

**Attachment A**

**STATEMENT OF WORK**

**Launch Services Program**

**West Coast Commercial Payload Processing 2**

**for the**

**National Aeronautics and Space Administration**

## TABLE OF CONTENTS

<b>1.0</b>	<b>SCOPE, OBJECTIVES, AND PAYLOAD PROCESSING .....</b>	<b>1</b>
1.1	Scope .....	1
1.2	Objectives.....	1
1.3	Payload Processing .....	1
1.3.1	Occupancy Period .....	2
<b>2.0</b>	<b>TECHNICAL REQUIREMENTS .....</b>	<b>2</b>
2.1	Facility .....	2
2.1.1	Spacecraft Facility Requirements .....	2
2.1.2	Launch Vehicle Hardware Facility Requirements .....	3
2.1.3	Facility Environments .....	3
2.2	Facility Systems .....	3
2.2.1	Mechanical Systems.....	4
2.2.2	Electrical Systems.....	5
2.2.3	Communications.....	5
2.2.3.1	Voice Systems.....	6
2.2.3.2	Television System.....	6
2.2.3.3	Timing System .....	6
2.2.3.4	Paging and Warning System .....	6
2.2.3.5	Data System.....	7
2.2.3.6	Radio Frequency System .....	7
2.2.3.7	Local Area Network System .....	7
2.2.3.8	Telephone System.....	8
2.3	Services.....	8
2.3.1	Standard Services .....	8
2.3.1.1	Administrative Support .....	8
2.3.1.2	Janitorial Support .....	9
2.3.1.3	Transportation Support .....	9
2.3.1.4	Cleanroom Garments and Supplies.....	9
2.3.1.5	Propellant Loading Support Equipment and Services .....	9
2.3.1.6	Handling Equipment .....	10
2.3.1.7	Fluids, Gases and Chemicals .....	10
2.3.1.8	Analysis/Sampling.....	10
2.3.1.9	Safety Equipment.....	10
2.3.1.10	Hazardous Waste.....	10
2.3.1.11	Security .....	10
2.3.1.12	Miscellaneous Equipment and Services.....	10
2.3.1.13	Support to Spacecraft Provided by the Government.....	11
2.3.2	Non-Standard Services .....	11
2.3.3	Mission Unique Services .....	12
2.3.4	Special Task Assignments .....	12
2.3.5	Facility Modifications .....	12

2.4	Processing Methodology .....	12
<b>3.0</b>	<b>MANAGEMENT .....</b>	<b>13</b>
3.1	Management Approach and Processes .....	13
3.1.1	Manifesting and Scheduling .....	13
3.1.2	Customer Communications and Support.....	13
3.1.2.1	Payload Planning Support.....	14
3.1.2.2	Daily Schedule Coordination Meetings .....	14
3.1.2.3	Training.....	14
3.2	NASA Insight and Approval.....	15
3.2.1	Anomaly Investigations.....	15
3.2.2	Documentation .....	15
3.3	Environmental Assessments .....	15
3.4	Key Personnel and Staffing .....	16

## **1.0 Scope, Objectives, and Payload Processing**

### **1.1 Scope**

This Statement of Work (SOW) defines the tasks required of the Contractor to provide processing facilities and services on Vandenberg Air Force Base (VAFB), California, for NASA spacecraft to be launched on Expendable Launch Vehicles (ELV), herein referred to as spacecraft or payload. The Contractor shall provide the following: advance planning, facilities, supplies, commodities, and services necessary for the Spacecraft Users and Launch Service Contractors (LSC) to perform prelaunch processing and integration of the spacecraft and LSC hardware. This processing may include propellant loading, spin-balancing, integration of the spacecraft with an upper stage and/or payload adapter, and encapsulation/transport of the completed payload stacks to the launch pad.

### **1.2 Objectives**

The Contractor shall perform advance planning necessary to furnish facilities, supplies, commodities, and services necessary for processing the spacecraft and providing for launch vehicle integration operations, when required. The Contractor shall be responsible for the following: (1) ensuring the facility is operated and maintained to appropriate safety, cleanliness, and other mission-specific requirements to support spacecraft processing; (2) providing services for the off-load, transportation, and receipt of the payload/Ground Support Equipment (GSE) from the arrival location to the processing facility; (3) providing the required commodities and services necessary to support payload processing; and (4) providing facilities and services to house support personnel. The Government will approve the processing site designated by the Contractor for each mission.

### **1.3 Payload Processing**

The Contractor shall provide, operate, and maintain a facility for processing flight hardware on VAFB under this contract. The Contractor is responsible for providing all services necessary for the Spacecraft Users to successfully prepare their flight hardware for launch. The Contractor shall abide by all Spacecraft User and LSC guidelines required to maintain the hardware during processing operations in the processing facility. During the occupancy period, the Contractor shall provide necessary facility access, including access by foreign national personnel, and support as required for payload processing. The Spacecraft Users will coordinate planned off-shift and 24-hour operations, but off-shift and 24-hour facility access and payload operations may also be required in the event of anomalies or unplanned processing schedule changes. The Contractor shall not store another tenant's flight hardware or ground support equipment in a bay occupied by a NASA payload/GSE. Shared areas (e.g., airlocks or general warehousing) are not included in the restriction, provided that shared areas are not obstructed by items stored by another facility tenant. In the event of a launch cancellation or postponement after payload erection, the Contractor shall provide facilities and services for further processing, off-loading propellants, or deservicing the payload for shipment back to the manufacturing plant or launch site. The Contractor shall provide support for packing and shipping GSE after the launch campaign is concluded.

### **1.3.1 Occupancy Period**

The period of time for use of the Contractor's facilities shall be from the initial facility occupancy date through the facility departure date. The occupancy period for each mission is provided with the Payload Processing Task Order (PPTO), and will be updated as required for each mission. To ensure readiness of the communications systems, the Contractor will permit NASA access to the facility for one week immediately prior to Spacecraft User mission occupancy; however, this week shall not be considered part of the Occupancy Period. During the occupancy period, the Contractor shall provide insight on activities of other facility tenants as they affect NASA's payload processing schedules. NASA and the Contractor recognize that the nature of space flight activity is such that schedules must sometimes be changed, often for reasons beyond the control or reasonable predictive capability of NASA or the Contractor.

## **2.0 Technical Requirements**

The Contractor shall provide services in support of spacecraft processing. This section of the SOW provides the technical requirements of each spacecraft.

