Potential Economic Benefits of Alaska Aerospace Corporation

Prepared for:

Alaska Aerospace Corporation

Research-Based Consulting

Juneau
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Prepared for:

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PREPARED BY:

McDowell GROUP

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Executive Summary

Alaska's aerospace industry is in a critical transitional phase in its history. Building on the state's significant geographic advantages, Alaska has invested millions of dollars over the past 15 years in development of the infrastructure and expertise needed to secure a foothold in the highly competitive rocket launch industry. Today, Alaska is in a position where it must either renew its commitment to support the industry, or forego the substantial economic benefits a competitive and sustainable aerospace industry can bring to Alaska.

The purpose of this study is to assess what the future could hold for Alaska in terms of potential economic benefits, should it choose to reinvest in its aerospace programs and infrastructure. A range of opportunities are presenting themselves to Alaska, such as Ground-based Midcourse Defense, additional small and medium lift rocket launches, and Unmanned Aircraft Systems. This study quantifies what these opportunities represent in terms of potential jobs and income for Alaska. Key findings are summarized below.

Ground-based Midcourse Defense (GMD)

Alaska Aerospace Corporation (AAC) has partnered with Lockheed Martin to bid on the $5 billion GMD contract, which includes operations at Fort Greely. Kotzebue-based NANA Development Corporation is also a sub-contractor on the Lockheed Martin/AAC team. The military will announce the contract winner in mid 2011. Benefits to Alaska would be substantial.

- Lockheed Martin has indicated it would likely open an office in Anchorage or Fairbanks to support GMD operations, something the current contractor has not done.
- Lockheed Martin will seek to staff the program with as many Alaska residents as possible. Lockheed Martin recently conducted a job fair in Fairbanks to begin staffing positions in the event the Lockheed Martin/AAC team wins the GMD contract.
- In total, GMD operations directed by Lockheed Martin and AAC are expected to generate nearly 300 total jobs and $32 million in annual wages and benefits.

Small and Medium Lift Orbital Launches

The Kodiak Launch Complex (KLC) continues to be an attractive venue for hosting small lift launches, and AAC is working towards constructing another launch platform which could support larger (medium lift) launches.

- AAC has identified 65 launches in the small-and-medium lift markets between now and 2020 with mission parameters that make KLC an attractive launch site. KLC is seen as a modern facility within the industry, and AAC is well-respected for their technical competence and lean staffing costs.
- AAC recently launched a Minotaur IV rocket for the Space Test Program's S26 mission that NASA officials called, "the most complex Space Test mission in 20 years." The positive experience is important as NASA has 14 missions scheduled through 2020, the majority of which will require

medium lift rockets to be launched from the west coast. Vandenberg AFB and the Kodiak Launch Complex are cited by government sources as the only viable options for hosting these launches.

- At present, AAC has identified 31 upcoming medium lift launches which must be launched from a west coast facility with a high inclination such as KLC or Vandenberg AFB.

- With the new rocket motor storage facility, AAC now offers customers the facilities to store rockets and launch them with 24-hour notice. The rapid launch capability will significantly lower launch costs at AAC for multi-launch missions because clients can assemble multiple rockets concurrently or in succession, then store the rockets until called to launch. The Department of Defense (DoD) is also very interested in KLC's rapid launch capabilities to satisfy DoD's urgent need for Operationally Responsive Space (ORS) initiative.

- Interviews with industry experts confirm KLC's advantageous location in accessing polar orbits. They noted the quantity of available orbital tracks around the equator is declining each year. In comparison, polar and other highly inclined orbits, efficiently reached from KLC, are much less crowded. This fact will serve to make polar orbits an attractive alternative in years to come.

- Small and medium-lift operations can create approximately 195 direct, indirect and induced jobs and a total of $21 million in annual wages and benefits.

In addition, the Delta II rocket is scheduled for retirement and NASA has identified two rocket series to take its place – the Taurus II (Orbital Sciences) and Falcon 9 (SpaceX). Orbital Sciences has expressed a strong interest in staging Taurus II launches from KLC. These launches represent a significant opportunity for AAC should the necessary capital improvements be made.

Unmanned Aircraft Systems (UAS)

AAC is working with the military to acquire a decommissioned Global Hawk drone in FY2013. AAC has proposed acting as operational staff for a Global Hawk which would fly regularly scheduled flights out of Eielson AFB. The military has already given two Global Hawks to NASA and other unmanned aircraft systems (UAS) to Lower 48 states for homeland security purposes, so Alaska might be looked at as "next in line." Alaska is in an excellent position to be given one of these decommissioned Global Hawks because the state has numerous potential uses for such aircraft; and AAC can accommodate far more user groups than a federal agency could.

- UAS's can be used to aid in search and rescue missions, perform geo-surveys for oil, gas and mineral deposits, assist fisheries enforcement efforts, perform data collection on wildlife, gather data for scientific purposes, monitor weather and much more. The Global Hawk is capable of remaining airborne for 36 hours and can image an area the size of Illinois on a single flight.

- Economic benefits, which can result from such an asset based in Alaska, include increases in oil, gas and mineral development or more economic activity associated with performing climate change studies based in Alaska.

- While the potential economic benefits are numerous and wide-ranging, without AAC involvement, the opportunities for Alaska may be limited. The only other organization with the expertise to fly UAS's is the military. Military control would limit state agencies and private company access to flight time.

- Interviews with several knowledgeable UAS authorities in Alaska agreed AAC is the best-equipped civilian organization in Alaska to operate a Global Hawk drone.

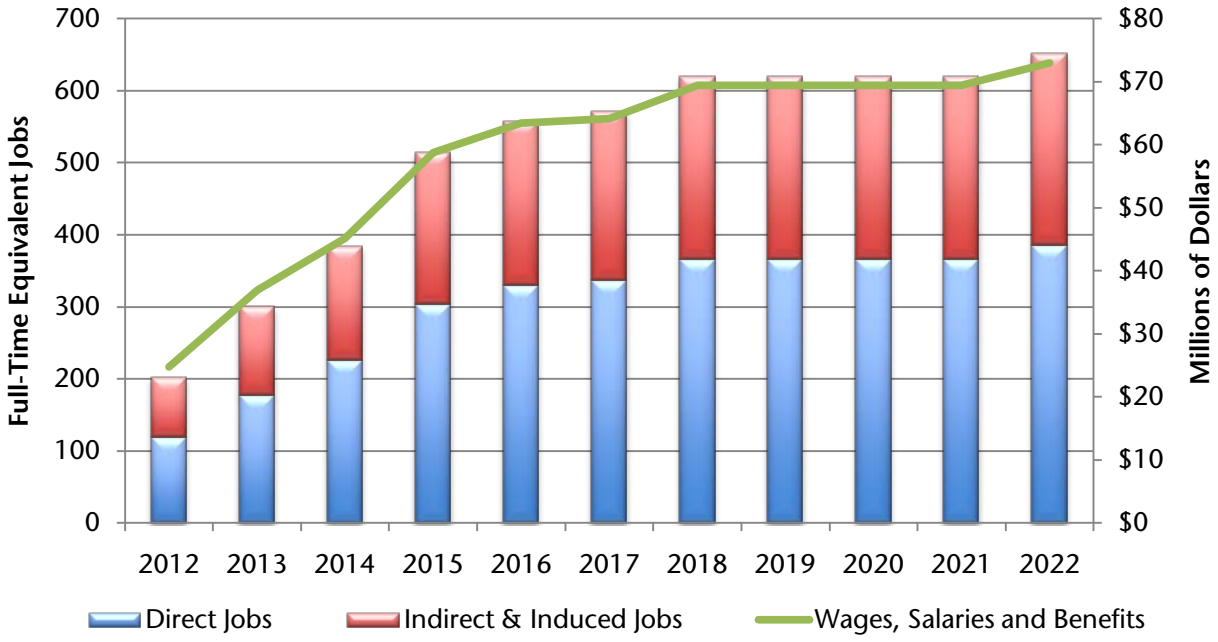
- A mature UAS program run by AAC would generate 75 total jobs and $6 million in wages and benefits. This is the expected economic activity associated with operating the Global Hawk, and does not include economic activity resulting from the data collected during missions.

