -----FLIGHT 1-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

DATE OF RUN 09/20/76  
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DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY (CM)			RADIUS OF GYRATION (CM)		
			X	Y	Z	KX	KY	KZ
WIDE BAND RECEIVER	C3 2	2.27	2926.1	-172.6	1059.2	0.	0.	0.
CONICAL ANTENNA	C3 1	.91	2926.1	-172.6	1059.2	0.	0.	0.
COMMUNICATIONS		5.04	2926.1	-172.6	1059.2	.0	.0	.0
FOR HV POWER SUPPLY	C4 1	12.00	3153.0	0.	889.0	0.	0.	0.
FOR INSTRUMENT IV-1	C4 1	1.40	3160.0	-208.2	1049.0	0.	0.	0.
DIRECT MOUNTING BRACKETRY		13.40	3153.7	-21.8	905.7	80.3	49.0	63.7
FOR INSTRUMENT I-21	C2 1	20.80	2569.2	101.0	987.0	0.	0.	0.
FOR INSTRUMENT I-21	C2 1	20.80	2569.2	0.	987.0	0.	0.	0.
FOR INSTRUMENT I-21	C2 1	20.80	2569.2	-101.0	987.0	0.	0.	0.
FOR INSTRUMENT I-21	C2 1	20.80	2662.0	101.0	987.0	0.	0.	0.
FOR INSTRUMENT I-21	C2 1	20.80	2662.0	0.	987.0	0.	0.	0.
FOR INSTRUMENT I-21	C2 1	20.80	2662.0	-101.0	987.0	0.	0.	0.
INSTRUMENT I-21 PLATFORM	C2 1	65.30	2634.0	0.	911.0	0.	0.	0.
FOR INSTRUMENT I-1	C4 1	39.00	3229.0	-0.	927.0	0.	0.	0.
FOR INSTRUMENT II-3	C4 1	20.40	3051.0	127.0	927.0	0.	0.	0.
FOR INSTRUMENT II-7	C3 1	6.40	2853.0	94.0	1090.0	0.	0.	0.
FOR INSTRUMENT II-9	C2 1	20.40	2440.0	142.0	978.0	0.	0.	0.
FOR INSTRUMENT II-10	C3 1	6.40	2853.0	-93.9	1090.0	0.	0.	0.
FOR IECM	C4 1	22.70	3054.0	-101.5	927.1	0.	0.	0.
FOR ESP	C2 1	13.60	2444.8	-94.0	914.0	0.	0.	0.
FOR BEAM DIAGNOSTIC PACKAGE	C3 1	9.10	2749.6	-165.0	995.7	0.	0.	0.
FOR RF TERMINAL	C3 1	5.00	2838.4	114.0	914.0	0.	0.	0.
INTERMEDIATE SPT STRUCTURE		333.10	2746.0	2.9	956.9	9.5	246.8	257.3
INSTR TO INSTR I/F STRUCTURE	C4 14	15.90	3073.4	0.	914.4	0.	0.	0.

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AMPS -----FLIGHT 1-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

DATE OF RUN 09/20/76  
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DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y	Z	KX	KY	KZ
			(CM)			(CM)		
THERMAL CURTAIN SPT-PALLET 1	C2 1	11.30	2561.0	0.	1016.0	0.	0.	0.
THERMAL CURTAIN SPT-PALLET 2	C3 1	11.30	2864.0	0.	1016.0	0.	0.	0.
THERMAL CURTAIN SPT-PALLET 3	C4 1	11.30	3146.0	0.	1016.0	0.	0.	0.
MISC STRUCTURE		33.90	2857.0	0.	1016.0	.0	238.9	238.9
PALLET I/F STRUCTURE		396.30	2782.4	1.7	958.5	90.5	257.5	265.2
L/L LOCKS -OBIPS	C4 1	6.80	3100.0	152.4	1084.6	0.	0.	0.
EMERGENCY JETT-MPM PLATFORM	C4 1	8.20	3067.0	152.4	1059.2	0.	0.	0.
CAPTURE RELEASE DEVICE	C3 1	1.80	2804.0	-170.0	1043.9	0.	0.	0.
CAPTURE RELEASE DEVICE	C3 1	10.00	2951.0	-170.0	1033.8	0.	0.	0.
L/L LOCKS-NIR SPEC	C2 1	1.80	2457.0	-30.4	1077.0	0.	0.	0.
L/L LOCKS-NIR SPEC	C2 1	9.10	2457.5	114.3	1107.4	0.	0.	0.
EMERGENCY JETT-MPM PLATFORM	C2 1	8.20	2452.0	152.4	1059.2	0.	0.	0.
CAPTURE RELEASE DEVICE	C2 1	10.40	2444.8	-101.5	1028.0	0.	0.	0.
PIC( FOR HOLDDOWN NUTS)	C2 6	6.00	2514.6	-0.	889.0	0.	0.	0.
HOLDDOWN ORDNANCE	C2 18	1.80	2514.6	-0.	889.0	0.	0.	0.
MECHANISMS		64.10	2694.5	22.8	1039.1	143.4	284.1	306.1
***** AMPS LABCRAFT		2787.35	2625.7	-9.9	972.7	105.0	331.7	331.0
EMERGENCY JETTISON FOR I-1	D4 1	.90	3232.0	0.	1231.9	0.	0.	0.
LIDAR EMITTER	D4 1	75.00	3188.0	-121.0	1041.4	0.	0.	0.
LIDAR EMITTER	D4 1	75.00	3270.0	-121.0	1041.4	0.	0.	0.
LIDAR RECEIVER	D4 1	300.00	3232.0	0.	1082.0	0.	0.	0.
***** LASER SOUNDER (I-1)		450.90	3231.0	-40.3	1068.8	60.6	31.3	61.7
EMERGENCY JETTISON FOR I-9	D4 1	.90	3055.9	0.	1231.9	0.	0.	0.

AMPS -----FLIGHT 1-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

DATE OF RUN 09/20/76  
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DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y (CM)	Z	KX	KY (CM)	KZ
ELECTRON ACCEL (I 3)	D4 1	40.50	3056.9	0.	1082.0	0.	0.	0.
GAS PLUME RELEASE (III-3)	D4 1	9.00	3056.9	0.	1219.2	0.	0.	0.
***** ELECT ACCELERATOR		50.40	3056.9	0.	1109.2	55.0	55.0	.0
IECM	D4 1	340.00	3072.1	-109.1	988.1	0.	0.	0.
***** IECM		340.00	3072.1	-109.1	988.1	.0	.0	0.
SOLAR FLUX MONITOR (IV-1)	D4 1	3.00	3232.0	-200.6	1079.0	0.	0.	0.
***** SOLAR FLUX MONITOR		3.00	3232.0	-200.6	1079.0	0.	0.	0.
OBIPS (II-3)	D4 1	43.00	3194.0	150.0	1117.6	0.	0.	0.
***** OBIPS		43.00	3194.0	150.0	1117.6	0.	0.	0.
CRYO LIMB SCANNER-DRY (II-7)	D3 1	207.00	2838.0	94.0	1077.0	0.	0.	0.
* CRYO	D3 1	293.00	2838.0	94.0	1077.0	0.	0.	0.
***** CRYO LIMB SCANNER		500.00	2838.0	94.0	1077.0	0.	0.	0.
CRYO IR INTERFEROMETER-DRY	D3 1	215.00	2838.0	-93.9	1077.0	0.	0.	0.
* CRYO	D3 1	285.00	2915.0	-93.9	1077.0	0.	0.	0.
***** CRYO IR INTERFEROMETER		500.00	2881.9	-93.9	1077.0	0.	38.1	38.1
WIDE BAND TRANSMITTER	C3 2	1.00	2831.0	-170.0	1047.5	0.	0.	0.
COMMAND RECEIVER	C3 1	1.00	2862.0	-170.0	1047.5	0.	0.	0.
RF MULTIPLEXER	C3 1	1.00	2857.5	-162.4	1049.0	0.	0.	0.
ANTENNA ,STUB	C3 1	1.00	2870.0	-190.0	1046.0	0.	0.	0.
COMMUNICATIONS		4.00	2855.1	-173.1	1047.5	10.3	14.7	17.9

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AMPS -----FLIGHT 1-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

DATE OF RUN 09/20/76  
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DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y	Z	KX	KY	KZ
			(CM)			(CM)		
CABLE SET-BEAM DIAG PACKAGE	C3 1	1.50	2865.0	-170.0	1053.0	0.	0.	0.
POWER SUPPLY	C3 1	29.00	2461.3	-170.0	1064.8	0.	0.	0.
POWER SUBSYSTEM		30.50	2481.2	-170.0	1064.2	2.6	87.3	87.3
STRIP HEATERS	C3 1	1.00	2865.0	-170.0	1053.0	0.	0.	0.
MULTILAYER INSULATION	C3 1	4.00	2844.0	-170.0	1072.0	0.	0.	0.
THERMAL SUBSYSTEM		5.00	2848.2	-170.0	1068.2	7.6	11.3	6.4
SUBCARRIER OSCILLATOR ASSY	C3 1	5.00	2847.3	-170.0	1067.9	0.	0.	0.
PCM PROGRAMMER	C3 1	2.00	2859.3	-178.9	1049.0	0.	0.	0.
COMMAND DECODER	C3 1	1.50	2794.0	-170.0	1049.0	0.	0.	0.
DATA MANAGEMENT SUBSYSTEM		8.50	2840.7	-172.1	1060.1	10.0	24.1	22.5
DEPLOY DEVICE (III-2)	C3 1	2.70	2974.3	-170.0	1052.1	0.	0.	0.
CAPTURE/RELEASE INTERFACE	C3 1	.50	2830.0	-170.0	1042.0	0.	0.	0.
LAUNCH LOCK-VECTOR MAG	C3 1	1.00	2974.3	-170.0	1062.3	0.	0.	0.
BASIC STRUCTURE PACKAGE	C2 1	26.00	2860.0	-170.0	1057.2	0.	0.	0.
STRUCTURE SUBSYSTEM		30.20	2874.3	-170.0	1056.7	2.6	37.5	37.4
CBIPS (II-3)	D3 1	38.00	2763.5	-170.0	1072.4	0.	0.	0.
VECTOR MAGNETOMETER (III-2)	D3 1	4.10	2974.3	-170.0	1063.6	0.	0.	0.
LEVEL II DIAGNOSTIC (III-4)	D3 1	23.00	2989.6	-170.0	1052.1	0.	0.	0.
INSTRUMENTS		65.10	2856.7	-170.0	1064.7	9.5	110.8	110.4
***** BEA DIAGNOSTIC PKG		143.30	2779.2	-170.2	1062.3	8.6	177.9	177.7

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 OF POOR QUALITY

AMPS -----FLIGHT 1-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

DATE OF RUN 09/20/76  
 PAGE 11

DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y	Z	KX	KY	KZ
			(CM)			(CM)		
* COMMAND RECEIVER	C2 1	1.00	2552.7	110.5	1067.0	0.	0.	0.
* COMMAND RECEIVER	C2 1	1.00	2552.7	-5.1	1062.0	0.	0.	0.
* COMMAND RECEIVER	C2 1	1.00	2552.7	-100.3	1067.0	0.	0.	0.
* COMMAND RECEIVER	C2 1	1.00	2650.2	110.5	1067.0	0.	0.	0.
* COMMAND RECEIVER	C2 1	1.00	2650.2	-5.1	1067.0	0.	0.	0.
* COMMAND RECEIVER	C2 1	1.00	2650.2	-100.3	1067.0	0.	0.	0.
* ANTENNA, STUB	C2 1	1.00	2581.2	105.4	1078.0	0.	0.	0.
* ANTENNA, STUB	C2 1	1.00	2581.2	0.	1078.0	0.	0.	0.
* ANTENNA, STUB	C2 1	1.00	2581.2	-105.4	1078.0	0.	0.	0.
* ANTENNA, STUB	C2 1	1.00	2678.7	105.4	1078.0	0.	0.	0.
* ANTENNA, STUB	C2 1	1.00	2678.7	-0.	1078.0	0.	0.	0.
* ANTENNA, STUB	C2 1	1.00	2678.7	-105.4	1078.0	0.	0.	0.
* COMMAND DECODER	C2 1	1.50	2552.7	110.5	1067.0	0.	0.	0.
* COMMAND DECODER	C2 1	1.50	2552.7	-5.1	1067.0	0.	0.	0.
* COMMAND DECODER	C2 1	1.50	2552.7	-110.5	1067.0	0.	0.	0.
* COMMAND DECODER	C2 1	1.50	2650.2	110.5	1067.0	0.	0.	0.
* COMMAND DECODER	C2 1	1.50	2650.2	-5.1	1067.0	0.	0.	0.
* COMMAND DECODER	C2 1	1.50	2650.2	-110.5	1067.0	0.	0.	0.
COMMUNICATIONS		21.00	2609.6	-2	1069.9	88.1	50.7	101.4
* CABLE SET-GAS RELEASE	C2 1	1.36	2563.4	105.4	1068.1	0.	0.	0.
* CABLE SET-GAS RELEASE	C2 1	1.36	2563.4	-0.	1068.1	0.	0.	0.
* CABLE SET-GAS RELEASE	C2 1	1.36	2563.4	-105.4	1068.1	0.	0.	0.
* CABLE SET-GAS RELEASE	C2 1	1.36	2660.9	105.4	1068.1	0.	0.	0.
* CABLE SET-GAS RELEASE	C2 1	1.36	2660.9	-0.	1068.1	0.	0.	0.
* CABLE SET-GAS RELEASE	C2 1	1.36	2660.9	-105.4	1068.1	0.	0.	0.
* POWER SUPPLY-GAS RELEASE	C2 1	3.00	2572.8	114.8	1069.1	0.	0.	0.
* POWER SUPPLY-GAS RELEASE	C2 1	3.00	2572.8	9.4	1069.1	0.	0.	0.
* POWER SUPPLY-GAS RELEASE	C2 1	3.00	2572.8	-96.0	1069.1	0.	0.	0.
* POWER SUPPLY-GAS RELEASE	C2 1	3.00	2670.3	114.8	1069.1	0.	0.	0.
* POWER SUPPLY-GAS RELEASE	C2 1	3.00	2670.3	9.4	1069.1	0.	0.	0.
* POWER SUPPLY-GAS RELEASE	C2 1	3.00	2670.3	-96.0	1069.1	0.	0.	0.

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AMPS -----FLIGHT 1-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

DATE OF RUN 09/20/76  
 PAGE 12

DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y	Z	KX	KY	KZ
			(CM)			(CM)		
ELECTRICAL		26.16	2618.6	6.5	1068.8	86.2	48.9	99.1
FOR INSTRUMENT I-21	C2 1	6.16	2563.4	105.4	957.0	0.	0.	0.
* FOR INSTRUMENT I-21	C2 1	6.40	2563.4	105.4	960.0	0.	0.	0.
FOR INSTRUMENT I-21	C2 1	6.16	2563.4	-0.	957.0	0.	0.	0.
* FOR INSTRUMENT I-21	C2 1	6.40	2563.4	-0.	960.0	0.	0.	0.
FOR INSTRUMENT I-21	C2 1	6.16	2563.4	-105.4	957.0	0.	0.	0.
FOR INSTRUMENT I-21	C2 1	6.40	2563.4	-105.4	960.0	0.	0.	0.
FOR INSTRUMENT I-21	C2 1	6.16	2660.9	105.4	957.0	0.	0.	0.
* FOR INSTRUMENT I-21	C2 1	6.40	2660.9	105.4	960.0	0.	0.	0.
FOR INSTRUMENT I-21	C2 1	6.16	2660.9	-0.	957.0	0.	0.	0.
* FOR INSTRUMENT I-21	C2 1	6.40	2660.9	-0.	960.0	0.	0.	0.
FOR INSTRUMENT I-21	C2 1	6.16	2660.9	-105.4	957.0	0.	0.	0.
* FOR INSTRUMENT I-21	C2 1	6.40	2660.9	-105.4	960.0	0.	0.	0.
DEPLOY DEVICE		75.36	2612.1	-0.	958.5	86.1	48.8	98.9
FOR GAS RELEASE INSTR (I-21)	C2 2	.09	2563.4	105.4	1066.0	0.	0.	0.
FOR GAS RELEASE INSTR (I-21)	C2 2	.09	2563.4	0.	1066.0	0.	0.	0.
FOR GAS RELEASE INSTR (I-21)	C2 2	.09	2563.4	-105.4	1066.0	0.	0.	0.
FOR GAS RELEASE INSTR (I-21)	C2 2	.09	2660.9	105.4	1066.0	0.	0.	0.
FOR GAS RELEASE INSTR (I-21)	C2 2	.09	2660.9	-0.	1066.0	0.	0.	0.
FOR GAS RELEASE INSTR (I-21)	C2 2	.09	2660.9	-105.4	1066.0	0.	0.	0.
*PIC(FOR GAS RELEASE)	C2 1	.20	2563.4	105.4	1066.2	0.	0.	0.
*PIC(FOR GAS RELEASE)	C2 1	.20	2563.4	-0.	1066.2	0.	0.	0.
*PIC(FOR GAS RELEASE)	C2 1	.20	2563.4	-105.4	1066.2	0.	0.	0.
*PIC(FOR GAS RELEASE)	C2 1	.20	2660.9	105.4	1066.2	0.	0.	0.
*PIC(FOR GAS RELEASE)	C2 1	.20	2660.9	-0.	1066.2	0.	0.	0.
*PIC(FOR GAS RELEASE)	C2 1	.20	2660.9	-105.4	1066.2	0.	0.	0.
ORDNANCE		1.74	2612.1	0.	1066.1	86.1	48.8	98.9

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AMPS -----FLIGHT 1-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

DATE OF RUN 09/20/76  
 PAGE 13

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DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y	Z	KX	KY	KZ
			(CM)			(CM)		
*MULTILAYER INSULATION	C2 1	1.60	2563.4	105.4	1023.0	0.	0.	0.
*MULTILAYER INSULATION	C2 1	1.60	2563.4	-0.	1023.0	0.	0.	0.
*MULTILAYER INSULATION	C2 1	1.60	2563.4	-105.4	1023.0	0.	0.	0.
*MULTILAYER INSULATION	C2 1	1.60	2660.9	105.4	1023.0	0.	0.	0.
*MULTILAYER INSULATION	C2 1	1.60	2660.9	-0.	1023.0	0.	0.	0.
*MULTILAYER INSULATION	C2 1	1.60	2660.9	-105.4	1023.0	0.	0.	0.
*STRIP HEATERS	C2 1	1.00	2563.4	105.4	1021.4	0.	0.	0.
*STRIP HEATERS	C2 1	1.00	2563.4	-0.	1021.4	0.	0.	0.
*STRIP HEATERS	C2 1	1.00	2563.4	-105.4	1021.4	0.	0.	0.
*STRIP HEATERS	C2 1	1.00	2660.9	105.4	1021.4	0.	0.	0.
*STRIP HEATERS	C2 1	1.00	2660.9	-0.	1021.4	0.	0.	0.
*STRIP HEATERS	C2 1	1.00	2660.9	-105.4	1021.4	0.	0.	0.
THERMAL CONTROL		15.60	2612.1	0.	1022.4	86.1	48.8	98.9
* GAS RELEASE	D2 1	160.00	2563.4	105.4	1023.0	0.	0.	0.
* GAS RELEASE	D2 1	160.00	2563.4	0.	1023.0	0.	0.	0.
* GAS RELEASE	D2 1	160.00	2563.4	-105.4	1023.0	0.	0.	0.
* GAS RELEASE	D2 1	160.00	2660.9	105.4	1023.0	0.	0.	0.
* GAS RELEASE	D2 1	160.00	2660.9	-0.	1023.0	0.	0.	0.
* GAS RELEASE	D2 1	160.00	2660.9	-105.4	1023.0	0.	0.	0.
GAS RELEASE INSTRUMENTS		960.00	2612.1	0.	1023.0	86.1	48.7	98.9
***** GAS RELEASE TOTAL		1099.86	2612.3	.1	1020.6	88.3	52.5	99.0
NEAR IR SPECTROMETER (II-9)	D2 1	60.00	2452.0	30.5	1140.5	0.	0.	0.
***** NEAR IR SPECTROMETER TOTAL		60.00	2452.0	30.5	1140.5	.0	.0	.0
* TM XMITTER (S-BAND)	C2 1	.50	2474.8	-59.0	1003.8	0.	0.	0.
* ANTENNA, CONICAL	C2 1	1.00	2507.0	-78.8	977.8	0.	0.	0.



