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Space Station Processing Facility Processing and Support Capabilities

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SPACE STATION PROCESSING FACILITY

PROCESSING AND SUPPORT CAPABILITIES

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LIST OF EFFECTIVE PAGES

This is the first publication of this document.

NOTE: At the time of publication, various areas of the SSPF are still under construction and are not yet operational. When all areas of the facility are activated and/or operational, this document will be revised and reissued.

TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 68.

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ABBREVIATIONS AND ACRONYMS

The following abbreviations and acronyms are used in this handbook. A more comprehensive listing is contained in NASA Reference Publication 1059 Revised; *Space Transportation System and Associated Payloads: Glossary, Acronyms, and Abbreviations*.

A&DC	Administrative and Data Communications
AFD	Aft Flight Deck
BCDS	Broadband Communications Distribution System
C&TS	Communication and Tracking Checkout System
CCAS	Cape Canaveral Air Station
CCTV	closed circuit television
CELA	Cargo Element Lifting Assembly
CEWS	Cargo Element Workstand
CITE	Cargo Integration Test Equipment
CWA	clean work area
ESP	electrical system pedestal
EWP	electrical wall pedestal
GHe	gaseous helium
GMT	Greenwich Mean Time
GN_2	gaseous nitrogen
GSE	ground support equipment
H_20	water
HIM	hardware interface module
IEMS	Integrated Environmental Monitoring System
I/F	interface terminal
IPT	Integrated Product Team
IRIG	Interrange Instrumentation Group
KSC	John F. Kennedy Space Center
LPIS	Launch Package Integration Stand
MET	mission-elapsed time
MGMT	Mission Greenwich Mean Time
MSDS	Material Safety Data Sheet
MUCS	Multi-User Cable System
NASA	National Aeronautics and Space Administration
O_2	gaseous oxygen
OIS-D	Operational Intercommunication System - Digital

ABBREVIATIONS AND ACRONYMS (continued)

P&AW	Paging and Area Warning
PACAS	Personnel Access Control Accountability System
PETS	Payload Environmental Transportation System
PSA	power supply assembly
ROAP	removable overhead access platform
SAA	satellite accumulation area
SID	Standard Interface Document
SSPF	Space Station Processing Facility
T-0	Time-Zero
T&CD	Timing and Countdown
TAA	Temporary Area Access
TCMS	Test, Control, and Monitoring System
TD	terminal distributor
USICU	United States International Standard Payload Rack Checkout Unit

FOREWORD

Launch site payload processing facilities are described in three levels of documentation. These levels and their purposes are:

a. K-STSM-14.1, *Launch Site Accommodations Handbook for Payloads* - This document provides a brief summary of each facility and a general description of John F. Kennedy Space Center launch and landing site operations.

b. Facility Handbooks - Each handbook provides a narrative description of the facility and its systems. Also, general operating rules, regulations, and safety systems are discussed in these handbooks. Handbooks available are:

K-STSM-14.1.1	*Facilities Handbook for Building AE*
K-STSM-14.1.2	*Facilities Handbook for Building AO*
K-STSM-14.1.3	*Facilities Handbook for Building AM* **
K-STSM-14.1.4	*Facilities Handbook for Hangar S* **
K-STSM-14.1.6	*Facilities Handbook for Explosive Safe Area 60A* **
K-STSM-14.1.7	*Facilities Handbook for Spacecraft Assembly and Encapsulation Facility Number 2*
K-STSM-14.1.8	*Facilities Handbook for Radioisotope Thermoelectric Generator Storage Building*
K-STSM-14.1.9	*Facilities Handbook for Life Sciences Support Facility Hangar L*
K-STSM-14.1.10	*Payload Accommodations at the Rotating Service Structure* *
K-STSM-14.1.12	*Facilities Handbook for Vertical Processing Facility*
K-STSM-14.1.13	*Orbiter Processing Facility Payload Processing and Support Capabilities* *
K-STSM-14.1.14	*Operations and Checkout* (*O&C) Building Payload Processing and Support Capabilities* *
K-STSM-14.1.15	*Facilities Handbook for Payload Hazardous Servicing Facility*
K-STSM-14.1.16	*Space Station Processing Facility Processing and Support Capabilities* *
K-STSM-14.1.17	*Facilities Handbook for Multi-Payload Processing Facility*

These facility handbooks are not under configuration control; however, they will be reissued as necessary in order to maintain usefulness to customers in their planning for launch site processing of their payloads.

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* These handbooks are titled differently because the facilities also serve functions other than payload support; only the payload accommodations are described in these documents.

** These handbooks are being phased out and will not be updated; the facilities are no longer available for payload processing activities.

c. Standard Interface Documents (SID's) - These reference documents are intended to provide the payload-to-facility interface design details for these launch site payload processing facilities:

SID 79K12170	*Payload Ground Transportation Canister*
SID 79K16210	*Vertical Processing Facility*
SID 79K16211	*Horizontal Processing Facility (O&C Building)*
SID 79K17644	*Payload Strongback*
SID 79K18218	*Launch Pad 39A*
SID 79K28802	*Launch Pad 39B*
SID 79K18745	*Orbiter Processing Facility (OPF)*
SID 79K24867	*Hangar L - Life Sciences Support Facility*
SID 82K00463	*Payload Environmental Transportation System (PETS) Multiuse Container*
SID 82K00678	*Single Pallet Rotation Device*
SID 82K00760	*Space Station Processing Facility*

SID's are not available for all launch site payload processing facilities. In these cases, the facility handbooks must be used for design interface information and customers should ask for verification of any areas of concern. When SID's are available, they should be used as the official definition of the facility interfaces. There are some SID's for which there are no handbooks; e.g., the payload strongback and the PETS multiuse container. In these cases, the SID's must be used.

Customers may obtain copies of any of these documents through the appropriate Integrated Product Team Lead or the Facility Manager.

SECTION I

INTRODUCTION

1.1 PURPOSE

The purpose of this handbook is to provide basic information concerning Space Station element and shuttle payload processing in the Space Station Processing Facility (SSPF). This handbook contains facility and equipment descriptions, monitoring and control capabilities, and laboratory and shop availability. The building and location are shown in figure 1-1.

1.2 SCOPE

This handbook is intended to be used by payload organizations as a guide for planning of payload activities in the SSPF, and also describes this building's capabilities and standardized interfaces.

1.3 FACILITY ACCOMMODATIONS

The facility accommodations available to the customer as identified herein provide support to a variety of National Aeronautics and Space Administration (NASA) and NASA customer payloads, and may accommodate several payload elements being processed simultaneously. The John F. Kennedy Space Center (KSC) Facilities Integrated Product Team (IPT) will determine launch site facility utilization assignments based on the Space Station and Shuttle customer requirements.

The SSPF is designated for active horizontal processing of Space Station and Shuttle payloads. Storage space in the SSPF is limited. If customers require additional storage space for GSE and shipping containers not actively being used for processing, other arrangements may be necessary.

Customers should be familiar with the Operations and Maintenance Instruction S9934, *Space Station Processing Facility, Emergency Procedures Document*.

1.4 HAZARDOUS AND CONTROLLED WASTE

Ninety days prior to their arrival, customers shall complete KSC Form 26-551, *Process Waste Questionnaire*, for any hazardous, controlled, and biomedical waste they expect to generate at KSC during processing or on-orbit. All waste generated at KSC will be managed in accordance with the requirements of KHB 8800.7, *Hazardous Waste Management*.

Once a customer has identified launch site waste generations, a short-term 208 L (55 gal) limit, satellite accumulation area (SAA) will be set up in the SSPF to accommodate points of generation of these wastes.

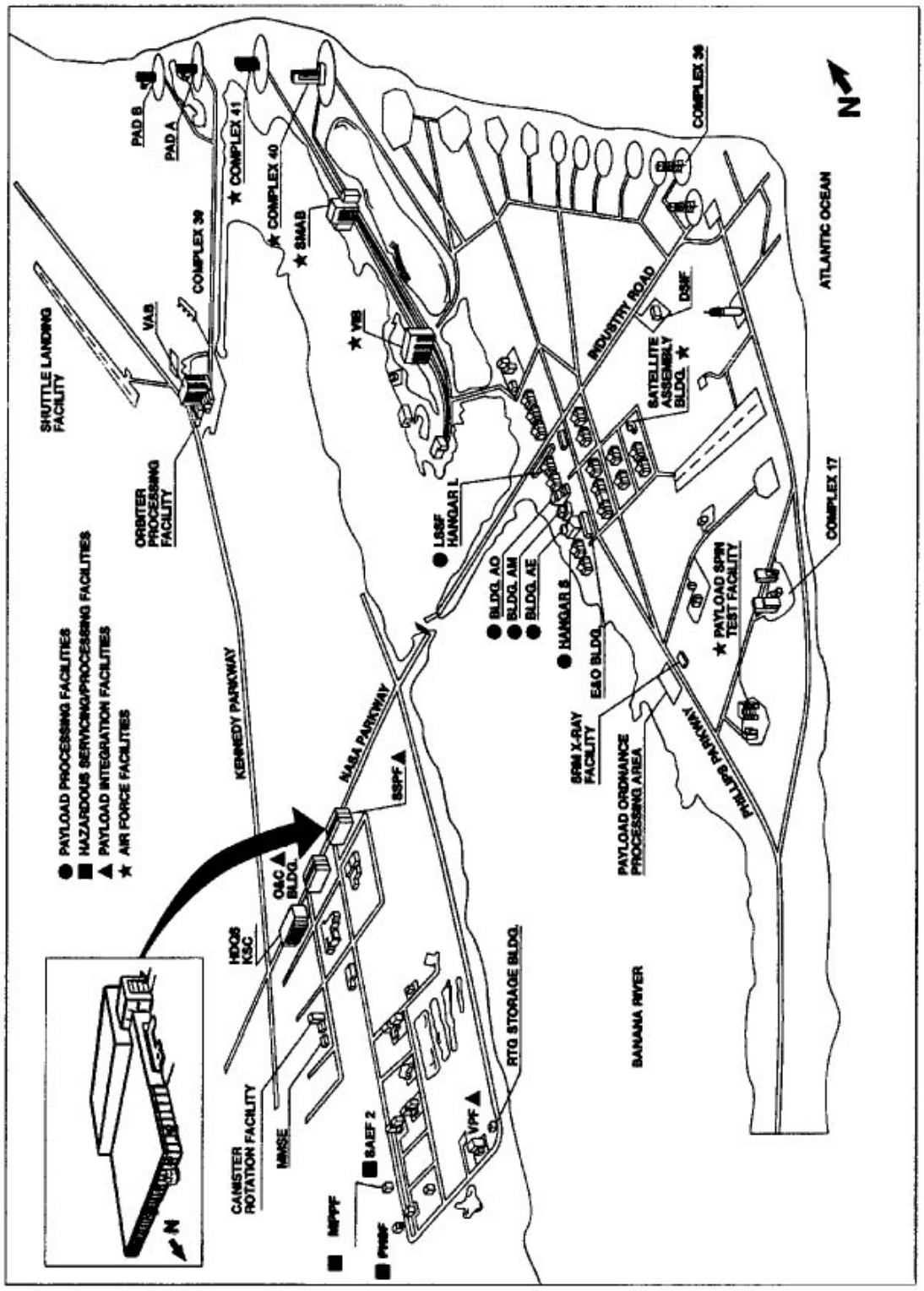

Figure 1-1. KSC/CCAS Payload Processing Facilities

These SAA's will be established in order to comply with the intent of the Resource Conservation and Recovery Act of 1976, which was established to institute a national program to control the generation, storage, transportation, treatment, and disposal of hazardous waste. A 90-day accumulation area will be provided in a small, separate building outside the SSPF.

Customers should coordinate any waste operations or problems with the appropriate IPT Lead or Facility Manager. Regulations for the use of, control of, and disposal of waste at the launch site are strictly enforced.

1.5 HAZARDOUS SUBSTANCE INVENTORY

A Material Safety Data Sheet (MSDS) and a KSC form 28-185, *KSC Environmental Health Protection Program Toxic Substance Registry System Inventory*, is required for each chemical commodity, either hazardous or non-hazardous, brought to KSC for payload processing. The MSDS is submitted to the appropriate IPT Lead and Facility Manager.

Inventory and accountability of all hazardous substances will be managed in accordance with the requirements of KHB 8800.6, *KSC Environmental Control Handbook.*

Additionally, the customer must submit specific information for each substance as to how much will be brought on-site, how much will be used on-site, and how much waste will be left over. This information will be submitted to the appropriate IPT Lead and Facility Manager. This data will be used to comply with the Emergency Planning and Community Right-to-Know Act, which is title III of the Superfund Amendments and Reauthorization Act of 1986.

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SECTION II

FACILITY DESCRIPTION

2.1 GENERAL

The SSPF (building M7-360) is a three story structure containing 42,455 m^2 (457,000 ft^2) of offices, laboratories, and payload processing areas. It is located in the KSC Industrial Area immediately east of the Operations and Checkout Building. An exterior view of the SSPF as seen from the north is shown in figure 2-1. Figure 2-2 shows the KSC Industrial Area location.

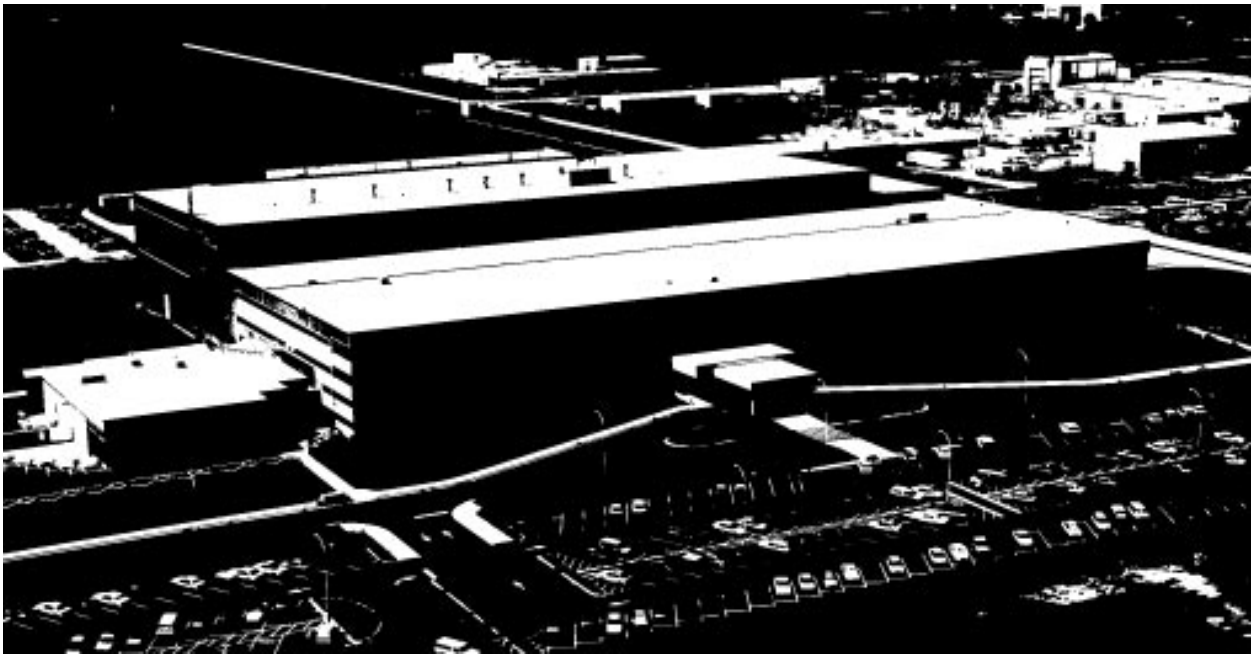

Figure 2-1. Space Station Processing Facility

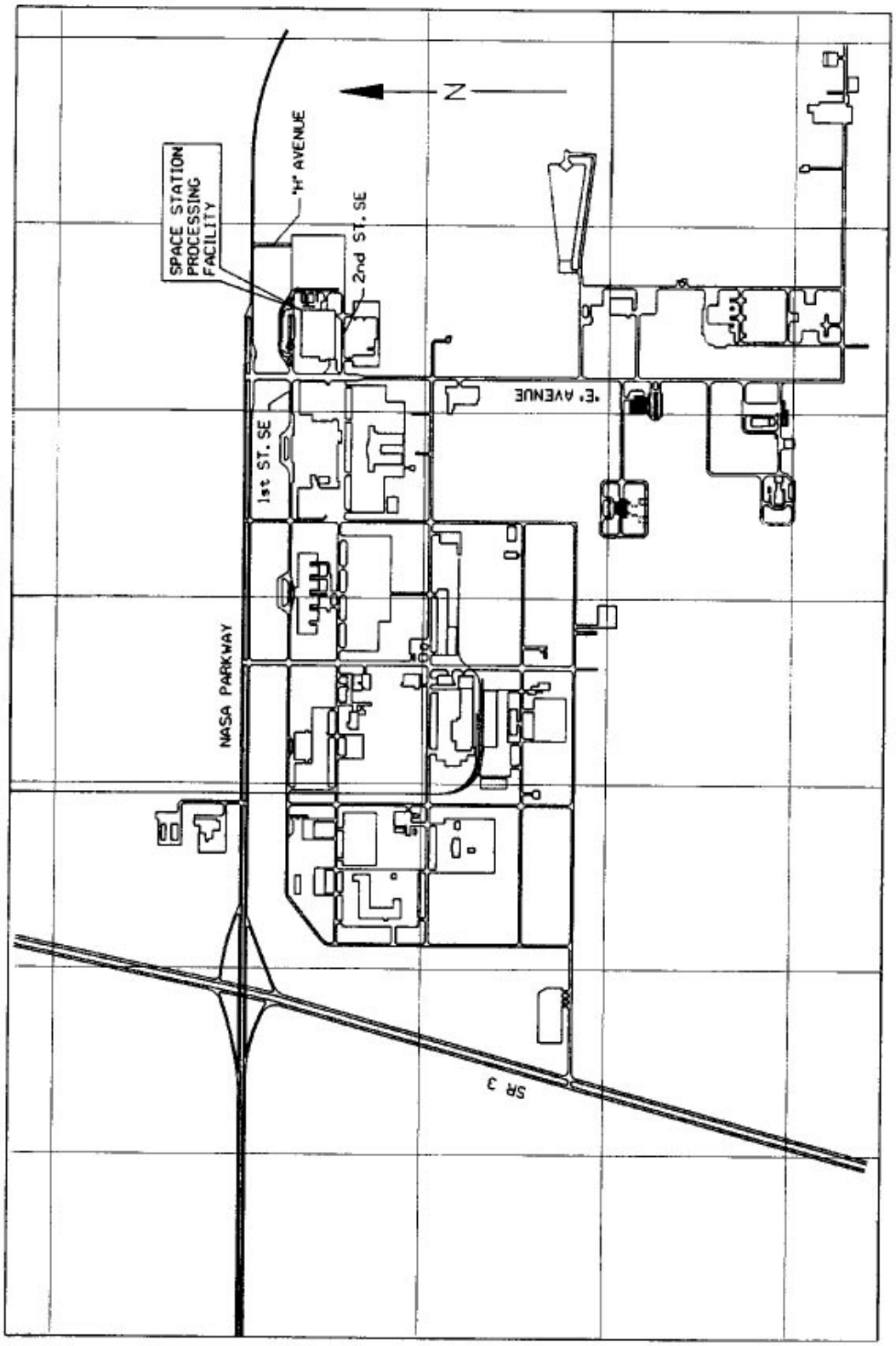

Figure 2-2. KSC Industrial Area

2.2 FUNCTIONS

The SSPF will be the primary facility at KSC for horizontal, non-hazardous, prelaunch/postlanding processing of space station elements, payloads and experiments. Prelaunch activities will include receipt, handling, and assembly of space station hardware, testing of experiments for proper configuration, and verification of critical systems and system interfaces. Payloads will then be transported either to the Orbiter Processing Facility for mating with the orbiter or to the Canister Rotation Facility (figure 2-3). Post-landing activities will include resupply operations, logistics element unloading and loading, Space Station logistic element maintenance, repair and reconfiguration, and payloads and experiment deintegration.

