FTD 530
TRAINING

SRB FACILITY FAMILIARIZATION (V31)

AUGUST 1981

SHEPPARD TECHNICAL TRAINING CENTER

Designed For ATC Course Use Do Not Use On The Job

TABLE OF CONTENTS

STUDENT HANDOUT DESCRIPTION

Student Handouts are training publications authorized by Air Training Command (ATC) for student use in ATC courses.

The STUDENT HANDOUT (HO) is an item of training literature in the form of a booklet, chart, table, schematic, circuit disgram, etc., used to augment SGs, WBs, or student texts.

HOs are designed for ATC course use only. They are updated as necessary for training purposes, but are NOT to be used on the job as authoritative references in preference to Technical Orders or other official publications.

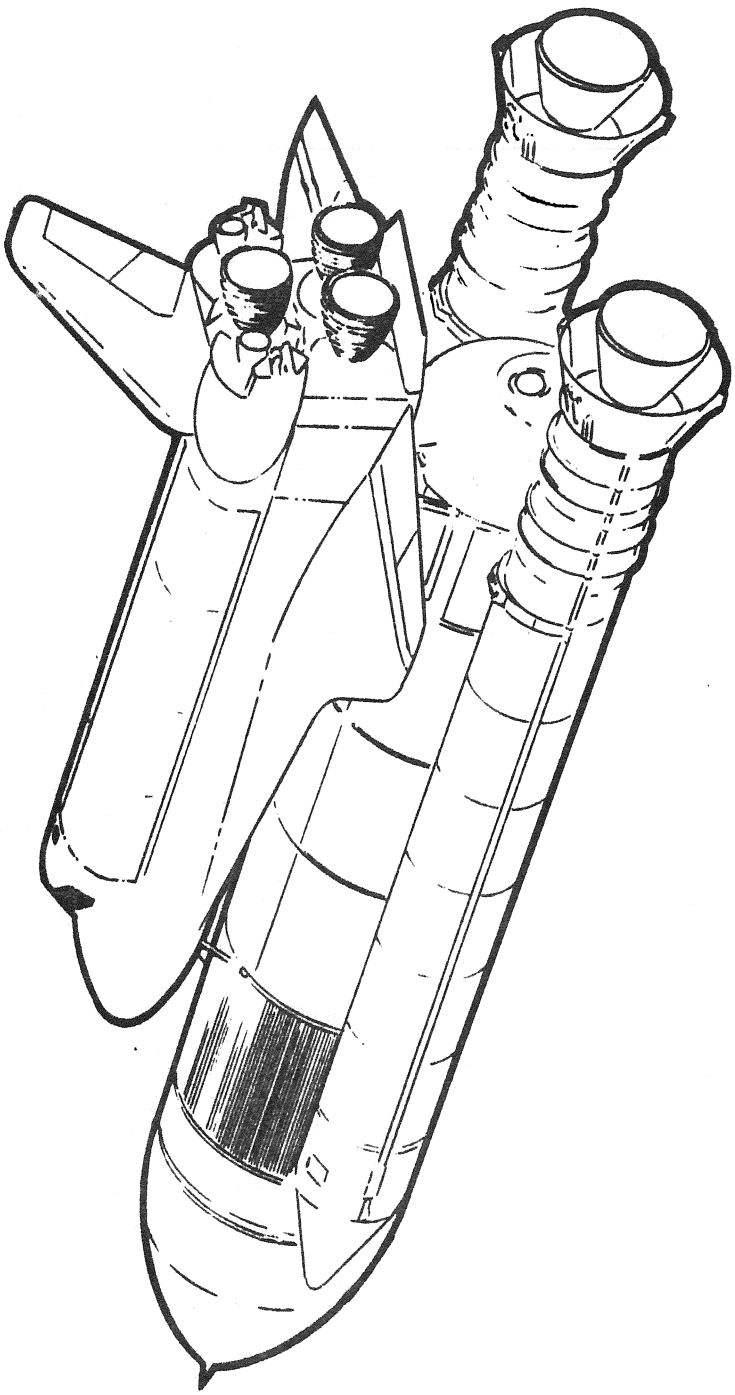
ABBREVIATIONS AND ACRONYMS

A	Ampere(s)
A-E	Architect-Engineer
AC	Alternating Current
APU	Auxiliary Power Unit
BIL	Basic Insulation Level
BSM	Booster Separation Motor
CDF	Confined Detonating Fuse
CFP	Contractor Furnished Property
CFM	Cubic Feet Per Minute
CI	Configueation Item
C/O	Checkout
COMM	Communication
DC	Direct Current
Distrib	Distribution
DOD	Department of Defense
ET	External Tank
ETA	External Tank Attach
E&I	Electrical and Instrumentation(system)
FPM	Feet Per Minute
FWD	Forward
GFP	Government Furnished Property
GHe	Gaseous Helium
GH_2	Gaseous Hydrogen
GN_2	Gaseous Nitrogen
GO_2	Gaseous Oxygen
GPM	Gallons Per Minute
GR	Grains
GSE	Ground Support Equipment
GSS	Ground Support Systems
He	Helium
HID	High Intensity Discharge
HPU	Hydraulic Power Unit
Hz	Hertz
I	Installed
ID	Identification
IEA	Integrated Electronics Assembly
I/F	Interface
JSC	Johnson Space Center
KHz	Kilohertz

LB	Pound(s)
LCC	Launch Control Center
LH	Left Hand
LH_2	Liquid Hydrogen
LO_2	Liquid Oxygen
LP	Launch Pad
LRU	Line Replaceable Unit
MEL	Master Equipment List
MMH	Monoethylhydrazine
MST	Mobile Service Tower
NASA	National Aeronautics and Space Administration
NSI	NASA Standard Initiator
NSN	National Stock Number
NVAFB	North Vandenberg Air Force Base
OFI	Operational Flight Instrumentation
OVS	Operational Voice System
PIC	Pyro Initiator Controller
PRF	Parachute Refurbishment Facility
PSI	Pounds Per Square Inch
PSIG	Pounds Per Square Inch, Gauge
PVC	Polyvinyl Chloride
QA	Quality Assurance
QD	Quick Disconnect
QTY	Quantity
RF	Radio Frequency
RFI	Radio Frequency Interference
RH	Right Hand
RIS	Receiving Inspection, Segment
RM	Rocket Motor
RPIE	Real Property Installed Equipment
PRM	Revolutions Per Minute
RSS	Range Safety System
S&A	Safe and Arm
SAMTO	Space and Missile Test Organization
SDAF	SRB Disassembly Facility
SE	Support Equipment
Serv	Service or Servicing
SF	Square Feet
SLC	Space Launch Complex
SPRR	Southern Pacific Railroad
SRB	Solid Rocket Booster

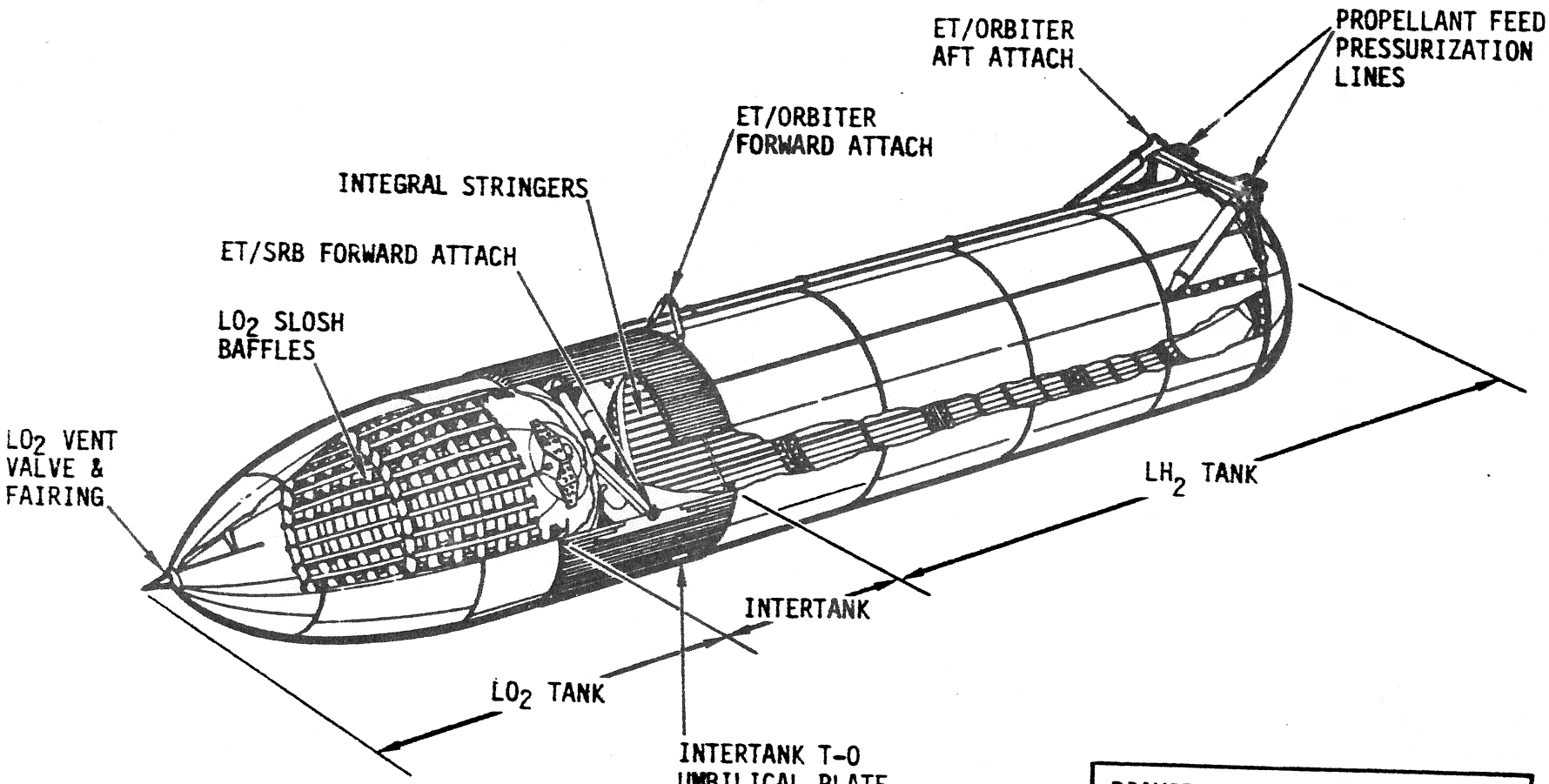
ABBREVIATIONS AND ACRONYMS cont'd

SRM	Solid Rocket Motor
SRSF	SRB Refurbishment and Subassembly Facility
SS	Station Set
SSF	SRB Storage Facility
SSME	Space Shuttle Main Engine
SSV	Space Shuttle Vehicle
STS	Space Transportation System
SVAFB	South Vandenberg Air Force Base
TBD	To Be Determined
TVC	Thrust Vector Control
UL/DL	Uplink/Downlink
USAF	United States Air Force
V	Volts
VAC	Volts, Alternating Current
VAFB	Vandenberg Air Force Base
VDC	Volts, Direct Current
VLPS	Vandenberg Launch Processing System
VDL	Voice Direct Lines



SPACE SHUTTLE VEHICLE (SSV)

EXTERNAL TANK

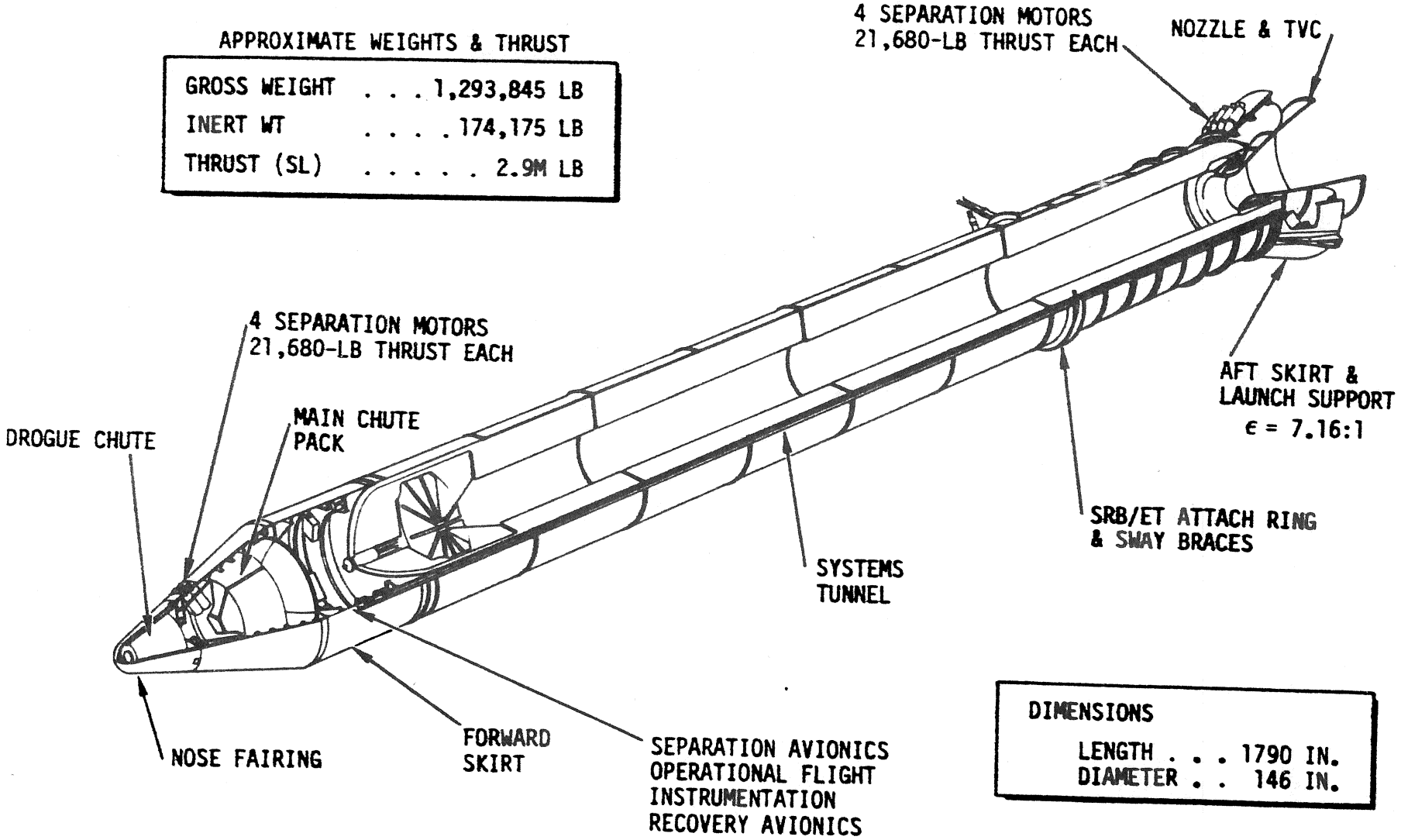


DIAMETER = 27 FT 9 IN.
LENGTH = 154.4 FT
PROPELLANT WT = 1.58×10^6 LB
INERT CONTROL WT = 72,000

SOLID ROCKET BOOSTER

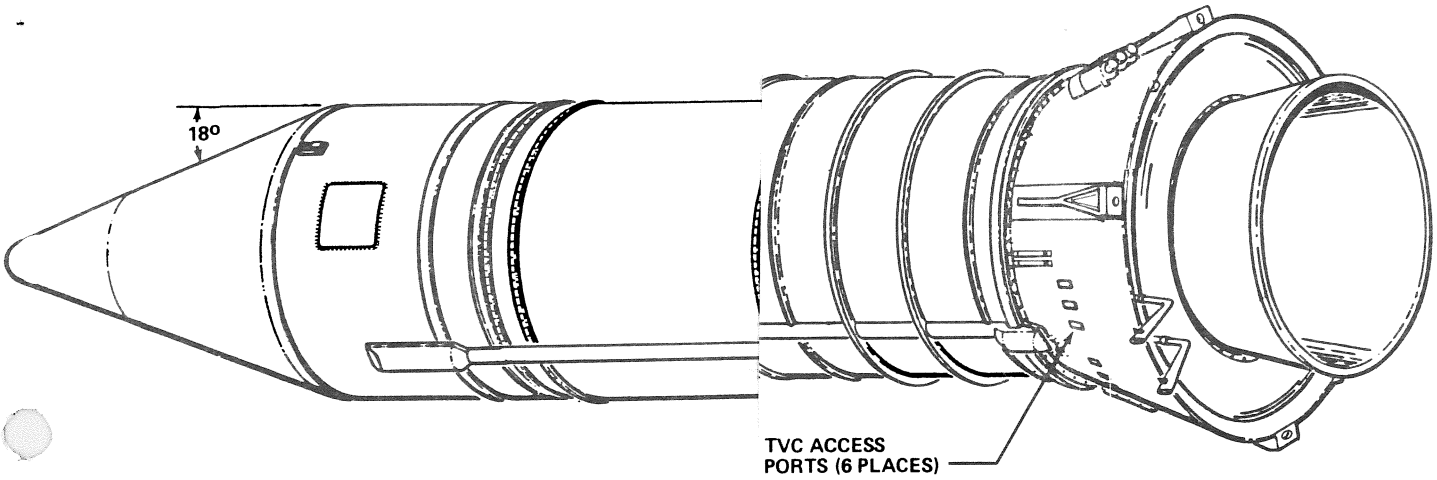
APPROXIMATE WEIGHTS & THRUST

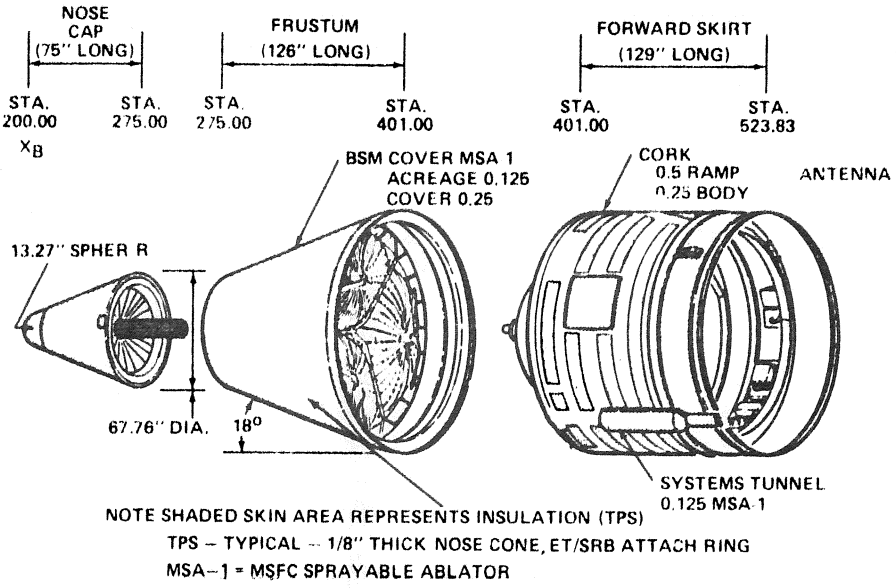
GROSS WEIGHT	1,293,845 LB
INERT WT	174,175 LB
THRUST (SL)	2.9M LB

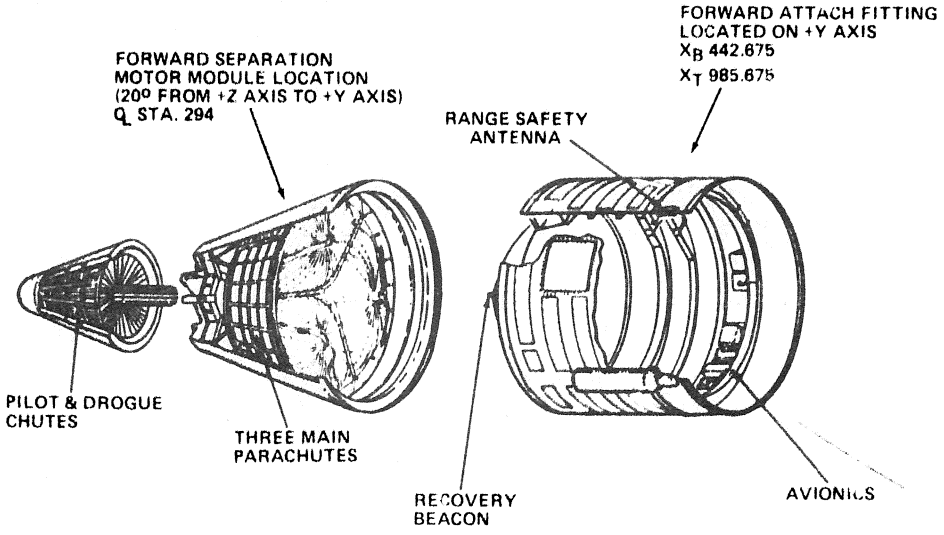


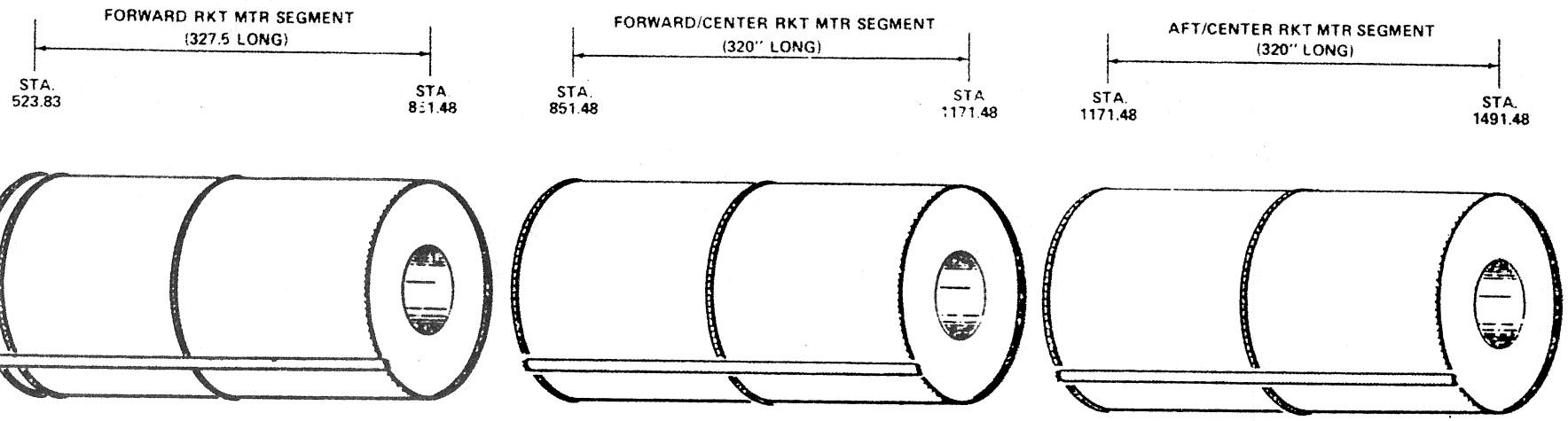
DIMENSIONS

LENGTH	1790 IN.
DIAMETER	146 IN.


18°
TVC ACCESS
PORTS (6 PLACES)


NOSE CAP (75" LONG)
FRUSTUM (126" LONG)
FORWARD SKIRT (129" LONG)
STA. 200.00
STA. 275.00
STA. 275.00
STA. 401.00
STA. 401.00
STA. 523.83
X_B
BSM COVER MSA 1
ACREAGE 0.125
COVER 0.25
CORK
0.5 RAMP
0.25 BODY
ANTENNA
13.27" SPHER R
67.76" DIA.
18°
SYSTEMS TUNNEL
0.125 MSA-1
NOTE SHADED SKIN AREA REPRESENTS INSULATION (TPS)
TPS – TYPICAL – 1/8" THICK NOSE CONE, ET/SRB ATTACH RING
MSA–1 = MSFC SPRAYABLE ABLATOR

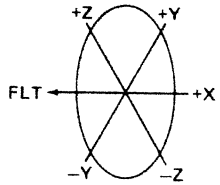

FORWARD ATTACH FITTING
LOCATED ON +Y AXIS
X_B 442.675
X_T 985.675
FORWARD SEPARATION
MOTOR MODULE LOCATION
(20° FROM +Z AXIS TO +Y AXIS)
℄ STA. 294
RANGE SAFETY
ANTENNA
PILOT & DROGUE
CHUTES
THREE MAIN
PARACHUTES
RECOVERY
BEACON
AVIONICS

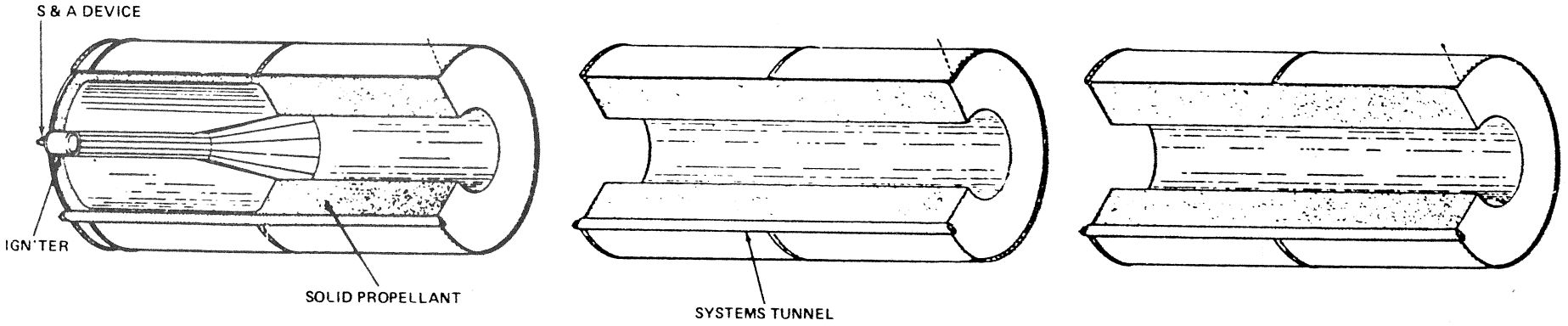


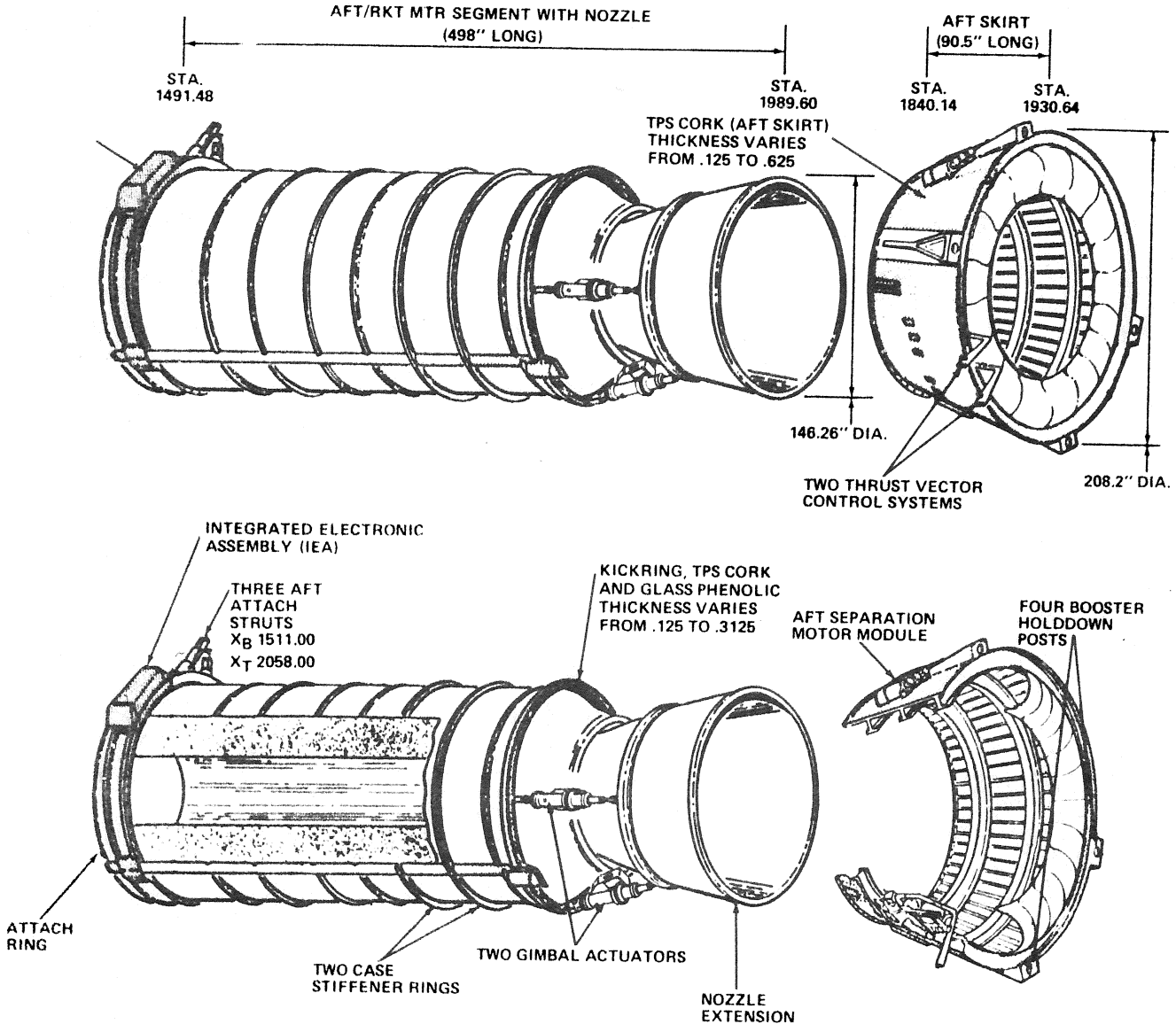
TPS FOR SRM HAS NOT BEEN FINALIZED

- CEI TARGET WEIGHT 1,293,327 LBS. (586,643 Kg)
- LENGTH 1,789.60 INCHES (149.13 FT.) (45.46 METERS)
- DIAMETER APPROXIMATELY 146" (12.17 FT.) (3.71 METERS)

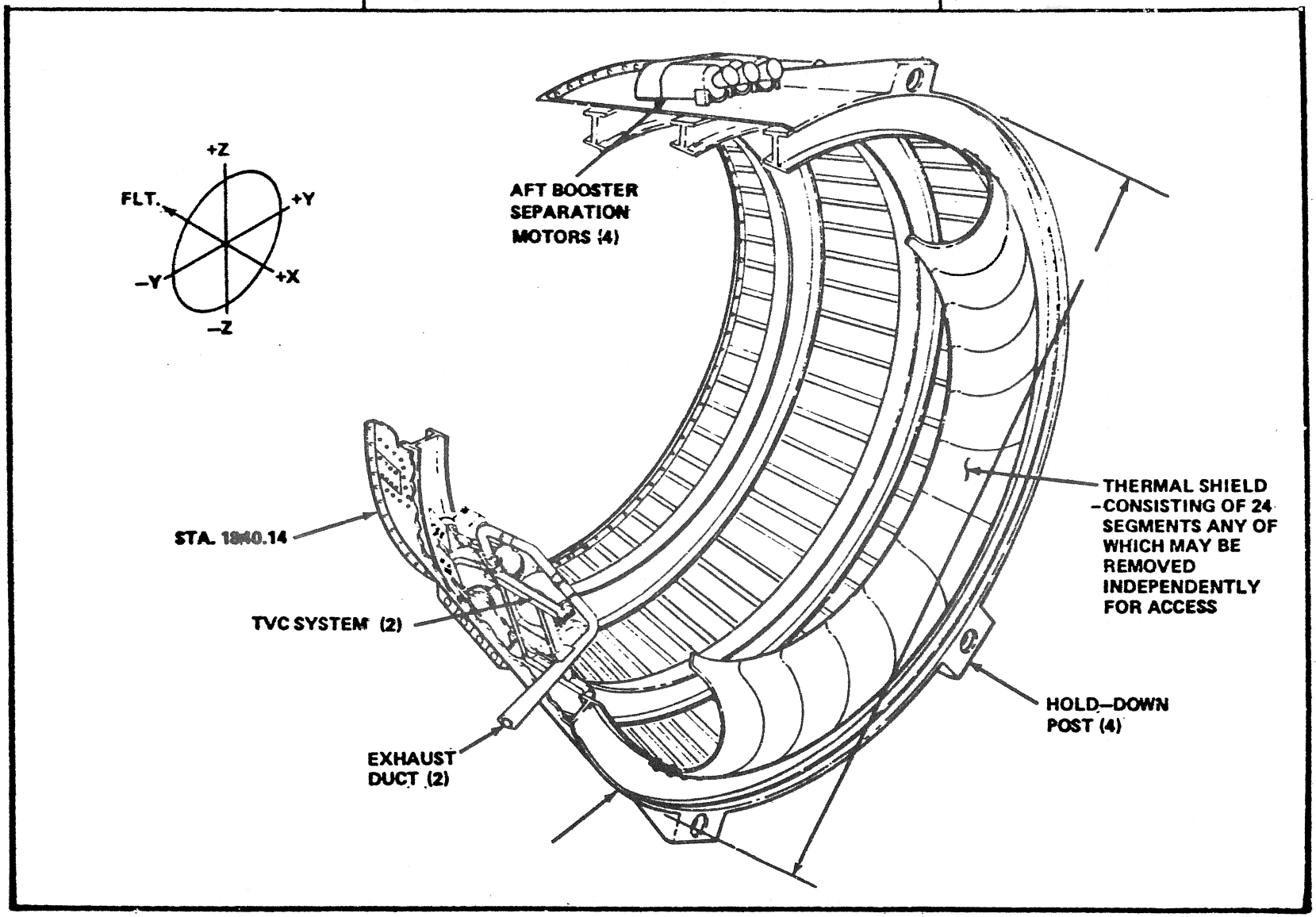
X_B = SOLID ROCKET BOOSTER
X_T = EXTERNAL TANK

