

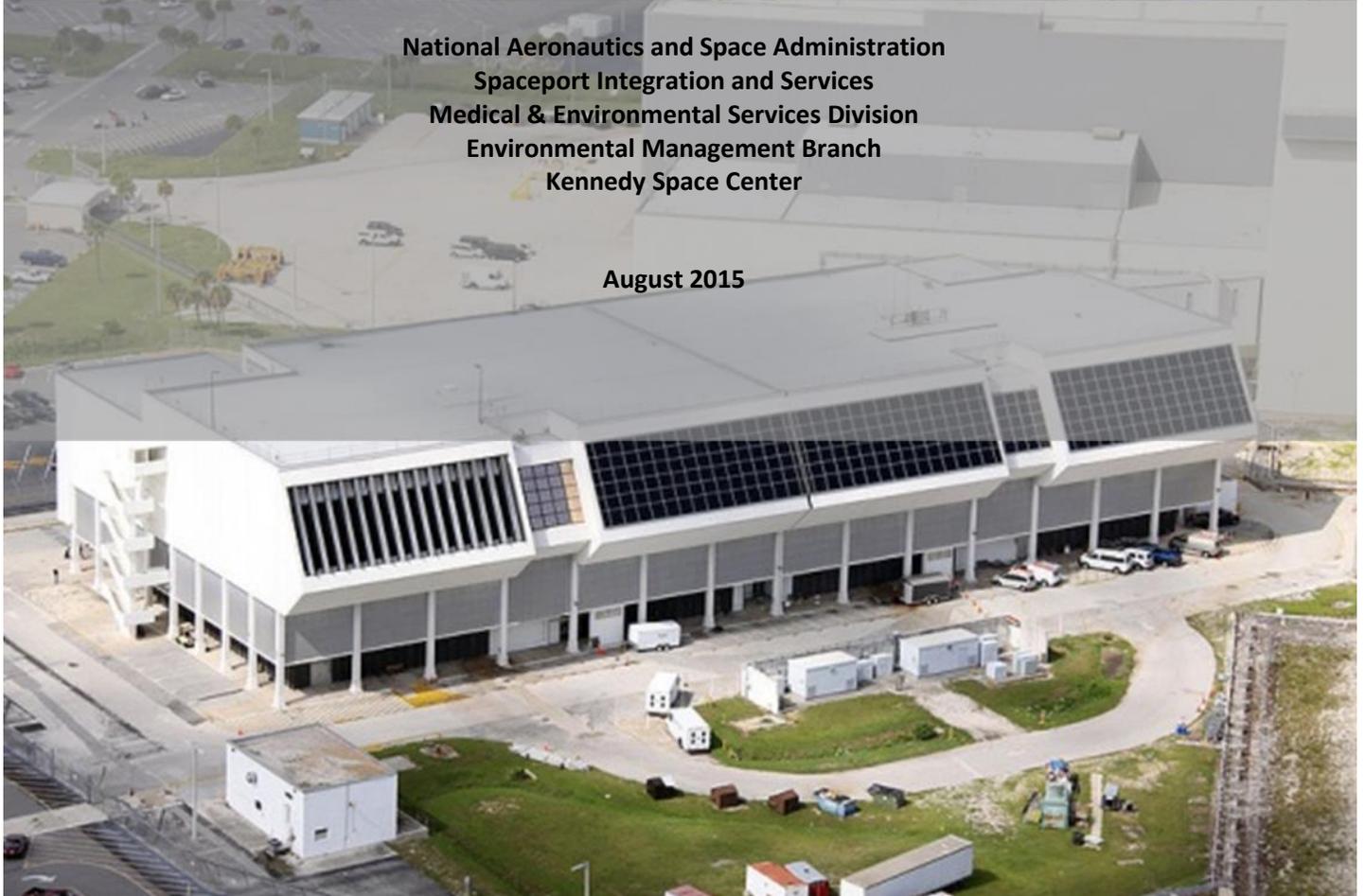


# Inventory of Equipment in Launch Control Center Firing Room 2

Prepared by:

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Kennedy Space Center

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## Presidential Remarks during NASA's Space Exploration Programs

### The Decision to Go to the Moon, the Apollo Program (1961-1972)

*"I believe that this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the moon and returning him safely to the earth."*

May 25, 1961, President John F. Kennedy



### Reusable Spacecraft, Space Shuttle Program (1981-2011)

*NASA will proceed with the development of a reusable space shuttle system and the intent is to launch as many as 50 missions per year, with hopes of driving down per-mission costs.*

January 5, 1972, President Richard M. Nixon



### The Next Chapter, Space Launch Systems (2011- Present)

*A new heavy lift launch vehicle will be designed by 2015 and construction to begin thereafter with a U.S. crewed orbital Mars mission by the mid-2030s, preceded by an asteroid mission by 2025. Ramping up robotic exploration of the solar system, including a probe of the Sun's atmosphere, new scouting missions to Mars and other destinations; and an advanced telescope to follow Hubble, allowing us to peer deeper into the universe than ever before.*

April 15, 2010, President Barack Obama



## EXECUTIVE SUMMARY AND ACKNOWLEDGEMENTS

The *Inventory of Equipment in the Launch Control Center Firing Room 2* was conducted by the National Aeronautics and Space Administration (NASA) at the Kennedy Space Center (KSC) in June 2012. The Inventory was prepared in agreement with NASA KSC and the Florida State Historic Preservation Office (FL SHPO) due to the modifications proposed for the firing rooms to upgrade the Center's infrastructure and facilities. It serves as one of the mitigation measures stipulated in the Programmatic Agreement among the NASA KSC, Advisory Council on Historic Preservation, and the FL SHPO, dated May 2009, under Mitigation Options, Stipulation V., Public Interpretation C.2., report suitable for the general public describing the historic property and its role in the United States space program.

The Inventory was completed in-house by Barbara Naylor, KSC Historic Preservation Officer, who directed and coordinated the project. Tremendous effort, design, and time was given to this Inventory by Nancy English, Cultural Resources Specialist, who did an excellent job in preparing and organizing these efforts and photographing the equipment. And a special thanks to the following employees at KSC for their contributions and wealth of technical data: Elaine Liston, KSC Archivist, who contributed historic photographs; Debbie Awtonomow, the Transition & Retirement Launch Control Center Project Manager, who assisted with the initial Inventory; and Chris Spears, KSC Property Disposal Officer, who coordinated the placement of the historic consoles on the U.S. General Services Administration portal for museums and organizations to claim.

# **INVENTORY OF EQUIPMENT IN THE LAUNCH CONTROL CENTER FIRING ROOM 2**

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# **INVENTORY OF EQUIPMENT IN THE LAUNCH CONTROL CENTER FIRING ROOM 2**

## **ACRONYM LIST**

AA, AB-1	Identification of Management Row, Console Number
ACC	Accessories
ACI	Automation Control Interface
AERO	Aerodynamics
APU	Auxiliary Power Unit
APU/HPU	Auxiliary Power Unit/High Power Unit
A/S	Apollo/Saturn
COMM	Communications
CS-2	Camera Site #2
CTIF	Console Tank Ice Frost
CVM2	Console Vehicle Monitor #2
CVM3	Console Vehicle Monitor #3
DPS	Data Processing System
EAFB	Edwards Air Force Base
ECLSS	Environmental Control and Life Support System
ECS	Environmental Control System
EPDC	Electrical Power Distribution and Control
ESA	Engineering Support Area
ET	External Tank
FC	Fuel Cell
FR	Firing Room
GLS	Ground Launch Sequencer
GNC	Guidance, Navigation, and Control
GPC	General Purpose Computers
GSE	Ground Support Equipment
HPU/HYD	High Power Unit/Hydraulics
HQS	Headquarters
HSP	Hot Spare Console
HYDR	Hydraulics
HAZ Gas	Hazardous Gas
ICE TEAM	The final inspection team, also known as the "ICE Team," walks on every level of the launch pad's fixed service structure and mobile launcher platform base, inspecting the shuttle, external fuel tank, solid rocket boosters, pad structure, and ground equipment for signs of ice buildup, debris, or anything else that might be amiss prior to launch. As part of the inspection, photos are taken and transmitted to the launch team for review.
ID	Identification
IMG	Image
ISS	International Space Station

## ACRONYM LIST (continued)

INSTRU	Instrumentation
JPG	File Format for Digital Photos
JSC	Johnson Space Center
KSC	Kennedy Space Center
LC	Launch Complex
LCC	Launch Control Center
LEED	Leadership in Energy and Environmental Design
LH <sup>2</sup>	Liquid Hydrogen
LOX or LO <sup>2</sup>	Liquid Oxygen
LPS	Launch Processing System
LRD	Landing and Recovery Director
LSS	Launch Support Services
MECH or MEQ	Mechanical
MMT	Mission Management Team
MODCOMP	Modular Computer Systems, Inc.
MPS	Main Propulsion System
MSFC	Marshall Space Flight Center
NASA	National Aeronautics and Space Administration
NPI	NASA Payload Integration
NTD	NASA Test Director
OAA	Orbiter Access Arm
OMR	Operations Management Room
OMS	Orbiter Maneuvering System
OSR	Operations Support Room
OTC	Orbiter Test Conductor
OTV	Operational Television
P/L	Payload
PAC	Program Analyzer Console
PR	Problem Report
PRSD	Power Reactant Storage and Distribution
PVP	Payload Vertical Processing
RCS	Reaction Control System
RSS	Rotating Service Structure
S&MA	Safety and Mission Assurance
SAM	Shuttle Attachment Manipulator
SARA	Console Support Racks
SE&I	Systems Engineering and Integration
SL	Spacelab
SRB	Solid Rocket Booster
SR&QA	Safety, Reliability and Quality Assurance
SRM	Solid Rocket Motor
SSC	Stennis Space Center
SSME	Space Shuttle Main Engine

### ACRONYM LIST (continued)

SSP	Space Shuttle Program
STA	Station Number
STI	Shuttle Thermal Imager
STS	Space Transportation System
SURFICE	Surface Ice – a weather/ice model prediction tool
TK	Thiokol
TPS	Thermal Protection System
TX	Transmitter
UHF/VHF	Ultra High Frequency/Very High Frequency
USA	United Space Alliance
VAB	Vehicle Assembly Building
WSMR	White Sands Missile Range
#	Number

# **INVENTORY OF EQUIPMENT IN THE LAUNCH CONTROL CENTER FIRING ROOM 2**

## **SECTION I - INTRODUCTION**

Upon completion of the Space Shuttle Program in 2011, the National Aeronautics and Space Administration (NASA) at the Kennedy Space Center (KSC) was tasked with upgrading its infrastructure and facilities to meet the future Center and commercial launch requirements. As part of this initiative, the Firing Rooms in the Launch Control Center (LCC) are being modified to be more flexible so controllers can process and launch multiple types of rockets and spacecraft, whether they are Government or commercial models. This generic approach will support the multiple users such as the Orion Multi-Purpose Crew Vehicle, the Space Launch System, and spacecraft for the Commercial Crew Program. Some of the upgrades include replacing the old Apollo-era historic wire cabling system underneath the tile flooring to meet current safety requirements and new codes for the future launch systems. Other modifications include the removal and disposal of equipment such as the historic consoles and support modules. This inventory was created to document the consoles, associated equipment, and miscellaneous items that contributed to Firing Room 2. It is one of several mitigation measures, agreed upon between NASA KSC and the Florida State Historic Preservation Office, for the “*adverse effect*” to the Section 106 undertaking for the LCC.

The inventory report is written in nine sections: (1) Introduction, (2) History of the LCC and Firing Rooms (3) Inventory of Equipment in Firing Room 2, (4) Equipment Claimed by Museums/Organizations, (5) Position Functions and Responsibilities, (6) Historic Launches and Landings, (7) Summary of Space Shuttle Flights, (8) Conclusion, and (9) Sources of Information. The following materials can be found in the four appendices: (1) Appendix A, Firing Room Layouts and LCC Floor Plans, (2) Appendix B, Photograph Record, (3) Appendix C, Photographs, and (4) Appendix D, the Space Shuttle Program Artifacts, Information Pamphlet. Since the four firing rooms are closely identical in design, a detailed description and dimensions of a constructed firing room are discussed in the Firing Room 3 section.

## **SECTION II – HISTORY OF THE LCC AND FIRING ROOMS**

The LCC performed the vital operations integral to the prelaunch preparation and launch of the Apollo, Skylab, and Space Shuttle vehicles. The firing rooms are considered contributing resources to the historic property. Originally nominated to the National Register of Historic Places in 2000 in the context of the Apollo Program from 1961 to 1975, the LCC has since gained importance in the context of the Space Shuttle Program from 1969 to 2011. The LCC is classified as both a Launch Operation Facility as well as a Communication Facility under the Criteria of Eligibility by property types. It is considered significant under Criterion A in the areas of Space Exploration and Communications and Criterion C in the area of Architecture. Because the LCC has achieved exceptional significance within the past 50 years, Criteria Consideration G applies.

### Facility (Exterior)

The International style facility is a four story, rectangular structure that measures approximately 378' in length, 182' in width, and 76' in height. It is oriented so that it lies nearly perpendicular to Launch Complexes 39A and 39B with each corner of the building pointing along one of the cardinal directions. It is constructed of reinforced concrete (precast and pre-stressed), sits on a poured concrete slab foundation, and has a flat, reinforced concrete roof topped by a layer of asphalt. On the third floor northwest corner is an enclosed bridge that provides direct access to the Vehicle Assembly Building (VAB). Several main access points can be found when entering the facility, one on the north elevation, south elevation, and middle (central) area with metal swing doors. The exterior east wall comprises six sets of windows where the four firing rooms and two viewing areas are located. In 2009, NASA modified the historic property by removing the original exterior sun louvers, leaky windows, and interior bow trusses. The aluminum sun louvers, which served as a glare shield for the firing room personnel, had deteriorated from 40 years of exposure from the Florida salt air and became a safety concern during severe weather conditions for KSC. The windows were replaced to protect the critical flight hardware equipment in the firing rooms. In addition, new bow trusses designed to look and feel like the original ones, and new window roll-down shades were installed. Some of the removed historic elements (e.g., sun louvers, bow trusses, and windows) were salvaged, reused, and repurposed for the newly designed Propellants North Silver LEED (Leadership in Energy and Environmental Design) certification facility, which is located east of the LCC.

### Facility & Firing Rooms (Interior)

There are four floors in the LCC. The first floor contains a lobby area, small cafeteria, the Operational Intercommunication System/Operational Television System Control and Switching Area, and the Complex Control Center. The second floor houses the Central Data Subsystem Area, the Record and Playback Subsystem Area, the Environment and Special Measurement System Area, and the Timing/Countdown Area. The third floor contains the four firing rooms beginning with Firing Room 1 on the north and ending with Firing Room 4 to the south. There are two Visitor Galleries on the third floor mezzanine level accessible by stairs. One is located between Firing Rooms 1 and 2 and the other between Firing Rooms 3 and 4. The fourth floor is comprised of conference rooms, office areas, and mechanical equipment rooms.

Each firing room was equipped with the Launch Processing System (LPS), which monitored and controlled most of the space shuttle assembly, check, and launch operations. Firing Rooms 1, 3, and 4 supported the simultaneous power-on processing operations of three orbiters in flow. Firing Room 2 was used to support space shuttle software development or orbiter power-on operations while an orbiter was being processed in one of the three orbiter processing facilities.

### LCC Lobby Display

Historic consoles and support modules from Firing Rooms 1, 2, and 3 are on display in the lobby area. Other artifacts found include a model of the VAB/LCC, Apollo and Space Shuttle mission plaques, several

large space murals, and a wall designated for the farewell *Atlantis* mission. In late 2012, the KSC Visitor Complex (Delaware North Companies Parks and Resorts), offered a new behind the scenes LCC Firing Room 4 Tour for visitor's to see and experience firsthand, up close and personal, a live shuttle launch sequence countdown. Photos of the lobby displays and artifacts can be found in Appendix C.

### Firing Room 1

Firing Room 1 was the first of the rooms to be outfitted with new computers and consoles. It supported the launch facilities integration and testing process for the Saturn 500F test vehicle in the spring and summer of 1966. It was the first of the firing rooms to support a mission in the Apollo era, with the launch of the unmanned Saturn V known as AS-501 (Apollo 4) on November 9, 1967, followed by the launches of Apollo 8, 9, 11, 13, 15, 16, and 17. Firing Room 1 also supported the first launch of the Space Shuttle with Columbia's maiden flight on April 12, 1981. In 2006, it was renamed the "Young-Crippen Firing Room" in honor of the STS-1 crew. Between 1981 and 2002, Firing Room 1 supported 61 shuttle missions, including five (5) classified missions for the Department of Defense. In 2009, it was refitted for the Ares Program, supporting the Ares I-X launch on October 27, 2009. Since then, in 2011, it has gone through further redesign with updated equipment and computers to support future manned space initiatives.

### Firing Room 2



Overview of Firing Room 2, facing west.

Firing Room 2 was the second to be brought up to operational capability. It was used for the second unmanned launch of a Saturn V (Apollo 6) on April 4, 1968, and supported the launches of Apollo 9, 12, and 14, and the final Saturn V launch, the Skylab Orbital Workshop, on May 14, 1973. During much of the Space Shuttle era, Firing Room 2 was used for launch sequencer software development and testing. In a 2011 podcast, NASA reported that Shuttle launches require two active firing rooms: one as the primary and one with senior engineering and management personnel teams. A third firing room is capable of stepping in.

### Firing Room 3

Firing Room 3 was first used for the launch of Apollo 10 on May 18, 1969. In November 1971, General Electric modified the room and associated support systems for the Skylab Program. It controlled the final four missions that used Apollo technology: Skylab 2, 3, 4, and the Apollo-Soyuz Test Project. All four of these missions used the Saturn IB rather than the Saturn V launch vehicle. In the mid-to-late 1970s, Firing Room 3 was briefly used as a tour stop where visitors could watch a compressed replay of the events leading up to the launch of Apollo 11 from the Visitor's Gallery. Between 1989 and 2005, Firing Room 3 supported 49 shuttle missions, including six (6) classified missions for the Department of Defense. By 1993, Firing Rooms 1 and 3 were the two "active" rooms controlling the Space Shuttle launches.

Firing Room 3 was divided into two distinct areas: (1) The eastern raised platform management area and (2) the main floor with consoles arranged in horseshoe shaped groups. The eastern area of the room contained a 34' high space with a series of platforms on three levels. On the top platform level, closest to the windows, were the console stations for the Launch Director, the Weather Monitor, and the Public Affairs Officer. The middle platform stations consisted of the Orbiter Test Director, the NASA Test Director, and the Support Test Manager. The lower platform stations were occupied by the Safety Console Coordinator, the Payload Test Conductor, and the Booster Test Conductor. Two soundproofed, triangular-shaped, glass type rooms, known as a "Bubble Room," were located in each corner of the upper two levels. The Operations Management Room (OMR, south Bubble Room) housed the Mission Management Team, who gave the final "go" for launch. The Operations Support Room (OSR, north Bubble Room) accommodated the high-level personnel, who, although not directly involved with the launch, held primary roles in the space exploration programs and observed countdown activities.

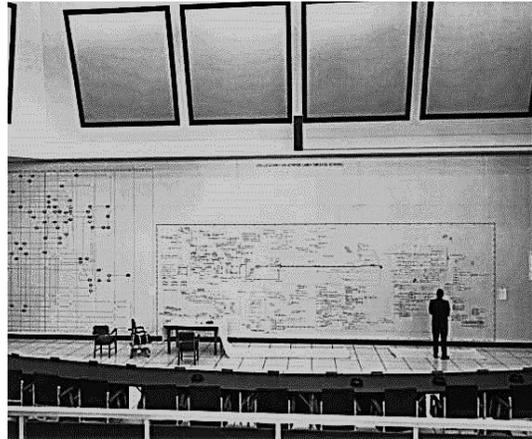
The main level floor area was in a 13' high space and consisted of consoles grouped by system functions. The first row was arranged with three horseshoe shaped groups of consoles with corresponding support modules located immediately behind them. The next three rows were comprised of two horseshoe shaped groups of consoles and the support modules (Figure 3).

Firing Room 3 measured approximately 145' in length and 80' in width, excluding the Master Console (Back Room) area. Two of the three walls consisted of gypsum wallboard and one was composed of acoustical panels. The walls were painted beige. The flooring consisted of 2' x 2' removable tiles that were suspended 1'-6" above the concrete slab to allow space for the computer cabling to run underneath. The room had exposed concrete ceilings, roughly 13' high, with surface mounted light fixtures. Also attached to the ceiling was the fire suppression system, denoted by red-painted pipes, and a control panel for the Halon emergency system was mounted on the north wall.

The Master Console (Back Room), located west of the main firing room, measured 80' in length and 19' in width. It contained the data collection equipment (modules) which were positioned in long rows. In the northern end of the room were two sets of consoles, known as the Master Launch Processing System Consoles. Like the construction of the firing room, this room contained painted gypsum board walls, an exposed ceiling with surface mounted light fixtures, and a raised 2' x 2' title floor.

## Firing Room 4

Firing Room 4 was the come-from-behind story of the LCC, because it was never fully equipped during the Apollo era. It was used to display program evaluation and review technique (PERT) charts and schedules on a 21 x 5-meter metal wall during the construction of Launch Complex 39 and the integration of Apollo/Saturn systems. Contractor support teams also held meetings in this room. It primarily supported the early to middle years of the Space Shuttle Program. In October 1993, it was only a partial firing room and used as an engineering analysis and support area for launch and checkout operations. In 2004, it underwent extensive renovations. During this process, the west, south, and east walls were painted beige, the HVAC ducts were relocated within a cove along the perimeter, the video monitors were removed from the upper wall surface to the south, the countdown clock was replaced, the floor received wall-to-wall carpeting, a drop-ceiling was added, the recessed light fixtures replaced the original surface-mounted fixtures, an elevator was added to provide access to the OSR and the lower floor layout was altered to contain four pairs of consoles with a new wood veneer finish. The consoles in the platform areas were also changed to wood veneer finish, although their layout remained the same. In addition, the original sound-proofed OSR and OMR (Bubble Rooms) were removed and new ones constructed with gypsum board forming the lower part of the wall and glass panels above extending to the ceiling.



