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PROGRAM 624A FACILITY REQUIREMENTS GENERAL SPECIFICATION

HEADQUARTERS
SPACE SYSTEMS DIVISION
AIR FORCE SYSTEMS COMMAND
UNITED STATES AIR FORCE

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PROGRAM 624A

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Headquarters
SPACE SYSTEMS DIVISION
Air Force Systems Command
United States Air Force

FOREWORD

This exhibit was prepared for the use and guidance of participants in Program 624A, TITAN III Standard Space Launching System. It is one of a family of specifications that is to be used in the development of the TITAN III.

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System Program Director
for 623A and 624A

TABLE OF CONTENTS

Contents (Cont)

Contents (Cont)

SSD EXHIBIT 62-130
1 November 1962

PROGRAM 624A FACILITY REQUIREMENTS, GENERAL SPECIFICATION

1.0 SCOPE.

1.1 General.

This specification provides general requirements for the design and construction surveillance of launch and support facilities for the Standard Space Launching System (SSLS). This specification covers the necessary modifications to existing facilities at AMR (P-20), and to the design and construction of facilities at AMR (ITL) and PMR (ITL).

1.2 Purpose.

The purpose of this document is to define the general configuration and facility system requirements. This specification shall serve as the top facility requirements specification and shall provide a basis for the generation of detailed facility design criteria and concepts to be prepared jointly by the system integration contractor and the Architect-Engineer contractor from inputs supplied by the Associate Contractors.

1.3 Application.

This specification shall be applied to the contracts of the SSLS Associate Contractors, and the Architect-Engineer (A and E). Detailed facility design shall be accomplished in accordance with the requirements of this specification and with the requirements of the facility design criteria documents applicable to each launch site.

2.0 APPLICABLE DOCUMENTS.

2.1 General Application.

The following documents, with issue dates as listed below, form a part of this specification to the extent specified herein. Subordinate documents, the issue of date shown in DOD Index, dated July 1961, with Supplement dated 30 April 1962, shall apply.

2.1.1 Military Specification.

MIL-E-6051C	Electrical Electronic System Capability and Interference Control Requirements, dated 17 Jun 60
MIL-I-26600	Interference Control Requirements, Aeronautical Equipment, dated 9 May 60
MIL-STD-447	Definition of Interchangeable, Substitute and Replacement Items, 29 May 62

2.1.2 Exhibits.

SSD Exhibit 62-126	Standard Space Launching System Requirements, General Specifications, Program 624A, 1 Nov 62
SSD Exhibit 62-128	Ground Equipment Requirements, General Specification, Program 624A, 1 Nov 62
SSD Exhibit 62-163	Program Control Documents, General Specification, Program 624A, 1 Nov 62
SSD Exhibit 62-117	Reliability and Quality Program Requirements, Program 624A, 1 Nov 62
SSD Exhibit 62-164	Interface Control Requirements Specification, Program 624A, 1 Nov 62
SSD Exhibit 62-166	Environmental Requirements Specification, Program 624A, 1 Nov 62
SSD Exhibit 62-167	Contamination Control Requirements Specification, Program 624A, 1 Nov 62
SSD Exhibit 62-129	Activation Requirements, General Specifications, Program 624A, 1 Nov 62
SSD Exhibit 62-169	Systems Functional Analysis Specification, Program 624A, 1 Nov 62

BSD Exhibit 61-99	Human Engineering, General Specifications Air Force Ballistic Missile Systems, 1 Feb 62
AFBM Exhibit 58-20A	Gas and Fluid Line Identification, 1 Dec 60

2.1.3 Manuals.

AFSCM Manual 375-1	Configuration Management during the Phase, dated 1 June 1962

2.1.4 Criteria Documents.

Reference A: Program 624A Facility Design Criteria, Launch Complex P-20, AMR SSS-TIII-OOR FAC/AMR/P-20

2.1.5 Criteria - Concept Documents.

Reference B: Criteria and Concepts SLV5-ITL Systems (TITAN III) Technical Launch Facilities, CCMTA

Reference C: Criteria and Concepts SLV5-ITL Systems (TITAN III) Technical Launch Facilities, PMR