Future Business Segments Offer Large Potential Benefits to Alaska

These opportunities – GMD, small/medium launch operations, and UAS – can result in $80 million in annual revenue for AAC by 2018. Total direct, indirect and induced economic activity associated with these aerospace ventures could approach $250 million annually.

Successful development of these business opportunities can generate 385 high-paying, high-tech jobs in Alaska, plus another 245 indirect and induced jobs[1] by 2022. Annual payroll can total $73 million. These figures represent the sum of AAC sustaining staff, technical support staff based in Anchorage, GMD operations, small-and-medium lift rocket operations, and UAS operations.

Potential Economic Benefits of AAC-related Operations (2012-2022)



Source: AAC and McDowell Group Estimates.

[1] Indirect jobs are those created by one business doing business with others in the area or state. For instance, AAC will indirectly create jobs with local security firms, hotels, and shipping companies. Induced jobs are created when workers spend their income in an economy.

The U.S. aerospace industry has some of the highest private sector economic multipliers of any industry because very little work is outsourced to foreign countries, labor costs make up a significant portion of total costs, and projects require extensive input from other industries. As Alaska's aerospace industry grows and matures, more companies will open offices in Alaska instead of posting part time staff here. This will lead to higher economic multipliers in Alaska and greater overall economic benefit for Alaskans.

Introduction

The Alaska Aerospace Corporation (AAC) has generated significant economic activity in Alaska since its creation in 1991. According to a 2010 study, 202 jobs and $10 million in annual labor income in Alaska were the direct or indirect result of AAC operations in 2009. AAC operates the Kodiak Launch Complex (KLC), which is a state-of-the-industry spaceport capable of launching payloads up to 4,000 pounds into polar and other orbits.

Alaska's unique physical location combined with the versatility of the Kodiak Launch Complex offer potential for an expanded aerospace industry in the state. To date, AAC has had 15 successful launches since its first launch in 1998. AAC managers estimate they could increase their launch manifest to four to six launches per year by developing rapid launch capability and constructing a medium lift facility. Expanded partnerships with the University of Alaska, United States military, NOAA, Department of Interior, oil/gas companies, and private sector rocket manufacturers could yield significant economic benefits for the state.

The Alaska Aerospace Corporation is in a transitional phase after completing its contract with the Missile Defense Agency. During the past year, the company has embarked on several new initiatives and is seeking sustainment funds to continue developing new business opportunities. The potential economic benefits of these new business opportunities are detailed in this report.

Methodology

The forecasted activity detailed in this report draws on projections of direct employment and payroll provided by AAC. The direct forecasted activity estimated by AAC is the product of research on similar programs in other parts of the U.S. or Alaska, and the company's own institutional knowledge about staffing needs and costs. McDowell Group has reviewed external literature on staffing needs and costs associated with similar industries in Alaska and other states for reference. Potential indirect and induced impacts in the Alaska economy resulting from the direct AAC-related activity were calculated by McDowell Group using IMPLAN multipliers. IMPLAN is an economic modeling software platform which employs a social accounting matrix and input/output model using region-specific data to produce multipliers for 440 sectors of the economy.

Indirect jobs are those created by one business doing business with others in the area or state. For instance, AAC will indirectly create jobs and income with local security firms, hotels, professional services firms, and construction companies as part of their business activities. Induced jobs and income are created when AAC and contracting workers spend their income in the Alaska economy.

Space Basics

The science and technology required to propel large objects into space is beyond the understanding of all but a very small group of people who have dedicated their lives to advancing humankind's space travel odyssey. Breaking down the finer points of the technology in few paragraphs is not possible, but before reading this report it is important to have a general idea of how rockets work and why a spaceport's location is important.

Rockets (more commonly referred to as launch vehicles or launchers in the industry) transport payloads to space in several stages. Payloads can consist of satellites, scientific experiments, remote sensing equipment, supplies for space stations or anything else that needs to be put in space. Launch vehicles have several segments, which are typically assembled at the launch site. Different kinds of payloads require different orbits to do their job. Some satellites orbit the earth near the equator and follow the rotation of the earth. These orbits are called geostationary and satellites appear to be fixed in the sky when seen from earth's surface. Others require a polar orbit, where the satellite's track travels north to south around the poles (roughly). Putting payloads into polar orbit is best done from a launch site which has a high-inclination (high latitude, such as Alaska). Additionally, the site requires an unrestricted ocean or desert downrange from its launch azimuth (the trajectory it sends rockets). For obvious reasons, the government does not permit rocket launches directly over heavily populated areas.

A Large Industry

The U.S. space industry is a diverse and complex blend of commercial, national defense, and research activities. In 2009, commercial space transportation and related industries accounted for $208 billion in economic activity in the U.S., including $53 billion in earnings and 1,029,440 jobs.[2] The industry has been growing rapidly; in 2004 space transportation and related activity accounted for $98 billion in economic activity, 550,000 jobs, and $25 billion in earnings. These measures of economic activity include all direct, indirect and induced impacts related to commercial space transportation in the U.S.

Globally, the FAA anticipates 469 satellites will be commercially launched over the next 10 years on 276 launch vehicles (some launch vehicles carry more than one satellite). This includes 120 non-geosynchronous orbit launches, including the elliptical polar orbits supported by KLC.[3] Even more satellites and space experiments will be launched by government agencies. Each launch requires years of preparation and tens of millions of dollars.

Tiny French Guiana, located on the northeastern edge of South American on the Atlantic Ocean, offers an interesting parallel to Alaska. The Guiana Space Centre (GSC) serves as the primary spaceport for European

[2] *The Economic Impact of Commercial Space Transportation on the U.S. Economy in 2009*, September 2010. Federal Aviation Administration, U.S. Department of Transportation.
[3] *2009 Commercial Space Transportation Forecasts*, FAA Commercial Space Transportation (AST) and the Commercial Space Transportation Advisory Committee (COMSTAC), May 2009.

launches of satellites requiring geostationary orbit around the equator. The facility was built in the late 1960's by France and now encompasses 330 square miles. To date, the European Space Agency has invested €1.6 billion ($2.18 billion) in the spaceport. It is estimated the space industry accounts for 24 percent[4] of French Guiana's GDP, which was $3.5 billion in 2006.[5] A significant aerospace cluster has been established in this remote outpost to support activities at the GSC. The French Guiana example illustrates how important geography is in locating spaceports. Long-term investment can take a place that has little more than geographic advantage and create a strong, sustainable space sector.

[4] European Space Agency.
[5] "Les comptes économiques de la Guyane en 2006 : premiers résultats" (French) National Institute of Statistics and Economic Studies (INSEE), Economic Accounts for Overseas (CEROM); retrieved 01/11/2011.