AMPS -----FLIGHT 1-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

DATE OF RUN 09/20/76  
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DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y (CM)	Z	KX	KY (CM)	KZ
* ANTENNA, CONICAL	C2 1	1.00	2408.0	-119.0	1002.2	0.	0.	0.
* COMMAND RECEIVER	C2 1	.60	2474.8	-59.0	976.6	0.	0.	0.
* DIPLEXER/SPLITTER	C2 1	1.00	2472.7	-105.5	990.6	0.	0.	0.
COMMUNICATIONS		4.10	2465.8	-89.8	989.9	26.0	37.2	42.6
* PCM PROGRAMMER	C2 1	2.00	2447.3	-102.9	998.2	0.	0.	0.
* COMMAND DECODER	C2 1	1.00	2462.6	-83.3	996.6	0.	0.	0.
DATA MANAGEMENT		3.00	2452.4	-96.4	997.7	5.3	7.3	11.7
* CABLE SET-ESP	C2 1	2.00	2457.5	-99.1	990.6	0.	0.	0.
* POWER SUPPLY-ESP	C2 1	23.00	2443.3	-62.6	990.6	0.	0.	0.
ELECTRICAL		25.00	2444.4	-65.5	990.6	9.9	3.9	10.6
* STRIP HEATERS	C2 1	1.00	2457.5	-99.1	990.6	0.	0.	0.
* MULTILAYER INSULATION	C2 1	3.90	2457.5	-99.1	990.6	0.	0.	0.
* THERMAL		4.90	2457.5	-99.1	990.6	.0	0.	.0
* CAPTURE/RELEASE INTERFACE	C2 1	3.30	2457.5	-99.1	990.6	0.	0.	0.
PROGRAMMED EJECTION		3.30	2457.5	-99.1	990.6	0.	0.	0.
* FOR ESP -ANTENNA	C2 1	.75	2493.1	-114.3	993.1	0.	0.	0.
* FOR ESP -ANTENNA	C2 1	.75	2421.9	83.9	993.1	0.	0.	0.
* LAUNCH LOCK-VECTOR MAG	C2 1	1.00	2505.8	-78.8	1003.3	0.	0.	0.
* FOR ESP -PROBE	C2 1	2.00	2420.5	-113.0	980.4	0.	0.	0.
* III-2 SENSOR DRIVE	C2 1	1.00	2493.1	-83.9	1003.0	0.	0.	0.
DEVICE DEPLOYMENT		5.50	2459.3	-74.8	992.1	65.5	39.9	75.4

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ORIGINAL PAGE IS  
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AMPS -----FLIGHT 1-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

DATE OF RUN 09/20/76  
 PAGE 15

DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY (CM)			RADIUS OF GYRATION (CM)		
			X	Y	Z	KX	KY	KZ
* SPIN TABLE- ESP	C2 1	6.50	2457.5	-99.1	1017.0	0.	0.	0.
* ESP STRUCTURE	C2 1	47.60	2457.5	-99.1	997.0	0.	0.	0.
* RELEASE ORDNANCE + CONT	C2 1	4.00	2457.5	-99.1	1014.7	0.	0.	0.
* EMI DIAGNOSTIC (III-25)	D2 1	22.60	2457.5	-99.1	990.6	0.	0.	0.
* PLANAR RPA (III-18)	D2 1	3.00	2459.0	-62.5	990.6	0.	0.	0.
* NEUTRAL MASS SPEC (III-23)	D2 1	10.00	2443.5	-132.0	990.6	0.	0.	0.
***** ESP		139.50	2454.4	-93.4	994.9	23.6	13.8	25.3

AMPS -----FLIGHT 1-----LAUNCH CONDITION  
MASS PROPERTIES AND EQUIPMENT LIST

DATE OF RUN 09/20/76  
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GRAND TOTAL

MASS 14724.08 KGS

CENTER OF GRAVITY

X = 2516.87 CM  
Y = -10.20 CM  
Z = 980.60 CM

RADIUS OF GYRATION

KX = 160.71 CM  
KY = 508.77 CM  
KZ = 508.43 CM

MOMENT OF INERTIA

IX= 38027 KG-M2  
IY= 378133 KG-M2  
IZ= 380619 KG-M2

PRODUCT OF INERTIA

PXY= -5252 KG-M2  
PXZ= -1752 KG-M2  
PYZ= 1129 KG-M2

MOMENT OF INERTIA

IX= 380267128 KG-CM2  
IY= 3781326053 KG-CM2  
IZ= 3806187520 KG-CM2

PRODUCT OF INERTIA

PXY= -52517875 KG-CM2  
PXZ= -17516574 KG-CM2  
PYZ= 11286530 KG-CM2

AMPS -----FLIGHT 1-----LANDED CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

DATE OF RUN 09/17/76  
 PAGE 1

DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y (CM)	Z	KX	KY (CM)	KZ
SPACELAB MODULE	A5 1	3363.00	2156.5	-8.5	1004.6	160.5	165.9	154.9
6 METER PALLET TRAIN	A1 1	1236.00	2700.0	11.9	911.6	212.6	179.4	223.0
3 METER PALLET	A4 1	618.00	3163.6	11.9	911.6	212.6	105.6	189.0
SL/ORBITER UTILITY BRIDGE	A6 1	218.20	1836.0	0.	914.4	0.	0.	0.
TUNNEL	A8 1	352.00	1877.1	0.	967.5	142.0	101.1	141.0
TUNNEL ADAPTER	A8 1	408.20	1500.0	0.	901.7	87.1	105.4	95.0
P/L ARS FAN AND DUCTING	A8 1	9.50	1577.3	0.	901.7	0.	0.	0.
AIRLOCK	A9 1	364.00	1605.3	0.	1069.3	0.	0.	0.
LESS SHUTTLE AIRLOCK	A9 1	-363.00	1402.0	0.	914.0	0.	0.	0.
***** BASIC SPACELAB		6205.90	2305.7	-1.1	973.7	177.9	430.4	432.8
EPS KIT 2-DRY PLUS RESIDUALS	B0 1	357.02	2634.0	-18.4	784.9	206.0	294.4	357.1
EPS KIT 2		357.02	2634.0	-18.4	784.9	206.0	294.4	357.1
ORBITER HEAT REJECTION KIT	B0 1	87.50	3088.6	0.	1204.0	98.0	171.7	108.5
LONGERON FITTING-PALLET	B0 1	40.40	2475.5	238.8	1051.6	0.	0.	0.
LONGERON FITTING-PALLET	B0 1	40.40	2475.5	-238.7	1051.6	0.	0.	0.
LONGERON FITTING-PALLET	B0 1	40.40	2925.1	238.8	1051.6	0.	0.	0.
LONGERON FITTING-PALLET	B0 1	40.40	2925.1	-238.7	1051.6	0.	0.	0.
LONGERON FITTING-PALLET	B0 1	40.40	3074.9	238.8	1051.6	0.	0.	0.
LONGERON FITTING-PALLET	B0 1	40.40	3074.9	-238.7	1051.6	0.	0.	0.
LONGERON FITTING-PALLET	B0 1	40.40	3224.8	238.8	1051.6	0.	0.	0.
LONGERON FITTING-PALLET	B0 1	40.40	3224.8	-238.7	1051.6	0.	0.	0.
KEEL FITTING-PALLET	B0 1	35.40	2993.4	0.	777.2	0.	0.	0.
KEEL FITTING-PALLET	B0 1	35.40	3000.6	0.	777.2	0.	0.	0.
LONGERON FITTING-MODULE	B0 1	40.40	2035.9	238.8	1051.6	0.	0.	0.
LONGERON FITTING-MODULE	B0 1	40.40	2035.9	-238.7	1051.6	0.	0.	0.
LONGERON FITTING-MODULE	B0 1	40.40	2275.7	238.8	1051.6	0.	0.	0.
LONGERON FITTING-MODULE	B0 1	40.40	2275.7	-238.7	1051.6	0.	0.	0.
KEEL FITTING-MODULE	B0 1	35.40	2275.7	0.	777.2	0.	0.	0.
LESS ORBITER ALLOWANCE	B0 1	-204.00	2728.0	0.	1003.3	0.	0.	0.

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AMPS -----FLIGHT 1-----LANDED CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

DATE OF RUN 09/17/76  
 PAGE 2

DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y (CM)	Z	KX	KY (CM)	KZ
ORBITER RETENTION FITTINGS		387.00	2661.5	.1	1001.8	297.2	534.1	582.9
CREWMAN 5	B0 1	77.10	1244.6	121.9	886.5	0.	0.	0.
CREWMAN 6	B0 1	77.10	1244.6	71.1	886.5	0.	0.	0.
SEAT 5	B0 1	24.50	1254.8	121.9	863.6	0.	0.	0.
SEAT 6	B0 1	24.50	1254.8	71.1	863.6	0.	0.	0.
O2 TANKAGE PLUS RESIDUAL	B0 1	37.60	1905.0	0.	782.3	0.	0.	0.
EMERGENCY EQUIPMENT	B0 1	49.50	1366.5	0.	1016.0	0.	0.	0.
WASTE WATER TANKAGE	B0 1	22.00	1216.7	12.7	800.1	0.	0.	0.
FOOD	B0 1	28.60	1181.1	-177.7	934.7	0.	0.	0.
HYGIENE EQUIPMENT	B0 1	26.20	1414.8	-109.1	904.2	0.	0.	0.
CREW PROVISIONS	B0 1	25.20	1244.6	96.5	886.5	0.	0.	0.
LICH	B0 1	31.90	1244.6	0.	800.1	0.	0.	0.
RESTRAINTS	B0 1	1.70	1206.5	0.	1016.0	0.	0.	0.
STOWAGE VOLUME PENTALY	B0 1	43.90	1104.9	-25.3	939.8	0.	0.	0.
CREW SYSTEMS		469.80	1302.5	28.2	888.9	103.4	202.2	208.6
MONITOR AND CONTROL PANEL	B0 1	5.00	1358.9	0.	1016.0	0.	0.	0.
KEYBOARD	B0 1	3.50	1358.9	0.	1016.0	0.	0.	0.
CRT DISPLAY/SIGNAL GENERATOR	B0 1	28.90	1358.9	0.	1016.0	0.	0.	0.
REMOTE STATION, COMMUNICATIO	B0 1	1.50	1358.9	0.	1016.0	0.	0.	0.
PSS EQUIPMENT		38.90	1358.9	0.	1016.0	.0	.0	.0
DOUBLE RACK	B5 1	58.10	2080.0	127.0	1034.3	0.	0.	0.
SINGLE RACK	B5 1	37.60	2207.0	127.0	1034.3	0.	0.	0.
PALLET HARDPOINTS	B1 45	37.35	2858.8	0.	934.7	0.	0.	0.
INSERTS FOR PANELS	B1 6	39.00	2846.3	0.	904.2	0.	0.	0.
STRUCTURE		172.05	2450.5	70.6	983.2	85.8	366.6	367.4

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AMPS -----FLIGHT 1-----LANDED CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

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DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y	Z	KX	KY	KZ
			(CM)			(CM)		
EXP SWITCH PANEL	B5 1	12.70	2156.0	0.	1016.0	0.	0.	0.
EXP SWITCH PANEL	B5 1	12.70	2156.0	0.	1016.0	0.	0.	0.
EXP SWITCH PANEL	B5 1	12.70	2156.0	0.	1016.0	0.	0.	0.
INVERTER (400 HZ)	B5 1	32.20	2197.9	-123.9	934.0	0.	0.	0.
<b>EPDS</b>		<b>70.30</b>	<b>2175.2</b>	<b>-56.8</b>	<b>978.4</b>	<b>74.0</b>	<b>45.9</b>	<b>65.2</b>
COLD PLATE-IECM	B4 1	5.50	3051.7	-109.2	965.2	0.	0.	0.
COLD PLATE-ELECT ACCEL	B4 1	5.50	3051.0	50.0	1013.5	0.	0.	0.
COLD PLATE-ELECT ACCEL	B4 1	5.50	3051.0	-50.0	1013.5	0.	0.	0.
COLD PLATE-ELECT ACCEL	B4 1	5.50	3152.6	0.	1092.2	0.	0.	0.
COLD PLATE-ELECT ACCEL	B4 1	5.50	3152.6	0.	990.0	0.	0.	0.
COLD PLATE-PEAKING BATTERY	B4 1	5.50	3192.4	114.0	914.0	0.	0.	0.
COLD PLATE-PS	B4 1	5.50	3154.3	0.	889.0	0.	0.	0.
COLD PLATE-RF TERMINAL	B3 1	5.50	2836.0	114.0	914.0	0.	0.	0.
<b>ECS</b>		<b>44.00</b>	<b>3080.2</b>	<b>14.9</b>	<b>973.9</b>	<b>95.5</b>	<b>123.8</b>	<b>128.4</b>
EXP RAU	B2 1	2.30	2524.8	0.	889.0	3.5	5.8	5.2
EXP RAU	B3 1	2.30	2824.5	0.	889.0	3.5	5.8	5.2
EXP RAU	B3 1	2.30	2824.5	0.	889.0	3.5	5.8	5.2
EXP RAU	B4 1	2.30	3124.2	0.	889.0	3.5	5.8	5.2
EXP RAU	B4 1	2.30	3124.2	0.	889.0	3.5	5.8	5.2
EXP RAU	B5 1	2.30	2156.5	-139.6	990.6	3.5	5.8	5.2
EXP COMPUTER	B5 1	30.20	2156.0	-0.	1016.0	0.	0.	0.
DIGITAL TAPE RECORDER	B5 1	43.00	2156.0	-0.	1016.0	0.	0.	0.
EXPERIMENT I/O	B5 1	27.50	2156.0	-0.	1016.0	0.	0.	0.
HIGH RATE DIGITAL MUX	B5 1	10.00	2156.0	-0.	1016.0	0.	0.	0.
TAPE AND CANISTERS	B5 15	88.50	2165.5	0.	1016.0	0.	0.	0.
<b>CMDS</b>		<b>213.00</b>	<b>2199.3</b>	<b>-1.5</b>	<b>1008.9</b>	<b>32.2</b>	<b>174.2</b>	<b>172.4</b>
CONSOL VERTICAL RAILS	B5 4	2.00	2156.5	0.	1016.0	0.	0.	0.

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AMPS -----FLIGHT 1-----LANDED CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

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DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y	Z	KX	KY	KZ
			(CM)			(CM)		
CONSOL HORIZONTAL RAILS	B5 4	3.00	2156.5	0.	1016.0	0.	0.	0.
PSA FOOT RESTRAINTS	B5 6	18.00	2156.5	0.	1016.0	0.	0.	0.
RACK CLOSEOUT FT RESTRAINTS	B5 4	31.70	2156.5	0.	1016.0	0.	0.	0.
HABITABILITY		54.70	2156.5	0.	1016.0	0.	.0	.0
KEYBOARD	B5 1	3.50	2156.0	-141.9	984.5	0.	0.	0.
CRT AND SYMBOL GENERATOR	B5 1	28.90	2156.0	-141.9	1009.9	0.	0.	0.
CONTROL AND DISPLAY		32.40	2156.0	-141.9	1007.2	7.9	7.9	0.
***** MISSION DEPENDENT EQUIPMENT		1926.67	2217.2	5.5	941.7	202.8	676.7	683.7
C AND D PANELS	C5 1	18.00	2156.0	0.	1016.0	0.	0.	0.
C AND D PANELS	C5 1	8.40	2156.0	0.	1016.0	0.	0.	0.
C AND D PANELS	C5 1	3.00	2156.0	0.	1016.0	0.	0.	0.
TV MONITOR	C5 1	10.00	2156.0	0.	1016.0	0.	0.	0.
OSCILLOSCOPE	C5 1	20.00	2156.0	0.	1016.0	0.	0.	0.
C AND W SENSORS-PRESSURE	C2 12	1.90	2156.0	0.	1016.0	0.	0.	0.
C AND W SENSORS-TEMPERATURE	C2 8	1.30	2156.0	0.	1016.0	0.	0.	0.
CONTROL AND DISPLAY		62.60	2156.0	0.	1016.0	.0	.0	.0
SIPS PLATFORM	C3 1	527.00	2856.0	0.	990.6	0.	0.	0.
TWO AXES GYRO PACKAGE	C3 1	8.00	2856.0	50.8	977.9	0.	0.	0.
TWO AXES GYRO PACKAGE	C3 1	8.00	2856.0	-50.7	977.9	0.	0.	0.
3 AXES GYRO PACKAGE-OBIPS	C4 1	10.00	3092.0	152.0	1066.8	0.	0.	0.
3 AXES GYRO PACKAGE-NIR SPEC	C2 1	10.00	2452.0	139.7	1054.1	0.	0.	0.
RATE GYROS		36.00	2809.3	81.1	1023.8	90.1	245.6	255.0

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AMPS -----FLIGHT 1-----LANDED CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

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DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y	Z	KX	KY	KZ
			(CM)			(CM)		
MPM PLATFORM-OBIPS	C4 1	56.00	3067.0	152.0	1104.9	0.	0.	0.
FIXED HD STAR TRKER-II-7-10	C4 1	4.00	3079.0	406.0	1104.9	0.	0.	0.
MPM PLATFORM-NIR SPEC	C2 1	56.00	2452.0	139.7	1117.6	0.	0.	0.
FIXED HEAD STAR TRACKER-NIR	C2 1	4.00	2452.0	0.	1054.1	0.	0.	0.
MPM		120.00	2759.9	149.7	1109.1	55.9	308.1	312.7
ATTITUDE POINTING		683.00	2836.7	30.6	1013.2	79.6	152.5	159.1
I/F PLUMBING KITS-PALLET 3	C4 1	12.00	3156.0	0.	876.3	0.	0.	0.
THERMAL CURTAIN-PALLET 1	C2 1	10.00	2561.0	0.	1016.0	0.	0.	0.
THERMAL CURTAIN-PALLET 2	C3 1	10.00	2864.0	0.	1016.0	0.	0.	0.
THERMAL CURTAIN-PALLET 3	C4 1	10.00	3156.0	0.	1016.0	0.	0.	0.
EXP HEAT EXCHANGER-LIDAR	C4 1	25.00	3219.0	-127.0	952.0	0.	0.	0.
TCS PUMP-LIDAR	C4 1	10.00	3219.0	-127.0	952.0	0.	0.	0.
COOLANT FILTERS	C4 6	2.70	3219.0	-127.0	952.0	0.	0.	0.
THERMAL CONTROL-LIDAR		37.70	3219.0	-127.0	952.0	.0	.0	.0
MPM CANISTER-NIR SPEC	C2 1	215.00	2452.0	10.0	1140.0	0.	0.	0.
THERMAL		294.70	2620.4	-9.0	1092.6	93.4	311.0	303.5
CABLE SET-PALLET 1	C2 1	102.00	2561.0	-119.3	914.4	0.	0.	0.
CABLE SET-PALLET 2	C3 1	91.00	2864.0	-119.3	914.4	0.	0.	0.
CABLE SET-PALLET 3	C4 1	68.00	3156.0	-119.3	914.4	0.	0.	0.
CABLE SET-MODULE TO PALLET	C7 1	57.00	2362.0	-152.3	863.6	0.	0.	0.
CABLE SET-MODULE	C5 1	34.00	2156.0	-152.3	863.6	0.	0.	0.
CABLE SET-SIPS TO INSTRUMENT	C3 1	40.00	2856.0	-152.3	863.6	0.	0.	0.

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AMPS -----FLIGHT 1-----LANDED CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

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DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION			
			X	Y	Z	KX	KY	KZ	
			(CM)			(CM)			
COMMON CABLE SET			392.00	2700.6	-130.3	897.4	28.6	304.4	303.9
PULSE POWER SUPPLY-LIDAR	C4 1	95.00	3156.0	0.	1010.9	0.	0.	0.	
PULSE POWER SUPPLY-ACCELER	C4 1	600.00	3156.0	0.	909.3	0.	0.	0.	
PEAKING BATTERY	C4 1	40.30	3166.0	101.6	902.0	0.	0.	0.	
ELECTRICAL DIST UNIT	C2 1	10.00	2561.0	-0.	902.0	0.	0.	0.	
ELECTRICAL DIST UNIT	C3 1	10.00	2864.0	-0.	902.0	0.	0.	0.	
ELECTRICAL DIST UNIT	C4 1	10.00	3166.0	-0.	902.0	0.	0.	0.	
POWER SUPPLIES			765.30	3145.1	5.4	921.2	40.7	82.3	78.4
ELECTRICAL			1157.30	2994.5	-40.6	913.2	75.0	283.3	289.3
FM MODULE	C5 1	21.80	2156.0	-0.	1016.0	0.	0.	0.	
SENSOR INTERFACE BOX	C3 1	2.27	2864.0	-0.	890.0	0.	0.	0.	
SENSOR INTERFACE BOX	C3 1	2.27	2864.0	-0.	890.0	0.	0.	0.	
SENSOR INTERFACE BOX	C2 1	2.27	3168.0	-0.	890.0	0.	0.	0.	
SENSOR INTERFACE BOX	C4 1	2.27	3168.0	-0.	890.0	0.	0.	0.	
ANALOG RECORDER	C5 1	22.70	2156.0	-0.	1016.0	0.	0.	0.	
TRANSIENT RECORDER	C5 5	30.80	2156.0	-0.	1016.0	0.	0.	0.	
SWITCHING PANEL	C5 1	3.63	2156.0	-0.	1016.0	0.	0.	0.	
VIDEO RECORDER	C5 1	36.30	2156.0	-0.	1016.0	0.	0.	0.	
DATA MANAGEMENT SYSTEM			124.31	2218.8	0.	1006.8	32.8	229.9	227.5
COMMAND TRANSMITTER	C3 1	.50	2926.1	-172.6	1059.2	0.	0.	0.	
RF MULTIPLEXER	C3 1	1.36	2926.1	-172.6	1059.2	0.	0.	0.	
WIDE BAND RECEIVER	C3 2	2.27	2926.1	-172.6	1059.2	0.	0.	0.	
CONICAL ANTENNA	C3 1	.91	2926.1	-172.6	1059.2	0.	0.	0.	