PERT Chart

Firing Room 4 gained its historic significance by launching the final 15 missions of the Space Shuttle Program beginning with STS-121 on July 4, 2006, and concluding with STS-135 on July 8, 2011. It supported a total of 22 shuttle missions. The 2006 KSC Press Release for the reopening of Firing Room 4 reported that on launch day a firing room is packed with upwards of 216 engineers. Computerization of the launch sequence activities for shuttle reduced the number of people needed in the firing room to support a launch from the Apollo days, when the firing room held over 440 people.

## Historic American Engineering Record

NASA KSC completed a Level II Historic American Engineering Record (HAER FL-8-11-A) on the LCC in January 2009. This documentation included information on the facility and firing rooms along with photographs, drawings, and a written history. The materials were submitted to the National Park Service, Library of Congress, and to the Florida State Historic Preservation Office Archives. The documentation can be accessed at <http://environmental.ksc.nasa.gov/projects/LCC.htm>.

### SECTION III - INVENTORY OF EQUIPMENT IN FIRING ROOM 2

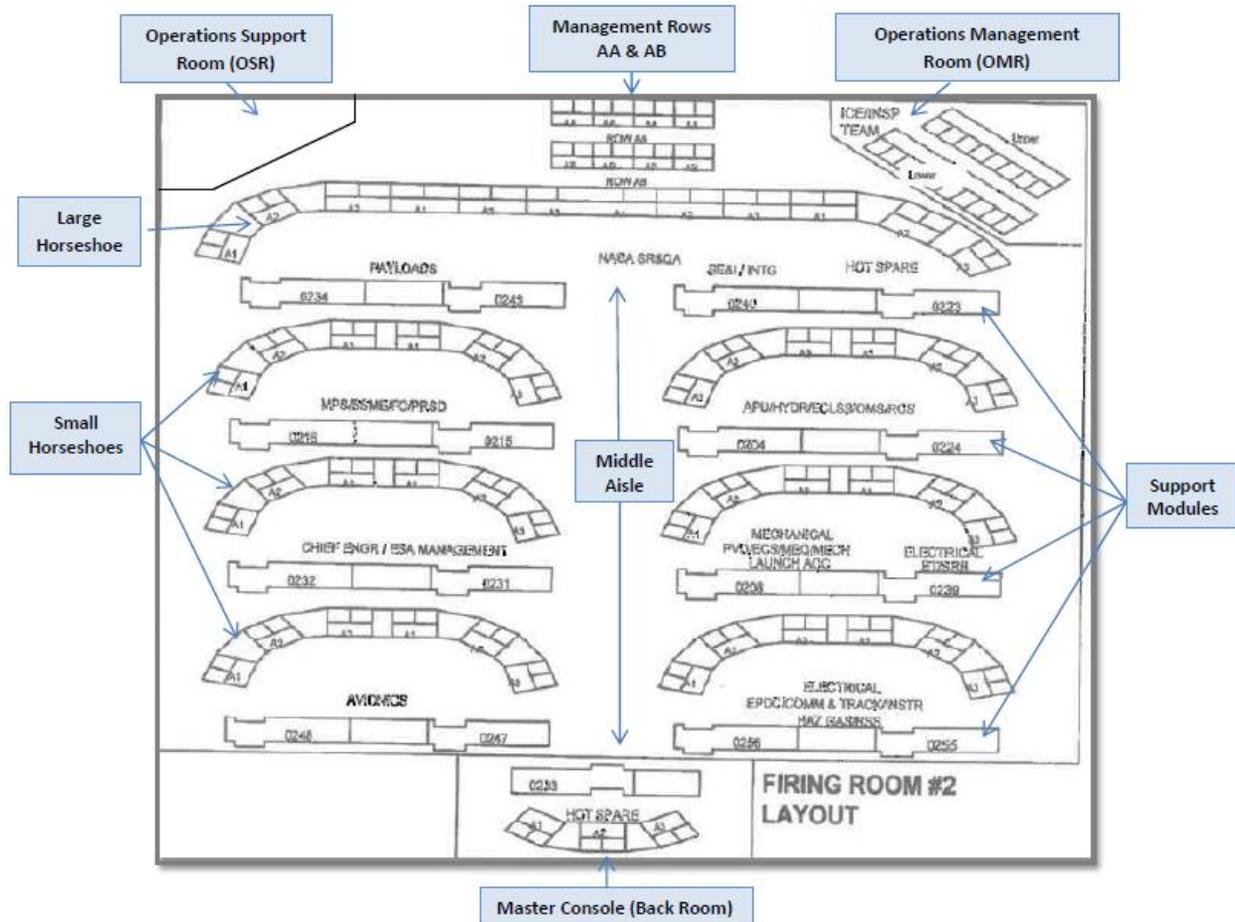
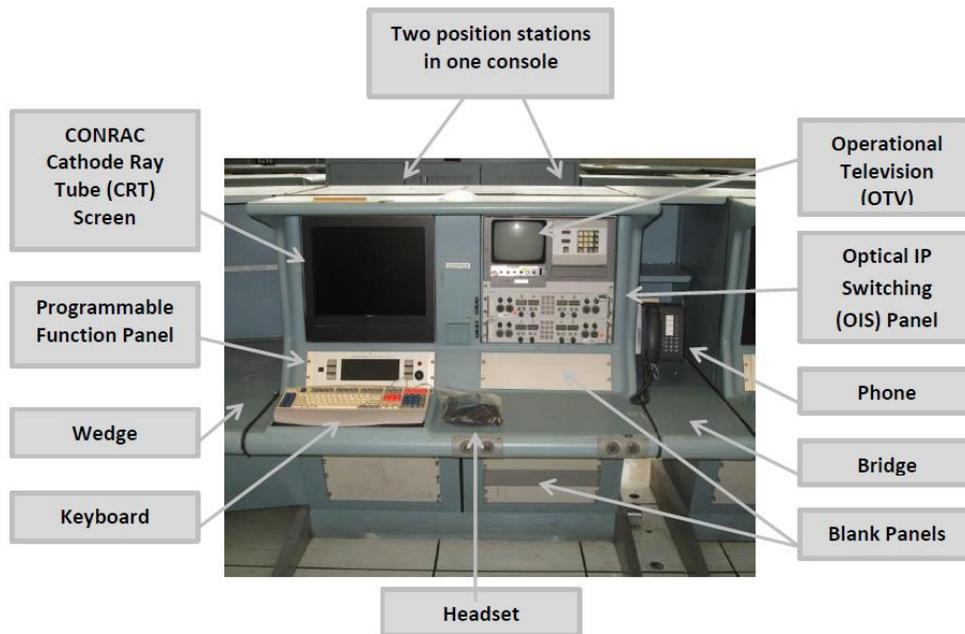


Figure 1. Layout of Firing Room 2

At the time of the inventory, Firing Room 2 consisted of two management rows (AA Management Row and AB Management Row) located on two raised flooring levels with the OMR and OSR (Bubble Rooms) located on either side, reference Figure 1. The OMR support consoles were arranged in two straight rows on raised levels facing towards the firing room. The main floor contained one large horseshoe configuration of console stations and six smaller horseshoes to support the management launch team activities. Behind each horseshoe were the corresponding support modules that held printers, computers, or reference manuals to assist each station. The methodology used to inventory the consoles commenced from station positions north to south in the room beginning with the top levels. The management row consoles faced west, looking towards the back wall and countdown clocks, whereas the support consoles faced east, looking towards the rebuilt historic bow trusses and windows.

A console shell was designed typically with two position stations, marked as doubles in the tables, with wedges placed throughout the large and small horseshoe rows for storage of documentation, headsets, etc. For example, AA-1 and AA-2 consoles were assembled into one shell casing. Telephones were

mounted on some of the wedges. The console insert panels were interchangeable and could be removed and remounted in other consoles, as needed. The blue shells of the consoles were identical and were used during the Apollo Program. When NASA transitioned from the Apollo Program to the Space Shuttle Program, the consoles were actually turned upside down and refitted with new hardware to accommodate the launch requirements for shuttle. One keyboard was shared for two position stations with a chair at each position, reference Figure 2. Built in the 1960s era, ash trays were mounted on the front faces of the units and were later reused to hold pencils, pens, and highlighters when the “no smoking” laws were mandated in Federal facilities. Modular racks, shells for printers, and support equipment, designed in straight rows, were inventoried in relationship to the consoles they supported. A middle aisle, running east and west, was formed with three of the six smaller horseshoes located on each side of the aisle.



**Figure 2. Console Configuration**

Tables 1-8A illustrate what was found during the inventory at each console position and row. NASA Property Tags and Station (STAs) numbers are listed in the tables, along with the name of the console position, how many OTV monitors (TVs) supported that console, etc. Following each table are the referenced photographs, which can be identified by their IMG number. The arrangement of each row is described below each table. Blank spaces in the tables indicate the information was not available at the time of the inventory. A summary of the equipment can be found in Table 9. Tables 10, 10A, and 10B describe the equipment found in the Master Console (Back Room). Other miscellaneous items and equipment (e.g., Apollo/Shuttle plaques, speakers, and room numbers) are described in Table 11. Speakers were found throughout the floor and one in each Bubble Room along with two different types of fire alarm systems. Three countdown clocks are mounted on the drop ceiling in the middle of the room, centered under the wall display screens. The abbreviations, known as NASA Acronyms, are explained in the Acronym List at the beginning of this document.

**Table 1. Row AA – Management Consoles**

Position ID #	Name of Console Position	NASA Property Tag #s	STA #s	OTV Monitors		IMG JPG #
				Medium	Small	
AA-1	Payload (P/L) Director	885911	103-4C			0001
AA-2	P/L Director	1139585/ 1390903	100-6C			0002
AA-3	Deputy International Space Station (ISS) Program Manager	885857	101-6B			0003
AA-4	ISS External Relations Officer	1018918	102-6B			0004
AA-5	Integration and Test Operations Manager	1136407	103-6B			0005
AA-6	Program Analyzer Console (PAC)	1136730	100-0E			0006
AA-7	PAC	220265 (OTV)/ 217045	No STA #		4	0007
AA-8	PAC	1136755	101-54			0008

Note: A total of 4 shell casings with 8 consoles in the top AA Management Row. AA-1 is located near the OSR; AA-8 is located near the OMR.

**Photographs**



IMG 0001



IMG 0002



IMG 0003



IMG 0004



IMG 0005



IMG 0006



IMG 0007



IMG 0008

**Table 1A. Row AB – Management Consoles**

Position ID #	Name of Console Position	NASA Property Tag #s	STA #s	OTV Monitors		IMG JPG #
				Medium	Small	
AB-1	Mission Management	1018739	100-73			0019
AB-2	Program Manager	1019546	102-72		1	0020
AB-3	ISS Deputy Program Manager	884995	101-4D			0021
AB-4	Ground Systems Director	885106	103-74		1	0022
AB-5	Integrated Data Systems	1020056	102-34			0023
AB-6	Integrated Data Systems	No Tag #	No STA #			0024
AB-7	Integrated Data Systems	884128 821057 (OTV)	101-14		1	0025
AB-8	Integrated Data Systems	No Tag #	No STA #			0026

Note: A total of 4 shell casings with 8 consoles in the top AB Management Row. AB-1 is located near the OSR; AB-8 is located near the OMR.

**Photographs**



IMG 0019



IMG 0020



IMG 0021



IMG 0022



IMG 0023



IMG 0024



IMG 0025



IMG 0026

**Overview of Management Consoles**



IMG 0015/Row AA



IMG 0031/Row AB



IMG 0035/Rows AA & AB

**Table 1B. Operations Management Room (OMR)  
(South Bubble Room – ICE Team) (Room 3P6)**

Position ID #	Name of Console Position	NASA Property Tag #s	STA #s	OTV Monitors		IMG JPG #
				Medium	Small	
UPPER ROW (7 consoles total), left to right facing towards the back wall						
A-1	Console Chief	No Tag #	102-0D			0038
A-2	Communication ICE/Engineering Technical Lead	No Tag #	103-0E			0038
A-3	USA CTIF	No Tag #	102-0D			0038
A-4	NASA CVM3	No Tag #	101-2E			0038
A-5	CVM2	No Tag #	102-2C			0038
A-6	Trouble Shooting Console	No Tag #	103-2B			0038
A-7	CVM1	No Tag #	100-4B			0038
LOWER ROW (9 consoles total), left to right facing towards the back wall						
A-8	SURFICE Computer Engineer	No Tag #	101-73			0039
A-9	STI Computer Engineer	No Tag #	102-0E			0039
A-10	RSS STI Engineer	No Tag #	No STA #			0039
A-11	Boeing AERO	No Tag #	103-73			0039
A-12	CS-2 STI Engineer	No Tag #	101-0C			0039
A-13	Solid Rocket Booster Mechanic	No Tag #	No STA #			0039
A-14	External Tank (ET) Thermal Protection System (TPS)	No Tag #	100-34			0039
A-15	ET TPS	No Tag #	101-34			0039
A-16	Space Shuttle Program Systems Integration	No Tag #	101-34			0039

Note: Upper Row – A total of 3 shell casings with 6 consoles in the upper row and one single console on the east end. Lower Row – A total of 9 consoles totaling 3 positions. One speaker was found in the OMR. The equipment had been removed from the consoles prior to inventory.

**Photographs**



IMG 0038/OMR Upper Row



IMG 0039/OMR Lower Row

**Table 1C. Operations Support Room (OSR)  
(North Bubble Room – Office Area) (Room 3P5)**

Position ID #	Name of Console Position	NASA Property Tag #s	STA #s	OTV Monitors		IMG JPG #
				Medium	Small	
All significant tagged equipment had been removed and the area converted into office space. One speaker was found.						0042 0043

**Photographs**



IMG 0042

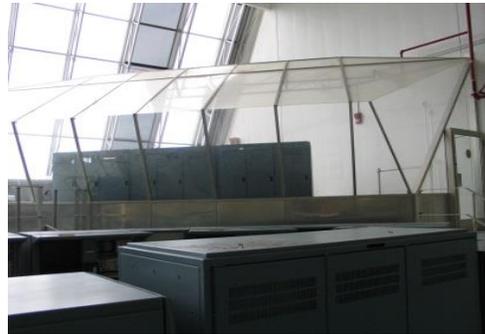


IMG 0043

**Overview of OSR and OMR**



IMG 0046/OSR



IMG 0040/OMR



IMG 0274/OSR (L), OMR (R), and center aisle

**Table 2. Main Floor – Large Horseshoe  
Payload, Safety & Mission Assurance (S&MA) and  
Space Shuttle Program (SSP) Launch Integration Consoles  
(Stations #223/#234/#240/#243)**

Position ID #	Name of Console Position	NASA Property Tag #s	STA #s	OTV Monitors		IMG JPG #
				Medium	Small	
#234-A1 (Doubles)	Assembly & Integration Manager	1140188	101-4C	1	2	0047 0049
#234	Single wedge with phone					0048
#234-A2 (Doubles)	Mission Manager	885914	102-4C	1	1	0050 0052
#234	Single wedge with phone					0051
#234-A3 (Doubles)	Chief Engineer	885063	103-4E	1	1	0053
#243-A1 (Doubles)	Payload S&MA	1370843	100-6E	1	1	0055
#243-A2 (Doubles)	MSFC Manager	885057	101-6D	1	1	0056
#243-A3 (Doubles)	JSC ISS Manager	1139846	102-6D	1	1	0057
#240-A1 (Doubles)	KSC S&MA	1140199	100-10	1	2	0059
#240-A2 (Doubles)	USA S&MA	1139828	101-0D	1	2	0060
#240-A3 (Doubles)	JSC S&MA	1018811	103-10	1	1	0061
#223-A1 (Doubles)	MSFC S&MA	1139818	103-34	1	1	0063 0065
#223	Single Wedge					0064
#223-A2 (Doubles)	SSP System Engineering & Integration Manager	1139813 884007	100-4A 102-33	1	2	0066 0068
#223	Single wedge with phone					0067
#223-A3 (Doubles)	NASA HQS Safety	1018727 1018716	101-13 102-53	1	1	0069

Note: A total of 12 shell casings (24 consoles) and 4 wedges found.

Photographs

Table 2. Main Floor – Large Horseshoe  
Payload, Safety & Mission Assurance (S&MA) and  
Space Shuttle Program (SSP) Launch Integration Consoles  
(Stations #223/#234/#240/#243)



IMG 0047



IMG 0048



IMG 0049



IMG 005



IMG 0051



IMG 0052



IMG 0053



IMG 0055



IMG 0056



IMG 0057



IMG 0059



IMG 0060



IMG 0061



IMG 0063



IMG 0064



IMG 0065



IMG 0066



IMG 0067



IMG 0068



IMG 0069

**Table 2A. Support Modules to the Large Horseshoe  
Payload Support Modules (Stations #234/#243/#295)**

Position ID #	Description of Support Modules	NASA Property Tag #s	STA #s	IMG JPG #
#234-A4	No equipment found.	216932 1370723	103-28	0076
#234-A5	MODCOMP	204290	No STA #	0076
#234-A6	ACI	No Tag #	No STA #	0076
#234-A7	AC Power Distribution Panel	1022798	No STA #	0076
#234-A8	Printer	No Tag #	100-0F	0076
#295-A1	Printers/Bookcase for documentation	No Tag #	100-0F	0077
#243-A4	No equipment found.	216936 447397	No STA #	0078
#243-A5	MODCOMP	No Tag #	No STA #	0078
#243-A6	ACI UNIT	No Tag #	No STA #	0078
#243-A7	AC Power Distribution Panel	1018754	103-0F	0078
#243-A8	Printer	1136730	100-0F	0078

Note: The equipment (e.g., printers, computers) supports Stations #234/#243.

**Photographs**



IMG 0076



IMG 0077



IMG 0078

**Overview of Payload Consoles and Support Modules – Large Horseshoe**



IMG 0075

**Table 2B. Support Modules to the Large Horseshoe**  
**S&MA/SSP Launch Integration Support Modules (Stations #223/#240/#295)**

Position ID #	Description of Support Modules	NASA Property Tag #s	STA #s	IMG JPG #
#240-A4	No equipment found.	1021565	101-12	0081
#240-A5	MODCOMP	No Tag #	No STA #	0081
#240-A6	ACI	No Tag #	103-55-1	0081
#240-A7	AC Power Distribution Panel	No Tag #	102-54-1	0081
#240-A8	Printer/Phone Unit	No Tag #	No STA #	0081
#295-A2	No equipment found.	1018782 1018786	102-73 103-6D	0082
#223-A4	No equipment found.	No Tag #	No STA #	0083
#223-A5	MODCOMP	No Tag #	No STA #	0083
#223-A6	ACI UNIT	No Tag #	No STA #	0083
#223-A7	AC Power Distribution Panel	1130960	101-53	0083
#223-A8	Printers	1136730	No STA #	0083

**Note:** The equipment (e.g., printers, computers) supports Stations #223/#240. A middle aisle separates the units beginning with #234-A4 thru #243-A8, noted in Table 2A, and #240-A4 thru #223-A8, noted in Table 2B.

**Photographs**



IMG 0081



IMG 0082



IMG 0083

**Overview of S&MA/SSP Launch Integration Support Modules**



IMG 0084

**Table 3. Main Floor – Small Horseshoe  
Cryogenic Propulsion Consoles (Stations #215/#216)**

Position ID #	Name of Console Position	NASA Property Tag #s	STA #s	OTV Monitors		IMG JPG #
				Medium	Small	
#216-A1 (Doubles)	Space Shuttle Main Engine (SSME)	1019781 1018750	101-11	1	1	0085 0087
#216	Single wedge					0086
#216-A2 (Doubles)	Main Propulsion System/SSME	1018732	101-2F	1	1	0088 0090
#216	Single wedge with phone					0089
#216-A3 (Doubles)	Main Propulsion Manager	885904	102-2D	1	1	0091
#216	Single wedge with phone					0092
#215-A1 (Doubles)	Cryo Propulsion Manager	1140191	100-4C	1	2	0094 0096
#215	Single wedge with phone					0095
#215-A2 (Doubles)	ET/LO <sup>2</sup> /LH <sup>2</sup>	885820	103-6C	1	1	0097 0099
#215	Single wedge with phone					0098
#215-A3 (Doubles)	ET LSS Manager	1020007	102-4D	1	1	0100

Note: A total of 6 shell casings (12 consoles) and 5 wedges found.

**Photographs**



IMG 0085



IMG 0086



IMG 0087



IMG 0088



IMG 0089



IMG 0090



IMG 0091



IMG 0092



IMG 0094



IMG 0095



IMG 0096



IMG 0097



IMG 0098



IMG 0099



IMG 0100

**Table 3A. Main Floor – Small Horseshoe  
Cryogenic Propulsion Support Modules (Stations #215/#216/#295)**

Position ID #	Description of Support Modules	NASA Property Tag #s	STA #s	IMG JPG #
#216-A8	Printer	No Tag #	No STA #	0104
#216-A7	AC Power Distribution Panel	1018724	103-2C	0104
#216-A6	ACI	No Tag #	No STA #	0104
#216-A5	MODCOMP	No Tag #	102-54-1	0104
#216-A4	Printer/Phone Unit	209044/ 447415	No STA #	0104
#0295-A3	Printer	No Tag #	102-6C/12 100-6D	0105
#215-A8	Printer	No Tag #		0106
#215-A7	AC Power Distribution Panel	1018728	103-4F	0106
#215-A6	ACI	No Tag #	No STA #	0106
#215-A5	MODCOMP	No Tag #	No STA #	0106
#215-A4	No equipment found.	209040/ 447418	No STA #	0106

Note: The equipment (e.g., printers, computers) supports Stations #215/#216.