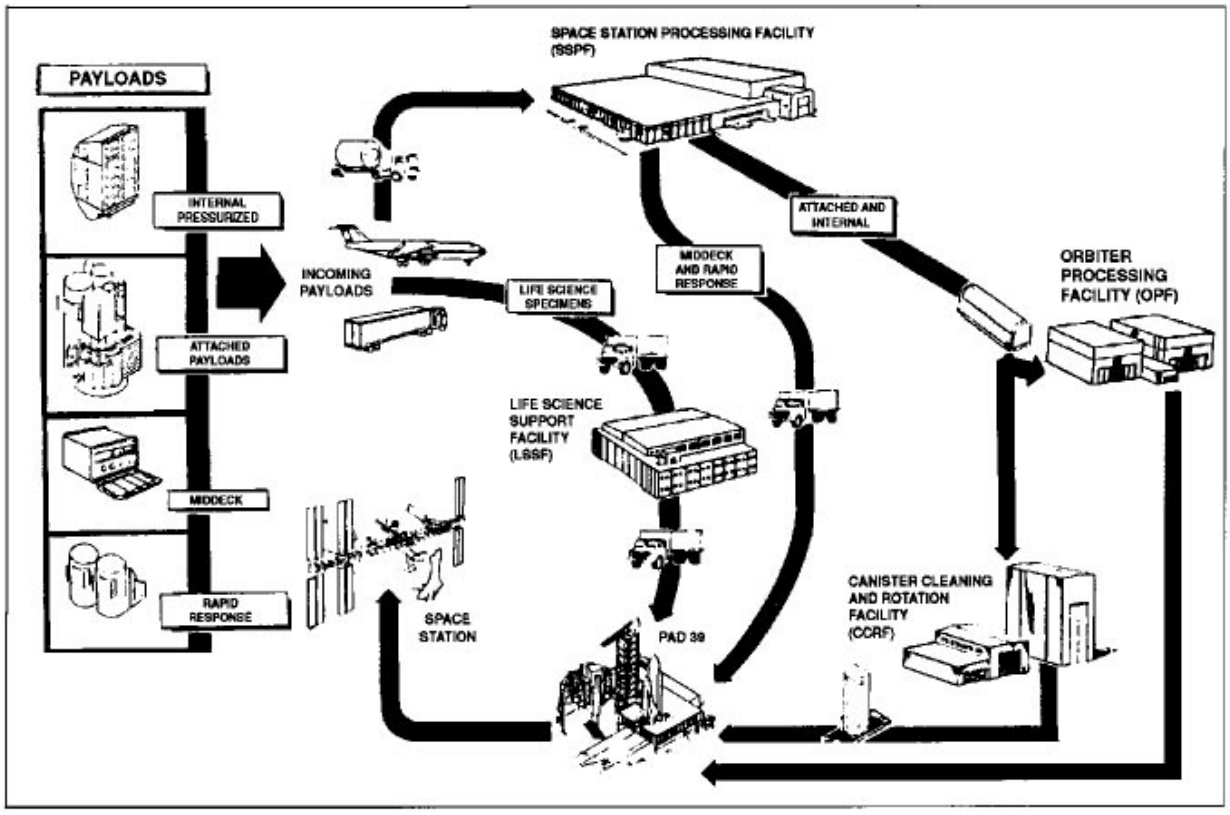

Figure 2-3. SSPF Payload Processing Flow

The SSPF is divided into five basic areas (figure 2-4):

a. bay areas (includes high bay and intermediate bay)

b. airlock

c. control and monitoring areas

d. service and support areas

e. administration

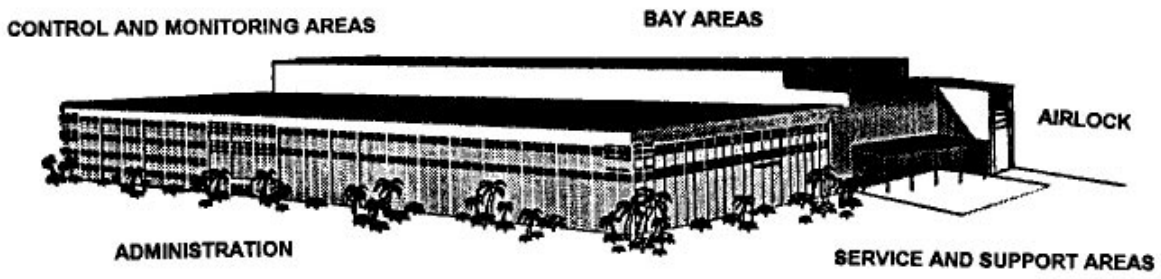

Figure 2-4. SSPF Key Plan

Assembly and testing of Space Station elements, mechanical and electrical experiment processing, as well as payload integration will be performed primarily in the bay area. Laboratories and shops will provide the off-line payload support to the integration conducted in the bay area. Control and monitor areas provide support to the bay integration activities. The service and support areas contains support systems for the bay area such as shipping and receiving. Also included in the service and support areas is the flight crew equipment/return and resupply area that will be used for both preflight and postflight processing.

2.3 ACCESS

2.3.1 PERSONNEL ACCESS. Access to the bay areas of the SSPF will be controlled by proper badging and will be monitored by access control monitors or electronic devices. A KSC picture badge, or valid temporary badge (machine pass), and a special mission badge and/or area permit with numbers 41 and 73 are required for access. Once the facility is fully operational, a magnetic Personnel Access Control Accountability System (PACAS) card will usually be required, in addition to the KSC badge and area permit. Temporary Area Access (TAA's) may be obtained through the NASA Facility Manager or the appropriate IPT Lead.

Personnel access to the bay area will be obtained through the two first floor personnel access rooms (room numbers 1217 and 1275). Personnel shall enter through the personnel access room ,and then proceed to the PACAS which will be activated and monitored at all times for access control at the designated entrance.

Entry into all laboratories, shops, experiment support areas, and control and monitoring rooms are controlled by cypher locks.

2.3.2 EQUIPMENT ACCESS. Equipment should be brought into the bay areas by the most efficient route that is relative to the size of the item.

2.3.2.1 Small Equipment/Tools. Small equipment and tools should normally be brought into the bay area via the two equipment airlock rooms (rooms 1221 and 1269).

2.3.2.2 Racks, Crated Items, and Servicers. Items small enough to be boxed or crated should normally be brought into the bay area through the receiving area and the hardware inspection area. The receiving area door and the hardware inspection area door are both 5.18 m (17 ft) high by 6.10 m (20 ft) wide (see figure 5-1).

2.3.2.3 Large Equipment Access. Large items of ground support equipment (GSE) and flight equipment can enter the SSPF through the airlock. The airlock door is 15.09 m (49.5 ft) high by 12.81 m (42 ft) wide (see figure 5-1).

2.3.3 FLOOR LOADING PROFILE. Loading systems that are beyond the following stated limits shall be submitted to the SSPF Facility Manager for review and approval. Steel-faced wheels, casters, or rollers will not be permitted on the floors. Load contact area is the actual bearing of the load support(s).

a. First Floor Areas

1. logistics areas = loads are limited to 150 psf

2. computer floor areas = loads are limited to 250 psf

3. receiving and inspection areas, off-line laboratories, corridors and miscellaneous areas = loads are limited to 200 psf

4. airlock and bay areas= loads are limited to 2,000 psf

b. Second Floor Areas

user/control room areas, and corridors and miscellaneous areas = loads are limited to 100 psf

2.3.4 EMERGENCY EGRESS. There are eleven emergency egress routes, located on the first floor, to the outside of the building. Figure 2-5 shows the available emergency egress routes for the SSPF.

2.4 RESTRICTIONS

The SSPF high bay, intermediate bay, and labs have controlled environments, and no manufacturing operations are permitted in these areas. Simple manufacturing tasks can be performed in the shops and service areas.

2.5 OPERATING REGULATIONS

Access to the stands and controlled areas in the flight hardware processing areas will be controlled. General work area rules that will be enforced for personnel working on the stands that contain flight hardware are:

a. Prior to entry into the bay area:

1. Entrance areas will have tacky mats which must be used prior to entry.

2. A smock exchange station will be located at the material service center, room 1252, (located between the two PACAS personnel access points). Smocks should only be donned in the clean room area. Lockers, located in the 1200 corridor, are available for personnel belongings. Contact the Facility Manager for locker keys.

3. Tobacco products, food, beverages, chewing gum, and flame-producing devices will be prohibited.

4. Items containing mercury or glass are not permitted in the clean work area (CWA).

b. After entry into the flight hardware processing area:

1. Badges must be placed on the badge board in the proper slot indicating where personnel will be working (i.e., workstand, pallet, module, upper level or ground level).

2. Use of flammable liquids and hazardous substances requires coordination with Operations and Environmental Safety.

3. Approved safety harnesses and lanyards shall be worn whenever personnel are required to work close to an unprotected edge of an elevated platform, stand, or other structure where there is a danger of falling. Refer to *Occupational Safety and Health Standard 29 CFR 1910* for detailed information on working at heights.

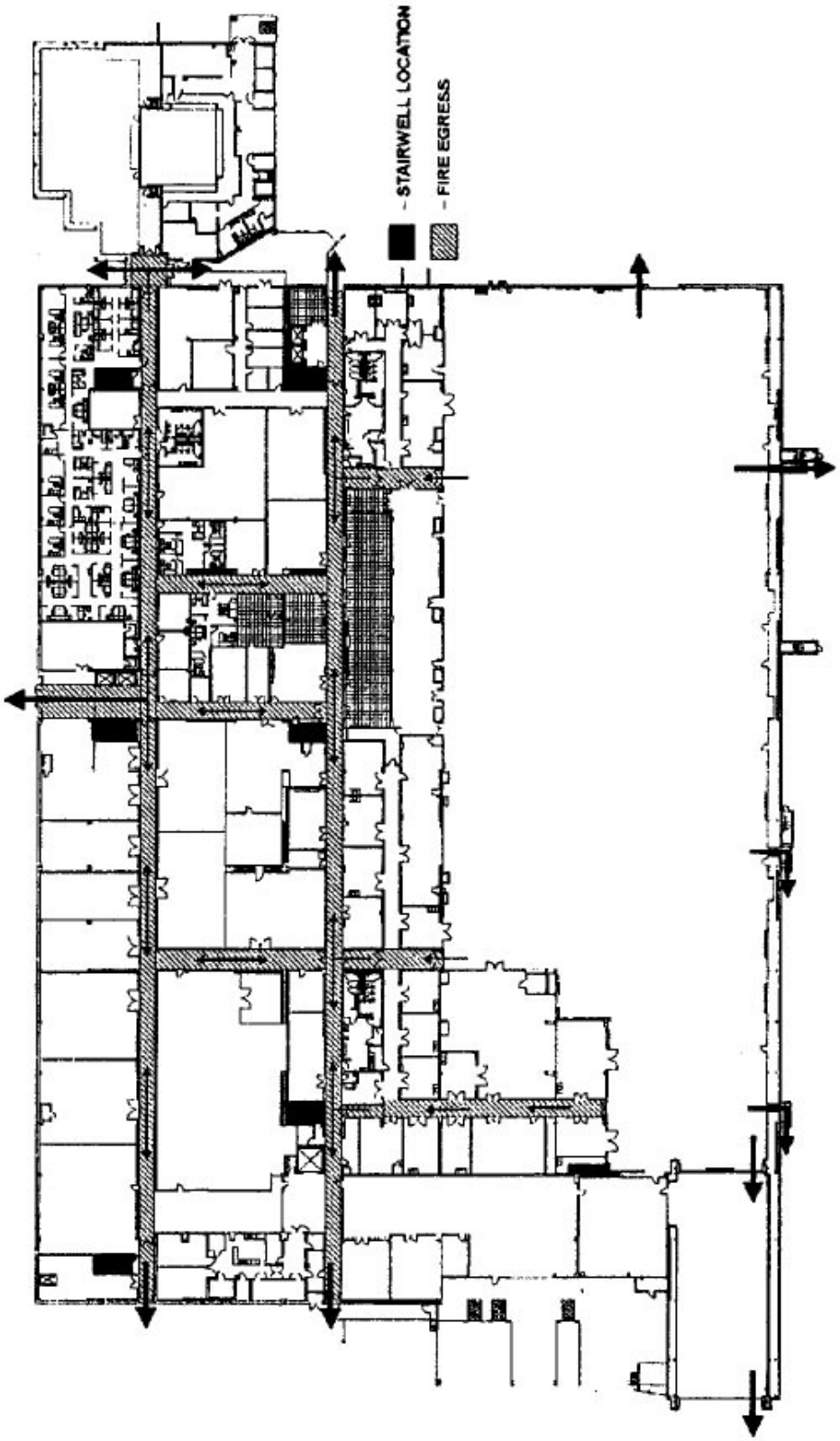

Figure 2-5. SSPF Fire Egress Plan

4. If working on workstands and/or support equipment, personnel shall tether eyeglasses, and remove or tape rings and watches.

5. All tools must be tethered when working over flight hardware.

6. All work using non-flame producing heating devices (i.e., soldering gun, heat gun, heat lamp) will require KSC Form 2-13, *Welding and Burning Permit*, if:

   a) work will be performed within 3 m (10 ft) of flight hardware

   b) work will be performed within 3 m (10 ft) of hazardous areas (explosives or flammable vapors present)

   c) work is performed in a controlled-access area

   If any of the above are true, personnel must coordinate with the Facility Manager to obtain the welding and burning permit, per SP 8.056, prior to starting work.

7. Electrical equipment must be hazard-proofed prior to energizing when explosive or flammable vapor is present.

8. All portable GSE will have an approved ground connection provided by the user.

2.6 ELECTRONIC SECURITY SYSTEM

The SSPF high and intermediate bay clean room areas will be secured at all times by means of the PACAS, described in paragraph 2.3.1. If personnel experience problems using the PACAS or require TAA's, they should contact the Facility Manager, the appropriate IPT Lead, or Security for assistance.

All large bay area doors are also monitored by the Electronics Security System and the opening of these doors must be coordinated through the Facility Manager or Security.

2.7 PAGING AND AREA WARNING (P&AW)

All areas of the SSPF are part of the KSC administrative P&AW system. The P&AW system is controlled from selected locations within the SSPF. The system is tied into the KSC Industrial Area network, and has the capability to support interior hallways and offices, high bay and intermediate bay perimeters, exterior corners of the facility, and the tunnel areas. The P&AW System is used to inform personnel of emergency conditions such as adverse weather and fire alarms, as well as for public announcements.

2.8 CAUTION AND WARNING SYSTEM

Electronic monitor panels located outside of the bay area personnel access doors are equipped with indicator lights that highlight activities, or alert personnel to specific conditions, occurring within the bay area. Prior to entry into the bay area, personnel should observe any yellow or red lights on these panels and note any areas that are

restricted. There are separate banks of lights for each area controlled by operational personnel from the control and monitoring areas of the SSPF.

2.9 ADMINISTRATIVE AND DATA COMMUNICATIONS (A&DC)

A&DC provides administrative communications to approximately 1500 user locations throughout the facility. At all user locations, four services are provided: telephone; low speed data connectivity; Broadband Communications Distribution System (BCDS); and, high speed data. These services are provided in a single user box. To date, no active equipment has been made available for the token ring service. BCDS is not available in the intermediate and high bay areas.