3.0 REQUIREMENTS.

3.1 Facility Design Criteria and Concepts.

Facility design criteria and concept documents, as referenced in this specification, shall identify those facilities subsystems or components which require verification or reliability testing, define the detailed requirements for A and E design, define the required verification test procedures, and identify the physical and functional interfaces between the facility and SSLS equipment developed by the Associate Contractors. Facility requirements shall be in accordance with the general specifications for SSLS requirements, SSD Exhibit 62-126, and as specified herein.

a. Criteria Document - The document as referenced throughout this specification as Reference A shall be prepared by the system integration contractor with inputs from the Associate Contractors. This document shall be applicable as of the latest approved issue.

b. Criteria - Concept Documents - These documents as referenced throughout this specification as References B and C shall be prepared jointly by the system integration contractor and the Architect-Engineer Contractor with inputs from the Associate Contractors. These documents shall be applicable as of the latest approved issue.

3.1.1 Approval of Facilities Design Criteria and Concepts - Facilities design criteria and concepts shall be submitted to SSD, Aerospace, and Associate Contractors for review, and to SSD for approval. The Aerospace/Associate Contractor review shall be for the purpose of determining functional and technical adequacy and shall be under the direction of Aerospace.

3.1.2 Approval of Architect-Engineer Design Drawings and Specifications - Design Drawings and Specifications shall be submitted to SSD, Aerospace, and Associate Contractors for review, and to SSD for the purpose of determining conformance to the approved design criteria and concept documents. After completion of final design drawings and specifications the system integration contractor and such other Associate Contractors as directed by SSD shall review and sign-off on these drawings and specifications. This sign-off shall certify that Facility Design is compatible with approved systems requirements.

3.1.3 Interface Responsibilities - Interfaces shall be controlled in accordance with SSD Exhibit 62-164. An interface code denoting each interface between Associate Contractors and between the AGE and facility systems, shall be prepared by the system integration contractor and approved by SSD, and shall identify the affected contractors, location of the interface and the appropriate system affected.

3.1.4 Changes - Changes to this document shall be made in accordance with SSD Exhibit 62-163. Changes to construction documents shall be in accordance with Configuration Control Board Instructions.

3.1.5 Environments - All equipment, structures, and installations designated as facilities shall be designed for satisfactory performance during and after being subjected to the environments specified herein. Facilities will be subjected to geophysical, induced, and controlled environmental conditions. The facilities shall also be compatible with SSD Exhibits 62-166 and 62-128.

3.1.5.1 Geophysical - The geophysical environment to be considered in the design of the facility shall be as follows:

a. Wind Loads - Provisions shall be made for stresses caused by wind during facility erection and after the facility is complete. Three categories of wind apply to facilities design: Launch wind, maximum operation wind, and maximum design wind.

(1) Launch Wind - All facilities shall operate to full specification requirements for this wind. The launch wind values shall be as specified in References A, B, or C as applicable.

(2) Maximum Operation Wind - These are the maximum short warning wind values associated with thunderstorms and shall be as specified in References A, B, or C as applicable.

(3) Maximum Design Wind - This wind is associated with a hurricane and time is available for securing and tying down. All facilities shall be designed to survive this wind condition with only minor damage. The maximum wind values shall be as specified in References A, B, or C as applicable.

(4) Operational Requirements - In the range of wind velocities between launch wind and maximum operation wind, normal operations shall be halted; the vehicle, if in position, shall be protected by the erector or Mobile Service Tower. In wind velocities above maximum operating wind the vehicle shall be dismantled and all equipment including the erector and/or mobile service tower shall be secured.

b. Temperature - Permissible variations in temperature limits shall be as specified in References A, B, or C as applicable.

c. Humidity and Precipitation - Drainage, leakage, salt atmosphere, pressure, lightning, and sand penetration effects shall be taken into consideration where applicable.

3.1.5.2 Induced - Facility design shall meet the induced environmental requirements inherent to launch complex operations such as engine exhaust gases, acoustic levels, propellant effects, etc., as specified in References A, B, or C as applicable.

3.1.5.3 Controlled - Sufficient static pressure shall be maintained to prevent infiltration of contaminated air into controlled environment areas.

3.1.6 Design Considerations - Particular attention shall be paid to those items that will require refurbishing after each launch. Refurbishing time after a normal launch shall not exceed 2 days with 2 eight (8) hour shifts each. After six (6) normal launches there may be a two (2) week period required for major stand maintenance or flame bucket refurbishing.