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AMPS -----FLIGHT 1-----LANDED CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

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DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY (CM)			RADIUS OF GYRATION (CM)		
			X	Y	Z	KX	KY	KZ
COMMUNICATIONS		5.04	2926.1	-172.6	1059.2	.0	.0	.0
FOR HV POWER SUPPLY	C4 1	12.00	3153.0	0.	889.0	0.	0.	0.
FOR INSTRUMENT IV-1	C4 1	1.40	3160.0	-208.2	1049.0	0.	0.	0.
DIRECT MOUNTING BRACKETRY		13.40	3153.7	-21.8	905.7	80.3	49.0	63.7
FOR INSTRUMENT I-21	C2 1	20.80	2569.2	101.0	987.0	0.	0.	0.
FOR INSTRUMENT I-21	C2 1	20.80	2569.2	0.	987.0	0.	0.	0.
FOR INSTRUMENT I-21	C2 1	20.80	2569.2	-101.0	987.0	0.	0.	0.
FOR INSTRUMENT I-21	C2 1	20.80	2662.0	101.0	987.0	0.	0.	0.
FOR INSTRUMENT I-21	C2 1	20.80	2662.0	0.	987.0	0.	0.	0.
FOR INSTRUMENT I-21	C2 1	20.80	2662.0	-101.0	987.0	0.	0.	0.
INSTRUMENT I-21 PLATFORM	C2 1	65.30	2634.0	0.	911.0	0.	0.	0.
FOR INSTRUMENT I-1	C4 1	39.00	3229.0	-0.	927.0	0.	0.	0.
FOR INSTRUMENT II-3	C4 1	20.40	3051.0	127.0	927.0	0.	0.	0.
FOR INSTRUMENT II-7	C3 1	6.40	2853.0	94.0	1090.0	0.	0.	0.
FOR INSTRUMENT II-9	C2 1	20.40	2440.0	142.0	978.0	0.	0.	0.
FOR INSTRUMENT II-10	C3 1	6.40	2853.0	-93.9	1090.0	0.	0.	0.
FOR IECM	C4 1	22.70	3054.0	-101.5	927.1	0.	0.	0.
FOR ESP	C2 1	13.60	2444.8	-94.0	914.0	0.	0.	0.
FOR BEAM DIAGNOSTIC PACKAGE	C3 1	9.10	2749.6	-165.0	995.7	0.	0.	0.
FOR RF TERMINAL	C3 1	5.00	2838.4	114.0	914.0	0.	0.	0.
INTERMEDIATE SPT STRUCTURE		333.10	2746.0	2.9	956.9	94.5	246.9	257.3
INSTR TO INSTR I/F STRUCTURE	C4 14	15.90	3073.4	0.	914.4	0.	0.	0.
THERMAL CURTAIN SPT-PALLET 1	C2 1	11.30	2561.0	0.	1016.0	0.	0.	0.
THERMAL CURTAIN SPT-PALLET 2	C3 1	11.30	2864.0	0.	1016.0	0.	0.	0.
THERMAL CURTAIN SPT-PALLET 3	C4 1	11.30	3146.0	0.	1016.0	0.	0.	0.

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AMPS -----FLIGHT 1-----LANDED CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

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DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y	Z	KX	KY	KZ
(CM)								
MISC STRUCTURE		33.90	2857.0	0.	1016.0	.0	238.9	238.9
PALLET I/F STRUCTURE		396.30	2782.4	1.7	958.5	90.5	257.5	265.2
L/L LOCKS -OBIPS	C4 1	6.80	3100.0	152.4	1084.6	0.	0.	0.
EMERGENCY JETT-MPM PLATFORM	C4 1	8.20	3067.0	152.4	1059.2	0.	0.	0.
CAPTURE RELEASE DEVICE	C3 1	1.80	2804.0	-170.0	1043.9	0.	0.	0.
CAPTURE RELEASE DEVICE	C3 1	10.00	2951.0	-170.0	1033.8	0.	0.	0.
L/L LOCKS-NIR SPEC	C2 1	1.80	2457.0	-30.4	1077.0	0.	0.	0.
L/L LOCKS-NIR SPEC	C2 1	9.10	2457.5	114.3	1107.4	0.	0.	0.
EMERGENCY JETT-MPM PLATFORM	C2 1	8.20	2452.0	152.4	1059.2	0.	0.	0.
CAPTURE RELEASE DEVICE	C2 1	10.40	2444.8	-101.5	1028.0	0.	0.	0.
PIC( FOR HOLDDOWN NUTS)	C2 6	6.00	2514.6	-0.	889.0	0.	0.	0.
HOLDDOWN ORDNANCE	C2 18	1.80	2514.6	-0.	889.0	0.	0.	0.
MECHANISMS		64.10	2694.5	22.8	1039.1	143.4	284.1	306.1
***** AMPS LABCRAFT		2787.35	2825.7	-9.9	972.7	105.0	331.7	331.0
EMERGENCY JETTISON FOR I-1	D4 1	.90	3232.0	0.	1231.9	0.	0.	0.
LIDAR EMITTER	D4 1	75.00	3188.0	-121.0	1041.4	0.	0.	0.
LIDAR EMITTER	D4 1	75.00	3270.0	-121.0	1041.4	0.	0.	0.
LIDAR RECEIVER	D4 1	300.00	3232.0	0.	1082.0	0.	0.	0.
***** LASER SOUNDER (I-1)		450.90	3231.0	-40.3	1068.8	60.6	31.3	61.7
EMERGENCY JETTISON FOR I-9	D4 1	.90	3056.9	0.	1231.9	0.	0.	0.
ELECTRON ACCEL (I-9)	D4 1	40.50	3056.9	0.	1082.0	0.	0.	0.
GAS PLUME RELEASE (III-3)	D4 1	9.00	3056.9	0.	1219.2	0.	0.	0.

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AMPS -----FLIGHT 1-----LANDED CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

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DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y	Z	KX	KY	KZ
			(CM)			(CM)		
***** ELECT ACCELERATOR		50.40	3056.9	0.	1109.2	55.0	55.0	.0
IECM	D4 1	340.00	3072.1	-109.1	988.1	0.	0.	0.
***** IECM		340.00	3072.1	-109.1	988.1	.0	.0	0.
SOLAR FLUX MONITOR (IV-1)	D4 1	3.00	3232.0	-200.6	1079.0	0.	0.	0.
***** SOLAR FLUX MONITOR		3.00	3232.0	-200.6	1079.0	0.	0.	0.
OBIPS (II-3)	D4 1	43.00	3194.0	150.0	1117.6	0.	0.	0.
***** OBIPS		43.00	3194.0	150.0	1117.6	0.	0.	0.
CRYO LIMB SCANNER-DRY (II-7)	D3 1	207.00	2838.0	94.0	1077.0	0.	0.	0.
***** CRYO LIMB SCANNER		207.00	2838.0	94.0	1077.0	0.	0.	0.
CRYO IR INTERFEROMETER-DRY	D3 1	215.00	2838.0	-93.9	1077.0	0.	0.	0.
***** CRYO IR INTERFEROMETER		215.00	2838.0	-93.9	1077.0	.0	.0	.0
WIDE BAND TRANSMITTER	C3 2	1.00	2831.0	-170.0	1047.5	0.	0.	0.
COMMAND RECEIVER	C3 1	1.00	2862.0	-170.0	1047.5	0.	0.	0.
RF MULTIPLEXER	C3 1	1.00	2857.5	-162.4	1049.0	0.	0.	0.
ANTENNA ,STUB	C3 1	1.00	2870.0	-190.0	1046.0	0.	0.	0.
COMMUNICATIONS		4.00	2855.1	-173.1	1047.5	10.3	14.7	17.9
CABLE SET-BEAM DIAG PACKAGE	C3 1	1.50	2865.0	-170.0	1053.0	0.	0.	0.
POWER SUPPLY	C3 1	29.00	2461.3	-170.0	1064.8	0.	0.	0.
POWER SUBSYSTEM		30.50	2481.2	-170.0	1064.2	2.6	87.3	87.3

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AMPS -----FLIGHT 1-----LANDED CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

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DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y	Z	KX	KY	KZ
			(CM)			(CM)		
STRIP HEATERS	C3 1	1.00	2865.0	-170.0	1053.0	0.	0.	0.
MULTILAYER INSULATION	C3 1	4.00	2844.0	-170.0	1072.0	0.	0.	0.
THERMAL SUBSYSTEM		5.00	2848.2	-170.0	1068.2	7.6	11.3	8.4
SUBCARRIER OSCILLATOR ASSY	C3 1	5.00	2847.3	-170.0	1067.9	0.	0.	0.
PCM PROGRAMMER	C3 1	2.00	2859.3	-178.9	1049.0	0.	0.	0.
COMMAND DECODER	C3 1	1.50	2794.0	-170.0	1049.0	0.	0.	0.
DATA MANAGEMENT SUBSYSTEM		8.50	2840.7	-172.1	1060.1	10.0	24.1	22.5
DEPLOY DEVICE (III-2)	C3 1	2.70	2974.3	-170.0	1052.1	0.	0.	0.
CAPTURE/RELEASE INTERFACE	C3 1	.50	2880.0	-170.0	1042.0	0.	0.	0.
LAUNCH LOCK-VECTOR MAG	C3 1	1.00	2974.3	-170.0	1062.3	0.	0.	0.
BASIC STRUCTURE PACKAGE	C2 1	26.00	2860.0	-170.0	1057.2	0.	0.	0.
STRUCTURE SUBSYSTEM		30.20	2874.3	-170.0	1056.7	2.6	37.5	37.4
OBIPS (II-3)	D3 1	38.00	2763.5	-170.0	1072.4	0.	0.	0.
VECTOR MAGNETOMETER (III-2)	D3 1	4.10	2974.3	-170.0	1063.6	0.	0.	0.
LEVEL II DIAGNOSTIC (III-4)	D3 1	23.00	2989.6	-170.0	1052.1	0.	0.	0.
INSTRUMENTS		65.10	2856.7	-170.0	1064.7	9.5	110.8	110.4
***** BEAM DIAGNOSTIC PKG		143.30	2779.2	-170.2	1062.3	8.6	177.9	177.7
COMMUNICATIONS		-0.	-0.	-0.	-0.	-0.	-0.	-0.
ELECTRICAL		-0.	-0.	-0.	-0.	-0.	-0.	-0.
FOR INSTRUMENT I-21	C2 1	6.16	2563.4	105.4	957.0	0.	0.	0.
FOR INSTRUMENT I-21	C2 1	6.16	2563.4	-0.	957.0	0.	0.	0.
FOR INSTRUMENT I-21	C2 1	6.16	2563.4	-105.4	957.0	0.	0.	0.

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AMPS -----FLIGHT 1-----LANDED CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

DATE OF RUN 09/17/76  
 PAGE 11

DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y	Z	KX	KY	KZ
			(CM)			(CM)		
FOR INSTRUMENT I-21	C2 1	6.16	2660.9	105.4	957.0	0.	0.	0.
FOR INSTRUMENT I-21	C2 1	6.16	2660.9	-0.	957.0	0.	0.	0.
FOR INSTRUMENT I-21	C2 1	6.16	2660.9	-105.4	957.0	0.	0.	0.
DEPLOY DEVICE		36.96	2612.2	0.	957.0	86.1	48.7	98.9
FOR GAS RELEASE INSTR (I-21)	C2 2	.09	2563.4	105.4	1066.0	0.	0.	0.
FOR GAS RELEASE INSTR (I-21)	C2 2	.09	2563.4	0.	1066.0	0.	0.	0.
FOR GAS RELEASE INSTR (I-21)	C2 2	.09	2563.4	-105.4	1066.0	0.	0.	0.
FOR GAS RELEASE INSTR (I-21)	C2 2	.09	2660.9	105.4	1066.0	0.	0.	0.
FOR GAS RELEASE INSTR (I-21)	C2 2	.09	2660.9	-0.	1066.0	0.	0.	0.
FOR GAS RELEASE INSTR (I-21)	C2 2	.09	2660.9	-105.4	1066.0	0.	0.	0.
ORDNANCE		.54	2612.1	0.	1066.0	86.1	48.7	98.9
THERMAL CONTROL		-0.	-0.	-0.	-0.	-0.	-0.	-0.
GAS RELEASE INSTRUMENTS		-0.	-0.	-0.	-0.	-0.	-0.	-0.
***** GAS RELEASE TOTAL		37.50	2612.2	0.	958.6	87.0	50.4	98.9
NEAR IR SPECTROMETER (II-9)	D2 1	60.00	2452.0	30.5	1140.5	0.	0.	0.
***** NEAR IR SPECTROMETER TOTAL		60.00	2452.0	30.5	1140.5	.0	.0	.0
COMMUNICATIONS		-0.	-0.	-0.	-0.	-0.	-0.	-0.
DATA MANAGEMENT		-0.	-0.	-0.	-0.	-0.	-0.	-0.
ELECTRICAL		-0.	-0.	-0.	-0.	-0.	-0.	-0.
PROGRAMMED EJECTION		-0.	-0.	-0.	-0.	-0.	-0.	-0.
DEVICE DEPLOYMENT		-0.	-0.	-0.	-0.	-0.	-0.	-0.
***** ESP		0.	0.	0.	0.	0.	0.	0.

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AMPS -----FLIGHT 1-----LANDED CONDITION  
MASS PROPERTIES AND EQUIPMENT LIST

DATE OF RUN 09/17/76  
PAGE 12

GRAND TOTAL

MASS 12470.02 KGS

CENTER OF GRAVITY

X = 2493.98 CM  
Y = -7.70 CM  
Z = 978.71 CM

RADIUS OF GYRATION

KX = 164.36 CM  
KY = 529.22 CM  
KZ = 531.45 CM

MOMENT OF INERTIA

IX= 33687 KG-M2  
IY= 349255 KG-M2  
IZ= 352197 KG-M2

PRODUCT OF INERTIA

PXY= -4336 KG-M2  
PXZ= -2262 KG-M2  
PYZ= 278 KG-M2

MOMENT OF INERTIA

IX= 336865250 KG-CM2  
IY= 3492554296 KG-CM2  
IZ= 3521966009 KG-CM2

PRODUCT OF INERTIA

PXY= -43360513 KG-CM2  
PXZ= -22617397 KG-CM2  
PYZ= 2776976 KG-CM2

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BCD INPUT \*ENDFILE\*A  
ERROR NUMBER 0065 DETECTED BY INPUTC AT ADDRESS 010135  
CALLED FROM AMPS AT 000114

ERROR SUMMARY

ERROR TIMES  
:0065 :0001

AMPS -----FLIGHT 2-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

DATE OF RUN 09/20/76  
 PAGE 1

DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y	Z	KX	KY	KZ
			(CM)			(CM)		
SPACELAB MODULE	A5 1	3363.00	2156.5	-8.5	1004.6	160.5	165.9	154.9
6 METER PALLET TRAIN	A1 1	1236.00	2739.0	11.9	911.6	212.6	179.4	223.0
3 METER PALLET	A4 1	618.00	3163.6	11.9	911.6	212.6	105.6	189.0
SL/ORBITER UTILITY BRIDGE	A6 1	218.20	1836.0	0.	914.4	0.	0.	0.
TUNNEL	A8 1	352.00	1877.1	0.	967.5	142.0	101.1	141.0
TUNNEL ADAPTER	A8 1	408.20	1500.0	0.	901.7	87.1	105.4	95.0
P/L AFS FAN AND DUCTING	A8 1	9.50	1577.3	0.	901.7	0.	0.	0.
AIRLOCK	A9 1	364.00	1605.3	0.	1069.3	0.	0.	0.
LESS SHUTTLE AIRLOCK	A9 1	-363.00	1402.0	0.	914.0	0.	0.	0.
***** BASIC SPACELAB		6205.90	2305.7	-1.1	973.7	171.9	430.4	432.8
EPS (SECOND UNIT)	B0 1	393.50	2376.4	213.4	1107.6	0.	0.	0.
* EXTRA WATER FOR COOLING	B0 1	68.20	1117.6	0.	1016.0	0.	0.	0.
EPS KIT 2-DRY PLUS RESIDUALS	B0 1	357.02	2634.0	-18.4	784.9	206.0	294.4	357.1
* EPS KIT 2-EXPENDABLES	B0 1	383.30	2763.8	-109.6	780.0	58.7	110.5	125.7
EPS KIT 2		740.32	2701.2	-65.6	782.4	156.0	228.8	275.6
ORBITER HEAT REJECTION KIT	B0 1	87.50	3098.6	0.	1204.0	98.0	171.7	108.5
LONGERON FITTING-PALLET	B0 1	40.40	2475.5	238.8	1051.6	0.	0.	0.
LONGERON FITTING-PALLET	B0 1	40.40	2475.5	-238.7	1051.6	0.	0.	0.
LONGERON FITTING-PALLET	B0 1	40.40	2925.1	238.8	1051.6	0.	0.	0.
LONGERON FITTING-PALLET	B0 1	40.40	2925.1	-238.7	1051.6	0.	0.	0.
LONGERON FITTING-PALLET	B0 1	40.40	3074.9	238.8	1051.6	0.	0.	0.
LONGERON FITTING-PALLET	B0 1	40.40	3074.9	-238.7	1051.6	0.	0.	0.
LONGERON FITTING-PALLET	B0 1	40.40	3224.8	238.8	1051.6	0.	0.	0.
LONGERON FITTING-PALLET	B0 1	40.40	3224.8	-238.7	1051.6	0.	0.	0.
WHEEL FITTING-PALLET	B0 1	35.40	2993.4	0.	777.2	0.	0.	0.
KEEL FITTING-PALLET	B0 1	35.40	3003.6	0.	777.2	0.	0.	0.
LONGERON FITTING-MODULE	B0 1	40.40	2035.9	238.8	1051.6	0.	0.	0.
LONGERON FITTING-MODULE	B0 1	40.40	2035.9	-238.7	1051.6	0.	0.	0.
LONGERON FITTING-MODULE	B0 1	40.40	2275.7	238.8	1051.6	0.	0.	0.

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ORIGINAL PAGE IS  
 OF POOR QUALITY



AMPS -----FLIGHT 2-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

DATE OF RUN 09/20/76  
 PAGE 2

DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y (CM)	Z	KX	KY (CM)	KZ
LONGERON FITTING-MODULE	B0 1	40.40	2275.7	-238.7	1051.6	0.	0.	0.
KEEL FITTING-MODULE	B0 1	35.40	2275.7	0.	777.2	0.	0.	0.
LESS ORBITER ALLOWANCE	B0 1	-204.00	2728.0	0.	1003.3	0.	0.	0.
ORBITER RETENTION FITTINGS		387.00	2661.5	.1	1001.8	297.2	534.1	582.9
CREWMAN 5	B0 1	77.10	1244.6	121.9	886.5	0.	0.	0.
CREWMAN 6	B0 1	77.10	1244.6	71.1	886.5	0.	0.	0.
SEAT 5	B0 1	24.50	1254.8	121.9	863.6	0.	0.	0.
SEAT 6	B0 1	24.50	1254.8	71.1	863.6	0.	0.	0.
O2 TANKAGE PLUS RESIDUAL	B0 1	37.60	1905.0	0.	782.3	0.	0.	0.
* USABLE O2	B0 1	22.70	1905.0	0.	782.3	0.	0.	0.
EMERGENCY EQUIPMENT	B0 1	49.50	1366.5	0.	1016.0	0.	0.	0.
WASTE WATER TANKAGE	B0 1	22.00	1216.7	12.7	800.1	0.	0.	0.
FOOD	B0 1	28.60	1181.1	-177.7	934.7	0.	0.	0.
HYGIENE EQUIPMENT	B0 1	26.20	1414.8	-109.1	904.2	0.	0.	0.
CREW PROVISIONS	B0 1	25.20	1244.6	96.5	886.5	0.	0.	0.
LIDH	B0 1	31.90	1244.6	0.	800.1	0.	0.	0.
RESTRAINTS	B0 1	1.70	1206.5	0.	1016.0	0.	0.	0.
STOWAGE VOLUME PENALTY	B0 1	43.90	1104.9	-25.3	939.8	0.	0.	0.
CREW SYSTEMS		492.50	1330.3	26.9	884.0	103.6	235.5	239.8
MONITOR AND CONTROL PANEL	B0 1	5.00	1358.9	0.	1016.0	0.	0.	0.
KEYBOARD	B0 1	3.50	1358.9	0.	1016.0	0.	0.	0.
CRT DISPLAY/SIGNAL GENERATOR	B0 1	28.90	1358.9	0.	1016.0	0.	0.	0.
REMOTE STATION, COMMUNICATIO	B0 1	1.50	1358.9	0.	1016.0	0.	0.	0.
PSS EQUIPMENT		38.90	1358.9	0.	1016.0	.0	.0	.0
DOUBLE RACK	B5 1	58.10	2080.0	127.0	1034.3	0.	0.	0.
SINGLE RACK	B5 1	37.60	2207.0	127.0	1034.3	0.	0.	0.
PALLET HARDPOINTS	B1 45	37.35	2858.8	0.	934.7	0.	0.	0.

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AMPS -----FLIGHT 2-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

DATE OF RUN 09/20/76  
 PAGE 3

DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y (CM)	Z	KX	KY (CM)	KZ
INSERTS FOR PANELS	B1 6	39.00	2846.3	0.	904.2	0.	0.	0.
STRUCTURE		172.05	2450.5	70.6	983.2	85.8	366.6	367.4
EXP SWITCH PANEL	B5 1	12.70	2156.0	0.	1016.0	0.	0.	0.
EXP SWITCH PANEL	B5 1	12.70	2156.0	0.	1016.0	0.	0.	0.
EXP SWITCH PANEL	B5 1	12.70	2156.0	0.	1016.0	0.	0.	0.
INVERTER (400 HZ)	B5 1	32.20	2197.9	-123.9	934.0	0.	0.	0.
EPDS		70.30	2175.2	-56.8	978.4	74.0	45.9	65.2
COLD PLATE-RF INSTR	B4 1	5.50	3051.7	-109.2	965.2	0.	0.	0.
COLD PLATE-PEAKING BATTERY	B4 1	5.50	3192.4	114.0	914.0	0.	0.	0.
COLD PLATE-PS	B4 1	5.50	3154.3	0.	889.0	0.	0.	0.
COLD PLATE-RF TERMINAL	B3 1	5.50	2836.0	114.0	914.0	0.	0.	0.
ECS		22.00	3058.6	29.7	920.5	96.8	141.2	166.6
EXP RAU	B2 1	2.30	2524.8	0.	889.0	3.5	5.8	5.2
EXP RAU	B3 1	2.30	2824.5	0.	889.0	3.5	5.8	5.2
EXP RAU	B3 1	2.30	2824.5	0.	889.0	3.5	5.8	5.2
EXP RAU	B4 1	2.30	3124.2	0.	889.0	3.5	5.8	5.2
EXP RAU	B4 1	2.30	3124.2	0.	889.0	3.5	5.8	5.2
EXP RAU	B5 1	2.30	2156.5	-139.6	990.6	3.5	5.8	5.2
EXP COMPUTER	B5 1	30.20	2156.0	-0.	1016.0	0.	0.	0.
DIGITAL TAPE RECORDER	B5 1	43.00	2156.0	-0.	1016.0	0.	0.	0.
EXPERIMENT I/O	B5 1	27.50	2156.0	-0.	1016.0	0.	0.	0.
HIGH RATE DIGITAL MUX	B5 1	10.00	2156.0	-0.	1016.0	0.	0.	0.
TAPE AND CANISTERS	B5 15	88.50	2156.5	0.	1143.0	0.	0.	0.
CMDS		213.00	2195.5	-1.5	1061.6	75.5	187.9	173.2
CONSOL VERTICAL RAILS	B5 4	2.00	2156.5	0.	1016.0	0.	0.	0.