2.10 EXTERNAL COMMUNICATION CAPABILITIES

All communication external to the SSPF is accomplished through the outside cable plant consisting of single mode fiber, multimode fiber, and 22 awg copper. Signal conditioning equipment is available for the following fiber optics transmissions:

1. analog signals up to 12 MHz
2. asynchronous digital signals up to 8 MBPS
3. RS423 and RS 422, multiplexed
4. T1 transmissions over synchronous optical network

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SECTION III

BAY AREA

3.1 GENERAL

The bay area of the SSPF (figure 3-1) is divided into an intermediate bay and a high bay. The intermediate bay is 15.2 m (50 ft) wide by 103.1 m (338 ft 2 in) long with a ceiling height of 9.1 m (30 ft) over the experiment processing and rack test areas and a 4.6 m (15 ft) ceiling over the rack processing area. The high bay is 32 m (105 ft) wide by 110.3 m (362 ft) long with a ceiling height of 18.8 m (61 ft 6 in). The high bay area will be utilized as the main processing area for horizontally-processed payload and flight elements.

The eight footprints of the high bay are designated payload processing areas. Facility services in the high bay are provided at each footprint through stub-ups recessed in the floor for interconnection to payload GSE that will be used for testing or processing of payloads. Facility services in the intermediate bay are located along the walls. The major support equipment elements in the high bay are:

a. Launch Package Integration Stand (LPIS), Aft Flight Deck (AFD) Stand, Time-Zero (T-0) Stand

b. Cargo Integration Test Equipment (CITE)

c. air-bearing equipment

d. Cargo Element Workstand (CEWS)

e. portable servicers

All workstands, support stands, and integration stands are designed to be movable; therefore, the high bay system configuration may vary with each flight mission. Figure 3-2 is an isometric view of the bay area. Figure 3-3 details a high bay footprint configuration.

The bay area processing activities will include staging, experiment integration, payload integration and verification, and postlanding deintegration for horizontally-processed payloads. The bay area is capable of supporting several payloads at the same time in different stages of integration and deintegration.

The intermediate bay will be the main area for experiment and rack processing. Experiments will be brought into the intermediate bay where they will be processed by experimenters for integration into racks that will be integrated into flight elements.

3.1.1 BAY AREA CRANES. The high bay is serviced by two 30-ton electrical bridge cranes. Crane hook travel is limited to within 4.5 m (14 ft 7 in) of the east wall for the east crane and to within 6.8 m (22 ft 3 in) of the west end of the high bay for the west crane. Both cranes are capable of service to within 2.2 m (7 ft 10 in) of the north and south walls. Maximum hook height is 15.2 m (50 ft). Both hooks are equipped with grounding straps and drip pans.

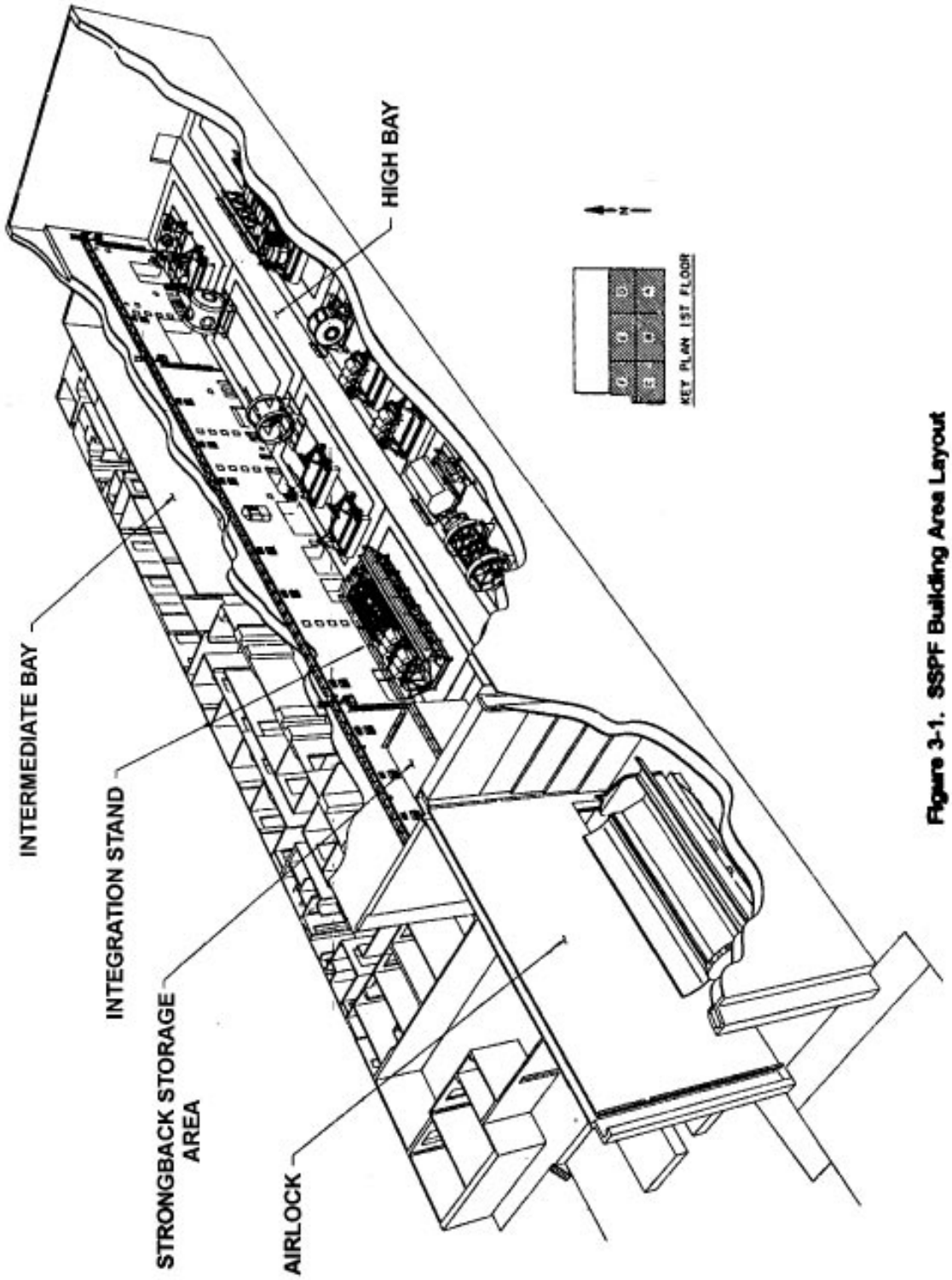


Figure 3-1. SSPF Building Area Layout

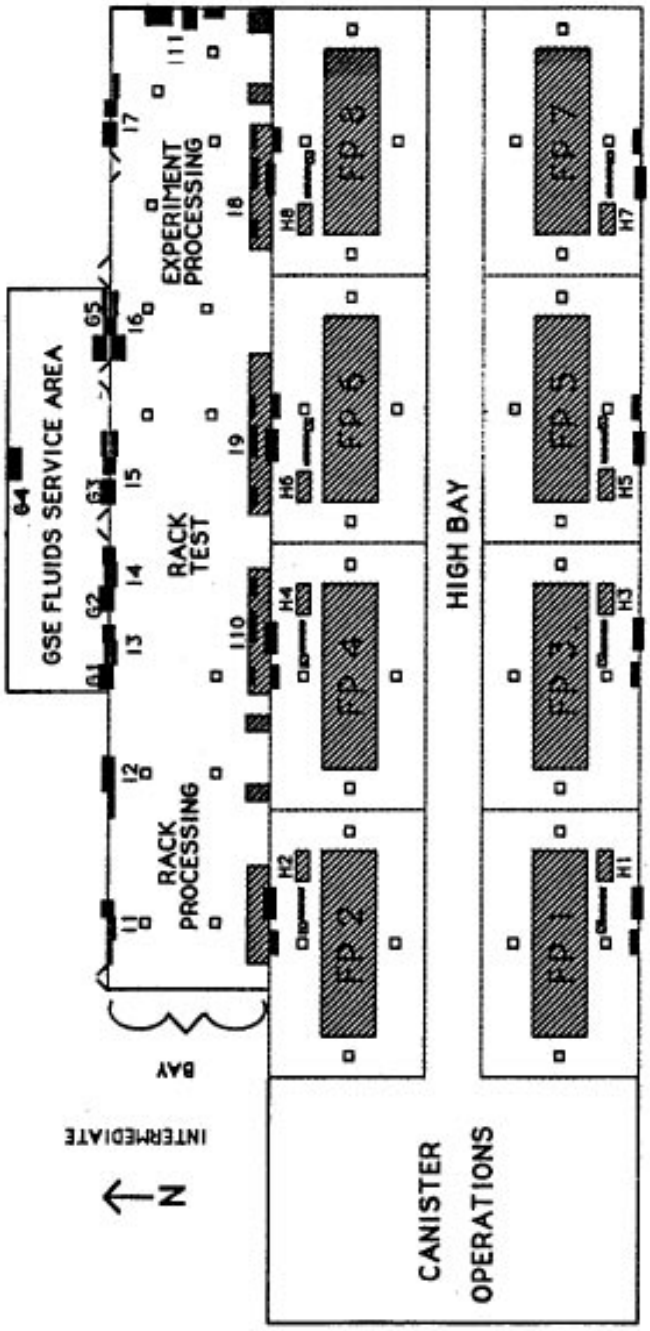


Figure 3-2. Plan View of Bay Area

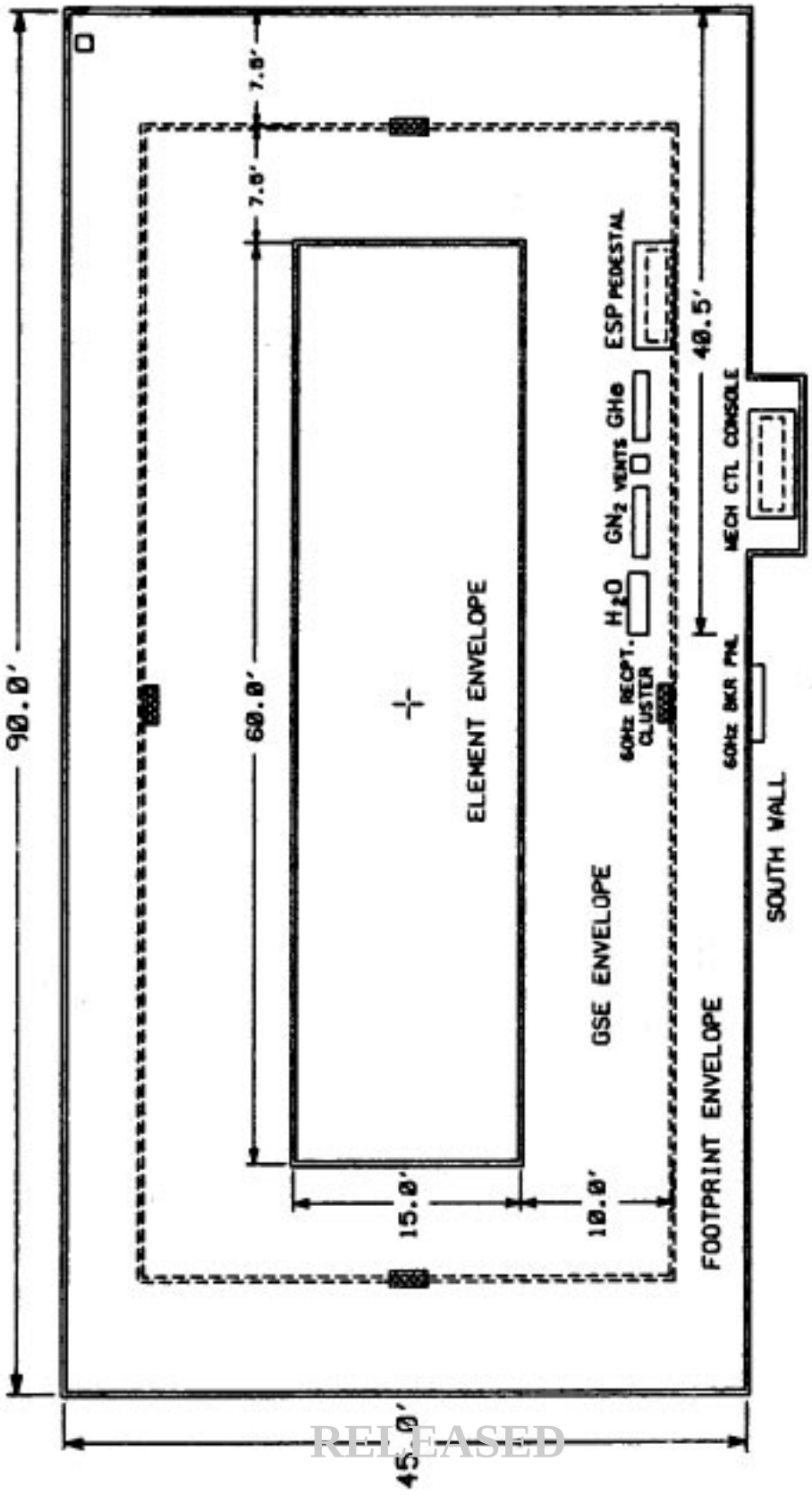


Figure 3-3. High Bay Footprint Configuration

The intermediate bay is serviced by two 4.54 metric ton (5-ton) electrical bridge cranes. Crane hook travel is limited to within 2.2 m (7 ft 11 in) of the east wall for the east crane and to within 1.9 m (6 ft 1 in) of the west end of the intermediate bay for the west crane. Both cranes are capable of service to within 1.6 m (5 ft 3 in) of the north wall and 1.2 m (3 ft 9 in) of the south wall. Maximum hook height is 7.6 m (25 ft). Both hooks are equipped with grounding straps and drip pans.

The two 27 metric ton (30-ton) high bay cranes may be operated only by KSC crane operators. All other cranes may be operated by personnel trained by KSC; this training must be arranged by the appropriate IPT Lead. KSC contractor personnel will provide crane training for payload/customer organizations as required in accordance with the Kennedy Management Instruction 6430.4, *Examination and Licensing of KSC Facility Crane Operators*. Physical examinations are a prerequisite to crane training.

3.1.2 LIFTING APPARATUS/SLINGS. General purpose slings and the Cargo Element Lifting Assembly (CELA) are available for general payload use. Requests for use of these items should be coordinated through the appropriate IPT Lead.

3.1.3 ENVIRONMENTAL CONTROL. The bay area provides a level 4 CWA that conforms to cleanliness requirements stated in K-STSM-14.2.1, *KSC Payload Facility Contamination Control Plan*. Eight air changes are provided per hour at working level 9.1 m (30 ft) and below, and four air changes per hour are provided above working level. Table 3-1 presents more detailed environmental control data; level 4 CWA cleanliness requirements are highlighted in bold.

The Integrated Environmental Monitoring System (IEMS) provides the capability to monitor temperature, humidity, and particulate counts. Fixed sensor points are located within the bay area. Additional environmental monitoring is available through portable carts. Requests for use of the portable carts should be coordinated through the Facility Manager.

3.1.4 FIRE PROTECTION AND SAFETY. The bay area has ionization (smoke) detectors installed in the air-conditioning return ducts. When activated, these detectors will shut down the air handling units for the high and intermediate bays and activate building and fire station alarms. Ultra-violet/infra-red detectors are wall-mounted and are used for flame detection. These detectors will activate building and fire station alarms.

Fire extinguishers are mounted approximately 1.22 m (4 ft) above the floor on the north and south area walls. Extinguishers are available for wood, paper, flammable liquids, and electrical fires.

Portable eye wash stations will be available for use within the bay area.

3.1.5 AMMONIA MONITORING SYSTEM. The GSE ammonia sensors are mounted on portable carts which can be placed near ammonia charged systems in the bay area. When this system is armed and the ammonia concentrations exceed prescribed levels, alarms are generated to alert personnel to unsafe conditions. An emergency vent system is activated for venting of ammonia fumes. The emergency vent system is operated as a contingency mode of the basic air-conditioning system.

When armed, this contingency mode may be activated by designated personnel located at either the user control rooms or at each high bay footprint. The level 4 CWA cleanliness may be lost in the event that the emergency vent system is activated.

Table 3-1. Cleanliness Requirements*

Clean Work Area Levels		Level #2	Level #3	**Level #4**	Level #5
Parameter	Airflow Type	Laminar	Non-Laminar	**Non-Laminar**	Non-Laminar
Maximum Airborne Particulate Counts Per m3 [Per ft^3]	Req. 0.5	10,000	1415.9 [50,000]	**2831.7 [100,000]**	8495.1 [300,000]
	Req. 5.0	65	8.5 [300]	**19.8 [700]**	28.3 [1,000]
	Monitoring	Continuous	Continuous	**Continuous**	Monthly
Temperature pv °C (°F)	Requirement	21.7 ± 3.3 (71±6)	21.7±3.3 (71 ±6)	**21.7±3.3 (71 ±6)**	21.7±3.3 (71 ±6)
	Monitoring	Continuous	Continuous	**Continuous**	Monthly
Relative Humidity (%)	Requirement	55 Max	55 Max	**55 Max**	55 Max
	Monitoring	Continuous	Continuous	**Continuous**	Monthly
Maximum Particle Fallout	Goal **	Level 200	Level 500	**Level 750**	Level 1000
	Monitoring	Continuous	Continuous	**Continuous**	Every 6 Mo.
Maximum NVR $0.1m^2/mg$ month	Requirement	1.0	1.0	**1.0**	2.0
	Monitoring	Continuous	Continuous	**Continuous**	Annually
Maximum Volatile Hydrocarbons (ppm) (v/v)	Requirement	15	15	**15**	N/A
	Monitoring	Every 2 weeks	Every 2 weeks	**Every 2 weeks**	N/A
Minimum Positive Pressure	Requirement	0.05 in H_20	0.05 in H_20	**0.02 in H_20**	N/A
	Monitoring	daily	daily	**daily**	N/A
Minimum Air Changes	Requirement	20/hour	6/hour	**4/hour**	2/hour

* During periods of operation
** Levels per KCI-HB-5340.1 continuous monitoring

3.1.6 ILLUMINATION. The bay area is lighted by ceiling-mounted fixtures. Each fixture has a 1000-W incandescent lamp and a 1000-W metal halide lamp with an integral constant wattage mercury-vapor transformer. The metal halide and incandescent lamps are independently controlled. The metal halide lamps provide approximately 753.5 lm/m^2 (70 fc); a total of 1076.4 lm/m^2 (100 fc) is provided when both incandescent and metal halide lamps are lighted. In case of normal power and lighting failure, emergency incandescent fixtures are strategically located throughout the area.