3.1.7 Human Engineering - The design of all facilities shall be in accordance with BSD Exhibit 61-99.

3.1.8 Maintainability - The design of all equipment shall adhere to the maintainability principles as established in SSD Exhibit 62-126, Attachment 1.

3.1.9 Interchangeability and Replaceability - Facilities shall be designed to be interchangeable and/or replaceable within the definitions set forth in MIL-STD-447.

3.1.10 Equipment Identification - A referenced designator (component identification code) shall be assigned to each item of equipment during the design phase and shall be used without change by all participating agencies.

3.1.11 Service Life - The facilities shall be designed for a normal service life of ten years.

3.1.12 Contamination Control - Provisions shall be made in the design, installation, and maintenance of all facility components and systems for contamination control in accordance with SSD Exhibit

62-167 as implemented by the Integrated Contamination Control Plan.

3.1.13 Fluid Line Identification - All gas and fluid lines and electrical conduit shall be color coded in accordance with AFBM Exhibit 58-20A.

3.1.14 Activation - Activation requirements and acceptance of checkouts for each launch complex shall be in accordance with SSD Exhibit 62-129.

3.1.15 Transfer of Launch Complex - Launch Complex transfer of accountability to the customer shall be in accordance with SSD Exhibit 62-129, Annex I.

3.1.16 Standard and Commercial Parts - Maximum practical use, commensurate with design requirements, shall be made of military standard parts, commercial parts, and parts of systems that are in common use or readily available. The variety of types and sizes of parts shall be held to a minimum compatible with system requirements.

3.2 Facility Construction Surveillance.

Requirements for construction surveillance by the system integration contractor and by such other Associate Contractors as directed by SSD shall be as follows:

a. Maintain cognizance of 624A facility construction through review of construction schedules and monitoring of construction contractor's performance as related to RPIE/AGE interface and participation with the construction agency in progress and performance reviews.

b. Perform reviews of appropriate facility shop drawings to ensure compatibility between the technical facilities and all other 624A systems.

c. Review for technical content, proposed construction contract changes as defined by Facility Engineering Change Proposals (FECP) pertaining to interface or function requirements.

d. Prepare Facility Engineering Change Proposals. Methods and procedures shall be in accordance with AFSCM Manual 375-1.

e. Construction surveillance activity shall include determination of the extent of compliance with the following documents:

(1) Interface Specifications.

(2) A&E Drawings, Specifications and Facility Acceptance Test Procedures.

(3) Shop Drawings and Contractor Field Construction Drawings.

(4) Construction contractor's schedules and the construction agency's program schedule.

(5) Construction agency's modification packages, change orders and letters of clarification.

(6) Master Equipment List. Deviations or discrepancies between the facility and the above document shall be reported to SSD.

(7) Construction Progress Reports. Progress of construction shall be monitored and reports prepared indicating projected and actual completion of key construction events.

(8) Construction Surveillance Plan. A construction surveillance plan shall be prepared and approved by SSD prior to implementing construction surveillance activities.

f. Participate in the facility acceptance inspection conducted with specifications provided by the Government. Deviations or discrepancies between the facility and the specifications shall be reported to SSD.

g. Deviations and/or deficiencies as they relate to interfaces between Real Property Installed Equipment (RPIE) and AGE shall be identified and reported to SSD.

3.3 Launch Complex P-20, AMR - Launch complex P-20 shall be converted on a minimum time, minimum modification basis from a Titan I Lot M, R and D configuration to accommodate the 624A Configuration A.

3.3.1 Function - The launch complex shall be designed to have the capability to assemble, service, checkout, and launch the 624A Configuration A as determined by the functional analysis provisions of SSD Exhibit 62-169.