**Photographs**



IMG 0104



IMG 0105

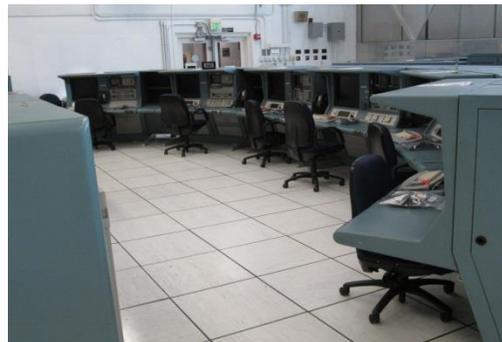


IMG 0106

**Overview of Cryogenic Propulsion Consoles  
(Stations #215/#216)**



IMG 0102



IMG 0103

**Table 4. Main Floor – Small Horseshoe**  
**APU/HYDR/ECLSS/OMS/RCS/FC/PRSD Consoles (Stations #204/#224)**

Position ID #	Name of Console Position	NASA Property Tag #s	STA #s	OTV Monitors		IMG JPG #
				Medium	Small	
#204-A1 (Doubles)	APU/HYD	1018717 883593	100-6F	1	1	0107 0109
#204	Single wedge with phone					0108
#204-A2 (Doubles)	OMS/RCS	1018723	106-6E	1	1	0110 0112
#204	Single wedge					0111
#204-A3 (Doubles)	Fuel Cell (FC)/PRSD	1022790 1136411	101-31 102-6E	1	1	0113
#204	Single wedge with phone					0114
#224-A1 (Doubles)	ECLSS	218287 1019993	100-11	1	1	0117 0119
#224	Single wedge					0118
#224-A2 (Doubles)	APU/HYD/OMS/RCS	1018720 876679	101-0E	1	1	0120 0122
#224	Single wedge with phone					0121
#224-A3 (Doubles)	ECLSS/FC/PRSD	217844 885001	102-0F	1	1	0123

Note: A total of 6 shell casing (12 consoles) and 5 wedges found.

**Photographs**



IMG 0107



IMG 0108



IMG 0109



IMG 0110



IMG 0111



IMG 0112



IMG 0113



IMG 0114



IMG 0117



IMG 0118



IMG 0119



IMG 0120



IMG 0121



IMG 0122



IMG 0123

**Table 4A. Main Floor – Small Horseshoe**  
**APU/HYDR/ECLSS/OMS/RCS/FC/PRSD Support Modules (Stations #204/#224/#295)**

Position ID #	Description of Support Modules	NASA Property Tag #s	STA #s	IMG JPG #
#204-A8	Printer	No Tag #	No STA #	0127
#204-A7	AC Power Distribution Panel	884964	No STA #	0127
#204-A6	ACI	No Tag #	No STA #	0127
#204-A5	MODCOMP	No Tag #	No STA #	0127
#204-A4	No equipment found.	447484 209048	No STA #	0127
#295-A4	Printer	1019789 1018909	103-41 102-32	0128
#224-A8	Printer	No Tag #	No STA #	0129
#224-A7	No equipment found.	885110	No STA #	0129
#224-A6	ACI	No Tag #	103-31	0129
#224-A5	MODCOMP	No Tag #	No STA #	0129
#224-A4	No equipment found.	209052 447487	No STA #	0129

Note: The equipment (e.g., printers, computers) supports Stations #204/#224.

**Photographs**



IMG 0127



IMG 0128



IMG 0129

**Overview of APU/HYDR/ECLSS/OMS/RCS/FC/PRSD Consoles**  
**(Stations #204/#224)**



IMG 0125



IMG 0126

**Table 5. Main Floor – Small Horseshoe  
Chief Engineer/ESA Management Consoles (Stations #231/#232)**

Position ID #	Name of Console Position	NASA Property Tag #s	STA #s	OTV Monitors		IMG JPG #
				Medium	Small	
#232-A1 (Doubles)	Boeing/JSC Chief Engineer	1139847	100-31	1	1	0130 0132
#232-A11	Single wedge	1371688	102-51			0131
#232-A2 (Doubles)	NASA Chief Engineer	1139843	101-30	1	2	0133 0135
#232-A12	Single wedge					0134
#232-A3 (Doubles)	USA Chief Engineer	885067	102-2E	1	1	0136
#232	Single wedge with phone					0137
#231-A1 (Doubles)	Director Vehicle Engineer	885957 1018719	100-4E 103-32	1	1	0140 0142
#231-A11	Single wedge	885009	102-14			0141
#231-A2 (Doubles)	TK SRM Chief Engineer	1024205 1018718	101-4E 103-33	1	1	0143 0145
#231-A12	Single wedge	1038803	100-72			0144
#231-A3 (Doubles)	MSFC Chief Engineer	885951 885011	102-4E 103-72	1	1	0146

Note: A total of 6 shell casing (12 consoles) and 5 wedges found.

**Photographs**



IMG 0130



IMG 0131



IMG 0132



IMG 0133



IMG 0134



IMG 0135



IMG 0136



IMG 0137



IMG 0140



IMG 0141



IMG 0142



IMG 0143



IMG 0144



IMG 0145



IMG 0146

**Table 5A. Main Floor – Small Horseshoe  
Chief Engineer/ESA Management Support Modules (Stations #231/#232/#295)**

<b>Position ID #</b>	<b>Description of Support Modules</b>	<b>NASA Property Tag #s</b>	<b>STA #s</b>	<b>IMG JPG #</b>
#232-A8	Printer with phone	No Tag #	103-2D	0150
#232-A7	AC Power Distribution Panel	1018743	103-2D	0150
#232-A6	ACI	884958	103-53	0150
#232-A5	MODCOMP	No Tag #	No STA #	0150
#232-A4	No equipment found.	1024952 209068 447436	103-0D	0150
#295-A5	Printer	1018742 885102	102-71 101-71	0151
#231-A8	Printer	No Tag #	No STA #	0152
#231-A7	AC Power Distribution Panel	1018737	103-50	0152
#231-A6	ACI	No Tag #	103-50	0152
#231-A5	MODCOMP	No Tag #	No STA #	0152
#231-A4	No equipment found.	1370366 209064 447431	102-75	0152

Note: The equipment (e.g., printers, computers) supports Stations #231/#232.

**Photographs**



IMG 0150



IMG 0151



IMG 0152

**Overview of Chief Engineer/ESA Management Consoles (Stations #231/#232)**



IMG 0148



IMG 0149

**Table 6. Main Floor – Small Horseshoe  
Mechanical PVD/ECS/MEQ/MECH and Electrical ET/SRB Consoles (Stations #208/#239)**

Position ID #	Name of Console Position	NASA Property Tag #s	STA #s	OTV Monitors		IMG JPG #
				Medium	Small	
#208-A1 (Doubles)	Launch Accessories	1019992 883582 401916	103-14	1	2	0153 0155
#208	Single wedge with phone					0154
#208-A2 (Doubles)	ECS/PVD	1370844	101-6F	1	2	0156 0158
#208	Single wedge					0157
#208-A3 (Doubles)	Mechanical	3059506 3059511 1018788	102-6F	1	2	0159 0161
#208	Single wedge with phone					0160
#239-A1 (Doubles)	Air Frame/TPS	1018749 1021571	103-54 100-12	1	1	0163 0165
#208	Single wedge					0164
#239-A2 (Doubles)	Pad/Electrical	885824 401964	101-0F	1	1	0166
#239	Single wedge with phone					0167
#239-A3 (Doubles)	GSE/Electrical	884961 1019764	100-53 102-10	1	1	0168

Note: A total of 6 shell casing (12 consoles) and 5 wedges found.

**Photographs**



IMG 0153



IMG 0154



IMG 0155



IMG 0156



IMG 0157



IMG 0158



IMG 0159



IMG 0160



IMG 0161



IMG 0163



IMG 0164



IMG 0165



IMG 0166



IMG 0167



IMG 0168

**Table 6A. Main Floor – Small Horseshoe  
Mechanical PVD/ECS/MEQ/MECH and Electrical ET/SRB Support Modules (Stations #208/#239/#295)**

Position ID #	Description of Support Modules	NASA Property Tag #s	STA #s	IMG JPG #
#208-A8	Printer	No Tag #	103-6F	0172
#208-A7	AC Power Distribution Panel	885781	103-6F	0172
#208-A6	ACI	No Tag #	No STA #	0172
#208-A5	MODCOMP	No Tag #	No STA #	0172
#208-A4	No equipment found.	209060 44765	No STA #	0172
#295-A6	Printer	885787 1023687	100-70 103-35	0173
#239-A8	Printer	No Tag #	No STA #	0174
#239-A7	AC Power Distribution Panel	1018730	No STA #	0174
#239-A6	ACI	No Tag #	No STA #	0174
#239-A5	MODCOMP	No Tag #	No STA #	0174
#239-A4	No equipment found.	209056 447460	No STA #	0174

Note: The equipment (e.g., printers, computers) supports Stations #208/#239.

**Photographs**



IMG 0172



IMG 0173



IMG 0174

**Overview of Mechanical PVD/ECS/MEQ/MECH  
and Electrical ET/SRB Consoles (Stations #208/#239)**



IMG 0170



IMG 0171

**Table 7. Main Floor – Small Horseshoe  
Avionics Consoles (Stations #247/#248)**

Position ID #	Name of Console Position	NASA Property Tag #s	STA #s	OTV Monitors		IMG JPG #
				Medium	Small	
#248-A1 (Doubles)	Ground Software	1370828	100-32	1	1	0175 0177
#248	Single wedge with phone					0176
#248-A2 (Doubles)	Flight Control	884984	101-32	1	1	0178 0180
#248	Single wedge					0179
#248-A3 (Doubles)	GNC	1370964	102-30	1	1	0181
#248	Single wedge with phone					0182
#247-A1 (Doubles)	Flight Software	1140186	100-4F	1	1	0185 0186 0187
#247	Single wedge					0186
#247-A2 (Doubles)	DPS	1370852	101-4F	1	1	0188 0190
#247	Single wedge with phone					0189
#247-A3 (Doubles)	SSME Avionics	1019999	102-4F	1	1	0191

Note: A total of 6 shell casing (12 consoles) and 5 wedges found.

**Photographs**



IMG 0175



IMG 0176



IMG 0177



IMG 0178



IMG 0179



IMG 0180



IMG 0181



IMG 0182



IMG 0185



IMG 0186



IMG 0187



IMG 0188



IMG 0189



IMG 0190



IMG 0191

**Table 7A. Main Floor – Small Horseshoe  
Avionics Support Modules (Stations #247/#248/#295)**

Position ID #	Description of Support Modules	NASA Property Tag #s	STA #s	IMG JPG #
#248-A8	Printer	No Tag #	No STA #	0195
#248-A7	AC Power Distribution Panel	885111	103-2E	0195
#248-A6	ACI	No Tag #	No STA #	0195
#248-A5	MODCOMP	No Tag #	No STA #	0195
#248-A4	No equipment found.	209072/ 447506	No STA #	0195
#295-A7	Printer	885949/ 1140194	100-4D/ 101-6C	0196
#247-A8	Printer	No Tag #	No STA #	0197
#247-A7	AC Power Distribution Panel	1018752	103-51	0197
#247-A6	ACI	No Tag #	No STA #	0197
#247-A5	MODCOMP	No Tag #	No STA #	0197
#247-A4	No equipment found.	209110/ 447502	No STA #	0197

Note: The equipment (e.g., printers, computers) supports Stations #247/#248.

**Photographs**



IMG 0195



IMG 0196



IMG 0197

**Overview of Avionics Consoles (Stations #247/#248)**



IMG 0193



IMG 0194

**Table 8. Main Floor – Small Horseshoe**  
**Electrical EPDC/Comm & Track/Instrumentation, HAZ GAS/RSS Consoles (Stations #255/#256)**

Position ID #	Name of Console Position	NASA Property Tag #s	STA #s	OTV Monitors		IMG JPG #
				Medium	Small	
#256-A1 (Doubles)	Comm/Navigation	1139840	100-71	1	1	0198 0200
#256-A11	Single wedge with phone					0199
#256-A2 (Doubles)	Instrumentation	C0141738 1140190	101-70	1	1	0201 0203
#256-A12	Single wedge					0202
#256-A3 (Doubles)	Booster Electrical	884977	103-11 102-70	1	1	0204
#256	Single wedge with phone					0204
#255-A1 (Doubles)	Hazardous Warning System	885055	No STA #	1	1	0205 0207
#255	Single wedge					0206
#255-A2 (Doubles)	Ground Electrical	1020053	101-10	1	1	0208
#255	Single wedge with phone					N/A
#255-A3 (Doubles)	EPDC	1140189	102-11	1	1	0209

Note: A total of 6 shell casing (12 consoles) and 5 wedges found.

**Photographs**



IMG 0198



IMG 0199



IMG 0200



IMG 0201



IMG 0202



IMG 0203



IMG 0204



IMG 0205



IMG 0206



IMG 0207



IMG 0208



IMG 0209

**Table 8A. Main Floor – Small Horseshoe  
Electrical EPDC/Comm & Track/Instrumentation,  
HAZ GAS/RSS Support Modules (Stations #255/#256/#295)**

Position ID #	Description of Support Modules	NASA Property Tag #s	STA #s	IMG JPG #
#256-A8	Printer with phone	No Tag #	No STA #	0213
#256-A7	AC Power Distribution Panel	1035553	No STA #	0213
#256-A6	ACI	No Tag #	No STA #	0213
#256-A5	MODCOMP	No Tag #	No STA #	0213
#256-A4	No equipment found.	209076 447446	No STA #	0213
#295-A8	Printer	1139831	100-14	0214
#255-A8	No equipment found.	No Tag #	No STA #	0215
#255-A7	No equipment found.	No Tag #	103-73	0215
#255-A6	No equipment found.	No Tag #	No STA #	0215
#255-A5	Modules (located in the LCC Lobby)	No Tag #	No STA #	0215
#255-A4	Modules (located in the LCC Lobby)	No Tag #	No STA #	0215

Note: The equipment (e.g., printers, computers) supports Stations #255/#256.

**Photographs**



IMG 0213



IMG 0214



IMG 0215

**Overview of Electrical EPDC/Comm & Track/Instrumentation,  
HAZ Gas/RSS Consoles (Stations #255/#256)**



IMG 0211



IMG 0212

**Table 9. Summary of Equipment in Firing Room 2**

Type	Quantity	Length	Width	Height
Management Consoles	8	2.5 ft	4 ft	4 ft
Support Consoles	54	5 ft	4.5 ft	4 ft
Wedges	26	3.5 ft	4.5 ft	4 ft
Support Modules	18	7.5 ft	3 ft	4 ft
Printer Ends	16	3 ft	3 ft	4 ft
SARA Racks	8	4.4ft	4.5 ft	4 ft
<b>Equipment Total</b>	130			

**Table 10. Master Consoles (Back Room) (Stations #233/#235)**

Position ID #	Name of Console Positions	NASA Property Tag #s	STA #s	OTV Monitors		IMG JPG #
				Medium	Small	
#235-A1 (Doubles)	LPS System Engineer	No Tag #	102-74	1		0216
#235-A2 (Doubles)	LPS System Engineer	No Tag #	101-16	1		0217
#235-A3 (Doubles)	LPS Test Conductor	No Tag #	103-71	1		0218
#233-A3 (Doubles)	LPS System Engineer	No Tag #	102-31	1		0220
#233-A2 (Doubles)	LPS System Engineer	No Tag #	101-33			0221
#233-A1 (Doubles)	LPS System Engineer	No Tag #	100-33	1		0222

Note: A total of 6 shells (i.e., doubles, 12 consoles), facing north (#235-A1-#235-A3) and facing south (#233-A3-#233-A1).

**Photographs**



IMG 0216



IMG 0217



IMG 0218



IMG 0220



IMG 0221



IMG 0222

**Table 10A. Master Consoles Support Modules (Back Room) (Stations #233/#235)**

Position ID #	Description of Support Modules	NASA Property Tag #s	STA #s	IMG JPG #
#233-A5	MOD COMP	447583	No STA #	N/A
#233-A7	ACI	No Tag #	100-33L	N/A
#235-A5	MOD COMP	2233704	No STA #	N/A
#235-A7	ACI	No Tag #	103-75	N/A

Note: A total of 4 equipment towers (e.g., printers, computer) support Stations #233/#235.

**Table 10B. Communication/Launch Processing System (LPS) Racks**

There were four rows of Communication/LPS racks within the Back Room that supported the main firing room consoles.

Position ID #	NASA Property Tag #	STA - #s	IMG JPG #
#203-A1	1131202	No STA #	0224
#203-A2	1131206	No STA #	0224
#203-A7	699480	No STA #	0224
#203-A8	1131209	No STA #	0224
#194-A41	No Tag #	No STA #	N/A
#294-A1	2235286	No STA #	0225
#294-A2	2235287	No STA #	0225
#294-A3	2235288	No STA #	0225
No Tag #	No Tag #	101-51	N/A
No Tag #	No Tag #	No STA #	N/A
#200-A1	499469/209119	No STA #	0226
#200-A2	449468/209120	No STA #	0226
#200-A7	499467/209121	No STA #	0226
#200-A8	499466/209122	No STA #	0226
#284-A1	478831	No STA #	0228
#266-A1	447550/209099	No STA #	0227, 0228
#265-A1	447551/209098	No STA #	0227
#264-A1	447552/209097	No STA #	0227
#268-A1	2163601/44740	No STA #	0228
#263-A1	447556/209095	No STA #	0228
#262-A1	447557/209095	No STA #	0228
#278-A1	447558/209093	No STA #	0228
#281-A1	447563/209092	No STA #	0228
#280-A1	447564/209091	No STA #	0228
#282-A1	447566/209090	No STA #	0228
#274-A1	1023729	No STA #	0228
#273-A1	209088/447568	No STA #	0228
#276-A1	217476/447569	No STA #	0228
#273-A1	447570/209087	No STA #	0228

**Table 10B. Communication/Launch Processing System (LPS) Racks (continued)**

<b>Position ID #</b>	<b>NASA Property Tag #</b>	<b>STA - #s</b>	<b>IMG JPG #</b>
#271-A1	447571/209076	No STA #	0228
#275-A1	447572/209089	No STA #	0228
#206-A1	No Tag #	No STA #	0231
#202-A1	No Tag #	No STA #	0231
#289-A1	651801/219412	No STA #	0231
#260-A1	209103/447542	No STA #	0231
#261-A1	447541/209104	No STA #	0231
#287-A1	2194131/65229	No STA #	0231, 0232
#269-A1	2091021/447531	No STA #	0231, 0232
#270-A1	209105/44753	No STA #	0231, 0232
#237-A1	No Tag #	No STA #	0231
#292-A5	No Tag #	No STA #	0231, 0233
#292-A4	No Tag #	No STA #	0231, 0233
#292-A3	No Tag #	No STA #	0231, 0233
#292-A2	No Tag #	No STA #	0231, 0233
#292-A1	No Tag #	No STA #	0231, 0233
#286-A1	217480/44739	No STA #	0235, 0240
#285-A1	241332	No STA #	0235, 0240
#290-A1	652230/219410	No STA #	0235, 0240
#290-A1	1024233	No STA #	0240
#277-A1	1024234	No STA #	0236, 0240
#241-A1	208155/499606	No STA #	0236, 0240
#242-A1	651800/219411	No STA #	0240
#247-A1	482428	No STA #	0240
#288-A1	1024231	No STA #	0236, 0240
#250-A1	447529/209124	No STA #	0244
#250-A2	No Tag #	No STA #	0244
#252-A1	3060765	No STA #	0244, 0246
#252-A2	3060764	No STA #	0244, 0246
#252-A3	3060857	No STA #	0244, 0246
#252-A4	3060856	No STA #	0244
#251-A1	447526	No STA #	0244
#251-A2	No Tag #	No STA #	0244
#251-A3	447525/216942	No STA #	0244
#250-A3	447521/209131	No STA #	0244
#200-A25	447520/209132	No STA #	0242, 0244
#200-A26	209009/499702	No STA #	0242, 0244
#200-A27	209010/499703	No STA #	0242, 0244
#200-A9	1145603	No STA #	0243, 0244
#200-A10	No Tag #	No STA #	0243, 0244
#200-A11	No Tag #	No STA #	0243, 0244
#200-A12	No Tag #	No STA #	0243, 0244

**Photographs**

**Table 10B. Communication/Launch Processing System Racks**



IMG 0224



IMG 0225



IMG 0226



IMG 0227



IMG 0228



IMG 0231



IMG 0232



IMG 0233



IMG 0235



IMG 0236



IMG 0240



IMG 0242



IMG 0243



IMG 0244

**Overview of Master Consoles (Back Room) and Launch Processing System Racks**



IMG 0219



IMG 0223



IMG 0248

**Table 11. Firing Room 2 Miscellaneous Items and Equipment**

<b>Item</b>	<b>Description</b>	<b>IMG JPG #</b>
Status Board Screens	2 large status board screens, one placed on each side of the 4 rear-projection screens. Comprised of 5 columns by 10 rows of data; data consisted of countdown milestones.	0278, 0279, 0281, 0282
Rear-projection Screens*	4 large screens noted in the middle of the drop ceiling. Approximate size: 2x3-meters. Never used during the Space Shuttle Program.	0283
Room Numbers	FR 1 – Room 3P1 FR 2 – Room 3P2 FR 3 – Room 3R3 FR 4 – Room 3P4	0284 0286 0287 0288
Countdown Clocks	Three countdown clocks showing Universal Time, Local Time, and the Shuttle Countdown Time.	0290
OTV Monitors	Brands: JVC, Dell, and Panasonic. Sizes: 8 inch (small) to 20 inch (medium) mounted in the consoles.	0291, 0292
Plaques*	5 plaques are mounted on the south wall: From left to right, Apollo 6, Apollo 9, Apollo 12, Apollo 14, and Skylab 1.	0293
Middle Inserts	Approximately 12 inches wide x 60 inches high.	0294
Wedges	Approximately 58 inches long, 40 inches wide, and 60 inches high.	0295, 0296, 0297, 0298
Consoles	Approximately 54 inches long, 56 inches wide, and 60 inches high. Console Brand: Martin Marietta Aerospace Panel Brand: Grass Valley Group.	0062
Headsets/ Keyboards/ Phones	Headsets, keyboards, and phones were found at most of the consoles. Telephone Brand: Siemens.	0300, 0301
Speakers	7 speakers mounted on the walls within the firing room: 5 within the floor level and 1 within each Bubble Room (2).	0322

\*Items that will remain in FR 2, screens and plaques. New countdown clocks will be installed to sync with the software developed for future program launch requirements.