Profile of Alaska Aerospace Corporation and the Kodiak Launch Complex

Alaska Aerospace Development Corporation (AADC) was formed in 1991 by an act of the Alaska Legislature. AADC was created as a public corporation charged with promoting, financing, developing and operating space launch and related facilities in Alaska.[6] The first AADC Board of Directors was named in 1992 and site selection and design for the Kodiak Launch Complex (KLC) were initiated the following year. Construction of KLC commenced in 1998 and the first rocket was launched that same year. Since 1998, KLC has had 15 successful launches including eight target missiles for the U.S. Missile Defense Agency (MDA), five launches for the U.S. Air Force, one for the U.S. Army, and one for the National Aeronautics and Space Administration (NASA). Another U.S. Air Force launch is scheduled for May 2011. In 2009, AADC formally changed its name to Alaska Aerospace Corporation (AAC).

KLC is located on Narrow Cape, 44 miles south of the community of Kodiak. KLC has been developed as a state-of-the-industry launch complex with its launch and launch support facilities gradually expanded to include six buildings and two launch pads. The Integration Processing Facility (IPF) provides 5,500 square feet of in-door work area for horizontal processing of rockets before placement at either launch pad. The Launch Service Structure (LSS) houses Launch Pad 1 (LP-1) and provides an all-weather facility for vertical processing of rockets in final preparation for launch. The Spacecraft and Assemblies Transfer (SCAT) Facility is a roller-mounted structure on rails that houses Launch Pad 2 (LP-2) and serves as an arctic entry for either the IPF or the LSS. The Payload Processing Facility (PPF) provides a 4,800 square-feet clean room for the processing of spacecraft before integration with the rocket at either launch pad. The Maintenance Support Facility (MSF) provides large storage areas, machine and electrical shops, shipping and receiving areas, and the offices for the full-time KLC administrative, technical, and engineering personnel. The Launch Control Center (LCC) is the technical and operational hub of launch operations during the mission. The LCC provides office space, telecommunications capability, and launch control capabilities to the range users of KLC. In 2009, a local Kodiak construction company was awarded a $7.0 million contract for Phases 1 and 2 of the Rocket Motor Storage Facility (RMSF) construction project.

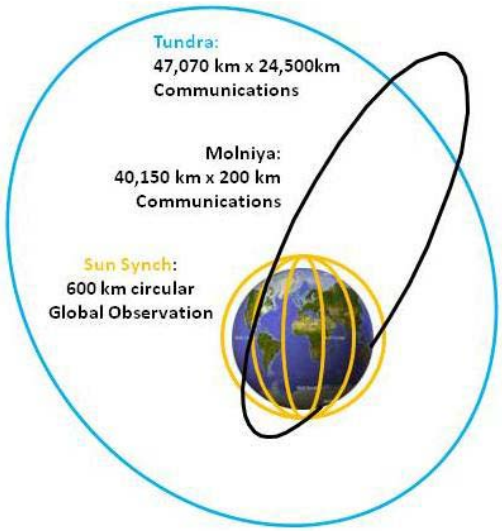
KLC Launch Pad 1

In addition to the fixed assets at KLC, AAC also owns and operates a mobile Range Safety and Telemetry System (RSTS) that consists of two identical systems. For launches from KLC, one RSTS system remains at KLC

[6] "Alaska Aerospace Development Corporation 2009 Annual Report."

while its sister system is deployed to either King Salmon or Cordova, Alaska. The RSTS is also deployable to locations around the world where it can support launches from other launch complexes besides KLC. The RSTS has supported a launch from Vandenberg Air Force Base (VAFB) from KLC; acting as a satellite ground station relaying mission critical data to the launch decision makers at VAFB.

KLC is considered a modern and state-of-the-industry spaceport by those in the industry. In fact, the Department of Defense is performing a launch modernization study and uses KLC as a case study. KLC is the only U.S. spaceport which was built to launch payloads into space, unlike other places that started out as a test range.



KLC was designed to support launches into polar orbit, including circular and highly elliptical Tundra and Molniya orbits. These are orbits that are not achievable from Lower 48 spaceports. A Tundra orbit is a type of elliptical geosynchronous orbit with a high inclination (usually near 63.4°) and an orbital period of 24 hours. A Molniya orbit is similar to Tundra in that it has the same inclination, but the orbital period is only about 12 hours instead of 24 hours. The only current U.S. user of Tundra orbits is Sirius Satellite Radio, which operates a constellation of three satellites. Satellites placed in Tundra orbit spend most of their time over a specific area of the Earth, a phenomenon known as apogee dwell. Satellites placed in Tundra and Molniya orbits heretofore had to be launched out of Russian launch sites (including the Sirius Radio satellites).

With Tundra orbits, two satellites can provide continuous coverage for a single large area while with Molniya three satellites can provide continues coverage for two specified locations. Sun synchronous (Polar) orbits are synchronized with Earth's rotation to always be in sunlight. Demand for launching satellites into polar orbit could increase, according to informed sources. Slots for putting satellites into geostationary orbit (around the equator) are getting crowded, and will provide an incentive for commercial and military launches to choose polar orbits instead.


Tundra Orbit Ground Track

KLC is one of four U.S. spaceports licensed by the Federal Aviation Administration's Office of Commercial Space Transportation (AST) to operate commercial launches. AST also has licensed the California Spaceport at Vandenberg Air Force Base, Spaceport

Florida at Cape Canaveral Air Station, and the Virginia Space Flight Center at Wallops Island.[7] Kodiak is the only commercial launch complex in the U.S. not co-located with a federal facility.

KLC's Competition

The U.S space industry operates in a competitive landscape that is a blend of public (government) fixed assets and private operational resources. KLC has a number of advantages relative to other spaceports in the U.S. KLC's location on southwestern Kodiak Island offers thousands of miles of unrestricted down-range launch area over the North Pacific Ocean, with launch azimuths (launch directions) ranging from 110° to 220°, which encompasses a wide sweep of the North Pacific. No other North American spaceport offers equally unrestricted launch horizons. Further, due to its unique location, KLC is the only U.S. facility that can launch directly into high inclination (63.4°) missions without land over-flight. Low inclination launches support equatorial orbits (where the spacecraft orbits Earth at or near the equator). High inclination launches support polar orbits (where the spacecraft orbits Earth over the north and south poles). Polar orbits are possible from spaceports in North American other than KLC; however, energy consuming in-flight dog-leg directional adjustments are required to achieve the desired inclination without flying over populated areas.

KLC's principal competition for polar launches is Spaceport Systems International, located on Vandenberg Air Force Base. Vandenberg's advantages over KLC include better access to a well-developed and relatively close service and supply network. Vandenberg's disadvantages relative to KLC, among other things (described below) include much narrower unrestricted launch azimuths. At Vandenberg, most launch azimuths range from 168° to 220°, with no over-flight of populated areas.

Other facilities, such as the recently built New Mexico Commercial Spaceport, are not competitive with KLC because of limited launch azimuths and requirements that jettisoned boosters land within very narrow areas. Major launch facilities such as Cape Canaveral in Florida and the Wallops Flight Facility in Virginia, can only offer polar and sun-synchronous orbits with costly and payload-limiting in-flight azimuth maneuvers.

Though KLC has certain transportation cost and logistics challenges related to its location, industry representatives point to operational advantages over Vandenberg. Vandenberg is a large and busy military facility, sometimes presenting significant challenges for securing priority launch dates and range clearances, as well as in addressing environmental issues unique to the area. These challenges can affect launch costs, as can delays in launch schedules. Launch delays among other users of the launch facility can have a domino effect on the schedules of following launches. KLC offers launch customers more scheduling flexibility and certainty; and therefore greater cost control.