The Contractor shall be responsible for providing, operating, and maintaining the facility, facility systems, and facility support equipment using industry's best practices. Use of Contractor's industry best practices will not supersede the maintenance and operational requirements set forth in the Payload Processing Task Order. The PPTO will include the Launch Site Support Plan (LSSP) for its respective spacecraft. There shall be a separate PPTO and LSSP for each mission. In the event that there is a conflict between the SOW and the PPTO, the basic contract shall prevail. Verification of performance will be in accordance with the "Government Insight and Approval" and "Milestone Performance and Payment" contract Articles.

The Contractor shall comply with all Federal, State, and local laws applicable to safety and occupational health including AFSPCMAN 91-710, Range Safety User Requirements Manual, and any other relevant requirements of this contract. The Contractor shall comply with AFSPCMAN 91-710 unless they have an existing agreement with the Range to use a predecessor document, such as Eastern & Western Range Safety requirements, EWR 127-1.

### **2.1 Facility**

The Contractor shall meet the minimum facility requirements stated in this SOW. Processing and support space requirements shall be provided in the PPTO and represent NASA's estimated needs based on spacecraft size and support equipment. The Contractor shall accommodate each spacecraft and its respective launch vehicle integrated operations (upper stage, payload attach fitting, spacecraft integration, or fairing installation) in the processing facility without compromising the requirements listed for the spacecraft.

#### **2.1.1 Spacecraft Facility Requirements**

The Contractor shall provide standard facility accommodations to include space to perform non-hazardous processing and space to perform hazardous processing. The spacecraft processing space shall include, as a minimum, dedicated use of one Cleanroom, one Control Room, one Garment Change Room, two Customer Office Areas, and conference areas. The Customer

Office Areas, combined, shall be able to accommodate a minimum of 45 people. The Contractor shall also provide an airlock to the cleanroom and propellant storage areas. The spacecraft cleanroom areas shall have conductive flooring.

Prior to occupancy, access shall be provided for the Spacecraft Users to become familiar with the facility capabilities for support of the spacecraft processing and integration activities. Following familiarization, the Contractor shall make provisions for the spacecraft to bolt down the support stand and associated hardware (if required).

### **2.1.2 Launch Vehicle Hardware Facility Requirements**

Prior to occupancy, access shall be provided for the Launch Service Contractor to become familiar with the facility capabilities for support of the launch vehicle hardware processing and integration activities with the spacecraft. Following familiarization, the Contractor shall make provisions for the Launch Service Contractor to bolt down the launch vehicle hardware support stand and associated hardware (if required) and perform the mating function with the spacecraft.

### **2.1.3 Facility Environments**

The Contractor shall provide data/information relative to the expected radio frequency (RF) and magnetic environment within the processing facility during the facility occupancy period and external to the processing facility during the Contractor-provided transportation of the payload, initially no later than 10 business days after contract award. The Contractor shall work as a team with the Customer and Range to optimize the RF and magnetic environment for the specific payloads.

The Contractor shall provide data/information relative to the capabilities and historical performance of the environmental control systems in the payload processing facility (PPF) and the expected environment during processing. The Contractor shall provide data/information relative to the materials that will be present in the facility and their compatibility with the spacecraft systems and materials.

## **2.2 Facility Systems**

The Contractor shall meet the minimum facility system requirements stated in this SOW. Detailed requirements will be provided in the PPTO for each mission. The Contractor shall be responsible for providing back-up capability for all critical facility systems. Critical facility systems are those systems that, if they are to fail, will result in damage to the satellite, vehicle hardware, or GSE. This includes systems whose loss will result in out-of-spec conditions in the environment and systems that can directly damage the hardware (e.g., power surges). The Contractor shall be responsible for submittal of the Certificate of Facility Readiness (COFR) in accordance with the "Milestone Performance and Payment" contract Article.

Following submittal of the COFR through post-launch facility departure, the Contractor shall report all non-routine maintenance and any major maintenance discrepancies, as well as all major repair efforts on critical systems that have the potential to impact the current mission. Where not specifically stated in the PPTO, interruptions in mission critical services should be no greater than 1 hour in any 24-hour period during NASA spacecraft occupancy of the facility requiring

that particular service. Facility system anomalies and conditions that fall outside of tolerance specified in the LSSP (excluding personnel safety issues, which are covered elsewhere) must be documented and reported to the COTR and the appropriate NASA Launch Site Integration Manager (LSIM) for the spacecraft that is occupying that particular facility under the following timelines:

- For anomalies that may impact the spacecraft customer's mission success (such as environmental conditions out of specified limits or facility power outages), the LSIM must be verbally notified within one hour of detection of the anomaly. Within 24 hours of detection of the anomaly, the Contractor shall provide to the COTR and the LSIM a written Problem Report (PR) documenting the anomaly with a corrective action plan stated. Once the anomaly has been corrected, a closure statement shall be added to the PR for record of the fix.
- For anomalies that do not have a mission success impact (such as phone system outages or HVAC issues in office spaces), the COTR and the LSIM must be notified no later than the beginning of the next work day, with an applicable Problem Report within 24 hours.

### **2.2.1 Mechanical Systems**

For all mechanical systems, the Contractor shall meet the requirements stated in the PPTO and those stated in the following paragraphs.

The Contractor shall provide overhead traveling bridge cranes to include those in the cleanroom and airlock that are designed, operated, and maintained in compliance with all applicable Occupational Safety and Health Administration (OSHA), American National Standard Institute (ANSI)/American Society of Mechanical Engineers (ASME), the Crane Manufacturers Association of America (CMA 70) documents, and Air Force Space Command Manual (AFSPCMAN) 91-710. Prior to each mission, the Contractor shall perform an Inspection, Operational Test, and Rated Load Test on the cranes to be used during the processing flow per AFSPCMAN 91-710 Vol. 6 Section 6, ANSI/ASME B30.2 Chapter 2-2 Section 2-2.1.2, 2-2.1.3, 2-2.2.1, and 2-2.2.2. The Contractor shall submit the Inspection and Test results as part of the COFR. Cranes shall be equipped with drip protection.

The Contractor shall provide a Heating, Ventilating, and Air Conditioning (HVAC) System to supply the following areas: airlock, cleanroom, control room, GSE storage room, break room, restrooms, conference room, office rooms, garment change room, and any other areas where flight hardware is processed. This system shall, as a minimum, be capable of controlling the temperature to  $71 \pm 6$ F, controlling the humidity to 30%-50% and meeting cleanliness class 7 or 8, per ISO 14644-1 under normal processing operations. The PPTO will specify the required parameters for its mission. The HVAC system shall comply with the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) guidelines for design, operation, and maintenance practices. In addition, the Contractor shall provide backup HVAC contingency capability.