## Photographs

**Table 11. Firing Room 2 Miscellaneous Items and Equipment**



IMG 0278



IMG 0279



IMG 0281



IMG 0282



IMG 0283



IMG 0284



IMG 0286



IMG 0287



IMG 0288



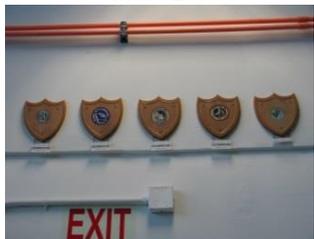
IMG 0290



IMG 0291



IMG 0292



IMG 0293



IMG 0294



IMG 0295



IMG 0296



IMG 0297



IMG 0298



IMG 0299



IMG 0062



IMG 0300



IMG 0301



IMG 0322

## SECTION IV – CONSOLES CLAIMED BY MUSEUMS/ORGANIZATIONS

As part of the Shuttle Transition and Retirement Program, NASA utilized the Government Services Administration (GSA) portal, <http://gsaccess.gov/NASWel.htm>, to offer up potential artifacts for authorized recipients to claim. The prescreening process provided a fair and equitable opportunity for recipients to claim historic artifacts during a 42-day viewing period. This is the first time NASA had made artifacts so widely available to other Federal agencies and to the public. The transfer of artifacts was extended to the following organizations in priority order: (1) to NASA if a program or project could reuse the item, (2) to the National Air and Space Museum and NASA Visitor Centers, and (3) to outside certified organizations such as universities, schools, and museums. Some of the items available in the GSA portal were shuttle tiles, tires, reinforced carbon-carbon panels, wind tunnel fan blades, signs, spacesuits, astronaut and shuttle photographs, and firing room consoles. Further information about artifacts can be found in Appendix D, *Space Shuttle Program Artifacts, Information Pamphlet*.

A total of 47 consoles were offered up in the portal; 3 in Period 1 (September 2009), 1 in Period 3 (March 2010), 26 in Period 12 (April 2012), and 17 in Period 13 (June 2012). Table 12 lists the organizations who have claimed consoles as of August 1, 2012.

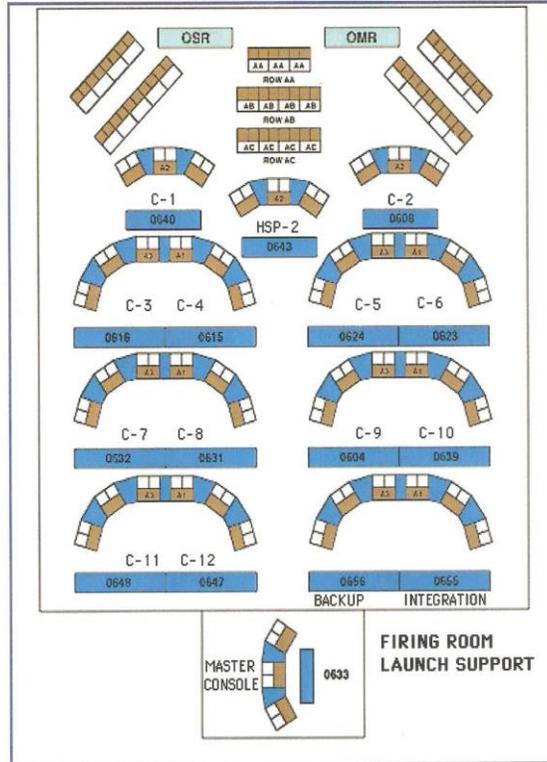
**Table 12. Consoles Claimed by Museums/Organizations**

Name of Museum/Organization	Type (Item)	Quantity
California Science Center Los Angeles, CA	Engineering Consoles	3
Smithsonian Chantilly, VA	Engineering and Launch Director Consoles	2
Coca Cola Columbus, GA	Biomed Console	1
KSC Visitor Complex Kennedy Space Center, FL	Public Affairs, Biomed, Launch Director, and Safety Consoles	2
Aviation Cadet Museum Eureka Springs, AR	Engineering and Management Consoles	2
March Air Field Museum Riverside, CA	Engineering and Management Consoles	2
Baylor University Waco, TX	Engineering Console	1
U.S. Space Walk of Fame Titusville, FL	Engineering and Management Consoles	2
<b>Total</b>		<b>15</b>

Note: A console is made up of 2 positions (e.g., Public Affairs/Biomed is one console).

**SECTION V – CONSOLE POSITION FUNCTIONS AND RESPONSIBILITIES**

Figure 3 illustrates the console layout for Firing Room 3 along with a description of console functions and responsibilities in Table 13.



**Figure 3. Firing Room 3 Console Layout**

**Table 13. Position Row and Console Functions/Responsibilities**

Position Row	Console Functions/Responsibilities
OMR	The Operations Management Room (OMR) is the Mission Management Team (MMT), which plays a key role in the final polling that takes place during the T-9 minute hold to clear the vehicle for liftoff. This panel of senior-level Government and contractor managers is chaired by the Space Shuttle Program Launch Integration Manager.
OSR	The Operations Support Room (OSR) is a high-level management team, not directly involved in the countdown, which typically includes the Associate Administrator for Space Flight and members of the Mission Management Council, comprised of Center Directors, who have primary roles in the Space Shuttle Program (JSC, KSC, MSFC, and SSC). Also seated in this room are the NASA Administrator and his or her Deputy.
AA & AA1A	The NASA Public Affairs office provides launch commentary to the public beginning approximately five hours before launch and continuing until liftoff. Once the shuttle has lifted off the pad, Public Affairs commentary switches from Kennedy to Mission Control at the Johnson Space Center, Houston, TX.

<b>Table 13. Position Row and Console Functions (continued)</b>	
<b>Position Row</b>	<b>Console Functions/Responsibilities</b>
AA2	The Director of Payload Operations is the top ranking NASA KSC official responsible for management and technical direction of preflight checkout and integration of the Space Shuttle and Expendable Launch Vehicle payloads and payload carriers. The Director conducts his own management poll to verify payloads are ready to fly prior to participating in the formal polling process conducted during final built-in hold(s).
AA3	This position is assigned at the Launch Director's discretion.
AA4	The Assistant Launch Director, who supports the Launch Director.
AA5	The Launch Director is the senior member of the Shuttle Launch Team, who has overall responsibility for management of launch activities and makes the final determination to launch or scrub. The Launch Director is also a member of the Mission Management Team.
AA6	The Flow Director oversees the preflight preparation, test, and checkout of the Orbiter from landing to launch. During the launch countdown phase, the Flow Director has the most familiarity with all elements of the Shuttle Launch Team.
AB	The Support Test Manager conducts and integrates all Launch Complex 39 ground support operations at KSC.
AB3 & AB4	The Orbiter Test Conductor (OTC) prime conducts and integrates all orbiter testing activities required in preparation for flight. This is the senior contractor representative on the Shuttle Test Team. The alternate OTC supports the prime just as the Assistant Launch Director supports the Launch Director. All top critical management positions have alternates.
AB5	The NASA Test Director (NTD) is the leader of the Shuttle Test Team and is responsible for directing and integrating all flight crew, orbiter, external tank/solid rocket booster, and ground support testing in the Shuttle launch countdown. The NTD is responsible for the safety of all personnel inside the Pad after external tank loading, including the flight crew. This position also reports to the Launch Director.
AB6	The Alternate NASA Test Director is similar to the Alternate OTC mentioned above. The Alternate NTD keeps track of the timeline for the NTD and works any red crew issues that may arise.
AB7	The Chief NASA Test Director provides expert advice to the Launch Director, NASA Test Director, and to the Landing and Recovery Director. The Chief NTD will have previously served as the NTD for numerous launches.
AB8 & AB8A	The Landing and Recovery Director (LRD) directs all KSC landing operations, including the Return-to-Launch Site and nominal end-of-mission landings. The Alternate LRD supports the LRD.
AC & AC1.5	The Safety Console Coordinator is responsible for ensuring all regulations and requirements affecting personnel and flight hardware safety are addressed and adhered to during launch countdown activities.
AC2	The NASA Safety provides NASA oversight to all safety issues.
AC3, AC3.5 & AC4	The KSC Physician, Crew Surgeon, and Biomedical Engineer maintain current medical data on each crew member in the event baseline data is needed in an emergency and would be responsible for medical advice in event of a contingency.
AC5 & AC5.5	The Payload Test Conductor and Alternate Payload Test Conductor manage and integrate all payload launch operations and represent the payload customer interests in countdown planning and execution.

<b>Table 13. Position Row and Console Functions (continued)</b>	
<b>Position Row</b>	<b>Console Functions/Responsibilities</b>
AC6	The NASA Payload Test Director is equivalent in the payloads world and is the chief position overseeing payload technical issues.
AC7 & AC8	The Tank/Booster Test Conductor and Tank/Booster Test Conductor prime manage and integrate all external tank and solid rocket booster testing required to launch.
C1	This position consists of the Lead Fluids Engineer, Power System Engineer, Lead Electrical Engineering, SAM Electrical Engineer, E/ORF Exp. Engineer, Payload Integration Engineer, Fluids Engineer, SL System Electrical Engineer, Software Engineer, Mid-Deck NPI, LPS Software Engineer, two Shuttle Payloads Engineers, and SPARE, which monitors the payloads and critical payload systems flying on the Shuttle such as electrical power, vital signs for any onboard research animals and critical temperature or pressure measurements. The personnel assigned to the Payloads Console vary from mission-to-mission in accordance with the Payload requirements.
HSP 2	The Hot Spare Console (HSP) is available for use should a primary console become unavailable. Two more HSP consoles are available in the backup firing room.
C2	<p>This position monitors the navigational aids, communications, mechanisms, and payload accessories.</p> <ul style="list-style-type: none"> <li>• The Navigation Aids Engineer maintains/controls landing aids systems such as radar altimeter, Tactical Air Navigation, Microwave Scanning Beam Landing System, and Ku-band rendezvous radar.</li> <li>• The Communications Engineers maintain/control UHF/VHF radios, FM data downlink, television cameras, Ku-band telemetry, payload/extravehicular activity data/comm, and S-band voice/telemetry.</li> <li>• Two Mechanical Engineers are assigned to the airframe and have expert knowledge of the orbiter's overall structure and provide expertise in such matters as closure of the umbilical doors on the orbiter after the external tank is jettisoned around eight and a half minutes into flight.</li> <li>• The Payload Electrical Engineer monitors payload electrical systems as they interface with the orbiter's electrical systems.</li> </ul>
C3 & C4	<p>Space Shuttle main engine parameters are monitored at this console and verified that they are acceptable for main engine start, including the critical task of loading the external tank with propellant around eight hours before liftoff.</p> <ul style="list-style-type: none"> <li>• The Liquid Oxygen Lead Loading engineer and fellow systems engineers are responsible for loading the external tank with approximately 148,750 gallons of liquid oxygen (LOX). This is transferred to the external tank via pumps and a cross-country line from a LOX storage tank located at the launch pad. This group also controls the oxygen portion of the Main Propulsion System (MPS).</li> <li>• The Space Shuttle Main Lead System Engineer and systems engineers monitor all Space Shuttle main engine parameters to verify acceptability for main engine start beginning at T-6.6 seconds.</li> <li>• The Liquid Hydrogen Lead Loading Engineering and systems engineers are responsible for loading the external tank with approximately 383,282 gallons of liquid hydrogen (LH2). The fuel is transferred via cross-country lines under different pressure from an LH2 storage sphere at the launch pad. The pressure is attained by boiling off some of the liquid hydrogen to its gaseous state in a vaporizer at the storage area.</li> </ul>

<b>Table 13. Position Row and Console Functions (continued)</b>	
<b>Position Row</b>	<b>Console Functions/Responsibilities</b>
C3 & C4 (con't)	<ul style="list-style-type: none"> <li>• The MPS LH3/Helium Engineer monitors the MPS configuration during the loading of the super cold (cryogenic) liquid hydrogen and the on-board helium system that operates the LH2 valve.</li> <li>• The Liquid Oxygen/Liquid Hydrogen Supervisor is a management-level engineer with expert knowledge of the cryogenics, as well as the systems used to store, transfer, and load the cryos into the shuttle external tank and MPS.</li> <li>• The MPS/SSME Lead Engineer is a senior engineer, who is extremely knowledgeable about all of the internal shuttle plumbing through which the cryos are funneled. This person is also an expert on the main engine components as they interface with the orbiter.</li> </ul>
C5 & C6	<p>The position consists of the Range Safety System, Environmental Control and Life Support System (ECLSS), Environmental Control Systems, Power Reactant, and Storage Distribution System.</p> <ul style="list-style-type: none"> <li>• The ECLSS engineers command the environmental and life support systems on the orbiter. This includes pressurization of the crew module, distribution of potable water, maintenance of breathing air quality, and functional verification of the operation of the avionics cooling system throughout the vehicle.</li> <li>• The Fuel Cell/Power Reactant and Storage Distribution engineers control and maintain the devices, which produce electrical power for the Shuttle by passing liquid hydrogen and oxygen over a catalyst in a strictly regulated operation. A by-product of this function is pure water that provides the crew with all of their required potable water needs.</li> <li>• The Purge, Vent, and Drain engineer controls all systems related to purging the orbiter such as conditioned air, gaseous nitrogen, and the operation of the 14 orbiter vent doors.</li> <li>• The Booster Range Safety engineer is familiar with the destruct devices on the booster and external tank. This position monitors the health of these safety devices; the command to fire them in the event of a contingency would be given by the Air Force, which is responsible for range safety during Shuttle countdown and launch.</li> </ul>
C7 & C8	<p>This position consists of the swingarms, hypergolics, hydraulics, auxiliary power units/hydraulic power units (APUs/HPUs) at the launch pad as well as on the Shuttle.</p> <ul style="list-style-type: none"> <li>• The Arms engineers are responsible for the Orbiter Access Arm (OAA) and the external tank gaseous oxygen vent arm on the fixed service structure at the launch pad. The flight crew enters the orbiter through the OAA, which is retracted at seven minutes prior to liftoff. At the end of the OAA is the environmental chamber, known as the “white room,” that interfaces with the crew module hatch. The gaseous oxygen vent arm has an attached vent hood or “beanie cap” to heat the external tank’s liquid oxygen vent system to prevent ice formation and is retracted at 2 minutes and 30 seconds before liftoff.</li> </ul>

<b>Table 13. Position Row and Console Functions (continued)</b>	
<b>Position Row</b>	<b>Console Functions/Responsibilities</b>
C7 & C8 (con't)	<ul style="list-style-type: none"> <li>• The Oxidizer System engineer and Fuel Systems engineer control the Orbiter Maneuvering System (OMS) engines and Reaction Control System (RCS) and their fuels, which provide the orbiter with thrust and maneuvering capability in space. There are two OMS engines and 44 RCS thrusters powered by a combination of hypergol fuel (monomethyl hydrazine) and oxidizer (nitrogen tetroxide). This fuel/oxidizer combination is very hazardous and requires constant monitoring and adjustment.</li> <li>• The Lead, Auxiliary Power Unit (APU) engineer and Systems engineer control the APUs, which run hydraulic pumps on the orbiter. The APUs are powered by hydrazine passing over a catalytic bed. These engineers also control the water spray boilers that cool the hydraulic fluid and the APU lube oil.</li> <li>• The Hydraulics Lead engineer takes the hydraulic pressure generated by the APU/pump combination and directs it to the systems needing it. This includes the orbiter landing gear, main engine thrust vector controllers, rudder speed brake, elevons, and the body flap.</li> <li>• The Solid Rocket Booster (HPU/HYD) Systems engineer control the HPUs on the two shuttle boosters and route the resulting hydraulic pressure to the SRB engine gimbal actuators. The HPUs on the boosters are very similar to the APUs on the orbiter.</li> </ul>
C9 & C10	<p>This position consists of the hazardous gas, instrumentation, and electrical power distribution and control systems both on the Shuttle as well as monitoring the systems of these console stations.</p> <ul style="list-style-type: none"> <li>• The Orbiter Instrumentation engineer and Systems engineer maintain and control the validity of Shuttle telemetry and instrumentation used for vehicle processing. They also maintain and monitor the on-board caution and warning electronics assembly, which provides the flight crew with visual and audible indications of out-of-tolerance conditions for selective flight-critical measurements. They also perform checkout and maintenance of the flight recorders which store orbiter instrumentation data, payload data, and modular auxiliary data during the mission.</li> <li>• The Hazardous Gas System engineer monitors the detection systems for hazardous concentrations of hydrogen, hypergolic fuels, and various items of fire detection equipment. These are located on board the vehicle as well as on select ground support equipment.</li> <li>• The Electrical Power Distribution and Control System engineers control and monitor electrical power distribution to the orbiter and payload buses and perform testing of the orbiter pyrotechnic devices.</li> <li>• The External Tank/Solid Rocket Electrical Systems engineer controls and monitors electrical power distribution to the SRB joint heater and external tank heater systems and perform testing of the SRB recovery system and SRB pyrotechnical devices.</li> </ul>

<b>Table 13. Position Row and Console Functions (continued)</b>	
<b>Position Row</b>	<b>Console Functions/Responsibilities</b>
C11 & C12	<p>This position consists of the avionics, monitoring of the shuttle’s avionics system, and controls or assists in controlling most of the Shuttle systems.</p> <ul style="list-style-type: none"> <li>• The Guidance and Navigation System engineers are responsible for the guidance and navigation hardware on board the orbiter. This includes the inertial measurement unit, which is used to compute the inertial attitude and velocity of the orbiter. Star trackers are used to obtain position data on orbit. Rotational and translational hand controllers, along with the rudder pedal transducer assemblies, provide crew input for manual roll, pitch, yaw, lateral, longitudinal, vertical, and rudder/brakes to the flight control systems.</li> <li>• The Orbiter Flight Control engineer, Ascent Flight Control engineer, and the SRB Flight Controls engineer monitor these flight control systems on the Shuttle elements during countdown and liftoff.</li> <li>• The Data Processing System engineers are responsible for operation, control, and software loading of the five General Purpose Computers (GPC) on the orbiter, and monitor the data streams and hardware devices that interface the GPC to Shuttle systems and flight crew. The GPCs provide the critical function of autonomous onboard control and monitoring of vehicle systems during flight.</li> <li>• The Flight Software engineer is responsible for the proper formatting and loading of flight computer programs and critical support data into the mass memory units for subsequent use by the GPC aboard the orbiter. This position also oversees configuration control of these programs and data during the loading process.</li> <li>• The SSME Controller engineers are responsible for operations, control, and software loading of the main engine controllers. The main engine controllers function as computerized feedback and control systems for operation- and performance-monitoring of the three SSMEs.</li> </ul>
Backup and Integration	<p>The Backup Console is available for use by various systems when their primary console is unavailable. During launch countdown, this console is used by the Ground Launch Sequencer (GLS) to monitor vehicle measurements. The GLS is an automated program, which controls all activity during the final portion of the countdown. Once it is started at about T-45 minutes, the remainder of the countdown can be accomplished with no further manual actions from the firing room. When the countdown resumes after the final built-in hold at T-9 minutes, the GLS assumes automatic control of the count, monitoring vehicle parameters, and is able to halt the countdown if a problem is detected. At T-31 seconds, it issues the command to the onboard launch sequences that allows the Shuttle to start its engines and launch.</p> <p>The GLS also provides automatic safing functions to the vehicle and ground support systems should a recycle or abort occur.</p> <ul style="list-style-type: none"> <li>• The Orbiter Project engineer and Orbiter Test Project engineer coordinate testing and troubleshooting involving multiple systems. They monitor overall Shuttle configuration and systems status.</li> </ul>

<b>Table 13. Position Row and Console Functions (continued)</b>	
<b>Position Row</b>	<b>Console Functions/Responsibilities</b>
Backup and Integration – (con't)	<ul style="list-style-type: none"> <li>The Shuttle Project engineer is the senior NASA engineer in the firing room during the launch countdown. This position directs troubleshooting and recovery from failures encountered during the countdown process.</li> <li>The GLS engineer and Systems engineer monitor the performance of the GLS prior to and during the final countdown.</li> </ul>
Master Console (Back Room)	<p>This position consists of the master Launch Processing System (LPS) consoles. The LPS Test Conductors are responsible for monitoring and verifying the integrity of the LPS. The personnel staffing these consoles are responsible for controlling the configuration of all the consoles in the primary firing room, 30 other processors, and many more peripheral devices that make up a “firing room.”</p> <ul style="list-style-type: none"> <li>Prior to the start of testing, the LPS consoles load the correct software into each of the remaining computers, connects the proper data paths to and from the Shuttle and all ground support equipment, and initializes the entire firing room system to begin processing.</li> <li>During routine Shuttle testing, these consoles perform integrity or health monitoring of all firing room assemblies, including the other consoles. Should a unit fail, the Master Console provides malfunction recovery and performs the necessary reconfiguration to allow the failed unit or spare unit to be brought back into service. After testing is complete, the Master Console controls problem resolution of failed components and prepares the firing room for the next test.</li> </ul>

**SECTION VI - HISTORIC LAUNCHES AND LANDINGS**

Table 14 illustrates the historic launches and landings supported by each firing room, including the space program it supported, the mission number, vehicle flight number, launch date, launch site (LC39A or B), and landing site and date.