3.1.7 60 Hz POWER SYSTEM. There are four 60 Hz power floor clusters per high bay footprint. Three electrical feeders provide continuous power to the high bay outlets. A common emergency tie-breaker switch cross-feeds power to the 60 Hz outlets. High bay power available is listed below.

a. 120/208 v, 3 phase, 60 amperes

b. 120/208 v, 3 phase, 100 amperes

c. 480 v, 3 phase, 200 amperes

There are eight 60 Hz power floor clusters located in the intermediate bay with 120/208 v, 3 phase, 100 amperes power. The 60 Hz power interface is usually through the alternating current electrical power carts.

3.1.8 ALTERNATING CURRENT ELECTRICAL POWER CARTS. Power cart assemblies are available with the following characteristics:

a. 120 v, single phase, 20 amperes

b. 208 v, 3 phase, 30 amperes

c. 120 v, single phase, 30 amperes

Each power cart assembly is be equipped with an emergency power shut-off switch, power-on indicator, an ammeter, individual circuit breakers and transient suppression capability, and grounding capability. Use of these power carts by the customer should be arranged in advance through the appropriate IPT Lead or the Facility Manager.

3.1.9 GROUNDING. All structures, equipment, and instrumentation in the bay area are grounded. Copper ground plates, .10 cm (0.25 in) thick, are located at various points in the processing rooms and in the floor clusters. The plates have eight drilled and tapped holes for the attachment of ground lugs. The ground plates, labeled "A" and "B", are connected to structural steel in the facility that in turn connects to the facility ground grid. Payload-unique GSE and instrumentation must be grounded when used in the area.

3.1.10 CONDUCTIVE EPOXY FLOORING. The bay area floor is covered with a conductive epoxy coating which provides electrostatic discharge capability.

3.1.11 CHILLED WATER SUPPLY. The chilled water system provides a means of transporting waste thermal energy away from the space station elements and experiment testing locations within the bay area. Chilled water at 10 °C (50 °F) is be provided at each high bay footprint; flow rate is 265 L (70 gal) per minute at 45 to 50 psi.

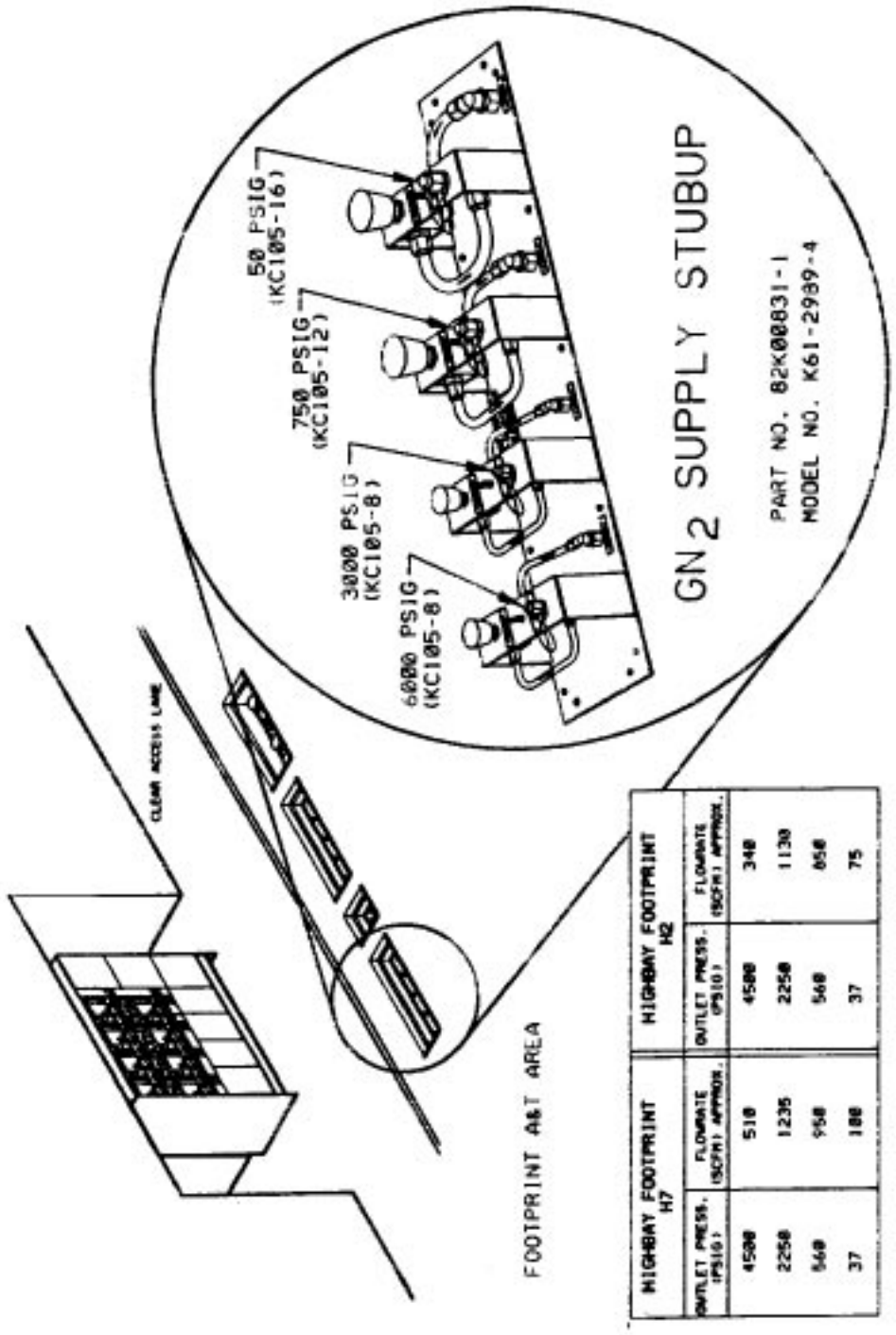
3.1.12 GASEOUS NITROGEN (GN_2). GN_2 will be used for system purging, lab experiments, and general rack and flight element processing. A GN_2 supply is provided at each high bay footprint. Figure 3-4 shows a typical GN_2 supply stubup configuration. The maximum GN_2 source pressure is 6000 psig. The GN_2 line is routed to a central regulation panel where it is regulated to:

a. 50 psig

b. 750 psig

c. 3000 psig

d. 6000 psig



HIGHBAY FOOTPRINT H7		HIGHBAY FOOTPRINT H2	
OUTLET PRESS. (PSIG)	FLOWRATE (SCFM) APPROX.	OUTLET PRESS. (PSIG)	FLOWRATE (SCFM) APPROX.
4500	510	4500	340
2250	1235	2250	1130
560	950	560	850
37	180	37	75

Figure 3-4. GN_2 Supply Stubup Configuration

3.1.13 GASEOUS HELIUM (GHe). GHe will be used for system purging and leak checking in support of lab experiments, and general rack and flight element processing. A GHe supply is provided at each high bay footprint. Figure 3-5 shows a typical GHe supply stubup configuration. The maximum GHe source pressure is 6000 psig. The GHe line is routed to a central regulation panel where it is regulated to:

a. 50 psig

b. 750 psig

c. 3000 psig

d. 6000 psig

3.1.14 BREATHING AIR PURGE/GASEOUS OXYGEN (O_2). A breathing air supply is provided at high bay footprints 3 and 5. Maximum source pressure is 2200 psig and is provided unregulated from a tube bank trailer. An O_2 supply is also provided at high bay footprints 3 and 5. Maximum source pressure is 6000 psig and is unregulated from a tube bank trailer. The breathing air and O_2 supply are not available for use simultaneously.

3.1.15 PORTABLE GN_2/GHe/O_2 PRESSURE REGULATION UNIT ASSEMBLIES. These servicers can filter and regulate facility-provided GN_2 or GHe for system purging, leak testing/isolation, flushing, and inerting of fluid systems. They can also be used to filter and regulate supplied O_2 for testing, servicing, and deservicing of environmental control systems. Use of the servicers can be scheduled through the appropriate IPT Lead or the Facility Manager.

3.1.16 GAS VENT SYSTEM. The main purpose of the gas vent system is to remove unwanted gases from various locations within the SSPF to the outside of the facility for dispersion into the atmosphere. The gas vent system is available at each high bay footprint and also at various locations within the intermediate bay. Figure 3-6 shows a typical vent stubup configuration. There are three vent sources available:

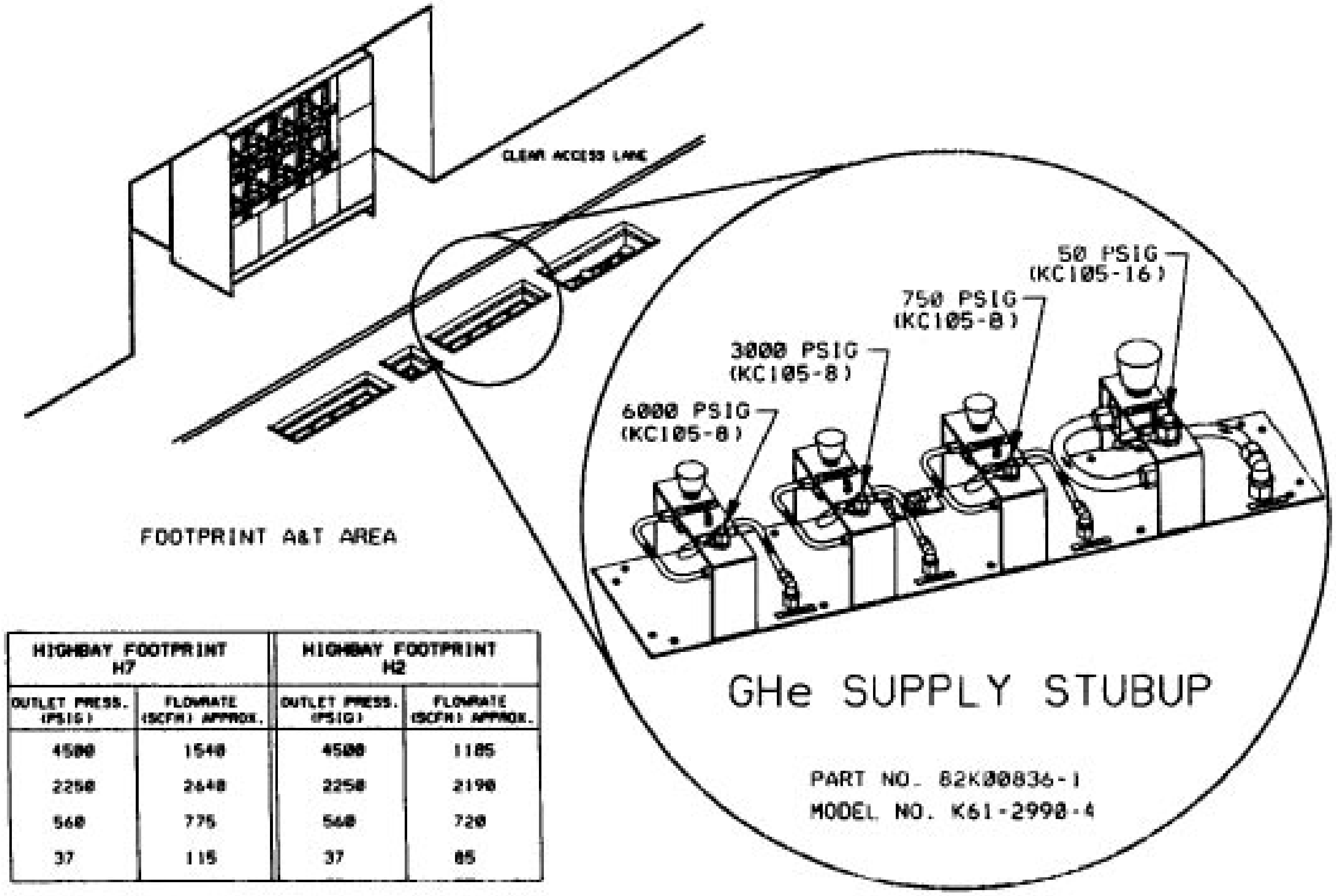
a. high pressure vent for clean gases or contaminated (oil) gases

b. low pressure vent for purges

c. controlled vent for ammonia only

3.1.17 VACUUM CLEANING SYSTEM. The vacuum cleaning system is designed as a constant-running, vacuum-tubing service arranged to function by means of a centrally-located exhaust equipment station. Vacuum system connections are located at each high bay footprint and also at various locations within the intermediate bay. This vacuum cleaning system is intended for housekeeping purposes only.

3.1.18 COMPRESSED AIR SYSTEM. The compressed air system's main purpose is to provide an air source for air-driven tools, air shower, other facility systems, and air-bearing pallets. The compressed air system provides Level 4 CWA compatible air at 125 psig by using oil-free instrument air-type compressors along with filtration and humidity control equipment. The compressed air system is available at each high bay footprint.



HIGHBAY FOOTPRINT H7		HIGHBAY FOOTPRINT H2	
OUTLET PRESS. (PSIG)	FLOWRATE (SCFM) APPROX.	OUTLET PRESS. (PSIG)	FLOWRATE (SCFM) APPROX.
4500	1540	4500	1185
2250	2640	2250	2190
560	775	560	720
37	115	37	85

Figure 3-5. GHe Supply Stubup Configuration

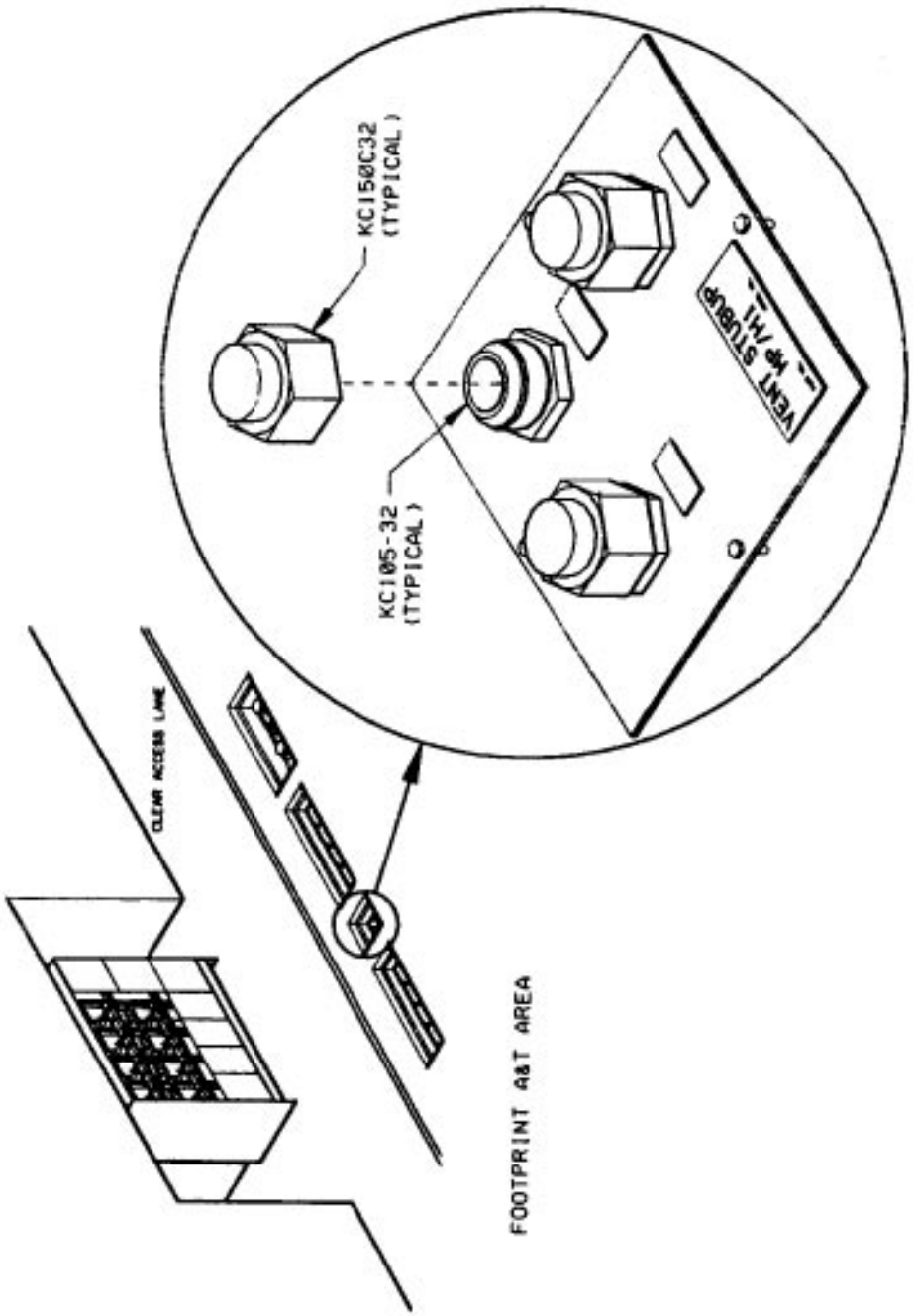


Figure 3-6. Gas Vent System Configuration

3.1.19 COMMUNICATIONS AND DATA HANDLING.

NOTE: For more detailed information relating to the SSPF communications systems refer to KSCM-DL-0125, *International Space Station Alpha Communications Systems Interface Description Document*.