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AMPS -----FLIGHT 2-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

DATE OF RUN 09/20/76  
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DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y	Z	KX	KY	KZ
			(CM)			(CM)		
CONSOL HORIZONTAL RAILS	B5 4	3.00	2156.5	0.	1016.0	0.	0.	0.
PSA FOOT RESTRAINTS	B5 6	18.00	2156.5	0.	1016.0	0.	0.	0.
RACK CLOSEOUT FT RESTRAINTS	B5 4	31.70	2156.5	0.	1016.0	0.	0.	0.
HABITABILITY		54.70	2156.5	0.	1016.0	0.	.0	.0
KEYBOARD	B5 1	3.50	2156.0	-141.9	994.5	0.	0.	0.
CRT AND SYMBOL GENERATOR	B5 1	28.90	2156.0	-141.9	1009.9	0.	0.	0.
CONTROL AND DISPLAY		32.40	2156.0	-141.9	1007.2	7.9	7.9	0.
***** MISSION DEPENDENT EQUIPMENT		2772.37	2278.4	19.0	946.8	213.8	628.0	632.7
C AND D PANELS	C5 1	18.00	2156.0	0.	1016.0	0.	0.	0.
C AND D PANELS	C5 1	8.40	2156.0	0.	1016.0	0.	0.	0.
C AND D PANELS	C5 1	3.00	2156.0	0.	1016.0	0.	0.	0.
TV MONITOR	C5 1	10.00	2156.0	0.	1016.0	0.	0.	0.
C AND W SENSORS-PRESSURE	C2 4	.64	2212.8	0.	1016.0	0.	0.	0.
C AND W SENSORS-TEMPERATURE	C2 4	.64	2212.8	0.	1016.0	0.	0.	0.
SENSOR INTERFACE BOX	C3 1	2.27	2864.0	-0.	890.0	0.	0.	0.
SENSOR INTERFACE BOX	C3 1	2.27	2864.0	-0.	890.0	0.	0.	0.
SENSOR INTERFACE BOX	C2 1	2.27	2257.0	-0.	890.0	0.	0.	0.
SENSOR INTERFACE BOX	C4 1	2.27	3168.0	-0.	890.0	0.	0.	0.
VIDEO RECORDER	C5 1	36.30	2156.0	-0.	1016.0	0.	0.	0.
ANALOG RECORDER	C5 1	22.70	2156.0	-0.	1016.0	0.	0.	0.
TRANSIENT RECORDER	C5 5	30.80	2156.0	-0.	1016.0	0.	0.	0.
SWITCHING PANEL	C5 1	3.63	2156.0	-0.	1016.0	0.	0.	0.
CONTROL AND DISPLAY		143.19	2156.6	0.	1008.0	30.7	177.8	175.1
FM MODULE	C5 1	21.80	2156.0	-0.	1016.0	0.	0.	0.

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AMPS -----FLIGHT 2-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

DATE OF RUN 09/20/76  
 PAGE 5

DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y	Z	KX	KY	KZ
			(CM)			(CM)		
DATA MANAGEMENT		21.80	2156.0	0.	1016.0	0.	0.	0.
SIPS PLATFORM	C3 1	527.00	2856.0	-0.	996.0	0.	0.	0.
MPM PLATFORM-OBIPS	C4 1	56.00	3067.0	152.0	1104.9	0.	0.	0.
MPM PLATFORM-NIR SPEC	C2 1	56.00	2452.0	139.7	1117.6	0.	0.	0.
FIXED HD STAR TRKER-II-7-10	C4 1	4.00	3079.0	406.0	1104.9	0.	0.	0.
FIXED HEAD STAR TRACKER-NIR	C2 1	4.00	2452.0	0.	1054.1	0.	0.	0.
TWO AXES GYRD PACKAGE	C3 1	8.00	2856.0	50.8	977.5	0.	0.	0.
TWO AXES GYRD PACKAGE	C3 1	8.00	2856.0	-50.8	977.5	0.	0.	0.
3 AXES GYRD PACKAGE-OBIPS	C4 1	10.00	3092.0	152.0	1066.8	0.	0.	0.
3 AXES GYRD PACKAGE-NIR SPEC	C2 1	10.00	2452.0	139.7	1054.1	0.	0.	0.
RATE GYRD		36.00	2809.3	81.0	1023.6	90.2	245.7	255.1
ATTITUDE POINTING		683.00	2836.7	30.6	1017.3	78.5	151.9	159.1
SIPS CANISTER-NIR SPEC	C2 1	90.00	2452.0	10.0	1140.0	0.	0.	0.
I/F PLUMBING KITS-PALLET 3	C4 1	12.00	3156.0	-0.	876.3	0.	0.	0.
EXP HEAT EXCHANGER-LIDAR	C4 1	25.00	3219.0	-127.0	952.0	0.	0.	0.
THERMAL CURTAIN-PALLET 1	C2 1	10.00	2561.0	-0.	1016.0	0.	0.	0.
THERMAL CURTAIN-PALLET 2	C3 1	10.00	2864.0	-0.	1016.0	0.	0.	0.
THERMAL CURTAIN-PALLET 3	C4 1	10.00	3156.0	-0.	1016.0	0.	0.	0.
TCS PUMP-LIDAR	C4 1	10.00	3219.0	-127.0	952.0	0.	0.	0.
COOLANT FILTERS	C4 6	2.70	3219.0	-127.0	952.0	0.	0.	0.
THERMAL		169.70	2744.4	-22.9	1057.7	108.7	359.0	351.1
PULSE POWER SUPPLY-LIDAR	C4 1	95.00	3156.0	-0.	957.6	0.	0.	0.
PULSE POWER SUPPLY	C4 1	600.00	3156.0	-0.	909.3	0.	0.	0.
PEAKING BATTERY	C4 1	40.30	3166.0	101.6	902.0	0.	0.	0.

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AMPS -----FLIGHT 2-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

DATE OF RUN 09/20/76  
 PAGE 6

DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y (CM)	Z	KX	KY (CM)	KZ
ELECT DIST PANEL	C2 1	10.00	2561.0	-0.	902.0	0.	0.	0.
ELECT DIST PANEL	C4 1	10.00	3166.0	-0.	902.0	0.	0.	0.
ELECT DIST PANEL	C3 1	10.00	2866.0	-0.	902.0	0.	0.	0.
POWER SUPPLY TOTAL		765.30	3145.1	5.4	914.6	27.9	76.7	78.3
CABLE SET-PALLET 1	C2 1	102.00	2561.0	-119.4	914.4	0.	0.	0.
CABLE SET-PALLET 2	C3 1	91.00	2864.0	-119.4	914.4	0.	0.	0.
CABLE SET-PALLET 3	C4 1	68.00	3156.0	-119.4	914.4	0.	0.	0.
CABLE SET-MODULE TO PALLET	C7 1	57.00	2362.0	-152.4	863.6	0.	0.	0.
CABLE SET-MODULE	C5 1	34.00	2156.0	-152.4	863.6	0.	0.	0.
CABLE SET-SIPS TO INSTRUMENT	C3 1	40.00	2856.0	-152.4	863.6	0.	0.	0.
CABLE SET TOTAL		392.00	2700.6	-130.4	897.4	28.6	304.4	303.9
ELECTRICAL		1157.30	2994.5	-40.6	908.8	70.6	282.1	289.3
WIDE BAND RECEIVER	C3 1	2.27	2926.1	-172.6	1059.2	0.	0.	0.
NARROW BAND RECEIVER	C3 1	.57	2926.1	-172.6	1059.2	0.	0.	0.
COMMAND TRANSMITTER	C3 1	.50	2926.1	-172.6	1059.2	0.	0.	0.
MULTIPLEXER	C3 1	1.36	2926.1	-172.6	1059.2	0.	0.	0.
CONICAL ANTENNA	C3 1	.91	2926.1	-172.6	1059.2	0.	0.	0.
L/L LOCKS-NIR SPEC	C2 1	1.80	2457.5	-30.5	1077.0	0.	0.	0.
L/L LOCKS-NIR SPEC	C2 1	9.10	2457.5	114.3	1107.4	0.	0.	0.
L/L LOCKS-OSIPS	C4 1	6.80	3100.0	152.4	1084.6	0.	0.	0.
LAUNCH/LANDING LOCKS		17.70	2704.3	114.2	1095.5	52.3	312.8	316.8
EMER JETTISON (MPM PLATFORM)	C2 1	8.20	2452.0	152.4	1059.2	0.	0.	0.

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AMPS -----FLIGHT 2-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

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DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y	Z	KX	KY	KZ
EMER JETTISON (MPM PLATFORM)	C4 1	8.20	3067.0	152.4	1059.2	0.	0.	0.
EMERGENCY JETTISON		16.40	2759.5	152.4	1059.2	.0	307.5	307.5
FOR PLASMA WAKE DIAGNOSTIC	C3 1	10.00	2749.6	-165.0	1059.0	0.	0.	0.
FOR PLASMA WAKE GENERATOR	C2 1	10.40	2444.8	-101.5	1028.0	0.	0.	0.
PIC( FOR HOLDDOWN NUTS)	C2 1	.20	2561.0	-0.	914.0	0.	0.	0.
PIC( FOR HOLDDOWN NUTS)	C4 1	.20	3156.0	-0.	914.0	0.	0.	0.
HOLDDOWN ORDNANCE	C2 6	6.00	2610.0	-0.	939.0	0.	0.	0.
CAPTURE/RELEASE DEVICE		26.80	2601.7	-101.0	1017.9	78.7	149.2	154.9
MECHANISMS		66.51	2695.3	12.7	1052.2	141.1	261.5	290.5
FOR HV POWER SUPPLY	C4 1	12.00	3153.0	-0.	889.0	0.	0.	0.
FOR INSTRUMENT IV-1	C4 1	1.40	3116.0	-208.0	1049.0	0.	0.	0.
FOR CHEMICAL RELEASE	C2 1	5.40	2673.0	-0.	914.0	0.	0.	0.
DIRECT MOUNTING BRACKETRY		18.90	3012.4	-15.5	908.1	68.6	219.6	222.5
INSTRUMENT I-21 PLATFORM	C2 1	65.30	2634.0	-91.1	927.1	0.	0.	0.
FOR INSTRUMENT I-1	C4 1	39.00	3229.0	-92.7	16.0	0.	0.	0.
FOR INSTRUMENT II-3	C4 1	20.40	3051.0	127.0	927.0	0.	0.	0.
FOR INSTRUMENT II-7	C3 1	6.35	2853.0	-0.	1090.0	0.	0.	0.
FOR INSTRUMENT II-9 AND II-4	C2 1	20.40	2440.0	142.0	978.0	0.	0.	0.
FOR INSTRUMENT II-10	C3 1	6.35	2853.0	-94.0	1090.0	0.	0.	0.
FOR RF RECEIVER PACKAGE	C3 1	13.60	2838.4	114.0	914.0	0.	0.	0.
FOR PLASMA WAKE GENERATOR	C2 1	13.60	2444.8	-94.0	914.0	0.	0.	0.
FOR PLASMA WAKE DIAGNOSTIC	C3 1	13.60	2749.6	-165.1	995.7	0.	0.	0.

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AMPS -----FLIGHT 2-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

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DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y (CM)	Z	KX	KY (CM)	KZ
FOR RF TERMINAL	C3 1	5.00	2838.4	114.0	914.0	0.	0.	0.
INTERMEDIATE SPT STRUCTURE		203.60	2797.7	-29.8	770.3	384.2	457.1	288.5
INSTR TO INSTR I/F STRUCTURE	C4 14	15.90	3037.4	-0.	990.6	0.	0.	0.
THERMAL CURTAIN SPT-PALLET 1	C2 1	11.34	2561.0	-0.	1016.0	0.	0.	0.
THERMAL CURTAIN SPT-PALLET 2	C3 1	11.34	2864.0	-0.	1016.0	0.	0.	0.
THERMAL CURTAIN SPT-PALLET 3	C4 1	11.34	3156.0	-0.	1016.0	0.	0.	0.
MISC STRUCTURE		34.02	2860.3	0.	1016.0	.0	242.9	242.9
PALLET I/F STRUCTURE		272.32	2834.4	-23.4	823.4	346.0	426.0	280.8
***** AMPS LABCRAFT		2513.82	2856.6	-14.1	949.5	155.8	345.6	326.7
EMERGENCY JETTISON FOR I-1	D4 1	.90	3232.0	-0.	1231.9	0.	0.	0.
LIDAR EMITTER	D4 1	75.00	3188.0	-121.0	1041.4	0.	0.	0.
LIDAR EMITTER	D4 1	75.00	3270.0	-121.0	1041.4	.0.	0.	0.
LIDAR RECEIVER	D4 1	300.00	3232.0	-0.	1082.0	0.	0.	0.
***** LASER SOUNDER (I-1)		450.90	3231.0	-40.3	1068.8	60.6	31.3	61.7
SOLAR FLUX MONITOR (IV-1)	D4 1	3.00	3232.0	-200.7	1079.0	0.	0.	0.
***** SOLAR FLUX MONITOR		3.00	3232.0	-200.7	1079.0	.0	0.	0.
OBIPS (II-3)	D4 1	43.00	3194.0	150.0	1117.6	0.	0.	0.
***** OBIPS		43.00	3194.0	150.0	1117.6	0.	0.	0.

AMPS -----FLIGHT 2-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

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DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y	Z	KX	KY	KZ
			(CM)			(CM)		
CRYO LIMB SCANNER-DRY	D3 1	207.00	2823.0	94.0	1077.0	0.	0.	0.
* CRYO	D3 1	293.00	2915.0	94.0	1077.0	0.	0.	0.
***** CRYO LIMB SCANNER-WET		500.00	2376.9	94.0	1077.0	0.	45.3	45.3
CRYO IR INTERFEROMETER-DRY	D2 1	215.00	2823.0	-94.0	1077.0	0.	0.	0.
* CRYO	D2 1	285.00	2915.0	-94.0	1077.0	0.	0.	0.
***** CRYO IR INTERFEROMETER		500.00	2675.4	-94.0	1077.0	0.	45.5	45.5
* COMMAND RECEIVER	C2 1	.60	2635.2	-0.	1028.0	0.	0.	0.
* ANTENNA, STUB	C2 1	1.00	2635.3	-0.	1028.0	0.	0.	0.
COMMUNICATIONS		1.60	2635.3	0.	1028.0	.0	.0	.0
* COMMAND DECODER	C2 1	1.50	2635.2	-0.	1028.0	0.	0.	0.
* SEQUENCER	C2 1	10.00	2635.2	-0.	1028.0	0.	0.	0.
DATA MANAGEMENT		11.50	2635.2	0.	1028.0	0.	0.	0.
* CHEMICAL RELEASE (I-21)	D2 1	1472.00	2635.2	-0.	1003.0	0.	0.	0.
* POWER SUPPLY	C2 1	3.00	2635.2	-0.	1028.0	0.	0.	0.
* CABLE SET-CHEMICAL RELEASE	C2 1	2.00	2635.2	-0.	1013.5	0.	0.	0.
FOR CHEMICAL RELEASE (I-21)	C2 1	.50	2635.2	-0.	940.0	0.	0.	0.
* CHEMICAL RELEASE STRUCTURE	C2 1	174.60	2635.2	-0.	1013.5	0.	0.	0.
*PIC	C2 2	2.00	2635.2	-0.	1028.0	0.	0.	0.
***** CHEMICAL RELEASE		1667.20	2635.2	0.	1004.4	4.2	4.2	.0
RF PLASMA WAVE PACKAGE(I-12)	D4 1	205.00	3036.8	-0.	1051.6	0.	0.	0.
DIPOLE ANTENNA (100 METERS)	C4 1	19.96	3065.8	-0.	1051.6	0.	0.	0.
COMMUNICATIONS		19.96	3065.8	0.	1051.6	0.	0.	0.

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DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y	Z	KX	KY	KZ
			(CM)			(CM)		
***** RF PLASMA WAVE PACKAGE		224.96	3039.4	0.	1051.6	.0	8.2	8.2
UV/VIS/NIR SPEC (II-4)	D2 2	44.00	2457.5	30.5	1140.5	0.	0.	0.
***** UV/VIS/NIR SPEC		44.00	2457.5	30.5	1140.5	0.	0.	0.
DEPLOYABLE TEST BODY(III-17)	D2 1	16.00	2454.9	-104.1	1061.7	0.	0.	0.
* DEPLOYABLE TEST BODY	D2 1	4.00	2454.9	-104.1	1061.7	0.	0.	0.
PRG EJEC (PWG,III-17)	C2 1	.90	2454.9	-104.1	1061.7	0.	0.	0.
CAPTURE/RELEASE INTERFACE	C2 1	.50	2454.9	-104.1	965.2	0.	0.	0.
PLASMA WAVE GENERATOR STRUCT	C2 1	20.40	2454.9	-104.1	1000.8	0.	0.	0.
DATA TRANSMITTER	C2 1	.50	2454.9	-104.1	1000.8	0.	0.	0.
COMMAND RECEIVER	C2 1	1.00	2454.9	-104.1	1000.8	0.	0.	0.
DIPLEXER	C2 1	1.00	2454.9	-104.1	1000.8	0.	0.	0.
ANTENNA, STUB	C2 1	1.00	2454.9	-104.1	1000.8	0.	0.	0.
COMMUNIATIONS		3.50	2454.9	-104.1	1000.8	.0	.0	.0
PCM PROGRAMMER/MULTIPLEXER	C2 1	1.00	2454.9	-104.1	1000.8	0.	0.	0.
COMMAND DECODER	C2 1	1.50	2454.9	-104.1	1000.8	0.	0.	0.
DATA MANAGEMENT		2.50	2454.9	-104.1	1000.8	.0	0.	0.
POWER SUPPLY	C2 1	18.00	2454.9	-104.1	1000.8	0.	0.	0.
CABLE SET	C2 1	1.00	2454.9	-104.1	1000.8	0.	0.	0.
ELECTRICAL		19.00	2454.9	-104.1	1000.8	.0	.0	.0
STRIP HEATERS	C2 1	1.00	2454.9	-104.1	1000.8	0.	0.	0.
MULTILAYER INSULATION	C2 1	1.70	2454.9	-104.1	1000.8	0.	0.	0.

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AMPS -----FLIGHT 2-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

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DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y	Z	KX	KY	KZ
			(CM)			(CM)		
THERMAL CONTROL		2.70	2454.9	-104.1	1000.8	0.	0.	0.
EXTENSION MECHANISM	C2	10.00	2454.9	-104.1	1000.8	0.	0.	0.
PLASMA WAKE GENERATOR		79.50	2454.9	-104.1	1016.6	27.1	27.1	0.
* TM XMITTER (S-BAND)	C4 1	.50	3071.4	-102.1	1001.3	0.	0.	0.
* 10 METER DIPOLE ANTENNA	C4 1	2.00	3053.1	-118.1	1010.1	0.	0.	0.
* CONICAL ANTENNA	C4 1	1.00	3030.2	-95.2	1010.1	0.	0.	0.
* CONICAL ANTENNA	C4 1	1.00	3030.2	-95.2	1004.1	0.	0.	0.
* COMMAND RECEIVER	C4 1	.60	3053.1	-141.0	1001.3	0.	0.	0.
* DIPLEXER/SPLITTER	C4 1	1.00	3077.0	-113.0	996.0	0.	0.	0.
COMMUNICATIONS		6.10	3051.0	-110.7	1005.2	14.9	17.8	22.0
* SUBCARRIER OSCILLATOR ASSY	C4 1	.90	3042.2	-124.5	1003.7	0.	0.	0.
* PCM PROGRAMMER/MULTIPLEXER	C4 1	2.00	3035.3	-114.3	990.6	0.	0.	0.
* COMMAND DECODER	C4 1	1.00	3053.1	-129.0	1003.7	0.	0.	0.
DATA MANAGEMENT		3.90	3041.5	-120.4	997.0	9.2	9.9	9.8
* RF PLASMA WAVE (I-12)	D4 1	5.00	3053.1	-124.5	991.4	0.	0.	0.
* VECTOR MAGNETOMETER(III-2)	D4 1	4.10	3053.1	-101.0	991.3	0.	0.	0.
* POWER SUPPLY-RF RCVR PKG	C4 1	10.00	3030.7	-118.1	993.6	0.	0.	0.
* CABLE SET-RF RECEIVER PKG	C4 1	1.00	3053.1	-118.7	999.7	0.	0.	0.
ELECTRICAL		11.00	3032.7	-118.2	994.2	1.8	6.7	6.4
PROG EJEC-RF RECEIVER PKG	C4 1	3.80	3053.1	-118.1	960.0	0.	0.	0.
* PROG EJEC-RF RECEIVER PKG	C4 1	4.00	3053.1	-118.1	965.7	0.	0.	0.
* SPIN TABLE-RF RCVR PKG	C4 1	4.50	3053.1	-118.1	980.5	0.	0.	0.
RF RECEIVER PACKAGE STRUCT	C4 1	14.20	3053.1	-118.1	999.8	0.	0.	0.
*STRIP HEATERS	C4 1	1.00	3053.1	-118.1	999.8	0.	0.	0.