**Table 14. Historic Launches and Landings**

<b>Firing Room 1</b>							
<b>Space Program</b>	<b>Mission No.</b>	<b>Vehicle/ Flight No.</b>	<b>Launch Date</b>	<b>Launch Site</b>		<b>Landing Site</b>	<b>Landing Date</b>
				<b>LC39A</b>	<b>LC39B</b>		
<b><i>Apollo Program</i></b>							
	Apollo 4	03032	11-09-67	X		North Pacific Ocean	11-9-67
	Apollo 8	03626	12-21-68	X		North Pacific Ocean	12-27-68
	Apollo 11	04039	07-16-69	X		North Pacific Ocean	07-24-69
	Apollo 13	04371	04-11-70	X		South Pacific Ocean	04-17-70

Table 14. Historic Launches and Landings (continued)							
Firing Room 1 (continued)							
Space Program	Mission No.	Vehicle/ Flight No.	Launch Date	Launch Site		Landing Site	Landing Date
				LC39A	LC39B		
<b><i>Apollo Program (continued)</i></b>							
	Apollo 15	05351	07-26-71	X		North Pacific Ocean	08-07-71
	Apollo 16	06000	04-16-72	X		South Pacific Ocean	04-27-72
	Apollo 17	06300	12-07-72	X		South Pacific Ocean	12-19-72
<b><i>Space Shuttle Program</i></b>							
	STS-1	Columbia-1	04-12-81	X		EAFB, 23	04-14-81
	STS-2	Columbia-2	11-12-81	X		EAFB, 23	11-14-81
	STS-3	Columbia-3	03-22-82	X		WSMR, 17	03-30-82
	STS-4	Columbia-4	06-27-82	X		EAFB, 22	07-04-82
	STS-5	Columbia-5	11-11-82	X		EAFB, 22	11-16-82
	STS-6	Challenger-1	04-04-83	X		EAFB, 22	04-09-83
	STS-7	Challenger-2	06-18-83	X		EAFB, 15	06-24-83
	STS-8	Challenger-3	08-30-83	X		EAFB, 22	09-05-83
	STS-9	Columbia-6	11-28-83	X		EAFB, 17L	12-08-83
	STS-26	Discovery-7	09-29-88		X	EAFB, 17L	10-03-88
	STS-27	Atlantis-3	12-02-88		X	EAFB, 17L	12-06-88
	STS-29	Discovery-8	03-13-89		X	EAFB, 22	03-18-89
	STS-30	Atlantis-4	05-04-89		x	EAFB, 22	05-28-89
	STS-31	Discovery-10	04-24-90		X	EAFB, 22	04-29-90
	STS-32	Columbia-9	01-09-90	X		EAFB, 22	01-20-90
	STS-34	Atlantis-5	10-18-89		X	EAFB, 23L	10-23-89
	STS-35	Columbia-10	12-02-90		X	EAFB, 22	12-10-90
	STS-39	Discovery-12	04-28-91	X		KSC, 15	04-06-91
	STS-41B (STS-10)	Challenger-4	02-03-84	X		KSC, 15	02-11-84
	STS-41D (STS-12)	Discovery-1	08-30-84	X		EAFB, 17L	09-05-84
	STS-43	Atlantis-9	08-02-91	X		KSC, 15	08-11-91
	STS-44	Atlantis-10	11-24-91	X		EAFB, 05R	12-01-91
	STS-47	Endeavour-2	09-12-92		X	KSC, 33	09-20-92
	STS-49	Endeavour-1	05-07-92		X	EAFB, 22	05-16-92
	STS-51	Discovery-17	09-12-93		X	KSC, 15	09-22-93
	STS-51A (STS-14)	Discovery-2	11-08-84	X		KSC, 15	11-16-84
	STS-51B (STS-17)	Challenger-7	04-29-85	X		EAFB, 17L	05-06-85
	STS-51F	Challenger-9	07-29-85	X		EAFB, 23	08-06-85
	STS-51I (STS-20)	Discovery-6	08-27-85	X		EAFB, 23	09-03-85

Table 14. Historic Launches and Landings (continued)							
Firing Room 1 (continued)							
Space Program	Mission No.	Vehicle/ Flight No.	Launch Date	Launch Site		Landing Site	Landing Date
				LC39A	LC39B		
<b><i>Space Shuttle Program (continued)</i></b>							
	STS-53	Discovery-15	12-02-92	X		EAFB, 22	12-09-92
	STS-55	Columbia-14	04-26-93	X		EAFB, 22	05-06-93
	STS-59	Endeavour-6	04-09-94	X		EAFB, 22	04-20-94
	STS-60	Discovery-18	02-03-94	X		KSC, 15	02-11-94
	STS-61A (STS-22)	Challenger-9	10-30-85	X		EAFB, 17L	11-06-85
	STS-61C (STS-24)	Columbia-7	01-12-86	X		EAFB, 22	01-18-86
	STS-68	Endeavour-7	09-30-94	X		EAFB, 22	10-11-94
	STS-69	Endeavour-9	09-07-95	X		KSC, 33	09-18-95
	STS-71	Atlantis-14	06-27-95	X		KSC, 15	07-07-95
	STS-72	Endeavour-10	01-10-96		X	KSC, 15	01-20-96
	STS-74	Atlantis-15	11-12-95	X		KSC, 33	11-20-95
	STS-75	Columbia-19	02-22-96		X	KSC, 33	03-09-96
	STS-76	Atlantis-16	03-22-96		X	EAFB, 22	05-29-96
	STS-88	Endeavour-11	05-19-96		X	KSC, 33	05-29-96
	STS-79	Atlantis-17	09-16-96	X		KSC, 15	09-26-96
	STS-81	Atlantis-18	01-12-97		X	KSC, 33	01-22-97
	STS-83	Columbia-22	04-04-97	X		KSC, 33	04-08-97
	STS-86	Atlantis-20	09-25-97	X		KSC, 15	10-06-97
	STS-89	Endeavour-12	01-22-98	X		KSC, 15	01-31-98
	STS-91	Discovery-24	06-02-98	X		KSC, 15	06-12-98
	STS-93	Columbia-26	07-23-99		X	KSC, 33	07-27-99
	STS-94	Columbia-23	07-01-97	X		KSC, 33	07-17-97
	STS-95	Discovery-25	10-29-98		X	KSC, 33	11-07-98
	STS-96	Discovery-26	05-27-99		X	KSC, 15	06-06-99
	STS-97	Endeavour-15	11-30-00		X	KSC, 15	12-11-00
	STS-101	Atlantis-21	05-19-00	X		KSC, 15	05-29-00
	STS-102	Discovery-29	03-08-01		X	KSC, 15	03-21-01
	STS-103	Discovery-27	12-19-99		X	KSC, 33	12-27-99
	STS-106	Atlantis-22	09-08-00		X	KSC, 15	09-20-00
	STS-109	Columbia-27	03-01-02	X		KSC, 33	03-12-02
	STS-111	Endeavour-18	06-05-02	X		EAFB, 22	06-19-02
	STS-113	Endeavour-19	11-23-02	X		KSC, 33	12-07-02
<b>Firing Room 2</b>							
<b><i>Apollo Program</i></b>							
	Apollo 6	03170	04-04-68	X		Pacific Ocean	04-04-68
	Apollo 9	03769	03-03-69	X		Atlantic Ocean	03-13-69
	Apollo 12	04225	11-14-69	X		Pacific Ocean	11-24-69
	Apollo 14	04900	01-31-71	X		Pacific Ocean	02-09-71

Table 14. Historic Launches and Landings (continued)							
Firing Room 2 (continued)							
Space Program	Mission No.	Vehicle/ Flight No.	Launch Date	Launch Site		Landing Site	Landing Date
				LC39A	LC39A		
<b><i>Apollo Program (continued)</i></b>							
	Skylab 1	-	05-14-73	X		Pacific Ocean	07-11-79
<b><i>No Space Shuttle Program missions</i></b>							
Firing Room 3							
<b><i>Apollo Program</i></b>							
	Apollo 10	03941	05-18-69		X	Pacific Ocean	05-26-69
	Skylab 2		05-25-73		X	Pacific Ocean	06-22-73
	Skylab 3		07-28-73		X	Pacific Ocean	09-25-73
	Skylab 4		11-16-73		X	Pacific Ocean	02-08-74
	Apollo-Soyuz Test Project		07-15-75		X	Pacific Ocean	07-24-75
<b><i>Space Shuttle Program</i></b>							
	STS-28	Columbia - 8	08-08-89		X	EAFB, 17	08-13-89
	STS-33	Discovery -9	11-22-89		X	EAFB, 04	11-27-89
	STS-36	Atlantis-6	02-28-90	X		EAFB, 23	03-04-90
	STS-37	Atlantis-8	04-05-91		X	EAFB, 33	04-11-91
	STS-38	Atlantis-7	11-15-90	X		KSC, 33	11-20-90
	STS-40	Columbia-11	06-05-91		X	EAFB, 22	06-14-91
	STS-41	Discovery-11	10-06-90		X	EAFB, 22	10-10-90
	STS-41C (STS-11)	Challenger-6	04-06-84	X		EAFB, 17	04-13-84
	STS-41G (STS-13)	Challenger-6	10-05-84	X		KSC, 33	10-13-84
	STS-42	Discovery-14	01-22-92	X		EAFB, 22	01-30-92
	STS-45	Atlantis-11	03-24-92	X		KSC, 33	04-02-92
	STS-46	Atlantis-12	07-31-92		X	KSC, 33	08-82-92
	STS-50	Columbia-12	06-25-92	X		KSC, 33	07-09-92
	STS-51C (STS-15)	Discovery-3	01-24-85	X		KSC, 15	01-27-85
	STS-51D (STS-16)	Discovery-4	04-12-85	X		KSC, 33	04-19-85
	STS-51G (STS-18)	Discovery-5	06-17-85	X		EAFB, 23	06-24-85
	STS-51J (STS-21)	Atlantis-1	10-03-85	X		EAFB, 23	10-07-85
	STS-51L (STS-25)	Challenger-10	01-28-86		X	Catastrophic Event	01-28-86
	STS-52	Columbia-13	10-22-92		X	KSC, 33	11-01-92
	STS-54	Endeavour-3	01-13-93		X	KSC, 33	01-19-93
	STS-56	Discovery-16	04-08-93		X	KSC, 33	04-17-93
	STS-57	Endeavour-4	06-21-93		X	KSC, 33	07-01-95

Table 14. Historic Launches and Landings (continued)							
Firing Room 3 (continued)							
Space Program	Mission No.	Vehicle/ Flight No.	Launch Date	Launch Site		Landing Site	Landing Date
				LC39A	LC39B		
<b>Space Shuttle Program (continued)</b>							
	STS-58	Columbia-15	10-18-93		X	EAFB, 22	11-01-93
	STS-61	Endeavour-5	12-02-93		X	KSC, 33	12-13-93
	STS-61B (STS-23)	Atlantis-2	11-26-85	X		EAFB, 22	12-03-85
	STS-62	Columbia-16	03-04-94		X	KSC, 33	03-18-94
	STS-63	Discovery-20	02-03-95		X	KSC, 15	02-11-95
	STS-64	Discovery-19	09-09-94		X	EAFB, 04	09-20-94
	STS-65	Columbia-17	07-08-94	X		KSC, 33	07-23-94
	STS-66	Atlantis-13	11-03-94		X	EAFB, 22	11-04-94
	STS-67	Endeavour-8	03-02-95	X		EAFB, 22	03-18-95
	STS-70	Discovery-21	07-31-95		X	KSC, 33	07-22-95
	STS-73	Columbia-18	10-20-95		X	KSC, 33	11-05-95
	STS-78	Columbia-20	06-20-96		X	KSC, 33	07-07-96
	STS-80	Columbia-21	11-19-96		X	KSC, 33	12-07-96
	STS-82	Discovery-22	02-11-97	X		KSC, 15	02-21-97
	STS-85	Discovery-23	08-07-97	X		KSC, 33	08-19-97
	STS-87	Columbia-24	11-19-97		X	KSC, 33	12-05-97
	STS-88	Columbia-25	04-17-98		X	KSC, 33	05-03-98
	STS-90	Endeavour-13	12-04-88	X		KSC, 15	12-15-88
	STS-98	Atlantis-23	02-07-01	X		EAFB, 22	02-20-01
	STS-100	Endeavour-16	04-19-01	X		EAFB, 22	05-01-01
	STS-104	Atlantis-24	07-12-01		X	KSC, 15	07-24-01
	STS-105	Discovery-30	08-10-01	X		KSC, 15	08-22-01
	STS-107	Columbia-28	01-16-03	X		Catastrophic Event	02-01-03
	STS-108	Endeavour-17	12-05-01		X	KSC, 15	12-17-01
	STS-110	Atlantis-25	04-08-02		X	KSC, 33	04-19-02
	STS-112	Atlantis-25	10-07-02		X	KSC, 33	10-18-02
	STS-114	Discovery-31	07-26-05		X	EAFB, 22	08-09-05
<b>Firing Room 4</b>							
<b>No Apollo Program missions</b>							
<b>Space Shuttle Program</b>							
	STS-84	Atlantis-19	05-15-97	X		KSC, 33	05-24-97
	STS-115	Atlantis-27	09-09-06		X	KSC, 33	09-21-06
	STS-116	Discovery-33	12-09-06		X	KSC, 15	12-22-06
	STS-117	Atlantis-28	06-08-07	X		EAFB, 22	06-22-07
	STS-118	Endeavour-20	08-08-07	X		KSC, 15	08-21-07
	STS-119	Discovery-36	03-15-09	X		KSC, 15	03-28-09
	STS-120	Discovery-34	10-23-07	X		KSC, 33	11-07-07
	STS-121	Discovery-32	07-04-06		X	KSC, 15	07-17-06
	STS-122	Atlantis-29	02-07-07	X		KSC, 15	02-20-08

Table 14. Historic Launches and Landings (continued)							
Firing Room 4 (continued)							
Space Program	Mission No.	Vehicle/ Flight No.	Launch Date	Launch Site		Landing Site	Landing Date
				LC39A	LC39B		
<b>Space Shuttle Program (continued)</b>							
	STS-123	Endeavour-21	03-11-08	X		KSC, 15	03-26-08
	STS-124	Discovery-35	05-31-08	X		KSC, 15	06-14-08
	STS-125	Atlantis-30	05-11-09	X		EAFB, 22	05-24-09
	STS-126	Endeavour-22	11-14-08	X		EAFB, 04-L	11-20-08
	STS-127	Endeavour-23	07-15-09	X		KSC, 15	07-31-09
	STS-128	Discovery-37	08-08-09	X		EAFB, 22L	09-11-09
	STS-129	Atlantis-31	11/16/09	X		KSC, 33	11-27-09
	STS-130	Endeavour-24	02/08/10	X		KSC, 15	02/21/10
	STS-131	Discovery-38	04/05/10	X		KSC, 33	04/20/10
	STS-132	Atlantis-32	05/14/10	X		KSC, 33	05/26/10
	STS-133	Discovery-39	02/24/11	X		KSC, 15	03/09/11
	STS-134	Endeavour-25	05/16/11	X		KSC, 15	06/01/11
	STS-135	Atlantis-33	07/08/11	X		KSC, 15	07/24/11

## SECTION VII - SUMMARY OF SPACE SHUTTLE FLIGHTS

The Space Shuttle Program flew a total of 135 flights over a 30-year period. Table 15 shows a breakdown of the total flights flown by each orbiter including the date and mission number for each first and last flight.

**Table 15. Summary of Space Shuttle Flights**

Orbiter	Total No. of Flights	First Flight	Mission No.	Last Flight	Mission No.
<i>Columbia</i>	28	04-12-81	STS-1	01-16-03	STS-107
<i>Challenger</i>	10	04-04-83	STS-6	01-28-86	STS-51L
<i>Discovery</i>	39	08-30-84	STS-41D	02-24-11	STS-133
<i>Atlantis</i>	33	10-03-85	STS-51J	07-08-11	STS-135
<i>Endeavour</i>	25	05-07-92	STS-49	05-16-11	STS-134
<b>Total</b>	<b>135</b>				

## SECTION VIII – CONCLUSION

As NASA looks to the future, the firing rooms are being redesigned and upgraded to launch a variety of space vehicles. Only Firing Room 2 remained with the original historic consoles and horseshoe layout still in place. This equipment inventory endeavored to capture the consoles as they looked and functioned during the Apollo and Space Shuttle programs. Now displayed in museums across the country, the consoles have a new mission – inspiring future space explorers!

## SECTION IX – SOURCES OF INFORMATION

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## **APPENDIX A – FIRING ROOM LAYOUTS AND LCC FLOOR PLANS**

APPENDIX A – FIRING ROOM LAYOUTS AND LCC FLOOR PLANS

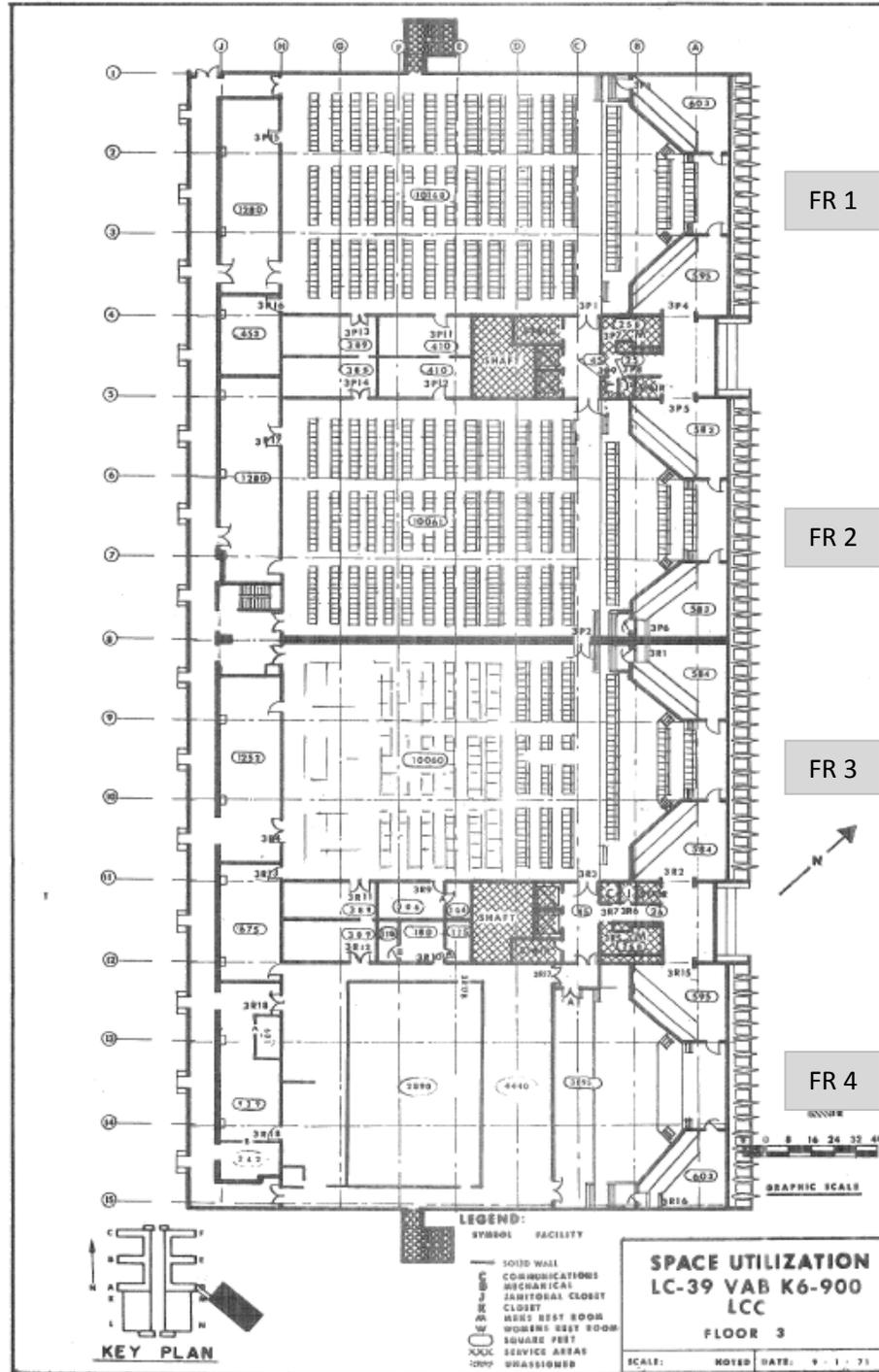


Figure A-1. Apollo-era Firing Room Layouts, dated September 1, 1971.