The Contractor shall provide continuous monitoring of the temperature, humidity, and cleanliness levels in the airlock and cleanroom. The Contractor shall provide an environmental

monitoring system that has the capability to monitor a clean work area as required in the ISO 14644-02. The Contractor shall provide verification of oxygen levels prior to the beginning of each scheduled work shift. All monitoring systems shall have an alarm capability to provide notification to the Spacecraft User before an out of specification condition has been reached.

In accordance with AFSPCMAN 91-710, once fuels are in the facility, the Contractor shall continuously monitor toxic vapor levels and provide toxic vapor checks every eight hours and prior to entry if the facility has been left unattended for eight hours. Monitoring shall be performed at American Conference of Governmental Industrial Hygienists (ACGIH) levels of 0.01 ppm for hydrazine.

The Contractor shall provide fire protection systems to include fire extinguishers located throughout the provided facilities, fire detectors, and a fire suppression system.

### **2.2.2 Electrical Systems**

For all electrical systems, the Contractor shall meet the requirements stated in the PPTO and those stated in the following paragraph.

The Contractor shall provide per National Electrical Code (NEC) Class I, Division 2, Group C and D hazard proofing for both the cleanroom and airlock electrical power receptacles. The Contractor shall provide a low-noise instrumentation ground. As a minimum, the Contractor's facility and instrumentation grounds shall be equipped with grounding plates available for Customer use in the cleanroom, airlock and control room. In addition, the Contractor shall be responsible for switching to facility back-up power for the clean room and Spacecraft Users GSE, HVAC, Environmental Monitoring system, and emergency lighting loads during a facility power outage and maintaining until facility power restoration. The Contractor shall ensure that the electrical systems are designed, operated, and maintained in accordance with the NEC and the National Fire Protection Association (NFPA).

The Contractor shall provide a lightning protection and grounding system for the hardware and GSE processing areas.

### **2.2.3 Communications**

The Contractor shall be responsible for providing, operating, and maintaining the necessary equipment to handle the flow of network, voice, video, timing, and telemetry, both internal and external to the processing facility, during payload processing and launch. The Contractor shall make all necessary arrangements with the appropriate Government agencies for interfacing signals that need to be transported to other Government facilities at VAFB. The Contractor shall establish a single Contractor/Government Communications demarcation point. The Contractor shall be responsible for all equipment up to the Contractor/Government interface demarcation point. The Government will make arrangements for the NISN circuit assignments as needed, but the Contractor shall deliver the specified signals to the Contractor/Government interface demarcation point. Certain operations will require redundancy in the voice and data systems to prevent single point failures from halting operations. The Contractor shall ensure its systems provide the necessary level of redundancy at all times during facility occupancy and launch operations as specified by the PPTO. The Contractor shall support voice communications

verification checks prior to spacecraft arrival, the Mission Dress Rehearsal (MDR), and Launch Operations (L-1 checks), as specified by the PPTO. The Contractor shall make personnel available during the MDR and Launch Operations for troubleshooting.

### **2.2.3.1 Voice Systems**

The Contractor shall provide a voice system capable of transporting twenty-four (24) full duplex voice channels internally as well as extending channels to various external locations such as Launch Complexes Remote Launch Control Center (RLCC), Launch Operations Control Center (LOCC), Buildings 836 and 840, and other NASA centers via NISN. The system shall be capable of concurrent operation of all stations, and each station shall be able to access multiple channels simultaneously. The Contractor shall provide the End Instrument stations and headsets at Customer locations within the processing facilities. The voice system shall have growth capability with respect to the number of stations available to Spacecraft Users. Stations located in areas where hazardous materials may be used shall meet the requirements defined in AFSPCMAN 91-710.

### **2.2.3.2 Television System**

The Contractor shall provide a television system consisting of closed-circuit television cameras located in the clean rooms and airlock areas and fitted with remote control pan, tilt, zoom, and focus to be controlled by the Payload customers in the control rooms. The system shall be capable of recording operations performed in the airlock and clean rooms. The system shall be capable of extending internally generated video to external locations such as Building 836, Building 840, and other NASA centers, as well as distributing internally various signals generated at external locations such as the space launch complex. The system shall be capable of accepting four NTSC video signals at the processing facility's Communications demarcation point, and distributing these signals within the processing facilities. The Contractor shall transport eight full video signals between the processing facility and Building 836. These one volt signals shall have a minimum resolution of 450 lines and a minimum of 50 DB signal to noise. The Contractor shall provide monitors at Customer locations within the processing facilities. The Contractor shall also provide a monitor in the NASA Launch Site Integration Manager's office area. Cameras located in areas where hazardous materials may be used shall meet requirements defined in AFSPCMAN 91-710.

### **2.2.3.3 Timing System**

The Contractor shall provide a timing system capable of accepting, distributing, and displaying Range generated timing signals. Timing signals include time of day (TOD), Greenwich Mean Time (GMT), Countdown displays, Global Positioning System (GPS) and Inter-Range Instrumentation Group (IRIG-B). Displays located in areas where hazardous materials may be used shall meet the requirements defined in AFSPCMAN 91-710.

### **2.2.3.4 Paging and Warning System**

The Contractor shall provide a paging and warning system capable of paging personnel in all occupied areas of the facility. Paging microphones shall be located in the control rooms and in the Customer Office Areas. The paging and warning system shall be capable of alerting

personnel inside and outside the facility in the event of a hazardous situation, as specified by AFSPCMAN 91-710. Control of the warning system shall be located in the control rooms.

#### **2.2.3.5 Data System**

The Contractor shall be responsible for providing, operating, and maintaining the necessary equipment to distribute Wide Area Networks, spacecraft command, and telemetry data within the facility during payload processing and launch. The Contractor shall make all necessary arrangements and coordinate with the appropriate Government agency for interfacing signals that are required at other Government facilities. The Contractor shall be responsible for all equipment up to the Communications demarcation points in the processing facility. The Contractor shall provide a data system capable of routing payload customer data from the clean rooms to external locations such as Bldg. 836. The system shall be capable of accepting Electronic Industry Association (EIA) RS-422 data, in various bit rates, and fiber optic based signals, and extending them to the VAFB/Government interface demarcation point for transmission to other centers via NISN, or to the launch complex area. The system shall have either the necessary redundancy to automatically re-establish any/all circuits in the event of a failure in system hardware/software or provide duplicate circuits per the PPTO requirements. The system shall be able to support late requirements and have a minimum growth capability of 25 percent. The Contractor shall provide between four and eight single mode unequipped fibers terminated with ST connectors between the processing facility and the Government communications demarcations points. The Government will provide the extension of these fibers to other operational locations on VAFB. The Government will provide all necessary end equipment for these fibers. The Government will make arrangements for the NISN and/or commercial carrier long distance circuit assignments as required, but the Contractor shall provide the transport media to deliver the specified signals to the processing facility communications demarcation point. Certain operations will require redundancy in the data systems to prevent single failures from halting operations.