Alaska's Aerospace Assets - Historical Roots

For a young state, Alaska has a long and diverse aerospace history that predates statehood. Elmendorf Air Force Base (AFB) and Eielson AFB both trace their original construction back to World War II. During the Cold War, Alaska's strategic position led to the creation of more military installations tasked with observing enemy movements, training soldiers for arctic combat, and housing missile defense systems. Anti-ballistic missile

[7] "2000 Reusable Launch Vehicle Programs and Concepts," Associate Administrator for Commercial Space Transportation (AST), Federal Aviation Administration, January 2000.

defense systems are currently in operation at Fort Greely by the Army's 49th Missile Defense Battalion with the Alaska Army National Guard.

The University of Alaska has been using the Poker Flat Research Range (PFRR), north of Fairbanks, to do auroral research since the 1920's, but began launching rockets in 1969. More than 1,700 launches of missiles and sounding rockets have been conducted at PFRR to conduct atmospheric research since its inception.

Today, Alaska's aerospace assets service a broad range of users. These include military operations at Joint Base Elmendorf Richardson (JBER), Eielson AFB, Fort Greely, Clear Air Force Station, Kodiak Launch Complex, and Navy SEAL training on Kodiak Island. University and NASA researchers have used launch facilities at Poker Flats and the Kodiak Launch Complex to stage scientific missions. In addition, telecommunications companies and rocket manufacturers have expressed interest in using the Kodiak Launch Complex for future missions.

Ground-based Midcourse Defense

AAC has teamed up with Lockheed Martin to pursue the U.S. Missile Defense Agency's (MDA) Ground-based Midcourse Defense (GMD) Development and Sustainment Contract. As a partner with Lockheed Martin, AAC would carry out operations and maintenance functions at Fort Greely and Vandenberg AFB. In addition to AAC, Lockheed Martin is partnering with another Alaskan company, the Kotzebue-based NANA Development Corporation. NANA will provide logistics management, engineering and supply support services at Fort Greely and Huntsville, Alabama.

Raytheon is Lockheed Martin's strategic partner and together the companies have developed missile systems which have achieved more than 50 intercepts in testing – more than any other team. Together the companies bring several decades of weapons systems experience to the project and employ 208,000 people worldwide.

The U.S. military's GMD system uses land-based missiles to intercept inter-continental ballistic missiles (ICBM) before they can strike American targets. Installations exist at Fort Greely and Vandenberg AFB that launch ground-based interceptors. These interceptors are essentially rockets whose payload consists of an Exo-atmospheric Kill Vehicle (EKV). The system is designed to quickly deliver the EKV to the upper atmosphere when an incoming ICBM is at its highest point. Once released, the EKV with its own thrusters will use incoming data from ground-based radar, satellite feeds, and its own on-board sensors to target the enemy ICBM and destroy it. A total of 30 interceptors were to be deployed by the end of 2010, with the majority being kept at Fort Greely near Delta Junction. The GMD system is designed to intercept ICBM's in space, so ICBMs carrying nuclear warheads will not produce fallout on areas below.

The GMD budget request for 2011 is $1.35 billion, which is consistent with recent budgets. The Center for Defense Information reports the current program, which has been headed by Boeing and Northrup Grumman since 2001, has produced 8 successful flight intercepts in 15 attempts since 1999. The most recent test of the GMD system was unsuccessful, as the EKV was successfully deployed, but was unable to hit the ICBM. Boeing and Northrup Grumman have submitted a proposal to continue the contract.

Recent tensions in the Korean peninsula underscore the importance of the Missile Defense Agency and the successful operation of Ground-based Midcourse Defense systems. In May 2009, North Korea detonated a 2.4 kiloton nuclear bomb in an underground test. A month earlier, North Korea launched a rocket which it claimed was carrying a satellite, but the action was condemned by several nations who claimed the mission was an ICBM test. The U.S. is a strong ally of South Korea and North Korea has repeatedly undertaken deliberate actions to demonstrate their military capacity. The succession of Kim Jong Il by his youngest son Kim Jong Un, presents the possibility of a power struggle in the North Korean military which could lead to unpredictable outcomes.

The RFP for the upcoming GMD contract closed on January 28, 2011. A final decision on which group will win the contract will be coming later in 2011. Should the Lockheed Martin/AAC team win the contract, the impacts to Alaska could be quite large. The GMD contract length is a minimum of 5 years and a maximum of 10 years.

Lockheed Martin and Alaska Aerospace will employ as many as 60 full-time employees at Delta Junction (Fort Greely) as soon as 2012, and the partners expect that number to increase to between 150 and 200 by 2015. By that point staff relocation will be complete and employment is not expected to change subsequently. Currently, many Boeing engineers working on the project are transient workers who do not stay in Alaska for most of the year. In the past, bed spaces have been provided for contractors at Fort Greely, but the military will discontinue that practice going forward. Contract employees must arrange their own living arrangements.

Lockheed Martin has indicated they will probably open an office in Anchorage or Fairbanks to support GMD operations in Alaska to save on travel costs and improve operational performance; something Boeing has not done. Project managers have also indicated plans to employ an additional 46 construction workers during 2011 and 2012 to build facilities needed for the GMD project. Lockheed Martin has also stated they will seek to staff the program with as many Alaska residents as possible. The company recently conducted a job fair in Fairbanks to begin staffing positions in the event they win the GMD contract. Lockheed Martin has expressed to federal and state officials the importance of having as much support staff on site in Delta Junction as possible to improve operations.

Expected Economic Impacts of New Employment from Lockheed/AAC GMD Program (2012-2022)

	2012	2013	2014	2015-2022
New Employment Impacts				
Direct	60	90	120	175
Indirect & Induced	40	60	80	120
Total Jobs	100	150	200	295
Labor Income ($millions)				
Direct	8	12	16	23
Indirect & Induced	3	5	6	9
Total Income	11	18	22	32

Note: Income figures represent salaries and benefits. Projected labor income has not been adjusted for inflation. Totals may differ due to rounding.
Source: AAC and McDowell Group Estimates.

Should the Lockheed Martin team win the GMD contract, activities associated with launch operations will conservatively provide approximately 300 jobs and $32 million in direct, indirect and induced labor income by 2015. NANA's involvement will produce additional impacts as a portion of their revenue from subcontracting in both Alaska and Alabama may be paid out as dividends to Alaska Native shareholders. While many of these jobs already exist as part of the current Fort Greely installation, the involvement of AAC and NANA combined with Lockheed Martin's demonstrated efforts to hire Alaskan labor will increase the economic impact to Alaska. Additionally, temporary construction jobs will be created in 2011 and 2012 (not included in table) for GMD-related construction projects as the Lockheed/AAC team installs proprietary systems.

The GMD project is very important to AAC from a revenue standpoint. If the Lockheed/AAC team wins the contract, AAC will realize revenues between $16 million and $18 million per year.

Medium Lift Market in Transition

Medium lift rockets are those which can carry payloads of 2,000 to 25,000 pounds. Medium lift launch vehicles like the Delta II, Falcon 9 and Taurus II are often used to deliver three to four satellites to orbit. It is an important segment of the launch market because many telecommunications and satellite television/radio constellations are carried by medium lift rockets. Packaging a constellation of multiple satellites onto the same launch vehicle is much more efficient than launching each satellite on its own rocket.

The medium lift market is currently at a crossroads. The Delta II rocket, which has delivered 60 percent of NASA's scientific satellites to space since 1998, is due for retirement by NASA. The Delta rocket family has been used for government and commercial applications since 1989, but after the next two missions, NASA plans to retire the rocket and begin using SpaceX's Falcon 9 and Orbital Sciences' Taurus II. Both rockets will also be used in NASA missions to provide supplies to the International Space Station (ISS). However, KLC is not an ideal place to stage ISS re-supply missions due to its high inclination.

