

Source: Modified from ENRI (1995b).  
Proposed Kodiak Launch Complex site location.



## The “Other” Cape Canaveral

# Alaska’s Kodiak Launch Complex

The Alaska Aerospace Development Corporation was established by the Alaska State Legislature in 1991 as a state owned corporation to promote development of an aerospace industry in the state. The corporation built and operates the Kodiak Launch Complex (KLC), the nation’s first full service commercial spaceport that was not collocated on a federal launch range, in partial fulfillment of its mission. KLC is situated on 3,717 acres of state owned land located about 44 road miles south of Kodiak City on Kodiak Island, Alaska. AADC also has authority to restrict access for public safety and security during launch operations on 7,000 additional acres of state owned land that abuts the complex. Flight operations began in 1998.

KLC is a modern, state-of-the-industry spaceport that was designed specifically to provide optimal support for space launches to polar orbit, as well as to provide support for long range ballistic missions. The spaceport offers unrestricted launch azimuths from 110° to 220°, and unrestricted down range flight corridors that preclude need for energy consuming dog leg flight segments. KLC consists of several facilities, described in detail below, all of which have been designed in consideration of the spaceport’s location on the seismically active Pacific Rim; all structures and components have been designed to exceed applicable design criteria for occupied structures in seismically active zones. There is no federally endangered or threatened plant or animal species on the range and no flight restrictions due to such concerns.

KLC consists of six main facilities and supporting infrastructure plus an antenna/instrumentation field. The facilities include the Launch Control Center (LCC), the Payload Processing Facility (PPF), the Integration Processing Facility (IPF), the Spacecraft Assemblies Transfer (SCAT) building, the Launch Service Structure (LSS), and the Maintenance and Service Facility (MSF). KLC is served by Kodiak Island’s commercial power grid via a 25kW feeder from the main distribution system. Step down transformers provide 480V three phase, 208V three phase, 110V single phase and 220V single phase power.

Diesel powered automatic start back up generators are situated at critical points to provide back up power as necessary; Uninterrupted Power Supply (UPS) systems are provided to assure power is available until the generators come on line. Each generator has a minimum of 72 hours of fuel capacity. Containment of accidental hydrocarbon fuels spills is provided for pursuant to the agency approved KLC Spill Prevention Control and Countermeasures Plan.

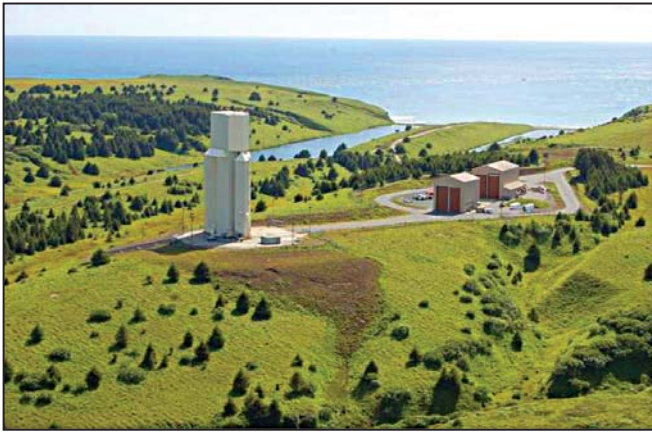
The Launch Control Center is the nerve center of the launch. It provides 14,000 sqft of space and supports mission command, control, and monitor from the Launch Operations Control Center (LOCC); weather forecasting from the Weather Forecast Center; and communications distribution and control from the Tech Control Center. Launch support staff offices and cubicles are also located in the LCC. The LCC is located approximately two statute miles from the launch pad area, and is well outside of the explosive safety quantity requirements for any area on the range where vehicle or spacecraft processing occurs. A wash room/lavatory and a break room are also provided.

Launch operations are managed from the LOCC. The LOCC has sufficient control consoles to accommodate both customer personnel and AADC staff. Each console has a computer and monitor with connection to the KLC LAN and select KLC CCTV feeds. Communications at each console are provided via a 24 channel Operational Intercom System. Each station is configurable to access up to 24 channels of existing voice nets and or interfaces. During missions the LOCC is staffed by the customer’s team of mission support specialists and their Mission Director, as well as by AADC staff including the Range Control Officer, the Range Operations Supervisor, the Weather Officer, the Range Safety Officer, and others depending on the nature of the mission. The LOCC has readily configurable distribution systems to accommodate mission needs. A raised false floor provides protected space for customer cabling and allows for rapid customization of work stations. Fiber and satellite communications connect the LOCC in real time to stations anywhere in the world, or on orbit, assuring effective command and control of missions.