APPENDIX A – FIRING ROOM LAYOUTS AND LCC FLOOR PLANS (con't)

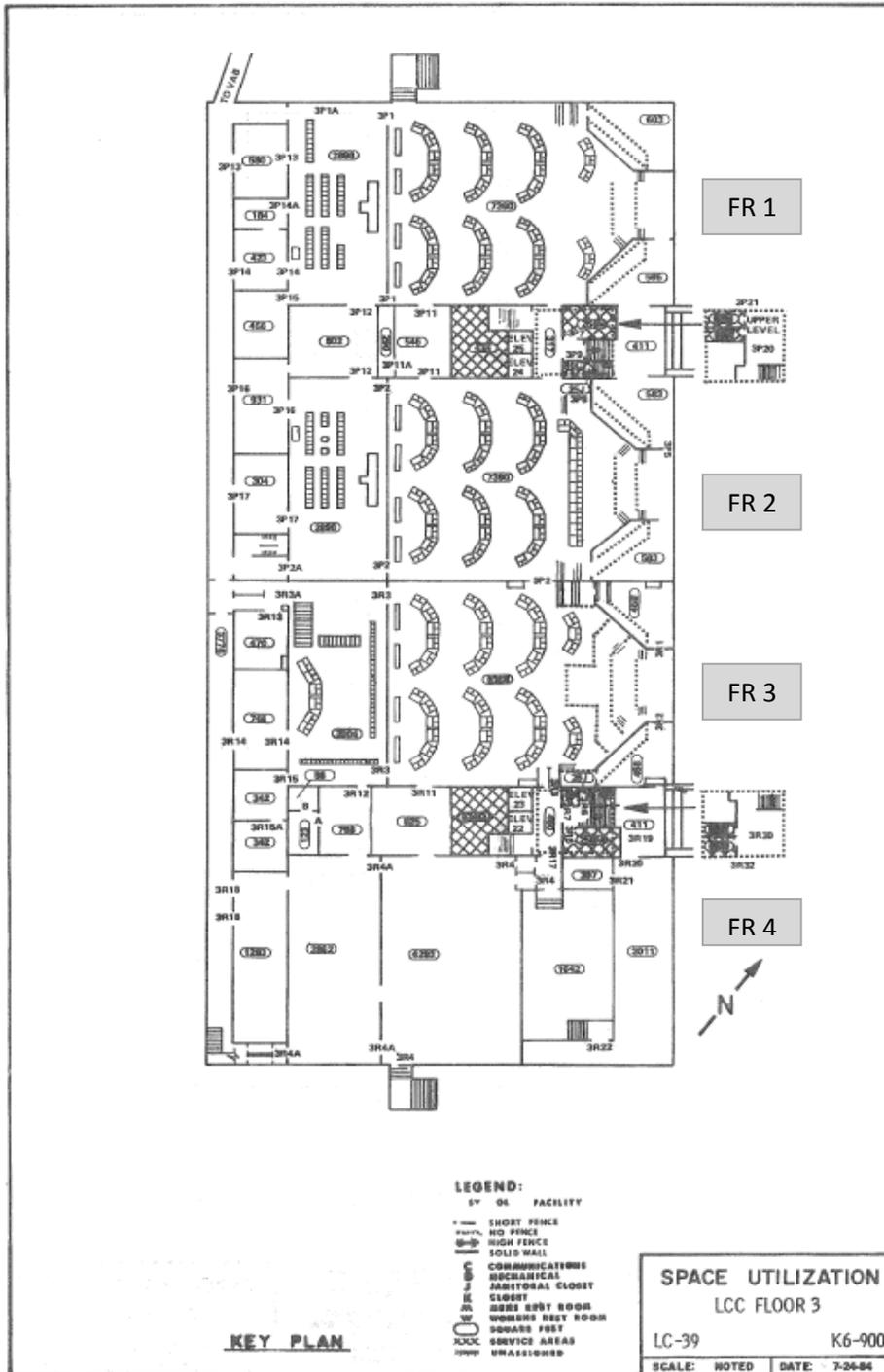


Figure A-2. Space Shuttle Firing Room Layouts, dated July 24, 1984.

APPENDIX A – FIRING ROOM LAYOUTS AND LCC FLOOR PLANS (con't)

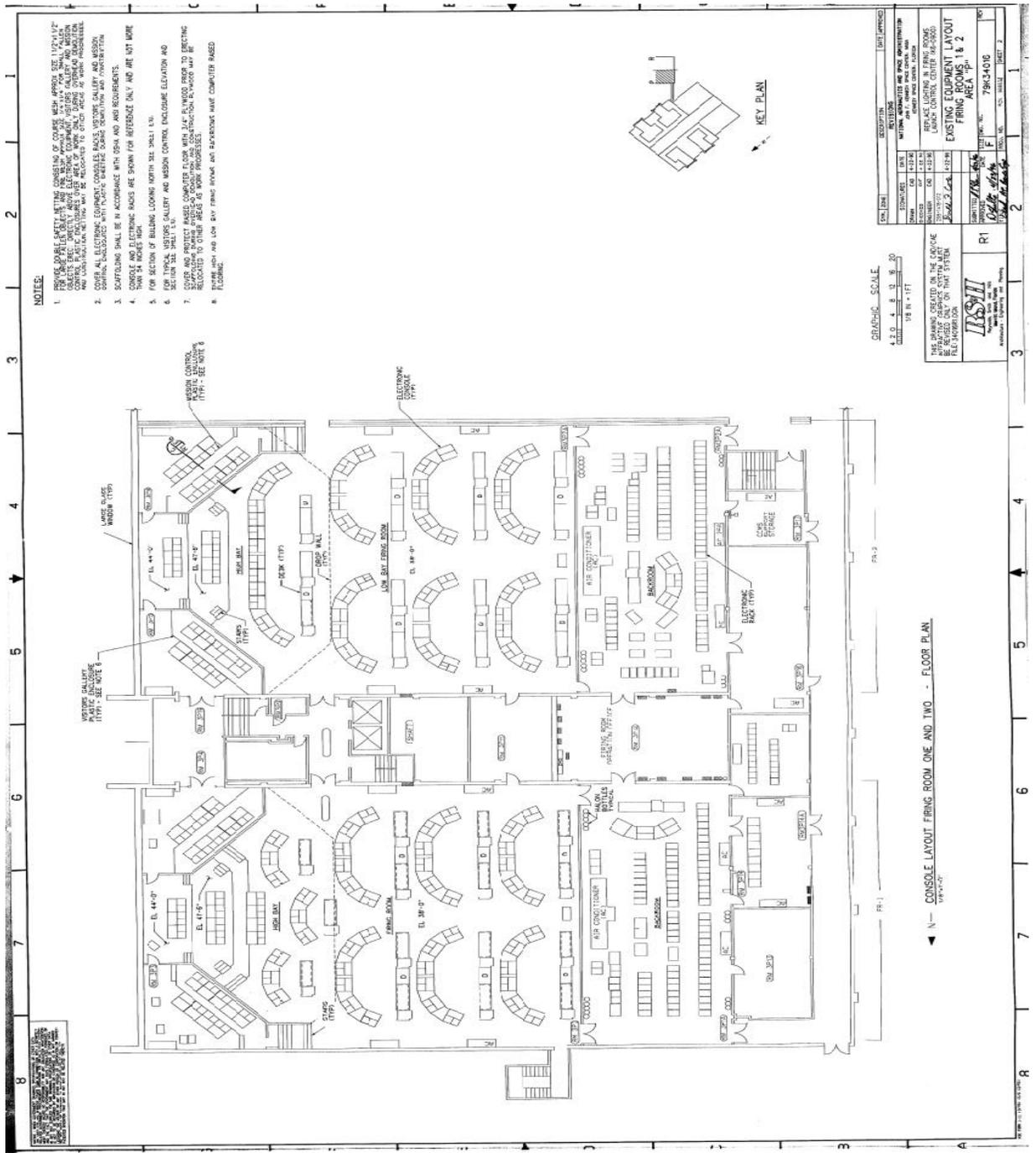


Figure A-3. Reynolds, Smith, and Hills, "Existing Equipment Layout, Firing Rooms 1 & 2, Area "P", dated April 22, 1996.

APPENDIX A – FIRING ROOM LAYOUTS AND LCC FLOOR PLANS (con't)

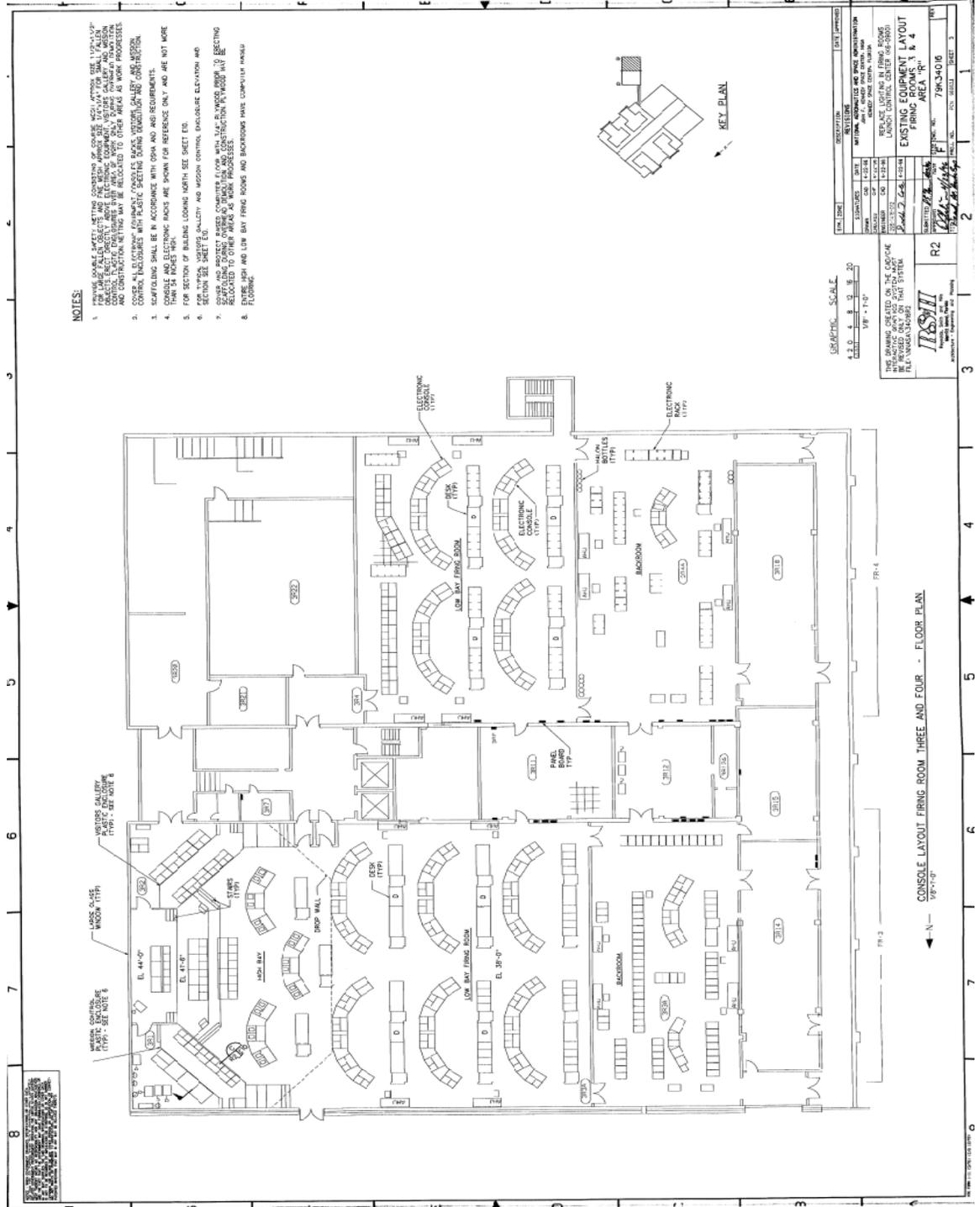
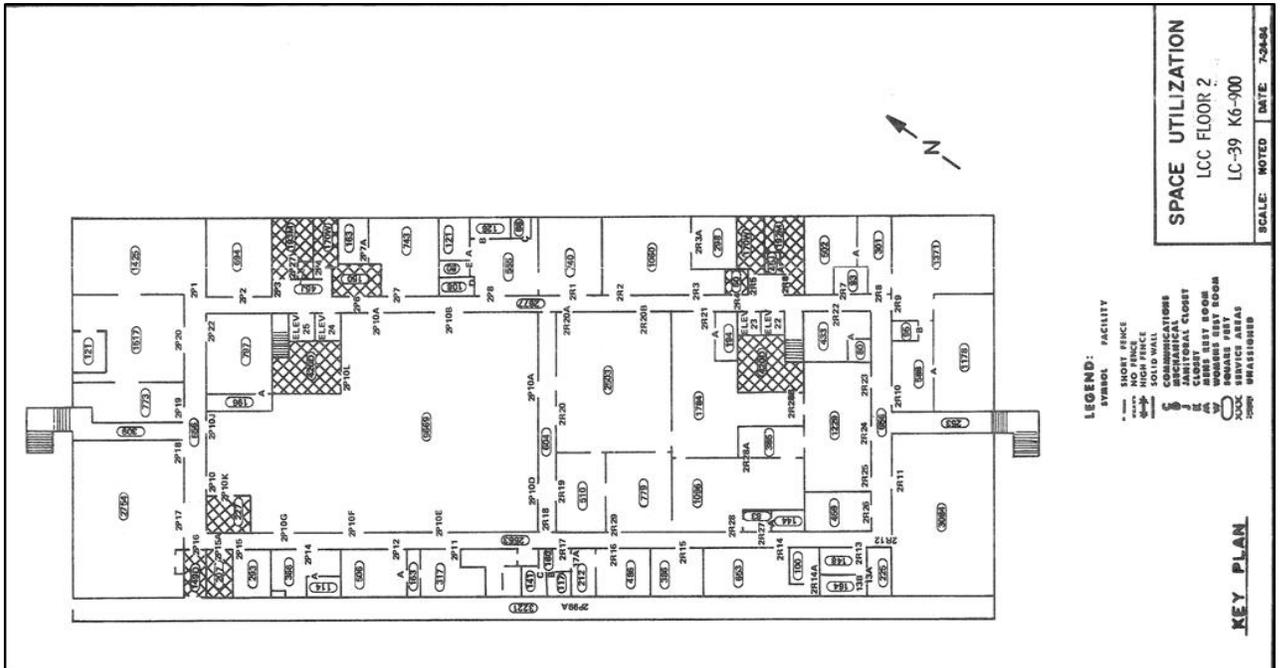


Figure A-4. Reynolds, Smith, and Hills, "Existing Equipment Layout, Firing Rooms 3 & 4, Area "R", dated April 22, 1996.

APPENDIX A – FIRING ROOM LAYOUTS AND LCC FLOOR PLANS (con't)



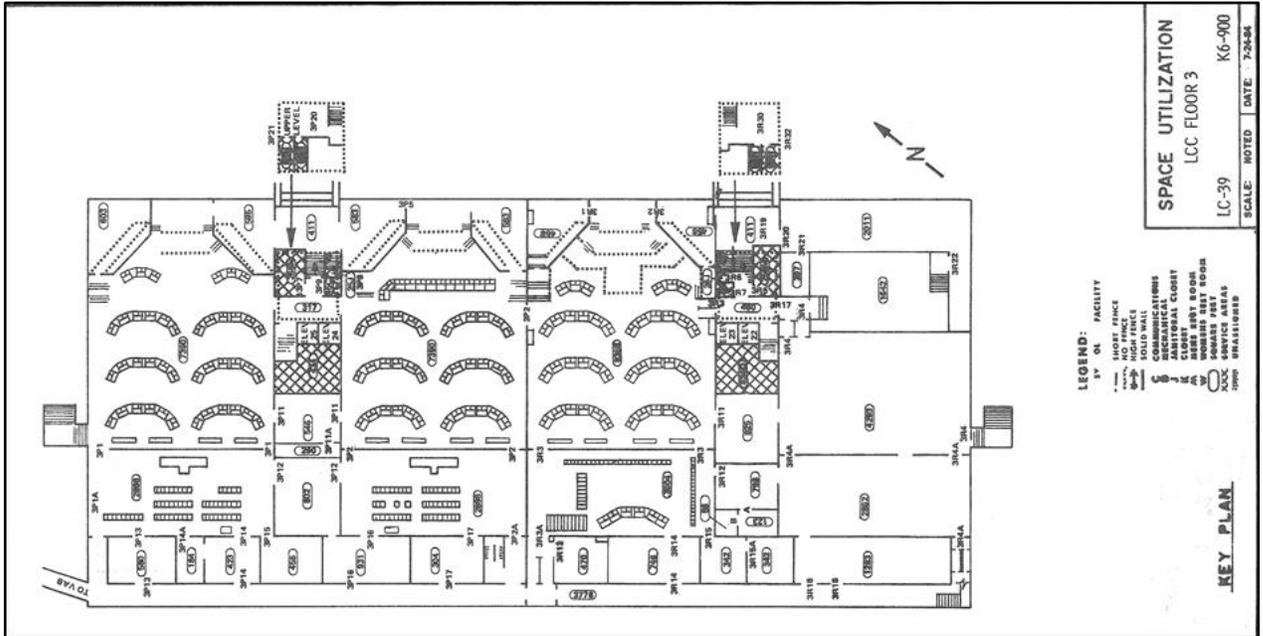
LCC 1st Floor



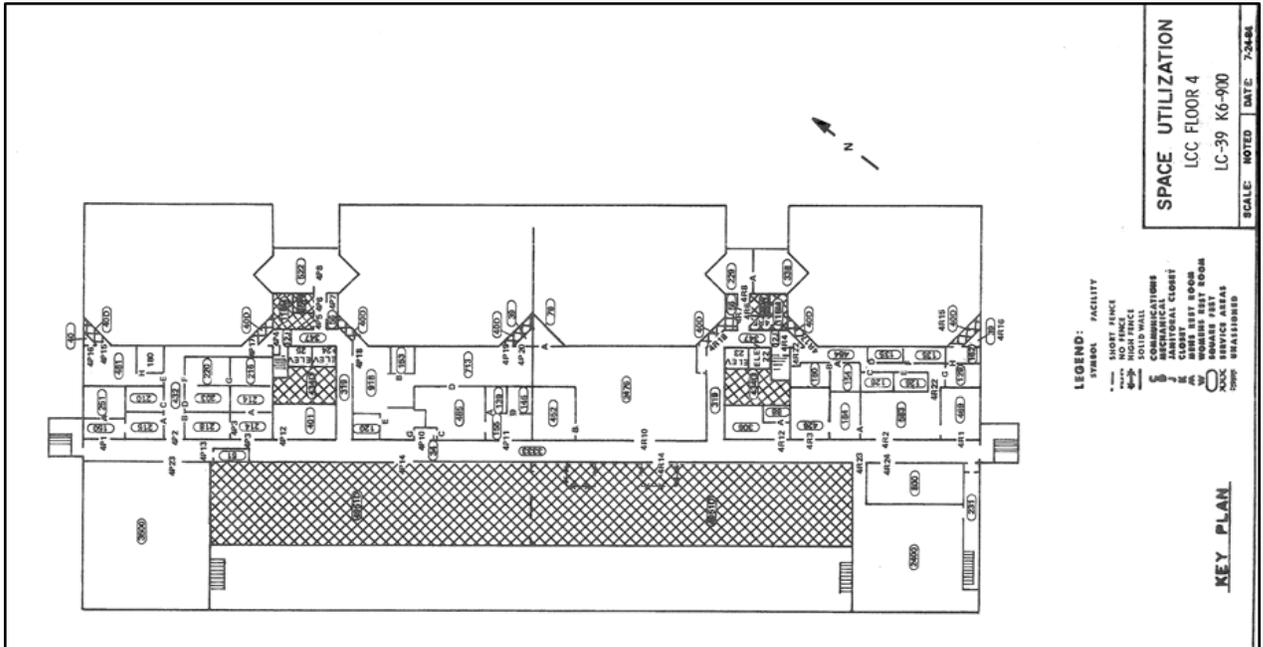
LCC 2nd Floor

Figure A-5. LCC 1st and 2nd Floor Plans, dated July 24, 1984.

APPENDIX A – FIRING ROOM LAYOUTS AND LCC FLOOR PLANS (con't)



LCC 3rd Floor



LCC 4th Floor

Figure A-6. LCC 3rd and 4th Floor Plans, dated July 24, 1984.