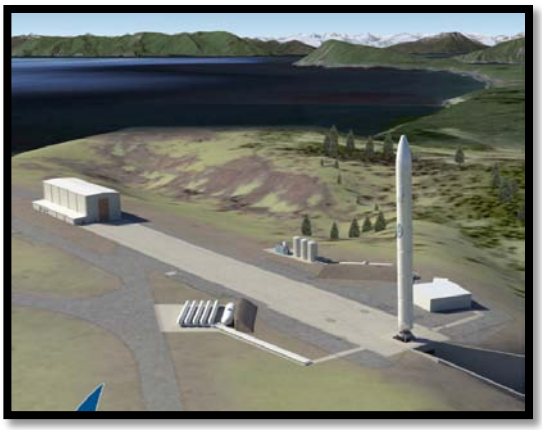
Due to this transition to new launch vehicles, it is an important time for the launch services industry. It is very likely both the Falcon 9 and Taurus II launch vehicles will be the primary rockets of choice for medium lift applications for the next 20 to 30 years. Companies and launch facilities that partner with them stand to incur significant benefits for years to come, if they get in "on the ground floor."

SpaceX, headquartered 140 miles southeast of Vandenberg AFB, is considering constructing a Falcon 9 launch pad at the nearby base. SpaceX is a start-up company founded by billionaire Elon Musk in 2002, who is also CEO of Tesla Motors – another high-tech Southern California company that manufactures electric cars. Two Falcon 9 rockets have been successfully launched since June 2010 from Cape Canaveral, Florida, but will need to launch from a different site for missions requiring polar orbit. Unless KLC offers a strategic, mission-specific advantage, it is expected the majority of Falcon 9's polar orbit launches will be hosted by Vandenberg AFB. Although Vandenberg AFB is closer to SpaceX manufacturing facilities, AAC has made their strengths clear to SpaceX in the event scheduling or other conflicts arise at Vandenberg.

The Taurus II is a multi-stage launch vehicle capable of delivering payloads weighing up to 15,900 lbs into orbit. Orbital will initially begin launching missions from Wallops Flight Facility in Virginia to supply the International Space Station, but the Taurus II can be launched from the Kodiak Launch Complex for polar missions. Orbital has streamlined the rocket/payload integration and testing process, in addition to simplifying interfaces, which will reduce the lead time for rocket preparation thus reducing mission costs. The Taurus II leverages proven technologies for liquid fuel and solid fuel rockets and combines them into one launch vehicle. Since many components have been operating successfully for years, Orbital considers the Taurus II a low-risk design in an industry where mission failure is incredibly expensive. The company has not committed to a facility for polar launches, but is interested in the Kodiak facility. AAC estimates Orbital will staff at least 50 full-time positions between Kodiak and Anchorage on an on-going basis to support such a relationship with KLC. A scenario where Orbital launches all Taurus II polar orbit missions from Kodiak is not factored into the analysis shown below because these projections are conservative. While AAC will not count on such a scenario, it is being pursued. Orbital Sciences is very interested because Kodiak's location will allow

the Taurus II rocket to carry 16 to 22 percent more payload than it can launching out of Vandenberg AFB for some orbits. This is a critical point because the addition or subtraction of a payload can be worth millions of dollars on each launch. In addition, Orbital may prefer launching at Kodiak instead of Vandenberg AFB where their main competition, SpaceX's Falcon 9, is planning to build a launch pad.

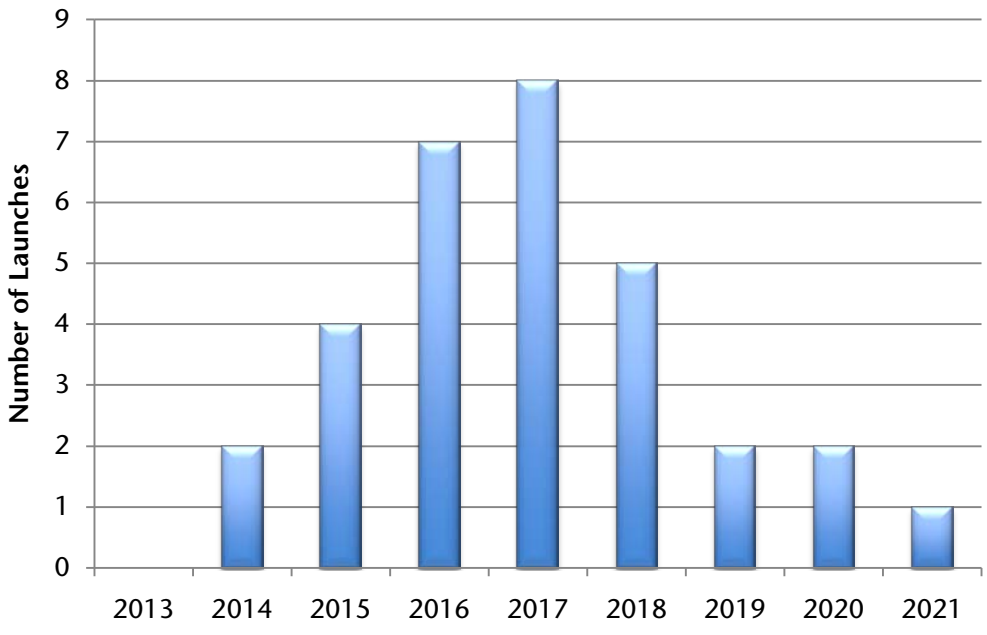
The medium lift market transition to Taurus II and Falcon 9 rockets is a momentous occasion for those in the industry because it lays the tracks for the next couple of decades. While KLC is in an ideal location, it will need to secure funding and complete expansion projects enabling KLC to fully serve the west coast medium lift market. Currently, no launch pad at KLC is equipped to launch a medium lift, liquid fuel rocket. Furthermore, the size of the Falcon 9 and Taurus II exceeds the height of the Launch Pad 1 LSS. For these reasons, AAC's plans for construction of a third launch pad that can accommodate larger rockets using liquid fuel are a requirement for KLC to enter the medium lift market.



Rendering of Future Launch Pad 3

AAC estimates there are currently 31 launches scheduled between 2014 and 2021 requiring medium lift rockets to achieve polar orbit. Iridium Communications, a satellite phone service provider, who is planning the deployment of a 66-satellite constellation scheduled to be launched between 2015 and 2017 accounts for roughly one third of these launches. The number of high-inclination launches past 2017 will almost certainly increase from the quantities show below as more are scheduled in upcoming years.

Upcoming High-Inclination Medium Lift Launches (2013-2021)



Source: AAC.

The window of opportunity for "buying land next to the train tracks" is limited. AAC will need to complete its medium lift expansion project by 2014 or forgo a serious attempt at entering the medium lift market as other facilities will have already secured relationships with Orbital or SpaceX.

Upcoming NASA Missions

NASA has 14 missions through 2020 that require medium lift launch vehicles, and the majority will propel payloads into polar orbit. Vandenberg AFB and the Kodiak Launch Complex are cited by government sources as the only viable options for hosting these launches. Launch vehicles have not been assigned to 12 of these missions, which is complicated by the retirement of the Delta II.

While neither the Falcon 9 nor Taurus II rocket has yet been certified to launch NASA payloads, the government agency is looking to both rocket platforms as a successor to the Delta II. The Falcon 9 rocket has successfully made two launches since June 2010 from Cape Canaveral, Florida. Orbital is still evaluating sites for its Taurus II rocket, but is expected to conduct its first launch from Wallops in late 2011. Both rockets will also be used by NASA missions to provide supplies to the International Space Station.