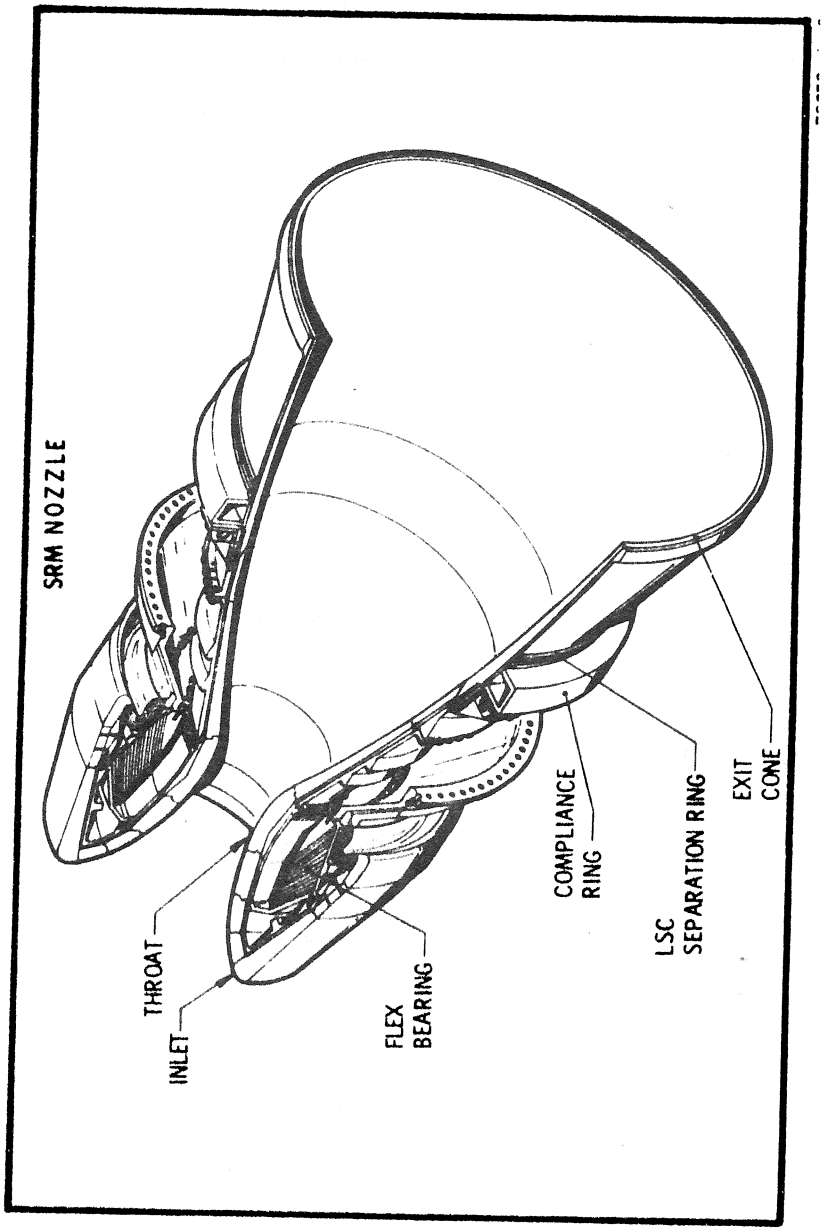


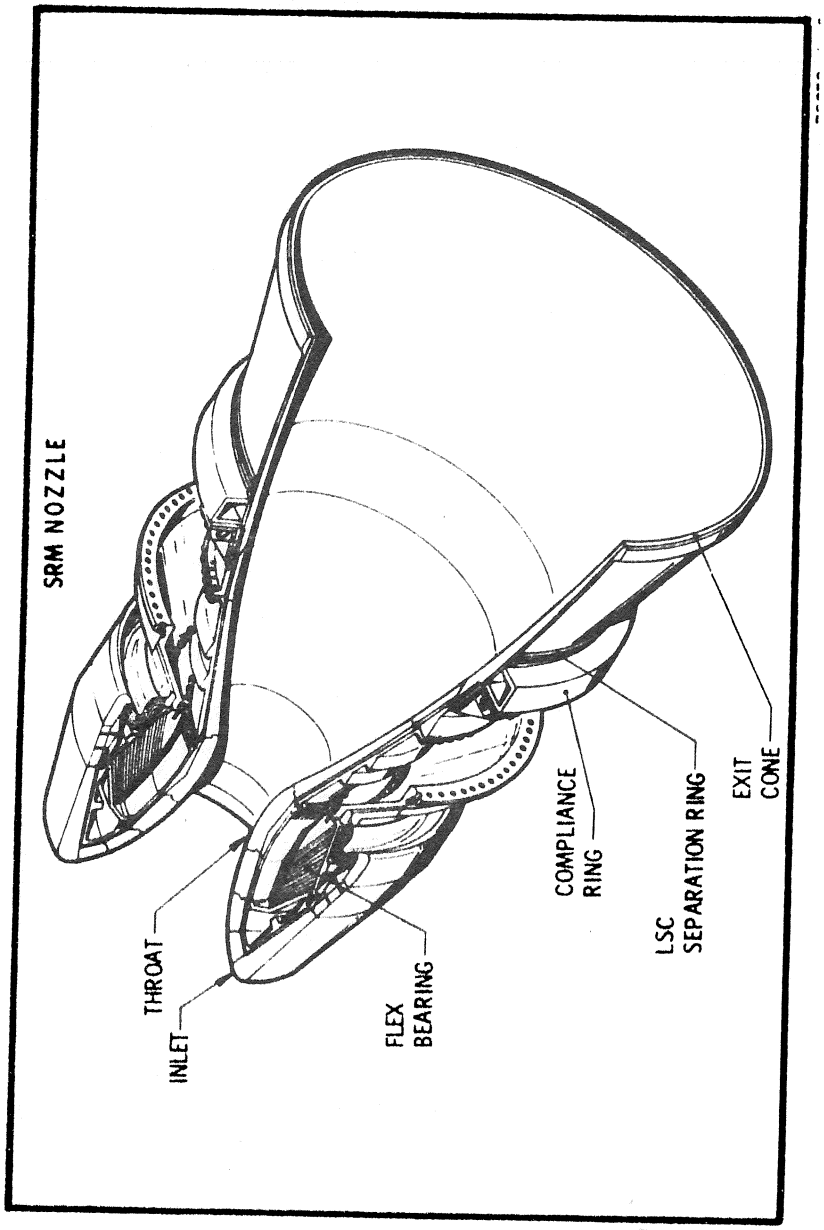



AFT/RKT MTR SEGMENT WITH NOZZLE
(498" LONG)
AFT SKIRT
(90.5" LONG)
STA.
1491.48
STA.
1989.60
STA.
1840.14
STA.
1930.64
TPS CORK (AFT SKIRT)
THICKNESS VARIES
FROM .125 TO .625
146.26" DIA.
208.2" DIA.
TWO THRUST VECTOR
CONTROL SYSTEMS
INTEGRATED ELECTRONIC
ASSEMBLY (IEA)
THREE AFT
ATTACH
STRUTS
X_B 1511.00
X_T 2058.00
KICKRING, TPS CORK
AND GLASS PHENOLIC
THICKNESS VARIES
FROM .125 TO .3125
AFT SEPARATION
MOTOR MODULE
FOUR BOOSTER
HOLDDOWN
POSTS
ATTACH
RING
TWO CASE
STIFFENER RINGS
TWO GIMBAL ACTUATORS
NOZZLE
EXTENSION

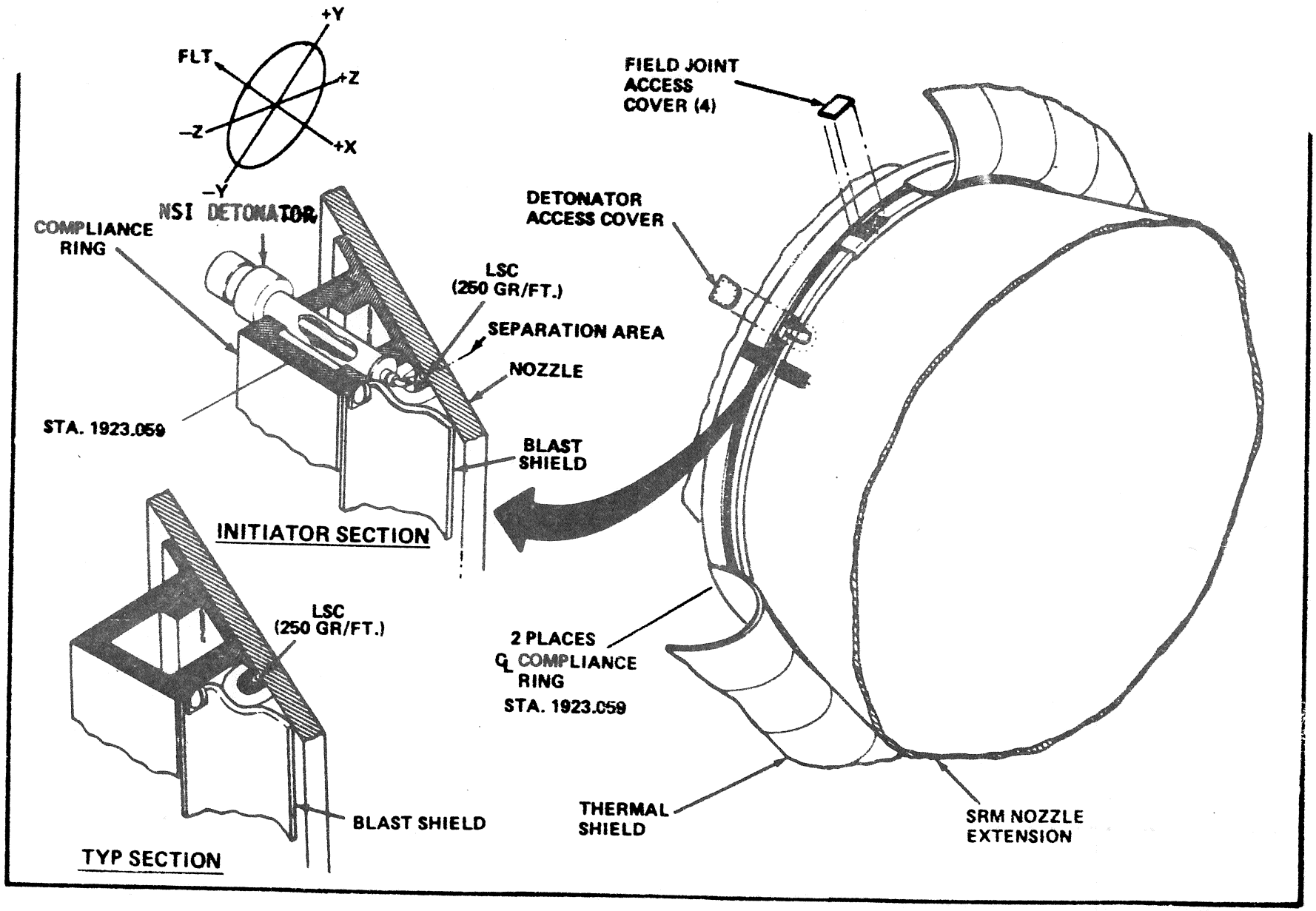
SRB
AFT SKIRT ASSEMBLY




SRM NOZZLE
THROAT
INLET
FLEX BEARING
COMPLIANCE RING
LSC SEPARATION RING
EXIT CONE


SRM NOZZLE
THROAT
INLET
FLEX BEARING
COMPLIANCE RING
LSC SEPARATION RING
EXIT CONE

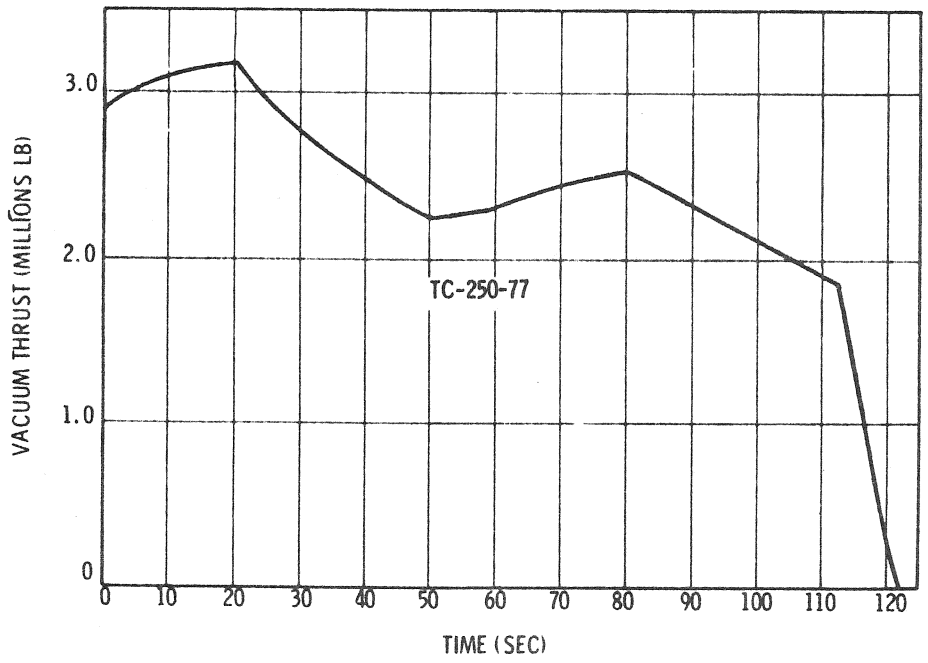
SRB
SRM NOZZLE LINEAR SHAPED CHARGE CUTOFF DEVICE



SRM WEIGHTS (POUNDS)

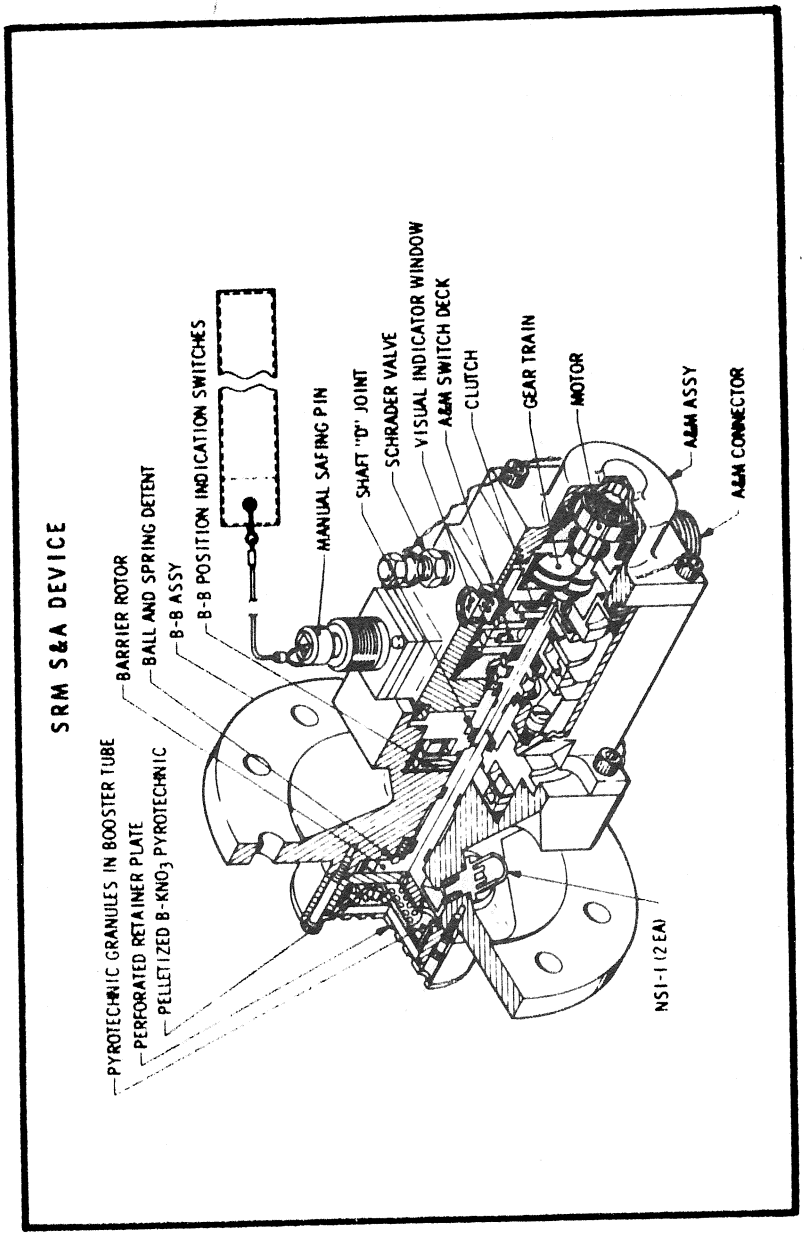
COMPONENT	INERT	PROPELLANT	COMPONENT TOTAL
FORWARD SEGMENT	32, 492	299, 936	332, 428
CENTER SEGMENTS (2)	49, 776	545, 394	595, 170
AFT SEGMENT	56, 992	264, 070	321, 062
NOZZLE EXIT CONE	5, 352		5, 352
ASSEMBLY ITEMS AND ATTACHMENTS	1, 319		1, 319
SRM TOTAL	145, 931	1, 109, 400	1, 255, 331

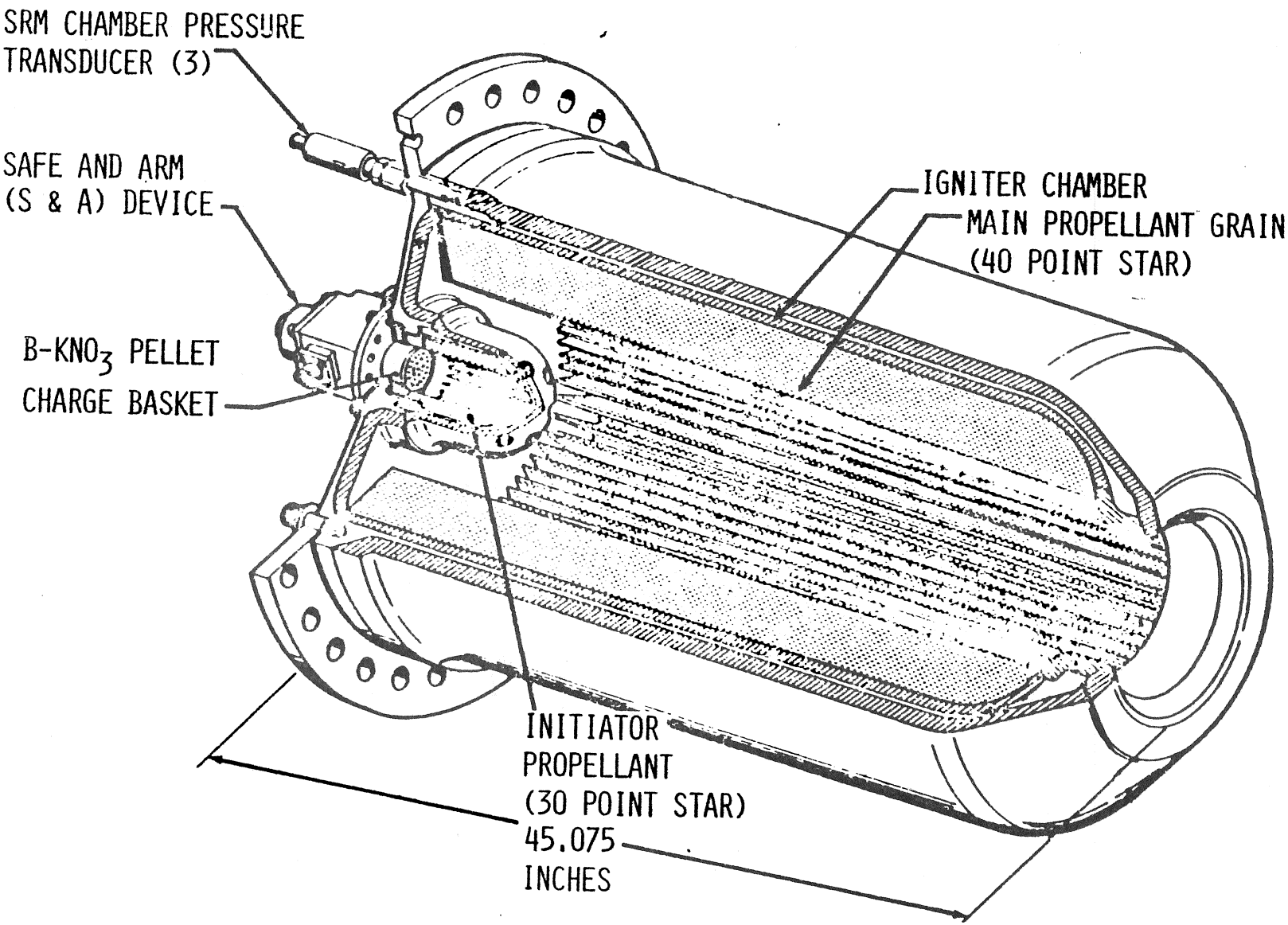
SRM VACUUM THRUST VS TIME



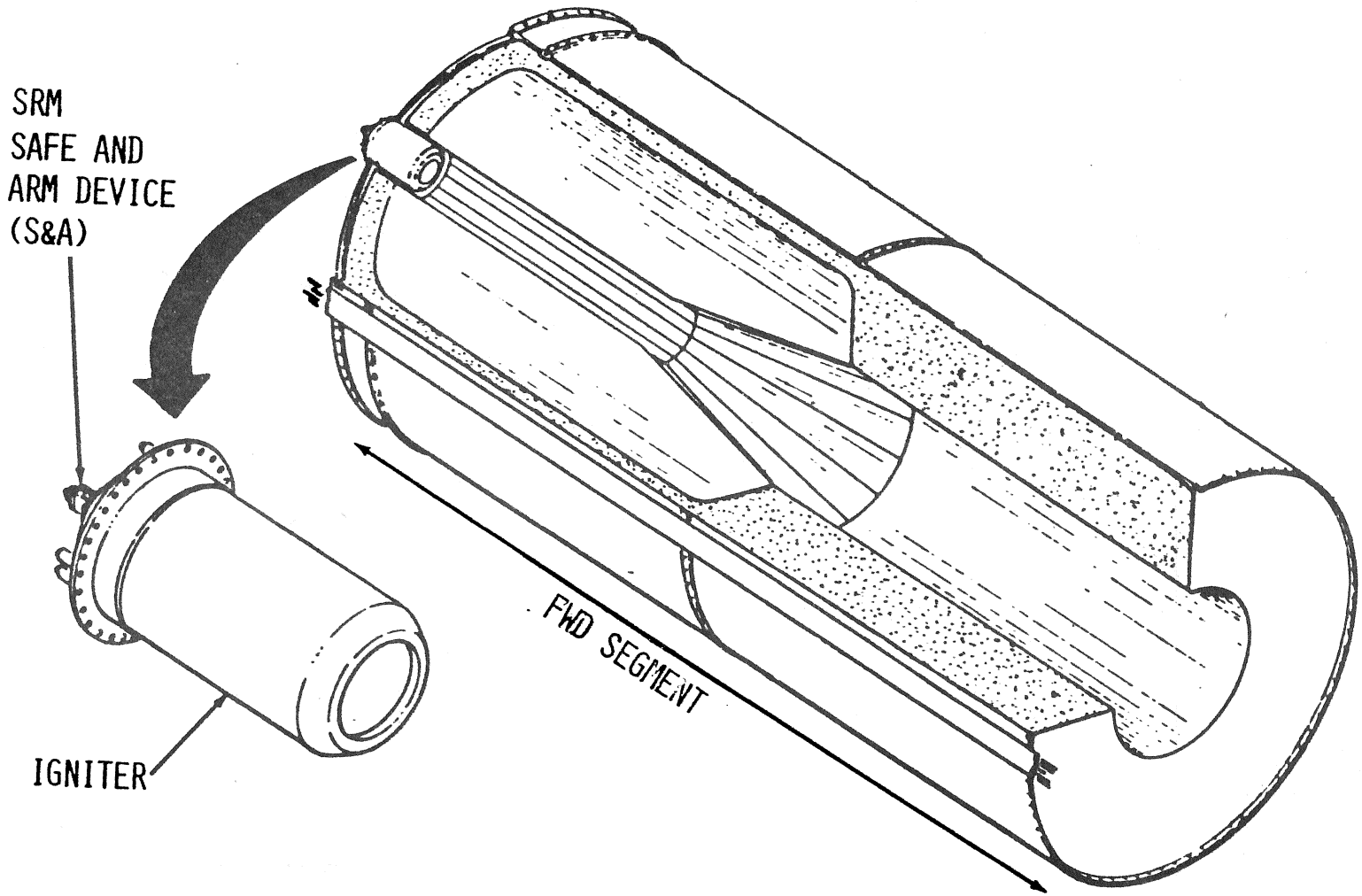
PROPELLANT FORMULATION

INGREDIENT	PERCENT BY WEIGHT
AMMONIUM PERCHLORATE (OXIDIZER)	69.81
ALUMINUM (FUEL)	16.00
IRON OXIDE (BURNING RATE ACCELERATOR)	0.19
PBAN POLYMER (BINDER AND FUEL)	12.00
EPOXY CURING AGENT (ECA)	2.00


SRM S&A DEVICE
PYROTECHNIC GRANULES IN BOOSTER TUBE
PERFORATED RETAINER PLATE
PELLETIZED B-KNO3 PYROTECHNIC
BARRIER ROTOR
BALL AND SPRING DETENT
B-B ASSY
B-B POSITION INDICATION SWITCHES
MANUAL SAFING PIN
SHAFT "O" JOINT
SCHRADER VALVE
VISUAL INDICATOR WINDOW
A&M SWITCH DECK
CLUTCH
GEAR TRAIN
MOTOR
A&M ASSY
A&M CONNECTOR
NSI-1 (2 EA)

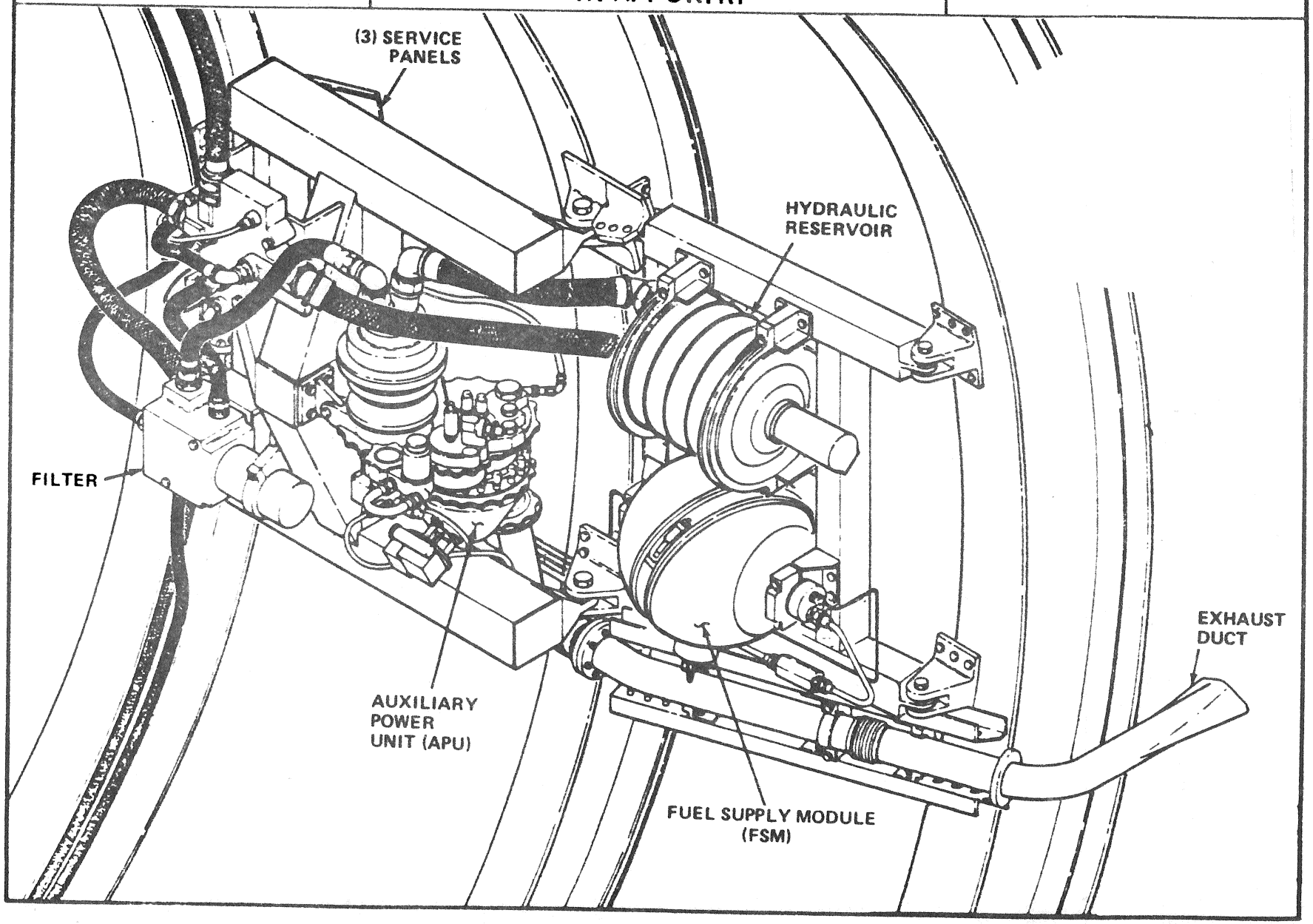

SRM CHAMBER PRESSURE TRANSDUCER (3)
SAFE AND ARM (S & A) DEVICE
B-KNO3 PELLET CHARGE BASKET
IGNITER CHAMBER
MAIN PROPELLANT GRAIN (40 POINT STAR)
INITIATOR PROPELLANT (30 POINT STAR)
45.075 INCHES

SRM Igniter

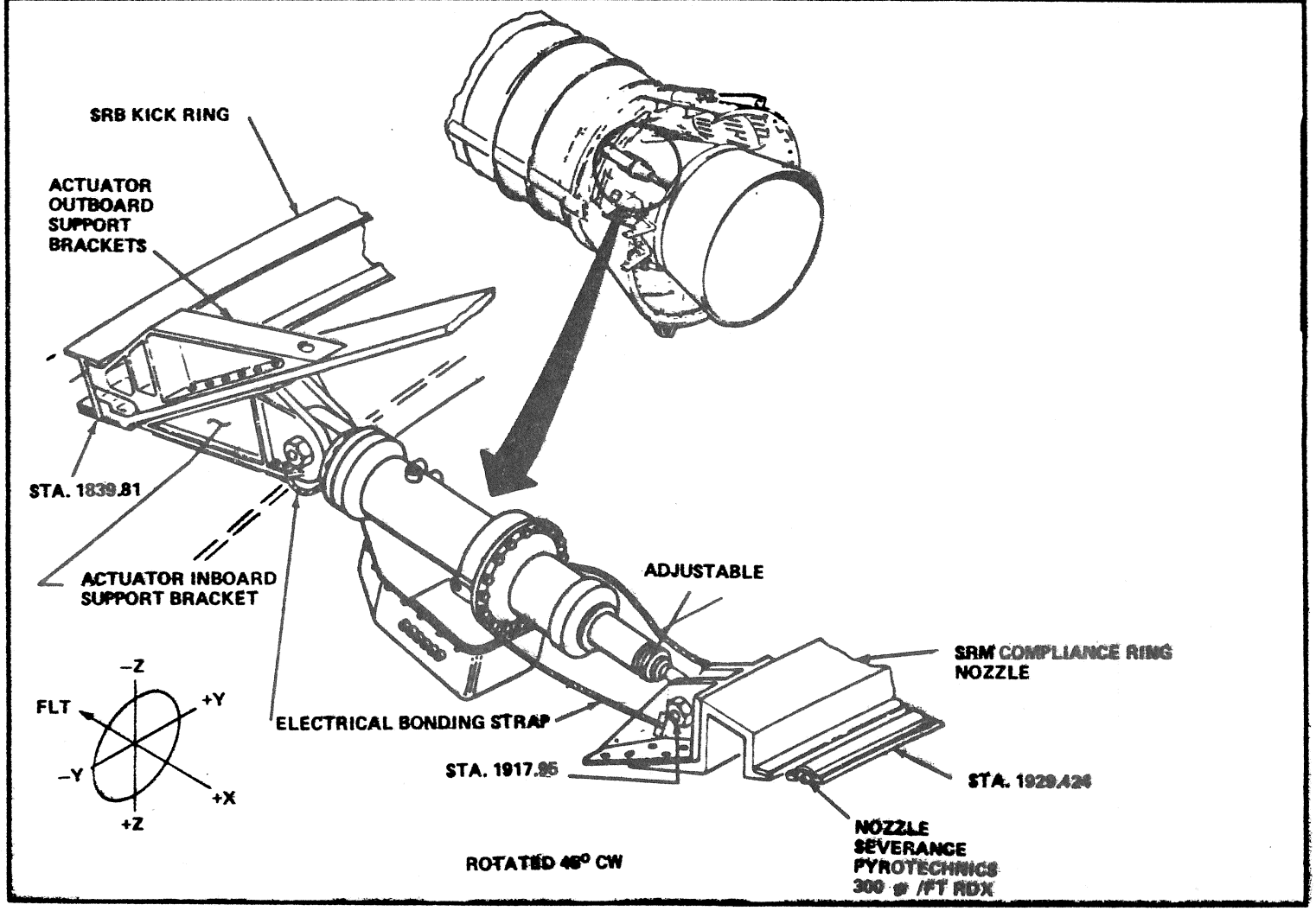


SRM Igniter location.

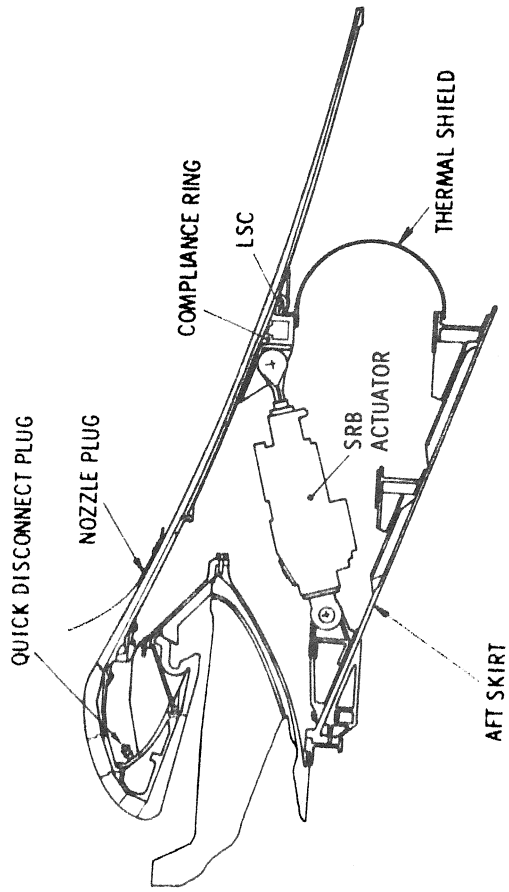
SRB
THRUST VECTOR CONTROL SYSTEM (TVC)
IN AFT SKIRT