3.1.19.1 Operational Intercommunication System-D (OIS-D). The OIS-D is a multi-channel, digital, voice communication network that interconnects operational areas required for payload processing at KSC and the Cape Canaveral Air Station (CCAS). The system provides a 512 channel communications system with an unlimited, non-blocking, conferencing capability. The OIS-D end units are located in the Control/User rooms and mounted on the railings, pedestals, and columns of the stands in the test areas, as well as on the north and south area walls near work areas. Refer to section IV of this document for a more detailed description of the OIS-D.

3.1.19.2 Closed Circuit Television (CCTV). The CCTV system provides color, closed-circuit video surveillance and recording of payload processing activities from operational areas. Portable cameras are available for floor level monitoring. The cameras can be remotely-controlled from the Control/User rooms. Interfaces are available at each high bay footprint for customer-provided cameras. Monitors are located in the user/control rooms and various other locations.

3.1.19.3 A&DC. Refer to paragraph 2.9.

3.1.19.4 P&AW. Refer to paragraph 2.7.

3.1.19.5 Timing & Countdown (T&CD). The timing and countdown system provides distribution and display of master timing and countdown signals in operational areas, test areas, and to the Test, Control, and Monitoring System (TCMS). Timing in Interrange Instrumentation Group A and B (IRIG A and B) formats for Greenwich Mean Time (GMT) and mission-elapsed time (MET) electrical interfaces are provided in the bay area. Countdown clock displays are located for maximum visibility at designated areas.

3.1.19.6 Local Area Paging. Personnel can be paged in specific test areas from the various user rooms located within the SSPF. Use and configuration of the system is based on individual customer requirements.

3.1.19.7 Multi-User Cable System (MUCS). The MUCS is a non-dedicated copper and fiber optics cabling system. Users that will be performing operations and experiments will have the capability to interface between the bay areas and the Control/User rooms. The cabling provides interfaces for non-dedicated multimode fiber optics, twisted pairs, 78 and 124 ohm twinax, 50 and 75 ohm coax, with impedance conversion capability for 78/124 ohm twinax and 50/75 ohm coax.

3.2 INTERMEDIATE BAY UNIQUE SERVICES

Figure 3-7 shows a floor diagram of the intermediate bay area and the facility services available in this area.

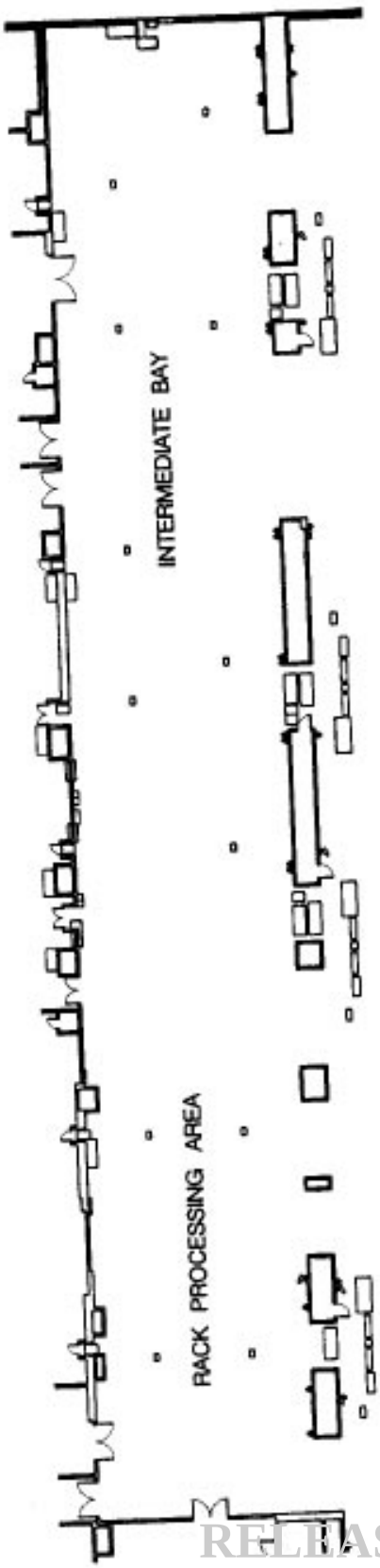


Figure 3-7. Intermediate Bay Area

3.2.1 EXPERIMENT PROCESSING AREA. This area located on the east end of the intermediate bay will be used to process small payloads.

3.2.2 RACK TEST AREA. This central area of the bay is where experiments and rack assemblies will be tested to verify compatibility with simulated Space Station interfaces.

3.2.2.1 United States International Standard Payload Rack Checkout Unit (USICU). The USICU will verify that racks delivered to the Space Station are electrically and mechanically compatible with the on-orbit Space Station.

3.2.3 RACK PROCESSING AREA. In this area, experiments will be integrated into internal standard payload racks.

3.3 WORKSTANDS

For further information on support equipment used in the SSPF, refer to the *Support Equipment Item Descriptions* which is a special report extracted from the *Launch Site Ground Support Equipment Management System*.

3.3.1 MECHANICAL. The mechanical equipment, systems, and services available provide support to trunnion-outfitted flight hardware.

a. Access Platforms. Each workstand is equipped with fixed personnel platforms parallel to the X_0 axis, one on each side of the workstand.

b. Access Stairs. Mobile stairs are attached to the workstands to provide personnel and equipment transfer from the ground level to the workstand.

c. Scaffolding. Scaffoldings can be erected at the end of each workstand to provide continuous access around the flight element.

d. Payload Fittings. These fittings serve as structure support interfaces between the flight or GSE trunnions and the workstand. Longeron rails on each workstand are designed to accept payload fittings at variable locations.

e. Fluids and Gases. Interfaces for compressed air and the vacuum cleaning system are provided at each workstand.

f. Cable Trays. Accommodations for electrical cable routing is provided through permanently attached cable trays. In addition, subsystem interfaces are included for OIS-D, 60 Hz power, and emergency facility crane system stop.

3.3.1.1 Cable Tray Stands. These are portable support structures utilized to route utility lines between facility interfaces and GSE to the workstands. The cable tray stands are modular in design to provide the maximum configuration flexibility.

3.3.1.2 CEWS. These stands will support a single cargo element with trunnions. Two or more stands may be joined together to support larger and multiple flight hardware elements. Figure 3-8 provides a diagram of the CEWS.

3.3.1.3 LPIS. The LPIS is a gross mechanical simulation of the orbiter payload bay and provides a mean to achieve final launch configuration and preparation of elements and payloads prior to installation into the payload canister. The LPIS will be compatible with the payload fittings and air-bearing pallets. Figure 3-9 provides a diagram of the LPIS.

3.3.1.4 AFD Stand. The AFD stand will provide structural support and equipment space for the AFD simulation which includes the CITE avionics equipment, a Payload Specialist station, a Mission Specialist Station, and a Timing and Countdown Display. The AFD will be compatible with the LPIS, CEWS, and the air-bearing pallets. Figure 3-10 provides a diagram of the AFD stand.

3.3.1.5 T-0 Stand. The T-0 Stand will provide structural support and equipment space for orbiter T-0 umbilical avionics equipment, resistor racks, and GSE distributors. The T-0 stand is compatible with the LPIS, CEWS and air-bearing pallets. Figure 3-11 provides a diagram of the T-0 stand. The removable overhead access platform (ROAP) can be stored above the T-0 stand.

3.3.2 ELECTRICAL. Facility communications (e.g., telephone, data communications, local paging, and timing and video signals) are available at the CITE stand, the AFD simulator, and T-0 stand.

3.3.2.1 CITE. The CITE will provide a functional simulation of orbiter avionics and power which interface with Space Station elements in the prelaunch, the ascent, and on-orbit station configurations in the SSPF. The CITE will support nonhazardous testing in any high bay footprint. During CITE testing, participation will include payload representatives, and flight crew members. Room 2397 of the SSPF has been designated as the Control/User room for CITE. Figure 3-12 details the SSPF functional block diagram.

3.3.2.2 AFD Simulator. The AFD simulator will be installed on the upper level of the AFD stand. The AFD simulator provides the crew member with electrical interface panels that are equivalent to those found in the AFD of the orbiter.

a. Closed Circuit TV System. The AFD console area will have two separate CCTV areas. The first orbiter CCTV will be used to simulate the orbiter display unit. This monochrome display will be mounted in the AFD console. The second orbiter CCTV area will support the actual orbiter CCTV system that will interface with the Space Station. This area will consist of two color monitors mounted near the AFD payload/on-orbit stations and two avionics boxes mounted below the AFD mission station.