3.3.2 Description.

The converted P-20 complex shall consist of the following existing, new, or modified systems or facilities:

a. Roads, fences, hardstands, and parking areas.
b. Launch stand.
c. Erector.
d. Umbilical tower.
e. Approach ramp building.
f. Cable ways.
g. Air conditioning shelter.
h. Propellant holding areas.
i. Theodolite building.
j. Control building.
k. Gas distribution system (AGE).
l. Water systems (Facility and AGE).
m. TV & Film Camera Pads.
n. Power supply and distribution system.
o. Instrumentation system (AGE).
p. Communication and hazard alert system.
q. Propellant vapor disposal (AGE) system.
r. Propellant transfer and pressurization system (AGE).
s. Contaminated Propellant and emergency disposal system.
t. Grounding system.
u. Change House (Protective clothing support area).
v. Pressure Controller Shelter.
w. Erector Hydraulic System.
x. Helium Storage Area.

Detailed requirements for each of the items mentioned above shall be as specified in Reference A.

3.3.3 Design Parameters.

The design parameters to be employed shall be those concerning environments, loads, launch stand rigidity, etc. as

defined in Paragraph 3.1.5 herein and Reference A. For detailed civil, architectural, structural, mechanical, and electrical requirements, see Reference A.

3.3.3.1 Civil

3.3.3.1.1 Grading and Drainage - Requirements for location, orientation and elevations (sea level datum) for existing and proposed buildings, area grading and drainage facilities shall be as specified in Reference A.

3.3.3.1.2 Launch Stand Area - Requirements for launch stand area paving shall be as specified in Reference A.

3.3.3.1.3 Access Roads, Holding Areas, Hard Stands, and Parking Areas - Materials used in these areas shall be compatible with the equipment and use identified for that area.

3.3.3.1.4 Sanitation - Detailed sanitation requirements shall be as specified in Reference A.

3.3.3.1.5 Fencing and Gates - Existing security fences and gates shall be modified, relocated or extended as required. All fencing material and construction methods shall conform to base security regulations.

3.3.3.2 Architectural and Structural Requirements

3.3.3.2.1 Launch Stand - Structural, mechanical, and electrical requirements shall be as specified in Reference A.

3.3.3.2.2 Erector - The erector will be increased in height and modified, as required, to allow the erection, assembly, checkout, etc., of the 624A Configuration A.

3.3.3.2.3 Umbilical Tower - The umbilical tower structure shall be increased in height and modified, as required, to support AGE lines servicing the complete vehicle during prelaunch.

3.3.3.2.4 Approach Ramp Building and Cableways - The approach ramp building shall be modified to accommodate the various changes in location and routing of AGE. The approach ramp building and cableways shall be sealed as required to meet building pressurization requirements. The extent of modifications such as the removal and replacing of doors, partitions, AGE mounting equipment, handrails, platforms, etc., and the pressurization requirements shall be as specified in Reference A.

3.3.3.2.5 Air Conditioning Shelter - No modifications to the existing air conditioning shelter will be required for the SSLS configuration proposed for use at this complex.

3.3.3.2.6 Propellant Holding Area - Requirements for fuel and oxidizer holding areas shall be as specified in Reference A.

3.3.3.2.7 Theodolite Building - A Theodolite Building shall be provided to house IGS Theodolite Equipment, as required by Reference A.

3.3.3.2.8 Control Building - The modifications required to the existing control building are as specified in Reference A.

3.3.3.2.9 Change House - The existing Fuel Storage and Transfer Building shall be modified for use as a protective clothing support area. Requirements for storage, lockers, dressing area, toilets and showers shall be as specified in Reference A.

3.3.3.2.10 Helium Storage Area - Requirements for a High Pressure Helium Gas Storage Area shall be as specified in Reference A.

3.3.3.2.11 Pressure Controller Shelter - Requirements for a pad and shelter to accommodate the nitrogen filter bank and pressure controller shall be as specified in Reference A.

3.3.3.3 Mechanical.

3.3.3.3.1 Water Systems - The existing water system will require only minor modifications.

3.3.3.3.2 Environmental Control.

3.3.3.3.2.1 Pressurization and Air Conditioning - A positive static pressure shall be provided by the facility where required in order to prevent contaminated air from entering areas occupied by personnel.

3.3.3.3.3. Propellant Facilities - Facility design shall include a fuel holding area, an oxidizer holding area, the equipment support structure, shelters, revetments, trailer hardstands, pipe support footings, and contaminated propellant disposal facilities.

3.3.3.3.4 Contaminated Propellant and Emergency Disposal System - Provisions shall be made for a contaminated propellant and emergency disposal system.