SRB
GIMBAL ACTUATOR



NOZZLE ACTUATOR CONFIGURATION

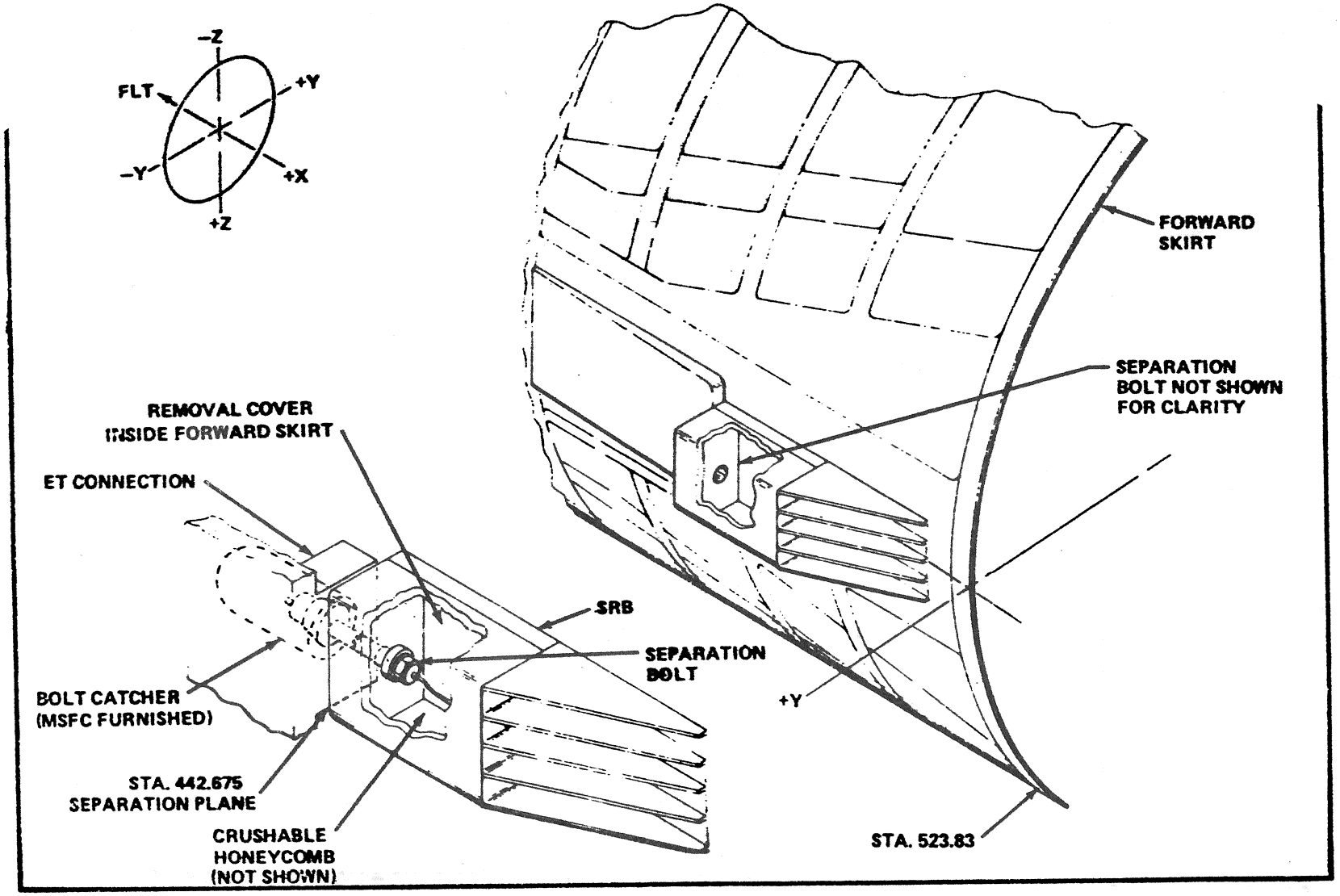


SRB HPU SUBSYSTEM

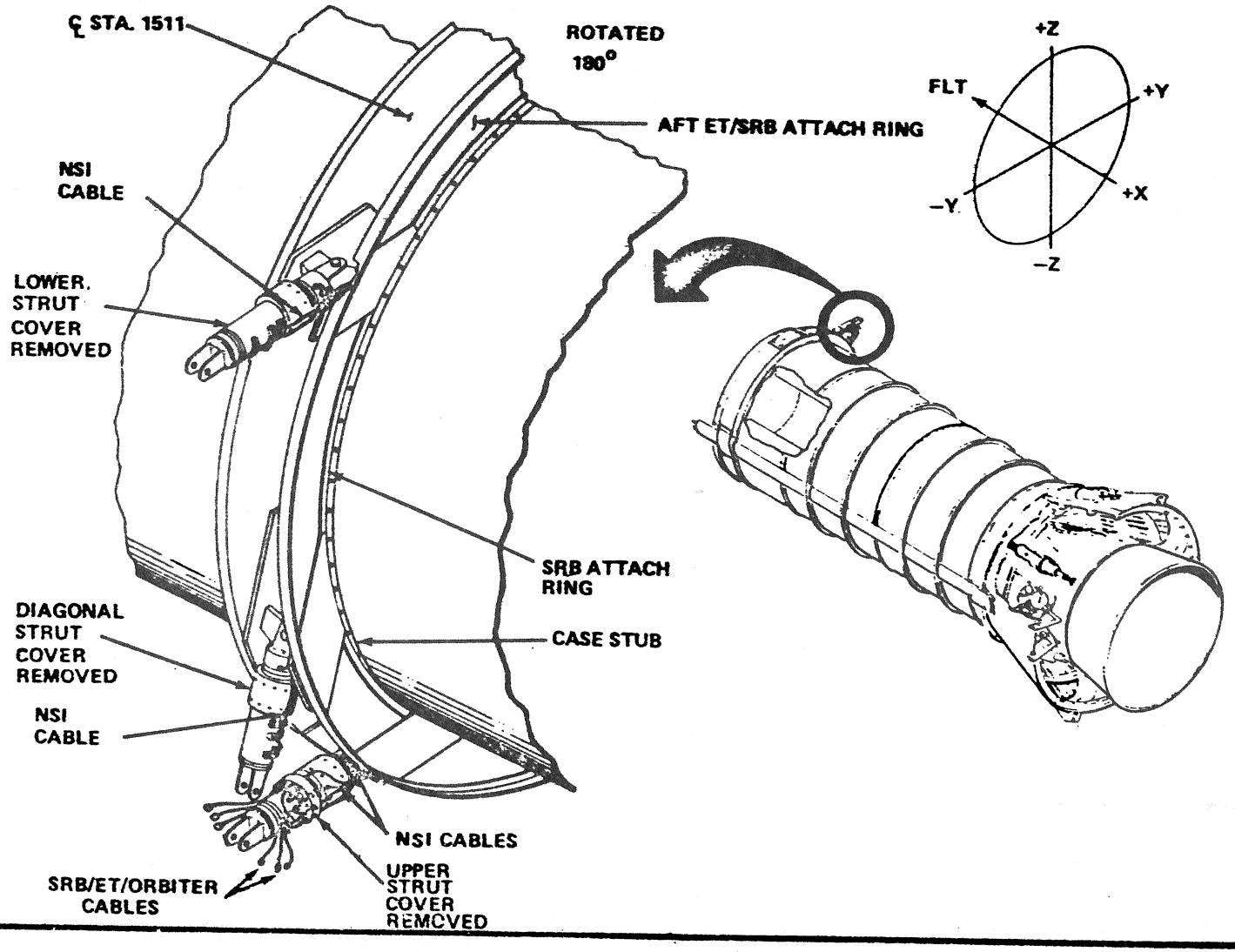
REFURBISHMENT REQUIREMENTS

- THE OPERATIONAL PHASE DESIGN GOAL OF THE HPU SUBSYSTEM IS TO HAVE HARDWARE WHICH DOES NOT HAVE TO BE REMOVED FROM THE SRB AFTER EACH FLIGHT FOR REFURBISHMENT. DURING THE DDT&E PHASE, THE SYSTEM WILL BE REMOVED FOR REFURBISHMENT AND EVALUATION.
  - DRAIN, FLUSH & PURGE N_2H_4 SYSTEM.
  - FLUSH & PURGE TURBINE & EXHAUST SYSTEM.
  - CLEAN, DRY AND VISUALLY INSPECT.
  - REMOVE, CLEAN AND DRY THE GAS GENERATOR.
  - SAMPLE HYDRAULIC OIL.
  - SAMPLE LUBE OIL.
  - PERFORM LEAKAGE TESTS.
  - PERFORM ACCEPTANCE TEST.
  - EVALUATE PERFORMANCE

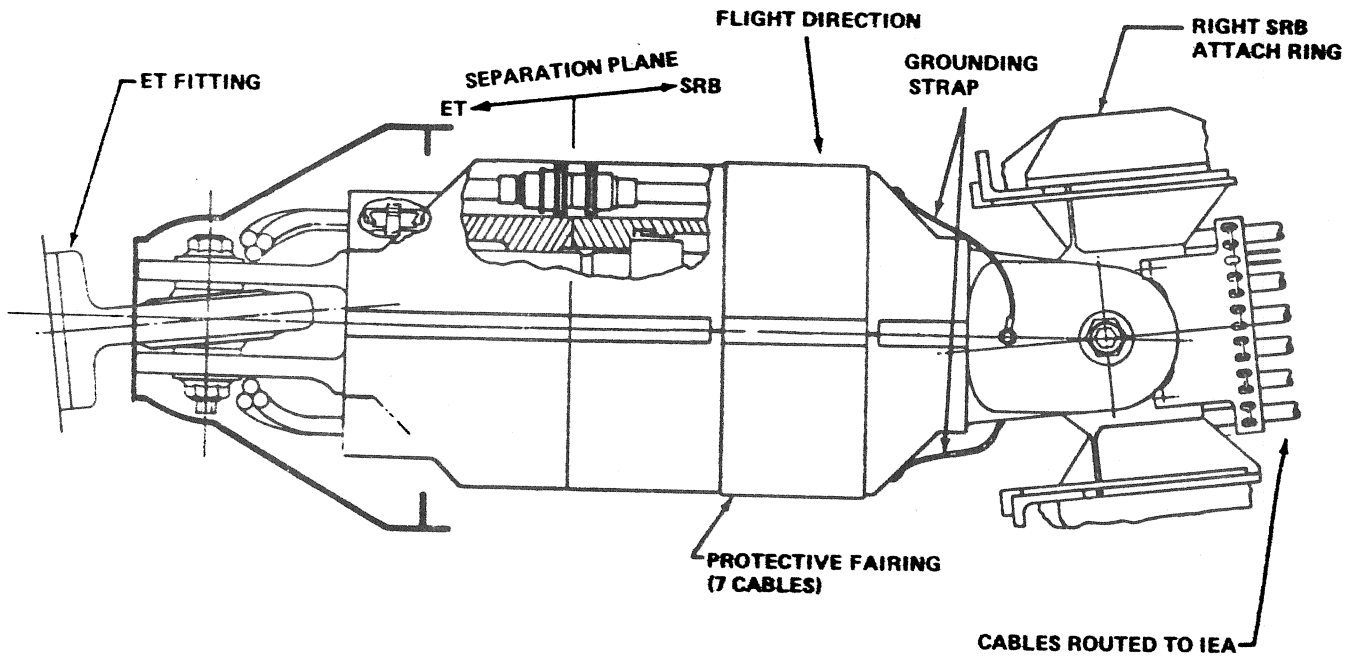
SRB
ET FORWARD ATTACH FITTING

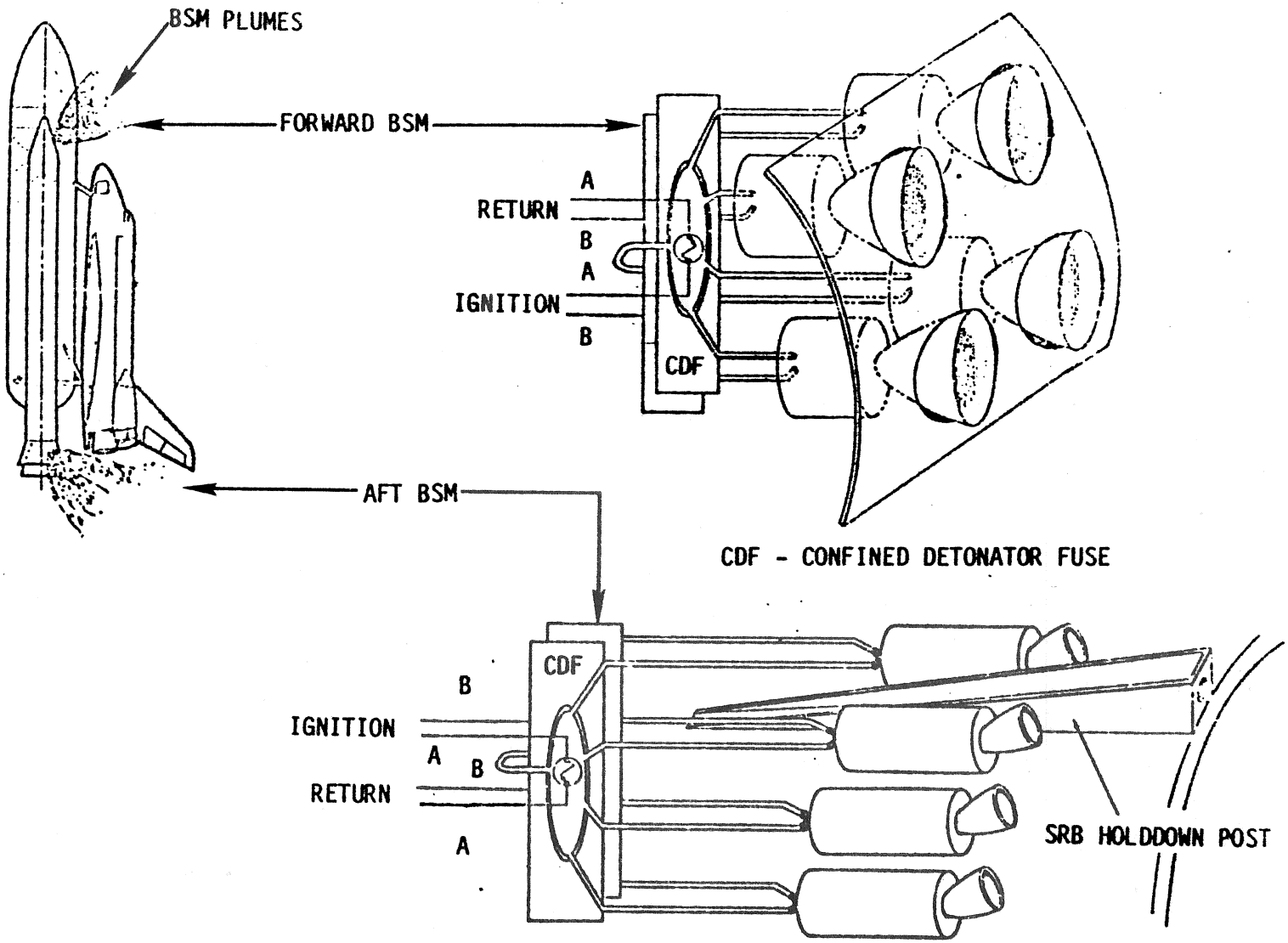


SRB
ET AFT ATTACH STRUTS



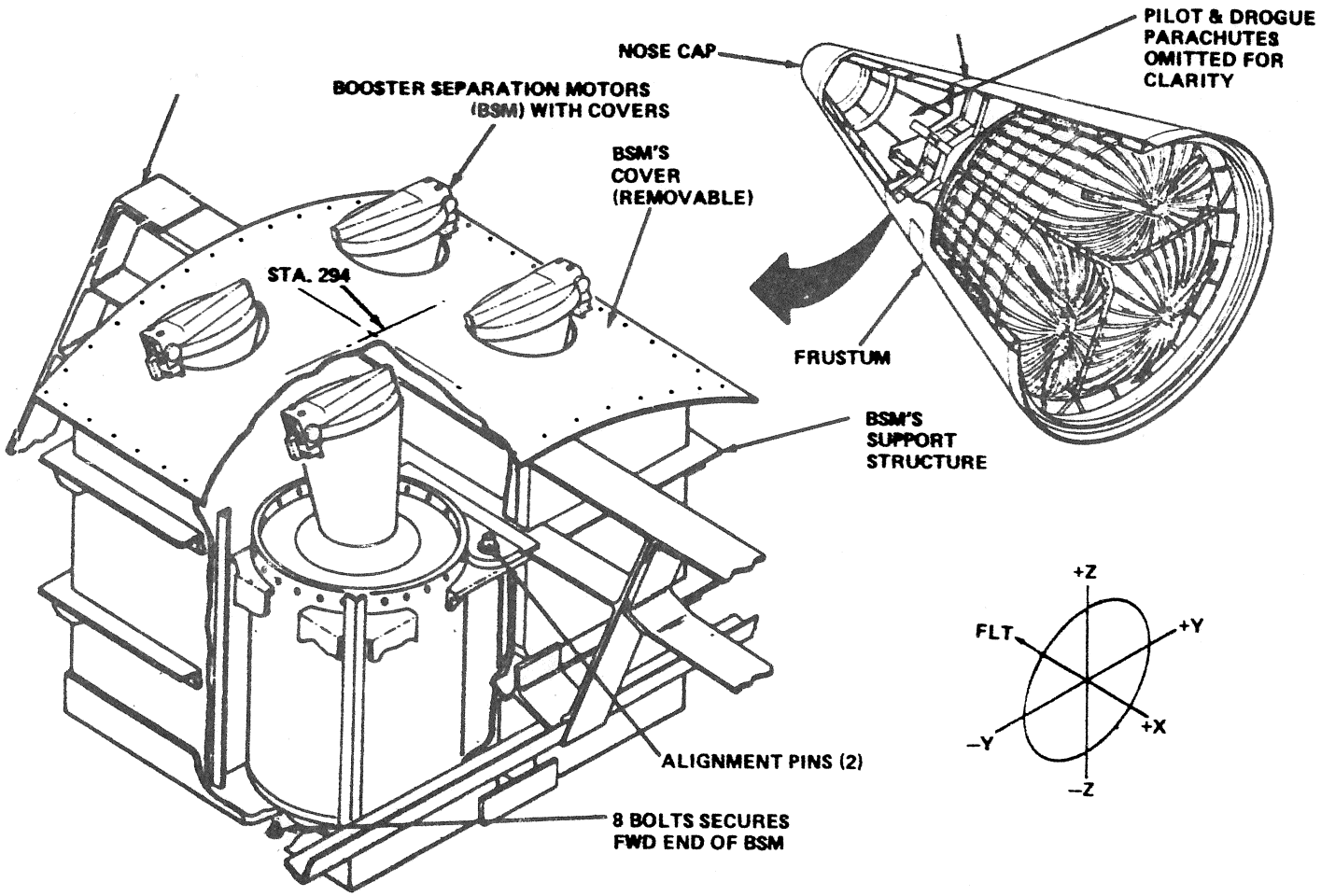
SRB/ET
UPPER STRUT ASSEMBLY
(RIGHT HAND)



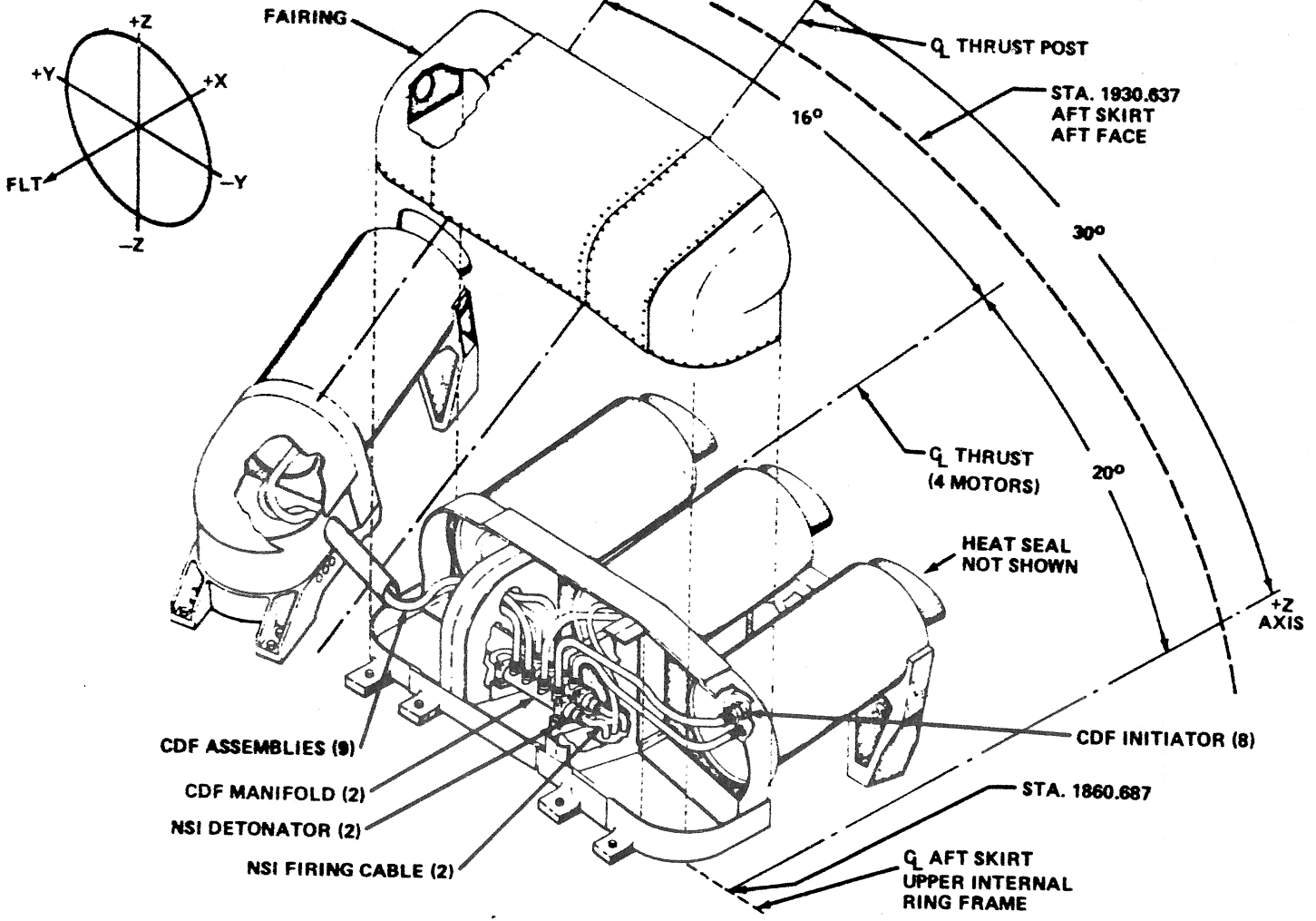


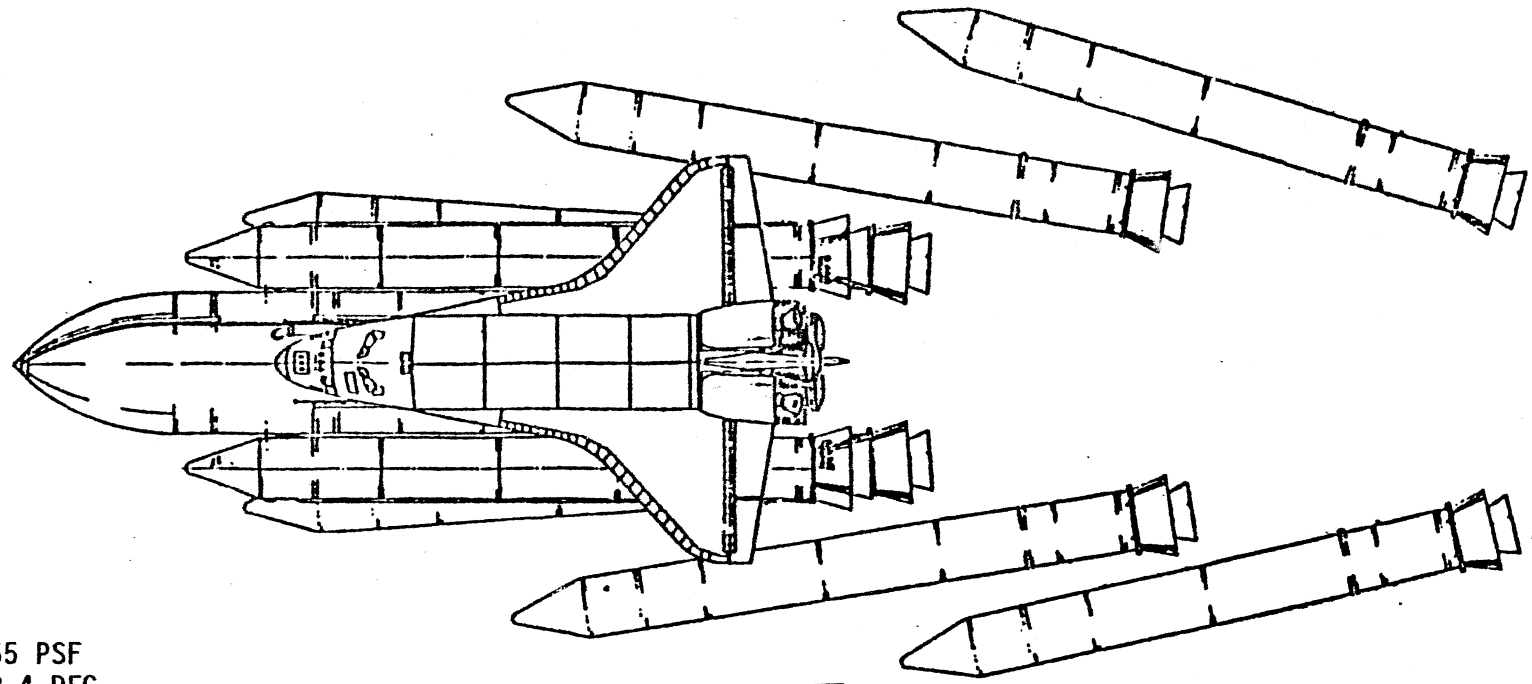
SRB Booster Separation Motors configuration.

SRB
FORWARD BOOSTER
SEPARATION MOTORS

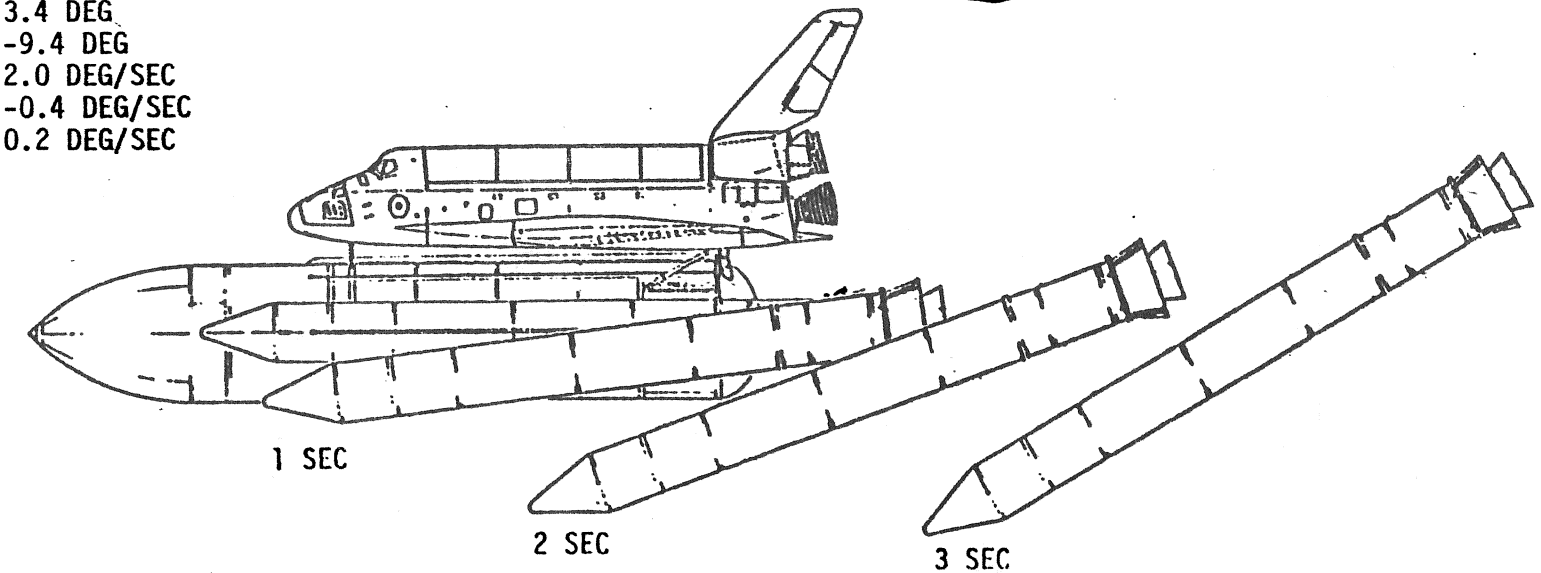


SRB
AFT BOOSTER SEPARATION MOTORS (BSM)





$\bar{q}$ = 65 PSF
α = 3.4 DEG
β = -9.4 DEG
p = 2.0 DEG/SEC
q = -0.4 DEG/SEC
r = 0.2 DEG/SEC



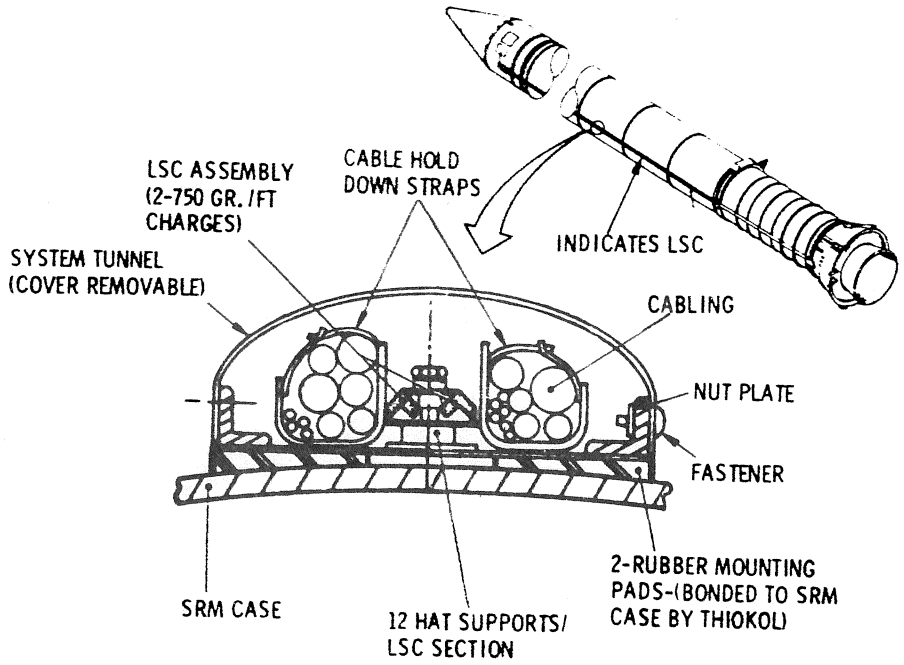
1 SEC

2 SEC

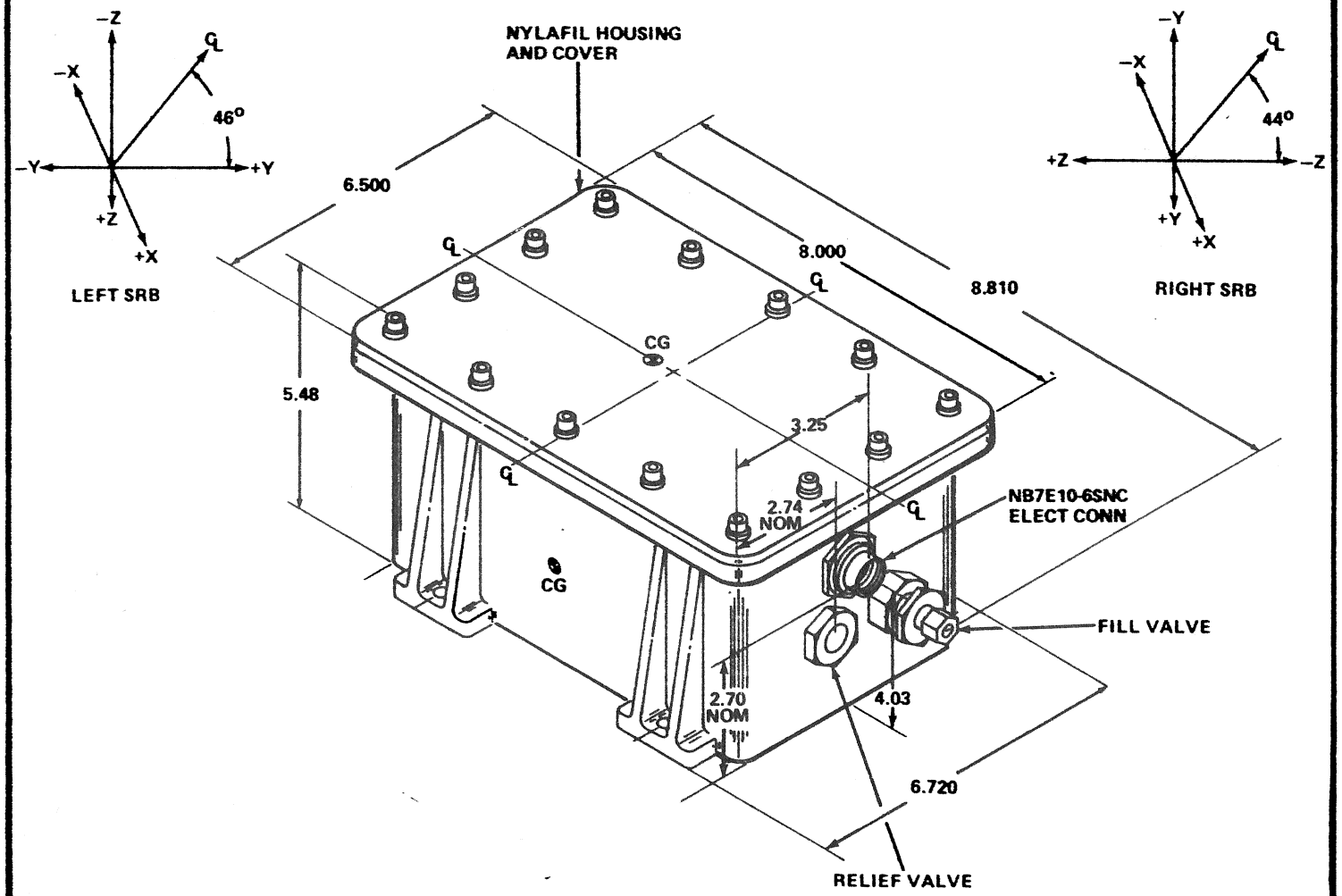
3 SEC

Typical SRB separation conditions.

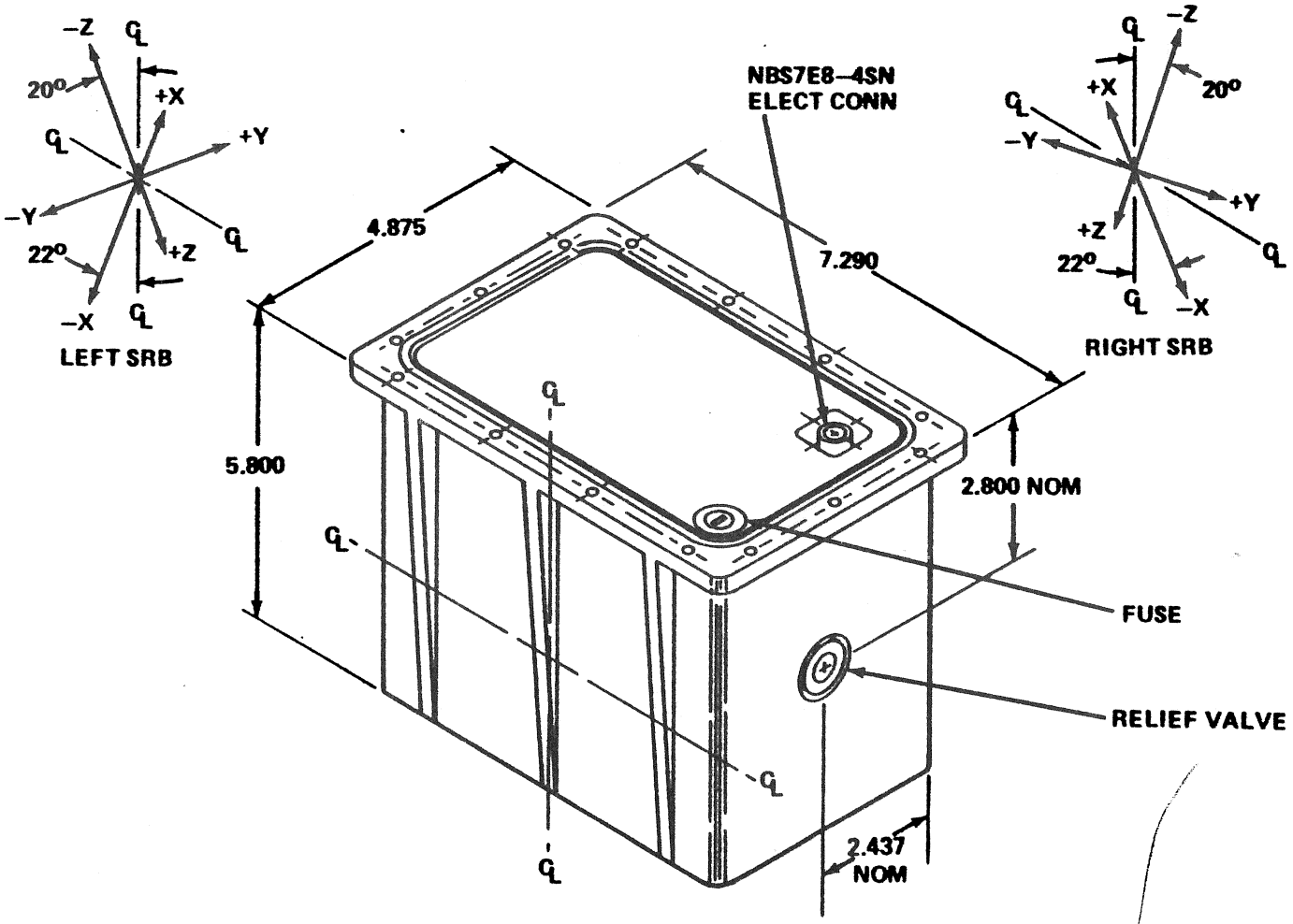
SRB RANGE SAFETY COMMAND DESTRUCT SYSTEM IN SYSTEMS TUNNEL