The KLC Weather Forecast Center is staffed by certified meteorologists, one of whom serves as the Launch Weather Officer. The center features an integrated weather forecast capability that utilizes data from organic assets as well as data from National Weather Service satellites and open ocean buoys. KLC’s organic meteorological assets



*The Launch Control Center*



include a Lockheed Martin Sippican WIN9000 GPS based upper air tracking and processing system that can track up to six upper air balloon borne radio sondes, a balloon inflation and radio sonde preparation building, an Ellason weather radar, a Mission System lightning strike detection system, three lightning potential field mill monitors, and two 10 meter complete surface weather stations. Data streams from these organic assets flow directly to the Weather Forecast Center by KLC LAN.

In addition to providing launch weather forecasts, KLC meteorologists provide mission directors and staff with ground measurements of wind speeds and direction, temperature, visibility, dew point, air pressure, precipitation, visibility, lightning strike, and lightning potential gradient. Upper air measurements from radio sondes include temperature, atmospheric pressure, relative humidity, wind speed, wind direction, refractive indices, and speed of sound from launch through 100,000ft MSL. Launch weather constraints, advisories, and warnings are provided to Mission Directors and staff as necessary.

The Tech Control Center is the communications hub of KLC. It provides both secure and unsecured communications within KLC and from KLC to the world. Communications available at KLC include both local and long distance telephone services, Internet and Virtual Private Network through the KLC Ethernet LAN, dedicated communication lines, dedicated on site telephone and fax lines through a PBX telephone system with 24 channel Operational Intercom System, and commercial cell phone service. The Operational Intercom System is a Quintron DICES III intercom system, which connects all operational facilities. The quantity of intercom stations depends on customer needs. The system supports greater than 200 voice nets and interfaces with the telephone, site radios, and the Paging and Area Warning systems. KLC also operates a radio net.

Two communication backbone systems, fiber optic and copper, connect KLC facilities to each other through buried conduit. The fiber optic system consists of 84 single mode fibers with 18 used for various facility systems including Internet, Paging and Area Warning, Timing and Countdown, HVDS, CCTV, Intrusion Detection System,



and fire alarm. The copper backbone consists of 200 pairs ranging from 19 AWG to 24 AWG.

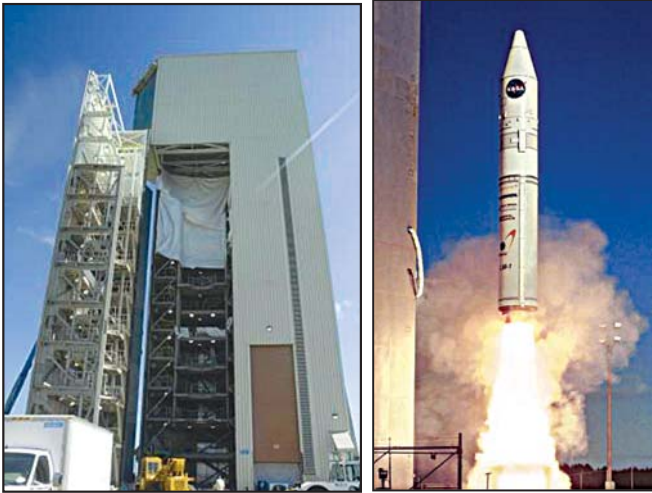
Communication between KLC and the rest of the world is provided by a Synchronous Optical Network (SONET) fiber ring. The SONET ring has full and automatic redundancy. AADC currently has one OC-12 capacity on the fiber ring with an installed capacity of two DS 3s (i.e. 56 T-1s). KLC SATCOM to off axis sites is via a KLC owned ground station that supports 12 T-1s. SATCOM T-1 service is redundantly provided via four separate satellite links. Two satellite T-1s provide data and intercom connections between the off axis site and KLC.

AADC can provide customers with secure classified communications through government certified classified systems and procedures.

Several offices and over 60 cubicles are available in the LCC for customer support. Each is tied into the KLC communications net.

Space vehicles and payloads are processed in the PPF, which includes a 40ft by 60ft airlock bay and a 40ft by 60ft processing bay. Each bay has 2,400sqft of floor space for a total of 4,800sqft. The PPF can be operated as a class 100,000 down to a class 7,000 clean room depending on customer needs. An air shower with air lock provides personnel access to the clean room. A wash room and area for changing clothes is included. A 15 ton bridge crane with 50ft of hook height serves both the airlock and processing bays. The airlock and processing bays are separated by a Megadoor. A 30ft by 32ft equipment airlock facilitates controlled entry of support equipment and fueling carts





to the processing bay without having to open the primary airlock. Pass through conduits are available to bring cabling from outside support equipment into the structure without compromising environmental quality. The PPF also includes a 700sqft control room with blast shutter. The facility is equipped to supply hypergolic fuel to space vehicles and payloads, and it includes an HVDS and appropriate engineering controls to provide a safe fueling environment. Hypergolic fuels are stored proximal to the PPF in an approved armored vault.