3.3.3.3.5 Erector Hydraulic System - Requirements for modification to the erector hydraulic system shall be as specified in Reference A.

3.3.3.4 Electrical.

3.3.3.4.1 General - The electrical system shall be as specified in Reference A. The scope of work required in the area of electrical facilities include: removal, disconnection, modification, and relocation of existing electrical equipment; extension of existing systems and circuits; and construction of new components. Electrical installations shall include lighting, power, grounding, underground duct banks, manholes, camera stations, alarm, warning, and control systems as required within the launch complex. Facility supplied power shall meet Electrical/Electronic AGE power requirements and characteristics as specified in SSD Exhibit 62-128.

3.3.3.4.2 Electro-Interference.

a. The facility shall operate satisfactorily without malfunction or degradation of performance due to electro-magnetic interference:

(1) Generated by the equipment defined herein and in SSD exhibits 62-126, 62-128 and 62-129

(2) In the electro-magnetic environment at AMR and PMR.

(3) With all payloads and payload AGE which comply with requirements of MIL-I-26600 and MIL-I-6051.

b. The facility shall not generate an electro-magnetic environment which causes malfunction or degradation of performance of:

(1) Other equipment of the facility.

(2) Payloads and payload AGE which comply with requirements of MIL-I-26600 and MIL-I-6051.

(3) Other equipment at AMR and PMR which complies with requirements of MIL-I-26600 and MIL-I-6051.

3.3.3.4.3 Grounding Requirements - Facility grounding shall conform to the grounding requirements as specified in Reference A.

3.3.3.4.4 Lightning Protection - Lightning protection shall conform to the requirements as specified in Reference A.

3.4 ITL System - AMR and PMR

3.4.1 Function - The above complexes are new facilities. These launch complexes shall be designed to have the capability to assemble, service, checkout and launch 624A configuration A and C vehicles as determined by functional analysis provisions of SSD Exhibit 62-169. These complexes shall contain all the features of the Integrate-Transfer-Launch Facility.

3.4.2 Descriptions

3.4.2.1 The ITL system shall consist of Complex 40, 41 and 42 at AMR and Complex 1 and 2 at PMR as follows:

a. Fixed umbilical tower.

b. SSLV Transporter and umbilical masts.

c. Mobile service tower (MST).

d. MST tracks, runway, anchorage and parking.

e. Dry exhaust duct and flame deflector.

f. Propellant holding areas.

g. Propellant liquid and vapor disposal facilities.

h. Propellant transfer and pressurization system.

i. Domestic and industrial water system.

j. AGE building.

k. Vehicle and facility air conditioning systems.

l. TV and film camera facilities.

m. Theodolite station and guidance facilities.

n. Power distribution and grounding systems.

o. Communications systems.

p. Roads, fences, miscellaneous hardstands.

q. Control center and interconnecting cabling.

r. Pressurization gas storage and distribution system.

s. Complex Support Building.

t. Barge unloading area, including turning basin and barge channels.

u. Segment Receipt-Inspection Building (RIS).

v. Segment Ready Storage Building (SRS).

w. Segment Arrival Storage Area (SAS).

x. Solid Motor Processing and Storage Area (SMPSA).

y. Warehouse.

z. Rail transfer system.

aa. Motor Inert Component Assembly - Storage Bldg. (MIS).

ab. Vertical Integration Building (VIB).

ac. Solid Motor Assembly Building (SMAB).

ad. Refurbish Area.

ae. Ready Building.

af. Supply and Issue Shops.

ag. Instrumentation System.

ah. Protective Clothing Support Building.

ai. All interconnecting utilities, roads, and power stations.

aj. Air Conditioning Shelter.

ak. Pyrotechnic Facilities.

Detailed requirements for each of the items mentioned above shall be as specified in References B and C.

3.4.3 Design Parameters - In the event of an incident the control center and MST (in retracted position) shall be designed to survive. Detailed requirements for the ITL System for AMR and PMR concerning environments, loads, launch stand rigidity, etc., shall be defined in Paragraph 3.1.5 herein, and in References B and C. Detail civil, architectural, structural mechanical and electrical requirements shall be defined in References B and C.

3.4.3.1 Civil - Requirements for the ITL System for AMR and PMR regarding grading and drainage, launch stand area, access roads, sanitation, and fencing and gates shall be as specified in References B and C.