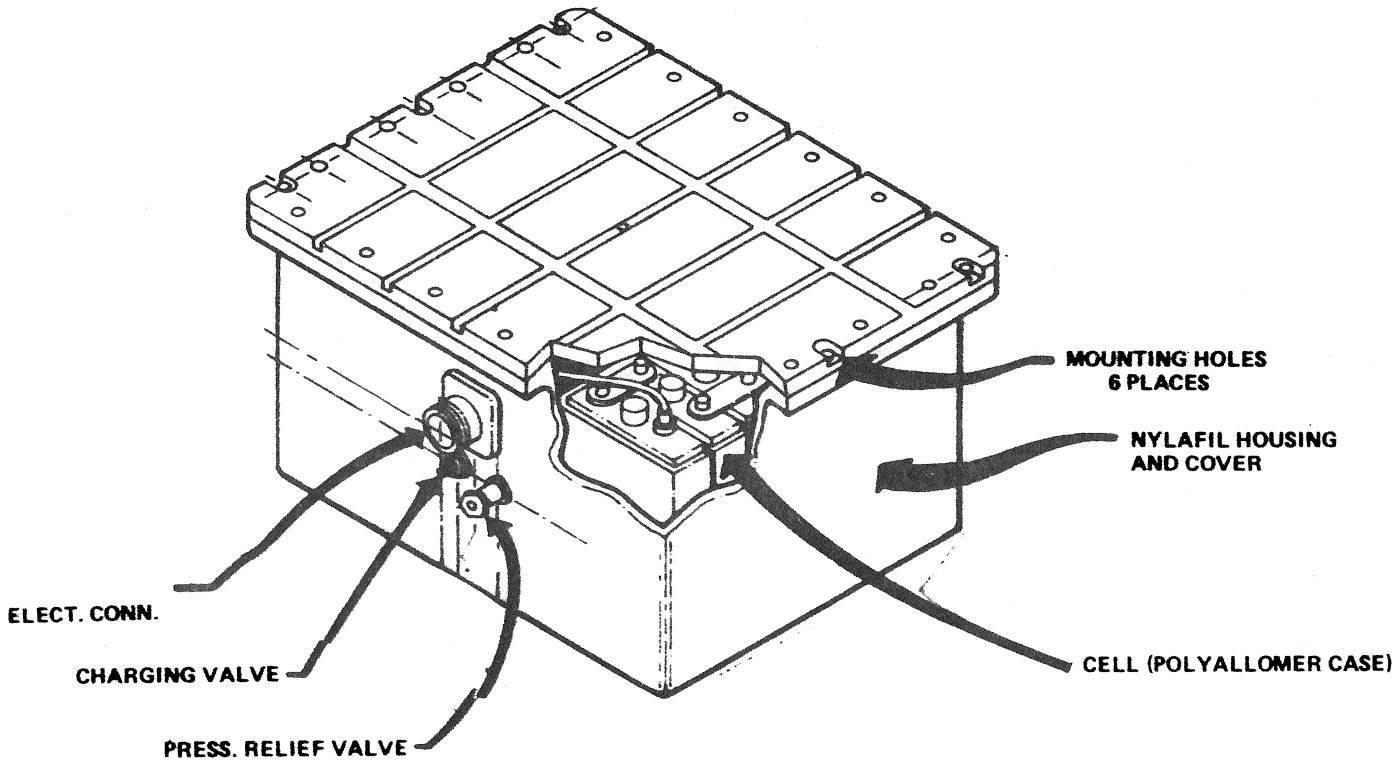
SRB
RANGE SAFETY BATTERY



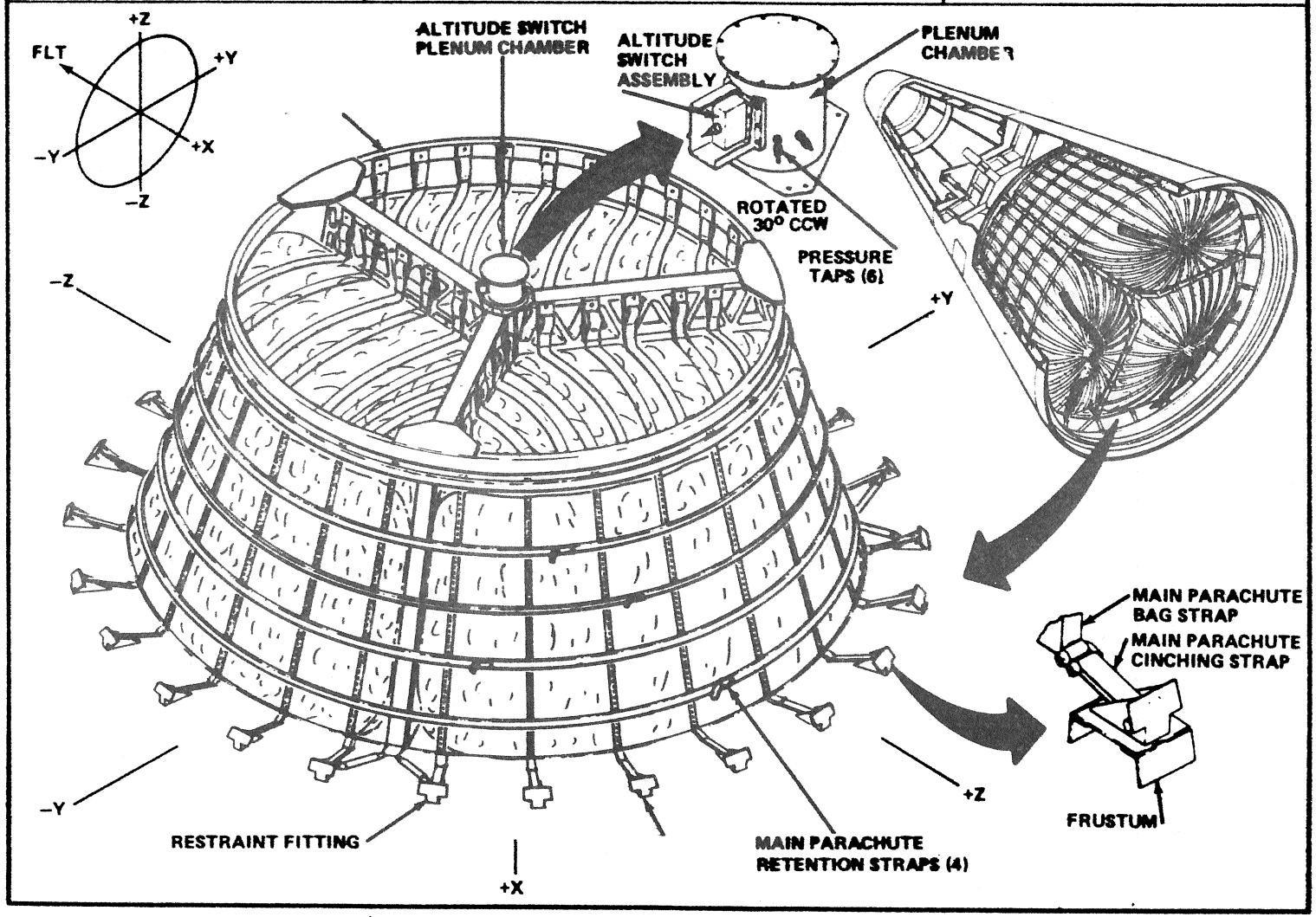
SRB
BATTERY FRUSTUM LOCATION AID



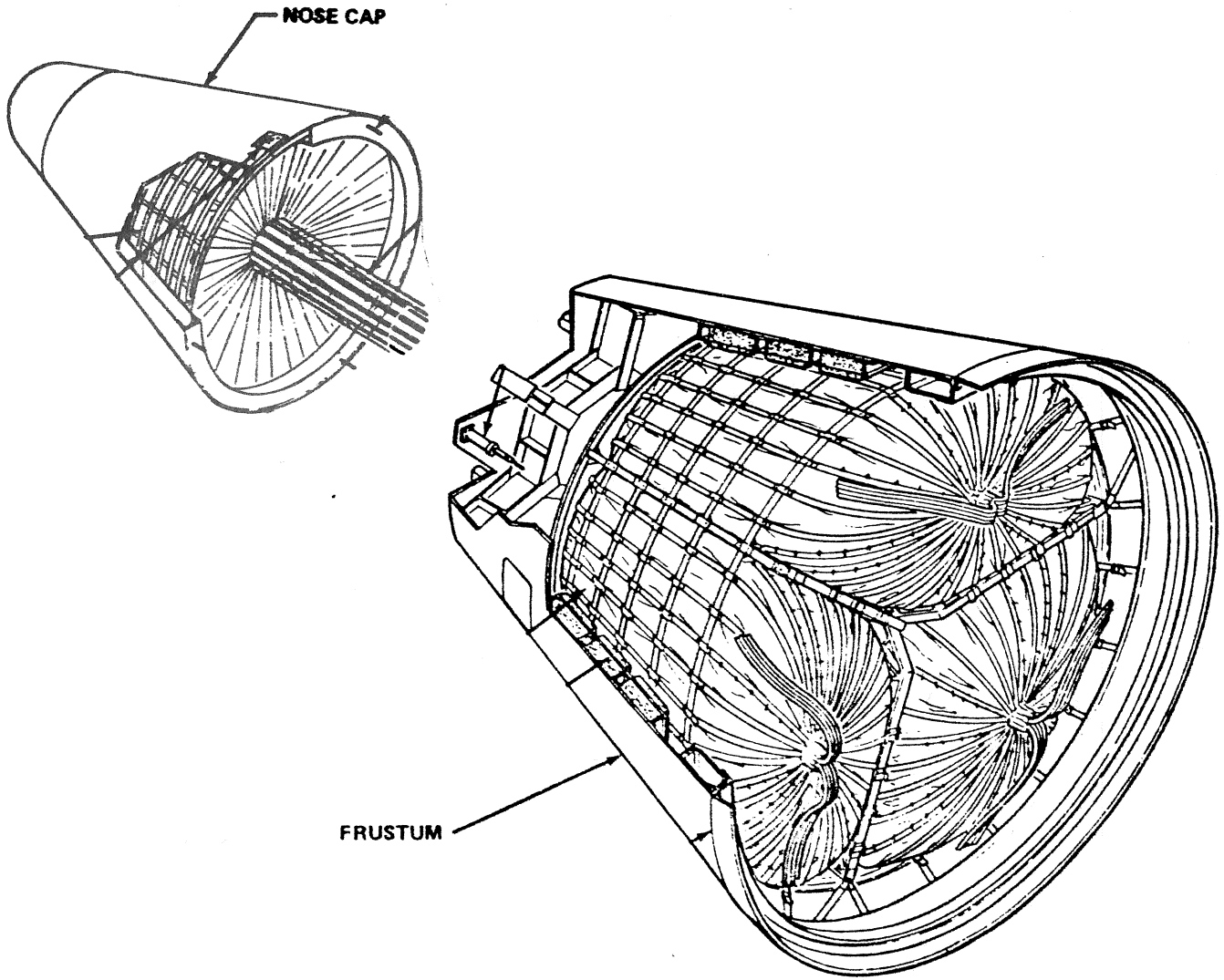
OFI BATTERY


MOUNTING HOLES
6 PLACES
NYLAFIL HOUSING
AND COVER
ELECT. CONN.
CHARGING VALVE
PRESS. RELIEF VALVE
CELL (POLYALLOMER CASE)

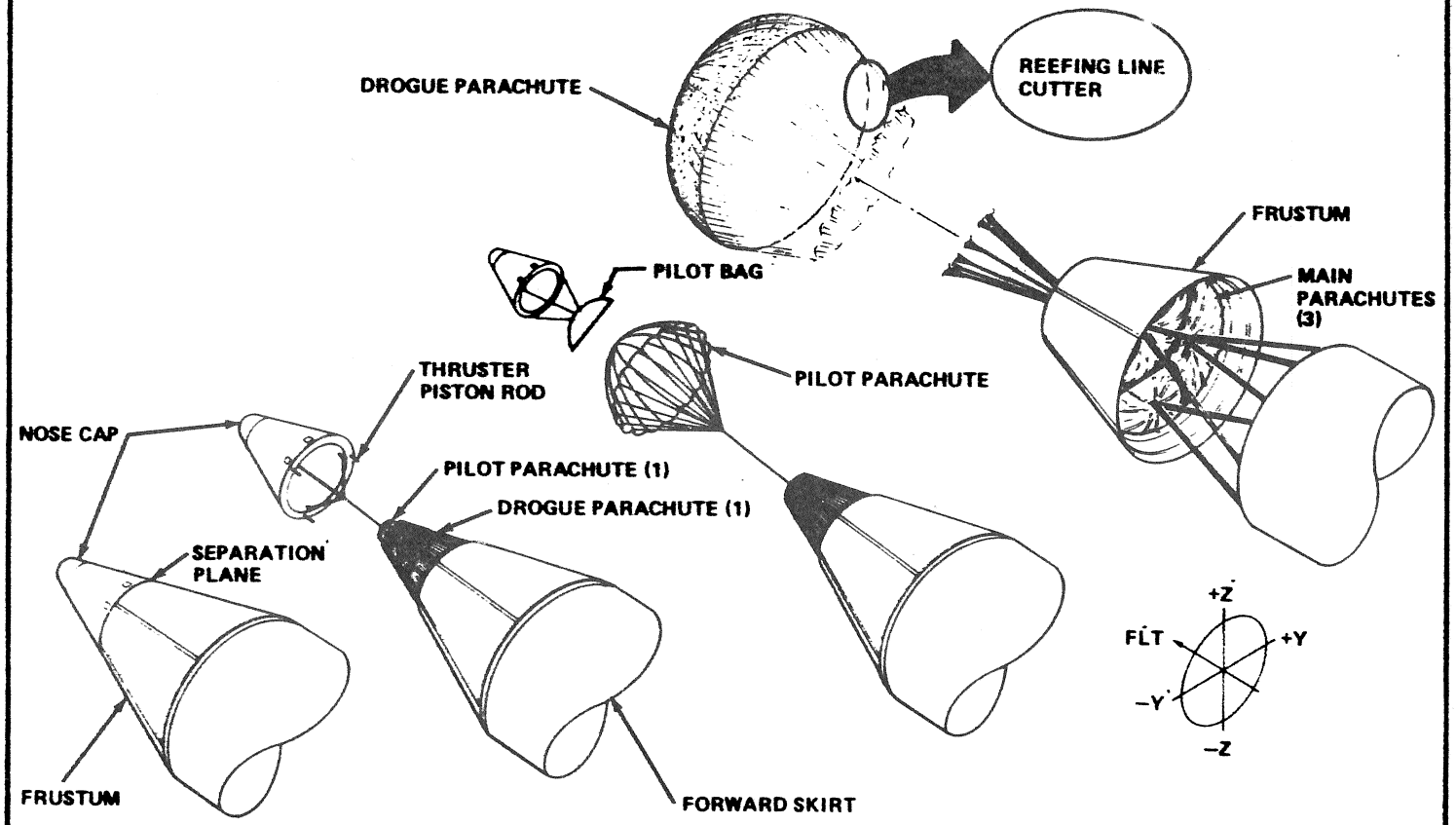
SRB
MAIN PARACHUTE CLUSTER



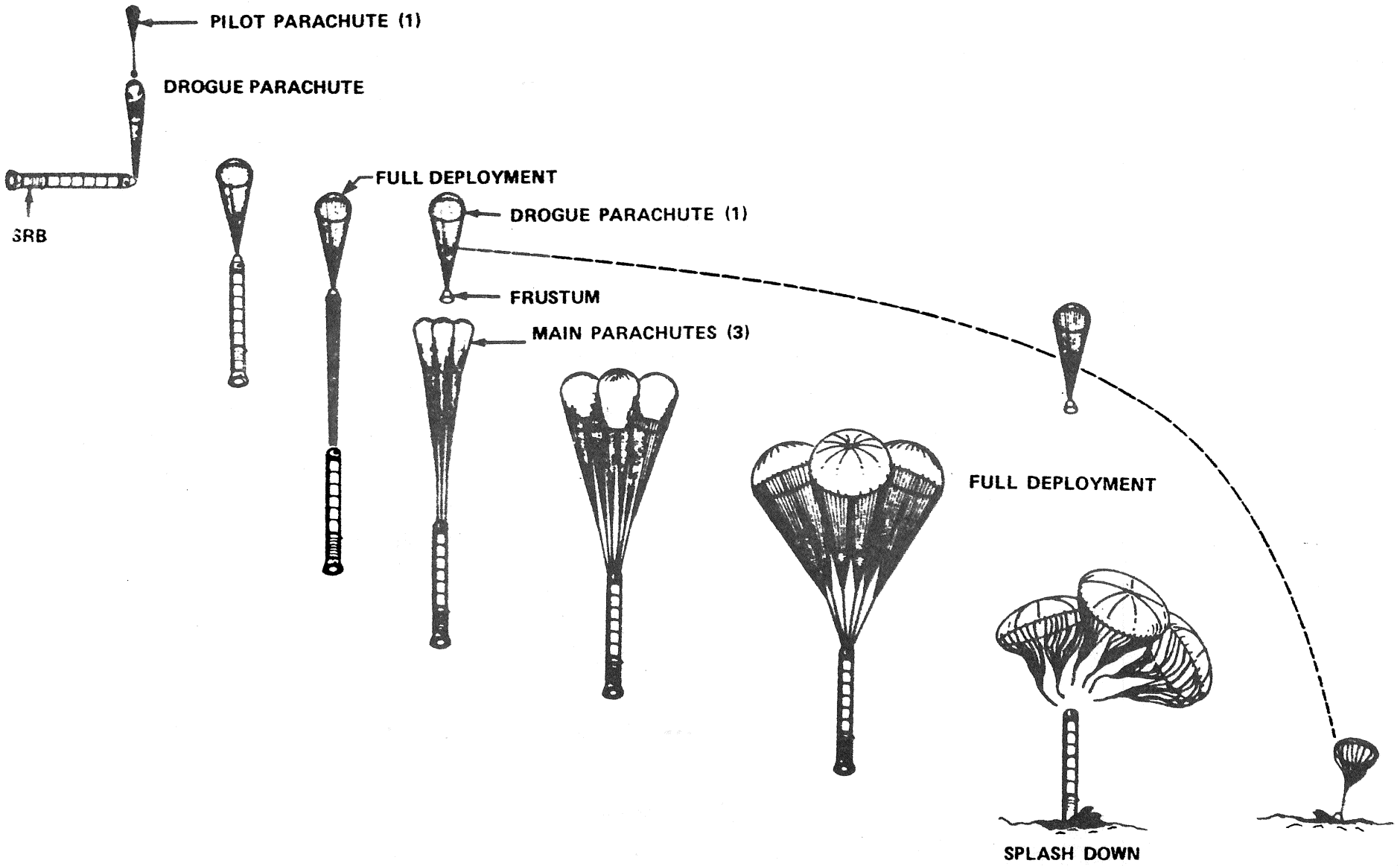
SRB
NOSE CAP & FRUSTUM
WITH PARACHUTES

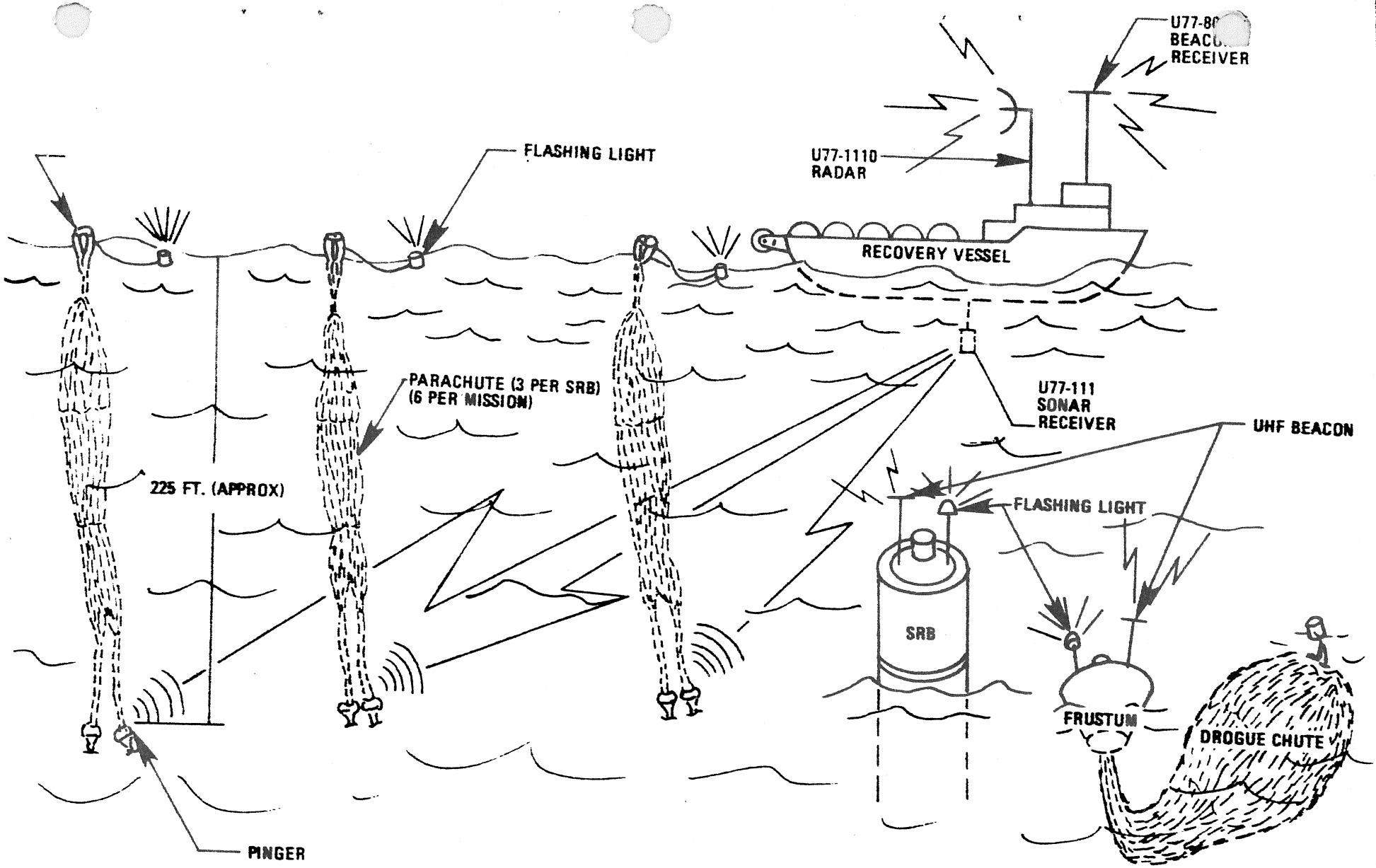


SRB
NOSE CAP SEPARATION &
PILOT PARACHUTE DEPLOYMENT

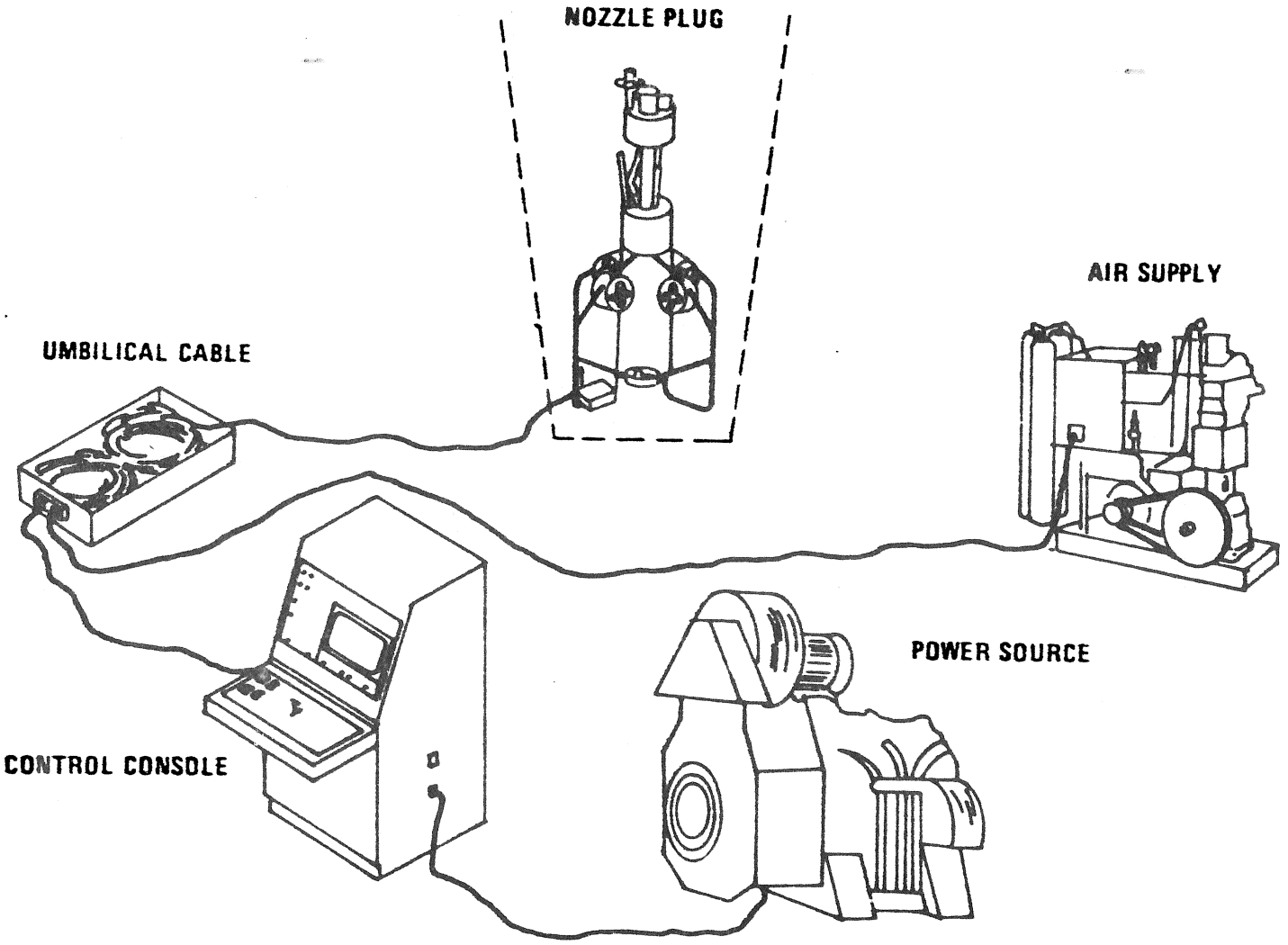


SRB PARACHUTE DEPLOYMENT SEQUENCE

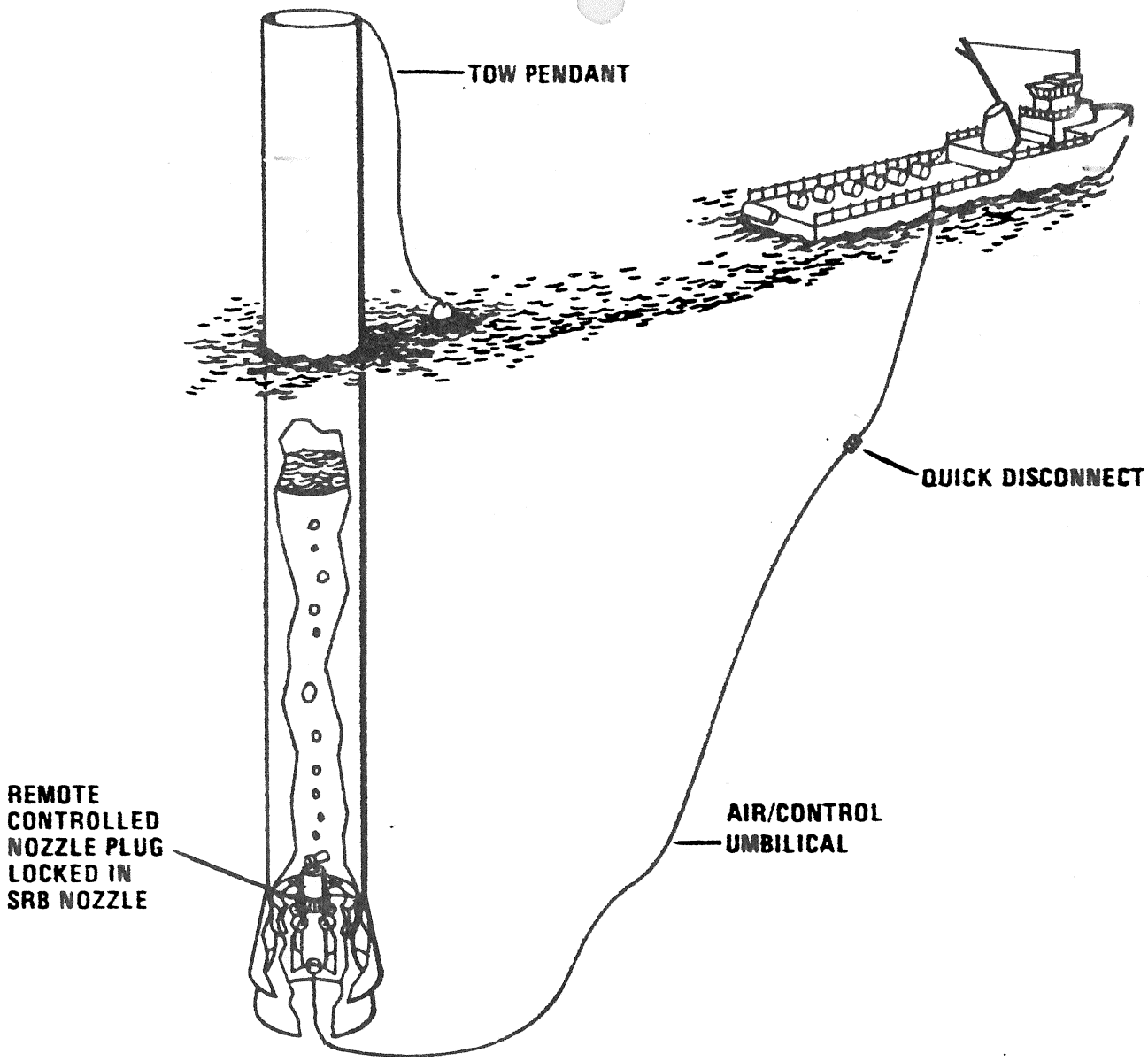




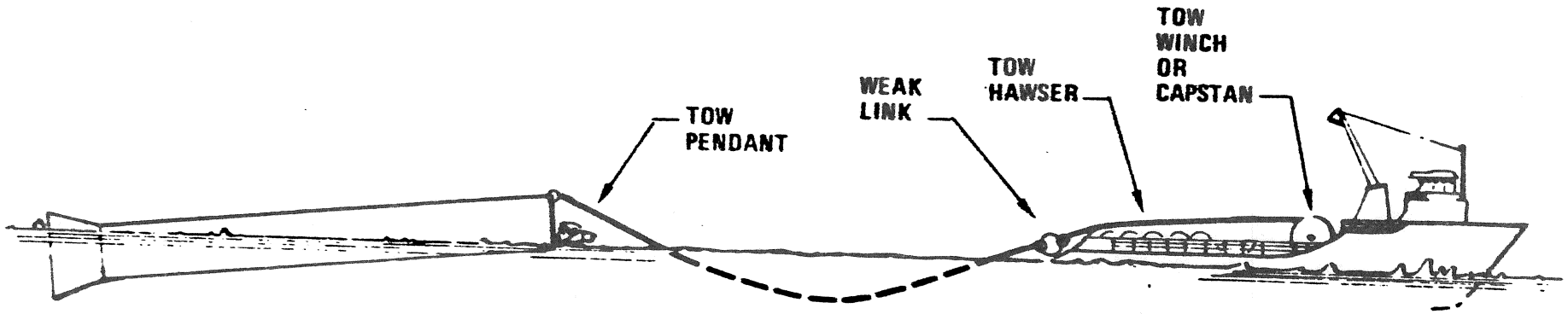
SRB LOCATION AIDS



SRB DEWATERING SYSTEM



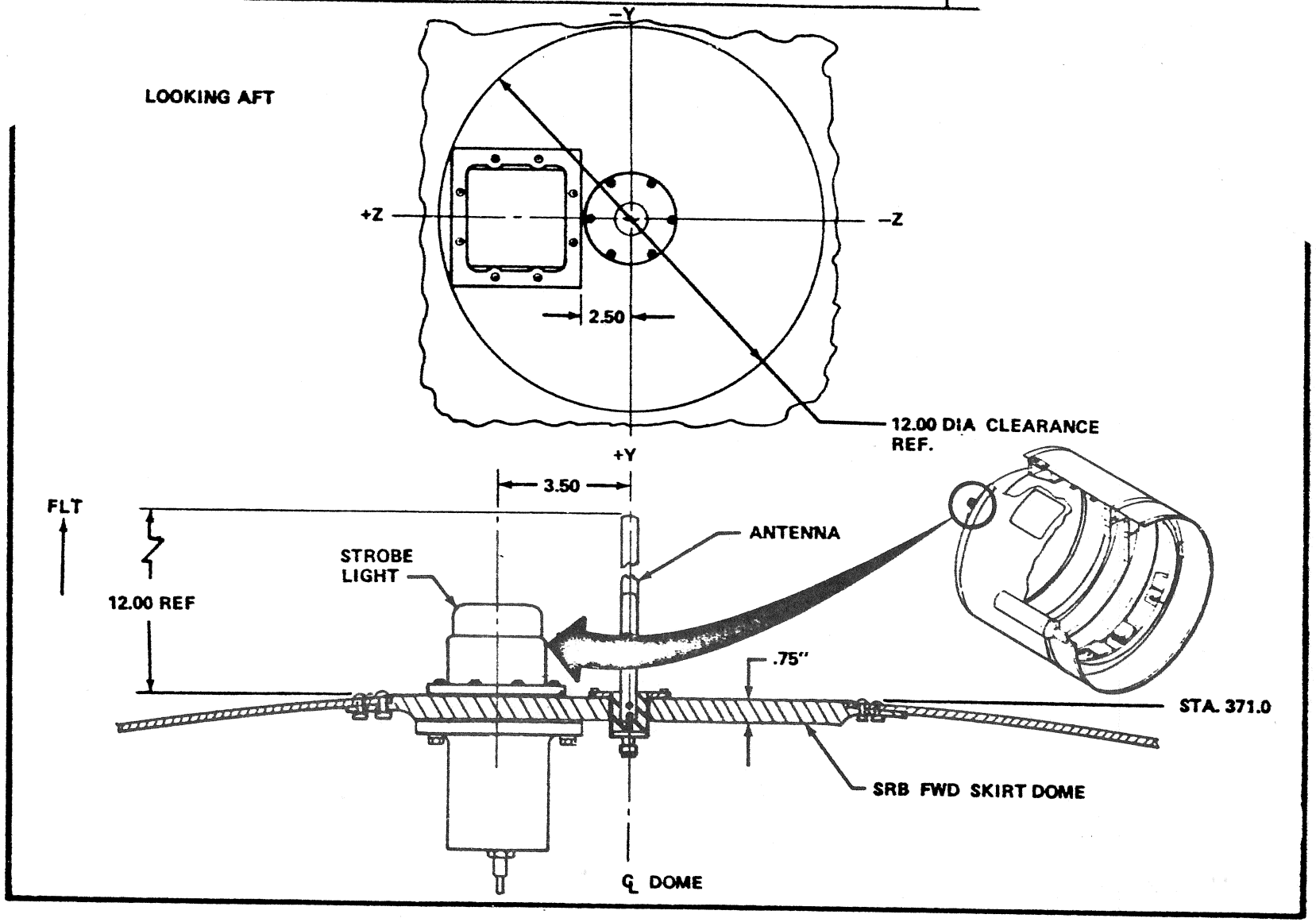
SRB DEWATERING



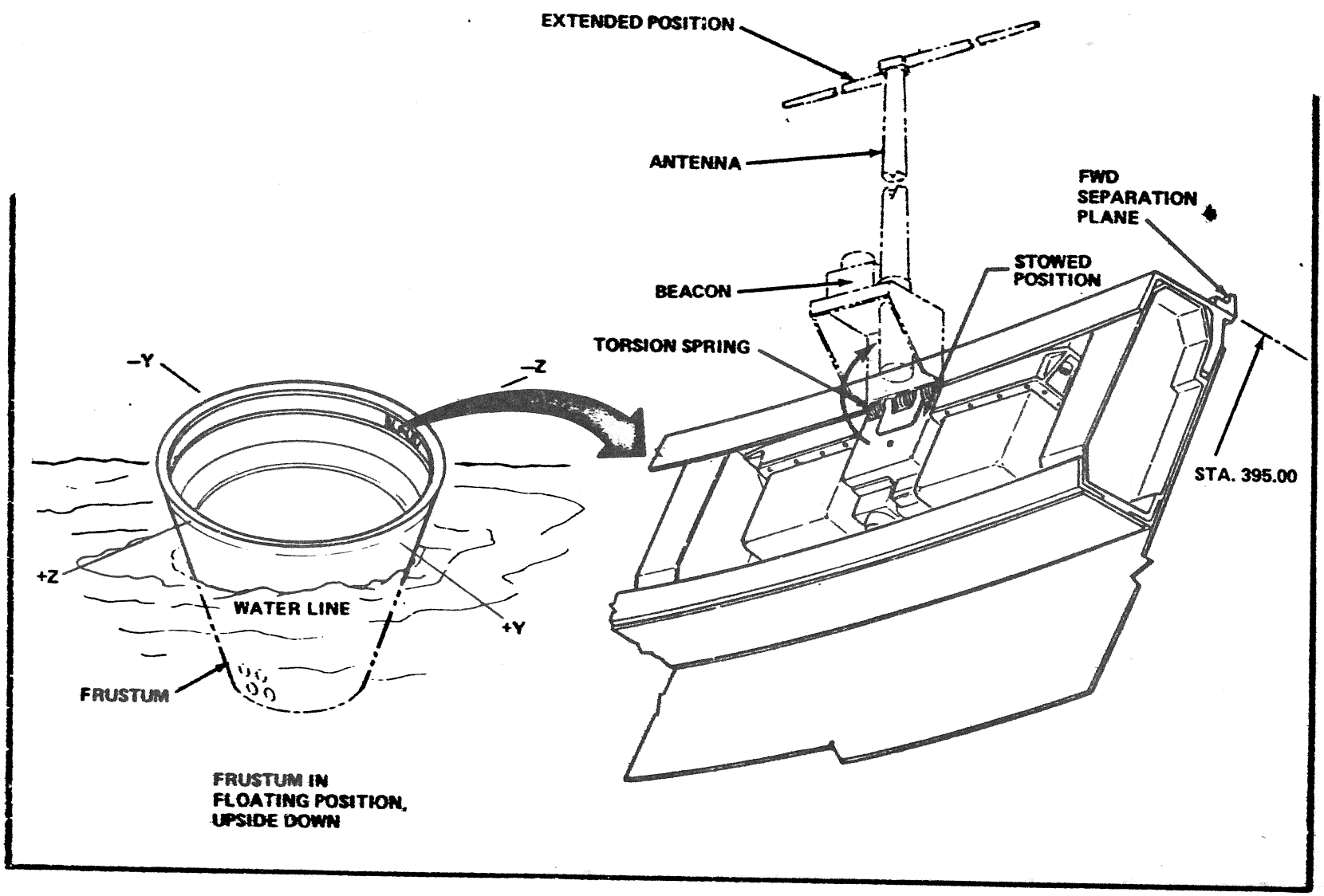
SRB TOWBACK

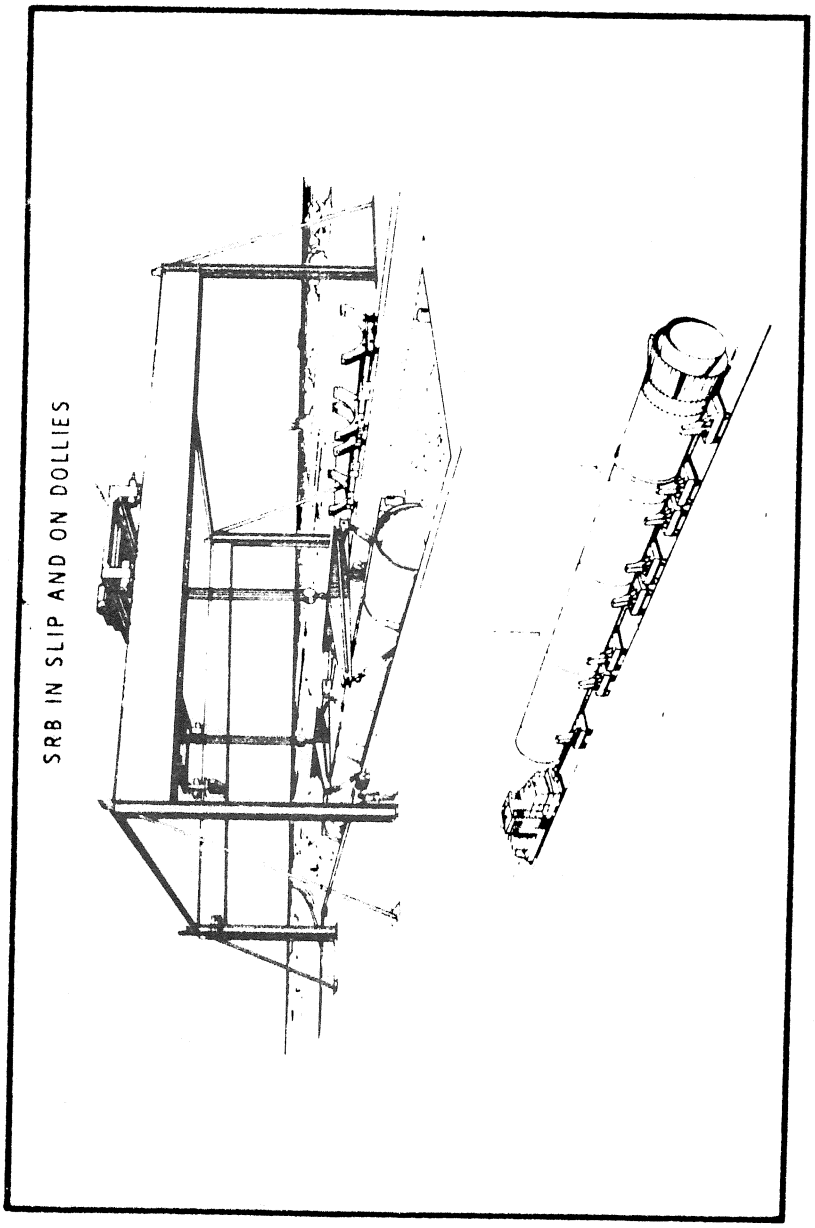
SRB

LOCATION AID ANTENNA AND STROBE LIGHT (LEFT)