#### **2.2.3.6 Radio Frequency System**

The Contractor shall provide a Radio Frequency (RF) system capable of radiating S-Band frequencies between the processing facility and various existing Government facilities on VAFB, in particular to the Vandenberg Tracking Station. The system shall be capable of supporting separate simultaneous transmit and receive signals to two locations concurrently. The Contractor shall provide end equipment and transport media between the processing facility and Building 836, antenna alignment services, obtain RF authorization, and obtain clearance from the appropriate Government agency before system use.

#### **2.2.3.7 Local Area Network System**

The Contractor shall provide a Local Area Network (LAN) system that will be used for administrative data only. The Spacecraft Users will provide their own workstation security. The Contractor will not be required to provide workstations or software for workstations. The Contractor shall provide all hardware and software (i.e., network switches/routers, network cable drops, etc.) necessary to establish and maintain connectivity between the facility systems and the appropriate VAFB interface point, and serve as an interface between the Spacecraft User and VAFB for coordination, troubleshooting, and network management.

### **2.2.3.8 Telephone System**

The Contractor shall provide a standard multi-line commercial telephone system, with station-to-station intercom and local area and VAFB dialing capability. The Contractor shall provide commercial telephone lines to support FAX machines and analog modems. The Contractor will not be responsible for the payment of charges associated with the commercial services. The Contractor shall make arrangements with the commercial carrier and appropriate VAFB agency for service and installation as well as provide assigned long distance access codes to track applicable charges. The Contractor shall submit an invoice for each mission's long distance telephone charges once they have been calculated upon mission facility departure. The Contractor shall provide a dedicated FAX machine to the Customer. End Instruments located in areas where hazardous materials may be used shall meet the requirements defined in AFSPCMAN 91-710. The exact telephone unit distribution will be detailed in the PPTO for each spacecraft.

## **2.3 Services**

The Contractor shall provide standard, non-standard, and mission unique services in support of mission processing at the processing facility, including arrangements for receipt of flight hardware and GSE.

### **2.3.1 Standard Services**

The Contractor shall provide facilities and support as defined within this SOW and applicable mission PPTOs for a Standard Service of fourteen weeks of facility occupancy. An additional period of time shall be allocated as a "grace period" during which the Government may incur additional occupancy without charge.

The following lists the minimum services to be provided by the Contractor for each payload. The Contractor shall provide an implementation schedule for all requested services, which incorporates required purchase dates for any long lead items.

#### **2.3.1.1 Administrative Support**

The Contractor shall provide basic accommodations in the office areas provided to include desks, chairs, whiteboards, and lockable cabinets. Each desk provided shall have access to power, phone, and local area network connections. The Spacecraft Users shall have access to copiers and fax machines.

The Contractor shall provide a break area to include, as a minimum, a refrigerator/freezer, microwave oven, and coffee machine.

The Contractor shall provide a conference room with, as a minimum, telecommunications capability, local area network connections, a projection screen, and a projector.

The Contractor shall assist the Spacecraft Users in shipping and receiving of hardware and packages.

### **2.3.1.2 Janitorial Support**

The Contractor shall provide janitorial support in all facility spaces provided for the Spacecraft User including office areas, control rooms, and cleanrooms.

### **2.3.1.3 Transportation Support**

The Contractor shall be responsible for coordinating the arrival of the flight hardware and GSE and providing all handling equipment necessary to off-load and transport it into the processing facility (see DRL 5). This includes arranging for the arrival site, security, and any material handling equipment needed at the point of arrival, including at the runway for flight hardware or GSE arrival by aircraft. When requested, the Contractor shall assist with the coordination of all necessary agencies, including the USAF; U.S. Customs, Immigration and Naturalization Service; and the Department of Agriculture, for the spacecraft arrival by aircraft. The Contractor shall provide trucks and GSE necessary to transport the spacecraft GSE between the Contractor's facility and the launch facility or other NASA facilities to be used by the spacecraft. This includes arranging for security escort support.

### **2.3.1.4 Cleanroom Garments and Supplies**

The Contractor shall provide ISO 14644-1 class 7 compatible cleanroom garments for 45 personnel for use during processing prior to the arrival of propellants. The Government will provide the NOMEX garments for processing after propellants arrive. The garments shall include coveralls, hoods, boots, beard covers, and gloves. The Contractor shall provide laundering, once a week minimum, for all garments provided by the Contractor and up to 60 sets of polyester garments provided by the Spacecraft User.

The Contractor shall provide equipment to monitor non-volatile residue (NVR) and hydrocarbons in the clean work areas.

The Contractor shall provide a whitelight and blacklight to support Spacecraft User cleanliness inspections.

In the garment change room the Contractor shall provide lockers, clean polyethylene zip lock bags for storing garments, a garment hanging rack, shoe cleaners, tacky mats, and cleanroom wipes.

### **2.3.1.5 Propellant Loading Support Equipment and Services**

The Contractor shall coordinate their support for the payload fueling activities and provide accommodations for all the propellant equipment to be used. The Spacecraft Users will perform the fueling activity in the processing facility. The Contractor shall provide breathing air connection panels, SCAPE suit-up areas, fuel vent line feed-throughs, areas to stage tube banks, areas to stage breathing air trailers, and connections for tube banks. The Government (or the Spacecraft Users through the Government) will purchase the propellants and provide for the storage and transportation on VAFB. The Contractor shall provide for the storage and handling of propellants at the processing facility. The Contractor shall be responsible for the integrity of the propellants from the time of receipt at their facility to the time of loading into the Spacecraft

User provided propellant cart. The Contractor shall provide certification that all fluids and gases provided by the Contractor meet the required specifications. The Contractor shall provide spill containment, a drip pan, and mop and sop kit for fueling operations.