3.4.3.2 Architectural, Structural, Mechanical and Electrical

3.4.3.2.1 Launch Stand - The launch stand shall provide a substructure for the umbilical tower, vehicle transporter frame and transporter rails. The launch stand shall contain the following:

a. A foundation for the umbilical tower.

b. Dry flame deflector.

c. Transporter frame supports and anchor bolts.

d. Exhaust duct.

e. Provision for water deluge system.

f. Sump.

3.4.3.2.2. Flame Deflector and Exhaust Duct - A flame deflector and exhaust duct shall be provided to turn, conduct, and discharge the exhaust gases in a manner which will preclude any major damage to the launch stand, exhaust duct, MST, or any adjacent launch complex facility during thrust build-up and lift-off.

3.4.3.2.3 Mobile Service Tower (MST) - The MST structure shall provide work platforms which will partially or completely encircle the vehicle, as required, and a means of raising, lowering and transporting the vehicle stages, solid motor segments and spacecraft.

3.4.3.2.4 Umbilical Tower - The umbilical tower shall be a structural tower capable of supporting and positioning the umbilical service lines (AGE) from the ground up the tower to the required elevations opposite the SSLV and spacecraft. The tower shall provide an elevator, access ladders, and platforms for handling equipment, ease of maintenance of umbilicals and access to the vehicles.

3.4.3.2.5 Air Conditioning Shelter - A building shall be provided to house air conditioning equipment for vehicle and spacecraft.

3.4.3.2.6 Cable Enclosures and Cabling - Cable enclosures shall be provided for interconnecting cabling between the launch stand, control center, AGE building, and guidance station.

3.4.3.2.7 Control Center - A control center shall be provided in the VIB for launch operations, and shall house launch control equipment. The control center shall be environmentally controlled and of adequate size to house all launch instrumentation and control equipment required in the SSLS Program, both SSLS OGE and spacecraft OGE.

3.4.3.2.8 AGE Building - An AGE equipment building shall be provided at the launch stand area. The building shall house checkout OGE, power supplies, sanitary facilities, pressurization control room (truck access required) and a cable tray passage way (interconnections from the control center shall pass through this passage way) to the umbilical mast. The building shall be designed for accommodation of the ITL mobile checkout vans and spacecraft checkout vans.

3.4.2.9 Theodolite Building - A theodolite building shall be provided to house IGS theodolite equipment, as specified in References B and C.

3.4.3.2.10 Storable Propellant Areas - Propellant holding areas shall be be provided for storable fuels and oxidizers, and shall provide for railroad tank car delivery of propellants. The propellant holding area shall also provide hardstands and space for transports, holding tanks, conditioning and transfer units. The holding areas shall provide revetted walls for blast protection and sumps for containing spills, should an incident occur.

3.4.3.2.11 Cyrogenic Holding Areas - Cyrogenic holding areas shall be provided for the LH_2 and LN_2 used in the X-20 vehicle. The holding areas hardstands locations and disposal area requirements for each shall be as specified in Reference B for Complex 40 AMR.

3.4.3.2.12 Gas Storage Shelter - A gas storage area shall be provided for the N_2, Helium and GO_2 pressurization gas storage, distribution, conversion, and pressure regulation equipment and

controls. A shelter shall also be provided for gas generation equipment.

3.4.3.2.13 Ready Building - Administrative space shall be provided for the Associate Contractors and range personnel, which are required in support of launch operations.

3.4.3.2.14 Motor Inert Component Assembly - Storage Building (MIS) - Storage and work area shall be provided in the Inert Assembly Building to permit build up of the solid motor inert sub-assembly.

3.4.3.2.15 Segment Receipt Inspection Building (RIS) - A building shall be provided for the Receiving and Inspection of solid motor segments and end closures containing live propellant. Also build up of aft segment to nozzle and skirt sub-assembly as well as build up of forward closure sub-assembly shall be accomplished. Appropriate consideration shall be given in the design of this building to the handling of live propellant.

3.4.3.2.16 SSLV Transporter and Track System - A transporter and track system shall be provided to transport the assembled vehicles from the Vertical Integration Building (VIB) through the Solid Motor Assembly Building to the Launch Pad. The transporter track system shall support the combined weight of the transporter and 624A Configuration A or C.