The Payload Processing Facility is an environmentally controlled facility; temperature and relative humidity are adjusted to match mission needs. The facility includes a breathing air system in the clean room capable of supporting four SCAPes from a wall mounted panel. The system consists of a purifier capable of providing OSHA grade D breathing air, a regenerative dryer, visual moisture indicator, and a catalyst converter to convert CO to CO<sub>2</sub>. The system is fed from an oil free compressor located outside of the clean bay. The PPF is located approximately one mile away from the LCC, and is midway between the LCC and LSS (which is about two miles away from the LCC) to mitigate potential explosion effects.

The Integration Processing Facility is KLC's missile processing building. It supports horizontal checkout and integration of rocket motors and related flight components. The IPF is an environmentally controlled structure capable of maintaining vehicle specific temperature and humidity. It is located about two miles away from the LCC. The IPF measures 55ft by 100ft and is equipped with a 25 ton bridge crane having 40ft of hook height. A 10ft by 15ft airlock is provided to accommodate transfer of support items without compromising environmental control. A Test Inspection Records Room, washroom/lavatory, and mechanical room complete the structure.

The Spacecraft Assemblies Transfer building is a mobile structure mounted on rails running between the IPF and Launch Pad 1 at the LSS. It is used to either move vehicle components to the LSS under environmental control, or to erect and shelter ballistic missiles preparatory to flight at Launch Pad 2, which is located approximately midway between the IPF and LSS. The SCAT has roll up doors at both ends that mate with identical doors on the IPF and LSS to allow all indoor transfer of vehicle components to the launch pads. The facility has a 25 ton bridge crane with 40ft of hook height.

The Launch Service Structure is an environmentally conditioned building that consists of three main sub-



structures: the Fixed Service Structure, the Rotating Service Door, and the Rotating Service Structure. The Facility includes an electrical room, air compressor, and utility risers. The LSS is equipped with a 75 ton bridge crane with 157ft of hook height, which is used to support vehicle break over and transfer of motors and payloads to the launch stool or stack. The facility is unique in that it can support the launch of a broad range of launch vehicles without extensive modification; work platforms are adjustable in 1ft increments and have custom inserts to accommodate different vehicle diameters. Several launch stools are kept at KLC that will readily accommodate a wide range of launch rings and vehicle weights. For launch, the Rotating Service Door and the Rotating Service Structure rotate open in opposite directions exposing the vehicle to the elements.

The Antenna/Instrumentation Field is located proximal to the MSF in direct line-of-sight to the pad area to assure radio frequency signals reception. Customer and AADC telemetry equipment populate the field, which is connected to the LOCC with fiber optic cabling for real time telemetry checks during count down operations. Both copper wire and fiber optics cabling are available between the pads and the LOCC for hard lone telemetry data.

AADC can provide range safety support and telemetry downlinks with operators via its Range Safety and Telemetry Systems (RSTS), or accept government furnished range control equipment and operators. The RSTS consists of two fully redundant S-band TM/GPS based road mobile systems that provide range flight safety, UHF command destruct, and telemetry receiving and recording support. The prime purpose of the RSTS is to provide the range safety and telemetry functions necessary to track and verify rocket flight within prescribed boundaries, to send a command destruct signal should that become necessary, and to provide telemetry receiving and recording of payload TM data. The two RSTS units can operate in conjunction with one another or independently depending on need. In most cases one RSTS unit is located at KLC and the other at an off axis site. The prime RSTS unit with Missile Flight Control Officer (MFCO) is located at KLC, and the second with another MFCO at an off axis site to assure TM tracking and receiving when plume attenuation occurs.

Each of the RSTS units is identical and consists of a Mobile Operations Center, two high gain 5.4m Mobile Antenna Systems, and emergency back up generator. Each RSTS unit includes a mobile telemetry trailer that provides additional TM recording capability and provides a dedicated customer work space and connectivity. To meet range safety requirements, each Mobile Operations Center is internally redundant to eliminate single point failure and to provide full operational capability in the event of a component failure.

The Maintenance and Service Facility provides an environmentally conditioned work area for support equipment maintenance and storage for consumables. It measures 178ft by 92ft and includes approximately 16,000sqft of ground level shop and storage area plus another 3,600sqft of office space in upper story mezzanines. The ground floor is partitioned into a 4,300sqft Storage Bay, a 3,675sqft RSTS Bay with a 925sqft RSTS Lab and Secure Storage Room, a 4,000sqft Service Bay, and a 500sqft Welding/Metal Fabrication Bay. The Storage, RSTS, and Service Bays have roll up doors on both ends allowing for drive through traffic. A kitchen/break room, lavatories with showers, bunk room, and laundry complete the facility.