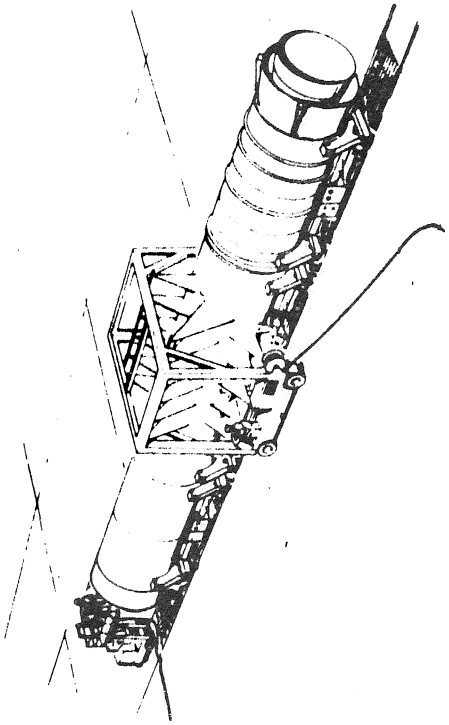
RB
FRUSTUM LOCATION AID

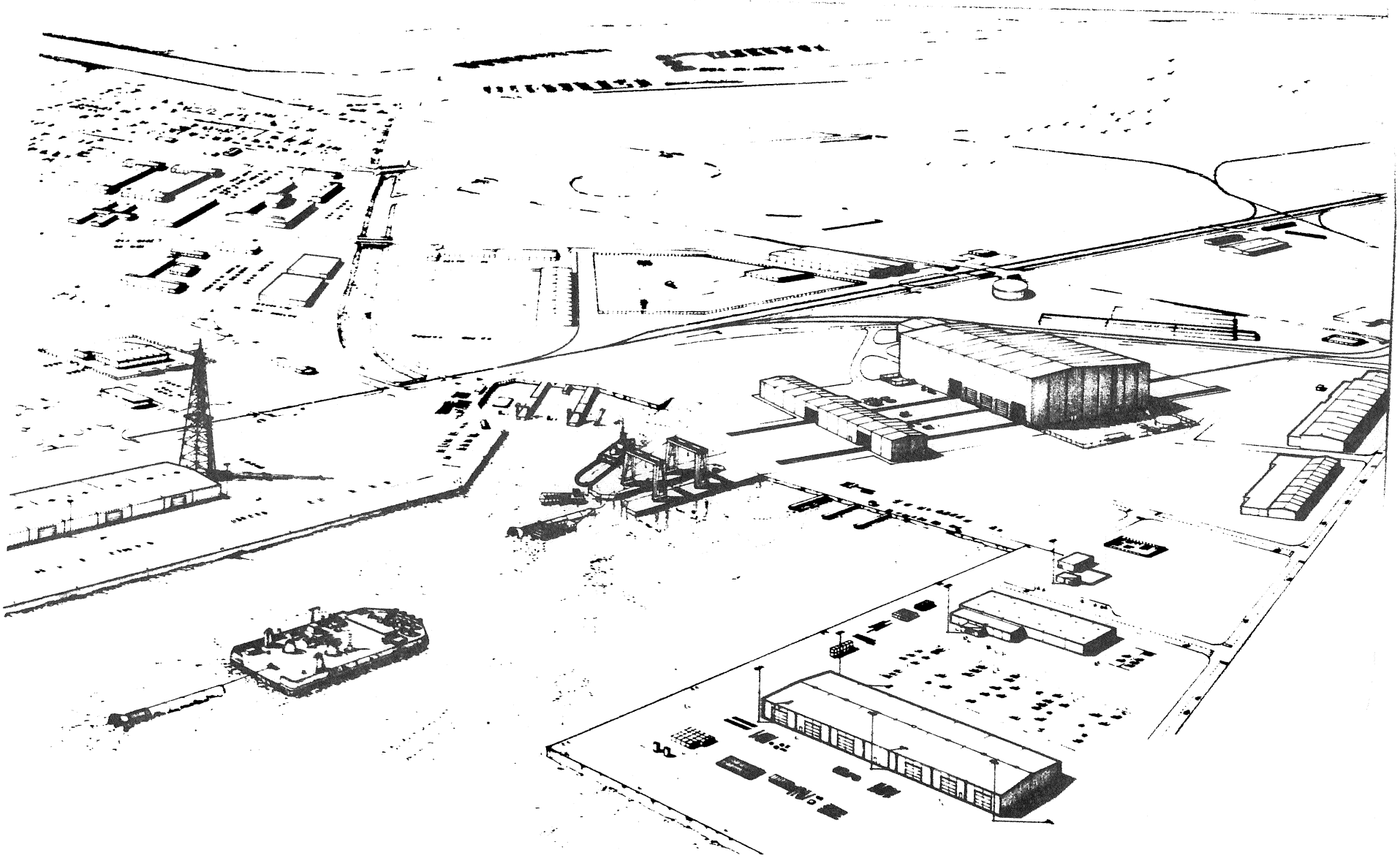




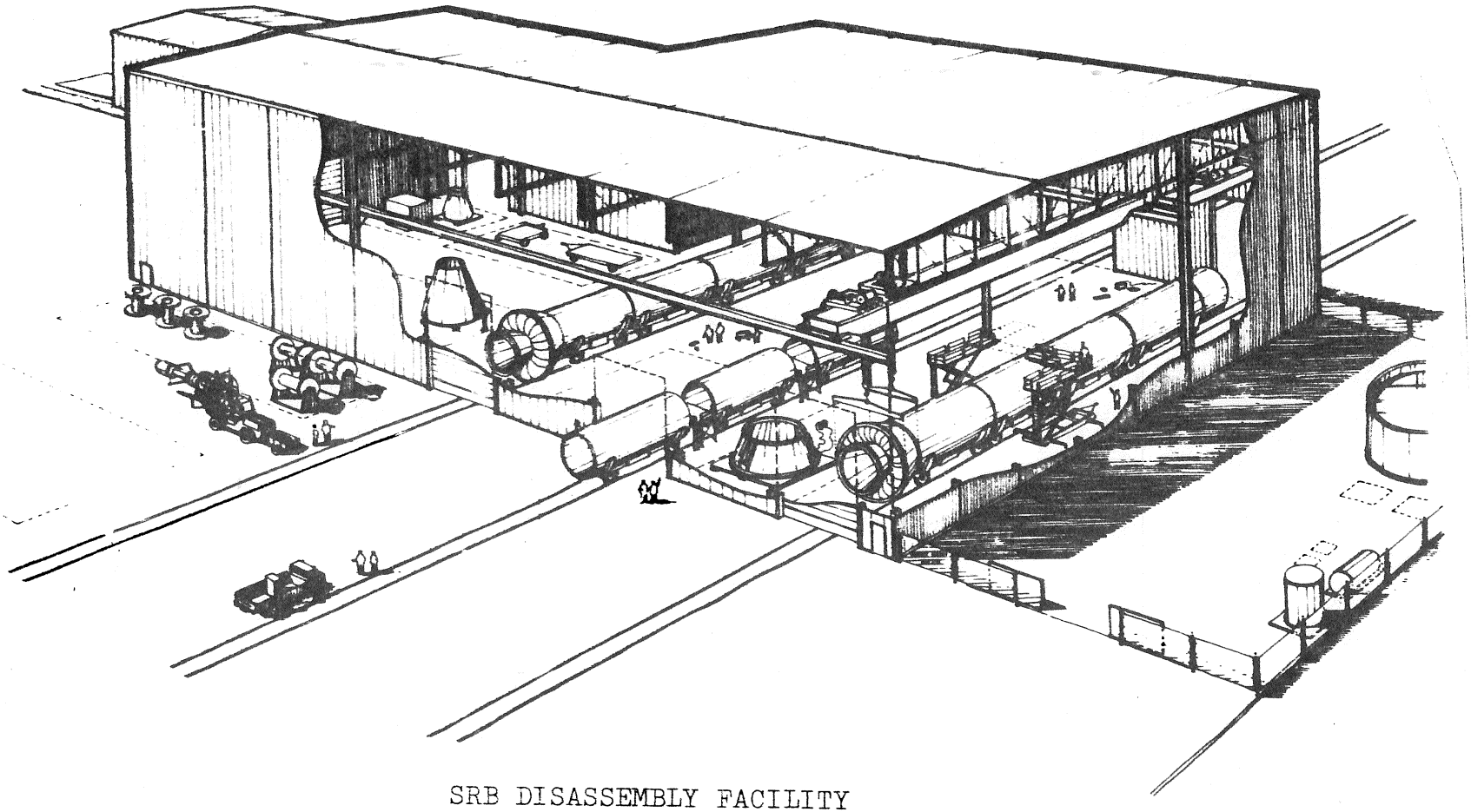
SRB IN SLIP AND ON DOLLIES

WASHING SRB

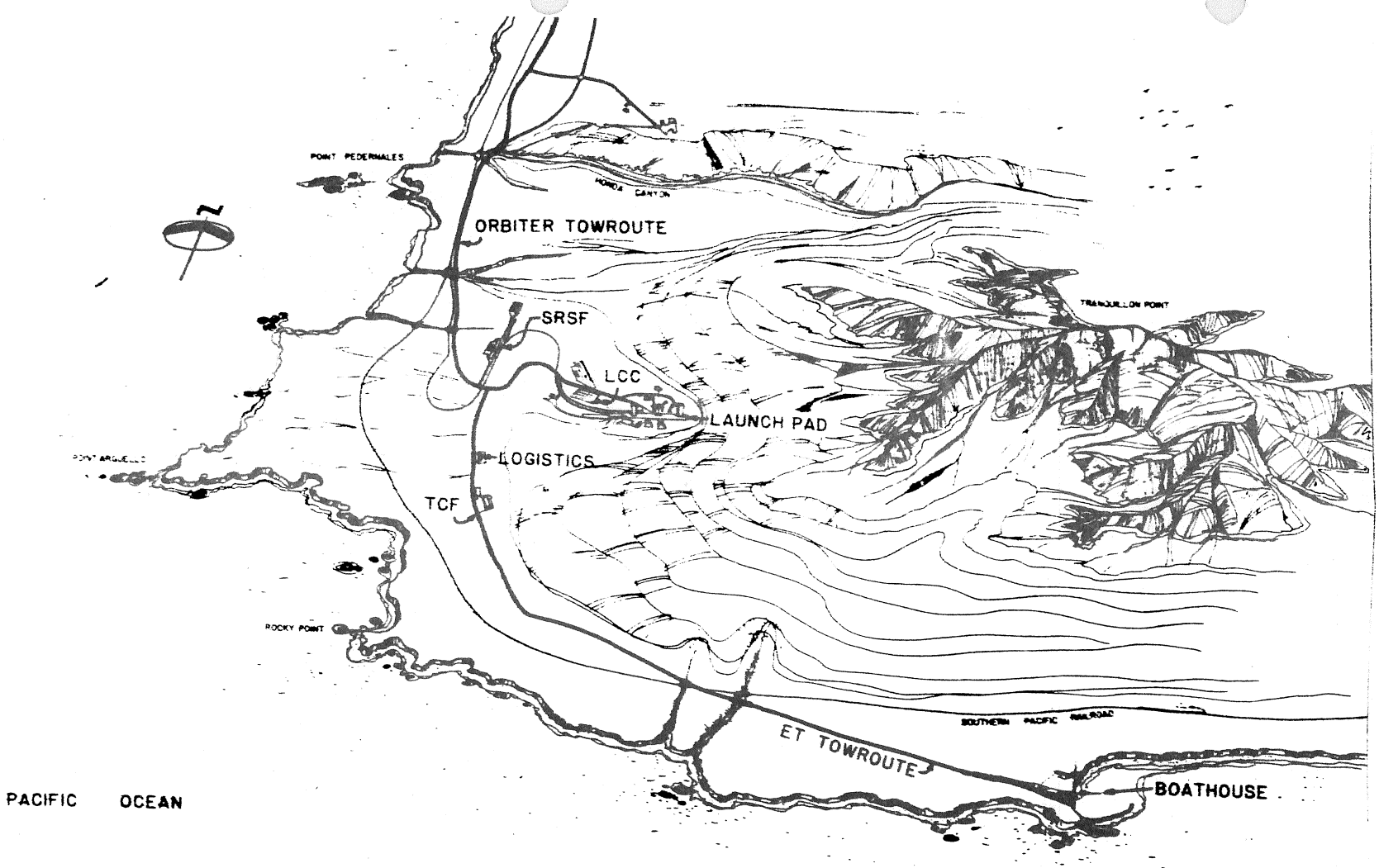




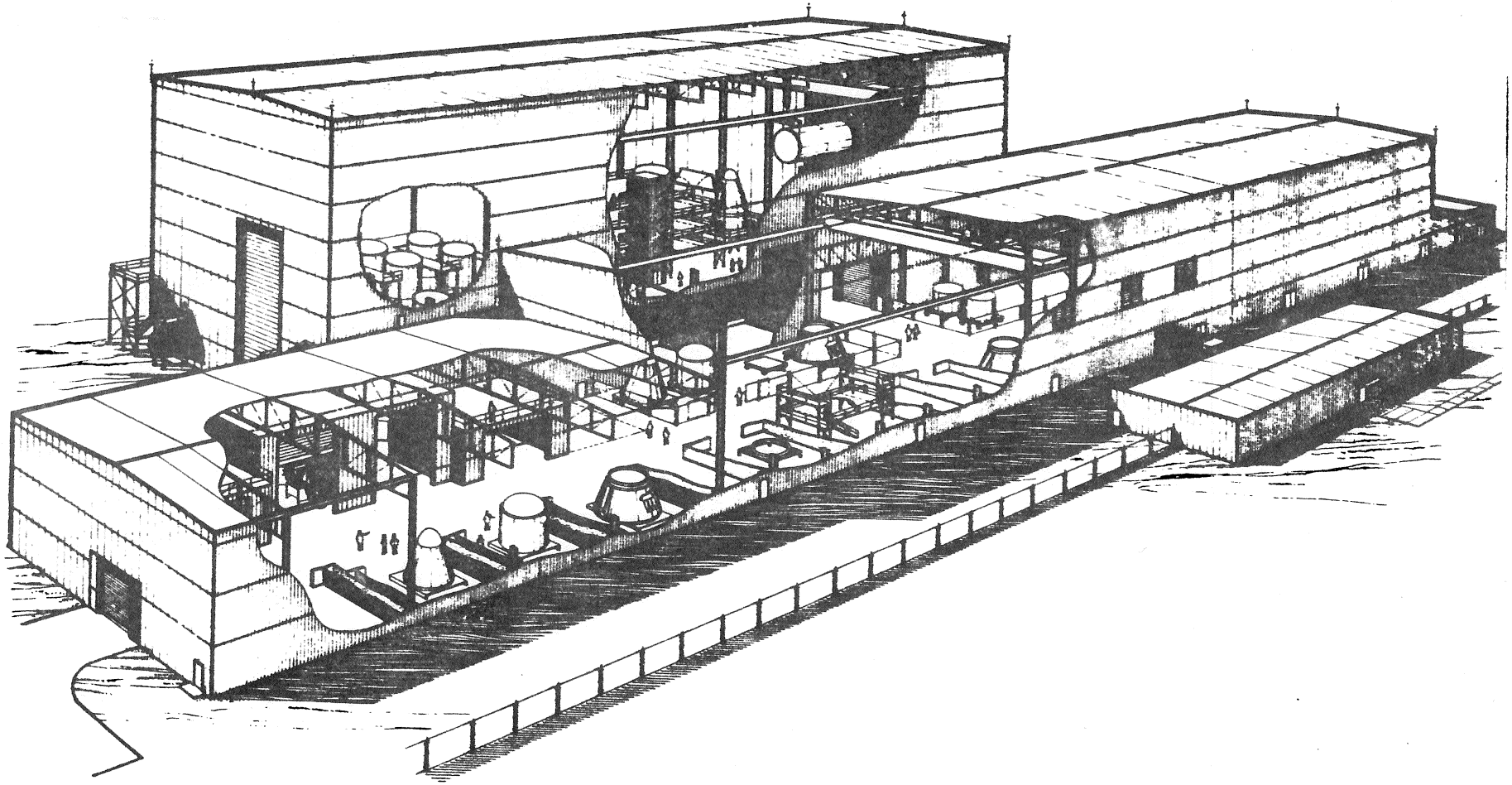
PORT HUENEME (V32)



SRB DISASSEMBLY FACILITY



SOUTH VAFB STS FACILITIES



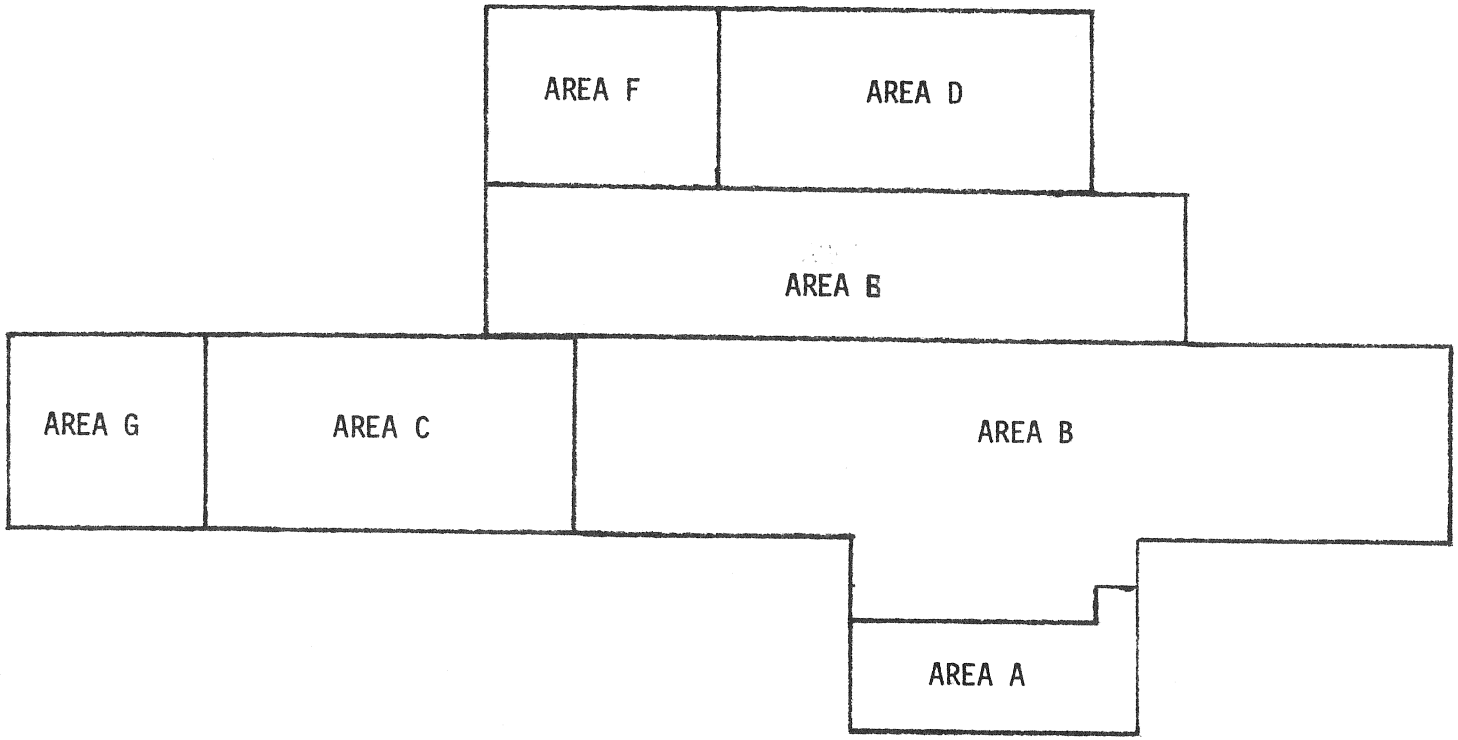
SRSF V-31

V-31 SRB REFURBISHMENT AND SUBASSEMBLY FACILITY

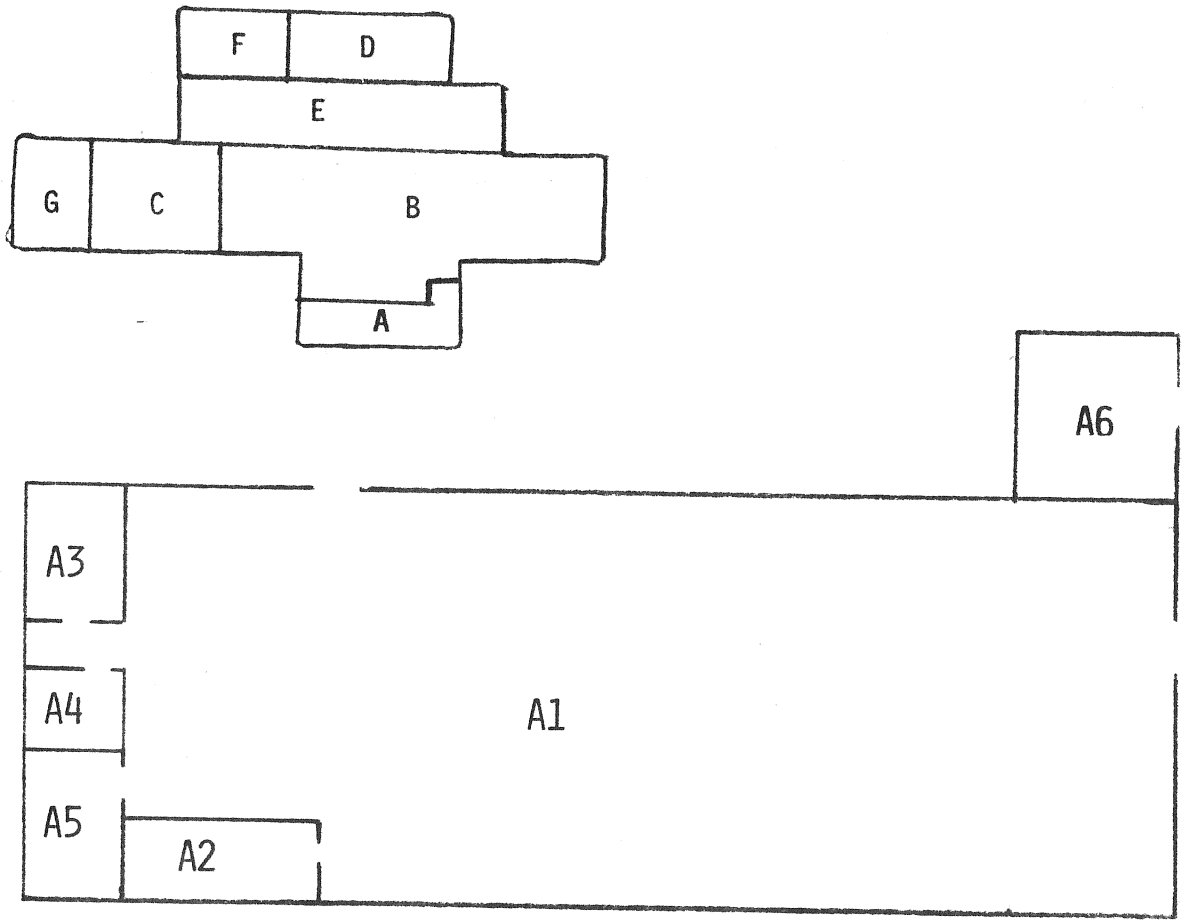
- THE FACILITIES, EQUIPMENT AND SERVICES REQUIRED FOR THE RECEIVING, PROCESSING, REFURBISHMENT, AND INPROCESS STORAGE OF THE VARIOUS COMPONENTS WHICH MAKE UP THE SOLID ROCKET BOOSTERS.

SRB REFURBISHMENT AND SUBASSEMBLY FACILITY (SRSF) FLOOR PLAN

- AREA-A - OPERATIONS SUPPORT
- AREA-B - INSPECTION AND RECEIVING
  MAJOR COMPONENT BUILDUP
  IN PROCESS STORAGE
- AREA-C - INSULATION AND CURING
- AREA-D - SRM SEGMENT RECEIVING AND INSPECTION
  AFT SECTION BUILDUP AND STORAGE
- AREA-E - MISC. SUPPORTING SERVICES
- AREA-F - SRM FORWARD, FORWARD CENTER
  AND AFT CENTER SEGMENT STORAGE
- AREA-G - CORK APPLICATION FACILITY



SRB REFURBISHMENT AND SUBASSEMBLY FACILITY FLOOR PLAN

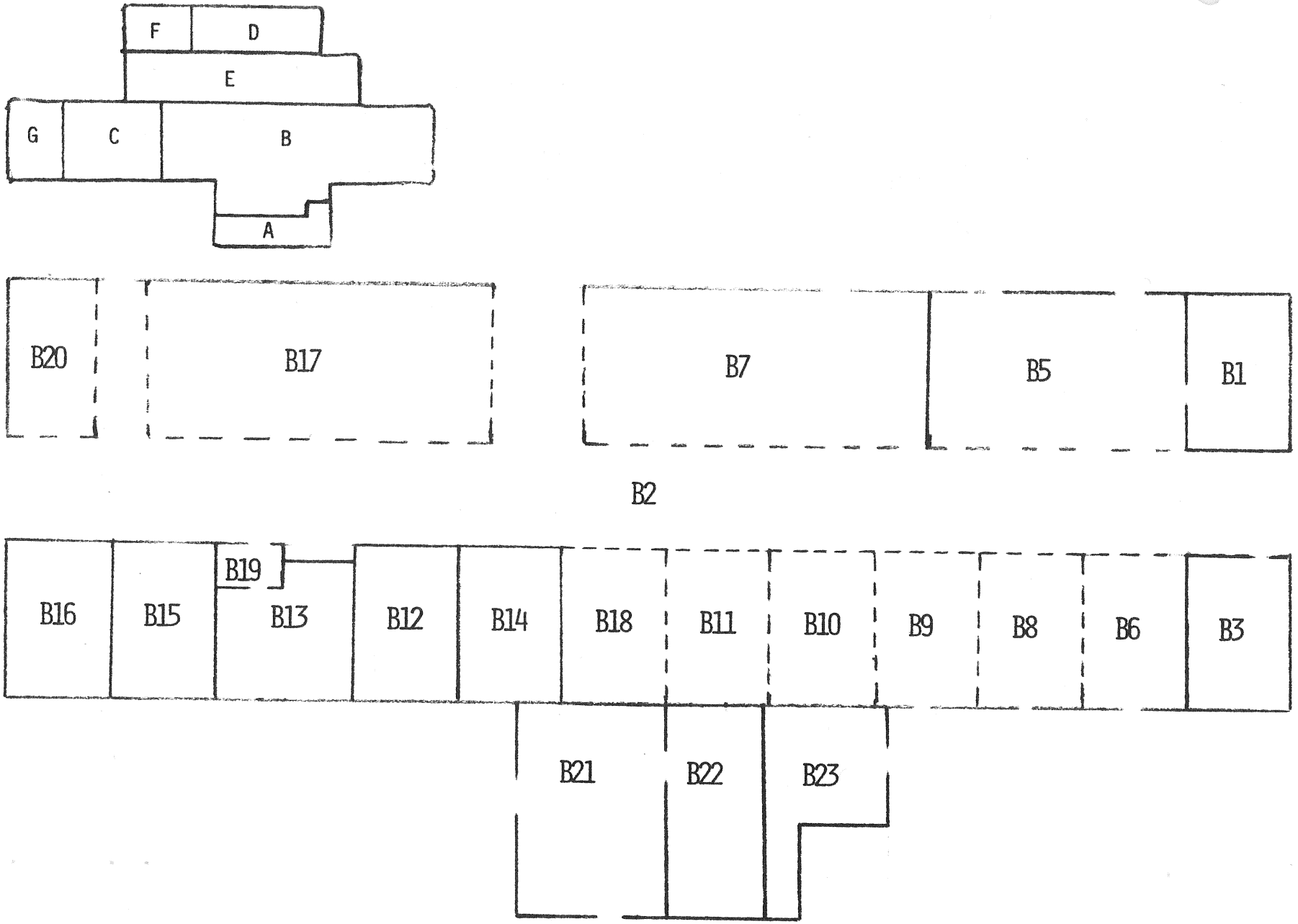


AREA A

OPERATIONS SUPPORT

AREA A - OPERATIONS SUPPORT

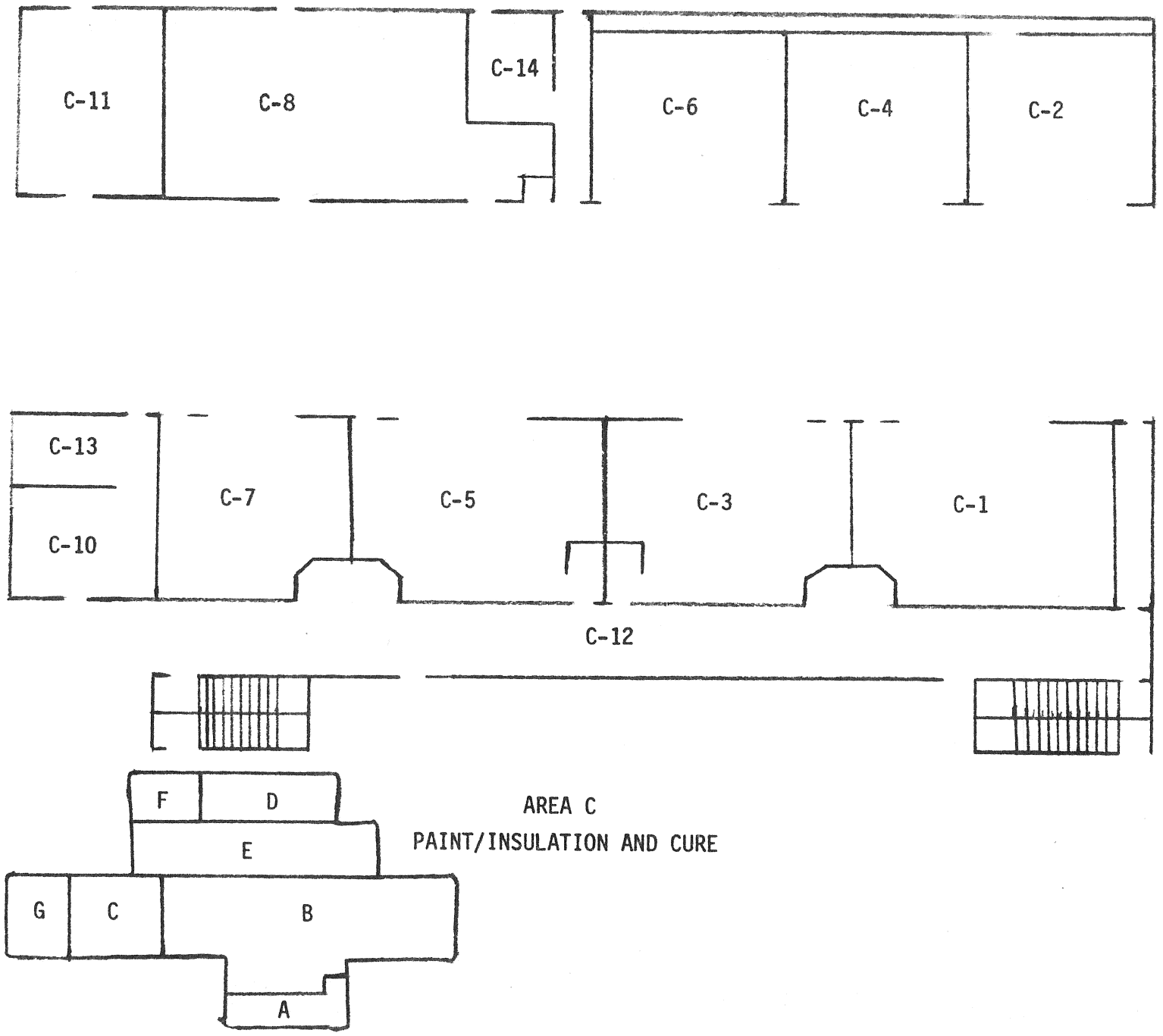
A1 Office/Foyer
A2 Manager's Office
A3 Women's Lockers
A4 Men's Lockers
A5 Engineering Terminal
A6 Men's Toilet and Showers
A7 Corridor
A8 Jan
A9 Cot Room
A10 Women's Toilet and Showers
A11 Tech Library
A12 Gen. Office
A13 Communications
A14 Mechanical Room
A15 Office
A16 Storage