3.4.3.2.17 Solid Motor Assembly Building - A solid motor assembly building shall be provided for assembly and checkout of the solid motors and for mating of these motors to the basic vehicle. Appropriate consideration shall be given in the design of this building to the handling of live propellants.

3.4.3.2.18 Solid Motor Processing and Storage Area - The Solid Motor Processing and Storage Area shall comprise all facilities required to accomplish barge unloading, segment receipt-inspection-storage and inert component receipt-inspection-sub-assembly.

3.4.3.2.19 Pyrotechnic Facilities - Existing AMR facilities will be made available for receiving, inspection and storage of pyrotechnics.

3.4.3.2.20 Vertical Integration Building - A vertical integration building shall be provided for the assembly and checkout of boosters and payloads. The VIB shall also provide space for launch control equipment, laboratories, communications equipment, inspection, maintenance and storage areas and administrative requirements.

3.4.3.2.21 Protective Clothing Support Building - Protective Clothing Support Building shall provide storage, lockers, dressing area, toilets, showers, etc., as specified in References B and C.

3.4.3.2.22 Complex Support Building - Complex Support Building shall provide equipment storage, tool crib, and technician work space, as specified in References B and C.

3.4.3.2.23 Track System - A standard railroad track system shall be provided for transportation of solid rocket motors through the solid motor processing and storage areas; to the solid motor assembly building and to the launch complexes as specified in References B and C. The standard track system shall also provide for transportation of storable propellants to each launch complex propellant holding area.

3.4.3.2.24 Barge Unloading Area - A barge channel, turning basin, dock and off-loading facility shall be provided for handling of the railroad cars transportating solid rocket motors and storable liquid propellants to the ITL area. The detail requirements for these facilities shall be as specified in Referenced B and C.

3.4.3.2.25 Refurbish Area - A refurbish area shall be provided for refurbishing the SSLV transporter frame and umbilical masts after a launch. Detail requirements for this area shall be as specified in References B and C.

3.4.3.2.26 Direct Support Facilities - Administrative Space, enclosed storage space, shops, and laboratories shall be provided to support

Associate Contractor requirements during the activation and launch operation.

3.4.3.2.27 Water Systems - Storage, pumping, distribution and control facilities shall be provided for domestic and industrial water requirements at each launch complex. Water is required for: launch stand washdown, launch mount deluge, propellant dilution, core engine deluge, thrust chamber spray, umbilical tower, mobile service tower, potable water, hose stations, fuel holding areas, oxidizer holding areas, solid motor processing and storage area, hydraulic system cooling, personnel shower and eyewash fountains. In addition to the above, water is also required for the Solid Motor Assembly Building and the Vertical Integration Building.

3.4.3.2.28 Environmental Control - Requirements for air conditioning and/or environmental control within buildings and structure shall be as specified in References B and C.

3.4.3.2.29 Electrical - Facility supplied power shall meet electrical/electronic AGE power requirements and characteristics as specified in References B and C. Electrical installation shall include communications, lighting, power, grounding, underground duct banks, manholes, camera stations, alarm warning and control systems.

3.4.3.2.29.1 Primary Power - The incoming power supply system shall be sized by the facility contractor to meet all facility and AGE requirements.

3.4.3.2.29.2 Secondary Power - The facility shall provide necessary unit sub-stations, distribution panels, lighting transformers, lighting panels, etc., required for the complete ITL System.

3.4.3.2.29.3 Emergency Power - Emergency power shall be provided at the Vertical Integration Building and the launch complexes for safe shutdown of launch vehicle and spacecraft OGE and GIE. Requirements for emergency power shall be provided at the

SMAB and SMPSA as specified in References B and C.

3.4.3.2.29.4 Electro-Interference - Same as 3.3.3.4.2.

3.4.3.2.29.5 Grounding - Facility Grounding shall conform to grounding requirements as specified in References B and C.

3.4.3.2.29.6 Lightning Protection - Lightning protection shall conform to the requirements specified in References B and C.

4.0 QUALITY ASSURANCE.

4.1 General.

Quality Assurance provisions shall meet the requirements of SSD Exhibit 62-117, as applicable to facilities.