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**APPENDIX B – PHOTOGRAPH RECORD**

## APPENDIX B – PHOTOGRAPH RECORD

IMG Number	Description
	<b>Table 1. AA Row – Management Consoles (reference page 8)</b>
IMG_0001	Console AA-1 Payload Director, looking West
IMG_0002	Console AA-2 Deputy Payload Director, looking West
IMG_0003	Console AA-3 Deputy International Space Station (ISS) Program Manager, looking West
IMG_0004	Console AA-4 ISS External Relations Officer, looking West
IMG_0005	Console AA-5 Integration and Test Operations Manager, looking West
IMG_0006	Console AA-6 PAC, looking West
IMG_0007	Console AA-7 PAC, looking West
IMG_0008	Console AA-8 PAC, looking West
IMG_0009	Consoles AA-8/AA-7, looking West
IMG_0010	Consoles AA-6/AA-5, looking West
IMG_0011	Consoles AA-4/AA-3, looking West
IMG_0012	Consoles AA-2/AA-1, looking West
IMG_0013	Consoles AA-2/AA-1 with modified panels, looking West
IMG_0014	AA Row, looking Northwest
IMG_0015	AA Row, looking Northwest
IMG_0016	AA Row, looking Southeast
IMG_0017	Back of AA Row, looking Northeast
IMG_0018	Backside of AA Row, showing raised flooring, looking Northeast
	<b>Table 1A. AB Row – Management Consoles (reference page 9)</b>
IMG_0019	Console AB-1 Mission Management, looking West
IMG_0020	Console AB-2 Program Manager, looking West
IMG_0021	Console AB-3 ISS Deputy Program Manager, looking West
IMG_0022	Console AB-4 Ground Systems Program Manager, looking West
IMG_0023	Console AB-5 Ground Systems Director, looking West
IMG_0024	Console AB-6 Integrated Data Systems, looking West
IMG_0025	Console AB-7 Integrated Data Systems, looking West
IMG_0026	Console AB-8 Integrated Data Systems, looking West
IMG_0027	Consoles AB-8/AB-7, looking West
IMG_0028	Consoles AB-6/AB-5, looking West
IMG_0029	Consoles AB-4/AB-3, looking West
IMG_0030	Consoles AB-2/AB-1, looking West
IMG_0031	AB Row, looking Northwest
IMG_0032	AB Row, looking Southwest
IMG_0033	Backside of AB Row, looking Northeast
IMG_0034	Stairs to both management rows, looking Northeast
IMG_0035	Close-up of Rows AA and AB, looking Northwest
	<b>Table 1B. Operations Management Room (OMR) (South Bubble Room - ICE Team) (reference page 10)</b>
IMG_0036	Entrance to OMR, looking East
IMG_0037	North entrance (Room 3P6) into OMR, looking South
IMG_0038	Upper row of consoles A-1 thru A-7 (computers removed), looking Southwest

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	<b>Table 1B. Operations Management Room (OMR) (South Bubble Room - ICE Team) (reference page 10) (continued)</b>
IMG_0039	Lower row of consoles A-8 thru A-16 (computers removed), looking Southwest
IMG_0040	Outside view of OMR, looking Southeast
IMG_0041	Loud speaker in OMR, looking South
	<b>Table 1C. Operations Support Room (OSR) North Bubble Room (reference page 11)</b>
IMG_0042	North entrance (Room 3P5) into OSR from Mezzanine floor, looking South
IMG_0043	Inside OSR, renovated for office space, looking Southwest
IMG_0044	Inside OSR showing glass walls and support structures, looking South
IMG_0045	Inside view, looking South
IMG_0046	Outside view of OSR with 4 <sup>th</sup> floor observation deck above, looking Northeast
	<b>Table 2. Payload, Safety &amp; Mission Assurance (S&amp;MA), Space Shuttle Program (SSP) Launch Integration Support Consoles (Large Horseshoe) (Stations #223, #234, #240, and #243) (reference page 12)</b>
IMG_0047	Console 0234A1, looking Northeast
IMG_0048	Console 0234A1 Wedge, looking Northeast
IMG_0049	Console 0234A1 Wedge Combo, looking Northeast
IMG_0050	Console 0234A2, looking Northeast
IMG_0051	Console 0234A2 Wedge, looking Northeast
IMG_0052	Console 0234A2 Wedge Combo, looking Northeast
IMG_0053	Console 0234A3, looking Northeast
IMG_0054	Consoles 0234A1 thru 0234A3, looking Northeast
IMG_0055	Console 0243A1, looking East
IMG_0056	Console 0243A2, looking East
IMG_0057	Console 0243A3, looking East
IMG_0058	Consoles 0243A1 thru 0243A3, looking East
IMG_0059	Console 0240A1, looking East
IMG_0060	Console 0240A2, looking East
IMG_0061	Console 0240A3, looking East
IMG_0062	Consoles 0240A1 thru 0240A3, looking Southeast
IMG_0063	Console 0223A1, looking East
IMG_0064	Console 0223A1 Closed Wedge cover, looking East
IMG_0065	Console 0223A1 Wedge Combo, looking East
IMG_0066	Console 0223A2, looking Southeast
IMG_0067	Console 0223A2 Wedge, looking Southeast
IMG_0068	Console 0223A2 Wedge Combo, looking Southeast
IMG_0069	Console 0223A3, looking Southeast
IMG_0070	Consoles 0223A1 thru 0223A3, looking Southeast
IMG_0071	Overall view of large horseshoe consoles, looking Southeast
IMG_0072	Overall view of large horseshoe consoles with Management Rows (upper left), looking Southeast
IMG_0073	Overall view of large horseshoe consoles with Support Modules (right), looking Southeast
IMG_0074	Overall view of large horseshoe consoles with Management Rows (upper right), looking Northeast

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	<b>Table 2. Payload, Safety &amp; Mission Assurance (S&amp;MA), Space Shuttle Program (SSP) Launch Integration Support Consoles (Large Horseshoe) (Stations #223, #234, #240, and #243) (reference page 12) (continued)</b>
IMG_0075	Overall view of large horseshoe consoles with Support Modules (left), looking Northeast
	<b>Table 2A. Payload Support Modules (#243/#234/#295) (reference page 14)</b>
IMG_0076	Support Modules 0234A4 thru 0234A8, looking West
IMG_0077	Storage Console 0295A1, looking West
IMG_0078	Support Modules 0243A4 thru 0243A8, looking West
IMG_0079	Support Modules 0234 (left) & 0243 (right) + Storage Console 0295A1, looking Northwest
IMG_0080	Close-up of Support Module Panel 0243A5, looking West
	<b>Table 2B. S&amp;MA and SSP Support Modules (#223/#240/#295) (reference page 15)</b>
IMG_0081	Support Modules 0240A4 thru 0240A8, looking West
IMG_0082	Storage Console 0295A2, looking West
IMG_0083	Support Modules 0223A4 thru 0223A8, looking West
IMG_0084	Overall view of large horseshoe Support Modules, looking Northwest
	<b>Table 3. Cryogenic Propulsion Consoles (#215/#216) (reference page 16)</b>
IMG_0085	Console 0216A1, looking Northeast
IMG_0086	Console 0216A1 Wedge, looking Northeast
IMG_0087	Console 0216A1 Wedge Combo, looking Northeast
IMG_0088	Console 0216A2, looking Northeast
IMG_0089	Console 0216A2 Wedge, looking Northeast
IMG_0090	Console 0216A2 Wedge Combo, looking Northeast
IMG_0091	Console 0216A3, looking East
IMG_0092	Console 0216A3 Bridge, looking East
IMG_0093	Consoles 0216A1 thru 0216A3, looking Northeast
IMG_0094	Console 0215A1, looking East
IMG_0095	Console 0215A1 Wedge, looking East
IMG_0096	Console 0215A1 Wedge Combo, looking East
IMG_0097	Console 0215A2, looking Southeast
IMG_0098	Console 0215A2 Wedge, looking Southeast
IMG_0099	Console 0215A2 Wedge Combo, looking Southeast
IMG_0100	Console 0215A3, looking Southeast
IMG_0101	Consoles 0215A1 thru 0215A3, looking Southeast
IMG_0102	Overall view of horseshoe consoles, looking South
IMG_0103	Overall view of horseshoe consoles, looking North
	<b>Table 3A. Cryogenic Support Modules (#215/#216/#295) (reference page 17)</b>
IMG_0104	Support Modules 0216A4 thru 0216A8, looking West
IMG_0105	Storage Console 0295A3, looking West
IMG_0106	Support Modules 0215A4 thru 0215A8, looking West
	<b>Table 4. APU/HYDR/ECLSS/OMS/RCS/FC/PRSD Consoles (#204/#224) (reference page 18)</b>
IMG_0107	Console 0204A1, looking Northeast
IMG_0108	Console 0204A1 Wedge, looking Northeast
IMG_0109	Console 0204A1 Wedge Combo, looking Northeast

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	<b>Table 4. APU/HYDR/ECLSS/OMS/RCS/FC/PRSD Consoles (#204/#224) (reference page 18) (con’t)</b>
IMG_0110	Console 0204A2, looking Northeast
IMG_0111	Console 0204A2 Wedge, looking Northeast
IMG_0112	Console 0204A2 Wedge Combo, looking Northeast
IMG_0113	Console 0204A3, looking East
IMG_0114	Console 0204A3 Bridge, looking East
IMG_0115	Console 0204A3 Bridge Combo, looking East
IMG_0116	Consoles 0204A1 thru 0204A3, looking Northeast
IMG_0117	Console 0224A1, looking East
IMG_0118	Console 0224A1 Wedge, looking East
IMG_0119	Console 0224A1 Wedge Combo, looking East
IMG_0120	Console 0224A2, looking East
IMG_0121	Console 0224A2 Wedge, looking East
IMG_0122	Console 0224A2 Wedge Combo, looking East
IMG_0123	Console 0224A3, looking Southeast
IMG_0124	Consoles 0224A1 thru 0224A3, looking Southeast
IMG_0125	Overall view of horseshoe consoles, looking South
IMG_0126	Overall view of horseshoe consoles, looking North
	<b>Table 4A. APU/HYDR/ECLSS/OMS/RCS/FC/PRSD Support Modules (#204/#224/#295) (reference page 19)</b>
IMG_0127	Support Modules 0204A4 thru 0204A8, looking West
IMG_0128	Storage Console 0295A4, looking West
IMG_0129	Support Modules 0224A4 thru 0224A8, looking West
	<b>Table 5. Chief Engineer/ESA Management Consoles (#231/#232) (reference page 20)</b>
IMG_0130	Console 0232A1, looking Northeast
IMG_0131	Console 0232A11 Wedge including OIS Panel, looking Northeast
IMG_0132	Console 0232A1 Wedge Combo, looking Northeast
IMG_0133	Console 0232A2, looking Northeast
IMG_0134	Console 0232A2 Wedge, looking Northeast
IMG_0135	Console 0232A2 Wedge Combo, looking Northeast
IMG_0136	Console 0232A3, looking East
IMG_0137	Console 0232A3 Bridge, looking East
IMG_0138	Console 0232A3 Bridge Combo, looking East
IMG_0139	Consoles 0232A1 thru 0232A3, looking Northeast
IMG_0140	Console 0231A1, looking West
IMG_0141	Console 0231A11 Wedge including OIS Panel, looking East
IMG_0142	Console 0231A1 Wedge Combo, looking East
IMG_0143	Console 0231A2, looking Southeast
IMG_0144	Console 0231A12 Wedge including OIS Panel, looking Southeast
IMG_0145	Console 0231A2 and Wedge Combo, looking Southeast
IMG_0146	Console 0231A3, looking Southeast
IMG_0147	Consoles 0231A1 thru 0231A3, looking Southeast
IMG_0148	Overall view of horseshoe consoles, looking Southeast
IMG_0149	Overall view of horseshoe consoles, looking Northeast
IMG_0150	Support Modules 0232A4 thru 0232A8, looking West

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	<b>Table 5A. Chief Engineer/ESA Management Support Modules (#231/#232/#295) (reference page 21)</b>
IMG_0151	Storage Console 0295A5, looking West
IMG_0152	Support Modules 0231A4 thru 0231A8, looking West
	<b>Table 6. Mechanical PVD/ECS/MEQ/MECH and Electrical ET/SRB Consoles (#208/#239) (reference page 22)</b>
IMG_0153	Console 0208A1, looking Northeast
IMG_0154	Console 0208A1 Wedge, looking Northeast
IMG_0155	Console 0208A1 Wedge Combo, looking Northeast
IMG_0156	Console 0208A2, looking Northeast
IMG_0157	Console 0208A2 Wedge, looking Northwest
IMG_0158	Console 0208A2 and Wedge Combo, looking Northwest
IMG_0159	Console 0208A3, looking East
IMG_0160	Console 0208A3 Bridge, looking East
IMG_0161	Console 0208A3 Bridge Combo, looking East
IMG_0162	Consoles 0208A1 thru 0208A3, looking Northeast
IMG_0163	Console 0239A1, looking East
IMG_0164	Console 0239A1 Wedge, Looking East
IMG_0165	Console 0239A1 Wedge Combo, looking East
IMG_0166	Console 0239A2, looking Southeast
IMG_0167	Console 0239A2 Wedge Combo, looking Southeast
IMG_0168	Console 0239A3, looking Southeast
IMG_0169	Consoles 0239A1 thru 0239A3, looking Southeast
IMG_0170	Overall view of horseshoe consoles, looking Southeast
IMG_0171	Overall view of horseshoe consoles, looking Northeast
	<b>Table 6A. Mechanical PVD/ECS/MEQ/MECH and Electrical ET/SRB Support Modules (#208/#239/#295) (reference page 23)</b>
IMG_0172	Support Modules 0208A4 thru 0208A8, looking West
IMG_0173	Storage Module 0295A6, looking West
IMG_0174	Support Modules 0239A4 thru 0239A8, looking West
	<b>Table 7. Avionics Consoles (#247/#248) (reference page 24)</b>
IMG_0175	Console 0248A1, looking Northeast
IMG_0176	Console 0248A1 Wedge, looking Northeast
IMG_0177	Console 0248A1 Wedge Combo, looking Northeast
IMG_0178	Console 0248A2, looking Northeast
IMG_0179	Console 0248A2 Wedge, looking Northeast
IMG_0180	Console 0248A2 Wedge Combo, looking Northeast
IMG_0181	Console 0248A3, looking East
IMG_0182	Console 0248A3 Bridge, looking East
IMG_0183	Console 0248A3 Bridge Combo, looking East
IMG_0184	Consoles 0248A1 thru 0248A3, looking Northeast
IMG_0185	Console 0247A1, looking East
IMG_0186	Console 0247A1 Wedge, looking East
IMG_0187	Console 0247A1 Wedge Combo, looking East
IMG_0188	Console 0247A2, looking Southeast
IMG_0189	Console 0247A2 Wedge, looking Southeast

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	<b>Table 7. Avionics Consoles (#247/#248) (reference page 24) (continued)</b>
IMG_0190	Console 0247A2 Wedge Combo, looking Southeast
IMG_0191	Console 0247A3, looking Southeast
IMG_0192	Consoles 0247A1 thru 0247A3, looking Southeast
IMG_0193	Overall view of horseshoe consoles, looking Southeast
IMG_0194	Overall view of horseshoe consoles, looking Northeast
	<b>Table 7A. Avionics Support Modules (#247/#248/#295) (reference page 25)</b>
IMG_0195	Support Modules 0248A4 thru 0248A8, looking West
IMG_0196	Printer Module 0295A7, looking West
IMG_0197	Support Modules 0247A4 thru 0247A8, looking West
	<b>Table 8. Electrical EPDC/Comm &amp; Track/Instrumentation, HAZ GAS/RSS Consoles (#255/#256) (reference page 26)</b>
IMG_0198	Console 0256A1, looking Northeast
IMG_0199	Console 0256A1 Closed Wedge, looking Northeast
IMG_0200	Console 0256A1 Wedge Combo, looking Northeast
IMG_0201	Console 0256A2, looking Northeast
IMG_0202	Console 0256A2 Closed Wedge, looking Northeast
IMG_0203	Console 0256A2 Wedge Combo, looking Northeast
IMG_0204	Console 0256A3 Bridge, looking East
IMG_0205	Console 0255A1, looking East
IMG_0206	Console 0255A1 Wedge, looking East
IMG_0207	Console 0255A1 Wedge Combo, looking East
IMG_0208	Console 0255A2, looking Southeast
IMG_0209	Console 0255A3, looking Southeast
IMG_0210	Consoles 0255A1 thru 0255A3, looking Southeast
IMG_0211	Overall view of horseshoe consoles, looking Southeast
IMG_0212	Overall view of horseshoe consoles, looking Northeast
	<b>Table 8A. Electrical EPDC/Comm &amp; Track/Instrumentation, HAZ GAS/RSS Support Modules (#255/#256/#295) (reference page 27)</b>
IMG_0213	Support Modules 0256A4 thru 0256A8, looking West
IMG_0214	Storage Module 0295A8, looking West
IMG_0215	Support Modules 0255A4 thru 0255A8, looking West (Note: 0255A4 & 0255A5 are on display in LCC lobby)
	<b>Table 10. Master Consoles (Back Room) ( #233/#235) (reference page 28)</b>
IMG_0216	Console 0235A1, looking East
IMG_0217	Console 0235A2, looking East
IMG_0218	Console 0235A3, looking East
IMG_0219	Consoles 0235A1 thru 0235A3, looking Southeast
IMG_0220	Console 0233A3, looking East
IMG_0221	Console 0233A2, looking East
IMG_0222	Console 0233A1, looking West
IMG_0223	Consoles 0233A1 thru 0233A3, looking Southwest
	<b>Table 10A. Master Console Support Modules (Back Room) – Modules were removed prior to photo inventory.</b>

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	<b>Table 10B. Communication/Launch Processing System Racks (reference page 29)</b>
IMG_0224	Modules 0203A1, 0203A2, 0203A7, 0203A8 and 194-A41 (L-R), looking West
IMG_0225	Modules 0294A1, 0294A2, 0294A3, empty, and OIS-CR2-DB1 Rack (L-R), looking West
IMG_0226	Modules 0200A1, 0200A2, 0200A7, and 0200A8 (L-R), looking Northwest
IMG_0227	Modules 0264A1, 0265A1, and 0266A1 (L-R), looking West
IMG_0228	Modules, 17 Racks, looking Northwest
IMG_0229	View of 17 Racks and next row of 14 Modules, looking North
IMG_0230	Backside view of 17 Racks, looking North
IMG_0231	View of 14 Modules, looking Northeast
IMG_0232	Modules 0287A1, 0269A1, and 0270A1 (L-R), looking Northwest
IMG_0233	Modules 0292A1 thru 0292A5 (Front view of 6 Storage Racks, 6 Panels, and 2 Storage Racks) (L-R), looking Northwest
IMG_0234	Backside of Modules 0287A1, 0269A1, and 0270A1, looking Northwest
IMG_0235	Close-up of Modules 0286A1 and 0290A1 (L-R), looking Northeast
IMG_0236	Modules 0277A1, 0241A1, 0242A1, 0267A1, and 0288A1 (R-L), looking Northeast
IMG_0237	Emergency Safing Patch Racks 0816/0834 (center), looking Southeast
IMG_0238	Under floor cables for Emergency Safing Patch Racks 0816/0834, looking Northeast
IMG_0239	OIC-CR2-DB2 0853 Rack, looking East
IMG_0240	Close-up of Modules 0286A1, 0287A1, and 0288A1 (R-L), looking Northeast
IMG_0241	Multiplex Communications Processor 0251A3 Rack, looking West
IMG_0242	Modules 200A25 thru 200A27 (R-L), looking Northeast
IMG_0243	Close-up of Open Racks for Printers 200A9 thru 200A12 (R-L), looking Northeast
IMG_0244	Open Racks for Printers 200A9 thru 200A12 (R-L), looking Southwest
IMG_0245	Backside view of 4 Printers, looking Northwest
IMG_0246	Close-up of Cables for Modules 0252A2 thru 0252A4 (R-L), looking West
IMG_0247	Close-up of Panel 0266A1 (Tektronix), looking East
IMG_0248	Overall view of Master Console Room, looking Southwest
IMG_0249	Overall view of Master Console Room, looking South
IMG_0250	Supply Cart (storage for fuses, PCM RAM), looking West
IMG_0251	Tablet PC Storage, looking West
IMG_0252	Power Supply Panel, looking South
IMG_0253	Power Supply Panel, looking South
IMG_0254	Door (Room 3P2) Entrance into Firing Room 2, looking East
IMG_0255	Exit Door to 3 <sup>rd</sup> Floor West Hallway, looking West
IMG_0256	West Door (Room 3P2A) entrance into Master Console Room, looking East
IMG_0257	Rectangular Fire Alarm, looking South
IMG_0258	Square Fire Alarm, looking West
IMG_0259	Sound Suppression Panels, looking Northwest
IMG_0260	Air Handler East Side, looking Southeast
IMG_0261	Air Handler West Side, looking Northwest
IMG_0262	Ceiling Fixtures and Sound Suppression Panels, looking South
IMG_0263	Removable Raised Floor Tiles, looking Northwest
IMG_0264	Cables under Raised Floor Tiles, looking Northwest
IMG_0265	Wall Speaker, looking South
IMG_0266	Caution Signs (Area Access No. 31) outside Room 3P2A, looking North
IMG_0267	Message Board, looking South

**APPENDIX B – PHOTOGRAPH RECORD (con’t)**

	<b>Table 11. Firing Room 2 Miscellaneous Items and Equipment (reference page 32)</b>
IMG_0268	Overall view of Firing Room 2 with screens, looking West
IMG_0269	Overall view of Firing Room 2, looking West
IMG_0270	Overall view of Firing Room 2, looking West
IMG_0271	Overall view of Firing Room 2, looking West
IMG_0272	Center aisle across Firing Room 2 to exit doors, looking North
IMG_0273	Center aisle across Firing Room 2 to exit doors, looking South
IMG_0274	View of center aisle from back of Firing Room 2 toward windows, looking East
IMG_0275	Aisle to Management Rows with large horseshoe on right, looking Southeast
IMG_0276	Backside view of consoles in small horseshoe, looking Northwest
IMG_0277	View of Launch Complex 39A from Firing Room 2, looking East
IMG_0278	South Status Board Screen, looking Southwest
IMG_0279	North Status Board Screen, looking Northwest
IMG_0280	Four Rear-projection Screens (countdown clocks removed), looking West
IMG_0281	South Status Board Screen with three Rear-projection Screens, looking Southwest
IMG_0282	North Status Board Screen with three Rear-projection Screens, looking Northwest
IMG_0283	Overall view of Four Rear-projection Screens and Firing Room 2, looking West
IMG_0284	Room 3R3 door leading to Firing Room 3 and elevators, looking South
IMG_0285	KSC Area Permit/Badge Sign from Room 3R3 door, looking South
IMG_0286	Room 3P2 exit from Firing Room 2 to Firing Room 1 and elevators, looking North
IMG_0287	Room 3P2 exit from Firing Room 2 to Firing Room 1 and elevators, looking North
IMG_0288	Entrance door into Room 3P11 Test, Assembly, and Inspection Record (TAIR) room, looking North
IMG_0289	Entrance into Master Console (Back Room) from Room 3P2A, looking West
IMG_0290	Countdown Clocks
IMG_0291	OTV Monitors, looking West
IMG_0292	OTV Monitors on Console 0223A2, looking Southeast
IMG_0293	Plaques from five Apollo missions (Apollo 6, 9, 12, 14, and the Skylab Orbital Workshop) launched from Firing Room 2, looking South
IMG_0294	Example of Console Bridge, looking East
IMG_0295	Console Wedge with Shelf, looking Northeast
IMG_0296	Enclosed Wedge, looking East
IMG_0297	Enclosed Wedge, looking East
IMG_0298	Wedge with OIS Panel, looking Southeast
IMG_0299	Close-up of Wedge with Panel, looking East
IMG_0300	Phones, headset, and keyboard, looking East
IMG_0301	Siemens phone, looking East
IMG_0302	Electrical panels, looking North
IMG_0303	Air conditioning unit, looking North
IMG_0304	Air conditioning unit, looking South
IMG_0305	Ceiling lights, looking West
IMG_0306	Removable raised floor tiles, looking North
IMG_0307	Message board, looking Southeast
IMG_0308	Close-up of NASA property tag, looking West
IMG_0309	Room 3P6 sign, “Firing Room 2, Operational Management Room, 3P6,” looking South
IMG_0310	Floor vent next to AA Management Row, looking Southwest