#### **2.3.1.6 Handling Equipment**

The Contractor shall provide handling equipment for the personnel to reach their spacecraft to include manlifts with up to a 30-foot reach and 8-foot ladders. The Contractor shall provide hardware handling equipment for loading, unloading, and transportation of the equipment to include forklifts, pallet jacks, furniture dollies, and hand trucks. All handling equipment shall comply with AFSPCMAN 91-710 requirements.

#### **2.3.1.7 Fluids, Gases and Chemicals**

The Contractor shall provide up to 15 gallons of de-ionized water. The Contractor shall provide up to 20 gallons of TTI-735A Grade A isopropyl alcohol.

#### **2.3.1.8 Analysis/Sampling**

The Contractor shall provide sampling and analysis of gases and fluids provided for the spacecraft. The specifications for the analysis will be provided in the PPTO. The Contractor shall provide the ability for priority turnaround on sampling and analysis. (See DRL 8.)

#### **2.3.1.9 Safety Equipment**

The Contractor shall provide safety equipment and support to comply with AFSPCMAN 91-710 and other safety requirements. This support is to include, as a minimum, emergency life support apparatus (ELSA), showers, eyewash stations, and a blast shield. The Contractor shall provide electrostatic discharge (ESD) protection to include grounding straps and a grounding strap tester.

#### **2.3.1.10 Hazardous Waste**

The Contractor shall dispose of all domestic, industrial, and hazardous waste generated at the processing facility, and is responsible for minor spill containment and facility decontamination in the event of a hazardous mishap.

#### **2.3.1.11 Security**

The Contractor shall ensure the security of the payload flight hardware and information. The Contractor shall control access to each payload's assigned areas, including controlling the access from other tenants. The Contractor shall ensure full and free access by the Spacecraft Users to their assigned areas, including for foreign national spacecraft users.

#### **2.3.1.12 Miscellaneous Equipment and Services**

The Contractor shall provide up to 6 tables and a minimum of one chair per table in the cleanroom and in the control room, compatible with the respective environments.

The contractor shall provide up to 200 ft<sup>2</sup> of temperature and humidity controlled, lockable,

storage space for tools and GSE not currently in use. The temperature control should be capable of maintaining the storage space +/- 5 degrees of the set point. The temperature range shall be between 60 deg F and 75 deg F. The humidity shall be between 30% and 60%.

The Contractor shall provide minor technical shop support. Examples of this support include sling proof load, electrical test equipment maintenance and repair, test equipment calibration, manufacturing of small mechanical parts, welding, pressure system component maintenance, precision cleaning, and non-destructive evaluation (NDE). To the extent that this support is not available at the Contractor facility, the Contractor shall arrange for Spacecraft User support from other local capability.

The Contractor shall coordinate and schedule with outside sources for requirements specified in the PPTO. The Contractor shall provide troubleshooting services to include coordinating with outside sources, VAFB Contractors and NASA until resolution of the problem.

### **2.3.1.13 Support to Spacecraft Provided by the Government**

The Government shall provide interface to the Western Range for the Spacecraft User and will provide the Range required Universal Documentation System (UDS) documents for the Spacecraft User requirements.

The Government shall provide the following range support for the spacecraft:

- Photographic support from VAFB
- RF Protection and Sector Blanking from VAFB
- RF Clearance from the base
- Base fire and medical support
- Base operations support
- All fueling and fluid support provided through the UDS documentation to include
  - Gaseous Nitrogen
  - Gaseous Helium
  - Liquid Nitrogen
  - Propellants
  - Breathing Air
  - SCAPE suits
  - SCAPE training
  - Propellant vent trailers
  - Empty 4BW drums
  - SPLASH Suits

### **2.3.2 Non-Standard Services**

The Contractor shall provide the non-Standard Services defined in the following table upon request from the Government. A description of each non-Standard Service is provided in the table below.

<b>Item No.</b>	<b>Non-Standard Service Item</b>	<b>Description</b>
1	Extended Facility Occupancy	One week of extended facility occupancy excluding the allowable grace period
2	Abbreviated hazardous spacecraft processing flow for 4 weeks.	Up to 4 weeks of hazardous operations (fueling, spinning, or lifting) using the clean room and control room with minimal administrative support.
3	Shortened spacecraft processing flow for 10 weeks	A full spacecraft processing of 10 weeks duration, excluding the allowable grace period.

### **2.3.3 Mission Unique Services**

The Contractor shall provide mission unique services applicable to each mission as specified in the PPTO.

### **2.3.4 Special Task Assignments**

The Contractor shall perform special tasks and analyses in support of this contract. At the Contracting Officer’s discretion, these tasks generally include analyses to obtain early data or non-mission specific support to the Government (including, but not limited to, storage).

### **2.3.5 Facility Modifications**

The Contractor shall perform facility modifications necessary for missions in support of this contract. At the Contracting Officer’s discretion, these tasks generally include electrical modifications or facility upgrades to comply with mission requirements.

## **2.4 Processing Methodology**

As part of payload processing the Spacecraft Users will perform hazardous operations. Typical hazardous operations include spacecraft propellant loading, spin balancing, ordnance installation and checkout, non-ionizing radiation sources (e.g., RF, laser, bright light), and upper stage (solid rocket motor) / payload handling. The Contractor’s facility should be sited and otherwise approved for these operations (reference the “Licenses and Permits for a Payload Processing Facility/Operator” contract Article). The Contractor shall work with and provide support to the Spacecraft Users to help mitigate hazards associated with processing operations.

Prior to the initial facility occupancy of this mission, NASA will submit documents to the Contractor, including: Spacecraft User Released Payload Processing Procedures, Payload Safety Documentation, and Final Processing Requirements, and Flight Hardware Flows. The Contractor shall review and provide a written response to these procedures and safety documentation per the timelines specified in the “Government Provided Documents” section of the PPTO. The Contractor may be required to provide signature concurrence to comply with Spacecraft User processing plans and procedures (e.g., Contamination Control Implementation Plan). The Contractor shall inform the COTR and the Spacecraft User of any processes that do not meet Contractor facility, safety, or environmental guidelines, or violate any facility operational permits or licenses. The Contractor shall review and provide input to the

Government pertaining to Spacecraft User procedures regarding facility capability, safety, and hazard mitigation.

The Contractor shall provide a response on the final processing requirements and flight hardware flows that indicates understanding of the requirements and certifies that it will meet the specified requirements. Exceptions to meeting the requirements must be documented and provided to the COTR and the Spacecraft User in accordance with the timelines specified in the “Government Provided Documents” section of the PPTO.