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AMPS -----FLIGHT 2-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

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DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y	Z	KX	KY	KZ
(CM)								
*MULTILAYER INSULATION	C4 1	1.70	3053.1	-118.1	999.8	0.	0.	0.
THERMAL CONTROL		2.70	3053.1	-118.1	999.8	.0	.0	.0
***** RF RECEIVER PACKAGE		59.30	3048.3	-116.9	991.5	14.7	16.5	12.5
VECTOR MAGNETOMETER	D3 1	4.10	2775.0	-170.0	1069.0	0.	0.	0.
ION MASS + DIST ANALYSIS	D3 1	2.00	2775.0	-117.0	106.9	0.	0.	0.
PLANAR RPA	D3 1	3.00	2775.0	-170.0	1069.6	0.	0.	0.
LANGMUIR PROBE	D3 1	3.50	2775.0	-170.0	1069.6	0.	0.	0.
NEUTRAL MASS SPEC	D3 1	10.00	2775.0	-170.0	1069.6	0.	0.	0.
PLASMA WAKE DIA-STRUCTURE	C3 1	11.34	2775.0	-170.0	1069.6	0.	0.	0.
CAPTURE/RELEASE INTERFACE	C3 1	.60	2926.1	-172.7	1059.2	0.	0.	0.
DATA TRANSMITTER	C3 1	.50	2775.0	-170.0	1069.6	0.	0.	0.
COMMAND RECEIVER	C3 1	.60	2775.0	-170.0	1069.6	0.	0.	0.
DIPLEXER	C3 1	1.00	2775.0	-170.0	1069.6	0.	0.	0.
ANTENNA, STUB	C3 1	1.00	2775.0	-170.0	1069.6	0.	0.	0.
COMMUNICATION		3.10	2775.0	-170.0	1069.6	0.	0.	0.
COMMAND DECODER	C3 1	1.40	2775.0	-170.0	1069.6	0.	0.	0.
PCM PROGRAMMER/MULTIPLEXER	C3 1	2.00	2775.0	-170.0	1069.6	0.	0.	0.
SUBCARRIER OSCILLATOR ASSY	C3 1	2.14	2775.0	-170.0	1069.6	0.	0.	0.
DATA MANAGEMENT		5.54	2775.0	-170.0	1069.6	.0	.0	.0
POWER SUPPLY	C3 1	17.00	2775.0	-170.0	1069.6	0.	0.	0.
CABLE SET	C3 1	1.40	2775.0	-170.0	1069.6	0.	0.	0.
ELECTRICAL		18.40	2775.0	-170.0	1069.6	.0	.0	0.
STRIP HEATERS	C3 1	1.00	2775.0	-170.0	1069.6	0.	0.	0.

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AMPS -----FLIGHT 2-----LAUNCH CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

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DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y (CM)	Z	KX	KY (CM)	KZ
MULTILAYER INSULATION	C3 1	3.50	2775.0	-170.0	1069.6	0.	0.	0.
THERMAL CONTROL		4.50	2775.0	-170.0	1069.6	.0	.0	0.
PLASMA WAKE DIAGNOSTIC PKG		66.03	2776.4	-168.4	1040.3	165.2	165.5	17.0
NEAR IR SPECTROMETER (II-9)	D4 1	60.00	2449.8	30.5	1140.5	0.	0.	0.
***** NEAR IR SPECTROMETER		60.00	2449.8	30.5	1140.5	.0	.0	.0

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AMPS -----FLIGHT 2-----LAUNCH CONDITION  
MASS PROPERTIES AND EQUIPMENT LIST

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GRAND TOTAL

MASS 15199.03 KGS

CENTER OF GRAVITY

X = 2513.39 CM  
Y = -1.64 CM  
Z = 981.07 CM

RADIUS OF GYRATION

KX = 167.89 CM  
KY = 499.10 CM  
KZ = 498.28 CM

MOMENT OF INERTIA

IX= 42815 KG-M2  
IY= 378380 KG-M2  
IZ= 377144 KG-M2

PRODUCT OF INERTIA

PXY= -4368 KG-M2  
PXZ= -5070 KG-M2  
PYZ= 2676 KG-M2

MOMENT OF INERTIA

IX= 428145052 KG-CM2  
IY= 3783798318 KG-CM2  
IZ= 3771444006 KG-CM2

PRODUCT OF INERTIA

PXY= -43681261 KG-CM2  
PXZ= -50704516 KG-CM2  
PYZ= 26759128 KG-CM2

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AMPS -----FLIGHT 2-----LANDED CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

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DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y (CM)	Z	KX	KY (CM)	KZ
SPACELAB MODULE	A5 1	3363.00	2156.5	-8.5	1004.6	160.5	165.9	154.9
6 METER PALLET TRAIN	A1 1	1236.00	2700.0	11.9	911.6	212.6	179.4	223.0
3 METER PALLET	A4 1	618.00	3163.6	11.9	911.6	212.6	105.6	189.0
SL/ORBITER UTILITY BRIDGE	A6 1	218.20	1836.0	0.	914.4	0.	0.	0.
TUNNEL	AB 1	352.00	1877.1	0.	967.5	142.0	101.1	141.0
TUNNEL ADAPTER	AB 1	408.20	1500.0	0.	901.7	87.1	105.4	95.0
P/L ARS FAN AND DUCTING	AB 1	9.50	1577.3	0.	901.7	0.	0.	0.
AIRLOCK	A9 1	364.00	1605.3	0.	1069.3	0.	0.	0.
LESS SHUTTLE AIRLOCK	A9 1	-363.00	1402.0	0.	914.0	0.	0.	0.
***** BASIC SPACELAB		6205.90	2305.7	-1.1	973.7	177.9	430.4	432.8
RMS (SECOND UNIT)	B0 1	393.50	2376.4	213.4	1107.6	0.	0.	0.
EPS KIT 2-DRY PLUS RESIDUALS	B0 1	357.02	2634.0	-18.4	784.9	206.0	294.4	357.1
EPS KIT 2		357.02	2634.0	-18.4	784.9	206.0	294.4	357.1
ORBITER HEAT REJECTION KIT	B0 1	87.50	3088.6	0.	1204.0	98.0	171.7	108.5
LONGERON FITTING-PALLET	B0 1	40.40	2475.5	238.8	1051.6	0.	0.	0.
LONGERON FITTING-PALLET	B0 1	40.40	2475.5	-238.7	1051.6	0.	0.	0.
LONGERON FITTING-PALLET	B0 1	40.40	2925.1	238.8	1051.6	0.	0.	0.
LONGERON FITTING-PALLET	B0 1	40.40	2925.1	-238.7	1051.6	0.	0.	0.
LONGERON FITTING-PALLET	B0 1	40.40	3074.9	238.8	1051.6	0.	0.	0.
LONGERON FITTING-PALLET	B0 1	40.40	3074.9	-238.7	1051.6	0.	0.	0.
LONGERON FITTING-PALLET	B0 1	40.40	3224.8	238.8	1051.6	0.	0.	0.
LONGERON FITTING-PALLET	B0 1	40.40	3224.8	-238.7	1051.6	0.	0.	0.
KEEL FITTING-PALLET	B0 1	35.40	2993.4	0.	777.2	0.	0.	0.
KEEL FITTING-PALLET	B0 1	35.40	3000.6	0.	777.2	0.	0.	0.
LONGERON FITTING-MODULE	B0 1	40.40	2035.9	238.8	1051.6	0.	0.	0.
LONGERON FITTING-MODULE	B0 1	40.40	2035.9	-238.7	1051.6	0.	0.	0.
LONGERON FITTING-MODULE	B0 1	40.40	2275.7	238.8	1051.6	0.	0.	0.
LONGERON FITTING-MODULE	B0 1	40.40	2275.7	-238.7	1051.6	0.	0.	0.
KEEL FITTING-MODULE	B0 1	35.40	2275.7	0.	777.2	0.	0.	0.

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AMPS -----FLIGHT 2-----LANDED CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

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DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y	Z	KX	KY	KZ
			(CM)			(CM)		
LESS ORBITER ALLOWANCE	B0 1	-204.00	2728.0	0.	1003.3	0.	0.	0.
ORBITER RETENTION FITTINGS		387.00	2661.5	.1	1001.8	297.2	534.1	582.9
CREWMAN 5	B0 1	77.10	1244.6	121.9	886.5	0.	0.	0.
CREWMAN 6	B0 1	77.10	1244.6	71.1	886.5	0.	0.	0.
SEAT 5	B0 1	24.50	1254.8	121.9	863.6	0.	0.	0.
SEAT 6	B0 1	24.50	1254.8	71.1	863.6	0.	0.	0.
O2 TANKAGE PLUS RESIDUAL	B0 1	37.60	1905.0	0.	782.3	0.	0.	0.
EMERGENCY EQUIPMENT	B0 1	49.50	1366.5	0.	1016.0	0.	0.	0.
WASTE WATER TANKAGE	B0 1	22.00	1216.7	12.7	800.1	0.	0.	0.
FOOD	B0 1	28.60	1181.1	-177.7	934.7	0.	0.	0.
HYGIENE EQUIPMENT	B0 1	26.20	1414.8	-109.1	904.2	0.	0.	0.
CREW PROVISIONS	B0 1	25.20	1244.6	96.5	886.5	0.	0.	0.
LIOH	B0 1	31.90	1244.6	0.	800.1	0.	0.	0.
RESTRAINTS	B0 1	1.70	1206.5	0.	1016.0	0.	0.	0.
STOWAGE VOLUME PENALTY	B0 1	43.90	1104.9	-25.3	939.8	0.	0.	0.
CREW SYSTEMS		469.80	1302.5	28.2	888.9	103.4	202.2	208.6
MONITOR AND CONTROL PANEL	B0 1	5.00	1358.9	0.	1016.0	0.	0.	0.
KEYBOARD	B0 1	3.50	1358.9	0.	1016.0	0.	0.	0.
CRT DISPLAY/SIGNAL GENERATOR	B0 1	28.90	1358.9	0.	1016.0	0.	0.	0.
REMOTE STATION, COMMUNICATIO	B0 1	1.50	1358.9	0.	1016.0	0.	0.	0.
PSS EQUIPMENT		38.90	1358.9	0.	1016.0	.0	.0	.0
DOUBLE RACK	B5 1	58.10	2080.0	127.0	1034.3	0.	0.	0.
SINGLE RACK	B5 1	37.60	2297.0	127.0	1034.3	0.	0.	0.
PALLET HARDPOINTS	B1 45	37.35	2858.8	0.	934.7	0.	0.	0.
INSERTS FOR PANELS	B1 6	39.00	2846.3	0.	904.2	0.	0.	0.
STRUCTURE		172.05	2450.5	70.6	983.2	85.8	366.6	367.4

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AMPS -----FLIGHT 2-----LANDED CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

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DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y (CM)	Z	KX	KY (CM)	KZ
EXP SWITCH PANEL	B5 1	12.70	2156.0	0.	1016.0	0.	0.	0.
EXP SWITCH PANEL	B5 1	12.70	2156.0	0.	1016.0	0.	0.	0.
EXP SWITCH PANEL	B5 1	12.70	2156.0	0.	1016.0	0.	0.	0.
INVERTER (400 HZ)	B5 1	32.20	2197.9	-123.9	934.0	0.	0.	0.
EPDS		70.30	2175.2	-56.8	978.4	74.0	45.9	65.2
COLD PLATE-RF INSTR	B4 1	5.50	3051.7	-109.2	965.2	0.	0.	0.
COLD PLATE-PEAKING BATTERY	B4 1	5.50	3192.4	114.0	914.0	0.	0.	0.
COLD PLATE-PS	B4 1	5.50	3154.3	0.	889.0	0.	0.	0.
COLD PLATE-RF TERMINAL	B3 1	5.50	2836.0	114.0	914.0	0.	0.	0.
ECS		22.00	3058.6	29.7	920.5	96.8	141.2	166.6
EXP RAU	B2 1	2.30	2524.8	0.	869.0	3.5	5.8	5.2
EXP RAU	B3 1	2.30	2824.5	0.	889.0	3.5	5.8	5.2
EXP RAU	B3 1	2.30	2824.5	0.	889.0	3.5	5.8	5.2
EXP RAU	B4 1	2.30	3124.2	0.	889.0	3.5	5.8	5.2
EXP RAU	B4 1	2.30	3124.2	0.	889.0	3.5	5.8	5.2
EXP RAU	B5 1	2.30	2156.5	-139.6	990.6	3.5	5.8	5.2
EXP COMPUTER	B5 1	30.20	2156.0	-0.	1016.0	0.	0.	0.
DIGITAL TAPE RECORDER	B5 1	43.00	2156.0	-0.	1016.0	0.	0.	0.
EXPERIMENT I/O	B5 1	27.50	2156.0	-0.	1016.0	0.	0.	0.
HIGH RATE DIGITAL MUX	B5 1	10.00	2153.0	-0.	1016.0	0.	0.	0.
TAPE AND CANISTERS	B5 15	88.50	2156.5	0.	1143.0	0.	0.	0.
CMDS		213.00	2195.5	-1.5	1061.6	75.5	187.9	173.2
CONSOL VERTICAL RAILS	B5 4	2.00	2153.5	0.	1016.0	0.	0.	0.
CONSOL HORIZONTAL RAILS	B5 4	3.00	2153.5	0.	1016.0	0.	0.	0.
PSA FOOT RESTRAINTS	B5 6	18.00	2156.5	0.	1016.0	0.	0.	0.
RACK CLOSEOUT FT RESTRAINTS	B5 4	31.70	2156.5	0.	1016.0	0.	0.	0.

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 MASS PROPERTIES AND EQUIPMENT LIST

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DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y (CM)	Z	KX	KY (CM)	KZ
HABITABILITY		54.70	2156.5	0.	1016.0	0.	.0	.0
KEYBOARD	B5 1	3.50	2156.0	-141.9	984.5	0.	0.	0.
CRT AND SYMBOL GENERATOR	B5 1	28.90	2156.0	-141.9	1009.9	0.	0.	0.
CONTROL AND DISPLAY		32.40	2156.0	-141.9	1007.2	7.9	7.9	0.
***** MISSION DEPENDENT EQUIPMENT		2298.17	2235.6	41.2	974.1	213.3	620.8	628.1
C AND D PANELS	C5 1	18.00	2156.0	0.	1016.0	0.	0.	0.
C AND D PANELS	C5 1	8.40	2156.0	0.	1016.0	0.	0.	0.
C AND D PANELS	C5 1	3.00	2156.0	0.	1016.0	0.	0.	0.
TV MONITOR	C5 1	10.00	2156.0	0.	1016.0	0.	0.	0.
C AND W SENSORS-PRESSURE	C2 4	.64	2212.8	0.	1016.0	0.	0.	0.
C AND W SENSORS-TEMPERATURE	C2 4	.64	2212.8	0.	1016.0	0.	0.	0.
SENSOR INTERFACE BOX	C3 1	2.27	2864.0	-0.	890.0	0.	0.	0.
SENSOR INTERFACE BOX	C3 1	2.27	2864.0	-0.	890.0	0.	0.	0.
SENSOR INTERFACE BOX	C2 1	2.27	2257.0	-0.	890.0	0.	0.	0.
SENSOR INTERFACE BOX	C4 1	2.27	3168.0	-0.	890.0	0.	0.	0.
VIDEO RECORDER	C5 1	36.30	2156.0	-0.	1016.0	0.	0.	0.
ANALOG RECORDER	C5 1	22.70	2156.0	-0.	1016.0	0.	0.	0.
TRANSIENT RECORDER	C5 5	30.80	2156.0	-0.	1016.0	0.	0.	0.
SWITCHING PANEL	C5 1	3.63	2156.0	-0.	1016.0	0.	0.	0.
CONTROL AND DISPLAY		143.19	2196.6	0.	1008.0	30.7	177.8	175.1
FM MODULE	C5 1	21.80	2156.0	-0.	1016.0	0.	0.	0.
DATA MANAGEMENT		21.80	2156.0	0.	1016.0	0.	0.	0.
SIPS PLATFORM	C3 1	527.00	2856.0	-0.	996.0	0.	0.	0.

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 MASS PROPERTIES AND EQUIPMENT LIST

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DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y (CM)	Z	KX	KY (CM)	KZ
MPM PLATFORM-OBIPS	C4 1	56.00	3067.0	152.0	1104.9	0.	0.	0.
MPM PLATFORM-NIR SPEC	C2 1	56.00	2452.0	139.7	1117.6	0.	0.	0.
FIXED HD STAR TRKER-II-7-10	C4 1	4.00	3079.0	406.0	1104.9	0.	0.	0.
FIXED HEAD STAR TRACKER-NIR	C2 1	4.00	2452.0	0.	1054.1	0.	0.	0.
TWO AXES GYRO PACKAGE	C3 1	8.00	2856.0	50.8	977.5	0.	0.	0.
TWO AXES GYRO PACKAGE	C3 1	8.00	2856.0	-50.8	977.5	0.	0.	0.
3 AXES GYRO PACKAGE-OBIPS	C4 1	10.00	3092.0	152.0	1066.8	0.	0.	0.
3 AXES GYRO PACKAGE-NIR SPEC	C2 1	10.00	2452.0	139.7	1054.1	0.	0.	0.
RATE GYRO		36.00	2809.3	81.0	1023.6	90.2	245.7	255.1
ATTITUDE POINTING		683.00	2836.7	30.6	1017.3	78.5	151.9	159.1
SIPS CANISTER-NIR SPEC	C2 1	90.00	2452.0	10.0	1140.0	0.	0.	0.
I/F PLUMBING KITS-PALLET 3	C4 1	12.00	3156.0	-0.	876.3	0.	0.	0.
EXP HEAT EXCHANGER-LIDAR	C4 1	25.00	3219.0	-127.0	952.0	0.	0.	0.
THERMAL CURTAIN-PALLET 1	C2 1	10.00	2561.0	-0.	1016.0	0.	0.	0.
THERMAL CURTAIN-PALLET 2	C3 1	10.00	2864.0	-0.	1016.0	0.	0.	0.
THERMAL CURTAIN-PALLET 3	C4 1	10.00	3156.0	-0.	1016.0	0.	0.	0.
TCS PUMP-LIDAR	C4 1	10.00	3219.0	-127.0	952.0	0.	0.	0.
COOLANT FILTERS	C4 6	2.70	3219.0	-127.0	952.0	0.	0.	0.
THERMAL		169.70	2744.4	-22.9	1057.7	108.7	359.0	351.1
PULSE POWER SUPPLY-LIDAR	C4 1	95.00	3156.0	-0.	957.6	0.	0.	0.
PULSE POWER SUPPLY	C4 1	600.00	3156.0	-0.	909.3	0.	0.	0.
PEAKING BATTERY	C4 1	40.30	3166.0	101.6	902.0	0.	0.	0.
ELECT DIST PANEL	C2 1	10.00	2561.0	-0.	902.0	0.	0.	0.
ELECT DIST PANEL	C4 1	10.00	3166.0	-0.	902.0	0.	0.	0.
ELECT DIST PANEL	C3 1	10.00	2866.0	-0.	902.0	0.	0.	0.

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AMPS -----FLIGHT 2-----LANDED CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

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DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION			
			X	Y	Z	KX	KY	KZ	
			(CM)			(CM)			
POWER SUPPLY TOTAL			765.30	3145.1	5.4	914.6	27.9	76.7	78.3
CABLE SET-PALLET 1	C2 1	102.00	2561.0	-119.4	914.4	0.	0.	0.	
CABLE SET-PALLET 2	C3 1	91.00	2864.0	-119.4	914.4	0.	0.	0.	
CABLE SET-PALLET 3	C4 1	68.00	3156.0	-119.4	914.4	0.	0.	0.	
CABLE SET-MODULE TO PALLET	C7 1	57.00	2362.0	-152.4	863.6	0.	0.	0.	
CABLE SET-MODULE	C5 1	34.00	2156.0	-152.4	863.6	0.	0.	0.	
CABLE SET-SIPS TO INSTRUMENT	C3 1	40.00	2856.0	-152.4	863.6	0.	0.	0.	
CABLE SET TOTAL			392.00	2700.6	-130.4	897.4	28.6	304.4	303.9
ELECTRICAL			1157.30	2994.5	-40.6	908.8	70.6	282.1	289.3
WIDE BAND RECEIVER	C3 1	2.27	2926.1	-172.6	1059.2	0.	0.	0.	
NARROW BAND RECEIVER	C3 1	.57	2926.1	-172.6	1059.2	0.	0.	0.	
COMMAND TRANSMITTER	C3 1	.50	2926.1	-172.6	1059.2	0.	0.	0.	
MULTIPLEXER	C3 1	1.36	2926.1	-172.6	1059.2	0.	0.	0.	
CONICAL ANTENNA	C3 1	.91	2926.1	-172.6	1059.2	0.	0.	0.	
L/L LOCKS-NIR SPEC	C2 1	1.80	2457.5	-30.5	1077.0	0.	0.	0.	
L/L LOCKS-NIR SPEC	C2 1	9.10	2457.5	114.3	1107.4	0.	0.	0.	
L/L LOCKS-OBIPS	C4 1	6.80	3100.0	152.4	1084.6	0.	0.	0.	
LAUNCH/LANDING LOCKS			17.70	2704.3	114.2	1095.5	53.3	312.8	316.8
EMER JETTISON (MPM PLATFORM)	C2 1	8.20	2452.0	152.4	1059.2	0.	0.	0.	
EMER JETTISON (MPM PLATFORM)	C4 1	8.20	3067.0	152.4	1059.2	0.	0.	0.	
EMERGENCY JETTISON			16.40	2759.5	152.4	1059.2	.0	307.5	307.5

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 MASS PROPERTIES AND EQUIPMENT LIST