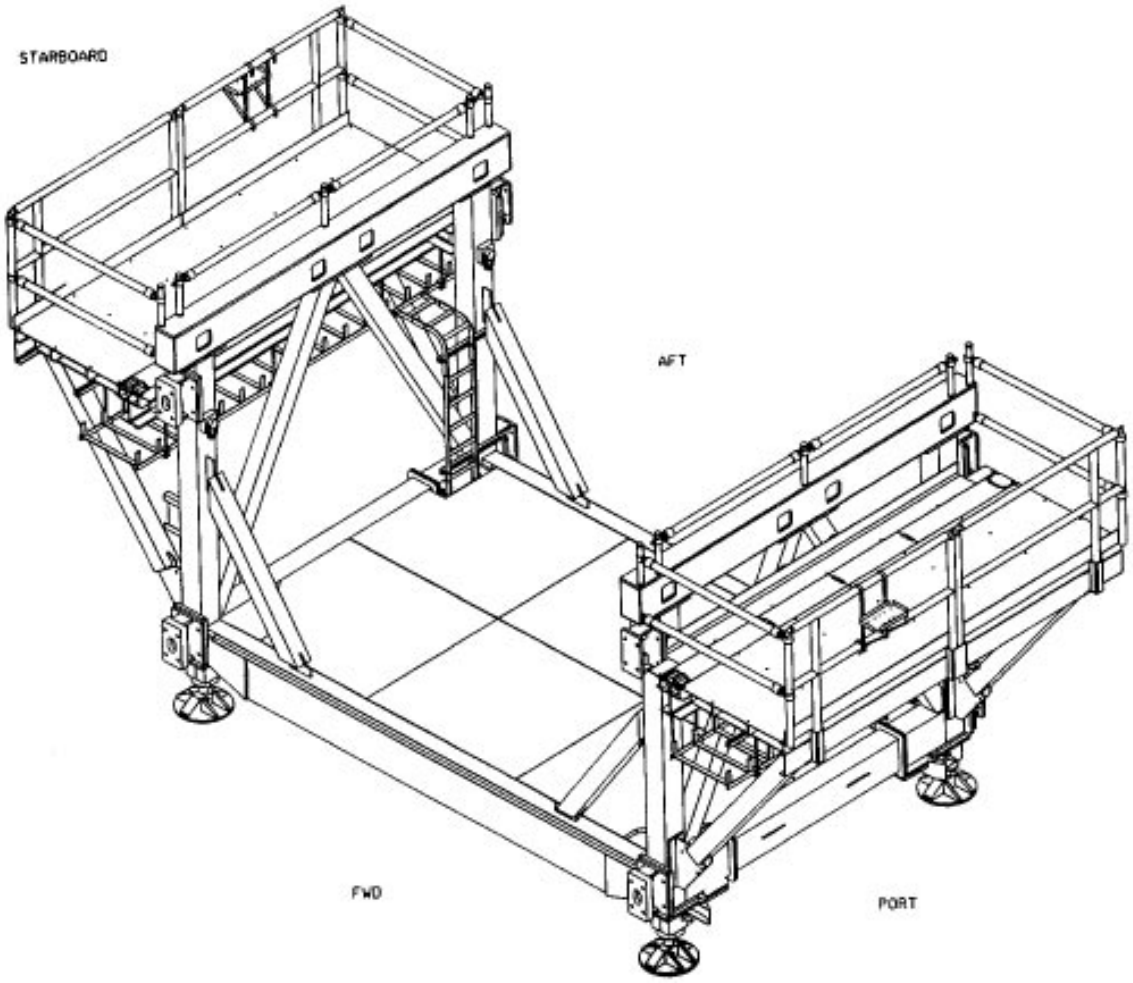


Figure 3-8 CEWS Layout

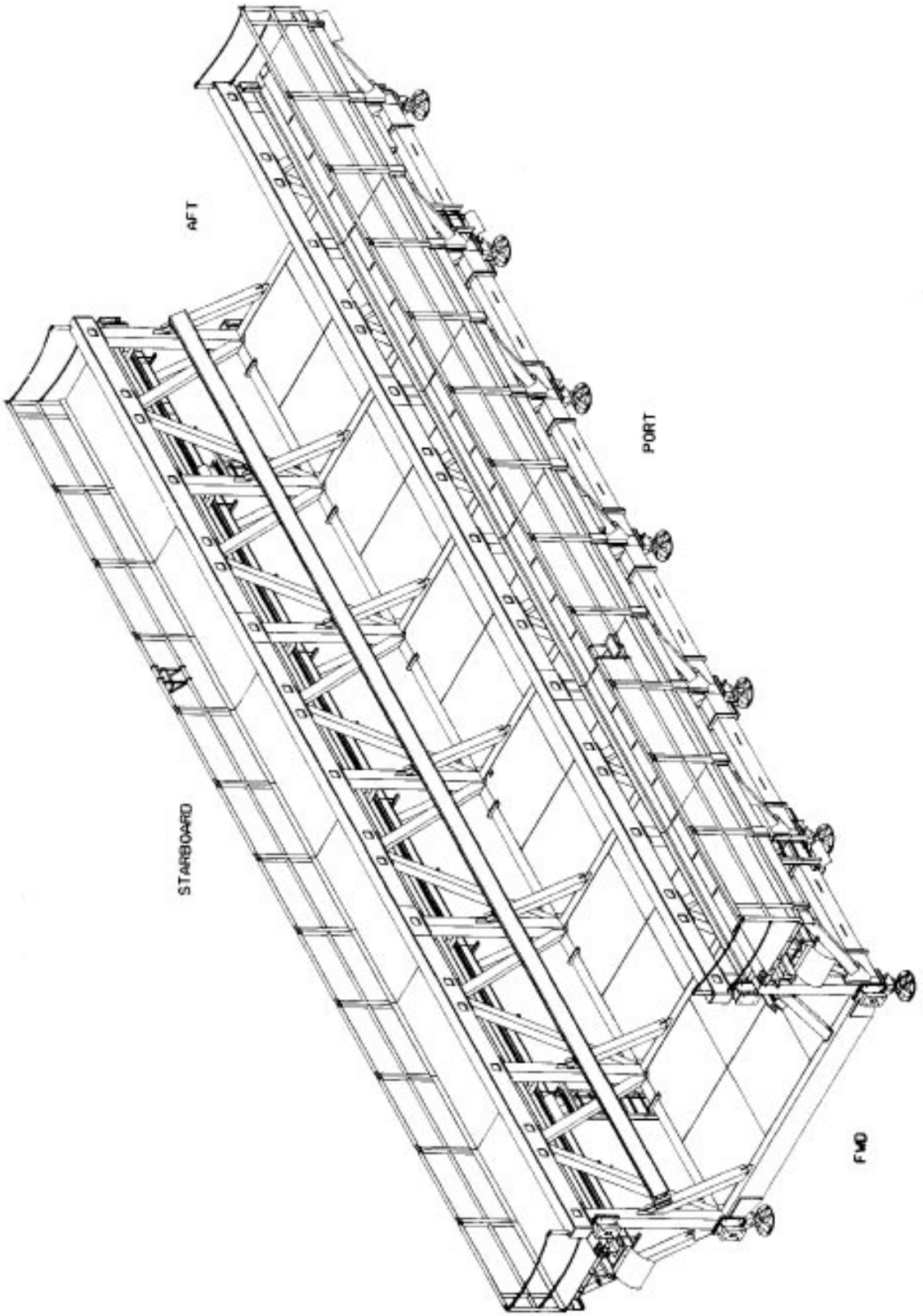


Figure 3-9. LPIS Configuration

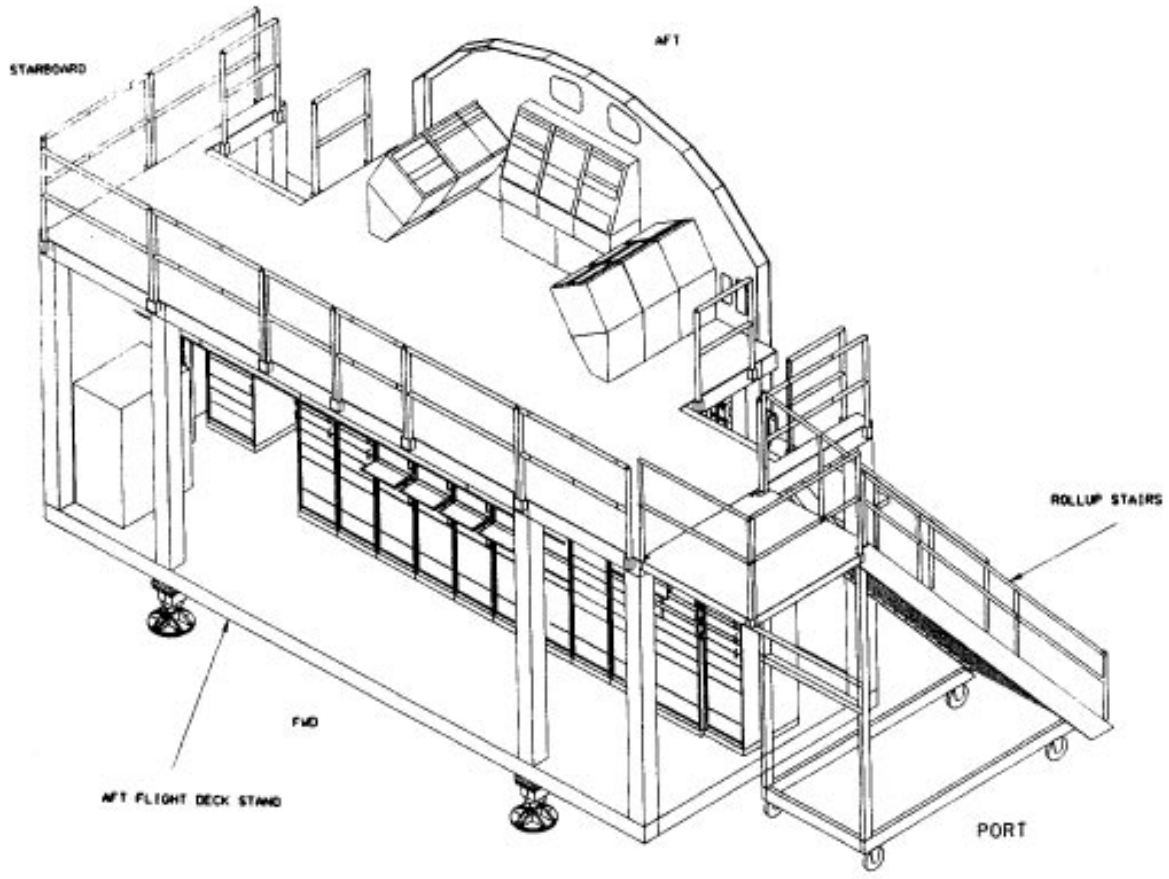


Figure 3-10. AFD Stand

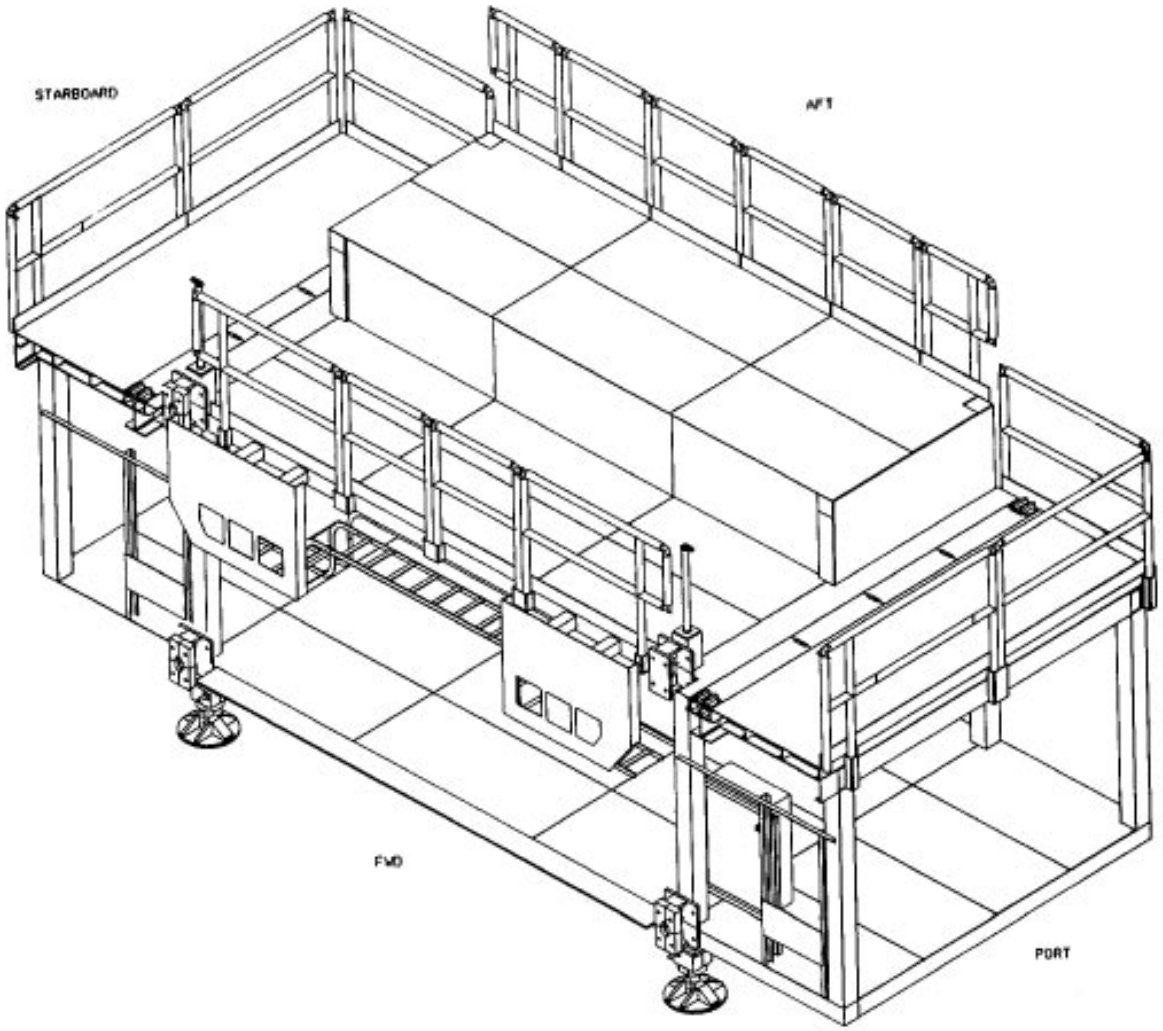


Figure 3-11. T-0 Stand Layout

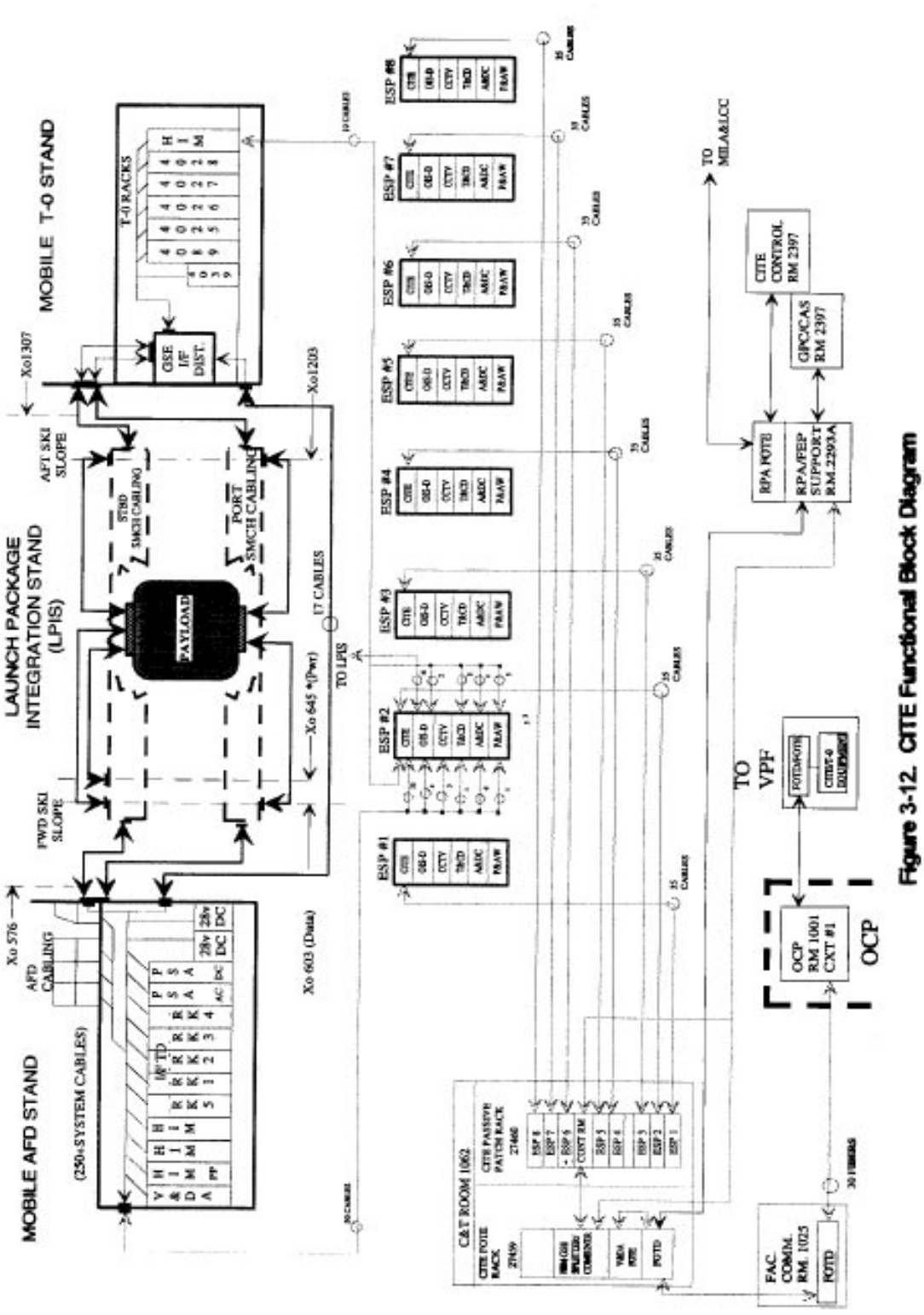


Figure 3-12. CITE Functional Block Diagram

b. Audio System. This audio system will interface with the Space Station. It will consist of two avionics boxes and control panels.

c. Interface Terminal Distributor (I/F TD). The I/F TD equipment will duplicate the orbiter/payload interface signal characteristics. The I/F TD will contain two multiplexer/demultiplexers, a pulse code modulator master unit, a payload interrogator, a payload data interleaver, and a payload signal processor.

d. Power Supply Assembly (PSA). The SSPF CITE PSA will provide simulated orbiter electrical alternating current (ac) and direct current (dc) power to payload interfaces and to orbiter avionics assemblies within the I/F TD and AFD stand. Remote control and monitor capability of most power will be provided from the CITE control room.

e. AFD/hardware interface modules (HIM's). The AFD/HIM's will provide the capability for remote control and monitoring of test equipment from the control room.

3.3.2.3 T-0 Interface Equipment. The T-0 interface equipment will provide a simulation of equipment used in the mobile launch platform at the pad to interface user GSE with a payload through the orbiter's T-0 umbilical. The equipment is planned to consist of five full size racks, a cable length simulator, a HIM, and interconnecting cables.

a. T-0 Stand HIM's. The T-0 stand HIM's will provide the capability for remote control and monitoring of test stand equipment from the control room.

b. T-0 Stand HIM Patch Panels. The T-0 stand HIM will interface through patch panels to provide variable routing of the HIM control and monitor signals.

3.4 AIRLOCK

Flight elements will enter the high bay through an airlock located at the west end of the SSPF. The airlock prevents contamination of the high bay CWA when moving Space Station elements or payloads into and out of the high bay. The airlock is able to accommodate the payload canister, in the horizontal position, on the transporter.

The airlock is 14 m (46 ft) wide by 32.9 m (108 ft) long with a ceiling height of 18.8 m (61 ft 6 in) and has 12.8 m (42 ft) by 15.1 m (49 ft 5 in) high vertical lift doors at both ends. From the airlock, equipment may be brought directly into the hardware inspection area through a 6.1 m (20 ft) wide by 2.1 m (7 ft) high door. Equipment may also be brought into the high bay through a 12.8 m by 15.2 m (42 ft by 50 ft) door. The airlock is equipped with a 14.7 metric ton (15 ton) bridge crane capable of service to within 3.5 m (11 ft 6 in) of the east wall, 3.2 m (10 ft 4 in) of the west wall, 1.5 m (4 ft 9 in) of the north wall, and 3.2 m (10 ft 4 in) of the south wall. Maximum hook height is 15.2 m (50 ft).

3.4.1 ENVIRONMENTAL CONTROL. Refer to paragraph 3.1.4.

3.4.2 FIRE PROTECTION AND SAFETY. The airlock has ionization (smoke) detectors installed in the air-conditioning return ducts. When activated, these detectors will shut down the air handling units in the airlock and activate building and fire station alarms.

Fire extinguishers are mounted approximately 1.2 m (4 ft) above the floor on the north and south area walls. Extinguishers are available for wood, paper, flammable liquids, and electrical fires.

3.4.3 ILLUMINATION. Refer to paragraph 3.1.7.

3.4.4 CONDUCTIVE EPOXY FLOORING. Refer to paragraph 3.1.11.

3.4.5 AIR-BEARING PALLET SYSTEM. Refer to paragraph 3.5.1.

3.4.6 GAS VENT SYSTEM. Refer to paragraph 3.1.16.

3.4.7 VACUUM CLEANING SYSTEM. Refer to paragraph 3.1.17.

3.4.8 COMPRESSED AIR SYSTEM. Refer to paragraph 3.1.18.

3.5 PORTABLE ACCESS AND HANDLING EQUIPMENT

The GSE available in the bay area will consist of both launch site and customer-provided equipment for access to and handling of the payloads and experiments.

Portable access equipment will consist of the following items:

a. powered work platforms

b. safety ladders

c. access stairs for use at stands

d. scaffolding

e. ROAP (used on the LPIS, AFD, T-0 stand, or CEWS for payload access)

f. lifting apparatus (CELA)/slings

3.5.1 AIR-BEARING PALLET SYSTEM. A self-propelled, air-bearing pallet is available to lift and move large items of flight hardware and workstands within the bay area. The air-bearing pallet provides grounding of workstands and flight hardware through grounding lugs provided at both ends of the pallet. The air-bearing pallet has two independent air motor drive units providing smooth continuous motion at all speeds and loads. The speed is variable from 0 to 40 foot per minute. In the case of an air supply failure, the drive units will bring the air-bearing to a complete stop. The air-bearing pallet is capable of positioning a load, in the lateral and longitudinal directions to within .10 m (.25 in) of the desired position. Use of the air-bearing pallet system must be arranged through the appropriate IPT Lead or the Facility Manager. Figure 3-13 shows a diagram of the air-bearing pallet system. There are three air-bearing pallets that are each capable of lifting and moving 34,050 kg (75,000 lb).

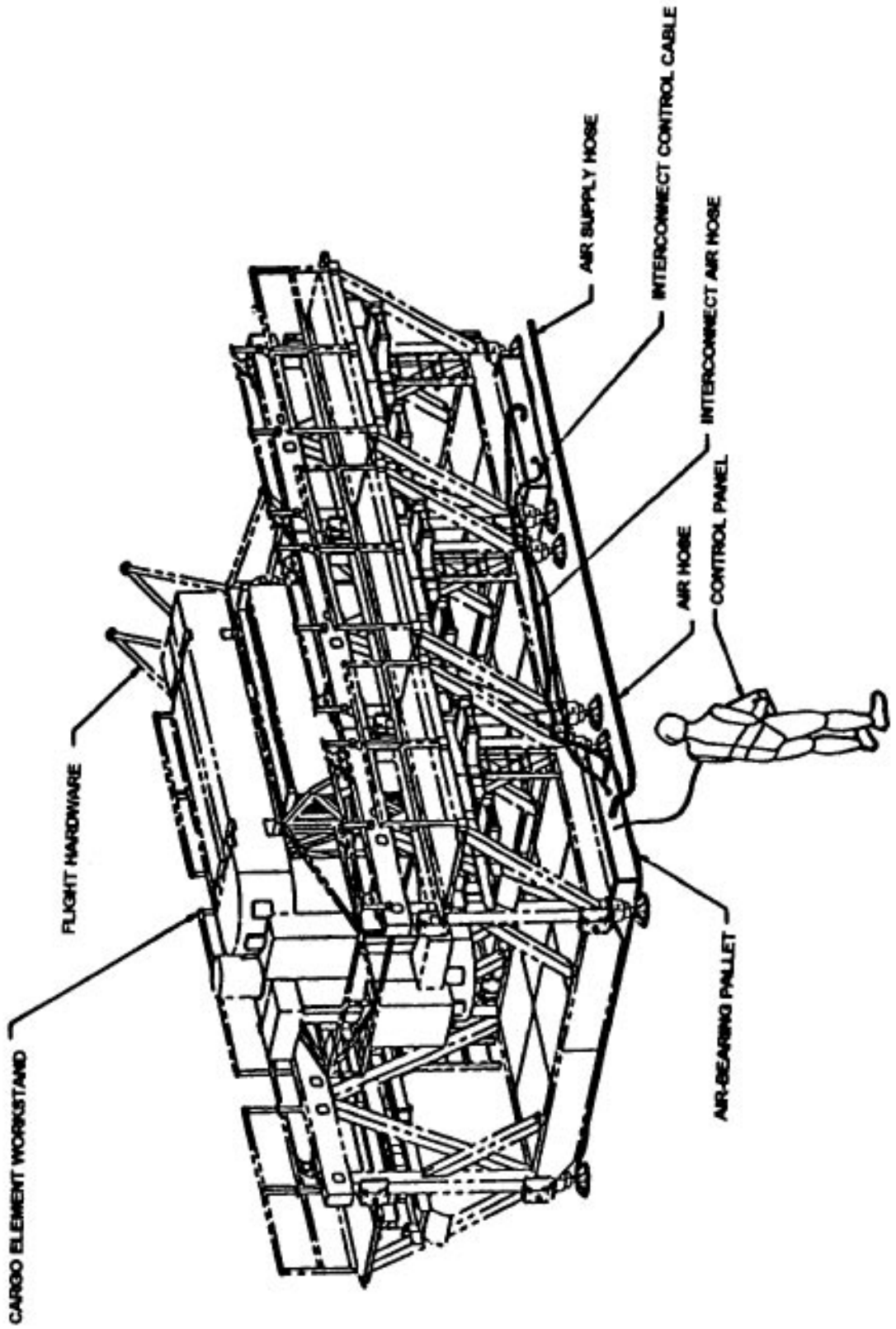


Figure 3-13. Air-Bearing Pallet System

3.5.2 AIR-BEARING CASTER SETS. The air-bearing caster sets are used to manually lift and move flight hardware and GSE. The air-bearing casters are intended to minimize the use of cranes and to provide the capability of positioning flight hardware and GSE outside the crane envelope. Two sizes of air-bearing caster sets are available: light duty and heavy duty. Use of the air-bearing caster sets must be arranged through the appropriate IPT Lead or Facility Manager. Figure 3-14 shows a diagram of an air-bearing caster set. The air-bearing caster sets are capable of moving the following loads:

a. light duty = 3,632 kg (8,000 lb) - 908 kg (2,000 lb per caster)

b. heavy duty = 11,350 kg (25,000 lb) - 2,838 kg (6,250 lb per caster)