At the COTR’s request, the Contractor shall assist the Spacecraft User in the development of the flight hardware flow in the processing facility. This shall include optimizing the use of floor space and facility systems, such as the cranes, high pressure gas, etc., for operations such as fueling, encapsulation, or canning.

During normal processing operations, Contractor-trained Spacecraft Users will have coordinated access to operate the following facility systems including, but not limited to, cranes, forklifts, fire protection system, and doors. The Contractor shall be responsible for ensuring that all facility, facility systems, and facility services are available when required per the processing flows and any subsequent planning and scheduling meetings. The Contractor shall monitor mission operations at the payload processing facility to ensure compliance with PPF rules, guidelines, and environmental management practices.

### **3.0 Management**

The Contractor shall provide a team of personnel necessary to manage the requirements in this SOW, the appendices, the PPTO, and the PPTO appendices.

#### **3.1 Management Approach and Processes**

For Management Approach and Processes, the Contractor shall meet the requirements stated in the following paragraphs.

##### **3.1.1 Manifesting and Scheduling**

The Contractor shall maintain a payload processing manifest schedule to be provided quarterly with updates if revised. The payload processing manifest schedule shall include a facility readiness schedule, the initial facility occupancy, planned facility outages, dates, and the processing durations for all manifest payloads whether they are commercial or government.

##### **3.1.2 Customer Communications and Support**

The Contractor shall establish lines of communication with the Government, which include teleconferences; discussions; and formal and informal requests for technical, status, and progress information on the processing facility. The Contractor shall ensure that the Spacecraft User’s requirements are met in a timely manner such that on-going operations within the Contractor’s facility are not impacted.

### **3.1.2.1 Payload Planning Support**

At the COTR's request, the Contractor shall support advanced planning working sessions such as Ground Operations Working Group and Payload Safety Working Group meetings. The Contractor shall provide a Facility Handbook. This handbook shall have a complete description of the facility and facility systems capabilities (see DRL 1). The Contractor shall attend and present the status of its facilities and preparation for facility payload processing support at all Ground Operation Working Group meetings, the Ground Operations Review (GOR), and the Spacecraft Pre-Ship Reviews as requested by the COTR. The Spacecraft Pre-Ship Review is customarily held at the spacecraft manufacturer's facility. Travel may be required for the other meetings as well.

### **3.1.2.2 Daily Schedule Coordination Meetings**

The Contractor shall support daily Government coordination meetings during the facility occupancy period. The coordination meetings will status work-in-progress and services required for the current and following day's activities. NASA will provide detailed schedule and service requirements to the Contractor.

The Contractor shall provide insight on all activities, including other facility tenants' activities as they affect NASA's payload processing operations, safety, and schedules. The Contractor shall ensure that the Customer's operations have priority over routine facility maintenance operations, except where safety may be impacted. Routine maintenance shall be scheduled to maximize the availability of facilities consistent with safety of operation, which shall prevail. Routine maintenance activities shall be included where appropriate in manifest and scheduling products prepared in accordance with SOW paragraph 3.1.1. Support conflicts will be resolved with a spirit of cooperation among tenants, commensurate with respective launch dates.

### **3.1.2.3 Training**

For each mission, the Contractor shall provide facility orientations as requested by the COTR. The orientation briefing and hand-outs shall include, but not be limited to, information summarizing the Contractor's key personnel contacts, facility layout, and operation methodology (see DRL 3). Spacecraft User's will be trained by the Contractor to operate those facility systems and equipment needed to perform various processing tasks using contractor-provided equipment, including crane and forklift operations. The Contractor shall provide safety training required to assure that payload personnel are fully informed relative to facility hazards, alarm system operation, escape routes, fire suppression systems, etc. The Contractor is also responsible for providing/coordinating training for ELSA equipment. The Contractor shall maintain facility access control to assure personnel have received the necessary training before they are permitted unescorted access to the facility.

The Contractor shall notify and provide specific requirements to the Spacecraft User of all certifications (e.g., medical, safety) required to perform operations (e.g., fueling, crane) in the Contractor's facility. The Contractor shall be responsible for obtaining all required VAFB crew certifications on behalf of the Spacecraft Users.

The Contractor shall ensure that their team of personnel receives Spacecraft User dictated training as required by the COTR. This training may include familiarization of the spacecraft or safety/sensitivity training on the spacecraft unique systems (e.g., Cleanliness, Laser).

### **3.2 NASA Insight and Approval**

Specific areas in which NASA requires insight and/or approval are defined in the “Government Insight and Approval” contract Article. In addition, the Contractor shall acknowledge and be responsive to the inquiries, requests, technical coordination, and recommendations of NASA independent assessment teams, panels, or commissions within the scope of contract requirements.

The Contractor shall support technical coordination and interaction including, but not limited to: telephone discussions, formal and informal written correspondence, video conferences, meetings, and any other form of communication or sharing of information necessary to accomplish the cooperation required to provide for NASA insight of the payload processing facilities. Working level relationships shall be encouraged between NASA and Contractor personnel to expedite insight and approval activities. The COTR will be the Primary point of contact for technical guidance.

#### **3.2.1 Anomaly Investigations**

The Contractor shall conduct an investigation, with insight by NASA, in the event of any facility component or equipment failure or anomaly. In addition, the Contractor shall conduct an investigation, with participation by NASA, in the event of any mishap as defined by NPR 8621.1 (NASA Procedural Requirements for Mishaps and Close Call Reporting, Investigating, and Recordkeeping) and as required by the “Safety and Health” contract Article. The Contractor shall implement an Impound Plan (see DRL 7) to ensure facility data is available to support a mishap investigation. The Contractor shall verbally and immediately notify the Contracting Officer or COTR of a Type A, B, or C mishap. The Contractor shall notify the LSP Safety Representative, Spacecraft User(s) Safety Representative, and the designated Air Force Safety Representative of any accidents, mishaps, close calls, or other incidents. Upon completion of the investigation, the Contractor shall submit a written report (see DRL 2). Certain requirements of the “Safety and Health” contract Article also apply to non-NASA mission failures and anomalies.

#### **3.2.2 Documentation**

The Contractor shall produce and make the appropriate distribution of all items on the Data Requirements List (DRL). As a contractual deliverable, changes to the DRL submissions shall be submitted for NASA approval. The Contractor shall develop and maintain a schedule for providing the deliverables specified in the DRL. The DRL in Attachment B defines the scope of documentation required; however, NASA will utilize the Contractor’s existing documentation to the maximum extent possible.