4.2 Verification Tests.

Verification Tests shall be conducted at AGE and Facility interfaces. Verification tests shall be developed by the A and E Contractor in accordance with the criteria contained in References A, B and C. These Verification Tests shall be made a part of the construction specification.

4.2.1 Documentation - Documentation of verification tests shall be maintained by the facility construction contractor and shall be made available to the customer upon request.

5.0 PREPARATION FOR DELIVERY. Not Applicable

6.0 NOTES.

6.1 Abbreviations.

A and E	-	Architect Engineer
AFBM	-	Air Force Ballistic Missile
AGE	-	Aerospace Ground Equipment
AMR	-	Atlantic Missile Range
COE	-	Corps of Engineers, U. S. Army
GFE	-	Government Furnished Equipment
GIE	-	Ground Instrumentation Equipment
I and C	-	Installation and Checkout

ITL	-	Integrate Transfer Launch
MGE	-	Maintenance Ground Equipment
MST	-	Mobile Service Tower
OGE	-	Operational Ground Equipment
PMR	-	Pacific Missile Range
SSLV	-	Standard Space Launch Vehicle
TSE	-	Test Support Equipment
TVC	-	Thrust Vector Control
VIB	-	Vertical Integration Building
SMAB	-	Solid Motor Assembly Building
SMPSA	-	Solid Motor Processing and Storage Area

6.2 Aerospace Ground Equipment.

Aerospace ground equipment is all equipment required on the ground to make a weapon system, command and control system, support system, advanced objective, sub-system, or end item of equipment operational in its intended environment. This includes all equipment required to install, launch, arrest, guide, control, direct, inspect, test, adjust, calibrate, appraise, gage, measure, assemble, disassemble, handle, transport, safeguard, store, actuate, service, repair, overhaul, maintain, or operate the system, subsystem, end item or component. This definition applies regardless of the method of development, funding, or procurement. AGE is functionally subclassified only as Operating Ground Equipment (OGE) and Maintenance Ground Equipment (MGE). OGE is that AGE which is a functional part of a system and which operates with the aerospace vehicle or end item as an essential operating element thereof. MGE is that AGE required to restore a system or end item to operating condition. For the purpose of this program, ground equipment shall include AGE, GIE, and TSE.

6.3 Operating Ground Equipment.

OGE is that AGE which is a functional part of the space system and support system and which operates with the vehicle in

performance of the space vehicle mission.

6.4 Maintenance Ground Equipment.

Maintenance Ground Equipment (MGE) shall be that equipment required to restore a Space System, support system, end item, or component to operating condition.

6.5 Ground Instrumentation Equipment.

GIE is that instrumentation equipment used for acquiring and recording any measurement parameter concerning performance and environmental data of the space system.

6.6 Interface.

Interface as used in this document shall constitute all physical (electrical, structural, mechanical, etc.) and functional (performance, pressure, volume, voltage, temperature, sequencing, etc.) characteristics which effect the design testing, operation and mating of the equipment or systems of two or more contractors.

6.7 Design Parameters.

The quantitative limits or boundaries of design.

6.8 Fuel.

The fuel for the core. The fuel will be an approximate 50-50 blend, by weight, of hydraxine and unsymmetrical dimethylhydrazine.

6.9 Injectant.

Solid Motor Thrust Vector Control Secondary Injection Fluid.

6.10 ITL.

Integrate Transfer Launch - A complex system that provides off-site assembly, checkout, and test of a vehicle.

6.11 Launch Stand.

The structure supporting the vehicle launch mounts, flame buckets, and vehicle servicing area.

6.12 Launch Envelope.

The space limitations above the launch deck through which the complete vehicle must pass during launch. This envelope includes the maximum excursions expected during the first few seconds after liftoff and must be clear of obstructions during launch.

6.13 Oxidizer.

The oxidizer for the core. The oxidizer will be nitrogen tetroxide.

6.14 Prelaunch Checkout and Countdown.

Prelaunch, checkout, and countdown are considered to begin at the time the vehicle is fully assembled upon the pad and ends with vehicle liftoff.

6.15 Subsystem.

A major functional part of a system, usually consisting of several components, which is essential to the operational completeness of the system. Examples are water, electrical, propellants, gases, and communications.

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