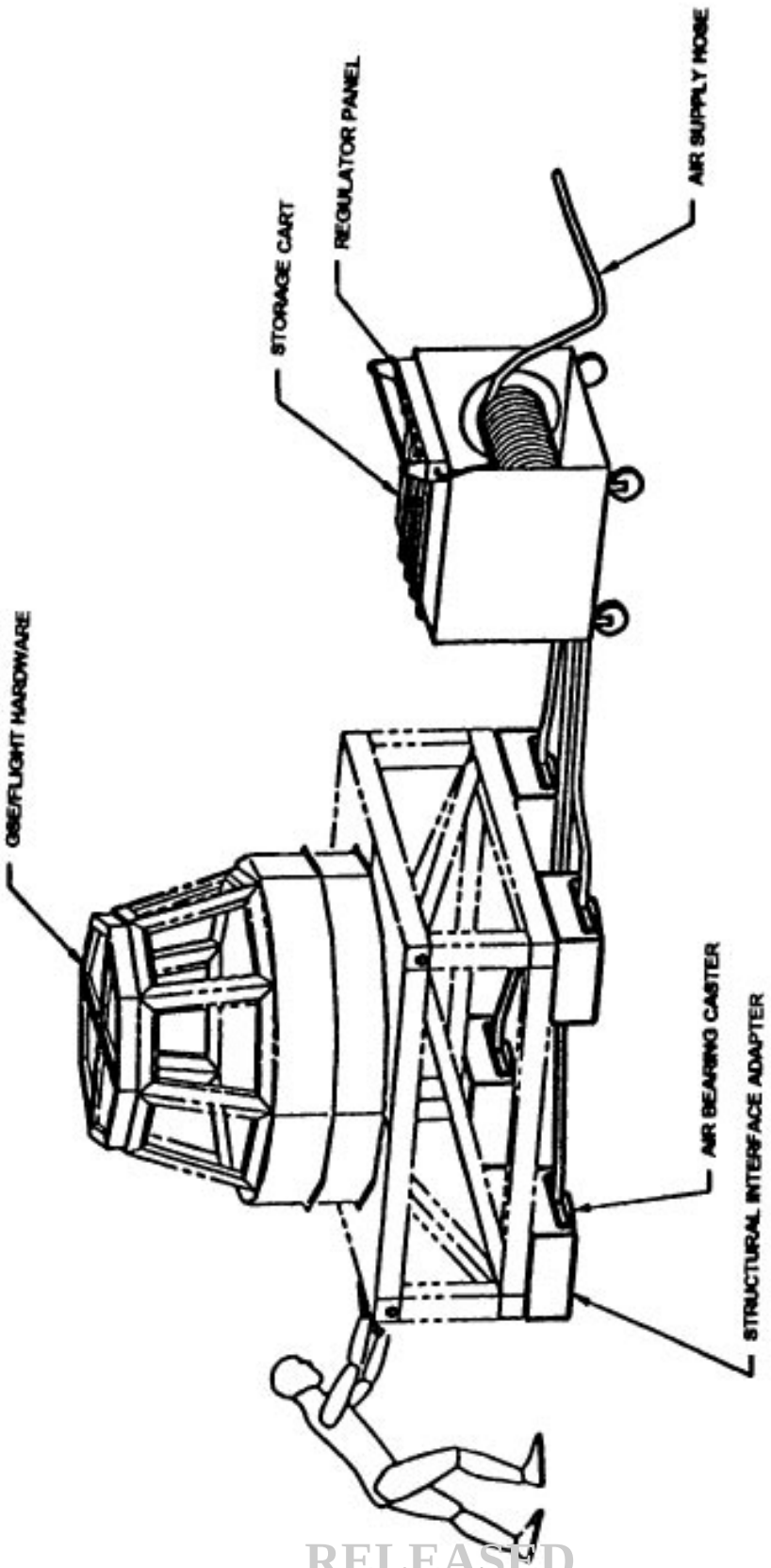


Figure 3-14. Air-Bearing Caster Set

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SECTION IV

CONTROL AND MONITORING AREAS

4.1 GENERAL

Control and monitoring areas for Space Station element and payload processing are located within the SSPF.

4.2 CONTROL/USER ROOMS

The nine control/user rooms are located on the southeast end of the second floor of the SSPF (rooms 2353, 2359, 2369, 2371, 2377, 2383, 2387, 2393, and 2397). Room 2397 has been assigned to support CITE. The area of the user rooms is approximately 145 m^2 (1,560 ft^2). The main double entry doors are 1.83 m (6 ft) wide by 2.13 m (7 ft) high. All of the user rooms have 2.7 m (9 ft) ceilings and .61 m (2 ft) raised, conductive tile flooring. The rooms are separated by sound-absorbing, accordion bi-fold doors that may be opened to accommodate the space allocations of experimenters assigned to a mission.

The control/user rooms area assigned to support the checkout of Space Station, or other payload, flight hardware and software. The assignment of the control/user rooms must be scheduled in advance through the appropriate IPT Lead or Facility Manager. Figure 4-1 shows the planned floor configuration of a typical user room. Figure 4-2 shows the planned floor configuration of the CITE room.

4.2.1 CUSTOMER MANAGEMENT ROOM. Room 2347 has been designated as a customer management area which will allow monitoring (T&CDT, CCTV, and OIS-D) capability for management personnel. This room also contains an observation window which allows viewing into the bay area.

4.2.2 CONTROL/USER ROOM SUPPORT PROVISIONS. The support provisions in the control/user rooms are described in the subsequent paragraphs.

4.2.2.1 Access Control. Access to the Control/User rooms is under tenant control. Mechanical cypher locks are installed on the user room doors. The cypher combination can be changed at the request of the SSPF Facility Manager and/or occupants.

4.2.2.2 Lighting. Fluorescent modular fixtures that provide 1076 lm/m^2 (100 fc) or more are mounted in the ceiling to provide lighting in the user rooms. Each room is equipped with 12 fixtures and an emergency light.

4.2.2.3 Fire Suppression. The user rooms are protected by a preaction fire suppression system.

4.2.2.4 Environmental Control. The air conditioning system maintains the temperature at 21.7 ± 3.3 °C (71 ± 6 °F) and the humidity at or below 55 percent.

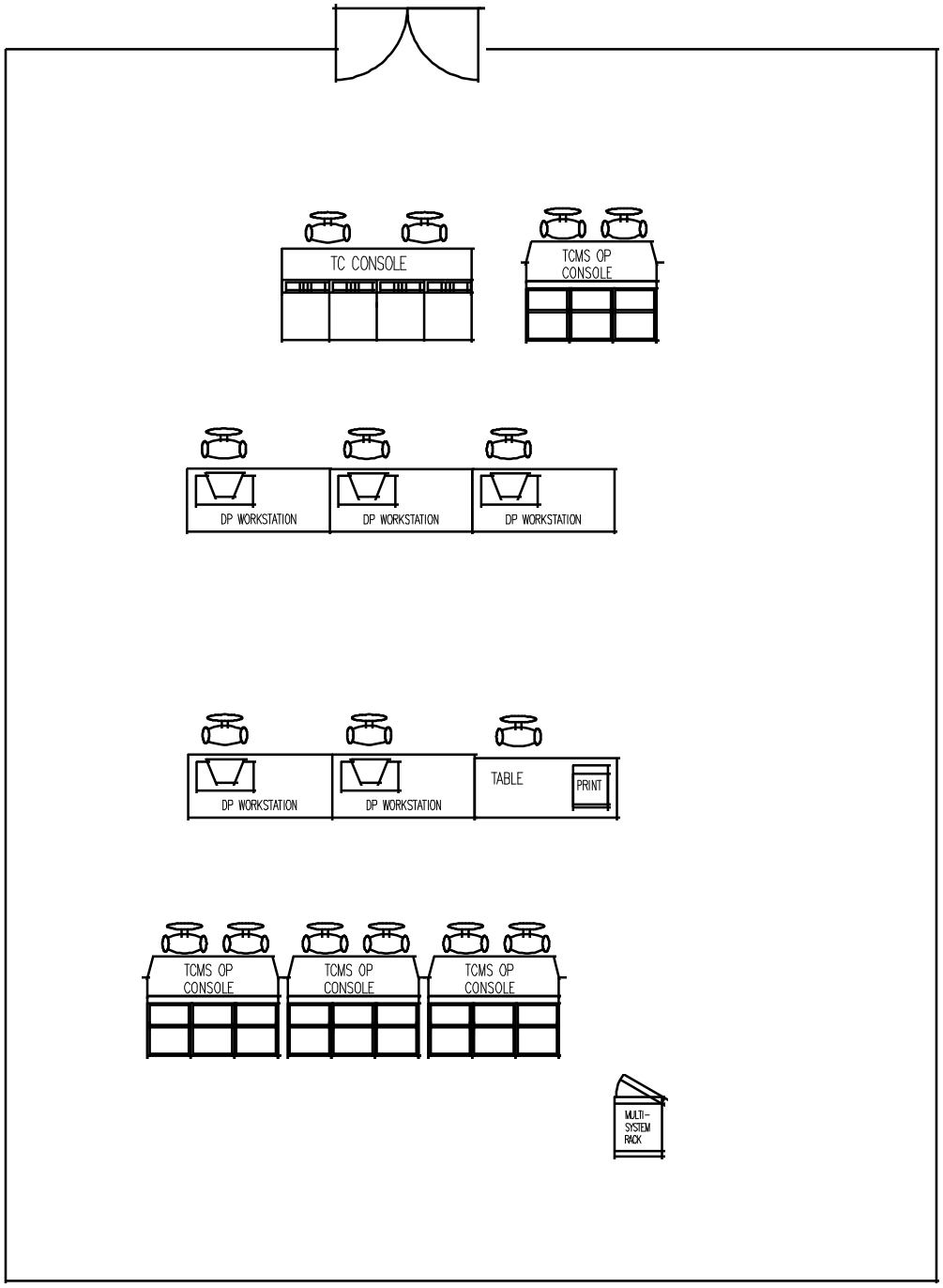

Figure 4-1. Typical Control/User Room Configuration

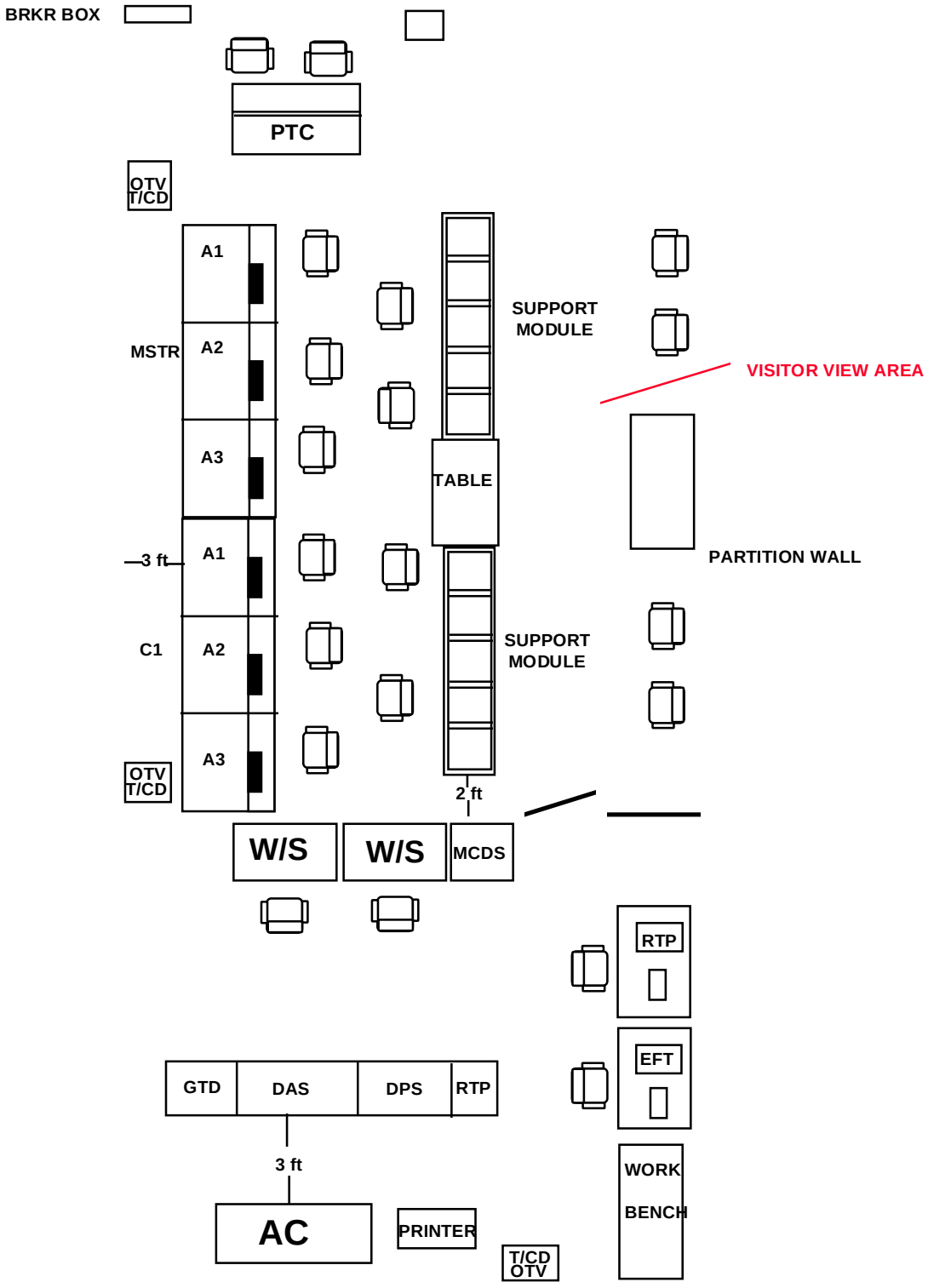

Figure 4-2. Planned Floor Configuration of CITE Room

4.2.2.5 Electrical Power Distribution. Single-phase, 60 Hz, 120 vac power is distributed in each room by wall-mounted, 20 amperes duplex receptacles. 120/208 vac, 3 phase, 30 amperes power is available from under-floor receptacles. The under floor receptacles are backed-up by a 10-minute uninterruptable power supply. Each room also has 15 amperes twisted-lock receptacles.

4.2.2.6 Grounding. A single grounding net is formed with a grounding wire connected between the neutral of the transformer servicing the room, and several steel stanchions of the raised flooring. The raised flooring sections are in turn bolted together, and the transformer neutral is connected to structural steel creating a continual ground.

4.2.2.7 OIS-D. The OIS-D system is a KSC-wide, digital, voice conferencing system. The system provides a 512 channel communications system with an unlimited, non-blocking, conferencing capability for all facilities at KSC. Operational communications will be provided between locations within the SSPF and with other locations at KSC. The OIS-D system provides:

a. translation of digital data into an optical signal for fiber optic transmission (and vice versa for digital data transmission)

b. transmission of KSC-wide voice data

c. analog-to-digital conversion for transmitting and digital-to-analog conversion for receiving

d. a user interface capability to access a number of non-blocking conference channels

4.2.2.8 CCTV Monitoring. CCTV monitoring of experiment activities in the area is available in the Control/User rooms.

4.2.2.9 T&CD. The T&CD system provides:

a. timing interface panels for distribution of IRIG-A, IRIG-B, Mission Greenwich Mean Time (MGMT), as well as countdown, MET, and real/simulated time codes

b. wall-mounted display units displaying Coordinated Universal Time, MGMT, and KSC countdown/MET

c. capability to read time code signal on time, propagation time delays compensation, and various time codes, pulse rate and code error

4.2.2.10 TCMS. TCMS was created to verify the compatibility of Space Station interfaces at KSC prior to launch. TCMS will be utilized in those control rooms which will primarily support resupply and return operations. The available support for users should be coordinated through the TCMS Integrated Product Team.

4.2.2.11 Communication and Tracking Checkout System (C&TS). The C&TS primarily verifies the functional interface compatibility of experiment racks with the Space Station flight Communication and Tracking System. C&TS elements required to provide this functionality include a distribution system for transmission of experiment data (high rate > =50 MBPS and support equipment, and standard interfaces and transmission media for communication with support equipment and data recorders. C&TS will be used to route experiment high rate data and video to users in the Control/User rooms from the bay area and certain off-line laboratories.

4.2.2.12 MUCS. Refer to paragraph 3.1.19.7.

4.2.1.13 Test Conductor Console. The test conductor console provides the test conductor with the following: telephones, C&AW capability, operational inter-communications among facilities, and access to the LAN.

4.2.1.14 Multi-System Racks. One multi-system rack is located in each Control/User room. Each rack provides an interface between users in the bay areas and specific off-line labs (rooms 1481, 1487, and 1495), via the MUCS and the communications and tracking system. Each rack also support the T&CD system via interface panels.