### **3.3 Environmental Assessments**

The Contractor shall be responsible for ensuring that its facilities have been evaluated as required under applicable federal, state, and local statutes and regulations.

### **3.4 Key Personnel and Staffing**

The Contractor shall provide a readily available, single point of contact to serve as the liaison with the Customer. This single point of contact shall have the authority to commit, sign, authorize, and schedule activities at the processing facility. All staffing of personnel necessary to operate and maintain the facility as necessary to support payload processing during the occupancy period shall be the responsibility of the Contractor.

**Attachment B**

**DOCUMENTATION REQUIREMENTS LIST**

**Launch Services Program West Coast Commercial Payload Processing 2**

**for the**

**National Aeronautics and Space Administration**

## 1.0 Data Requirements List

The Data Requirements List (DRL) described in SOW 3.2.2 identifies critical elements of the contracted effort where aspects of payload processing insight are required by NASA and where NASA approval is required. The following DRL defines the scope of documentation required; however, NASA will utilize the Contractor’s existing documentation to the extent practicable if it meets compliance requirements. The submittal dates specified represent "on-dock" dates at the resident office. DRL approval may be assumed unless the Contractor is notified by NASA of disapproval within thirty (30) days.

The number of copies listed in Table D2-A represents the number of hard copies to be delivered to NASA only if the DRL data is not available electronically. All electronic formats shall be mutually acceptable. All data requirements shall be delivered to the KSC ELV Library. The Contractor shall notify the Contracting Officer in writing of DRL delivery.

<b>DRL Item</b>	<b>Document</b>	<b>Submittal Date</b>	<b>Insight (I) Approval (A)</b>	<b>Subsequent Submittal/ Changes</b>
1	Facility Handbook (CD or hardcopy acceptable)	10 Business Days After Contract Award	I	As Required
2	Mishap Reporting and Investigation	No Later Than 5 Days after Type A, B, or C Occurrence	I	As Required
3	Orientation Presentation	No Later Than 3 Days After each facility occupancy date	I	As Required
4	Certificate Of Facility Readiness (COFR)	See “Milestone Performance and Payment” Article	A	As Required
5	Off-loading and Transport Operation Procedures and Transportation route survey	20 Days Prior to each facility occupancy date	A	As Required
6	Facility Safety Manual (CD or hardcopy acceptable)	10 Business Days After Contract Award	A	As Required
7	Impound Plan	10 Business Days After Contract Award	I	As Required

8	Sample Analysis Result of Gases, Propellants & Fluid Commodites	No later than 1 week prior to need date of commodity	I	No earlier than 2 Days before Payload first Use
9	Facility Environment History	10 Business Days After Contract Award	I	As Required

**DRL 1 Facility Handbook**

As the facility or facilities systems are modified, the Contractor shall revise the Facility Handbooks and applicable safety documentation requirements to reflect the current facility and facility systems capabilities.

**DRL 2 Mishap Reporting and Investigation**

For Type A, B, C, and D mishaps and close calls, as defined in NPR 8621.1, reports shall be generated per requirements in SOW paragraph 3.2.1. A copy of the report shall be forwarded to the COTR within five days for Type A, B, and C mishaps and seven days for all others.

**DRL 3 Orientation Presentation**

The presentation and hand-out material shall include: status of the processing facility and its associated systems, open deviation/waivers, anomalies currently open or under investigation, safety training information, delivery dates of commodities, and agreements for services. Also, the package shall address mission unique requirements, support and services. An overview of the processing facility and mission flow shall be provided.

**DRL 4 Certificate of Facility Readiness (COFR)**

The Contractor shall generate a detailed report on the facility, facility systems and facility support equipment documenting that the square footage required is provided for, and that contamination and environmental control, electrical, communication and video systems comply with the requirements as stated in the SOW, associated Appendices, and the PPTO. As a minimum, the COFR shall:

- Identify all systems by name
- Identify each system as critical/non-critical
- Provide a brief description of status and readiness of the facility and each facility system
- Provide a copy of the certification for each systems proofload, calibration, compliance or inspection
- List supporting documentation for each system
- Provide a summary of facility modifications implemented since last NASA usage

- Have an Open items, Issues, and Concerns Section with associated correction plan and date
- Have an Exception, waivers, and deviation Section
- Provide a Safety statement of readiness

**DRL 5      Offloading and Transport Operation Procedures and Transportation Route Survey**

The Contractor shall be notified of approval or disapproval in ten calendar days. For offloading Flight hardware and GSE, any operation procedures used shall be submitted by the Contractor. The survey will include but not be limited to: road conditions, overhead obstruction, bridge conditions and a map identifying the transportation route. Not earlier than one (1) business day prior to transportation, a final route survey shall be performed by driving the transport route.

**DRL 6      Facility Safety Manual**

As standard operating safety requirements for organizations occupying the facility change, the Contractor shall revise the safety manual to reflect current safety policy and criteria applicable to ground support equipment (GSE) and to ground operations processing at the facility. The contractor shall also make the appropriate revisions if there are any mission-unique safety systems for a mission that drives the control or mitigation for a potential safety hazard other than those already addressed in the current Manual.

**DRL 7      Impound Plan**

The Contractor's Impound Plan shall identify the procedures/actions, roles and responsibilities that will be implemented by the Contractor after a mishap occurs.

The Impound Plan shall include:

- a. Identification of the location or space where impounded data, records, and equipment shall be stored and secured during an investigation
- b. Procedures for release of impounded data, records, equipment, and facilities at the mishap site

Data and records, regardless of format, to be impounded may include, but are not limited to:

- a. Check-out logs, test and check-out record charts, launch records, weather information, telemetry tapes, video tapes, audio tapes, time cards, training records, work authorization documents, inspection records, analyses, and problem reports.

- b. Historical data associated with the specific equipment, operations, and operating personnel including, environmental, operational, psychological, and other factors bearing on the situation.

**DRL 8      Sample Analysis Results of Propellants, Gases, or Fluids**

At the request of the Customer, the Contractor shall generate a report detailing the results of the propellant, gases, or fluids sample analysis. Parameters to be analyzed will be specified by the Customer prior to taking the sample.

**DRL 9      Facility Environment History**

The latest facility environment history will be provided to include the latest RF survey results, the latest magnetic survey results and the latest cleanroom cleanliness results.