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	<b>Table 11. Firing Room 2 Miscellaneous Items and Equipment (reference page 32) (continued)</b>
IMG_0311	Extra chairs for launch day visitor’s, looking Southwest
IMG_0312	Extra chairs for launch day visitor’s, looking North
IMG_0313	Phone and chair for launch day guests, looking Southwest
IMG_0314	Close-up of OIS Patch Distribution numbers, looking Southwest
IMG_0315	Open ashtray with note holder below, looking East
IMG_0316	Close-up of ashtray, looking East
IMG_0317	LPS Maintenance Notice, looking Southeast
IMG_0318	PCM/MTU switch configuration note above ashtray, looking Northeast
IMG_0319	LCC-2A, LCC-3 Standard Configuration drawing, looking East
IMG_0320	System Chart, looking Southeast
IMG_0321	Handwritten OIS channel list with keypad, looking Northeast
IMG_0322	Speaker, looking South
IMG_0323	Voltage/Power Panel, looking South
	<b>Launch Control Center (LCC) Lobby Display (reference page 2)</b>
IMG_0324	Overall view of LCC Lobby, looking Southeast
IMG_0325	Overall view of LCC Lobby, looking Northeast
IMG_0326	North wall of LCC Lobby with Shuttle Mission Plaques, looking Northeast
IMG_0327	South wall of LCC Lobby with mural and model display, looking Southeast
IMG_0328	Consoles 0696A14 and 0696A13 from Firing Room 3, looking South
IMG_0329	Close-up of Test Conductor Consoles 0696A14 and 0696A13, looking South
IMG_0330	Consoles and Support Modules 0255A4 and 0255A5, looking South
IMG_0331	Close-up of Support Modules 0255A4 and 0225A5, looking South
IMG_0332	Backside of Consoles and Support Modules, looking North
	<b>Launch Control Center (LCC) Lobby Display (reference page 2) (continued)</b>
IMG_0333	Consoles and Support Modules from Firing Room 1, looking South
IMG_0334	Close-up of Consoles from Firing Room 1, looking Southwest
IMG_0335	Backside of Consoles and Support Modules, looking North
IMG_0336	Close-up of Apollo and Shuttle models, looking South
IMG_0337	Close-up of VAB and LCC model, looking North
IMG_0338	Large mural on South wall, looking South
IMG_0339	Small mural on South wall, looking South
IMG_0340	Farewell to Atlantis display, looking North
	<b>Visitor’s Gallery - Mezzanine Level (LCC 3<sup>rd</sup> Floor) (reference page 2)</b>
IMG_0341	Stairs to Visitor’s Gallery between Firing Rooms 1 and 2 mezzanine level, looking East
IMG_0342	Visitor’s Gallery 1 view toward Firing Room 1, looking North
IMG_0343	Visitor’s Gallery 1 view toward windows, looking Northeast
IMG_0344	Visitor’s Gallery 1 view toward Firing Room 2, looking Southeast
IMG_0345	Stairs to upper level restrooms, looking West
IMG_0346	Stairs to Visitor’s Gallery between Firing Rooms 3 and 4 mezzanine level, looking East
IMG_0347	Visitor’s Gallery 2 view toward Firing Room 3, looking Northeast
IMG_0348	Visitor’s Gallery 2 view toward Firing Room 4, looking Southeast
IMG_0349	Stairs to upper level restrooms, looking West

## **APPENDIX C - PHOTOGRAPHS**

APPENDIX C – PHOTOGRAPHS



IMG 0001



IMG 0002



IMG 0003



IMG 0004



IMG 0005



IMG 0006



IMG 0007



IMG 0008



IMG 0009



IMG 0010



IMG 0011



IMG 0012



IMG 0013



IMG 0014



IMG 0015



IMG 0016



IMG 0017



IMG 0018



IMG 0019



IMG 0020



IMG 0021



IMG 0022



IMG 0023



IMG 0024



IMG 0025



IMG 0026



IMG 0027



IMG 0028



IMG 0029



IMG 0030



IMG 0031



IMG 0032



IMG 0033



IMG 0034



IMG 0035

APPENDIX C – PHOTOGRAPHS (con't)



IMG 0036



IMG 0037



IMG 0038



IMG 0039



IMG 0040



IMG 0041



IMG 0042



IMG 0043



IMG 0044



IMG 0045



IMG 0046



IMG 0047



IMG 0048



IMG 0049



IMG 0050



IMG 0051



IMG 0052



IMG 0053



IMG 0054



IMG 0055



IMG 0056



IMG 0057



IMG 0058



IMG 0059



IMG 0060



IMG 0061



IMG 0062



IMG 0063



IMG 0064



IMG 0065



IMG 0066



IMG 0067



IMG 0068



IMG 0069



IMG 0070

APPENDIX C – PHOTOGRAPHS (con't)



IMG 0071



IMG 0072



IMG 0073



IMG 0074



IMG 0075



IMG 0076



IMG 0077



IMG 0078



IMG 0079



IMG 0080



IMG 0081



IMG 0082



IMG 0083



IMG 0084



IMG 0085



IMG 0086



IMG 0087



IMG 0088



IMG 0089



IMG 0090



IMG 0091



IMG 0092



IMG 0093



IMG 0094



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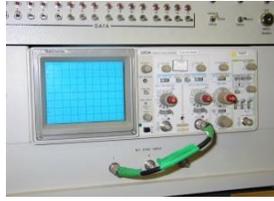


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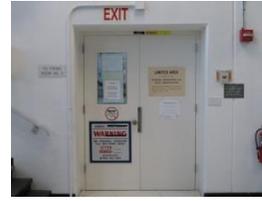
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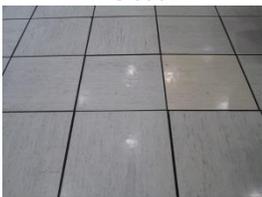
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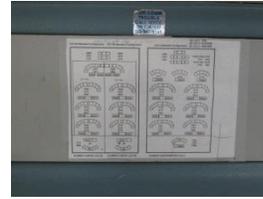
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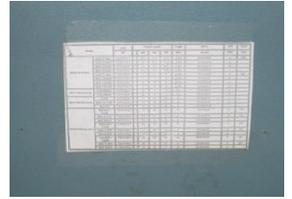
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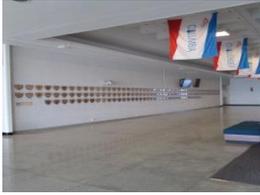
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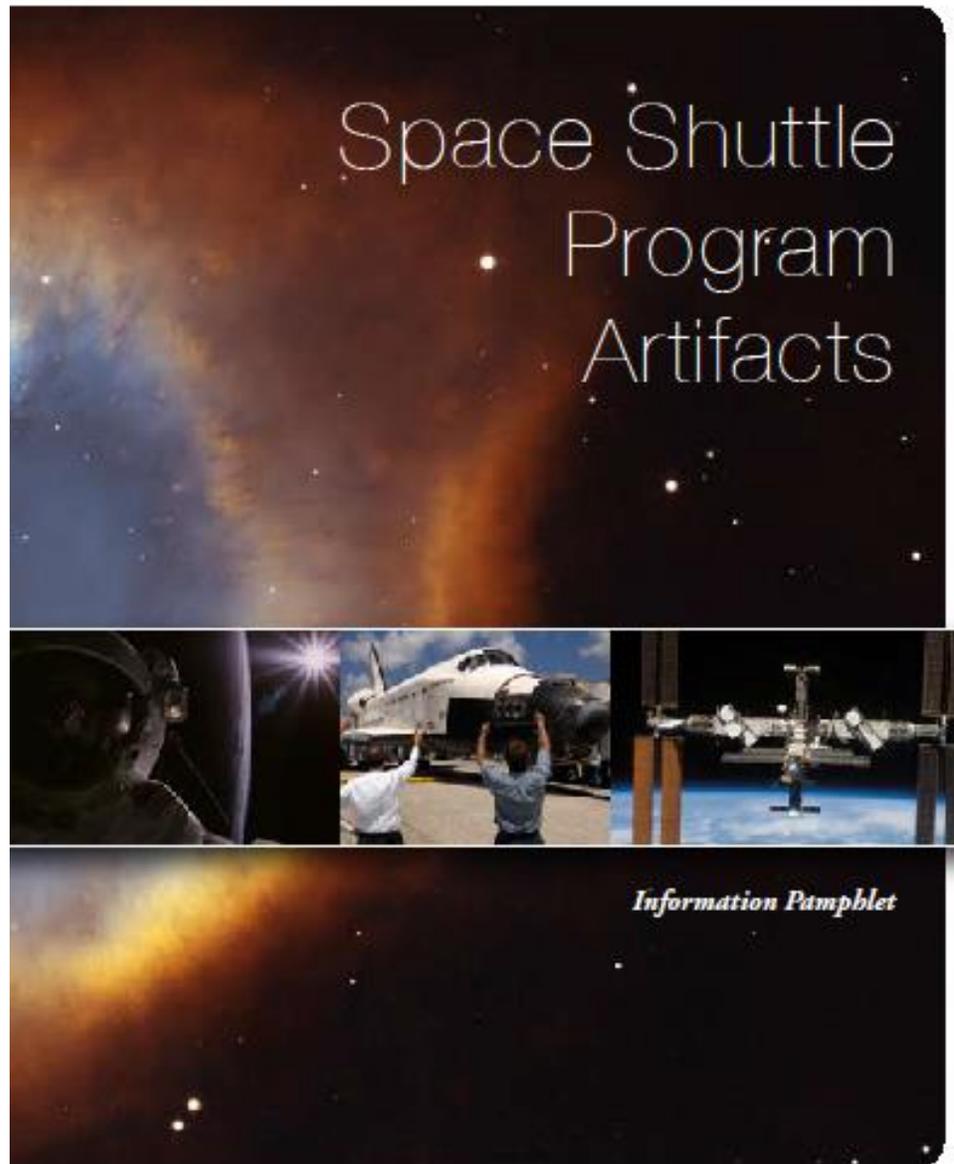
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**APPENDIX D – SPACE SHUTTLE PROGRAM ARTIFACTS,  
INFORMATION PAMPHLET**

APPENDIX D – SPACE SHUTTLE PROGRAM ARTIFACTS,  
INFORMATION PAMPHLET

National Aeronautics and Space Administration



## APPENDIX D – SPACE SHUTTLE PROGRAM ARTIFACTS, INFORMATION PAMPHLET (con't)

National Aeronautics and Space Administration



*As we celebrate the 40th anniversary of the first human presence on the Moon, NASA continues to move forward with a new focus for the human space flight program. We expect to retire the Space Shuttles and associated hardware following our last mission, currently projected for 2010. At the same time, we will continue to transition to the next generation space transportation.*

### **SPACE SHUTTLE HISTORY**

NASA's Space Shuttle orbiters are the first spacecraft capable of routinely launching into orbit like rockets and then returning to Earth as gliders. They are the main element of NASA's Space Transportation System and are used for scientific research and space applications, such as deploying and repairing satellites.

On its own, a Space Shuttle can carry a payload of about 65,000 pounds to orbit. Typical missions have crews of 7 astronauts, orbit at altitudes of approximately 150 to 250 miles, and stay in space from 10 days to 2 weeks.

The Space Shuttle system is composed of several large components: the orbiter, three main engines, the external tank, and two solid rocket boosters.



During the Shuttle-Mir Program, the Shuttles' space access capabilities were combined with the Mir space station's long-duration space flight qualities to create a new and effective platform for space research, technology development, and a return to the Moon.

## APPENDIX D – SPACE SHUTTLE PROGRAM ARTIFACTS, INFORMATION PAMPHLET (con't)

National Aeronautics and Space Administration

### **FREQUENTLY ASKED QUESTIONS**

#### *How will NASA dispose of Space Shuttle Program artifacts?*

NASA recognizes the importance the Space Shuttle Program has played in our Nation's history and will work with the appropriate Federal agencies to ensure that Shuttle artifacts are preserved. In order for that to occur, NASA will utilize existing legislative authorities and agreements to transfer these assets to authorized recipients as appropriate.

#### *What will be available and when?*

There are potentially thousands of items that will be available that include major items such as Space Shuttle Main Engines and smaller hardware pieces that have flown in space. NASA continues to dispose of excess and obsolete Space Shuttle Program inventory, but the majority will not be available until after the final flights in 2010.

#### *How do we obtain items we are interested in?*

Museums have the ability to obtain surplus property through their State Agencies for Surplus Property (SASPs) which have access to the General Services Administration's automated system GSAXcess. SASPs are able to obtain "Search and Select" access by sending a request to [gsaxcess@gsa.gov](mailto:gsaxcess@gsa.gov) or by contacting the GSAXcess Help Desk at 1-866-333-7472.

#### *Are there costs?*

Costs vary but generally include packaging, preparation, and transportation costs as well as any SASP directed fees.

#### *When will a decision be made pertaining to who will receive one of the Shuttle orbiters at the conclusion of the program?*

NASA's primary focus is to ensure that the Space Shuttle safely and successfully completes its mission of finishing the assembly of the International Space Station by the end of 2010. NASA intends to transfer the Shuttle Orbiter *Discovery* to the Smithsonian Institution, National Air and Space Museum. NASA has made no decisions on final disposition of the Shuttle orbiters *Atlantis* and *Endeavour*.

As the Space Shuttle phase-out plans mature over the next several years, disposition of all property will be accomplished according to Government guidelines. Because of the role that they have played in our Nation's space program, special attention will be paid to the Shuttle orbiters to ensure they will be retired to places for display in the broadest interest of the American taxpayers.



## APPENDIX D – SPACE SHUTTLE PROGRAM ARTIFACTS, INFORMATION PAMPHLET (con't)

National Aeronautics and Space Administration

### ***Federal Surplus Personal Property Donation Program***

#### ***General Information***

The Federal Government has legislative authority to transfer surplus personal property to SASPs to screen property for further distribution to state and local governments and eligible nonprofit organizations.

SASPs determine eligibility for participation in the donation program and assist eligible donees in locating, screening, and acquiring needed equipment. SASPs also advise donees of the terms, conditions, restrictions, and noncompliance ramifications associated with donated personal property.

Additional conditions and restrictions are imposed by the General Services Administration on certain types of property, and SASPs may assess donation recipients a service charge to cover packaging, preparation, transportation, and administrative expenses for donated surplus property.

Additional information is available at <http://www.gsa.gov>

**Roman J. Marciniak**  
(703) 605-2905  
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[christopher.willett@gsa.gov](mailto:christopher.willett@gsa.gov)



### ***Where to Find Additional Information***

<http://www.nasa.gov/transition>

This Web site offers additional information regarding the Space Shuttle transition and highlights how NASA is progressing with Shuttle retirement and transitioning to the new Constellation human space flight system. It also has current transition documents, including the NASA Transition Plan, the Multi-Program Integrated Milestones chart depicting when the remaining Shuttle flights are scheduled to occur, as well as a listing of other public sites that provide other useful information.

<http://spaceoperations.nasa.gov>

This Web site offers various information regarding current Shuttle and International Space Station missions as well as general space operations in space communication and launch services. It also provides details about future activities as the Shuttle retires and the space operations organization begins fully supporting the Constellation Program.

<http://www.nasa.gov/directorates/esmd>

This Web site offers the latest information on space exploration and primarily highlights the development of the new Constellation human space flight system. This is a very exciting Web site where you can experience NASA's new "future" along with links to a lot of information and videos. This is a very good site for those interested in the future of space exploration.

## APPENDIX D – SPACE SHUTTLE PROGRAM ARTIFACTS, INFORMATION PAMPHLET (con't)

National Aeronautics and Space Administration

### ***Identifying Space Shuttle Related Artifacts***

NASA understands that history is more than what happened and when. There are many interconnected pieces that make up our rich story of space flight. NASA has made a concerted effort with the assistance of our historians and the National Air and Space Museum to identify those assets to ensure they are preserved for all mankind.

Space Shuttle Program historic artifacts are generally categorized as those items having significance to the history of human space flight in the Space Shuttle era (from its inception in 1972 to its end near 2010).

*The National Air and Space Museum has identified the following categories as having historic significance:*

- Events (missions, extravehicular activities, etc.)
- People (astronauts, managers, engineers, technicians, etc.)
- Technologies (engines, tiles, spacesuits, spacecraft components, etc.)
- Processes (tests, manufacturing, mission operations, etc.)
- Research (scientific instruments, experiment specimens, etc.)
- Memorabilia (patches, pins, posters, awards, collectibles, etc.)

*Flight status is being used as a first-cut criterion for judging the significance of potential artifacts:*

- **Category I:** Items that have flown (spacecraft and components, crew equipment, scientific instruments, and memorabilia).
- **Category II:** Items that have not flown but could have (flight qualified spares, backup hardware, and engineering test articles made of the same components as the flight article).
- **Category III:** Items that have not flown and are not meant to fly but represent the development and practice of space flight (prototypes, boilerplates, developmental test models, wind tunnel models, mockups, display models, simulators, training equipment, memorabilia, public outreach materials, and commissioned art).



## APPENDIX D – SPACE SHUTTLE PROGRAM ARTIFACTS, INFORMATION PAMPHLET (con't)

National Aeronautics and Space Administration

### **Potential Space Shuttle Program Historic Artifacts:**

*Examples include, but are not limited to, items such as the following:*

**Personal Use Flight Items (Mission Related)**—items used to serve the astronaut's needs such as clothing and body protection as well as:

- Crew altitude protection system (CAPS) consisting of a helmet; communications cap; pressure garment; antiexposure, antigravity suit; gloves; and boots
- Escape equipment worn over the CAPS during launch and consisting of an emergency oxygen system; parachute harness; parachute pack with automatic opener; pilot chute; drogue chute and main canopy; life raft; flotation devices; and survival vest pockets containing a radio/beacon; signal mirror; shroud cutter; pen gun flare kit; sea dye marker; and smoke flare and beacon
- Miscellaneous gear used by an astronaut as a carrying device (such as pouches) and as protective apparatus (such as goggles).

**Tools, Equipment, and Materials (Manufacturing):**

- Specifically manufactured to support the orbiters—could include equipment in the Vehicle Assembly Building and Orbiter Processing Facilities
- For manufacturing materials that mask large surfaces such as the thermal protection system
- For manufacturing or preparing materials such as tools used for repair work, testing, and training (space and ground support)
- For fabricating of all other objects required specifically for use in support of the Space Shuttle Program.

**Tools and Equipment for Science and Technology (Mission Requirements)**—items such as the operational bioinstrumentation system and radiation equipment as well as tools, equipment, and supplies for:

- Observing, measuring, and documenting objects and events outside Earth's atmosphere
- Observing, measuring, and documenting atmospheric phenomena
- Studying the universe.

**Communication Equipment**—tools, equipment, and supplies such as:

- Ground and onboard orbital computers
- Precision drawings and models
- Still and video cameras used on the orbiter
- Equipment used to facilitate communication outside Earth's atmosphere.

**Distribution and Transportation**—assets used in order to:

- Pack, transport, or hold unique items used in space such as cargo containers
- Transport people or goods above the surface of Earth.

**Miscellaneous Communication (Outreach and Education):**

- Items used in advertising an event such as limited edition posters, banners, or catalogues
- Limited editions of paintings or other artwork specifically depicting scenes or events directly related and unique to the SSP
- Flags, pins, or patches
- Information used to communicate, such as documents, photographs, commemorative items, and instructional models
- Items used to communicate a particular achievement, such as "Return to Flight."

## APPENDIX D – SPACE SHUTTLE PROGRAM ARTIFACTS, INFORMATION PAMPHLET (con't)

National Aeronautics and Space Administration

### **Space Shuttle Program Transition**

By focusing on the evolution of our skilled workers, our facilities, and our infrastructure as we move from the Space Shuttle system to the Constellation system, transition requirements provide NASA with a unique opportunity to revitalize the Nation's human space flight program. NASA has established a senior leadership team to address the disposition of personal property to include artifacts and memorabilia. Our partnership with the General Services Administration provides the mechanism to notify interested eligible recipients of the availability of these items.



### **What's Next?**

#### *Rendezvous Magazine*

"NASA is not going out of business, but rather beginning a new way of doing business for the next 50 years. We are extending our reach beyond low earth orbit, which is truly exciting."

—William Gerstenmaier, Associate Administrator/Space Operations

From the time of our birth, humans have felt a primordial urge to explore—to blaze new trails, map new lands, and answer profound questions about ourselves and our universe. The U.S. Space Exploration Policy will lead us across the solar system beginning with the Moon, then on to Mars, and beyond. But before we can achieve the future, we must perform in the present. NASA's current space flight programs, the Shuttle and Station, are our present reality; our primary overriding responsibility is to safely and successfully complete the Space Shuttle Program and the assembly of the International Space Station.



"It is with an iron will that they embark on the most daring of all endeavors . . . to meet the shadowy future without fear and conquer the unknown."

—Ferdinand Magellan, circa 1520

APPENDIX D – SPACE SHUTTLE PROGRAM ARTIFACTS,  
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