These NASA missions represent a significant opportunity for AAC, should the necessary capital improvements be accomplished at KLC. Orbital Sciences recently launched a small lift Minotaur IV rocket from KLC carrying seven different satellites as part of Air Force Space Test Program's STP-S26 mission. Another Minotaur IV launch is scheduled for May 2011, which will launch the TacSat-4 DoD satellite into polar orbit. The recent launch was successful, despite significant technical challenges in accommodating so many different payloads.

Economic Benefits of Medium Launch

KLC is uniquely positioned to serve medium lift clients requiring polar orbits. In light of NASA's mission schedule and the current landscape for other government and commercial launches, AAC expects KLC can host between 1 to 4 medium lift launches per year after Launch Pad 3 is completed in 2014.

The economic activity associated with each launch is significant. Each launch mission requires engineers, technicians, and specialists in communications, security, safety, meteorology, and other areas of expertise. A single launch campaign may require 50 to 100 people during a typical six-week launch duration.

Potential Economic Impacts from Medium Lift Launches

	Number of Launches			
	1	2	3	4
FTE Employment				
Direct	19	38	57	76
Indirect & Induced	13	26	40	53
Total Jobs	32	64	97	129
Labor Income ($millions)				
Direct	2.5	5.0	7.5	10.0
Indirect & Induced	1.0	2.0	3.0	4.0
Total Income	3.5	7.0	10.5	14.0

Source: AAC and McDowell Group Estimates.

Based on AAC launch estimates, medium lift launches can generate approximately 130 full-time equivalent jobs, directly and indirectly. With increased launch activity, it is likely several companies will open offices in Kodiak or Anchorage, which will further increase the number of jobs associated with launch activity at KLC.

Jobs associated with launches are often well paid and will produce significant benefits for local economies as well as increasing the tax base for local governments. Each launch will generate approximately $3.5 million in salaries, wages and benefits, both directly and indirectly. Annual salaries, wages and benefits can range from $3.5 million to $14 million per year depending on the number of medium lift launches KLC is able to host. AAC estimates each launch will result in roughly $5 million in revenue.

The figures shown above represent employment tied to just the launch itself. However, the revenue provided by hosting launches also helps employ full-time, year-round AAC employees in Kodiak and Anchorage.

Small Lift Launch

Small-lift rockets are roughly defined as those with payloads weighing less than 2,000 pounds. As telecommunications and remote sensing equipment experience further advances in miniaturization, small-lift satellites will prove to be an expanding portion of the launch market in the next 10 to 20 years.

Recent Success

KLC's most recent small-lift launch came on November 19, 2010 when the U.S. Air Force successfully launched the STP-S26 Minotaur IV rocket carrying seven satellites into orbit. The $170 million flight carried a mix of NASA, military and university experiments. The mission showcased new technologies and a number of firsts. Officials with NASA's Space Test Program (STP) called it the "most complex mission in 20 years."

A video of the launch can be viewed online at http://www.youtube.com/watch?v=5gS4n5vz9Tw.

Orbital Sciences' Minotaur IV rocket successfully tested the hydrazine auxiliary propulsion system (HAPS). With HAPS, a rocket can deploy payload at one altitude, then climb higher and deploy an additional payload at a totally different altitude – obtaining vastly different orbits using the same rocket. AAC was part of rocket history as the STP-S26 launch marked the first time HAPS technology had been proven in space. Successfully integrating HAPS onto other Orbital rockets will allow Orbital to bundle customers demanding different orbits onto the same rocket. This has the potential to provide significant cost savings as customers are able to more effectively bundle satellites or piggy-back onto other launches.

NASA's FASTSAT (Fast, Affordable, Science and Technology Satellite) was built to demonstrate the capability to build, design, and test a microsatellite offering a low-cost option for conducting experiments using autonomous satellites in space. The intent is such a satellite will allow researchers to conduct low-cost experiments on their own autonomous satellite in space. The satellite, which is about the size of an exercise ball, was built in less than 10 months at a relatively modest cost of $4 million. "We think we can do whole missions for less than $10 million instead of the traditional $100's of millions, and that includes the launch vehicle, the satellite, and the widget you want to test," said FASTSAT Project Manager Edward Montgomery.[8]

The STP-S26 mission flew the first Organism/Organic Exposure to Orbital Stresses (O/OREOS) satellite into space. The O/OREOS satellite is about the size as a loaf of bread, and is NASA's first cubesat. CubeSats are a standardized type of nano-satellite. The O/OREOS satellite has two separate science experiments onboard; each measuring how microorganisms react to space.

From the rocket to the experiments onboard, most everything about the STP-S26 mission was designed to bring down the cost of launching experiments into space. The successful complex launch of so many payloads showcased AAC's operational abilities.

[8] NASA *Science News* (November 19, 2007).

Upcoming Launch of the TacSat-4

KLC will again host a Minotaur IV rocket launch in May 2011, which will carry the TacSat-4 satellite. A Navy-led project, the TacSat-4 will provide better UHF coverage to U.S. Armed Forces in high-latitude locations and help improve satellite communications coverage that cannot be reached using traditional geostationary satellite communications.

The TacSat-4 launch was originally slated for the fall of 2009, but has been delayed several times due to changing DoD priorities.

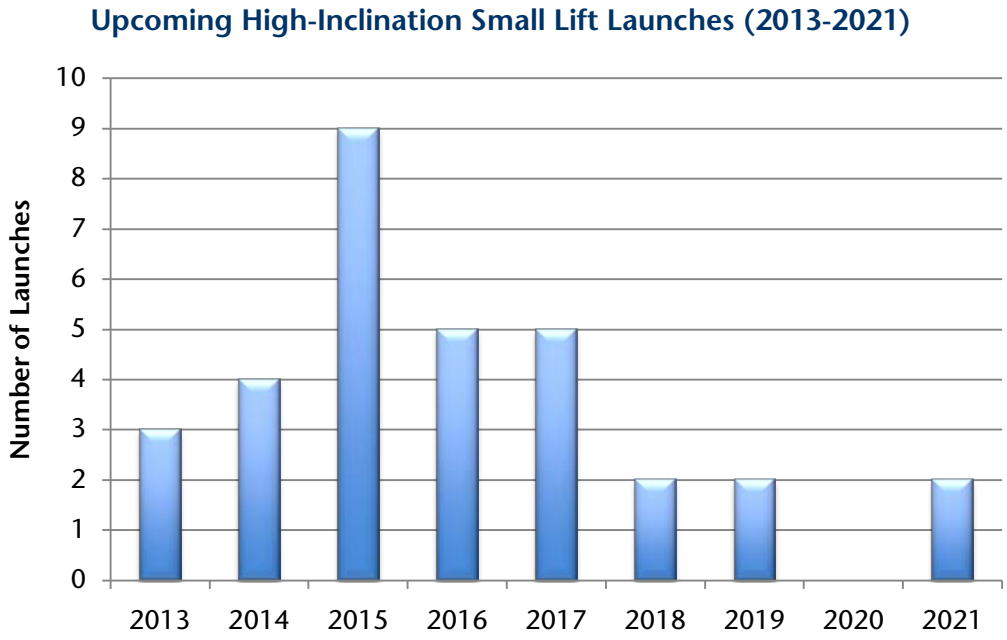
Rapid Launch Capabilities Can Lower Costs, Attract Launches

AAC is currently working to provide facilities that will accommodate orbital launches of payload with 24-hour notice following launch vehicle processing. Basically, a customer will have the ability to assemble 2 or more rockets and payloads at KLC, which will then be put in storage. Once in storage, the rockets can be launched on short notice. Currently, no other U.S. spaceport has the capability to launch orbital rocket missions on a 24-hour notice. AAC will offer its customers significant operational cost savings on multiple-launch missions because launch vehicles and payloads can be assembled concurrently or in succession. Labor costs are significant in this industry and allowing a team to assemble 2 or 3 rockets at one time in Kodiak, instead of having to return for each launch, can result in significant cost savings.