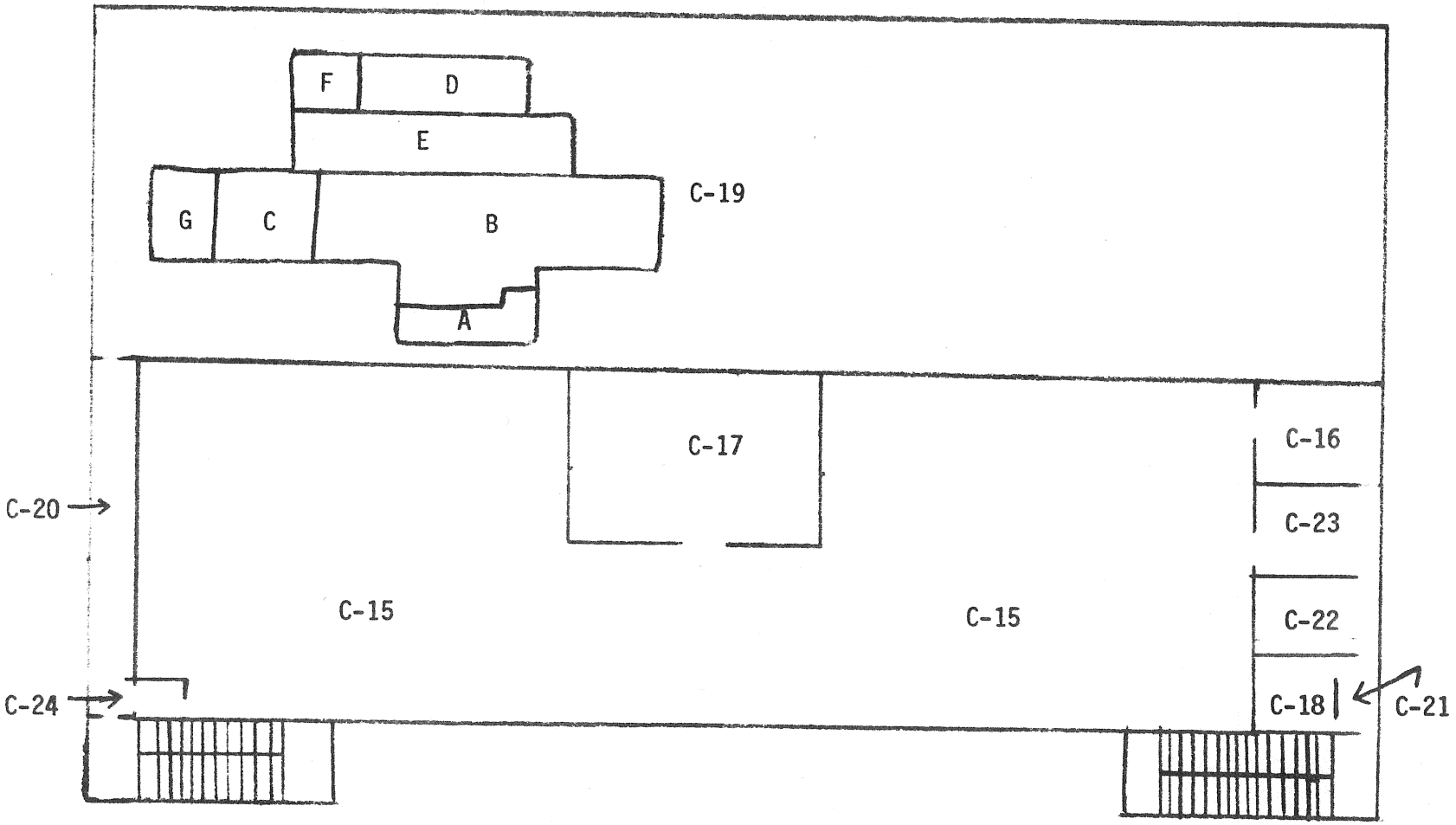
AREA B INSPECTION AND RECEIVING

AREA B - INSPECTION AND RECEIVING MAJOR
COMPONENT BUILD-UP IN PROCESS STORAGE

B1 IEA And FLT. Cable Checkout
B2 Not Used
B3 Storage
B4 Mech Equip
B5 R & I
B6 Frustum Buildup
B7 Controlled Storage
B8 In Process Storage
B9 Nose Assembly Buildup
B10 Forward Skirt Buildup
B11 In Process Storage
B12 AFT Skirt Buildup
B13 TVS Sub-Assembly Room
B14 AFT Skirt TVC Assembly
B15 Mech. Room
B16 Ordnance Ring/Pyrotechnic Buildup
B17 Controlled Storage
B18 Et Attach Ring Checkout
B19 Not Used
B20 Soft Cover/Sling Storage



AREA C
PAINT/INSULATION AND CURE

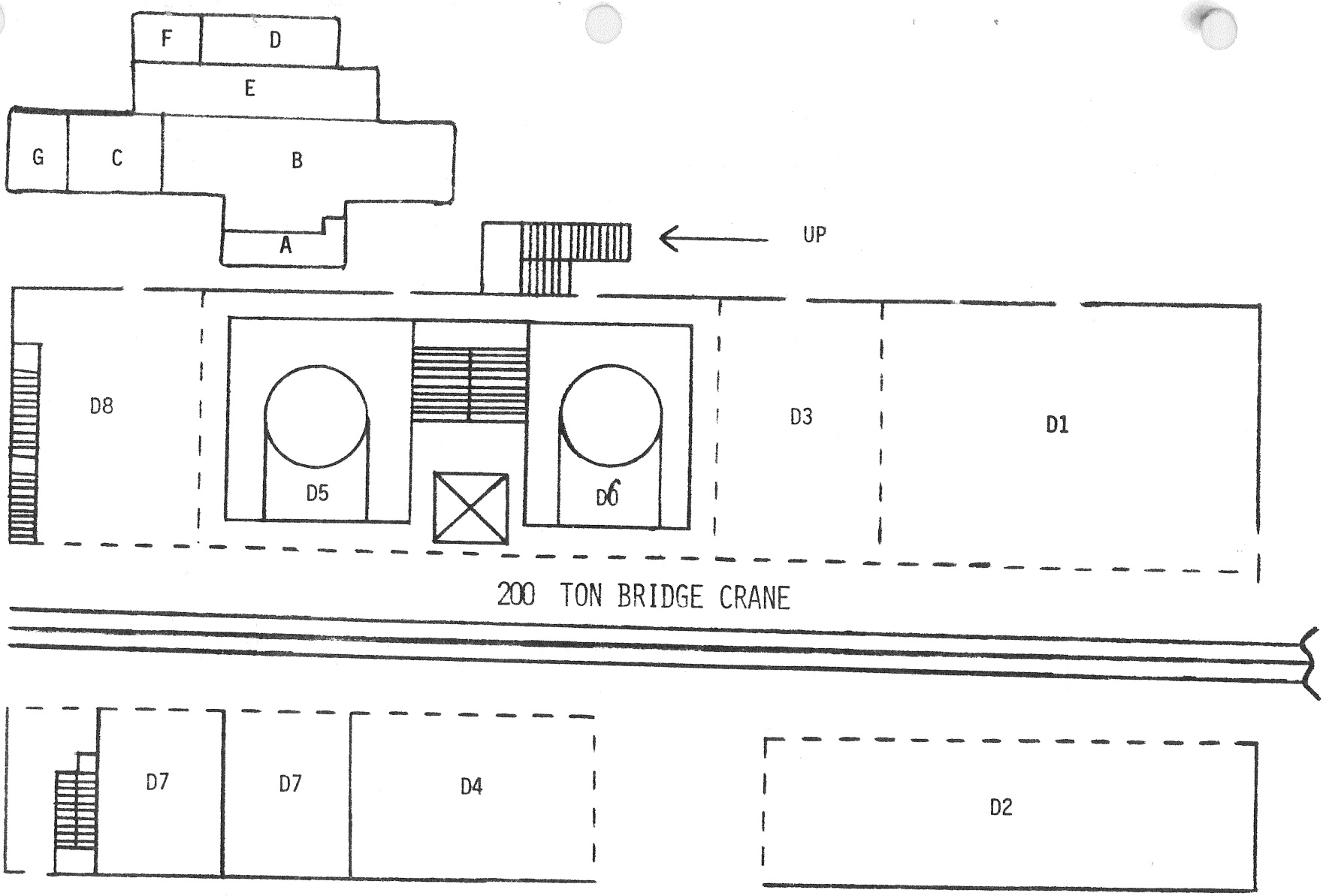


AREA C

PAINT/INSULATION AND CURE

AREA C - INSULATION AND CURING

C1 Frustum Spray
C2 Frustum Cure
C3 Forward Skirt Spray
C4 Forward Skirt Cure
C5 Nose Cap Spray
C6 Nose Cap Cure
C7 Small Parts Spray
C8 Small Parts Cure
C9 Aisle Mechanical Equipment
C10 Inert - Storage
C11 Paint Storage
C12 Mixing & Pump Room
C13 Small Boiler Room

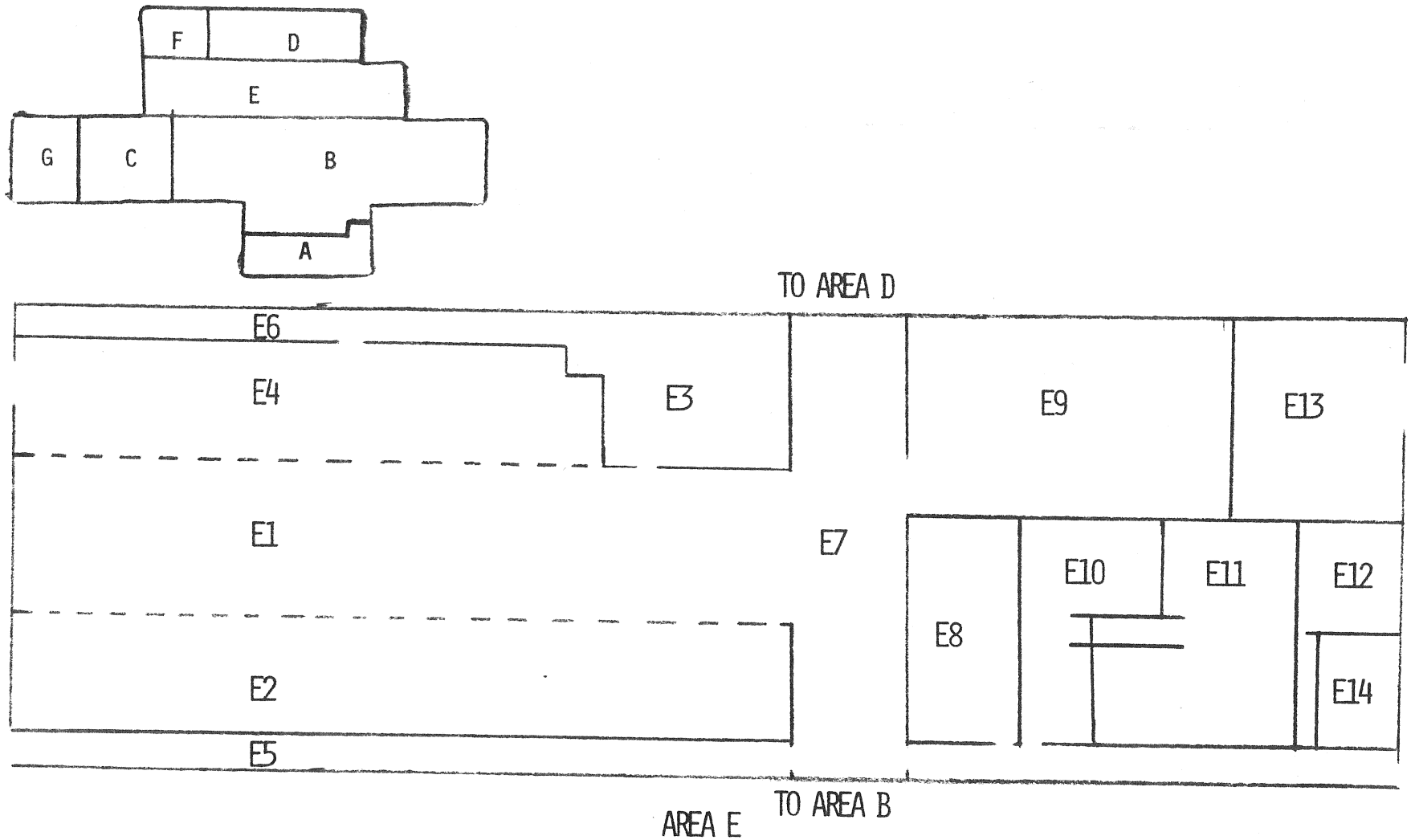


AREA D

SRM SEGMENT RECEIVING AND INSPECTION AFT SECTION BUILDUP AND STORAGE

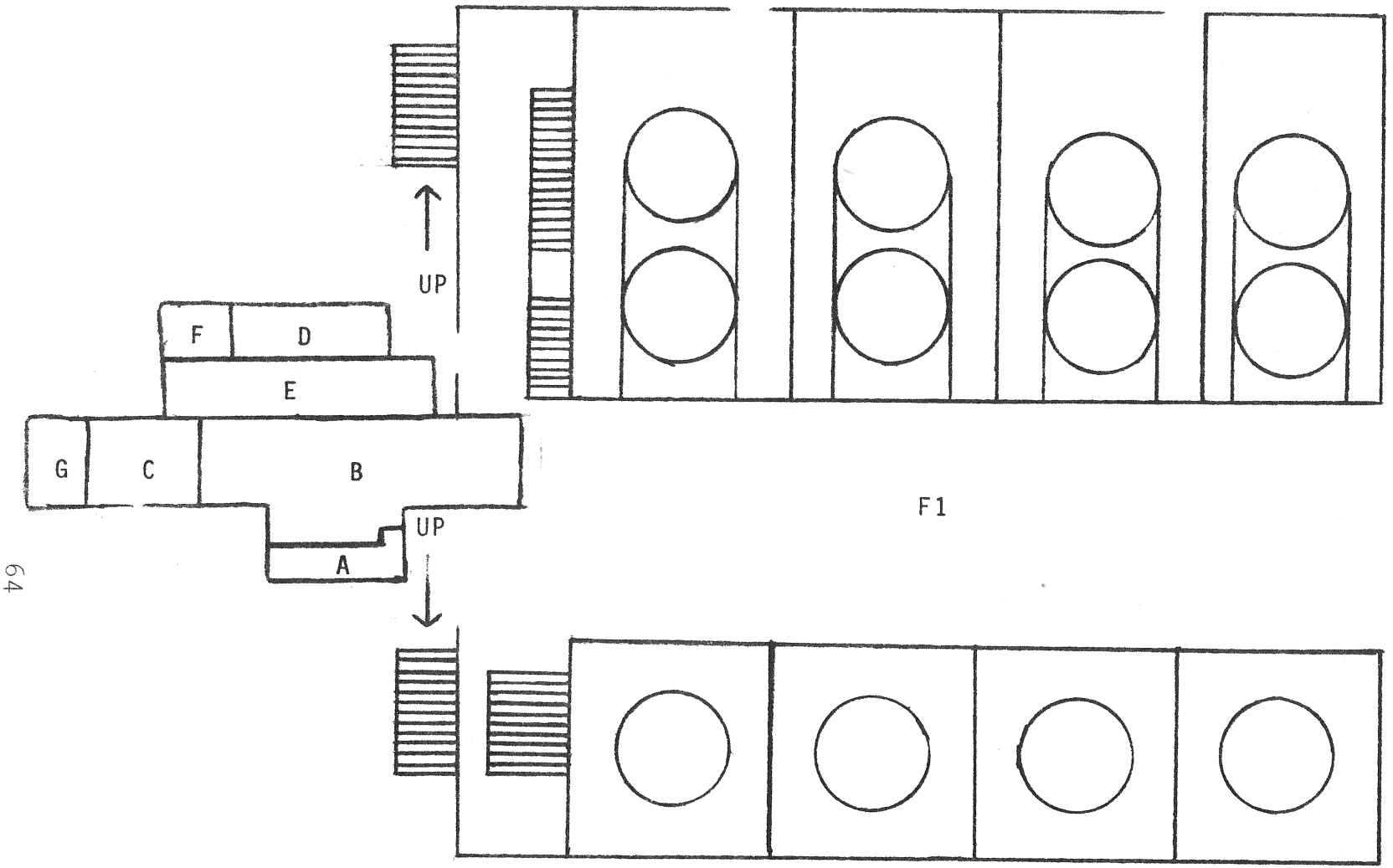
AREA D - SRM SEGMENT RECEIVING AND INSPECTION
AFT SECTION BUILDUP AND STORAGE

D1 Handling Ring Removal
D2 Segment Shipping Cover Laydown
D3 Fwd Section Mating
D4 In Process Storage
D5 Aft Booster Section Buildup
D6 Aft Booster Section Buildup
D7 Aft SRM Segment in Process Storage
D8 Fwd Section Mating
D9 Soft Cover/Sling Storage



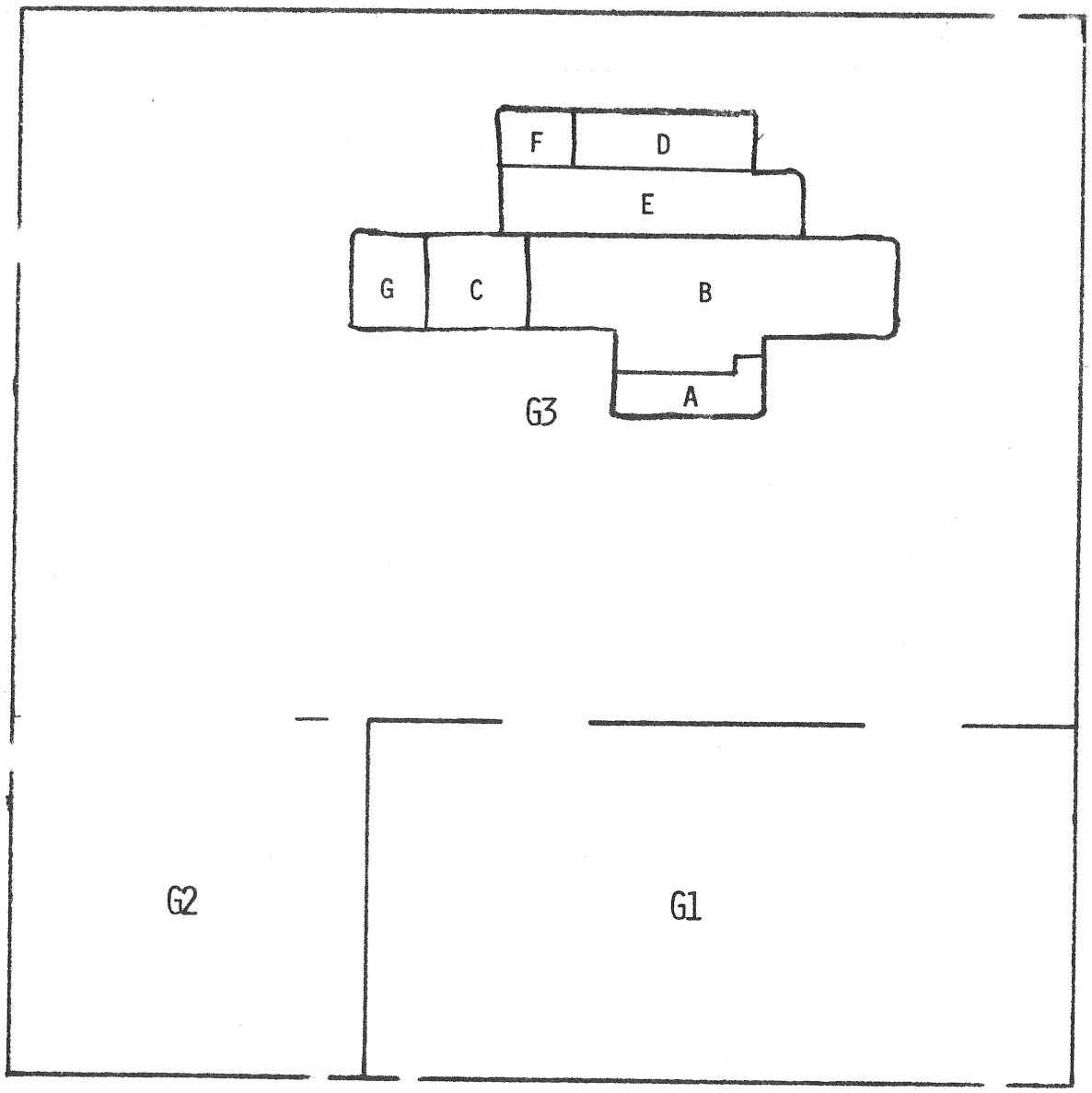
AREA E

MISC. SUPPORTING AREA



AREA F

SRM FORWARD, FORWARD CENTER AND AFT CENTER SEGMENT STORAGE



AREA G CORK APPLICATION FACILITY

AREA E - MISC. SUPPORTING SERVICES

E1 Protective Clothing
E2 Bonded Tools
E3 Elect Support Equip
E4 Toilet
E5 Mech/Elect Equip
E6 Flight Battery Activation
E7 Transfer Aisle
E8 Corridor

AREA F

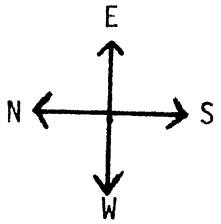
F1 SRM Forward, Forward Center and
AFT Center Segment Storage

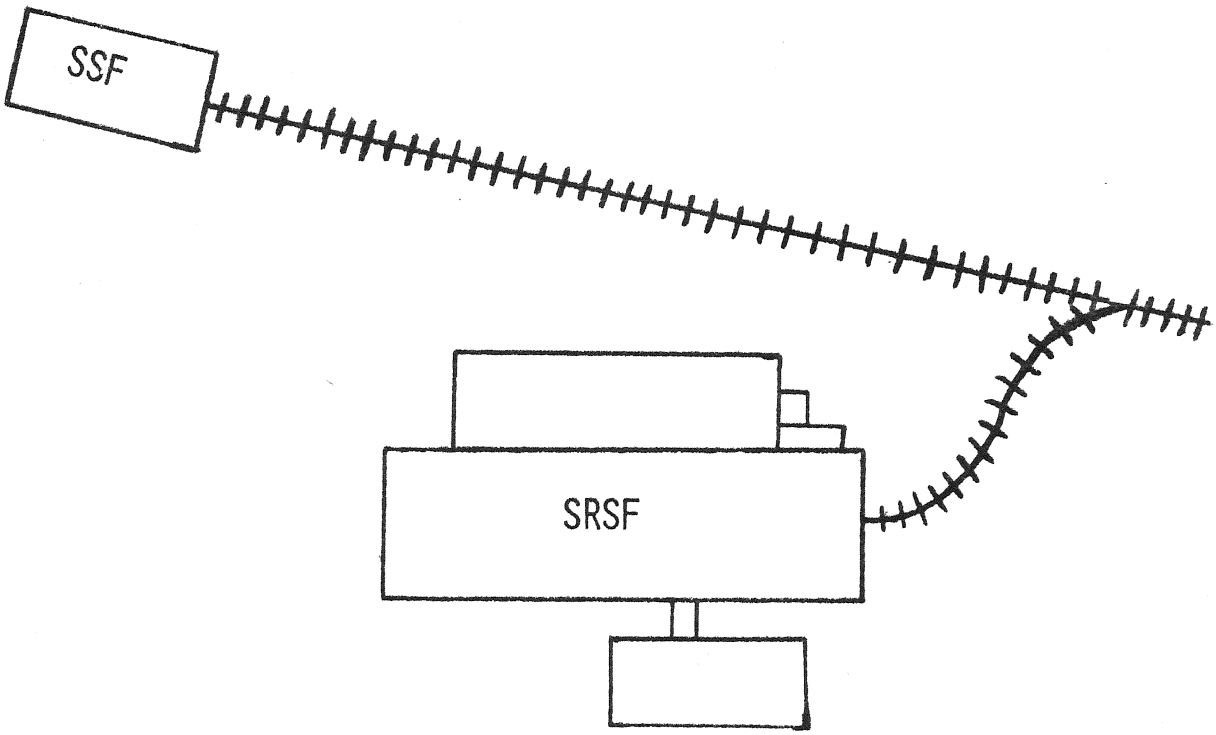
AREA G - CORK APPLICATION FACILITY

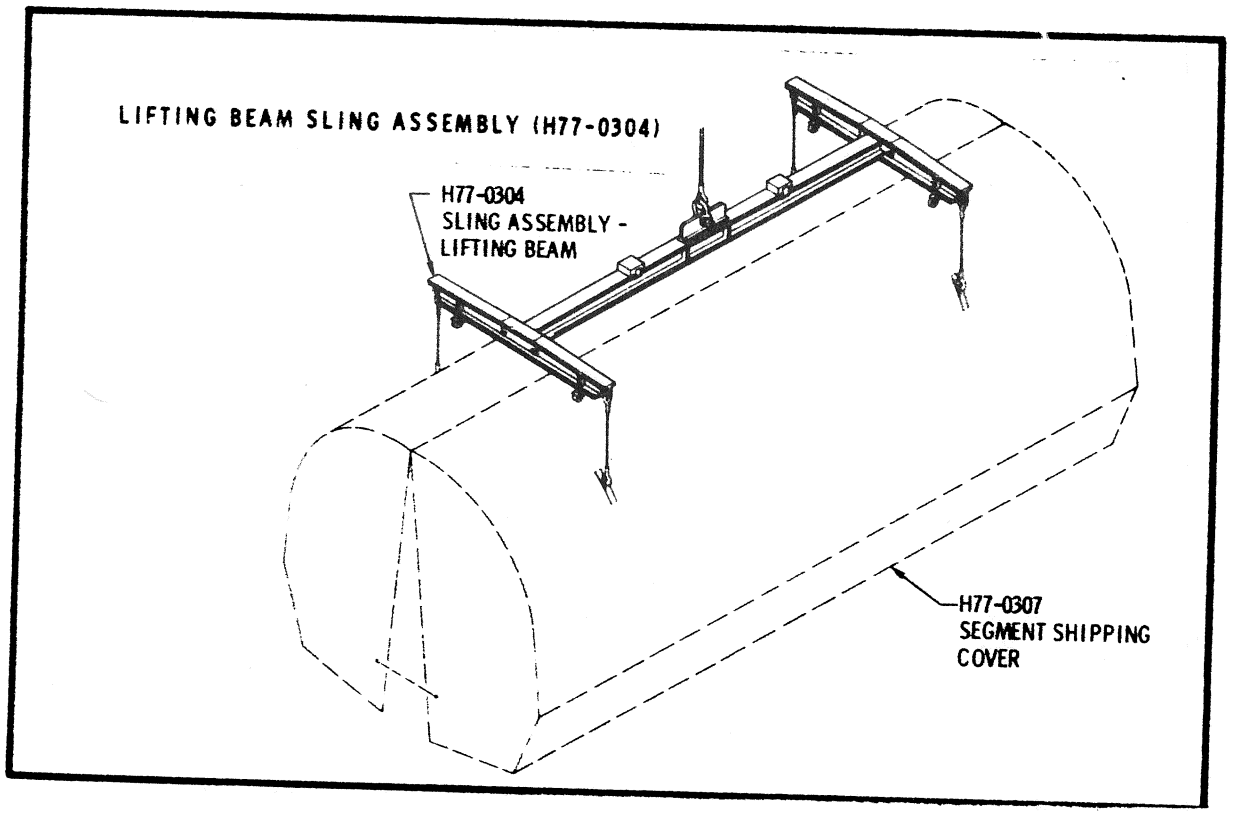
G1 Kitting
G2 Cold Storage
G3 Lab
G4 Cork Cutting and Storage
G5 Painting
G6 Cork Lay-Up, Clean-Up, and Ring Lay-Up

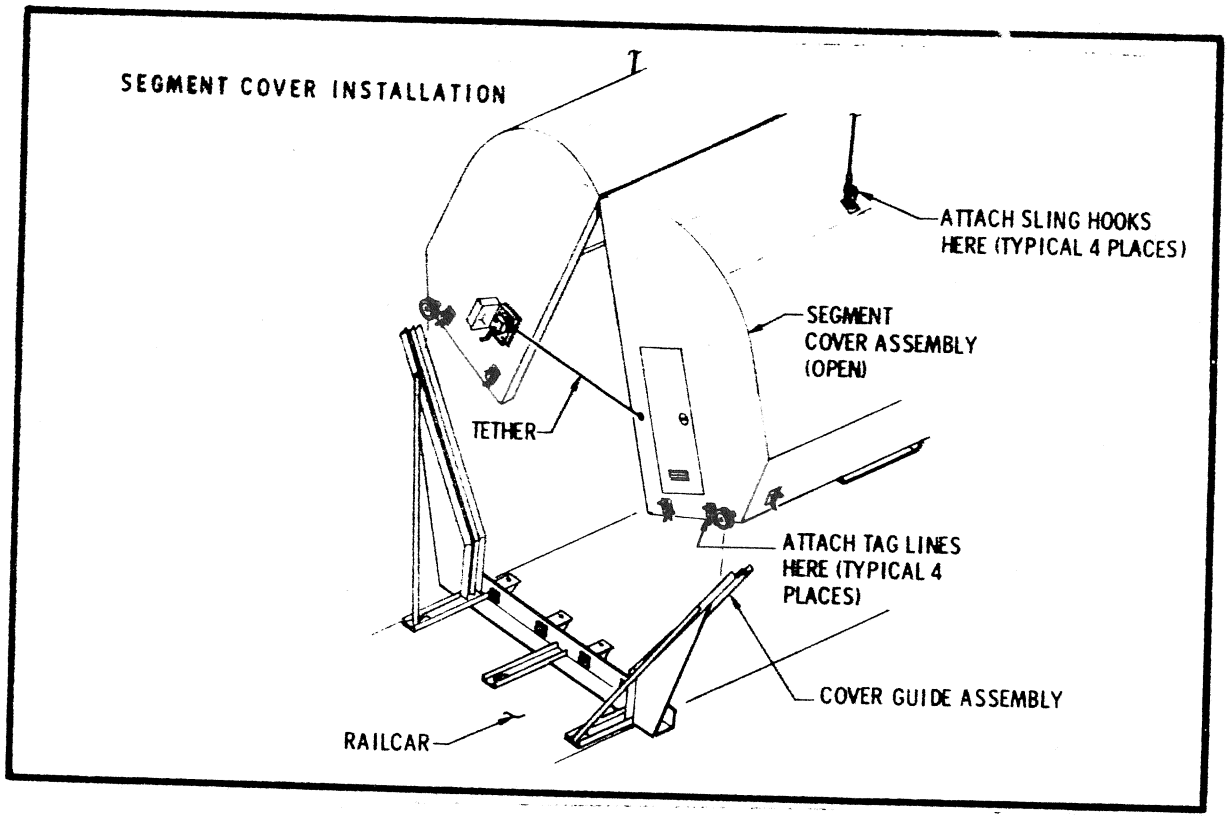
V-23

LOCATION OF SRSF AND SSF

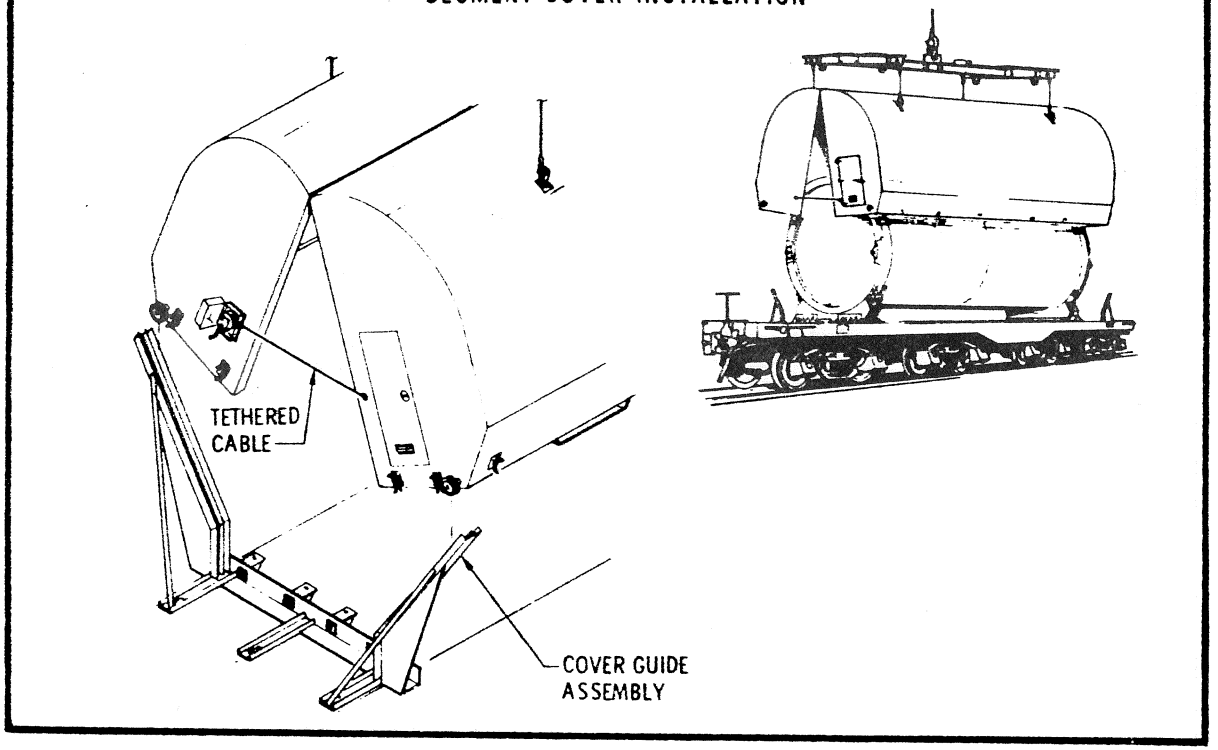




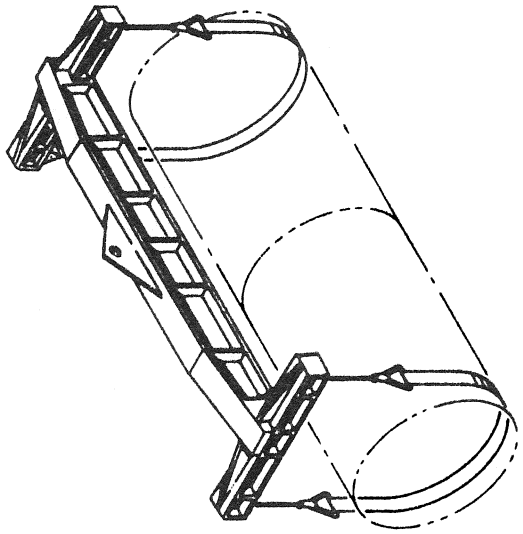

LIFTING BEAM SLING ASSEMBLY (H77-0304)
H77-0304
SLING ASSEMBLY -
LIFTING BEAM
H77-0307
SEGMENT SHIPPING
COVER


SEGMENT COVER INSTALLATION
ATTACH SLING HOOKS HERE (TYPICAL 4 PLACES)
SEGMENT COVER ASSEMBLY (OPEN)
TETHER
ATTACH TAG LINES HERE (TYPICAL 4 PLACES)
COVER GUIDE ASSEMBLY
RAILCAR