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DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y	Z	KX	KY	KZ
(CM)								
FOR PLASMA WAKE DIAGNOSTIC	C3 1	10.00	2749.6	-165.0	1059.0	0.	0.	0.
FOR PLASMA WAKE GENERATOR	C2 1	10.40	2444.8	-101.5	1028.0	0.	0.	0.
PIC( FOR HOLDDOWN NUTS)	C2 1	.20	2561.0	-0.	914.0	0.	0.	0.
PIC( FOR HOLDDOWN NUTS)	C4 1	.20	3156.0	-0.	914.0	0.	0.	0.
HOLDDOWN ORDNANCE	C2 6	6.00	2610.0	-0.	939.0	0.	0.	0.
CAPTURE/RELEASE DEVICE		26.80	2601.7	-101.0	1017.9	78.7	149.2	154.9
MECHANISMS		66.51	2695.3	12.7	1052.2	141.1	261.5	290.5
FOR HV POWER SUPPLY	C4 1	12.00	3153.0	-0.	889.0	0.	0.	0.
FOR INSTRUMENT IV-1	C4 1	1.40	3116.0	-208.0	1049.0	0.	0.	0.
FOR CHEMICAL RELEASE	C2 1	5.40	2673.0	-0.	914.0	0.	0.	0.
DIRECT MOUNTING BRACKETRY		18.80	3012.4	-15.5	908.1	68.6	219.6	222.5
INSTRUMENT I-21 PLATFORM	C2 1	65.30	2634.0	-91.1	927.1	0.	0.	0.
FOR INSTRUMENT I-1	C4 1	39.00	3229.0	-92.7	16.0	0.	0.	0.
FOR INSTRUMENT II-3	C4 1	20.40	3051.0	127.0	927.0	0.	0.	0.
FOR INSTRUMENT II-7	C3 1	6.35	2853.0	-0.	1090.0	0.	0.	0.
FOR INSTRUMENT II-9 AND II-4	C2 1	20.40	2440.0	142.0	978.0	0.	0.	0.
FOR INSTRUMENT II-10	C3 1	6.35	2853.0	-94.0	1090.0	0.	0.	0.
FOR RF RECEIVER PACKAGE	C3 1	13.60	2838.4	114.0	914.0	0.	0.	0.
FOR PLASMA WAKE GENERATOR	C2 1	13.60	2444.8	-94.0	914.0	0.	0.	0.
FOR PLASMA WAKE DIAGNOSTIC	C3 1	13.60	2749.6	-165.1	995.7	0.	0.	0.
FOR RF TERMINAL	C3 1	5.00	2838.4	114.0	914.0	0.	0.	0.
INTERMEDIATE SPT STRUCTURE		203.60	2797.7	-29.8	770.3	384.2	457.1	288.5

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AMPS -----FLIGHT 2-----LANDED CONDITION  
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DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y	Z	KX	KY	KZ
			(CM)			(CM)		
INSTR TO INSTR I/F STRUCTURE	C4 14	15.90	3037.4	-0.	990.6	0.	0.	0.
THERMAL CURTAIN SPT-PALLET 1	C2 1	11.34	2561.0	-0.	1016.0	0.	0.	0.
THERMAL CURTAIN SPT-PALLET 2	C3 1	11.34	2864.0	-0.	1016.0	0.	0.	0.
THERMAL CURTAIN SPT-PALLET 3	C4 1	11.34	3156.0	-0.	1016.0	0.	0.	0.
MISC STRUCTURE		34.02	2860.3	0.	1016.0	.0	242.9	242.9
PALLET I/F STRUCTURE		272.32	2834.4	-23.4	823.4	346.0	426.0	280.8
***** AMPS LABCRAFT		2513.82	2856.8	-14.1	949.5	155.8	345.6	326.7
EMERGENCY JETTISON FOR I-1	D4 1	.90	3232.0	-0.	1231.9	0.	0.	0.
LIDAR EMITTER	D4 1	75.00	3188.0	-121.0	1041.4	0.	0.	0.
LIDAR EMITTER	D4 1	75.00	3270.0	-121.0	1041.4	0.	0.	0.
LIDAR RECEIVER	D4 1	300.00	3232.0	-0.	1082.0	0.	0.	0.
***** LASER SOUNDER (I-1)		450.90	3231.0	-40.3	1068.8	60.6	31.3	61.7
SOLAR FLUX MONITOR (IV-1)	D4 1	3.00	3232.0	-200.7	1079.0	0.	0.	0.
***** SOLAR FLUX MONITOR		3.00	3232.0	-200.7	1079.0	.0	0.	0.
OBIPS (II-3)	D4 1	43.00	3194.0	150.0	1117.6	0.	0.	0.
***** OBIPS		43.00	3194.0	150.0	1117.6	0.	0.	0.
CRYO LIMB SCANNER-DRY	D3 1	207.00	2823.0	94.0	1077.0	0.	0.	0.
***** CRYO LIMB SCANNER-WET		207.00	2823.0	94.0	1077.0	0.	0.	0.

AMPS -----FLIGHT 2-----LANDED CONDITION  
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DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y (CM)	Z	KX	KY (CM)	KZ
CRYO IR INTERFEROMETER-DRY	D2 1	215.00	2823.0	-94.0	1077.0	0.	0.	0.
***** CRYO IR INTERFEROMETER		215.00	2823.0	-94.0	1077.0	.0	.0	.0
COMMUNICATIONS		-0.	-0.	-0.	-0.	-0.	-0.	-0.
DATA MANAGEMENT		-0.	-0.	-0.	-0.	-0.	-0.	-0.
FOR CHEMICAL RELEASE (I-21)	C2 1	.50	2635.2	-0.	940.0	0.	0.	0.
***** CHEMICAL RELEASE		.50	2635.2	0.	940.0	0.	0.	0.
RF PLASMA WAVE PACKAGE(I-12)	D4 1	205.00	3036.8	-0.	1051.6	0.	0.	0.
DIPOLE ANTENNA (100 METERS)	C4 1	19.96	3065.8	-0.	1051.6	0.	0.	0.
COMMUNICATIONS		19.96	3065.8	0.	1051.6	0.	0.	0.
***** RF PLASMA WAVE PACKAGE		224.96	3039.4	0.	1051.6	.0	8.2	8.2
UV/VIS/NIR SPEC (II-4)	D2 2	44.00	2457.5	30.5	1140.5	0.	0.	0.
***** UV/VIS/NIR SPEC		44.00	2457.5	30.5	1140.5	0.	0.	0.
DEPLOYABLE TEST BODY(III-17)	D2 1	16.00	2454.9	-104.1	1061.7	0.	0.	0.
PROG EJEC (PWG,III-17)	C2 1	.90	2454.9	-104.1	1061.7	0.	0.	0.
CAPTURE/RELEASE INTERFACE	C2 1	.50	2454.9	-104.1	965.2	0.	0.	0.
PLASMA WAVE GENERATOR STRUCT	C2 1	20.40	2454.9	-104.1	1000.8	0.	0.	0.
DATA TRANSMITTER	C2 1	.50	2454.9	-104.1	1000.8	0.	0.	0.
COMMAND RECEIVER	C2 1	1.00	2454.9	-104.1	1000.8	0.	0.	0.
DIPLEXER	C2 1	1.00	2454.9	-104.1	1000.8	0.	0.	0.
ANTENNA, STUB	C2 1	1.00	2454.9	-104.1	1000.8	0.	0.	0.
COMMUNICATIONS		3.50	2454.9	-104.1	1000.8	.0	.0	.0

D-54

AMPS -----FLIGHT 2-----LANDED CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

DATE OF RUN 09/16/76  
 PAGE 10

DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y (CM)	Z	KX	KY (CM)	KZ
PCM PROGRAMMER/MULTIPLEXER	C2 1	1.00	2454.9	-104.1	1000.8	0.	0.	0.
COMMAND DECODER	C2 1	1.50	2454.9	-104.1	1000.8	0.	0.	0.
DATA MANAGEMENT		2.50	2454.9	-104.1	1000.8	.0	0.	0.
POWER SUPPLY	C2 1	18.00	2454.9	-104.1	1000.8	0.	0.	0.
CABLE SET	C2 1	1.00	2454.9	-104.1	1000.8	0.	0.	0.
ELECTRICAL		19.00	2454.9	-104.1	1000.8	.0	.0	.0
STRIP HEATERS	C2 1	1.00	2454.9	-104.1	1000.8	0.	0.	0.
MULTILAYER INSULATION	C2 1	1.70	2454.9	-104.1	1000.8	0.	0.	0.
THERMAL CONTROL		2.70	2454.9	-104.1	1000.8	0.	0.	0.
EXTENSION MECHANISM	C2 1	10.00	2454.9	-104.1	1000.8	0.	0.	0.
PLASMA WAKE GENERATOR		75.50	2454.9	-104.1	1014.2	25.7	25.7	0.
COMMUNICATIONS		-0.	-0.	-0.	-0.	-0.	-0.	-0.
DATA MANAGEMENT		-0.	-0.	-0.	-0.	-0.	-0.	-0.
ELECTRICAL		-0.	-0.	-0.	-0.	-0.	-0.	-0.
PRG.EJEC-RF RECEIVER PKG	C4 1	3.80	3053.1	-118.1	990.0	0.	0.	0.
RF RECEIVER PACKAGE STRUCT	C4 1	14.20	3053.1	-118.1	999.8	0.	0.	0.
THERMAL CONTROL		-0.	-0.	-0.	-0.	-0.	-0.	-0.
***** RF RECEIVER PACKAGE		18.00	3053.1	-118.1	991.4	16.2	16.2	.0
VECTOR MAGNETOMETER	D3 1	4.10	2775.0	-170.0	1069.0	0.	0.	0.
ION MASS + DIST ANALYSIS	D3 1	2.00	2775.0	-117.0	106.9	0.	0.	0.
PLANAR RPA	D3 1	3.00	2775.0	-170.0	1069.6	0.	0.	0.
LANGMUIR PROBE	D3 1	3.50	2775.0	-170.0	1069.6	0.	0.	0.

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AMPS -----FLIGHT 2-----LANDED CONDITION  
 MASS PROPERTIES AND EQUIPMENT LIST

DATE OF RUN 09/16/76  
 PAGE 11

DESCRIPTION	QTY	MASS (KG)	CENTER OF GRAVITY			RADIUS OF GYRATION		
			X	Y	Z	KX	KY	KZ
(CM)								
NEUTRAL MASS SPEC	D3 1	10.00	2775.0	-170.0	1069.6	0.	0.	0.
PLASMA WAKE DIA-STRUCTURE	C3 1	11.34	2775.0	-170.0	1069.6	0.	0.	0.
CAPTURE/RELEASE INTERFACE	C3 1	.60	2926.1	-172.7	1059.2	0.	0.	0.
DATA TRANSMITTER	C3 1	.50	2775.0	-170.0	1069.6	0.	0.	0.
COMMAND RECEIVER	C3 1	.60	2775.0	-170.0	1069.6	0.	0.	0.
DIPLEXER	C3 1	1.00	2775.0	-170.0	1069.6	0.	0.	0.
ANTENNA, STUB	C3 1	1.00	2775.0	-170.0	1069.6	0.	0.	0.
COMMUNICATION		3.10	2775.0	-170.0	1069.6	0.	0.	0.
COMMAND DECODER	C3 1	1.40	2775.0	-170.0	1069.6	0.	0.	0.
PCM PROGRAMMER/MULTIPLEXER	C3 1	2.00	2775.0	-170.0	1069.6	0.	0.	0.
SUBCARRIER OSCILLATOR ASSY	C3 1	2.14	2775.0	-170.0	1069.6	0.	0.	0.
DATA MANAGEMENT		5.54	2775.0	-170.0	1069.6	.0	.0	.0
POWER SUPPLY	C3 1	17.00	2775.0	-170.0	1069.6	0.	0.	0.
CABLE SET	C3 1	1.40	2775.0	-170.0	1069.6	0.	0.	0.
ELECTRICAL		18.40	2775.0	-170.0	1069.6	.0	.0	0.
STRIP HEATERS	C3 1	1.00	2775.0	-170.0	1069.6	0.	0.	0.
MULTILAYER INSULATION	C3 1	3.50	2775.0	-170.0	1069.6	0.	0.	0.
THERMAL CONTROL		4.50	2775.0	-170.0	1069.6	.0	.0	0.
PLASMA WAKE DIAGNOSTIC PKG		66.08	2776.4	-168.4	1040.3	165.2	165.5	17.0
NEAR IR SPECTROMETER (II-9)	D4 1	60.00	2449.8	30.5	1140.5	0.	0.	0.
***** NEAR IR SPECTROMETER		60.00	2449.8	30.5	1140.5	.0	.0	.0

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AMPS -----FLIGHT 2-----LANDED CONDITION  
MASS PROPERTIES AND EQUIPMENT LIST

DATE OF RUN 09/16/76  
PAGE 12

GRAND TOTAL

MASS\* 12425.83 KGS

CENTER OF GRAVITY

X = 2477.66 CM  
Y = 1.73 CM  
Z = 979.80 CM

RADIUS OF GYRATION

KX = 175.01 CM  
KY = 526.58 CM  
KZ = 526.48 CM

MOMENT OF INERTIA

IX= 39373 KG-M2  
IY= 344546 KG-M2  
IZ= 344420 KG-M2

PRODUCT OF INERTIA

PXY= -3016 KG-M2  
PXZ= -5850 KG-M2  
PYZ= 1835 KG-M2

MOMENT OF INERTIA

IX= 393726546 KG-CM2  
IY=3445460671 KG-CM2  
IZ=3444202457 KG-CM2

PRODUCT OF INERTIA

PXY= -30159046 KG-CM2  
PXZ= -58603668 KG-CM2  
PYZ= 18351001 KG-CM2

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APPENDIX E

ELECTRICAL ENERGY MANAGEMENT

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## ELECTRICAL ENERGY MANAGEMENT

A power profile analysis of the Flight 1 mission was completed using the timelines developed during the study and the power requirements specified in the instrument IFRDs. The power requirements for subsystem support components are estimated based on the preliminary subsystem design. The analysis reflects a conservative approach to the load analysis and will be updated when operational sequences and power requirements are revised.

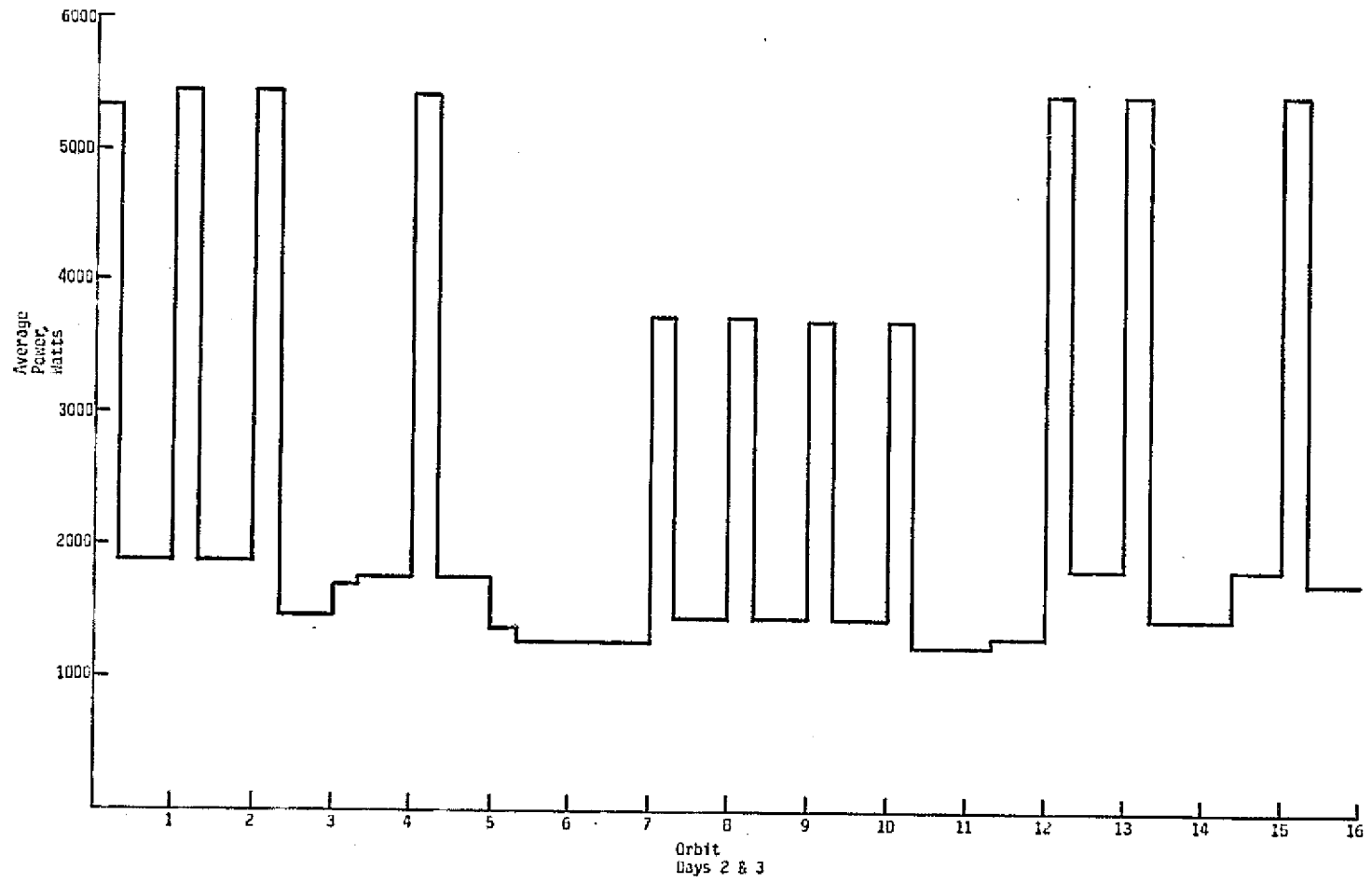
The timeline schedules the operation of the instruments but does not necessarily indicate the instrument status between operations. As a ground rule for this analysis the instrument was turned "off" if three or more orbits lapsed between operations. If the operation sequence required operation within 3 orbits, the instrument was placed in the "standby" mode between operations. Additional ground rules used in the analysis were as follows:

- o Time period for day orbit = 53 minutes  
Time period for night orbit = 37 minutes
- o Duty cycles when not indicated as a full day or night orbit are estimated and an average power calculated for use in profile
- o Only Flight 1 calculated
- o Power for computer and I/O unit part of Spacelab power allocation

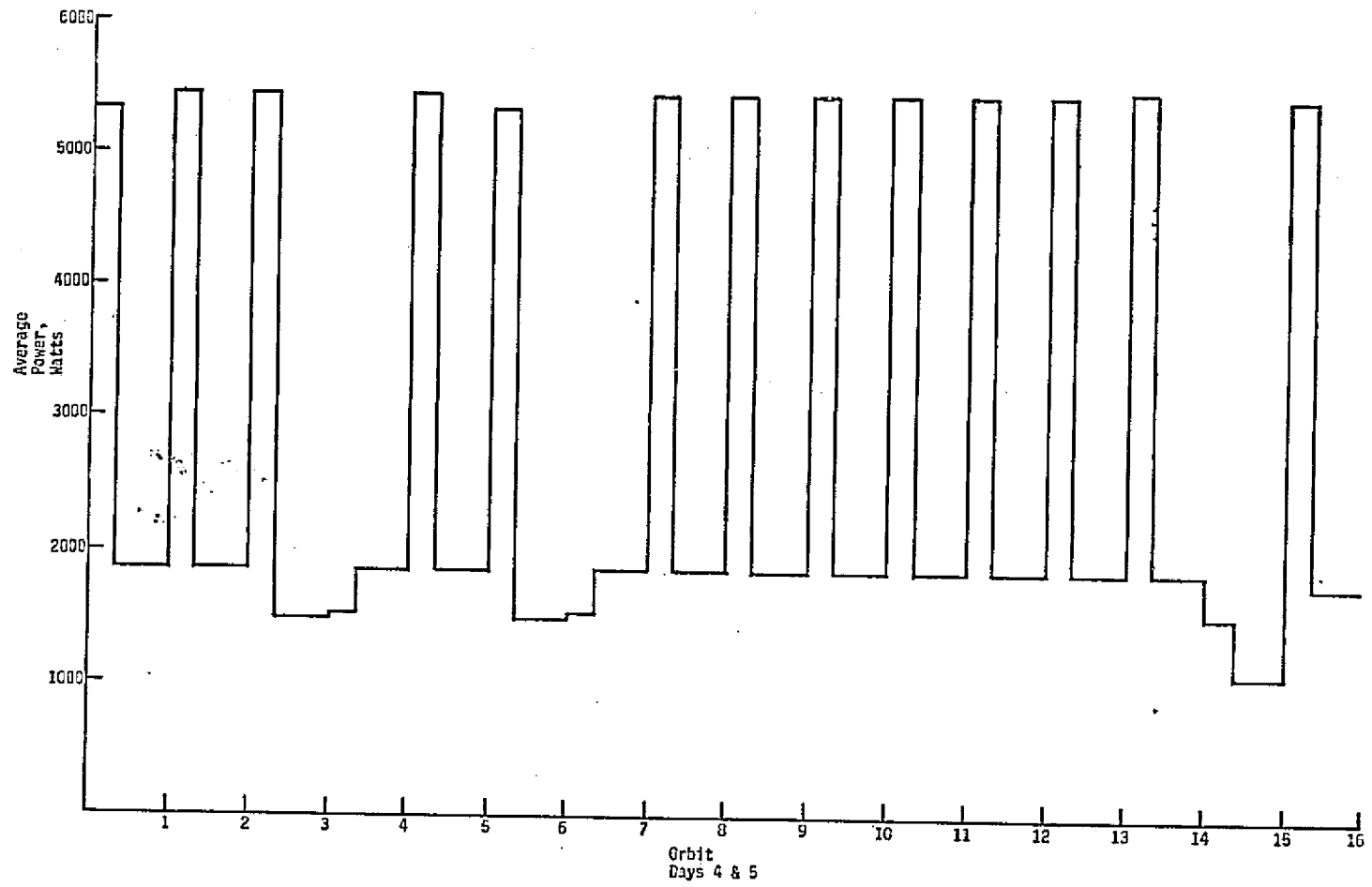
Power profiles for Flight 1 are shown in the attached figures. The analysis results show an average power of 2622 watts and a total energy requirement of 378 kwh. The 2622 watts is well within the allowable 3400 watt continuous power available from the Orbiter fuel cells. The 378 kwh, however, is 9 kwh above the 369 kwh energy allocation from the Orbiter system. Since this preliminary analysis is very conservative in nature, this small disparity is not considered significant. Power management techniques could be suggested to eliminate the negative margin or an additional energy kit could be added to increase the energy available. The analysis of the power and energy for each day is shown in the attached tables. A daily summary of the totals is shown in Section 4.3.