Rapid launch capabilities at KLC will position Alaska for a key role in the DoD's new Operationally Responsive Space (ORS) initiative. ORS places greater national security reliance on the rapid launch of small satellites on small lift rockets. The military has become increasingly aware of the line-of-sight limitations with satellites orbiting the equator. Essentially, the northern side of a mountainous region may not be viewable because of the satellite's position. With more satellites in polar orbits, linked up to other DoD satellites, it will solve the line-of-sight limitations with current satellite installations.

Small Lift Market Potential

As of December 2010, no other KLC launches have been scheduled after the TacSat-4 launch in May. However, AAC has pending proposals for upcoming small-lift launches. Through 2021, AAC has identified 32 small lift launches sponsored by government agencies which will require polar orbits or high-inclination launches. According to industry authorities, this is a very conservative figure. The number of actual small and medium lift launches which are well-suited to a west coast launch can exceed 100 and more launches will appear beyond 2016 as new projects move forward and big space systems are replaced or augmented by small and medium lift systems.



Source: AAC.

Virtually all of the launches indicated on the preceding graph will fly on the Minotaur IV or Athena II rocket. KLC was built with the Athena II rocket in mind, and the facility recently hosted a successful Minotaur IV launch.

During the past decade, the commercial small-lift market has seen far fewer launches than the medium-lift or heavy-lift markets. The reason for this is smaller payloads often piggy-back on larger rockets with larger payloads, thus negating the need for a small-lift rocket. While this can help offset launch costs, it also puts the smaller payloads at the mercy of the primary payload client. Several private companies and governments are working on designing more cost-effective small-lift rockets. The emergence of an affordable launcher will be a niche for dedicated nano-satellite class launches.

Economic Benefits of Small Lift Launches

AAC has the capacity to launch up to four small rockets from its Launch Pad 1 per year. Each launch creates, on average, 16 jobs and brings in about $1.75 million worth of direct and indirect income into the state. AAC estimates each launch will result in roughly $2.5 million in revenue. Total economic output resulting from each medium-lift launch is on the order of $3 million. The income earned in connection with launches is new money, brought into the state's economy from outside, but without a launch those dollars will go elsewhere.

Some of these jobs employ local Alaska residents working at KLC in operations, maintenance, administration and security. Some of these jobs are temporary, high-paying jobs associated with companies coming into the state to assemble the rocket or payload. Beyond the direct employment, jobs are created indirectly in the transportation, hospitality, government and security sectors and additional jobs are induced through workers spending income within Alaska.

Potential Economic Impacts from Small Lift Launches

	Number of Launches			
	1	2	3	4
Employment				
Direct	10	19	29	38
Indirect & Induced	7	13	20	27
Total Jobs	16	33	49	65
Labor Income ($millions)				
Direct	1.3	2.5	3.8	5.1
Indirect & Induced	0.5	1.0	1.5	2.0
Total Income	1.8	3.5	5.3	7.1

Note: Totals may differ due to rounding.
Source: AAC and McDowell Group Estimates.

Unmanned Aircraft Systems (UAS)

Unmanned aircraft systems offer promising potential to government agencies and private companies in Alaska. UAS are also referred to as unmanned aerial vehicles (UAV), drones, or remotely piloted vehicles (RPV). Regardless of what terminology is used, they all generally refer to unmanned aircraft. The Alaska Aerospace Corporation is currently working with the DoD to acquire a decommissioned Global Hawk in 2013.

Profile of the Northrop Grumman Global Hawk (RQ-4A)

The Global Hawk is the military's largest operational UAS. The craft have been used extensively in wartime reconnaissance missions flying over Afghanistan and Iraq. With a length of 44 feet, a wingspan of 116 feet, and a weight of just 8,500 pounds, the plane is able to reach altitudes of 65,000 feet and remain airborne for up to 36 hours. In terms of size, the Global Hawk has a larger wingspan than a Boeing 737 but weighs about a quarter as much. It can image an area the size of Illinois in a single mission and has a range of over 15,000 miles. Its synthetic aperture radar can penetrate cloud-cover.

The Global Hawk can accommodate a wide range of sensors and is able to fly "untethered" from ground-based communications transmitters by using a satellite data link. The UAS navigation and communication system is comprised of a Mission Control Element and Launch and Recovery Element. These two distinct stations can be located separately and serve different functions.

Potential for Large UAS Operations in Alaska

Due to Alaska's low population density, few roads, and rugged environment, UAS are an ideal solution for exploring, mapping and securing resources. At the rate UAS technology has advanced in recent years, and the high demand for natural resources, it is almost a foregone conclusion that UAS will serve a big role in the future economic development of Alaska. In less than 80 years the technology has gone from strapping cameras on homing pigeons to remotely piloting large aircraft via satellite linkup.

While there are dozens, perhaps hundreds of uses for UAS in Alaska, there are potential safety and liability challenges for the FAA. Alaska has the most active pilots per capita than any other state. Small UAS flying in uncontrolled airspace can be dangerous to other planes flying in the area. The safety risk makes a large UAS like the Global Hawk an attractive solution because it can access controlled airspace and has the capability to carry out a wide range of missions.

"If it's dull, dirty or dangerous, it's best done by drones."
Harry Kieling - Dept. of Interior
Alaska Regional Manager

Alaska has a large military air space and two air bases to stage UAS flights. The Global Hawk can access Class A airspace above 18,000 feet by using military airspace and at that point can fly anywhere the flight plan allows access to. This complies with FAA regulations, whereas smaller craft flying at lower altitudes may not be able to secure clearance.

A UAS with the versatility and range of a Global Hawk could serve government agencies and private companies in the following capacities:

- Climate change research on polar ice caps
- Aid search and rescue missions
- Wildfire monitoring and management
- Natural resource mapping and exploration
- Monitoring volcanic activity
- Fault line analysis
- Assist fisheries enforcement
- Assist in data collection on marine mammals and wildlife
- Scientific research and experiments
- Post Disaster Reconnaissance
- Erosion monitoring
- Weather monitoring

Commercial uses for the UAS will spur economic development and lower operational costs. UAS are particularly attractive to the resource development industries (oil, gas and mineral) because they can explore large tracts of distant terrain for potential mineral or petroleum deposits. In Australia the technology has already been used to perform geo-surveys on large areas of open desert. A Global Hawk can be used to scan the pipeline for leaks as well.

Alaska Aerospace Corporation is Well-Positioned

AAC has proposed acting as operational staff for a Global Hawk which will fly regularly scheduled flights, based out of Eielson Air Force Base, to be used by various government agencies or private companies on a pay-by-flight basis. Such an arrangement will allow the military to house the UAS at a U.S. Air Force Base until it becomes needed. With AAC acting as operational staff, the plane will be available to multiple civilian user groups, not just a single agency such as NOAA or the Department of Interior.

Successfully negotiating an arrangement with the military will be crucial. Buying a new Global Hawk, or even a decommissioned one, will be expensive ($65 million new).

AAC is a logical choice to operate the Global Hawk for a number of reasons. Most importantly, AAC's involvement will maximize the utility of the UAS and make it easier to accommodate all user groups. AAC's position as a public corporation gives them the freedom to do business with private companies and work with state or federal agencies in a flexible manner. Agencies planning to use the aircraft will be offered a streamlined access to flight hours.