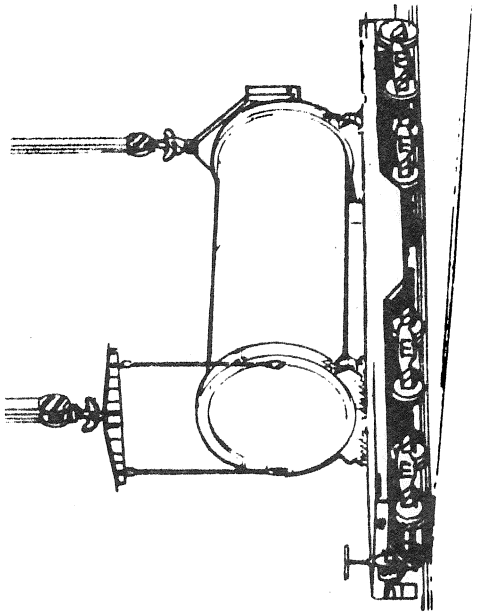
SEGMENT COVER INSTALLATION

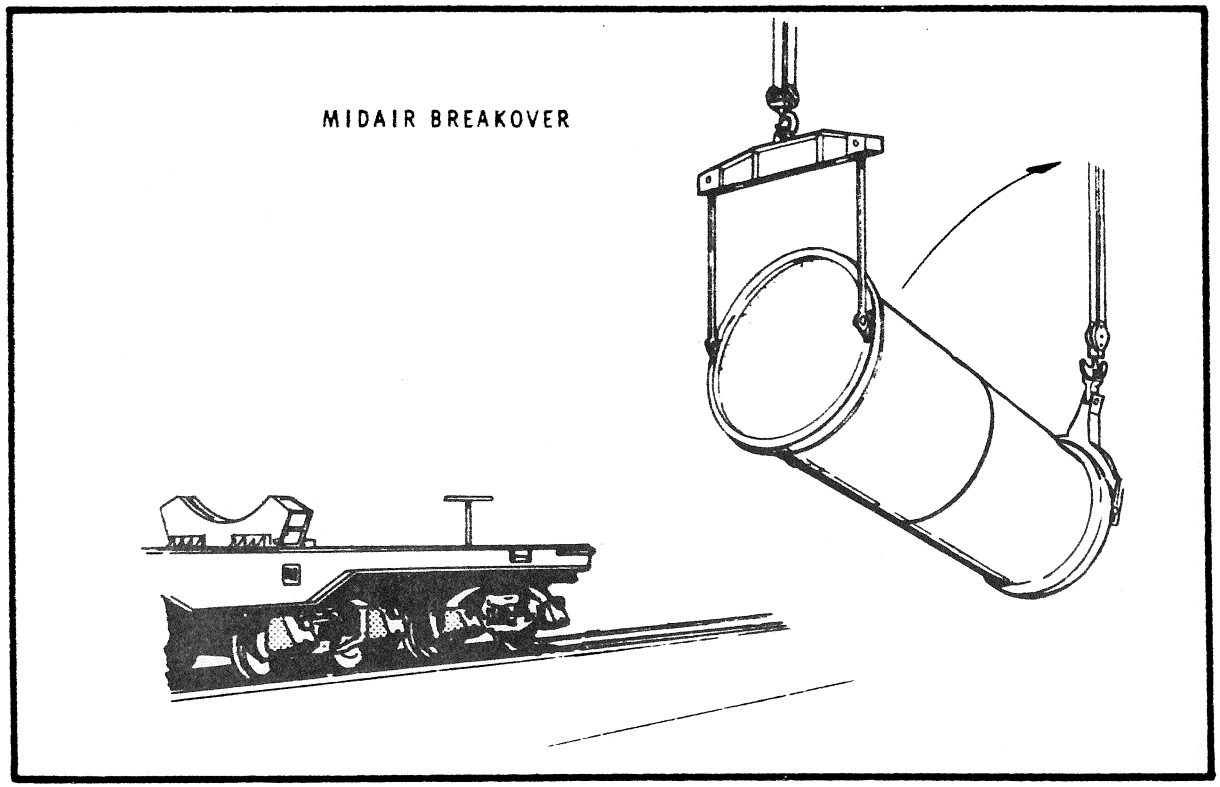


CASE SEGMENT LIFTING BEAM (H77-0330)

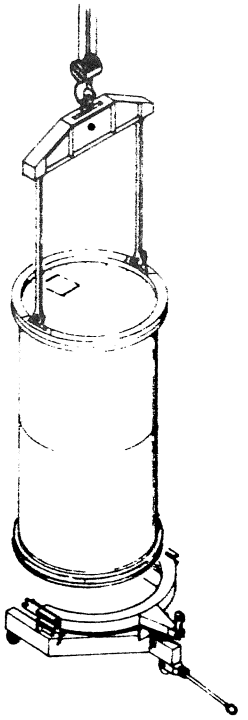


BREAKOVER ARRANGEMENT

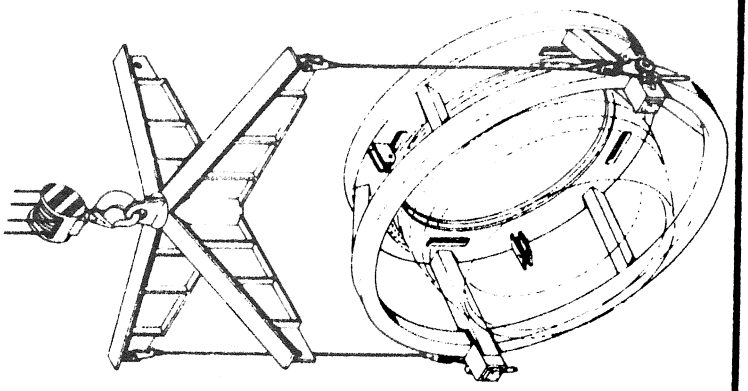


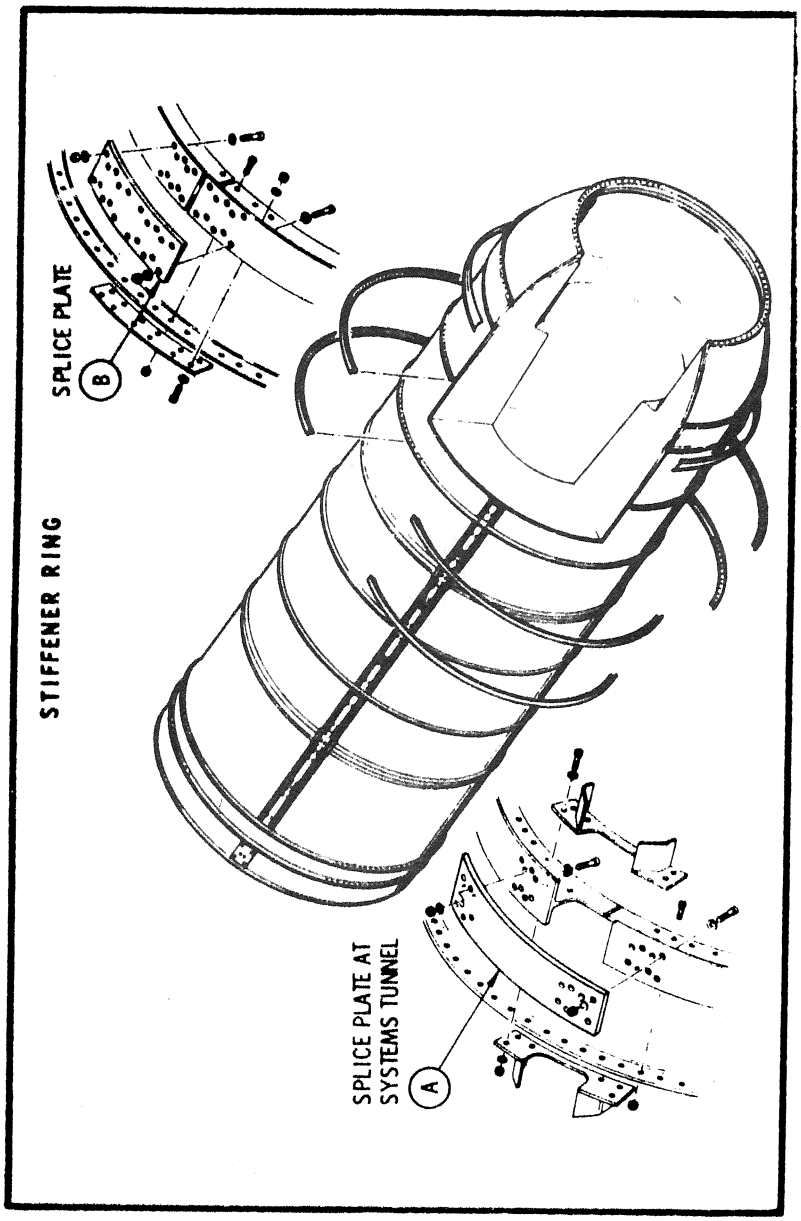

MIDAIR BREAKOVER

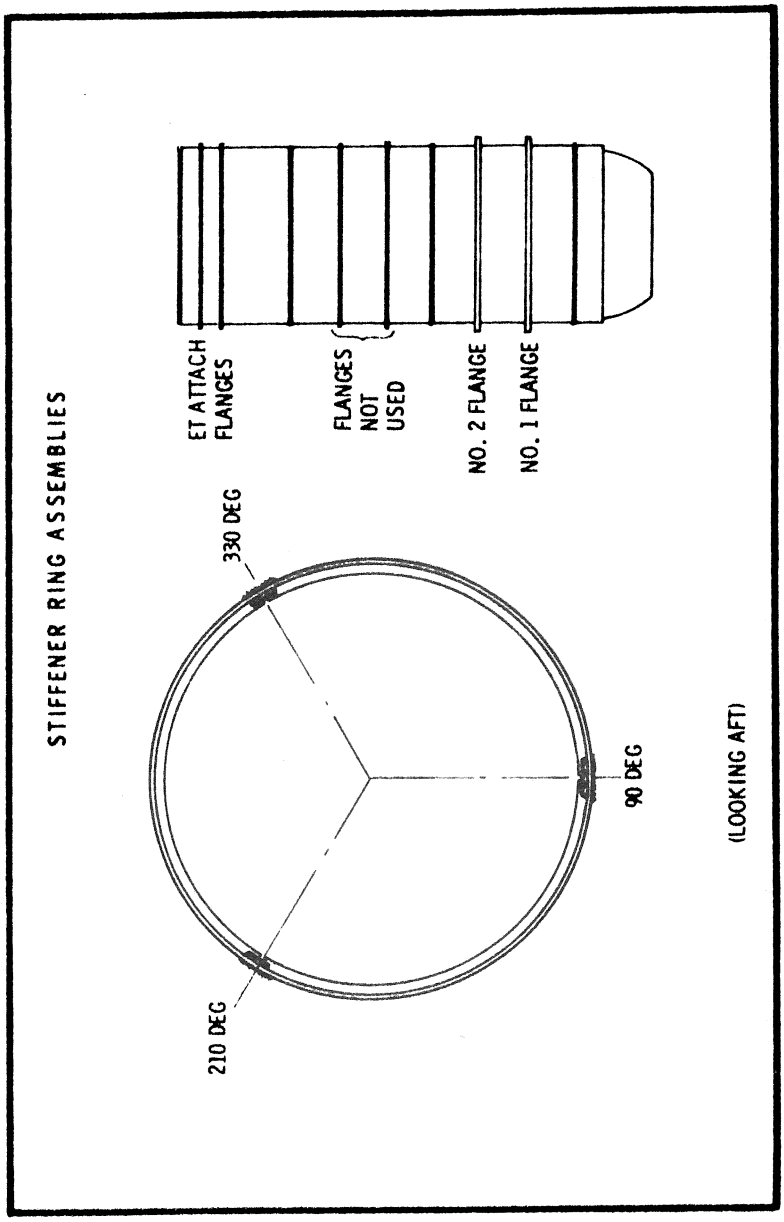
RELEASE OF BREAKOVER
LIFTING BEAM



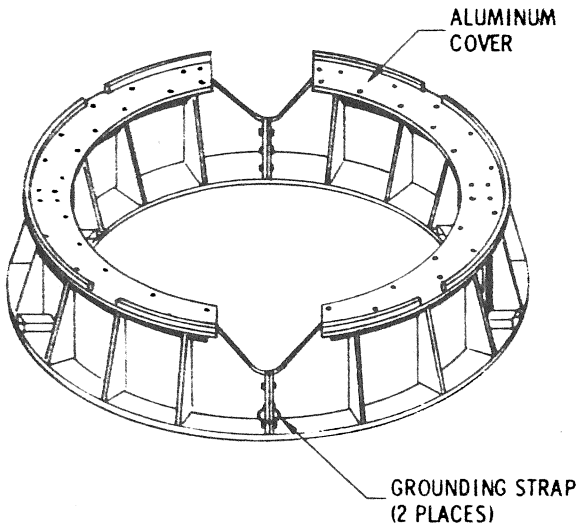
NOZZLE HANDLING FIXTURE



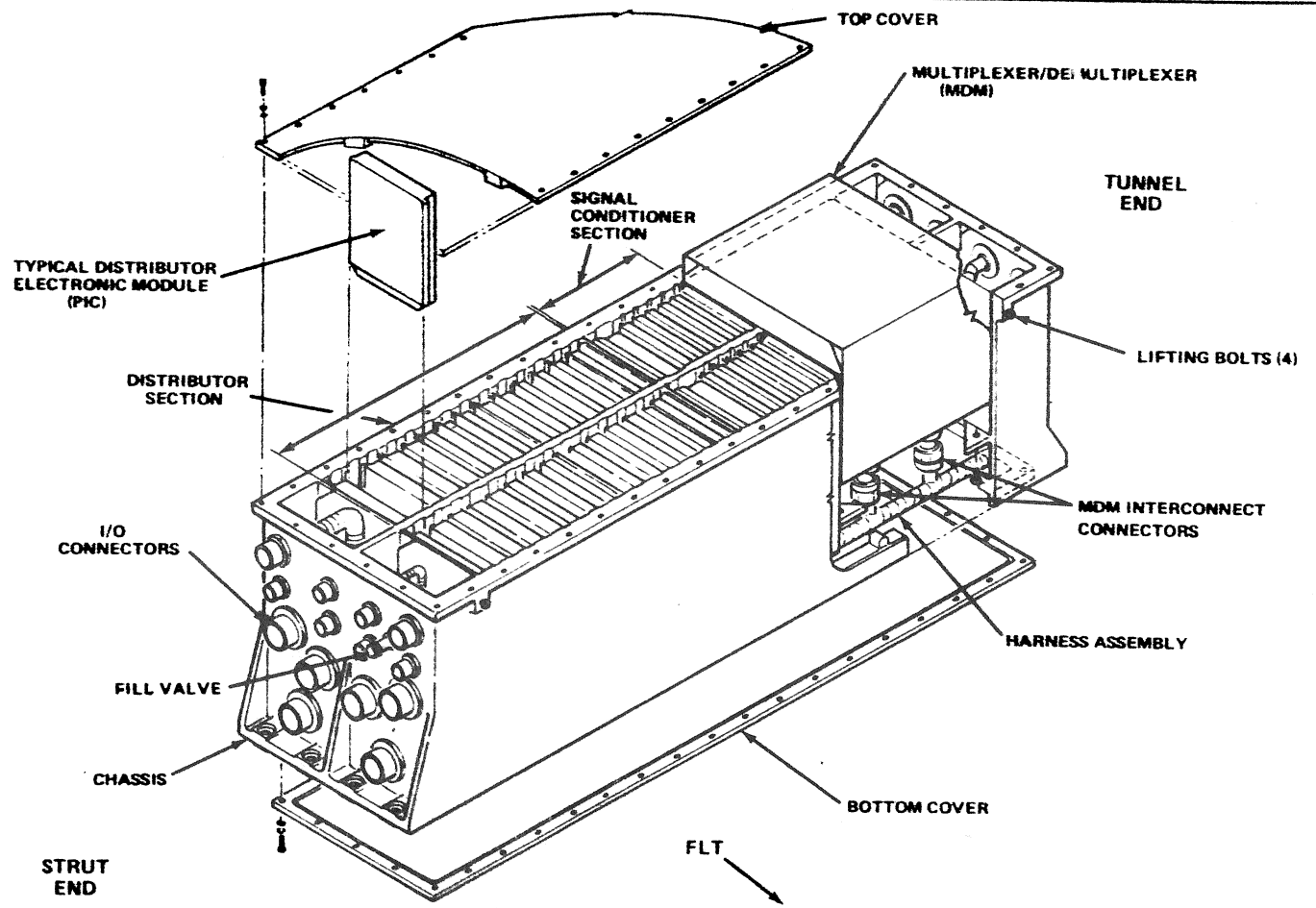

STIFFENER RING
SPLICE PLATE
B
SPLICE PLATE AT
SYSTEMS TUNNEL
A

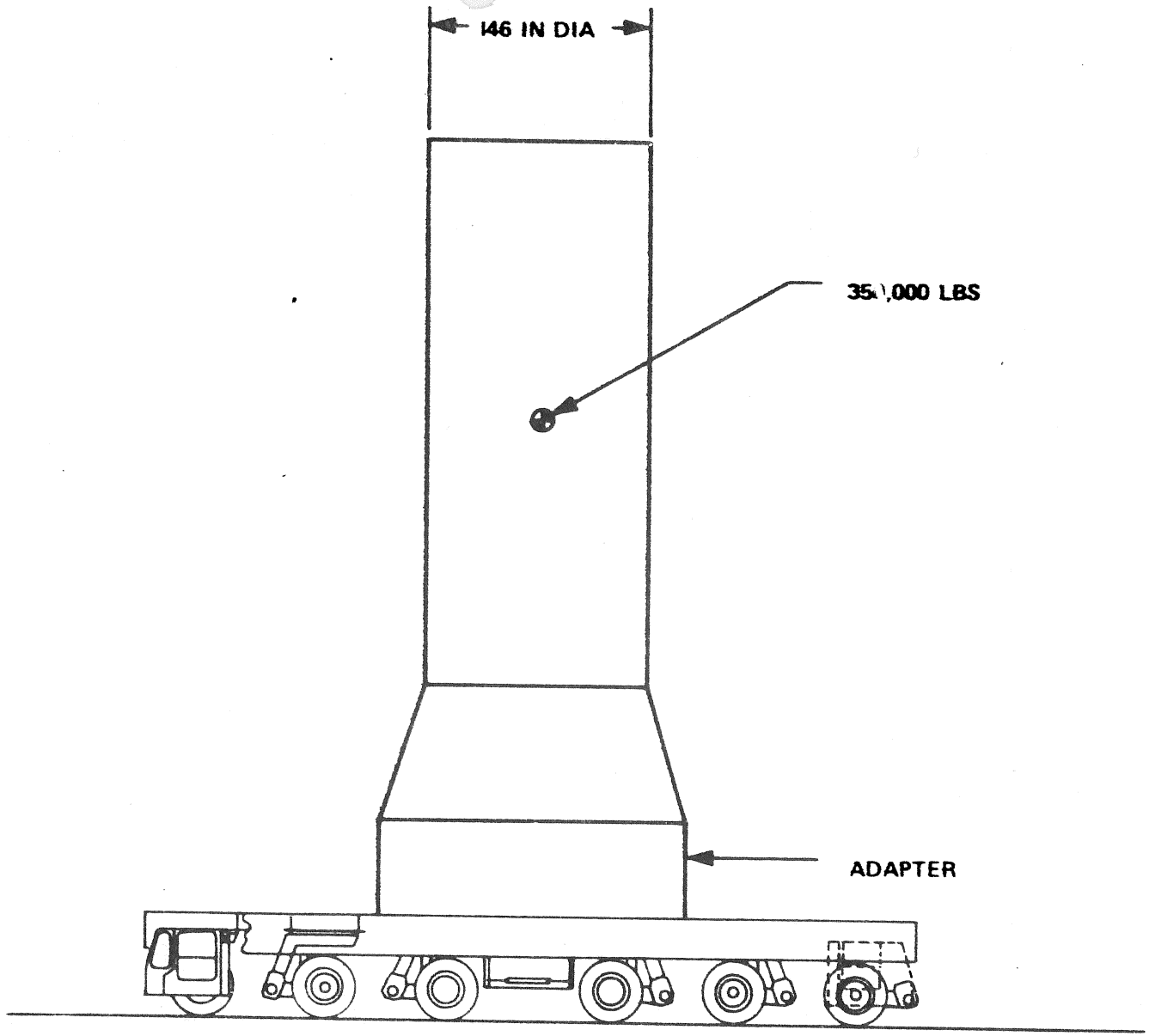

STIFFENER RING ASSEMBLIES
ET ATTACH FLANGES
FLANGES NOT USED
NO. 2 FLANGE
NO. 1 FLANGE
330 DEG
90 DEG
210 DEG
(LOOKING AFT)

SUPPORT STAND

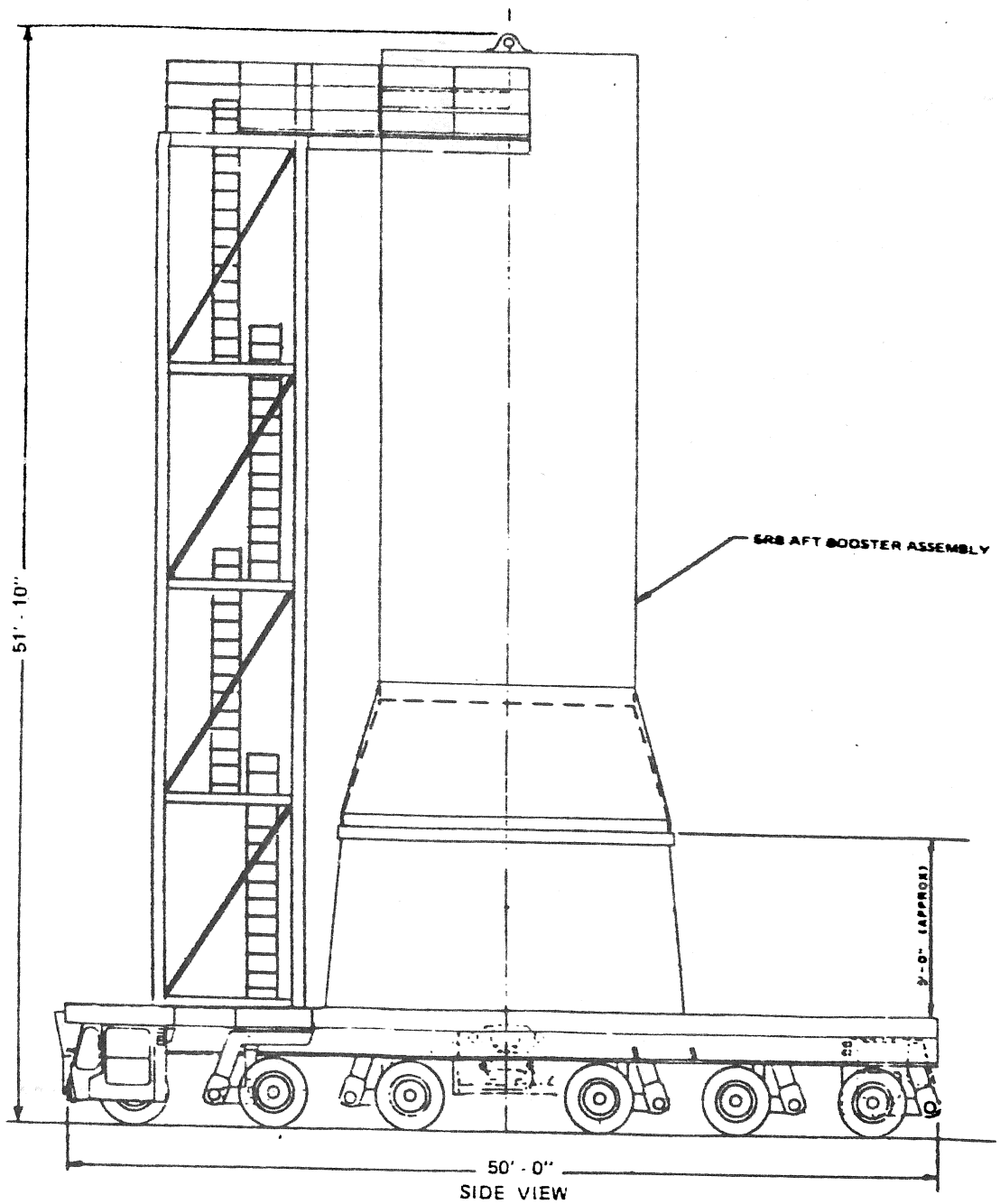


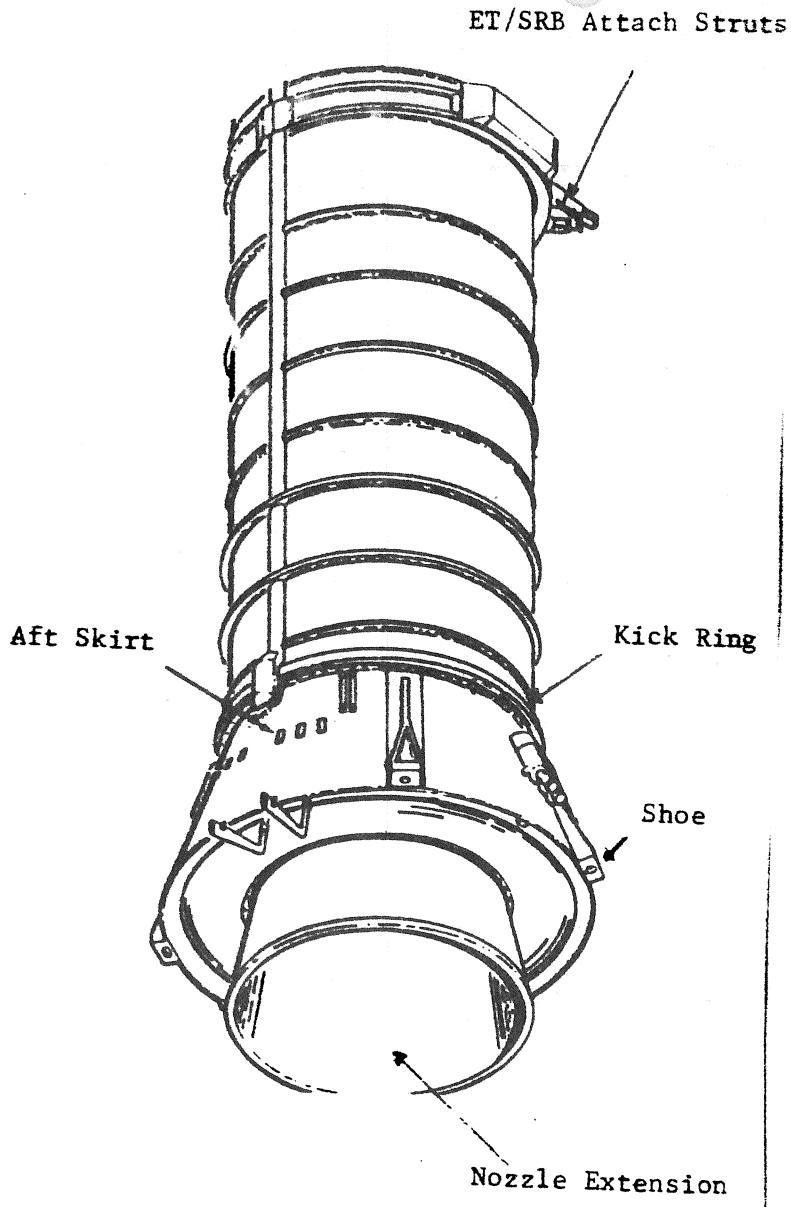
SRB
IEA AFT ASSEMBLY



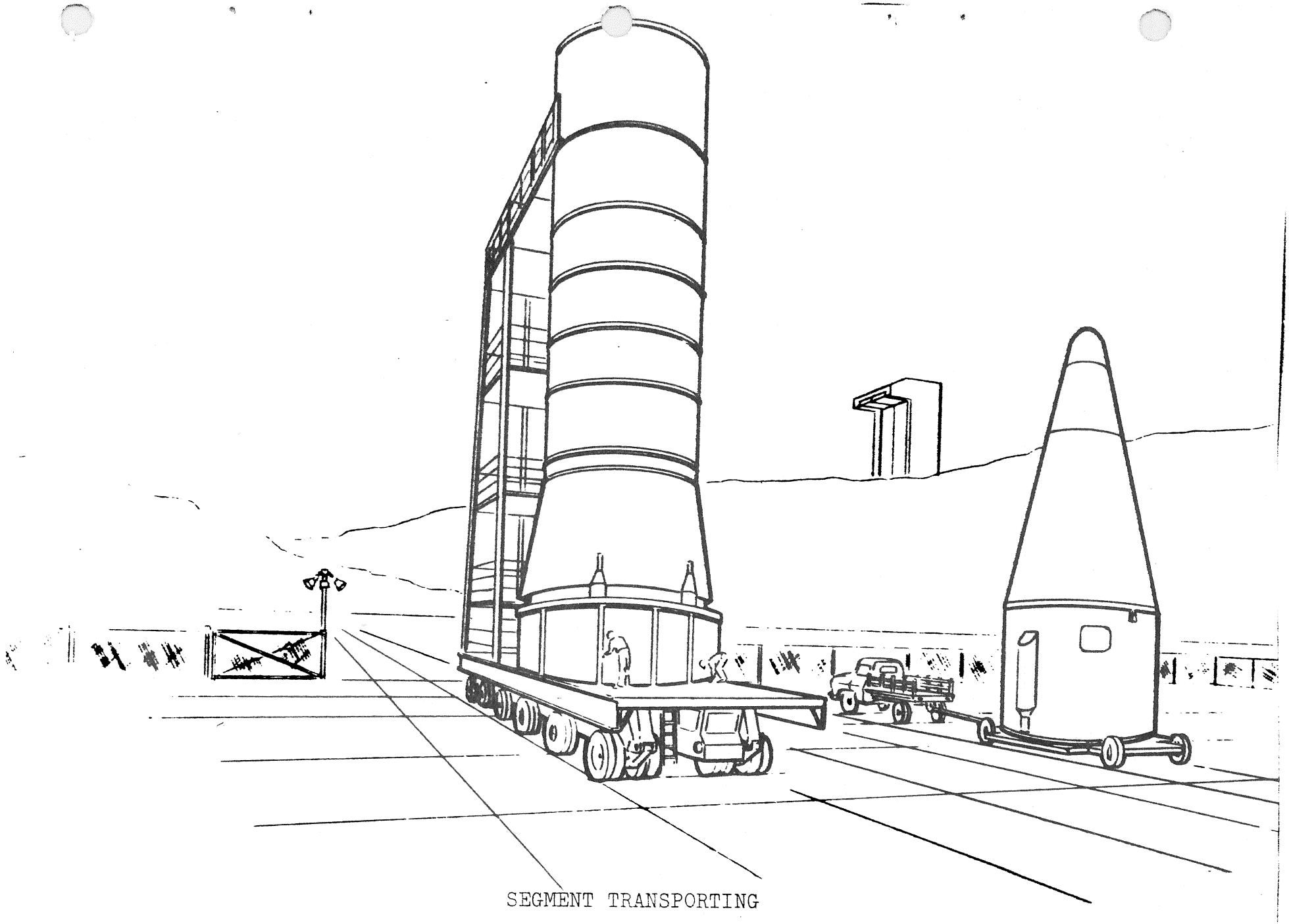


SEGMENT TRANSPORTER

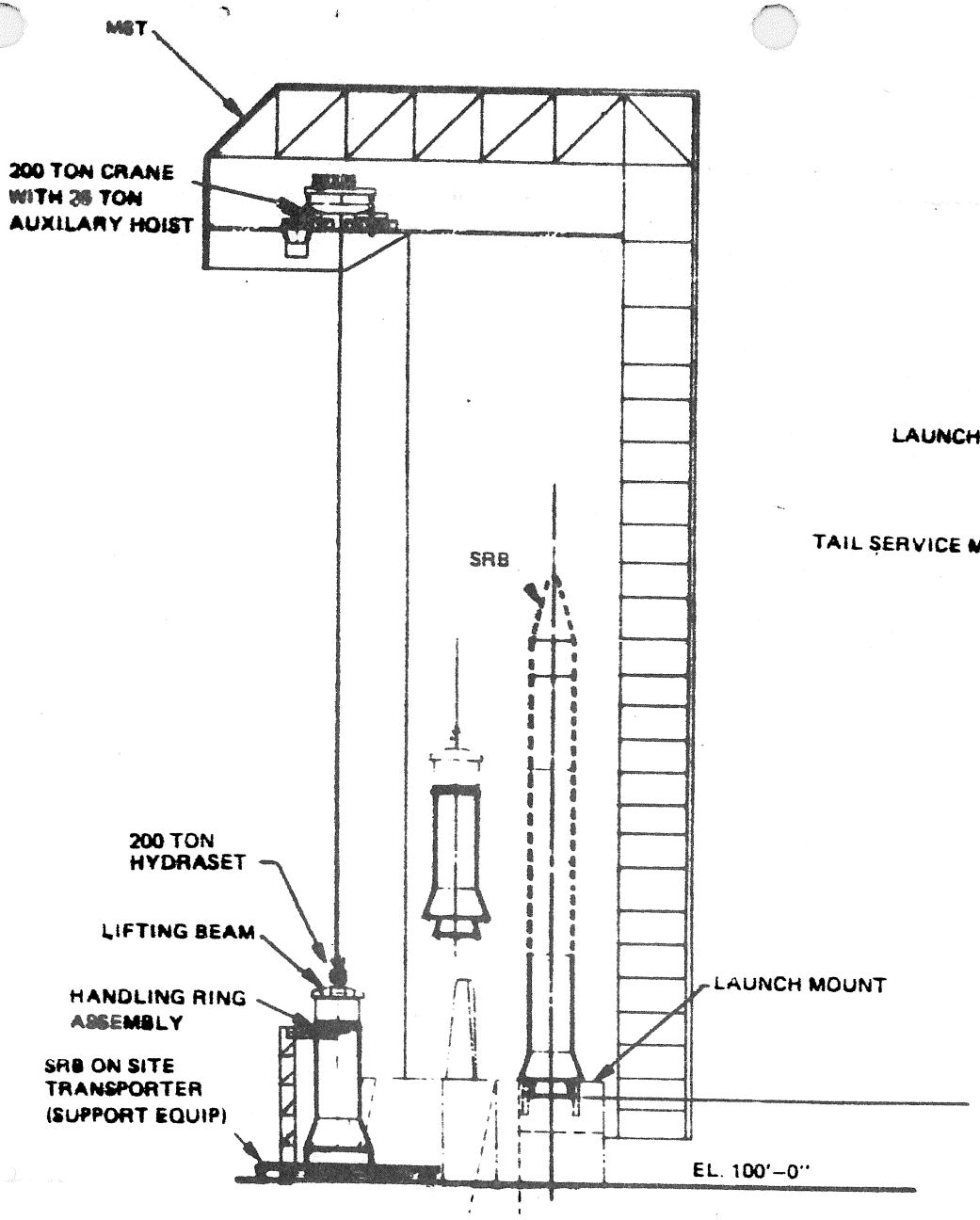


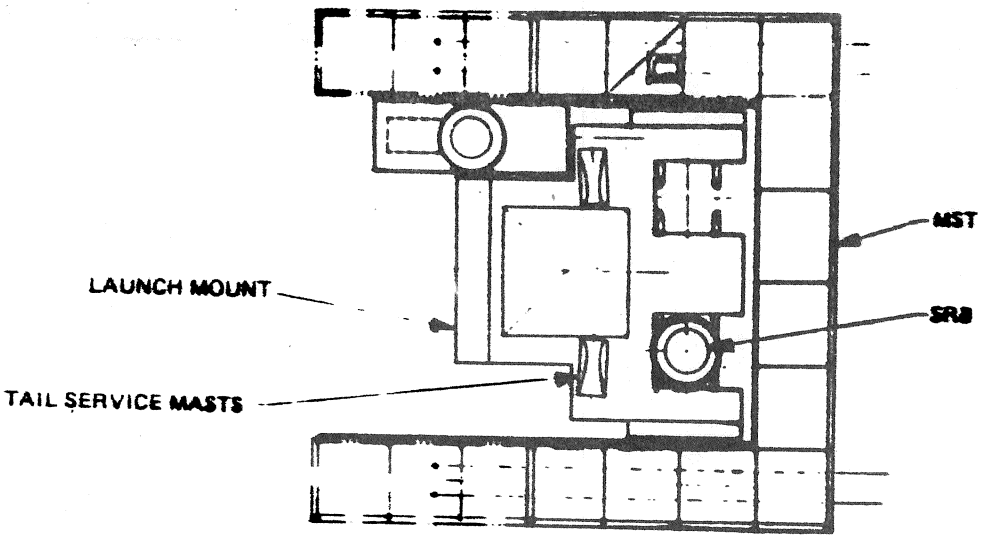


SEGMENT TRANSPORTER

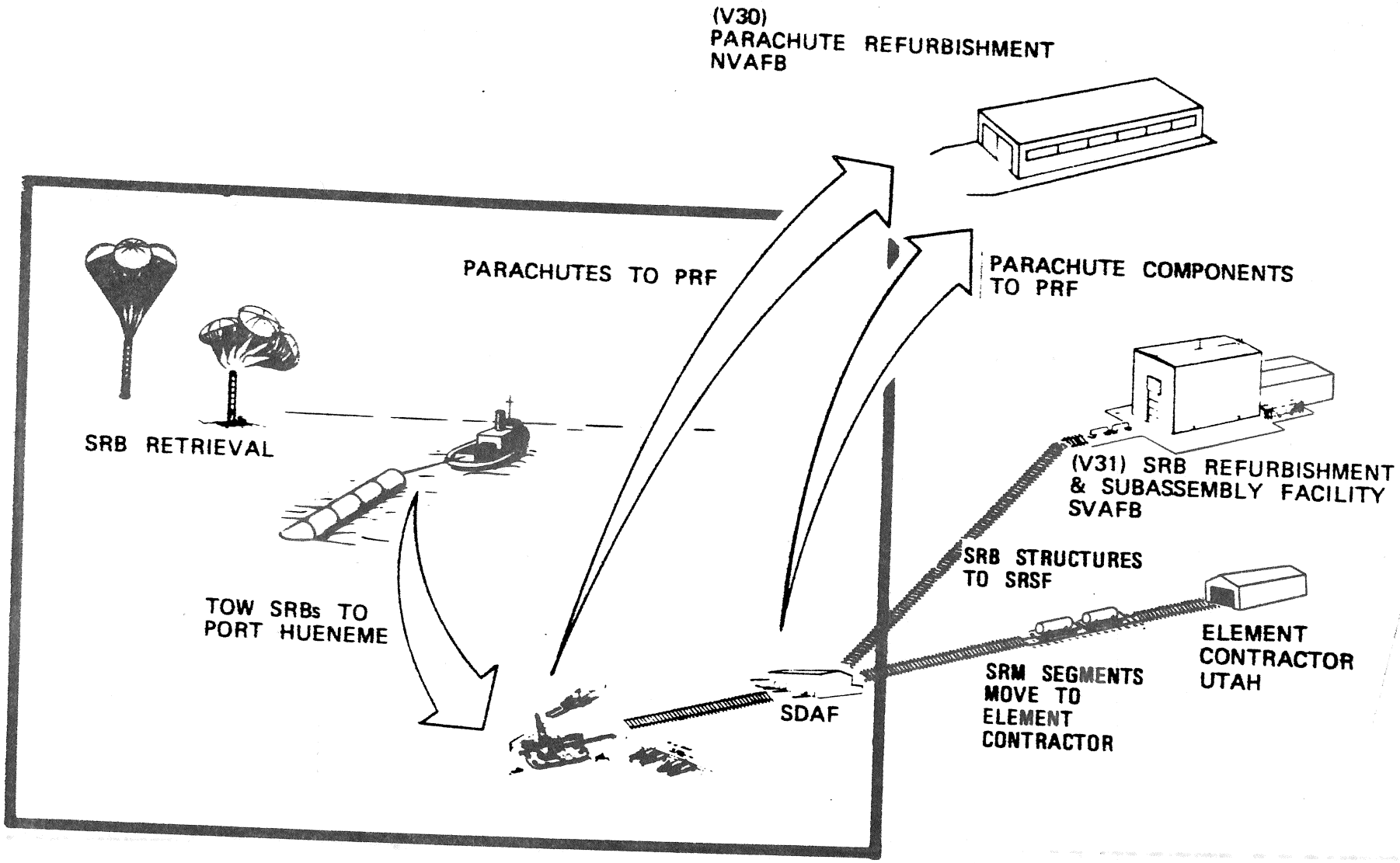


SEGMENT TRANSPORTING





SRB STACKING AND ALIGNMENT



SRB FLOW SEQUENCE

SRSF (V31) OPERATIONS

The V31 SRB Refurbishment and Subassembly Facility comprises the mechanical, electrical, fluid, and supporting major components necessary to store, assemble, service, and check out the Solid Rocket Boosters. A SRB Facility (SSF) will be provided for kitting and SE/ flight hardware.