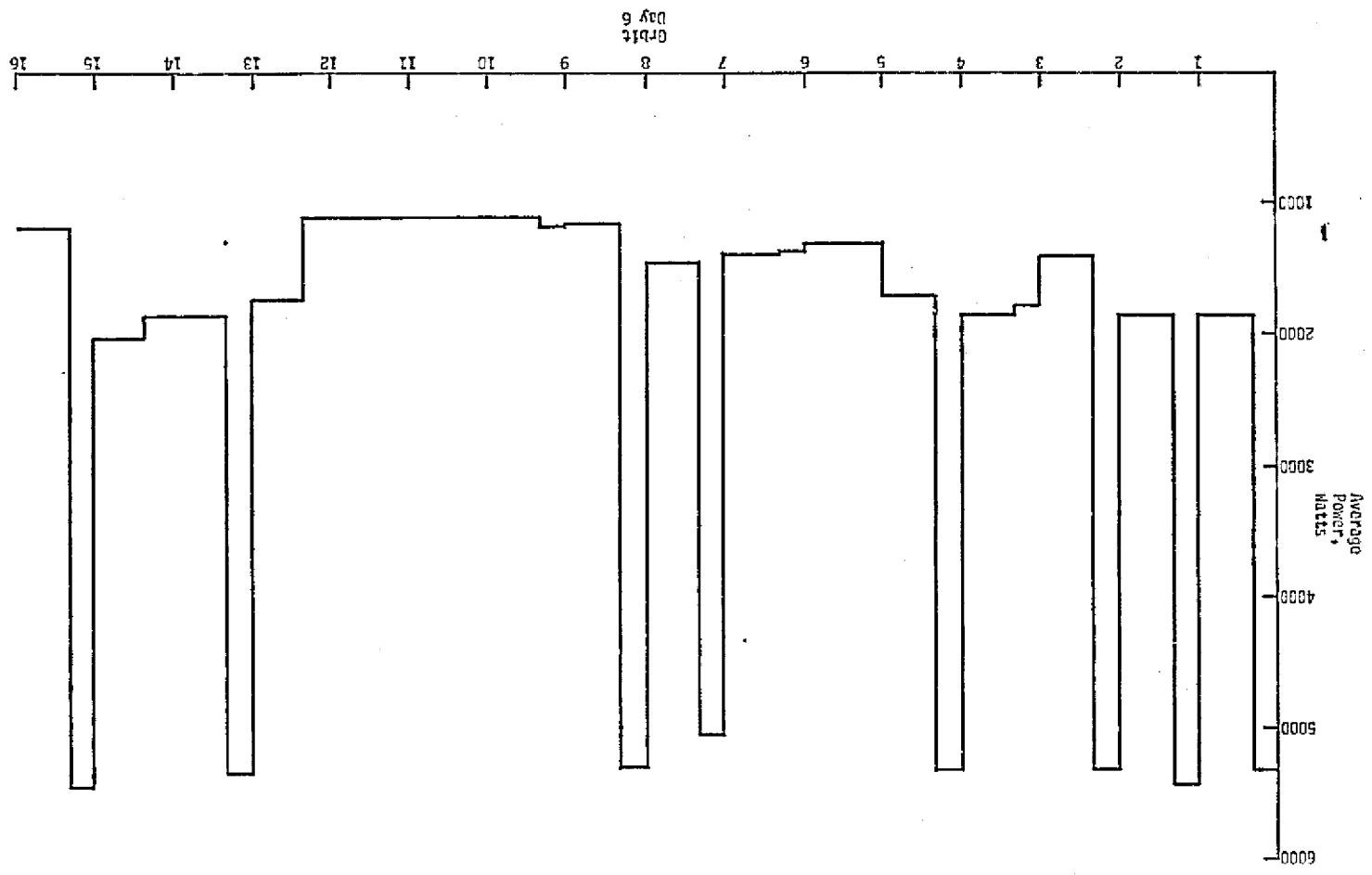
The power analysis for Flight 2 was not performed since the majority of the instruments are the same as Flight 1. This indicates that the energy required for Flight 2 would approximate that of Flight 1 and would also be manageable within the power and energy available.

E-3



7-3





5-5

LOAD	ORBIT		1		2		3		4		5		6		7		8		Total W-H
	Scoby Pwr (W)	Oper Pwr (W)	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D	
	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	
I-1																			
Laser Sounder	40	3600	3600	2220	40	35	3600	2220	40	35	3600	2220	40	35	3600	2220	-	-	9,045
II-7																			
Cryo-Cool Limb Scnr.	15	75	75	46	75	66	75	46	75	66	75	46	15	13	15	9	75	66	470
SIPS	59	268	268	165	268	237	268	165	268	237	268	165	59	52	59	36	268	237	1,696
II-9																			
Near IR Spectrometer	10	196	60	37	80	71	111	68	80	71	111	68	40	35	10	6	45	40	572
Mini Mount	115	200	138	85	147	130	161	99	147	130	161	99	131	116	115	71	131	116	1,606
Pump	-	115	115	70	115	102	115	70	115	102	115	70	115	102	115	70	115	102	1,376
II-10																			
Cryo-Cool, Inf. Spec	0.5	56	56	35	56	49	56	35	56	49	56	35	0.5	-	0.5	-	56	49	336
I-21																			
Chemical Release Sys.	All Power Self Contained Except Thermal Covered Below																		
II-3																			
OBIPS on Point. Plat	7	116	-	-	-	-	-	-	-	-	-	-	-	116	72	-	-	-	72
Mini Mount	115	200	-	-	-	-	-	-	-	-	-	-	-	200	123	-	-	-	123
I-9																			
Electron Accel	200	2500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2500
III-3																			
Level I Beam Diag.	4	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10
II-3																			
OBIPS on RMS																			
III-2																			
Vector Magnetometer	All Power Self Contained Except Thermal which is covered below																		
III-4																			
Level II Beam Diag.																			
III-25, III-18, III-23																			
ESP	All Power Self Contained Except Thermal which is covered below																		
IV-1																			
Solar Flux Cal Array	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ITEM	-	400	400	247	400	353	400	247	400	353	400	247	400	353	400	247	400	353	4,800
Thermal	-	-	228	161	228	201	286	178	288	254	288	178	288	254	288	178	288	254	3,307
Lidar Pump	-	84	84	52	84	74	84	52	84	74	84	52	84	74	84	52	84	74	1,008
Freon Pump	-	274	274	169	274	242	274	169	274	242	274	169	274	242	274	242	274	169	3,288
			5298	3267	1767	1560	5432	3367	1827	1613	5432	3349	1522	1276	1711	1058	1776	1568	24,428

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LOAD	ORBIT		9		10		11		12		13		14		15		16		Total W-H
	Scdy Pwr (W)	Oper Pwr (W)	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D	
	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	
I-1																			
Laser Sounder	40	3600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9,020
II-7																			
Cryo-Cool Liab Scnr	15	75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	351
SIPS	59	268	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,300
II-9																			
Near IR Spectrometer	10	196	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	503
Mini Mount	115	200	115	70	115	102	115	70	115	102	115	70	115	102	115	70	115	102	1,576
Pump	-	115	115	70	115	102	115	70	115	102	115	70	115	102	115	70	115	102	1,376
II-10																			
Cryo-Cool Infr Spec	0.5	56	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	264
I-21																			
Chemical Release Sys	All Power Self Contained Except Thermal, Covered Below																		
II-3																			
OBIPS on Point. Plat	7	116	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mini Mount	115	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I-9																			
Electron Accel	200	2500	2500	1542	200	177	2500	1542	200	177	2500	1542	200	177	2500	1542	200	177	6,699
III-3																			
Level I Beam Diag.	4	10	10	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6
II-3																			
OBIPS on RHS																			
III-2																			
Vector Magnetometer	All Power Self Contained Except Thermal which is covered below																		
III-4																			
Level II Beam Diag.																			
III-25, III-18, III-23																			
ESP	All Power Self Contained Except Thermal which is covered below																		
IV-1																			
Solar Flux Cal Array	-	8	-	-	8	7	-	-	-	-	-	-	-	-	-	-	-	-	7
TECM	-	400	400	247	400	353	400	247	400	353	400	247	400	353	400	247	400	353	4,800
Thermal	-	182	112	254	274	254	157	254	224	254	157	184	162	288	178	288	254	288	3,197
Lidar Pump	-	84	84	52	84	74	84	52	84	74	84	52	84	74	84	52	84	74	1,008
Freon Pump	-	274	274	169	274	242	274	169	274	242	274	169	274	242	274	169	274	242	3,288
			3680	2268	1450	1281	3742	2307	1443	1274	3742	2307	1372	1213	3776	2328	1337	1181	33,405

E-7



LOAD	ORBIT		1		2		3		4		5		6		7		8		Total W-H
	Stby Pwr (W)	Oper Pwr (W)	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D	
	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	
I-1																			
Laser Sounder	40	3600	3600	2220	40	35	3600	2220	40	35	3600	2220	40	35	3600	2220	-	-	9,065
II-7																			
Cryo-Cool Limb Scnr	15	75	75	46	75	66	75	46	75	66	75	46	75	66	-	-	-	-	474
SIPS	59	268	268	165	268	237	268	165	268	237	268	165	59	52	59	52	268	237	1,712
II-9																			
Near IR Spectrometer	10	196	60	37	80	71	111	68	80	71	111	68	40	35	10	6	5	40	572
Mini Mount	115	200	138	85	147	130	161	99	147	130	161	99	131	116	185	71	131	116	1,610
Pump	-	115	115	70	115	102	115	70	115	102	115	70	115	102	115	70	115	102	1,376
II-10																			
Cryo-Cool Infr Spec	0.5	56	56	35	56	49	56	35	56	49	56	35	0.5	-	0.5	-	56	49	336
I-21																			
Chemical Release Sys	All Power Self Contained Except Thermal, Covered Below																		
II-3																			
OBIPS on Point, Plat	7	116	-	-	-	-	-	-	-	-	-	-	116	72	-	-	-	-	72
Mini Mount	115	200	-	-	-	-	-	-	-	-	-	-	200	123	-	-	-	-	123
I-9																			
Electron Accel	200	2500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,719
III-3																			
Level I Beam Diag.	4	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10
II-3																			
OBIPS on RMS																			
III-2	All Power Self Contained Except Thermal Which is Covered Below																		
Vector Magnetometer																			
III-4																			
Level II Beam Diag.																			
III-25, III-18, III-23																			
ESP	All Power Self Contained Except Thermal Which is Covered Below																		
IV-1																			
Solar Flux Cal Array	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
IDCM	-	400	400	247	400	353	400	247	400	353	400	247	400	353	400	247	400	353	4,800
Thermal	-	-	288	178	288	254	288	178	288	254	288	178	276	254	276	170	276	244	3,315
Lidar Pump	-	84	84	52	84	74	84	52	84	74	84	52	84	74	84	52	84	74	1,008
Freon Pump	-	274	274	169	274	242	274	169	274	242	274	169	274	242	274	169	274	242	3,288
			5358	3304	1827	1613	5432	3349	1827	1613	5432	3349	1435	1276	1704	1070	1764	1558	29,460

I-8

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LOAD	ORBIT		9		10		11		12		13		14		15		16		Total W-H																
	Stby Pwr (W)	Oper Pwr (W)	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D																	
	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H		Avg Pwr	W-H														
I-1																																			
Laser Sounder	40	3600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6,825														
II-7																																			
Cryo-Cool Limb Scnr	15	75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	358														
SIPS	59	268	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,294														
II-9																																			
Near IR Spectrometer	10	196	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	503														
Mini Mount	115	200	115	70	115	102	115	70	115	102	115	70	115	102	115	70	131	116	161	99	147	130	161	99	131	116	1,576								
Pump	-	115	115	70	115	102	115	70	115	102	115	70	115	102	115	70	115	102	115	70	115	102	115	70	115	102	1,376								
II-10																																			
Cryo-Cool Infr Spec	0.5	56	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	252													
I-21																																			
Chemical Release Sys			All Power Self Contained Except Thermal, Covered Below																																
II-3																																			
OBIPS on Point Plat	7	116	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-														
Mini Mount	115	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-														
I-9																																			
Electron Accel	200	2500	2500	1542	200	177	2500	1542	200	177	2500	1542	-	-	-	-	-	-	-	-	-	4,980													
III-3																																			
Level I Beam Diag.	4	10	10	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6													
II-3																																			
OBIPS on RMS																																			
III-2																																			
Vector Magnetometer			All Power Self Contained Except Thermal Which is Covered Below																																
III-4																																			
Level II Beam Diag.																																			
III-25, III-18, III-23																																			
ESP			All Power Self Contained Except Thermal Which is Covered Below																																
IV-1																																			
Solar Flux Cal Array	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-														
TECH	-	400	400	247	400	353	400	247	400	353	400	247	400	353	400	247	400	353	400	247	400	353	400	247	400	353	4,800								
Thermal	-	-	242	149	242	214	242	149	242	214	242	149	242	214	242	170	276	242	276	170	276	242	276	170	276	242	3,108								
Lidar Pump	-	84	84	52	84	74	84	52	84	74	84	52	84	74	84	52	84	74	84	52	84	74	84	52	84	74	1,008								
Freon Pump	-	274	274	169	274	242	274	169	274	242	274	169	274	242	274	169	274	242	274	169	274	242	274	169	274	242	3,288								
			3740	2305	1430	1266	3730	2299	1430	1266	3730	2299	1230	1087	1230	757	1291	1141	5620	3341	1815	1603	5620	3341	1639	1271	1402	900	1815	1603	5420	3341	1764	1558	29,374

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LOAD	ORBIT		1		2		3		4		5		6		7		8		Total W-H						
	Subd F- (W)	Oper Pwr (W)	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H							
			N	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D							
I-1																									
Laser Sounder	50	3600	3600	2220	40	35	3600	2220	40	35	3600	2220	40	35	3600	2220	40	35	13,650						
II-7																									
Cryo-Cool, Limb Scnr	13	75	75	46	75	66	75	46	75	66	75	46	15	13	15	9	75	66	75	46	75	66			
SIPS	59	268	268	165	268	237	268	165	268	237	268	165	59	52	59	36	268	168	268	165	268	237	268		
II-9																									
Near IR Spectrometer	10	196	60	37	80	71	111	68	80	71	111	68	45	40	60	37	80	71	111	68	80	71	111		
Mini Mount	115	200	138	85	147	130	161	99	147	130	161	99	131	116	138	85	147	130	161	99	147	130	161		
Pump	-	115	115	70	115	115	70	115	102	115	70	115	102	115	70	115	102	115	70	115	102	115	70		
II-10																									
Cryo-Cool Infr Spec	0.5	56	56	35	56	49	56	35	56	49	56	35	0.5	-	0.5	-	56	49	56	35	56	49	56		
I-21																									
Chemical Release Sys			All Power Self Contained Except Thermal, Covered Below																						
II-3																									
OBIPS on Point. Plat	7	116	-	-	-	-	-	-	-	-	-	-	116	72	-	-	-	-	-	-	-	-	-	72	
Min. Mount	115	200	-	-	-	-	-	-	-	-	-	-	200	123	-	-	-	-	-	-	-	-	-	123	
I-9																									
Electron Accel	200	2500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
III-3																									
Level I Beam Diag.	4	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
II-3																									
OBIPS on RMS																									
III-2																									
Vector Magnetometer			All Power Self Contained Except Thermal Which is Covered Below																						
III-4																									
Level II Beam Diag.																									
III-25, III-18, III-23																									
ESP			All Power Self Contained Except Thermal Which is Covered Below																						
IV-1																									
Solar Flux Cal Array	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
IEM	-	400	400	247	400	353	400	247	400	353	400	247	400	353	400	247	400	353	400	247	400	353	400	247	400
Thermal	-	-	288	178	288	254	288	178	288	254	288	178	288	254	288	178	288	254	288	178	288	254	288	178	288
Lidar Pump	-	84	84	52	84	74	84	52	84	74	84	52	84	74	84	52	84	74	84	52	84	74	84	52	84
Freon Pump	-	274	274	169	274	242	274	169	274	242	274	169	274	242	274	169	274	242	274	169	274	242	274	169	274
			5358	3304	1827	1613	5432	3349	1827	1613	5432	3349	1827	1613	5432	3349	1827	1613	5432	3349	1827	1613	5432	3349	1827
																									34,300

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LOAD	OR/IT		9				10				11				12				13				14				15				16				Total W-H
	Stdb Pwr (W)	Oper Pwr (W)	N		D		N		D		N		D		N		D		N		D		N		D		N		D		N		D		
			Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H			
I-1 Laser Sounder	40	3600	3600	2220	40	35	3600	2220	40	35	3600	2220	40	35	3600	2220	40	35	3600	2220	40	35	3600	2220	40	35	40	25	40	35	3600	2220	40	35	15,845
II-7 Cryo-Cool Lab Scanner	15	75	75	46	75	66	75	46	75	66	75	46	75	66	75	46	75	66	75	46	75	66	15	9	75	66	75	46	75	66	75	46	75	66	859
SIMS	59	268	268	165	268	237	268	165	268	237	268	165	268	237	268	165	268	237	268	165	268	237	59	36	268	237	268	156	268	237	268	156	268	237	3,087
II-9 Near IR Spectrometer	10	196	111	68	80	71	111	68	80	71	111	68	80	71	111	68	80	71	111	68	80	71	111	68	80	71	111	68	80	71	111	68	45	40	1,081
Mini Mount	115	200	161	99	147	130	161	99	147	130	161	99	147	130	161	99	147	130	161	99	147	130	161	99	147	130	161	99	147	130	161	99	131	116	1,818
Pump	-	115	115	70	115	102	115	70	115	102	115	70	115	102	115	70	115	102	115	70	115	102	115	70	115	102	115	70	115	102	115	70	115	102	1,376
II-10 Cryo-Cool Infr Spec	0.5	56	56	35	56	49	56	35	56	49	56	35	56	49	56	35	56	49	56	35	56	49	0.5	-	56	49	56	35	56	49	56	35	56	49	437
I-21 Chemical Release Svcs	All Power Self Contained Except Thermal Covered Below																																		
II-3 OBIPS on Point. Plat	7	116	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Mini Mount	115	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
I-9 Electron Accel	200	2500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
III-3 Level I Beam Diag.	4	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
II-3 OBIPS on RMS	All Power Self Contained Except Thermal Which is Covered Below																																		
III-2 Vector Magnetometer	All Power Self Contained Except Thermal Which is Covered Below																																		
III-4 Level II Beam Diag.	All Power Self Contained Except Thermal Which is Covered Below																																		
III-25, III-18, III-23 ESP	All Power Self Contained Except Thermal Which is Covered Below																																		
IV-1 Solar Flux Cal Array	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	
IECM	-	400	400	247	400	353	400	247	400	353	400	247	400	353	400	247	400	353	400	247	400	353	400	247	400	353	400	247	400	353	400	247	400	353	4,800
Thermal	-	-	288	178	288	254	288	178	288	254	288	178	288	254	288	178	288	254	288	178	288	254	288	178	288	254	288	178	288	254	288	178	288	254	3,656
Lidar Pump	-	84	84	52	84	74	84	52	84	74	84	52	84	74	84	52	84	74	84	52	84	74	84	52	84	74	84	52	84	74	84	52	84	74	1,008
Freon Pump	-	274	274	169	274	242	274	169	274	242	274	169	274	242	274	169	274	242	274	169	274	242	274	169	274	242	274	169	274	242	274	169	274	242	3,288
			5432	3349	1827	1613	5432	3349	1827	1613	5432	3349	1827	1613	5432	3349	1827	1613	5442	3356	1827	1613	1545	953	1079	1613	5432	3349	1776	1568				37,262	

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LOAD	ORBIT																																Total W-H								
	Stdy Pwr (W)	Oper Pwr (W)	1		2		3		4		5		6		7		8		N	D	N	D	N	D	N	D	N	D	N	D	N	D									
			Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H																Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H	Avg Pwr	W-H
I-1 Laser Sounder	40	3600	3600	2200	40	35	3600	2220	40	35	3600	2200	40	35	40	25	40	35	3600	2220	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3600	2200	40	35	11,300	
II-7 Cryo-Cooled Limb Scnr	15	75	25	46	75	66	75	46	75	66	75	46	15	13	15	9	75	66	75	46	75	66	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	470	
SIFS	59	268	268	165	268	237	268	165	268	237	268	165	59	52	59	36	268	237	268	165	268	237	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,696	
III-9 Near IR Spectrometer	10	196	60	37	80	71	111	68	80	71	60	37	10	9	60	37	80	71	60	37	10	9	10	6	10	9	60	37	80	71	111	78	80	71	99	147	130	161	79	709	
Mini Mount	115	200	138	85	147	130	161	99	147	130	138	85	115	102	138	85	147	130	138	85	115	102	115	71	115	102	138	85	147	130	161	99	147	130	161	78	80	71	1,650		
Pump	-	115	115	70	115	102	115	70	115	102	115	70	115	102	115	70	115	102	115	70	115	102	115	70	115	102	115	70	115	102	115	70	115	102	115	70	115	102	115	70	1,376
II-10 Cryo-Cooled Spcc.	0.5	56	56	35	56	49	56	35	56	49	56	35	0.5	-	0.5	-	56	49	56	35	56	49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	336		
I-21 Chemical Release Sys	All Power Self Contained Except Thermal Which is Covered Below																																								
II-3 OBIPS on Pointing Plat	7	116	-	-	-	-	-	-	-	-	-	-	-	-	116	72	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	72		
Mini Mount	115	200	-	-	-	-	-	-	-	-	-	-	-	200	123	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	123		
I-9 Electron Accel	200	2500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
III-3 Level I Beam Diag.	4	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
II-3 OBIPS on RMS																																									
III-2 Vector Magnetometer	All Power Self Contained Except Thermal Which is Covered Below																																								
III-4 Level II Beam Diag.																																									
III-25, III-18, III-23 ESP	All Power Self Contained Except Thermal Which is Covered Below																																								
IV-1 Solar Flux Cal Array	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
IEH	-	400	400	247	400	353	400	247	400	353	400	247	400	353	400	247	400	353	400	247	400	353	400	247	400	353	400	247	400	353	400	247	400	353	400	247	400	353	4,800		
Thermal	-	-	288	178	288	254	288	178	288	254	288	178	288	254	288	178	288	254	288	178	288	254	288	178	288	254	288	178	288	254	288	178	288	254	288	178	288	254	3,456		
Lidar Pump	-	84	84	52	84	74	84	52	84	74	84	52	84	74	84	52	84	74	84	52	84	74	84	52	84	74	84	52	84	74	84	52	84	74	84	52	84	74	1,008		
Freon Pump	-	274	274	169	274	242	274	169	274	242	274	169	274	242	274	169	274	242	274	169	274	242	274	169	274	242	274	169	274	242	274	169	274	242	274	169	274	242	3,268		
			5358	3304	1827	1613	5432	3349	1877	1613	5338	3304	3399	1236	1787	1103	1827	1613	5358	3304	1685	1688	1286	793	1296	1136	1359	838	1388	1226	5032	3103	1628	1261			30,284				

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APPENDIX F

CONTROL AND DISPLAY FUNCTIONAL ANALYSIS

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## AMPS CONTROL AND DISPLAY (C&D) FUNCTIONAL REQUIREMENTS ANALYSIS

This section contains the detailed instrument and FSE C&D functional requirements for Flight 1 and Flight 2. The IFRD information was expanded in order to provide sufficient detail for subsequent C&D analyses, software analyses, and the data management and communication subsystem areas.