Attachment C

ACRONYMS AND ABBREVIATIONS

**Launch Services Program West Coast Commercial Payload Processing 2**  
**for the**  
**National Aeronautics and Space Administration**

### Acronyms and Abbreviations List

A	approval by NASA
A/C	air conditioning
AFB	Air Force Base
ANSI	American National Standard Institute
ASHRAE	American Society of Heating Refrigeration and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
COFR	Certificate of Facility Readiness
CoLT	Correlative Lidar Trailer
COTR	Contracting Officer Technical Representative
dB	decibel
Deg	degree
DoD	Department of Defense
DRL	Data Requirements List
e.g.	for example (exempli gratia)
EIA	Electronic Industry Association
ELSA	Emergency Life Support Apparatus
ELV	Expendable Launch Vehicle
ESD	Electrostatic Discharge
EWR	Eastern/Western Range
F	Fahrenheit
F/D	Fill & Drain
FAR	Federal Acquisition Regulation
FFP	firm fixed price
Ft	feet
GMT	Greenwich Mean Time
GPS	Global Positioning System
GSE	Ground Support Equipment
HVAC	Heating, Ventilating & Air Conditioning
I	Insight by NASA
i.e.	that is (id est)
IEEE	Institute of Electrical and Electronic Engineers
IRIG	Inter-Range Instrumentation Group
KSC	John F. Kennedy Space Center
LOCC	Launch Operations Control Center
LSC	Launch Service Contractor

LSIM	Launch Site Integration Manager
LSP	Launch Services Program
LSSP	Launch Site Support Plan
NASA	National Aeronautics and Space Administration
NDE	non-destructive evaluation
NEC	National Electrical Code
NFPA	National Fire Protection Association
NFS	NASA FAR Supplement
NISN	NASA Integrated Science Network
OSHA	Occupational Safety and Health Administration
PPF	Payload Processing Facility
Ppm	parts per million
PSWG	Payload Safety Working Group
RF	radio frequency
RLCC	Range Launch Control Center
SCAPE	Self Contained Atmospheric Protective Ensemble
SOW	statement of work
STD	Standard
TBD	To Be Determined
UPS	Un-interruptible Power Supply
USAF	United States Air Force
VAFB	Vandenberg Air Force Base

Attachment D

DEFINITIONS

**Launch Services Program West Coast Commercial Payload Processing 2**

**for the**

**National Aeronautics and Space Administration**

## Definitions

Airlock:	An area, with a controlled environment, designed to accept the payload and its transporter. The airlock provides isolation from both the outside and cleanroom environment, and allows stabilization of temperature, humidity, and minimization of contamination.
Anomaly:	Any unexpected event. This may be a communications problem, an excursion outside of facility cleanliness specifications, or other unwanted occurrence.
Canning:	Building up the transportation canister used to transport the Payloads and associated vehicle launch hardware.
Cleanroom:	An environmentally controlled area for processing spacecraft. A facility or area where contamination such as hydrocarbons, non volatile residue, and particulate are limited to predefined levels based on the class of the cleanroom. Monitoring of contamination levels is mandatory to ensure they stay within specified limits.
Control Room:	An area which houses Payload Users provided electrical GSE and personnel during payload testing and launch operations.
Customer:	The Kennedy Space Center Contracting Officer or the designated representative (e.g. COTR).
Launch Service Contractor (LSC):	Contractor providing Launch Vehicle services.
Mission:	The overall flow or processing of the payloads and Launch vehicle.
NISN:	NASA Integrated Science Network. The NASA communications infrastructure used to provide connectivity between geographically dispersed locations for voice, video and data.
Payload:	Any of a class of satellite or probe that is ultimately to be placed into space. It may also be referred to as a Spacecraft or an Observatory.
Propellant:	Any of a class of solid, liquid, or gaseous substances used to produce thrust. Propellants may be toxic, corrosive, or capable of producing severe injury due to cold.

**Range:** The Government or Government agency responsible for controlling Government resources on VAFB.

**Spacecraft:** Any of a class of satellite or probe that is ultimately to be placed into space. It may also be referred to as a Payload or an Observatory.

**Spacecraft User:** The Government or Contractor organization responsible for processing a payload or its associated launch vehicle components (e.g. Payload Attach Fitting) in the PPF. It may also be referred to as a Payload User or Mission User.

**Target Launch Date:** The Launch date, for a specific mission, as specified in the Contract.

Attachment E

**LIST OF APPLICABLE DOCUMENTS**

**Launch Services Program West Coast Commercial Payload Processing 2**

**for the**

**National Aeronautics and Space Administration**

## Applicable Documents List

### Government Documents

AFSPCMAN 91-710	Range Safety User Requirements Manual <i>Note: The Contractor shall comply with AFSPCMAN 91-710, unless they have an existing agreement with the Range to use a predecessor document, such as Eastern &amp; Western Range Safety Requirements, EWR 127-1. Proof of such agreement must be provided with DRL-6.</i>
AFR 19-2	Air Force Regulation 19-2, Environmental Impact Analysis Process
CFR 49	Code of Federal Regulations (CFR) 49: Transportation
DOD 6055.9-STD	Ammunition and Explosives Safety Standards
EWR 127-1	Eastern and Western Range 127-1 Range Safety Requirements
ISO 14644	Cleanrooms and Associated Controlled Environments - A series of international standards defining Classification of Air Cleanliness, performance, testing, monitoring and operations of cleanrooms.
MIL-PRF-27407	Propellant, Pressurizing Agent, Helium
MIL-PRF-27401	Propellant, Pressurizing Agent, Nitrogen
MIL-PRF-26536	Propellant, Hydrazine
NPR 8621.1	NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating, and Recordkeeping
NPR 8715.3	NASA General Safety Program Requirements
NPR 8715.7	Expendable Launch Vehicle Payload Safety Program

Voluntary Commercial Standards

ANSI/ASME B30.2	Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist)
ANSI/CGA G-7.1	Commodity Specification for Air (from Compressed Gas Association Inc.)
CMA 70	Specifications for Top Running Bridge & Gantry Type Multiple Girder Electric Overhead Traveling Cranes.( from Crane Manufacturers Association of America, Inc.)
EIA RS-170	Electrical Performance Standards for Monochrome TV Studio Facilities (from Electronic Industry Association)
EIA RS-422	Electrical Characteristics of Balanced Voltage Digital Interface Circuits (from Electronic Industry Association)
IEEE 802.3	Information Technology - Local and Metropolitan Area Networks
NEC	National Electric Code
NFPA	National Fire Protection Association (Codes and Standards)
NFPA 780	Lightning Protection Code