Secondly, AAC has a successful track record of navigating and maintaining expensive aerospace assets. AAC anticipates running the mission control operations out of Elmendorf AFB and launching the Global Hawk from Eielson AFB. AAC's 100 percent launch success rate has continually proven their technical capacity, whether it is bundling payloads on rockets or launching test rockets in the GMD program. AAC has proven its competence at managing complex missions, with expensive equipment and zero-margin for error. AAC's UAS program will be staffed by current or former military UAS pilots.

AAC is not the only Alaska organization with UAS experience, but they are the best positioned to fly large UAS such as the Global Hawk. The Poker Flat Research Range near Fairbanks has experience flying small-to-medium sized UAS; however managers of that facility agree AAC will be better suited to fly large UAS.

Third, Alaska might be considered as "next in line." The military has given five retired predator drones to the Department of Homeland Security to monitor the northern and southern borders of the continental U.S. The Air Force transferred two Global Hawks to NASA's Dryden Flight Research Center for use in high-altitude, long-duration science missions. Last spring NASA flew their Global Hawk over Alaska and into Arctic airspace, proving the craft's ability to fly at high latitudes. The craft reached latitudes of 85° for the first time on April 23, 2010 as NASA flew a 28-hour mission to within 340 miles of the North Pole.

Competition is stiff for these decommissioned drones, but the great need for UAS in Alaska coupled with the state's large area of unrestricted air space gives AAC an excellent chance at securing a decommissioned Global Hawk. Without AAC, a federal agency operating in Alaska could still have access to a Global Hawk, but

in all likelihood, access for state agencies and private companies will be restricted. This scenario could limit the potential for economic development.

Economic Impact of a Global Hawk in Alaska

The economic impact of a large UAS able to conduct a broad range of civilian missions can be significant. The most important benefits to Alaska's economy will stem from the missions themselves. Resource exploration can lead to a new mine or a new petroleum discovery. It will mean new scientific missions, which will bring in high-paying jobs and provide the University system unrivaled access to such a UAS.

AAC sees 2013 as a possible inception date for UAS operations, with a two-year ramp up period. By 2015, the company expects they can be flying regular missions. Operationally, a Global Hawk acquisition will create up to 75 full-time jobs, and $6 million in income per year. However, the value of the information derived from UAS missions is expected to yield significantly higher economic returns.

Potential Economic Impacts from Unmanned Aircraft Systems Operations (2014-2022)

	2014	2015	2016	2017	2018	2019	2020	2021	2022
Employment									
Direct	17	29	36	44	44	44	44	44	44
Indirect & Induced	12	20	25	31	31	31	31	31	31
Total Jobs	29	49	59	75	75	75	75	75	75
Labor Income ($millions)									
Direct	2.0	3.1	3.9	4.5	4.5	4.5	4.5	4.5	4.5
Indirect & Induced	0.8	1.3	1.6	1.8	1.8	1.8	1.8	1.8	1.8
Total Income	2.7	4.4	5.5	6.2	6.2	6.2	6.2	6.2	6.2

Notes: Includes only direct, indirect, and induced economic activity associated with actually operating the UAS. Income figures represent salaries and benefits. Projected labor income has not been adjusted for inflation.
Source: AAC and McDowell Group Estimates.

A robust UAS program has significant revenue potential for AAC. The corporation estimates it can generate $21 million in revenue by 2017 from UAS operations.

UAS operations at the Poker Flat Rocket Range, which are still in their infancy, have already attracted two businesses to set up shop in Alaska. One is a start-up firm working on developing ground-based radar avoidance technology and the other is Concurrent Technologies, a large applied sciences company. An ad-hoc "UAS interest group" has been formed and meets once a year in Alaska. This group has grown to nearly 200 members and includes names such as BP, ConocoPhillips, Shell, Venture Ad Astra, Insitu, and Stark Aerospace. Employment attracted to the state by UAS is in the single-digits at this point, but the rapid growth in interest by prominent participants suggests much bigger opportunities lie ahead.

Sustaining the Alaska Aerospace Corporation

The Alaska Aerospace Corporation employs 28 people in order to sustain operations and maintain the Kodiak Launch Complex as well as another 17 technical support staff in Anchorage. AAC will need $10 million in sustaining funds for the next fiscal year, or will be obligated to discontinue operations and place KLC into a caretaker mode. Launching rockets, securing long-term government defense contracts or developing a UAS program are all business propositions with years of lead time (tangible results in terms of economic benefits cannot be expected within the year, but rather over the next few years). With sustainment funds, AAC can move forward on the proposals they have pending on GMD, small lift rockets and their UAS program. The company expects one or all of these business segments will be able to cover sustainment costs in the future.

Alaska's aerospace industry is still very small, and has a very small economic impact relative to Alaska's key basic industries of oil/gas, mining, commercial fishing, or tourism. However, it is also a young, high-tech industry with potential for growth, as this report illustrates. Virtually every job in the industry provides a living wage, capable of supporting families in Alaska.

Potential Economic Impacts of Future Projects and AAC Sustainment (2012-2022)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Employment											
Direct	110	180	225	305	330	340	365	365	365	365	385
Indirect & Induced	70	115	145	190	210	215	230	230	230	230	245
Total Jobs	180	295	370	495	540	550	595	595	595	595	630
Labor Income ($millions)											
Direct	18	26	32	42	45	46	50	50	50	50	52
Indirect & Induced	7	11	13	17	18	18	20	20	20	20	21
Total Income	25	37	45	59	63	64	69	69	69	69	73
Economic Output ($millions)											
Direct	42	63	84	100	116	120	131	131	131	131	138
Indirect & Induced	37	56	74	88	102	106	115	115	115	115	121
Total Income	79	119	157	187	217	226	247	247	247	247	258

Note: Income figures represent salaries and benefits. Projected labor income has not been adjusted for inflation. Totals may differ due to rounding.

Source: AAC and McDowell Group Estimates.

As a corporation, funding AAC is not without risk. This report details the potential for future AAC business segments as they currently exist. Unexpected events can have positive or adverse effects on the projections. The military may decide to postpone their scheduled decommissioning of the Global Hawk Block 10 fleet. Lockheed Martin and AAC may not win the GMD contract, or Orbital Sciences may decide to locate west-coast launches of their Taurus II and Minotaur IV exclusively out of another spaceport.

However, if AAC is able to execute their plans for expansion, it is estimated the aerospace industry will add 385 jobs, and another 245 indirect/induced jobs to the statewide economy. Economic impacts will be significant in Kodiak, Anchorage, Fairbanks and Delta Junction. The state's economy will benefit from the $70 million to $80 million in earnings generated from this additional employment activity.

By 2018, AAC estimates $80 million in annual revenue for the Corporation. Annual direct, indirect and induced economic output, which includes AAC revenue and contractor spending on aerospace ventures outlined in this report, is estimated to approach $260 million by 2022.

The projections contained in this report assume AAC is able to execute future business expansion plans, but are otherwise conservative. They focus only on the operational impacts, and do not assume aerospace companies locate significant numbers of full-time staff to Alaska. However, in other areas with significant launch activity, both remote and urban, companies do maintain offices with year-round staff. With enough activity, it's very likely that will happen in Alaska too. Furthermore, some missions will have significant strategic value to Alaska. Jobs resulting from resource exploration using a Global Hawk drone, or those residual jobs created simply by having a mature aerospace industry in the state are not included in the projections. Therefore, these projections can be viewed as a foundation for future growth both in the aerospace industry and other industries as well.

The Alaska Aerospace Corporation was created by the State of Alaska to develop a high-technology aerospace industry in Alaska. AAC has positioned itself to build on competitive advantages available in Alaska and those associated with the experience of its people.