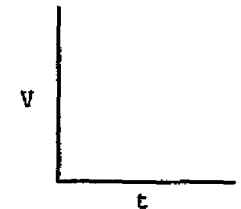
The tables define the functions required, the operational phase during which the functions are primarily used, the type of control or display function either a two function discrete (D), a multifunction discrete (Dm), an analog function (A), or a graphic display, and the function range and resolution when available. The analog function designation does not necessarily mean an analog signal, but only designates a high resolution command or display. The function could be implemented, for example, by an analog signal or by a PCM type signal.



Function	Power Up/ Checkout	Cal.	Experiment Operation	Control Type Discrete or Analog	Display Type Discrete or Analog	Function Range	Function Resolution	Remarks
<u>I-1 LASER SOUNDER -</u>								
<u>TRANSMITTER; O<sub>3</sub>,</u>								
<u>AEROSOLS, 2 REQUIRED</u>								
<u>Laser</u>								
Main Power (On/Off)	X			D	D			
Aperture Door (Open/ Close)	X			D	D			
Cell Thermal (On/Off)	X			D	D			
Dye Thermal (On/Off)	X			D	D			
Flashlamp Thermal (On/Off)	X			D	D			
Input Current		X		A	A			
Input Voltage		X		A	A			
Pulse Width		X		D(m)	D(m)			
Laser Output Power		X		----	A			
Wavelength Tune		X		A	A			
Alignment		X		2A	----			
High Voltage (On/Off)	X			D	D			
Dye Pumps (On/Off)	X			D	D			
<u>Amplifier</u>								
Cell Thermal (On/Off)	X			D	D			
Dye Thermal (On/Off)	X			D	D			
Flashlamp Thermal (On/Off)	X			D	D			
Input Current		X		A	A			
Input Voltage		X		A	A			
Laser Output Power		X		----	A			
Pulse Width		X		D(m)	D(m)			
Dye Pumps (On/Off)	X			D	D			
								Grating Position Readout Peak Output Power

Function	Power Up/ Checkout	Cal.	Experiment Operation	Control Type (Discrete or Analog)	Display Type (Discrete or Analog)	Function Range	Function Resolution	Remarks
<u>I-1 LASER SOUNDER - TRANSMITTER; O<sub>3</sub>, AEROSOLS, 2 REQUIRED (CONTINUED)</u>								
<u>Harmonic Generator</u>								
Thermal (On/Off)	X			D	D			
Output Power		X		----	A			
Mode (O <sub>3</sub> /Aerosol)			X	D	D			
Start/Stop (Ready/OPR)			X	D	D			
<u>I-1 LASER SOUNDER - RECEIVER-ALL TRANSMITTERS</u>								
<u>Alignment</u>								
Pitch		X		A	----			} 1 Set Required For Each Transmitter
Yaw		X		A	----			
Alignment		X		----	Quadgraphic			
<u>Telescope</u>								
Pre-filter Select		X		D(m)	D(m)			} 1/Transmitter
Univ Filter Select		X		D(m)	D(m)			
Univ Filter Mode (OPR/CAL)		X	X	D	D			
Wavelength Tune		X		A	----			Univ Filter Voltage Target = Ocean
Received Power		X		----	A			
Range Limits			X	2A	2A			
Range Resolution			X	A	A			
Attenuator (In/Out)		X		D	D			
Threshold			X	D(m)	D(m)			N.D. Filter For $\lambda$ Cal,

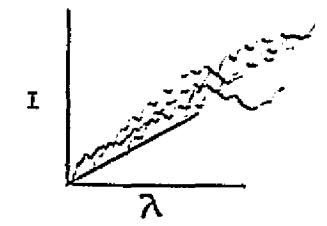
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Function	Power Up/ Checkout	Cal.	Experiment Operation	Control Type Discrete or Analog	Display Type Discrete or Analog	Function Range	Function Resolution	Remarks
<u>I-1 LASER SOUNDER -</u>								
<u>RECEIVER ALL</u>								
<u>TRANSMITTERS</u>								
<u>(CONTINUED)</u>								
<u>Telescope (Continued)</u>								
Integrated Count Vs Range			X	---	Plot			Preset Illum Source Provides Cal Level For Tuning
Integration Interval			X	A	A			
Display Mode (Sig, Back, Sig-Back)			X	D(m)				
Calibrate		X		D	A			
Saturation Ind		X		---	D			
Start/Stop (Ready/OPR)			X	D	D			
Main Power (On/Off)	X			D	D			
Aperture Door (Open/ Close)	X			D	D			
High Voltage (On/Off)	X			D	D			
<u>I-9 ELECTRON ACCELERATOR</u>								
Main Power (On/Off)	X			D	D			
Aperture Door (Open/ Close)	X			D	D			
Bank Voltage		X		A	A			
Voltage Mode (V(t))			X	D(m)	D(m)			
Pulse Width			X	D(m)	D(m)			
Current Mode			X	D(m)	D(m)			
Pitch Angle			X	2A	2A			
Pitch Angle Mode			X	D(m)	D(m)			
Beam Diameter			X	A	Oscillo- scope			
Start/Stop			X	D	D			

Function	Power Up/ Checkout	Cal.	Experiment Operation	Control Type (Discrete or Analog)	Display Type (Discrete or Analog)	Function Range	Function Resolution	Remarks
<u>I-9 ELECTRON ACCELERATOR</u> (CONTINUED)								
V <sub>Accel</sub> Vs Time			X	----	Oscillo- scope			
I <sub>Accel</sub> Vs Time			X	----	Oscillo- scope			
<u>I-12 RF PLASMA WAVE PACKAGE</u>								
<u>Transmitter</u>								
Main Power (On/Off)	X	X	X	D	D			
Power Level	X	X	X	A	A			
Freq Mode (Fixed/Swept)			X	D(m)	D(m)			
Frequency			X	A	A			
Pulse Width			X	D(m)	D(m)			
Pulse Shape			X	D(m)	D(m)			
Repetition Rate			X	D(m)	D(m)			
Start/Stop (Ready/Opr)	X	X	X	D	D			
Mode Switch			X	D	D			
<u>Receiver</u>								
Main Power (On/Off)	X	X	X	D	D			
Attenuation			X	D(m)	D(m)			
Freq Mode (Fixed/Swept)			X	D	D			
Frequency			X	A	A			
Bandwidth			X	D(m)	D(m)			
Freq Vs Delay Time			X	----	Plot			
IF Vs Time			X	----	A			
Video Amplitudes Vs Time			X	----	Plot			
Fourier Transform			X	----	Plot			

Function	Power Up/ Checkout	Cal.	Experiment Operation	Control Type (Discrete or Analog)	Display Type (Discrete or Analog)	Function Range	Function Resolution	Remarks
<u>I-21 CHEMICAL RELEASE</u> <u>(SS #1 GAS RELEASE)</u> <u>(6 RELEASE MODULES)</u>								
Main Power (On/Off)	X			D	D			All Commands RF
Module Select			X	D(6)	D(6)			
Timer (On/Off)			X	D	D			
Time Delay			X	A	A			
Arm/Safe			X	D	D			
Detonate/Safe			X	D	D			
<u>II-3 OBIPS (B) (PLATFORM</u> <u>I; ACOUSTIC GRAVITY WAVE</u> <u>EXPERIMENT)</u>								
Main Power (On/Off)	X			D	D			TV Monitor
Aperture Door (Open/ Close)	X			D	D			
Sunshield (Extend/ Retract)	X			D	D			
H.V. (On/Off)	X			D	D			
Calibration (On/Off)		X		D	D			
Gain			X	A	----			
Focus			X	A	----			
Frame Rate			X	D(m)	D(m)			
Start/Stop			X	D	D			
Magnification (Zoom)			X	A	----			
Video Display			X	----	Video			

Function	Power Up/ Checkout	Cal.	Experiment Operation	Control Type (Discrete or Analog)	Display Type (Discrete or Analog)	Function Range	Function Resolution	Remarks
<u>II-3 OBIPS (A) (BEAM STUDIES; REMOTE MANIPULATOR)</u> Same Functions As OBIPS (B) Except No Sunshield								
<u>II-4 UV-VIS-IR SPECTROMETER (2 UNITS FOR MISSION #2)</u>								
Main Power (On/Off)	X			D	D			
Aperture Door (Open/Close)	X			D	D			
λ Scan Range			X	2A	2A			
λ Scan Rate			X	D(m)	D(m)			
Mode			X	D(m)	D(m)			
Calibrate		X		D	D			
O-Order Detector		X		----	----			
Gain			X	A	----			
Spatial Resolution			X	D(m)	D(m)			
Spectral Resolution			X	D(m)	D(m)			
Start/Stop			X	D	D			
Intensity Vs λ			X	----	Plot			



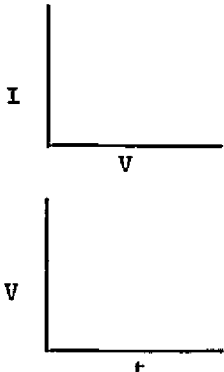
Multiple Superimposed Plots of I vs λ Displaced Vertically By A Function of Spatial Resolution

Function	Power Up/ Checkout	Cal.	Experiment Operation	Control Type (Discrete or Analog)	Display Type (Discrete or Analog)	Function Range	Function Resolution	Remarks
<u>II-7 CRYO COOLED LIMB SCANNER</u>								
Main Power (On/Off)	X			D	D			Internal Scanning of Secondary Mirror No Onboard Data Monitoring Ground Will Reduce and Analyze
Aperture Door (Open/ Close)	X			D	D			
Cryo Temps			X	----	6A			
Cryo Flow Rates			X	4A	4A			
Cryo Supply Level			X	----	A			
Scan Rate			X	A	A			
Start/Stop			X	D	D			
<u>II-9 NEAR IR SPECTROMETER</u>								
Main Power (On/Off)	X			D	D			No Onboard Data Monitoring
Aperture Door (Open/ Close)	X			D	D			
Cryo Temps			X	----	6A			
Cryo Flow Rates			X	4A	4A			
Cryo Supply Levels			X	----	A			
Start/Stop			X	D	D			

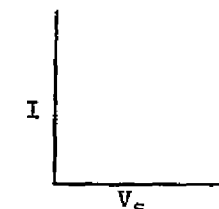
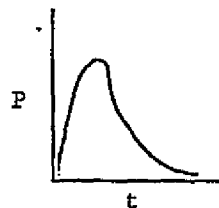
Function	Power Up/ Checkout	Cal.	Experiment Operation	Control Type Discrete or Analog	Display Type Discrete or Analog	Function Range	Function Resolution	Remarks
<u>II-10 CRYO COOLED IR SPECTROMETER</u>								
Main Power (On/Off)	X			D	D			No Onboard Data Monitoring
Aperture Door (Open/Close)	X			D	D			
Cryo Temps			X	----	6A			
Cryo Flow Rates			X	4A	4A			
Cryo Supply Level			X	----	A			
Scan Rate			X	A	A			
Start/Stop			X	D	D			
<u>III-2 VECTOR MAGNETOMETER (SS #2 FLUXGATE MAG ONLY; 1 SYST ON RMS, 1 SYST IN III-25 ESP)</u>								
Main Power (On/Off)	X			D	D			Modified Via Computer Computational Rqts Or Via Ground Voice Uplink No Onboard Data Display; Output To Computer For Orbiter Orientation Computation
Sample Rate			X	D(m)	D(m)			
Bias			X	D(m)	D(m)			
Start/Stop			X	D	D			
<u>III-3 LEVEL I DIAGNOSTICS (GAS RELEASE)</u>								
Main Power (On/Off)	X			D	D			Gated to Accel Pulse
Plenum Pressure			X	A	A			
Storage Pressure			X	----	A			
Burst Delay			X	A	A			

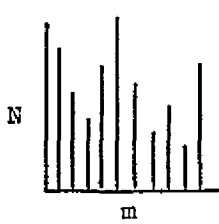

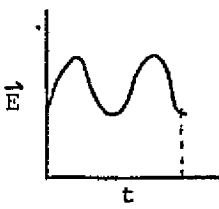
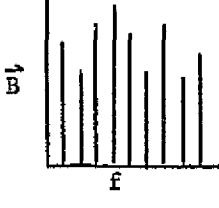


Function	Power Up/ Checkout	Cal.	Experiment Operation	Control Type (Discrete or Analog)	Display Type (Discrete or Analog)	Function Range	Function Resolution	Remarks
<u>III-3 LEVEL I DIAGNOSTICS</u> (CONTINUED)								
Start/Stop			X	D	D			Assumes Direction of Release Slaved to Accel Pitch Angle
<u>III-4 LEVEL II BEAM DIAGNOSTICS (RMS)</u>								
<u>Faraday Cup</u>								
Main Power (On/Off)	X			D	D			
Grid 1 Potential			X	A	Oscillo- scope			
Grid 2 Potential			X	A	Oscillo- scope			
Current (3)			X	----	Oscillo- scope			
<u>Electrostatic Analyzer</u>								
Main Power (On/Off)	X			D	D			
Sweep Voltage			X	A	Oscillo- scope			
Current			X		Oscillo- scope			
Count Rate			X	----	A			

Function	Power Up/ Checkout	Cal.	Experiment Operation	Control Type (Discrete or Analog)	Display Type (Discrete or Analog)	Function Range	Function Resolution	Remarks
<u>III-4 LEVEL II BEAM DIAGNOSTICS (RMS)</u>								
<u>Gold Probe (Langmuir Probe)</u>								
Main Power (On/Off)	X			D	D			
Mode (V Vs I or V Vs t) Voltage			X	D	D			
Current			X	A	Oscillo- scope			
<u>III-10 ION MASS AND DISTRIBUTION ANALYZER</u>								
Main Power (On/Off)	X			D	D			<p>Note: Wideband Inst. Data, No Inst Processing</p>
Mode Select			X	D(m)	D(m)			
H.V. (On/Off)	X			D	D			
H.V. Adjust			X	A	A			
Magnet Current			X	A	A			
Calibration		X		D	D			
Count Rates (3)			X	----	3D			
Energy Vs. Mass			X	----	Plot			

Function	Power Up/ Checkout	Cal.	Experiment Operation	Control Type (Discrete or Analog)	Display Type (Discrete or Analog)	Function Range	Function Resolution	Remarks
<u>III-16 ION MASS SPECTROMETER (III-25 SS)</u>								
Main Power (On/Off)	X			D	D			No Data Display Required; Parameters Modified Via Ground Voice Uplink
Mode			X	D(m)	D(m)			
Potential			X	A	A			
Calibration		X		D	D			
Start/Stop			X	D	D			
<u>III-17 DEPLOYABLE TEST BODY</u>								
Main Power (On/Off)	X			D	D			Instrument Provided Ejection Mechanism
Inflate/Deflate			X	D	D			
Pressure			X	----	A			
Body Potential			X	----	A			
Magnet Current			X	----	A			
Bias Potential			X	A	A			
Bias Current			X	A	A			
Start/Stop			X	D	D			
Lock/Unlock	X			D	D			
Eject/Safe	X			D	D			
<u>III-18 PLANAR RETARDING POTENTIAL ANALYZER</u>								
Main Power (On/Off)	X			D	D			
Grid 1 Potential			X	A	A			
Grid 2 Potential			X	A	A			
Grid 3 Potential			X	A	A			

Function	Power Up/ Checkout	Cal.	Experiment Operation	Control Type (Discrete or Analog)	Display Type (Discrete or Analog)	Function Range	Function Resolution	Remarks
<u>III-18 PLANAR RETARDING POTENTIAL ANALYZER (CONTINUED)</u>								
Current Range			X	D(m)	D(m)			 <p>Wideband Analog Data Digitized</p>
Sweep Rate			X	D(m)	D(m)			
Start/Stop			X	D	D			
Sweep Voltage			X		Plot			
Current			X		Plot			
<u>III-22 LANGMUIR PROBE (III-25 SS)</u>								
Main Power (On/Off)	X			D	D			 <p>Note: Instrument Processes Data</p>
Sensitivity Range			X	D(m)	D(m)			
Voltage			X	A	A			
Electron Temp			X	----	A			
Electron Density			X	----	A			
Space Potential			X	----	A			
Start/Stop			X	D	D			
Space Potential Vs t			X	----	Plot			
Rise Time			X	----	A			
Peak Potential			X	----	A			

Function	Power Up/ Checkout	Cal.	Experiment Operation	Control Type Discrete or Analog	Display Type Discrete or Analog	Function Range	Function Resolution	Remarks
<u>III-23 NEUTRAL MASS SPECTROMETER</u>	X			D	D			
Main Power (On/Off)	X		D	D	D			
Mode			X	D(m)	D(m)			
Detector Sensitivity (3)			X	3D(m)	3D(m)			
Calibration (Auto)		X		D	D			
Scan Voltage			X	A	A			
Start/Stop			X	D	D			
Count Rate			X	----	3A			
Count Vs Mass No.			X	----	Plot			
Count Vs t			X	----	3 Plots			
<u>III-25 EMI DIAGNOSTIC PACKAGE (ESP)</u>								
<u>DC E-Field</u>								
Main Power (On/Off)	X			D	D			
Field Magnitude			X	----	A			
Magnitude Vs t			X	----	Plot			
<u>AC B-Field</u>								
Main Power (On/Off)	X			D	D			
Orientation (1 Axis Only)			X	----	A			
Power Spectrum			X		Histogram			
Flux Gate Magnetometer		See	III-2 Instrument					

Function	Power Up/ Checkout	Cal.	Experiment Operation	Control Type (Discrete or Analog)	Display Type (Discrete or Analog)	Function Range	Function Resolution	Remarks
<u>III-25 EMI DIAGNOSTIC PACKAGE (ESP)</u>								
Langmuir Probe			See III-22 Instrument					
Ion Mass Spectrometer			See III-16 Instrument					
Electrostatic Analyzer			Replaced by Ion Mass Spectrometer					
<u>IV-1 SOLAR FLUX CAL ARRAY</u>								
Main Power (On/Off)	X			D	D			
Start/Stop			X	D	D			
No Onboard Data Monitoring - Data Will Be Reduced And Analyzed Post Mission								
<u>INTEGRATED ENVIRONMENTAL CONTAMINATION MONITOR</u>								
Main Power (On/Off)	X			D	D			
All Data Recorded Internally To Package No Other C&D								
<u>FSG-GIMBALED PLATFORM-- TYPICAL</u>								
Main Power (On/Off)	X			D	D			
Launch Locks	X			D	D			
Rate Gyro Package (On/ Off)	X			D	D			
Mode			X	D(m)	D(m)			
Gimbal Position			X	3A	3A			
Slew Rate (High/Low)			X	D	D			

Function	Power Up/ Checkout	Cal.	Experiment Operation	Control Type (Discrete or Analog)	Display Type (Discrete or Analog)	Function Range	Function Resolution	Remarks
<u>FSC-GIMBALED PLATFORM-- TYPICAL</u>								
Start/Stop			X	D	D			Auto Acquisition Mode Ejection Mechanism
Safe/Arm	X			D	D			
Safe/Jettison	X			D	D			
<u>FSE-HIGH ENERGY POWER SUPPLY</u>								
Main Power (On/Off)	X			D	D			Release Mechanism Jettison  Ejection Velocity Fixed Pre-Flight  Direction Set by Orbiter Attitude
Charging Voltage			X	A	A			
Charging Current			X	A	A			
Bank Energy			X	----	A			
Time To Full Charge			X	----	A			
PFU Input Currents			X	----	A			
PFU Output Current			X	----	A			
PFU Output Voltage			X	----	A			
Instrument Select			X	D(m)	D(m)			
<u>FSE RELEASE MECHANISM</u>								
Main Power (On/Off)	X			D	D			
Module Select			X	D(6)	D(6)			
Launch Locks (Latch/ Unlatch)	X			D	D			
Eject/Save			X	D	D			
Arm/Save	X			D	D			
Jettison/Save	X			D	D			

Function	Power Up/ Checkout	Cal.	Experiment Operation	Control Type (Discrete or Analog)	Display Type (Discrete or Analog)	Function Range	Function Resolution	Remarks
<u>FSE STOWAGE MECHANISMS</u>								
Main Power (On/Off)	X			D	D			
Launch Locks	X			D	D			
<u>FSE-REMOTE MANIPULATOR SYSTEM (RSP) - ORBITER SUBSYSTEM</u>								
Assume Position Control, Display (Angles), and Pro- grammable Position/ Scan Modes Available								