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SECTION V

LABORATORIES AND SHOPS

5.1 GENERAL

The SSPF provides 15 off-line laboratories, two chemical labs, two darkrooms, and other shop areas adjacent to the intermediate bay. These areas will be used to support payload ground processing activities. Use of these laboratories and shops and their services must be requested and must be scheduled through the appropriate IPT Lead and the Facility Manager. Some of the areas are dedicated for payload support; while other areas will support payload activities on an as-available basis only. See each subsection for clarification.

Access to these areas will be under tenant control. Some of the doors are equipped with mechanical cypher locks. The cypher lock combination can be changed at the request of the SSPF Facility Manager and/or occupants.

This section presents the laboratories and shops grouped by function and location, as appropriate. Figure 5-1 shows the laboratory and shop areas of the SSPF.

5.2 EXPERIMENT LABORATORIES

5.2.1 OFF-LINE LABORATORIES.

The off-line laboratories are a group of rooms located on the first floor of the SSPF adjacent to the intermediate bay and are planned for specific experiment off-line operations. They will be used for both preflight and postlanding operations.

The air handling equipment in these laboratories can be set to maintain the temperature at 21.7 +/- 3.3 °C (71 +/- 6°F) and the humidity at or below 55 percent.

The cleanliness level of these laboratory areas can be maintained at least a Level 4 CWA. See K-STSM-14.2.1 for further environmental information. Environmental monitoring through the use of portable IEMS carts is available and can be arranged through the appropriate IPT Lead or Facility Manager.

Each off-line laboratory has single phase, 60 Hz, 120 volt +/-3 percent power receptacles. Some 208 volt, single phase and triple phase, power is available for National Electrical Manufacturer's Association L21-30R receptacles. See drawings 82K00760 or 82K04904 for detailed receptacle locations and identifications.

Grounding in the off-line laboratories is accomplished via grounding plates, labeled "A" or "B", which are tied directly to the neutral of the respective transformer servicing the circuits in each off-line laboratory. Transformer neutrals are, in turn, connected to structural steel.

All areas have A&DC capability. (Refer to paragraph 2.9 for further information).

Table 5-1 lists the room numbers, square footage, ceiling heights, and facility equipment and services provided.

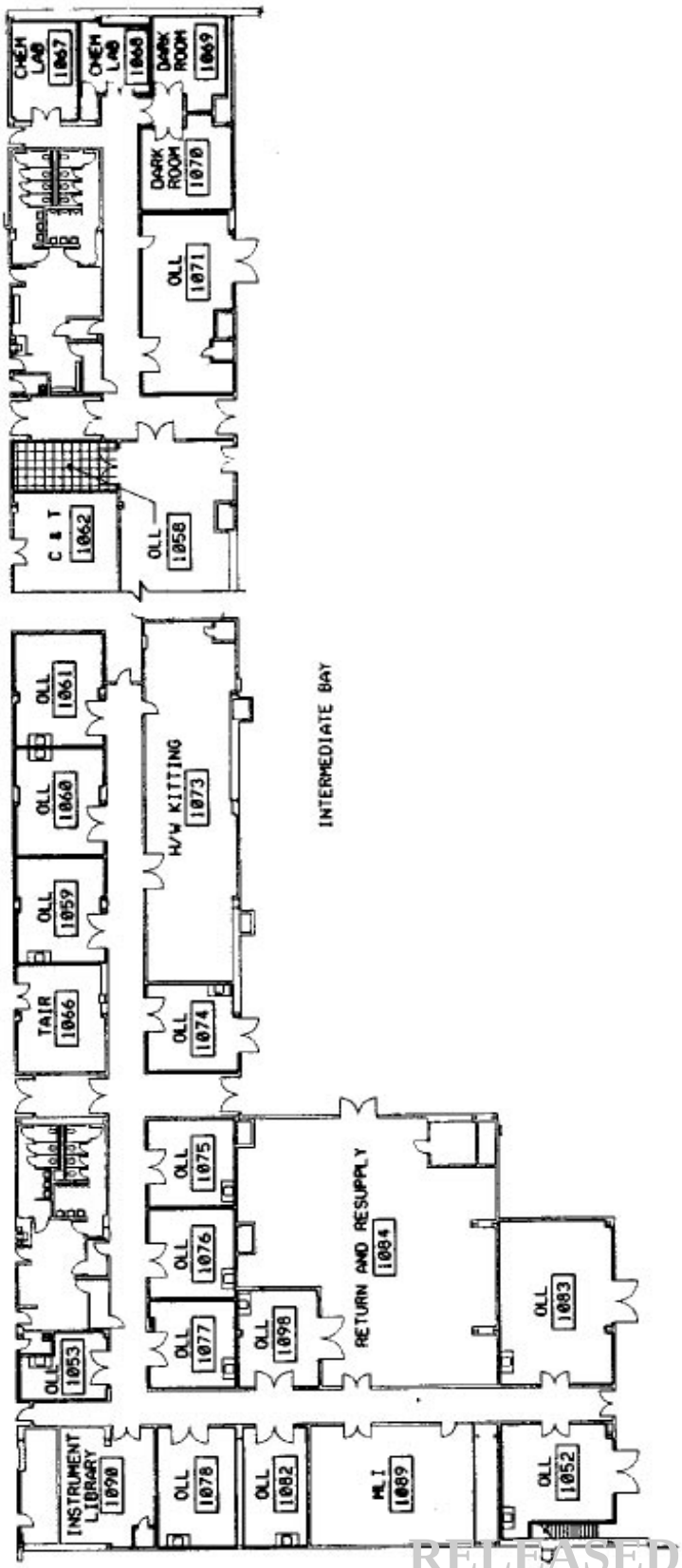

Figure 5-1. Layout of Off-Line Laboratories, First Floor

Table 5-1. Off-Line Laboratory Data

Room/ Door Number	Area m^2 (ft^2)	Door Access m (ft)	Ceiling Height m (ft)	Equipment and Services
1052/ 1496	54.5 (586.3)	1.8 × 2.1 (6 × 7)	4.6 (15)	GN_2 GHe Vents- high and low pressure Facility vent Sink with hot and cold H_20 with drain 10K laminar flow bench Compressed air Vacuum system High rate data IEMS 2-ton hoist capacity
1053/ 1482	23.1 (249.3)	2.4 × 2.4 (8 × 8)	3.4 (11)	Sink with hot and cold H_20 with drain Vacuum system High rate data IEMS 2-ton hoist capacity
1058/ 1421	23.9 (257.5)	2.4 × 2.4 (8 × 8)	3.4 (11)	Sink with hot and cold H_20 with drain Vacuum system High rate data IEMS 2-ton hoist capacity
1059/ 1462	44.7 (481.5)	2.4 × 2.4 (8 × 8)	3.4 (11)	Sink with hot and cold H_20 with drain Vacuum system High rate data IEMS 2-ton hoist capacity
1060/ 1456	44.3 (477.3)	2.4 × 2.4 (8 × 8)	3.4 (11)	Sink with hot and cold H_20 with drain Vacuum system High rate data IEMS 2-ton hoist capacity
1061/ 1452	47.0 (505.5)	2.4 × 2.4 (8 × 8)	3.4 (11)	Sink with hot and cold H_20 with drain Vacuum system High rate data IEMS 2-ton hoist capacity

Table 5-1. Off-Line Laboratory Data (continued)

Room/ Door Number	Area m^2 (ft^2)	Door Access m (ft)	Ceiling Height m (ft)	Equipment and Services
1071/ 1417	71.5 (770)	2.4 × 2.4 (8 × 8)	4.6 (15)	GN_2 GHe Vents- high and low pressure Facility vent Sink with hot and cold H_20 with drain Compressed air Vacuum system High rate data IEMS 2-ton hoist capacity
1074/ 1465	34.7 (373)	2.4 × 2.4 (8 × 8)	3.4 (11)	Vents- high and low pressure Sink with hot and cold H_20 with drain Vacuum system High rate data IEMS 2-ton hoist capacity
1075/ 1473	35.5 (382.5)	2.4 × 2.4 (8 × 8)	3.4 (11)	Vents- high and low pressure Sink with hot and cold H_20 with drain Vacuum system High rate data IEMS 2-ton hoist capacity
1076/ 1477	36.1 (387.2)	2.4 × 2.4 (8 × 8)	3.4 (11)	Vents- high and low pressure Sink with hot and cold H_20 with drain Vacuum system High rate data IEMS 2-ton hoist capacity
1077/ 1481	36.0 (385)	2.4 × 2.4 (8 × 8)	3.4 (11)	Vents- high and low pressure Sink with hot and cold H_20 with drain Vacuum system TCMS Timing and Countdown OIS-D CCTV High rate data Multi-user panel IEMS Communication and tracking 2-ton hoist capacity

Table 5-1. Off-Line Laboratory Data (continued)

Room/ Door Number	Area m^2 (ft^2)	Door Access m (ft)	Ceiling Height m (ft)	Equipment and Services
1078/ 1486	44.6 (480.5)	2.4 × 2.4 (8 × 8)	3.4 (11)	Vents- high and low pressure Sink with hot and cold H_20 with drain Vacuum system High rate data IEMS 2-ton hoist capacity
1082/ 1488	36.4 (392)	2.4 × 2.4 (8 × 8)	3.4 (11)	Vents- high and low pressure Sink with hot and cold H_20 with drain Vacuum system High rate data IEMS 2-ton hoist capacity
1083/ 1495	88.6 (954)	1.8 × 2.1 (6 × 7)	4.6 (15)	GN_2 GHe Vents- high and low pressure Facility vent Sink with hot and cold H_20 with drain Compressed air Vacuum system TCMS Timing and Countdown OIS-D CCTV High rate data Multi-user panel IEMS Communication and tracking 2-ton hoist capacity
1098/ 1487	37.4 (402.7)	2.4 × 2.4 (8 × 8)	3.4 (11)	Vents- high and low pressure Sink with hot and cold H_20 with drain Vacuum system TCMS Timing and Countdown OIS-D CCTV High rate data Multi-user panel IEMS Communication and tracking Oxygen deficiency monitoring system 1-ton hoist capacity

5.2.2 CHEMICAL LABORATORIES. Table 5-2 lists the room numbers, square footage, ceiling heights, and facility equipment and services provided. Refer to paragraphs 1.5 and 1.6 for detailed information regarding hazardous waste requirements and guidelines.

Table 5-2. Chemical Laboratory Data

Room/ Door Number	Area m^2 (ft^2)	Door Access m (ft)	Ceiling Height m (ft)	Equipment and Services
1067/ 1403	31.6 (340.2)	1.8×2.1 (6×7)	3.4 (11)	Chemical sink with hot and cold H_20 with drain, fume hood, and vent Vacuum system IEMS Communication and tracking Oxygen deficiency monitoring system 2-ton hoist capacity
1068/ 1405	26.3 (283.1)	1.8×1.8 (6×7)	3.4 (11)	Chemical sink with hot and cold H_20 with drain, fume hood, and vent Vacuum system IEMS Communication and tracking Oxygen deficiency monitoring system 2-ton hoist capacity

5.2.3 DARK ROOMS. Table 5-3 lists the room numbers, square footage, ceiling heights, and facility equipment and services provided. Refer to paragraphs 1.5 and 1.6 for detailed information regarding hazardous waste requirements and guidelines.

Table 5-3. Dark Room Data

Room/ Door Number	Area m^2 (ft^2)	Door Access m (ft)	Ceiling Height m (ft)	Equipment and Services
1069/ 1407A	29.5 (317.8)	1.8×2.1 (6×7)	3.4 (11)	Sink with hot and cold H_20 with drain Chemical sink Fume hood and vent Vacuum system IEMS 2-ton hoist capacity
1070/ 1407B	36.6 (393.8)	1.8×2.1 (6×7)	3.4 (11)	Sink with hot & cold H_20 with drain Chemical sink Fume hood and vent Vacuum system IEMS 2-ton hoist capacity

SECTION VI

SERVICE AND SUPPORT AREAS

6.1 GENERAL DESCRIPTION

6.2 LOADING DOCK AREA

A 579.7 m^2 (6,240 ft^2) covered area is available for the loading and unloading of equipment into and out of the SSPF. The floor loading requirements ensure compatibility for use with a 2,724 kg (6,000 lb) forklift. The loading dock area has been equipped with three hydraulic dock levelers that are used to adjust the loading dock so that the facility and truck beds are at the same level. The loading dock has a capability to service three trucks simultaneously. The loading dock area is equipped with wheel chocks and bumpers, electric forklift recharge capability, and drain and sump pumps. All major deliveries should be scheduled in advance through the Facility Manager.

6.3 SHIPPING AND RECEIVING

A 418.7 m^2 (4,507 ft^2) shipping and receiving area is located adjacent to the loading dock. This area has a 4.9 m (16 ft 1 in) clear ceiling height. One set of 5.2 m by 6.1 m (17 ft by 20 ft) doors opens to the loading dock area. Another set of 5.2 m by 5.5 m (17 ft by 18 ft) doors opens to the logistics area. In addition, a 60.9 m^2 (655 ft^2) bonded storage area is located in this area. This area has access to the facility vacuum system and the facility compressed air outlets.

6.4 HARDWARE INSPECTION

A 204.4 m^2 (2,200 ft^2) area is available for hardware inspection. It is equipped with a 4.54 metric ton (5-ton) bridge crane that has a 7.6 m (25 ft) hook height. Maximum hoist capability is 4.54 metric ton (5-ton). A 3.1 m by 6.1 m (10 ft by 20 ft) set of doors provides access to the high bay and airlock. A 5.2 m by 6.1 m (17 ft by 20 ft) set of doors provides access to the shipping and receiving area. A Level 4 CWA environment is maintained. Remote monitoring of temperature, humidity, particle count, and differential pressure will be available. This area has access to the facility vacuum system and the facility compressed air outlets. The floor was designed to accommodate the air-bearing pallet system.

6.5 FLIGHT CREW EQUIPMENT/RESUPPLY AND RETURN AREA

This area will be used for both preflight and postflight processing of Space Shuttle and Space Station missions. It is located in the west and central area of the first floor. Areas include :

a. Flight Crew Equipment Area. This visibly CWA will be used to process Space Shuttle and Space Station mission flight crew equipment drawers, trays, and lockers.

b. Resupply and Return Equipment Processing Area. This visibly CWA area (room 1093) will be used to process Space Station resupply orbital replacement units and materials placed in drawers, trays, and lockers. It will also be used as an off-line processing area for dry cargo containers and unpressurized logistics containers.

c. Resupply and Return Drawer Processing Room. This area (room 1061) will be used for use in preflight drawer preparation. It will also be used for the integration and deintegration of drawers, trays, and lockers.

d. Food Preparation Area. This area is designed to stage, store, prepare, pack, and load flight food for Space Station mission.

e. Waste Staging Area. This area (room 1289B) will be used as a staging area for the postflight de-integration of waste containers for human, biomedical, wet and dry trash, chemical, food, and gray water waste.

f. Resupply and Return Equipment Processing Laboratory. This level 4 CWA (room 1489) will be used for integration and deintegration of all drawers and racks. Bench reviews and Crew Equipment Interface Testing will be performed in this area. This area will also be used for the storage of flight crew equipment, experiment items and resupply articles required for upcoming resupply missions.

APPENDIX A

REFERENCES

KCI-HB-5340.1	*Payload Facility Contamination Control Implementation Plan*
KHB 8800.6	*KSC Environmental Control Handbook*
KHB 8800.7	*Hazardous Waste Management*
KMI 6430.4	*Examination and Licensing of KSC Facility Crane Operators*
KSC-STA-61.01 Revision B	*SSPF Facility and Equipment Design Plan (FEDP)*
KSCM-D:-0003 Revision A	*Implementation Plan, Operational Intercommunications System - Digital (OIS-D)*
KSCM-DL-0125	*International Space Station Alpha Communications Systems Interface Descriptions Document*
K-STSM-14.2.1	*KSC Payload Facility Contamination Control Plan*
OMI S9934	*Space Station Processing Facility, Emergency Procedures Document*
TS-TCMS-92002 Revision Basic	*Test, Control, and Monitoring System (TCMS) Operations Plan*
29 CFR 1910	*Occupational Safety and Health Standard*

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CG-LSO	W. FLETCHER
CG-LSO-2	S. GREEN
CG-LSO-2	D. HAGIST
CG-LSO-2	R. MARTUCCI
CG-LSO-2	J. SCHNERINGER
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CM-INT-2	W. HARDING
CM-INT-2	M. POULIN
CM-INT-3	J. STRAITON
CM-INT-4	F. STUMP
CM-INT-5	D. BURRIS
CM-INT-6	K. MORRIS
CM-INT-31	R. WEBSTER
CM-INT-32	M. LAVOIE
CS-OTE	R. BOURNE
CS-OTE-1	L. ROE
CS-PED	S. BARTELL
CS-PTS	D. WEBB
CS-PTS-2	C. JACOBSON
MDS&DS-KSC-F100	T. SMITH
MDS&DS-KSC-F120	C. KLEINSCHMIDT
MDS&DS-KSC-F126	R. BAUMAN
MDS&DS-KSC-F126	R. BRUNTON
MDS&DS-KSC-F126	T. EDSON
MDS&DS-KSC-F128	L. EDLUND
MDS&DS-KSC-F140	G. THURN
MDS&DS-KSC-F150	J. KOCH
MDS&DS-KSC-F200	J. SCHOFIELD
MDS&DS-KSC-F204	M. KINSLOW
MDS&DS-KSC-F206	R. PEPPER
MDS&DS-KSC-F212	S. HOFFMAN
MDS&DS-KSC-F222	R. ZOHLER
MDS&DS-KSC-F250	J. BRANNIGAN
MDS&DS-KSC-F260	R. CHURNELL
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