New and refurbished solid rocket motor segments and new SRB components are received from their vendors. Retrieved SRB components are received from the V32 SRB Retrieval and Disassembly and the V30 Parachute Refurbishment Station Sets. Components are stored, assembled, checked out and delivered to the launch pad, as scheduled.

A TVC Hot Fire Facility will be provided. The facility will consist of a Control Building and Test Cell with interconnecting electrical and instrumentation wiring. The TVC Hot Fire Facility will be geographically located near Station Set V33 and will be identified as V31A. The facility will provide the facilities, equipment, manpower, supplies, planning and management required for performing checkout of the SRB aft skirt TVC system, including passivation, GN_2 spin and hot firing.

Upon arrival at the SRSF, a receiving inspection is performed on all of the components. The condition of the retrieved components if further determined by dimensional checks. These components, including the SRMs, are stored, as required, prior to transfer to the assembly buildup areas. he SRB assemblies are built up, checked out, insulated and painted, then transferred to the major assembly buildup area. The major segments, i.e., the aft booster assembly and the nose/forward skirt assembly are assembled and checked out. These segments are then connected utilizing a test cable and an assembly checkout is performed. The major segments, including the SRM segments, are then stored or transferred to the launch pad, for stacking.

SRSF Operations are comprised of the following:

a. Receiving and Inspection of New Components
b. Inspection and Dimensional Checks
c. Subassembly Buildup (New)
d. Repair and Refurbishment
e. Component Storage
f. SRB Segment Storage
g. Transport Center and Forward Segments to LP
h. Move Aft Segment to Assembly Area
i. Subassembly Buildup
j. Subassembly Checkout
k. Insulate and Paint
l. Assemble and Checkout AFT Booster Assembly
m. Assemble and Checkout Nose/Forward Skirt Assembly
n. Store Nose/Forward Skirt Assembly
o. Perform Assembly Checkout
p. Store Aft Booster Assembly in Place
q. Transport AFT Booster Assembly to LP
r. Service Equipment/Facility Preparations and Resupply
s. Transport Nose/Forward Skirt Assembly to LP

New hardware required for SRB buildup is received from the manufacturer and inspected for shipping damage and configuration compliance. This hardware includes the major structure and/or components for the aft skirt, forward skirt, frustum, stiffener rings, systems cables, cable tunnel covers, ET attach ring, aft IEA and aft flight cable. The expendable hardware includes the nose cap, ordnance ring, ET struts, nozzle extension, separation motors and associated ordnance.

The SRM segments arrive on a transcontinental rail car and are hoisted and rotated to a vertical position. The handling rings are removed and an inspection performed. The forward and center SRB segments are then transferred directly to a storage area until they are required at the launch pad for stacking. The other SRB components, including the aft SRM segment, may be stored or transported to the subassembly area for buildup of the SRB assemblies. Ordnance items, separation motors, SRM segments and other hazardour materials are stored in designated areas as required for safety.

The SRM segment shipping covers and handling rings are placed on the transcontinental rail cars and transferred to the SDAF to receive expended SRM segments.

The retrieved hardware is received from the SDAF. It includes the major structure and/or components for the frustum, forward skirt, aft skirt, ET attach rings, stiffener ring segments, and tunnel covers. The forward and aft skirts, frustum, and ET attach ring segments are placed on verification stands and visual, weld, and dimensional checks performed to verify roundness, parallelism and true position of interface points. The retrieved parachute support structure is shipped to the PRF for buildup of the parachute pack. The packs are then returned to the SRSF for storage or assembly into the recovery section.

The new skirts are received from the Receiving and Inspection area and placed on their respective installation platforms.

The forward skirt is built up by installing new hardware, including the forward IEA, rate gyros, cable assemblies, timer, RF transmitter and command receivers and decoders. After electrical interfaces are connected, a veritification is performed.

The new skirt subassemblies are now in the same configuration as the retrieved subassemblies.

Assembly buildup operations begin with the receipt of new or retrieved subassemblies in the assembly area. Those major components processed in the assembly area are the forward skirt, aft skirt, and nose assembly. The ordnance ring and separation modules are built up prior to being transferred to the assembly area.

Operations on a forward skirt buildup start when it is received from the refurbishment, receiving, or storage area and given a visual inspection. After the skirt is placed on a workstand, the two pendant, main parachute fittings, ordnance and RSS components are installed. Ordnance and RSS components consist of the Confined Detonating Fuse (CDF) hardware, NSI simulators, S&A device, and recovery components.

The buildup of the nose assembly starts with arrival of the frustum and ordnance ring at the assembly area. The ordnance ring is installed on the workstand and the frustum lowered and attached to the ring. Frustum components are installed including nose cap thrusters, separation motor module, OFI and cables, ordnance components, and flotation. The main parachute cluster pack is transferred to the assembly area and installed on its workstand. The frustum is then lowered onto the parachute cluster pack and final hookup of altitude-switch tubing and installation of parachute location aid hardware is performed.

NSI Go Simulators are installed for checkout of the ordnance system. Testing of the forward skirt assembly and nose assembly includes a continuity, E&D, ordnance and Range Safety System (RSS) check. Upon completion of the assembly checkout, the forward skirt assembly and nose assembly are transferred to the insulate and paint area.

Operations on the aft skirt buildup are started when it is received from the refurbishment, storage, or receiving area and given a visual inspection. After placing the skirt on a workstand, the CDF, CDF Manifold, Separation Motor module and Operational Flight Instrumentation (OFI) system are installed. The new aft skirt is positioned in the aft skirt buildup stand in the TVC area and is built up as follows. The TVC system is assembled on the TVC service stand in the TVC Buildup Area, a verification test performed and then moved to the aft skirt assembly area. The TVC system and actuators are then installed in the aft skirt and hydraulic and electrical interfaces are connected. Electrical and instrumentation cable assemblies are installed. The TVC system gear boxes are serviced and the actuator length is set. The hydraulic system is filled and leak checked. The new aft skirt is now the same configuration as the retrieved skirt and is moved to the aft skirt buildup stand in the assembly area for completion of buildup. The aft skirt assembly is now ready for checkout.

The hardware is transferred to an insulate and paint area for material application, then to another area for curing. The material application sequence is insulation, sealant and paint. The assemblies that require insulation and paint are the aft skirt, system tunnel covers, ETA ring, aft attach struts, forward skirt, frustum, and nose cap. Processing of the assemblies is performed in two steps, material application and curing.

The assemblies previously mentioned are then transferred to the assembly area for buildup of the nose/forward skirt assembly and the aft booster assembly.

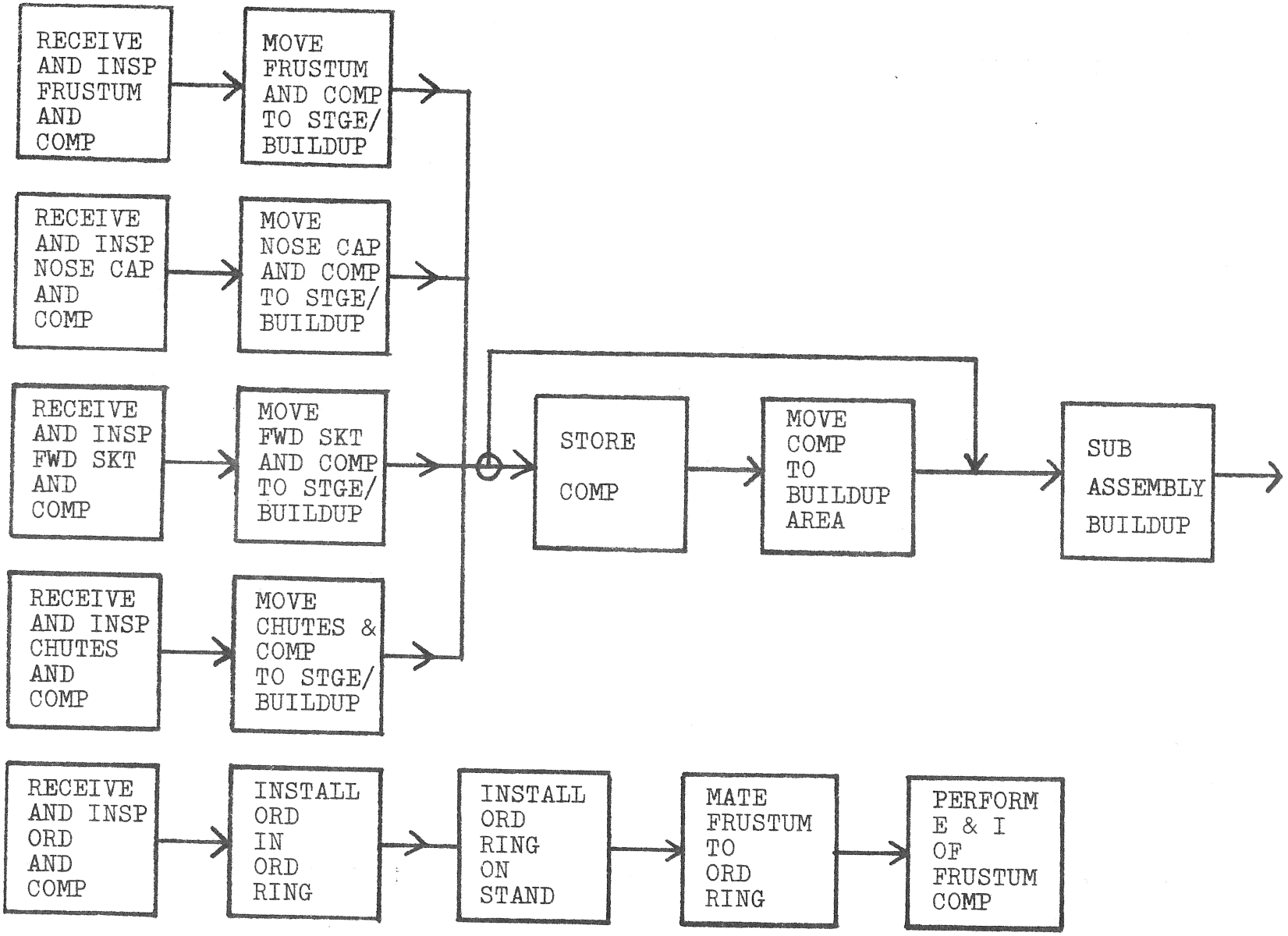
The assembly of the nose/forward skirt assembly starts with the installation of the forward skirt assembly on the assembly workstand. The frustum is then positioned over the forward skirt assembly and lowered on safety spacers between the frustum and the forward skirt assembly. The two pendants, parachute risers, and electrical cables are then connected and a continuity test performed. The safety spacers are then removed and the frustum is lowered and mated to the forward skirt assembly. The drogue/pilot parachutes are transferred to the assembly area and installed and connected. The nose cap is then transferred to the assembly area and positioned over the frustum, the drogue parachute bridle attached, then lowered and mated to the frustum. The nose assembly is now ready for checkout.

The assembly of the aft booster assembly starts with the positioning of the aft skirt assembly on the assembly stand. The aft SRM segment is transferred to the assembly area and positioned and mated to the aft skirt assembly. The nozzle extension is transferred from its storage area and positioned beneath the aft skirt/aft SRM assembly, raised and mated to the nozzle. The TVC actuators are then connected to the nozzle extension. The SRB/ET attach ring and stiffener rings are installed on the aft SRM segment. The aft booster assembly buildup will be completed by installing the aft IEA on the ET attach ring and routing the electrical flight cables from the IEA to the aft skirt. The aft booster assembly is then ready for the assembly checkout.

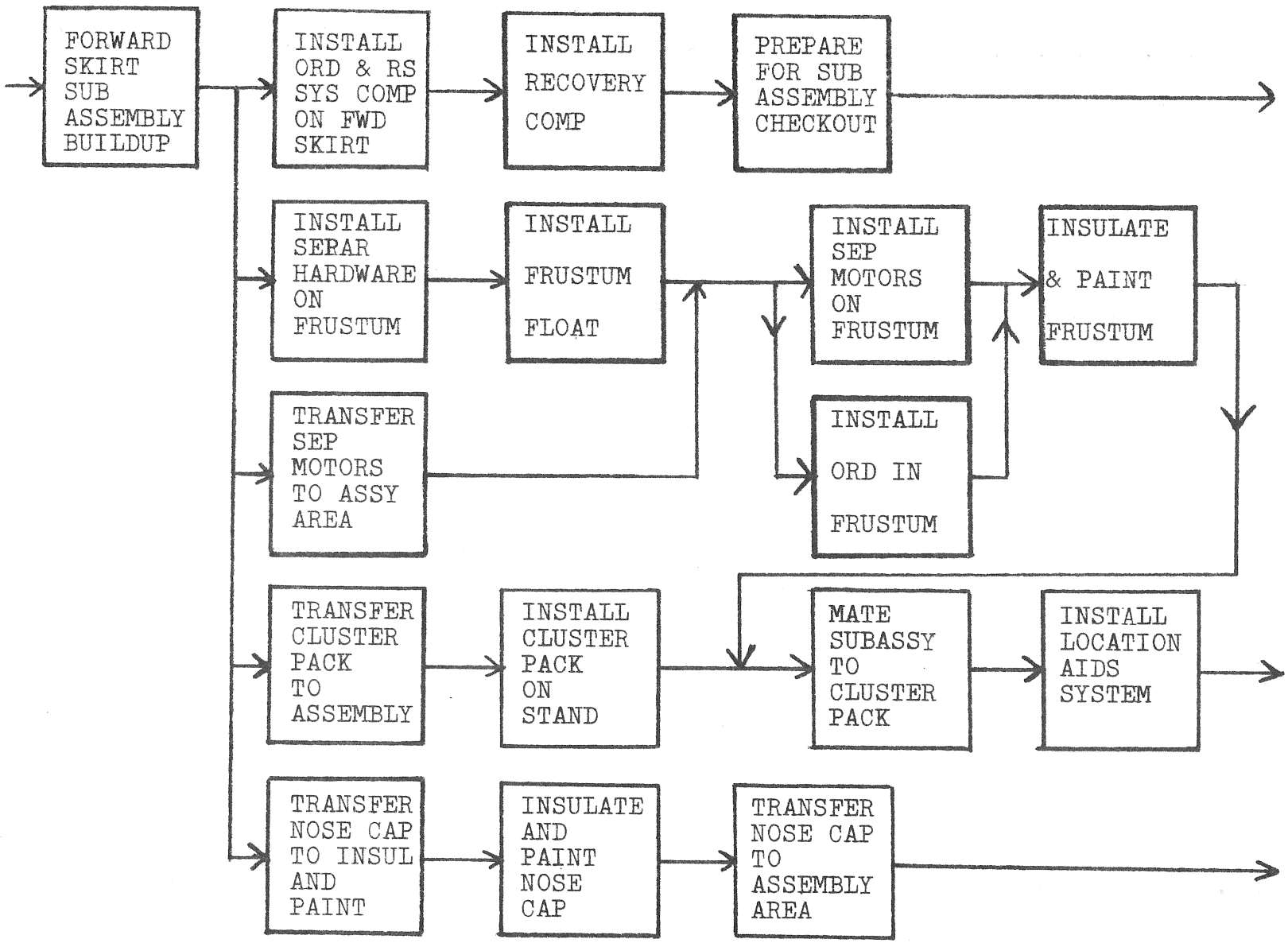
The nose/forward skirt assembly and the aft booster assembly are connected with SE cables and pre-power checks are performed. The system is then powered up and verification and checkout of all systems is performed. The test requirements for this configuration include those necessary to verify all systems and subsystems included in the forward and aft assemblies; such as, the ignition system, TVC system, separation system, location aids system, range safety system, rate gyro system and the OFI. The SE cables are then disconnected and protective covers installed on the SRB cable connectors. The aft skirt cable tunnel covers are installed.

The hose/forward skirt and the aft booster assemblies are stored or transferred to the pad for stacking.

The TVC hot fire facility is the activity center where all the equipment, facilities, and services are provided for receiving the SRB aft skirt on a rubber tired dolly, perform hydrazine servicing GN_2 spin, and hot firing test and deservicing. The SRB aft skirt TVC system hot firing activity starts with the transporting of the skirt to the hot fire facility from the SRSF facility low bay utilizing a rubber tired dolly. The TVC fuel system will then be serviced with hydrazine and a passivation and bearing soak performed. A low speed GN_2 spin will be peformed and hydraulic servicing accomplished to remove air entrapped in the TVC hydraulic system. After a GN_2 spin test and data review, a hot firing test will be performed to verify the TVC rock and tilt systems. Upon verification of a successful test by a data review, the fuel system will be drained and purged. The aft skirt will then be returned to the SRSF high bay for aft booster buildup. The facility will provide the equipment, manpower, supplies, planning and management required for performing checkout of the SRB aft skirt TVC system including passivation, GN_2 spin, and hot firing. The TVC hot fire facility will consist of a control building and test cell with interconnecting electrical and instrumentation wiring. The TVC hot fire control building, located approximately 200 ft from the test cell, will contain a control room to house the checkout and control support equipment and an engineering and data review room. The test cell will be of sufficient size to accommodate the aft skirt on the dolly with associated test and safety equipment. The cell will be supported by a hydrazine transfer system, gaseous nitrogen system and fire protection system.



FWD SKIRT REFURBISHMENT FLOW



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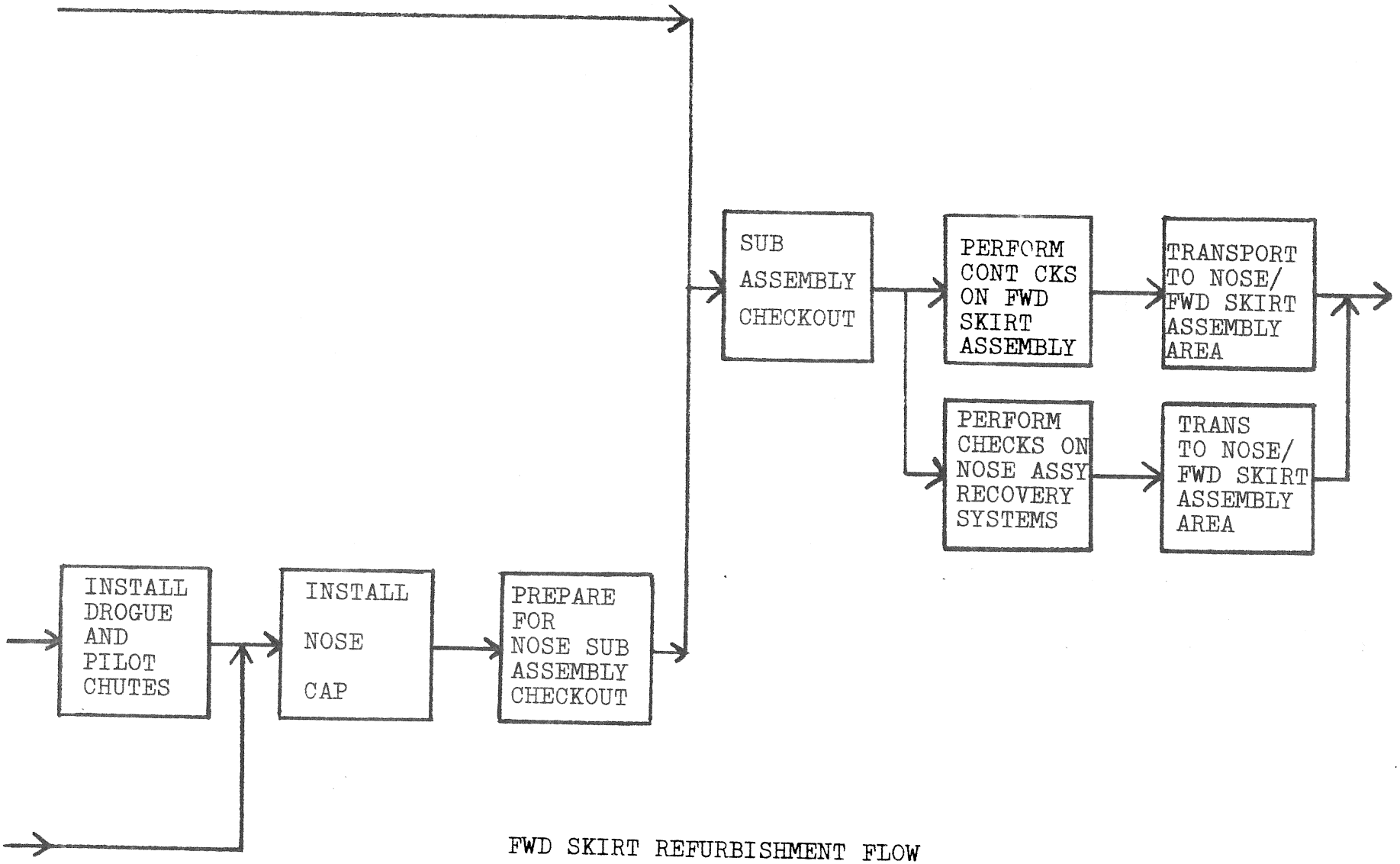

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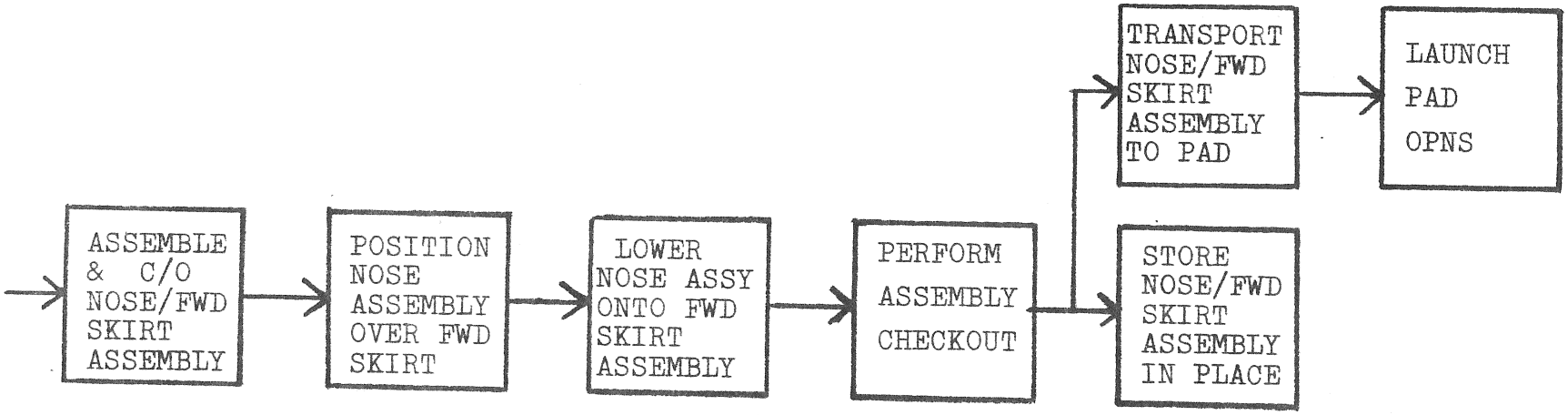

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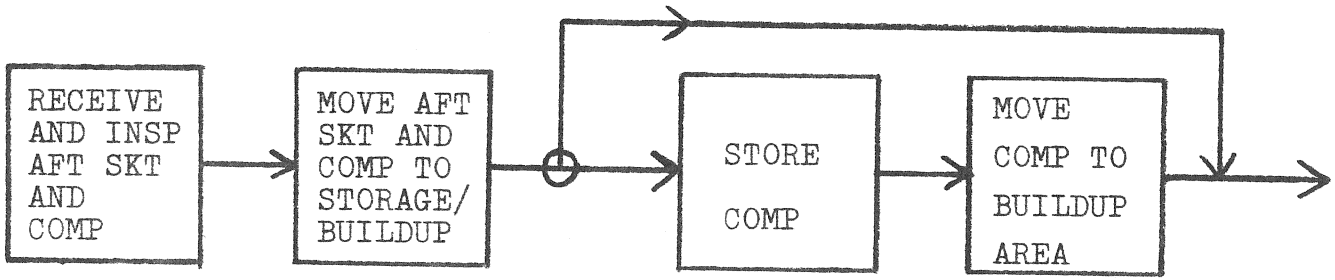
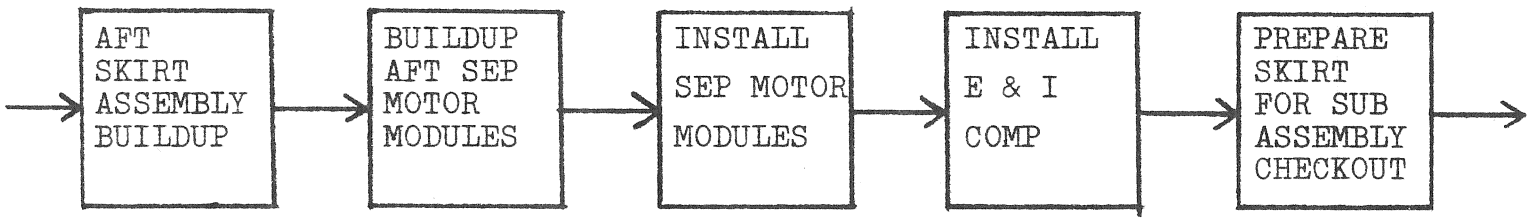


AFT SKIRT REFURBISHMENT FLOW



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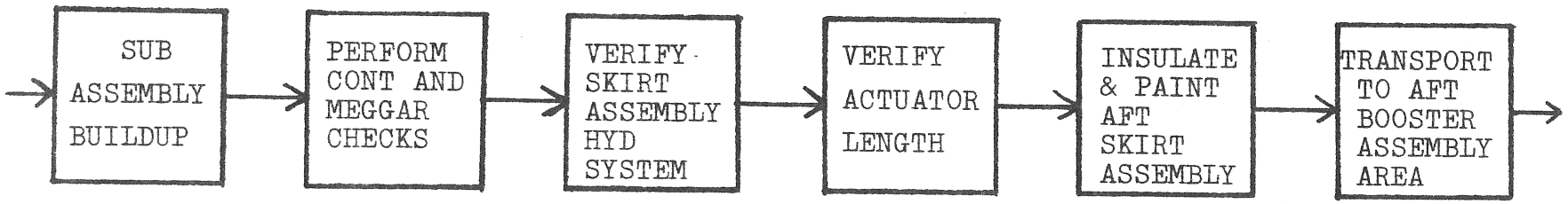

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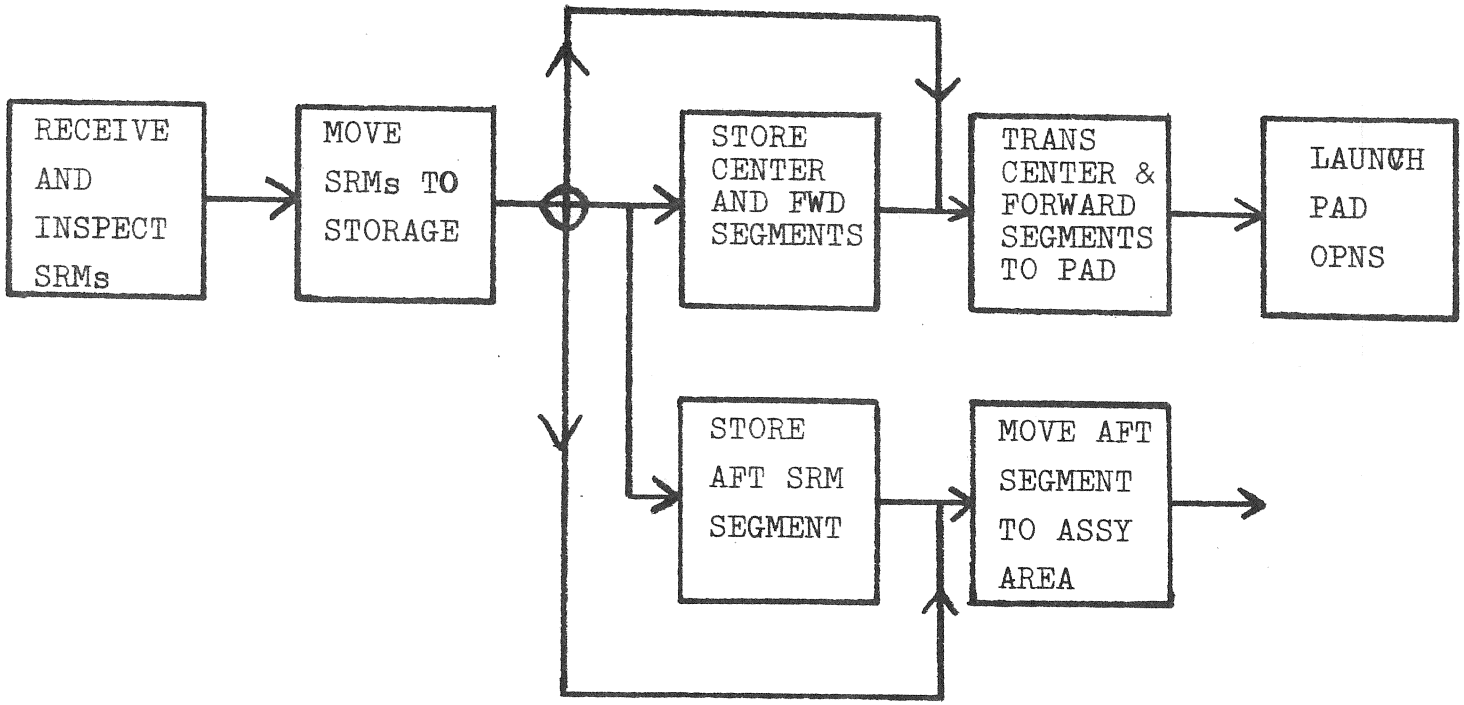
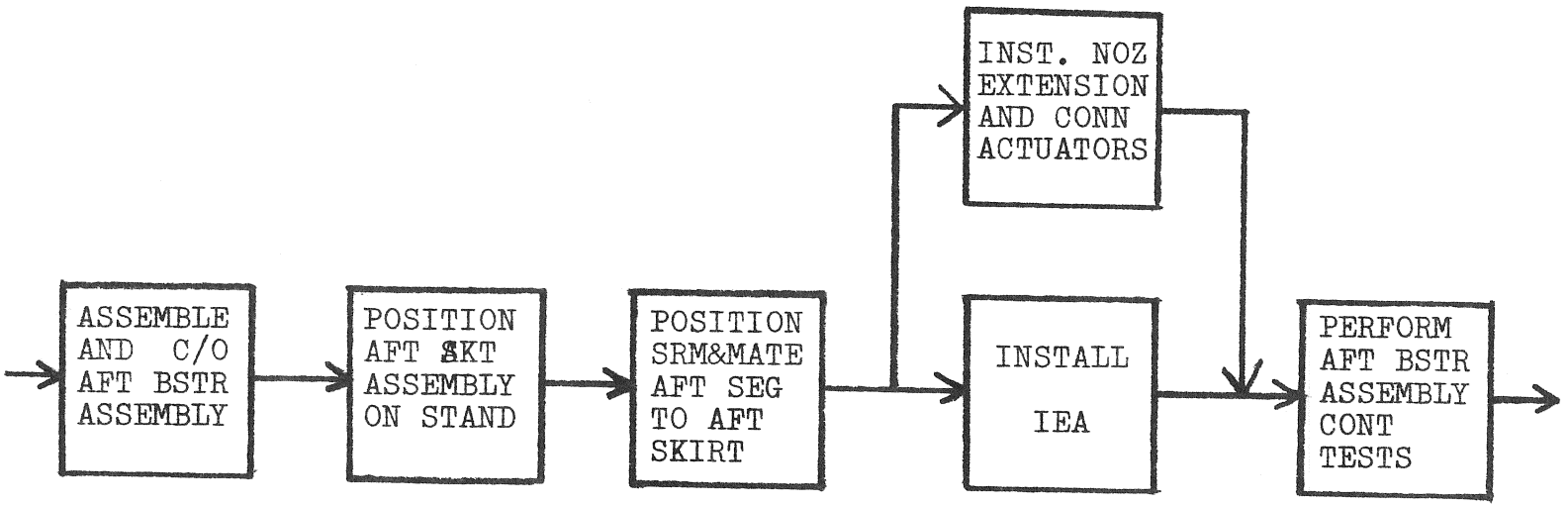


SRM REFURBISHMENT FLOW



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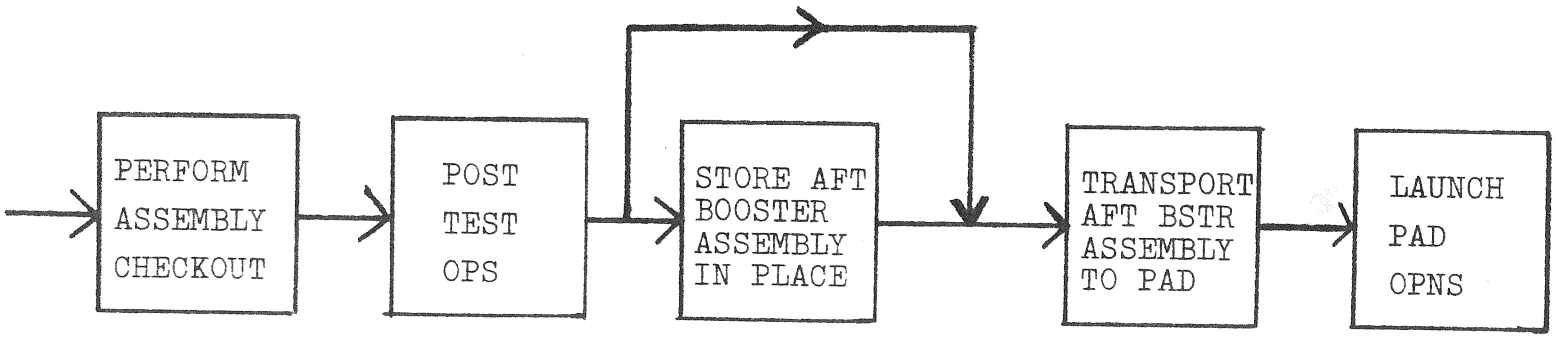

SRM REFURBISHMENT FLOW